SUBSURFACE INVESTIGATION OF THE CITRIC BLOCK, FORMER BUILDINGS 1D, 3A, 3B, 4A, 4B, 7A AND 7B

Pfizer Inc Williamsburg Facility
Brooklyn, New York

ROUX Associates, Inc.
ENVIRONMENTAL CONSULTING & MANAGEMENT

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Pfizer Inc Williamsburg Facility
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1.0 INTRODUCTION

Roux Associates, Inc. (Roux Associates) has completed a subsurface investigation at the recently-demolished portion of the Citric Block (Site) at the Pfizer Inc (Pfizer) Williamsburg Facility, Brooklyn, New York (Figure 1). The portion of the Citric Block that was investigated includes former Buildings 1D, 3A, 3B, 4A, 4B, 7A, and 7B, as well as the yard in the center of the block (Figure 2). The remainder of the Citric Block will be investigated following completion of demolition activities at the Citric Block. The investigation was undertaken from July 12 through July 18, 1995, in accordance with the July 1995 Work Plan titled, "Subsurface Investigation Work Plan (Work Plan), Citric Block, Former Buildings 1D, 3A, 3B, 4A, 4B, 7A and 7B" (Roux Associates 1995a; Appendix A).

Pfizer has decommissioned the Citric Block to prepare this property for future re-development and/or beneficial use. As part of this process, the Citric Block buildings were demolished and demolition activities were completed during August 1995. Presently, the reinforced concrete slab foundation is the only above-ground remnant of the former buildings. The slab is continuous throughout the entire block and it varies in thickness (i.e., approximately 0.5 to 1.5 ft).

The objective of the Citric Block subsurface investigation was to determine soil and perched ground-water quality conditions throughout the areas that included the former Buildings 1D, 3A, 3B, 4A, 4B, 7A and 7B, as well as the yard in the center of the block. The Citric Block subsurface investigation was performed during July 1995. Soil and ground-water analytical results were received from the analytical laboratory in August 1995.

Immediately upon Pfizer's receipt of the laboratory data, Pfizer contacted on August 10, 1995 the New York State Department of Environmental Conservation (NYSDEC) Spills and National Response Center Hotlines, and separately Mr. Shaminder Singh of Region 2 NYSDEC, regarding a potential release. As discussed further in this report, the soil and perched ground-water quality results indicate the presence of certain metals and polycyclic aromatic hydrocarbons (PAHs) in soils beneath the concrete slab at the Citric Block. The NYSDEC issued Pfizer Spill No. 95-05760. Also, Pfizer submitted the laboratory results separately to the NYSDEC in an August 11, 1995 letter to Mr. Singh (Appendix B).

In response to Pfizer's reporting of this potential release, Mr. Singh, along with Mr. Richard Gardineer of Region 2 NYSDEC, visited the Site on August 14, 1995. During this visit to the Citric Block, an overview of the Citric Block decommissioning activities, including a summary of the subsurface investigation results developed to date, were provided by Pfizer and Roux Associates. Following this visit, the NYSDEC issued an August 28, 1995 letter to Pfizer (Appendix C) requesting Pfizer to submit any additional information relevant to this matter to enable the NYSDEC to determine if hazardous waste disposal occurred at the Citric Block. The NYSDEC indicated that if hazardous waste disposal occurred, the Site will be entered in the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

The remainder of the report is as follows. Section 2.0 of this report provides the background information for the Site. The scope of work is presented in Section 3.0. The results of the investigation are provided in Sections 4.0 and 5.0, including a description of the Site hydrogeology and soil quality and perched ground-water quality, respectively. Section 6.0 provides an evaluation of the current potential exposure pathways at the Site. The summary of findings and recommendations is provided in Section 7.0. The references are provided in Section 8.0.

2.0 BACKGROUND

The Pfizer Williamsburg facility is located at 630 Flushing Avenue, Brooklyn, New York (Figure 1). The Citric Block is located in the eastern central portion of the facility and is bounded on the north by Gerry Street, on the east by Harrison Avenue, on the south by Flushing Avenue and the northern edge of three existing buildings and on the west by Union Avenue (Figure 2).

Pfizer has decommissioned the Citric Block to prepare this property for future re-development and/or beneficial use. As part of this process, the Citric Block buildings were demolished and demolition activities were completed during August 1995, with construction debris from the former buildings being disposed at the Fresh Kills Landfill in Staten Island, New York. Presently, the reinforced concrete slab foundation is the only above-ground remnant of the former buildings. The slab is continuous throughout the entire block and it varies in thickness (i.e., approximately 0.5 to 1.5 ft).

To investigate subsurface conditions at the Citric Block, Roux Associates developed and submitted a Work Plan to Pfizer. A copy of the Work Plan is provided in Appendix A.

In preparation of the Citric Block Work Plan, a review of engineering drawings from Pfizer was performed. Engineering drawings reviewed were Site Plans that included building locations, general floor plans and aboveground storage tank and piping locations, and indicated the following:

- with the exception of the building foundations, no below grade structures apparently exist at the Citric Block; and
- all tanks were apparently aboveground (these tanks were removed during demolition activities).

The Citric Block Subsurface Investigation was performed during July 1995. Soil and perched ground-water quality data were received from the analytical laboratory in August 1995.

On August 10, 1995, Pfizer contacted the NYSDEC Region 2 Spills Management Division to state that a release may have occurred based upon data presented in this laboratory report. The following day, Pfizer hand delivered a letter to the NYSDEC confirming the call made on August 10, 1995, and providing a brief history of facility operations and a brief discussion of the attached analytical data summary tables (Appendix B).

On August 14, 1995, the NYSDEC conducted an inspection of Pfizer's Williamsburg Plant Citric Block. During this Site visit, an overview of the Citric Block decommissioning activities, including a summary of the subsurface investigation results developed to date, were provided by Pfizer and Roux Associates. The NYSDEC issued an August 28, 1995 letter to Pfizer (Appendix C) requesting Pfizer to submit any additional information relevant to this matter to enable the NYSDEC to determine if hazardous waste disposal occurred at the Citric Block. The NYSDEC indicated that if hazardous waste disposal occurred, the Citric Block will be entered in the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

3.0 SCOPE OF WORK

The scope of work for the Citric Block subsurface investigation was performed in accordance with the Citric Block Work Plan (Roux Associates 1995a). A copy of the Work Plan is provided in Appendix A. A brief description of the scope of work is provided below.

Soil borings and sampling and perched ground-water sampling were conducted to characterize the soil and perched ground-water quality beneath former Buildings 1D, 3A, 3B, 4A, 4B, 7A and 7B, as well as the yard in the center of the block. The soil boring locations within the former buildings are shown in Figure 3. The soil borings were drilled using the Geoprobe™ method. Prior to soil sampling, the concrete slab at each soil boring location was cored to permit the use of Geoprobe™ drilling and sampling equipment.

At each soil boring, soil samples were collected continuously at 2-foot (ft) intervals down to the clay layer, which ranged from approximately 3 ft to 18 ft below land surface (bls). However, three soil borings (i.e., CB-5, CB-7 and CB-11) were drilled and sampled continuously at 2-ft intervals to 20 ft bls to determine the continuity of the low permeability clay layer. Each soil sample was inspected by the field geologist to characterize lithology and any evidence of contamination (i.e., staining and odors). A portion of each soil sample was placed in a plastic Ziploc™ bag and screened in the field for volatile organic compounds (VOCs) using a photoionization detector (PID).

The soil sample from the 0 to 2 ft interval and the sample that exhibited the highest degree of contamination (i.e., staining and odors) above the low permeability clay layer or perched ground water (if present) was selected for laboratory analysis. However, if no impacts were discernable, the 2-ft interval above the low permeability clay layer or perched ground water was submitted for analysis.

A listing of soil samples collected for chemical analysis including sampling depth interval and analyses performed is provided in Table 1. In accordance with the Work Plan, soil samples were analyzed for VOCs using the NYSDEC Analytical Services Protocol (ASP)

Method 91-1, semivolatile organic compounds (SVOCs) using NYSDEC ASP Method 91-2, metals using NYSDEC ASP Method 91-3, total organic carbon (TOC) using NYSDEC ASP Method 9060 and pH using NYSDEC ASP Method 9045.

Ten Shelby™ tubes (i.e., five fill material and five clay) for permeability testing and five samples for grain size analysis were collected adjacent to selected soil borings throughout the Site. The locations selected for the collection of Shelby™ tubes and samples for grain size analysis were based upon the presence of perched water and the clay layer. Shelby™ tube sample intervals are provided in Table 2. The permeability testing and grain size analysis was performed by J&L Testing, Canonsburg, Pennsylvania.

An attempt was made in each soil boring to collect ground water perched on top of the clay. Perched ground-water samples were collected from only 3 of 13 soil borings, due to the sporadic occurrence of the thin zone of ground water perched on top of the low permeability clay. Perched ground-water samples were collected using a slotted drive-point sampler attached to the steel rods of the Geoprobe™. The sampler was placed into the open borehole to the desired depth. A polyethylene tube was placed in the sampler and attached to a vacuum pump. The vacuum pump was turned on and the perched ground-water sample was collected if a sufficient volume was present.

A listing of perched ground-water samples collected for chemical analyses, including the analyses performed is provided in Table 3. Perched ground-water samples were collected only from Soil Borings CB-2, CB-10, and CB-12 beneath former Buildings 4A, 3B, and 3A, respectively. The perched ground water was analyzed for VOCs using NYSDEC ASP Method 91-4, SVOCs using NYSDEC ASP Method 91-2, metals using NYSDEC ASP Method 91-3 and TOC using NYSDEC ASP Method 9060. pH was measured in the field. It should be noted that if a sample was not collected, it was due to insufficient water (e.g., perched water was not present).

To prevent cross-contamination, all downhole, equipment was decontaminated after each use by washing in potable water and non-phosphate laboratory grade detergent, followed by a potable water rinse.

All soil borings were surveyed for land surface elevations by a New York State Licensed Surveyor, A. James deBruin & Sons, Bethpage, New York.

4.0 SITE HYDROGEOLOGY

The Pfizer Williamsburg facility is located one mile east of the East River and is underlain by unconsolidated deposits that are comprised of man-made fill and underlying natural clays and sands. A geologic cross section of the Site is shown in Figure 4. The man-made fill immediately underlies the Citric Block to a depth ranging from approximately 3 ft (CB-5) to 18 ft (CB-7) bls (Appendix D). The fill is typically comprised of black to brown coarse sand, some silt and trace gravel that contains varying amounts of bricks and concrete.

The fill is immediately underlain by a thick, low permeability clay layer that varies in thickness from approximately 20 ft to 30 ft beneath the Citric Block (Figure 4). The clay layer was encountered in all 13 soil borings sampled during the investigation, and was encountered at depths ranging from 3 ft to 18 ft bls. The clay forms a continuous layer beneath the Citric Block and apparently reflects the former marsh environment that surrounded Wallabout Creek which formerly flowed through this area. In addition, both former on-site diffusion and production well logs were reviewed and noted that clay was found underlying the fill material throughout the Citric Block (i.e., DW-10, PW-5 and PW-6) and ranged in thickness from 18 ft (PW-6) to 27 ft (PW-5). Copies of these well logs are provided in Appendix D. Most importantly, the clay will act as a barrier between the fill/perched ground water and the underlying Upper Glacial aquifer.

To confirm the continuity of the clay layer, three boreholes (i.e., CB-5, CB-7 and CB-11) were drilled to 20 ft bls. All of these boreholes encountered the clay. It is noted, however, that some thin sand lenses were present in the upper zones of the clay. Underlying the thick continuous clay layer is the Upper Glacial aquifer, which begins at approximately 25 ft to 35 ft beneath the Citric Block (Figure 4).

A sporadic, thin zone of perched ground water was encountered in only 3 of 13 soil borings (i.e., at Soil Borings CB-2, CB-10 and CB-12) at depths ranging from approximately 3 ft to 3.5 ft bls, as observed during the investigation beneath the Citric Block. The ground water encountered was perched on top of the low permeability clay layer. The zone of perched ground water, where present, predominately ranged in thickness from 1 ft to 2 ft. Locally, however, the perched zone of ground water is thicker. For example, approximately 11.5 ft of perched ground water was encountered in Soil Boring CB-2 (Appendix D).

Five fill material and clay Shelby™ tube samples were tested for permeability from selected soil borings and, where possible, the fill material samples were collected immediately above the clay samples. Table 2 shows a summary of the permeability results and the laboratory report is provided in Appendix E. The permeability of the fill material ranged from 1.69 x 10^{-4} centimeters per second (cm/sec) at CB-13 to 2.82 x 10^{-7} cm/sec at CB-6. The permeability of the clay layer ranged from 8.75 x 10^{-5} cm/sec at CB-4, to 1.44 x 10^{-7} cm/sec at CB-13. These low permeabilities of the clay are consistent with permeabilities from published information (Walton 1991). This permeability data confirms that the clay will act as a barrier to potential downward migration of contaminants from the fill/perched zone, through the clay and into the underlying Upper Glacial aquifer.

Ground-water flow beneath the Citric Block within the Upper Glacial aquifer (i.e., 25 ft to 35 ft bls) is to the northwest toward the East River (Doriski 1986). Historical ground-water quality data developed from on-site production and diffusion wells at the Site indicate the water supply aquifers beneath the Williamsburg Plant have not been impacted by Site operations.

5.0 SOIL AND PERCHED GROUND-WATER QUALITY RESULTS

The objective of the subsurface investigation was to determine soil and perched ground-water quality conditions throughout the areas that included former Buildings 1D, 3A, 3B, 4A, 4B, 7A and 7B, as well as the yard in the center of the block. A summary of the soil-quality results are provided in Tables 4 through 7. Soil-quality data were compared to the NYSDEC Recommended Soil Cleanup Objectives (RSCOs) for soil (NYSDEC 1994). The concentrations of metals and SVOCs detected in soil that exceed the NYSDEC RSCOs are shown in Figures 5 and 6, respectively. A summary of perched ground-water results are provided in Tables 8 through 11.

5.1 Soil Quality

Soil-quality conditions were evaluated in the portion of the Citric Block at former Buildings 1D, 3A, 3B, 4A, 4B, 7A and 7B as well as the yard in the center of the block. It is important to note that all soil samples were collected from the fill underlying the Site, and not from natural indigenous soils. Therefore, soil data are representative of the quality of the fill materials and not of the deeper, naturally occurring low permeability sediments (clay) of the former Wallabout Creek.

A description of the soil-quality conditions is provided below.

5.1.1 Metals

All 23 Target Analyte List (TAL) metals were detected in soil (fill) beneath former Buildings 1D, 3A, 3B, 4A, 4B, 7A and 7B and the yard in the center of the block; however, only 13 metals were detected above the NYSDEC RSCOs. The metals detected above the NYSDEC RSCOs are shown below and in Table 4 and Figure 5.

Metals	NYSDEC RSCOs (mg/kg)	Range of Concentration Exceeding RSCOs (mg/kg)	Number of Detections Exceeding RSCOs	Location of Maximum Concentration
Arsenic	7.5	8.2 - 72.0	19 of 28	CB-2 (0-2 ft)
Barium	300	411 - 599	2 of 28	CB-10 (0-2 ft)
Beryllium	0.16	0.18 - 0.22	7 of 28	CB-7 (0-2 ft)

Metals	NYSDEC RSCOs (mg/kg)	Range of Concentration Exceeding RSCOs (mg/kg)	Number of Detections Exceeding RSCOs	Location of Maximum Concentration
Cadmium	1	1.1 - 4.1	8 of 28	CB-9* (0-2 ft)
Chromium	10	11.9 - 31.9	15 of 28	CB-11 (2-4 ft)
Cobalt	30	46.8 - 57.4	2 of 28	CB-9 (0-2 ft)
Copper	25	29.9 - 654	22 of 28	CB-2 (2-4 ft)
Iron	2,000	2,090 - 34,700	28 of 28	CB-13 (0-2 ft)
Lead	400	427 - 4,630	13 of 28	CB-8 (0-2 ft)
Mercury	0.1	0.43 - 2,640	28 of 28	CB-4 (0-2 ft)
Nickel	13	13.2 - 61.7	16 of 28	CB-6 (2-4 ft)
Selenium	2	2.1 - 11.5	12 of 28	CB-4 (0-2 ft)
Zinc	20	22.0 - 1,510	27 of 28	CB-10 (0-2 ft)
*	Field Duplicate			
mg/kg	Milligrams per Kilogram			

As shown in the above table, metals concentrations that exceeded the NYSDEC RSCOs were detected throughout the Citric Block area of investigation. A comparison of the soil-quality data collected from different depth horizons (e.g., 0 to 2 ft bls vs. 2 to 4 ft bls) within each borehole indicates that the constituent concentrations that exceeded the NYSDEC RSCOs for samples CB-7, CB-10 and CB-13 decreased with depth.

5.1.2 Volatile Organic Compounds

No VOCs were detected above the NYSDEC RSCOs. Only low concentrations (i.e., in general, < 10 micrograms per kilogram [μg/kg]) of 15 VOCs were detected in soil samples sporadically throughout the Citric Block area of investigation (Table 5). In addition, the detections of methylene chloride are believed to be a laboratory artifact, and are not considered representative of environmental conditions.

5.1.3 Semivolatile Organic Compounds

Twenty-four SVOCs were detected in soil samples collected in the Citric Block area of investigation (Table 6). These SVOCs are predominantly PAHs. Seven of the 24 SVOCs (all PAHs) were detected above the NYSDEC RSCOs (Figure 6). Benzo(a)pyrene was the predominant PAH detected above the NYSDEC RSCOs (in all samples from 0 to 2 ft bls). With the exception of Soil Sample CB-2, all PAH concentrations detected above the NYSDEC RSCOs decreased in concentration with depth (Figure 6).

5.1.4 pH and Total Organic Carbon

pH in soil ranged from 5.73 (CB-1 0 to 2 ft) to 8.50 (CB-5 and CB-6 0 to 2 ft) (Table 7). Total Organic Carbon (TOC) in soil ranged from 710 milligrams per kilogram (mg/kg) in CB-3 (4 to 6 ft) to 207,000 mg/kg in CB-5 (2 to 4 ft) (Table 7).

5.2 Perched Ground-Water Quality

Perched ground-water quality conditions were evaluated in the portion of the Citric Block at former Buildings 1D, 3A, 3B, 4A, 4B, 7A and 7B as well as the yard in the center of the block. A description of perched ground-water quality conditions is presented below.

It is important to note that all perched ground-water samples were collected utilizing the Geoprobe™ method, thereby resulting in the collection of samples that were silty. Moreover, these samples were not filtered prior to analysis, in accordance with NYSDEC sampling protocols. Consequently, perched ground-water quality results are considered biased high, especially with respect to metals concentrations which are naturally occurring and are likely partitioned to sediment (silt) present in the sample.

5.2.1 Metals

Soil Borings CB-2 and CB-10 were the only soil borings where perched ground water was analyzed (unfiltered) for metals due to the limited occurrence of perched ground water at the Citric Block area of investigation. All 23 TAL metals were detected in both perched ground-water samples (Table 8).

5.2.2 Volatile Organic Compounds

Soil Borings CB-2, CB-10 and CB-12 were the only soil borings where perched ground water was collected for VOC analysis. Only low concentrations (i.e., generally < 1 μg/L) of nine VOCs were detected in perched ground water (Table 9). The VOCs detected were as follows:

- 1,1-dichloroethene;
- 1,1-dichloroethane;
- chloroform;
- 1,2-dichloroethane;
- benzene;
- tetrachloroethene;
- toluene;
- xylene; and
- chloroethane.

The detections of acetone and methylene chloride are believed to be a laboratory artifact, and are not considered representative of environmental conditions.

5.2.3 Semivolatile Organic Compounds

No SVOCs were detected in any of the perched ground-water samples collected at the Site (Table 10).

5.2.4 pH and Total Organic Carbon

pH and TOC in perched ground water ranged from 7.89 to 8.16 and 16.1 mg/kg to 80.6 mg/kg, respectively (Table 11). It is noted that only two perched ground-water samples (i.e., CB-2 and CB-10) were analyzed for these parameters.

6.0 EVALUATION OF CURRENT POTENTIAL EXPOSURE PATHWAYS

This section will discuss site features that are relevant to assessing risk and provide an overview of current potential exposure considerations. Potential future exposure scenarios are not addressed in this preliminary evaluation since at this time provisional plans for future land usage are not sufficiently developed.

Based on this analysis, Roux Associates concludes that under the current conditions with the presence of a continuous slab of concrete capping the Site, there are no identifiable pathways for exposure to chemicals in Site-related soil. Consequently, there appear to be no immediate risks to human health because exposure to chemicals within the soil matrix at the Site cannot occur. Similarly, under present Site conditions contact with chemicals identified in the perched ground water cannot be contacted by humans since there is no beneficial use of these limited quantities of ground water. At the present time, the aquifer beneath the low permeability clay layer is not known to be impacted nor is this deeper ground water known to be used locally as a current source of drinking water. Thus, no potential human health risks associated with the aquifer are recognized at this time.

6.1 Relevant Site Features

As stated previously, all buildings within the Citric Block have been demolished. A reinforced concrete slab which is assumed to be no more than 2 ft thick is the only remaining visible evidence of the former structures. Recent inspections at the Site indicate that the slab is continuous across the Site, effectively capping the Site. Therefore, there is no access to the subsurface. Any cracks or other discontinuities in the slab have been repaired to ensure the integrity of the present Site cap. Access to the Site is precluded by an eight foot chain link fence topped with barbed wire that surrounds the entire city block for which the Citric Block resides, and the presence of a 24-hour on-site security guard. In addition, there is no access through the existing buildings adjacent to the Citric Block.

The building foundations are believed to extend to a depth of approximately 15 ft bls. Although no engineering drawings have been identified to verify this information, the deep foundations would be consistent with the engineering requirements to support a six story building. Sewer and/or process line pipes are contained beneath the slab and within the foundations.

The Citric Block is underlain by man-made fill ranging in thickness from 3 ft to 18 ft followed by approximately 20 to 30 ft of low-permeability clay. The Upper Glacial aquifer, which occurs between 25 to 35 ft bls, lies beneath this low permeability clay layer. Although ground water occurs primarily within the Upper Glacial aquifer, a thin zone of perched ground water was encountered on top of the low permeability clay layer at approximately 3 to 3.5 ft bls in Soil Borings CB-2, CB-10 and CB-12.

6.2 Exposure Considerations

Exposure is defined as the contact of a receptor with a chemical or physical agent (USEPA 1989). A complete exposure pathway has four components:

- Source and method of release;
- Transport medium;
- Point of human contact; and
- Exposure route (i.e., ingestion, dermal absorption, etc.) (USEPA 1989).

Exposure considerations for a site include a determination of potential receptors for site-related chemicals as well as pathways whereby receptors may contact the site-related chemicals. The Site is located in an urban area; therefore, it is reasonable to assume that if exposure can occur at this Site, potential receptors would include adults and children who live and/or work at or near the Site.

At present, it is known that soils and perched ground water at the Site contain certain chemicals (e.g., metals, PAHs). At this time, all potential pathways for migration of contaminants have not been explored. However, there are known sewage pipes in the vicinity of the Site that could act as conduits for Site-related chemicals, and, by the very nature of the permeability of old sewer piping there could also be a net contribution to the Site from the system.

For the purposes of this preliminary evaluation, only potential exposure at the Site itself is considered in more depth since there is insufficient data to consider the impact of chemical migration to off-site locations. Thus, for the purposes of this preliminary assessment, adults and/or children contacting soil and/or ground water at the Site, in its present condition, is given more detailed consideration.

6.2.1 Exposure to Soil

Chemicals of potential concern have been identified in surface and subsurface soils. However, Site soils are currently completely inaccessible to all human receptors since the city block for which the Citric Block resides is surrounded by an eight foot fence topped with barbed wire, under constant surveillance by a security guard and covered in its entirety by a reinforced concrete slab acting as a cap. Based on the foregoing information, there is presently no mechanism for human contact with the Site-related soils. Thus, no exposure pathway for potential exposures to chemicals in soils is present.

6.2.2 Exposure to Ground Water

As discussed above, the presence of the unbroken concrete slab which is contiguous with the buildings at the Site prevents any contact by receptors with soils or perched ground water present at the Site. Furthermore, there is no beneficial use for small volumes of perched ground water and therefore there is currently no potential for exposure to the perched ground water at the Site. Based on current knowledge, the perched ground water has no connection to the underlying aquifer because of the clay aquitard that separates the aquifer from the unconsolidated fill material containing the perched ground water. Furthermore, it should be noted that the Upper Glacial aquifer underlying the Site is not locally a known source of potable water in the vicinity of the Site. Thus, it may be concluded that no exposure pathway exists for the chemicals detected in the perched ground water at the Site.

6.3 Summary and Discussion

The results of the preliminary exposure pathways analysis indicate that the impacted soil and perched ground water underlying the continuous slab present at the Citric Block does not currently present a significant risk to public health or the environment. This conclusion is based upon the absence of exposure pathways thereby preventing contact of contaminants with a potential receptor. Since exposures to Site-related chemicals cannot occur, there are currently no potential risks identified for this Site.

6.4 Identification of Data Gaps

This preliminary evaluation of potential exposure pathways has been completed with the recognition that the nature and extent of chemicals present at the Site has not been fully defined. To complete a detailed risk assessment that will not only more fully explore risks associated with development of the Site but also examine long term risks associated with some future Site use, certain additional data should be collected. Based on a review of the currently available data, the following additional information should be collected during the next phase of the investigation:

- completion of the nature and extent of chemicals present at the Site by collecting additional samples (i.e., soil and perched ground water) in all areas of the Site, but focusing on parts of the Site that have not as yet been sampled;
- speciation of relevant metals to ensure that valid exposure pathways and toxicological parameters are taken into consideration. For example, if metallic mercury were found to be associated with the elevated levels of mercury at the Site then inhalation of mercury vapor would need to be considered during intrusive activities at the Site;
- a second level of data validation is required to ensure that the results reported by the analytical laboratory are accurate and that any data not meeting certain quality criteria is adequately identified;
- collect background soil samples for metals and PAHs that are representative of the Site location in an urban environment that has been in existence for approximately a century; and
- define future Site use so that representative short and long term exposure scenarios can be developed.

7.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

A brief summary of the findings and recommendations is provided below.

- A thick continuous clay layer was encountered throughout the Citric Block area of investigation during the soil sampling program. The permeability of the thick continuous clay layer ranged from 8.75 x 10^{-5} cm/sec to 1.44 x 10^{-7} cm/sec, confirming that the clay will act as a barrier to potential downward migration of contaminants from the fill/perched zone, through the clay and into the underlying Upper Glacial aquifer.

- The perched ground water appeared to be very limited (encountered in only 3 of 13 soil borings) throughout the Site and predominantly ranged in thickness from approximately 1 ft to 2 ft.

- Metals and SVOCs (primarily PAHs) were detected in soil above the NYSDEC RSCOs throughout the Site. No VOCs were detected in soil above the NYSDEC RSCOs.

- The exceedances of the NYSDEC RSCOs for metals in soil is corroborated by the perched ground-water quality data. Again, however, it is noted that perched ground water is limited at the Site (only present at 3 of 13 sample locations). No SVOCs were detected in perched ground water at the Site. Only low concentrations of VOCs were detected in the perched ground water and the compounds detected were similar to those detected in soil.

- The results of the preliminary exposure pathways analysis indicate that the impacted soil and perched ground water underlying the continuous slab present at the Citric Block does not currently present a significant risk to public health or the environment. This conclusion is based upon the absence of exposure pathways thereby preventing contact of contaminants with a potential receptor. Since exposures to Site-related chemicals cannot occur, there are currently no potential risks identified for this Site.

Respectfully submitted,

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TABLES

Table 1. Summary of Soil Analytical Program, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Soil Sample Designations	Depth Interval Collected (feet)	Analytical Parameters
CB-1	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-1	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-2	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-2	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-3	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-3	4 - 6	VOCs, SVOCs, Metals, TOC, pH
CB-4	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-4	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-5	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-5	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-6	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-6	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-7	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-7	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-8	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-8	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-9	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-9	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-10	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-10	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-11	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-11	2 - 4	VOCs, SVOCs, Metals, TOC, pH
CB-12	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-12	4 - 6	VOCs, SVOCs, Metals, TOC, pH
CB-13	0 - 2	VOCs, SVOCs, Metals, TOC, pH
CB-13	2 - 4	VOCs, SVOCs, Metals, TOC, pH

VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
TOC - Total Organic Carbon

Table 2. Summary of Triaxial Permeability Results for Fill Material and Clay, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation	Depth Interval (feet)	Fill Material (cm/sec)	Depth Interval (feet)	Clay (cm/sec)
CB-1	2 - 4	5.14E-06	6 - 8	1.31E-05
CB-4	2 - 4	1.24E-05	7 - 9	8.75E-05
CB-6	2 - 4	2.82E-07	6 - 8	8.62E-07
CB-9	1 - 3	9.41E-06	5 - 7	6.32E-07
CB-13	1 - 3	1.69E-04	8 - 10	1.44E-07

cm/sec - Centimeters per second

Table 3. Summary of Perched Ground-Water Analytical Program, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Perched Ground-Water Designations	Analytical Parameters
CB-1	--
CB-2	VOCs, SVOCs, Metals, TOC, pH
CB-3	--
CB-4	--
CB-5	--
CB-6	--
CB-7	--
CB-8	--
CB-9	--
CB-10	VOCs, SVOCs, Metals, TOC, pH
CB-11	--
CB-12	VOCs
CB-13	--

VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
TOC - Total Organic Carbon
-- - Perched ground-water sample not collected for laboratory analysis due to insufficient volume

Table 4. Summary of Metals Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-1	CB-1	CB-2	CB-2	CB-3
	Sample Depth (ft bls):	0-2	2-4	0-2	2-4	0-2
	Sample Date:	7/13/95	7/13/95	7/13/95	7/13/95	7/13/95
Metals (Concentrations in mg/kg)	NYSDEC RSCOs (mg/kg)					
Aluminum	33,000[1]	6,260	7,280	4,530	7,090	2,980
Antimony	--	11.7	7.1 B	3.4 B	6.4 B	9.2 B
Arsenic	7.5	**10.9**	**30.2**	**72.0**	**20.9**	4.3
Barium	300	157	56.6	60.7	97.9	38.5 B
Beryllium	0.16	0.10 B	0.10 B	0.11 B	**0.18 B**	0.04 U
Cadmium	1	**1.5**	**2.9**	0.80 B	**3.9**	0.75 B
Calcium	35,000[1]	10,100	24,000	13,900	4,410	16,200
Chromium	10	**11.9**	**14.0**	7.9	**22.1**	**26.8**
Cobalt	30	3.1 B	5.2 B	22.1	6.9 B	12.6
Copper	25	**255**	**220**	**222**	**654**	**118**
Iron	2,000	**6,880**	**10,900**	**12,500**	**7,590**	**6,090**
Lead	400	**4,220**	**1,660**	360	**484**	**734**
Magnesium	5,000[1]	968	1,480	1,670	976 B	958 B
Manganese	5,000[1]	330	146	197	54.3	102
Mercury	0.1	**484**	**95.5**	**64.1**	**49.4**	**69.2**
Nickel	13	8.5	**29.0**	**15.5**	**42.1**	8.0
Potassium	43,000[1]	377 B	791 B	454 B	530 B	557 B
Selenium	2	1.7	1.4	1.5	0.84 B	0.75 B
Silver	--	14.8	1.5 B	0.12 U	0.13 U	4.5
Sodium	8,000[1]	147 B	744 B	295 B	163 B	215 B
Thallium	--	1.8 B	1.4 B	1.8 B	0.78 B	0.79 B
Vanadium	150	15.4	34.1	16.4	17.1	8.8 B
Zinc	20	**435**	**1,110**	**831**	**532**	**269**

Table 4. Summary of Metals Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-3	CB-4	CB-4	CB-5	CB-5
	Sample Depth (ft bls):	4-6	0-2	2-4	0-2	2-4
	Sample Date:	7/13/95	7/13/95	7/13/95	7/12/95	7/12/95
Metals (Concentrations in mg/kg)	NYSDEC RSCOs (mg/kg)					
Aluminum	33,000[1]	604	4,430	7,430	3,830	4,100
Antimony	--	2.1 B	2.3 B	1.4 B	4.4 B	2.5 B
Arsenic	7.5	**8.2**	**31.2**	**26.4**	5.6	3.6
Barium	300	9.6 B	183	119	55.7	59.4
Beryllium	0.16	0.04 U	0.05 U	**0.19 B**	0.04 U	**0.19 B**
Cadmium	1	0.08 B	0.47 B	0.53 B	0.38 B	0.07 U
Calcium	35,000[1]	303 B	27,100	57,600	32,300	7,930
Chromium	10	0.41 B	8.7	**14.3**	9.7	7.1
Cobalt	30	4.0 B	3.9 B	4.8 B	8.8 B	4.1 B
Copper	25	12.7	**93.8**	**107**	**31.6**	**29.9**
Iron	2,000	**2,090**	**10,300**	**18,000**	**7,830**	**8,750**
Lead	400	66.3	273	158	316	190
Magnesium	5,000[1]	124 B	1,790	7,940	4,070	1,310
Manganese	5,000[1]	8.1	493	858	241	88.1
Mercury	0.1	**2.7**	**2640**	**499**	**68.8**	**85.5**
Nickel	13	**24.1**	7.9 B	12.1	11.5	11.3
Potassium	43,000[1]	209 B	1820	1610	604 B	668 B
Selenium	2	0.43 U	**11.5**	**4.4**	1.2	**5.9**
Silver	--	0.12 U	0.15 U	0.14 U	0.13 U	0.13 U
Sodium	8,000[1]	188 B	368 B	501 B	182 B	250 B
Thallium	--	0.69 U	2.9	3.3	0.71 U	1.6 B
Vanadium	150	1.3 B	20.7	30.0	11.5	13.8
Zinc	20	**714**	**150**	**307**	**93.1**	**53.1**

Table 4. Summary of Metals Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Metals (Concentrations in mg/kg)	Sample Designation: Sample Depth (ft bls): Sample Date: NYSDEC RSCOs (mg/kg)	CB-6 0-2 7/12/95	CB-6* 0-2 7/12/95	CB-6 2-4 7/12/95	CB-7 0-2 7/12/95	CB-7 2-4 7/12/95
Aluminum	33,000[1]	4,020	6,510	5,330	3,350	6,000
Antimony	--	70.0	43.1	2.0 B	5.2 B	0.78 U
Arsenic	7.5	**22.6**	**20.5**	**10.7**	**9.8**	1.3 B
Barium	300	130	164	63.0	91.7	18.1 B
Beryllium	0.16	0.04 U	0.05 U	0.12 B	**0.22 B**	0.04 U
Cadmium	1	0.23 B	0.29 B	**1.5**	0.34 B	0.07 U
Calcium	35,000[1]	3,430	12,000	52,000	4,880	650 B
Chromium	10	**19.0**	**20.6**	**12.0**	8.5	9.7
Cobalt	30	3.1 B	4.6 B	5.0 B	6.1 B	2.7 B
Copper	25	**179**	**212**	**78.0**	**54.4**	8.8
Iron	2,000	**20,300**	**23,300**	**10,900**	**13,300**	**5,330**
Lead	400	**2,050**	**1,240**	**541**	145	5.8
Magnesium	5,000[1]	1,160	2,180	3,640	561 B	1,390
Manganese	5,000[1]	83.0	123	277	169	48.8
Mercury	0.1	**28.3**	**57.8**	**30.1**	**7.9**	**2.5**
Nickel	13	**16.4**	**29.7**	**61.7**	**16.6**	9.6
Potassium	43,000[1]	685 B	872 B	679 B	664 B	308 B
Selenium	2	**3.2**	**4.2**	2.0 U	**2.5**	0.79 B
Silver	--	0.12 U	0.14 U	0.11 U	0.14 U	0.13 U
Sodium	8,000[1]	102 U	118 U	150 B	381 B	114 U
Thallium	--	2.0	3.7	1.5 B	2.0 B	0.74 U
Vanadium	150	26.4	26.0	18.4	24.8	9.2 B
Zinc	20	**123**	**142**	**194**	**107**	**22.0**

Table 4. Summary of Metals Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-8	CB-8	CB-9	CB-9*	CB-9
	Sample Depth (ft bls):	0-2	2-4	0-2	0-2	2-4
	Sample Date:	7/14/95	7/14/95	7/14/95	7/14/95	7/14/95
Metals (Concentrations in mg/kg)	NYSDEC RSCOs (mg/kg)					
Aluminum	33,000[1]	4,490	3,890	2,890	5,030	10,900
Antimony	--	6,550	7.7 B	58.7	66.7	12.5
Arsenic	7.5	7.2	5.7	**10.0**	**11.1**	**57.0**
Barium	300	55.2	37.2 B	65.0	118	39.7 B
Beryllium	0.16	**0.20 B**	0.04 U	0.04 U	0.11 B	0.04 U
Cadmium	1	0.63 B	0.06 U	0.21 B	**4.1**	0.06 U
Calcium	35,000[1]	14,000	1,070	16,500	25,200	2,900
Chromium	10	7.3	4.3	7.8	8.7	**18.4**
Cobalt	30	3.4 B	4.2 B	**57.4**	**46.8**	5.9 B
Copper	25	**151**	9.9	**42.0**	**53.3**	11.4
Iron	2,000	**5,960**	**7,300**	**6,440**	**7,880**	**5,820**
Lead	400	**4,630**	28.1	362	**919**	34.7
Magnesium	5,000[1]	816 B	771 B	1,470	1,790	1,280
Manganese	5,000[1]	83.9	24.4	108	157	54.6
Mercury	0.1	**17.9**	**0.43**	**52.9**	**56.8**	**0.78**
Nickel	13	10.5	**13.2**	10.1	10.3	**25.4**
Potassium	43,000[1]	651 B	461 B	718 B	994 B	879 B
Selenium	2	0.70 B	1.2	1.4	1.7	1.2
Silver	--	0.13 U	0.12 U	3.9	2.6	0.12 U
Sodium	8,000[1]	448 B	106 U	117 U	352 B	141 B
Thallium	--	0.81 B	0.81 B	1.3 B	1.3 B	0.70 U
Vanadium	150	11.7	4.2 B	14.2	15.6	19.0
Zinc	20	**192**	**78.2**	**87.4**	**131**	**534**

Table 4. Summary of Metals Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-10	CB-10	CB-11	CB-11	CB-12
	Sample Depth (ft bls):	0-2	2-4	0-2	2-4	0-2
	Sample Date:	7/13/95	7/13/95	7/14/95	7/14/95	7/12/95
Metals (Concentrations in mg/kg)	NYSDEC RSCOs (mg/kg)					
Aluminum	33,000[1]	6,040	4,150	7,910	10,200	6,240
Antimony	--	2.6 B	0.74 U	3.1 B	0.79 U	4.2 B
Arsenic	7.5	**20.3**	4.6	**33.4**	**12.1**	5.4
Barium	300	**599**	15.0 B	152.0	58.6	**411**
Beryllium	0.16	0.06 B	0.04 U	0.16 B	**0.20 B**	0.08 B
Cadmium	1	**1.9**	0.06 U	0.39 B	0.12 B	**2.7**
Calcium	35,000[1]	60,200	4,510	43,400	8,820	46,300
Chromium	10	**28.4**	7.5	**23.7**	**31.9**	**23.2**
Cobalt	30	5.5 B	2.5 B	5.2 B	6.2 B	5.6 B
Copper	25	**124**	11.2	**72.2**	**35.5**	**123**
Iron	2,000	**18,000**	**6,840**	**19,700**	**17,600**	**19,700**
Lead	400	**665**	77.9	**536**	54.4	**427**
Magnesium	5,000[1]	7,730	1,290	3,830	2,560	5,150
Manganese	5,000[1]	534	52.0	453	303	375
Mercury	0.1	**30.3**	**18.9**	**108**	**15.2**	**32.4**
Nickel	13	**24.0**	8.7	**22.1**	**20.5**	**24.1**
Potassium	43,000[1]	1430	300 B	1640	840 B	957 B
Selenium	2	**2.2**	0.43 U	**2.2**	**2.1**	**2.5**
Silver	--	0.11 U	0.12 U	0.60 B	0.13 U	0.13 U
Sodium	8,000[1]	1,050	593 B	308 B	242 B	471 B
Thallium	--	1.6 B	0.70 U	2.6	2.0 B	2.2 B
Vanadium	150	24.1	8.5 B	22.1	28.9	17.3
Zinc	20	**1,510**	**35.8**	**317**	**117**	**931**

Table 4. Summary of Metals Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation:		CB-12	CB-13	CB-13
Sample Depth (ft bls):		4-6	0-2	2-4
Sample Date:		7/12/95	7/12/95	7/12/95
Metals (Concentrations in mg/kg)	NYSDEC RSCOs (mg/kg)			
Aluminum	33,000[1]	4,580	6,410	6,410
Antimony	--	0.75 U	10.8 B	1.4 B
Arsenic	7.5	1.9 B	**24.0**	**17.9**
Barium	300	46.4	186	83.3
Beryllium	0.16	**0.21 B**	0.09 B	0.06 B
Cadmium	1	0.06 U	**1.1**	0.74 B
Calcium	35,000[1]	1,110	53,600	29,900
Chromium	10	7.8	**20.7**	**11.9**
Cobalt	30	1.8 B	7.3 B	4.8 B
Copper	25	8.9	**405**	**62.6**
Iron	2,000	**3,980**	**34,700**	**8,870**
Lead	400	8.9	**557**	219
Magnesium	5,000[1]	571 B	5,220	3,590
Manganese	5,000[1]	13.1	410	208
Mercury	0.1	**4.3**	**24.0**	**24.0**
Nickel	13	5.0 B	**32.2**	**14.1**
Potassium	43,000[1]	538 B	1,350	981 B
Selenium	2	0.99 B	**6.2**	**2.4**
Silver	--	0.12 U	0.12 U	0.12 U
Sodium	8,000[1]	192 B	567 B	522 B
Thallium	--	1.0 B	3.6	1.9 B
Vanadium	150	15.5	25.3	27.9
Zinc	20	16.1	**517**	**119**

mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
U - Indicates compound not detected
B - Estimated value
[1] - Eastern U.S.A. background
* - Field duplicate
Boldface - Data highlighted in bold represent results detected above the NYSDEC RSCOs.

Table 5. Summary of Volatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-1	CB-1	CB-2	CB-2	CB-3
	Sample Depth (ft bls):	0-2	2-4	0-2	2-4	0-2
	Sample Date:	7/13/95	7/13/95	7/13/95	7/13/95	7/13/95
Volatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Chloromethane	--	12 U	13 U	12 U	11 U	11 U
Bromomethane	--	12 U	13 U	12 U	11 U	11 U
Vinyl Chloride	200	12 U	13 U	12 U	11 U	11 U
Chloroethane	1,900	12 U	13 U	12 U	11 U	11 U
Methylene Chloride	100	12 JB	5 JB	6 JB	6 JB	5 JB
Acetone	200	7 J	17	5 J	29	28
Carbon Disulfide	2,700	12 U	13 U	12 U	3 J	11 U
1,1-Dichloroethene	400	12 U	13 U	12 U	11 U	11 U
1,1-Dichloroethane	200	12 U	13 U	12 U	11 U	11 U
1,2-Dichloroethene (total)	300	12 U	13 U	12 U	11 U	11 U
Chloroform	300	12 U	13 U	12 U	11 U	11 U
1,2-Dichloroethane	100	12 U	13 U	12 U	11 U	11 U
2-Butanone	300	12 U	13 U	12 U	5 J	11 U
1,1,1-Trichloroethane	800	12 U	13 U	12 U	11 U	11 U
Carbon Tetrachloride	600	12 U	13 U	12 U	11 U	11 U
Bromodichloromethane	--	12 U	13 U	12 U	11 U	11 U
1,2-Dichloropropane	--	12 U	13 U	12 U	11 U	11 U
cis-1,3-Dichloropropene	--	12 U	13 U	12 U	11 U	11 U
Trichloroethene	700	12 U	13 U	12 U	11 U	11 U
Dibromochloromethane	--	12 U	13 U	12 U	11 U	11 U
1,1,2-Trichloroethane	--	12 U	13 U	12 U	11 U	11 U
Benzene	60	12 U	13 U	12 U	11 U	11 U
trans-1,3-Dichloropropene	--	12 U	13 U	12 U	11 U	11 U
Bromoform	--	12 U	13 U	12 U	11 U	11 U
4-Methyl-2-pentanone	1,000	12 U	13 U	12 U	11 U	11 U
2-Hexanone	--	12 U	13 U	12 U	11 U	11 U
Tetrachloroethene	1,400	12 U	13 U	12 U	11 U	11 U
1,1,2,2-Tetrachloroethane	60	12 U	13 U	12 U	11 U	11 U
Toluene	1,500	12 U	13 U	12 U	11 U	11 U
Chlorobenzene	1,700	12 U	13 U	12 U	11 U	11 U
Ethylbenzene	5,500	12 U	13 U	12 U	11 U	11 U
Styrene	--	12 U	13 U	12 U	11 U	11 U
Xylene (total)	1,200	12 U	13 U	12 U	11 U	11 U

Table 5. Summary of Volatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Volatile Organic Compounds (Concentrations in μg/kg)	Sample Designation: Sample Depth (ft bls): Sample Date: NYSDEC RSCOs (μg/kg)	CB-3 4-6 7/13/95	CB-4 0-2 7/13/95	CB-4 2-4 7/13/95	CB-5 0-2 7/12/95	CB-5 2-4 7/12/95
Chloromethane	--	12 U	13 U	12 U	11 U	13 U
Bromomethane	--	12 U	13 U	12 U	11 U	13 U
Vinyl Chloride	200	12 U	13 U	12 U	11 U	13 U
Chloroethane	1,900	12 U	13 U	12 U	11 U	13 U
Methylene Chloride	100	6 JB	5 JB	3 JB	2 JB	7 JB
Acetone	200	28	13 U	12 U	19	36
Carbon Disulfide	2,700	7 J	13 U	12 U	11 U	13 U
1,1-Dichloroethene	400	12 U	13 U	12 U	11 U	13 U
1,1-Dichloroethane	200	12 U	13 U	12 U	11 U	2 J
1,2-Dichloroethene (total)	300	12 U	13 U	12 U	3 J	7 J
Chloroform	300	12 U	13 U	12 U	3 J	2 J
1,2-Dichloroethane	100	12 U	13 U	12 U	11 U	13 U
2-Butanone	300	19	13 U	12 U	11 U	13 U
1,1,1-Trichloroethane	800	12 U	13 U	12 U	11 U	13 U
Carbon Tetrachloride	600	12 U	13 U	12 U	11 U	13 U
Bromodichloromethane	--	12 U	13 U	12 U	11 U	13 U
1,2-Dichloropropane	--	12 U	13 U	12 U	11 U	13 U
cis-1,3-Dichloropropene	--	12 U	13 U	12 U	11 U	13 U
Trichloroethene	700	12 U	13 U	12 U	11 U	13 U
Dibromochloromethane	--	12 U	13 U	12 U	11 U	13 U
1,1,2-Trichloroethane	--	12 U	13 U	12 U	11 U	13 U
Benzene	60	12 U	13 U	12 U	11 U	13 U
trans-1,3-Dichloropropene	--	12 U	13 U	12 U	11 U	13 U
Bromoform	--	12 U	13 U	12 U	11 U	13 U
4-Methyl-2-pentanone	1,000	12 U	13 U	12 U	11 U	13 U
2-Hexanone	--	12 U	13 U	12 U	11 U	13 U
Tetrachloroethene	1,400	12 U	13 U	12 U	11 U	6 J
1,1,2,2-Tetrachloroethane	60	12 U	13 U	12 U	11 U	13 U
Toluene	1,500	12 U	13 U	12 U	11 U	13 U
Chlorobenzene	1,700	12 U	13 U	12 U	11 U	13 U
Ethylbenzene	5,500	12 U	13 U	12 U	11 U	13 U
Styrene	--	12 U	13 U	12 U	11 U	13 U
Xylene (total)	1,200	12 U	13 U	12 U	11 U	13 U

Table 5. Summary of Volatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation:		CB-6	CB-6*	CB-6	CB-7	CB-7
Sample Depth (ft bls):		0-2	0-2	2-4	0-2	2-4
Sample Date:		7/12/95	7/12/95	7/12/95	7/12/95	7/12/95
Volatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Chloromethane	--	12 U	180	12 U	12 U	50
Bromomethane	--	12 U	12 U	12 U	12 U	12 U
Vinyl Chloride	200	12 U	12 U	12 U	12 U	12 U
Chloroethane	1,900	12 U	12 U	12 U	12 U	12 U
Methylene Chloride	100	6 JB	8 JB	6 JB	5 JB	4 JB
Acetone	200	4 J	6 J	28	3 J	15
Carbon Disulfide	2,700	12 U	12 U	12 U	12 U	12 U
1,1-Dichloroethene	400	12 U	12 U	12 U	12 U	12 U
1,1-Dichloroethane	200	12 U	26	12 U	12 U	12 U
1,2-Dichloroethene (total)	300	12 U	12 U	6 J	12 U	12 U
Chloroform	300	5 J	37	2 J	12 U	12 U
1,2-Dichloroethane	100	12 U	12 U	12 U	12 U	12 U
2-Butanone	300	12 U	12 U	6 J	12 U	12 U
1,1,1-Trichloroethane	800	12 U	36	12 U	12 U	12 U
Carbon Tetrachloride	600	12 U	12 U	12 U	12 U	12 U
Bromodichloromethane	--	12 U	12 U	12 U	12 U	12 U
1,2-Dichloropropane	--	12 U	12 U	12 U	12 U	12 U
cis-1,3-Dichloropropene	--	12 U	12 U	12 U	12 U	12 U
Trichloroethene	700	12 U	12 U	12 U	12 U	12 U
Dibromochloromethane	--	12 U	12 U	12 U	12 U	12 U
1,1,2-Trichloroethane	--	12 U	12 U	12 U	12 U	12 U
Benzene	60	12 U	12 U	12 U	12 U	12 U
trans-1,3-Dichloropropene	--	12 U	12 U	12 U	12 U	12 U
Bromoform	--	12 U	12 U	12 U	12 U	12 U
4-Methyl-2-pentanone	1,000	12 U	12 U	12 U	12 U	12 U
2-Hexanone	--	12 U	12 U	12 U	12 U	12 U
Tetrachloroethene	1,400	1 J	12 U	4 J	12 U	12 U
1,1,2,2-Tetrachloroethane	60	12 U	12 U	12 U	12 U	12 U
Toluene	1,500	12 U	12 U	2 J	12 U	12 U
Chlorobenzene	1,700	12 U	12 U	12 U	12 U	12 U
Ethylbenzene	5,500	12 U	12 U	12 U	12 U	12 U
Styrene	--	12 U	12 U	12 U	12 U	12 U
Xylene (total)	1,200	12 U	12 U	12 U	12 U	12 U

Table 5. Summary of Volatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-8	CB-8	CB-9	CB-9*	CB-9
	Sample Depth (ft bls):	0-2	2-4	0-2	0-2	2-4
	Sample Date:	7/14/95	7/14/95	7/14/95	7/14/95	7/14/95
Volatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Chloromethane	--	12 U	12 U	12 U	11 U	12 U
Bromomethane	--	12 U	12 U	12 U	11 U	12 U
Vinyl Chloride	200	12 U	12 U	12 U	11 U	12 U
Chloroethane	1,900	12 U	12 U	12 U	11 U	12 U
Methylene Chloride	100	5 JB	5 JB	12 B	6 JB	10 JB
Acetone	200	12 U	12 J	9 J	11 U	19
Carbon Disulfide	2,700	12 U	4 J	12 U	11 U	12 U
1,1-Dichloroethene	400	12 U	12 U	12 U	11 U	12 U
1,1-Dichloroethane	200	12 U	12 U	12 U	11 U	12 U
1,2-Dichloroethene (total)	300	12 U	12 U	12 U	11 U	12 U
Chloroform	300	2 J	12 U	3 J	11 U	12 U
1,2-Dichloroethane	100	12 U	12 U	12 U	11 U	12 U
2-Butanone	300	12 U	5 J	12 U	11 U	4 J
1,1,1-Trichloroethane	800	12 U	12 U	12 U	11 U	12 U
Carbon Tetrachloride	600	12 U	12 U	12 U	11 U	12 U
Bromodichloromethane	--	12 U	12 U	12 U	11 U	12 U
1,2-Dichloropropane	--	12 U	12 U	12 U	11 U	12 U
cis-1,3-Dichloropropene	--	12 U	12 U	12 U	11 U	12 U
Trichloroethene	700	12 U	12 U	3 J	11 U	12 U
Dibromochloromethane	--	12 U	12 U	12 U	11 U	12 U
1,1,2-Trichloroethane	--	12 U	12 U	12 U	11 U	12 U
Benzene	60	12 U	12 U	12 U	2 JB	12 U
trans-1,3-Dichloropropene	--	12 U	12 U	12 U	11 U	12 U
Bromoform	--	12 U	12 U	12 U	11 U	12 U
4-Methyl-2-pentanone	1,000	12 U	12 U	12 U	11 U	12 U
2-Hexanone	--	12 U	12 U	12 U	11 U	12 U
Tetrachloroethene	1,400	12 U	12 U	12 U	11 U	12 U
1,1,2,2-Tetrachloroethane	60	12 U	12 U	12 U	11 U	12 U
Toluene	1,500	12 U	12 U	12 U	1 JB	12 U
Chlorobenzene	1,700	7 J	12 U	12 U	11 U	12 U
Ethylbenzene	5,500	12 U	12 U	12 U	11 U	12 U
Styrene	--	12 U	12 U	12 U	11 U	12 U
Xylene (total)	1,200	12 U	12 U	12 U	2 J	12 U

Table 5. Summary of Volatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-10	CB-10	CB-11	CB-11	CB-12
	Sample Depth (ft bls):	0-2	2-4	0-2	2-4	0-2
	Sample Date:	7/13/95	7/13/95	7/14/95	7/14/95	7/12/95
Volatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Chloromethane	--	11 U	11 U	10 U	12 U	11 U
Bromomethane	--	11 U	11 U	10 U	12 U	11 U
Vinyl Chloride	200	11 U	11 U	10 U	12 U	11 U
Chloroethane	1,900	11 U	11 U	10 U	12 U	11 U
Methylene Chloride	100	5 JB	10 JB	5 JB	4 JB	3 JB
Acetone	200	11 U	6 J	12	8 J	11 U
Carbon Disulfide	2,700	11 U	11 U	10 U	8 U	11 U
1,1-Dichloroethene	400	11 U	11 U	10 U	12 U	11 U
1,1-Dichloroethane	200	11 U	11 U	10 U	12 U	11 U
1,2-Dichloroethene (total)	300	11 U	11 U	10 U	12 U	11 U
Chloroform	300	11 U	11 U	10 U	12 U	11 U
1,2-Dichloroethane	100	11 U	11 U	10 U	12 U	11 U
2-Butanone	300	11 U	11 U	5 J	12 U	11 U
1,1,1-Trichloroethane	800	11 U	11 U	10 U	12 U	11 U
Carbon Tetrachloride	600	11 U	11 U	10 U	12 U	11 U
Bromodichloromethane	--	11 U	11 U	10 U	12 U	11 U
1,2-Dichloropropane	--	11 U	11 U	10 U	12 U	11 U
cis-1,3-Dichloropropene	--	11 U	11 U	10 U	12 U	11 U
Trichloroethene	700	11 U	11 U	10 U	12 U	11 U
Dibromochloromethane	--	11 U	11 U	10 U	12 U	11 U
1,1,2-Trichloroethane	--	11 U	11 U	10 U	12 U	11 U
Benzene	60	11 U	11 U	10 U	12 U	11 U
trans-1,3-Dichloropropene	--	11 U	11 U	10 U	12 U	11 U
Bromoform	--	11 U	11 U	10 U	12 U	11 U
4-Methyl-2-pentanone	1,000	11 U	11 U	11	12 U	11 U
2-Hexanone	--	11 U	11 U	10 U	12 U	11 U
Tetrachloroethene	1,400	11 U	11 U	2 J	12 U	11 U
1,1,2,2-Tetrachloroethane	60	11 U	11 U	10 U	12 U	11 U
Toluene	1,500	11 U	11 U	1 J	12 U	11 U
Chlorobenzene	1,700	11 U	11 U	10 U	12 U	11 U
Ethylbenzene	5,500	11 U	11 U	10 U	12 U	11 U
Styrene	--	11 U	11 U	10 U	12 U	11 U
Xylene (total)	1,200	11 U	11 U	10 U	12 U	11 U

Table 5. Summary of Volatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Volatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)	Sample Designation: CB-12 Sample Depth (ft bls): 2-4 Sample Date: 7/12/95	CB-13 0-2 7/12/95	CB-13 2-4 7/12/95
Chloromethane	--	12 U	11 U	12 U
Bromomethane	--	12 U	11 U	12 U
Vinyl Chloride	200	12 U	11 U	12 U
Chloroethane	1,900	12 U	11 U	12 U
Methylene Chloride	100	4 JB	6 JB	4 JB
Acetone	200	5 J	9 J	15
Carbon Disulfide	2,700	12 U	11 U	12 U
1,1-Dichloroethene	400	12 U	11 U	12 U
1,1-Dichloroethane	200	12 U	11 U	12 U
1,2-Dichloroethene (total)	300	12 U	8 J	12 U
Chloroform	300	12 U	11 U	12 U
1,2-Dichloroethane	100	12 U	11 U	12 U
2-Butanone	300	12 U	11 U	12 U
1,1,1-Trichloroethane	800	12 U	11 U	12 U
Carbon Tetrachloride	600	12 U	11 U	12 U
Bromodichloromethane	--	12 U	11 U	12 U
1,2-Dichloropropane	--	12 U	11 U	12 U
cis-1,3-Dichloropropene	--	12 U	11 U	12 U
Trichloroethene	700	12 U	2 J	12 U
Dibromochloromethane	--	12 U	11 U	12 U
1,1,2-Trichloroethane	--	12 U	11 U	12 U
Benzene	60	12 U	11 U	12 U
trans-1,3-Dichloropropene	--	12 U	11 U	12 U
Bromoform	--	12 U	11 U	12 U
4-Methyl-2-pentanone	1,000	12 U	11 U	12 U
2-Hexanone	--	12 U	11 U	12 U
Tetrachloroethene	1,400	12 U	7 J	12 U
1,1,2,2-Tetrachloroethane	60	12 U	11 U	12 U
Toluene	1,500	12 U	11 U	12 U
Chlorobenzene	1,700	12 U	11 U	12 U
Ethylbenzene	5,500	12 U	11 U	12 U
Styrene	--	12 U	11 U	12 U
Xylene (total)	1,200	12 U	11 U	12 U

µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
U - Indicates compound not detected
J - Estimated value
B - Analyte detected in associated blank sample
* - Field duplicate

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-1	CB-1DL	CB-1	CB-2	CB-2
	Sample Depth (ft bls):	0-2	0-2	2-4	0-2	2-4
	Sample Date:	7/13/95	7/13/95	7/13/95	7/13/95	7/13/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Phenol	30	400 U	2000 U	430 U	410 U	370 U
bis(2-Chloroethyl)ether	--	400 U	2000 U	430 U	410 U	370 U
2-Chlorophenol	800	400 U	2000 U	430 U	410 U	370 U
1,3-Dichlorobenzene	1,600	400 U	2000 U	430 U	410 U	370 U
1,4-Dichlorobenzene	8,500	400 U	2000 U	430 U	410 U	370 U
1,2-Dichlorobenzene	7,900	400 U	2000 U	430 U	410 U	370 U
2-Methylphenol	100	400 U	2000 U	430 U	410 U	370 U
2,2'-oxybis(1-Chloropropane)	--	400 U	2000 U	430 U	410 U	370 U
4-Methylphenol	900	400 U	2000 U	430 U	410 U	370 U
N-Nitroso-di-n-propylamine	--	400 U	2000 U	430 U	410 U	370 U
Hexachloroethane	--	400 U	2000 U	430 U	410 U	370 U
Nitrobenzene	200	400 U	2000 U	430 U	410 U	370 U
Isophorone	--	400 U	2000 U	430 U	410 U	370 U
2-Nitrophenol	330	400 U	2000 U	430 U	410 U	370 U
2,4-Dimethylphenol	--	400 U	2000 U	430 U	410 U	370 U
2,4-Dichlorophenol	400	400 U	2000 U	430 U	410 U	370 U
1,2,4-Trichlorobenzene	3,400	400 U	2000 U	430 U	410 U	370 U
Naphthalene	13,000	400 U	2000 U	430 U	410 U	370 U
4-Chloroaniline	220	400 U	2000 U	430 U	410 U	370 U
Hexachlorobutadiene	--	400 U	2000 U	430 U	410 U	370 U
bis(2-Chloroethoxy)methane	--	400 U	2000 U	430 U	410 U	370 U
4-Chloro-3-Methylphenol	240	400 U	2000 U	430 U	410 U	370 U
2-Methylnaphthalene	36,400	400 U	2000 U	430 U	410 U	370 U
Hexachlorocyclopentadiene	--	400 U	2000 U	430 U	410 U	370 U
2,4,6-Trichlorophenol	--	400 U	2000 U	430 U	410 U	370 U
2,4,5-Trichlorophenol	100	960 U	4800 U	1000 U	980 U	890 U
2-Chloronaphthalene	--	400 U	2000 U	430 U	410 U	370 U
2-Nitroaniline	430	960 U	4800 U	1000 U	980 U	890 U
Dimethylphthalate	2,000	400 U	2000 U	430 U	410 U	370 U
Acenaphthylene	41,000	400 U	2000 U	430 U	410 U	370 U
2,6-Dinitrotoluene	1,000	400 U	2000 U	430 U	410 U	370 U
3-Nitroaniline	500	960 U	4800 U	1000 U	980 U	890 U
Acenaphthene	50,000	120 J	2000 U	430 U	410 U	370 U
2,4-Dinitrophenol	200	960 U	4800 U	1000 U	980 U	890 U
4-Nitrophenol	100	960 U	4800 U	1000 U	980 U	890 U
Dibenzofuran	6,200	71 J	2000 U	430 U	410 U	370 U
2,4-Dinitrotoluene	--	400 U	2000 U	430 U	410 U	370 U
Diethylphthalate	7,100	400 U	2000 U	430 U	410 U	370 U
4-Chlorophenyl-phenylether	--	400 U	2000 U	430 U	410 U	370 U
Fluorene	50,000	240 J	2000 U	430 U	410 U	370 U
4-Nitroaniline	--	960 U	4800 U	1000 U	980 U	890 U
4,6-Dinitro-2-methylphenol	--	960 U	4800 U	1000 U	980 U	890 U
N-Nitrosodiphenylamine (1)	--	400 U	2000 U	430 U	410 U	370 U
4-Bromophenyl-phenylether	--	400 U	2000 U	430 U	410 U	370 U

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Semivolatile Organic Compounds (Concentrations in µg/kg)	Sample Designation: Sample Depth (ft bls): Sample Date: NYSDEC RSCOs (µg/kg)	CB-1 0-2 7/13/95	CB-1DL 0-2 7/13/95	CB-1 2-4 7/13/95	CB-2 0-2 7/13/95	CB-2 2-4 7/13/95
Hexachlorobenzene	410	400 U	2000 U	430 U	410 U	370 U
Pentachlorophenol	1,000	960 U	4800 U	1000 U	980 U	890 U
Phenanthrene	50,000	8900 E	9000 D	430 U	200 J	180 J
Anthracene	50,000	1600	1600 JD	430 U	44 J	58 J
Carbazole	--	1200	1400 JD	430 U	410 U	370 U
Di-n-butylphthalate	8,100	400 U	2000 U	430 U	410 U	370 U
Fluoranthene	50,000	8200 E	9600 D	500	280 J	330 J
Pyrene	50,000	9800 E	9500 D	460	280 J	310 J
Butylbenzylphthalate	50,000	400 U	2000 U	430 U	410 U	370 U
3,3'-Dichlorobenzidine	--	400 U	2000 U	430 U	410 U	370 U
Benzo (a) anthracene	220	**5100 E**	**4900 D**	180 J	160 J	220 J
Chrysene	400	**6100 E**	**5500 D**	180 J	160 J	210 J
bis(2-Ethylhexyl)phthalate	50,000	400 U	2000 U	430 U	410 U	370 U
Di-n-octylphthalate	50,000	400 U	2000 U	430 U	410 U	370 U
Benzo(b)fluoranthene	1,100	**4900 E**	**3500 D**	110 J	140 J	240 J
Benzo(k)fluoranthene	1,100	**1800**	**3100 D**	100 J	120 J	82 J
Benzo(a)pyrene	61	**4300 E**	**4200 D**	430 U	**130 J**	**170 J**
Indeno(1,2,3-cd)pyrene	3,200	1700	1700 JD	430 U	72 J	88 J
Dibenzo(a,h)anthracene	14	**160 J**	**530 JD**	430 U	410 U	370 U
Benzo(g,h,i)perylene	50,000	1900	2100 D	430 U	89 J	91 J

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-3	CB-3DL	CB-3	CB-4	CB-4
	Sample Depth (ft bls):	0-2	0-2	4-6	0-2	2-4
	Sample Date:	7/13/95	7/13/95	7/13/95	7/13/95	7/13/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Phenol	30	380 U	1900 U	390 U	440 U	410 U
bis(2-Chloroethyl)ether	--	380 U	1900 U	390 U	440 U	410 U
2-Chlorophenol	800	380 U	1900 U	390 U	440 U	410 U
1,3-Dichlorobenzene	1,600	380 U	1900 U	390 U	440 U	410 U
1,4-Dichlorobenzene	8,500	380 U	1900 U	390 U	440 U	410 U
1,2-Dichlorobenzene	7,900	380 U	1900 U	390 U	440 U	410 U
2-Methylphenol	100	380 U	1900 U	390 U	440 U	410 U
2,2'-oxybis(1-Chloropropane)	--	380 U	1900 U	390 U	440 U	410 U
4-Methylphenol	900	380 U	1900 U	390 U	440 U	410 U
N-Nitroso-di-n-propylamine	--	380 U	1900 U	390 U	440 U	410 U
Hexachloroethane	--	380 U	1900 U	390 U	440 U	410 U
Nitrobenzene	200	380 U	1900 U	390 U	440 U	410 U
Isophorone	--	380 U	1900 U	390 U	440 U	410 U
2-Nitrophenol	330	380 U	1900 U	390 U	440 U	410 U
2,4-Dimethylphenol	--	380 U	1900 U	390 U	440 U	410 U
2,4-Dichlorophenol	400	380 U	1900 U	390 U	440 U	410 U
1,2,4-Trichlorobenzene	3,400	380 U	1900 U	390 U	440 U	410 U
Naphthalene	13,000	380 U	1900 U	390 U	440 U	410 U
4-Chloroaniline	220	380 U	1900 U	390 U	440 U	410 U
Hexachlorobutadiene	--	380 U	1900 U	390 U	440 U	410 U
bis(2-Chloroethoxy)methane	--	380 U	1900 U	390 U	440 U	410 U
4-Chloro-3-Methylphenol	240	380 U	1900 U	390 U	440 U	410 U
2-Methylnaphthalene	36,400	380 U	1900 U	390 U	440 U	410 U
Hexachlorocyclopentadiene	--	380 U	1900 U	390 U	440 U	410 U
2,4,6-Trichlorophenol	--	380 U	1900 U	390 U	440 U	410 U
2,4,5-Trichlorophenol	100	910 U	4500 U	930 U	1000 U	980 U
2-Chloronaphthalene	--	380 U	1900 U	390 U	440 U	410 U
2-Nitroaniline	430	910 U	4500 U	930 U	1000 U	980 U
Dimethylphthalate	2,000	380 U	1900 U	390 U	440 U	410 U
Acenaphthylene	41,000	380 U	1900 U	390 U	440 U	410 U
2,6-Dinitrotoluene	1,000	380 U	1900 U	390 U	440 U	410 U
3-Nitroaniline	500	910 U	4500 U	930 U	1000 U	980 U
Acenaphthene	50,000	100 J	1900 U	390 U	440 U	410 U
2,4-Dinitrophenol	200	910 U	4500 U	930 U	1000 U	980 U
4-Nitrophenol	100	910 U	4500 U	930 U	1000 U	980 U
Dibenzofuran	6,200	53 J	1900 U	390 U	440 U	410 U
2,4-Dinitrotoluene	--	380 U	1900 U	390 U	440 U	410 U
Diethylphthalate	7,100	380 U	1900 U	390 U	440 U	410 U
4-Chlorophenyl-phenylether	--	380 U	1900 U	390 U	440 U	410 U
Fluorene	50,000	210 J	1900 U	390 U	440 U	410 U
4-Nitroaniline	--	910 U	4500 U	930 U	1000 U	980 U
4,6-Dinitro-2-methylphenol	--	910 U	4500 U	930 U	1000 U	980 U
N-Nitrosodiphenylamine (1)	--	380 U	1900 U	390 U	440 U	410 U
4-Bromophenyl-phenylether	--	380 U	1900 U	390 U	440 U	410 U

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-3	CB-3DL	CB-3	CB-4	CB-4
	Sample Depth (ft bls):	0-2	0-2	4-6	0-2	2-4
	Sample Date:	7/13/95	7/13/95	7/13/95	7/13/95	7/13/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Hexachlorobenzene	410	380 U	1900 U	390 U	440 U	410 U
Pentachlorophenol	1,000	910 U	4500 U	930 U	1000 U	980 U
Phenanthrene	50,000	7200 E	7100 D	390 U	160 J	130 J
Anthracene	50,000	1300	1500 JD	390 U	59 J	52 J
Carbazole	--	1200	1200 JD	390 U	440 U	410 U
Di-n-butylphthalate	8,100	380 U	1900 U	390 U	440 U	410 U
Fluoranthene	50,000	7200 E	6600 D	75 J	290 J	210 J
Pyrene	50,000	6300 E	7300 D	67 J	240 J	140 J
Butylbenzylphthalate	50,000	240 J	1900 U	390 U	440 U	410 U
3,3'-Dichlorobenzidine	--	380 U	1900 U	390 U	440 U	410 U
Benzo (a) anthracene	220	**3800 E**	**3400 D**	390 U	160 J	410 U
Chrysene	400	**4500 E**	**4000 D**	390 U	160 J	410 U
bis(2-Ethylhexyl)phthalate	50,000	160 J	1900 U	390 U	440 U	410 U
Di-n-octylphthalate	50,000	45 J	1900 U	390 U	440 U	410 U
Benzo(b)fluoranthene	1,100	**2500**	**3000 D**	390 U	220 J	94 J
Benzo(k)fluoranthene	1,100	**2400**	1100 JD	390 U	190 J	100 J
Benzo(a)pyrene	61	**3100 E**	**2900 D**	390 U	**150 J**	**82 J**
Indeno(1,2,3-cd)pyrene	3,200	870	1100 JD	390 U	170 J	89 J
Dibenzo(a,h)anthracene	14	**81 J**	**450 JD**	390 U	440 U	410 U
Benzo(g,h,i)perylene	50,000	1100	1400 JD	390 U	180 J	95 J

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-5	CB-5	CB-6	CB-6*	CB-6
	Sample Depth (ft bls):	0-2	2-4	0-2	0-2	2-4
	Sample Date:	7/12/95	7/12/95	7/12/95	7/12/95	7/12/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Phenol	30	380 U	430 U	390 U	410 U	400 U
bis(2-Chloroethyl)ether	--	380 U	430 U	390 U	410 U	400 U
2-Chlorophenol	800	380 U	430 U	390 U	410 U	400 U
1,3-Dichlorobenzene	1,600	380 U	430 U	390 U	410 U	400 U
1,4-Dichlorobenzene	8,500	380 U	430 U	390 U	410 U	400 U
1,2-Dichlorobenzene	7,900	380 U	430 U	390 U	410 U	400 U
2-Methylphenol	100	380 U	430 U	390 U	410 U	400 U
2,2'-oxybis(1-Chloropropane)	--	380 U	430 U	390 U	410 U	400 U
4-Methylphenol	900	380 U	430 U	390 U	410 U	400 U
N-Nitroso-di-n-propylamine	--	380 U	430 U	390 U	410 U	400 U
Hexachloroethane	--	380 U	430 U	390 U	410 U	400 U
Nitrobenzene	200	380 U	430 U	390 U	410 U	400 U
Isophorone	--	380 U	430 U	390 U	410 U	400 U
2-Nitrophenol	330	380 U	430 U	390 U	410 U	400 U
2,4-Dimethylphenol	--	380 U	430 U	390 U	410 U	400 U
2,4-Dichlorophenol	400	380 U	430 U	390 U	410 U	400 U
1,2,4-Trichlorobenzene	3,400	380 U	430 U	390 U	410 U	400 U
Naphthalene	13,000	380 U	430 U	390 U	410 U	400 U
4-Chloroaniline	220	380 U	430 U	390 U	410 U	400 U
Hexachlorobutadiene	--	380 U	430 U	390 U	410 U	400 U
bis(2-Chloroethoxy)methane	--	380 U	430 U	390 U	410 U	400 U
4-Chloro-3-Methylphenol	240	380 U	430 U	390 U	410 U	400 U
2-Methylnaphthalene	36,400	380 U	430 U	390 U	410 U	400 U
Hexachlorocyclopentadiene	--	380 U	430 U	390 U	410 U	400 U
2,4,6-Trichlorophenol	--	380 U	430 U	390 U	410 U	400 U
2,4,5-Trichlorophenol	100	920 U	1000 U	940 U	980 U	950 U
2-Chloronaphthalene	--	380 U	430 U	390 U	410 U	400 U
2-Nitroaniline	430	920 U	1000 U	940 U	980 U	950 U
Dimethylphthalate	2,000	380 U	430 U	390 U	410 U	400 U
Acenaphthylene	41,000	380 U	430 U	58 J	60 J	400 U
2,6-Dinitrotoluene	1,000	380 U	430 U	390 U	410 U	400 U
3-Nitroaniline	500	920 U	1000 U	940 U	980 U	950 U
Acenaphthene	50,000	380 U	430 U	150 J	140 J	400 U
2,4-Dinitrophenol	200	920 U	1000 U	940 U	980 U	950 U
4-Nitrophenol	100	920 U	1000 U	940 U	980 U	950 U
Dibenzofuran	6,200	380 U	430 U	73 J	410 U	400 U
2,4-Dinitrotoluene	--	380 U	430 U	390 U	410 U	400 U
Diethylphthalate	7,100	380 U	430 U	390 U	410 U	400 U
4-Chlorophenyl-phenylether	--	380 U	430 U	390 U	410 U	400 U
Fluorene	50,000	380 U	430 U	140 J	120 J	400 U
4-Nitroaniline	--	920 U	1000 U	940 U	980 U	950 U
4,6-Dinitro-2-methylphenol	--	920 U	1000 U	940 U	980 U	950 U
N-Nitrosodiphenylamine (1)	--	380 U	430 U	390 U	410 U	400 U
4-Bromophenyl-phenylether	--	380 U	430 U	390 U	410 U	400 U

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-5	CB-5	CB-6	CB-6*	CB-6
	Sample Depth (ft bls):	0-2	2-4	0-2	0-2	2-4
	Sample Date:	7/12/95	7/12/95	7/12/95	7/12/95	7/12/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Hexachlorobenzene	410	380 U	430 U	390 U	410 U	400 U
Pentachlorophenol	1,000	920 U	1000 U	940 U	980 U	950 U
Phenanthrene	50,000	650	150 J	1400	1500	590
Anthracene	50,000	180 J	430 U	440	380 J	190 J
Carbazole	--	73 J	430 U	120 J	94 J	400 U
Di-n-butylphthalate	8,100	380 U	430 U	390 U	2100	650
Fluoranthene	50,000	1000	180 J	3000	3200	1100
Pyrene	50,000	550	110 J	1400	1700	550
Butylbenzylphthalate	50,000	380 U	430 U	390 U	410 U	400 U
3,3'-Dichlorobenzidine	--	380 U	430 U	390 U	410 U	400 U
Benzo (a) anthracene	220	**440**	75 J	**1100**	**1200**	**430**
Chrysene	400	**490**	120 J	**1200**	**1200**	**430**
bis(2-Ethylhexyl)phthalate	50,000	380 U	430 U	65 J	150 J	310 J
Di-n-octylphthalate	50,000	78 J	44 J	70 J	120 J	280 J
Benzo(b)fluoranthene	1,100	290 J	60 J	770	940	320 J
Benzo(k)fluoranthene	1,100	310 J	52 J	1100	1100	370 J
Benzo(a)pyrene	61	**380 J**	60 J	**1000**	**1100**	**380 J**
Indeno(1,2,3-cd)pyrene	3,200	120 J	430 U	240 J	240 J	91 J
Dibenzo(a,h)anthracene	14	380 U	430 U	390 U	410 U	400 U
Benzo(g,h,i)perylene	50,000	110 J	430 U	210 J	200 J	78 J

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-7	CB-7	CB-8	CB-8	CB-9
	Sample Depth (ft bls):	0-2	2-4	0-2	2-4	0-2
	Sample Date:	7/12/95	7/12/95	7/14/95	7/14/95	7/14/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Phenol	30	400 U	390 U	390 U	410 U	4000 U
bis(2-Chloroethyl)ether	--	400 U	390 U	390 U	410 U	4000 U
2-Chlorophenol	800	400 U	390 U	390 U	410 U	4000 U
1,3-Dichlorobenzene	1,600	400 U	390 U	390 U	410 U	4000 U
1,4-Dichlorobenzene	8,500	400 U	390 U	390 U	410 U	4000 U
1,2-Dichlorobenzene	7,900	400 U	390 U	390 U	410 U	4000 U
2-Methylphenol	100	400 U	390 U	390 U	410 U	4000 U
2,2'-oxybis(1-Chloropropane)	--	400 U	390 U	390 U	410 U	4000 U
4-Methylphenol	900	400 U	390 U	390 U	410 U	4000 U
N-Nitroso-di-n-propylamine	--	400 U	390 U	390 U	410 U	4000 U
Hexachloroethane	--	400 U	390 U	390 U	410 U	4000 U
Nitrobenzene	200	400 U	390 U	390 U	410 U	4000 U
Isophorone	--	400 U	390 U	390 U	410 U	4000 U
2-Nitrophenol	330	400 U	390 U	390 U	410 U	4000 U
2,4-Dimethylphenol	--	400 U	390 U	390 U	410 U	4000 U
2,4-Dichlorophenol	400	400 U	390 U	390 U	410 U	4000 U
1,2,4-Trichlorobenzene	3,400	400 U	390 U	390 U	410 U	4000 U
Naphthalene	13,000	400 U	390 U	390 U	410 U	4000 U
4-Chloroaniline	220	400 U	390 U	390 U	410 U	4000 U
Hexachlorobutadiene	--	400 U	390 U	390 U	410 U	4000 U
bis(2-Chloroethoxy)methane	--	400 U	390 U	390 U	410 U	4000 U
4-Chloro-3-Methylphenol	240	400 U	390 U	390 U	410 U	4000 U
2-Methylnaphthalene	36,400	400 U	390 U	390 U	410 U	4000 U
Hexachlorocyclopentadiene	--	400 U	390 U	390 U	410 U	4000 U
2,4,6-Trichlorophenol	--	400 U	390 U	390 U	410 U	4000 U
2,4,5-Trichlorophenol	100	960 U	930 U	940 U	980 U	9500 U
2-Chloronaphthalene	--	400 U	390 U	390 U	410 U	4000 U
2-Nitroaniline	430	960 U	930 U	940 U	980 U	9500 U
Dimethylphthalate	2,000	400 U	390 U	390 U	410 U	4000 U
Acenaphthylene	41,000	400 U	390 U	390 U	410 U	4000 U
2,6-Dinitrotoluene	1,000	400 U	390 U	390 U	410 U	4000 U
3-Nitroaniline	500	960 U	930 U	940 U	980 U	9500 U
Acenaphthene	50,000	400 U	390 U	390 U	410 U	4000 U
2,4-Dinitrophenol	200	960 U	930 U	940 U	980 U	9500 U
4-Nitrophenol	100	960 U	930 U	940 U	980 U	9500 U
Dibenzofuran	6,200	400 U	390 U	390 U	410 U	4000 U
2,4-Dinitrotoluene	--	400 U	390 U	390 U	410 U	4000 U
Diethylphthalate	7,100	400 U	390 U	390 U	410 U	4000 U
4-Chlorophenyl-phenylether	--	400 U	390 U	390 U	410 U	4000 U
Fluorene	50,000	400 U	390 U	390 U	410 U	4000 U
4-Nitroaniline	--	960 U	930 U	940 U	980 U	9500 U
4,6-Dinitro-2-methylphenol	--	960 U	930 U	940 U	980 U	9500 U
N-Nitrosodiphenylamine (1)	--	400 U	390 U	390 U	410 U	4000 U
4-Bromophenyl-phenylether	--	400 U	390 U	390 U	410 U	4000 U

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-7	CB-7	CB-8	CB-8	CB-9
	Sample Depth (ft bls):	0-2	2-4	0-2	2-4	0-2
	Sample Date:	7/12/95	7/12/95	7/14/95	7/14/95	7/14/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Hexachlorobenzene	410	400 U	390 U	390 U	410 U	4000 U
Pentachlorophenol	1,000	960 U	930 U	940 U	980 U	9500 U
Phenanthrene	50,000	570	390 U	580	410 U	13000
Anthracene	50,000	180 J	390 U	150 J	410 U	2900 J
Carbazole	--	400 U	390 U	390 U	410 U	4000 U
Di-n-butylphthalate	8,100	400 U	390 U	390 U	410 U	4000 U
Fluoranthene	50,000	1500	390 U	1400	410 U	16000
Pyrene	50,000	840	390 U	1100	410 U	9600
Butylbenzylphthalate	50,000	400 U	390 U	390 U	410 U	4000 U
3,3'-Dichlorobenzidine	--	400 U	390 U	390 U	410 U	4000 U
Benzo (a) anthracene	220	**720**	390 U	**820**	410 U	**6500**
Chrysene	400	**760**	390 U	**920**	410 U	**7300**
bis(2-Ethylhexyl)phthalate	50,000	400 U	390 U	390 U	410 U	1400 J
Di-n-octylphthalate	50,000	44 J	390 U	390 U	410 U	4000 U
Benzo(b)fluoranthene	1,100	570	390 U	760	410 U	**5700**
Benzo(k)fluoranthene	1,100	490	390 U	250 J	410 U	**1900 J**
Benzo(a)pyrene	61	**610**	**75 J**	**680**	410 U	**4600**
Indeno(1,2,3-cd)pyrene	3,200	170 J	390 U	440	410 U	1300 J
Dibenzo(a,h)anthracene	14	400 U	390 U	**48 J**	410 U	4000 U
Benzo(g,h,i)perylene	50,000	120 J	390 U	540	410 U	1300 J

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation:		CB-9*	CB-9	CB-10	CB-10DL	CB-10
Sample Depth (ft bls):		0-2	2-4	0-2	0-2	2-4
Sample Date:		7/14/95	7/14/95	7/13/95	7/13/95	7/13/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Phenol	30	7600 U	400 U	380 U	7600 U	370 U
bis(2-Chloroethyl)ether	--	7600 U	400 U	380 U	7600 U	370 U
2-Chlorophenol	800	7600 U	400 U	380 U	7600 U	370 U
1,3-Dichlorobenzene	1,600	7600 U	400 U	380 U	7600 U	370 U
1,4-Dichlorobenzene	8,500	7600 U	400 U	380 U	7600 U	370 U
1,2-Dichlorobenzene	7,900	7600 U	400 U	380 U	7600 U	370 U
2-Methylphenol	100	7600 U	400 U	380 U	7600 U	370 U
2,2'-oxybis(1-Chloropropane)	--	7600 U	400 U	380 U	7600 U	370 U
4-Methylphenol	900	7600 U	400 U	380 U	7600 U	370 U
N-Nitroso-di-n-propylamine	--	7600 U	400 U	380 U	7600 U	370 U
Hexachloroethane	--	7600 U	400 U	380 U	7600 U	370 U
Nitrobenzene	200	7600 U	400 U	380 U	7600 U	370 U
Isophorone	--	7600 U	400 U	380 U	7600 U	370 U
2-Nitrophenol	330	7600 U	400 U	380 U	7600 U	370 U
2,4-Dimethylphenol	--	7600 U	400 U	380 U	7600 U	370 U
2,4-Dichlorophenol	400	7600 U	400 U	380 U	7600 U	370 U
1,2,4-Trichlorobenzene	3,400	7600 U	400 U	380 U	7600 U	370 U
Naphthalene	13,000	7600 U	400 U	1400	7600 U	370 U
4-Chloroaniline	220	7600 U	400 U	380 U	7600 U	370 U
Hexachlorobutadiene	--	7600 U	400 U	380 U	7600 U	370 U
bis(2-Chloroethoxy)methane	--	7600 U	400 U	380 U	7600 U	370 U
4-Chloro-3-Methylphenol	240	7600 U	400 U	380 U	7600 U	370 U
2-Methylnaphthalene	36,400	7600 U	400 U	770	7600 U	370 U
Hexachlorocyclopentadiene	--	7600 U	400 U	380 U	7600 U	370 U
2,4,6-Trichlorophenol	--	7600 U	400 U	380 U	7600 U	370 U
2,4,5-Trichlorophenol	100	18000 U	970 U	910 U	18000 U	900 U
2-Chloronaphthalene	--	7600 U	400 U	380 U	7600 U	370 U
2-Nitroaniline	430	18000 U	970 U	910 U	18000 U	900 U
Dimethylphthalate	2,000	7600 U	400 U	380 U	7600 U	370 U
Acenaphthylene	41,000	7600 U	400 U	840	1700 JD	370 U
2,6-Dinitrotoluene	1,000	7600 U	400 U	380 U	7600 U	370 U
3-Nitroaniline	500	18000 U	970 U	910 U	18000 U	900 U
Acenaphthene	50,000	7600 U	400 U	1600	7600 U	370 U
2,4-Dinitrophenol	200	18000 U	970 U	910 U	18000 U	900 U
4-Nitrophenol	100	18000 U	970 U	910 U	18000 U	900 U
Dibenzofuran	6,200	2800 J	400 U	1700	1800 JD	370 U
2,4-Dinitrotoluene	--	7600 U	400 U	380 U	7600 U	370 U
Diethylphthalate	7,100	7600 U	400 U	380 U	7600 U	370 U
4-Chlorophenyl-phenylether	--	7600 U	400 U	380 U	7600 U	370 U
Fluorene	50,000	7600 U	400 U	2300	2600 JD	370 U
4-Nitroaniline	--	18000 U	970 U	910 U	18000 U	900 U
4,6-Dinitro-2-methylphenol	--	18000 U	970 U	910 U	18000 U	900 U
N-Nitrosodiphenylamine (1)	--	7600 U	400 U	380 U	7600 U	370 U
4-Bromophenyl-phenylether	--	7600 U	400 U	380 U	7600 U	370 U

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation: Sample Depth (ft bls): Sample Date:	CB-9* 0-2 7/14/95	CB-9 2-4 7/14/95	CB-10 0-2 7/13/95	CB-10DL 0-2 7/13/95	CB-10 2-4 7/13/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Hexachlorobenzene	410	7600 U	400 U	380 U	7600 U	370 U
Pentachlorophenol	1,000	18000 U	970 U	910 U	18000 U	900 U
Phenanthrene	50,000	42000	470	21000 E	26000 D	370 U
Anthracene	50,000	9900	100 J	5000 E	6200 JD	370 U
Carbazole	--	7600 U	400 U	2700	3100 JD	370 U
Di-n-butylphthalate	8,100	7600 U	400 U	320 J	7600 U	370 U
Fluoranthene	50,000	45000	690	27000 E	34000 D	220 J
Pyrene	50,000	26000	450	17000 E	16000 D	220 J
Butylbenzylphthalate	50,000	5000 J	400 U	380 U	7600 U	370 U
3,3'-Dichlorobenzidine	--	7600 U	400 U	380 U	7600 U	370 U
Benzo (a) anthracene	220	**17000**	**280 J**	**12000 E**	**15000 D**	140 J
Chrysene	400	**18000**	290 J	**13000 E**	**15000 D**	160 J
bis(2-Ethylhexyl)phthalate	50,000	5500 J	400 U	620	7600 U	370 U
Di-n-octylphthalate	50,000	7600 U	400 U	380 U	7600 U	370 U
Benzo(b)fluoranthene	1,100	**15000**	190 J	**13000 E**	**10000 D**	110 J
Benzo(k)fluoranthene	1,100	**4400 J**	160 J	**8600 E**	**11000 D**	45 J
Benzo(a)pyrene	61	**11000**	**210 J**	**11000 E**	**11000 D**	370 U
Indeno(1,2,3-cd)pyrene	3,200	3200 J	86 J	**4200 E**	**3500 JD**	370 U
Dibenzo(a,h)anthracene	14	7600 U	400 U	380 U	7600 U	370 U
Benzo(g,h,i)perylene	50,000	2700 J	80 J	4100 E	3000 JD	370 U

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-11	CB-11	CB-12	CB-12DL	CB-12
	Sample Depth (ft bls):	0-2	2-4	0-2	0-2	4-6
	Sample Date:	7/14/95	7/14/95	7/12/95	7/12/95	7/12/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Phenol	30	6800 U	400 U	400 U	2000 U	400 U
bis(2-Chloroethyl)ether	--	6800 U	400 U	400 U	2000 U	400 U
2-Chlorophenol	800	6800 U	400 U	400 U	2000 U	400 U
1,3-Dichlorobenzene	1,600	6800 U	400 U	400 U	2000 U	400 U
1,4-Dichlorobenzene	8,500	6800 U	400 U	400 U	2000 U	400 U
1,2-Dichlorobenzene	7,900	6800 U	400 U	400 U	2000 U	400 U
2-Methylphenol	100	6800 U	400 U	400 U	2000 U	400 U
2,2'-oxybis(1-Chloropropane)	--	6800 U	400 U	400 U	2000 U	400 U
4-Methylphenol	900	6800 U	400 U	400 U	2000 U	400 U
N-Nitroso-di-n-propylamine	--	6800 U	400 U	400 U	2000 U	400 U
Hexachloroethane	--	6800 U	400 U	400 U	2000 U	400 U
Nitrobenzene	200	6800 U	400 U	400 U	2000 U	400 U
Isophorone	--	6800 U	400 U	400 U	2000 U	400 U
2-Nitrophenol	330	6800 U	400 U	400 U	2000 U	400 U
2,4-Dimethylphenol	--	6800 U	400 U	400 U	2000 U	400 U
2,4-Dichlorophenol	400	6800 U	400 U	400 U	2000 U	400 U
1,2,4-Trichlorobenzene	3,400	6800 U	400 U	400 U	2000 U	400 U
Naphthalene	13,000	6800 U	400 U	200 J	1200 JD	400 U
4-Chloroaniline	220	6800 U	400 U	400 U	2000 U	400 U
Hexachlorobutadiene	--	6800 U	400 U	400 U	2000 U	400 U
bis(2-Chloroethoxy)methane	--	6800 U	400 U	400 U	2000 U	400 U
4-Chloro-3-Methylphenol	240	6800 U	400 U	400 U	2000 U	400 U
2-Methylnaphthalene	36,400	6800 U	400 U	110 J	2000 U	400 U
Hexachlorocyclopentadiene	--	6800 U	400 U	400 U	2000 U	400 U
2,4,6-Trichlorophenol	--	6800 U	400 U	400 U	2000 U	400 U
2,4,5-Trichlorophenol	100	16000 U	950 U	950 U	4800 U	960 U
2-Chloronaphthalene	--	6800 U	400 U	400 U	2000 U	400 U
2-Nitroaniline	430	16000 U	950 U	950 U	4800 U	960 U
Dimethylphthalate	2,000	6800 U	400 U	100 J	2000 U	400 U
Acenaphthylene	41,000	6800 U	400 U	160 J	2000 U	400 U
2,6-Dinitrotoluene	1,000	6800 U	400 U	400 U	2000 U	400 U
3-Nitroaniline	500	16000 U	950 U	950 U	4800 U	960 U
Acenaphthene	50,000	6800 U	400 U	390 J	2000 U	400 U
2,4-Dinitrophenol	200	16000 U	950 U	950 U	4800 U	960 U
4-Nitrophenol	100	16000 U	950 U	950 U	4800 U	960 U
Dibenzofuran	6,200	6800 U	400 U	210 J	2000 U	400 U
2,4-Dinitrotoluene	--	6800 U	400 U	400 U	2000 U	400 U
Diethylphthalate	7,100	6800 U	400 U	400 U	2000 U	400 U
4-Chlorophenyl-phenylether	--	6800 U	400 U	400 U	2000 U	400 U
Fluorene	50,000	6800 U	400 U	310 J	2000 U	400 U
4-Nitroaniline	--	16000 U	950 U	950 U	4800 U	960 U
4,6-Dinitro-2-methylphenol	--	16000 U	950 U	950 U	4800 U	960 U
N-Nitrosodiphenylamine (1)	--	6800 U	400 U	400 U	2000 U	400 U
4-Bromophenyl-phenylether	--	6800 U	400 U	400 U	2000 U	400 U

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-11	CB-11	CB-12	CB-12DL	CB-12
	Sample Depth (ft bls):	0-2	2-4	0-2	0-2	4-6
	Sample Date:	7/14/95	7/14/95	7/12/95	7/12/95	7/12/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)					
Hexachlorobenzene	410	6800 U	400 U	400 U	2000 U	400 U
Pentachlorophenol	1,000	16000 U	950 U	950 U	4800 U	960 U
Phenanthrene	50,000	39000	780	5800 E	3600 D	400 U
Anthracene	50,000	7600	140 J	900	800 JD	400 U
Carbazole	--	3500 JB	400 U	380 J	2000 U	400 U
Di-n-butylphthalate	8,100	6800 U	400 U	420	2000 U	400 U
Fluoranthene	50,000	35000	1000	5600 E	3400 D	400 U
Pyrene	50,000	24000	660	4400 E	2500 D	400 U
Butylbenzylphthalate	50,000	6800 U	400 U	400 U	2000 U	400 U
3,3'-Dichlorobenzidine	--	6800 U	400 U	400 U	2000 U	400 U
Benzo (a) anthracene	220	**14000**	**450**	**2900**	**1600 JD**	400 U
Chrysene	400	**17000**	**510**	**3200 E**	**1800 JD**	400 U
bis(2-Ethylhexyl)phthalate	50,000	5100 J	400 U	220 J	2000 U	400 U
Di-n-octylphthalate	50,000	6800 U	400 U	160 J	2000 U	400 U
Benzo(b)fluoranthene	1,100	**8500**	310 J	**1800**	1100 JD	400 U
Benzo(k)fluoranthene	1,100	**7000**	280 J	**1200**	530 JD	400 U
Benzo(a)pyrene	61	**10000**	**320 J**	**2200**	**1000 JD**	400 U
Indeno(1,2,3-cd)pyrene	3,200	**4400 J**	190 J	1100	400 JD	400 U
Dibenzo(a,h)anthracene	14	**1400 J**	400 U	**87 J**	2000 U	400 U
Benzo(g,h,i)perylene	50,000	4900 J	180 J	1200	410 JD	400 U

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation:		CB-13	CB-13DL	CB-13
Sample Depth (ft bls):		0-2	0-2	2-4
Sample Date:		7/12/95	7/12/95	7/12/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)			
Phenol	30	400 U	810 U	390 U
bis(2-Chloroethyl)ether	--	400 U	810 U	390 U
2-Chlorophenol	800	400 U	810 U	390 U
1,3-Dichlorobenzene	1,600	400 U	810 U	390 U
1,4-Dichlorobenzene	8,500	400 U	810 U	390 U
1,2-Dichlorobenzene	7,900	400 U	810 U	390 U
2-Methylphenol	100	400 U	810 U	390 U
2,2'-oxybis(1-Chloropropane)	--	400 U	810 U	390 U
4-Methylphenol	900	400 U	810 U	390 U
N-Nitroso-di-n-propylamine	--	400 U	810 U	390 U
Hexachloroethane	--	400 U	810 U	390 U
Nitrobenzene	200	400 U	810 U	390 U
Isophorone	--	400 U	810 U	390 U
2-Nitrophenol	330	400 U	810 U	390 U
2,4-Dimethylphenol	--	400 U	810 U	390 U
2,4-Dichlorophenol	400	400 U	810 U	390 U
1,2,4-Trichlorobenzene	3,400	400 U	810 U	390 U
Naphthalene	13,000	110 J	810 U	390 U
4-Chloroaniline	220	400 U	810 U	390 U
Hexachlorobutadiene	--	400 U	810 U	390 U
bis(2-Chloroethoxy)methane	--	400 U	810 U	390 U
4-Chloro-3-Methylphenol	240	400 U	810 U	390 U
2-Methylnaphthalene	36,400	400 U	810 U	390 U
Hexachlorocyclopentadiene	--	400 U	810 U	390 U
2,4,6-Trichlorophenol	--	400 U	810 U	390 U
2,4,5-Trichlorophenol	100	970 U	1900 U	930 U
2-Chloronaphthalene	--	400 U	810 U	390 U
2-Nitroaniline	430	970 U	1900 U	930 U
Dimethylphthalate	2,000	400 U	810 U	390 U
Acenaphthylene	41,000	82 J	810 U	390 U
2,6-Dinitrotoluene	1,000	400 U	810 U	390 U
3-Nitroaniline	500	970 U	1900 U	930 U
Acenaphthene	50,000	140 J	810 U	390 U
2,4-Dinitrophenol	200	970 U	1900 U	930 U
4-Nitrophenol	100	970 U	1900 U	930 U
Dibenzofuran	6,200	110 J	810 U	390 U
2,4-Dinitrotoluene	--	400 U	810 U	390 U
Diethylphthalate	7,100	400 U	810 U	390 U
4-Chlorophenyl-phenylether	--	400 U	810 U	390 U
Fluorene	50,000	120 J	810 U	390 U
4-Nitroaniline	--	970 U	1900 U	930 U
4,6-Dinitro-2-methylphenol	--	970 U	1900 U	930 U
N-Nitrosodiphenylamine (1)	--	400 U	810 U	390 U
4-Bromophenyl-phenylether	--	400 U	810 U	390 U

Table 6. Summary of Semivolatile Organic Compounds Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

	Sample Designation:	CB-13	CB-13DL	CB-13
	Sample Depth (ft bls):	0-2	0-2	2-4
	Sample Date:	7/12/95	7/12/95	7/12/95
Semivolatile Organic Compounds (Concentrations in µg/kg)	NYSDEC RSCOs (µg/kg)			
Hexachlorobenzene	410	400 U	810 U	390 U
Pentachlorophenol	1,000	970 U	1900 U	930 U
Phenanthrene	50,000	2000	2300 D	440
Anthracene	50,000	460	600 JD	83 J
Carbazole	--	230 J	260 JD	390 U
Di-n-butylphthalate	8,100	1000	1400 D	390 U
Fluoranthene	50,000	3400 E	3900 D	480
Pyrene	50,000	1200	1400 D	260 J
Butylbenzylphthalate	50,000	400 U	810 U	390 U
3,3'-Dichlorobenzidine	--	400 U	810 U	390 U
Benzo (a) anthracene	220	**1200**	**1400 D**	200 J
Chrysene	400	**1400**	**1700 D**	220 J
bis(2-Ethylhexyl)phthalate	50,000	210 J	290 JD	49 J
Di-n-octylphthalate	50,000	44 J	810 U	43 J
Benzo(b)fluoranthene	1,100	900	**1500 D**	150 J
Benzo(k)fluoranthene	1,100	740	990 D	99 J
Benzo(a)pyrene	61	**920**	**1100 D**	**150 J**
Indeno(1,2,3-cd)pyrene	3,200	270 J	310 JD	62 J
Dibenzo(a,h)anthracene	14	400 U	810 U	390 U
Benzo(g,h,i)perylene	50,000	240 J	270 JD	63 J

µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
RSCOs - Recommended Soil Cleanup Objectives
U - Indicates compound not detected
J - Estimated value
B - Analyte detected in associated blank sample
E - Exceeds calibration range
D, DL - Sample diluted
* - Field duplicate
Boldface - Data highlighted in bold represent results detected above the NYSDEC RSCOs.

Table 7. Summary of pH and Total Organic Carbon Detected in Soil, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation:	CB-1	CB-1	CB-2	CB-2	CB-3	CB-3	CB-4	CB-4
Sample Depth (ft bls):	0-2	2-4	0-2	2-4	0-2	4-6	0-2	2-4
Sample Date:	7/13/95	7/13/95	7/13/95	7/13/95	7/13/95	7/13/95	7/13/95	7/13/95
Parameter								
pH	5.73	5.91	6.17	6.31	6.22	6.12	5.67	6.21
Total Organic Carbon (mg/kg)	26,300	9,090	4,130	5,710	25,190	710	21,220	28,800

Sample Designation:	CB-5	CB-5	CB-6	CB-6*	CB-6	CB-7	CB-7	CB-8
Sample Depth (ft bls):	0-2	2-4	0-2	0-2	2-4	0-2	2-4	0-2
Sample Date:	7/12/95	7/12/95	7/12/95	7/12/95	7/12/95	7/12/95	7/12/95	7/14/95
Parameter								
pH	8.50	7.52	8.50	8.00	7.49	7.51	7.03	6.72
Total Organic Carbon (mg/kg)	33,850	207,000	33,000	11,500	61,450	183,000	780	35,800

Sample Designation:	CB-8	CB-9	CB-9*	CB-9	CB-10	CB-10	CB-11	CB-11
Sample Depth (ft bls):	2-4	0-2	0-2	2-4	0-2	2-4	0-2	2-4
Sample Date:	7/14/95	7/14/95	7/14/95	7/14/95	7/13/95	7/13/95	7/14/95	7/14/95
Parameter								
pH	6.53	6.17	6.23	6.21	5.98	6.30	6.41	7.03
Total Organic Carbon (mg/kg)	19,800	22,200	6,700	10,100	28,800	1,700	58,800	9,830

Sample Designation:	CB-12	CB-12	CB-13	CB-13
Sample Depth (ft bls):	0-2	4-6	0-2	2-4
Sample Date:	7/12/95	7/12/95	7/12/95	7/12/95
Parameter				
pH	7.00	6.51	8.02	8.01
Total Organic Carbon (mg/kg)	35,500	2,040	36,500	32,900

ft bls - Feet below land surface
mg/kg - Milligrams per kilogram
* - Field duplicate

Table 8. Summary of Metals Detected in Perched Ground Water, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation:	CB-2	CB-10
Sample Date:	7/13/95	7/14/95
Metals (Concentrations in µg/L)		
Aluminum	55,300	183,000
Antimony	166	119
Arsenic	226	909
Barium	1,470	2,170
Beryllium	2.3 B	8.8
Cadmium	31.4	23.4
Calcium	635,000	2,230,000
Chromium	236	1,670
Cobalt	171	413
Copper	5,190	2,970
Iron	65,400	338,000
Lead	17,900	25,100
Magnesium	46,600	105,000
Manganese	2,670	8,180
Mercury	3,560	5,900
Nickel	470	482
Potassium	72,300	156,000
Selenium	17.9	43.4
Silver	10.6	327
Sodium	176,000	473,000
Thallium	14.2	33.5
Vanadium	153	475
Zinc	8,450	22,800

µg/L - Micrograms per liter
B - Estimated value

Table 9. Summary of Volatile Organic Compounds Detected in Perched Groundwater, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation:	CB-2	CB-10	CB-12
Sample Date:	7/13/95	7/14/95	7/12/95
Volatile Organic Compounds (Concentrations in µg/L)			
Chloromethane	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U
Vinyl Chloride	1.0 U	1.0 U	1.0 U
Chloroethane	1.0 U	1.0 U	**1.0 J**
Methylene Chloride	**1.1 JB**	**1.1 JB**	**0.3 J**
Acetone	**4.2 JB**	**5.6 B**	**17.0**
Carbon Disulfide	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1.0 U	1.0 U	**0.2 J**
1,1-Dichloroethane	1.0 U	1.0 U	**4.0**
cis-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U
Chloroform	**0.8 J**	**0.6 J**	**0.6 J**
1,2-Dichloroethane	1.0 U	1.0 U	**1.0**
2-Butanone	5.0 U	5.0 U	5.0 U
Bromochloromethane	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	1.0 U	1.0 U	1.0 U
Bromodichloromethane	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U
Trichloroethene	1.0 U	1.0 U	1.0 U
Dibromochloromethane	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U
Benzene	1.0 U	**0.3 J**	**0.3 J**
trans-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U
4-Methyl-2-pentanone	5.0 U	5.0 U	5.0 U
2-Hexanone	5.0 U	5.0 U	5.0 U
Tetrachloroethene	1.0 U	**0.6 J**	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane	1.0 U	1.0 U	1.0 U
Toluene	**0.2 J**	**0.4 J**	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U
Styrene	1.0 U	1.0 U	1.0 U
Xylene (total)	**0.3 J**	**0.6 J**	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane	1.0 U	1.0 U	1.0 U

µg/L - Micrograms per liter
U - Indicates compound not detected
J - Estimated value
B - Analyte detected in associated blank sample

Table 10. Summary of Semivolatile Organic Compounds Detected in Perched Ground Water, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation: Sample Date:	CB-2 7/13/95	CB-10 7/14/95
Semivolatile Organic Compounds (Concentrations in µg/L)		
Phenol	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U
2-Chlorophenol	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U
2-Methylphenol	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U
4-Methylphenol	10 U	10 U
N-Nitroso-di-n-propylamine	10 U	10 U
Hexachloroethane	10 U	10 U
Nitrobenzene	10 U	10 U
Isophorone	10 U	10 U
2-Nitrophenol	10 U	10 U
2,4-Dimethylphenol	10 U	10 U
2,4-Dichlorophenol	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U
Naphthalene	10 U	10 U
4-Chloroaniline	10 U	10 U
Hexachlorobutadiene	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U
4-Chloro-3-Methylphenol	10 U	10 U
2-Methylnaphthalene	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U
2-Chloronaphthalene	10 U	10 U
2-Nitroaniline	25 U	25 U
Dimethylphthalate	10 U	10 U
Acenaphthylene	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U
3-Nitroaniline	25 U	25 U
Acenaphthene	10 U	10 U
2,4-Dinitrophenol	25 U	25 U
4-Nitrophenol	25 U	25 U
Dibenzofuran	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U
Diethylphthalate	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U
Fluorene	10 U	10 U
4-Nitroaniline	25 U	25 U
4,6-Dinitro-2-methylphenol	25 U	25 U

Table 10. Summary of Semivolatile Organic Compounds Detected in Perched Ground Water, Citric Block Investigation, Pfizer Inc, Brooklyn, New York.

Sample Designation: Sample Date:	CB-2 7/13/95	CB-10 7/14/95
Semivolatile Organic Compounds (Concentrations in µg/L)		
N-Nitrosodiphenylamine (1)	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U
Hexachlorobenzene	10 U	10 U
Pentachlorophenol	25 U	25 U
Phenanthrene	10 U	10 U
Anthracene	10 U	10 U
Carbazole	10 U	10 U
Di-n-butylphthalate	10 U	10 U
Fluoranthene	10 U	10 U
Pyrene	10 U	10 U
Butylbenzylphthalate	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U
Benzo (a) anthracene	10 U	10 U
Chrysene	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	10 U
Di-n-octylphthalate	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U
Benzo(a)pyrene	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U

µg/L - Micrograms per liter
U - Indicates compound not detected

Table 11. Summary of pH and Total Organic Carbon Detected in Perched Ground Water, Citric Block Investigation, Pfizer Inc., Brooklyn, New York.

Sample Designation: Sample Date: Parameter	CB-2 7/13/95	CB-10 7/14/95
pH	7.89	8.16
Total Organic Carbon (mg/L)	16.1	80.8

mg/L - Milligrams per liter

FIGURES

SOURCE: USGS BROOKLYN, NY QUADRANGLE, 1979
7.5 MINUTE SERIES TOPOGRAPHIC

Title:

SITE LOCATION MAP

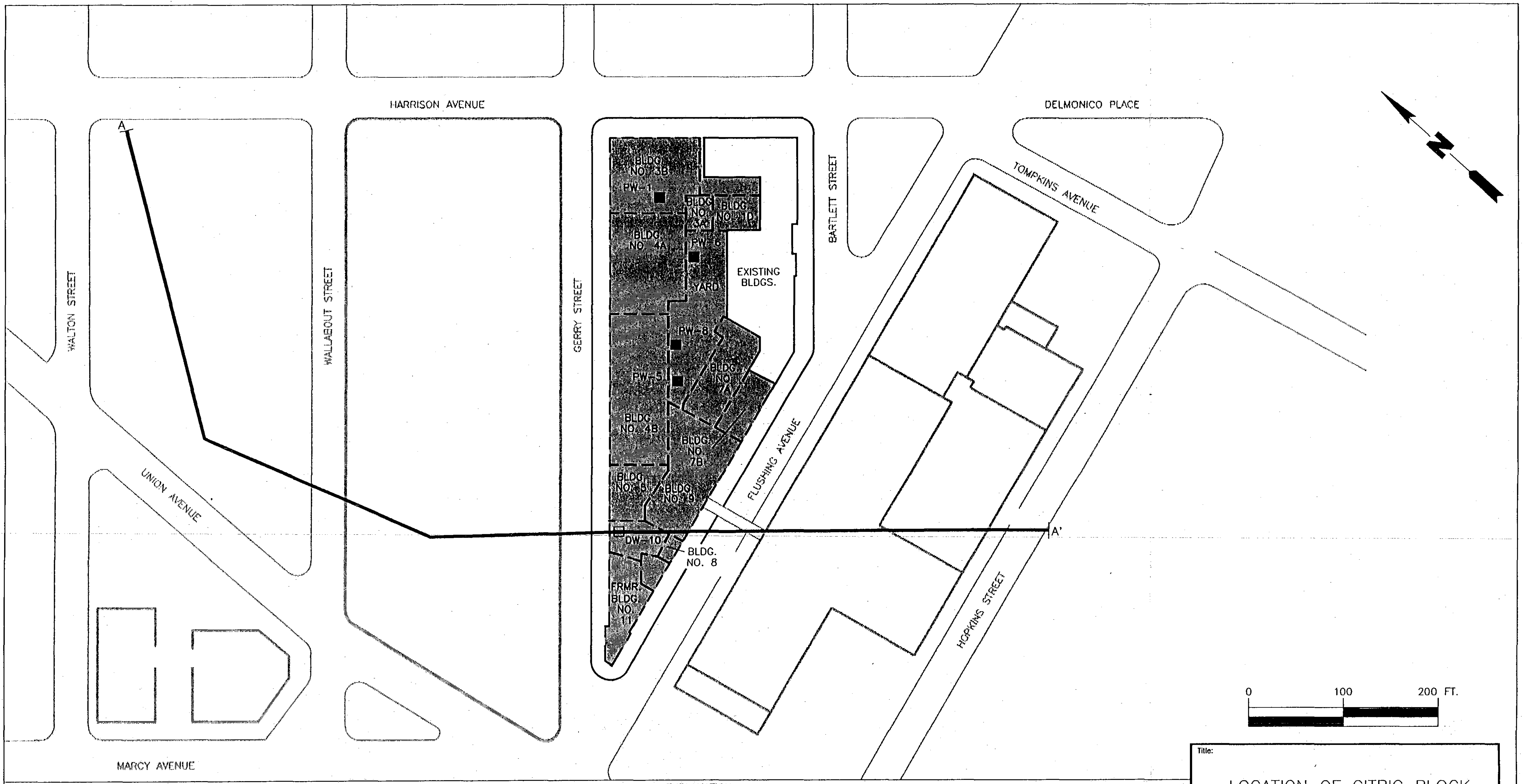
CITRIC BLOCK INVESTIGATION

Prepared For:

PFIZER INC.
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: L.W.	Date: 9/95	FIGURE
Prepared by: J.R.	Scale: 1" = 2000'	
Project Mgr: S.J.G.	Revision:	1
File No: 04744Y	Project: 04744Y	



EXPLANATION

PW-1 ■	LOCATION AND DESIGNATION OF FORMER PFIZER PRODUCTION WELL
DW-30 ☐	LOCATION AND DESIGNATION OF FORMER PFIZER DIFFUSION WELL
A├──┤A'	LINE OF GEOLOGIC CROSS-SECTION (FIGURE 4)
— — — —	OUTLINE OF FORMER BUILDING
▨	AREA OF CITRIC BLOCK

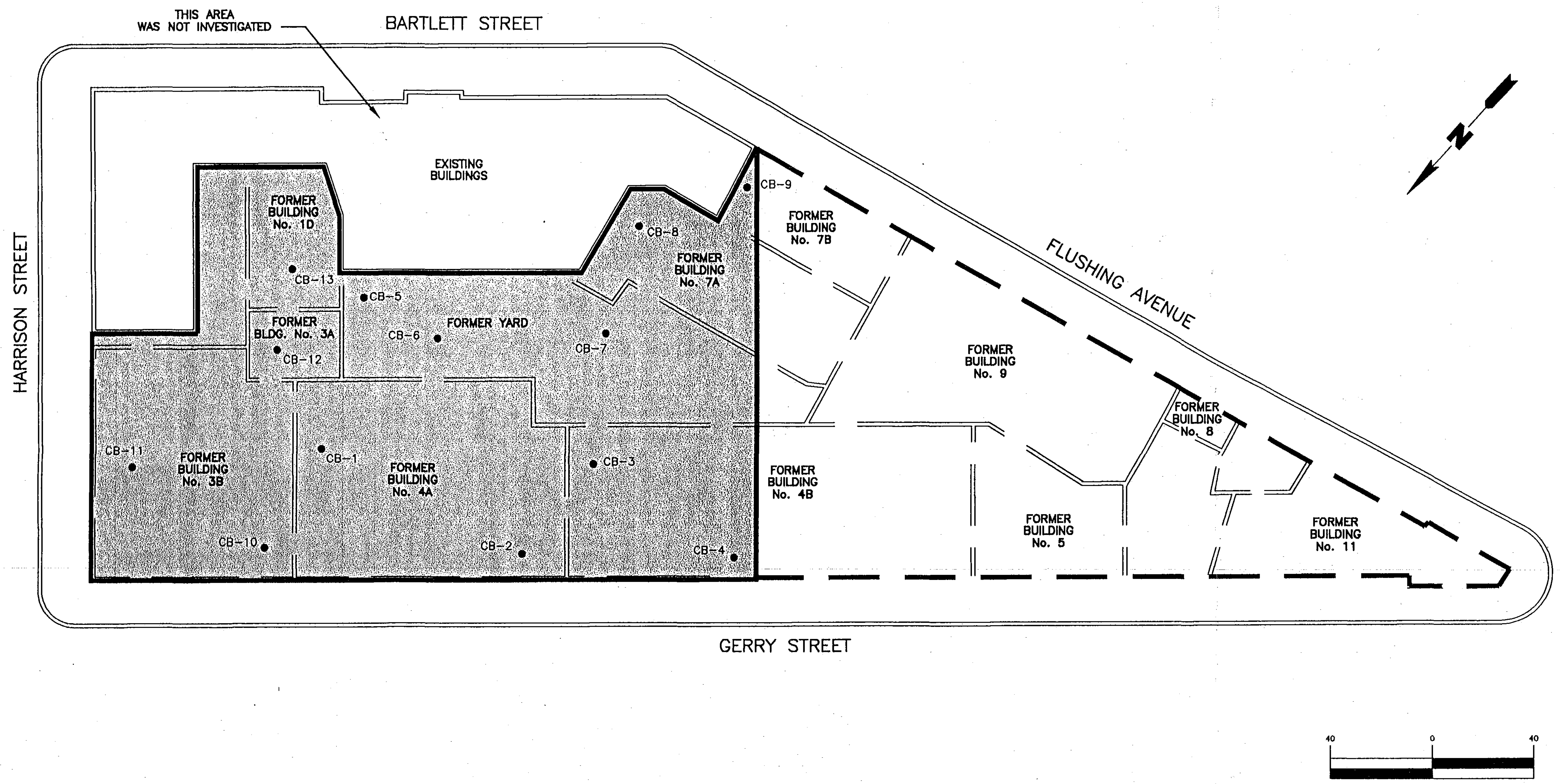
Title:

LOCATION OF CITRIC BLOCK

CITRIC BLOCK INVESTIGATION

Prepared For:
PFIZER INC
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX ROUX ASSOCIATES INC Consulting Ground-Water Geologists & Engineers	Compiled by: L.M.	Date: 9/95	FIGURE
	Prepared by: J.R.	Scale: SHOWN	2
	Project Mgr: S.J.G.	Revision:	
	File No: 04744051	Project: 04744Y03	



EXPLANATION

CB-3 ● LOCATION AND DESIGNATION OF SOIL BORING

▨ AREA OF INVESTIGATION

NOTE: BUILDING DEMOLITION WAS
COMPLETED BY AUGUST, 1995.

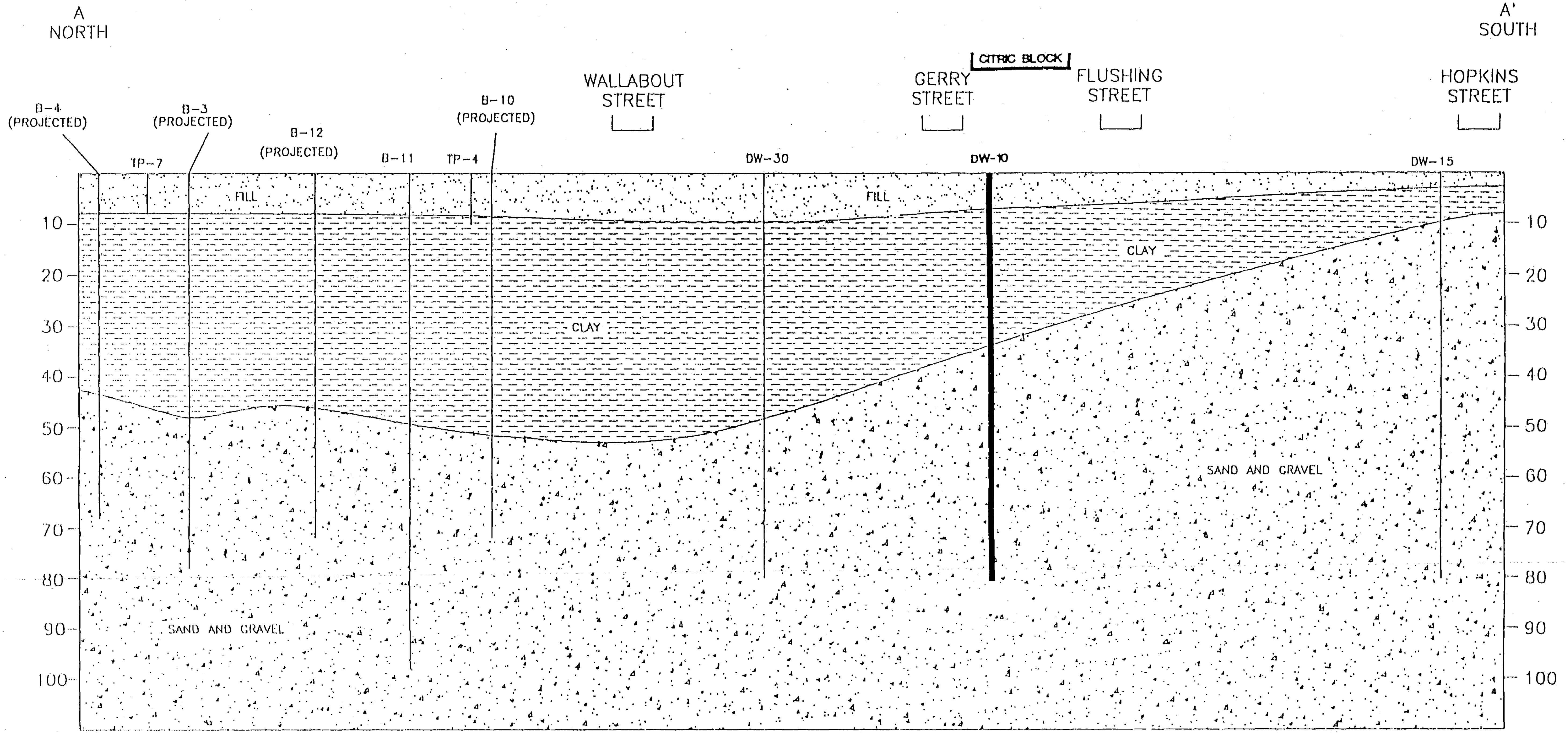
Title:

SITE PLAN

CITRIC BLOCK INVESTIGATION

Prepared For:
PFIZER INC
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX ROUX ASSOCIATES INC *Environmental Consulting & Management*	Compiled by: S.J.G.	Date: 9/95	FIGURE
	Prepared by: J.R.	Scale: SHOWN	
	Project Mgr: S.J.G.	Revision:	3
	Project No.: 04744Y	File No: 04744050	



EXPLANATION

TP-7 LOCATION AND DESIGNATION OF ROUX TEST PIT

DW-10 LOCATION AND DESIGNATION OF PFIZER DIFFUSION WELL

PW-15 LOCATION AND DESIGNATION OF PFIZER PRODUCTION WELL

B-11 LOCATION AND DESIGNATION OF SOIL MECHANICS BORING

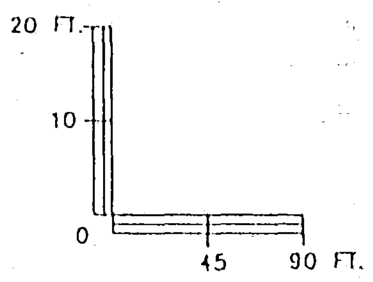
▨ FILL

▤ CLAY

▨ SAND AND GRAVEL (UPPER GLACIAL AQUIFER)

SOURCE:

1. PHASE II, HYDROGEOLOGY OF THE PFIZER, WILLIAMSBURG PLANT AREA, WILLIAMSBURG, NEW YORK (ROUX ASSOCIATES, INC., FEBRUARY 1989)
2. EVALUATION OF SOIL QUALITY CONDITIONS AT THE SOLID WASTE MANAGEMENT UNITS LOCATED AT SITE "A", PFIZER, INC., WILLIAMSBURG, NEW YORK (ROUX ASSOCIATES, INC., AUGUST 1989)
3. SUPPLEMENTAL SOILS INVESTIGATION FOR SITE "A", PFIZER, INC., WILLIAMSBURG, NEW YORK (ROUX ASSOCIATES, INC., NOVEMBER 1989)



VERTICAL EXAGGERATION EQUALS 4.5X

Title:

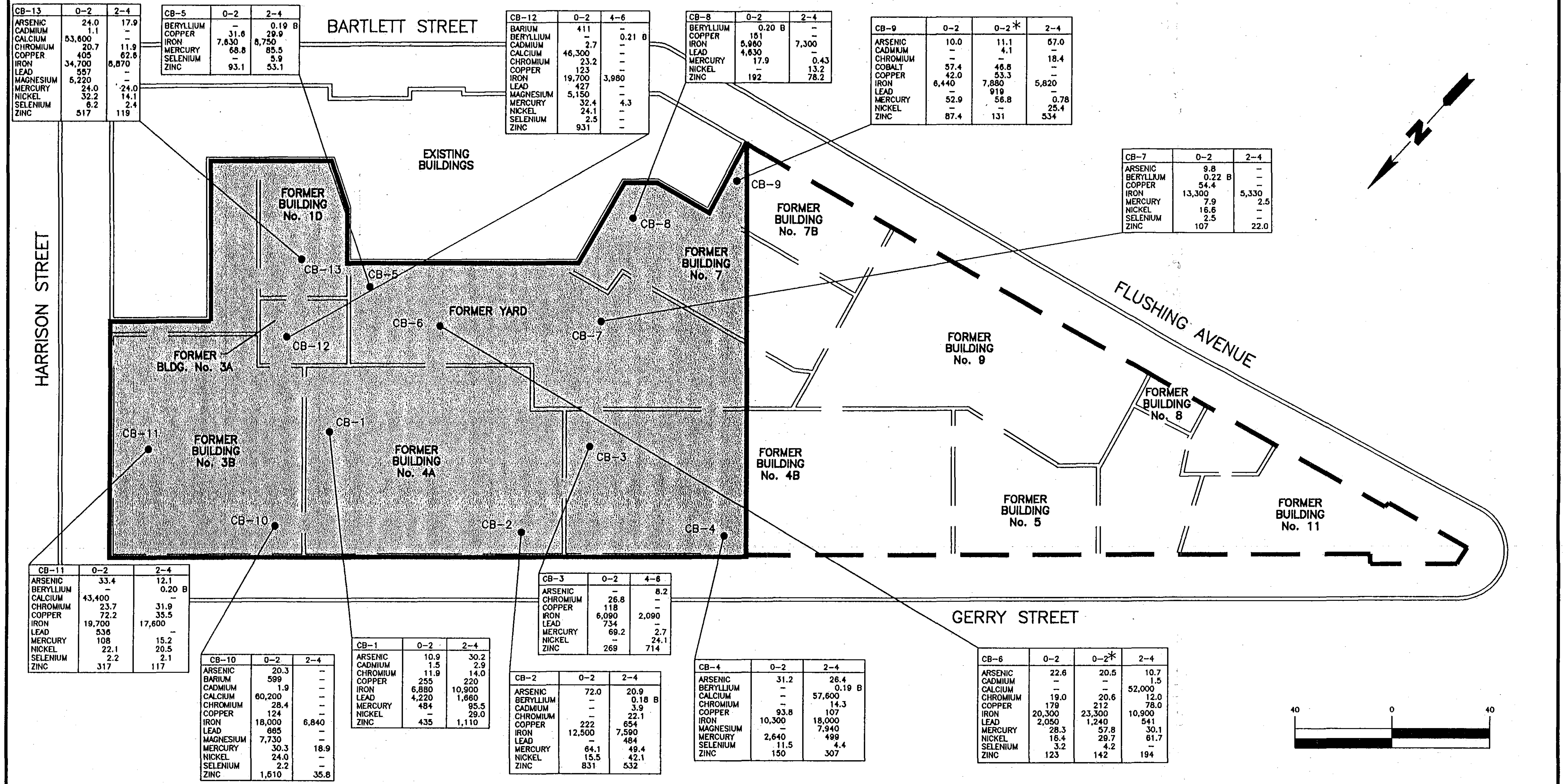
GENERALIZED GEOLOGIC CROSS-SECTION-A-A'

CITRIC BLOCK INVESTIGATION

Prepared For:
PFIZER INC
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX
ROUX ASSOCIATES INC
Consulting Ground-water Geologists & Engineers

Compiled by: L.W.	Date: 9/95	FIGURE 4
Prepared by: J.R.	Scale: SHOWN	
Project Mgr: S.J.C.	Revision:	
File No: 04744Y	Project: 04744Y	



CB-13	0-2	2-4
ARSENIC	24.0	17.9
CADMIUM	1.1	–
CALCIUM	53,600	–
CHROMIUM	20.7	11.9
COPPER	405	62.6
IRON	34,700	8,870
LEAD	557	–
MAGNESIUM	6,220	–
MERCURY	24.0	24.0
NICKEL	32.2	14.1
SELENIUM	6.2	2.4
ZINC	517	119

CB-5	0-2	2-4
BERYLLIUM	–	0.19 B
COPPER	31.6	29.9
IRON	7,630	8,750
MERCURY	68.8	85.5
SELENIUM	–	5.9
ZINC	93.1	53.1

CB-12	0-2	4-6
BARIUM	411	–
BERYLLIUM	–	0.21 B
CADMIUM	2.7	–
CALCIUM	46,300	–
CHROMIUM	23.2	–
COPPER	123	–
IRON	19,700	3,980
LEAD	427	–
MAGNESIUM	5,150	–
MERCURY	32.4	4.3
NICKEL	24.1	–
SELENIUM	2.5	–
ZINC	931	–

CB-8	0-2	2-4
BERYLLIUM	0.20 B	–
COPPER	161	–
IRON	5,960	7,300
LEAD	4,630	–
MERCURY	17.9	0.43
NICKEL	–	13.2
ZINC	192	78.2

CB-9	0-2	0-2*	2-4
ARSENIC	10.0	11.1	67.0
CADMIUM	–	4.1	–
CHROMIUM	–	–	18.4
COBALT	57.4	46.8	–
COPPER	42.0	53.3	–
IRON	6,440	7,880	5,820
LEAD	–	919	–
MERCURY	52.9	56.8	0.78
NICKEL	–	–	25.4
ZINC	87.4	131	534

CB-7	0-2	2-4
ARSENIC	9.8	–
BERYLLIUM	0.22 B	–
COPPER	54.4	–
IRON	13,300	5,330
MERCURY	7.9	2.5
NICKEL	16.6	–
SELENIUM	2.5	–
ZINC	107	22.0

CB-11	0-2	2-4
ARSENIC	33.4	12.1
BERYLLIUM	–	0.20 B
CALCIUM	43,400	–
CHROMIUM	23.7	31.9
COPPER	72.2	35.5
IRON	19,700	17,600
LEAD	536	–
MERCURY	108	15.2
NICKEL	22.1	20.5
SELENIUM	2.2	2.1
ZINC	317	117

CB-10	0-2	2-4
ARSENIC	20.3	–
BARIUM	599	–
CADMIUM	1.9	–
CALCIUM	60,200	–
CHROMIUM	28.4	–
COPPER	124	–
IRON	18,000	6,840
LEAD	665	–
MAGNESIUM	7,730	–
MERCURY	30.3	18.9
NICKEL	24.0	–
SELENIUM	2.2	–
ZINC	1,610	35.8

CB-1	0-2	2-4
ARSENIC	10.9	30.2
CADMIUM	1.5	2.9
CHROMIUM	11.9	14.0
COPPER	255	220
IRON	6,880	10,900
LEAD	4,220	1,660
MERCURY	484	95.5
NICKEL	–	29.0
ZINC	435	1,110

CB-3	0-2	4-6
ARSENIC	–	8.2
CHROMIUM	26.8	–
COPPER	118	–
IRON	6,090	2,090
LEAD	734	–
MERCURY	69.2	2.7
NICKEL	–	24.1
ZINC	269	714

CB-2	0-2	2-4
ARSENIC	72.0	20.9
BERYLLIUM	–	0.18 B
CADMIUM	–	3.9
CHROMIUM	–	22.1
COPPER	222	654
IRON	12,500	7,590
LEAD	–	484
MERCURY	64.1	49.4
NICKEL	15.5	42.1
ZINC	831	532

CB-4	0-2	2-4
ARSENIC	31.2	26.4
BERYLLIUM	–	0.19 B
CALCIUM	–	57,600
CHROMIUM	–	14.3
COPPER	93.8	107
IRON	10,300	18,000
MAGNESIUM	–	7,940
MERCURY	2,640	499
SELENIUM	11.5	4.4
ZINC	150	307

CB-6	0-2	0-2*	2-4
ARSENIC	22.6	20.5	10.7
CADMIUM	–	–	1.5
CALCIUM	–	–	52,000
CHROMIUM	19.0	20.6	12.0
COPPER	179	212	78.0
IRON	20,300	23,300	10,900
LEAD	2,050	1,240	541
MERCURY	28.3	57.8	30.1
NICKEL	16.4	29.7	61.7
SELENIUM	3.2	4.2	–
ZINC	123	142	194

EXPLANATION

CB-3 ●	LOCATION AND DESIGNATION OF SOIL BORING
NYSDEC RSCOs	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION RECOMMENDED SOIL CLEANUP OBJECTIVES
*	FIELD DUPLICATE
–	DENOTES CONCENTRATION NOT DETECTED OR DETECTED BELOW THE NYSDEC RSCOs
B	ESTIMATED VALUE
+	EASTERN USA BACKGROUND CONCENTRATIONS
mg/Kg	MILLIGRAMS PER KILOGRAM
▨	AREA OF INVESTIGATION

NYSDEC RSCOs (mg/Kg)

ARSENIC	7.5
BARIUM	300
BERYLLIUM	0.16
CADMIUM	1
CALCIUM	35,000+
CHROMIUM	10
COBALT	30
COPPER	25
IRON	2,000
LEAD	400
MAGNESIUM	5,000+
MERCURY	0.1
NICKEL	13
SELENIUM	2
ZINC	20

SAMPLE DESIGNATION

SAMPLE DEPTH (FEET BELOW LAND SURFACE)

CB-4	0-2	2-4
ARSENIC	31.2	26.4
BERYLLIUM	–	0.19 B
CALCIUM	–	57,600
CHROMIUM	–	14.3
COPPER	93.8	107
IRON	10,300	18,000
MAGNESIUM	–	7,940
MERCURY	2,640	499
SELENIUM	11.5	4.4
ZINC	150	307

ALL CONCENTRATIONS ARE IN mg/Kg

NOTE: BUILDING DEMOLITION WAS COMPLETED BY AUGUST, 1995.

Title:

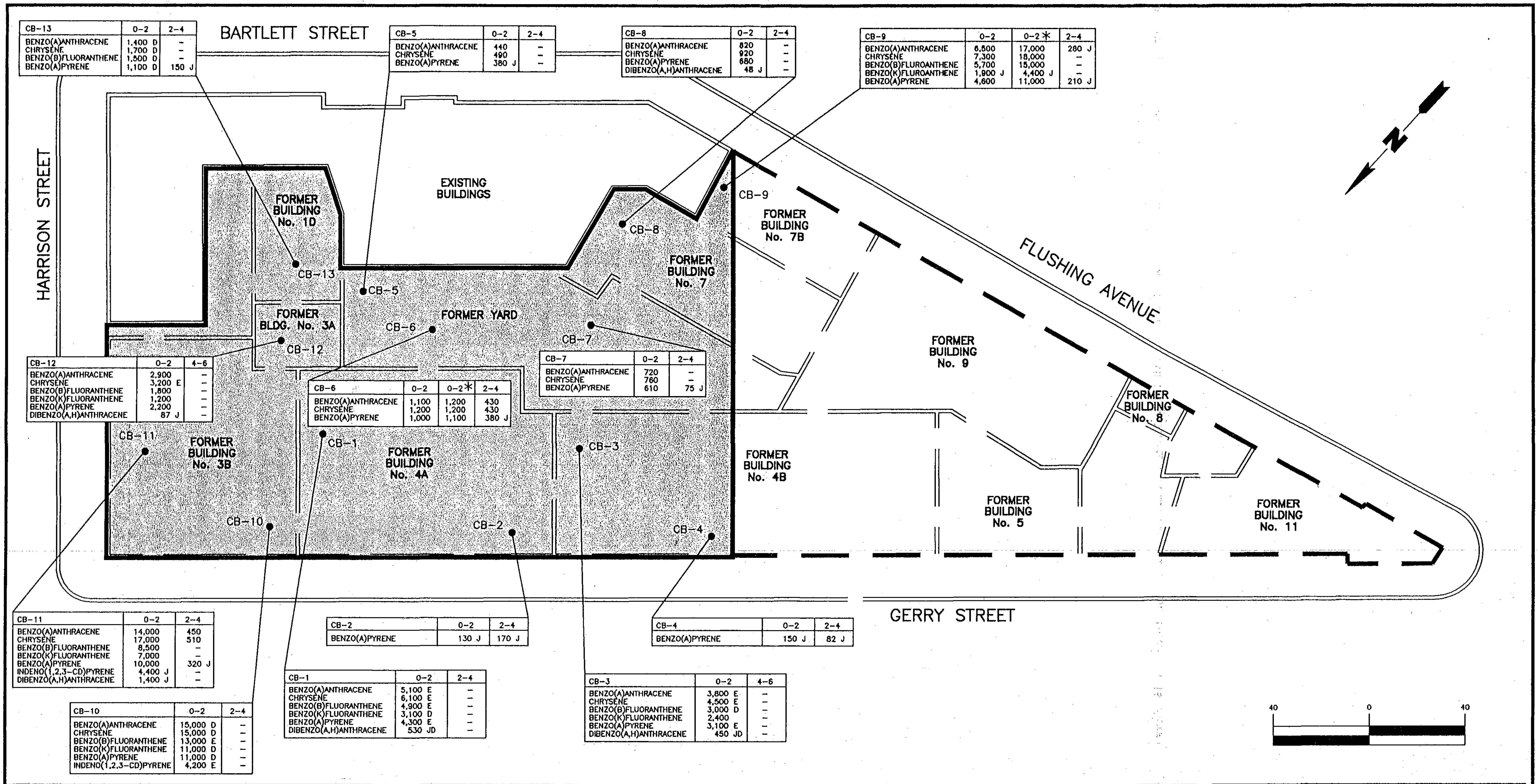
METALS DETECTED IN SOIL THAT EXCEED THE NYSDEC RSCOs

CITRIC BLOCK INVESTIGATION

Prepared For:
PFIZER INC
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: S.J.G.	Date: 9/95	FIGURE
Prepared by: J.R.	Scale: SHOWN	5
Project Mgr: S.J.G.	Revision:	
Project No.: 04744Y	File No: 04744037	



CB-13	0-2	2-4
BENZO(A)ANTHRACENE	1,400 D	–
CHRYSENE	1,700 D	–
BENZO(B)FLUORANTHENE	1,500 D	–
BENZO(A)PYRENE	1,100 D	150 J

CB-5	0-2	2-4
BENZO(A)ANTHRACENE	440	–
CHRYSENE	490	–
BENZO(A)PYRENE	380 J	–

CB-8	0-2	2-4
BENZO(A)ANTHRACENE	820	–
CHRYSENE	920	–
BENZO(A)PYRENE	680	–
DIBENZO(A,H)ANTHRACENE	48 J	–

CB-9	0-2	0-2 *	2-4
BENZO(A)ANTHRACENE	6,600	17,000	280 J
CHRYSENE	7,300	18,000	–
BENZO(B)FLUROANTHENE	5,700	15,000	–
BENZO(K)FLUROANTHENE	1,900 J	4,400 J	–
BENZO(A)PYRENE	4,600	11,000	210 J

CB-12	0-2	4-6
BENZO(A)ANTHRACENE	2,900	–
CHRYSENE	3,200 E	–
BENZO(B)FLUORANTHENE	1,800	–
BENZO(K)FLUORANTHENE	1,200	–
BENZO(A)PYRENE	2,200	–
DIBENZO(A,H)ANTHRACENE	87 J	–

CB-6	0-2	0-2 *	2-4
BENZO(A)ANTHRACENE	1,100	1,200	430
CHRYSENE	1,200	1,200	430
BENZO(A)PYRENE	1,000	1,100	380 J

CB-7	0-2	2-4
BENZO(A)ANTHRACENE	720	–
CHRYSENE	760	–
BENZO(A)PYRENE	610	75 J

CB-11	0-2	2-4
BENZO(A)ANTHRACENE	14,000	450
CHRYSENE	17,000	510
BENZO(B)FLUORANTHENE	8,500	–
BENZO(K)FLUORANTHENE	7,000	–
BENZO(A)PYRENE	10,000	320 J
INDENO(1,2,3-CD)PYRENE	4,400 J	–
DIBENZO(A,H)ANTHRACENE	1,400 J	–

CB-2	0-2	2-4
BENZO(A)PYRENE	130 J	170 J

CB-4	0-2	2-4
BENZO(A)PYRENE	150 J	82 J

CB-1	0-2	2-4
BENZO(A)ANTHRACENE	5,100 E	–
CHRYSENE	6,100 E	–
BENZO(B)FLUORANTHENE	4,900 E	–
BENZO(K)FLUORANTHENE	3,100 D	–
BENZO(A)PYRENE	4,300 E	–
DIBENZO(A,H)ANTHRACENE	530 JD	–

CB-3	0-2	4-6
BENZO(A)ANTHRACENE	3,800 E	–
CHRYSENE	4,500 E	–
BENZO(B)FLUORANTHENE	3,000 D	–
BENZO(K)FLUORANTHENE	2,400	–
BENZO(A)PYRENE	3,100 E	–
DIBENZO(A,H)ANTHRACENE	450 JD	–

CB-10	0-2	2-4
BENZO(A)ANTHRACENE	15,000 D	–
CHRYSENE	15,000 D	–
BENZO(B)FLUORANTHENE	13,000 E	–
BENZO(K)FLUORANTHENE	11,000 D	–
BENZO(A)PYRENE	11,000 D	–
INDENO(1,2,3-CD)PYRENE	4,200 E	–

EXPLANATION

CB-3 ●	LOCATION AND DESIGNATION OF SOIL BORING
NYSDEC RSCOs	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION RECOMMENDED SOIL CLEANUP OBJECTIVES
*	FIELD DUPLICATE
–	DENOTES CONCENTRATION NOT DETECTED OR DETECTED BELOW THE NYSDEC RSCOs
D	SAMPLE DILUTED
E	EXCEEDED CALIBRATION RANGE, ESTIMATED VALUE
J	ESTIMATED VALUE
ug/Kg	MICROGRAMS PER KILOGRAM
▨	AREA OF INVESTIGATION

NYSDEC RSCOs (ug/Kg)	
BENZO(A)ANTHRACENE	220
BENZO(B)FLUORANTHENE	1,100
BENZO(K)FLUORANTHENE	1,100
BENZO(A)PYRENE	61
CHRYSENE	400
DIBENZO(A,H)ANTHRACENE	14
INDENO(1,2,3-CD)PYRENE	3,200

SAMPLE DESIGNATION

SAMPLE DEPTH (FEET BELOW LAND SURFACE)

CB-11	0-2	2-4
BENZO(A)ANTHRACENE	14,000	450
CHRYSENE	17,000	510
BENZO(B)FLUORANTHENE	8,500	–
BENZO(K)FLUORANTHENE	7,000	–
BENZO(A)PYRENE	10,000	320 J
INDENO(1,2,3-CD)PYRENE	4,400 J	–
DIBENZO(A,H)ANTHRACENE	1,400 J	–

ALL CONCENTRATIONS ARE IN ug/Kg

NOTE: BUILDING DEMOLITION WAS COMPLETED BY AUGUST, 1995.

Title:

SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL THAT EXCEED THE NYSDEC RSCOs

CITRIC BLOCK INVESTIGATION

Prepared For:
PFIZER INC
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: S.J.G.	Date: 9/95	FIGURE
Prepared by: J.R.	Scale: SHOWN	6
Project Mgr: S.J.G.	Revision:	
Project No.: 04744Y	File No: 04744039	

APPENDICES

APPENDIX A

APPENDIX A

Subsurface Investigation Work Plan, Citric Block, Former Buildings 1D, 3A, 3B, 4A, 4B, 7A and 7B

SUBSURFACE INVESTIGATION WORK PLAN
CITRIC BLOCK FORMER BUILDINGS
1D, 3A, 3B, 4A, 4B, 7A, AND 7B

Pfizer Inc Williamsburg Facility
Brooklyn, New York

July 12, 1995

Prepared for:

Pfizer Inc
630 Flushing Avenue
Brooklyn, New York 11206

Prepared by:

ROUX ASSOCIATES, INC.
1377 Motor Parkway
Islandia, New York 11788

CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

Roux Associates, Inc. (Roux Associates) has prepared this Work Plan for a subsurface environmental investigation of the recently-demolished portion of the Citric Block (Site) at the Pfizer Inc (Pfizer) Williamsburg Facility in Brooklyn, New York. The portion of the Citric Block being investigated includes former Buildings 1D, 3A, 3B, 4A, 4B, 7A, and 7B, as well as the yard in the center of the block. The remainder of the Citric Block will be investigated during a future block-wide investigation, which will be performed following completion of demolition activities at the Citric Block.

A brief discussion of pertinent background information, including a description of hydrogeologic conditions at the Site, is provided in Section 2 of this Work Plan. The Scope of Work is presented in Section 3, and a schedule for implementation of the Scope of Work is provided in Section 4.

2.0 BACKGROUND

The Site is located along both sides of Flushing Avenue in Brooklyn, New York (Figure 1). The Citric Block is located in the central portion of the Site, and is bounded on the north by Gerry Street, on the east by Harrison Avenue, and on the south by Bartlett Street and Flushing Avenue (Figure 2). Pfizer is currently decommissioning portions of the Citric Block, as well as the entire adjacent Organics/Suciac Block, to prepare these properties for future re-development and/or beneficial use. As part of this process, many of the buildings at the Citric Block have been demolished. Building demolition activities at the Citric Block were completed during June 1995, with construction debris from the former buildings being disposed at the Fresh Kills Landfill in Staten Island, New York. Presently, the reinforced concrete-slab foundation is the only aboveground remnant of the former buildings. The slab is continuous throughout the entire block, and is assumed to be no more than 2 feet thick. All below-grade structures, including the building foundations, piping, and utilities still remain in place at this time. Building foundations extend to a depth of approximately 15 feet below land surface.

The Site is underlain by at least 100 feet of unconsolidated deposits composed of man-made fill and native clay, sand, and gravel. A cross section of the Site subsurface, developed based on previous investigations in other areas of the Site, is shown in Figure 3. As shown in the cross section, the Citric Block is immediately underlain by approximately 6 to 7 feet of man-made fill composed of black to brown coarse sand and gravel containing varying amounts of bricks, cinders and scrap metal. The fill is underlain, in turn, by approximately 20 to 30 feet of low-permeability clay, which appears to be present in a continuous layer beneath the Citric Block. The presence of a continuous clay layer reflects the marsh environment formerly present in the Site vicinity. The upper glacial aquifer, composed mainly of sand and gravel, underlies the clay layer. The top of the upper glacial aquifer varies from between 25 to 35 feet beneath the Citric Block (Figure 3).

A thin zone of perched ground water was encountered on top of the low-permeability clay layer at approximately 7 feet below land surface during investigations at the adjacent Organics/Suciac Block. Ground water also occurs beneath the Site within the upper glacial aquifer, as indicated by the logs of deeper production and diffusion wells at the Site.

Locally, ground-water flow within the upper glacial aquifer is to the northwest, toward the East River (Doriski, 1986). Historical ground-water quality data developed from the on-site production and diffusion wells indicate that the upper glacial aquifer beneath the Site has not been impacted by Site operations.

3.0 SCOPE OF WORK

The Scope of Work developed for the investigation of the recently-demolished portion of the Citric Block consists of both soil and ground-water sampling. Any amendments to the Work Plan will be memorialized in field-change memoranda. All field-change memoranda will be provided as attachments to the final investigation report.

All field tasks will be performed in accordance with Roux Associates' Corporate Standard Operating Procedures (SOPs) and the Health and Safety Plan (HASP) prepared for this investigation. The SOPs are provided in Appendix A, and the HASP is provided in Appendix B.

3.1 Soil Boring and Sampling Program

Thirteen soil borings (CB-1 through CB-13) will be drilled and sampled to characterize soil-quality conditions beneath the former Citric Block buildings and the yard in the center of the block. Proposed soil-boring locations are shown in Figure 4. The following table lists the soil borings associated with each of the former buildings.

Former Building No.	Number of Soil Borings	Soil Boring Designation
1D	1	CB-13
3A	1	CB-12
3B	2	CB-10, CB-11
4A	2	CB-1, CB-2
4B	2	CB-3, CB-4
7A	1	CB-8
7B	1	CB-9
Yard	3	CB-5, CB-6, CB-7

Ten of the 13 soil borings will be drilled to the perched water table (assumed to be 6 to 7 feet below land surface) or the clay layer, whichever is encountered first. The remaining three borings will be drilled to a depth of 20 feet below land surface to assess the continuity of the clay layer reportedly present beneath the Citric Block. (The locations of the deeper borings will be selected in the field, and will be widely spaced throughout the Citric Block.)

At each boring, soil samples will be collected at 2-foot intervals. Each soil sample will be inspected by the field geologist or engineer to characterize lithology and any evidence of contamination (e.g., staining and/or odors). A portion of each soil sample will be placed in a plastic Ziploc™ bag or glass jar and screened in the field for volatile organic compounds (VOCs) using a photoionization detector (PID). Detailed soil-boring and sampling procedures are provided in Appendix A.

The soil sample collected from the 0- to 2-foot interval (i.e., immediately below the concrete slab) and the soil sample that exhibits the highest degree of contamination (e.g., staining and/or odors) will be selected for laboratory analysis to assess the nature and extent of any soil impacts. However, if no impacts are discernible, the samples collected from the 0- to 2-foot interval and the 2-foot interval immediately above the water table will be submitted for analysis.

Each soil sample submitted for laboratory analysis will be analyzed for Target Compound List (TCL) VOCs, TCL semivolatile organic compounds (SVOCs), Target Analyte List (TAL) metals, total organic carbon (TOC), and pH. Two replicate samples and two matrix-spike/spike-duplicate samples will also be collected and analyzed for the suite of parameters listed above. In addition, one field blank per day will be collected and analyzed for the full suite of parameters. A trip blank will accompany each cooler containing VOC samples, and will be analyzed for VOCs only. All analyses will be performed in accordance with NYSDEC's Analytical Services Protocol (ASP).

Soil borings will be drilled using the Geoprobe™ method, unless impenetrable fill material or subsurface debris precludes its use, whereupon a truck-mounted hollow-stem auger drill rig or tripod rig will be used. Prior to soil sampling, the concrete slab at each soil-boring location will be cored to permit the use of drilling equipment. Typical Geoprobe™ methods are described below.

The truck-mounted Geoprobe™ equipment will be positioned over the selected boring location, and a 2-foot-long drive-point sampler containing a disposable acetate liner will be attached to steel rods and driven to the desired sampling depth. The drive-point sampler remains closed while it is being driven to the sampling depth. The sampler is opened by releasing a stop pin from the surface, and the sampler is driven 2 feet into the material to be sampled (releasing the stop pin allows a piston to retract inside of the sampling tube while it is displaced by the soil core). The soil core contained within the disposable acetate liner is retrieved by retracting the steel rods and the drive-point sampler. The disposable acetate liner, with the intact soil sample, is then removed from the drive point sampler.

To prevent cross-contamination, all non-disposable downhole equipment will be decontaminated after each use by washing in potable water and a non-phosphate laboratory-grade detergent, followed by a potable water rinse. A new acetate liner will be used for each soil sample.

Soil samples from the fill material and underlying clay at five locations (i.e., a total of ten samples) will also be analyzed for grain-size distribution and vertical permeability to assist in evaluating, if necessary, fate and transport of potential contaminants migrating vertically through the clay. These ten samples will be collected using Shelby™ tubes driven by a truck-mounted drill rig.

Each soil boring will also be surveyed for horizontal and vertical coordinates (relative to the National Geodetic Vertical Datum) to determine the approximate elevation of the perched water table at the locations where ground water was encountered, and to determine, if possible, the direction of perched ground-water flow beneath the Citric Block.

3.2 Ground-Water Sampling Program

Ground-water samples will be collected from each soil boring in which perched ground water is encountered. Ground-water samples will be collected using the Geoprobe™ method once each soil boring reaches the clay layer. (Ground-water samples from the deeper borings will be collected before penetrating more than 2 feet into the clay layer.) To collect the ground-water samples, a slotted drive-point sampler will be attached to steel rods and lowered to the base of the open boring (or driven if the boring collapses). The slotted sampler is sealed within the steel rods while it is being lowered/driven to the sampling depth. The rods are then retracted to expose the slotted sampler, and the ground-water sample is extracted (using a pump) through the tube attached to the slotted sampler. A volume equal to at least three times the volume of water standing in the borehole will be drawn through the tube prior to collecting the ground-water samples. If a hollow-stem auger rig or tripod rig is used to drill the boreholes, a teflon bailer will be used to collect the ground water, if present.

Ground-water samples will be analyzed for TCL VOCs and SVOCs, TAL metals, TOC, and pH according to NYSDEC's ASP. One replicate sample and one matrix-spike/spike-duplicate sample will also be collected and analyzed for this suite of parameters. In addition, one field blank per day will be collected and analyzed for the full suite of parameters. A trip blank will accompany each cooler containing VOC samples, and will be analyzed for VOCs only.

3.3 Reporting

A report summarizing the investigation results will be prepared following receipt and interpretation of all soil and ground-water quality data. The report will include, at a minimum, the following:

- a description of all samples collected;
- a location map showing all sample points;
- all analytical and geotechnical results; and
- findings and conclusions.

The report will be submitted in draft form for review and, upon approval by Pfizer, will be finalized.

4.0 SCHEDULE

Roux Associates can begin to implement the Scope of Work within 2 weeks of receiving notice to proceed. It is anticipated that the field investigation will take approximately 6 days to complete. The laboratory turnaround time for both analytical and geotechnical samples will be 4 weeks from the laboratory receipt of each sampling batch. The draft summary report will be submitted approximately 4 weeks after the receipt of all analytical and geotechnical data. The total duration of this investigation is anticipated to be 10 weeks.

Respectfully Submitted,

ROUX ASSOCIATES, INC.

Scott J Glash

Scott J. Glash, C.P.G.
Senior Hydrogeologist/
Project Manager

Douglas J. Swanson

Douglas J. Swanson
Principal Hydrogeologist/
Vice President

5.0 REFERENCES

Doriski, T.P., 1986. The Water-Table Aquifer on Long Island, New York, in March-April 1984. U.S. Geological Survey Water-Resources Investigations Report 86-4189. Plate 1A.

SOURCE: USGS BROOKLYN, NY QUADRANGLE, 1979
7.5 MINUTE SERIES TOPOGRAPHIC

Title:

SITE LOCATION MAP

CITRIC BLOCK INVESTIGATION

Prepared For:

PFIZER INC.
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: L.W.	Date: 9/95	FIGURE
Prepared by: J.R.	Scale: 1" = 2000'	
Project Mgr: S.J.G.	Revision:	1
File No: 04744Y	Project: 04744Y	

EXPLANATION

PW-1 ■	LOCATION AND DESIGNATION OF FORMER PFIZER PRODUCTION WELL
DW-30 □	LOCATION AND DESIGNATION OF FORMER PFIZER DIFFUSION WELL
A├──┤A'	LINE OF GEOLOGIC CROSS-SECTION (FIGURE 4)
— — — —	OUTLINE OF FORMER BUILDING
▨	AREA OF CITRIC BLOCK

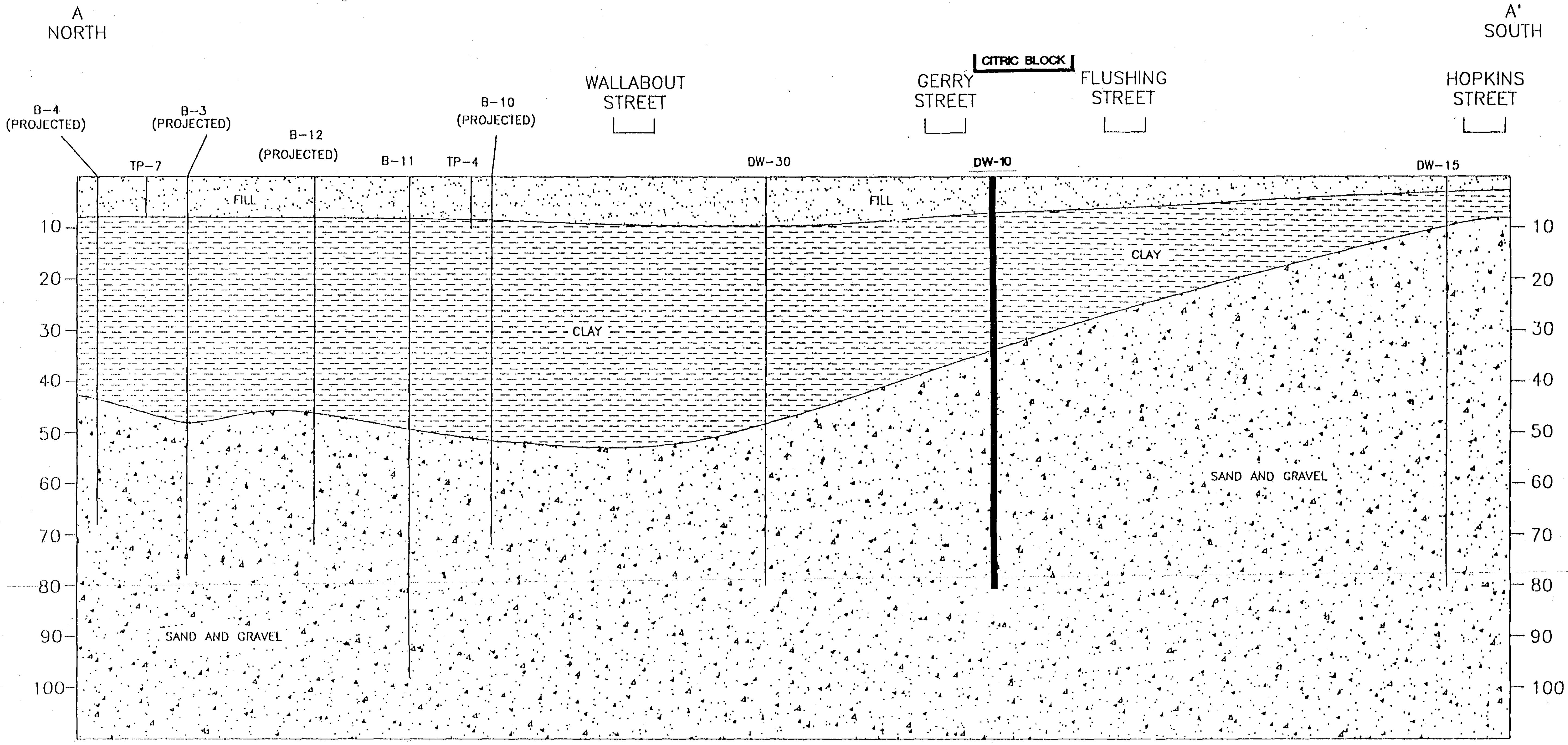
Title:

LOCATION OF CITRIC BLOCK

CITRIC BLOCK INVESTIGATION

Prepared For:
PFIZER INC
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

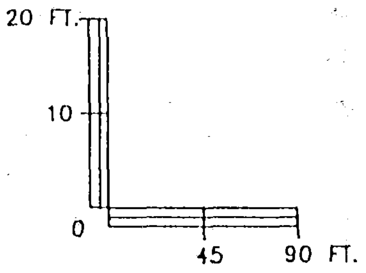
ROUX ROUX ASSOCIATES INC Consulting Ground-Water Geologists & Engineers	Compiled by: L.M.	Date: 9/95	FIGURE
	Prepared by: J.R.	Scale: SHOWN	2
	Project Mgr: S.J.G.	Revision:	
	File No: 04744051	Project: 04744Y03	



EXPLANATION

TP-7	LOCATION AND DESIGNATION OF ROUX TEST PIT
DW-10	LOCATION AND DESIGNATION OF PFIZER DIFFUSION WELL
PW-15	LOCATION AND DESIGNATION OF PFIZER PRODUCTION WELL
B-11	LOCATION AND DESIGNATION OF SOIL MECHANICS BORING
▨	FILL
▤	CLAY
▨	SAND AND GRAVEL (UPPER GLACIAL AQUIFER)

SOURCE:
1. PHASE II, HYDROGEOLOGY OF THE PFIZER, WILLIAMSBURG PLANT AREA, WILLIAMSBURG, NEW YORK (ROUX ASSOCIATES, INC., FEBRUARY 1989)
2. EVALUATION OF SOIL QUALITY CONDITIONS AT THE SOLID WASTE MANAGEMENT UNITS LOCATED AT SITE "A", PFIZER, INC., WILLIAMSBURG, NEW YORK (ROUX ASSOCIATES, INC., AUGUST 1989)
3. SUPPLEMENTAL SOILS INVESTIGATION FOR SITE "A", PFIZER, INC., WILLIAMSBURG, NEW YORK (ROUX ASSOCIATES, INC., NOVEMBER 1980)



VERTICAL EXAGGERATION EQUALS 4.5X

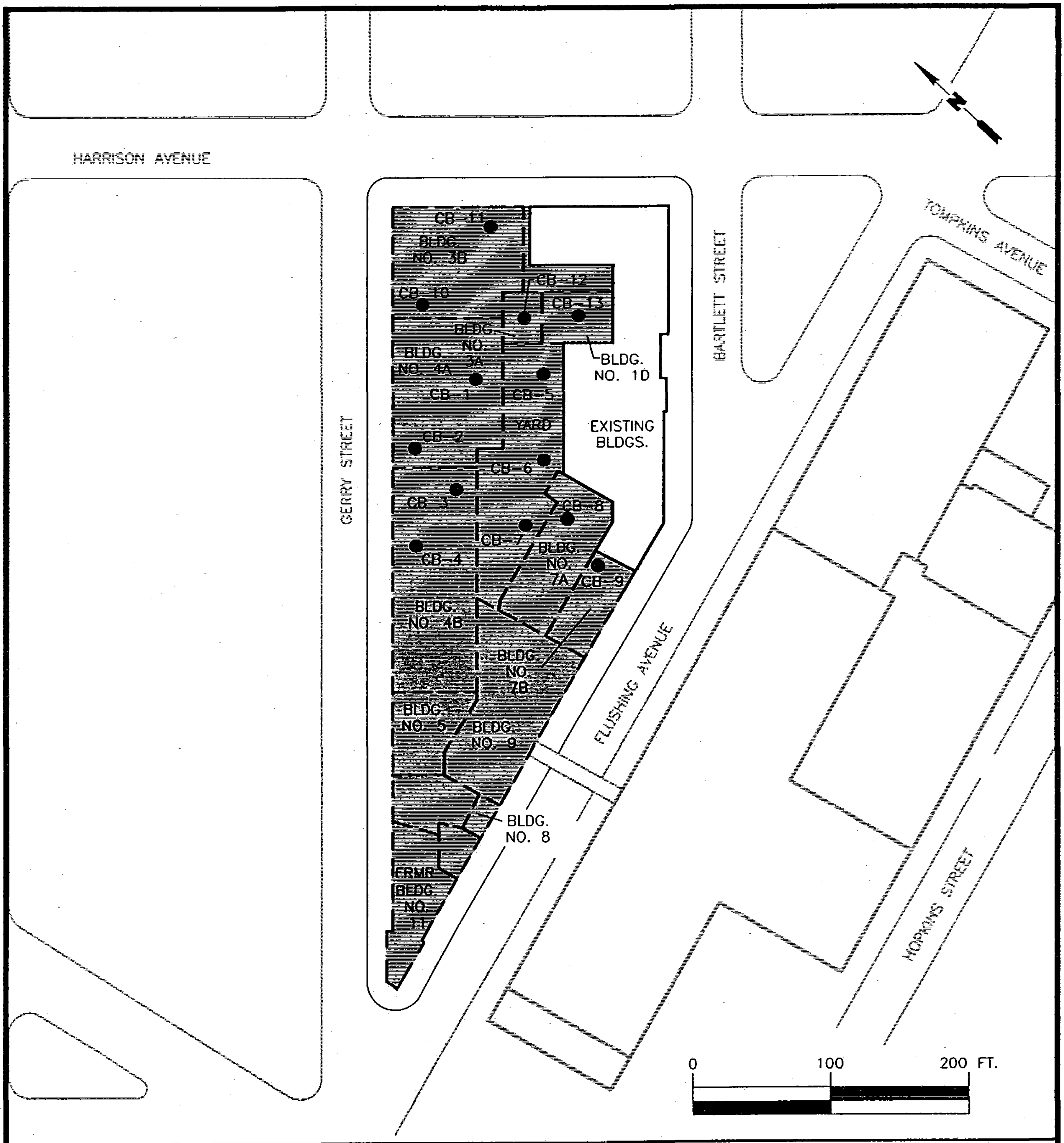
Title:

GENERALIZED GEOLOGIC CROSS-SECTION-A-A'

CITRIC BLOCK INVESTIGATION

Prepared For:
PFIZER INC
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX ROUX ASSOCIATES INC Consulting Ground-Water Geologists & Engineers	Compiled by: L.W.	Date: 9/95	FIGURE
	Prepared by: J.R.	Scale: SHOWN	3
	Project Mgr: S.J.G.	Revision:	
	File No: 04744Y	Project: 04744Y	



EXPLANATION

CB-5 ● LOCATION AND DESIGNATION OF PROPOSED SOIL BORING

▨ AREA OF INVESTIGATION

— — — — OUTLINE OF FORMER BUILDING

Title:

LOCATIONS OF PROPOSED SOIL BORINGS

CITRIC BLOCK INVESTIGATION

Prepared For: PFIZER INC
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX ROUX ASSOCIATES INC *Environmental Consulting & Management*	Compiled by: L.W.	Date: 9/95	FIGURE
	Prepared by: J.R.	Scale: SHOWN	4
	Project Mgr: S.J.G.	Revision:	
	File No: 04744044	Project: 04744Y03	

APPENDIX A

Roux Associates'
Standard Operating Procedures

APPENDIX A

Table of Contents for Standard Operating Procedures

Collection of Soil Samples for Laboratory Analysis

Soil Boring and/or Monitoring or Observation Well Drilling, Formation Sampling, and Corehole Abandonment in Unconsolidated Formations

Decontamination of Field Equipment

Sample Handling

Field Record Keeping and Quality Assurance/Quality Control

Screening Soil Samples for Volatile Organic Vapors

STANDARD OPERATING PROCEDURE FOR COLLECTION OF SOIL SAMPLES FOR LABORATORY ANALYSIS

Date: May 15, 1990

Revision Number: 0

Corporate QA/QC Manager: Michael A. DeCillis

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines for the collection of soil samples for laboratory analysis. This SOP is applicable to soil samples collected from split-spoon samplers during drilling, hand auger samples, grab samples from stockpiled soils, surface samples, test pit samples, etc.

2.0 CONSIDERATIONS

Soil samples may be collected in either a random or biased manner. Random samples can be based on a grid system or statistical methodology. Biased samples can be collected in areas of visible impact or suspected source areas. Soil samples can be collected at the surface, shallow subsurface, or at depth. When samples are collected at depth the water content should be noted, since generally "soil sampling" is restricted to the unsaturated zone. Equipment selection will be determined by the depth of the sample to be collected. A thorough description of the sampling locations and proposed methods of sample collection should be included in the work plan.

Commonly, surface sampling refers to the collection of samples at a 0 to 6 inch depth interval. Certain regulatory agencies may define the depth interval of a surface sample differently, and this must be defined in the work plan. Collection of surface soil samples is most efficiently accomplished with the use of a stainless steel trowel or scoop. For samples at greater depths a decontaminated bucket auger or power auger may be needed to advance the hole to the point of sample collection. Another clean bucket auger should then be used to collect the sample. To collect samples at depths of greater than approximately six feet the use of a drill rig and split spoon samples will usually be necessary. In some situations, sample locations are accessed with the use of a backhoe.

3.0 MATERIALS/EQUIPMENT

a. A work plan which outlines soil sampling requirements.

b. Field notebook, field form(s), maps, chain-of-custody forms, and custody seals.

c. Decontamination supplies (including: non-phosphate, laboratory grade detergent, buckets, brushes, potable water, distilled water, regulatory-required reagents, aluminum foil, plastic sheeting, etc.).

d. Sampling device (split-spoon sampler, stainless steel hand auger, stainless steel trowel, etc.).

e. Stainless steel spoons or spatulas.

f. Disposable sampling gloves.

g. Laboratory-supplied sample containers with labels.

h. Cooler with blue or wet ice.

i. Plastic sheeting.

j. Black pen and indelible marker.

k. Zip-lock bags and packing material.

l. Tape measure.

m. Paper towels or clean rags.

n. Masking and packing tape.

o. Overnight (express) mail forms.

4.0 DECONTAMINATION

All reusable sampling equipment will be thoroughly cleaned according to the decontamination SOP. Where possible, thoroughly pre-cleaned and wrapped sampling equipment should be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and plastic sheeting will be changed after each use and discarded in an appropriate manner.

5.0 PROCEDURE

5.1 Prior to collecting soil samples, ensure that all sampling equipment has been thoroughly cleaned according to the decontamination SOP. If samples are to be collected at depth, then the boring must be advanced with thoroughly cleaned equipment to the desired sampling horizon and a different thoroughly cleaned sampler must be used to collect the sample.

5.2 Using disposable gloves and a pre-cleaned, stainless steel spatula or spoon, extract the soil sample from the sampler, measure the recovery, and separate the wash from the true sample. Where allowed by regulatory agency(ies), disposable plastic spoons may be used.

5.3 Place the sample in a laboratory-supplied, pre-cleaned sample container. This should be done as quickly as possible and this is especially important when sampling for volatile organic compounds (VOCs). Samples to be analyzed for VOCs must be collected prior to other constituents.

5.4 The sample container will be labeled with appropriate information such as, client name, site location, sample identification (location, depth, etc.), date and time of collection, and sampler's initials.

5.5 Using the remaining portion of soil from the sampler, log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, organic content, layering, grain size, etc.).

5.6 If soil samples are to be composited in the field, then equal portions from selected locations will be placed on a clean plastic sheet and homogenized. Alternately, several samples may be submitted to the laboratory for compositing by weight. The method used is dependent upon regulatory requirements. Specific compositing procedures shall be approved by the appropriate regulatory agency and described in the work plan. Samples to be analyzed for VOCs will not be composited unless required by a regulatory agency.

5.7 After the sample has been collected, labeled, and logged in detail, it is placed in a zip-lock bag and stored in a cooler at 4°C.

5.8 A chain-of-custody form is completed for all samples collected. One copy is retained and two are sent with the samples in a zip-lock bag to the laboratory. A custody seal is placed on the cooler prior to shipment.

5.9 Samples collected from Monday to Friday are to be delivered to the laboratory within 24 hours of collection. If Saturday delivery is unavailable, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if any analytes require a shorter delivery time.

5.10 The field notebook and appropriate forms should include, but not be limited to the following: client name, site location, sample location, sample depth, sample identification, date and time collected, sampler's name, method of sample collection, number and type of containers, geologic description of material, description of decontamination procedures, etc. A site map should be prepared with exact measurements to each sample location in case follow-up sampling is necessary.

5.11 All reusable sampling equipment must be thoroughly cleaned in accordance with the decontamination SOP. Following the final decontamination (after all samples are collected) the sampling equipment is wrapped in aluminum foil. Discard any gloves, foil, plastic, etc. in an appropriate manner that is consistent with site conditions.

STANDARD OPERATING PROCEDURE FOR SOIL BORING AND/OR MONITORING OR OBSERVATION WELL DRILLING, FORMATION SAMPLING AND BOREHOLE ABANDONMENT IN UNCONSOLIDATED FORMATIONS

Date: May 15, 1990

Revision Number: 0

Corporate QA/QC Manager: Michael A. DeCillis

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to describe the considerations and procedures, and to establish the guidelines for drilling (soil borings, wells, or piezometers) and formation sampling activities in unconsolidated formations. There are several drilling techniques available which include hollow-stem auger, cable tool, hydraulic rotary, cased-hole rotary, and air rotary. Formation (sediment/soil) sample collection include disturbed (drill cuttings), intact (split-spoon), and undisturbed (Shelby-tube or Denison-core). Borehole abandonment (closure) procedures will also be addressed in this SOP.

The objective of drilling is to collect accurate subsurface information and to prepare a borehole for potential completion as a well or piezometer. Consequently, the lithologic data is the all important, most essential information that can be collected. The lithologic data characterizes subsurface conditions, describes hydrogeologic coefficients qualitatively and/or quantitatively, and identifies optimum locations for screen zones if wells are constructed.

Data can be obtained through the physical examination and testing of formation samples, as well as knowledge regarding ground-water levels. Thus, drill fluid mix, fluid loss, rate of drilling, lengths of split-spoon and Shelby-tube/Denison-core recovery, etc. must be monitored by the on-site hydrogeologist or geologist.

2.0 DRILLING TECHNIQUE-SELECTION

Verify that the drilling technique is the one specified in the investigation work plan, and that the drilling equipment mobilized by the driller is in good condition and proper working order. Do not permit the driller to use a drilling rig that appears to be substandard, in disrepair, etc., and/or is questionable as to whether or not the rig has the capabilities to accomplish the goals of the drilling program. The drilling rig must be capable of:

a. Penetration of all anticipated subsurface materials and formations at a desired rate, and construction of a borehole of desired diameter (for the anticipated well, if applicable, including the placement of a gravel or sand pack through a tremie pipe and necessary formation sealing material such as bentonite or cement).

b. Identification of lithology for development of a geologic log of all unconsolidated formations and materials penetrated, including physical characteristics and visual description of color, grain sizes, sorting and mineralogy.

c. Collection of samples of aquifer fluids during the drilling process and prior to well construction, while at the same time minimizing potential for cross-contamination. The method used should prevent cross-contamination between surface soils and ground water or between different hydrogeologic units.

d. Collection of intact and/or undisturbed soil samples from the center line or sidewall of the borehole. This objective requires the drilling to be halted while soil samples are taken from the bottom or side of the incomplete borehole.

e. Completion of the borehole into a well (monitoring or observation) or piezometer during the initial construction process (i.e., constructing a well or piezometer as the borehole is drilled, or constructing a well or piezometer in the borehole immediately after the drilling tools are removed).

f. Implementation of borehole geophysical logging (when applicable and possible) to enable more accurate vertical and horizontal extrapolation of borehole data to the lithology of the hydrogeologic system.

g. Completion of a well or piezometer, if applicable, in the borehole following a time lapse for interpretation of geologic or geophysical data from the borehole.

3.0 DRILLING TECHNIQUE - DESCRIPTION

3.1 Hollow-Stem Auger - This drilling method is rapid and extremely effective in most cohesive sediments but less so in loose sandy material. Penetration may be up to 150 feet below land surface (bls) depending on the size of the rig, drilling conditions, and the diameter of the auger flight; however, depths up to 250 feet bls have been achieved under compatible conditions. A major advantage of this technique is that normally no fluids are introduced into the formation. If the auger flights can be removed and the integrity of the borehole maintained, then electrical and radiation (e.g., gamma, neutron, etc.) geophysical logs can be run. If the auger flights must remain in the borehole, then only radiation geophysical logs can be run. Casing, screen, and sampling devices can then be lowered through the hollow stem by removing the removable plug at the bottom of the auger flights, and gravel packing and cementing can be accomplished within the hollow stem. However, this can be difficult especially below the water table. Auger flight outside diameters (OD) range from 5 inches (in.) to 12 in. The diameter of a well that can be constructed inside the hollow stem is limited, however, to about 4 in.

3.2 Cable Tool (Percussion) - This drilling method is slow because the borehole is advanced by lifting and dropping a heavy string of drilling tools. Cuttings accumulate in the drill casing and are removed by a sand bailer. A steel casing is driven in as the hole is deepened. Cable-tool rigs can be used in unconsolidated sediment and bedrock to depths of hundreds or thousands of feet and often employ telescoping techniques for drilling deep boreholes. Electrical geophysical logs cannot be run through the steel cased borehole, but radiation logs (e.g., gamma, neutron, etc.) can be run. Well casing and screen can be installed within the cased hole after which the outer casing is pulled back (removed). Because the boring is cased as it is being drilled, cross-contamination between various depths is practically eliminated. The method provides an excellent means to collect good, representative formation samples.

3.3 Hydraulic Rotary - This drilling method uses a rotating bit to drill (advance) the borehole. Drill cuttings are removed using a recirculating drilling fluid (mud or water). Although setting up the drilling equipment is slow, the drilling process is reasonably fast. In the mud-rotary method, drilling mud forms a cake on the borehole wall which prevents excessive loss of fluid to the formation being drilled. The hydrostatic pressure combined with the weight and density of the mud slurry keeps the hole open. This allows the drill rods to be removed from the borehole and geophysical logs (electric and radiation) to be run in the open borehole.

In reverse hydraulic rotary drilling, the drilling fluid moves downward through annular space and then upward inside the drill pipe. If the drilling fluid does not contain mud, then sufficient water flow is required as make-up water because the borehole wall is not sealed; therefore, significant water loss can occur to the formation being drilled. The borehole is held open by hydrostatic pressure only. A serious obstacle to this drilling method occurs when the static water level is less than 15 feet below land surface because of insufficient hydrostatic head difference between the borehole and the water table. However, the problems of excessive water loss and shallow depths to water may be overcome by using mud as the drilling fluid.

In mud-rotary drilling, the drilling fluid (mud) moves downward through the drill pipe and then upward through the annular space. Therefore, the borehole is held open by hydrostatic pressure and the mud cake lining the wall of the borehole. The mud-rotary method can be used to construct moderate to deep wells in unconsolidated (and consolidated material), while the reverse rotary technique can be used to construct moderate to deep wells in unconsolidated materials. The principal disadvantage may be the difficulty in removing mud cake from the formation at the screened zone. Extensive well development may be required to remove the mud cake.

3.4 Cased-Hole Rotary - Several new rotary drilling techniques have been developed in which a steel casing is advanced with an air-rotary or mud-rotary drill. This technique is highly desirable for use in exploratory drilling at monitoring sites because water and soil samples may be collected under conditions which preclude contamination from shallower depths. Furthermore, this technique is extremely effective in boulder or cavernous zones which would inhibit or preclude drilling using other techniques. Drilling results are comparable to cable-tool drilling but with greatly enhanced speeds. In all the cased-hole techniques, the main benefit is that the only portion of the borehole which is open, is at the bottom of the drill casing; thus, no soil or water from shallower depths can move down and impact the depth drilled and/or sampled. Electrical geophysical logs cannot be run through the steel-cased borehole, however, radiation logs (e.g., gamma, neutron, etc.) can be run.

Presently, there are three cased-hole rotary techniques which include:

a. The drill-thru casing hammer technique in which the casing is advanced by percussion with a casing hammer or vibratory driver similar to the method used in a borehole drilled by the air-rotary method. The casing hammer can also pull out the casing (air drilling only).

b. The Odex™ Drilling System (European system) which "pulls" the casing using a fixture attached to an air-hammer type drill bit (air drilling only).

c. The Barber™ Drilling System in which drilling is done with a top-head drive and a rotary table that spins casing into the ground. Casing can be fitted with a carbide "shoe" to cut boulders and an air hammer can be used above the bit. Air or mud rotary can be used to lift cuttings.

Two potential problems may be encountered using the cased-hole rotary technique which include: 1) "sand heave" when drilling stops (which can be quickly drilled or bailed out) and 2) possible aeration of water in the cased borehole if volatiles are being tested (which can be overcome by pumping or bailing the standing water out before sampling). The minimum drill casing diameter is 6 inches and depth is limited to approximately 450 feet.

3.5 Air Rotary - This drilling method uses a rotating bit to drill, and high-velocity compressed air to remove cuttings from the borehole. A pneumatic down-hole hammer is often used to add percussion to the rotary drilling action. This drilling method is very fast and, although it is most suitable for penetrating hard bedrock, it can be used in unconsolidated formations. The borehole may be cased or uncased depending on geologic conditions. If an open borehole is drilled, then electrical and radiation (e.g., gamma, neutron, etc.) geophysical logs can be run. If a cased borehole is drilled, then only radiation geophysical logs can be run.

Four potential problems may be encountered when using the air-rotary technique:

a. When a prolific aquifer is tapped, the compressed air may not be able to lift the water to the surface.

b. Aeration of water in the borehole (and finished well) immediately prior to sampling can interfere with a number of inorganic and organic water-quality parameters.

c. Low yield water entry zones may not be identified because the air pressure prevents water from entering the borehole. Care should be taken to prevent overdrilling of the borehole.

d. Air rotary drilling can induce the migration of volatile organics to the surface or adjacent structures causing potential aesthetic or health and safety concerns.

If the air-rotary technique is used then the following special procedures will be implemented:

a. The type of air compressor and lubricating oil will be documented on an appropriate field form and in the field notebook and a 1-pint sample of the oil will be retained for characterization in the event organic compounds are detected in a well sample.

b. An air line oil filter will be required and changed per manufacturer's recommendations during operation with documentation of this maintenance on an appropriate field form and in the field notebook. More frequent oil filter changes will be made if oil is visibly detected in the filtered air.

c. The use of any additive will be prohibited, except approved water (e.g., potable water) for dust control and cuttings removal.

4.0 DECONTAMINATION

Drilling equipment decontamination procedures are outlined in the field equipment decontamination SOP. Proper decontamination in accordance with regulatory guidelines must be clearly documented in the field notebook.

5.0 PROCEDURE FOR DRILLING

5.1 Document all drilling-related activities (e.g., starting, stopping, footage, problems, decontamination, etc.) on the daily log form and in the field notebook. Record dates and times of activities, and names of Roux Associates personnel providing oversight.

5.2 Monitor and record drill fluid mix, speed of rotation, pressure on the drill fluid, rate of drilling, and length of drill rods or casing in the borehole.

5.3 Confirm that the drill rods and core barrel are straight, or discontinue drilling.

5.4 Pay particular attention to the advancement of the boring because differences in the rate of drilling may be indicative of differences in subsurface geologic conditions (e.g., sand and gravel versus clay).

5.5 Maintain a continuous dialogue with the driller to track and keep informed of all drilling activities (e.g., the speed of the drill and drilling pressure, difficult and easy drilling conditions, etc.).

5.6 Collect formation samples as described below in Section 6.0. Sample jars must be labeled appropriately (e.g., project number and name, site location, boring number, date, sample interval, blow counts, and initials of Roux Associates personnel collecting sample).

5.7 Record geologic information in the geologic log form and in the field notebook.

5.8 Handle and ship split-spoon sample jars carefully to avoid breakage and handle and ship tubes or cores carefully to prevent disturbance.

6.0 PROCEDURE FOR FORMATION SAMPLING

6.1 Intact formation sampling will be implemented using split-spoon samplers (which are driven), Shelby-tube samplers (which are pushed), or Denison-core samplers (which are rotated) depending on the drilling technique employed. Formation samples will be retained in suitable size (e.g., 1-pint or 0.5-pint) jars for physical descriptions and potential physical and chemical analysis. The appropriately labeled jars and tubes will be stored in a safe place to avoid breakage, agitation, and freezing. Intact formation samples will be collected as described in the work plan at specified intervals (e.g., at 5-foot increments below land surface) and at each major change in subsurface materials. Hydrogeologic information will be recorded on a geologic log form and in the field notebook. Detailed descriptions of the type(s) of intact sample(s) collected, sampling intervals and conditions, and objective(s) of the sample collection will be provided in the work plan.

6.2 Disturbed formation samples (drill cuttings) will be examined continuously throughout the entire depth of the borehole. If applicable to the study and/or stated in the work plan, borehole cuttings will be collected from the circulating auger flights which lift cuttings to land surface (hollow-stem auger technique), from the sand bailer (cable-tool technique), from the recirculating drilling fluid (mudflume) which transports cuttings to land surface (mud-rotary and related techniques), or from the compressed air used to carry cuttings to land surface (air-rotary and related techniques). Formation samples will be retained in appropriate size (e.g., 1-pint or 0.5-pint), properly labeled jars and stored in a safe place to avoid breakage, agitation, and freezing. Hydrogeologic data will be recorded on a geologic log form and in the field notebook.

6.3 The soil cores from the wells drilled at the site are used for lithologic identification. The first 18 inches of soil for each borehole will be collected intact using a split-spoon sample, Shelby-tube sampler, or Denison-core sampler. Split-spoon samples may be collected continuously from boreholes for cluster wells; single well and/or piezometer boreholes may be split-spooned throughout drilling or at specified intervals or changes in lithology. The conditions for sampling will be specified in the work plan.

6.4 Before collecting and retaining soil and/or sediments collected with the split-spoon sampler, the top several inches will be removed from the sampler and discarded to eliminate any sediment that may have caved into the bottom of the borehole.

6.5 Sediment sampling equipment such as split-spoon samplers, spatulas, etc. (but not including Shelby-tube or Denison-core samplers, which area not re-usable) will be decontaminated by steam cleaning and/or a non-phosphate, laboratory-grade and distilled/deionized wash followed by a distilled/deionized water rinse. (Refer to the SOP for Decontamination of Field Equipment for a detailed description of minimum and special decontamination procedures.) Decontamination of sediment sampling equipment will take place prior to the collection of the first sample and following the collection of each subsequent sample.

7.0 <u>BOREHOLE ABANDONMENT OR CLOSURE</u>

7.1 Upon the completion of the investigation, a determination will be made as whether to maintain the borehole (for a well or piezometer) or to close it (i.e., abandon and seal it). If the client and Roux Associates agree to abandon the borehole, then the state will be notified and a request will be presented for borehole abandonment. Upon state approval to seal the borehole, appropriate state borehole abandonment forms will be completed, if required. Following state approval, the abandonment of any borehole (or boring) will be in accordance with local, state and/or Federal regulations.

7.2 For each abandoned borehole, the procedure will be documented on an appropriate field form or in the study notebook. Documentation may include, where appropriate, the following:

a. Borehole designation.

b. Location with respect to the replacement borehole, if replaced (e.g., 30 ft north and 40 ft west of Borehole B-1). A location sketch should be prepared.

c. Open depth prior to grouting and any other relevant circumstances (e.g., formation collapse).

d. Drill casing left in the borehole by depth, size, and composition.

e. A copy of the geologic log.

f. A revised diagram of the abandoned borehole using a supplemental geologic log form.

g. Additional items left in hole by depth, description, and composition (e.g., lost tools, bailers, etc.).

h. A description and daily quantities of grout used to compensate for settlement.

i. The date of grouting.

j. The level of water or mud prior to grouting and the date and time measured.

k. Any other state or local well abandonment reporting requirements.

STANDARD OPERATING PROCEDURE
FOR DECONTAMINATION OF FIELD EQUIPMENT

Date: December 21, 1989 Revision Number: 0

Corporate QA/QC Manager: Michael a. DeCillis

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to establish the guidelines for decontamination of all field equipment potentially exposed to contamination during drilling, and soil and water sampling. The objective of decontamination is to ensure that all drilling, and soil-sampling and water-sampling equipment is decontaminated (free of potential contaminants): 1) prior to being brought onsite to avoid the introduction of potential contaminants to the site; 2) between drilling and sampling events/activities onsite to eliminate the potential for cross-contamination between boreholes and/or wells; and 3) prior to the removal of equipment from the site to prevent the transportation of potentially contaminated equipment offsite.

In considering decontamination procedures, state and federal regulatory agency requirements must be considered because of potential variability between state and federal requirements and because of variability in the requirements of individual states. Decontamination procedures must be in compliance with state and/or federal protocols in order that regulatory agency(ies) scrutiny of the procedures and data collected do not result in non acceptance (invalidation) of the work undertaken and data collected.

2.0 PROCEDURE FOR DRILLING EQUIPMENT

The following is a minimum decontamination procedure for drilling equipment. Drilling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

2.1 The rig and all associated equipment should be properly decontaminated by the contractor before arriving at the test site.

2.2 The augers, drilling casings, rods, samplers, tools, rig, and any piece of equipment that can come in contact (directly or indirectly) with the soil, will be steam cleaned onsite prior to set up for drilling to ensure proper decontamination.

2.3 The same steam cleaning procedures will be followed between boreholes (at a fixed on-site location[s], if appropriate) and before leaving the site at the end of the study.

2.4 All on-site steam cleaning (decontamination) activities will be monitored and documented by a member(s) of the staff of Roux Associates, Inc.

2.5 If drilling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat drilling equipment, then special decontamination procedures may have to be utilized before steam cleaning (e.g., hexane scrub and wash).

2.6 Containment of decontamination fluids may be necessary (e.g., rinsate from steam cleaning) or will be required (e.g., hexane), and disposal must be in accordance with state and/or federal procedures.

3.0 PROCEDURE FOR SOIL-SAMPLING EQUIPMENT

The following is a minimum decontamination procedure for soil-sampling equipment (e.g., split spoons, stainless-steel spatulas). Soil-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

3.1 Wear disposable gloves while cleaning equipment to avoid cross-contamination and change gloves as needed.

3.2 Steam clean the sampler or rinse with potable water. If soil-sampling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat sampling equipment, then special decontamination procedures may have to be utilized before steam cleaning and washing in detergent solution (e.g., hexane scrub and wash).

3.3 Prepare a non-phosphate, laboratory-grade detergent solution and distilled or potable water in a clean bucket.

3.4 Disassemble the sampler, as necessary and immerse all parts and other sampling equipment in the solution.

3.5 Scrub all equipment in the bucket with a brush to remove any adhering particles.

3.6 Rinse all equipment with copious amounts of potable water followed by distilled or deionized water.

3.7 Place clean equipment on a clean plastic sheet (e.g., polyethylene)

3.8 Reassemble the cleaned sampler, as necessary.

3.9 Transfer the sampler to the driller (or helper) making sure that this individual is also wearing clean gloves, or wrap the equipment with a suitable material (e.g., plastic bag, aluminum foil.

As part of the decontamination procedure for soil-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

4.0 PROCEDURE FOR WATER-SAMPLING EQUIPMENT

The following is a decontamination procedure for water-sampling equipment (e.g., bailers, pumps). Water-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

4.1 Decontamination procedures for bailers follow:

a. Wear disposable gloves while cleaning bailer to avoid cross-contamination and change gloves as needed.

b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a bucket.

c. Disassemble bailer (if applicable) and discard cord in an appropriate manner, and scrub each part of the bailer with a brush and solution.

d. Rinse with potable water and reassemble bailer.

e. Rinse with copious amounts of distilled or deionized water.

f. Air dry.

g. Wrap equipment with a suitable material (e.g., clean plastic bag, aluminum foil).

h. Rinse bailer at least three times with distilled or deionized water before use.

4.2 Decontamination procedures for pumps follow:

a. Wear disposable gloves while cleaning pump to avoid cross-contamination and change gloves as needed.

b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a clean bucket, clean garbage can, or clean 55-gallon drum.

c. Flush the pump and discharge hose (if not disposable) with the detergent solution, and discard disposable tubing and/or cord in an appropriate manner.

d. Flush the pump and discharge hose (if not disposable) with potable water.

e. Place the pump on clear plastic sheeting.

f. Wipe any pump-related equipment (e.g., electrical lines, cables, discharge hose) that entered the well with a clean cloth and detergent solution, and rinse or wipe with a clean cloth and potable water.

g. Air dry.

h. Wrap equipment with a suitable material (e.g., clean plastic bag).

As part of the decontamination procedure for water-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

STANDARD OPERATING PROCEDURE
FOR SAMPLE HANDLING

Date: May 15, 1990

Revision Number: 0

Corporate QA/QC Manager: Michael A. DeCillis

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for sample handling which will allow consistent and accurate results. Valid chemistry data are integral to investigations that characterize media-quality conditions. Thus, this SOP is designed to ensure that once samples are collected, they are preserved, packed and delivered in a manner which will maintain sample integrity to as great an extent as possible. The procedures outlined are applicable to most sampling events and any required modifications must be clearly described in the work plan.

2.0 CONSIDERATIONS

Sample containers, sampling equipment decontamination, quality assurance/quality control (QA/QC), sample preservation, and sample handling are all components of this SOP.

2.1 Sample Containers

Prior to collection of a sample, considerations must be given to the type of container that will be used to store and transport the sample. The type and number of containers selected is usually based on factors such as sample matrix, potential contaminants to be encountered, analytical methods requested, and the laboratory's internal quality assurance requirements. In most cases, the overriding considerations will be the analytical methodology, or the state or federal regulatory requirements because these regulations generally encompass the other factors. The sample container selected is usually based on some combination of the following criteria:

a. Reactivity of Container Material with Sample

Choosing the proper composition of sample containers will help to ensure that the chemical and physical integrity of the sample is maintained. For sampling potentially hazardous material, glass is the recommended container type because it is chemically inert to most substances. Plastic containers are not recommended for most hazardous wastes because the potential exists for contaminants to adsorb to the surface of the plastic or for the plasticizer to leach into the sample.

In some instances, however, the sample characteristics or analytes of interest may dictate that plastic containers be used instead of glass. Because some metals species will adhere to the sides of the glass containers in an aqueous matrix, plastic bottles (e.g., nalgene) must be used for samples collected for metals analysis. A separate, plastic container should accompany glass containers if metals analysis is to be performed along with other analyses. Likewise, other sample characteristics may dictate that glass cannot be used. For example, in the case of a strong alkali waste or hydrofluoric solution, plastic containers may be more suitable because glass containers may be etched by these compounds and create adsorptive sites on the container's surface.

b. Volume of the Container

The volume of sample to be collected will be dictated by the analysis being performed and the sample matrix. The laboratory must supply bottles of sufficient volume to perform the required analysis. In most cases, the methodology dictates the volume of sample material required to complete the analysis. However, individual laboratories may provide larger volume containers for various analytes to ensure sufficient quantities for duplicates or other QC checks.

To facilitate transfer of the sample from the sampler into the container and to minimize spillage and sample disturbance, wide-mouth containers are recommended. Aqueous volatile organic samples must be placed into 40-milliliter (ml) glass vials with polytetrafluoroethylene (PTFE) (e.g., Teflon™) septums. Non-aqueous volatile organic samples should be collected in the same type of vials or in 4-ounce (oz) wide-mouth jars provided by the laboratory. These jars should have PTFE-lined screw caps.

c. Color of Container

Whenever possible, amber glass containers should be used to prevent photodegradation of the sample, except when samples are being collected for metals analysis. If amber containers are not available, then containers holding samples should be protected from light (i.e., place in cooler with ice immediately after filling).

d. Container Closures

Container closures must screw on and off the containers and form a leak-proof seal. Container caps must not be removed until the container is ready to be filled with the sample, and the container cap must be replaced (securely) immediately after filling it. Closures should be constructed of a material which is inert with respect to the sampled material, such as PTFE (e.g., Teflon™). Alternately, the closure may be separated from the sample by a closure liner that is inert to the sample material such as PTFE sheeting. If soil or sediment samples are being collected, the threads of the container must be wiped clean with a dedicated paper towel or cloth so the cap can be threaded properly.

e. Decontamination of Sample Containers

Sample containers must be laboratory cleaned by the laboratory performing the analysis. The cleaning procedure is dictated by the specific analysis to be performed on the sample. Sample containers must be carefully examined to ensure that all containers appear clean. Do not mistake the preservative as unwanted residue. The bottles should not be field cleaned. If there is any question regarding the integrity of the bottle, then the laboratory must be contacted immediately and the bottle(s) replaced.

f. Sample Bottle Storage and Transport

No matter where the sample bottles are, whether at the laboratory waiting to be packed for shipment or in the field waiting to be filled with sample, care must be taken to avoid contamination. Sample shuttles or coolers, and sample bottles must be stored and transported in clean environments. Sample bottles and clean sampling equipment must never be stored near solvents, gasoline, or other equipment that is a potential source of cross-contamination. When under chain of custody, sample bottles must be secured in locked vehicles, and custody sealed in shuttles or in the presence of authorized personnel. Information which documents that proper storage and transport procedures have been followed must be included in the field notebook and on appropriate field forms.

2.2 Decontamination of Sampling Equipment

Proper decontamination of all re-usable sampling equipment is critical for all sampling episodes. The SOP for Decontamination of Field Equipment and SOPs for method-specific or instrument-specific tasks must also be referred to for guidance for decontamination of various types of equipment.

2.3 Quality Assurance/Quality Control Samples

QA/QC samples are intended to provide control over the proper collection and tracking of environmental measurements, and subsequent review, interpretation and validation of generated analytical data. The SOPs for Collection of Quality Control Samples, for Evaluation and Validation of Data, and for Field Record Keeping and Quality Assurance/Quality Control must be referred to for detailed guidance regarding these respective procedures. SOPs for method-specific or instrument-specific tasks must also be referred to for guidance for QA/QC procedures.

2.4 Sample Preservation Requirements

Certain analytical methodologies for specific analytes require chemical additives in order to stabilize and maintain sample integrity. Generally, this is accomplished under the following two scenarios:

a. Sample bottles are preserved at the laboratory prior to shipment into the field.

b. Preservatives are added in the field immediately after the samples are collected.

Many laboratories provide pre-preserved bottles as a matter of convenience and to help ensure that samples will be preserved immediately upon collection. A problem associated with this method arises if not enough sample could be collected, resulting in too much preservative in the sample. More commonly encountered problems with this method include the possibility of insufficient preservative provided to achieve the desired pH level or the need for additional preservation due to chemical reactions caused by the addition of sample liquids to pre-preserved bottles. The use of pre-preserved bottles is acceptable; however, field sampling teams must always be prepared to add additional preservatives to samples if the aforementioned situations occur. Furthermore, care must be exercised not to overfill sample bottles containing preservatives to prevent the sample and preservative from spilling and therefore diluting the preservative (i.e., not having enough preservative for the volume of sample).

When samples are preserved after collection, special care must be taken. The transportation and handling of concentrated acids in the field requires additional preparation and adherence to appropriate preservation procedures. All preservation acids used in the field should be trace-metal or higher-grade.

2.5 Sample Handling

After the proper sample bottles have been received under chain-of-custody, properly decontaminated equipment has been used to collect the sample, and appropriate preservatives have been added to maintain sample integrity, the final step for the field personnel is checking the sample bottles prior to proper packing and delivery of the samples to the laboratory.

All samples should be organized and the labels checked for accuracy. The caps should be checked for tightness and any 40-ml volatile organic compound (VOC) bottles must be checked for bubbles. Each sample bottle must be placed in an individual "zip-lock" bag to protect the label, and placed on ice. The bottles must be carefully packed to prevent breakage during transport. When several bottles have been collected for an individual sample, they should not be placed adjacent to each other in the cooler to prevent possible breakage of all bottles for a given sample. If there are any samples which are known or suspected to be highly contaminated, these should be placed in an indivudual cooler under separate chain-of-custody to prevent possible cross contamination. Sufficient ice (wet or blue packs) should be placed in the cooler to maintain the temperature at 4 degrees Celsius (°C) until delivery at the laboratory. Consult the work plan to determine if a particular ice is specified as the preservation for transportation (e.g., the United States Environmental Protection Agency does not like the use of blue packs because they claim that the samples will not hold at 4°C). If additional coolers are required, then they should be purchased. The chain-of-custody form should be properly completed, placed in a "zip-lock" bag, and placed in the cooler. One copy must be maintained for the project files. The cooler should be sealed with packing tape and a custody seal. The custody seal number should be noted in the field book. Samples collected from Monday through Friday will be delivered to the laboratory within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if certain analytes require a shorter delivery time. If overnight mail is utilized, then the shipping bill must be maintained for the files and the laboratory must be called the following day to confirm receipt.

3.0 EQUIPMENT AND MATERIALS

3.1 General equipment and materials may include, but not necessarily be limited to, the following:

a. Sample bottles of proper size and type with labels.

b. Cooler with ice (wet or blue pack).

c. Field notebook, appropriate field form(s), chain-of-custody form(s), custody seals.

d. Black pen and indelible marker.

e. Packing tape, "bubble wrap", and "zip-lock" bags.

f. Overnight (express) mail forms and laboratory address.

g. Health and safety plan (HASP).

h. Work plan/scope of work.

i. Pertinent SOPs for specified tasks and their respective equipment and materials.

3.2 Preservatives for specific samples/analytes as specified by the laboratory. Preservatives must be stored in secure, spillproof glass containers with their content, concentration, and date of preparation and expiration clearly labeled.

3.3 Miscellaneous equipment and materials including, but not necessarily limited to, the following:

a. Graduated pipettes.

b. Pipette bulbs.

c. Litmus paper.

d. Glass stirring rods.

e. Protective goggles.

f. Disposable gloves.

g. Lab apron.

h. First aid kit.

i. Portable eye wash station.

j. Water supply for immediate flushing of spillage, if appropriate.

k. Shovel and container for immediate containerization of spillage-impacted soils, if appropriate.

4.0 PROCEDURE

4.1 Examine all bottles and verify that they are clean and of the proper type, number, and volume for the sampling to be conducted.

4.2 Label bottles carefully and clearly with project name and number, site location, sample identification, date, time, and the sampler's initials using an indelible marker.

4.3 Collect samples in the proper manner (refer to specific sampling SOPs).

4.4 Conduct preservation activities as required after each sample has been collected. Field preservation must be done immediately and must not be done later than 30 minutes after sample collection.

4.5 Conduct QC sampling, as required.

4.6 Seal each container carefully and place in an individual "zip lock" bag.

4.7 Organize and carefully pack all samples in the cooler immediately after collection (e.g., bubble wrap). Insulate samples so that breakage will not occur.

4.8 Complete and place the chain-of-custody form in the cooler after all samples have been collected. Maintain one copy for the project file. If the cooler is to be transferred several times prior to shipment or delivery to the laboratory, it may be easier to tape the chain-of-custody to the exterior of the sealed cooler. When exceptionally hazardous samples are known or suspected to be present, this should be identified on the chain-of-custody as a courtesy to the laboratory personnel.

4.9 Add additional ice as necessary to ensure that it will last until receipt by the laboratory.

4.10 Seal the cooler with packing tape and a custody seal. Record the number of the custody seal in the field notebook and on the field form. If there are any exceptionally hazardous samples, then shipping regulations should be examined to ensure that the sample containers and coolers are in compliance and properly labeled.

4.11 Samples collected from Monday through Friday will be delivered to the laboratory within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if certain analytes require a shorter delivery time.

4.12 Maintain the shipping bill for the project files if overnight mail is utilized and call the laboratory the following day to confirm receipt.

STANDARD OPERATING PROCEDURE FOR FIELD RECORD KEEPING AND QUALITY ASSURANCE/QUALITY CONTROL

Date: May 15, 1990

Revision Number: 0

Corporate QA/QC Manager: Michael A. DeCilli

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide procedures and standards for record keeping and maintenance, for all field activities conducted by Roux Associates, Inc. (Roux Associates).

Strict quality assurance/quality control (QA/QC) is necessary to properly and accurately document and preserve all project-related information. Quality assurance is implemented to corroborate that quality control procedures are followed. Quality control provides a means to monitor investigation activities (e.g., sampling and laboratory performance) as a check on the quality of the data.

Valid data and information are integral to all aspects of Roux Associates' field activities. These aspects include, but are not necessarily limited to, activities that involve: drilling; sediment, sludge, and soil sampling (lithologic, and soil-quality and analysis); well construction and development; aquifer testing and analysis; water-quality sampling and analysis (surface water and ground water); free-product sampling and analysis; air-quality sampling and analysis; geophysical testing; demolition activities; waste removal operations; engineering installations; etc. The data will be confirmed by QA/QC methods established and set forth in the work plan/scope of work. Without checks on the field and analytical procedures, the potential exists for contradictory results, and associated incomplete or incorrect results from the interpretation of potentially questionable data.

Documentation will be entered in the field notebook and must be transcribed with extreme care, in a clear and concise manner, as the information recorded will become part of the permanent legal record. Because field notes are the legal record of site activities, they must be taken in a standard and consistent manner. If abbreviations are used, then they must first be spelled out for clarity (i.e., to avoid ambiguity and misunderstanding). All entries must be dated and initialed, and the time (military time) of the entry included. Field notebooks and forms must be assigned to an individual project and properly identified (i.e., client name, project number, location and name of site, individual recording information, dates, times, etc.). Change of possession of field notebooks or forms must be documented with the date and time, and initialed by both individuals. Following each day's entries, the field notebook or form must be photocopied in the event that the original documentation is lost or stolen. All field notebooks must have the company name and address legibly printed in indelible ink along with the message "If found, then please forward to Roux Associates, Inc. at the above address - REWARD OFFERED."

Information must be recorded while onsite because it may be difficult to recall details at a later date. Furthermore, information must be documented immediately as it provides unbiased information which will be used for writing the report when the field activities are completed. Project-related documentation is an irreplaceable, important record for other individuals who may become involved in the project, and provides the project manager with a complete history of project-related activities. Written information must be accompanied by maps, sketches, and photographs where appropriate, especially if these supplemental sources of information assist in the documentation process. A new page must be used in the field notebook for each new day's entries (i.e., unused portions of a previous page must have an "X" placed through it). The end of the day's records must be initialed and dated.

As part of record keeping and QA/QC activities, state and federal regulatory agencies should be contacted to check if special or different protocols are required and/or if particular or unconventional methods are required for the given field activity. Thus, the record keeping and QA/QC activities implemented by Roux Associates are based on technically sound standard practices and incorporate Roux Associates own, extensive experience in conducting hydrogeologic field activities.

2.0 MATERIALS

In order to track investigation activities, specific materials are required. These materials include the following:

a. A bound, waterproof field notebook.

b. Appropriate Roux Associates' forms (e.g., daily log, geologic log, monitoring well construction log, well sampling data form, location sketch, chain of custody, telephone conversation record, meeting notes, etc.).

c. Appropriate labels (e.g., sample, Roux Associates' Custody Seal, etc.)

d. Work plan/scope of work.

e. Health and safety plan (HASP).

f. Appropriate Roux Associates' SOPs.

g. Black pens, and indelible markers.

h. Camera and film.

3.0 DOCUMENTATION

3.1 Before the Roux Associates personnel leave the field, they must ensure that their field notes include comprehensive descriptions of the hydrogeologic conditions, and all investigation-related activities and results (onsite and offsite). This will safeguard against the inability to reconstruct and comprehend all aspects of the field investigation after its completion, and will serve to facilitate the writing of an accurate report. Properly documented information provides the QA/QC tracking (back-up) required for all Roux Associates' projects. General types of information that must be recorded (where pertinent to the investigation being conducted) include, but may not necessarily be limited to, the following:

a. List of Roux Associates personnel onsite.

b. Name, date, and time of arrival onsite by Roux Associates personnel, including temporary departures from, and returns to, the site during the work day.

c. Client and project number.

d. Name and location of study area.

e. Date and time of arrival onsite by non-Roux Associates personnel (names and affiliation) and equipment (e.g., subcontractors and facility personnel, and drilling equipment, respectively, etc.), including temporary departures from, and returns to, the site during the work day, and departure at the end of the work day.

f. List of non-Roux Associates personnel onsite.

g. Weather conditions at the beginning of the day as well as any changes in weather that occur during the working day.

h. Health and safety procedures including level of protection, monitoring of vital signs, frequency of air monitoring, and any change (i.e., downgrade or upgrade) in the level of protection for Roux Associates and other on-site personnel (e.g., subcontractors, facility personnel, etc.).

i. Health and safety procedures not in compliance with the HASP (for all on-site personnel).

j. Site reconnaissance information (e.g., topographic features, geologic features, surface-water bodies, seeps, areas of apparent contamination, facility/plant structures, etc.).

k. Air monitoring results (i.e., photoionization detector [PID], etc., measurements).

l. Task designation and work progress.

m. Work-related and site-related discussions with subcontractors, regulatory agency personnel, plant personnel, the general public, and Roux Associates personnel.

n. Delays, unusual situations, problems and accidents.

o. Field work not conducted in accordance with the work plan/scope of work, and rationale and justification for any change(s) in field procedures including discussions with personnel regarding the change(s) and who authorized the change(s).

p. QA/QC procedures not conducted in accordance with the QA/QC procedures established in the work plan/scope of work and rationale and justification for any change(s) in QA/QC procedures including discussions with personnel regarding the change(s) and who authorized the change(s).

q. Equipment and instrument problems.

r. Decontamination and calibration procedures.

s. Activities in and around the site and work area by any and all on-site personnel which may impact field activities.

t. Sketches, maps, and/or photographs (with dates and times) of the site, structures, equipment, etc. that would facilitate explanations of site conditions.

u. Contamination evidenced as a result of work-related activities (e.g., visible contaminants [sheen] in drilling fluids or on drilling equipment; sheen on, or staining of, sediments; color of, or separate [nonaqueous] phase on, water from borehole or well; vapors or odors emanating from a borehole or well; etc.); make all observations as objectively as possible (e.g., grey-blue, oil-like sheen; black and orange, rust-like stain; fuel-like odor; etc.) and avoid using nontechnical or negative-sounding terms (e.g., slimy, goopy, foul-smelling).

v. Date and time of final departure from the site of all personnel at the end of the work day.

3.2 In addition to the general types of information that must be recorded (as presented in Section 3.1), task-specific information must also be properly documented. Task-specific information which is required is provided in each respective task-oriented SOP, and the documentation procedures outlined in each SOP must be followed.

MEMORANDUM

TO: East Providence Project File
East Providence Field Staff
FROM: Drew Baris
DATE: November 10, 1994
RE: Standard Operating Procedure for Screening Soil Samples for Volatile Organic Vapors

---

The Standard Operating Procedure for the field screening of all soil samples collected during the field activities at the Mobil Oil Corporation East Providence Terminal is provided below. Conformance with the procedures should be documented in accordance with record keeping requirements specified in the Field Sampling Plans for the project.

- Calibrate the PID according to manufacturer's specifications at the beginning of each day. Check the calibration during operation with standard gases if PID results appear erratic or inconsistent with field observations. Recalibrate the instrument if necessary.

- Extract the soil sample from the sampler, quickly measure the recovery, and separate the wash from the true sample.

- Place the sample in a clean ziplock bag or glass jar (as quickly as possible to avoid loss of VOCs) filling the bag or jar half full. If using glass jars, aluminum foil should be placed over the mouth of the jar prior to securing the lid.

- Label the bags with the boring number, depth of sample, date of collection and blow counts. In addition, the field personnel will ensure the following: samples are taken at appropriate depths; unrepresentative portions of the sample are discarded properly; that the sampler is decontaminated properly between use; and the driller uses proper methods during sample collection.

- Log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, organic content, and layering).

- After the sample has been collected, allow approximately 10 minutes as an equilibration period prior to PID screening. Immediately prior to PID screening, agitate the sample for five seconds. Then open the ziplock seal the minimum amount necessary insert PID probe. If using glass jars, pierce the aluminum foil the minimum amount necessary to insert the probe. Measure the relative concentration of VOCs in the headspace of the soil sample. The initial (peak) reading must be recorded.

- Record the PID reading in the field notebook.

APPENDIX B

Health and Safety Plan

HEALTH AND SAFETY PLAN

Pfizer Inc
Willliamsburg, New York

Appendix B

July 6, 1995

Approvals:

Roux Associates, Inc.
Project Manager

Scott J Glash

Scott J. Glash

7-6-95

Date

Roux Associates, Inc.
Health and Safety
Manager

Linda M. Wilson

Linda M. Wilson

7-6-95

Date

Roux Associates, Inc.
Site Health and Safety
Manager

Date

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FIGURES

ATTACHMENTS

1.0 GENERAL

This site-specific Health and Safety Plan (HASP) has been prepared in accordance with 29 CFR 1910.120 Occupational Safety and Health Act (OSHA) Hazardous Waste Operations, and Roux Associates, Inc. (Roux Associates) Standard Operating Procedures (SOPs). It addresses all activities to be performed during the investigation at the Pfizer Inc Citric Block, Williamsburg Facility, Brooklyn, New York (Site). The HASP will be implemented by the designated Site Health and Safety Officer (SHSO) during work at the Site.

Compliance with this HASP is required for all Roux Associates employees and third parties who enter this Site. Assistance in implementing this HASP can be obtained from Roux Associates' Health and Safety Manager (HSM). The content of this HASP may undergo revision based upon additional information made available. Any changes proposed must be reviewed and approved by Roux Associates' HSM or her designee.

Scope of Work:

The Scope of Work for this investigation will include implementation of the following tasks:

- Soil Boring and Sampling; and
- Ground-Water Sampling.

Each task is described in detail in Section 3 of the Work Plan.

2.0 EMERGENCY INFORMATION

Multiple emergency services may be obtained from 911. More specific numbers for local services are listed below.

Type	Name	Telephone Numbers
Police		(718) 963-5311
Fire		(718) 636-1700
Hospital	Woodhull Medical Center	(718) 963-8000
Ambulance		
National Response Center		(800) 424-8802
Poison Control Center		(800) 526-8816
Roux Associates' Health and Safety Manager	Linda Wilson	(516) 232-2600

The route to Woodhull Medical Center is shown in Figure B-1.

3.0 HEALTH AND SAFETY PERSONNEL DESIGNATIONS

Roux Associates has designated health and safety personnel to be responsible for the implementation of this HASP for Roux Associates employees, and to provide assistance to the Contractor for health and safety related issues.

Personnel Designation	Responsibilities
Health and Safety Manager (HSM)	Implementation and modification of the HASP. Will assign health and safety duties. Provides adequate resources for field health and safety personnel. Ensures that field personnel are trained and aware of Site conditions. Schedules adequate personnel and equipment to perform job safely.
Site Health and Safety Officer (SHSO)/ Site Emergency Coordinator	Conducts safety briefings and worker awareness meetings. Ensures compliance with HASP. Notifies OHSS of accidents/incidents. Coordinates health and safety activities. Makes contact with local emergency groups prior to beginning work on-site. Responsible for evacuation, emergency treatment, and emergency transport of Site personnel.
Field Crew Personnel	Report unsafe or hazardous conditions to SHSO. Understand the information contained in this HASP.

4.0 SITE HISTORY AND PHYSICAL DESCRIPTION

This section provides a brief summary of the history and physical description of the Site, as documented in part by CDM in the Corrective Action Prior to Loss of Interim Status Final Report.

4.1 Location

The Williamsburg facility is located along both side of Flushing Avenue, in Brooklyn, New York (Figure 1). The Citric Block is situated in the central portion of the facility. It is bounded on the north by Gerry Street, on the east by Harrison Avenue, and on the south by Bartlett Street and Flushing Avenue.

4.2 History

The facility was established in 1849. Pharmaceuticals and industrial organic chemicals were manufactured. Fermentation and organic chemical synthesis processes were conducted at this facility.

Pfizer submitted Resource Conservation and Recovery Act (RCRA) Part A permit applications for a storage and neutralization unit, a container storage area and three injection wells in 1980. In 1981, Pfizer added several spent solvent storage tanks to the permit. Inspections by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) cited several satellite waste accumulation areas throughout the facility. Pfizer submitted a closure plan for the container storage area and solvent storage tanks on July 20, 1984. NYSDEC approved the closure plan and the units were certified closed on November 16, 1987.

Based on a review of Pfizer files, 24 USTs were abandoned in place. Five of the USTs contained petroleum, while the other 19 contained solvents or other process chemicals. Three additional USTs were removed in 1993. Post excavation sampling indicated that soil had been impacted by release from these USTs. The NYSDEC was notified, and based on the proposed demolition of the building, it was agreed that an investigation would be performed when the demolition was completed.

5.0 HAZARD ASSESSMENT

The potential hazards associated with the anticipated investigation activities include chemical and physical hazards. There is little potential for encountering biological hazards due to the nature of the work location and the activities to be conducted.

5.1 Chemical Hazards

Previous investigations have shown the presence of various organic compounds, including benzene and toluene at the Williamsburg facility. The toxicological, physical, and chemical properties of these potential contaminants are presented in Table B-1. This table includes action levels (permissible exposure levels) which will establish the level of protection. The potential for encountering these contaminants exists during invasive activities such as drilling.

5.2 Physical Hazards

A variety of physical hazards may be present during Site activities. These hazards are similar to those associated with any construction-type project. These physical hazards are due to motor vehicle and heavy equipment operation, the use of power and hand tools, hazardous working surfaces, and handling and storage of fuels. These hazards are not unique and are generally familiar to most field personnel. In addition, at this Site there is also the potential for the ground to cave in due to the settlement of buried wastes (e.g., drums). Additional task-specific requirements will be covered during safety briefings.

5.2.1 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps, and generators. High noise operations will be evaluated at the discretion of the SHSO. Personnel with 8-hour time-weighted-average exposures exceeding 85 dBA must be included in a hearing conservation program in accordance with 29 CFR 1910.95.

5.2.2 Heat Stress

Heat stress is a significant potential hazard and can be associated with heavy physical activity and/or the use of personal protective equipment (PPE) in hot weather environments.

Heat cramps are brought on by prolonged exposure to heat. As an individual sweats, water and salts are lost by the body resulting in painful muscle cramps. The signs and symptoms of heat cramps are as follows:

- severe muscle cramps, usually in the legs and abdomen;
- exhaustion, often to the point of collapse; and
- dizziness or periods of faintness.

First aid treatment includes shade, rest and electrolyte fluid replacement therapy. Normally, the individual should recover within one-half hour. If the individual has not recovered within 30 minutes and the temperature has not decreased, the individual should be transported to a hospital for medical attention.

Heat exhaustion may occur in a healthy individual who has been exposed to excessive heat while working. The circulatory system of the individual fails as blood collects near the skin in an effort to rid the body of excess heat. The signs and symptoms of heat exhaustion are as follows:

- rapid and shallow breathing;
- weak pulse;
- cold and clammy skin with heavy perspiration;
- skin appears pale;
- fatigue and weakness;
- dizziness; and
- elevated body temperature.

First aid treatment includes cooling the victim, elevating the feet, and replacing fluids and electrolytes. If the individual has not recovered within 30 minutes and the temperature has not decreased, the individual should be transported to the hospital for medical attention.

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a MEDICAL EMERGENCY, requiring immediate cooling of the victim and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- dry, hot, red skin;
- body temperature approaching or above 105°F;
- large (dilated) pupils; and
- loss of consciousness - the individual may go into a coma.

First aid treatment requires immediate cooling and transportation to a medical facility.

Heat stress (heat cramps, heat exhaustion, and heat stroke) is a significant hazard if any type of protective equipment (semipermeable or impermeable) which prevents evaporative cooling is worn in hot weather environments. Local weather conditions may require restricted work schedules in order to adequately protect personnel. The use of work/rest cycles (including working in the cooler periods of the day or evening) and training on the signs and symptoms of heat stress should help prevent heat-related illnesses from occurring. Work/rest cycles will depend on the work load required to perform each task, type of protective equipment, temperature, and humidity. In general, when the temperature exceeds 88°F, a 15 minute rest cycle will be initiated once every two hours. In addition, potable water and fluids containing electrolytes (e.g., Gatorade) will be available to replace lost body fluids.

5.2.3 Cold Stress

Cold stress is a danger at low temperatures and when the wind-chill factor is low. Prevention of cold-related illnesses is a function of whole-body protection. Adequate insulating clothing must be used when the air temperature is below 40°F. In addition, reduced work periods followed by rest in a warm area may be necessary in extreme conditions. Training on the signs and symptoms of cold stress should prevent cold-related illnesses from occurring. The signs and symptoms of cold stress include the following:

- severe shivering;

- abnormal behavior;
- slowing;
- weakness;
- stumbling or repeated falling;
- inability to walk;
- collapse; and/or
- unconsciousness.

First aid requires removing the victim from the cold environment and seeking medical attention immediately. Also, prevent further body heat loss by covering the victim lightly with blankets. Do not cover the victim's face. If the victim is still conscious, administer hot drinks, and encourage activity, such as walking wrapped in a blanket.

6.0 TRAINING REQUIREMENTS

The Hazardous Waste Operations and Emergency Response Rule (29 CFR 1910.120) requires that all personnel be trained to recognize on-site hazards, understand the provisions of this HASP, and be made aware of the responsible health and safety personnel. This section discusses the means to meet these requirements.

6.1 Basic Training

All Site personnel who will perform work in areas where the potential for toxic exposure exists will be health and safety-trained prior to performing work on-site, per OSHA 29 CFR 1910.120(e). Training records will be submitted to and maintained by the SHSO on-site, as described in Section 7.4.

6.2 Site Specific Training

Health- and safety-related training that will specifically address the activities, procedures, monitoring and equipment for the Site operations will be provided to all Site personnel and visitors by the SHSO. It will include Site and facility layout, hazards, emergency services at the Site and will detail all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand, and to reinforce their responsibilities regarding safety and operations for their particular activity. Site-specific training will be documented and kept as part of the project records.

6.3 Safety Briefings

Project personnel will be given briefings by the SHSO on an as-needed basis to further assist them in conducting their activities safely. Safety briefings will be held when new operations are to be conducted, whenever changes in work practices must be implemented, before work is begun at each location, and each Monday morning. Records of safety briefings will be kept as part of the project records.

6.4 Record Keeping Requirements

All record keeping requirements mandated by OSHA 29 CFR 1910.120 will be strictly followed. Specifically, all personnel training records, injury/incident reports, medical examination records and exposure monitoring records will be maintained by Roux Associates and each contractor for a period of at least thirty years after the employment termination date of each employee. Pertinent health and safety training and medical certifications will be kept onsite during the field operations. The SHSO shall maintain a daily written log of all health and safety monitoring activities, and monitoring results shall become part of the project records.

7.0 MONITORING PROCEDURES FOR SITE OPERATIONS

The SHSO will record wind direction and temperature during monitoring in the logbook. All monitoring equipment will be calibrated per the owner's manual which will be kept onsite, or at least monthly according to Site inspection rules.

7.1 Intrusive Operations

Data from previous investigations have identified the presence of organic compounds in soil. Air monitoring will be performed to establish the concentrations of these constituents during intrusive activities (e.g., well installation) using a photoionization detector (PID), and Dräeger tubes (for benzene).

The SHSO will monitor the breathing zone with the PID in continuous operating mode and with the alarm activated. The alarm will be set at 5 parts per million (ppm), which is below the permissible exposure level (PEL) for all constituents of concern (except benzene). If the PID indicates the 5 ppm level is exceeded, the SHSO will order cessation of the activity until all personnel within the work zone have donned a full face air purifying respirator, or until the nature of the hazard has been more thoroughly evaluated.

Dräeger tubes will be used to provide direct readings to establish the levels of benzene if the PID indicates the 5 ppm level is exceeded, to determine that personal protection is adequate. The Dräeger tubes will not be chemical specific to benzene, but will be conservatively biased high, and the readings will enable the SHSO to make an immediate decision on the level of protection. If any detections of benzene are noted based upon the Dräeger tube readings, the SHSO will order cessation of the activity until:

- all potentially exposed personnel have donned Level B respiratory protection (supplied air);
- the benzene levels are not detectable by the Dräeger tubes; or
- the nature of the hazard has been more thoroughly evaluated and it has been determined that the measured compound(s) was not benzene.

7.2 Non-Intrusive Operations

Based on the current understanding of Site conditions, monitoring may be performed using Dräeger tubes on the first day of non-intrusive operations and periodically thereafter, if the PID readings indicate a more accurate assessment is warranted.

8.0 MEDICAL SURVEILLANCE REQUIREMENTS

Medical surveillance specifies any special medical monitoring and examination requirements as well as stipulates that all Roux Associates, Inc. personnel and contractors are required to pass the medical surveillance examination or equivalent for hazardous waste work required by 29 CFR 1910.120. As a minimum, the examination will include:

- complete medical and work histories;
- EKG;
- urinalysis;
- physical exam;
- eye exam;
- blood chemistry;
- pulmonary function test; and
- audiometry.

The examination will be taken annually, at a minimum, and upon termination of employment with the company. Additional medical testing may be required by the HSM or OHSS in consultation with the company physician and the SHSO if an overt exposure or accident occurs, or if other Site conditions warrant further medical surveillance.

9.0 ZONES, PROTECTION AND COMMUNICATIONS

Work zones, levels of personal protection, and means of communication are described below.

9.1 Site Zones

Roux Associates employs the following three zone approach to Site operations.

- the Work Zone;
- the Contamination Reduction Zone; and
- the Support Zone.

9.1.1 Work Zone

The Work Zone is the area where work will be conducted. The Work Zone will be designated by a temporary barrier consisting of red barricade tape. No personnel shall work in the Work Zone without a buddy. All workers within the Work Zone shall wear the proper personal protective equipment (see Section 10.2). No unauthorized persons will be allowed in the Work Zone during Site activities.

No personnel are allowed in the Work Zone without:

- a buddy;
- the proper personal protective equipment;
- medical authorization; and
- training certification.

9.1.2 Contamination Reduction Zone

A Contamination Reduction Zone (CRZ) will be established between the Work Zone and the Support Zone. The CRZ will provide for full personnel and portable equipment decontamination (Section 9.3). The CRZ will also contain safety and emergency equipment such as first aid equipment (bandages, blankets, eye wash) and containment equipment (adsorbent, fire extinguisher).

9.1.3 Support Zone

The Support Zone is considered the uncontaminated area and will provide for team communications and emergency response. Appropriate safety and support equipment will be located in this zone. The Support Zone will be located up-wind of Site operations, if possible and may be used as a potential evacuation point. No potentially contaminated personnel or materials are allowed in this zone except appropriately packaged/decontaminated and labeled samples and drummed wastes.

9.2 Personal Protection

This section describes the levels of protection which will be required by on-site personnel during the remediation activities.

9.2.1 General

The level of protection to be worn by field personnel and visitors will be defined and controlled by the SHSO with approval of the HSM. Where more than one hazard area is indicated, further definition shall be provided by review of Site hazards, conditions, and operational requirements and by monitoring at the particular operation being conducted.

During intrusive activities, continuous monitoring will be performed using the PID. Dräeger tubes will also be used for initial and periodic real-time measurements of benzene. The use of Dräeger tubes for benzene will allow the SHSO to make an immediate decision on the adequacy of protection against this compound. Should the PID or Dräeger tubes indicate that the PEL for benzene has been exceeded, work will cease in this area until:

- workers have donned a full face air purifying respirator; or
- the concentration levels for benzene are below the Dräeger tube detection levels.

Protection may be upgraded or downgraded by the SHSO in conjunction with the HSM based upon the PID instrument and Dräeger tube results.

9.2.2 Respiratory Protection and Clothing

Three levels of protective equipment are discussed below including Level D, Level C, and Level B.

Level D Protection

1. PPE:
    - Cotton coveralls
    - Cotton gloves
    - Boots/shoes, leather or chemical-resistant, steel toe and shank
    - Boots (outer), chemical-resistant (disposable)
    - Safety glasses or chemical splash goggles
    - Hard hat
    - Escape mask

2. Criteria for selection

   PID readings in the breathing zone are less than 5 ppm, and benzene is not detected using Dräeger tubes. Work functions preclude splashes, immersion, or potential for unexpected inhalation of any chemicals.

NOTE: Modifications of Level D will be used to increase the level of skin protection during activities which increase the degree of contact with chemical hazards. These modifications include the use of chemical/corrosion resistant coveralls (e.g., tyveks), and chemical resistant gloves.

Level C Protection

1. PPE:
    - Full-face, air-purifying, cartridge-equipped respirator (MSHA/NIOSH approved)
    - Chemical-resistant clothing (coverall; hooded, two- piece chemical splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls)
    - Cotton or synthetic coveralls*

- Gloves (outer), chemical-resistant - nitriles
- Gloves (inner), chemical-resistant - latex
- Boots (outer), chemical-resistant, steel toe and shank
- Boots (outer), chemical-resistant (disposable)
- Hard hat (face shield)
- Escape mask*
- 2-Way radio communications (intrinsically safe)*

*Optional

2. Criteria for selection
   - Continuous total vapor readings register between 5 ppm and 25 ppm on PID, and benzene is not detected with Dräeger tubes.
   - Measured air concentrations of identified substances (organic vapors) will be reduced by the respirator to at or below the substance's exposure limit, and the concentration is within the service limit of the canister.
   - Atmospheric contaminant concentrations do not exceed Immediately Dangerous to Life and Health (IDLH) levels.
   - Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical-resistant clothing.
   - Job functions have been determined not to require self-contained breathing apparatus.

Level B Protection

1. PPE:
   - Pressure-demand, self-contained breathing apparatus (MSHA/NIOSH approved)
   - Chemical-resistant clothing (overall and long-sleeved jacket; coveralls; hooded, one or two-piece chemical-splash suit; disposable chemical- resistant coveralls)
   - Coveralls
   - Gloves (outer), chemical-resistant

- Gloves (inner), chemical-resistant
- Boots (inner), chemical-resistant, steel toe and shank
- Boots (outer), chemical-resistant, (disposable)
- Hard hat (face shield)
- 2-way radio communications (intrinsically safe)

2. Criteria for Selection

   Meeting any one of these criteria warrants use of Level B protection:
   - PID readings in the breathing zone are greater than 25 ppm and less than 500 ppm, <u>or</u> benzene is detected, but less than 100 ppm utilizing Dräeger tubes.
   - The type(s) and atmospheric concentration(s) of toxic substance(s) have been identified and require the highest level of respiratory protection, but a lower level of skin and eye protection. These would be atmospheres:
     -- with IDLH concentrations

     or

     -- exceeding limits of protection afforded by a full-face, air-purifying mask

     or

     -- containing substances requiring air-supplied equipment, but substances and/or concentrations do not represent a serious skin hazard.
   - The atmosphere contains less than 19.5% oxygen.
   - Operations at the Site make it highly unlikely that the small, unprotected arc of the head or neck will be contacted by splashes of extremely hazardous substances.
   - If work is performed in an enclosed space.

9.3 Decontamination Procedures

A steam cleaner will be utilized to decontaminate heavy equipment used in drilling. Personnel should exercise caution when using a steam cleaner. The high pressure steam can cause burns. Protective gloves, face shields, hard hats, steel-toed boots, and Tyvek suits or rain gear will be worn when using steam cleaners.

9.3.1 Contamination Prevention

Adequate contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include the following.

Personnel

- Do not walk through areas of obvious or known contamination;
- Do not handle contaminated materials directly;
- Make sure all PPE has no cuts or tears prior to donning;
- Fasten all closures on suits, covering with tape, if necessary;
- Take particular care to protect any skin injuries;
- Stay upwind of airborne contaminants;
- Do not carry cigarettes, gum, etc., into contaminated areas; and
- Use disposables to cover nondisposable equipment when contact is probable.

Sampling/Monitoring

- When required by the SHSO, cover instruments with clear plastic, leaving opening for sampling and exhaust ports; and
- Bag sample containers prior to the placement of sample material.

Heavy Equipment

- Care should be taken to limit the amount of contamination that comes in contact with heavy equipment;
- If contaminated tools are to be placed on non-contaminated equipment for transport to the decontamination pad, plastic should be used to keep the equipment clean; and
- Excavated soils should be contained and kept out of the way of workers.

9.3.2 Decontamination

All personnel and equipment exiting the Work Zone shall be thoroughly decontaminated. Figures B-2, B-3 and B-4 illustrate decontamination procedures for Levels D, C and B. Safety briefings shall explain the decontamination procedures for personnel and portable equipment for the various levels of protection. Heavy equipment will be decontaminated with a steam cleaner.

9.3.3 Disposal Procedures

All discarded materials, waste materials, or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left at the Site. All potentially contaminated materials (e.g., soil, clothing, gloves, etc.) will be bagged or drummed, as necessary, and segregated for disposal. All contaminated materials shall be disposed of in accordance with appropriate regulations. All non-contaminated materials shall be collected and bagged for appropriate disposal as normal domestic waste. All waste disposal operations conducted by Roux Associates will be monitored by the SHSO and carried out under the appropriate level of personal protection.

9.4 Standard Operating Procedures/Safe Work Practices

This section discusses safe work practices to be used during all activities. In addition, non-monitoring safety related procedures are described.

9.4.1 Communications

- Telephones -- A telephone will be available for communication with emergency support services/facilities.
- Hand Signals -- To be employed by personnel required to have Level C protection. They shall be known by the entire field team before operations commence and covered during Site-specific training.

The following hand signals will be used, if needed:

Signal	Meaning
Hand gripping throat	Out of air, can't breath
Grip partner's wrist	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	I'm alright, okay
Thumbs down	No, negative

9.4.2 General Safe Work Practices

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth contact and ingestion of material is prohibited onsite except in lunch room or designated office areas.
- Hands must be washed thoroughly upon leaving the Work Zone or before eating, drinking, or any other activities.
- Contaminated protective equipment shall not be removed from the Site until it has been decontaminated and properly packaged and labeled.
- Portable eyewash stations shall be located in the decontamination staging area in the Support Zone.
- No facial hair, which interferes with a satisfactory fit of respiratory equipment, will be allowed on personnel that may be required to wear respiratory protective equipment.
- An emergency first aid kit and fire extinguisher shall be onsite in the Support Zone at all times.
- All respiratory protection selected to be used onsite shall meet NIOSH/MSHA requirements for the existing contaminants.
- Any skin contact with surface and ground water shall be avoided.
- No contact lenses may be worn.

9.4.3 Waste Disposal

All waste disposal operations shall be monitored by the SHSO and performed using the appropriate level of personal protection. Personnel shall wear the prescribed clothing, especially eye protection and chemical resistant gloves, when handling or drumming waste materials. Contamination avoidance shall be practiced at all times.

9.4.4 Heavy Equipment and Drill Rig Safety

Typical machinery to be found at this site may include pumps, compressors, generators, portable lighting systems, fork lifts, trucks, dozers, backhoes, and drill rigs. From a safety standpoint, it is important for all site workers to be continually aware of the equipment around them. It poses a serious hazard if not operated properly, or if personnel near machinery cannot be seen by operators.

Drilling crews are confronted with all of these heavy equipment hazards. They must be responsible for housekeeping around the rig because of the rods, auger sections, rope, and hand tools cluttering the operation. Maintenance is a constant requirement. Overhead and buried utilities require special precautions because of electrical and natural gas hazards. Electrical storms may seek out a standing derrick. The hoist or cathead rope poses specific hazards that must be respected. A clean, dry, sound rope should always be used. Hands should be kept away from the test hammer. Hearing loss, while not an immediate danger, is considerable over time. Hearing protection must be worn.

9.4.5 Confined Space Entry

The scope of work does not require personnel to enter any confined space during the conduct of this project. Confined space is defined as having limited or restricted means of entry or exit, is large enough for an employee to enter and perform assigned work, and is not designed for continuous occupancy by the employee. These spaces include, but are not limited to, underground vaults, tanks, storage bins, pits and diked areas, vessels, and silos.

A permit-required confined space is one that meets the definition of confined space, and has one or more of the following characteristics:

- contains or has the potential to contain a hazardous atmosphere;
- contains a material that has the potential for engulfing an entrant;
- has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section; and/or
- contains any other recognized serious safety or health hazards.

10.0 EMERGENCY PLAN

As a result of the hazards onsite and the conditions under which operations are conducted, the possibility of an emergency exists. An emergency plan is required by OSHA 29 CFR 1910.120 to be available for use and is included below. A copy of this plan shall be posted in the Support Zone at each work site.

10.1 Site Emergency Coordinator(s)

The SHSO shall act as the Site Emergency Coordinator to make contact with the local fire, police and other emergency units prior to beginning work onsite. In these contacts, the SHSO will inform the emergency units about the nature and duration of work expected at the Site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants.

The SHSO or his designee shall implement this emergency plan whenever conditions at the Site warrant such action. The coordinator(s) will be responsible for assuring the evacuation, emergency treatment, emergency transport of Site personnel as necessary, and notification of emergency response units and the appropriate management staff.

10.2 Evacuation

In the event of an emergency situation, such as fire, explosion, significant release of particulates, etc., an air horn or other appropriate device will be sounded by the SHSO for approximately ten seconds indicating the initiation of evacuation procedures. All persons in both the restricted and non-restricted areas will evacuate and assemble near the Support Zone or other safe area as identified in advance by the SHSO. Under no circumstances will incoming personnel or visitors be allowed to proceed into the evacuated area once the emergency signal has been given. The SHSO must see that access for emergency equipment is provided and that all combustible apparatus has been shutdown once the alarm has been sounded. Once the safety of all personnel is established, the fire department and other emergency response groups will be notified by telephone of the emergency. The hospital route will be posted onsite (Figure B-1). Any other excavation routes will be specified by the appropriate emergency personnel.

10.3 Potential or Actual Fire or Explosion

If the potential for a fire exists or if an actual fire or explosion occurs, the following procedure will be implemented:

- immediately evacuate the Work Zone as described above (Section 9.2); and
- notify fire department and security.

10.4 Environmental Incident (Release or Spread of Contamination)

The SHSO shall instruct a person on-site to immediately contact police and fire authorities to inform them of the possible or immediate need for nearby evacuation. If a significant release (above the reportable quantity as described in 40 CFR 302) has occurred, the National Response Center and other appropriate groups should be contacted. Those groups will alert National or Regional Response Teams as necessary. The personnel listed below shall be notified as necessary.

Type	Name	Telephone #
Fire Department		(718) 636-1700
Hazardous Material Emergency Response		911
Police Department		(718) 963-5311
Ambulance		911
Poison Control Center		1-800-526-8816
Hospital	Woodhull Medical Center	(718) 963-8000
National Response Center (Release or Spill)		(800) 424-8802
Site Health and Safety Officer		
Health and Safety Manager	Linda Wilson	(516) 232-2600
Site Manager	Scott Glash	(516) 232-2600

10.5 Personal Injury

Emergency first aid shall be applied on-site as deemed necessary to stabilize the patient. Notify the emergency units as deemed necessary.

10.6 Overt Personnel Exposure

If an overt exposure to toxic materials should occur, the exposed person shall be treated on-site as follows:

Skin Contact:	Wash/rinse affected area thoroughly with copious amounts of soap and water, then provide appropriate medical attention. An eyewash and/or emergency shower or drench system will be provided on-site at the CRZ and/or support zone as appropriate. Eyes should be rinsed for at least fifteen (15) minutes upon chemical contamination.
Inhalation:	Move to fresh air and/or if necessary, decontaminate and transport to the hospital.
Ingestion:	Decontaminate and transport to emergency medical facility.
Puncture Wound or Laceration	Decontaminate and transport to emergency medical facility. SHSO will provide medical data sheets to medical personnel as requested.

10.7 Adverse Weather Conditions

In the event of adverse weather conditions, the SHSO will determine if work can continue without sacrificing the health and safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- heavy rainfall;
- potential for heat stress;
- potential for cold stress and cold-related injuries;
- limited visibility;
- potential for electrical storms;
- potential for malfunction of H & S monitoring equipment or gear; and
- potential for accidents.

11.0 AUTHORIZATIONS

Personnel authorized to enter the Site while operations are being conducted must be approved by the SHSO and the Project Manager. This document will be completed when the subcontractors have assigned trained personnel for the Site. Authorization will require completion of appropriate training courses, medical examination requirements as specified by OSHA 29 CFR 1910.120, and review and sign-off of this HASP.

The following Roux Associates personnel are authorized to perform work onsite:

1. Scott Glash
2. Douglas Swanson
3. Linda Wilson
4. Jeffrey Makowski
5. Nicholas Argentieri
6. Ann Farrell
7. Susan Weber
8.
9.
10.

Other personnel authorized to enter the Site are:

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

12.0 FIELD TEAM REVIEW

Each person entering the Site and each field member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read and understand this Site-Specific Health and Safety Plan. I will comply with the provision contained therein.

Site/Project: ________________________________

Name Printed	Signature	Date

Table B-1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Citric Block, Williamsburg Facility, Brooklyn, New York

Compound	CAS#	TLV (mg/m^3)	IDLH (ppm)	PEL (mg/m^3)	Routes of Exposure	Toxic Properties	Target Organs	Physical/ Chemical Properties
Ethylbenzene	100-41-4	435 100 ppm	2,000 ppm	435 100 ppm	Dermal; inhalation; ingestion	CNS depression Sensory irritant Narcosis	eyes resp system	Liquid, aromatic BP = 277°F FP = 59°F
Benzene	71-43-2	30 10 ppm	0	3 1 ppm	Dermal; inhalation ingestion	CNS depression Hematopoietic depression Dermatitis	CNS blood skin eyes resp system bone marrow	Liquid BP = 80.093°C flammable LEL = 1.4% UEL = 8.0%
Toluene	108-88-3	375 100 ppm	2,000 ppm	375 100 ppm	Dermal; inhalation; ingestion	CNS depression Liver damage Kidney damage Defatting of skin	CNS liver kidney skin	Liquid benzene odor BP = 11.04°C flammable LEL = 1.2% UEL = 7.1%
Xylenes	1330-20-7	100 ppm	1,000 ppm	100 ppm	Dermal; inhalation; ingestion;	CNS depression Sensory irritant Dermatitis Abdominal pain	CNS eyes GI tract blood liver kidney	Liquid, aromatic BP = 281°F -292°F FP = 81-90°F
Petroleum hydrocarbons (Petroleum distilled)	8002-05-9	1600 400 ppm	10,000	1600 400 ppm	Dermal; inhalation; ingestion	CNS depressant Respiratory irritant Dried/cracked skin	CNS respiratory tract skin	Colorless liquid BP = 86-460° UEL = 5.9% LEL = 1.1% Flammable

Table B-1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at the Citric Block, Williamsburg Facility, Brooklyn, New York

Compound	CAS#	TLV (mg/m^3)	IDLH (ppm)	PEL (mg/m^3)	Routes of Exposure	Toxic Properties	Target Organs	Physical/ Chemical Properties
Aroclor 1260	11096-82-5	0.001	NA	NA	Dermal; inhalation; ingestion	Liver damage Nausea Abdominal pain	liver skin	

TLV - Threshold Unit Value - must not be exceeded over 8 hour shift
IDLH - Immediately Dangerous to Life and Health - maximum concentration from which one could escape in 30 minutes without a respirator
EL mg/m^3 - Permissible Exposure Limit - must net be exceeded over 8 hour shift
PPM - Part Per Million
CNS - Central Nervous System
CVS - Cardiovascular System
GI tract - Gastrointestinal tract
BP - Boiling Point
FlPt - Flash Point
UEL - Upper Explosive Limit
LEL - Lower Explosive Limit

References

U.S. Department of Labor. 1990. OSHA Regulated Hazardous Substances, Industrial Exposure and Control Technologies Government Institutes, Inc.

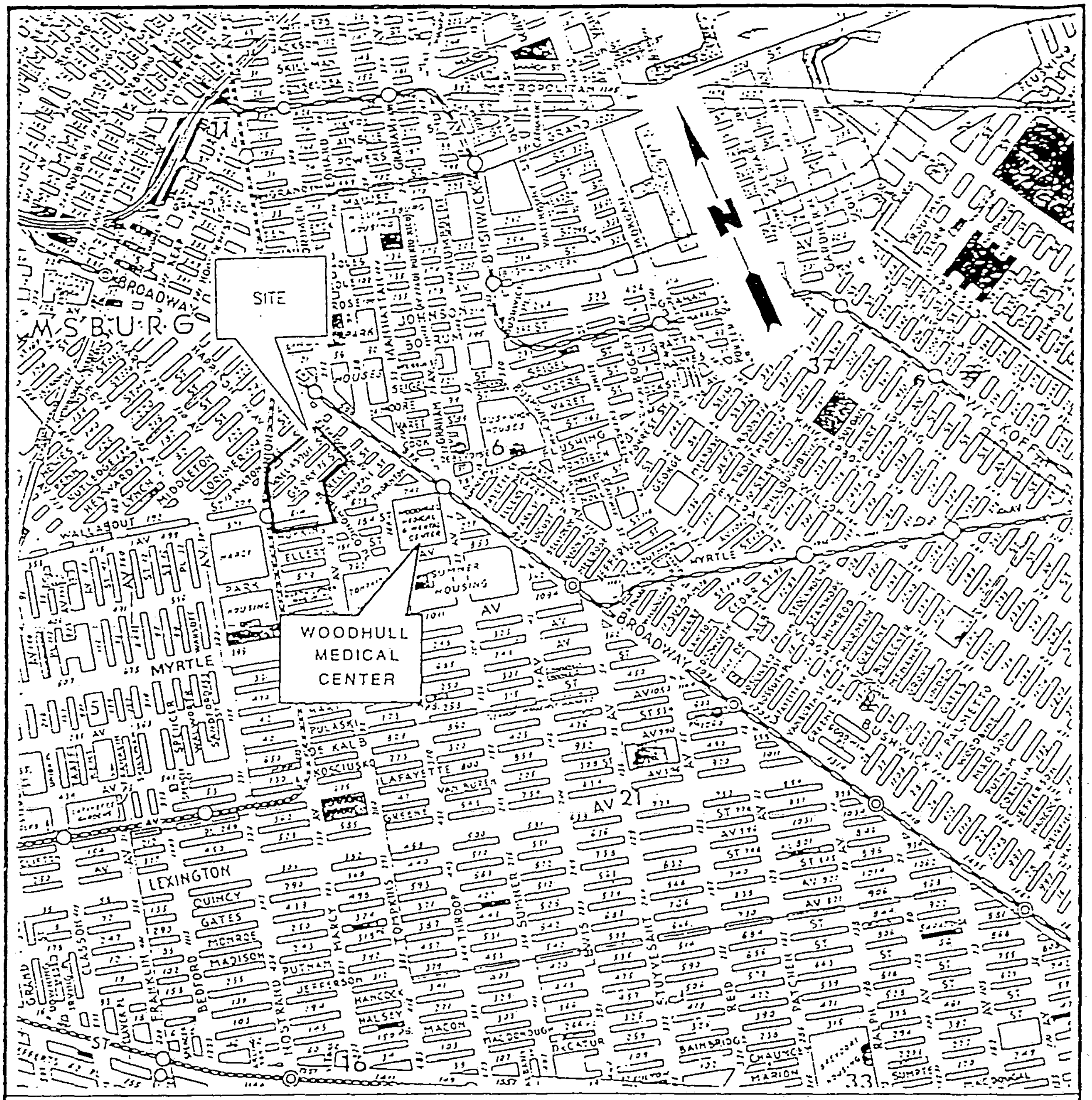
Hawley's Condensed Chemical Dictionary, Sax, N. Van Nostrand and Reinhold Company, 11th Edition, 1987.

Proctor, N.H., J.P. Hughes and M.L. Fischman. 1989. Chemical Hazards of the Workplace. Van Nostrand Reinhold. New York.

Sax, N.I. and R.J. Lewis. 1989. Dangerous Properties of Industrial Materials. 7th Edition. Van Nostrand Reinhold. New York.

Guide to Occupational Exposure Values. 1990. American Conference of Governmental Industrial Hygienists.

-- No values were available.



DIRECTIONS TO HOSPITAL:

PROCEED EAST ON FLUSHING AVENUE FOR THREE BLOCKS – WOODHULL MEDICAL CENTER IS RIGHT

Title:

ROUTE TO WOODHULL MEDICAL CENTER

CITRIC BLOCK INVESTIGATION

Prepared For:
PFIZER INC
WILLIAMSBURG FACILITY, BROOKLYN, NEW YORK

ROUX
ROUX ASSOCIATES INC
Consulting Ground-Water Geologists & Engineers

Compiled by: L.W.	Date: 8/95	FIGURE
Prepared by: J.R.	Scale: 1" = 2000'	B-1
Project Mgr: S.J.G.	Revision:	
File No: 04744Y	Project: 04744Y	

TYPICAL DECONTAMINATION LAYOUT

LEVEL D DECONTAMINATION PROCEDURES

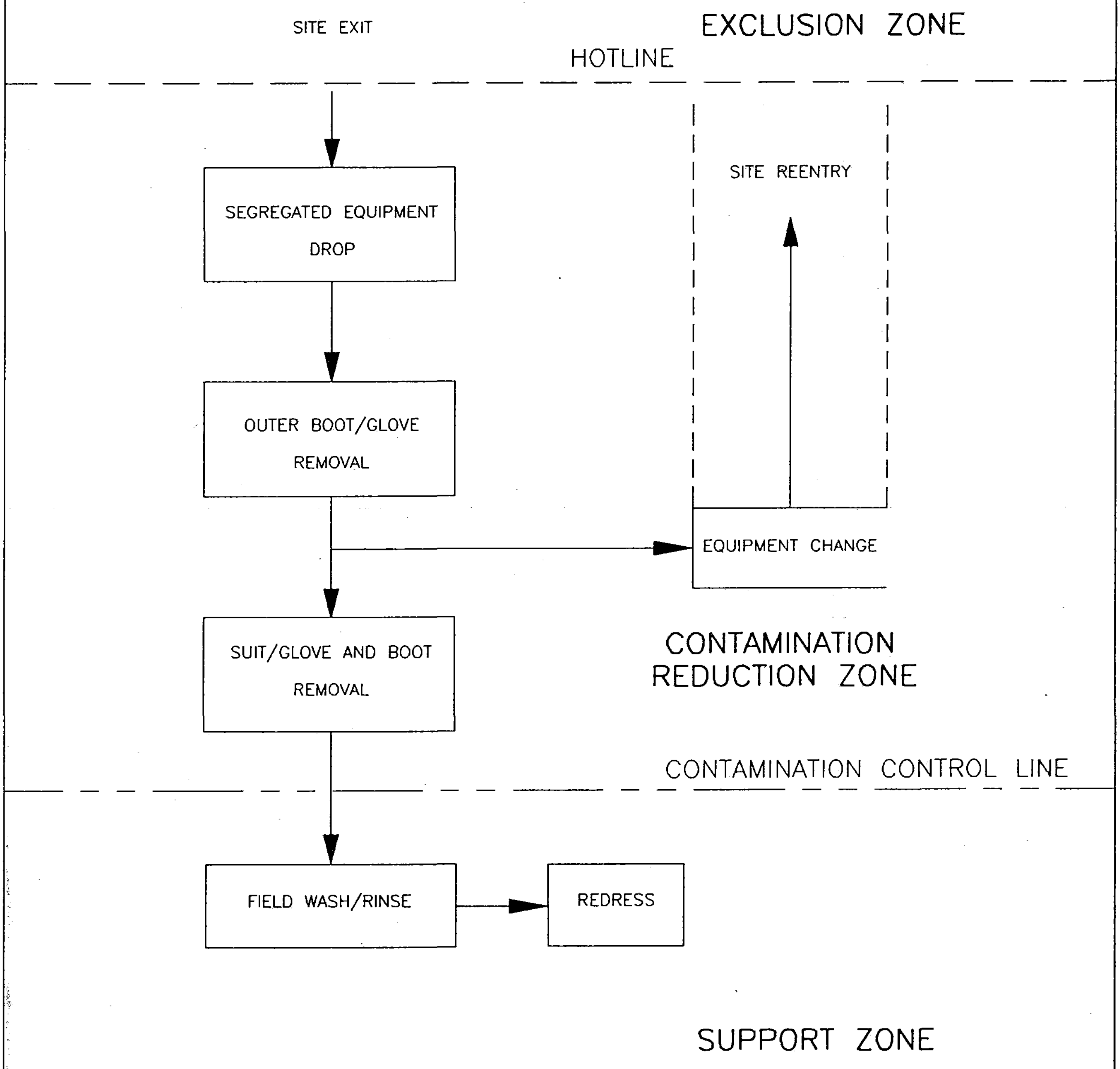


FIGURE B-2

TYPICAL DECONTAMINATION LAYOUT

LEVEL C PROTECTION

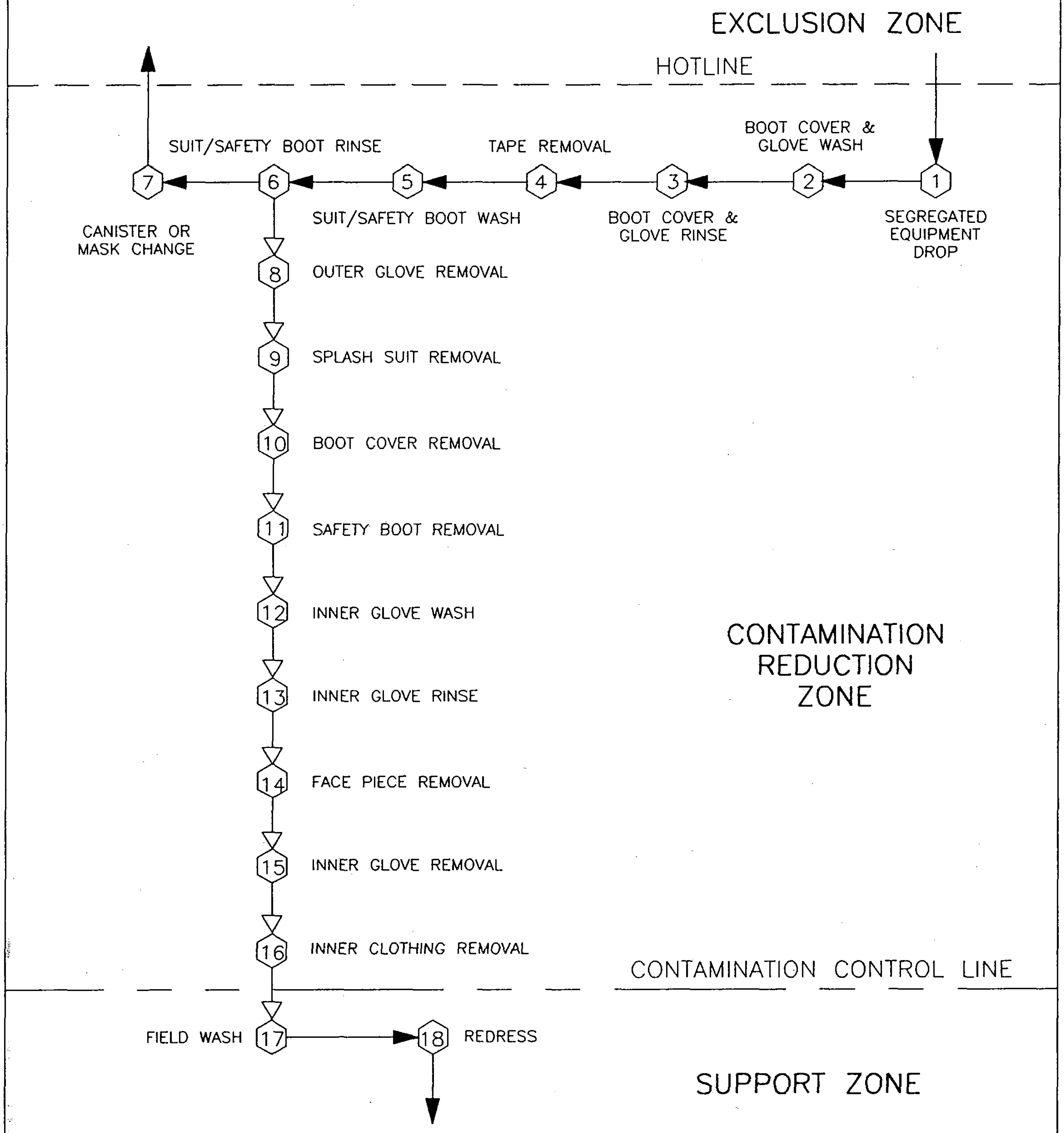


FIGURE B-3

TYPICAL DECONTAMINATION LAYOUT

LEVEL B PROTECTION

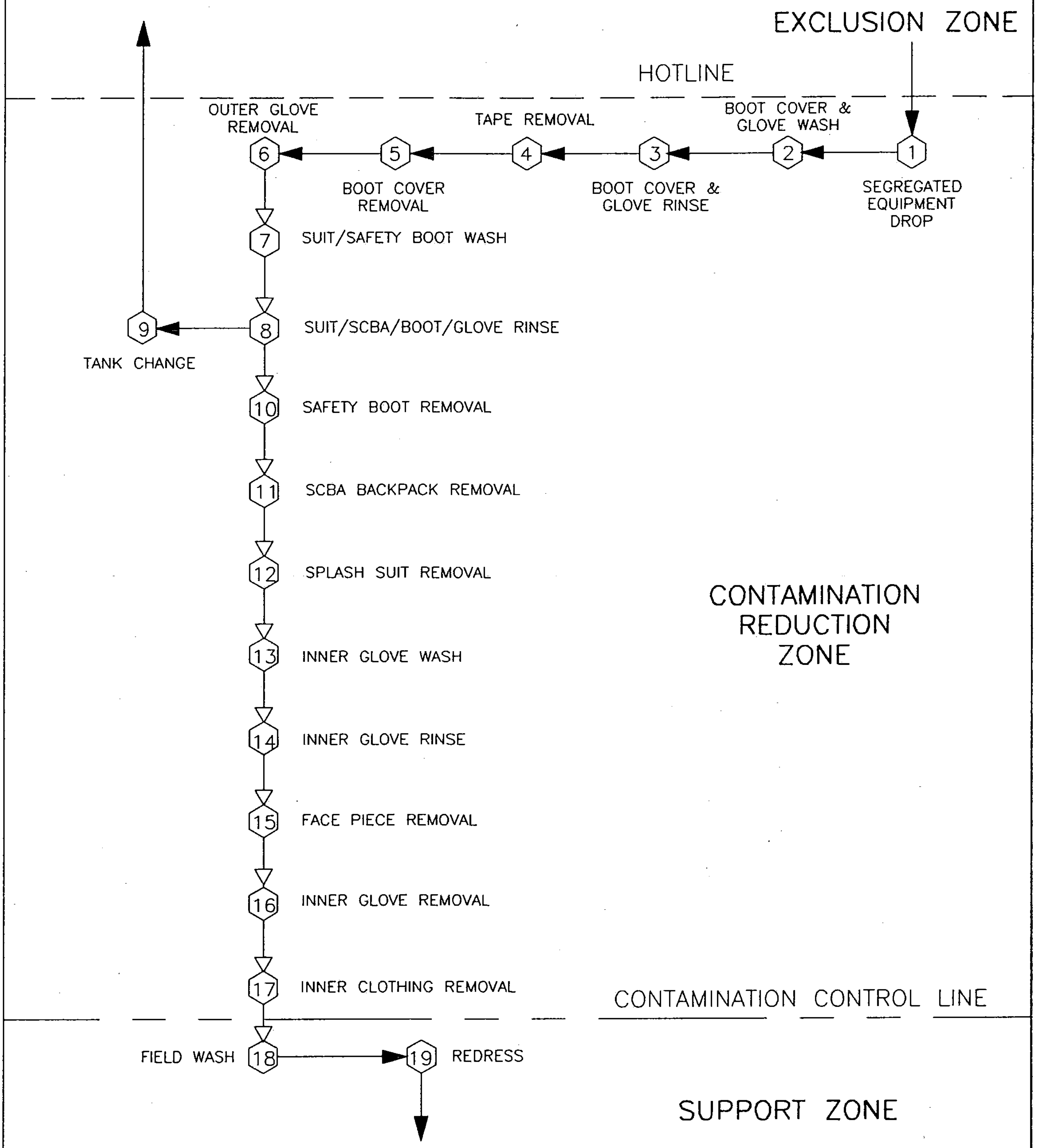


FIGURE B-4

ATTACHMENT B-1

Incident Report

INCIDENT REPORT

Site ____

Site Location ____

Report Prepared By ____
Name Printed Title

Incident Category (Check all that apply)

____ Injury
____ Near Miss
____ Motor Vehicle
____ Mechanical
____ Illness
____ On-Site Equipment
____ Fire
____ Other
____ Property Damage
____ Chemical Exposure
____ Electrical

Date and Time of Incident ____

Names of Persons Injured (see end of report for details)

____

____

____

NARRATIVE REPORT OF INCIDENT

(Provide sufficient detail so that the reader may fully understand the actions leading to or contributing to the incident, the incident occurrence, and actions following the incident. Append additional sheets of paper if necessary.)

____

____

____

____

____

____

Project # ____________________
Project Name: ____________________
Location: ____________________
Date: ____________________

INCIDENT REPORT
Page 2 of 4

WITNESSES TO INCIDENT

1. Name ____________________ Company ____________________
Address ____
Telephone No. ____

2. Name ____________________ Company ____________________
Address ____
Telephone No. ____

PROPERTY DAMAGE

Brief Description of Property Damage ____

____

____

____

____

Estimate of Damage ____

INCIDENT LOCATION

____

____

____

INCIDENT ANALYSIS

Causative agent most directly related to accident (object, substance, material, machinery, equipment, conditions): ____

____

____

Project #
Project Name:
Location:
Date:

INCIDENT REPORT

Was weather a factor?

Unsafe mechanical/physical/environmental condition at time of incident (be specific)

Unsafe act by injured and/or others contributing to the Incident (be specific, must be answered)

Personal factors (improper attitude, lack of knowledge or skill, slow reaction, fatigue)

ON-SITE INCIDENTS

Level of personal protection equipment required in Site Safety Plan

Modifications

Was injured using required equipment?

Project #
Project Name:
Location:
Date:

INCIDENT REPORT
Page 4 of 4

INCIDENT FOLLOW-UP

Date of Incident

Site

Brief Description of Incident

Outcome of Incident

Physician's Recommendations

Date Injured Returned to Work

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT B-2

Site Safety Follow-Up Report

Project #
Project Name:
Location:
Date:

SITE SAFETY FOLLOW-UP REPORT

This section must be filled out and returned to the Site Safety Officer after each site visit or task.

Person Responsible for Follow-up Report

Actual Date of Work

ACTUAL SITE INVESTIGATION TEAM

Roux Personnel	Responsibility

Other Interested Parties	Affiliation	Purpose of Visit

Project #
Project Name:
Location:
Date:

PERSONAL PROTECTIVE EQUIPMENT

Level of Respiratory Protection Used	Activity Performed

Field Dress	Activity

MONITORING EQUIPMENT

HNU/OVA/CGI

- Background reading
    - Readings above background?
    - Location of high readings

Radiation

- Readings above background? _____ Yes _____ No
- If yes, specify where readings were found and what action was taken

Project # ____________________
Project Name: ____________________
Location: ____________________
Date: ____________________

GENERAL SAFETY

Were any safety problems encountered while on site?
Explain ____

____

____

____

____

ACCIDENT REPORT INFORMATION

Did Any Team Member Report	Yes	No
• Chemical exposure	____	____
• Illness, discomfort, or unusual symptoms	____	____
• Environmental problems (heat, cold, etc.)	____	____

Explain ____

____

____

____

____

Was an Employee Exposure/Injury Incident Report Completed? ____ Yes ____ No

INJURIES

Injured Person

Name of Address of Injured ______________________________

____

SSN ______________ Age ________ Sex ________

Years of Service ______________ Time on Present Job ______________

Title/Classification ______________________________

Severity of Injury or Illness

_____ Disabling _____ Non-Disabling

_____ Fatality _____ Medical Treatment

Estimated Number of Days Away From Job ______________________________

Nature of Injury or Illness ______________________________

____

____

Classification of Injury

____	Fractures	____	Heat Burns	____	Cold Exposure
____	Dislocations	____	Chemical Burns	____	Frostbite
____	Sprains	____	Radiation Burns	____	Heat Stroke
____	Abrasions	____	Bruises	____	Heat Exhaustion Concussion
____	Lacerations	____	Blisters	____	Toxic
____	Punctures	____	Bites	____	Toxic Respiratory Exposure
____	Faint/Dizziness	____	Dermal Allergy	____	Ingestion
____	Other			____	Respiratory Allergy

Part of Body Affected ______________________________

Degree of Disability ______________________________

Date Medical Care was Received ______________________________

Where Medical Care was Received ______________________________

Address (if off-site) ______________________________

If Hospitalized, Name, Address and Telephone of Hospital ______________________________

____

____

Name, Address and Telephone Number of Physician ______________________________

____

____

ATTACHMENT B-3

Health and Safety
Field Change Request Form

Project # ____________________
Project Name: ____________________
Location: ____________________
Date: ____________________

FIELD CHANGE REQUEST

SITE SAFETY REVIEW – CHANGES AND OVERALL EVALUATION
(To Be Completed For Each Field Change In Plan)

Was the Safety Plan Followed as presented ____ Yes ____ No

Describe, in detail, all changes to the Safety Plan

____

____

____

____

____

Reason for changes ____

____

____

____

____

Follow-up, Review and Evaluation Prepared by ____________________ Date __________

Discipline ____

Approved by: Site Manager ____________________ Date __________

Site Safety Officer ____________________ Date __________

Approved by: Office Health & Safety Supervisor ____________________ Date __________

Evaluation of Site Safety Plan

Was the Safety Plan adequate? ____ Yes ____ No

What changes would you recommend? ____________________________________

____

____

____

____

APPENDIX B

APPENDIX B

Pfizer Inc Correspondence to the NYSDEC,
Dated August 11, 1995

Pfizer Inc
Brooklyn Plant
630 Flushing Avenue
Brooklyn, NY 11206
Tel 718 780 8878 Fax 718 780 8721

U.S. Pharmaceuticals

August 11, 1995

Mr. Shaminder Singh
New York State Department of Environmental Conservation
47-40 41st Street
Long Island City, New York 11101

Re: Summary of Soil Quality Results for the Citric Block
Pfizer Inc, Williamsburg, Brooklyn Plant

Dear Mr. Singh:

As discussed with you yesterday during our teleconference, Pfizer has obtained soil quality data for its Williamsburg, Brooklyn Plant which we are providing to the New York State Department of Environmental Conservation (NYSDEC). The location of the Williamsburg Plant is shown in Figure 1.

Pfizer is currently decommissioning portions of the Williamsburg Plant to prepare this property for potential future redevelopment. The site is planned for general commercial use such as parking associated with a retail establishment. As part of this process, building structures on two city blocks have recently been demolished. These blocks are respectively known as the Citric Block and the Organic/Suciac Block, and their location is shown in Figure 2.

The soil samples were collected from the Citric Block. Presently, the majority of the buildings on this block have been demolished leaving concrete slab foundations as the only above-ground remnants. The remaining concrete slabs effectively cover the underlying soil.

To support potential redevelopment activities at the Citric Block, soil samples and perched grab groundwater samples were collected and analyzed to evaluate environmental conditions present beneath the slab. Soil and water samples were analyzed for Target Compound List volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and Target Analyte List metals.

A review of the preliminary data indicate that metals concentrations, particularly mercury and lead, and some SVOCs are above regional "background" levels. This suggests that contaminants may have possibly been released into the subsurface from historical operations at the plant. In the early part of this century, mercury was used for the manufacture of medicinal products. This ended in the 1940s. With respect to lead, we have no current knowledge of its use in our manufacturing.

A summary of soil quality analytical results for metals, VOCs, and SVOCs detected in soil are provided in Tables 1, 2, and 3. As shown in Table 1, mercury concentrations ranged from 0.43 milligrams per kilogram (mg/kg) to 2,640 mg/kg in fill material immediately underlying the slab. Lead concentrations ranged from 5.8 mg/kg to 4,630 mg/kg.

In addition to the soil samples, grab samples of the perched groundwater were collected from three soil borings. Two of these samples were analyzed for metals, VOCs, and SVOCs, and the third sample was analyzed for VOCs only. Due to a large quantity of sediment in the samples, we believe the data to be more representative of the suspended sediment rather than the perched groundwater. In order to accurately assess perched groundwater conditions, properly installed groundwater monitoring wells would be necessary. However, for your information these results are presented in Tables 4, 5 and 6.

We believe that these impacted soils and groundwater do not pose any immediate or substantial threat to human health or the environment, because:

- the area of concern is covered extensively by concrete slabs or asphalt pavement that range in thickness from 0.5 feet to 1.5 feet;
- soil borings related to other activities have indicated that the site is underlain by an impervious clay layer; and
- the area of concern is enclosed by a chain-link fence with 24-hour security, thereby preventing public access.

We look forward to meeting with you at this site on Monday, August 14, 1995 at 11:30 AM. In the interim, if you have any questions or require additional information, please call.

We appreciate your input and guidance regarding this matter.

Respectfully yours,

Thomas J. Snee

Thomas Snee
Environmental Manager

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APPENDIX C

APPENDIX C

NYSDEC Correspondence to Pfizer Inc,
Dated August 28, 1995

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road, Albany, New York 12233

Michael D. Zagata
Commissioner

AUG 28 1995

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Pfizer, Inc.
630 Flushing Avenue
Brooklyn, New York 11206

Dear Ladies/Gentlemen:

As mandated by Section 27-1305.4.a. of the Environmental Conservation Law (ECL), copy enclosed, the New York State Department of Environmental Conservation (NYSDEC) must investigate all inactive disposal sites suspected or known to contain hazardous wastes. We have received information which leads us to suspect that hazardous waste has been disposed of at the following location:

DEC Site No.: 224024
Site Name: Pfizer, Brooklyn
Site Address: 630 Flushing Avenue, Brooklyn, NY 11206

Therefore, this letter constitutes notification of the NYSDEC's intention to investigate the validity of this suspicion. Should this study confirm that hazardous waste disposal has occurred, this site will be entered in the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

A summary of the information we presently have on the site is included. If you should have information that may be relevant to our investigation, please forward it within fifteen days of receipt of this letter to myself, at the Bureau of Hazardous Site Control, Room 220, 50 Wolf Road, Albany, New York 12233-7010.

Sincerely,

John B. Swartwout, P.E.
Chief
Eastern Investigation Section
Bureau of Hazardous Site Control
Division of Hazardous Waste Remediation

Enclosure

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

SITE INVESTIGATION INFORMATION

ITE NAME	2. SITE NUMBER	3. TOWN/CITY/VILLAGE	4. COUNTY
fizer, Brooklyn	224-024	Williamsburg	Brooklyn

. REGION	6. CLASSIFICATION		
2	CURRENT	PROPOSED- P	MODIFY

7. LOCATION OF SITE (Attach U.S.G.S. Topographic Map showing site location)

a. Quadrangle- Brooklyn
b. Site Latitude 40° 70.0' 76.5" Site Longitude 73° 94.8' 60.7"
c. Tax Map Numbers
d. Site Street Address- 630 Flushing Ave., Brooklyn, NY 11206

. BRIEFLY DESCRIBE THE SITE (Attach site plan showing disposal/sampling locations)

ite is bounded by Harrison Ave., Wallabout St., Union Ave., and Flushing Ave., and is located in Williamsburg section of Brooklyn. A site map is attached. Site is approximately 2 city blocks. Site was a pharmaceutical plant which is undergoing decommissioning. The site is intended for commercial redevelopment. The building structures have already been demolished. Up until the 1940s, mercury was used on site in the production of medicinal products.

a. Area ______ acres b. EPA ID Number NYD986936804
. Completed ( )Phase I ( )Phase II ( ) PSA ( )RI/FS ( )PA/SI (X)Other- soil sampling

. HAZARDOUS WASTE DISPOSED (Include EPA Hazardous Waste Numbers)

Disposal of lead(7439-92-1), mercury(7439-97-6), and arsenic(7440-38-2) are suspected.

10. ANALYTICAL DATA AVAILABLE

a. ( )Air (X)Groundwater ( )Surface Water ( )Sediment (X)Soil ( )Waste ( )Leachate ( )EPTox ( )TCLP
b. Contravention of Standards or Guidance Values

	SOIL(ppm)		GROUNDWATER(ppm)	
	sample results	cleanup objective	sample results	GA standard
lead	4630	site background	25.1	0.025
ercury	2840	0.1	5.9	0.002
rsenic	72	7.5	0.9	0.025
hromium	26.8	10	1.7	0.05
cadmium	3.9	1	0.03	0.01

1. CONCLUSION

This site contains metals in soil and groundwater. At least some of the contamination appeas to be related to past operations at the lant. Pfizer plans to do additional testing, including TCLP on soils. TCLP failures are likely. This site needs to be categorized as a otential Registry site until hazardous waste disposal can be confirmed.

2. SITE DATA

a. Nearest Surface Water: Distance-5000ft. Direction- west Classification ______
. Nearest Groundwater: Depth-40ft. Flow Direction- northwest (X)Sole Source ( )Primary ( )Principal
. Nearest Water Supply: City water Direction ______ Active ( )Yes ( )No
d. Nearest Building: Distance- 0ft. Direction ______ Use ______
e. In State Economic Development Zone? ( )Y (U)N
Crops or livestock on site? ( )Y (X)N
g. Documented fish or wildlife mortality? ( )Y (X)N
h. Impact on special status fish or wildlife resource? ( )Y (X)N
i. Controlled Site Access? (X)Y ( )N
j. Exposed hazardous waste? ( )Y (X)N
k. HRS Score ______
l. For Class 2: Priority Category ______

. SITE OWNER'S NAME	14. ADDRESS	15. TELEPHONE NUMBER
izer, Inc.	630 Flushing Ave., Brooklyn, NY 11206	(718)780-8888

16. PREPARER

/s/ 8/14/95
Signature Date
[illegible] Singh, SE1, Region 2
Name, Title, Organization

17. APPROVED

John B. Swartwout 8/23/95
Signature Date
John B. Swartwout, Chief, Eastern Investigation Section
Name, Title, Organization

APPENDIX D

APPENDIX D

Geologic Logs

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**		Log of Soil Boring No. **CB-1**	
Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/13/95**	Date Completed: **7/13/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **8.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite** from **0 ft** to **6 ft**	
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **Not Encountered**	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown coarse SAND and red brick, little concrete (fill); dry.	FILL	◆		0	4.5-inch concrete core not included in geologic logging. Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis.
	Dark gray to black SILT and coarse Sand (fill); moist to wet.		◆		NM	Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
5	Dark gray to black SILT and coarse Sand (fill); wet.		◆		0	Black staining. Sample collected for grain size analysis of fill material. Geotechnical samples collected from 2-4 ft and 6-8 ft for permeability.
	Gray CLAY, little fine Sand; moist.	CL				Black staining. Bottom of borehole 6 feet below land surface.
10						
15						
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25						

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**		Log of Soil Boring No. **CB-2**	
Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/13/95**	Date Completed: **7/13/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **16.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite**	from **0 ft** to **16 ft**
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **3.5** feet	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown coarse SAND and Silt, little Gravel, little concrete and red brick (fill); dry.	FILL	⧗		NM	10-inch concrete core not included in geologic logging. Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
	Brown to gray medium SAND and Silt (fill); moist to wet.		⧗		NM	Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
5	Gray medium SAND and Silt (fill); wet.		⧗		0	
	Gray fine SAND, some Silt, little Clay (fill); wet.		⧗		NM	No headspace analysis due to insufficient sample volume.
	Gray fine to medium SAND (fill); wet.		⧗		0	
10	Gray fine to medium SAND (fill); wet.		⧗		0	Water samples collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis.
	No recovery.		○		NM	No headspace analysis due to no sample recovery.
15	Gray CLAY, some Silt, some fine Sand; moist.	CL	⧗		0	
						Bottom of borehole 16 feet below land surface.
20						
25						

Project: **04744Y03** **Roux Associates** Page 1 of 1

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**	**Log of Soil Boring No. CB-3**

Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/13/95**	Date Completed: **7/13/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **16.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite**	from **0 ft** to **16 ft**
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **Not Encountered**	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Light brown medium to coarse SAND, trace Gravel (fill); dry.	FILL			NM	5-inch concrete core not included in geologic logging. Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
	Wood.				0	
	Dark gray fine SAND (fill); moist.				6	Sample from 4-6 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. Trace petroleum odor.
5						
	Dark gray fine SAND (fill); moist.				0	
	Dark gray fine SAND (fill); moist.				0	
10	Dark gray fine SAND (fill); moist.				0	
	Dark gray fine SAND and Silt, some Clay (fill); moist.				0	
15	Dark gray CLAY, some Silt, some fine Sand; moist.	CL			0	
						Bottom of borehole 16 feet below land surface.
20						
25						

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**	**Log of Soil Boring No. CB-4**

Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/13/95**	Date Completed: **7/13/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **8.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite**	from **0 ft** to **8 ft**
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **Not Encountered**	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Black coarse SAND and Gravel (fill); moist.	FILL			NM	Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume. Black staining.
	Dark gray to black coarse SAND, some Gravel, little red brick (fill); moist.				NM	Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume. Black staining.
	Black SILT, some Clay (fill); moist.				0	Black staining.
5						Sample collected for grain size analysis of fill material.
	Black SILT, some Clay (fill); moist.				0	Black staining.
	Green-gray CLAY; moist.	CL				Geotechnical samples collected from 2-4 ft and 7-9 ft for permeability.
						Bottom of borehole 8 feet below land surface.
10						
15						
20						
25						

ROUX

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**		Log of Soil Boring No. **CB-5**	
Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/12/95**	Date Completed: **7/12/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **20.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite**	from **0 ft** to **20 ft**
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **Not Encountered**	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown SILT and coarse Sand, some concrete (fill); dry.	FILL	◆		NM	8-inch concrete core not included in geologic logging. Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
	Brown SILT and coarse Sand, trace concrete (fill); moist.		◆		0	
	Gray CLAY, some Silt; moist.	CL				Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis.
5	No recovery.	SW	○		NM	No headspace analysis due to no sample recovery.
	Gray fine to medium SAND; moist.		◆		0	
	Gray fine to medium SAND; wet.		◆		0	
10	Gray fine to medium SAND; wet.		◆		0	
	Gray fine to medium SAND; wet.		◆		0	
15	Dark gray CLAY, some Silt, trace fine Sand; moist.	CL	◆		0	
	Dark gray CLAY, some Silt, trace fine Sand; moist.		◆		0	
	Gray CLAY, little Silt; moist.		◆		0	
20						Bottom of borehole 20 feet below land surface.
25						

Project: **04744Y03** **Roux Associates**

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**	Log of Soil Boring No. **CB-6**
Logged By: **Jeff Makowski** / Checked By: **S. Glash**	Date Started: **7/12/95** / Date Completed: **7/12/95**
Drilling Co: **Aquifer Drilling & Test**	Drill Bit Diameter: **2-inch** / Total Depth: **6.0 ft**
Driller: **Anthony Hilenski**	Backfill Material: **Bentonite** from **0 ft** to **6 ft**
Drilling Method: **Geoprobe**	Sampler: **Acetate Tube**
Drilling Equipment: **Geoprobe 5400**	Depth to Water at Time of Drilling: **Not Encountered**

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown SILT, little coarse Sand, trace concrete (fill); dry.	FILL			NM	8-inch concrete core not included in geologic logging.
	Light brown medium SAND, little concrete (fill); moist.				NM	Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
	Dark gray medium SAND, little Silt (fill); moist to wet.				0	Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume. Sample collected for grain size analysis of fill material. Geotechnical samples collected from 2-4 ft and 6-8 ft for permeability. Bottom of borehole 6 feet below land surface.
5	Dark gray CLAY, some Silt; moist.	CL				
10						
15						
20						
25						

ROUX

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**	Log of Soil Boring No. **CB-7**

Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/12/95**	Date Completed: **7/12/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **20.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite**	from **0 ft** to **20 ft**
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **Not Encountered**	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown to black coarse SAND and Gravel, some concrete (fill); dry.	FILL			0	10-inch concrete core not included in geologic logging. Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis.
	Dark gray SILT and fine Sand, trace green-gray Clay, trace concrete (fill); moist.				0	Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis.
	Dark gray fine to medium SAND (fill); moist to wet.				0	
5						
	Dark gray fine to medium SAND (fill); wet.				0	
	Dark gray fine to medium SAND (fill); wet.				0	
10	No recovery.				NM	No headspace analysis due to no sample recovery.
	Dark gray fine to medium SAND (fill); wet.				0	
	Dark gray fine to medium SAND (fill); wet.				0	
15						
	Dark gray fine to medium SAND (fill); wet.				0	
	Gray CLAY, some Silt; moist.	CL			0	
20						Bottom of borehole 20 feet below land surface.
25						

ROUX

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**	Log of Soil Boring No. **CB-8**
Logged By: **Jeff Makowski** Checked By: **S. Glash**	Date Started: **7/14/95** Date Completed: **7/14/95**
Drilling Co: **Aquifer Drilling & Test**	Drill Bit Diameter: **2-inch** Total Depth: **10.0 ft**
Driller: **Anthony Hilenski**	Backfill Material: **Bentonite** from **0 ft** to **10 ft**
Drilling Method: **Geoprobe**	Sampler: **Acetate Tube**
Drilling Equipment: **Geoprobe 5400**	Depth to Water at Time of Drilling: **Not Encountered**

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown coarse SAND, some red brick and Gravel (fill); dry.	FILL			NM	7.5-inch concrete core not included in geologic logging. Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
	Gray SILT, trace Clay (fill); moist.				NM	Trace petroleum odor. Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
	Gray SILT, trace Clay (fill); moist.				0	
5	Dark gray fine to medium SAND, trace Gravel (fill); dry.					
	Dark gray medium to coarse SAND (fill); moist.				0	
	Gray fine to medium SAND, little Silt (fill); moist.				0	
	Gray CLAY, some Silt, some fine Sand; moist.	CL				
10						Bottom of borehole 10 feet below land surface.
15						
20						
25						

ROUX

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**	Log of Soil Boring No. **CB-9**

Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/14/95**	Date Completed: **7/14/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **6.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite**	from **0 ft** to **6 ft**
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **Not Encountered**	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown to black coarse SAND and Gravel, some red brick (fill); dry.	FILL			NM	5-inch concrete core not included in geologic logging. Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume. Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume. Orange, yellow, and red staining of clay. Sample collected for grain size analysis of fill material. Geotechnical samples collected from 1-3 ft and 5-7 ft for permeability. Bottom of borehole 6 feet below land surface.
	Dark gray SILT, little Clay, trace fine Sand (fill); moist.				NM	
5	Green-gray CLAY, some Silt, some fine Sand; dry.	CL			0	
10						
15						
20						
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ROUX

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**	Log of Soil Boring No. **CB-10**

Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/13/95**	Date Completed: **7/13/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **6.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite**	from **0 ft** to **6 ft**
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **3.5** feet	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown SILT, little red brick and concrete, trace coarse Sand (fill); dry.	FILL			NM	5-inch concrete core not inluded in geologic logging.
	Gray fine to medium SAND and Silt, trace red brick (fill); moist to wet.				0	Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
	Gray medium SAND (fill); wet.				0	Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. Water samples collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis.
5	Gray to black CLAY, some fine Sand; moist.	CL				Black staining. Bottom of borehole 6 feet below land surface.
10						
15						
20						
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Project: **PFIZER INC WILLIAMSBURG, BROOKLYN**		Log of Soil Boring No. **CB-11**	
Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/14/95**	Date Completed: **7/14/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **20.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite**	from **0 ft** to **20 ft**
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **Not Encountered**	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Orange-brown coarse SAND and Gravel, some red brick (fill); dry.	FILL	◆		NM	12-inch concrete core not included in geologic logging.
	Black coarse SAND, little Silt (fill); moist.		◆		NM	Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
5	Black coarse SAND, little Silt (fill); moist.		◆		0	Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume. Black staining and trace petroleum odor.
	Black SILT, some coarse Sand, trace Gravel (fill); moist.		◆		0	Black staining.
	Black SILT, trace Clay (fill); moist.		◆		0	Black staining.
10	Gray CLAY, some Silt; moist.	CL	◆		0	
	Gray CLAY, some Silt; moist.		◆		0	
15	Dark gray CLAY, some Silt; moist.		◆		0	
	No recovery.		○		NR	No headspace analysis due to no sample recovery.
	Dark gray CLAY, some Silt, little fine Sand; moist.		◆		0	
20						Bottom of borehole 20 feet below land surface.
25						

ROUX

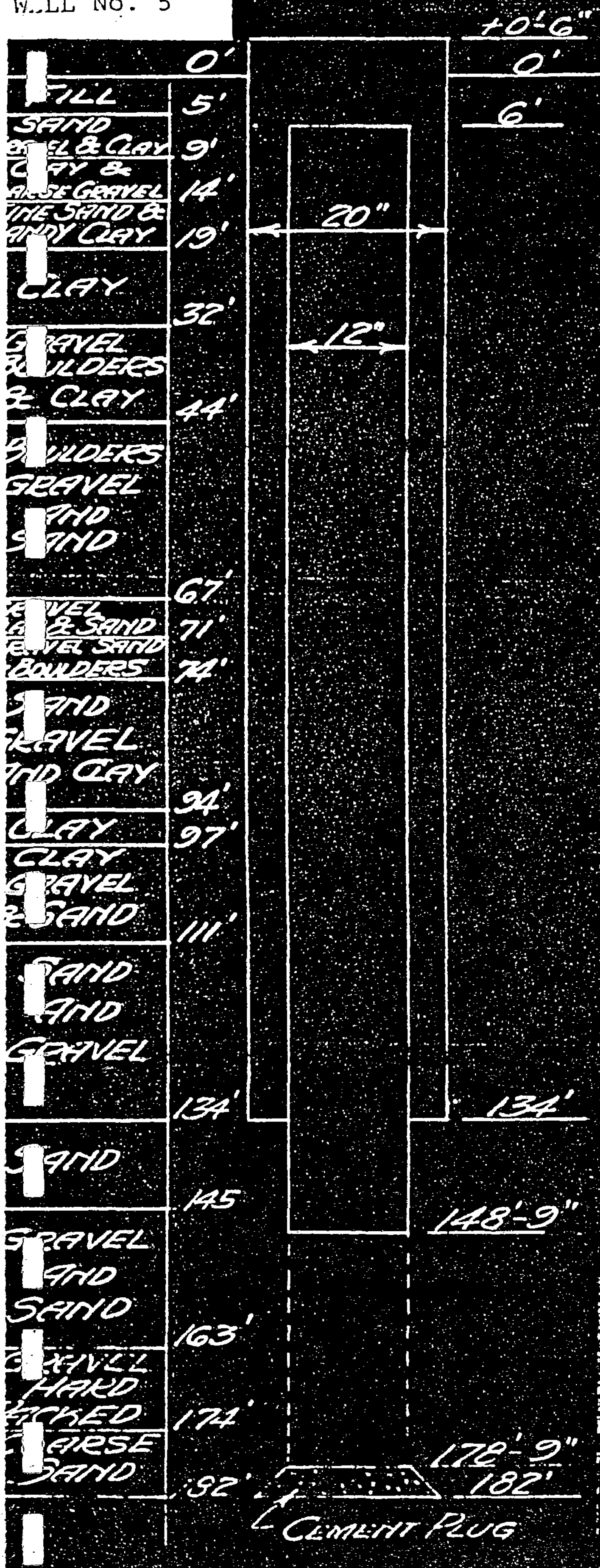
Project: **PFIZER INC WILLIAMSBURG, BROOKLYN**		Log of Soil Boring No. **CB-12**	
Logged By: **Jeff Makowski**	Checked By: **S. Glash**	Date Started: **7/12/95**	Date Completed: **7/12/95**
Drilling Co: **Aquifer Drilling & Test**		Drill Bit Diameter: **2-inch**	Total Depth: **6.0 ft**
Driller: **Anthony Hilenski**		Backfill Material: **Bentonite**	from **0 ft** to **6 ft**
Drilling Method: **Geoprobe**		Sampler: **Acetate Tube**	
Drilling Equipment: **Geoprobe 5400**		Depth to Water at Time of Drilling: **3.0** feet	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown medium to coarse SAND, little red brick, trace concrete (fill); dry.	FILL	⧗		NM	12-inch concrete core not included in geologic logging. Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
	No recovery.		○		NM	No headspace analysis due to no sample recovery.
	Dark brown SILT, little medium Sand (fill); moist.		⧗		NM	Sample from 4-6 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
5	Green-gray CLAY, some Silt; moist.	CL				Water sample collected for TCL VOC analysis. Slight petroleum odor in water sample. Bottom of borehole 6 feet below land surface.
10						
15						
20						
25						

Project: **PFIZER INC** **WILLIAMSBURG, BROOKLYN**	Log of Soil Boring No. **CB-13**
Logged By: **Jeff Makowski** Checked By: **S. Glash**	Date Started: **7/12/95** Date Completed: **7/12/95**
Drilling Co: **Aquifer Drilling & Test**	Drill Bit Diameter: **2-inch** Total Depth: **8.0 ft**
Driller: **Anthony Hilenski**	Backfill Material: **Bentonite** from **0 ft** to **8 ft**
Drilling Method: **Geoprobe**	Sampler: **Acetate Tube**
Drilling Equipment: **Geoprobe 5400**	Depth to Water at Time of Drilling: **Not Encountered**

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Brown coarse SAND, some red brick, little concrete (fill); dry.	FILL			NM	8-inch concrete core not included in geologic logging.
	Brown coarse SAND, some red brick, little concrete (fill); dry to moist.				NM	Sample from 0-2 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
	Dark brown SILT, little red brick, little medium Sand (fill); moist to wet.				0	Sample from 2-4 ft collected for TCL VOC, TCL SVOC, TAL Metals, TOC and pH analysis. No headspace analysis due to insufficient sample volume.
5						Sample collected for grain size analysis of fill material.
	Brown SILT, some medium Sand (fill); wet.				0	Geotechnical samples collected from 1-3 ft and 8-10 ft for permeability.
	Gray CLAY, some Silt; moist.	CL				Bottom of borehole 8 feet below land surface.
10						
15						
20						
25						

W..LL No. 5



Material

Pipe: 134'-6" OF 20" STEEL PIPE T.&C.
142'-9" OF 12" " " "

Screen: 30' OF 12" EVERDUR

Cone: 12"x18" CEMENTED

Pump

8-25-61
4-6 54

Type	RKLC M (SPEC)	Shop No.	22668A
Setting	~~125'-2"~~ 133'-3"	Size	12"
Suction	9'-10" OF 8"	Stages	4
Basket	E.K.	Impellers	BRONZE
Discharge	8"	Head	TF 825
Tubing	WATER LUB.	Press B. P.	70 #
Shafting	1½"	Air Line	~~135'~~ B.P. ~~145'~~ 130' ~~144'-8"~~

Motor

Make	U.S.	Type	CODE "G"
Volts	208	Cycle	60
Phase	3	Amp.	202
H. P.	75	R. P. M.	1800
Frame	952	Form	VERT.
Model	CFU	Serial	345583

Well

Started	1-25-51	Static Level	71' 70'
First Test	3-23-51	Production	710 715
Final Test	6-4-51	Pumping Level	91'4" 80'
Accepted	6-4-51	Guarantee	700
Clear Depth	179'	Press.	70 #

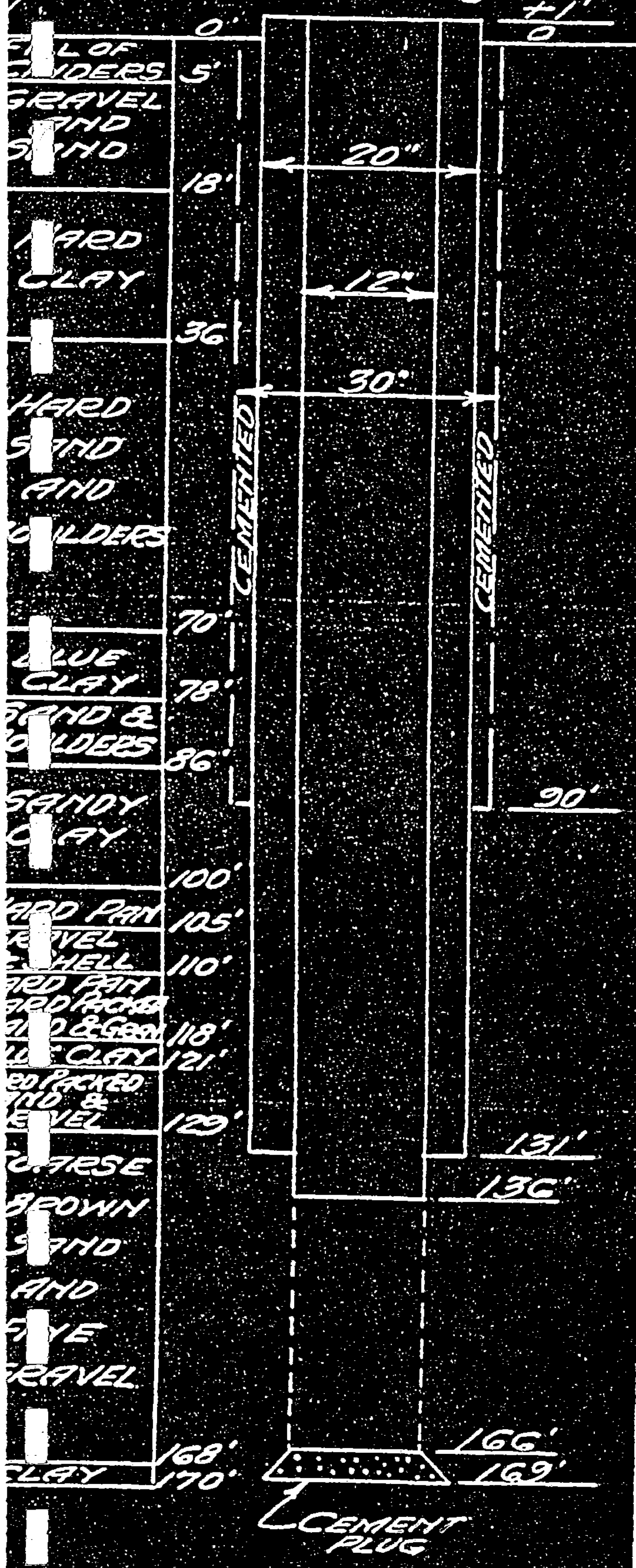
Driller: G.S. DIVINS

Installer: C.H. JOLLEY — T. POWELL

[illegible]

K-2048

CHAS PFIZER & CO. INC.
BARTLETT ST. PLANT
BROOKLYN, N.Y.
RFO
4
3 (THEIR #5)



Material

Pit: 132' of 20" Steel Pipe, Welded
137' " 12" " " T & C.

Screen: 30' of 12" Everdur

Cone: 1-12"x18"x 3' Long Cone, Cemented

Pump

Type	RKLC	**Shop No.**	7-16-51 19078
Setting	125'-3"	**Size**	12"
Suction	10' of 8"	**Stages**	4
Basket		**Impellers**	Bronze
Discharge	8"x10' Cpld.	**Head**	TF 818
Tubing	Water Lub.	**Press. B. P.**	40#
Shafting	1½"	**Air Line**	130' ~~135'~~ 3" B.P.

Motor

Make	U.S.	**Type**	Hollow Shaft
Volts	208	**Cycle**	60
Phase	3	**Amp.**	123 for 220V
H. P.	50	**R. P. M.**	1800
Frame	405-4	**Form**	Vert.
Model	CFU	**Serial**	653594

Well

Started	9-15-48	**Static Level**	73'
First Test	11-13-48	**Production**	800 700 Fin.
Final Test	12-20-48	**Pumping Level**	85' 87' Fin.
Accepted	12-20-48	**Guarantee**	700
Clear Depth	166'	**Press.**	44# B.P. Fin.

Driller: John Petrash

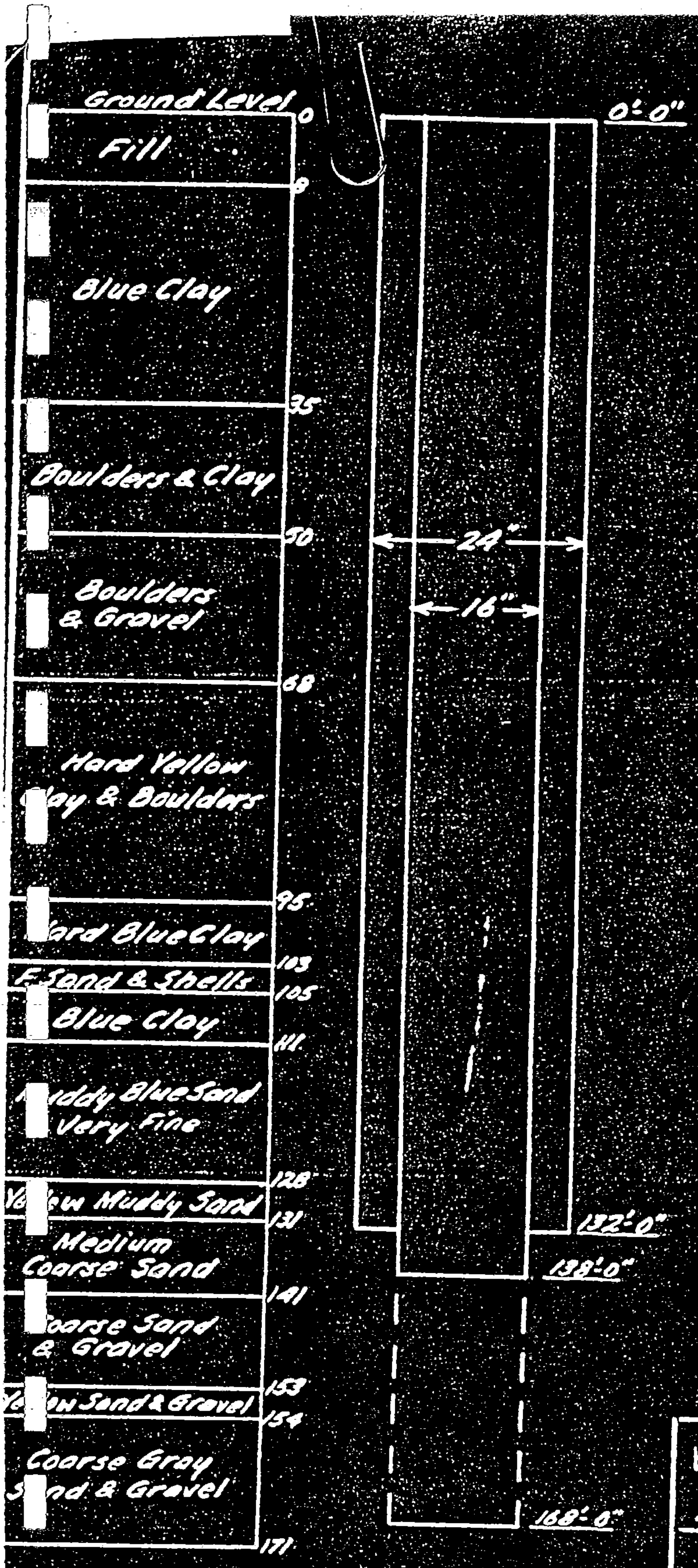
Installer: Q. S. Chandler

LAYNE-NEW YORK CO., INC. NEW YORK, N. Y.
WATER SUPPLY CONTRACTORS

CHAS. PFIZER CO.
BROOKLYN, N.Y.
BARTLETT ST. PLANT

DRAWN BY R.F.O. APPROVED BY

LAYNE WELL NO. ~~2~~ 3 (THEIR #6)
N.Y.W.P. & C.C. # K-1629



5-10-43

Material

Pit: 132' of 24" O.D. × 3/8" Pipe Welded
138' of 16" O.D. × 3/8" " "

Screen: 30' of 16" Everdur

Cone: Steel Plate

Pump:

Type	DRLC	Shop No.	12579
Setting	123'-8" to S.F.	Size	15"
Suction	10' of 8"	Stages	2
Basket	—	Impellers	Bronze
Discharge	8"	Head	TA-1
Tubing	Water Lub.	Press. B. P.	53#
Shafting	1½"	Air Line	120'

12-21-50

Motor

4-25-50

Make	U.S.	Type	Hollowshaft
Volts	208	Cycle	60
Phase	3	Amp.	~~202~~ 256
H. P.	~~75~~ 100	R. P. M.	1800
Frame	~~952~~ 504-5	Form	Vertical
Model	CFU CODE-"F"	Serial	~~345583~~ ~~852628~~ 872147

Well

Started	1-5-43	Static Level	71'-6"
First Test	5-2-43	Production	993
Final "	7-8-43	Pumping Level	81
Accepted	7-8-43	Guarantee	993
Clear Depth	172' B.P.	Press.	53#

Driller: O.R. Firestone & L.E. Willoughby
Installer: T. A. Murray

LAYNE-NEW YORK CO., INC. NEW YORK N.Y.
WATER SUPPLY CONTRACTORS
K1344

CHAS. PFIZER & CO., INC.
11 BARTLETT STREET
BROOKLYN. N.Y.

DRAWN BY W.A.N.
APPROVED BY W.A.N.
WELL NO. 1 (THEIR #10)

APPENDIX E

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	: ROUX ASSOCIATES	Date	: 7-27-95
Project Location	: PFIZER WILLIAMS	Job No.	: 95S1845-02
Sample Number	: CB-9 FILL	Tested By	: JR
Description	: (1'-3')	Checked By:	JS

Physical Property Data

Initial Height (in)	:	2.00	Final Height (in)	:	2.00
Initial Diameter (in)	:	2.72	Final Diameter (in)	:	2.73
Initial Wet Weight (g)	:	359.90	Final Wet Weight (g)	:	367.20
Wet Density (pcf)	:	117.87	Wet Density (pcf)	:	119.38
Moisture Content %	:	22.40	Moisture Content %	:	23.40
Dry Density (pcf)	:	96.30	Dry Density (pcf)	:	96.75

Test Parameters

Fluid		:	Deaired Water	Effective		
Cell Pressure	(psi)	:	48.00	Confining Pressure (psi)	:	5.5
Head Water	(psi)	:	43.00	Gradient	:	13.80
Tail Water	(psi)	:	42.00			

Permeability Input Data

Flow, Q	(cc)	:	23.15
Length, L	(in)	:	2.00
Area, A	(sqin)	:	5.85
Head, h	(psi)	:	1.00
Time, t	(min)	:	73.00
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 9.41E-06 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

APPENDIX E

Geotechnical Laboratory Report

GEOTECHNICAL LABORATORY TEST RESULTS
FOR PFIZER, INC.
CITRIC BLOCK
WILLIAMSBURG FACILTIY
BROOKLYN, NEW YORK

Performed For:

Roux Associates, Inc.
1377 Motor Parkway
Islandia, NY 11788

Performed By:

J&L Testing Company, Inc.
938 South Central Avenue
Canonsburg, PA 15317

July 27, 1995
Job No.: 95S1845-02

JLT J&L TESTING COMPANY, INC.
GEOTECHNICAL AND GEOSYNTHETICS MATERIALS TESTING AND RESEARCH

July 27, 1995
Job No.: 95S1845-02

Roux Associates, Inc.
1377 Motor Parkway
Islandia, NY 11788

Attn: Mr. Scott J. Glash, C.P.G.

RE: GEOTECHNICAL LABORATORY TESTING FOR PFIZER, INC.
CITRIC BLOCK, WILLIAMSBURG FACILITY
BROOKLYN, NEW YORK

Dear Mr. Glash:

J&L Testing Company, Inc. (JLT) is pleased to present the results of the above referenced geotechnical testing performed on the samples shipped to our laboratory on July 18, 1995. The total number of samples and sample identification are as listed in the sample chain of custody attached (Appendix B).

The tests performed are permeability testing (ASTM D5084) on the Shelby tube samples labeled "clay" and "fill", respectively, and grain size analysis including hydrometer (ASTM D422) performed on the samples shipped in zip lock bags. All test results are labeled and presented in Appendix A. All samples will be retained for a period of 90 days and then disposed unless instructed otherwise.

We sincerely appreciate your confidence in our services and look forward to working with you again. Should you have any questions, comments or require additional information please call. Thank you.

Sincerely,

J & L TESTING COMPANY, INC.

Mahiru Shettima, Ph.D., P.E.
Director

Enclosure
MS/jlt

APPENDIX A

ENGINEER Jeff Makowski
DATE ASS July 19, 1995
DATE DUE ASAP

JOB NO. 95S1845-02
JOB NAME Roux Associates
Pfizer, Williamsburg
Facility

DATE REC July 19, 1995
DATE CMP. July 26, 1995
REC. BY J.R.
PAGE NO 1 of 1

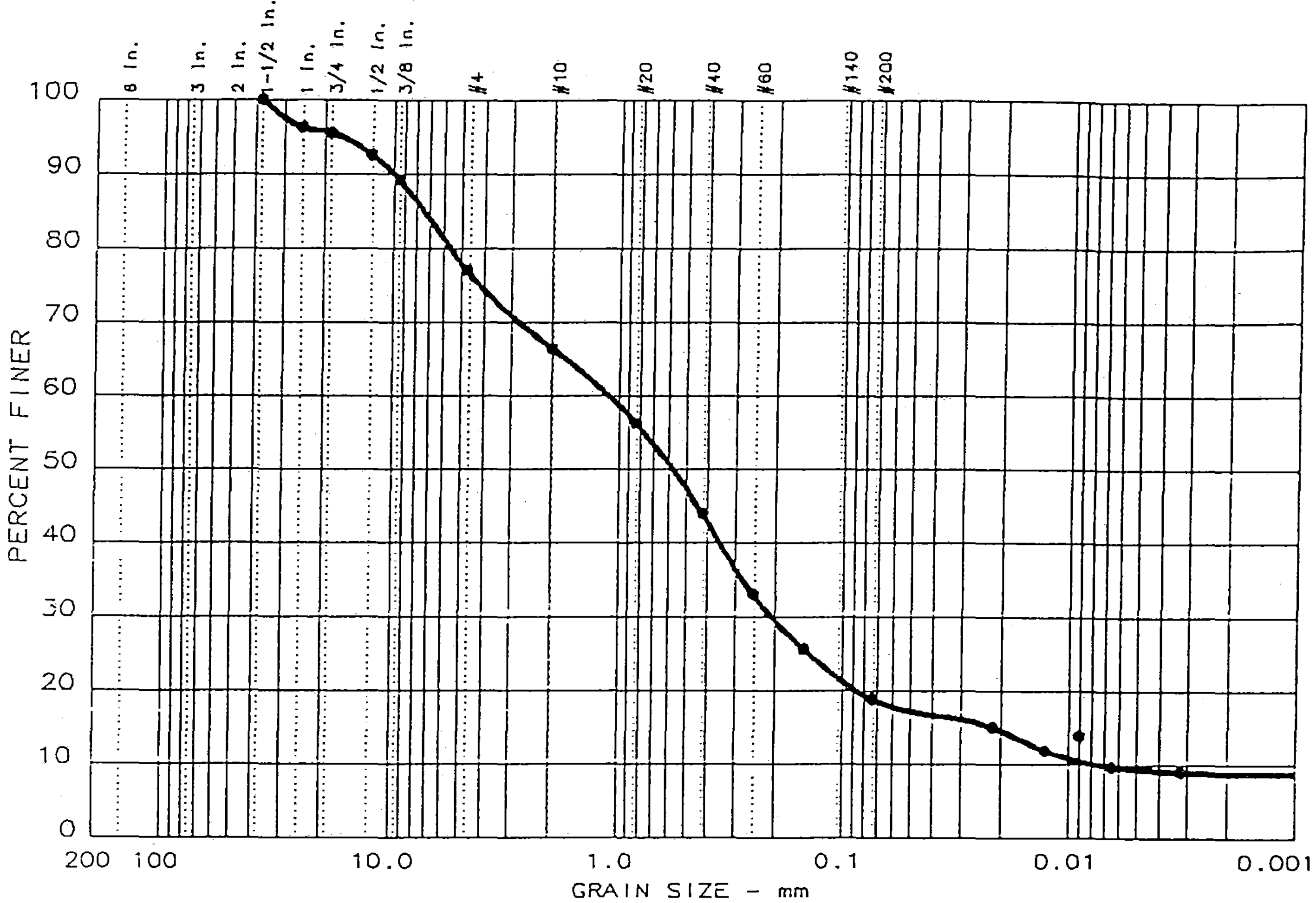
SUMMARY OF LABORATORY TEST RESULTS

BORING AND SAMPLE NO.	DEPTH feet	CLASSIFICATION	PERM k cm/sec	NATURAL WATER CONTENT (%)	ATTERBERG LIMIT		UNCON. COMPRESS		UNIT DRY WGT (pcf)	RELATIVE DENSITY	GRAIN SIZE		TRIAXAL			
					LIQUID LIMIT	PLASTIC LIMIT	STRESS (pcf)	STRAIN (%)			SIEVE	HYDR	U.U.	CIU	CELL PRESSURE (psi)	BACK PRESSURE (psi)
CB-1	Bulk	Silty Sand (SM)									*	*				
CB-4	Bulk	Silty Sand (SM)									*	*				
CB-6	Bulk	Silty Sand (SM)									*	*				
CB-9	Bulk	Silty Sand (SW-SM)									*	*				
CB-13	Bulk	Silty Sand (SM)									*	*				
CB-1	2-4 ft.	Tube Sample - Fill	5.14×10^{-6}													
CB-1	6-8 ft.	Tube Sample - Clay	1.31×10^{-5}													
CB-4	2-4 ft.	Tube Sample - Fill	1.24×10^{-5}													
CB-4	7-9 ft.	Tube Sample - Clay	8.75×10^{-5}													
CB-6	2-4 ft.	Tube Sample - Fill	2.82×10^{-7}													
CB-6	6-8 ft.	Tube Sample - Clay	8.62×10^{-7}													
CB-9	1-3 ft.	Tube Sample - Fill	9.41×10^{-6}													
CB-9	5-7 ft.	Tube Sample - Clay	6.32×10^{-7}													
CB-13	1-3 ft.	Tube Sample - Fill	1.69×10^{-4}													
CB-13	8-10 ft.	Tube Sample - Clay	1.44×10^{-7}													

* See Test Curves Test Comp and Checked Test In Progress

CB - 1

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
●	11	0.0	22.9	58.3	10.0	8.8	SM

SIEVE inches size	PERCENT FINER		
	●		
1.5	100.0		
1	96.2		
0.75	95.5		
0.5	92.5		
0.375	89.2		
	GRAIN SIZE		
D_{60}	1.11		
D_{30}	0.21		
D_{10}	0.00		
	COEFFICIENTS		
C_c	5.31		
C_u	153.1		

SIEVE number size	PERCENT FINER		
	●		
4	77.1		
10	66.4		
20	56.2		
40	43.9		
60	33.0		
100	25.6		
200	18.8		

Sample information:

● CB-1

PFIZER WILLIAMSBURG

Remarks:

J & L TESTING
CO., INC.

Project No.: 95S1845-02
Project: ROUX ASSOCIATES

Date: 07-24-95

Data Sheet No. 3

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	ROUX ASSOCIATES	Date	:	7-27-95
Project Location	:	PFIZER WILLIAMS	Job No.	:	95S1845-02
Sample Number	:	CB-1 FILL	Tested By	:	JR
Description	:	(2'-4')	Checked By:		JS

Physical Property Data

Initial Height (in)	:	2.50	Final Height (in)	:	2.48
Initial Diameter (in)	:	2.88	Final Diameter (in)	:	2.88
Initial Wet Weight (g)	:	477.80	Final Wet Weight (g)	:	469.90
Wet Density (pcf)	:	111.67	Wet Density (pcf)	:	111.09
Moisture Content %	:	40.00	Moisture Content %	:	37.60
Dry Density (pcf)	:	79.76	Dry Density (pcf)	:	80.73

Test Parameters

Fluid		:	Deaired Water	Effective		
Cell Pressure	(psi)	:	48.00	Confining Pressure (psi)	:	5
Head Water	(psi)	:	44.00	Gradient	:	22.26
Tail Water	(psi)	:	42.00			

Permeability Input Data

Flow, Q	(cc)	:	20.15
Length, L	(in)	:	2.48
Area, A	(sqin)	:	6.49
Head, h	(psi)	:	2.00
Time, t	(min)	:	65.00
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 5.14E-06 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	ROUX ASSOCIATES	Date	:	7-27-95
Project Location	:	PFIZER WILLIAMS	Job No.	:	95S1845-02
Sample Number	:	CB-1 CLAY	Tested By	:	JR
Description	:	(6'-8')	Checked By:		JS

Physical Property Data

Initial Height (in)	:	1.67	Final Height (in)	:	1.66
Initial Diameter (in)	:	2.83	Final Diameter (in)	:	2.80
Initial Wet Weight (g)	:	374.20	Final Wet Weight (g)	:	371.40
Wet Density (pcf)	:	136.07	Wet Density (pcf)	:	138.30
Moisture Content %	:	17.10	Moisture Content %	:	15.80
Dry Density (pcf)	:	116.20	Dry Density (pcf)	:	119.43

Test Parameters

Fluid		:	Deaired Water	Effective		
Cell Pressure	(psi)	:	48.00	Confining Pressure (psi)	:	5
Head Water	(psi)	:	44.00	Gradient	:	33.25
Tail Water	(psi)	:	42.00			

Permeability Input Data

Flow, Q	(cc)	:	17.90
Length, L	(in)	:	1.66
Area, A	(sqin)	:	6.16
Head, h	(psi)	:	2.00
Time, t	(min)	:	16.00
Temp, T	(Deg C)	:	23.0

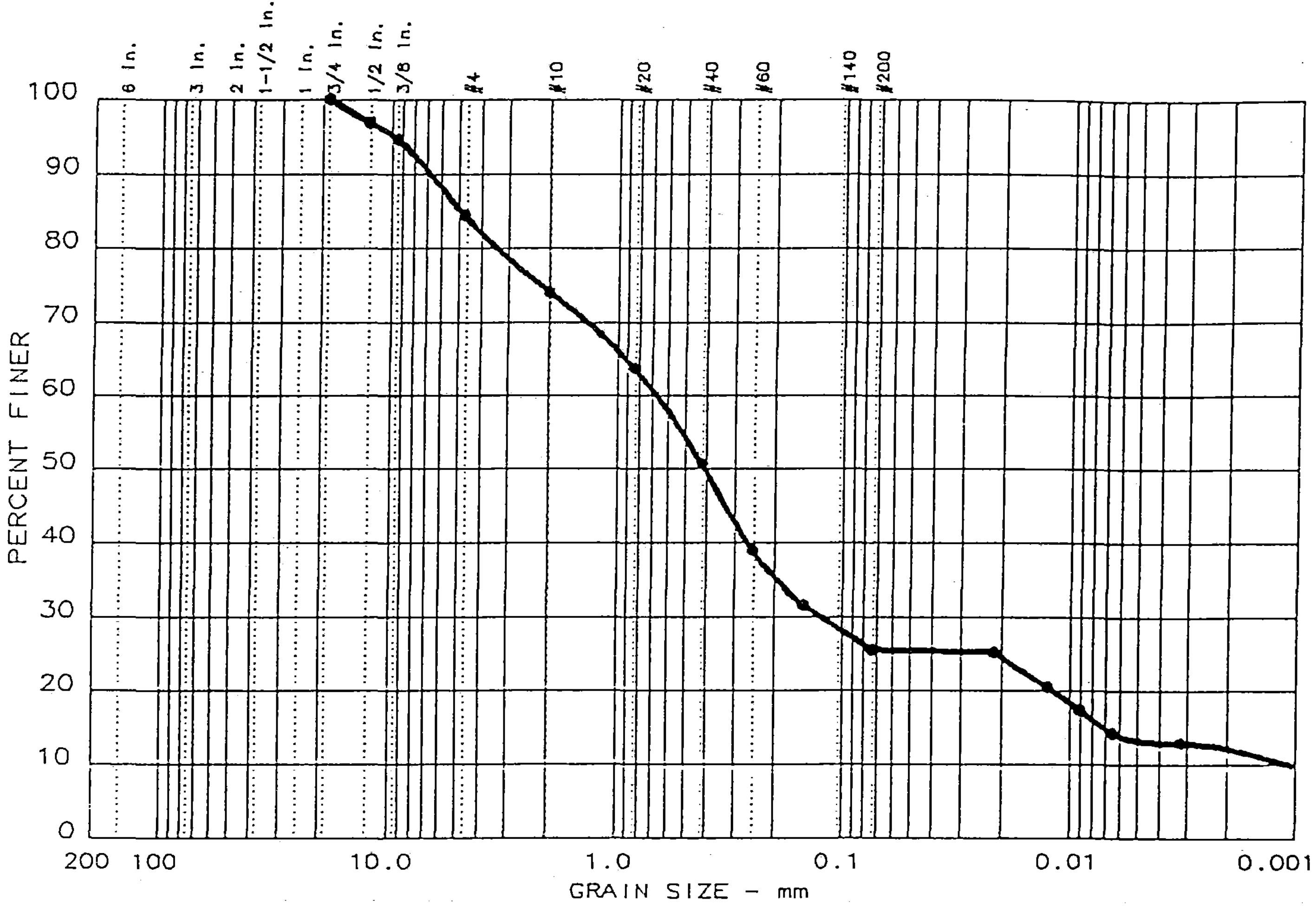
Computed Permeability

PERMEABILITY, K = 1.31E-05 (cm/sec) at 20 Degrees C

J & L TESTING CO. INC.

CB - 4

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
●	9	0.0	15.6	58.8	13.5	12.1	SM

SIEVE inches size	PERCENT FINER ●		
0.75	100.0		
0.5	96.8		
0.375	94.6		
	GRAIN SIZE		
D_{60}	0.67		
D_{30}	0.12		
D_{10}	0.00		
	COEFFICIENTS		
C_c	20.89		
C_u	616.6		

SIEVE number size	PERCENT FINER ●		
4	84.4		
10	74.1		
20	63.7		
40	50.7		
60	39.0		
100	31.6		
200	25.6		

Sample information:

● CB-4

PFIZER WILLIAMSBURG

Remarks:

J & L TESTING CO., INC.

Project No.: 95S1845-02
Project: ROUX ASSOCIATES

Date: 07-24-95
Data Sheet No. 1

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	: ROUX ASSOCIATES	Date	: 7-27-95
Project Location	: PFIZER WILLIAMS	Job No.	: 95S1845-02
Sample Number	: CB-4 FILL	Tested By	: JR
Description	: (2'-4')	Checked By:	JS

Physical Property Data

Initial Height (in)	: 2.74	Final Height (in)	: 2.74
Initial Diameter (in)	: 2.81	Final Diameter (in)	: 2.79
Initial Wet Weight (g)	: 580.40	Final Wet Weight (g)	: 583.20
Wet Density (pcf)	: 130.01	Wet Density (pcf)	: 132.51
Moisture Content %	: 20.10	Moisture Content %	: 20.60
Dry Density (pcf)	: 108.25	Dry Density (pcf)	: 109.88

Test Parameters

Fluid		: Deaired Water	Effective	
Cell Pressure	(psi)	: 48.00	Confining Pressure (psi)	: 5
Head Water	(psi)	: 44.00	Gradient	: 20.15
Tail Water	(psi)	: 42.00		

Permeability Input Data

Flow, Q	(cc)	: 15.90
Length, L	(in)	: 2.74
Area, A	(sqin)	: 6.11
Head, h	(psi)	: 2.00
Time, t	(min)	: 25.00
Temp, T	(Deg C)	: 23.0

Computed Permeability

PERMEABILITY, K = 1.24E-05 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	ROUX ASSOCIATES	Date	:	7-27-95
Project Location	:	PFIZER WILLIAMS	Job No.	:	95S1845-02
Sample Number	:	CB-4 CLAY	Tested By	:	JR
Description	:	(7'-9')	Checked By:		JS

Physical Property Data

Initial Height (in)	:	1.80	Final Height (in)	:	1.78
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.85
Initial Wet Weight (g)	:	385.30	Final Wet Weight (g)	:	386.80
Wet Density (pcf)	:	132.31	Wet Density (pcf)	:	129.65
Moisture Content %	:	22.80	Moisture Content %	:	23.40
Dry Density (pcf)	:	107.75	Dry Density (pcf)	:	105.07

Test Parameters

Fluid		:	Deaired Water	Effective		
Cell Pressure	(psi)	:	48.00	Confining Pressure (psi)	:	5.5
Head Water	(psi)	:	43.00	Gradient	:	15.51
Tail Water	(psi)	:	42.00			

Permeability Input Data

Flow, Q	(cc)	:	30.00
Length, L	(in)	:	1.78
Area, A	(sqin)	:	6.38
Head, h	(psi)	:	1.00
Time, t	(min)	:	8.31
Temp, T	(Deg C)	:	23.0

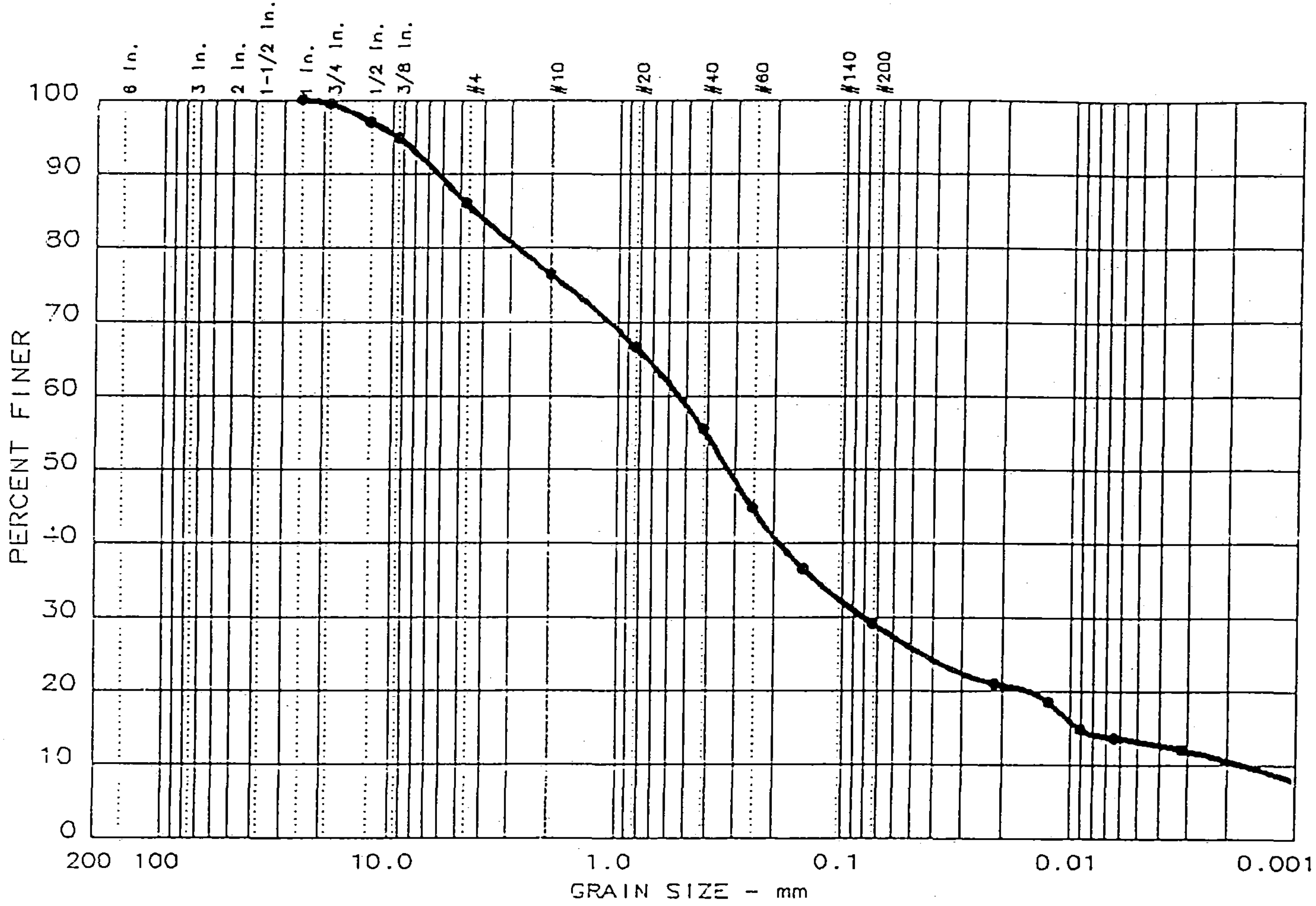
Computed Permeability

PERMEABILITY, K = 8.75E-05 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

CB - 6

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
●	10	0.0	14.0	56.8	18.7	10.5	SM

SIEVE inches size	PERCENT FINER ●		
1	100.0		
0.75	99.4		
0.5	97.0		
0.375	94.8		

	GRAIN SIZE		
D_{60}	0.53		
D_{30}	0.08		
D_{10}	0.00		

	COEFFICIENTS		
C_c	7.00		
C_u	305.5		

SIEVE number size	PERCENT FINER ●		
4	86.0		
10	76.3		
20	66.6		
40	55.5		
60	44.7		
100	36.5		
200	29.2		

Sample information:

● CB-6

PFIZER WILLIAMSBURG

Remarks:

J & L TESTING CO., INC.

Project No.: 95S1845-02
Project: ROUX ASSOCIATES

Date: 07-24-95 Data Sheet No. 2

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	ROUX ASSOCIATES	Date	:	7-27-95
Project Location	:	PFIZER WILLIAMS	Job No.	:	95S1845-02
Sample Number	:	CB-6 FILL	Tested By	:	JR
Description	:	(2'-4')	Checked By:		JS

Physical Property Data

Initial Height (in)	:	2.80	Final Height (in)	:	2.78
Initial Diameter (in)	:	2.85	Final Diameter (in)	:	2.83
Initial Wet Weight (g)	:	619.30	Final Wet Weight (g)	:	606.90
Wet Density (pcf)	:	131.96	Wet Density (pcf)	:	132.10
Moisture Content %	:	21.20	Moisture Content %	:	18.70
Dry Density (pcf)	:	108.88	Dry Density (pcf)	:	111.29

Test Parameters

Fluid		:	Deaired Water	Effective		
Cell Pressure	(psi)	:	48.00	Confining Pressure (psi)	:	5
Head Water	(psi)	:	44.00	Gradient	:	19.86
Tail Water	(psi)	:	42.00			

Permeability Input Data

Flow, Q	(cc)	:	21.40
Length, L	(in)	:	2.78
Area, A	(sqin)	:	6.29
Head, h	(psi)	:	2.00
Time, t	(min)	:	1455.00
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 2.82E-07 (cm/sec) at 20 Degrees C

J & L TESTING CO. INC.

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	: ROUX ASSOCIATES	Date	: 7-27-95
Project Location	: PFIZER WILLIAMS	Job No.	: 95S1845-02
Sample Number	: CB-6 CLAY	Tested By	: JR
Description	: (6'-8')	Checked By:	JS

Physical Property Data

Initial Height (in)	2.27	Final Height (in)	2.38
Initial Diameter (in)	2.85	Final Diameter (in)	2.77
Initial Wet Weight (g)	536.00	Final Wet Weight (g)	522.10
Wet Density (pcf)	140.88	Wet Density (pcf)	138.55
Moisture Content %	18.40	Moisture Content %	16.10
Dry Density (pcf)	118.99	Dry Density (pcf)	119.34

Test Parameters

Fluid		Deaired Water	Effective	
Cell Pressure	(psi)	48.00	Confining Pressure (psi)	5
Head Water	(psi)	44.00	Gradient	23.19
Tail Water	(psi)	42.00		

Permeability Input Data

Flow, Q	(cc)	9.95
Length, L	(in)	2.38
Area, A	(sqin)	6.03
Head, h	(psi)	2.00
Time, t	(min)	198.00
Temp, T	(Deg C)	23.0

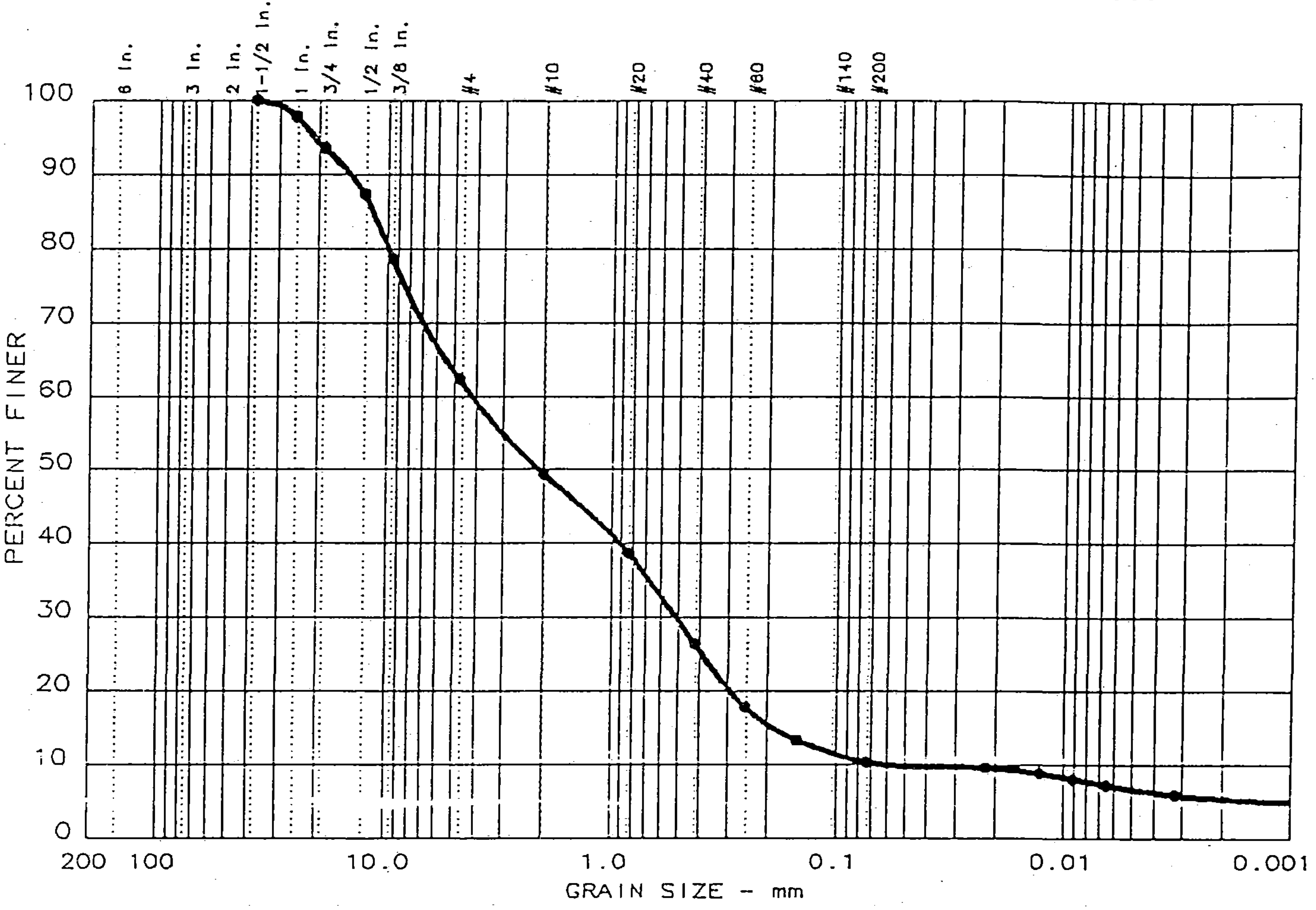
Computed Permeability

PERMEABILITY, K = 8.62E-07 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

CB - 9

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
●	13	0.0	37.6	52.1	5.0	5.3	SW-SM

SIEVE inches size	PERCENT FINER ●		
1.5	100.0		
1	97.8		
0.75	93.5		
0.5	87.3		
0.375	78.6		
	GRAIN SIZE		
D_{60}	4.12		
D_{30}	0.51		
D_{10}	0.05		
	COEFFICIENTS		
C_c	1.07		
C_u	70.8		

SIEVE number size	PERCENT FINER ●		
4	62.4		
10	49.3		
20	33.6		
40	26.4		
60	17.8		
100	13.4		
200	10.3		

Sample information:

● CB-9

PFIZER WILLIAMSBURG

Remarks:

J & L TESTING CO., INC.

Project No.: 95S1845-02
Project: ROUX ASSOCIATES

Date: 07-24-95 Data Sheet No. 5

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	: ROUX ASSOCIATES	Date	: 7-27-95
Project Location	: PFIZER WILLIAMS	Job No.	: 95S1845-02
Sample Number	: CB-9 CLAY	Tested By	: JR
Description	: (5'-7')	Checked By:	JS

Physical Property Data

Initial Height (in)	2.67	Final Height (in)	2.70
Initial Diameter (in)	2.78	Final Diameter (in)	2.73
Initial Wet Weight (g)	529.40	Final Wet Weight (g)	520.20
Wet Density (pcf)	124.33	Wet Density (pcf)	125.28
Moisture Content %	24.30	Moisture Content %	22.10
Dry Density (pcf)	100.03	Dry Density (pcf)	102.60

Test Parameters

Fluid		Deaired Water	Effective Confining Pressure (psi)	5
Cell Pressure	(psi)	48.00	Gradient	20.44
Head Water	(psi)	44.00		
Tail Water	(psi)	42.00		

Permeability Input Data

Flow, Q	(cc)	16.20
Length, L	(in)	2.70
Area, A	(sqin)	5.85
Head, h	(psi)	2.00
Time, t	(min)	513.00
Temp, T	(Deg C)	23.0

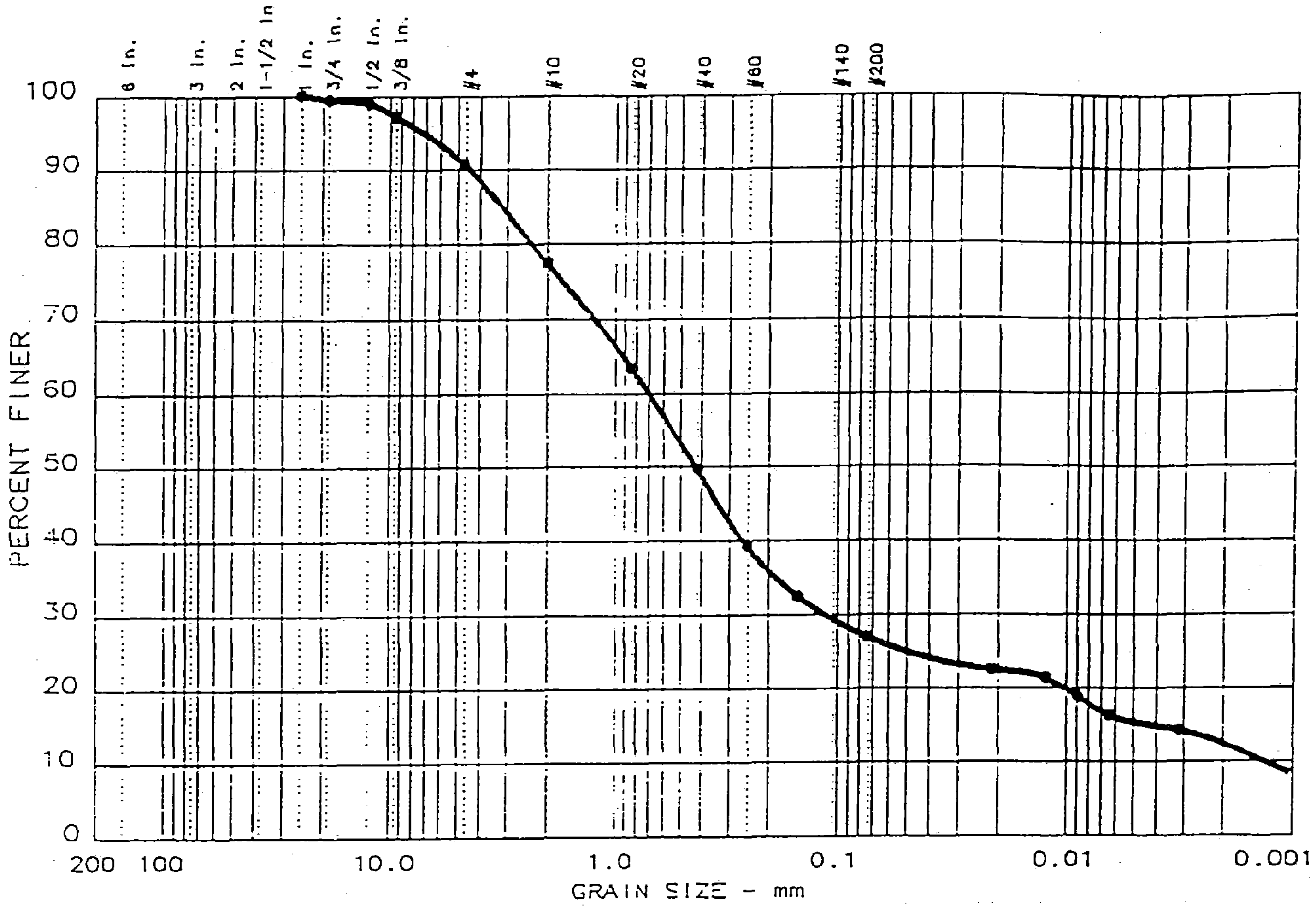
Computed Permeability

PERMEABILITY, K = 6.32E-07 (cm/sec) at 20 Degrees C

J & L TESTING CO. INC.

CB - 13

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY	USCS
●	12	0.0	9.4	63.7	14.6	12.3	SM

SIEVE inches size	PERCENT FINER ●		
1	100.0		
0.75	99.4		
0.5	98.9		
0.375	97.2		
	GRAIN SIZE		
D_{60}	0.69		
D_{30}	0.11		
D_{10}	0.00		
	COEFFICIENTS		
C_c	14.13		
C_u	524.8		

SIEVE number size	PERCENT FINER ●		
4	90.6		
10	77.4		
20	63.5		
40	49.6		
60	39.3		
100	32.5		
200	26.9		

Sample information:

● CB-13

PFIZER WILLIAMSBURG

Remarks:

J & L TESTING CO., INC.

Project No.: 95S1845-02
Project: ROUX ASSOCIATES
Date: 07-24-95
Data Sheet No. 4

SUMMARY OF TRIAXIAL PERMEABILITY TEST RESULTS

Client	:	ROUX ASSOCIATES	Date	:	7-27-95
Project Location	:	PFIZER WILLIAMS	Job No.	:	95S1845-02
Sample Number	:	CB-13 FILL	Tested By	:	JR
Description	:	(1'-3')	Checked By:		JS

Physical Property Data

Initial Height (in)	:	1.30	Final Height (in)	:	1.29
Initial Diameter (in)	:	2.80	Final Diameter (in)	:	2.76
Initial Wet Weight (g)	:	212.00	Final Wet Weight (g)	:	219.70
Wet Density (pcf)	:	100.80	Wet Density (pcf)	:	108.35
Moisture Content %	:	16.00	Moisture Content %	:	24.30
Dry Density (pcf)	:	86.90	Dry Density (pcf)	:	87.17

Test Parameters

Fluid		:	Deaired Water	Effective		
Cell Pressure	(psi)	:	48.00	Confining Pressure (psi)	:	5.5
Head Water	(psi)	:	43.00	Gradient	:	21.40
Tail Water	(psi)	:	42.00			

Permeability Input Data

Flow, Q	(cc)	:	30.00
Length, L	(in)	:	1.29
Area, A	(sqin)	:	5.98
Head, h	(psi)	:	1.00
Time, t	(min)	:	3.33
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 1.69E-04 (cm/sec) at 20 Degrees C

J & L TESTING CO. INC.

SUMMARY OF TRIAXIAL PERMEABILITY
TEST RESULTS

Client	:	ROUX ASSOCIATES	Date	:	7-27-95
Project Location	:	PFIZER WILLIAMS	Job No.	:	95S1845-02
Sample Number	:	CB-13 CLAY	Tested By	:	JR
Description	:	(8'-10')	Checked By:		JS

Physical Property Data

Initial Height (in)	:	2.40	Final Height (in)	:	2.50
Initial Diameter (in)	:	2.92	Final Diameter (in)	:	2.86
Initial Wet Weight (g)	:	566.60	Final Wet Weight (g)	:	546.00
Wet Density (pcf)	:	134.18	Wet Density (pcf)	:	129.40
Moisture Content %	:	24.90	Moisture Content %	:	20.10
Dry Density (pcf)	:	107.43	Dry Density (pcf)	:	107.74

Test Parameters

Fluid		:	Deaired Water	Effective		
Cell Pressure	(psi)	:	48.00	Confining Pressure (psi)	:	5
Head Water	(psi)	:	44.00	Gradient	:	22.08
Tail Water	(psi)	:	42.00			

Permeability Input Data

Flow, Q	(cc)	:	4.40
Length, L	(in)	:	2.50
Area, A	(sqin)	:	6.42
Head, h	(psi)	:	2.00
Time, t	(min)	:	515.00
Temp, T	(Deg C)	:	23.0

Computed Permeability

PERMEABILITY, K = 1.44E-07 (cm/sec) at 20 Degrees C

J & L TESTING CO, INC.

APPENDIX B

ROUX

CHAIN OF CUSTODY

№ 02653Y

ROUX ASSOCIATES INC
Environmental Consulting
& Management

1377 MOTOR PARKWAY
ISLANDIA, NEW YORK 11788
(516) 232-2600 FAX (516) 232-9898

ANALYSES

PAGE 1 OF 1

PROJECT NAME PFIZER-WILLIAMSBURG	PROJECT NUMBER 04744403
PROJECT LOCATION WILLIAMSBURG, BROOKLYN	
SAMPLER(S) JEFF MAKOWSKI	

SAMPLE DESIGNATION/LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	PERMEABILITY TESTING					TOTAL BOTTLES	NOTES
CB-13/1'-3'	7/17/95	1100	SOIL	X					1	
CB-1/2'-4'	7/18/95	1000							1	
CB-1/6'-8'	7/18/95	1010							1	SHELBY TUBES
CB-9/5'-7'	7/18/95	1140							1	SHIPPED
CB-9/1'-3'	7/18/95	1145							1	SEPARATELY
CB-13/8'-10'	7/18/95	1230							1	FROM COOLER
CB-4/2'-4'	7/18/95	1335							1	
CB-4/7'-9'	7/18/95	1350							1	
CB-6/2'-4'	7/18/95	1540							1	
CB-6/6'-8'	7/18/95	1555	↓	↓					1	

RELINQUISHED BY: (SIGNATURE)	FOR	DATE	TIME	SEAL INTACT Y OR N	RECEIVED BY: (SIGNATURE)	FOR	DATE	TIME	SEAL INTACT Y OR N
	ROUX	7/18/95	1600	[✓ Y] OR N					Y OR N
				Y OR N					Y OR N
				Y OR N					Y OR N

DELIVERY METHOD
FED. EX. P1

ANALYTICAL LABORATORY
J & L COMPANY

COMMENTS PLEASE REPORT TO SCOTT GLASH

ROUX

CHAIN OF CUSTODY

№ 02652Y

ROUX ASSOCIATES INC
Environmental Consulting
& Management

1377 MOTOR PARKWAY
ISLANDIA, NEW YORK 11788
(516) 232-2600 FAX (516) 232-9898

PAGE 1 OF 1

PROJECT NAME PFIZER - WILLIAMSBURG	PROJECT NUMBER 04744Y03
PROJECT LOCATION WILLIAMSBURG, BROOKLYN	
SAMPLER(S) JEFF MAKOWSKI	

				ANALYSES							
SAMPLE DESIGNATION/LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	GRAIN SIZE & HYDROMETER TESTING						TOTAL BOTTLES	NOTES
~~CB-11~~ (JM) (JM)	~~7/17/95~~	~~1225~~	~~Soil~~	~~X~~						~~1~~	(JM)
CB-1	7/18/95	1000	SOIL	X						1	
CB-13	7/17/95	1005	SOIL	X						1	
CB-9	7/18/95	1150	SOIL	X						1	
CB-4	7/18/95	1400	SOIL	X						1	
CB-6	7/18/95	1545	SOIL	X						1	

RELINQUISHED BY: (SIGNATURE)	FOR	DATE	TIME	SEAL INTACT Y OR N	RECEIVED BY: (SIGNATURE)	FOR	DATE	TIME	SEAL INTACT Y OR N
	Roux Assoc	7/18/95	1600	[✓ Y] OR N					Y OR N
				Y OR N					Y OR N
				Y OR N					Y OR N

DELIVERY METHOD
FED. EX. #549833059G

ANALYTICAL LABORATORY
J & L TESTING

COMMENTS PLEASE REPORT TO SCOTT GLASH