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FOUR WINDS PLAZA PARTNERSHIP
LETTER TO DPNR AND EPA

**RE GERAGHTY & MILLER
DRAFT PHASE II RI**

TUT 006 0662

*MS. CAROLINE KWAN
USEPA - REGION II*

LAW OFFICES OF JOHN K. DEMA, P.C.

JOHN K. DEMA

CAREY-ANNE MOODY

1 November 1994

Roy Adams, Commissioner
Department of Planning and Natural Resources
United States Virgin Islands
Nisky Center
Charlotte Amalie, St. Thomas 00801

Andrew Praschak, Esquire
Assistant Regional Counsel
USEPA - Caribbean Field Office
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Ms. Caroline Kwan
Project Manager
USEPA - Region II
26 Federal Plaza, Room 737
New York, New York 10278

Re: Tutu Water Wells Site Investigation
St. Thomas, United States Virgin Islands

Dear Commissioner Adams, Attorney Praschak and Ms. Kwan:

The purpose of the Phase II RI field investigation is to identify and characterize the 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 the soil and groundwater at the Tutu Wells Site.

There are, however, technical, procedural and analytical errors and omissions in the Draft Phase II RI which greatly affect the results and conclusions of the study. Since these conclusions will be the basis for the design and implementation of any remediation activities, it is our concern that the conclusions of the Phase II RI will only serve to negatively impact the groundwater resources and residents of the United States Virgin Islands.

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We do believe, however, that the current Draft Phase II RI document is a vastly superior document than would have resulted had Geraghty & Miller been allowed to proceed with their original Technical Memorandum II issued during the summer of 1993. The Technical Group, comprised of the technical representatives of the PRPs, worked together to pool their collective knowledge about the site and recommended additional investigations that were implemented during the last few months. Unfortunately, the existence of data does not, by itself, appear to eliminate the application of illogical and inconsistent analysis and conclusions driven primarily by considerations other than the scientific data pertinent to the site.

This letter will summarize certain data which has been excluded, overlooked or otherwise distorted in an attempt by Geraghty & Miller to exclude Esso from its responsibility for releasing chlorinated hydrocarbons into the Turpentine Run Aquifer. We further offer opinions and data advanced by our experts, including Dr. David Keith Todd, which stands in direct opposition to the conclusions reached by Geraghty & Miller.

Dr. David Keith Todd has published numerous works, including the text book, Groundwater Hydrology. His recent publication is as co-editor for Geraghty & Miller's The Water Encyclopedia, which is advertised as "The Flagship Publication of the New Geraghty & Miller Book Series."

In his study of groundwater contamination in the Tutu area, Dr. Todd concludes:

> Recently obtained data from a study of soil contamination, shown in Table 7 (H=GCL, 1993b), along with subsequent sampling of the groundwater in November 1993 (Table 4) at the Tutu Esso property, have allowed for confirmation of this gas station as a source for petroleum and chlorinated hydrocarbon contamination in the aquifer. *See* Appendix II, page 15.

A. Disregard of Other Published Data in the Study Design

EPA's directive for the study originated from the discovery of contaminated groundwater in production wells in the Tutu area. Groundwater contamination and subsequent soil gas studies indicated major areas of hydrocarbon and VOC contamination (hot spots) at and in the vicinity of Esso, Texaco and O'Henry Dry Cleaners. Due to the results of these findings, TEIC was formed to conduct a scientific study and evaluation of the contamination sources, fate and transport. Historic data, soil gas studies, etc. should have been and should be included in the evaluation and recommendations for future investigative activities.

To date, three soil gas surveys have been performed in the vicinity of the Esso Tutu station. The first survey was conducted in the fall of 1987 by Geoscience Consultants, Ltd. for Texaco. As reported by Scott Graber of CDM FPC in a November 1987 letter to Caroline Kwan:

> . . . The ECD analysis confirmed the results of the FID, that a late peaking chlorinated hydrocarbon (PCE) is present in the areas of the Tillet Well, the Esso Station, and the Public Education Facility (formerly, the Lagging (sic) Clothe Factory, which reportedly used PCE). *See* Exhibit "A".

In April of 1988, Esso contracted Belgodere and Associates, Inc. (BAI) to conduct a soil gas survey. Although this study was plagued by mismanagement and poor planning, the results have not been entirely dismissed by CDM FPC. In another letter from Scott Graber to Caroline Kwan dated June 29, 1988, Mr. Graber reports the following:

> "The following observations and subsequent conclusions can be made based on the information obtained during the Tutu Esso Soil Gas Survey. Total BTEX soil gas values were reported in excess of *1000 ppm* in the southern portion of the Esso property adjacent to the petroleum underground storage tanks. This area of high BTEX soil gas contamination extends to the southwest of the Esso property into the Four Winds parking lot. (figure 1). The concentration of total BTEX is reduced from above *1000 ppm* to below 1 ppm with increased distance from the southern portion of the Esso property, upgradient as well as down gradient. Unfortunately, the full extent of the soil gas contamination (i. e. values equal or below the agreed upon background level) around the Esso station was not determined due to the relatively high detection limit of 1 ppm. *However, based on the soil gas survey results and plotting the plume of petroleum hydrocarbon contamination, it seems apparent that Esso is responsible for a product release and the contamination of soil gas in at least the immediate vicinity of its service station.* (Emphasis added). *See* Exhibit "B".

Additionally, Carole Petersen, Chief of the U.S. EPA's New York/Caribbean Superfund Branch II, in her April 4, 1991 comments to Ana Gloria Ramos on the Tutu Service Station Investigation Work Plan, dated January 1991, referenced the results of the Belgodere Study in "Specific Comment #11"

> "Page 6, Paragraph 2. Per EPA request, Esso also analyzed for several chlorinated hydrocarbons during its soil gas survey. Elevated levels of PCE and TCE were detected in soil gas in the northwest and southwest corners of the ESSO service station." *See* Exhibit "C".

The above comment by EPA was a subject of conversation among TEIC and Geraghty & Miller as documented from the Geraghty & Miller "Telephone Conversation Record" dated April 23, 1991 from Ana Gloria Ramos and Jose Agrelot to Tom Danahy (G&M Bates Stamp A08862 - A08863):

> Item 11. EPA has continually referred to TCE/PCE contemn in NW & SW corners of ESSO.
>
> > Agrelot: NW corner yes, <u>but</u> SW corner <u>no</u>! Soil gas points SW of ESSO are beyond property line of ESSO parcel. Important for CERCLA issue. *See* Exhibit "D".

While it is true that the area southwest of the ESSO station referred to by EPA is not located on Esso property, it is, in fact, the terminus for Esso's illegal discharge pipe originating at the south oil/water separator and running to the storm drain in Four Winds' parking lot. In fact, Esso's practice of disposing of their contaminants onto adjoining property and then hiding and denying the practice will be discussed numerous times in the pages that follow.

The third soil gas survey was conducted in January of 1992 by Target Environmental Services for Four Winds Plaza and PID/Harthman. In their report dated February 1992, Target states the following conclusions based on their soil gas survey:

> "Map patterns and chromatographic data indicate that petroleum hydrocarbons have entered the subsurface at the Tutu Esso and have subsequently migrated northward beyond the pump islands. Xylene map patterns suggest that the source for the occurrence is clearly associated with the Esso facility. There is no evidence that contaminants from a reported release on the Texaco property northeast of the Four Winds Plaza have impacted the survey area.
>
> GC/ECD analysis indicates that significant concentrations of PCE, c-1,2-DCE and TCE and lessor occurrences of t-1,2-DCE, 1,1,1-TCA and 1,1-DCE are present in the northern portion of the Tutu Esso and beneath the Four Winds Plaza parking lot. The PCE occurrence extends throughout most of the survey area, while c-1,2-DCE and TCE were detectable only on the northern portion of the Tutu Esso and beneath the adjacent Four Winds Plaza parking lot. The DCE and TCA were likely minor components of original PCE or TCE solvent mixtures or they may be breakdown products formed when original compound(s) underwent chemical transformation in the subsurface. *While no specific source point is evident, the contour patterns do not support a source outside the immediate area of occurrence.*" (Emphasis added). *See* Exhibit "E".

Although Esso apparently disputes the Belgodere results, it is not possible to ignore the results since they have been substantially verified by two other studies.

B. <u>Incomplete Investigation of Study Area: MW-9, MW-9S, and The Mystery Hole</u>

In Geraghty & Miller's section entitled "BTEX and Petroleum-Related Compounds in Groundwater," the following observations are reported:[1]

> Floating product has been observed in Monitoring Wells MW-9, MW-9S and SW-7 at the Esso Tutu Service Station;
>
> Visual observation indicated the presence of liquid phase hydrocarbon product in shallow Monitoring Wells MW-9 and MW-9S between September and November 1992;
>
> Floating product was observed once in Monitoring Wells MW-5 (0.01 foot) and MW-9 (sheen);
>
> In Monitoring Well MW-9S, product was measured on four occasions, with thickness ranging from a sheen on September 17, October 28, and November 16, 1992 to 0.11 foot on September 28, 1992;
>
> The product in Monitoring Well MW-9S *appeared to be a petroleum hydrocarbon that had weathered to a dark-colored, viscous oily liquid.* [Emphasis added].
>
> During the comprehensive groundwater sampling event in May and June 1994, product sheen or petroleum odors were once again reported in Monitoring Well MW-9S;
>
> The product detected in MW-9S and SW-7 is not related to dissolved BTEX concentrations, but rather *appears to e derived from waste oil and heavier petroleum hydrocarbons that do not have a significant BTEX content.* [Emphasis added].

All three of the these Monitoring Wells (MW-9, MW-9S and SW-7) have been reported to have floating product that is described by Geraghty & Miller as *appearing* to have been derived from waste oil. All three of these Monitoring Wells are within a very few yards of the north oil/water separator. All three of these Monitoring Wells are within a very few yards of SS-8 (7.0') where PCE was detected by BBL below the break in the effluent pipe in a dark colored viscous oily liquid at concentrations of

[1]Geraghty & Miller, <u>Draft Phase II Remedial Investigation, Tutu Wells Site, St. Thomas, U.S. Virgin Islands</u>, October 1994, § 5.2.1.1, Pages 5-33 through 5-34.

1,500 ppb. All three of these wells are less than 60 feet from the Splash and Dash Car Wash where a weathered black petroleum hydrocarbon was observed and documented to be flowing into the cistern excavation of the car wash in February 1991. Yet, Geraghty & Miller has not made public the analytical results of the product sampling of MW-9S that occurred at 5:10 PM on November 16,1992 as reported in the Geraghty & Miller Log Book #4C as prepared by Ruben Ponciano.

An analysis of the events surrounding the MW-9 series of monitoring wells at the rear of ETSS is instructive. The chronology of events excerpted from copies of Geraghty & Miller Log Books produced during discovery in August of 1993 are set forth in Appendix I attached hereto.

This chronology of events of the installation and sampling of the three MW-9 series monitoring wells raises a number of disconcerting questions:

1. What caused the cavity containing hydrocarbon product at the location of the first attempt to install MW-9S? Was it a result of the original terminus of the discharge pipe from the north oil/water separator? With its close proximity to the north oil/water separator and the observation of apparent black weathered petroleum hydrocarbon in the immediate vicinity, why was it simply filled and forgotten?

2. Where are the analytical results from sampling of the nearly 1.5" of floating product from the second MW-9S measured on September 28, 1992?

3. Where are the analytical results from the sampling that occurred on November 16, 1992?

C. Black Petroleum Hydrocarbon Seepage into Splash & Dash Cistern Excavation

Indications of discharges from the Esso Tutu station onto Four Winds property are evidenced by the petroleum-like substance draining to the car wash cistern excavation during its construction. The reason for heightened concern with these discharges is the fact that VOCs were disposed of by mixing them with the used oil in the north oil/water separator.[2] There is numerous testimony regarding this incident. According to the deposition testimony of Lisa Bonanno, owner operator of the car wash:

Q: How deep was the pit when you walked over there with Mr. Mosa?
A: I don't know exactly how deep it was at the time when we discovered it, and I don't know exactly how deep it is right now, but we could ask George Mosa.
Q: No estimation?
A: Seven feet.

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[2] *See* Exhibit "M". Deposition testimony of Thomas Gutshall at p. 30, l. 4 through p. 31, l. 21.

Q: And where on this seven feet-feet drop were you seeing something you perceived as oil?
A: If you cut the wall of the cistern, the cistern wall is 28 feet long. If you cut it in half it would be on the half closer to the street as opposed to Four Winds Plaza.
Q: Over the entire plan of it, 14 feet of it?
A: Yes
Q: Can you describe for me what the dirty burnt oil looked like?
A: Yes, it was dark, and it was thick, and it smelled, and it was seeping out the wall. It started seeping out not high, it was lower, deeper, I should say, and it was seeping out, and -- at first it didn't seem like a problem at all. It just looked like it was -- it was late in the afternoon when they finished the pit, and it didn't seem like much of a problem. George Mosa said what do we do, and I said we build a car wash. So he put plywood up, just leaned it up against the wall just so.

Deposition Transcript of Lisa Bonanno, 3/18/91. Page 164, line 20 through Page 165, line 23. *See* Exhibit "K".

Q: At that point did you notify anyone else about the problem or the potential problem?
A: No, because I didn't think it was a problem on that day. That night it apparently rained, and the next morning at 7:30 in the morning when I reached there, I got there at exactly 7:30 and the guys must have come on the job earlier. We start at 7:30, and one of my employees was taking a plastic cup, and filling it up, skimming the oil off the bottom of the cistern. There was a little bit of water because, as I said, it rained, skimming off the oil and pouring it into a five gallon jug. I was surprised and I said what is this guy doing. I thought it was a joke, and Mosa told me.
Q: Let me stop you for a minute. How much of this alleged oil did your friend or employee scoop up that morning?
A: The best thing to do would be to speak directly with George Mosa. It was several five gallon barrels.

Deposition Transcript of Lisa Bonanno, 3/18/91. Page 167, lines 3-22. *See* Exhibit "K".

From the deposition of George Mosa, Contractor for the construction of the car wash:

A: During the course of digging about five feet below the pavement we experienced oil mixtures or petroleum mixtures with the soil. And the deeper we went, the worse it became.
Q: Would you describe what this substance looked like?
A: I'd say at one point it was very dark liquid, oily, coming out from -- cutting, when they were cutting with the blade in the bulldozer it was exactly from the size of where the gas station wall started oozing some kind of oil liquid, which really --
Q: How, did any of this liquid substances accumulate in the bottom of the excavation?
A: Yes, when we came to the dimension I needed, the depth, and I stopped there, this was all surfacing on the bottom.
Q: Did you notify anyone from Esso?
A: Well every morning as worked progressed, one of my help was supposed to skim it and dump it in the Esso pit.
Q: And do you know -- do you personally know if in fact he took this liquid and gave it back to Esso?
A: Yes, that is what my instruction was, not to throw it in there -- to throw it in the pit.

Q: You mean the pit in Esso?
A: Yes, Esso.
A: We did. The manager there and Lisa Bonanno.
Q: And what did you do with the liquid accumulation on the bottom of the excavation?

Deposition Transcript of George Mosa, 6/13/91, Page 6, line 10 through Page 7, line 9. *See* Exhibit "L".

Further testimony regarding the black viscous substance emanating from the car wash excavation was made by Thomas Gutshall:

Q. Let me tell you that an excavation was made for the placement of that building and there was testimony, sworn testimony, to the fact that a dark ooze substance described this morning as goop.
A. Makes sense.

****
BY MR. DEMA:

Q. This is the Deposition Exhibit from the earlier deposition, and some 55 gallon drums were filled with a substance which Mr. Morris described as goop, a dark goopie liquid coming from areas one, two , three, four, five and six?
A. Yes.
Q. Based on you're familiarity with what was being placed into the catch basin, the only water separator and the waste oil pit up until the time you left the station, could you describe for me the visual characteristic of the liquids that would be visible in those areas?
A. In other words, the question is, what we were putting in the oil pits could possibly be what he found was mixed with water? Yes, quite easily.
Q. Was it dark in characteristic as opposed to light like gasoline?
A. It would be dark brown because the dirt was being mixed with it also.

MS. TURNER: I'm sorry, you said it was dirt being mixed?

THE WITNESS: Once (sic) mixes with the dirt and starts collecting the dirt and finally gets to a point that it's been sitting, by that time it's going to be a very dark brown, maybe even possibly black in some instances. Oil does that.

Deposition of Thomas Gutshall, 6/13/91, Page 70, line 5 to page 72, line 11. *See* Exhibit "M".

Nelson Rosado, a civil engineer with Essorico, witnessed the incident.

Q. Yes. Mr. Rosado, upon your inspection, did you see a black, brownish liquid coming from the excavation wall by the service station?
A. Yeah.
Q. Having seen that, sir, when you went out of the pit and told the Country Manager for Esso of your findings, what did you tell him?
A. Okay. As soon as I got out from the excavation, I told Mr. Jenson what I saw in the excavation, that I saw product, a black substance down there.

Q. I'm sorry. Did you say that you saw a problem?
A. Not a problem, a product.
Q. Did you have a conversation with Mr. Jenson as to what to do about it?
A. Yes. I told him that I'm going to report that to Esso Puerto Rico, and they have to decide what they're going to do. That's all what I have to do with that excavation. I only check it out and report.
Q. And it's your testimony that you went back and made that report to Mr. Augusto Munoz?
A. Yeah, I told my supervisor what I saw.
Q. Did Mr. Munoz say "Did you bring back a sample, Engineer Rosado?
A. I don't remember if he asked about that.
Q. Could you tell me as exactly as you remember what you told him was coming out of the Esso wall?
A. Well, like I say before, it was – between dark brown and black.
Q. Did he say "Do you think it was oil?
A. I don't know. I can't--
Q. You don't know or you don't remember?
A .No I can't' say it was oil. I don't know.
Q. I'm asking you what Mr. Munoz asked you. I'm trying to understand. You are the retail engineer in the field, and you go back to Mr. Augusto Munoz, who is head of Essorico retail engineering, and you say there is this black, brownish liquid substance coming from the excavation wall by Esso, and what does Mr. Munoz say?
A. Well, I don't remember what he say.
Q. Did he ask you whether you thought this was coming from the Esso station?
A. Yeah, he asked me.
Q. And what did you tell him?
A. Well, I told him, that I saw the-- that substance from that--that is below the area of the service station.
Q. Did he ask whether you thought it was coming from the service station?

MR. ROMERO: Did Mr. Munoz ask him that?

MR. DEMA: Yes.

A: I don't remember if he asked. I report to him what I saw.
Q. (Mr. Dema:) Do you know what–anything else that ever happened?
A. From that point?
Q. From that point.
A. No, I don't know, because I make a report, and they were with environmental problem.
Q. Do you know whether they ever did anything about this environmental problem?
A. No. I had nothing more to do with environmental section.

Deposition of Nelson Rosado, 10/14/92. Page 73, line 21 to page 76, line 8. *See* Exhibit "N".

Analysis from the contaminated zone in the wall of the open excavation revealed total BTEX greater than 300 ppb, Methylnapthalene 793 mg/kg, Phenanthrene 460 mg/kg. Detection limits for EPA analysis 8010/8020 was 60 ppb. Detection limits for EPA analysis 8270, 380-1800 mg/kg. *See* Exhibit "O".

Prior to the backfilling of the car wash excavation, a PVC sump was installed (Waste Oil Well/TA-CR-MW1) and screened at the depth of the oil saturated zone. Analysis of liquid from this well revealed contaminants including Benzene 730 ppb, MTBE 27,000 ppb, Oil and Grease 6.2 ppb and Heavy Oil 100,000 mg/kg. Due to free product and/or extremely high concentrations of gasoline components, dilution rates for VOC analysis were as high as 100.

D. 2,000 Gallon North Oil/Water Separator

The 2,000 gallon north oil/water separator has been a focus of investigation since the EPA was notified of the Tutu contamination in July of 1987. A focus by nearly everyone but Geraghty & Miller. In his deposition of August 10, 1983, held in the offices of Geraghty & Miller in Rochelle Park, New Jersey, Tom Danahy, Geraghty & Miller's Senior Scientist/Project Manager, admitted complete ignorance to the existence and/or location of the north oil/water separator.

> Q: Do you have any written document depicting an oil water sprayer (sic)in the area which you have marked, well, between the area marked oil water sprayer(sic) and the area marked office?
>
> A: I am familiar with the area. There's grading on either side, and upon visual inspection, there was some metal plates or some, that part of the area has been used for storage, and I'm not really sure what is in the subsurface underneath that area. I do recall some additional information that was provided by Esso in the depositions that were given which I received recently, and we're still developing information on the former units or operations at the Esso station.
>
> **Deposition Transcript on Thomas V. Danahy, August 10, 1993, Page 29, line 14 through Page 30, Line 5. *See* Exhibit "P".**

Since it was obvious that Geraghty & Miller had a demonstrated lack of interest in conducting a detailed physical and scientific investigation which matched that of its client, ESSO, the U.S. Federal District Court was required to order an investigation of the north oil/water separator.

The facts of the concerted efforts to hide the extent of ESSO's acts of contamination have just recently come to light through the efforts of the hearings in U.S. District Court. It is now apparent that Esso, Soil Tech and certain of ESSO's lawyers were apparently acting in concert to conceal analytical results from sampling done at the Esso station in December 1989 indicating that chlorinated hydrocarbon contamination had occurred at the site.

E. Presence of VOCs in the North Oil/Water Separator

Water samples were taken from the tanks, storm drains and sumps at the Esso Tutu by the Region II Technical Assistance Team (TAT) on August 17, 1987. The results of those samples were analyzed by Arnaldo Martinez and Douglas Henner of Weston Spill Prevention and Emergency Response Division, who noted in their January 27, 1998 report:

> "Samples one through eleven were analyzed for polychlorinated biphenyl's (PCBs) and numbers twelve through twenty-two were analyzed for volatile organic compounds (VOCs). Split samples were provided for Tutu Texaco and Tutu Esso.
>
> Some samples show very high levels of VOCs typical for sample collected from gasoline stations and auto body shops." *See* Exhibit "Q".

Scott Graber of the CDM Federal Programs Corporation analyzed samples taken the Esso Tutu holding tank and oil/water separator and found toluene, ethyl benzene and xylene in all three samples as well as a number of benzene-containing volatile and extractable compounds. Sample eE-64 from the oil/water separator also contained detectable levels of methylene chloride, 2-butonone, 1,1,1 trichlorethane, tetrachloroethene and benzene. *See* Exhibit "R".

In the "Final CLP Sample Analysis Data Summary Of Soils And Waters Sampled in 1989", and submitted to U.S. EPA by CDM Federal Programs Corporation on May 5, 1990, reports on the analysis of oil samples from the Esso Tutu collected on June 8, 1989.

> "Two oil samples and one duplicate were collected. BTEX compounds were prevalent, but all three samples also contained chlorinated hydrocarbons (tetrachlorethene and 1,1,1-trichlorethane)." *See* Exhibit "S".

In December of 1989, Soil Tech performed a site investigation at Esso Tutu apparently at the request of Esso's attorneys, Francis Torres and Jose Cepada. These results, which where not disclosed for almost three years on orders of Esso's attorneys, indicate the presence of 477,330 ppb of the chlorinated hydrocarbon PCE. *See* Exhibit "T".

Soil Tech had been designated as the "On-Site Coordinator" for all TEIC field investigations including the investigations for the Remedial Investigation. *See* Exhibit "U".

According to EPA's Administrative Order dated March 22, 1990, an EPA contractor collected oil samples from the ETSS UST located below the tire service area. Although the holding time was exceeded, the analysis revealed 30 ppm of tetrachloroethane and 25 ppm of 1,1,1 trichloroethane. In addition, oil samples were collected from the ETSS holding tank. Although the holding time was exceeded, this analysis revealed 63 ppm of TCE and 43 ppm of 1,1,1 trichloroethane.

Thomas Gutshall described how VOCs entered the waste oil pit:

Q. Up until the catch basin and the oil/water separators were installed, would you describe for me the mechanical methods of cleaning various auto parts in your full service shop?
A. Name me an auto part.
Q. How about -- you had mentioned in your testimony that you did engine breakdowns?
A. Yes.
Q. Did it ever come to pass when you were doing engine breakdowns that you had to degrease the engine parts?
A. Yes.
Q. How would you go about that?
A. If the engine was out it would be disassembled. I had a machine. I can't recall the name of the machine. It was full of liquid to pull out parts, had a pump, circulated, placed that part in it, you could leave it or you could hand clean it, remove it, wash it off and you have a clean part.
Q. I'll show you page 37 of a Selig catalog?
A. Yes, that is a parts washer.
Q. So just to keep the record straight, we'll mark this Exhibit 7.

[EXHIBIT 7 WAS MARKED]

Q. Do you know whether in fact chemicals were purchased from Selig Chemical of Puerto Rico during the time we're talking about?
A. The company name against?
Q. Selig, S-E-L-I-G?
A. I don't recall.
Q. The device described in your earlier testimony and then depicted on page 37, is that similar to the devise you described?
A. Described -- is similar.
Q. And in this particular picture there is a gentleman degreasing an auto part, supposedly?
A. Yes.
Q. And there is a 55 gallon drum?
A. Yes.
Q. Which contains the recirculated liquid?
A. Yes.
Q. In that similar to the operation you guys had?
A. Yes.
Q. This is the period of time prior to the installation of oil/water separator and the catch basins?
A. Yes.
Q. Where was the disposal of the used chemicals?
A. Dumped in the HCA holding container of the oil after it was nonusable.
Q. Which the rest of us referred to collectively as the waste oil pit?
A. Right.

Deposition of Thomas Gutshall, 6/13/91, page 29, line 14 to page 31, line 21. *See* Exhibit "M".

and:

Q. Now, did you also use -- well, let's go for parts. Cleaning carburetors, did you clean carburetors with the parts cleaning device?

A. Yes.
Q. The parts washer, shall we call it?
A. Yes.
Q. How about brake drums?
A. No.
Q. Were there any times that you used spray degreaser?
A. Yes.
Q. Do you remember what the product names of the spray degreasers were?
A. No.
Q. Do you remember whether or nor you ever used Gunk products?
A. Gunk, yes.
Q. Mr. Berry had testified earlier today that they used a product called Brakleen. B-R-A-K-L-E-E-N?
A. Yes. That is true, bought it at Western Auto.
Q. And the Gunk degreaser for carburetors, carburetor cleaner?
A. Yes. STP Carburetor Cleaner.
Q. Did you use a Gunk brake cleaner?
A. That is a possibility.
Q. Did you do grease jobs?
A. Yes.
Q. Do you remember whether you used white lithium grease?
A. On door hinges.
Q. Do you remember whether you used gasket cement?
A. Gasket sealer?
Q. Right.
A. Yes, yes.
Q. Did you clean radiators?
A. What do you mean by clean radiators?
Q. You drive in, you pour some type of--
A. Flush the radiators.
Q. Flush something in the radiators, run the car for a while?
A. Not usually, try not to.
Q. Does that happen occasionally?
A. Yes.
Q. What did you do with the flush material from the radiator?
A. Went on the ground.

Deposition of Thomas Gutshall, 6/13/91, page 33, line 12 to page 35, line 13. *See* Exhibit "M".

Sample invoices showing Esso Tutu purchases of such products as Superkleen and the Material Safety Data Sheet for Superkleen which contains cresylis acid, methylene chloride, sodium dichromate and 1.1.1 trichloroethane are set forth in Exhibit "V" attached hereto.

F. <u>Excavation of the North Oil/Water Separator's Discharge Pipe</u>

On January 21, 1993, during a site investigation conducted by BBL, the egress pipe from the north oil/water separator located below the former tire service area was found to contain a thick dark liquid phase hydrocarbon product. At this point, Esso unilaterally ceased the site inspection. Esso refused any further attempts to investigate this outfall until November of 1993, when threatened with sanctions for contempt of court, BBL excavated the outfall pipe.

On November 11, 1993, the site inspection resumed at the effluent pipe of the North oil/water separator. BBL excavated the length of the effluent pipe from the separator to the pipe terminus at the retaining wall on the west side of the service station. The 6-inch cast iron effluent pipe was broken near its connection to the oil/water separator. Since no support block was found around the connection, apparently the soils settled causing the pipe to separate from the connection. Dark stained, liquid phase hydrocarbon product saturated soils surrounded the effluent pipe break. Upon inspection of the broken pipe, it was determined that the break was quite old as the break surfaces were old, coated with oil and dull. The extent of the soil contamination suggested that the leak was not recent; soils were heavily stained and oozed liquid phase hydrocarbon product into the trench.

The effluent pipe terminated approximately two feet from the retaining wall. The pipe appeared to have been broken and no evidence of pipe elbows or joints were discovered. Although the original terminus of the effluent pipe is not known, apparently the pipe was constructed to extend directly west of Esso Tutu into what is now the Four Winds parking lot. At the time of the construction of Four Winds Plaza, approximately nine years after the opening of Esso Tutu, the effluent pipe may have been cut to allow for the construction of the retaining wall. This outfall of the effluent pipe and the effluent pipe break may very well explain the liquid phase hydrocarbon product flowing into the Splash and Dash excavation, as well as the liquid phase hydrocarbon product found in MW-9, MW-9S and SW-7. At a minimum, it deserved more than a fleeting mention by Geraghty & Miller.

G. <u>Discharge from the South Oil/Water Separator</u>

It has been determined that discharges from the Esso Tutu station were directed onto Four Winds property. Thomas Gutshall, Service Manager at Esso Tutu 1985 to 1987 and 1988 to 1990, testified that the pipe from a catch basin discharged liquid into the storm drain located at Four Winds and also onto the ground at Four Winds.

Q: So what was suppose to go into the catch basin?
A: Water.
Q: When you watched (sic) the stalls.
Q: So that was specifically designed to catch the water from the wash?
A: It was mixed with the water.
Q: Now, after this was installed, was that ever used as a method of, as receptacle for the parts washer liquid?
A: No, not to my knowledge.
Q: Was that ever used as a receptacle for the radiator cleaner?

A: Yes.
Q: Any used waste oil ever go in there?
A: No
Q: Now, would you describe for me the pipe that goes through the retaining wall to the south, where did that empty into? I think we have brief--previously looked at that on Exhibit No. 4.
A: That was originally hooked up to the storm drain belonging to the Virgin Islands government?

[EXHIBIT 9 WAS MARKED]

Q: Looking at Exhibit 9, I show you a recent picture, because I see Splash and Dash building back here, off the west side of the Esso Station and a storm drain that actually shows the same sign as in Exhibit No. 4 on the west wall, and ask if that was the storm drain to which the pump (sic) coming through the retaining wall was connected?
A: Yes.
Q: Who effected that connection, who made the connection?
A: Esso
Q: And how long did that connection last, to your knowledge?
A: I think about 10 days.
Q: Then what happened?
A: The Department of Public Works cut the pipe and capped it.
Q: Did it stay capped?
A: No.
Q: Why did it not stay capped?
A: The cap came off, to the best of my knowledge.
Q: Did it fall off?
A: I had seen the cap gone. That is the best I can tell you. I just happened to look and the cap was gone.
Q: Mr. Berry testified this morning that at some point in time the liquid flowed freely from the oil/water separator on to the ground immediately outside the retaining wall?
A: Is that a question?
Q: That is a statement. Would you agree with that statement?
A: Yes, I would agree with that statement.

Deposition of Thomas Gutshall, 6/13/91, page 38, line 7 through page 40, line 18. Exhibit "M".

and:

Q. The outflow from the oil/water separator after it was capped, how long a period of time went by before it fell off or before it lost it's cap?
A. Maybe an hour after it was put on.

Deposition of Thomas Gutshall, 6/13/91, Page 42, line 12 through line 15. Exhibit "M".

H. Leakage from the Oil/Water Separator

Thomas Gutshall testified that he witnessed evidence of leakage from the catch basin tanks:

Q. Have you personally ever checked those tanks and seen a particular level of liquid present in any of those vessels and then gone back and looked at that level and see it diminish?
A. Yes.
Q. And would you detail it for me when that was and the vessel in which you saw it?
A. I cannot tell you the dates.
Q. Could you tell me the period of employment?
A. The second period of employment after Safety Kleen emptied our pit, oil pit in the back, I think then in turn it started to, I don't want to say monitor, and to physically have some-one open it, will you look in and see what is going on. The pit in time filled up. I in turn informed Esso and the discussion started with who was going to pay for it and when are we going to do it, when are we going to have normal conversation back and forth between dealer and wholesaler. I kept looking fat the pit and noted that the pit had in fact lost some of its liquid, a good two feet.
Q. Over what period of time?
A. Oh, a period of about five days.
Q. Had you given anyone authority to remove any liquid from that pit?
A. No, you couldn't get to the pit or not without my key or going through the front door and office and the parts room.

Deposition of Thomas Gutshall, 6/13/91, Page 73, line 8 through page 74, line 14. Exhibit "M".

and:

Q. Did you ever bring it to anyones attention that the liquid in the pit had diminished a good two feet upon inspection?
A. Yes.
Q. To whose attention did you bring it?
A. Mr. Bayard.
Q. And?
A. And Mr. Gerbow, Agusto Gerbow, the V.I. Manager.
Q. First what did Mr. Bayard say or do about it?
A. Mr. Bayard, I don't know. I informed him of it. I felt that was something that he should -- you now, I just informed him about it.
Q. And what did Mr. Gerbow say or do about it?
A. Okay.
Q. Quote, unquote?
A. That was about as best I can recall. Okay, we'll look into it, check on it.

Deposition of Thomas Gutshall, 6/13/91, Page 73, line 8 through page 74, line 14. Exhibit "M".

I. Past Disposal Practices At The Esso Tutu Service Station

When the amount of waste oil generated exceeded the ability of the north oil/water separator to leach contaminants into the environment, innovative techniques were employed for the illegal disposal of this waste product. What is even more interesting is the fact that these practices were conducted with the full knowledge of Ana Gloria Ramos, TEIC's Designated Coordinator.

In the now infamous January 23, 1990 Soil Tech Memorandum to Goldman & Antonetti, Jose Agrelot, TEIC's On-Site Coordinator, reported the Esso Tutu practice of disposing of the contents from the north oil/water separator by pumping them into the sanitary sewer.

> "It was reported, by the service station Manager, that the oil and grease separator has no discharge connections. The liquid in the oil and grease trap is pumped to a holding tank located in the rear of the office building (see Figure No. 1). Periodically, the holding tank is emptied by pumping the liquid into the bathroom toilet." See Exhibit "T".

On December 9, 1993, in the Federal District Court in St. Thomas, Ana Gloria Ramos, Environmental and Safety Engineer for Esso and the Designated Coordinator for TEIC, testified that on more than one occasion she saw the contents of the north oil/water separator being pumped into the bathroom toilet.

Q Item number five in the memorandum refers to a report received by Mr. Agrelot from the station manager about the oil grease separator, and a method by which it was being pumped out. Do you see that, ma'am?
A (Reading Document)
Q I'm not asking you to read it. I'm asking you if you have -- do have any knowledge personally what that paragraph is talking about?
A Yes, I saw the employees of Mr. Bayard were discharging from the oil and water separator into the toilet and I talked to him about that.
Q What did you have to say to him?
A I just told him that, I think. Daniel Bayard. I said, Danny, this is your business, you run this, but I think you're doing something which is not appropriate, that's not -- you're not suppose to do something like that.

And then, once again, I went to the site and he was doing it because I saw him more than one time. And I went back again, and I said, Danny, you're doing things that are not right, The first time I mentioned that, he said, Ana Gloria try to help me with Esso to do the job for you.
Q I'm not trying to stop you from talking.
A To slow down.
Q Did you tell Mr. Bayard and his employees to stop the practice of emptying the oil/water separator into the toilet?
A I talked to Mr. Bayard, not to his employees.
Q And did you tell Mr. Bayard to stop doing it?

A I told him that was not suppose to be done.

[Testimony of Ana Gloria Ramos, 12/9/93, Page 69, line 12 through page 70, line 14.]. ***See*** **Exhibit "W".**

J. Chlorinated Hydrocarbon Fate and Transport from the Esso Tutu Service Station ("ETSS")

Soil analysis done in 1993 by Basland and Bouck for Esso/Exxon at a point approximately nine feet below surface near the north oil/water separator revealed diminishing contamination levels. In 1992, Geraghty & Miller performed an investigation and monitoring well installation (MW-9, MW-9S). The investigation discovered a petroleum hydrocarbon product floating in the monitoring well. Product was removed but apparently not sampled. Groundwater samples from some of the shallow wells around the station typically have high levels of BTEX and/or petroleum hydrocarbons (up to 10,000 ppb). Non-detects at elevated detection limits of up to 1,000 ppb should not be used to determine if a contaminated site has or has not contributed to groundwater contamination. An entry of "0" is not a logical or responsible conclusion when quantifying the contribution by ETSS of chlorinated hydrocarbons to groundwater. As reported by Dr. Paul Fahrenthold, former Chief of Organic Chemicals Branch of the U.S. EPA, states that "[t]he analysis of transport by Geraghty & Miller is incorrect based on mathematical relations of the VOCs in air, soil and water. Current groundwater monitoring data is compatible with concentrations of PCE in oil of approximately 400 ppm." *See* Exhibit "X".

K. Pre and Post Groundwater Pumping Conditions

Pumping conditions prior to 1987 as they relate to source, fate and transport of contaminants can be estimated and were known, but appear not to have been considered in the Draft Phase II RI. This was discussed over the years during technical meetings with personnel from Geraghty & Miller and was researched by others through interviews with well owners and government officials. The estimates are good approximations of pumping rates and average water use.

Although the 1987 USGS map of the Tutu area was produced shortly after the 1987 stop-pumping order, groundwater levels still showed the effects of reversing gradients that occur from pumping of the major wells at the volumes described above. The effect of pumping on groundwater gradients was reconfirmed by the recent TEIC pump test at the Eglin III Well.

Long-term pumping of major wells did result in groundwater gradient reversal and flow of contaminants toward the wells. For example, the fact that the pumping of the Tillet well had a major effect on groundwater flow and contaminant transport is clear from groundwater sampling and analysis, and modeling. Geraghty & Miller's own interpretation of the extent of the petroleum hydrocarbon plume near Texaco and Tillet in 1994 indicates the effects of the Tillet pumping seven years after the well stopped pumping (Fig. 5-17). A large portion of the BTEX and VOC plume was captured by pumping. Prior to 1987 up-gradient flow toward Tillet also occurred. This to be expected and is discussed in numerous reports. *See* Exhibit "Y".

The concentration of contaminants in soil gas for BTEX, total FID Volatiles and VOCs all show the effects of the Four Winds wells pumping prior to 1987. The contaminants were pulled upgradient toward the wells, thereby reducing the downgradient flow. <u>It must be remembered that the interpretation by Geraghty & Miller of contaminant plumes and sources of contamination are based primarily on May and June 1994 soil/water quality data and water levels.</u>

On page 5-36 and 5-37 of the Draft Phase II RI, Geraghty & Miller states that:

> "The overall configuration of the area impacted by VOC's is apparently controlled by the groundwater flow directions (*see* Figures 4-9 through 4-12) . . . The northern chlorinated VOC plume mapped in 1994 is elongated in the direction of shallow groundwater flow."

Although it ignored the Harthman Wells, the Eglin III pump test indicates the wide area of influence and gradient changes caused by pumping in the Tutu area. The pumping of many wells at the same time would further lower the groundwater table and increase gradients toward pumping wells.

If the overall configuration of the area impacted by VOCs is controlled by groundwater flow directions, how can pre-1987 pumping conditions be ignored? Flow of groundwater and contaminants was dramatically different prior to 1987 than it is today. There would be less "smear" downgradient of Tillet from Laga and Texaco. Contaminants from ESSO/EXXON would also have been pulled toward Four Winds, Tillet and other pumping wells. This is apparent from soil gas, groundwater analysis, the USGS maps, and other pump tests.

Geraghty & Miller's mapping and interpretation of the "Northern" VOC plume do not reflect all the previous facts stated above and the results of data collected and scientific opinion from the other PRPs. (*See* comments to Draft RI, Sept 1994). An evaluation of pumping histories, current and past groundwater flow patterns, historic use and disposal of contaminants, evaluation of all groundwater quality and soil gas data indicate a <u>decrease in concentration of contaminants with distance from a source.</u> This decrease in concentration was one of the criterion used by Geraghty & Miller to show the existence of the "two" plumes emanating from Laga and O'Henry.

Geraghty & Miller states on pg. 5-37:

> "However, the northern plume is still separate from the southern plume in 1994, as it was in 1992 (Geraghty and Miller, Inc. 1993a, 1993b), as evidenced by the <u>low or non-detectable levels of chlorinated VOCs</u> in monitoring wells MW-11D, SW-4 and SW-5. . ." (Emphasis added).

Caribbean Hydrotech's groundwater quality data as of late 1993 and Geraghty & Miller's data from the May-June 1994 sampling of deep wells, shows a decrease in VOC (PCE, TCE, DCE) levels with increasing distance from the Esso Tutu Service Station. A decrease in VOC levels in the wells south of the Four Winds Shopping Center was used to justify the southern limits of the "Northern Plume". A similar decrease was ignored at the northern limit of the Four Winds parking lot. This demonstrates a distinct separation of the VOC plumes emanating from Laga and ETSS.

In late 1992, both Caribbean Hydrotech and Geraghty & Miller measured VOC levels at FW-1 and reported 293 ppb, declining to 55 ppb at MW-6D. VOC levels began to increase at CHT 6D and rose to 842 ppd near the former Laga building.

In Geraghty & Miller's May-June sampling, deep wells show a similar pattern. VOC levels near the ETSS ranged from 126-172 ppb at MW-8 and MW-10D. To the north in the Four Winds parking lot, CHT-6D reported 66 ppb and MW-5 showed 23 ppb. Wells northeast of Four Winds show significantly lower VOC contamination levels. VOC levels begin increasing in the area of the Texaco Station and continue to increase approaching the Laga building. This confirms the continued existence of separate plumes within the Geraghty & Miller "Northern Plume". In addition, the use of 10, 100 and 1000 ppb concentration lines mask the existence of two distinct VOC plumes, and their sources, within the "Northern Plume".

In summary, all data, previous activities, and soil/aquifer characteristics provide indisputable evidence that Esso Tutu Service Station contributed chlorinated VOCs to the groundwater. Ignoring its contribution is a serious omission and error.

Very truly yours,

John K. Dema, Esquire

JKD/s
Attachments

cc: Four Winds Plaza Partnership

APPENDIX I

CHRONOLOGY OF EVENTS EXCERPTED FROM GERAGHTY & MILLER LOG BOOKS

APPENDIX I

CHRONOLOGY OF EVENTS EXCERPTED FROM GERAGHTY & MILLER LOG BOOKS

24 July 1992 (from Log Book #4A, Ruben Ponciano)

7:00 AM	Drillers are moving CME-55 to MW-9 drilling area.
8:00 AM	Soil Sampling begins
8:50 AM	GC sample (2-4'). Hnu=25ppm. VOA sample for lab analysis were collected from (2-4').
9:15 AM	Drillers are setting 4" PVC casing.
9:45 AM	Drillers finished setting PVC casing. Cleaning up area. Top ofbedrock approx. 5.2' bbl.

28 July 1992 (from Log Book 4A, Ruben Ponciano)

7:05 AM	Drilling crew moving to MW-9 drilling area.
8:45 AM	The F-600 is here. Drillers are assembling.
	[Note: Next Two Pages (124 and 125) of the Log are Missing. Log resumes with page 126]
9:25 AM	Run #2 (10-15') First foot begins.
9:54 AM	Run #3 (15-20') First foot begins.
9:59 AM	Hnu=10ppm inside hole, 0 ppm breathing zone.
12:05 PM	Go to Lunch
2:45 PM	Drillers finished pulling rods out of borehole. Cleaning up area.

30 July 1992 (from Log Book 3A, Wanda Morales)

8:05	Start reaming at MW-9 at 3.7 ft. Downhole pressure 600psi.
8:18	Borehole at 26 ft. gray cuttings, gasoline odors from cuttings.
8:53	Borehole at 31. ft. Gray cuttings, gas odors from cuttings
9:37	Borehole at 37.0 ft. Gray dry cuttings.

11:50	Tools out of hole. Borehole depth 34.3 ft. Water level 27.7 ft. (bls).
12:00	Set up geophysical equipment.
13:06	Start logging with caliper. Up to surface notice that caliper arms are not open. Clean up probe. Try again. There is some oil in the water.
13:30	Caliper arms do not open at bottom of borehole. The arms open at the surface, but not inside the hole. Check electrical connection and put some tape around it. Clean caliper probe and send it down. Contact C. Moffett and explain the situation.
13:48	Caliper arms do not open again. Take out probe and clean it out. Oily film and mud cover the probe. Try again after clean out probe.
14:43	Caliper arms open above the water surface in the borehole. Lowered the probe until borehole bottom depth. Arms do not open again. Take probe out of borehole and clean it.
15:03	Try again. Seems that caliper arms get sticky on the **[oily crossed out]** muddy water and could not open. C. Moffett call: go ahead w/ monitoring well installation and do not run geophysical logging according to T. Danahy.
15:45	(from Log Book #4A, Ruben Ponciano) Wanda told me that there is physical evidence of product in MW-9.

<u>9 September 1992</u> **(from Log Book #5, Derrick)**

7:37	Drilling of MW-9S begins using air hammer B-90 rig.
8:18	At approx. 12 feet there is a slight smell of product.
10:15	Drilling is stopped. Air pressure is not enough to blow cuttings from hole.
1:45	Air compressor company called but it will not be fixed today. MW-9S is sealed with a c-ply sand sack and bentonite pellets around TW bore hole opening near land surface to prevent rain or runoff water from entering the hole.

10 September 1992 (from Log Book #4B, Ruben Ponciano)

2:30	Go to MW-9S location. The air compressor has been temporarily fixed. Cuttings are not coming out of borehole.
3:07	Drilling resumes.
3:43	Drill rigs stops. Cuttings not coming out. Reportedly, drill rig is receiving enough pressure. Possibly there is a cavity in the unconsolidated later or its fractured because air bubbles are forming on wet asphalt pavement. Drillers will try to push a deconed 6" casing down borehole then place the 4" stainless steel casing inside the 6" casing, then raise 6" casing.
6:12	Cuttings are coming out of borehole. Trace of product is observed on cuttings.
7:30	Still drilling
10:00	It seems that the 6" stainless steel casing top has separated itself at 10' and 20' bls. Borehole would be grouted and another borehole will be initiated.
10:15	Drilling is suspended for the day.

11 September 1992 (from Log Book #5, Derrick)

8:25	Returned to MW-9S. Drill rig pulled casing last night. Problem existed when they were placing 6" casing. Decided to grout up MW-9S.
8:30	It appears that there is a cavity 2' below land surface at MW-9S approx. 1' wide. An attempt was made to sound borehole but stopped for fear of getting steel tape stuck.
9:00	Tom Danahy arrives. He was briefed on car wash and MW-9S. He suggests to thicken grout so that it doesn't interfere with MW-9. 4 bags of 94 pound cement was mixed with each grout preparation after Tom Danahy's suggestion. The usual is 3 bags/batch. And less water.
10:05	Grout is 4'3" from land surface in MW-9S. There appeared to be a cavity pulling the grout in a southwest direction. Drillers went to buy more cement.
10:21	Grouting continued.
10:25	Grouting stopped to buy more cement.

11:06 Started grouting again using 3 bags of cement/mix and less water. Next hole for MW-9S will be on the yellow line north of the previous MW-9S attempt and 7' west of Esso wall.

11:33 Grouting stopped. MW-9S was grouted up to 28" then 1 empty bag of cement was placed in the hole opening and wet cement was poured over the bag and around the hole.

14 September 1992 (from Log Book #4B, Ruben Ponciano)

7:15 PM Police car was moved from drilling area MW-9S. Drillers getting ready for drilling and installation of MW-9S. The total depth of MW-9S will be 21 ft. bls. It will have a 10 ft. screen (10' - 20').

8:00 PM Drilling of MW-9S begins

9:00 PM We reach 20' bls. Drillers pull out rods.

9:30 PM Drillers are placing stainless steel pipe. The borehole collapsed. Bottom of screen is at 18.67 ft. bls. Top of screen is at 8.76 ft. bls.

12:00 AM Leave site.

15 September 1992 (from Log Book #4B, Ruben Ponciano)

2:20 PM Getting ready for well development of MW-9S.
MW-9S DTW = 13.34 ft.
There is product in the well(trace). Hnu = 22 ppm

4:23 PM Pumping of water inside MW-9S begins.

4:30 PM GC sample is collected (GW).

4:35 PM Purging is suspended. Well went dry. Water is light brown.
Approx. 20 gal. of water removed.

4:45 PM Go to field office to deliver the GC sample.

16 September 1992 (from Log Book #4B, Ruben Ponciano)

8:30 Arrive at field office. Ana Gloria and Jose Agrelot are waiting for us.

8:55 USEPA representatives Laura Scalise and Suzanne Trealmontara arrive at field office.

9:20 Discuss today's ground water sampling activity.

10:10	Go to take water level measurements.
11:15	Go to field office for meeting about the ground water sampling procedure.
2:20	Alberto Barere told me that we are not going to sample today.
2:55	There is product in MW-9S approx. 0.11' of product. DTW = 13.11

5 October 1992 (from Log Book #4B, Ruben Ponciano)

2:35	Go to remove product from MW-9S.
2:45	Setting vacuum pump into MW-9S. DTW = 13.02' DTP = 12.98' PT = 0.04'
3:00	After product removal DTW = 13.09. We check the DTP and DTW with an interface probe.
3:15	There is a trace of product inside well.
4:20	Go to measure product thickness at MW-9S.
4:35	There is no product detection on interface probe.

6 October 1992 (from Log Book #4B, Ruben Ponciano)

9:49	Go to measure product thickness at MW-9S DTW = 12.90 DTP = 12.90 Trace of product is observed within well
10:00	DTW = 12.52

7 October 1992 (from Log Book #4B, Ruben Ponciano)

8:35	Go to MW-9 area.
8:50	Go to check product thickness at MW-9S DTW = 12.76 DTP = 12.76 PT = 0.0
9:05	Pumping begins at MW-9
9:12	PID = less than 2,000 ppm
9:19	PID = 800 ppm

9:30	PID = 780
9:40	Setting pump at MW-9S
9:47	PID = 600
9:51	PID = 696 Trace of product was observed in this well (MW-9S)
9:56	PID = 520
10:59	Field parameter after sampling for MW-9 PID = 680
12:00	Field parameter for MW-9S PID = 1,200

16 November 1992 (from Log Book #4C, Ruben Ponciano)

8:00	Days activities include sampling product in MW-9S
12:06	MW-9, DTW = 10.95
12:11	MW-9S, DTW = 10.45
2:15	Go to get ready for small pump test at MW-9S.
4:20	Setting pump on MW-9S
4:25	MW-9S static level, DTW = 10.65
4:29	MW-9S static level, DTW = 11.00
4:43	Pumping Begins
4:45	DTW = 11.2'. Strong odor
4:47	DTW = 11.37
4:49	MW-9S, DTW = 11.02
4:50	MW-9S discharge = 0.75 gpm. no product observed/sheen observed.
4:51	MW-9S: DTW = 11.90
4:54	MW-9S: DTW = 12.11
4:58	Pump shut off. DTW = 12.30

5:10 Groundwater sampling at MW-9S. Sheen observed in ground water samples.

17 November 1992 (from Log Book #4C, Ruben Ponciano)

1:30 Caroline Kwan from EPA, Ana Gloria Ramos, Cardova, [illegible] and Tom Danahy arrive at site.

APPENDIX II

GROUNDWATER CONTAMINATION
OCTOBER 1994

DAVID KEITH TODD

GROUNDWATER CONTAMINATION
TUTU AREA, ANNA'S RETREAT
ST. THOMAS, U.S. VIRGIN ISLANDS

October 1994

David Keith Todd
Consulting Engineers, Inc.
Berkeley, California

TUT 006 0692

GROUNDWATER CONTAMINATION

TUTU AREA, ANNA'S RETREAT

ST. THOMAS, U.S. VIRGIN ISLANDS

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Summary

This study is an evaluation of groundwater contamination and transport in the Tutu area of Anna's Retreat, St. Thomas, U.S. Virgin Islands. The purpose of this study is to determine the sources of contaminants that have been detected in the Harthman wells and to determine the likelihood of future contamination should these wells resume operation.

This study stems from availability of recently obtained soil and water quality data confirming the presence of the Tutu Esso gas station as a source of subsurface contamination in the area, refined water supply well pumping rates, along with recently collected water level data measured in the Harthman wells and other wells throughout the Tutu area.

The evaluation was based on a review and analysis of all available reports of investigations, employee and expert depositions, and data from subsurface modeling exercises generated for this report.

The physical setting of the Tutu area includes location and geologic setting. Island water use is summarized, along with operation of water supply wells by the Harthman family. The hydrogeology of the Tutu aquifer describes the main aquifer, hydraulic properties, and water table configuration.

Analysis of water quality includes the occurrence and sources of contamination. Contaminant migration analysis consists of detailed review of previous analytical and numerical groundwater modeling efforts in the Tutu area, along with the construction of an analytical model specifically for this report.

Conclusions document sources of existing contamination and the potential for future contamination of the Harthman wells due to migrating groundwater from several sources in the Tutu area.

1. Introduction

Background

This study was prepared in order to develop factual information regarding groundwater contamination and transport for the PID/Harthman litigation. Specifically, data were required on the occurrence and migratory routes of contaminants.

Scope of Investigation

The investigation consisted of review and analysis of the following sources of data:

(1) All available reports and data concerning subsurface contamination investigations conducted in the Tutu area.

(2) Depositions of Tutu Esso Service Station employees.

(3) Depositions and professional opinions of various consultants.

(4) Analytical modeling effort conducted by Hydrologic Associates U.S.A. Inc. (1993).

(5) All input and output data for the numerical groundwater flow and pathline analysis model constructed by Gartner and Lee (1993).

(6) Additional modeling conducted specifically for this report.

This report represents a compilation of selected factual information from the above sources of data. In instances where conflicting information occurred, an effort was made to provide an interpretation that was most probably correct.

2. Physical Setting

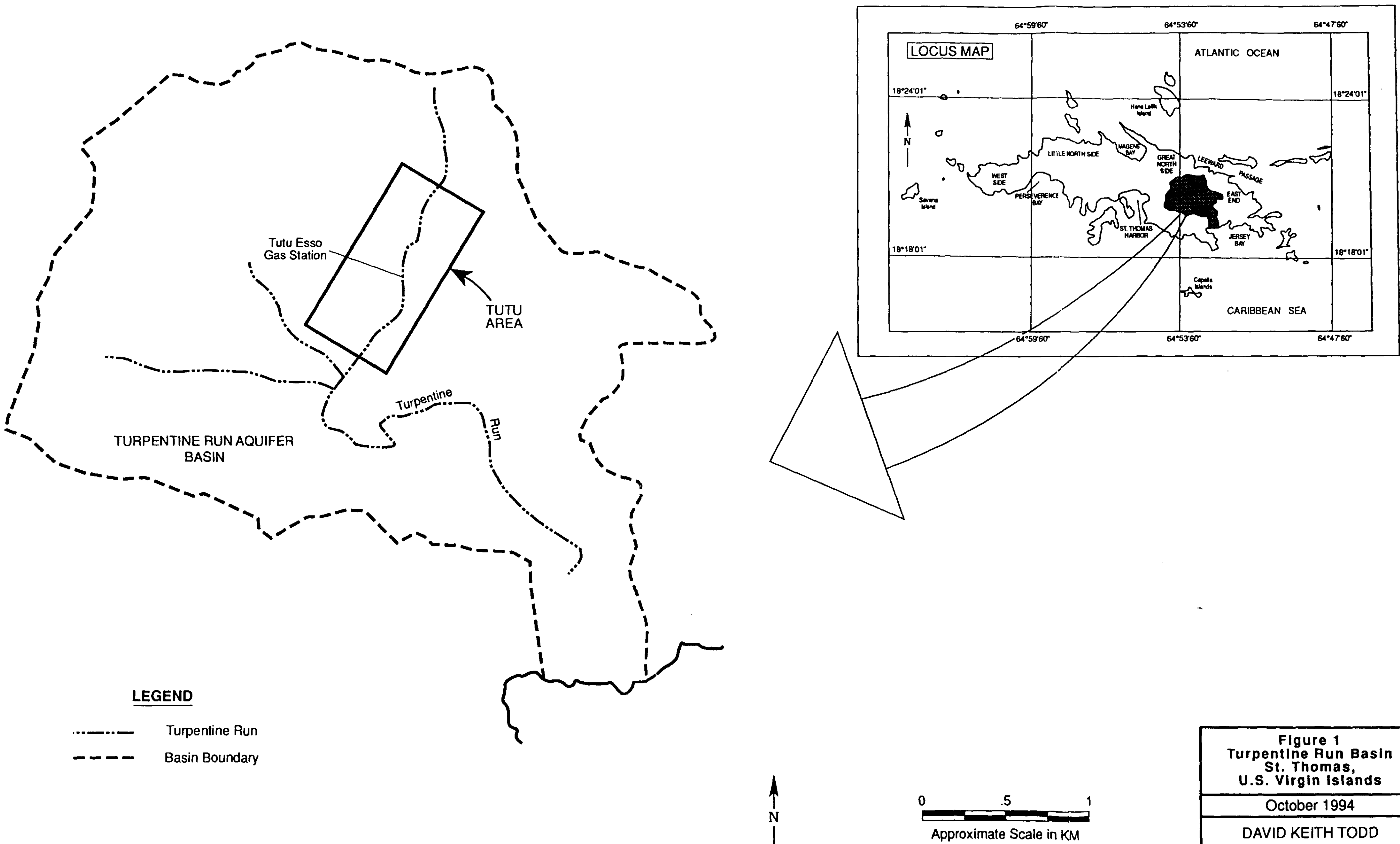
Location of Study Area

The study area consists of the Tutu section of Anna's Retreat, St. Thomas, U.S. Virgin Islands. The Tutu area is located in the east-central part of St. Thomas, within the surface drainage basin of the upper Turpentine Run (Figure 1). This area is drained by three narrow, intermittent streams (locally referred to as "guts") which join to form the main channel of Turpentine Run at Mt. Zion.

Geologic Setting

The island of St. Thomas is composed primarily of volcanic rocks of Cretaceous age. Two volcanic formations, the Water Island Formation and the younger Louisenhoj Formation, are present in the upper Turpentine Run basin. The Water Island Formation contains the oldest rocks on the island, consisting primarily of lava flows and breccias with some intrusive dikes and plugs. This formation is overlain by the Louisenhoj Formation, which consists of pyroclastic to epiclastic augite andesite.

Subsurface drilling in the Tutu area has indicated the presence at shallow depths of fill material and reworked native sediments. These sediments are underlain by alluvial and colluvial deposits varying from zero to 2 feet in thickness. Alluvial and colluvial deposits may be as thick as 10 to 20 feet in isolated valley areas. These deposits are further underlain by a weathered, fractured volcaniclastic rock unit characterized as a gray to greenish-gray volcanic sandstone and breccia with a fine-grained matrix.



Source: USGS Water Resources Investigations Report 88-4131

Figure 1
Turpentine Run Basin
St. Thomas,
U.S. Virgin Islands

October 1994

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The rock unit is highly fractured based on field inspection of outcrops and evidenced by the fracture trace analyses which have identified numerous fracture trends. The principal fracture traces include a northeast-southwest fracture trace that passes northwest of the VIHA and former LAGA buildings, and a north-south trace that intersects at north of the Four Winds Plaza and extends along Route 38 and the axis of the Turpentine Run, to the south end of the Four Winds Plaza. The presence of dikes in the Tutu area does not appear to obstruct groundwater flow.

3. Water Use

St. Thomas Water Supply

The principal source of water supply on St. Thomas is rain water falling on sloping metal roofs; the water drains into gutters and then into underground cisterns for storage and subsequent use. Seawater desalination plants also supply an approximate 1.8 million gallons per day (MGD) of water to hotels and commercial areas of St. Thomas; however, much of the island, including the central and eastern portions, is not served by this public water system.

Groundwater from an estimated 350 public and private wells scattered over the island further supplements the municipal supply by means of water truck deliveries to houses short of water. In 1983, water permits for wells in the Turpentine Run basin were estimated at 1,000,000 gallons per day (gpd). Table 1 depicts 1987 water usage estimates for several wells other than the Harthman wells in the Tutu area.

Table 1. 1987 Water Usage Estimates for Non–Harthman Wells

Well	Estimated Pumping Rate (gpd)	Comments
Eglin (I, II, and III)	34,500	1980
	32,100	1981
	27,600	1982
	14,000	post 1988
Four Winds (I and II)	30,000	–
Harvey	530	variable
Ramsay	200	–
Rodriguez	200 to 600	–
Tillet	12,000 to 15,000	1962 to 1985
	50,000	post 1985
VIHA (I, II, and III)	20,000	–

gpd = gallons per day
variable = variable pumping period
Sources: Geraghty & Miller (1992)
Hydrologic Associates U.S.A. Inc. (1993)
Bruce K. Green

Contamination of groundwater due to commercial activities in the Tutu area has caused the closing of most of the water supply wells. Contamination in the form of petroleum and chlorinated hydrocarbons was originally cited in the Tillet well in 1987, leading to the shut down of most of the water supply wells in the area.

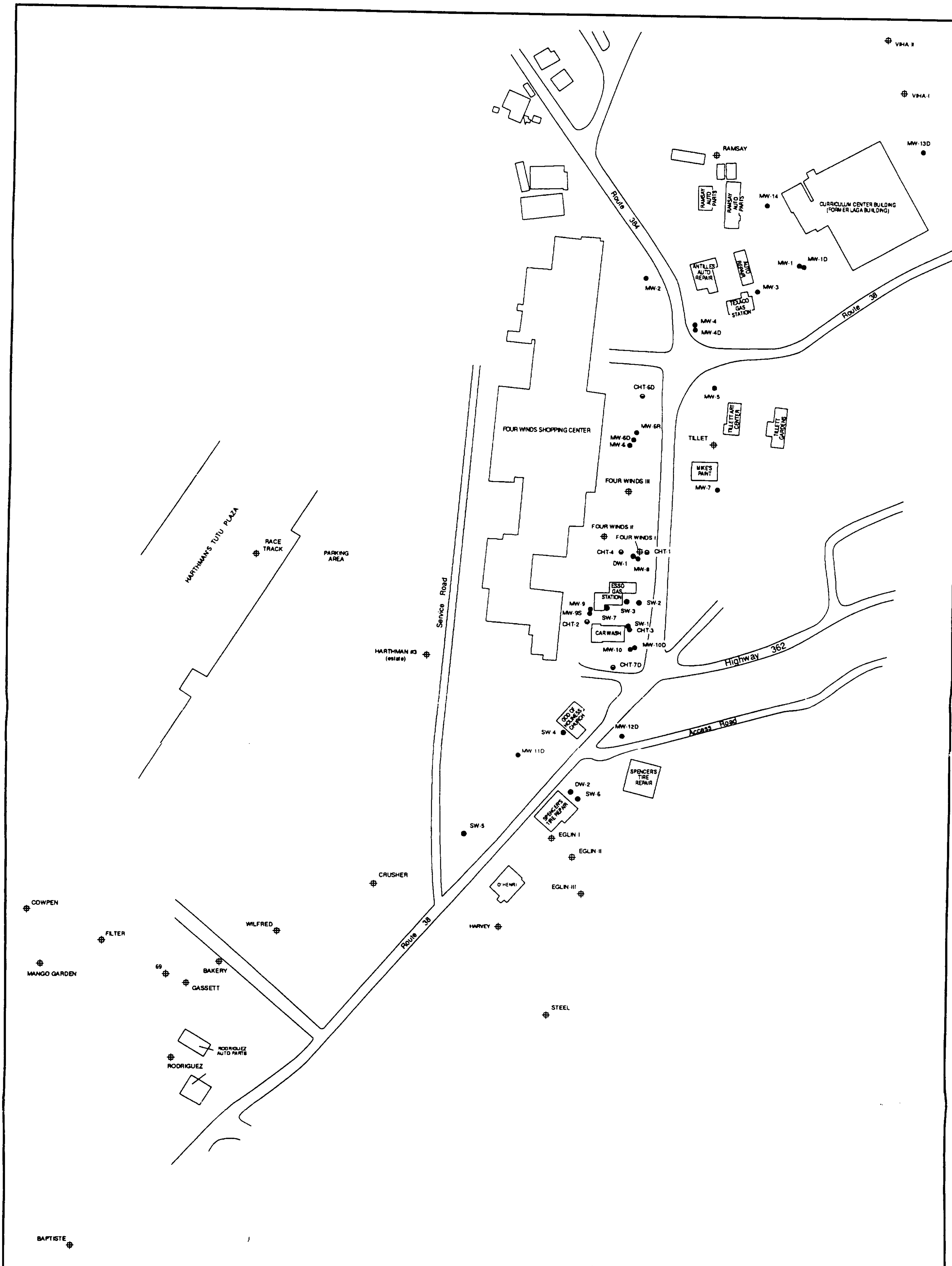
Harthman Wells

The Harthman family owns ten wells in the Tutu area (see Figure 2). The Batiste well lies in a separate sub-basin and was accordingly not included in this study. The Harthman wells have been used to supply water for agricultural and domestic needs, in addition to the commercial sale of water. Water has been sold to various consumers including the Virgin Islands Housing Authority communities in Tutu. Wells were also leased to businesses such as the Virgin Island Telephone Company and Creagar Motors. The Harthman wells ranged in depth from 60 to 325 feet, with historical permitted water withdrawals ranging from 75,000 to 150,000 gpd up until 1987. Table 2 contains available estimated pumping rates of the Harthman wells prior to their shutdown.

Table 2. Well Depths and Estimated Pumping Rates of Harthman Wells

Harthman Well	Well Depth (ft)	Pumping Rate (gpm)
Race Track	180	20 *
Crusher	210	20 to 40
Wilfred	60	6
Cow Pen	97	8
Filter	120	6
69	125	8
Bakery	325	20
Mango Garden	325	6
Estate	130	20

* = pumped periodically
N/A = data not available
gpm = gallons per minute
Sources: Hydrologic Associates U.S.A. Inc (1993)
Bruce K. Green



LEGEND

● MW-8	Shallow Monitoring Well Location
● MW-6D	Deep Monitoring Well Location
⊕ FOUR WINDS I	Existing Supply Well Location
⊖ CHT-1	Monitoring Well Installed by Caribbean Hydro-Tech, Inc. (Locations Approximate)
▬▬	Extent of Groundwater Contamination

0 200 400

Scale in Feet

Figure 2
Tutu Area Base Map

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The presence of contaminants in the Harthman wells was detected in July 1987. Accordingly, the Harthman wells were not allowed to be used for the purpose of commercial potable water sales. Minor withdrawals (500 to 1000 gpd) from two of the Harthman wells (Crusher and Race Track) were permitted for construction purposes after 1992. The Mango Tree well has also continued operation at an approximate rate of 200 gpd. Most of the wells have been shut down indefinitely, due to threat of contaminant migration and smearing of the contaminant plume.

4. Hydrogeology

Principal Aquifer

Groundwater in the Turpentine Run basin occurs under water table conditions. The principal water-bearing zone is fractured and weathered portions of the Louisenhoj and Water Island Formations. Subsurface investigations have indicated that the shallow zone of the main water-bearing unit is more permeable than the deeper zone. The alluvium forms a second water-bearing unit in the lower part of the Turpentine Run basin, which is outside the Tutu study area. Depending on local topography and pumping conditions, depth to groundwater ranges between 10 to 90 feet below ground surface.

Recharge to the aquifer is primarily due to occasional heavy rainfall events. Due to the high evapotranspiration rate and surface runoff, rainfall high in frequency and volume is necessary for recharge to occur. Groundwater recharge to the upper Turpentine Run basin due to rainfall has been estimated at 130 million gallons per year.

Aquifer Tests

Previous investigations in the Tutu area have included aquifer tests conducted on several Harthman wells and other water supply wells in the area. Analysis of these data had not accounted for effects of casing storage on the early time pumping test data. In many instances, early data reflect the removal of water stored in the well casing, as opposed to the formation, yielding an erroneously low transmissivity value. Accordingly, all available pumping test data were reanalyzed accounting for casing storage, resulting in aquifer transmissivities ranging from a low of 24 ft^2/day in the Race Track well to a high of 5,500 ft^2/day in the Four Winds #3 well.

Pumping test results further indicate that drawdowns have been observed in observation wells located as far as 450 feet away from pumping wells, suggesting that the degree of fracture connectivity is substantial.

The discrepancy in the range of aquifer transmissivity values obtained from pumping tests describes the heterogeneous nature of the aquifer. The observed trends of increasing drawdown rates with increasing pumping time observed during several tests further suggest that transmissivity values are likely to decrease with increasing distance from the pumping wells. Therefore, transmissivity values obtained from pumping tests only characterize the transmissive nature of the aquifer within the cone of depression produced as a result of well pumpage. Drawdown test data also indicate the anisotropic nature of the aquifer, evidenced by variable transmissivity values obtained from pumping and observation well pairs.

Since the heterogenous and anisotropic nature of the Tutu aquifer is not everywhere defined, any estimation of contaminant transport should incorporate a range of values for aquifer transmissivity.

Water Table Configuration

Since the 1987 shutdown of production wells, groundwater levels which had declined due to pumpage have recovered. Water level elevations measured in 1994 are depicted in Figure 3 for shallow wells (Caribbean Hydrotech and Geraghty & Miller, 1994). Since several wells were reportedly operating, the water table configuration does not represent non-pumping conditions. As indicated by the water level elevation contours in Figure 3, groundwater flow in the shallow zone is toward the south. The buried channel of Turpentine Run and the fracture

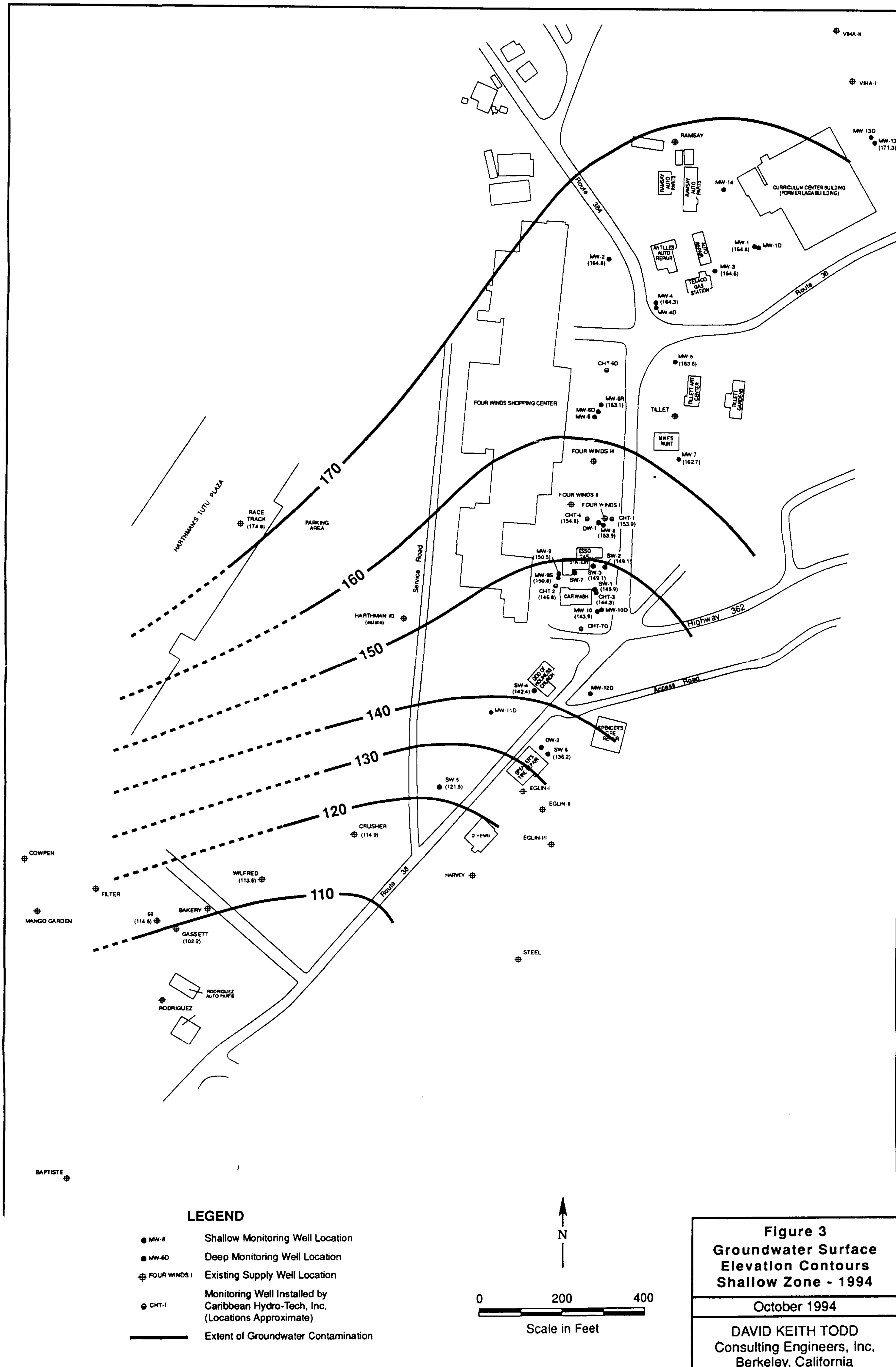

Figure 3
Groundwater Surface Elevation Contours Shallow Zone - 1994

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trace along Route 38 appear to serve as a highly permeable discharge point, represented by converging water level contours.

Review of water level data from deep wells (Geraghty & Miller, 1993) indicates that groundwater flow in the deep zone mimics that of the shallow zone. Water level measurements in shallow and deep well pairs have indicated the presence of vertical gradients ranging from strongly downward near the former LAGA building and slightly downward south of Tutu Esso and southwest of Tutu Texaco, to slightly upward in the northern part of the Four Winds Plaza.

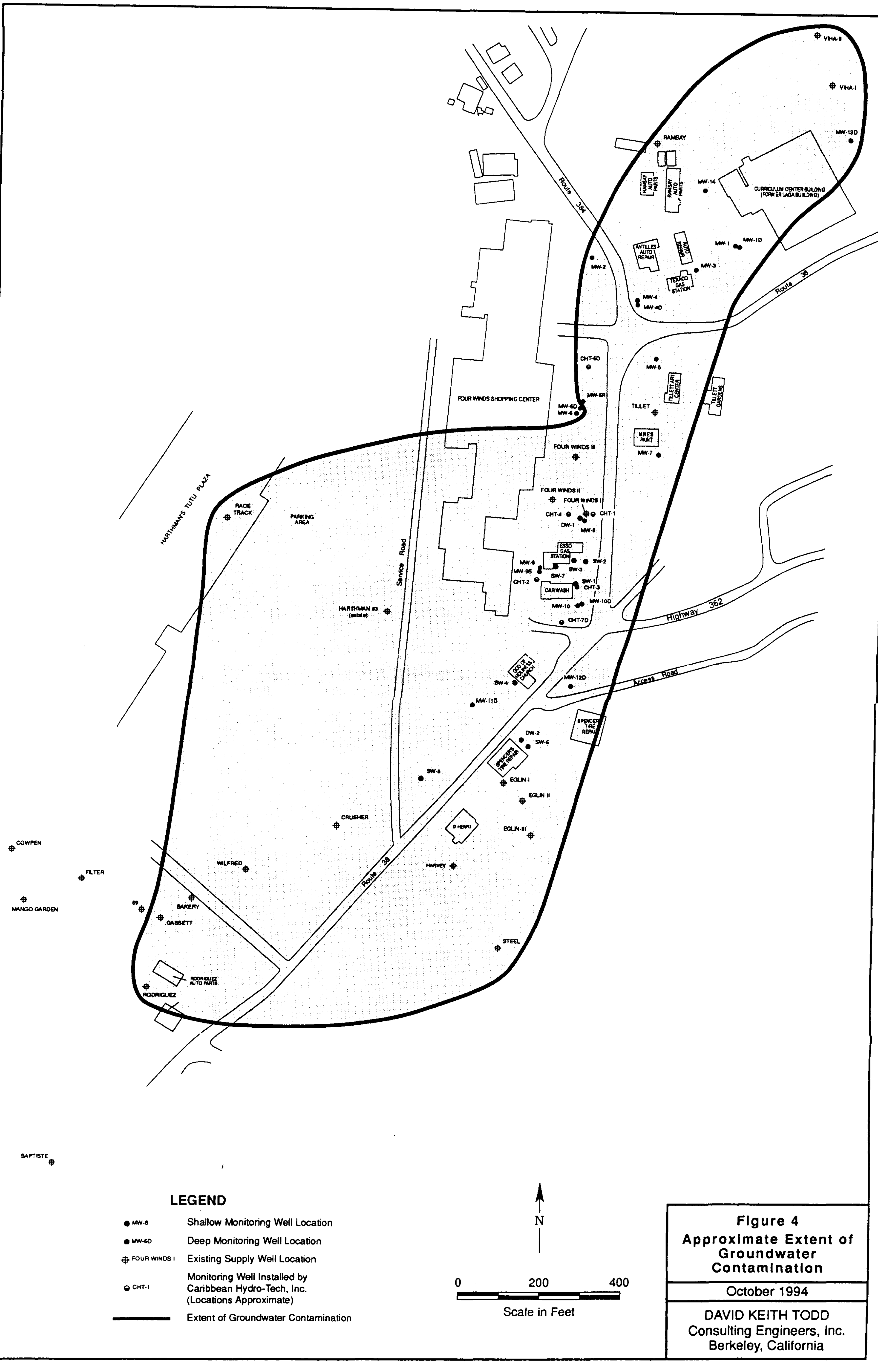
5. Water Quality

Occurrence of Contamination

Occurrence of groundwater contamination in the Tutu area has been investigated since the detection of petroleum products in the Tillet supply well in 1987. Figure 4 depicts the approximate areal extent of groundwater contamination in the Tutu area. Installation and sampling of numerous monitor wells and soil borings, together with several soil gas studies, have indicated the consistent subsurface presence of petroleum and chlorinated hydrocarbons as far north as the Curriculum building (former LAGA building), as far south as the Rodriguez Esso Service Station, and as far west as several of the Harthman supply wells.

Figure 2 shows the location of various groundwater monitor points in the Tutu area. Table 3 summarizes the results of a 1992 comprehensive groundwater monitoring study conducted in the Tutu area (Geraghty & Miller, 1993a). This study did not include sampling of wells on the Tutu Esso property. The results of a more recent study on groundwater quality at the Tutu Esso gas station and adjacent areas are depicted in Table 4 (Archer & Greiner, 1994). As the water quality data indicate, petroleum hydrocarbon compounds are present in the Tutu area at levels as high as 110,000 ppb (MTBE), while chlorinated hydrocarbon products have been recently detected at levels as high as 600 ppb (1,2-DCE).

Table 5 summarizes groundwater chemistry at the Harthman wells (Blasland, Brouk & Lee, 1993a). These data indicate the presence of similar contaminants as those detected in monitor wells, with the detection of petroleum and chlorinated hydrocarbon compounds in 1987, and residual detections in subsequent samples.



LEGEND

● MW-8	Shallow Monitoring Well Location
● MW-6D	Deep Monitoring Well Location
⊕ FOUR WINDS I	Existing Supply Well Location
⊖ CHT-1	Monitoring Well Installed by Caribbean Hydro-Tech, Inc. (Locations Approximate)
▬▬	Extent of Groundwater Contamination

Figure 4
Approximate Extent of Groundwater Contamination

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Table 3. 1992 Water Quality Sampling

WELL	DATE	Benzene ug/L	Toluene ug/L	Ethylbenzene ug/L	Xylenes ug/L	MTBE ug/L	PCE ug/L	TCE ug/L	1,2-DCE ug/L
MW-1	10/6/92	<50	<50	<50	<50	<50	590	190	100
MW-1D	10/2/92	rej	rej	rej	rej	rej	190 J	52 J	600 J
MW-2	9/30/92	<10	<10	<10	<10	<10	15	3 J	26
MW-3	9/30/92	<25	<25	<25	<25	24 J	58	19 J	530 E
MW-4	9/30/92	<10	<10	<10	<10	1.2 J	25	8 J	86
MW-4D	10/7/92	<10	<10	<10	<10	<10	44	11	150
MW-5	10/1/92	1000	180 J	930	1600	6200	<500	<500	<500
MW-5 FR	10/1/92	950	170 J	890	1500	6200	<500	<500	<500
MW-6D	9/30/92	<10	<10	<10	<10	<10	<10	<10	<10
MW-6R	9/29/92	<10	<10	<10	<10	<10	13	3 J	39
MW-7	10/5/92	<10	<10	<10	<10	5.8 J	110	29	170
MW-8	9/29/92	<10	<10	<10	<10	51	38	14	140
MW-9	10/7/92	26	<10	19	2 J	2700 D	<10	<10	<10
MW-9 FR	10/7/92	28	<10	24	3 J	2900 D	<10	<10	<10
MW-9S	10/7/92	16	2 J	5 J	2 J	2200 D	<10	<10	2 J
MW-10	10/6/92	<33	<33	<33	<33	660	25 J	29 J	130
MW-10D	10/6/92	<50	<50	<50	<50	780	40 J	18 J	180
MW-11D	10/2/92	<10	<10	<10	<10	<10	<10	<10	<10
MW-12D	10/5/92	<10	1 J	<10	<10	11	<10	<10	2 J
MW-13D	10/6/92	<10	1 J	<10	<10	<10	7 J	<10	<10
MW-14	10/1/92	<10	<10	<10	<10	<10	1 J	<10	44
CHT-1	2/27/92	ND	ND	ND	ND	55	69	14	170
CHT-2	2/29/92	<50	<50	120	<50	NA	<50	<50	<50
	5/27/92	NA	NA	NA	NA	NA	ND	ND	ND
CHT-3	2/27/92	26000	38000	2400	38000	62000	<1000	<1000	<1000
	5/27/92	NA	NA	NA	NA	NA	ND	ND	ND
CHT-4	2/27/92	ND	ND	ND	5.4	<10	73	18	210
	2/27/92 D	ND	ND	ND	ND	ND	110 J	22	97 J
CHT-6D	12/16/92	11	ND	ND	ND	120	55	19	130
	12/16/92	1.3	0.75	ND	ND	NA	3.2	0.54	31
	12/16/92	2.3	3.2	ND	ND	NA	3.3	0.64	32
	12/16/92	1.7	0.85	ND	ND	NA	1.6	0.52	29
CHT-7D	5/13/92	2.9	ND	ND	ND	NA	43	13	113.2
	12/18/92	14	ND	3.8	2.7	NA	83	14	140

Source: Geraghty & Miller (1993a)

Notes: FR = Field Replicate ND = Not Detected HA = Hydrologic Associates, Inc.
rej = Result rejected NA = Not Analyzed CHT = Caribbean HydroTech, Inc.
< = Result was not detected at the corresponding analytical detection limit.
J = Result was detected, but below the analytical detection limit.
D = Analyte is identified at a secondary dilution level.
E = Result is detected in exceedance of calibration range.

Table 4. 1993 Water Quality Sampling

Analytical Parameter	Units	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	DW-1	DW-2
Volatile Organic Compounds										
Benzene	ug/L	3700	1400	12000	<5	<5	<5	160	<5	<5
Toluene	ug/L	1800	1800	3400	<5	<5	<5	16	<5	<5
Ethylbenzene	ug/L	2000	1000	2200	<5	<5	<5	110	<5	<5
o-Xylenes	ug/L	2300	2900	3400	<5	<5	<5	120	<5	<5
m&p-Xylenes	ug/L	5800	1100	6900	<5	<5	<5	51	<5	<5
Methyl Tert Butyl Ether	ug/L	42000	52000	110000	10	<5	6	1600	19	21
TCE	ug/L	<250	<250	<250	<5	<5	<5	<5	15	<5
PCE	ug/L	<250	<250	<250	18	5	<5	<5	62	14
1,2-DCE (total)	ug/L	<250	<250	<250	46	5	<5	<5	130	33
Vinyl Chloride	ug/L	<500	<500	<500	<10	<10	<10	<10	<10	<10

Analytical Parameter	Units	CHT-2	CHT-3	CHT-4	CHT-7D	MW-8	MW-9	MW-10	MW-10 (duplicate)	MW-10D	MW-12D
Volatile Organic Compounds											
Benzene	ug/L	5	1900	<5	<5	<5	11	<5	<5	<5	<5
Toluene	ug/L	<5	<50	<5	<5	<5	<.5	<5	<5	<5	<5
Ethylbenzene	ug/L	<5	1500	<5	<5	<5	39	<5	<5	<5	<5
o-Xylenes	ug/L	<5	53	<5	<5	<5	<5	<5	<5	<5	<5
m&p-Xylenes	ug/L	<5	1100	<5	<5	<5	<5	<5	<5	<5	<5
Methyl Tert Butyl Ether	ug/L	870	15000	6	14	10	450	420	430	130	39
TCE	ug/L	5	50	16	14	9	<5	14	12	11	<5
PCE	ug/L	5	50	50	50	32	<5	22	19	39	<5
1,2-DCE (total)	ug/L	6	50	15	140	89	<5	57	51	100	<5
Vinyl Chloride	ug/L	<10	<100*	<10	<10	<10	<10	17	16	<10	<10

Source: Archer & Greiner (1994)
Notes:
All samples collected in November 1993, reported in April 1994 Summary of Ground-Water Analytical Results: Esso Tutu Service Station and Adjacent Areas, attached to letter dated June 21, 1994 from R.T. Lehman to S.S. Brotman.

* Elevated chlorinated organic detection limit as a result of aromatic hydrocarbon concentrations.

Table 5. Water Quality Sampling of Harthman Wells

WELL	DATE	Benzene ug/L	Toluene ug/L	Ethylbenzene ug/L	Xylenes ug/L	PCE ug/L	TCE ug/L	1,2-DCE ug/L	MTBE ug/L
HARTHMAN	7/87	ND	6.3	NA	NA	2.9	ND	ND	NA
I	8/87	ND	ND	NA	NA	3	ND	1	NA
(Bakery/	9/87	ND	ND	NA	NA	1	<1	ND	NA
Gassett)	10/87	<1	ND	NA	NA	ND	<1	<1	NA
	10/87	ND	ND	ND	ND	ND	0.5	ND	ND
	11/87	ND	ND	NA	NA	ND	<1	ND	NA
	12/87	ND	ND	NA	NA	ND	ND	ND	NA
	1/88	ND	ND	NA	NA	ND	ND	NA	NA
	2/88	ND	ND	NA	NA	ND	<1	ND	NA
	5/88	<1	33	NA	NA	<1	5	NA	NA
	8/88	ND	4	NA	NA	ND	<1	NA	NA
	11/88	ND	ND	NA	NA	ND	<1	NA	NA
	1/14/88	ND	ND	ND	ND	ND	ND	ND	ND
	2/5/91	ND	44 D	ND	ND	ND	1	ND	NA
	6/4/91	ND	ND	ND	ND	ND	ND	ND	NA
	10/1/91	ND	ND	ND	ND	ND	.11 J	ND	NA
	2/4/92	.06 J	ND	ND	ND	ND	.09 J	.11 J	NA
	2/4/92 FR	.07 J	ND	ND	ND	ND	ND	ND	NA
	2/26/92	ND	ND	ND	ND	<1	<1	<1	<10
	5/27/92	ND	ND	ND	ND	ND	.06 J	ND	NA
	9/15/92	ND	ND	ND	ND	ND	ND	ND	NA
	4/1/93	ND	.064 J	ND	ND	ND	ND	ND	NA
HARTHMAN	7/87	ND	5.7	NA	NA	102	7	ND	NA
II	8/87	ND	ND	NA	NA	26	3	12	NA
(Crusher)	9/87	ND	ND	NA	NA	14	1	<1	NA
	10/87	5	ND	NA	NA	29.5	ND	4	NA
	10/87	ND	ND	ND	ND	6.2	ND	ND	ND
	11/87	ND	ND	NA	NA	5	7	ND	NA
	12/87	ND	ND	NA	NA	ND	ND	ND	NA
	1/88	ND	ND	NA	NA	4	1	NA	NA
	2/88	ND	ND	NA	NA	3	2	<1	NA
	5/88	ND	38	NA	NA	130	46	NA	NA
	8/88	ND	ND	NA	NA	10	1	NA	NA
	9/26/90	ND	ND	ND	ND	7 J	1 J	5J	NA
	2/5/91	ND	ND	ND	ND	9	2	5J	NA
	6/4/91	ND	ND	ND	ND	7 J	1 J	6J	NA
	10/1/91	ND	ND	ND	ND	3.1	0.77	4.7	NA
	2/3/92	ND	ND	ND	ND	1.2	0.8 J	1.9 J	NA
	2/3/92 FR	ND	ND	ND	ND	5.3	0.95	4.2	NA
	2/26/92	ND	ND	ND	ND	9.5	ND	5	ND
	9/16/92	ND	ND	ND	ND	10	2.3	11	NA
HARTHMAN	8/87	ND	ND	NA	NA	1	ND	ND	NA
III	9/87	ND	ND	NA	NA	ND	ND	ND	NA
(Estate)	10/87	ND	1	NA	NA	2.5	ND	ND	NA
	10/87	ND	ND	ND	ND	ND	ND	ND	ND
	12/87	ND	ND	NA	NA	ND	ND	ND	NA
	1/88	ND	ND	NA	NA	ND	ND	NA	NA
	2/88	ND	ND	NA	NA	ND	ND	ND	NA
	5/88	<1	ND	NA	NA	2	ND	NA	NA
	8/88	ND	ND	NA	NA	ND	ND	NA	NA
	11/14/88	ND	ND	ND	ND	7 J	1 J	5J	ND
	9/26/90	ND	ND	ND	ND	7 J	1 J	5J	NA
	2/5/91	ND	ND	ND	ND	9	2	5J	NA
	6/4/91	ND	ND	ND	ND	7 J	1 J	6J	NA
	10/1/91	ND	ND	ND	ND	3.1	0.77	4.7	NA
	2/3/92	ND	ND	ND	ND	1.2	0.8 J	1.9 J	NA
HARTHMAN Batiste	2/26/92	ND	ND	ND	ND	<1	<1	<1	<10
HARTHMAN Wilfred	2/26/92	ND	ND	ND	ND	<1	<1	<1	<10
HARTHMAN Zero Filter	2/26/92	ND	ND	ND	ND	<1	<1	<1	<10
HARTHMAN Race Track	2/26/92	ND	ND	ND	ND	1.3	<1	<1	<10

Source: Blasland, Bouck & Lee (1993a)

Notes:
FR = Field Replicate
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Sources of Contamination

Detailed analysis of contaminant sources has been conducted in the Tutu area. Table 6 reveals the potential responsible parties identified and the types of contaminants contributed.

Table 6. Potential Responsible Parties and Types of Contaminants Contributed

	BTEX^	Oil/Grease	Chlorinated Hydrocarbons *	BNA **
VI Housing Authority	X	X	X	X
LAGA Building			X	
Ramsey Motors		X		
Gasset Auto Parts	X	X		X
Tutu Texaco	X	X		
Western Auto		X		X
Tutu Esso	X	X	X	X
Rodriguez Esso	X			
O'Henry Dry Cleaners			X	
Tillet	X			X

^ BTEX = Benzene, Toluene, Ethylbenzene, Xylene
* Chlorinated Hydrocarbons include tetrachloroethene (PCE), trichloroethene (TCE), cis/trans-1,2-dichloroethylene (DCE), and 1,2-dichloroethane (DCA)
** BNA = Base/Neutral & Acid extractables
Source: Hydrologic Associates U.S.A., Inc. (1993)

Recently obtained data from a study of soil contamination, shown in Table 7 (H+GCL, 1993b), along with subsequent sampling of groundwater in November 1993 (Table 4) at the Tutu Esso property, have allowed for confirmation of this gas station as a source for petroleum and chlorinated hydrocarbon contamination in the aquifer.

Soil samples collected at Tutu Esso contained total petroleum hydrocarbon concentrations as high as 73,000 ppm, total BTEX concentrations as high as 83,300 ppb, MTBE concentrations as high as 1300 ppb, and numerous chlorinated solvents including tetrachloroethene (PCE) concentrations as high as 3,000 ppb. H+GCL (1993) concluded that given the presence in soil of elevated levels of petroleum and chlorinated hydrocarbon compounds at depths of 7.5 feet below ground surface, together with the presence of the water table at 15 feet below ground surface, it is likely that contaminants from Tutu Esso have contaminated underlying groundwater.

This conclusion is corroborated by groundwater samples collected from wells immediately downgradient of the soil contaminated areas within Tutu Esso, which contained total BTEX concentrations as high as 21,000 ppb, MTBE concentrations as high as 110,000 ppb and total petroleum hydrocarbon concentrations as high as 310 ppm. Because of elevated levels of petroleum hydrocarbons at Tutu Esso, detection limits for chlorinated hydrocarbons in samples from several wells were raised as high as 500 ppb. Therefore, samples containing less than 500 ppb of these contaminants could not be detected. However, samples from other monitor wells located immediately downgradient of the Tutu Esso, where the concentrations of petroleum compounds were not as elevated, contained chlorinated hydrocarbons such as PCE at levels as high as 39 ppb, DCE at levels as high as 100 ppb, and TCE at levels as high as 14 ppb.

Table 7. 1993 Tutu Esso Soil Sampling

Sample I.D.	Depth (ft)	Analyte Found	Concentration (ug/kg)
S. O/W sep.	0	MTBE	1.5 J
EX-B	0	MTBE	99 u
		Acetone	1,800 u
		1,1-DCA	50 u
		2-Butanone	820 u
		1,1,1-TCA	32 uJ
		4-methyl-2-pentanone	1,200 u
		Benzene	120 u
		Toluene	950 u
		Ethylbenzene	38 u J
		Xylenes	270 u
EX-B	0	Methylene chloride	10 u (mg/kg)
		1,1-DCA	2.4 u J (mg/kg)
		1,1,1-TCA	9.8 u (mg/kg)
		4-methyl-2-pentanone	5.9 u J (mg/kg)
		PCE	8.5 u (mg/kg)
		Benzene	13 u (mg/kg)
		Toluene	280 u D (mg/kg)
		Ethylbenzene	47 u (mg/kg)
		Xylenes	270 u (mg/kg)
EX-C	7	None	-
EX-D	7	TPH	66 (mg/kg)
EX-E	3.5	MTBE	230
		Acetone	9,200 D
		1,1-DCA	88
		cis/trans 1,1-DCE	3,400 D
		2-Butanone	67
		1,1,1-TCA	3.1 J
		TCE	35
		4-methyl-2-pentanone	870 E
		PCE	3,000 D
		Benzene	150
		Toluene	150
		Ethylbenzene	11,000 D
		Xylenes	72,000 D
		TPH	73,000 (mg/kg)
		Lead	0.20 (mg/l)
EX-E	7.5	MTBE	330 u
		Acetone	1,600 u E
		1,1-DCA	110 u
		cis/trans 1,2-DCE	120 u
		2-Butanone	260 u
		1,1,1-TCA	39 u
		TCE	48 u
		4-methyl-2-pentanone	2,000 u E
		PCE	890 u
		Benzene	280 u
		Toluene	25,000 u D
		Ethylbenzene	6,300 u D
		Xylenes	43,000 u D
		TPH	56,000 (mg/kg)
		Lead	0.063 (mg/kg)
EX-E	9	Results Pending	-
SB-1	10-12	MTBE	510 u
		Acetone	120 u
		Benzene	48 u
		Ethylbenzene	280 u
		Xylenes	63 u
		TPH	3,000 (mg/kg)
SB-1	12-14	MTBE	1,300 u E
		Acetone	72 u
		Ethylbenzene	19 u J
		TPH	720 (mg/kg)
SW-1	8-10	MTBE	76
		Acetone	6.5 J
SW-2	7.5	Acetone	12

Source: H+GCL (1993b)
Samples collected in November 1993, reported by December 21, 1993 memorandum on Esso Overnight Trip Summary, provided to councel by letter dated January 25, 1994.
Notes:

D– Compound quantitated using secondary dilution
E– Concentration exceeds calibration range
J– Result detected below the reporting limit or is an estimated concentration
u– Reporting limits raised due to high levels of target analytes

6. Contaminant Migration

Previous Modeling Efforts

The rate and direction of groundwater flow during non-pumping conditions is largely controlled by aquifer hydraulic conductivity and water table gradient, together with the occurrence, extent, orientation, and degree of connectivity of fractures. During pumping conditions, groundwater flow directions are additionally impacted by the resultant lowering of the static water level. The areal extent of groundwater flow to a pumping well is determined through delineation of the capture zone (also referred to as the zone of contribution) of that well. A capture zone represents the surface and subsurface area around a well which contributes groundwater to that well.

Since compounds in solution migrate with groundwater, the capture by supply wells of contaminants depends on the zone of groundwater contribution to each pumping well. An attempt to delineate capture zones of supply wells in the Tutu area is documented by Hydrologic Associates U.S.A., Inc. (HA) (1993). The results of this approach indicate that prior to their shutdown in 1987, the Harthman wells were capturing contaminated groundwater emanating from Tutu Esso, Rodriguez Esso, O'Henry Dry Cleaners, and Western Auto. This study further concluded that renewal of pumpage from the Harthman wells would result in the capture of contaminants migrating from sources such as Tutu Esso, Rodriguez Esso, O'Henry Dry Cleaners, Tutu Texaco, and the former LAGA building.

A second approach (Gartner Lee, 1993) to capture zone delineation consisted of construction of a numerical computer model using the MODFLOW and MODPATH codes (McDonald and Harbaugh, 1988; Pollock, 1989). The computer model was constructed to simulate groundwater flow, delineate capture zones of wells, and track flow paths of particles representing contaminants. The results of this study indicate that had Harthman wells, Crusher and Wilfred, not been shut down in 1987, they would have extracted contaminated groundwater emanating from the former LAGA building, Ramsay motors, Gassett Auto Parts, Tutu Texaco, Tutu Esso gas station, O'Henry Dry Cleaners, and Rodriguez Esso gas station.

Analytical Modeling of Capture Zones

A new analytical model was constructed as part of this investigation to delineate more representative capture zones for the Harthman wells. This modeling effort was based on

1) refined water supply well pumping rates;
2) re-analyzed values of aquifer transmissivity; and
3) confirmation of Tutu Esso gas station as a source of groundwater contamination in the Tutu area.

Model results were used to determine the source of contaminants migrating to the Harthman wells prior to their shutdown in 1987, and due to their potential future pumpage.

The model chosen is one adopted by the USEPA (USEPA, 1991) as their standard tool for delineating the capture zones of water supply wells. By accepting well-specific data characterizing subsurface conditions and pumping rates at each well, and by accounting for a regional non-pumping hydraulic gradient and potential interference between pumping wells, this model uses an analytical solution to calculate a zone of groundwater contribution to each well.

The selection of this model was based on review of required input data and resultant output data generated by previous modeling efforts, and subsequent comparison with the quantity and quality of available site-specific data. The sophistication and capabilities of the selected code are highly consistent with the nature and amount of data currently available in the study area. Of additional importance is the understanding that the precision of numerical models (i.e. MODFLOW/MODPATH) is limited by the precision of the input parameters, and that analytical methods are the most efficient alternative when data necessary for identification of the system are sparse and uncertain (Javandel et. al., 1984).

Model Input

Input into the model consisted of aquifer parameters including transmissivity, initial saturated thickness, and porosity. Also required by the model were location and pumping rates of wells, size of well casings, radius of the cone of depression, regional non-pumping hydraulic gradient, and recharge to the aquifer. In determining these parameters, all available reports including previous modeling efforts (Hydrologic Associates, 1993 and Gartner Lee, 1993) were reviewed. In addition, newly analyzed pumping test data were incorporated, as were updated well pumpage history data.

Output from the model is in the form of calculated groundwater flowpaths to each pumping well, describing the areal contribution of groundwater to each well.

Model Results

Pre-1987 Operation of Wells

Since the historical operation schedule of water supply wells in the Tutu area is not well documented, in order to determine the source of contaminants detected in the Harthman wells prior to their shutdown in 1987, several pumping scenarios were considered. It is understood that at any given time prior to 1987, a single well, a combination of various wells, or all wells may have been pumping.

The first scenario simulated involves simultaneous pumpage by all supply wells capable of potentially affecting the capture zones of the Harthman wells. Well pumping rates used in the modeling are depicted in Tables 1 and 2. Given the variability in the pumping test results, all transmissivity values obtained at or in the vicinity of the pumping wells were considered. The first scenario used a transmissivity of 563 ft^2/day, representing the geometric mean of values obtained from the aquifer tests.

The capture zones of all pumping wells under this scenario along with their proximity to various sources of contamination are depicted on Figure 5. As the figure indicates, when all wells pump at the same time, contaminated groundwater emanating from Tutu Esso gas station and O'Henry Dry Cleaners is captured by the Crusher well, while groundwater from Rodriguez Esso migrates to the Harthman Bakery and Rodriguez supply wells. This is corroborated by water quality data which indicate the presence at the Harthman Crusher and Bakery wells of similar constituents to those released at Tutu Esso, O'Henry Dry Cleaners, and Esso Rodriguez.

The second scenario simulated involved the same pumping pattern, using a transmissivity value of 678 ft^2/day. This value was obtained from the analysis of a pumping test conducted at

Tutu Area Supply Wells

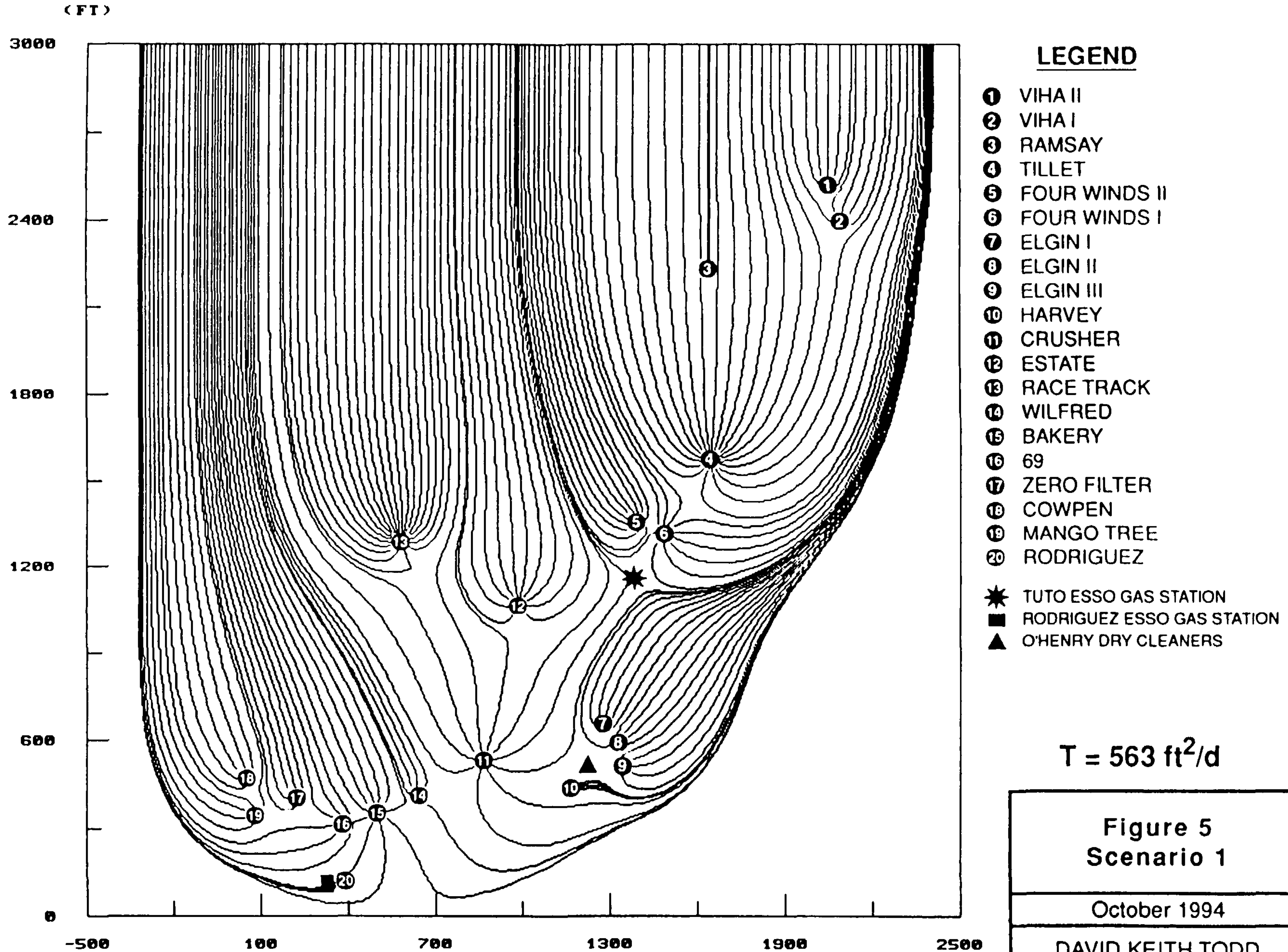

Figure 5
Scenario 1

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the Crusher well. Figure 6 depicts the capture zones of wells under Scenario 2. Under this scenario, capture zones of wells were slightly modified; the Crusher and Harvey wells capture groundwater emanating from Tutu Esso gas station and O'Henry Dry Cleaners, while the Bakery and Rodriguez wells continue to induce groundwater flow from the Rodriguez gas station.

A transmissivity value of 600 ft^2/day obtained from a Four Winds well was used under the same pumping conditions for Scenario 3. The results, as shown on Figure 7, indicate that Tutu Esso gas station and O'Henry Dry Cleaners fall within the capture zone of the Crusher well, while groundwater underlying Rodriguez Esso gas station migrates toward the Bakery and Rodriguez wells.

Scenario 4 also involves simultaneous pumpage of all wells, but under an average transmissivity value of 300 ft^2/day, obtained from the Elgin II well. Figure 8 depicts the results of this scenario, indicating that groundwater emanating from Rodriguez Esso is captured by the Bakery well, while groundwater underlying Tutu Esso gas station migrates toward the Crusher well, along with Four Winds wells I and II. O'Henry Dry Cleaners also lies within the capture zone of the Crusher well.

Scenarios 1 through 4 indicate that given the available data characterizing hydrogeologic conditions in the vicinity of the Harthman wells and other nearby supply wells, and assuming all wells are operating at their maximum reported rates, the Harthman wells are subject to contamination by groundwater emanating from Tutu Esso gas station, Rodriguez Esso gas station, and O'Henry Dry Cleaners. The capture of contaminants by these wells is corroborated by water quality data (Table 5).

Scenario 5 (Figure 9) simulates the simultaneous operation of the Harthman wells without

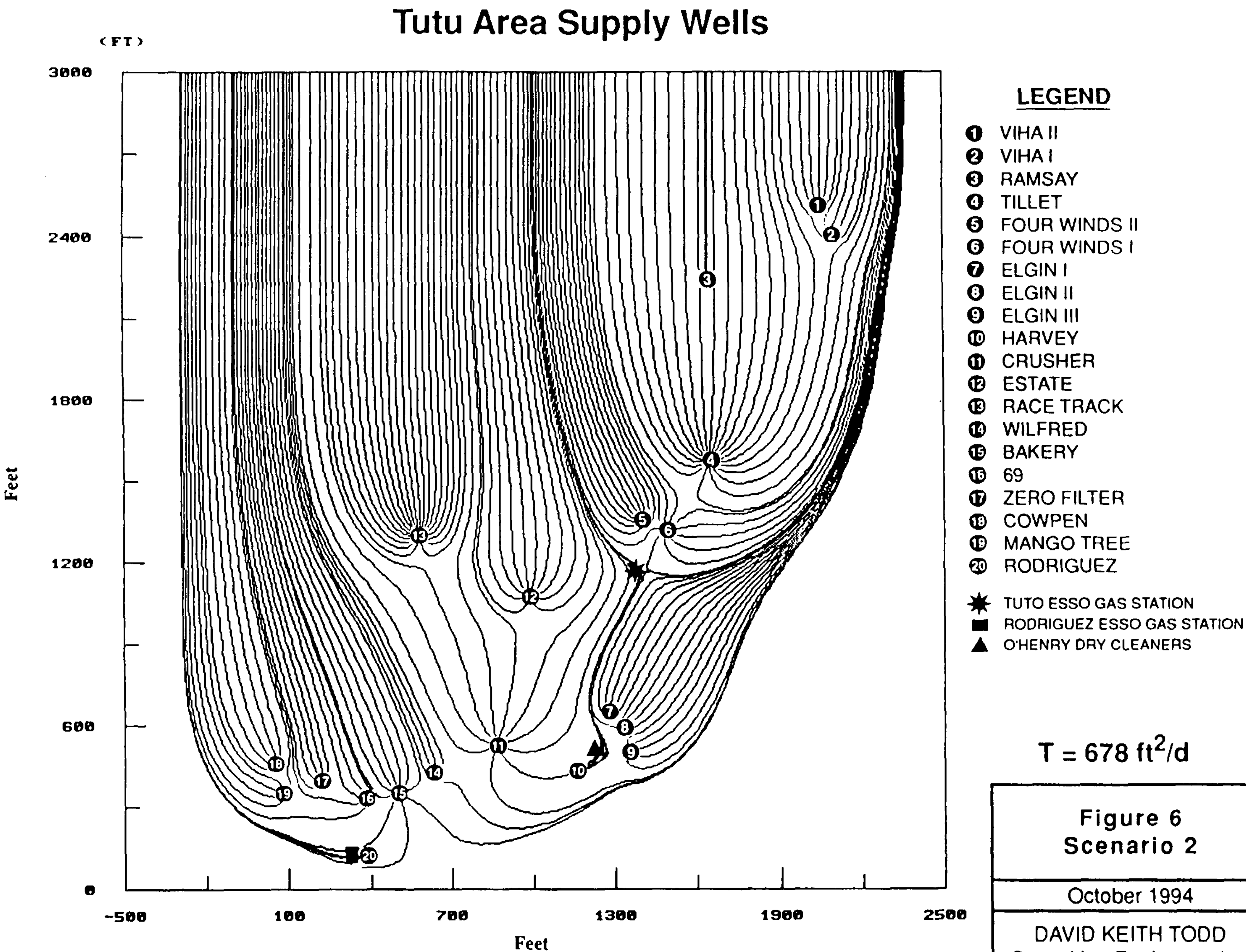

Figure 6
Scenario 2

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Tutu Area Supply Wells

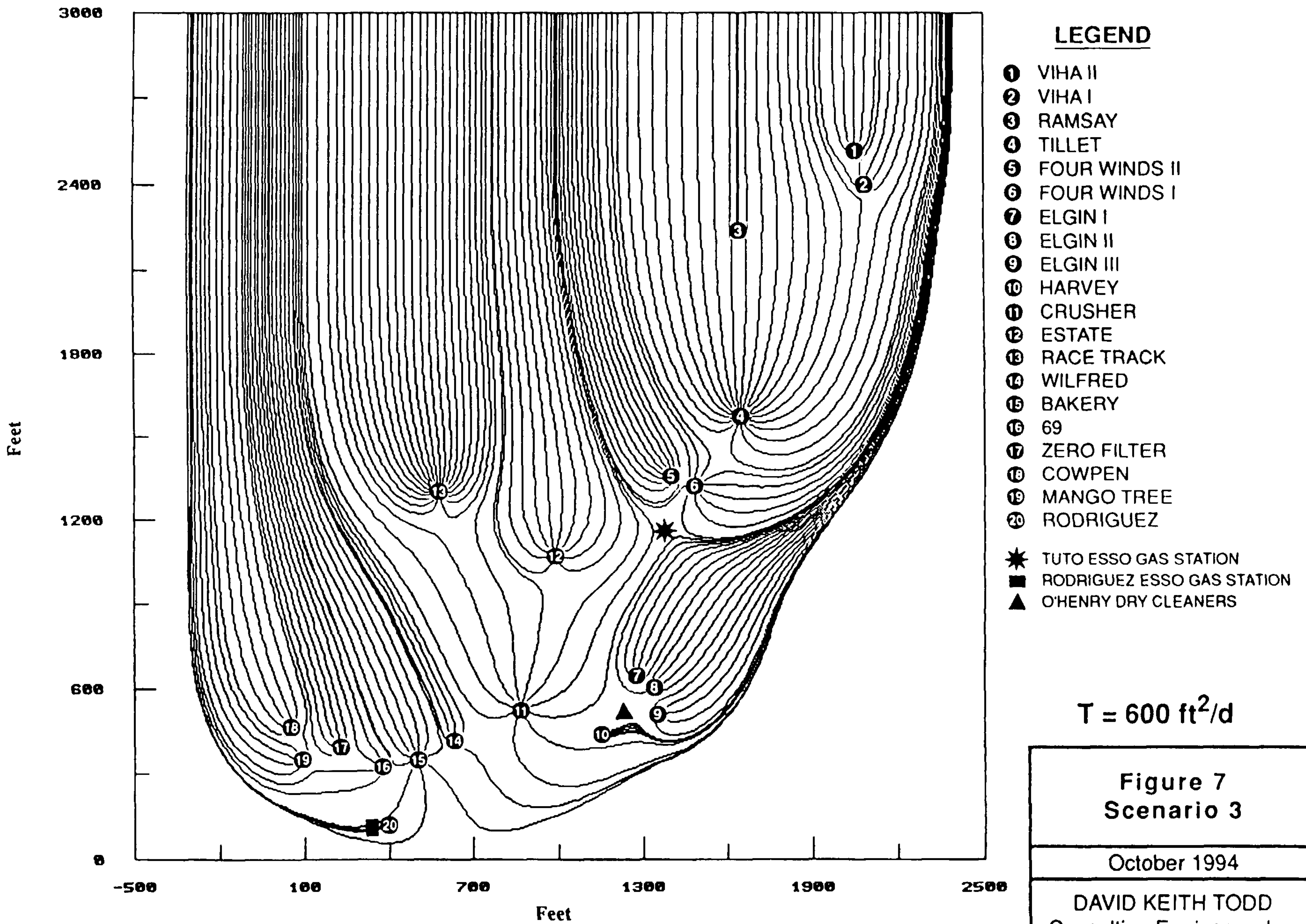

Figure 7
Scenario 3

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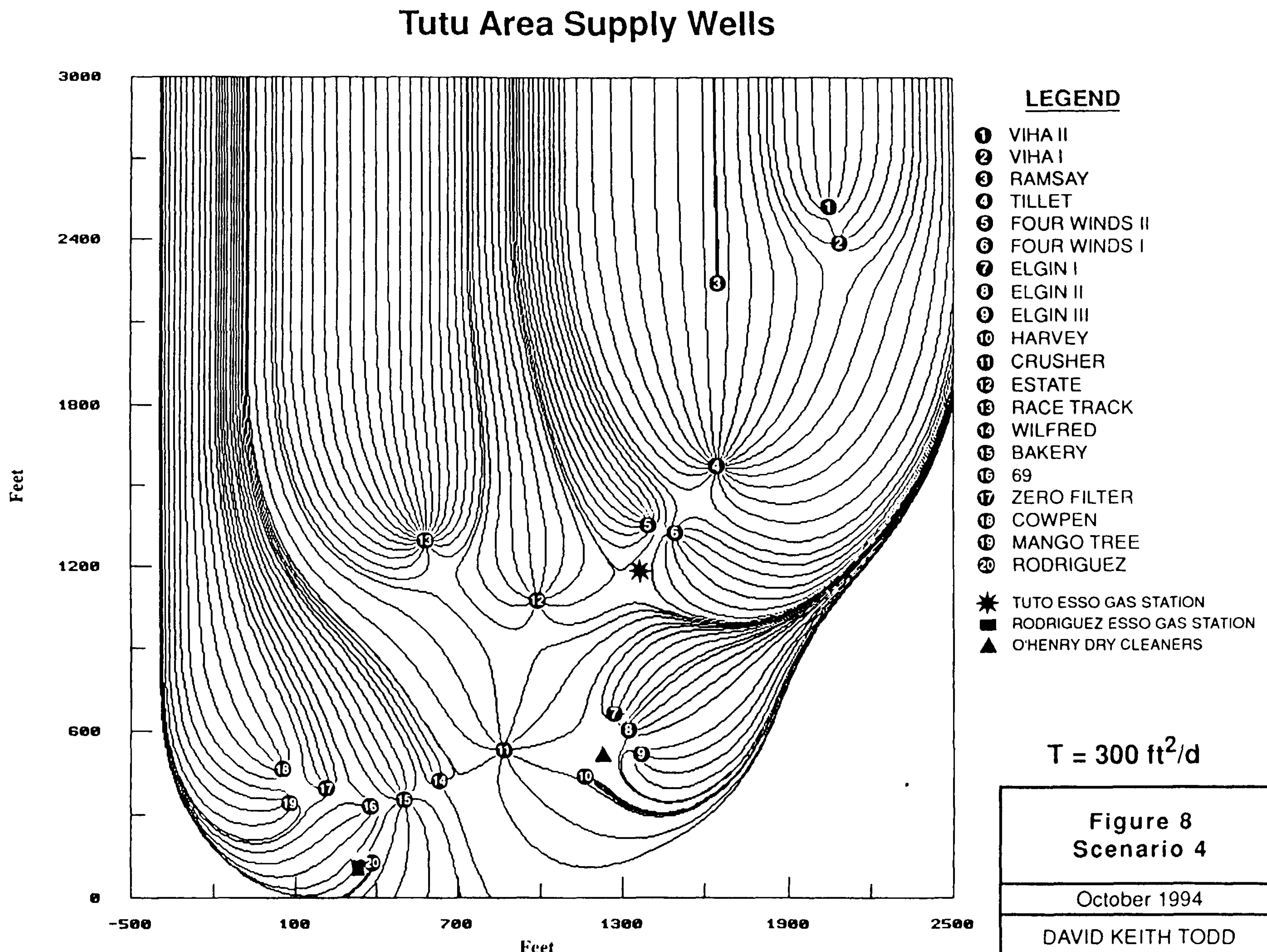

Figure 8
Scenario 4

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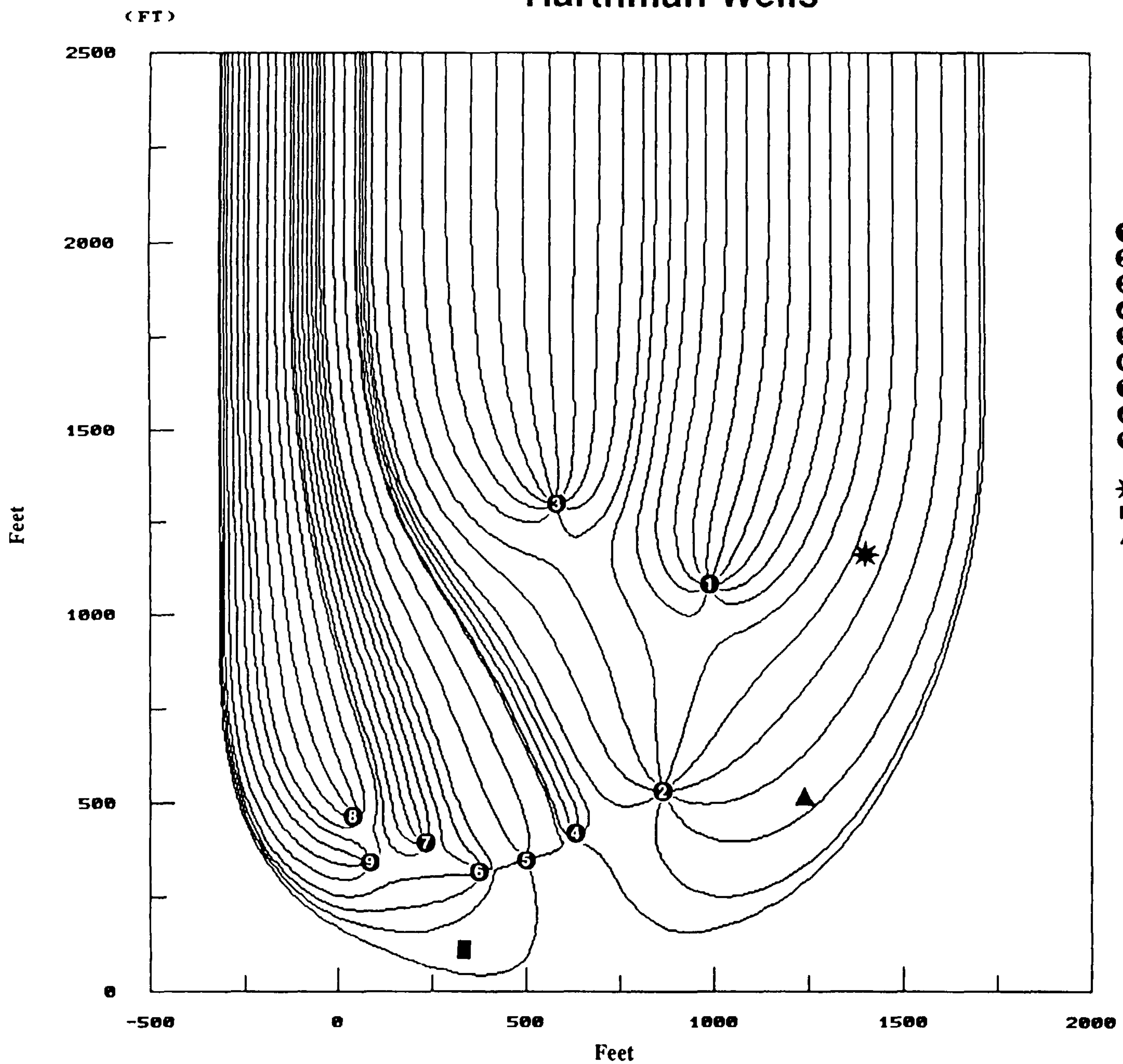
Harthman Wells



LEGEND

- ❶ ESTATE
- ❷ CRUSHER
- ❸ RACE TRACK
- ❹ WILFRED
- ❺ BAKERY
- ❻ 69
- ❼ ZERO FILTER
- ❽ COWPEN
- ❾ MANGO TREE

- ✷ TUTO ESSO GAS STATION
- ■ RODRIGUEZ ESSO GAS STATION
- ▲ O'HENRY DRY CLEANERS

$T = 563\ ft^2/d$

Figure 9
Scenario 5

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interference from other wells. This model run was made using the geometric mean of transmissivity values (563 ft^2/day). The results indicate that Tutu Esso and O'Henry Dry Cleaners fall within the capture zone of the Crusher well, while Rodriguez Esso gas station falls within the capture zone of the Bakery well.

Future Operation of Harthman Wells

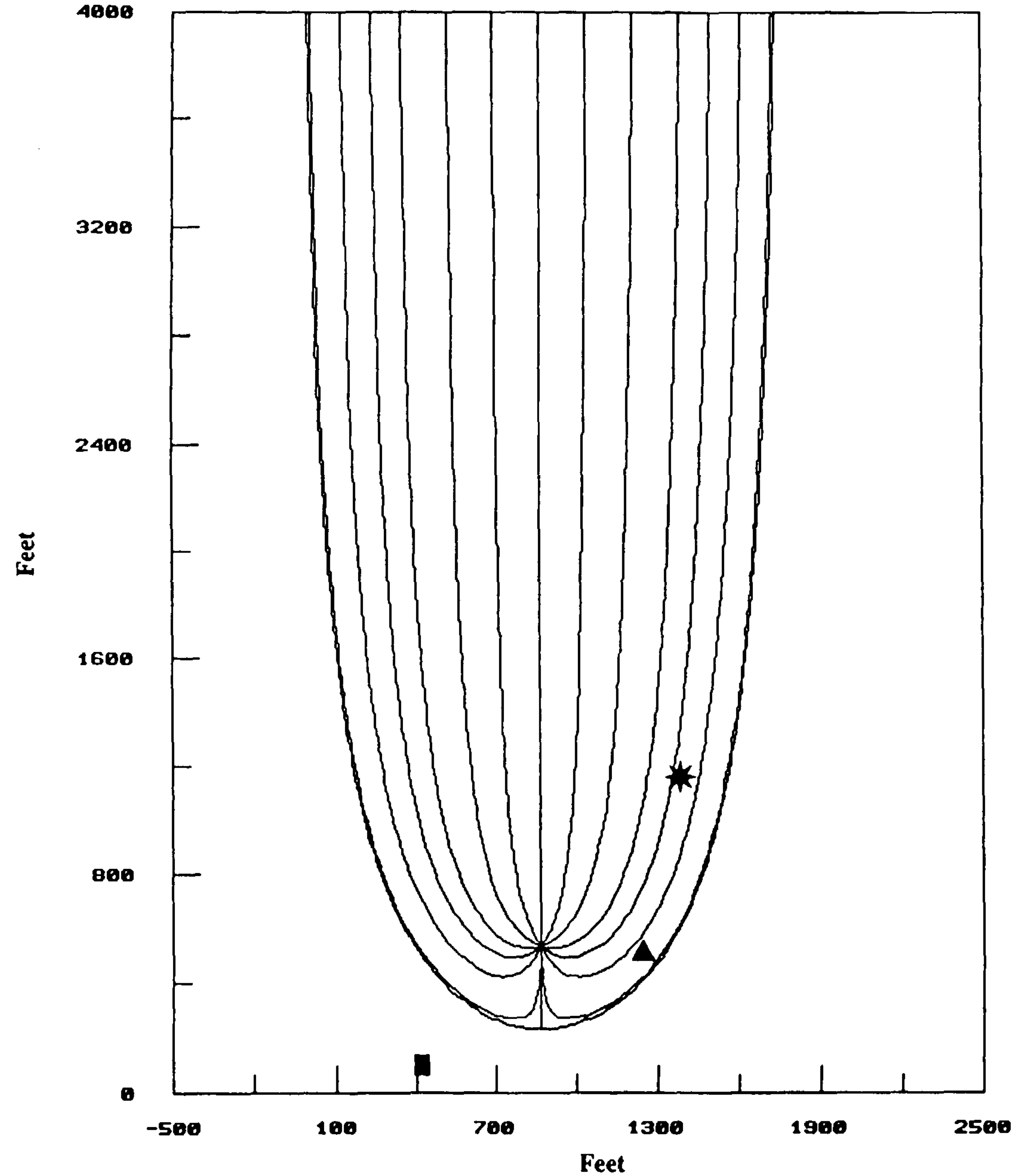
To test the potential of each Harthman well operating separately to capture contaminants under potential future pumpage, Scenarios 6 through 14 were analyzed. Future pumping rates were assumed to equal pre-1987 rates. When delineating a capture zone for each well, the geometric mean transmissivity value of 563 ft^2/day was used, unless a value was available from a test conducted on the particular well.

Scenario 6 (Figure 10) simulates the capture zone of the Crusher well, indicating future lone operation of this well can result in the capture of contaminants emanating from both Tutu Esso and O'Henry Dry Cleaners; groundwater flow from Rodriguez Esso does not appear to reach the Crusher well.

Figure 11 (Scenario 7) depicts the capture zone of the Race Track well. A pumping test conducted on this well resulted in a low transmissivity value of 24 ft^2/day. This in turn results in a large zone of groundwater contribution to the well. As Figure 11 suggests, operation of the Race Track well can result in the capture of contaminants emanating from various sources including Tutu Esso, Rodriguez Esso, and O'Henry Dry cleaners. This well was rarely operated in the past, but its pumpage has resulted in the capture of contaminants, evidenced by a single round of water quality sampling (Table 5).

Figures 12 through 14 (Scenarios 8 through 10) depict capture zones for the Bakery,

Crusher Well



LEGEND

- TUTO ESSO GAS STATION
- RODRIGUEZ ESSO GAS STATION
- O'HENRY DRY CLEANERS

Q = 30 gpm
T = 678 ft^2/d

Figure 10
Scenario 6

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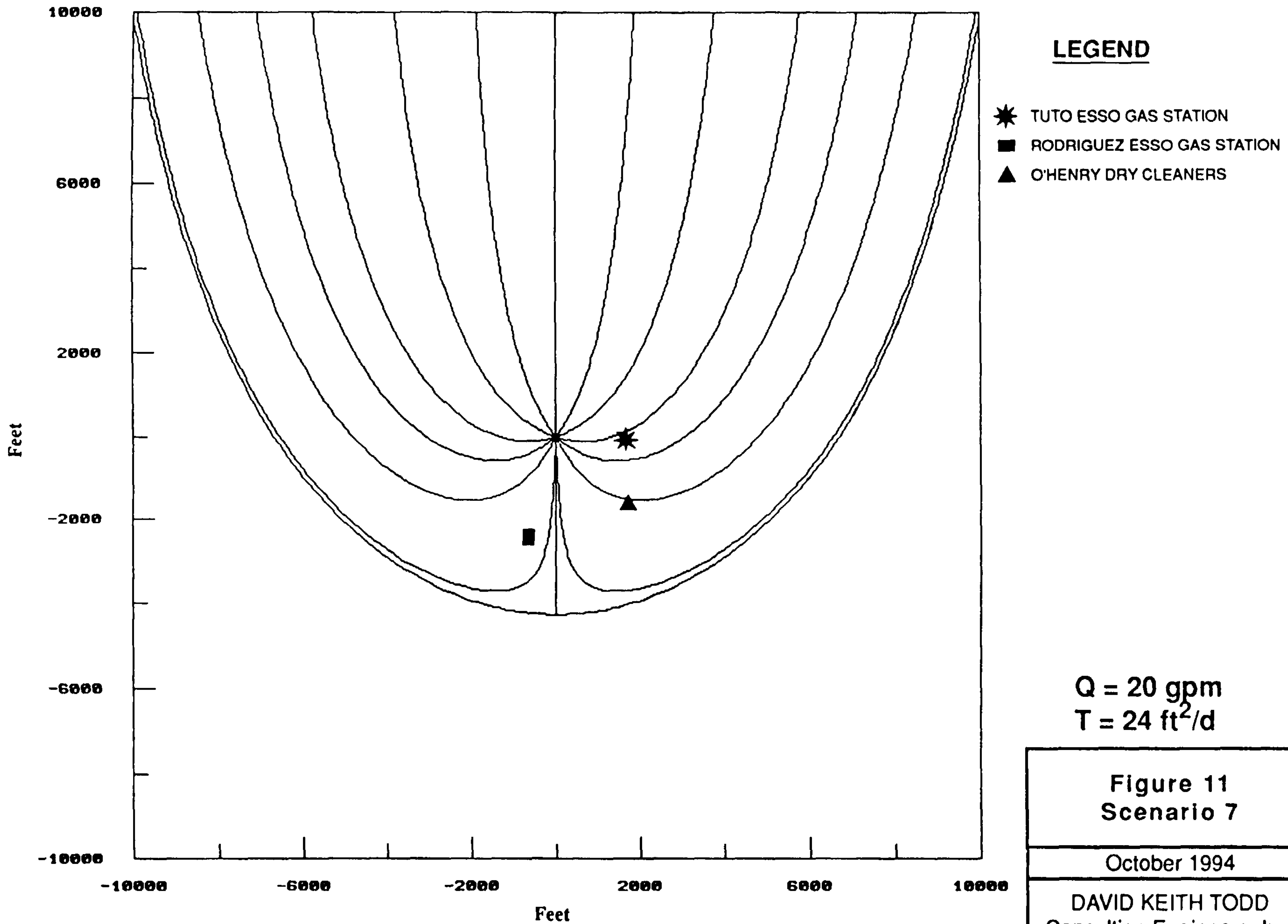
Race Track Well



Q = 20 gpm
T = 24 ft^2/d

Figure 11
Scenario 7

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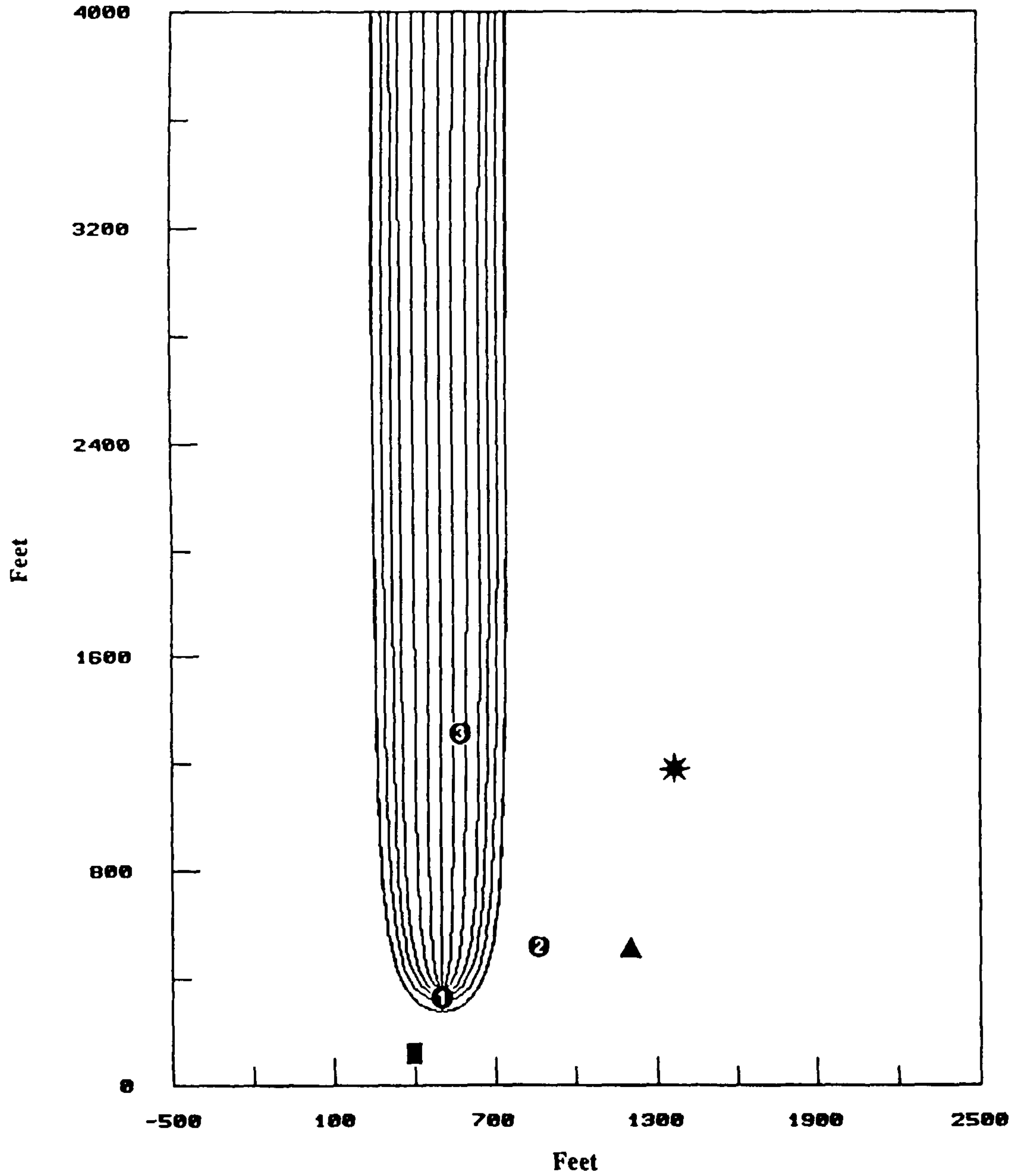
Bakery Well



Q = 20 gpm
T = 1242 ft^2/d

Figure 12
Scenario 8

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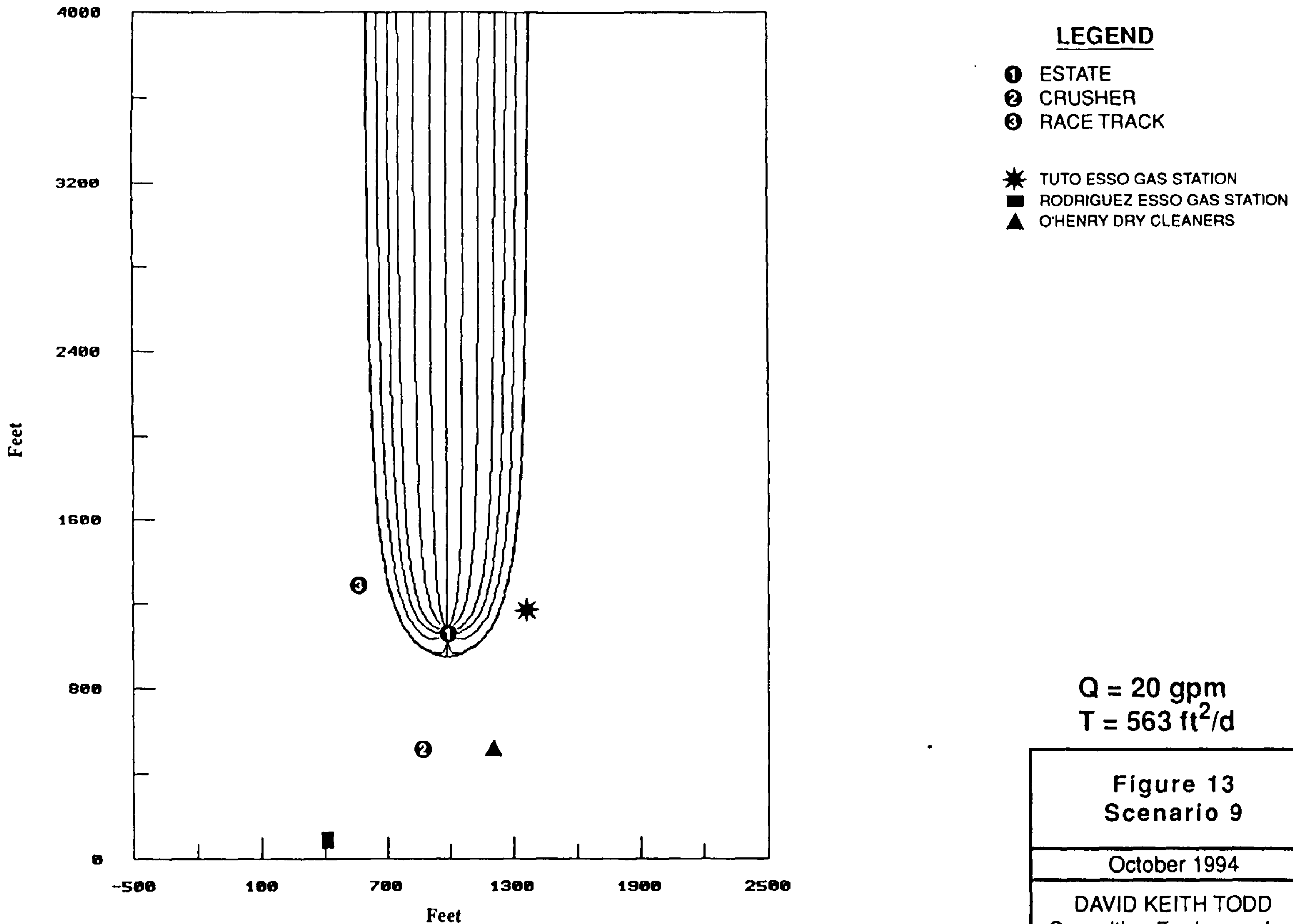
Estate Well



Q = 20 gpm
T = 563 ft^2/d

Figure 13
Scenario 9

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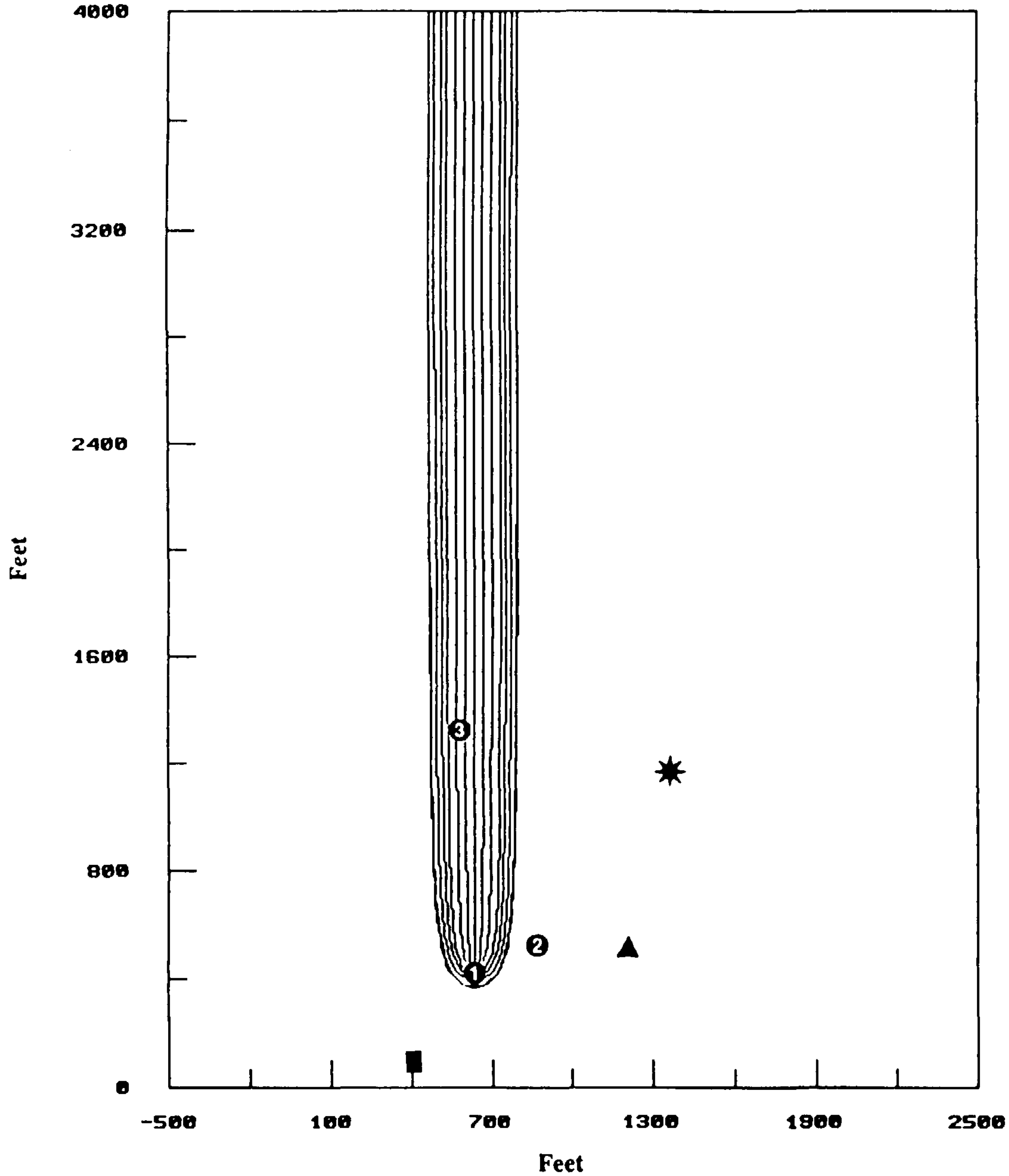
Wilfred Well



LEGEND

❶ WILFRED
❷ CRUSHER
❸ RACE TRACK

✷ TUTO ESSO GAS STATION
■ RODRIGUEZ ESSO GAS STATION
▲ O'HENRY DRY CLEANERS

Q = 6 gpm
T = 563 ft^2/d

Figure 14
Scenario 10

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Estate, and Wilfred wells, respectively. The capture zones of these three wells do not intercept any of the identified sources of contaminants; however, they do intercept areas which are subject to contamination during pumpage of the Race Track well. Although the absence of pumpage in the last seven years should have allowed contaminants to migrate away from these areas via natural groundwater flow, residual amounts may still persist. In addition, the release in the Tutu area of non-aqueous phase liquids (NAPL's) is suspected, resulting in the continuous presence of residual contaminants. Accordingly, pumpage of Bakery, Estate, and Wilfred wells may also result in future contamination.

Figures 15 through 18 (Scenarios 11 through 14) depict the capture zones of Zero Filter, 69, Mango Tree, and Cowpen wells. Review of these figures indicates that the capture zones of these wells do not intercept any source areas, nor do they intercept areas subject to contamination during pumpage of other wells.

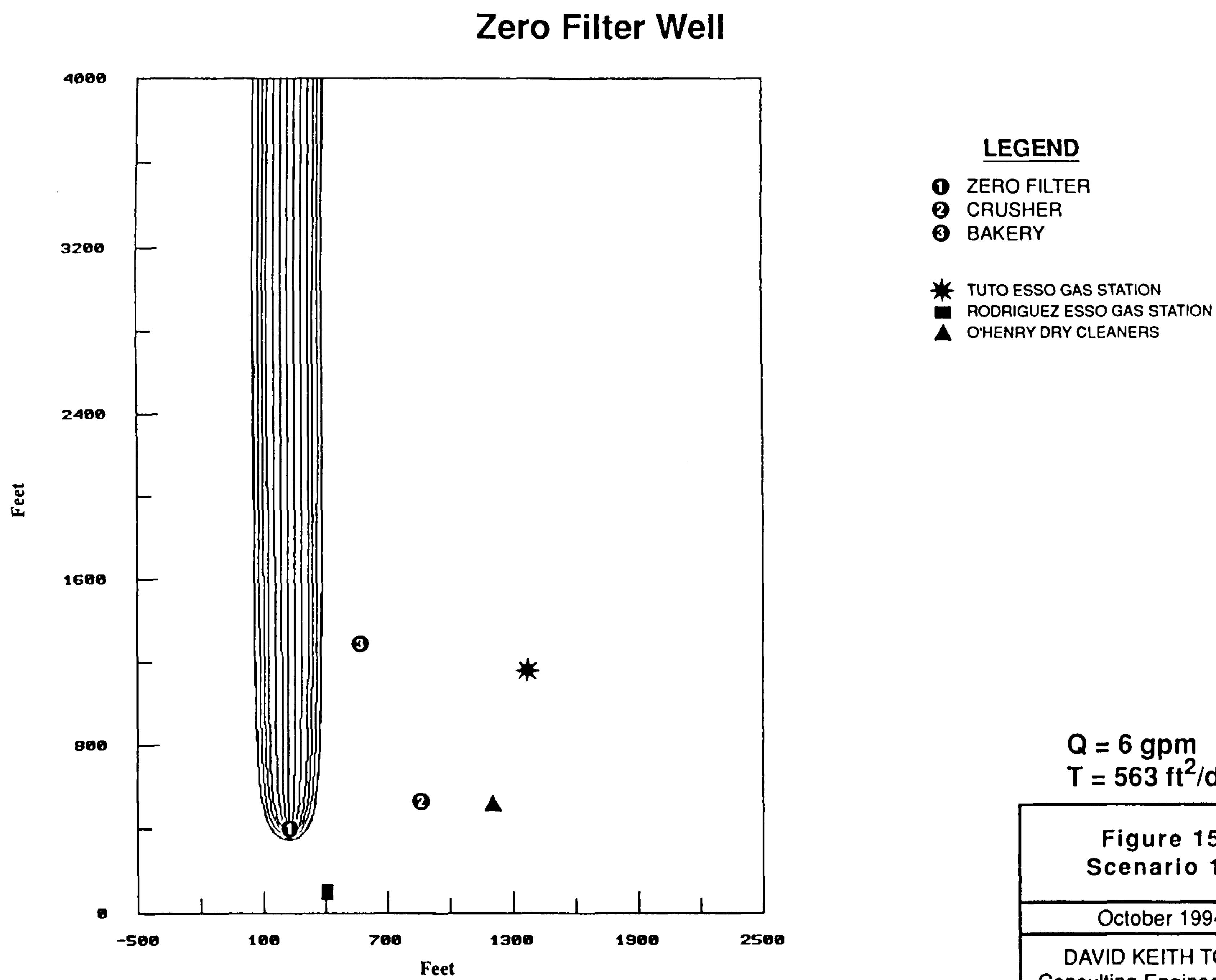

Figure 15
Scenario 11

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69 Well

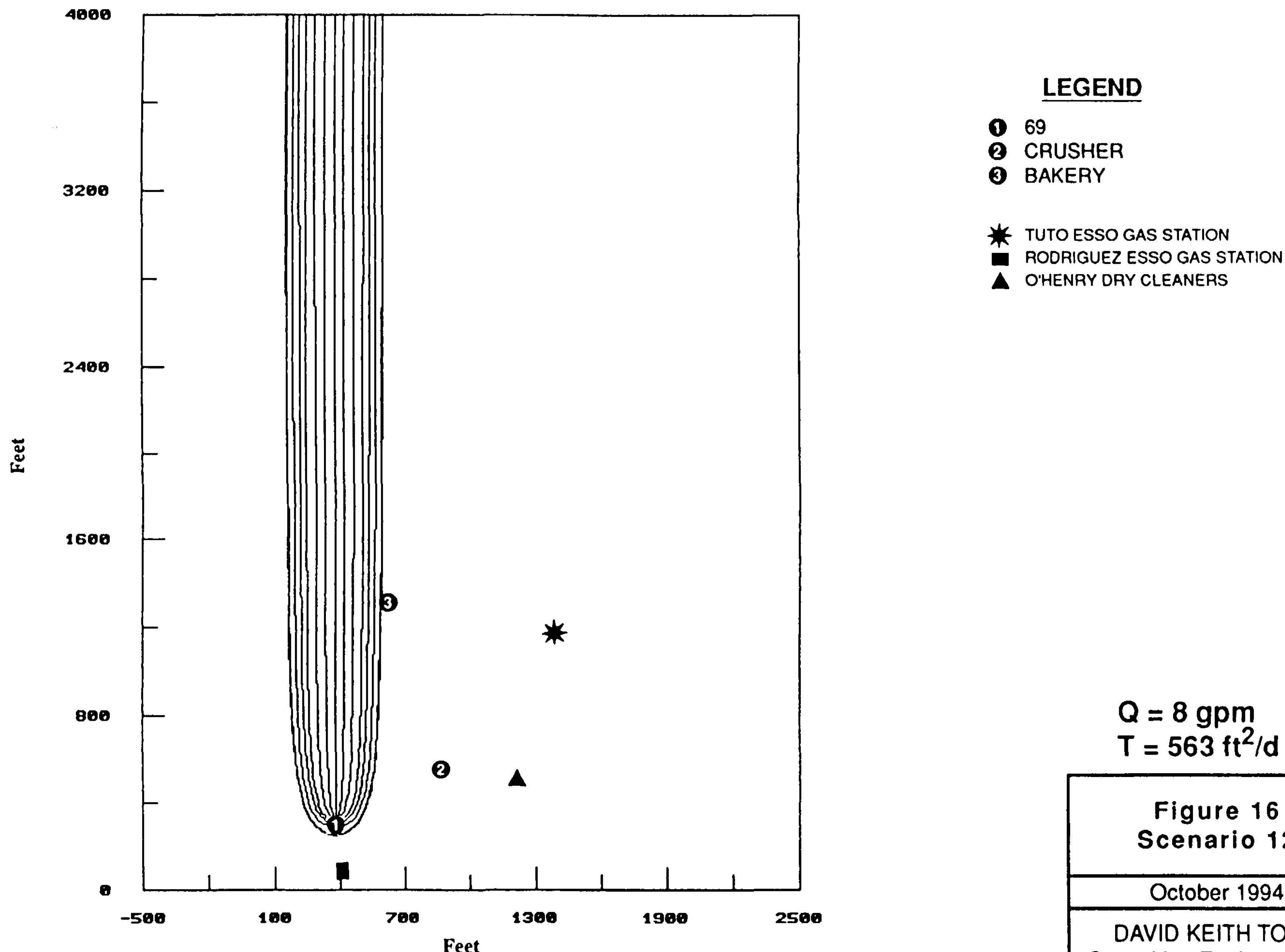

Figure 16
Scenario 12

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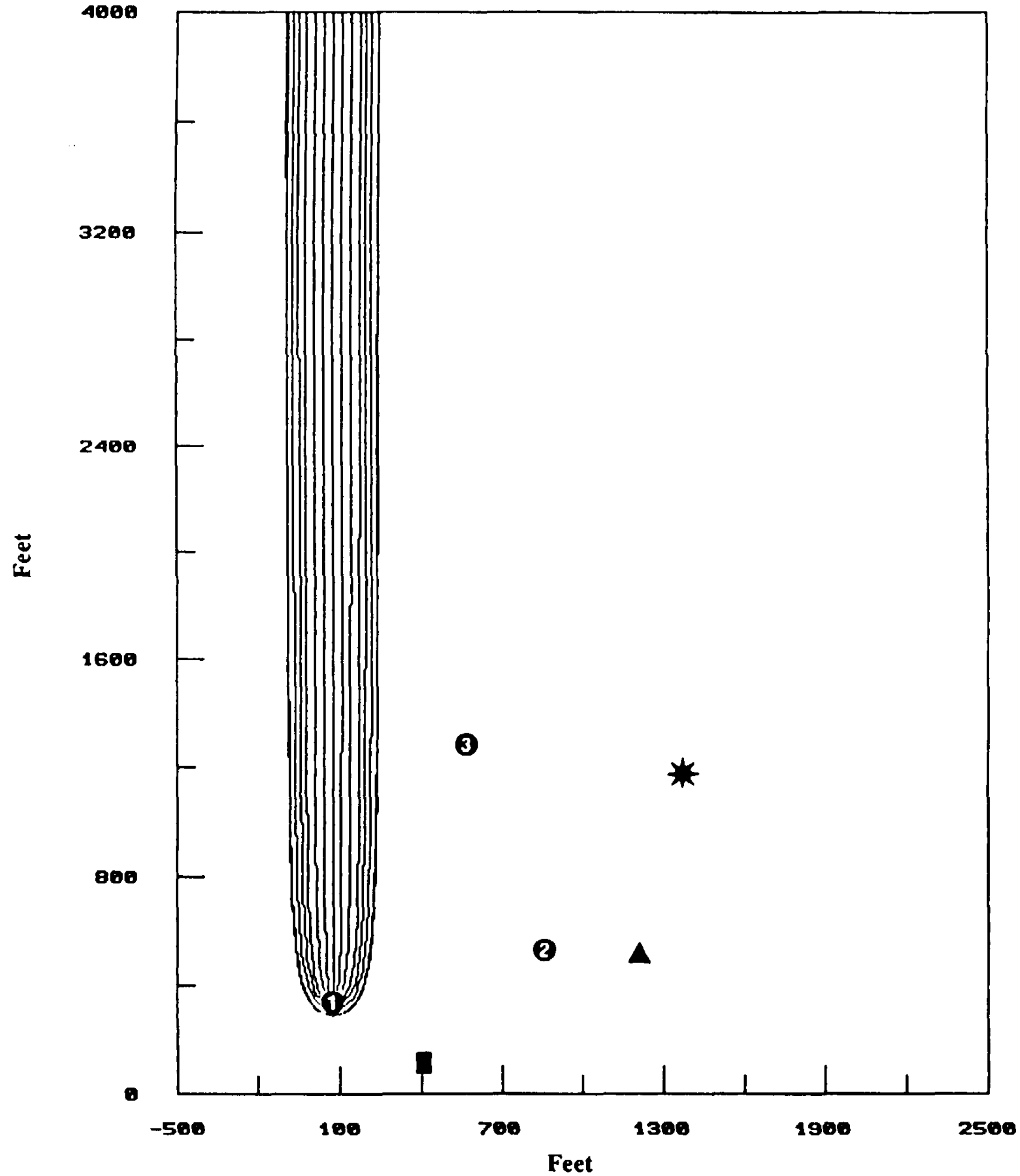
Mango Tree Well



LEGEND

- ❶ MANGO TREE
- ❷ CRUSHER
- ❸ RACE TRACK

- ✷ TUTO ESSO GAS STATION
- ■ RODRIGUEZ ESSO GAS STATION
- ▲ O'HENRY DRY CLEANERS

$Q = 6$ gpm
$T = 563$ ft^2/d

Figure 17
Scenario 13

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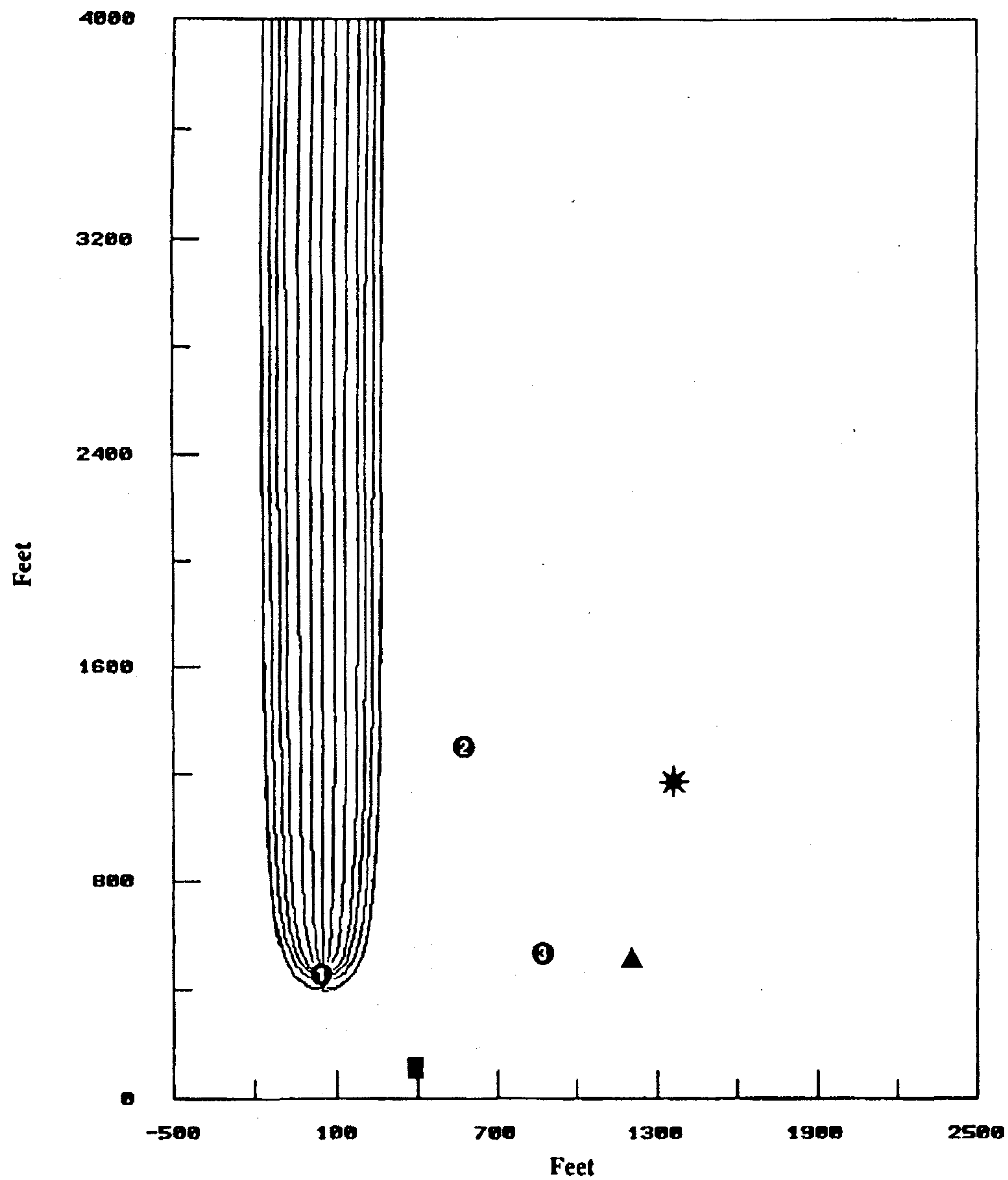
Cowpen Well



LEGEND

❶ COWPEN
❷ CRUSHER
❸ RACE TRACK

✷ TUTO ESSO GAS STATION
■ RODRIGUEZ ESSO GAS STATION
▲ O'HENRY DRY CLEANERS

$Q = 8$ gpm
$T = 563\ ft^2/d$

Figure 18
Scenario 14

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7. Conclusions

Petroleum and chlorinated hydrocarbon compounds have been detected in the Harthman wells since the beginning of sampling in 1987. Review of recently obtained soil and groundwater quality data collected at the Tutu Esso gas station confirms that this station is a source of these same compounds detected in underlying soil and groundwater.

Given the proximity of the Tutu Esso gas station to the Harthman wells, together with the availability of additional recently obtained subsurface data, an analytic modeling exercise was conducted, indicating that several Harthman wells have captured groundwater emanating from Tutu Esso gas station, O'Henry Dry Cleaners, and Rodriguez Esso gas station. Additionally, modeling results indicate that future operation of the Harthman wells will result in the capture of groundwater emanating from Tutu Esso gas station, O'Henry Dry Cleaners, and Rodriguez Esso gas station.

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Professional Record
of
David Keith Todd, Consulting Engineer

Background:

David Keith Todd has served as an independent consulting engineer on a part-time basis in the field of water resources planning, development, and management since 1950. In 1978 he formed his own consulting firm--David Keith Todd Consulting Engineers, Inc.--in Berkeley, California, staffed with engineers and geologists. The company specializes in the planning, development, management, and protection of groundwater.

Dr. Todd also holds the position of Professor of Civil Engineering, Emeritus at the University of California, Berkeley. In recent years he taught all of the hydrology courses and was in charge of the graduate program in Water Resources Engineering. As a result of his extensive experience in teaching, research, and consulting, he has been associated with wide variety of water projects and issues. His numerous publications in the water field have earned him a national as well as an international reputation, particularly relating to underground water.

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Professional Registration:

California	- Registered Civil Engineer, Certificate No. 12000
Indiana	- Registered Civil Engineer, Certificate No. 8560
Delaware	- Registered Professional Engineer, Certificate No. 9695

Professional Affiliation:

Fellow, American Society of Civil Engineers
Fellow, American Geophysical Union
Member, American Water Works Association
Fellow, American Meteorological Association
Fellow, American Association for the Advancement of Science
Member, National Water Well Association and the Association of Ground Water Scientists and Engineers
Member, American Institute of Hydrology, Certified Hydrologist-Ground Water, No. 630

Professional Recognition:

Member, Tau Beta Pi
Member, Chi Epsilon
Member, Sigma Xi
Postdoctoral Fellow, National Science Foundation, 1957-1958
Research Prize, American Society of Civil Engineers, 1960
American Men of Science, 10th edition, 1962
Who's Who in Engineering, 9th edition, 1964
Distinguished Alumnus, Purdue University, 1964
Senior Postdoctoral Fellow, National Science Foundation, 1964-1965
Centennial Professor, American University of Beirut, Lebanon, 1967
Visiting Professor, Universidad de Oriente, Puerta la Cruz, Venezuela, 1969-1972
Who's Who in America, 38th edition, 1974

Professional Experience:

1978-date:	President, David Keith Todd Consulting Engineers, Inc.
1950-date:	Instructor, Lecturer, Assistant Professor, Associate Professor, Professor, and Professor Emeritus of Civil Engineering, University of California, Berkeley.
1950-1970:	Research Engineer (part-time), Office of Research Services, University of California, Berkeley.
1954-1956:	Hydraulic Engineer (part-time), U.S. Geological Survey, Berkeley, California.
1948-1950:	Hydraulic Engineer, U.S. Bureau of Reclamation, Denver, Colorado.

Foreign Consulting Experience in Water Resources:

Europe--Studies of groundwater resources, development, and problems in Switzerland, England, France, Germany, Sweden, and Netherlands, 1957-1958 and 1964-1965.

Thailand, Philippines, and Japan--Consultant for lectures and study tour on development of groundwater resources, UNESCO, 1962.

India--Consultant on preparation of groundwater project proposal from the Government of India to the Special Fund, United Nations, 1963; organizer of Seminar on Artificial Recharge of Groundwater for the United Nations, Ahmedabad, India, 1984-1985.

Pakistan--Member of White House-Interior Scientific Team to review and recommend program for improvement of agriculture in the Indus River Plain, West Pakistan; primary emphasis was on feasibility of new wells to pump groundwater for lowering of the water table, leaching of salt from the soil, and increasing irrigation water supply, U.S. Department of the Interior, 1961-1963; Consultant on new well field for water supply of the City of Faisalabad, Engineering-Science, Arcadia, California, 1983.

Saudi Arabia--Consultant on planning and investigation of groundwater resources in Northern Saudi Arabia, Ralph M. Parsons Co., Los Angeles, 1965-1967.

Lebanon--Consultant on development of groundwater resources for water supply for the City of Beirut and on utilization of submarine springs discharging groundwater from limestone aquifers into the sea, Special Fund, United Nations, 1967.

Cyprus--Consultant on management of groundwater resources and control of seawater intrusion, Special Fund, United Nations, 1967.

Algeria--Consultant on groundwater resources development and utilization for economic development by irrigation and industry of three major areas in Algeria, General Electric Company, Santa Barbara, California, 1965-1970.

Libya--Consultant on groundwater resources development for irrigation, Joufrah Project near Hon, Philipp Holsmann AG, Frankfurt am Main, Germany, 1975-1977.

Nicaragua--Consultant on protection of the water supply system for the City of Managua against groundwater pollution, Empresa de Aguadora, Managua, Nicaragua, 1976-1978.

Foreign Consulting Experience in Water Resources:

Barbados--Consultant on development plans for supplemental water supplies for irrigation and municipal uses, and on prevention of seawater intrusion, Stanley Associated Engineering, Ltd., Edmonton, Canada, 1977-1978.

Jamaica--Consultant on plans for village water supplies throughout the island from wells and springs, Stanley Associates Engineering Ltd., Edmonton, Canada, 1978.

Turks and Caicos Islands--Consultant on groundwater development for water supplies on small coral limestone islands, Stanley Associates Engineering Ltd., Edmonton, Canada, 1980.

Peru--Consultant on groundwater development to augment water supply for City of Lima, Peru, Engineering-Science, Arcadia, California, 1980-1982.

Sri Lanka--Consultant on groundwater development in the Jaffna Area, Engineering-Science, Arcadia, California, 1982.

Chile--Consultant on groundwater development in the Atacama Desert, BHP Utah International, San Francisco, California, 1983-1994.

Australia--Invited lecturer on groundwater resources to provincial water agencies in Brisbane, Sydney, Melbourne, Adelaide, and Perth, 1986.

Consulting Clients in the United States on Water Resources:

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2. Arid Tech, Inc., Manhattan Beach, CA
3. Bechtel Corporation, San Francisco, CA
4. BHP-Utah International, San Francisco, CA
5. BKK Corporation, City of Industry, CA
6. Bodega Bay Public Utility District, Bodega Bay, CA
7. Brelje & Race, Santa Rosa, CA
8. Browning-Ferris Industries, Houston, TX
9. California Department of Water Resources, Sacramento, CA
10. Case Western Reserve University, Cleveland, OH
11. Chemical Waste Management, Inc., San Jose, CA
12. Chevron Chemical Co., Richmond, CA
13. City and County of Honolulu, HI
14. City of Ceres, CA
15. City of Emeryville, CA
16. City of Healdsburg, CA
17. City of Livermore, CA
18. City of Los Angeles, CA
19. City of Mendocino, CA
20. City of Oakland, CA
21. City of San Bruno, CA
22. City of Santa Barbara, CA
23. City of Seattle, WA
24. Creegan and D'Angelo, San Jose, CA
25. Dames & Moore, San Francisco, CA
26. Dow Chemical Co., Pittsburg, CA
27. East Valley Water District, San Bernardino, CA
28. Engineering-Science, Inc., Arcadia, CA
29. FMC Corporation, Philadelphia, PA
30. Fox and Carskadon, San Mateo, CA
31. General Electric Company, Santa Barbara, CA
32. Geoconsultants, Inc., San Jose, CA
33. Geraghty & Miller, Inc., Plainview, NY
34. Goleta Water District, Goleta, CA
35. Granite Construction Co., Watsonville, CA
36. Great Oaks Water Co., San Jose, CA
37. Harding-Lawson Associates, Novato, CA
38. Harstad Associates, Inc., Seattle, WA
39. High Plains Underground Water Conservation District, Lubbock, TX
40. Monterey County Water Conservation District, Salinas, CA

Consulting Clients in the United States on Water Resources:

41. Peter Kaldveer & Associates, Oakland, CA
42. Kennedy/Jenks/Chilton Engineers, San Francisco, CA
43. Kern County Water Agency, Bakersfield, CA
44. Kirker Chapman & Associates, San Francisco, CA
45. Lawrence Livermore Laboratory, Livermore, CA
46. Leggette, Brashears & Graham, New York, NY
47. Lowry & Associates, Pleasanton, CA
48. McKesson Corporation, Dublin, CA
49. Miami Conservancy District, Dayton, OH
50. Northrop Corporation, Hawthorne, CA
51. Occidental Chemical Company, Lathrop, CA
52. Oceanic California, Inc., The Sea Ranch, CA
53. Office of Science and Technology, Executive Office of the President, Washington, D.C.
54. Rittenhouse-Zeman & Associates, Portland, OR
55. Sacramento Municipal Utility District, Sacramento, CA
56. San Francisco Bridge Company, San Francisco, CA
57. Santa Clara Valley Water District, San Jose, CA
58. Scotts Valley Water District, Scotts Valley, CA
59. Shoshone & Arapahoe Tribes, Fort Washakie, WY
60. Solvent Service, Inc., San Jose, CA
61. Steffen, Robertson & Kirsten, Lakewood, CO
62. Terra California, Walnut Creek, CA
63. Time Oil Co., Tacoma, WA
64. URS Corporation, San Bernardino, CA
65. United Nations, NY
66. U.S. Bureau of Reclamation, Sacramento, CA
67. U.S. Department of Justice, Washington, D.C.
68. U.S. Environmental Protection Agency, Washington, D.C.
69. University of California, Berkeley, CA
70. Weigmann & Rose International Corp., Richmond, CA
71. Winzler & Kelly, Santa Rosa, CA
72. Woodward-Clyde & Associates, Oakland, CA
73. Yucaipa Valley Water District, Yucaipa, CA

Publications

Author of more than 115 technical publications in the field of hydrology and water resources, with particular emphasis on groundwater resources (complete list of publications available upon request). Included are seven books:

(1) *Annotated Bibliography on Artificial Recharge of Groundwater through 1954*, U.S. Geological Survey Water-Supply Paper 1477, Government Printing Office, Washington, D.C., 115 pp., 1959.

(2) *Groundwater Hydrology*, John Wiley & Sons, Inc., New York, NY 336 pp., 1959, 2nd edition, 535 pp., 1980. This book has been used as a textbook by some 52 American universities, published in several international editions, and translated into Hindi, Malaysian, Persian, Portuguese, Spanish and Turkish.

(3) *The Water Encyclopedia* (Editor), Water Information Center, Inc., Port Washington, NY, 559 pp., 1970. Named an outstanding reference book of 1971 by *Library Journal* and an outstanding academic book of 1971 by *Choice Magazine*.

(4) *Water Publications of State Agencies* (Edited with G.J. Giefer), Water Information Center, Inc., Port Washington, N.Y., 350 pp., 1972; First Supplement, 189 pp., 1976.

(5) *Polluted Groundwater* (with D.E.O. McNulty), Water Information Center, Inc., Port Washington, NY, 179 pp., 1976.

(6) *Ground-Water Resources of the United States* (Compiler), Premier Press, Berkeley, CA, 749 pp., 1983.

(7) *The Water Encyclopedia* (Edited with F. van der Leeden and F.L. Troise), Lewis Publishers, Chelsea, MI, 808 pp., 1990.

EXHIBIT LIST

TO LETTER OF NOVEMBER 1, 1994
FROM FOUR WINDS PLAZA PARTNERSHIP
TO DPNR AND EPA

TUTU WELL CONTAMINATION
ST. THOMAS, U.S. VIRGIN ISLANDS

EXHIBIT LIST TO LETTER OF NOVEMBER 1, 1994

A) LETTER from CDM Regional Manager, Scott Graber, to the EPA dated November 25, 1987 regarding Overview of Texaco Soil Gas Survey.

B) LETTER from CDM Regional Manager, Scott Graber, to the EPA dated June 29, 1988 regarding Overview of Esso Soil Gas Survey.

C) LETTER from EPA Regional II, Carole Petersen, to Ana Gloria Ramos dated April 4, 1991 regarding Comments on the Tutu Service Station Investigation Work Plan dated January 1991.

D) TELEPHONE CONVERSATION RECORD of phone call from Ana Gloria Ramos and Jose Agrelot to Tom Danahy of Geraghty & Miller dated April 23, 1991 regarding EPA comments on Draft Work Plan.

E) REPORT, "Soil Gas Survey, Four Winds Shopping Center and Environs, Tutu Area, Anna's Retreat, U.S. Virgin Islands", prepared by Target Environmental Services, dated February 1992.

F) LOGBOOK #4A, excerpts from Geraghty & Miller Logbook #4A.

G) LOGBOOK #3A, excerpts from Geraghty & Miller Logbook #3A.

H) LOGBOOK #5, excerpts from Geraghty & Miller Logbook #5.

I) LOGBOOK #4B, excerpts from Geraghty & Miller Logbook #4B.

J) LOGBOOK #4C, excerpts from Geraghty & Miller Logbook #4C.

K) DEPOSITION EXCERPTS of **Lisa Bonanno**, March 18, 1991, Owner and Operator of the Splash and Dash Car Wash.

> ***See* pp. 162-173 for her description of the oil-like substance collecting in the car wash excavation**

L) DEPOSITION of **George Mosa**, Contractor for the construction of Splash and Dash Car Wash.

> ***See* entire transcript for his description of an oil like substance "oozing" into the excavation from beneath the Tutu Esso station during late February of 1991**

M) DEPOSITION EXCERPTS of **Thomas Gutshall,** former service manager Esso Tutu.

> *See* pp. 30-31 - Chemicals from part washer were dumped into the waste oil pit. Deposition Exhibit 7 attached.
>
> *See* pp. 37-42 - Description of oil/water separator and discharge pipe. Deposition Exhibits 4 and 8 attached.
>
> *See* pp. 60-62 - Discussion of pipe line replacement.

N) DEPOSITION EXCERPTS of **Nelson Rosado**, October 14, 1992, Engineer of Essorico.

> ***See*** **p. 66, line 20 through p. 75 - Rosado climbed down into the excavation and observed a black, brownish liquid coming from the wall by the Esso station.**

O) COVER LETTER dated August 20, 1991 from Richard Smith to the EPA (Chester) with lab results of soil sample taken from car wash excavation by Marcella Jennings of Caribbean Safe Water Lab.

P) DEPOSITION EXCERPTS of **Thomas Danahy**, August 10, 1993, Senior Scientist, Project Manager, Geraghty & Miller.

> *See* p. 29, line 14 through p. 30, line 5 - Danahy not really sure what is in the subsurface underneath that area.

Q) REPORT of Weston Sper dated January 27, 1988- results of VOC testing in the waste oil storage tanks at Esso Tutu.

R) LETTER from CDM Regional Manager, Scott Graber, to the EPA dated March 6, 1989 regarding test samples taken from the oil/water separator and holding tank at Esso Tutu.

S) FINAL REPORT, "Final CLP Sample Analysis Data Summary of Soils and Waters Sampled in 1989 of Tutu Wellfield, St. Thomas, U.S. Virgin Islands", from CDM FPC U.S. EPA dated May 31, 1990.

T) MEMORANDUM, from Engr. Jose C. Agrelot of Soil Tech to Lic. Jose L. Cepeda regarding Soil Sampling at the Esso Tutu Car Care Center, dated January 23, 1990.

U) PROJECT ORGANIZATIONAL CHART, Tutu Wellfield Investigation, from Geraghty & Miller with Bates Stamp No. A03970

V) INVOICE from Selig Chemical Industries dated 7/21/83 showing purchase of Superkleen by Esso Tutu with MSDS sheets attached.

W) TRANSCRIPT excerpt from December 9, 1993 Hearing before The Honorable Stanley S. Brotman, regarding testimony of Ana Gloria Ramos.

> ***See*** **p. 69, line 12 through page 70, line 14 - Ramos saw employees discharging oil from the oil water separator.**

X) REPORT of Dr. Paul Fahrenthold will be provided at a later date.

EXHIBIT 'A'

November 25, 1987

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Contract No.: 68-01-7331
Document No.: T648-C02-EI-[illegible]

Subject: Overview of Texaco Soil Gas Survey of the Tutu Wellfield Site

Dear Ms. Kwan:

The purpose of this letter is to provide you with our comments on the Texaco Soil Gas Survey of the vicinity of the Tutu Texaco service station, St. Thomas, Virgin Islands.

The purpose of the survey was to assess Texaco's role in the contamination of area groundwater. The survey will aid in the location of groundwater monitoring wells, to be installed after the removal of leaking underground storage tanks at the [illegible] station. It is essential that soil gas be analyzed prior to any remediation involving soil disturbance.

Texaco has contracted Geoscience Consultant, Ltd. (GCL) to perform the work. GCL has, in turn, contracted Tracer Research Corporation (TRC) to do the actual sampling and analysis of the soil gas using an on-site gas chromatograph (GC). Due to the detection of benzene, toluene, trichloroethylene (TCE), tetrachloroethylene (PCE), and other contaminants in groundwater from nearby wells, Texaco has agreed to analyze for benzene, toluene, ethylbenzene, and xylene (BTEX) and total hydrocarbons, as well as chlorinated hydrocarbons which are not normally associated with gasoline.

While gasoline components were analyzed using a flame ionization detector (FID), the chlorinated hydrocarbons were analyzed using an electron capture detector (ECD).

At the close of the project, [illegible] on-site and 46 off-site (i.e. off the service station) probed points had been analyzed for BTEX and total hydrocarbons (Figure 1). In addition, 2 off-site points were analyzed to serve as background values, and an area behind the fire station was measured daily for drift. Nine locations were probed and analyzed for chlorinated hydrocarbons using an ECD. Pipes were hand-driven to depths ranging from approximately 2 to 9 feet below the surface. In areas covered by concrete or asphalt, an electric hand drill was used initially to break through the soil. Although pipes were driven until rock or bedrock was reached, it was generally impossible to get deeper than 5 or 6 feet. Where possible, shallow and deep samples were analyzed, although most values did not differ greatly.

DP100034

Total hydrocarbon values have been used to preliminarily define the plume(s) of contamination (Figure 2). According to TRC's on-site chemist the chromatograms of soil gas samples from the vicinity of the underground tanks are characteristic of gasoline, although it was impossible to break out individual benzene, toluene, ethylbenzene, and xylene peaks from the total hydrocarbon peaks. At one on-site location (B2), Texaco used an OB101 column (a "stickier" column) in an attempt to spread out the chromatograms. Using a standard concentration of 2000 ug/l, it was barely possible to detect benzene and toluene peaks. However, at a higher total hydrocarbon sample point (B2), 6700 ug/l benzene and 78,000 ug/l total hydrocarbons were found. Toluene was lower than the detection limit of 55 ug/l.

In the area of Tillet's well, a late hydrocarbon peak distinguishes the soil gas samples in this area from those near the tanks. According to TRC, the chromatograms from these samples near Tillet's well are not characteristic of gasoline.

Chromatograms of samples from the vicinity of the Esso service station show a mixture of the typical gasoline peaks and the late peak. Texaco's consultants have suggested that this late peak may be PCE.

It appears that bedrock is closer to the surface below the Tillet property than the rest of the study area. The Tillet property lies to the south of the Texaco station and is elevated approximately 10-15 feet relative to the station and the Four Winds Shopping Center and parking lot to the west. Outcrops can be observed behind the VITELCO building, which is adjacent to the paint store building.

The points driven into the Tillet property have generally been not deeper than 5 or 6 feet, although one point (T19) was driven to 9 feet 10 inches. These samples indicated aromatic hydrocarbon values similar to background. There are, however, significant amounts of chlorinated hydrocarbons in the soil gas near the Tillet well. This particular hydrocarbon peak was not observed on the chromatgrams from samples taken at the Texaco station.

It should be noted that benzene and other contaminants (aromatic hydrocarbons)have been detected in ground water from the Tillet well, despite the fact that the aromatic hydrocarbon values in the soil gas samples are low. The level sampled beneath the Tillet property is at least a few feet above street level, and approximately 10 feet above the level sampled at Texaco and The Four Winds Parking Lot. Chlorinated hydrocarbons are more volatile in soil than the aromatic hydrocarbons. If the water table is never reached or close when sampling, the BTEX values will normally be low relative to the chlorinated hydrocarbons unless you sample a pocket of high concentration. Ground water occurs at approximately 20 feet below the surface of the Tillet property.

Ms. Kwan
Page Three

Bedrock in the area consists of fractured volcanics. The fracture pattern has an effect on hydraulic conductivity and aquifer contamination. It is likely that the fractured bedrock high of the Tillet area was recharged by the contaminated alluvium. One sample of ground water from the Tillet well was run through the GC. While toluene was below the detection limit of 5 ppb, benzene was valued at approximately 800 ppb.

The ECD analyses confirmed the results of the FID, that a late peaking chlorinated hydrocarbon (PCE) is present in the areas of the Tillet Well, the Esso Station, and the Public Education Facility (formerly, the Lagging Clothe Factory, which reportedly used PCE).

Based on the results of the soil gas survey, it seems apparent that Texaco has contaminated the soil gas in the area of the tanks. The contamination appears to extend into the area underlying Rts. 38 and 384 close to the station. The values from the northern section of The Four Winds Parking Lot are orders of magnitude lower than the values closer to the station and similar to background.

In the southern section of the parking lot, however, higher values suggest that Esso is at least partially responsible for hydrocarbon contamination. It appears that Esso is down-gradient from Tillet's well, and this should be considered during the evaluation. It should be noted that the Tillet well is located centrally to Texaco and Esso, and was reportedly pumping 60 gallons per minute (gpm) prior to being closed to operation due to contamination. There are also 2 wells on the Four Winds property just north of the Esso station, which may h[illegible]e, in effect, reversed any regional gradient during heavy pumping.

In conclusion, it is [illegible] Texaco's best interest to remain open-minded and honest in terms of sampling, analysis, and interpretation of the data, due to the complexity of this area (i.e. limited knowledge about the character and thickness of alluvium and groundwater elevations, a factor upon which soil gas is dependent).

Sincerely,

CDM Federal Program Co[illegible]ion

Scott Graber

Scott Graber
TES I[illegible] Work Assi[illegible]t Manager

SG:kw

cc: J. Fo[illegible]
NYC F[illegible]

(SG1/29)

DP100656

TUT 006 0755

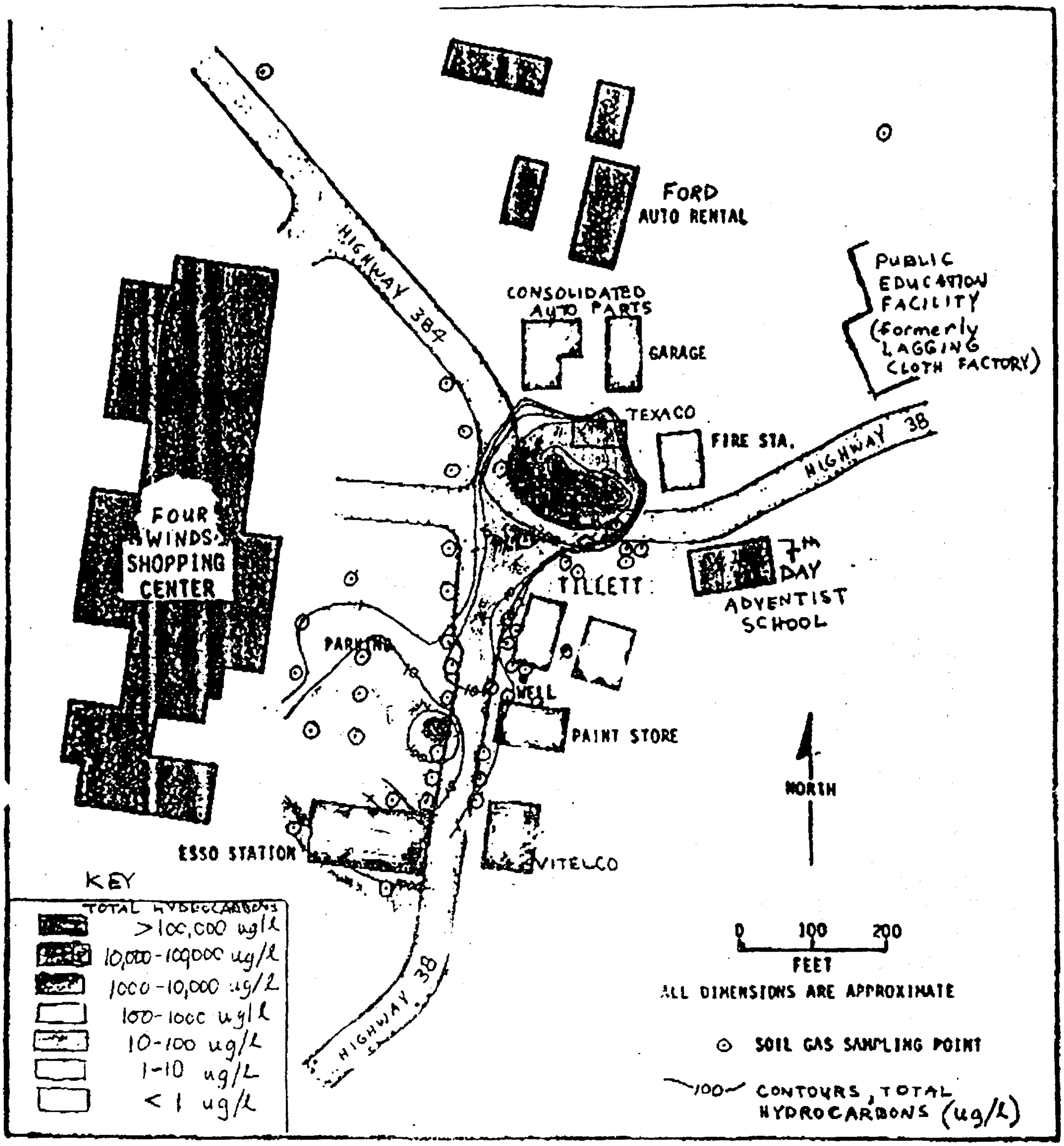


FIGURE 2.

PRELIMINARY RESULTS OF SOIL GAS SAMPLING AT THE TUTU AREA.

DP100057

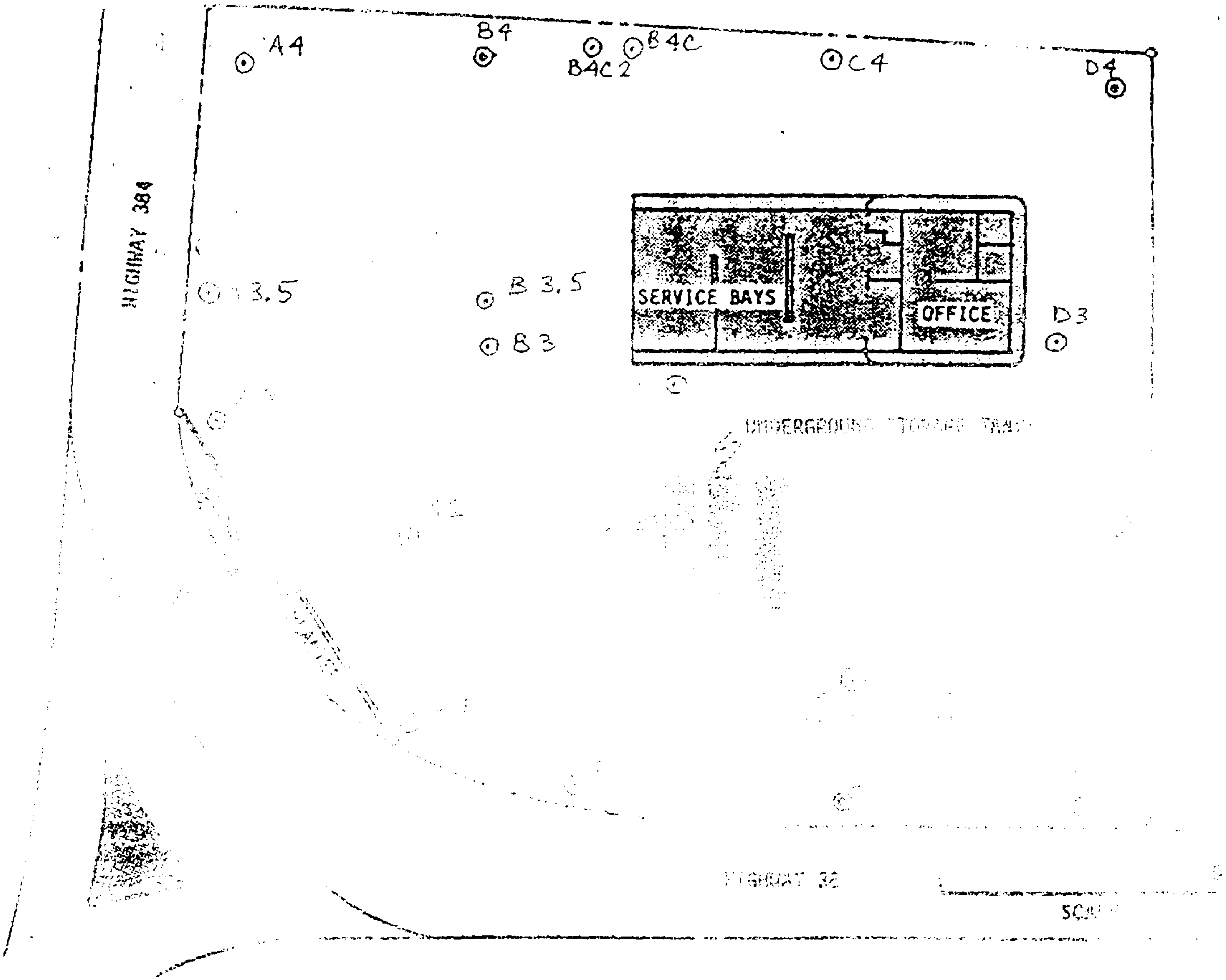
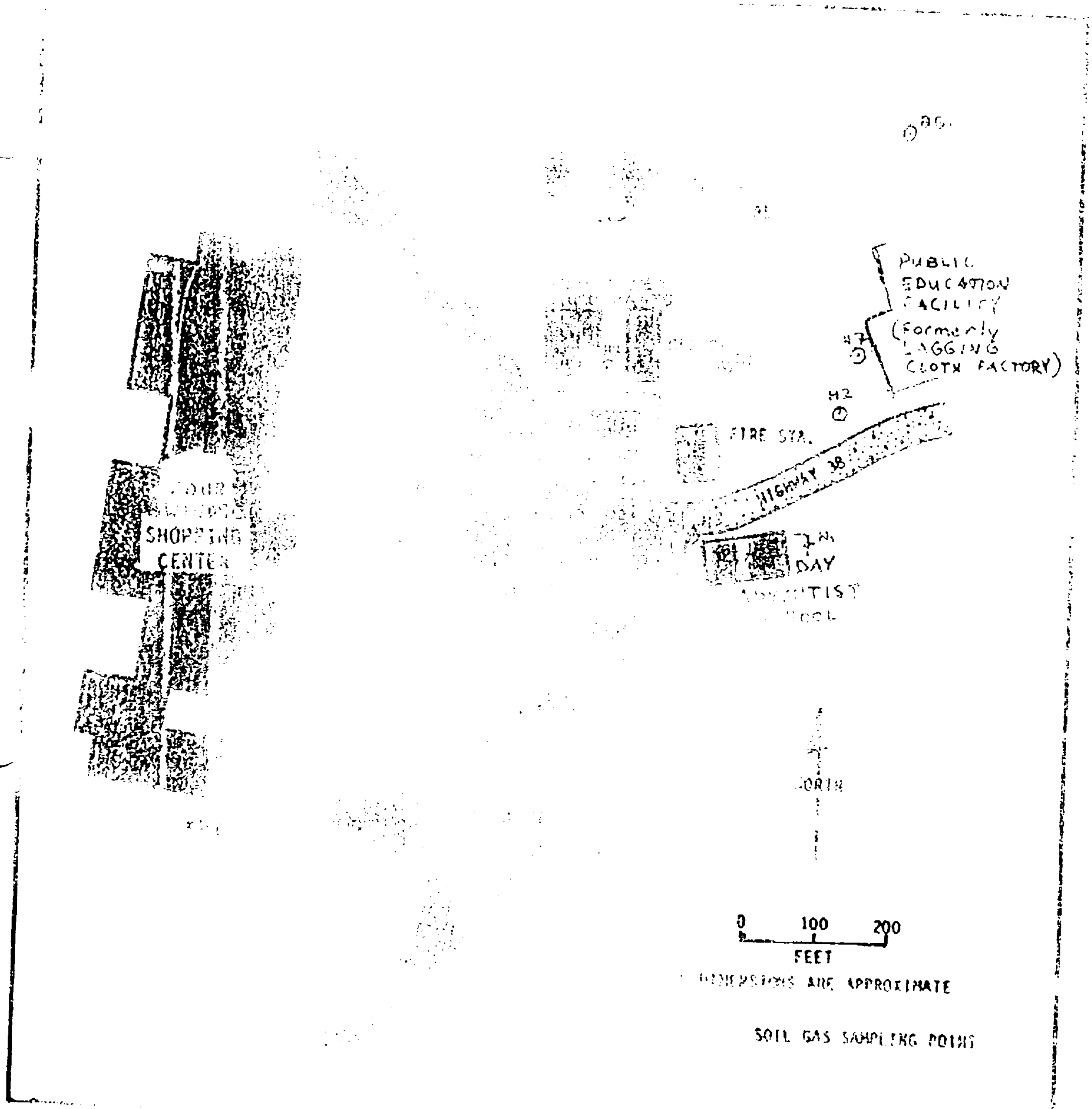


FIGURE ENLARGEMENT

LOCATIONS OF SOIL GAS SAMPLING POINTS ON TEXACO STATION SITE, TUTU.


PUBLIC
EDUCATION
FACILITY
(Formerly
LAGGING
CLOTH FACTORY)
47
42
FIRE STA.
HIGHWAY 38
SHOPPING
CENTER
DAY
0 100 200
FEET
ARE APPROXIMATE

SOIL

DP10

Bedrock in the area consists of fractured volcanics. The fracture pattern has an effect on hydraulic conductivity and aquifer contamination. It is likely that the fractured bedrock high of the Tillet area was recharged by the contaminated alluvium. One sample of ground water from the Tillet well was run through the GC. While toluene was below the detection limit of 5 ppb, benzene was valued at approximately 800 ppb.

The ECD analyses confirmed the results of the FID, that a late peaking chlorinated hydrocarbon (PCE) is present in the areas of the Tillet Well, the Esso Station, and the Public Education Facility (formerly, the Lagging Clothe Factory, which reportedly used PCE).

Based on the results of the soil gas survey, it seems apparent that Texaco has contaminated the soil gas in the area of the tanks. The contamination appears to extend into the area underlying Rts. 38 and 384 close to the station. The values from the northern section of The Four Winds Parking Lot are orders of magnitude lower than the values closer to the station and similar to background.

In the southern section of the parking lot, however, higher values suggest that Esso is at least partially responsible for hydrocarbon contamination. It appears that Esso is down-gradient from Tillet's well, and this should be considered during the evaluation. It should be noted that the Tillet well is located centrally to Texaco and Esso, and was reportedly pumping 60 gallons per minute (gpm) prior to being closed to operation due to contamination. There are also 2 wells on the Four Winds property just north of the Esso station, which may have, in effect, reversed any regional gradient during heavy pumping.

In conclusion, it is in Texaco's best interest to remain open-minded and honest in terms of sampling, analysis, and interpretation of the data, due to the complexity of this area (i.e. limited knowledge about the character and thickness of alluvium and groundwater elevations, a factor upon which soil gas is dependent).

Sincerely,

CDM Federal Programs Corporation

Scott Graber
TES III Work Assignment Manager

SG:kw

cc: J. Font
NYC File

DP100000

(SG1/29)

TUT 006 0759

EXHIBIT 'B'

June 29, 1988

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Contract No: 68-01-7331
Document No: T648-C02-LR-CDEM-1

Subject: Overview of Esso Soil Gas Survey Conducted on April 5, 1988 through April 23, 1988 in Tutu, St. Thomas, U.S. Virgin Islands; Work Assignment 648

Dear Ms. Kwan

The purpose of the survey was to assess Esso's role in the contamination of area groundwater. The survey will aid in defining the location and extent of subsurface petroleum hydrocarbon contamination, and define the potential source of the contamination.

Esso Standard Oil SA LTD. has contracted Belgedere and Associates Inc. (BAI) to conduct the soil gas survey. Due to the detection of groundwater contamination in the Tutu vicinity, Esso had agreed to analyze onsight for benzene, toluene, ethylbenzene, and xylene (BTEX) as well as trichloroethylene, tetrachloroethylene, and dichlorethylene (chlorinated hydrocarbons). Two HNu 301 series Gas Chromatographs (GC) were used for the field analyses of the soil gas samples. One GC was equipped with a photo ionization detector (PID) and a flame ionization detector (FID) and a 10% TCEP, Chromosorb PAW 8' x 1/8" ss pack column. This GC was set up for BTEX detection. The other GC, which was set up for chlorinated hydrocarbon detection was equipped with a FID and a 3% SE 30 Chromosorb WAW 6' x 1/8" ss pack column. Although the BAI chemists often verbally reported the presence of chlorinated hydrocarbon peaks during sample analysis, chlorinated hydrocarbon values from only 8 sample locations were reported in the preliminary reduced data. This was insufficient for us to make any conclusions about the extent of chlorinated hydrocarbon contamination in the area.

The first phase of the soil gas survey was done on a grid pattern with 29 sample points and 50 foot centers within and immediately surrounding the service station. The grid was extended based on field judgement to define the extent of contamination. A total of 44 locations were sampled by driving 5/8 inch probes to depths ranging between 2 and 8 feet. Shallow (4') and deep (6-8') samples were analyzed where possible. Soil gas was evacuated from the probe using a battery operated vacuum pump. The soil gas samples were then extracted from the probe at the septum using gas tight syringes.

The lithology as well as man-made obstacles, such as storm drains and building slabs, made it impossible to follow the exact grid as proposed by BAI. For example, several proposed points across Road Number 38 were not tested due to the closeness of the bedrock to the surface.

JC2/49

DP100556

A review of the preliminary soil gas data from the Esso Tutu Site was undertaken to establish its validity and applicability.

The major analytical problem encountered during data acquisition was signal noise. The noise could have been from any number of sources including unstable power supply, dirty injector and/or detector, short in cable or grounding problem, column degradation or contamination, and electronic failure within the instrument. The major consequences of the noise are baseline instability, extraneous peaks which may confound peak identification and quantitation, and poor sensitivity.

While generally applicable, the utmost care must be taken in drawing specific conclusions from the data in their preliminary form because:

- o There were several days during which two sets of data were generated on separate instruments for each sample. According to Louis Maldenado (Belgodere & Associates), all of the data are still being evaluated and some preliminary results may be substituted with results from the alternate data set. The changes could significantly affect data interpretation.

- o The work plan stipulates that results will be based on multiple calibration gas analyses from which an average response factor will be calculated for each component. Preliminary data is based on response from a single calibration run. Assuming that representative calibrations were used, use of average response factors should not yield significantly different results. However, given the numerous analytical problems encountered, this assumption may not be correct.

- o For several of the days during which data were collected, the instrument was calibrated and programmed to automatically generate the final calculated result (i.e. identify the chromatographic peak by its presence within a retention time window and apply calibration response factor to the measured peak area). The preliminary data was taken directly from this printout apparently without checking the validity of peak identifications. Peak mis-identification by the instrument can occur even under ideal analytical conditions and is much more likely when the baseline is noisy. One such mis-identification was found during this review (resulting in a value for ethyl benzene + M,P-xylene of 0.001 instead of 0.054 ppm) and others are likely to be found and corrected during generation of the final data.

- o Each sample was analyzed at least twice and up to four times in an effort to generate reproducible results. In many cases, one of the four analyses yielded a significant "hit" while the other three showed no evidence of the compound. This strongly suggests the possibility of false negatives, which could drastically alter the interpretation of the overall data set (specifically, the drawing of plumes). It is not clear whether the potential for false negatives is inherent in the method or is a consequence of the analytical problems cited. It may be a combination of the two.

The following should be considered when interpreting the final data set:

- o Due to analytical problems, two GCs, three different detectors (one PID, two FID) and at least three different columns were used. As long as each was properly calibrated, there should be reasonable continuity in the results as a whole. However, there are at least two populations of data because a switch was made to a different type of column (due to lack of backup) with different chromatographic characteristics. The result, at a minimum, is discontinuity in the ethyl benzene and xylene data.

- o The "Total Hydrocarbon" values reported were generated by applying an average response factor of the calibration gas constituents to the total (combined) peak area from each chromatogram. These values are grossly affected when extraneous peaks are detected due to signal noise. Depending on what this value is to be used for, it might be better to simply sum the individual compound values.

- o There may be aspects of the methodology itself that yield questionable results (such as false negatives discussed above). One possible aspect is the condition under which the sample gas is drawn into the syringe. If the pressure of the volume being sampled is significantly below one atmosphere, the sample could be diluted by an unknown amount, thus yielding erroneously low results. Dilution would occur as air leaked into the sampling system across the pressure gradient. If the system is leaked-tight, air would rush into the syringe needle once it was removed from the sampling system until the pressure of the sample gas in the syringe was one atmosphere.

At the start of the Esso soil gas survey,it was agreed to use the same background value that was used for the Texaco soil gas survey (< 1 ppb). The low end standards (ppb range) were not available for the GC calibration, but it was thought possible by Esso that by diluting the standards they could calibrate the GCs such that they get order of magnatude readings down to 2 ppb. Due to the numerous analytical problems encountered as the project progressed, and the time factors involved, it was decided by Esso, BAI, EPA, DPNR, and CDM FPC that a detection limit of 1 ppm was adequate to define the extent of contamination for the purpose of the soil gas phase of the project.

It has been determined that the data recieved from BAI is generally applicable to the stated purpose of establishing the order of magnatude of BTEX present in the soil gas to the detection limit of about 1ppm by volume. The total BTEX values were used to define the extent of contamination (Figure 1). It must be stressed that the conclusions have been made based on data in its preliminary form. All of the data will be evaluated and changes by Esso could significantly affect data interpretation.

The following observations and subsequent conclusions can be made based on the information obtained during the Tutu Esso Soil Gas Survey. Total BTEX soil gas values were reported in excess of 1000 ppm in the southern portion of the Esso property adjacent to the petroleum underground storage tanks. This area of high BTEX soil gas contamination extends to the southwest of the Esso property into the Four Winds Plaza parking lot (figure 1). The concentration of total BTEX is reduced from above 1000 ppm to below 1 ppm with increased distance from the southern portion of the Esso property, upgradient as well as down gradient. Unfortunately, the full extent of the soil gas contamination (i.e. values equal or below the agreed upon background level) around the Esso station was not determined due to the relatively high detection limit of 1 ppm. However, based on the soil gas survey results and plotting the plume of petroleum hydrocarbon contamination, it seems apparent that Esso is responsible for a product release and the contamination of soil gas in at least the immediate vicinity of its service station. The results of Tutu Texaco Soil Gas Survey indicate that Texaco is also responsible for a product release and contamination of soil gas in at least the immediate vicinity of its service station.

If Esso is planning an excavation of their underground storage tanks as part of their service station maintenance program, it is our recommendation that soil samples be collected and analyzed as part of this excavation. After the tank excavation and sampling, CDM FPC recommends a joint investigation between Esso and Texaco to further define the nature and extent of the contamination in the Tutu Wellfield Area. The joint investigation will make all subsequent activities more cost efficient for all involved parties. The first phase of the investigation should consist of a subsurface investigation involving the installation of groundwater monitoring wells, split spoon soil boring and analyses, and groundwater collection and analyses. EPA at this point should consider a time schedule to implement the PRP committee and commence with the next phase.

Sincerely,

CDM Federal Programs Corporation

Scott Graber
TES III Work Assignment Manager

cc: Jose Fonte, EPA Caribbean Division
Greg Rhymer, DPNR
Colleen Connor, ORC
NYC File

JC1/49

RESULTS OF THE ESSO SOIL ... SURVEY AT THE TUTU AREA

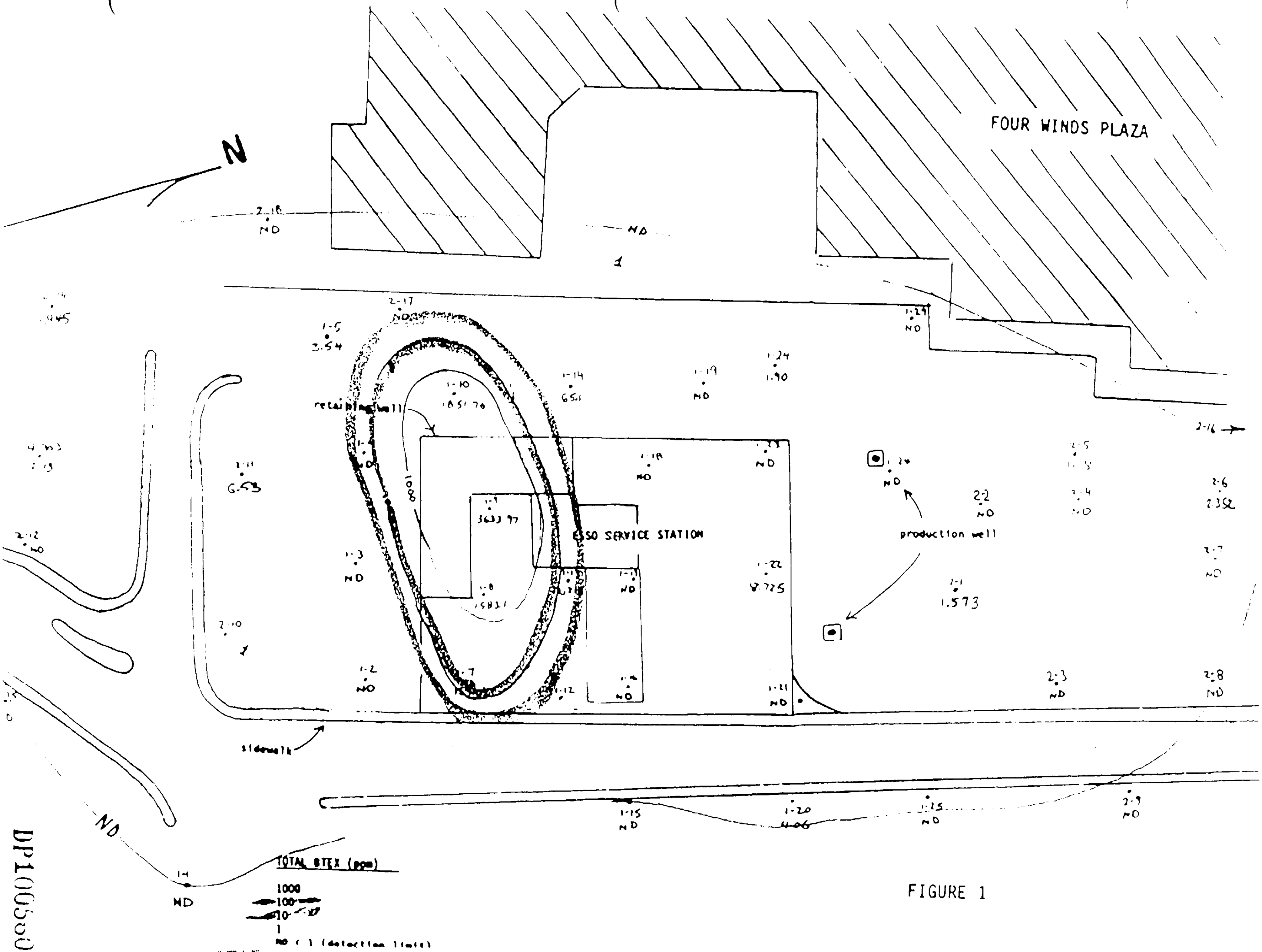


FIGURE 1

EXHIBIT 'C'

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

APR 04 1991

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Anna Gloria Ramos, P.E.
Project Coordinator
Tutu Environmental Investigation Committee
G.P.O. Box 4269
San Juan, Puerto Rico 00936-4269

Re: Comments on the Tutu Service Station Investigation Work Plan dated January 1991

Dear Ms. Ramos:

The U.S. Environmental Protection Agency (EPA) has completed a review of the above-referenced document. Enclosed please find general and specific comments on the work plan. Please resubmit the work plan for our review by April 29, 1991.

Please call Ms. Caroline Kwan if you have any questions.

Sincerely yours,

Carole Petersen

Carole Petersen, Chief
New York/Caribbean Superfund Branch II

ENCLOSURES:

RECEIVED APR 11 1991

A03716

GENERAL COMMENTS

1. The hydrogeological investigation, and groundwater sampling plan presented in the draft workplan go a long way towards addressing the aquifer contamination problem. The proposed list of analytes (limited to TCL VOAs) is sufficient to characterize areas of fuel and/or chlorinated hydrocarbon contamination. However, EPA believes that the number and locations of samples proposed are not adequate to characterize the site.

   As was stated in the February 21 meeting, EPA regards the Tutu Wellfield area as a single site. It will be much more difficult to obtain cohesive investigation results if the various respondents address the site in a piecemeal fashion. The study should be comprehensive enough to investigate any contamination at all three PRP facilities, as well as provide information to determine whether other possible PRPs exist.

   Addditional sampling points are proposed on the attached map. These would further clarify the extent and origin of contamination around the Laga Building, Tillett Gardens, and the O'Henry facility, among others. Monitoring wells have been added to provide upgradient reference data. Also, to further define contaminant sources, wells have been inserted between PRP properties and existing production wells where VOC contamination has been reported. The additional suggested wells, in conjunction with data from existing wells, will give a clearer picture of groundwater flow and the extent of contamination. Deeper wells are also necessary at sampling locations to fully define the lateral and vertical extent of groundwater contamination.

   <u>The same analytes (petroleum and chlorinated volatiles) must be analysed at all sampling points to provide a reliable assessment of the nature and extent of groundwater contamination.</u>

2. Additional data will need to be collected to meet the data quality objectives of the baseline risk assessment to be performed by EPA. It will be most cost effective to collect this data during the current investigation. To assess health-based risks from fugitive dust inhalation and ingestion of surface soils, full TCL data must be provided from surface soil samples collected from any visibly contaminated, unpaved areas as well as from background locations. If groundwater discharges to surface water anywhere in the study area, water samples should be analyzed

from the discharge points.

3. This work plan does not address the site feasibility study. The feasibility study must be performed in accordance with the Order.

SPECIFIC COMMENTS

1. Page 1, Paragraph 3. The work plan must be amended here and elsewhere to include the investigation of chlorinated hydrocarbons at the site. It would be better just to refer to Volatile Organic Compounds (VOCs).

2. Page 1, Paragraph 4. The Geraghty and Miller Sampling Analysis Monitoring Plan (SAMP) has been identified as a guideline for monitoring of the well water supply in the area of concern. Since the work plan should be a stand-alone document, the SAMP should be incorporated into this work plan.

3. Page 2, Paragraph 2, Reference to Figure 2. The site should be better delineated on the map of existing wells.

4. Page 3, Paragraph 2, Reference to Figure 3. The locations of existing wells need to be superimposed onto this map.

5. Page 4, Paragraph 2. A list of the closed wells should be included in the work plan and these wells should be designated as closed on the maps.

6. Page 4, Previous work. This section should reference studies which determined the direction of groundwater flow. A generalized map of groundwater flow direction in the valley and Turpentine Run Basin should be included.

7. Page 4, Paragraph 4. This paragraph should be deleted.

8. Page 5, Paragraph 1. The VIHA-1 well should be referenced once specific comment #4 is incorporated.

9. Page 5, Paragraph 2. Summary maps showing the results of the soil gas surveys at both Texaco and Esso should be included in this section.

10. Page 6, Paragraph 1. The limited number (9) of soil gas sampling points should be specified and this paragraph should reference a figure showing survey results.

11. Page 6, Paragraph 2. Per EPA request, Esso also analyzed for several chlorinated hydrocarbons during its soil gas survey. Elevated levels of PCE and TCE were detected in

soil gas in the northwest and southwest corners of the ESSO service station.

12. Page 7, Paragraph 3, second bullet. Previous site investigations by EPA should be reviewed as well.

13. Page 8, last paragraph, last sentence. See the attached map of additional proposed boring and well locations.

14. Page 9, Paragraph 1. See comment 1.

15. Page 9, Paragraph 2, second sentence. As stated on page 15, the portable gas chromatograph (GC) should be calibrated to scan for select chlorinated hydrocarbons as well (PCE, TCE, DCE).

16. Page 9, Paragraph 3. Additional surface soil samples will be necessary to assess risks from fugitive dust inhalation and soil ingestion pathways. See General comment #3.

17. Page 10, Groundwater investigation. Due to the complexity of determining groundwater hydraulics in fractured bedrock such as underlies the Tutu site, all available information on structural geology must be used to locate the monitoring wells along fracture zones wherever possible. Fracture-trace analysis of air photos is a critical first step. Beyond that, core and borehole geophysical information should be obtained from each bedrock well. Geophysical logs such as caliper and sonic logs can provide information about fracture zones in open holes. Final well locations must be determined, with EPA/DPNR approval, based on all available field information.

18. Page 10, Paragraph 4, Depth of monitoring wells. Local production and private wells where volatile organic contamination has been detected are screened at depths ranging from 100 to greater than 300 feet below the ground surface. At least half of the new monitoring wells should be installed deep enough to monitor the same horizons tapped by the drinking water wells. A thorough inventory of existing well construction data is needed to determine the appropriate elevations for the new well screens.

19. Page 10, Paragraph 4, line 5. Where organic contamination is a concern, as at the Tutu site, current EPA protocol is that monitoring well screens and casing should be constructed of stainless steel. PVC may react with volatile organic compounds, especially chlorinated solvents. This should be corrected here and throughout the document.

20. Page 11, Paragraph 2. See comment 15. Contamination has been detected at depths greater than 100 feet. Deep wells

must be deep enough to monitor that horizon.

21. Page 11, Paragraph 4. The pumping schedules of any existing wells must be taken into account during the water level measurements and pump tests. DPNR should close any pumping wells prior to and during these events.

22. Page 11, Paragraph 5. It is not sufficient to take continuous water-level measurements in only one observation well during the pump test. As many observation wells as possible (a minimum of 3) must be continuously monitored. Furthermore, two pump tests are recommended to more accurately determine aquifer characteristics like hydraulic conductivity and flow boundaries. Disposal of pump test water should be sent to an air stripper and discharged accordingly.

23. Page 12, Paragraph 1, line three. Wells should sit a minimum of two weeks following development before sampling.

24. Page 12, Free Product Investigation. The cut off level of three inches is arbitrary. There is no such cut off in 40 CFR 280.65. Moreover, 40 CFR 280.64 states that free product must be removed to the maximum extent practicable as determined by the implementing agency. In addition, there is no reason to stop sampling of wells during this time period.

25. Page 13, Paragraph 1, line 1. This sentence should read "The exact locations of additional monitoring wells to be drilled as part of the free product investigation will be selected with EPA/DPNR approval...."

26. Page 14, Paragraph 4, well-screen specifications. As noted in comment 16, well screens should be stainless steel construction, not schedule 40 PVC. EPA's "Compendium of Superfund Field Operational Methods" notes that "manufacturers do not recommend the use of threaded schedule 40 PVC well casing because of potential mechanical failure."

    Also, 0.20-inch slot is too large. The unconsolidated sediments in the area contain a high proportion of clay and silt sized particles which would pass through a 0.20-inch slot. Screen size should be determined based on local grain size.

27. Page 16, Paragraph 2. If a sheen is detected in any of the wells, the well must be sampled.

28. Page 21, Paragraph 1, Line 5. The sentence should read "...if free product occurs in the vicinity of the former storage tank locations or elsewhere...."

TLT 006 0771

29. Page 22, Paragraph 1, The investigation report must also include interpretation and discussion of the results of the field investigation.

30. Page 22, Paragraph 1, line 4. Typo "minimum."

31. Page 22, Paragraph 1, line 5. A structure map of the elevation of the bedrock surface should be prepared based on all available data. However, this reference to a structure map appears to refer to a topographic contour map of the ground surface.

32. Page 22, Paragraph 2. The raw chemical analytical data (Form 1 sheets) must be submitted in report appendices. Other raw field data such as water level measurements, pump test data, boring logs, etc. should also be included in appendices.

33. Table 1. The work plan proposes a trip blank for each day soil samples are collected. Current data validation QA/QC protocol requires trip blanks for aqueous samples, but not for soils.

34. Table 2, number 10. Typo. Should be 1,2-Dichloroethene (total).

35. Table 4. Maximum holding times are from validated time of sample receipt (VTSR) by the lab.

APPENDIX A

36. Page A-5, Section 6.0. Following decontamination, equipment should be wrapped in aluminum foil, shiny side out.

37. Page A-6, Section 7.9. Typo second line - "of" should be "or."

APPENDIX D

38. Page D-2. Core depth should be recorded inside and outside each core box, and if possible on the core itself.

APPENDIX E

39. Page E-1, Section 2.0. Stainless steel screen and casing should be installed. Screen-slot size and filter-pack size should be proposed with the right to change them based on actual field conditions.

APPENDIX F

40. EPA recommends borehole geophysical logging (caliper and sonic) of the bedrock portion of wells to identify fracture zones.

41. Page F-2, Section 1.8. Stainless steel, not PVC.

APPENDIX G

42. Page G-1. It should be noted that wells should sit a minimum of 2 weeks after development prior to purging and sampling.

EXHIBIT 'D'

GERAGHTY & MILLER, INC.
Environmental Services

TELEPHONE CONVERSATION RECORD

DATE: 4/23/91 TIME: 4:35 PROJECT: PR01301

FROM: ANA GLORIA RAMOS / JOSE AGRELOT TO: TOM DANAHY

COMPANY: ESSO / SOIL TECH COMPANY: G&M

TELE NO: (809) 792-2920 TELE NO: (201) 909-0700

RE: Tutu WORK PLAN - RESPONSE TO USEPA COMMENTS

RAMOS & AGRELOT CALLED TO DISCUSS THEIR COMMENTS ON G&M DRAFT LETTER (dated April 22) RESPONDING TO USEPA COMMENTS ON TUTU WORK PLAN.

Within letter addressed to Carolyn Kwan, Ramos/Agrelot comments include:

General Comments

1. First Paragraph should be re-worded to limit our commitment to 4 deep wells. Discussion of additional wells during a supplemental investigation should be excluded/or minimized.

2. Agrelot believes soil samples should be collected near the LAGA Building. Therefore, TVD suggested that soil boring B-1 could be moved (to the east) closer to suspect areas north of the LAGA Building.

Specific Comments

Decisions by TEIC need to be confirmed with Texaco (McCoy)

Item 9. G&M does have all soil gas maps (see supplemental report for ESSO chlorinated HC map). Ana Gloria Ramos approves of submitting soil gas results.

GERAGHTY & MILLER, INC.
Environmental Services

TELEPHONE CONVERSATION RECORD

DATE: 4/23/91 TIME: 4:35 PROJECT: PR01301

FROM: PANOS/AGRELOT TO: TOM DANAHY

COMPANY: COMPANY:

TELE NO: TELE NO:

RE: TUTU - CONTINUED

Item 11. EPA has continually referred to TCE/PCE contam in NW & SW corners of ESSO.
Agrelot: NW corner yes, but SW corner no!
Soil gas points SW of ESSO are beyond property line of ESSO parcel.
Important for CERCLA issue.

MISCELLANEOUS

Agrelot: Has seen some recently installed monitoring wells downgradient (SW) of O'Henry adjacent to Highway 438 - Maybe part of O'Henry Investigation.

PANOS: - Needs CEMIC Invoice for Sept 1990 sampling as back-up documentation for G&M's April 16, 1991 invoice.
- Requests TVD confirms Meeting w/ EPA

A08863

TUT 006 0776

EXHIBIT 'E'

SOIL GAS SURVEY

FOUR WINDS SHOPPING CENTER AND ENVIRONS

TUTU AREA, ANNA'S RETREAT

U.S. VIRGIN ISLANDS

PREPARED FOR

LAW OFFICE OF JOHN K. DEMA, P.C.

1236 STRAND STREET, SUITE 103

CHRISTIANSTED, ST. CROIX, VIRGIN ISLANDS 00820-5008

PREPARED BY

TARGET ENVIRONMENTAL SERVICES, INC.

9180 RUMSEY ROAD

COLUMBIA, MARYLAND 21045

(410) 992-6622

FEBRUARY 1992

EXECUTIVE SUMMARY

On January 7 through 13, 1991, **TARGET Environmental Services, Inc. (TARGET)** conducted a soil gas survey at **Four Winds Shopping Center and Environs, Tutu Area, Anna's Retreat**, U.S. Virgin Islands, where petroleum and chlorinated hydrocarbons have been detected in water supply wells. The samples were analyzed by GC/FID and GC/ECD for petroleum and chlorinated hydrocarbons.

The highest levels of Total FID Volatiles were present on the **Rodriguez Esso** and this occurrence apparently extends some distance to the southeast. The highest hydrocarbon levels in the **Four Winds Plaza** area occurred at **Tutu Esso**. This occurrence appeared to have migrated northward beyond the pump islands into the shopping center parking lot. The FID chromatogram signatures of the samples with the highest levels of Total FID Volatiles from both **Esso** stations reveal a complex petroleum hydrocarbon fuel mixture. There was no evidence that contaminants from a reported occurrence on the **Texaco** property to the northeast have impacted the **Four Winds Plaza** property. The water supply wells at **Four Winds Plaza** are within the area of contamination associated with **Tutu Esso**. The water supply well on the Harthman property nearest location 166, appears to be at greatest risk of being impacted by the occurrence on the **Rodriguez Esso.**

GC/ECD analysis revealed significant concentrations of tetrachloroethene (PCE), cis-1,2-dichloroethene (c-1,2-DCE) and trichloroethene (TCE) in the northern portion of the **Tutu Esso** and beneath the **Four Winds Plaza** parking lot. No significant chlorinated hydrocarbons were detected on the Harthman and **Rodriguez Esso** properties.

Introduction

The **Law Office of John K. Dema**, representing **Four Winds Plaza**, contracted **TARGET Environmental Services, Inc. (TARGET)** to perform a soil gas survey on a portion of the **Four Winds Plaza** property and on adjacent properties in the Tutu area, Anna's Retreat, St. Thomas, U.S. Virgin Islands. The purpose of the soil gas survey was to help determine the source(s) of the hydrocarbons in the shopping center's water supply wells and to determine if water supply wells on the adjacent Harthman property were at similar risk.

In 1983 and 1987, halogenated and non-halogenated hydrocarbons were discovered in water supply wells in the area. Subsequent soil gas surveys and water samples from the supply wells detected petroleum and halogenated hydrocarbons in the ground water at nearby **Esso** and **Texaco** service stations and beneath the shopping center parking lot. As a result, the Virgin Islands Department of Planning and Natural Resources ordered that the supply wells be shut down.

Site soils were reported to be permeable stratified sands, gravels and clays up to 20 feet thick over fractured bedrock. The ground water level fluctuates from a rainy season high of about 20 feet to a dry season low of about 90 feet. Regional flow is southward. The field phase of the soil gas survey was conducted on January 7 through 13, 1992.

Detectability

The soil gas survey data presented in this report are the result of precise sampling and measurement of contaminant concentrations in the vadose zone. Analyte detection at a particular location is representative of vapor, dissolved, and/or liquid phase contamination at that location. The presence of detectable levels of target analytes in the vadose zone is dependent upon several factors, including the presence of vapor-phase hydrocarbons or dissolved or liquid concentrations adequate to facilitate volatilization into the unsaturated zone.

Terminology

In order to prevent misunderstanding of certain terms used in this report, the following clarifications are offered:

The term "feature" is used in reference to a discernible pattern in the contoured data. It denotes a contour form rather than a definite or separate chemical occurrence.

The term "occurrence" is used to indicate an area where chemical compounds are present in sufficient concentrations to be detected by the analysis of soil vapors. The term is not indicative of any specific mode of occurrence (vapor, dissolved, etc.), and does not necessarily indicate or suggest the presence of "free product" or "phase-separated hydrocarbons."

The term "anomaly" refers to an area where hydrocarbons were measured in excess of what would normally be considered "natural" or "background" levels.

The term "analyte" refers to any of the hydrocarbons standardized for quantification in the chromatographic analysis.

The term "vadose zone" represents the unsaturated zone between the ground water table and the ground surface.

The term "indicates" is used when evidence dictates a unique conclusion. The term "suggests" is used when several explanations of certain evidence are possible, but one in particular seems more likely. As a result, "indicates" carries a higher degree of confidence in a conclusion than does "suggests."

The terms "elevated" and "significant" are used to describe concentrations of analytes which indicate the existence of a potential problem in the soil or ground water.

The terms "low", "moderate" and "high", when applied to Total FID Volatile petroleum hydrocarbons, are relative and subjective terms based on **TARGET**'s analysis of thousands of soil gas samples from hundreds of sites. Because site conditions and sampling techniques vary, specific action levels cannot be set for soil gas. Decisions regarding the necessity for further actions should be based upon comparisons of samples of soil or ground water with the regulatory action levels set for these media.

Field Procedures

Soil gas samples were collected at a total of 169 locations at the site, as shown in Figure 1A and 1B. Three proposed samples (Sample 24 from near the southeast corner of **Western Auto**, Sample 47 from southeast of the car wash, and Sample 168 from south of **Gasset Auto**) could not be collected due to the presence of very shallow ground water. Several samples were collected shallower than the proposed 4 feet due to probe refusal (see Table 1). Sample 172 was collected from a monitoring well located between the building on the **Tutu Esso** and the adjacent car wash.

To collect the samples a 1/2 inch hole was produced to a depth of approximately 4 feet by using a drive rod. Where pavement or concrete was present, a rotary hammer was employed for penetration prior to using the drive rod. The entire sampling system was purged with ambient air drawn through an organic vapor filter cartridge, and a stainless steel probe was inserted to the full depth of the hole and sealed off from the atmosphere. A sample of in-situ soil gas was then withdrawn through the probe and used to purge atmospheric air from the sampling system. A second sample of soil gas was withdrawn through the probe and encapsulated in a pre-evacuated glass vial at two atmospheres of pressure (15 psig). The self-sealing vial was detached from the sampling system, packaged, labeled, and stored for laboratory analysis.

Prior to the day's field activities all sampling equipment, slide hammer rods and probes were decontaminated by washing with soapy water and rinsing thoroughly. Internal surfaces were flushed dry using pre-purified nitrogen or filtered ambient air, and external surfaces were wiped clean using clean paper towels.

Field control samples were collected at the beginning and end of each day's field activities and after every twentieth soil gas sample. These QA/QC samples were obtained by filtering ambient air through a dust and organic vapor filter cartridge and collecting in the same manner as described above.

The volatile petroleum hydrocarbons reported in Field Control Samples 210 and 213 are the result of carryover in the sampling equipment following the collection of Samples 106 and 146, respectively, which contained high levels of volatile hydrocarbons. The very low levels of volatile hydrocarbons reported in Field Control Samples 214, 215 and 216 are most likely the result of minor carryover, but the levels are insufficient to have influenced the survey results.

A very low level of tetrachloroethene (PCE) was present in Field Control Sample 202. This sample was collected following Sample 20, which contained a moderate amount of PCE. Field Control Sample 202 was the last blank of the day and the blank collected as the first sample the next morning did not contain detectable levels of PCE.

Laboratory Procedures

All of the samples collected during the field phase of the survey were subjected to dual analyses. One analysis was conducted according to EPA Method 601 (modified) on a gas chromatograph equipped with an electron capture detector (ECD), but using direct injection instead of purge and trap. Specific analytes standardized for this analysis were:

1,1-dichloroethene (11DCE)
methylene chloride (CH_2Cl_2)
trans-1,2-dichloroethene (t12DCE)
1,1-dichloroethane (11DCA)
cis-1,2-dichloroethene (c12DCE)
chloroform ($CHCl_3$)
1,1,1-trichloroethane (111TCA)
carbon tetrachloride (CCl_4)
trichloroethene (TCE)
1,1,2-trichloroethane (112TCA)
tetrachloroethene (PCE)

The chlorinated hydrocarbons in this suite were chosen because of their common usage in industrial solvents, and/or their degradational relationship to commonly used compounds.

The second analysis was conducted according to EPA Method 602 (modified) on a gas chromatograph equipped with a flame ionization detector (FID), but using direct injection instead of purge and trap. The analytes selected for standardization in this analysis were:

methyl tertiary butyl ether (MTBE)
benzene
toluene
ethylbenzene
meta- and para- xylene
ortho-xylene

These compounds were chosen because of their utility in evaluating the presence of fuel products, or petroleum based solvents.

The analytical equipment was calibrated using an instrument-response curve and injection of known concentrations of the above standards. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples and their response factors were used to calculate the analyte concentrations.

The Total FID Volatiles values were generated by summing the areas of all chromatogram peaks and calculated using the instrument response factor for toluene. Injection peaks, which also contain the light hydrocarbon methane, were excluded to avoid the skewing of the Total FID Volatiles values due to injection disturbances and biogenic methane. For samples with low hydrocarbon concentrations, the calculated Total FID Volatiles concentration is occasionally lower than the sum of the individual analytes. This is because the response factor used for the Total FID Volatiles calculation is a constant, whereas the individual analyte response factors vary with concentration. It is important to understand that the Total FID Volatiles levels reported are relative, not absolute, values.

The tabulated results of the laboratory analyses of the soil gas samples are reported in micrograms per liter ($\mu g/l$) in Tables 2 and 3. Although "micrograms per liter" is equivalent to "parts per billion (v/v)" in water analyses, they are not equivalent in gas analyses, due to the difference in the mass of equal volumes of water and gas matrices. Because pentane and MTBE co-elute, they are listed together in the table. The xylenes concentrations reported in Table 2 are the sum of the m- and p-xylene and o-xylene concentrations for each sample.

For QA/QC purposes, a duplicate analysis was performed on every tenth field sample. Laboratory blanks of nitrogen gas (99.999%) were also analyzed after every tenth field sample.

Discussion and Interpretation of Results

In order to provide graphic presentation of the results, selected individual data sets in Tables 2 and 3 have been mapped and contoured to produce Figures 2 through 12. The contour lines show areas where concentrations are of similar magnitude. The limits of the soil gas survey do not necessarily outline the exact edges of a potential ground water or soil plume which acts as a source of the vapors. However, areas of highest concentration and relative highs and lows are clearly exhibited in the soil gas data and the data will reflect conditions in the subsurface at each sample point. Dashed contours are used where patterns are extrapolated into areas of less complete data, or as auxiliary contours. Map sample points with no data shown indicate that the analyte concentrations in the sample were below the detection limit.

The survey area was divided into two parts: the first part is the area including and surrounding the parking lot of the **Four Winds Plaza** and **Tutu Esso**. The second part includes the Harthman Property, **Rodriguez Esso** and vicinity.

Four Winds Plaza and Tutu Esso Area

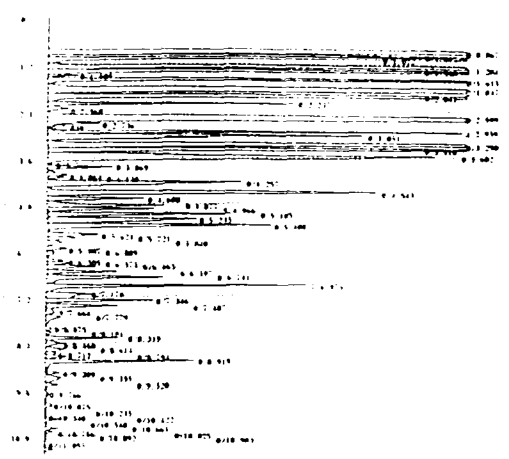
Observations

The highest levels of Total FID Volatiles from the **Tutu Esso** and adjacent areas (Figure 2) occurred between the building and the tank area on the **Esso** site (Stations 105 and 106). Significantly elevated levels are also present north of the pump islands (Stations 95 and 97). Low levels extend northward into the **Four Winds Plaza** parking lot and are present south of the car wash.

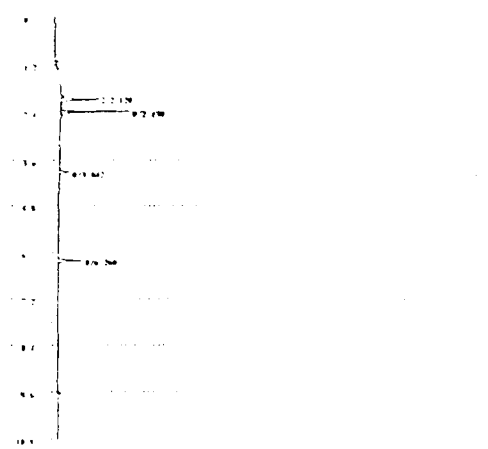
Isolated very low levels typical of background concentrations were evident at a few other scattered locations.

Map patterns for MTBE/pentane (Figure 3) are similar to, but less extensive than, those of Total FID Volatiles. Benzene (Figure 4) was detected only on the Esso site. The toluene, ethylbenzene, and xylenes occurrences, as exemplified by the xylenes map (Figure 5), are similar. These analytes are at their highest concentrations in Sample 105, and the occurrences extend northward beyond the pump islands.

The FID chromatogram signatures of the samples from the TuTu Esso reveal a complex petroleum hydrocarbon fuel mixture, as exemplified by Chromatogram 1, Sample 105. Isolated peaks representing the FID response to chlorinated compounds are present in the signatures of several samples from the parking lot, shown by Chromatogram 2, Sample 18.



CHROMATOGRAM 1. GC/FID SIGNATURE OF SAMPLE 105



CHROMATOGRAM 2. GC/FID SIGNATURE OF SAMPLE 18

The xylenes are less volatile and less soluble than the other analytes, adsorb more readily to the soil particles, and tend to remain nearer to the source. As a result, the xylenes are usually good indicators of source locations. The xylene map patterns suggest that the hydrocarbons entered the subsurface near the center of the **Esso** site. The occurrence south of the car wash (Stations 51-53) may have originally been continuous with the occurrence on the **Esso** station. Soil venting during excavation activities which took place when the car wash was built is probably responsible for the absence of volatile hydrocarbons in samples at and immediately south of the car wash.

GC/ECD analysis of the samples from the **Tutu Esso/Four Winds Plaza** area revealed tetrachloroethene (PCE, Figure 6) to be the most widespread halogen. The highest level was present near the northern boundary of the **Tutu Esso** (Station 35) and comparable levels extend northward into the parking lot. Lower levels were present throughout most of the remainder of the surveyed area. Slight increases in concentration were observed northwest of the paint store (Station 61) and in the northern portion of the parking lot (Station 10).

Elevated levels of cis-1,2-dichloroethene (c-1,2-DCE, Figure 7) and trichloroethene (TCE, Figure 8) were present in the same area with the highest levels of PCE. TCE was highest north of the pump islands on the **Esso** site (Station 97), but its overall extent was much more limited than the PCE. Relatively low levels of trans-1,2-dichloroethene (t-1,2-DCE) were present in the northern portion of the **Esso** site and in a small area of the parking lot to the north. An isolated low level of 1,1-dichloroethene (1,1-DCE, not mapped) was present in one sample north of the pump islands and very low levels of 1,1,1-trichloroethane (1,1,1-

TCA, not mapped) were present in a few samples adjacent to the building on the Esso site.

Conclusions

Map patterns and chromatographic data indicate that petroleum hydrocarbons have entered the subsurface at the **Tutu Esso** and have subsequently migrated northward beyond the pump islands. Xylene map patterns suggest that the source for the occurrence is clearly associated with the **Esso** facility. There is no evidence that contaminants from a reported release on the **Texaco** property northeast of the **Four Winds Plaza** have impacted the survey area.

GC/ECD analysis indicates that significant concentrations of PCE, c-1,2-DCE and TCE and lesser occurrences of t-1,2-DCE, 1,1,1-TCA and 1,1-DCE are present in the northern portion of the **Tutu Esso** and beneath the **Four Winds Plaza** parking lot. The PCE occurrence extends throughout most of the survey area, while c-1,2-DCE and TCE were detectable only on the northern portion of the **Tutu Esso** and beneath the adjacent **Four Winds Plaza** parking lot. The DCE and TCA were likely minor components of original PCE or TCE solvent mixtures or they may be breakdown products formed when the original compound(s) underwent chemical transformation in the subsurface. While no specific source point is evident, the contour patterns do not support a source outside the immediate area of occurrence.

EXHIBIT 'F'

6/29/92

Geraghty & Miller
Logbook #4A
RI/FS
Tutu/St. Thomas

PR01301

TUT 006 0794

Eibén Ponciano (RP.)

Meagher & Miller

Log book #4A

77/78

PRC 1301

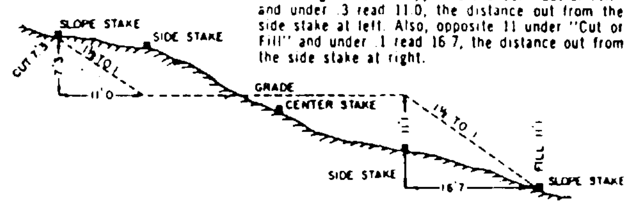
(809) 798-8900

* Rock description: The final rock description are in P.R. All rock samples are Volcanic Sandst.
RP.

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below, opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

Weds 7/23/92 (Thurs) (120)

4:00 Tow truck in place. Tech. removing the disable vehicle.

4:15 Setting of security fence has been achieved. Driller left the site. Go to the house.

4:35 Arrive at the house.

Tutu 7/24/92 (Fri) 121

6:35 I left the house. Go to field office to get equipment.

7:00 Arrive at drilling area MW-9. Driller are moving CME 55 to drilling area MW-9.

7:15 Driller are setting the CME 55 on MW-9.

7:30 Setting soil sampling station. Driller getting ready for soil sampling.

7:45 Driller went to fix security fence around MW-9.

7:55 Driller are back from fixing security fence around MW-9. Getting ready for soil sampling.

8:00 Soil sampling begin.

8:15 SS sample (0-2')
Hnu = 17 PPM

8:30 SS sample (2-4')
Hnu = 25 PPM

SS samples for 20 analyses were collected from (2-4') the soil of the [illegible]: BNA, Metals, TPH [illegible]

Pic 7/24/92 (Fri) (122)

collected from split spoon samplers (0-2' and 2-4') both soil samples were mixed in a stainless steel bowl and collected.

9:15 Drillers are setting the 4" PVC casing.

9:45 Drillers finish last setting PVC casing. Cleaning up area. Top of bedrock at 5.2'

10:05 Go to field's office to do some paperwork.

10:45 Go to the house.

11:00 Arrive at the house.

11:30 Go to airport St. Thomas.

2:00 Arrive at San Juan.

Tutu 7/28/92 (Tue) (123)

6:35 Left the house to go to the site

6:53 Arrive at decon area. Drillers are here.

7:05 Drillers are discussing, & are moving toward drilling area MW-9.

7:10 Drillers are getting ready to start coring.

7:30 Go with Miller to get a ~~piece of~~ plumbing part for the drilling rig.

8:00 Back at drilling area MW-9.

8:15 Drillers getting ready to start coring. Go to get at decon area the rock sample boxes.

8:30 Go to the water source (UHA) for water for the F-60.

8:45 The F-60 is here. Drillers assembling the core barrel.

9:55 Drillers are ready.

Tue 7/28/92 (Tues) 126

Run #2 (10-15')
~~First~~ foot begin at 9^{25}
~~Last~~ foot ends at 9^{30}
penetration rate = 5'/5m = 1.0
pressure = 100 PSI
Run # 2 (10-15')
Recovery = 0.4'
% Recovery = 8
RQD = ∅
Penetration rate = 5'/5m = 1.0
pressure = 100 psi
Slightly altered weathered fracture zone from 10-15'.
Gravel sizes; slightly altered; moderately strong; bluish green; Clay, little silt is also ~~absent~~ observed in this sample interval. Clay is gray,
~~but~~

Tue 7/28/92 (Tues) 127

Run #3 (15-20)
First foot begins at 9^{54}
First foot ends at $9^{54\,30''}$
penetration rate = 1'/0.5 = 2.0
pressure =
2nd foot begin at $9^{54\,30''}$
" " ends at 9^{55}
penetration rate = 1'/1.5 = 0.67
pressure =
3rd foot begin at 9^{55}
3rd foot ends at = 10^{02}
penetration rate = 1'/7m = 0.14
pressure = 150 PSI
9^{59} Hnu = 10 PPM inside hole
Hnu = ∅ ppm (breathing zone)
CGI = 0% LEL
4th foot begin at 10^{02}
4th foot ends at 10^{07}
penetration rate = 1'/5min = 0.20
pressure = 150 PSI
5th foot begins at 10^{07}
5th foot ends at 10^{12}
penetration rate = 1'/5min = 0.20
pressure = 150 PSI

Tutu 7/28/92 (Tues) (28)

10^{20} Hnu 5-10 PPM inside borehole
breathing zone ØPPM
CGI = Ø% LEL
~~Recovery~~
Run # 3 (15-20')
Recovery = 1.0
% Recovery
RQD = ——— Ø
5'

penetration rate = 5/19
pressure = 150 PSI

Rock description, 3 pieces of rock, Damascus, slightly weathered fracture zone from 15-20. TD of borehole = 20'
A pocket of unconsolidated material ≈ 0.3' of thickness mainly of silty clay, trace sand, medium to coarse.
Hnu = 2-3 PPm. Transtain

Tutu 7/28/92 (Tues) (29)

Run # 4 (20-~~25~~ 24.7)
First foot begins at 10^{44}
First foot ends at 10^{46}
penetration rate = 1'/2 min
pressure = 100 PSI
2nd foot begins at 10^{46}
2nd foot ends at 10^{49}
penetration rate = 1'/3 min
pressure = 100 PSI
3rd foot begins at 10^{49}
3rd foot ends at 10^{51}
penetration rate = 1'/2 min =
4th foot begins at 10^{51}
4th foot ends at 10^{55}
penetration rate = 1'/4 min
pressure = 100 PSI
0.2' foot begins at 10^{55}
10^{57} Hnu = 10-15 PPM (above background) inside borehole. Breathing zone = ØPPM. CGI = Ø% LEL
0.2' ends at 11^{05}
penetration rate = 0.2'/10 min
pressure = 100 PSI

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Tu(e 7/28/92 (Tues) (130)
24.2')

Run #4 (20-~~25~~24)
Recovery = 1.3
% Recovery 31
RQD = —— / 4.2 = ∅

penetration rate = 4.20/21 min
pressure = 100 PSI
slightly altered fracture zone from 20-25' b/s.
Volcanic ~~siltstone~~ sandstone, Bluish ~~green~~ green, aphanitic, weak; moderately to highly ~~altered~~ altered. (24.2-28.4')

Run #5 (~~25-30~~)
0.8' begin at ~~10~~ 11^15
0.8' ends at 11^18
penetration rate = ~~[illegible]~~ 0.8'/~~[illegible]~~ 3 min =
pressure = 100 PSI
2nd foot begin at 11^18
2nd foot ends at 11^23
penetration rate = 1'/5 min =
pressure = 100 PSI

Tutu 7/28/92 (Tues) (31)

3rd foot begins at 11^23
3rd foot ends at 11^40
penetration rate = 1'/7 min
pressure
11^41 We ran out of water. So far we have used approx. 1,000 gallons of water. Water is not recirculating. coring is suspended.
12^05 Go for lunch
12^35 Back from lunch.
4th foot begin at 12^50
4th foot begin at 12^57
penetration rate = 1'/7 min
pressure = 100 PSI
5th foot begin at 12^57 } 0.4'
5th foot ends at 1^04 } 0.4/7 min
Run #5 (24.2-28.4')
Recovery = 1.6'
% Recovery = 38
RQD = —— / 4.20 = ∅

penetration rate = ~~[illegible] /7 min~~
pressure = 100 PSI

Tutu 7/28/92 (Tues) (132)

Volcanic ~~Siltstone~~ Sandstone
Grayish green, moderately strong, fine, rectangular,
~~matrix silt, silt~~, White
material less than 5% of
rock matrix, plagioclase,
calcite veins, slightly
altered, Chlorite, Iron stain
slightly weathered fracture
zone from ~~25 - 28~~
27.2 - 28.4' b/s.

~~Run #6 (28.4~~
Run #5A (28.4 - 31.0)
~~Coring to~~
1.6' begin at 1^{13}
1.6' end at 1^{20}
penetration rate = 1.6'/7min
pressure = 100 PSI.
1st foot begins at 1^{24}
1st foot ends at 1^{30}
penetration rate = 1'/6min
pressure = 100 PSI
1^{36} Hnu Reading = 5-10 PPM inside
borehole. Hnu = 0 PPM breathing
zone. CGI = 2 % LEL.

Tutu 7/28/92 (Tues) (3)

Run #5A (28.4 - 31.0)
Recovery = 2.5
% recovery = 96
RQD = 0.4+0.55+0.45 / 2.6 = 53
penetration rate = 2.6/13min = 0.20
pressure = 100 PSI
Rock description: Volcanic
sandstone, Grayish green,
moderately strong; medium to
small gravel size, rectangular to
irregular; dull, glassy; Plagio-
clase, Orthoclase, pyroxene,
quartz; calcite veins, slightly
to moderately altered. slightly
weathered fracture zone from
29.3' to 30.2' b/s. Fractures
(slightly altered) observed approxi-
mately at ~~29.0~~ 28.8 and
29.1' b/s.

Tile 7/28/92 (Tues) (134)

Run #6 (31–35')
First foot begins at 1[51]
First foot ends at 1[58]
penetration rate = 1'/7min
pressure = 150 PSI
2nd foot begins at 1[55]
2nd foot ends at 2[00]
penetration rate = 1'/2min
pressure = 150 PSI
3rd foot begins at 2[00]
3rd foot ends at 2[07]
penetration rate = 1'/7min
pressure = 150 PSI
4th foot begins at 2[07]
4th foot ends at 2[17]
penetration rate = 1'/10min
pressure = 150 PSI

Run #6 (31–35')
Recovery = 4.0'
% Recovery = 100
RQD = $\frac{0.45+0.55+0.4+0.4+0.4}{4}$
RQD = 55
Penetration rate = 4'/26min = 9.5
pressure = 150 PSI

Tile 7/28/92 (Tues) (135)

Rock description: Volcanic sandstone Breccia; ~~medium to large~~ pebble small to medium gravel size, Greyish green; moderately to poorly sorted; slightly altered, moderately strong; plagioclase, pyroxene, calcite veins, chlorite; slightly altered fracture (90°) from 31.7 to 32.3'. Slightly altered weathered fractures ~~at~~ approximately at 31.2', 31.8', 32.2', 33.1 and 34.5' bls.

2[45] Driller finished pulling rods out of borehole. Cleaning up area.

3[00] Juan Rivera moved the CME-55 drilling rig to decon area.

3[08] Jorge and Millet are setting the security fence around MW-4.

3[10] I left the site. Go to field's office to drop off equipment.

3[45] I left the field's office. Go to buy films and to develop a project's films.

4[05] Arrive at the house.

Tue 7/30/92 (Cloud) (140)

6:37 I left the house to [illegible]field's office for today soil sampling activity B-6

7:05 Arrive at decon area. Drillers are here.

7:15 Signing the tailgate list. Go with Clinton ~~for~~ to see borings locations B-1 and B-6.

7:30 Drillers getting ready to mobilized the drill rig. We will start with the B-6.

7:45 Drillers are ~~getting ready~~ setting the CME-55 at B-6

7:55 Soil sampling began

8:00 GC sample (0-2')
Hnu is not working properly Susan went to get the other one.

8:10 Susan Colligan is back with the Hnu S/N 101363.

8:25 Attempted to calibrate Hnu S/N 101363 it ~~seems that~~ seems that is not working properly. Soil samples will be collected above

Tue 7/30/92 (Hum) (141)

top of bedrock.

8:35 I briefed Clinton about the conditions of both Hnu units. He told me probably humidity is ~~doing~~ making Hnus ~~not~~ work improperly. Susan went to her place to get her Hnu. ~~A~~ Soil sampling is held for 5-10 minutes to give her a ~~chance~~ chance to get ~~the~~ her Hnu.

8:55 Susan Colligan is back with her Hnu ~~SN~~. The battery of her Hnu is dead.

9:20 GC sample (2-4')
Hnu = 25 PPM

9:40 GC sample (4-6')
VOA (4-6')
Hnu = 100 ppm

9:50 GC sample (6-8')
BNA, Metal, TPH (composite from 4-8'). Top of bedrock 7.2' bls.

10:00 Drillers left drilling area B-4. Go to the decon area.

Tue 7/30/92 (Thur) (142)

10[15] Go to field equipment blank
10[25] Go to field's office to drop off soil samples.
10[50] Back to decon area. Go to decon split spoon sample
11[25] Drillers are going to move to drilling area B-1.
11[45] Driller getting ready to start soil sampling at B-1.
11[50] Soil sampling begin.
12[48] GC sample (0-2)
Hnu = 52 PPM
12[52] GC sample (2-4')
Hnu = 32 PPM
1[08] GC sample (4-6')
Hnu = 392 PPM VOA = 392 PPM
1[34] GC sample (6-8'), (8-10) 42 PPM
Hnu = 62
BNA, Metal, TPH (4-6')
1[45] Drillers are grouting B-1.
1[55] Driller moving to decon area.
2[00] Go to Field office to drop off soil samples and GC

Tue 7/30/92 (Thur) (143)

samples and field equipment.
2[15] Driller are decon drilling tool and split spoon samples.
2[30] Go to Whitehouse to get A roll of aluminum foil. Go also to get ice for soil samples preservation
2[45] Helping driller to ~~pack~~ prepare soil sample for shipment
3[15] Go to decon area to deliver the aluminum foil to Juan Rivera's crew. They are still decon the spoon.
3[25] Go to get film from blazing photo. Go to drilling area MW-4.
~~3[45] Back to drilling area.~~
Wanda told me that there is physical evidence of product in MW-9.
3[50] Back to decon area. Drillers (Jorge & Millet) also to take them to drilling area MW-9.
JV

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Tue 7/30/92 (Thurs) 144

4:00 Go to field's office.

4:30 I left field's office after discussing tomorrow's drilling activity. Go to the house.

4:45 Arrive at the house.

Tue 7/30/92 (Fri) 145

6:40 I left the house. Go to field's office to get supplies & equipment for today's soil sampling activity. B-7 Soil sampling at B-7

7:05 Arrive at decon area.

7:15 Drillers setting CME-55 on B-7

7:37 Soil sampling begins.

7:40 First spoon is out. 14, 49, 12 50/5".

7:55 Drilling location was moved approx 15' to the north. Reason, the augers were tilted.

8:15 Soil sampling begins at new location.

8:20 The spoon got refused at 8'. Moving to another location ~5' from that one. The whole area (next to fire station) is filled up with big boulders.

8:56 GC sample (0-2')

Arr = 0 ppm. Augers are not going down.

u 7/30/92 (Fri) (146)

9:10 Soil sampling is done.
9:20 Drillers are moving to decon area.
9:25 Drillers getting ready to grout B-7.
10:00 Go to field's office.
10:25 Go to decon split spoons.
10:50 Go to field's office
11:10 I left the field's office. Go to the house.
11:30 Arrive at the house.

1:15 left the house Go to airport
3:45 Arrive at San Juan
4:00 Arrive at office in San Juan

R.

Tutu 8/3/92 (mon) (147)

8:00 I left the house. Go to decon area.
8:15 Drillers (both crews) are in St. thomas. They went to Soil Tech's house # 2 to change their ~~ct~~ clothes. Go to
8:14 field's office to get supplies & equipment for today's drilling activity. Soil Sampling ~~at the~~ around Henry's ~~Laundr~~ & Dry Cleaner & at Gasset.
8:45 Waiting for Drillers at decon area.
9:05 Go with Mr. Moffat to drilling area B-2, and B-3. Driller getting ready for mobilization
10:~~05~~ 450 Go to help Mr. Moffat to do the field equipment blank.
10:15 Soil sampling at B-3 begins.
10:20 Hnu S/N ~~A0106~~ A01061
10:30 GC sample (0-2')
Hnu = 0.2 PPM. Drillers got refusal at 3.5' BLS. The sampler got refusal at 3.3' bls.
10:40 GC sample (2-4')
Hnu = ∅ PPM
Soil sample for lab analysis will be collected from 0-2'

TUT 006 0806

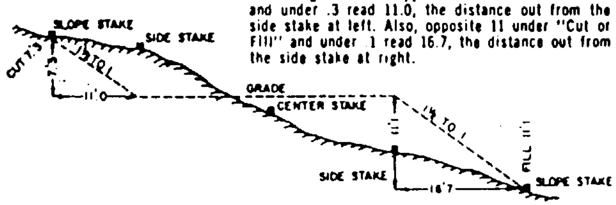
EXHIBIT 'G'

GERAGHTY & MILLER
LOG BOOK #3A
AI/FS FIELD ACT.
TUTU/ST. THOMAS
PRO 13.01

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

GERAGHTY & MILLER
LOG BOOK #3A / W.I. MORALES
RI/FS FIELD ACTIVITIES
TUTU / ST. THOMAS
PR013.01

(6)

16:10 Back to field office. Today to keep working on process data from MW-11D & MW-12D. Contact J. Nelson (Colog): try to determine ΔT & porosity high values. Re-print Run 1 from MW-11D & produce Run 2 log.

19:45 Left field office.

W. A. [illegible]

(7)

PR013.01 July 30, 1992
Tutu R.I. (Thursday)

7:00 AM Arrived at field office to get supplies.

7:11 Arrived at MW-9 location. O.G. on site. They are working on the cuttings removal system installation.

8:00 Set up to start reaming of MW-9

8:05 Start reaming at MW-9 at 3.7 ft
Downhole pressure: 600 psi

8:18 Borehole at 26.0 ft: gray cuttings, [redacted] gasoline odors from cuttings.

8:53 Borehole at 31.0 ft. Gray cuttings gas odors from cuttings.

9:25 Borehole at 35.0 ft. Gray, dry cuttings.

9:37 Borehole at 37.0 ft. Gray cuttings dry.

(8)

9:40 Complete reaming of MW-9. Start removal of tools from hole. West to field office to get computer + printer for geophysical logging of MW-9.

10:05 Back to MW-9. Tools + 10 inch hammer bit stuck inside borehole. Drillers clear the hole w/ air trying to get the rods out.

10:40 Tools + hammer bit out of borehole. Measure hole:

28.9 ft

Borehole ~~[illegible]~~ casing 8.1 ft

Placed tools back into borehole.

11:06 Measured water level of MW-8:

17.84 ft (top stainless steel riser)

(9)

11:20 Clean up of MW-9. Drillers pour some water try to clear the borehole.

11:25 Start removal of tools + 10 inch hammer bit from borehole.

11:30 Difficulties to remove rods from hole.

11:50 Tools out of hole. Borehole depth 34.3 ft

Water level: 27.7 ft (bls)

12:00 Set up geophysical equipment.

12:45 MW-9

Stickup: 1.55 ft

Caliper arms to measuring point: 6.15 ft

Starting depth: 6.15 ft

PVC stick up: − 1.55

4.6 ft

TUT 006 0811

12:55 Calibrate caliper probe w/ 6 + 12 inch rings

13:06 Start logging w/ caliper:

Starting depth: 4.6 ft
Bottom depth: 30.44 ft
Caliper arms 1.12
31.56 ft

Output file: 3ARM.3A∅
Logging is recording 1 inch diameter hole. Up to surface notice that caliper arms are not open. Clean up probe. Try again. There is some oil in the water.

13:28 Starting depth: 4.6 ft
Bottom depth: 32.82 ft
+ Caliper arms: 1.12
33.94 ft

Output file: 3ARM.3A∅
13:30 Caliper arms do not open at bottom of borehole. The arms open at the surface, but not inside the hole. Check the electrical connection + ~~[illegible]~~

put some tape around it. Clean the caliper probe + send it down. Contact C. Moffat + expl the above situation.
13:48 Starting depth: 4.6 ft
Bottom depth 33.04
+ Caliper arms 1.12
bottom 34.16 ft

Output file: 3ARM.3A∅

Logging data recorded: 1 inch diameter hole. Caliper arms do not open again. Take out prol + clean it out. Oily film + mud cover the probe. Try again afte clean out the probe.

14:43 Starting depth: 4.6 ft
Bottom depth: 33.32 ft
+ Caliper arms
extension bottom: 1.12
34.44 ft

Output file: 3ARM.3A∅

TUT 006 0812

(12)

Caliper arms open above the water surface in the borehole. Lowered the probe until borehole bottom depth. Arms do not open again. Take probe out of borehole & clean it. Contact Colog office. Ask Paul about the problem w/ the caliper arms. He said that arms should open unless there is an electrical failure when it ~~comes~~ goes inside the water. He said try to open the arms at different depths.

15:03 Try again to run the caliper outside the water.

Starting depth: 4.6 ft
final depth: 19.0
⇒ above water level: 20.01 ft
Output file: 3ARM.3AØ
Caliper arms open & data was recorded: 10 inch diameter

Seems that caliper arms got ~~pe~~ sticky on the ~~water~~ muddy

(13)

water & could not open.

C. Moffatt call: go ahead w/ the monitoring well installation & do not run the geophysical logging according to J. Baraby. Demobilize geophysical equipment.

15:30 Start monitoring well installation.

MW-9

Screen:	20.0 ft
Bottom cap:	0.33 ft
Riser:	15.0 ft
Cut off:	1.24 ft
Well length:	34.09 ft
Well depth:	34.1 ft (bls)
Top 2 ft ~~Top Sand Pack~~:	14.1 ft ~~11.8 ft~~
Top bentonite:	10.0 ft
Grout	⇒ flush mounted manhole

16:32 Grouting of well annulus:
first batch: 38.2 gal

16:42 Second batch: 10.4 gal
Total grout ⇒ 48.6 gal

TUT 006 0813

17:00 After finish grouting, drillers clean out the area + installed the flush mounted manhole on the well. Back to field office.

18:00 Drillers mobilize the B-90 + tools to decontamination station.

W. I. [illegible]

Tutu R.I. July 31, 1992
PR03.01 (friday)

7:10 Arrived at decontamination station. Drillers set up to start steam cleaning of B-90 + tools. Check MW-9 area.

7:45 Water level MW-9:

13.18 ft (top of stainless steel riser)

Area is clear.

8:00 Water level at MW-7:

17.48 ft (top stainless steel riser)

Check MW-12D area, manhole needs finishing + some trash bags around site has to be pick up. Inform J. Ramos + O. Garcia about this situation.

EXHIBIT 'H'

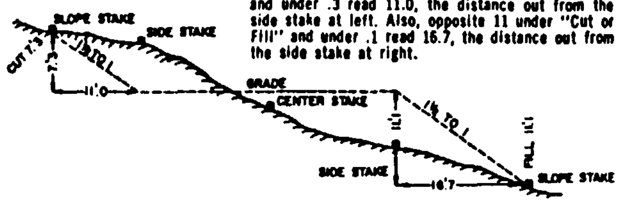
Logbook
Guest.

PR01301.
Jake.

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

Tutu
Wells
Site
Logbook # 5

Date 8 9, 1992

6:40 Derrick Ruben left home
6:56 Arrive at Soil tech office
7 05 Arrived to site ~~Soil tech not there~~ Car still there at MW 95

7:10 Derrick, Ruben Tonito went to Soil tech office to drop off cooler

7:37 Derrick arrives at MW 95 drillers just started drilling with Air hammer using B-90 rig.

7:48 Drillers added Environmental oil ~~to case~~ for the hammer

8:14 approximately at 12'. There is a slight smell of product Hammer is ~~[illegible]~~ 5' Long Length of casing segments 15'

8:31 added oil and another 15' Segment of Casing

9:05 am Drill rig stopped Air compressor site was not delivering the amount of air

9:21 Started drilling

9:10 am Richi, Pablo, Willie and Max from Soil tech arrives

9:14 Ruben goes to the Soil tech office to call Jim Danaly

Still problems with the air compressor There is a leak in one of the fittings, Tonito left for the office to call PK to see if we have enough pressure to continue to drill.

9:53 Tonito said it is ok to continue drilling

9:54 Started drilling

:15 a Stopped drilling
Hammer is cutting but
~~cut~~ Air pressure is not enough
to blow cuttings from the
hole. Thus cuttings restrict
the motion of the hammer

10:50 am Derrick spoke with Ruben
to tell him about the hammer;
and that Soil tech is
trying to call the
company that they rented
the compressor from to
help them with troubleshooting.

10:50 Susan goes to the Soil
Tech office to check on
the HNU.

11:30 Derrick and Ruben went to
Lunch
12:15 pm Returned.

1:45 Toni to Said Air compressor
will not be fixed today

2:00 pm Start to develope MW6R
2:06 pm Derrick arrives at MW6K

~~Open~~ Recorded water level indicator
opened well
collected Static water level
2:30 pm 8.2' from T.O.C
sounded depth 22.84
water column 14.64 ft
Well casing volume =
14.64 ft x 0.65 Gal/ft
= 9.52 gallons

2:45 picked up PSPO

2:50 Arrived at MW6K

Pump is 1' from bottom
intake is 2' from bottom
or 20.64'

TUT 006 0819

Start Pump 3:10 pm stop
Start Pump again 3:15 pm

rate 9 gallons/min

3:15 pm brownish slight ~~oil~~ product sheen
no smell
3:18 pm brownish " "
no smell

3:19 DTW 9.76

3:22 brownish slight product sheen
3:23 DTW 10.52
3:25 DTW 10.10

3:25 Pumprate still 9 gallons/min
3:28 brownish
3:30 DTW 10.64
3:34 light brown very slight sheen
3:34 DTW 10.58
3:35 DTW 10.56
3:44 pm Collected sample for GC.
Labled MW 6R

4:08 DTW 10.38
pump for 54 min
4:15 pm Cleaned up area
4:4? left to pick up packages sample bottles at post office

5:30 loaded packages in ? office prepared bottles for drum sampling

5:45 pm left for ? house

Note MW 9S was sealed with an empty ~~cement~~ Sand sack and Bentonite pellets around the bore hole opening near land surface to prevent rain or runoff water from entering the hole
This was done before leaving the site on 9/9/92

d 11/92

7:05 Arrived to the site

Went to the office to make copies
7:20 of field paper

7:40 leaving office to MW9

7:55 Derrick going to collect water levels at MW7

8:25 returned to MW9S.
drill rig pulled out casing
last night problem existed
in the drilling when they
were placing the 6" casing.

Decided to grout up.
MW9S
8:29 Turned on Grout machine
8:30 Began cleaning asphalt pavement
with ~~hex~~ flat shovel,
scrub brush and hose
area south of MW9S
Car wash personnel was
also cleaning pavement with

The carwash owner spoke with ... about the soil on the pavement. Immediate action was initiated to clean

It appears that there is a
cavity 2' below land surface
at MW9S approximately
1' wide. An attempt was made to sound
the borehole but stopped for fear of getting steel
tape stuck.
8:45 Temporarily stopped cleaning
asphalt pavement and began
adding cement bags to grout
machine

8:52 ~~water was moved away~~
Surface water was moved away
from the MW9S opening
with a scrub brush
grout hose was already
in the bore hole.

9:00 Tom Danahy arrives
He was briefed on the
car wash and MW9S.

He suggested to thicken
grout so that it
does not interfere with
MW9

TUT 006 0821

7 bags of 94 pounds of cement was mixed with each grout preparation after Tom suggestion. The usual is 3 bags/batch and used less water

9:

10:05 grout is 4'3" from Land Surface in MW 9S
There appeared to be a cavity pulling the grout in a South west direction.

Drillers went to the store to buy cement

10:21 grouting continued

@ 10:25 grouting stopped to buy more cement

10 56 grout is 3'10" from L.S
11:04 Started grouting again using 3 bags of cement / mix and less water

Next hole for MW9S will be on the yellow line north of the previous MW 9S attempt and 7' west of Esso's well
11:33 grouting stops
11:33am MW 9S was grouted up to 28" ~~2.5'~~ Then ~~gravel will be placed~~ 3 empty bags of cement was placed into the hole opening and wet cement was poured over the bag and around the hole. Then a plastic garbage can was nailed to the asphalt upside down and covering the bore hole.

11 37 Cleaning grout machine.

11:40 Spoke with Police officer D. Griffiths that we are closing the parking area until Monday.

11 51 Marking monitoring wells with marking pen on M.H. Plate

7

Drillers still washing pavement with water and a scrub brush.

12:20pm Went to the office to discuss activities for next week

TUT 006 0823

EXHIBIT 'I'

Geraghty & Miller

Logbook # 4B

RI/FS

Tutu/St. Thomas

PR01301

Rubén Ponciano (RP)

Geraghty & Miller

Log book # 4B

RI/FS

Tutu, St. Thomas

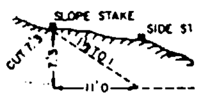
-PR01301

8/15/92

All rock sample descriptions were ~~corrected~~ ~~corrected~~ corrected with the help of Alex Soto.

RPonciano

DISTANCES FROM SIDE STAKES



Bench marking
[illegible] etc.

Water Level measurements
& Field measurements
(PH, etc.)
[illegible] sampling

MW-4
6R
8
9
-10
10D
11D
12D

Tonite
9029
3739
250-0140
Paper begins

K+E "Rite in the Rain"

The paper in this book has been treated by an exclusive chemical waterproofing process. Wet or dry, even the hardest pencil will produce a clean, sharp mark.

KEUFFEL & ESSER CO.

TUT 006 0826

Tu 9/10/92 (Wed) (94)

4^30 Developing MW-6R.

5^00 Well develop of 6R is done. Go to deliver 6th GC sample to Ken.

5^15 Go to prepare sample bottles for tomorrow Drum sampling activity

5^45 I left the field's office.

N.

Tielk 9/10/92 (Wed) (Thus) (95)

6^45 I left the house. Go to field's office.

7^00 Arrive at site. Drillers are not here. Go to check bentonite seal around ~~MW-95~~ MW-95.

7^20 Drillers arrive at site. They are cleaning decon area.

8^00 Go to field's office to prepare labels for sample bottles

8^25 spoke with tom about air compressor still down. Drum sampling activity one ~~drum~~ drum per well. MW-4, MW-5, MW-9, MW-95 will be composite together. Derrick Stepanay will help me to do the drum sampling.

9^15 Go to Kessler house for drum sampling

Soil samples from the drums will be identified as DS-n...

Drums Sample - 42.

TUT 006 0827

#440 Tutu 9/10/92 (Thurs) (9)

945 DS-1 soil (cutting) sample from drums

Well ID	-	Drum #
MW-4	-	D-~~96~~ 86
MW-4D	-	D-96
MW-5	-	D-12
MW-9	-	D-64
MW-9S	-	D-123
B-1, B-2, B-4, B-5, B-6,	}	D-91

DS-2 Soil sample

MW-2	-	~~B-11, B-12~~ D-56
MW-7	-	~~B-13, B-10~~ D-44
MW-8	-	D-58
MW-11D	-	D-78
MW-12D	-	D-77
MW-13D	-	D-27
MW-14	-	D-30
B-11, B-12, B-13, B-10	}	D-71

DS-3 soil sample

MW-1	-	D-114
MW-1D	-	D-104
MW-10	-	D-19

Tutu 9/10/92 (Thurs) (97)

MW-10D	-	D-39
MW-6	-	D-48
MW-6R	-	D-115
MW-6D	-	D-90

Soil samples collected from the drums, will be analyzed for TCLP.

1140 Drum sampling is done. Cleaning up area

1200 Go to drilling area MW-9S. Driller still ~~are~~ trying to fix the air compressor.

1230 Same to drilling area MW-9S. Air Compressor still down.

1240 Go to prepare soil sample for shipment.

200 Soil sample are ready for shipment.

230 Go to drilling area MW-9S. The air compressor has been temporary fixed. Cuttings are not coming out of borehole.

TUT 006 0828

9/10/92 Tutu (thurs) 98

3:30 Tonito (Soil Tech field's supervisor) recomended me to set a 6" casing and then to air hammer through the 6" casing, then after we reached our total depth of 29'. We insert the 4" Stainless steel ~~ss~~ screens and raising pipes. We did the same on MW-6R.

3:48 Drillers are waiting for Pichi to bring the rest of the pipes.

4:00 Go with ~~Mr~~ Derrick Stepanof to show him the location of the monitoring wells that we have installed at ~~Tut~~ the Tutu site.

4:15 Derrick goes to take water level meassurements.

4:45 Pichi is here with the ~~ss~~ stainless steel pipes.

5:00 Drillers are loading the 6" and 4" stainless steel

9/10/92 Tutu (thurs) 99

pipes on the truck. ~~for~~ these pipes will be decontaminated.

5:15 Driller are ~~decontaminating~~ deconing the pipes.

5:30 Drillers back with the stainless steel pipes from decon area.

5:35 Opea is pulling rods out of borehole. He will change the air down the hole hammer from 10" to ~~4¼~~ 4¼".

5:40 Drillers are placing the 6" stainless steel casing.

6:10 PM Air down the hole hamering begins 16' of casing is installed

6:12 PM Cuttings are comming out of borehole. Trace of product is observed in cuttings.

6:40 PM Drillers are going to ~~ge~~ install another 5' of casing.

7:30 Still drilling

8:30 " "

9:30 " "

10:00 PM It ~~looks like seems~~ seemes that the 6" stainless steel

TUT 006 0829

Tue 9/10/92 (100)

Casing ~~tip~~ has separated ~~himself~~ itself at 10' and 20' b/S. Borehole would be grouted and another borehole will be initiated

10^45 PM Drilling is suspended for the day. Drillers cleaning up area. Borehole will be grouted tomorrow.

10^35 I left the site. Go to the house

10^50 Arrive at the house

Tue 9/11/92 (01)

6^45 I left the house. Go to the site.

7^15 Drillers are not here yet. Go to field's office.

7^30 Try to call Cardona. He was not at the office (P.R.).

7^45 Demeck went to measure water level measurements. He has left MW-9, and MW-7. Osea is here. Quike & Arken went to get cement and water respectively. They are getting ready to grout the borehole

8^15 Car wash's ~~owner~~ owner is mad at us. He did know that we were going to be drilling ~~the~~ at MW-9S. There was muddy water in front of his car wash (back Port)

8^35 Go with Papo Gonzalez to get ~~GC~~ a ground water sample for GC analyses.

9^45 GC samples were collected. Go to field's office to speak with Tom Danahy.

Tutu 9/11/92 (102)

10^30 Go back to drilling area MW-9S. Drillers are grouting and cleaning up area.

10^50 Explained Tom Daraely the Water treatment system installation. We I grabbed a GC sample from Tank #1. (IWTF)

11^10 Go to Label monitoring well.

12^30 I left the field's office. Go to the house. I am going to fly to San Juan

Tutu 9/14/92 (Mon) (103)

8^30 I left the house. Go to the field's office to get some supplies and forms for today's drilling activity. Monitoring well installation of MW-9S.

8^45 Arrive at field's office. Organizing bedrock sample description.

8^55 Alberto Carrero from Soil Tech is here. Helping him to cut bottle sample for today quarterly GW sampling event.

9^05 Tonch arrive at field's office. He let me know that we are not going to be able to drill during the morning. We received a letter from Four Winds Plaza's manager about drilling activity should be done after business hour.

9^30 Go to help Clinton with the Ground water sampling.

10^00 Go to the house. I'll be working tonight.

Tue 9/14/92 (10.4)

6^{30}pm I left the house. Go to field's office to get forms and clipboard.

6^{48} Arrived at drilling area MW-9S.

6^{55} Waiting for ~~car of~~ a police car to be moved from ~~a monitoring~~ MW-9S location.

7^{15} Police car was moved from drilling area MW-9S. ~~Driller,~~ getting ready for drilling and installation of MW-9S. The total depth of MW-9S will be 21' b/s. It will have 10' of screen (10-20').

8^{00}pm Drilling ~~begins~~ at MW-9S ~~bob~~ begins.

9^{00}pm We reached the 20' b/s. Drillers will pull out rods out of borehole for ~~A~~ the installation of pipe.

9^{30} Drillers are placing the stainless steel pipe. The borehole collapsed ≈ 2'. Bottom of screen is at 18.67' b/s. Top of screen is at 8.67' b/s.

Tue 9/14/92 (5)

10^{05} Drillers getting ready for MW-9S grouting.

11^{30} Drillers are cleaning up area.

12^{00}AM We left the site. Go to the house

TUT 006 0832

Tutu 9/15/92 (Tues) (106)

8^{30} I left the house. Go to the site.

8^{45} Arrive at site. Clayton and I go to the water treatment system area.

~~8^{50}~~

9^{00} I collect an water sample for GC analyses from water coming out of carbons (drums).

9^{10} Go to deliver the sample EFF-1 to ... at the field's office.

9^{40} Ground water sampling at 4-Winds.

10^{00} Go with pump to Garret well.

10^{15} Water level measurement at Garret well.

DTW = 26.44'

10^{25} Submersible pump is set at 45' bls. The intake is set at 44' bls.

10^{35} Go to Ramsay well to get an electrical cord.

Tutu 9/15/92 (Tues) (107)

10^{50} pumping begins.

11^{10} Go with Alberto Barrera to sample the Laplace well.

11^{45} Go to sample the Gosser well

12^{30} Go to get a water sample from the holding tanks (discharged water). These samples will be sent to the lab. ED-1. The trip blank for this sample is ~~lab~~ labeled TBED91592.

12^{45} Go to prepare the samples for shipment to the lab.

1^{30} Go to the water treatment system. So far we have discharged ≈ 1100 gallons of water.

2^{20} Getting ready for well development at MW-95.
DTW = 13.34.
There is product in this well (trace). Hnu = 23 ppm
inside well.

TUT 006 0833

Tube 9/16/92 (108)

There is ≈ 3.4 gallons in water inside the well.

2:50 The centrifugal pump ~~got~~ is down. Driller, and Rapo, Gonzalez are trying to fix it.

3:45 ~~The~~ centrifugal pump still down.

4:23 Purging of water inside MW-29 begins.

4:30 ~~The~~ GC sample ~~for~~ is collected (5 w.)

4:35 Purging is suspended, well went dry. Water is light brown. ≈ 20 gallons of water removed

4:45 Go to field's office to deliver the GC sample to Gen.

4:50 Go ~~back~~ to water treatment system. 3,332 gallons of the treated water has been discharged.

5:15 Water treatment system is ~~sh~~ shut off. Approximately 3,429 gallons of treated water was discharged into the sewer

Tube 9/16/92 (109)

5:20 Go to field's office.

5:30 I left the field's office on the Chicago.

Tutu 9/16/92 (110)

7[10] I left the house. Go to the field's office.

7[35] Arrived the site. The forklifter is here. Go back to field's office.

7[45] Cleaning up office. Ana Gloria Ramos and Jose C. Agrelot are here.

8[15] Go to help Alberto Barrera in ground water sampling activity (supply well).

8[20] Waiting at Tillet well ~~to~~ to start sampling.

8[40] Trip blank is prepared by Soil Tech's representative

9[08] Ground water sampling at Tillet begins.

9[24] Alberto is taking H PID readings from a glass Jar. It has reached a pike of 12 ppm.

9[42] pump is shut off. ≈ 450 gallons of water was removed.

9[55] Go to sample Hartman II.

Tutu 9/16/92 (111)

10[03] Arrived at Hartman II area. Setting ground water sampling station

10[11] pumping begins

10[42] pump is shut off. Cleaning up area.

10[50] Go to sample the Smith's well

11[01] Pump is on at Smith's well.

11[25] Ground water sample is collected

11[30] Pump is shut off. Cleaning up area. Go to resample again Eglin I, II, and IV.

11[39] pump is turned on at Eglin I

12[05] Ground water sample is collected at Eglin I.

12[15] Ground water sample is collected at Eglin III. Waiting for owner to open pump at Eglin II.

1[05] Ground water at Hartman I (resampled) is collected.

1[30] Go to Tillet well.

TUT 006 0835

Tulu 9/16/92 (112)

2^{00} Ground water at Tullet MW well is collected.

2^{30} Go to Hailman IV.

2^{45} The supervisor of Tulu part did not allow ground water sample at Hailman IV. Go to prepare ground water for shipment

3^{35} I left the office. Go to the room.

9/17/92 Tulu (Thurs) 113

7^{10} I left Chalcedon. Go to the site.

7^{25} Arrived site. Waiting for Tomio.

7^{55} Go to take water level measurements.

9^{00} Still collecting water levels. There are vehicles on tops of MW-2, and MW-10.

9^{05} Go to take water level ~~measu~~ measurements of MW-6R, and 6D

10^{00} Still getting ground water level measurements.

10^{45} Ground water level measurement was not taken at MW-6. There is a transducer set in the well. I lifted ≈ 3 ft. 4 inches.

~~10~~ Go to MW-5.

~~11~~ 11^{35} Water level measurement of all wells is done. MW-2 was not done because there is a vehicle on top of that well.

11^{50} Go to field's office for

Tutu 9/28/92 (Mon) 116

8:30 I left the house. Go to field's office. Ana gloria Ramos and Jose C. Agulat are ~~here~~ waiting for us.

8:45 Arrive at field's office.

8:55 USEPA's representative, Laura Scalisa and Suzane Trealmontana are here.

9:20 Discussing today's ground water sampling activity

9:50 Go to take water level measurement with Steve Alicea of SoilTech. Go to water treatment system to speak with ~~Papo~~ Papo.

10:10 Arrive at MW-13D. DTW = 83.08'

10:20 " at MW-1 DTW = 27.60'

10:25 " " MW-11 DTW = 29.48'

10:32 " " MW-14 DTW = 26.46'

10:45 " " MW-3 DTW = 16.51'

10:55 DTW = 11.44', DTP = 11.43' Trace of product (0.01')

11:04 DTW = 10.88'

Tutu, 9/28/92 (Mon) 117

11:12 MW-2, DTW = 12.74

11:15 Go ~~back~~ to field's office. We are going to have a meeting about the ground water sampling procedure.

12:00 Back from the meeting. Go to start purging MW-8.

12:15 Getting ready for well purging at MW-8. DTW = 17.03

12:30 Go to lunch.

1:00 Back from lunch.

1:10 Waiting for Papo for well's purging

1:20 Papo, Steve and Angel getting ready to well evacuation. Waiting for the 350 F-350. We need ~~it~~ it for displacement of the 550 gallons water tank.

2:20 Alberto Barrera told to me that we are not going to sample today.

2:45 Go to continue ground water level measurement.

2:55 There is product in MW-9S 0.11 of product. DTW = 13.11'

TUT 006 0837

3^{05} Go to take water level measurement of MW-10, and MW-10D. Go to speak with Car Wash's owner about that.
3^{15} He told me (Georgie) that I can do it. DTW = 20.52' 10D = DTW = 20.98'
3^{30} Go to take water level measurement of MW-11D. DTW = 18.94'
3^{40} Go to take water level at MW-12D = DTW = ~~18.47~~ 17.00'
3^{55} Go to take water level at MW-7 DTW = 17.00
4^{02} DTW at MW-5 - DTW = 22.83
4^{15} Go to the water treatment system area.
4^{30} Go to field's office.
4^{45} I left the field's office. Go to the house.

7^{00} I left the house. Go to field's office.
7^{15} Arrive at field's office.
7^{20} Go to the well MW-6 area.
7^{28} Papo is getting ready for well's purging. DTW = 12.03' 3.5.
7^{45} Still getting ready to start ground water sampling.
8^{39} Purging of well begin
8^{41} purging rate 2 gall/min
8^{50} pumping is stopped. ± 12 gallons of water was removed.
9^{56} Driller getting ready to start purging of well MW-6R water level measurement will be taken at MW-6D. Go to take water level measurement at ~~6D~~ MW-6R and MW-6D.
10^{00} It is raining pretty heavy.
10^{15} DTW of MW-6R = 7.50'
MW-6D - 7.30'
10^{25} Stopped raining. Papo and his crew are getting ready to purging of well MW-6R. Papo is making some adjustment

(134)

10³⁴ PID = Ø
SC = 1556
pH = 7.00
Temp = 29.4
Q = 8 gpm

(88 gal)

10⁴⁵ PID = Ø
SC = 1589
pH = 7.00
Temp = 29.3
Q = 8 gpm

(104 gal)

10⁴⁸ Pump is shut off
11⁰⁰ Cleaning up area. Go to help Alberto Barrera with the ground water sampling at MW-11D
12³⁰ Finished ground water sampling at MW-11D. Go to the house
12⁵⁰ Arrive at the house. 4 O day I am ~~planned to~~ flying to San Juan) Return

Tutu 10/5/92 (Mon) (135)

8⁰⁰ I left the house. Go to the site.
8¹⁵ Arrive at the site. Go to get Ice.
8⁴⁵ Still waiting for Soil Tech's representative. Go to Field's office to do some paper work
9⁵⁰ Go to MW-12D.
9⁵⁵ We are setting everything up ~~so~~ to start ground water sampling at MW-12D.
DTW = 27.82
10¹³ Pumping at MW-12D
10¹⁴ Q = 4 gpm
10¹⁵ Q = 0.75 gpm (34 gal)
10¹⁷ Q = 6 gpm
10¹⁹ Q = 4.25 gpm
10²³ PID = Ø
SC = 1459
pH = 7.23
Temp = 31.1
Q = 4.25 gpm
~~10³⁰~~ 10³² PID = Ø
SC = 1453
pH = 7.50
Temp = 31.2
Q = 4.25 gpm
(38.25 gal)

TUT 006 0839

Tutu 10/5/92 (Tues) 136

10^{44} PID = Ø
SC = 1455
PH = 7.07
Temp = 31.0
Q = 4.25

10^{44} pump is shut off.
10^{47} Cleaning up area.
11^{00} DTW at MW-7
DTW = 16.76
11^{32} pumping begins at MW-7
Q = 1 gpm
11^{36} Q = 3 gpm.
11^{38} PID = Ø
SC = 1294
PH = 7.05
Temp = ~~[illegible]~~ 30.3
Q = 3 gpm

(10 gall)

11^{43} PID = Ø
SC = 1288
PH = 7.05
Temp = 29.5
Q = 3 gpm

(17 gall)

Tutu 10/5/92 (Tues) 137

11^{48} PID = Ø
SC = 1292
PH = 7.12
Temp = 29.5

(~~27~~ gall)

11^{50} pump is shut off. Cleaning up area.
11^{55} moving to MW-4D.
12^{03} DTW at MW-4D
DTW = 11.10
12^{11} pumping begins at MW-4D
Q = 2.25 gpm
12^{18} Q = 3 gpm
~~12^{25}~~ ~~Pump~~
12^{41} PID = Ø
SC = 1471
PH = 7.00
Temp = 30.0
Q = 3.0 gpm

(90 gal)

~~12^{17}~~ 1^{15} PID = ~~Ø~~ 90.7
SC = 1472
PH = 7.00
Temp = 30.0
Q = 3.0 gpm

(178 gal)

TUT 006 0840

Tutu 10.5.92 (mon) 138

PID = 52 ppm
SC = 1476
pH = 7.00
Temp = 30.5
Q = 3 gpm
pump is shut off.

1:50 Cleaning up area.
1:55 Moving to Esso storage area.
2:00 Go to lunch.
2:35 Back from lunch. Go to remove the product from MW-95.
2:45 Setting vacuum pump into MW-95. DTW = 13.02, DTP = 12.98
PT = 0.04
3:00 DTW after product removal DTW = 13.09'. We checked the DTP and DTW with and interface probe.
3:15 There is trace of product inside the well.
3:45 Waiting for Steve Alicia Soil Tech technician to bring my van.

Tutu 10.5.92 mon 139

3:55 Go to field's office to
4:10 Discuss with Clinton about tomorrow field's activities.
4:20 Go to measure product thickness at MW-95.
4:35 There is no product detection by the interface probe.
4:45 Go to the home.
5:10 arrive at the home.

ulu 10.6.92 (Tues) 14L

4^{15} Am I left the house. Go to the field's office.

4^{30} Arrive at field's office

4^{35} Go to the Esso storage area.

5^{00} am We are ready to start purging at MW-10D. Waiting for Steve Allen.

DTW at MW-10D = 20.~~6~~66

DTW at MW-10 = 20.52

MW-10 will be monitored during purging of MW-10D. Reading will be taken every ~~10~~ 10 mins.

5^{14} Am pumping at MW-10D

Q = 8 gpm

5^{24} PID = Ø

SC = 606

PH = 7.10

Temp = 29.3

Q = 8 gpm

(80 gal)

5^{34} PID = Ø

SC = 1106

PH = 7.49

temp = 30.1

Q = 8 gpm

5^{40} Pump was lowered ≈ 4 more feet. reason well went dry. pump off

5^{44} Well recharge pretty well but at that rate 8 gpm went dry again.

~~6^{03} pump is shut off.~~

5^{55} PID = Ø

SC = 1264

PH = 7.23

temp = 29.8

Q = 8 gpm

6^{04} PID = Ø

SC = 1273

PH = 7.23

Temp = 29.5

Q = 8 gpm

pump is shut off

6^{30} Am pumping at MW-10 begin

~~6^{31}~~ Q = 4.75 gpm

6^{31} Q = 2 gpm

6^{34} PID = Ø

SC = 464

PH = 7.23

Temp = 31.0

Q = 2 gpm

TUT 006 0842

6^{34} PID = Ø
SC = 592
PH = 7.18
Temp = 31.4
Q = 2 gpm

~~5^{44}~~ ~~PID =~~
~~SC =~~
~~PH = 7~~
~~Temp = 31.4~~
~~Q =~~

6^{41} PID = Ø
SC = 960
PH = 7.15
Temp = 31.5
Q =

6^{42} well went dry. Pump was lowered. pump is off.

6^{48} DTW = 31.60
6^{55} DTW = 30.90
6^{57} DTW = 30.70
7^{09} DTW = 30.50

Submersible pump is ~~clo~~ clogged.

7^{31} MW-10 will be pump again until SC stabilize.
DTW = 29.60

7^{37} pumping start at MW-10
Q = 1 gpm

7^{40} SC = 1173
7^{43} SC = 1179
7^{46} SC = 1170
7^{53} SC = 1228
7^{54} SC = 1225
7^{55} SC = 1229
7^{57} Well's specific conductance is stabilized. well went dry

8^{10} Go to decon submersible pump.

8^{15} Go to MW-1 (Resampled)
DTW = 28.79
Setting submersible pump -

8^{54} pumping begins at MW-1.
8^{56} Q = 0.75 gpm
8^{57} Q = 2 gpm
8^{58} Q = 1 gpm

9^{02} PID = Ø
SC = 1330
PH = 7.03
Temp = 31.1
Q = 1 gpm

(10 gal)

9^{12} PID =
SC = 1335
PH = ~~7.0~~ 7.00
Temp = 31.3
Q = 1 gpm

(10 gal)

TUT 006 0843

9[22] PID = ∅
SC = 1333
PH = 7.02
Temp = 32.1
Q ≤ 1 gpm
(10 gal)

9[25] pump is shut off.
Cleaning up area

9[30] moving to E storage area, to decon submersible pump.

9[49] Go to measure product thickness at MW-95.
D+W = 12.90
D+P = 12.90
Trace of product is observed in the well.

10[00] D+W of MW-9.
D+W = 12.52

10[30] Go to take D+W of MW-130
D+W = 83.20

10[45] Setting submersible pump at MW-130.

11[04] Pumping begins at MW-130
Q = ~~6gpm~~ 6 gpm.

11[15] Well went dry. A sample

~~11[17]~~ for field's parameter was not taken due to the pumping rate.
The water level went after the 100' of depth.

11[30] The well did not recover the 75% within the 15 min.

11[33] Cleaning up site. MW-130 will take a long wait to recover

11[50] Go to help Barrera with the ground water sampling at MW-131.

12[45] Go to field's office to help prepare samples for shipment.

2[00] I left the field's office. Go to the house.

2[15] Arrive at the house.

TUT 006 0844

Tula 10/7/92

6:43 I left the house. Go to the site.

7:05 Arrive at the site. Papo is ~~here~~ at MW-4D. 4D will be ~~sampled~~ resampled again but this time will be only for VOCs.

7:15 DTW at MW-4D
DTW = ~~12~~ 11.08.

7:30 Getting ready to start purging MW-4D

7:55 Pumping at MW-4D begins
Q = 8 gpm

8:06 PID = Ø
SC = 1477 (88 gal)
PH = 7.15
temp = 28.6
Q = 8 gpm

8:17 PID = Ø
SC = 1474 (88 gal)
PH = ~~28.6~~ 7.17
temp = 28.6
Q = 8 gpm

8:28 PID = Ø
SC = ~~1474~~
PH = 7.16 (104 gal)
Temp = 28.8
Q = 8 gpm

8:30 Pump is shut off.

8:35 Cleaning up area. Go to MW-9 area.

8:45 DTW of MW-9
DTW = 12.40'

8:50 Go to check product thickness at MW-9S.
DTW = 12.76
DTP = 12.76
PT = 0.0

9:05 Pumping begins at ~~MW-9S~~ MW-9
Q = 2 gpm

9:12 PID = 2000 ppm
SC = 1386
PH = 7.15 (14 gal)
temp = 33.2
Q = 2 gpm

9:19 PID = 800 ppm
SC = ~~1486~~ 1490
PH = 7.12

9^{28} Q = 0.5 gpm to 1.5 gpm
9^{30} PID = 780 Temp = 32.2
SC = 1486 PH = 7.14
Q = 1.5 gpm
9^{33} pump is shut off.
9^{35} Clearing up area.
9^{40} setting pump at MW-9S
9^{43} pumping begin at MW-9S
Q = 0.25 gpm (2 gal)
9^{44} Q = 1.75 gpm
9^{47} Q = 0.75 gpm PID = 600
9^{48} Q = 2 gpm PH = 7.03
(4 gal) Temp = 32.6
SC = 1250
Q = 2 gpm
9^{51} PID = ~~680~~ 696
SC = 1325
PH = 7.15
temp = 32.~~4~~
Q = 2 gpm (6 gal)
Trace of product were observed in this well ~~(MW~~
(MW-9S)

9^{56} PID = 520
SC = 1322
Temp = 32.0
PH = 7.11
Q = 2 gpm.
Well went dry.
10^{10} Go to field's office to do some paperwork.
10^{40} go back to the site
10^{42} Field's parameter for Tap water faucet at Exxo
SC = 664
PH = 7.56
PID = 0
Temp = 29.2
10^{54} Field's parameter after sampling for MW-9
PID = 680
SC = 1480
PH = 7.16
temp = 31.2
12^{00} Field's parameter for MW-9S
PID = 1200 PH = 7.17
SC = 1320
te... = 31.3

12⁰ Go to lunch
1¹⁰ Back from lunch - Go to help Clinton and Alberto with groundwater sample.
3⁰⁰ Go to town (Fed. EX.) to send ~~the~~ equipment to the states.
5⁰⁰ Back at the house.

Tue 10/8/92
8¹⁵ I left the office. Go to field's office.
8³⁰ Arrived at office. Go to do some paper work. ~~to~~ Clinton needs info about field's activities performed during september for the monthly progress report
9³⁰ Cleaning up office.
10⁰⁰ I left the office. Go to airport. I am flying to San Juan today.

2⁰⁰ Arrived at San Juan.
2¹⁵ Go to do paper work
5³⁰ I left the office.

TUT 006 0847

EXHIBIT 'J'

Geraghty & Miller, Inc.

Logbook #4C

TUTU RI/FS

PR01301

Tutu, St. Thomas

TUI 006 0849

Name Ruben Ponciano
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Freld's office phone #
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TUT 006 0850

DT-0659

Projects Tutu, St. Thomas
PR01301 11/16/92

ELAN Publishing Co., Inc.
Meredith, N.H. 03253

Projects (continued)

N

A

PI

TUT 006 0851

h
ip
va

DT

Tute, 11.16.92 (map)

8:00 Am Arrive at field's office. Getting supplies and equipment for today's ~~fild~~ field ~~work~~ work activities, sound of water level, ground water sampling of product in MW-95, ~~Su~~ and ~~sur~~ surveying site ~~and~~ area.

8:40 Go to the Essot storage area. Go to get equipment and supplies for today's activities.

9:20 Back to field's office.

10:00 Back to the site

10:05 Arrive at MW-1D, MW-1, MW-14 well location area.

10:07 there is a bus parked on top of MW-1. Go to speak to someone to move the ~~bus~~ bus.

10:20 Go to take W.L.M of MW-1D, MW-1, and MW-14

10:25 MW-1, DTW = 24.89

10:27 MW-1D, DTW = 44.75

Tutu 11-16 ~~15~~ '92 (mon) TVD ②

10^{44}	MW-14; DTW = 24.24
10^{53}	MW-13D; DTW = 90.86
11^{06}	MW-3; DTW = 13.49
11^{15}	MW-4D; ~~8.70~~ DTW = 8.78
11^{25}	MW-4; DTW = 10.18
11^{40}	MW-2; DTW = 10.18
11^{56}	MW-6D; DTW = 5.32
11^{58}	MW-6R; DTW = 5.51
12^{06}	MW-9; DTW = 10.45
12^{11}	MW-9S; DTW = 10.45
12^{27}	MW-10R; DTW = ~~17.24~~ 16.72
12^{30}	MW-10D; DTW = 17.26
12^{48}	MW-11D; DTW = 15.43
1^{00}	MW-12D; DTW = 23.69
1^{09}	MW-7; DTW = 15.46
1^{20}	MW-8; DTW = 12.70
1^{24}	MW-5; DTW = 19.43

1^{35} Go to lunch.
2^{10} Back from lunch.
2^{15} Go to ~~set~~ get ready for
Small pump test at MW-9S
2^{39} Tom went to field office.
Tom ~~setting~~ [illegible]
[illegible] and [illegible]
ground water sample of [illegible]

Tutu 11-16 ~~15~~ (mon) TVD ③

12.11
10.65
1.46

4^{20} Setting ~~[illegible]~~ / [illegible]
pump [illegible] MW-9S
4^{25} MW-9S static w. ~~[illegible]~~ [illegible]
level 10.65'
4^{29} Static water level at MW-9
DTW = 11.00
4^{43} Pumping begin.
4^{45} DTW = 11.60, Strong odor.
4^{47} DTW = 11.37 Q = 0.75 gpm
4^{49} MW-9; DTW = 11.02'
4^{50} MW-9S discharge = 0.75 gpm
no product observed / sheen observed
4^{51} MW-9S; DTW = 11.90
4^{52} MW-9; DTW = 11.04
4^{54} MW-9S; DTW = 17.11
4^{58} Pump shut off. DTW = 12.30 / MW-9S
Battery is dying out.
5^{10} Groundwater sampling at
MW-9S. Sheen observed in groundwater samples.
5^{20} Cleaning up area.
5^{35} Go to field's office.
5^{49} Cleaning up field's office.
6^{25} Go to Airport with Tom
Donahy. He wants to pick up
his car.

TUT 006 0852

Tutu 11.17.92 (Tues) ⑤

12:30 Finished replacing well cap at MW-4D. We got a sealed cap but the top of casing does not guarantee a good seal. Go to check MW-6D, and MW-1D.

12:35 ~~MW-4D Shows a~~ No well cap ~~on MW~~ on MW-1D has a good seal

12:45 ~~MW-~~ MW-6D's well cap shows a good seal. Go to storage area at Esso.

1:00 Go to lunch.

1:15 Back from lunch. At field's office locating Boring and ~~well~~ well, and surface soil sampling ~~to~~ from aero photograph to a base map.

1:25 1:20 Go to ~~Esso~~ storage area. Caroline Kwan, from EPA, Ana Gloria Ramos, Cardona, AC. and Tony Donachy ~~are~~ arrive at site

⑥

they are walking up ~~an~~ Nitt area

2:00 Alberto & I will go over the core ~~box~~ boles.

3:30 Go to see some outcrops around site.

4:30 Go back to field office.

4:45 Go to meet Tony Donachy at Nisky Center.

5:20 Seeing outcrops by airport.

6:00 Back at the house

Outcrops ... strikes & dips

TUT 006 0853

Tutu 11.16 92 TVD (MON ~~Tues~~) (4)

7^{30}PM Arrived ~~at~~ house.

[illegible]

Tutu 11.17 92 TVD (Tues) 5

8^{00} Arrive at field office.

8^{15} Go to flag surface soil sampling locations.

849 Still flagging and checking MW's, Borings and surface soil locations on base maps.

~~9~~10^{15} Still checking locations. The culvert is also going to be checked.

10^{39} Finished checking locations. Go to storage area at Esso to pack up equipment to be taken to P. Rico, deconning equipment, pulling core holes samples out MW-17D, MW-11D, and 6D. Went to field's office to

~~10~~ leave base maps ~~as~~ so Tom can take them and to make some phone calls

11^{20} Go to check well ~~at~~ cap at MW-4D.

Tuti 11.17.92 (Tues) ⑤

12:30 Finished replacing well cap at MW-4D. We got a sealed cap but the top of casing does not guarantee a good seal. Go to check MW-6D, and MW-1D.

12:35 ~~MW-1D shows a~~ No well cap ~~on MW~~ on MW-1D has a good seal

12:45 ~~MW~~ MW-6D's well cap shows a good seal. Go to storage area at Esso.

1:00 Go to lunch.

1:15 Back from lunch. At field's office locating Boring and ~~well~~ well, and surface soil sampling ~~for~~ from aerophotograph to a base map.

~~1:25~~ 1:20 Go to ~~Esso~~ storage area. Caroline Kuran, from EPA, Ana Gloria Ramos, Carlora, AC. and Tom Danahy ~~am~~ arrive at site

⑥

they are [illegible] up ~~on~~ Nitt area

2:00 Alberto & I will go over the core ~~box~~ boxes.

3:30 Go to see some outcrops around site.

4:30 Go back to field office.

4:45 Go to meet Tom Danahy at Nisky center.

5:20 Seeing outcrops by airport.

6:00 Back at the house

EXHIBIT 'K'

FILE COPY

IN THE DISTRICT COURT OF THE VIRGIN ISLANDS

DIVISION OF ST. THOMAS AND ST. JOHN

P.I.D., INC., Plaintiff, vs. TEXACO, INC., TEXACO CARIBBEAN, INC., VERNON MORGAN, ESSO STANDARD OILS, S.A., LTD, DANIEL BAYARD, Defendants.	CIVIL NO. 89/220
FOUR WINDS PLAZA PARTNERSHIP, Plaintiff, vs. TEXACO, INC., TEXACO CARRIBBEAN, INC., VERNON MORGAN, ESSO STANDARD OIL, S.A., LTD., DANIEL BAYARD, Defendants.	CIVIL NO. 89/224

DEPOSITION OF:

LISA BONANNO

DATE:
March 18, 1991

JULEE NORMAN, C.S.R.
Reported by: RITA SHEPARD, C.S.R.
P.O. Box 9968
St. Thomas, USVI 00801

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• • P R O C E E D I N G S

LISA BONANNO, • a witness, having been first duly sworn, was • examined and testified as follows:

DIRECT EXAMINATION

BY MR. COLE:

Q: Ms. Bonanno, for the record could you please • give your full name and your residence address?

A: My name a Lisa Marie Bonanno Bertrand, • B-E-R-T-R-A-N-D. I live at 2C-A and 2C-B Estate • Bakkeroe in St. Thomas.

Q: And what is your date of birth?

A: It is 4/8/61.

Q: How long have you been a resident of St. • Thomas?

A: For two years. Well, I moved down • permanently August of '89, but I've been basically • traveling back and forth for four or five years.

Q: Where was your residence prior to August of • 89?

A: 311 Roseland Avenue Essex Fells, New Jersey.

Q: Essex?

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A: Fells. E-S-S-E-X, and then F-E-L-L-S.

Q: What is your educational background, Ms. • Bonanno?

A: I got a bachelor's degree at Syracuse • University with a concentrate in French at the Sorbonne • and I got a master's at Harvard.

Q: What year did you obtain your degree from • Syracuse?

A: I graduated in '83.

Q: What was your major?

A: It was in education.

Q: And you say you studied at the Sorbonne?

A: Yes, I did.

Q: For how long?

A: For one year.

Q: And obtained a degree?

A: A concentration in French.

Q: And when was that?

A: In 1982.

Q: So you spent one year of your undergraduate • career overseas then?

A: Exactly.

Q: And then a master's degree from Harvard?

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A: Yes.

Q: When did you obtain that degree?

A: I graduated in '84.

Q: What sort of degree?

A: In reading and language for education.

Q: What did you do after you graduated from • Harvard?

A: I taught in New Jersey in North Bergen, New • Jersey.

Q: For what school?

A: It was school Horris Man, was the name of • school.

Q: Was that a private school?

A: No, it wasn't, it was a public school.

Q: What did you teach?

A: Taught first grade and helped in teaching • other teachers a reading and writing program that I • developed at Harvard.

Q: And that was starting in 1985? How long did • you do that?

A: I only taught for one year.

Q: Until 1986?

A: That's correct.

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Q: Do you recall what month?

A: The end of the first school year, so June.

Q: What did you do after that?

A: I worked for Gardner Road Construction • Company.

Q: Gardner Road?

A: Gardner Road Construction Company.

Q: How do you spell that?

A: G-A-R-D-N-E-R, and then road, R-O-A-D, • Construction Company.

Q: In what capacity?

A: I was the assistant to my father. My older • sister left for a year, supposedly for a year, and I • was filling in her position.

Q: What position did your father have in that • company?

A: He was the owner of the company.

Q: What kind of business was it in?

A: Constructing multi-tenant buildings and • residential units.

Q: What were your duties within the company?

A: My duties were basically to coordinate the • different departments and make sure that everyone was

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doing what they are supposed to do, and bring the • information back to my

EXHIBIT B

[19] Q: Are there any other shareholders?
[20] A: No, there is not.
[21] Q: It's a corporation?
[22] A: It's a corporation.
[23] Q: The permits for construction are all under

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Spash and Dash's corporate status?
[2] A: No, the permits for construction are under • Four Winds Plaza because Four Winds Plaza was building • the car wash and submitted the application for the • permit.
[6] Q: And you somehow took assignment of those?
[7] A: That's correct.
[8] Q: From what I understood, you have financing • for your building, the building; is that correct?
[10] A: Yes, that's correct, Four Winds Plaza has • nothing to do with it as of now.
[12] Q: And ground broke in February?
[13] A: Twenty-fifth.
[14] Q: And you started telling us this morning a • little bit about a problem that you encountered.
[16] A: Yes.
[17] Q: When did you first learn of that problem?
[18] A: I don't know the exact date. It may have • been on the 25th. Actually it was on the 25th. George • Mosa came to my office and said I think you should come • and see what is going on. I went there.
[22] Q: Who is George Mosa?
[23] A: He's my construction manager, he's in charge

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of it.
[2] Q: Does he work for anyone other than himself?
[3] A: He works for himself.
[4] Q: Mosa?
[5] A: M-O-S-A
[6] Q: Now, I take it your office for the video • store is located right in Four Winds Plaza?
[8] A: That's correct.
[9] Q: And he knew to come to your office there?
[10] A: That's correct.
[11] Q: Describe to me what happened when he came to • your office?
[13] A: He said I think you better come and take a • look, and I had just been there about 15 minutes before • that when they started digging, and so I was surprised. • And we came out of my office, and on the way walking • there he said that they were digging the cistern wall, • there was seepage of some substance coming out of the • wall, and I asked him what he thought the substance was • and he said that it was oil. He called it dirty oil, • that was his words, burnt oil, dirty burnt oil he said.
[22] Q: Referring to Exhibit 1, can you mark an X • with Mr. Dema's pen where you're referring to when you

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say you were digging for the cistern wall? Where is • the wall located?
[3] A: That would be where the cistern is in the • dark, the black pen. This is the wall of the Esso and • this is the wall of the car wash and this is the • cistern. This is where the oil was leaking out of, and • it was leaking out of the wall, it was seeping out the • wall and going down into the pit of the bottom of the • cistern.
[10] Q: At that point when you walked over with Mr. • Mosa, how deep was the pit?
[12] A: Excuse me, to clarify for the the record -- • I'm sorry, it's here. I apologize. •
[15] MR. DEMA: Okay, we've changed the • diagram to reflect that you've marked on the blue block • No. 2; correct.
[18] THE WITNESS: That's correct, and it's • correct now.
[20] Q: How deep was the pit when you walked over • there with Mr. Mosa.
[22] A: I don't know exactly how deep it was at the • time when we discovered it, and I don't know exactly

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how deep it is right now, but we could ask George Mosa.
[2] Q: No estimation?
[3] A: Seven feet.
[4] Q: And where on this seven-feet drop were you • seeing something you perceived as oil?
[6] A: If you cut the wall of the cistern, the • cistern wall is 28 feet long. If you cut it in half it • would be on the half closer to the street as opposed to • Four Winds Plaza.
[10] Q: Over an entire plan of it, 14 feet of

it?
[11] A: Yes.
[12] Q: Can you describe for me what the dirty burnt • oil looked like?
[14] A: Yes, it was dark, and it was thick, and it • smelled, and it was seeping out of the wall. It • started seeping out not high, it was lower, deeper, I • should say, and it was seeping out, and -- at first it • didn't seem like a problem at all. It just looked like • it was -- it was late in the afternoon when they • finished the pit, and it didn't seem like much of a • problem. George Mosa said what do we do, and I said we • build a car wash. So he put plywood up, just leaned it • up against the wall just so.

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[1] Q: So what?
[2] A: Just to see if it would contain it.
[3] Q: This is Mr. Mosa's idea?
[4] A: Yes, it wasn't my idea because actually I • didn't know it until the next morning when I came.
[6] Q: Let me stop you. I still want to stick with • you that first night. On the dig that was made, and • where you put the plywood up to see what happened in • the morning --
[10] A: That is not true. He put the plywood up • after. He showed it to me and he said do you think • that this is a problem, what should we do. I said I • did not feel it was a problem because it was a known • fact that there were some problems from Esso and that • everyone knew about it. I almost anticipated that, you • know, I would see some kind of something because that • is what everyone has been talking about, and I at the • time at all I didn't think anything of it. I said -- • we didn't really discuss whether to stop or continue. • He just wanted to bring it to my attention, and I said • I was aware of it, that there was problems in that • area.
[23] Q: When you think back, was this all done the

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very first day you started construction?
[2] A: Yes, the first day at seven o'clock.
[3] Q: At that point did you notify anyone else • about the problem or the potential problem?
[5] A: No, because I didn't think it was a problem • on that day. That night it apparently rained, and the • next morning at 7:30 in the morning when I reached • there, I got there exactly at 7:30 and the guys must • have come on the job earlier. We start at 7:30, and • one of my employees was taking a plastic cup, filling • it up, skimming the oil off the bottom of the cistern. • There was a little bit of water because, as I said, it • rained, skimming off the oil and pouring it into a five • gallon jug. I was surprised and I said what is this • guy doing. I thought it was a joke, and George Mosa • told me.
[17] Q: Let me stop you for a minute. How much of • this alleged oil did your friend or employee scoop up • that morning?
[20] A: The best thing to do would be to speak • directly with George Mosa. It was several five gallon • barrels.
[23] Q: Several?

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[1] A: That is what I was told, but I didn't see • that with my own eyes.
[3] Q: You then went around to where?
[4] A: To Esso.
[5] Q: Who at Esso?
[6] A: I spoke with the new manager. His first name • is Don. I don't remember his last name, but I do have • a card probably in my office.
[9] Q: What did you tell him?
[10] A: I told him please come and look at what I was • seeing, and I told him that there could be a serious • problem here. I said is this what is existing or do • you have a leak right now and he said that we have -- I • said do you have any oil pits along this wall, and he • said yes. And I said are they used. He said they are • back there. I said you need to get them pumped out, • and you have to get them pumped out today, I don't want • anything to stop my car wash. He said they'll be • pumped out today. I went to George and I assumed that • they would be pumped out. The next day I came --
[21] Q: We were talking about the 26th if • construction was the 25th?
[23] A: Right.

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[1] Q: Now you're talking about the 27th?
[2] A: Right.
[3] Q: What happened on the 27th?
[4] A: I don't have an exact recollection of what • happened every single day, but I do know that when it • rained it was

more apparent. When it didn't rain it • was only a little bit to scoop off. We were getting • ready for my inspection for the slab of the cistern, • and every -- like every time -- George would come back • and forth to my office, and I would go back and forth • to the construction site, and every time I spoke with • him I asked him if Esso came and pumped out the tanks, • and he would inform me of the status.
[14] Q: Were they pumping out the tanks?
[15] A: No, they did not.
[16] Q: So I went back to Don and I told him you • don't understand the seriousness of this. I said that • I have an inspector coming out to inspect my • construction for the slab, and I need to pour the next • day, and if he noticed, there may be or may not be a • problem. Because at that point I thought maybe it • wasn't the normal problem that everyone was talking • about, that there was still oil there and it was

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leaking out. He said it would be taken care of, and so • I said great, and then the inspector came and didn't • say anything, you know, so we assumed that, you know, • there was nothing wrong and everything was fine and we • continued.
[6] Q: This was the Virgin Islands construction • inspector?
[8] A: This is Planning and Natural Resources • inspector. His name is Mr. Peters.
[10] MR. ROMERO: Are we on the 27th?
[11] THE WITNESS: I don't know the exact • date. I'm sure he has a record of when he came.
[13] BY MR. MEYERS:
[14] Q: This is Mr. Peters of DPNR that was • inspecting the slab for the cistern?
[16] A: That's right. And he inspected it, he • approved it, we poured and we started framing up the • walls. There is oil stains on the sheet rock that we • used to put, to frame the walls, and it didn't seem • like it was going away. So at that point it was • obvious that there was a leak, that it wasn't just • seepage in the ground. So I went to Don and I said, • listen, you don't understand the seriousness of this.

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[1] Q: Who is Jim Jensen?
[2] A: He is the guy who is the main person in • charge of Esso down in St. Thomas. And the way that I • knew his name was because when I was speaking to Daniel • Bayard about leasing space from them, he in the final • thing admitted that, well, he said that he talked to • Jim Jensen and Jim Jensen said that no, he had plans to • develop it to a convenience store, and there wasn't • room for a car wash. So I knew that he was ahead of it • from that. • So Don confirmed that Jim Jensen was the guy • in charge. I said call him now. I said let's take a • chance. He called and the guy was not in. He left a • massage to call me. I asked him for his number so I • could call him directly, and his fax number, and I went • back to my office and I called him and he was not • available. I called several times during that day. I • was there at seven in the morning, so this all happened • early in morning when I kept calling and calling.
[20] Q: Do you know the date this was?
[21] A: No, I don't know exactly right now, but it • was about two weeks ago, not more than three, and not • last week. He called me back, and I said that we have

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a serious situation here. He admitted that he was • aware of the situation, and I said, good, what are you • going to do about it. He said we're planning on • pumping them out. I said that is not good enough, it • has to be pumped out today, I have an inspection • tomorrow and if anything stops my car wash, there is • going to be a problem.
[8] MR. ROMERO: When was your inspection • going to be?
[10] A: As I said, I don't know the exact dates, but • Peter will tell you. What they did first is inspect • the slab of the cistern. Then they build forms for a • wall of the cistern and you tile all the steel in them, • and then they have to inspect the steel and the frames • before you pour. So it was after the slab inspection, • after the pouring of the slab, after making all the • forms and putting shoes on and all the steel, but • before the pouring of the walls. • The exact date I'm sure George Mosa • knows them, and so does Peters. I didn't happen to • write it down. He said that he would have them pumped •

out that day. And I left the office to take my • daughter to the doctor.

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When I got back there was no evidence of • trucks. My construction guys were gone. I called • George Mosa and he said yes, there was construction • there and it looked like they were pumping out the • tanks. Then the day after they started taking out the • lift and they took out lifts and they filled in • concrete. But apparently there is one more tank.
[8] Q: Wait, wait, wait. You're going too fast for • me. I'm just a slow country lawyer from Iowa. They • took out lifts, as in like a car lift?
[11] A: Yes.
[12] MR. ROMERO: They're still out there?
[13] A: They said that they were shipping them to St. • Croix. See, I guess what made me so upset was I didn't • know what to do with the oil, so we gave it back to • Esso and they poured it in the pit.
[17] MR. ROMERO: Which pit?
[18] A: Back in the pit that was leaking. They were • employees.
[20] Q: You said they were taking out in addition to • the lifts something else?
[22] A: No, they took out the lifts and they topped • off the pits with concrete.

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[1] MR. ROMERO: She said they pumped out • the tanks too.
[3] A: Yes they pumped out the tanks too, but not • all of them. There is one more tank they didn't pump • out yet.
[6] Q: How is it you know that?
[7] A: Because I asked the guys yesterday. I said • are all the tanks pumped out and they said no.
[9] Q: Who is they?
[10] A: The employee of Esso that work there. I said • which one is it, and they showed me, and Attorney Dema • and I said when is it being pumped out. He said • they're planning on pumping it out, it's not finished, • it's not done. That is what they said.
[15] Q: When you got your construction permits from • the DPNR, was there any kind of qualifications or • requirements placed on you regarding the testing of any • kind of soil sample or anything of that nature?
[19] A: None.
[20] Q: Were you required to notify anyone from DPNR • other than the building inspectors for the cistern • about starting the construction?
[23] A: No, my only requirement is to post a sign

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that gives my permit numbers.
[2] Q: Other than notifying Esso, did you notify any • other governmental agencies regarding what you saw?
[4] A: No, to be completely honest, I didn't.
[5] Q: You have been completely honest throughout • this deposition haven't you?
[7] A: I have. I had no idea it was a problem or a • potential problem until I told this guy and he informed • me that it had to be brought out today. Even when he • started draining it, to me I didn't understand really • why because my assumption was everyone knows about the • situation, they knew about it before. I went in for my • permits, they knew about it while I had my permits in • review, they knew after I got my permits, they knew • about it when I dug ground and Peters already • inspected. • If there was going to be a problem they would • have said it right now. And to go back about scooping • out the oil, we didn't necessarily scoop out the oil to • hide it from anyone. We scooped it out because I • didn't want oil in my pit when I poured any concrete. • If I was going to hide it, I wouldn't give it to Esso • and watch them pour it back into the pit. So that is

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what happened. •
[3] MR. MEYERS: It's five o'clock. I've • got some more regarding those dates. •
[6] MR. DEMA: I'd love to give you a few • more minutes. The consent judgement against Rite Way • was entered on December 26, 1989.
[9] THE WITNESS: I'm sorry, September 26, • 1989? •
[12] MR. MEYERS: December or September? •
[14] MR. DEMA: December, day after • Christmas. A call for them to surrender and vacate the • premises known as Department Store by 16 January 1990. • That is according to Judge Henry Feuerzeig. •
[19] MR. MEYERS: And the cease and

TUT 006 0862

EXHIBIT 'L'

FILE COPY

IN THE DISTRICT COURT OF THE VIRGIN ISLANDS

DIVISION OF ST. THOMAS AND ST. JOHN

FOUR WINDS PLAZA PARTNERSHIP, Plaintiff, vs. TEXACO, INC., TEXACO CARIBBEAN, INC., VERNON MORGAN, ESSO STANDARD OIL, S.A., LTD., DANIEL BAYARD, Defendants.	CIVIL NO. 1989/224 ACTION FOR DAMAGES JURY TRIAL DEMANDED
P.I.D, INC., Plaintiff, vs. TEXACO, INC., TEXACO CARIBBEAN, INC., VERNON MORGAN, ESSO STANDARD OIL, S.A., LTD., DANIEL BAYARD, Defendants.	

DEPOSITION OF:

GEORGE MOSA

DATED:
June 13, 1991

JULEE NORMAN, C.S.R.
RITA SHEPARD, C.S.R.
P.O. Box 9968
St. Thomas, USVI 00801

TUT 006 0864

IN THE DISTRICT COURT OF THE VIRGIN ISLANDS
DIVISION OF ST. THOMAS AND ST. JOHN
FOUR WINDS PLAZA PARTNERSHIP,)
)
Plaintiff,) CIVIL NO. 1989/224
)
vs.) ACTION FOR DAMAGES
) JURY TRIAL DEMANDED
TEXACO, INC., TEXACO CARIBBEAN,)
INC., VERNON MORGAN, ESSO STANDARD)
OIL, S.A., LTD., DANIEL BAYARD,)
)
Defendants.)
__________________________________)
P.I.D, INC.,)
) Plaintiff,)
) vs.)
) TEXACO, INC., TEXACO CARIBBEAN,)
INC., VERNON MORGAN, ESSO STANDARD) OIL,
S.A., LTD., DANIEL BAYARD,)
) Defendants.)
__________________________________)

DEPOSITION OF:
GEORGE MOSA

DATED:
June 14, 1991

JULEE NORMAN, C.S.R.

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RITA SHEPARD, C.S.R
P.O. Box 9968
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* * * * *

The following is a transcript of the deposition of GEORGE MOSA before RITA SHEPARD, C.S.R, within and for the Territory of the United States Virgin Islands, on the 14th day of June, 1991, at the Law Offices of Briggs, Knoepfel & Ronca, 30 Dronnigens Gade, St. Thomas, USVI 00804.

* * * * *

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DIRECT EXAMINATION
BY: Mr. Dema

DIRECT EXAMINATION
BY: Mr. Knoepfel

CROSS EXAMINATION
BY: Ms. Turner

* * * * *

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• • • P R O C E E D I N G S

GEORGE MOSA, • a witness, having been first duly sworn, was • examined and testified as follows:

DIRECT EXAMINATION

BY MR. DEMA:

Q: Have you ever had your taken deposition • before?

A: Here, no.

Q: Okay. This is part of a court proceeding, • and we're going to ask you some factual questions about • what you saw or did with relation to an excavation in • February and March of 1991 this year. • If there is a question that any of us ask • that you don't understand, ask us to rephrase it or • repeat it and we'll be happy to do so.

A: Okay.

Q: The first main rule is you have to speak • audibly so this young lady can hear you and be able to • make a transcript. • Would you state your name and address for the • record?

A: My name is George Mosa, M-O-S-A, 1-41 Bakkero

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• • • Estate, St. Thomas.

Q: And what is your trade or profession, sir?

A: I'm a general contractor. Now I'm in the • management of construction.

Q: And in approximately February of this year • were you involved in any construction in the area of • Estate Tutu in St. Thomas?

A: Yes.

Q: Would you describe for us what the • construction project was?

A: I was commissioned by Lisa Bonanno and her • husband Georgio to help them build a car wash, which • they call Splash and Dash Car Wash.

Q: I show you a picture of what has been marked • Tom Gutshall No. 9 and ask if that was the approximate • area which was to the south of the Esso Tutu station • where this car wash is being built?

A: Yes.

EXHIBIT A

TUT 006 0865

[21] Q: Now, would you describe what you did in terms • of starting the construction?
[23] A: We have heavy equipment hired from D&C and we • start digging the cistern in the foundation area.
[25] Q: And did anything out of the ordinary happen

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• • • during the course of your digging?
[4] A: During the course of digging about five feet • below the pavement we experienced oil mixtures or • petroleum mixtures with the soil. And the deeper we • went, the worse it become.
[8] Q: Would you describe what this substance looked • like?
[10] A: I'd say at one point it was very dark liquid, • oilily, coming out from -- cutting, when they were • cutting with the blade in the bulldozer it was exactly • from the size of from where the gas station wall • started oozing some kind of oil liquid, which really --
[15] Q: Now, did any of this liquid substances • accumulate in the bottom of the excavation?
[17] A: Yes, when we came to the dimension I needed, • the depth, and I stopped there, this was all of the • surfacing in the bottom.
[20] Q: Did you notify anybody from Esso?
[21] A: We did. The manager there and Lisa Bonanno.
[22] Q: And what did you do with the liquid • accumulation on the bottom of the excavation?
[24] A: Well every morning as worked progressed, one • of my help was supposed to skim it and dump it in the

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• • • Esso pit?
[4] Q: And do you know -- do you personally know if • in fact he took this liquid and gave it back to Esso?
[6] A: Yes, that is what my instruction was, not to • throw it in there -- to throw it in the pit.
[8] Q: You mean the waste oil pit in Esso?
[9] A: Yes, Esso.
[10] Q: And what type of pipe or vessel did he use to • take it?
[12] A: Well we use five-gallon paint buckets. I • still have the buckets on the premises. This is the • type of buckets I use on the premises and stuff, • five-gallon buckets.
[16] Q: And did this happen one day or more than one • day?
[18] A: It happened almost every day until I poored • the slab of the cistern and then the liquids was • forming around the slab on the bottom of it.
[21] Q: And how many buckets of this liquid over the • course of these days?
[23] A: I can't recall, but a lot of it.
[24] Q: A lot of it?
[25] A: Yes.

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• •
[3] Q: I have no further questions. • Anyone else?
[5] DIRECT EXAMINATION
[6] BY MR. KNOEPFEL:
[7] Q: Who gave you the instructions to pour it into • the Esso waste oil pit?
[9] A: The manager there.
[10] Q: The manager there?
[11] A: Yes.
[12] Q: Do you know his name?
[13] A: I think his name Danny. I don't know the • last name.
[15] Q: You didn't know how many buckets were • actually --
[17] A: Not really, quite a few.
[18] Q: Was it quite a few every day?
[19] A: I'd say a few. I don't know how many because • I wasn't all the time there.
[21] Q: Did anyone other than Dan from Esso ever talk • to you about it?
[23] A: No, not to me.
[24] Q: Thank you, Mr. Mosa?
[25] REDIRECT EXAMINATION

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• •
[3] BY MR. DEMA:
[4] Q: Mr. Mosa, there is one other question. When • you were doing the excavation, there has been some • statement that the wall of the Esso building to the • south side was moving up and down. • Could you comment on that?
[9] A: I can't. No, I never seen it move. And if • that moved this would be broken by now.
[11] Q: So you inspected that wall to see whether • there were any cracks or movement in that wall?
[13] A: Yes, I was paying attention to that.
[14] Q: Did you find any?
[15] A: No.

[16] Q: Thank you. No other questions.
[17] CROSS EXAMINATION
[18] BY MR. TURNER:
[19] Q: I just have a few questions, Mr. Mosa. My • name is Judy Turner, and I represent Esso. • You've testified that you saw a substance • coming from the side of the gas station wall. Did you • personally see it as it was oozing?
[24] A: Yes, we tried to stop it with all kinds of • means to come under the forms. I put plywood forms

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• • • against it this way not to disturb us, and it was • really coming out after that from the side of the form.
[5] Q: Was it coming in a stream are you saying?
[6] A: It's not a stream, it's really like oozing • like, you know, like flow, a very slow flow I would • say. Can't explain how. Not gushing.
[9] Q: How many days did you see this?
[10] A: This was the first few days. The first few • days and then subsided in different locations.
[12] Q: Are you saying it collected in the bottom of • the pit for each of these days?
[14] A: Yes. It just ran on the wall itself because • we went deeper than the part where oil was coming out, • which I believe it was four feet deeper than that • position.
[18] Q: And how much collected every day in the • bottom?
[20] A: I have no idea. But we did collect a few • buckets a day, a few.
[22] Q: Did you keep a sample of any of the substance • that you collected?
[24] A: No.
[25] Q: Did you notify any Virgin Islands government

Page 11

• • • authority?
[4] A: I notified Lisa Bonanno and the gentlemen • from Esso. That is the only thing I did. And I was • told to continue the work.
[7] Q: Did you think it was your obligation to • notify any Virgin Islands government authority?
[9] A: Not really. I was the manager and I managed • the site for the Bonannos.
[11] Q: Do you know if the Bonannos ever notified any • governmental agency?
[13] A: I have no idea.
[14] Q: Did the Bonannos ever mention to you they're • afraid their permits would be pulled if anyone from the • Virgin Islands government knew of it?
[17] A: No, it was not mentioned to me. It was just • the nature of, let's do the permits. And she wants the • car wash open as soon as possible, not to delay work.
[20] Q: Did you personally pour any of the substance • that you said was collected from the bottom of the pit • into any container at the Esso Station?
[23] A: Specifically myself, no. But my help.
[24] Q: What are the names of these workers?
[25] A: Poly Karpcartny, P-O-L-Y-K-A-R-P-C-A-R-T-N-Y.

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• •
[3] Q: Who were the other help -- does he still work • for you?
[5] A: Yes.
[6] Q: Who were the other helpers?
[7] A: Talmoth Titer, T-A-L-M-O-T-H-T-I-T-E-R, I • think.
[9] Q: Does he still work for you?
[10] A: Yes.
[11] Q: The names of any others?
[12] A: All my help is still there. If you need any • names, I can supply you with all of them. Everyone is • still working on the project.
[15] Q: And you've testified you never spoke to • anyone at Esso other than the Esso gas station manager • about this problem?
[18] A: Yes. I noticed that people came from Esso • management. But I never spoke to anyone other than • that other man Dan.
[21] Q: When did you first speak to Dan; on the first • day after you saw it?
[23] A: Maybe after the first or second day I saw the • oil.
[25] Q: That you saw the substance in the pit?

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• •
[3] A: Yes.
[4] Q: Did did there come a time when Esso • representatives came to look at the pit?
[6] A: I don't remember myself. I don't know the • people if they are Esso or some other people came in. • I do not know if Esso came when I was there or I wasn't • there.

[10] Q: Let's go back. How many hours a day did you • spend on that site? Did you spend all day there?
[12] A: Most of the day. But also I buy material, I • run for organizing the project. So I almost not there • eight hours a day. I can be in the office if I'm • buying water and ice?
[16] Q: But were you there most of each day?
[17] A: Most of each day, yes.
[18] Q: Now, you mentioned that you notified Dan of • this problem on what you think is the first day?
[20] A: I don't remember if it was the first or the • second day.
[22] Q: Did you ever see anyone from Esso come over • to the pit and look at the pit and the substance?
[24] A: I don't remember. I don't know if they are • from Esso or somebody else.

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• •
[3] Q: But you saw a gentleman come over and look at • the pit?
[5] A: Yes.
[6] Q: What date was that?
[7] A: I don't know dates. If you want dates I have • to look at the bills of D&C Company that I remember all • the dates they were digging there.
[10] Q: What do you have to show me what those are?
[11] A: The dates of the machinery when they were • rented.
[13] Q: Could you provide us with that?
[14] A: Yes, I can.
[15] Q: Do you have any written documentation that • reflects your noticing the substance in the pit?
[17] A: No, no.
[18] Q: Do you have any notes regarding • conversations?
[20] A: No.
[21] Q: Do you have any notes reflecting concerns you • had either with Dan Morris or Lisa Bonanno or her • husband regarding what you saw in the pit?
[24] A: No.
[25] Q: Did either of the Bonannos every ask you to

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• • • stop excavation until a solution had been found • regarding the substance in the pit?
[5] A: No.
[6] Q: Did Dan Morris ever come over and look at the • substance in the pit?
[8] A: Yes.
[9] Q: Do you know what day he did that?
[10] A: No.
[11] Q: Did the Bonannos ever request that you take a • sample from the pit?
[13] A: No.
[14] Q: And how can this -- how did this substance • final stop oozing, when was it no longer there?
[16] A: Well, I was told by Dan that they going to • pump it, Esso going to pump oil. And I have no idea • when it was pumped or not. And as, you know, time • passed by this oil came out from the wall. The longer • we work on the job, the less oil came out. • And the end of the project when I start • covering, only the traces of oil was there because • bailing it out. And I don't know what else I can tell • you.
[25] Q: Other than your own personal opinion, did

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• • • anyone ever make any test, to your knowledge to • determine what you say is oil, where it came from?
[5] A: To my knowledge I don't know if it was done • or anyone did tests.
[7] Q: Do you have any information to actually • determine where this substance came from?
[9] A: The only -- no. From conversations that they • did have a pit for used oil that was adjoined to the • wall there. There was a pit, and it's cracked, and • this is all, you know.
[13] Q: Is this all supposition on your part?
[14] A: Conversation with -- you know, around the gas • station. I cannot really pinpoint names. I can't • remember.
[17] Q: But you yourself or your company never made • any tests?
[19] A: No.
[20] Q: What company were you from?
[21] A: I'm self-employed.
[22] Q: And what is your phone number?
[23] A: 774-1886.
[24] Q: Do you have a foreman or are you the foreman?
[25] A: I'm the foreman/manager.

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• •
[3] Q: What stage is this Splash and Dash operation • at now?
[5] A: Almost in final stage.

[6] Q: It's almost done. Have you run into any • other problems during your building of the Splash and • Dash?
[9] A: Not really, just rocks.
[10] Q: Do you have any documents at all in your • company relating to the substance you found in the pit?
[12] A: No.
[13] Q: Did you ask the Bonannos, either of the • Bonannos to come look at the pit when you saw this • substance in the bottom?
[16] A: Yes, I did.
[17] Q: And who came?
[18] A: Lisa and Georgio.
[19] Q: When did they come?
[20] A: The same as I notified them, the same day.
[21] Q: What was their reaction?
[22] A: They're going to talk to Esso people.
[23] Q: Do you know if they ever actually talked to • Esso people?
[25] A: I have no idea. But I was told they did

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• • • talk.
[4] Q: Do you know if the Bonannos made any tests on • the substance or took any samples of the substance?
[6] A: I don't recall actually. • Excuse me, when you ask of Bonannos did they • take samples. Themselves, they didn't. But it was in • the course of their investigation and some other people • came.
[11] Q: And who were the other people?
[12] A: His firm or somebody else. His other firm • came.
[14] Q: Did a representative from Mr. Dema's office • come?
[16] A: There were representatives there.
[17] MR. KNOEPFEL: Mr. Romero, Mr. Cole?
[18] Q: What day did they come?
[19] A: I don't know about the dates. They should • have the dates. I didn't --
[21] Q: Do you know if anyone else besides the • lawyers' representatives on the day that you're • referring to came and took samples?
[24] A: To tell you the truth, I don't know all of • them who are they. It be Lisa or Esso. So they go

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• • • take samples. • There is also a pipe there on the site that • we put all the way down to the location.
[6] Q: And was this the day that you discovered the • substance?
[8] A: The day after I built the cistern.
[9] Q: So it was a long time after?
[10] A: I wouldn't say long.
[11] Q: How long, just so I know?
[12] A: I wasn't moving very fast. I was building • very fast. I would say within a week?
[14] Q: Can you provide us with the documents you • referred to about those when you were using the heavy • equipment?
[17] A: Yes, I can. I can give you the dates.
[18] MR. DEMA: You can give them to me, Mr. • Mosa. I'll make them immediately available to Ms. • Turner.
[21] A: No problem.
[22] BY MS. TURNER:
[23] Q: Other than what you've testified to about • your helpers using five gallon buckets to skim the • substance that was in the pit, and you said that they

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• • • were supposed to dump it in the Esso waste oil pit, do • you know if that substance was ever placed any place • else?
[6] A: Yes, it was never placed any place.
[7] Q: I'm sorry?
[8] A: I know that it was not placed any place else • but the thing.
[10] Q: You're saying that that was the only • receptacle that you know of?
[12] A: Yes.
[13] Q: I have no further questions.
[14] MS. HOERBER: I have no questions?
[15] MR.DEMA:: Thank you, Mr. Mosa, • appreciate your time.
[17] [WHEREUPON THE DEPOSITION WAS CONCLUDED.]

EXHIBIT 'M'

FILE COPY

IN THE DISTRICT COURT OF THE VIRGIN ISLANDS

DIVISION OF ST. THOMAS AND ST. JOHN

FOUR WINDS PLAZA PARTNERSHIP, Plaintiff, vs. TEXACO, INC., TEXACO CARIBBEAN, INC., VERNON MORGAN, ESSO STANDARD OIL, S.A., LTD., DANIEL BAYARD, Defendants.	CIVIL NO. 1989/224 ACTION FOR DAMAGES JURY TRIAL DEMANDED
P.I.D, INC., Plaintiff, vs. TEXACO, INC., TEXACO CARIBBEAN, INC., VERNON MORGAN, ESSO STANDARD OIL, S.A., LTD., DANIEL BAYARD, Defendants.	

DEPOSITION OF:

THOMAS GUTSHALL

DATED:
June 13, 1991

JULEE NORMAN, C.S.R.
RITA SHEPARD, C.S.R.
P.O. Box 9968
St. Thomas, USVI 00801

IN THE DISTRICT COURT OF THE VIRGIN ISLANDS
DIVISION OF ST. THOMAS AND ST. JOHN
FOUR WINDS PLAZA PARTNERSHIP,)
)
Plaintiff,) CIVIL NO. 1989/224
)
vs.) ACTION FOR DAMAGES
) JURY TRIAL DEMANDED
TEXACO, INC., TEXACO CARIBBEAN,)
INC., VERNON MORGAN, ESSO STANDARD)
OIL, S.A., LTD., DANIEL BAYARD,)
)
Defendants.)
_________________________________)
P.I.D, INC.,)
) Plaintiff,)
) vs.)
) TEXACO, INC., TEXACO CARIBBEAN,)
INC., VERNON MORGAN, ESSO STANDARD) OIL, S.A., LTD., DANIEL BAYARD,)
) Defendants.)
_________________________________)
DEPOSITION OF:
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DATED:
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JULEE NORMAN, C.S.R.
RITA SHEPARD, C.S.R.
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* * * * *
The following is a transcript of the deposition of THOMAS GUTSHALL, before RITA SHEPARD, C.S.R, within and for the Territory of the United States Virgin Islands, on the 13th day of June, 1991, at the Law Offices of Briggs, Knoepfel & Ronca, 30 Dronnigens Gade, St. Thomas, USVI 00804.
* * * * *
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Page 5

Page 4

• • • P R O C E E D I N G S
THOMAS GUTSHALL, • a witness, having been first duly sworn, was examined • and testified as follows:
DIRECT EXAMINATION
BY MR. DEMA:
Q: Would you state your name, residence and • business address for the record, please?
A: Thomas Gutshall 100-13 Estate Contant, home. • Smith Bay Texaco, business.
Q: How do you spell your name?
A: G-U-T-S-H-A-L-L.
Q: What is your main trade or profession, sir?
A: Gasoline automotive.
Q: And what do you do with that trade or • profession?
A: Retail fuel.
Q: Where did you learn the trade?
A: Amaco Standard Oil of Indiana.
Q: When did you first come to the Virgin • Islands?
A: In '71. Pardon me, 1980.
Q: We're going to be asking you some questions

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• • • today, Mr. Gutshall, about your experiences in the • Virgin Islands with regard to a certain employment at • Estate Tutu. • Have you ever had your deposition taken • before? • The first rule of a deposition is that --
A: Don't shake your head.
Q: She's got to hear it. That is the principal • thing. • Second, and no less important really, is that • you understand what I ask or any of the other attorneys • ask. And sometimes we botch the question, so if there • is something that is not clear to you, please ask us to • repeat it or rephrase it and we will. Or if you don't • hear it or for

EXHIBIT F

TUT 006 0872

any reason ask us, tell us and we'll try • to rephrase it.
[19] A: Okay.
[20] Q: Briefly, I represent Four Winds Plaza. My • name is Jack Dema, in a suit which presently is again • various Texaco and Esso affiliates. Mrs. Judith Turner • represents Esso, Esso Standard Oil, Ltd., and Mr. • Knoepfel represents the Harthmans and P.I.D., which is • a development entity, concentrating in the Tutu area.

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• •
[3] A: Yes.
[4] Q: And mist Mary Hoerber represents Texaco • affiliates, TCI, Texaco Caribbean, Inc. • When we refer to Texaco and Esso, and I will • try, and everyone does try to refer to, for example,
[8] TCI being Texaco Caribbean, Inc., and depending on what • years you tell us about, it will either be ESSOSA, • which is a short term for Esso Standard Oil Limited or • Esso Virgin Islands, which is Esso Virgin Islands, Inc. • Can you tell us, to the best of your memory, • your dates of employment at Esso Tutu?
[14] A: There were two occasions. The first occasion • would be '85 to '87. The second occasion would be from • 88 to '90.
[17] Q: Now would you briefly recite your experience • in the Virgin Islands between 1980 and 1985?
[19] A: I worked for Caribbean AMCG. I was the • general manager and also for Autowise. It's a chain • out of the states.
[22] Q: And what came to pass that you started • working for Esso Tutu in '85?
[24] A: When I worked for Autowise that is where I • met the owner of Tutu Esso. He was looking for a

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• • • service manager, so we negotiated and I took the job.
[4] Q: Now, being lawyers we have to draw a slightly • finer distinction. Did you meet a gentleman by the • name of Danny Bayard?
[7] A: Yes.
[8] Q: And based on other documents in this case I • think we could all stipulate for the record that Danny • Bayard was the lessee of Esso Tutu?
[11] A: He owned it. He owned the business.
[12] Q: Business that was operating there?
[13] A: Right.
[14] Q: And what position were you hired for?
[15] A: Service manager.
[16] Q: Could you briefly detail for us your job • responsibilities in that position?
[18] A: Scheduled the shop with its repairs, oversee • those said repairs, collect the money on those repairs, • coordinate the parts to the mechanics, coordinate the • information to the customer in reference to their car.
[22] Q: And did you go on a period of training or did • you just jump on and start?
[24] A: What do you mean by a period of training? • With Danny Bayard?

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• •
[3] Q: With Danny Bayard.
[4] A: No, I had already had enough experience in • that field.
[6] Q: Now, with regard to the station itself, could • you tell us what was explained to you with regard to • the original equipment that you found at the station • when you got there in 1985? In particular with regard • to the area of the service bays and the underground • tanks?
[12] A: What underground tanks? Are you speaking of • gas tanks?
[14] Q: Let's forget about the underground tanks • first. If you first detail for me the equipment that • was present in the service bays when you first got • there?
[18] A: Are you talking stationary equipment or are • you talking equipment that you could move around to • work on vehicles?
[21] Q: Stationary equipment, hoists, underground • pipes, catch basins?
[23] A: There were no catch basins. There were three • hoists, which were operated underground, hydraulic air, • and one alignment machine, which was operated on top of

Page 9

• • • the ground, hydraulic and electrical, and one above • ground electric hoist, and one flat stall.
[5] Q: One flat stall?

TUT 006 0873

[4] Q: Was Mr. Griffith aware that you were running • a repair operation out of the station?
[6] A: Yes.
[7] Q: Was Mr. Griffith aware during the period 1985 • to the point that the oil/water separator was being put • in that you were changing oil?
[10] A: I don't know. I can only assume, and I don't • want to • assume.
[13] Q: If you do ever assume throughout the course • of this deposition, sir, just tell us you're making an • assumption. If you're talking a guess, tell us you're • guessing?
[17] A: I would assume Mr. Griffith came on the • property. I don't know how he would not know that oil • was being changed in a full service shop. But I can't • sit here and say he actually saw one of us changing oil • in a car. But I would assume any amount of • intelligence would tell you that.
[23] Q: And you indeed were purchasing a fair amount • of oil from ESSOSA?
[25] A: I never purchased it, so I wouldn't know how

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• • • much was being purchased.
[4] Q: Who was in charge of purchasing?
[5] A: Mr. Bayard in the first timeframe of my • employment.
[7] Q: Since we have it handy, looking at Exhibit 6, • it details a purchase of a product called a floor • degreaser. Are you familiar with that product?
[10] A: Yes.
[11] Q: You had referred earlier in your testimony to • an Amway concrete floor cleaner?
[13] A: Same thing.
[14] Q: Up until the catch basin and the oil/water • separators were installed, would you describe for me • the mechanical methods of cleaning various auto parts • in your full service shop?
[18] A: Name me an auto part.
[19] Q: How about -- you had mentioned in your • testimony that you did engine breakdowns?
[21] A: Yes.
[22] Q: Did it ever come to pass when you were doing • engine breakdowns that you had to degrease the engine • parts?
[25] A: Yes.

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• •
[3] Q: How would you go about that?
[4] A: If the engine was out it would be • disassembled. I had a machine. I can't recall the • name of a machine. It was full of liquid to pull out • parts, had a pump, circulated, placed that part in it, • you could leave it or you could hand clean it, remove • it, -- wash it off and you have a clean part.
[10] Q: I'll show you page 37 of a Selig catalog?
[11] A: Yes, that is a parts washer.
[12] Q: So just to keep the record straight, we'll • mark this Exhibit 7.
[14] [EXHIBIT 7 WAS MARKED.] • Do you know whether in fact chemicals were • purchased from Selig Chemical of Puerto Rico during the • time we're talking about?
[18] A: The company name again?
[19] Q: Selig, S-E-L-I-G?
[20] A: I don't recall.
[21] Q: The device described in your earlier • testimony and then depicted on page 37, is that similar • to the device you described?
[24] A: Described -- is similar.
[25] Q: And in this particular picture there is a

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• • • gentlemen degreasing an auto part, supposedly?
[4] A: Yes.
[5] Q: And there is a 55 gallon drum?
[6] A: Yes.
[7] Q: Which contains the recirculated liquid?
[8] A: Yes.
[9] Q: Is that similar to the operation you guys • had?
[11] A: Yes.
[12] Q: This is the period of time prior to the • installation of oil/water separator and the catch • basins?
[15] A: Yes.
[16] Q: Where was the disposal of the used chemicals?
[17] A: Dumped in the HCA holding container for the • oil after it was nonusable.
[19] Q: Which the rest of us refer to collectively as • the waste oil pit?
[21] A: Right.
[22] Q: Do you have any memory as to where the • cleaner product for this degreasing operation was • obtained?
[25] A: Number One Automotive Consolidated.

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• •
[3] Q: Number One Automotive Consolidated?
[4] A: Number one was Consolidated Auto Parts owned • by Dough Smith and numerous others.
[6] Q: Do you remember the product?
[7] A: No.
[8] Q: Do you remember the brand name?
[9] A: No.
[10] Q: Did it come in 55 gallon drums?
[11] A: Or five gallon pales. We always bought it in • the five gallons. It was easier to store.
[13] Q: With what frequency did you change?
[14] A: Basically on the request of the technician, • when he felt it was too dirty.
[16] Q: So that went into the HCA, waste oil pit -- • pit and the used oil went into the waste oil pit?
[18] A: Yes.
[19] Q: Did there ever come a point in time between • 1985 and 1987 when your period of employ was • interrupted that the waste oil pit was cleaned up?
[22] A: Well -- while I wasn't there?
[23] Q: While you were there?
[24] A: It was cleaned out, yes.
[25] Q: And how was it cleaned out?

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• •
[3] A: We sold it to WAPA. I don't recall the name • of the company or the gentlemen who would do it. He'd • come in with a tanker truck, drop his hose, pump it • out, take it to WAPA and sell it to them.
[7] Q: With what frequency was that?
[8] A: As needed.
[9] Q: Do you have any idea about how many times a • year that was?
[11] A: No.
[12] Q: Now, did you also use -- well, let's go for • parts. Cleaning carburetors, did you clean carburetors • with the parts cleaning device?
[15] A: Yes.
[16] Q: The parts washer, shall we call it?
[17] A: Yes.
[18] Q: How about brake drums?
[19] A: No.
[20] Q: Were there any times that you used spray • degreaser?
[22] A: Yes.
[23] Q: Do you remember what the product names of the • spray degreasers were?
[25] A: No.

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• •
[3] Q: Do you remember whether or not you ever used • Gunk products?
[5] A: Gunk, yes.
[6] Q: Mr. Berry had testified earlier today that • they used a product called Brakleen, B-R-A-K-L-E-E-N?
[8] A: Yes. That is true, bought it at Western • Auto.
[10] Q: And the Gunk degreaser for carburetors, • carburetor cleaner?
[12] A: Yes STP Carburetor Cleaner.
[13] Q: Did you use a Gunk brake cleaner?
[14] A: That is a possibility.
[15] Q: Did you do grease jobs?
[16] A: Yes.
[17] Q: Do you remember whether you used white • lithium grease?
[19] A: On door hinges.
[20] Q: Do you remember whether you used gasket • cement. ?
[22] A: Gasket sealer?
[23] Q: Right?
[24] A: Yes, yes.
[25] Q: Did you clean radiators?

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• •
[3] A: What do you mean by clean radiators?
[4] Q: You drive in, you pour some type of --
[5] A: Flush the radiators.
[6] Q: Flush something in the radiators, run the car • for a while?
[8] A: Not usually, try not to.
[9] Q: Does that occasionally happen?
[10] A: Yes.
[11] Q: What did you do with the flush material from • the radiator?
[13] A: Went on the ground.
[14] Q: Did you ever use products called Mac's, Mac's • Brake and Motor Cleaner?
[16] A: I don't recognize the name.
[17] Q: Ever recognize the name Heavy Duty Brake • Cleaner?
[19] A: No, I don't recall.
[20] Q: Do you recall the product name for the • radiator flush?
[22] A: No, I can't recall the name. I can identify • it if I saw the product. But I could not give you the • name.
[25] Q: Now after you had this

TLIT 006 080745

conversation with the

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• • • gentlemen from ESSOSA or witnessed the conversation, • what happened with regard to the installation or lack • of installation of an oil/water separator?
[6] A: We installed it.
[7] Q: Can you tell us everything you remember about • that process?
[9] A: Yes, it upset me that I had to close down • half of my shop at the time because they had to run • lines from -- in the vicinity of stall No. 3 and to dig • a pit there and went over and dug a pit on the west • wall, which I've already identified where the drain • comes out, Exhibit 4, and they dug it out and made an • oil separator and a drain on the south side. I believe • it was in stall 3 actually, I think. It's hard to • remember exactly where, but it was designed to catch • the water and whatever from these stalls into here, • over to here, automatically flow. These two here had • to drain --
[21] Q: Before you go on, because when we look at • this later and you say these two, since we don't yet • have you on video tape, we have to be a little more • careful about the record. Could you, using a dark pen --
[25] MR. KNOEPFEL: Jack, for clarification

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• • • we put it on a separate sheet.
[4] [EXHIBIT 8 WAS MARKED.]
[5] Q: What we'll identified as Exhibit No. 8, Mr. • Gutshall, would you be so kind as to depict for us the • changes that occurred once the catch basins. Drains • and oil/water separators were installed?
[9] A: Drained here -- drain here. Do you want the • piping also?
[11] Q: Yes, please.
[12] A: It went across. This was your actual • separator and this -- which side do you want to call • this?
[15] Q: West.
[16] A: West, south. The drain for stalls 1, 3 and • 4, which is on the south wall and connected to the oil • separator, which is stalls 5 and 6 on the west wall, • then the exit drain was put through the wall.
[20] Q: Now, if we could label O slash W as an • oil/water separator. And the box you made is the catch • basins and the double lines type?
[23] A: Yes, that is the drain pipe.
[24] Q: Sorry go ahead.
[25] A: You had three compartments in your separator.

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• •
[3] Q: One, two, three, labeling them as sduch on • the diagram? The catch basin on the south side, was • that connected to any of the traps in the hoists?
[6] A: Not to my knowledge.
[7] Q: So what was supposed to go into the catch • basin?
[9] A: Water.
[10] Q: Where did the water come from?
[11] A: When you watched the stalls.
[12] Q: So that was specifically designed to catch • the water from the wash?
[14] A: It was mixed with the water.
[15] Q: Now, after this was installed, was that ever • used as a method of, as receptacle for the parts washer • liquid?
[18] A: No, not to my knowledge.
[19] Q: Was that ever used as a receptacle for the • radiator cleaner?
[21] A: Yes.
[22] Q: Any used waste oil ever go in there?
[23] A: No.
[24] Q: Now, would you describe for me the pipe that • goes through the retaining wall to the south, where did

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• • • that empty into? I think we have brief -- previously • looked at that on Exhibit No. 4.
[5] A: That was originally hooked up to the storm • drain belonging to the Virgin Islands government?
[7] [EXHIBIT 9 WAS MARKED.]
[8] Q: Looking at Exhibit No. 9, I show you a recent • picture, because I see Splash and Dash building back • here, off the west side of the Esso Station and a storm • drain that actually shows the same sign as in Exhibit • No. 4 on the west wall, and ask if that was the storm • drain to which the pump coming through the retaining • wall was connected?
[15] A: Yes.
[16] Q: Who effected that connection, who made the • connection?
[18] A: Esso.
[19] Q: And how long did that connection

last, to • your knowledge?
[21] A: I think about ten days.
[22] Q: Then what happened?
[23] A: The Department of Public Works cut the pipe • and capped it.
[25] Q: Did it stay capped?

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• •
[3] A: No.
[4] Q: Why did it not stay capped?
[5] A: The cap came off, to the best of my • knowledge.
[7] Q: Did the cap fall off?
[8] A: I had seen the cap gone. That is the best I • can tell you. I just happened to look and the cap was • gone.
[11] Q: Mr. Berry testified this morning that at some • point in time the liquid flowed freely from the • oil/water separator on to the ground immediately • outside the retaining wall?
[15] A: Is that a question?
[16] Q: That was a statement. Would you agree with • that statement?
[18] A: Yes, I would agree with that statement.
[19] Q: Now, Mr. Berry also testified that various • types of liquids, clues -- including water, radiator • vents and the like were placed into the catch basin?
[22] A: Yes.
[23] Q: You -- he testified to that during the -- his • stay, the oil/water separator, except for one period of • flooding, never overflowed. Could you tell me how that

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• • • was physically possible?
[4] A: What physically possible?
[5] Q: What is -- what is your question?
[6] Q: Seemingly a continuing stream of liquids of • various types went into a recepticle with a limited • quantity?
[9] A: Yes.
[10] Q: That receptacle never seemed to overflow. • And miracle could you explain physically why that was?
[12] A: That was taken out by hand by buckets and • dumped into our oil pit on a need be basis.
[14] Q: And how was that need expressed?
[15] A: What do you mean?
[16] Q: How often did that happen?
[17] A: That could have happened once a week.
[18] Q: And did anyone ever attempt to measure the • levels in that particular containment area?
[20] A: You're talking about the oil separator?
[21] Q: Yes.
[22] A: When you say measure, what do you mean?
[23] Q: In other words --
[24] A: We would open the top to see if it's full or • how much longer we would do that like that.

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• •
[3] Q: Was the quantity of liquid that went in ever • measured?
[5] A: No.
[6] Q: Was there any way of determination whether it • ever had a leak?
[8] A: The oil separator?
[9] Q: Yes?
[10] A: No, there is no way of determination whether • it had a leak or not.
[12] Q: The outflow from the oil/water separator, • after it was capped, how long a period of time went by • before it fell off or before it lost it's cap?
[15] A: Maybe an hour after it was put on.
[16] Q: Now, with regard to the waste oil pit, was • any attempt ever made to measure that on a regular • basis?
[19] A: No, it would be inspected to see how much oil • was in it so you could judge when to call somebody to • empty it.
[22] Q: And on what basis was that inspected and by • whom?
[24] A: I never inspected it personally, per se, went • to look to see how much oil was in there. I would send

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• • • one of the shop runners to check the pit and see how • full it is and let me know, and maybe at that time walk • back and look myself. But there was no set schedule to • inspect it.
[7] Q: Was an examination ever made by anybody in • your employ or by yourself with regard to -- any • containment vessel which showed the possibility that a • leak might exist?
[11] A: Repeat that? I'm sorry.
[12] Q: With regard to any containment for any of • these waste -- any containment vessels or any of these • waste products?
[15] A: Yes.
[16] Q: Was any inspections made by you

memory serves, we used this.
[7] Q: Esso took all the forms exampled by Exhibit 3 • in Oriol's deposition?
[9] A: Yes.
[10] Q: So we can keep this straight, I guess I ought • to run a couple copies of this.
[12] [BRIEF RECESS.]
[13] [EXHIBITS 10 and 11 WERE MARKED.]
[14] BY MR. DEMA:
[15] Q: So for the record, we've marked as Exhibit 10 • the exhibit marked Deposition Exhibit 3 and Hans • Oriol's deposition as Exhibit 11, the exhibit marked 4 • in Hans Oriol's deposition?
[19] MS. TURNER: Could you tell me who Hans • Oriol is so I'll know?
[21] MR. DEMA: He is a gentleman.
[22] MS. HOERBER: He's Bayard's partner.
[23] MS. TURNER: No one did apparently • except when we took the deposition.
[25] THE WITNESS: She said it was Bayard's

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• • • partner.
[4] MS.HOERBER: According to Mr. Oriol.
[5] BY MR.DEMA:
[6] A: What dates?
[7] Q: From 1982?
[8] A: And still to this day?
[9] MS.HOERBER: No.
[10] MR. KNOEPFEL: No.
[11] BY MR. DEMA:
[12] Q: To 1988.
[13] A:.Okay, yes. Very good.
[14] Q: Now, referring to our deposition No. 10? • Exhibit No. 10, was it your testimony that you had seen • that during your first round of employment?
[17] A: Yes.
[18] Q: And it was being used during your first round • of employment?
[20] A: To the best of my knowledge.
[21] Q: Do you have any personal knowledge as to how • frequently the reconciliations were made during your • first round of employment?
[24] A: No.
[25] Q: Did you ever see any reconciliation sheets at

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• • • that time that showed weekly or monthly • reconciliations?
[5] A: No.
[6] Q: Prior to July 1987 from the point you started • in 1985, were there any repairs of any type made to • your knowledge to the underground storage tanks or the • tank piping system?
[10] A: Yes.
[11] Q: Could you detail what you know of those • repairs?
[13] A: There was a leak discovered going through the • set of pumps closest to the building, which would be, • let's go over here.
[16] Q: Referring to Exhibit No. 1?
[17] A: Yes, gas island closest to the building. How • do you want to do it?
[19] MS. TURNER: I'm sorry you said there • was a leak where?
[21] THE WITNESS: On the island closest to • the building.
[23] BY MR. DEMA:
[24] Q: Were pressure tests ever conducted of that • pipe?

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• •
[3] A: I don't know.
[4] Q: How do you know that there was a leak?
[5] A: I was told by Mr. Bayard.
[6] Q: Was there ever any repairs made to the pipe?
[7] A: Oh, yes, it was replaced.
[8] Q: Do you know who conducted the row pairs?
[9] A: Eugenio.
[10] Q: Approximately what period of time was this?
[11] A: I have no idea.
[12] Q: Prior to your, to the summer of '87, I take • it?
[14] A: It would be my first employment.
[15] Q: Prior to the problem with the underground • storage tanks? • Yes, oh, yes.
[18] Q: Did Mr. Bayard mention to you his estimate of • the amount of product that had been replaced?
[20] A: No.
[21] Q: Was it ever mentioned to you whether it was a • small quantity or a large quantity?
[23] A: It was enough that it reflected a loss of • money when you balanced out everything. It doesn't • quite make it. At first there was suspect of some type

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• • • of theft or something like that.
[4] Q: Was that ever eliminated as a possibility?

[5] A: Well, when they found out it was leaking, • yes, the theft was gone. When it was dug up, this was • evidence that the leaking pipe had rusted through.
[8] Q: Did you ever see that?
[9] A: Yes, I saw it.
[10] Q: So you personally observed the rusted through • pipe between the gas station island and the underground • storage tank. • Did you ever have a discussion with Mr. • Bayard as to how he kept his records at that point?
[15] A: No.
[16] Q: Did you ever have a discussion with Mr. • Bayard as to inventory records around the time that • there was a suspected leak in the underground storage • tank?
[20] A: No.
[21] Q: Did you ever have a discussion with anyone • with regard to whether a conclusion was made as to • whether their's was a leak in the underground storage • tank?
[25] A: Repeat the question.

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• •

[3] Q: Did you ever have any discussion with anyone • with regard to whether a conclusion was formed as to • the presence of a leak in the underground storage tank?
[6] A: No.
[7] Q: Did you ever know of any facts which would • indicate to you that there was a leak in the • underground storage tank?
[10] A: Prior to it actually being taken out, no.
[11] Q: After it was removed did you ever have • occasion to see it?
[13] A: Yes.
[14] Q: When you looked at it was there anything • which gave you reason to believe that there might have • been a leak?
[17] A: The only thing that I can say I saw on the • tank, and that would be closest the way the tank was • sitting towards the south end of tank as it was sitting • in there towards the south wall, was a wet area with • material stuck to it when the tank came out. That is • the only thing I ever saw. • I was not present for the pressure test. I • guess I wasn't invited. It was done after normal • working hours.

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• •

[3] Q: With a select cast?
[4] A: Very select, invitation only.
[5] Q: Were you present when the tank was physically • removed from the pit?
[7] A: Yes.
[8] Q: Did you have occasion to go into the pit?
[9] A: No, not into the pit.
[10] Q: Did you see any evidence of product in the • pit?
[12] A: No.
[13] Q: Did you detect any smell of the product when • the tank was uncovered?
[15] A: You could smell product before the tank was • uncovered. With the gas there it's impossible to not • smell gasoline. I mean while it's even sealed, • covered, capped, your going to smell gasoline.
[19] Q: Did you ever have any discussions with anyone • else besides Mr. Bayard about the integrity of the tank • after it was removed?
[22] A: Repeat that, I'm sorry.
[23] Q: Did you ever have discussions with anyone • other than Mr. Bayard about the integrity of the tank • after the tank was removed?

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• •

[3] A: Agusto Gerbow and I talked briefly. He was • the manager.
[5] Q: Would you tell me everything that you said to • Mr. Gerbow and Mr. Gerbow said to you relative to the • integrity of the tank?
[8] A: The only thing I ever said, do you think • there was a leak. And Mr. Gerbow said I really don't • think there was, but we won't know until they do a • pressure check on it. He told me that would be done • the next day. And when the next day the new tanks were • in the ground when I arrived for work at eight o'clock • in the morning. The oil -- old tank was still sitting • there. I was told by Mr. Bayard that the old tank did • in fact have an pinhole leak, but it could have • happened caused by the pressure check itself. • He said to me that they could not confirm • that that had been leaking.
[20] Q: Did you ever have occasion to speak with Mr. • Gerbow again?
[22] A: No, not about that at all. I kind of took • the hint.

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-- the car wash.
[23] Q: Somewhere we have a picture here which I'd • like to show you. If you look at Exhibit No. 9, you • see a concrete structure immediately adjacent to the

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• • • south wall of the Esso Station?
[4] A: Yes.
[5] Q: Let me tell you that an excavation was made • for the placement of that building and there was • testimony, sworn testimony to the fact that a dark • oozie substance described this morning as goop.
[9] A: Makes sense.
[10] Q: Emanated from the south wall excavation of • the Esso Station?
[12] MS. TURNER: The testimony this morning • was not that it emanated from the south wall. • I'm objecting to the characterization of • Mr. Morris' testimony.
[16] MR. DEMA: There was testimony from the • same witness and earlier from Mr. Jenson of Esso that • there was a similar goop-like substance that Esso • contractors came in and then emptied from the catch • basin?
[21] MR.DEMA: Just to clarify the record, • Mr. Morris called the liquid that, that was in the • bottom of the excavation bit. He didn't it call that • either. He said it was liquid and dark in color and • that he doubted if it was gasoline all right.

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• •
[3] MS. TURNER: Seriously, what Mr. Morris • described as, quote, goop was the substance that the • contractors took out of various places of the Esso • Stations and put into the drums..
[7] MR. DEMA: Fair enough.
[8] BY MR. DEMA:
[9] Q: This is the Deposition Exhibit from the • earlier deposition, and some 55 gallon drums were • filled with a substance which Mr. Morris described as • goop, a dark goopie liquid coming from areas one, two, • three, four, five and six?
[14] A: Yes.
[15] Q: Based on you're familiarity with what was • being placed into the catch basin, the only water • separator and the waste oil pit up until the time you • left the station, could you describe for me the visual • characteristics of the liquids that would be visible in • those areas?
[21] A: In other words, the question is, is what we • were putting in the oil pits could possibly be what he • found was mixed with water? Yes, quite easily.
[24] Q: Was it dark in characteristic as opposed to • light like gasoline?

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• •
[3] A: It would be the dark brown because the dirt • was being mixed with it also.
[5] MS. TURNER: I'm sorry, you said it was • dirt being mixed?
[7] THE WITNESS: Once mixes with the dirt • and starts collecting the dirt and finally gets to a • point that it's been sitting, by that time it's going • to be a very dark brown, maybe even possibly black in • some instances. Oil does that.
[12] BY MR. DEMA:
[13] Q: Now, throughout the time you -- that you were • in either stage of employment, did you have any reason • to suspect that there might be an escape into the • environment of the dark liquid that was being collected • in any of those places?
[18] A: No, it never even crossed my mind. You just • don't -- it's the Virgin Islands. There is every shade • tree mechanic dumping oil right now on the ground. I • couldn't tell you how many times I have watched people • change oil in the parking lot right there. • Well, I'll leave it at that.
[24] Q: With regard to these particular tanks, • though, sir, which particular tanks?

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• •
[3] A: Any of the tanks we referred to as -- or that • Esso refers to as holding on a cement area, which are • number rated in this picture as one, two, three, four, • five and six. And in your diagram as catch basin, and • one, two, three oil/water ~~separator and HCAs.~~
[8] Q: Have you personally ever checked those tanks • and seen a particular level of liquid present in any of • those vessels and then gone back and looked at that • level and see it deminish?
[12] A: Yes.
[13] Q: And would you detail it for me when that was • and the vessel in which you saw it?

[15] A: I cannot tell you the dates.
[16] Q: Could you tell me the period of employment?
[17] A: The second period of employment after • Safety-Kleen emptied our pit, oil pit in the back, I • think then in turn it started to, I don't want to say • monitor, and to physically have someone open it, will • you look in and see what is going on. The pit in turn • filled up. • I in turn informed Esso and the discussion • started with who was going to pay for it and when are • we going to do it, when are we going to next have

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• • • normal conversation back and forth between dealer and • wholesaler. • I kept looking at the pit and noted that the • pit had in fact lost some of its liquid, a good two • feet.
[8] Q: Over what period of time?
[9] A: Oh, a period of about five days.
[10] Q: Had you given anyone authority to remove any • liquid from that pit?
[12] A: No, you couldn't get to the pit or not • without my key or going through the front door and • office and the parts room.
[15] Q: During your first period of employment I • believe you testified that occasionally this waist • product was sold to WAPA?
[18] A: Yes.
[19] Q: And I believe you testified that at some • interval someone would check the pit to see whether it • was high enough to call for a pick up?
[22] A: Yes.
[23] Q: Was there ever a time during the first period • of employment when you looked at the level of the pit • trying to estimate when WAPA would come and pick it up

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• • • and notice that?
[4] A: WAPA did not come and pick it up. It was • sold to WAPA and independent trucker who had an oil • tanker. I don't know who it was, where he is at. He • was put out of business when WAPA refused to buy the • oil that was removed from his truck and take it to
[9] WAPA. If he was paid, I don't know if Danny was paid. • I don't know. I know it was sold to WAPA.
[11] Q: Did there come a time that an observation was • made of that oil pit and the decreasing level was seen?
[13] A: Not to my knowledge.
[14] Q: And have you no idea who that trucker was?
[15] A: None whatsoever, none.
[16] Q: Did you ever bring it to anyone's attention • that the liquid in the pit had diminished a good two • feet upon inspection?
[19] A: Yes.
[20] Q: To whose attention did you bring it?
[21] A: Mr. Bayard.
[22] Q: And?
[23] A: And Mr. Gerbow, Agusto Gerbow, the V.I. • manager.
[25] Q: First what did Mr. Bayard say or do about it?

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• •
[3] A: Mr. Bayard, I don't know. I informed him of • it. I felt that that was something that he should -- • you know, I just informed him about it.
[6] Q: And what did Mr. Gerbow say or do about it?
[7] A: Okay.
[8] Q: Quote, unquote?
[9] A: That was about as best I can recall. Okay, • we'll look into it, check on it.
[11] Q: Are you personally aware of whether anyone • from Esso checked into it?
[13] A: Safety-Kleen came back and emptied the tank • again and we were asked not to use the tank -- or the • pit. I should not say tank.
[16] Q: And this was up until the 1990 period?
[17] A: It kind of worked out well because we had • opened up the Long Bay facility. We closed the shop in • February, there was no reason to use the oil pit • anymore, it was a dead issue. So it just kind of -- it • was stopped right there.
[22] Q: February of what year?
[23] A: Ninety.
[24] Q: February '90?
[25] A: Yes.

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• •
[3] Q: Can you tell me why in March of 1991 when the • contractors came they were able to take many barrels, • 55 gallon drums of liquid out of those areas as • described in Mr. Morris' Exhibit 1?

[7] A: No.
[8] Q: Fair enough. Thank you, sir, for your • patients. I will turn you over to the next • questioning.
[11] DIRECT EXAMINATION
[12] BY MR. KNOEPFEL:
[13] Q: Mr. Gutshall, could you describe for me this • waste oil pit?
[15] A: Basically like a cistern, same thing, • concreted. I never saw the bottom actually. The only • thing I ever saw on the bottom would be I saw some, • looked as if it was cans, oil filters, junk. I never • physically saw the bottom of the pit, I saw the walls • which were concrete.
[21] Q: Can you tell us the dimensions of that pit?
[22] A: No, I can't. It was oblong. But I'm not -- • it was covered. Whenever I looked in the pit only half • of the top would open up, so you never really opened up • the hole pit. There is a steel cover over the whole

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• • • thing.
[4] Q: The part that you could see cuts the • approximate dimensions of what you could see?
[6] A: Five by five maybe, five foot by five foot.
[7] Q: And you think that was -- is that half of • what --
[9] A: That would be the half that I could see. I • never really saw even when they emptied it out, • Safety-Kleen or previous to that it was never really • opened up. I took a flahslight once and looked,in it. • And I said that is -- you know, I was done with that.
[14] Q: To your knowledge, from what you could see • this five by five was that approximately one half of • the entire pit?
[17] A: I would say.
[18] Q: So it could be ten feet?
[19] A: It was a big pit.
[20] Q: Do you have any idea how deep it was?
[21] A: Fifteen feet.
[22] Q: Fifteen feet?
[23] A: Yes.
[24] Q: You said you could see things on the bottom?
[25] A: I took a flashlight and looked down in there.

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• •
[3] Q: And you would say it's as deep as 15 feet?
[4] A: I would say 15 feet, yes.
[5] Q: This cover was the steel cover covering the • entire top of this?
[7] A: Yes.
[8] Q: Was that in one piece or two pieces?
[9] A: Two pieces, I believe.
[10] Q: Was it hinged?
[11] A: Yes, it was hinged, made of steel. Danny • made it, had it made.
[13] Q: So to open up -- to get access to the pit • you'd have to somehow open this steel cover?
[15] A: Right, I would never do it. It was too • heavy.
[17] Q: Was the opening when you opened up the steel • cover five by five approximately?
[19] A: No, less than that, maybe three, three.
[20] Q: And when it was pumped out, how was it pumped • out?
[22] A: Which?
[23] Q: Which way?
[24] A: Several.
[25] Q: Describe those?

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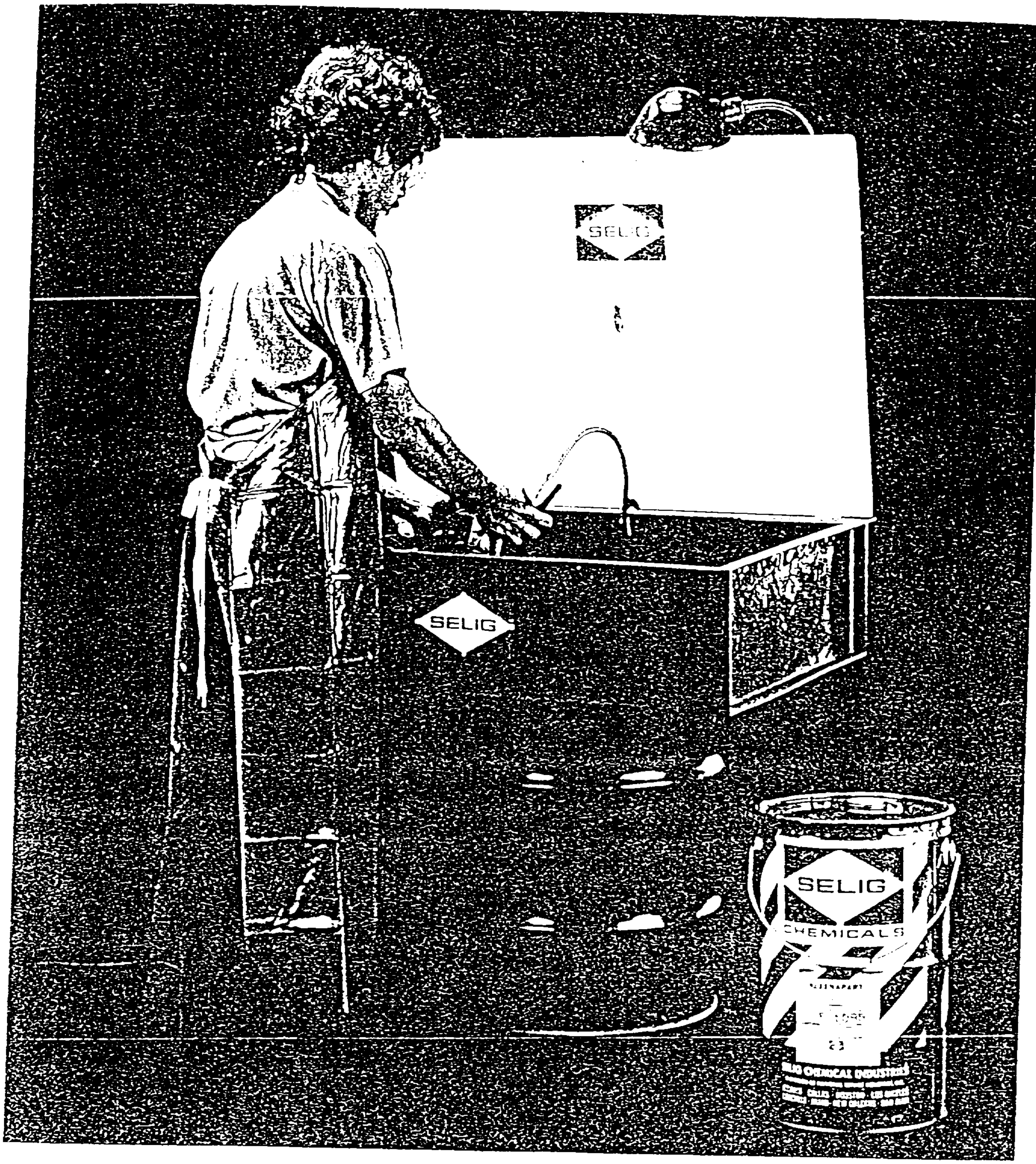
• •
[3] A: First occasion that I was there the gentlemen • just drop the hose in and with a lawn mower engine on • his truck would pump it into his tanker. Safety-Kleen • had very elaborate measuring devices in between their • pump, their suction pump and would measure their tank • after they were done where the other gentlemen never • did that, they were just pumped out and let's go.
[10] Q: Can you tell me the approximate dimensions of • the oil/water separator?
[12] A: Approximately four feet deep with three • compartments. And I would say the compartments are • approximately three by two on each compartment.
[15] Q: Were these compartments connected?
[16] A: The only way they were connected would be at • the top so the water could flow through the hole, • separate from the oil and it would flow over.
[19] Q: Concrete walls dividing each of these three • compartments?
[21] A: Right. I would say maybe they're four inches • thick.

AUTO PART CLEANERS AND DEGREASERS



KLEENAPART

THE DELUXE WINNER PARTS WASHER

SWIPE

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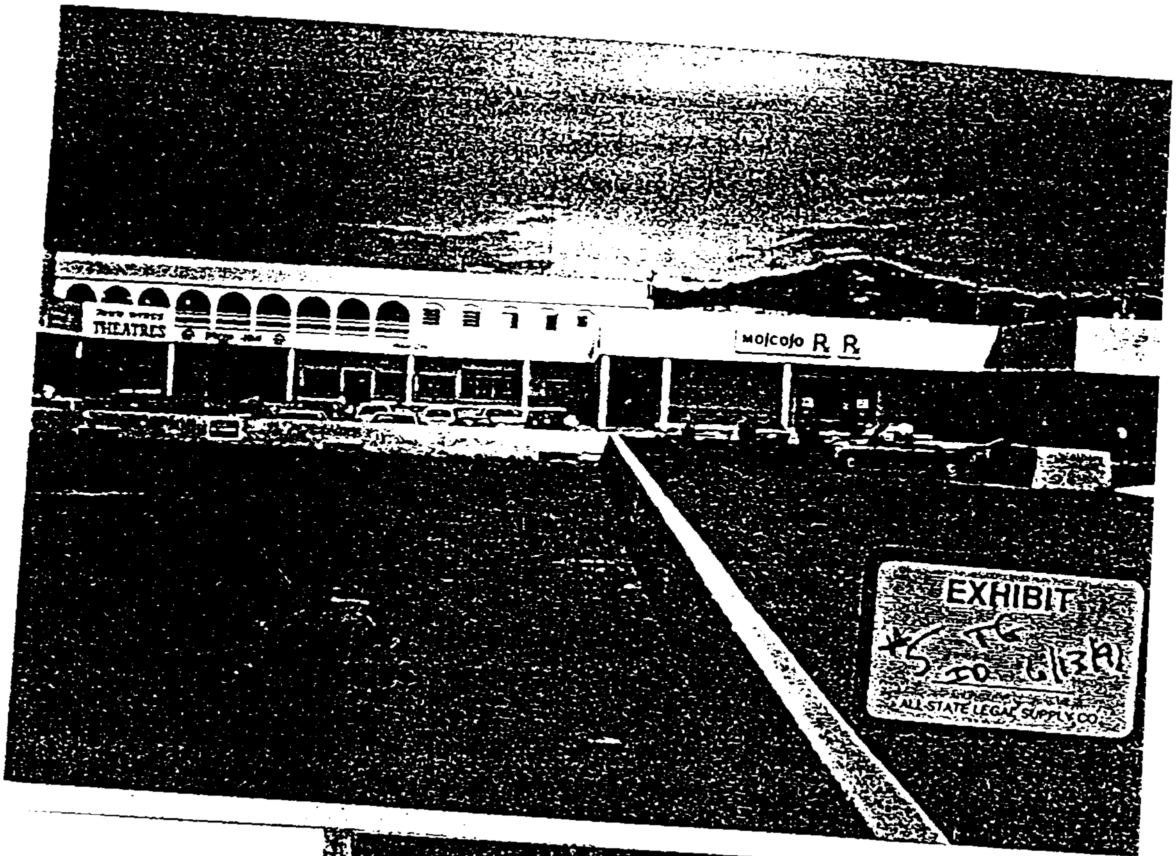
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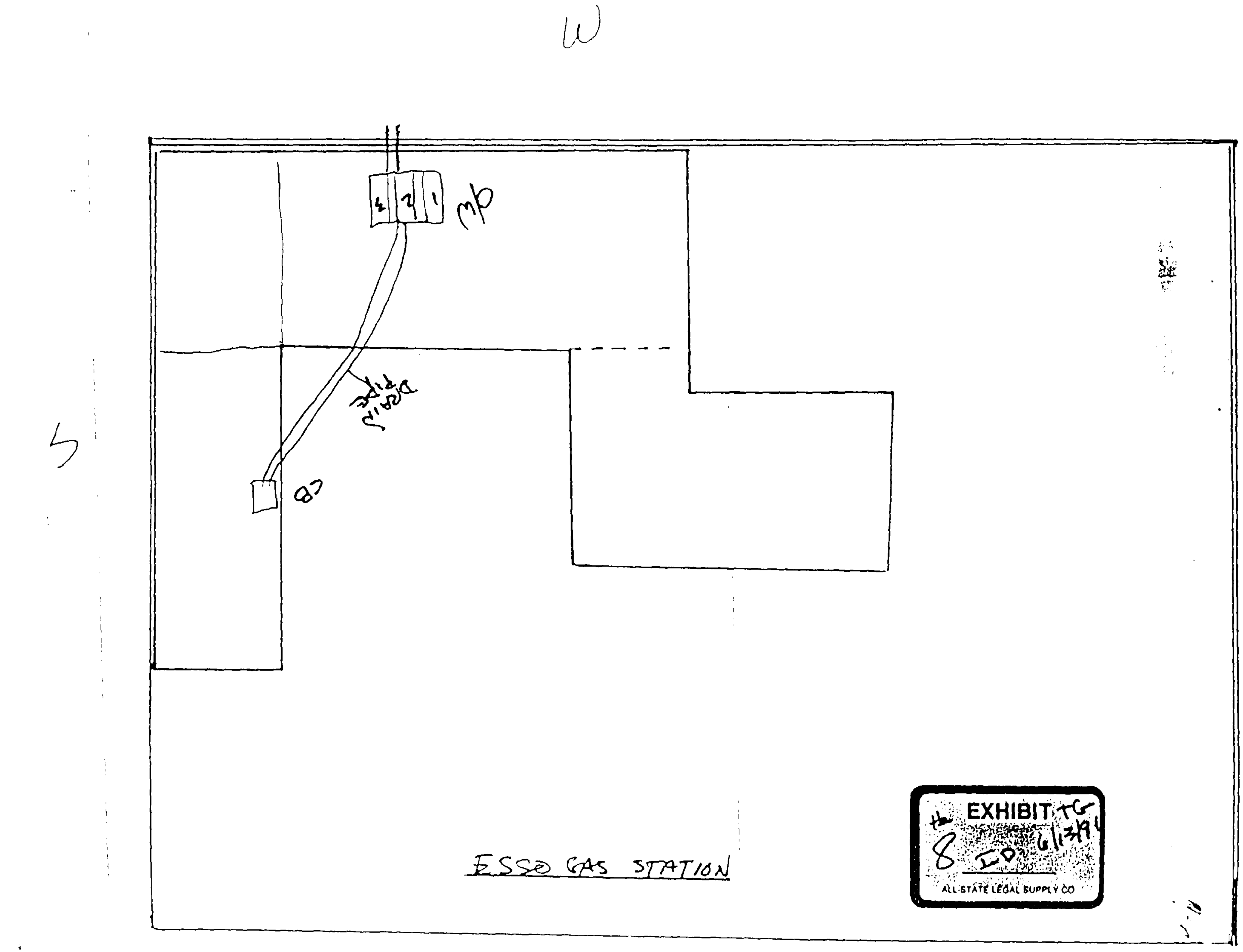
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EXHIBIT 'N'

IN THE DISTRICT COURT OF THE VIRGIN ISLANDS

DIVISION OF ST. THOMAS - ST. JOHN

IN RE: TUTU WATER WELLS CONTAMINATION LITIGATION	MASTER DOCKET FILE NO. 1989-107
RHODA J. HARTHMAN, CHARLOTTE A. LABARRE, ALBERT E. HARTHMAN, ARTHUR E. HARTHMAN, AUSTIN E. HARTHMAN, EDGAR A. HARTHMAN, SAMMY E. HARTHMAN and P.I.D., INC., WATER SERVICES, LIMITED and TUTU SERVICES, LIMITED, Plaintiffs, VS. TEXACO, INC., TEXACO CARIBBEAN, INC., VERNON MORGAN, ESSO STANDARD OIL, S.A., LTD., DANIEL BAYARD, EXXON CORPORATION, ESSO VIRGIN ISLANDS, INC., ESSO STANDARD OIL COMPANY (PUERTO RICO), THE DUPLAN CORPORATION, LAGA INDUSTRIES, LTD., PANEX INDUSTRIES, INC., PANEX CO., PAUL LAZARE and ANDREAS GAL, Defendants.	CASE NO. 1989-220
ESSO STANDARD OIL, S.A., Defendant and Third-Party Plaintiff, VS. LAGA INDUSTRIES, LTD., DUPLAN CORPORATION, PANEX COMPANY, PAUL LAZARE and ANDREAS GAL, L'HENRI, INC., RAMSAY MOTORS, INC., THIRD-PARTY DEFENDANTS.	

ORAL DEPOSITION OF NELSON ROSADO

FOUR WINDS PLAZA PARTNERSHIP,

Plaintiff,

vs.

TEXACO, INC., TEXACO CARIBBEAN, INC., VERNON MORGAN, ESSO STANDARD OIL, S.A., LTD., DANIEL BAYARD, EXXON CORPORATION, ESSO VIRGIN ISLANDS, INC., THE DUPLAN CORPORATION, LAGA INDUSTRIES, LTD., PANEX INDUSTRIES, INC., PANEX CO., PAUL LAZARE and ANDREAS GAL,

Defendants.

CASE NO. 1989-224

ESSO STANDARD OIL, S.A.,

Defendant and
Third-Party
Plaintiff,

vs.

LAGA INDUSTRIES, LTD., DUPLAN CORPORATION, PANEX COMPANY, PAUL LAZARE and ANDREAS GAL, L'HENRI, INC., RAMSAY MOTORS, INC.,

Third-Party
Defendants.

VIDEOTAPE DEPOSITION OF NELSON ROSADO, taken on the 14th day of October, 1992, at the Law Offices of Goldman, Antonetti, Ferraiuoli & Axtmayer, American International Plaza, 14th Floor, 250 Munoz Rivera Avenue, Hato Rey, Puerto Rico 00918, between the hours of 9:40 a.m. and 1:07 p.m., pursuant to notice and Federal Rules of Civil Procedure.

REPORTED BY:
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[1] (0000) THE VIDEO OPERATOR: We are now on record. • The time is 9:40 on October 14th, 1992. We are at the • Offices of Goldman, Antonette, Ferraiuoli & Axtmayer in Hato • Rey, Puerto Rico in the American International Plaza • Building. • My name is Henry E. Tonnemacher, Video Seven • Seas, Ltd. We are here to receive deposition from Mr. • Nelson Rosado concerning the Tutu Water Wells Contamination • Litigation, Civil Number 1969/220 and Civil Number 19 -- I • believe that should have been -- pardon me -- 1989/220 and • 1989/224, Master Docket File No. 1989/107. • Present are myself, the video operator, and • also present are the following. If everyone would just • introduce themselves.
[15] MR. ZEBEDEE: John A. Zebedee with the Law • Offices of James L. Hymes, and we represent the Defendant • Vernon Morgan.
[18] MR. ROMERO: Eugenio Romero with the Law • Office of Goldman, Antonette, Ferraiuoli & Axtmayer, and we • represent the ESSO Defendants in this case.
[21] MR. DEMA: Jack Dema, I represent Four Winds.
[22] MR. KNOEPFEL: My name is Richard Knoepfel. • I'm with the Firm of Briggs, Knoepfel & Ronca, and we • represent the Plaintiffs Harthman and P.I.D.
[25] MR. DALEY: Richard Daley from the Firm of

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Pattie & Daley in Christiansted, St. Croix for the Defendant • Exxon Corporation.
[3] MR. DEMA: And if the court reporter will • swear the witness.
[5] MR. MEYERS: Addison Meyers representing • Texaco Caribbean from the Law Firm Anderson, Moss, Parks, • Meyers, Sherouse.
[8] MR. DEMA: Sorry, Sonny.
[9] (0174) NELSON ROSADO, • called as a witness, having been first duly sworn, testified • as follows:
[12] DIRECT EXAMINATION
[13] BY MR. DEMA:
[14] Q: Would you state your name and residence address for • the record, please?
[16] A: My name is Nelson Rosado. I live in Puerto Rico.
[17] Q: And would you state your street residence address?
[18] A: Okay. My address is Via La Doca, BA-26 Bosque Del • Lago, Toa Alta, Puerto Rico.
[20] Q: And where are you presently employed, sir?
[21] A: I work for ESSO Standard Oil Company, Puerto Rico.
[22] Q: And how long have you been in that employment?
[23] A: About 15 years.
[24] Q: In that same capacity?
[25] A: Yes. Like a -- I'm a civil engineer, engineering

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field.
[2] Q: And where did you graduate -- where did you get • your engineering degree?
[4] A: Okay. From Mayaguez Compos -- that's Colegio De • Agricultura y Artes Mechanicas De Mayaguez.
[6] Q: And in what field is your degree in engineering?
[7] A: Civil engineering.
[8] Q: And after you graduated with the engineering • degree, what job did you go into?
[10] A: Well, I start working with a private company in • construction. Then I work for Government one year, and then • I start working for ESSO.
[13] Q: And after your initial engineering training, have • you received any further training particularly with regards • to any environmental matters, for example?
[16] A: Yes. We in ESSO, we take some seminars, and we • take with different companies they show us about the • environmental equipment and environmental law.
[19] Q: And where do you take these seminars?
[20] A: Well, we check with a different company like • Solares, C.I.V.
[22] Q: Are all the seminars you've attended been given • here on Puerto Rico?
[24] A: Yeah, in Puerto Rico.
[25] Q: So would it be correct that you have worked, you

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said, 15 years for ESSORICO?
[2] A: Uh-huh.
[3] Q: Does that bring us approximately to 1977 is when • you started?
[5] A: Yeah, 1977. July 1977.
[6] Q: And did you start in the retail engineering • department?
[8] A: No. I start in the operation department.
[9] Q: And what were your responsibilities in the • operation department?
[11] A: Well, I work in the plants and terminals, like • maintenance engineer.
[13] Q: How long?
[14] A: Going to say about three to five years, more or • less.
[16] Q: And when you worked in plants and terminals, did • that have anything to do with the remodeling or new • construction of service stations in the Virgin Islands?
[19] A: I work in the construction, new service station, • remodeling service stations St. Croix, U.S. Virgin Islands.
[21] Q: During this first period of three to five years • during your employ?
[23] A: My first period in operation department I only work • like with maintenance, no big projects in the retail • department.

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[1] Q: Okay. So when you were in operations, is it • correct that you had nothing to do with engineering projects • in the Virgin Islands?
[4] A: Well, I work in the Virgin Islands in maintenance • for the St. Thomas plant and also St. Croix plant, the • terminal that we have over there.
[7] Q: So those --
[8] MR. ROMERO: Are you referring to the first • three to five years still?
[10] MR. DEMA: Yes.
[11] A: Yeah.
[12] Q: (Mr. Dema:) So during your first three to five • years, you did come to the Virgin Islands and worked at the • plants both in St. Croix and St. Thomas?
[15] A: Yeah, that's correct.
[16] Q: And what type of work did you perform?
[17] A: Well, like I say, maintenance. We come to change • valve, we come to replace pipes, we have to fix any problem • with any tanks in the U.S. Virgin Islands.
[20] Q: And during that period of three to five years, did • you have any problems with any tanks in the Virgin Islands?
[22] A: No, I don't remember if we have a big problem. • Only we can say to replace a valve, to replace a vent, or • checking the tanks.
[25] Q: Now during your first three to five years when you

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were in operations doing maintenance in the Virgin Islands, • could you tell us whether there was an ongoing tank • replacement program in the Virgin Islands?
[4] A: For the service station?
[5] Q: For the service station, for the replacement of • underground service tanks.
[7] A: Well, in those years, I don't be involved in the • retail department. I can't say if they change tanks or • something like that.
[10] Q: Okay. After your stay in the operations • department, what was your next job assignment?
[12] A: Well, as soon as I finish with the operation • department, they transfer me to the retail department.
[14] Q: And where in the retail department did you work?
[15] A: I work with the sales department in charge of • maintenance in the service station and the remodeling and • construction of new service stations.
[18] Q: And is this in what is referred to as retail • engineering?
[20] A: Yeah.
[21] Q: So do you have an approximate date or year when you • started with retail engineering?
[23] A: No. I don't have the exact date.
[24] Q: So it's some time between 19 -- if you started in • July of 1977 and worked approximately three to five years,

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we could then say it is some time between 1980 and 1982; is • that correct?
[3] A: Yeah, more or less.
[4] Q: And from that point you have been in charge of both • remodeling and new construction and maintenance?
[6] A: From that point I start working with the • maintenance of the service station and some minor in the • service station.
[9] Q: Now specifically in reference to St.

remember we discuss • about this, because this is a very old construction.
MR. ROMERO: A very what?
THE WITNESS: A very old construction.
MR. ROMERO: Old.
A: It's very old, this grease trap. After the new • one, I don't know about this. After I went to clean the new • grease trap, that's when I saw that.
Q: (Mr. Dema:) You were, in fact, in charge of • cleaning it, were you?
A: Yes, I sent to clean the grease trap.
Q: Were you there when it was cleaned?
A: Yeah.
Q: How long did it take?

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A: It don't take too long.
Q: It don't take too long?
A: No. To clean the grease trap, it don't take too • long.
Q: How did you do it?
A: Well, they pick up the water and the oil, and they • put it in drums.
Q: Who's they?
A: Devira Corporation.
Q: Sir?
A: Devira. That's De Arce's company.
Q: So Mr. De Arce again?
A: Yeah.
Q: And what did he do with it?
A: Well, they put the oil and the water in drums, and • they let the drums in the service station.
Q: What happened to the drums?
A: I can't answer that.
Q: What else did they do?
A: That's all, that we clean the grease trap, and we • left the drums.
Q: Did you wash it?
A: What area?
Q: This tank we're referring to.
A: They cleaned those tanks.

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Q: Well, Exhibit No. 8 shows me climbing down into • that tank. I'll show you Exhibit No. 9, which shows me in • the bottom of the tank.
MR. MEYERS: Rather ungracefully, I might • add.
MR. DEMA: I try my best, Sonny.
Q: (Mr. Dema:) And as you can see in the picture, • which we will hold up for the camera, there is neither oil • nor water nor residue of either in the bottom of that tank. • Could you tell me why that is?
A: Well, because we cleaned the tank. We cleaned it.
Q: With what?
A: We take out all the grease and the oil.
Q: Right. Then what?
A: And then we -- we cleaned the walls to take out any • grease that we have in that tank.
Q: And how did you do that?
A: Well, they do it with some piece of cloth. They • clean the walls.
Q: With a piece of cloth?
A: Yeah.
Q: What else did you do after you cleaned the walls • with a piece of cloth?
A: Well, that's it.
(4596)

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Q: Well, I'll show you Exhibits 10 and 11, sir, which • we'll hold up for the camera to look at, which are pictures • showing the interior of the tank and the floor of the tank. • And I would ask you whether you did anything else besides • rub the walls with a cloth?
A: Okay. Well, they use a like -- like you paint a • wall, they use water with some -- they mix water with • concrete, and they paint the wall to keep it clean.
Q: So they mixed water with concrete and applied that • to the walls and floor; is that your testimony?
A: Yeah. Just like you paint a wall.
Q: Do you know what this product was that is a mixture • of water and concrete?
A: Yeah, it's water and concrete.
Q: So that's what they did, they --
A: Yeah.
Q: mixed up water and concrete and put it on?
A: Yeah.
Q: A fresh coat?
A: Yeah, it's just like you paint a wall, that's it, • with a brush.
Q: Anything else they did?
A: No.
Q: As an engineer for ESSORICO, did you ever ask where • the pipes shown in Exhibit 12 went?

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A: No, I didn't check with all those pipes.
Q: At any point from 1982 until today, have you ever • identified where those --

have you ever seen any document, • any drawing, any as-built plan that shows where those pipes • go?
[6] A: No. I don't see anything.
[7] Q: Are you at all curious?
[8] A: No.
[9] Q: Thank you, Mr. Rosado. • Could you tell me within ESSORICO engineering • did you ever have meetings with your supervisor or other • engineers regarding how the service stations in the Virgin • Islands are being maintained?
[14] A: Well, sometimes we discuss our major work that we • have to do in the service station that we have to put new • identification, that we have to put new tanks, and we have • to replace pumps. That's when we meet to discuss about the • service station.
[19] Q: Well, with reference to the Virgin Islands, did you • ever attend any meetings at retail engineering which • discussed an underground storage tank replacement program • for the Virgin Islands?
[23] A: Well, the underground storage tank, replacement • storage tank was handled by the other engineers in the ESSO • section.

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[1] Q: Was there an underground storage tank replacement • program?
[3] A: Yes, it's underway.
[4] Q: When did it start?
[5] A: I think we start three or four years ago, more or • less.
[7] Q: And when you say the other engineers in the ESSO • section are doing it, what section?
[9] A: That's in the retail department, in the section • that I am in.
[11] Q: So would you identify it by name for me, sir, the • other engineers that are involved in the underground storage • tank replacement program?
[14] A: Well, Carlos Fuentes, Angel Roman, and Samuel Cruz.
[15] Q: Are they all there still?
[16] A: No, only Samuel Cruz and Carlos Fuentes.
[17] Q: Where is Mr. Roman?
[18] A: Roman is -- right now he's a contractor.
[19] Q: Does he work for ESSO?
[20] A: Yeah, sometimes he work for ESSO.
[21] Q: One big happy family. • Did you ever -- were you ever involved in • doing micro assessments of the Virgin Islands service • stations?
[25] A: No.

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[1] Q: Do you know whether anyone ever did?
[2] A: No.
[3] Q: So then you were not involved with this underground • storage tank replacement program at all?
[5] A: Not in Tutu.
[6] Q: Anywhere in the Virgin Islands?
[7] A: Yeah, we change tanks in Hans Oriol Service • Station.
[9] Q: In Hans Oriol's Service Station?
[10] A: Yeah.
[11] Q: As part of the underground storage tank replacement • program?
[13] A: That's correct.
[14] Q: What did you do in preparation for that?
[15] A: Well, we get permits from the government to start • working with replacement of the tanks.
[17] Q: Did you ever conduct a coarsivity analysis of the • soil?
[19] A: No.
[20] Q: Did you ever do a pH of the soil?
[21] A: No.
[22] Q: Did anyone ever show you a micro assessment of Mr. • Oriol's service station?
[24] A: No.
[25] Q: Do you know what a micro assessment is relative to

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the underground storage tank replacement program?
[2] A: No, I'm not very clear about that, because that's • the environmental field. ESSO has a section that deal with • environmental. I only work in replacement of the tank. If • we have any environmental problem, we refer the problem to • that section.
[7] Q: Please tell me who's in charge of that section.
[8] A: Well, in ESSO we have Hernon Flores to work with • environmental.
[10] Q: He just was hired not too long ago, right?
[11] A: Yeah, that's right.
[12] Q: So besides Mr. Flores, who is a recent hire, who • else is there?
[14] A: Ana Gloria Ramos is the other engineer who handle • environmental.
[16] Q: Anyone else other than Ana Gloria?

[17] A: No. Well, right now they hire a new engineer. I • don't remember the name.
[19] Q: Okay. When you do these repairs, for example, or • installations, do you ever make written reports?
[21] A: Well, if we have any problem, I go to my supervisor • that if we have any problem, if we have any contamination. • Also, we have a company Soil Tech. Any time that we make a • replacement of tanks, they go -- they go to the area, and • they pick up some sample of the soil. We have any problem,

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they make a report to the Environmental Quality Board and to • the ESSO Company.
[3] Q: And do you ever make any reports to Mr. Munoz?
[4] A: About what?
[5] Q: Well, you spent -- you supervised $9,200 worth of • construction of Mr. De Arce putting in the oil water • separator. Did you ever make a report to Mr. Munoz about • it?
[9] A: In that case, in that kind of project, yes, we talk • to him, we finish the project, whatever, how is the project • running.
[12] MR. ROMERO: He wants to know if you prepared • a written report.
[14] A: No. A written report, no.
[15] Q: (Mr. Dema:) When Mr. Munoz told you to empty the • oil water separator and to empty the 2,000-gallon oil water • separator, did you make a written report after you finished • that work?
[19] A: No. No, we didn't make a written report.
[20] Q: Well, tell me what Mr. Munoz referred to, this tank • that we're looking at in Exhibits 8 through 12, when he said • to empty it and clean it and flash it with new concrete, • what did he -- what did he call it?
[24] (4920) MR. ROMERO: Objection to the • characterization of what Mr. Augusto Munoz's testimony may

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have been. • You want to quote his express testimony?
[3] Q: (Mr. Dema:) What did Mr. Munoz call that?
[4] A: What, to clean the --
[5] Q: Well, he had to say, Mr. Rosado, would you clean --
[6] A: Yeah.
[7] Q: something.
[8] A: Yeah.
[9] Q: What did he call it?
[10] A: He told me to clean the grease trap and the pit and • this tank, also. That's it.
[12] Q: So he called that a tank?
[13] A: Well, I don't remember if he called it a tank or • slop oil tank or whatever. I have instructions to go over • the grease trap and other one.
[16] Q: Did you ever go and report back to Mr. Munoz and • said, "Mr. Munoz, we cleaned the tank, and there are these • pipes that lead in and out of the tank, and we don't know • where they go"?
[20] A: We cleaned the -- I cleaned the area, but I don't • pay attention to where those lines run.
[22] Q: So when you were cleaning that tank, did you clean • on the inside of that pipe a few inches?
[24] A: We clean the tank, and we cleaned -- yes, maybe • they cleaned a few inches from the pipe. But the main thing

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is to clean the tank.
[2] Q: And did you see whether there was any residue • inside those pipes?
[4] A: No.
[5] Q: Did you ever look inside the pipe?
[6] A: No, I didn't look inside the pipe.
[7] (Respite).
[8] (5000)
[9] Q: I'll show you what we will mark as Deposition • Exhibit No. 14, bears Bates Stamp 906015B. It's an invoice. • First showing it to counsel.
[12] (Respite).
[13] Q: When you've had a chance to look at that, sir, • would you let us know?
[15] A: Uh-huh.
[16] (Respite).
[17] A: Okay.
[18] Q: Is that your signature in the middle of the page on • the stamp?
[20] A: Yeah.
[21] Q: And could you tell us what this work was for?
[22] A: First, I don't know which service station it is. I • don't remember the -- I know service contract for '87, but I • don't know which one is the service station.
[25] Q: These documents were produced by Mr. De Arce for

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worked performed at ESSO Tutu.
[2] A: Is that for ESSO Tutu?
[3] Q: Could you tell us, based on what is being charged • and what you signed off, the work that was done?
[5] A: Well, this invoice is for replacement of some • fiberglass line.
[7] Q: And what is the nota?
[8] A: It says emergency work.
[9] Q: Do you remember what nature that work was?
[10] A: No, I don't remember right now.
[11] (5165)
[12] Q: I'll show you what we'll mark as Exhibit No. 15, • showing it to your counsel. I'll also mark the other • invoices. For the record, 15 bears Bates Stamp 906016B. • Exhibit marked 16 bears Bates Stamp 906034B. Exhibit 17 • bears Bates Stamp 906101B.
[17] MR. ROMERO: You want this exhibit to be two • pages?
[19] MR. DEMA: No.
[20] Q: (Mr. Dema:) While they're looking at that, sir, I • would direct your attention to approximately February of • 1991, and ask if you remember being in St. Thomas and • getting a call to join one Mr. Jenson, Country Manager for
[24] ESSO V.I., at the ESSO Tutu station to look at an excavation • site immediately next to it?

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[1] A: Yeah.
[2] Q: And did you go to that excavation site?
[3] A: Yes, I went to the excavation site.
[4] Q: And who was there?
[5] A: Well, on the excavation site was Mr. Jim Jenson, • Eugenio De Arce, Ramos, one of his employees, Nestor Ramos.
[7] Q: And who is Nestor Ramos?
[8] A: That's one of De Arce's employees.
[9] Q: And once you arrived there, could you tell us what • you did?
[11] A: Well, as soon as I get to the service station, I • went to the excavation, I check the excavation.
[13] Q: Who went into the excavation?
[14] A: I went with Nestor Ramos.
[15] Q: Did Mr. De Arce accompany you into the excavation?
[16] A: I think that De Arce was outside the excavation. I • don't remember if he go down to the excavation.
[18] Q: Before you went down into the excavation pit, what • were you told was the problem?
[20] A: Well, they told me that they have some leak from • the ESSO Service Station to the excavation.
[22] Q: Who told you that?
[23] A: Mr. Jenson.
[24] Q: Did you discuss this leak with Mr. Jenson?
[25] A: Well, as soon as I saw the problem at the service

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station, I told to him what I saw.
[2] Q: Well, before you went into the pit, Mr. Jenson told • you they had a leak from the service station, did you have • any other discussion with him about it?
[5] (5329) MR. ROMERO: Objection. That's not what he • said. His testimony is not that Mr. Jenson said that there • was a leak from the service station.
[8] Q: (Mr. Dema:) Do you remember the question, sir?
[9] A: Yeah. Can you repeat it?
[10] Q: Before you climbed down into the excavation pit, • did you have any other discussion with Mr. Jenson or with • Mr. De Arce or anyone present, Mr. Ramos, about the nature • of the problem?
[14] A: No.
[15] Q: Then could you tell us your findings when you • climbed down into the pit next to the ESSO station?
[17] A: Okay. I went down to the excavation, I saw a black • between a black and brown product.
[19] Q: I'm sorry, I missed the last word.
[20] A: Product.
[21] Q: Product?
[22] A: Yeah, product.
[23] Q: As in petroleum product?
[24] A: I can't say that's a petroleum product.
[25] Q: Would you describe for me what you mean by the word

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product"?
[2] A: Okay. You can say that I see a substance.
[3] Q: A substance?
[4] A: Yeah. I can't identify like any petroleum product, • because I'm not an expert in that area.
[6] Q: So it was a black or brown substance. Could you • describe for us the physical characteristics of this •

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substance?
[9] A: Yeah, it was between black and brown, dark brown, • black more or less.
[11] Q: Was it solid or liquid?
[12] A: It was liquid.
[13] Q: Did you take any sample of it?
[14] A: Well, Nestor, he take a small sample.
[15] Q: What did Nestor do with the sample?
[16] A: I don't remember. It was a small one in a cone, • and then I think that we throw the glass -- the cone.
[18] Q: A cone?
[19] A: Yeah.
[20] Q: What type of cone?
[21] A: It's like a -- like a triangle one. One you use to • drink water.
[23] MR. ROMERO: A paper cup?
[24] THE WITNESS: Paper cup, yeah.
[25] Q: (Mr. Dema:) A paper cup?

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[1] A: Yeah, paper cup.
[2] Q: So he took this liquid -- this black, brownish • liquid into a paper cup?
[4] A: Yeah.
[5] Q: And did he take it out of the pit with him?
[6] A: I don't remember we take out from the pit. I think • that we show that to Mr. Jenson.
[8] Q: And what did Mr. Jenson say to do with the sample • that you took of this liquid?
[10] A: I don't remember. I don't remember. I think that • we dispose of it.
[12] Q: You disposed of it?
[13] A: Yeah. I don't think that we take out the sample • with us.
[15] Q: Was it of any concern to you as the ESSORICO • engineer on site as to what that brownish, blackish liquid • on the side of the excavation wall next to ESSO might be?
[18] A: Yes. I told to Mr. Jenson what I saw, and as soon • as I get here in Puerto Rico, I told to Engineer Munoz what • I saw.
[21] Q: What did you tell him you thought it was?
[22] A: I saw a liquid substance below the area, and that's • what I saw.
[24] Q: And what did Mr. Munoz say when you told him that?
[25] A: Well, my part in that situation was just to check

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it out and report what I saw, then the -- the people that • work in the environmental area, they handle the --
[3] Q: They did something?
[4] A: I don't know. I can't answer that. I only do what • I have to do. That's to check it out what I saw over there.
[6] Q: Did Mr. Munoz ever say does that stuff belong to • us?
[8] A: No, I don't remember, because I report to him, and • then he discuss that with the environmental people. I don't • know what they do.
[11] Q: Did Mr. Jenson ever say, "Engineer Rosado, do we • have a problem"?
[13] A: I don't remember if he asked about that.
[14] Q: If he had asked that question, sir, "Engineer • Rosado, do we have a problem," what would have been your • response?
[17] (5490) MR. ROMERO: Objection to the speculative • nature of the question.
[19] MR. DEMA: You're quite correct, sir.
[20] Q: (Mr. Dema:) We took Mr. Jenson's deposition on • April 11th, 1991, and on Page 65, on Line 14 we asked him • this question, "Did you think it important to conduct an • integrity test of the pipeline between the catch basin and • the oil water separator?" And his answer was, "I had • concern because of the proximity of the excavation to my

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structure, and I was relying on Mr. Rosado's opinion as to • whether or not I was going to have a problem as a result. • He indicated he did not believe so. And I rely on my • support staff to provide the expertise that does not -- is • not within my organization." • Do you remember that conversation?
[7] A: I don't remember that conversation, but he say that • we don't have any problem, referring to what? To excavation • or to what?
[10] Q: Apparently, Mr. Jenson sent you down into this • excavation pit to look at this dark, blackish, brown liquid • that was staining the wall next to the ESSO station and • said, Mr. Rosado, -- "Engineer Rosado, do we have a • problem"?
[15] MR. ROMERO: No. You care to

read back to • Mr. Rosado, and he's asked you to do so, to understand what • Mr. Jenson was referring to when you quoted his answer?
[18] MR. DEMA: I will be delighted to read back • to him.
[20] Q: (Mr. Dema:). Answer, "I had concern because of the • proximity of the excavation to my structure, and I was • relying on Mr. Rosado's opinion as to whether or not I was • going to have a problem as a result. He indicated he did • not believe so. I rely on my support staff to provide the • expertise that does not -- is not within my organization."

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[1] Q: Does that help your recollection of the • conversation that you and Mr. Jenson had when you came out • of the pit?
[4] A: Well, what Mr. Jenson doesn't say there, what I • want to know, what I'm not clear about is his referring • about the excavation, proximity of the excavation to the • service station, or he's referring to the -- to the • substance that was over there.
[9] Q: Well, Mr. -- Engineer Rosado, we would like to know • the same thing, and you were there. So do you know -- can • you tell us what the conversation was between you and Mr. • Jenson when you came out of the pit and said after • collecting this sample in a water cup, there is this black, • brownish liquid coming from the wall by the ESSO Station?
[15] (5636) MR. ROMERO: Objection. Mr. Rosado has not • testified that that was his testimony.
[17] Q: (Mr. Dema:) Mr. Rosado, was there a black, • brownish liquid coming from the excavation wall by the ESSO • Service Station?
[20] A: Can you rephrase it again?
[21] Q: Yes. Mr. Rosado, upon your inspection, did you see • a black, brownish liquid coming from the excavation wall by • the service station?
[24] A: Yeah.
[25] Q: Having seen that, sir, when you went up out of the

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pit and told the Country Manager for ESSO of your findings, • what did you tell him?
[3] A: Okay. As soon as I get out from the excavation, I • told to Mr. Jenson what I saw in the excavation, that I saw • a product, a black substance down there.
[6] Q: I'm sorry. Did you say that you saw a problem?
[7] A: Not a problem, a product.
[8] Q: A product?
[9] A: Yeah, a product.
[10] Q: Did you have a conversation with Mr. Jenson as to • what to do about it?
[12] A: Yes. I told to him that I'm going to report that • to ESSO Puerto Rico, and they have to decide what they're • going to do. That's all what I have to do with that • excavation. I only check it out and report.
[16] Q: And it's your testimony that you went back and made • that report to Mr. Augusto Munoz?
[18] A: Yeah, I told to my supervisor what I saw.
[19] Q: Did Mr. Munoz say, "Did you bring back a sample, • Engineer Rosado"?
[21] A: I don't remember if he asked about that.
[22] Q: Could you tell me as exactly as you remember what • you told him was coming out of the ESSO wall?
[24] A: Well, like I say before, it was a -- between dark • brown and black.

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[1] Q: Did he say, "Do you think it was oil"?
[2] A: I don't know. I can't --
[3] Q: You don't know or you don't remember?
[4] A: No, I can't say it was oil. I don't know.
[5] Q: I'm asking you what Mr. Munoz asked you. • I'm trying to understand. You are the retail • engineer in the field, and you go back to Mr. Augusto Munoz, • who is head of ESSORICO retail engineering, and you say • there is this black, brownish liquid substance coming from • the excavation wall by ESSO, and what does Mr. Munoz say?
[11] A: Well, I don't remember what he say.
[12] Q: Did he ask you whether you thought this was coming • from the ESSO Station?
[14] A: Yeah, he asked me.
[15] Q: And what did you tell him?
[16] A: Well, I told him, that I saw the -- that substance • from that -- that is below the area of the service station.
[18] Q: Did he ask you whether you

thought it was coming • from the service station?
[20] MR. ROMERO: Did Mr. Munoz ask him that?
[21] MR. DEMA: Yes.
[22] A: I don't remember if he asked. I report to him what • I saw.
[24] Q: (Mr. Dema:) Do you know what -- anything else that • ever happened?

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[1] A: From that point?
[2] Q: From that point.
[3] A: No, I don't know, because I make a report, and they • and they were with environmental problem.
[5] Q: Do you know whether they ever did anything about • this environmental problem?
[7] A: No. I had nothing more to do with environmental • section.
[9] MR. DEMA: We have to take a brief recess • with regard to changing a tape.
[11] (5766) THE VIDEOTAPE OPERATOR: It is now 11:39. We • are going off record to change videotapes in the deposition • of Mr. Rosado of 10-14-92.
[14] (Short recess taken).
[15] (0000) THE VIDEOTAPE OPERATOR: This is the • beginning of Tape No. 2. It is 12:01, October 14th, '92, • continuation of the deposition of Mr. Nelson Rosado.
[18] (0041)
[19] Q: (Mr. Dema:) Mr. Rosado, I will show you what's • been marked Deposition Exhibit No. 15, which is a bill from • Mr. De Arce, from 18 September 1985, and see if you are • familiar with that billing.
[23] (Respite).
[24] A: Okay.
[25] Q: And are you familiar with it, sir?

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[1] A: Well, I don't remember it.
[2] Q: What is the project it describes?
[3] A: It describes the replacement fiberglass line, to • put a new fiberglass line.
[5] Q: And is this type of work for $4,869 something that • would come under your purview as the maintenance engineer • for ESSORICO?
[8] A: Well, that can be handled by me or that can be • handled by other engineer. I don't remember.
[10] Q: Do you have a record as to what fiberglass line was • replaced?
[12] A: No.
[13] Q: How do you know?
[14] MR. ROMERO: He's telling you.
[15] A: Because what I written here, I know that they're • replacing -- this is for replacing two lines of fiberglass, • but I don't remember which line.
[18] Q: (Mr. Dema:) Are there any documents that would • tell us which lines were replaced?
[20] A: I don't know, but ----
[21] Q: Well, Mr. Rosado, if there are a certain number of • lines, some of which are steel and some of which are • fiberglass at a service station, are you telling me that • engineering does not keep any record of when a particular • line was replaced?

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[1] MR. ROMERO: He has not told you anything as • to what kind of records are kept by engineering, Mr. Dema. • Would you care to make a specific question?
[4] Q: (Mr. Dema:) Do you remember the question?
[5] A: No.
[6] MR. DEMA: Would you read the question back • to him?
[8] (Following read by reporter: • Well, Mr. Rosado, if there are a certain • number of lines, some of which are steel and some of which • are fiberglass at a service station, are you telling me that • engineering does not keep any record of when a particular • line was replaced?").
[14] (0317) MR. ROMERO: I'll make the objection for the • record.
[16] A: Well, when we replace lines, if this is not a major • project, this is a minor project, just go and replace maybe • 20 feet of line, 100 feet of line, this is not a big • project, and we send to replace the line, and we paid the • invoice, and that's it. • When we keep record is when we make a big • project. A complete new service station, something like • that, we make a file with the service station, but for minor • problems like this ----
[25] Q: (Mr. Dema:) So when ESSORICO made this service

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station in 1969, I take it then there's a big file?
[2] A: Yeah.
[3] Q: Have you looked for that file?

[4] A: I go to Catano area to try to find something about • the service station, but I couldn't find nothing about the • service station, the construction of the service station.
[7] Q: How does this come to the attention of ESSORICO • Engineering, this type of line replacement for $4,800?
[9] A: Well, they -- it can be the dealer have any • problem.
[11] Q: Well, how do we know why the line was replaced?
[12] A: Well, ESSO replace a line in case -- first, we • make --
[14] MR. ROMERO: He wants to know how you find • out. How you find out.
[16] A: Okay. If we have, suspect that we have any • problems in service station, we make a pressure test to the • line.
[19] MR. ROMERO: How do you find out what was • done there? Why?
[21] Q: (Mr. Dema:) Exhibit No. 15, why did ESSO change • those lines?
[23] MR. ROMERO: Do you know?
[24] A: Well, if we change the lines, they're supposed to • maybe we have --

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[1] MR. ROMERO: I'm sorry, Mr. Rosado, I'm going • to ask you not to speculate. You either know or you don't • know.
[4] THE WITNESS: Okay.
[5] MR. DEMA: You stopped him just in time, Mr. • Romero, congratulations. • Mr. Romero, -- I wish I could ask you • questions.
[9] MR. ROMERO: I gladly would answer.
[10] Q: (Mr. Dema:) Engineer Rosado, could you tell me the • reasons why lines would be replaced at the ESSO Tutu Service • Station?
[13] A: Well, they can be replaced because they are old • lines, and because there is a problem in the line.
[15] Q: Two reasons; they're old or there is a problem in • the line?
[17] A: That's right.
[18] Q: Would you tell me all the engineering • considerations that go into replacing old lines?
[20] A: Old lines, for -- by the age, they are very old • lines, we replace the line to avoid any problem.
[22] Q: Okay. Now based on Exhibit No. 15, were these old • lines that you were replacing?
[24] A: Uh-huh.
[25] MR. ROMERO: Are you asking him if the age of

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the lines can be -- is reflected?
[2] Q: (Mr. Dema:) I'm asking -- referring to the lines • that were changed out, shown in Exhibit No. 15, and we are • looking at the receipt, were they old lines?
[5] A: I don't know if it was old lines.
[6] Q: What was replaced?
[7] A: From what I see here, these lines, gasoline lines, • they change for fiberglass.
[9] Q: Were they -- the lines that were replaced, were • they fiberglass or were they metal?
[11] A: I don't know if they were metal or fiberglass.
[12] Q: Does ESSORICO have a maintenance program where they • keep track of the age of the pipelines and replace them on a • preset basis?
[15] A: Well, right now we have a program, and we have all • the ages of the tanks from the installation of each service • station here in Puerto Rico and the U.S. Virgin Islands, we • have all the ages. The basis of that we are replacing • tanks.
[20] Q: I understand you have a program now.
[21] A: Yeah.
[22] Q: I'm asking in September of 1985, sir, did you at
[23] ESSORICO keep track of how old those lines were?
[24] A: No.
[25] Q: So then how would you know that you were going to

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replace the line by reason of age?
[2] MR. ROMERO: Are you referring to Mr. Rosado • personally keeping record of the age of the lines at the • stations or ESSORICO in general or retail engineering • department? • Is that clear to Mr. Rosado, --
[7] THE WITNESS: No.
[8] MR. ROMERO: -- which of the three you are • talking about?
[10] Q: (Mr. Dema:) Mr. Rosado, let me start again.
[11] MR. ZEBEDEE: He did answer the question.
[12] MR. ROMERO: Does he know which one he was • referring to?
[14] Q: (Mr. Dema:) One of the reasons

you gave us to • replace lines was age. Does ESSORICO, to your knowledge, • keep track of the age of the lines at ESSO Tutu?
A: Well, ESSO has a file for putting the installation • of the old equipment that we have, and they can know the age • of the lines on the tanks.
Q: Very good. And we have been trying to locate that • file for almost two years. So could you tell us where it • is?
A: I don't know. I don't know where the file.
Q: So then how can you say with such certainty that
ESSORICO has a file where they keep track of the age of

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their equipment?
A: The file -- they have the age more or less the • installation of those service stations, the tanks, lines, • pumps, because when we install any equipment, that's capital • money, and that goes to a -- to the capital equipment, and • you can look in that -- in that record, and you can see the • age of when the -- the equipment was installed.
Q: We have a record of new construction, and there's a • 500-gallon slop oil tank which Mr. Munoz testified was a • steel tank. Where do I go to find out where that tank is • and what its age is?
A: Well, we can check in the -- in the -- it's a • record that we call P98.
Q: P98?
A: Yeah.
Q: In preparation for your deposition today, did you • check the P98 records?
A: No.
Q: Why not?
A: I didn't think about that.
Q: What are the P98 records?
MR. ROMERO: Would you remind Mr. Rosado the • topics as to which he was noticed to that he would be • examined upon?
Q: (Mr. Dema:) Where are the P98 records kept?

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A: That's in ESSO office.
Q: Where is that ESSO office located?
A: Here in Guaynabo, Puerto Rico.
Q: Is that the San Patricio office?
A: San Patricio office, that's right.
Q: And what department are they located in?
A: That's in the accounting department.
Q: And does the accounting department also have the • records for all the repairs that were done at that service • station?
A: Not for the repairs. Just only for, like I say • before, capital project.
Q: Who has the records for the repairs?
A: Well, like I say before, minor maintenance repair • was done directly with the people in the U.S. Virgin • Islands. We have a major repair, it's done by ESSO Puerto • Rico.
Q: Where are the documents for the major repairs kept?
A: Well, when I make a project like a new service • station, I open a file for every invoice, for any item that • I put in the service station to handle the construction. I • keep a file, and then that file is -- as soon as we finish, • we keep that file, and we send to the Catano area.
Q: What about remodeling?
A: Remodeling, yes, we open file for remodeling.

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Q: And who keeps the file?
A: The engineering shop open a file for the project. • As soon as we finish the project, we send the file to • Catano.
Q: Where are the -- the amount of $4,800 that's shown • in Exhibit 15, where would that record be kept, the receipt?
MR. ROMERO: Referring to Exhibit --
MR. DEMA: 15.
MR. ROMERO: Would you show it to him?
MR. DEMA: I did.
A: Would you ask it again? Can you rephrase it?
Q: (Mr. Dema:) Where are the records of the receipts • for this type of expenditure kept?
A: When we make any repair, that repair is expense, • it's -- we make the job, and we pay -- we prepare a purchase • order for the contractor, we pay the contractor for the job, • and those -- those records we keep in the -- in the • accounting department they have file, and they keep those • files for I don't know how many years, and then they send • Catano area. They have a lot of

files over there.
[21] Q: And I take it you did not check with accounting to • see any documents they may have with regard to repairs at
[23] ESSO Tutu?
[24] A: No. No.
[25] (1183)

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[1] Q: I show you Exhibit 16, Bates Stamp 906034B. Could • you tell us what that job was?
[3] A: This is for -- make a connection between two tanks.
[4] Q: And why was that done?
[5] A: Well, maybe -- we change product in the U.S. Virgin • Islands. Before we have leaded and unleaded product, then • we change for unleaded only, and then we have premium and • regular, and we have -- like example, we have three tanks or • four tanks. Then we have -- you have three tanks with • premium, with leaded, one tank with unleaded. Then they • switch, they connect two tanks just for the capacity to have • more capacity in the service station.
[13] Q: And how do you know that that describes the invoice • shown on Deposition Exhibit 16?
[15] A: I can't answer you on that -- that question. • That's what we do when we have problem with capacity in • tanks in the service station.
[18] Q: So your answer was just speculation?
[19] A: Yes, sir.
[20] (1315)
[21] Q: I'll show you Exhibit 17, marked 9 November 1981, • and it says call by something Rosado.
[23] A: Uh-huh.
[24] Q: Is that you?
[25] A: Yeah.

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[1] Q: So then we could at least with some certainty say • that on November 9th, 1981 you had already started • overseeing maintenance in the Virgin Islands; is that • correct?
[5] A: That's right.
[6] (1368)
[7] Q: I'll show you what is marked -- what we'll mark as • Exhibit 18, Bates Stamp 906020B, Purchase Order 131, and • after showing it to counsel, we'll ask you to look at it.
[10] (Respite).
[11] Q: What was done with regard to that service call?
[12] A: I don't understand what it's saying right here. • It's not clear.
[14] Q: Okay.
[15] A: I can't read that.
[16] Q: Where would I find Purchase Order 131?
[17] A: Well, 1986, you can try to find it in the ESSO • Catano area. This is a very old one, '86.
[19] Q: Sir, looking back at Exhibit 14 and Exhibit 15, is • there any way to tell which pipelines were replaced?
[21] A: Can you ask the question again?
[22] Q: Is there any records that we could look at to tell • to locate -- physically locate the location of the • pipelines that were replaced?
[25] A: To find records, if we have any record of that,

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it's in the Catano area. That's the only place that we • find, because these invoices are very old.
[3] Q: You said that there were two reasons to replace • pipelines; one is age, and the second is a problem.
[5] A: Uh-huh.
[6] Q: If there is a problem, for example, a hole in the • line, do you keep any separate records with regard to that • fact?
[9] A: No. They only replace the line, and that's it.
[10] Q: Is there anything in engineering where back in '85, • 86, '87 you were making notifications of a release of • product in these situations, if, in fact, there was a • release of product?
[14] A: No, I don't have nothing about that.
[15] Q: With reference to ESSO Rodriguez, sir, are you • familiar with that station?
[17] A: Yes, I know that is a service station.
[18] Q: From your maintenance visits to the Virgin Islands, • have you ever had occasion to have anything to do with the
[20] ESSO Rodriguez station?
[21] A: No. Only one time we replace the pumps for new • ones.
[23] Q: And when was that?
[24] A: I think that was last year.
[25] Q: Was that the incident where you received a stop

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work order?

EXHIBIT 'O'

MAR-31-94 WED 11:46 B.K.R. 8097765576 P.01

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LAW OFFICES OF JOHN K. DEMA, P.C.

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pls. copy Caroline [illegible] 7th floor [illegible]

20 August 1991

Amy Chester, Esquire
Assistant Regional Counsel
United States Environmental Protection
Agency, Region II
26 Federal Plaza, Room 400
New York, New York 10278

Post-It™ brand fax transmittal memo 7671	# of pages ▸
To Rich Smith	From DAH
Co. PRODUCED to	Co. ESSO
Dept. By [illegible]	Phone #
Fax #	Fax #

Re: Esso Tutu, St. Thomas, U.S.V.I.

Dear Attorney Chester:

Enclosed are copies of some deposition transcripts of former employees of the Esso Tutu Car Care Center. Attorney Dema thought you might be interested in reading their comments regarding waste oil.

I have also enclosed a copy of the lab report from an analysis of a soil sample taken from the bottom of the cistern excavation immediately adjacent to the Esso Tutu property. We also took a liquid sample but, unfortunately, the sample was destroyed in transit to the lab in New York.

I hope everything is going well with you and I want to thank you again for meeting with me when I was in New York earlier this spring. If you have any questions, please do not hesitate to call.

Very truly yours,

Richard W. Smith
Research Assistant

RWS/s
Enclosures

[illegible]

EXHIBIT D

TUT 006 0902

(607) 565-2893

Apr 2, 1991

LAB SAMPLE ID : 27646

P.O. #	:
Client site	: FOUR WINDS CAR WASH
Origin	: SOIL
Description	: COMPOSITE
Sampled on	: 03/21/91 by CSWL
Date received	: 03/27/91
PWS ID #	:

Caribbean Safe Water Lab
Marcella Jennings
P.O. Box 7669
St. Thomas, V.I. 00801

* Key	Method	Analyst	Date Analyzed	Notebook Reference
1	SW846/5030/8010	PC	03/28/91	91-029-571
2	SW846/5030/8020	PC	03/28/91	91-029-571

Compound Detected	Concentration	Units	Key *
Tetrachloroethene	ND<60	ppb	1
Benzene	150	ppb	2
Toluene	ND<60	ppb	2
Ethylbenzene	184	ppb	2
p-Xylene	ND<60	ppb	2
m-Xylene	ND<60	ppb	2
o-Xylene	ND<60	ppb	2
Surrogate Recovery	91	percent	2

Approved by : [signature]
Manager, Organics

The information in this report is accurate to the best of our knowledge and ability. In no event shall our liability exceed the cost of these services. Your samples will be discarded after 14 days unless we are advised otherwise.

cc :

L000004

TUT 006 0903

BASE/NEUTRAL/ACID EXTRACTABLE COMPOUNDS

Laboratory Name: CIMO Laboratories, Inc.
Client Name: ERI Environmental Services
Project/Facility Name: Carribean Safe Water
Sample Location: FL(?)
Matrix: Soil
Method: EPA 8270

Sample ID: 3(3)-01
Date Collected: 03/21/93
Date Received: 03/26/93
Date Extracted: 04/02/93
Date Analyzed: 04/10/93
Date Reported: 04/11/93

COMPOUND	Detection Limit (ug/kg)	Sample Conc. (ug/kg)	Q
Phenol	330.00		U
bis(2-Chloroethyl) ether	330.00		U
2-Chlorophenol	330.00		U
1,3-Dichlorobenzene	330.00		U
1,4-Dichlorobenzene	330.00		U
Benzidine	1500.00		U
Benzyl alcohol	330.00		U
1,2-Dichlorobenzene	330.00		U
1,2-Diphenylhydrazine	330.00		U
2-Methylphenol	330.00		U
bis(2-Chloroisopropyl) ether	330.00		U
N-Nitrosodimethylamine	330.00		U
4-Methylphenol	330.00		U
N-Nitroso-di-n-propylamine	330.00		U
Hexachloroethane	330.00		U
Nitrobenzene	330.00		U
Isophorone	330.00		U
2-Nitrophenol	330.00		U
2,4-Dimethylphenol	330.00		U
Benzoic acid	1600.00		U
bis(2-Chloroethoxy) methane	330.00		U
2,4-Dichlorophenol	330.00		U
1,2,4-Trichlorobenzene	330.00		U
Naphthalene	330.00		U
4-Chloroaniline	660.00		U
Hexachlorobutadiene	330.00		U
4-Chloro-3-methylphenol	330.00		U
2-Methylnaphthalene	330.00	343.0	
Hexachlorocyclopentadiene	330.00		U
2,4,6-Trichlorophenol	330.00		U
2,4,5-Trichlorophenol	330.00		U
2-Chloronaphthalene	330.00		U
2-Nitroaniline	1600.00		U
Dimethylphthalate	330.00		U
Acenaphthylene	330.00		U
2,6-Dinitrotoluene	330.00		U
3-Nitroaniline	1600.00		U
Acenaphthene	330.00		U
2,4-Dinitrophenol	1600.00		U
4-Nitrophenol	330.00		U
2,4-Dinitrotoluene	330.00		U
Diethylphthalate	330.00		U
4-Chlorophenyl phenylether	330.00		U
Fluorene	330.00		U
4-Nitroaniline	1600.00		U
4,6-Dinitro-2-methylphenol	1600.00		U
N-Nitrosodiphenylamine (1)	330.00		U
4-Bromophenyl phenylether	330.00		U
Hexachlorobenzene	330.00		U
Pentachlorophenol	1600.00		U
Phenanthrene	330.00	453.0	
Anthracene	330.00		U
Di-n-butylphthalate	330.00		U
Fluoranthene	330.00		U
Pyrene	330.00		U
Butylbenzylphthalate	330.00		U
3,3'-Dichlorobenzidine	660.00		U
Benzo(a)anthracene	330.00		U
Chrysene	330.00		U
bis(2-Ethylhexyl) phthalate	330.00		U
Di-n-octylphthalate	330.00		U
Benzo(b)fluoranthene	330.00		U
Benzo(k)fluoranthene	330.00		U
Benzo(a)pyrene	330.00		U
Indeno(1,2,3-cd)pyrene	330.00		U
Dibenz(a,h)anthracene	330.00		U
Benzo(g,h,i)perylene	330.00		U

$ #10252
b #68180

(607) 565-2893

LAB SAMPLE ID : 27646

Apr 11, 1991

Caribbean Safe Water Lab
Marcella Jennings
P.O. Box 7669
St. Thomas, V.I. 00801

P.O. # :
Client Site : FOUR WINDS CAR WASH
Origin : SOIL
Description : COMPOSITE
Sampled on : 03/21/91 by CSWL
Date received : 03/27/91

ANALYSIS	RESULT	UNITS	DATE	ANALYSIS DONE BY
METHOD 8270	See Attach		04/11/91	LAB ID 10310
% Solids	81	%	04/11/91	LAB ID 10310

Approved by : ____________
Lab Director

The information in this report is accurate to the best of our knowledge and ability. In no event shall our liability exceed the cost of these services. Your samples will be discarded after 14 days unless we are advised otherwise.

cc :

L 0000051

TUT 006 0905

EXHIBIT 'P'

IN THE DISTRICT COURT OF
THE VIRGIN ISLANDS
DIVISION OF ST. THOMAS-ST. JOHN
MASTER DOCKET FILE NO 1989-107
CASE NO. 1989-224

IN RE:
TUTU WATER WELLS
CONTAMINATION LITIGATION,

FOUR WINDS PLAZA
PARTNERSHIP,
Plaintiff,
vs.
DEPOSITION OF:
THOMAS V. DANAHY
TEXACO, INC., et al.,
Defendant.

TRANSCRIPT of the stenographic notes of the proceedings in the above-entitled matter, as taken by and before DIANA SPIEGEL, a Certified Shorthand Reporter and Notary Public of the State of New Jersey, held at the office of GERAGHTY & MILLER, INC., 201 W. Passaic Street, 3rd Floor, Rochelle Park, New Jersey, on Tuesday, August 10, 1993, commencing at 9:00 in the morning.

APPEARANCES:

JOHN K. DEMA, ESQ.
Attorney for Plaintiff

AMERLING & BURNS, ESQS.
BY: JOHN R. COON, ESQ.
Attorneys for Defendant, Western Auto

ROSENMAN & COLIN, ESQS.
BY: DAVID A. SLOSSBERG, ESQ.
Attorneys for Defendants, Laga

ARCHER & GREINER, ESQS.
BY: DEBRA S. ROSEN, ESQ.
Attorneys for Defendants, Esso

O'CONNOR & LEMOS, P.A.
BY: MARY E. HOERBER, ESQ.
Attorneys for Defendant, Texaco

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EXHIBITS

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1 THOMAS V. DANAHY, 201 West Passaic Street, 3rd Floor, Rochelle Park, New Jersey, having been duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. DEMA:

Q: State your full name and address for the record.

A: Thomas V. Danahy, 340 Germonds Road, West Nyack, New York.

Q: And your place of employment?

A: I'm employed at Geraghty and Miller, Incorporated in Rochelle Park, New Jersey.

Q: And your employment capacity?

A: I'm a senior scientist project manager.

Q: I show you a three-page document that is a listing of your credentials, I believe, if you would look at that and tell me whether or not, in fact, it is?

A: Yes, it's my resume.

Q: And is that resume up to current date?

A: Yes, more or less, more project experience I could put on there, but that's fairly complete.

Q: Are there any publications other than the three listed here which you've written which

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Danahy - direct

are not included?

A: No, there are not.

MR. DEMA: I would like this marked Exhibit 1 to the deposition.

(Curriculum vitae is marked P-1 for identification.)

Q: I'll show you a notice of deposition, have you seen a copy of that document?

A: Yes, I have.

Q: And would you read it through?

A: Yes, I've read all that.

MR. DEMA: I'd like that marked Exhibit 2 to the deposition.

(Notice is marked P-2 for identification.)

Q: I believe Mr. Coon is looking at Exhibit-2. Can all parties present starting with myself, state who they are representing today? I'm Jack Dema, I represent Four Winds.

MR. COON: John Coon, Western Auto.

MR. SLOSSBERG. David Slossberg, Laga.

MS. ROSEN: Debra Rosen, Esso defendants.

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Danahy - direct

MS. HOERBER: Mary Hoerber, Texaco Carribean.

Q: Now, there are a number of documents in the room, Mr. Danahy. Are they organized in any particular format?

A: Yes, they are. And there's a couple different things I should point out to you. First thing is what are known as project files or red files.

MS. ROSEN: We're looking at the boxes.

A: The center box says project file on it. That filing system is maintained by the secretarial staff, and it is intended to have all outgoing and incoming correspondence filed in it for this project. There are a couple different project numbers related to this, and our filing system is based upon those project numbers. For the Tutu Wells site investigation, there are two main project numbers; first one, which is PR008.01, is the project that is related to the eight sampling events that had been performed at the water supply wells in the Tutu area. That includes the sampling analysis monitoring plan which was originally approved by

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Danahy - direct

the U.S. E.P.A., and that was the September 1990 version, and due to a laboratory change, there was a revision to that sampling analysis monitoring plan in September 1991, and the main documents that were produced under that project number are the eight sampling reports. The second main project number for the Tutu site is related to the remedial investigation, which the project number for that is PR0013.01.

[20] Q: Yes, with regards to the placement of [21] monitoring wells, would you describe whether there [22] were discussions or written comments with the [23] client prior to the actual production of a written [24] description of where they would be?
[25] A: I don't believe there's any written

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[1] Danahy - direct [2] comment from the clients regarding sampling [3] locations, whether they be borings or monitoring [4] wells. The only verbal communication that might [5] have affected actual well locations would have [6] included site visits and review of the site for [7] access for drilling locations. And that was done [8] in the latter part of 1991, and really it was [9] finalized in Tech Memo 1 based upon the initial [10] field work that we did and the site [11] reconnaissance, and, again, the main discussions [12] there that were performed, along with Department [13] of Natural Resources personnel, was site access [14] and ability to get into some boring locations. [15] We tried certain boring locations or [16] had planked boring locations, but there was also [17] the third-party landowners who might have placed [18] some limitations on where we ut our drilling [19] rig. In fact, I think you are aware there were [20] some monitoring wells put in some locations where [21] we might have preferred putting our monitoring [22] well, in particular, in front of the car wash, so [23] it really was, the finalization of the monitoring [24] wells and soil boring locations was not something [25] that was really subject to client comments, and it

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[1] Danahy - direct [2] was more based on technical discussions with the [3] U.S.E.P.A., and then the final field location [4] based on site access.
[5] Q: Did you ever get any written comments [6] or verbal comments from any scientist that were in [7] the employ of the client as opposed to in-house [8] people for Geraghty & Miller?
[9] A: As the investigation progressed, there [10] was some information that was produced by Esso [11] regarding a discharge pipe at the rear of the Laga [12] building, a former discharge pipe. And I believe [13] that was information that was developed by a [14] previous deposition. I'm not sure exactly how Esso [15] became familiar with it, but it was something that [16] was brought to our attention, and it was mentioned [17] as a likely source of potential waste water that [18] was discharged from the rear of the Laga [19] building. And there was a foundation that was [20] being constructed in the vicinity of that former [21] pipe, and the committee believed it was imperative [22] that we investigate that area before the [23] foundation was installed and the area disturbed. [24] So there were three additional soil [25] borings, borings 14, 15 and 16, that were

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[1] Danahy - direct [2] recommended based upon the information provided by [3] Esso regarding that former discharge pipe, so [4] there was some map showing, sketch map showing the [5] discharge pipe, and I had my field people who were [6] working down there at the time take a look at it, [7] and we recommended to the U.S.E.P.A. we take [8] samples there because it was something that should [9] have been done in a timely manner because of the [10] pending construction, so we prepared a letter to [11] the U.S.E.P.A. regarding that, and the E.P.A. [12] agreed that we should perform those borings and we [13] installed those borings.
[14] Q: Is there any written documents as to [15] what information was provided by Esso in that [16] regard?
[17] A: There's only a sketch map of the [18] discharge pipe, and the recommendation from Esso [19] is that we should do some borings there, and we [20] opted to put in three soil borings.
[21] Q: And those documents are where?
[22] A: I believe they are in the project [23] files, and there's a map that Geraghty & Miller [24] prepared, based upon that sketch map, the sketch [25] map was very crude and just, you know, showed a

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[1] Danahy - direct [2] back of a building and a pipe out there and that's [3] about it.
[4] Q: Did Esso provide any documents with [5] regard to a configuration of pipes and underground [6] vessels, tanks at its service station?
[7] A: We've performed a site reconnaissance [8] of the site and prepared our own sketch maps of [9] the Esso and Texaco stations. I don't recall any [10] detailed plans from either Esso or Texaco. I [11] don't know if they have any of those documents.
[12] Q: Is there any documents in there [13] requesting them from Esso or Texaco?
[14] A: No, there are not.
[15] Q: The site reconnaissance that you did, [16] was that reduced to maps, sketches, drawings?
[17] A: Yes, it was.
[18] Q: In your site reconnaissance, did you [19] learn the overall location of a 2,000-gallon oil [20] water sprayer in the northwest section of the Esso [21] Tutu Service Station?
[22] A: The only oil water sprayer I'm familiar [23] with is in the west central portion of the Esso [24] station.
[25] Q: What does Geraghty & Miller have on its

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[1] Danahy - direct [2] documents indicating the 2,000 gallon vessel that [3] is in the northwest section of the station?
[4] A: I don't know if we have anything on a [5] map that indicates there is a vessel in the [6] northwest corner of Esso.
[7] Q: Perhaps I'm using the wrong direction. [8] There is one effluent pipe that goes through the [9] retaining wall directly opposite the police [10] station, are you familiar with that one?
[11] A: Yes.
[12] Q: What do you call that one in your [13] working papers?
[14] A: That's an oil water sprayer.
[15] Q: And the one that is within a metal [16] caged area, are you familiar with that one?
[17] A: No, I'm not.
[18] Q: Could you pick out a site [19] reconnaissance map for me from the documents we [20] have here?
[21] A: I guess the best reference might be [22] Tech Memo 1, which has several site maps in it.
[23] (A discussion takes place off the [24] record.)
[25] Q: Mr. Danahy, we were asking you about a

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[1] Danahy - direct [2] site map and we're now looking at Figure 4, which [3] is part of what publication?

[4] A: Technical Memorandum One, Tutu Service [5] Station Investigation, St. Thomas, U.S. Virgin [6] Islands, which is dated April 10, 1992.
[7] Q: I noted you left the room and came back [8] with this. From whence did you retrieve it?
[9] A: From my office.
[10] Q: I was under the impression all the [11] documents we subpoenaed are within this room, [12] would you correct my impression of this room?
[13] A: I believe the files are now complete.
[14] Q: Do you have any other written document [15] depicting an oil water sprayer in the area which [16] you have marked, well, between the area marked [17] oil water sprayer" and the area marked as [18] office"?
[19] A: I am familiar with that area. There's [20] grading on either side, and upon visual [21] inspection, there was some metal plates or some, [22] that part of the area has been used for storage, [23] and I'm not really sure what is in the subsurface [24] underneath that area. [25] I do recall some additional information

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[1] Danahy - direct [2] that was provided by Esso in the depositions that [3] were given which I received recently, and we're [4] still developing information on the former units [5] or operations at the Esso station.
[6] MR. COON: Can we make Figure 4 an [7] exhibit?
[8] MR. DEMA: Figure 4 will be marked as [9] Exhibit No. 3.
[10] (Figure 4 is received and marked P-3 [11] for identification.)
[12] Q: Do you have any documents which show [13] the former lift areas which are seemingly not [14] depicted on Figure 4, Exhibit No. 3?
[15] A: It is my understanding that the area on [16] the southern portion of the Esso station was used [17] as the maintenance basis, and I'm not sure if [18] lifts were operated in that area or not.
[19] Q: Well, when was the date of the [20] reconnaissance on Figure 4, Exhibit 3?
[21] A: That reconnaissance was done in, over a [22] couple site visits, mostly during April of '90 -- [23] no, it would have been June of '91 and November of [24] 91.
[25] Q: So you were employed by Geraghty &

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[1] Danahy - direct [2] Miller at that point?
[3] A: I didn't say I was.
[4] Q: And did you assist in the preparation [5] of Figure 4, Exhibit 3?
[6] A: Yes, I did.
[7] Q: Is this a document that has been [8] retained by you in the normal course of business?
[9] A: Yes, it has.
[10] Q: This is a document Geraghty & Miller [11] relies upon in its normal practice of business?
[12] A: Yes.
[13] Q: With regard to all the documents that [14] have been produced in this room today, sir, are [15] they business documents of Geraghty & Miller?
[16] A: Yes, they are business documents, field [17] notes, I suppose they are all considered business [18] products. Some of them are correspondence between [19] Esso's attorneys and Texaco's attorneys.
[20] Q: Does Geraghty Miller keep these [21] documents in the normal course of its business?
[22] A: Yes, we do.
[23] Q: And as project manager, are you [24] familiar with the continuation Tutu Water Wells? [25] At the meeting in Puerto Rico to discuss the

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[1] Danahy - direct [2] comments to Tech Memo 2, would you state the name [3] of everybody present at that meeting?
[4] A: The people who were attending that [5] meeting were Ana Gloria Ramos, Jose Agrelot, [6] Francis Torres, Scott McKay, and if Jose Agrelot [7] was not present, then for Soil Tech, Jose Cardona.
[8] Q: You say that Esso has started to [9] provide you certain deposition transcripts, are [10] they contained within this room?
[11] A: I believe they are. I don't know if [12] you are informed or not, but given the short [13] notice of our request to provide these documents [14] today, I was on vacation over the past week and [15] just returned this morning and only had an hour or [16] so to review all the documents here. To my [17] knowledge, they are complete.
[18] MS. ROSEN: In fairness to you, I [19] didn't see any depositions, and I know you didn't [20] have an opportunity to go through all the boxes [21] like I did yesterday.
[22] A: There might be one more bound document [23] which has a lot of information that was provided [24] by yourself on behalf of Four Winds Plaza, [25] supplemental information provided to the U.S.

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[1] Danahy - direct [2] E.P.A., included in that package was sent to me by [3] Goldman-Antonetti, included in that was [4] depositions from various people including former [5] Esso employees.
[6] Q: Prior to your receipt of the document [7] prepared by my office, commenting on Tech Memo 2, [8] did Esso provide you with any documentation as to [9] the previous uses of Esso Tutu Service Station [10] with regard to engine and parts degreasing?
[11] A: No, I don't recall any information of [12] that nature I was provided.
[13] Q: Did Esso provide you any documentation [14] with regard to the disposal of degreasing fluids [15] into any on-site storage receptacles of the Esso [16] Tutu Service Station?
[17] A: No, I don't recall any information of [18] that nature.
[19] Q: Did Esso ever provide you with any [20] documentation with regard to repairs to pipe lines [21] at the Esso Tutu Service Station?
[22] A: There is some information I was [23] provided regarding the historical leak testing of [24] one of the tanks at Esso, and the decision or [25] discussion of those results and the correspondence

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[1] Danahy - cross [2] to the U.S.E.P.A. I believe that we reviewed, and [3] I don't recall any other information regarding the [4] leak testing or piping replacement.
[5] Q: With regard to the copying of the [6] documents that you have brought here today, once [7] we get into an inspection of them, does Geraghty & [8] Miller use any outside copying service or has [9] there been any discussion as to the process of [10] copying?
[11] A: I guess I'll leave that up to Mary. We [12] discussed it briefly this morning that it really [13] would be up to you to determine how you would like [14] to

EXHIBIT 'Q'

Caroline

WESTON • SPER

Suite 201, 1090 King Georges Post Road,
Edison, NJ 08837 • (201) 225-6116

TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-01-7367

TAT-02-F-04398

MEMORANDUM

TO: Carlos O'Neill
U.S EPA Caribbean Field Office

FROM: Arnaldo Martinez, TAT II PM AM
Douglas Henney, TAT II QC DH

SUBJECT: St. Thomas, Tutu HSL + 40
Sampling Results

DATE: January 27, 1988

The following letter report is provided in accordance with TDD #02-8709-29.

The completed analysis report of the HSL+40 sampling of the Tutu well site was received on January 18, 1988. A copy of the laboratory report was delivered to the EPA PM on January 20, 1988.

Table #1 shows the concentration of contaminants found in each well. The major contaminants found are 1,2-transdichloroethylene (DCE), trichloroethylene (TCE), tetrachloroethylene (PCE) and tertbutyl methyl ether (TBME). TBME was not detected during previous samplings. Other compounds found in low or trace concentration are: 1,1,1-trichloroethane; benzoic acid; 4-methoxy-1,1-dimethyl ethyl phenol; 2-butoxyethyl phosphate; 1,2-dichlorobenzene; 2-ethyl-1-hexanol; N-2-dimethyl -1- propaneamine; chloroform; toluene; pentachlorphenol, methylene chloride and 2-methyl naphtalene.

A high concentration (120,000 ug/l) of methylene chloride was found in the Harvey's Well. Toluene was detected in low or trace concentrations in two wells (Byran's and Leonard's). Unlike previous samplings, benzene was not detected in any of the sampled wells.

EXHIBIT M

EP000062

TUT 006 0911

The following wells show no detectable concentration of any of the organic compounds tested: Rodriguez Auto, Devcon #1, Devcon #3, Dench, and Harthman Estate.

Table #2 shows the compounds and metals that are regulated under CERCLA, their reportable quantities (RQ) and their Drinking Water Standards Maximum Contaminant Level (MCL), if any.

Of the metals tested, arsenic, selenium and zinc were found in greater than trace concentrations. Arsenic was found only in the Harthman Crusher Well. Zinc concentrations ranged from nondetectable in Devcon #1 to 460 ug/l in Smith Well. Other metals found in detectable but not quantifiable concentrations are chromium, copper, thallium and antimony. The concentration of metals found in each well is listed in Table #1.

Cyanide was found in five wells. The concentrations ranged from detectable but not quantifiable (trace), to 58 ug/l in Eglin #1 well. The concentration of cyanide found in each well is listed in Table #1.

The HSL+40 sampling results confirm that the major pollutants in the Tutu well site are DCE, TCE and PCE. Seven wells show concentrations greater or equal to 100 ppb of one or more of these compounds.

A new major contaminant was found in this sampling. Six wells show a concentration greater or equal to 100 ppb of tertbutyl methyl ether.

Benzene was not detected in any of the samples taken for this analysis. Previous analysis with the photovac portable chromatograph and GCMS confirmation samples had shown concentrations greater than 1000 ppb in the Tillet Well. This was also found in the photovac samples for the month of November. Samples for photovac analyis taken concurrently with the HSL samples show a concentration of 46 ppb of benzene in the Tillet Well.

The cause of this discrepancy is unknown at present, TAT will review previous data to identify potential causes for this occrrence as well as discuss the analysis with the presently contracted laboratory.

TABLE 1
CONTAMINANT CONCENTRATIONS (ug/1) FOUND IN TUTU WELL SITE
October 1987

Bryan's Well

Toluene	Trace
Zinc	Trace

Tillet's Well

1,2-transdichloroethylene	600
Trichloroethylene	25
Tetrachloroethylene	140
Tertbutylmethyl ether	470
1,2-dichlorobenzene	Trace
Trichlorobenzene	Trace
2-methyl naphtalene	Trace
Chromium	Trace
Copper	Trace

Four Winds Plaza #1

1,2-transdichloroethylene	280
Trichloroethylene	18
Tetrachloroethylene	140
Tertbutylmethyl ether	470
Chromium	Trace
Copper	Trace
Zinc	51

Elgin #3

1,2-transdichloroethylene	78
Trichloroethylene	8.4
Tetrachloroethylene	40
Tertbutylmethyl ether	270 estimated
Chromium	Trace
Copper	Trace
Thallium	Trace
Zinc	98

Eglin #2

1,2-transdichloroethylene	57
Trichloroethylene	7.5
Tetrachloroethylene	21
Tertbutylmethyl ether	390 estimated
Copper	Trace
Zinc	200

TABLE 1
CONTAMINANT CONCENTRATIONS (ug/l) FOUND
IN TUTU WELL SITE
(Continued)

Eglin #1

1,2-transdichloroethylene	56	
Trichloroethylene	10	
Tetrachloroethylene	100	
Tertbutylmethyl ether	270	estimated
Copper	Trace	
Zinc	82	
Cyanide**	58	

Francois Well

1,2-transdichloroethylene	100	
Trichloroethylene	15	
Tetrachloroethylene	130	
Tertbutylmethyl ether	180	estimated
Chromium	Trace	
Zinc	Trace	
Cyanide	Trace	

VIHA #1

1,2-transdichloroethylene	4.9
1,1,1-trichloroethane	Trace
Trichloroethylene	Trace
Tetrachloroethyelne	Trace
Benzoic Acid	Trace
Copper	Trace
Zinc	Trace
Cyanide	23

VIHA #3

Methylene chloride	6.9	
Trichloroethylene	Trace	
Benzoic acid	Trace	
4-methoxy-1,1-dimethyl ethyl phenol	2.1	estimated
2-butoxy ethyl phosphate	3.1	estimated
Copper	Trace	
Selenium	Trace	
Zinc	Trace	
Cyanide	Trace	

TABLE 1
CONTAMINANT CONCENTRATIONS (ug/l) FOUND
IN TUTU WELL SITE
(Continued)

Demitri's Well

Tetrachloroethylene	Trace
Copper	20 estimated
Selenium	Trace
Zinc	40 estimated

Harthman Estate Well

Selenium	Trace
Zinc	Trace

Rodriguez Auto Well

Copper	Trace
Zinc	Trace

Ramsey Motors Well

1,2-transdichloroethylene	6.3
Trichloroethylene	Trace
Tetrachloroethylene	22
Antimony	Trace
Zinc	Trace
Cyanide	Trace

Steele's Well

1,2-transdichloroethylene	47
Trichloroethylene	15
Tetrachloroethylene	320
Tertbutylmethyl ether	37
1,2-dichlorobenzene	Trace
Chromium	Trace
Copper	Trace
Antimony	Trace
Zinc	Trace

Harvey's Well

Methylene chlorde	120,000
1,2-transdichloroethylene	49
Trichloroethylene	23
Tetrachloroethylene	2,000
Chromium	Trace
Copper	Trace
Zinc	340

TABLE 1
CONTAMINANT CONCENTRATIONS (ug/l) FOUND
IN TUTU WELL SITE
(Continued)

<u>Mathias</u>

Trichloroethylene	Trace	
Tetrachloroethylene	3.6	
2-ethyl-1-hexanol	4.7	estimated
N,2-dimethyl-1-propaneamine	32	estimated
Copper	Trace	
Selenium	5.6	
Zinc	Trace	

<u>Smith's Well</u>

1,2-transdichloroethylene	100	
Chloroform	Trace	
Trichloroethylene	21	
Tetrachloroethylene	150	
Tertbutylmethyl ether	34	estimated
Copper	7	
Selenium	3	
Zinc	460	

<u>Devcon #1 Well</u>

None detected

<u>Devcon #3 Well</u>

Chromium	Trace
Selenium	7.1
Zinc	Trace

<u>Alpha Leonard Well</u>

Tetrachloroethylene	Trace
Toluene	22
Selenium	8.5

<u>DeDe Well</u>

Pentachlorophenol	Trace
Copper	Trace
Zinc	Trace

TABLE 1
CONTAMINANT CONCENTRATIONS (ug/l) FOUND
IN TUTU WELL SITE
(Continued)

Harthman Crusher Well

1,2-transdichloroethylene	Trace
Trichloroethylene	Trace
Tetrachloroethylene	6.2
Arsenic	15
Zinc	Trace

Dench Well

Copper	Trace
Antimony	Trace
Thallium	12
Zinc	68

Harthman Bakery Well

1,2-transdichloroethylene	Trace
Trichloroethylene	Trace
Benzoic acid	Trace
Antimony	Trace
Zinc	Trace

NOTE: These results have been corrected for contaminants found in the field blanks and laboratory blanks.

TABLE 2
REGULATED COMPOUNDS

COMPOUND NAME	CERCLA REG.	RQ (Pds)	MCL (ug/l	RMCL (ug/l
1,2-transdichloroethylene	X	1,000		
Trichloroethylene	X	1,000		
Tetrachloroethylene	X	1		
Tertbutylmethyl ether				
1,1,1-trichloroethane	X	1,000	200	
Benzoic acid	X	5,000		
Methylene chloride	X	1,000		
4-metoxy-1,1-dimethyl ethyl phenol				
2-butoxy ethyl phosphate				
1,2-dichlorobenzene	X	100		
2,ethyl-1- hexanol				
N,2-dimethyl-1-propaneamine				
Chloroform	X	5,000	100 (total trihalomethane)	
Toluene	X	1,000		
Pentachlorophenol	X	10		
2-methyl naphtalene				
Chromium	X	1 (dusts)	50	
Copper	X	1 (dusts)		1,000
Zinc	X	1 (dusts)		
Cyanide	X	1 (dusts)		
Thallium	X	1 (dusts)		
Selenium	X	1 (dusts)	10	
Antimony	X	1 (dusts)		
Arsenic	X	1 (dusts)	50	

Ken Wenz

John

7/28/87 4:30 PM

preliminary - verbal results - Tutu wells, USVI

QA/QC to be performed after receipt of hard copy. These are verbally reported results. We will have TAT QA/QC them once hard copy received. Expect hard copy, week of August 3.

Note - Some benzene showed up in analysis of blank which was run after the high contamination sample. It is being re-run to see if this was residue from the run of the high contamination sample.

Based on verbal results, the closed Tillet well is definitely contaminated + decision to shut down is fully supported. The other wells sampled did not appear to have ~~benzene~~ gasoline contamination.

Tillet well had high non-gasoline (halogenated hydrocarbon) contamination as well - a surprising finding - and the other wells had lower level contamination, such as was found in a 1982 Geraghty + Miller report which included the housing authority well (which we believe is closed + which we used as a background check relative to the gasoline plume).

TUT 006 0919

EP000070

Tillet well:

benzene, 633 ppb from surface sample, 6,950 ppb when pumped
toluene, 452 ppb
xylene results pend

~~[illegible]~~ other: ethylbenzene 951 ppb
tetrachloroethylene 2,400 ppb
1,1,1,trichloroethane 58 ppb
trichloethylene 711 ppb

other wells:

ranged 7 ppb to 18.8 ppb trichloroethylene
3 ppb to ~~[illegible]~~ 102 ppb tetrachloroethylene

NJDEP Drinking Water certified Lab "California..

(X)

SUMMARY OF LABORATORY RESULTS FOR OIL AND WATER SAMPLES COLLECTED FROM TANKS, STORM DRAINS AND SUMPS AT GASOLINE STATIONS AND AUTO BODY SHOPS IN TUTU, ST. THOMAS, U.S. VIRGIN ISLANDS ON AUGUST 17, 1987

Personnel from the Region II Technical Assistance Team (TAT) and the St. Thomas Department of Planning and Natural Resources (DPNR) collected eleven oil and water samples on August 17, 1987, from various storage tanks, storm drains and sumps at gasoline stations and auto body shops in Tutu, St. Thomas, as directed by TDD Numbers 02-8708-16 and 02-8708-32. Table I provides descriptions of all samples.

The Tutu oil samples were taken from waste oil storage tanks, sumps and storm drains. Sample numbers one through eleven were analyzed for polychlorinated biphenyls (PCBs) and numbers twelve through twenty-two were analyzed for volatile organic compounds (VOCs). Split samples were provided for Tutu Texaco and Tutu Esso.

VOC analysis was performed in an attempt to match the VOCs found in the contaminated Tutu Wells with those found in these samples. Note that sample numbers one through eleven correspond to sample numbers twelve through twenty-two.

The samples were shipped on August 26, 1987 to S-Cubed Laboratories in San Diego, California. The samples were detained in customs and not received by the laboratory until September 15, 1987. The sample analysis was conducted through the Contract Laboratory Program (CLP).

The CLP designated holding times for VOCs were exceeded, and the samples were warm upon arrival at the laboratory. The PCB samples, however, do not require preservation and did not exceed their designated holding times. The PCB data meets the EPA quality assurance/quality control (QA/QC) requirements and is acceptable. The results indicate that all samples analyzed for PCBs were below the method detection limits of 80 and 160 ug/kg.

Table II illustrates the volatile organic compounds (VOCs) identified in the samples. Some samples show very high levels of VOCs typical for samples collected from gasoline stations and auto body shops. In addition to those compounds found in Table II, several unknowns were detected as tentatively identified compounds.

Attachments

DRAFT

TABLE I

Sample Number	Description
3239B-1	Bay #1 sump, Tutu Texaco
3239B-2	Bay #2 sump, Tutu Texaco
3239B-3	Bay #3 sump, Tutu Texaco
3239B-4	Oil and water separator, Tutu Texaco
3239B-5	Waste oil tank, Tutu Texaco
3239B-6	Storm drain, Tutu Texaco
3239B-7	Gutter, Consolidated Auto Parts
3239B-8	Storm drain, Consolidated Auto Parts
3239B-9	Waste oil storage tank, Ramsey Motor
3239B-10	Virgin Islands Housing Authority (VIHA) waste oil Underground Storage Tank (UST)
3239B-11	Oil and water separator, Tutu Esso
3239B-12	Bay #1 sump, Tutu Texaco
3239B-13	Bay #2 sump, Tutu Texaco
3239B-14	Bay #3 sump, Tutu Texaco
3239B-15	Oil and water separator, Tutu Texaco
3239B-16	Waste oil tank, Tutu Texaco
3239B-17	Storm drain, Tutu Texaco
3239B-18	Gutter, Consolidated Auto Parts
3239B-19	Storm drain Consolidated Auto Parts
3239B-20	Waste oil storage tank, Ramsey Motor
3239B-21	VIHA waste oil UST
3239B-22	Oil and water separator, Tutu Esso

DRAFT

EXHIBIT 'R'

CDM Federal Programs Corporation

March 6, 1989

Ms. Caroline Kvan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Project: EPA Contract No. 68-01-7331
Document No: T648-C02-EP-CZUU-1

Subject: CLP Sample Analysis Data Summary
Case No. 3900 I Ser 25
Tutu Wellfield Area
Work Assignment 648

Dear Ms. Kvan:

Enclosed please find the summary CLP analyses results for samples taken in the Tutu Wellfield Area, St. Thomas, U.S. Virgin Islands on September 12 and 15, 1988. The samples were analyzed by Cenref Labs Brighton, Colorado. The identification and location of the three samples are given below:

Sample #	Sample Location
eT-62	Tutu Texaco Service Station - oil/water separator
eE-63	Tutu Esso Service Station - holding tank
eE-64	Tutu Esso Service Station - oil/water separator

We have taken the liberty to limit the list of compounds to include benzenes, substituted benzenes, dichloroethane, dichloroethene, trichloroethane, trichloroethene, tetrachloroethane, tetrachloroethene compounds, toluene, xylene and any other compounds found above detection limits. These compounds (BTEX and chlorinated hydrocarbons) were identified as groundwater contaminants in past EPA sampling events conducted in the Tutu Wellfield Area. Alkanes and related compounds were not included.

It can be seen from the results that toluene, ethylbenzene and xylene were found in all three samples. A number of benzene-containing volatile and extractable compounds were tentatively identified in all three samples. Sample eE-64 from the Esso oil/water separator also contained detectable levels of methylene chloride, 2-butanone, 1,1,1-trichloroethane, tetrachloroethene and benzene. Copies of the laboratory analysis data sheets for the three samples are attached.

EXHIBIT O

TUT 006 0924

CD000383

All three of these sampling locations will be resampled later this month due to a break in the chain-of-custody during the original sample shipment.

Should you have any questions regarding these data, please do not hesitate to call me at (212) 393-9634.

Sincerely,

CDM Federal Programs Corporation

Scott Graber

Scott Graber
TES III Regional Manager

SG/rw

Attachment

cc: P. Fischetti
J. Claypoole
NYC File
Document Control

(WP8/47)NY-GMO

LAB ANALYSIS DATA SHEETS

CENREF LABS

SAS No. 39001, Set 25

VOLATILE ORGANIC COMPOUNDS (mg/kg)

Compound:	eT-62	eE-63	eT-64
methylene chloride	25u	250u	57
1,1-dichloroethene	25u	250u	25u
1,1-dichlorethane	25u	250u	25u
1,2-dichloroethene (total)	25u	250u	25u
1,2-dichloroethane	25u	250u	25u
2-butanone	50u	500u	62
1,1,1-trichloroethane	25u	250u	100
trichloroethene	25u	250u	25u
1,1,2-trichloroethane	25u	250u	25u
tetrachloroethene	25u	250u	65
1,1,2,2-tetrachloroethane	25u	250u	25u
benzene	25u	250u	29
toluene	140	1800	2900*
ethylbenzene	400	230	4500*
xylene (total)	160	1600	1900*

Tentatively identified compounds:

propyl benzene	-	1200J	890J
ethyl methyl benzene	860J	6000J	1600J
C3 substituted benzene	-	2200J	-
C3 substituted benzene	-	1800J	-
trimethyl benzene	370J	8000J	1000J
ethyl methyl benzene	-	1700J	940J
trimethyl benzene	1300J	-	1900J
trimethyl benzene	390J	-	1000J
methyl propyl benzene	470J	1400J	1000J
methyl methyl ethyl benzene	550J	-	1100J
C4 substituted benzene	280J	2000J	760J
C4 substituted benzene	-	1200J	-
C4 substituted benezene	-	950J	-
ethyl dimethyl benzene	440J	-	-
tetramethyl benzene	-	-	680J
ethyl methyl benzene	-	-	940J
tetramethyl benzene	400J	-	-

u - below the detection limit
J - estimated value
* - value from analysis of a diluted aliquot of this sample

PM/52

EXTRACTABLE ORGANIC COMPOUNDS (mg/kg)

Tentatively identified compounds:	eT-62	eE-63	eT-64
C4 substituted benzene	220J	930J	1400J
C4 substituted benzene	-	620J	-
ethyl dimethyl benzene	-	690J	780J
1-methyl-3-(1-methyl ethyl)-benzene	-	720J	1600J
tetramethyl benzene	-	540J	360J
tetramethyl benzene	-	710J	410J
methyl-propyl benzene	-	-	720J
dihydro-methyl benzene	260J	-	-
dimethyl-(methyl ethyl)-benzene	260J	-	-
methyl naphthalene	-	990J	-
substituted methyl naphthalene	390J	-	290J
dimethyl naphthalene	250J	-	-
dihydro-methyl-indene	-	690J	490J
dihydro-dimethyl-indene	-	-	270J

J - estimated concentration

EXHIBIT 'S'

FINAL REPORT
FINAL CLP SAMPLE ANALYSIS DATA SUMMARY OF SOILS AND WATERS SAMPLED IN 1989
TUTU WELLFIELD
ST. THOMAS, U.S. VIRGIN ISLANDS

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, D.C. 20460

EPA Work Assignment No.	: C02048
EPA Region	: II
Site No.	: 2P1D
Contract No.	: 68-W9-0002
CDM Federal Programs Corporation Document No.	: TES5-C02048-FR-BQYF
Prepared By	: CDM Federal Programs Corporation
Work Assignment Project Manager	: Scott Graber
Telephone Number	: (212) 393-9634
Primary Contact	: Caroline Kwan
Telephone Number	: (212) 264-0151
Date Prepared	: May 31, 1990

(TV 25/41)

(Master 11)

TUT 006 0930

May 31, 1990

Ms. Caroline Kwan
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Project: EPA Contract No: 68-W9-0002

Work Assignment: C02048 - Tutu Well Field

Document No: TES5-C02048-EP-BQTV

Subject: Final CLP Sample Analysis Data Summary of Soils and Waters Sampled in 1989 from the Tutu Texaco Soil Pile, Tutu Esso Excavation Pit and Soil Pile, and 104(e) Letter Response Sites (Second Round), Tutu Well Field, St. Thomas, U.S. Virgin Islands

Dear Ms. Kwan,

This letter is to inform you that final data validation of samples collected from the Tutu Well Field, St. Thomas, U.S. Virgin Islands, in June 1989 has been completed by EPA'S Monitoring and Management Branch (MME MMB requested several changes in our validation of data sets 12058 (org :cs) and 4512B (TPH). FPC has addressed those problems and the changes have been incorporated into the enclosed tables, which constitute the "official" data analyses from the site. Only one of the validation changes affects a numeric value: Total Petroleum Hydrocarbons (TPH) in sample ESP-02 (CLP #4512B-74) from the Esso Soil Pile changed from 139 ug/g to 213 ug/g.

The tables included with this report contain all 1989 data for the Tutu Well Field site, including volatile compound analyses from oils (case 4512b) from 104(e) Letter Response sites, which were summarized in a letter report dated January 29, 1990. The conclusions presented in FPC's preliminary summary of "unvalidated" analyses (Letter Report of April 27, 1990) are unchanged.

For your convenience, relevant parts of the April 27 report are reproduced below. We have omitted discussion of the Supercat Area and copies of 1988 Data Analysis Summary Reports to EPA. A report addressing the Supercat Area will be sent you under a separate document number.

The samples analyzed were collected the week of June 5-10, 1989, and consist of:

Case 12058 - soils and aqueous samples - volatile organics (VOAs),

extractables (semi-VOAs - base/neutral/acids, pesticides, and pcbs)
Case 4512b - soils and aqueous samples - total petroleum hydrocarbons (TPH)
Case 4512b - oils - Volatile organics (VOAs)
Case 4658b - soils and aqueous samples - EP toxicity

Splits of PRP samples were accepted by FPC during the following oversight activities:

Texaco soil pile sampling (following soil pile ventilation)
Esso tank excavation (from pit following tank removal activities)
Esso soil pile sampling (prior to ventilation).

The 104(e) Letter Response site sampling represents a second investigation. These, and additional sites, were originally sampled in the summer of 1988. In 1989, FPC collected 104(e) Letter Response site samples from:

Texaco Tutu Station
Esso Tutu Car Care Station
O'Henry Dry Cleaners
Department of Education Building (formerly LAGA)
Ramsay Motor Company
Consolidated Auto Parts (now Gassett Motors)

A master table of locations of split samples accepted by FPC during field oversight activities is included with the data tables. It lists the PRP field number, FPC field numbers, CLP sample numbers and analyses performed.

The data tables list only analytes found above detection limits. We have included data qualified as estimated (J), tentatively identified (NJ), e. mated and found in blanks (BJ). Analytes qualified as below d ection limits (U) or estimated below detection limits (UJ) were not included. Values that were rejected during the validation process due to problems with laboratory instrument calibration are listed as rejected (R) with no value. Analyses from field blanks and trip blanks are presented with the data from each site to indicate which analytes may have been introduced by sampling or laboratory contamination.

Brief summaries of the analytical results from each site are presented below.

Texaco Soil Pile - Splits from the ventilated soils awaiting disposal at the Texaco site are relatively clean. VOAs were collected from the top, middle and bottom of the pile at each location. All other analyses were performed on homogenized (top/middle/bottom) samples. The main VOA found was methylene chloride, which was also found in a lab blank. Sample SP2-022 from the middle of Texaco's location SP-3 contained chlorinated hydrocarbons and xylenes. Tentatively identified hydrocarbons were also found in semivolatile analyses from this location. No pesticides or PCBs were detected. TPH at the three locations split with FPC ranged from <10 ug/g (ppm) to 91 ug/g. The only metals detected by EP Toxicity analysis were cadmium and lead. Cadmium ranged from .35 to 2.8 ug/l; lead ranged from 1.8 to 31 ug/l.

Esso Excavation Pit - FPC accepted splits from 7 of the 13 locations sampled by Esso. Of the VOAs detected, xylene and ethylbenzene were the most common, being present in all but one sample. Benzene was detected in four samples, toluene in two. The highest concentrations - 311,000 ug/kg (ppb) - of benzene, toluene, ethylbenzene, and xylene (BTEX) were found in sample TE-X-03. Various benzenes were tentatively identified in most samples. No chlorinated hydrocarbons were identified except 8 ug/kg (ppb) chlorobenzene in sample TE-X-05. Semivolatiles detected included naphthaline, methylnapthalenes, fluorene, phenathrene, bis(2-ethylhexyl)phthalate, and benzene isomers, most of which were found in five of the samples. No pesticides or PCBs were detected. TPH in the pit soils ranged from <10 to 69 ug/g (ppm) in all but location TE-X-03, which contained 2550 ug/g. Barium, cadmium and lead were detected in almost all the samples.

Esso Soil Pile - FPC accepted splits from 3 of 7 locations. VOAs were collected from the top, middle and bottom of the pile at each location. All other analyses were performed on homogenized (top/middle/bottom) samples. Contaminants found were similar to those found in the excavation pit. High values for xylenes and ethylbenzene were found in all but one sample. Toluene was detected in two samples. Tentatively identified compounds in all samples include abundant hydrocarbons and benzenes. Semivolatiles detected in all samples include naphthalene, methylnaphthalenes, fluorene, phenathrene, bis(2-ethylhexyl)phthlate, and benzene isomers. No pesticides or PCBs were detected. TPH ranged from 48 to 139 ug/g (ppm). Barium, cadmium, and lead were detected in all samples and arsenic was detected in one.

O'Henry Dry Cleaners - Three samples were collected at the site. Chlorinated hydrocarbons were the prinipal VOAs found. Sample eO2-02 contained the highest values (20 ug/kg [ppb] 1,2-dichloroethene, 75 ug/kg trichloroethene and 180,000 ug/kg tetrachloroethene). Semivolatiles detected include phenol, heptadecane and bis(2-ethylhexyl)phthalate. No pesticides or PCBs were found. TPH ranged from 38 ug/g (ppm) to 302 ug/g. Cadmium was the only metal detected; it was present in amounts less than 1 ug/l.

Department of Education (LAGA) - Five (4 soil and 1 water) samples were collected. Toluene, ethylbenzene and xylenes were detected in sample eL-02-01S. Xylenes were also detected in eL-02-02S. Heptanes were tentatively identified in the water sample. Most of the semivolatiles found were also in sample eL-02-01S. They include phenol, methylphenols, naphthalene, methylnaphthalenes and other hydrocarbons. The only pesticide detected was Endosulfan I, also in sample eL-02-01S. TPH ranged from 544 to 3470 ug/g (ppm). Cadmium and lead were detected in all samples.

Ramsay Motor Company - One soil sample was collected. Meythylene chloride, xylenes and tentatively identified benzenes were detected in the VOA analysis. Semivolatiles detected included naphthalene, methylnaphthalene, fluorene, fluoranthene, pyrene, and benzofluoranthenes. No pesticides or PCBs were found. TPH was 23,400 ug/g (ppm). Cadmium and lead were detected at 6.1 and 15 ug/l, respectively.

One oil sample was collected at Ramsay. BTEX compounds were identified as was 2-hexanone. Propylbenzene, 2-methylbutane, 2,3-dimethylbutane, and methyl-cyclopentane were tentatively identified.

Consolidated Auto Parts - One oil sample was collected. The lab mistakenly analyzed the sample as a water and consequently, most of the values were rejected.

Texaco Station - Seven oil samples were collected from the oil/water separator, the middle bay colletion pit, and various storage drums. One sample (eT-02-03a) was mistakenly analyzed as water and consequently most values for it were rejected. BTEX compounds were the main oil constituents in the remaining samples. Chlorinated hydrocarbons (3900 ppb 1,1,1-trichloroethane) were found in one oil from a storage drum.

Esso Station - Two oil samples and one duplicate were collected. BTEX compounds were prevalent, but all three samples also contained chlorinated hydrocarbons (tetrachloroethene and 1,1,1-trichloroethane). Trimethylbenzenes, 3-methylpentane, and 2-cethoxy-2-propane were tentatively identified in sample eE-02-01a.

FPC has now received validated data for all Tutu samples collected to date. This report completes our data summary requirements for 1989 sampling activities for the Tutu Well Field site. If you have any comments or questions regarding this data, please contact Sally Odland or me at (212) 393-9634.

Sincerely,

CDM Federal Programs Corporation

Sally Odland for

Scott B. Graber
TES V Regional Manager

SG/sko

EXHIBIT 'T'

SOIL TECH

SUBSOIL EXPLORATION • ENVIRONMENTAL • CONSTRUCTION MATERIAL'S LABORATORY

MEMORANDUM
PRIVILEDGED AND CONFIDENTIAL

TO	:	Goldman & Antonetti Lic. José L. Cepeda
FROM	:	Engr. José C. Agrelot Soil Tech
PROJECT	:	Esso Tutu Car Care Center Soil Sampling (Job No. ~~89579~~)
DATE	:	January 23, 1990

Enclosed is a summary of the preliminary chemical results received to this date, through the Fax, from ETC Laboratory. Figure No. 1 shows the location of the boreholes conducted at site. Boreholes were numbered from B-101 through B-109. Depth of investigation range from ground surface to 12.0 feet deep.

The chemical results indicated the presence of BTEX concentrations (not total BTEX) at the following boreholes:

Table "A"
BTEX Summary

Borehole No.-Sample	Depth (feet)	Concentration range (PPB)
101-3	8 - 10	25 - 110
-4	10 - 12	300 - 1,300
102-2	4 - 6	50 - 60
-3	8 - 10	400 - 1,200
-4	10 - 12	500 - 1,100
103-4	7 - 7.5	5 - 30
Holding Tank	NA	45,000 - 250,000

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AMUR STREET CORNER DUINA. REPARTO LANDRAU, RIO PIEDRAS, P.R. 00927

The only samples disclosing the presence of chlorinated hydrocarbons (PCE) were the following:

Table "B"
PCE Summary

Borehole No.	Depth (feet)	Concentration (PPB)
103-1	0 - 1	394.3
103-2	2 - 2.5	85.1
109-3	8 - 9.5	10.46
Holding Tank	NA	477,330

NA = not available

Based on the above results, the following summary of finding is presented:

1. BTEX concentrations, found in the soil samples, range from 5 to 1,300 PPB which are not considered significantly high for a service station. EPA has accepted for soil excavated from this site, a total soil BTEX limit of 10 PPM or 10,000 PPB.
2. Soil samples corresponding to borehole B-103 show PCE concentrations (80 - 400 PPB) in the uppermost 2.5 feet. This borehole was drilled adjacent to the oil/grease separator.
3. The soil sample, collected in borehole B-109 at a depth of 8 - 9.5 feet measured from existing grade, indicated very low PCE concentrations (10.5 PPB). This sample was obtained very close to the water table.

4. The liquid sample collected from the holding tank, disclosed very high concentrations of PCE (greater than 400 PPM) and BTEX (45 - 250 PPM).

5. It was reported, by the service station Manager, that the oil and grease separator has no discharge connections. The liquid in the oil and grease trap is pumped to a holding tank located in the rear of the office building (see Figure No. 1). Periodically, the holding tank is emptied by pumping the liquid into the bathroom toilet.

The final report with on-site QA/QC procedures and field sampling description will be submitted as soon as ETC final reports are received. We expect to receive these reports by next week.

If any other information is necessary, please contact the undersigned at your convenience.

Truly yours,

José C. Agrelot, MSCE, P.E.
Consulting Engineer

JCA/lvl/89579B

SOIL TECH

Table No. 1
Chemical Results Summary (ug/Kg)
Job No. 89579

Sample No.	Depth (feet)	Bzn. PPB	Tol PPB	E. Bzn. PPB	M Xyl. PPB	OP Xyl PPB	DCE PPB	TCE PPB	PCE PPB
101-1	0 - 1.5	ND	ND	ND	ND	ND	ND	ND	ND
-2	4 - 4.75	ND	ND	ND	ND	ND	ND	ND	ND
-3	8 - 10	ND	27.8	ND	59.6	108.3	ND	ND	ND
-4	10 - 12	ND	548.3	303.5	1,008.5	1,286.4	ND	ND	ND
102-1	0 - 1.5	ND	ND	ND	ND	ND	ND	ND	ND
-2	4 - 6	ND	ND	58.2	ND	ND	ND	ND	ND
-3	8 - 10	ND	ND	1,116.9	425.6	714.9	ND	ND	ND
-4	10 - 12	625	ND	1,037	575	NA	ND	ND	ND
103-1	0 - 1	ND	ND	ND	ND	ND	ND	ND	394.3
-2	2 - 2.5	ND	ND	ND	ND	ND	ND	ND	85.1
-3	4.5 - 5.0	ND	ND	ND	ND	ND	ND	ND	ND
-4	7 - 7.5	5.5	ND	25.9	ND	6.1	ND	ND	ND
104	-	Not drilled a thick concrete slab found.							
105-1	0 - 1.5	ND	ND	ND	ND	ND	ND	ND	ND
106-1	0.5 - 1.0	ND	ND	ND	ND	ND	ND	ND	ND
-2	2.5 - 3.0	ND	ND	ND	ND	ND	ND	ND	ND
-3	4 - 4.25	ND	ND	ND	ND	ND	ND	ND	ND
107-1	0 - 1.5	ND	ND	ND	ND	ND	ND	ND	ND
-2	4 - 5.5	ND	ND	ND	ND	ND	ND	ND	ND
108-1	0 - 1.5	ND	ND	ND	ND	ND	ND	ND	ND
-2	4 - 6	ND	ND	ND	ND	ND	ND	ND	ND
-3	7.5 - 8.5	ND	ND	ND	ND	ND	ND	ND	ND
109-1	0 - 2	ND	ND	ND	ND	ND	ND	ND	ND
-2	4 - 6	ND	ND	ND	ND	ND	ND	ND	ND
-3	8 - 9.5	ND	ND	ND	ND	ND	ND	ND	10.46

SOIL TECH

Table No. 1
Chemical Results Summary (ug/Kg)
Job No. 89579
-2-

Sample No.	Depth (feet)	Bzn. PPB	Tol PPB	E. Bzn. PPB	M Xyl. PPB	OP Xyl PPB	DCE PPB	TCE PPB	PCE PPB
FB-1	0 - 1.5	ND	ND	ND	ND	ND	ND	ND	ND
TB	GA-5311	2.23	2.39	ND	ND	ND	ND	ND	ND
W-1		Results not received.							
FB-2		ND	ND	ND	ND	ND	ND	ND	ND
W-2		ND	0.752	ND	ND	ND	ND	ND	ND
TB	GA-5312	0.72	ND	ND	ND	ND	ND	ND	ND
W-3		ND	0.86	ND	ND	ND	ND	ND	ND
FB-3		ND	ND	ND	ND	ND	ND	ND	ND
HT		ND	245,090	45,310	181,280	ND	ND	ND	477,330
TB	GA-5314	ND	ND	ND	ND	ND	ND	ND	ND
TB	GA-5308	ND	ND	ND	ND	ND	ND	ND	ND

FB = Field Blank
TB = Trip Blank
W = Water Sample
HT = Holding Tank
ND = Non- Detectable
NA = Not Available

SOIL TECH

MEMORANDUM
PRIVILEDGED AND CONFIDENTIAL
JOB NO. 89579

Esso Tutu Car Care Center
Soil Sampling

GOLDMAN & ANTONETTI

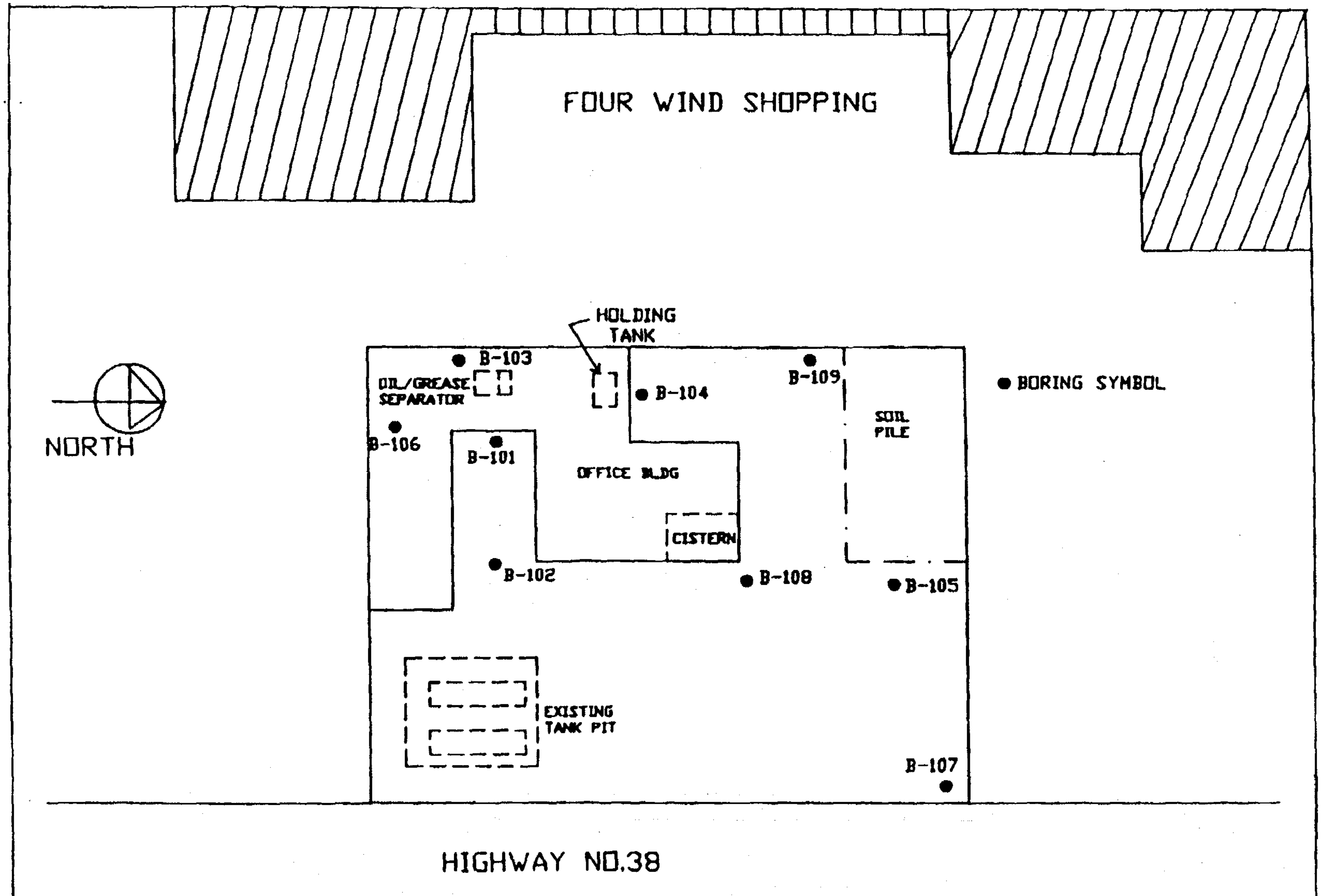
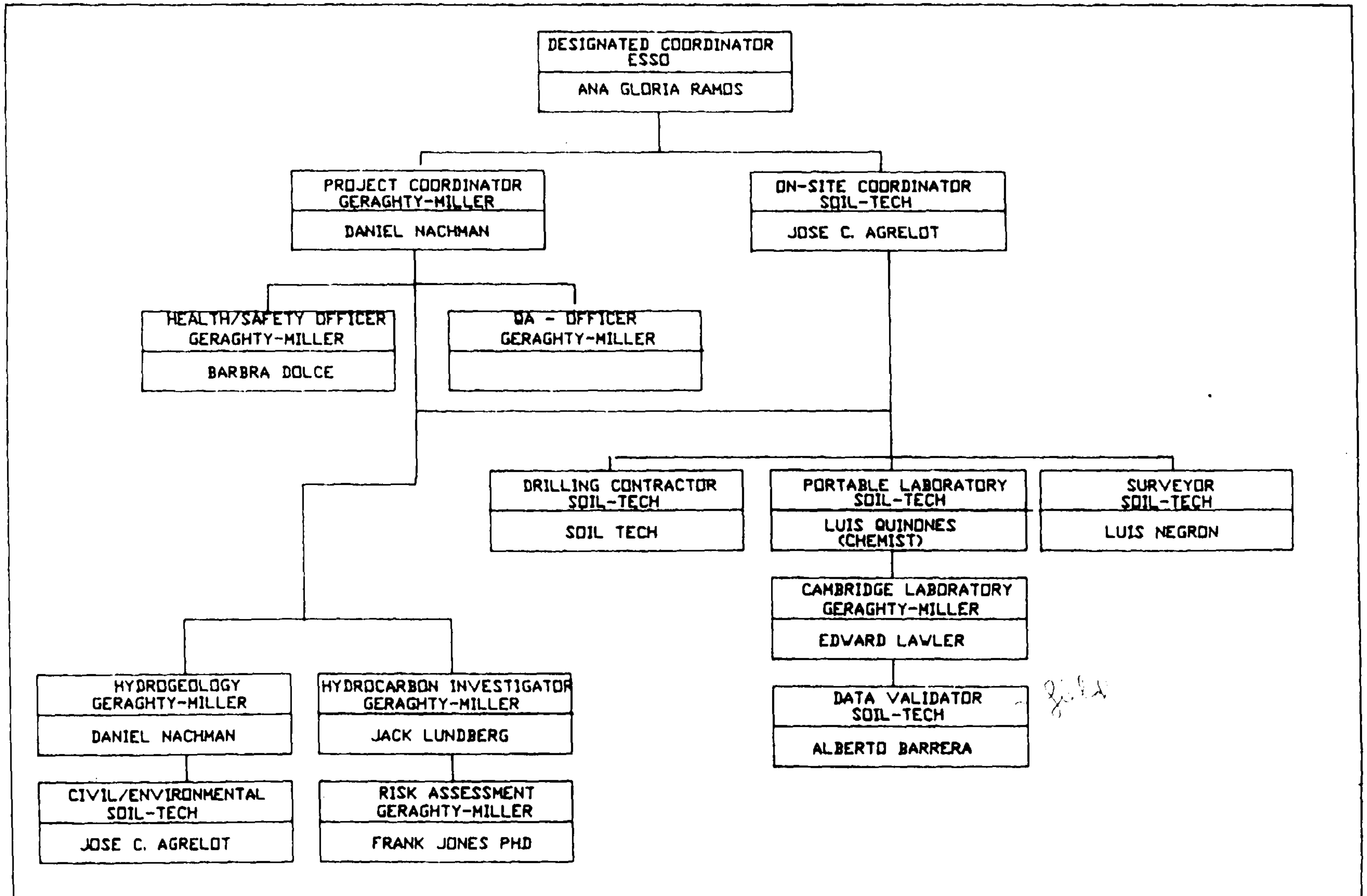


FIGURE NO.1	SAMPLING POINTS	SOILTECH
JOB # 89579		

TUT 006 0942

EXHIBIT 'U'



PROJECT ORGANIZATIONAL CHART

A03970

EXHIBIT 'V'

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	11	416	A00743	600	106240			

ROUTING VIA	SALESMAN NAME	SALESMAN ORDER NO	ORDERED BY	F.O.B.	CUSTOMER ORDER NUMBER	SALESMAN ORDER DATE
DOLPHIN	BENJAMIN			PP		7/21/83

PRODUCT NUMBER	QUANTITY ORDERED	QUANTITY SHIPPED	UNIT OF ISSUE DESCRIPTION	ITEM DESCRIPTION	PRICE PER MEAS[illegible]
	5	5	50# BAG	A P ABSORBENT	
	3	~~3~~ 2	150# BBL	WASHKLEEN XXXX	
	1	1	X 6-GAL. CAN	SUPER KLEENAKARB	
	1	1	EACH	7-GAL. DIPPING BASKET	

$404 48

EXHIBIT N

ATLANTA INVOICE NO.	OPER INT.

PRICE OK

CREDIT OK

PACKING SLIP

TUT 006 0946

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A DIVISION OF NATIONAL SERVICE INDUSTRIES, INC.

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☐ P.O. 58265, LOS ANGELES, CALIFORNIA 90058
☐ 2700 McCONE AVE., HAYWARD, CALIFORNIA 9454
☐ P.O. BOX 1016, LOUISVILLE, KENTUCKY 40201
☐ P.O. BOX 97, HIALEAH, FLORIDA 33011
☐ P.O. BOX 29149, NEW ORLEANS, LOUISIANA 70129
☐ P.O. BOX 1882, CAROLINA, PUERTO RICO 00630

BILL TO
COMPANY NAME: Tutu Esso
STREET ADDRESS: Tutu
CITY: St Thomas STATE: V.I. ZIP CODE:

ORDER DATE: 9/21/83
REQUESTED SHIPPING DATE:
F.O.B. SHIPPING POINT:
SHIPPING VIA:
TERMS: NET 30 DAYS
CUSTOMER ORDER NO:
BUYER'S SIGNATURE AND TITLE:

BRANCH USE ONLY
ACTV CODE | BRANCH CODE | CUSTOMER NO. | CUSTOMER MAINTENANCE
SALESMAN CODE & NAME: 6 ON Antone Dey
SPECIAL INSTRUCTIONS:
BRANCH USE ONLY

SHIP TO
COMPANY NAME:
STREET ADDRESS:
CITY: STATE: ZIP CODE:
ATTENTION OF
BILL TO SAME AS SHIP TO: UNLESS OTHERWISE INDICATED

PRODUCT NUMBER	QUANTITY ORDERED	UNIT OF ISSUE CONTENT	UNIT OF ISSUE DESCRIPTION	PRODUCT DESCRIPTION	PRICE PER MEASURE
	5	Bags		A.P. Absorbent	20.25
	3	150#	Cnt	Washklean XXXX	84.25
	1	7 gal	Can	Super Kleenahunt	16.85
	1	Only		Dipping Basket	N/C

THIS ORDER IS PAYABLE UPON FINAL ACCEPTANCE BY THE SELIG CHEMICAL INDUSTRIES AND REPRESENTS THE ENTIRE AGREEMENT BETWEEN THE PARTIES HERETO

RETURNS ALLOWED ONLY UPON WRITTEN AUTHORIZATION BY SELIG CHEMICAL INDUSTRIES. SUBSEQUENT INVOICE INCORPORATED HEREIN BY REFERENCE

TUT 006 0947

MATERIAL SAFETY DATA SHEET

SELIG

MICAL INDUSTRIES
VISION OF
NATIONAL SERVICE INDUSTRIES

DATE 01/17/89 SUPER KLEENAKARB
SUPERSEDES 06/27/88 PRODUCT NUMBER

SECTION I - E M E R G E N C Y C O N T A C T S

SELIG CHEMICAL INDUSTRIES LOCAL POISON CONTROL CENTER TELEPHONE
840 SELIG DRIVE, S W
ATLANTA GA 30378 TRANSPORTATION EMERGENCY
TELEPHONE (404)691-9220 CHEMTREC TOLL-FREE 1-800-424-9300 ALL CALLS RECORDED
BETWEEN 8 00A M - 5 00P M DISTRICT OF COLUMBIA (202)483-7616 ALL CALLS RECORDED
(EASTERN TIME ZONE)

SECTION II - H A Z A R D O U S I N G R E D I E N T S CAS

@ 1	CRESYLIC ACID	1319-77-3	-25
@ 2	METHYLENE CHLORIDE	75-09-2	45-55
@ 3	SODIUM DICHROMATE	10588-01	
@ 4	1,1,1 TRICHLOROETHANE	71-55-6	
5			
6			
7			
8			

@ IDENTIFIES CHEMICALS LISTED UNDER SARA SECTION 313 FOR RELEASE REPORTING

SECTION III - P H Y S I C A L D A T A

BOILING POINT (F) 104 SPECIFIC GRAVITY
VAPOR PRESSURE(MMHG) UNK PERCENT VOLATILE BY VOLUME (%)
VAPOR DENSITY(AIR=1) UNK EVAPORATION RATE(NA =1)
SOLUBILITY IN WATER EMULSIFIES PH(CONCENTRATE) NA
PH(USE DILUTION OF NA
APPEARANCE AND ODOR YELLOW-BROWN COLOR, BIPHASE LIQUID, ODOR OF CRESOL

SECTION IV - F I R E A N D E X P L O S I O N D A T A

FLASH POINT(F)(METHOD USED) NONE (NA
FLAMMABLE LIMITS LEL UNK UEL UNK
EXTINGUISHING MEDIA NA
SPECIAL FIRE FIGHTING NA
UNUSUAL FIRE HAZARDS NA

SECTION V - H E A L T H H A Z A R D D A T A

SYMPTOMS

SKIN CORROSIVE TO SKIN
EYES CORROSIVE TO EYES
INHALE CAN CAUSE DIZZINESS, NAUSEA AND HEADACHE
INGEST CORROSIVE TO THROAT AND STOMACH

TUT 006 0948

FIRST AID

SKIN WASH IMMEDIATELY WITH SOAP AND WATER. TREAT FOR CARBOLIC ACID BURNS
EYES FLUSH IMMEDIATELY WITH PLENTY OF WATER FOR 15 MINUTES. CONSULT PHYSICIAN
INHALE MOVE TO FRESH AIR. ADMINISTER OXYGEN IF NEEDED. CALL DOCTOR
INGEST RINSE MOUTH AND GIVE PLENTY OF WATER FOLLOWED BY MILK AND WHITE OF EGGS
DO NOT INDUCE VOMITING. IMMEDIATELY SEEK MEDICAL ATTENTION

MATERIAL SAFETY DATA SHEET

SELIG

CHEMICAL INDUSTRIES
DIVISION OF
NATIONAL SERVICE INDUSTRIES

DATE 01/17/89
SUPERSEDES 08/27/88 PRODUCT NUMBER

SECTION VI - R E A C T I V I T Y D A T A

STABILITY STABLE
INCOMPATIBILITY(AVOID) CATIONIC MATERIAL
POLYMERIZATION WILL NOT OCCUR
HAZARDOUS DECOMPOSITION
THERMAL DECOMPOSITION MAY YIELD PHOSGENE, CHLORINE, HCL AND CO

SECTION VII - S P I L L AND D I S P O S A L

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
ABSORB ON AN ABSORBANT SUCH AS SELIG ... ABSORBANT AND ... IN ... DRUM FOR DISPOSAL. OPEN DOORS AND WINDOWS TO IMPROVE VENTILATION. WASH ... AREA WITH SOAP AND WATER

WASTE DISPOSAL METHOD
... PRODUCT MAY HAVE TO BE ABSORBED ... INERT ... AND DISPOSE OF AS HAZARDOUS WASTE ... CONSULT C.F.R. TITLE 40, PART 2... FOR POSSIBLE ... FEDERAL AGENCIES FOR PROPER DISPOSAL PROCEDURES IN YOUR AREA.

FEDERAL HAZARDOUS WASTE NUMBER(S ... F004, D00...

SECTION VIII - S P E C I A L P R O T E C T I O N

RESPIRATORY PROTECTION CHEMICAL CARTRIDGE RESPIRATOR IF IN AN UNVENTILATED AREA
VENTILATION LOCAL-BEST
PROTECTIVE CLOTHING RUBBER OR NEOPRENE GLOVES
EYE PROTECTION SAFETY GOGGLES, FULL FACE SHIELD

SECTION IX - S P E C I A L P R E C A U T I O N S

KEEP OUT OF REACH OF CHILDREN. HARMFUL IF SWALLOWED
AVOID CONTACT WITH SKIN AND EYES

TUT 006 0949

EXHIBIT 'W'

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

IN RE: TUTU WATER WELLS CONTAMINATION LITIGATION	CIVIL NO: 89-107

FACT FINDING CONFERENCE
[December 9 & 10, 1993]
December 9, 1993

BEFORE: THE HONORABLE STANLEY S. BROTMAN
Sitting by Designation, Presiding

APPEARANCES:

For the Plaintiffs:

Attorneys for PID-Harthmans
Richard R. Knoepfel, Esq.
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DOLORES S. RIVAS, RPR
Official Court Reporter

And he said, wait a second, let me think about it. We didn't check. And he went, later he came back and he said, hey, I saw something in the Goldman, Antonetti, which is the period I conducted at Tutu Esso.

So, I have asked him to bring that to the office and when he come, and he came with a file with this memo was included. That was the way it was. It came out.

Q Item number five, I believe -- may I approach the witness Your Honor?

THE COURT: Sure.

BY MR. LEHMAN:

Q Item number five in the memorandum refers to a report received by Mr. Agrelot from the station manager about the oil grease separator, and a method by which it was being pumped out. Do you see that, ma'am?

A (Reading document)

Q I'm not asking you to read it. I'm asking you if you have -- do you have any knowledge personally what that paragraph is talking about?

A Yes, I saw the employees of Mr. Bayard were discharging from the oil and water separator into the toilet and I talked to him about that.

Q What did you have to say to him?

A I just told him that, I think. Daniel Bayard. I said, Danny, this is your business, you run this, but I think you're doing something which is not the appropriate, that's not -- you're not supposed to do something like that.

And then, once again, I went to the site and he was doing it because I saw him more than one time. And I went back again, and I said, Danny, you're doing things that are not right. The first time I mentioned that, he said, Dona Gloria try to help me with Esso to do the job for you.

Q I'm not trying to stop you from you talking.

A To slow down.

Q Did you tell Mr. Bayard and his employees to stop the practice of emptying the oil/water separator into the toilet?

A I talked to Mr. Bayard, not to his employees.

Q And did you tell Mr. Bayard to stop doing it?

A I told him that that was not supposed to be done.

MR. LEHMAN: That's all I have, Judge. Thank you.

THE COURT: Mr. Holt, then Mr. Leland.

MR. ZEBEDEE: I have a couple, Your Honor.

THE COURT: All right, but let's do it quickly.

CROSS EXAMINATION

BY MR. HOLT:

Q Ms. Ramos, maybe I didn't understand your last testimony. Are you saying the first time that you heard that Agrelot did testing, other than for TEIC and removal of the tanks, was recently, when Mr. Griffith asked you about this?

A What?

Q Let me ask you this. Did you know that Mr. Agrelot's firm was out testing the soil in Tutu in December of 1989, when this was taking place?

A Sir, I didn't have any recollection of that.

Q Let me show you what I will mark as Plaintiff's Exhibit Number 17.

Showing you Exhibit Number 17, can you tell me the date of that document?

A On top it says December 12 or 13.

Q Of 1989?

A Yes.

Q Is your signature on that document?

A Yes.

Q It's written in Spanish?

A Yes.

Q What is the purpose of this document?

A It's a justification for the deviation for accounting procedures doing the job, and was about whatever it was established to prove that later on when the auditors come they will see that the job was done and we have the justification for doing it that way.

Q You were asking whoever is above to approve a payment for Mr. Agrelot to do soil testing in Tutu in December of 1989, without going through normal bidding procedures, because there was an emergency, didn't you?

EXHIBIT 'X'

FAHRENTHOLD & ASSOCIATES, INC.

(Tel) 510-933-4849; (Fax) 510-933-4234

2855 Mitchell Dr., Suite 230
Walnut Creek, CA 94598

PAUL FAHRENTHOLD

hazardous waste treatment
remedial program design
process engineering

EDUCATION

Florida State University: Postdoctoral Fellow, 1966
University of Houston: Ph.D., Chemistry, 1966
Rice University: M.S., Chemical Engineering, 1962
University of Texas: B.S., Chemical Engineering, 1960

REGISTRATION

Registered Professional Engineer: Mississippi

PROFESSIONAL HISTORY

Fahrenthold & Associates, Inc., 1988 to Present
ENTRIX, Inc, Vice President, Waste Management/Water Resources Group, 1986 to 1988
Woodward-Clyde Consultants, Senior Consultant, 1982-1986
U.S. Environmental Protection Agency, Chief of Organic Chemicals Branch, 1972-1982
Calumet Petrochemicals, Vice President, 1967-1972
Calumet Industries, Technical Assistant to the President, 1967-1972
Texas Eastman Company, Research Chemist, 1966-1967

REPRESENTATIVE EXPERIENCE

In past positions I have supported and directed program activities in a variety of engineering and scientific areas for a large number of projects and have developed specific expertise in the areas of design of data-gathering programs for evaluating the extent of contaminant migration; selecting and evaluating the applicability of soil, waste, and groundwater treatment processes; coordinating technical information for multidisciplinary projects; and selecting, screening and evaluating corrective action programs for groundwater and other hazardous wastes.

Consulting projects in support of RCRA or CERCLA have been completed which focused on the elimination of hazardous wastes through treatment and subsequent reclassification for disposal as non-hazardous or recycling for agricultural use. With the

EPA many studies were made to evaluate the potential for recycle of in-plant streams, treatment of wastes for product recovery and segregation of wastes for detoxification.

Other specific projects have focused on providing services for achieving compliance with the Clean Water Act. Those services included review of current wastewater handling practices, management of the waste streams, and the current treatment technology.

Specific wastewater management experience includes:

California, National chemical manufacturing company. Prepared a survey of the existing treatment system and recommended additional treatment steps to achieve BATEA level of technology. The recommended steps included extensive on-site treatment and recycle of wastewater.

Washington, Wood preserving company. Reviewed the stormwater treatment system for the facility and recommended course of action to comply with EPA discharge regulations.

Specific superfund project experience includes:

Houston, Texas, apportionment study: Designed study to identify, by the nature of the chemicals manufactured in their facilities, parties contributing wastes to the site. With other committee members, reviewed data obtained to ensure appropriate allocation of quantities of waste.

Soil and groundwater cleanup, Salinas, CA: Project Manager, with responsibility for design and construction of the entire remedial program. The program included many investigations and subsequent remedial actions such as asbestos removal, groundwater extraction and treatment, soil excavation and soil vapor extraction.

Feasibility study for Monsanto Co., Houston: Coordinator and Project Chemist. Identified and classified all materials on-site (e.g. PCBs, solvents, etc.),, selected appropriate remedial options, and evaluated the alternatives in terms of cost, effectiveness, etc.

South Valley (New Mexico Superfund site): Completed a sampling and analytical data-gathering program with rigorous QA/QC which confirmed the origin of contaminants present in both groundwater aquifers.

Pt. Quendall (Washington): Completed a data gathering program to define the extent of contamination due to polynuclear aromatic hydrocarbons using indicator pollutant analysis and correlation of the indicator with polynuclear aromatic hydrocarbons.

Bio-Ecology (Texas Superfund site): Designed the bench-scale program for soil stabilization of wastes with flue dust, fly ash and proprietary adsorbents (Radecca). The program included the evaluation of leachate from the stabilized wastes.

Metals Processing Facility: Designed the program for the evaluation and design of a treatment process for impounded wastes containing nickle and cyanide.

Electronics Plating Firm: Designed the experimental program for evaluating the optimum chemical treatment system for copper and nickel plating wastes; designed the full-scale system.

East Bay Regional Park District: Designed the experimental program for successful evaluation of treatment options for an impoundment containing degalvanizing wastes (zinc).

Lawrence Livermore National Laboratory: Directed the evaluation and design of an activated carbon adsorption system for the treatment of photographic rinse waste water; directed the design and construction of the full-scale system.

1960-1962 Union Carbide Corp.

My duties with Union Carbide (as an employee of Union Carbide International Co.) focused on the design and construction of plants manufacturing commodity organic chemicals. Specific assignments covered the design and construction of plants to manufacture ethyleneamines, oxo alcohols and basic hydrocarbons, i.e. ethylene, propylene, butenes, etc.

As a design engineer I was responsible for the design of acetylene recovery facilities which were a part of the ethylene manufacturing complex. Other duties addressed the design of distillation columns for separation and recovery of ethylene and methane and refrigeration cycles necessary for the separation.

The assignments for projects were made out of the Houston, Texas office and were both domestic and foreign. The ethyleneamine facility and oxo alcohol facilities were in Italy (Sicily), with the ethylene plant assignments being mainly design work primarily in the Houston office.

The technical job skills required were the ability to prepare material balances for the process streams and convert them to process and instrument flow diagrams. Also, the tasks required the preparation of mechanical equipment specifications for the major and minor items required to contain and process the process chemicals. Much of the materials of construction were special alloys and plastics.

Since the Italian designers spoke no English, I became fluent in Italian in order to facilitate the progress of the design. This special ability to communicate was required in dealing with people to accomplish most, if not all, of the technical tasks associated with the Italian projects.

At the end of my assignment in Italy (11 months) I returned to the USA and enrolled in graduate school.

1966-1967 Texas Eastman Co.

As a research chemist with the Texas Eastman Co. I surveyed the existing process operations for the plant (reviewing the production processes for synthetic ethanol, acetaldehyde, oxo alcohols and ethylene oxide) to identify the potential for process improvement through catalyst modification.

The results of the survey indicated that the synthetic alcohol process was a candidate for additional review and experimentation. I undertook a laboratory program to try various modifications to the existing catalyst (phosphoric acid) in an attempt to gain a longer lived system.

After 18 months I left Eastman to pursue a career with a greater engineering component than life in the chemical research laboratory.

1967-1972 Calumet Industries

Upon joining Calumet Industries I was made the Technical Assistant to the President of the company. In that role I assisted in the planning and licensing of a new venture, Calumet Petrochemicals.

In 1968, as a Vice President and Director of Calumet Petrochemicals, I designed and constructed a petroleum sulfonate plant in Natchez, Miss. Many of my functions were directed toward the manufacture of oil soluble sulfonates of all types, i.e. emulsion breaking salts such as magnesium, calcium, and barium sulfonates and emulsion forming salts such as sodium, potassium, and ethanolamine sulfonates. Much work was done on the development of continuous processing of the sulfonates to make the neutral salt and the high base number products (e.g. 300AV calcium sulfonate).

During the construction of the plant I supervised an average of six piping and mechanical designers, and numerous consultants for special technical tasks such as electrical design, foundation and piling design, etc. The scope of the construction included the process area, tank farm, and loading dock at the Mississippi River.

Occasionally, I would assist Calumet Refining Company in solving processing problems at their facility in Princeton, La. Examples of the type of assistance would be the selection of a cooling tower, selection of process control valves, etc.

Assignments at Calumet required the management of other technical staff and the construction crafts, on occasion. The venture had numerous financial problems associated with the lack of a stable market, and a number of technical problems derived from the advanced nature of the plant. As a result, I left to join EPA in 1972.

1972-1982 United States EPA

From 1972 until 1977 I was an enforcement technical support person in the Dallas regional office (Region VI). In this initial role I was responsible for the preparation of NPDES discharge permits for facilities that made organic chemicals, primarily in Louisiana and Texas. Preparation of the permits required a knowledge of the production processes to understand the nature of the raw waste load to be treated, and a knowledge of the types of treatment processes that might be suitable for reducing pollutants in those discharges. In my capacity of permit writer I prepared and issued 10 or 12 permits in three years.

In the latter half of my tenure in Dallas (beginning in 1975) I was the leader of the technical support section of the stationary source air enforcement group. In that role I provided the technical work-up for Notices of Violation issued as the result of a field investigation. I also prepared testimony for enforcement conferences and was charged with the planning and scheduling of the field inspections.

In both roles as air and water enforcer I participated in a number of public hearings, provided testimony for litigation, was deposed and assisted in the preparation of interrogatories and depositions, and assisted other programs in the interpretation of chemical or plant process data.

In 1977 I accepted a transfer to Washington, D.C. as a national expert in the Organic Chemicals Industry to assist in the preparation of regulations for the control of the 129 Priority Pollutants. In the role of project officer for the Organic Chemicals Industry study I organized a task force of contractors to study in detail the processes and treatment technologies used in the industry. The effort addressed the need for technical data on the treatment of chemicals, economic data on the cost of treatment of priority pollutants discharged by the industry, and environmental data on the quantities of pollutants entering the environment at locations throughout the nation.

Pioneering efforts were required in a number of areas: new analytical methods were required to identify and quantify the presence of priority pollutants in effluents, new concepts were invented to study the economic impacts of various levels of pollutant regulation, novel ways were found to categorize the industry to determine which processes could be expected to discharge the largest quantities of toxic pollutants (and which ones would not), and information was solicited and shared with the industry to foster a better understanding of the mission.

In 1979 I was made the Chief of the Organic Chemicals Branch extending my responsibility to establishing regulations for the pesticide, pharmaceutical, and plastics and synthetic fibers industries. My duties in this position were similar to those previously described with the addition of making input to policy and regulatory strategy, assisting other programs such as RCRA and CERCLA, and enforcement cases in both air and water pollution.

In 1982 the original studies of the industries under my direction were completed and I left the agency to enter the private sector.