TEXTRON

Textron Inc.

40 Westminster Street
Providence, R.I. 02903
401/421-2800

February 14, 1997

Mr. Pat Evangelista
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866

Re: Diamond Alkali Superfund Site,
Passaic River Study Area

Dear Mr. Evangelista:

Enclosed is Textron's response to EPA's information request dated December 24, 1996 regarding the above-referenced matter. An extension to respond until February 14, 1997 was granted by Ms. Amelia Wagner, Assistant Regional Counsel.

Sincerely,

Jamieson M. Schiff
Environmental Counsel

JMS:sas
Enclosure

Textron Inc.'s Response to EPA Request for Information
Diamond Alkali Superfund Site, Passaic River Study Area

Textron Inc. sold its former Spencer-Kellogg Division, including its former Newark plant at Doremus Avenue, over eleven years ago. As part of that transaction it transferred facility documents and records. Hence, Textron's ability to respond to EPA's information request, which seeks very detailed information concerning events in some cases twenty years ago, is necessarily limited. Additionally, the request in certain instances seeks information concerning events that preceded Textron's operation of the facility. Nevertheless, Textron has attempted to respond based upon reasonably available information given the burdens that EPA's request impose in relation often to the probative value of the information sought.

1) **How long has your company operated at the facility designated above? If your company no longer operates at this facility, during what years did your company operate at the facility?**

Response:
Textron Inc. (hereinafter "Textron") operated its Spencer Kellogg Division, Newark Resin Plant (hereinafter "the facility") from December 1978 to July 1985.

2) **a) Does your company have or has it in the past had a permit or permits issued pursuant to the Resource Conservation and Recovery Act, 42 U.S.C. §6901 et seq.? If "yes", please provide the years that your company held such a permit and its EPA Identification Number.**

Response:
According to a March 8, 1984 letter from the NJDEP (attached as Exhibit 1), Textron filed a RCRA Part A permit application in connection with a hazardous waste storage tank. To the best of Textron's knowledge, the facility was never issued a RCRA Part B operating permit during Textron's ownership. The facility's EPA I.D. number was NJD092217892.

b) Does your company have or has it in the past had a permit or permits issued pursuant to the Federal Water Pollution Control Act, 33 U.S.C. §1251, et seq.? If "yes", please provide the years that your company held such a permit.

Response:
The facility held a Passaic Valley Sewerage Commissioners Permit from May 1981 to May 1986. See Permit No. 20401860, attached as Exhibit 2, and Textron's New Jersey

Environmental Cleanup Responsibility Act (ECRA) General Information Submission, attached as Exhibit 3.

3) Did your company receive, utilize, manufacture, discharge, release, store or dispose of any materials containing the following substances:

Response:
According to information contained in Exhibit 4 (Textron's ECRA Site Evaluation Submission and various raw material records), Textron received, stored and utilized the following substances in its production processes from 1978 to 1985:

	Yes	No
2,3,7,8 tetrachlorodibenzo-p-dioxin or other dioxin compounds		X
Acids: synethol acids, adipic acid, benzoic acid, phospheric acid, phosphoric acid, sulfuric acid, isophthalic acid, methacrylic acid, chlorendic acid, acrylic acid, fumaric acid and ammonium persulfate	X	
Ammonium hydroxide	X	
Benzene		X
Butanol	X	
Butyl acetate	X	
Ethanol	X	
Ethyl benzene	X	
Formaldehyde	X	
Methyl methacrylate	X	
Neopentyl glycol	X	
Phthalic anhydride	X	
other anhydrides, please specify maleic anhydride and trimellitic anhydride	X	
Polyaromatic hydrocarbons If "yes," please list specific compounds		X
Solvents, if "yes," please specify compound Aromatic Solvent 100, Aromatic Solvent 150, Aliphatic Solvent 140, VM&P naphtha, isoactylalcohol, methyl propyl ketone, MEK, isoparaffinic petroleum solvent and mineral spirits	X	
Styrene	X	
Toluene and vinyl toluene	X	
Xylene	X	
PCBs		X
Arsenic		X
Cadmium		X
Chromium		X
Copper		X

Lead	X
Mercury	X
Nickel	X
Silver	X
Zinc	X
Cyanide	X

For a discussion of substances that may have been released at the facility during historical operations, see response to Question 8.

4) **a) Provide a description of the manufacturing processes for which all hazardous substances, including, but not limited to, the substances listed in response to item (3), were a product or by-product.**

Response:
A description of Textron's manufacturing processes is contained in Exhibit 4, Textron's ECRA Site Evaluation Submission at Appendix 2.

b) During what parts of the manufacturing processes identified in the response to items (4)(a), above, were hazardous substances, including, but not limited to, the substances listed in response to item (3), generated?

Response:
Water of esterification was generated during resin reaction in Building 31. Since the reaction that produced this water was a reversible one, the water has to be removed from the process as it is generated. This was done by adding a reflux solvent (e.g., xylene or ethylbenzene) to form an azeotrope. The azeotrope allowed water to evaporate at temperatures below its normal boiling point. Overhead decanters were then used to collect the evaporated water. Until the early 1980's, this water was discharged directly to the Passaic Valley Sewerage Commission (PVSC) system. Beginning in the early 1980's, the water was separated from the sewer discharge line and piped to a receiving tank where the solvent was separated from the water. Any recovered solvent was then recycled back into the production process and the water was discharged to the sanitary sewer system. See Exhibit 4 at Appendix 2. Textron does not have information confirming the specific chemical composition of the esterification water.

Waste filter cake and press paper were generated during the filtration of finished products prior to filling in drums. The filter cake and press paper were transferred to open head drums, properly marked, closed and held for disposal until a full truck load (80 drums) accumulated. The chemical composition of the filter press waste was 30-50% diatomaceous earth, 30-50% filter paper, 10-20% waste resin and 0-10% organic solvents. When a full truck load of drums had been collected, the drums were opened, checked for liquids, closed and labeled with hazardous waste labels and flammable solid labels. The drums were then shipped, properly manifested, to a licensed TSDF for disposal. See Exhibit 4 at Appendices 2 and 8.

Cotton and/or nylon strainer bags were used to filter finished products prior to tank truck loading. The bags were thoroughly drained and disposed of with the drummed filter press waste. Drainings from the strainer bags were either recycled in the production process or collected as 1285 Premix and disposed as bulk hazardous waste, properly manifested, to a licensed TSDF. The chemical composition of the 1285 Premix was 10-60% organic solvents and 40-90% waste resin. See Exhibit 4 at Appendices 2 and 8.

Off-grade finished resin product was either collected in drums and resold as fuel or added over time to the 1285 Premix noted above for off-site disposal.

Waste solvent was generated from occasional cleaning of the process lines. This solvent was collected in drums and recycled back into the production process. According to former plant personnel, this waste solvent may have also been placed into the 1285 Premix drums at some point in the past. The time period during which this may have occurred is unknown.

The amounts of the waste generated per volume of finished product is unknown for all wastes noted above.

i) Describe the chemical composition of these hazardous substances.

Response:
See response to Question 4(b) above.

ii) For each process, what amount of hazardous substances was generated per volume of finished product?

Response:
See response to Question 4(b) above.

iii) Were these hazardous substances combined with wastes from other processes? If so, wastes from what processes?

Response:
See response to Question 4(b) above.

5) Describe the methods of collection, storage, treatment, and disposal of all hazardous substances, including, but not limited to, the substances listed in response to item (3) and (4). Include information on the following:

Response:
See response to Question 4b above.

a) Identify all persons who arranged for and managed the processing, treatment, storage and disposal of hazardous substances.

Response:
According to Textron's April 17, 1985 Hazardous Waste Contingency Plan contained in Exhibit 4, ECRA Site Evaluation Submission at Appendix 9, the following persons may have been involved in the processing, treatment, storage and disposal of hazardous wastes at the facility during Textron's period of ownership. The addresses and telephone numbers listed below for these former employees are those that were last known to Textron:

Arthur Dieffenbach
Plant Superintendent
Sebring Avenue
Bound Brook, NJ 08805
469-1509

Richard Barr
Plant Engineer
84 Shore Road
Andover, NJ 07821
(201) 852-5003

John Brooks
Plant Manager
Devon Road
Colonia, NJ 07067
381-6706

Scott Johnston
Process Engineer
111 West 7th Avenue, Apt. 8
Roselle, NJ 07203
(201) 245-4887

b) If hazardous substances were taken off-site by a hauler or transporter, provide the names and addresses of the waste haulers and the disposal site locations.

Response:
Textron objects to this request on the grounds that it is overbroad, unduly burdensome and not reasonably calculated to lead to the production of relevant information.

c) Describe <u>all</u> storage practices employed by your company with respect to all hazardous substances from the time operations commenced until the present. Include all on-site and off-site storage activities.

Response:
The information provided below is contained in Exhibit 4, ECRA Site Evaluation Submission at Appendices 1, 2, 3, 4 and 7. For a facility map refer to Exhibit 4 at Appendix 1.

Most dibasic acids and some polyols were received in 50 lb. bags by truck, unloaded at the west end of Building 31/32, and moved into the first floor of the building for temporary storage. These materials were then moved to the fifth floor of the building for more permanent storage.

Hydrocarbon solvents, and alcohols used as solvents, were delivered in both tank trucks and 55-gallon drums. Tank trucks were unloaded into above ground storage tanks

located in the tank farm east of Building 31. Drums were unloaded and stored on pallets in the outside yard area east of Building 25 or on the fifth floor of Building 32.

Phthalic anhydride was received in tank trucks and unloaded into aboveground storage tanks located east of Building 31.

Trimethyl propane and vinyl toluene were unloaded from either rail cars or tank trucks into above ground storage tanks located between Buildings 4 and 25.

Generally, bulk raw materials that were unloaded into storage tanks around the plant were subsequently transferred via above ground piping to storage tanks located on the fourth floor of Building 31/32. Occasionally, solvents were transferred via above ground piping directly into the thinning tanks located on the first floor of Building 31/32.

Drums of waste filter cake and press paper were transported via elevator and lift truck from the third floor of Building 31/32 to the first floor of Building 13 where they were held for disposal.

Strainer bag drainings and off-grade finished resin product (1285 Premix) were stored in one large above ground tank, or in 55-gallon drums located on a cement pad, prior to off-site disposal.

Drums of finished products were stored in an area on the second floor of Building 31 or in storage tanks located throughout the plant.

i) If drums were stored outside, were the drums stored on the ground or were they stored on areas that had been paved with asphalt or concrete? Please provide a complete description of these storage areas.

Response:
The drums stored by Textron outside the manufacturing building were stored on pallets. The facility was almost entirely paved during Textron's period of ownership.

ii) When drums were stored outside, were empty drums segregated from full drums?

Response:
Textron has no information or documents indicating whether empty drums were segregated from full drums during outside storage operations.

d) What processes do you use to treat your waste? What do you do with the waste after it is treated?

Response:
According to available information, and other than the separation of water from reflux solvent discussed in Question 4, Textron did not treat its waste streams prior to disposal.

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6) **a) For process waste waters generated at the facility which contained any hazardous substances, including, but not limited to, the substances listed in response to item (3) and (4):**

i) Was the waste stream discharged into a sanitary sewer and if so, during what years?

Response:
According to available information, the only operations that generated waste waters were the coating resin manufacturing processes conducted in Building 31/32. Water of esterification from these operations was discharged to the PVSC sanitary sewer system. These discharges continued throughout Textron's ownership of the facility.

ii) Were they treated before being discharged to the sanitary sewer and if so, how? Please be specific.

Response:
Process waste waters that were discharged to the sanitary sewer system were not pretreated until the early 1980s. The subsequent pretreatment consisted of separating reflux solvent from the water. This was the only "treatment" of waste waters that Textron conducted during its ownership of the facility.

iii) If the waste waters were not discharged to the sanitary sawer, where were they disposed and during what years?

Response:
No waste waters were discharged to locations other than the sanitary sewer system.

iv) Please provide the results of any analyses performed on any waste process streams generated at the facility.

Response:
Sampling of waste waters in the early 1980s consisted of measurements of the lower explosive limit (LEL) as required by the PVSC. Textron was unable to locate copies of these analyses.

v) EPA has information that in 1976 a sanitary sewer line at your facility ruptured causing process waste water to discharge into adjacent surface water. Please provide a detailed description of this incident including the nature and content of the waste water, the results of sampling and any steps taken to mitigate the effects of the discharge.

Response:
This incident would have occurred before Textron's ownership and operation of the facility, since Textron did not acquire the facility until December 1978. All the information Textron has concerning this incident is contained in the enclosed Exhibit 4, ECRA Site Evaluation Submission at Appendix 5. Textron is not aware of any sampling or remediation that was conducted in response to this incident.

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b) For floor drains or other disposal drains at the facility:

i) Did the drains connect to a sanitary sewer and if so, during what years?

ii) If the floor drains or other disposal drains at the facility were not discharged to the sanitary sewer, where did they discharge and during what years?

Response:
Floor drains in Building 31/32 were connected to the sanitary sewer system at the time of Textron's purchase of the facility in December 1978 until 1985 when Textron sealed these drains. Other than these floor drains, Textron is not aware of any other floor drains at the facility that were used for the disposal of waste waters. Textron believes that any remaining floor drains at the facility also would have discharged to the sanitary sewer system.

c) i) Did any storm sewers, catch basins or lagoons exist at any time at the facility and if so, during what years?

Response:
Textron has no knowledge of the existence of lagoons at the facility. Storm sewers and associated catch basins exist at the facility. Textron is not aware of the installation date(s) of these structures. No other catch basins exist at the facility.

ii) If catch basins or lagoons existed, were they lined or un-lined?

Response:
The storm water catch basins that existed at the facility during Textron's ownership were lined with concrete.

iii) What was stored in the lagoons?

Response:
Not applicable.

iv) Where was the discharge from any of these structures released and during what years? Was this discharge treated before its release and if so, how and during what years? What was the chemical composition of any waste waters released, and during which years?

Response:
All storm water from the storm sewers and associated catch basins was discharged to the Passaic River. Textron did not pretreat the storm water prior to its discharge nor conduct any sampling of the storm water that was discharged to these structures. Textron did not discharge any process waste waters to the storm sewers and catch basins.

d) Please supply diagrams of any waste water collection, transport or disposal systems on the property.

Response:
A diagram of the storm water collection and conveyance system is provided on Plate 1 in the March 1987 report contained in Exhibit 7.

7) **a) For each hazardous substance, including, but not limited to, the substances listed in response to item (3) or identified in the responses to item (4), above, provide the total amount generated during the operation of the facility on an annual basis.**

Response:
Exhibit 4, ECRA Site Evaluation Submission at Appendix 2, indicates that approximately eighty 55-gallon drums of filter cake, press paper and strainer bag waste were generated per month by the facility. The annual volume of esterification water, strainer bag drainings and process line solvent washings generated is unknown.

b) Were any hazardous substances, including, but not limited to, the substances listed in response to item (3) or identified in the responses to item (4), above, disposed of in the Passaic River or discharged to the Passaic River? If yes, identify the hazardous substances, estimate the amount of material discharged to or disposed of in the Passaic River and the frequency with which this discharge or disposal occurred. Also please include any sampling of the river which you might have done after any discharge or disposal.

Response:
To the best of Textron's knowledge, no hazardous substances were intentionally disposed of in, or discharged to, the Passaic River during Textron's ownership of the facility.

8) **Please identify any leaks, spills, explosions, fires or other incidents of accidental material discharge that occurred at the facility during which or as a result of which any hazardous substances, including, but not limited to, the substances listed in response to item (3) or (4), were released on the property, into the waste water or storm drainage system at the facility or to the Passaic River. Provide any documents or information relating to these incidents, including the ultimate disposal of any contaminated materials.**

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Response:
Accidental discharges of hazardous substances to the property, to the waste water or storm water systems, or to the Passaic River during Textron's ownership of the facility are discussed in (b) and (c), below. Textron is also aware of one such release that occurred subsequent to Textron's ownership of the facility. In November 1991, during Textron's implementation of a soil remediation project conducted during the ECRA proceeding at the facility, a thin layer of free-phase resinous material was encountered on the water surface during excavation of soils to the water table along the northern railroad siding at the facility. Subsequently, following a period of heavy rainfall and high tides, a small amount of this material (i.e., less than 5 gallons) was released to the Passaic River. Textron's contractors immediately contained the spill with collection booms. The NJDEP was notified consistent with N.J.A.C. 7:1E-5.3 and there were no enforcement actions taken. Textron filed a spill report with the NJDEP dated December 20, 1991. See Exhibit 5, Monthly ECRA Progress Report dated December 16, 1991. Textron has not been able to locate a copy of the spill report.

a) Please provide the results of any sampling of the soil, water, air or other media after any such incident and before and after clean-up. Please provide in this information all sampling performed for or by NJDEP.

Response:
Textron is not aware of any sampling, including sampling by or for the NJDEP, that was conducted during its ownership of the facility to address any accidental discharges of hazardous substances to the property, into the waste water or storm water systems, or to the Passaic River. Further, no sampling of environmental media was conducted in response to the accidental discharge of resinous material to the Passaic River in November 1991.

b) EPA has information that in 1977, 1978 and 1979 there were three separate incidents involving the discharge of resin to the facility's property or to adjacent surface waters. Please provide detailed descriptions of these incidents including the constituents of the discharged material, how the discharge occurred, any steps taken to mitigate the effects of the spills, and any actions taken to prevent further occurrences. Please include any sampling results.

Response:
The only documented discharges of resin that Textron is aware of are described in Exhibit 4, ECRA Site Evaluation Submission at Appendix 5. Accidental spills and leaks of various materials may have occurred during the manufacture and storage of coating resins at the time Textron owned the facility. Areas potentially impacted by these spills were addressed as a part of the ECRA investigation. See response to Question 12 for further information regarding these areas.

c) Please describe in detail all spills of phthalic anhydride onto the facility's property or into adjacent surface waters. Please describe how the discharge occurred, any steps taken to mitigate the effects of the spills, and any actions taken to prevent further occurrences.

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Response:
Spills of phthalic anhydride that occurred during Textron's ownership of the facility are described in Exhibit 4, ECRA Site Evaluation Submission at Appendix 5. Areas potentially impacted by these spills were addressed as a part of the ECRA investigation. See response to Question 12 for further information regarding these areas.

9) **a) Was your facility ever subject to flooding. If so, was the flooding due to:**

i) overflow from sanitary or storm sewer back-up, and/or

ii) flood overflow from the Passaic River?

b) Please provide the date and duration of each flood event.

Response:
Textron is not aware of any flooding which occurred at the facility during Textron's period of ownership.

10) **Please provide a detailed description of any civil, criminal or administrative proceedings against your company for violations of any local, State or federal laws or regulations relating to water pollution or hazardous waste generation, storage, transport or disposal. Include information on the Administrative Consent Order, ECRA Case #85403. Provide copies of all pleadings and depositions or other testimony given in these proceedings.**

Response:
A copy of the Administrative Consent Order for ECRA Case No. 85403 is attached as Exhibit 6. Textron does not possess copies of any pleadings, depositions or testimony given in this matter.

The Coast Guard assessed a $50 fine to Textron as a result of a September 10, 1979 spill of an unknown amount of resin at the facility which entered an underground flume and discharged into Newark Bay. See Exhibit 4, ECRA Site Evaluation Submission at Appendix 5. Textron does not possess copies of any pleadings, depositions or testimony related to this matter.

11) **Provide a copy of each document which relates to the generation, purchase, use, handling, hauling, and/or disposal of all hazardous substances, including, but not limited to, the substances listed in response to item (3) or (4). If you are unable to provide a copy of any document, then identify the document by describing the nature of the document (e.g. letter, file memo, invoice, inventory form, billing record, hazardous waste manifest, etc.). Describe the relevant information contained therein. Identify by name and job title the person who prepared the document. If the document is not readily available, state where it is stored, maintained, or why it is unavailable,**

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Response:
Textron objects to this question on the grounds that it is overbroad, unduly burdensome, and not reasonably calculated to lead to the production of relevant information.

12) a) Did you or anyone else sample the soil, ground water, surface water, ambient air or other environmental media at the facility for purposes other than those identified in questions above?

Response:
Textron and its agents have collected samples of soil, ground water, surface water and ambient air in compliance with the requirements of ECRA under Case No. 85403 during numerous phases of sampling and cleanup. Textron has not collected samples of other environmental media as part of this ECRA proceeding.

b) If so, please provide all other documents pertaining to the results of these analyses.

Response:
Attached herein as Exhibit 7 are the relevant documents that provide the results of the soil, ground water, surface water and ambient air sampling conducted by Textron under ECRA Case No. 85403. These documents are:

- 1987, March. ENVIRON Corporation. *Presentation of the ECRA Sampling Plan Results.* Volumes I and II.

- 1988, June. ENVIRON Corporation. *Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan.* Volume I.

- 1990, October. ENVIRON Corporation. *Presentation of Additional ECRA Sampling Results and Revised Cleanup Plan.* Volume I.

- 1990, December 27. Letter to M. Fisher of the NJDEP providing results of quarterly ground water monitoring.

- 1991, April 12. Letter to S. Balakrishnan of the New Jersey Department of Environmental Protection (NJDEP) presenting results of pre-remediation and quarterly ground water sampling.

- 1991, May 22. Letter to S. Balakrishnan of the NJDEP presenting results of additional pre-remediation soil sampling.

- 1991, September 16. ENVIRON Corporation. Letter and progress report to S. Balakrishnan of the New Jersey Department of Environmental Protection (NJDEP) providing results of pre-remediation sampling.

- 1992, July. Canonie Environmental. *Final Report on Soils Remediation.*

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- 1994, January 12. ENVIRON Corporation. Letter to M. Buriani of the NJDEP providing summarized results of the four rounds of post-cleanup quarterly ground water monitoring.

- 1995, January 17. ENVIRON Corporation. Letter to M. Buriani of the NJDEP presenting results of confirmatory soil sampling and ground water sampling in and around Building 31/32.

- 1995, July. ENVIRON Corporation. *Presentation of the April-May 1995 Ground Water Sampling Program Results and Proposed Remedial Action Work Plan.*

13) a) Has your company owned the facility at the location designated above? If so, from whom did your company purchase the property and in what year? If your company subsequently sold the property, to whom did your company sell it and in what year? Please provide copies of any deeds and documents of sale.

Response:
Textron owned the Spencer Kellogg Division, Newark Resin Plant from December 1978 to July 1985. Textron purchased the property from Ashland Oil, Inc. and sold it to NL Industries, Inc. A copy of the deed from Ashland Oil reflecting the purchase of the property is attached as Exhibit 8. Textron can not locate at this time a copy of the deed it transferred to NL Industries reflecting the property's sale.

b) If your company did not own the facility, from whom did your company rent the facility and for what years? Please provide copies of any rental agreements.

Response:
Not applicable.

c) To the extent that you know, please provide the names of all parties who owned or operated the facility during the period from 1940 through the present. Describe the relationship, if any, of each of those parties with your company.

Response:
The names and dates of ownership of the facility from 1940 through the present are as follows. None of these entities (other than Textron Inc.) are related to Textron Inc.:

1943 - 1951	U.S. Industrial Chemical, Inc.
1951- 1954	National Distillers Products
1954 - 1968	Archer-Daniels-Midland Co.
1968 - 1978	Ashland Oil, Inc.
1979 - 1985	Textron Inc.
1985 - 1989	NL Industries, Inc.
1989 - Present	Reichhold Chemicals, Inc.

14) Answer the following questions regarding your business or company. In identifying a company that no longer exists, provide all the information requested,

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except for the agent for service of process. If your company did business under more than one name, list each name.

a) State the legal name of your company.

b) State the name and address of the president or the chairman of the board, or other presiding officers of your company.

c) Identify the state of incorporation of your company and your company's agent for service of process in the state of incorporation and in New Jersey.

d) Provide a copy of your company's "Certificate of Incorporation" and any amendments thereto.

e) If your company is a subsidiary or affiliate of another company, or has subsidiaries, or is a successor to another company, identify these related companies. For each related company, describe the relationship to your company; indicate the date and manner in which each relationship was established. Please include in any explanation, the details of the relationship between Spencer-Kellogg and Textron.

f) Identify any predecessor organization and the dates that such company became part of your company.

g) Identify any other companies which were acquired by your company or merged with your company.

h) Identify the date of incorporation, state of incorporation, agents for service of process in the state of incorporation and New Jersey, and nature of business activity, for each company identified in the responses to items (14) (e), (f), and (g), above.

i) Identify all previous owners or parent companies, address(es), and the date change in ownership occurred.

Response:
Textron objects to this request on the grounds that it is overbroad, unduly burdensome and not reasonably calculated to lead to the production of relevant information. Without waiving its objection, Spencer-Kellogg was a former division of Textron Inc. from December 1978 until July 1985. Textron Inc. is a publicly held company, incorporated under the laws of Delaware, and headquartered in Providence, RI. Enclosed is a copy of its most recent annual report. Its agent for service of process in New Jersey is The Corporation Trust Company, 820 Bear Tavern Road, West Trenton, NJ 08628.

15) **Provide the name, address, telephone number, title and occupation of the person(s) answering this "Request for Information" and state whether such person(s) has personal knowledge of the responses. In addition, identify each person who assisted in any way in responding to the "Request for Information"**

and specify the question to which each person assisted in responding. Please include the names and addresses of former employees who were contacted to respond to any of the questions.

Response:
The following persons assisted in the preparation of the responses to this Request for Information. Scott MacDonald and William Kraft have knowledge of the former Textron facility through conducting extensive work as part of the ECRA/ISRA investigation at the facility. Elizabeth Sanders assisted Mr. MacDonald and Mr. Kraft with the response.

Scott MacDonald, Manager
William Kraft, Senior Associate
Elizabeth Sanders, Technical Assistant
ENVIRON Corporation
Carnegie Center
Princeton, New Jersey 08540

Jamieson Schiff, Environmental Counsel, Textron Inc., 40 Westminster Street, Providence, Rhode Island 02903, also assisted.

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Exhibit 1

ATTACHMENT 4

CERTIFIED MAIL
P439576265
RETURN RECEIPT REQUESTED

Received
3/1/84

CLFRB
SWH

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State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WASTE MANAGEMENT
32 E. Hanover St., CN 028, Trenton, N.J. 08625

DR. MARWAN M. SADAT, P.E.
DIRECTOR

08 MAR 1984

LINO F. PEREIRA, P.E.
DEPUTY DIRECTOR

Mr. Arthur E. Dieffenbach, Plant Superintendent
Spencer Kellogg Division of Textron, Inc.
400 Doremus Avenue
Newark, New Jersey 07105

RE: Facility Status of Spencer Kellogg, Newark, New Jersey, EPA ID NO. NJD092217892

Dear Mr. Dieffenbach:

The Bureau of Hazardous Waste Engineering (the Bureau) acknowledges receipt of your letter dated January 30, 1984 which contains a delisting request for the tank storage (S02) hazardous waste activity that your company filed for in its RCRA Part A application.

Your delisting request for Spencer Kellogg is based on a proposal that the bulk storage tank identified as T-309 which is now in premix (hazardous waste) service be taken out of service (closure of this facility). After tank T-309 closure is implemented, a 6000 gallon tank that is normally used for product bulk shipments would be used on an intermittent basis to hold i.e. store premix material before disposal off-site when sufficient quantity of premix has been accumulated to schedule removal by tank truck. Prior to transfer of premix (waste) to the product storage tank, this material would be temporarily accumulated in drums. After each shipment of the hazardous waste from the 6000 gallon tank, it would be returned to product storage service until the need for waste storage in this tank recurs.

The Bureau has reviewed your delisting request and after due consideration, made the following determinations:

1) Spencer Kellogg plans to continue utilizing a tank for accumulation of hazardous waste prior to disposal off-site.

2) The change in the name given to the tank to be employed for the handling of hazardous waste does not alter the nature of its intended use.

3) N.J.A.C. 7:26-9.3 allows for accumulation of hazardous waste in <u>containers only</u> for 90 days or less without a permit. New Jersey Hazardous Waste Management Regulations do not allow exemption for accumulation of wastes in tanks regardless of the time limit involved.

4) When you and Messrs. Smith and Brooks met at the DEP offices with Messrs. Kuhlwein and Esterman of my staff on October 4, 1983, various methods of waste handling were discussed. The distinction between use of tanks vs. containers for handling of wastes and their relevance to delisting poten-

If there is any misunderstanding of the facts noted above, please inform this Bureau immediately. Based on the assumption that the above understanding is correct, this Bureau has drawn the following conclusions:

1) Your were previously informed by letter dated August 17, 1983 that your S01 process was delisted because it only reflects the storage of hazardous waste in drums for a period of ninety (90) days or less.

2) You were also informed in DEP's 8/17/83 letter that your facility was not excluded from regulations under N.J.A.C. 7:26-1 et seq. because its S02 process constitutes a TSD activity.

3) The proposals contained in your submittal of January 30, 1984 will result in a continuation of the S02 process (tank storage) for hazardous waste at your facility - TSD activity.

4) The closure plan that you submitted for S02 process cannot be considered at this time because your "closure" plan calls for substituting a 6000 gallon tank in place of tank T-309 while continuing S02 (hazardous waste tank storage) activity. However, when you take tank T-309 out of service, you should notify the Department and provide the following information:

   a) The date when waste was no longer put into tank T-309
   b) Quantity of waste removed from the tank and method of disposal
   c) Means taken to decontaminate the facility (equipment)
   d) Steps taken to assure that human health and the environment are protected from this facility henceforth

As a result of the conclusions previously drawn, your company's hazardous waste facility continues to be included in DEP's list of "existing TSD facilities" (see N.J.A.C. 7:26-1.4 and 12.3) and therefore must conform with the interim operating requirements of N.J.AC. 7:26-1 et seq. for "existing facilities". These requirements include:

1) Establishment of financial assurance for closure as per N.J.A.C. 7:26-9.10

2) Demonstration of financial responsibility for claims as per N.J.A.C. 7:26-9.13

3) Submission of TSD facility annual report in compliance with N.J.A.C. 7:26-7.6(f)2

The following is a summary of the closure mechanisms that are allowed for existing facilities under N.J.A.C. 7:26-9.10:

1) Closure Trust Fund (N.J.A.C. 7:26-9.10(f)1)

2) Surety Bond guaranteeing payment into a closure trust fund (N.J.A.C. 7:26-9.10(f)2)

3) Closure Letter of Credit and establishment of a Standy Trust Fund at the time the letter of credit is obtained (N.J.A.C. 7:26-9.10(f)4)

4) Closure Insurance (N.J.A.C. 7:26-9.10(f)5)

845030019

The following is a summary of acceptable means to demonstrate financial responsiblity for sudden and accidental occurrences under N.J.A.C. 7:26-9.13:

1) Submission of an originally signed duplicate of the insurance policy. This policy must be either:

   a) Amended by attachment of an originally signed duplicate of a Hazardous Waste Facility Liability Endorsement; or

   b) An originally signed duplicate of a Certificate of Liability Insurance must accompany the policy as evidence of the coverage.

2) Passing a financial test for liability coverage according to N.J.A.C. 7:26-9.13(f).

3) Use of a combination of insurance and financial test.

In order to comply with the New Jersey Hazardous Waste Management Regulations regarding financial requirements, you should select appropriate documents from those mechanisms listed above and submit them to this Bureau within forty-five (45) days from the date of your receipt of this letter. A copy of the Wording of Instruments.guidelines N.J.A.C. 7:26-9 (Appendix A) is enclosed to aid you in preparation of the financial documents. The wording of instruments must be exactly as shown in the "guidelines".

If you should have any questions on any of these matters, please contact Mr. Benjamin Esterman of my staff at (609) 984-4061.

Very truly yours,

Frank Coolick

Frank Coolick, Chief
Bureau of Hazardous Waste Engineering

EP14/j20b5-7

Enclosures

Exhibit 2

PASSAIC VALLEY SEWERAGE COMMISSIONERS

SEWER CONNECTION PERMIT

PERMIT # 20401860

(Please use the Permit Number on any correspondence with PVSC)

In compliance with the provisions of the Federal Water Pollution Control Act, its amendments, the Clean Water Act and the Rules and Regulations of the Passaic Valley Sewerage Commissioners:

Spencer Kellogg

Division of Textron, Inc.
(herein, after referred to as the Permittee)

is authorized to discharge from a facility located at

400 Doremus Avenue

Newark, NJ 07105

to the Passaic Valley Sewerage Commissioners Treatment Works in accordance with discharge limitations, monitoring requirements and other conditions set forth herein.

Effective Date 5/29/81

Expiration Date 5/29/86

PASSAIC VALLEY SEWERAGE COMMISSIONERS

by: _____
Executive Director

REV: 3/83

845030022

(F) Radioactive Wastes. Radioactive wastes or isotopes of such half life or concentration that they do not comply with regulations or orders issued by the appropriate authority having control over their use and which will, or may, cause damage or hazards to the treatment works or personnel operating the system.

(G) Excessive Discharge Rate. Industrial wastes discharged in a slug of such volume or strength so as to cause a treatment process upset and subsequent loss of treatment efficiency.

(H) Heat. (a) any discharge in excess of 150°F (65°C) (b) Heat in amounts which would inhibit biological activity in the PVSC treatment works resulting in a treatment process upset and subsequent loss of treatment efficiency, but in no case shall heat be introduced into the PVSC treatment works in such quantities that the temperature of the influent waters at the treatment plant exceed 40°C (104°).

(I) Unpolluted Waters. Any unpolluted water including, but not limited to, cooling water or uncontaminated storm water, which will increase the hydraulic load on the treatment system, except as approved by PVSC.

(J) Water. Any water added for the purpose of diluting wastes which would otherwise exceed applicable maximum concentration limits.

(2) No person shall discharge or convey, or permit to be discharged or conveyed, to the treatment works any wastes containing pollutants of such character or quantity that will:

(A) Not be susceptible to treatment or interfere with the process or efficiency of the treatment system.

(B) Violate pretreatment standards. As pretreatment standards for toxic or other hazardous pollutants are promulgated by USEPA for a given industrial category, all industrial users within that category must immediately conform

C. EFFLUENT LIMITATIONS, MONITORING AND COMPLIANCE REQUIREMENTS

1. During the period beginning (5/29/81) and lasting through (5/29/86) the permittee is authorized to discharge from outlet(s) number(s) (20401860-44100-0201). Such discharges shall be monitored by the permittee as specified below. Volume to be determined from water consumption data less 5% credit for evaporation.

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS		
	~~30 DAY~~ AVERAGE	DAILY MAX	MEASUREMENT FREQUENCY	SAMPLE TYPE	REPORTING PERIOD
BOD (0310)	XXXXX	XXXXX	* WEEKLY	24 Hr. Comp.	QUARTERLY
TSS (0530)	XXXXX	XXXXX	* WEEKLY	24 Hr. Comp.	QUARTERLY
VOLUME	XXXXX	XXXXX	XXXXX	XXXXX	QUARTERLY
pH (9000)	XXXXX	5 - 10.5	CONTINUOUS RECORDER	XXXX	Page 6 - B**

*SAMPLING HAS COMMENCED

** Permittee to store recorder charts and have available to PVSC Personnel on demand.

REV: 3/83

845030024

D. Monitoring and Reporting

1. Monitoring results obtained during the previous 3 months shall be reported on the designated Discharge Monitoring Report, PVSC Form MR-1 or 2. Reports are due January 21, April 21, July 21, October 21. The first report is due on (*). If an Industrial user fails to submit Form MR-1 or 2 on a timely basis, the Executive Director shall estimate the use for the period. The estimates may be made 30 days after the due date of the report, except for the fourth quarter where the estimates may be made after October 21. Properly signed reports required herein shall be submitted to PVSC at the following address:

Executive Director
Passaic Valley Sewerage Commissioners
600 Wilson Avenue
Newark, NJ 07105

2. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

3. Test Procedures:

Test procedures for the analysis of pollutants shall conform to regulations contained in the PVSC Rules and Regulations, Federal, State and local laws or regulations.

4. Recording of Results:

For each measurement of a sample taken pursuant to the requirements of this permit, the permittee shall maintain a record of the following information:

a) The date, exact place and the time of sampling;

b) The dates the analyses were performed;

c) The person(s) who performed the analysis;

d) The analytical techniques or methods used; and

e) The results of all required analyses.

*Permittee has been required to submit monitoring reports since 7/15/81.

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The volume of each sample shall be proportional to the discharge flow rate unless specifically modified by PVSC. For a 24 hour continuous discharge, a minimum of 24 individual samples shall be collected at equal intervals and at least once per hour. For continuous discharges of 12 to 24 hours, individual samples shall be taken at equal intervals and at least once per hour. For continuous discharges of less than 12 hours, individual samples shall be taken at least once every 30 minutes. For discharges which are not continuous, individual samples shall be taken such that they will be representative of plant waste.

g. "Grab" - an individual sample collected in less than 15 minutes.

h. "Quarterly" - every three (3) months.

i. "N/A" - not applicable.

E. MANAGEMENT REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or modification which will result in new, different, or increased discharges of pollutants must be reported by submission of a new PVSC Sewer Connection Application or, if such changes will not violate the effluent limitations specified in this permit, by notices to PVSC of such changes. Following such notices, the permit may be modified to specify and limit any pollutants not previously limited.

welfare to the local environment or which interferes with the operation of the PVSC Treatment Works.

5. Removed Substances

Solids, sludges, filter backwash or other pollutants or hazardous waste removed in the course of pretreatment or control of wastewaters and/or the treatment of intake waters shall be disposed of in accordance with applicable Federal, State and local laws and regulations. Records documenting such disposal shall be made available to PVSC for review upon request.

F. MANAGEMENT RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the authorized representatives of PVSC, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring methods required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall, in writing, notify the succeeding owner or controller of the existence of this permit, and the need to apply for a new permit, a copy of which shall be forwarded to PVSC.

any applicable State Law or regulation under authority preserved by Section 510, of the Federal Water Pollution Control Act. (The Act)

7. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

8. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

Exhibit 3

RECEIVED

TEXTRON

Textron Inc.

40 Westminster Street
Providence, R.I. 02903
401/421-2800

June 21, 1985

N.J. Department of Environmental Protection
Division of Waste Management
Bureau of Industrial Site Evaluation CN 028
Trenton, NJ 08625

Attention: ECRA Initial Notice

Gentlemen:

On June 17, 1985, Textron Inc. ("Textron") entered into a Purchase and Sale Agreement with NL Industries, Inc. ("NL"), relating to the sale by Textron to NL of the assets and business of Textron's Spencer Kellogg Division ("Spencer Kellogg"). Said assets include Spencer Kellogg's six operating facilities, one of which is located in New Jersey (the "Newark Resin Plant").

Therefore, enclosed for filing in accordance with the regulations of the Environmental Cleanup Responsibility Act is Textron's Initial Notice General Information Submission, relating to the Newark Resin Plant. Also enclosed is a copy of the Purchase and Sale Agreement referred to above.

Should you have any questions regarding this Initial Notice or the proposed transaction, please contact the undersigned.

Please acknowledge receipt of the enclosed documents by so noting on the enclosed copy of this letter and returning the copy in the enclosed self-addressed, stamped envelope.

Very truly yours,

Frederick K. Butler

Frederick K. Butler
Group Counsel
& Assistant Secretary

FKB:ens
Enclosures

845030030

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
HAZARDOUS SITE MITIGATION ADMINISTRATION
BUREAU OF INDUSTRIAL SITE EVALUATION

ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT
INITIAL NOTICE
GENERAL INFORMATION SUBMISSION

(This is the first part of a two-part application form. This information must be submitted within 5 days following public release of a decision to close operations or the signing of a sales agreement or option to purchase involving an Industrial Establishment as defined in N.J.S.A. 13:1K-6, the Environmental Cleanup Responsibility Act.)

Please refer to N.J.A.C. 7:1-3.7 et seq. before filling out this form. Answer all questions. Please print or type.

Date June 21, 1985

1. A. Industrial Establishment
Name Spencer Kellogg Division of Textron Inc. Newark Resin Plant Telephone No. (201) 589-3709

Street Address 400 Doremus Avenue

City or Town Newark State NJ Zip Code 07105

Municipality _____ County Essex

B. Lot number 9 and 11 Block number 5070

C. Standard Industrial Classification (SIC) Number 2821

D. Current Owner

Name Textron Inc. Telephone No. (401) 421-2800

Street Address 40 Westminster Street

Municipality Providence State RI Zip Code 02903

E. If the industrial establishment discharges to a publicly-owned treatment plant, provide the name and address of that facility.

Name Passaic Valley Sewerage Commissioners Telephone No. (201) 344-1800

Street Address 600 Wilson Avenue

Municipality Newark State NJ Zip Code 07105

FOR DEP use only
Date Received _____
Notice Number _____

ECRA-1 5/84

845030031

F. Has an ECRA application been filed for this Industrial Establishment or locati previously? No If so, when? _____ For what reason? _____

Final Disposition? _____

G. How is this Industrial Establishment heated?(gas,oil,electricity) gas and oil

2. Previous owner(s) and current address (es)(attach additional sheets if necessary).

Name	Current Address	Description of the Operation
Ashland Oil Company (1968-1978)	P.O. Box 391 Ashland, KY 41160	Manufacture of special chemical products and polyester resins
Archer-Daniels-Midland Co. (1954-1968)	4666 Faries Parkway Box 1470, Decatur, IL 62525	Manufacture of special chemical products and alkyd resins
U.S. Industrial Chemicals Co. (up to 1954)	11500 North Lake Drive Cincinnati, OH 45240	Manufacture of special chemical products and ethyl alcohol

3. If the transaction initiating an ECRA review is the closure of operations, fill in date of public release of the decision to close the facility and enclose a copy of public announcement. Not applicable.

Date of the public release of the decision _____

Is the public release enclosed? _____ Yes _____ No

If you checked "no", state the reason(s) _____

845030032

4. If the transaction initiating an ECRA review is an agreement of sale or option to purchase, fill in the date of the execution of that instrument plus provide a copy of the document June 17, 1985

Name and address of the other parties to the transfer:

Name	Street Address and Municipality	Phone No.
NL Industries, Inc.	1230 Avenue of the Americas New York, NY 10020	(212) 621-9400

Is a copy of the agreement of sale or option to purchase attached? x Yes _____ No

If you checked "no", state the reason(s) _____

5. Actual date proposed for closure of operations or transfer of title July 31, 1985

6. Authorized agent designated to work with the Department.

Name Frederick K. Butler, Group Counsel and Assistant Secretary

Street Address Textron Inc., 40 Westminster Street

Municipality Providence State RI Zip Code 02903

Telephone No. (401) 421-2800 (Ext. 202)

7. List all federal and state environmental permits applied for and received at this facility (attach additional sheets if necessary).

_____ Check here if no permits are involved.

A. New Jersey Bureau of Air Pollution Control. See attached Schedule 7A.

Permit Number	Date of Approval or Denial	Reason for Denial (if applicable)	Expiration Date

B. New Jersey Pollutant Discharge Elimination System None.

Number	Discharge Activity	Date issued or Denied	Expiration Date	Body of Water Discharged into

C. United States Environmental Protection Agency(EPA) Identification Number.

NJD092217892

D. All other federal, state, local environmental permits.

Agency Issuing Permit	Permit Number	Date of Approval or Denial	Expiration Date
Passaic Valley Sewerage Commissioners	-----	5-29-81	5-29-86

845030034

8. If applicable, identify all administrative orders, temporary or permanent injunctions, civil administrative penalties, civil penalties, or criminal actions concerning the environment issued against the facility during the last ten years.

_____ Check here if no enforcement actions are involved

A. Date of Action 10/11/77

Section of Law or Statute violated 33 USC-1321

Type of Enforcement Action Civil penalty

Description of the violation Discharge of oil (less than 5 gallons) into Passaic River by Ashland Oil, Inc.

How was the violation resolved?

Fine of $150 was paid by Ashland Oil, Inc. on October 25, 1977.

B. Date of Action 2/13/79

Section of Law or Statute violated 33 USC-1321

Type of Enforcement Action Civil penalty

Description of the violation Alleged discharge of oil by Ashland Oil, Inc. into Newark Bay.

How was the violation resolved? Dismissed due to insufficient evidence to substantiate a claim.

(Add additional pages, if necessary) See attached Schedule 8.

Send this completed form to:

N.J. Department of Environmental Protection
Division of Waste Management
Bureau of Industrial Site Evaluation
CN 028
Trenton, New Jersey 08625

Attn: ECRA Initial Notice

845030036

Schedule 7A

INITIAL NOTICE - GENERAL INFORMATION SUBMISSION (page 7 of 8)

New Jersey Bureau of Air Pollution Control

Permit Number	Date of Approval or Denial	Reason for Denial	Expiration Date
578	1-28-75	Expired-Not In Use	12-1-83
18080	9-24-76	———	9-23-86
18081	1-27-75	———	9-23-86
18082	1-27-75	———	9-23-86
18083	1-27-75	———	9-23-86
18084	1-27-75	———	9-23-86
18085	1-27-75	———	9-23-86
18086	1-27-75	———	9-23-86
18087	1-27-75	———	9-23-86
18957	3-31-75	———	9-23-86
19050	4-14-75	———	9-23-86
41057	11-29-78	———	11-20-88
40251	8-15-78	———	8-15-88
40194	9-12-79	———	9-10-89
037407	1-21-78	———	4-21-88
037409	1-21-78	———	4-21-88
037410	1-21-78	———	4-21-88
037411	4-21-78	———	4-21-88
037412	4-21-78	———	4-21-88
037413	4-20-78	———	4-21-88
037414	4-21-78	———	4-21-88
037415	4-21-78	———	4-21-88
037416	4-21-78	———	4-21-88
8789	———	Not in use	12/78
065769	8-1-83	———	8-1-88
065770	8-1-83	———	8-1-88
065771	8-1-83	———	8-1-88
065772	8-1-83	———	8-1-88
065773	8-1-83	———	8-1-88
065774	8-1-83	———	8-1-88
067362	1-30-84	———	1-30-89
067363	1-30-84	———	1-30-89
068606	12-9-82	Temporary	8-24-85

Schedule 8

INITIAL NOTICE-GENERAL INFORMATION SUBMISSION (page 8 of 8)

Item 8 (continued)

_____ Check here if no enforcement actions are involved

C. Date of Action 2/25/80

Section of Law or Statute violated FWPCA Sec. 1321(b)(3)

Type of Enforcement Action civil penalty

Description of the violation Discharge of 5 gallons of oil into Newark Bay

How was the violation resolved?

Fine of $50 was paid June 18, 1980.

D. Date of Action 8/27/81

Section of Law or Statute violated N.J. A.C. 7:27-16.6(f)1

Type of Enforcement Action Order for compliance

Description of the violation Failure to submit a plan to achieve compliance for Source Operations relating to Volatile Organic Substances.

How was the violation resolved? Plan submitted as required and approval form, permit and certificate received December 9, 1982.

845030038

Exhibit 4

TEXTRON

Textron Inc.

40 Westminster Street
Providence, RI 02903
401/421-2800

August 23, 1985

BY OVERNIGHT COURIER

RECEIVED
AUG 26 12 29 PM '85
DIVISION OF
WASTE MANAGEMENT
HSMA-BISE

Anthony J. McMahon, Chief
Bureau of Industrial Site Evaluation
Division of Waste Management
428 East State Street
Trenton, New Jersey 08608

Re: **Administrative Consent Order of Textron Inc.**
ECRA Case #85403

Dear Mr. McMahon:

In accordance with paragraph 10(A) of the above-captioned Order, enclosed for filing are an original and two copies of the Site Evaluation Submission section of the Initial Notice for the subject Industrial Establishment, required by N.J.A.C. 7:1-3.7.

Please contact Frederick K. Butler at the above-listed telephone number, if you require any additional information.

Sincerely,

Susannah Hillery Blood
Product Liability Specialist

SHB:dmp
Enclosures

cc: Frederick K. Butler, Esq. - Corporate
Dotz A. Darrah, Esq. - Skadden Arps
G. William Harrison - NL Spencer Kellogg
Joseph H. Highland, Ph.D. - Environ
Janet Smith, Esq. - NL Industries Inc.
Bill Weddendorf - NL Chemicals
(ALL WITH ENCLOSURES)

845030275

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
HAZARDOUS SITE MITIGATION ADMINISTRATION
BUREAU OF INDUSTRIAL SITE EVALUATION

2886
SES
1985
Site Evaluation Submission

ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT (ECRA)

APPLICATION FOR ECRA REVIEW
INITIAL NOTICE

SITE EVALUATION SUBMISSION (SES)

This is the second part of a two-part application submittal and must be submitted within 30 days following public release of the decision to close operations or execution of an agreement of sale or option to purchase.

DATE August 23, 1985

NAME OF INDUSTRIAL ESTABLISHMENT Spencer Kellogg Newark Resin Plant

ADDRESS 400 Doremus Avenue

CITY OR TOWN Newark ZIP CODE 07105

MUNICIPALITY _____ COUNTY Essex

NAME OF PROPERTY OWNER NL Spencer Kellogg Inc., formerly owned by Spencer Kellogg Division of Textron Inc.

FIRM: NL Spencer Kellogg Inc.

DRESS: 1230 Avenue of the Americas

TY OR TOWN: New York ZIP CODE: 10020

MUNICIPALITY _____ COUNTY New York

SUBMIT THE ORIGINAL PLUS TWO COPIES OF THE FOLLOWING:
(NOTE: ITEM FOURTEEN (14) REQUIRES THREE COPIES)

9. A scaled site map identifying all areas where hazardous substances or wastes have been or currently are generated, manufactured, refined, transported, treated, stored, handled or disposed, above or below ground.
IS THIS MAP ENCLOSED? ☒ YES (See Appendix # 1) ☐ NO

10. A detailed description of the most recent operations and processes at the industrial establishment organized in the form of a narrative report designed to guide the Department step-by-step through a plant evaluation, with particular emphasis on areas of the process stream where hazardous substances and wastes are generated, manufactured, refined, transported, treated, stored, handled or disposed on site, above or below ground. Also identify any floor drains with their points of discharge, septic systems if applicable, seepage pits and dry wells. Please note that establishments which ceased production prior to December 31, 1983, but are subject to ECRA because of on-going storage beyond that date, must provide details on past operations.

IS THIS REPORT ENCLOSED? ☒ YES (See Appendix # 2) ☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): _____

FOR DEP USE ONLY

Notice No. _____

845030040

11. A. A description of the types, age (installation date), construction material, capacity, contents, and locations of storage vessels, surface impoundments, landfills, or other types of storage facilities, including drum storage, containing hazardous substances or wastes.

ARE THESE FACILITIES IDENTIFIED ON YOUR SITE MAP OR DESCRIBED IN A NARRATIVE REPORT?
☒ YES (See Appendix # 3) ☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): _____

B. The integrity of all underground tanks which contain hazardous wastes or substances must be verified. This may be accomplished in one of several ways: a) Performance of a satisfactory leak test in conformance with Criterion 329 of the National Fire Protection Association, or; b) Performance of subsurface soil investigation (soil borings and analysis), or; c) Excavate and remove the tank and establish the absence of contamination, or; d) other methods approved by the NJDEP.

ARE THE RESULTS OF THE LEAK DETECTION TEST OR THE SUBSURFACE INVESTIGATION ENCLOSED?
☐ YES (See Appendix # _____) ☒ NO

IF YOU HAVE CHECK "NO", STATE THE REASON(S): Subsurface soil investigation will be conducted according with the sampling plan in order to determine the integrity of all underground tanks.

12. A complete inventory of hazardous substances and wastes, including description and locations of all hazardous substances or wastes generated, manufactured, refined, transported, treated, stored, handled or disposed on site, above and below ground, and a description of the location, types and quantities of hazardous substances and wastes that will remain on site. (Attach additional sheets if necessary.) Review N.J.A.C. 7:1E, Appendix A and N.J.A.C. 7:26-8 prior to completing to ensure that all defined hazardous materials are included.

MATERIAL	QUANTITY	LOCATION	STORAGE METHOD	TO REMAIN ON SITE (Yes or No)
See Appendix 4				

845030041

13. A. A detailed description, date and location on a scaled map of any known spill or discharge of hazardous substances or wastes that occurred during the historical operation of the site and a detailed description of any remedial actions undertaken to handle any spill or discharge of hazardous substances or wastes. (Attach additional sheets if necessary.)

IS THIS INFORMATION ENCLOSED? ☒ YES (See Appendix # 5) ☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): _____

ARE THE SPILLS IDENTIFIED ABOVE INDICATED ON THE SCALED SITE MAP? ☒ YES ☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): _____

13 B. If this facility has an approved Spill Prevention Control and Countermeasure Plan (SPCC), enclose a copy with this submittal.

IS YOUR SPCC PLAN ENCLOSED? ☒ YES (See Appendix # 6*)
☐ NO, this facility is not required to have an SPCC plan

14. A. A detailed sampling or other environmental evaluation measurement plan which includes proposed soil, groundwater, surface water, surface water sediment, and air sampling determined appropriate for the site. (This sampling plan must be developed in conformance with ECRA Regulations N.J.A.C. 7:1-3.14 et seq., and Quality Assurance Guidelines as developed by DEP)

ARE THREE COPIES OF THE SAMPLING PLAN ENCLOSED? ☒ YES (See Appendix # 7)
☐ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): _____

14. B. If the sampling plan includes groundwater sampling and/or the installation of monitoring wells, the applicant must complete a "Request for Hydrogeologic Assessment" form (blank form attached).

IS GROUNDWATER SAMPLING PROPOSED? ☒ YES ☐ NO

IS THE "REQUEST FOR HYDROGEOLOGIC ASSESSMENT" FORM ATTACHED? ☒ YES (See Appendix # 8)
☐ NO

* The plant's Hazardous Waste Contingency Plan is included as Appendix 9.

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): _____

15. A detailed description of the procedures to be used to decontaminate and/or decommission equipment and buildings involved with the generation, manufacture, refining, transportation, treatment, storage, handling, or disposal of hazardous wastes or substances including the name and location of the transporter, the ultimate disposal facility, and any other organizations involved.

IS THE DETAILED DESCRIPTION ENCLOSED? ☐ YES (See Appendix # _____) ☒ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): New owner intends to use the facility in essentially the same manner.

16. Copies of all previous soil, groundwater and surface water sampling results, including effluent quality monitoring, conducted at the site of the industrial establishment during the history of ownership/operation by the owner or operator. Also include a detailed description of the location, collection, chain of custody, methodology, analyses, laboratory, quality assurance/quality control procedures, and other factors involved in preparation of the sampling results.

ARE HISTORICAL RESULTS ENCLOSED? ☐ YES (See Appendix # _____) ☒ NO

IF YOU HAVE CHECKED "NO", STATE THE REASON(S): No previous testing

17. List any other information you are submitting or which has been formally requested by this agency:

Appendix 9 - The facility's Hazardous Waste Contingency Plan.

(See following page)

I hereby certify that this application and any attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true. I am aware that false swearing is a crime in the State of New Jersey. I am cognizant that knowingly providing false information is a violation under ECRA and that "any officer or management official of an industrial establishment who knowingly directs or authorizes the violation of any provisions" of ECRA may be personally liable for penalties of up to $25,000 per day.

TEXTRON INC.

By: John L. Morse

John L. Morse, Vice President
Risk Management Insurance

August 23, 1985
Date

845030044

Appendix 1

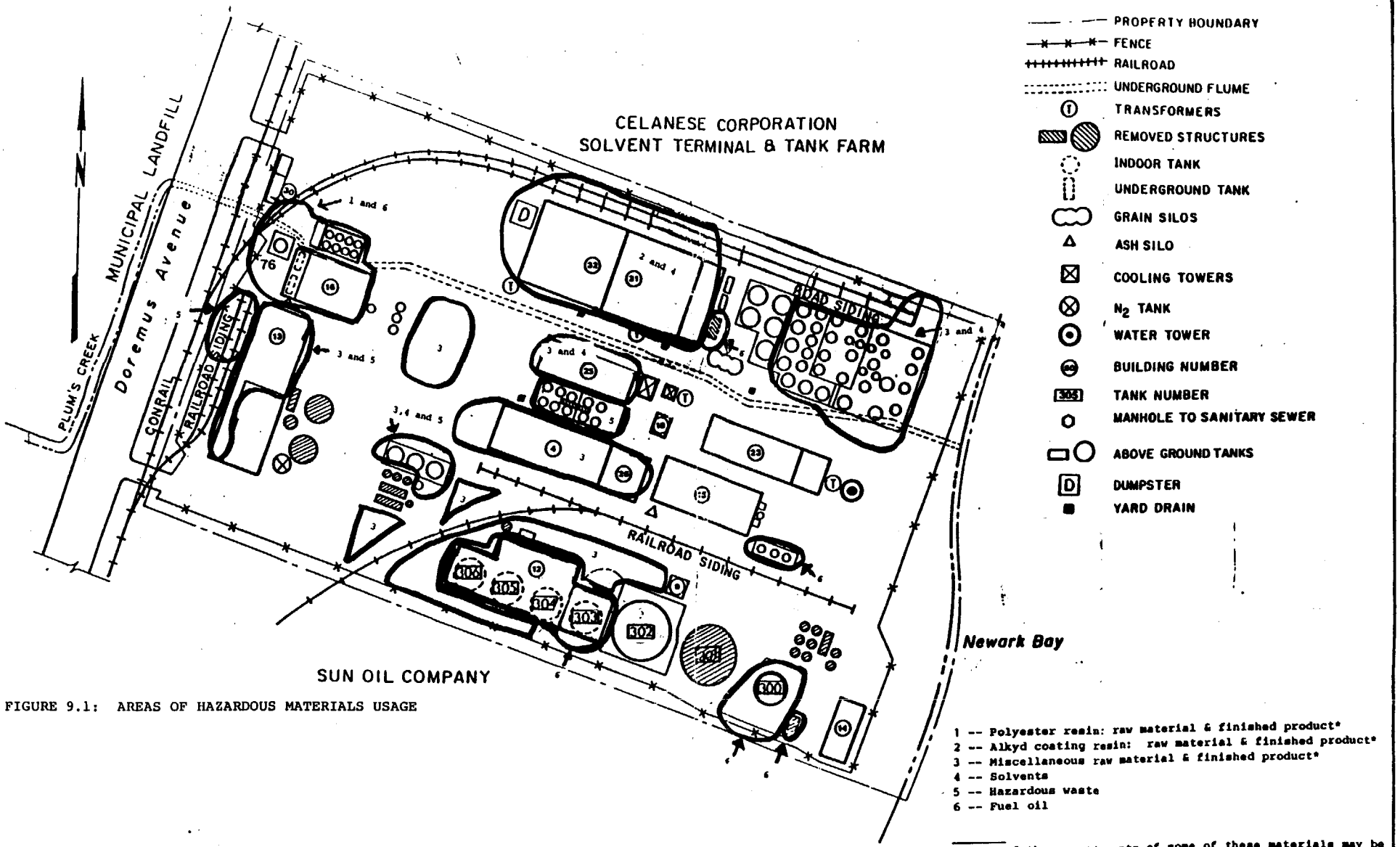


FIGURE 9.1: AREAS OF HAZARDOUS MATERIALS USAGE

SEE DETAIL MAP FOR IDENTIFICATION OF TANKS IN TANK FARM.

1 -- Polyester resin: raw material & finished product*
2 -- Alkyd coating resin: raw material & finished product*
3 -- Miscellaneous raw material & finished product*
4 -- Solvents
5 -- Hazardous waste
6 -- Fuel oil

* Some of the constituents of some of these materials may be considered hazardous.

845030046

Appendix 2

PLANT PROCESS DESCRIPTION ECRA FORM II - #10

The Spencer Kellogg Newark, N.J. Plant is engaged in the manfacture of coating resins used primarily in the paint industry. Raw materials, consisting mainly of vegetable oils, polyols, dibasic acids and anhydrides and various solvents are received in both bulk and packaged quantities. The vegetable oils are received by either rail car or tank truck and are unloaded into storage tanks in the tank farm area east of Bldg. 31. Glycerine (a polyol) and phthalic anhydride are received in tank trucks and unloaded into storage tanks in the same area. Most dibasic acids and some other polyols are received in 50 lb bags by truck and are unloaded at the west end of Bldg. 32 for storage. In addition, trimethylol propane (a polyol) and vinyl toluene (a monomer) are unloaded from either rail cars or tank trucks into storage tanks located between buildings 4 and 25.

Hydrocarbon solvents and alcohols, used as solvents, are received in the plant in both tank truck and 55 gallon drums. Tank trucks are unloaded into storage tanks in the tank farm east of Bldg. 31. Drum quantities are unloaded and stored on pallets in the outside yard area east of Bldg. 25 or on the fifth floor of Bldg. 32.

These bulk raw materials are combined by pumping thru closed piping systems to meters and/or weigh tanks and are then charged to one of the resin reactors located on the fourth floor of Bldg. 31. Bagged raw materials are manually charged to the resin reactor from the 5th floor of Bldg. 31. This raw material charge is reacted at temperatures between 250°F and 600°F to form a resin product. During this reaction period some water of esterification is formed which is separated from solvents and other organics in a receiver tank. The water of esterification is then discharged to the Passaic Valley Sewerage Commission System.

The finished resin products are then partly diluted with various solvents in the resin reactors and transferred to a resin thin tank to which additional quantities of solvents are added in order to adjust products to specifications. These solvents are pumped directly to the thin tank through a solvent meter that determines quantity of solvent added to the thin tank. The thin tanks are located on the three lower floors of Bldg. 31. The products are then filtered using a paper dressed, plate and frame filter press, to drums on the second floor of Bldg. 31 or to stroage tanks located throughout the plant.

During the filtration a quantity of diatomaceous earth is added to the thin tank to aid in the filtration. When filtration is completed, the filter press is blown dry with nitrogen gas and the filter cake and press paper are removed from the press on the third floor of Bldg. 31 and 32. This press cake and paper are transferred to open head drums of hazardous waste. The drums are properly stencilled and closed. They are then transported via elevator and lift truck to the first floor of Bldg. 13 where they are held for disposal until a full truck load quantity is accumulated (approximately once per month). When a full truck load (80 drums) has been collected, the drums are opened, checked for liquids etc., closed, and labelled with hazardous waste labels and flammable solid labels. They are then shipped, properly manifested, to a Chemical Waste Management site at Emelle, Alabama for proper disposal. There are no hazardous wastes disposed of at the Newark site.

The products produced are loaded into drums in a drumming area on the second floor of Bldg. 31 or loaded into tank trucks from storage tanks at various locations throughout the plant. These locations for tank truck loading are (1) west end of Bldg. 4, (2) south side of Bldg. 31, (3) north side of Bldg. 25, and (4) south side of tank farm that is located east of Bldg. 31. On occasion, lines must be washed with solvents and this solvent is collected in drums and recycled back into our process.

Tank truck loading of products requires straining of product through a strainer bag of cotton and/or nylon. These bags are thoroughly drained and disposed of with filter press waste as hazardous waste. Bag drainings are recycled to the process or collected as 1285 premix which is then disposed of as bulk liquid hazardous waste, properly manifested to Solvents Recovery Service in Linden, N.J.

845030049

Appendix 3

TANK FARM INVENTORY

TANK NO.	PRODUCT	CAPACITY	GPI	INSTALLED	MATERIAL RECD. BY	TANK CONSTRUCTION
1	PAMAK 4A	50,000	195	1948	T/C-T/W	347 CLAD SS
2	Superior Linseed Oil	50,000	195	1948	T/C-T/W	347 CLAD SS
3	Unfiltered #1 Castor Oil	50,000	195	1948	T/W	347 CLAD SS
4	#1 FILTERED CASTOR	50,000	195	1948	T/W	CARBON STEEL
5	Unfiltered Extra Pale Castor Oil	50,000	195	1948	T/W	CARBON STEEL
6	Glycerine	20,000	96	1948	T/w	304 SS
7	SUNFLOWER FATTY ACID	13,000	54	1948	T/C-T/W	304 SS
8	O/R SOYBEAN	20,000	96	1948	T/C-T/W	CARBON STEEL
9	FUEL OIL	20,000	96	1948	T/W	CARBON STEEL
10	150 SOLVENT	20,000	96	1948	T/W	CARBON STEEL
11	XYLOL	20,000	96	1948	T/W	CARBON STEEL
12	EXEMPT. M.S.	20,000	96	1948	T/W	CARBON STEEL
13	O/R SOYBEAN	20,000	96	1948	T/W	CARBON STEEL
14	O/R SOYBEAN	20,000	96	1948	T/C-T/W	CARBON STEEL
15	KELLIN T-33	20,000	96	1948	T/C	CARBON STEEL
16	EXEMPT V.M.P.	20,000	96	1948	T/W	CARBON STEEL
17	UNFLT EXTRA PALE C/O	20,000	96	1948	T/W	CARBON STEEL
18	XYLOL	20,000	96	1948	T/W	CARBON STEEL
19	EXEMPT M.S.	20,000	96	1948	T/W	CARBON STEEL
20	RC 3553	20,000	96	1948	PLANT PRODUCT	CARBON STEEL
21	Pamolyn 200	13,000	54	1948	T/C-T/W	304 SS
22	NOT IN USE	13,000	54	1948	T/W	304 SS
23	O.M.S.	13,000	54	1948	T/W	CARBON STEEL
24	TOLUOL	13,000	54	1948	T/W	CARBON STEEL
25	Rec. Methanol	13,000	54	1948	FROM PLANT	CARBON STEEL
26	P5555-MO-45	13,000	54	1948	PLANT PRODUCT	CARBON STEEL
27	1241-M-60HV	13,000	54	1948	PLANT PRODUCT	CARBON STEEL
28	NOT IN USE	13,000	54	1948		CARBON STEEL
29	NOT IN USE	13,000	54	1948		CARBON STEEL
30	Ethyal Benzene	13,000	54	1948	T/W	CARBON STEEL
31	PHTHALIC ANHYDRIDE	29,500	273.54	1978	T/W	304 SS
32	NOT IN USE	13,000	54	1948		CARBON STEEL
33	NOT IN USE	13,000	54	1948		CARBON STEEL
111	BUTYL CELLOSOLVE	15,288	49		T/W	CARBON STEEL
112	Synethol Acids Recovered	14,218	59		PLANT BY-PRODUCT	ALUMINUM
113	SEC BUTYL ALCOHOL	5,900	49	1965	T/W	CARBON STEEL
114	Sec. Butanol	5,900	49	1965	T/W	CARBON STEEL
115	Ethanol	5,900	49	1965	T/W	CARBON STEEL
116	ETHANOL	5,900	49	1965	T/W	CARBON STEEL

REVISED DATA 5/29/85 AED

845030051

TANK INVENTORY-RAW MATERIALS-BETWEEN BLDGS. 4 & 25

NEWARK, NEW JERSEY-RESINS AND PLASTICS DATE _____

TANK NO.	PRODUCT	CAPACITY	GPI	TEMP.	MATERIAL RECD. BY	TANK CONSTRUCTION
127	NOT IN USE	15000	49			316 SS
128	TRIMETHYCOL PROPANE	15000	49		T/C-T/W	316 SS
129	NOT IN USE	15000	49			304 SS
130	NEOPENTYL GLYCOL 30-367	15000	49		T/W	304 SS
131	PROPYLENE GLYCOL 30-016	15000	49		T/W	CARBON STEEL
132	STYRENE 30100	15000	49		T/W	PLASTIC LINED CARBON STEEL
133	VINYL TOLUENE 30104	15000	49		T/C-T/W	PLASTIC LINED CARBON STEEL
134	VINYL TOLUENE 30104	15000	49		T/C-T/W	PLASTIC LINED CARBON STEEL
135	NOT IN USE	15000	49			CARBON STEEL
136	NOT IN USE	15000	49			PLASTIC LINED CARBON STEEL
76	NOT IN USE	20700	96			ALUMINUM
105	NOT IN USE	10283	54			STEEL
106	NOT IN USE	10283	54			STEEL
107	NOT IN USE	10283				STEEL
	No.2 Fuel Oil-NOT IN USE		Underground adjacent to boiler room			UNKNOWN
	No.2 Fuel Oil-NOT IN USE		Located adjacent to building 16			UNKNOWN
	No.2 Fuel Oil-NOT IN USE		Located adjacent to building 16			UNKNOWN
79	NOT IN USE	3000			3rd floor Bldg. 31	STEEL
300	NOT IN USE	259000			Diked area of yard	STEEL
309	NOT IN USE	47000			Diked area of yard	STEEL

0-100 Drums containing hazardous waste stored between tanks 300 and 302.
Several portable tanks containing hazardous waste stored between tanks 300 and 302.

ALL TANKS ARE 10FT DIAM. X 26FT HIGH

INSTALLATION DATE-----1975

845030052

REVISED DATA - 5/29/85 AED

Appendix 4

SPENCER KELLOGG - TEXTRON - NEWARK, NJ

HAZARDOUS MATERIALS STORAGE

MATERIAL	QUANTITY	LOCATION	STORAGE METHOD
Adipic Acid	4330 lbs	Bldg.32-5th Fl.	Bags
Ammonium Hydroxide	16,700 lbs	Bldg.32-1st Fl.	Drums
Benzoic Acid	12,694 lbs	Bldg.32-5th Fl.	Bags
Butyl Acetate	-	Bldg.32-4th Fl.	Drum
Formaloehyde (37%)	1370 lbs	Bldg.31-1st Fl.	Drum
Ethyl Benzene	25,523 lbs	Tank #30	Bulk
Maleic Anhyoride	27,600 lbs	Bldg.32-5th Fl.	Bags
Methyl Methacrylate	670 lbs	Bldg.32-5th Fl.	Drum
Mineral Spirits	60,377 lbs	Tanks #12 & 19	Bulk
Phospheric Acid (85%)	286 lbs	Bldg.31-4th Fl.	Drum
Sodium Hydroxide (Caustic)	~4,000 lbs	Bldg.32-5th Fl.	Drum
Sulfuric Acid	124 lbs	Bldg.31-4th Fl.	Drum
Toluene	34,139 lbs	Tank #24	Bulk
VM & P	86,279 lbs	Tank #16	Bulk
Xylene	63,707 lbs	Tanks #11 & 18	Bulk
Vinyl Toluene	62,584 lbs	Tanks #133 & 134	Bulk
#6 Fuel Oil	70,000 Gallons	Tanks #303 & 320	Bulk
Odorless Mineral Spirits	37,813 lbs	Tank #23	Bulk
Solvent 150	30,080 lbs	Tank #10	Bulk

0-100 Drums containing hazardous waste stored between tanks 300 and 302.

Several portable tanks containing hazardous waste stored between tanks 300 and 302.

All materials to remain on site because the business is being continued by the purchaser.

Appendix 5

Spencer Kellogg

ECRA Case #85403

Appendix 5

Description of Spill or Discharge

During the operation of the facility, the following spills or discharges are known to have occurred. Each area will be assessed during the sampling program either directly or indirectly.

1. On or about August 19, 1976, the sanitary sewer line ruptured. The material in the sewer line apparently drained into the underground flume and was discharged into Newark Bay. Approximately 20,000 pounds of caustic wash had been discharged into the sanitary sewer atounr this time, but the amount of material that actually leaked from the samitary sewer is unknown since the pipes are underground. At the time of the incident, the Coast Guard, USEPA, Passaic Valley Sewage Commission and Ashland Chemicals (through the Emergency Reporting System) were notified. An attempt was also made to notify NJDEP. No citations were issued, and a new sewer pipe was installed and approved by the City of Newark.

2. On June 29, 1977, an estimated 5 gallons or less of Pamak (96% vegetable oil and 4% resin) leaked onto the ground when a Pamak pump developed a leak in the mechanical seal. That night the condensate

845030056

jammed and water overflowed onto the ground. The water flowed through the spilled Pamak carrying it onto Celanese's property and into Newark Bay. The Coast Guard was present when the run-off was discovered. The National Response Center, NJDEP, USEPA, Passaic Valley Sewage Commission and Ashland Chemical were notified immediately. Ashland Chemical was fined $150 for the discharge. In the initial cleanup, an absorbent material was used and in the final cleanup about one foot of dirt was removed and replaced with new fill.

3. On July 12, 1978, about 75 gallons of a resin was spilled when the packing on the pump failed. Approximately 5 to 10 gallons of the resin reached Newark Bay. The resin, comprised mostly of 27 parts of Soya Oil and three parts of modifier, is nontoxic. The Coast Guard, NJDEP and Ashland Chemical were notified immediately. No fine was levied by the Coast Guard. The spill was cleaned up immediately using containment booms and vacuum trucks.

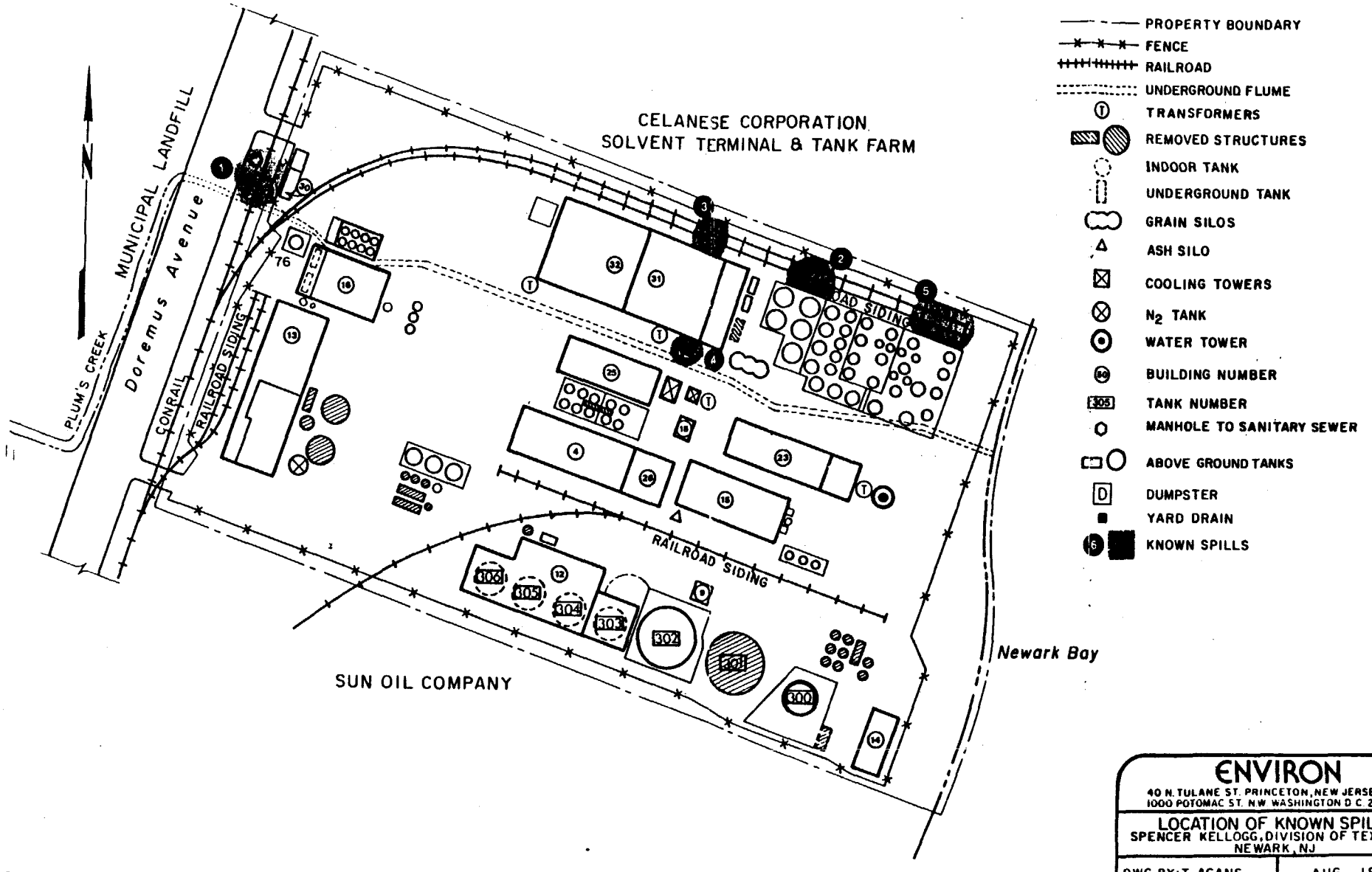
4. On September 10, 1979, an unknown amount of resin spilled from an overflowing tank into the yard where it flowed toward the yard drain. Some of it entered the underground flume and was discharged into Newark Bay. When the facility operators discovered the discharge, they notified the Goast Guard, the Passaic Valley Sewage Commission and Spencer Kellogg. The yard drain was then plugged with rags to prevent

845030057

further entry and the spill in the yard was cleaned up and covered with Speedi Dri. The Coast Guard fined Spencer Kellogg $50 for the discharge. A spill contractor was hired to do further cleanup.

5. Since the mid-1950s when the facility first began to use liquid phthalic anhydride, a few spills have occurred in the unloading area due to leaks in the pump seals and gaskets. In each instance, the phthalic anhydride which rapidly crystalizes at room temperature was broken up with jack hammers and pick-axes and removed. In some instances the area was then covered with gravel or stone.

845030058



SEE DETAIL MAP FOR IDENTIFICATION OF TANKS IN TANK FARM.

ENVIRON
40 N. TULANE ST. PRINCETON, NEW JERSEY 08540
1000 POTOMAC ST. NW WASHINGTON D.C. 20007

LOCATION OF KNOWN SPILLS
SPENCER KELLOGG, DIVISION OF TEXTRON
NEWARK, NJ

DWG. BY: T. AGANS	AUG., 1985
SCALE: 3/8" = 30'	FIG. 13-1

845030059

Appendix 6

Ashland

Ashland Chemical Company

DIVISION OF ASHLAND OIL, INC.

RESINS & PLASTICS DIVISION • 400 DOREMUS AVENUE, NEWARK, NEW JERSEY 07105 • (201) 589-3709

May 27,1977

Department of Environmental Protection
Division of Water Resources
P.O. Box 2809
Trenton, N.J. 08625

Attn: Spill Prevention Personnel

Gentlemen:

The following SPCC plan is being submitted per your request. Per Section 7:1E-4.1 referring to major facilities, the following information was requested. Order of below is as listed in Section 7:1E-4.1.

(1) See attached.
(2) See attached
(3) Approximate storage and transfer capacity is 7,250,000 gallons.
(4) Approximate daily throughput is 430,900 pounds. Based on total pounds shipped and received during period of 5/76 - 4/77 on a 7 day a week 50 week operation.
(5) At present, only equipment is absorbent, shovels, pumps, etc. Investigation contracting of professional clean-up organization. Will advise any developments.
(6) No training required for above equipment.
(7) Not applicable.
(8) See attached.
(9) Ashland will self-insure.

If any further information or clarification is required, please contact me.

Sincerely,

J. F. Brooks
Plant Manager

845030061

SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN

PART I
GENERAL INFORMATION

1. Name of facility Ashland Chemical Company

2. Type of facility Resins & Plastics Production

3. Location of facility 400 Doremus Avenue
   Newark, New Jersey 07105

4. Name and address of owner or operator:

   Name Ashland Oil, Inc.

   Address 1401 Winchester Avenue
   Ashland, KY 41101

5. Designated person accountable for oil spill prevention at facility:

   Name and title Richard Barr, Plant Engineer

6. Facility experienced a reportable oil spill event during the twelve months prior to Jan. 10, 1974 (effective date of 40 CFR, Part 112). (If YES, complete Attachment #1.) No

MANAGEMENT APPROVAL

This SPCC Plan will be implemented as herein described.

Signature John F Brooks

Name John F. Brooks

Title Plant Manager

CERTIFICATION

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR, Part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

Robert J. Quist
Printed Name of Registered Professional Engineer

(Seal) Robert J Quist

Signature of Registered Professional Engineer

Date May 30, 1977

Registration No. 19380 State N.J.

845030062

PART I
GENERAL INFORMATION

7. Potential Spills — Prediction & Control:

Source	Major Type of Failure	Total Quantity (bbls)	Rate (bbls/hr)	Direction of Flow*	Secondary Containment
Area #3	Tank Rupture	357	357	NW	Fully Diked
Bldg. #4	" "	505	505	N or S	Undiked-inside bldg.
Area #7	" "	61,667	1,000	NE	Fully Diked
Bldg. #12	" "	11,380	1,000	NE	Undiked, inside bldg.
Area #15	" "	245	245	E	Undiked
Area #17	" "	493	493	N	Undiked
Area #35	" "	42	42	NE	Undiked
Area #38	" "	245	245	N	Undiked
Area #39	" "	1,119	1,119	E	3 lg tanks diked 3 small (238 BBL) undiked
Area #40	" "	5,952		E	Undiked - tanks empty
Area #42	" "	1,190	1,190	NE	Fully Diked
Area #44	" "	125	125	NE	Fully Diked

Discussion: Majority of products stored in tanks are extremely viscious and will flow quite slowly if accidently spilled. Many raw materials are heated to keep them liquid and will quickly "freeze-up" if spilled. These properties tend to minimize the chance of an accidental spill reaching the river. The spill "rate" listed above is based upon the most likely accident which could cause a spill, namely breakage of the tank unloading line before its block valve. Since the materials stored are viscious as mentioned above, the spill rate is restricted to under 700 GPM.

Attach map if appropriate. See Area Designation Plot Plan, attached.

Name of facility Newark, New Jersey Resins & Plastics Plant

Operator Ashland Chemical Company

PART I
GENERAL INFORMATION

[Response to statements should be: YES, NO, or NA (Not Applicable).]

8. Containment or diversionary structures or equipment to prevent oil from reaching navigable waters are practicable. (If NO, complete Attachment #2.) — Yes

9. Inspections and Records
   A. The required inspections follow written procedures. — No
   B. The written procedures and a record of inspections, signed by the appropriate supervisor or inspector, are attached. — No

   Discussion: All tankage, dikes, and loading/unloading equipment is inspected on a monthly basis. Schduled safety inspections are made monthly which includes spill control equipment. Deficiencies are reported to plant maintenance superintendent and plant manager following each inspection.

10. Personnel, Training, and Spill Prevention Procedures
   A. Personnel are properly instructed in the following:
      (1) operation and maintenance of equipment to prevent oil discharges, and — Yes
      (2) applicable pollution control laws, rules, and regulations. — Yes

   Describe procedures employed for instruction: Written plant operating procedures explain and define how to operate loading and operating equipment. Plant safety meetings plus initial employee training cover these subjects. On the job training by supervisors reinforces these procedures with all operators. During safety meetings environmental laws and regulations are discussed with operators and new rules are passed on to the operators on the job as needed.

   B. Scheduled prevention briefings for the operating personnel are conducted frequently enough to assure adequate understanding of the SPCC Plan. — Yes

   Describe briefing program: During monthly safety meetings, the SPCC is reviewed by all employees so that they are familiar with it. Plant supervisors conduct these meetings and can pass on comments by employees about the plan.

Name of facility: Newark, New Jersey Resins & Plastics Plant

Operator: Ashland Chemical Company

(Prior to completing Part II, Alternate A, refer to regulations and instructions pages 6-7.)

PART II. ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

A. Facility Drainage

1. Drainage from diked storage areas is controlled as follows (include operating description of valves, pumps, ejectors, etc. *(Note: Flapper-type valves should not be used)*:

Dikes normally are not drained. If a spill occurs, portable pumps are usually utilized to drain the dike into a containment vessel. Existing block valves on dike drains are of the gate type and are car-sealed closed. Before operating any dike drain valve, a supervisor must check water quality before an operator can operate valve. After completion of drainage, the valve is again sealed closed in the presence of a supervisor.

2. Drainage from undiked areas is controlled as follows (include description of ponds, lagoons, or catchment basins and methods of retaining and returning oil to facility):

General slope of plant tends to cause drainage to go toward middle of plant. If small spills occur, they normally are trapped in the natural low spots of the plant allowing the operators to clean up the spill. Plant has portable pumps and absorbent readily available on site to assist in any spill clean-up.

3. The procedure for supervising the drainage of rain water from secondary containment into a storm drain or an open watercourse is as follows (include description of (a) inspection for pollutants, and (b) method of valving security). (A record of inspection and drainage events is to be maintained on a form similar to Attachment #3):

If dike must be drained due to accumulated water, a shift supervisor is required to inspect the water and have it analyzed if necessary prior to draining. He then approves the draining by an operator and again checks the area after draining is completed. After the dike is fully drained the valve is car-sealed in the closed position. The foreman logs this work in his foreman's log book.

Name of facility Newark, New Jersey, Resins & Plastics Plant

Operator Ashland Chemical Company

PART II, ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

[Response to statements should be: YES, NO, or N/A (Not Applicable).]

B. Bulk Storage Tanks

1. Describe tank design, materials of construction, fail-safe engineering features, and if needed, corrosion protection:

All tanks are designed based on API and ASME standards, and incorporate corrosion resistant materials.

2. Describe secondary containment design, construction materials, and volume:
Secondary containment design is of concrete reinforced walls around tanks to be protected. Dikes generally are about 3 ft. high by 6" to 12" thick but vary depending on specific tanks protected.

3. Describe tank inspection methods, procedures, and record keeping:

Tanks are visually inspected for leaks or defects on a daily basis. Special inspection with ultrasonic testers are scheduled whenever problems are noted and when tanks are emptied and cleaned.

4. Internal heating coil leakage is controlled by one or more of the following control factors:
   (a) Monitoring the steam return or exhaust lines for oil. No
   Describe monitoring procedure: Coil leaks are frequently detected by noting storage tank contamination with trace amounts of water during regular quality control checks.
   (b) Passing the steam return or exhaust lines through a settling tank, skimmer, or other separation system. No
   (c) Installing external heating systems. Yes
   used on almost all revised and new tankage.

5. Disposal facilities for plant effluents discharged into navigable waters are observed frequently for indication of possible upsets which may cause an oil spill event. N/A
   Describe method and frequency of observations: plant effluent discharges into municipal system.

Name of facility: Newark, New Jersey Resins & Plastics Plant

Operator: Ashland Chemical Company

PART II, ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

[Response to statements should be: YES, NO, or NA (Not Applicable).]

C. Facility Transfer Operations, Pumping, and In-plant Process

1. Corrosion protection for buried pipelines: No underground process lines.
   (a) Pipelines are wrapped and coated to reduce corrosion. N/A
   (b) Cathodic protection is provided for pipelines if determined necessary by electrolytic testing. N/A
   (c) When a pipeline section is exposed, it is examined and corrective action taken as necessary. N/A

2. Pipeline terminal connections are capped or blank-flanged and marked if the pipeline is not in service or on standby service for extended periods. Yes
   Describe criteria for determining when to cap or blank-flange:
   If pipeline is to be left out of service for a long period of time, it is either capped off or blind flanged. Most pipelines are used on a daily basis and are not capped off between uses.

3. Pipe supports are designed to minimize abrasion and corrosion and allow for expansion and contraction. Yes
   Describe pipe support design:
   Pipe supports are designed using normal engineering standards in order to allow for expansion. Corrosion problems are minimized by use of proper construction practices.

4. Describe procedures for regularly examining all above-ground valves and pipelines (including flange joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces):
   Visual inspections are performed daily as part of the tank inventory (gauging) work. Monthly safety inspections are used to supplement this work. Periodic special inspections by company safety engineer are also made.

5. Describe procedures for warning vehicles entering the facility to avoid damaging above-ground piping:
   All pipelines have adequate clearance above trucks or railcars. Trucks must check in a guard gate prior to entering plant. Pipeline which could be damaged are noted with signs and/or barricades.

Name of facility: Newark, New Jersey Resins & Plastics Plant

Operator: Ashland Chemical Company

PART II, ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

[Response to statements should be: YES, NO, or NA (Not Applicable).]

D. Facility Tank Car & Tank Truck Loading/Unloading Rack

Tank car and tank truck loading/unloading occurs at the facility. (If YES, complete 1 through 5 below.) Yes

1. Loading/unloading procedures meet the minimum requirements and regulations of the Department of Transportation. Yes

2. The unloading area has a quick drainage system. No

3. The containment system will hold the maximum capacity of any single compartment of a tank truck loaded/unloaded in the plant. No
   Describe containment system design, construction materials, and volume: No

   No containment system installed at truck or rail loading racks. Most materials loaded are extremely viscious and will not flow more than a few feet if spilled. As a result most spills are simply shoveled up into drums if a spill occurrs. Materials generally are not water soluable.

4. An interlocked warning light, a physical barrier system, or warning signs are provided in loading/unloading areas to prevent vehicular departure before disconnect of transfer lines. Yes
   Describe methods, procedures, and/or equipment used to prevent premature vehicular departure:

   Signs are installed in front of trucks or railcars to prevent accidental movement prior to disconnect. In addition a plant operator is required to be present during the entire loading operation.

5. Drains and outlets on tank trucks and tank cars are checked for leakage before loading/unloading or departure. Yes

Name of facility: Newark, New Jersey Resins & Plastics Plant

Operator: Ashland Chemical Company

PART II. ALTERNATE A
DESIGN AND OPERATING INFORMATION
ONSHORE FACILITY (EXCLUDING PRODUCTION)

[Response to statements should be: YES, NO, or NA (Not Applicable).]

E. Security

1. Plants handling, processing, or storing oil are fenced. Yes

2. Entrance gates are locked and/or guarded when the plant is unattended or not in production. Yes

3. Any valves which permit direct outward flow of a tank's contents are locked closed when in non-operating or standby status. Yes

4. Starter controls on all oil pumps in non-operating or standby status are:
   (a) locked in the off position; No
   (b) located at site accessible only to authorized personnel. Yes

5. Discussion of items 1 through 4 as appropriate:

   Plant has security guards on duty and entire plant is fenced in. Only authorized persons may enter plant so starter controls are protected from accidental use.

6. Discussion of the lighting around the facility:

   All areas of the plant are lighted to permit good night time operation. Plant operates 24 hours/day.

Name of facility Newark, New Jersey Resins & Plastics Plant

Operator Ashland Chemical Company

845030069

HAZARDOUS SUBSTANCES INVENTORY

(as listed in NJAC 7:1E-1.3(j))

MATERIAL	ESTIMATED MAXIMUM INVENTORY (in pounds)
Maleic Anhydride	336,000
Triethylamine	10,000
Diethylamine	5,000
Formaldehyde	3,900
Styrene	350,000
Fumaric Acid	38,000
Vinyl Acetate	2,500
Ammonia 26%	23,250
Lime - Hydrated	2,500
Phosphoric Acid	7,000
Isopropyl Alcohol	13,000
N-Propyl Alcohol	1,000
Toluene	245,000
Ethyl Benzene	160,000
Xylene	300,000
Benzoic Acid	5,000
Sodium Nitrite	100
Methyl Mathacrylate	100,000
PETROLEUM SOLVENTS	
Aromatic Solvent 100	50,000
Mineral Spirits, Odorless	100,000
Aromatic Solvent 150	80,000
Aliphatic Solvent 140	107,000
Mineral Spirits, Rule 66	300,000
VM&P	155,000

FINISHED GOODS INVENTORY	ESTIMATED MAXIMUM INVENTORY (in pounds)
CLASSIFICATION	
Alkyds Resins	8,500,000
Polyester Resins	3,500,000

845030070

SPILL CONTROL PLAN

1. If appropriate, shut all valves immediately to cut off source of flow.

2. If not possible to shut valves, notify supervisor immediately.

3. All personnel on duty will report to supervisor and follow his instructions as to specific duties to be performed.

4. Move oil absorbent material, neutralizing material, and shovels from warehouse to area of spill.

5. Use shovels to move sand and dirt to encircle spill and prevent it flowing thru ditches or into sewers.

6. Use material to absorb or neutralize spill.

7. Once spill is contained, neutralized, and/or absorbed:

   (a) Pick up absorbent

   (b) Put in empty trash cans

   (c) Dispose of immediately

8. Should spill occur in other than normal working hours, the individual finding the spill will follow the emergency reporting procedure posted in the plant. If unable to reach the posted procedure in the plant, then telephone as follows:

   (a) Fire Department

   (b) Police Department

   (c) Ashland Oil, Ashland, Ky.

   (d) District Manager and/or Plant Manager

845030071

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DANIEL J O'HERN COMMISSIONER
P. O. BOX 1390
TRENTON, N.J. 08625
609-292-2885

Ashland Chemical Co.
Resin & Plastics Production
400 Doremus Avenue
Newark, New Jersey 07105

October 24, 1978

Attn: John F. Brooks
Plant Manager

Dear Sirs:

This office has on file a spill prevention plan which you submitted on May 30, 1977 . The plan was prepared in accordance with Title 40, Code of Federal Regulation, Part 112 (effective January 10, 1974) and/or our regulation N.J.A.C. 7:1E-1.1 et seq., effective April 1, 1977.

As you are probably aware, the State regulations were amended on March 30, 1978. The principal change was the addition of a new Subchapter 4 intended to govern the preparation of discharge prevention and discharge clean-up and removal plans by major facilities. This Subchapter took effect on September 1, 1978. The data to be filed under the new Subchapter is substantially different from the previous Subchapter 4 and the Federal regulation. The scope of the new regulations may require that the plans previously submitted be updated, revised or amended, since the State regulations impose certain additional mandates not found in the Federal regulations.

A copy of N.J.A.C. 7:1E-1.1 et seq. is enclosed to assist you in preparing the necessary additions and/or revisions to your plans. Your attention is directed to the filing requirements set forth in Sections 7:1E-4.3, 7:1E-4.5 and 7:1E-4.21. The plans are to be site-specific. A recOpitulation of the statute is not acceptable. The plan must contain a general site plan and a facility drainage plan as required in Section 7:1E-4.5(b).

This office will promptly review your entire submittal upon receipt of your resubmission. If you have any question about the preparation of plans under the new rules we can be reached at 609-292-5560.

Very truly yours,

Tom Leonard
Supervisor Engineering Review and Survey Section
Office of Hazardous Substances Control

E116:G6

cpy to J Menott

100% RECYCLED

845030072

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201 / 589-3709

September 12, 1979

Office of Hazardous Substances Control
Division of Water Resources
P. O. Box 2809
Trenton, New Jersey 08625

Att: Spill Prevention

Dear Sirs:

Attached are copies of proposed Discharge Prevention, Containment or Countermeasure Plan and Discharge Cleanup and Removal Plan as required by your office. The DPCC plan filing requirements can be stated as follows:

Spencer Kellogg - Div. of TEXTRON, Inc.
Newark Resin Plant
390-400 Doremus Avenue
Newark, New Jersey 07105

Approx. Storage Capacity:	1,505,000 Gallons
Approx. Transfer Rate:	60,000 Gallons Per Day
Substances are listed on Plot Plan	
Financial Responsibility:	Insurance

The general description of proposed DPCC plan can be stated as follows:

1. Installation of nominal 18 inch high concrete dike across east end of plant bordering waterways.

2. Extension of existing concrete dike on north side of property for a distance of approximately 280 feet.

3. Installation of concrete dike on south side of property to a point approximately 6 feet east of existing rail access to the plant.

845030073

4. Installation of concrete curbing around yard drain catch basins and steel cover plates fitted to be dropped over basin grating in the event that spill occurs.

   (See Sketch Attached)

5. Catch basin at east end of truck scale will have a steel plate installed to cover grating. Plate to be removed only for draining of storm water from area as necessary.

The proposed DCR plan will include the services of a spill cleanup contractor.

Spill Division
Olsen & Hassold, Inc.
62-64 E. 26th Street
Paterson, New Jersey 07514

Notification of management personnel in the event of discharge would be accomplished via telephone using existing plant personnel telephone listing.

Personnel authorized to hire cleanup contractors and/or release funds for discharge response, containment, cleanup and removal are:

John F. Brooks	Plant Manager	201-381-6706
Arthur Dieffenbach	Sr. Process Engineer	201-469-1509
Richard Barr	Plant Engineer	201-852-5003
Ralph Lizo	Office Manager	212-241-7563

We trust that you will find this plan to be acceptable. If any further information is required please contact me at:

Spencer Kellogg - Div. of TEXTRON, Inc.
400 Doremus Avenue
Newark, New Jersey 07105

201-589-3709

Yours truly,

Arthur E. Dieffenbach

Arthur E. Dieffenbach
Sr. Process Engineer

:ir

att.

845030074

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201/589-3709

October 11, 1979

Office of Hazardous Substances Control
Division of Water Resources
P. O. Box 2809
Trenton, New Jersey 08625

Att: Mr. Scott Mc Cone

Dear Mr. Mc Cone:

Attached is a copy of SPCC plan filed in May, 1977 when this facility was owned by Ashland Chemical Co. In December, 1978, this facility was purchased by Spencer Kellogg Division of TEXTRON, Inc. as indicated by our previously submitted proposed DPCC plan. As I indicated in our phone conversation this morning, the SPCC plan needs to be updated to incorporate various equipment and processing changes that have taken place since May, 1977. This will be done based on your questions and comments on both plans when they are received from you.

If you need any further information regarding either of these plans, please contact me at:

Spencer Kellogg Div. of TEXTRON, Inc
400 Doremus Avenue
Newark, New Jersey 07105

201-589-3709

Sincerely yours,

Arthur E. Dieffenbach
Senior Process Engineer

:ir

att.

845030075

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON 08625

Office of the Commissioner

October 19, 1979

Mr. Arthur E. Dieffenbach
Spencer Kellogg
Div. of Textron, Inc.
400 Doremus Avenue
Newark, New Jersey 07105

Re: Spencer Kellogg
Newark Facility
DPCC Plan

Dear Mr. Dieffenbach:

The DPCC Plan submitted by the above referenced facility to this Office for review was examined for completeness and was found to be deficient in the following areas:

* N.J.A.C. 7:1E-4.3 Information to be Filed with the Division
* N.J.A.C. 7:1E-4.4 Preparation and Submission of Plans
* N.J.A.C. 7:1E-4.7 Facility Drainage and Secondary Containment
* N.J.A.C. 7:1E-4.8 Housekeeping, Maintenance, Inspection and Records
* N.J.A.C. 7:1E-4.9 Detection of Discharges to Ground Water
* N.J.A.C. 7:1E-4.12 Personnel Training
* N.J.A.C. 7:1E-4.14 Petroleum and Hazardous Substances Bulk Storage Tanks
* N.J.A.C. 7:1E-4.15 Tank Car and Tank Truck Loading/Unloading Areas
* N.J.A.C. 7:1E-4.16 Drum Storage Areas for Hazardous Substances

* asterisk denotes applicable section. Refer to the enclosure for specific information.

The actual review of this plan will not be commenced until this Office has received the additional information for each of the applicable sections. The additional information shall be submitted within ninety (90) days of your receipt of this letter, in accordance with N.J.A.C. 7:1E-4.4(b), to: Chief, Office of Hazardous Substances Control, Department of Environmental Protection, Office of the Commissioner, P. O. Box CN029, Trenton, New Jersey 08625.

845030076

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201 / 589-3709

June 25, 1982

Mr. W. Nedick
State of New Jersey
Department of Environmental
Protection
Division of Waste Management
120 Route 156
Yardville, New Jersey 08620

Dear Mr. Nedick:

We wish to respond to your letter of June 15, 1982 regarding our proposed DPCC/DCR plan for our facility as follows:

A. We would propose to institute a schedule of operation for use of our storm drain cover devices as follows:

1. All yard storm drains located in areas where hazardous materials are stored and/or transferred will have a cover device installed in place at all times. Cover devices would be removed to allow for drainage of accumulated storm water and would be reinstalled when storm water drainage is completed.

   There would be one (1) exception to the above and that would be a drain located adjacent to our truck scale. The installation of a device in this area would render our truck scale inoperative. For that particular storm drain we would propose to have a cover device available in the immediate area at all times. In the event that a spill would occur in that area, the cover device would be installed immediately over the storm drain. We would provide proper training and written instructions to our supervisors and other employees as to the procedures for doing this and the urgency that it would require. We hope that you will find this to be a satisfactory schedule of operation for our cover devices.

845030077

B. I am attaching a copy of our letter to Mr. Stoop regarding our proposed plan for compliance of our fuel oil storage tank. This letter was directed to Mr. Stoop as a result of my conversation with you on June 24, 1982.

We hope you will find these proposals acceptable and if you desire any further information please contact me.

Arthur E. Dieffenbach,
Senior Process Engineer

:mf

845030078

DEFICIENCIES NOTED IN DPCC PLAN
SPENCER KELLOGG
NEWARK, N.J.

Enclosure:

7:1E-4.3(a)3	The name and address of the registered agent was not included in the plan.
7:1E-4.4(b)	Information concerning the completion date (month and year) of the proposed diking around the facility was not included in the plan.
7:1E-4.7(b)1	A statement to the permeability of the diked areas around the storage tanks when compared to the estimated time to remove the largest spill inside the dikes was not included in the plan.
7:1E-4.7(c)2	The capacity of the containment areas around the storage tanks and the tank truck loading areas was not addressed in the plan.
7:1E-4.7(c)4	The manner in which discharged hazardous substances will be prevented from entering the Newark Bay via the storm sewer lines was not addressed in the plan. Specific areas include the drainage from the bulk warehouse and the tank truck loading areas.
7:1E-4.7(c)6	The compatibility of materials stored within the same containment areas was not included in the plan.
7:1E-4.7(c)7	The estimated time to remove the largest probable spill from each of the containment areas was not included in the plan.
7:1E-4.8(a)	The types of containers used to store or process hazardous substances was not included in the plan.
7:1E-4.8(f)	The availability of and location of safety equipment used by personnel involved in the clean-up of spills was not included in the plan.
7:1E-4.9	Since spills from storage tanks have occurred in the past, the condition of the ground water should be determined by installing observatic wells as outlined in this section.
7:1E-4.12(b)	Information concerning the designated person with the authority to act was not included in the plan.

845030079

DEFICIENCIES NOTED IN DPCC PLAN
SPENCER KELLOGG
NEWARK, N.J.

Enclosure:
Page 2

7:1E-4.14(a)1	Bulk storage tanks Number 105, 106, 107 and 315 do not appear to be provided with an adequate means of secondary containment.
7:1E-4.14(a)4	The location of valves on the above-ground tanks was not addressed in the plan.
7:1E-4.14(a)5	The schedule for testing the above-ground tanks was not included in the plan.
7:1E-4.14(b)	The presence of buried bulk storage tanks was not included in the plan.
7:1E-4.14(d)	The manner in which the discharge from internal heating coils is designed to prevent a discharge was not included in the plan.
7:1E-4.15(a)	The containment systems present around each of the tank car and tank truck loading areas was not included in the plan.
7:1E-4.15(c)	The presence of or lack of paving or surfacing in the tank car and tank truck loading areas was not included in the plan.
7:1E-4.16	The type of secondary containment around the drum storage area was not included in the plan.

NOTE: As per our telephone conversation, the DPCC Plan should be written following the same format as the regulations.

845030080

If you wish to make any inquiries concerning this DPCC Plan, you may contact Mr. Scott McCone at the above address or at (609) 292-5560.

Very truly yours,

Thomas Leonard
Supervisor of Engineering Review Section
Office of Hazardous Substances Control

TL:SMc:jdm

Enclosure: Deficiencies Noted in DPCC Plan

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201/589-3709

December 11, 1979

Mr. T. Leonard
Office of Hazardous Substance Control
Division of Water Resources
P.O. Box 2809
Trenton, New Jersey 08625

Dear Mr. Leonard:

In response to our phone conversation of November 14, 1979 and Mr. Mc Cone's response to our Spill Control proposal dated October 19, 1979 we offer the following requested information. These items are listed in order of deficiencies noted in our previously submitted plan.

1. 7:1E4.3(a)3

   Registered agent for Spencer Kellogg Div. of TEXTRON Inc. is:

   Corporation Trust Company
   28 W. State Street
   Trenton, New Jersey 08608

2. 7:1E4.4(b)

   Completion of proposed diking would be within one year of approval of plan or September 30, 1980.

3. 7:1E-4.7(b)1

   Dike areas around tanks are constructed of reinforced concrete.

4. 7:1E4.7(c)2

   Containment capacity of diked areas is sufficient to hold volume of largest tank in that area. Containment of tank truck loading areas will be accomplished through diking of plant as indicated in proposed plan.

845030082

5. 7:1E4.7(c)4

Sketch attached to proposed plan for closing off storm drain basins will serve to prevent discharges to Newark bay from all areas including bulk warehouse and tank truck loading areas. Products produced and stored at this location are high viscosity resin solutions that will flow very slowly or "freeze up" if accidently spilled. These properties will minimize possibility of material flowing to storm drains before drain closure can be fixed in place.

6. 7:1E4.7(c)6

Materials stored within same containment areas are compatible and pose no threat in case of spillage at storage or ambient temperatures.

7. 7:1E4.7(c)7

Estimated removal time for spills in containment areas using portable pumping equipment available at the location are:

a. 50M gal. estimated largest spill would be totally contained by diking and estimated removal time would be approximately 6 hours.

b. Spill containment for fuel oil storage area (T-303) would be through plant diking with estimated maximum spill of 360,000 gallons. Estimated cleanup time would be 20 hours.

c. Spill containment in area T-309 would be through diking (existing) maximum spill volume would be 36,000 gallons with estimated cleanup time of 4 hours.

d. Spill containment for bldg. 16 tank farm area would be through existing diking. Maximum spill would be 8500 gallons with cleanup time estimated at 1 to 2 hours.

8. 7:1E4.8(a)

Containers used to store and process hazardous substances are compatible with materials being stored and processed in all areas of the plant.

9. 7:1E4.8(f)

Plant employees who would be involved in spill cleanup have been issued individual safety equipment normally needed for this type of job. This equipment includes boots, gloves, respiratory equipment etc. Additional safety equipment for replacement is available from plant stock.

10. 7:1E4.9

We do not feel that installation of observation wells will result in an environmental gain in the range of economic costs for installing these wells. The Newark Plant is built on what was apparently at one time a dumping site and is located where it is affected by tidal flow of underground waters. In addition plant has strict policy of visual observance when pumping into tanks and daily inspection and measurement of tank levels for inventory purposes. Plant is also patrolled by uniformed guards during nonoperating hours and for 16 hours of each working day. The above makes it likely that any leak occurring will be readily detected by personnel in the plant and immediate action would be taken. This would be in compliance with section 7:1E4.9a.

11. 7:1E4.12(b)

Person designated with authority to act is: John F. Brooks
Plant Manager

12. 7:1E4.14(a)1

Storage tanks 105,106,107 and 315 will be contained by installation of diking around the plant as proposed in this plan.

13. 7:1E4.14(a)4

-All above ground bulk storage tanks in the plant are equipped with valves installed on tanks outlets that will prevent tank contents from escaping outside containment area in the event of pipe rupture.

14. 7:1E4.14(a)5

Tanks are visually inspected for leaks or defects on a daily basis. Special inspection with ultrasonic testers are scheduled whenever problems are noted and when tanks are emptied and cleaned.

15. 7:1E4.14b

Underground storage tanks on premises consist of a fuel oil day tank that is gauged on a daily basis and levels are recorded. In addition a gasoline storage tank is no longer in use and has been emptied and sealed off.

16. 7:1E4.14(d)

Coil leaks are detected by noting storage tank contamination with trace amounts of water during regular quality control checks. Storage tanks are heated with steam pressure and tanks are not pressurized therefore coil leakage will be transferred into tank contents and not into heating system.

845030084

17. 7:1E4.15(a)

No containment system is installed at truck or rail car loading areas. Most materials loaded are extremely viscous and will not flow more than a few feet if spilled. In addition proposed plant diking in this plan will serve to contain spills and prevent spill from entering adjacent water.

18. 7:1E4.15(c)

All tank truck loading areas are paved with asphalt paving. Tank cars are loaded very infrequently and in most cases they are loaded adjacent to bldg. 4 which is in a paved area also.

19. 7:1E4.16

Secondary containment around drum storage areas will be accomplished by plant diking as proposed in this plan.

We hope that this revised proposal will meet with your approval.

Very truly yours,

A. E. Dieffenbach
Senior Process Engineer

aed:ir

845030085

April 5, 1982

Mr. John Brooks
Spencer Kellogg
Division of Textron
400 Doremus Avenue
Newark, NJ 07105

Dear Mr. Brooks:

As was indicated during a March 29, 1982 DHM visit to your facility, enclosed is a photocopy of the October 14, 1980 letter for which no response was received by our office.

Before a final review of your DPCC/DCR Plans on file can be made pursuant to the inspection visit, this required general information shall first be supplied.

In accordance with N.J.A.C. 7:1E-4.4(b), the additional information shall be submitted within thirty (30) days of receipt of this letter.

If there are any questions, feel free to contact me by calling (609) 292-5560.

Sincerely yours,

W. Nedick
Bureau of Prevention and Planning

WN:cb

Enclosure

cc Mr. Diffenbach
Spencer Kellogg

845030086

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

TRENTON 08625

Office of the Commissioner

October 14, 1980

Spenser Kellogg
Textron Inc.
400 Doremus Avenue
Newark, N.J. 07105

Attn: Mr. John Brooks
Plant Manager

Dear Mr. Brooks:

This office is updating the spill prevention files and we request the following information to be on your file:

1. Name and location of the facility;
2. Name(s) of the owner or operator of the facility;
3. Name and address of the owner or operator's registered agent;
4. Storage and transfer capacity of the facility;
5. The types of hazardous substances listed in 7:1E-1.3(j) which are transfered, refined, processed or stored at the facility, excepting small quantities used for research or educational, analytical and other laboratory purposes only (list of Hazardous Substances is included in the enclosures);
6. Average daily throughput of the facility for each hazardous substance requested to paragraph 5.

If you have any question concerning the above please feel free to call the writer at (609) 292-5560.

Very truly yours,

Mohamed Elsnady
Principal Environmental Engineer

Enclosures:

List of Hazardous Substaces (April 28, 1980)
2 Petroleum Product definition (Docket No. DEP 017-80-03)

845030087

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201/589-3709

April 21, 1982

Bureau of Prevention and Planning
Division of Hazard Management
New Jersey Department Enviromental Protection
120 Route 156
Yardville, New Jersey 08620

Dear Mr. Nedick:

In response to your letter of April 5, 1982, we wish to indicate to you that the letter of October 14, 1980 from your department to Spencer Kellogg was never received by us. However, we wish to respond to the letter of October 14, 1980 as follows:

1. Name and Location of Facility
   Spencer Kellogg Div. of Textron Inc.
   Newark Resin Plant
   390-400 Doremus Avenue
   Newark, New Jersey 07105

2. Name of Owner and Operator of Facility
   Spencer Kellogg Div. of Textron Inc.
   P. O. Box 807
   Buffalo, New York 14240

3. Owner's Registered Agent
   Corporation Trust Co.
   28 West State Street
   Trenton, New Jersey 08608

4. Storage and Transfer Capacity of Facility
   Storage - 1,450,000 gallons
   Transfer - 60,000 gallons per day

5 & 6 Hazardous substances stored and transferred and average daily thruput.

845030088

SUBSTANCE	THROUGH PUT
Adipic Acid	580 lb/day
Ammonia (30%)	422 lb/day
Benzoic Acid	205 lb/day
Formaldehyde (37%)	130 lb/day
Maleic Anhydride	1069 lb/day
Methyl Methacrylate	80 lb/day
Phosphoric Acid	5 lb/day
Sodium Hydroxide	672 lb/day
Styrene	980 lb/day
Sulfuric Acid	5 lb/day
Toluol	2456 lb/day
Xylol	11,823 lb/day
Fuel Oil	3775 gallons/day
150 Solvent	881 lb/day
Mineral Spirits	11357 lb/day
High Flash Naptha	2528 lb/day
Odorless Mineral Spirits	2586 lb/day
140 Solvent	684 lb/day
Triethyl Amine	102 lb/day
Vinyl Toluene	634 lb/day
Dicyclo Pentadiene	556 lb/day

All of the above average daily throughput figures were calculated from actual plant usage for first quarter of 1982 except for fuel oil. Fuel oil throughput was calculated from actual usage during calendar year of 1981.

If you require any additional information regarding this matter please call me at 201-589-3709.

Arthur Dieffenbach
Sr. Process Engineer

:mf
cc: J. F. Brooks
M. Smith
M. J. Soderberg

845030089

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
HAZARD MANAGEMENT DIVISION

120 ROUTE 156
(609) 292-5560 (DAILY)

YARDVILLE, N.J. 08620
(609) 292-7172 (24 HOUR HOTLINE)

April 30, 1982

Spencer Kellogg Textron
400 Doremus Avenue
Newark, NJ 07105

ATTENTION: Arthur Dieffenbach

RE: Spencer Kellogg
Newark

Dear Mr. Dieffenbach:

This Division has made a review of the amended Discharge Prevention, Containment and Countermeasure (DPCC) and Discharge Cleanup and Removal (DCR) Plans for the referenced facility. Upon inspection (March 29, 1982) and pursuant to N.J.A.C. 7:1E-1 et seq. "Rules Concerning Discharges of Petroleum and Other Hazardous Substances," the following additional information is required to consider the Plans complete:

1. What is the manner in which discharged hazardous substances will be prevented from entering the bay via storm sewers? If it is proposed to close off particular storm drains, a schedule of implementation should be provided. (4.7)

2. What is the capacity of the diking system for the in-service 460,000 gallon capacity fuel oil tank? If the other fuel oil tank is intended to be put in service, it should be provided with adequate secondary containment and the containment capacity noted also. (4.7)

3. Detection of Discharges to Ground Water

   How accurate is your daily inventory balancing and product gauging methods? Is it temperature corrected? Are records of the program maintained by the owner or operator for a period of three years? And are they available to the Department for inspection during business hours? (4.9)

845030090

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201/589-3709

May 13, 1982

Mr. W. Nedick
Department of Environmental Protection
120 Route 156
Yardville, New Jersey 08620

Dear Mr. Nedick:

We wish to respond to your letter of April 30, 1982 as follows:

1. Prevention of hazardous substance discharge to the bay via storm sewers will be controlled by the dikes currently installed around the storage tanks that contain the hazardous substances listed in my letter of April 21, 1982. Those substances on that list not normally stored in bulk tanks are being stored inside a bldg from which there is no discharge to the storm sewer. In the event that a spill of one of these material should occur in an outside area of the plant, storm drain would be closed off using our portable cover device-which was pointed out to you during your inspection of our facility. This would be done when necessary to prevent any spill from entering the drain and traversing into the bay.

2. Capacity of diking for the 460000 gallon fuel oil storage tank is calculated as 171,000 gallons. We do not plan to utilize the second fuel oil storage tank at this time.

3. Accuracy of daily inventory records is within 1/8 of one inch in product gauging on storage tanks and calculations are temperature corrected. Record for the program are maintained by the owner and can be retained for a period of three years if required. In addition, they would be available for inspection during business hours.

4. Tank car and tank truck unloading and loading areas will be controlled by the dikeage currently in place along the rear of the plant. In addition, material loaded are extremely viscous and will not flow more than a few feet if a spill occurs. In that event, if a spill occurs it is immediately contained and shovelled up into drums. In view of the above we do not feel that additional secondary containment in these areas is necessary.

845030091

4. All tank car and tank truck loading/unloading areas should be provided with a secondary containment system. This system may include any of the following:

   a. Curbing
   b. Trenching System and Catchment Basin
   c. Drainage to a Separator or Approved Waste Water Treatment Facility
   d. Other Means Acceptable to the Department

5. Areas to be Upgraded/Modified e.g. Secondary Containment Circa Drum Storage Areas and Storm Sewers

   Since the DPCC Plan calls for additional procedures, methods not yet fully operational, these items should be listed seperately and a schedule for installation, and operational status shall be provided. Approval of the DPCC Plan may be conditioned on making such items operational on a schedule acceptable to the Division.

6. If storage tanks 105, 106, 107 and 315 are to be taken out of service, a statement "to this effect" should be made in the form of an amendment to the Plan on file, otherwise, they shall be provided adequate secondary containment.

In accordance with N.J.A.C. 7:1E-4.4(b), the additional information shall be submitted within thirty (30) days of receipt of this letter.

If there are any questions regarding this matter, please contact me at (609) 292-5560.

Sincerely yours,

W Nedick

Walt Nedick
Bureau of Prevention and Planning

WN:cb

Spencer Kellogg

ECRA Case #85403

AREAS OF ENVIRONMENTAL CONCERN

Twenty-one areas of environmental concern were identified based on a series of site visits and a review of both past and present site operations. It should be noted that areas of concern do not necessarily indicate known or apparent areas of environmental problems. Rather, they are areas of the site where contaminants are potentially present and thus are appropriate for inclusion in the sampling program. The locations of these areas are shown in Figure 14.3. Each area is listed in Table 14.2 and a rationale provided as to why the area was selected.

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Table 14.2: Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale
1	Area of apparent resin spill onto cracked pavement.
2	Area of likely discharge onto unpaved region from dumpster and compactor which receive waste from buildings 31 and 32.
3	Area of potential spill of finished products (resins) during railroad car loading.
4	Area of likely discharge of vegetable oils and fish oils during railroad car unloading.
5	Area of likely dicharge of phthalic anhydride during railroad car unloading.
6	Underground fuel oil tank.
7	Site of solvent tank truck unloading prior to and subsequent to area being paved.
8	"Underground" fuel oil tanks.[2]
9	Limited area of suspected contamination beneath building on stilts. Raw materials and finished product from polyester resin manufacturing process may have spilled through hole in the floor.
10	Currently raw materials storage area. Before area was paved, it was used for finished product and raw materials storage.
11	Former above ground storage tank located in unpaved area.
12	Building on stilts with apparent evidence of spills beneath.
13	Site of former above ground storage tanks while area was unpaved.

[1] The locations of the Areas of Environmental Concern are depicted in Figure 14.3.

[2] These tanks appear to be mostly above ground level, but are covered with earth.

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Table 14.2: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale
14	Site of former above ground storage tanks while area was unpaved.
15	Site of former drum storage while area was unpaved.
16	Site of former drum storage while area was unpaved.
17	Site of former drum storage while area was unpaved.
18	Site of fuel oil unloading in unpaved area with apparent evidence of spills.
19	Tank previously used for solvent sludge storage. Area within dike unpaved.
20	Location of former underground gasoline tank.
21	Site of former above ground tank farm while area was unpaved.

[1] The locations of the Areas of Environmental Concern are depicted in Figure 14.3.

845030095

Spencer Kellogg

ECRA Case #85403

PROPOSED SAMPLING AND ANALYSIS

Sampling in Areas of Environmental Concern

The following sampling program is proposed in order to determine whether chemical contaminants exist within the twenty-one areas of environmental concern. Proposed sampling locations are delineated on Figure 14.4. The types of samples to be collected are summarized in Table 14.3.

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5. As we pointed out to you during your inspection our level of drum storage has been reduced to a fraction of what it was when our plan was originally proposed. This, together with the fact that products stored in drums are viscous and flow very little if a spill should occur, makes us feel that additional containment facilities in these areas would not be necessary. Spills would be prevented from entering storm drains through the use of our portable cover device previously discussed.

   The exception to this would be the area in the rear of our plant which we refer to as T-301 pad. This area was questioned by Mr. Gagliano during your inspection. We feel that due to the location of the storm drain in this area and the remoteness of the location in the plant we would propose to install a 4 to 6 inch berm across the approach to the yard drain extending 15 feet on each side of the drain. We estimate that this could be installed within 90 days of plan approval.

   In order to facilitate storm drain closure if required we propose to fabricate and install our in house designed cover devices on several drains in strategic areas. Since these covers are portable, they can be moved quickly into other areas in the remote event that they would be required. This proposal could be completed within 60 days of plan approval.

   Our original plan proposed extension of existing plant diking in my letter of September 12, 1979. However, since our business level has changed and our drum storage philosophy has also changed, we feel that this proposal is no longer necessary for spill control purposes. When originally proposed, our drum storage was substantial but since that time we have begun utilizing a public warehouse for storage of our drum products. This has reduced our on site storage to a very small fraction of what it formerly was and consequently reduced the possibility and severity of a spill occurrence. For these reasons we are now withdrawing that proposal from our plan.

6. As we stated during your inspection visit, storage tanks 105, 106, 107 & 315 have been taken out of service. We request that this be made an amendment to our plan.

   If you have any questions regarding these matters please contact me.

Arthur Dieffenbach

Arthur Dieffenbach
Sr. Process Engineer

:mf
cc: J. F. Brooks
M. J. Soderberg
R. Barr
M. Smith

845030097

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT

120 ROUTE 156
(609) 292-8860 (DAILY)

YARDVILLE, N.J. 08620
(609) 292-7172 (24 HOUR HOTLINE)

1982 JUN 21 PM 2:53
R & P NEWARK, N.J.

June 15, 1982

Mr. Arthur Dieffenbach
Sr. Process Engineer
Spencer Kellogg
Division of Textron Inc.
400 Doremus Avenue
Newark, NJ 07105

RE: DPCC/DCR Plans for
Spencer Kellogg
Newark Facility

Dear Mr. Dieffenbach:

This Division has made a review of the information provided in your dated May 13, 1982 letter pursuant to the referenced facility.

A. Item Number One and Five of Your Response

A schedule of operation should be submitted as part of the Plan explaining the procedures when and how the "cover devices" are to be used.

For example, in order to be consistent with the Discharge Prevention Regulations, the "cover devices" should be put in use prior to transfers taking place e.g. before a spill occurs rather than after.

B. Item Number Two of Your Response

7:1E-4.14, aboveground tanks, provide that secondary containment systems shall be capable of effectively holding the entire tank contents. It was indicated that the diking capacity is 171,000

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gallons for the 460,000 gallon fuel oil tank. If it is Spencer Kellogg's intent to store more contents than the secondary containment system will effectively hold, a schedule of compliance should be proposed by the owner or operator of the facility subject to department approval. Therefore, it is requested that plans for compliance be submitted as part of the DPCC Plan.

In accordance with N.J.A.C. 7:1E-4.4(b), the required information shall be submitted within thirty (30) days.

If there are any questions, please contact me by calling (609) 292-9592.

Sincerely,

W. Nedick

W. Nedick
Bureau of Prevention and Planning

WN:cb

845030099

Appendix 7

Spencer Kellogg TEXTRON

Spencer Kellogg
Division of Textron Inc.

400 Doremus Avenue
Newark, NJ 07105
201/589-3709

June 29, 1982

Mr. Furman C. Stoop
State of New Jersey
Department of Environmental Protection
Supervisor of Prevention Planning
Division of Waste Management
120 Route 156
Yardville, New Jersey 08620

Dear Mr. Stoop:

At the suggestion of Mr. W. Nedick, we are submitting a proposal for DPCC plan compliance exemption regarding a #6 Fuel Oil storage tank on our property. This tank has a storage capacity of 460,000 gallons and the calculated dike capacity around this tank totals 171,000 gallons. The tank is enclosed inside a building that consists of a concrete foundation and pad, structural steel framing and corrugated metal siding. The building was constructed about 1931 and the tank installed at about the same time.

The tank is being used as a #6 Fuel Oil storage tank to augment the storage capacity of our day tanks adjacent to our boiler house. We seek to obtain an exemption from compliance with 7:1E - 4.14 based on the following:

1. We would limit our storage of #6 Fuel Oil in this tank to not more than 170,000 gallons at any time. This would be monitored through careful inventory control and be verified by means of a tank level gauge currently installed. We would maintain record of tank levels for your department's review and we propose that these records would consist of tank gauge reading before and after every fuel oil delivery is received. Additional records of fuel oil consumed are currently kept by boiler house personnel on a daily basis and the combination of these records would give us a fuel oil balance check.

2. Our fuel oil useage has declined over the past several years, due mainly to our aggressive energy conservation program. Therefore our need to store large quantities of fuel oil has ended and, more importantly, our company officers have directed that our fuel oil storage be limited to a 3 to 4 week supply to minimize inventory costs. This would limit our allowed fuel oil storage to

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between 40,000 and 120,000 gallons based on our useage and depending upon time of year. Our fuel oil inventory levels in recent months reflects this management decision.

3. The location of the tank and the building is in a low point in the yard based on elevation measurements. This would indicate that the possibility of a fuel oil spill from this tank reaching the adjacent water would be remote and only then if our storage volume would exceed dike capacity. As previously proposed we do not plan to exceed dike capacity.

In review of the above, we sincerely hope that you will grant an exemption as requested above. If you require any further information regarding this matter please contact me.

Arthur E. Dieffenbach,
Sr. Process Engineer

:mf

845030102

Spencer Kellogg
Division of Textron
400 Doremus Avenue
Newark, Essex County, New Jersey

ECRA Case #85403

SITE EVALUATION PLAN

Question # 14 - Areas of Environmental Concern and Sampling Plan

Appendix 7

INTRODUCTION

Purpose and Scope

The proposed sampling program described below was prepared and will be implemented by ENVIRON Corporation. The purpose of the sampling program is to determine soil and groundwater conditions at the Spencer Kellogg, Division of Textron Inc., facility in Newark, New Jersey, in order to comply with the requirements of ECRA.* The proposed sampling program includes: monitor well installation, well development, groundwater sampling and analysis, and soil sampling and analysis. The protocols which will be followed for the drilling and sampling of water and soils have previously been submitted by Dan Raviv Associates, Inc. to the New Jersey Department of Environmental Protection (NJDEP), Bureau of Industrial Site Evaluation.

* As authorized by the July 25, 1985, Textron Inc. Administrative Consent Order under ECRA, this facility has been sold to NL Industries Inc.

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Spencer Kellogg

ECRA Case #85403

Site Description

The Spencer Kellogg facility is located in Newark, Essex County, New Jersey. The site is located in the Piedmont Physiographic Province of New Jersey. The site is underlain by Pleistocene deposits of glacial clay, silt, sand, gravel and boulders which overlie the Triassic Brunswick formation (bedrock). The Spencer Kellogg facility is situated along Newark Bay on what was marshland before it was filled in. Plum's Creek drains a landfill east of the property. The creek enters an underground flume, through which it flows under Doremus Avenue and the Spencer Kellogg facility to a disharge point in Newark Bay. The main features of the site are outlined on Figure 14.1 and 14.2 and described in Table 14.1.

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Table 14.1: Structures on Site

Building Number *	Description
4	Finished Goods Tank House. Formerly Fermenting and Still House.
9	Organic peroxide storage. Formerly molasses pump house.
12	Tank House. Eastern portion of building is the Fuel Oil Tank House. Formerly Bonded Warehouse for alcohol finished product.
13	Northern portion of building is a warehouse. Southern portion is office space.
14	Garage.
15	Boiler House. On the Eastern exterior are the two boilers and the boiler stack.
16	Polyester Resin Manufacturing Building with office and storage space.
18	Electrical Equipment Room.
23	Maintenance Shop. Formerly alkyd resin research laboratory.
25	Building used for drum storage of miscellaneous supplies. Formerly shop.
26	Building used for raw material storage and miscellaneous storage. Formerly Mill Building.
30	Fire Pump and Guard House Building.
31	Alkyd Resin Manufacturing and Dowtherm Building.
32	Alkyd Resin Manufacturing Building. Formerly a warehouse.

* The building numbers are those assigned by the facility. All buildings currently standing on the site are included on the list. These are depicted in Figure 14.1.

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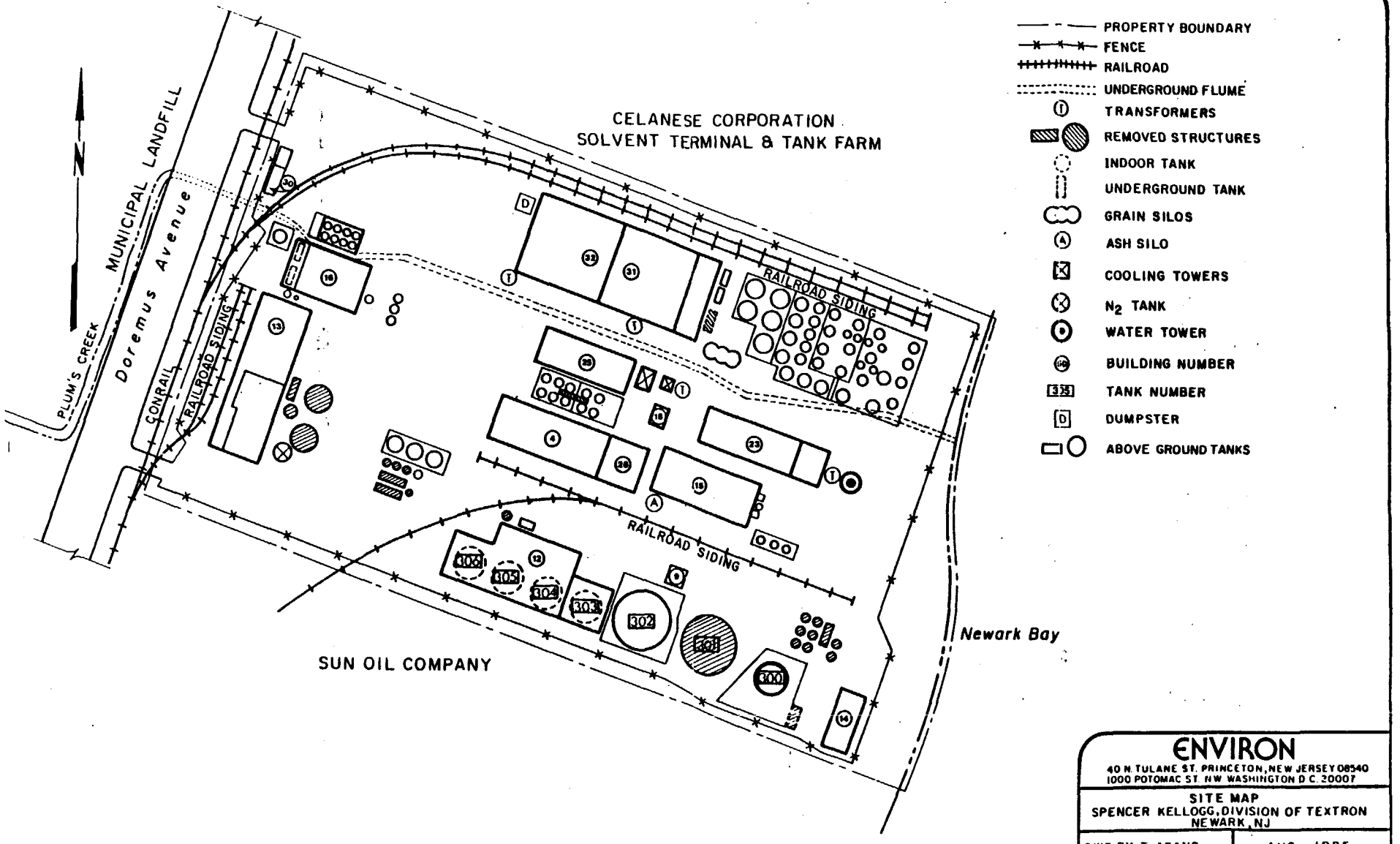

SEE DETAIL MAP FOR IDENTIFICATION OF TANKS IN TANK FARM.

ENVIRON
40 N. TULANE ST. PRINCETON, NEW JERSEY 08540
1000 POTOMAC ST. NW WASHINGTON D.C. 20007

SITE MAP
SPENCER KELLOGG, DIVISION OF TEXTRON
NEWARK, NJ

DWG. BY: T. AGANS	AUG., 1985
SCALE: 3/8" = 30'	FIG. 14-1

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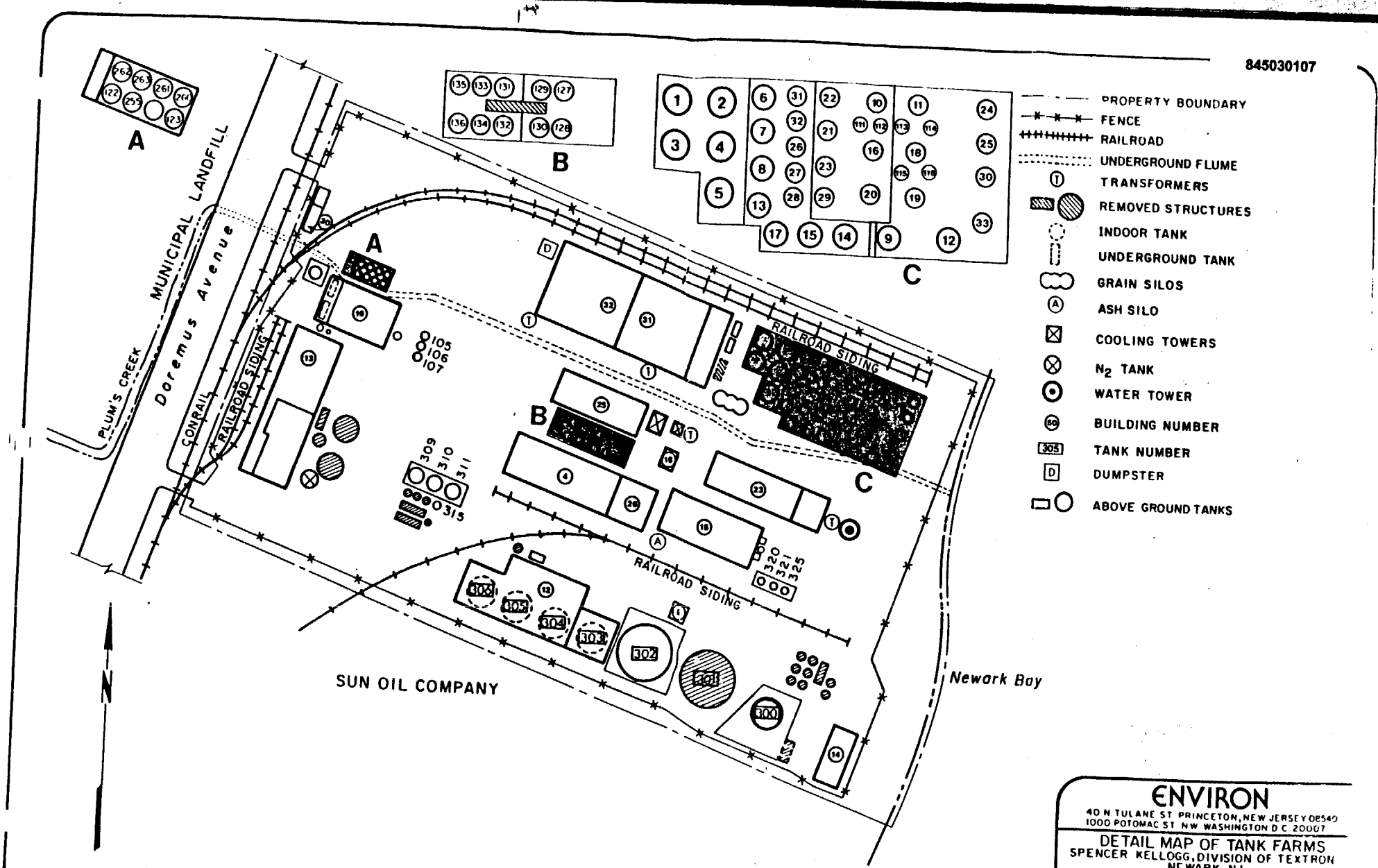
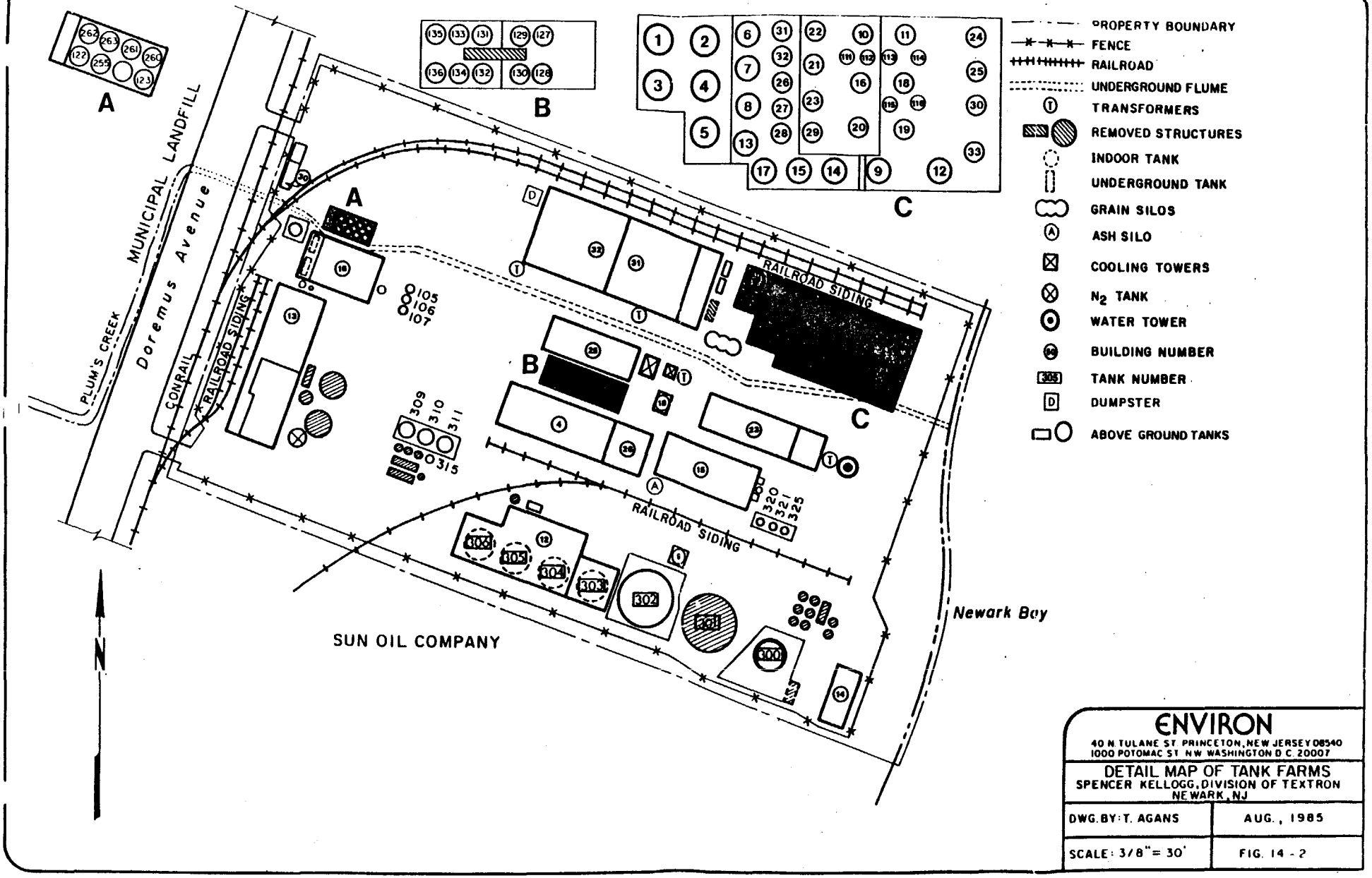
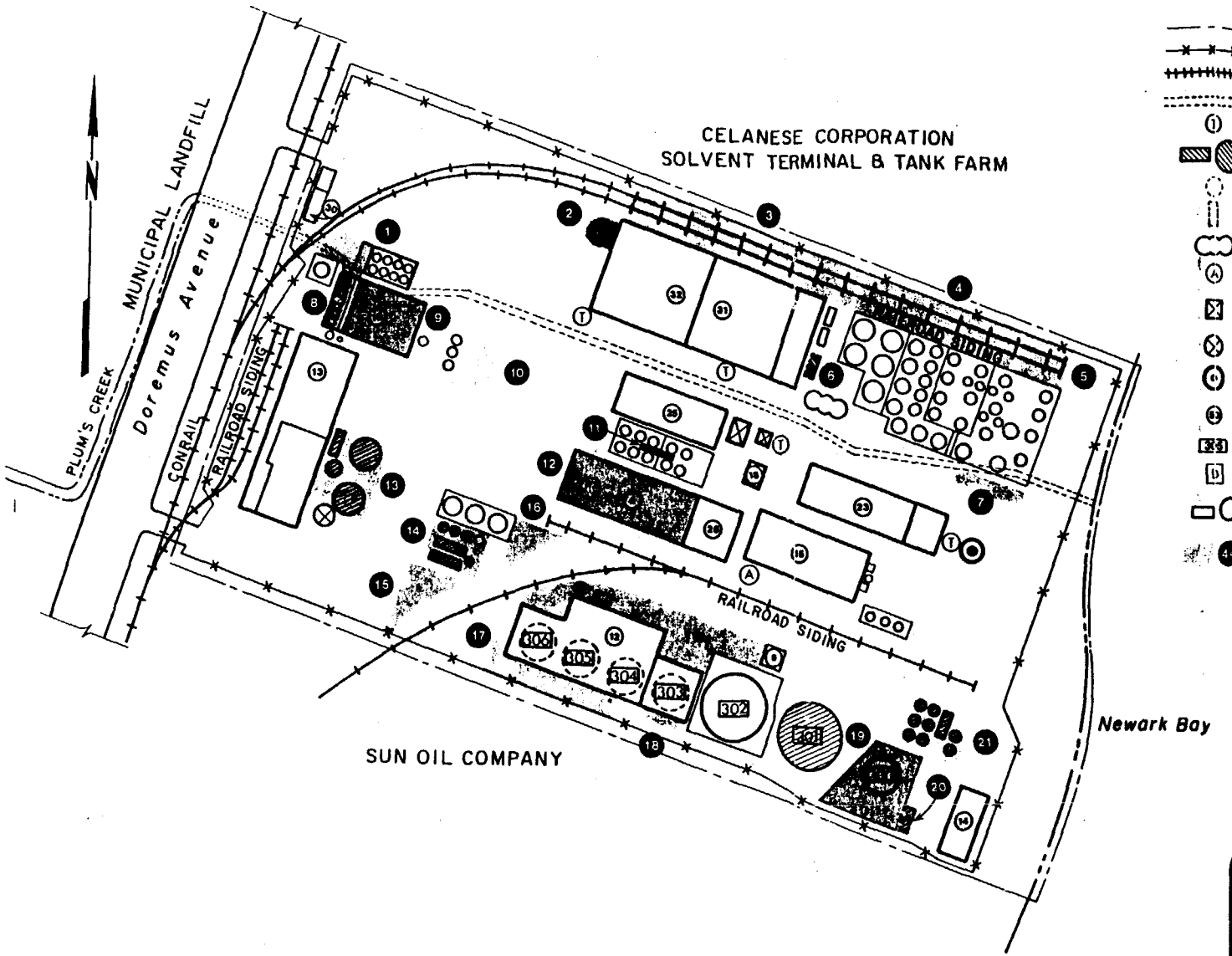


ENVIRON	
40 N TULANE ST PRINCETON, NEW JERSEY 08540 1000 POTOMAC ST NW WASHINGTON D C 20007	
DETAIL MAP OF TANK FARMS SPENCER KELLOGG, DIVISION OF TEXTRON NEWARK, NJ	
DWG. BY: T. AGANS	AUG., 1985
SCALE: 3/8" = 30'	FIG. 14 - 2



ENVIRON	
40 N. TULANE ST. PRINCETON, NEW JERSEY 08540 1000 POTOMAC ST. N.W. WASHINGTON D.C. 20007	
DETAIL MAP OF TANK FARMS SPENCER KELLOGG, DIVISION OF TEXTRON NEWARK, NJ	
DWG. BY: T. AGANS	AUG., 1985
SCALE: 3/8" = 30'	FIG. 14 - 2



SEE DETAIL MAP FOR IDENTIFICATION OF TANKS IN TANK FARM.

ENVIRON
40 N. TULANE ST. PRINCETON, NEW JERSEY 08540
1000 POTOMAC ST. N.W. WASHINGTON D.C. 20007

AREAS OF ENVIRONMENTAL CONCERN
SPENCER KELLOGG, DIVISION OF TEXTRON
NEWARK, NJ

DWG. BY: T. AGANS	AUG., 1985
SCALE: 3/8" = 30'	FIG. 14.3

Table 14.3: Proposed Sampling Locations

A. Areas of Environmental Concern Sampled Directly:

AEC[1]	Locations[2]	Sample Description	Analysis Requested[3]
1	51	Power Auger Boring (Soil [2]/6-18", above water table)	VOCs, Maleic Anhydride, Phthalic Anhydride
2	52	Power Auger Boring (Soil [2]/6-18", above water table)	VOCs, Maleic Anhydride, Phthalic Anhydride
3	53, 54	Power Auger Boring (Soil [2]/6-18", above water table)	VOCs, TPHCs
4	41	Surface Soil Sample	Fingerprint[4]
5	42	Surface Soil Sample	Phthalic Anhydride
6	55,56,57,58[5]	Power Auger Borings (Soil [2]/above water table, 6" below bottom of tank)	TPHCs
7	8	Shallow Well (Soil [2]/6-18", 4-5') (Water/1 sample)	VOCs, Cl
8	59,60,61,62[6]	Power Auger Boring (Soil [1]/6" below bottom of tank)	TPHCs
9	63	Hand Auger Boring (Soil [1]/0-1')	VOCs, Phthalic Anhydride, Maleic Anhydride
10	3	Shallow Well (Soil [2]/6-18", 4-5') (Water/1 sample)	VOCs, TPHCs, Cl
12	64	Hand Auger Boring (Soil [1]/0-1')	VOCs, TPHCs
13	65	Power Auger Boring (Soil [2]/6-18", above water table)	VOCs, TPHCs
14	66	Power Auger Boring (Soil [2]/6-18", above water table)	PP+40, TPHCs

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Table 14.3: Proposed Sampling Locations (continued)

A. Areas of Environmental Concern Sampled Directly: (continued)

AEC[1]	Locations[2]	Sample Description	Analysis Requested[3]
15	67	Power Auger Boring (Soil [2]/6-18", above water table)	VOCs, TPHCs
16	68	Power Auger Boring (Soil [2]/6-18", above water table)	VOCs, TPHCs
17	69,70,71	Power Auger Boring (Soil [2]/6-18", above water table)	VOCs, TPHCs
	72	Power Auger Boring (Soil [2]/6-18", above water table)	VOCs, TPHCs
18	6	Shallow Well (Soil [2]/6-18", above water table) (Water/1 sample)	PP + 40, TPHCs, Cl
20	9	Shallow Well (Soil [2]/6-18", above water table) (Water/1 sample)	VOCs, TPHCs, Cl
21	73	Power Auger Boring (Soil [2]/6-18", above water table)	VOCs, TPHCs

B. Areas of Environmental Concern Sampled Indirectly:

AEC[1]	Locations[2]	Sample Description	Analysis Requested[3]
11	5[7]	Shallow Well (Soil [2]/6-18", above water table) (Water/1 sample)	VOCs, TPHCs, Cl
19	9[8]	Shallow Well (Soil [2]/6-18", above water table) (Water/1 sample)	VOCs, TPHCs, Cl

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Table 14.3: Proposed Sampling Locations (continued)

[1] Area of Environmental Concern.

[2] Sampling locations are depicted in Figure 14.4. The numbering for Shallow Wells begins with 1, for Deep Wells with 21, for Surface Water with 31, for Surface Soil with 41, and for Soil Borings with 51.

[3] TPHCs - Total Petroleum Hydrocarbons
VOCs - Will be determined using a GC/MS scan for volatile organics
PP + 40 - 129 USEPA priority pollutants plus 40 unidentified peaks
Cl - Chloride analysis
Pb - Lead analysis

[4] A GC fingerprint will be developed for the vegetable and fish oils which may have been spilled here. This procedure will be used to determine whether any oils present are the non-hazardous vegetable and fish oils.

[5] Continuous split spoon sampling from the ground surface to total depth will be performed on one of the four borings. The data collected will be used in characterizing site hydrogeologic conditions.

[6] Due to the location of the fuel oil tanks, it is not possible to take samples between the tanks and building 16.

[7] This sample will be taken down-gradient of the location of the former tank since the new tank farm on this location prevents direct sampling of the area. The sampling location is also centrally situated to detect possible groundwater contamination emanating from materials present under Building 4.

[8] This sample will be taken in Area of Environmental Concern 20 but should also detect possible groundwater contamination from Area of Environmental Concern 19.

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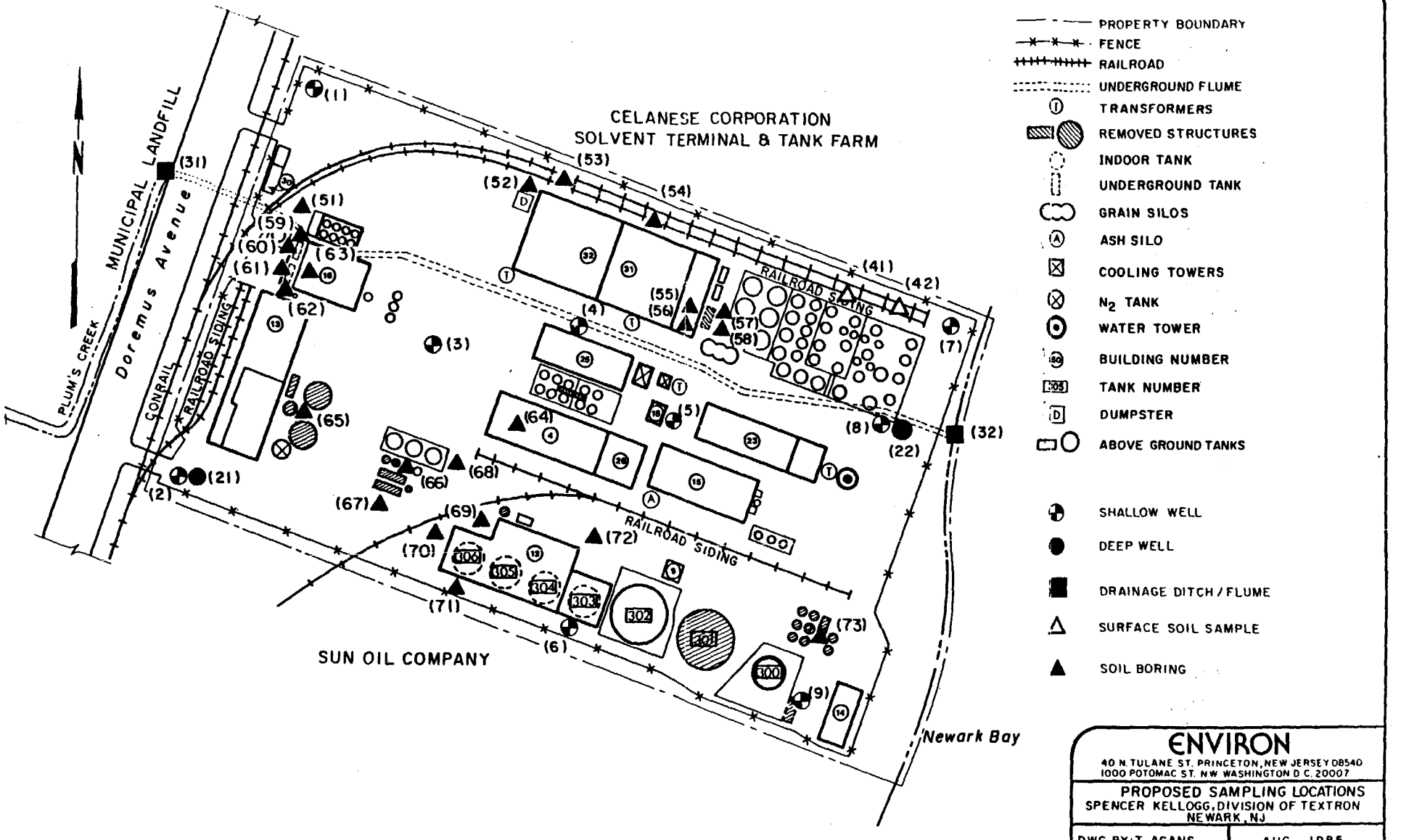

SEE DETAIL MAP FOR IDENTIFICATION OF TANKS IN TANK FARM.

ENVIRON
40 N. TULANE ST. PRINCETON, NEW JERSEY 08540
1000 POTOMAC ST. NW WASHINGTON D.C. 20007

PROPOSED SAMPLING LOCATIONS
SPENCER KELLOGG, DIVISION OF TEXTRON
NEWARK, NJ

DWG. BY: T. AGANS	AUG., 1985
SCALE: 3/8" = 30'	FIG. 14-4

Spencer Kellogg

ECRA Case #85403

Sampling for Characterization of Hydrogeologic Conditions

In addition to the sampling and analysis described in Table 14.3 for the areas of environmental concern, samples from other portions of the facility will be obtained and analyzed. These will provide information necessary to characterize site hydrogeologic conditions. The type and nature of the additional samples to be collected and analyzed are presented in Table 14.4 and are depicted on Figure 14.4.

Split spoon sampling will be used to obtain the lithologic data necessary to characterize the site hydrogeology. Continuous split spoon samples from the ground surface to total depth will be collected from each of the two deep wells and from one of the four deep borings in Area of Environmental Concern #6.

Background water and soil analyses will be performed at the well nest in the SW corner of the site, the shallow well in the NW corner and at the entry of Plum's Creek to the underground flume.

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Table 14.4: Additional Proposed Sampling

Sampling Location[1]	Sample Description	Analysis Requested[2]
1[3]	Shallow Well (Soil [2]/6-18", above water table) (Water/1 sample)	VOCs, TPHCs, Cl
2[3]	Shallow Well (Water/1 sample)	VOCs, TPHCs, Cl
4	Shallow Well (Soil [2]/6-18", above water table) (Water/1 sample)	VOCs, Cl
7	Shallow Well (Soil [2]/6-18", above water table) (Water/1 sample)	VOCs, TPHCs, Cl
21[3,4]	Deep Well (Soil [3]/6-18", above water table, bottom of water table aquifer) (Water/1 sample)	PP + 40, TPHCs, Cl
22[4]	Deep Well (Soil [3]/6-18", above water table, bottom of water table aquifer) (Water/1 sample)	VOCs, Cl
31[3]	Plum's Creek (Water/1 sample)	PP + 40, TPHCs
32	Effluent Outfall of Underground Flume (Water/1 sample)	PP + 40, TPHCs

[1] Sampling locations are depicted in Figure 14.4. The numbering for Shallow Wells begins with 1, for Deep Wells with 21, for Surface Water with 31, for Surface Soil with 41, and for Soil Borings with 51.

[2] TPHCs - Total Petroleum Hydrocarbons
VOCs - Will be determined using a GC/MS scan for volatile organics
PP + 40 - 129 USEPA priority pollutants plus 40 unidentified peaks
Cl - Chloride analysis

[3] Background water and soil samples.

[4] Continuous split spoon sampling from the ground surface to total depth will be performed on each of the deep wells. The data collected will be used in characterizing site hydrogeologic conditions.

845030115

Spencer Kellogg

ECRA Case #85403

SAMPLING AND ANALYTICAL METHODOLOGIES

Well Construction

Well specifications are shown in Figures 14.5 and 14.6. Boreholes will be power augered. If necessary, the deep wells will be drilled with mud rotary. Well construction will include PVC casing and screen. The wells will be air developed with further development, if necessary, by pumping or bailing prior to sampling. All wells will be surveyed and water table/potentiometric data will be obtained.

Nine shallow wells will be installed to assess the water quality of the shallow groundwater. As a result, they must be screened at the water table. It is imperative that there be a good seal between the top of the well screen and the ground surface to avoid contaminating the well from surficial sources. Therefore, a minimum of two feet of bentonite-concrete grout will be installed. It is estimated that the water table lies four to six feet below the ground surface. We propose to install a screen with the top two to three feet above the water table. Preliminary information suggests that there may be a clay-rich layer between the depths of approximately fifteen to thirty feet. Such a clay layer would serve as a confining zone preventing further downward migration of any contaminants which may be present. It is imperative that the well screen not penetrate this layer to avoid any potential contamination of deeper aquifers. Therefore, the bottom of the well screen will not be installed deeper than fifteen feet below the ground surface.

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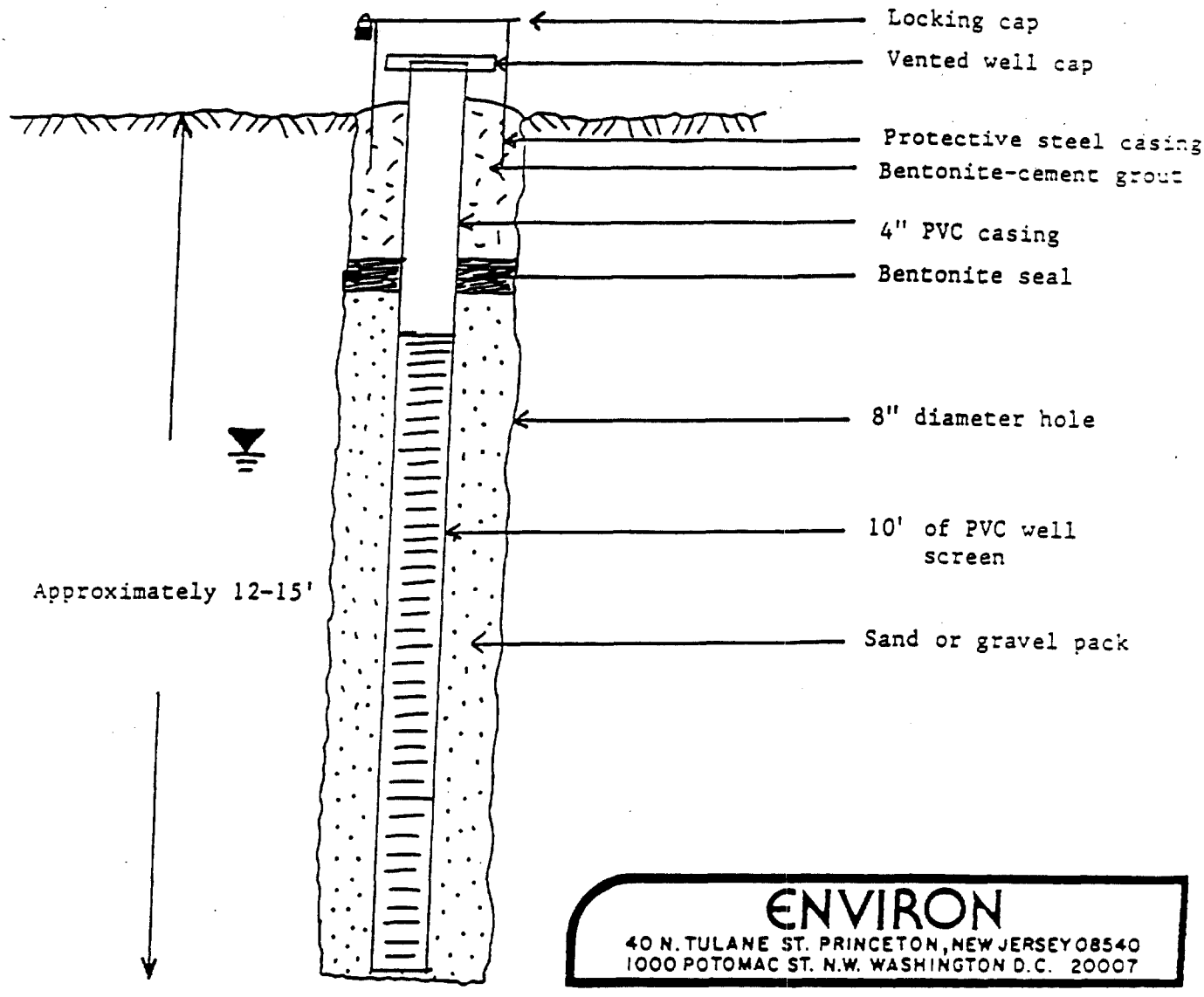

Figure 14.5: Proposed specifications for the shallow monitor wells at the Spencer Kellogg facility in Newark, New Jersey.

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Spencer Kellogg

ECRA Case #85403

Soil Samples

During soil borings and during the construction of monitor wells, soil samples will be collected by continuous split spoon. For quality control, the samples to be analyzed will be taken from the central one foot portion of the split spoon.

Sampling Methodologies

The protocols to be followed for soil and groundwater sampling are those previously submitted by Dan Raviv Associates, Inc. to the NJDEP, Bureau of Industrial Site Evaluation.

Each sample container will be labeled and the method of collection and location recorded in a field log book. The samples will be placed in containers prepared and supplied by the laboratory. Strict chain of custody records and procedures will be followed. All samples for volatile organic analysis will be collected in duplicate. Field blank samples for both water and soil will accompany the field crew during sample collection.

To provide quality control, a selected number of soil and water duplicate samples will be collected and analyzed. Three soil and two water duplicates will be analyzed for the same parameters as the originally designated samples.

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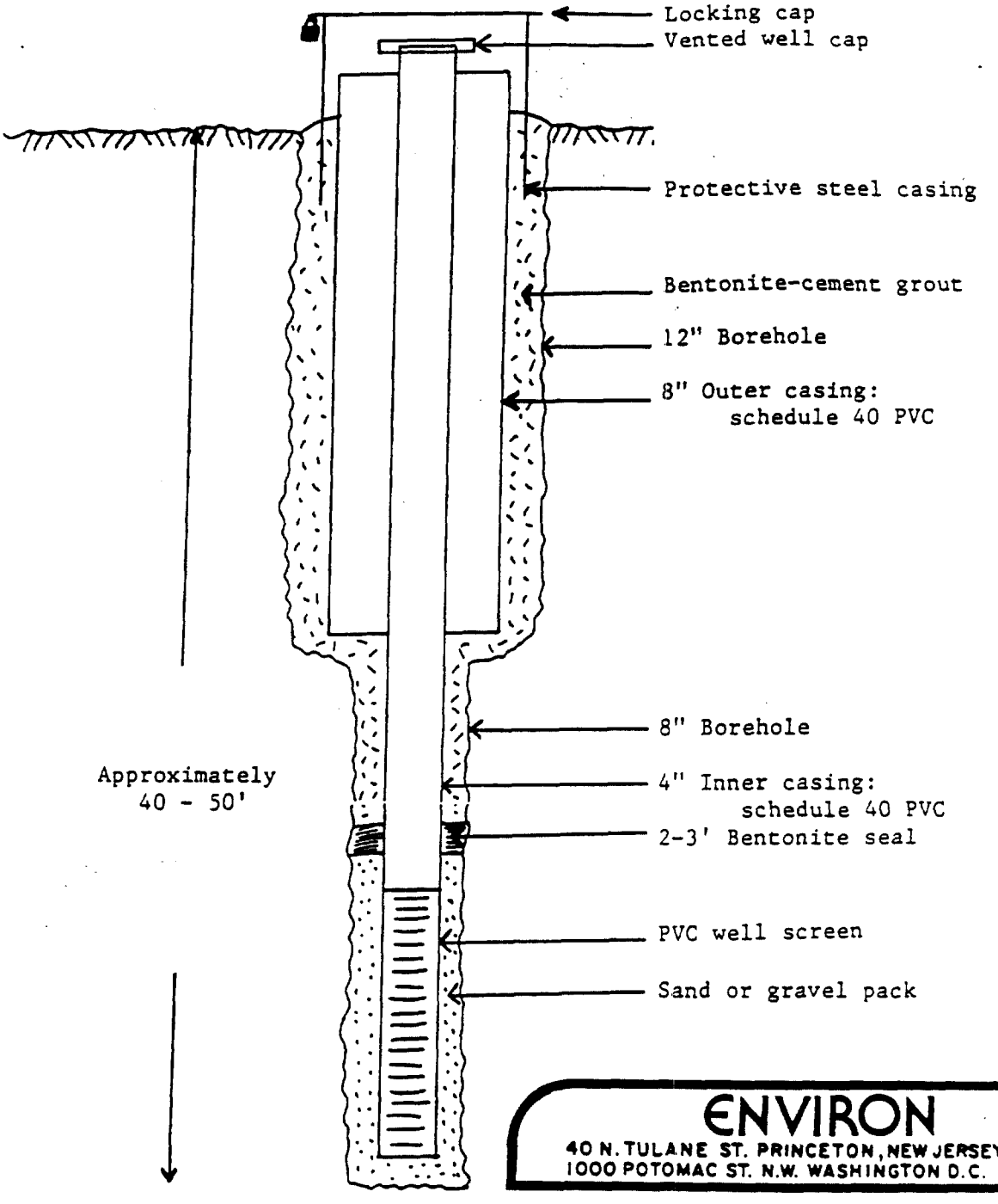

Figure 14.6: Proposed specifications for the deep monitor wells at the Spencer Kellogg facility in Newark, New Jersey.

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Spencer Kellogg

ECRA Case #85403

Laboratory Selection

Gollob Analytical Service of Berkeley Heights, New Jersey, which has performed analyses for other ECRA cases, will analyze all water and soil samples.

Analytical Methodologies

Details on analytical methodologies will be included in the laboratory QC/QA manual.

845030120

Appendix 8

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Appendix = 8

NEW JERSEY GEOLOGICAL SURVEY

REQUEST FOR HYDROGEOLOGIC ASSESSMENT – ECRA PROGRAM

(To be completed whenever groundwater sampling is proposed or required as part of a Sampling Plan)

Preparer ENVIRON Corporation Date August 22, 1985

Name of Industrial Establishment Spencer Kellogg, Division of Textron, Inc.

Address 400 Doremus Avenue

City/Township Newark County Essex

USGS Quadrangle Elizabeth 81 PR and Jersey City 81 PR

Latitude 40 45 ' 08 " Longitude 74 07 ' 30 "

1. Attach a site map or photo copy of the USGS "Quad" with the location of the site circled or outlined in RED and any relevant information (e.g., analyses, well logs, etc.)

2. A. Are wells nearby? ☐ Yes ☒ No

   B. Are wells contaminated? ☐ Yes ☐ No not applicable

   C. Is there an imminent health hazard to your knowledge? ☐ Yes ☒ No

   D. Mark the location of any known wells near the facility, and complete the following if such information is available. (Use back of sheet for additional remarks.)

	WELL OWNER	DISTANCE FROM SITE (ft)	DEPTH	USE*	REMARKS
1.	None				
2.					
3.					
4.					
5.					

* *P = Public Supply F = Irrigation I = Industrial M = Monitoring D = Domestic*

3. Briefly describe the nature of the operation active/inactive at this facility.

The facility currently manufactures coating resins used primarily in the paint industry. The raw materials consist mainly of vegetable oils, polyols, dibasic acids and anhydrides. The finished product is diluted with various solvents. In the past, the plant has been used for production of polyester resins, phenolic resins, bodied vegetable oils and for alcohol fermentation.

4. Check known or suspected sources of ground water or soil contamination:

☐ Drums	☐ Spill(s)	☐ Lagoon(s)
☐ Septic Tank(s)		☐ Seepage Pit(s)
☐ Below-ground Storage		☐ Above-ground Storage
☐ Landfill(s)		☐ Industrial Accident
☐ Discharge(s) onto Ground		☐ Other – *Explain Below*

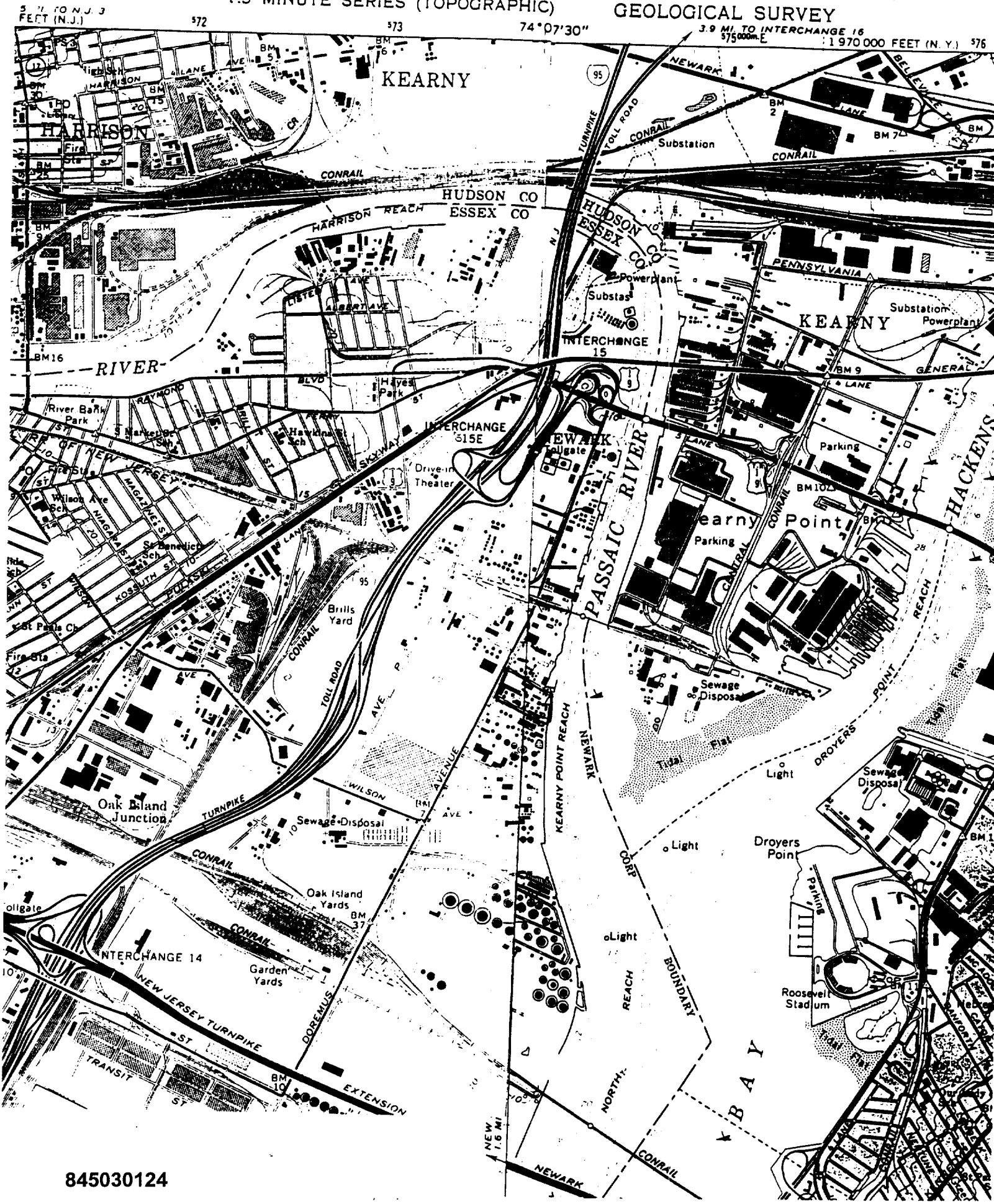
Areas of environmental concern and the rationale for why each area was selected are described in the Sampling Plan. See Number 5 for additional comments.

5. Additional Comments

We have no information to indicate known or suspected groundwater contamination. Based on our understanding of the Bureau of Industrial Site Evaluation guidance for Sampling Plans and on the history of operations at this plant, however, we believe it is appropriate to include groundwater monitoring in the Sampling Plan.

ELIZABETH QUADRANGLE
NEW JERSEY–NEW YORK
7.5 MINUTE SERIES (TOPOGRAPHIC)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



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Appendix 9

CONTINGENCY PLAN

Spencer Kellogg Div. Textron

Newark Plant
400 Doremus Ave.
Newark, N.J. 07105

Revised 4-17-85

845030126

This contingency plan has been prepared pursuant to NJAC 7:26-9.7. It describes the Hazardous Waste Management practices which are designed to minimize threats to human health and the environment during both routine operations and all possible emergencies involving hazardous waste. In addition, this plan includes a list of fire-fighting and rescue equipment, description of alarm systems and the emergency procedures that will be implemented in the event of fire, spills of chemicals or hazardous waste and all other emergencies.

EMERGENCY COORDINATOR

The Primary Emergency Coordinator, or designated alternate, is responsible for coordinating all emergency response measures and is on call 24 hours a day including weekends. Listed below are the names, home addresses and home phone numbers of the Primary Emergency Coordinator, and alternates in descending order to assume responsibility during absenses.

Primary Emergency Coordinator:

Arthur Dieffenbach, Plant Superintendent
890 Sebring Avenue, Bound Brook,N.J. 08805
(201) 469-1509

Alternates:

1. Richard Barr,Plant Engineer
   84 Shore Rd.,Andover,N.J. 07821
   (201) 852-5003
2. John Brooks,Plant Manager
   91 Devon Rd.,Colonia,N.J. 07067
   (201) 381-6706
3. Scott Johnston,Process Engineer
   111 West 7Th Ave.,Apt.8,Roselle,N.J. 07203
   (201) 245-4887

845030127

HAZARDOUS WASTE MANAGEMENT

PERSONNEL TRAINING

Facility Personnel engaged in Hazardous Waste handling receive on the job training given by qualified supervisory personnel. The responsibilities for this traning are assigned to:

A. Scott Johnston - Process Engineer

B. Richard D. Barr - Plant Engineer

The job descriptions for each of these positions and the qualifications of persons necessary to fill these positions can be stated as follows:

A. PROCESS ENGINEER: Conduct of enviromental affairs including monitoring of problem areas. Familiar with enviromental regulations of USEPA NJDEP and other regulatory bodies. Coordinates engineering activities in enviromental areas. Filing necessary enviromental and other regulatory agency reports, development and implementation of necessary control procedures. Liasion with company enviromental affairs and other interested departments. Responsible for locating a properly licensed hauler and a properly licensed disposal site and to keep the necessary papers for the manifest system.

QUALIFICATIONS: Familiar with USEPA and NJDEP regulations especially RCRA. Education and experience requirements BS in Chemical Engineering with 5 to 10 years experience in chemical processing plant in such areas as process engineering, plant engineering, manufacturing supervision and project engineering. Registered Professional Engineer in New Jersey.

B. PLANT ENGINEER: In charge of all engineering related to the installation and the maintaining of all plant equipment to insure its efficient and continued operation. Direct all programs related to safety, security and fire protection. Direct the powerhouse for steam generation and head up all efforts relating to energy conservation.

QUALIFICATIONS: Familiar with USEPA and NJDEP regulations regarding the handling of hazardous waste. Minimum of 5-10 years experience in the chemical industry. The person should have 2 to 3 years experience in the handling of hazardous waste as far as proper storage, hauling and disposal. Familiarity with all aspects of the paper work for hazardous waste.

845030128

JOB DESCRIPTIONS - WASTE HANDLING

Press Person- The job duties of a press person include but are not limited to making hookups for filtrations and tending to operation of pressroom. Cleaning and redressing - filter presses when filtrations are completed. Removes waste press paper and filter cake to proper containers for disposal and properly marks containers as instructed.

Press Person Helper- The job duties of a press person helper include but are not limited to assisting the press person in fullfillment of all of his duties.

Warehouse Person- Lift Truck- The job duties of a warehouseperson lift truck operator include but are not limited to preparing press waste for shipment by applying proper shipping labels, movement of material to staging area and loading into properly permitted trucks for transportation to disposal site.

Hazardous Waste Training

Conducted by Scott Johnston and responsible supervisors.

All training of plant personnel in handling of hazardous wastes consist of on the job training covering the following:

1. Protective equipment required when handling wastes.
2. Procedures for separation of wastes.
3. Proper labelling requirements of DOT, NJDEP, and disposal site.
4. Packaging requirements for drum waste quantities.

Above training to be supplied to new employees assigned to waste handling and reviewed on a periodic basis with current employees involved in waste handling.

HAZARDOUS WASTE DESCRIPTION AND ANALYSIS:

Hazardous Waste is generated from filtration of resin products. The waste is mainly solid, and the lesser amount of liquid waste is separated and disposed of separately.

Solid Hazardous Waste:

Diatomaceous Earth	30-50%
Filter Paper	30-50%
Waste Resin	10-20%
Organic Solvents	0-10%

Liquid Hazardous Waste:

Organic Solvents	10-60%
Waste Resin	40-90%

Health Hazards of Waste:

Dermatitis from excessive skin contact due to employee handling material improperly. Burns that would occur if waste should accidently be ignited.

Physical Hazards of Waste:

The waste is flammable.

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HAZARDOUS WASTE MANAGEMENT PRACTICES:

1. Security of the areas are maintained by complete fencing of entire plant tract. In addition the plant utilizes contract security guard service on a seven day week basis. This security guard makes periodic rounds of plant areas and is backed up by ADT service to ensure that this security patrol is maintained. Plant Engineer checks Detex clock rounds made by security guards on a daily basis.

2. Facility personnel are currently trained in handling and labelling of hazardous wastes in accordance with current requirements. Periodic updating of training is documented and records kept of this retraining as required.

3. Storage areas for hazardous wastes are in areas that will not create significant hazards. Plant fire brigades have been thoroughly trained and training updates are held on a quarterly basis. Ignitable hazardous wastes are stored in closed containers only thereby minimizing possibility of ignition.

4. Plant property is in service area of paid Newark City Fire Department which has an excellent reputation. In addition, the plant fire brigade is active and has been trained to coordinate fire protection with the City fire dept.

5. The Discharge Clean-up and Removal (DCR) Plan (attached) describes measures that would be taken in the event of an accidental release of hazardous waste.

6. Daily inspections are made of 55 gallon drums and other portable containers containing hazardous waste. If a release of hazardous waste is detected (either a Sudden or Non-Sudden release), then the following actions are taken:

   A. Implementation of the DCR plan including immediate measures to contain and clean-up the spilled material.

   B. The Plant Superintendent is notified and an immediate determination is made of which container (s) is leaking hazardous waste. The material is then transferred from the leaking containers to secure containers.

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DISCHARGE CLEAN UP AND REMOVAL PLAN

1. If appropriate, shut all valves immediately to cut off source of flow.

2. If not possible to shut valves, notify supervisor immediately.

3. All personnel on duty will report to supervisor and follow his instructions as to specific duties to be performed.

4. Move oil absorbent material, neutralizing material, and shovels from warehouse to area of spill.

5. Use shovels to move sand and dirt to encircle spill and prevent it flowing thru ditches or into sewers.

6. Use material to absorb or neutralize spill.

7. Once spill is contained, neutralized, and/or absorbed:

    (a) Pick up absorbent

    (b) Put in empty open head, 55 gallon drums

    (c) Contact Process Engineer for proper disposal

8. Should spill occur in other than normal working hours, the individual finding the spill will follow the emergency reporting procedure posted in the plant. If unable to reach the posted procedure in the plant, then telephone as follows:

    (a) Fire Department

    (b) Police Department

    (c) Primary Emergency Coordinator (Plant Supt.) or alternate .

845030132

PLANT EMERGENCY PROCEDURE

In the event of a major fire or other situation that requires evacuation of the plant for the protection of all employees, the following shutdown procedures will be followed as long as safely possible:

1. Operators when notified of need to evacuate the plant will do the following.

   A. Shut heat off reactor and apply full cooling water.

   B. Apply 30 CFM inert gas blanket or sparge depending upon status of reactor. i.e. If reactor is under heavy inert gas sparge simply reduce sparge to 30 CFM. If reactor is under reflux apply 30 CFM inert gas blanket if this can be done without endangering the operator.

   C. If reactor is under pressure, do not attempt to vent pressure or apply inert gas blanket. Put reactor cooling on and shut off reflux return pump (s) if safe access to pump switch is possible.

   D. Evacuate building, DO NOT TAKE ELEVATOR! Leave by stairwell in either bldg. 31 or 32.

   E. Evacuation staging area will be in area of gate 400 yard. All employees are to report there for verification that evacuation is complete.

2. Pressman and warehousemen will prepare for evacuation as follows when notified.

   A. Shut off all pumps and close valves in pressroom and elsewhere if this can be done safely without endangering employee. Evacuate by stairs DO NOT TAKE ELEVATOR.

   B. Warehousemen charging reactors will leave the area immediately DO NOT TAKE ELEVATOR.

   C. Warehousemen filling drums or loading tankwagons will close loading/filling valves and evacuate by stairs. DO NOT TAKE ELEVATOR.

   D. Tankwagon unloading will stop immediately and truck or other pumps shutdown. Valves will be closed where safely possible and plant personnel and truck drivers will evacuate to staging area at 400 yard gate.

845030133

3. Fire brigade members are requested to report to area of fire for assignment to help contain and control the fire.

4. Shift foremen will close air valves on all storage tanks in bldg. 31 & 32 using air switch in control room.

5. Shift foremen will alert all personnel of need to evacuate and when safely possible check to see that cooling is on all reactors.

6. Shift foremen will report with his fore brigade members to designated area for fire fighting instructions.

7. Shift foreman will designate one person and a backup person on his shift who will be responsible for:

   A. Make necessary calls for assistance when necessary. This means fire department, ambulance and/or police when these units are not called by phone operator on day shift or other persons.

   B. Make necessary calls to plant management personnel when these people are not on premises.

      1. A. Dieffenbach (Primary Emergency coordinator)

      2. J. Brooks

      3. R. Barr

      4. S. Johnston

   C. Direction of emergency units into plant and to area of problem. This is done by stationing at 400 & 390 yard gate to meet emergency units on arrival.

   D. Conduct head count of employees at staging area and notifying plant supervision of any one missing.

8. Maintenance personnel who are members of plant fire brigade will evacuate plant and report to staging area at 400 yard gate. Men who had been working inside buildings must NOT take elevators when evacuating buildings. ALWAYS USE STAIRS.

10. Office personnel will evacuate plant immediately in same manner as in fire drill instructions.

11. Office Manager or his designated backup will be responsible for head count of all office personnel at staging area. In addition he will be responsible for setup of switchboard on night connections when this can be safely accomplished.

12. Plant supervision will designate one employee at the staging area who will be responsible for keeping gate entrances clear for emergency vehicle access and entry. He will also be responsible for control of outsiders and refuse them plant entry unless they are members of emergency units and show proper identification.

13. Plant powerhouse personnel will remain on duty when safely possible but when necessary will shut down equipment in a safe manner when able to do so without endangering themselves or others.

14. Representatives of government agencies (OSHA, DEP, COST GUARD, ETC.) will be allowed on plant premises but media personnel (newspapers, television, etc.) will not be allowed on plant premises without consent of plant manager or person designated by him. These people must be accompanied by a member of plant supervision if they are allowed on the premises.

15. It is important to remember that the safety of plant personnel is of utmost importance. Any part of this emergency procedure that cannot be followed in a safe manner should be disregarded.

845030135

FIRE REPORTING INSTRUCTIONS

Any fire in the Plant of such a nature or size that it cannot be put out Quickly with a fire extinguisher should be reported as follows:

A. DAY SHIFT (8:30 a.m. to 4:30 p.m. except SAT.,SUN., AND HOLIDAYS)

1. person who discovers the fire shall IMMEDIATELY notify persons in area of danger.
2. Notify telephone operator from nearest phone by dialing "O" (operator) and tell operator location of fire.
3. Operator will then notify powerhouse and inform engineer of location of fire.
4. Engineer will then blow fire whistle in accordance with code to alert fire brigades as to location of fire.
5. Operator will then notify Newark Fire Department then set up night connections and leave the building.
6. If person discovers the fire is near the powerhouse,he should notify the engineer directly and then inform telephone operator who will call the Newark Fire Department.
7. ADT fire boxes may be pulled, but telephone operator must be notified so that she can call the powerhouse to alert the fire brigade and evacuate the Plant.
8. Plant will be evacuated according to Plant evacuation procedure. People will report to the 400 gate (Sun Oil side) on Doremus Ave. for a head count.

845030136

FIRE WHISTLE CODE

STATION	LOCATION	BLASTS
1	BLDG. 16 - 390 YARD	1 LONG 1 SHORT
2	BLDG. 13 - 400 YARD	1 LONG 2 SHORT
3	BLDG. 4 & 12	1 LONG 3 SHORT
4	BLDG. 31 & 32	1 LONG 4 SHORT
5	TANK.FARM BY RIVER	1 LONG 5 SHORT
6	GARAGE AREA	1 LONG 6 SHORT

ALARM TO BE REPEATED THREE (3) TIMES

DAY FIRE BRIGADE

ADMINISTRATOR	R. BARR
FIRE CHIEF	R. ALLEN
NOZZLE	JOHN MC GRATH
HOSE	A. REICH, G. ALBRETSEN
HYDRANT	A. PANASIEWICZ
PUMP	F. MALCZUK

LOCATION ADT FIRE ALARM BOXES

EAST PLATFORM	BLDG. 13	WAREHOUSE
SOUTH ENTRANCE	BLDG. 4	
WEST PLATFORM	BLDG. 32	WAREHOUSE

845030137

NIGHT FIRE BRIGADES

Shift supervisor is in command of night fire brigades on their respective shifts.

NIGHT FIRE BRIDAGE TEAMS ARE:

D. HAHNEMAN	K. KORINISKIE	MCALLISTER
SHIFT A	SHIFT B	SHIFT C
M. SWEET	H. AMAY	J. PIVOVARNIK
T. DOSTANKO	E. SMITH	J. POPKO
J. GERO	S. JONES	E. LOUIS
D. EVANS	J. WALKER	J. JEAN MARY
R. WILLIAMS	J. THOMAS	W. FLOUYNOY

NIGHT FIRE REPORTING:

In case of fire at night, notify powerhouse at once by telephone or in person. Tell the engineer on watch the location and nature of fire. Phone number is Ext. 250 or 589-3711.

GENERAL PROCEDURE:

1. Person observing fire notifies powerhouse of location and nature of fire and alerts personnel in area, if fire cannot be put out quickly with a fire extinguisher.

2. Engineer on watch, alerts Plant fire brigade and shift supervisors by blowing fire whistle (see fire whistle code).

3. Shift supervisor, if he does not already know location of fire, calls the powerhouse to determine location and nature of fire. He then begins action to control and extinguish fire.

4. Shift foreman designates one man on his shift to turn in fire alarm by pulling nearest ADT box. If alarm to fire department has already been given it is not necessary to repeat alarm. Same designated person, then notifies watchman (guard) of fire, and guard must open gates and wait for fire department arrival at gate.

5. Upon arrival of Fire Department, person assigned to gate duty will direct fire company to area of emergency and Plant fire brigade personnel will turn primary role of fire fighting over to Newark fire department.

845030138

6. Shift supervisor or designated person then notifies Plant management personnel and concerned department heads:

A. Dieffenbach, Primary Emergency Coordinator	469-1509
J. Brooks	381-6706
R. Barr	852-5003
S. Johnston	245-4887
T. Sturm	748-3735
R. Allen	635-5214

845030139

FIRE DRILLS

(REFER TO FIRE REPORTING INSTRUCTIONS)

In the instance of a fire drill the following additions and or deletions of the fire reporting instructions will be done.

1. Item #5 - Telephone Operator will not notify the fire dept. and will not setup night connections and will stay at her station. It will be the responsibility of the Office Manager to assure that the operator knows it is a drill after she notifies the power-house. The Office Manager will then make sure all office personnel evacuate to the holding area at the South West gate (400 gate) Sun Oil side on Doremus Avenue.

2. All operations in the plant will cease and people will evacuate to the holding area except the following people:

   A. Day and or shift fire brigade-they will report to the fire area and wait for instructions. Operators that are on the fire brigade will follow the same procedure as an evacuation ie: put reactor on cooling shutdown all feeds and charging operations and report to fire area indicated by alarm.

   b. All chemical operators - they will continue to operate their equipment but must know what they would have done if the fire were real.

   C. Power house engineer stays at his post and will be notified that it is a drill after he has given the alarm.

   D. No ADT boxes will be pulled.

   E. Supervisor that is in charge of the area where there are contractors working will be responsible for their notification and evacuation.

   F. All other personnel must leave plant at once and proceed to holding area.

3. Anyone doing a pumping at the time of the alarm must secure the equipment before evacuation. Truck drivers whether loading or unloading must shut down their equipment, close all valves and covers on their truck and evacuate the plant. It will be the responsiblitly of the shipping and receiving dept. to see that this is done.

845030140

AVAILABLE EMERGENCY EQUIPMENT FOR PLANT USE

1. Portable fire extinguishers (105) spotted at various locations throughout the plant. (list attached)

2. Portable hose reel carts (6) with 200 ft. of 1½ inch fire hose each and combination nozzle. Set in weather protected reel houses in each area of the plant.

3. Stationary hose reels (10) each containing 100 ft. of 1½ inch fire hose and combination nozzles connected to stand pipe on each floor of bldg. 31 and bldg. 32.

4. Emerson Resuscitator with spare oxygen tank, bldg. 15.

5. Fire fighting foam supply which consists of 120 gallons of Protein Foam.

6. 5 self contained breathing apparatus (MSA air masks model no.401) for emergencies and rescues.
   Locations:
   1) Production office, 4th floor, bldg. 31
   2) Shipping office, 1st floor, bldg. 32
   3) Maintenance office, 1st. floor, bldg. 32
   4) Control room, 4th floor, bldg. 31
   5) Power house, bldg. 15

7. 3 Fire moniters for containing fire in tank farm.

   Locations:
   1) Roof of Dowtherm room, bldg. 31
   2) 2nd. floor, bldg. 23
   3) Water tower

8. Twin fire pumps, 750 GPM, fire pump house.

9. Water tower (for fire containment), 75,000 gallons, 135' high.

845030141

ASHLAND CHEMICAL CO.

NEWARK N.J. RESINS & PLASTICS

MONTHLY FIRE EXTINGUISHER CHECK LIST

INSPECTED BY _____ DATE _____

NO.	LOCATION	TYPE	CONDITION	REMARKS
1.	T/F SO. WALL	DRY CHEM		
2.	T/F EAST WALL	DRY CHEM		
3.	T/F NO. WALL	DRY CHEM		
4.	BLDG. 31 BOILER ROOM	C02		
5.	BLDG. 31 ROOF	DRY CHEM		
6	BLDG. 32 ROOF	C02		
7.	BLDG. 32 5th FL.N W	FOAM		
8	BLDG. 32 5th FL. E.	C02		
9	BLDG. 31 5th FL. W.	FOAM		
10.	BLDG 31 5th FL. E	FOAM		
11.	BLDG. 31 5th FL. SE	DRY CHEM		
12.	BLDG. 31 4th FL. SE	DRY CHEM		
13.	BLDG. 31 4th FL LAB	C02		
14.	BLDG. 31 4th FL LAB	C02		
15.	BLDG. 31 4th FL. E.	FOAM		
16.	BLDG. 31 4th FLR. W	DRY CHEM		
17.	BLDG. 31 4th FLR. CONT RM.	C02		
18.	BLDG. 32 4th FL. E.	DRY CHEM		
19.	BLDG. 32 4th FL. STAMP RM.	C02		
20.	BLDG 32 4th FLR NW	DRY CHEM		
21	BLDG 32 3rd FL N.W.	FOAM		
22.	BLDG 32 3rd FLR PRESS RM.	DRY CHEM		

845030142

MONTHLY FIRE EXTINGUISHER CHECK LIST

NO.	LOCATION	TYPE	CONDITION	REMARKS
23	Bldg. 323rd Fl Press Rm	Dry Chem		
24	Bldg 32 3rd Fl E	Dry Chem		
25	Bldg.31 3rd Fl W	Dry Chem		
26	Bldg 31 3rd Fl SE	Dry Chem		
27	Bldg 31 2nd Fl Elect Rm	CO2		
28	Bldg 31 2nd Fl SE	Foam		
29	Bldg 31 2nd Fl TT44	CO2		
30	Bldg 31 2nd Fl So.	Foam		
31	Bldg 32 2nd Fl E	CO2		
32	Bldg 32 2nd Fl NW	Dry Chem		
33	Bldg 32 1st Fl S	CO2		
34	Bldg 32 1st Fl E	Foam		
35	Bldg 31 1st Fl NW	Foam		
36	Bldg 31 1st Fl NW	CO2		
37	Bldg 31 1st Fl S	CO2		
38	Bldg 31 st Fl SE	CO2		
39	Bldg. 31 Foam House	50# CO2		
40	Bldg 31 T/W Ldg	Dry Chem		
41	Bldg 25 T/W Ldg	Dry Chem		
42	Bldg 25 W End	Foam		
43	Bldg 25 SE Corn	CO2		
44	Main Transf.Guard Hse	CO2		
45	Bldg 16 T/W Ldg	Dry Chem		
46	Bldg 16 Boiler Rm	Dry Chem		

845030143

MONTHLY FIRE EXTINGUISHER CHECK LIST

	LOCATION	TYPE	CONDITION	REMARKS
47	Bldg. 16 1st Fl W	CO2		
48	Bldg 16 1st Fl Pltfrm	Dry Chem		
49	Bldg 16 1st Fl Storerm	CO2		
50	Bldg 16 1st Fl NE	Dry Chem		
51	Bldg 16 1st Fl Office	CO2		
52	Bldg 16 1st Fl S.	Dry Chem		
53	Bldg 16 2nd Fl E	CO2		
54	Bldg 16 2nd Fl SW	Dry Chem		
55	Bldg 16 2nd Fl Cont Rm	CO2		
56	Bldg 16 3rd Fl W	Dry Chem		
57	Bldg 16 3rd Fl E	CO2		
	Bldg 16 1st Fl Column	CO2		
59	Bldg 32 1st Fl W	Dry Chem		
60	Bldg 13B 1st Fl E	Dry Chem		
61	Bldg 13B 1st F Dr Area	Dry Chem		
62	Vacant			
63	Bldg 13B 1st Fl S.	CO2		
64	Bldg 13A 1st Fl T-128	Dry Chem		
65	Bldg 13 A 1st Fl So.	CO2		
66	Bldg 13A 1st Fl S	Foam		
67	Bldg 13B 2nd Fl S	Foam		
68	Bldg 13B 2nd Fl NE	Foam		
69	Bldg 13B 2nd Fl Column	CO2		
0	Bldg 13A 2nd Fl Vault			

845030144

MONTHLY FIRE EXTINGUISHER CHECK LIST

NO	LOCATION	TYPE	CONDITION	REMARKS
71	Bldg 13A 2nd Fl Office	CO2		
72	Bldg 13A 2nd Fl Ladies Rm	CO2		
73	BLDG 31 4TH FLOOR ~~So.~~ SIDE	WHEEL DRY CHEM		
74	BLDG 31 3RD FL ~~So.~~ SIDE	WHEEL DRY CHEM		
75	Vacant			
76	Vacant			
77	Vacant			
78	Vacant			
79	Vacant			
80	Vacant			
81	Bldg 12 1st Fl NW	CO2		
2	Bldg 12 3rd Fl Center	CO2		
83	Bldg 12 1st Fl NE	CO2		
84	Bldg 4 1st Fl So.	CO2		
85	Bldg. 4 1st Fl So.	Foam		
86	Bldg 4 2nd Fl So.	CO2		
87	Bldg 4 3fd Fl So.	CO2		
88	Vacant			
89	Bldg 26 2nd Fl Center	Foam		
90	Bldg 26 1st Fl NE	Foam		
91	Bldg 26 1st Fl No.	Foam		
92	Bldg 26 1st Fl So.	CO2		
93	Bldg 18 Elect. Rm	CO2		
4	Bldg 18 Transf Rm	CO2		
	Bldg 15 Powerhouse	CO2		
96	Bldg 9 W. Side	CO2		

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MONTHLY FIRE EXT[illegible] CHECK LIST

NO.	LOCATION	TYPE	CONDITION	REMARKS
97	Bldg 14 Garage	CO2		
98	Vacant			
99	Vacant			
100	Vacant			
101	Bldg 23 2nd Fl lab	CO2		
102	Bldg 23 1st Fl Shop	50# CO2		
103	Bldg 23 1st Fl Shop	CO2		
104	Bldg 23 1st Fl Shop	CO2		
105	Bldg 4 T/W Ldg	Dry Chem		

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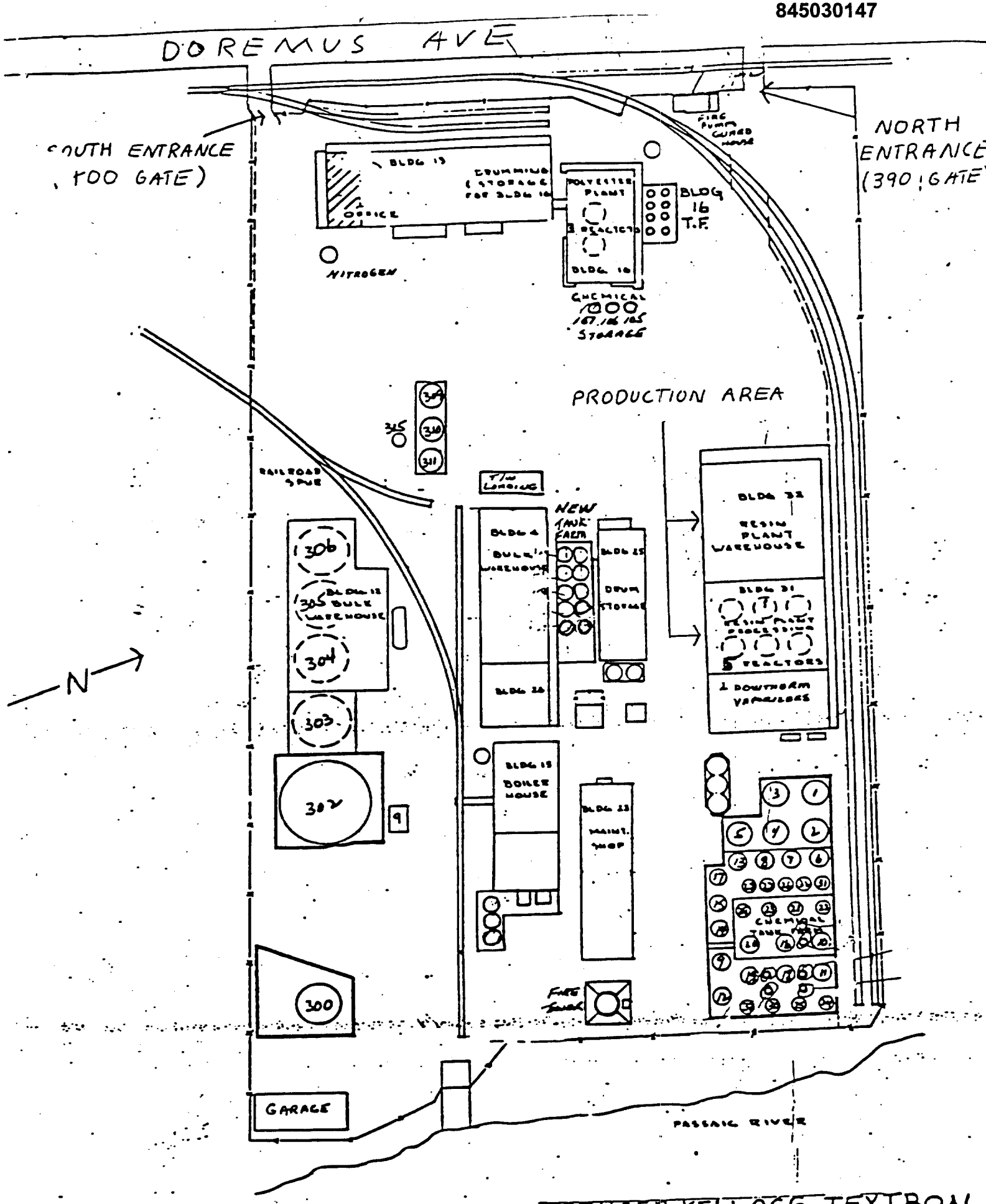

SPENCER KELLOGG TEXTRON
DIV. OF TEXTRON INC.

Exhibit 5

ENVIRON

December 16, 1991

HAND DELIVERY

Mr. Sal Balakrishnan
BEECRA Cleanup Oversight Section
New Jersey Department of
Environmental Protection and Energy
401 East State Street
Trenton, NJ 08625

Re: Textron Inc. - Former Spencer Kellogg Facility
Newark, Essex County, New Jersey
ECRA Case No. 85403

Dear Mr. Balakrishnan:

Enclosed please find the progress report describing the activities associated with implementation of the Cleanup Plan at the former Spencer Kellogg facility for November 1991. Also included in this report are responses to several issues raised in your October 31, 1991 letter to Textron.

Please contact us if you have any questions or need further information.

Sincerely,

Scott E. MacDonald
Manager

Julia L. Mermelstein
Senior Associate

SEM/JM:dmd
0288E:PAA01F80.W51

Enclosures
cc: J. Schiavone
R. Lawrence

845030149

CLEANUP PLAN IMPLEMENTATION
PROGRESS REPORT

Textron Inc. - Former Spencer Kellogg Facility
ECRA Case No. 85403

November 1991

1. Activities Performed This Reporting Period

The activities performed during this reporting period include: (1) continued discussions with Reichhold personnel regarding site coordination issues; (2) final modifications to the low temperature thermal aeration (LTTA) unit and initial trial testing; (3) temporary cessation of excavation activities beneath Building 4 (AEC 12); (4) site preparation activities, including railroad track removal; (5) excavation and post-excavation sampling in various AECs; (6) off-site disposal of several waste streams; and (7) activities related to the observation of free-phase material in AEC 3.

Site Coordination Issues

On November 7, 14, and 21, 1991, representatives of ENVIRON, Canonie, and Reichhold met at the site to discuss ongoing site coordination issues, including access to particular areas of the site and alternative piping requirements for feedstock delivery to the large tank farm during remediation of AEC 7. The pipe relocation system for AEC 7 was constructed and tested during November 1991. The new piping system will be tied into the existing lines in December 1991 prior to initiation of remedial activities in this area.

Final Modifications to the LTTA Unit and Initial Trial Run

As indicated in the November 15, 1991 progress report to NJDEPE, Canonie made final connections of all LTTA system components during October 1991. Final modifications to the system's quench tower, including installation of a new booster

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pump and piping, were made during this reporting period to increase the flow rate in the quench tower, thus completing the setup of the LTTA system.

Canonie conducted the initial trial run of the LTTA unit on November 26, 1991. Approximately 120 tons of excavated soil from AECs 3, 4 and 5 were processed during the six-hour test. Preliminary analytical results of hourly post-treatment samples indicated levels of toluene, ethylbenzene and xylene significantly below 10 ppm and levels of benzene at or below 1 ppm. The presence of benzene in these samples was not expected since this compound was not previously detected at the site. The occurrence of benzene in the post-treatment sampling results will continue to be evaluated during the trial testing period. Laboratory error may account for some portion of the benzene results. Final results from post-treatment sampling of this and other trial runs to be conducted in early December will be discussed and presented in the progress report for December 1991. As previously discussed with S. Balakrishnan of NJDEPE, all analytical data generated during remediation, as well as applicable Quality Assurance/Quality Control (QA/QC) documentation, will be submitted with the final report documenting the results of site cleanup.

Remedial Activities Beneath Building 4 (AEC 12)

As indicated in the November 15, 1991 progress report, approximately 40% of AEC 12 had been excavated as of October 31, 1991. Textron elected to dispose of the resinous materials removed from beneath Building 4 (AEC 12) as New Jersey hazardous waste (C433) at Chemical Waste Management's landfill in Model City, New York. During November 1991, additional excavation activities were temporarily suspended pending final approval from the Model City facility for disposal of these materials. Limitations regarding staging areas for roll-off containers on-site precluded the generation of additional materials for off-site disposal. On November 13, 1991, seven rolloffs of resinous material (including resin from AEC 19) were sent to Chemical Waste Management's landfill in Model City, New York. Canonie also pumped approximately 20,000 gallons of water from AEC 12 that was ultimately disposed of at Chemical Waste Management's water treatment facility in Newark, New Jersey as non-hazardous wastewater.

In addition, high tides on October 30 and 31, 1991 resulted in flooding at the site, including the filling of the excavation beneath Building 4 (AEC 12) with approximately 25,000 gallons of water. Excavation in this AEC could not be resumed until the stormwater was removed. The stormwater from the excavation was treated on-site using activated carbon prior to being discharged to the Passaic Valley Sewerage Authority (in accordance with appropriate approval). Excavation in AEC 12 resumed on December 10, 1991.

Site Preparation Activities in AECs 3, 4, 5, 16, 19, and 25

During this reporting period, Canonie removed the railroad tracks in AECs 3, 4, 5, 16, and 25, removed the northern and western sides of the retaining wall surrounding AEC 19 to facilitate equipment access, and removed dried, resinous materials from the ground surface in AEC 19. Disposal of these materials is discussed in the section of this progress report entitled "Off-Site Waste Disposal."

Excavation Activities and Post-Excavation Sampling

During November 1991, Canonie excavated a "hot spot" area in AEC 3, excavated AECs 23 and 28 for base/neutral compounds (BNs) and performed additional excavations in AECs 3, 4, 5 and 9 to address volatile organic compounds (VOCs). Relevant excavation activities and post-excavation sampling are discussed below. The locations of most of the post-excavation samples are shown on Figure 5 of the May 1991 Work Plan, although a number of additional sampling locations described below were not proposed in the May 1991 Work Plan. A complete list of samples collected during November 1991, as well as drawings showing the locations of samples not proposed in the May 1991 Work Plan, are provided as Attachment 1 to this progress report. The available analytical results for samples collected during November 1991 are provided as Attachment 2 to this progress report.

a) **BN Areas**

As proposed in the May 1991 Work Plan, Canonie excavated an area within AEC 3 and all of AECs 23 and 28 due to the presence of BNs above site-specific cleanup criteria. Post-excavation samples were subsequently collected from

sampling locations P-5 and P-6 along the western and eastern sidewalls of the excavation in AEC 3, from sampling locations P-35 and P-36 along the western and eastern sidewalls of the excavation in AEC 23, and from sampling locations P-17 and P-18 along the western and eastern sidewalls of the excavation in AEC 28. These sample locations are shown on Figure 5 of the May 1991 Work Plan. The soil samples obtained from each of the referenced locations were collected from a depth of 1.5 feet below ground surface and analyzed for BN+15 using EPA Method 8270. The specific results of this sampling are discussed below.

AEC 3

The sample results from P-5 and P-6 indicated levels of carcinogenic polycyclic aromatic hydrocarbons (CaPAHs) and total BNs above site-specific cleanup criteria. To ensure that all BNs within this area were appropriately remediated, Canonie extended the excavation approximately 10 feet in both the western and eastern directions and collected additional post-excavation samples along new western and eastern sidewalls (samples P-5A and P-6A) from a depth of 1.5 feet below ground surface. The analytical results from both of these additional samples exceeded the site-specific action level for CaPAHs, and the sample from P-6A also exceeded the site-specific action level for total BNs. To further evaluate the extent of CaPAHs within AEC 3, Canonie collected two additional samples at 10 foot intervals west and east of P-5A and P-6A, respectively. These sample locations are identified as P-5B, P-5C, P-6B, and P-6C. The analytical results for these additional samples were below site-specific action levels for CaPAHs and total BNs. Therefore, the extent of these compounds within AEC 3 has been fully delineated. The excavation in this area will be extended to clean sample locations P-5B and P-6B and no further post-excavation sampling will be conducted.

AEC 23

The analytical results for samples P-35 and P-36 were below the site-specific action level for CaPAHs, and the sample result from P-36 was also below the site-specific action level for total BNs. The sample from P-35, however, exceeded the site-specific action level for total BNs due to the presence of high concentrations

(1,700 ppm) of bis(2-ethylhexyl) phthalate. Because the presence of this compound is atypical for this site and the results, in part, could be indicative of plastic contamination introduced during sampling and/or analysis, Canonie collected an additional sample adjacent to previous location P-35 (sample P-35A) to confirm the presence of this compound. The analytical results for this additional sample were below the site-specific action levels for both CaPAHs and total BNs (Bis[2-ethylhexyl] phthalate was detected at 0.17 ppm). Although the results of the confirmatory sample do not indicate unacceptable BN levels along the sidewall, Canonie will extend the excavation to the east a minimum of one foot and collect one additional sidewall sample ~~to confirm that the BN contamination in this area has been~~ adequately addressed

AEC 28

Samples were collected from locations P-17 and P-18, along the eastern and western sidewalls of the excavation in AEC 28. The analytical results for these samples are expected in December 1991 and will be included with the progress report for that period.

b) VOC Areas

As proposed in the May 1991 Work Plan, Canonie excavated soils in AECs 3, 4, 5 and 9, all of which are being remediated for VOCs (with the exception of the BN "hot spot" in AEC 3 described above that is being remediated for both BNs and VOCs). Relevant excavation activities and post-excavation sampling in each of these AECs are described below. All post-excavation soil samples were collected at a depth of 1.5 feet below ground surface and analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020.

AECs 3, 4, and 5

To maintain the physical integrity of the northern retaining wall along AECs 3, 4 and 5, soils were excavated to within one foot of the wall. As required by NJDEPE's October 31, 1991 letter, post-excavation samples were subsequently collected at 30-foot intervals along the exposed sidewall in these areas. Preliminary

analytical results for a number of these samples exceeded the site-specific cleanup criteria for the target VOCs. As a result, Canonie collected additional samples approximately one foot deeper within the sidewalls at those former sampling locations (at the same depth below ground surface) containing VOCs in excess of the cleanup criteria. The analytical results for these additional samples, however, have not yet been received. All verified analytical data from this area will be provided and discussed with the progress report for December 1991.

Canonie collected additional post-excavation samples along the southern borders of AECs 4 and 5 (beneath the tank farm wall) because approximately 8 to 12 inches of soil were exposed during low tide conditions. It is currently believed, however, that these soils samples may have been collected from a zone which is below the ground water level at high tide. The preliminary analytical results for a number of these samples exceeded the site-specific cleanup criteria for target VOCs. Canonie subsequently collected additional samples approximately 1.5 feet further into the sidewalls at these former sampling locations (at the same elevation) containing VOCs in exceedance of the cleanup criteria. The analytical results have not yet been received. All verified data will be provided and discussed with the progress report for December 1991. A proposal for further action, if any, in this area will be made following the receipt of the additional analytical results and the determination of the actual high tide conditions in AECs 4 and 5.

No samples were collected along the southern border of AEC 3 (along the loading dock wall) because the building's foundation extends several feet below the water table.

Three additional samples (P-64, P-65, and P-66) not proposed in the May 1991 Work Plan were collected in the southeastern portion of AEC 5, which contains a pump pad, loading rack, and stairway pad (hereinafter referred to as the "loading rack area"). Soil excavation in this area could not be conducted under the structures in this area and could not be extended to the tank farm wall due to access problems and concerns about maintaining the physical integrity of these features. The analytical results for all three samples were below the site-specific action levels for target VOCs. Therefore, no further excavation of soils or remedial action will be undertaken in the loading rack area.

Samples were also collected from locations P-9, along the eastern border of AEC 5, and P-10, between Building 31/32 and the tank farm. The analytical results for the sample from P-9 were below site-specific action levels for target VOCs. Therefore, the extent of the excavation along the eastern border of AEC 5 has been fully delineated. The analytical results for the sample from P-10 exceeded the site-specific action levels for VOCs. The excavation in that area will be extended and an additional post-excavation sample will be collected. The specific results for these samples will be provided with other data from AECs 3, 4, and 5 in the progress report for December 1991.

AEC 9

As proposed in the May 1991 Work Plan, Canonie excavated the area within AEC 9 (beneath Building 16) as shown on Figure 5 of the May 1991 Work Plan. In response to NJDEPE's February 8, 1991 conditional approval letter, the post-excavation sample (P-21) from this area was analyzed for both BTEX and BN compounds. The analytical results for this sample were below the site-specific action levels. Therefore, no further action is required in this AEC.

Activities Related to the Observation of Free-Phase Material in AEC 3

Subsequent to completion of excavation activities in AEC 3, a thin layer of free-phase resinous material was discovered on the ground water in the bottom of the AEC 3 excavation. This material appears to have originated from under the current production building south of AEC 3. A period of heavy rainfall also contributed to the release of a small amount (something less than 5 gallons) of this material to Newark Bay. This material was immediately contained by collection booms. As you know, both the initial observation and the release to Newark Bay were reported to NJDEPE in the manner provided in N.J.A.C. 7:1E-5.3 required under applicable regulations. A final spill report is being prepared by Textron and will be provided to the agency on December 20, 1991.

In response to the observation of free-phase material in AEC 3, gravel-filled trenches have been installed along the loading dock of Building 31/32 in areas where a thin layer of product was observed. These trenches will serve to collect and contain

this material. Two vertical stand-pipes have also been installed through the gravel in the trench so that recovery of the free-phase material can be facilitated. ENVIRON is currently working with Reichhold personnel to review structural drawings and to obtain access to areas beneath the building to better understand the potential extent and source(s) of this material. Textron will report to NJDEPE in future progress reports any information with regard to the source(s) of the material as well as any actions taken to address these sources. Textron reserves all rights and defenses with regard to its responsibilities, if any, for remediating these sources.

Off-Site Waste Disposal

The following disposal activities took place during November 1991: approximately 220 cubic yards (11 rolloffs) of asphalt from various AECs were sent for recycling to Clayton Block in Lakewood, New Jersey; approximately 55 cubic yards (5 rolloffs) of concrete from AEC 19 were sent for recycling to Clayton Block in Lakewood, New Jersey; approximately 140 cubic yards (7 rolloffs) of excavated resin from AECs 12 and 19 were sent to Chemical Waste Management's landfill in Model City, New York; and approximately 20,000 gallons of water from excavated resin in AEC 12 were sent to Chemical Waste Management's water treatment facility in Newark, New Jersey.

As described in the November 15, 1991 progress report, Textron intends to dispose of miscellaneous debris generated during remediation as non-hazardous waste. During November 1991, Canonie prepared an application for classification of this waste as ID-13, and submitted it to Mr. Richard Johnson of NJDEPE's Division of Hazardous Waste Management on December 3, 1991.

2. Data Produced in November 1991

As discussed above, Canonie collected post-excavation samples for BN analysis in AECs 3, 9, 23, and 28 and for VOC analysis in AECs 3, 4, 5, and 9 during November 1991. The available analytical results of this sampling are provided as an attachment to this progress report.

3. Modifications to the October 1990 Cleanup Plan

AEC 4

In the October 1990 Cleanup Plan, ENVIRON indicated that the surficial soils in AEC 4 contained resinous materials that would not be suitable for low temperature thermal treatment, but would be scraped away and transported off-site for disposal at an appropriate disposal facility. During November 1991, however, Canonie determined that the dried, resinous material can be processed in the LTTA unit. Therefore, both the resinous surface materials and the soils excavated from this area will be processed on-site.

AEC 5

As discussed above, Canonie determined that the southeastern portion of AEC 5 (the loading rack area) could not be excavated to the tank farm wall (as indicated in the October 1990 Cleanup Plan) due to the presence of a pump pad, loading rack, and stairway pad which rest on shallow foundations. As described in Section 1 of this progress report, post-excavation samples were collected in this area, and the analytical results were below the site-specific action levels for VOCs. As a result, no further excavation of soils is planned for this section of AEC 5.

Project Schedule

An updated project schedule based upon current projections is provided as Attachment 3 to this progress report. This project schedule represents planned activities (i.e., desirable start and completion dates) and is not intended to establish firm deadlines. At the time of the submittal of the November 15, 1991 progress report, it was anticipated that the completion of soil processing and preparation of the Final Report would take place within approximately the dates projected in the October 1990 Cleanup Plan. However, based on the results of the LTTA trial run, the actual throughput rate of the unit is expected to be 15 tons per hour (tph) rather than the 30 tph rate on which the previous completion date was based. The current project schedule anticipates completion of soil processing and preparation

of the Final Report by April 1, 1992. Textron will notify NJDEPE of any additional modifications to the project schedule in future progress reports.

4. Remedial Costs and Percent of Total Remedial Activities to Date

Costs for remediation activities through November 1991 total approximately $725,000. This cost includes Canonie's activities related to obtaining permits, mobilizing to the site, removing asphalt, excavation in several AECs, and initial testing of the LTTA unit. Approximately 36% of all remedial activities has been completed. Therefore, the projected costs to completion appear to be within the amounts estimated for purposes of financial assurance.

5. Information Requested in NJDEPE's October 31, 1991 Letter

In its October 31, 1991 letter, NJDEPE requested that responses to a number of issues be submitted with the monthly progress report due December 15, 1991. These issues included (1) the locations where field instrument measurements to monitor air quality will be taken, and (2) acknowledgement of the requirements related to asbestos concerns. In addition, the letter requests that NJDEPE be notified at least 14 days prior to the initiation of any sampling and/or cleanup activity at the site. These items are discussed below.

Air Quality Monitoring

In its October 31, 1991 letter, NJDEPE states that "the [May 1991 Work Plan's] air emissions contingency plan (section 5.7) does not specify the locations where field instrument measurements to determine potential exceedances of applicable air quality standards will be taken," and requests clarification. The clarification requested is provided below.

During remediation, Canonie has been and will continue to take field measurements of air quality at the following locations: (1) downwind of excavations in progress; (2) downwind of the screen-all unit where oversized debris is separated from material to be processed in the LTTA unit; (3) downwind of the contaminated soil feed hopper which holds soils prior to treatment; and (4) downwind of the contaminated soil stockpile while it is uncovered during the day for processing.

Asbestos Concerns

In its October 31, 1991 letter, NJDEPE states that "all friable and/or deteriorated ACMs shall either be properly encapsulated or removed in accordance with all applicable state, federal and local guidelines." In response to this requirement, Textron has asked ENVIRON to conduct an asbestos survey at the facility. This survey will include visual inspection of suspected asbestos containing materials (ACMs) and sampling of friable and damaged materials to confirm the presence and amount of ACMs that may require remediation. The results of this survey will be provided to NJDEPE in a subsequent progress report.

Textron is seeking the cooperation of NL Industries, Inc. (NL) in conducting the survey. However, by conducting the survey, Textron is not accepting responsibility for any ACMs that may be discovered at the facility and is reserving all rights it may have against any and all parties with respect to ACMs at the former Spencer Kellogg facility.

Notification Requirement

NJDEPE's October 31, 1991 letter stated that "Textron shall notify this Bureau at least 14 days prior to the initiation of any sampling and/or cleanup activity at the site." At the time Textron received the letter, cleanup activities and sampling activities had already been conducted at the site. Moreover, Textron did notify NJDEPE, both orally and in earlier progress reports, of the schedule for initiating cleanup and sampling activities, and has continually provided NJDEPE with detailed schedules of all remedial activities. Due to the need for day-to-day flexibility in cleanup implementation, however, it is not possible to provide 14 days notice prior to initiation of each remediation action or round of soil samples. These activities are expected to be conducted on a daily basis throughout the remainder of the cleanup. Therefore, Textron will continue to provide NJDEPE with updated schedules which outline proposed start and completion dates for all planned tasks.

6. Activities Scheduled for December 1991

Activities for December 1991 primarily will include: (1) completion of the LTTA trial runs; (2) commencement of full-scale soil processing, including approximately 1200 tons of soil from AECs 3, 4, 5 and 16; (3) completion of the excavation of AEC 3 and backfilling of

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the excavation with clean fill material; (4) restoration of the railroad tracks in AEC 3, 4 and 5; (5) installation of an additional gravel trench in an apparent source location along the Building 31/32 loading dock; (6) completion of the installation of temporary piping adjacent to AEC 7; (7) excavation of AEC 16; (8) resumption of the AEC 12 resin excavation and off-site disposal; and (9) initiation of asbestos survey.

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Exhibit 6

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
HAZARDOUS SITE MITIGATION ADMINISTRATION
CN 028, Trenton, N.J. 08625

MARWAN M. SADAT, P.E.
DIRECTOR

JORGE H. BERKOWITZ, PH.D.
ADMINISTRATOR

IN THE MATTER OF	:	ADMINISTRATIVE CONSENT
TEXTRON INC.	:	ORDER

The following FINDINGS are made and ORDER is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP") by N.J.S.A. 13:1D-1 et seq. and the Environmental Cleanup Responsibility Act, N.J.S.A. 13:1K-6 et seq., and duly delegated to the Assistant Director for Enforcement and Field Operations within the Division of Waste Management pursuant to N.J.S.A 13:1B-4.

FINDINGS

1. The Environmental Cleanup Responsibility Act, N.J.S.A. 13:1K-6 et seq. ("ECRA" or "the Act"), was signed into New Jersey State Law by Governor Thomas H. Kean on September 2, 1983, and took effect on December 31, 1983.

2. ECRA required the NJDEP to adopt rules and regulations to implement the Act. On March 6, 1984, NJDEP adopted the Interim ECRA Regulations, N.J.A.C. 7:1-3 ("Regulations") in compliance with the Administrative Procedure Act, N.J.S.A. 52:14B-1 et seq., upon acceptance for filing by the Office of Administrative Law pursuant to N.J.A.C. 1:30-4.4(d).

3. ECRA requires that the owner or operator of an industrial establishment planning to sell or transfer operations (a) notify the NJDEP in writing within five days of the execution of an agreement of sale pursuant to N.J.A.C. 7:1-3.7, (b) submit within 60 days prior to transfer of title a Negative Declaration or Cleanup Plan to the NJDEP for approval, and (c) obtain, upon approval of any necessary Cleanup Plan by the NJDEP, a surety bond or other financial security approved by the NJDEP guaranteeing performance of the Cleanup Plan in an amount equal to the cost estimate for the approved Cleanup Plan.

4. N.J.S.A. 13:1K-13 provides that failure to submit a Negative Declaration or Cleanup Plan pursuant to ECRA is grounds for voiding the sale by NJDEP. Any person who knowingly gives or causes to be given any false information or who fails to comply with the provisions of ECRA is liable for a penalty of not more than $25,000.00 for each occurrence, and each day of a violation of a continuing nature constitutes an additional and separate offense. Furthermore, any officer or management official of an industrial establishment who knowingly directs or authorizes the violation of any provisions of the Act shall be personally liable for the $25,000.00 penalties for each violation described above.

5. Textron Inc. ("Textron"), a Delaware Corporation, owns and operates a specialty chemical and polyester resin manufacturing facility located at 400 Doremus Avenue, Newark, Essex County; said site being further known as Block 5070, Lots 9 and 11 on the tax map of the City of Newark ("Newark facility"). Textron has informed NJDEP that the Standard Industrial Classification ("SIC") number which best describes the operations at the Newark facility is 2821. Textron has further informed NJDEP that hazardous substances are used in the operations at the Newark facility. The Newark facility is an Industrial Establishment as defined by ECRA.

6. Textron has entered into a Purchase and Sale Agreement (the "Agreement") dated June 17, 1985, with NL Industries, Inc., a New Jersey Corporation ("NL"), pursuant to which NL will purchase substantially all of the assets of Textron's Spencer Kellogg Division (the "Division") as a going concern (the "Asset Purchase"). The Spencer Kellogg Division includes six (6) manufacturing operations, the Newark facility being the only one in New Jersey. The Agreement contemplates that the closing of the Asset Purchase will occur on July 31, 1985.

7. On June 21, 1985, Textron submitted to NJDEP the General Information Submission ("GIS") section of the Initial ECRA Notice for the Newark facility. NJDEP reviewed the GIS for the Newark facility and in a letter dated July 1, 1985 found it to be complete.

8. Due to both the procedural and substantive requirements of the Regulations, Textron has advised the NJDEP that it cannot comply with all of the requirements of ECRA and the Regulations prior to the closing of the Asset Purchase. The Newark facility is an integral part of the Spencer Kellogg Division, and, therefore, it is not possible to separate that facility from the Asset Purchase without seriously impeding the Division's business and operations. In addition, the business risks of delaying the closing until after compliance with the requirements of ECRA and the Regulations would jeopardize the entire transaction and significantly increase and prolong the uncertainties normally associated with a prospective change in ownership among the Division's 451 employees, 63 of which are employed at the Newark facility. Therefore, Textron has requested that NJDEP prepare an Administrative Consent Order which, when signed by all parties thereto, will allow the Asset Purchase to be consummated prior to Textron's completion of all administrative requirements under ECRA.

9. In appropriate cases, NJDEP may allow transactions subject to ECRA to proceed prior to completing the standard ECRA administrative process by execution of an Administrative Consent Order. The Administrative Consent Order specifies a time schedule for completion of ECRA requirements by the industrial establishment and provides for financial assurance in a form and amount acceptable to NJDEP prior to consummation of any transactions subject to ECRA. Failure to fully comply with all the terms and conditions of the Administrative Consent Order shall subject the Ordered Party to the full range of penalties and remedies prescribed in the Act, the Regulations, and the Administrative Consent Order.

ORDER

NOW, THEREFORE, IT IS ORDERED AND AGREED THAT:

10. ECRA Program Requirements

A. Textron shall submit the Site Evaluation Submission ("SES") section of the Initial Notice (commonly referred to as ECRA II) required by N.J.A.C. 7:1-3.7 within 30 days from the effective date of this Administrative Consent Order.

B. Within 90 days from receipt of NJDEP's written approval of the Sampling Plan prepared pursuant to N.J.A.C. 7:1-3.7(d)14 and N.J.A.C. 7:1-3.9, Textron shall initiate, complete, and submit to NJDEP the results from any NJDEP-approved Sampling Plan including, but not limited to, complete delineation of environmental contamination on-site, and any off-site environmental contamination resulting from discharges of hazardous wastes or substances on or from the Industrial Establishment. NJDEP and Textron recognize that additional sampling may be necessary during the various stages of the implementation of this Administrative Consent Order and ECRA, including during the implementation of a Cleanup Plan, at the subject Industrial Establishment to delineate fully the nature and extent of environmental contamination on-site, and any off-site environmental contamination resulting from discharges of hazardous substances or wastes on or from the subject Industrial Establishment. Therefore, Textron agrees to submit any additional sampling plans for NJDEP review and approval, as required by NJDEP in writing during the various stages of the implementation of this Administrative Consent Order and ECRA to further delineate the nature and extent of environmental contamination on or from the subject Industrial Establishment. NJDEP and Textron mutually agree that Textron shall submit any additional sampling plans required to NJDEP for review and approval within 30 days of the receipt of said written request. Within 90 days from receipt of NJDEP's written approval of any additional sampling plans, Textron shall initiate, complete and submit to NJDEP the results from any additional NJDEP-approved sampling plan required pursuant to this paragraph.

C. Textron shall submit a Negative Declaration or Cleanup Plan within 60 days of receipt of a written demand from NJDEP for a Negative Declaration or Cleanup Plan. If a Cleanup Plan is required, the Cleanup Plan shall address remediation of any contamination identified on or from the Industrial Establishment. Any Negative Declaration or Cleanup Plan submitted shall conform to N.J.A.C. 7:1-3.1 et seq. NJDEP shall notify Textron in writing requiring Textron to submit either a Negative Declaration or Cleanup Plan when sampling results have satisfied NJDEP's requirement to delineate fully the nature and extent of environmental contamination on or from the Industrial Establishment.

D. Textron shall implement any Cleanup Plan approved by NJDEP pursuant to the requirements of N.J.S.A. 13:1K-10(a) in accordance with the approved time schedule or defer implementation of all or part of the Cleanup Plan subject to NJDEP approval pursuant to N.J.A.C. 7:1-3.14.

E. Should NJDEP determine that any submittal made as part of the GIS or under this section is inadequate or incomplete, then NJDEP shall provide Textron with written notification of the deficiency(ies), and Textron shall revise and resubmit the required information within a reasonable period of time not to exceed thirty (30) days from receipt of such notification.

11. Financial Assurance

A. Textron shall obtain and provide to NJDEP financial assurance in the form of a surety bond or letter of credit in the amount of $100,000 prior to execution of this Administrative Consent Order. The financial assurance must conform with the requirements of N.J.S.A. 13:1K-9(b)3, N.J.A.C. 7:1-3.10, N.J.A.C. 7:1-3.13, and this Administrative Consent Order.

B. Textron shall establish a standby trust fund within seven days from the effective date of this Administrative Consent Order. The financial institution which issues the financial assurance shall agree to promptly and directly deposit all amounts up to the total value of the financial assurance into the standby trust fund upon written demand by NJDEP.

C. Upon NJDEP written approval of a Cleanup Plan, Textron shall amend the amount of the financial assurance to equal the estimated cost of implementation of the approved Cleanup Plan, or shall provide such other financial assurance as may be approved by NJDEP in an amount equal to the estimated cost of implementation of the approved Cleanup Plan.

D. In the event that NJDEP determines that Textron has failed to perform any of its obligations under this Administrative Consent Order, NJDEP may draw on the financial assurance in the amount necessary for NJDEP to pay for the accomplishment of any cleanup and any other costs associated with NJDEP's implementation of Textron's cleanup obligations pursuant to ECRA and this Administrative Consent Order; provided, however, that before any such written demand is made, NJDEP shall notify Textron in writing of the obligation(s) with which it has not complied, and Textron shall have reasonable time, not to exceed fourteen (14) calendar days, to perform such obligation(s) to NJDEP's satisfaction. Nothing in this paragraph shall prevent NJDEP from collecting stipulated penalties pursuant to paragraph 12 E of this Administrative Consent Order for cause.

E. Upon NJDEP's written approval of a Negative Declaration, Textron shall be relieved of any further obligation to maintain in full force and effect the financial assurance required by this Administrative Consent Order for the facility which is the subject of the NJDEP-approved Negative Declaration. Upon NJDEP's written approval of the completion of any cleanup required by this Administrative Consent Order, as verified by final site inspection pursuant to N.J.A.C. 7:1-3.12(e) and upon Textron's satisfaction of all financial obligations in connection therewith, Textron shall be relieved of any further obligation to maintain in full force and effect the financial assurance required by this Administrative Consent Order for the facility at which the approved cleanup has been completed.

12. Additional Conditions of Consent

A. Textron and NL shall allow the NJDEP access to the subject Industrial Establishment for the purpose of undertaking all necessary monitoring and environmental cleanup activities required pursuant to ECRA, the Regulations and this Administrative Consent Order. Prior to entry into this Administrative Consent Order, Textron shall provide NJDEP with appropriate documentation that NL shall allow the NJDEP access required herein.

B. Compliance with the terms of this Administrative Consent Order shall not excuse Textron from obtaining and complying with any applicable federal, state or local permits, statutes, regulations and/or orders while carrying out the obligations imposed by ECRA through this Administrative Consent Order. The execution of this Administrative Consent Order shall not excuse Textron from compliance with all other applicable environmental permits, statutes, regulations and/or orders and shall not preclude NJDEP from requiring that Textron obtain and comply with any permits, and/or orders issued by NJDEP under the authority of the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and the Spill Compensation and Control Act ("Spill Act") N.J.S.A. 58:10-23.11 et seq., for the matters covered herein. The terms and conditions of any such permit shall not be pre-empted by the terms and conditions of this Administrative Consent Order if the terms and conditions of any such permit are more stringent than the terms and conditions of this Administrative Consent Order. Should any of the measures to be taken by Textron during the remediation of any ground water and surface water pollution result in a new or modified discharge as defined in the NJPDES regulations, N.J.A.C. 7:14A-1 et seq., then Textron shall obtain a NJPDES permit or permit modification from NJDEP prior to commencement of said activity.

C. NJDEP agrees that it will not bring any action, nor will it recommend that the Attorney General's Office bring any action for Textron's failure to comply with (a) the time requirements in N.J.S.A. 13:1K-9(b)1 that NJDEP be notified within five (5) days of execution of an agreement of sale or option to purchase and (b) the time requirement in N.J.S.A. 13:1K-9(b)2 that a Negative Declaration or Cleanup Plan be submitted 60 days prior to transfer of title. NJDEP also agrees that it will not bring any action, nor will it recommend that the Attorney General bring any action seeking monetary penalties for Textron's failure to meet the time requirements specified in (a) and (b) of this paragraph.

D. No obligations imposed by this Administrative Consent Order (other than paragraph "E" below) are intended to constitute a debt, claim, penalty or other civil action which could be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Administrative Consent Order shall constitute continuing regulatory obligations imposed pursuant to the police power of the State of New Jersey, intended to protect the public health, safety and welfare.

E. In the event that Textron fails to comply with any of the provisions of this Administrative Consent Order, Textron shall pay to NJDEP stipulated penalties in the amount of $5,000.00 for each day on which Textron fails to comply with any obligation under this Administrative Consent Order provided, however, that no such stipulated penalty shall be payable by Textron with respect to such period that said failure to comply results from Force Majeure.

F. The provisions of this Administrative Consent Order shall be binding upon Textron and its officers, management officials, employees, agents, successors in interest, assigns, tenants, and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

G. Textron's failure to submit an approvable Negative Declaration or Cleanup Plan shall constitute grounds for the NJDEP to void the subject sale or transfer of the Newark facility. NJDEP's right to void the subject sale or transfer shall terminate upon NJDEP's written approval of an appropriate Negative Declaration or Cleanup Plan submitted by Textron pursuant to this Administrative Consent Order and ECRA.

H. Any submission to be made to NJDEP in accordance with this Administrative Consent Order shall be directed to:

Anthony J. McMahon, Chief
Bureau of Industrial Site Evaluation
Division of Waste Management
CN028
Trenton, NJ 08625

13. Force Majeure

If any event occurs which purportedly causes or may cause delays in the achievement of any deadline contained in this Administrative Consent Order, Textron shall notify NJDEP in writing within ten (10) days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length, precise cause or causes, measures taken or to be taken and the time required to minimize the delay. Textron shall adopt all necessary measures to prevent or minimize any delay. If any delay or anticipated delay had been or will be caused by fire, flood, riot, strike or other circumstances alleged to be beyond the control of Textron, then the time for performance hereunder may be extended by NJDEP for a period no longer than the delay resulting from such circumstances, provided that NJDEP may grant additional extensions for good cause. If the events causing such delay are not found by NJDEP to be beyond the control of Textron, failure to comply with the provisions of the Administrative Consent Order shall constitute a breach of the Administrative Consent Order's requirements. The burden of proving that any delay is caused by circumstances beyond Textron control and the length of such delay attributable to those circumstances shall rest with Textron. Increases in the costs or expenses incurred in fulfilling the requirements contained herein shall not be a basis for an extension of time. Similarly, delay in completing an interim requirement shall not automatically justify or excuse delay in the attainment of subsequent requirements.

14. Reservation of Rights

This Administrative Consent Order shall be fully enforceable in the New Jersey Superior Court having jurisdiction over the subject matter and signatory parties upon the filing of a summary action for compliance pursuant to the Environmental Cleanup Responsibility Act, N.J.S.A. 13:1K-6 et seq. This Administrative Consent Order may be enforced in the same manner as an Administrative Order issued by NJDEP pursuant to other statutory authority and shall not preclude NJDEP from taking whatever action it deems appropriate to enforce the environmental protection laws of the State of New Jersey in any manner not inconsistent with the terms of this Administrative Consent Order. It is expressly recognized by NJDEP and Textron that nothing in this Administrative Consent Order shall be construed as a waiver by NJDEP of its rights with respect to enforcement of ECRA on bases other than those set forth in Sections 10 and 12 of this Administrative Consent Order or by Textron of its right to seek review of any enforcement action as provided by the Administrative Procedure Act, N.J.S.A. 52:14B-1 et seq. Furthermore, nothing in this Administrative Consent Order shall constitute a waiver of any statutory right of NJDEP to require Textron to implement additional remedial measures should NJDEP determine that such measures are necessary to protect the public health, safety and welfare.

15. NJDEP and Textron have entered into this Administrative Consent Order in good faith to ensure ECRA compliance and to allow the proposed Asset Purchase to be completed as quickly as possible. Textron has executed this Administrative Consent Order without trial or adjudication of any issue of fact or law. Accordingly, neither Textron's execution of this Administrative Consent Order, nor its compliance with any of the provisions herein, shall be deemed or construed to be an admission of liability at any time or for any purpose other than Textron's liability to comply with the terms and conditions of ECRA as set forth in this Administrative Consent Order.

16. Textron hereby consents to entry of this Administrative Consent Order and waives its right to a hearing concerning the terms hereof pursuant to N.J.S.A. 52:14B-1 et seq.

17. This Administrative Consent Order shall take effect upon the signature of all parties. Upon the signature of all parties, Textron may complete the sale or transfer of the Newark facility subject to the Administrative Consent Order.

NEW JERSEY DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Date: _____

By: _____
Joseph Rogalski, Assistant
Director for Enforcement &
Field Operations

TEXTRON INC.

Date: 1/24/85

By: _____

Name: George H. Hartmann
Title: Group Vice President

Fleet National Bank

INTERNATIONAL DIVISION
P.O. BOX 516, Providence, R.I. 02901
(401) 278-5740

SWIFT FLTBUS3P
CABLE ADDRESS
FLEETBANK
TELEX: ITT 4435019

ISSUE DATE JULY 23, 1985 PAGE 1
IRREVOCABLE LETTER OF CREDIT
NUMBER S85-5181

BENEFICIARY:
DIVISION OF WASTE MANAGEMENT, NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
428 EAST STATE STREET
TRENTON, NEW JERSEY 08608
ATTN: THOMAS KEARNS, ASST. CHIEF, BUREAU OF
INDUSTRIAL SITE EVALUATION

DEAR SIRS:

WE HEREBY ESTABLISH OUR IRREVOCABLE STANDBY LETTER OF CREDIT NO. S85-5181, IN YOUR FAVOR, AT THE REQUEST AND FOR THE ACCOUNT OF TEXTRON INC., 40 WESTMINSTER STREET, PROVIDENCE, RHODE ISLAND 02903, UP TO THE AGGREGATE AMOUNT OF ONE HUNDRED THOUSAND AND 00/100 USDOLLARS (USD100,000.00), AVAILABLE UPON PRESENTATION BY YOU OF (1) YOUR SIGHT DRAFT, BEARING REFERENCE TO THIS IRREVOCABLE STANDBY LETTER OF CREDIT NO. S85-5181, AND (2) YOUR SIGNED STATEMENT READING AS FOLLOWS:
"I HEREBY CERTIFY THAT THE AMOUNT OF THE DRAFT IS PAYABLE PURSUANT TO THE AUTHORITY OF THE ENVIRONMENTAL CLEANUP RESPONSIBILITY ACT, N.J.S.A. 13:1K-6 ET SEQ. (P.L. 1983, C.330) ("ECRA") AND THE INTERIM ECRA REGULATIONS, N.J.A.C. 7:1-3."

THIS LETTER OF CREDIT IS EFFECTIVE AS OF JULY 23, 1985 AND SHALL EXPIRE ON JULY 22, 1986 UNLESS EARLIER TERMINATED IN ACCORDANCE WITH THE TERMS OF THIS CREDIT, WE SHALL DULY HONOR SUCH DRAFT UPON PRESENTATION TO US, AND WE SHALL DEPOSIT THE AMOUNT OF THE DRAFT DIRECTED INTO THE STANDBY TRUST FUND OF TEXTRON, INC. OR ITS SUCCESSORS IN ACCORDANCE WITH YOUR INSTRUCTIONS.

THIS LETTER OF CREDIT IS IRREVOCABLE AND ISSUED FOR A PERIOD OF AT LEAST ONE (1) YEAR. THIS LETTER OF CREDIT WILL BE AUTOMATICALLY EXTENDED FOR A PERIOD OF AT LEAST ONE (1) YEAR UNLESS, AT LEAST NINETY (90) DAYS BEFORE THE CURRENT EXPIRATION DATE, WE NOTIFY BOTH THE NJDEP AND TEXTRON INC. BY CERTIFIED MAIL THAT WE HAVE DECIDED NOT TO EXTEND THIS LETTER OF CREDIT BEYOND THE CURRENT EXPIRATION DATE. THE 90-DAY PERIOD WILL BEGIN ON THE DATE OF RECEIPT BY NJDEP AS SHOWN ON THE SIGNED RETURN RECEIPT.

(CONTINUED)

Fleet National Bank

INTERNATIONAL DIVISION
P.O. BOX 516. Providence, R.I. 02901
(401) 278-5740

SWIFT:FLTBUS3P
CABLE ADDRESS
FLEETBANK
TELEX: ITT 4435019

WITHOUT RESPONSIBILITY ON OUR PART, TEXTRON INC. HAS ADVISED US THAT WHENEVER THE CLEANUP PLAN COST ESTIMATE INCREASES TO AN AMOUNT GREATER THAN THE AMOUNT OF CREDIT, TEXTRON INC. SHALL WITHIN 60 DAYS OF THE INCREASE, CAUSE THE AMOUNT OF THE CREDIT TO BE INCREASED TO AN AMOUNT AT LEAST EQUAL TO THE NEW ESTIMATE OR OBTAIN OTHER FINANCIAL ASSURANCE AS SPECIFIED IN N.J.A.C. 7:1-3.13 TO COVER THE INCREASE. WHENEVER THE ADJUSTED CLEANUP COST ESTIMATE DECREASES DURING THE IMPLEMENTATION OF THE APPROVED CLEANUP PLAN AT THE INDUSTRIAL ESTABLISHMENT, THE LETTER OF CREDIT MAY BE REDUCED TO THE AMOUNT OF THE NEW ESTIMATE FOLLOWING WRITTEN APPROVAL BY NJDEP. NOTICE OF AN INCREASE OR DECREASE IN THE AMOUNT OF THE CREDIT SHALL BE SENT TO THE NJDEP BY CERTIFIED MAIL WITHIN 60 DAYS OF THE CHANGE.

THIS LETTER OF CREDIT IS SUBJECT TO THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS (1983 REVISION) INTERNATIONAL CHAMBER OF COMMERCE PUBLICATION NO. 400.

VERY TRULY YOURS,

Barbara A. Fattionte
AUTHORIZED SIGNATURE

AUTHORIZED SIGNATURE

RL/ZD

845030171

Exhibit 7

ENVIRON

January 17, 1995

Hand Deliver

Mr. Mike Buriani
BEECRA Cleanup Oversight Section
New Jersey Department of Environmental Protection
401 East State Street
Trenton, NJ 08625

Re: Textron Inc. - Former Spencer Kellogg Facility
Newark, Essex County, New Jersey
ECRA Case No. 85403

Dear Mr. Buriani:

This letter provides the results of additional soil and ground water sampling activities conducted at the above-referenced facility during November and December 1994 and, where appropriate, outlines recommendations for further actions. The work implemented was consistent with the proposals initially outlined in ENVIRON's April 25, 1994 letter and May 27, 1994 addendum to the New Jersey Department of Environmental Protection (NJDEP). As you know, the proposed sampling was approved by the NJDEP in its August 30, 1994 letter to Textron. Also contained in this letter is a summary of a September 2, 1994 conversation between you and Andrew Kolesar, Esq. of Skadden, Arps, Slate, Meagher & Flom confirming the resolution of residual lead issues at the facility.

Resampling at Former Post-Excavation Sampling Locations

As discussed fully in previous correspondence to the NJDEP, three limited areas contain residual levels of volatile organic compounds (VOCs) above the 1,000 ppm total VOC cap currently utilized by the NJDEP. These include areas beneath an aboveground storage tank (Area 1), along the northern retaining wall (Areas 3, 4 and 5) and below one end of the large tank farm foundation wall (Area 4). The specific sampling points include P98/98A in Area 1, P76 in Areas 3, 4 and 5 and P85/85A in Area 4 (see Plate 1). With the exception of these sampling points, the results of all post-excavation sampling from these areas meet the NJDEP's current guidance levels for residential property use. In its November 23, 1993 letter, the NJDEP indicated that no further action would be needed to address these three residual sampling locations provided that engineering and institutional controls were implemented.

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Textron, ENVIRON and the NJDEP discussed the residual VOC levels in soils and potential site use restriction requirements as referenced above during a February 22, 1994 meeting. Textron and ENVIRON understood from that meeting that the NJDEP would allow soils to remain in place without site use restrictions where concentrations of VOCs had been reported above the 1,000 ppm cap in the November 1991 analyses, provided that additional sampling evidenced natural degradation and/or conditions favorable to degradation of these constituents. Accordingly, in its April 25, 1994 letter to the NJDEP, Textron submitted a proposal for additional soil sampling at these three prior post-excavation sampling locations. The samples would be collected from approximately the same location and depth as the samples which exhibited total VOC levels above 1,000 ppm and analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX) using USEPA Method 8020. This sampling proposal was approved in the August 30, 1994 letter to Textron. As stated in that letter, no further action would be required by the NJDEP, including site use restrictions, if the total concentration of BTEX is less than 1,000 ppm and the individual concentrations are less than the NJDEP cleanup criteria. Copies of the April 25 and August 30 correspondence are attached for your reference.

A summary of results of the recent soil sampling is provided in Table 1. The results indicate that residual VOC concentrations at the three former post-excavation sampling locations are well below the 1,000 ppm total VOC cap. The range of total VOC concentrations was 39.9 to 168 ppm, with the identified compounds consisting of ethylbenzene, toluene and/or xylenes. No individual compound exceeded its respective cleanup criterion for residential property use. Consistent with the NJDEP's August 30, 1994 letter, no further action will be required for these areas based on these data. Therefore, Textron and ENVIRON believe that all obligations under the administrative consent order have been met for soils.

Ground Water Sampling at Building 31

As discussed fully in ENVIRON's May 27, 1994 letter to you, a number of field activities were implemented in January 1994 which were designed to evaluate the potential source of resinous materials observed in the loading dock area and dissolved organic constituents in ground water. Six locations within Building 31 were selected near the interior wall of the loading dock and adjacent to former floor drains to evaluate the potential presence of resinous material beneath the building. At each location (shown on Plate 2), the concrete floor was cored and observations were made regarding the presence or absence of affected soils and/or resinous materials. No affected soils or resinous materials were observed. A small void space was noted below the concrete floor, as were compacted clay materials at each location.

In its May 27, 1994 letter to the NJDEP, Textron and ENVIRON indicated that additional ground water sampling was necessary in and around Building 31 to determined the nature and extent of elevated BTEX concentrations previously identified at MW27 prior to determining the appropriateness of remedial actions to address levels of those constituents. Accordingly, Textron and ENVIRON proposed to obtain ground water samples in and around Building 31 from temporary well points installed using the

TABLE 1
Summarized Soil Sampling Results
November - December 1994

Location	Sampling Depth	BTEX Concentrations (ppm)	
P76	1.5 - 2.0 feet	Benzene	ND
		Toluene	19
		Ethylbenzene	0.016
		Xylenes	110
P85/85A	2.3 - 2.8 feet	Benzene	ND
		Toluene	ND
		Ethylbenzene	48
		Xylenes	120
P98/98A	1.7 - 2.0 feet	Benzene	ND
		Toluene	39
		Ethylbenzene	ND
		Xylenes	0.91

Notes:

ppm - parts per million = mg/kg.
ND - Not Detected.

Hydro-punch system. A number of well points were proposed adjacent to MW27 and within the building. Sampling of the vertical standpipes located along the northern side of the building was also proposed if samples could not be readily obtained inside the building using the Hydro-punch system. Ground water samples would be collected for BTEX analysis by USEPA Method 602. In its August 30, 1994 letter, the NJDEP approved this ground water sampling proposal.

As proposed, a number of Hydro-punch locations were completed to determine VOC levels in ground water in and around Building 31 (see Plate 2). Three interior locations were sampled, including two coring locations previously installed and inspected in January 1994 (HP01 and HP02) and one additional location near the western common wall with Building 32 (HP05). At HP05, a nonaqueous phase product layer approximately 1-inch thick was encountered on the ground water surface. A sample was collected of the product as well as of the underlying ground water. For the exterior locations, ENVIRON first installed Hydro-punch well points approximately 20 feet east (HP03) and 40 feet west (HP04) of existing well MW27. Ground water samples were collected from these locations for on-site screening purposes and for laboratory analysis. Because results of field screening suggested potentially elevated VOC levels at HP03 and HP04, two additional well points were installed east (HP07 and HP09) and west (HP06 and HP08) of MW27 to complete the field activities.

Because a drum conveyor system was recently installed in the building and along the northern loading dock, Hydro-punch sampling in the eastern and northern portions of the building could not be conducted. Rather, ground water samples were collected from three of the four vertical standpipes located along the northern wall of the building and from existing well MW11 located east of Building 31. A ground water sample was not obtained from standpipe 2 because it is only 25 feet east of standpipe 3 and is within the same area of gravel backfill. These standpipes were sampled consistent with NJDEP recommendations for monitoring well sampling, with levels of pH, temperature, specific conductance and dissolved oxygen monitored during purging. Levels of these parameters stabilized after purging of approximately 4 to 5 standpipe volumes. The purge water was contained in 55-gallon drums pending proper disposal.

Ground water samples collected from existing monitoring wells, vertical standpipes and Hydro-punch locations were analyzed for BTEX by Accutest Laboratories, Inc. of Dayton, New Jersey using USEPA Method 602. The summarized ground water sampling results are provided on Plate 2, including BTEX concentrations in the product layer encountered at HP05. The data suggest two areas of BTEX ground water contamination beneath and near Building 31/32. The first area includes HP01, HP05 and HP06, where the most elevated VOC concentrations were identified during this delineation program, as well as MW27 and HP07. The presence of free-phase nonaqueous product at HP05 suggests that this material is a possible source for the ground water contamination detected at these locations.

The second area of BTEX ground water contamination includes the three sampled standpipes. The data at these locations suggest that these standpipes may monitor

ground water of similar quality that may have accumulated in gravel trenches (shown on Plate 2) installed north of the building to address resinous materials observed in soils adjacent to the building during the previous 1991 soil cleanup program. (During sampling of these standpipes, resinous material was present only at SP02.) In addition, the relatively low levels of VOCs at HP02 suggest that ground water contamination detected on the north side of the building may be distinct from the contamination identified south of the building. Last, the low concentrations of VOCs at HP08, HP09 and MW11 indicates that this sampling program has nearly defined the width of the plume downgradient of Building 31/32. It is also important to note that the ground water data from the seven locations south of the building indicate significant variability in ground water quality, with alternating high and low BTEX concentrations. The reason for this variability is not currently known. Textron and ENVIRON believe that the installation and sampling of additional monitoring wells, as proposed below, is necessary to confirm the BTEX concentrations and to more accurately define the plume boundaries. Similarly, Textron and ENVIRON believe that further investigations for free-phase product beneath Building 31 is warranted.

Proposed Additional Actions

Textron proposes to install two additional monitoring wells (MWs 28 and 29) at the locations shown on Plate 2 to confirm the width of the BTEX plume south of Building 31/32. These proposed locations are near the presumed eastern and western boundaries of the plume. These wells will be screened across the water table, similar to the construction of all other on-site shallow monitoring wells, and sampled for BTEX. A confirmatory ground water sample will also be collected for BTEX analysis from MW27. Construction specifications and ground water sampling procedures will be consistent with current NJDEP recommendations for wells monitoring unconsolidated formations. Additional Hydro-punch locations (HP10 through HP13) will also be installed along the southern border of the building to confirm the earlier results. As previously indicated, the data showed alternating high BTEX concentrations (e.g., HP06, HP07, MW27) adjacent to much lower BTEX concentrations (e.g., HP08, HP04, HP03, and HP09). This variability cannot be readily explained based on known site information. The ground water concentrations therefore need to be confirmed to better evaluate potential remedial responses for this area.

To address the potential eastern and western extent of affected ground water associated with the vertical standpipes north of the building, two Hydro-punch locations (HP20 and HP21) are proposed as shown on Plate 2. These locations will be sampled for BTEX. The three standpipes previously sampled will also be resampled for BTEX to determine if there has been any change in ground water concentrations with time.

To delineate the extent of the free-phase product identified at location HP05, Textron and ENVIRON will complete several additional Hydro-punch locations within Building 31. The product layer thicknesses, where detected, will be measured in the screen installed at each Hydro-punch location. It is currently anticipated that three additional Hydro-punch locations will be completed near HP05 (HP14, HP15, and HP16) and two Hydro-punch locations (HP17 and HP18) will be placed near HP01 to look for free-

phase product. The concentration of dissolved VOCs previously detected in HP01 suggests that free product may be present nearby. One additional Hydro-punch location (HP19) will be installed along the eastern arm of the floor trench system to confirm the presence or absence of free product and to characterize ground water quality in that portion of the building. Additional locations may be added, if necessary, to complete the product delineation.

To gather site-specific information about ground water flow direction for the area of Building 31/32, the monitoring wells and standpipes that have not been surveyed will be surveyed and tied to site datum. Also, the elevation of the building floor will be surveyed to enable ground water elevations to be determined at interior Hydro-punch locations. Water level measurements will be collected and evaluated to construct a ground water contour map for the area.

Textron will proceed with the installation of the monitoring wells and Hydro-punch locations upon receipt of written NJDEP approval of the above-described proposals. The results of this additional ground water and free-product delineation program will be submitted to the NJDEP within 120 days of receipt of NJDEP's approval. Should these additional sampling activities sufficiently define the ground water plume and the free product layer, recommendations for necessary remedial actions with respect to these conditions will be submitted with the results of the additional sampling activities.

Residual Lead Concentrations in Soils

Textron proposed in its May 27, 1994 letter to conduct limited additional soil sampling at points between previous sampling locations where lead concentrations exceeded 1,000 ppm and adjacent sampling locations approximately 5 feet away where lead levels were less than 1,000 ppm. It was Textron's and ENVIRON's understanding that the NJDEP would not require further action should the lead levels in these additional samples be below 1,000 ppm (less than one order of magnitude above the NJDEP direct contact residential surface soil cleanup criterion in place at that time and thus not subject to further remediation under ISRA). The NJDEP approved this sampling proposal in its August 30, 1994 letter to Textron.

As we have discussed on prior occasions, Textron withdrew its May 27, 1994 proposal to sample additional soils for lead based on a September 2, 1994 telephone conversation between you and Andrew Kolesar of Skadden Arps. During that conversation, and based on a review of documentation provided to you on September 1, the NJDEP agreed that a no further action approval (NFA) for lead had been previously given by the Department and, therefore, the NJDEP would not require further investigation and/or remediation or impose a site use restriction for lead. As such, Textron requests NJDEP's written confirmation of this agreement and, as previously indicated, that all obligations with respect to soils have been met.

If you have any questions about these sampling results or the proposal for additional ground water sampling, please do not hesitate contact us.

Sincerely,

Scott E. MacDonald
Manager

William D. Kraft
Senior Associate

SEM/WDK:dmd
0288E:PAA05965.W51

cc: Jack Schiavone
Andrew Kolesar, Esq.

02-0288E
Progress Report

January 12, 1994

HAND DELIVERY

Mr. Mike Buriani
BEECRA Cleanup Oversight Section
New Jersey Department of
Environmental Protection and Energy
401 East State Street
Trenton, NJ 08625

Re: Textron Inc. - Former Spencer Kellogg Facility
Newark, Essex County, New Jersey
ECRA Case No. 85403

Dear Mr. Buriani:

Enclosed please find the progress report describing the activities associated with the implementation of the Cleanup Plan at the former Spencer Kellogg facility for October through December 1993.

Please contact us if you have any questions or need further information.

Sincerely,

Scott E. MacDonald /JLM

Scott E. MacDonald
Manager

Scott R. Palmer

Scott R. Palmer
Senior Associate

CENTRAL FILE

SEM/JLM:jml
0288E:PAA04670.W51

Enclosures

cc: J. Schiavone
A. Kolesar

845030180

CLEANUP PLAN IMPLEMENTATION PROGRESS REPORT

Textron Inc. - Former Spencer Kellogg Facility
ECRA Case No. 85403

October through December 1993

1. Activities Performed This Reporting Period

The activities performed during this reporting period of October through December 1993 include (1) receipt and review of the New Jersey Department of Environmental Protection and Energy (NJDEPE) letter dated November 24, 1993 regarding post-remedial soil conditions at the site; (2) receipt and review of ground water monitoring results from quarterly sampling and the investigation of AEC 3; (3) monitoring of standpipes in AEC 3; and (4) implementation of initial actions to understand any potential source(s) of free-phase material observed in AEC 3 and the conditions underneath Building 31/32.

NJDEPE Letter Dated November 24, 1993

Textron and ENVIRON received and reviewed the NJDEPE's November 24, 1993 letter to Mr. Paul Duff. This letter provided NJDEPE's comments on Textron's June 28, 1993 Technical Response Document and a number of progress reports. As you know, ENVIRON has discussed a number of these comments with you and Mr. Steve Maybury, and submitted a letter to Mr. Maybury on December 22, 1993, requesting a meeting with the NJDEPE to review further potential requirements for the site as outlined in the NJDEPE's letter. Textron and ENVIRON believe that resolution of the issues raised in the NJDEPE's letter is critical to "closing the book" on the soils cleanup program and that these issues can be resolved most expeditiously in a meeting. A meeting has been scheduled for January 28, 1994 at 1:30 p.m. with representatives of ENVIRON, Textron, and the NJDEPE.

Ground Water Monitoring

As noted in the February 16, 1993 progress report, MW10, MW14, and MW28 (a new well downgradient of MW14) were installed on January 7 and 8, 1993 for quarterly ground water monitoring purposes.[1] At that time, MW11 and MW27 were also installed to investigate the presence of and potential impact to ground water from free-phase resinous material observed in AEC 3 during prior excavation activities. A drawing showing the locations of these monitoring wells was provided with the February 16, 1993 progress report.

The first three rounds of quarterly sampling were conducted on January 26, 1993, April 27, 1993, and August 4, 1993, and the analytical results from these sampling events were provided in previous progress reports to the NJDEPE. On October 18, 1993, the fourth round of ground water samples were collected from all five wells; these samples were analyzed for priority pollutant volatile organic compounds plus a 15 compound forward library search (VOC+15) and xylenes. The analytical results of this fourth round of sampling are tabulated and provided in Table 1, and are briefly discussed below. The analytical data package for this sampling is also attached to this progress report. Ground water elevations measured during the most recent sampling are provided in Table 2. For discussion purposes, the results from all four rounds of quarterly monitoring have been consolidated into Tables 3 and 4. General conclusions regarding the four rounds of sampling and recommendations for future actions are provided below.

- **Quarterly Ground Water Monitoring Results**

  As noted above, MW10, MW14, and MW28 were sampled for VOC+15 and xylenes as part of the post-cleanup monitoring program. The fourth round sample from MW10 contained 1,270 parts per billion (ppb) of toluene, further confirming the decreasing trend observed since the first round (26,400 ppb). The second and third round results for this constituent were 7,190 ppb and 9,000 ppb, respectively. Concentrations of ethylbenzene (129 ppb) and total xylenes (304 ppb) were also

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[1] As previously discussed with and approved by Ms. Helen Dudan (NJDEPE Case Geologist), MW15 and MW20 (formerly located laterally downgradient of MW10) were not reinstalled for quarterly monitoring purposes. This was formerly acknowledged in the NJDEPE's November 24, 1993 letter.

reported for the fourth round of sampling. These levels also are lower than those detected during earlier sampling rounds. Samples collected during the first round contained estimated concentrations of ethylbenzene and total xylenes at 230 and 695 ppb, respectively, samples from the second round contained estimated levels of ethylbenzene and total xylenes at 186 and 458 ppb, respectively; and samples from the third round contained estimated levels of 196 and 304 ppb, respectively. VOCs were not detected above the method detection limits (MDLs) in the sample from MW14. This result is consistent with those from previous quarterly sampling events. In the sample from MW28 (downgradient of MW14), no VOCs were detected above the MDL. Previously, m-xylene was detected in MW28 at concentrations of 358 ppb, 11.3 ppb, and 174 ppb during the first, second, and third rounds, respectively.

As indicated in Textron's October 1990 Cleanup Plan, and confirmed in the NJDEPE's February 8, 1991 conditional approval letter, quarterly monitoring would be conducted for a minimum of one year after the planned remedial actions for soils had been conducted. It was agreed with the NJDEPE that the need for additional monitoring, or any other action, would be determined after this period of monitoring. Based on a number of factors, Textron and ENVIRON do not believe that any further work is needed for ground water in this area of the site. First, source control actions in the vicinity of MW10 were fully implemented as documented in Canonie's July 1992 final cleanup report. Second, as discussed above and summarized in Table 3, a significant decrease in toluene concentrations, the primary VOC detected in shallow ground water in this area, has been observed over the course of the quarterly sampling program in MW10. Further, the results from MW14 and MW28, located downgradient from the source area monitored by MW10, indicated no significant levels of toluene or any other VOC. Textron and ENVIRON believe that these results confirm the successful execution of source control activities. Third, as part of the Phase II Sampling Plan, mathematical analyses were performed to evaluate the potential migration of VOC contamination in the shallow aquifer. The results, presented in ENVIRON's June 1988 report, indicate that the concentration of VOCs at the nearest receptor boundary (Newark Bay) would be insignificant and would pose no risk to public health or the

environment, even in the absence of any source control actions. Since source control actions have been implemented and a significant decrease in ground water contaminants noted, additional monitoring or ground water cleanup in this area of the site is considered unnecessary. Textron requests the NJDEPE's concurrence.

- **Investigation of AEC 3**

  As indicated above, ground water samples were collected from MW11 and MW27, both located downgradient of AEC 3, and were analyzed for VOC+15 plus xylenes. Similar to the first three rounds of sampling, VOCs were not detected above the MDLs in the fourth round sample from MW11. The sample from MW27 contained 19,800 ppb toluene, 6,270 ppb ethylbenzene, 30,000 ppb total xylenes, and 807 ppb benzene. These results are consistent with those reported for the first three rounds of sampling, although the levels observed in the fourth round for each of these constituents were slightly lower than those reported for earlier rounds.

  As noted in previous progress reports, Textron could not undertake certain actions related to determining the potential source(s) of the free-phase resinous material beneath Building 31/32, which may be creating the impact to ground water observed in MW27, due to a January 10, 1992 explosion and fire in Building 31/32. However, sufficient access to Building 31/32 was gained in November of 1993. As a result, Textron implemented several actions to understand any potential source(s) of the free-phase material observed in AEC 3 and the conditions underneath Building 31/32. These actions included: (1) holding discussions with plant personnel and review of available plant drawings to investigate possible sources and pathways for migration of any free-phase resinous material; (2) visual inspection of the first floor of the building; and (3) determining the feasibility of inspecting conditions underneath the building.

  The meeting with current plant personnel to discuss historical operations and material handling in Building 31/32 was held on November 10, 1993. Based on our discussions and understanding of the plant operations, potential pathways for material to have migrated to the area beneath the building include: (1) breaches in the first floor (including the loading dock area) and/or current floor trench system; (2) poor seals around former floor drains on the first floor, and (3) breaks in the

sewer line beneath the building. However, ENVIRON has no information at this time that would serve to confirm the exact source responsible for the conditions observed in AEC 3.

With the assistance of Reichhold Chemicals personnel and GPX, ENVIRON conducted an inspection of the building and reviewed plant drawings to determine the feasibility of inspecting conditions underneath the building. GPX is a company with expertise in projects requiring the investigation of conditions beneath buildings and has successfully conducted such work at the former Spencer Kellogg facility in the past. Plan drawings of the first floor foundations, framing, and piling details were reviewed and the perimeter of the building and elevator shaft pit were examined to determine potential access points beneath the building. We were unable to identify any existing means of access to beneath the first floor of the building. The plan drawings reveal a complex network of pilings and interferences which may indicate limited void space beneath the first floor.

Although potential constraints imposed by the foundation structure and limited access appear to exist, the following approach will be implemented in an attempt to gain further information on the conditions beneath the building. First, a limited number of small diameter borings will be cut through the concrete flooring (including the loading dock) to examine the void space. If there is sufficient void space, a video survey will be performed with a mini-camera to observe conditions beneath the building that could represent a source of the material along the loading dock. This work is scheduled to be completed in January 1994. The results of this work, along with recommendations for any additional actions, will be provided in the next quarterly progress report.

Inspection of Standpipes in AEC 3

Since the last progress report of October 15, 1993, ENVIRON performed inspections of the standpipes in AEC 3 on October 18, 1993 and November 18, 1993. During both inspections, ENVIRON observed a thin, resinous skin-like film on the surface of the water in SP-2. The film was penetrated with a bailer, and grab samples of water did not contain non-aqueous phase liquids. No such film was observed in the other standpipes. These results are consistent with prior observations made over the past several months.

The NJDEPE indicated in its March 30, 1993 letter that it would be appropriate for Textron to modify the operating trench system (in AEC 3) to accommodate ground water recovery if the sampling results appear to warrant such an action. As discussed in previous correspondence, including the April 15, 1993 and July 15, 1993 progress reports and the June 28, 1993 letter, the gravel subsurface trenches in AEC 3 were installed to prevent further migration of any free-phase resinous material observed during excavation activities in this area. The associated vertical standpipes were installed solely to monitor the accumulation, or lack thereof, of this material over time. As previously noted, the trench/standpipe system was not designed, nor is it suitable, for ground water sampling or recovery purposes. If consideration of all relevant factors indicates the need for ground water remediation, an appropriate system would need to be designed. The NJDEPE acknowledged this position in its November 24, 1993 letter.

2. Data Produced During this Reporting Period

As noted above, the analytical results for ground water samples collected during October 1993 were received and are presented in Table 1, which is included with this progress report. The laboratory analytical data package for these results is also provided with this progress report.

3. Remedial Costs and Percentage of Total Remedial Activities to Date

As reported in the last progress report, with the soils remediation at the site completed, invoiced costs totaled $2,576,855. These costs include Canonie's activities related to obtaining permits, site mobilization, excavation and restoration in target AECs, off-site disposal of waste materials, processing of soils through the LTTA unit, site restoration, and demobilization.

4. Activities Scheduled for January through March 1993

Activities for January through March 1994 will include (1) participation in a meeting among representatives of the NJDEPE, Textron, and ENVIRON on January 28 to discuss a number of comments contained in the NJDEPE's November 24, 1993 letter; (2) preparation of any additional written response subsequent to the meeting; and (3) implementation of the video survey beneath Building 31/32.

TABLE 1
Ground Water Sampling Results
(Collected 10/18/93)
Textron Inc., Newark, New Jersey

	MW10-GW14	MW10-GW14D (Duplicate)	MW11-GW04	MW14-GW14	MW27-GW04	MW28-GW04	TB-101893	WB01-1018
Benzene	ND	ND	ND	ND	807	ND	ND	ND
Ethylbenzene	129	171	ND	ND	6,270	ND	ND	ND
Toluene	1,270	1,680	ND	ND	19,800	ND	ND	ND
m-Xylene	175	255	ND	ND	18,100	ND	ND	ND
o+p-Xylenes	129	181	ND	ND	11,900	ND	ND	ND
Chloride	1,480 ppm	1,640 ppm	501 ppm	142 ppm	431 ppm	501 ppm	--	--
Total Dissolved Solids	3,510 ppm	3,530 ppm	755 ppm	480 ppm	253 ppm	755 ppm	--	--

Notes:

All results are in parts per billion (ppb) except where noted.
ND = Compound not detected above method detection limit.

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TABLE 2
Ground Water Elevations (feet above mean sea level)
10/18/93
Textron, Inc.
Newark, New Jersey

Monitoring Well	Elevation
1	2.05
3	3.05
4	3.41
5	3.25
6	3.98
8	3.24
9	3.84
10	3.9
11	4.15
14	3.85
17	4.29
18	3.46
19	2.6
21	1.92
22	No measurement[2]
23	1.98
25	3.94
26	2.41
27	3.73
28	3.64

Notes:

[1] Not able to obtain water level measurements from MW2 due to the presence of a black tar-like substance in this upgradient background well believed to be present from an off-site source.

[2] No measurement collected from MW22 for 10/18/93 only.

TABLE 3
Summary of the Quarterly
Ground Water Monitoring Results
Textron Inc., Newark, New Jersey

Collected January 1993	MW10-GW11		MW14-GW11	MW14-GW11D (Duplicate)	MW28-GW01
Benzene	ND		ND	ND	ND
Ethylbenzene	230.00 J		ND	ND	5.94 J
Methylene chloride	159.00 J		ND	ND	1.15
Toluene	26400.00		2.33 J	0.87 J	ND
m-Xylene	329.00 J		ND	ND	358
o+p-Xylenes	326.00 J		ND	ND	6.19 J
Collected 4/27/93	**MW10-GW02**		**MW14-GW12**		**MW28-GW02**
Benzene	ND		ND		ND
Ethylbenzene	186J		ND		ND
Methylene Chloride	98.6		ND		ND
Toluene	7,190		ND		ND
m-Xylene	231J		ND		11.3
o+p-Xylenes	227J		ND		ND
Chloride	1,790 ppm		1,190		1,280
Total Dissolved Solids	4,790 ppm		2,490		2,520
Collected 8/14/93	**MW10-GW13**	**MW10-GW13 (Duplicate)**	**MW14-GW13**		**MW28-GW03**
Benzene	ND	ND	ND		ND
Ethylbenzene	196J	164J	ND		ND
Toluene	9,000	8,930	ND		ND
m-Xylene	227J	129J	ND		174
o+p-Xylenes	216J	165J	ND		2.55 J
Chloride	1,910 ppm	1,940 ppm	181 ppm		862 ppm
Total Dissolved Solids	4,510 ppm	5,670 ppm	599 ppm		1,610 ppm

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TABLE 3
Summary of the Quarterly
Ground Water Monitoring Results
Textron Inc., Newark, New Jersey

Collected 10/18/93	MW10-GW14	MW10-GW14D	MW14-GW14		MW28-GW04
Benzene	ND	ND	ND		ND
Ethylbenzene	129	171	ND		ND
Toluene	1,270	1,680	ND		ND
m-Xylene	175	255	ND		ND
o+p-Xylenes	129	181	ND		ND
Chloride	1,480 ppm	1,640 ppm	142 ppm		501 ppm
Total Dissolved Solids	3,510 ppm	3,530 ppm	480 ppm		755 ppm

Notes:

All results are in parts per billion (ppb) except where noted.
ND = Compound not detected above method detection limit.
J = Estimated value when mass spectral data indicate the presence of a compound below the method detection limit.

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TABLE 4
Summary of the Ground Water Sampling Results
for the Investigation of AEC 3
Textron Inc., Newark, New Jersey

Collected January 1993	MW11-GW01		MW27-GW01
Benzene	ND		890.00
Ethylbenzene	ND		8770.00
Methylene chloride	2.39 J		176.00 J
Toluene	ND		35200.00
m-Xylene	ND		26800.00
o+p-Xylenes	ND		14400.00
Collected 4/27/93	**MW11-GW01**	**MW11-GW02 (Duplicate)**	**MW27-GW02**
Benzene	ND	ND	900
Ethylbenzene	ND	ND	7,170
Methylene Chloride	ND	ND	ND
Toluene	ND	ND	22,700
m-Xylene	ND	ND	18,000
o+p-Xylenes	ND	ND	12,300
Chloride	498	414	342
Total Dissolved Solids	1,220	1,270	11,120
Collected 8/04/93	**MW11-GW02**		**MW27-GW03**
Benzene	ND		950
Ethylbenzene	ND		7,440
Toluene	ND		24,400
m-Xylene	1.04J		21,800
o+p-Xylenes	ND		13,700
Chloride	1,740 ppm		396 ppm
Total Dissolved Solids	2,840 ppm		7,050 ppm

TABLE 4
Summary of the Ground Water Sampling Results for the Investigation of AEC 3 Textron Inc., Newark, New Jersey

Collected 10/18/93	MW11-GW04		MWZ7-GW04
Benzene	ND		807
Ethylbenzene	ND		6,270
Toluene	ND		19,800
m-Xylene	ND		18,100
o+p-Xylenes	ND		11,900
Chloride	501 ppm		431 ppm
Total Dissolved Solids	755 ppm		253 ppm

Notes:

All results are in parts per billion (ppb) except where noted.
ND = Compound not detected above method detection limit.
J = Estimated value when mass spectral data indicate the presence of a compound below the method detection limit.

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ENVIRON

May 22, 1991

HAND DELIVERY

Mr. Sal Balakrishnan
BEECRA Cleanup Oversight Section
New Jersey Department of Environmental Protection
401 East State Street
Trenton, NJ 08625

Re: Textron Inc. - Former Spencer Kellogg Facility
Newark, Essex County, New Jersey
ECRA Case No. 85403

Dear Mr. Balakrishnan:

Enclosed please find the progress report describing the activities associated with implementation of the Cleanup Plan for the former Spencer Kellogg facility for April 1991. Submission of this progress report on or before May 22, 1991 is in accordance with the agreement reached during our May 9, 1991 telephone conversation.

As proposed in the October 1990 Cleanup Plan, a detailed work plan for remediation has been completed and is attached to this progress report. The Health and Safety and Quality Assurance Plans are also provided.

The revised schedule for the cleanup is provided in Figure 7 of the attached Work Plan, as discussed in the progress report. The revised schedule is dependent upon a number of activities beyond Textron's control, including NJDEP's response to ENVIRON's outstanding letters concerning Textron's waste classification analysis and NJDEP's review and approval of the air permit application to be submitted shortly. It is also dependent upon receiving

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cooperation from Reichhold on certain site access issues. We will keep NJDEP informed of possible delaying events, should they occur.

Please contact us if you have any questions or need further information.

Sincerely,

Scott MacDonald
Manager

Julia Mermelstein
Associate Engineer

SEM/JM:rdp
0288E:PAA0130C.W51

Enclosures

cc: J. Schiavone
R. Lawrence

CLEANUP PLAN IMPLEMENTATION PROGRESS REPORT

Textron Inc. - Former Spencer Kellogg Facility
ECRA Case No. 85403

April 1991

1. Activities Performed This Reporting Period

The activities performed during this reporting period included: (1) a site visit with the NJDEP Cleanup Oversight Coordinator; (2) receipt and analysis of the results from pre-remediation soil sampling conducted during March; (3) submission of documentation to NJDEP regarding the waste designation of soils to be remediated; (4) further discussions with NJDEP regarding site-specific cleanup criteria; (5) execution of a contract between Textron and Canonie, the remediation contractor; (6) preparation of a detailed work plan for the remediation; (7) further discussions with potential excavation subcontractors regarding remediation in AEC 12 (beneath Building 4); and (8) further discussions with Reichhold regarding site coordination issues. Provided below are brief descriptions of these activities.

Site Visit

On April 3, 1991, Textron and ENVIRON personnel conducted a site visit with Mr. Sal Balakrishnan, NJDEP Cleanup Oversight Coordinator. The purpose of this visit was to familiarize Mr. Balakrishnan with the site, as well as the specific areas targeted for remediation. During this visit, Mr. Balakrishnan indicated that the agency is concerned about the potential presence of friable asbestos and requested that ENVIRON review its project files to determine if any information exists concerning past investigations or correspondence with NJDEP relating to asbestos. Mr. Balakrishnan further requested that ENVIRON provide a written response to this issue within 30 days.

As documented in ENVIRON's May 2, 1991 letter to Mr. Balakrishnan, ENVIRON's project notes and files indicate that what appeared to be asbestos was noted around piping in or under several buildings at the site in 1985. However, none of this information suggests that the asbestos observed at these locations was in an unacceptable condition at that time. As stated in the referenced letter, Textron believes that the current condition of any asbestos at the site cannot accurately reflect its condition at the time of transfer of site ownership by Textron (mid-1985). In view of the fact that NJDEP did not raise concerns about the asbestos at that time, Textron believes that any concerns by the agency regarding this issue should be addressed by subsequent property owners. Further background and discussion of this issue is provided in ENVIRON's May 2, 1991 letter.

Review of Pre-Remediation Sampling Results

As required by NJDEP's February 8, 1991 conditional approval letter, a number of areas (AECs 6, 8, 10, 17 [southern portion] and 23) not previously targeted for further investigation or cleanup were sampled for base/neutral compounds (BNs) to support the proposal for no further action in those areas. As proposed in the October 1990 Cleanup Plan, additional sampling was also performed to support "hot-spot" excavations and to confirm the estimates of soil volumes. These results and their implications for the proposed scope of the cleanup are discussed in Sections 2 and 3 of this progress report.

Waste Classification

In accordance with NJDEP's February 8, 1991 conditional approval letter, Textron obtained documentation supporting its view that the soil to be treated as part of this ECRA cleanup is not properly classified as a hazardous waste and, therefore, that a RCRA TSD permit is not required to proceed with the remediation at this site and that no further waste classification is necessary. This documentation was provided to the agency as part of ENVIRON's April 19, 1991 letter to Mr. Balakrishnan. In that letter, ENVIRON also reported that Mr. Richard Johnson, of NJDEP's Bureau of Hazardous Waste Classification, indicated that the Case Manager, based on the documentation provided and his knowledge of the factual background regarding the site, could confirm

that no formal waste classification is required. Textron and Canonie are currently preparing to mobilize personnel and equipment to the site in late August 1991. In view of the relatively short time between now and mobilization to the site, Textron needs such confirmation (i.e., that no formal waste classification is required) as soon as possible in order to avoid delays in commencing the cleanup.

Cleanup Criteria

ENVIRON's April 19, 1991 letter also confirmed the agreements reached with Mr. Mark Fisher, NJDEP's ECRA Case Manager, and Mr. Fred Cornell, former NJDEP Technical Coordinator, regarding the application of tentatively identified compounds (TICs) to site-specific cleanup criteria as well as the requirement for total petroleum hydrocarbon (TPHC) analysis of pre- and post-remediation samples. This letter clarified our understanding that TICs not classified as carcinogenic polycyclic aromatic hydrocarbons (CaPAHs) or volatile organic compounds (VOCs), and not belonging to any other relevant category, would not be applied to any site-specific cleanup standard. This letter also confirmed that VOCs and BNs are the appropriate target cleanup parameters for this site, and that the agency agreed to drop the request for TPHC analysis in pre- and post-remediation samples.

Remediation Contract

Textron concluded negotiations on a contract for the remedial services with Canonie Environmental Services Corp., the remedial contractor selected to perform low temperature thermal desorption of on-site soils. The remediation contract was completed and signed during April 1991.

Preparation of Work Plan

Canonie prepared a draft work plan for remediation. This work plan, finalized in May, is provided as an attachment to this progress report. Several modifications to the scope of cleanup, operational procedures and cleanup implementation schedule provided in the October 1990 Cleanup Plan are reflected in the work plan. These changes are discussed in Section 3 of this report.

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Remediation in AEC 12

Prior to submission of the October 1990 Cleanup Plan, ENVIRON met with a structural engineer (Joel Moskowitz of Mueser Rutledge Consulting Engineers) and an excavation contractor (Code Environmental Services, Inc.) to discuss the feasibility ot removing soils from beneath Building 4 (AEC 12). Code Environmental indicated that cleanup of soils under Building 4 could be accomplished using an industrial vacuum technology, provided that the excavation would not adversely affect the stability of the foundation. No information was readily available at the plant on the type or capacity of the piles supporting the building. Consequently, test pit excavations were completed by Code Environmental in December 1990 to examine the foundation structure. Based on this field investigation, it appeared that the bottoms of the building perimeter foundations are below the water table, and the foundations exposed appeared to be pile caps. Mueser Rutledge concluded that the removal of soil to the water table would not have an adverse affect on the foundation support.

During the month of April, Canonie conducted additional investigations beneath Building 4 and reviewed facility drawings. Based on this work, however, a number of potential obstacles have been identified, including the presence of structural beams that will impede access to certain portions of AEC 12. In addition, it appears that Code Environmental is unable to use the industrial vacuum technology under Building 4. Canonie is continuing to evaluate these potential obstacles. If, based on the results of this evaluation, any modifications to the scope of remediation proposed in the October 1990 Cleanup Plan for this AEC are needed, NJDEP will be provided with appropriate information regarding such modifications in future progress reports.

Site Coordination Issues

As discussed in the progress report for March, representatives of Textron, Canonie and ENVIRON met with Reichhold personnel to discuss coordination of remedial activities with ongoing manufacturing operations. Among those issues discussed was the need for and feasibility of alternative arrangements for feedstock delivery to the large tank farm via the railroad tracks (AECs 3, 4 and 5) and product delivery from the tank farm via AEC 7. Although significant progress was made during April, final

resolution of site coordination issues will be necessary prior to the mobilization for cleanup.

2. Data Produced in April 1991

As previously indicated, ENVIRON conducted additional soil sampling at the site during March in accordance with the scope of sampling proposed in the October 1990 Cleanup Plan and that requested in NJDEP's February 8, 1991 conditional approval letter. As outlined in the October 1990 Cleanup Plan, ENVIRON collected samples from: (1) areas targeted for remediation to confirm that the bounds of excavation estimated in the October 1990 Cleanup Plan reflect conservative estimates and to support "hot-spot" excavations in certain areas; (2) areas in the vicinity of five Phase I soil samples with lead and arsenic concentrations exceeding 1,000 ppm and 20 ppm, respectively; and (3) areas where previous duplicate sample results were inconsistent. As required in NJDEP's February 8, 1991 conditional approval letter, ENVIRON collected additional samples from several areas not previously targeted for remediation to confirm that no further action is required in those areas. Table 1 lists the sampling locations, depths and analyses for each sample. The analytical results are discussed below and are presented in Tables 2 and 3, provided as an attachment to this progress report. These results also are shown graphically on Plate 1. Tier II data packages are being submitted with this progress report.

Sampling Results in Areas Not Previously Targeted for Remediation

In its February 8, 1991 conditional approval letter, NJDEP requested that ENVIRON collect additional soil samples in several areas (AECs 6, 8 and 10) where previous BN analyses indicated CaPAHs above 10 ppm, but below 15 ppm. Although not requested in the Agency's letter, an additional soil sample was collected in the vicinity of MW12 due to the detection of CaPAHs above 10 ppm during an earlier sampling event. As stated in the October 1990 Cleanup Plan, the site-specific action level for CaPAHs is 10 ppm. The agency indicated in its conditional approval letter, however, that residual levels above 10 ppm will be accepted provided that adjacent borings contain levels of these constituents not materially different from the cleanup criteria (i.e., "generally less than 1.5 times the cleanup criteria"). The purpose of this sampling, therefore, was to confirm that no further action is needed at those locations.

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All samples collected adjacent to these areas were analyzed for BN+15[1]. In accordance with that letter, ENVIRON also collected samples adjacent to previous boring locations 1706, 1707 and 2303 (where earlier BN results were rejected due to poor chromatograms) and from the vicinity of MW17/MW26 to investigate inconsistent BN sampling results previously obtained from that location.

Levels of total CaPAHs and total BNs in samples from borings 604, 1004, 1005, 1711 and B-8 and B-10 (near MW17/MW26) do not exceed or are not materially different from site-specific action levels for those constituents. Therefore, these results confirm that no further action is needed in AECs 6, 10 and 17 (in the vicinity of boring 1711) or in the vicinity of MW17/MW26 (borings B-8 and B-10). Although CaPAH levels above 15 ppm were detected in the sample from boring 804, the result from adjacent boring 805 was below the site-specific action level, suggesting that only a limited, "hot-spot" excavation is needed in AEC 8. Sample results from borings 1712, 2304 and B-11 (near MW12) contain CaPAHs above 15 ppm or total BNs above 100 ppm. Therefore, remediation is proposed in the vicinity of these borings. Based on the patterns of BNs detected at other locations at the site, it is anticipated that the extent of remediation needed in these areas will be limited; however, actual limits of excavation ultimately will be determined by the results of either additional pre-remediation samples or post-excavation samples.

Delineation Sampling in Areas Targeted for Remediation

As proposed in the October 1990 Cleanup Plan, delineation samples for VOCs were collected from AECs 1, 7, 14, 17, 21 and 25 to confirm that the estimated remediation bounds reflect conservative cleanup volumes. Delineation samples for VOCs were analyzed on-site using a field GC following modified EPA Method 8020. All samples were collected from 18-24 inches below the ground surface. Additionally,

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[1]Although requested in NJDEP's conditional approval letter, the Alumina Partitioning Cleanup Method (Method 3650 for Matrix Cleanup and Method 3611 for Alumina Partitioning) prior to BN analysis was inadvertently not performed. While elevated method detection limits (MDLs) were observed in samples from a few borings (307, 804, 1712, 2304, B-11, and B-12), these samples also contained targeted CaPAHs or total BNs in excess of the site-specific action levels. Based on the data, these areas have been targeted for remediation. In the remaining samples, compounds were either detected at very low levels, or the sum of the MDLs for targeted CaPAHs were below or not materially different from site-specific action levels. Therefore, the slightly elevated MDLs in several samples did not affect the determination of whether a given area is to be remediated.

samples were collected from areas where the presence of BNs has been used to target the area for cleanup to determine if concentrations in the surrounding area are materially different from the levels previously detected or to show that BNs have only a very limited presence. These areas include AECs 3, 15, 17 (northern portion), 18 and 28 and the area adjacent to MW7.[2]

Sampling results for VOCs from AECs 1, 17, 21 and 25 confirmed that soils containing levels of VOCs exceeding the site-specific action level of 10 ppm are confined to those areas previously targeted for remediation within those AECs. VOC concentrations ranged from non-detect to 7.6 ppm in these areas. Sampling results from AECs 7 and 14, however, indicate that the areas previously targeted for remediation should be expanded as shown on Plate 2. In those areas, levels of VOCs above 10 ppm were detected.

Levels of total CaPAHs and total BNs in samples from borings 1508 and 1803 do not exceed or are not materially different from the site-specific action levels. These sample results confirm that the extent of total CaPAH and total BN contamination in these areas is limited and that only localized "hot-spot" excavations will be needed. Borings adjacent to certain other suspected BN "hot-spots" -- borings 308, 2803 and B-12 (near MW7) -- yielded BN results materially in excess of site-specific cleanup levels. Therefore, ENVIRON proposes expansion of the areas targeted for remediation in these areas, as shown on Plate 2. The ultimate extent of BNs in this area will be determined by additional pre-remediation or post-excavation sampling.

Metals Delineation

As agreed to at the September 10, 1990 meeting with NJDEP, no further action (or deed restrictions) would be required due to the presence of fill-related metals unless the results of the additional samples exhibit levels of lead or arsenic materially different from (i.e., three or four times greater than) those previously detected at adjacent boring

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[2]It should be noted that cleanup in AECs 8 and 28 was not previously proposed in the October 1990 Cleanup Plan. However, based upon the presence of CaPAHs above 15 ppm in those areas, NJDEP requested "hot-spot" soil removal in its February 8, 1991 conditional approval letter. Similarly, the area adjacent to MW7 was not targeted for cleanup in the October plan, nor was remediation of this area requested in the agency's conditional approval letter. However, because levels of CaPAHs exceeded 15 ppm at this location, cleanup of this area has been targeted and a delineation sample was collected during the recent sampling program.

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locations. As proposed in the October 1990 Cleanup Plan, ENVIRON collected samples to be analyzed for lead and, in one instance, arsenic in the vicinity of five previous soil samples containing concentrations exceeding 1,000 ppm of lead or 20 ppm of arsenic. The purpose of this additional sampling was to ensure that the levels of lead and arsenic measured at these additional sampling locations are not materially different from those previously obtained. The previous soil samples were obtained from AECs 21 and 23 and from boreholes completed during the installation of monitoring wells MW16, MW18 and MW26.

Sample results from borings 2110, 2304, B-7, B-9 and B-10 confirm that lead or arsenic levels at these locations are not materially different from those previously obtained in adjacent borings. In fact, the concentrations of lead or arsenic are generally lower than those previously detected. With the exception of 1100 ppm of lead in boring B-10, no concentration of lead or arsenic exceeded 1000 ppm or 20 ppm, respectively. Based on these data, no further investigation regarding the presence of fill-related metals will be undertaken at this site.

3. Modifications to the October 1990 Cleanup Plan

Based on the results of the pre-remediation soil sampling and discussions with Canonie regarding implementation of the remedial work plan, a number of modifications to the October 1990 Cleanup Plan have been included in the attached work plan. These modifications include: (1) the targeting of additional soil volumes for remediation; (2) modifications to operating procedures during remediation; and (3) modifications to the project schedule. These proposed changes are discussed below. Since these modifications are technically amendments to the October 1990 Cleanup Plan, Textron desires to obtain NJDEP's approval of them prior to proceeding with the cleanup.

Additional Soil Volumes Targeted for Remediation

Based on the analytical results of the pre-remediation soil sampling, modifications regarding the extent of excavation have been made to areas previously targeted for remediation in AECs 7, 14, 28 and in the vicinity of MW7. Additionally, several new areas have been added to the scope of cleanup. These areas include limited excavations in AECs 8 and 17 (southern portion) and in the area adjacent to MW12.

The revised soil quantities targeted for remediation are shown by AEC on Table 4 and the areal extent is illustrated on Plate 2, each of which is provided as an attachment to this progress report.

Some uncertainty still remains with regard to the extent of remediation that will be needed in several of the areas targeted due to the presence of BNs above site-specific action levels (AECs 17 [southern portion] and 28, and in the vicinity of MW7 and MW12). However, based on the localized occurrence of BNs detected in other locations of the site, the extent of these constituents is expected to be limited in these areas. The ultimate bounds of remediation will be determined either by additional pre-remediation sampling or by post-excavation sampling. Also, while the eastern and southern bounds of the area targeted for remediation in AEC 7 are clearly defined by VOC sampling results below 10 ppm along those sides, the western boundary has been estimated based on the presence of distribution piping extending from the tank farm wall.

A limited additional soil volume--an estimated 380 cubic yards or 7% more than was estimated in the October 1990 Cleanup Plan--has been targeted for remediation based on the results of the most recent sampling. Since the remedial volume estimates provided in the October 1990 Cleanup Plan likely overestimated the volume of soil to be remediated, a revised cost estimate and additional financial assurance beyond that already posted based on the October 1990 Cleanup Plan have not been provided[3]. The 20% scope contingency, along with the conservative volume estimates used for the previous cost estimate, should ensure that the proposed additional volumes do not cause the cost of remediation to exceed the estimate provided in the October 1990 Cleanup Plan.

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[3]It should be noted that the soil volume estimated in Table 3 of Canonie's Work Plan for the central areas of the site (AECs 16, 17 [northern portion] and 25) is less than that shown in Table 4 of this progress report. Canonie's Work Plan illustrates the initial bounds of excavation planned for this area. Actual bounds will be determined by post-excavation sampling. Based on the results of the recent sampling, the volume of soil in this area estimated in the October 1990 Cleanup Plan appears to be conservative. ENVIRON and Textron believe that this further supports the recommendation not to revise the existing cost estimate.

845030203

Operational Procedures During Remediation

At Canonie's suggestion, several modifications to operational procedures described in the October 1990 Cleanup Plan have been made and are documented in the attached work plan. These changes relate to: (1) the stockpiling of excavated material for treatment; (2) the handling of oversized excavated material; (3) the post-treatment sampling; (4) the post-excavation sampling; and (5) the projected turnaround time for off-site analyses. These modifications are briefly discussed below.

In the October 1990 Cleanup Plan, ENVIRON stated that the amount of soil excavated each day will be limited to the amount expected to be processed in a day to minimize the quantity of soil staged at one time. Instead, excavated soils sufficient to operate the treatment unit for several days may be stockpiled in a materials storage area. Excavated soils may also be directly processed.

As described in the October 1990 Cleanup Plan, debris greater than 2 inches will be screened from excavated soils prior to thermal treatment. This material will be checked in the field using an organic vapor analyzer (OVA) to determine if readings exceed background levels. The October 1990 Cleanup Plan stated that all such debris exhibiting significant readings would be disposed of off-site. Canonie's work plan differentiates the types of screened debris and provides for slightly different handling. Unnatural debris (e.g., pipes, concrete and timbers) will be disposed of off-site. In addition, natural pervious debris (e.g., stumps and logs) will be disposed of off-site. Natural, impervious debris not exhibiting OVA readings above background will be backfilled along with treated soil. Because natural impervious debris is unlikely to have absorbed constituents of concern at the site, natural impervious debris (expected to be rocks) exhibiting OVA readings above background will be aerated until no OVA readings are detected and will be backfilled along with treated soil. It is our understanding that this procedure was acceptable to NJDEP when Canonie remediated the TP Industrial Site in South Kearny, New Jersey, a site where solvent recycling and distribution activities resulted in similar constituents requiring remediation.

As described in the October 1990 Cleanup Plan, during the treatment of soils containing VOCs and BNs above site-specific action levels, hourly post-treatment samples will be collected and analyzed off-site for BNs. To be sure that the sample results are representative of the cleanup levels achieved, and to avoid segregation of

each hourly treatment run, Textron proposes that the results of these hourly samples be averaged to determine achievement of site-specific action levels. It is our understanding that this procedure was acceptable to NJDEP when Canonie remediated the TP Industrial Site.

The October 1990 Cleanup Plan indicated that the rate of throughput of the remediation equipment was 20 tons per hour and that post-treatment sampling, to confirm the effectiveness of the treatment unit, would be conducted every hour. Canonie has indicated that higher throughput rates may be achieved and has proposed trial runs at 20, 25 and 30 tons per hour. Canonie has indicated, however, that a sampling frequency of once per hour should still be employed because the throughput rate may vary during cleanup operations and a sampling rate based on tonnage would be difficult to administer. In addition, Canonie indicates that greater sampling frequencies are not required to ensure the effectiveness of the unit and have not been required at other sites, including the TP Industrial Site.

The October 1990 Cleanup Plan stated that post-excavation samples would be taken every 30 feet along excavation walls. As the work plan developed, it became clear that taking samples in some locations would be impossible (because of the presence of building foundations, for example) or would not be necessary to support a decision not to continue excavating (at the property boundary, for example). Consequently, there are areas where no post-excavation sampling is planned. Generally, however, post-excavation sampling is planned for 30 foot intervals in all other areas. Table 4 and Figure 5 attached to the work plan indicate the post-excavation sampling proposed.

The October 1990 Cleanup Plan indicated that off-site analytical results could be expected within 48 hours of sampling. While VOC results can be expected within two business days after sampling, off-site BN analyses will ordinarily be performed within two weeks.

Project Schedule

In the October 1990 Cleanup Plan, it was projected that mobilization of the thermal treatment system would begin in June 1991 and that soil treatment would be completed by December 31, 1991. This schedule was based on the assumption that

845030205

approval for the October 1990 Cleanup Plan would be obtained by December 31, 1990, and that a contract with a remediation contractor would be entered into shortly thereafter. As it turned out, NJDEP approval was not obtained until mid-February 1991 and that approval required considerable additional sampling and analysis. Textron entered into a remediation contract as soon as reasonably practical after the results of the pre-remediation sampling were known. Given the date that Textron entered into the remediation contract, August 1991 was the earliest date that the treatment unit could be made available at the site. Consequently, it is now anticipated that mobilization will take place in late August 1991. A modified project schedule is included in the attached work plan for cleanup implementation.

Although the modified schedule projects a later mobilization date, the dates for completion of the remedy and submission of the final report should not be delayed beyond the dates set forth in the October 1990 Cleanup Plan, if Canonie's assumptions concerning approval of the air permit for the remediation prove correct. Canonie's earlier schedule projected nearly five months for review and approval of the air permit application. Based on an encouraging initial meeting with the NJDEP, Canonie's present estimate for completion of the review and issuance of the permit is three months. Canonie anticipates having all the necessary information to submit the completed air permit application within the very near future.

The projected schedule also assumes that site coordination issues can be favorably resolved with Reichhold prior to mobilization. In addition, the projected schedule also assumes that additional waste classification is not required and that we obtain prompt responses to this and previous submissions to NJDEP. Textron is awaiting the NJDEP's confirmation of these assumptions.

Certain other assumptions are implicit in the detailed schedule provided with the work plan. In the event that any of these assumptions proves incorrect and a delaying event occurs, Textron will notify the NJDEP and provide appropriate revisions to the projected schedule as necessary.

4. Activities Scheduled for May 1991

Activities for May 1991 primarily will include: (1) continued discussions with Reichhold plant personnel regarding the coordination of remedial activities with ongoing manufacturing operations; (2) further evaluation regarding the technical feasibility of removing soils from beneath Building 4 (AEC 12); (3) submission of the air permit application; and (4) resolution of outstanding issues with the NJDEP, including issues pertaining to waste classification and the October 1990 Cleanup Plan modifications proposed herein.

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ATTACHMENTS

TABLE 1
Sampling Locations, Depths, and Analytical Parameters

AEC	Boring	Sample Number	Collection Method[1]	Depth[2] (feet)	Analytical Parameters[3]
1	0102	288E-0101-SB01	HSAB	1.5-2.0	VOC
3	0307	288E-0307-SB01	HSAB	1.5-2.0	BN+15
	0308	288E-0308-SB01	HSAB	1.5-2.0	BN+15
6	0604	288E-0604-SB02	Trowel	0.0-0.5	BN+15
7	0702	288E-0702-SB01	HSAB	1.5-2.0	VOC
	0703	288E-0703-SB01	HSAB	1.5-2.0	VOC
	0704	288E-0704-SB01	HSAB	1.5-2.0	VOC
	0705	288E-0705-SB01	HSAB	1.5-2.0	VOC
8	0804	288E-0804-SB01	HSAB	2.0-2.5	BN+15
	0805	288E-0805-SB01	HSAB	2.5-3.0	BN+15
10	1004	288E-1004-SB01	HSAB	0.0-0.5	BN+15
	1005	288E-1005-SB01	HSAB	0.0-0.5	BN+15
14	1406	288E-1406-SB01	HSAB	1.5-2.0	VOC
	1406B	288E-1406B-SB01	HSAB	1.5-2.0	VOC
	1406C	288E-1406C-SB01	HSAB	1.5-2.0	VOC
	1406D	288E-1406D-SB01	HSAB	1.5-2.0	VOC
	1407	288E-1407-SB01	HSAB	1.5-2.0	VOC
	1408	288E-1408-SB01	HSAB	1.5-2.0	VOC
	1409	288E-1409-SB01	HSAB	1.5-2.0	VOC
15	1508	288E-1508-SB01	HSAB	0.0-0.5	BN+15
17	1710	288E-1710-SB01	HSAB	1.5-2.0	VOC
	1711	288E-1711-SB01	HSAB	0.0-0.5	BN+15
	1712	288E-1712-SB01	HSAB	0.0-0.5	BN+15
	B-13	288E-B-13-SB01	HSAB	1.5-2.0	BN+15
18	1803	288E-1803-SB01	HSAB	0.0-0.5	BN+15
21	2106	288E-2106-SB01	HSAB	1.5-2.0	VOC
	2107	288E-2107-SB01	HSAB	1.5-2.0	VOC
	2108	288E-2108-SB01	HSAB	1.5-2.0	VOC

TABLE 1 (continued)
Sampling Locations, Depths, and Analytical Parameters

AEC	Boring	Sample Number	Collection Method[1]	Depth[2] (feet)	Analytical Parameters[3]
	2109	288E-2109-SB01	HSAB	1.5-2.0	VOC
	2110	288E-2110-SB01	HSAB	0.0-0.5	lead, arsenic
23	2304	288E-2304-SB01	HSAB	0.0-0.5	lead, BN+15
25	2504	288E-2504-SB01	HSAB	1.5-2.0	VOC
28	2803	288E-2803-SB01	Trowel	0.0-0.5	BN+15
--	B-7	288E-B-7-SB01	Trowel	0.0-0.5	lead
--	B-8	288E-B-8-SB01	Trowel	0.0-0.5	BN+15
--	B-9	288E-B-9-SB01	HSAB	0.0-0.5	lead
--	B-10	288E-B-10-SB01	Trowel	0.0-0.5	BN+15, lead
--	B-11	288E-B-11-SB01	HSAB	0.0-0.5	BN+15
--	B-12	288E-B-12-SB01	Trowel	1.5-2.0	BN+15

[1] HSAB = Hollow-stem Auger Boring

[2] Depths are measured from the soil surface.

[3] Analytical Parameter Abbreviations and Analytical Methodologies:
BN+15 = Priority Pollutant Base/Neutral Compounds plus 15-compound library search (EPA Method 8270)
VOC = Ethylbenzene, toluene and xylenes (modified EPA Method 8020)
Lead (EPA Method 7420)
Arsenic (EPA Method 7060)

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TABLE 2
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 1	
ENVIRON SAMPLE ID	288E-0102-SB01
MATRIX	Soil
COLLECTION METHOD	HSAB
DEPTH (feet)	1.5-2.0
COLLECTION DATE	03/14/91
Volatile Organic Compounds (VOCs)	
Toluene	.503
Ethylbenzene	7.09
P,M-Xylene	ND
O-Xylene	ND
Total VOCs	7.593

84503021

TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 3			
	ENVIRON SAMPLE ID	288E-0307-SB01	288E-0308-SB01
	MATRIX	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB
	DEPTH (feet)	1.5-2.0	1.5-2.0
	COLLECTION DATE	03/14/91	03/14/91
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)			
	Benzo(a)Pyrene	3.1	ND
	Benzo(b)Fluoranthene	5.7	ND
	Benzo(a)Anthracene	6.5	1.0 J
	Benzo(j)Fluoranthene	ND	ND
	Benzo(k)Fluoranthene	3.5	ND
	Chrysene	8.2	1.1
	Indeno(1,2,3-cd)Pyrene	2.2	ND
	Total CaPAHs	29.2	2.1
Base/Neutral Organic Compounds (Non-CaPAHs)			
	1,2,4-Trichlorobenzene	ND	ND
	Acenaphthene	16.0	3.1
	Acenaphthylene	ND	ND
	Anthracene	5.8	ND
	Benzo(g,h,i)Perylene	2.0	ND
	Di-n-Butylphthalate	ND	ND
	Di-n-Octylphthalate	ND	ND
	Dibenzofuran	8.7	1.6
	Dibenz(a,h)Anthracene	ND	ND
	Fluoranthene	31.0	4.5
	Fluorene	12.0	2.1
	Naphthalene	27.0	15.0
	Phenanthrene	37.0	6.1
	Pyrene	23.0	3.2
	bis(2-Ethylhexyl)Phthalate	ND	ND
	Total Base/Neutral Compounds	191.7	37.7

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TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 6		
	ENVIRON SAMPLE ID	288E-0604-SB01
	MATRIX	Soil
	COLLECTION METHOD	Trowel
	DEPTH (feet)	0.0-0.5
	COLLECTION DATE	03/18/91
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)		
	Benzo(a)Pyrene	2.9
	Benzo(b)Fluoranthene	2.5
	Benzo(a)Anthracene	2.6
	Benzo(j)Fluoranthene	ND
	Benzo(k)Fluoranthene	ND
	Chrysene	3.2
	Indeno(1,2,3-cd)Pyrene	ND
	Total CaPAHs	11.2
Base/Neutral Organic Compounds (Non-CaPAHs)		
	1,2,4-Trichlorobenzene	ND
	Acenaphthene	0.25
	Acenaphthylene	ND
	Anthracene	0.45
	Benzo(g,h,i)Perylene	2.5
	Di-n-Butylphthalate	ND
	Di-n-Octylphthalate	ND
	Dibenz(a,h)Anthracene	ND
	Fluoranthene	3.5
	Fluorene	0.21
	Naphthalene	0.32
	Phenanthrene	2.2
	Pyrene	4.9
	bis(2-Ethylhexyl)Phthalate	2.4
	Total Base/Neutral Compounds	27.93

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TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 7					
	ENVIRON SAMPLE ID	288E-0702-SB01	288E-0703-SB01	288E-0704-SB01	288E-0705-SB01
	MATRIX	Soil	Soil	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB
	DEPTH (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0
	COLLECTION DATE	03/18/91	03/15/91	03/15/91	03/18/91
Volatile Organic Compounds (VOCs)					
	Toluene	3.140	ND	0.211	ND
	Ethylbenzene	NQ[1]	ND	ND	ND
	P,M-Xylene	732.0	ND	ND	4318
	O-Xylene	843.0	ND	ND	NQ[1]
	Total VOCs	1578.14	ND	0.211	4318

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TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 8			
	ENVIRON SAMPLE ID	288E-0804-SB01	288E-0805-SB01
	MATRIX	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB
	DEPTH (feet)	2.0-2.5	2.5-3.0
	COLLECTION DATE	03/18/91	03/15/91
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)			
	Benzo(a)Pyrene	5.9	ND
	Benzo(b)Fluoranthene	5.1	ND
	Benzo(a)Anthracene	6.3	ND
	Benzo(j)Fluoranthene	ND	ND
	Benzo(k)Fluoranthene	4.1	ND
	Chrysene	6.1	1.2 J
	Indeno(1,2,3-cd)Pyrene	2.0	ND
	Total CaPAHs	29.5	1.2
Base/Neutral Organic Compounds (Non-CaPAHs)			
	1,2,4-Trichlorobenzene	ND	ND
	Acenaphthene	2.6	ND
	Acenaphthylene	ND	ND
	Anthracene	3.2	ND
	Benzo(g,h,i)Perylene	ND	ND
	Di-n-Butylphthalate	ND	ND
	Di-n-Octylphthalate	ND	ND
	Dibenzofuran	2.2	11.0
	Dibenz(a,h)Anthracene	ND	ND
	Fluoranthene	13.0	1.5
	Fluorene	4.0	0.62 J
	Naphthalene	ND	8.0
	Phenanthrene	4.6	2.1 J
	Pyrene	20.0	1.8
	bis(2-Ethylhexyl)Phthalate	ND	0.5 J
	Total Base/Neutral Compounds	79.1	26.7

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TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 10					
ENVIRON SAMPLE ID	288E-1004-SB01		288E-1005-SB01		
MATRIX	Soil		Soil		
COLLECTION METHOD	HSAB		HSAB		
DEPTH (feet)	0.0-0.5		0.0-0.5		
COLLECTION DATE	03/15/91		03/15/91		
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)					
Benzo(a)Pyrene	0.43		ND		
Benzo(b)Fluoranthene	0.53		ND		
Benzo(a)Anthracene	0.35	J	0.26	J	
Benzo(j)Fluoranthene	ND		ND		
Benzo(k)Fluoranthene	0.47		ND		
Chrysene	0.38		0.25		
Indeno(1,2,3-cd)Pyrene	ND		ND		
Total CaPAHs	2.16		0.51		
Base/Neutral Organic Compounds (Non-CaPAHs)					
1,2,4-Trichlorobenzene	ND		ND		
Acenaphthene	ND		ND		
Acenaphthylene	0.06	J	ND		
Anthracene	0.11	J	ND		
Benzo(g,h,i)Perylene	ND		ND		
Di-n-Butylphthalate	0.06	J	0.3	J	
Di-n-Octylphthalate	ND		0.52	J	
Dibenz(a,h)Anthracene	ND		ND		
Fluoranthene	0.95		0.5	J	
Fluorene	ND		ND		
Naphthalene	0.89		ND		
Phenanthrene	0.33	J	0.29	J	
Pyrene	0.44		0.26	J	
bis(2-Ethylhexyl)Phthalate	0.56		1.1		
Total Base/Neutral Compounds	5.56		3.48		

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TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 14							
ENVIRON SAMPLE ID	288E-1406-SB01	288E-1406B-SB01	288E-1406C-SB01	288E-1406D-SB01	288E-1407-SB01	288E-1408-SB01	288E-1409-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	GRAB	HSAB	HSAB	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0
COLLECTION DATE	03/14/91	03/14/91	03/15/91	03/18/91	03/15/91	03/14/91	03/18/91
Volatile Organic Compounds (VOCs)							
Toluene	NA	94.9	NA	ND	ND	ND	0.199
Ethylbenzene	NA	131.0	NA	ND	16.0	0.137	ND
P,M-Xylene	NA	182.0	NA	ND	ND	ND	4.690
O-Xylene	NA	377.0	NA	ND	ND	ND	1.310
Total VOCs	NA	784.9	NA	ND	16.0	0.137	6.199

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TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 15		
	ENVIRON SAMPLE ID	288E-1508-SB01
	MATRIX	Soil
	COLLECTION METHOD	HSAB
	DEPTH (feet)	0.0-0.5
	COLLECTION DATE	03/14/91
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)		
	Benzo(a)Pyrene	2.2
	Benzo(b)Fluoranthene	2.1
	Benzo(a)Anthracene	2.4
	Benzo(j)Fluoranthene	ND
	Benzo(k)Fluoranthene	1.6
	Chrysene	2.4
	Indeno(1,2,3-cd)Pyrene	1.8
	Total CaPAHs	12.5
Base/Neutral Organic Compounds (Non-CaPAHs)		
	1,2,4-Trichlorobenzene	ND
	Acenaphthene	ND
	Acenaphthylene	ND
	Anthracene	0.58
	Benzo(a)Fluorene	1.0
	Benzo(e)Pyrene	1.5
	Benzo(g,h,i)Perylene	1.5
	Di-n-Butylphthalate	ND
	Di-n-Octylphthalate	ND
	Dibenzofuran	0.31
	Dibenz(a,h)Anthracene	ND
	Fluoranthene	4.9
	Fluorene	0.49
	Naphthalene	0.44
	Phenanthrene	2.7
	Pyrene	3.8
	bis(2-Ethylhexyl)Phthalate	ND
	Total Base/Neutral Compounds	29.72

84503021 8

TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 17			
ENVIRON SAMPLE ID	288E-1710-SB01	288E-1711-SB01	288E-1712-SB01
MATRIX	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB
DEPTH (feet)	1.5-2.0	0.0-0.5	0.0-0.5
COLLECTION DATE	03/14/91	03/13/91	03/14/91
Volatile Organic Compounds (VOCs)			
Toluene	ND		
Ethylbenzene	3.610		
P,M-Xylene	ND		
O-Xylene	ND		
Total VOCs	3.610		
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)			
Benzo(a)Pyrene		ND	5.2
Benzo(b)Fluoranthene		ND	9.0
Benzo(a)Anthracene		ND	3.8
Benzo(j)Fluoranthene		ND	1.1
Benzo(k)Fluoranthene		ND	ND
Chrysene		ND	4.5
Indeno(1,2,3-cd)Pyrene		ND	5.1
Total CaPAHs		ND	28.7
Base/Neutral Organic Compounds (Non-CaPAHs)			
1,2,4-Trichlorobenzene		ND	ND
Acenaphthene		ND	ND
Acenaphthylene		ND	ND
Anthracene		ND	0.39 J
Benz(e)Acephenanthrylene		ND	2.8
Benzo(b)Fluorene		ND	0.86
Benzo(e)Pyrene		ND	4.5
Benzo(g,h,i)Perylene		ND	4.90
Di-n-Butylphthalate		ND	ND
Di-n-Octylphthalate		ND	ND
Dibenz(a,h)Anthracene		ND	0.85
Fluoranthene		ND	4.4
Fluorene		ND	ND
Naphthalene		0.53 J	4.8
Phenanthrene		ND	1.8
Pyrene		ND	3.6
bis(2-Ethylhexyl)Phthalate		ND	ND
Total Base/Neutral Compounds		0.53	57.60

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TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 18		
	ENVIRON SAMPLE ID	288E-1803-SB01
	MATRIX	Soil
	COLLECTION METHOD	HSAB
	DEPTH (feet)	0.0-0.5
	COLLECTION DATE	03/13/91
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)		
	Benzo(a)Pyrene	ND
	Benzo(b)Fluoranthene	ND
	Benzo(a)Anthracene	ND
	Benzo(j)Fluoranthene	ND
	Benzo(k)Fluoranthene	ND
	Chrysene	ND
	Indeno(1,2,3-cd)Pyrene	ND
	Total CaPAHs	ND
Base/Neutral Organic Compounds (Non-CaPAHs)		
	1,2,4-Trichlorobenzene	ND
	Acenaphthene	ND
	Acenaphthylene	ND
	Anthracene	ND
	Benzo(g,h,i)Perylene	ND
	Di-n-Butylphthalate	ND
	Di-n-Octylphthalate	ND
	Dibenz(a,h)Anthracene	ND
	Fluoranthene	ND
	Fluorene	ND
	Naphthalene	ND
	Phenanthrene	ND
	Pyrene	ND
	bis(2-Ethylhexyl)Phthalate	ND
	Total Base/Neutral Compounds	ND

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TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 21						
	ENVIRON SAMPLE ID	288E-2106-SB01	288E-2107-SB01	288E-2108-SB01	288E-2109-SB01	288E-2110-SB01
	MATRIX	Soil	Soil	Soil	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB
	DEPTH (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	0.0-0.5
	COLLECTION DATE	03/15/91	03/15/91	03/18/91	03/15/91	03/15/91
	Arsenic					19.0
	Lead					600.0
Volatile Organic Compounds (VOCs)						
	Toluene	ND	0.918	MQ[2]	ND	
	Ethylbenzene	ND	ND	ND	ND	
	P,M-Xylene	ND	ND	ND	ND	
	O-Xylene	ND	ND	ND	ND	
	Total VOCs	ND	0.918	ND	ND	

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TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 23		
	ENVIRON SAMPLE ID	288E-2304-SB01
	MATRIX	Soil
	COLLECTION METHOD	HSAB
	DEPTH (feet)	0.0-0.5
	COLLECTION DATE	03/13/91
	Lead	940
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)		
	Benzo(a)Pyrene	2.8
	Benzo(b)Fluoranthene	3.2
	Benzo(a)Anthracene	3.1
	Benzo(j)Fluoranthene	ND
	Benzo(k)Fluoranthene	2.6
	Chrysene	3.3
	Indeno(1,2,3-cd)Pyrene	2.7
	Total CaPAHs	17.70
Base/Neutral Organic Compounds (Non-CaPAHs)		
	1,2,4-Trichlorobenzene	ND
	Acenaphthene	1.6
	Acenaphthylene	ND
	Anthracene	1.4
	Benzo(g,h,i)Perylene	ND
	Di-n-Butylphthalate	ND
	Di-n-Octylphthalate	ND
	Dibenzofuran	1.5
	Dibenz(a,h)Anthracene	0.78 J
	Fluoranthene	8.9
	Fluorene	2.2
	Naphthalene	ND
	Phenanthrene	7.3
	Pyrene	5.3
	bis(2-Ethylhexyl)Phthalate	21.0
	Total Base/Neutral Compounds	67.68

845030222

TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 25		
	ENVIRON SAMPLE ID	288E-2504-SB01
	MATRIX	Soil
	COLLECTION METHOD	HSAB
	DEPTH (feet)	1.5-2.0
	COLLECTION DATE	03/14/91
Volatile Organic Compounds (VOCs)		
	Toluene	0.250
	Ethylbenzene	ND
	P,M-Xylene	ND
	O-Xylene	ND
	Total VOCs	0.250

845030223

TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

AEC 28	
ENVIRON SAMPLE ID	288E-2803-SB01
MATRIX	Soil
COLLECTION METHOD	Trowel
DEPTH (feet)	0.0-0.5
COLLECTION DATE	03/18/91
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)	
Benzo(a)Pyrene	4.6
Benzo(b)Fluoranthene	4.1
Benzo(a)Anthracene	4.7
Benzo(j)Fluoranthene	ND
Benzo(k)Fluoranthene	5.1
Chrysene	5.1
Indeno(1,2,3-cd)Pyrene	ND
Total CaPAHs	23.60
Base/Neutral Organic Compounds (Non-CaPAHs)	
1,2,4-Trichlorobenzene	ND
Acenaphthene	2.0
Acenaphthylene	ND
Anthracene	2.0
Benzo(g,h,i)Perylene	1.9
Di-n-Butylphthalate	ND
Di-n-Octylphthalate	ND
Dibenzofuran	0.7
Dibenz(a,h)Anthracene	ND
Fluoranthene	9.9
Fluorene	1.2
Naphthalene	0.96
Phenanthrene	8.0
Pyrene	9.0
bis(2-Ethylhexyl)Phthalate	1.5
Total Base/Neutral Compounds	60.76

845030224

TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

ENVIRON SAMPLE ID	288E-B-7-SB01	288E-B-8-SB01	288E-B-9-SB01	288E-B-10-SB01	288E-B-11-SB01	288E-B-12-SB01	288E-B-13-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	Trowel	Trowel	HSAB	Trowel	HSAB	Trowel	HSAB
DEPTH (feet)	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	0.0-0.5	1.5-2.0
COLLECTION DATE	03/13/91	03/13/91	03/18/91	03/13/91	03/14/91	03/18/91	03/14/91
Lead	490		92	1100.0			
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)							
Benzo(a)Pyrene		0.53		1.2	ND	8.1	1.2
Benzo(b)Fluoranthene		0.78		1.8	ND	11.0	1.1
Benzo(a)Anthracene		ND		0.96 J	ND	6.9	1.00 J
Benzo(j)Fluoranthene		ND		ND	ND	ND	ND
Benzo(k)Fluoranthene		0.55		0.87	ND	5.5	0.91
Chrysene		0.77		1.3	ND	8.4	1.5
Indeno(1,2,3-cd)Pyrene		0.51		1.2	ND	7.1	0.86
Total CaPAHs		3.14		7.33	ND	47.00	6.57
Base/Neutral Organic Compounds (Non-CaPAHs)							
1,2,4-Trichlorobenzene		ND		ND	ND	0.39 J	ND
Acenaphthene		ND		ND	ND	1.5	ND
Acenaphthylene		ND		ND	ND	ND	ND
Anthracene		0.12 J		ND	ND	2.0	0.23 J
Benzo(e)Pyrene		0.82		1.2	ND	ND	1.3
Benzo(g,h,i)Perylene		0.4		0.98	ND	8.9	0.95
Di-n-Butylphthalate		ND		ND	160.0	ND	ND
Di-n-Octylphthalate		ND		ND	ND	ND	ND
Dibenzofuran		ND		ND	ND	0.59	ND
Dibenz(a,h)Anthracene		ND		ND	ND	1.3	ND
Fluoranthene		1.20		1.80	ND	11.0	1.5
Fluorene		ND		ND	ND	1.0	ND
Naphthalene		0.08 J		0.10 J	59.0	1.9	0.96
Phenanthrene		0.75		0.67 J	ND	8.6	1.10 J
Pyrene		0.95		1.6	ND	12.0	1.4
bis(2-Ethylhexyl)Phthalate		0.56		0.84	180.0	0.78 J	ND
Total Base/Neutral Compounds		8.02		14.52	399.00	96.96	14.01

845030225

TABLE 2 (continued)
Summary of Analytical Results of Pre-Remediation Soil Sampling

ENVIRON SAMPLE ID	288E-FB-910314	288E-FB-910315
MATRIX	Aqueous	Aqueous
DEPTH (feet)	NA	NA
COLLECTION DATE	03/14/91	03/15/91
COMMENTS	QA/QC	QA/QC
Arsenic		ND
Lead		ND
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)		
Benzo(a)Pyrene	ND	ND
Benzo(b)Fluoranthene	ND	ND
Benzo(a)Anthracene	ND	ND
Benzo(j)Fluoranthene	ND	ND
Benzo(k)Fluoranthene	ND	ND
Chrysene	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND
Total CaPAHs	ND	ND
Base/Neutral Organic Compounds (Non-CaPAHs)		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	ND	ND
Acenaphthylene	ND	ND
Anthracene	ND	ND
Benzo(g,h,i)Perylene	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octylphthalate	ND	ND
Dibenz(a,h)Anthracene	ND	ND
Fluoranthene	ND	ND
Fluorene	ND	ND
Naphthalene	ND	ND
Phenanthrene	ND	ND
Pyrene	ND	ND
bis(2-Ethylhexyl)Phthalate	ND	0.01
Total Base/Neutral Compounds	ND	0.01

0288E:PAA011FF.W51

845030226

NOTES

1. Depths are measured from the soil surface.

2. Explanation of abbreviations:

   HSAB: Hollow-Stem Auger Boring
   NA: Sample was not analyzed, based on field observations (odor) that soils were contaminated.
   J: Indicates an estimated value, based on an assumption of a 1:1 response factor for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.
   ND: Compound not detected.
   NQ_1: Identified by operator but not quantified because peak was obscured by off-scale peak of other compound.
   NQ_2: Identified by operator but not quantified due to shift in retention time outside of instrument calibration range. Actual concentration is less than 10 ppm.

3. All concentrations are reported in parts per million (ppm).

4. VOC analyses were conducted on-site using a field gas chromatograph to perform a modified Method 8020 analysis.

5. The following compounds reported in the table were detected as tentatively identified compounds (TICs):

   Dibenzofuran
   Benz(e)Acephenanthrylene
   Benzo(a)Fluorene
   Benzo(b)Fluorene
   Benzo(a)Pyrene
   Benzo(e)Pyrene
   Benzo(j)Fluoranthene

6. Total Base/Neutral Compounds includes Total CaPAHs.

0288E:PAA011FF.W51

845030227

TABLE 3
Compilation of Tentatively Identified Compounds from the Analytical Results of Pre-Remediation Soil Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppm)
288E-0307-SB01	Soil	BENZENE, (1-METHYLETHYL)-	8.77	44000
		BENZENE, 1,2-DIMETHYL-	5.34	81000
		BENZENE, 1-ETHYL-3-METHYL-	8.14	42000
		BENZENE, ETHYL-	5.15	45000
		CYCLOHEXANE, OCTYL-	9.02	62000
		DECANE, 3-METHYL-	9.87	43000
		DECANE, 5-METHYL-	9.59	41000
		DIBENZOFURAN	18.00	8700
		NAPHTHALENE, 2-METHYL	14.19	6100
		OCTANE, 3,6-DIMETHYL-	6.84	53000
		OCTANE, 3,6-DIMETHYL-	7.70	57000
		UNDECANE	10.47	44000
		UNKNOWN	7.28	67000
		UNKNOWN	8.86	160000
		UNKNOWN	9.36	270000
		UNKNOWN	9.51	57000
		UNKNOWN	9.74	96000
		UNKNOWN	18.39	47000
		UNKNOWN	18.93	77000
		UNKNOWN	19.52	33000
		UNKNOWN	19.62	48000
		UNKNOWN	22.58	67000
288E-0308-SB01	Soil	DIBENZOFURAN	17.99	1600
		NAPHTHALENE, 2-METHYL	14.20	2000
288E-0604-SB01	Soil	ALKYL BENZENE	5.95	410
		ALKYL BENZENE	6.14	1300
		ALKYL BENZENE	6.68	410
		ALKYL BENZENE	8.29	330
		BENZENE, 1,1'-OXYBIS	17.23	6100
		NAPHTHALENE, 2-METHYL	15.29	510
		UNKNOWN	7.67	1300
		UNKNOWN	15.71	490
		UNKNOWN	20.01	570
		UNKNOWN	24.93	330

845030228

TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Pre-Remediation Soil Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppm)
288E-0804-SB01	Soil	ALKANE	8.31	23000
		ALKANE	8.57	11000
		ALKANE	9.06	11000
		ALKANE	9.83	37000
		ALKANE	9.99	14000
		ALKANE	10.12	11000
		ALKANE	11.39	24000
		ALKANE	11.91	15000
		ALKANE	12.74	17000
		ALKANE	12.81	14000
		BENZENE, 1,1'-OXYBIS	12.81	250000
		DIBENZOFURAN	19.19	2200
		UNKNOWN	10.70	51000
288E-0805-SB01	Soil	ALKANE	8.33	27000
		ALKANE	10.09	17000
		ALKANE	10.71	39000
		ALKANE	11.32	10000
		ALKANE	11.41	24000
		ALKANE	11.92	14000
		ALKANE	12.51	6000
		ALKANE	12.75	21000
		ALKANE	12.82	8500
		BENZENE, 1,1'-OXYBIS	17.30	280000
		DIBENZOFURAN	19.26	11000
		NAPHTHALENE, 2-METHYL	15.29	910
		PHENOXYPHENOL ISOMER	22.37	19000
		TRIMETHYLDECANE ISOMER	11.60	6000
		UNKNOWN	9.87	39000
		UNKNOWN	12.06	4000
		UNKNOWN (AROMATIC)	16.84	50000
288E-1004-SB01	Soil	BENZENE, 1,2-DIMETHYL-	5.72	4800
		BENZENE, ETHYL-	5.55	850
		BENZO [A] PYRENE	34.54	430
		BENZOIC ACID	12.42	400
		DODECANE	12.66	350
		ETHANE, 1,1,2,2-TETRACHLORO-	6.76	710
		NAPHTHALENE, 2-METHYL	14.67	63
		UNKNOWN	25.52	350
		UNKNOWN	34.03	430
		UNKNOWN	35.00	1200
		UNKNOWN	35.09	640
		UNKNOWN	35.82	920

84503022 9

TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Pre-Remediation Soil Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppm)
288E-1005-SB01	Soil	DOCOSANE	34.02	2100
		HEPTACOSANE	36.46	1800
		HEPTACOSANE	37.28	2100
		IRON, TRICARBONYL[N-(PHENYL-2-	35.67	2800
		NONACOSANE	33.15	1800
		UNKNOWN	34.61	1800
		UNKNOWN	36.08	2100
		UNKNOWN	36.80	3500
288E-1508-SB01	Soil	11H-BENZO[A]FLUORENE	27.40	1000
		4H-CYCLOPENTA[DEF]PHENANTHRENE	23.79	1000
		BENZO[E]PYRENE	33.86	1500
		DECANE,4-METHYL-	8.80	1500
		DIBENZOFURAN	17.98	310
		ETHANE, 1,1,2,2-TETRACHLORO-	6.25	1200
		NAPHTHALENE, 2-METHYL	14.18	330
		OCTANE, 2,3,7,-TRIMETHYL-	6.81	1500
		OCTANE, 3-ETHYL-2,7-DIMETHYL-	9.05	1000
		SULFUR, MOL. (S8)	25.38	12000
		UNKNOWN	7.26	1000
		UNKNOWN	9.46	1200
288E-1711-SB01	Soil	3-UNDECENE, 6-METHYL-	7.11	2000
		BENZENE, (1-METHYLETHYL)-	7.55	2800
		BENZENE, 1,2-DIMETHYL	5.97	3200
		BENZENE, 1,2-DIMETHYL-	5.44	5500
		DECANE	8.45	2800
		DECANE,4-METHYL-	8.95	6300
		NONANE, 3,7-DIMETHYL-	9.30	3200
		OCTANE, 3,6-DIMETHYL-	6.96	2800
		SULFUR, MOL. (S8)	25.58	15000
		UNKNOWN	7.40	4000
		UNKNOWN	7.81	1600
		UNKNOWN	8.89	1600
		UNKNOWN	9.20	2800
		UNKNOWN	9.62	2800
		UNKNOWN	9.84	3200
		UNKNOWN	10.08	2800
		UNKNOWN	10.59	2800
		UNKNOWN	11.15	2000
		UNKNOWN	36.70	2800

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TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Pre-Remediation Soil Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppm)
288E-1712-SB01	Soil	11H-BENZO(B)FLUORENE	27.66	860
		BENZENE, 1,1'-(1-ETHYL-1,2-	34.01	1100
		BENZO(J)FLUORANTHENE	33.72	1100
		BENZO[B]TRIPHENYLENE	37.46	1500
		BENZO[E]PYRENE	34.14	4500
		BENZ[E]ACEPHENANTHRYLENE	33.49	2800
		ETHANE, 1,1,2,2-TETRACHLORO-	6.40	1100
		SULFUR, MOL. (S8)	25.61	11000
		UNKNOWN	36.84	1900
288E-1803-SB01	Soil	CYCLOHEXANE, ETHYL-	4.68	1600
		CYCLOHEXANE,1,3-DIMETHYL-,CIS-	3.55	3500
		CYCLOPENTANE, 1-ETHYL-2-METHYL	3.82	2000
		CYCLOPENTANEMETHANAMINE, 2-	3.48	2000
		HEPTADECANE, 2,6,10,15-	16.27	4700
		NONANE, 3,7-DIMETHYL-	12.66	2000
		NONANE, 3-METHYL-5-PROPYL-	14.52	3500
		OCTACOSANE	19.48	2400
		PENTADECANE	17.92	5500
		SULFUR, MOL. (S8)	25.64	20000
		UNKNOWN	3.34	2000
		UNKNOWN	4.76	2400
288E-2304-SB01	Soil	BENZENE, 1,2-DIETHYL-	9.62	52000
		BENZENE, 1,3-DIETHYL-5-METHYL-	11.61	15000
		BENZENE, 1-METHYL-4-(1-	10.42	160000
		BENZENE, 1-METHYL-4-PROPYL-	9.74	65000
		BENZENE,1,2,4-TRIMETHYL-	8.36	65000
		CYCLOHEXANE, 1-ETHYL-4-METHYL-	5.92	62000
		CYCLOHEXANE, 1-METHYL-3-	8.15	65000
		DIBENZOFURAN	18.19	1500
		HEPTANE, 3-ETHYL-2-METHYL-	7.21	89000
		HEPTANE, 3-ETHYL-5-METHYL-	7.06	110000
		NAPHTHALENE, 2-METHYL	14.38	5100
		NONANE	7.67	62000
		NONANE, 2,6-DIMETHYL-	9.08	160000
		NONANE, 3,7-DIMETHYL-	9.41	52000
		UNKNOWN	6.64	100000
		UNKNOWN	7.48	65000
		UNKNOWN	8.20	52000
		UNKNOWN	10.23	52000

84503023 1

TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Pre-Remediation Soil Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppm)
		UNKNOWN	11.05	34000
		UNKNOWN	11.16	21000
		UNKNOWN	11.46	34000
		UNKNOWN	11.77	20000
288E-2803-SB01	Soil	ALKYL BENZENE	6.13	1100
		DIBENZOFURAN	19.15	700
		NAPHTHALENE, 2-METHYL	15.26	530
		UNKNOWN	17.76	3300
		UNKNOWN (AROMATIC)	16.79	1100
288E-B007-SB01	Soil	ALKYL BENZENE	5.96	12000
		ALKYL BENZENE	6.14	1900
		DIBENZOFURAN	19.15	590
		NAPHTHALENE, 2-METHYL	15.26	3300
		UNKNOWN	8.55	2900
288E-B008-SB01	Soil	BENZENE, 1,2-DIMETHYL-	5.45	820
		BENZO[E]PYRENE	34.13	820
		ETHANE, 1,1,2,2-TETRACHLORO-	6.39	670
		ETHANE, 1,1,2-TRICHLORO-	3.39	300
		UNKNOWN	36.71	450
288E-B010-SB01	Soil	1,3,5-CYCLOHEPTATRIENE	3.34	1600
		BENZENE, 1,1'-OXYBIS	16.28	650
		BENZENE, 1,2-DIMETHYL-	5.44	520
		BENZO[E]PYRENE	34.12	1200
		UNKNOWN	36.69	650
288E-B011-SB01	Soil	1,2-BEZENEDICARBOXYLIC ACID,	26.17	440000
		9-OCTADECENOIC ACID (Z)-	26.65	820000
		BENZENE, 1,2-DIMETHYL-	5.98	200000
		BENZENE, 1-METHYL-3-(1-	9.69	330000
		BENZENE, ETHYL-	5.26	150000
		BENZENE,1,3-DIMETHYL-	5.48	630000
		DECANE	8.45	810000
		DECANE, 2,6,7-TRIMETHYL-	9.06	270000
		DECANE, 3-METHYL-	9.98	310000
		DODECANE	12.59	530000
		DODECANE, 2,7,10-TRIMETHYL-	9.20	560000
		DODECANE, 3-METHYL-	9.84	760000
		HEPTANE, 2,2-DIMETHYL-	9.62	710000
		NONANE, 2,6-DIMETHYL-	8.94	640000

84503023

TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Pre-Remediation Soil Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppm)
		OCTADECANOIC ACID	26.88	260000
		PHTHALIC ANHYDRIDE	14.68	340000
		TETRADECANOIC ACID	21.76	660000
		UNKNOWN	10.08	360000
		UNKNOWN	30.52	960000
		UNKNOWN	32.25	170000
288E-B013-SB01	Soil	BENZENE, 1,2-DIMETHYL-	5.32	13000
		BENZENE, ETHYL-	5.14	2900
		BENZO[E]PYRENE	33.86	1300
		CYCLOHEXANONE	5.82	15000
		ETHANE, 1,1,2,2-TETRACHLORO-	6.25	1100
		NAPHTHALENE, 2-METHYL	14.19	400
		UNKNOWN	25.40	15000
288E-FB-910315	Aqueous	NO TIC'S OR UNKNOWNS	0.00	0
288E-FB-910319	Aqueous	NO TIC'S OR UNKNOWNS	0.00	0

0288E:PAA0125D.W51

84503023

Julia

ENVIRON

December 27, 1990

Mr. Mark Fisher
New Jersey Department of
Environmental Protection
Bureau of Environmental Evaluation and
Cleanup Responsibility Assessment
401 East State Street, 5th Floor
Trenton, NJ 08625

Re: Textron, Inc.--Spencer Kellogg Facility
Newark, New Jersey
ECRA Case No. 85402

Dear Mr. Fisher:

Per your request, please find enclosed three copies of the following information:

- Analytical results of quarterly ground water sampling; and
- Ground water elevations collected during this sampling round.

Please note that MW14 has been replaced by MW14B and was sampling during this round of quarterly ground water sampling. I have attached the lithologic log for MW14B, as well as the completed Form A. In addition, I have included a table showing the surveyed location of the former MW14 and that of MW14B. MW14B is located approximately 15 feet northwest of the former MW14.

Should you have any questions about this material, or require additional information, please do not hesitate to call.

Sincerely,

Scott E. MacDonald
Senior Associate

SEM:srf
0288E:PAA00AA4.W51
Enclosures

cc: B. Lawrence, Esq.
J. Schiavone

GROUND WATER ELEVATIONS (FEET ABOVE SEA LEVEL) AT LOW AND HIGH TIDES (10/29/90)

Spencer Kellogg Site
Newark, New Jersey

Monitoring Well	Low	High
1	2.26	2.19
3	2.79	2.76
4	0.64	1.58
5	3.45	3.44
6	4.15	4.12
7	0.44	2.65
8	0.45	2.22
9	3.76	3.71
10	4.33	4.28
11	4.11	4.1
12	2.58	2.53
13	4.65	4.59
14B[2]	4.65	4.58
15	4.09	4.04
16	3.79	3.79
17	0.74	2.47
18	1.73	2.81
19	3.92	3.9
20	4.39	4.46
21	1.44	1.72
22	-1.98[3]	1.53
23	1.39	1.63
24	1.05	1.67
25	0.94	1.78
26	1.01	1.83

Notes:

1. Not able to obtain water level measurements from MW2 due to the presence of a black tar-like substance in this upgradient background well.

2. MW14 was replaced by MW14B. MW14 was damaged physically, and was removed and filled.

3. The negative elevation in the low tide measurement for MW22 probably reflects an error in the depth to water measurement.

ORGANIC SAMPLE RESULTS SUMMARY

000017

845030236

NET Atlantic, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: ENVIRON CORPORATION
Sample ID: 288E-MW10-GW07

Report #: 90.3065
Lab ID: 49653

	ug/l			ug/l	
Chloromethane	1100	U	1,2-Dichloropropane	670	U
Bromomethane	1100	U	trans-1,3-Dichloropropene	560	U
Vinyl chloride	1100	U	Trichloroethene	210	U
Chloroethane	1100	U	Chlorodibromomethane	340	U
Methylene chloride	310	U	1,1,2-Trichloroethane	560	U
Benzene	490	U	cis-1,3-Dichloropropene	560	U
1,1-Dichloroethene	310	U	2-Chloroethyl vinyl ether	1100	U
1,1-Dichloroethane	520	U	Bromoform	520	U
Total-1,2-Dichloroethene	180	U	Chloroform	180	U
1,2-Dichloroethane	310	U	Tetrachloroethene	460	U
1,1,2,2-Tetrachloroethane	770	U	1,1,1-Trichloroethane	420	U
Toluene	8100		Carbon tetrachloride	310	U
Chlorobenzene	670	U	Ethylbenzene	800	U
Bromodichloromethane	240	U	Total Xylenes	1100	U
1,2-&1,4-Dichlorobenzenes	1100	U	1,3-Dichlorobenzene	560	U
Trichlorofluoromethane	220	U			

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit

NET Atlantic, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: ENVIRON CORPORATION
Sample ID: 288E-WB102990

Report #: 90.3065
Lab ID: 49654

	ug/l			ug/l	
Chloromethane	10	U	1,2-Dichloropropane	6	U
Bromomethane	10	U	trans-1,3-Dichloropropene	5	U
Vinyl chloride	10	U	Trichloroethene	2	U
Chloroethane	10	U	Chlorodibromomethane	3	U
Methylene chloride	7		1,1,2-Trichloroethane	5	U
Benzene	4	U	cis-1,3-Dichloropropene	5	U
1,1-Dichloroethene	3	U	2-Chloroethyl vinyl ether	10	U
1,1-Dichloroethane	5	U	Bromoform	5	U
Total-1,2-Dichloroethene	2	U	Chloroform	2	U
1,2-Dichloroethane	3	U	Tetrachloroethene	4	U
1,1,2,2-Tetrachloroethane	7	U	1,1,1-Trichloroethane	4	U
Toluene	6	U	Carbon tetrachloride	3	U
Chlorobenzene	6	U	Ethylbenzene	7	U
Bromodichloromethane	2	U	Total Xylenes	10	U
1,2-&1,4-Dichlorobenzenes	10	U	1,3-Dichlorobenzene	5	U
Trichlorofluoromethane	2	U			

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit

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NET Atlantic, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: ENVIRON CORPORATION
Sample ID: 288E-MW15-GW07

Report #: 90.3065
Lab ID: 49655

	ug/l			ug/l	
Chloromethane	10	U	1,2-Dichloropropane	6	U
Bromomethane	10	U	trans-1,3-Dichloropropene	5	U
Vinyl chloride	10	U	Trichloroethene	2	U
Chloroethane	10	U	Chlorodibromomethane	3	U
Methylene chloride	3	U	1,1,2-Trichloroethane	5	U
Benzene	4	U	cis-1,3-Dichloropropene	5	U
1,1-Dichloroethene	3	U	2-Chloroethyl vinyl ether	10	U
1,1-Dichloroethane	5	U	Bromoform	5	U
Total-1,2-Dichloroethene	2	U	Chloroform	2	U
1,2-Dichloroethane	3	U	Tetrachloroethene	4	U
1,1,2,2-Tetrachloroethane	7	U	1,1,1-Trichloroethane	4	U
Toluene	6	U	Carbon tetrachloride	3	U
Chlorobenzene	6	U	Ethylbenzene	7	U
Bromodichloromethane	2	U	Total Xylenes	10	U
1,2-&1,4-Dichlorobenzenes	10	U	1,3-Dichlorobenzene	5	U
Trichlorofluoromethane	2	U			

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit

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NET Atlantic, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: ENVIRON CORPORATION
Sample ID: 288E-MW14B-GW07

Report #: 90.3065
Lab ID: 49656

	ug/l			ug/l	
Chloromethane	10000	U	1,2-Dichloropropane	6000	U
Bromomethane	10000	U	trans-1,3-Dichloropropene	5000	U
Vinyl chloride	10000	U	Trichloroethene	1900	U
Chloroethane	10000	U	Chlorodibromomethane	3100	U
Methylene chloride	2800	U	1,1,2-Trichloroethane	5000	U
Benzene	4400	U	cis-1,3-Dichloropropene	5000	U
1,1-Dichloroethene	2800	U	2-Chloroethyl vinyl ether	10000	U
1,1-Dichloroethane	4700	U	Bromoform	4700	U
Total-1,2-Dichloroethene	1600	U	Chloroform	1600	U
1,2-Dichloroethane	2800	U	Tetrachloroethene	4100	U
1,1,2,2-Tetrachloroethane	6900	U	1,1,1-Trichloroethane	3800	U
Toluene	4100	J	Carbon tetrachloride	2800	U
Chlorobenzene	6000	U	Ethylbenzene	12000	
Bromodichloromethane	2200	U	Total Xylenes	51000	
1,2-&1,4-Dichlorobenzenes	10000	U	1,3-Dichlorobenzene	5000	U
Trichlorofluoromethane	2000	U			

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit

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NET Atlantic, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: ENVIRON CORPORATION
Sample ID: 288E-MW14B-GW77

Report #: 90.3065
Lab ID: 49657

	ug/l			ug/l	
Chloromethane	10000	U	1,2-Dichloropropane	6000	U
Bromomethane	10000	U	trans-1,3-Dichloropropene	5000	U
Vinyl chloride	10000	U	Trichloroethene	1900	U
Chloroethane	10000	U	Chlorodibromomethane	3100	U
Methylene chloride	2800	U	1,1,2-Trichloroethane	5000	U
Benzene	4400	U	cis-1,3-Dichloropropene	5000	U
1,1-Dichloroethene	2800	U	2-Chloroethyl vinyl ether	10000	U
1,1-Dichloroethane	4700	U	Bromoform	4700	U
Total-1,2-Dichloroethene	1600	U	Chloroform	1600	U
1,2-Dichloroethane	2800	U	Tetrachloroethene	4100	U
1,1,2,2-Tetrachloroethane	6900	U	1,1,1-Trichloroethane	3800	U
Toluene	3600	J	Carbon tetrachloride	2800	U
Chlorobenzene	6000	U	Ethylbenzene	10000	
Bromodichloromethane	2200	U	Total Xylenes	44000	
1,2-&1,4-Dichlorobenzenes	10000	U	1,3-Dichlorobenzene	5000	U
Trichlorofluoromethane	2000	U			

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit

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NET Atlantic, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: ENVIRON CORPORATION
Sample ID: 288E-MW13-GW07

Report #: 90.3065
Lab ID: 49658

	ug/l			ug/l	
Chloromethane	25	U	1,2-Dichloropropane	15	U
Bromomethane	25	U	trans-1,3-Dichloropropene	13	U
Vinyl chloride	25	U	Trichloroethene	5	U
Chloroethane	25	U	Chlorodibromomethane	8	U
Methylene chloride	7	U	1,1,2-Trichloroethane	13	U
Benzene	11	U	cis-1,3-Dichloropropene	13	U
1,1-Dichloroethene	7	U	2-Chloroethyl vinyl ether	25	U
1,1-Dichloroethane	12	U	Bromoform	12	U
Total-1,2-Dichloroethene	4	U	Chloroform	4	U
1,2-Dichloroethane	7	U	Tetrachloroethene	10	U
1,1,2,2-Tetrachloroethane	17	U	1,1,1-Trichloroethane	10	U
Toluene	15	U	Carbon tetrachloride	7	U
Chlorobenzene	15	U	Ethylbenzene	94	
Bromodichloromethane	6	U	Total Xylenes	25	U
1,2-&1,4-Dichlorobenzenes	25	U	1,3-Dichlorobenzene	13	U
Trichlorofluoromethane	5	U			

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit

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NET Atlantic, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: ENVIRON CORPORATION
Sample ID: 288E-MW20-GW07

Report #: 90.3065
Lab ID: 49659

	ug/l			ug/l	
Chloromethane	10	U	1,2-Dichloropropane	6	U
Bromomethane	10	U	trans-1,3-Dichloropropene	5	U
Vinyl chloride	10	U	Trichloroethene	2	U
Chloroethane	10	U	Chlorodibromomethane	3	U
Methylene chloride	3	U	1,1,2-Trichloroethane	5	U
Benzene	4	U	cis-1,3-Dichloropropene	5	U
1,1-Dichloroethene	3	U	2-Chloroethyl vinyl ether	10	U
1,1-Dichloroethane	5	U	Bromoform	5	U
Total-1,2-Dichloroethene	2	U	Chloroform	2	U
1,2-Dichloroethane	3	U	Tetrachloroethene	4	U
1,1,2,2-Tetrachloroethane	17		1,1,1-Trichloroethane	4	U
Toluene	6	U	Carbon tetrachloride	3	U
Chlorobenzene	6	U	Ethylbenzene	13	
Bromodichloromethane	2	U	Total Xylenes	10	U
1,2-&1,4-Dichlorobenzenes	10	U	1,3-Dichlorobenzene	5	U
Trichlorofluoromethane	2	U			

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit

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NET Atlantic, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: ENVIRON CORPORATION
Sample ID: 288E-TB-102990

Report #: 90.3065
Lab ID: 49660

	ug/l			ug/l	
Chloromethane	10	U	1,2-Dichloropropane	6	U
Bromomethane	10	U	trans-1,3-Dichloropropene	5	U
Vinyl chloride	10	U	Trichloroethene	2	U
Chloroethane	10	U	Chlorodibromomethane	3	U
Methylene chloride	3	U	1,1,2-Trichloroethane	5	U
Benzene	4	U	cis-1,3-Dichloropropene	5	U
1,1-Dichloroethene	3	U	2-Chloroethyl vinyl ether	10	U
1,1-Dichloroethane	5	U	Bromoform	5	U
Total-1,2-Dichloroethene	2	U	Chloroform	2	U
1,2-Dichloroethane	3	U	Tetrachloroethene	4	U
1,1,2,2-Tetrachloroethane	7	U	1,1,1-Trichloroethane	4	U
Toluene	6	U	Carbon tetrachloride	3	U
Chlorobenzene	6	U	Ethylbenzene	7	U
Bromodichloromethane	2	U	Total Xylenes	10	U
1,2-&1,4-Dichlorobenzenes	10	U	1,3-Dichlorobenzene	5	U
Trichlorofluoromethane	2	U			

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit

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Julie

ENVIRON

April 12, 1991

FEDERAL EXPRESS

Mr. Sal Balakrishnan
BEECRA Cleanup Oversight Section
New Jersey Department of Environmental Protection
401 East State Street
Trenton, NJ 08625

Re: Textron Inc. - Former Spencer Kellogg Facility
Newark, Essex County, New Jersey
ECRA Case No. 85403

Dear Mr. Balakrishnan:

Enclosed please find the progress report describing the activities associated with implementation of the Cleanup Plan for the former Spencer Kellogg facility for March 1991.

As indicated in the October 1990 Cleanup Plan and in the initial progress report to Ms. Tessie Fields, a detailed work plan for remediation, and health and safety and quality assurance plans, will be submitted to NJDEP. These plans are anticipated to be submitted to NJDEP in May 1991. Textron expects that modifications to the cleanup schedule and scope of cleanup will be submitted as part of the work plan.

Please contact me if you have any questions or need further information.

Sincerely,

Scott MacDonald

Scott MacDonald
Manager

Julia Mermelstein

Julia Mermelstein
Associate Engineer

SM:JM:srf
0288E:PAA0110B.W51

cc: R. Lawrence, Esq.
J. Schiavone

ATTACHMENT 1

(PLATE GOES HERE)

CLEANUP PLAN IMPLEMENTATION
PROGRESS REPORT

Textron Inc. - Former Spencer Kellogg Facility
ECRA Case No. 85403

March 1991

1. Activities Performed This Reporting Period

Activities performed during this reporting period include the implementation of pre-remediation soil sampling, further discussions with the Bureau of Hazardous Waste Classification, continued negotiations of a final remediation contract, the posting of financial assurance, and discussions with the current plant owner regarding access. These activities are discussed in the following paragraphs.

Implementation of Additional Sampling

As required by NJDEP's February 8, 1991 conditional approval letter, a number of areas (AECs 6, 8, 10, 17, and 23) not previously targeted for further investigation or cleanup were sampled for base/neutral compounds to support the proposal for no further action in those areas. As proposed in the October 1990 Cleanup Plan, additional sampling to support "hot-spot" excavations and to confirm the estimates of soil volumes was also performed. A plate and table showing the locations, depths, and targeted analyses of these samples is provided as Attachment 1 to this progress report. It is currently anticipated that final data will be received in April and all data and analyses will be presented in the remediation Work Plan currently expected to be submitted in May. Any modifications to the Cleanup Plan based on the sampling results will be included in the Work Plan.

Waste Classification

As indicated in Textron's February 1991 Progress Report, ENVIRON prepared and submitted a letter on February 25, 1991 to Mr. Kurt Whitford of NJDEP's Bureau of Hazardous Waste Classification summarizing Textron's analysis regarding the waste designation of the soils to be remediated at this site. On March 14, 1991, ENVIRON received a written response and held subsequent discussions with Richard Johnson

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regarding agency guidance. Based on this response and follow-up conversations with this Bureau, Textron believes that a RCRA TSD permit is not required to proceed with the remediation and that no further waste classification is necessary. Documentation regarding this issue will be submitted under separate cover.

Remediation Contract

Attorneys for Textron and Canonie Environmental Services Corp., the remedial contractor selected to perform low temperature thermal desorption of on-site soils, have exchanged additional drafts and comments on a contract for the remedial services. The remediation contract that sets forth the terms and conditions governing the cleanup is nearly complete. A final remediation contract is expected to be completed in April 1991.

Financial Assurance

Financial assurance documentation was submitted to NJDEP by Textron on March 15, 1991, the extended deadline approved by Tina Layre.

Physical Access for Cleanup Plan Implementation

On March 15, 1991, Textron met with Reichhold, the current site owner, to discuss coordination of remedial activities with ongoing manufacturing activities. Two significant issues identified and discussed during this meeting were: (1) the removal of items stored aboveground in areas targeted for excavation and/or equipment staging; and (2) the need for and feasibility of alternative arrangements for feedstock delivery to the large tank farm via railroad tracks (AECs 3, 4, and 5) and product delivery from the tank farm via AEC 7. Reichhold and Textron will continue to work toward resolving these and other coordination issues. If their resolution affects the Cleanup Plan or the schedule for Cleanup Plan implementation, Textron will notify the NJDEP and propose appropriate modifications.

2. Data Produced in March 1991

The analytical results of quarterly ground water sampling and ground water elevations collected during January 1991 are provided as Attachment 2 to this progress report. As

845030248

previously indicated, field and laboratory data associated with the pre-remediation sampling currently are expected to be submitted in the final Work Plan.

3. Activities Scheduled for April 1991

Activities scheduled for April 1991 include a site visit with the NJDEP Cleanup Oversight Coordinator, receipt and analysis of results from pre-remediation soil sampling conducted during March, and completion of the remediation agreement between Textron and Canonie.

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Sampling Locations, Depths, and Analytical Parameters

AEC	Boring	Sample Number	Collection Method[1]	Depth[2] (feet)	Analytical Parameters[3]
1	0102	288E-0101-SB01	HSAB	1.5-2.0	VOC
3	0307	288E-0307-SB01	HSAB	1.5-2.0	BN+15
	0308	288E-0308-SB01	HSAB	1.5-2.0	BN+15
6	0604	288E-0604-SB02	HSAB	0.0-0.5	BN+15
7	0702	288E-0702-SB01	HSAB	1.5-2.0	VOC
	0703	288E-0703-SB01	HSAB	1.5-2.0	VOC
	0704	288E-0704-SB01	HSAB	1.5-2.0	VOC
	0705	288E-0705-SB01	HSAB	1.5-2.0	VOC
8	0804	288E-0804-SB01	HSAB	2.0-2.5	BN+15
	0805	288E-0805-SB01	HSAB	2.5-3.0	BN+15
10	1004	288E-1004-SB01	HSAB	0.0-0.5	BN+15
	1005	288E-1005-SB01	HSAB	0.0-0.5	BN+15
14	1406	288E-1406-SB01	HSAB	1.5-2.0	VOC
	1406B	288E-1406B-SB01	HSAB	1.5-2.0	VOC
	1406C	288E-1406C-SB01	HSAB	1.5-2.0	NA
	1406D	288E-1406D-SB01	HSAB	1.5-2.0	VOC
	1407	288E-1407-SB01	HSAB	1.5-2.0	VOC
	1408	288E-1408-SB01	HSAB	1.5-2.0	VOC
	1409	288E-1409-SB01	HSAB	1.5-2.0	VOC
15	1508	288E-1508-SB01	HSAB	0.0-0.5	BN+15
17	1710	288E-1710-SB01	HSAB	1.5-2.0	VOC
	1711	288E-1711-SB01	HSAB	0.0-0.5	BN+15
	1712	288E-1712-SB01	HSAB	0.0-0.5	BN+15
	B-13	288E-B-13-SB01	HSAB	1.5-2.0	BN+15
18	1803	288E-1803-SB01	HSAB	0.0-0.5	BN+15
21	2106	288E-2106-SB01	HSAB	1.5-2.0	VOC
	2107	288E-2107-SB01	HSAB	1.5-2.0	VOC
	2108	288E-2108-SB01	HSAB	1.5-2.0	VOC
	2109	288E-2109-SB01	HSAB	1.5-2.0	VOC
	2110	288E-2110-SB01	HSAB	0.0-0.5	lead, arsenic
23	2304	288E-2304-SB01	HSAB	0.0-0.5	lead, BN+15

Sampling Locations, Depths, and Analytical Parameters

AEC	Boring	Sample Number	Collection Method[1]	Depth[2] (feet)	Analytical Parameters[3]
25	2504	288E-2504-SB01	HSAB	1.5-2.0	VOC
28	2803	288E-2803-SB01	HSAB	0.0-0.5	BN+15
--	B-7	288E-B-7-SB01	HAB	0.0-0.5	lead
--	B-8	288E-B-8-SB01	HAB	0.0-0.5	BN+15
--	B-9	288E-B-9-SB01	HSAB	0.0-0.5	lead
--	B-10	288E-B-10-SB01	HAB	0.0-0.5	BN+15, lead
--	B-11	288E-B-11-SB01	HSAB	0.0-0.5	BN+15
--	B-12	288E-B-12-SB01	HSAB	1.5-2.0	BN+15

[1] Collection Method Abbreviations:
HAB = Hand Auger Boring
HSAB = Hollow-stem Auger Boring

[2] Depths are measured from the soil surface.

[3] Analytical Parameter Abbreviations and Analytical Methodologies:
BN+15 = Priority Pollutant Base/Neutral Compounds plus 15-compound library search (EPA Method 8270)
VOC = Ethylbenzene, toluene and xylenes (modified EPA Method 8020)
Lead (EPA Method 7420)
Arsenic (EPA Method 7060)
NA = Not analyzed due to aromatic hydrocarbon odor

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ATTACHMENT 2

ORGANIC SAMPLE RESULTS SUMMARY

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NET ATLANTIC, INC.
Report of Results

Client: ENVIRON CORPORATION
Sample ID: 288E-MW10-GW08
% Moisture: N/A

Report NO: 91.0264
NET-Mid ID: 56534

Volatiles by GC/MS 624 AQ

Benzene	200.	U	ug/L	1,1-Dichloroethene	150.	U	ug/L
Bromodichloromethane	100.	U	ug/L	total-1,2-Dichloroethene	100.	U	ug/L
Bromoform	250.	U	ug/L	1,2-Dichloropropane	300.	U	ug/L
Bromomethane	500.	U	ug/L	cis-1,3-Dichloropropene	250.	U	ug/L
Carbon Tetrachloride	150.	U	ug/L	trans-1,3-Dichloropropene	250.	U	ug/L
Chlorobenzene	300.	U	ug/L	Ethylbenzene	58.	J	ug/L
Chloroethane	500.	U	ug/L	Methylene Chloride	150.	U	ug/L
2-Chloroethylvinyl ether	500.	U	ug/L	1,1,2,2-Tetrachloroethane	350.	U	ug/L
Chloroform	100.	U	ug/L	Tetrachloroethene	200.	U	ug/L
Chloromethane	500.	U	ug/L	Toluene	14518.		ug/L
Dibromochloromethane	150.	U	ug/L	1,1,1-Trichloroethane	200.	U	ug/L
1,2 & 1,4-Dichlorobenzene	500.	U	ug/L	1,1,2-Trichloroethane	250.	U	ug/L
1,3-Dichlorobenzene	250.	U	ug/L	Trichloroethene	100.	U	ug/L
1,1-Dichloroethane	250.	U	ug/L	Trichlorofluoromethane	100.	U	ug/L
1,2-Dichloroethane	150.	U	ug/L	Vinyl Chloride	500.	U	ug/L
Total Xylenes	218.	J	ug/L				

VALUE If the result is a value greater than or equal to the detection limit, the value is reported.

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value. This flag is used when the data indicates the presence of a compound that meets identification criteria or the result is less than the specified detection limit. (e.g. If the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, report as 3 J.)

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NET ATLANTIC, INC.
Report of Results

Client: ENVIRON CORPORATION
Sample ID: 288E-MW15-GW08
% Moisture: N/A

Report NO: 91.0264
NET-Mid ID: 56535

Volatiles by GC/MS 624 AQ

Benzene	4.0	U	ug/L	1,1-Dichloroethene	3.0	U	ug/L
Bromodichloromethane	2.0	U	ug/L	total-1,2-Dichloroethene	2.0	U	ug/L
Bromoform	5.0	U	ug/L	1,2-Dichloropropane	6.0	U	ug/L
Bromomethane	10.	U	ug/L	cis-1,3-Dichloropropene	5.0	U	ug/L
Carbon Tetrachloride	3.0	U	ug/L	trans-1,3-Dichloropropene	5.0	U	ug/L
Chlorobenzene	6.0	U	ug/L	Ethylbenzene	7.0	U	ug/L
Chloroethane	10.	U	ug/L	Methylene Chloride	3.0	U	ug/L
2-Chloroethylvinyl ether	10.	U	ug/L	1,1,2,2-Tetrachloroethane	7.0	U	ug/L
Chloroform	2.0	U	ug/L	Tetrachloroethene	4.0	U	ug/L
Chloromethane	10.	U	ug/L	Toluene	6.0	U	ug/L
Dibromochloromethane	3.0	U	ug/L	1,1,1-Trichloroethane	4.0	U	ug/L
1,2 & 1,4-Dichlorobenzene	10.	U	ug/L	1,1,2-Trichloroethane	5.0	U	ug/L
1,3-Dichlorobenzene	5.0	U	ug/L	Trichloroethene	2.0	U	ug/L
1,1-Dichloroethane	5.0	U	ug/L	Trichlorofluoromethane	2.0	U	ug/L
1,2-Dichloroethane	3.0	U	ug/L	Vinyl Chloride	10.	U	ug/L
Total Xylenes	10.	U	ug/L				

VALUE If the result is a value greater than or equal to the detection limit, the value is reported.

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value. This flag is used when the data indicates the presence of a compound that meets identification criteria or the result is less than the specified detection limit. (e.g. If the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, report as 3 J.)

000014

845030255

NET ATLANTIC, INC.
Report of Results

Client: ENVIRON CORPORATION
Sample ID: 288E-MW14B-GW08
% Moisture: N/A

Report NO: 91.0264
NET-Mid ID: 56536

Volatiles by GC/MS 624 AQ

Benzene	1000.	U	ug/L	1,1-Dichloroethene	750.	U	ug/L
Bromodichloromethane	500.	U	ug/L	total-1,2-Dichloroethene	500.	U	ug/L
Bromoform	1250.	U	ug/L	1,2-Dichloropropane	1500.	U	ug/L
Bromomethane	2500.	U	ug/L	cis-1,3-Dichloropropene	1250.	U	ug/L
Carbon Tetrachloride	750.	U	ug/L	trans-1,3-Dichloropropene	1250.	U	ug/L
Chlorobenzene	1500.	U	ug/L	Ethylbenzene	8585.		ug/L
Chloroethane	2500.	U	ug/L	Methylene Chloride	750.	U	ug/L
2-Chloroethylvinyl ether	2500.	U	ug/L	1,1,2,2-Tetrachloroethane	1750.	U	ug/L
Chloroform	1968.		ug/L	Tetrachloroethene	1000.	U	ug/L
Chloromethane	2500.	U	ug/L	Toluene	4903.		ug/L
Dibromochloromethane	750.	U	ug/L	1,1,1-Trichloroethane	1000.	U	ug/L
1,2 & 1,4-Dichlorobenzene	2500.	U	ug/L	1,1,2-Trichloroethane	1250.	U	ug/L
1,3-Dichlorobenzene	1250.	U	ug/L	Trichloroethene	500.	U	ug/L
1,1-Dichloroethane	1250.	U	ug/L	Trichlorofluoromethane	500.	U	ug/L
1,2-Dichloroethane	750.	U	ug/L	Vinyl Chloride	2500.	U	ug/L
Total Xylenes	71675.		ug/L				

VALUE If the result is a value greater than or equal to the detection limit, the value is reported.

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value. This flag is used when the data indicates the presence of a compound that meets identification criteria or the result is less than the specified detection limit. (e.g. If the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, report as 3 J.)

NET ATLANTIC, INC.
Report of Results

Client: ENVIRON CORPORATION
Sample ID: 288E-MW20-GW08
% Moisture: N/A

Report NO: 91.0264
NET-Mid ID: 56537

Volatiles by GC/MS 624 AQ

Benzene	20.	U	ug/L	1,1-Dichloroethene	15.	U	ug/L
Bromodichloromethane	10.	U	ug/L	total-1,2-Dichloroethene	10.	U	ug/L
Bromoform	25.	U	ug/L	1,2-Dichloropropane	30.	U	ug/L
Bromomethane	50.	U	ug/L	cis-1,3-Dichloropropene	25.	U	ug/L
Carbon Tetrachloride	15.	U	ug/L	trans-1,3-Dichloropropene	25.	U	ug/L
Chlorobenzene	30.	U	ug/L	Ethylbenzene	9.4	J	ug/L
Chloroethane	50.	U	ug/L	Methylene Chloride	15.	U	ug/L
2-Chloroethylvinyl ether	50.	U	ug/L	1,1,2,2-Tetrachloroethane	35.	U	ug/L
Chloroform	10.	U	ug/L	Tetrachloroethene	20.	U	ug/L
Chloromethane	50.	U	ug/L	Toluene	94.		ug/L
Dibromochloromethane	15.	U	ug/L	1,1,1-Trichloroethane	20.	U	ug/L
1,2 & 1,4-Dichlorobenzene	50.	U	ug/L	1,1,2-Trichloroethane	25.	U	ug/L
1,3-Dichlorobenzene	25.	U	ug/L	Trichloroethene	10.	U	ug/L
1,1-Dichloroethane	25.	U	ug/L	Trichlorofluoromethane	10.	U	ug/L
1,2-Dichloroethane	15.	U	ug/L	Vinyl Chloride	50.	U	ug/L
Total Xylenes	50.	U	ug/L				

VALUE If the result is a value greater than or equal to the detection limit, the value is reported.

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value. This flag is used when the data indicates the presence of a compound that meets identification criteria or the result is less than the specified detection limit. (e.g. If the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, report as 3 J.)

090016

845030257

NET ATLANTIC, INC.
Report of Results

Client: ENVIRON CORPORATION
Sample ID: 288E-MW20-GW88
% Moisture: N/A

Report NO: 91.0264
NET-Mid ID: 56538

Volatiles by GC/MS 624 AQ

Benzene	20.	U	ug/L	1,1-Dichloroethene	15.	U	ug/L
Bromodichloromethane	10.	U	ug/L	total-1,2-Dichloroethene	10.	U	ug/L
Bromoform	25.	U	ug/L	1,2-Dichloropropane	30.	U	ug/L
Bromomethane	50.	U	ug/L	cis-1,3-Dichloropropene	25.	U	ug/L
Carbon Tetrachloride	15.	U	ug/L	trans-1,3-Dichloropropene	25.	U	ug/L
Chlorobenzene	30.	U	ug/L	Ethylbenzene	7.9	J	ug/L
Chloroethane	50.	U	ug/L	Methylene Chloride	15.	U	ug/L
2-Chloroethylvinyl ether	50.	U	ug/L	1,1,2,2-Tetrachloroethane	35.	U	ug/L
Chloroform	10.	U	ug/L	Tetrachloroethene	20.	U	ug/L
Chloromethane	50.	U	ug/L	Toluene	103.		ug/L
Dibromochloromethane	15.	U	ug/L	1,1,1-Trichloroethane	20.	U	ug/L
1,2 & 1,4-Dichlorobenzene	50.	U	ug/L	1,1,2-Trichloroethane	25.	U	ug/L
1,3-Dichlorobenzene	25.	U	ug/L	Trichloroethene	10.	U	ug/L
1,1-Dichloroethane	25.	U	ug/L	Trichlorofluoromethane	10.	U	ug/L
1,2-Dichloroethane	15.	U	ug/L	Vinyl Chloride	50.	U	ug/L
Total Xylenes	50.	U	ug/L				

VALUE If the result is a value greater than or equal to the detection limit, the value is reported.

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value. This flag is used when the data indicates the presence of a compound that meets identification criteria or the result is less than the specified detection limit. (e.g. If the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, report as 3 J.)

000017

845030258

NET ATLANTIC, INC.
Report of Results

Client: ENVIRON CORPORATION
Sample ID: 288E-MW13-GW08
% Moisture: N/A

Report NO: 91.0264
NET-Mid ID: 56539

Volatiles by GC/MS 624 AQ

Benzene	18.		ug/L	1,1-Dichloroethene	3.0	U	ug/L
Bromodichloromethane	2.0	U	ug/L	total-1,2-Dichloroethene	2.0	U	ug/L
Bromoform	5.0	U	ug/L	1,2-Dichloropropane	6.0	U	ug/L
Bromomethane	10.	U	ug/L	cis-1,3-Dichloropropene	5.0	U	ug/L
Carbon Tetrachloride	3.0	U	ug/L	trans-1,3-Dichloropropene	5.0	U	ug/L
Chlorobenzene	6.0	U	ug/L	Ethylbenzene	7.0	U	ug/L
Chloroethane	10.	U	ug/L	Methylene Chloride	8.6		ug/L
2-Chloroethylvinyl ether	10.	U	ug/L	1,1,2,2-Tetrachloroethane	7.0	U	ug/L
Chloroform	26.		ug/L	Tetrachloroethene	4.0	U	ug/L
Chloromethane	10.	U	ug/L	Toluene	34.		ug/L
Dibromochloromethane	3.0	U	ug/L	1,1,1-Trichloroethane	4.0	U	ug/L
1,2 & 1,4-Dichlorobenzene	10.	U	ug/L	1,1,2-Trichloroethane	5.0	U	ug/L
1,3-Dichlorobenzene	5.0	U	ug/L	Trichloroethene	2.0	U	ug/L
1,1-Dichloroethane	5.0	U	ug/L	Trichlorofluoromethane	2.0	U	ug/L
1,2-Dichloroethane	3.0	U	ug/L	Vinyl Chloride	10.	U	ug/L
Total Xylenes	10.	U	ug/L				

VALUE If the result is a value greater than or equal to the detection limit, the value is reported.

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value. This flag is used when the data indicates the presence of a compound that meets identification criteria or the result is less than the specified detection limit. (e.g. If the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, report as 3 J.)

000018

845030259

NET ATLANTIC, INC.
Report of Results

Client: ENVIRON CORPORATION
Sample ID: 288E-WB-012491
% Moisture: N/A

Report NO: 91.0264
NET-Mid ID: 56540

Volatiles by GC/MS 624 AQ

Benzene	4.0	U	ug/L	1,1-Dichloroethene	3.0	U	ug/L
Bromodichloromethane	2.0	U	ug/L	total-1,2-Dichloroethene	2.0	U	ug/L
Bromoform	5.0	U	ug/L	1,2-Dichloropropane	6.0	U	ug/L
Bromomethane	10.	U	ug/L	cis-1,3-Dichloropropene	5.0	U	ug/L
Carbon Tetrachloride	3.0	U	ug/L	trans-1,3-Dichloropropene	5.0	U	ug/L
Chlorobenzene	6.0	U	ug/L	Ethylbenzene	7.0	U	ug/L
Chloroethane	10.	U	ug/L	Methylene Chloride	3.0	U	ug/L
2-Chloroethylvinyl ether	10.	U	ug/L	1,1,2,2-Tetrachloroethane	7.0	U	ug/L
Chloroform	2.0	U	ug/L	Tetrachloroethene	4.0	U	ug/L
Chloromethane	10.	U	ug/L	Toluene	6.0	U	ug/L
Dibromochloromethane	3.0	U	ug/L	1,1,1-Trichloroethane	4.0	U	ug/L
1,2 & 1,4-Dichlorobenzene	10.	U	ug/L	1,1,2-Trichloroethane	5.0	U	ug/L
1,3-Dichlorobenzene	5.0	U	ug/L	Trichloroethene	2.0	U	ug/L
1,1-Dichloroethane	5.0	U	ug/L	Trichlorofluoromethane	2.0	U	ug/L
1,2-Dichloroethane	3.0	U	ug/L	Vinyl Chloride	10.	U	ug/L
Total Xylenes	10.	U	ug/L				

VALUE If the result is a value greater than or equal to the detection limit, the value is reported.

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value. This flag is used when the data indicates the presence of a compound that meets identification criteria or the result is less than the specified detection limit. (e.g. If the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, report as 3 J.)

000019

845030260

NET ATLANTIC, INC.
Report of Results

Client: ENVIRON CORPORATION
Sample ID: 288E-TB-012491
% Moisture: N/A

Report NO: 91.0264
NET-Mid ID: 56541

Volatiles by GC/MS 624 AQ

Benzene	4.0	U	ug/L	1,1-Dichloroethene	3.0	U	ug/L
Bromodichloromethane	2.0	U	ug/L	total-1,2-Dichloroethene	2.0	U	ug/L
Bromoform	5.0	U	ug/L	1,2-Dichloropropane	6.0	U	ug/L
Bromomethane	10.	U	ug/L	cis-1,3-Dichloropropene	5.0	U	ug/L
Carbon Tetrachloride	3.0	U	ug/L	trans-1,3-Dichloropropene	5.0	U	ug/L
Chlorobenzene	6.0	U	ug/L	Ethylbenzene	7.0	U	ug/L
Chloroethane	10.	U	ug/L	Methylene Chloride	3.0	U	ug/L
2-Chloroethylvinyl ether	10.	U	ug/L	1,1,2,2-Tetrachloroethane	7.0	U	ug/L
Chloroform	2.0	U	ug/L	Tetrachloroethene	4.0	U	ug/L
Chloromethane	10.	U	ug/L	Toluene	6.0	U	ug/L
Dibromochloromethane	3.0	U	ug/L	1,1,1-Trichloroethane	4.0	U	ug/L
1,2 & 1,4-Dichlorobenzene	10.	U	ug/L	1,1,2-Trichloroethane	5.0	U	ug/L
1,3-Dichlorobenzene	5.0	U	ug/L	Trichloroethene	2.0	U	ug/L
1,1-Dichloroethane	5.0	U	ug/L	Trichlorofluoromethane	2.0	U	ug/L
1,2-Dichloroethane	3.0	U	ug/L	Vinyl Chloride	10.	U	ug/L
Total Xylenes	10.	U	ug/L				

VALUE If the result is a value greater than or equal to the detection limit, the value is reported.

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value. This flag is used when the data indicates the presence of a compound that meets identification criteria or the result is less than the specified detection limit. (e.g. If the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, report as 3 J.)

000050

845030261

GROUND WATER ELEVATIONS (FEET ABOVE SEA LEVEL) AT LOW AND HIGH TIDES (1/24/91)
Spencer Kellogg Site
Newark, New Jersey

Monitoring Well	Low	High
1	2.07	2.1
3	2.64	2.62
4	0.77	1.58
5	4.57	4.56
6	4.13	4.12
7	0.74	2.29
8	-3.39[2]	1.74
9	3.64	3.72
10	4.44	4.46
11	4.57	4.57
12	2.72	2.58
13	4.63	4.63
14B	4.9	4.84
15	4.32	4.6
16	4.26	2.56
17	-0.91[2]	3.62
18	2.96	2.38
19	4.1	3.6
20	4.56	2.39
21	1.29	6.54
22	0.71	-1.41[2]
23	1.31	3.83
24	0.63	1.49
25	0.63	1.49
26	0.97	1.55

Notes:

1. Not able to obtain water level measurements from MW2 due to the presence of a black tar-like substance in this upgradient well.
2. Negative elevations probably reflect errors in depth to water measurements.

0288E:PAA0109E.W51

Exhibit 8

845030264

DEED

THIS DEED OF CONVEYANCE, made and entered into this 11th day of December, 1978, by and between ASHLAND OIL, formerly known as Ashland Oil & Refining Company, INC.,/a Kentucky corporation, with offices at 5200 Paul G. Blazer Memorial Parkway, Dublin, Ohio 43017 (hereinafter called ("GRANTOR") and TEXTRON, INC., a Delaware corporation with its principal place of business at 40 Westminster Street, Providence, Rhode Island 02903, (hereinafter called "Grantee").

WITNESSETH:

That for and in consideration of $1,500,000 cash in hand this day paid, ~~and other good and valuable consideration as set forth in that certain Purchase Agreement dated November 15, 1978 between GRANTOR and GRANTEE,~~ the receipt and adequacy of all of which is hereby acknowledged, GRANTOR has granted, bargained, sold and conveyed, and does by these presents grant, bargain, sell and convey unto GRANTEE, its successors and assigns forever, those certain four (4) parcels of land, together with all improvements located thereon, described in Exhibit A, which is attached hereto and made a part hereof (hereinafter sometimes called the "Premises"). The Premises are Lots 9/and 9A and 11/and 11A in Block No. 5070 in Newark, Essex County, New Jersey.

TO HAVE AND TO HOLD the Premises with rights and appurtenances thereunto belonging to GRANTEE, its successors and assigns forever.

This conveyance is made subject to applicable zoning laws, ordinances, regulations and restrictions and to all easements, rights of way, exceptions, reservations, restrictions and conditions contained in prior instruments of record in the chain of title to the Premises described in Exhibit A.

COUNTY OF ESSEX
CONSIDERATION 1,500,000.
REALTY TRANSFER FEE 5,250.00
DATE 12/18/78

RECEIVED & RECORDED
REGISTER'S OFFICE
ESSEX COUNTY, N.J.
DEC 18 12 23 PM '78
REGISTER

EXHIBIT A

LEGAL DESCRIPTION OF REAL ESTATE TO BE CONVEYED TOGETHER WITH A LIST OF ANY APPLICABLE LIENS, CHARGES OR ENCUMBRANCES.

Property 1 - Newark, N.J.

All those certain lots, pieces or parcels of land lying and being in the City of Newark, in Essex County, New Jersey, and being more particularly bounded and described as follows:

PARCEL I

Beginning at a point on the westerly bank of the Passaic River, where the division line between the premises herein described and the land formerly of the Federal Real Estate Company [now of Ashland Oil, Inc. ("AOI")] intersects the said River; running thence along the northerly line of the land of AOI, and hereinafter described as PARCEL II, north 55 degrees 26 minutes west 762 feet to the easterly line of the land conveyed by John C. Ahrens and Elizabeth, his wife, to Bay Shore Connecting Railroad Company, by deed dated March 21, 1907, and recorded April 12, 1907, in L. Q-41 c.p. 364; running thence along the easterly line of the property of the Bay Shore Connecting Railroad Company north 32 degrees 35 minutes east 248.38 feet to the southerly line of the land now or formerly of The Texas Company; running thence along southerly line of the land now or formerly of The Texas Company south 55 degrees 59 minutes east 681.45 feet to the westerly bank of the Passaic River; and running thence southerly along the westerly bank of said River to the point or place of beginning.

PARCEL II
"A"

Beginning at a point in the westerly high water line of the Passaic River, where the same is intersected by the division lines between lands formerly of Organic Salt & Acid Company, Inc. (now the property of AOI) and being the courses first described in PARCEL 1 above; thence along said division line north 63 degrees 38 minutes west 774 feet to the easterly line of lands of the Bay Shore Connecting Railroad Company; thence along said last mentioned line south 24 degrees 21

minutes west 238.80 feet to the northerly line of lands now or formerly of Ballard Oil Equipment Company; thence along said last mentioned line south 63 degrees 38 minutes east 853 feet to the said high water line of the Passaic River; thence along said high water line of the Passaic River north 6 degrees 15 minutes east 254.15 feet to the beginning. The above description being in accordance with a survey made by George H. Gardner, Surveyor, dated February 16, 1925.

PARCEL II
"B"

Beginning at a point in the high water line of the northwesterly shore of the Passaic River, where the same is intersected by the southerly line of subdivision "A" of PARCEL II; thence southeasterly 75 feet to and at right angles with the exterior wharf line established by the Commissioners appointed under the authority of the act entitled "An Act to Ascertain the Rights of the State and of Riparian Owners in the Lands Lying under the Waters of the Bay of New York and Elsewhere in this State", approved April 11, 1864, and the supplements thereto; thence northeasterly along said exterior wharf line as shown and located on the map annexed to the grant from Edward C. Stokes, Governor, and others, Riparian Commissioners, to Federal Real Estate Company, recorded in Deed Book R 42, Page 561, et seq. 254 feet; thence northwesterly at right angles with said exterior wharf line 75 feet to the high water line of the northwesterly shore of the Passaic River where the same is intersected by the southerly line of the property described as PARCEL I herein; thence southwesterly along the high water mark to the place of beginning.

PARCEL II
"C"

Beginning in the exterior wharf line as called for in the grant made by the State of New Jersey on October 24, 1907, to Federal Real Estate Company, where the same is intersected by the southerly line of said grant;

Thence (1) south 83 degrees 42 minutes east along the extension of the southerly line of said grant and binding upon the grant made by the State of New Jersey July 18, 1927, to Ballard Oil Equipment Company, Inc., thirty-two and eleven hundredths (32.11) feet to the Pierhead and Bulkhead Line approved May 10,

1915 by the Assistant Secretary of War and adopted August 3, 1915 by the Board of Commerce and Navigation appointed under the authority of the act entitled "An Act creating a department to be known as the Board of Commerce and Navigation, and vesting therein all the powers and duties now devolved, by law, upon the Board of Riparian Commissioners, the Department of Inland Waterways, the Inspectors of Power Vessels, and the New Jersey Harbor Commission", approved April 8, 1915, and other acts and joint resolutions of the Legislature of said State;

Thence (2) north 10 degrees 25 minutes east following said Pierhead and Bulkhead Line two hundred fifty-five and ninety hundredths (255.90) feet to a point;

Thence (3) north 83 degrees 42 minutes west in line with the northerly line of grant made by the State of New Jersey to Federal Real Estate Company aforesaid, fifty-three and forty-two hundredths (53.42) feet to the Exterior Line as called for in the aforesaid grant;

Thence (4) southwardly following said Exterior Wharf Line two hundred and fifty-four (254) feet to the place of beginning.

Together with all right, title and interest of AOI in and to the Wharf of the Passaic River in front of the premises described as PARCEL I and all riparian rights of the said AOI in and to any land lying in the bed of said Passaic River lying in front of said PARCEL I.

Together with a right of way for ingress and egress to and from Doremus Avenue to the premises described as PARCEL I and PARCEL II, Subdivision "A", over the right of way of the Bay Shore Connecting Railroad Company as reserved in the deed to the Bay Shore Connecting Railroad Company by deed from John C. Ahrens and Elizabeth his wife, dated March 21, 1907, and recorded April 12, 1907, in Liber Q41, c.p. 364.

PARCEL III

Beginning at a point in the mean high water line of the westerly shore of the Passaic River where the same is intersected by the northerly boundary of lands formerly of the

Federal Real Estate Company (now of AOI) said point being distant 762 feet measured south 55 degrees 26 minutes east along said northerly boundary from its intersection with the easterly line of Bay Shore Connecting Railroad;

Thence (1) north 14 degrees 56 minutes east crossing the mouth of Plums Creek a distance of 270.46 feet to a point in the mean high water line of the westerly shore of Passaic River where the same is intersected by the division line between lands now or formerly of The Texas Company and lands of AOI, said point being distant south 55 degrees, 59 minutes east 681.45 feet eastwardly from the easterly line of the Bay Shore Connecting Railroad measured along said division line.

Thence (2) in a general southwestwardly, northwestwardly, southeastwardly and southwestwardly direction following said mean high water line of Passaic River and Plums Creek, the various courses and distances thereof to the point and place of beginning.

It being understood, however, that nothing contained in this grant shall constitute a right to close up or divert Plums Creek to the detriment of the owners of land through which said creek runs or to interfere with the natural uses of said creek for drainage purposes.

PARCEL IV

Beginning at a point in the former mean high water line of the westerly shore of Passaic River where the same is intersected by the boundary line between lands formerly of Federal Real Estate Company and lands of AOI herein, said point being distant 762 feet on a course which bears south 63 degrees 37 minutes 10 seconds east from the Southeasterly line of the Bay Shore Connecting Railroad, measured along the aforesaid boundary line, said point being also described as the beginning point in PARCEL I, in the deed from U.S. Industrial Alcohol Co., to U.S. Industrial Chemicals, Inc. dated December 31, 1938;

Thence (1) south 63 degrees 37 minutes 10 seconds east along the extension of said boundary line a distance of 12 feet to a point;

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Thence (2) south 83 degrees 42 minutes east bounding upon the northerly line of lands granted by the State of New Jersey to Federal Real Estate Company, October 27, 1907, and lands granted to U.S. Industrial Alcohol Co., July 15, 1929, a distance of 124.99 feet to the Pierhead and Bulkhead Line approved May 10, 1915 by the Secretary of War (re-approved June 27, 1925 by the Acting Secretary of War);

Thence (3) north 10 degrees 25 minutes east following said Pierhead and Bulkhead Line a distance of 272.26 feet to a point;

Thence (4) north 82 degrees 03 minutes 34 seconds west bounding upon the southerly line of lands granted by the State of New Jersey to The Texas Company, January 16, 1928, a distance of 157.90 feet to a point in the former mean high water line of the westerly shore of Passaic River where the same is intersected by the boundary line between lands now or formerly of The Texas Company and lands of said AOI herein;

Thence (5) south 64 degrees 10 minutes 10 seconds east along the extension of said boundary line a distance of 4.41 feet more or less to the end of the first course described in the grant made by the State of New Jersey to U.S. Industrial Chemicals, Inc., April 6, 1942;

Thence (6) south 6 degrees 44 minutes 50 seconds west along said first course described in the grant to U.S. Industrial Chemicals, Inc., April 6, 1942, a distance of 270.48 feet to the point and place of beginning.

With the right and privilege under the covenants and conditions of this grant, to exclude the tidewater from so much of the lands above described as lie under tide-water, by filling in or otherwise improving the same, and to appropriate the lands under water above described to its and their exclusive private uses, subject to approval of plans and specifications by Board of Commerce and Navigation or its successors in office.

Being the same lots, pieces or parcels of land conveyed to Ashland Oil & Refining Company, a Kentucky corporation, (name changed

to Ashland Oil, Inc. January 29, 1970) by deed dated May 15, 1967 from Archer-Daniels-Midland Company, a Delaware corporation, of record in the Essex County Registers Office in Book 4239 of Deeds at Page 129.

The above described real estate is subject to the following:

1. Rights or claims of parties other than Ashland Oil, Inc. in actual possession of any or all of the property.

2. Unrecorded easements, if any, on, above or below the surface; and any discrepancies or conflicts in boundary lines, and shortage in area or encroachments, if any, which a correct survey or an inspection of the premises would disclose, made subsequent to July 9, 1954.

3. Unrecorded easement for spurs and sidings of Bay Shore Connecting Railroad, and for covered flume, formerly known as Plums Creek; encroachment into subject property concrete wall along Southerly line thereof, and encroachment of bulkhead timbers from subject property into adjoining premises, all as shown on survey dated July 9, 1954, by Borrie and McDonald.

4. Easement for Plumb Creek across subject property and rights of owners adjoining thereto.

5. There is no insurance that the above described property fronts on any public street or highway. (Access to subject property is under terms and conditions of deed recorded in Deed Book M-39, Page 553, and Deed Book Q-41, Page 364.

6. Easement over the most Northerly 15 feet of the above described property recorded in Deed Book 1-94, Page 3, to be used as a roadway.

7. Terms and conditions of three riparian grants recorded in Deed Book R-52, Page 561, Deed Book X-99, Page 403, and Deed Book C-108, Page 152, in the Office aforesaid.

8. Terms and conditions of an unrecorded Riparian Grant from the State of New Jersey

to U. S. Industrial Alcohol Co., dated July 15, 1929.

9. Unrecorded storage contract with Commodity Credit Corporation, dated August 30, 1952.

10. Rights and estates, if any, of U. S. A. in lands lying between original natural high water mark line of Passaic River and the original natural low water mark line of said River.

11. Rights of Board of Commerce and Navigation to regulate construction on the waterfront under Public Law of N.J. 1914, Page 205, Section No. 4.

12. Paramount rights of United States of America over Commerce & Obligue or Navigation, including to fix and alter harbor bulkhead and pierhead line from time to time and to take lands as included therein or remove fill or improvements thereon or thereunder any point below ordinary high water mark line of Passaic River, all without compensation.

13. Terms and conditions of the agreement between Celanese Corporation of America and Archer-Daniels-Midland Company, dated May 31, 1955, recorded in Deed Book 3335, Page 509.

14. Terms and conditions of unrecorded agreement between Bay Shore Connecting Railroad Co. and Baker's Coconut Co., dated December 28, 1921, as recited in instrument recorded in Deed Book P-71, Page 368.

15. Outstanding rights of the State of New Jersey and owners abutting thereon in a tidewater creek to the Westward of the area of Riparian Grant recorded in Deed Book R-42, Page 561.

16. Unrecorded license agreement between Archer-Daniels-Midland Co. and Sun Oil Company, dated July 11, 1963, concerning construction and maintenance of a pile cluster on subject property.

17. Allocable taxes per this Purchase Agreement.

18. Unrecorded side track agreement with Bay Shore Connecting Railroad Co., dated August 24, 1951.

19. Sewer easement being negotiated with the Housing Authority of the City of Newark, New Jersey.

GRANTOR for itself, its successors and assigns warrants and covenants with GRANTEE to defend the title to the property hereby conveyed against the lawful claims and demands of all persons claiming by, through or under GRANTOR, but no other.

IN WITNESS WHEREOF, GRANTOR has caused this instrument to be executed by its duly authorized officers and its Corporate Seal to be affixed as of the day and year first above written.

Signed and acknowledged in the presence of the undersigned attesting witnesses:

David J. D'Antoni

Ronald G. Darkes

ASHLAND OIL, INC.

By: E. A. Von Doersten
E. A. Von Doersten
Its: Senior Vice President

ATTEST:

By: Richard J. Lyon
Richard J. Lyon
Its: Assistant Secretary

STATE OF OHIO)
)
COUNTY OF FRANKLIN)

Be it remembered that on the 11th day of December, 1978, before me the subscriber, a Notary Public, authorized to take acknowledgements and proofs in said county and state, personally appeared Richard J. Lyon, to me known, who being by me duly sworn according to law on his oath does depose and make the seal of ASHLAND OIL, INC., the grantor in the foregoing deed named; that the seal affixed to the said deed is the corporate seal of the said corporation, that it was so affixed by virtue of authority from the Board of Directors of the said corporation; that E.A. Von Doersten, as such Senior Vice President did affix said seal thereto, sign and deliver said deed, and heard him declare that he signed, sealed and delivered the same as the voluntary act and deed of said corporation, by virtue of such authority, and that this deponent signed his name thereto, at the same time, as a subscribing witness; the full and actual consideration paid for transfer of title to the realty evidenced by the within deed, as such consideration is defined in P.L. 1968 C.49, Section 1(c), is $1,500,000.

Verla Wright
Notary Public

Subscribed and sworn to before me at Dublin, Ohio, the day and year aforesaid.

Franklin County Ohio,
My Commission Expires 2-21-79

This instrument was prepared by
Richard J. Lyon, Attorney-at-Law

5200 Paul G. Blazer Parkway
Dublin, Ohio 43017

Presentation of the April-May 1995
Ground Water Sampling Program Results
and
Proposed Remedial Action Work Plan
for the Former Spencer Kellogg Inc. Facility
in Newark, New Jersey

ISRA Case No. 85403

Prepared for

Textron Inc.
Providence, Rhode Island

Prepared by

ENVIRON Corporation
Princeton, New Jersey

July 1995

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CONTENTS

		Page
I.	INTRODUCTION	1
	A. Purpose and Scope	1
	B. History of Building 31/32 and Related Environmental Investigations	2
II.	METHODOLOGIES	9
	A. Hydro-Punch Locations and Sampling	9
	B. Monitoring Well Locations and Construction	10
	C. Collection and Analysis of Ground Water Samples	10
	D. Quality Assurance/Quality Control Samples	11
III.	HYDROGEOLOGY	12
	A. Site Geology	12
	B. Ground Water Flow	12
IV.	DISCUSSION OF ANALYTICAL RESULTS	15
	A. Introduction	15
	B. Free Product Delineation Results	15
	C. Ground Water Sampling Results	16
	D. Quality Assurance/Quality Control Samples	18
V.	REMEDIAL ACTION WORK PLAN	20
	A. Overview	20
	B. Free Product Recovery	20
	1. Objectives	20
	2. Recovery System	21
	C. Natural Remediation of Dissolved BTEX	23
	1. Current Plume Configuration	23
	2. Cleanup Objectives and Goals	23
	3. Natural Remediation	26
	4. Ground Water Monitoring	28
VI.	PRELIMINARY SCHEDULE AND COST ESTIMATE	31
	A. Preliminary Schedule	31
	B. Preliminary Cost Estimate	31

CONTENTS
(continued)

Page

APPENDICES

Appendix A: Monitoring Well Construction Logs
Appendix B: Laboratory Deliverables for the April-May 1995 Sampling Program
Appendix C: Administrative Checklist
Appendix D: Ground Water Modeling Methodology and Calculations

TABLES

Table 1: Ground Water Elevations in and around Building 31 Former Spencer Kellogg Site, Newark, New Jersey 13
Table 2: Surface Water Quality Criteria for Portion of Newark Bay Classified as SE-2/SC Waters 25
Table 3: BTEX Concentrations Discharged into Newark Bay Based on Flow Rate in Plum Creek. Estimated by USGS 29
Table 4: Conceptual Cost Estimate for the Free Product Recovery and Ground Water Monitoring, Textron Inc., Newark, New Jersey 32

FIGURE

Figure V-1: Conceptual Schematic of Proposed Free Product Recovery System 22

I. INTRODUCTION

A. Purpose and Scope

Extensive soil sampling has been conducted at the former Spencer Kellogg facility (the "Site") in Newark, New Jersey in response to the requirements of the Environmental Cleanup Responsibility Act (ECRA), now known as the Industrial Site Recovery Act (ISRA). That sampling identified soil contamination requiring remedial action in various portions of the facility, primarily due to levels of toluene, ethylbenzene, xylenes and base/neutral compounds above applicable cleanup standards. Soil remediation was conducted between 1991 and 1992 and included excavation of soils adjacent to the loading dock along the northern side of Building 31/32. During that excavation, free-phase resinous material was observed entering portions of the excavation adjacent to the loading dock of the building. The resinous material was contained and removed and did not reaccumulate during the remainder of the cleanup program. To determine the potential source of this material, ENVIRON Corporation (ENVIRON) implemented various investigatory measures in and around Building 31/32. During these sampling activities, ENVIRON identified ground water contamination south of the building and free-phase product beneath the building. A detailed discussion of these historical soil and ground water sampling activities near Building 31/32, and other investigations related to the building, is provided below.

Based on the presence of free product and dissolved ground water contamination beneath and around Building 31/32, ENVIRON has prepared this Remedial Action Work Plan (RAWP, or the "Plan") to address these conditions. The Plan presents the results of the most recent ground water characterization, conducted in April and May 1995, and discusses these data in relation to the results from prior ground water sampling near the building. This sampling defined the extent of the free product, delineated the eastern boundary of the dissolved-phase plume and confirmed the pattern of alternating

high and low benzene, toluene, ethylbenzene, and xylene (BTEX) concentrations south of the building. Section II discusses the methodologies used to locate the sampling points, collect the ground water samples and delineate the free product. Hydrogeological findings and analytical results are provided in Sections III and IV. Section V presents the cleanup goals and alternatives that are considered appropriate to address the free product and dissolved VOC levels in ground water and identifies the preferred remedial alternatives. A preliminary schedule and cost estimate for implementation of those alternatives is given in Section VI.

B. History of Building 31/32 and Related Environmental Investigations

Information regarding historical operations in Building 31/32 was obtained from former Textron personnel, as previously indicated in Textron's January 19, 1994 progress report to the New Jersey Department of Environmental Protection (NJDEP). Building 31/32 is located near the northern Site boundary and was constructed in 1948. Specifically, Building 31 was constructed to house the main polyester resin manufacturing operations. Building 32, connected to the western wall of Building 31, was constructed primarily for drum storage, warehousing and shipping purposes, although manufacturing operations also occurred on the upper floors of this building. Dry raw materials for resin manufacturing and some liquid raw materials in drums are received on the first floor of Building 32. These materials are subsequently moved to the fifth floor using an elevator and are then transferred to Building 31 for the resin manufacturing process. Bulk liquid raw materials are delivered to storage tanks on the upper floors of Building 31 via railcars, tankers, or from the aboveground tanks located east of the building. Process materials flow via gravity to the reactors, blenders and mixers, as well as the storage tanks, on the fourth floor of both buildings. The third floor of Building 31 contains the bottoms of the reactor vessels and the filtration process equipment for the resin products. Filtered products are then transferred to the second floors of both buildings, which house the thinning and drumming operations. Thinning tanks are also located on the first floor of Building 31.

The resin manufacturing reaction produces water in a reversible reaction, so water must be removed before the reaction is complete. To accomplish this, a reflux solvent

(xylenes or ethylbenzene) is added to create an azeotrope, enabling the evaporation of the water at temperatures below its boiling point. Historically, process wastewater from these reactions was discharged via below-floor piping to the former combined industrial and sanitary sewer system[1]. That system was directly connected to the Passaic Valley Sewerage Commission (PVSC). In the early 1980s, PVSC began to require dischargers to monitor for lower explosive limits (LELs). Accordingly, process wastewater was subsequently piped to a collection tank on the first floor for monitoring prior to discharge to the PVSC. Any residual solvent was decanted for on-site recycling and the remaining wastewater discharged to the combined sewer system. In 1989, a steam stripper was installed on the first floor for wastewater treatment in response to the Organic Chemical, Plastics and Synthetic Fibers regulations of 40 CFR 114.

In addition to the wastewater piping, each floor of both buildings also had floor drains. Prior to 1985, these floor drains were piped through all of the floors and connected to a single line that discharged directly to the PVSC sewer system. In 1985, all of the floor drains were reconnected to the collection tank on the first floor of the building to enable recovery of residual solvent prior to wastewater discharge. A sealed interior trench system was also installed at that time to contain any drainage or spills of process wastes and/or other materials within the building. The trench system directs those discharges to the collection tank for recovery prior to appropriate disposal. This trench system is shown on the plan view of Building 31 provided as Plate 1. In the late 1980s, the floor drains were sealed. The sewer lines were then decommissioned and have been inactive since that time.

Based on the information regarding the historical manufacturing processes in Building 31/32, operations involving the use of solvents or generation and discharge of process wastewaters did not occur on the first floor of Building 32. Therefore, solvents would not have been discharged as part of standard operations to the floor drain system. Accordingly, operations in Building 32 are not considered a potential source for the free

---

[1] Based on engineering diagrams of the building and sewer system, the sewer lines are located beneath the depths of structural beams installed between column footings. Thus, these sewer lines are near the seasonal high water table, and may be temporarily beneath the water table during periods of high tide.

product and dissolved-phase ground water contamination identified beneath and around Building 31.

The soil remediation conducted during 1991 and 1992 by Textron's contractor, Canonie, included excavation of soils north of the building and removal of VOCs from those soils using a low-temperature thermal aeration technology. Following excavation of soils adjacent to the building in November 1991, and a subsequent heavy rainstorm, a thin layer of a free-phase resinous material was observed on the water surface in the excavation. This material appeared to have seeped from areas adjacent to the loading dock and was similar in appearance to resinous material present on the ground surface adjacent to the loading dock. The accumulated material was removed and the excavation backfilled, with gravel used as the backfill in those portions of the excavation where the resinous material had been observed. Three gravel trenches were created during backfilling solely to prevent the further migration of any free-phase resinous material. Four vertical, perforated PVC standpipes were installed within the gravel trenches to monitor the accumulation, or lack thereof, of this material over time. The locations of these gravel trenches and vertical standpipes are shown on Plate 1.

Textron monitored these standpipes on a monthly basis beginning in October 1992. This monitoring was intended to document the presence of any material that had reaccumulated. In its March 30, 1993 letter to Textron, the NJDEP approved Textron's proposal for continued monthly monitoring of the standpipes and removal of any resinous material that had reaccumulated.

Of the 13 monitoring episodes between October 1992 and October 1993, the resinous material was not observed on four occasions. Resinous material, in the form of a skin-like layer on the water surface, was encountered at standpipe SP-2 during the remaining nine monitoring events. Notably, the resinous material was observed during only one event each at SP-1, SP-3 and SP-4, most recently in December 1992. Based on the absence of significant reaccumulation of the resinous material, monthly monitoring was terminated in October 1993.

The absence of reaccumulation of the resinous material at SP-1, SP-3 and SP-4, and the lack of a consistent and appreciable layer of the resinous material at SP-2, indicates that there is no significant ongoing source of the free-phase resinous material observed

in this area. Further, these monitoring observations indicate that this material is not present to such a degree that recovery is feasible or warranted.

To investigate the potential impact to ground water from the free-phase resinous material, Textron reinstalled monitoring well MW11 (abandoned during the 1991-1992 soil cleanup program) and installed MW27 in January 1993. Samples were collected from these wells on a quarterly basis in January, April, August and October 1993 for VOC+15 analysis, including xylenes. Results from these sampling rounds were discussed in progress reports previously submitted to the NJDEP. As indicated in these reports, VOCs were not above method detection limits at MW11 during these four sampling rounds. BTEX constituents were identified at MW27 in each sampling round at total concentrations between 56.9 and 86.1 parts per million (ppm). These levels are substantially higher than those recently detected at MW27, as discussed below. It is also significant to note that no free-phase resinous material has been observed at these wells at any time.

To further investigate potential sources of the free-phase resinous material, ENVIRON and Textron used the information described above regarding historical operations in Building 31 and engineering diagrams of the building. Based on this information, three potential pathways were identified: (1) breaches in the first floor (including the loading dock area) and/or the current floor trench system; (2) poor seals around floor drains on the first floor; and (3) breaks in the sewer line beneath the building. Regarding the first two potential pathways, ENVIRON has not observed any cracks on the first floor of Building 31 during site visits. Further, although standing water in the trench system during these site visits prevented a complete inspection of the system integrity, the presence of standing water suggests that the system is intact. Finally, former Textron personnel reported that the sewer system beneath Building 31 required repair on two occasions (prior to 1967 and in the late 1970s) in response to the backing up of floor drains, suggesting that there may have been leaks in the sewer system.

Based on the above information, Textron cored the concrete floor at six locations in January 1994 to determine whether void spaces were present beneath the floor slab. These potential void spaces would be inspected for evidence of resinous material that

could act as a source of the resinous material observed in the excavation immediately north of the building. Three specific areas were investigated: (1) the loading dock adjacent to which the resinous material had been observed; (2) inside Building 31 along the floor drain\sewer system which runs under the floor slab along the center of the building; and (3) inside the building adjacent and upgradient of monitoring well MW27. Results of this investigation were provided to the NJDEP in a May 27, 1994 progress report and are briefly summarized below.

This inspection revealed that there was limited void space beneath the floor slab (i.e., between 2 and 5 inches.) The observations also indicated that compacted fill was placed around the pile boxes and structural foundation system of the building to enable direct pouring of the concrete floor on the fill surface when the building was constructed. As such, the observed void spaces represent the amount of settling over the past 50 years. There was no evidence at these locations of any material similar to that observed in AEC 3 excavation. Because this investigation did not identify a source area beneath the building, sampling was proposed in the May 27, 1994 letter to the NJDEP to delineate levels of dissolved BTEX constituents. This sampling plan was approved in the NJDEP's August 30, 1994 letter to Textron.

The sampling program was implemented in November 1994 and included three Hydro-punch sampling points inside the building and six sampling points south of the building. As proposed, ground water samples were collected from each of these sampling points and analyzed for BTEX. Confirmatory ground water samples were also obtained from MWs 11 and 27. Finally, ground water samples were collected from standpipes SP-1, SP-3 and SP-4 to provide information regarding ground water quality north of the building. This sampling program identified a free-phase nonaqueous product layer on the water table at one interior Hydro-punch sampling location, HP05. Ground water sampling results (1) confirmed prior sampling of MWs 11 and 27, (2) identified relatively similar BTEX levels at the three sampled standpipes, and (3) identified an inconsistent pattern of BTEX concentrations south of the building. Results of this sampling program were provided to the NJDEP in a January 17, 1995 letter report.

Analytical results from the vertical standpipes support prior observations that indicate a separate source area for the contamination detected north of the building along the loading dock. First, the degree of similarity of BTEX levels at these locations suggests that these levels are due to former activities along the loading dock and represent residual concentrations following the 1991-1992 soil cleanup program in AEC 3. Further, as described above, resinous material observed on the water in the excavation in AEC 3 during the cleanup program in that area was similar in nature to resinous material observed on the ground surface adjacent to the loading dock at that time. Consequently, ENVIRON believes that surface discharges of resinous material at the loading dock are the most likely source for the resinous material encountered in the excavation. Because the free-phase product detected beneath Building 31 is not resinous in nature, it appears to be clearly unrelated to the material previously observed during remedial activities in AEC 3.

Textron believes that it has conducted all practicable investigations to determine whether additional resinous material is present in the subsurface and to identify a source for the observed resinous material. These investigations included the subfloor coring program described above, the recent two-phase Hydro-punch sampling program, and the monthly monitoring of the vertical standpipes. The interior sampling locations were targeted to locations where resinous material, if present, would most likely be observed, including along the loading dock and adjacent to former combined sewer lines. The absence of resinous material at these locations indicates that the resinous material likely did not originate from an interior source. Based on the current configuration and operations of Building 31, additional interior investigations and sampling locations are not feasible. Textron believes that the results of these studies confirm that the resinous material first observed along the loading dock (1) has not reaccumulated; (2) is not present beneath the building floor; (3) likely resulted from surface discharges; and (4) is not related to the free product observed beneath the building. Accordingly, no further investigations are necessary with respect to the resinous material, other than the ground water monitoring proposed below.

In the January 17 letter report, Textron also proposed a second phase of delineation sampling using Hydro-punch sampling points and additional monitoring wells. Ground

water sampling was proposed to delineate levels of dissolved BTEX constituents beneath and downgradient of the building. Interior Hydro-punch sampling was also proposed to further investigate the presence and extent of the free-phase product previously identified. The NJDEP approved this sampling proposal in its February 22, 1995 letter to Textron.

ENVIRON implemented the most recent sampling plan in April and May 1995, installing two monitoring wells (MWs 29 and 30) and completing 12 Hydro-punch sampling points, six inside Building 31 to delineate the area of free product and six outside the building to define areas of dissolved phase BTEX contamination. Free product was observed at five of the interior Hydro-punch locations, generally at thicknesses less than one inch. This phase of interior sampling defined the extent of the free product. Ground water samples were collected for BTEX analysis from the six exterior Hydro-punch sampling points and from MWs 27, 29 and 30. These results defined the eastern boundary of the BTEX plume and confirmed the inconsistent pattern of BTEX concentrations south of the building.

II. METHODOLOGIES

A. Hydro-Punch Locations and Sampling

In its January 17, 1995 sampling plan, Textron proposed to install approximately 12 additional Hydro-punch sampling points in and around Building 31, with additional locations to be completed as necessary based on observations of free product and field screening results during implementation of the sampling program. Plate 1 shows the locations of the completed Hydro-punch sampling points. Access constraints and building structural members (e.g., column footings and beams, overhead steam lines, interior drum handling system and industrial sewer lines) prevented installation of proposed locations HP18 and HP19. The remaining Hydro-punch sampling points were completed near the proposed locations.

Each interior Hydro-punch sampling point was completed in a similar manner. After the concrete floor was cored, two 3-inch-diameter split spoons were driven with a tripod-mounted rig to remove the majority of soils above the water table, located approximately 6 feet below the floor. The tripod rig was then used to drive the Hydro-punch sampling device approximately 2 feet below the water table, intercepting the soil-water interface, enabling an accurate determination of the presence of free product. A ground water sample was collected from each Hydro-punch location using a Teflon bailer and inspected for evidence of free product. Where free product was observed, the thickness of the product layer in the bailer was measured. This measurement was confirmed by using an oil/water interface probe in the screened interval. This oil/water interface probe was also used to confirm the absence of free product at locations where no product layer was observed in the bailer. Because most of the interior locations contained free product, ground water samples were not collected for BTEX analysis from those locations.

Ground water samples from exterior Hydro-punch locations were first screened with an HNu photo-ionization detector to evaluate potential BTEX levels. Elevated responses at certain locations indicated that the sampling point was not near the plume boundary. Accordingly, these locations (e.g., HP20) were sealed and moved further from the suspected plume source area and reinstalled. Ground water samples were collected from all completed exterior Hydro-punch locations and analyzed for BTEX using Method 8240. Following collection of ground water samples, the Hydro-punch locations were sealed with a cement-bentonite grout.

B. Monitoring Well Locations and Construction

Monitoring wells MW29 and MW30 were installed on April 11, 1995 by Advanced Drilling, Inc. at the locations ENVIRON proposed in its January 17 sampling plan, as shown on Plate 1. These locations were selected to be at the eastern and western edges of the ground water plume south of the building, as defined by the initial 1994 Hydro-punch sampling program. Both wells were drilled with hollow-stem augers to a depth of 8 feet below grade, the approximate surface of a peat and silty clay layer (i.e., meadow mat) underlying the site, and were constructed with 5 feet of Schedule 40 PVC 0.020" slot screen and Schedule 40 PVC riser. The annular space around the screened interval and approximately 1 foot above that interval was packed with #2 well sand. The remaining annular space was sealed with 6 inches of granular bentonite and a bentonite-cement grout. The wells are protected by locking flushmount casings. Construction logs for these wells are provided in Appendix A. The wells were developed on April 20 for at least one hour using a peristaltic pump and a bailer. The water clarity at MW30 improved markedly during development, being almost sediment-free after one hour. Ground water at MW29 contained a minor amount of sediment after development.

C. Collection and Analysis of Ground Water Samples

Ground water samples were collected by ENVIRON from MWs 27, 29 and 30 on May 8, 1995 using current NJDEP-recommended procedures. MW11 was not sampled because results from the November 1994 and prior sampling programs confirm that detectable BTEX levels are not present at this well. Depths to water and well bottom

were measured at each of the wells being sampled, and the volume of standing water was calculated. More than three well volumes were removed using a peristaltic pump. During this purging, ENVIRON recorded pH, temperature, and specific conductance readings at a rate of at least once per well volume. Purging continued until these parameters had essentially stabilized. ENVIRON withdrew a ground water sample using a Teflon bailer after the water level had returned to near static conditions. In all cases, this recovery occurred within 30 minutes after purging was completed. All of these ground water samples were analyzed for BTEX using Method 8240.

D. Quality Assurance/Quality Control Samples

One duplicate ground water sample was collected during each portion of the sampling program (from locations HP20 and MW29) to assess the reproducibility of the laboratory analyses. One equipment wash blank was also collected during the Hydro-punch sampling to monitor the completeness of decontamination procedures. This wash blank was collected by pouring laboratory-prepared deionized water through the sample bailer between completion of the interior free-product delineation and collection of the ground water sample from HP20. ENVIRON also collected one trip blank and one equipment blank during the ground water sampling program. All blanks were analyzed for BTEX.

III. HYDROGEOLOGY

A. Site Geology

Information regarding site geology was obtained during prior sampling programs and confirmed with observations made during the installation of MWs 29 and 30 and the Hydro-punch sampling points. This information indicates that the upper 4 to 6 feet of material in the vicinity of Building 31 consists of a coarse fill unit composed primarily of cinders, ash and silty sand. The unsaturated zone beneath the building is the same material, overlain by approximately 3 feet of a dense silty sand that was emplaced during construction of the building. This fill unit extends below the water table to the surface of a meadow mat, a peat-like layer with a significant fraction of grassy vegetative matter. The wells are constructed with the screened interval extending to the top of the meadow mat. The meadow mat is underlain by a regionally extensive clay and silt layer that separates the surficial saturated zone from the underlying aquifer.

B. Ground Water Flow

Ground water elevations were obtained on April 12, 1995 in standpipes SP-1, SP-3 and SP-4, monitoring wells MWs 27, 29 and 30, and Hydro-punch locations HP16 and HP17. Ground water elevations were also obtained at the above standpipes and monitoring wells on May 11. These elevations are provided on Table 1. Ground water elevations obtained from HP16 and HP17 may not be accurate because it was not feasible to allow water levels to stabilize prior to measurement. The measured ground water elevation at HP17 is higher than elevations north and south of the building, suggesting that this measurement is not representative of site conditions, but may be elevated due to measurement of the water level shortly after Hydro-punch sampling. The ground water elevation at HP16 is consistent with the understanding of the Site's ground water flow regime.

TABLE 1
Ground Water Elevations in and around Building 31
Former Spencer Kellogg Site, Newark, New Jersey

Measurement Location	April 12, 1995 Elevation	May 11, 1995 Elevation
MW27	3.41	3.59
MW29	2.35	2.78
MW30	2.93	3.57
SP-1	4.53	4.57
SP-3	4.68	4.73
SP-4	4.52	4.57
HP16	3.78	NA
HP17	5.09	NA

The elevations in the standpipes, virtually the same for each measurement event, are approximately 0.8 to 1.0 feet higher than those at the monitoring wells south of the building. Thus, these elevations confirm that the ground water flow direction is to the south toward the flume, consistent with prior ground water flow determinations at the Site.

The ground water flow regime in this portion of the Site is governed by an underground flume. Plum Creek originates west of the Site and receives drainage from a landfill before draining into an underground flume that flows beneath Doremus Avenue and the Site. The flume discharges from a pipe in the breakwall directly into Newark Bay. Based on historical Site diagrams and on information provided by former Site personnel, the majority of the flume at the Site is a box culvert of wooden construction. The portion located approximately between the western edge of the silos and Newark Bay consists of a 36-inch diameter concrete pipe added by the Army Corps of Engineers in 1943, when the bayshore was extended. There is no access to the flume on the Site. The flume intercepts the water table and is approximately 3 feet high and 3 feet wide. Given its wooden construction, the flume enables significant ground water infiltration. Based on tidal studies previously conducted by ENVIRON and presented to the NJDEP, ground water elevations in monitoring wells near the flume vary appreciably throughout a tidal cycle.[2] Given the distance of these wells from Newark Bay, ENVIRON concluded that the observed tidal influence must be due to ground water recharge and discharge through the wooden flume walls during a tidal cycle. Thus, ground water flowing southeast from Building 31 discharges to the flume before draining to Newark Bay. Further, because these tidal effects have been observed in monitoring wells both north and south of the flume, the flume also represents a localized ground water divide at the Site. The absence of BTEX contamination in monitoring wells immediately south of the flume (i.e., MWs 4 and 5) supports the conclusion that the flume acts as a sink for ground water in this portion of the Site, preventing the migration of ground water from the Building 31 area to other areas south of the flume.

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[2] These studies were described in ENVIRON's June 1988 report for the site entitled *Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan.*

IV. DISCUSSION OF ANALYTICAL RESULTS

A. Introduction

Results of the April-May 1995 ground water sampling program and free product measurements are provided on Plate 1, along with the results of the initial November-December 1994 sampling program. Appendix B provides the laboratory deliverables for the April-May 1995 sampling program. The 1994 and 1995 sampling results indicate that: (1) free product is present beneath a small portion of Building 31 and has been delineated; (2) the extent of elevated VOCs in ground water north and south of the building has been delineated; (3) there are alternating high and low BTEX levels south of the building; and (4) the free product appears to be the source of dissolved ground water contamination in monitoring wells south of Building 31. Each of these aspects is discussed below.

B. Free Product Delineation Results

Approximately 1 inch of free product was identified in November 1994 on the water table at Hydro-punch sampling point HP05. Analysis of this product layer indicated that it was more than 90% toluene, ethylbenzene and xylenes. Hydro-punch delineation sampling conducted in April 1995 identified this free product at locations HP14, HP15, HP16, HP18 and HP22. Based on the observed thicknesses of product at these locations, it appears that HP14 was installed near the center of the plume, because the product layer at HP14 was thicker than the 3-foot length of the bailer. The product thicknesses observed at HP15 and HP16 were approximately 0.5 to 1 inch, similar to that previously observed at HP05. Less than 1/8 inch of product was observed at HP22, and only a sheen was seen at HP18. The minimal product thicknesses at HP18 and HP22 confirm that the southern and northern boundaries of the free product condition have been defined. Physical obstructions (e.g., structural members of the building, the trench

system and reactor vessels) prevented installation of Hydro-punch sampling points to the east and west of the area in which the free product was encountered. However, ENVIRON believes that the existing data indicate that the free product is highly localized, confirming that additional sampling east and west of HP14 is not necessary prior to development of an appropriate remedial approach.

The localized nature of the free product is consistent with the potential sources identified for this contamination. As discussed in detail above in Section I.B., information reviewed regarding historical conditions in Building 31 identified three potential pathways for migration of free product to the subsurface: (1) potential breaches in the first floor (including the former loading dock area) and/or the current floor trench system; (2) poor seals around floor drains on the first floor; and (3) breaks in the sewer line beneath the building. Although former Textron personnel indicated that there had been breaches in the integrity of the former combined sewer lines beneath the building, ENVIRON does not believe that this information alone is conclusive with respect to the sewer lines being a source for the observed free product. Further, it is ENVIRON's understanding that sewer line repairs were made on the main branch of the system, located near the center of the building; sampling confirms that no free product is present near this line. Rather, the area of free product is located along a side branch of the former sewer system. Also, a former floor drain and the current trench system are located near where the free product is observed. Thus, based on current information, we are unable to determine the source of the free product.

In its February 22, 1995 letter to Textron, the NJDEP indicated that soil sampling was required to address the former sewer system leaks. However, because the lines are situated at or immediately above the water table, Textron believes that any leakage from the sewer lines would impact ground water rather than the overlying soil column and that former releases from the sewer lines are most appropriately addressed as part of the ongoing ground water investigation.

C. Ground Water Sampling Results

Ground water samples were collected in April 1995 for BTEX analysis from Hydro-punch locations HP10 through HP13, HP20 and HP21, and from MWs 27, 29 and 30.

Summarized sampling results are shown on Plate 1. These results indicate that the ground water sampling at HP21, in combination with the data from MWs 11 and 30, has defined the eastern extent of the dissolved BTEX plume. Additionally, the marked decrease in BTEX levels between SP-4 and HP20, located approximately 41 feet west of SP-4, indicates that HP20 is near the western edge of the plume north of the building. Textron believes that these data are sufficient to evaluate remedial alternatives to address dissolved BTEX levels and that further investigation is not needed.

Regarding the Hydro-punch results south of the building, one additional Hydro-punch sampling point was installed approximately 5 to 7 feet east of each of the 1994 sampling locations to delineate areas of alternating high and low BTEX concentrations. The results of each of these 1995 Hydro-punch locations, also shown on Plate 1, are similar to the data from the 1994 Hydro-punch location immediately to the west. For example, the total BTEX levels at November 1994 locations HP03 and HP07 were 378 ppb and 35,230 ppb, and in the corresponding April 1995 delineation Hydro-punch points HP12 and HP13, 2,510 ppb and 32,530 ppb. Therefore, these 1995 sampling results confirm that there are zones of alternating high and low BTEX levels south of the building.

The confirmed variability in BTEX concentrations downgradient of the building suggests the presence of preferential ground water migration pathways from the free product source. Building construction diagrams indicate that the foundation wall extends to a depth that at times may be below the water table. Further, the foundation footings, including those at locations along the building perimeter, extend to depths well below the water table. Therefore, ground water flow would occur most readily at locations between the foundation footings and beneath the foundation wall. At periods of high water table conditions, the water table may be at a depth less than the base of the foundation wall, inhibiting ground water flow. Additionally, ground water flow through fill material along underground piping is another potential preferential migration pathway.

The free product source, upgradient of most of the exterior Hydro-punch locations, in combination with preferential ground water flow around structural members of Building 31/32, readily explains the observed pattern of BTEX concentrations at most of

the exterior sampling locations. Although elevated BTEX levels were detected at HP07 and HP13, which are not directly downgradient of the free product area, ENVIRON believes that contamination at these locations is also likely attributable to conditions beneath the building. Elevated BTEX concentrations at HP01 suggest that the dissolved-phase BTEX plume has migrated to a greater extent than its free product source and may be present at locations upgradient of HP07 and HP13. ENVIRON believes that these data indicate that dissolved phase constituents migrating beyond the free product source likely result in the BTEX levels detected at HP07 and HP13. Additionally, ENVIRON believes that sampling activities and site operation information confirm that there are no other potential sources for BTEX levels at these locations. First, the April 1995 sampling program confirmed that there is no free product associated with the HP01 area. Second, there is no potential source area beneath the portion of the building adjacent to HP07 and HP13 (i.e., the boiler room). Finally, ground water quality data for wells east of the building (MWs 11 and 30) confirm that the elevated BTEX concentrations at HP07 and HP13 are limited in extent.

D. Quality Assurance/Quality Control Samples

Results of duplicate sample analysis, provided on Plate 1, indicate agreement between the sampling results, with differences between concentrations of less than 10% to approximately 40%, well within the range of variability in the analytical method. Analyses of the trip blanks that accompanied the sampling team during Hydro-punch installation and sampling, and subsequent monitoring well sampling, indicated that BTEX levels were below method detection limits. Similarly, BTEX concentrations in the field blank for the monitoring well sampling event were below method detection limits. However, the field blank associated with the Hydro-punch sampling program contained detectable BTEX levels, likely due to incomplete decontamination of the bailer following collection of samples containing free product.

This field blank was collected after completion of the exterior Hydro-punch sampling south of the building and of the interior Hydro-punch samples in which free product was observed. Because ground water samples from Hydro-punch locations HP20 and HP21 were obtained after this wash blank was collected, BTEX levels in those samples may be

in part attributable to residual BTEX levels present on the sampling equipment. ENVIRON does not believe, however, that these results compromise the usefulness of the data. BTEX levels in the wash blank represent only approximately 10% to 20% of the concentrations reported in sample HP20. Therefore, the relatively minor portion of BTEX constituents potentially attributable to the equipment does not alter the conclusions reached regarding data from HP20. Similarly, the potential contribution to BTEX levels at HP21 is not relevant because those BTEX concentrations at that location were below ground water quality standards.

V. REMEDIAL ACTION WORK PLAN

A. Overview

The purpose of this Remedial Action Work Plan (RAWP) is to outline and discuss the methodology and extent of the proposed remediation relating to the BTEX free product found under Building 31 and the dissolved-phase BTEX in the ground water surrounding and immediately adjacent to Building 31. The guidelines and checklists outlined in the NJDEP document entitled *Guide for the Submission of Remedial Action Workplans*, dated March 1995, were followed in the preparation of this report. The administrative checklist for Remedial Action Work Plans and the ground water natural remediation checklist are presented as Appendix C.

In general, the proposed remediation will involve the removal and disposal of the free product, after which the dissolved-phase BTEX will naturally attenuate through ground water discharge to the underground flume and ultimate mixing and discharge to the SE-2 waters of Newark Bay.

B. Free Product Recovery

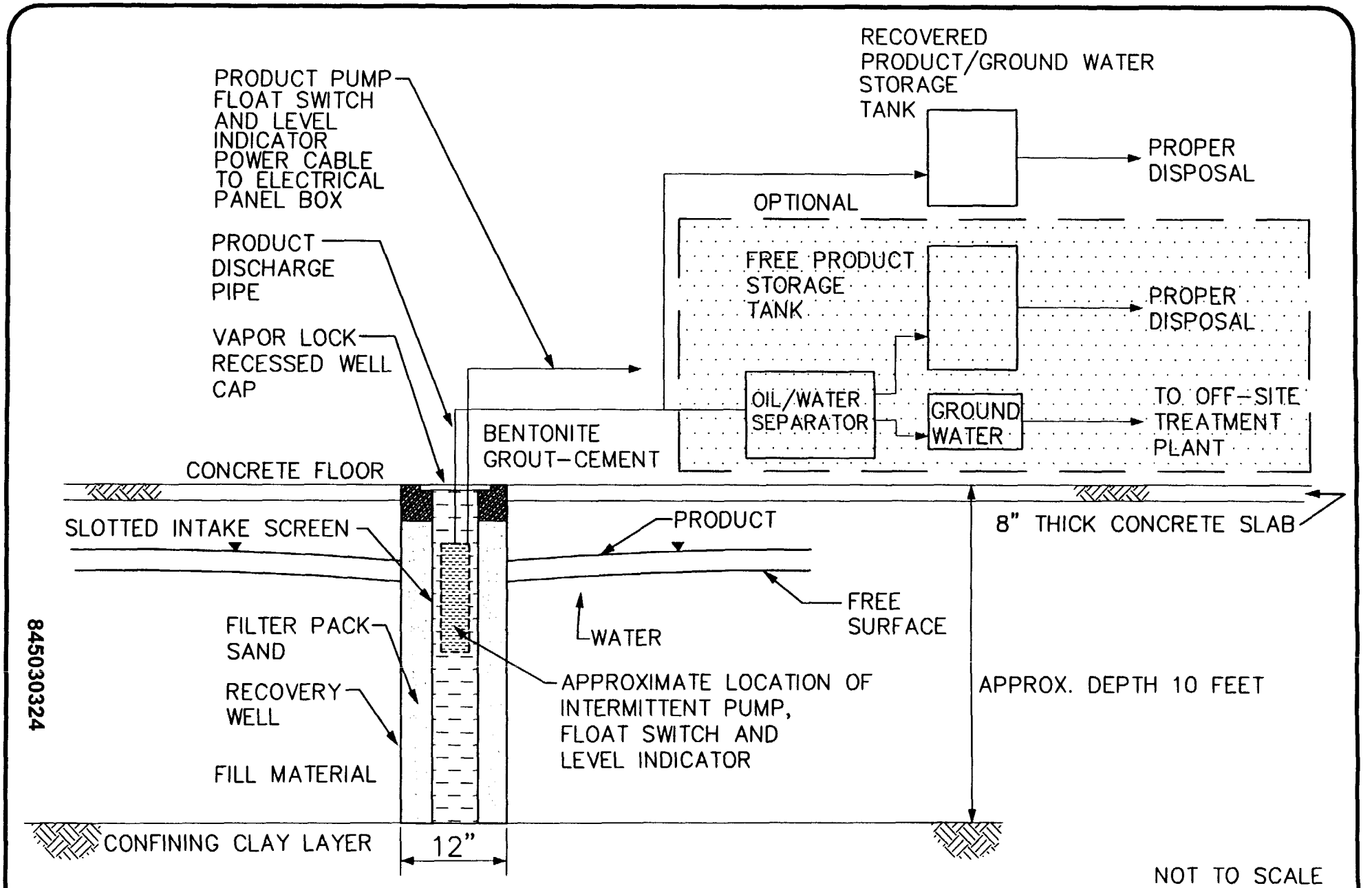
1. Objectives

The objective of the free product recovery is to remove the free-phase material from the ground water surface under Building 31. The extent of the free product, estimated based on Hydro-punch data, is presented on Plate 1. Remediation of the free product phase will effectively remove the source of ongoing dissolved-phase BTEX ground water contamination. After recovery, the free product will be drummed or tanked and disposed off-site in accordance with all appropriate and relevant state, federal and local regulations. The volume of free product anticipated

to be removed is very low, so it is not considered cost-effective to recycle or recover the extracted free product.

2. Recovery System

Figure V-1 shows a conceptual schematic of the proposed free product recovery system. The proposed recovery system for free product removal involves a single well and pump, in-line with a holding tank. An oil/water separator may be placed before the holding tank if it is determined that separate disposal of ground water extracted during free product removal is beneficial and/or cost-effective. Use of one well for extraction purposes will minimize intrusion into and disruption of the Building 31 working area. A 14-inch diameter hole will be cored through the concrete slab, and a limited access cable tool rig will be used to drill and drive a 12-inch pipe to a total depth of approximately 10 feet, extending into the semi-confining clay unit that underlies the surficial saturated zone. Once the casing is advanced, a stainless steel screen, a gravel pack, and a riser will be installed, after which the drive casing will be extracted. The well will be screened in the free product region, and the pump will be installed at the level of the free product to minimize extraction of ground water. The use of one well approximately 8 inches in diameter within the boundary of the free product is expected to effectively remove the free product, as the free product is estimated to cover a relatively small (10 feet x 35 feet maximum) area (see Plate 1). Use of an intermittent pump with a float switch or similar flow regulation device will also help to minimize the quantity of ground water removed along with the free product. Intermittent pumping will continue until all recoverable free product has been removed, after which the recovery well will be periodically inspected for signs of free product accumulation over time. When it has been determined that all recoverable free product has been removed, the recovery well will be abandoned by a licensed and certified New Jersey driller. Plate 1 shows the approximate location of the proposed well, which is subject to change based on actual site and structural conditions observed during installation.



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ENVIRON

DRAFTED BY: MC | DATE: 7/26/95

CONCEPTUAL SCHEMATIC OF PROPOSED FREE PRODUCT RECOVERY SYSTEM

TEXTRON, NEWARK, NEW JERSEY

Figure V-1

0288IX02

C. Natural Remediation of Dissolved BTEX

1. Current Plume Configuration

Plate 1 shows the current plume interpretation derived from monitoring well and Hydro-punch data. The plume includes the gravel trench areas along the north side of Building 31, based on the results of sampling from the vertical standpipes located in these areas. Dissolved BTEX concentrations detected in the ground water in this area are believed to be the result of residual contamination from free-phase resinous material encountered during the 1991-1992 soil cleanup program (see discussion in Section I.B) and not related to the free product observed beneath Building 31. However, the plume configuration was extended to include the trench areas to provide a conservative estimate of the plume extent used in the calculations described below. The underground flume serves as the southern boundary of the plume and the discharge point for this ground water.

2. Cleanup Objectives and Goals

The primary remedial objective regarding dissolved BTEX concentrations in ground water is to prevent migration of dissolved BTEX constituents at levels exceeding applicable standards to potential human and/or ecological receptors, including portions of aquifers not currently impacted and surface water. As discussed above, the predominant ground water discharge location in this portion of the Site is the underground flume. Due to the presence of this pathway, other potential ground water discharge points (e.g., deeper saturated zone, other portions of the shallow aquifer), are not impacted by BTEX levels in the shallow ground water near Building 31. Additionally, there is no ground water withdrawal for industrial, municipal or domestic use in the vicinity, nor are there any basements at the Site. Accordingly, the only potential receptor requiring evaluation is the surface water of Newark Bay.

Based on the discharge of ground water to surface water via the flume, Textron believes that: (1) the appropriate cleanup goals for BTEX concentrations in shallow ground water are the NJDEP surface water quality criteria ("SWQC") for the portion

of Newark Bay adjacent to the Site; and (2) the Natural Remediation Compliance Program is applicable to the Site. The section of Newark Bay bordering the Site is designated by the NJDEP as Class SE-2/SC waters (i.e., saline estuarian and saline coastal waters.) SWQC for benzene, toluene and ethylbenzene for this classification are provided in Table 2. The NJDEP does not currently have a SWQC for xylenes. The surface water quality criteria for SE-2 waters for benzene, ethylbenzene and toluene were calculated based on the protection of human health from the ingestion of contaminated fish (N.J.A.C. 7:9B-1.14(c)) using the procedures specified in the NJDEP document entitled *Basis and Background for the 1992 Proposed Revisions to the Surface Water Quality Standards*. Since NJDEP has not developed a surface water quality criterion for xylene, ENVIRON has used the procedure specified in that NJDEP document to calculate a xylene surface water quality criterion for SE-2 waters that is also based on human health considerations. As specified in the above-mentioned *Basis and Background* document, the following formula and assumptions were used:

$$\text{SE-2 xylene criterion} = \frac{0.0073 \text{ mg/kg/d} \times 70 \text{ kg} \times 1000 \text{ ug/mg}}{0.0065 \text{ kg/d} \times 2.17 \text{ L/kg}} = 36.2 \text{ ppm}$$

where:

0.0073 mg/kg/d	=	RfD (reference dose) used by the State of New Jersey in the development of the New Jersey drinking water standard for xylene.
70 kg	=	Assumed body weight of average adult.
0.0065 kg/d	=	Assumed daily consumption of edible aquatic products.
2.17 L/kg	=	Average bioconcentration factor for xylene obtained from the Hazardous Substances Databank (7/95).

TABLE 2
Surface Water Quality Criteria
for Portion of Newark Bay
Classified as SE-2/SC Waters

Parameter	Surface Water Quality Criteria (ppm)	Locations With Exceedances of Criteria
Benzene	0.071	HP02, HP03, HP04, HP10, HP12, MW27
Toluene	200	HP05
Ethylbenzene	27.9	HP01, HP05, HP06, HP10
Xylenes	NS	NA

Notes:

Surface water quality criteria specified in N.J.A.C. 7:9B-1.14.

NS - Not specified. As described in text, ENVIRON calculated a criterion of 36.2 ppm using the methodology specified in the NJDEP's *Basis and Background for the 1992 Proposed Revisions to the Surface Water Quality Standards*. This xylene criterion was exceeded at locations HP01, HP05, HP06 and HP10.

In order to qualify for the Natural Remediation Compliance Program, the NJDEP indicates that site conditions must satisfy several criteria including: (1) the downgradient extent of the dissolved phase plume has been defined; (2) free product and source areas have been defined and remediated; and (3) contamination above applicable criteria does not impact, and is not expected to reach, potential human and ecological receptors. Textron believes that the ground water conditions near Building 31 satisfy these criteria. First, because the ground water discharges to the flume, the downgradient extent of the plume has been defined as the northern edge of the flume. Second, as described above, Textron proposes to remove the free product detected beneath Building 31, addressing the source of the dissolved BTEX contamination. Third, because of the discharge to the flume and the absence of local ground water withdrawal, there is no potential for ground water with elevated BTEX concentrations to migrate to human receptors. Further, as described below, ground water modeling results demonstrate that BTEX contamination does not, and will not in the future, impact ecological receptors because constituents discharging into the flume do not reach Newark Bay at levels exceeding SWQC. Based on these factors, Textron believes that Site conditions satisfy the NJDEP's requirements with respect to the Natural Remediation Compliance Program.

Textron recognizes that current BTEX concentrations in ground water near Building 31 may require the designation of a Classification Exception Area (CEA). However, because the proposed free product recovery will remove the source of these dissolved BTEX levels, and consequently, it is anticipated that these BTEX levels will decline, Textron believes that the need for a CEA is most appropriately evaluated upon completion of the ground water monitoring program described below.

3. Natural Remediation

Ground water north and south of the underground flume discharges into the flume, which acts as a local sink for ground water. The dissolved BTEX present in the ground water combines with other, non-impacted ground water both south and north of the flume to mix with the flow from Plum Creek, which is collected in the

flume before discharge to Newark Bay. The following paragraphs describe the approach used to estimate the maximum concentrations of BTEX discharged to the SE-2 surface waters of Newark Bay from the area of the current plume configuration presented on Plate 1. The calculations and methodology are discussed below and are presented in detail in Appendix D.

As discussed in the Hydrogeology Section (Section III), the majority of the underground flume is wooden and acts as a sink for ground water both north and south of the flume. In general, benzene, toluene and ethylbenzene levels in ground water, both beneath Building 31 and at exterior locations north and south of the building, are below SWQC. As summarized on Table 2, of the 22 locations sampled in 1994 and 1995, only nine had at least one of these constituents above SWQC, and only two (HP05 and HP10) had two constituents above SWQC. Further, the average levels of these constituents in ground water are consistently below or not materially different from the SWQC. Based on these sporadic occurrences of benzene, toluene and ethylbenzene at levels above SWQC, it appears that dissolved phase BTEX contamination in the Building 31 vicinity is not resulting in significant concentrations being discharged to the flume and Newark Bay. Although these BTEX levels do not suggest that Newark Bay is being adversely impacted by ground water conditions near Building 31, to conservatively evaluate BTEX concentrations potentially discharging to the flume, ENVIRON modeled BTEX levels in the ground water discharge assuming that the maximum detected concentration of each of the BTEX compounds was present throughout the current BTEX plume.

A one-dimensional Darcy approach was used to determine the maximum concentrations of dissolved BTEX discharged to the Newark Bay. The maximum dissolved BTEX levels observed in any well or Hydro-punch were conservatively assumed to be spread over the entire plume area. A value for hydraulic conductivity (1E-3 cm/sec) was obtained from the report entitled *Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan for the Spencer Kellogg Facility Formerly a Division of Textron, Inc.* dated June 1988. In addition, Figures III-1 through III-7 of that report show the elevations of the ground water surface in the area of the flume and clearly indicate that the ground water in

this area is collected by the flume. These figures were used to determine the hydraulic gradients of the areas both north and south of the flume. The maximum average hydraulic gradient north of the flume and the corresponding hydraulic gradient for the area south of the flume were used to produce a conservative estimate of the maximum concentrations expected to be discharged to Newark Bay.

Due to the relatively short travel distance of the plume to the flume, it was assumed that advection (ground water flow) would dominate over diffusion and retardation. Data from the aforementioned June 1988 Results Report show an average fill layer depth of 8 feet, with the ground water surface at an average depth between 2 feet and 4 feet below ground surface. Using this data, an average aquifer thickness of 5 feet (1.52 meters) was used to conservatively conceptualize the quantity of ground water discharging to the flume. Although it is widely recognized that a concentration distribution exists in a realistic plume scenario, the dissolved phase BTEX plume depth was conservatively assumed to extend from the ground water surface to the silty clay confining unit, covering the entire aquifer depth in the estimated plume area.

Finally, quantities for flow in Plum Creek, assumed to represent clean ground water discharge into the flume, and flow from ground water contaminated with the maximum dissolved BTEX levels observed at any sampling location, were determined and used to calculate the concentrations of dissolved BTEX discharged into Newark Bay. It should be noted that in addition to the mixing occurring in the flume, additional mixing will realistically occur upon flume exit to Newark Bay. The flow rate for Plum Creek was obtained through estimates provided by the U.S. Geological Survey (USGS) Water Resources Division, and is appended to the discharge calculations. As mentioned in Section IV.C, samples from locations south of the flume show that the dissolved BTEX plume does not extend southward of the flume, so the dissolved BTEX is effectively captured by the flume.

Table 3 presents the results of these calculations for Plum Creek at the full flow rate, as determined by the U.S.G.S. As seen in the table, the levels of dissolved BTEX are well below existing New Jersey surface water discharge criteria for SE-2 waters. Therefore, Textron believes that active recovery and treatment of the

TABLE 3
BTEX Concentrations Discharged into Newark Bay Based on Flow Rate in Plum Creek. Estimated by USGS

Contaminant	(Mass Loading Rate) x (Flume Flow Rate)	Maximum Concentration Discharged to Bay	New Jersey Surface Water Criteria for SE-2 Waters
Benzene	(23.3 μg/sec)/(28.6 L/sec)	= 0.815 μg/L	71 μg/L
Ethylbenzene	(8,360 μg/sec)/(28.6 L/sec)	= 292 μg/L	27,900 μg/L
Toluene	(11,880 μg/sec)/(28.6 L/sec)	= 415 μg/L	200,000 μg/L
Xylenes	(25,520 μg/sec)/(28.6 L/sec)	= 892 μg/L	No standard

dissolved plume are not necessary, in that the existing discharge is protective of the environment.

4. Ground Water Monitoring

To confirm the effectiveness of the free product/source removal action, Textron proposes to monitor ground water quality in the Building 31 vicinity on a quarterly basis for one year following completion of the free product recovery. This monitoring period was selected because Textron believes that it is an appropriate timeframe to evaluate changes in dissolved BTEX levels. Additionally, this proposed program is consistent with a previous NJDEP approval for a one-year quarterly ground water monitoring program at the Site for five wells located in an area where elevated BTEX levels were similar to those detected at MW27. That monitoring program, conducted in the portion of the Site between Buildings 4 and 12 following the 1991-1992 soil cleanup program, was designed to verify that BTEX levels either remained relatively constant or decreased following removal of the soil source area. Given the similarity between that source removal and ground water monitoring program to the remedial actions proposed in this Plan, Textron believes that a one-year ground water monitoring program is sufficient to verify the effectiveness of the proposed remedial actions.

The proposed quarterly ground water monitoring network include MWs 29 and 30 to document BTEX levels near the plume boundaries, MW27 to determine BTEX levels near the center of the plume, and vertical standpipes SP-3 and SP-4 to verify the effectiveness of the 1991-1992 source removal action north of the building. Although hydrogeological data indicates that the vertical standpipes are upgradient of the building, and, therefore, are not affected by the free product condition, Textron proposes additional sampling of these standpipes to enable a comparison with ground water data from the November 1994 sampling round. These data will be statistically evaluated to determine whether the BTEX levels are remaining stable or are significantly decreasing. Because of the similar BTEX levels previously detected at the standpipes in November 1994, sampling of all of the standpipes is unnecessary. Additionally, SP-2 is damaged and not suitable for sampling. Other

NJDEP requirements related to ground water monitoring under the Natural Remediation Compliance Program (i.e., documentation of ground water uses on a 25-year planning horizon and notification of downgradient property owners) do not apply to the Site because of its location on Newark Bay and the discharge of ground water to the flume.

The proposed ground water sampling will be conducted using current NJDEP-recommended procedures. Depths to water and well bottom will be measured at each of these wells, and the volume of standing water calculated. A minimum of three well volumes will be purged using a peristaltic pump. During this purging, pH, temperature, and specific conductance readings will be recorded at a rate of at least once per well volume with purging continued until these parameters have essentially stabilized. Ground water samples will be withdrawn using a Teflon bailer after the water level returns to near static conditions. During each sampling round, one trip blank, one field blank and one duplicate ground water sample will be collected.

VI. PRELIMINARY SCHEDULE AND COST ESTIMATE

A. Preliminary Schedule

It is estimated that 1 to 2 months will be required for procurement and installation of the free product recovery system, and between 3 to 9 months will be required to remove the recoverable free product. Quarterly ground water monitoring will be conducted for 1 year after the end of the free product recovery, after which the need for further monitoring and/or a classification exception will be evaluated.

B. Preliminary Cost Estimate

Table 4 presents the conceptual cost estimate for the free product recovery and ground water monitoring. Total costs are estimated at $47,000 including ENVIRON's supervision during system installation and start-up, and monthly visits to check system operation and product thickness in the recovery well. Five 55-gallon drums of a free product and water mixture were assumed based on the current understanding of the amount of recoverable free product and recovered ground water expected from the free product removal system, but this is subject to change based on determination of the actual quantities recovered. The cost for ground water monitoring is based on implementing the program described in Section V.4.

0288I:PCC00634.W51

TABLE 4
Conceptual Cost Estimate for the Free Product Recovery and Ground Water Monitoring
Textron Inc., Newark, New Jersey

Cost Item	Capital Cost
FREE PRODUCT RECOVERY	
Well Installation, Pump, Holding Tank	$25,000
Transportation and Disposal Costs (Assuming 5 drums of free product w/water layer)	$2,000
Free Product Recovery Subtotal	**$27,000**
Engineering, Design and Construction Oversight	**$10,000**
Contingency (20%)	**$5,000**
FREE PRODUCT RECOVERY TOTAL	**$42,000**
GROUND WATER MONITORING	$5,000
GRAND TOTAL	**$47,000**

0288I:PCC00634.W51

APPENDIX A

Monitoring Well Construction Logs

WELL# MW29

PERMIT#

DATE: 04/10/95

LOGGED BY: SCOTT HAYTER

DRILLING CO.: ADVANCED DRILLING, INC.

DRILLER: RICK EMPSON

RIG: GEFCO SS-15

METHOD: HOLLOW-STEM AUGER

BORING DIA.: 10 INCHES

BORING DEPTH: 7 FEET

DEPTH TO WATER: 3.35 FEET

SURFACE ELEV.: 6.05 FEET

WELL CASING

LENGTH: 2 FEET

DIA.: 4-INCH

TYPE: SCHEDULE 40 PVC

T.O.C. ELEV.: 5.70

WELL SCREEN

LENGTH: 5 FEET

DIA.: 4-INCH

SLOT SIZE: No. 20

WELL DEVELOPMENT

TIME: 1 HOUR

METHOD: PERISTALTIC PUMP

EST. YIELD: 2.5 GALLONS

ENVIRON

WELL LOG

PROJECT: ECRA #7: TEXTRON
NEWARK, NEW JERSEY

CASE # 020288I

COMMENTS:

L02

DEPTH (feet)	GRAPHIC LOG	WELL CONSTRUCT	SAMPLE TYPE	BLOW COUNTS	SAMPLE INTERVAL (feet)	DESCRIPTIVE INTERVAL (feet)	DESCRIPTION
0							
						0.0–0.8	ASPHALT AND ROAD STONE
1							
2						0.8–3.0	DARY GREY SAND AND GRAVEL.
3							
4							
5						3.0–7.0	DARK GREY SILT AND CLAY, HIGH ORGANIC CONTENT.
6				WEIGHT OF HAMMER	5.0–7.0		
7							
8							
9							
10							

845030337

WELL# MW30

PERMIT#

DATE: 04/10/95

LOGGED BY: SCOTT HAYTER

DRILLING CO.: ADVANCED

DRILLER: RICK EMPSON

RIG: GEFCO SS-15

METHOD: HOLLOW-STEM AUGER

BORING DIA.: 10 INCHES

BORING DEPTH: 7 FEET

DEPTH TO WATER: 2.70 FEET

SURFACE ELEV.: 6.37

WELL CASING

LENGTH: 2 FEET

DIA.: 4-INCH

TYPE: SCHEDULE 40 PVC

T.O.C. ELEV.: 6.01

WELL SCREEN

LENGTH: 5 FEET

DIA.: 4-INCH

SLOT SIZE: No. 20

WELL DEVELOPMENT

TIME: 1 HOUR

METHOD: PERISTALTIC PUMP

EST. YIELD: 2.5 GALLONS

ENVIRON

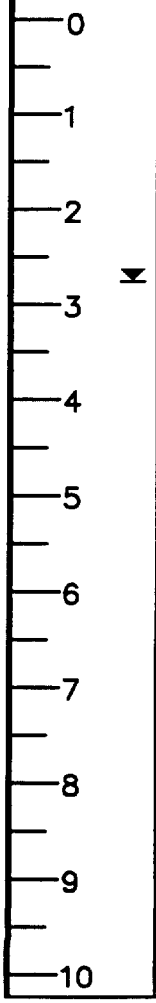
WELL LOG

PROJECT: ECRA #7: TEXTRON
NEWARK, NEW JERSEY

CASE # 020288I

COMMENTS:

L01



DEPTH (feet)	GRAPHIC LOG	WELL CONSTRUCT	SAMPLE TYPE	BLOW COUNTS	SAMPLE INTERVAL (feet)	DESCRIPTIVE INTERVAL (feet)	DESCRIPTION
						0.0–0.8	ASPHALT AND ROAD STONE
						0.8–4.0	DARY GREY SAND AND GRAVEL.
				PUSHED IN BY HAND	5.0–7.0	4.0–7.0	DARK GREY SILT AND CLAY, HIGH ORGANIC CONTENT.

845030338

APPENDIX B

Laboratory Deliverables for the April-May 1995 Sampling Program

ACCUTEST
2235 ROUTE 130, DAYTON, NJ 08810 • (908) 329-0200

06/02/95

TECHNICAL REPORT FOR

Environ

SAMPLES TAKEN AT:	Textron
CLIENT PROJECT ID:	02-0288I
ACCUTEST JOB NUMBER:	E3485
SAMPLES RECEIVED AT ACCUTEST ON:	05/11/95
NUMBER OF SAMPLES IN THIS REPORT:	6
TOTAL NUMBER OF PAGES IN REPORT:	64

VINCENT J. PUGLIESE
PRESIDENT

845030340

RESULTS RELATE ONLY TO THE ITEMS TESTED
THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF ACCUTEST

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Environ
214 Carnegie Center

Princeton, NJ 08540

ATTN: Scott Hayter

DATE: 06/02/95
JOB No: E3485
PROJECT No: 02-0288I
SAMPLE RECEIVED: 05/11/95

SAMPLE SUMMARY

SAMPLE No	COLLECTED DATE	TIME	BY	POINT OF COLLECTION
E3485-1	05/11/95	00:00		GROUND WATER - 288I-MW27-GW01 Textron
E3485-2	05/11/95	00:00		GROUND WATER - 288I-MW29-GW01 Textron
E3485-3	05/11/95	00:00		GROUND WATER - 288I-MW29-GW11 Textron
E3485-4	05/11/95	00:00		GROUND WATER - 288I-MW30-GW01 Textron
E3485-5	05/11/95	00:00		WATER - 288I-FB-950511 FIELD BLANK Textron
E3485-6	05/11/95	08:15	RW	WATER - 288I-TB-950511 TRIP BLANK Textron

VINCENT J. PUGLIESE
PRESIDENT

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LABORATORY DELIVERABLES

1.	Cover Page, Title Page listing Lab Certification #, facility name and address, and date of report.	X
2.	Table of Contents.	X
3.	Summary Sheets listing analytical results for all targeted and non-targeted compounds.	X
4.	Summary Table cross-referencing field ID #'s vs. lab ID #'s.	X
5.	Document bound, paginated and legible.	X
6.	Chain of Custody.	X
7.	Methodology Summary.	X
8.	Laboratory Chronicle and Holding Time Check.	X
9.	Results submitted on a dry weight basis (if applicable).	N/A
10.	Method Detection Limits.	X
11.	Lab certified by NJDEPE for parameters or appropriate category of parameters or a member of the USEPA CLP.	X
12.	Non-Conformance Summary.	X

Manager

Date 6/21/95

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TABLE OF CONTENTS

REDUCED LABORATORY DATA DELIVERABLES FOR NON-USEPA/CLP METHODS

TITLE/ COVER PAGE

DELIVERABLE CHECKLIST

TABLE OF CONTENTS

SECTION 1 GENERAL

A. Results Summary
B. Chain of Custody
C. Laboratory Chronicles

SECTION 2 GC/MS SUPPORT DATA

A. Methodology Review
B. Conformance/Non-Conformance Summary
C. Tune Results Summary
D. Method Blank Results Summary
E. Calibration Summary
F. Surrogate Compound Recovery Results Summary
G. Matrix Spike/Matrix Spike Duplicate Results Summary
H. Internal Standard Summary
I. Sample and Blank Chromatograms, Quant Reports, Mass Spectra, and Library Search Data

SECTION 3 GC SUPPORT DATA

A. Methodology Review
B. Conformance/Non-Conformance Summary
C. Method Blank Results Summary
D. Calibration Summary
E. Surrogate Compound Recovery Results Summary
F. Matrix Spike/Matrix Spike Duplicate Results Summary
G. Retention Time Shift Summary
H. Sample, Blank and Multi-Peak Standard Chromatograms and Quant Reports

SECTION 4 METALS SUPPORT DATA (sorted by Instrument Type - ICP, Furnace, Flame, Mercury)

A. Methodology Review
B. Conformance/Non-Conformance Summary
C. Calibration Blank Results Summary
D. Batch Quality Control Summary
   - Method Blank Results Summary
   - Matrix Spike/ Duplicate Sample Results Summary
   - Laboratory Control Sample Results Summary
   - Serial Dilution Summary
E. Calibration Summary
   - Initial Calibration Summary
   - Continuous Calibration Summary
   - ICP Interference Check Sample Results Summary

SECTION 5 GENERAL CHEMISTRY/ PETROLEUM HYDROCARBON SUPPORT DATA

A. Methodology Review
B. Conformance/Non-Conformance Summary
C. Blank Results Summary
D. Spike Sample Results Summary
E. Duplicate Sample Results Summary
F. IR Spectra (Pet. Hydro. only)

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ANALYSIS REPORT

SAMPLE No	COLLECTED DATE	TIME	BY	POINT OF COLLECTION
E3485-1	05/11/95	00:00		GROUND WATER - 288I-MW27-GW01 Textron

TEST DESCRIPTION	RESULT	MDL	UNITS	DATE	INIT
PURGEABLE AROMATICS					
BENZENE[1]	530	100	UG/L	05/23/95	JKS
ETHYLBENZENE[1]	6200	100	UG/L	05/23/95	JKS
TOLUENE[1]	ND	100	UG/L	05/23/95	JKS
XYLENE (TOTAL)[1]	30000	100	UG/L	05/23/95	JKS

[1] MDL ELEVATED DUE TO DILUTION FACTOR.

ND = NOT DETECTED
UG/L = PPB MG/L = PPM
MDL = METHOD DETECTION LIMIT

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ANALYSIS REPORT

SAMPLE No	COLLECTED DATE	TIME	BY	POINT OF COLLECTION
E3485-2	05/11/95	00:00		GROUND WATER - 288I-MW29-GW01 Textron

TEST DESCRIPTION	RESULT	MDL	UNITS	DATE	INIT
PURGEABLE AROMATICS					
BENZENE[1]	18	10	UG/L	05/23/95	JKS
ETHYLBENZENE[1]	520	10	UG/L	05/23/95	JKS
TOLUENE[1]	ND	10	UG/L	05/23/95	JKS
XYLENE (TOTAL)[1]	1500	10	UG/L	05/23/95	JKS

[1] MDL ELEVATED DUE TO DILUTION FACTOR.

ND = NOT DETECTED
UG/L = PPB MG/L = PPM
MDL = METHOD DETECTION LIMIT

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ANALYSIS REPORT

SAMPLE No	COLLECTED DATE	TIME	BY	POINT OF COLLECTION
E3485-3	05/11/95	00:00		GROUND WATER - 288I-MW29-GW11 Textron

TEST DESCRIPTION	RESULT	MDL	UNITS	DATE	INIT
PURGEABLE AROMATICS					
BENZENE[1]	27	10	UG/L	05/23/95	JKS
ETHYLBENZENE[1]	870	10	UG/L	05/23/95	JKS
TOLUENE[1]	ND	10	UG/L	05/23/95	JKS
XYLENE (TOTAL)[1]	2500	10	UG/L	05/23/95	JKS

[1] MDL ELEVATED DUE TO DILUTION FACTOR.

ND = NOT DETECTED
UG/L = PPB MG/L = PPM
MDL = METHOD DETECTION LIMIT

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ANALYSIS REPORT

SAMPLE No	COLLECTED DATE	TIME	BY	POINT OF COLLECTION
E3485-4	05/11/95	00:00		GROUND WATER - 288I-MW30-GW01 Textron

TEST DESCRIPTION	RESULT	MDL	UNITS	DATE	INIT
PURGEABLE AROMATICS					
BENZENE	1.9	1.0	UG/L	05/23/95	JKS
ETHYLBENZENE	ND	1.0	UG/L	05/23/95	JKS
TOLUENE	ND	1.0	UG/L	05/23/95	JKS
XYLENE (TOTAL)	ND	1.0	UG/L	05/23/95	JKS

ND = NOT DETECTED
UG/L = PPB MG/L = PPM
MDL = METHOD DETECTION LIMIT

845030347

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ANALYSIS REPORT

SAMPLE No	COLLECTED DATE	TIME	BY	POINT OF COLLECTION
E3485-5	05/11/95	00:00		WATER - 288I-FB-950511 FIELD BLANK Textron

TEST DESCRIPTION	RESULT	MDL	UNITS	DATE	INIT
PURGEABLE AROMATICS					
BENZENE	ND	1.0	UG/L	05/22/95	JKS
ETHYLBENZENE	ND	1.0	UG/L	05/22/95	JKS
TOLUENE	ND	1.0	UG/L	05/22/95	JKS
XYLENE (TOTAL)	ND	1.0	UG/L	05/22/95	JKS

ND = NOT DETECTED
UG/L = PPB MG/L = PPM
MDL = METHOD DETECTION LIMIT

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ANALYSIS REPORT

SAMPLE No	COLLECTED DATE	TIME	BY	POINT OF COLLECTION
E3485-6	05/11/95	08:15	RW	WATER - 288I-TB-950511 TRIP BLANK Textron

TEST DESCRIPTION	RESULT	MDL	UNITS	DATE	INIT
PURGEABLE AROMATICS					
BENZENE	ND	1.0	UG/L	05/22/95	JKS
ETHYLBENZENE	ND	1.0	UG/L	05/22/95	JKS
TOLUENE	ND	1.0	UG/L	05/22/95	JKS
XYLENE (TOTAL)	ND	1.0	UG/L	05/22/95	JKS

ND = NOT DETECTED
UG/L = PPB MG/L = PPM
MDL = METHOD DETECTION LIMIT

GW, FB, TB

ACCUTEST®

CHAIN OF CUSTODY

FRESH PONDS CORPORATE VILLAGE, BUILDING B
2235 ROUTE 130, DAYTON, NJ 08810
908-329-0200 FAX: 908-329-3499/3480

ACCUTEST JOB #:

ACCUTEST QUOTE #:

CLIENT INFORMATION

NAME: ENVIRON CORP
ADDRESS: 214 Carnegie Ctr Suite 201
CITY: Princeton STATE: NJ ZIP: 08540
SEND REPORT TO: PHONE #: William Kraft 609-243-9844

FACILITY INFORMATION

PROJECT NAME: TEXTRON
LOCATION: Newark NJ
PROJECT NO.: 02-0288I
FAX #: 609-452-0284

ANALYTICAL INFORMATION

BTEX

MATRIX CODES

DW - DRINKING WATER
GW - GROUND WATER
WW - WASTE WATER
SO - SOIL
SL - SLUDGE
OI - OIL
LIQ - OTHER LIQUID
SOL - OTHER SOLID

ACCUTEST SAMPLE #	FIELD ID / POINT OF COLLECTION	COLLECTION DATE	COLLECTION TIME	SAMPLED BY:	MATRIX	# OF BOTTLES	PRESERVATION HCl	NaOH	HNO3	H2SO4	NONE	BTEX	LAB USE ONLY
E3485-1	288I-MW27-GW01	5/11/95			aq	3	✓					✓	9C4
E3485-2	288I-MW29-GW01					3	✓					✓	
E3485-3	288I-MW29-GW11					2	✓					✓	
E3485-4	288I-MW30-GW01					3	✓					✓	
E3485-5	288I-FB-950511					2	✓					✓	
E3485-6	288I-FB-950511 *		0815	RW		2	✓					✓	

DATA TURNAROUND INFORMATION

- [X] 21 DAYS STANDARD
- [ ] 14 DAYS *RUSH*
- [ ] 7 DAYS *EMERGENCY*
- [ ] OTHER

APPROVED BY:

21 DAY TURNAROUND HARDCOPY. EMERGENCY OR RUSH IS FAX DATA UNLESS PREVIOUSLY APPROVED

DATA DELIVERABLE INFORMATION

- [X] NJ REDUCED
- [ ] NJ Full
- [ ] FULL CLP
- [ ] DISK DELIVERABLE
- [ ] OTHER (SPECIFY)
- [ ] COMMERCIAL "A"
- [ ] COMMERCIAL "B"
- [ ] STATE FORMS

RED/T2

COMMENTS/REMARKS

* INFO FROM TB TAG. 5-11-95

SAMPLES RECEIVED ON ICE AT ACCUTEST

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESION, INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE TIME:	RECEIVED BY:
1. William Kraft	5/11/95	1. FB 5-11-95 15:25	2.		2.
3.		3.	4.		4.
5.		5.	SEAL #	PRESERVE WHERE APPLICABLE	ON ICE / TEMPERATURE

845030350

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LABORATORY CHRONICLE

ACCUTEST JOB #.....E3485

DATE SAMPLES RECEIVED.....05/11/95

ACCUTEST SAMPLE #	SAMPLE DATE	ANALYTE	METHOD	INITIAL PREP.	FINAL PREP.	PREP. INITIALS	INITIAL ANALYSIS	REPORTED ANALYSIS	ANALYST INITIALS
E3485-1	05/11/95	PURGEABLE AROMATICS	EPA 624				05/22/95	05/23/95	JKS
E3485-2	05/11/95	PURGEABLE AROMATICS	EPA 624				05/22/95	05/23/95	JKS
E3485-3	05/11/95	PURGEABLE AROMATICS	EPA 624				05/22/95	05/23/95	JKS
E3485-4	05/11/95	PURGEABLE AROMATICS	EPA 624				05/22/95	05/23/95	JKS
E3485-5	05/11/95	PURGEABLE AROMATICS	EPA 624				05/22/95	05/22/95	JKS
E3485-6	05/11/95	PURGEABLE AROMATICS	EPA 624				05/22/95	05/22/95	JKS

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GC/MS METHODOLOGY SUMMARY FOR WATER MATRIX

All method used for GC/MS are referenced from EPA Methods 624 and 625, 40 CFR Part 136, 10/26/84 and /or "Test Methods For Evaluating Solid Wastes", SW846, 3rd Edition, November, 1986.

VOLATILE ORGANIC BY EPA 624/SW846 8240

This method can be summarized as follows: An inert gas is bubbled through a sample aliquot to transfer the purgeables from the aqueous phase to the vapor phase. The vapor phase is swept through a specially designed sorbent trap where the purgeables are trapped. After an eleven minute purge time the trap is heated to 180 C and backflushed with the inert gas to desorb the purgeables onto the gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected by a mass spectrometer.

BASE NEUTRAL EXTRACTABLES BY EPA 625/SW846 8270

This method can be summarized as follows: A measured Volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph greater then 11 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/Ms utilizing direct injection.

ACID EXTRACTABLE BY EPA 625/SW846 8270

This method can be summarized as follows: A measured volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph less than 2 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/MS.

For all fraction analyzed by gas chromatography/ mass spectrometry, a computer system is used to compare any detected peaks by the retention time and the relative abundance of three characteristic masses for qualitative identification. Quantitative analysis is performed using internal standard techniques with a single characteristic mass. All results are then reviewed by trained analysts to further validate the data.

For fractions requiring a library search, the unidentified mass spectra is compared to a computer NBS library of approximately 30,000 compounds. These unknown peaks are then qualified for an estimated concentration by external standard technique comparing unknown peak response to an internal standard response of known concentration.

845030352

845030353

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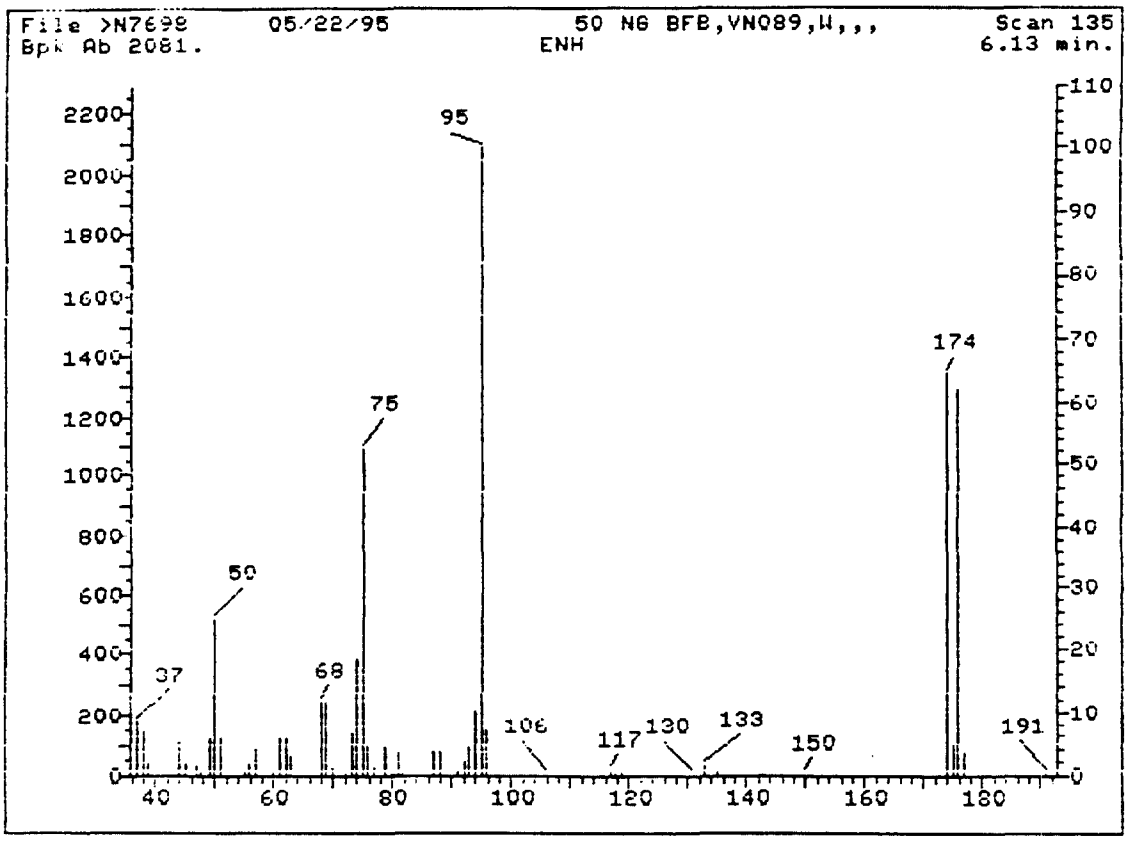
GC/MS ANALYSIS CONFORMANCE/NON-CONFORMANCE SUMMARY

	NO	YES
1. Chromatograms Labeled/Compounds Identified *(Field Samples and Method Blanks)*		✓
2. GC/MS Tune Specifications		
a. BFB Meet Criteria		✓
b. DFTPP Meet Criteria		NA
3. GC/MS Tuning Frequency - Performed every 24 hours for 600 series and 12 hours for 8000 series.		✓
4. GC/MS Calibration - Initial Calibration performed within 30 days before sample analysis and continuing calibration performed within 24 hours of samples analysis for 600 series and 12 hours for 8000 series.		✓
5. GC/MS Calibration Requirements		
a. Calibration Check Compounds		✓
b. System Performance Check Compounds		✓
6. Blank Contamination - *If yes, list compounds and in each blank:*	✓	
a. VOA Fraction		
b. B/N Fraction		
c. Acid Fraction		
7. Surrogate Recoveries Meets Criteria		✓
If not met, list those compounds and their recoveries which fall outside the acceptable range:		
a. VOA Fraction		
b. B/N Fraction		
c. Acid Fraction		
If not met, were the calculations checked (results not qualified as estimated by laboratory based on surrogate recoveries)		✓
8. Matrix Spike/ Matrix Spike Duplicate Recoveries Meet Criteria		✓
If not met, list those compounds and their recoveries which fall outside the acceptable range:		
a. VOA Fraction		
b. B/N Fraction		
c. Acid Fraction		
9. Internal Standard Area/ Retention Time Shift Meet Criteria		✓
10. Extraction Holding Time Met		NA
If not met, list number of days exceeded for each samples:		
11. Analysis Holding Time Met		✓
If not met, list number of days exceed for each sample:		

Additional Comments: _____

QC Review Signature: _____ Date: 6/1/95



GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.79	24.79	Ok
75	30-60% of mass 95	52.32	52.32	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.03	7.03	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	64.48	64.48	Ok
175	5-9% of mass 174	4.78	7.41	Ok
176	95-101% of mass 174	62.03	96.20	Ok
177	5-9% of mass 176	3.95	6.37	Ok

Injection Date: 05/22/95
Injection Time: 10:12
Data File: >N7698
Scan: 135

845030354

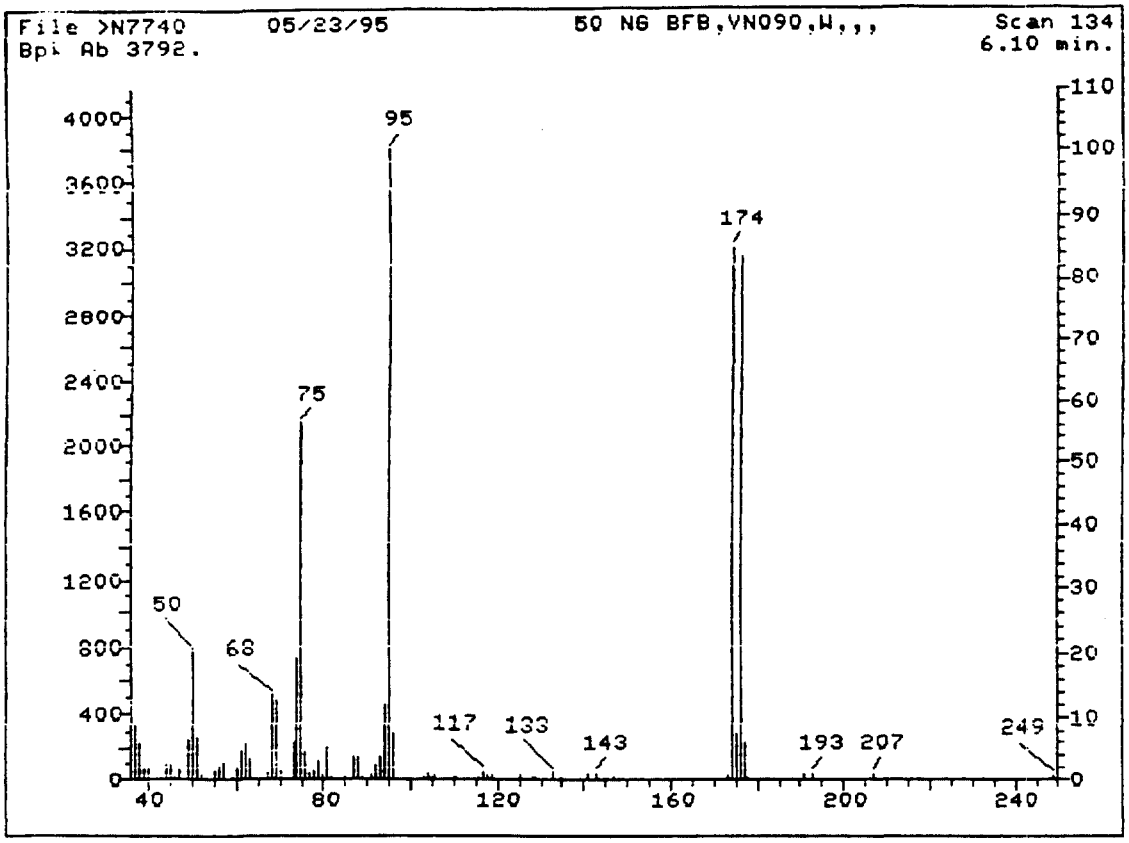
GC/MS PERFORMANCE STANDARD

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	24.79	24.79	Ok
75	30-60% of mass 95	52.32	52.32	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.03	7.03	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	64.48	64.48	Ok
175	5-9% of mass 174	4.78	7.41	Ok
176	95-101% of mass 174	62.03	96.20	Ok
177	5-9% of mass 176	3.95	6.37	Ok

Data File: >N7698 Injection Date: 05/22/95
Scan: 135 Injection Time: 10:12

TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS

SAMPLE ID	DATA FILE	INJECTION DATE	INJECTION TIME
500 PPB STD	>N7699::D6	5/22/95	10:56
200 PPB STD	>N7700::D6	5/22/95	11:27
100 PPB STD	>N7701::D6	5/22/95	11:58
50 PPB STD	>N7702::D6	5/22/95	12:30
20 PPB STD	>N7703::D6	5/22/95	13:01
2 PPB STD	>N7704::D6	5/22/95	13:33
MB-VN089	>N7705::D6	5/22/95	14:25
E3491-3	>N7706::D6	5/22/95	16:03
E3491-1	>N7707::D6	5/22/95	16:35
E3491-2	>N7708::D6	5/22/95	17:06
E3491-4	>N7709::D6	5/22/95	17:38
E3491-5	>N7710::D6	5/22/95	18:09
E3511-5MS	>N7711::D6	5/22/95	18:40
E3511-5MSD	>N7712::D6	5/22/95	19:12
BLANK SPIK	>N7713::D6	5/22/95	19:43
E3511-5	>N7714::D6	5/22/95	20:14
E3485-5	>N7715::D6	5/22/95	20:44
E3485-6	>N7716::D6	5/22/95	21:15
E3677-1	>N7717::D6	5/22/95	21:46
E3677-2	>N7718::D6	5/22/95	22:17
E3686-1	>N7719::D6	5/22/95	22:48
E3687-1	>N7720::D6	5/22/95	23:19
E3687-3	>N7721::D6	5/22/95	23:50
E3655-3	>N7722::D6	5/23/95	0:21
E3655-2	>N7723::D6	5/23/95	0:52
E3655-1	>N7724::D6	5/23/95	1:23
E3687-5	>N7725::D6	5/23/95	1:55
E3511-4	>N7726::D6	5/23/95	2:26
E3511-6	>N7727::D6	5/23/95	2:57
E3511-3	>N7728::D6	5/23/95	3:28
E3511-1	>N7729::D6	5/23/95	3:59
E3511-7	>N7730::D6	5/23/95	4:30
E3511-2	>N7731::D6	5/23/95	5:01
E3485-4	>N7732::D6	5/23/95	5:32
E3485-3	>N7733::D6	5/23/95	6:03
E3485-2	>N7734::D6	5/23/95	6:34
E3485-1	>N7735::D6	5/23/95	7:05



GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	20.31	20.31	Ok
75	30-60% of mass 95	56.36	56.36	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.52	7.52	Ok
173	Less than 2% of mass 174	.66	.78	Ok
174	Greater than 50% of mass 95	84.70	84.70	Ok
175	5-9% of mass 174	7.52	8.87	Ok
176	95-101% of mass 174	83.31	98.35	Ok
177	5-9% of mass 176	6.22	7.47	Ok

Injection Date: 05/23/95
Injection Time: 09:11
Data File: >N7740
Scan: 134

GC/MS PERFORMANCE STANDARD

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	20.31	20.31	Ok
75	30-60% of mass 95	56.36	56.36	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.52	7.52	Ok
173	Less than 2% of mass 174	.66	.78	Ok
174	Greater than 50% of mass 95	84.70	84.70	Ok
175	5-9% of mass 174	7.52	8.87	Ok
176	95-101% of mass 174	83.31	98.35	Ok
177	5-9% of mass 176	6.22	7.47	Ok

Data File: >N7740 Injection Date: 05/23/95
Scan: 134 Injection Time: 09:11

TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS

SAMPLE ID	DATA FILE	INJECTION DATE	INJECTION TIME
20 PPB STD	>N7741::D6	5/23/95	10:12
20 PPB STD	>N7742::D6	5/23/95	11:03
MB-VN090	>N7743::D6	5/23/95	11:49
E3687-1	>N7744::D6	5/23/95	12:42
E3485-4	>N7745::D6	5/23/95	13:14
E3655-3	>N7746::D6	5/23/95	13:46
E3655-2	>N7747::D6	5/23/95	14:18
E3612-10MS	>N7748::D6	5/23/95	15:24
E3612-10MSD	>N7749::D6	5/23/95	15:55
BLANK SPIK	>N7750::D6	5/23/95	16:27
E3612-10DUP	>N7751::D6	5/23/95	16:59
E3612-10	>N7752::D6	5/23/95	17:31
E3612-11	>N7753::D6	5/23/95	18:02
E3612-12	>N7754::D6	5/23/95	18:34
E3612-9	>N7755::D6	5/23/95	19:05
E3525-2	>N7756::D6	5/23/95	19:37
E3612-5	>N7757::D6	5/23/95	20:08
E3612-7	>N7758::D6	5/23/95	20:39
E3612-4	>N7759::D6	5/23/95	21:10
E3612-1	>N7760::D6	5/23/95	21:41
E3612-2	>N7761::D6	5/23/95	22:12
E3612-8	>N7762::D6	5/23/95	22:42
E3612-3	>N7763::D6	5/23/95	23:13
E3612-6	>N7764::D6	5/23/95	23:44
E3525-3	>N7765::D6	5/24/95	0:15
E3539-1	>N7766::D6	5/24/95	0:46

ACCUTEST
2235 ROUTE 130, DAYTON, NJ 08810 • (908) 329-0200

ANALYSIS REPORT FOR VOLATILE ORGANICS BY GC/MS

			DATA FILES	ANALYSIS DATE
TEST CODE	: 05/22/95	Initial	: >N7705	05/22/95
LAB SAMPLE #	: MB-VN089	Dilution #1	:	
MATRIX	: WATER	Dilution #2	:	
METHOD	: EPA 624			

	COMPOUND	RESULT (ug/L)	MDL (ug/L)	Q
1)	BENZENE	ND	1.0	
2)	ETHYLBENZENE	ND	1.0	
3)	TOLUENE	ND	1.0	
4)	XYLENES, TOTAL	ND	1.0	

ND = NOT DETECTED
MDL= METHOD DETECTION LIMIT

(1) - RESULTS REPORTED FROM DILUTION #1
(2) - RESULTS REPORTED FROM DILUTION #2

QUALIFIERS (Q)
J =INDICATES AN ESTIMATED VALUE BELOW MDL
B =INDICATES COMPOUND FOUND IN THE ASSOCIATED BLANK AS WELL AS IN SAMPLE
E =ESTIMATED VALUE; EXCEEDS INSTRUMENT CALIBRATION RANGE

ACCUTEST
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ANALYSIS REPORT FOR VOLATILE ORGANICS BY GC/MS

			DATA FILES	ANALYSIS DATE
TEST CODE	: 05/23/95	Initial	: >N7743	05/23/95
LAB SAMPLE #:	MB-VN090	Dilution #1	:	
MATRIX	: WATER	Dilution #2	:	
METHOD	: EPA 624			

	COMPOUND	RESULT (ug/L)	MDL (ug/L)	Q
1)	BENZENE	ND	1.0	
2)	ETHYLBENZENE	ND	1.0	
3)	TOLUENE	ND	1.0	
4)	XYLENES, TOTAL	ND	1.0	

ND = NOT DETECTED
MDL= METHOD DETECTION LIMIT

(1) - RESULTS REPORTED FROM DILUTION #1
(2) - RESULTS REPORTED FROM DILUTION #2

QUALIFIERS (Q)
J =INDICATES AN ESTIMATED VALUE BELOW MDL
B =INDICATES COMPOUND FOUND IN THE ASSOCIATED BLANK AS WELL AS IN SAMPLE
E =ESTIMATED VALUE; EXCEEDS INSTRUMENT CALIBRATION RANGE

Initial Calibration Data
HSL Compounds

Case No: Instrument ID: N CORE

Contractor: ACCUTEST Calibration Date: 05/22/95

Contract No: BTEX+ETHERS (CAP)

Minimum $\overline{RF}$ for SPCC is .05 Maximum % RSD for CCC is 35%

Laboratory ID:	>N7704	>N7703	>N7702	>N7701	>N7700	>N7699					
Compound	RF 2.00	RF 20.00	RF 50.00	RF 100.00	RF 200.00	RF 500.00	$\overline{RRT}$	$\overline{RF}$	% RSD	CCC	SPCC	
TERTIARY BUTYL ALCOHOL	.09344	.09546	.10314	.09528	.09411	.08385	.820	.09421	6.550			(Conc=100.0,500
METHYL TERT BUTYL ETHER	.70827	.74225	.77609	.79214	.59323	.76648	.741	.72974	10.003			
DI-ISOPROPYL ETHER	-	.25526	.26584	.27176	.24182	.27108	.791	.26115	4.850			
1,2-DICHLOROETHANE-D4 (SUR)	1.78480	1.86347	1.78025	1.82616	1.76571	1.73770	1.077	1.79302	2.506			(Conc=30.0,30.0
BENZENE	.82189	.90615	.87727	.92449	.75087	.92401	.959	.86745	7.939			
TOLUENE-D8 (SUR)	1.13572	1.14658	1.09142	1.16624	1.12565	1.16756	.838	1.13886	2.504			(Conc=30.0,30.0
TOLUENE	1.26341	1.20509	1.18649	1.27288	1.06979	1.27931	.845	1.21283	6.575			
CHLOROBENZENE	.76855	.86262	.81910	.94828	.77556	.92170	1.004	.84930	8.825			
ETHYLBENZENE	1.51895	1.41670	1.36762	1.55261	1.27888	1.58081	1.015	1.45259	8.118			
m,p-XYLENE	1.43982	1.51795	1.43245	1.52475	1.25089	1.22014	1.030	1.39767	9.419			(Conc=4.0,40.0,
o-XYLENE	1.26496	1.32098	1.29059	1.45685	1.14364	1.42270	1.087	1.31662	8.607			
4-BROMOFLUOROBENZENE (SUR)	.74109	.76003	.74294	.77521	.77681	.76315	1.171	.75987	2.015			(Conc=30.0,30.0
1,3-DICHLOROBENZENE	.59175	.70262	.69388	.72808	.65820	.74518	1.315	.68662	8.047			
1,4-DICHLOROBENZENE	.81101	.85396	.77654	.94464	.73634	.92383	1.324	.84106	9.773			
1,2-DICHLOROBENZENE	-	.81626	.78775	.79105	.66490	.75985	1.364	.76396	7.706			
NAPHTHALENE	2.79125	2.96313	2.19249	2.59079	2.00229	-	1.562	2.50799	16.067			(Conc=2.0,20.0

RF - Response Factor (Subscript is amount in ug/Kg)

$\overline{RRT}$ - Average Relative Retention Time (RT Std/RT Istd)

$\overline{RF}$ - Average Response Factor

%RSD - Percent Relative Standard Deviation

CC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Continuing Calibration Check
HSL Compounds

Case No: Calibration Date: 05/23/95

Contractor: ACCUTEST Time: 10:12

Contract No: BTEX+ETHERS (CAP) Laboratory ID: >N7741

Instrument ID: N CORE Initial Calibration Date: 05/22/95

Minimum $\overline{RF}$ for SPCC is .05 Maximum % Diff for CCC is 20%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
TERTIARY BUTYL ALCOHOL	.09421	.09418	.04			(Conc=500.00)
METHYL TERT BUTYL ETHER	.72974	.71171	2.47			
DI-ISOPROPYL ETHER	.26115	.27324	4.63			
1,2-DICHLOROETHANE-D4 (SUR)	1.79302	1.77371	1.08			(Conc=30.00)
BENZENE	.86745	.84665	2.40			
TOLUENE-D8 (SUR)	1.13886	1.19123	4.60			(Conc=30.00)
TOLUENE	1.21283	1.27197	4.88			
CHLOROBENZENE	.84930	.90893	7.02			
ETHYLBENZENE	1.45259	1.46992	1.19			
m,p-XYLENE	1.39767	1.55453	11.22			(Conc=40.00)
o-XYLENE	1.31662	1.39291	5.79			
4-BROMOFLUOROBENZENE (SUR)	.75987	.73614	3.12			(Conc=30.00)
1,3-DICHLOROBENZENE	.68662	.65589	4.48			
1,4-DICHLOROBENZENE	.84106	.87949	4.57			
1,2-DICHLOROBENZENE	.76396	.79833	4.50			
NAPHTHALENE	2.50799	1.19885	52.20			(Conc=20.00)

RF - Response Factor from daily standard file at 20.00 ug/Kg

$\overline{RF}$ - Average Response Factor from Initial Calibration Form VI

%Diff - % Difference from original average or curve

CC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN089 BATCH DATE : 05/22/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL)	#	S2 (BFB)	#	S3 (DCE)	#	TOT OUT	Q
01	MB-VN089	^N7705	W	101		91		90		0	
02	E3491-3	^N7706	W	97		88		101		0	
03	E3491-1	^N7707	W	100		95		95		0	
04	E3491-2	^N7708	W	101		98		100		0	
05	E3491-4	^N7709	W	111	*	98		116	*	2	
06	E3491-5	^N7710	W	104		86		108		0	
07	E3511-5MS	^N7711	W	100		100		110		0	
08	E3511-5MSD	^N7712	W	104		99		107		0	
09	BLANKSPIK	^N7713	W	100		97		107		0	
10	E3511-5	^N7714	W	102		86		101		0	
11	E3485-5	^N7715	W	98		95		95		0	
12	E3485-6	^N7716	W	103		86		98		0	
13	E3677-1	^N7717	W	111	*	83	*	97		2	
14	E3677-2	^N7718	W	100		78	*	100		1	
15	E3686-1	^N7719	W	99		92		96		0	
16	E3687-1	^N7720	W	105		97		94		0	
17	E3687-3	^N7721	W	107		86		93		0	
18	E3655-3	^N7722	W	101		91		97		0	
19	E3655-2	^N7723	W	99		90		106		0	
20	E3655-1	^N7724	W	106		95		106		0	

		WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) =	TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) =	4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) =	1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN089 BATCH DATE : 05/22/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	TOT OUT	Q
01	E3687-5	^N7725	W	108	101	109	0	
02	E3511-4	^N7726	W	103	85 *	122 *	2	
03	E3511-6	^N7727	W	105	91	105	0	
04	E3511-3	^N7728	W	104	100	106	0	
05	E3511-1	^N7729	W	106	104	124 *	1	
06	E3511-7	^N7730	W	104	109	129 *	1	
07	E3511-2	^N7731	W	106	103	113	0	
08	E3485-4	^N7732	W	106	88	106	0	
09	E3485-3	^N7733	W	97	95	102	0	
10	E3485-2	^N7734	W	100	93	107	0	
11	E3485-1	^N7735	W	99	95	113	0	
12								
13								
14								
15								
16								
17								
18								
19								
20								

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT
c - SAMPLE RE-ANALYZED

COMMENTS : _____

845030363

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN090 BATCH DATE : 05/23/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	TOT OUT	Q
01	MB-VN090	^N7743	W	105	94	94	0	
02	E3687-1	^N7744	W	105	97	108	0	
03	E3485-4	^N7745	W	105	98	107	0	
04	E3655-3	^N7746	W	104	95	100	0	
05	E3655-2	^N7747	W	105	87	112	0	
06	E3612-10MS	^N7748	W	103	99	89	0	
07	E3612-10MSD	^N7749	W	104	92	102	0	
08	BLANKSPIK	^N7750	W	109	100	103	0	
09	E3612-10DUP	^N7751	W	105	75 *	103	1	
10	E3612-10	^N7752	W	103	97	100	0	
11	E3612-11	^N7753	W	110	86	105	0	
12	E3612-12	^N7754	W	103	86	104	0	
13	E3612-9	^N7755	W	100	86	103	0	
14	E3525-2	^N7756	W	99	87	104	0	
15	E3612-5	^N7757	W	104	92	97	0	
16	E3612-7	^N7758	W	106	102	109	0	
17	E3612-4	^N7759	W	105	96	94	0	
18	E3612-1	^N7760	W	101	105	104	0	
19	E3612-2	^N7761	W	103	107	103	0	
20	E3612-8	^N7762	W	104	101	101	0	

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN090 BATCH DATE : 05/23/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	TOT OUT	Q
01	E3612-3	^N7763	W	105	95	104	0	
02	E3612-6	^N7764	W	106	103	103	0	
03	E3525-3	^N7765	W	102	86	103	0	
04	E3539-1	^N7766	W	111 *	81 *	100	2	
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT
c - SAMPLE RE-ANALYZED

COMMENTS : _____

845030365

Volatile Blank Spike Recoveries

Analysis Date : 05/22/95 BS File : >N7713
Instrument ID : N
Matrix : Water
Reporting units: ug/L Page: 1

E3511-6, E3511-3, E3511-2, E3485-3, E3485-2, E3485-1
The following QC data pertains to Lab Sample Numbers:

E3491-3, E3491-1, E3491-2, E3491-5, E3511-5, E3485-5, E3485-6, E3686-1, E3655-1, E3687-

Compounds	Sample Result	Conc Added	Conc MS	% Rec#	QC Limits Rec
BENZENE	0	20	20	100	37-151
ETHYLBENZENE	0	20	19	95	37-162
TOLUENE	0	20	20	99	47-150
o-XYLENE	0	20	21	103	nd- nd
m,p-XYLENE	0	40	42	104	nd- nd
METHYL TERT BUTYL ETHER	0	20	21	104	nd- nd
DI-ISOPROPYL ETHER	0	20	18	91	nd- nd
NAPHTHALENE	0	20	15	75	50-150
TERTIARY BUTYL ALCOHOL	0	400	531	133	nd- nd
CHLOROBENZENE	0	20	20	101	37-160
1,2-DICHLOROBENZENE	0	20	19	96	18-190
1,3-DICHLOROBENZENE	0	20	18	88	59-156
1,4-DICHLOROBENZENE	0	20	20	98	18-190

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits.

845030366

D = Detected (Result > 0) nd = QC Limits yet to be determined
COMMENTS: _____

Volatile Spike/Spike Duplicate Recoveries

Analysis Date : 05/22/95
Instrument ID : N
Matrix : Water
Reporting units: ug/L

MS File : >N7711
MSD File: >N7712

Page: 1

The following QC data pertains to Lab Sample Numbers:

Compounds	Sample Result	Conc Added	Conc MS	% Rec#	Conc MSD	% Rec#	RPD#	QC Limits RPD	QC Limits Rec
BENZENE	0	20	21	107	21	104	4	nd	37-151
ETHYLBENZENE	0	20	20	102	21	106	3	nd	37-162
TOLUENE	0	20	21	105	22	110	5	nd	47-150
o-XYLENE	0	20	21	103	24	119	14	nd	nd- nd
m,p-XYLENE	0	40	44	110	47	117	6	nd	nd- nd
METHYL TERT BUTYL ETHER	0	20	21	105	22	109	3	nd	nd- nd
DI-ISOPROPYL ETHER	0	20	20	99	20	98	2	nd	nd- nd
NAPHTHALENE	0	20	15	75	8	40*	61	nd	50-150
TERTIARY BUTYL ALCOHOL	0	400	619	155	518	129	18	nd	nd- nd
CHLOROBENZENE	0	20	20	100	20	100	0	nd	37-160
1,2-DICHLOROBENZENE	0	20	22	109	23	113	4	nd	18-190
1,3-DICHLOROBENZENE	0	20	21	106	17	87	20	nd	59-156
1,4-DICHLOROBENZENE	0	20	21	107	21	106	1	nd	18-190

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits.

845030367

D - Detected (Result > 0) nd = QC Limits yet to be determined

COMMENTS: _____

Volatile Spike/Spike Duplicate Recoveries

Analysis Date : 05/23/95
Instrument ID : N
Matrix : Water
Reporting units: ug/L

MS File : >N7748
MSD File: >N7749

Page: 1

E3612-4, E3612-1, E3612-6
The following QC data pertains to Lab Sample Numbers:

E3681-1, E3485-4, E3655-3, E3655-2, E3612-10, E3612-11, E3612-12, E3612-9, E3612-5, E3612-7,

Compounds	Sample Result	Conc Added	Conc MS	% Rec#	Conc MSD	% Rec#	RPD#	QC Limits RPD	QC Limits Rec
BENZENE	0	20	21	105	20	102	3	nd	37-151
ETHYLBENZENE	0	20	20	98	18	90	8	nd	37-162
TOLUENE	0	20	21	107	20	102	4	nd	47-150
o-XYLENE	0	20	20	101	20	99	2	nd	nd- nd
m,p-XYLENE	0	40	41	103	41	103	0	nd	nd- nd
METHYL TERT BUTYL ETHER	0	20	22	108	21	104	4	nd	nd- nd
DI-ISOPROPYL ETHER	0	20	20	100	19	95	5	nd	nd- nd
NAPHTHALENE	0	20	11	55	7	35*	44	nd	50-150
TERTIARY BUTYL ALCOHOL	0	400	532	133	531	133	0	nd	nd- nd
CHLOROBENZENE	0	20	22	109	20	99	10	nd	37-160
1,2-DICHLOROBENZENE	0	20	21	103	17	83	21	nd	18-190
1,3-DICHLOROBENZENE	0	20	20	99	17	84	16	nd	59-156
1,4-DICHLOROBENZENE	0	20	21	106	17	87	19	nd	18-190

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits.

D = Detected (Result > 0) nd = QC Limits yet to be determined

COMMENTS: _____

845030368

Volatile Blank Spike Recoveries

Analysis Date : 05/23/95 BS File : >N7750
Instrument ID : N
Matrix : Water
Reporting units: ug/L

The following QC data pertains to Lab Sample Numbers:

Compounds	Sample Result	Conc Added	Conc MS	% Rec#	QC Limits Rec
BENZENE	0	20	22	112	37-151
ETHYLBENZENE	0	20	23	116	37-162
TOLUENE	0	20	23	117	47-150
o-XYLENE	0	20	24	120	nd- nd
m,p-XYLENE	0	40	48	121	nd- nd
METHYL TERT BUTYL ETHER	0	20	23	117	nd- nd
DI-ISOPROPYL ETHER	0	20	22	111	nd- nd
NAPHTHALENE	0	20	22	109	50-150
TERTIARY BUTYL ALCOHOL	0	400	358	89	nd- nd
CHLOROBENZENE	0	20	23	117	37-160
1,2-DICHLOROBENZENE	0	20	23	115	18-190
1,3-DICHLOROBENZENE	0	20	20	101	59-156
1,4-DICHLOROBENZENE	0	20	24	118	18-190

" Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits.

845030369

D = Detected (Result > 0) nd = QC Limits yet to be determined

COMMENTS: _____

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N7703::D6 Date Analyzed: 05/22/95

Instrument ID: N core Time Analyzed: 13:01

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

	IS 1 AREA	#	RT	IS 2 AREA	#	RT	IS 3 AREA	#	RT
12 Hour Std	12027		6.88	55726		7.80	45197		11.24
UPPER LIMIT	24054			111452			90394		
LOWER LIMIT	6014			27863			22599		
SAMPLE NO									
1 MB-VN089	15190		6.88	63392		7.78	46635		11.24
2 E3491-3	12326		6.88	57761		7.79	43865		11.25
3 E3491-1	12956		6.87	57197		7.81	41763		11.24
4 E3491-2	12989		6.90	58753		7.80	44978		11.24
5 E3491-4	9196		6.89	46352		7.81	34620		11.25
6 E3491-5	7154		6.88	31949		7.80	24727		11.26
7 E3511-5MS	10371		6.91	47858		7.81	38382		11.25
8 E3511-5MSD	10337		6.88	46862		7.80	35122		11.24
9 BLANK SPIK	10637		6.90	49170		7.82	39732		11.24
10 E3511-5	10721		6.88	45703		7.82	35075		11.24
11 E3485-5	13183		6.88	55606		7.80	42898		11.24
12 E3485-6	13425		6.88	60412		7.80	47047		11.24
13 E3677-1	10725		6.88	48023		7.80	33662		11.24
14 E3677-2	10257		6.86	46446		7.80	35307		11.24
15 E3686-1	15646		6.86	73947		7.78	56952		11.24
16 E3687-1	13312		6.86	57158		7.78	44008		11.24
17 E3687-3	12238		6.86	52412		7.78	39547		11.24
18 E3655-3	13674		6.90	65754		7.78	49394		11.24
19 E3655-2	11411		6.86	55404		7.78	42620		11.24
20 E3655-1	11198		6.88	54793		7.80	42342		11.24

IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N7703::D6 Date Analyzed: 05/22/95

Instrument ID: N core Time Analyzed: 13:01

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

		IS 1 AREA	#	RT	IS 2 AREA	#	RT	IS 3 AREA	#	RT
	12 Hour Std	12027		6.88	55726		7.80	45197		11.24
	UPPER LIMIT	24054			111452			90394		
	LOWER LIMIT	6014			27863			22599		
	SAMPLE NO									
1	E3687-5	11874		6.90	56505		7.80	41316		11.24
2	E3511-4	8851		6.88	46099		7.82	33597		11.24
3	E3511-6	9826		6.89	47549		7.79	34214		11.23
4	E3511-3	10575		6.90	46762		7.82	36253		11.24
5	E3511-1	5065	*	6.87	26345	*	7.79	20854	*	11.26
6	E3511-7	9276		6.89	45160		7.81	36149		11.25
7	E3511-2	9028		6.89	40759		7.81	32283		11.23
8	E3485-4	9290		6.88	41723		7.80	32073		11.23
9	E3485-3	10351		6.89	47978		7.80	37435		11.24
10	E3485-2	10094		6.87	45324		7.81	36544		11.25
11	E3485-1	10489		6.89	49308		7.81	39551		11.25
12										
13										
14										
15										
16										
17										
18										
19										
20										

IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

845030371

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N7741::D6 Date Analyzed: 05/23/95

Instrument ID: N core Time Analyzed: 10:12

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

	IS 1 AREA	#	RT	IS 2 AREA	#	RT	IS 3 AREA	#	RT
12 Hour Std	13845		6.87	60294		7.79	44429		11.23
UPPER LIMIT	27690			120588			88858		
LOWER LIMIT	6923			30147			22214		
SAMPLE NO									
1 MB-VN090	15131		6.88	60585		7.78	45826		11.22
2 E3687-1	12949		6.90	63602		7.78	49022		11.24
3 E3485-4	12210		6.88	58316		7.80	44587		11.24
4 E3655-3	13684		6.90	63423		7.80	47837		11.24
5 E3655-2	11335		6.90	56826		7.82	44142		11.26
6 E3612-10MS	16417		6.86	67566		7.78	47632		11.24
7 E3612-10MSD	12520		6.90	56960		7.80	44080		11.24
8 BLANK SPIK	12057		6.89	54806		7.81	40746		11.25
9 E3612-10DUP	12437		6.90	55045		7.82	41841		11.25
10 E3612-10	13440		6.88	58410		7.78	44345		11.24
11 E3612-11	11546		6.88	55783		7.80	39698		11.24
12 E3612-12	11938		6.88	54306		7.80	41911		11.24
13 E3612-9	11395		6.88	55196		7.80	40173		11.24
14 E3525-2	12307		6.88	56124		7.80	44866		11.24
15 E3612-5	13576		6.88	60921		7.80	45839		11.24
16 E3612-7	13807		6.88	61800		7.80	49756		11.24
17 E3612-4	12797		6.88	56755		7.80	43634		11.24
18 E3612-1	13539		6.87	61095		7.80	46942		11.21
19 E3612-2	13086		6.91	60573		7.77	46605		11.21
20 E3612-8	12826		6.88	56828		7.78	44644		11.22

IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

845030372

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N7741::D6 Date Analyzed: 05/23/95

Instrument ID: N core Time Analyzed: 10:12

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

		IS 1 AREA	#	RT	IS 2 AREA	#	RT	IS 3 AREA	#	RT
	12 Hour Std	13845		6.87	60294		7.79	44429		11.23
	UPPER LIMIT	27690			120588			88858		
	LOWER LIMIT	6923			30147			22214		
	SAMPLE NO									
1	E3612-3	10329		6.86	47647		7.78	37404		11.22
2	E3612-6	10751		6.88	49553		7.78	37665		11.22
3	E3525-3	11705		6.88	58332		7.80	42729		11.22
4	E3539-1	11338		6.87	53825		7.79	39248		11.21
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

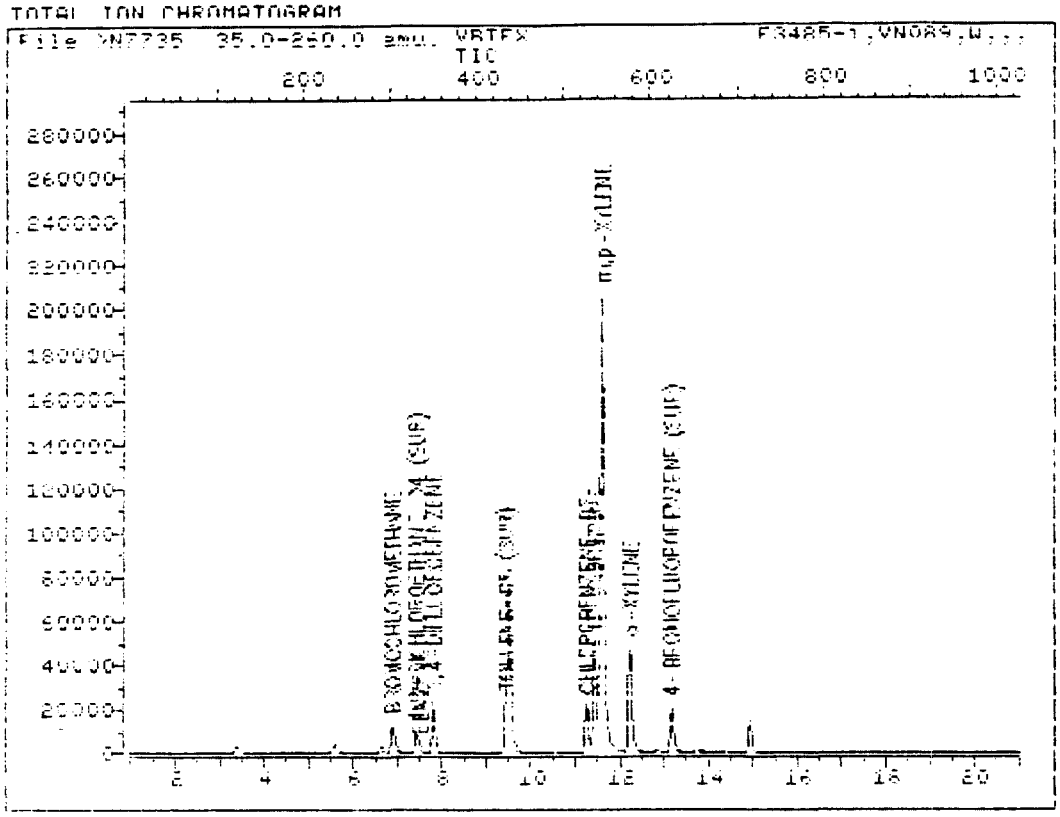
IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

845030373

TOTAL ION CHROMATOGRAM



Data File: >N7735::D6 Quant Output File: ^N7735::QT
Name: VBTEX
Misc: E3485-1,VN089,W,,,

Id File: IN0522::QT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

Operator ID: JKS
Quant Time: 950523 07:30
Injected at: 950523 07:05

845030374

QUANT REPORT

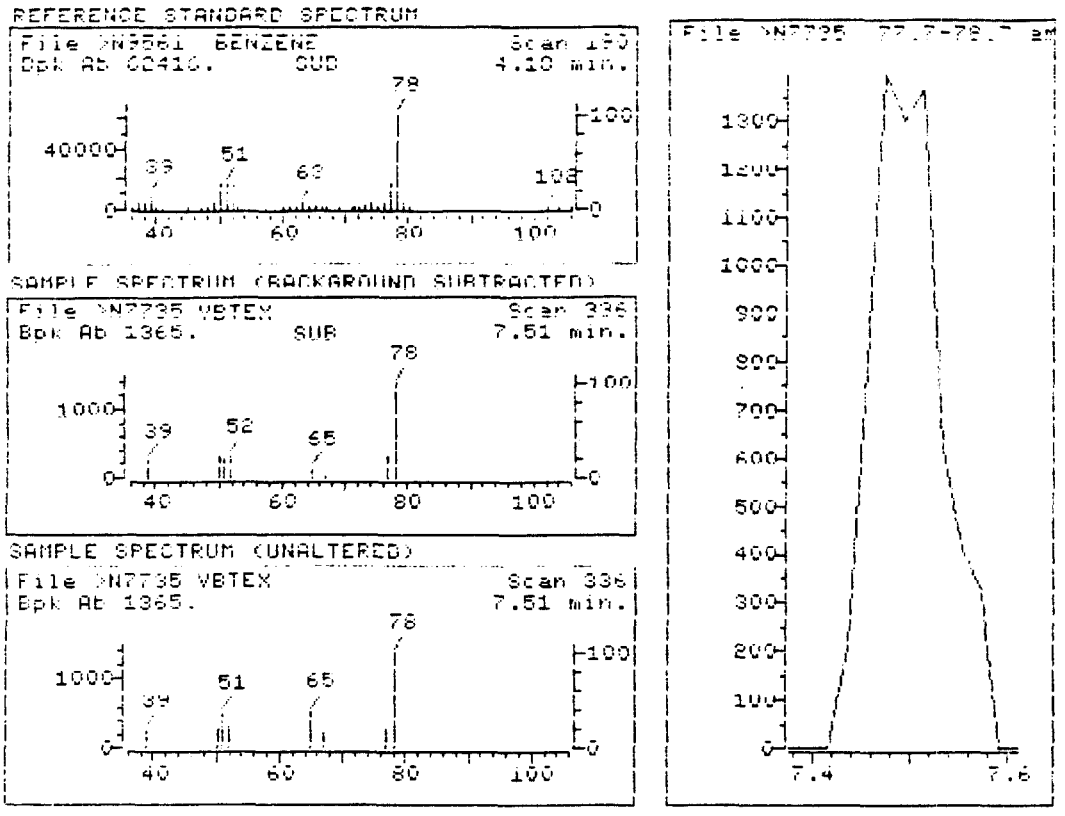
Operator ID: JKS Quant Rev: 6 Quant Time: 950523 07:[illegible]
Output File: ^N//35::U1 Injected at: 950523 0[illegible]:0[illegible]
Data File: >N//35::D6 Dilution Factor: 100.0000
Name: VBTEX
Misc: E3485-1,VN089,W,,,

ID File: IN0522::U1
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.89	304	10489	30.00	PPB	[illegible]
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.42	331	21233	3386.99	PPB	[illegible]
5)	*1,4-DIFLUOROBENZENE	7.81	351	49308	30.00	PPB	[illegible]
7)	BENZENE	7.51	336	7520	527.45	PPB	100
9)	*CHLOROBENZENE-D5	11.25	527	39551	30.00	PPB	[illegible]
12)	ETHYLBENZENE	11.42	536	118772	6202.03	PPB	[illegible]
13)	m,p-XYLENE	11.58	544	432413	23467.04	PPB	95
14)	o-XYLENE	12.22	577	107198	6175.75	PPB	[illegible]
18)	4-BROMOFLUOROBENZENE (SUR)	13.16	625	28462	2841.12	PPB	8[illegible]
19)	TOLUENE-D8 (SUR)	9.43	434	44583	2969.35	PPB	[illegible]

* Compound is ISTD

845030375

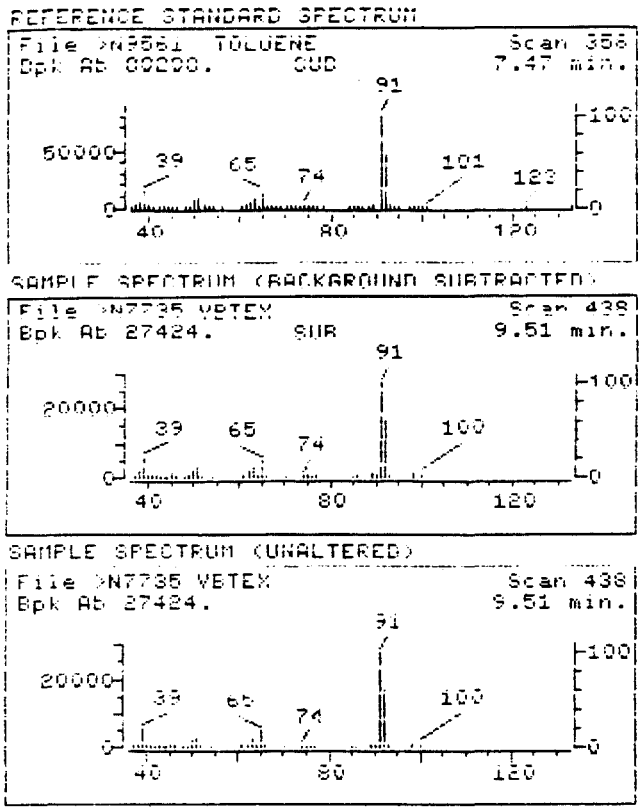


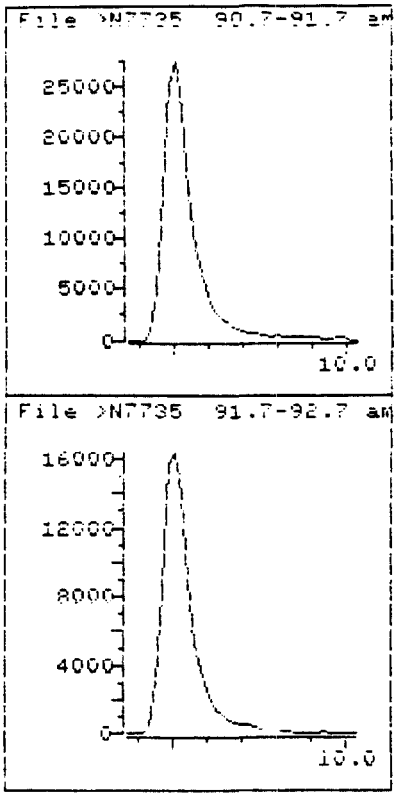
Data File: >N7735::D6
Name: VBTEX
Misc: E9489-1,VNU89,W,,,
Quant Time: 950523 07:30
Injected at: 950523 07:05

Quant Output File: ^N7735::Q1

Quant ID File: 1NU522::U1
Last Calibration: 950522 15:01

Compound No: 7
Compound Name: BENZENE
Scan Number: 336
Retention Time: 7.51 min.
Quant Ion: 78.0
Area: 7520
Concentration: 527.45 PPB
q-value: 100





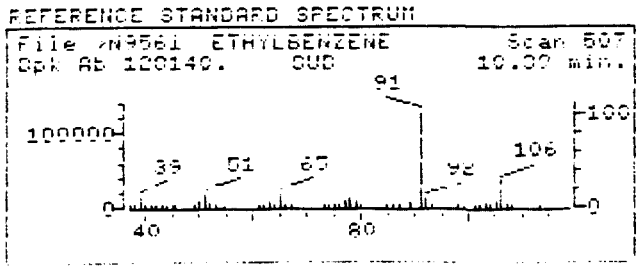
Data File: >N7735::D6
Name: VBTEX
Misc: E9485-1,VN089,W,,,
Quant Time: 950523 07:50
Injected at: 950523 07:05

Quant Output File: >N7735::Q1

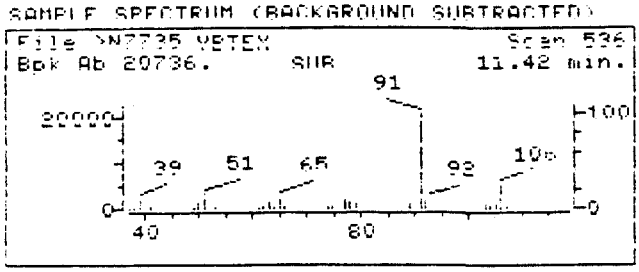
Quant ID File: 1N0522::01
Last Calibration: 950522 13:01

Compound No: 10
Compound Name: TOLUENE
Scan Number: 438
Retention Time: 9.51 min.
Quant Ion: 91.0
Area: 166117
Concentration: 10589.10 PPB
q-value: 97

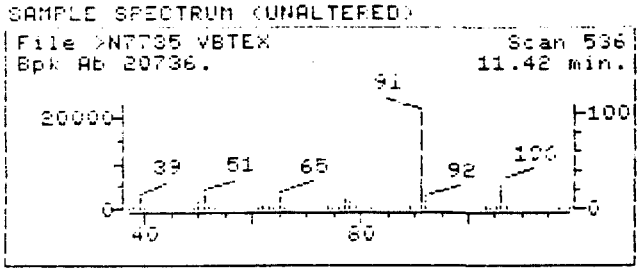
REFERENCE STANDARD SPECTRUM

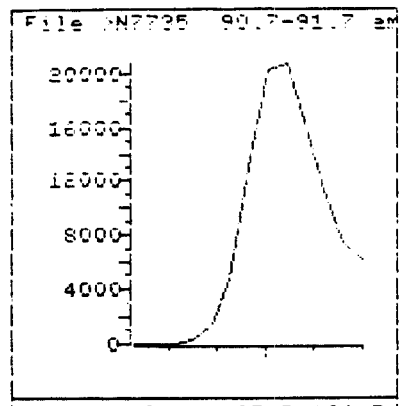


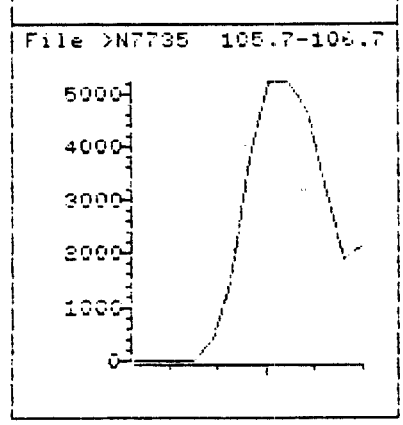
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







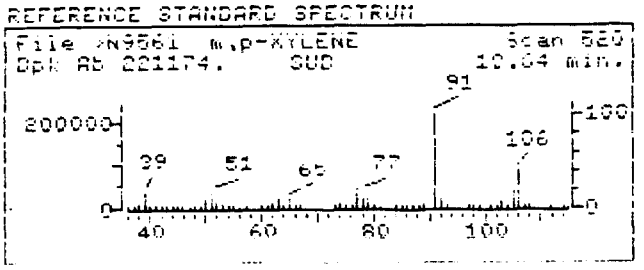
Data File: >N7735::D6
Name: VBTEX
Misc: E3485-1,VN089,W,,,
Quant Time: 950523 07:30
Injected at: 950523 07:05

Quant Output File: ^N7735::QT

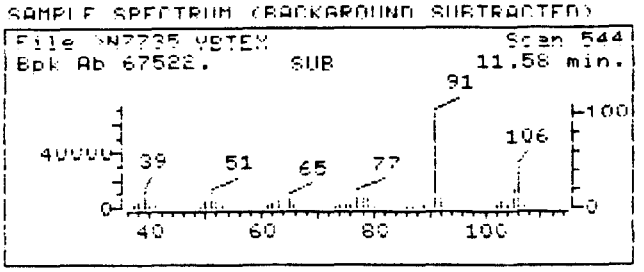
Quant ID File: IN0522::01
Last Calibration: 950522 13:01

Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 536
Retention Time: 11.42 min.
Quant Ion: 91.0
Area: 118772
Concentration: 6202.03 PPB
q-value: 77

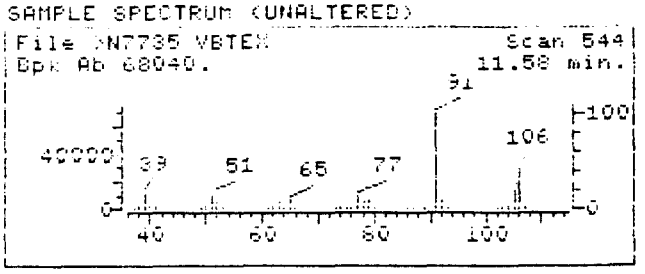
REFERENCE STANDARD SPECTRUM

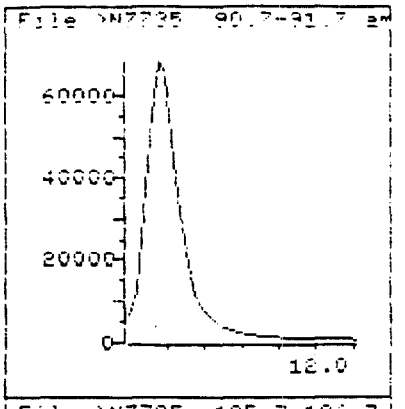


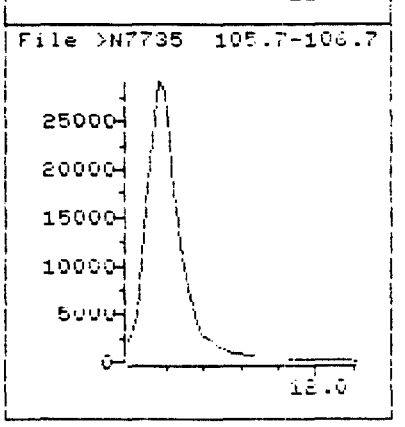
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







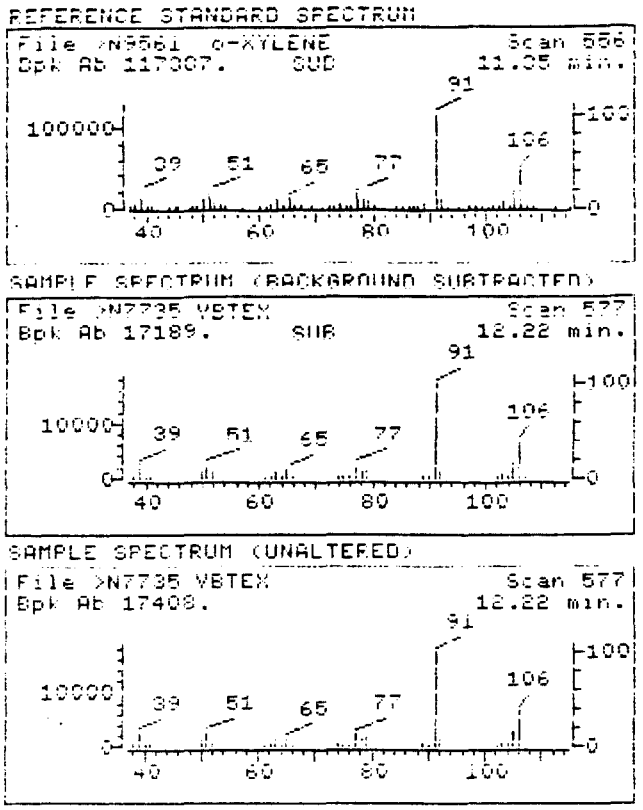
Data File: >N7735::D6
Name: VBTEX
Misc: E3485-1,VN089,W,,,
Quant Time: 950523 07:30
Injected at: 950523 07:05

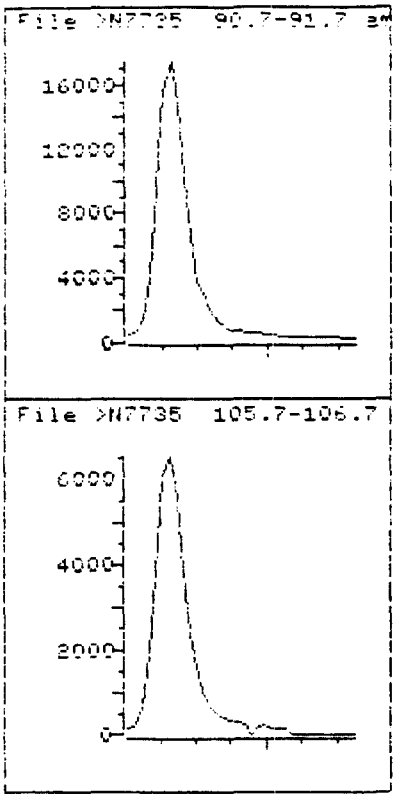
Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 544
Retention Time: 11.58 min.
Quant Ion: 91.0
Area: 432413
Concentration: 23467.04 PPB
q-value: 98

Quant Output File: >N7735::U1

Quant ID File: 1N0522::U1
Last Calibration: 950522 13:01

845030379





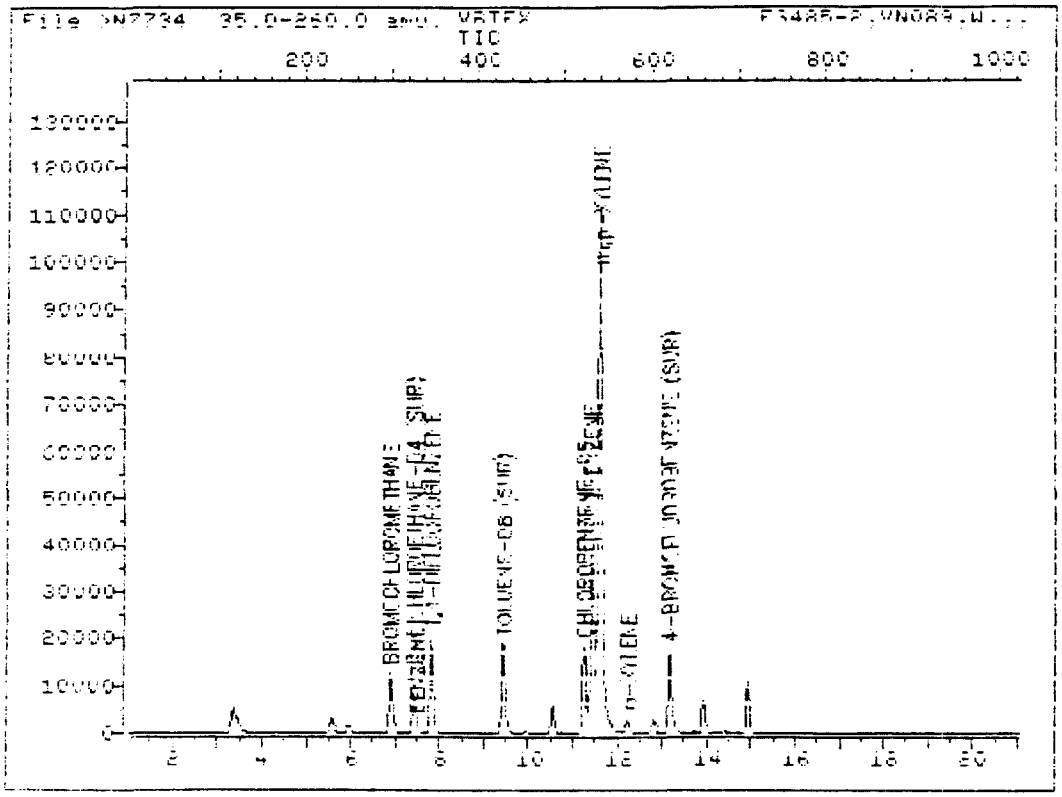
Data File: >N7735::U6
Name: VBTEX
Misc: E2489-1,UNU89,W,,,
Quant Time: 950523 0:30
Injected at: 950523 0:05

Quant Output File: ^N7735::U1

Quant ID File: IN0522::U1
Last Calibration: 950522 13:01

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 577
Retention Time: 12.22 min.
Quant Ion: 91.0
Area: 107198
Concentration: 6175.75 PPB
q-value: 9%

TOTAL ION CHROMATOGRAM



Data File: >N7734::Da Quant Output File: >N7734::QT
Name: VBTEX
Misc: E3485-2,VN089,W,,,

Id File: INU522::QT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 95U522 13:01

Operator ID: JKS
Quant Time: 95U523 06:59
Injected at: 95U523 06:34

QUANT REPORT

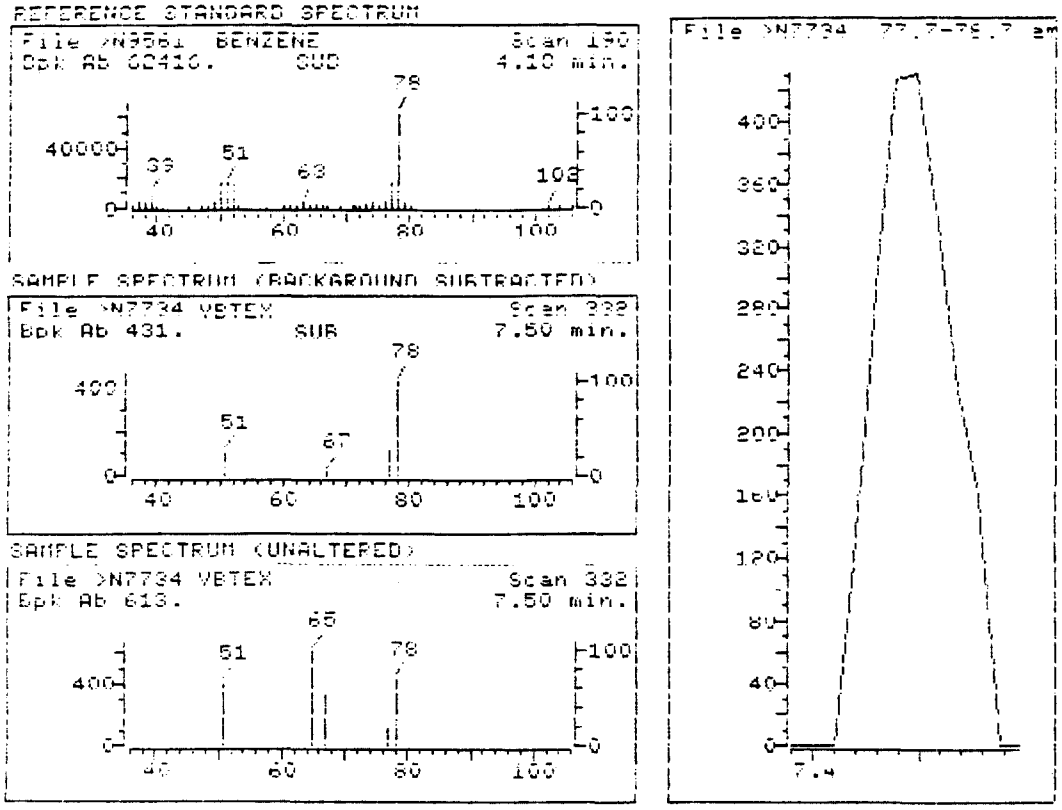
Operator ID: JKS Quant Rev: 6 Quant Time: 950523 06:5[illegible]
Output File: ^N//34::U1 Injected at: 950523 06:34
Data File: >N//34::D6 Dilution Factor: 10.00000
Name: VETEX
Misc: E3485-2,VN089,W,,,

ID File: IN0522::U1
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

	Compound	R.T.	Scan#	Area	Conc	Units	Q
1)	*BROMOCHLOROMETHANE	6.87	300	10094	30.00	PPB	96
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.42	328	19455	322.48	PPB	[illegible]
5)	*1,4-DIFLUOROBENZENE	7.81	348	45324	30.00	PPB	9[illegible]
7)	BENZENE	7.50	332	2335	17.82	PPB	100
9)	*CHLOROBENZENE-D5	11.25	524	36544	30.00	PPB	92
12)	ETHYLBENZENE	11.41	532	91407	516.58	PPB	[illegible]
13)	m,p-XYLENE	11.60	542	242878	1426.56	PPB	8[illegible]
14)	o-XYLENE	12.23	574	12287	76.61	PPB	87
18)	4-BROMOFLUOROBENZENE (SUR)	13.16	622	25910	279.92	PPB	8[illegible]
19)	TOLUENE-D8 (SUR)	9.43	431	41459	298.85	PPB	89

* Compound is ISTD

845030382

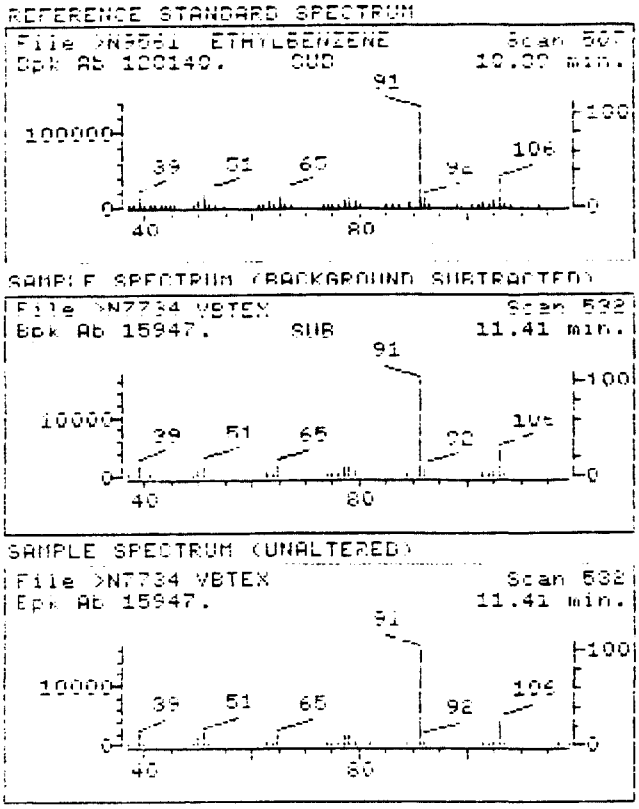


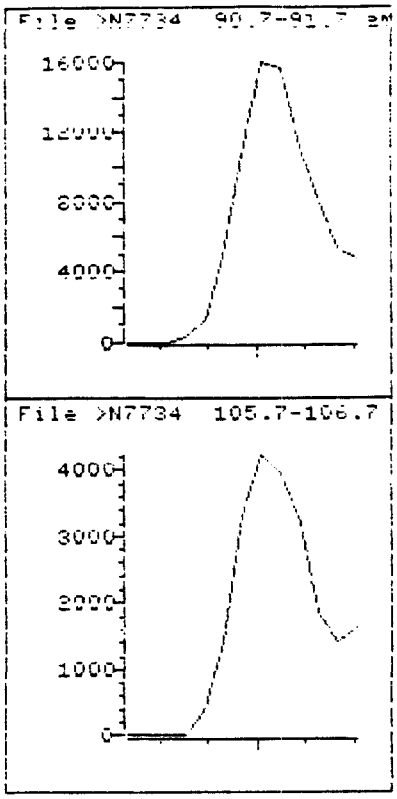
Data File: >N7734::D6
Name: VBTEX
Misc: E3489-2,VN089,W,,,
Quant Time: 950523 06:59
Injected at: 950523 06:34

Quant Output File: ^N7734::Q1

Quant ID File: INU522::U1
Last Calibration: 950522 13:01

Compound No: 7
Compound Name: BENZENE
Scan Number: 332
Retention Time: 7.50 min.
Quant Ion: 78.0
Area: 2535
Concentration: 17.82 PPB
q-value: 100



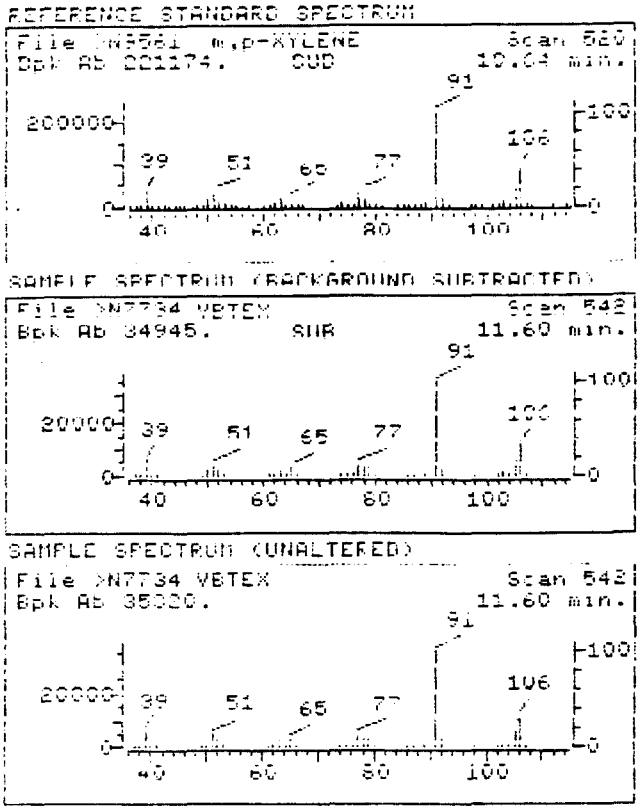


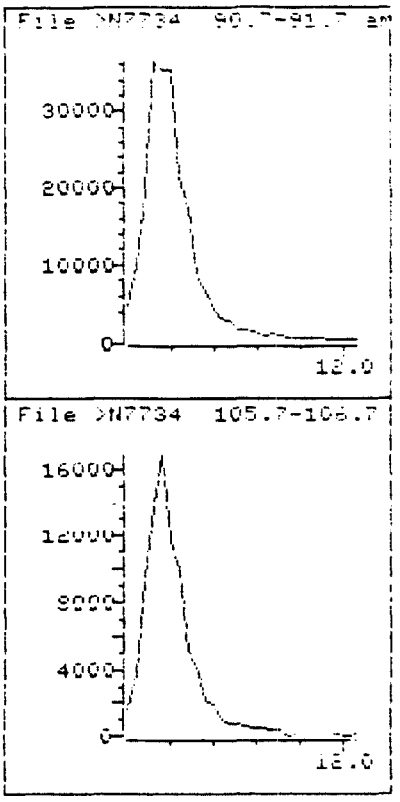
Data File: >N7734::D6
Name: VBTEX
Misc: E3485-2,UNU89,W,,,
Quant Time: 950529 06:59
Injected at: 950529 06:34

Quant Output File: >N7734::U1

Quant ID File: 1N0522::U1
Last Calibration: 950522 19:01

Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 532
Retention Time: 11.41 min.
Quant Ion: 91.0
Area: 9140?
Concentration: 516.98 PPB
q-value: ?9



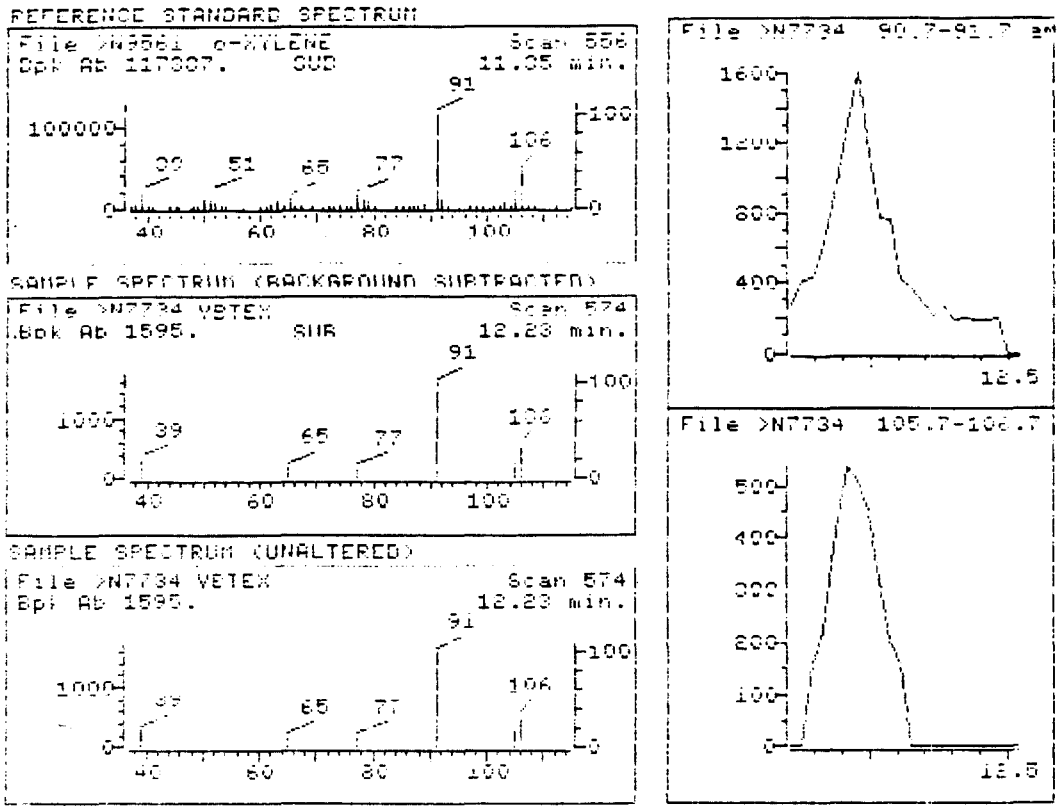


Data File: >N7734::D6
Name: VBTEX
Misc: E3489-2,UNU84,W,,,
Quant Time: 950523 06:59
Injected at: 950523 06:34

Quant Output File: ^N7734::U1

Quant ID File: IN0522::U1
Last Calibration: 950522 19:01

Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 542
Retention Time: 11.60 min.
Quant Ion: 91.0
Area: 242878
Concentration: 1426.96 PPB
q-value: 85



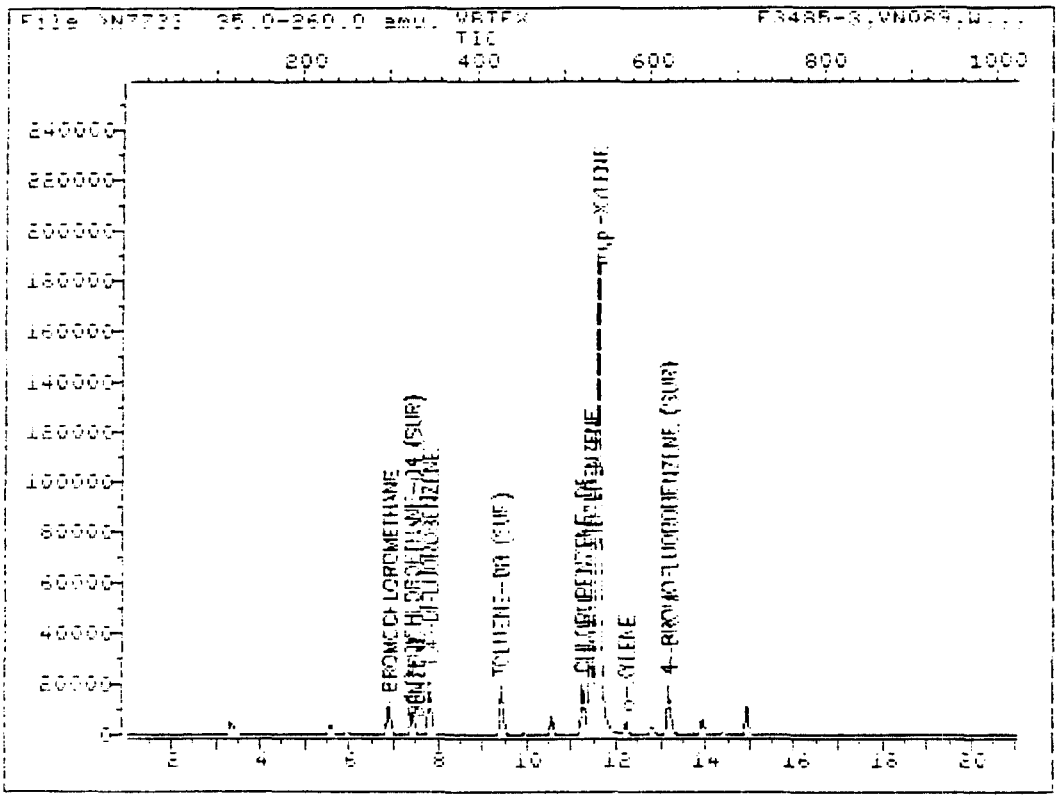
Data File: >N7734::U6
Name: VBTEX
Misc: B3469-2,UNU89,W,,,
Quant Time: 990523 06:59
Injected at: 990523 06:34

Quant Output File: ^N7734::U1

Quant ID File: 1:0522::U1
Last Calibration: 990522 19:01

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 574
Retention Time: 12.23 min.
Quant Ion: 91.0
Area: 1228
Concentration: 6.61 PPB
q-value: 8

TOTAL ION CHROMATOGRAM



Data File: >N7733::D6 Quant Output File: >N7733::Q1
Name: VBTEX
Misc: E3485-3,VN089,W,,,

Id File: IN0522::01
Title: VOLATILE ORGANIC ANALYSIS(+ E.HERS) BY EPA 624
Last Calibration: 950522 13:01

Operator ID: JKS
Quant Time: 950523 06:28
Injected at: 950523 06:03

845030387

QUANT REPORT

Operator ID: JKS Quant Rev: 6 Quant Time: 950523 06:28
Output File: ^N7733::U1 Injected at: 950523 06:03
Data File: >N7733::D6 Dilution Factor: 10.00000
Name: VBTEX
Misc: E3485-3,VN089,W,,,

ID File: IN0522::U1
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.89	301	10351	30.00	PPB	[illegible]
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.39	327	18965	306.55	PPB	[illegible]
5)	*1,4-DIFLUOROBENZENE	7.80	348	47978	30.00	PPB	[illegible]
7)	BENZENE	7.49	332	3708	26.73	PPB	100
9)	*CHLOROBENZENE-D5	11.24	524	37435	30.00	PPB	[illegible]
12)	ETHYLBENZENE	11.42	533	158192	872.74	PPB	[illegible]
13)	m,p-XYLENE	11.60	542	419871	2407.44	PPB	[illegible]
14)	o-XYLENE	12.22	574	20145	122.62	PPB	91
18)	4-BROMOFLUOROBENZENE (SUR)	13.16	622	27054	285.31	PPB	[illegible]
19)	TOLUENE-D8 (SUR)	9.41	430	41491	291.96	PPB	82

* Compound is ISTD

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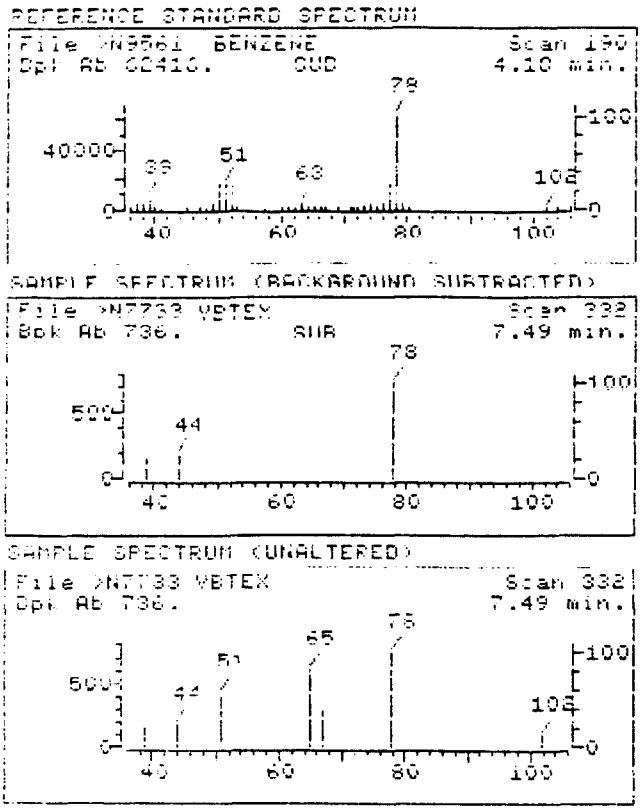
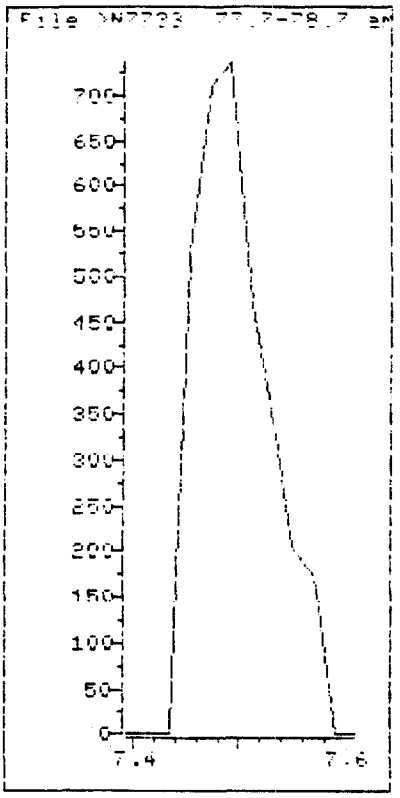




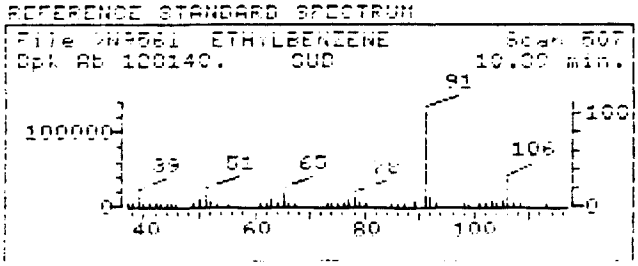
Data File: >N7733::D6
Name: VBTEX
Misc: E9489-3,VN089,W,,,
Quant Time: 950523 06:28
Injected at: 950523 06:03

Quant Output File: ^N7733::W1

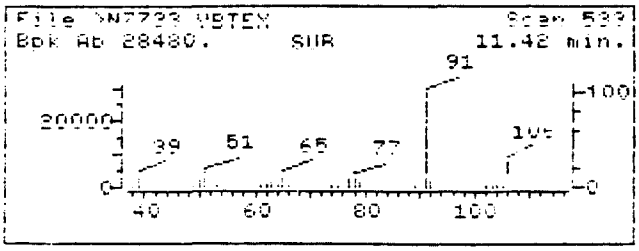
Quant ID File: IN0522::01
Last Calibration: 950522 13:01

Compound No: 7
Compound Name: BENZENE
Scan Number: 332
Retention Time: 7.49 min.
Quant Ion: 78.0
Area: 5708
Concentration: 26.75 PPB
q-value: 100

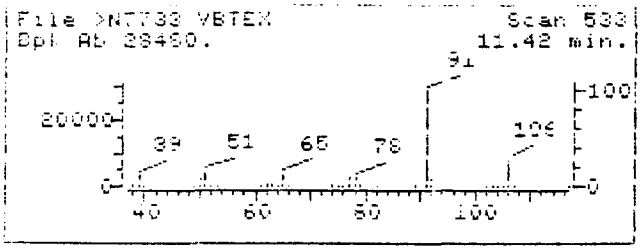
REFERENCE STANDARD SPECTRUM

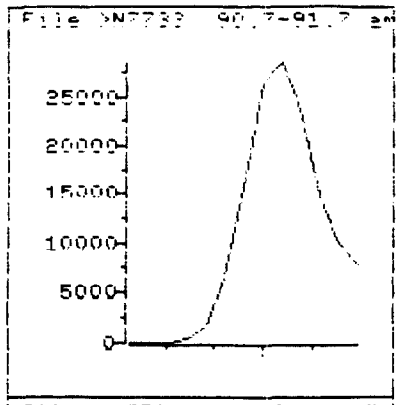


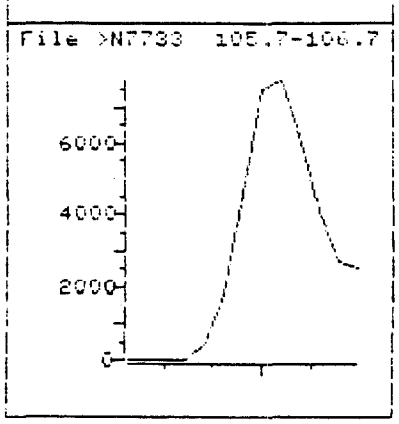
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







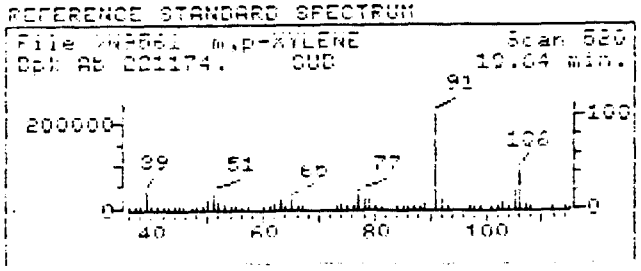
Data File: >N7733::D6
Name: VBTEX
Misc: E3480-3,UN089,W,,,
Quant Time: 950523 06:28
Injected at: 950523 06:03

Quant Output File: >N7733::Q1

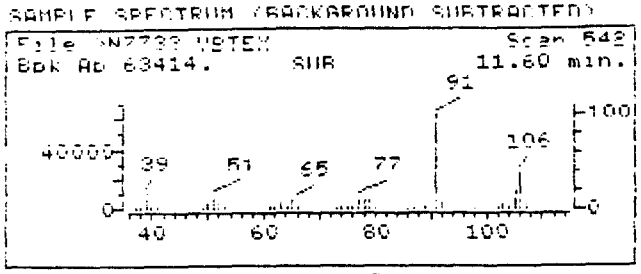
Quant ID File: 1N0522::01
Last Calibration: 950522 15:01

Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 533
Retention Time: 11.42 min.
Quant Ion: 91.0
Area: 158192
Concentration: 872.74 PPB
q-value: 80

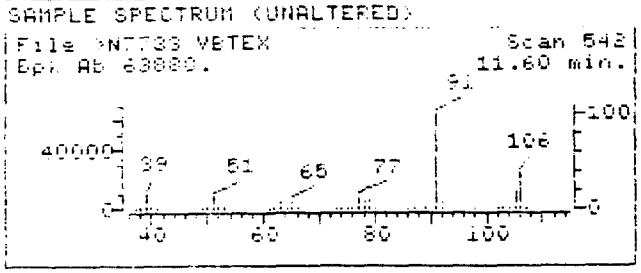
REFERENCE STANDARD SPECTRUM

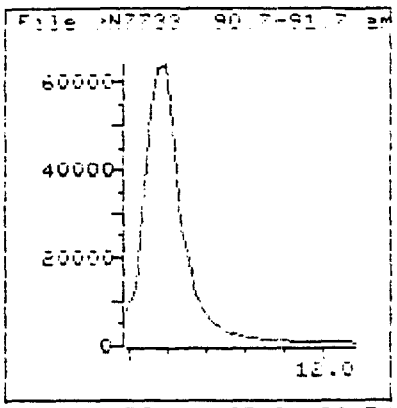


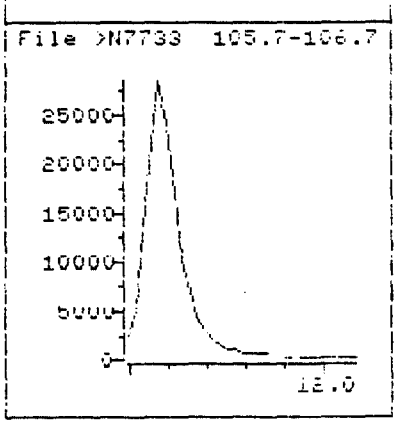
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







Data File: >N7733::D6
Name: VBTEX
Misc: E3485-3,VN089,W,,,
Quant Time: 950523 06:28
Injected at: 950523 06:03

Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 542
Retention Time: 11.60 min.
Quant Ion: 91.0
Area: 419871
Concentration: 2407.44 PPB
q-value: 93

Quant Output File: >N7733::Q1

Quant ID File: 1N0522::01
Last Calibration: 950522 13:01

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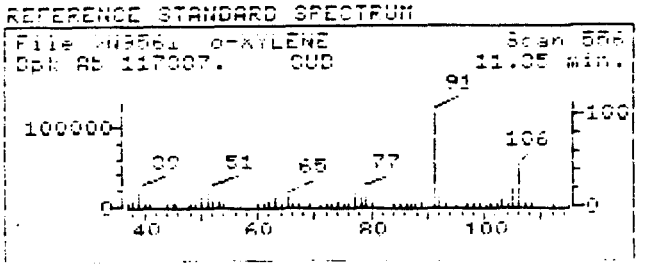
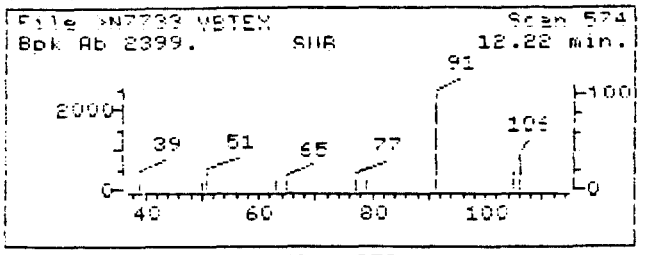
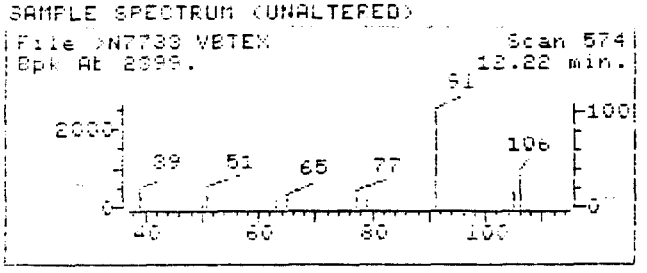
REFERENCE STANDARD SPECTRUM

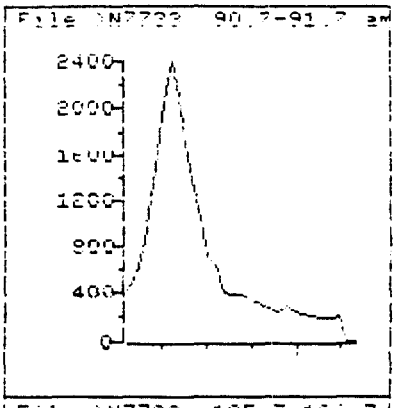


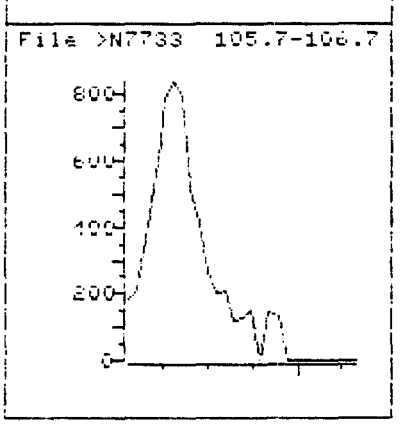
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







Data File: >N7733::D6
Name: VBTEX
Misc: E3485-3,VN089,W,,,
Quant Time: 950523 06:28
Injected at: 950523 06:03

Quant Output File: ^N7733::Q1

Quant ID File: IN0522::Q1
Last Calibration: 950522 13:01

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 574
Retention Time: 12.22 min.
Quant Ion: 91.0
Area: 20145
Concentration: 122.62 PPB
q-value: 91

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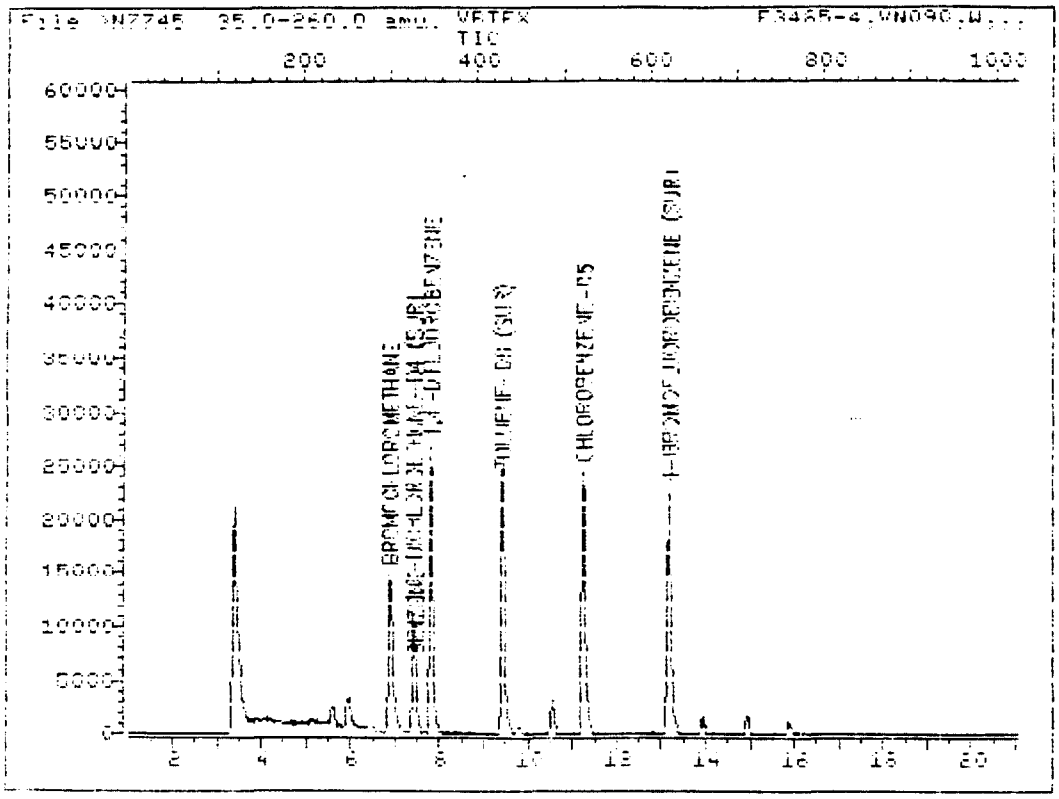
TOTAL ION CHROMATOGRAM

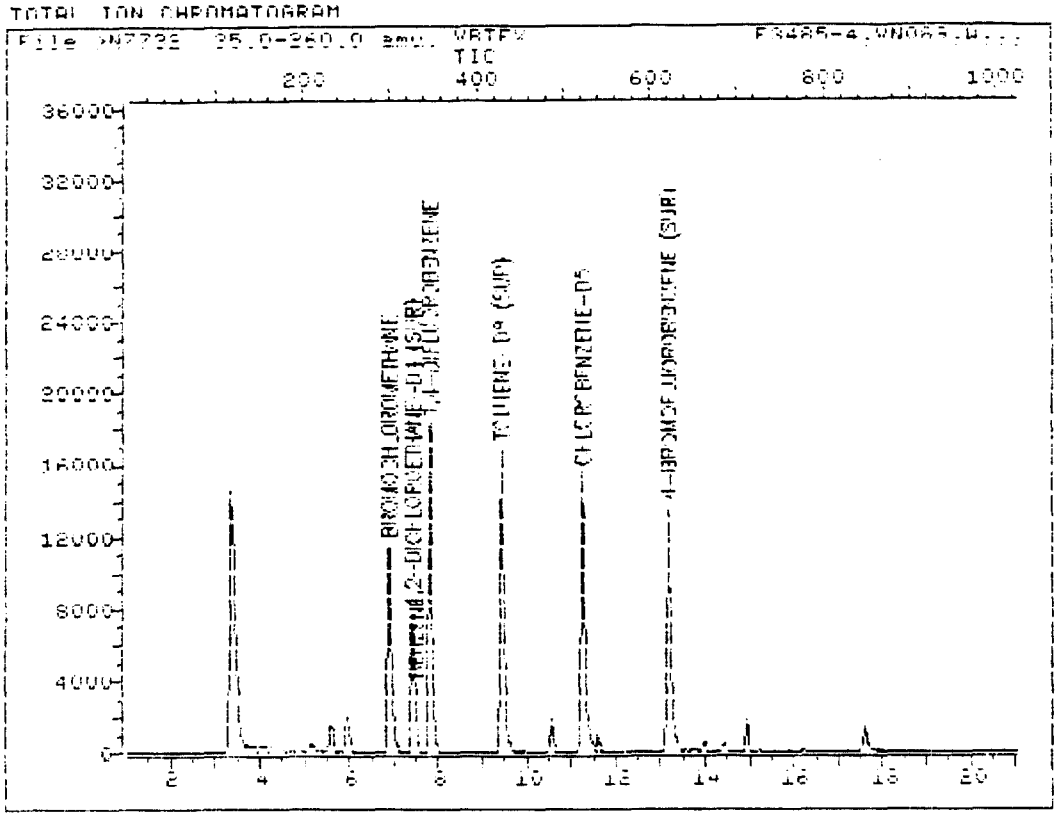


Data File: >N7745::US Quant Output File: ^N7745::UI
Name: VBTEX
Misc: E3485-4,VN090,W,,,

Id File: !N0522::UI
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 15:01

Operator ID: JKS
Quant Time: 950523 15:59
Injected at: 950523 15:14

TOTAL ION CHROMATOGRAM



Data File: >N7732::D6 Quant Output File: >N7732::Q1
Name: VBTEX
Misc: E3485-4,VN089,W,,,

Id File: IN0522::01
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

Operator ID: JKS
Quant Time: 950523 05:57
Injected at: 950523 05:32

845030394

QUANT REPORT

Operator ID: JKS Quant Rev: 6 Quant Time: 950523 13:39
Output File: ^N7745::01 Injected at: 950523 13:14
Data File: >N7745::D6 Dilution Factor: 1.00000
Name: VBTEX
Misc: E3485-4,VN090,W,,,

ID File: IN0522::01
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

	Compound	R.T.	Scan#	Area	Conc	Units	c
1)	*BROMOCHLOROMETHANE	6.88	301	12210	30.00	PPB	-
4)	1,2-DICHLOROETHANE-D4 (SOR)	7.41	328	23383	32.04	PPB	[illegible]
5)	*1,4-DIFLUOROBENZENE	7.80	348	58316	30.00	PPB	-
7)	BENZENE	7.47	331	3199	1.90	PPB	[illegible]
9)	*CHLOROBENZENE-D5	11.24	524	44587	30.00	PPB	[illegible]
18)	4-BROMOFLUOROBENZENE (SOR)	13.17	623	33359	29.54	PPB	[illegible]
19)	TOLUENE-D8 (SOR)	9.40	430	53313	31.50	PPB	[illegible]

* Compound is ISTD

845030395

5

QUANT REPORT

Operator ID: JKS
Output File: ^N7732::01
Data File: >N7732::06
Name: VBTEX
Misc: E3485-4,VN089,W,,,

Quant Rev: 6
Quant Time: 950523 05:5
Injected at: 950523 05:32
Dilution Factor: 1.00000

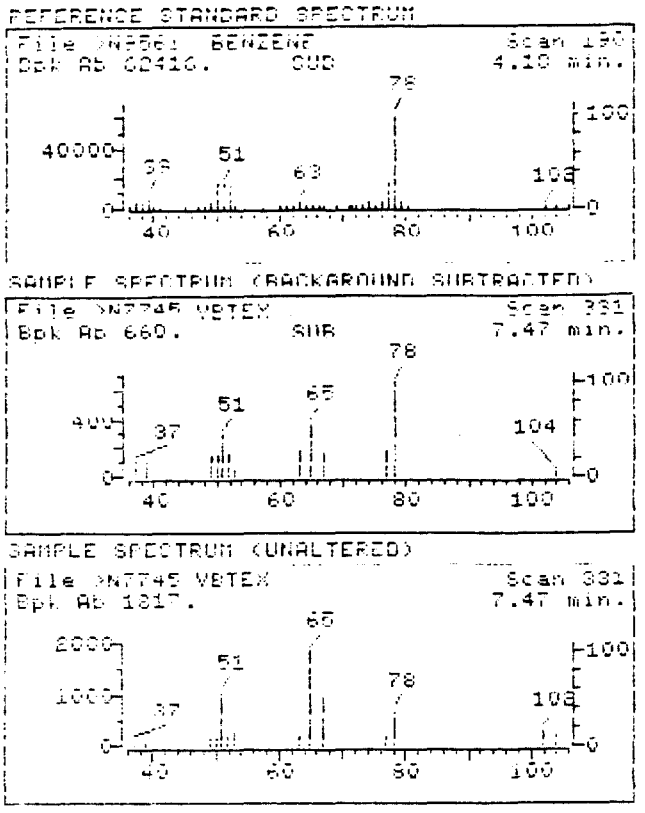
ID File: IN0522::01
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

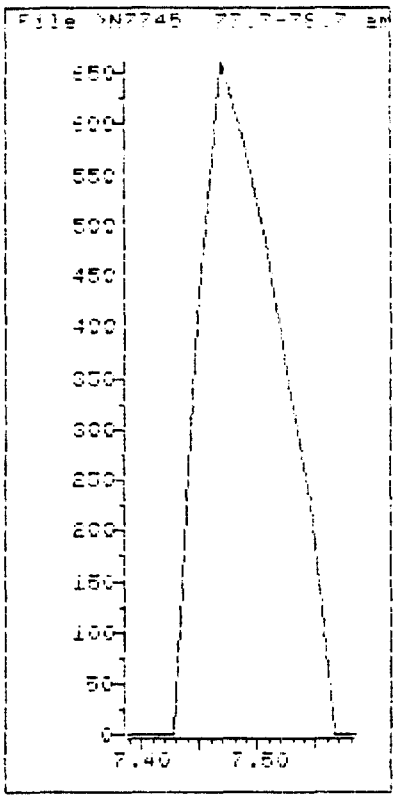
	Compound	R.T.	Scan#	Area	Conc	Units	Q
1)	*BROMOCHLOROMETHANE	6.88	300	9290	30.00	PPB	[illegible]
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.41	327	17604	31.71	PPB	[illegible]
5)	*1,4-DIFLUOROBENZENE	7.80	347	41723	30.00	PPB	[illegible]
7)	BENZENE	7.48	331	2865	2.37	PPB	[illegible]
9)	*CHLOROBENZENE-D5	11.23	523	32073	30.00	PPB	[illegible]
18)	4-BROMOFLUOROBENZENE (SUR)	13.17	622	21437	26.39	PPB	[illegible]
19)	TOLUENE-D8 (SUR)	9.42	430	38777	31.85	PPB	[illegible]

* Compound is ISTD

low hit confirmation for N 7745

845030396





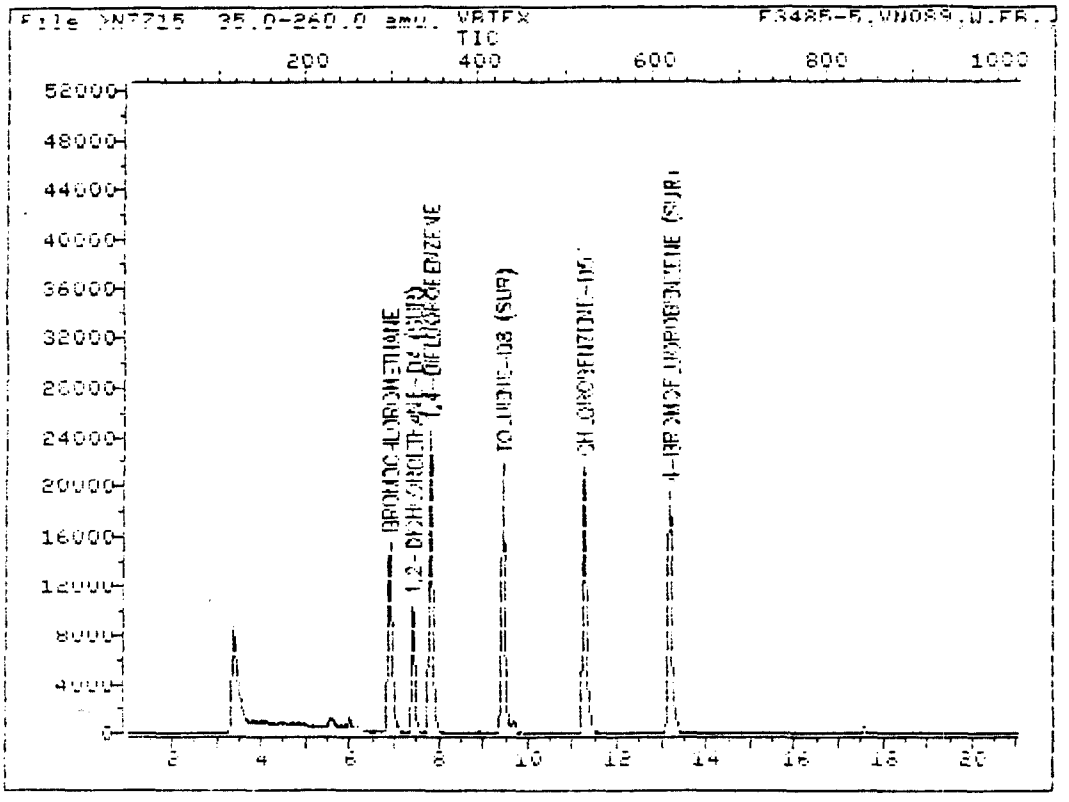
Data File: >N7745::D6
Name: VBTEX
Misc: ES485-4,UNUYU,W,,,
Quant Time: 95U523 13:39
Injected at: 95U523 13:14

Quant Output File: ^N7745::U1

Quant ID File: iNU522::U1
Last Calibration: 95U522 13:U1

Compound No: 2
Compound Name: BENZENE
Scan Number: 331
Retention Time: 7.47 min.
Quant Ion: 78.0
Area: 3199
Concentration: 1.9U PPB
q-value: 1UU

TOTAL ION CHROMATOGRAM



Data File: >N7715::D6 Quant Output File: ^N7715::U1
Name: VBTEX
Misc: E3486-5,VN089,W,FB,,

Id File: INU522::U1
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 19:01

Operator ID: JKS
Quant Time: 950522 21:09
Injected at: 950522 20:44

QUANT REPORT

Operator ID: JKS
Output File: ^N//15::QT
Data File: >N//15::D6
Name: VBTEX
Misc: E3485-5,VN089,W,FB,,

Quant Rev: 6
Quant Time: 950522 21:0[illegible]
Injected at: 950522 20:4[illegible]
Dilution Factor: 1.00000

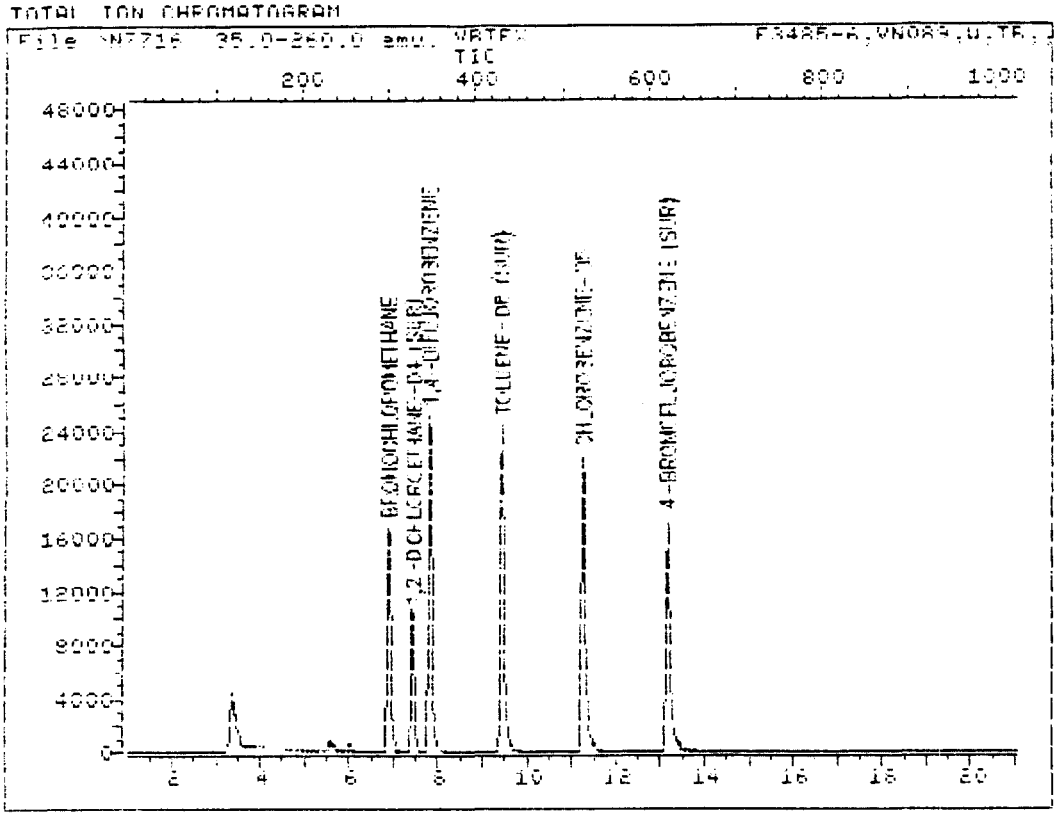
ID File: IN0522::UT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

	Compound	R.T.	Scan#	Area	Conc	Units	Q
1)	*BROMOCHLOROMETHANE	6.88	301	13183	30.00	PPB	[illegible]
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.41	328	22356	28.3[illegible]	PPB	[illegible]
5)	*1,4-DIFLUOROBENZENE	7.80	348	55606	30.00	PPB	[illegible]
9)	*CHLOROBENZENE-D5	11.24	524	42898	30.00	PPB	[illegible]
18)	4-BROMOFLUOROBENZENE (SUR)	13.17	623	30942	28.48	PPB	[illegible]
19)	TOLUENE-D8 (SUR)	9.42	431	47669	29.27	PPB	[illegible]

* Compound is ISTD

845030399

TOTAL ION CHROMATOGRAM



Data File: >N/716::D6 Quant Output File: ^N/716::D1

Name: VBTEX

Misc: E3485-6,VN089,W,TB,,

Id File: INU522::U1

Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624

Last Calibration: 950522 13:01

Operator ID: JRS

Quant Time: 950522 21:40

Injected at: 950522 21:19

QUANT REPORT

Operator ID: JKS Quant Rev: 6 Quant Time: 990522 21:40
Output File: ^N/716::U1 Injected at: 990522 21:17
Data File: >N/716::D6 Dilution Factor: 1.00000
Name: VB1EX
Misc: E5489-6,UN089,W,1B,,

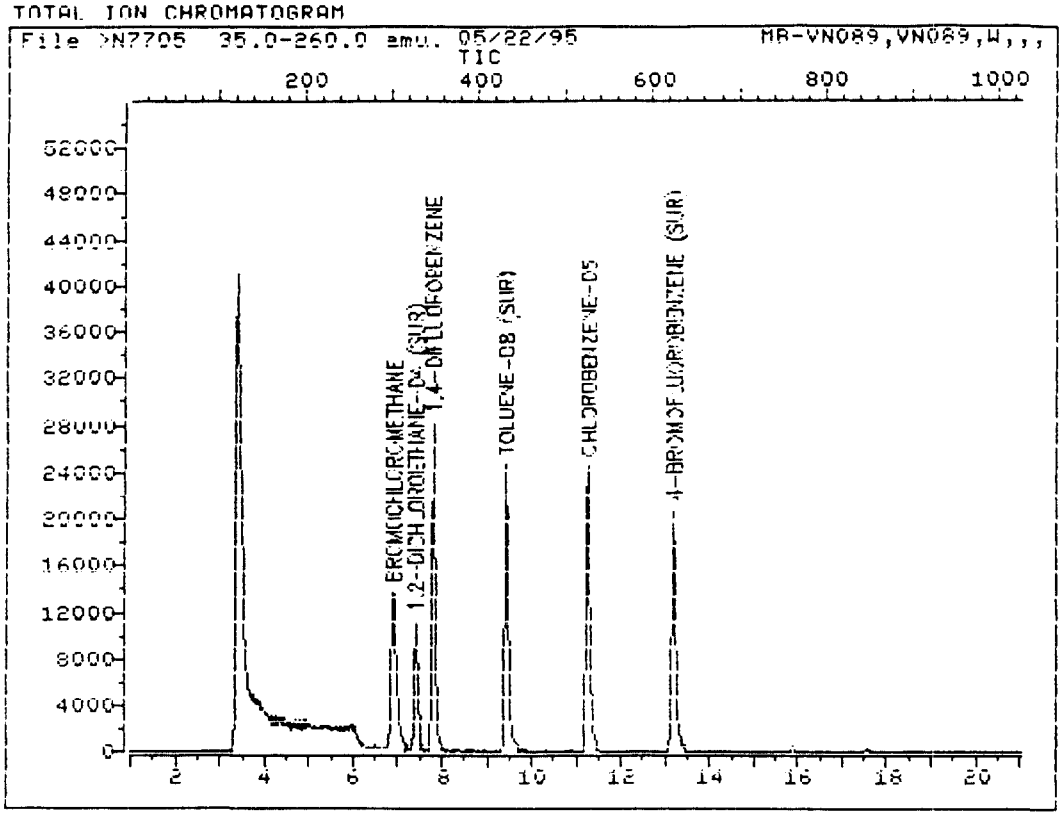
ID File: 1N0522::U1
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 990522 13:01

	Compound	R.T.	Scan#	Area	Conc	Units	Q
1)	*BROMOCHLOROMETHANE	6.88	301	13425	20.00	PPB	
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.43	329	25886	24.92	PPB	
5)	*1,4-DIFLUOROBENZENE	7.80	348	60412	20.00	PPB	
9)	*CHLOROBENZENE-D5	11.24	524	47047	20.00	PPB	
18)	4-BROMOFLUOROBENZENE (SUR)	13.16	622	30705M	25.77	PPB	
19)	TOLUENE-D8 (SUR)	9.42	431	99038	20.82	PPB	

* Compound is ISTD

845030401

TOTAL ION CHROMATOGRAM



Data File: >N7705::D6 Quant Output File: ^N7705::Q1
Name: 05/22/95
Misc: MB-VN089,VN089,W,,,

Id File: IN0522::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

Operator ID: JKS
Quant Time: 950522 14:49
Injected at: 950522 14:25

QUANT REPORT

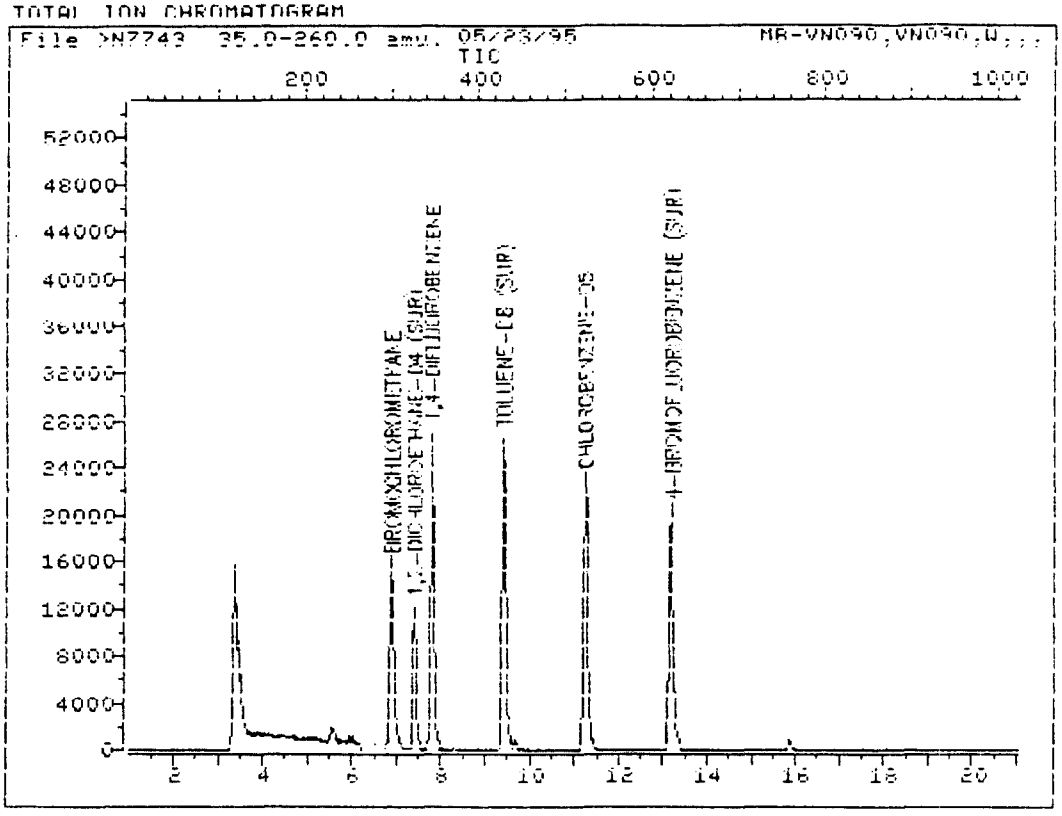
Operator ID: JKS Quant Rev: 6 Quant Time: 950522 14:49
Output File: ^N2705::QT Injected at: 950522 14:25
Data File: >N2705::D6 Dilution Factor: 1.00000
Name: 05/22/95
Misc: MB-VN089,VN089,W,,,

ID File: IN0522::QT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.88	303	15190	30.00	PPB	96
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.39	329	24491	26.98	PPB	99
5)	*1,4-DIFLUOROBENZENE	7.78	349	63392	30.00	PPB	97
9)	*CHLOROBENZENE-D5	11.24	526	46635	30.00	PPB	95
18)	4-BROMOFLUOROBENZENE (SUR)	13.18	625	32376	27.41	PPB	72
19)	TOLUENE-D8 (SUR)	9.41	432	53809	30.39	PPB	78

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >N7743::D6 Quant Output File: ^N7743::U1
Name: 05/23/95
Misc: MB-VN090,VN090,W,,,

Id File: IN0522::U1
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 13:01

Operator ID: JRS
Quant Time: 950523 12:14
Injected at: 950523 11:49

QUANT REPORT

Operator ID: JKS Quant Rev: 6 Quant Time: 950523 12:14
Output File: ^N/743::01 Injected at: 950523 11:49
Data File: >N/743::D6 Dilution Factor: 1.00000
Name: 05/23/95
Misc: MB-VN090,VN090,W,,,

ID File: IN0522::01
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950522 15:01

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.88	301	15151	50.00	PPB	91
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.39	327	25388	28.07	PPB	96
5)	*1,4-DIFLUOROBENZENE	7.78	347	60585	50.00	PPB	96
9)	*CHLOROBENZENE-D5	11.22	523	45826	50.00	PPB	98
18)	4-BROMOFLUOROBENZENE (SUR)	13.17	623	32744	28.21	PPB	81
19)	TOLUENE-D8 (SUR)	9.40	430	54993	31.61	PPB	94

* Compound is ISTD

845030405

6-4

ACCUTEST
2235 ROUTE 130, DAYTON, NJ 08810 • (908) 329-0200

05/11/95

TECHNICAL REPORT FOR

Environ

SAMPLES TAKEN AT:	Textron
CLIENT PROJECT ID:	02-02881
ACCUTEST JOB NUMBER:	E2788
SAMPLES RECEIVED AT ACCUTEST ON:	04/13/95
NUMBER OF SAMPLES IN THIS REPORT:	9
TOTAL NUMBER OF PAGES IN REPORT:	111

VINCENT J. PUGLIESE
PRESIDENT

845030406

RESULTS RELATE ONLY TO THE ITEMS TESTED

THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF ACCUTEST

ACCUTEST
2235 ROUTE 130, DAYTON, NJ 08810 • (908) 329-0200

Environ
214 Carnegie Center

Princeton, NJ 08540

ATTN: Scott Hayter

DATE: 05/11/95
JOB No: E2788
PROJECT No: 02-02881
SAMPLE RECEIVED: 04/13/95

SAMPLE SUMMARY

SAMPLE No	COLLECTED DATE	TIME	BY	POINT OF COLLECTION
E2788-1	04/12/95	00:00	SH	GROUND WATER - 0288I-HP20-GW01 Textron
E2788-2	04/12/95	00:00	SH	GROUND WATER - 0288I-HP20-GW01 (DUP) Textron
E2788-3	04/11/95	00:00	SH	GROUND WATER - 0288I-HP21-GW01 Textron
E2788-4	04/11/95	00:00	SH	GROUND WATER - 0288I-HP10-GW01 Textron
E2788-5	04/12/95	00:00	SH	GROUND WATER - 0288I-HP11-GW01 Textron
E2788-6	04/11/95	00:00	SH	GROUND WATER - 0288I-HP12-GW01 Textron

VINCENT J. PUGLIESE
PRESIDENT

ACCUTEST
2235 ROUTE 130, DAYTON, NJ 08810 • (908) 329-0200

Environ
214 Carnegie Center

Princeton, NJ 08540

ATTN: Scott Hayter

DATE: 05/11/95
JOB No: E2788
PROJECT No: 02-02881
SAMPLE RECEIVED: 04/13/95

SAMPLE SUMMARY

SAMPLE No	COLLECTED DATE	TIME	BY	POINT OF COLLECTION
E2788-7	04/11/95	00:00	SH	GROUND WATER - 0288I-HP13-GW01 Textron
E2788-8	04/12/95	00:00	SH	WATER - 0288I-FB01-04/12 Textron
E2788-9	04/10/95	00:00	DH	WATER - 0288I-TB01-04/10 Textron

VINCENT J. PUGLIESE
PRESIDENT

ACCUTEST
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LABORATORY DELIVERABLES

1.	Cover Page, Title Page listing Lab Certification #, facility name and address, and date of report.	X
2.	Table of Contents.	X
3.	Summary Sheets listing analytical results for all targeted and non-targeted compounds.	X
4.	Summary Table cross-referencing field ID #'s vs. lab ID #'s.	X
5.	Document bound, paginated and legible.	X
6.	Chain of Custody.	X
7.	Methodology Summary.	X
8.	Laboratory Chronicle and Holding Time Check.	X
9.	Results submitted on a dry weight basis (if applicable).	N/A
10.	Method Detection Limits.	X
11.	Lab certified by NJDEPE for parameters or appropriate category of parameters or a member of the USEPA CLP.	X
12.	Non-Conformance Summary.	X

J. Rodrigues
Manager

5/11/95
Date

845030409

3

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TABLE OF CONTENTS

REDUCED LABORATORY DATA DELIVERABLES FOR NON-USEPA/CLP METHODS

TITLE/ COVER PAGE

DELIVERABLE CHECKLIST

TABLE OF CONTENTS

SECTION 1 GENERAL

A. Results Summary
B. Chain of Custody
C. Laboratory Chronicles

SECTION 2 GC/MS SUPPORT DATA

A. Methodology Review
B. Conformance/Non-Conformance Summary
C. Tune Results Summary
D. Method Blank Results Summary
E. Calibration Summary
F. Surrogate Compound Recovery Results Summary
G. Matrix Spike/Matrix Spike Duplicate Results Summary
H. Internal Standard Summary
I. Sample and Blank Chromatograms, Quant Reports, Mass Spectra, and Library Search Data

SECTION 3 GC SUPPORT DATA

A. Methodology Review
B. Conformance/Non-Conformance Summary
C. Method Blank Results Summary
D. Calibration Summary
E. Surrogate Compound Recovery Results Summary
F. Matrix Spike/Matrix Spike Duplicate Results Summary
G. Retention Time Shift Summary
H. Sample, Blank and Multi-Peak Standard Chromatograms and Quant Reports

SECTION 4 METALS SUPPORT DATA (sorted by Instrument Type - ICP, Furnace, Flame, Mercury)

A. Methodology Review
B. Conformance/Non-Conformance Summary
C. Calibration Blank Results Summary
D. Batch Quality Control Summary
   - Method Blank Results Summary
   - Matrix Spike/ Duplicate Sample Results Summary
   - Laboratory Control Sample Results Summary
   - Serial Dilution Summary
E. Calibration Summary
   - Initial Calibration Summary
   - Continuous Calibration Summary
   - ICP Interference Check Sample Results Summary

SECTION 5 GENERAL CHEMISTRY/ PETROLEUM HYDROCARBON SUPPORT DATA

A. Methodology Review
B. Conformance/Non-Conformance Summary
C. Blank Results Summary
D. Spike Sample Results Summary
E. Duplicate Sample Results Summary
F. IR Spectra (Pet. Hydro. only)

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GC/MS METHODOLOGY SUMMARY FOR WATER MATRIX

All method used for GC/MS are referenced from EPA Methods 624 and 625, 40 CFR Part 136, 10/26/84 and /or "Test Methods For Evaluating Solid Wastes", SW846, 3rd Edition, November, 1986.

VOLATILE ORGANIC BY EPA 624/SW846 8240

This method can be summarized as follows: An inert gas is bubbled through a sample aliquot to transfer the purgeables from the aqueous phase to the vapor phase. The vapor phase is swept through a specially designed sorbent trap where the purgeables are trapped. After an eleven minute purge time the trap is heated to 180 C and backflushed with the inert gas to desorb the purgeables onto the gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected by a mass spectrometer.

BASE NEUTRAL EXTRACTABLES BY EPA 625/SW846 8270

This method can be summarized as follows: A measured Volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph greater then 11 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/Ms utilizing direct injection.

ACID EXTRACTABLE BY EPA 625/SW846 8270

This method can be summarized as follows: A measured volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph less than 2 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/MS.

For all fraction analyzed by gas chromatography/ mass spectrometry, a computer system is used to compare any detected peaks by the retention time and the relative abundance of three characteristic masses for qualitative identification. Quantitative analysis is performed using internal standard techniques with a single characteristic mass. All results are then reviewed by trained analysts to further validate the data.

For fractions requiring a library search, the unidentified mass spectra is compared to a computer NBS library of approximately 30,000 compounds. These unknown peaks are then qualified for an estimated concentration by external standard technique comparing unknown peak response to an internal standard response of known concentration.

CERTIFICATIONS: NJ (12129) • NY (10983) • PA (68-408) • MA (NJ141) • CT (PH-0585) • MD (167) • NC (346) • SC (94009) • TN (2968)

845030412

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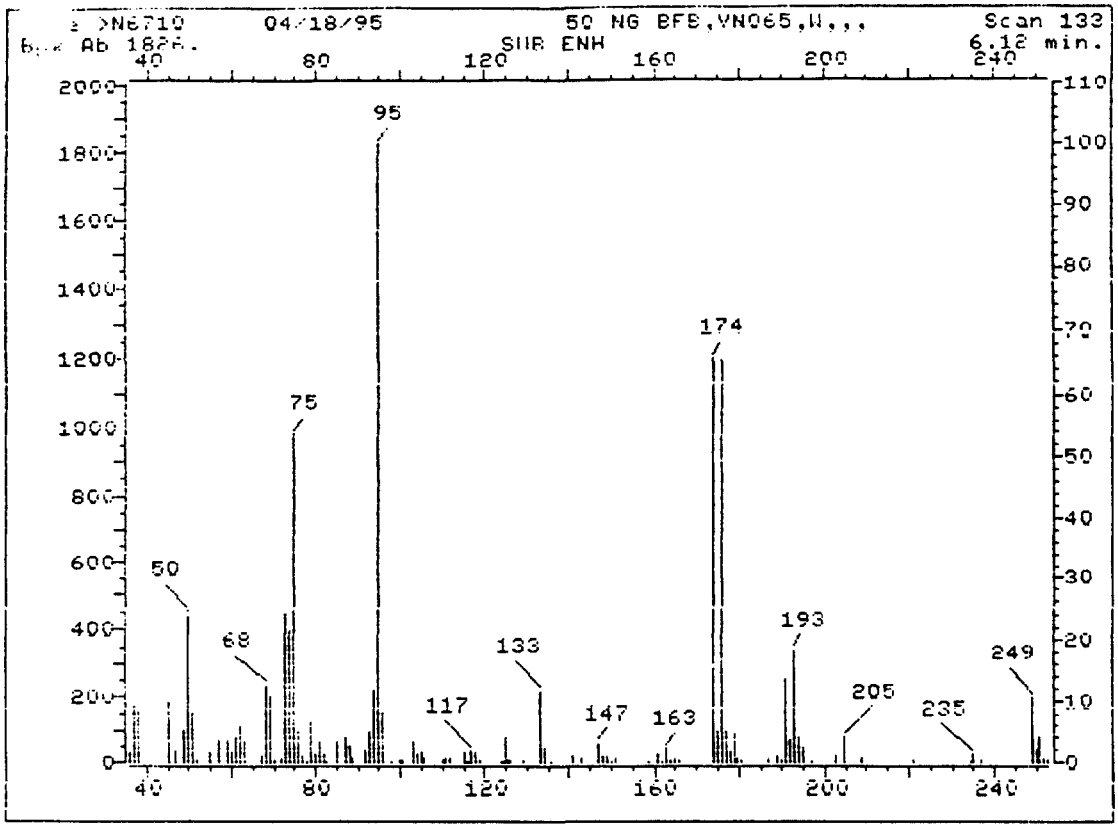
GC/MS ANALYSIS CONFORMANCE/NON-CONFORMANCE SUMMARY

	NO	YES
1. Chromatograms Labeled/Compounds Identified *(Field Samples and Method Blanks)*		✓
2. GC/MS Tune Specifications		✓
a. BFB Meet Criteria N/A		
b. DFTPP Meet Criteria N/A		
3. GC/MS Tuning Frequency - Performed every 24 hours for 600 series and 12 hours for 8000 series.		✓
4. GC/MS Calibration - Initial Calibration performed within 30 days before sample analysis and continuing calibration performed within 24 hours of samples analysis for 600 series and 12 hours for 8000 series.		✓
5. GC/MS Calibration Requirements		✓
a. Calibration Check Compounds		✓
b. System Performance Check Compounds		
6. Blank Contamination - *If yes, list compounds and in each blank:*	✓	
a. VOA Fraction		
b. B/N Fraction		
c. Acid Fraction		
7. Surrogate Recoveries Meets Criteria	✓	
If not met, list those compounds and their recoveries which fall outside the acceptable range:		
a. VOA Fraction One surrogate out in E2788 6*		
b. B/N Fraction		
c. Acid Fraction		
If not met, were the calculations checked (results not qualified as estimated by laboratory based on surrogate recoveries)		✓
8. Matrix Spike/ Matrix Spike Duplicate Recoveries Meet Criteria		✓
If not met, list those compounds and their recoveries which fall outside the acceptable range:		
a. VOA Fraction		
b. B/N Fraction		
c. Acid Fraction		
9. Internal Standard Area/ Retention Time Shift Meet Criteria		✓
10. Extraction Holding Time Met N/A		
If not met, list number of days exceeded for each samples:		
11. Analysis Holding Time Met		✓
If not met, list number of days exceed for each sample:		

Additional Comments: * Surrogates are outside of QC limits due to possible matrix interference, verified by reanalysis.

QC Review Signature: Benedetta Lopresti Date: 5/10/95

CERTIFICATIONS: NJ (12129) • NY (10983) • PA (68-408) • MA (NJ141) • CT (PH-0585) • MD (167) • DE • VA (00004) • NC (346) • SC (94009) • TN (2968)



GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.18	24.18	Ok
75	30-60% of mass 95	53.75	53.75	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.22	8.22	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	65.58	65.58	Ok
175	5-9% of mass 174	5.07	7.73	Ok
176	95-101% of mass 174	65.17	99.37	Ok
177	5-9% of mass 176	5.13	7.87	Ok

Injection Date: 04/18/95
Injection Time: 09:30
Data File: >N6710
Scan: 133

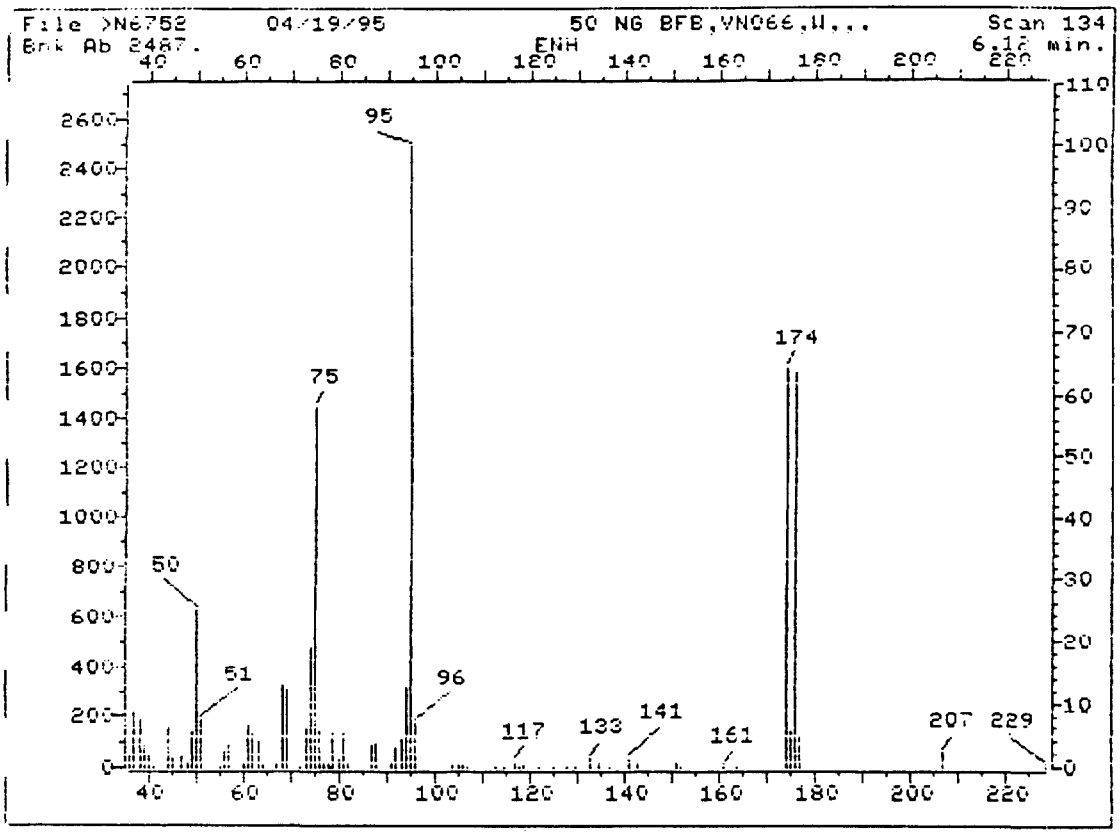
GC/MS PERFORMANCE STANDARD

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.18	24.18	Ok
75	30-60% of mass 95	53.75	53.75	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.22	8.22	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	65.58	65.58	Ok
175	5-9% of mass 174	5.07	7.73	Ok
176	95-101% of mass 174	65.17	99.37	Ok
177	5-9% of mass 176	5.13	7.87	Ok

Data File: >N6710 Injection Date: 04/18/95
Scan: 133 Injection Time: 09:30

TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS

SAMPLE ID	DATA FILE	INJECTION DATE	INJECTION TIME
500 PPB STD	>N6711::D4	4/18/95	10:30
200 PPB STD	>N6712::D4	4/18/95	11:01
100 PPB STD	>N6713::D4	4/18/95	11:32
50 PPB STD	>N6714::D4	4/18/95	12:03
20 PPB STD	>N6715::D4	4/18/95	12:35
2 PPB STD	>N6716::D4	4/18/95	13:06



GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	19-40% of mass 95	25.00	25.00	Ok
75	30-60% of mass 95	57.87	57.87	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.80	6.80	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	64.03	64.03	Ok
175	5-9% of mass 174	5.34	8.34	Ok
176	95-101% of mass 174	63.28	98.84	Ok
177	5-9% of mass 176	4.75	7.50	Ok

Injection Date: 04/19/95
Injection Time: 10:20
Data File: >N6752
Scan: 134

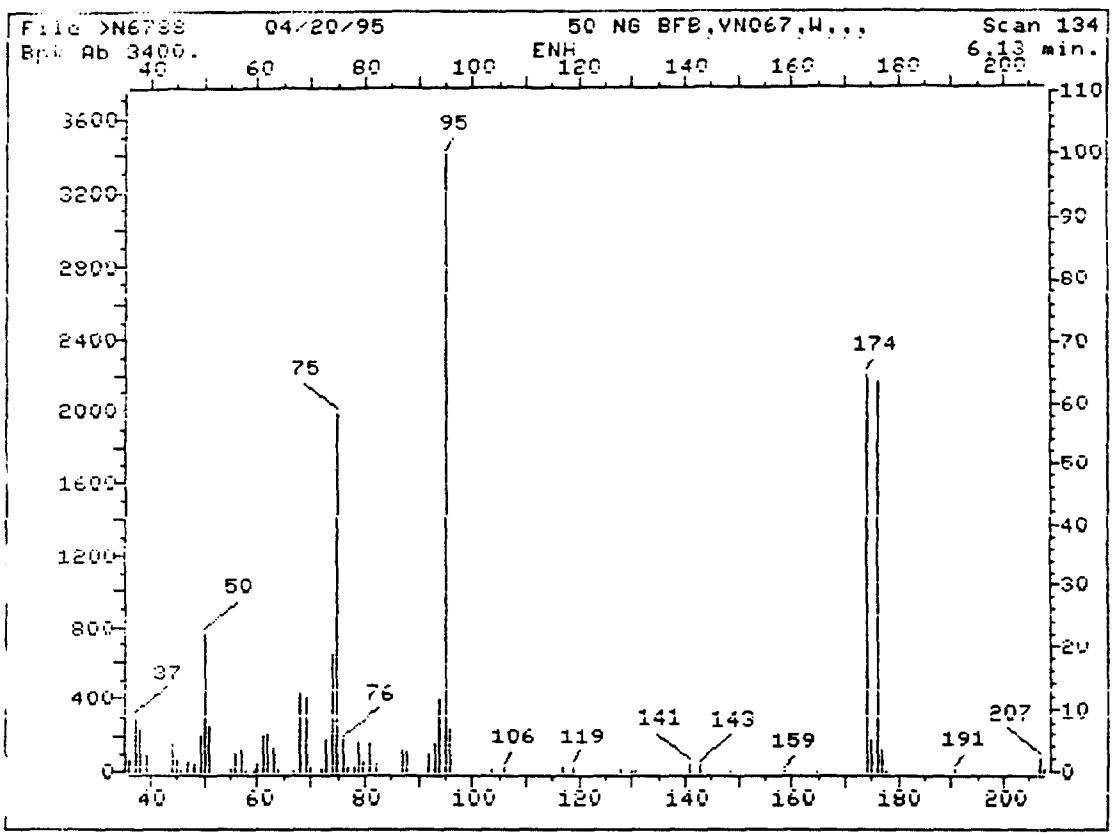
GC/MS PERFORMANCE STANDARD

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	25.00	25.00	Ok
75	30-60% of mass 95	57.87	57.87	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.80	6.80	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	64.03	64.03	Ok
175	5-9% of mass 174	5.34	8.34	Ok
176	95-101% of mass 174	63.28	98.84	Ok
177	5-9% of mass 176	4.75	7.50	Ok

Data File: >N6752 Injection Date: 04/19/95
Scan: 134 Injection Time: 10:20

TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS

SAMPLE ID	DATA FILE	INJECTION DATE	INJECTION TIME
20 PPB STD	>N6753::D4	4/19/95	11:10
MB-UN066	>N6754::D4	4/19/95	11:58
MB-UN066	>N6755::D4	4/19/95	12:49
E2736-7MS	>N6756::D4	4/19/95	13:39
E2736-7MSD	>N6757::D4	4/19/95	14:12
BLANK SPIK	>N6758::D4	4/19/95	14:45
E2736-7	>N6759::D4	4/19/95	15:19
E2736-6	>N6760::D4	4/19/95	15:53
E2736-8	>N6761::D4	4/19/95	16:28
BLANK SPIKE	>N6762::D4	4/19/95	17:02
BLANK	>N6763::D4	4/19/95	17:36
E2764-16	>N6764::D4	4/19/95	18:09
E2764-17	>N6765::D4	4/19/95	18:42
E2764-22	>N6766::D4	4/19/95	19:16
E2764-23	>N6767::D4	4/19/95	19:49
E2764-24	>N6768::D4	4/19/95	20:22
E2764-20	>N6769::D4	4/19/95	20:55
E2764-21	>N6770::D4	4/19/95	21:27
E2764-26	>N6771::D4	4/19/95	22:00
E2764-25	>N6772::D4	4/19/95	22:32
E2764-25DUP	>N6773::D4	4/19/95	23:04
E2764-18	>N6774::D4	4/19/95	23:36
E2764-19	>N6775::D4	4/20/95	0:08
E2764-27	>N6776::D4	4/20/95	0:40
E2764-28	>N6777::D4	4/20/95	1:12
E2764-29	>N6778::D4	4/20/95	1:43
E2764-30	>N6779::D4	4/20/95	2:15
E2723-1	>N6780::D4	4/20/95	2:47
E2787-3	>N6781::D4	4/20/95	3:18
E2787-4	>N6782::D4	4/20/95	3:49
E2787-1	>N6783::D4	4/20/95	4:21
E2787-2	>N6784::D4	4/20/95	4:52
E2787-5	>N6785::D4	4/20/95	5:23
E2787-5MS	>N6786::D4	4/20/95	5:55
E2787-5MSD	>N6787::D4	4/20/95	6:26



GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	22.50	22.50	Ok
75	30-60% of mass 95	58.28	58.28	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.99	6.99	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	64.63	64.63	Ok
175	5-9% of mass 174	5.16	7.99	Ok
176	95-101% of mass 174	63.78	98.68	Ok
177	5-9% of mass 176	3.87	6.07	Ok

Injection Date: 04/20/95
Injection Time: 09:13
Data File: >N6788
Scan: 134

GC/MS PERFORMANCE STANDARD

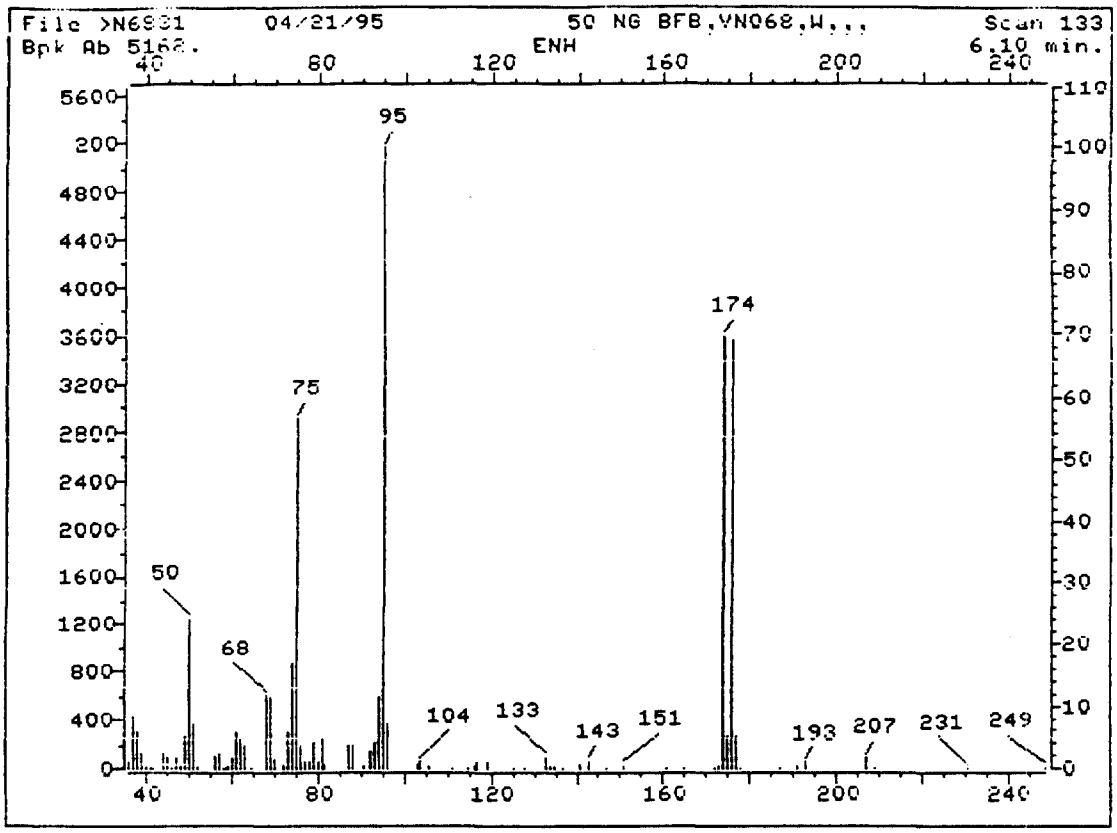
m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	22.50	22.50	Ok
75	30-60% of mass 95	58.28	58.28	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.99	6.99	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	64.63	64.63	Ok
175	5-9% of mass 174	5.16	7.99	Ok
176	95-101% of mass 174	63.78	98.68	Ok
177	5-9% of mass 176	3.87	6.07	Ok

Data File: >N6788 Injection Date: 04/20/95
Scan: 134 Injection Time: 09:13

TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS

SAMPLE ID	DATA FILE	INJECTION DATE	INJECTION TIME
20 PPB STD	>N6789::D4	4/20/95	9:44
MB-VN067	>N6790::D4	4/20/95	10:25
MB-VN067	>N6791::D4	4/20/95	11:09
E2787-5	>N6792::D4	4/20/95	11:56
E2736-8	>N6793::D4	4/20/95	12:29
E2764-16	>N6794::D4	4/20/95	13:01
E2764-17	>N6795::D4	4/20/95	13:33
E2764-22	>N6796::D4	4/20/95	14:05
E2764-24	>N6797::D4	4/20/95	14:37
E2764-20	>N6798::D4	4/20/95	15:09
E2764-21	>N6799::D4	4/20/95	15:41
E2764-26	>N6800::D4	4/20/95	16:14
E2764-28	>N6801::D4	4/20/95	16:46
E2781-2MS	>N6802::D4	4/20/95	17:26
E2781-2MSD	>N6803::D4	4/20/95	17:58
BLANK SPIK	>N6804::D4	4/20/95	18:30
E2781-2	>N6805::D4	4/20/95	19:02
E2781-2DUP	>N6806::D4	4/20/95	19:34
E2847-1	>N6807::D4	4/20/95	20:06
E2791-3	>N6808::D4	4/20/95	20:38
BLANK	>N6809::D4	4/20/95	21:10
E2790-2	>N6810::D4	4/20/95	21:41
E2791-2	>N6811::D4	4/20/95	22:13
E2788-9	>N6812::D4	4/20/95	22:45
E2788-3	>N6813::D4	4/20/95	23:17
E2788-1	>N6814::D4	4/20/95	23:49
E2788-2	>N6815::D4	4/21/95	0:21
E2788-8	>N6816::D4	4/21/95	0:52
E2788-6	>N6817::D4	4/21/95	1:24
E2788-5	>N6818::D4	4/21/95	1:56
E2788-7	>N6819::D4	4/21/95	2:28
E2788-4	>N6820::D4	4/21/95	3:00
E2781-1	>N6821::D4	4/21/95	3:31
E2791-1	>N6822::D4	4/21/95	4:03
E2790-1	>N6823::D4	4/21/95	4:35
E2764-27	>N6824::D4	4/21/95	5:07
E2764-27DUP	>N6825::D4	4/21/95	5:39

E2764-20	>N6828::D4	4/21/95	7:14
E2764-21	>N6829::D4	4/21/95	7:45
E2764-22	>N6830::D4	4/21/95	8:17



GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.23	24.23	Ok
75	30-60% of mass 95	56.43	56.43	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.03	7.03	Ok
173	Less than 2% of mass 174	.49	.70	Ok
174	Greater than 50% of mass 95	69.64	69.64	Ok
175	5-9% of mass 174	5.22	7.50	Ok
176	95-101% of mass 174	68.92	98.97	Ok
177	5-9% of mass 176	5.22	7.57	Ok

Injection Date: 04/21/95
Injection Time: 10:32
Data File: >N6831
Scan: 133

GC/MS PERFORMANCE STANDARD

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	24.23	24.23	Ok
75	30-60% of mass 95	56.43	56.43	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.03	7.03	Ok
173	Less than 2% of mass 174	.49	.70	Ok
174	Greater than 50% of mass 95	69.64	69.64	Ok
175	5-9% of mass 174	5.22	7.50	Ok
176	95-101% of mass 174	68.92	98.97	Ok
177	5-9% of mass 176	5.22	7.57	Ok

Data File: >N6831 Injection Date: 04/21/95
Scan: 133 Injection Time: 10:32

TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS

SAMPLE ID	DATA FILE	INJECTION DATE	INJECTION TIME
20 PPB STD	>N6832::D4	4/21/95	11:10
MB-UN068	>N6833::D4	4/21/95	11:54
E2790-2	>N6834::D4	4/21/95	12:47
E2791-2	>N6835::D4	4/21/95	13:19
E2788-8	>N6836::D4	4/21/95	13:51
E2788-5	>N6837::D4	4/21/95	14:22
E2791-1	>N6838::D4	4/21/95	14:54
E2843-10MS	>N6839::D4	4/21/95	15:28
E2843-10MSD	>N6840::D4	4/21/95	16:00
BLANK SPIKE	>N6841::D4	4/21/95	16:32
E2843-10	>N6842::D4	4/21/95	17:04
E2843-10DUP	>N6843::D4	4/21/95	17:37
E2843-11	>N6844::D4	4/21/95	18:09
E2843-12	>N6845::D4	4/21/95	18:42
E2844-11	>N6846::D4	4/21/95	19:14
E2844-12	>N6847::D4	4/21/95	19:46
E2936-1	>N6848::D4	4/21/95	20:18
E2844-1	>N6849::D4	4/21/95	20:51
E2844-2	>N6850::D4	4/21/95	21:23
E2844-3	>N6851::D4	4/21/95	21:55
E2844-4	>N6852::D4	4/21/95	22:27
E2844-5	>N6853::D4	4/21/95	23:00
E2844-6	>N6854::D4	4/21/95	23:32
E2844-7	>N6855::D4	4/22/95	0:04
E2844-8	>N6856::D4	4/22/95	0:36
E2843-8	>N6857::D4	4/22/95	1:09
E2843-9	>N6858::D4	4/22/95	1:41
E2843-9DUP	>N6859::D4	4/22/95	2:13
E2844-10	>N6860::D4	4/22/95	2:45
E2844-9	>N6861::D4	4/22/95	3:18
E2843-7	>N6862::D4	4/22/95	3:50
E2843-6	>N6863::D4	4/22/95	4:22
E2843-4	>N6864::D4	4/22/95	4:55
E2843-3	>N6865::D4	4/22/95	5:27
E2843-1	>N6866::D4	4/22/95	5:59
E2843-5	>N6867::D4	4/22/95	6:32
E2843-2	>N6868::D4	4/22/95	7:04

ACCUTEST
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ANALYSIS REPORT FOR VOLATILE ORGANICS BY GC/MS

			DATA FILES	ANALYSIS DATE
TEST CODE	: 04/20/95	Initial	: >N6791	04/20/95
LAB SAMPLE #	: MB-VN067	Dilution #1	:	
MATRIX	: WATER	Dilution #2	:	
METHOD	: EPA 624			

	COMPOUND	RESULT (ug/L)	MDL (ug/L)	Q
1)	BENZENE	ND	1.0	
2)	ETHYLBENZENE	ND	1.0	
3)	TOLUENE	ND	1.0	
4)	XYLENES, TOTAL	ND	1.0	

ND = NOT DETECTED
MDL= METHOD DETECTION LIMIT

(1) - RESULTS REPORTED FROM DILUTION #1
(2) - RESULTS REPORTED FROM DILUTION #2

QUALIFIERS (Q)
J =INDICATES AN ESTIMATED VALUE BELOW MDL
B =INDICATES COMPOUND FOUND IN THE ASSOCIATED BLANK AS WELL AS IN SAMPLE
E =ESTIMATED VALUE; EXCEEDS INSTRUMENT CALIBRATION RANGE

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ANALYSIS REPORT FOR VOLATILE ORGANICS BY GC/MS

			DATA FILES	ANALYSIS DATE
TEST CODE	: 04/21/95	Initial	: >N6833	04/21/95
LAB SAMPLE #	: MB-VN068	Dilution #1	:	
MATRIX	: WATER	Dilution #2	:	
METHOD	: EPA 624			

	COMPOUND	RESULT (ug/L)	MDL (ug/L)	Q
1)	BENZENE	ND	1.0	
2)	ETHYLBENZENE	ND	1.0	
3)	TOLUENE	ND	1.0	
4)	XYLENES, TOTAL	ND	1.0	

ND = NOT DETECTED
MDL= METHOD DETECTION LIMIT

(1) - RESULTS REPORTED FROM DILUTION #1
(2) - RESULTS REPORTED FROM DILUTION #2

QUALIFIERS (Q)
J =INDICATES AN ESTIMATED VALUE BELOW MDL
B =INDICATES COMPOUND FOUND IN THE ASSOCIATED BLANK AS WELL AS IN SAMPLE
E =ESTIMATED VALUE; EXCEEDS INSTRUMENT CALIBRATION RANGE

Initial Calibration Data
HSL Compounds

Case No: Instrument ID: N CORE

Contractor: ACCUTEST Calibration Date: 04/18/95

Contract No: BTEX+ETHERS (CAP)

Minimum $\overline{RF}$ for SPCC is .05 Maximum % RSD for CCC is 35%

Laboratory ID:	>N6716	>N6715	>N6714	>N6713	>N6712	>N6711					
Compound	RF 2.00	RF 20.00	RF 50.00	RF 100.00	RF 200.00	RF 500.00	$\overline{RRT}$	$\overline{RF}$	% RSD	CCC	SPCC	
TERTIARY BUTYL ALCOHOL	.09352	.08329	.08250	.09061	.09281	.08976	.819	.08875	5.345			(Conc=100.0,500.
METHYL TERT BUTYL ETHER	.88480	.73759	.75833	.80738	.73603	.87238	.740	.79942	8.336			
DI-ISOPROPYL ETHER	.19484	.25611	.25728	.27085	.28489	.27837	.790	.25706	12.656			
1,2-DICHLOROETHANE-D4 (SUR)	1.93339	1.79500	1.84525	1.85786	1.85928	1.74560	1.077	1.83940	3.470			(Conc=30.0,30.0,
BENZENE	.91468	.84054	.82013	.89709	.92873	.87032	.960	.87858	4.854			
TOLUENE-D8 (SUR)	1.14354	1.16211	1.13799	1.13576	1.15565	1.16060	.838	1.14928	1.012			(Conc=30.0,30.0,
TOLUENE	1.25591	1.23343	1.20915	1.27871	1.26819	1.26547	.845	1.25181	2.069			
CHLOROBENZENE	.93797	.91518	.92195	1.03258	.99689	.95305	1.004	.95960	4.802			
ETHYLBENZENE	1.73048	1.45729	1.53147	1.64062	1.59644	1.46766	1.016	1.57066	6.744			
m,p-XYLENE	1.59607	1.44870	1.49526	1.58017	1.53678	1.06378	1.031	1.45346	13.655			(Conc=4.0,40.0,1
o-XYLENE	1.48371	1.43947	1.45441	1.47654	1.42256	1.42804	1.087	1.45079	1.745			
4-BROMOFLUOROBENZENE (SUR)	.75549	.82270	-	.86816	-	-	1.172	.81545	6.951			(Conc=30.0,30.0,
1,3-DICHLOROBENZENE	.89104	.71442	.95013	.81548	.83386	.98565	1.319	.86510	11.394			
1,4-DICHLOROBENZENE	1.04861	.94804	.95013	1.01179	1.08307	.98565	1.325	1.00455	5.392			
1,2-DICHLOROBENZENE	1.01038	.79784	.80801	.88078	.89981	.84412	1.366	.87349	8.921			
NAPHTHALENE	-	1.73056	1.53435	.83503	1.36364	-	1.565	1.36590	28.139			(Conc=2.0,20.0,5

RF - Response Factor (Subscript is amount in ug/Kg)

$\overline{RRT}$ - Average Relative Retention Time (RT Std/RT Istd)

$\overline{RF}$ - Average Response Factor

..0 - Percent Relative Standard Deviation

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Continuing Calibration Check
HSL Compounds

e No: Calibration Date: 04/19/95

Contractor: ACCUTEST Time: 11:10

Contract No: BTEX+ETHERS (CAP) Laboratory ID: >N6753

Instrument ID: N CORE Initial Calibration Date: 04/18/95

Minimum $\overline{RF}$ for SPCC is .05 Maximum % Diff for CCC is 20%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
TERTIARY BUTYL ALCOHOL	.08875	.08506	4.15			(Conc=500.00)
METHYL TERT BUTYL ETHER	.79942	.84011	5.09			
DI-ISOPROPYL ETHER	.25706	.27719	7.83			
1,2-DICHLOROETHANE-D4 (SUR)	1.83940	1.79672	2.32			(Conc=30.00)
BENZENE	.87858	.89214	1.54			
TOLUENE-D8 (SUR)	1.14928	1.18119	2.78			(Conc=30.00)
TOLUENE	1.25181	1.25633	.36			
CHLOROBENZENE	.95960	.93887	2.16			
ETHYLBENZENE	1.57066	1.54010	1.95			
m,p-XYLENE	1.45346	1.57035	8.04			(Conc=40.00)
o-XYLENE	1.45079	1.41693	2.33			
4-BROMOFLUOROBENZENE (SUR)	.81545	.84167	3.22			(Conc=30.00)
1,3-DICHLOROBENZENE	.86510	.96735	11.82			
1,4-DICHLOROBENZENE	1.00455	.96735	3.70			
1,2-DICHLOROBENZENE	.87349	.92035	5.36			
NAPHTHALENE	1.36590	.41921	69.31			(Conc=20.00)

RF - Response Factor from daily standard file at 20.00 ug/Kg

$\overline{RF}$ - Average Response Factor from Initial Calibration Form VI

ff - % Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Continuing Calibration Check
HSL Compounds

Case No: Calibration Date: 04/20/95

Contractor: ACCUTEST Time: 09:44

Contract No: BTEX+ETHERS (CAP) Laboratory ID: >N6789

Instrument ID: N CORE Initial Calibration Date: 04/18/95

Minimum $\overline{RF}$ for SPCC is .05 Maximum % Diff for CCC is 20%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
TERTIARY BUTYL ALCOHOL	.08875	.08308	6.38			(Conc=500.00)
METHYL TERT BUTYL ETHER	.79942	.78836	1.38			
DI-ISOPROPYL ETHER	.25706	.27571	7.26			
1,2-DICHLOROETHANE-D4 (SUR)	1.83940	1.82653	.70			(Conc=30.00)
BENZENE	.87858	.92339	5.10			
TOLUENE-D8 (SUR)	1.14928	1.15454	.46			(Conc=30.00)
TOLUENE	1.25181	1.23299	1.50			
CHLOROBENZENE	.95960	.97582	1.69			
ETHYLBENZENE	1.57066	1.56817	.16			
m,p-XYLENE	1.45346	1.54871	6.55			(Conc=40.00)
o-XYLENE	1.45079	1.43839	.85			
4-BROMOFLUOROBENZENE (SUR)	.81545	.82797	1.54			(Conc=30.00)
1,3-DICHLOROBENZENE	.86510	.95737	10.67			
1,4-DICHLOROBENZENE	1.00455	.95737	4.70			
1,2-DICHLOROBENZENE	.87349	.94194	7.84			
NAPHTHALENE	1.36590	.52351	61.67			(Conc=20.00)

RF - Response Factor from daily standard file at 20.00 ug/Kg

$\overline{RF}$ - Average Response Factor from Initial Calibration Form VI

%Diff - % Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

845030426

Continuing Calibration Check
HSL Compounds

.se No: Calibration Date: 04/21/95

Contractor: ACCUTEST Time: 11:10

Contract No: BTEX+ETHERS (CAP) Laboratory ID: >N6832

Instrument ID: N CORE Initial Calibration Date: 04/18/95

Minimum $\overline{RF}$ for SPCC is .05 Maximum % Diff for CCC is 20%

Compound	$\overline{RF}$	RF	%Diff	CCC	SPCC	
TERTIARY BUTYL ALCOHOL	.08875	.08463	4.64			(Conc=500.00)
METHYL TERT BUTYL ETHER	.79942	.80311	.46			
DI-ISOPROPYL ETHER	.25706	.27193	5.79			
1,2-DICHLOROETHANE-D4 (SUR)	1.83940	1.84594	.36			(Conc=30.00)
BENZENE	.87858	.88453	.68			
TOLUENE-D8 (SUR)	1.14928	1.12435	2.17			(Conc=30.00)
TOLUENE	1.25181	1.31796	5.28			
CHLOROBENZENE	.95960	1.02665	6.99			
ETHYLBENZENE	1.57066	1.61796	3.01			
m,p-XYLENE	1.45346	1.61899	11.39			(Conc=40.00)
o-XYLENE	1.45079	1.48441	2.32			
4-BROMOFLUOROBENZENE (SUR)	.81545	.75769	7.08			(Conc=30.00)
1,3-DICHLOROBENZENE	.86510	.70169	18.89			
1,4-DICHLOROBENZENE	1.00455	.86310	14.08			
1,2-DICHLOROBENZENE	.87349	.81336	6.88			
NAPHTHALENE	1.36590	.26153	80.85			(Conc=20.00)

RF - Response Factor from daily standard file at 20.00 ug/Kg

$\overline{RF}$ - Average Response Factor from Initial Calibration Form VI

iff - % Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN066 BATCH DATE : 04/19/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL)	#	S2 (BFB)	#	S3 (DCE)	#	TOT OUT	Q
01	MB-VN066	^N6755	W	107		94		107		0	
02	E2736-7MS	^N6756	W	105		112		111		0	
03	E2736-7MSD	^N6757	W	103		108		127	*	1	
04	BLANKSPIK	^N6758	W	102		107		111		0	
05	E2736-7	^N6759	W	104		108		113		0	
06	E2736-6	^N6760	W	102		104		111		0	
07	E2736-8	^N6761	W	106		104		128	*	1	
08	BLANKSPIKE	^N6762	W	101		101		112		0	
09	BLANK	^N6763	W	****	*	****	*	****	*	3	
10	E2764-16	^N6764	W	109		98		110		0	
11	E2764-17	^N6765	W	101		106		114		0	
12	E2764-22	^N6766	W	110		102		114		0	
13	E2764-23	^N6767	W	104		95		110		0	
14	E2764-24	^N6768	W	106		109		111		0	
15	E2764-20	^N6769	W	102		104		113		0	
16	E2764-21	^N6770	W	105		111		114		0	
17	E2764-26	^N6771	W	103		112		103		0	
18	E2764-25	^N6772	W	101		112		112		0	
19	E2764-25DUP	^N6773	W	101		110		105		0	
20	E2764-18	^N6774	W	107		95		103		0	

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN066 BATCH DATE : 04/19/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	TOT OUT	Q
01	E2764-19	^N6775	W	104	90	103	0	
02	E2764-27	^N6776	W	107	105	97	0	
03	E2764-28	^N6777	W	105	91	103	0	
04	E2764-29	^N6778	W	104	87	102	0	
05	E2764-30	^N6779	W	100	87	107	0	
06	E2723-1	^N6780	W	104	112	108	0	
07	E2787-3	^N6781	W	101	105	100	0	
08	E2787-4	^N6782	W	101	106	104	0	
09	E2787-1	^N6783	W	107	106	98	0	
10	E2787-2	^N6784	W	99	97	104	0	
11	E2787-5	^N6785	W	104	100	106	0	
12	E2787-5MS	^N6786	W	98	103	90	0	
13	E2787-5MSD	^N6787	W	96	100	101	0	
14								
15								
16								
17								
18								
19								
20								

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT
c - SAMPLE RE-ANALYZED

COMMENTS : _____

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN067 BATCH DATE : 04/20/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	TOT OUT	Q
01	MB-VN067	^N6791	W	107	91	107	0	
02	E2787-5	^N6792	W	108	97	98	0	
03	E2736-8	^N6793	W	106	104	107	0	
04	E2764-16	^N6794	W	108	104	113	0	
05	E2764-17	^N6795	W	103	110	112	0	
06	E2764-22	^N6796	W	106	96	109	0	
07	E2764-24	^N6797	W	104	101	109	0	
08	E2764-20	^N6798	W	103	112	118 *	1	
09	E2764-21	^N6799	W	106	120 *	127 *	2	
10	E2764-26	^N6800	W	104	108	132 *	1	
11	E2764-28	^N6801	W	106	94	107	0	
12	E2781-2MS	^N6802	W	99	107	108	0	
13	E2781-2MSD	^N6803	W	102	109	103	0	
14	BLANKSPIK	^N6804	W	97	104	100	0	
15	E2781-2	^N6805	W	102	96	107	0	
16	E2781-2DUP	^N6806	W	105	91	102	0	
17	E2847-1	^N6807	W	100	97	106	0	
18	E2791-3	^N6808	W	100	96	96	0	
19	BLANK	^N6809	W	**** *	**** *	**** *	3	
20	E2790-2	^N6810	W	105	91	96	0	

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN067 BATCH DATE : 04/20/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	TOT OUT	Q
01	E2791-2	^N6811	W	82 *	93	71 *	2	
02	E2788-9	^N6812	W	97	92	97	0	
03	E2788-3	^N6813	W	105	99	98	0	
04	E2788-1	^N6814	W	101	97	99	0	
05	E2788-2	^N6815	W	97	95	104	0	
06	E2788-8	^N6816	W	103	101	92	0	
07	E2788-6	^N6817	W	67 *	94	76	1	
08	E2788-5	^N6818	W	107	92	99	0	
09	E2788-7	^N6819	W	100	88	102	0	
10	E2788-4	^N6820	W	100	102	106	0	
11	E2781-1	^N6821	W	102	95	109	0	
12	E2791-1	^N6822	W	104	98	105	0	
13	E2790-1	^N6823	W	109	95	105	0	
14	E2764-27	^N6824	W	104	100	112	0	
15	E2764-27DUP	^N6825	W	103	96	106	0	
16	E2847-2	^N6826	W	104	87	97	0	
17	E2847-3	^N6827	W	107	95	102	0	
18	E2764-20	^N6828	W	102	109	124 *	1	
19	E2764-21	^N6829	W	106	110	115 *	1	
20	E2764-22	^N6830	W	104	87	102	0	

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT
c - SAMPLE RE-ANALYZED

COMMENTS : _____

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN068 BATCH DATE : 04/21/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	TOT OUT	Q
01	MB-VN068	^N6833	W	104	88	97	0	
02	E2790-2	^N6834	W	101	97	94	0	
03	E2791-2	^N6835	W	99	91	100	0	
04	E2788-8	^N6836	W	98	93	98	0	
05	E2788-5	^N6837	W	104	99	98	0	
06	E2791-1	^N6838	W	102	104	112	0	
07	E2843-10MS	^N6839	W	99	101	104	0	
08	E2843-10MSD	^N6840	W	102	100	99	0	
09	BLANKSPIKE	^N6841	W	99	100	102	0	
10	E2843-10	^N6842	W	103	96	105	0	
11	E2843-10DUP	^N6843	W	105	94	103	0	
12	E2843-11	^N6844	W	102	97	108	0	
13	E2843-12	^N6845	W	101	91	99	0	
14	E2844-11	^N6846	W	107	87	102	0	
15	E2844-12	^N6847	W	105	92	102	0	
16	E2936-1	^N6848	W	96	104	103	0	
17	E2844-1	^N6849	W	110	95	101	0	
18	E2844-2	^N6850	W	99	115	105	0	
19	E2844-3	^N6851	W	104	100	101	0	
20	E2844-4	^N6852	W	102	114	114	0	

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN068 BATCH DATE : 04/21/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	TOT OUT	Q
01	E2844-5	^N6853	W	101	98	104	0	
02	E2844-6	^N6854	W	90	98	85	0	
03	E2844-7	^N6855	W	105	101	98	0	
04	E2844-8	^N6856	W	101	91	105	0	
05	E2843-8	^N6857	W	105	86	114	0	
06	E2843-9	^N6858	W	107	86	111	0	
07	E2843-9DUP	^N6859	W	104	87	111	0	
08	E2844-10	^N6860	W	105	102	101	0	
09	E2844-9	^N6861	W	98	102	111	0	
10	E2843-7	^N6862	W	99	92	112	0	
11	E2843-6	^N6863	W	101	103	112	0	
12	E2843-4	^N6864	W	103	93	103	0	
13	E2843-3	^N6865	W	104	104	102	0	
14	E2843-1	^N6866	W	104	114	106	0	
15	E2843-5	^N6867	W	101	90	111	0	
16	E2843-2	^N6868	W	98	99	113	0	
17								
18								
19								
20								

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT
c - SAMPLE RE-ANALYZED

COMMENTS : _____

VOLATILE SURROGATE RECOVERY SUMMARY

LAB NAME : ACCUTEST LABORATORIES

BATCH ID : VN081 BATCH DATE : 05/11/95

	LAB SAMPLE NO	DATA FILE	MATRIX	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	TOT OUT	Q
01	E2788-6	VN7390	W	87 *	129 *	102	2	
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

	WATER QC LIMITS	SOIL QC LIMITS
S1 (TOL) = TOLUENE-D8 (SUR)	(88 -110)	(81 -117)
S2 (BFB) = 4-BROMOFLUOROBENZENE (SUR	(86 -115)	(74 -121)
S3 (DCE) = 1,2-DICHLOROETHANE-D4 (SU	(76 -114)	(70 -121)

MATRIX = Soil(S), Water(W)

Column to be used to flag recovery values
* Values outside of contract required QC limits

QUALIFIERS (Q)

a - SURROGATE RECOVERY(S) OUT DUE TO MATRIX INTERFERENCE VERIFIED BY REANALYSIS
b - SURROGATE DILUTED OUT
c - SAMPLE RE-ANALYZED

COMMENTS : _____

Volatile Spike/Spike Duplicate Recoveries

Analysis Date : 04/19/95
Instrument ID : N
Matrix : Water
Reporting units: ug/L

MS File : >N6756
MSD File: >N6757

Page: 1

The following QC data pertains to Lab Sample Numbers:
E2787-5, E2736-8, E2764-16, E2764-17, E2764-22, E2764-24, E2764-20, E2764-21, E2764-26, E2
E2781-2, E2781-2DUP, E2847-1, E2791-3, E2790-2, E2791-2, E2788-9, E2788-3, E2788-1, E2788-2.

Compounds	Sample Result	Conc Added	Conc MS	% Rec#	Conc MSD	% Rec#	RPD#	QC Limits RPD	QC Limits Rec
BENZENE	0	20	20	99	22	108	9	nd	37-151
ETHYLBENZENE	0	20	20	102	21	106	4	nd	37-162
TOLUENE	0	20	20	100	21	106	6	nd	47-150
o-XYLENE	0	20	19	95	21	107	12	nd	nd- nd
m,p-XYLENE	0	40	43	108	46	116	7	nd	nd- nd
METHYL TERT BUTYL ETHER	10	20	33	118	34	120	2	nd	nd- nd
DI-ISOPROPYL ETHER	0	20	21	107	23	114	6	nd	nd- nd
NAPHTHALENE	0	20	19	93	23	115	21	nd	50-150
TERTIARY BUTYL ALCOHOL	0	400	684	171	734	184	7	nd	nd- nd
CHLOROBENZENE	0	20	19	96	21	103	7	nd	37-160
1,2-DICHLOROBENZENE	0	20	21	103	22	110	7	nd	18-190
1,3-DICHLOROBENZENE	0	20	19	93	19	96	4	nd	59-156
1,4-DICHLOROBENZENE	0	20	20	98	21	103	5	nd	18-190

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits.

D = Detected (Result > 0) nd = QC Limits yet to be determined

COMMENTS: _____

Volatile Blank Spike Recoveries

Analysis Date : 04/19/95 BS File : >N6758
Instrument ID : N
Matrix : Water
Reporting units: ug/L

The following QC data pertains to Lab Sample Numbers:

E2788-9, 3, 12

Compounds	Sample Result	Conc Added	Conc MS	% Rec#	QC Limits Rec
BENZENE	0	20	20	99	37-151
ETHYLBENZENE	0	20	20	99	37-162
TOLUENE	0	20	20	102	47-150
o-XYLENE	0	20	20	101	nd- nd
m,p-XYLENE	0	40	43	107	nd- nd
METHYL TERT BUTYL ETHER	0	20	21	104	nd- nd
DI-ISOPROPYL ETHER	0	20	23	114	nd- nd
NAPHTHALENE	0	20	27	133	50-150
TERTIARY BUTYL ALCOHOL	0	400	573	143	nd- nd
CHLOROBENZENE	0	20	20	99	37-160
1,2-DICHLOROBENZENE	0	20	20	101	18-190
1,3-DICHLOROBENZENE	0	20	24	121	59-156
1,4-DICHLOROBENZENE	0	20	21	105	18-190

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits.

D = Detected (Result > 0) nd = QC Limits yet to be determined

Volatile Spike/Spike Duplicate Recoveries

Analysis Date : 04/20/95
Instrument ID : N
Matrix : Water
Reporting units: ug/L

MS File : >N6802
MSD File: >N6803

Page: 1

E2764-21, E2764-22
The following QC data pertains to Lab Sample Numbers:

E2788-6, E2788-7, E2788-4, E2781-1, E2790-1, E2764-27, E2764-27DUP, E2764-20, E2788

Compounds	Sample Result	Conc Added	Conc MS	% Rec#	Conc MSD	% Rec#	RPD#	QC Limits RPD	QC Limits Rec
BENZENE	0	20	22	110	22	108	2	nd	37-151
ETHYLBENZENE	0	20	22	111	21	106	5	nd	37-162
TOLUENE	0	20	22	109	21	106	2	nd	47-150
o-XYLENE	0	20	22	109	21	107	2	nd	ind- nd
m,p-XYLENE	0	40	46	116	46	115	1	nd	ind- nd
METHYL TERT BUTYL ETHER	0	20	21	104	20	99	6	nd	ind- nd
DI-ISOPROPYL ETHER	0	20	24	121	22	111	9	nd	ind- nd
NAPHTHALENE	0	20	10	52	16	78	39	nd	50-150
TERTIARY BUTYL ALCOHOL	0	400	1208	302	1049	262	14	nd	ind- nd
CHLOROBENZENE	0	20	22	110	22	108	2	nd	37-160
1,2-DICHLOROBENZENE	0	20	24	122	21	104	15	nd	18-190
1,3-DICHLOROBENZENE	0	20	20	101	20	102	1	nd	59-156
1,4-DICHLOROBENZENE	0	20	21	104	21	106	2	nd	18-190

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits.

D = Detected (Result > 0) nd = QC Limits yet to be determined

COMMENTS:

Volatile Blank Spike Recoveries

Analysis Date : 04/20/95 BS File : >N6804
Instrument ID : N
Matrix : Water
Reporting units: ug/L Page: 1

The following QC data pertains to Lab Sample Numbers:
E2788-6,7,4,5

Compounds	Sample Result	Conc Added	Conc MS	% Rec#	QC Limits Rec
BENZENE	0	20	21	106	37-151
ETHYLBENZENE	0	20	21	105	37-162
TOLUENE	0	20	20	102	47-150
o-XYLENE	0	20	21	105	nd- nd
m,p-XYLENE	0	40	44	111	nd- nd
METHYL TERT BUTYL ETHER	0	20	21	105	nd- nd
DI-ISOPROPYL ETHER	0	20	23	117	nd- nd
NAPHTHALENE	0	20	12	59	50-150
TERTIARY BUTYL ALCOHOL	0	400	494	123	nd- nd
CHLOROBENZENE	0	20	22	109	37-160
1,2-DICHLOROBENZENE	0	20	22	109	18-190
1,3-DICHLOROBENZENE	0	20	18	90	59-156
1,4-DICHLOROBENZENE	0	20	19	94	18-190

Column to be used to flag recovery and RPD values with an asterisk.

* Values outside of QC limits.

845030438

D = Detected (Result > 0) nd = QC Limits yet to be determined

COMMENTS:

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N6753::D4 Date Analyzed: 04/19/95

Instrument ID: N core Time Analyzed: 11:10

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

	IS 1 AREA	#	RT	IS 2 AREA	#	RT	IS 3 AREA	#	RT
12 Hour Std	17434		6.88	71614		7.80	57834		11.24
UPPER LIMIT	34868			143228			115668		
LOWER LIMIT	8717			35807			28917		
SAMPLE NO									
1 MB-UN066	13162		6.87	65383		7.79	49820		11.25
2 E2736-7MS	14441		6.87	62598		7.81	49276		11.23
3 E2736-7MSD	11162		6.90	56969		7.82	47051		11.26
4 BLANK SPIK	13935		6.88	58717		7.82	48730		11.26
5 E2736-7	14004		6.90	59866		7.82	48387		11.26
6 E2736-6	14580		6.92	61419		7.82	51250		11.26
7 E2736-8	11895		6.90	57642		7.82	47506		11.26
8 BLANK SPIKE	12523		6.90	57195		7.84	48772		11.26
9 BLANK	0	*	0.00	0	*	0.00	0	*	0.00
10 E2764-16	13178		6.90	57137		7.82	43260		11.26
11 E2764-17	12938		6.90	56620		7.82	45955		11.26
12 E2764-22	11944		6.89	54768		7.81	43308		11.25
13 E2764-23	13776		6.90	60110		7.82	46553		11.26
14 E2764-24	12616		6.90	56302		7.82	42630		11.26
15 E2764-20	13659		6.90	59508		7.80	49122		11.24
16 E2764-21	13551		6.93	62881		7.81	48050		11.25
17 E2764-26	14423		6.90	61376		7.80	47881		11.24
18 E2764-25	11471		6.90	46078		7.80	38130		11.24
19 E2764-25DUP	11731		6.90	52338		7.80	42259		11.24
20 E2764-18	13474		6.88	63419		7.79	48917		11.25

IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N6753::D4 Date Analyzed: 04/19/95

Instrument ID: N core Time Analyzed: 11:10

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

	IS 1 AREA	#	RT	IS 2 AREA	#	RT	IS 3 AREA	#	RT
12 Hour Std	17434		6.88	71614		7.80	57834		11.24
UPPER LIMIT	34868			143228			115668		
LOWER LIMIT	8717			35807			28917		
SAMPLE NO									
1 E2764-19	12177		6.88	56301		7.80	43010		11.26
2 E2764-27	13378		6.88	61593		7.80	48023		11.26
3 E2764-28	14129		6.89	64950		7.81	49943		11.25
4 E2764-29	13521		6.87	58375		7.80	46530		11.24
5 E2764-30	13216		6.88	63171		7.80	50699		11.24
6 E2723-1	16376		6.86	72376		7.80	58907		11.24
7 E2787-3	13446		6.87	57717		7.80	46722		11.24
8 E2787-4	14640		6.88	66444		7.82	54052		11.24
9 E2787-1	13139		6.88	59239		7.80	47045		11.24
10 E2787-2	13873		6.88	67224		7.81	55244		11.23
11 E2787-5	12565		6.87	58354		7.79	44257		11.23
12 E2787-5MS	16063		6.88	67421		7.80	54278		11.24
13 E2787-5MSD	14311		6.88	62865		7.78	51083		11.24
14									
15									
16									
17									
18									
19									
20									

IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

845030440

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N6789::D4 Date Analyzed: 04/20/95

Instrument ID: N core Time Analyzed: 09:44

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

	IS 1 AREA	#	IS 1 RT	IS 2 AREA	#	IS 2 RT	IS 3 AREA	#	IS 3 RT
12 Hour Std	16268		6.90	74104		7.80	58042		11.24
UPPER LIMIT	32536			148208			116084		
LOWER LIMIT	8134			37052			29021		
SAMPLE NO									
1 MB-VN067	13269		6.86	66208		7.78	48488		11.22
2 E2787-5	17456		6.86	77812		7.78	58494		11.23
3 E2736-8	14188		6.88	64716		7.80	53082		11.24
4 E2764-16	13910		6.88	62714		7.80	49844		11.24
5 E2764-17	12327		6.88	57274		7.80	47667		11.24
6 E2764-22	13318		6.88	58861		7.80	46507		11.24
7 E2764-24	12236		6.89	53917		7.80	42796		11.25
8 E2764-20	13488		6.88	61377		7.82	50934		11.24
9 E2764-21	14936		6.89	68452		7.81	53888		11.23
10 E2764-26	13707		6.89	67332		7.81	56301		11.24
11 E2764-28	13865		6.89	65027		7.81	50369		11.25
12 E2781-2MS	13693		6.87	61382		7.79	48190		11.23
13 E2781-2MSD	13755		6.88	61997		7.79	49281		11.25
14 BLANK SPIK	14106		6.88	60136		7.82	49754		11.23
15 E2781-2	14443		6.88	65549		7.80	51038		11.25
16 E2781-2DUP	14585		6.88	67394		7.79	53723		11.25
17 E2847-1	13977		6.88	61702		7.80	51085		11.24
18 E2791-3	15333		6.88	65946		7.80	53356		11.23
19 BLANK	0	*	0.00	0	*	0.00	0	*	0.00
20 E2790-2	13223		6.86	56205		7.80	45029		11.24

IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N6789::D4 Date Analyzed: 04/20/95

Instrument ID: N core Time Analyzed: 09:44

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

	IS 1 AREA	#	RT	IS 2 AREA	#	RT	IS 3 AREA	#	RT
12 Hour Std	16268		6.90	74104		7.80	58042		11.24
UPPER LIMIT	32536			148208			116084		
LOWER LIMIT	8134			37052			29021		
SAMPLE NO									
1 E2791-2	11695		6.76	29951	*	7.64	63554		11.24
2 E2788-9	15701		6.88	64434		7.80	54169		11.23
3 E2788-3	14296		6.88	65794		7.79	49117		11.23
4 E2788-1	15394		6.89	68293		7.78	55556		11.22
5 E2788-2	12513		6.88	58423		7.80	49776		11.24
6 E2788-8	14487		6.85	60451		7.78	46679		11.24
7 E2788-6	13420		6.77	37478		7.59	64096		11.13
8 E2788-5	12600		6.90	51198		7.80	39012		11.24
9 E2788-7	11629		6.88	53139		7.79	43552		11.23
10 E2788-4	13852		6.88	69075		7.80	55188		11.24
11 E2781-1	13448		6.87	63501		7.79	52474		11.25
12 E2791-1	13885		6.88	67500		7.80	52404		11.24
13 E2790-1	12357		6.87	53258		7.79	40178		11.25
14 E2764-27	13166		6.88	61404		7.80	49057		11.24
15 E2764-27DUP	13639		6.90	64727		7.80	51154		11.24
16 E2847-2	13488		6.88	59266		7.80	44519		11.24
17 E2847-3	13130		6.88	57881		7.80	43082		11.23
18 E2764-20	12230		6.88	61902		7.80	52072		11.24
19 E2764-21	12695		6.88	62768		7.80	47802		11.23
20 E2764-22	13296		6.89	62640		7.81	47487		11.24

IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N6832::04 Date Analyzed: 04/21/95

Instrument ID: N core Time Analyzed: 11:10

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

	IS 1 AREA	#	IS 1 RT	IS 2 AREA	#	IS 2 RT	IS 3 AREA	#	IS 3 RT
12 Hour Std	16448		6.86	78494		7.78	58891		11.22
UPPER LIMIT	32896			156988			117782		
LOWER LIMIT	8224			39247			29446		
SAMPLE NO									
1 MB-VN068	14244		6.86	62703		7.80	47341		11.24
2 E2790-2	15844		6.89	67805		7.79	52346		11.23
3 E2791-2	14310		6.87	68845		7.80	53401		11.26
4 E2788-8	14264		6.90	67803		7.82	53992		11.23
5 E2788-5	13884		6.88	66555		7.80	51661		11.24
6 E2791-1	13178		6.90	62670		7.82	51371		11.24
7 E2843-10MS	14277		6.86	65729		7.78	51011		11.24
8 E2843-10MSD	14695		6.88	63022		7.81	52020		11.23
9 BLANK SPIKE	14659		6.87	67715		7.79	54237		11.25
10 E2843-10	12610		6.87	57936		7.81	44709		11.25
11 E2843-10DUP	12939		6.87	59612		7.81	44201		11.25
12 E2843-11	13785		6.88	64695		7.80	50825		11.24
13 E2843-12	14345		6.90	63981		7.80	50665		11.26
14 E2844-11	12709		6.88	57407		7.80	43609		11.25
15 E2844-12	13655		6.90	63057		7.80	47488		11.24
16 E2936-1	14151		6.88	63095		7.80	50807		11.26
17 E2844-1	12797		6.88	59987		7.80	41082		11.24
18 E2844-2	13691		6.88	63683		7.82	50886		11.24
19 E2844-3	13848		6.87	61449		7.79	46271		11.23
20 E2844-4	12082		6.86	57272		7.78	45473		11.24

IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

VOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: ACCUTEST Laboratories Contract:_____.

Lab Code:_____ Case No:_____ SAS no:_____ SDG no:_____.

Lab File ID (Standard): >N6832::D4 Date Analyzed: 04/21/95

Instrument ID: N core Time Analyzed: 11:10

Matrix:(soil/water) WATER Level:(low/med) LOW Column:(pack/cap) PACK

		IS 1 AREA	#	RT	IS 2 AREA	#	RT	IS 3 AREA	#	RT
	12 Hour Std	16448		6.86	78494		7.78	58891		11.22
	UPPER LIMIT	32896			156988			117782		
	LOWER LIMIT	8224			39247			29446		
	SAMPLE NO									
1	E2844-5	12955		6.88	57523		7.80	46030		11.24
2	E2844-6	10374		6.82	29420	*	7.64	50451		11.24
3	E2844-7	10287		6.90	48395		7.80	37254		11.24
4	E2844-8	11472		6.88	55895		7.80	43722		11.25
5	E2843-8	10572		6.88	55214		7.80	41615		11.24
6	E2843-9	11373		6.90	55904		7.80	40400		11.26
7	E2843-9DUP	11201		6.88	55639		7.80	40316		11.25
8	E2844-10	13081		6.88	58642		7.82	47188		11.24
9	E2844-9	12019		6.89	57248		7.83	45266		11.25
10	E2843-7	11019		6.88	56257		7.80	44493		11.24
11	E2843-6	12496		6.90	61481		7.82	48429		11.24
12	E2843-4	11388		6.93	52462		7.82	42064		11.24
13	E2843-3	12784		6.91	56759		7.81	44314		11.25
14	E2843-1	10988		6.88	53505		7.80	37280		11.24
15	E2843-5	12171		6.88	57012		7.80	47847		11.24
16	E2843-2	10844		6.88	51219		7.80	42755		11.24
17										
18										
19										
20										

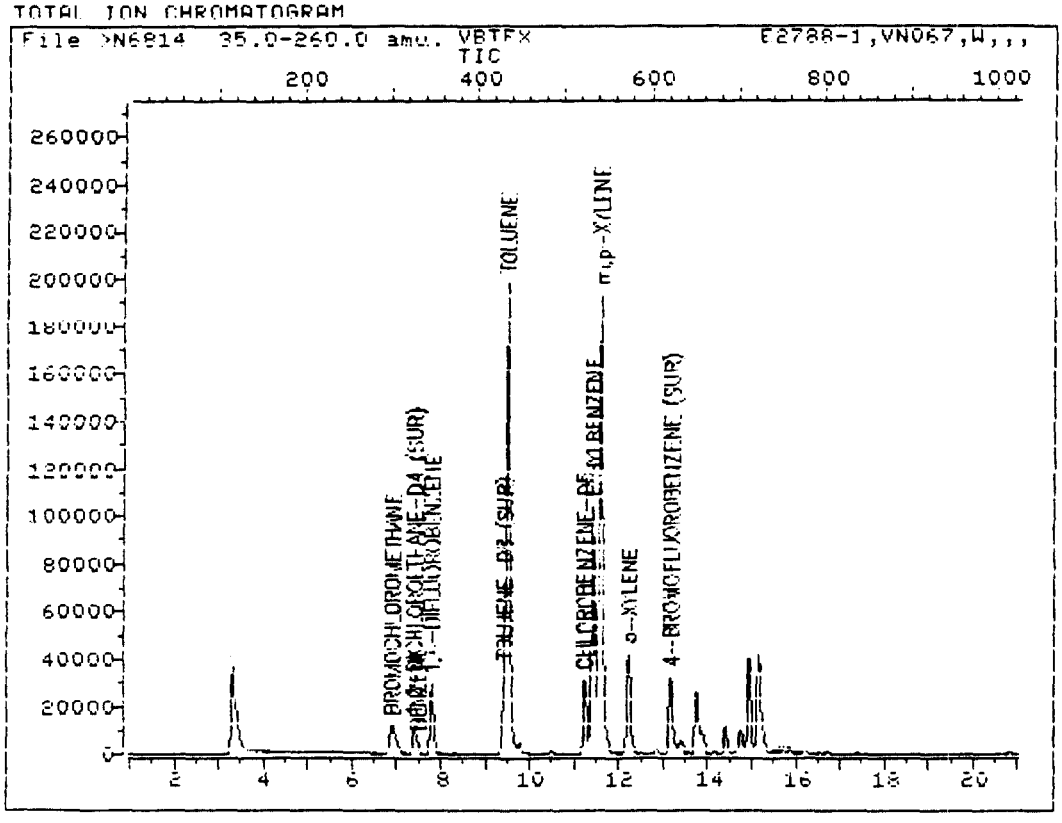
IS 1 = BROMOCHLOROMETHANE
IS 2 = 1,4-DIFLUOROBENZENE
IS 3 = CHLOROBENZENE-D5

UPPER LIMIT = +100% of internal standard area.
LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

845030444

TOTAL ION CHROMATOGRAM



Data File: >N6814::D4 Quant Output File: ^N6814::QN
Name: VBTEX
Misc: E2788-1,VN067,W,,,

Id File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950421 00:14
Injected at: 950420 23:49

QUANT REPORT

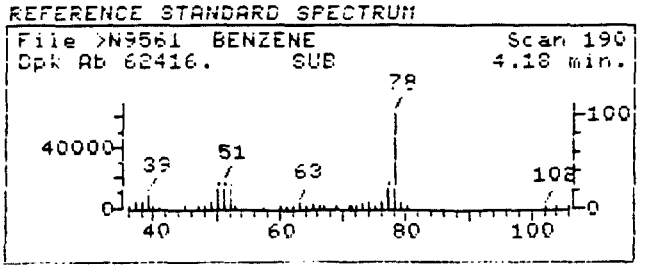
Operator ID: JKS Quant Rev: 6 Quant Time: 950421 00:14
Output File: ^N6814::QN Injected at: 950420 23:49
Data File: >N6814::D4 Dilution Factor: 5.00000
Name: VBTEX
Misc: E2788-1,VN067,W,,,

ID File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

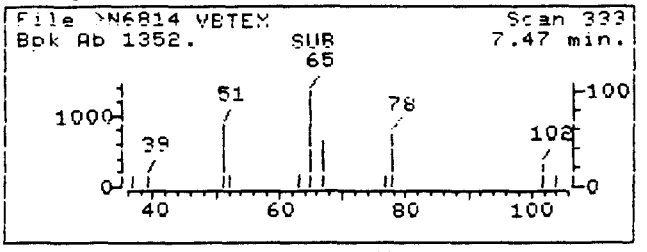
	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.89	303	15394	30.00	PPB	91
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.39	329	27900	147.80	PPB	99
5)	*1,4-DIFLUOROBENZENE	7.78	349	68293	30.00	PPB	93
7)	BENZENE	7.47	333	4106	10.26	PPB	100
9)	*CHLOROBENZENE-D5	11.22	525	55556	30.00	PPB	88
10)	TOLUENE	9.48	436	397847	858.10	PPB	97
12)	ETHYLBENZENE	11.42	535	224698	386.26	PPB	80
13)	m,p-XYLENE	11.58	543	394226	732.32	PPB	90
14)	o-XYLENE	12.22	576	95594	177.90	PPB	96
18)	4-BROMOFLUOROBENZENE (SUR)	13.16	624	43783	144.97	PPB	85
19)	TOLUENE-D8 (SUR)	9.41	432	64404	151.30	PPB	86

* Compound is ISTD

REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



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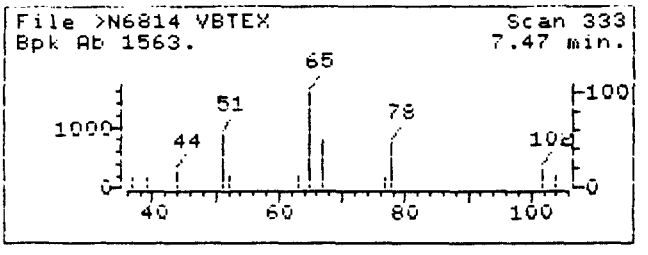
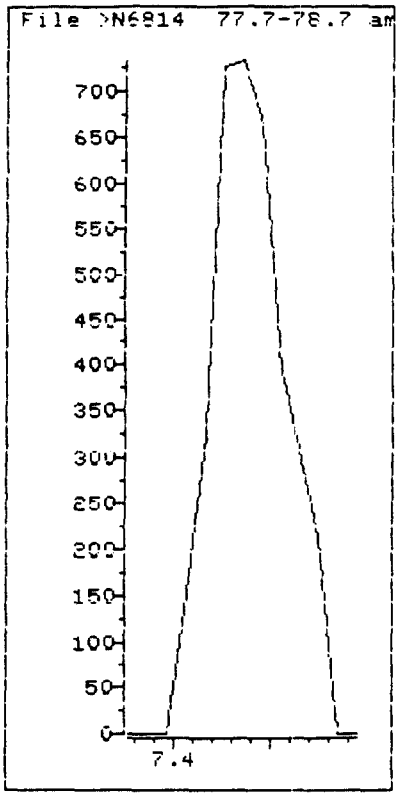




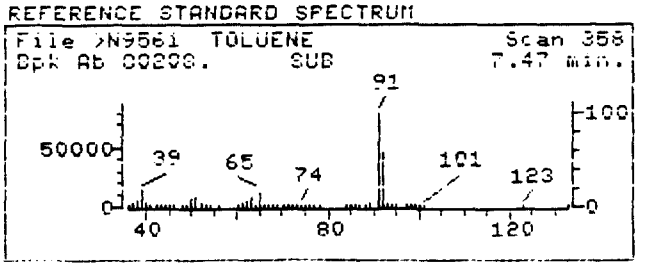
Data File: >N6814::D4
Name: VBTEX
Misc: E2788-1,VN067,W,,,
Quant Time: 950421 00:14
Injected at: 950420 23:49

Quant Output File: ^N6814::QN

Quant ID File: INU418::UT
Last Calibration: 950418 13:40

Compound No: 7
Compound Name: BENZENE
Scan Number: 333
Retention Time: 7.47 min.
Quant Ion: 78.0
Area: 4106
Concentration: 10.26 PPB
q-value: 100

REFERENCE STANDARD SPECTRUM



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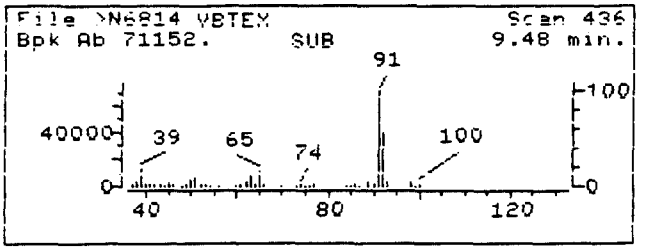

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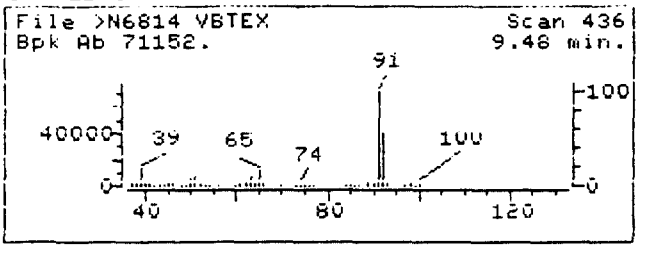
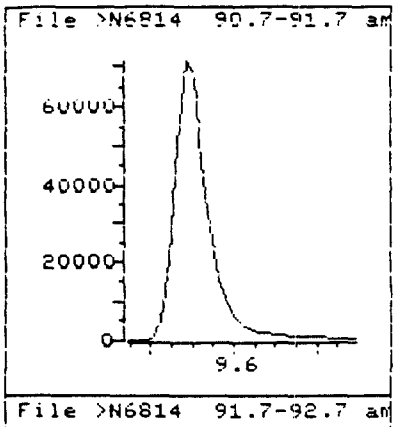
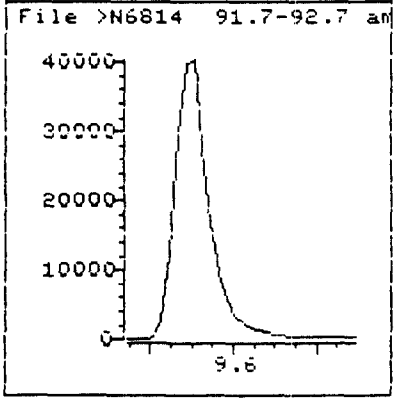






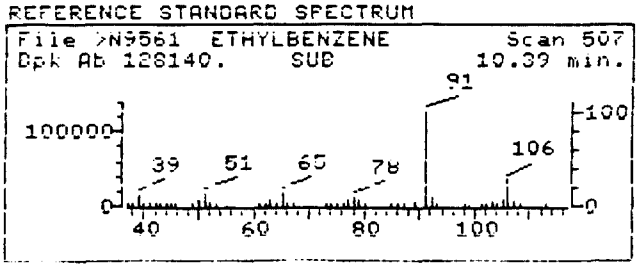
Data File: >N6814::D4
Name: VBTEX
Misc: E2788-1,VN067,W,,,
Quant Time: 950421 00:14
Injected at: 950420 23:49

Quant Output File: ^N6814::QN

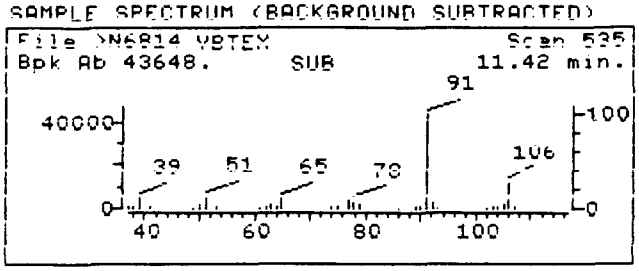
Quant ID File: INU418::UT
Last Calibration: 950418 13:40

Compound No: 10
Compound Name: TOLUENE
Scan Number: 436
Retention Time: 9.48 min.
Quant Ion: 91.0
Area: 397847
Concentration: 858.10 PPB
q-value: 97

REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



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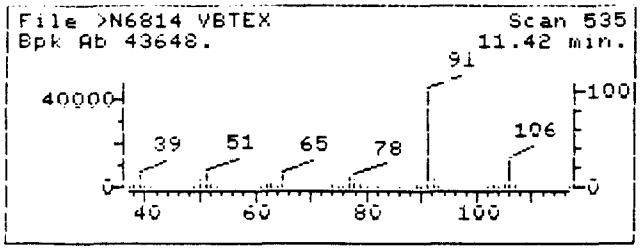
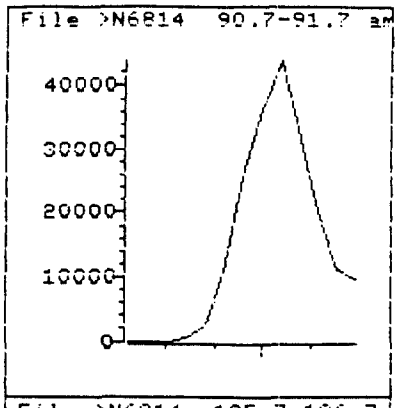
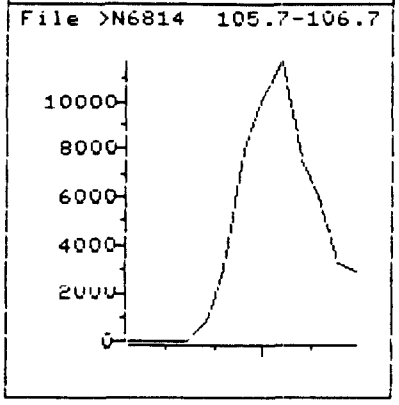






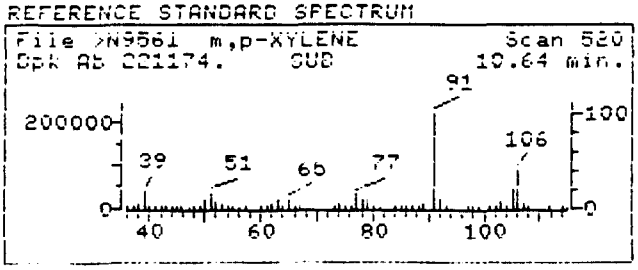
Data File: >N6814::D4
Name: VBTEX
Misc: E2788-1,VNU67,W,,,
Quant Time: 950421 00:14
Injected at: 950420 23:49

Quant Output File: ^N6814::QN

Quant ID File: INU418::UI
Last Calibration: 950418 13:40

Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 535
Retention Time: 11.42 min.
Quant Ion: 91.0
Area: 224698
Concentration: 386.26 PPB
q-value: 80

REFERENCE STANDARD SPECTRUM



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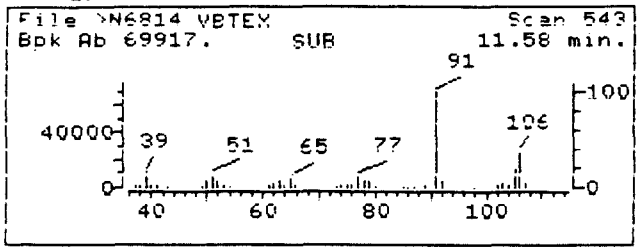

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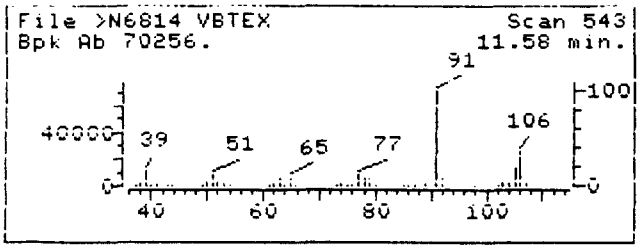
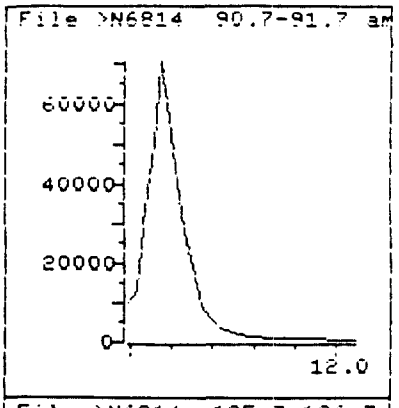
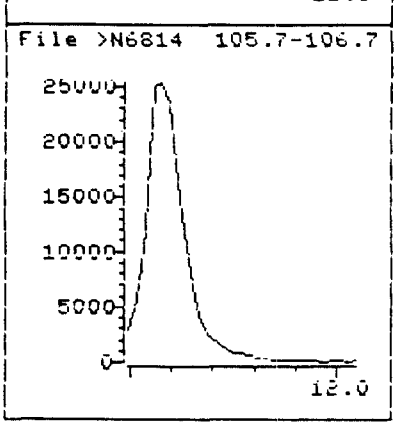






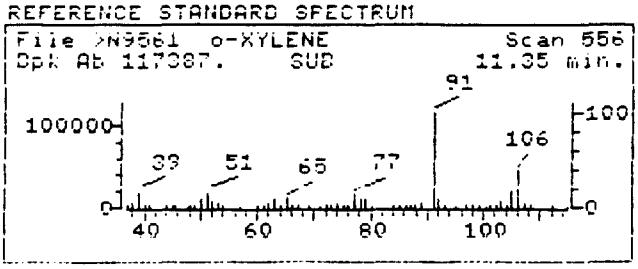
Data File: >N6814::D4
Name: VBTEX
Misc: E2788-1,VN067,W,,,
Quant Time: 950421 00:14
Injected at: 950420 23:49

Quant Output File: ^N6814::QN

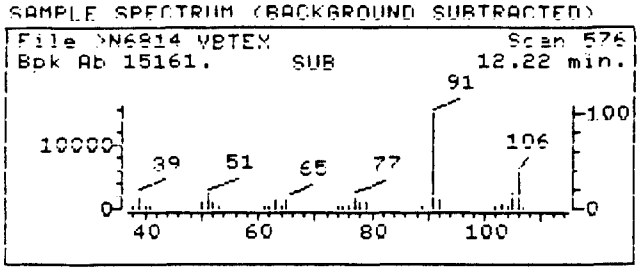
Quant ID File: !N0418::01
Last Calibration: 950418 13:40

Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 543
Retention Time: 11.58 min.
Quant Ion: 91.0
Area: 394226
Concentration: 732.32 PPB
q-value: 90

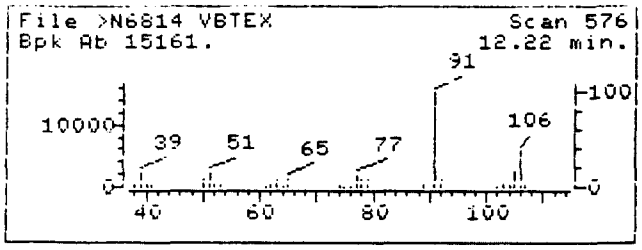
REFERENCE STANDARD SPECTRUM

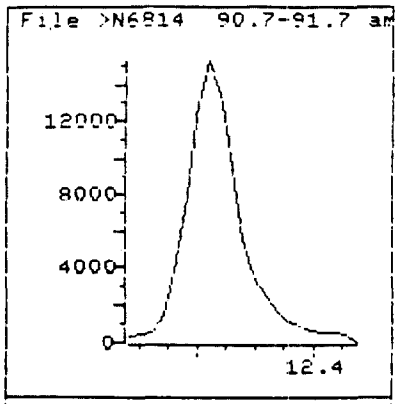


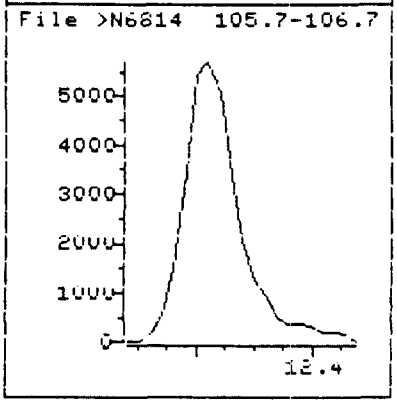
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







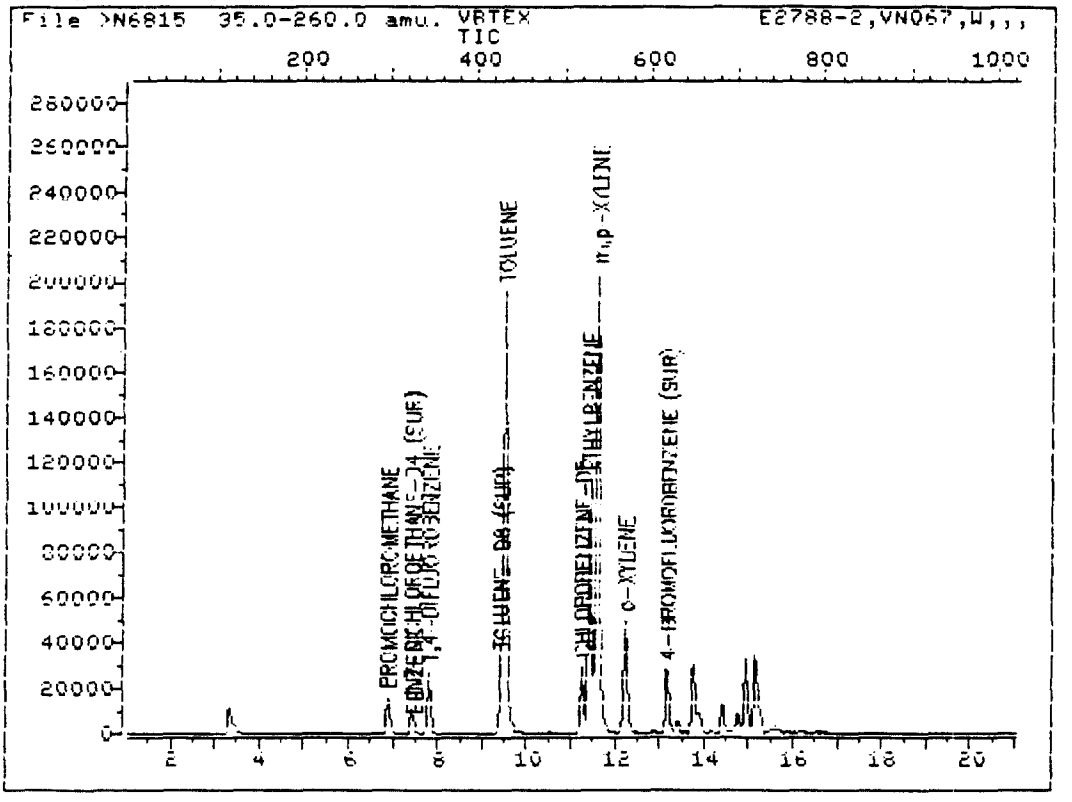
Data File: >N6814::D4
Name: VBTEX
Misc: E2788-1,VN067,W,,,
Quant Time: 950421 00:14
Injected at: 950420 23:49

Quant Output File: ^N6814::QN

Quant ID File: INU418::UI
Last Calibration: 950418 15:40

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 576
Retention Time: 12.22 min.
Quant Ion: 91.0
Area: 95594
Concentration: 177.90 PPB
q-value: 96

TOTAL ION CHROMATOGRAM



Data File: >N6815::D4 Quant Output File: ^N6815::QN
Name: VBTEX
Misc: E2788-2,VN067,W,,,

Id File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950421 00:46
Injected at: 950421 00:21

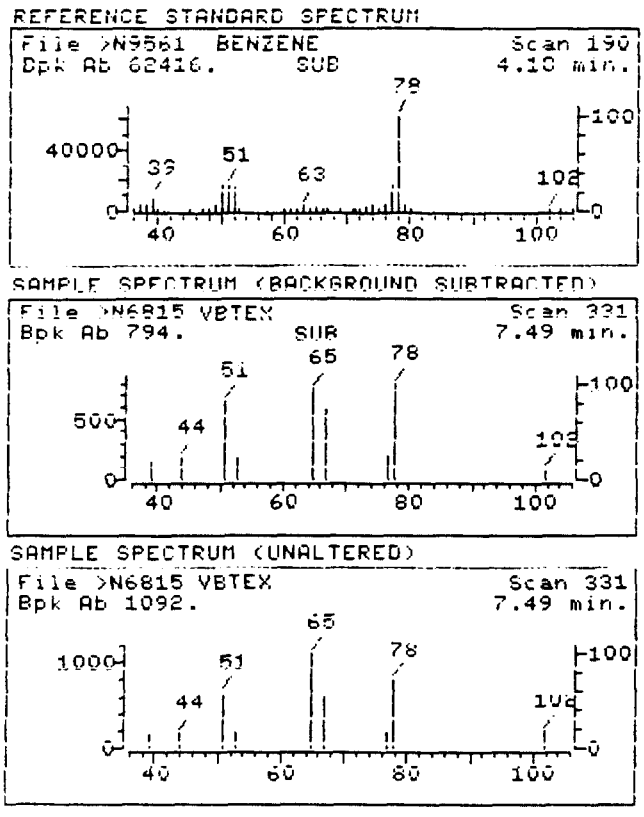
QUANT REPORT

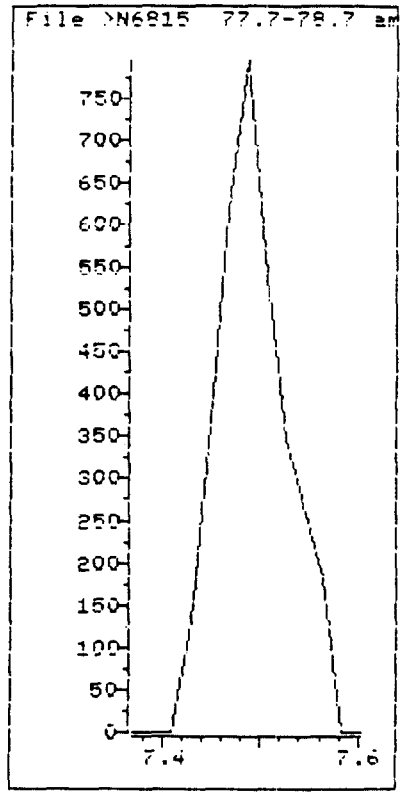
Operator ID: JKS Quant Rev: 6 Quant Time: 950421 00:46
Output File: ^N6815::QN Injected at: 950421 00:21
Data File: >N6815::D4 Dilution Factor: 5.00000
Name: VBTEX
Misc: E2788-2,VN067,W,,,

ID File: IN0418::QT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.88	300	12513	30.00	PPB	92
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.41	327	23881	155.63	PPB	99
5)	*1,4-DIFLUOROBENZENE	7.80	347	58423	30.00	PPB	96
7)	BENZENE	7.49	331	3792	11.08	PPB	100
9)	*CHLOROBENZENE-D5	11.24	523	49776	30.00	PPB	94
10)	TOLUENE	9.50	434	387983	934.00	PPB	97
12)	ETHYLBENZENE	11.41	532	230746	442.71	PPB	75
13)	m,p-XYLENE	11.59	541	417047	864.68	PPB	86
14)	o-XYLENE	12.22	573	101230	210.27	PPB	98
18)	4-BROMOFLUOROBENZENE (SUR)	13.17	622	38459	142.13	PPB	89
19)	TOLUENE-D8 (SUR)	9.42	430	55632	145.87	PPB	89

* Compound is ISTD



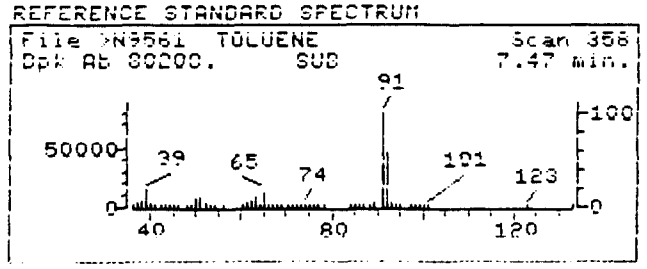


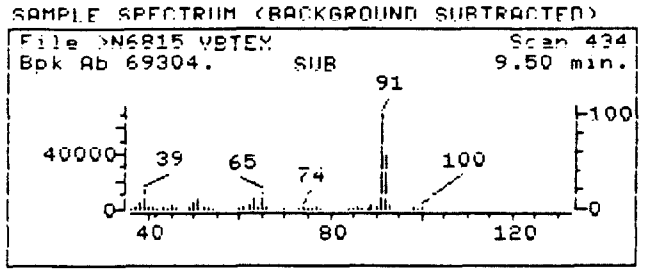
Data File: >N6815::D4
Name: VBTEX
Misc: E2788-2,VNU67,W,,,
Quant Time: 950421 00:46
Injected at: 950421 00:21

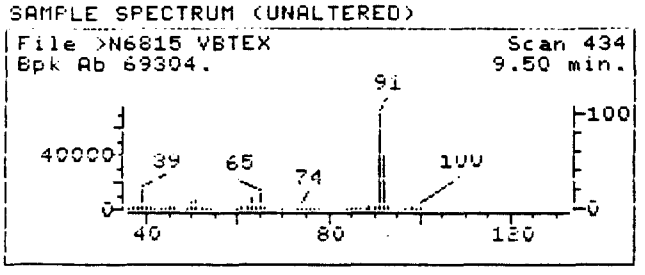
Quant Output File: ^N6815::QN

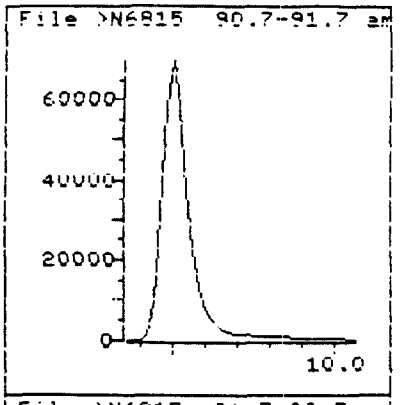
Quant ID File: INU418::UI
Last Calibration: 950418 13:40

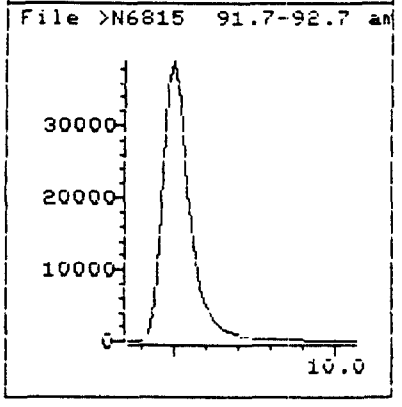
Compound No: 7
Compound Name: BENZENE
Scan Number: 331
Retention Time: 7.49 min.
Quant Ion: 78.0
Area: 3792
Concentration: 11.08 PPB
q-value: 100









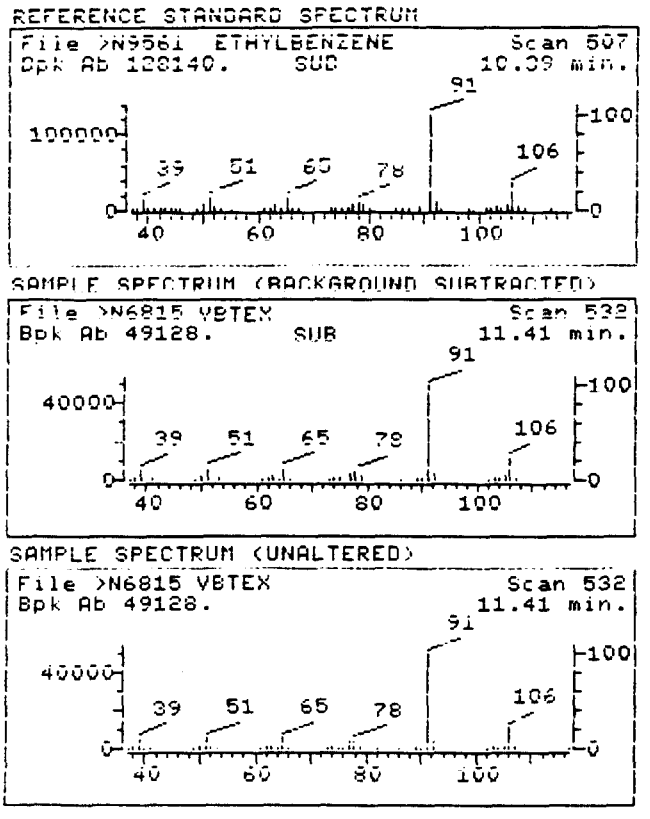


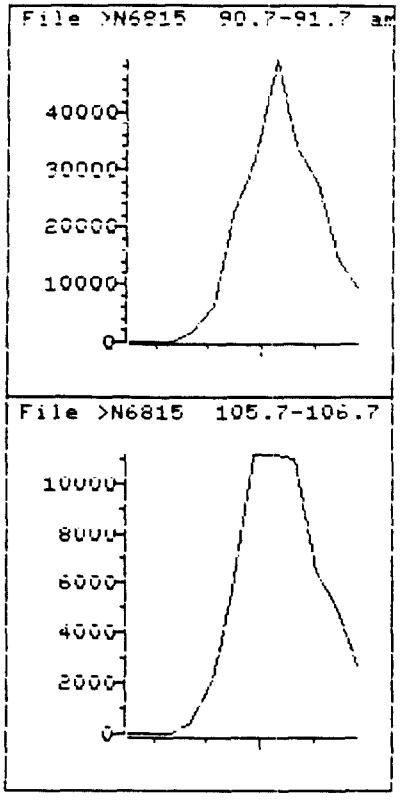
Data File: >N6815::D4
Name: VBTEX
Misc: E2788-2,VN067,W,,,
Quant Time: 950421 00:46
Injected at: 950421 00:21

Quant Output File: ^N6815::QN

Quant ID File: INU418::UI
Last Calibration: 950418 13:40

Compound No: 10
Compound Name: TOLUENE
Scan Number: 434
Retention Time: 9.50 min.
Quant Ion: 91.0
Area: 387983
Concentration: 934.00 PPB
q-value: 97





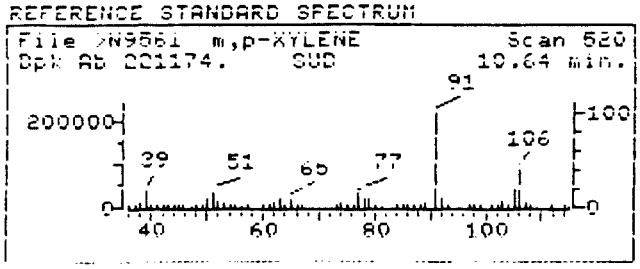
Data File: >N6815::D4
Name: VBTEX
Misc: E2788-2,VNU67,W,,,
Quant Time: 950421 00:46
Injected at: 950421 00:21

Quant Output File: ^N6815::QN

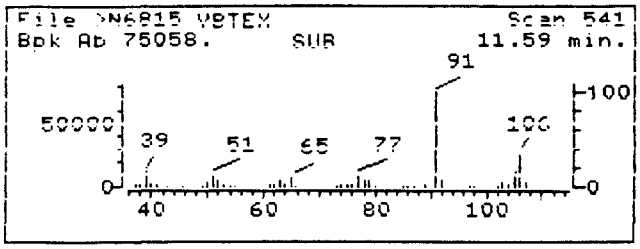
Quant ID File: INU418::UI
Last Calibration: 950418 15:40

Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 532
Retention Time: 11.41 min.
Quant Ion: 91.0
Area: 230746
Concentration: 442.71 PPB
q-Value: 73

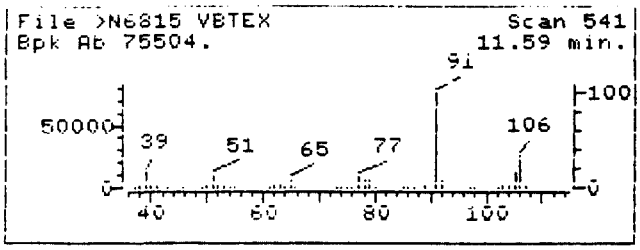
REFERENCE STANDARD SPECTRUM

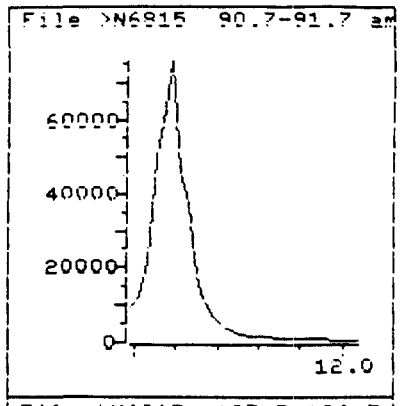


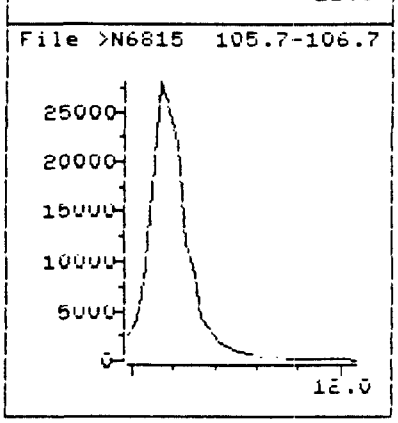
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)





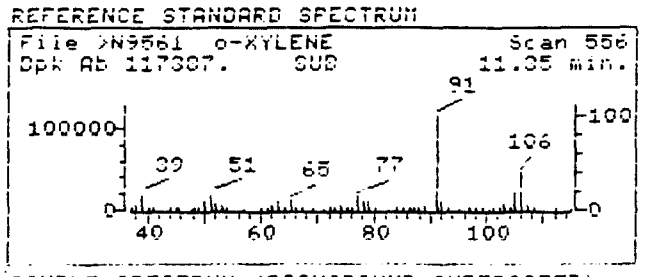


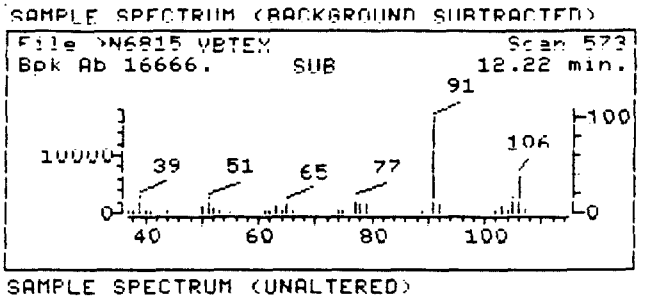
Data File: >N6815::D4
Name: VBTEX
Misc: E2788-2,VN067,W,,,
Quant Time: 950421 00:46
Injected at: 950421 00:21

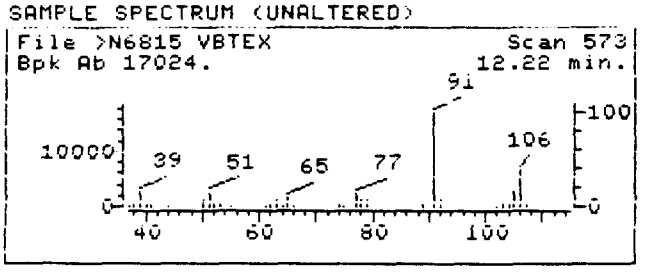
Quant Output File: ^N6815::QN

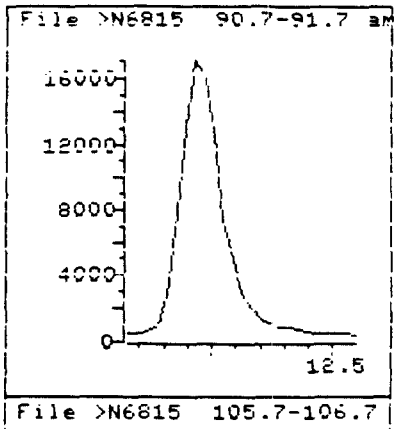
Quant ID File: INU418::U1
Last Calibration: 950418 13:40

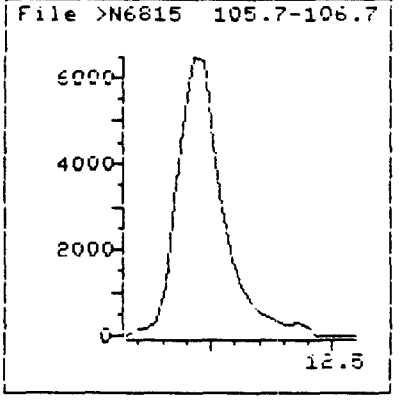
Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 541
Retention Time: 11.59 min.
Quant Ion: 91.0
Area: 417047
Concentration: 864.68 PPB
q-value: 86











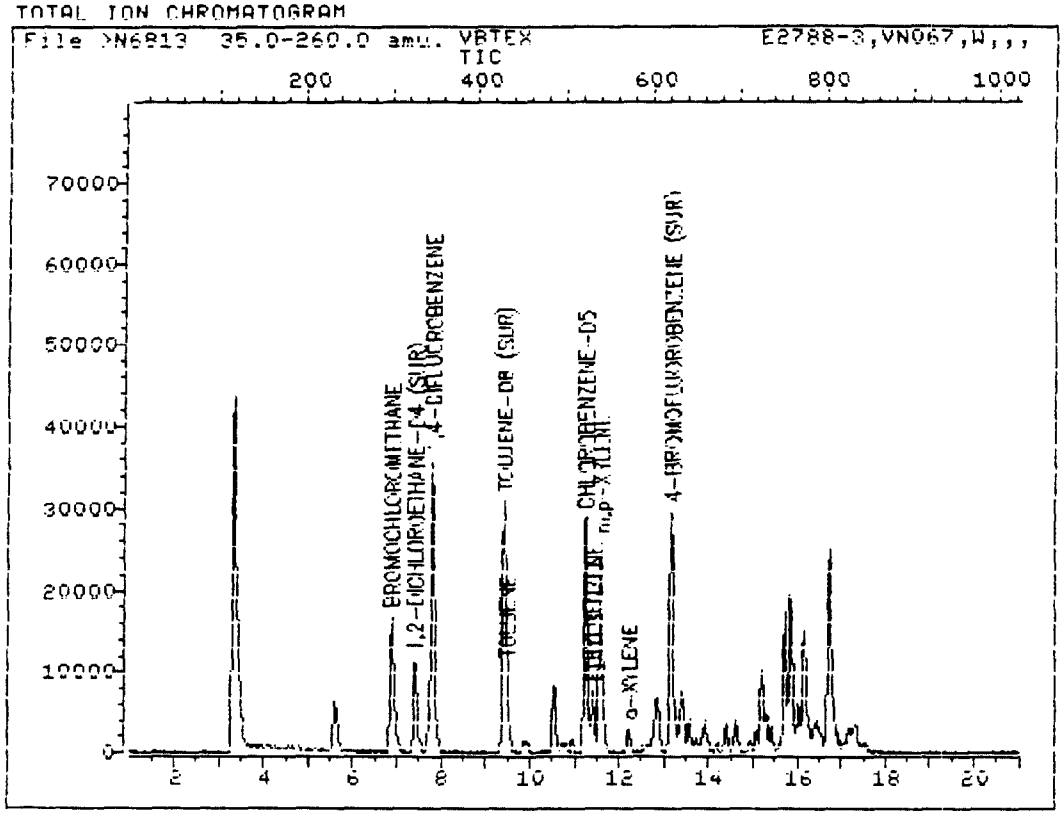
Data File: >N6815::D4
Name: VBTEX
Misc: E2788-2,VN067,W,,,
Quant Time: 950421 00:46
Injected at: 950421 00:21

Quant Output File: ^N6815::QN

Quant ID File: IN0418::01
Last Calibration: 950418 13:40

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 573
Retention Time: 12.22 min.
Quant Ion: 91.0
Area: 101230
Concentration: 210.27 PPB
q-value: 98

TOTAL ION CHROMATOGRAM



Data File: >N6813::D4 Quant Output File: ^N6813::QN
Name: VBTEX
Misc: E2788-3,VN067,W,,,

Id File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950420 23:42
Injected at: 950420 23:17

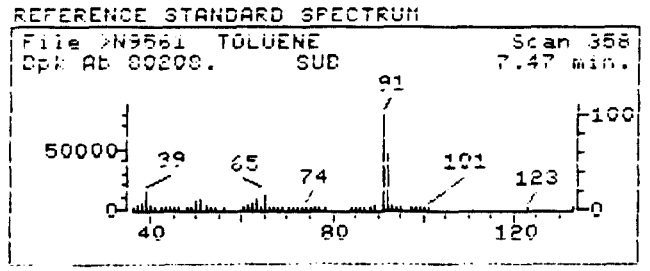
QUANT REPORT

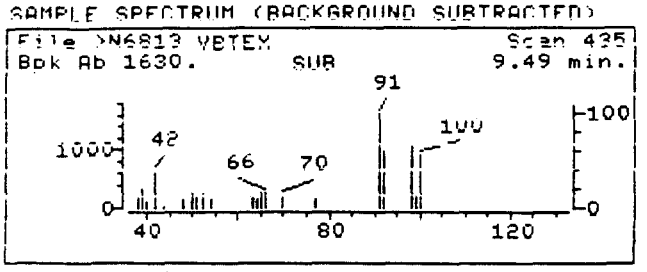
Operator ID: JKS Quant Rev: 6 Quant Time: 950420 23:42
Output File: ^N6813::QN Injected at: 950420 23:17
Data File: >N6813::D4 Dilution Factor: 1.00000
Name: VBTEX
Misc: E2788-3,VN067,W,,,

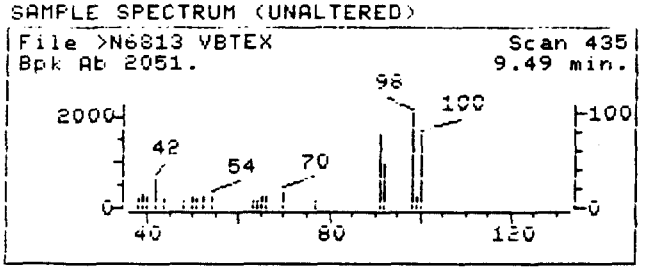
ID File: IN0418::DT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

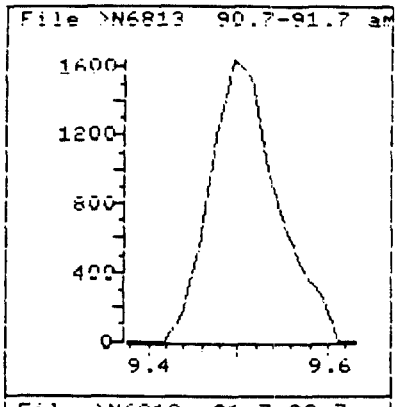
	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.88	301	14296	30.00	PPB	9
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.40	328	25679	29.30	PPB	9
5)	*1,4-DIFLUOROBENZENE	7.79	348	65794	30.00	PPB	9
9)	*CHLOROBENZENE-D5	11.23	524	49117	30.00	PPB	9
10)	TOLUENE	9.49	435	8605	4.20	PPB	9
12)	ETHYLBENZENE	11.41	533	14842	5.77	PPB	8
13)	m,p-XYLENE	11.59	542	52308	21.98	PPB	9
14)	o-XYLENE	12.23	575	7473	3.15	PPB	9
18)	4-BROMOFLUOROBENZENE (SUR)	13.17	623	39672	29.72	PPB	8
19)	TOLUENE-D8 (SUR)	9.42	431	59087	31.40	PPB	8

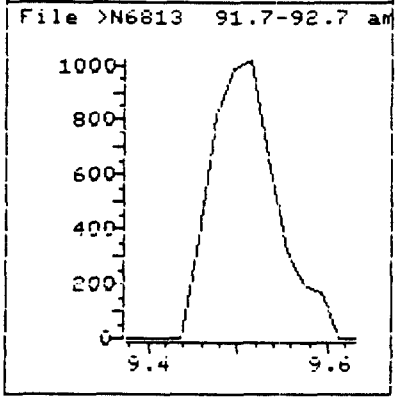
* Compound is ISTD









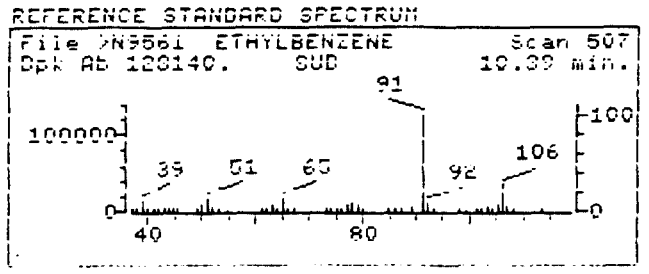


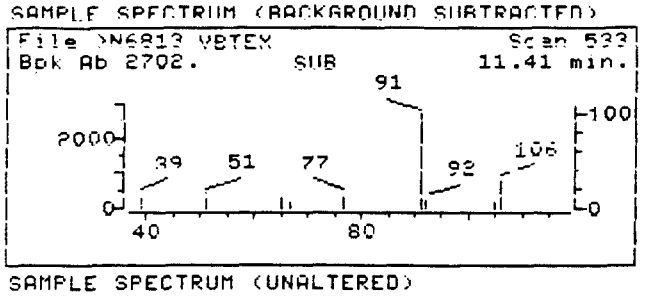
Data File: >N6813::D4
Name: VBTEX
Misc: E2788-3,VNU67,W,,,
Quant Time: 950420 23:42
Injected at: 950420 23:17

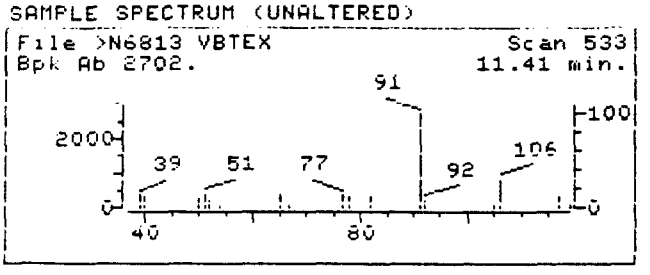
Quant Output File: ^N6813::QN

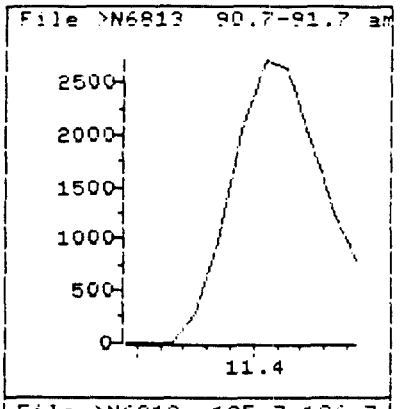
Quant ID File: INU418::UI
Last Calibration: 950418 19:40

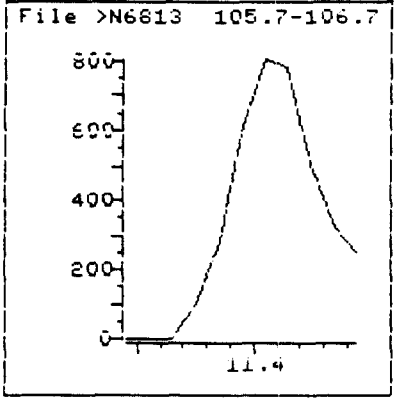
Compound No: 10
Compound Name: TOLUENE
Scan Number: 435
Retention Time: 9.49 min.
Quant Ion: 91.0
Area: 8605
Concentration: 4.20 PPB
q-value: 96









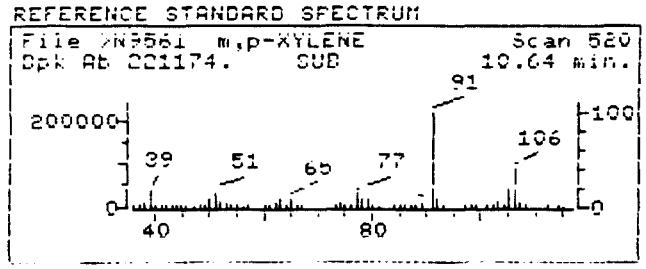


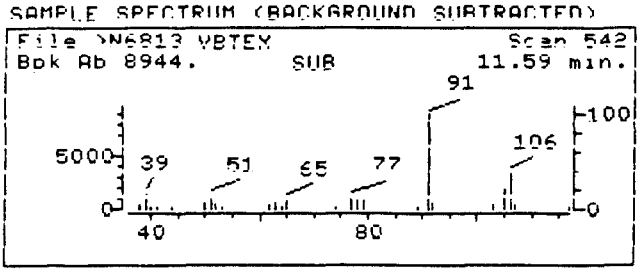
Data File: >N6813::D4
Name: VBTEX
Misc: E2788-3,VN067,W,,,
Quant Time: 950420 23:42
Injected at: 950420 23:17

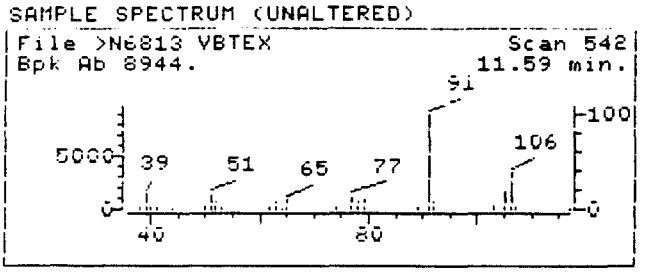
Quant Output File: >N6813::QN

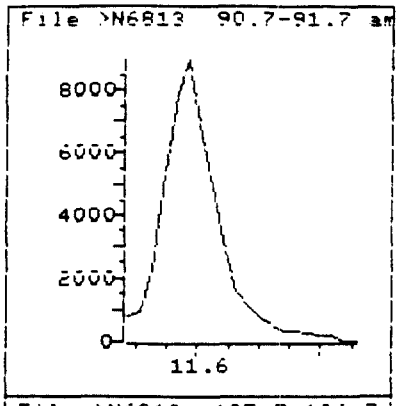
Quant ID File: IN0418::QI
Last Calibration: 950418 13:40

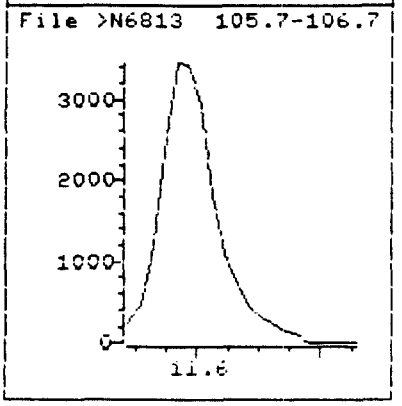
Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 533
Retention Time: 11.41 min.
Quant Ion: 91.0
Area: 14842
Concentration: 5.77 PPB
q-value: 84









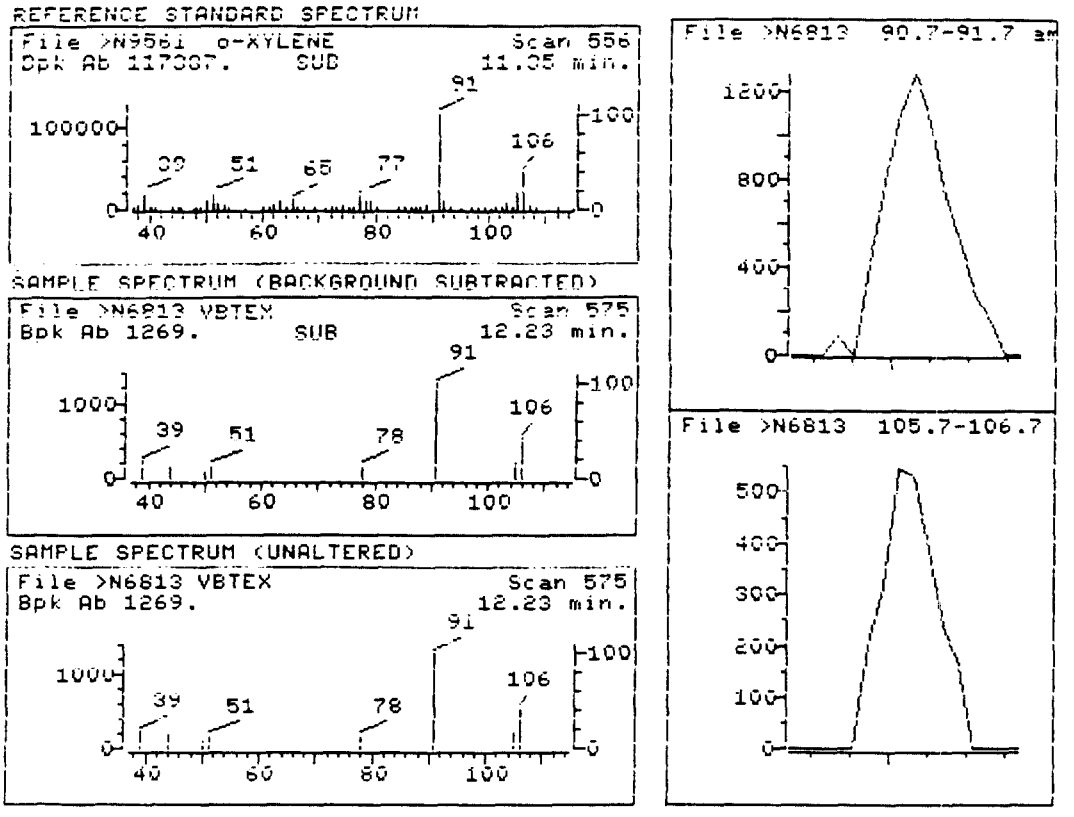


Data File: >N6813::D4
Name: VBTEX
Misc: E2788-3,VN067,W,,,
Quant Time: 950420 23:42
Injected at: 950420 23:17

Quant Output File: ^N6813::WN

Quant ID File: 1N0418::01
Last Calibration: 950418 19:40

Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 542
Retention Time: 11.59 min.
Quant Ion: 91.0
Area: 52308
Concentration: 21.98 PPB
q-value: 94



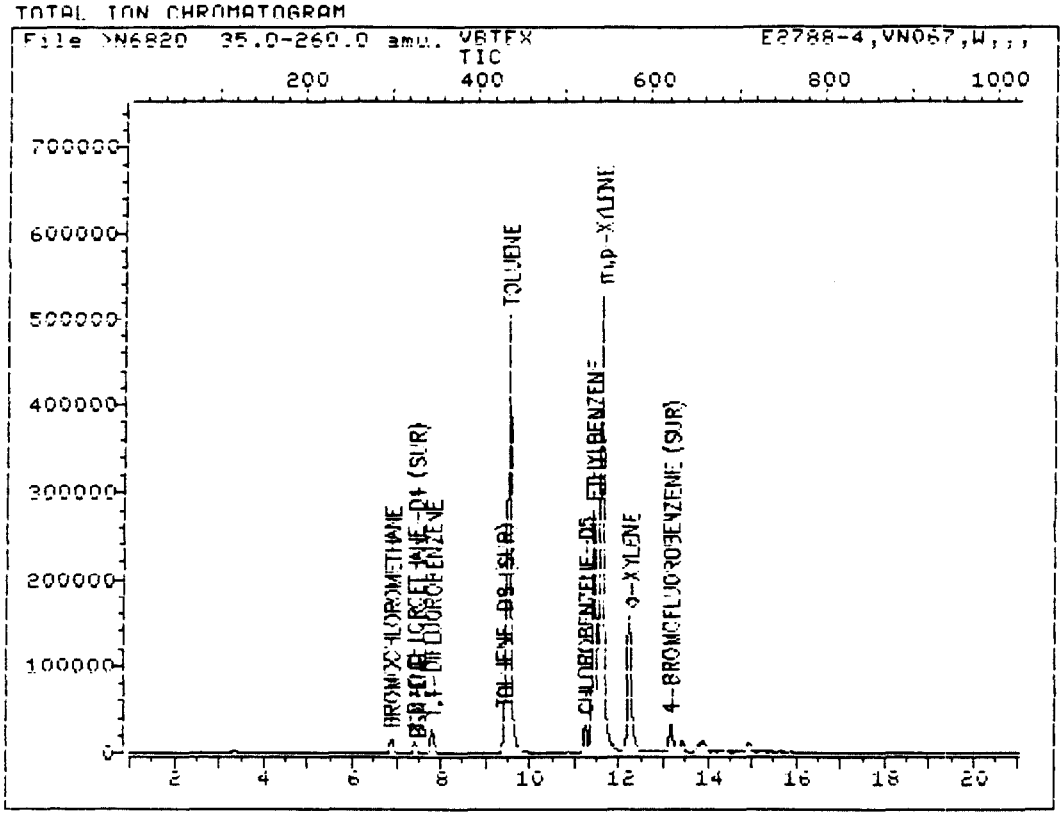
Data File: >N6813::D4
Name: VBTEX
Misc: E2788-3,VN067,W,,,
Quant Time: 950420 23:42
Injected at: 950420 23:17

Quant Output File: ^N6813::QN

Quant ID File: IN0418::UI
Last Calibration: 950418 13:40

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 575
Retention Time: 12.23 min.
Quant Ion: 91.0
Area: 7473
Concentration: 3.15 PPB
q-value: 97

TOTAL ION CHROMATOGRAM



Data File: >N6820::D4 Quant Output File: ^N6820::QN
Name: VBTEX
Misc: E2788-4,VN067,W,,,

Id File: IN0418::01
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950421 03:25
Injected at: 950421 03:00

QUANT REPORT

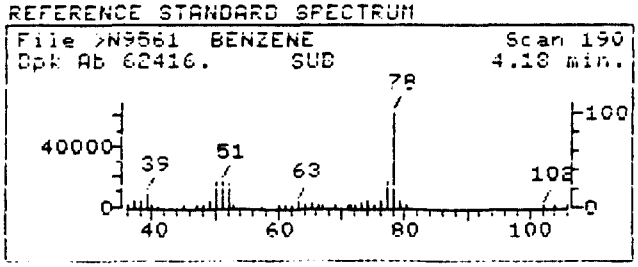
Operator ID: JKS Quant Rev: 6 Quant Time: 950421 03:25
Output File: ^N6820::QN Injected at: 950421 02:00
Data File: >N6820::D4 Dilution Factor: 200.0000
Name: VBTEX
Misc: E2788-4,VN067,W,,,

ID File: 1N0418::DT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

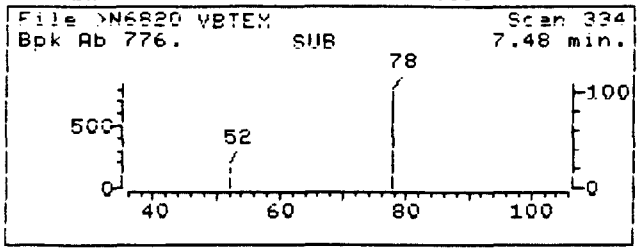
	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.88	303	13852	30.00	PPB	84
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.41	330	27012	6360.92	PPB	99
5)	*1,4-DIFLUOROBENZENE	7.80	350	69075	30.00	PPB	96
7)	BENZENE	7.48	334	5089	305.40	PPB✓	100
9)	*CHLOROBENZENE-D5	11.24	526	55188	30.00	PPB	95
10)	TOLUENE	9.50	437	1039618	90290.63	PPB✓	95
12)	ETHYLBENZENE	11.41	535	612145	42371.96	PPB✓	81
13)	m,p-XYLENE	11.59	544	1095737	81811.86	PPB✓	96
14)	o-XYLENE	12.23	577	328926	24649.08	PPB✓	98
18)	4-BROMOFLUOROBENZENE (SUR)	13.15	624	45770	6102.25	PPB	99
19)	TOLUENE-D8 (SUR)	9.42	433	63290	5987.11	PPB	80

* Compound is ISTD

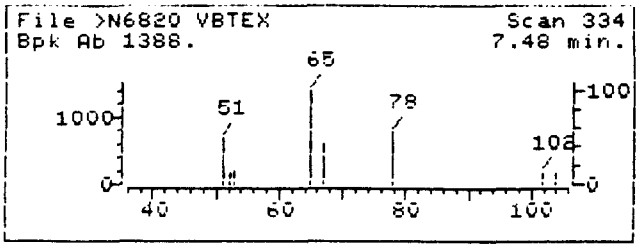
REFERENCE STANDARD SPECTRUM

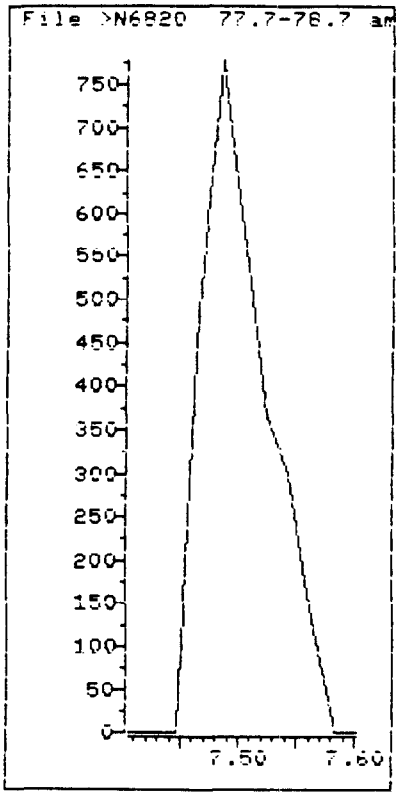


SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)





Data File: >N6820::D4
Name: VBTEX
Misc: E2788-4,VNU67,W,,,
Quant Time: 950421 03:25
Injected at: 950421 03:00

Quant Output File: ^N6820::QN

Quant ID File: INU418::UI
Last Calibration: 950418 15:40

Compound No: 7
Compound Name: BENZENE
Scan Number: 334
Retention Time: 7.48 min.
Quant Ion: 78.0
Area: 3089
Concentration: 305.40 PPB
q-value: 100

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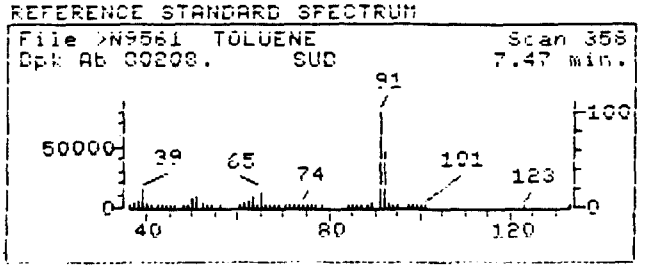
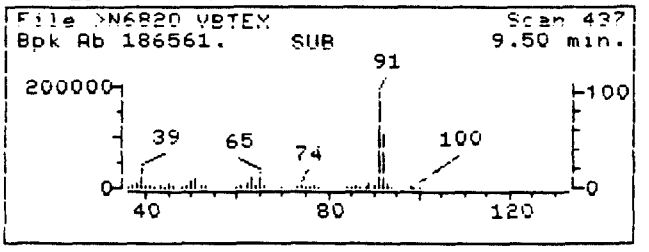
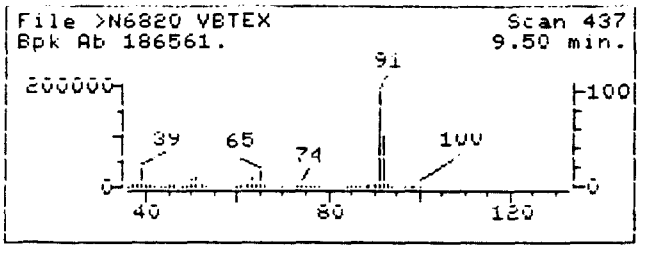
REFERENCE STANDARD SPECTRUM

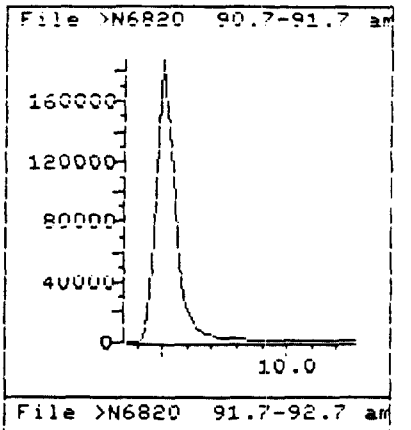


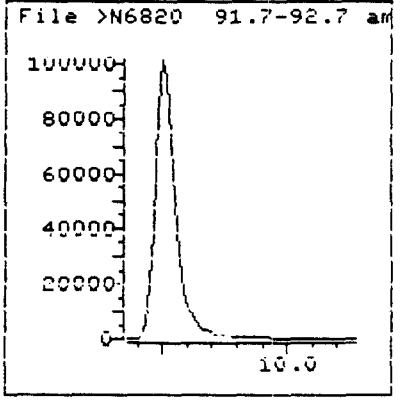
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)





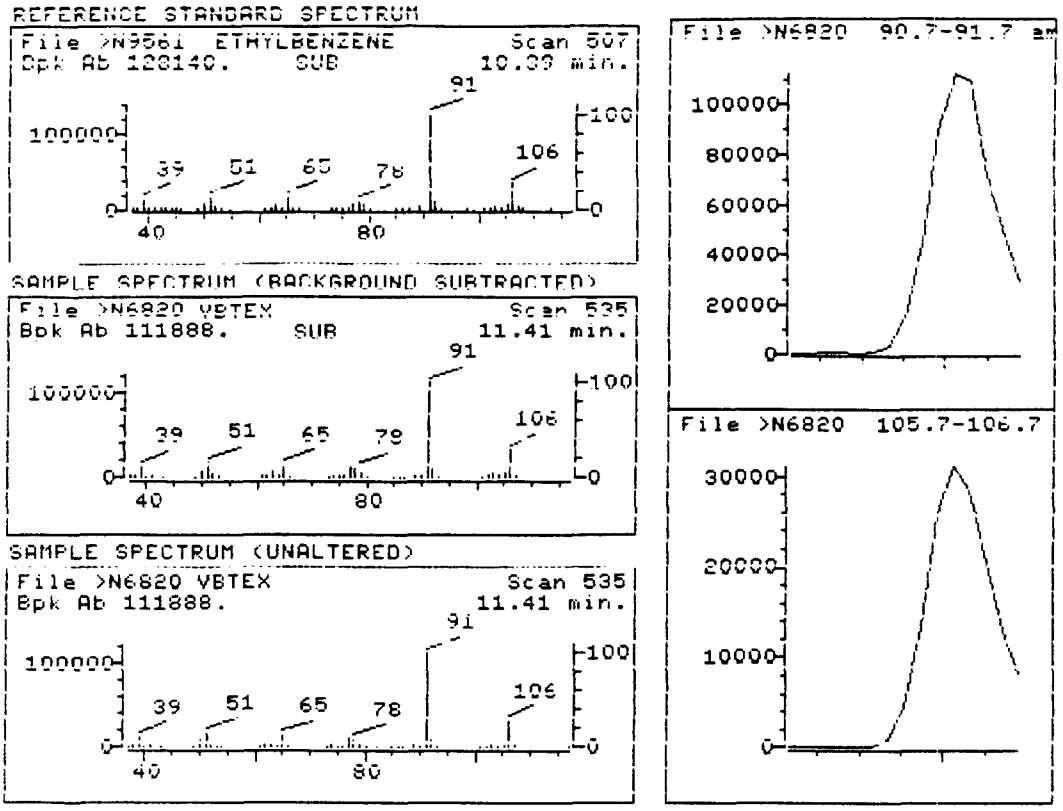


Data File: >N6820::D4
Name: VBTEX
Misc: E2788-4,VN067,W,,,
Quant Time: 950421 03:25
Injected at: 950421 03:00

Quant Output File: ^N6820::QN

Quant ID File: 1N0418::01
Last Calibration: 950418 13:40

Compound No: 10
Compound Name: TOLUENE
Scan Number: 437
Retention Time: 9.50 min.
Quant Ion: 91.0
Area: 1039618
Concentration: 90290.63 PPB
q-value: 95

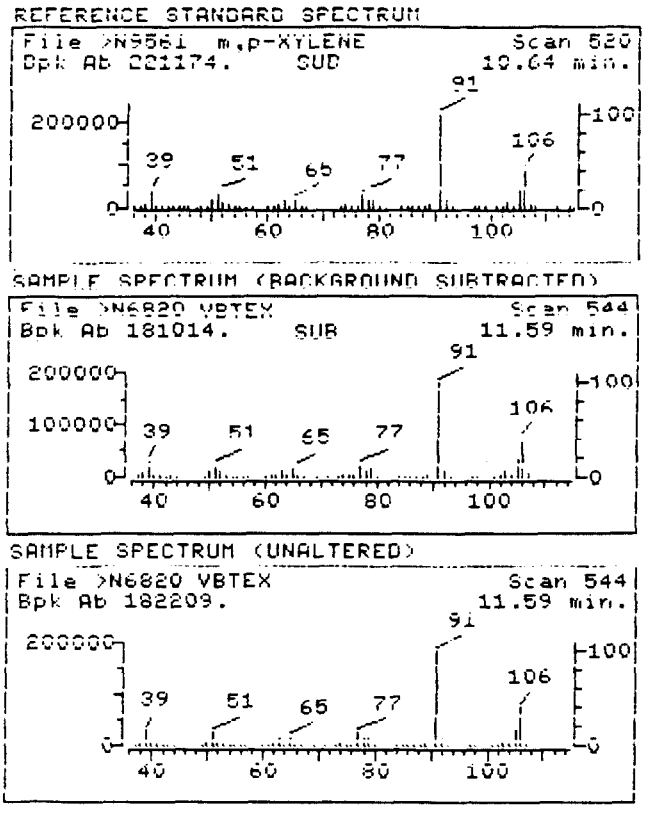


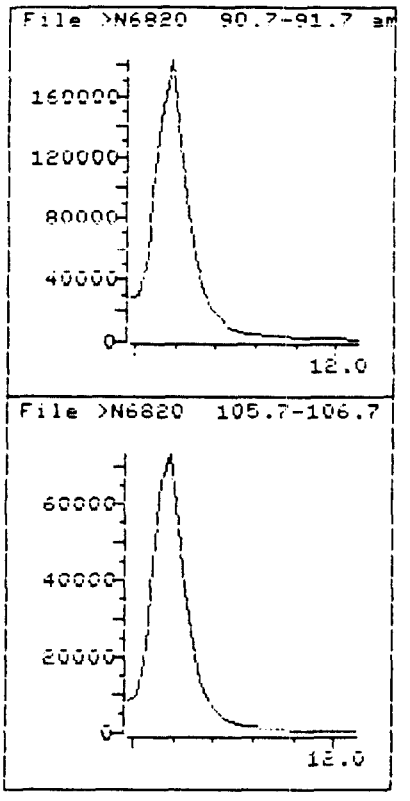
Data File: >N6820::D4
Name: VBTEX
Misc: E2788-4,VNU67,W,,,
Quant Time: 950421 03:25
Injected at: 950421 03:00

Quant Output File: ^N6820::QN

Quant ID File: INU418::U1
Last Calibration: 950418 13:40

Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 535
Retention Time: 11.41 min.
Quant Ion: 91.0
Area: 612145
Concentration: 42371.96 PPB
q-value: 81



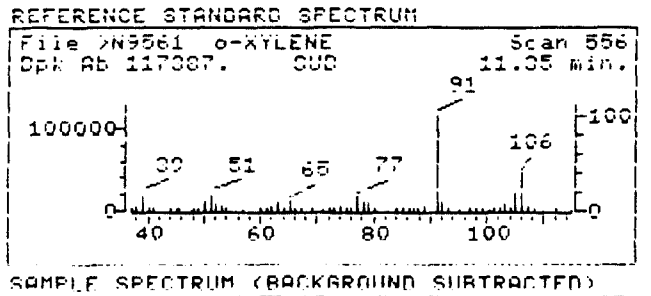


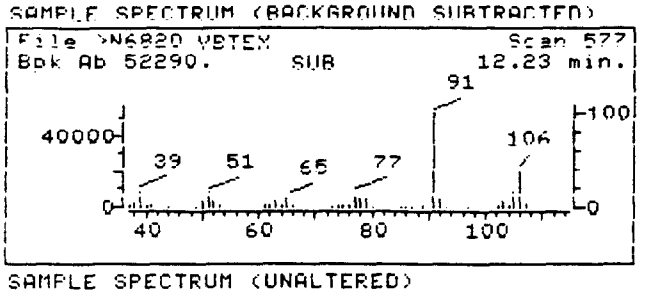
Data File: >N6820::D4
Name: VBTEX
Misc: E2788-4,VNU67,W,,,
Quant Time: 950421 03:25
Injected at: 950421 03:00

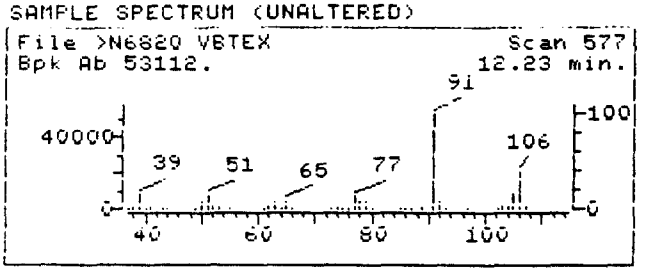
Quant Output File: ^N6820::QN

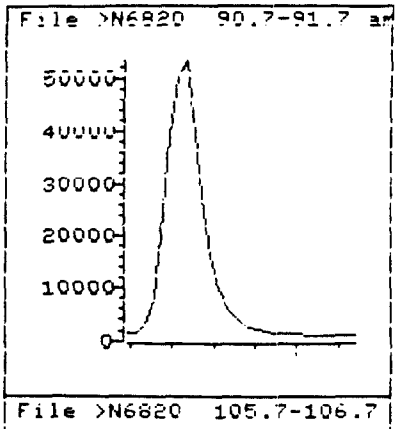
Quant ID File: INU418::UI
Last Calibration: 950418 13:40

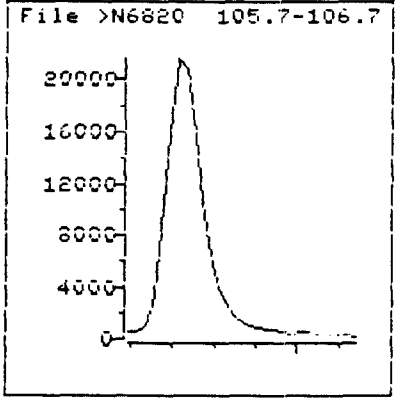
Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 544
Retention Time: 11.59 min.
Quant Ion: 91.0
Area: 1093737
Concentration: 81811.86 PPB
q-value: 96











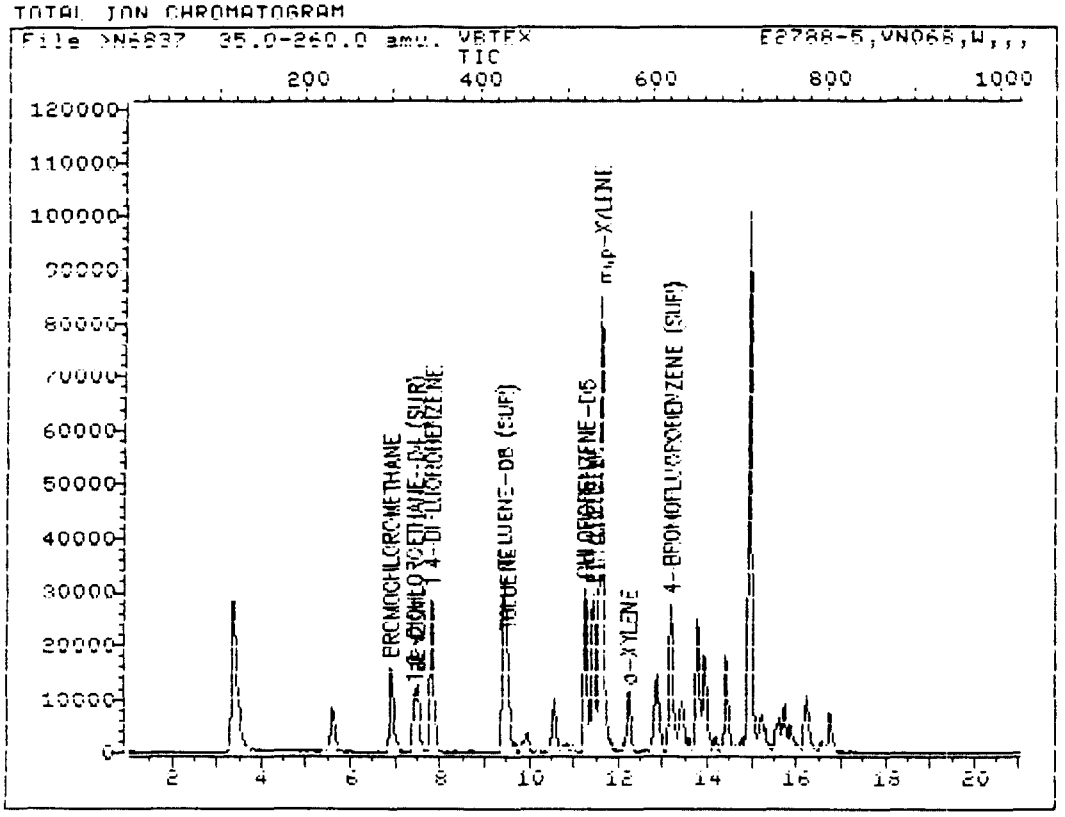
Data File: >N6820::D4
Name: VBTEX
Misc: E2788-4,VN067,W,,,
Quant Time: 950421 03:25
Injected at: 950421 03:00

Quant Output File: ^N6820::QN

Quant ID File: INU418::UI
Last Calibration: 950418 15:40

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 577
Retention Time: 12.23 min.
Quant Ion: 91.0
Area: 328926
Concentration: 24649.08 PPB
q-value: 98

TOTAL ION CHROMATOGRAM



Data File: >N6837::D4 Quant Output File: ^N6837::UN
Name: VBTEX
Misc: E2788-5,VN068,W,,,

Id File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950421 14:48
Injected at: 950421 14:22

QUANT REPORT

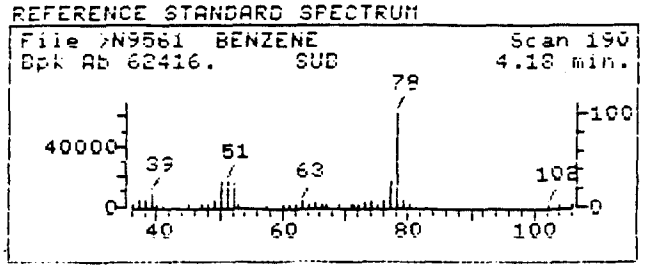
Operator ID: JKS Quant Rev: 6 Quant Time: 950421 14:48
Output File: ^N6837::QN Injected at: 950421 14:22
Data File: >N6837::D4 Dilution Factor: 1.00000
Name: VBTEX
Misc: E2/88-5,VN068,W,,,

ID File: 1NU418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

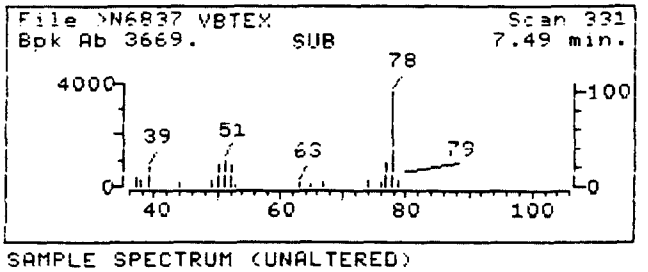
	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.88	300	13884	30.00	PPB	81
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.41	327	24928	29.28	PPB	96
5)	*1,4-DIFLUOROBENZENE	7.80	347	66555	30.00	PPB	9
7)	BENZENE	7.49	331	21580	10.97	PPB ✓	100
9)	*CHLOROBENZENE-D5	11.24	523	51661	30.00	PPB	99
10)	TOLUENE	9.50	454	28873	13.39	PPB ✓	94
12)	ETHYLBENZENE	11.44	533	66499	24.59	PPB ✓	79
13)	m,p-XYLENE	11.59	541	176177	70.39	PPB ✓	84
14)	o-XYLENE	12.22	573	27007	10.81	PPB ✓	95
18)	4-BROMOFLUOROBENZENE (SUR)	13.18	622	41829	29.79	PPB	85
19)	TOLUENE-D8 (SUR)	9.42	430	61631	31.14	PPB	82

* Compound is ISTD

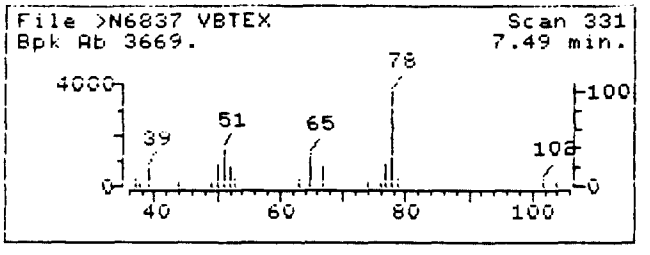
REFERENCE STANDARD SPECTRUM

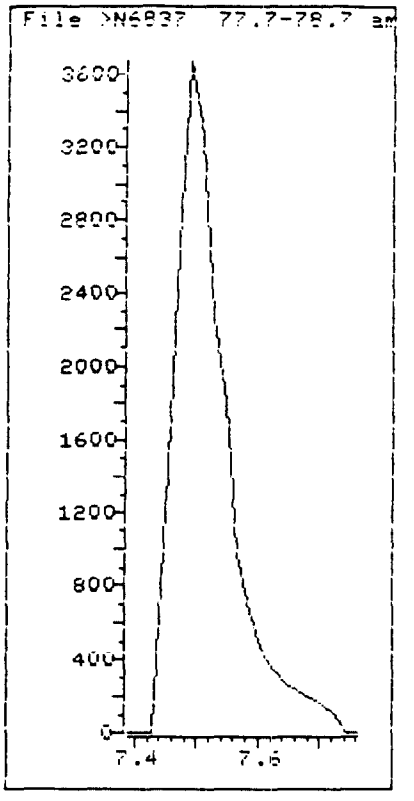


SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



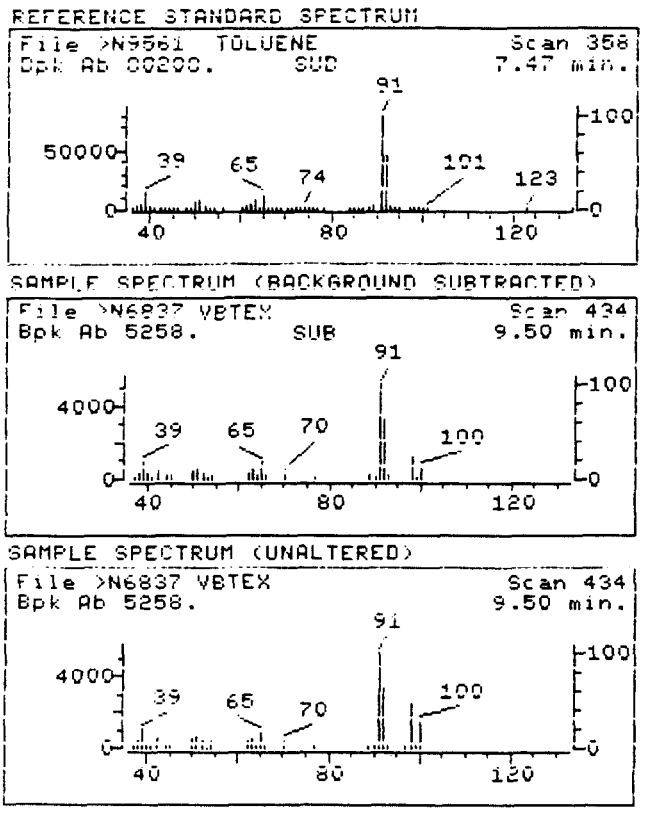


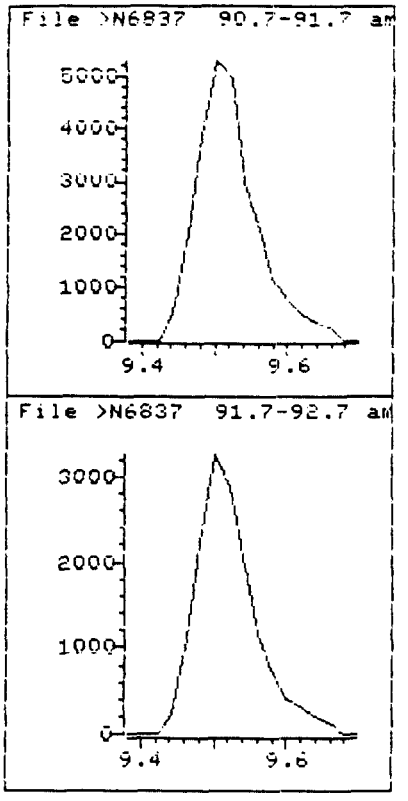
Data File: >N6837::D4
Name: VBTEX
Misc: E2788-5,VN068,W,,,
Quant Time: 950421 14:48
Injected at: 950421 14:22

Quant Output File: ^N6837::QN

Quant ID File: INU418::01
Last Calibration: 950418 13:40

Compound No: 7
Compound Name: BENZENE
Scan Number: 331
Retention Time: 7.49 min.
Quant Ion: 78.0
Area: 21380
Concentration: 10.97 PPB
q-value: 100





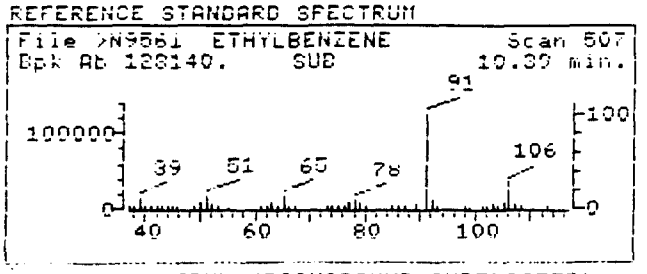
Data File: >N6837::D4
Name: VBTEX
Misc: E2788-5,VN068,W,,,
Quant Time: 950421 14:48
Injected at: 950421 14:22

Quant Output File: ^N6837::QN

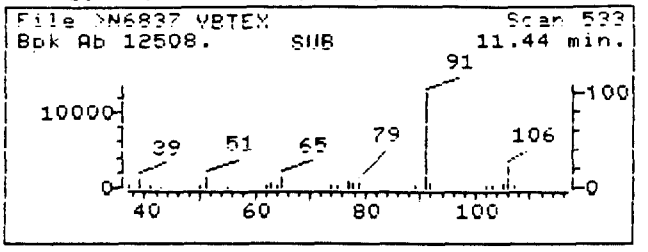
Quant ID File: IN0418::UI
Last Calibration: 950418 15:40

Compound No: 10
Compound Name: TOLUENE
Scan Number: 434
Retention Time: 9.50 min.
Quant Ion: 91.0
Area: 28873
Concentration: 13.39 PPB
q-value: 94

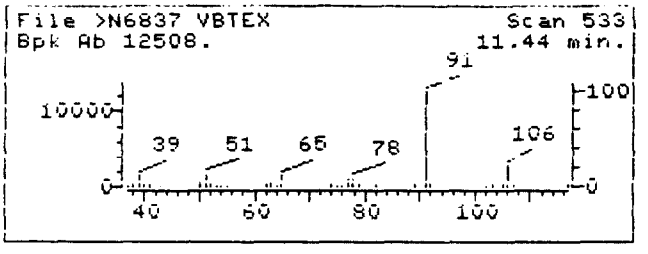
REFERENCE STANDARD SPECTRUM

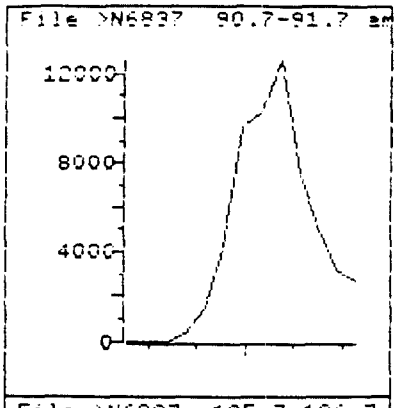


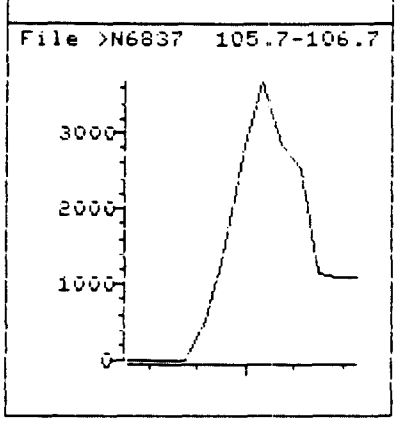
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







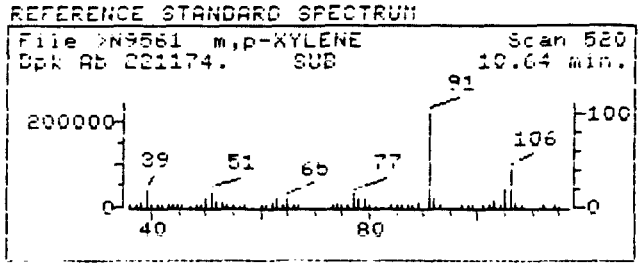
Data File: >N6837::D4
Name: VBTEX
Misc: E2788-5,VNU68,W,,,
Quant Time: 950421 14:48
Injected at: 950421 14:22

Quant Output File: ^N6837::QN

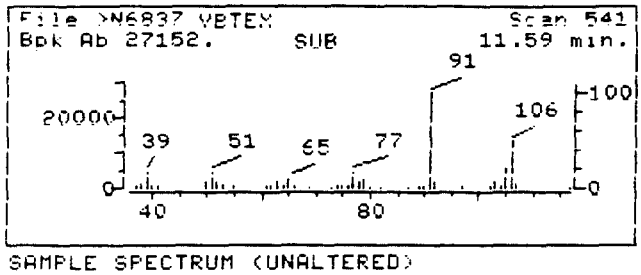
Quant ID File: INU418::UT
Last Calibration: 950418 13:40

Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 533
Retention Time: 11.44 min.
Quant Ion: 91.0
Area: 66499
Concentration: 24.59 PPB
q-value: 73

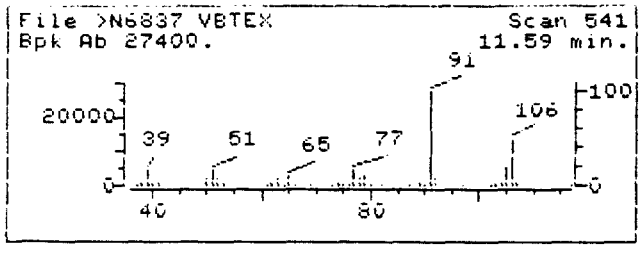
REFERENCE STANDARD SPECTRUM

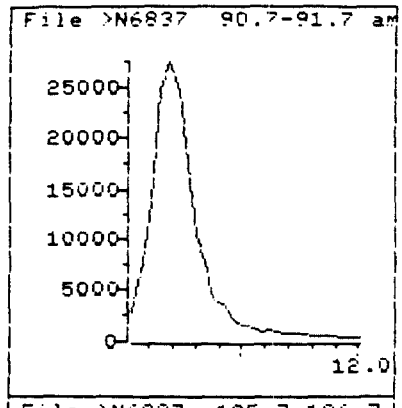


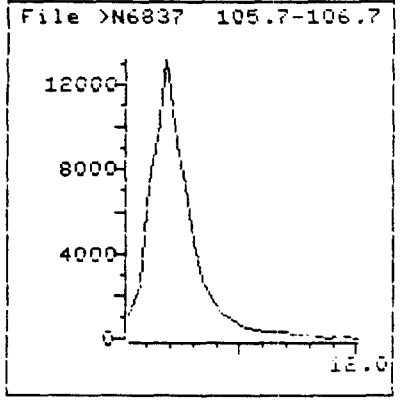
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







Data File: >N6837::04
Name: VBTEX
Misc: E2788-5,VN068,W,,,
Quant Time: 950421 14:48
Injected at: 950421 14:22

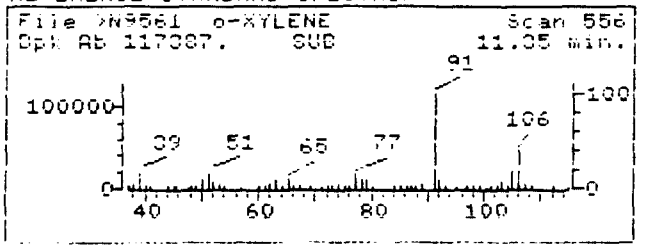
Quant Output File: >N6837::WK

Quant ID File: IN0418::01
Last Calibration: 950418 12:40

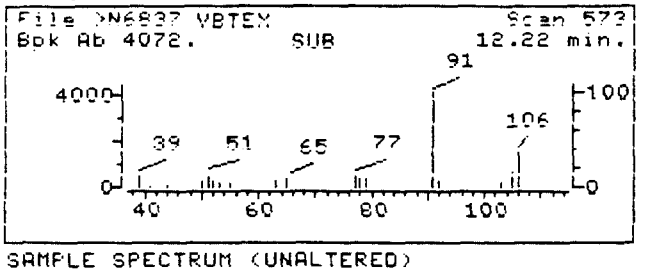
Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 541
Retention Time: 11.59 min.
Quant Ion: 91.0
Area: 176177
Concentration: 70.39 PPB
q-Value: 89

845030477

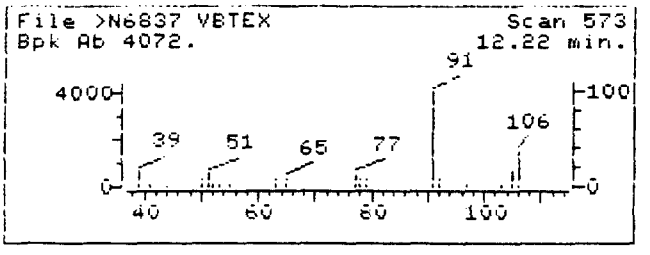
REFERENCE STANDARD SPECTRUM

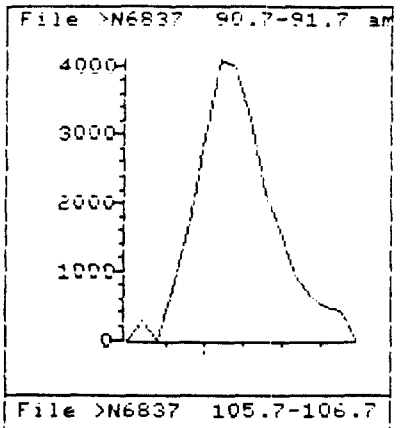


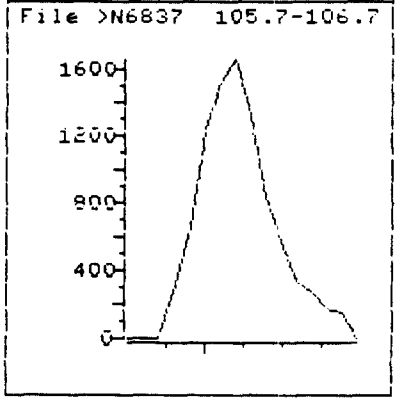
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







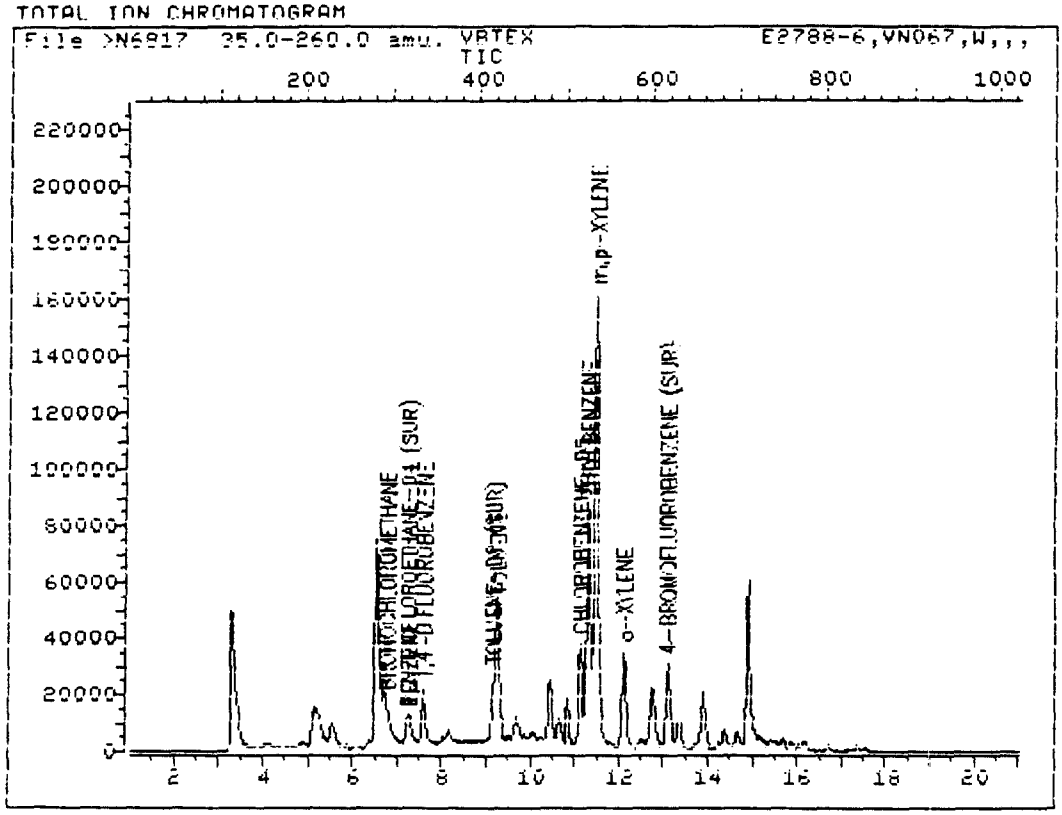
Data File: >N6837::D4
Name: VBTEX
Misc: E2788-5,VN068,W,,,
Quant Time: 950421 14:48
Injected at: 950421 14:22

Quant Output File: ^N6837::QN

Quant ID File: IN0418::QI
Last Calibration: 950418 15:40

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 573
Retention Time: 12.22 min.
Quant Ion: 91.0
Area: 27007
Concentration: 10.81 PPB
q-value: 95

TOTAL ION CHROMATOGRAM

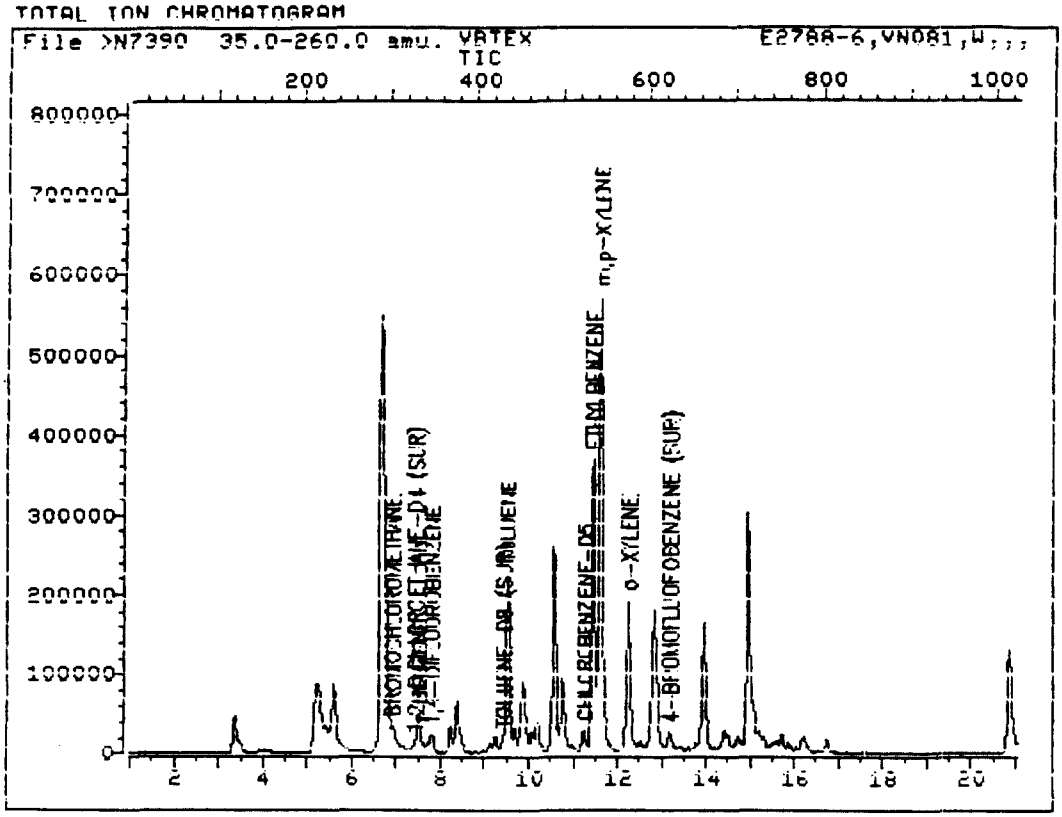


Data File: >N6817::D4 Quant Output File: ^N6817::QN
Name: VBTEX
Misc: E2788-6,VN067,W,,,

Id File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950421 01:49
Injected at: 950421 01:24

TOTAL ION CHROMATOGRAM



Data File: >N7390::D4 Quant Output File: ^N7390::QT
Name: VBTEX
Misc: E2788-6,VN081,W,,,

Id File: INU426::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950426 12:50

Operator ID: JKS
Quant Time: 950511 09:47
Injected at: 950511 09:02

QUANT REPORT

Operator ID: JKS Quant Rev: 6 Quant Time: 950421 01:49
Output File: ^N6817::QN Injected at: 950421 01:24
Data File: >N6817::D4 Dilution Factor: 10.00000
Name: VBTEX
Misc: E2788-6,VN067,W,,,

ID File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.77	295	13420	30.00	PPB	7[illegible]
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.24	319	18739	227.74	PPB	8[illegible]
5)	*1,4-DIFLUOROBENZENE	7.59	337	37478	30.00	PPB	9[illegible]
7)	BENZENE	7.28	321	12553	114.37	PPB ✓	100
9)	*CHLOROBENZENE-D5	11.13	518	64096	30.00	PPB	9[illegible]
10)	TOLUENE	9.27	423	110811	414.32	PPB ✓	9[illegible]
12)	ETHYLBENZENE	11.30	527	197198	587.64	PPB ✓	8[illegible]
13)	m,p-XYLENE	11.48	536	365296	1176.34	PPB ✓	98
14)	o-XYLENE	12.13	569	83265	268.63	PPB ✓	8[illegible]
18)	4-BROMOFLUOROBENZENE (SUR)	13.10	619	48918	280.78	PPB	92
19)	TOLUENE-D8 (SUR)	9.17	418	49629	202.12	PPB	90

* Compound is ISTD

QUANT REPORT

Operator ID: JKS Quant Rev: 6 Quant Time: 950511 09:47
Output File: ^N7390::QT Injected at: 950511 09:02
Data File: >N7390::D4 Dilution Factor: 1.00000
Name: VBTEX
Misc: E2788-6,VN081,W,,,

ID File: IN0426::QT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950426 12:50

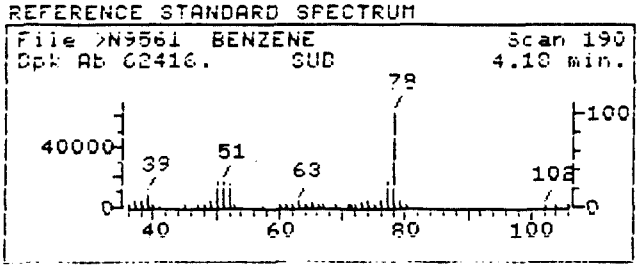
	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.90	304	7634	30.00	PPB	82
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.43	331	14912	30.62	PPB	100
5)	*1,4-DIFLUOROBENZENE	7.80	350	40667	30.00	PPB	97
7)	BENZENE	7.51	335	70198	64.01	PPB	100
9)	*CHLOROBENZENE-D5	11.26	527	30030	30.00	PPB	93
10)	TOLUENE	9.50	437	456292	377.49	PPB	89
12)	ETHYLBENZENE	11.44	536	840476	572.13	PPB	82
13)	m,p-XYLENE	11.59	544	1172432	809.26	PPB	99
14)	o-XYLENE	12.24	577	390558	306.18	PPB	97
18)	4-BROMOFLUOROBENZENE (SUR)	13.18	625	29203	38.71	PPB	91
19)	TOLUENE-D8 (SUR)	9.42	433	30524	26.13	PPB	98

* Compound is ISTD

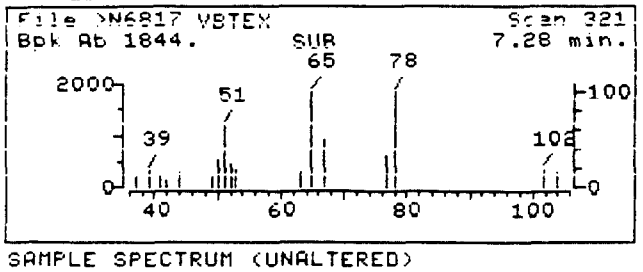
Confirmation for N6217

845030482

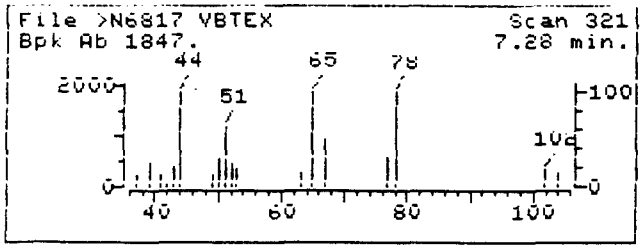
REFERENCE STANDARD SPECTRUM

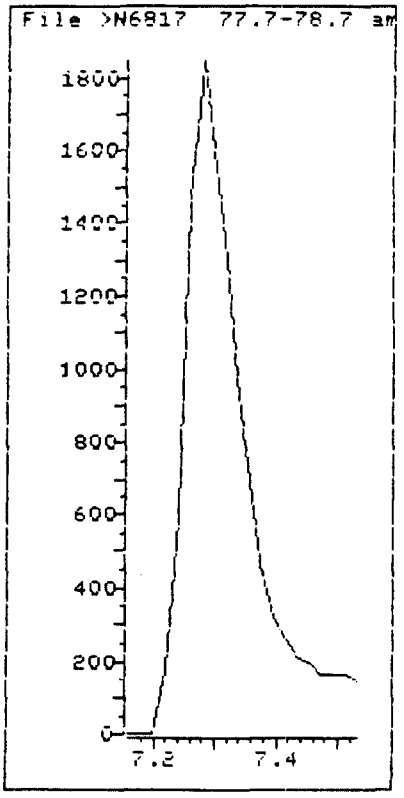


SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)



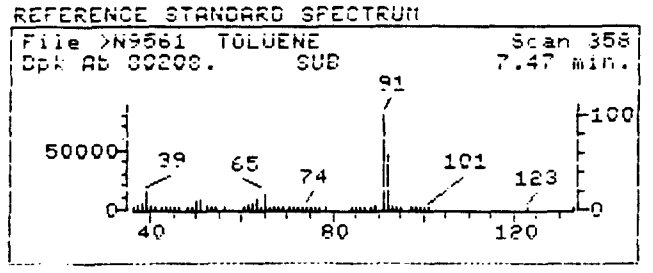


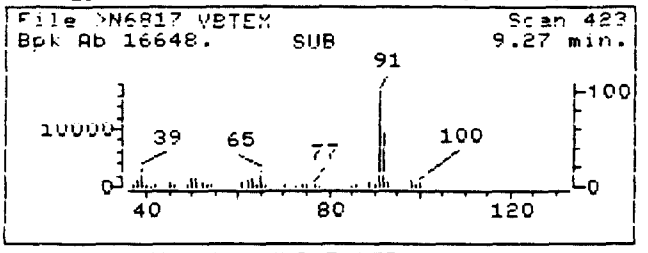
Data File: >N6817::D4
Name: VBTEX
Misc: E2788-6,VN067,W,,,
Quant Time: 950421 01:49
Injected at: 950421 01:24

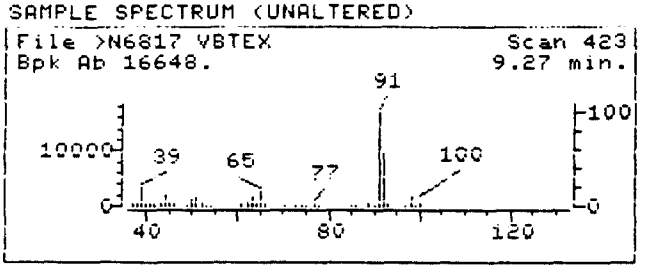
Quant Output File: ^N6817::QN

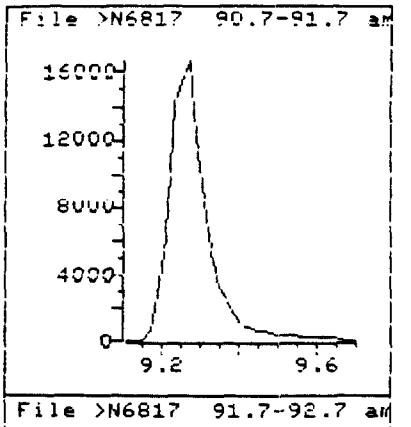
Quant ID File: INU418::UI
Last Calibration: 950418 15:40

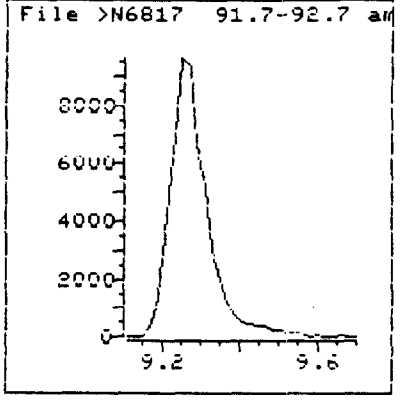
Compound No: 7
Compound Name: BENZENE
Scan Number: 321
Retention Time: 7.28 min.
Quant Ion: 78.0
Area: 12553
Concentration: 114.37 PPB
q-value: 100









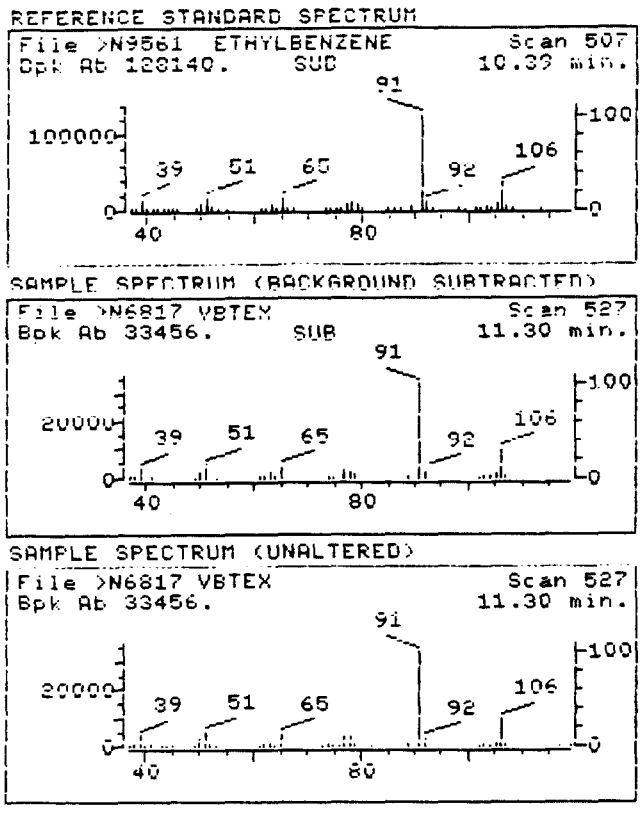


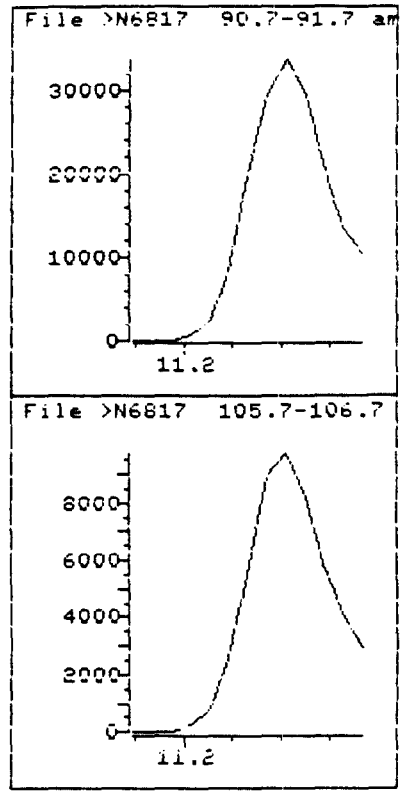
Data File: >N6817::D4
Name: VBTEX
Misc: E2788-6,VNU67,W,,,
Quant Time: 950421 01:49
Injected at: 950421 01:24

Quant Output File: ^N6817::QN

Quant ID File: INU418::01
Last Calibration: 950418 13:40

Compound No: 10
Compound Name: TOLUENE
Scan Number: 423
Retention Time: 9.27 min.
Quant Ion: 91.0
Area: 110811
Concentration: 414.32 PPB
q-value: 97





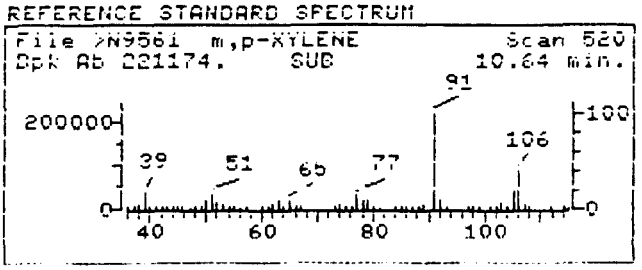
Data File: >N6817::D4
Name: VBTEX
Misc: E2788-6,VN067,W,,,
Quant Time: 950421 01:49
Injected at: 950421 01:24

Quant Output File: ^N6817::QN

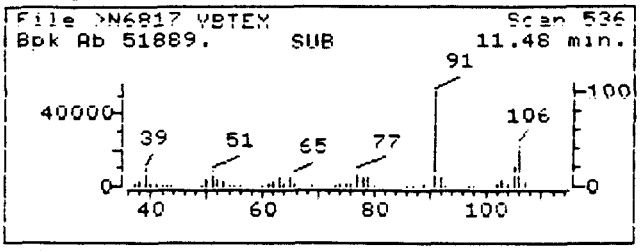
Quant ID File: 1N0418::01
Last Calibration: 950418 15:40

Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 527
Retention Time: 11.30 min.
Quant Ion: 91.0
Area: 197198
Concentration: 587.64 PPB
q-value: 83

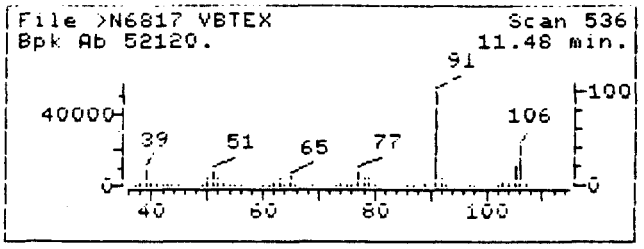
REFERENCE STANDARD SPECTRUM

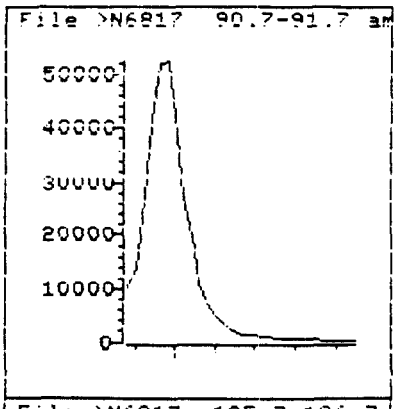


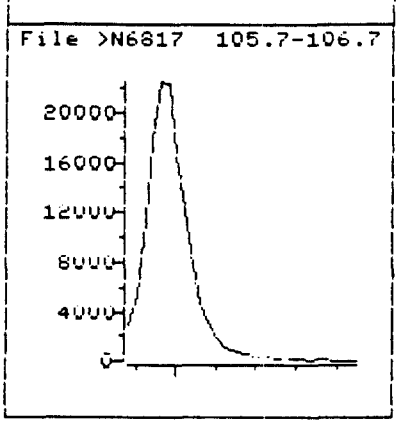
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)





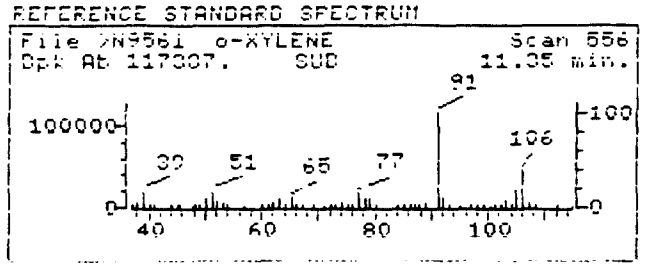


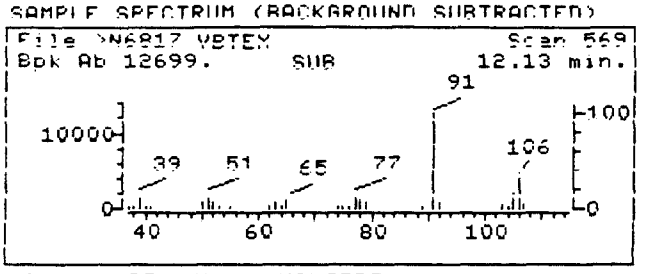
Data File: >N6817::D4
Name: VBTEX
Misc: E2788-6,VN067,W,,,
Quant Time: 950421 01:49
Injected at: 950421 01:24

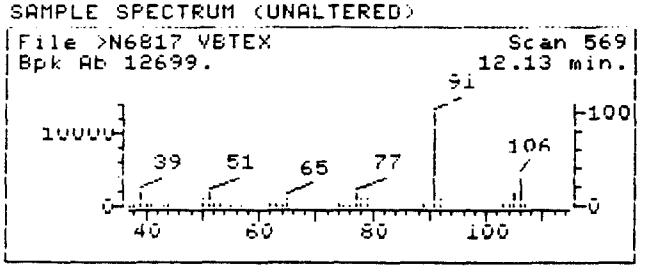
Quant Output File: ^No817::QN

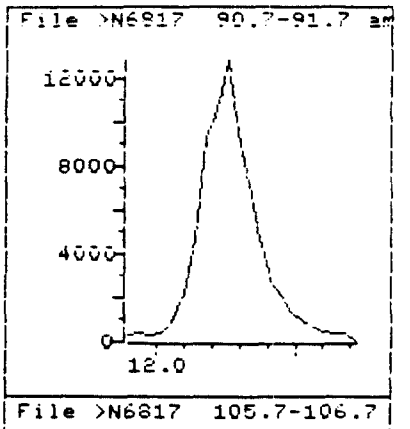
Quant ID File: INU418::UI
Last Calibration: 950418 13:40

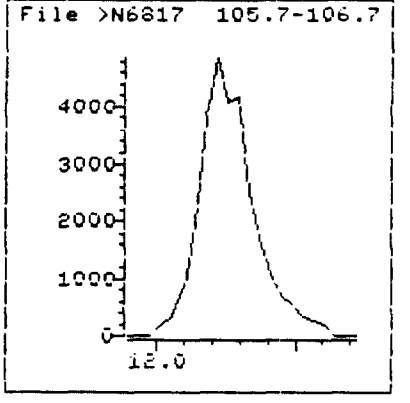
Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 536
Retention Time: 11.48 min.
Quant Ion: 91.0
Area: 365296
Concentration: 1176.34 PPB
q-value: 98











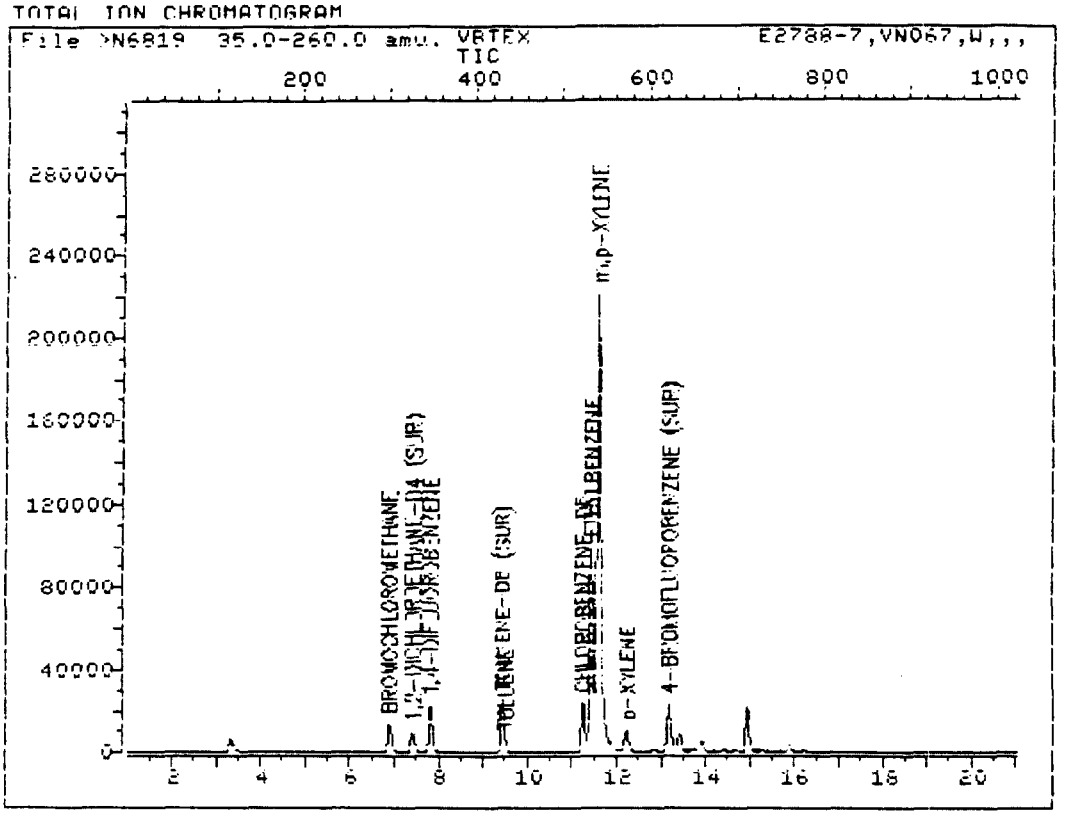
Data File: >N6817::D4
Name: VBTEX
Misc: E2788-6,VN067,W,,,
Quant Time: 950421 01:49
Injected at: 950421 01:24

Quant Output File: ^N6817::QN

Quant ID File: INU418::UI
Last Calibration: 950418 13:40

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 569
Retention Time: 12.13 min.
Quant Ion: 91.0
Area: 83265
Concentration: 268.63 PPB
q-value: 86

TOTAL ION CHROMATOGRAM



Data File: >N6819::D4 Quant Output File: ^N6819::QN
Name: VBTEX
Misc: E2788-7,VN067,W,,,

Id File: 1N0418::01
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950421 02:53
Injected at: 950421 02:28

QUANT REPORT

Operator ID: JKS Quant Rev: 6 Quant Time: 950421 02:5?
Output File: ^N6819::QN Injected at: 950421 02:28
Data File: >N6819::D4 Dilution Factor: 100.0000
Name: VBTEX
Misc: E2788-7,VN067,W,,,

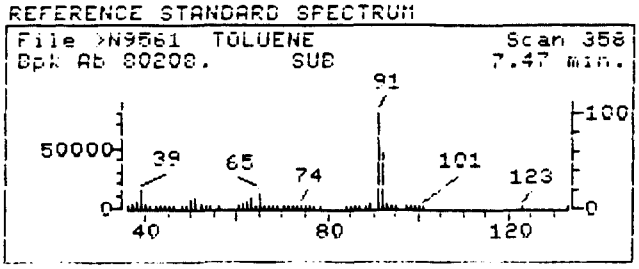
ID File: 1N0418::DT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.88	301	11629	30.00	PPB	8?
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.40	328	21894	30?0.64	PPB	??
5)	*1,4-DIFLUOROBENZENE	7.79	348	53139	30.00	PPB	??
9)	*CHLOROBENZENE-D5	11.23	524	43552	30.00	PPB	??
10)	TOLUENE	9.49	435	2444	154.49	PPB ✓	8
12)	ETHYLBENZENE	11.41	533	214546	9409.17	PPB ✓	??
13)	m,p-XYLENE	11.59	542	470689	22307.14	PPB ✓	??
14)	o-XYLENE	12.23	575	22730	1079.22	PPB ✓	??
18)	4-BROMOFLUOROBENZENE (SUR)	13.17	623	31392	2651.?6	PPB	??
19)	TOLUENE-D8 (SUR)	9.42	431	49951	299?.87	PPB	??

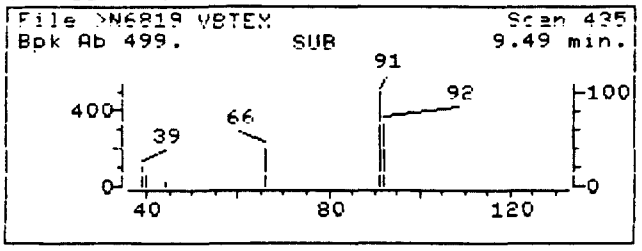
* Compound is ISTD

845030489

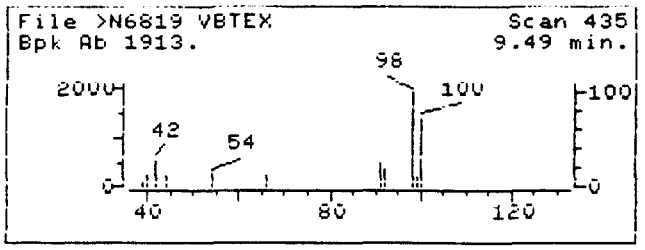
REFERENCE STANDARD SPECTRUM

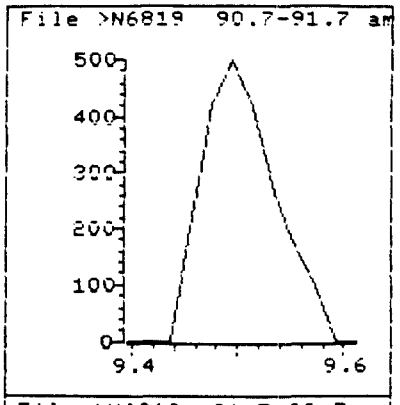


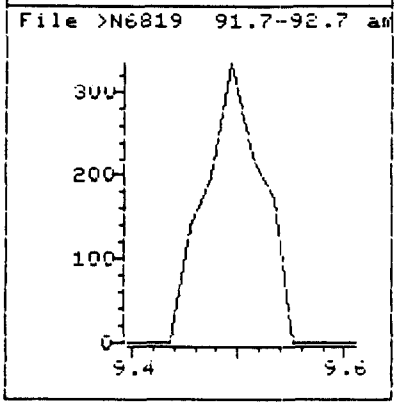
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







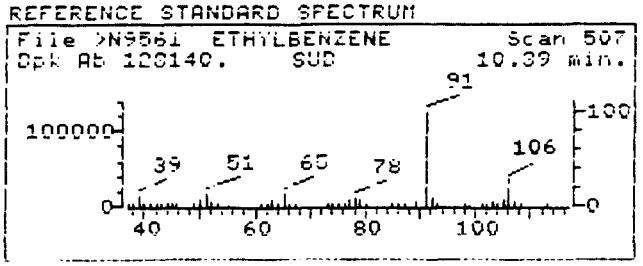
Data File: >N6819::D4
Name: VBTEX
Misc: E2788-7,VN067,W,,,
Quant Time: 950421 02:53
Injected at: 950421 02:28

Quant Output File: ^N6819::QN

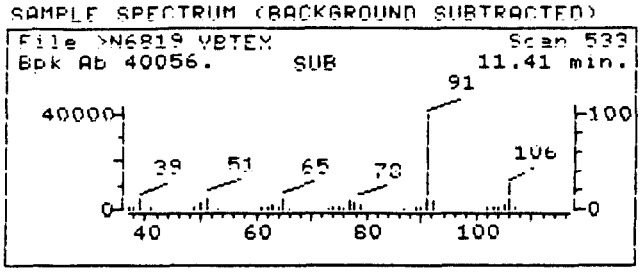
Quant ID File: 1NU418::QT
Last Calibration: 950418 13:40

Compound No: 10
Compound Name: TOLUENE
Scan Number: 435
Retention Time: 9.49 min.
Quant Ion: 91.0
Area: 2444
Concentration: 134.49 PPB
q-value: 87

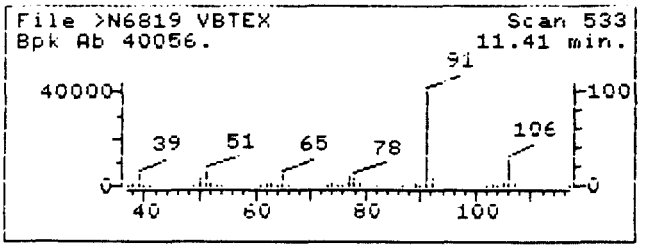
REFERENCE STANDARD SPECTRUM

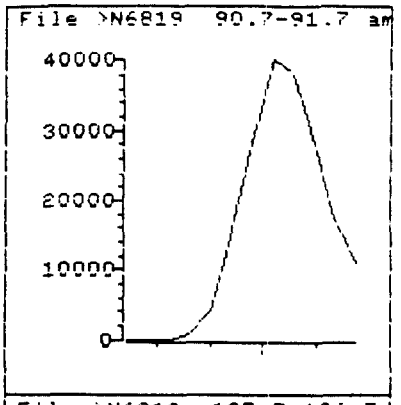


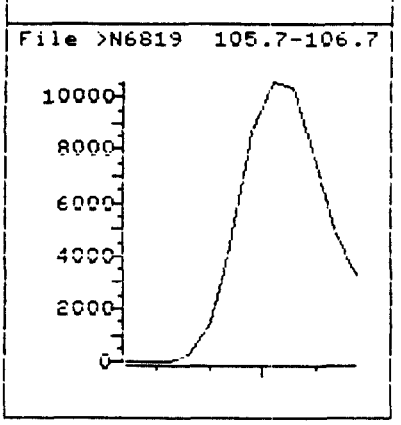
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







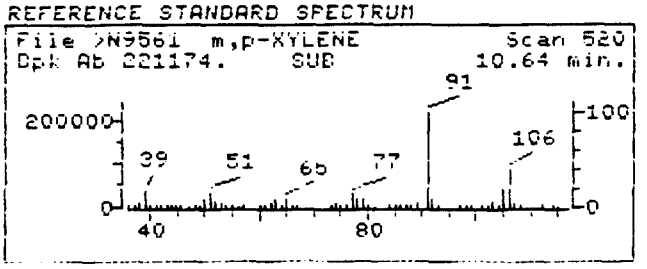
Data File: >N6819::D4
Name: VBTEX
Misc: E2788-7,VNU67,W,,,
Quant Time: 950421 02:53
Injected at: 950421 02:28

Quant Output File: ^N6819::QN

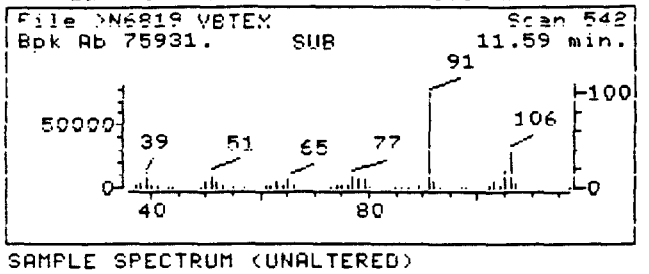
Quant ID File: INU418::UI
Last Calibration: 950418 13:40

Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 533
Retention Time: 11.41 min.
Quant Ion: 91.0
Area: 214546
Concentration: 9409.17 PPB
q-value: 79

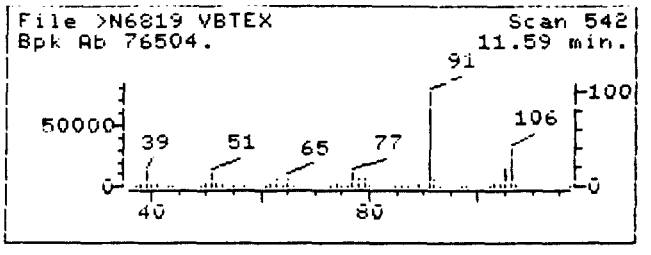
REFERENCE STANDARD SPECTRUM

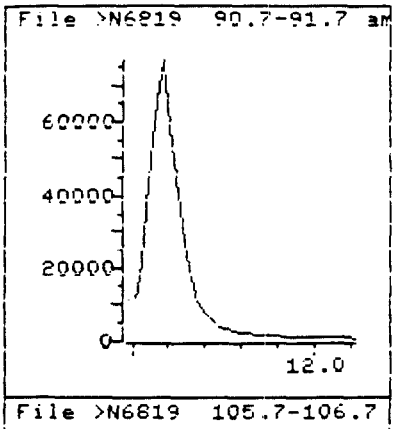


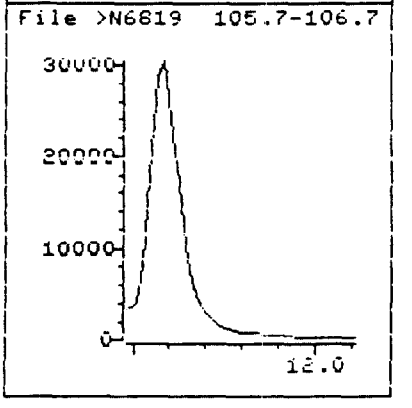
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







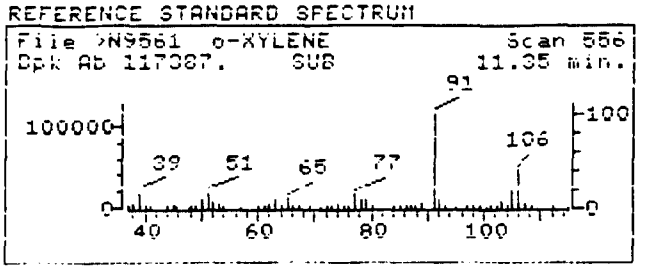
Data File: >N6819::D4
Name: VBTEX
Misc: E2788-7,VN067,W,,,
Quant Time: 950421 02:53
Injected at: 950421 02:28

Quant Output File: >N6819::QN

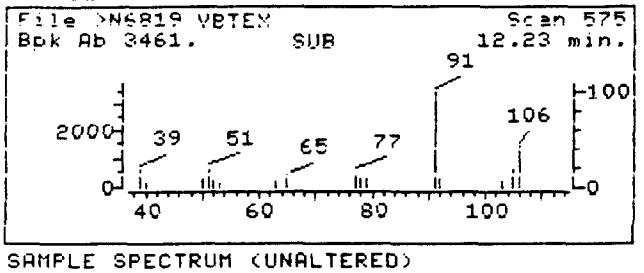
Quant ID File: IN0418::U1
Last Calibration: 950418 13:40

Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 542
Retention Time: 11.59 min.
Quant Ion: 91.0
Area: 470689
Concentration: 22307.14 PPB
q-value: 96

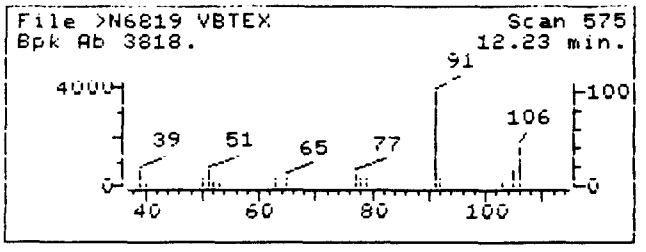
REFERENCE STANDARD SPECTRUM

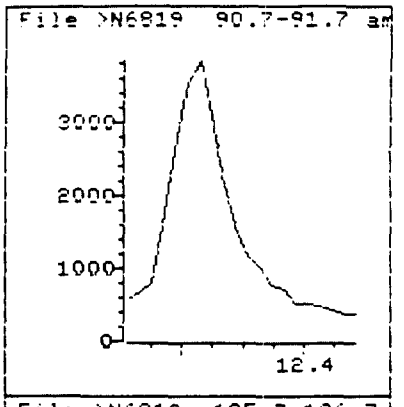


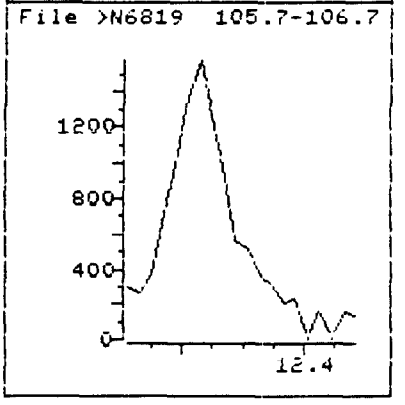
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







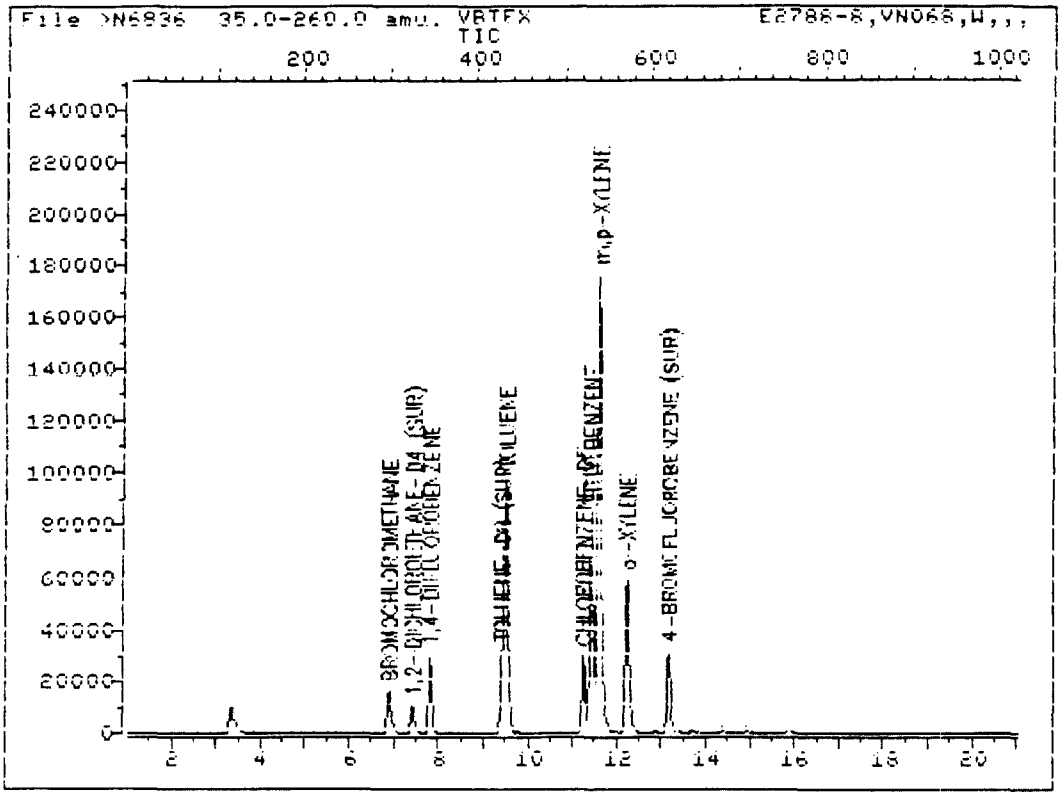
Data File: >N6819::D4
Name: VBTEX
Misc: E2788-7,VNU67,W,,,
Quant Time: 950421 02:53
Injected at: 950421 02:28

Quant Output File: ^N6819::QN

Quant ID File: INU418::UT
Last Calibration: 950418 13:40

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 575
Retention Time: 12.23 min.
Quant Ion: 91.0
Area: 22730
Concentration: 1079.22 PPB
q-value: 96

TOTAL ION CHROMATOGRAM

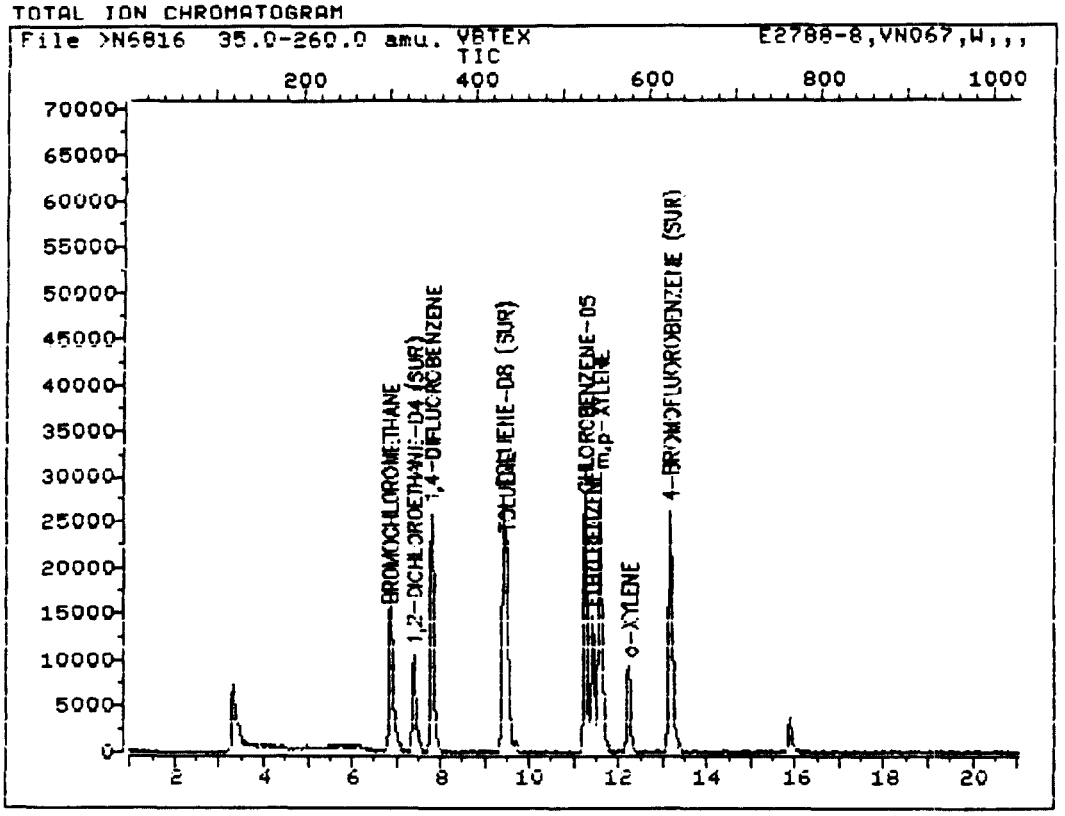


Data File: >N6836::D4 Quant Output File: ^N6836::QN
Name: VBTEX
Misc: E2788-8,VN068,W,,,

Id File: IN0418::D1
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950421 14:16
Injected at: 950421 13:51

TOTAL ION CHROMATOGRAM



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Id File: IN0418::DT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950421 01:17
Injected at: 950421 00:52

QUANT REPORT

Operator ID: JKS Quant Rev: 6 Quant Time: 950421 14:16
Output File: ^N6836::QN Injected at: 950421 13:51
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Name: VBTEX
Misc: E2788-8,VN068,W,,,

ID File: IN0418::DT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.90	301	14264	30.00	PPB	
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.42	328	25652	29.53	PPB	9
5)	*1,4-DIFLUOROBENZENE	7.82	348	67803	30.00	PPB	9
9)	*CHLOROBENZENE-D5	11.23	523	53992	30.00	PPB	9
10)	TOLUENE	9.50	434	186364	82.72	PPB ✓	9
12)	ETHYLBENZENE	11.41	532	184498	65.25	PPB ✓	9
13)	m,p-XYLENE	11.59	541	356692	135.98	PPB ✓	9
14)	o-XYLENE	12.23	574	133795	51.24	PPB ✓	9
18)	4-BROMOFLUOROBENZENE (SUR)	13.17	622	40767	27.78	PPB	8
19)	TOLUENE-D8 (SUR)	9.42	430	61042	29.51	PPB	8

* Compound is ISTD

QUANT REPORT

Operator ID: JKS Quant Rev: 6 Quant Time: 950421 01:17
Output File: ^N6816::QN Injected at: 950421 00:52
Data File: >N6816::D4 Dilution Factor: 5.00000
Name: VBTEX
Misc: E2788-8,VN067,W,,,

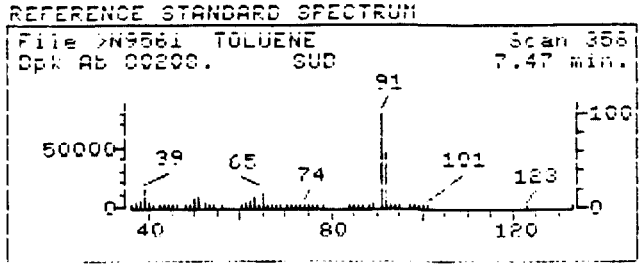
ID File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.85	302	14487	30.00	PPB	81
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.39	330	24549	138.19	PPB	96
5)	*1,4-DIFLUOROBENZENE	7.78	350	60451	30.00	PPB	92
9)	*CHLOROBENZENE-D5	11.24	527	46679	30.00	PPB	88
10)	TOLUENE	9.48	437	35343	90.73	PPB	93
12)	ETHYLBENZENE	11.42	536	33729	69.11	PPB	78
13)	m,p-XYLENE	11.57	544	66800	147.69	PPB	94
14)	o-XYLENE	12.24	578	23946	53.04	PPB	85
18)	4-BROMOFLUOROBENZENE (SUR)	13.16	625	38290	150.89	PPB	91
19)	TOLUENE-D8 (SUR)	9.41	433	55321	154.68	PPB	64

* Compound is ISTD

Confirmation for >N6816

REFERENCE STANDARD SPECTRUM



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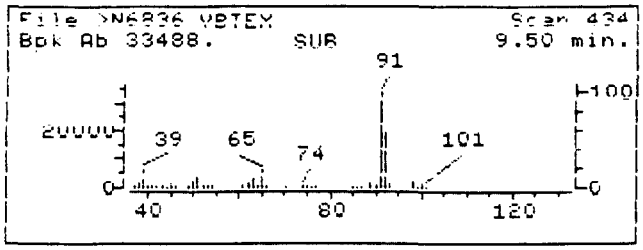

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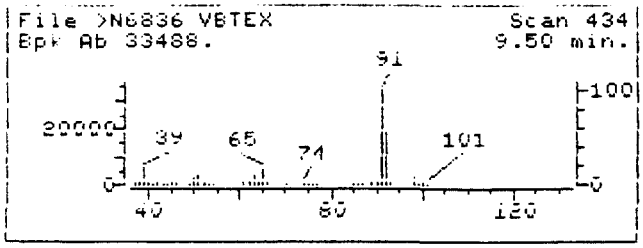

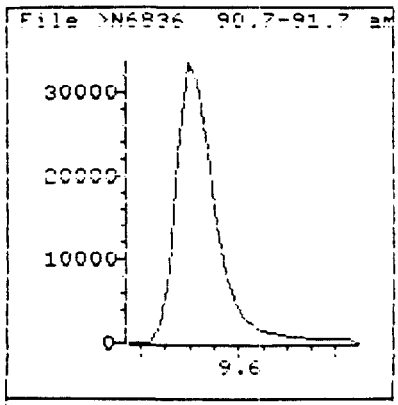

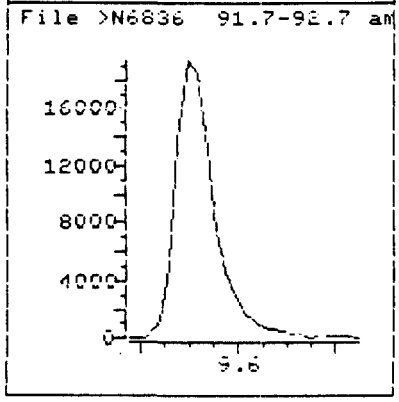

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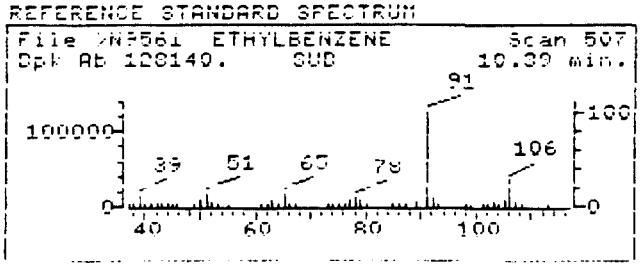
Quant Time: 950421 14:16
Injected at: 950421 13:51

Quant Output File: ^N6836::QN

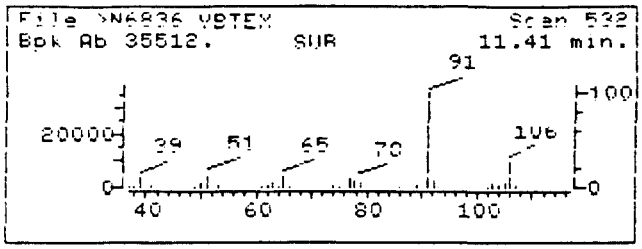
Quant ID File: IN0418::01
Last Calibration: 950418 15:40

Compound No: 10
Compound Name: TOLUENE
Scan Number: 434
Retention Time: 9.50 min.
Quant Ion: 91.0
Area: 186364
Concentration: 82.72 PPB
q-value: 99

REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



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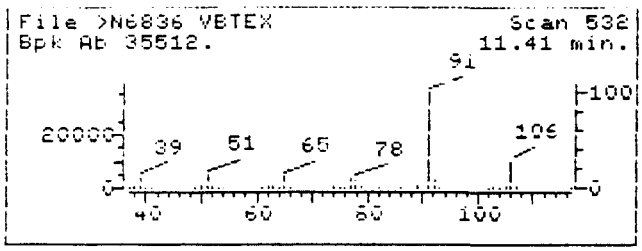

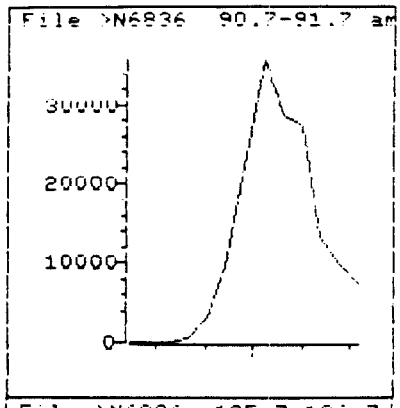

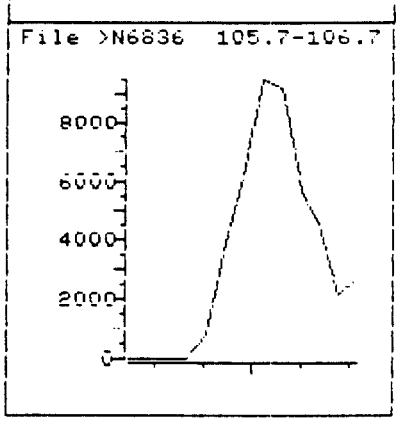

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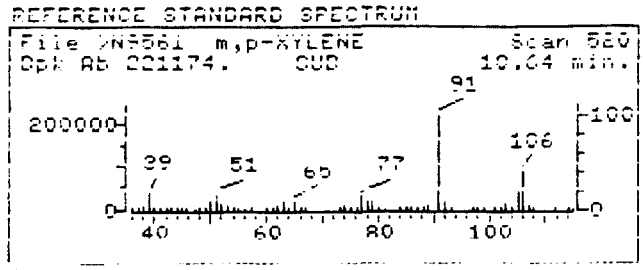
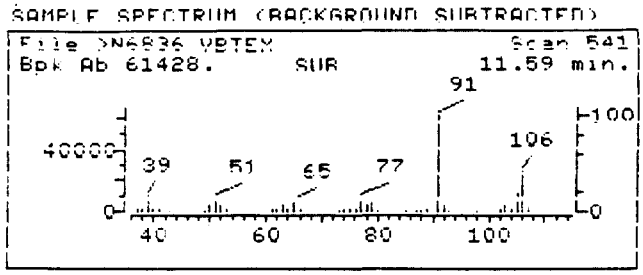
Name: VBTEX
Misc: E2788-8,VNU68,W,,,
Quant Time: 950421 14:16
Injected at: 950421 13:51

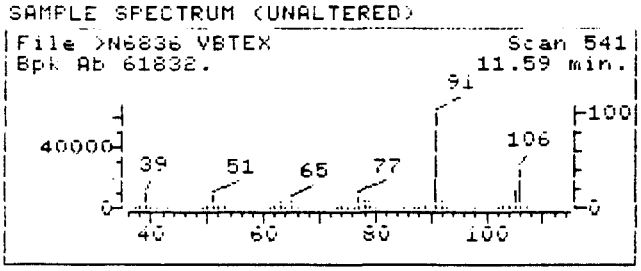
Quant Output File: ^N6836::WN

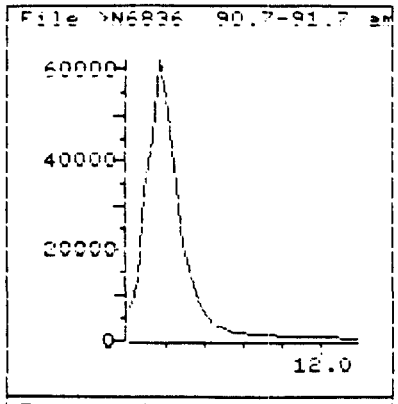
Quant ID File: INU418::UI
Last Calibration: 950418 13:40

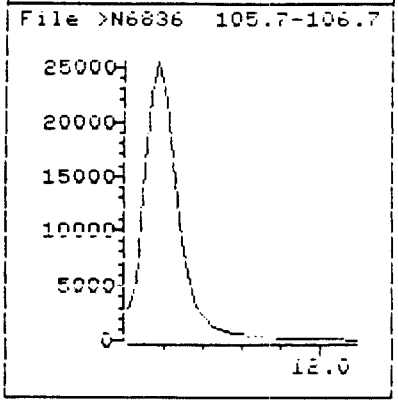
Compound No: 12
Compound Name: ETHYLBENZENE
Scan Number: 532
Retention Time: 11.41 min.
Quant Ion: 91.0
Area: 184458
Concentration: 65.25 PPB
q-value: 79











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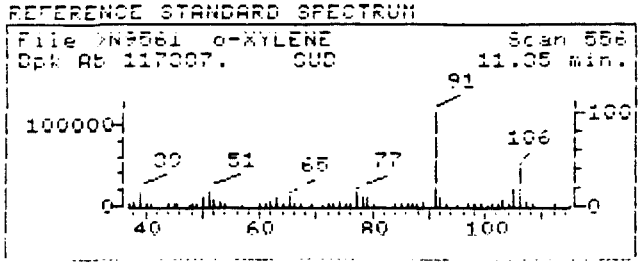
Name: VBTEX
Misc: E2788-8,VN068,W,,,
Quant Time: 950421 14:16
Injected at: 950421 13:51

Quant Output File: ^N6836::QN

Quant ID File: INU418::UI
Last Calibration: 950418 13:40

Compound No: 13
Compound Name: m,p-XYLENE
Scan Number: 541
Retention Time: 11.59 min.
Quant Ion: 91.0
Area: 355692
Concentration: 135.98 PPB
q-value: 99

REFERENCE STANDARD SPECTRUM



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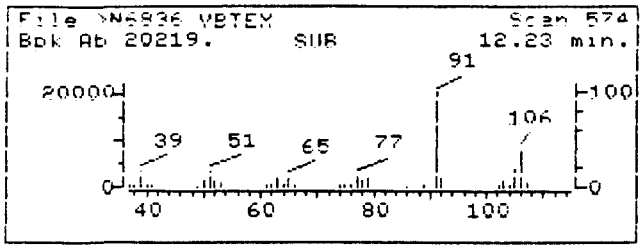

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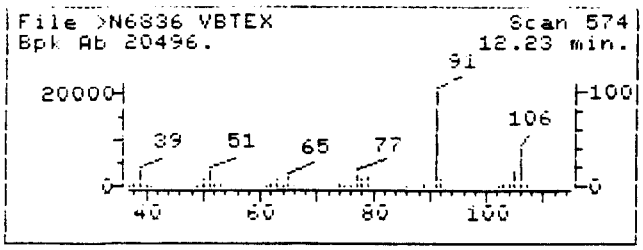

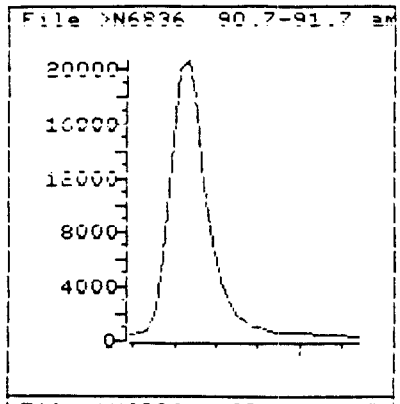

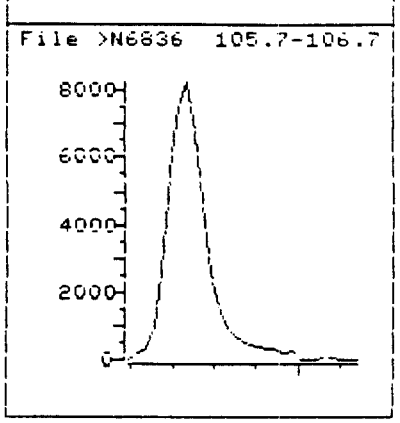

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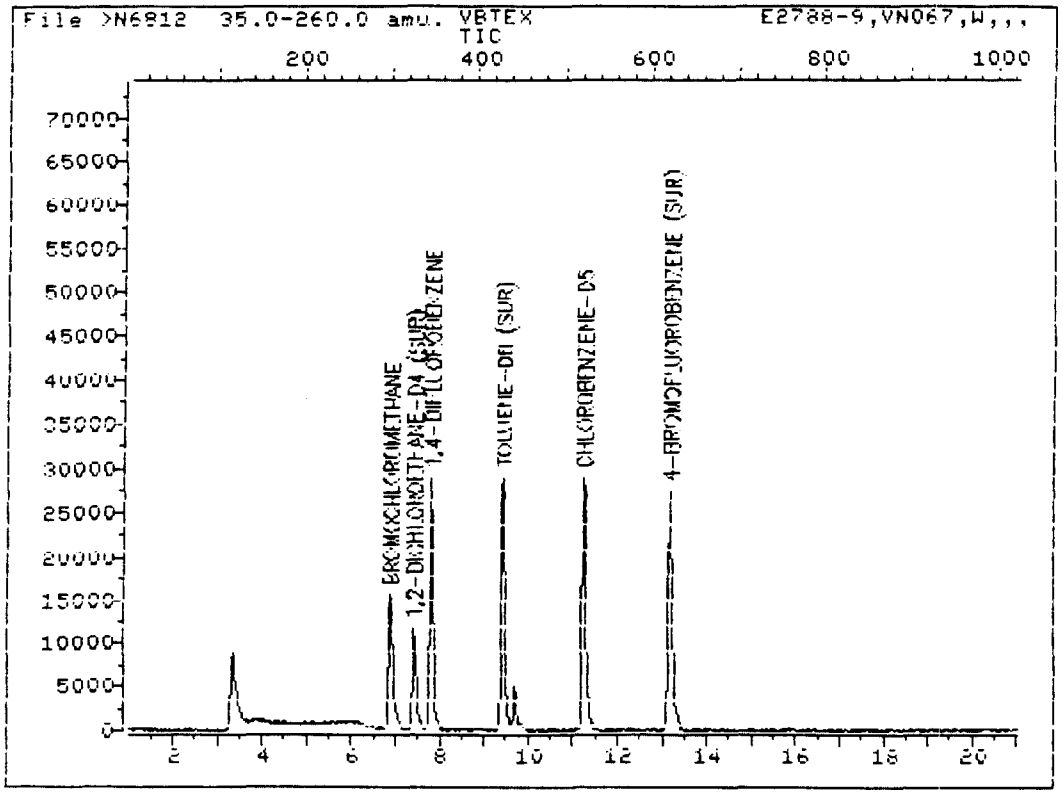
Misc: E2788-8,VN068,W,,,
Quant Time: 950421 14:16
Injected at: 950421 13:51

Quant Output File: >N6836::QN

Quant ID File: IN0418::QT
Last Calibration: 950418 13:40

Compound No: 14
Compound Name: o-XYLENE
Scan Number: 574
Retention Time: 12.23 min.
Quant Ion: 91.0
Area: 133795
Concentration: 51.24 PPB
q-value: 98

TOTAL ION CHROMATOGRAM



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Id File: IN0418::DT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950420 23:10
Injected at: 950420 22:45

QUANT REPORT

Operator ID: JKS
Output File: ^N6812::QN
Data File: >N6812::D4
Name: VBTEX
Misc: E2788-9,VN067,W,,,

Quant Rev: 6 Quant Time: 950420 25:10
Injected at: 950420 22:45
Dilution Factor: 1.00000

ID File: IN0418::01
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.88	301	15701	30.00	PPB	8?
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.41	328	27934	29.02	PPB	9?
5)	*1,4-DIFLUOROBENZENE	7.80	348	64434	30.00	PPB	9?
9)	*CHLOROBENZENE-D5	11.23	524	54169	30.00	PPB	9?
18)	4-BROMOFLUOROBENZENE (SUR)	13.17	623	40487	27.50	PPB	9?
19)	TOLUENE-D8 (SUR)	9.42	431	60159	28.99	PPB	8?

* Compound is ISTD

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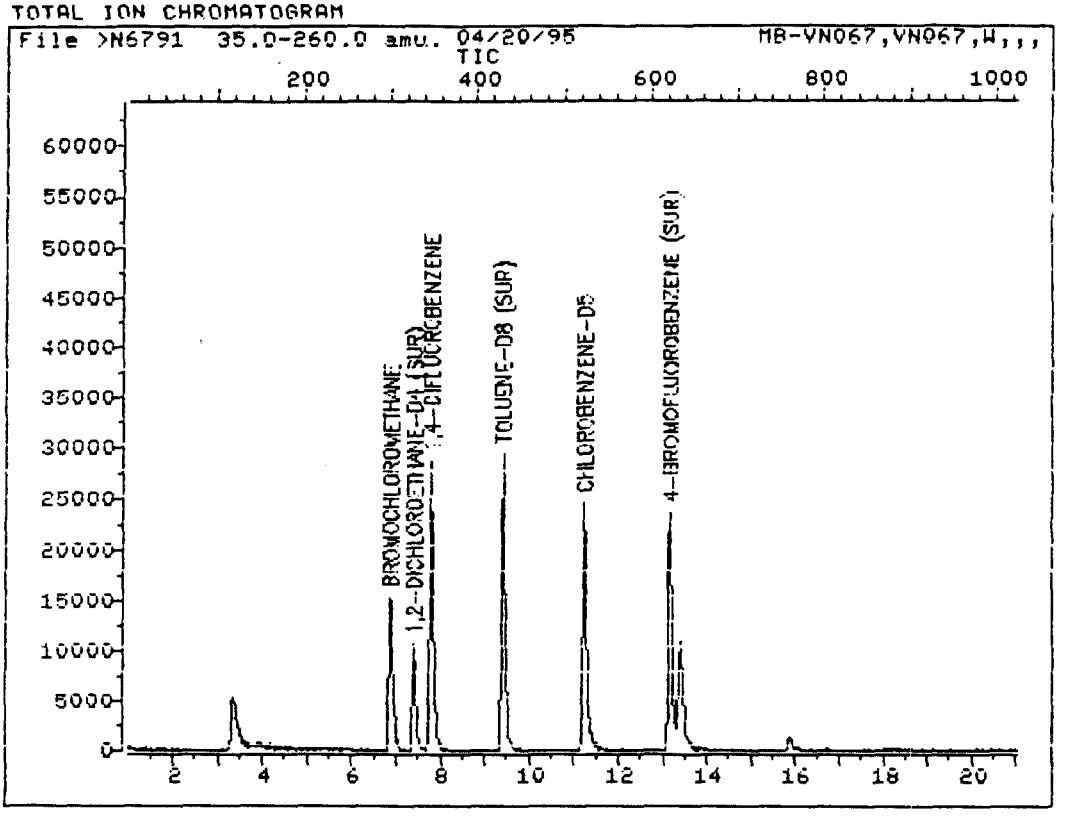
107

TOTAL ION CHROMATOGRAM



Data File: >N6791::D4 Quant Output File: ^N6791::QN
Name: 04/20/95
Misc: MB-VN067,VN067,W,,,

Id File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950420 11:34
Injected at: 950420 11:09

QUANT REPORT

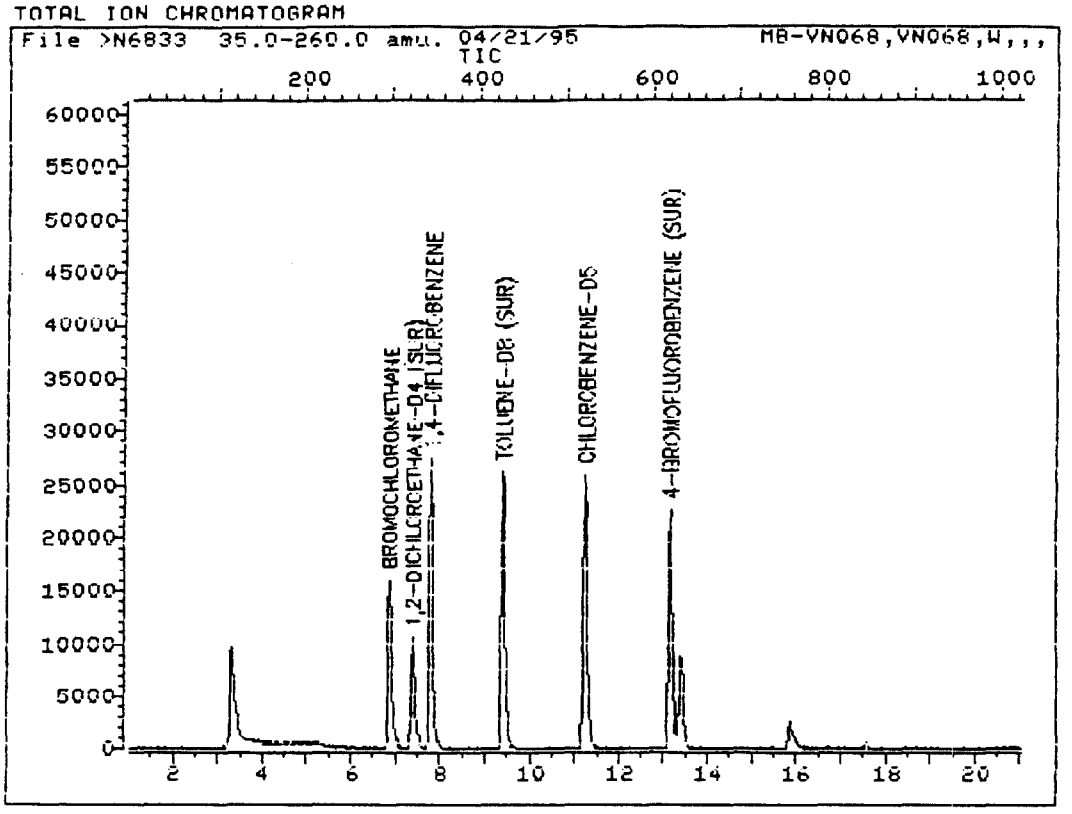
Operator ID: JKS Quant Rev: 6 Quant Time: 950420 11:34
Output File: ^N6791::QN Injected at: 950420 11:09
Data File: >N6791::D4 Dilution Factor: 1.00000
Name: 04/20/95
Misc: MB-VN067,VN067,W,,,

ID File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

	Compound	R.T.	Scan#	Area	Conc	Units
1)	*BROMOCHLOROMETHANE	6.86	300	13269	30.00	PPB
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.39	327	26040	32.01	PPB
5)	*1,4-DIFLUOROBENZENE	7.78	347	66208	30.00	PPB
9)	*CHLOROBENZENE-D5	11.22	523	48488	30.00	PPB
18)	4-BROMOFLUOROBENZENE (SUR)	13.16	622	36086	27.38	PPB
19)	TOLUENE-D8 (SUR)	9.41	430	59664	32.12	PPB

* Compound is ISTD

TOTAL ION CHROMATOGRAM



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Name: 04/21/95
Misc: MB-VN068,VN068,W,,,

Id File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

Operator ID: JKS
Quant Time: 950421 12:19
Injected at: 950421 11:54

QUANT REPORT

Operator ID: JKS
Output File: ^N6833::QN
Data File: >N6833::D4
Name: 04/21/95
Misc: MB-VN068,VN068,W,,,

Quant Rev: 6 Quant Time: 950421 12:19
Injected at: 950421 11:54
Dilution Factor: 1.00000

ID File: IN0418::OT
Title: VOLATILE ORGANIC ANALYSIS(+ ETHERS) BY EPA 624
Last Calibration: 950418 13:40

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*BROMOCHLOROMETHANE	6.86	299	14244	30.00	PPB	79
4)	1,2-DICHLOROETHANE-D4 (SUR)	7.39	326	25423	29.11	PPB	93
5)	*1,4-DIFLUOROBENZENE	7.80	347	62703	30.00	PPB	9/
9)	*CHLOROBENZENE-D5	11.24	523	47341	30.00	PPB	97
18)	4-BROMOFLUOROBENZENE (SUR)	13.15	621	34054	26.46	PPB	95
19)	TOLUENE-D8 (SUR)	9.40	429	56567	31.19	PPB	90

* Compound is ISTD

APPENDIX C

Administrative Checklist

Administrative Checklist For Remedial Action Workplans in accordance N.J.A.C 7:26E

Facility Name: Former Spencer Kellogg Division

Case #: 85403

UST #: N/A

General Check one:	YES	NO	N/A
1. Table of Contents	X		
Specific			
1. Introduction and summary of site conditions, including areas of concern, data summary, scaled site maps, potential receptors, etc. (SI/RI Report or summary) (N.J.A.C. 7:26E-6.2(a)1 & 2)	X		
2. Remedial Action Selection Report (aka Effectiveness Analysis and Certification) as per P.L. 1993, c. 139, Section 35	X		
3. Soil remediation plan See Section V			X
a. Detailed description of remedial action and remedial technology for each area of concern (N.J.A.C. 7:26E-6.2(a)5)			X
b. Post-remedial sampling (N.J.A.C. 7:26E-6.3 & 6.4)			X
c. Cleanup goals (compound specific) (N.J.A.C. 7:26E-6.2(a)4)			X
d. Scaled site maps (N.J.A.C. 7:26E-4.9 and 6.2(a)6)			X
e. Permit requirements/applications (N.J.A.C. 7:26E-6.2(a)8)			X
f. System specifications and construction information (N.J.A.C. 7:26E-6.2(a)9)			X
g. Soil erosion and sediment control plan (N.J.A.C. 7:26E-6.2(a)10)			X
h. Soil disposal/soil re-use plan (N.J.A.C. 7:26E-6.4(b)			X
4. Ground water remediation plan	X		
a. Plume(s) delineated	X		
b. Wells properly constructed	X		
c. Flow direction defined, including ground water elevation contour maps	X		

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		Check one:	YES	NO	N/A
d.	Detailed description of remedial action and remedial technology for each area of concern (N.J.A.C. 7:26E-6.2(a)5)		X		
e.	Cleanup goals (compound specific) (N.J.A.C. 7:26E-6.2(a)4)		X		
f.	Remedial monitoring plan/effectiveness evaluation plan		X		
g.	Hydraulic control information/maintenance	See Sections VB and VC			N/A
h.	Treated water discharge location	See Sections VB and VC			N/A
i.	Scaled site maps per N.J.A.C. 7:26E-4.9 and 6.2(a)6		X		
j.	Permit requirements/applications (N.J.A.C. 7:26E-6.2(a)8) *				X
k.	System specifications and construction information (N.J.A.C. 7:26E-6.2(a)9)		X		
5.	Data presentation format and quality assurance project plan (N.J.A.C. 7:26E-6.2(a)7)		X		
6.	Site Specific Health and Safety Plan (N.J.A.C. 7:26E-6.2(a)11) *			X	
7.	Site restoration plan and remedial system dismantling plan (N.J.A.C. 7:26E-6.2(a)12 & 13)		X		
8.	Cost estimate (N.J.A.C. 7:26E-6.2(a)14)		X		
9.	Schedule of implementation (N.J.A.C. 7:26E-6.2(a)15		X		

Note: **all "no" and "n/a" responses must be accompanied by supporting rational.**

*Applicable Permit Application preparation will commence pending approval of this Remedial Action Work Plan. Likewise, a site specific Health and Safety Plan for the work proposed herein will be prepared pending approval of this Remedial Action Plan.

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Ground Water Natural Remediation Checklist

I. Evaluation of Remedial Investigation (Y or N)

N/A **A. Soil investigation/delineation completed** See Section V

Y **B. Receptor evaluation completed** See Section III

Y **C. Ground water delineation completed** See Section C1

II. Unacceptable scenarios (Y or N)

N **A. History of non-decreasing contaminant concentrations** See Sections I and IV

N **B. Excessive dissolved contaminant concentrations** See Section IV

N **C. Receptors previously impacted** See Section III

N **D. Free product present** See Section VB

III. Evaluation of the Remedial Action Workplan (Y or N)

N **A. Soil remediation proposed or completed** See Section V A, V B and V C

Y **B. Sentinel well(s) installed at proper distance between source and receptor(s)** See Section C.4

N/A **C. Travel time calculation for contaminants from pump/slug test (include retardation calculations)**

N/A **D. Contaminant degradability documented**

N/A **E. Site specific information supporting favorable degradation rate**

N/A **F. Documentation regarding current or potential ground water use for 25 year horizon**

N/A **G. Written notification to potentially affected down gradient property owners**

Y **H. Monitoring plan** See Section C.4

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APPENDIX D

Ground Water Modeling Methodology and Calculations

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APPENDIX D

Ground Water Modeling Methodology and Calculations

The purpose of these calculations is to derive a conservative estimate of the dissolved BTEX concentrations entering Newark Bay. Due to the relatively short travel distance of the dissolved BTEX in the ground water, advection is considered the governing mode of travel. A one dimensional, Darcy approach was used, assuming the maximum concentration of each BTEX constituent over the entire interpreted plume. The NJDEP-approved June 1988 *Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan for the Spencer Kellogg Facility Formerly a Division of Textron, Inc.* was referenced for the hydraulic conductivity and aquifer thickness:

- $K = 1 \times 10^{-3}$ cm/sec for the fill material; and
- Aquifer thickness of 5' (1.52 m). (Average fill thickness across site is 8', with average ground water surface between 2' to 4' below ground surface. 8' fill - 3' unsaturated zone = 5' saturated zone).

Figures III-1 to III-7 of the June 1988 report were used to calculate i, the hydraulic gradient, for both north and south of the flume. The 800' flume distance considered (from the flume discharge point to 800' along the flume) was sectioned into four equal parts, and the hydraulic gradient based on measurements of the shallow ground water surface elevations was computed at the 3 dividing lines of the equally sectioned flume areas, and averaged for each figure.

i_n = $i_{north\ of\ flume}$

$i_{avg\ n}$ = average hydraulic gradient north of the flume

$i_{avg\ n_{max}}$ = maximum average hydraulic gradient north of the flume

and likewise for i_s which stands for the hydraulic gradient south of the flume.

Although it is recognized that within any plume area a contaminant distribution exists, the maximum concentrations of BTEX observed in any well or Hydro-punch will be assumed over the entire upper aquifer depth (5' or 1.52 m) in the estimated plume boundaries of 190' (58 m) along the plume edge traveling a distance of 130' (40 m) (very conservative). The one dimensional Darcy approach, given by:

$$Q = K\ i\ A$$

where:

Q = flow

K = hydraulic conductivity

i = hydraulic gradient

was used to compute both ground water and plume discharge rates into the flume.

Assumptions

- $K = 1 \times 10^{-3}$ cm/sec = 1×10^{-5} m/sec
- 8' average fill depth, 2'-4' from ground surface to ground water
- Advection dominates over dispersion and diffusion, especially when considering the short travel distance of the plume to the flume.
- Known values for dissolved BTEX constituents will be applied over the entire plume area for loading calculations for highest concentration observed in any well or Hydro-punch during all sampling events.
- Loading and discharge to the flume will be calculated based on highest $i_{avg\ n}$ and corresponding $i_{avg\ s}$ and average $i_{avg\ n}$ and $i_{avg\ s}$ values.

Spencer Kellogg Facility, Newark, New Jersey
ISRA Case No. 85403

Date	Tide	Gradients North of Plume			Average i_n	Gradients South of Plume			Average i_s
		1	2	3		1	2	3	
1/25/88	High	0.012	0.016	0.039	0.022	0.012	0.013	0.022	0.016
1/25/88	Low	0.013	0.022	0.078	0.038	0.016	0.024	0.037	0.026
3/2/88	High	0.015	0.019	0.052	0.029	0.012	0.013	0.012	0.012
3/2/88	Low	0.024	0.041	0.085	0.050	0.018	0.034	0.032	0.028
3/16/88	High	0.005	0.007	0.030	0.014	0.010	0.010	0.007	0.009
4/13/88	Low	0.012	0.017	0.047	0.025	0.005	0.006	0.010	0.007
4/29/88	Low	0.013	0.020	0.093	0.042	0.033	0.019	0.026	0.078
Total Averages					0.031				0.025

Low Tide $i_{avg\ n}$	0.039	High Tide $i_{avg\ n}$	0.022
Low Tide $i_{avg\ s}$	0.035	High Tide $i_{avg\ s}$	0.012

Lowest $i_{avg\ n}$	0.014	Highest $i_{avg\ n}$	0.050	Lowest $i_{avg\ s}$	0.007	Highest $i_{avg\ s}$	0.078

- Free product (i.e., source) removal.
- 5 feet (1.52 meters) from ground water surface to flume bottom (8' fill - 3' unsaturated zone = 5' saturated zone).
- Flow in flume from Plum Creek is 1.0 cfs (based on USGS estimation (attached)).
- 800' (243.8 meters) of flume length to which ground water from the site discharges.

Flow in Plum Creek (from USGS estimation - see attached) = 1.0 cfs

$$1.0\ cfs \times 2.832 \times 10^{1}\ l/ft^{3} = 28.3\ l/sec$$

One dimensional, Darcy advection

$$Q = K\ i\ A$$

where:

A = Darcy area
i = hydraulic gradient
K = hydraulic conductivity = 1×10^{-5} m/s

Plume discharge to flume: (Q_p = Plume Flow into Flume)

$i_{avg\ n\ max}$ = (0.050)

A = (58 m) (1.52m) = 88.2 m^2

Q_p = (1×10^{-5} m/s) (0.050) (88.2 m^2)
K $i_{avg\ n\ max}$ A

Q_p = 4.41×10^{-5} m^3/s = 0.044 l/s

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$i_{avg\ n} = (0.031)$

$Q_p = (1 \times 10^{-5}\ m/s)\ (0.031)\ (88.2\ m^2)$
$\quad\quad K \quad\quad\quad i_{avg\ n} \quad A$

$Q_p = 2.73 \times 10^{-5} = 0.027$ liters/sec

Q_p @ $i_{avg\ n\ max} = 0.044$ liters/sec

} Plume Flow into Flume

Q_p @ $i_{avg\ n\ avg} = 0.027$ liters/sec

Ground Water Discharge to Flume (Clean)

(1) Using $i_{avg\ n\ max}$, (and corresponding $i_{avg\ s}$):

$A_n = 186\ m\ (1.52\ m) = 283\ m^2$ (244 m - 58 m = 186 m)

Ground Water Discharge Not Associated With Plume Area

[Total flume length less plume width]

$i_{avg\ n\ max} = 0.050$ $\quad\quad$ $i_{avg\ s} = 0.028\ m^2$

$A_s = 244\ m\ (1.52\ m) = 371\ m^2$

(2) Clean Flow From North of Flume:

$Q_n = (283\ m^2)\ (0.050)\ (1.0 \times 10^{-5}\ m/sec) = 1.42 \times 10^{-4}\ m^3/sec$
$\quad\quad A \quad\quad i_{avg\ n\ max} \quad\quad K$

$Q_n = 0.14$ L/sec

Highest Concentrations Observed in Monitoring Well (MW) or Hydro-punch (HP):			
Contaminant	**MW/HP #**	**Sampling Date**	**Max. Conc. (μg/L)**
Benzene	MW-27	5/95	530
Ethylbenzene	HP-05	11/94	190,000
Toluene	HP-05	11/94	270,000
Xylenes	HP-05	11/94	580,000

Loading Rates into Flume Based on Maximum Concentrations:	
Benzene	(530 μg/L) (0.044 L/sec) = 23.32 μg/sec
Ethylbenzene	(190,000 μg/L) (0.044 L/sec) = 8,360 μg/sec
Toluene	(270,000 μg/L) (0.044 L/sec) = 11,880 μg/sec
Xylenes	(580,000 μg/L) (0.044 L/sec) = 25,520 μg/sec

$i_{avg\ n\ avg}$: (0.027 L/sec) = Loading Rate	
Benzene	(530 μg/L) (0.027 L/sec) = 14.31 μg/sec
Ethylbenzene	(190,000 μg/L) (0.027 L/sec) = 5,130 μg/sec
Toluene	(270,000 μg/L) (0.027 L/sec) = 7,290 μg/sec
Xylenes	(580,000 μg/L) (0.027 L/sec) = 15,660 μg/sec

(3) From South of Flume:

$$Q_s = (371\ m^2)\ (0.028)\ (1.0 \times 10^{-5}\ m/sec) = 1.04 \times 10^{-4}\ m^3/sec$$

[0.028 = $i_{avg\ s}$ corresponding to $i_{avg\ n\ max}$]

Q_s = 0.10 L/sec
(with an $i_{avg\ s}$ corresponding to $i_{avg\ n\ max}$).

(4) Using $i_{avg\ n}$ and $i_{avg\ s}$ Averages:

$$Q_n = (283\ m^2)(0.031)(1.0 \times 10^{-5}\ m/sec) = 8.77 \times 10^{-5}\ m^3/sec$$
$$= 0.09\ L/sec$$

$$Q_s = (371\ m^2)(0.025)(1.0 \times 10^{-5}\ m/sec) = 9.28 \times 10^{-5}\ m^3/sec$$
$$= 0.09\ L/sec$$

$$Q_{t_{flume}} = Q_n + Q_s + Q_{plume} + Q_{Plum\ Creek}$$

At $i_{avg\ n\ max}$,

$$Q_{t_{flume}} = 0.14\ L/sec + 0.10\ L/sec + 0.044\ L/sec + 28.3\ L/sec$$
$$Q_{t_{flume}} = 28.6\ L/sec$$

At $i_{avg\ avg}$,

$$Q_{t_{flume}} = 0.09\ L/sec + 0.09\ L/sec + 0.027\ L/sec + 28.3\ L/sec$$
$$Q_{t_{flume}} = 28.5\ L/sec$$

- Little difference between Q_t @ $i_{avg\ n_{max}}$ and @ $i_{avg\ avg}$.
  $\therefore$ use $i_{i\ avg\ n_{max}}$ (more conservative).

Concentrations Discharged at $i_{avg\ n\ max}$ into Passaic at Flow Rate in Plum Creek Estimated by USGS

- Benzene: (23.32 μg/sec)/(28.6 L/sec) = 0.815 μg/L
- Ethylbenzene: (8,360 μg/sec)/(28.6 L/sec) = 292.3 μg/L
- Toluene: (11,880 μg/sec)/(28.6 L/sec) = 415.4 μg/L
- Xylenes: (25,520 μg/sec)/(28.6 L/sec) = 892.3 μg/L

0288I:PCC00634.W51

United States Department of the Interior

GEOLOGICAL SURVEY
NEW JERSEY DISTRICT OFFICE
WATER RESOURCES DIVISION
MOUNTAIN VIEW OFFICE PARK
810 BEAR TAVERN ROAD, SUITE 206
WEST TRENTON, NJ 08628

TELEFAX TRANSMITTAL FORM

DATE: 6/27/95 TIME: 1710

TO: (LOCATION) Environ

(PERSON) John Butziger

FROM: Allan Brown

SUBJECT: Average flow for Plum Creek

NUMBER OF PAGES TO FOLLOW: 4

SPECIAL INSTRUCTIONS:

IF THERE IS A PROBLEM, CALL 609-771-3902
FAX NUMBER 609-452-0284

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United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Water Resources Division
Mountain View Office Park
810 Bear Tavern Road, Suite 206
West Trenton, New Jersey 08628

June 27, 1995

Mr. John Butziger
Environ
214 Carnegie Center
Princeton, NJ 08540-6284

Dear Mr. Butziger:

We have estimated the mean annual discharge for Plum Creek at its confluence with the Passaic River as 1 cfs (cubic foot per second). The calculation of this estimate was based on a regional average flow per square mile from six nearby sites at which we have collected streamflow information. These six sites, the calculation of the average discharge, and the delineation of the drainage area are shown on the enclosures. The estimate is very approximate because it does not include discharges to the stream from manmade sources and because we do not have good topographic control beyond that shown on our topographic maps to accurately determine the drainage area.

If you have more questions, please call me at 609-771-3967 or Bob Schopp at 609-771-3968.

Sincerely yours,

G. Allan Brown
Hydrologist

Enclosure

GAB:nm

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Average discharge calculation for Plum Creek, tributary to Passaic River

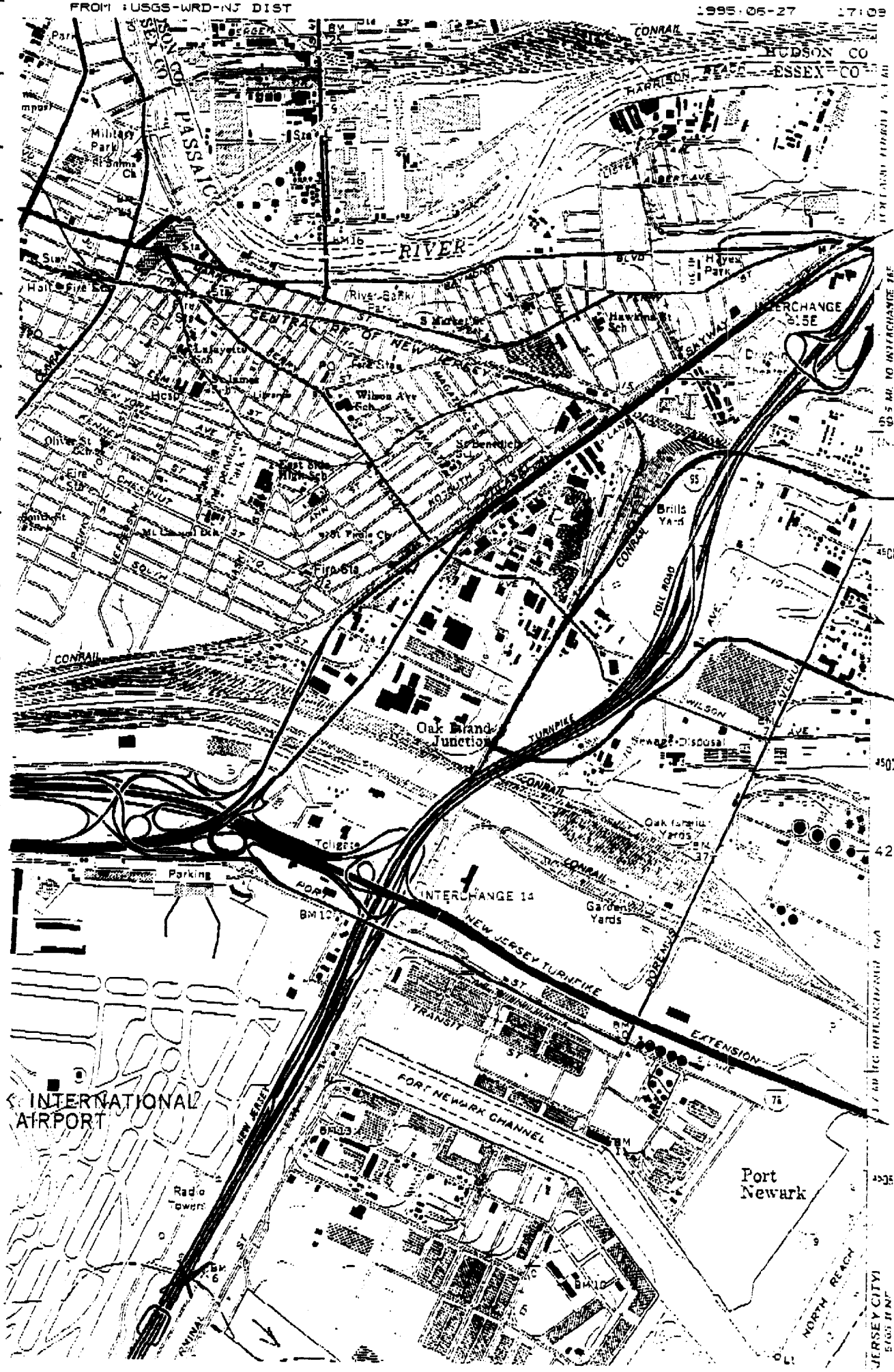
Site	Drainage area	Average discharge	Discharge per square mile
01393450 Elizabeth River at Ursino Lake	16.9 mi^2	28.80 cfs	1.70 cfs/mi^2
01393500 Elizabeth River at Elizabeth	20.2	25.50	1.26
01392000 Weasel Brook at Clifton	4.45	6.74	1.51
01392200 Third River at Nutley	11.40	25.48	2.23
01392710 Third River at Passaic	11.80	21.60	1.83
01392500 Second River at Belleville	11.60	18.30	1.58

Average 1.7 cfs/mi^2

Delineated drainage area of Plum Creek (see maps) = 0.58 mi^2

Average discharge for Plum Creek = 0.58 mi^2 x 1.7 cfs/mi^2
= 0.99 cfs/mi^2 = 1 cfs/mi^2

GAB
6/26/95



Elizabeth 7½ USGS quad

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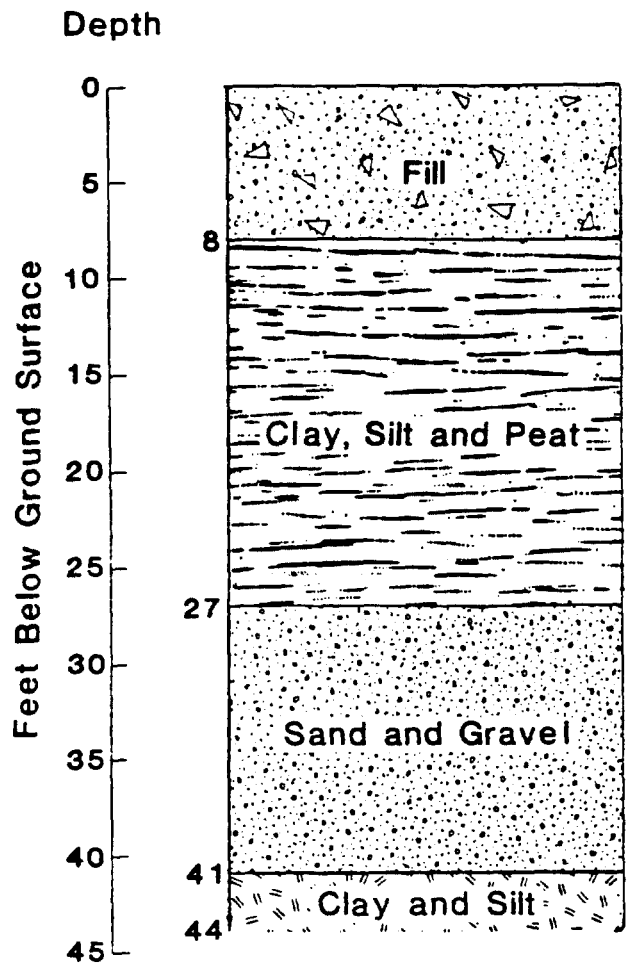
Jersey City
7½' USGS
quad

Plum
Creek

Revised
Mouths of
Passaic &
Hackensack
River
Pas
2-14-94

845030525

Clay, Silt and Peat



Thickness Varies from 2 to 11 Feet

Thickness Varies from 18 to 22 Feet

Thickness Varies from 13 to 14 Feet

Total Thickness Unknown, Known Thickness Varies from 2 to 4 Feet

FROM PHASE II ECRA SAMPLING PLAN RESULTS, 1988

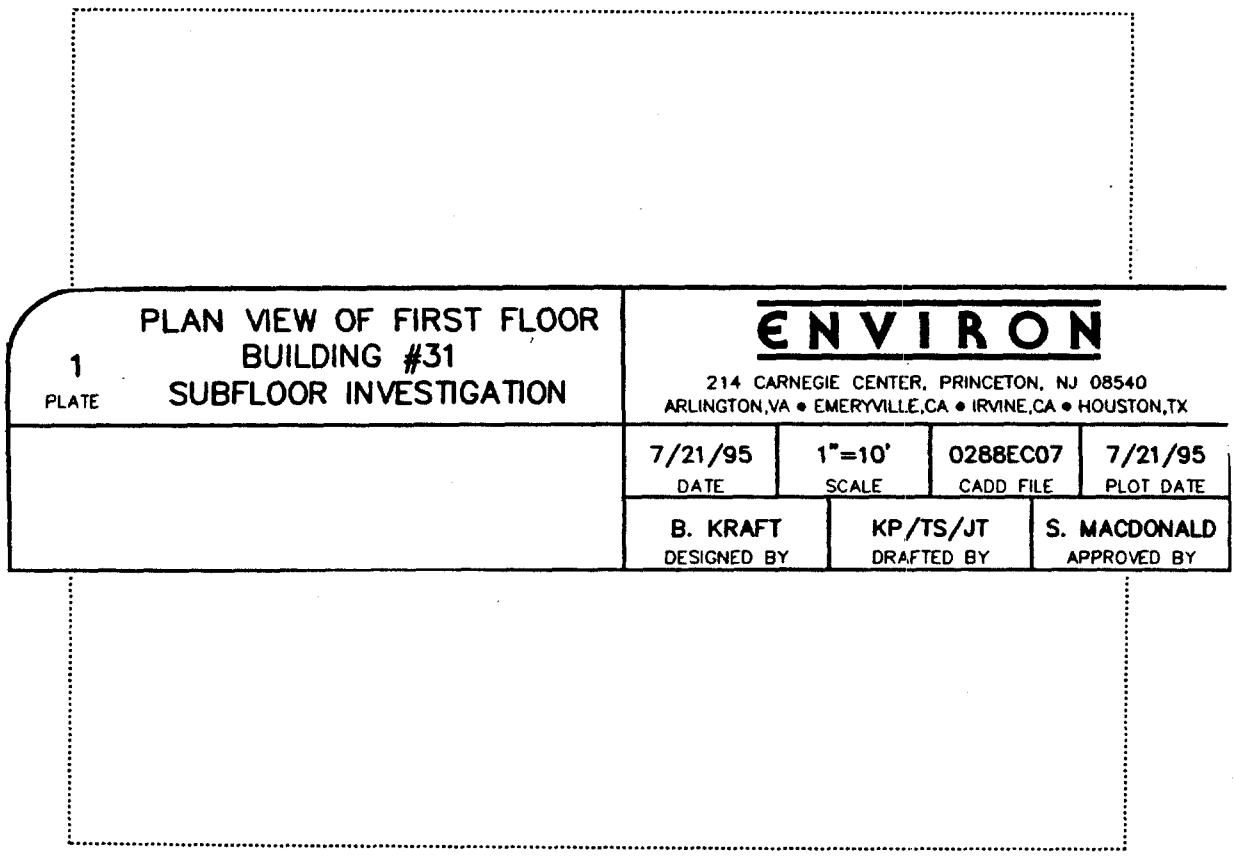
Thickness shown in column is an average thickness over the entire site compiled from the fourteen sets of well data.

ENVIRON
Counsel in Health and Environmental Science

Generalized Geologic Column
Spencer-Kellogg Site
Newark, New Jersey

Figure

THIS MAP CAN BE FOUND IN THE SITE FILE LOCATED AT: U.S. EPA SUPERFUND RECORDS CENTER, 290 BROADWAY, 18TH FLOOR, NY,NY 10007



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Canonie Environmental

July 1992 90-247

FINAL REPORT ON SOILS REMEDIATION
TEXTRON INC.
FORMER SPENCER KELLOGG FACILITY
NEWARK, NEW JERSEY

ECRA CASE NO. 85403

845030528

July 1992 90-247

FINAL REPORT ON SOILS REMEDIATION
TEXTRON INC.
FORMER SPENCER KELLOGG FACILITY
NEWARK, NEW JERSEY

ECRA CASE NO. 85403

845030529

CanonieEnvironmental

TABLE OF CONTENTS

	PAGE
LIST OF TABLES	i
LIST OF FIGURES	ii
LIST OF APPENDICES	iii
1.0 INTRODUCTION	1
2.0 REMEDIATION OF AECs	4
2.1 VOC Areas	5
2.1.1 AEC 1	5
2.1.2 AECs 3, 4, and 5	7
2.1.3 AEC 7	10
2.1.4 AEC 9	11
2.1.5 AEC 12	12
2.1.6 AEC 12S	13
2.1.7 AEC 14	15
2.1.8 AEC 16	16
2.1.9 AEC 17	17
2.1.10 AEC 19	18
2.1.11 AEC 21	19
2.1.12 AEC 25	20
2.2 BN Areas	22
2.2.1 AEC 8	22
2.2.2 AEC 15	24

TABLE OF CONTENTS

(Continued)

	PAGE
2.2.3 AEC 18	25
2.2.4 AEC 28	26
2.2.5 MW 7 Area	27
2.2.6 MW 12 Area	28
2.2.7 MW 15 Area	29
2.2.8 Boring 1707/1712 Area	30
2.2.9 Boring 2303/2304 Area	31
2.2.10 Boring 306/307 Area	32
2.2.11 MW 10/Boring M2401 Area	34
3.0 ON-SITE SOIL TREATMENT	36
3.1 Soil Treatment Levels	36
3.2 LTTA® Mobilization	37
3.3 Permitting	38
3.4 LTTA® Startup	38
3.5 VOC-Impacted Soil Treatment	39
3.6 BN-Impacted Soil Treatment	40
4.0 OFF-SITE DISPOSAL	42
4.1 ID-13 Debris	42
4.2 Asphalt	42

TABLE OF CONTENTS

(Continued)

	PAGE
4.3 Concrete	43
4.4 Stabilized AEC 12 Resin	43
4.5 Railroad Ties	43
4.6 Perched Water from AEC 12	44
4.7 Storm Water	44
5.0 HEALTH AND SAFETY	45
5.1 Construction Safety Statistics	45
5.2 Air Sampling	46
5.2.1 Background Air Sampling	47
5.2.2 Air Sampling During Excavation	48
5.2.3 Screen-All and Feed Hopper Air Sampling	49
5.2.4 Personal Air Sampling	49
5.3 Air Monitoring by Direct Reading Instruments	49
5.3.1 VOC and Total Dust Air Monitoring at AECs	50
5.3.2 VOC and Total Dust Air Monitoring at the LTTA Unit	51
6.0 QA/QC	52
6.1 Overall QA Program	52
6.2 Audits	54
6.3 On-Site Laboratory Data Quality Objectives	54

TABLE OF CONTENTS

(Continued)

	PAGE
6.3.1 Precision	55
6.3.2 Accuracy	56
6.3.3 Completeness	57
6.3.4 Representativeness	57
6.3.5 Comparability	58
6.4 Reporting of On-Site Laboratory Data	59
6.4.1 Post-Excavation VOC Samples	59
6.4.2 Post-Treatment VOC Samples	60
6.5 Off-Site Confirmation of On-Site Results	60
6.5.1 Comparison of Analytical Results - On-Site 8020 Versus Off-Site 8020	61
6.5.2 Comparison of Analytical Results - On-Site 8020 Versus Off-Site 8240	62
6.5.2.1 Post-Excavation Results	63
6.5.2.2 Post-Treatment Results	63
6.6 Off-Site BN Results	63
6.7 Additional QA Measurements	64
6.7.1 PAS Results	65
6.7.2 MDL Results	65

TABLE OF CONTENTS

(Continued)

	PAGE
6.7.3 Initial Calibration Results	66
6.7.4 Continuing Calibration Results	66
6.7.5 Surrogate Standard	66
6.8 Conclusions	66
7.0 SURFACE RESTORATION	69
7.1 Off-Site Fill Material	69
7.2 Railroad Tracks	69
7.3 AEC 7 Concrete Pad	70
7.4 Asphalt	70
8.0 COSTS	71
9.0 SCHEDULE	72
REFERENCES	
TABLES	
FIGURES	
APPENDICES	

LIST OF TABLES

TABLE NUMBER	TITLE
1	Excavation Quantities Summary
2	AEC 1 - Post-Excavation Samples
3	AECs 3,4,5 - Post-Excavation Samples
4	AEC 7 - Post-Excavation Samples
5	AEC 12S - Post-Excavation Samples
6	AEC 14 - Post-Excavation Samples
7	AEC 16 - Post-Excavation Samples
8	AEC 17 - Post-Excavation Samples
9	AEC 19 - Post-Excavation Samples
10	AEC 21 - Post-Excavation Samples
11	AEC 25 - Post-Excavation Samples
12	AEC 8 - Post-Excavation Samples
13	AEC 9 - Post-Excavation Samples
14	AEC 15 - Post-Excavation Samples
15	AEC 18 - Post-Excavation Samples
16	AEC 28 - Post-Excavation Samples
17	MW 7 - Post-Excavation Samples
18	MW 12 - Post-Excavation Samples
19	MW 15 - Post-Excavation Samples
20	Borings 1707/1712- Post-Excavation Samples
21	Borings 2303/2304 - Post-Excavation Samples
22	Borings 306/307 - Post-Excavation Samples
23	MW 10/ Boring M2401 - Post-Excavation Samples

LIST OF TABLES

(Continued)

TABLE NUMBER	TITLE
24	VOC Soil Processing Daily Log
25	VOC Soil Processing - Summary of Daily Results
26	BN Soil Processing - Summary of Daily Results
27	Off-Site Disposal Log
28	Charcoal Tube Samples - Summary of Results
29	Air Monitoring - Summary of Results
30	Comparison of QC Limits
31	Project Precision Results
32	Project Accuracy Results
33	Off-Site Confirmatory Analysis VOC Post-Excavation Samples Summary of Method 8020 Results vs. On-Site Method 8070 Results
34	Off-Site Confirmatory Analysis VOC Post-Excavation Samples Summary of Method 8020 Results vs. On-Site Method 8070 Results
35	Off-Site Confirmatory Analysis VOC Post-Excavation Samples Summary of Method 8020 Results vs. On-Site Method 8240 Results

LIST OF TABLES

(Continued)

TABLE NUMBER	TITLE
36	Precision and Accuracy Study
37	Method Detection Limit Results
38	Initial Calibration Summary (% RSD)
39	Continuing Calibration Summary
40	LTTA® Startup Tests

LIST OF FIGURES

FIGURE NUMBER	DRAWING NUMBER	TITLE
1	90-247-A18	Site Location Map
2	90-247-E17	Final Excavation Limits and Post-Excavation Samples
3	90-247-E31	Project Schedule

LIST OF APPENDICES

APPENDIX	TITLE
A	VOC Post-Excavation Results
B	BN Post-Excavation Results
C	VOC Post-Treatment Results
D	BN Post-Treatment Results
E	Debris Disposal Documentation
F	Asphalt Weight Tickets
G	Concrete Weight Tickets
H	Non-Hazardous Waste Landfilled at Model City
I	Railroad Tie Weight Tickets
J	Perched Liquid Disposal Manifests
K	Stormwater Disposal
L	Daily Air Monitoring Records
M	Charcoal Tube Sample Results
N	Method 8020 Off-Site Analytical Duplicate Results
O	Method 8240 Off-Site Analytical Duplicate Results
P	Field Audit Reports
Q	Clean Fill Analysis
R	AEC 7 Concrete Pad As-Built Drawing
S	New Jersey Tier II On-Site VOC Data Package
T	New Jersey Tier II Off-Site VOC Data Package
U	New Jersey Tier II BN Data Package
V	QA/QC Data Calculations
X	Permits

FINAL REPORT ON SOILS REMEDIATION
TEXTRON INC.
FORMER SPENCER KELLOGG FACILITY
NEWARK, NEW JERSEY
ECRA CASE NO. 85403

1.0 INTRODUCTION

This final report has been prepared to document remedial actions conducted between October 1, 1991 and April 8, 1992 at the Former Spencer Kellogg Facility in Newark, New Jersey. A site location map is provided as Figure 1. The remedial actions were conducted by Canonie Environmental Services Corp. (Canonie) under contract with Textron Inc. (Textron). The remedial actions were performed in accordance with the requirements of the New Jersey Environmental Cleanup Responsibility Act (ECRA), an Administrative Consent Order dated July 25, 1985, Textron's approved Cleanup Plan, and related correspondence.

The basis for the remedial action was provided in ENVIRON Corp.'s (ENVIRON's) October 1990 ECRA Cleanup Plan that the New Jersey Department of Environmental Protection and Energy (NJDEPE) conditionally approved by letter dated February 8, 1991. The Cleanup Plan specified on-site thermal aeration as the method for remediation of unsaturated site soils containing volatile organic compounds (VOCs) or base neutral (BN) compounds in excess of the site cleanup levels. The approved site cleanup levels were 10 parts per million (ppm) for total VOCs, 1 ppm for benzene, 10 ppm for total carcinogenic polycyclic aromatic hydrocarbons (CaPAHs), and 100 ppm for total BNs.

Project Planning Documents, consisting of a Work Plan, Health and Safety Plan (HASP), and Quality Assurance Project Plan (QAPP), were developed by Canonie to provide additional detail on the planned remedial actions. The Project Planning Documents were submitted to the NJDEPE on May 22, 1991, and were approved on

October 31, 1991. No significant deviations from the Project Planning Documents occurred during the course of the remedial action.

This Final Report describing the field activities performed by Canonie during the remedial action is organized into the following sections:

- Section 2.0 - Describes remediation of individual Areas of Environmental Concern (AECs) at the site.
- Section 3.0 - Describes the on-site thermal aeration of contaminated site soils.
- Section 4.0 - Documents all materials disposed of off-site.
- Section 5.0 - Summarizes the health and safety activities conducted during the project.
- Section 6.0 - Describes the quality assurance/quality control (QA/QC) measures performed.
- Section 7.0 - Documents the surface restoration performed at the close of the project.
- Section 8.0 - Presents the total costs for remedial actions performed by Canonie.
- Section 9.0 - Presents the schedule achieved by Canonie during execution of the project.

The Final Report is provided in several volumes. Volume 1 presents the text, tables, and figures. Volume 2 presents Appendices A through R and Appendices V and X which contain backup documentation and data. Volumes 3.1 through 3.5 present Appendix S in five separate binders. Volume 4 consists of Appendix T and is contained in an individual storage box. Volume 5 consists of Appendix U and is contained in an individual storage box.

2.0 REMEDIATION OF AECs

Table 3 of Canonie's May 1991 Work Plan identified 22 individual AECs to be remediated. These areas are listed in Table 1 and shown on Figure 2. During the remedial action, all areas were excavated vertically to the water table. The areas were excavated horizontally until results of post-excavation samples from the sidewalls of each excavation were below the appropriate site cleanup level, or until the horizontal limits of the excavation reached a building structure or property line. The excavated soil was thermally aerated on-site in Canonie's low temperature thermal aeration (LTTA®) system to below the site cleanup levels and then backfilled into the excavated AECs. The surface of each backfilled AEC was then restored to its original condition.

Table 1 compares the quantity of material from each area which was anticipated in the Work Plan to be excavated with the actual quantity excavated. Figure 2 shows the initial and final excavation limits and the location of all post-excavation samples for each area.

As specified in the Work Plan, post-excavation samples were collected every 30 linear feet around the excavations. In addition to the post-excavation sampling locations specified in the Work Plan, samples were also collected where unsaturated soils were present beneath site structures (e.g., retaining walls and building foundations) adjacent to excavated areas, as required by NJDEPE's October 31, 1991 letter to Textron.

2.1 VOC Areas

Fourteen AECs containing a total of 5,248 cubic yards of VOC-impacted soil above the site cleanup levels were excavated and treated during the remedial action. The VOC site cleanup levels were:

- o 10 ppm total VOCs;
- o 1 ppm benzene.

The post-excavation samples were analyzed for VOCs by SW-846 Method 8020 in an on-site laboratory. The on-site results were reported on a wet weight basis, as allowed for by SW-846 Method 8020. As discussed in detail in Section 6.4, the conclusions presented below remain unchanged when the wet weight data are converted to dry weight data. Duplicates of over 10 percent of the post-excavation VOC samples were analyzed at off-site laboratories by either SW-846 Method 8020 or SW-846 Method 8240.

The remediation of each individual VOC area is discussed in the following sections.

2.1.1 AEC 1

The initial and final excavation limits in AEC 1, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 1 are summarized in Table 2.

Prior to excavation of AEC 1, the overlying railroad tracks and asphalt were removed. AEC 1 was then excavated on February 8, 1992 to the initial limits specified in the Work Plan. Post-excavation samples P-1, P-2, P-3, and P-4 were collected after excavation to the initial limits. Samples P-1, P-3, and P-4 were collected in the

locations specified in the Work Plan. Sample P-2 was collected 10 feet east of the location specified in the Work Plan as requested by the NJDEPE in its correspondence to Textron dated October 31, 1991. The analytical results of the initial AEC 1 sampling show that samples P-3 and P-4 were below the site cleanup levels, while samples P-1 and P-2 exceeded the 10 ppm total VOC criteria.

Further excavation beyond sample P-1 was performed on February 17, 1992 and a new sample, identified as P-1A, was collected. The results of P-1A were above the 10 ppm total VOC criteria. Therefore, the AEC 1 excavation was further extended beyond samples P-1A and P-2 on February 23, 1992 and two new samples, identified as P-1B and P-2A, were collected. As shown on Figure 2, the AEC 1 excavation was extended to the north until a concrete structure was encountered. The top of this structure was buried six inches below the asphalt surface grade and extended to a depth of approximately three feet below grade. No unsaturated soils were present below the structure, therefore, no samples were collected at this location. Sample P-2A was collected adjacent to the eastern end of the structure (as far west as was possible). The results of samples P-1B and P-2A were below the site cleanup levels. Therefore, no further excavation was required.

Samples P-97 and P-98 were collected on February 8, 1992 from unsaturated soils exposed below tank retaining walls adjacent to AEC 1. Sample P-97 was below the cleanup criteria. Sample P-98 exceeded the cleanup criteria. An additional sample, identified as P-98A, was collected on February 24, 1992 1 foot further into the sidewall beyond sample P-98. Sample P-98A also exceeded the VOC cleanup criteria. Due to the presence of the large tank above this area, no further excavation or sampling was conducted.

A total of 307 cubic yards of VOC-impacted soil was excavated from AEC 1. The soils were screened to remove any oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were placed in a stockpile area and

allowed to naturally aerate. The stockpiled rocks were monitored with an organic vapor analyzer (OVA) until no organic vapor emissions were present above background levels defined that day, and then backfilled into an open excavation. Daily background levels were determined adjacent to and upwind of the rock stockpile area. Any screened debris materials were disposed of at the Essex County Transfer Station as ID-13 material. The railroad ties removed from AEC 1 were recycled at Alternate Disposal Systems Inc. (ADSI) in Parlin, New Jersey, a facility approved by the NJDEPE to accept railroad ties. The asphalt removed from the surface of AEC 1 was recycled at S,D&G Aggregates (S,D&G) in Carteret, New Jersey, a facility approved by the NJDEPE for asphalt recycling.

After the completion of excavation, AEC 1 was backfilled with soil which had been treated in the LTTA® system to below the site cleanup levels. The asphalt and railroad tracks were then restored to their original line and grade.

2.1.2 AECs 3, 4, and 5

The initial and final excavation limits in AECs 3, 4, and 5, as well as the location of all post-excavation samples collected in these areas, are shown on Figure 2. The results of all post-excavation samples from AECs 3, 4, and 5 are summarized in Table 3.

The railroad tracks were removed from AECs 3, 4, and 5 between November 1, 1991 and November 4, 1991. Excavation was then started at the eastern boundary of AEC 5 and proceeded westward. Excavation to the northern property line was proposed in the Work Plan, but was not possible without compromising the integrity of the retaining wall located adjacent to and approximately two feet south of the northern property line. Therefore, in order to avoid removal of the retaining wall or comprising the integrity of the structure, the northern boundary of the AECs 3, 4, and

5 excavation was located one foot south of the concrete retaining wall (three feet south of the property line).

The Borings 306/307 BN area was located within the western half of AEC 3. Excavation of this BN area and collection of the required number of sidewall samples with BN and CaPAH concentrations below the cleanup criteria were completed prior to the excavation of the western half of AEC 3 in connection with the VOC remediation. Excavation and sampling in the Borings 306/307 BN area are discussed in Section 2.2.10.

The Work Plan required collection of three post-excavation VOC samples, P-9, P-10, and P-11 after excavation to the initial limits of AECs 3, 4, and 5. As shown in Table 3, samples P-9 and P-11 were below the VOC cleanup level and sample P-10 exceeded the 10 ppm total VOC cleanup criteria.

The southern border of the AEC 4 excavation was extended 3 feet beyond sample P-10 on December 4, 1991 and a new sample, identified as P-10A, was collected. The results of P-10A were below the 10 ppm total VOC cleanup criteria. Therefore, no further excavation in this area was required.

In addition to the three post-excavation VOC samples required by the Work Plan, 16 post-excavation VOC samples were collected at locations along the northern boundary of AECs 3, 4, and 5 from exposed soil beneath the retaining wall as required by the NJDEPE's October 31, 1991 letter. In 4 of these 16 sample locations, an additional sample, identified by the -A suffix, was collected 1 foot further into the sidewall beyond the original sample. The results of 9 of the 16 samples from the initial sample locations along the northern excavation boundary, as well as all four of the "-A" samples, exceeded the 10 ppm total VOC cleanup criteria.

The southern limit of the AEC 4 excavation was defined by the northern dike wall of the adjacent tank farm. The exposed soils beneath the dike wall foundation were below the high tide water level. Samples of the saturated soils were collected from four locations, identified as P-85, P-86, P-87, and P-88 beneath the dike wall foundation. The results of three of these samples, P-85, P-87, and P-88, exceeded the 10 ppm total VOC cleanup criteria. In these three locations, an additional sample, identified by the -A suffix, was collected from the saturated soils 1 foot further into the sidewall beyond the original sample. The results of P-85A and P-88A exceeded the 10 ppm total VOC cleanup criteria. The results of P-87A were below the 10 ppm total VOC cleanup criteria.

A total of 1333 cubic yards of VOC-impacted soil was excavated from AECs 3, 4, and 5. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris materials were disposed of at the Essex County Transfer Station as ID-13 material. The railroad ties removed from AECs 3, 4, and 5 were recycled at ADSI in Parlin, New Jersey.

Prior to the remediation, it was anticipated that the top 6 inches of material in AEC 4 would have a sticky, resinous consistency which would prevent it from being processed in the LTTA® system. Therefore, the Work Plan indicated that this material would be disposed of off-site. However, once excavation began, the material was found to have physical characteristics which allowed for processing in the LTTA® system. It was therefore treated in the LTTA® system rather than disposed of off-site.

After excavation of AECs 3, 4, and 5 to the final limits, the area was backfilled with clean, imported fill material. Imported fill material was used because at the time that AECs 3, 4, and 5 were ready for backfilling, the quantity of clean, processed soil from

the LTTA® system required to backfill the excavation was not available. The certification and analysis of the imported fill material is discussed in Section 7.1. The railroad tracks in AECs 3, 4, and 5 were then replaced to their original line and grade.

2.1.3 AEC 7

The initial and final excavation limits in AEC 7, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 7 are summarized in Table 4.

AEC 7 represents a truck loading area adjacent to the tank farm which is an integral part of the site's ongoing manufacturing operations. In order to minimize the length of time that AEC 7 was partially excavated while the final excavation limits were determined, sampling was performed along the sidewalls of trenches excavated around AEC 7 prior to excavation of the interior of AEC 7. In this way, the final excavation limits could be determined while AEC 7 was in use, after which the entire excavation and backfilling could quickly be completed.

The concrete pad covering AEC 7 was removed between December 17 and 19, 1991. The initial post-excavation VOC samples required in the Work Plan, P-12 through P-16, were obtained on December 17, 1991. Samples were collected after removal of the concrete pad by hand excavating trenches to the required sample depth of 1.5 feet. Of these five initial samples, all but one (P-14) exceeded the 10 ppm total VOC cleanup criteria.

The AEC 7 limits were extended a minimum of 5 feet and 5 new post-excavation samples, P-12A through P-16A, were collected on December 18, 1991 via hand excavation. All of these samples except P-12A were below the 10 ppm total VOC cleanup criteria. The AEC 7 limits were subsequently extended three times beyond sample P-12A and three new post-excavation samples, identified sequentially as P-

12B, P-12C, and P-12D, were collected via hand excavation. The final excavation limits of AEC 7 were defined after collection of P-12D, which contained total VOCs below the 10 ppm cleanup level.

The remaining concrete and asphalt were removed from the surface of AEC 7 prior to excavation of the underlying soils. AEC 7 was then excavated to the final limits, defined by the sample results below the 10 ppm limit, between January 31, 1992 and February 6, 1992.

No unsaturated exposed soils were present below the foundation to the tank farm retaining wall which defined the northern limit of the AEC 7 excavation.

A total of 475 cubic yards of VOC-impacted soil was excavated from AEC 7. The soils were screened to remove any oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The removed concrete pad and asphalt were recycled at S,D&G in Carteret, New Jersey, a facility approved by the NJDEPE for concrete recycling.

After the completion of excavation, AEC 7 was backfilled with soil which had been treated in the LTTA® to below the site cleanup levels. The concrete pad was then restored to its original grade.

2.1.4 AEC 9

AEC 9 was remediated for VOCs. However, consistent with the requirements of NJDEPE's October 31, 1991 letter to Textron, a post-excavation sample was also collected for BN analysis. The initial and final excavation limits in AEC 9, as well as

the location of all post-excavation samples collected in this area, are shown on Figure 2. The result of the VOC post-excavation sample from AEC 9 is summarized in Table 5. The result of the BN post-excavation sample from AEC 9 is summarized in Table 13.

AEC 9 was an area of approximately 1 cubic yard which was located beneath the concrete floor inside Building 16. After removal of the concrete floor, AEC 9 was excavated to the limits specified in the Work Plan on November 13, 1991. Post-excavation sample P-21 was then collected at the location specified in the Work Plan. Sample P-21 was analyzed for both VOCs and BNs. The results of sample P-21 were below the applicable VOC and BN cleanup levels. Therefore, no further excavation in AEC 9 was required.

A total of 3 cubic yards of soil was excavated from AEC 9. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The broken pieces of the concrete floor were disposed of at S,D&G in Carteret, New Jersey.

After the completion of excavation, AEC 9 was backfilled with soil which had been treated in the LTTA® system to below the site cleanup levels. The concrete floor was then restored to its original grade.

2.1.5 AEC 12

The initial and final excavation limits of AEC 12 are shown on Figure 2. Under the Cleanup Plan, no post excavation samples were required in AEC 12 because the excavation limits were pre-determined. AEC 12 was an area located beneath Building

4 at the site. The poor access (through a crawlspace approximately 3 feet high) into AEC 12 prevented excavation by standard excavation equipment. High-pressure vacuum equipment was used to remove the materials in AEC 12. Excavation of AEC 12 started on October 15, 1991 at the area's western boundary. The material removed from the western one-fourth of AEC 12 (approximately 150 cubic yards) was granular soil which was thermally treated on-site in the LTTA® system. The material in the eastern three-fourths of AEC 12 was of a resinous consistency which was not suitable for on-site treatment in the LTTA® system due to its physical characteristics. Bentonite was added to the resinous material to bind up excess moisture present in the soil prior to transport of the resin off-site for disposal. The stabilized resin, as well as the debris which was also removed from AEC 12, was disposed of under New Jersey hazardous waste code C433 at Chemical Waste Management's Model City, New York landfill.

After the completion of excavation, AEC 12 was backfilled to its original grade with soil which had been treated in the LTTA® system to below the site cleanup levels.

2.1.6 AEC 12S

The initial and final excavation limits in AEC 12S, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 12S are summarized in Table 6.

AEC 12S was not identified in the Work Plan as an area to be remediated. However, in its October 31, 1991 letter to Textron, NJDEPE required that a sample for VOC analysis be collected south of former boring location 1202, outside the perimeter of Building 4 (AEC 12). A sample from this area, located 20 feet east of the southwest corner of Building 4 and 4 feet south of the southern boundary of the AEC 12 excavation, was collected on November 21, 1991. The results of this sample

exceeded the 10 ppm total VOC criteria. Therefore, excavation of the surrounding area was required.

A square area centered on the initial boring with 9-foot long sidewalls was excavated on February 28, 1992. Samples P-101, P-102, and P-103 were then collected from the west, south, and east sidewalls, respectively, of the excavation on February 28, 1992. The northern side of the square abutted AEC 12, an area previously remediated. Samples P-101 and P-102 were below the site cleanup criteria while sample P-103 exceeded the 10 ppm total VOC cleanup level.

On March 3, 1992 the AEC 12S excavation was extended 10 feet east beyond sample P-103 and a new sample, identified as P-103A, was collected. Sample P-103A was below the 10 ppm total VOC cleanup criteria. Therefore, no further excavation in AEC 12S was required.

A total of 27 cubic yards of VOC-impacted soil was excavated from AEC 12S. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of AEC 12S was recycled at S,D&G in Carteret, New Jersey

After the completion of excavation, AEC 12S was backfilled to its original grade with soil which had been treated in the LTTA® system to below the site cleanup levels.

2.1.7 AEC 14

The initial and final excavation limits in AEC 14, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 14 are summarized in Table 7.

Prior to excavation of AEC 14, the overlying asphalt was removed. AEC 14 was then excavated between January 30, 1992 and February 14, 1992 to the initial limits specified in the Work Plan. Post-excavation samples P-24 through P-30 were then collected at the locations specified in the Work Plan. The analytical results of the initial AEC 14 sampling show that all samples exceeded the 10 ppm total VOC cleanup criteria except P-29 and P-30.

On February 17, 1992, the AEC 14 excavation was extended 7 feet south, west, and north and 5 new post-excavation samples, identified as P-24A through P-28A, were collected. These analytical results showed that the five additional soil samples exceeded the 10 ppm total VOC cleanup criteria.

On February 19, 1992, the AEC 14 excavation was extended an additional 5 feet south, west, and north and 5 new post-excavation samples, identified as P-24B through P-28B, were collected. All of these samples were below the 10 ppm total VOC cleanup criteria except P-24B.

On February 22, 1992, the AEC 14 excavation was extended 5 feet north and a new sample, identified as P-24C, was collected. Sample P-24C exceeded the VOC cleanup criteria.

On February 23, 1992, the AEC 14 excavation was extended an additional 5 feet north and sample P-24D was collected. Sample P-24D exceeded the VOC cleanup criteria.

On February 25, 1992 the AEC 14 excavation was extended an additional 5 feet north and sample P-24E was collected. At this point, the northern boundary had been extended 5 times and the western boundary had been extended twice. Therefore, two additional sidewall samples, P-99 and P-100, were collected to maintain the sample spacing criteria of 1 post-excavation sample per 30 linear feet specified in the Work Plan. Samples P-24E, P-99, and P-100 were all below the 10 ppm total VOC cleanup criteria. Therefore no further excavation in AEC 14 was required.

A total of 871 cubic yards of VOC-impacted soil was excavated from AEC 14. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of AEC 14 was recycled at Clayton Block in Lakewood, New Jersey, a facility approved by the NJDEPE for asphalt recycling. Approximately twenty abandoned concrete pile caps, each approximately four feet high and three feet in diameter, were removed from AEC 14 during excavation of the area. The concrete pile caps were crushed on-site and recycled at S,D&G in Carteret, New Jersey.

After the completion of excavation, AEC 14 was backfilled with soil which had been treated in the LTTA® system to below the site cleanup levels. The asphalt was then restored to the original grade.

2.1.8 AEC 16

The initial and final excavation limits in AEC 16, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 16 are summarized in Table 8.

The overlying asphalt and a rail spur approximately 40 feet long were removed prior to excavation. AEC 16 was then excavated between December 7 and 12, 1991 to the limits specified in the Work Plan. Post-excavation samples P-31 through P-34 were then collected at the locations specified in the Work Plan. The results of all four samples were below the 10 ppm total VOC cleanup criteria. Therefore, no further excavation in AEC 16 was required.

A total of 189 cubic yards of VOC-impacted soil was excavated from AEC 16. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The railroad ties removed from AEC 16 were disposed of at ADSI in Parlin, New Jersey. The asphalt removed from the surface of AEC 16 was recycled at Clayton Block in Lakewood, New Jersey.

After the completion of excavation, AEC 16 was backfilled with soil which had been treated in the LTTA® system to below the site cleanup levels. The asphalt was then restored to its original grade. Pursuant to an agreement reached with Reichhold, the rail spur was not replaced.

2.1.9 AEC 17

The initial and final excavation limits in AEC 17, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 17 are summarized in Table 9.

The MW 10/Boring M2401 BN area was located within AEC 17. Excavation of this BN area and collection of the required number of sidewall samples with BN and

CaPAH concentrations below the cleanup criteria was completed prior to the excavation of AEC 17. Excavation and sampling in the MW 10/Boring M2401 BN area are discussed in Section 2.2.11.

After the completion of the MW 10/Boring M2401 excavation and removal of the remaining asphalt from the surface of AEC 17, the remaining portions of AEC 17 were excavated on January 16 through 19, 1992 to the limits specified in the Work Plan. Post-excavation samples P-43 through P-47 were then collected at the locations specified in the Work Plan. In addition, samples P-89 through P-91 were collected from sidewalls of excavations where unsaturated soils were present below building foundations. The results of all eight of these samples were below 10 ppm total VOC cleanup criteria. Therefore, no further excavation in AEC 17 was required.

A total of 315 cubic yards of VOC-impacted soil was excavated from AEC 17. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface was recycled at Clayton Block in Lakewood, New Jersey.

After the completion of excavation, AEC 17 was backfilled with soil which had been treated in the LTTA® system to below the site cleanup levels. The asphalt was then restored to its original grade.

2.1.10 AEC 19

AEC 19 was an area around an empty aboveground storage tank surrounded by a concrete retaining wall. A portion of the concrete retaining wall was removed to

make the area accessible to excavation equipment. AEC 19 was then excavated between December 17, 1991 and December 22, 1991. The AEC 19 retaining wall's foundation and the base of the tank extended below the water table. Therefore, since the excavation sidewalls had no exposed unsaturated soils, no post-excavation samples were collected. The AEC 19 excavation limits are shown on Figure 2.

A total of 350 cubic yards of VOC-impacted soil was excavated from AEC 19. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. The screened debris was disposed of at the Essex County Transfer Station as ID-13 material. Any concrete pieces from the retaining wall were recycled at Clayton Block in Lakewood, New Jersey, a facility approved by the NJDEPE for concrete recycling.

After the completion of excavation, AEC 19 was backfilled to its original grade with soil which had been treated in the LTTA® system to below the site cleanup levels.

2.1.11 AEC 21

The initial and final excavation limits in AEC 21, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 21 are summarized in Table 10.

AEC 21 was located adjacent to the southern boundary of the area where the LTTA® was erected for thermal processing. Samples P-58 and P-59 were collected from trenches on the northern edge of AEC 21 on September 4, 1991 prior to mobilization of the LTTA® in order to determine the excavation limits prior to setting up the LTTA® system. Samples P-58 and P-59 were below the 10 ppm total VOC cleanup criteria.

After removal of the overlying asphalt, AEC 21 was excavated between February 25, 1992 and March 3, 1992 to the initial limits specified in the Work Plan. Post-excavation samples P-55, P-56, and P-57 from AEC 21's western sidewall and P-60, P-61, and P-62 from AEC 21's eastern sidewall were then collected at the locations specified in the Work Plan. The three samples from the eastern sidewall were all below the 10 ppm total VOC cleanup criteria, while the three samples from the western sidewall were above the cleanup limits.

On March 4, 1992, the AEC 21 excavation was extended 3 feet west and 3 new post-excavation samples, identified as P-55A, P-56A, and P-57A, were collected. The results of all three of these samples were below the 10 ppm total VOC cleanup criteria. Therefore, no further excavation in AEC 21 was required.

A total of 633 cubic yards of VOC-impacted soil was excavated from AEC 21. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of AEC 21 was recycled at Clayton Block in Lakewood, New Jersey.

After the completion of excavation, AEC 21 was backfilled to its original grade with soil which had been treated in the LTTA® system to below the site cleanup levels. The asphalt was then restored to its original grade.

2.1.12 AEC 25

The initial and final excavation limits in AEC 25, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 25 are summarized in Table 11.

After removal of approximately 111 feet of rail spur and the overlying asphalt, AEC 25 was excavated on January 20 through 30, 1992 to the limits specified in the Work Plan. Post-excavation samples P-48, P-49, and P-50 were then collected at the locations specified in the Work Plan. The results of each of these three samples were below the 10 ppm total VOC cleanup criteria. Therefore, no further excavation was required in AEC 25.

The northern boundary of the AEC 25 excavation abutted the foundation of Building 26. No exposed unsaturated soils were present below this foundation. Therefore, no post-excavation samples were collected from the northern sidewall of AEC 25.

A total of 143 cubic yards of VOC-impacted soil was excavated from AEC 25. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The railroad ties removed from AEC 25 were disposed of at ADSI in Parlin, New Jersey. The asphalt removed from the surface of AEC 25 was recycled at Clayton Block in Lakewood, New Jersey.

After the completion of excavation, AEC 25 was backfilled with soil which had been treated in the LTTA® system to below the site cleanup levels. The asphalt was then restored to its original grade. The rail spur in AEC 25 was not replaced.

2.2 BN Areas

Eleven areas containing a total of 590 cubic yards of BN-impacted soil above the site cleanup levels were excavated and treated during the remedial action. The BN site cleanup levels were:

- o 100 ppm total BNs;
- o 10 ppm total CaPAH.

The post-excavation samples were analyzed for BNs plus a forward library search (BN + 15) by SW-846 Method 8270 at off-site laboratories. The individual criteria listed above included applicable tentatively identified compounds (TICs) identified during the forward library search.

The remediation of each individual BN area is discussed in the following sections.

2.2.1 AEC 8

The initial and final excavation limits in AEC 8, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 8 are summarized in Table 12.

As described in the following paragraphs, difficulties were encountered with the analysis of several samples collected from AEC 8. For a number of samples, the reported method detection limits (MDLs) for individual target BN compounds were elevated, although applicable cleanup levels were not exceeded. Subsequent to the receipt of results for the initial samples that had elevated MDLs, all samples from this area were subjected to matrix cleanup and alumina partitioning (SW-846 Methods 3650 and 3611, respectively) following sample extraction in an effort to lower the

MDLs for the target BN compounds. The samples described below reflect the utilization of several laboratories in order to produce results with acceptable MDLs. The final results described below for each sample location were for samples analyzed by a laboratory with significant experience in performing the matrix cleanup and alumina partitioning methods. These results are sufficient to confirm that the target BN and CaPAH compounds have been adequately addressed in AEC 8.

After removal of the overlying asphalt, AEC 8 was excavated to the initial limits specified in the Work Plan on January 29, 1992. Post-excavation samples P-19 and P-20 were then collected at the locations specified in the Work Plan. The eastern boundary of the AEC 8 excavation was the foundation of an adjacent loading dock. Sample P-19 was collected from soils beneath this foundation since unsaturated soils were present below it. Sample P-19 contained non-detectable levels of BNs and CaPAHs, but MDLs for individual BN compounds were elevated due to the presence of non-target compounds. To confirm that target BN compounds had been appropriately addressed, additional confirmatory samples were collected in the location of P-19. Sample P-19 was recollected on three separate occasions (P-19S, P19SS and P-19SSS) and sent to three different laboratories for analysis. Samples P-19S and P-19SS were also reported with elevated MDLs for target BN compounds. The result of sample P-19SSS had acceptable MDLs and was below both the CaPAH and BN cleanup criteria.

The results of P-20 did not exceed the CaPAH and BN cleanup levels, but had elevated MDLs. The western sidewall of AEC 8 was therefore extended 2 feet on February 17, 1992 and a new post-excavation sample, identified as P-20A, was collected. The results of P-20A exceeded the CaPAH and BN cleanup criteria. Therefore, the western sidewall of AEC 8 was extended 2 feet further on February 28, 1992 and a new sample, identified as P-20B, was collected. The results of sample P-20B did not exceed the CaPAH and BN cleanup levels, but had elevated MDLs. On March 10, 1992, an additional sample, identified as P-20BS, was collected

from the same approximate location as P-20B. The results of P-20BS had acceptable detection limits and were below the BN and CaPAH cleanup criteria. Therefore, no further excavation in AEC 8 was required.

On March 10, 1992, at the same time that P-20BS was collected, an additional sample, identified as P-20C, was collected from a trench excavation five feet west of the location of P-20BS. The results of P-20C were below the BN and CaPAH cleanup criteria.

A total of 32 cubic yards of BN-impacted soil was excavated from AEC 8. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of AEC 8 was recycled at S,D&G in Carteret, New Jersey.

After the completion of excavation, AEC 8 was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels. The asphalt was then restored to its original grade.

2.2.2 AEC 15

The initial and final excavation limits in AEC 15, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 15 are summarized in Table 14.

After removal of the overlying asphalt, AEC 15 was excavated on January 31, 1992 to the initial limits specified in the Work Plan. Post-excavation samples P-37 and P-38 were then collected at the locations specified in the Work Plan. Samples P-37 and P-

38 were below the BN and CaPAH cleanup criteria, however, sample P-37 had elevated MDLs for target BN compounds. Therefore, on February 28, 1992 a new sample, identified as P-37S was collected in the approximate location as P-37. P-37S was subjected to matrix cleanup and alumina partitioning prior to analysis. The results of P-37S were below the BN and CaPAH cleanup criteria and had acceptable MDLs for target BN compounds. Therefore, no further excavation in AEC 15 was required.

A total of 34 cubic yards of BN-impacted soil was excavated from AEC 15. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of AEC 15 was recycled at Clayton Block in Lakewood, New Jersey.

After the completion of excavation, AEC 15 was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels. The asphalt was then restored to its original grade.

2.2.3 AEC 18

The initial and final excavation limits in AEC 18, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 18 are summarized in Table 15.

After removal of the overlying asphalt, AEC 18 was excavated on January 27, 1992 to the initial limits specified in the Work Plan. Post-excavation samples P-53 and P-54 were then collected at the locations specified in the Work Plan. The results of

samples P-53 and P-54 were both below the BN and CaPAH cleanup criteria. Therefore, no further excavation in AEC 18 was required.

A total of 23 cubic yards of BN-impacted soil was excavated from AEC 18. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of AEC 18 was recycled at Clayton Block in Lakewood, New Jersey.

After the completion of excavation, AEC 18 was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels. The asphalt was then restored to its original grade.

2.2.4 AEC 28

The initial and final excavation limits in AEC 28, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from AEC 28 are summarized in Table 16.

AEC 28 was excavated to the initial limits specified in the Work Plan on November 22, 1991. Post-excavation samples P-17 and P-18 were then collected from the locations specified in the Work Plan. The results of sample P-18 were below the BN and CaPAH cleanup criteria, while sample P-17 exceeded the CaPAH limit.

On December 10, 1991 the eastern edge of AEC 28 was extended 5 feet and a new post-excavation sample, identified as P-17A, was collected. Sample P-17A exceeded the CaPAH cleanup criteria.

On January 31, 1992 the eastern edge of AEC 28 was extended 5 feet and a new post-excavation sample, identified as P-17B, was collected. Sample P-17B exceeded the CaPAH cleanup criteria.

On February 11, 1992 the eastern edge of AEC 28 was extended to the retaining wall of the adjacent tank farm. This retaining wall extended below the water table, with no unsaturated soils present below the wall. Therefore, no further excavation of AEC 28 was required.

A total of 63 cubic yards of BN-impacted soil was excavated from AEC 28. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material.

After the completion of excavation, AEC 28 was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels.

2.2.5 MW 7 Area

The initial and final excavation limits in the MW 7 area, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from this area are summarized in Table 17.

After removal of the overlying asphalt, the MW 7 area was excavated to the initial limits specified in the Work Plan on January 31, 1992. Post-excavation samples P-7 and P-8 were then collected at the locations specified in the Work Plan. The results of sample P-7 were below the CaPAH and BN cleanup criteria. Sample P-8 exceeded the CaPAH limit.

On February 13, 1992 the MW 7 area was extended north to approximately one foot south of the retaining wall on the northern boundary of the site and a new sample, identified as P-8A, was collected. The results of sample P-8A were below the BN and CaPAH cleanup criteria. Therefore, no further excavation was required in the MW 7 BN area.

A total of 48 cubic yards of BN-impacted soil was excavated from the MW 7 area. These soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material.

After the completion of excavation, the area was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels. The asphalt was then restored to its original grade.

2.2.6 MW 12 Area

The initial and final excavation limits in the MW 12 area, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from this area are summarized in Table 18.

After removal of the overlying asphalt, the MW 12 area was excavated on January 31, 1992 to the initial limits specified in the Work Plan. Post-excavation samples P-22 and P-23 were then collected at the locations specified in the Work Plan. The results of sample P-23 were below the CaPAH BN cleanup criteria. Sample P-22 exceeded the CaPAH criteria.

On February 12, 1992, the MW 12 area excavation was extended 5 feet to the west and a new sample, identified as P-22A, was collected. The results of sample P-22A were below the CaPAH and BN cleanup criteria. Therefore, no further excavation was required in the MW 12 area.

A total of 44 cubic yards of BN-impacted soil was excavated from the MW 12 area. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of this area was recycled at Clayton Block in Lakewood, New Jersey.

After the completion of excavation, the area was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels. The asphalt was then restored to its original grade.

2.2.7 MW 15 Area

The initial and final excavation limits in the MW 15 area, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from this area are summarized in Table 19.

After removal of the overlying asphalt, the MW 15 area was excavated on January 31, 1992 to the initial limits specified in the Work Plan. Post-excavation samples P-51 and P-52 were then collected at the locations specified in the Work Plan. The results of sample P-52 were below the CaPAH and BN cleanup criteria. Sample P-51 exceeded the CaPAH criteria.

On February 12, 1992, the MW 15 area excavation was extended 5 feet to the east and a new sample, identified as P-51A, was collected. The results of sample P-51A exceeded the CaPAH cleanup criteria.

On February 25, 1992, the MW 15 area excavation was extended 5 feet to the east and a new sample, identified as P-51B, was collected. The results of sample P-51B were below the CaPAH and BN cleanup criteria. Therefore, no further excavation was required in the MW 15 area.

A total of 30 cubic yards of BN-impacted soil was excavated from the MW 15 BN area. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. The screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of the area was recycled at Clayton Block in Lakewood, New Jersey.

After the completion of excavation, the area was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels. The asphalt was then restored to its original grade.

2.2.8 Boring 1707/1712 Area

The initial and final excavation limits in the Boring 1707/1712 area, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from this area are summarized in Table 20.

After removal of the overlying asphalt, the Boring 1707/1712 area was excavated on January 27, 1992 to the initial limits specified in the Work Plan. Post-excavation

samples P-40 and P-39 were then collected at the locations specified in the Work Plan. The results of sample P-40 were below the CaPAH and BN cleanup criteria. Sample P-39 exceeded the CaPAH criteria.

On February 12, 1992, the Boring 1707/1712 area excavation was extended 5 feet east to the edge of Building 12. No exposed unsaturated soil was present under this building foundation for sample collection. Therefore, no further excavation was required in the Boring 1707/1712 BN area.

A total of 25 cubic yards of BN-impacted soil was excavated from the Boring 1707/1712 area. These soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. The screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of the area was recycled at S,D&G in Carteret, New Jersey.

After the completion of excavation, the area was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels. The asphalt was then restored to its original grade.

2.2.9 Boring 2303/2304 Area

The initial and final excavation limits in the Boring 2303/2304 area, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from this area are summarized in Table 21.

After removal of the overlying asphalt, the Boring 2303/2304 area was excavated on November 4, 1991 to the initial limits specified in the Work Plan. Post-excavation

samples P-35 and P-36 were then collected at the locations specified in the Work Plan. The results of sample P-36 were below the CaPAH and BN cleanup criteria. The results of sample P-35 contained 1700 ppm bis(2-ethylhexyl) phthalate. The presence of this compound is atypical for this site and could, in part, be indicative of plastic contamination introduced during sampling and/or analysis. Therefore, on November 13, 1991 a new sample identified as P-35A was collected in the approximate location of sample P-35. The results of sample P-35A were below the CaPAH and BN cleanup criteria. Therefore, no further excavation was required in the Boring 2303/2304 area.

A total of 49 cubic yards of BN-impacted soil was excavated from the Boring 2303/2304 area. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of the area was recycled at S,D&G in Carteret, New Jersey.

After the completion of excavation, the area was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels. The asphalt was then restored to its original grade.

2.2.10 Boring 306/307 Area

The initial and final excavation limits in the Boring 306/307 area, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from this area are summarized in Table 22.

The Boring 306/307 area was located within the boundaries of AEC 3, which was remediated for VOCs. Excavation and post-excavation confirmatory sampling to define the final limits of the Boring 306/307 area were completed prior to excavation of the surrounding AEC 3 soils. The BN-impacted soils from the Boring 306/307 area were segregated from the VOC-impacted soils from AEC 3 and processed separately through the LTTA® with other BN soils.

The initial post-excavation samples required by the Work Plan, P-5 and P-6, were collected in hand-excavated trenches on November 4, 1991. The results of P-5 and P-6 both exceeded the CaPAH and BN cleanup criteria. On November 13, 1991 two new post-excavation samples, identified as P-5A and P-6A were collected from trenches 5 feet beyond the initial limits. The results of P-5A and P-6A both exceeded the CaPAH criteria.

On November 22, 1991, additional sampling was performed in the Boring 306/307 area. Samples P-5B and P-5C were collected from trenches 10 and 20 feet, respectively, west of the existing western sidewall. Samples P-6B and P-6C were collected from trenches 10 and 20 feet, respectively, east of the existing eastern sidewall. The results of all four samples were below the CaPAH and cleanup criteria. Therefore, the Boring 306/307 area was excavated to the limits defined by samples P-5B and P-6B.

A total of 177 cubic yards of BN-impacted soil was excavated from the Boring 306/307 area. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and were monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material.

After the completion of excavation of the surrounding VOC area, the area was backfilled with clean imported fill material. The analyses performed on the imported fill material is described in Section 7.1. The asphalt was then restored to its original grade.

2.2.11 MW 10/Boring M2401 Area

The initial and final excavation limits in the MW 10/Boring M2401 area, as well as the location of all post-excavation samples collected in this area, are shown on Figure 2. The results of all post-excavation samples from this area are summarized in Table 23.

The MW 10/Boring M2401 area was located within the boundaries of AEC 17, which was remediated for VOCs. Excavation and post-excavation confirmatory sampling to define the final limits of the MW 10/Boring M2401 area was completed prior to excavation of the surrounding AEC 17 soils. The BN-impacted soils from the MW 10/Boring M2401 area were segregated from the VOC-impacted soils from AEC 17 and were processed separately through the LTTA® system with other BN-impacted soils.

After removal of the overlying asphalt, the MW 10/Boring M2401 area was excavated to the initial limits specified in the Work Plan. Post-excavation samples P-41 and P-42 were then collected at the locations specified in the Work Plan. The results of both samples exceeded the CaPAH criteria.

On February 12, 1992, the MW 10/Boring M2401 area excavation was extended 2 feet to the east and 10 feet to the west and two new post-excavation samples, identified as P-41A and P-42A, were collected. The results of both samples were below the CaPAH and BN cleanup criteria. Therefore, no further excavation was required in the MW 10/Boring M2401 area.

A total of 65 cubic yards of BN-impacted soil was excavated from the MW 10/Boring M2401 area. The soils were screened to remove oversized rocks and debris and treated on-site in Canonie's LTTA® system. The screened rocks were allowed to naturally aerate and monitored until no organic vapor emissions were present above background levels monitored that day, and then backfilled into an open excavation. Any screened debris was disposed of at the Essex County Transfer Station as ID-13 material. The asphalt removed from the surface of this area was recycled at S,D&G in Carteret, New Jersey.

After the completion of excavation, the area was backfilled with BN soils which had been treated in the LTTA® to below the site cleanup levels. The asphalt was then restored to its original grade.

3.0 ON-SITE SOIL TREATMENT

The VOC- and BN-impacted soils excavated from the individual site areas were treated on-site using Canonie's LTTA® unit. The LTTA® system treated the impacted soils by thermally desorbing the volatile and semi-volatile contaminants from the soils into a heated airstream, then thermally oxidizing these contaminants in an afterburner. Further details on the operation of the LTTA® were provided in Section 6.5 of the Work Plan.

On-site soil processing began on November 26, 1991 and ended on March 5, 1992. A daily summary of the key soil processing information is presented in Table 24. A total of 6,479 tons of original soil was treated on-site in the LTTA® during the project. 426 tons of this soil were reprocessed pursuant to Textron's request to reduce the residual VOC levels, even though the initial processing achieved the 10 ppm standard.

3.1 Soil Treatment Levels

The soil treatment levels for the on-site LTTA® unit were defined in the Work Plan and approved by the NJDEPE as follows:

- 10 ppm total VOCs;
- 1 ppm benzene;
- 100 ppm total BNs;
- 10 ppm CaPAHs.

The BN and CaPAH criteria included applicable TICs as well as targeted compounds. In order to ensure that the LTTA® was capable of processing the site soils, an internal total VOC level of only 1 ppm was used during the LTTA® startup period and the first month of soil processing (from November 26 through December 22, 1991). During the remainder of the project, an internal total VOC level of 2 ppm was utilized. The application of internal levels more stringent than those required by the NJDEPE was undertaken by Textron to insure that any residual levels were well below the NJDEPE-approved cleanup level.

3.2 LTTA® Mobilization

The LTTA® system consisted of the following process units:

1. A feed hopper/feed conveyor;
2. A materials dryer;
3. A pug mixer;
4. A cyclone separator;
5. An afterburner/quench tower;
6. A baghouse;
7. A venturi scrubber;
8. An operations control house;
9. A generator.

The LTTA® system was delivered to the site and set up at the locations shown on Figure 2 of the Work Plan between September 5, 1991 and October 1, 1991.

Between October 1, 1991 and November 26, 1991, Canonie performed on-site modifications to the LTTA® system. These modifications were performed to tailor various LTTA® operating parameters to the site-specific soil contaminants. The modifications included increasing the airflow through the afterburner, increasing the water flow through the quench tower, and lowering the angle of the materials dryer to increase soil residence time.

3.3 Permitting

Canonie applied for and received an air emissions permit for operation of the LTTA® from the NJDEPE, Division of Environmental Quality, Bureau of New Source Review. The air emissions permit was issued to Canonie under Log Number 1-91-2608. The conditions of the air permit required that Canonie undertake continuous emission monitoring (CEM) of the stack emissions for carbon monoxide and oxygen and also conduct a one-time only stack test for various metals and volatiles. The stack test results, CEM results and process monitoring data have been submitted to the Bureau of Technical Services as required by the air permit. A copy of the air permit is provided in Appendix X.

Canonie received a soil erosion control permit for the on-site remediation activities from the City of Newark prior to on-site soil processing. A copy of the permit is provided in Appendix X.

3.4 LTTA® Startup

An LTTA® startup was performed after mobilization of the LTTA® was complete and full-scale operation was ready to begin. The objective of the test was to determine

optimal operating parameters for the process such as throughput rate, soil temperature, and air flow. The startup was conducted between November 26, 1991 and December 7, 1991 and consisted of four individual trials. The results of the LTTA® startup test are summarized in Table 40.

The results of Trials 1, 2, and 3 were below the site-specific treatment standard for VOCs of 10 ppm. Textron, however, required Canonie to reprocess such soils to determine whether lower residual levels could be achieved. In Trial 4, the soils processed in Trials 1 through 3 were reprocessed and achieved residual levels below 1 ppm. As a result of the performance of the LTTA® during the trial runs, the processing rate was reduced from a planned rate of 40 to 50 tons per hour (tph) to 15 to 20 tph.

3.5 VOC-Impacted Soil Treatment

Table 24 summarizes the daily soil processing results achieved during the project. As detailed on Table 24, a total of 5,744 tons of VOC-impacted soils were treated during 395.5 hours of operation of the LTTA® system. This tonnage includes the LTTA® startup test, and includes only the first treatment of processed soils. A total of 425 tons of soil was processed a second time in order to achieve the internal treatment levels.

Post-treatment soil samples were collected hourly throughout soil processing operations. The hourly samples were collected from stockpiled soils which accumulated beneath the discharge end of the effluent soil conveyor. The hourly post-treatment sample results are provided in Appendix C.

The daily averages of the individual hourly total VOC analytical results for processed soil samples are shown in Table 26. The 10 ppm total VOC cleanup criteria was met on all days of soil processing. In addition, the stricter internal treatment levels which

were applied at Textron's request were met on 51 of 57 days of VOC-impacted soil processing (50 of 53 days after the LTTA® startup test). Any treated soils not meeting the internal treatment levels were reprocessed.

The daily quantities of soil processed in Table 24 and the daily average total VOC concentrations in Table 26 have been used to calculate the weighted average total VOC concentration of treated soil for the entire project. This calculation is provided in Appendix C. This calculation represents the average concentration of soils which were backfilled into excavations and therefore does not incorporate the results of initial passes through the LTTA® for soils which required reprocessing. The results of this calculation show the average total VOC concentration of treated soils backfilled on-site was 0.434 ppm.

The post-treatment VOC samples were analyzed by SW-846 Method 8020 in an on-site laboratory. The on-site results were reported on a wet-weight basis, as allowed for by SW-846 Method 8020. As discussed in detail in Section 6.4, the conclusions previously presented herein regarding the adequacy of treatment remain unchanged when the wet weight data are converted to a dry-weight basis. Duplicates of over 10 percent of the post-treatment VOC samples were analyzed at an off-site laboratory by either Method 8020 or SW-846 Method 8240.

3.6 BN-Impacted Soil Treatment

Table 24 summarizes the daily soil processing results achieved during the project. As shown on Table 24, a total of 735 tons of BN-impacted soils were treated during 44 hours of operation of the LTTA® system. The daily average BN and CaPAH analytical results for processed soil samples are shown in Table 26. BN-impacted soils were treated on eight days of LTTA® operations during the project. The treatment levels were met on all eight days.

The daily quantities of soil processed listed in Table 24 and the daily average BN and CaPAH concentrations listed in Table 27 have been used to calculate the weighted average BN and CaPAH concentrations of treated soil for the entire project. This calculation is provided in Appendix D. The results of this calculation show an average total BN concentration (excluding CaPAHs) of 1.100 ppm and an average CaPAH concentration of 1.425 ppm for the treated soils which were backfilled on-site.

All post-treatment BN soil samples were analyzed by SW-846 Method 8270 at an off-site laboratory.

4.0 OFF-SITE DISPOSAL

Materials from seven different wastestreams were disposed of off-site during the remedial activities. Table 27 provides a chronological summary of the materials transported off-site for disposal and their ultimate designation. Each wastestream was disposed of in accordance with the appropriate state and federal laws as detailed in the following sections.

4.1 ID-13 Debris

During the screening of excavated soil, material greater than 2 inches in diameter was separated from the excavated soil. The natural non-porous screened materials (rocks) were allowed to aerate and were then backfilled. The natural porous material (wood) and non-natural site debris were classified and disposed of as New Jersey ID-13 waste. ID-13 status for the site debris was approved by the NJDEPE in its December 20, 1991 letter to Canonie. A total of 613.17 tons of this ID-13 debris was disposed of at the Essex County Transfer Station in Newark, New Jersey (operated by Solid Waste Transfer and Recycling, Inc.). Appendix E contains the ID-13 application, acceptance notification, a copy of transfer station weight slips and a summary table of loads of all debris disposed of as ID-13 material.

4.2 Asphalt

Asphalt removed from the surface of the AECs was then sent to either S,D&G in Carteret, New Jersey or Clayton Block in Lakewood, New Jersey for recycling. Both facilities are approved by the Essex County Solid Waste Board and the NJDEPE for asphalt recycling. A total of 587.12 tons of asphalt were recycled. Appendix F contains a copy of the weight slips and a summary table of all loads of asphalt recycled during the project.

4.3 Concrete

Waste concrete was generated by the demolition of the AEC 19 retaining wall, the AEC 7 concrete pad, the pile caps buried approximately one foot beneath the surface of AEC 14, and the AEC 9 concrete floor. All such concrete waste, approximately 309 tons, was sent to S,D&G in Lakewood, New Jersey or Clayton Block in Carteret, New Jersey for recycling. Both facilities are approved by the Essex County Solid Waste Board and the NJDEPE for concrete recycling. Appendix G contains a copy of the weight slips and a summary table of all loads of concrete recycled during the project.

4.4 Stabilized AEC 12 Resin

During the excavation of AEC 12 a resinous material that could not be processed in the LTTA® unit was encountered. Bentonite was added to this material to bind up excess moisture present in the soil. The material was then sent to Chemical Waste Management's landfill in Model City, New York for disposal. Toxicity Characteristic Leaching Procedure (TCLP) testing performed prior to the remediation determined the resin to be non-hazardous as defined by 40 CFR 261. The material was manifested as New Jersey hazardous waste code C433 due to the presence of toluene. A total of 424.53 tons of this material was shipped to Model City. Appendix H contains TCLP data, waste profile sheets, facility acceptance correspondence, completed manifests and a summary table of all loads of AEC 12 resin disposed of during the project.

4.5 Railroad Ties

Railroad ties were removed from the railroads tracks located in AECs 1, 3, 4, 5, 16, and 25 and sent to ADSI located in Parish, New Jersey for recycling. ADSI is approved by the Essex County Solid Waste Board and the NJDEPE to recycle railroad

ties. A total of 65.44 tons of ties were recycled at ADSI during the project. Appendix I contains the acceptance letter, a copy of the weight slips and a summary table of all loads of railroad ties disposed of during the project.

4.6 Perched Water from AEC 12

During the excavation of the AEC 12, perched water was encountered which flowed into the excavation and was ultimately pumped out. A total of 64,560 gallons of the liquid was sent to Chemical Waste Management's treatment facility at Lister Avenue in Newark, New Jersey. The water was manifested under the waste code X900 due to its non-hazardous nature. Appendix J contains the waste profile, laboratory analytical results, facility acceptance correspondence, completed manifests and a summary table of all perched water disposed of off-site during the project.

4.7 Storm Water

Rain water that remained in excavations was pumped into holding tanks, then treated through liquid-phase activated carbon drums and was pumped into a second holding tank. From the second holding tank, the water was discharged into the Passiac Valley Sewer Commission (PVSC) sewer system. This disposal procedure was in accordance with the PVSC requirements detailed in their May 21, 1991 approval correspondence and instructions received during subsequent site visits. An estimated 25,000 gallons were treated and discharged into the sewer system. Appendix K contains the PVSC correspondence, discharge records, and a summary table of discharges of treated storm water.

5.0 HEALTH AND SAFETY

Canonie implemented a health and safety program at the site to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials. This program was directed by a site safety officer (SSO) during all remedial activities. The major components of this program were construction safety, air sampling, and air monitoring.

5.1 Construction Safety Statistics

The safety program was implemented in accordance with the HASP established for this project which required adherence to Occupational Safety and Health Administration (OSHA) construction industry standards, general industry standards, and hazardous waste site operations standards.

These standards applied to all aspects of the site remediation including heavy equipment safety, LTTA® operations, excavation safety, use of personal protective equipment (PPE), and personnel and equipment decontamination procedures. Approximately 6500 man hours were expended by Canonie field personnel remediating the site. Canonie's subcontractors, including Hi-Tech Remediation Ltd. and GPX Inc., expended approximately 4200 additional hours of work. No recordable injuries occurred during the course of this project.

5.2 Air Sampling

Air sampling during the project consisted of collection of discrete samples of air in charcoal tubes for subsequent analysis by an independent laboratory for specific compounds.

The air sampling program was conducted in accordance with the requirements of the HASP. Air samples were drawn through calibrated low flow pumps, collected on charcoal-filled sorbent tubes, and analyzed for ethylbenzene, toluene, and xylene via gas chromatography. In addition, some samples were analyzed for benzene to comply with OSHA requirements. Charcoal tube samples were analyzed by Roy F. Weston Laboratories, Lionville, Pennsylvania and MDS Laboratories, Reading, Pennsylvania in accordance with National Institute of Occupational Safety and Health (NIOSH) Method 1501.

Charcoal tube samples were collected in background locations, upwind and downwind of areas undergoing excavation, and in locations representing the breathing zone of workers involved in the process.

The laboratories reported charcoal tube analytical results in micrograms of analyte per charcoal tube. When this result is divided by the volume of air sampled through the tube (liters), the results are expressed in micrograms per liter (μg/l) or milligrams per cubic meter (mg/m^3). Occupational exposure limits are generally expressed in mg/m^3 or ppm in air by volume. The unit "ppm" is more commonly used for VOCs and ppm is used throughout this report. All laboratory results have been converted to ppm in the Table 28 by the following formula:

$$PPM = \frac{(mg/m^3)24.45}{MW}$$

Where:

PPM = parts per million in air by volume

24.45 = molar volume of gas at 25 degrees Celsius

MW = molecular weight of the analyte

mg/m^3 = concentration of the analyte in air expressed in milligrams per cubic meter

5.2.1 Background Air Sampling

Prior to remedial activities, charcoal tube samples were collected to document background target compound concentrations characteristic of the area. A total of 10 samples were collected. Table 28 contains summary information for each of these samples, including sampling date, identification number, location, and target compound concentrations detected. Only one of the 10 background charcoal tube samples, identified as C101891142, showed target compounds above the level of detection. These results were 0.14 ppm ethylbenzene, 0.08 ppm toluene, and 0.17 ppm xylenes. Detection of these compounds at low ppm concentrations may be attributed to emissions from adjacent industrial operations. The OSHA Permissible Exposure Limit (PEL) for each of the three compounds, expressed as an 8-hour time weighted average, is 100 ppm in air. These results were each roughly one thousandth of their respective federal occupational exposure limit.

5.2.2 Air Sampling During Excavation

Charcoal tube sampling was conducted during excavation upwind and downwind of areas being excavated and on personnel working in the cab of the trackhoe. A total of 59 charcoal tube samples were collected during excavation. A summary of the excavation air sample results is presented in Tables 28. Target compounds were detected in 33 of the 59 samples. The highest concentration was measured during the excavation of AEC 4, where xylene was measured at 4.80 ppm. The PEL for xylene is 100 ppm. None of the 59 charcoal tubes showed concentrations which exceeded the occupational exposure standards, and the majority of samples had concentrations of less than one hundredth of the PEL for the particular compound.

During the excavation of AEC 1, odors believed to be similar to styrene and vinyl toluene were noted by several Reichhold employees. In response, 3 charcoal tube samples collected in this area were analyzed for these two compounds. These samples were CO22392-112, CO22392-114, and CO22292-111. The results are shown in Table 28. Styrene was detected below the 50 ppm PEL in all three samples, at 0.22 ppm, 0.06 ppm, and 0.14 ppm, respectively, in each case more than 200 times below the occupational exposure limit. Vinyl toluene was not detected in any of these three samples.

Air samples were collected at all AECs except AEC 9, AEC 15, AEC 16 and AEC 18. The areas not sampled were short-term excavations (less than four hours) and only air monitoring via direct reading instruments (e.g. flame ionization detectors) was performed. A summary of air monitoring results from these short term excavation areas is included in Table 29.

5.2.3 Screen-All and Feed Hopper Air Sampling

Charcoal tube samples were collected at the Screen-All and feed hopper to quantify the target compound concentrations created during the handling of the site soils. Four Screen-All samples and three feed hopper samples were analyzed. A summary of the results is presented in Table 28. Target compounds were detected in all seven samples. The highest target compound concentration in this group of samples was xylene at 3.93 ppm. The PEL for xylene is 100 ppm. Therefore, site employees who worked in the proximity of the Screen-All and feed hopper (i.e., conveyor belts) were not exposed to target compounds at levels approaching the occupational exposure limits.

5.2.4 Personal Air Sampling

Personal air sampling devices were worn by site personnel who were judged to have potential exposure to target compounds and who did not work at the excavation areas (personal air sampling at the excavation areas is discussed in Section 5.2.2). These personnel included LTTA® laborers, the control house operator, and the soils lab technician. A summary of the results is presented in Table 28. Four of seven samples showed target compounds at measurable levels. The highest target compound concentration in this group of samples was xylene at 0.43 ppm. All results were at least 100 times below the occupational limits for the individual target compounds.

5.3 Air Monitoring by Direct Reading Instruments

The purpose of the air monitoring program was to identify site emissions, implement controls, and select the proper PPE. Air monitoring was conducted using direct reading instruments to provide immediate information upon which to base field decisions. Total VOCs were monitored by a photoionization detector (PID) and/or a

flame ionization detector (FID). The detectors were calibrated against a reference gas standard on a daily basis. A direct reading particulate monitor was used to measure total dust levels.

Air monitoring was conducted on a daily basis at the AECs during excavation, at the LTTA® unit while soils were processed, and at the Screen-All during operation. Levels of PPE were implemented during remedial activities based on the results of the air monitoring and the action levels specified in the HASP which were as follows:

1. Concentrations of VOCs in the breathing zone up to 10 ppm; up to 1.0 mg/m^3 total dust - Level "D";

2. VOCs in the breathing zone more than 10 ppm above background levels, for sustained periods, but less than 250 ppm; dust levels greater than 1 mg/m^3 - Level "C";

3. VOC concentrations greater than 250 ppm in the breathing zone or during confined space entry - Level "B".

5.3.1 VOC and Total Dust Air Monitoring at AECs

At the AECs, air monitoring by PID or FID showed that air emissions ranged from background to an instantaneous, unsustained level of approximately 98 ppm in the worker breathing zone. Air monitoring instrument responses fluctuated considerably, and sustained elevated readings were observed only infrequently. Excavation activities were performed in either Level "D" or Level "C", based upon instrument readings. A summary of the ranges of air monitoring results and the PPE used in the AECs is presented in Table 29. Level "C" PPE was used at AEC 1, 3, 4, 5, 7, 12, and 21. Level "B" PPE was only used during the AEC 12 excavation. AEC 12 was located under a building and constituted a confined space entry during initial

remediation. Total dust concentrations in the worker breathing zone at the AECs ranged from 0.01 mg/m^3 to 1 mg/m^3. Excavation operations did not generate airborne dust for sustained periods and upgrading site personnel to Level "C" PPE was not required on the basis of comparison of dust monitoring results and the appropriate exposure standard. Air monitoring sheets for VOC and total dust are provided in Appendix L.

5.3.2 VOC and Total Dust Air Monitoring at the LTTA Unit

Air monitoring was conducted at various locations around the LTTA® unit including the control room, the dryer, the baghouse, the venturi scrubber, the pugmill, the pumphouse, the feed hoppers, and the conveyor belts. A summary of the VOC air monitoring measurement ranges and the levels of PPE worn is presented in Table 29. Concentrations of VOCs measured around the LTTA®, were generally similar to that day's ambient levels (as defined by monitoring conducted daily), except at the conveyor feedbelt and the feed hoppers. Air concentrations of VOCs ranged from background to 90 ppm near the conveyor belt and feed hoppers. Worker exposure was minimal since site employees were not required to work at these areas for extended periods (less than 15 minutes at one time). Air monitoring for total dust was conducted at various locations around the LTTA® unit. Dust readings above 1 mg/m^3 were observed at various times at the dryer drum seal and at the conveyor offloading soils. Engineering controls, generally in the form of water application, were immediately implemented to reduce dust levels to background concentrations. Air monitoring sheets for VOCs and total dust are provided in Appendix L.

6.0 QA/QC

The overall QA objective during this project was to implement procedures which provide for the generation of defensible data which demonstrates that cleanup objectives were met. The QA procedures which were to be followed to meet this objective were detailed in the QAPP. Measures were documented in the QAPP which specified the QA procedures to be followed so that conditions adverse to quality could be identified and corrected. The overall effectiveness of the QA program in providing for legally defensible data may be assessed by evaluating the compliance of the site QA procedures with the requirements of the QAPP. The QA/QC procedures successfully produced defensible data that demonstrates that cleanup objectives were met.

During the remediation, VOC soil samples were analyzed in Canonie's on-site laboratory by Method 8020. Duplicates of over 10 percent of VOC samples were analyzed off-site by Method 8020 and Method 8240. BN soil samples were analyzed off-site by Method 8270.

6.1 Overall QA Program

The specific QA procedures which were followed during this project were defined and documented in the QAPP. These procedures were based upon nationally recognized practices for collection, transport, analysis, and reporting of chemical constituents in environmental samples. QA procedures included the following:

1. Data Quality Objectives (DQOs) - Project objectives were defined in Section 3.0 of the QAPP for precision, accuracy, representativeness, completeness and comparability (PARCC) of the on-site laboratory analyses. These goals were as strict or stricter than the advisory limits established by the EPA in

SW-846 and were developed from guidelines contained in "Data Quality Objectives for Remedial Response Activities - Development Process," EPA 540/G-87/003, March 1987. The project PARCC results are discussed in Section 6.3.

2. Sampling Plan - Sample collection, handling and preservation procedures were performed as described in Section 4.0 of the QAPP. These procedures were derived from sampling procedures outlined in "Samplers and Sampling Procedures for Hazardous Waste Streams," EPA-600/2-80-018.

3. Sample Custody - Sample identification, custody and monitoring procedures were performed as described in Section 5.0 of the QAPP. These procedures were derived from nationally recognized practices, including those described in "Region II CERCLA Quality Assurance Manual," Revision I, October 1989.

4. Calibration Procedures and Frequency - Equipment and instrumentation calibration was performed in accordance with Section 6.0 of the QAPP and manufacturers' suggested protocols.

5. Analytical Procedures - Analytical procedures were performed as required in Section 7.0 of the QAPP. The extraction method for on-site VOC analysis specified in the QAPP was modified during the project in order to achieve lower detection limits by extracting 6.0 grams of soil in 6.0 ml of methanol instead of 1.0 gram of soil in 10.0 ml of methanol as specified in the QAPP.

6. Internal QC - Procedures for internal QC of individual sets of samples were followed as described in Section 9.0 of the QAPP. Internal QC procedures were utilized to evaluate the precision and accuracy of individual sets of

MS/MSD results, calibration results, and surrogate recoveries. Individual samples which did not meet the following criteria for acceptability were determined to be unacceptable and were reanalyzed:

- o 85 to 115 percent recovery for continuing calibration results;
- o 75 to 125 percent recovery for surrogate standard results;
- o 75 to 125 percent recovery for MS results;
- o 75 to 125 percent recovery for MSD results;
- o 20 percent difference for MS/MSD results.

6.2 Audits

Field audits and laboratory audits were conducted by Canonie following the guidelines described in Section 10.0 of the QAPP. The purpose of the audits was to monitor adherence to the QAPP and to make recommendations for improving the data collection activities. A field audit and a laboratory audit were conducted during the demonstration test on December 6, 1991 and again during regular thermal treatment operations on February 20, 1992. These audits confirmed that the procedures which were documented in the QAPP were properly implemented. Copies of the audit reports are provided in Appendix P.

6.3 On-Site Laboratory Data Quality Objectives

DQOs for PARCC for Method 8020 VOC analysis in the on-site laboratory were established prior to the initiation of remedial activities to establish criteria for objectively judging the effectiveness of the QA procedures. The PARCC parameters

are indicators of data quality. The DQOs were identified in Table 4 of the QAPP and were based upon the intended usage of the on-site laboratory data. Table 30 compares the advisory QC limits which were designated in SW-846 for Method 8020 to the DQOs which were designated in the QAPP for the on-site laboratory. The DQOs for the on-site laboratory meet or exceed the criteria established in SW-846 for Method 8020.

PARCC results generated by the on-site laboratory can be compared to the established DQOs to verify that these goals have been met. Three of these parameters (precision, accuracy and completeness) are quantitative goals which may be measured using statistical techniques. Representativeness and comparability are addressed on a qualitative basis.

6.3.1 Precision

Precision is defined as a measure of the reproducibility of measurements under a given set of conditions. Precision is expressed as relative percent difference (percent RPD) or relative standard deviation (RSD). A goal of 20 percent RPD was established in the QAPP for the following three parameters:

1. MS/MSD recoveries;

2. Laboratory duplicate (unspiked MS/MSD compounds) recoveries;

3. Field duplicate recoveries.

Table 31 presents a summary of the overall precision results which were obtained throughout the project by the on-site laboratory. The calculations for the summarized precision data are located in Appendix S. The project goal for precision was defined as an upper control limit of 20 percent RPD (or RSD). The project limit for precision

(percent RPD or RSD) for a given set of data is the average of the data plus three standard deviations of the data. This project goal was met for each of the three parameters listed above.

6.3.2 Accuracy

Accuracy is defined as the degree of agreement of a measurement (or an average of similar measurements) with the true value. Accuracy is expressed in terms of the dispersion of percent recovery over the entire project. The following parameters were used to evaluate accuracy:

1. MS recovery;

2. MSD recovery;

The project accuracy is calculated as the ratio of three standard deviations of the individual percent recovery to the project average percent recovery and is also expressed as a percentage. A goal of 25 percent relative difference in recovery was set for the project.

The project accuracy results for MS and MSD recoveries were calculated from valid sets of MS/MSD data as shown in Appendix S and are summarized in Table 32. Project accuracy results have been calculated for both MS and MSD recovery for benzene, toluene, chlorobenzene, and 1,2-dichlorobenzene (a total of eight accuracies). Three out of these eight results are greater than the project goal of 25 percent relative difference in recovery. Although the project goal for MS/MSD recovery was not met for every compound, all results are within the advisory limits contained in SW-846 and therefore are considered to be acceptable.

6.3.3 Completeness

Completeness is defined as a measure of the amount of valid data which is obtained during the project compared to the amount of data that is collected. On-site laboratory VOC analytical data is included in a New Jersey Tier II data package. This data package is located in Appendix S. A total of 110 out of 112 post-excavation confirmatory VOC sidewall soil samples, 384 out of 384 post-treatment VOC soil samples, 38 out of 38 field duplicate post-treatment VOC soil samples, and 14 out of 14 proof-of-process soil samples have been identified as valid in this report. This total represents 99.66 percent completion of the data from the samples which were analyzed on-site. Therefore, the project goal of 90 percent completion was met.

Because method blanks and matrix spikes were not analyzed along with samples, P-29 and P-30, their results could be considered invalid. Therefore, the total VOCs results for P-29 and P-30, 0.43 ppm and 5.48 ppm, respectively, should be considered only as estimates. However, because these values are substantially below the cleanup criteria of 10 ppm total VOCs for post-excavation soil samples, the decisions made based on the results of these samples are still considered to be adequate.

6.3.4 Representativeness

The project goal for representativeness was to adhere to the guidelines established in the QAPP for sample collection. These guidelines dictated a frequency of sample collection for post-excavation soil samples of 1 per 30 linear feet of excavated side-walls and a frequency of sample collection for post-treatment soil samples of 1 per hour during the processing of soils.

In the QAPP, a sampling frequency for full-scale operation post-treatment soils was set at one-hour intervals. A process stream of 40 to 50 tph was anticipated and each hourly sample would therefore be representative of 40 to 50 tons of soil. However,

soils were processed throughout the project at a rate of approximately 15 tph, effectively doubling or tripling the quantity of post-treatment samples and increasing the representativeness of each individual sample for the soil which it represented.

Representativeness was ensured throughout the project by following the properly detailed sampling and analysis plan and by meeting or exceeding project goals for the number of samples taken to represent the field conditions for the entire project.

6.3.5 Comparability

Comparability is defined as a measure of confidence that one data set can be described as similar to another data set of the same samples. Comparability reflects internal consistency of data collection procedures with regard to a single parameter, expression of data in the same units as reported by other organizations measuring the same parameters, and obtaining analytical results which, although not identical, are similar to analytical results of previous samples collected from the same source.

Post-excavation sample results from the on-site laboratory were obtained using consistent data collection procedures throughout the project. The post-excavation sample results were comparable to historical data from the target areas regarding the data reported and type of VOCs found.

The post-treatment soil sample results were obtained using consistent procedures throughout the project. The type and concentration of VOCs in the treated soil sample results were internally consistent throughout the project, with only minor variation (less than 1 ppm total VOCs) in the total VOC concentrations. These variations are believed to be due to differences in feed concentrations, LTTA® treatment temperature, or other system operations variables. No historical data was available to compare the treated soil sample results to, therefore, the results were compared on an individual basis against the overall project averages.

Off-site duplicate VOC samples were originally intended to be comparable to the on-site laboratory results by following SW-846 Method 8020 (GC) methodology. However, on January 9, 1992 the method for off-site VOC analysis was modified to SW-846 Method 8240 (GC/MS). The objective of utilizing Method 8240 was to verify that Method 8020 used in on-site analysis provided for proper identification of site contaminants. Because the two sets of data are obtained by different analytical procedures, they are not directly comparable to each other.

6.4 Reporting of On-Site Laboratory Data

Results of VOC analyses from the on-site laboratory were calculated and presented on a wet weight basis. Moisture content analyses are needed to report analytical results on a dry-weight basis but were not performed in the on-site laboratory. The wet weight VOC data was used during the remediation activities to determine whether additional excavation would be required in VOC-impacted AECs and whether additional processing in the LTTA® system would be required for treated soils. Because the wet weight VOC data are well below the related cleanup standards, conversion to dry weight data using conservative moisture content assumptions does not affect the adequacy of the decisions made using the wet weight results.

6.4.1 Post-Excavation VOC Samples

The moisture contents measured in the duplicate post-excavation samples sent off-site for VOC analysis ranged from 11 to 26 percent. This range is consistent with the moisture content values obtained from samples during earlier Phase I, Phase II, and additional ECRA sampling activities at the site. Using the conservative (highest) value of 26 percent moisture content to convert all on-site results to dry weight values, the cleanup level of 10 ppm total VOCs would have been exceeded in only one of the post-excavation samples that defined the final limits of any excavation. This sample, identified as P-34, was from AEC 16. The dry weight result for this sample would be

10.8 ppm total VOCs using the moisture content data from a duplicate of this sample analyzed off-site. However, as shown in Table 34, the duplicate sample P-34 contained only 0.77 ppm total VOCs (dry weight basis), well below the cleanup criteria of 10 ppm total VOCs. Based on this information, the presentation of the post-excavation VOC sample results on a wet weight basis does not impact the use of the data in demonstrating that the cleanup objectives were met.

6.4.2 Post-Treatment VOC Samples

The moisture contents measured in the duplicate post-treatment samples sent off-site for VOC analysis ranged from 5 to 22 percent, with the majority of values (93 percent) below 20 percent. All treated soils with daily average total VOC results above the internal treatment standard (1 ppm from November 26 to December 22, 1991, 2 ppm for the remainder of the project) were reprocessed. Assuming a 30 percent moisture content (an unlikely scenario), if these internal treatment standards had been applied on a dry weight basis, the corresponding wet weight standards would have been 0.70 ppm from November 26 to December 22, 1991 and 1.54 ppm for the remainder of the project. As shown on Table 25, these wet weight internal standards were not exceeded in any of the treated soils which were backfilled. Therefore, the conclusions regarding the adequacy of soils treatment remain unchanged when the wet weight data are converted to dry weight data.

6.5 Off-Site Confirmation of On-Site Results

In accordance with the Work Plan and as described in Table 7 of the QAPP, 10 percent of the samples which were analyzed on-site were duplicated and sent to a New Jersey certified off-site analytical laboratory for confirmation of the on-site analyses. In the QAPP, off-site GC analysis by Method 8020 was required for the purpose of directly comparing off-site results to on-site results. However, on January 9, 1992, the off-site analysis of VOCs was changed to GC/MS analysis by Method

8240. The absence of any compounds in the 8240 analytical results which were not identifiable by Method 8020 was intended to be an indication that Method 8020 was appropriate for the on-site VOC analysis.

Of the 114 post-excavation VOC soil samples which were analyzed on-site, 17 (15 percent) were sent off-site for confirmation of the on-site results. Method 8020 was performed by Northeastern Analytical Corporation (NAC) for the first 4 samples and Method 8240 was performed by Weston Analytics (Weston) for the remaining 13. Of the 388 post-treatment VOC soil samples which were analyzed on-site, 44 (11 percent) were sent off-site for confirmation of the on-site results. Method 8240 was performed by Weston for off-site analysis of all post-treatment VOC soil samples. Tier II data packages for the off-site 8020 and 8240 analyses are presented in Appendix T.

6.5.1 Comparison of Analytical Results - On-Site 8020 Versus Off-Site 8020

Four post-excavation samples (P-10, P-21, P-69, and P-75) were analyzed on-site following SW-846 Method 8020 and confirmed off-site by NAC following SW-846 Method 8020. These results are presented in Table 33. One sample (P-21) was reported to have no detectable quantities of VOCs by both laboratories and the other three samples were reported to have greater than 10 ppm total VOC concentrations by both laboratories. Discrepancies exist between the on-site results and the off-site results for these three samples. However, the available QA/QC information for these samples is not sufficient to conclusively resolve the differences. Because both sets of sample results exceeded the 10 ppm cleanup criteria, the field decisions which were made based upon the data were not affected by the differences between the data sets.

6.5.2 Comparison of Analytical Results - On-Site 8020 Versus Off-Site 8240

Thirteen post-excavation samples and 44 post-treatment samples were analyzed on-site following SW-846 Method 8020 and confirmed off-site by Weston following SW-846 Method 8240. These results are presented in Tables 34 and 35, respectively.

The difference in analytical techniques used in Methods 8020 and 8240 can cause different results to be obtained in analysis of the same sample by the two methods. The primary difference between these two methods is the selectivity of the detectors. The GC/MS (8240) detector used on this project is less selective in its identification of organic compounds than the GC (8020) detector. Specifically, the GC/MS detector identified branched alkanes and other TICs to which the GC detector did not respond. The identification of these additional compounds by the GC/MS detector may have either created false positive errors through their quantitation as xylenes or created false negative errors through their quantitation as internal standard compounds. Therefore the difference in analytical results obtained on the same sample by the two methods is not an indication of the accuracy of either of the sets of results. Rather, the off-site data serves as a confirmation that the on-site data was appropriately compared to cleanup criteria to make decisions regarding the need for additional excavation (for post-excavation samples) or processing of soil (for post-treatment samples).

If the on-site and off-site results of the same sample are either both above or both below the relevant cleanup criteria, the on-site data is believed to have been used appropriately. Furthermore, if an on-site sample result is above the cleanup criteria but the corresponding off-site sample result is below the limit, this difference is not of concern because the use of the on-site data would only have resulted in a conservative decision. Only one case exists where an on-site sample was below the cleanup criteria but the corresponding off-site sample exceeded the limit. The discussion of this case is included in Section 6.5.2.1.

6.5.2.1 Post-Excavation Results

Results for the 13 confirmatory post-excavation VOC soil samples which were analyzed off-site by Method 8240 are presented in Table 34. Five samples were reported to have greater than 10 ppm total VOC concentrations by both laboratories. Six samples were reported to have less than 10 ppm total VOC concentrations by both laboratories. The results of sample P-55 from the on-site laboratory exceeded the 10 ppm cleanup criteria but the off-site results of P-55 were less than the limit. Because the soil sidewall represented by sample P-55 was further excavated, the difference in results is not of concern. The on-site results of sample P-57A were below the 10 ppm limit, but the off-site results exceeded 10 ppm. A review of the GC/MS off-site data indicates that the Method 8240 results may have inaccurately quantitated as xylene branched alkanes not detectable by Method 8020. Based on this information, discrepancies between results from the two laboratories appear to be attributable to interferences to the GC/MS detector which were caused by branched alkanes or other non-target compounds which were not identified by the GC detector utilized on-site.

6.5.2.2 Post-Treatment Results

Results for the 44 confirmatory post-treatment VOC soils which were analyzed off-site by SW-846 Method 8240 are presented in Table 35. As discussed in Section 3.1, an internal cleanup criteria of 2 ppm was utilized for post-treatment soil samples in lieu of the less stringent 10 ppm level specified in the Cleanup Plan. One of the 44 samples (1213-06) was reported to have greater than 2.0 ppm total VOC concentrations by both laboratories. All 43 other samples were reported to have less than 2.0 ppm total VOC concentrations by both laboratories.

6.6 Off-Site BN Results

Post-excavation BN soil samples and post-treatment BN soil samples were analyzed off-site by NAC following SW-846 Method 8270 with a forward library search for tentatively identified compounds. The samples were collected, identified and transported in accordance with the guidelines contained within the QAPP. The samples were analyzed in accordance with NAC's internal laboratory QA program. This program follows the QA/QC guidelines which are described in SW-846 for Method 8270. Sample results were reported in Tier II data packages which are located in Appendix U. The QA/QC results were also included in the data packages. The quality of these BN sample results are consistent with the DQOs for this project.

6.7 Additional QA Measurements

In addition to the PARCC data quality objectives which were specifically outlined in the QAPP and addressed above, other measurements conducted at the on-site laboratory for the specific purpose of providing data of known, good quality, in accordance with SW-846 Method 8020, include the following:

1. Precision and Accuracy Study (PAS) Results;
2. Method Detection Limit (MDL) Results;
3. Initial Calibration Results;
4. Continuing Calibration Results;
5. Surrogate Recovery Results.

These additional measurements were conducted to ensure that the laboratory system was properly functioning prior to the analysis of any samples, continued to operate

within the acceptable guidelines established in SW-846 Method 8020, and followed the procedures established in the QAPP.

6.7.1 PAS Results

A precision and accuracy study (PAS) was conducted on October 2, 1991, prior to the analysis of environmental samples, in accordance with Section 8.7.3 of SW-846 Method 8000 (Gas Chromatography) and in accordance with the QAPP. The goal of the PAS was to meet the acceptable limits for system precision and accuracy as identified in Table 30 prior to the start of project sample analysis. Another PAS was conducted at the end of the project on March 7, 1992. These two studies are compared to the project QC limits in Table 36. The data on this table indicates that the PAS results were within the acceptable limits prior to any sample analysis and improved over the duration of the project.

6.7.2 MDL Results

Two method detection limit (MDL) studies were conducted prior to the analysis of environmental samples in accordance with 40 CFR 136 Appendix B and in accordance with the QAPP. While 40 CFR 136 Appendix B addresses the analysis of water samples, it was relevant to utilize the MDL determination procedure for on-site analysis of soil samples. The results of these studies are presented in Table 37. The results show that while the detection limits utilized for this project were greater than the MDLs which were achieved during the studies, they were well within normal ranges for this method typically achieved by certified laboratories and therefore were sufficient for demonstrating that cleanup objectives were met. The MDL results shown in Table 37 were equal to those typically achieved by fixed laboratories.

6.7.3 Initial Calibration Results

On a regular basis, an initial multiple point calibration curve was analyzed and determined to be acceptable in accordance with the requirements set forth in Section 7.4.3 of SW-846 Method 8000. This initial calibration procedure was conducted seven times over the six-month period. The results are summarized in Table 38. All nine compounds and two surrogates on all seven calibration curves were within the acceptable limit of 20 percent RSD. This calibration curve was verified on a daily basis by the measurement and acceptable recovery of one or more calibration standards.

6.7.4 Continuing Calibration Results

Daily continuing calibration results were analyzed and determined to be acceptable in accordance with Section 7.4.3 of SW-846 Method 8000 prior to the analysis of samples. This requirement was followed throughout the project. The precision and accuracy of the continuing calibration results are presented in Table 39.

6.7.5 Surrogate Standard Recoveries

Surrogate standards were added to all blanks, calibrations, and samples prior to analysis. Bromofluorobenzene was utilized as an internal standard and fluorobenzene was utilized as a surrogate standard. Both surrogates were required to be recovered within 25 percent of the true value for all reported results. Samples which did not meet the surrogate recovery standard were reanalyzed.

6.8 Conclusions

The QA program ensured that the off-site and on-site analytical data was properly generated. The QA program had many components, each with specific procedures

or quantitative goals to be met. The requirements of the QA program were specified in the QAPP.

The QA program for the analytical data generated in the on-site laboratory consisted of DQOs as well as specific procedures. The DQOs for the on-site laboratory were designed to meet or exceed the criteria established in SW-846 for the analysis of VOCs in soil. The operating procedures, instrumentation, documentation, and internal QC performed on-site were at least equivalent to those required in a non-mobile, certified environmental laboratory.

The project DQOs for the analytical data generated in the on-site analytical laboratory were met for all quantitatively measurable parameters (precision, accuracy, completeness) with the exception of three out of eight MS/MSD accuracy results which exceeded the project goal of 25 percent recovery. However, the SW-846 advisory limits were met for all quantitatively measurable parameters, including all MS/MSD recovery results. The DQOs were met for the qualitatively measurable parameters of representativeness and comparability by following the procedures detailed in the QAPP and by sampling at a frequency which was consistent with the guidelines established in the QAPP.

The operating procedures, instrumentation, documentation, and internal QC were followed as specified in the QAPP.

The analytical data from off-site laboratories was generated following standard analytical procedures. The QA data on these analyses shows it to be valid and useable.

The purpose of the QA program data was to provide defensible data of known, high quality. Based upon the results presented herein, the requirements of the QA program

were met and the data is considered to be defensible and is of sufficient quality to demonstrate that cleanup objectives were met.

7.0 SURFACE RESTORATION

The mobilization of the LTTA® plant and the remediation of AECs required various methods of surface restoration. Fill material was imported to level the plant area unit and provide a stable base. AEC surfaces were covered with asphalt,concrete, soil and/or rail spurs following backfilling.

7.1 Off-Site Fill Material

The areas where the unit was erected required the importing of fill material for leveling and to provide a stable subbase for the weight of the unit. Canonie imported 2364 tons of a dense graded aggregate material (DGA) from Millington Quarry located in Millington,New Jersey. This material qualified as certified clean fill material as defined by the NJDEPE. The DGA was produced from virgin quarry material mined at the Millington location. Analysis of the Millington Quarry DGA showed the material to be free of VOC or BN contamination. Appendix Q contains documentation of the clean fill analysis and owner certification of virgin material provided by Millington Quarry.

7.2 Railroad Tracks

In AECs 1, 3, 4, and 5, active rail spurs were removed to allow excavation of the underlying soils. After backfilling of the excavated areas, the rail spurs were replaced to their original line and grade. In AEC 1, a spur switch and 143 linear feet of rail spur were removed and replaced. In AECs 3, 4, and 5 a total of 958 linear feet of rail spurs were removed and replaced. All rail restoration was performed in accordance with "Conrail Specifications for Industrial Rail Sidings." On December 27, 1991, Mr. Frank Martins of Conrail inspected and approved the rail installation in AECs 3, 4, and 5 on May 7, 1992, Mr. Martins inspected and approved the rail installation in AEC 1.

7.3 AEC 7 Concrete Pad

A concrete pad covered AEC 7 prior to remediation of the area. The concrete pad was restored over portions of AEC 7 after backfilling. Canonie placed 3180 square feet of 4500 psi concrete with an 8-inch thick cross-section. A curing accelerator was added to aid in the cold-weather curing process. The pad was reinforced with 6-inch by 6-inch wire mesh and had caulked expansion joints. Appendix R contains an as-built drawing of the pad.

7.4 Asphalt

A total of 3503 square yards of asphalt was replaced after the completion of backfilling of certain individual areas. All asphalt restoration materials and construction were in accordance with New Jersey Department of Transportation (NJDOT) Standard Specifications for Road and Bridge Construction - 1989 Edition. All existing asphalt edges were saw cut prior to paving. Tack coat was applied to all joints after paving. The following paving cross-section was installed in all areas:

- Four-inch NJDOT dense graded aggregate;
- Two-inch NJDOT I-2 asphalt concrete base course;
- Two-inch NJDOT I-4 asphalt concrete surface course.

8.0 COSTS

The total remedial action cost for Canonie's services, including those of subcontractors and vendors, was $2,700,876.10. This cost consisted of the following:

1. Engineering: $114,513.20;
2. Analytical: $67,440.00;
3. Mobilization/Demobilization: $255,000.00;
4. Soil Processing: $981,172.00;
5. AEC 12 Excavation: $348,878.20;
6. Transport and Off-Site Disposal: $373,942.05;
7. Site Restoration: $395,778.00;
8. Work necessary to maintain Reichhold facility production: $164,152.60.

9.0 SCHEDULE

A final project schedule is provided as Figure 3. This schedule lists the start and finish dates for the major activities associated with the remediation. Key milestone dates are provided below:

1. Site mobilization begins - September 6, 1991;
2. AEC 12 excavation begins - October 15, 1991;
3. LTTA® startup test/full-scale soil processing begins - November 26, 1991;
4. Soil processing complete - March 5, 1992;
5. LTTA® demobilization complete - March 28, 1992;
6. Final site restoration complete - April 11, 1992.

TABLES

8450306 12

TABLE 1

EXCAVATION QUANTITIES SUMMARY

Excavation Area	Contaminant	Design Quantity	Actual Quantity
AEC 1	VOC	150	307
AEC 3,4,5	VOC	1,816	1,333
AEC 7	VOC	251	475
AEC 8	BN	19	32
AEC 9	VOC	1	3
AEC 12	VOC	672	602
AEC 12S	VOC	0	27
AEC 14	VOC	509	871
AEC 15	BN	7	34
AEC 16	VOC	302	189
AEC 17	VOC	295	315
AEC 18	BN	9	23
AEC 19	VOC	297	350
AEC 21	VOC	382	633
AEC 25	VOC	116	143
AEC 28	BN	22	63
MW-7	BN	33	48
MW-12	BN	33	44
MW-15	BN	9	30
Boring 1707/1712	BN	9	25
Boring 2303/2304	BN	20	49
Boring 306/307	BN	36	177
MW10/Boring M2401	BN	45	65
TOTAL		5,033 cy	5,838 cy

Notes:

1. All quantities are given in cubic yards.
2. Design quantities are taken from Table 3 of May 1991 Work Plan prepared by Canonie.
3. Boring 1707/1712 was located within AEC 17.
4. Boring 306/307 was located within AEC 5.

TABLE 2

AEC 1
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	P-1	P-2	P-3	P-4	P-97	P-98	P-1A	P-2A	P-98A	P-1B
Lab ID No.	TX0634	TX0635	TX0636	TX0637	TX0638	TX0639	TX0710	TX0777	TX0791	TX0776
File ID	20208040	20208041	20208036	20208037	20208047	20208038	20217027	20224020	20225020	20224019
Date Sampled	2/8/92	2/8/92	2/8/92	2/8/92	2/8/92	2/8/92	2/17/92	2/23/92	2/24/92	2/23/92
Date Analyzed	2/8/92	2/8/92	2/8/92	2/8/92	2/8/92	2/8/92	2/17/92	2/24/92	2/25/92	2/24/92
Dilution Factor	4000	20	1	1	1	2000	1000	1	500	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	200 U	1.0 U	0.050 U	0.050 U	0.050 U	100 U	50 U	0.050 U	25 U	0.050 U
Toluene	400 U	2.0 U	1.0	0.10 U	0.10 U	200 U	100 U	0.10 U	50 U	0.10 U
Ethylbenzene	3700	6.2	1.3	0.12	0.19	1900	930	0.20	1700	0.11
Xylene, total	9900	11	1.9	0.44	0.45	3100	2100	0.38	980	0.55
Chlorobenzene	200 U	1.0 U	0.050 U	0.050 U	0.050 U	100 U	50 U	0.050 U	25 U	0.050 U
1,2-Dichlorobenzene	200 U	1.0 U	0.050 U	0.050 U	0.050 U	100 U	50 U	0.050 U	25 U	0.050 U
1,3-Dichlorobenzene	200 U	1.0 U	0.050 U	0.050 U	0.050 U	100 U	50 U	0.050 U	25 U	0.050 U
1,4-Dichlorobenzene	200 U	1.0 U	0.050 U	0.050 U	0.050 U	100 U	50 U	0.050 U	25 U	0.050 U
VOCs, total	13600	17.2	4.2	0.56	0.64	5000	3030	0.58	2680	0.66

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503061 4

TABLE 3

AECs 3,4,5
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	P-9	P-10	P-11	P-64	P-65	P-66	P-67	P-68	P-69	P-70
Lab ID No.	TX0057	TX0069	TX0166	TX0058	TX0059	TX0060	TX0061	TX0062	TX0063	TX0064
File ID	11115006	11120025	11206047	11115007	11115016	11118007	11118005	11118008	11118010	11118013
Date Sampled	11/15/91	11/19/91	12/4/91	11/15/91	11/15/91	11/15/91	11/15/91	11/15/91	11/15/91	11/18/91
Date Analyzed	11/15/91	11/20/91	12/7/91	11/15/91	11/15/91	11/18/91	11/18/91	11/18/91	11/18/91	11/18/91
Dilution Factor	1	100	1	1	1	1	1	1	1	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.050 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	5.0 U	0.050 U
Toluene	0.15	10 U	0.10 U	0.10 U	0.10 U	0.88 X	1.4 X	3.4 X	190 X	0.10 U
Ethylbenzene	0.10 U	55	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.15	10 U	0.10 U
Xylene, total	0.18	320	0.43	0.10 U	0.15	0.34	0.37	0.10 U	17	0.49
Chlorobenzene	0.050 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	5.0 U	0.050 U
1,2-Dichlorobenzene	0.050 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	5.0 U	0.050 U
1,3-Dichlorobenzene	0.050 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	5.0 U	0.050 U
1,4-Dichlorobenzene	0.050 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	5.0 U	0.050 U
VOCs, total	0.33	375	0.43	—	0.15	1.21	1.77	3.55	207	0.49

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
X - An interfering peak from an unidentified compound may have contributed to the obtained value for toluene.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503061S

AECs 3,4,5
VOC Post-Excavation Soil Samples
Summary of Results
(continued)

Sample Name	P-71	P-72	P-73	P-74	P-75	P-76	P-77	P-78	P-79	P-80
Lab ID No.	TX0065	TX0066	TX0067	TX0068	TX0070	TX0079	TX0080	TX0081	TX0162	TX0163
File ID	11120022	11120021	11120047	11120024	11120026	11120043	11120044	11120045	11213022	11210025
Date Sampled	11/18/91	11/18/91	11/18/91	11/18/91	11/19/91	11/21/91	11/21/91	11/21/91	12/4/91	12/4/91
Date Analyzed	11/20/91	11/20/91	11/21/91	11/20/91	11/20/91	11/21/91	11/21/91	11/21/91	12/13/91	12/11/91
Dilution Factor	100	100	10	100	20	500	100	100	1	50
Compound	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*
Benzene	5.0 U	5.0 U	0.50 U	5.0 U	1.0 U	25 U	5.0 U	5.0 U	0.050 U	2.5 U
Toluene	10 U	10 U	1.0 U	28 X	2.0 U	50 U	10 U	10 U	0.10 U	5.0 U
Ethylbenzene	10 U	10 U	1.0 U	10 U	2.0 U	220	47	390	0.77	85
Xylene, total	72	140	3.8	36	11	1100	250	130	0.99	34
Chlorobenzene	5.0 U	5.0 U	0.50 U	5.0 U	1.0 U	25 U	5.0 U	5.0 U	0.050 U	2.5 U
1,2-Dichlorobenzene	5.0 U	5.0 U	0.50 U	5.0 U	1.0 U	25 U	5.0 U	5.0 U	0.050 U	2.5 U
1,3-Dichlorobenzene	5.0 U	5.0 U	0.50 U	5.0 U	1.0 U	25 U	5.0 U	5.0 U	0.050 U	2.5 U
1,4-Dichlorobenzene	5.0 U	5.0 U	0.50 U	5.0 U	1.0 U	25 U	5.0 U	5.0 U	0.050 U	2.5 U
VOCs, total	72	140	3.8	64	11	1320	297	520	1.76	119

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
X - An interfering peak from an unidentified compound may have contributed to the obtained value for toluene.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503061 6

TABLE 3

AECs 3,4,5
VOC Post-Excavation Soil Samples
Summary of Results
(continued)

Sample Name	P-81	P-82	P-85	P-86	P-87	P-88	P-10A	P-69A	P-71A	P-72A
Lab ID No.	TX0164	TX0165	TX0071	TX0072	TX0073	TX0074	TX0167	TX0101	TX0102	TX0103
File ID	11213023	11211014	11120027	11120016	11120017	11120029	11211015	11125017	11125009	11125010
Date Sampled	12/4/91	12/4/91	11/19/91	11/19/91	11/19/91	11/19/91	12/4/91	11/25/91	11/25/91	11/25/91
Date Analyzed	12/13/91	12/11/91	11/20/91	11/20/91	11/20/91	11/20/91	12/11/91	11/25/91	11/25/91	11/25/91
Dilution Factor	1	1	500	20	20	100	1	10	200	200
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.050 U	0.050 U	25 U	1.0 U	1.0 U	5.0 U	0.050 U	0.50 U	10 U	10 U
Toluene	0.14	0.33	410 X	2.0 U	2.0 U	10 U	0.10 U	23 X	20 U	20 U
Ethylbenzene	0.10 U	0.10 U	93	2.0 U	2.0 U	10 U	0.10 U	5.3	20 U	20 U
Xylene, total	0.70	0.10 U	640	2.7	27	170	0.34	66	30	210
Chlorobenzene	0.050 U	0.050 U	25 U	1.0 U	1.0 U	5.0 U	0.050 U	0.50 U	10 U	10 U
1,2-Dichlorobenzene	0.050 U	0.050 U	25 U	1.0 U	1.0 U	5.0 U	0.050 U	0.50 U	10 U	10 U
1,3-Dichlorobenzene	0.050 U	0.050 U	25 U	1.0 U	1.0 U	5.0 U	0.050 U	0.50 U	10 U	10 U
1,4-Dichlorobenzene	0.050 U	0.050 U	25 U	1.0 U	1.0 U	5.0 U	0.050 U	0.50 U	10 U	10 U
VOCs, total	0.84	0.33	1143	2.7	27	170	0.34	94.3	30	210

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
X - An interfering peak from an unidentified compound may have contributed to the obtained value for toluene.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

845030617

TABLE 3

AECs 3,4,5
VOC Post-Excavation Soil Samples
Summary of Results
(continued)

Sample Name	P-74A	P-85A	P-87A	P-88A
Lab ID No.	TX0104	TX0105	TX0106	TX0107
File ID	11125019	11125020	11125021	11125014
Date Sampled	11/25/91	11/25/91	11/25/91	11/25/91
Date Analyzed	11/25/91	11/25/91	11/25/91	11/25/91
Dilution Factor	10	5000	10	200
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.50 U	250 U	0.50 U	10 U
Toluene	1.4 X	500 U	1.0 U	34
Ethylbenzene	1.0 U	500 U	1.0 U	67
Xylene, total	36	6300	1.2	760
Chlorobenzene	0.50 U	250 U	0.50 U	10 U
1,2-Dichlorobenzene	0.50 U	250 U	0.50 U	10 U
1,3-Dichlorobenzene	0.50 U	250 U	0.50 U	10 U
1,4-Dichlorobenzene	0.50 U	250 U	0.50 U	10 U
VOCs, total	37.4	6300	1.2	861

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
X - An interfering peak from an unidentified compound may have contributed to the obtained value for toluene.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

845030618

TABLE 4

AEC 7
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	P-12	P-13	P-14	P-14S	P-15	P-16	P-12A	P-13A	P-14A	P-15A
Lab ID No.	TX0251	TX0252	TX0253	TX0254	TX0255	TX0256	TX0264	TX0265	TX0266	TX0267
File ID	11217046	11217027	11217049	11217050	11217029	11217030	11217043	11217039	11217044	11217041
Date Sampled	12/17/91	12/17/91	12/17/91	12/17/91	12/17/91	12/17/91	12/18/91	12/18/91	12/18/91	12/18/91
Date Analyzed	12/18/91	12/17/91	12/18/91	12/18/91	12/17/91	12/17/91	12/18/91	12/18/91	12/18/91	12/18/91
Dilution Factor	500	1000	1	1	10	1000	200	1	1	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	25 U	50 U	0.050 U	0.050 U	0.50 U	50 U	10 U	0.050 U	0.050 U	0.050 U
Toluene	50 U	100 U	0.11	0.16	1.0 U	100 U	20 U	0.10 U	0.98	0.10 U
Ethylbenzene	110	650	0.11	0.14	2.7	120	100	0.12	0.47	0.10 U
Xylene, total	940	6200	1.8	3.0	20	500	510	2.5	2.7	0.61
Chlorobenzene	25 U	50 U	0.050 U	0.050 U	0.50 U	50 U	10 U	0.050 U	0.050 U	0.050 U
1,2-Dichlorobenzene	25 U	50 U	0.050 U	0.050 U	0.50 U	50 U	10 U	0.050 U	0.050 U	0.050 U
1,3-Dichlorobenzene	25 U	50 U	0.050 U	0.050 U	0.50 U	50 U	10 U	0.050 U	0.050 U	0.050 U
1,4-Dichlorobenzene	25 U	50 U	0.050 U	0.050 U	0.50 U	50 U	10 U	0.050 U	0.050 U	0.050 U
VOCs, total	1050	6850	2.02	3.30	22.7	620	610	2.62	4.15	0.61

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503061 9

AEC 7
VOC Post-Excavation Soil Samples
Summary of Results
(continued)

Sample Name	P-16A	P-12B	P-12C	P-12D
Lab ID No.	TX0268	TX0281	TX0291	TX0301
File ID	11217045	11217060	11221017	11221037
Date Sampled	12/18/91	12/19/91	12/21/91	12/22/91
Date Analyzed	12/18/91	12/20/91	12/21/91	12/22/91
Dilution Factor	5	200	10	5
Compound	**mg/Kg**	**mg/Kg**	**mg/Kg**	**mg/Kg**
Benzene	0.25 U	10 U	0.50 U	0.25 U
Toluene	0.91	20 U	3.4	0.82
Ethylbenzene	0.50 U	20 U	2.1	1.1
Xylene, total	6.4	67	6.7	4.1
Chlorobenzene	0.25 U	10 U	0.50 U	0.25 U
1,2-Dichlorobenzene	0.25 U	10 U	0.50 U	0.25 U
1,3-Dichlorobenzene	0.25 U	10 U	0.50 U	0.25 U
1,4-Dichlorobenzene	0.25 U	10 U	0.50 U	0.25 U
VOCs, total	7.31	67	12.2	6.02

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

845030620

TABLE 5

AEC 9
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	P-21
Lab ID No.	TX0052
File ID	11113013
Date Sampled	11/13/91
Date Analyzed	11/13/91
Dilution Factor	1

Compound	mg/Kg
Benzene	0.050 U
Toluene	0.10 U
Ethylbenzene	0.10 U
Xylene, total	0.10 U
Chlorobenzene	0.050 U
1,2-Dichlorobenzene	0.050 U
1,3-Dichlorobenzene	0.050 U
1,4-Dichlorobenzene	0.050 U
VOCs, total	——

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503062

TABLE 6

AEC 12S
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	AEC 12S	P-101	P-102	P-103	P-103A
Lab ID No.	TX0084	TX0870	TX0871	TX0872	TX0898
File ID	11120040	20228676	20228125	20228123	20228122
Date Sampled	11/21/91	2/28/92	2/28/92	2/28/92	3/3/92
Date Analyzed	11/21/91	2/28/92	3/3/92	3/3/92	3/3/92
Dilution Factor	20	4	4	50	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	1.0 U	0.20 U	0.20 U	2.5 U	0.050 U
Toluene	2.0 U	0.43	0.40 U	5.0 U	0.10 U
Ethylbenzene	12	0.40 U	1.3	12	0.10 U
Xylene, total	72	0.64	1.8	150	0.34
Chlorobenzene	1.0 U	0.20 U	0.20 U	2.5 U	0.050 U
1,2-Dichlorobenzene	1.0 U	0.20 U	0.20 U	2.5 U	0.050 U
1,3-Dichlorobenzene	1.0 U	0.20 U	0.20 U	2.5 U	0.050 U
1,4-Dichlorobenzene	1.0 U	0.20 U	0.20 U	2.5 U	0.050 U
VOCs, total	84	1.07	3.1	162	0.34

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503062

TABLE 7

AEC 14
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	P-24	P-25	P-26	P-27	P-28	P-29	P-30	P-99	P-100	P-24A
Lab ID No.	TX0661	TX0662	TX0663	TX0664	TX0665	TX0693	TX0694	TX0838	TX0839	TX0705
File ID	20210060	20210051	20210052	20210061	20210062	20214017	20214018	20225022	20228075	20217023
Date Sampled	2/10/92	2/10/92	2/10/92	2/10/92	2/10/92	2/13/92	2/13/92	2/25/92	2/25/92	2/17/92
Date Analyzed	2/10/92	2/10/92	2/10/92	2/10/92	2/10/92	2/14/92	2/14/92	2/25/92	2/28/92	2/17/92
Dilution Factor	1000	50	10	1000	20	1	1	1	1	500
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	50 U	1.2 U	0.50 U	50 U	1.0 U	0.050 U	0.050 U	0.050 U	0.050 U	25 U
Toluene	100 U	65	2.0	840	2.1	0.10 U	0.38	0.19	0.10 U	120
Ethylbenzene	320	54	4.5	1100	2.0 U	0.17	1.5	0.10 U	0.10 U	570
Xylene, total	1600	270	50	3700	18	0.26	3.6	0.35	0.10 U	2900
Chlorobenzene	50 U	1.2 U	0.50 U	50 U	1.0 U	0.050 U	0.050 U	0.050 U	0.050 U	25 U
1,2-Dichlorobenzene	50 U	1.2 U	0.50 U	50 U	1.0 U	0.050 U	0.050 U	0.050 U	0.050 U	25 U
1,3-Dichlorobenzene	50 U	1.2 U	0.50 U	50 U	1.0 U	0.050 U	0.050 U	0.050 U	0.050 U	25 U
1,4-Dichlorobenzene	50 U	1.2 U	0.50 U	50 U	1.0 U	0.050 U	0.050 U	0.050 U	0.050 U	25 U
VOCs, total	1920	389	56.5	5640	20.1	0.43	5.48	0.54	——	3590

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503062 3

TABLE 7

AEC 14
VOC Post-Excavation Soil Samples
Summary of Results
(continued)

Sample Name	P-25A	P-26A	P-27A	P-28A	P-24B	P-25B	P-26B	P-27B	P-28B	P-24C
Lab ID No.	TX0706	TX0707	TX0708	TX0709	TX0725	TX0726	TX0727	TX0728	TX0729	TX0765
File ID	20217024	20217017	20217025	20217026	20219028	20219023	20219024	20219026	20219027	20222014
Date Sampled	2/17/92	2/17/92	2/17/92	2/17/92	2/19/92	2/19/92	2/19/92	2/19/92	2/19/92	2/22/92
Date Analyzed	2/17/92	2/17/92	2/17/92	2/17/92	2/19/92	2/19/92	2/19/92	2/19/92	2/19/92	2/22/92
Dilution Factor	5	20	200	200	100	1	1	1	1	20
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.25 U	1.0 U	10 U	10 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	1.0 U
Toluene	5.4	23	98	20 U	10 U	0.10 U	0.10 U	0.10 U	0.15	2.0 U
Ethylbenzene	6.0	58	570	140	45	0.11	0.10 U	0.10 U	0.10 U	8.0
Xylene, total	22	130	1100	490	300	0.32	0.10 U	0.12	0.22	28
Chlorobenzene	0.25 U	1.0 U	10 U	10 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	1.0 U
1,2-Dichlorobenzene	0.25 U	1.0 U	10 U	10 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	1.0 U
1,3-Dichlorobenzene	0.25 U	1.0 U	10 U	10 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	1.0 U
1,4-Dichlorobenzene	0.25 U	1.0 U	10 U	10 U	5.0 U	0.050 U	0.050 U	0.050 U	0.050 U	1.0 U
VOCs, total	33.4	211	1770	630	345	0.43	——	0.12	0.37	36.0

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503062

TABLE 7

AEC 14
VOC Post-Excavation Soil Samples
Summary of Results
(continued)

Sample Name	P-24D	P-24E
Lab ID No.	TX0790	TX0837
File ID	20224018	20225047
Date Sampled	2/23/92	2/25/92
Date Analyzed	2/24/92	2/25/92
Dilution Factor	50	1
Compound	mg/Kg	mg/Kg
Benzene	2.5 U	0.050 U
Toluene	5.0 U	0.11
Ethylbenzene	36	0.10 U
Xylene, total	160	0.34
Chlorobenzene	2.5 U	0.050 U
1,2-Dichlorobenzene	2.5 U	0.050 U
1,3-Dichlorobenzene	2.5 U	0.050 U
1,4-Dichlorobenzene	2.5 U	0.050 U
VOCs, total	196	0.45

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503062S

TABLE 10

AEC 21
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	P-55	P-56	P-57	P-58	P-59	P-60	P-61	P-62	P-63	P-55A
Lab ID No.	TX0895	TX0896	TX0897	*	*	TX0823	TX0824	TX0825	TX0840	TX0912
File ID	20305054	20305055	20228095	9109L608-001	9109L608-002	20225064	20225049	20225050	20228121	20228114
Date Sampled	3/3/92	3/3/92	3/3/92	9/4/91	9/4/91	2/25/92	2/25/92	2/25/92	2/26/92	3/4/92
Date Analyzed	3/5/92	3/5/92	3/3/92	9/5/91	9/5/91	2/25/92	2/25/92	2/25/92	3/3/92	3/4/92
Dilution Factor	100	400	200	50	50	1	4	4	1	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	5.0 U	20 U	10 U	0.120 U	0.12 U	0.050 U	0.20 U	0.20 U	0.050 U	0.050 U
Toluene	10 U	180	31	0.220	0.020 J	0.10 U	0.40 U	0.47	0.10 U	0.10 U
Ethylbenzene	39	850	350	0.260	0.12 U	0.24	0.40 U	0.40 U	0.10 U	0.26
Xylene, total	47	2600	880	2.000	0.070 J	0.10 U	1.7	0.40 U	0.10 U	0.10 U
Chlorobenzene	5.0 U	20 U	10 U	3.20	0.12 U	0.050 U	0.20 U	0.20 U	0.050 U	0.050 U
1,2-Dichlorobenzene	5.0 U	20 U	10 U	1.20 U	0.12 U	0.050 U	0.20 U	0.20 U	0.050 U	0.050 U
1,3-Dichlorobenzene	5.0 U	20 U	10 U	1.40	0.12 U	0.050 U	0.20 U	0.20 U	0.050 U	0.050 U
1,4-Dichlorobenzene	5.0 U	20 U	10 U	3.70	0.12 U	0.050 U	0.20 U	0.20 U	0.050 U	0.050 U
VOCs, total	86	3630	1260	3.210	0.090	0.24	1.7	0.47	—	0.26

AEC: Area of Environmental Concern VOC: Volatile Organic Compound

U - Undetected at, or above, the reported detection limit.

J - Estimated; below the limits of reliable quantitation.

Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.

On-site results are reported in mg/Kg (ppm) on a wet-weight basis.

Results for samples P-58 and P-59 are reported in mg/Kg (ppm) on a dry-weight basis.

VOC post-excavation results sheets are located in Appendix A.

Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.

Sample locations are shown on Figure 2.

*: Samples P-58 and P-59 were analyzed by Roy F. Weston - Lionville. New Jersey Tier II data package is located in Appendix U.

845030626

TABLE 8

AEC 16
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	P-31	P-32	P-33	P-34
Lab ID No.	TX0201	TX0180	TX0181	TX0182
File ID	11213016	11211027	11211020	11211021
Date Sampled	12/12/91	12/7/91	12/7/91	12/7/91
Date Analyzed	12/13/91	12/11/91	12/11/91	12/11/91
Dilution Factor	1	1	1	10
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.050 U	0.050 U	0.050 U	0.50 U
Toluene	0.10 U	0.10 U	0.10 U	1.5
Ethylbenzene	0.10 U	0.10 U	0.10 U	1.9
Xylene, total	0.62	0.35	0.10 U	5.8
Chlorobenzene	0.050 U	0.050 U	0.050 U	0.50 U
1,2-Dichlorobenzene	0.050 U	0.050 U	0.050 U	0.50 U
1,3-Dichlorobenzene	0.050 U	0.050 U	0.050 U	0.50 U
1,4-Dichlorobenzene	0.050 U	0.050 U	0.050 U	0.50 U
VOCs, total	0.62	0.35	———	9.2

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

845030627

TABLE 9

AEC 17
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	P-43	P-44	P-45	P-46	P-47	P-89	P-90	P-91	P-43S
Lab ID No.	TX0402	TX0404	TX0405	TX0406	TX0407	TX0408	TX0409	TX0410	TX0403
File ID	20120044	20122035	20122036	20122037	20122038	20122039	20122040	20122041	20120045
Date Sampled	1/19/92	1/19/92	1/19/92	1/19/92	1/19/92	1/19/92	1/19/92	1/19/92	1/19/92
Date Analyzed	1/20/92	1/22/92	1/22/92	1/22/92	1/22/92	1/22/92	1/22/92	1/22/92	1/20/92
Dilution Factor	1	1	1	1	1	1	1	1	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Toluene	0.10 U	0.10 U	0.15	0.10 U	0.12	0.10 U	0.38	0.10 U	0.10 U
Ethylbenzene	0.10 U	0.10 U	0.10 U	0.10 U	4.4	0.15	0.28	0.10 U	0.10 U
Xylene, total	0.10 U	0.10 U	0.10 U	0.25	0.24	0.10 U	0.43	0.10 U	0.10 U
Chlorobenzene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
1,2-Dichlorobenzene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
1,3-Dichlorobenzene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
1,4-Dichlorobenzene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
VOCs, total	——	——	0.15	0.25	4.76	0.15	1.09	——	——

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503062B

TABLE 10

AEC 21
VOC Post-Excavation Soil Samples
Summary of Results
(continued)

Sample Name	P-56A	P-57A
Lab ID No.	TX0913	TX0914
File ID	20228126	20228112
Date Sampled	3/4/92	3/4/92
Date Analyzed	3/4/92	3/4/92
Dilution Factor	10	5
Compound	mg/Kg	mg/Kg
Benzene	0.50 U	0.25 U
Toluene	1.0 U	1.3
Ethylbenzene	1.2	2.2
Xylene, total	4.4	2.2
Chlorobenzene	0.50 U	0.25 U
1,2-Dichlorobenzene	0.50 U	0.25 U
1,3-Dichlorobenzene	0.50 U	0.25 U
1,4-Dichlorobenzene	0.50 U	0.25 U
VOCs, total	5.6	5.7

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503062 9

TABLE 11

AEC 25
VOC Post-Excavation Soil Samples
Summary of Results

Sample Name	P-48	P-49	P-50
Lab ID No.	TX0506	TX0507	TX0416
File ID	20131031	20131032	20129015
Date Sampled	1/30/92	1/30/92	1/20/92
Date Analyzed	1/31/92	1/31/92	1/29/92
Dilution Factor	1	1	1
Compound	mg/Kg	mg/Kg	mg/Kg
Benzene	0.050 U	0.050 U	0.050 U
Toluene	0.10 U	0.10 U	0.10 U
Ethylbenzene	0.10 U	0.10 U	0.10 U
Xylene, total	0.53	0.38	0.10 U
Chlorobenzene	0.050 U	0.050 U	0.050 U
1,2-Dichlorobenzene	0.050 U	0.050 U	0.050 U
1,3-Dichlorobenzene	0.050 U	0.050 U	0.050 U
1,4-Dichlorobenzene	0.050 U	0.050 U	0.050 U
VOCs, total	0.53	0.38	———

AEC: Area of Environmental Concern
VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.
Results are reported in mg/Kg (ppm) on a wet-weight basis.
VOC post-excavation results sheets are located in Appendix A.
Raw chromatograms and sample reports are included in a New Jersey Tier II data package located in Appendix S.
Sample locations are shown on Figure 2.

84503063O

AEC 8

BN Post-Excavation Soil Samples

Summary of Results

Sample Name	P-19	P-20	P-19S	P-20A	P-19SS	P-20B	P-19SSS*	P-20BS	P-20C
On-Site Lab ID No.	TX0484	TX0485	TX0695	TX0696	TX0886	TX0857	TX0963	TX0962	TX0961
Off-Site Lab ID No.	0373-01R	0373-2R	S124-001	S124-002	0810-1	0794-1R	HA7740	HA7739	HA7738
Date Sampled	1/29/92	1/29/92	2/17/92	2/17/92	3/2/92	2/27/92	3/10/92	3/10/92	3/10/92
Date Analyzed	2/7/92	2/7/92	2/24/92	2/24/92	3/9/92	3/9/92	3/16/92	3/16/92	3/16/92
Dry Weight, %	72.41	73.36	86	79	80.79	89.72	76	78	83
BN Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	28000 U	82000 U	15000 U	17000 U	25000 U	2900 J	2220	1830	2670
Acenaphthylene	28000 U	82000 U	15000 U	17000 U	25000 U	22000 U	460 U	450 U	420 U
Acenaphthene	28000 U	82000 U	15000 U	17000 U	25000 U	22000 U	250 U	240 U	230 U
Fluorene	28000 U	82000 U	15000 U	10000 J	25000 U	22000 U	1080	358	263
Hexachlorobenzene	28000 U	82000 U	15000 U	17000 U	25000 U	22000 U	250 U	240 U	230 U
Phenanthrene	28000 U	9400 J	15000 U	63000	25000 U	22000 U	1790	1170	523 J
Anthracene	28000 U	82000 U	15000 U	13000 J	25000 U	22000 U	250 U	172 J	230 U
Di-n-butyl phthalate	28000 U	82000 U	15000 U	17000 U	25000 U	22000 U	2330	1030	1050
Fluoranthene	28000 U	13000 J	15000 U	44000	1800 J	22000 U	684	1590	510
Pyrene	2900 J	15000 J	4200 J	63000	3700 J	22000 U	3040	1840	382
Bis (2-ethylhexyl) phthalate	28000 U	82000 U	1300000 B	1000000 B	25000 U	2900 J	1300 U	1300 U	1200 U
Benzo (g,h,i) perylene	28000 U	82000 U	15000 U	13000 J	25000 U	22000 U	1300	833	490 U
CaPAH Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Benzo (a) anthracene	28000 U	82000 U	15000 U	23000	25000 U	22000 U	703 J	828 J	940 U
Chrysene	28000 U	82000 U	15000 U	27000	25000 U	22000 U	1690	1040	294 J
Benzo (b) fluoranthene	28000 U	82000 U	15000 U	19000	25000 U	22000 U	870	1560	314
Benzo (k) fluoranthene	28000 U	82000 U	15000 U	16000 J	25000 U	22000 U	330 U	320 U	300 U
Benzo (a) pyrene	28000 U	82000 U	15000 U	20000	25000 U	22000 U	620	967	300 U
Indeno (1,2,3-cd) pyrene	28000 U	82000 U	15000 U	13000 J	25000 U	22000 U	766	799	450 U
Dibenzo (a,h) anthracene	28000 U	82000 U	15000 U	17000 U	25000 U	22000 U	330 U	320 U	300 U
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
BNs	0	0	0	0	0	120000	32600	51920	22450
CaPAHs	0	0	0	0	0	0	0	0	0
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	0	0	0	118	0	0	4.649	5.194	0.608
Total BNs less CaPAHs (mg/Kg)	2.9	37.4	1304.2	1206	5.5	125.8	45.044	60.743	28.848

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral TIC - Tentatively Identified Compound

CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon

*: Some data sheets misidentified P-19SSS as P-1935S.

Individual results are reported in ppb (ug/Kg) on a dry weight basis

B: Compound also detected in the associated method blank.

J: Estimated; below the limits of reliable quantitation.

U: Undetected at, or above, the reported detection limit.

Sample locations are shown on Figure 2

.97
.82
1.01
0.91
0.63
0.67

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TABLE 13

AEC 9

BN Post-Excavation Soil Samples

Summary of Results

Sample Name	P-21
On-Site Lab ID No.	TX0055
Off-Site Lab ID No.	3517-3
Date Sampled	11/13/91
Date Analyzed	11/18/91
Dry Weight, %	87.97
BN Compounds	ug/Kg
Naphthalene	380 U
Acenaphthylene	41 J
Acenaphthene	380 U
Fluorene	380 U
Hexachlorobenzene	380 U
Phenanthrene	200 J
Anthracene	210 J
Fluoranthene	780
Pyrene	810
Bis (2-ethylhexyl) phthalate	64 J
Benzo (g,h,i) perylene	340 J
CaPAH Compounds	ug/Kg
Benzo (a) anthracene	360 J
Chrysene	450
Benzo (b) fluoranthene	430
Benzo (k) fluoranthene	500
Benzo (a) pyrene	300 J
Indeno (1,2,3-cd) pyrene	320 J
Dibenzo (a,h) anthracene	380 U
TICs Identified as BNs or CaPAHs	ug/Kg
BNs	0
CaPAHs	540
	mg/Kg
Total CaPAHs (mg/Kg)	2.90
Total BNs less CaPAHs (mg/Kg)	2.445

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral

CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon

TIC - Tentatively Identified Compound

Individuals results are reported in ppb (ug/Kg) on a dry weight basis

J: Estimated; below the limits of reliable quantitation.

U: Undetected at, or above, the reported detection limit.

Sample locations are shown on Figure 2.

84503632

TABLE 14

AEC 15

BN Post-Excavation Soil Samples

Summary of Results

Sample Name	P-37	P-38	P-37S
On-Site Lab ID No.	TX0522	TX0523	TX0869
Off-Site Lab ID No.	0416-6	0416-7 R	0793-1
Date Sampled	1/31/92	1/31/92	2/28/92
Date Analyzed	2/8/92	2/10/92	3/6/92
Dry Weight, %	81.6	80.03	82.85
BN Compounds	ug/Kg	ug/Kg	ug/Kg
Naphthalene	4100 U	420 U	130 J
Acenaphthylene	4100 U	420 U	400 U
Acenaphthene	4100 U	420 U	400 U
Fluorene	4100 U	420 U	43 J
Hexachlorobenzene	4100 U	420 U	400 U
Phenanthrene	4100 U	150 J	290 J
Anthracene	4100 U	420 U	46 J
Fluoranthene	4100 U	240 J	270 J
Pyrene	4100 U	390 J	370 J
Bis (2-ethylhexyl) phthalate	4100 U	420 U	180 BJ
Benzo (g,h,i) perylene	4100 U	290 J	220 J
CaPAH Compounds	ug/Kg	ug/Kg	ug/Kg
Benzo (a) anthracene	4100 U	200 J	310 J
Chrysene	4100 U	290 J	420
Benzo (b) fluoranthene	4100 U	270 J	340 J
Benzo (k) fluoranthene	4100 U	550	260 J
Benzo (a) pyrene	4100 U	360 J	220 J
Indeno (1,2,3-cd) pyrene	4100 U	270 J	200 J
Dibenzo (a,h) anthracene	4100 U	420 U	400 U
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg	ug/Kg
BNs	0	0	1020
CaPAHs	0	510	0
	mg/Kg	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	0	2.45	1.750
Total BNs less CaPAHs (mg/Kg)	0	1.07	2.569

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral

CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon

TIC - Tentatively Identified Compound

Individual results are reported in ppb (ug/Kg) on a dry weight basis

B: Compound also detected in the associated method blank.

J: Estimated; below the limits of reliable quantitation.

U: Undetected at, or above, the reported detection limit.

Sample locations are shown on Figure 2.

845030633

AEC 18

BN Post-Excavation Soil Samples

Summary of Results

Sample Name	P-53	P-54
On-Site Lab ID No.	TX0475	TX0476
Off-Site Lab ID No.	0373-5	0373-6
Date Sampled	1/27/92	1/27/92
Date Analyzed	2/7/92	2/7/92
Dry Weight, %	78.07	82.13
BN Compounds	ug/Kg	ug/Kg
Naphthalene	270 J	260 J
Acenaphthylene	430 U	2000 U
Acenaphthene	430 U	2000 U
Fluorene	430 U	2000 U
Hexachlorobenzene	430 U	2000 U
Phenanthrene	590	930 J
Anthracene	93 J	240 J
Fluoranthene	970	1200 J
Pyrene	1000	1800 J
Bis (2-ethylhexyl) phthalate	430 U	2000 U
Benzo (g,h,i) perylene	910	340 J
CaPAH Compounds	ug/Kg	ug/Kg
Benzo (a) anthracene	830	870 J
Chrysene	900	1100 J
Benzo (b) fluoranthene	810	910 J
Benzo (k) fluoranthene	1100	1100 J
Benzo (a) pyrene	940	1100 J
Indeno (1,2,3-cd) pyrene	770	780 J
Dibenzo (a,h) anthracene	430 U	2000 U
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg
BNs	770	0
CaPAHs	0	2400
	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	5.35	8.26
Total BNs less CaPAHs (mg/Kg)	4.603	4.77

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral

CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon

TIC - Tentatively Identified Compound

Individual results are reported in ppb (ug/Kg) on a dry weight basis

J: Estimated; below the limits of reliable quantitation.

U: Undetected at, or above, the reported detection limit.

Sample locations are shown on Figure 2.

84503063

TABLE 16

AEC 28

BN Post-Excavation Soil Samples

Summary of Results

Sample Name	P-17	P-18	P-17A	P-17B
On-Site Lab ID No.	TX0090	TX0089	TX0192	TX0521
Off-Site Lab ID No.	3658-1	3658-2	3836-1	0416-3
Date Sampled	11/26/91	11/26/91	12/12/91	2/4/92
Date Analyzed	11/29/91	11/29/91	12/17/91	2/7/92
Dry Weight, %	73.46	80.48	77.23	68.79
BN Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	730	1200 U	380 J	760 J
Acenaphthylene	450 U	1200 U	430 U	190 J
Acenaphthene	810	120 J	420 J	3300
Fluorene	690	170 J	320 J	2400
Hexachlorobenzene	450 U	1200 U	430 U	1500 U
Phenanthrene	4500	970 J	3500	16000
Anthracene	1300	170 J	890	5100
Fluoranthene	5000	1200	4100	10000
Pyrene	4700	1100 J	3700	26000
Bis (2-ethylhexyl) phthalate	450 U	1200 U	430 U	550 J
Benzo (g,h,i) perylene	1800	360 J	2700	9700
CaPAH Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Benzo (a) anthracene	2900	450 J	2300	19000
Chrysene	2600	470 J	2500	16000
Benzo (b) fluoranthene	3700	510 J	3000	13000
Benzo (k) fluoranthene	1400	470 J	4200	21000
Benzo (a) pyrene	2900	550 J	3900	14000
Indeno (1,2,3-cd) pyrene	2000	350 J	2600	6100
Dibenzo (a,h) anthracene	680	1200 U	1100	1500 U
TICs identified as BNs or CaPAHs	ug/Kg	ug/Kg	ug/Kg	ug/Kg
BNs	4030	2000	2290	31600
CaPAHs	2300	0	2300	14400
	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	18.48	2.8	21.9	103.5
Total BNs less CaPAHs (mg/Kg)	23.56	6.09	18.3	105.6

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral

CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon

TIC - Tentatively Identified Compound

Individual results are reported in ppb (ug/Kg) on a dry weight basis

J: Estimated; below the limits of reliable quantitation.

U: Undetected at, or above, the reported detection limit

Sample locations are shown on Figure 2.

84503063S

MW 7

BN Post-Excavation Soil Samples
Summary of Results

Sample Name	P-7	P-8	P-8A
On-Site Lab ID No.	TX0519	TX0520	TX0686
Off-Site Lab ID No.	0416-1	0416-2	0664-1
Date Sampled	1/31/92	1/31/92	2/13/92
Date Analyzed	2/6/92	2/6/92	2/26/92
Dry Weight, %	68.96	84.67	81.80
BN Compounds	ug/Kg	ug/Kg	ug/Kg
Naphthalene	57 J	64 J	410 U
Acenaphthylene	480 U	69 J	410 U
Acenaphthene	480 U	51 J	410 U
Fluorene	480 U	390 U	410 U
Hexachlorobenzene	480 U	390 U	410 U
Phenanthrene	480 U	480	230 J
Anthracene	480 U	310 J	410 U
Fluoranthene	52 J	1800	290 J
Pyrene	62 J	2700	390 J
Bis (2-ethylhexyl) phthalate	170 J	970	140 J
Benzo (g,h,i) perylene	61 J	3500	280 J
CaPAH Compounds	ug/Kg	ug/Kg	ug/Kg
Benzo (a) anthracene	480 U	2100	190 J
Chrysene	480 U	4200	240 J
Benzo (b) fluoranthene	58 J	4500	230 J
Benzo (k) fluoranthene	84 J	3800	220 J
Benzo (a) pyrene	62 J	3700	140 J
Indeno (1,2,3-cd) pyrene	480 U	3100	190 J
Dibenzo (a,h) anthracene	480 U	970	72 J
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg	ug/Kg
BNs	0	0	0
CaPAHs	0	11850	280
	mg/Kg	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	0.204	34.22	1.562
Total BNs less CaPAHs (mg/Kg)	0.402	9.944	1.33

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral

CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon

TIC - Tentatively Identified Compound

Individual results are reported in ppb (ug/Kg) on a dry weight basis

J: Estimated; below the limits of reliable quantitation.

U: Undetected at, or above, the reported detection limit.

Sample locations are shown on Figure 2.

84503063

MW 12

BN Post-Excavation Soil Samples
Summary of Results

Sample Name	P-22	P-23	P-22A
On-Site Lab ID No.	TX0524	TX0525	TX0677
Off-Site Lab ID No.	0416-4	0416-5R	0565-1
Date Sampled	1/31/92	1/31/92	2/11/92
Date Analyzed	2/7/92	2/10/92	2/20/92
Dry Weight, %	76.94	85.36	77.78
BN Compounds	ug/Kg	ug/Kg	ug/Kg
Naphthalene	220 J	85 J	67 J
Acenaphthylene	2200 U	390 U	430 U
Acenaphthene	2200 U	150 J	190 J
Fluorene	1100 J	120 J	210 J
Hexachlorobenzene	2200 U	390 U	430 U
Phenanthrene	4000	1400	2000
Anthracene	2100 J	340 J	530
Fluoranthene	7000	1300	2600
Pyrene	8700	1900	3000
Bis (2-ethylhexyl) phthalate	18000	1700	1400
Benzo (g,h,i) perylene	850 J	1100	750
CaPAH Compounds	ug/Kg	ug/Kg	ug/Kg
Benzo (a) anthracene	3300	860	1300
Chrysene	3700	1100	1600
Benzo (b) fluoranthene	2700	1400	1300
Benzo (k) fluoranthene	3400	1100	1300
Benzo (a) pyrene	2800	1100	1300
Indeno (1,2,3-cd) pyrene	1500 J	970	730
Dibenzo (a,h) anthracene	320 J	350 J	180 J
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg	ug/Kg
BNs	2200	0	0
CaPAHs	0	0	0
	mg/Kg	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	17.72	6.88	7.71
Total BNs less CaPAHs (mg/Kg)	44.17	8.095	10.747

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral

CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon

TIC - Tentatively Identified Compound

Individual results are reported in ppb (ug/Kg) on a dry weight basis

J: Estimated; below the limits of reliable quantitation.

U: Undetected at, or above, the reported detection limit.

Sample locations are shown on Figure 2.

8450306 37

TABLE 19
MW 15
BN Post-Excavation Soil Samples
Summary of Results

Sample Name	P-51	P-52	P-51A	P-51B
On-Site Lab ID No.	TX0526	TX0527	TX0678	TX0822
Off-Site Lab ID No.	0416-8	0416-9	0565-2	0742-1
Date Sampled	1/31/92	1/31/92	2/12/92	2/25/92
Date Analyzed	2/7/92	2/7/92	2/20/92	3/4/92
Dry Weight, %	81.54	85.95	53.98	87.45
BN Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	520	210 J	330 J	150 J
Acenaphthylene	410 U	390 U	620 U	380 U
Acenaphthene	700	67 J	620 U	380 U
Fluorene	640	69 J	72 J	380 U
Hexachlorobenzene	410 U	390 U	620 U	380 U
Phenanthrene	3200	350 J	790	110 J
Anthracene	1300	110 J	210 J	380 U
Fluoranthene	3000	400	1100	130 J
Pyrene	5900	670	2000	200 J
Bis (2-ethylhexyl) phthalate	170 BJ	390 U	620 U	1900 B
Benzo (g,h,i) perylene	1500	61 J	1600	41 J
CaPAH Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Benzo (a) anthracene	3000	300 J	1200	380 U
Chrysene	2900	430	1700	130 J
Benzo (b) fluoranthene	2500	300 J	1800	110 J
Benzo (k) fluoranthene	3800	310 J	1500	100 J
Benzo (a) pyrene	3200	260 J	1900	62 J
Indeno (1,2,3-cd) pyrene	1500	120 J	1500	380 U
Dibenzo (a,h) anthracene	600	390 U	390 J	380 U
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg	ug/Kg	ug/Kg
BNs	280	1330	0	980
CaPAHs	9710	0	1900	0
	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	27.21	1.72	11.89	0.402
Total BNs less CaPAHs (mg/Kg)	17.21	3.267	6.102	3.511

OK
check
TICs

OK

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral
CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon
TIC - Tentatively Identified Compound
Individual results are reported in ppb (ug/Kg) on a dry weight basis

B: Compound also detected in the associated method blank.
J: Estimated; below the limits of reliable quantitation.
U: Undetected at, or above, the reported detection limit.
Sample locations are shown on Figure 2

84503063

TABLE 20

Borings 1707 / 1712
BN Post-Excavation Soil Samples
Summary of Results

Sample Name	P-39	P-40
On-Site Lab ID No.	TX0473	TX0474
Off-Site Lab ID No.	0373-3	0373-4
Date Sampled	1/27/92	1/27/92
Date Analyzed	2/6/92	2/6/92
Dry Weight, %	75.59	85.78
BN Compounds	ug/Kg	ug/Kg
Naphthalene	1200	390 U
Acenaphthylene	57 J	390 U
Acenaphthene	88 J	390 U
Fluorene	90 J	390 U
Hexachlorobenzene	440 U	390 U
Phenanthrene	1200	390 U
Anthracene	340 J	390 U
Fluoranthene	3400	67 J
Pyrene	4300	48 J
Bis (2-ethylhexyl) phthalate	36 J	390 U
Benzo (g,h,i) perylene	4000	390 U
CaPAH Compounds	ug/Kg	ug/Kg
Benzo (a) anthracene	3800	390 U
Chrysene	3700	45 J
Benzo (b) fluoranthene	5300	48 J
Benzo (k) fluoranthene	2700	59 J
Benzo (a) pyrene	4400	48 J
Indeno (1,2,3-cd) pyrene	3900	390 U
Dibenzo (a,h) anthracene	770	390 U
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg
BNs	770	0
CaPAHs	0	0
	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	24.57	0.200
Total BNs less CaPAHs (mg/Kg)	15.481	0.115

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral
CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon
TIC - Tentatively Identified Compound
Individual results are reported in ppb (ug/Kg) on a dry weight basis.

J: Estimated; below the limits of reliable quantitation.
U: Undetected at, or above, the reported detection limit.
Sample locations are shown on Figure 2.

84503063

TABLE 21

Borings 2303 / 2304
BN Post-Excavation Soil Samples
Summary of Results

Sample Name	P-35	P-36	P-35A
On-Site Lab ID No.	TX0045	TX0046	TX0056
Off-Site Lab ID No.	3380-3R	3380-4	3517-4
Date Sampled	11/4/91	11/4/91	11/13/91
Date Analyzed	11/12/91	11/9/91	11/18/91
Dry Weight, %	76.60	79.29	76.20
BN Compounds	ug/Kg	ug/Kg	ug/Kg
Naphthalene	26000 U	75 J	1300 U
Acenaphthylene	26000 U	420 U	1300 U
Acenaphthene	26000 U	420 U	1300 U
Fluorene	26000 U	420 U	1300 U
Hexachlorobenzene	26000 U	420 U	1300 U
Phenanthrene	26000 U	260 J	310 J
Anthracene	26000 U	63 J	1300 U
Fluoranthene	26000 U	410 J	420 J
Pyrene	26000 U	590	830 J
Bis (2-ethylhexyl) phthalate	1700000	1500 B	170 J
Benzo (g,h,i) perylene	26000 U	590	1600
CaPAH Compounds	ug/Kg	ug/Kg	ug/Kg
Benzo (a) anthracene	26000 U	350 J	490 J
Chrysene	26000 U	440	680 J
Benzo (b) fluoranthene	26000 U	700	1800
Benzo (k) fluoranthene	26000 U	750	1600
Benzo (a) pyrene	26000 U	770	1700
Indeno (1,2,3-cd) pyrene	26000 U	560	1700
Dibenzo (a,h) anthracene	26000 U	420 U	630 J
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg	ug/Kg
BNs	97000	0	0
CaPAHs	0	0	540
	mg/Kg	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	0	3.57	8.6
Total BNs less CaPAHs (mg/Kg)	1797	3.488	3.33

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral
CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon
TIC - Tentatively Identified Compound
Individual results are reported in ppb (ug/Kg) on a dry weight basis.

B: Compound also detected in the associated method blank.
J: Estimated; below the limits of reliable quantitation.
U: Undetected at, or above, the reported detection limit.
Sample locations are shown on Figure 2

84503064O

TABLE 22

Borings 306 / 307
BN Post-Excavation Soil Samples
Summary of Results

✓ ✓ OK

Sample Name	P-5	P-6	P-5A	P-6A	P-5B	P-6B	P-5C	P-6C
On-Site Lab ID No.	TX0043	TX0044	TX0053	TX0054	TX0085	TX0087	TX0086	TX0088
Off-Site Lab ID No.	3380-1R	3380-2R	3517-1	3517-2	3620-1	3620-3	3620-2	3620-4
Date Sampled	11/4/91	11/4/91	11/13/91	11/13/91	11/21/91	11/21/91	11/21/91	11/21/91
Date Analyzed	11/12/91	11/12/91	11/18/91	11/18/91	11/25/91	11/25/91	11/25/91	11/25/91
Dry Weight, %	84.95	82.16	79.36	76.34	85.35	88.12	90.71	85.26
BN Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	34000	24000 U	380 J	23000	110 J	1000	850	390 U
Acenaphthylene	24000 U	24000 U	640	4400 U	390 U	380 U	370 U	390 U
Acenaphthene	32000	9800 J	200 J	15000	59 J	380 U	360 J	390 U
Fluorene	27000	7000 J	150 J	12000	43 J	360 J	240 J	390 U
Hexachlorobenzene	24000 U	24000 U	420 U	4400 U	390 U	380 U	370 U	390 U
Phenanthrene	93000	22000 J	680	36000	120 J	2500	1100	110 J
Anthracene	12000 J	3500 J	520	5600	390 U	580	130 J	390 U
Fluoranthene	63000	30000	2100	18000	190 J	380 U	1000	120 J
Pyrene	42000	55000	3200	31000	240 J	2900	1300	180 J
Bis (2-ethylhexyl) phthalate	2000 J	17000 J	1100	4600	95 J	480 B	760 B	62 J
Benzo (g,h,i) perylene	3700 J	24000 U	3700	2300 J	390 U	930	520	74 J
CaPAH Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Benzo (a) anthracene	9500 J	6700 J	2600	6500	81 J	1100	350 J	390 U
Chrysene	8100 J	6100 J	4100	8300	110 J	1300	440	93 J
Benzo (b) fluoranthene	11000 J	24000 U	7300	6700	260 J	1200	540	110 J
Benzo (k) fluoranthene	9100 J	24000 U	4600	7300	87 J	1200	390	77 J
Benzo (a) pyrene	9000 J	24000 U	6000	5300	110 J	1200	460	74 J
Indeno (1,2,3-cd) pyrene	4100 J	24000 U	4100	2400 J	390 U	800	320 J	59 J
Dibenzo (a,h) anthracene	24000 U	24000 U	1400	4400 U	390 U	380 U	370 U	390 U
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
BNs	31000	0	2930	0	0	2300	0	0
CaPAHs	0	0	8700	0	0	0	0	0
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	50.8	12.8	38.8	36.5	0.648	6.8	2.5	0.413
Total BNs less CaPAHs (mg/Kg)	339.7	144.3	15.6	147.5	0.857	11.05	6.26	0.546

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral
CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon
TIC - Tentatively Identified Compound
Individual results are reported in ppb (ug/Kg) on a dry weight basis

B: Compound also detected in the associated method blank.
J: Estimated; below the limits of reliable quantitation.
U: Undetected at, or above, the reported detection limit.
Sample locations are shown on Figure 2

84503064

TABLE 23

MW-10/Boring 2401
BN Post-Excavation Soil Samples
Summary of Results

Sample Name	P-41	P-42	P-41A	P-42A
On-Site Lab ID No.	TX0006	TX0007	TX0016	TX0018
Off-Site Lab ID No.	3202-1	3202-2	3301-1	3301-2
Date Sampled	10/17/91	10/17/91	10/28/91	10/28/91
Date Analyzed	10/22/91	10/22/91	11/5/91	11/5/91
Dry Weight, %	64.72	71.45	81.53	87.57
BN Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Naphthalene	2100	200 J	410 U	180 J
Acenaphthylene	100 J	470 U	410 U	380 U
Acenaphthene	2800	470 U	410 U	39 J
Fluorene	3000	470 U	61 J	51 J
Hexachlorobenzene	520 U	470 U	410 U	580
Phenanthrene	24000	540	280 J	430
Anthracene	7200	130 J	410 U	71 J
Fluoranthene	21000	1200	310 J	650
Pyrene	20000	1500	240 J	850
Bis (2-ethylhexyl) phthalate	2400	7300	100 B J	4200 B
Benzo (g,h,i) perylene	6000	1800	140 J	650
CaPAH Compounds	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Benzo (a) anthracene	11000	1300	93 J	420
Chrysene	12000	1600	130 J	490
Benzo (b) fluoranthene	21000	3900	210 J	740
Benzo (k) fluoranthene	520 U	470 U	110 J	680
Benzo (a) pyrene	12000	2500	150 J	650
Indeno (1,2,3-cd) pyrene	6200	1700	130 J	580
Dibenzo (a,h) anthracene	3200	840	410 U	130 J
TICs Identified as BNs or CaPAHs	ug/Kg	ug/Kg	ug/Kg	ug/Kg
BNs	12300	0	0	0
CaPAHs	1600	1200	0	0
	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Total CaPAHs (mg/Kg)	67.0	13.04	0.823	3.69
Total BNs less CaPAHs (mg/Kg)	100.9	12.67	1.131	7.701

Samples were analyzed by EPA Method 8270 for BNs with a forward library search for TICs. All samples were analyzed for the entire BN compound list. The compound list shown on this table includes only those BNs which were identified on the site. The full list of BN results is located in Appendix B.

BN - Base/Neutral
CaPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon
TIC - Tentatively Identified Compound
Individual results are reported in ppb (ug/Kg) on a dry weight basis

B: Compound also detected in the associated method blank.
J: Estimated; below the limits of reliable quantitation.
U: Undetected at, or above, the reported detection limit.
Sample locations are shown on Figure 2

84503064

TABLE 24

SOIL PROCESSING DAILY LOG

DATE	SOIL SOURCE	TOTAL TONS	NEW TONS	HOURS OF OPERATION	INTERNAL TREATMENT LEVELS MET
26 Nov 91	AEC 3,4,5	120	56	6	No
02 Dec 91	AEC 3,4,5	140	140	6	No
03 Dec 91	AEC 3,4,5	112	112	5	No
06 Dec 91	REPROCESS	44	0	2.5	Yes
07 Dec 91	REPROCESS	82	0	2.5	Yes
11 Dec 91	AEC 16	42	42	5.5	Yes
13 Dec 91	AEC 16 & AEC 12	112	112	7	Yes
13 Dec 91	AEC 16 & AEC 12	16	16	1	No
14 Dec 91	AEC 16 & AEC 12	52	52	5.25	Yes
15 Dec 91	REPROCESS & AEC 3,4,5	106	72	7.5	Yes
17 Dec 91	AEC 19 & AEC 3,4,5	77	77	6	No
18 Dec 91	AEC 19	90	90	5.5	No
20 Dec 91	AEC 19	80	80	8.5	Yes
22 Dec 91	AEC 19	97	97	8.5	Yes
06 Jan 92	REPROCESS & AEC 3,4,5	125	38	8.5	Yes
08 Jan 92	REPROCESS & AEC 3,4,5	175	60	9.25	Yes
09 Jan 92	BN	146	146	8	Yes
09 Jan 92	REPROCESS	15	0	1	Yes
15 Jan 92	BN	130	130	8	Yes
16 Jan 92	BN	59	59	3.5	Yes
16 Jan 92	AEC 17	55	55	3.5	Yes
17 Jan 92	AEC 17	77	77	5	Yes
18 Jan 92	AEC 17 & AEC 3,4,5	106	106	6	Yes
19 Jan 92	AEC 17	88	88	5.5	Yes
20 Jan 92	AEC 3, 4, 5, & AEC 25	79	79	5	Yes
21 Jan 92	AEC 3, 4, 5, & AEC 25	63	63	4.5	Yes

TABLE 24

SOIL PROCESSING DAILY LOG
(Continued)

DATE	SOIL SOURCE	TOTAL TONS	NEW TONS	HOURS OF OPERATION	INTERNAL TREATMENT LEVELS MET
22 Jan 92	AEC 3, 4, 5	143	143	9	Yes
23 Jan 92	AEC 3, 4, 5	126	126	8	Yes
27 Jan 92	AEC 3, 4, 5	137	137	8.5	Yes
28 Jan 92	AEC 3, 4, 5	83	83	6	Yes
29 Jan 92	AEC 3, 4, 5	110	110	7	Yes
29 Jan 92	AEC 25	30	30	2	Yes
30 Jan 92	AEC 25	22	22	1.5	Yes
30 Jan 92	AEC 14	127	127	8	Yes
31 Jan 92	AEC 7	75	75	5	Yes
31 Jan 92	BN	65	65	3.5	Yes
01 Feb 92	BN	145	145	9	Yes
02 Feb 92	BN	45	45	2.5	Yes
02 Feb 92	AEC 7 & AEC 14	79	79	5.5	Yes
03 Feb 92	AEC 7	144	144	9.5	Yes
04 Feb 92	AEC 7	120	120	7.75	Yes
04 Feb 92	AEC 14	31	31	2	Yes
05 Feb 92	AEC 7	119	119	8	Yes
05 AEC 92	AEC 14	15	15	1	Yes
06 Feb 92	AEC 7	111	111	7	Yes
07 Feb 92	AEC 7 & AEC 14	149	149	9	Yes
08 Feb 92	AEC 7	60	60	4	Yes
08 Feb 92	AEC 1	82	82	5.5	Yes
09 Feb 92	AEC 1	147	147	9.5	Yes
10 Feb 92	AEC 1	15	15	1	Yes
10 Feb 92	AEC 14	131	131	8.5	Yes
13 Feb 92	AEC 14	71	71	4	Yes
17 Feb 92	AEC 14	100	100	6.5	Yes

TABLE 24

SOIL PROCESSING DAILY LOG
(Continued)

DATE	SOIL SOURCE	TOTAL TONS	NEW TONS	HOURS OF OPERATION	INTERNAL TREATMENT LEVELS MET
18 Feb 92	BN	130	130	8.5	Yes
19 Feb 92	AEC 14	116	116	7.5	Yes
20 Feb 92	AEC 14	153	153	9.5	Yes
21 Feb 92	AEC 14 & AEC 1	147	147	9.5	Yes
22 Feb 92	AEC 14 & AEC 1	145	145	9	Yes
23 Feb 92	AEC 14 & AEC 1	146	146	9	Yes
24 Feb 92	AEC 14	101.5	101.5	6.5	Yes
24 Feb 92	AEC 21	52.5	52.5	3.5	Yes
25 Feb 92	AEC 21	150	150	10	Yes
26 Feb 92	AEC 21	158	158	10	Yes
27 Feb 92	AEC 21	154	154	10	Yes
28 Feb 92	AEC 21	153	153	9.5	Yes
02 Mar 92	AEC 21	104	104	7	Yes
03 Mar 92	AEC 21	139	139	9	Yes
04 Mar 92	AEC 21	132	132	8.5	Yes
04 Mar 92	BN	15	15	1	Yes
05 Mar 92	AEC 21	139	139	8.25	Yes
TOTALS		6905	6479	439.5	

Notes

1. Tonnage measured on calibrated feed conveyor belt scale.
2. New tonnage excludes soils which were reprocessed.
3. New tonnage total of 6479 tons includes 735 tons of BN Soils and 5744 tons of VOC Soils.
4. The internal treatment level utilized by Canonie for total VOCs was 1 ppm from 11/26/91 to 12/22/91 and 2 ppm for the remainder of the project. The treatment levels required by NJDEPE was 10 ppm total VOCs, 1 ppm for benzene, 100 ppm total BNs, and 10 ppm total CaPAHs. All processed soils met the NJDEPE required treatment levels.
5. All excavated BN soils were placed in a single stockpile. Therefore, on any day of BN soil processing, the soil source may have been a number of different individual BN areas.

Daily Post-Treatment Soil Average VOC Concentrations
Summary of Results

Process Date	Benzene	Toluene	Ethyl-benzene	Total Xylene	Chloro-benzene	1,2-Dichloro-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	Total VOCs
11/26/1991 *	0.6	0.35	0.3	0.83	0.050 U	0.050 U	0.050 U	0.050 U	2.06
12/2/1991 *	0.15	0.23	0.27	1.01	0.050 U	0.050 U	0.050 U	0.050 U	1.66
12/3/1991 *	0.075	0.23	0.23	0.94	0.050 U	0.050 U	0.050 U	0.050 U	1.47
12/6/1991 *	0.076	0.10 U	0.10 U	0.101	0.050 U	0.050 U	0.050 U	0.050 U	0.177
12/7/1991 *	0.058	0.10 U	0.10 U	0.073	0.050 U	0.050 U	0.050 U	0.050 U	0.131
12/11/91	0.098	0.10 U	0.10 U	0.200	0.050 U	0.050 U	0.050 U	0.050 U	0.298
12/13/91	0.043	0.102	0.188	1.02	0.050 U	0.050 U	0.050 U	0.050 U	1.35
12/14/91	0.067	0.10 U	0.10 U	0.150	0.050 U	0.050 U	0.050 U	0.050 U	0.217
12/15/91	0.107	0.102	0.072	0.325	0.050 U	0.050 U	0.050 U	0.050 U	0.607
12/17/91	0.018	0.074	0.154	0.767	0.050 U	0.050 U	0.050 U	0.050 U	1.03
12/18/91	0.009	0.081	0.167	0.794	0.050 U	0.050 U	0.050 U	0.050 U	1.05
12/21/91	0.026	0.10 U	0.10 U	0.229	0.050 U	0.050 U	0.050 U	0.050 U	0.254
12/22/91	0.016	0.10 U	0.10 U	0.117	0.050 U	0.050 U	0.050 U	0.050 U	0.132
1/6/92	0.054	0.10 U	0.014	0.268	0.050 U	0.050 U	0.050 U	0.050 U	0.335
1/8/92	0.040	0.020	0.10 U	0.265	0.050 U	0.050 U	0.050 U	0.050 U	0.326
1/9/92	0.14	0.10 U	0.10 U	0.10 U	0.050 U	0.050 U	0.050 U	0.050 U	0.14
1/16/92	0.050 U	0.045	0.10 U	0.170	0.050 U	0.050 U	0.050 U	0.050 U	0.215
1/17/92	0.050 U	0.10 U	0.10 U	0.046	0.050 U	0.050 U	0.050 U	0.050 U	0.046
1/18/92	0.035	0.016	0.067	0.321	0.050 U	0.050 U	0.050 U	0.050 U	0.439
1/19/92	0.050 U	0.10 U	0.068	0.265	0.050 U	0.050 U	0.050 U	0.050 U	0.333
1/20/92	0.023	0.057	0.080	0.493	0.050 U	0.050 U	0.050 U	0.050 U	0.652
1/21/92	0.042	0.028	0.052	0.434	0.050 U	0.050 U	0.050 U	0.050 U	0.556
1/22/92	0.047	0.10 U	0.10 U	0.167	0.050 U	0.050 U	0.050 U	0.050 U	0.214
1/23/92	0.055	0.10 U	0.10 U	0.173	0.050 U	0.050 U	0.050 U	0.050 U	0.228
1/27/92	0.076	0.10 U	0.10 U	0.038	0.050 U	0.050 U	0.050 U	0.050 U	0.113
1/28/92	0.017	0.10 U	0.027	0.065	0.050 U	0.050 U	0.050 U	0.050 U	0.109
1/29/92	0.025	0.10 U	0.10 U	0.032	0.050 U	0.050 U	0.050 U	0.050 U	0.056
1/30/92	0.098	0.035	0.10 U	0.257	0.050 U	0.050 U	0.050 U	0.050 U	0.390
1/31/92	0.050 U	0.10 U	0.10 U	0.138	0.050 U	0.050 U	0.050 U	0.050 U	0.138
2/2/92	0.011	0.024	0.10 U	0.160	0.050 U	0.050 U	0.050 U	0.050 U	0.195
2/3/92	0.050 U	0.10 U	0.10 U	0.103	0.050 U	0.050 U	0.050 U	0.050 U	0.103

84503064

Daily Post-Treatment Soil Average VOC Concentrations
Summary of Results
(Continued)

2/4/92	0.050 U	0.036	0.10 U	0.151	0.050 U	0.050 U	0.050 U	0.050 U	0.187
2/5/92	0.006	0.048	0.10 U	0.150	0.050 U	0.050 U	0.050 U	0.050 U	0.204
2/6/92	0.050 U	0.10 U	0.10 U	0.113	0.050 U	0.050 U	0.050 U	0.050 U	0.113
2/7/92	0.042	0.10 U	0.10 U	0.056	0.050 U	0.050 U	0.050 U	0.050 U	0.097
2/8/92	0.049	0.10 U	0.052	0.230	0.050 U	0.050 U	0.050 U	0.050 U	0.331
2/9/92	0.050 U	0.10 U	0.052	0.066	0.050 U	0.050 U	0.050 U	0.050 U	0.118
2/10/92	0.038	0.024	0.025	0.299	0.050 U	0.050 U	0.050 U	0.050 U	0.386
2/13/92	0.050 U	0.054	0.058	0.284	0.050 U	0.050 U	0.050 U	0.050 U	0.396
2/17/92	0.050 U	0.064	0.10 U	0.367	0.050 U	0.050 U	0.050 U	0.050 U	0.431
2/19/92	0.050 U	0.162 √	0.154 √	0.600	0.050 U	0.050 U	0.050 U	0.050 U	0.916
2/20/92	0.050 U	0.015	0.018	0.280	0.050 U	0.050 U	0.050 U	0.050 U	0.313
2/21/92	0.050 U	0.059	0.055	0.385	0.050 U	0.050 U	0.050 U	0.050 U	0.499
2/22/92	0.006	0.049	0.213 √	0.500	0.050 U	0.050 U	0.050 U	0.050 U	0.769
2/23/92	0.014	0.10 U	0.283 ~	0.400	0.050 U	0.050 U	0.050 U	0.050 U	0.697
2/24/92	0.050 U	0.049	0.080	0.310	0.050 U	0.050 U	0.050 U	0.050 U	0.439
2/25/92	0.006	0.10 U	0.139	0.321	0.050 U	0.050 U	0.050 U	0.050 U	0.466
2/26/92	0.050 U	0.011	0.130	0.357	0.050 U	0.050 U	0.050 U	0.050 U	0.498
2/27/92	0.050 U	0.040	0.187	0.497 √	0.050 U	0.050 U	0.050 U	0.050 U	0.741
2/28/92	0.050 U	0.058	0.265	0.501	0.050 U	0.050 U	0.050 U	0.050 U	0.824
3/2/92	0.050 U	0.10 U	0.226	0.560	0.050 U	0.050 U	0.050 U	0.050 U	0.786
3/3/92	0.050 U	0.171	0.231	0.720	0.050 U	0.050 U	0.050 U	0.050 U	1.12
3/4/92	0.050 U	0.055	0.070	0.322	0.050 U	0.050 U	0.050 U	0.050 U	0.447
3/5/92	0.007	0.036	0.044	0.290	0.050 U	0.050 U	0.050 U	0.050 U	0.377

VOC: Volatile Organic Compound

*: LTTA Startup data was generated on these dates.

Shaded dates refer to soils which were reprocessed in order to meet internal treatment criteria.

U: Undetected at, or above, the reported detection limit (for all samples on the associated date).

The daily average results shown above were calculated from the average of hourly post-treatment VOC samples.

The total VOC may not equal the individual sums due to differences in rounding off numbers.

Individual hourly post-treatment VOC sample results are located in Appendix C.

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TABLE 26

Daily Post-Treatment Soil Average BN/CaPAH Concentrations
Summary of Results

Process Date	Total CaPAHs (mg/Kg)	BNs less CaPAHs (mg/Kg)
1/9/92	1.427	1.208
1/15/92	1.434	1.038
1/16/92	0.659	1.806
1/31/92	1.880	1.064
2/1/92	1.215	0.579
2/2/92	0.138	0.825
2/18/92	2.112	1.156
3/4/92	2.325	3.323
Required Cleanup Level	10	100

Average = 1.425

BN: Base/Neutral Compounds
CaPAH: Carcinogenic Polycyclic Aromatic Hydrocarbon Compunds
Results are reported in mg/Kg (ppm) on a dry-weight basis.
The daily average results shown above were calculated from the individual hourly BN post-treatment samples.
Individual hourly BN post-treatment sample results are located in Appendix D.

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TABLE 27
OFF-SITE DISPOSAL SUMMARY

LOAD NUMBER	DATE	MATERIAL	DISPOSAL FACILITY	QUANTITY
1	10/22/91	ASPHALT	SD&G AGGREGATES - CARTERET, NJ	20 TONS
2	10/22/91	ASPHALT	SD&G AGGREGATES - CARTERET, NJ	20 TONS
3	10/22/91	ASPHALT	SD&G AGGREGATES - CARTERET, NJ	20 TONS
4	10/22/91	ASPHALT	SD&G AGGREGATES - CARTERET, NJ	20 TONS
5	10/24/91	ASPHALT	SD&G AGGREGATES - CARTERET, NJ	20 TONS
6	10/24/91	ASPHALT	SD&G AGGREGATES - CARTERET, NJ	20 TONS
7	10/24/91	ASPHALT	SD&G AGGREGATES - CARTERET, NJ	20 TONS
8	10/24/91	ASPHALT	SD&G AGGREGATES - CARTERET, NJ	24.38 TONS
9	11/01/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	22.60 TONS
10	11/01/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	23.19 TONS
11	11/01/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	24.49 TONS
12	11/04/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	24.75 TONS
13	11/04/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	24.27 TONS
14	11/04/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	22.23 TONS
15	11/05/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	25.76 TONS
16	11/05/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	21.48 TONS
17	11/05/91	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	22.51 TONS
18	11/06/91	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	19.98 TONS
19	11/06/91	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	20.03 TONS
20	11/11/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	25.39 TONS
21	11/11/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	28.75 TONS
22	11/11/91	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	20 CY
23	11/11/91	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	20 CY
24	11/11/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	26.06 TONS
25	11/11/91	WASTE WATER	CHEM WASTE MGMT. - NEWARK, NJ	4989 GALS
26	11/11/91	WASTE WATER	CHEM WASTE MGMT. - NEWARK, NJ	4063 GALS
27	11/17/91	WASTE WATER	CHEM WASTE MGMT. - NEWARK, NJ	4019 GALS
28	11/17/91	WASTE WATER	CHEM WASTE MGMT. - NEWARK, NJ	5470 GALS
29	11/13/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	10.47 TONS
30	11/13/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	11.18 TONS
31	11/13/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	14.04 TONS
32	11/13/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	10.24 TONS
33	11/13/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	10.75 TONS
34	11/13/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	10.75 TONS
35	11/13/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	11.58 TON
36	12/17/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	16.93 TONS
36A	12/17/91	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	22.53 TONS

TABLE 27 (CONT.)
OFF-SITE DISPOSAL SUMMARY

LOAD NUMBER	DATE	MATERIAL	DISPOSAL FACILITY	QUANTITY
37	12/17/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	22.91 TONS
38	12/17/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	14.88 TONS
41	12/18/91	CONCRETE	SD&G AGGREGATES - CARTERET, NJ	20 TONS
42	12/18/91	CONCRETE	SD&G AGGREGATES - CARTERET, NJ	20 TONS
43	12/19/91	CONCRETE	SD&G AGGREGATES - CARTERET, NJ	20 TONS
44	12/19/91	CONCRETE	SD&G AGGREGATES - CARTERET, NJ	20 TONS
39	12/19/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	10.33 TONS
40	12/19/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	9.13 TONS
45	12/20/91	CONCRETE	SD&G AGGREGATES - CARTERET, NJ	20 TONS
46	12/20/91	CONCRETE	SD&G AGGREGATES - CARTERET, NJ	20 TONS
47	12/26/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	11.67 TONS
48	12/26/91	RESIN	CHEM WASTE MGMT. - MODEL CITY	11.78 TONS
49	01/02/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	10.79 TONS
50	01/06/92	R.R. TIES	ADSI - PARLIN, NJ	26.87 TONS
51	01/07/92	R.R. TIES	ADSI - PARLIN, NJ	25.43 TONS
52	01/07/92	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	16.77 TONS
53	01/08/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	6.64 TONS
54	01/21/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.33 TONS
55	01/21/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.12 TONS
56	01/21/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	15.05 TONS
57	01/21/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	5843 GALS
58	01/21/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	14.18 TONS
59	01/21/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	15.82 TONS
60	01/21/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	17.94 TONS
61	01/21/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	12.18 TONS
62	01/27/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	3018 GALS
63	01/27/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	3653 GALS
65	01/28/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	16.19 TONS
66	01/28/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.72 TONS
67	01/28/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	14.90 TONS
68	01/28/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	12.30 TONS
64	01/29/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	4653 GALS
69	01/29/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	12.69 TONS
70	01/29/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	11.78 TONS
71	01/31/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	9.54 TONS
72	01/31/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	8.27 TONS
73	02/03/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	18.6 TONS

TABLE 27 (CONT.)
OFF-SITE DISPOSAL SUMMARY

LOAD NUMBER	DATE	MATERIAL	DISPOSAL FACILITY	QUANTITY
74	02/03/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	15.64 TONS
75	02/04/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	21.90 TONS
76	02/04/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	8.53 TONS
77	02/04/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	8.43 TONS
78	02/04/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	15.23 TONS
79	02/04/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	15.03 TONS
80	02/04/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	15.67 TONS
81	02/04/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	15.13 TONS
82	02/04/92	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	17.40 TONS
83	02/05/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.06 TONS
84	02/05/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	15.05 TONS
85	02/05/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	14.97 TONS
86	02/05/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	10.92 TONS
87	02/05/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	11.08 TONS
88	02/05/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	19.43 TONS
89	02/07/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	17.13 TONS
90	02/10/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	15.77 TONS
91	02/11/92	LIQUID	CHEM WASTE MGMT. - NEWARK, NJ	4682 GALS
92	02/12/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	16.76 TONS
93	02/13/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	10.23 TONS
94	02/13/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.75 TONS
95	02/13/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	14.27 TONS
96	02/13/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.60 TONS
97	02/13/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	12.06 TONS
98	02/13/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	12.60 TONS
99	02/14/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	10.84 TONS
100	02/14/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	11.72 TONS
101	02/14/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.40 TONS
102	02/14/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.29 TONS
103	02/14/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.99 TONS
104	02/14/92	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	21.49 TONS
105	02/14/92	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	18.56 TONS
106	02/14/92	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	17.57 TONS
107	02/14/92	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	22.69 TONS
108	02/18/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	17.66 TONS
109	02/19/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	16.23 TONS
110	02/21/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	15.12 TONS

TABLE 27 (CONT.)
OFF-SITE DISPOSAL SUMMARY

LOAD NUMBER	DATE	MATERIAL	DISPOSAL FACILITY	QUANTITY
111	02/25/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	11.55 TONS
112	02/25/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	9.18 TONS
113	02/25/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	11.59 TONS
114	02/26/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	5524 GALS
115	02/26/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	18.64 TONS
116	02/27/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	4261 GALS
117	02/27/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	18.63 TONS
118	02/27/92	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	20.49 TONS
119	02/27/92	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	15.64 TONS
120	02/27/92	ASPHALT	CLAYTON BLOCK - LAKEWOOD, NJ	18.34 TONS
121	02/27/92	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	21.79 TONS
121	02/28/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	2838 GALS
122	02/28/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	3362 GALS
123	02/28/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	2567 GALS
124	02/28/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	10.29 TONS
125	02/28/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	9.12 TONS
126	02/28/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	12.29 TONS
127	02/28/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	7.88 TONS
128	03/03/92	WATER	CHEM WASTE MGMT. - NEWARK, NJ	3580 GALS
129	03/03/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	9.24 TONS
130	03/05/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	2.88 TONS
131	03/10/92	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	15.80 TONS
132	03/10/92	CONCRETE	CLAYTON BLOCK - LAKEWOOD, NJ	13.41 TONS
133	03/11/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	13.09 TONS
134	03/11/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	9.51 TONS
135	03/11/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	9.80 TONS
136	03/11/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	10.15 TONS
137	03/24/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	7.13 TONS
138	03/30/92	R.R. TIES	ADSI - PARLIN, NJ	13.14 TONS
139	04/01/92	LIQUID	CHEM WASTE MGMT. - NEWARK, NJ	2038 GALS
140	04/06/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	10.62 TONS
141	04/06/92	ID-13 DEBRIS	ESSEX COUNTY TRANSPORT STATION	9.73 TONS
142	04/07/92	RESIN	CHEM WASTE MGMT. - MODEL CITY	8.70 TONS

TABLE 28
CHARCOAL TUBE SAMPLES - BACKGROUND
Summary of Results

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene
10-14-91	C101491141	East Fence at LTTA Venturi Scrubber	<0.05	<0.05	<0.06
10-14-91	C101491143	North Fence, 100' West of East Fence	<0.05	<0.05	<0.06
10-14-91	C101491144	West Fence, 100' South of North Fence	<0.05	<0.05	<0.06
10-16-91	C101691141	East Fence at Venturi Scrubber	<0.05	<0.05	<0.06
10-16-91	C101691142	South Fence, 70' West of Monitoring Well #6	<0.05	<0.05	<0.06
10-16-91	C101691143	North Fence Line 100' West of East Fence	<0.05	<0.05	<0.06
10-16-91	C101691144	West Fence, 100' South of North Fence	<0.05	<0.05	<0.05
10-18-91	C101891142	North Fence, 100' West of East Fence	0.14	0.17	0.08
10-21-91	C102191141	South Fence, 70' West of Monitoring Well #6	<0.05	<0.05	<0.05
10-21-91	C102191142	North Fence, 100' West of East Fence	<0.05	<0.05	<0.05
		Occupational Exposure Limits			
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.

845030653

TABLE 28
AEC 1
CHARCOAL TUBE SAMPLES
Summary of Results

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene	Benzene
2-06-92	CO20692-79	AEC 1 Upwind Area	<0.28	<0.28	<0.32	<0.38
2-06-92	CO20692-80	AEC 1 Downwind Area	<0.28	<0.28	<0.32	<0.38
2-06-92	CO20692-81	AEC 1 Personal in Trackhoe Cab	<0.28	<0.28	<0.32	<0.38
2-07-92	CO20792-83	AEC 1 Personal in Trackhoe Cab	0.14	0.09	<0.05	<0.06
2-20-92	CO22092-105	AEC 1 Downwind Area	0.09	0.08	<0.01	<0.04
2-20-92	CO22092-106	AEC 1 Upwind Area	<0.04	<0.04	<0.05	<0.06
2-22-92	CO22292-111	AEC 1 Personal in Trackhoe Cab	0.21	0.11	0.04	<0.05
2-23-92	CO22392-113	AEC 1 Personal and LTTA Personal	0.06	0.09	<0.03	<0.02
2-23-92	CO22392-112	AEC 1 Downwind Area	0.16	<0.05	<0.06	<0.07
2-23-92	CO22392-114	AEC 1 Upwind Area	0.05	<0.05	<0.06	<0.07
		Occupational Exposure Limits				
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150	1 10 5

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.

84503065

TABLE 28
AEC 1
CHARCOAL TUBE SAMPLES
Summary of Results

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene	Benzene	Styrene	Vinyl Toluene
2-22-92	CO22292-111	AEC 1 Personal in Trackhoe Cab	0.21	0.11	0.04	<0.05	0.14	<0.03
2-23-92	CO22392-112	AEC 1 Downwind Area	0.16	<0.05	<0.06	<0.07	0.22	<0.05
2-23-92	CO22392-114	AEC 1 Upwind Area	0.05	<0.05	<0.06	<0.07	0.06	<0.05
		Occupational Exposure Limits						
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150	1 10 5	50 50 100	100 50 NE

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.
3. NE - not established by Occupational Safety and Health Administration (OSHA).

845030655

TABLE 28
AEC 3, 4, 5
CHARCOAL TUBE SAMPLES
Summary of Results

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene
11-15-91	C111591141	AEC 5 North of Area	<0.04	<0.04	<0.05
11-15-91	C111591142	AEC 5 South of Area	<0.05	<0.05	<0.05
11-15-91	C111591143	AEC 5 Personal in Trackhoe	<0.05	<0.05	<0.05
11-18-91	C111891141	AEC 4 Personal in Trackhoe	<0.08	<0.08	<0.09
11-18-91	C111891142	AEC 3-5 Upwind Area	<0.08	<0.08	<0.09
11-18-91	C111891143	AEC 3-5 Downwind Area	<0.07	<0.07	<0.07
11-20-91	C112091142	AEC 4 Upwind Area	0.40	1.11	0.62
11-20-91	C112091143	AEC 4 Downwind Area	1.81	4.80	2.88
11-20-91	C112091141	AEC 4 Personal in Trackhoe	1.23	3.40	2.73
12-04-91	C120491141	AEC 3 Upwind Area	0.10	0.42	0.03
12-04-91	C120491142	AEC 3 Downwind Area	<0.05	<0.05	<0.06
12-04-91	C120491143	AEC 3 Personal in Trackhoe	<0.05	<0.02	<0.06
		Occupational Exposure Limits			
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.

845030656

845030657

TABLE 28
AEC 7 and AEC 8
CHARCOAL TUBE SAMPLES
Summary of Results

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene	Benzene
1-30-92	C013092-64	AEC 7 Upwind Area	<0.13	<0.13	<0.15	<0.18
1-30-92	C013092-65	AEC 7 Downwind Area	0.09	0.51	0.21	<0.09
2-01-92	C020192-69	AEC 7 Downwind Area	0.05	0.33	<0.01	<0.04
2-01-92	C020192-70	AEC 7 Upwind Area	0.11	0.66	<0.06	<0.07
2-01-92	C020192-71	AEC 7 Personal in Trackhoe	<0.05	0.11	<0.06	<0.07
1-29-92	C012992-61	AEC 8 Upwind Area	<0.09	<0.09	0.10	<0.12
1-29-92	C012992-62	AEC 8 Downwind Area	<0.09	<0.09	<0.10	<0.12
1-29-92	C012992-60	AEC 8 Personal in Trackhoe	<0.09	<0.09	<0.10	<0.11
		Occupational Exposure Limits				
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150	1 10 5

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.

8450306S8

TABLE 28
AECs 12, 12S, and 14
CHARCOAL TUBE SAMPLES
Summary of Results

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene	Benzene
2-17-92	C021792-99	AEC 12 Work Area	0.07	0.28	0.07	<0.05
3-04-92	C030492-130	AEC 12S Personal in Trackhoe	0.04	0.07	0.04	<0.05
2-09-92	C020992-87	AEC 14 Personal in Trackhoe	<0.06	0.21	<0.06	<0.08
2-09-92	C020992-86	AEC 14 Downwind Area	0.12	0.24	0.14	<0.16
2-10-92	C021092-88	AEC 14 Personal in Trackhoe	0.06	0.18	0.06	0.003
2-14-92	C021492-96	AEC 14 Personal in Trackhoe	0.05	0.05	0.06	<0.07
2-14-92	C021492-97	AEC 14 Downwind Area	<0.05	<0.05	<0.06	<0.07
2-14-92	C021492-98	AEC 14 Upwind Area	<0.05	0.11	0.06	<0.07
2-18-92	C021892-103	AEC 14 Personal in Trackhoe	<0.07	<0.07	<0.09	<0.10
2-18-92	C021892-101	AEC 14 Upwind Area	<0.07	0.07	<0.09	<0.10
2-18-92	C021892-102	AEC 14 Downwind Area	<0.07	0.15	<0.08	<0.10
2-22-92	C022292-111	AEC 14 Personal in Trackhoe	0.21	0.11	0.04	<0.05
		Occupational Exposure Limits				
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150	1 10 5

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.

845030659

TABLE 28
AECs 17 and 21
CHARCOAL TUBE SAMPLES
Summary of Results

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene	Benzene
1-18-92	C011892-46	AEC 17 Personal in Trackhoe	<0.04	<0.04	<0.05	<0.06
1-18-92	C011892-47	AEC 17 Downwind Area	<0.06	<0.06	<0.07	<0.09
1-18-92	C011892-48	AEC 17 Upwind Area	<0.06	<0.06	<0.07	<0.08
2-04-92	C030492-130	AEC 21 Personal in Trackhoe	0.04	0.07	0.04	<0.05
2-24-92	C022492-115	AEC 21 Personal in Trackhoe	0.04	0.37	0.03	<0.02
2-27-92	C022792-122	AEC 21 Personal in Trackhoe	<0.04	0.07	<0.04	<0.05
3-03-92	C030392-127	AEC 21 Personal in Trackhoe	0.12	0.23	0.40	<0.05
3-03-92	C030392-128	AEC 21 Downwind Area	0.04	0.12	0.05	<0.05
3-03-92	C030392-129	AEC 21 Upwind Area	0.24	0.59	0.32	<0.05
		Occupational Exposure Limits				
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150	1 10 5

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.

845030660

TABLE 28
AEC 25, MW 12, MW 7, SB 1707, SB 2303, AEC 28
CHARCOAL TUBE SAMPLES
Summary of Results

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene	Benzene
1-20-92	C012092-51	AEC 25 Personal in Trackhoe	<0.08	<0.07	<0.10	<0.11
1-21-92	C012192-54	AEC 25 Upwind Area	<0.11	<0.11	<0.12	<0.15
1-21-92	C012192-55	AEC 25 Downwind Area	0.09	0.50	0.07	<0.07
1-31-92	C013192-66	MW 12 Personal in Trackhoe	<0.11	<0.11	<0.13	<0.15
1-31-92	C013192-67	MW 12 Upwind Area	<0.16	<0.16	<0.19	<0.22
1-31-92	C013192-68	MW 12 Downwind Area	<0.08	<0.08	<0.09	<0.11
1-28-92	C012892-59	MW 7 Personal in Trackhoe	<0.11	0.11	0.12	<0.15
2-11-92	C021192-92	SB 1707, SB 2303, AEC 28 Personal in Trackhoe	<0.01	<0.01	<0.01	<0.03
		Occupational Exposure Limits				
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150	1 10 5

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.

TABLE 28
FEED HOPPER and SCREEN ALL-ALL AREAS
CHARCOAL TUBE SAMPLES
Summary of Reports

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene	Benzene
1-15-92	C011592-44	Feed Hopper	<0.03	0.10	0.25	<0.06
1-15-92	C011592-45	Screen-All	<0.03	<0.04	0.25	<0.06
1-20-92	C012092-50	Screen-All	0.06	0.32	<0.04	<0.06
1-28-92	C012892-57	Screen-All	<0.03	0.11	<0.03	<0.06
2-03-92	C020392-76	Feed Hopper	0.69	3.93	0.11	<0.13
2-20-92	C022092-107	Screen-All	0.05	0.17	<0.03	<0.06
2-27-92	C022792-121	Downwind Feed Hopper 10'	0.30	0.74	0.38	<0.05
		Occupational Exposure Limits				
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150	1 10 5

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.

84503066

TABLE 28
PERSONNEL NOT INVOLVED IN EXCAVATION
CHARCOAL TUBE SAMPLES
Summary of Results

All results in ppm

Date	Sample ID	Sample Location	Ethylbenzene	Xylenes	Toluene	Benzene
2-03-92	C020392-77	Control House - Personal	<0.01	0.09	<0.02	<0.06
2-13-92	C021392-95	Pump House - Personal	<0.06	<0.06	<0.07	<0.08
2-20-92	C022092-108	Reichhold Security Office	0.33	0.43	<0.01	<0.03
2-22-92	C022292-110	Control House - Personal	<0.04	<0.04	<0.04	<0.05
2-23-92	C022392-113	AEC 1 and around LTTA	0.06	0.09	<0.03	<0.02
2-25-92	C022592-116	Soils and Safety Trailer	<0.04	<0.04	<0.04	<0.05
3-05-92	C030592-133	LTTA Laborer	<0.06	0.06	<0.07	<0.08
		Occupational Exposure Limits				
		Permissible Exposure Limit Threshold Limit Value Short-Term Exposure Limit	100 100 125	100 100 150	100 100 150	1 10 5

Notes

1. The symbol "less than" (<) preceding a result indicates that the substance was not detected.
2. Charcoal tube analytical results are located in Appendix M.

845030662

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
2-07-92	AEC 1	Excavation	PID	1.4	75	C
2-19-92	AEC 1	Excavation	PID	0.5	1.2	D
2-20-92	AEC 1	Excavation	PID	1.0	12.0	D
2-22-92	AEC 1	Excavation	PID	1.0	7.0	D
2-23-92	AEC 1	Excavation	FID	1.0	25	C
11-01-91	AEC 3,4,5	Railroad Removal	PID	4.0	45	D & C
11-02-91	AEC 3,4,5	Railroad Removal	PID	4.0	40	C
11-03-91	AEC 3,4,5	Railroad Removal	PID	2.5	2.5	D
11-04-91	AEC 3,4,5	Railroad Removal	PID	1.2	1.2	D
11-15-91	AEC 5	Excavation	PID	4.0	25	D
11-18-91	AEC 4	Excavation	PID	4.0	30	C
11-20-91	AEC 3,4,5	Excavation	FID	4.8	22	C
12-04-91	AEC 3	Railroad Removal	PID	0.4	0.4	D
1-06-92	AEC 3,4,5	Railroad Removal	PID	1.0	1.0	D

845030663

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
1-30-92	AEC 7	Excavation	PID	0.4	2.7	D
2-01-92	AEC 7	Excavation	PID	1.3	97.8	C
2-03-92	AEC 7	Excavation	PID	0.3	50.3	C
2-04-92	AEC 7	Excavation	PID	1.7	10.8	D
1-29-92	AEC 8	Excavation	PID	0.2	5.0	D
2-26-92	AEC 8	Excavation	PID	0.4	0.4	D
2-27-92	AEC 8	Excavation	PID	0.4	0.4	D
11-12-91	AEC 9	Excavation	PID	1.5	1.5	D
10-21-91	AEC 12	Excavation	PID	5	22	C
10-22-91	AEC 12	Excavation	PID	6	50	D & B
10-23-91	AEC 12	Excavation	PID	5	5	D
10-24-91	AEC 12	Excavation	PID	5	6	D
10-25-91	AEC 12	Excavation	PID	6	100	C
10-26-91	AEC 12	Excavation	PID	5.0	5.0	D

84503064

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
10-28-91	AEC 12	Excavation	PID	7.0	7.0	C
10-29-91	AEC 12	Excavation	PID	2.0	2.2	C
10-31-91	AEC 12	Off Loading Vacuum Truck	PID	2.0	7.0	C
11-04-91	AEC 12	Excavation	PID	1.0	1.2	D
12-10-91	AEC 12	Excavation	PID	0.8	0.8	D
12-11-91	AEC 12	Excavation	PID	0.4	0.4	D
12-13-91	AEC 12	Excavation	PID	3.6	3.6	D
12-14-91	AEC 12	Excavation	PID	2.6	2.6	D
2-28-92	AEC 12	Excavation	PID	1.0	1.0	D
10-21-91	AEC 14	Asphalt Removal	FID	7.0	7.6	D
10-24-91	AEC 14	Asphalt Removal	PID	5.0	6.0	D
10-25-91	AEC 14	Asphalt Removal	PID	6.0	6.0	D
10-28-91	AEC 14	Asphalt Removal	PID	7.0	7.0	D
10-29-91	AEC 14	Asphalt Removal	PID	2.0	2.0	D
11-20-91	AEC 14	Excavation	FID	4.8	35	C

84503065

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
1-30-92	AEC 14	Excavation	PID	2.4	4.2	D
2-02-92	AEC 14	Excavation	PID	0.3	9.6	D
2-09-92	AEC 14	Excavation	PID	1.1	10.2	D
2-17-92	AEC 14	Excavation	PID	0.2	0.2	D
2-18-92	AEC 14	Excavation	FID	1.0	1.5	D
2-19-92	AEC 14	Excavation	PID	0.6	6.0	D
2-22-92	AEC 14	Excavation	PID	1.0	9.0	D
2-23-92	AEC 14	Excavation	PID	0.5	1.5	D
1-31-92	AEC 15	Excavation	PID	1.0	5.0	D
11-02-91	AEC 16	Asphalt Removal	PID	4.0	4.5	D
11-04-91	AEC 16	Asphalt Removal	PID	1.0	1.3	D
11-05-91	AEC 16	Asphalt Removal	PID	1.0	1.3	D
10-28-91	AEC 17	Excavation	PID	7.0	7.1	C
1-15-92	AEC 17	Excavation	PID	0.6	0.7	D

845030666

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
1-16-92	AEC 17	Excavation	PID	0.0	2.42	D
1-19-92	AEC 17	Excavation	PID	2.0	5.0	D
1-27-92	AEC 18	Excavation	PID	0.4	8.1	D
12-17-91	AEC 19	Excavation	PID	1.4	1.4	D
12-18-91	AEC 19	Excavation	PID	1.0	4.0	D
12-22-91	AEC 19	Excavation	PID	2.4	2.6	D
2-24-92	AEC 21	Excavation	PID	1.0	12	D
2-25-92	AEC 21	Excavation	PID	1.0	10	D
2-26-92	AEC 21	Excavation	PID	1.0	5.0	D
2-27-92	AEC 21	Excavation	PID	0.5	20	C
2-28-92	AEC 21	Excavation	PID	1.0	1.0	D
3-02-92	AEC 21	Excavation	PID	1.0	15	D
3-03-92	AEC 21	Excavation	PID	1.0	15	D
3-04-92	AEC 21	Excavation	FID	1.0	20	D

845030667

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
11-04-91	AEC 25	Railroad Removal	PID	1.0	1.3	D
1-20-92	AEC 25	Excavation	PID	2.0	5.0	D
1-21-92	AEC 25	Excavation	PID	2.4	9.0	D
11-22-91	AEC 28	Excavation	PID	4.5	4.5	D
1-28-92	MW-7	Excavation	PID	0.2	0.4	D
1-27-92	Boring 1707	Excavation	PID	0.4	0.4	D
1-27-92	Boring 2303	Excavation	PID	0.4	0.4	D
1-06-92	*LTTA Unit	Processing Soils	PID	1.0	2.0	D
1-07-92	*LTTA Unit	Processing Soils	PID	1.0	1.0	D
1-08-92	*LTTA Unit	Processing Soils	PID	1.0	1.0	D
1-09-92	*LTTA Unit	Processing Soils	PID	1.0	1.0	D
1-15-92	*LTTA Unit	Processing Soils	PID	0.7	0.7	D
1-16-92	*LTTA Unit	Processing Soils	PID	0.0	0.68	D

845030668

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
1-19-92	*LTTA Unit	Processing Soils	PID	2.0	2.0	D
1-20-92	*LTTA Unit	Processing Soils	PID	2.0	2.0	D
1-21-92	*LTTA Unit	Processing Soils	PID	1.9	2.4	D
1-22-92	*LTTA Unit	Processing Soils	PID	1.0	2.0	D
1-22-92	Feed Conveyor	Loading Soils	PID	9.0	10	C
1-27-92	*LTTA Unit	Processing Soils	PID	0.4	0.4	D
1-27-92	Feed Conveyor & Feed Hopper	Loading Soils	PID	0.2	8.0	D
1-28-92	*LTTA Unit	Processing Soils	PID	0.2	0.2	D
1-29-92	*LTTA Unit	Processing Soils	PID	0.1	1.2	D
1-29-92	Feed Conveyor	Loading Soils	PID	0.1	10.6	D
1-30-92	*LTTA Unit	Processing Soils	PID	0.1	2.4	D
1-30-92	Feed Conveyor	Loading Soils	PID	0.1	8.5	D
1-31-92	*LTTA Unit	Processing Soils	PID	2.0	6.1	D
1-31-92	Feed Hoppers	Loading Soils	PID	2.0	10	D
2-01-92	*LTTA Unit	Processing Soils	PID	1.3	1.3	D
2-02-92	*LTTA Unit	Processing Soils	PID	0.3	0.9	D

845030669

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
2-03-92	*LTTA Unit	Processing Soils	PID	0.3	3.4	D
2-03-92	Feed Hopper	Loading Soils	PID	0.3	4.1	D
2-04-92	*LTTA Unit	Processing Soils	PID	1.7	1.7	D
2-05-92	*LTTA Unit	Processing Soils	PID	0.6	2.6	D
2-06-92	*LTTA Unit	Processing Soils	PID	0.3	0.3	D
2-07-92	*LTTA Unit	Processing Soils	PID	0.9	2.7	D
2-07-92	Feed Conveyor	Loading Soils	PID	0.9	7.3	D
2-08-92	*LTTA Unit	Processing Soils	PID	0.4	1.2	D
2-09-92	*LTTA Unit	Processing Soils	PID	0.4	2.3	D
2-10-92	*LTTA Unit	Processing Soils	PID	0.6	0.6	D
2-17-92	*LTTA Unit	Processing Soils	PID	0.01	0.04	D
2-18-92	*LTTA Unit	Processing Soils	FID	0.6	1.2	D
2-19-92	*LTTA Unit	Processing Soils	PID	0.6	0.6	D
2-20-92	*LTTA Unit	Processing Soils	PID	1.2	2.0	D
2-21-92	*LTTA Unit	Processing Soils	PID	1.0	1.2	D
2-21-92	Feed Conveyor	Loading Soils	PID	1.0	9.0	D
2-22-92	*LTTA Unit	Processing Soils	PID	1.0	1.0	D

845030670

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
2-23-92	*LTTA Unit	Processing Soils	PID	1.0	1.0	D
2-24-92	*LTTA Unit	Processing Soils	PID	0.8	1.0	D
2-25-92	*LTTA Unit	Processing Soils	PID	1.0	1.0	D
2-26-92	*LTTA Unit	Processing Soils	PID	0.8	0.8	D
2-27-92	*LTTA Unit	Processing Soils	PID	0.5	0.5	D
2-28-92	*LTTA Unit	Processing Soils	PID	0.1	1.0	D
2-28-92	Feed Conveyor	Loading Soils	PID	1.0	90	D
3-02-92	*LTTA Unit	Processing Soils	PID	1.0	1.0	D
3-03-92	*LTTA Unit	Processing Soils	PID	1.0	1.0	D
3-04-92	*LTTA Unit	Processing Soils	FID	1.0	1.0	D
3-04-92	Feed Conveyor & Feed Hopper	Loading Soils	FID	1.0	1.0	D
3-05-92	*LTTA Unit	Processing Soils	FID	1.0	1.0	D
3-06-92	*LTTA Unit	Plant Demobilization	FID	1.5	1.5	D
1-29-92	Screen All	Screening Soils	PID	0.1	4.7	D
1-30-92	Screen All	Screening Soils	PID	2.4	20.2	C

84503067

TABLE 29
AIR MONITORING
Summary of Results

All results in ppm

Date	Area	Activity	Instrument	Measured VOC Levels Minimum	Measured VOC Levels Maximum	PPE Level
2-03-92	Screen All	Screening Soils	PID	0.3	25.2	C
2-04-92	Screen All	Screening Soils	PID	1.7	1.7	D
2-19-92	Screen All	Screening Soils	PID	1.0	1.5	D
2-20-92	Screen All	Screening Soils	PID	1.0	2.0	D
2-22-92	Screen All	Screening Soils	PID	1.0	1.0	D
2-26-92	Screen All	Screening Soils	PID	1.2	1.8	D
3-02-92	Screen All	Screening Soils	PID	2.0	2.0	D
3-03-92	Screen All	Screening Soils	PID	2.0	2.0	D
3-04-92	Screen All	Screening Soils	FID	0.5	0.5	D
3-05-92	Screen All	Screening Soils	FID	1.0	1.0	D

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TABLE 29
AIR MONITORING
Summary of Results

Notes

1. VOC levels refer to concentration above background.

	PPM	=	Parts Per Million of Substance in Air By Volume
Level	D	=	Tyvek, Hard Hat, Gloves, Duct Tape, and Boots
Level	C	=	Tyvek, Hard Hat, Gloves, Duct Tape, Boots, and Full Face Air Purifying Respirator
	PPE	=	Personal Protective Equipment
	PID	=	Photoionization Detector
	FID	=	Flame Ionization Detector
	VOC	=	Volatile Organic Compounds
	*	=	LTTA Unit includes the control room, dryer, baghouse, venturi scrubber, pugmill, pumphouse, feed hoppers, and the conveyor belt.

845030673

TABLE 30

Comparison of QC Limits
SW-846 Advisory Limits versus Project Goals

Parameter	SW-846 Advisory Limit	Project Goal
MS Recovery, % Recovery		
Chlorobenzene	60 - 133	75 - 125*
Toluene	59 - 139	75 - 125*
Benzene	66 - 142	75 - 125*
1,2-Dichlorobenzene	Not Established	75 - 125*
MS/MSD Difference, % Relative Percent Difference		
Chlorobenzene	21	20
Toluene	21	20
Benzene	21	20
1,2-Dichlorobenzene	Not Established	20
Initial Calibration, % Relative Standard Deviation		
All Compounds	20	20
Daily Calibration Results, % Recovery		
Benzene	85 - 115	85 - 115
Toluene	85 - 115	85 - 115
Ethylbenzene	85 - 115	85 - 115
m-Xylene	85 - 115	85 - 115
o/p-Xylene	85 - 115	85 - 115
Chlorobenzene	85 - 115	85 - 115
1,2-Dichlorobenzene	85 - 115	85 - 115
1,3-Dichlorobenzene	85 - 115	85 - 115
1,4-Dichlorobenzene	85 - 115	85 - 115
Surrogate Recovery, % Recovery		
Fluorobenzene	75 - 125	75 - 125
Bromofluorobenzene	75 - 125	75 - 125**
System Precision and Accuracy, % Recovery		
Benzene	77 - 123	80 - 120
Toluene	77.5 - 122.5	80 - 120
Ethylbenzene	63 - 137	80 - 120
m-Xylene	Not Established	80 - 120
o/p-Xylene	Not Established	80 - 120
Chlorobenzene	80.5 - 119.5	80 - 120
1,2-Dichlorobenzene	68 - 132	80 - 120
1,3-Dichlorobenzene	72.5 - 127.5	80 - 120
1,4-Dichlorobenzene	69.5 - 130.5	80 - 120

* Project goal for matrix spike recovery was established at +/- 25 %. On an overall project basis, these results were calculated as three standard deviations of the project average.

**: Bromofluorobenzene was used as an internal standard throughout the project.

84503074

TABLE 31

Project Precision Results

Precision Parameter	Project Goal	Project Average	Standard Deviation	Project Results
Matrix Spike/Matrix Spike Duplicate Recovery, % RPD				
Chlorobenzene	20	3.03	2.40	10.2
Toluene	20	3.94	3.05	13.1
Benzene	20	3.48	3.71	14.6
1,2-Dichlorobenzene	20	4.08	2.95	12.9
Project precision results for MS/MSD were calculated as the project average % RPD plus three standard deviations of the project % RPD.				
Laboratory Duplicate Recovery, % RSD				
Ethylbenzene	Not Established	10.3	N/A	N/A
m-Xylene	Not Established	12.5	N/A	N/A
o/p-Xylene	Not Established	15.0	N/A	N/A
Field Duplicate Recovery, % RPD				
Benzene	Not Established	16.8	N/A	N/A
Toluene	Not Established	17.4	N/A	N/A
Ethylbenzene	Not Established	14.5	N/A	N/A
Total Xylene	Not Established	15.6	N/A	N/A

MS/MSD: Matrix Spike/Matrix Spike Duplicate; RPD: Relative Percent Difference; RSD: Relative Standard Deviation
AVE: Project Average Result; SD: Standard Deviation; N/A: Not Applicable
Supporting documentation and calculations are located in Appendix V.

845030675

TABLE 32

Project Accuracy Results

Accuracy Parameter	Project Goal	Project Average	Standard Deviation	Project Results
Matrix Spike Recovery, % R				
Chlorobenzene	25	109	5.7	17.1
Toluene	25	105	7.9	23.7
Benzene	25	113	8.6	25.8
1,2-Dichlorobenzene	25	105	6.2	18.6
Matrix Spike Duplicate Recovery, % R				
Chlorobenzene	25	108	5.7	17.1
Toluene	25	104	8.9	26.7
Benzene	25	112	9.5	28.5
1,2-Dichlorobenzene	25	104	6.8	20.4

R: Recovery; AVE: Project Average Result; SD: Standard Deviation
Project accuracy results were calculated as three standard deviations of the project average.
Supporting documentation and calculations are located in Appendix V.

845030676

TABLE 33

Off-Site Confirmatory Analysis
VOC Post-Excavation Soil Samples
Summary of Method 8020 Results
and
Comparison with On-Site Method 8020 Results

Off-Site 8020 Results

Sample Name	P-10	P-69	P-75	P-21
Lab ID No.	TX0077	TX0078	TX0076	TX0055
File ID	-	-	-	-
Date Sampled	11/19/91	11/15/91	11/19/91	11/13/91
Date Analyzed	11/25/91	11/25/91	11/25/91	11/25/91
Dilution Factor	1	1	1	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	1.3 U	1.4 U	9.8	1.1 U
Toluene	1.3 U	1.4 U	29	1.1 U
Ethylbenzene	230	16	52	1.1 U
Xylene, total	910	39	153	1.1 U
Chlorobenzene	NR	NR	NR	NR
1,2-Dichlorobenzene	NR	NR	NR	NR
1,3-Dichlorobenzene	NR	NR	NR	NR
1,4-Dichlorobenzene	NR	NR	NR	NR
VOCs, total	1140	55	244	1.1 U

On-Site 8020 Results

VOCs, total	375	207	11	0.10 U

VOC: Volatile Organic Compound NR: Not Reported

U - Undetected at, or above, the reported detection limit.

Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8020.

Results from off-site are reported in mg/Kg (ppm) on a dry-weight basis.

Off-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix T.

On-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix S.

Sample locations are shown on Figure 2.

84503067

TABLE 34

Off-Site Confirmatory Analysis
VOC Post-Excavation Soil Samples
Summary of Method 8240 Results
and
Comparison with On-Site Method 8020 Results

Off-Site 8240 Results

Sample Name	P-1	P-3	P-14S	P-103	P-24	P-25A	P-24C	P-31	P-34	P-43S
Lab ID No.	TX0683	TX0684	TX0263	TX0950	TX0685	TX0713	TX0949	TX0257	TX0258	TX0411
File ID	CCDC12	CCDB11	CCAT13	CCDR12	DDDC11	CCDG09	CCDR06	CCAT05	CCAT08	COWA01
Date Sampled	2/8/92	2/8/92	12/17/91	2/28/92	2/10/92	2/17/92	2/22/92	12/12/91	12/7/91	1/19/92
Date Analyzed	2/22/92	2/21/92	12/19/91	3/9/92	2/22/92	2/26/92	3/9/92	12/19/91	12/19/91	1/31/92
Dilution Factor	6250	1	5	250	6250	1	625	1	5	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	36 U	0.007 U	0.029 U	1.6 U	37 U	0.006 U	3.7 U	0.006 U	0.029 U	0.007 U
Toluene	36 U	0.62	0.010 J	1.7	81	8.5 D	3.7 U	0.003 J	0.047	0.009
Ethylbenzene	630	0.86	0.029 U	11	420	0.160 U	16	0.006 U	0.035	0.005 J
Xylene, total	110	1.0	0.44	47	2100 D	28 D	110	0.009	0.690	0.022
Chlorobenzene	36 U	0.007 U	0.029 U	1.6 U	37 U	0.006 U	3.7 U	0.006 U	0.029 U	0.007 U
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,3-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
VOCs, total	740	2.48	0.45	59.7	2600	36.5	126	0.012	0.772	0.036
On-Site 8020 Results										
VOCs, total	13600	4.2	3.30	162	1920	33.4	36.0	0.62	9.2	0.10 U

VOC: Volatile Organic Compound
J: Estimated
D: Secondary dilution
U - Undetected at, or above, the reported detection limit.
NR: Not reported
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8240.
Results from off-site are reported in mg/Kg (ppm) on a dry-weight basis.
Off-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix T.
On-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix S.
Sample locations are shown on Figure 2.

845030678

Off-Site Confirmatory Analysis
VOC Post-Excavation Soil Samples
Summary of Method 8240 Results
and
Comparison with On-Site Method 8020 Results

Off-Site 8240 Results

Sample Name	P-55	P-57A	P-49
Lab ID No.	TX0951	TX0952	TX0623
File ID	CCDR07	CCDR04	CCCT04
Date Sampled	3/3/92	3/4/92	1/30/92
Date Analyzed	3/9/92	3/9/92	2/12/92
Dilution Factor	1250	125	1
Compound	mg/Kg	mg/Kg	mg/Kg
Benzene	7 U	0.72 U	0.006 U
Toluene	7 U	0.82	0.006 U
Ethylbenzene	7 U	3.4	0.006
Xylene, total	7 U	22	0.005 J
Chlorobenzene	7 U	0.72 U	0.006 U
1,2-Dichlorobenzene	NR	NR	NR
1,3-Dichlorobenzene	NR	NR	NR
1,4-Dichlorobenzene	NR	NR	NR
VOCs, total	7 U	26.2	0.011

On-Site 8020 Results

VOCs, total	86	5.7	0.38

VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
J: Estimated
NR: Not reported
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8240.
Results from off-site are reported in mg/Kg (ppm) on a dry-weight basis.
Off-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix T.
On-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix S.
Sample locations are shown on Figure 2.

845030679

TABLE 35

Off-Site Confirmatory Analysis
VOC Post-Treatment Soil Samples
Summary of Method 8240 Results
and
Comparison with On-Site Method 8020 Results

Off-Site 8240 Results

Sample Name	1211-01	1213-06	1214-06	1215-04	1217-01	1218-01	0106-05	0108-04	0117-05	0118-07
Lab ID No.	TX0259	TX0260	TX0261	TX0262	TX0279	TX0280	TX0346	TX0347	TX0412	TX0413
File ID	CCAV04	CCAX10	CCAV07	CCAW03	CCAZ17	CCBG06	CCBY20	CCBY21	COWA09	COWA10
Date Sampled	12/11/91	12/13/91	12/14/91	12/15/91	12/17/31	12/18/91	1/6/92	1/8/92	1/17/92	1/18/92
Date Analyzed	12/23/91	12/27/91	12/23/91	12/26/91	12/31/91	1/10/92	1/25/92	1/25/92	1/31/92	1/31/92
Dilution Factor	1	50	1	5	1	5	1	1	1	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.045	0.30 U	0.048	0.014 J	0.017	0.020 J	0.006 U	0.008	0.006 U	0.006
Toluene	0.092	0.98	0.059	0.056	0.017 B	0.023 J	0.019	0.017	0.006 U	0.023
Ethylbenzene	0.037	1.9	0.018	0.054	0.008	0.30 U	0.012	0.015	0.003 J	0.047
Xylene, total	0.12	8.2	0.062	0.27	0.006	0.024 J	0.083	0.10	0.026	0.24
Chlorobenzene	0.006 U	0.30 U	0.006 U	0.006 U	0.006 U	0.030 U	0.006 U	0.006 U	0.006 U	0.006 U
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,3-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
VOCs, total	0.294	11.1	0.187	0.394	0.048	0.067	0.114	0.140	0.029	0.316
On-Site 8020 Results										
VOCs, total	0.34	8.67	0.186	1.40	0.716	0.803	0.684	0.522	0.10 U	1.18

VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
J: Estimated
NR: Not reported
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8240.
Results from off-site are reported in mg/Kg (ppm) on a dry-weight basis.
Off-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix T.
On-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix S.

845030680

Off-Site Confirmatory Analysis
VOC Post-Treatment Soil Samples
Summary of Method 8240 Results
and
Comparison with On-Site Method 8020 Results

Off-Site 8240 Results

Sample Name	0119-06	0120-03	0122-01	0123-04	0127-01	0128-05	0129-02	0130-02	0131-04	0202-08
Lab ID No.	TX0414	TX0415	TX0499	TX0500	TX0501	TX0502	TX0503	TX0614	TX0615	TX0616
File ID	COWA04	COWA05	COWM01	COWM02	COWM03	BOWM11	COWM05	CCCT03	CCCT05	CCCV15
Date Sampled	1/19/92	1/20/92	1/22/92	1/23/92	1/27/92	1/28/92	1/29/92	1/30/92	1/31/92	2/2/92
Date Analyzed	1/31/92	1/31/92	1/31/92	1/31/92	1/31/92	2/3/92	1/31/92	2/12/92	2/13/92	2/13/92
Dilution Factor	1	1	1	1	1	1	1	1	1	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.006	0.010	0.007	0.036	0.045	0.010	0.010	0.005 J	0.006 U	0.010
Toluene	0.012	0.022	0.030	0.020	0.019	0.012	0.007	0.006 U	0.003 J	0.015
Ethylbenzene	0.007	0.047	0.016	0.007	0.003 J	0.011	0.006 U	0.006 U	0.006 U	0.006 U
Xylene, total	0.050	0.18	0.084	0.030	0.020	0.14	0.007	0.006 U	0.007	0.010
Chlorobenzene	0.006 U	0.006 U	0.005 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,3-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
VOCs, total	0.075	0.259	0.137	0.093	0.087	0.173	0.024	0.005	0.010	0.035
On-Site 8020 Results										
VOCs, total	0.12	1.28	0.316	0.27	0.11	0.351	0.10 U	0.354	0.22	0.36

VOC: Volatile Organic Compound
J: Estimated value
U - Undetected at, or above, the reported detection limit.
NR: Not reported
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8240.
Results from off-site are reported in mg/Kg (ppm) on a dry-weight basis.
Off-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix T.
On-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix S.

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Off-Site Confirmatory Analysis
VOC Post-Treatment Soil Samples
Summary of Method 8240 Results
and
Comparison with On-Site Method 8020 Results

Off-Site 8240 Results

Sample Name	0203-08	0204-07	0205-06	0206-05	0207-02	0208-07	0209-07	0210-02	0213-03	0217-03
Lab ID No.	TX0617	TX0618	TX0619	TX0621	TX0679	TX0680	TX0681	TX0682	TX0711	TX0712
File ID	CCCV09	CCCV10	CCCW05	CCCV12	CCDB05	CCDB08	CCDB13	CCDB10	CCDJ09	CCDG08
Date Sampled	2/3/92	2/4/92	2/5/92	2/6/92	2/7/92	2/8/92	2/9/92	2/10/92	2/13/92	2/17/92
Date Analyzed	2/13/92	2/13/92	2/15/92	2/13/92	2/21/92	2/21/92	2/22/92	2/21/92	2/28/92	2/28/92
Dilution Factor	1	5	5	1	1	1	1	1	5	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.004 J	0.029 U	0.032 U	0.005 J	0.016	0.009	0.008	0.016	0.018 J	0.004 J
Toluene	0.005 U	0.031	0.043	0.006 U	0.015	0.012	0.006	0.013	0.082	0.014
Ethylbenzene	0.005 U	0.029 U	0.032 U	0.006 U	0.009	0.029	0.004 J	0.012	0.076	0.008
Xylene, total	0.010	0.066	0.048	0.006 U	0.011	0.019	0.003 J	0.019	0.20	0.050
Chlorobenzene	0.005 U	0.029 U	0.032 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,3-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
VOCs, total	0.014	0.097	0.091	0.005	0.051	0.069	0.021	0.060	0.376	0.076
On-Site 8020 Results										
VOCs, total	0.29	0.36	0.40	0.168	0.23	0.39	0.37	0.573	0.43	0.40

VOC: Volatile Organic Compound
J: Estimated value
U - Undetected at, or above, the reported detection limit.
NR: Not reported
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8240.
Results from off-site are reported in mg/Kg (ppm) on a dry-weight basis.
Off-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix T.
On-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix S.

845030682

TABLE 35

Off-Site Confirmatory Analysis
VOC Post-Treatment Soil Samples
Summary of Method 8240 Results
and
Comparison with On-Site Method 8020 Results

Off-Site 8240 Results

Sample Name	0219-05	0220-05	0221-05	0222-05	0223-03	0224-03	0225-05	0226-04	0227-08	0228-01
Lab ID No.	TX0803	TX0804	TX0805	TX0806	TX0807	TX0808	TX0941	TX0942	TX0943	TX0944
File ID	CCDJ12	CCDJ13	CCDJ14	CCDJ15	CCDO11	CCDO12	CCDT03	CCDS08	CCDT07	CCDS10
Date Sampled	2/19/92	2/20/92	2/21/92	2/22/92	2/23/92	2/24/92	2/25/92	2/26/92	2/27/92	2/28/92
Date Analyzed	2/28/92	2/28/92	2/28/92	2/28/92	3/4/92	3/4/92	3/11/92	3/10/92	3/11/92	3/10/92
Dilution Factor	1	1	1	1	1	5	5	1	5	1
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.006 U	0.003 J	0.006 U	0.003 J	0.021	0.016 J	0.029 U	0.006 U	0.010	0.005 J
Toluene	0.019	0.032	0.033	0.019	0.019	0.044	0.018 J	0.007	0.042	0.029
Ethylbenzene	0.025	0.040	0.041	0.032	0.080	0.037	0.077	0.018	0.14	0.046
Xylene, total	0.094	0.13	0.21	0.160	0.031	0.12	0.16	0.042	0.35	0.120
Chlorobenzene	0.006 U	0.006 U	0.006 U	0.006 U	0.005 U	0.006 U	0.029 U	0.006 U	0.006 U	0.006 U
1,2-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,3-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,4-Dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
VOCs, total	0.138	0.205	0.284	0.214	0.151	0.217	0.255	0.067	0.542	0.200
On-Site 8020 Results										
VOCs, total	1.34	0.93	1.32	2.21	0.50	0.64	0.74	0.81	1.06	2.47

VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
J: Estimated value
NR: Not reported
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8240.
Results from off-site are reported in mg/Kg (ppm) on a dry-weight basis.
Off-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix T.
On-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix S.

845030683

Off-Site Confirmatory Analysis
VOC Post-Treatment Soil Samples
Summary of Method 8240 Results
and
Comparison with On-Site Method 8020 Results

Off-Site 8240 Results

Sample Name	0302-02	0303-01	0304-07	0305-02
Lab ID No.	TX0945	TX0946	TX0947	TX0948
File ID	CCDT09	CCDT10	CCDT11	CCDT12
Date Sampled	3/2/92	3/3/92	3/4/92	3/5/92
Date Analyzed	3/11/92	3/11/92	3/11/92	3/11/92
Dilution Factor	5	5	5	5
Compound	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.007	0.005 J	0.009	0.020 J
Toluene	0.021 J	0.024 J	0.039	0.052
Ethylbenzene	0.085	0.051	0.030	0.017 J
Xylene, total	0.160	0.14	0.11	0.067
Chlorobenzene	0.006 U	0.006 U	0.006 U	0.006 U
1,2-Dichlorobenzene	NR	NR	NR	NR
1,3-Dichlorobenzene	NR	NR	NR	NR
1,4-Dichlorobenzene	NR	NR	NR	NR
VOCs, total	0.273	0.220	0.188	0.156
On-Site 8020 Results				
VOCs, total	1.09	0.50	0.33	0.24

VOC: Volatile Organic Compound
U - Undetected at, or above, the reported detection limit.
J: Estimated value
NR: Not reported
Samples were extracted following EPA Method 5030 and results were obtained following EPA Method 8240.
Results from off-site are reported in mg/Kg (ppm) on a dry-weight basis.
Off-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix T.
On-site analytical reports are included in New Jersey Tier II data packages which are located in Appendix S.

845030684

TABLE 36

Precision and Accuracy Study

Results from 10/02/91 - in ug/L

8020 Compound	ug/L	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	AVE	%R	SD	%RSD	Project Results Range, %	Project Goals Range, %
Benzene	20.000	20.475	20.412	20.639	20.838	19.389	19.505	19.033	20.042	100.21	0.713	3.56	89.5 - 110.9	80 - 120
Toluene	20.000	19.683	19.485	19.762	19.935	18.584	18.677	17.921	19.150	95.75	0.757	3.95	83.9 - 107.6	80 - 120
Chlorobenzene	20.000	19.362	18.948	19.130	19.306	18.048	18.293	17.759	18.692	93.46	0.649	3.47	83 - 103.9	80 - 120
Ethylbenzene	20.000	18.997	18.309	18.605	18.705	17.493	17.543	17.131	18.112	90.56	0.717	3.96	78.7 - 102.4	80 - 120
m-Xylene	20.000	14.797	14.215	14.460	14.505	13.627	13.714	13.879	14.171	70.86	0.443	3.13	61.5 - 80.24	80 - 120
o,p-Xylene	40.000	35.231	33.648	34.149	34.447	32.260	32.436	32.934	33.586	83.97	1.101	3.28	74.1 - 93.8	80 - 120
1,2-Dichlorobenzene	20.000	19.165	18.001	18.276	18.291	17.108	17.282	17.083	17.887	89.43	0.772	4.32	76.5 - 102.4	80 - 120
1,3-Dichlorobenzene	20.000	21.095	19.564	20.043	19.969	19.075	18.474	18.856	19.582	97.91	0.882	4.50	84.4 - 111.4	80 - 120
1,4-Dichlorobenzene	20.000	18.142	16.832	16.893	16.939	16.138	16.303	15.892	16.734	83.67	0.743	4.44	70.4 - 96.98	80 - 120

Results from 03/07/92 - in ug/L

8020 Compound	Conc.	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	AVE	%R	SD	%RSD	Project Results Range, %	Project Goals Range, %
Benzene	20.000	20.535	20.370	21.068	20.332	20.413	20.197	19.895	20.401	102.01	0.357	1.75	96.8 - 107.3	80 - 120
Toluene	20.000	20.013	20.002	21.283	20.917	20.558	19.965	20.199	20.420	102.10	0.518	2.53	94.5 - 109.7	80 - 120
Chlorobenzene	20.000	20.524	20.529	21.835	21.392	21.113	20.733	20.533	20.951	104.76	0.514	2.45	97.4 - 112.1	80 - 120
Ethylbenzene	20.000	20.537	20.433	21.860	21.334	21.027	20.396	20.457	20.863	104.32	0.565	2.71	96.2 - 112.4	80 - 120
m-Xylene	20.000	19.496	19.277	20.105	19.495	19.355	19.039	19.400	19.452	97.26	0.327	1.68	92.2 - 102.3	80 - 120
o,p-Xylene	40.000	40.844	40.030	42.261	41.568	40.882	40.149	40.534	40.895	102.24	0.791	1.93	96.4 - 108	80 - 120
1,2-Dichlorobenzene	20.000	18.562	18.449	19.168	18.508	18.676	17.970	18.149	18.497	92.49	0.385	2.08	86.2 - 98.73	80 - 120
1,3-Dichlorobenzene	20.000	20.360	20.352	21.335	20.469	20.512	20.057	20.609	20.528	102.64	0.396	1.93	96.8 - 108.4	80 - 120
1,4-Dichlorobenzene	20.000	20.006	19.808	20.421	20.406	20.100	19.521	19.309	19.939	99.69	0.422	2.12	93.3 - 106	80 - 120

AVE: Average; %R: Percent Recovery: SD: Standard Deviation; %RSD: Percent Relative Standard Deviation

The range for system precision and accuracy results are calculated as the average recovery plus or minus three standard deviations from the average.

Project results are better than the SW-846 advisory limits and project limits which are presented in Table 30.

Supporting documentation and calculations are located in Appendix V.

845030685

TABLE 37

Method Detection Limit Results

Results from 10/02/91 - in ug/L

8020 Compound	Conc.	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	AVE	SD	MDL, ug/L	Instrument MDL, mg/Kg	Project MDL, mg/Kg
Benzene	0.500	0.500	0.528	0.451	0.487	0.426	0.476	0.478	0.478	0.0329	0.103	0.0052	0.050
Toluene	0.500	0.808	0.761	0.725	0.742	0.697	0.726	0.700	0.737	0.0385	0.121	0.0060	0.10
Chlorobenzene	0.500	0.545	0.497	0.448	0.263	0.252	0.402	0.389	0.3994	0.1107	0.348	0.0174	0.050
Ethylbenzene	0.500	0.552	0.507	0.444	0.485	0.406	0.437	0.415	0.4637	0.0531	0.167	0.0083	0.10
m-Xylene	0.500	0.524	0.447	0.440	0.462	0.339	0.402	0.454	0.4383	0.0569	0.179	0.0089	0.10
o,p-Xylene	1.000	1.161	0.915	0.910	0.927	0.835	0.881	0.842	0.9244	0.1103	0.347	0.0173	0.10
1,2-Dichlorobenzene	0.500	0.057	0.034	0.000	0.040	0.029	0.026	0.033	0.0313	0.0171	0.054	0.0027	0.050
1,3-Dichlorobenzene	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0.000	0.000	0.050
1,4-Dichlorobenzene	0.500	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.0039	0.0102	0.032	0.0016	0.050

Results from 11/05/91 - in ug/L*

8020 Compound	Conc.	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	AVE	SD	MDL, ug/L	Instrument MDL, mg/Kg	Project MDL, mg/Kg
Benzene	0.500	0.500	0.456	0.449	0.444	0.421	0.521	0.454	0.4636	0.0346	0.109	0.0054	0.050
Toluene	0.500	0.903	1.006	1.043	0.947	1.001	0.790	0.699	0.9127	0.1261	0.396	0.0198	0.10
Chlorobenzene	0.500	0.284	0.511	0.419	0.473	0.443	0.501	0.424	0.4364	0.0762	0.239	0.0120	0.050
Ethylbenzene	0.500	0.837	0.854	0.797	0.689	0.857	0.754	0.590	0.7683	0.0992	0.312	0.0156	0.10
m-Xylene	0.500	1.100	1.269	1.213	0.951	1.302	1.000	0.801	1.0909	0.184	0.578	0.0289	0.10
o,p-Xylene	1.000	1.409	1.453	1.396	1.189	1.446	1.287	1.077	1.3224	0.1441	0.453	0.0226	0.10
1,3-Dichlorobenzene	0.500	0.569	0.534	0.465	0.512	0.322	0.489	0.482	0.4819	0.0786	0.247	0.0124	0.050
1,2-Dichlorobenzene	0.500	0.550		0.437	0.389		0.506	0.372	0.4508	0.076	0.239	0.0119	0.050
1,4-Dichlorobenzene	0.500	0.571	0.805	0.462	0.538		0.467	0.468	0.5518	0.1319	0.414	0.0207	0.050

MDL: Method Detection Limit; AVE: Average; SD: Standard Deviation *: Internal Standard Calculation Method

MDLs for Dichlorobenzenes were determined by SW-846 Method 8010 (Hall Electrolytic Conductivity Detector).

The method detection limit is defined in 40 CFR 136, Appendix B and is calculated as 3.143 x SD (for a seven sample population).

Supporting documentation is located in Appendix V.

84503068

Initial Calibration Summary
Percent Relative Standard Deviation (%RSD)

8020 Compound	10/2/91	10/21/91	11/5/91	12/6/91	1/6/92	1/18/92	2/14/92	AVERAGE
Benzene	7.467	9.678	7.842	9.874	10.330	5.971	11.220	**8.91**
Toluene	10.994	11.740	8.508	6.634	6.826	9.541	7.054	**8.76**
Chlorobenzene	10.717	10.497	8.722	7.820	10.370	10.720	13.590	**10.35**
Ethylbenzene	7.497	9.330	6.788	10.350	5.593	9.317	6.721	**7.94**
m-Xylene	10.212	4.920	6.448	8.909	8.542	17.740	5.702	**8.92**
o,p-Xylene	6.197	5.570	4.834	7.300	4.517	4.561	7.364	**5.76**
1,2-Dichlorobenzene	5.933	7.394	8.337	6.810	5.978	9.435	9.289	**7.60**
1,3-Dichlorobenzene	7.384	10.706	7.812	7.490	7.885	10.760	8.883	**8.70**
1,4-Dichlorobenzene	5.225	6.169	6.346	11.024	3.738	8.411	8.362	**7.04**
Surrogates								
Fluorobenzene	2.149	3.770	2.616	12.687	8.161	11.900	10.080	**7.34**
Bromofluorobenzene	8.166	2.139	2.584	11.281	7.746	12.360	6.677	**7.28**

Multi-point curves typically consisted of 9 calibration points: 1, 2, 4, 10, 20, 40, 50, 80, and 100 ug/L.
Surrogate concentrations were 10 ug/L for fluorobenzene and 25 ug/L for bromofluorobenzene.
Project averages are less than the SW-846 advisory limits and project limits which are presented in Table 30.
Supporting documentation is located in Appendix V.

845030687

TABLE 39

Continuing Calibration Summary

8020 Compound	Daily Limit	Project Average	Project RSD
Daily Calibration Results, % Recovery			
Benzene	85 - 115	90.8	5.94
Toluene	85 - 115	93.5	5.98
Ethylbenzene	85 - 115	97.5	7.51
m-Xylene	85 - 115	98.5	7.53
o/p-Xylene	85 - 115	99.0	5.84
Chlorobenzene	85 - 115	95.4	6.41
1,2-Dichlorobenzene	85 - 115	92.1	5.07
1,3-Dichlorobenzene	85 - 115	92.6	4.80
1,4-Dichlorobenzene	85 - 115	94.7	8.64

AVE: Average; RSD: Relative Standard Deviation
Daily limits were used to assess accuracy of individual results on a daily basis.
Individual results which did not meet the daily limit were rejected and a new calibration was performed.
Supporting documentation and calculations are located in Appendix V.

845030688

TABLE 40
LTTA Startup Test
Summary of Operations

Trial #	Dates	Production Hours	Tons Processed	Source of Soil	Untreated Soil Total VOCs	Treated Soil Total VOCs	Removal Efficiency	Internal Treatment Levels Met
1	11/26	6	120	AEC 3,4,5	5100	2.06	99.98%	no
2	12/2	6	140	AEC 3,4,5	2840	1.66	99.94%	no
3	12/3	5	112	AEC 3,4,5	5050	1.47	99.97%	no
4	12/6, 12/7	5	126	Reprocessing of soils from Trials 1,2, and 3	4.10	0.15	96.34%	yes

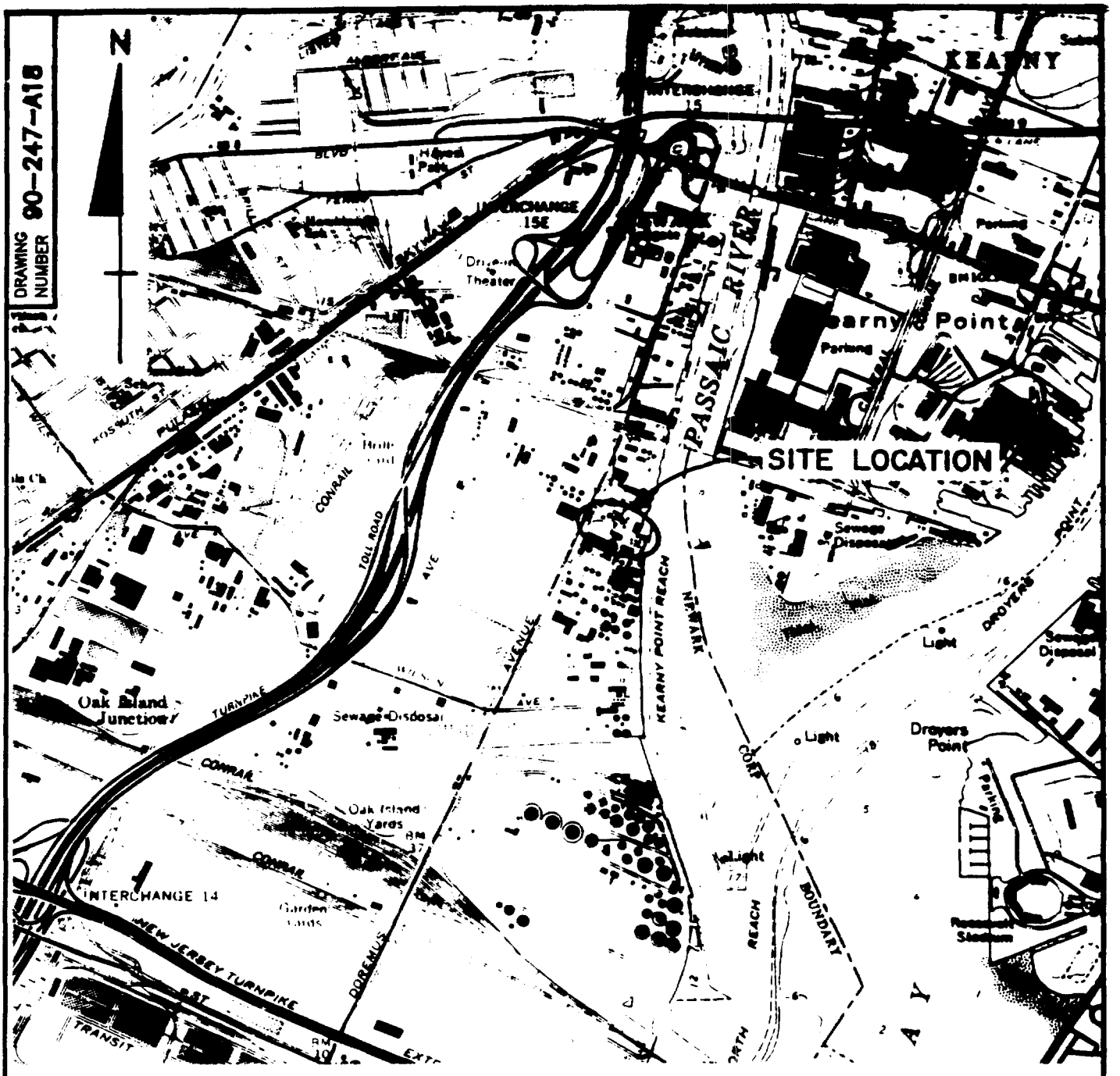
Notes

1) All concentrations are in ppm.
2) The internal treatment level utilized by Canonie for total VOCs was 1 ppm from 11/26/91 to 12/22/91 and 2 ppm for the remainder of the project. The treatment levels required by NJDEPE was 10 ppm total VOCs, 1 ppm for benzene, 100 ppm total BNs, and 10 ppm total CaPAHs. All processed soils met the NJDEPE required treatment levels.

84503068 9

FIGURES

8450306 90



REFERENCES:

-U.S.G.S. 7.5 MIN. SERIES QUADRANGLE JERSEY CITY, N.J. – N.Y. 1967 PHOTOREVISED 1981.

-U.S.G.S. 7.5 MIN. SERIES QUADRANGLE ELIZABETH, N.J. – N.Y. 1967 PHOTOREVISED 1981.

SCALE

2,000' 0 2,000 FEET

SITE LOCATION MAP
FORMER SPENCER KELLOGG FACILITY
NEWARK, NEW JERSEY

PREPARED FOR

TEXTRON INC.

Canonie Environmental

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	APP'D BY
3	8/16/91	ISSUED TO AGENCY	DRE	CDT	BMB
2	6/26/91	ISSUED TO AGENCY ALTERNATE AIR QUALITY PERMIT	WLH	CDT	
1	5/20/91	ISSUED FOR AGENCY REVIEW	J.M.R.	B.H.	PMB 5/20/91

DATE: 1-22-91
SCALE: AS SHOWN

FIGURE 1

DRAWING NUMBER 90-247-A18

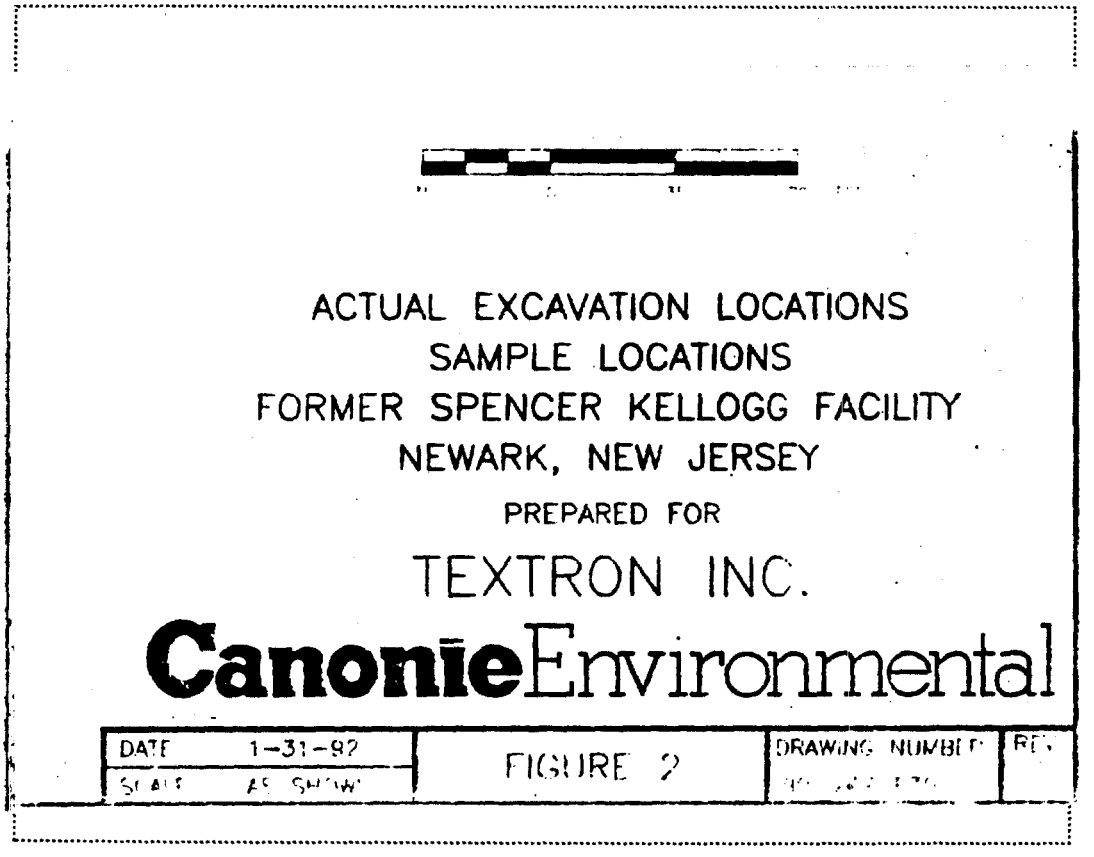
THIS MAP CAN BE FOUND IN THE SITE FILE LOCATED AT: U.S. EPA SUPERFUND RECORDS CENTER, 290 BROADWAY, 18TH FLOOR, NY,NY 10007

FINAL PROJECT RECORD
SITE REMEDIATION
FORMER SPENCER KELLOGG FACILITY
NEWARK, NEW JERSEY
PREPARED FOR
TEXTRON, INC.

DATE: 4-21-92	FIGURE 3	DRAWING NUMBER	REV.
SCALE: AS SHOWN		90-247-E31	2

845030692

THIS MAP CAN BE FOUND IN THE SITE FILE LOCATED AT: U.S. EPA SUPERFUND RECORDS CENTER, 290 BROADWAY, 18TH FLOOR, NY,NY 10007



845030693

ENVIRON

September 16, 1991

HAND DELIVERY

Mr. Sal Balakrishnan
BEECRA Cleanup Oversight Section
New Jersey Department of Environmental Protection and Energy
401 East State Street
Trenton, NJ 08625

Re: Textron Inc. - Former Spencer Kellogg Facility
Newark, Essex County, New Jersey
ECRA Case No. 85403

Dear Mr. Balakrishnan:

Enclosed please find the progress report describing the activities associated with implementation of the Cleanup Plan for the former Spencer Kellogg facility for August 1991.

Please contact us if you have any questions or need further information.

Sincerely,

Scott E. MacDonald
Manager

Julia L. Mermelstein
Associate Engineer

SEM/JM:dmd
0288E:PAA01A34.W51

Enclosures

cc: J. Schiavone
R. Lawrence

ENVIRON Corporation · Counsel in Health and Environmental Science
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845030694

CLEANUP PLAN IMPLEMENTATION
PROGRESS REPORT

Textron Inc. - Former Spencer Kellogg Facility
ECRA Case No. 85403

August 1991

1. Activities Performed This Reporting Period

The activities performed during this reporting period include: (1) further discussions with Reichhold personnel concerning site coordination and restoration issues; (2) preparation and submission of a written response by Canonie to the New Jersey Department of Environmental Protection and Energy's (NJDEPE) August 6, 1991 letter concerning the air permit application for operation of the low temperature thermal aeration unit; (3) preparation and submission by Canonie of waste profiles to potential disposal facilities for large debris and other materials targeted for off-site disposal; (4) receipt and review of the analytical results of additional pre-remediation soil sampling conducted in June 1991; and (5) discussions with the NJDEPE regarding a number of issues raised in the agency's draft letter, dated August 27, 1991, which responded to several monthly progress reports and Canonie's May 1991 Work Plan. These activities are discussed in the following paragraphs.

Site Coordination Issues

Representatives of Textron, ENVIRON, Canonie and Reichhold have continued to discuss the terms of site access, coordination and restoration in final preparation for cleanup prior to mobilization in early September. With the exception of issues related to product delivery in AEC 7, most of the outstanding site coordination matters have been resolved. Canonie and Reichhold personnel held a meeting at the site to discuss alternative piping arrangements for tanker truck delivery in AEC 7. Subsequently, a detailed draft design for the temporary relocation of the piping and electrical systems was prepared by Canonie and submitted to Reichhold for review. Reichhold has not yet approved the piperack design.

Air Permit Application

Canonie received comments on its June 18, 1991 Air Quality Permit Application from the NJDEPE in a letter dated August 6, 1991. In that letter, the agency requested additional information which Canonie provided in writing to NJDEPE in a letter dated

August 16, 1991. As part of Canonie's response, a revised Air Quality Permit Application was also submitted at that time. In addition, Canonie performed a Preliminary Screening Risk Assessment, as discussed in NJDEPE's August 6, 1991 letter, and provided the results to the agency on August 20, 1991. A meeting between Canonie and Joel Leon of NJDEPE's Division of Environmental Quality was subsequently held to discuss outstanding issues. As a result of that meeting, Canonie prepared and submitted a Second Revised Air Quality Permit Application on September 4, 1991. NJDEPE is currently completing its review of the revised application and other relevant information. It is currently anticipated that issuance of an air permit by NJDEPE should occur during September 1991.

Off-Site Waste Disposal

As discussed in the progress report for July 1991, Canonie collected representative samples from several waste streams which will be disposed of off-site at an out-of-state landfill during remedial activities. These samples were analyzed for RCRA toxicity characteristics using the TCLP analysis. As previously indicated, the analytical results show the concentrations of TCLP analytes to be well below the levels defining RCRA hazardous wastes. During this reporting period, Canonie prepared and submitted to Laidlaw, Inc. and Chemical Waste Management, Inc. profiles of the waste streams that may be disposed of as non-hazardous waste at Laidlaw's landfill in Pinewood, South Carolina or Chemical Waste Management's Emelle, Alabama or Model City, New York facility.

Additional Pre-Remediation Sampling Results

The results of the additional pre-remediation soil sampling conducted in June 1991 were received and reviewed during this reporting period. As indicated in the progress report for May 1991, this sampling was performed to reduce the level of uncertainty with regard to the extent of remediation needed in certain areas of environmental concern (AECs) containing concentrations of volatile organic compounds (VOCs) or base/neutral compounds (BNs) above site-specific cleanup criteria. These results and their implications for the proposed scope of cleanup are discussed in Sections 2 and 3 of this progress report.

Response to NJDEPE's August 27, 1991 Draft Letter

Mr. Sal Balakrishnan, NJDEPE Cleanup Oversight Coordinator, provided a copy of a draft letter to representatives of Textron and ENVIRON on August 27, 1991 concerning the agency's response to progress reports submitted to date and to

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Canonie's May 1991 Work Plan. Based upon a preliminary review of this letter, ENVIRON held initial telephone discussions with Joe Telaficci, NJDEPE Technical Coordinator, on August 30, 1991. During this conversation, a number of issues raised in the agency's draft letter were clarified and/or resolved. Additional discussions concerning other issues raised in the agency's draft letter are necessary. As discussed with Mr. Telaficci, written confirmation of all agreements reached will be provided to NJDEPE under separate cover shortly following the conclusion of those discussions.

2. Data Produced in August 1991

Results of Additional Pre-Remediation Soil Sampling

As previously indicated, ENVIRON conducted additional pre-remediation soil sampling during June 1991 in accordance with the scope of sampling proposed in the progress report for May 1991. Soil samples were collected from AECs 3, 7 and 28 and from areas near MW7 and MW12 to increase the level of certainty regarding the actual limits of excavation in these areas. With the exception of one sample from AEC 3 and all samples from AEC 7, which were analyzed for VOCs plus a 15-compound forward library search (VOC+15), all soil samples were analyzed for BNs plus a 15-compound forward library search (BN+15). Prior to the BN+15 analysis, soil samples were subjected to appropriate cleanup methods (Method 3650 for matrix cleanup and Method 3611 for alumina partitioning). Table 1, which is provided in Attachment 1 to this report, lists the sampling locations, depths, and analyses for each sample. The analytical results are discussed below and are presented in Tables 2 and 3 and on Plate 1, also provided in Attachment 1 to this progress report. The Tier II data packages for this sampling program also are being submitted with this progress report.

a) AEC 3

As stated in the May 1991 progress report, the western boundary of AEC 3 had not been fully delineated for either BNs or VOCs. Therefore, ENVIRON collected soil samples from boring 309 for BN+15 analysis at depths of 0.0 to 0.5 foot and 1.5 to 2.0 feet below grade. The sample from 1.5 to 2.0 feet was also analyzed for VOC+15.

Levels of total carcinogenic polycyclic aromatic hydrocarbons (CaPAHs) and total BNs in samples from boring 309 either do not exceed or are not materially different (less than 1.5 times the cleanup criteria) from site-specific action levels for these constituents. However, total VOCs in the sample collected from 1.5 to 2.0 feet are in excess of the site-specific action level. Consequently, the actual limit of excavation

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along the western side of AEC 3 will be determined by additional pre-remediation or post-excavation sampling.

Based upon the BN results from boring 309, and those from other areas within AEC 3 provided in earlier progress reports, Textron and ENVIRON do not believe that further sampling for BNs in this area (either pre-remediation or post-excavation) is necessary. As indicated in the progress report for May 1991, concentrations of CaPAHs and total BNs from previous boring 308 were below site-specific action levels, confirming the limits of excavation for BNs within AEC 3 to the east. Further, the proposed excavation in this area will extend from the northern property boundary to Building 31/32. Soils are not expected to remain in place along these boundaries because the foundations of the northern retaining wall and Building 31/32 are believed to extend to a depth equal to or below the water table. Based on this information, Textron believes it has delineated the area that must be remediated for BNs and seeks NJDEPE's concurrence that additional analysis for BNs will not be needed in this area during remedial activities. The lack of need for such post-excavation analyses will help minimize the impact of the cleanup in this critical area of plant operations, because if such samples were taken, a two-week delay for receipt of post-excavation sampling results would be necessary.

b) AEC 7

Although VOC concentrations were below site-specific action levels at previous borings 703 and 704 (Plate 1; Attachment 2), thereby confirming the maximum extent of excavation in the eastern and southern portions of this AEC, ENVIRON collected additional delineation samples to reduce the uncertainty regarding the extent of remediation for VOCs to the west. In addition, an additional sample was collected from boring 706 between previous borings 701 and 704 to refine the eastern excavation boundary prior to commencement of remediation.

Samples were collected from borings 706, 707, 708 and 709 from a depth of 1.5 to 2.0 feet below grade. At boring locations 706 and 708, which were within the area already targeted for remediation, an organic vapor analyzer (OVA) was used as an initial screening technique. Based on the results of the "head space" analyses, along with field observations (odor) that the sample was contaminated, the soil sample from boring 706 was not analyzed in the laboratory. As a result, the excavation boundary for the eastern side of AEC 7 is still defined by former boring 704. While levels of VOCs in the sample from boring 708 exceeded site-specific action level for VOCs, concentrations of VOCs in samples from borings 707 and 709 were below site-specific action

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levels, confirming that the area targeted for remediation along the western and southern sides of AEC 7 is confined to the area previously targeted for remediation.

c) **AEC 28**

To increase the certainty regarding the extent of soils requiring remediation in AEC 28, ENVIRON collected a sample from boring 2804 from a depth of 0.0 to 0.5 foot below grade for BN+15 analysis. Levels of total CaPAHs and total BNs from this analysis do not exceed site-specific action levels, confirming that soils containing these constituents at concentrations above the action levels are confined to the area previously targeted for remediation in this AEC.

d) **Vicinity of MW7**

To increase the level of certainty regarding the extent of soils requiring remediation to the south of MW7, ENVIRON collected two samples for BN+15 analysis from boring B-14. Samples were collected from 0.0 to 0.5 foot and from 1.5 to 2.0 feet below grade. Concentrations of total CaPAHs and total BNs from this analysis do not exceed the site-specific action levels, confirming that soils exceeding the action levels are confined to the area previously targeted for remediation.

e) **Vicinity of MW12**

To refine the limits of excavation in this area, ENVIRON collected two samples for BN+15 analysis from each of two borings (B-15 and B-16) along the northern and western boundaries of the area previously targeted for remediation. Samples were collected from each boring at depths of 0.0 to 0.5 foot and 2.0 to 2.5 feet below grade. Concentrations of total CaPAHs and total BNs either do not exceed or are not materially different from the site-specific action levels at these boring locations. Therefore, the area expected to be excavated in this AEC is confined to the area previously targeted for remediation.

Quarterly Ground Water Sampling

The analytical results of quarterly ground water sampling and ground water elevations collected during July 1991 are provided as Attachment 2 to this progress report. The Tier II data package for this quarterly ground water sampling round is also being submitted with this progress report.

3. Modifications to the October 1990 Cleanup Plan

Additional Soil Volume Targeted for Remediation

Based on the results of the additional pre-remediation soil sampling described above, no significant modifications to the volume of soils targeted for remediation are needed. However, as noted above, total VOC concentrations from boring 309 exceeded the site-specific action level for these constituents. As a result, the initial excavation boundary for the western side of AEC 3 proposed in the October 1990 Cleanup Plan will be moved approximately 10 feet west of its original location. The actual limit of excavation will be confirmed by post-excavation sampling for VOC+15. The actual soil volume removed from AEC 3 during cleanup will be reported to NJDEPE as part of the monthly progress reports.

Well Abandonment

As part of pre-mobilization activities, ENVIRON has evaluated the need for removing certain monitoring wells located in areas targeted for remediation in order to accomplish the cleanup objectives. Based on this evaluation, the following wells will need to be removed during cleanup activities: MWs 10, 14, and 24. These wells are located within AECs 17 and 25. Abandonment of these wells will be performed by a licensed New Jersey well driller according to NJDEPE established protocols. Because MWs 10 and 14 are part of the current ground water monitoring network, replacement wells will be installed subsequent to completion of cleanup activities. MW24 is screened within the deeper aquifer which is no longer subject to investigation. Therefore, this well will not be replaced. Due to the proximity of proposed excavations to monitoring wells in other areas, additional wells may need to be removed during cleanup. NJDEPE will be kept informed of such actions through the monthly progress reports. Further, given the fact that at least two -- and possibly all -- of the five wells currently utilized for quarterly ground water sampling will be abandoned during cleanup, the quarterly sampling will be suspended until cleanup is complete and the target wells are replaced.

Project Schedule

Provided in Attachment 3 is an updated project schedule for cleanup implementation. Although slight modifications have been made to the sequence and commencement dates for certain tasks included in the schedule in the Work Plan, there are no significant changes to the schedule for completion of cleanup activities.

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4. Activities Scheduled for September 1991

Activities for September 1991 primarily will include: (1) continued discussions with Reichhold personnel regarding coordination of remedial activities with ongoing manufacturing operations; (2) resolution of outstanding issues with NJDEPE, including approval of the modifications to the October 1990 Cleanup Plan set forth in the April and May 1991 progress reports, and issuance of the air permit; (3) mobilization by Canonie for cleanup; and (4) commencement of demonstration test activities.

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ATTACHMENT 1

TABLE 1
Sampling Locations, Depths, and Analytical Parameters for Additional Pre-remediation Sampling

AEC	Boring	Sample Number	Collection Method[1]	Depth[2] (feet)	Analytical Parameters[3]
3	0309	288E-0309-SB01	HSAB	0.0-0.5	BN+15
		288E-0309-SB02	HSAB	1.5-2.0	BN+15, VOC+15, xylenes
7	0706	288E-0706-SB01	HSAB	1.5-2.0	VOC+15, xylenes
	0707	288E-0707-SB01	HSAB	1.5-2.0	VOC+15, xylenes
	0708	288E-0708-SB01	HSAB	1.5-2.0	VOC+15, xylenes
	0709	288E-0709-SB01	HSAB	1.5-2.0	VOC+15, xylenes
28	2804	288E-2804-SB01	HAB	0.0-0.5	BN+15
MW7	B-14	288E-B014-SB01	HSAB	0.0-0.5	BN+15
		288E-B014-SB02	HSAB	1.5-2.0	BN+15
MW12	B-15	288E-B015-SB01	HSAB	0.0-0.5	BN+15
		288E-B015-SB02	HSAB	2.0-2.5	BN+15
	B-16	288E-B016-SB01	HSAB	0.0-0.5	BN+15
		288E-B016-SB02	HSAB	2.0-2.5	BN+15

[1] Collection Method Abbreviations:
HAB = Hand Auger Boring
HSAB = Hollow Stem Auger Boring

[2] Depths are measured from the soil surface.

[3] Analytical Parameter Abbreviations and Analytical Methodologies:
BN+15 = Priority Pollutant Base/Neutral Compounds plus 15-compound forward library search (EPA Method 625)
VOC+15 = Priority Pollutant Volatile Organic Compounds plus 15-compound forward library search (EPA Method 624)

TABLE 2
Summary of Analytical Results of Additional Pre-Remediation Soil Sampling

AEC 3			
	ENVIRON SAMPLE ID	288E-0309-SB01	288E-0309-SB02
	MATRIX	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB
	DEPTH (feet)	0.0-0.5	1.5-2.0
	COLLECTION DATE	06/28/91	06/28/91
Carcinogenic Polycylic Aromatic Hydrocarbons (CaPAHs)			
	Benzo(a)Pyrene	2.10	2.20
	Benzo(b)Fluoranthene	ND	1.70
	Benzo(a)Anthracene	2.60	1.70 J
	Benzo(k)Fluoranthene	ND	2.80
	Dibenz(a,h)Anthracene	ND	ND
	Chrysene	4.00	3.90
	Indeno(1,2,3-cd)Pyrene	1.20	ND
	Total CaPAHs	9.90	12.30
Base/Neutral Organic Compounds (Non-CaPAHs)			
	Acenaphthene	10.00 J	0.97
	Anthracene	1.40	1.70
	Benzo(g,h,i)Perylene	1.30 J	ND
	Di-n-Butylphthalate	ND	ND
	Dibenzofuran	0.58	ND
	Fluoranthene	7.80	5.60
	Fluorene	1.40	1.10
	Naphthalene	7.70	3.70
	Phenanthrene	7.90	7.00
	Pyrene	6.10	8.00
	bis(2-Ethylhexyl)Phthalate	ND	ND
	Total Base/Neutral Compounds	54.08	40.37
Volatile Organic Compounds (VOCs)			
	Benzene		4.80 J
	Ethylbenzene		43.00
	Tetrachloroethene		ND
	Toluene		ND
	Xylenes, Total		360.00
	Total VOCs		407.80

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TABLE 2 (continued)
Summary of Analytical Results of Additional Pre-Remediation Soil Sampling

AEC 7					
	ENVIRON SAMPLE ID	288E-0706-SB01	288E-0707-SB01	288E-0708-SB01	288E-0709-SB01
	MATRIX	Soil	Soil	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB
	DEPTH (feet)	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0
	COLLECTION DATE	06/28/91	06/28/91	06/28/91	06/28/91
Volatile Organic Compounds (VOCs)					
	Benzene	NA	ND	ND	ND
	Ethylbenzene	NA	ND	8.50	ND
	Tetrachloroethene	NA	ND	ND	ND
	Toluene	NA	ND	2.00	0.0052 J
	Xylenes, Total	NA	1.50	33.00	ND
	Total VOCs	NA	1.50	43.50	0.0052

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TABLE 2 (continued)
Summary of Analytical Results of Additional Pre-Remediation Soil Sampling

AEC 28	
ENVIRON SAMPLE ID	288E-2804-SB01
MATRIX	Soil
COLLECTION METHOD	HSAB
DEPTH (feet)	0.0-0.5
COLLECTION DATE	06/28/91
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)	
Benzo(a)Pyrene	ND
Benzo(b)Fluoranthene	ND
Benzo(j)Fluoranthene	ND
Benzo(a)Anthracene	0.73
Benzo(k)Fluoranthene	ND
Dibenz(a,h)Anthracene	ND
Chrysene	1.40
Indeno(1,2,3-cd)Pyrene	ND
Total CaPAHs	2.13
Base/Neutral Organic Compounds (Non-CaPAHs)	
Acenaphthene	ND
Anthracene	ND
Benzo(g,h,i)Perylene	ND
Di-n-Butylphthalate	ND
Fluoranthene	0.64
Fluorene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	1.40
bis(2-Ethylhexyl)Phthalate	1.20
Total Base/Neutral Compounds	5.37

84503070 6

TABLE 2 (continued)
Summary of Analytical Results of Additional Pre-Remediation Soil Sampling

ENVIRON SAMPLE ID	288E-B014-SB01	288E-B014-SB02	288E-B015-SB01	288E-B015-SB02	288E-B016-SB01	288E-B016-SB02
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	0.0-0.5	2.0-2.5	0.0-0.5	2.0-2.5
COLLECTION DATE	06/28/91	06/28/91	06/28/91	06/28/91	06/28/91	06/28/91
Carcinogenic Polycyclic Aromatic Hydrocarbons (CaPAHs)						
Benzo(a)Pyrene	0.11 J	0.20	1.60	0.26	ND	0.52
Benzo(b)Fluoranthene	0.25 J	0.22	1.30	0.45	ND	0.52
Benzo(a)Anthracene	0.22 J	0.20 J	3.10	0.47	ND	0.52
Benzo(j)Fluoranthene	ND	ND	ND	0.32	ND	ND
Benzo(k)Fluoranthene	0.29	0.16	2.10	0.40	ND	0.54
Dibenz(a,h)Anthracene	ND	ND	ND	0.083 J	ND	0.16
Chrysene	0.26	0.26	4.50	ND	ND	0.70
Indeno(1,2,3-cd)Pyrene	ND	ND	ND	0.27	ND	0.34
Total CaPAHs	1.13	1.04	12.60	2.253	ND	3.30
Base/Neutral Compounds (Non-CaPAHs)						
Acenaphthene	0.60	ND	5.80	0.14	ND	0.075 J
Anthracene	0.47	0.09	4.00	0.22	ND	0.21
Benz(e)Acephenanthrylene	ND	ND	ND	0.20	ND	ND
Benzo(e)Pyrene	ND	ND	ND	ND	ND	0.48
Benzo(g,h,i)Perylene	ND	ND	ND	0.29	ND	0.35
Di-n-Butylphthalate	ND	0.031 J	ND	0.022 J	0.13 J	0.037 J
Dibenzofuran	ND	ND	3.70	0.091	ND	0.037
Fluoranthene	1.80	0.46	13.00	1.10	0.11 J	1.10
Fluorene	0.21	0.029 J	1.70	0.16	ND	0.084
Naphthalene	ND	0.064 J	0.34 J	0.097	0.17 J	0.039 J
Phenanthrene	2.30	0.28	20.00	1.10	0.11 J	0.91
Pyrene	0.79	0.41	15.00	0.98	0.19 J	0.98
bis(2-Ethylhexyl)Phthalate	0.51	0.62	10.00	130.00	4.70	2.40
Total Base/Neutral Compounds	7.81	3.024	86.14	136.653	5.41	10.002

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TABLE 2 (continued)
Summary of Analytical Results of Additional Pre-Remediation Soil Sampling

AEC 99	
ENVIRON SAMPLE ID	288E-0628-WB01
MATRIX	Aqueous
DEPTH (feet)	NA
COLLECTION DATE	06/28/91
COMMENTS	QA/QC
Carcinogenic Polycylic Aromatic Hydrocarbons (CaPAHs)	
Benzo(a)Pyrene	ND
Benzo(b)Fluoranthene	ND
Benzo(a)Anthracene	ND
Benzo(k)Fluoranthene	ND
Dibenz(a,h)Anthracene	ND
Chrysene	ND
Indeno(1,2,3-cd)Pyrene	ND
Total CaPAHs	ND
Base/Neutral Organic Compounds (Non-CaPAHs)	
Acenaphthene	ND
Anthracene	ND
Benzo(g,h,i)Perylene	ND
Di-n-Butylphthalate	ND
Fluoranthene	ND
Fluorene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND
bis(2-Ethylhexyl)Phthalate	ND
Total Base/Neutral Compounds	ND
Volatile Organic Compounds (VOCs)	
Benzene	ND
Ethylbenzene	ND
Tetrachloroethene	0.0047
Toluene	ND
Xylenes, Total	ND
Total Volatile Organics	0.0047

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TABLE 2 (continued)
Summary of Analytical Results of Additional Pre-Remediation Soil Sampling

NOTES

1. Depths are measured from the soil surface.

2. Explanation of abbreviations:

   HSAB: Hollow-Stem Auger Boring
   NA: Sample was not analyzed, based on field observations (odor) that soils were contaminated.
   J: Indicates an estimated value, based on an assumption of a 1:1 response factor for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.
   ND: Compound not detected.

3. All concentrations are reported in parts per million (ppm).

4. The following compounds reported in the table were detected as tentatively identified compounds (TICs):

   Dibenzofuran
   Benz(e)Acephenanthrylene
   Benzo(e)Pyrene
   Benzo(j)Fluoranthene

5. Total Base/Neutral Compounds includes Total CaPAHs.

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TABLE 3
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional Pre-Remediation Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppb)
288E-0309-SB01	Soil	BENZENE, 1,2-DIMETHYL-	5.76	250000
		UNKNOWN	6.81	72000
		CYCLOHEXANE, PROPYL-	7.08	59000
		OCTANE, 3,6-DIMETHYL-	7.20	72000
		UNKNOWN	7.66	130000
		UNKNOWN	7.85	100000
		BENZENE,1-ETHYL-2-METHYL-	8.04	88000
		CYCLOHEXANE, 1-METHYL-2-PROPYL	8.38	97000
		BENZENE,1,2,4-TRIMETHYL-	8.61	97000
		UNKNOWN	9.25	190000
		BENZENE, 1-METHYL-3-PROPYL-	9.86	78000
		UNKNOWN	11.20	15000
		NAPHTHALENE, 2-METHYL	14.67	1400
		DIBENZOFURAN	18.50	580
		UNKNOWN	24.50	25000
		UNKNOWN	25.11	29000
		UNKNOWN	25.26	69000
		UNKNOWN	25.71	78000
		UNKNOWN	26.06	50000
		UNKNOWN	26.72	190000
		PHENANTHRENE, 1-METHYL-7-(1-	28.17	130000
		UNKNOWN	38.69	85000
288E-0309-SB02	Soil	BENZENE, ETHYL-	5.54	26000
		BENZENE, 1,2-DIMETHYL-	5.75	140000
		UNKNOWN	6.79	44000
		CYCLOHEXANE, PROPYL-	7.07	37000
		OCTANE, 3,6-DIMETHYL-	7.18	58000
		UNKNOWN	7.65	71000
		UNKNOWN	7.84	65000
		UNKNOWN	8.06	48000
		CYCLOHEXANE, 1-METHYL-2-PROPYL	8.35	75000
		BENZENE, 1,2,3-TRIMETHYL-	8.58	82000
		NONANE, 2,6-DIMETHYL-	9.24	140000
		CYCLOHEXANE, (1-METHYLPROPYL)-	9.43	26000
		NONANE, 3,7-DIMETHYL-	9.57	37000
		NAPTHALENE, DECAHYDRO-, TRANS-	9.91	30000
		BENZENE, 1-METHYL-3-(1-	10.42	26000
		UNKNOWN	11.19	17000
		NAPHTHALENE, 2-METHYL	14.67	880
		UNKNOWN	25.02	14000

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TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional Pre-Remediation Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppb)
		UNKNOWN	25.74	75000
		UNKNOWN	26.04	44000
		UNKNOWN	26.68	85000
		UNKNOWN	0.94	14000
		CYCLOHEXANE, 2-PROPENYL-	24.24	4800
		UNKNOWN	25.91	35000
		UNKNOWN	26.18	9600
		UNKNOWN	27.23	16000
		UNKNOWN	28.04	6400
		UNKNOWN	29.52	4800
		CYCLOOCTANE, 1,4-DIMETHYL-,	31.30	30000
		UNKNOWN	34.91	85000
288E-0707-SB01	Soil	UNKNOWN	0.92	1500
		UNKNOWN	22.82	6800
		4,7-METHANO-1H-INDENE, 3A,4,7,	24.18	2300
		UNKNOWN	25.46	400
		CYCLOHEXANE, 1,1,3-TRIMETHYL-	25.93	3900
		CYCLOPENTANE, BUTYL-	27.25	1200
		CYCLOHEXANONE, 2,3-DIMETHYL-	27.98	1300
		UNKNOWN	29.61	290
		CYCLOHEXANE, 1,2,4-TRIMETHYL-	31.13	6200
		UNKNOWN	33.10	430
288E-0708-SB01	Soil	UNKNOWN	0.96	1900
		UNKNOWN	21.31	1900
		CYCLOHEXANE,1,2-DIMETHYL,-CIS-	22.86	860
		4,7-METHANO-1H-INDENE, 3A,4,7,	24.18	690
		PENTALENE, OCTAHYDRO-2-METHYL	25.58	1000
		CYCLOHEXANE, 1,1,3-TRIMETHYL-	25.93	5500
		2-PENTENE, 3-ETHYL-4,4-DIMETHY	27.25	3600
		UNKNOWN	27.98	3100
		UNKNOWN	29.58	510
		CYCLOHEXANE, 1,2,3-TRIMETHYL-,	31.25	5300
		UNKNOWN	35.98	4600

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TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional Pre-Remediation Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppb)
288E-0709-SB01	Soil	UNKNOWN	1.32	61
		4,7-METHANO-1H-INDENE, 3A,4,7,	24.56	8
288E-2804-SB01	Soil	BENZENE, 1,1'-OXYBIS	16.57	1100
		UNKNOWN	32.80	960
		UNKNOWN	33.16	960
		UNKNOWN	33.20	2100
		UNKNOWN	34.00	800
		UNKNOWN	36.23	1600
		UNKNOWN	36.98	2100
		UNKNOWN	37.94	1400
		UNKNOWN	38.05	960
288E-B014-SB01	Soil	UNKNOWN	5.11	660
		UNKNOWN	5.45	740
		UNKNOWN	6.87	740
		UNKNOWN	7.86	590
		UNKNOWN	8.88	520
		NONANE, 3,7-DIMETHYL-	9.11	590
		UNKNOWN	9.20	590
		HEPTANE, 2,2-DIMETHYL-	9.52	960
		PENTANE,2,2,3,4-TETRAMETHYL-	9.73	440
		UNKNOWN	9.98	660
		1,3-DITHIOLANE-2-THIONE	10.36	1900
		1,1'-BIPHENYL, 2-FLUORO-	15.28	960
		UNKNOWN	17.37	1600
		4H-CYCLOPENTA[DEF]PHENANTHRENE	23.98	370
		UNKNOWN	25.67	660
		UNKNOWN	26.20	520
		UNKNOWN	31.28	370
		UNKNOWN	31.86	660
		UNKNOWN	34.37	880
		UNKNOWN	37.41	740
288E-B014-SB02	Soil	1,3,5-CYCLOHEPTATRIENE	3.60	770
		BENZENE, ETHYL-	5.52	240
		BENZENE, 1,2-DIMETHYL-	5.71	810
		BENZENE, 1,2-DIMETHYL	6.23	160
		ETHANE, 1,1,2,2-TETRACHLORO-	6.68	450
		BENZENE, 1,2,3,4-TETRAMETHYL-	11.15	160

84503071 2

TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional Pre-Remediation Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppb)
		BENZENE, 1,2,3,4-TETRAMETHYL-	11.24	200
		UNKNOWN	26.57	490
		UNKNOWN	29.86	370
		UNKNOWN	30.01	240
		PENTACOSANE	32.57	240
		PENTACOSANE	34.38	450
		NONACOSANE	36.06	650
		UNKNOWN	36.24	450
		UNKNOWN	38.17	490
288E-B015-SB01	Soil	HEPTANE, 4-ETHYL-2,2,6,6-	8.88	4200
		HEPTANE, 2,2,4,6,6-PENTAMETHYL	9.02	1300
		NONANE, 3,7-DIMETHYL-	9.10	5700
		UNDECANE, 3,6-DIMETHYL-	9.19	1300
		HEXANE, 2,2,5,5-TETRAMETHYL	9.53	9700
		OCTANE, 2,2,6-TRIMETHYL-	9.74	4400
		DODECANE, 4-METHYL-	9.99	4600
		UNKNOWN	10.49	2200
		UNKNOWN	11.05	1300
		OCTANE, 2,5,6-TRIMETHYL-	11.59	1100
		HEPTANE, 3-ETHYL-5-METHYL-	11.82	1800
		HEPTANE, 2,2,4-TRIMETHYL-	11.89	1300
		NAPHTHALENE, 2-METHYL	14.33	210
		DIBENZOFURAN	18.15	3700
		UNKNOWN	19.99	1800
		PENTADECANE, 2,6,10,14-	20.84	1800
		DIBENZOTHIOPHENE	21.73	1300
		4H-CYCLOPENTA[DEF]PHENANTHRENE	23.98	2600
		UNKNOWN	26.19	7900
		TETRATETRACONTANE	27.52	3700
		UNKNOWN	31.28	6200
		UNKNOWN	31.84	5100
288E-B015-SB02	Soil	UNKNOWN	6.83	160
		NAPHTHALENE, 2-METHYL	14.78	63
		DIBENZOFURAN	18.60	91
		PROPANOIC ACID, 2-METHYL -,1-	19.80	3800
		UNKNOWN	24.46	240
		UNKNOWN	24.90	200
		UNKNOWN	25.12	160

8450307 13

TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional Pre-Remediation Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppb)
		SULFUR, MOL. (S8)	26.08	870
		PHOSPHORIC ACID, 2-ETHYLHEXYL	30.23	280
		BIS(2-ETHYLHEXYL)PHTHALATE	31.42	8700
		BIS(2-ETHYLHEXYL)PHTHALATE(ACN	31.56	790
		UNKNOWN	33.21	200
		BENZO(J)FLUORANTHENE	34.59	320
		BENZ[E]ACEPHENANTHRYLENE	34.72	200
288E-B016-SB01	Soil	BENZENE, ETHYL-	5.54	770
		BENZENE, 1,2-DIMETHYL-	5.73	7000
		BENZENE, 1,2-DIMETHYL	6.25	770
		UNKNOWN	7.62	770
		BENZENE, (1-METHYLETHYL)-	8.53	1100
		DECANE	8.64	770
		UNKNOWN	9.17	3500
		METHANE, ISOCYANATO-	9.33	1100
		NONANE, 3-METHYL-5-PROPYL-	9.41	3600
		DECANE, 2,6,8-TRIMETHYL-	9.50	990
		UNKNOWN	9.84	6600
		UNKNOWN	9.97	660
		UNDECANE, 3,6-DIMETHYL-	10.04	2500
		DODECANE, 4-METHYL-	10.30	3200
		UNDECANE	10.80	3500
		UNKNOWN	11.16	1400
		UNKNOWN	11.91	1100
		HEPTANE, 3-ETHYL-5-METHYL-	12.13	770
		PENTANE, 2,2,3-TRIMETHYL-	12.20	990
		INDENO[2',1':4,5]THIENO[3,2-B]	30.66	1400
288E-B016-SB02	Soil	BENZENE, 1,2-DIMETHYL-	5.73	360
		ETHANE, 1,1,2,2-TETRACHLORO-	6.69	240
		UNKNOWN	9.82	200
		DIBENZOFURAN	18.49	37
		UNKNOWN	24.35	160
		PYRENE, 1-METHYL-	27.97	160
		BENZO[E]PYRENE	34.52	480
		UNKNOWN	36.23	440
		UNKNOWN	36.29	280
		UNKNOWN	36.97	800

845030714

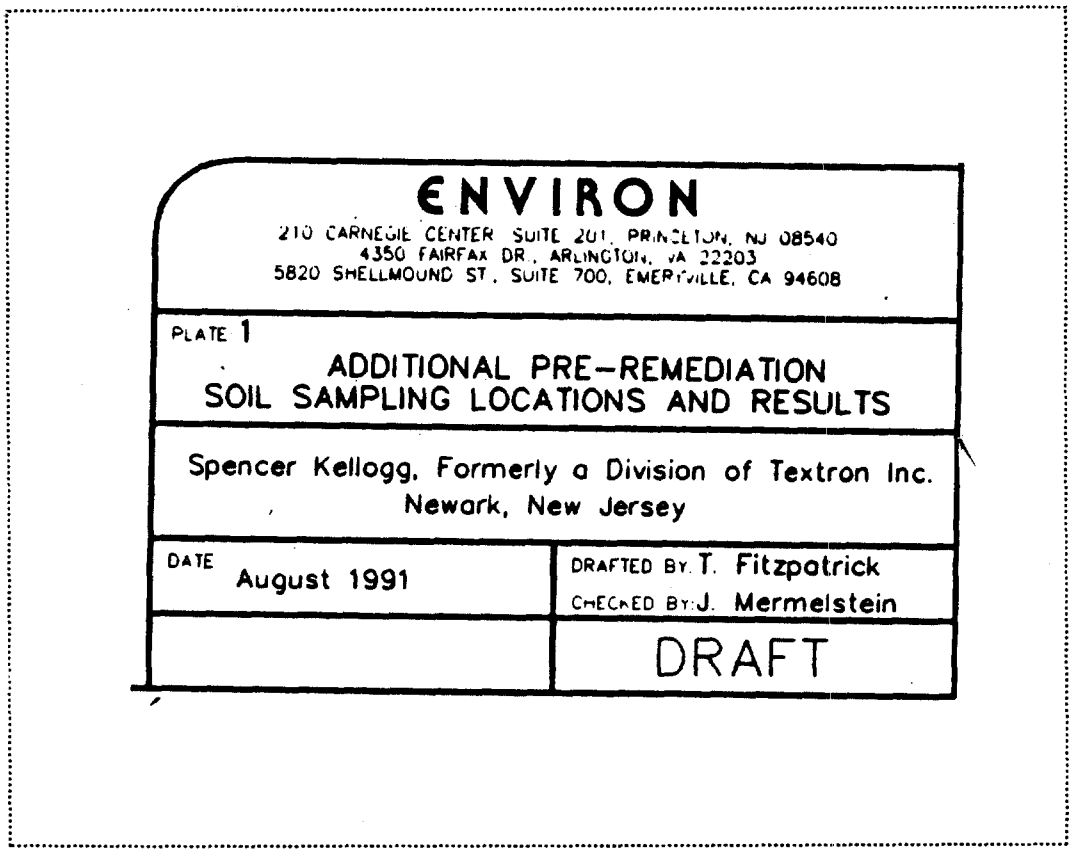
TABLE 3 (continued)
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional Pre-Remediation Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentration (ppb)
288E-0628-WB01	Water	NO TIC'S OR UNKNOWNS		

0288E:PAA018FE.W51

8450307 15

THIS MAP CAN BE FOUND IN THE SITE FILE LOCATED AT: U.S. EPA SUPERFUND RECORDS CENTER, 290 BROADWAY, 18TH FLOOR, NY,NY 10007



845030716

ATTACHMENT 2

NET Atlantic, Inc.

Results Summary Table

The following table correlates the submitted client identification with the laboratory ID. The Laboratory ID is used on the following tables because of space constraints in the printed report.

Client: ENVIRON CORPORATION Job No: 91.2389

NET ID	Client ID	Sampling Date	Date Received	MATRIX
70228	288E-MW15-GW10	07/25/1991	07/25/1991	MS
70229	288E-~~MW14D-GW10~~ MW14S-GW10	07/25/1991	07/25/1991	MS
70230	288E-MW10-GW10	07/25/1991	07/25/1991	MS
70231	288E-MW20-GW10 KAB 9/10/91	07/25/1991	07/25/1991	MS
70232	288E-MW20-~~GW10D~~ GW10D	07/25/1991	07/25/1991	MS
70233	288E-MW13-GW10	07/25/1991	07/25/1991	MS
70234	288E-WB01-0725	07/25/1991	07/25/1991	MS
70235	288E-TB-072591	07/25/1991	07/25/1991	MS

845030718

NET Atlantic, Inc.

Results Summary Table

Laboratory ID:	70228	70229 MW14S	70230	70231	70232 GW05
Field ID(may be truncated):	288E-MW15-GW10	288E-~~MW14S~~-GW10	288E-MW10-GW10	288E-MW20-GW10	288E-MW20-~~GW10D~~
Parameter		KAB 9-10-91			KAB 9-10-9
Volatiles by GC/MS 624					
Benzene	4.0 U ug/L	400. U ug/L	200. U ug/L	4.0 U ug/L	4.0 U ug/L
Bromodichloromethane	2.0 U ug/L	200. U ug/L	100. U ug/L	2.0 U ug/L	2.0 U ug/L
Bromoform	5.0 U ug/L	500. U ug/L	250. U ug/L	5.0 U ug/L	5.0 U ug/L
Bromomethane	10. U ug/L	1000. U ug/L	500. U ug/L	10. U ug/L	10. U ug/L
Carbon Tetrachloride	3.0 U ug/L	300. U ug/L	150. U ug/L	3.0 U ug/L	3.0 U ug/L
Chlorobenzene	6.0 U ug/L	600. U ug/L	300. U ug/L	6.0 U ug/L	6.0 U ug/L
Chloroethane	10. U ug/L	1000. U ug/L	500. U ug/L	10. U ug/L	10. U ug/L
2-Chloroethylvinyl ether	10. U ug/L	1000. U ug/L	500. U ug/L	10. U ug/L	10. U ug/L
Chloroform	2.0 U ug/L	200. U ug/L	100. U ug/L	2.0 U ug/L	2.0 U ug/L
Chloromethane	10. U ug/L	1000. U ug/L	500. U ug/L	10. U ug/L	10. U ug/L
Dibromochloromethane	3.0 U ug/L	300. U ug/L	150. U ug/L	3.0 U ug/L	3.0 U ug/L
1,2 & 1,4-Dichlorobenzene	10. U ug/L	1000. U ug/L	500. U ug/L	10. U ug/L	10. U ug/L
1,3-Dichlorobenzene	1.9 U ug/L	190. U ug/L	95. U ug/L	1.9 U ug/L	1.9 U ug/L
1,1-Dichloroethane	5.0 U ug/L	500. U ug/L	250. U ug/L	5.0 U ug/L	5.0 U ug/L
1,2-Dichloroethane	3.0 U ug/L	300. U ug/L	150. U ug/L	3.0 U ug/L	3.0 U ug/L
1,1-Dichloroethene	3.0 U ug/L	300. U ug/L	150. U ug/L	3.0 U ug/L	3.0 U ug/L
total-1,2-Dichloroethene	2.0 U ug/L	200. U ug/L	100. U ug/L	2.0 U ug/L	2.0 U ug/L
1,2-Dichloropropane	6.0 U ug/L	600. U ug/L	300. U ug/L	6.0 U ug/L	6.0 U ug/L
cis-1,3-Dichloropropene	5.0 U ug/L	500. U ug/L	250. U ug/L	5.0 U ug/L	5.0 U ug/L
trans-1,3-Dichloropropene	5.0 U ug/L	500. U ug/L	250. U ug/L	5.0 U ug/L	5.0 U ug/L
Ethylbenzene	7.0 U ug/L	3351. ug/L	350. U ug/L	17. ug/L	17. ug/L
Methylene Chloride	3.0 U ug/L	300. U ug/L	150. U ug/L	3.0 U ug/L	3.0 U ug/L
1,1,2,2-Tetrachloroethane	7.0 U ug/L	700. U ug/L	350. U ug/L	7.0 U ug/L	7.0 U ug/L
Tetrachloroethene	4.0 U ug/L	400. U ug/L	200. U ug/L	4.0 U ug/L	4.0 U ug/L
Toluene	6.0 U ug/L	604. ug/L	7599. ug/L	8.6 ug/L	8.2 ug/L
1,1,1-Trichloroethane	4.0 U ug/L	400. U ug/L	200. U ug/L	4.0 U ug/L	4.0 U ug/L
1,1,2-Trichloroethane	5.0 U ug/L	500. U ug/L	250. U ug/L	5.0 U ug/L	5.0 U ug/L
Trichloroethene	2.0 U ug/L	200. U ug/L	100. U ug/L	2.0 U ug/L	2.0 U ug/L
Trichlorofluoromethane	2.0 U ug/L	200. U ug/L	100. U ug/L	2.0 U ug/L	2.0 U ug/L
Vinyl Chloride	10. U ug/L	1000. U ug/L	500. U ug/L	10. U ug/L	10. U ug/L
Xylenes, Total	10. U ug/L	16238. ug/L	223. J ug/L	2.0 J ug/L	2.0 J ug/L

NET Atlantic, Inc.

Results Summary Table

Laboratory ID:	70233			70234			70235		
Field ID(may be truncated):	288E-MW13-GW10			288E-WB01-0725			288E-TB-072591		
Parameter									
Volatiles by GC/MS 624									
Benzene	20.	U	ug/L	4.0	U	ug/L	4.0	U	ug/L
Bromodichloromethane	10.	U	ug/L	2.0	U	ug/L	2.0	U	ug/L
Bromoform	25.	U	ug/L	5.0	U	ug/L	5.0	U	ug/L
Bromomethane	50.	U	ug/L	10.	U	ug/L	10.	U	ug/L
Carbon Tetrachloride	15.	U	ug/L	3.0	U	ug/L	3.0	U	ug/L
Chlorobenzene	30.	U	ug/L	6.0	U	ug/L	6.0	U	ug/L
Chloroethane	50.	U	ug/L	10.	U	ug/L	10.	U	ug/L
2-Chloroethylvinyl ether	50.	U	ug/L	10.	U	ug/L	10.	U	ug/L
Chloroform	10.	U	ug/L	2.0	U	ug/L	2.0	U	ug/L
Chloromethane	50.	U	ug/L	10.	U	ug/L	10.	U	ug/L
Dibromochloromethane	15.	U	ug/L	3.0	U	ug/L	3.0	U	ug/L
1,2 & 1,4-Dichlorobenzene	50.	U	ug/L	10.	U	ug/L	10.	U	ug/L
1,3-Dichlorobenzene	9.5	U	ug/L	1.9	U	ug/L	1.9	U	ug/L
1,1-Dichloroethane	25.	U	ug/L	5.0	U	ug/L	5.0	U	ug/L
1,2-Dichloroethane	15.	U	ug/L	3.0	U	ug/L	3.0	U	ug/L
1,1-Dichloroethene	15.	U	ug/L	3.0	U	ug/L	3.0	U	ug/L
total-1,2-Dichloroethene	10.	U	ug/L	2.0	U	ug/L	2.0	U	ug/L
1,2-Dichloropropane	30.	U	ug/L	6.0	U	ug/L	6.0	U	ug/L
cis-1,3-Dichloropropene	25.	U	ug/L	5.0	U	ug/L	5.0	U	ug/L
trans-1,3-Dichloropropene	25.	U	ug/L	5.0	U	ug/L	5.0	U	ug/L
Ethylbenzene	285.		ug/L	7.0	U	ug/L	7.0	U	ug/L
Methylene Chloride	15.	U	ug/L	3.0	U	ug/L	3.0	U	ug/L
1,1,2,2-Tetrachloroethane	35.	U	ug/L	7.0	U	ug/L	7.0	U	ug/L
Tetrachloroethene	20.	U	ug/L	4.0	U	ug/L	4.0	U	ug/L
Toluene	30.	U	ug/L	6.0	U	ug/L	6.0	U	ug/L
1,1,1-Trichloroethane	20.	U	ug/L	4.0	U	ug/L	4.0	U	ug/L
1,1,2-Trichloroethane	25.	U	ug/L	5.0	U	ug/L	5.0	U	ug/L
Trichloroethene	10.	U	ug/L	2.0	U	ug/L	2.0	U	ug/L
Trichlorofluoromethane	10.	U	ug/L	2.0	U	ug/L	2.0	U	ug/L
Vinyl Chloride	50.	U	ug/L	10.	U	ug/L	10.	U	ug/L
Xylenes, Total	50.	U	ug/L	10.	U	ug/L	10.	U	ug/L

GROUND WATER ELEVATIONS (FEET ABOVE SEA LEVEL) AT LOW AND HIGH TIDES (7/25/91)
Spencer Kellogg Site
Newark, New Jersey

Monitoring Well	Low	High
1	2.16	2.09
3	2.86	2.79
4	5.83	5.83
5	2.86	2.85
6	4.16	4
7	0.5	2.44
8	1.6	2.7
9	3.74	3.59
10	4.12	4.06
11	4.27	4.3
12	2.73	2.94
13	4.67	4.55
14B	4.23	4.28
15	3.84	3.77
16	4.5	4.29
17	0.91	2.56
18	3.15	3.47
19	3.94	3.91
20	4.24	4.19
21	1.44	-0.21
22	0.74	1.71
23	1.39	1.69
24	0.91	1.77
25	0.87	-0.17
26	1.41	1.77

Notes:

1. Not able to obtain water level measurements from MW2 due to the presence of a black tar-like substance in this upgradient well.

0288E:PAA019E9.W51

ATTACHMENT 3

ENVIRON

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845030723

Julia Rennebeck

Presentation of Additional ECRA Sampling Results and Revised Cleanup Plan for the Spencer Kellogg Facility Formerly a Division of Textron Inc. 400 Doremus Avenue Newark, Essex County, New Jersey

ECRA Case No. 85403

Volume I of IV

Prepared for

Textron Inc.
Providence, Rhode Island 02903

Prepared by

ENVIRON® Corporation
Princeton, New Jersey 08540

October 1990

845030724

CONTENTS

	Page
I. INTRODUCTION	1
A. Purpose and Scope	1
B. Site Description	3
C. Summary of Previous Sampling Activities, Environmental Concerns and Recommended Actions	4
1. Soil Contamination Related in Whole or in Part to On-Site Industrial Activities	8
2. Soil Contamination Related Solely to On-Site Fill Materials	9
3. Shallow Ground Water	10
4. Deep Ground Water	12
II. METHODOLOGY FOR ADDITIONAL ECRA SAMPLING	13
A. Modifications to Sampling Program	13
1. Modifications Due to Field Conditions	13
2. Modifications to Conditions Set Forth in NJDEP's July 20, 1990 Approval Letter	14
B. Soil Sampling Methods	15
C. Quality Assurance/Quality Control Measures	15
1. Decontamination Procedures	15
2. QA/QC Samples	15
3. Documentation	19
D. Laboratory Procedures	20
III. RESULTS AND DISCUSSION OF ADDITIONAL ECRA SAMPLING	22
A. Introduction	22
1. General	22
2. Rationale for Selection of Sampling Locations and Analyses	24
B. Quality Assurance/Quality Control Results	25
1. Method Blanks	25
2. Trip Blanks	25
3. Field Blanks	27
4. Duplicate Samples	27
C. Soil Results in Areas Previously Targeted for Cleanup	29
1. AEC 3: Finished Product Loading Area	29
2. AEC 14: Former Drum Storage Area	29
3. AEC 16: Former Drum Storage Area	29
4. AEC 17 (Northern Section): Former Drum Storage Area	29
5. AEC 21: Former Aboveground Tank Farm	30
6. AEC 23: Tank Wagon Loading Area	30
7. AEC 25: Tank Wagon Loading Area	30

CONTENTS

D. Areas Not Previously Targeted for Cleanup 31
1. AEC 2: Dumpster/Trash Compactor Area 31
2. AEC 5: Phthalic Anhydride Unloading Area 31
3. AEC 6: Fuel Oil Underground Storage Tank 31
4. AEC 8: Two Fuel Oil Underground Storage Tanks 32
5. AEC 9: Discharge of Raw Materials and Resin through Floor 32
6. AEC 10: Finished Product and Raw Material Storage 32
7. AEC 13: Former Aboveground Storage Tank Area 32
8. AEC 15 (Southern Section): Former Drum Storage Area 33
9. AEC 17 (Southern Section): Former Drum Storage Area 33
10. AEC 18: Fuel Oil Unloading Area 33
11. AEC 26: Drains From Large Tank Farm 33
12. AEC 28: Railroad Siding Runoff Discharge Pipe 34
13. Samples Collected Adjacent to Monitoring Wells 34

IV. CLEANUP PLAN 36

A. Introduction 36
B. Cleanup Objectives 36
C. Scope of Cleanup 37
D. Pre-Remediation Sampling 39
1. Introduction 39
2. Delineation in Areas Targeted for Remediation 39
3. Metals Delineation 41
E. Proposed Cleanup Remedy 41
1. Excavation and Soil Handling 43
2. Low-Temperature Volatilization 44
3. Off-Site Disposal 44
4. Site Restoration 45
F. Remediation Monitoring and Post-Excavation Sampling 45
G. Schedule 46
H. Progress and Final Reports 46
I. Cost Estimate 48

LIST OF TABLES

Table 1: Areas of Environmental Concern 5
Table 2: Sampling Locations, Collection Methods, Depths and Analyses 16
Table 3: Analytical Methods 21
Table 4: Site-Specific Informal ECRA Action Levels 23
Table 5: Compounds Present in Laboratory Method Blanks 26
Table 6: Concentrations of Duplicate Sample Analyses 28

CONTENTS

TABLES (continued

Table 7:	Summary of Estimated Soil Volumes Requiring Remediation	38
Table 8:	Proposed Sampling Locations, Depths, and Analytical Parameters	40
Table 9:	Cost Estimate for Proposed Cleanup Plan	49

LIST OF FIGURES

Figure 1:	Cleanup Implementation Schedule	47

LIST OF PLATES

Plate 1: Areas of Environmental Concern and Phase I and Phase II Sampling Locations
Plate 2: Phase I Volatile Organic Compounds Results
Plate 3: Results of Phase II Hydrocarbon Fingerprinting Analysis of Soil Samples
Plate 4: Phase II Metal Results Above ECRA Guidelines in Surface Soil Samples
Plate 5: Phase II Metal Results Above ECRA Guidelines in Deeper Soil Samples
Plate 6: Phase I Ground Water Analytical Results Above ECRA Guidelines
Plate 7: Phase II Ground Water Analytical Results Above ECRA Guidelines
Plate 8: March 1988 Ground Water Analytical Results at or Above ECRA Guidelines
Plate 9: Locations of Additional ECRA Sampling
Plate 10: Results of Additional ECRA Sampling
Plate 11: Areas Targeted for Remediation
Plate 12: Proposed Pre-Remediation Sampling Locations

LIST OF APPENDICES

Appendix A: Analytical Results of Quarterly Ground Water Monitoring
Appendix B: Summary of Analytical Results of Additional ECRA Sampling
Appendix C: Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling
Appendix D: Summary of Results from Samples Analyzed at Tufts University

I. INTRODUCTION

A. Purpose and Scope

On July 25, 1985, Textron Inc. (Textron) signed an Administrative Consent Order under the New Jersey Environmental Cleanup Responsibility Act (ECRA) which provided for Textron's compliance with ECRA after the sale of its Spencer Kellogg resin manufacturing facility (the Spencer Kellogg facility or the site) to NL Industries, Inc. To assist Textron in complying with ECRA, ENVIRON implemented a New Jersey Department of Environmental Protection (NJDEP)-approved Phase I Sampling Plan from November 1986 to March 1987. ENVIRON submitted the results of that investigation to NJDEP in March 1987 in a report entitled "Presentation of the ECRA Sampling Plan Results." In April 1987, ENVIRON performed additional field work and presented the results to NJDEP in June 1987 in a report entitled "Presentation of the Interim Investigation Results."

Results of the Phase I Sampling Plan indicated the presence of soil and ground water contamination[1] at the Spencer Kellogg facility. ENVIRON implemented the NJDEP-approved Phase II Sampling Plan during November and December 1987 to define more fully the nature and areal extent of both soil and ground water contamination in certain areas of the site, to characterize ground water flow patterns, and to clarify other issues that were not resolved during the first phase of sampling. ENVIRON provided the results to NJDEP in June 1988 in a report entitled "Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan."

Based on the results of the Phase I and Phase II sampling programs and consideration of informal NJDEP ECRA guidelines, ENVIRON and Textron concluded that the unsaturated soils in certain areas of the site required remediation due to the presence of volatile organic compounds (VOCs). The occurrence of VOCs in these areas seemed likely related to known on-site industrial operations. Additionally, these constituents were found in the shallow ground water in limited areas of the site. Initially, in situ bioremediation was considered as a cleanup remedy. Bench-scale laboratory testing and field studies were conducted to evaluate this innovative technology. The results of this work and a formal proposal for in situ bioremediation were provided to NJDEP in the January 17, 1990 Cleanup Plan for the Spencer Kellogg facility.

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[1] For the Phase I and II results reports, contamination was defined as concentrations of a particular substance exceeding informal NJDEP ECRA action levels for soil or ground water.

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In its April 3, 1990 letter responding to the January 1990 Cleanup Plan, NJDEP concluded that while in situ bioremediation would be acceptable, there was insufficient data to approve the proposed Cleanup Plan. In that letter, NJDEP requested further characterization sampling for base/neutral compounds (BNs) in certain areas already targeted for cleanup (target areas) and in certain additional areas where no further action had been proposed (non-target areas). NJDEP also requested additional delineation sampling for VOCs in those areas already targeted for remediation. In a June 26, 1990 letter to NJDEP, ENVIRON set forth a proposed scope of sampling in both target and non-target areas. NJDEP approved some of this work in its July 20, 1990 letter to Textron, and the remainder was subsequently approved as set forth in ENVIRON's August 1, 1990 letter to NJDEP. This additional ECRA sampling was conducted during July and August 1990.

In this report, ENVIRON provides a brief summary of the Phase I and Phase II analytical results, presents and evaluates the results of the additional ECRA sampling, and provides a revised Cleanup Plan. The revised Cleanup Plan consists of a conceptual design for cleanup of contaminated soils using low-temperature volatilization and a discussion of additional tasks that must be completed prior to implementing cleanup. A final work plan will be developed and permitting will be initiated after NJDEP approval of the revised Cleanup Plan. The proposal to use low-temperature volatilization rather than in situ bioremediation results from the uncertainty as to whether bioremediation can effectively degrade VOCs and BNs to required levels and the extended length of time that would be required to complete remediation using biodegradation.

The revised Cleanup Plan consists of the following components:

- A discussion of overall cleanup objectives;
- A sampling plan to complete delineation of target areas;
- A description of the cleanup technology proposed for the site;
- A schedule for Cleanup Plan implementation; and
- A cost estimate for the proposed cleanup activities.

The cleanup objectives are defined as remediation of VOCs and BNs in soils to levels below site-specific cleanup criteria. The technology selected is low-temperature volatilization. The proposed additional sampling plan is designed to: (1) confirm the bounds of VOC contamination in target areas; (2) ensure that lead and arsenic levels in soils in certain locations are not materially different from those previously measured; and (3) confirm that BNs in one location are limited in their areal extent.

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The schedule provides an estimate of the time required to prepare for implementation and to implement the Cleanup Plan, and is based on the assumption that NJDEP approval will be received by December 31, 1990. The estimated costs are based on detailed discussions with qualified contractors capable of performing the proposed cleanup actions. If necessary, the schedule and/or cost estimate will be modified as part of the final remedial work plan to reflect any changes that may result from further discussions with qualified contractors and current plant personnel[2] regarding scheduling, from an evaluation of the results of delineation sampling or from actual contractor quotes for the proposed work.

B. Site Description

The Spencer Kellogg facility is situated on the west bank of Newark Bay. The site, approximately 10 acres in area, is directly across from Kearny Point, which marks the confluence of the Passaic and Hackensack Rivers, where these rivers join to form Newark Bay. Originally marshland, the site was filled in by the early 1900s and has since been used for industrial activity.

Plate 1 depicts the main features of the site. A breakwall consisting of concrete-covered rip rap is located along the eastern property edge adjacent to Newark Bay. West of the property is a landfill which drains into Plum Creek. Upon leaving the landfill, Plum Creek enters an underground conduit or flume, through which it flows under Doremus Avenue and beneath the site. This flume discharges from a pipe in the breakwall directly into Newark Bay.

According to plant personnel, the site has been used as a manufacturing facility since the first or second decade of this century. Before that time, the site housed an alcohol distillery. Resins and resin-related products have been manufactured on-site from the early 1930s to the present. For the past several decades, the facility has manufactured coating resins used primarily in the paint industry. The site has been almost entirely paved for the last few decades.

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[2] The current owner/operator of the site is Reichhold Chemicals, Inc., which acquired the site from NL Industries, Inc. in 1989. Anticipated cleanup activities are being coordinated with Reichhold personnel.

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C. Summary of Previous Sampling Activities, Environmental Concerns and Recommended Actions

Based on a series of initial site visits and a review of past and present operations, 27 areas of environmental concern (AECs) were identified. The rationale for selection of each AEC is provided in Table 1, and the locations are illustrated on Plate 1. To evaluate the effect of past site activities on the quality of soil and ground water and to determine the geologic and hydrogeologic characteristics of the site, ENVIRON completed 46 soil borings and installed 11 shallow and 3 deep monitoring wells during execution of the Phase I Sampling Plan, primarily within the aforementioned AECs. The shallow wells were installed to monitor the fill unit, which extends to a depth of approximately 10 feet below grade. The deep wells monitor a sandy aquifer encountered between 30 and 40 feet below grade. Separating the water-bearing units is a 20-foot clay, silt and peat layer. Soil, surface water and ground water samples were collected and analyzed for those chemicals that were potentially present due to industrial activities within the AECs.

The Phase I Sampling Plan results indicated that the primary constituents in soil at the site are total petroleum hydrocarbons (TPHCs) and VOCs, particularly ethylbenzene, toluene and xylenes. Priority pollutant metals (PPMs), BNs and other VOCs, such as benzene, methylene chloride and chloroform, were detected in only a few soil samples.

The primary ground water contaminants detected at the site during Phase I sampling were ethylbenzene and toluene. PPMs were detected above informal ECRA action levels in two of the five wells tested for metals. TPHCs, benzene and cyanide were each detected in only one ground water sample. Trace levels of VOCs were observed in one deep monitoring well. No other constituents of concern were detected at concentrations above informal ECRA action levels in ground water or soil samples collected during the Phase I sampling program.

To provide a more comprehensive data base required for determining the need for and possible nature and extent of soil and ground water remediation, ENVIRON collected 42 additional soil samples and installed 11 additional shallow and deep monitoring wells during execution of the Phase II Sampling Plan. The primary objectives of the Phase II Sampling Plan were to: (1) delineate the extent of ground water contamination; (2) identify the specific hydrocarbons that contribute to the TPHC contamination in each AEC; and (3) further characterize the nature of metal contamination.

The results of the Phase II Sampling Plan indicated that PPMs were present at random locations over broad areas of the site and confirmed that a significant quantity of TPHCs detected previously are nonhazardous fish and vegetable oils. The data also indicated that

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TABLE 1
Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
1	Area of apparent resin spill onto cracked pavement.
2	Area of possible discharge onto unpaved region from dumpster and compactor that receive waste from Buildings 31 and 32.
3	Area of potential spill of finished products (resins) during railroad car loading.
4	Area of possible discharge of vegetable oils and fish oils during railroad car unloading.
5	Area of possible discharge of phthalic anhydride during railroad car unloading.
6	Underground fuel oil tank.
7	Site of solvent tank truck unloading prior to and subsequent to area being paved.
8	"Underground" fuel oil tanks.[2]
9	Limited area of potential discharge of raw materials and finished products from the polyester resin manufacturing process through a hole in the building's floor.
10	Site of finished product and raw materials storage while area was unpaved.
11	Former aboveground storage tank located in unpaved area.

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TABLE 1 (continued)
Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
12	Building on stilts with potential for spills or discharges beneath.
13	Site of former aboveground storage tanks while area was unpaved.
14	Site of former aboveground storage tanks while area was unpaved.
15	Site of former drum storage while area was unpaved.
16	Site of former drum storage while area was unpaved.
17	Site of former drum storage while area was unpaved.
18	Site of fuel oil unloading in unpaved area with evidence of spills.
19	Tank previously used for solvent sludge storage. Area within dike unpaved.
20	Location of former underground gasoline tank.
21	Site of former aboveground tank farm while area was unpaved.
22	Concrete pad on which 1285 Premix has been stored in drums.
23	Tank wagon loading area for Building 4 where 1285 Premix may be generated.
25	Tank wagon loading area for Building 26 where 1285 Premix may be generated.

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TABLE 1 (continued)
Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
26	Drains in large tank farm which may have discharged to the ground in past. Drains are now plugged.
27	Drum storage area on unpaved ground (observed during April 9, 1986, NJDEP site inspection).
28	Area around the break in the pipe which carries runoff from the northern railroad siding (observed during April 9, 1986, NJDEP site inspection).

1 The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

2 These tanks appear to be mostly above ground level, but are covered with earth.

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petroleum-based hydrocarbons, such as fuel oils, lubricating oils and gasoline, are present at levels below those (i.e., <15,000 ppm) that would require remedial action at this site.[3]

Phase II ground water quality data were similar to those obtained during Phase I ground water sampling. VOCs were present in localized areas of the site, but were not detected in Phase II wells installed in downgradient areas. In addition, only two dissolved PPMs were detected and TPHCs were present only in the two background wells. No significant levels of contaminants were detected in the deep aquifer.

Provided below is a brief discussion of the results of both sampling programs in terms of the probable source(s) of each constituent group (VOCs, TPHCs and PPMs) and the potential need for remediation of soils and ground water. While BN or polycyclic aromatic hydrocarbon (PAH) analyses were performed during Phase I sampling, NJDEP requested significant additional sampling and analysis after the Phase I and II sampling programs were completed. The results of that work are described in Section III, along with an interpretation of all BN data as they relate to remedial needs. Limited additional analyses were performed for VOCs as well, the results of which do not change the conclusions presented below. The results of these analyses are presented in Section III.

1. **Soil Contamination Related in Whole or in Part to On-Site Industrial Activities**

VOCs, particularly ethylbenzene, toluene and xylenes, appear to have been the result of historical industrial operations and activities at the facility. The occurrence and relative concentrations of these compounds are generally consistent with known and possible uses within certain AECs. The distribution and concentrations of VOCs detected during the Phase I sampling are provided on Plate 2.

The results of Phase I and II sampling provided adequate definition of the lateral and vertical extent of VOCs in soils for estimating the potential scope of remediation. Given that past on-site industrial operations are the likely source of these materials and that VOCs are present in shallow ground water, remediation of VOCs in soils is proposed.

TPHCs are also present in the soils of the fill material on-site. Like VOCs, the past use and handling of raw materials, products and wastes appear to have contributed

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[3] During a meeting among Textron, ENVIRON and NJDEP on September 10, 1990, the agency indicated that 15,000 pm of TPHCs would be used as a standard to trigger cleanup provided that carcinogenic and noncarcinogenic BNs are not present above 10 and 100 ppm, respectively.

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to the levels of TPHCs found in soil. However, unlike VOCs, some of the TPHC contamination noted appears to be fill-related.

Results of hydrocarbon "fingerprinting" analyses performed as part of the Phase II Sampling Plan indicated that a significant portion of the TPHCs detected are nonhazardous fish and vegetable oils. The non-petroleum-based fractions typically were identified as either soybean oil or linseed oil. The petroleum hydrocarbon fractions were qualitatively identified by their gas chromatographic characteristics as paint thinner, fuel oils, lubricating oils, gasoline, kerosene, coal tar, and PAHs. The results of these analyses are provided on Plate 3.

The presence of non-petroleum-based hydrocarbons such as soybean or linseed oil is not of concern and does not warrant remedial attention.[4] In contrast, Textron and ENVIRON understand that the presence of petroleum-based products would be of concern to NJDEP if the levels measured exceeded 15,000 ppm. None of the soil samples analyzed exceeded 15,000 ppm of petroleum hydrocarbons. Therefore, the presence of TPHCs is not a factor in planning the remediation at this site. However, as discussed in Section III, BNs will be used to determine the remedial requirements in areas containing TPHCs.

The occurrence of PAHs or total BNs in soils in some areas of the site may be related to the past release of petroleum hydrocarbons, although the detection of these compounds in areas where no apparent on-site source exists suggests that they may also be associated with the fill. Total BNs or PAHs were analyzed for during the Phase I sampling program. Additional PAH and total BN data were recently collected, and the results of all PAH/BN sampling are presented and discussed in Section III.

2. Soil Contamination Related Solely to On-Site Fill Materials

Several species of metals were found at background locations and in samples from locations within the central and eastern portions of the site (Plates 4 and 5). However, their presence is believed to be associated with on-site fill materials rather than past industrial activities because none of the metals detected is known to have been used during the operating history of the site in any way that would have resulted in the observed patterns of metal contamination. In addition, the variability of metal concentrations and noted increases of metal concentrations with depth at several sampling locations are indicative of heterogeneous fill material rather than the effect of

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[4] NJDEP confirmed this position during a September 10, 1990 meeting among Textron, ENVIRON and NJDEP.

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site operations. If the metals had been introduced into the soil by site activities, the higher concentrations would be expected in the near-surface soil samples. The occurrence of PPMs is generally limited to the central and eastern portions of the site, areas where distinct fill material exists. For these reasons, Textron recommended in its June 1988 report that any cleanup activity not include PPMs in soils.

In its January 30, 1989 and April 3, 1990 response letters to Textron, NJDEP concurred with Textron's position that the metal contamination is related to the fill material. However, NJDEP also indicated in its April 3, 1990 letter that a deed restriction likely would be required for the metals. During Textron's September 10, 1990 meeting with NJDEP to discuss this potential deed restriction, the agency indicated that, based on the levels of heavy metals detected to date at the site, neither remediation nor a deed restriction would be required. NJDEP expressed concern, however, about the levels of lead and arsenic detected in a few soil samples and requested that limited additional site characterization -- in the vicinity of soil samples with concentrations exceeding 1,000 ppm of lead and 20 ppm of arsenic -- be conducted as part of the approved Cleanup Plan. The purpose of this sampling will be to ensure that the levels of lead and arsenic measured at the limited additional sampling locations are not materially different from those previously obtained (e.g., that they are not 3 to 4 times greater than those previously detected). Unless the additional samples exhibit levels of lead or arsenic levels previously detected, NJDEP indicated that no remediation or deed restriction will be required. A proposal for the additional sampling for lead and arsenic is provided in Section IV of this report.

3. Shallow Ground Water

Despite the presence of TPHCs, PPMs, BNs and VOCs within the shallow soils of the fill material, little contamination has been detected in the shallow ground water. TPHCs at levels slightly above the informal ECRA action level are present only in the upgradient background wells (MWs 1 and 2) and are attributable to off-site sources. With one exception, the only dissolved PPM detected at concentrations above the informal ECRA action level is selenium, the source of which appears to be Newark Bay. BNs have never been detected in the ground water samples taken from the on-site monitoring wells. The analytical results of Phase I and Phase II ground water sampling are summarized on Plates 6 through 8.

VOCs detected in the shallow ground water for the most part seem to be related to contaminated on-site soils, but the impact appears to be limited in areal extent. VOCs have been detected in only 5 of 20 shallow wells (MW7, MW10, MW11, MW13, and

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MW20). Toluene and/or ethylbenzene were generally the detected constituents of concern, although low levels of benzene and xylenes were occasionally reported. Except for MW10, the concentrations of total VOCs in the shallow ground water were relatively low. Based on the results of soil samples collected from MW10 and MW13 during well installation, it appears that the presence of VOCs in these wells is related to localized soil contamination. VOCs detected in MW20 are likely related to migration from MW10 or to nearby soil contamination. Low levels of VOCs detected in MW7 and MW11 could be related to migration from off-site sources of contamination.

As part of the Phase II Sampling Plan, mathematical analyses were performed to evaluate the potential migration of VOC contamination in the shallow aquifer. The results, presented in the June 1988 report, indicate that the concentration of VOCs at the nearest receptor boundary (Newark Bay) would be insignificant and would not pose a risk to public health or the environment. Consequently, ground water remediation was not proposed by Textron in the June 1988 report.

NJDEP indicated in its January 30, 1989 letter to Textron that the proposal not to remediate shallow ground water could not be accepted at that time because no actual soil remediation was proposed. Instead, NJDEP requested that Textron conduct quarterly ground water sampling from wells MW10, MW13, MW14, MW15 and MW20, and that this monitoring continue for a period of one year after source control/removal was implemented. NJDEP stated that the need for ground water remediation would be evaluated at that time. NJDEP restated this position in its more recent April 3, 1990 letter, and indicated that ground water cleanup may be required if soil remediation does not result in a sufficient decrease of ground water contaminants.

Textron continues to believe that shallow ground water remediation is not warranted for the reasons stated previously. The source of VOCs affecting the shallow ground water should be extensively reduced by the implementation of the low-temperature volatilization process discussed in Section IV. This should lead to a sufficient decrease in ground water contaminants to preclude the need for any ground water remediation.

Consistent with NJDEP's request, quarterly ground water sampling from the referenced wells began in April 1989, and all data have been provided to the agency as they have been acquired. A summary of the results of this sampling performed to date is provided in Appendix A. A full analysis of the results of quarterly sampling will be made after implementation of the Cleanup Plan for soils.

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4. Deep Ground Water

The analytical results of ground water samples collected from wells monitoring the deep aquifer indicated that the deep ground water beneath the site has not been affected by site activities. Lead, selenium and VOCs were detected at concentrations above the informal ECRA action levels in one monitoring well, but during only one of three sampling rounds. In addition, TPHCs at a concentration just slightly over the informal ECRA action level were detected in one other deep well during one sampling round. A number of factors likely caused the incidental detection of these compounds (field acidification of samples, tidal influence of Newark Bay, contamination during well installation, etc.), but none are linked to past industrial operations at the site. Therefore, no remedial action with respect to the deep aquifer is required, nor was any proposed to NJDEP in the June 1988 report or in the January 1990 Cleanup Plan. The agency did not take exception to this conclusion.

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II. METHODOLOGY FOR ADDITIONAL ECRA SAMPLING

ENVIRON completed the additional ECRA sampling investigation at the Spencer Kellogg facility in general conformance with the scope of work set forth in ENVIRON's June 26 and August 1, 1990 letters and approved by NJDEP in its July 20, 1990 letter and July 30, 1990 telephone conversation with ENVIRON. All procedures and sampling techniques were consistent with the protocols outlined in NJDEP's Sampling Plan Guide and ENVIRON's Manual of Field Procedures. Some modifications to the sampling program were necessary due to certain conditions and restrictions encountered during field work. In addition, ENVIRON received agency approval to modify several requirements set forth in NJDEP's July 20, 1990 letter. These changes are described below.

A. Modifications to Sampling Program

1. Modifications Due to Field Conditions

The proposed sampling depths included the first 6-inch interval below the ground surface, 18 to 24 inches below the ground surface for VOCs only, and the 6-inch interval immediately above the water table.

Because of the high water table encountered at the site (usually between 2.5 and 3 feet below ground surface) and the presence of a gravel layer below the asphalt at many boring locations, the surface sample was within 1 foot of the water table at several locations. Thus, only one sample was collected at boring locations 1003, 1305, 1306, B-4 and B-6. Also, at several locations where sampling only for VOCs from the 18- to 24-inch interval was proposed, this sample coincided with the 6-inch interval immediately above the water table (for which both BN and VOC sampling was proposed). This occurred at borings 306, 1605, 2105, 2303, 2503, M1501 and M2401. Therefore, a single sample from the 18- to 24-inch interval at each of these locations was analyzed for BNs and VOCs. Additionally, split spoon recovery at some sampling locations was poor, making it difficult to determine the actual depth of the sample. In these instances, the sampling depth was recorded as the maximum depth range of the split spoon. This occurred at borings 1507 and B6.

Other modifications due to field conditions are listed below:

- Due to access difficulties, several borings that were proposed in ENVIRON's June 26, 1990 letter as hollow-stem auger borings were completed using hand augers instead. These borings included 502, 2802, B-1 and B-5.

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- In AEC 26, samples for VOCs from borings 2601 and 2604 were taken from 12 to 14 inches rather than from 18 to 24 inches due to hand auger refusal at 14 inches.

- During field sampling activities, ENVIRON discovered that the area immediately south of the underground storage tank in AEC 6 is covered by a concrete pad. Therefore, boring 603 was completed adjacent to the southeastern corner of the underground storage tank.

2. Modifications to Conditions Set Forth in NJDEP's July 20, 1990 Approval Letter

Several modifications to the additional sampling requested by NJDEP in its July 20, 1990 conditional approval letter were agreed upon verbally by Mark Fisher, NJDEP Case Manager, during a July 30, 1990 telephone conversation with ENVIRON and confirmed in ENVIRON's August 1, 1990 letter. These modifications are summarized below.

- It was agreed that in AEC 8, previous Phase I sampling for PAHs met the objectives of the sampling requested by NJDEP in its July 20, 1990 letter. Therefore, additional sampling for BNs within this AEC was not required.

- ENVIRON clarified the fact that the soils removed from the concrete pad (AEC 22) were temporarily staged on asphalt. As a result, NJDEP agreed that additional soil sampling in the staging area would not be required.

- NJDEP's July 20, 1990 letter requested BN characterization sampling in all of the AECs previously targeted for remediation. Instead of discrete sampling in all of these AECs, BN characterization sampling was conducted in those areas where the results of petroleum hydrocarbon "fingerprinting" analyses, performed during the Phase II investigation, suggested the greatest potential for BNs. The areas sampled included AECs 3, 14, 16, 17, 21, 23, and 25. NJDEP agreed that this scope of work would satisfy the agency's requirements for additional characterization sampling in target areas.

- NJDEP agreed that delineation sampling for VOCs in target areas could take place as part of pre-remediation activities.

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B. Soil Sampling Methods

Most of the soil borings were completed using a hollow-stem auger. Where access to a sampling location by a drill rig was limited, a hand auger was used for sample collection. All hollow-stem auger borings were plugged with a cement-bentonite grout mixture. All hand auger borings were plugged with cuttings from the borehole.

Soil samples were collected from hollow-stem auger borings using a split-spoon sampling device. Table 2 lists the sample locations, depths, and analyses performed on each sample. Boring depths were measured from the soil surface (not grade) to the base of the boring. In paved areas, the soil surface is covered with approximately 6 inches of gravel and asphalt. In unpaved areas, the soil is covered with up to 6 inches of gravel.

"Head-space" analysis was performed on soil samples from AEC 9 using an HNu meter. Volatile organics were not detected in any of the boring locations using this approach. All samples screened by "head space" analysis were submitted to the laboratory for confirmatory testing.

C. Quality Assurance/Quality Control Measures

1. Decontamination Procedures

The split spoons used to collect soil samples from hollow-stem auger borings were decontaminated by steam cleaning with potable water before the collection of each sample. The hand augers used to collect soil samples from the borings were decontaminated with an alconox-solution wash, a tap water rinse, and a final rinse with deionized water before the collection of each new sample. To avoid cross-contamination between samples, ENVIRON personnel used fresh gloves to collect each sample.

2. QA/QC Samples

To monitor the effectiveness of decontamination, ENVIRON collected at least one field (wash) blank from all sampling equipment used during each day of sampling. The wash blank was analyzed for all parameters for which samples collected on that day were analyzed, including BN+15, VOC+15 and xylenes.

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TABLE 2
Sampling Locations, Collection Methods, Depths and Analyses

AEC	Boring	Sample Number	Collection Method[1]	Depth (feet)[2]	Analytical Parameters[3]
2	0202	288E-0202-SB01	HSAB	0.0-0.5	BN+15
	0202	288E-0202-SB02	HSAB	1.5-2.0	VOC+15, Xylenes
3	0306	288E-0306-SB01	HAB	0.0-0.5[4]	BN+15
	0306	288E-0306-SB02	HAB	1.5-2.0[4]	BN+15, VOC+15, Xylenes
5	0502	288E-0502-SB01	HAB	0.0-0.5[5]	BN+15
	0502	288E-0502-SB02	HAB	1.5-2.0[5]	VOC+15, Xylenes
6	0603	288E-0603-SB01	HSAB	0.0-0.5	BN+15
	0603	288E-0603-SB02	HSAB	1.5-2.0	VOC+15, Xylenes
	0603	288E-0603-SB03	HSAB	3.0-3.5	BN+15, VOC+15, Xylenes
9	0902	288E-0902-SB01	HAB	1.0-1.2	VOC+15, Xylenes
	0903	288E-0903-SB01	HAB	0.0-0.5	BN+15
	0903	288E-0903-SB02	HAB	0.5-0.8	VOC+15, Xylenes
	0904	288E-0904-SB01	HAB	0.0-0.5	BN+15
	0904	288E-0904-SB02	HAB	1.5-1.7	VOC+15, Xylenes
	0905	288E-0905-SB01	HAB	1.3-1.5	VOC+15, Xylenes
10	1003	288E-1003-SB01	HSAB	0.0-0.5[6]	BN+15
13	1305	288E-1305-SB01	HSAB	0.0-0.5	BN+15
	1306	288E-1306-SB01	HSAB	0.0-0.5	BN+15
14	1405	288E-1405-SB01	HSAB	0.0-0.5	BN+15
	1405	288E-1405-SB02	HSAB	1.5-2.0	BN+15
15	1506	288E-1506-SB01	HSAB	0.0-0.5	BN+15
	1506	288E-1506-SB03	HSAB	1.0-1.5	BN+15
	1507	288E-1507-SB01	HSAB	0.0-0.5	BN+15
	1507	288E-1507-SB03	HSAB	2.0-4.0[7]	BN+15
16	1605	288E-1605-SB01	HSAB	0.0-0.5	BN+15
	1605	288E-1605-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
	1605	288E-1605-SB22	HSAB	1.5-2.0	BN+15
17	1706	288E-1706-SB01	HSAB	0.0-0.5	BN+15
	1706	288E-1706-SB03	HSAB	1.5-2.0	BN+15

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TABLE 2
Sampling Locations, Collection Methods, Depths and Analyses

AEC	Boring	Sample Number	Collection Method[1]	Depth (feet)[2]	Analytical Parameters[3]
	1707	288E-1707-SB01	HSAB	0.0-0.5	BN+15
	1707	288E-1707-SB03	HSAB	0.5-1.0	BN+15
	1707	288E-1707-SB11	HSAB	0.0-0.5	BN+15
	1707	288E-1707-SB33	HSAB	0.5-1.0	BN+15
	1708	288E-1708-SB01	HSAB	0.0-0.5	BN+15
	1708	288E-1708-SB03	HSAB	2.0-2.5	BN+15
	1708	288E-1708-SB11	HSAB	0.0-0.5	BN+15
	1709	288E-1709-SB01	HSAB	0.0-0.5	BN+15
	1709	288E-1709-SB03	HSAB	2.5-3.0	BN+15
	M240	288E-M2401-SB01	HSAB	0.0-0.5	BN+15
	M240	288E-M2401-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
	M240	288E-M2401-SB22	HSAB	1.5-2.0	VOC+15, Xylenes
18	1802	288E-1802-SB01	HSAB	0.0-0.5	BN+15
	1802	288E-1802-SB03	HSAB	2.0-2.5	BN+15
21	2105	288E-2105-SB01	HSAB	0.0-0.5	BN+15
	2105	288E-2105-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
23	2303	288E-2303-SB01	HSAB	0.0-0.5	BN+15
	2303	288E-2303-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
25	2503	288E-2503-SB01	HSAB	0.0-0.5	BN+15
	2503	288E-2503-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes
26	2601	288E-2601-SB01	HAB	0.0-0.5	BN+15
	2601	288E-2601-SB02	HAB	1.0-1.2	VOC+15, Xylenes
	2602	288E-2602-SB01	HAB	0.2-0.5	BN+15
	2602	288E-2602-SB02	HAB	1.7-2.0	VOC+15, Xylenes
	2603	288E-2603-SB01	HAB	0.0-0.5	BN+15
	2603	288E-2603-SB02	HAB	1.5-2.0	VOC+15, Xylenes
	2604	288E-2604-SB01	HAB	0.0-0.5	BN+15
	2604	288E-2604-SB02	HAB	1.0-1.2	VOC+15, Xylenes
28	2802	288E-2802-SB01	HAB	0.0-0.5[8]	BN+15
	2802	288E-2802-SB11	HAB	0.0-0.5[8]	BN+15
	B-1	288E-B-1-SB01	HAB	0.0-0.5[5]	BN+15
	B-1	288E-B-1-SB02	HAB	1.5-2.0[5]	VOC+15, Xylenes
	B-1	288E-B-1-SB03	HAB	1.5-2.0	BN+15

845030744

TABLE 2
Sampling Locations, Collection Methods, Depths and Analyses

AEC	Boring	Sample Number	Collection Method[1]	Depth (feet)[2]	Analytical Parameters[3]
	B-2	288E-B-2-SB01	HSAB	0.0-0.5	BN+15
	B-2	288E-B-2-SB02	HSAB	2.0-3.0	BN+15
	B-2	288E-B-2-SB03	HSAB	3.0-3.5	BN+15
	B-3	288E-B-3-SB01	HSAB	0.0-0.5	BN+15
	B-3	288E-B-3-SB03	HSAB	2.0-2.5	BN+15
	B-4	288E-B-4-SB01	HSAB	0.0-0.5	BN+15
	B-5	288E-B-5-SB01	HAB	0.0-0.5	BN+15
	B-5	288E-B-5-SB03	HAB	1.0-1.5	BN+15
	B-5	288E-B-5-SB11	HAB	0.0-0.5	BN+15
	B-6	288E-B-6-SB01	HSAB	0.0-2.0[7]	BN+15
	M150	288E-M1501-SB01	HSAB	0.0-0.5	BN+15
	M150	288E-M1501-SB02	HSAB	1.5-2.0	BN+15, VOC+15, Xylenes

[1] Collection Method Abbreviations:
HAB = Hand Auger Boring
HSAB = Hollow-Stem Auger Boring

[2] Depths are measured from the soil surface. The soil surface is covered with approximately 6 inches of gravel and asphalt, except where noted.

[3] Analytical Parameter Abbreviations:
BN+15 = Priority Pollutant Base/Neutral Compounds plus 15 compound library search
VOC+15 = Priority Pollutant Volatile Organics plus 15 compound library search

[4] The soil surface is covered with approximately 6 inches of gravel.

[5] The soil surface is covered with approximately 2 inches of gravel.

[6] The soil surface in AEC 10 is covered with approximately 6 inches of gravel and asphalt and a 6-inch concrete pad.

[7] Due to poor recovery in the split spoon, it was not possible to determine the sampling interval. Therefore, the entire depth of the split spoon is considered to be the sampling interval.

[8] The soil surface is covered with approximately 1 inch of gravel.

288E:PAA00420.W51

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NET, the contracted laboratory, provided trip blanks to monitor possible contamination from sample handling, transport, and storage. A minimum of one trip blank accompanied the field crew for each day of sampling for VOCs, and was sent to the laboratory for VOC+15 and xylene analysis.

To evaluate quality control and the reproducibility of results, ENVIRON collected 1 duplicate per 20 samples. The duplicate soil sample for BN+15 analysis was collected by homogenizing a sample and then alternately filling the sample bottles of the duplicate pair. In the case of the VOC+15 and xylene duplicate, containers were filled prior to homogenization to minimize potential volatilization.

3. Documentation

Tier II data packages, including the original data and full laboratory documentation, are being submitted as attachments to this report in Volumes II, III, and IV. Several adjustments necessary to interpret the data effectively are described below.

- The collection of duplicate samples generates two sets of results for a given sampling location and depth. Assuming both samples were collected and analyzed correctly, both sets of results are considered valid. For this report, results of duplicate samples are presented individually rather than averaged.

- The unabridged data tables provided in Volumes II, III and IV of this report also present tentatively identified compounds (TICs), which are obtained from the forward library search associated with the BN and VOC priority pollutant scans. Reported with these chemicals are the estimated concentrations and retention times used by the laboratory for identification of compounds. The estimated concentrations are based on assumed response factors, and may vary from actual concentrations by as much as 500%. Because of the substantial uncertainty in the quantification of TIC concentrations, it is unreasonable to include these chemicals in any BN and VOC total. Thus, the TICs are not included in the summary table in Section IV. Their presence, however, is considered in attempting to understand qualitatively the nature and source(s) of contamination. Appendix C lists the TICs for each sample.

- If the letter "J" follows a reported concentration, that compound was not present above the minimum detection limit (which is based on the dilution of the extract). However, mass spectral data suggested its presence, and the

845030746

reported concentration is an estimate. These values have been added to the tables provided by NET in the Tier II data packages (Volumes II through IV). ENVIRON has also provided these values in the summary tables of analytical results (see Appendix B).

- The data qualifier "B" following a value indicates that the compound was also detected in the method blank analyzed with that sample. The purpose of this qualifier is to warn that the quantification of a chemical has been affected by contamination in the analytical laboratory, as measured by the method blank.

D. Laboratory Procedures

All soil samples were analyzed by NET of Thorofare, New Jersey. NET is a state-certified laboratory (State Certification No. 08153). Table 3 lists the analytical method used for each parameter.

In a cooperative research effort with Tufts University, several duplicate samples were analyzed using a field-deployable, gas chromatograph-mass spectrometer (GC-MS). This device thermally desorbs organic compounds from soil followed by analysis by high resolution capillary column (DB-624 stationary phase) gas chromatography. The analytical results were used for preliminary evaluation of the field deployable GC-MS and are presented in Appendix D. No determination has been made by ENVIRON concerning the validity of the data.

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TABLE 3
Analytical Methods

Parameter	EPA Method	
	Water	Soil
Base/Neutral Compounds	625	625[1]
Volatile Organic Compounds	624	624[2]

1 Following extraction by EPA Method SW846:8270; samples were subject to matrix cleanup and alumina partitioning using EPA Methods 3650 and 3611, respectively, prior to BN+15 analysis.
2 Following extraction by EPA Method SW846:8240

288E:PAA00420.W51

845030748

III. RESULTS AND DISCUSSION OF ADDITIONAL ECRA SAMPLING

A. Introduction

1. General

This section of the report presents and discusses the analytical results of additional BN characterization sampling conducted at the Spencer Kellogg site. Results of VOC analysis performed on a limited number of samples from specific areas of the site are also provided. Data from earlier investigations for BNs or PAHs and VOCs are referenced where appropriate. The results are summarized for each tested AEC in Appendix B and are graphically presented on Plate 10. The unabridged summary tables and Tier II data packages appear in Volumes II through IV. Where applicable, these results and the quality assurance/quality control results are presented in terms of their relationship to site-specific informal ECRA action levels (hereinafter referred to as site-specific action levels), discussed during a meeting among NJDEP, Textron and ENVIRON on September 10, 1990. The site-specific action levels for these compounds are presented in Table 4. These criteria have been used to evaluate the levels of contaminants detected during this phase of sampling and the need for further investigation and/or cleanup.

The site-specific action levels for carcinogenic and noncarcinogenic BNs are 10 ppm and 100 ppm, respectively, consistent with current NJDEP guidelines. As indicated on Table 4, ENVIRON is using an action level of 10 ppm rather than 1 ppm for total VOCs. During the above-referenced meeting, NJDEP indicated that the higher standard of 10 ppm could be utilized at this site provided that benzene and chlorinated organics are not present and there is no impact to ground water or it can be demonstrated through modeling that no adverse impact on ground water will occur from such residual levels. Benzene and chlorinated organics have not been detected in on-site soils. Although ground water impact has occurred in limited areas of the site, the ground water modeling previously conducted by ENVIRON during the Phase II Sampling Plan indicated that the concentration of VOCs at the nearest receptor boundary (Newark Bay) would be insignificant and pose no risk to public health or the environment. The model utilized assumed no source control. With the source removal proposed in Section IV, impacts to ground water would be expected to substantially decrease over time. As a result, ENVIRON believes that all criteria have been met and that the 10 ppm standard for total VOCs is appropriate for this site.

845030749

TABLE 4
Site-Specific Informal ECRA Action Levels

Parameter	Soil
Base/Neutral Compounds (BNs)[1]	
Carcinogenic	10 ppm
Noncarcinogenic	100 ppm
Volatile Organic Compounds (VOCs)[2]	10 ppm

ppm: Parts per million (mg/kg)

[1] The informal ECRA action level for BNs has been set by NJDEP for this case to reflect 10 ppm for carcinogenic BNs and 100 ppm for noncarcinogenic BNs. Carcinogenic BNs include:

benzo(a)anthracene	dibenzo(a,h)pyrene
benzo(b)fluoranthene	dibenzo(a,i)pyrene
benzo(j)fluoranthene	dibenzo(a,h)anthracene
benzo(k)fluoranthene	dibenzo(a,l)pyrene
benzo(a)pyrene	dibenzo(a,e)pyrene
chrysene	indeno(1,2,3-cd)pyrene

[2] NJDEP has indicated that the informal ECRA action level for VOCs can be modified from 1 ppm to 10 ppm provided that: (1) benzene is not present; (2) chlorinated organics are not present; and (3) there is no impact to ground water or it can be demonstrated through modeling that no adverse impact on ground water will occur from such residual levels.

288E:PAA00420.W51

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2. Rationale for Selection of Sampling Locations and Analyses

Most of the samples collected during this phase of sampling were taken from locations that had been sampled during previous site characterization studies. The earlier soil samples obtained from these locations were analyzed for VOCs and TPHCs. The sampling performed during this recent investigation was designed primarily to: (1) determine if significant BN levels exist at the site; and (2) evaluate the extent of VOCs in areas not previously tested for these compounds. Additional testing for VOCs was also performed in areas known to contain elevated VOC concentrations. More specific rationales for the selection of sampling locations and analyses are described below.

In its April 3, 1990 letter, NJDEP indicated that the results of petroleum hydrocarbon analyses suggested a potential BN problem at the site. During the September 10, 1990 meeting, the agency further indicated that TPHCs are used only as an indicator of potential contamination and that BN concentrations rather than TPHC concentrations are used to determine the need for remediation. As a result, NJDEP requested additional BN sampling.

To respond to the agency's concerns and request for additional sampling, ENVIRON collected soil samples for BN+15 analysis from locations where earlier TPHC results exceeded 500 ppm as determined by the "fingerprinting" analyses. These samples were collected from the first 6-inch soil interval below the soil surface (surface sample) and from an interval 0 to 6 inches above the water table (deeper sample). Matrix cleanup and alumina partitioning using EPA Methods 3650 and 3611, respectively, were performed on the samples prior to BN+15 analysis. As indicated by NJDEP in its April 3, 1990 letter, the BN data from areas not previously targeted for cleanup would be used to support a no further action approach or the need for additional investigation and/or cleanup. Data from BN characterization sampling, performed in areas previously targeted for cleanup due to the presence of elevated levels of VOCs, have been used in evaluating the applicability of potential remedial technologies.

As indicated above, NJDEP also requested additional sampling for VOCs. Specifically, the agency asked for VOC sampling from 18 to 24 inches below the soil surface in limited areas of the site. The purpose of this sampling was to: (1) examine the potential presence of VOCs in areas not previously investigated for these compounds (i.e., AECs 5 and 26); (2) delineate the horizontal extent of VOCs previously detected below the floor in Building 16; and (3) verify the absence of VOCs at depth in AEC 2 to support a no further action approach for this area. Additional samples for VOCs were also collected from several AECs previously targeted for

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cleanup as part of the proposed column testing associated with evaluating further in situ bioremediation as the cleanup remedy. As stated in Section I, Textron decided not to pursue this technology further and column testing was not performed.

Provided below is a brief summary of the results obtained from this sampling program as well as recommendations for future actions.

B. Quality Assurance/Quality Control Results

1. Method Blanks

One targeted BN, bis(2-ethylhexyl)phthalate, and one targeted VOC, methylene chloride, were detected in laboratory method blanks. Other BN and VOC compounds were also tentatively identified. Table 5 lists the compounds, the number of times each was detected, and the range of concentrations.

The highest concentration of bis(2-ethylhexyl)phthalate detected in a method blank was 2100 ppb. This compound was detected at similar concentrations in a number of soil samples and at lower concentrations in several wash blanks. Methylene chloride was detected in only one method blank at a concentration of 3 ppb, and was not detected in any soil samples. Nearly all of the BN TICs identified in the method blanks were also detected in some soil samples. The two VOC TICs, 2-butanone and vinyl acetate, were identified in two soil samples.

The presence of bis(2-ethylhexyl)phthalate is likely attributed to the plastic tubing used in the laboratory. Methylene chloride is a common laboratory contaminant which is used in the base/neutral extraction procedure. Some of the BN TICs, such as 1,1,2-trichloroethane and 1,1,2,2-tetrachloroethane, are believed to result from the breakdown of methylene chloride during sonication per EPA method 3550 of SW846. NET, the analytical laboratory, believes that the presence of other BN TICs may be the result of laboratory contamination, although the exact cause is currently not known. The source of the VOC TICs is not known.

2. Trip Blanks

One trip blank accompanied the field crew each day of VOC sampling and was analyzed for VOC+15 including xylenes. Complete results for the trip blanks are presented in Volumes II through IV.

No targeted VOCs were detected in any of the three trip blanks. Two tentatively identified compounds, acetone and carbon disulfide, were detected. Acetone, a common laboratory contaminant, was present in each trip blank at concentrations

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TABLE 5
Compounds Present in Laboratory Method Blanks

Compound	Number of Occurrences	Range of Concentrations (ppb)
Base/Neutral Compounds		
Bis-(2-Ethylhexyl)phthalate	2	220-2,100
1,1,2-Trichloroethane (TIC)	5	230-530
1,1,2,2-Tetrachloroethane (TIC)	4	470-1,100
5-Hexen-2-one (TIC)	2	8-200
1,3-Epoxy-4-methyl-pentane (TIC)	1	1,200
4-Hydroxy-2-propyl-2-Hexanone (TIC)	1	1,600
2-Propenylidene-Cyclobutene (TIC)	1	190
6-Bromo-2-hexanone (TIC)	2	200-260
2-Hexanone (TIC)	1	67
3-Hexanone (TIC)	3	52-1,600
2-Methyl-2-(1-methylethyl)oxyrane (TIC)	1	1,700
Methyl-benzene (TIC)	2	7-320
4-Methyl-2-pentanone (TIC)	2	11-270
3-Methyl-2-pentanone (TIC)	1	1,400
2,3-Dimethyl-2-Butanol (TIC)	1	6
2-Butanone (TIC)	1	62
Volatile Organic Compounds		
Methylene chloride	1	3
2-Butanone (TIC)	3	1,250-7,411
Vinyl acetate (TIC)	1	1,250

25 laboratory method blanks analyzed
TIC: Tentatively identified compound

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ranging from 12 to 80 ppb. Carbon disulfide was detected only in the trip blank associated with the July 25, 1990 samples at a trace concentration of 2 ppb.

3. Field Blanks

One field (wash) blank was collected each day of sampling except on July 25, 1990, when two were collected. The wash blanks were analyzed for all chemical parameters which were sampled for on that day.

One targeted VOC, methylene chloride, and one targeted BN, bis(2-ethylhexyl) phthalate, were detected in one or more of the field blanks. No tentatively identified VOCs were detected, but several BN TICs were detected in trace quantities.

Methylene chloride was detected in two of the four field blanks analyzed for VOC+15. Methylene chloride is used in the laboratory sample extraction procedure for BN compounds, and its presence is likely the result of laboratory contamination. Two of the five field blanks analyzed for BN+15 contained trace concentrations of bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate is a common laboratory contaminant which can result from contact with latex gloves or laboratory tubing. This compound was also detected in two method blanks.

Four of the six field blanks contained a number of BN TICs. The "unknown" dimethylsiloxanes are likely attributed to laboratory contamination from the "bleeding" of the gas chromatography column. Most of the remaining BN TICs were detected at equal or higher concentrations in the soil samples. Many of these were also detected in the laboratory method blanks. Therefore, the BN TICs may be the result of incomplete decontamination of the field sampling equipment and/or laboratory contamination.

4. Duplicate Samples

Seven duplicate soil samples were collected. Six were analyzed for BN+15 and one for VOC+15 including xylenes. Table 6 provides a comparison of the analytical results for each duplicate sample. All duplicate sample results appear to fall within an acceptable range except for the duplicate sample from boring B-5. This sample contained total BN concentrations of 19.2 and 459.1 ppm. As a result, boring B-5 will be resampled as described in Section IV.

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TABLE 6
Concentrations of Duplicate Sample Analyses

Sample Location	Depth	Matrix	Analysis	Conc. 1	Conc. 2
1605	1.5-2.0	Soil	BN+15	23.9	17.2
1707	0.0-0.5	Soil	BN+15	57.1	11.1
	0.5-1.0	Soil	BN+15	0.7	6.8
1708	0.0-0.5	Soil	BN+15	1.77	0.95
M2401	1.5-2.0	Soil	VOC+15 including xylenes	0.04	0.10
2802	0.0-0.5	Soil	BN+15	61.9	20.6
B-5	0.0-0.5	Soil	BN+15	19.2	459.1

Notes:

Depths are in feet below the soil surface.
Concentrations are reported in parts per million (ppm).

288E:PAA00420.W51

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C. Soil Results in Areas Previously Targeted for Cleanup

1. AEC 3: Finished Product Loading Area

Two samples were collected from boring 306 during this phase of additional sampling. The surface sample was analyzed for BN+15 and the deeper sample collected from 1.5-2.0 feet was analyzed for BN+15 and VOC+15 including xylenes. A total carcinogenic BN concentration of 5.4 ppm was present in the surface sample. Total noncarcinogenic BNs were also present in this sample at a concentration of 4.7 ppm. The deeper sample exceeded the site-specific action levels for carcinogenic and noncarcinogenic BNs with concentrations of 54.3 and 456.9 ppm, respectively. A total VOC concentration of 40.8 ppm was also detected in the deeper sample. This concentration exceeds the site-specific action level of 10 ppm. AEC 3 was previously targeted for cleanup based upon VOC results obtained during the Phase I sampling. Cleanup of this area is proposed in Section IV.

2. AEC 14: Former Drum Storage Area

Two samples were collected for BN+15 analysis from boring 1405. Although ENVIRON requested VOC+15 including xylene analysis of the deeper sample, this testing was inadvertently not performed by the analytical laboratory. Concentrations of total carcinogenic and noncarcinogenic BNs in both samples were well below the site-specific action levels. Based upon the results of VOC analysis performed during the Phase I sampling, cleanup of this area is proposed in Section IV.

3. AEC 16: Former Drum Storage Area

Two samples were collected from boring 1605. The surface sample was analyzed for BN+15, while the deeper sample was analyzed both for BN+15 and VOC+15 including xylenes. Neither sample contained total carcinogenic and noncarcinogenic BN concentrations exceeding the site-specific action levels. The deeper sample, however, contained a total VOC concentration of 1,859 ppm. High levels of VOCs were previously detected in this AEC during the Phase I sampling. Cleanup of this area is proposed in Section IV.

4. AEC 17 (Northern Section): Former Drum Storage Area

One boring, M2401, was completed in the northern portion of AEC 17 as part of the additional sampling phase. Two samples were collected from depths of 0.0-0.5 and 1.5-2.0 feet below the soil surface. The surface sample was analyzed for BN+15. The

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deeper sample was analyzed for both BN+15 and VOC+15 including xylenes. Total BN concentrations in the surface sample were below the site-specific action levels for total carcinogenic and noncarcinogenic compounds. The concentration of total carcinogenic BNs in the deeper sample was 22.3 ppm, which is not materially in excess of the site-specific action level. The concentrations of total VOCs and noncarcinogenic BNs in this sample were below the site-specific action level. Based upon previous VOC sampling in this AEC, cleanup of this area is proposed in Section IV.

5. AEC 21: Former Aboveground Tank Farm

Two samples were collected from boring 2105 during the additional sampling phase. The surface sample was analyzed for BN+15 and the deeper sample for BN+15 and VOC+15 including xylenes. Total carcinogenic and noncarcinogenic BN concentrations were below the site-specific action levels. The total VOC concentration of 8,700 greatly exceeded the site-specific action level of 10 ppm. Based upon the VOC data obtained from this and previous investigations, cleanup of this area is proposed in Section IV.

6. AEC 23: Tank Wagon Loading Area

Two samples were collected from boring 2303. The surface sample was analyzed for BN+15 and the deeper sample for BN+15 and VOC+15 including xylenes. The concentration of total carcinogenic BNs in the surface sample was 10.1 ppm, which is essentially equivalent to the site-specific action level of 10 ppm. The concentrations of total noncarcinogenic BNs in this sample were below the site-specific action level. Total carcinogenic and noncarcinogenic BN concentrations in the deeper sample were below site-specific action levels. VOCs were not detected. Based upon these results, and the fact that total VOCs less than 10 ppm were detected within this AEC during the Phase I sampling, cleanup of this area is not proposed.

7. AEC 25: Tank Wagon Loading Area

As part of the additional sampling, two samples were collected from boring 2503. The surface sample was analyzed for BN+15 and the deeper sample for BN+15 and VOC+15 including xylenes. Concentrations of all tested parameters were below the site-specific action levels. Based upon the detection of elevated levels of VOCs in another sample from this AEC during the Phase I sampling, cleanup of this area is proposed in Section IV.

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D. Areas Not Previously Targeted for Cleanup

1. AEC 2: Dumpster/Trash Compactor Area

Two samples were collected during this phase of sampling from boring 202. The surface sample was analyzed for BN+15 and the deeper sample for VOC+15 including xylenes. Total carcinogenic and noncarcinogenic BN concentrations were below the site-specific action levels, and VOCs were not detected. Previous sampling for VOCs at a depth of 6 to 12 inches within this AEC during the Phase I investigation (boring 201) did not reveal the presence of VOCs. Based upon the fact that VOCs were not detected at depth during this phase of sampling and BNs were not present above site-specific levels, no further action is proposed for this AEC.

2. AEC 5: Phthalic Anhydride Unloading Area

As part of the additional sampling phase, two samples were collected from boring 502. The surface sample was analyzed for BN+15. The deeper sample was analyzed for VOC+15 including xylenes. Total carcinogenic and noncarcinogenic BN concentrations were below site-specific action levels. However, the total VOC concentration of 3,000 ppm was above the site-specific action level of 10 ppm. As a result, cleanup of this AEC is proposed in Section IV.

3. AEC 6: Fuel Oil Underground Storage Tank

During the Phase I sampling program, one soil sample was collected adjacent to the east side of the underground tank and analyzed for PAHs. A concentration of 3.7 ppm of total PAHs was detected. During this recent phase of sampling, three samples were collected from the area adjacent to previous boring 601. The surface sample was analyzed for BN+15. An intermediate depth sample was analyzed for VOC+15 including xylenes. The deeper sample was analyzed for both BN+15 and VOC+15 including xylenes. The concentration of total carcinogenic BNs in the surface sample was 12.7 ppm, which is not materially different from the site-specific action level. The concentration of total noncarcinogenic BNs in this sample was well below the site-specific action level of 100 ppm. Concentrations of total BNs and VOCs in the intermediate and deeper samples were well below the site-specific action levels. Based on these data, no further action is proposed for this AEC.

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4. AEC 8: Two Fuel Oil Underground Storage Tanks

As discussed in Section II, NJDEP agreed that previous sampling within this AEC for PAHs satisfies the Department's requirements for characterization sampling. Therefore, additional testing was not performed during this phase of work. Soil borings were previously completed 0-6 inches below the tank inverts at either end of the tanks and west of the center of each tank. Total PAHs were below the site-specific action levels of 10 ppm with the exception of one sample from boring 803 (23 ppm). ENVIRON believes that this level is not materially different from the site-specific action level, and therefore does not warrant cleanup. No further action is proposed.

5. AEC 9: Discharge of Raw Materials and Resin through Floor

During the Phase I sampling program, one soil boring (901) was completed through a hole in the floor through which resinous materials had impacted the underlying soils. Elevated levels of VOCs were detected in the sample collected from this boring. In order to determine the extent of this impact, six samples were collected from four borings (902, 903, 904 and 905) as part of the additional sampling phase. Two surface samples were analyzed for BN+15 and four deeper samples were analyzed for VOC+15 including xylenes. One of the samples analyzed for BNs contained a total carcinogenic BN concentration of 13.2 ppm, which is not materially different from the site-specific action level of 10 ppm. All other total BN concentrations were below the site-specific action levels. Total VOCs were either not detected or were present at trace levels in all four samples analyzed for VOC+15. Based upon the previous level of VOCs detected in boring 901 and the presence of resinous materials, cleanup of a small area around boring 901 is proposed in Section IV.

6. AEC 10: Finished Product and Raw Material Storage

One soil sample was collected from 0.0-0.5 foot and analyzed for BN+15. The concentration of total carcinogenic BNs was 11.3 ppm, which is not materially different from the site-specific action level. The concentration of noncarcinogenic BNs was well below the site-specific action level. Because the referenced level of carcinogenic BNs is not materially different from the site-specific action level, no further action is proposed for this AEC.

7. AEC 13: Former Aboveground Storage Tank Area

Two surface soil samples were collected at boring locations 1305 and 1306 as part of the additional sampling phase. Both samples were analyzed for BN+15.

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Concentrations of total carcinogenic and noncarcinogenic BNs were well below the site-specific action levels. As a result, no further action is proposed for this AEC.

8. AEC 15 (Southern Section): Former Drum Storage Area

Two samples were collected from each of two borings, 1506 and 1507, and were analyzed for BN+15. All four samples contained total noncarcinogenic BN concentrations below the site-specific action level. In addition, three of the four samples contained total carcinogenic BN concentrations below the site-specific action level. The other sample had a total carcinogenic BN concentration of 122 ppm, which is significantly above the site-specific action level. As a result, cleanup of this AEC is proposed in Section IV.

9. AEC 17 (Southern Section): Former Drum Storage Area

Two samples were collected from each of four borings as part of this phase of sampling. All samples were analyzed for BN+15. Concentrations of total noncarcinogenic BNs were below the site-specific action level. Seven of the eight samples contained concentrations of total carcinogenic BNs below the site-specific action level. The remaining sample, a duplicate sample, contained carcinogenic BN concentrations of 6 and 34 ppm. Although one of the duplicate samples contained carcinogenic BNs above 10 ppm, the results are considered anomalous and not materially in excess of 10 ppm. Therefore, no further action is proposed for this AEC.

10. AEC 18: Fuel Oil Unloading Area

Two samples were collected from boring 1802. Samples were analyzed for BN+15. The surface sample contained a concentration of total carcinogenic BNs of 16.2 ppm, which is not materially different from the site-specific action level. All other BN concentrations were below the site-specific action levels. As a result, no further action is proposed for this AEC.

11. AEC 26: Drains From Large Tank Farm

Two soil samples were collected from each of the four borings completed through the floor of the tank farm in areas adjacent to former drains for storm water runoff. The four surface samples were analyzed for BN+15, and the four deeper samples were analyzed for VOC+15 including xylenes. Concentrations of total carcinogenic and noncarcinogenic BNs were either non-detect or were well below the site-specific action levels. Concentration of total VOCs in three of the four samples analyzed were well

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below the site-specific action level. The fourth sample reported a total VOC concentration of 23.9 ppm. Because this level is not materially different from the site-specific action level of 10 ppm, and because other samples from AEC 26 suggest that any contamination present is isolated, no further action is proposed in this AEC.

12. AEC 28: Railroad Siding Runoff Discharge Pipe

One duplicate soil sample was collected from boring 2802 and analyzed for BN+15. The concentration of total noncarcinogenic BNs was below the site-specific action level. The concentrations of total carcinogenic BNs were 10.4 and 17.1 ppm, which are not materially different from the site-specific action level of 10 ppm. Therefore, no further action is proposed for this AEC.

13. Samples Collected Adjacent to Monitoring Wells

During the Phase I sampling program, soil samples were obtained and analyzed for VOCs and BNs during the installation of monitoring wells 1, 6, 9, 10, 21 and 23. With one exception, total BNs were below 1 ppm. Total BNs at 158 ppm were detected in the soil boring adjacent to MW10. This area was previously targeted for cleanup based upon the presence of elevated concentrations of VOCs.

During this phase of sampling, seven borings (B1 through B6 and M1501) were completed adjacent to other monitoring wells in areas not previously targeted for cleanup. One to three soil samples were collected from each boring. All samples were analyzed for BN+15, with two samples also being analyzed for VOC+15 including xylenes.

Borings B-3 and M1501, B-4, and B-6 are located adjacent to monitoring wells MW15, MW16 and MW18, respectively. Each boring was sampled for BN+15. No total carcinogenic or noncarcinogenic BN concentrations above the site-specific action levels were detected in borings B-3, B-4 or B-6. However, elevated BN concentrations were detected in M1501, which is located approximately 5 to 10 feet from boring B-3. Two samples were collected from this boring. The surface sample was analyzed for BN+15, while the deeper sample was analyzed for both BN+15 and VOC+15 including xylenes. Concentrations of total BNs in the surface sample were well below the site-specific action levels. The deeper sample exceeded both the carcinogenic and noncarcinogenic site-specific action levels for BNs with concentrations of 463.6 and 365.2 ppm, respectively. VOCs were not detected in this sample. Based upon the BN data, cleanup of this area is proposed in Section IV.

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Boring B-1 is located adjacent to MW7. Two samples were collected. The surface sample was analyzed for BN+15, and the deeper sample was analyzed for BN+15 and VOC+15 including xylenes. The concentration of total BNs in the surface sample was below the site-specific action levels. The concentration of carcinogenic BNs in the deeper sample was 29.7 ppm, which is not materially different from the site-specific action level. The concentrations of total noncarcinogenic BNs and total VOCs in the deeper sample were below the site-specific action levels. Based upon these data, no further work is proposed in the vicinity of this boring.

B-2 is located adjacent to MW12. Three samples were collected and analyzed for BN+15. The surface sample had a total carcinogenic BN concentration of 14.9 ppm, which is not materially different from the site-specific action level. The concentration of total noncarcinogenic BNs for this sample was well below the site-specific action level. Total BN concentrations in the intermediate and deeper samples were also well below the site-specific action levels. Based on these data, no further action is proposed in the vicinity of this boring.

B-5 is located adjacent to monitoring wells MW17 and MW26. Samples were collected at two depths and analyzed for BN+15. The surface duplicate sample had total carcinogenic BN concentrations of 9.3 and 272.1 ppm. Concentrations of total noncarcinogenic BNs in the surface sample were 9.8 and 187.0 ppm. In the deeper sample, the concentration of total carcinogenic BNs was 11.5 ppm, which is not materially different from the site-specific action level. The concentration of total noncarcinogenic BNs for this sample was well below the site-specific action level. Due to the large concentration discrepancies in the duplicate surface sample, resampling is proposed for this area in Section IV. If the results of the confirmatory sampling are not materially different from the site-specific action levels, cleanup will not be proposed. If this is not the case, cleanup of this area will be reflected in the final remedial workplan.

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IV. CLEANUP PLAN

A. Introduction

This section describes the proposed Cleanup Plan for the Spencer Kellogg site. The plan consists of a conceptual design for cleanup of VOC- and BN-contaminated soils, and discusses additional tasks that must be completed prior to implementing cleanup. Textron plans to begin the permitting process and the preparation of a detailed work plan following approval of this Cleanup Plan by NJDEP. The Cleanup Plan consists of the following components:

- The overall cleanup objectives;
- The preferred cleanup approach for contaminated soil;
- A sampling program to complete delineation of target areas;
- A schedule to implement the Cleanup Plan; and
- A cost estimate for the proposed cleanup activities.

The Cleanup Plan proposes on-site, low-temperature volatilization as the preferred remedial action for all target areas at the site. Low-temperature volatilization will effectively treat VOCs and BNs to levels below the site-specific cleanup guidelines. A contingency remedial action plan is not included, because the costs provided include as many passes through the low-temperature unit as needed to obtain the necessary reductions in VOC and BN concentrations, although only one such pass is anticipated to be necessary.

B. Cleanup Objectives

The site-specific action levels, set forth in Section III, for VOCs and BNs have been used to assess soil sampling results. In addition, these action levels were used for the purposes of analyzing remedial options and establishing target areas and soil volumes to develop this Cleanup Plan. These site-specific criteria, as listed below, are also proposed as appropriate cleanup targets for this site:

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Parameter	Cleanup Target (ppm)
Total Carcinogenic BNs	10
Total Noncarcinogenic BNs	100
Total VOCs	10

C. Scope of Cleanup

In establishing the scope of cleanup activities necessary for this site, ENVIRON targeted areas where VOCs are present at concentrations materially in excess of 10 ppm. Those areas where BNs are present at concentrations materially in excess of the proposed cleanup criteria are also targeted for cleanup. As a result of applying the above criteria to site sampling results, no further action is proposed for 13 AECs (AECs 2, 6, 8, 10, 11, 13, 18, 20, 22, 23, 26, 27, and 28). Fourteen AECs and one additional area not within a designated AEC are targeted for remediation based on VOCs and/or BNs present at levels exceeding the cleanup criteria.

Plate 11 presents the areas targeted for cleanup under this approach. Most of these areas were selected based on the presence of VOCs. Some of these areas also contain BNs above the proposed cleanup targets. Two areas, AEC 15 and the area around MW15, are targeted based upon the presence of BNs only. Table 7 summarizes the areas and volume estimates of soil targeted for cleanup. The area and depth of soil in each AEC are based on the results of Phase I, Phase II, and recent additional characterization sampling, field observations during these investigations, depth to ground water, and knowledge of site operating history. In some instances, areas targeted for remediation were extended beyond the original AEC demarcation based on the distance to the nearest "clean" sample location, on judgments as to the possible extent of contamination related to an AEC, or until a physical barrier, such as a building or wall, was reached.

ENVIRON believes this approach has resulted in a conservative estimate, which is likely to have overestimated the volume of soil to be remediated. Prior to cleanup, the delineation sampling described in the next section will be used to verify that ENVIRON's current estimates provide a conservative soil volume estimate for financial assurance purposes. The actual volume of soil that will be remediated, however, will be determined during cleanup through post-excavation sampling and, overall, the volume of soil may well

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TABLE 7

Summary of Estimated Soil Volumes Requiring Remediation

Target Area	Area (ft^2)	Depth (ft)	Volume[a] (yd^3)
AEC 1	1,350	3	150
AEC 3	7,999	3.5	1,037
AEC 4	4,990	3.5	647
AEC 5	1,815	2.5	168
AEC 7	1,230	3	137
AEC 9	9	3.5	1
AEC 12	6,050	3	672
AEC 14	3,778	2.5	350
AEC 15	78	2.5	7[b]
AEC 16	6,307	2.5	584
AEC 17	4,701	3	522
AEC 19	3,210	2.5	297
AEC 21	5,150	2	382
AEC 25	5,098	2.5	472
Area around MW15	78	3	9[b]
		TOTAL	5,435

[a] All remediation volumes are driven by VOCs unless otherwise noted.

[b] Remediation is driven by BNs; the volume is based on remediating soil within a 5-foot radius excavated to the water table; one additional area (around MW17) reported a large discrepancy in duplicate BN data, and will be investigated further to determine if that area should be included as a target area.

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be less than currently estimated. The depth estimates in each area correspond to the depth to ground water.

D. Pre-Remediation Sampling

1. Introduction

NJDEP has requested delineation sampling in areas targeted for remediation, primarily to ensure that sufficient soil volumes have been estimated for the purpose of financial assurance. As a means of confirming that the estimated remediation bounds reflect conservative estimates, ENVIRON proposes to collect a limited number of delineation soil samples at the locations shown on Plate 12.

Additional limited characterization sampling in the vicinity of Phase I soil samples with concentrations exceeding 1,000 ppm of lead and 20 ppm of arsenic will be conducted prior to cleanup. These sampling locations also are shown on Plate 12. The purpose of this sampling is to ensure that concentrations of those metals materially different from results previously obtained do not exist in these areas.

The approach to and rationale for this sampling are discussed in the following sections. Details regarding the sampling locations, depths and analytical parameters are provided on Table 8.

2. Delineation in Areas Targeted for Remediation

In certain areas of the site, the bounds of remediation are limited by the physical presence of buildings, bermed walls and property lines. In these instances, there is no need for delineation sampling. Where such physical boundaries are not present, however, and where no data exist, delineation samples for VOCs will be collected and analyzed following EPA Method 8020 using a field GC. Additionally, samples will be collected from areas where the presence of BNs has been used to target the area for cleanup to determine if concentrations in the surrounding area are materially different from those levels previously detected or to show that BNs have only a very limited presence. The BN analyses will be performed by a state-certified laboratory using Method 3550 from SW846 for sample preparation and USEPA Method 625 for analysis.

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Table 8
Proposed Sampling Locations, Depths, and Analytical Parameters

AEC	Boring	Sample Number	Collection Method[1]	Depth[2] (feet)	Analytical Parameters[3]
1	0102	288E-0101-SB01	HSAB	1.5-2.0	VOC
7	0702	288E-0702-SB01	HSAB	1.5-2.0	VOC
	0703	288E-0703-SB01	HSAB	1.5-2.0	VOC
	0704	288E-0704-SB01	HSAB	1.5-2.0	VOC
14	1406	288E-1406-SB01	HSAB	1.5-2.0	VOC
	1407	288E-1407-SB01	HSAB	1.5-2.0	VOC
	1408	288E-1408-SB01	HSAB	1.5-2.0	VOC
15	1508	288E-1508-SB01	HSAB	0.0-0.5	BN+15
17	1710	288E-1710-SB01	HSAB	1.5-2.0	VOC
21	2106	288E-2106-SB01	HSAB	1.5-2.0	VOC
	2107	288E-2107-SB01	HSAB	1.5-2.0	VOC
	2108	288E-2108-SB01	HSAB	1.5-2.0	VOC
	2109	288E-2109-SB01	HSAB	1.5-2.0	VOC
	2110	288E-2110-SB01	HSAB	0.0-0.5	lead, arsenic
23	2304	288E-2304-SB01	HSAB	0.0-0.5	lead
25	2504	288E-2503-SB01	HSAB	1.5-2.0	VOC
	B-7	288E-B-7-SB01	HAB	0.0-0.5	BN+15
	B-8	288E-B-8-SB01	HSAB	0.0-0.5	lead
	B-9	288E-B-9-SB01	HSAB	0.0-0.5	lead
	B-10	288E-B-10-SB01	HAB	0.0-0.5	lead

[1]Collection Method Abbreviations:
HAB = Hand Auger Boring
HSAB = Hollow-stem Auger Boring

[2]Depths are measured from the soil surface.

[3]Analytical Parameter Abbreviations:
BN+15 = Priority Pollutant Base/Neutral Compounds plus 15-compound library search (EPA Method 625)
VOC = Priority Pollutant Volatile Organics (EPA Method 8020)
Lead (EPA Method 7420)
Arsenic (EPA Method 7060)

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a) VOC Field Analysis

ENVIRON will collect soil samples and perform field GC analysis for VOCs at boring locations adjacent to AECs 1, 7, 14, 17, 21, and 25. All samples will be collected from 18-24 inches below the ground surface.

If the results of the field analysis indicate the presence of VOCs exceeding 10 ppm, ENVIRON will collect and analyze (using field methods) an additional sample 5-10 feet from the initial boring location. This process will continue until the results of the field analysis are such that the remedial boundary can be confidently designated.

b) BN Delineation

ENVIRON will collect one surface sample from boring 1508 for BN+15 analysis. This boring is to be located approximately 5 feet from previous boring 1506. If the results indicate levels materially different from the site-specific action levels, additional sampling and/or cleanup in this area may be necessary.

3. Metals Delineation

ENVIRON will collect samples to be analyzed for lead and, in one instance, arsenic in the vicinity of previous soil samples containing concentrations exceeding 1,000 ppm of lead or 20 ppm of arsenic. These samples are listed on Table 8 and the locations are shown on Plate 12. The purpose of this additional sampling will be to ensure that the levels of lead and arsenic measured at these additional sampling locations are not materially different from those previously obtained. In the event that results of this sampling indicate significantly higher lead or arsenic levels, further investigation will be undertaken.

E. Proposed Cleanup Remedy

This section describes the major components of the proposed cleanup remedy for the Spencer Kellogg facility. The preferred remedial approach for this site is the use of low-temperature volatilization to reduce concentrations of VOCs and BNs from soils in the target areas to below the cleanup criteria. Based on discussions with firms providing this capability, such as Canonie Environmental and Weston Services, Inc., this technology is capable of reducing the concentrations of VOCs and BNs found at the site to below cleanup targets. Textron and ENVIRON have discussed with these firms the feasibility of using this technology at the site, the availability of field units, space and materials handling requirements, soil processing rates (throughput), and cost. In general, based on the experience of these firms, concentrations of VOCs and BNs up to 10,000 and 300 ppm,

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respectively, can be reduced to below the cleanup targets with a single pass through the system. Feed soil with concentrations higher than these levels may require more than one pass to achieve the cleanup targets. To implement this technology at the site, it will be necessary to obtain a permit to construct/install air quality control equipment and a certificate to operate air quality control equipment for this project.

These units require up to approximately 5,000 ft^2 for setup of the equipment, plus areas for staging soil before and after treatment. Expected throughput rates range from 7.5-20 tons/hr. (5.4-14.3 yds^3/hr) depending on the equipment used, soil moisture content, and contaminant type and concentration. Adjustment of the retention time in the unit can be made as soil from different areas is processed, or additional passes through the unit can be made if particular batches require further treatment. Typically, these units are operated 8 hours per day. Actual field-scale units are available from the above firms for use at the Spencer Kellogg site. Canonie has completed an ECRA cleanup in South Kearny using this process. An 80% in-service factor has been indicated by Canonie (the unit can be expected to be out of service 20% of the time for maintenance).

Contaminated soil from the target areas will be excavated, treated on-site, and placed back in the on-site excavations. Implementation of this remedy will require removal of portions of railroad track in a few target areas and removal of asphalt in most target areas. At the completion of cleanup, these areas will be restored, as necessary.

Textron plans to proceed with obtaining formal bids from qualified contractors and selecting a contractor after submitting this Cleanup Plan to NJDEP. Work will begin on preparing permit applications and the final work plan once NJDEP approval is received. Prior to starting full remediation operations at the site, Textron will submit the detailed work plan to NJDEP containing a quality assurance plan and a health and safety plan. The quality assurance plan will describe the procedures to be followed to insure the quality of data generated in the field. The contractor will be required to implement a health and safety program which complies with all applicable requirements. All on-site personnel will have completed the mandatory 40-hour health and safety training stipulated by the Occupational Safety and Health Administration (OSHA) in 29 CFR 1910. A designated health and safety coordinator will be present on-site to perform air monitoring, establish safety programs, conduct health and safety meetings, and monitor safety procedures as the work progresses.

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The following sections briefly describe the major components of the cleanup.

1. Excavation and Soil Handling

Soil from most of the target areas will be excavated using conventional equipment (e.g., backhoes) and transported to a designated staging area prior to processing. ENVIRON anticipates that soil from beneath Building 4 (AEC 12) will be removed using specialized equipment (e.g., a vacuum excavator). Soil beneath Building 16 (AEC 9) will be removed manually (i.e., by laborers with shovels) after an opening is cut in the concrete floor.

ENVIRON has met with a structural engineer (Joel Moskowitz of Mueser Rutledge Consulting Engineers) and an excavation contractor (Robert Brown of Code Environmental Services, Inc.) to discuss the feasibility of removing soil from beneath Building 4. According to Mr. Moskowitz, no information was readily available at the plant on the type or capacity of the piles supporting Building 4, although the building appeared to be structurally sound. Assuming that the building is supported on sound piles, it will be possible to remove soil from beneath Building 4. Mr. Moskowitz recommended additional review and analysis to develop an excavation procedure for cleanup. This will include: (1) review of building plans and other data that may be available; (2) examination of the existing structures in greater detail; and (3) examination of the existing backfill, pile caps and piles by excavating several test pits. This work will be required to ensure that remediation under Building 4 can proceed, and to develop an excavation procedure. These activities will be performed during development of the detailed work plan for site cleanup.

The amount of soil excavated each day will be limited to the amount expected to be processed in a day, to minimize the quantity of soil staged at one time. Based on discussions with firms providing low-temperature volatilization capabilities, a pre-screening step will be required to remove debris greater than approximately 2 inches prior to processing in the thermal unit. The oversize material will be checked in the field with an organic vapor analyzer (OVA) or HNu. If no significant reading is observed, the contractor will backfill the oversize material with the treated soil; if a significant reading is observed, the material will be properly classified and disposed of off-site.

Most of the target areas are covered with asphalt that will need to be removed prior to excavation of the underlying soil. AECs 3, 4, 5, 9, 12, and 19 are currently not paved. In addition, a total of approximately 900 feet of railroad track will be removed in AECs 3, 4, and 5.

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2. Low-Temperature Volatilization

The overall process for a low-temperature volatilization system includes a feed hopper, conveyance system, the thermal unit, a quench system, and off-gas control. The thermal unit consists of a drier, which operates at 550-600°F to volatilize organics with a boiling point below this temperature, and an afterburner, which operates at approximately 1200°F to combust organics in the vapor phase. Because of the presence of petroleum hydrocarbons at the Spencer Kellogg site, an afterburner for the vapor phase will be necessary. At this time, it is anticipated that the system and staging areas will be located adjacent to AEC 21, a relatively inactive area of the facility.

Contaminated soil excavated from the target areas will be screened and material less than 2 inches will be staged for processing. Soil will be excavated and brought to the processing area at a rate that closely matches the throughput of the thermal unit, so that a minimum amount of contaminated soil will be staged at any time. The treated soil will be cooled, sampled, and placed back in on-site excavations after determining that the cleanup criteria have been achieved.

3. Off-Site Disposal

Portions of the contaminated soil to be excavated from two AECs will be transported off-site for disposal. In AECs 4 and 12, the surface soil is heavily contaminated with spilled resinous materials. The surface materials from these two AECs are not suitable for treatment in the proposed low-temperature process. Therefore, for planning purposes, it is estimated that approximately the top 6 inches of soil will be scraped away and transported off-site for disposal at an appropriate commercial facility. The remaining soil in AECs 4 and 12 will then be remediated via low-temperature volatilization. The volume of soil from AEC 4 to be disposed off-site is estimated to be 92 yd^3 and the volume of soil from AEC 12 is estimated to be 112 yd^3.

It may also be necessary to dispose of other materials off-site. All oversize material and debris recovered during excavation may not be suitable for backfilling on-site; some of this material may require off-site disposal. There may also be some volume of treated soil that cannot be backfilled due to limitations on the ability to recompact all soil into the original excavations. In addition, asphalt removed from AECs currently paved will be taken off-site; however, this material may be recycled at an asphalt plant rather than disposed of in a landfill. The cost estimate includes allowances for these items.

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4. Site Restoration

Because excavation of the target areas will disrupt active areas of the facility, these areas will be restored as cleanup is completed in each area. Site restoration activities will include appropriate replacement of railroad tracks and repaving.

F. Remediation Monitoring and Post-Excavation Sampling

During implementation of cleanup, soil sampling will be conducted to monitor the effectiveness of treatment (post-remedial sampling) and to verify that removal of contaminated soil from each target area is complete (post-excavation sampling).

It is expected that the contractor selected to conduct the cleanup will provide on-site analytical capabilities in a mobile laboratory to analyze soil samples for VOCs by GC. The on-site laboratory will perform a certification in accordance with EPA and/or NJDEP protocols to assure compliance with analytical standards, and will analyze samples for VOCs by EPA Method 8020. This method of analysis will serve as the primary verification for post-remedial and post-excavation sampling. Textron proposes to send 10% of all samples to a state-certified analytical laboratory for verification of the on-site analyses.

For post-remedial sampling, Textron proposes to collect and analyze one sample for every 20 cubic yards processed (approximately one sample per hour). Analytical results for these samples will be available the following day so that the previous day's soil volume can be verified as acceptable for backfilling. In the event that the on-site analysis indicates that the cleanup criterion for VOCs is not met, the soil represented by that sample (approximately 20 cubic yards) will be reprocessed through the treatment unit and resampled prior to backfilling. Treated soil will be staged until the off-site analytical results are received (within 48 hours). In the event that off-site analytical results do not agree with the on-site analysis and indicate that the cleanup criteria are not met, the discrepancy will be resolved by first examining the QA/QC procedures, followed by resampling of the treated soil and reprocessing, if necessary. When treating areas with elevated BN concentrations (e.g., AEC 3), a sample will be taken and sent off-site for BN as well as VOC analyses.

With the exception of two isolated areas currently targeted for remediation due to the presence of BNs only (new borings 1506 and 1508), post-excavation samples will be collected every 30 feet along the sidewalls of each excavation in the target areas and analyzed for VOCs by the on-site GC. Textron also proposes to send 10% of the samples to an analytical laboratory for verification testing. Samples will not be collected from the floor of the excavations because each area will be excavated to the water table. As with the post-remediation sampling, in the event that there is a discrepancy between the off-site analytical laboratory and the on-site GC analysis, the difference will be resolved by

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reviewing the QA/QC data, or further excavation will be performed and additional post-excavation sampling conducted. It is currently believed that the two referenced exceptions to the post-excavation sampling represent localized BN contamination. If the results of the delineation borings proposed in Section IV.D verify this, "hot spot" excavations will be performed without subsequent post-excavation sampling.

In addition, air monitoring as required to satisfy air permit conditions will be conducted and will be described in the detailed work plan.

G. Schedule

This section outlines the anticipated sequence of activities leading to completion of the cleanup pursuant to the proposed Cleanup Plan. Figure 1 is an estimated schedule of activities for the next phase of work and includes an estimate of the timing for implementation of sitewide cleanup. As indicated on the schedule, 2-1/2 months (until the end of 1990) have been factored into the schedule for NJDEP review and approval of this Revised Cleanup Plan, before initiation of the proposed additional sampling at the site. Three months have been estimated for mobilizing and making necessary arrangements for sampling through collection of samples and receipt and evaluation of laboratory results. evaluating the sampling results. Concurrent with the sampling work, a detailed remedial work plan will be prepared and the necessary permits will be obtained. Completion of these activities is estimated to take approximately five months. Mobilization and implementation of cleanup are estimated to take approximately four months. Because the cleanup is scheduled around a July shutdown of the Reichhold plant, substantial delay in receiving NJDEP's approval of the Cleanup Plan could delay remediation. ENVIRON will also submit monthly progress reports to NJDEP after approval of the Cleanup Plan until submission of the final report.

H. Progress and Final Reports

As indicated above, monthly progress reports will be submitted to NJDEP after approval of this Cleanup Plan is received. Progress reports will be prepared using the suggested format in NJDEP's Cleanup Plan Guide and will describe work performed and any problems or delays encountered during implementation. Costs incurred and data collected will be presented in each progress report, as appropriate.

Following the conclusion of the cleanup work, a final report will be prepared and submitted to the NJDEP, as required by the ECRA regulations. Consistent with NJDEP's Cleanup Plan Guide, the major components of the final report will include a narrative summary of cleanup work for each target area, a summary of milestone dates for cleanup activities; copies of manifest or shipping forms for any material transported off-site,

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including the name of all subcontractors, transporters, and disposal facilities utilized; presentation of all post-excavation and post-treatment sampling results; copies of all permits obtained; and the total actual cost to complete the cleanup. As indicated in Figure 1, two months have been scheduled to complete and submit this report, to allow for receipt and compilation of all manifests, disposal documentation, subcontractor invoices, and other necessary information.

I. Cost Estimate

Table 9 presents the estimated cost to implement the proposed Cleanup Plan. The total cost represents the expenditures to construct the remedial systems and to conduct treatment. Both direct and indirect costs have been considered in the development of the total cost. Direct costs include such items as mobilization/demobilization, all site work, expenditures for equipment, materials, labor, transportation and disposal, and contingencies. Indirect costs, such as engineering and design, and field services and supervision, are added to the total direct costs using standard factors.

It has been necessary to make certain judgments to provide a basis for the cost estimate. The following general judgments and considerations are incorporated into the cost estimate:

- An estimate of $8,500 has been included for pre-remediation sampling for metals, BNs, and VOCs.

- Mobilization/demobilization has been estimated at $265,000 based on discussions with qualified contractors. This includes the contractor's cost associated with development of the detailed work plan and permitting.

- The cost for low-temperature volatilization is based on a unit cost of $90/ton for treatment. This unit cost includes costs to perform all site work (including excavation, treatment, and backfilling treated soil), conduct air monitoring, perform post-excavation and post-treatment soil sampling with on-site analysis, and prepare a final report.

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TABLE 9
Cost Estimate for Proposed Cleanup Plan

Cost Item		Costs
Pre-remediation Sampling		$ 8,500
Mobilization/demobilization		265,000
Low-Temperature Volatilization Treatment		659,100
Excavation Under Buildings 4 and 16		100,000
Off-Site Laboratory Verification Analysis		33,000
Transportation and Disposal		240,700
Remove and Replace Railroad		70,200
Repave		43,500
	SUBTOTAL =	$1,420,000
Health and Safety Contingency (10%)		$ 142,000
Scope Contingency (20%)		284,000
	TOTAL DIRECT COST =	$1,846,000
Engineering and Design (10%)		$ 184,600
Field Services and Supervision (7%)		129,200
	TOTAL COST =	$2,159,800

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- Removal of soil from under Buildings 4 (AEC 12) and 16 (AEC 9) has been estimated separately from excavation of other AECs, which is included in the on-site treatment unit cost. The cost to remove soil from under Buildings 4 and 16 is estimated at approximately $100,000 based on discussions with contractors. This cost includes a geotechnical inspection and evaluation of the piles to ensure that soil can be removed without compromising the integrity of the structure.

- Transportation and disposal (T&D) cost provides for off-site disposal of the following components of excavated material: (1) soil from the top 6 inches of AECs 4 and 12; (2) debris not suitable for backfill; (3) excess treated soil that cannot be backfilled; and (4) asphalt. The volume of soil from AECs 4 and 12 is estimated to be 204 yd^3. The in-place soil density is assumed to be 1.4 tons/yd^3. It was assumed that 10% of the total material excavated consists of debris greater than 2 inches and that half of this material is not suitable for backfilling on-site. It was also assumed that 5% of the treated soil would not be backfilled because of soil expansion during excavation and limitations on the ability to recompact all treated soil into on-site excavations. An estimated 686 tons of asphalt will be removed from AECs 1, 7, 14, 15, 16, 17, 21, and 25 and the area around MW15. The unit T&D cost for these materials (except asphalt) could range from $150/ton to $230/ton, depending on whether the materials are ultimately disposed in a nonhazardous or hazardous commercial landfill. For purposes of the cost estimate, a unit T&D cost of $230/ton for disposal at a regulated hazardous waste disposal facility is used for these materials. Based on quotes received from contractors, asphalt may be recycled at an asphalt plant at a unit cost of $12/ton.

- Removal and replacement of sections of railroad are estimated at $70,200 based on quotes received from several contractors.

- Repaving those AECs currently paved was calculated using a unit cost of $2/$ft^2$.

Because the Cleanup Plan is conceptual and based on currently available data, contingencies are included to account for unknown conditions. Specifically, a 10% health and safety contingency, to address costs associated with working in protective clothing, and a 20% scope contingency, to account for possible changes that may occur during final design and implementation, have been included. Commonly used factors have been included in the cost estimate to account for engineering and design, and for field services and supervision. The 10% factor for engineering and design is included to cover potential

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costs beyond those of the contractors associated with developing the work plan, permitting, and coordinating with the current site owner prior to implementing the cleanup. The 7% factor for field services and supervision accounts for anticipated costs for services during cleanup, such as supervising subcontractors, sampling, and preparing progress reports.

This cost estimate is based on information and budgetary estimates provided by potential contractors. Final costs will be dependent upon actual labor and material costs at the time of implementation, actual site conditions encountered during construction and excavation, competitive market conditions, final project schedule, regulatory requirements, actual quantities of soils to be treated, and cleanup levels ultimately accepted by NJDEP. As a result, the final cleanup costs may vary from the estimate presented here and the revised estimate, if appropriate, will be provided in the detailed work plan.

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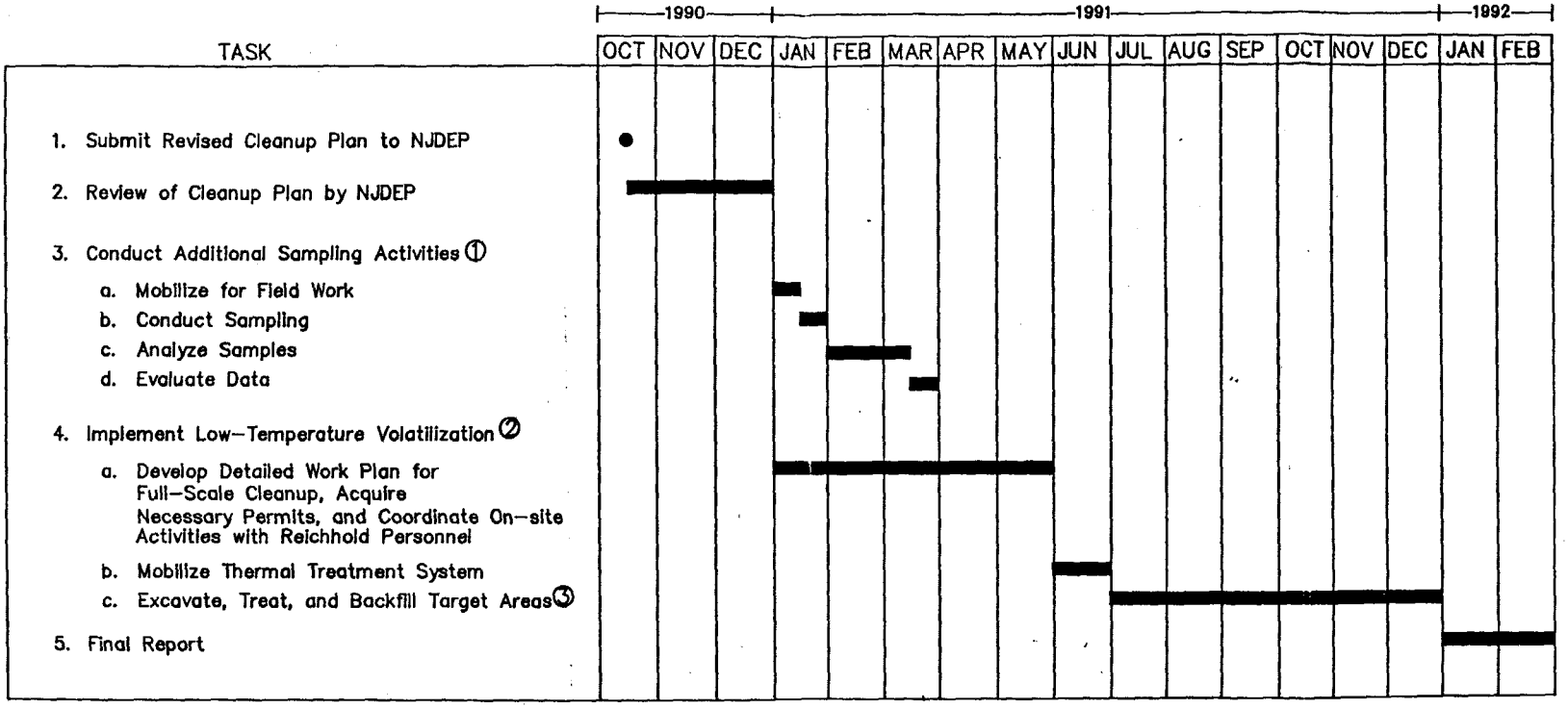

① Assumes NJDEP approval of proposed pre-remediation sampling.

② Based on discussions with potential contractors.

③ Post-excavation sampling will take place simultaneously with excavation, treatment, and backfilling activities. The length of on-site activities depends on the throughput of the treatment unit chosen. Assumes that Reichhold will agree to this schedule.

P:\020286\028sg04

ENVIRON
Counsel in Health and Environmental Science

CLEANUP IMPLEMENTATION SCHEDULE
Former Spencer Kellogg Site

845030778

Figure 1

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ENVIRON

210 CARNEGIE CENTER, SUITE 201, PRINCETON, NJ 08540
4350 FAIRFAX DR., ARLINGTON, VA 22203
5820 SHELLMOUND ST., SUITE 700, EMERYVILLE, CA 94608

PLATE: 12

PROPOSED PRE-REMEDIATION SAMPLING LOCATIONS

Spencer Kellogg, Formerly A Division Of Textron Inc.
Newark, New Jersey

DATE: October 1990	DRAFTED BY: T. Fitzpatrick CHECKED BY: J. Mermelstein

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ENVIRON
210 CARNEGIE CENTER, SUITE 201, PRINCETON, NJ 08540
4350 FAIRFAX DR., ARLINGTON, VA 22203
5820 SHELLMOUND ST., SUITE 700, EMERYVILLE, CA 94608

PLATE: 11

AREAS TARGETED FOR REMEDIATION

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE: October 1990	DRAFTED BY: T. Fitzpatrick CHECKED BY: J. Mermelstein

845030780

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ENVIRON
210 CARNEGIE CENTER SUITE 201 PRINCETON N J 08540
1000 POTOMAC ST N W WASHINGTON D C 20007

Plate 10

RESULTS OF ADDITIONAL ECRA SAMPLING

Spencer Kellogg, formerly a Division of Textron Inc.
Newark, New Jersey

DATE	DRAFTED BY M. Smith
October 1990	CHECKED BY J. Mermelstein
Revised:	

845030781

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ENVIRON
210 CARNEGIE CENTER, SUITE 201, PRINCETON, NJ 08540
4350 FAIRFAX DR., ARLINGTON, VA 22203
5820 SHELLMOUND ST., SUITE 700, EMERYVILLE, CA 94608

PLATE: 9

LOCATIONS OF ADDITIONAL ECRA SAMPLING

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE: October 1990	DRAFTED BY: T. Fitzpatrick CHECKED BY: J. Mermelstein

845030782

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ENVIRON
210 CARNEGIE CENTER SUITE 201 PRINCETON N J 08540
1000 POTOMAC ST N W WASHINGTON D C 20007

Plate 8

MARCH 1988 GROUND WATER ANALYTICAL RESULTS AT OR ABOVE ECRA GUIDELINES

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE June 1988	DRAFTED BY M. SMITH CHECKED BY J.L. CUTLER

845030783

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ENVIRON
210 CARNEGIE CENTER, SUITE 201, PRINCETON, N.J. 08540
1000 POTOMAC ST., N.W. WASHINGTON D.C. 20007

Plate 7

PHASE II
GROUND WATER ANALYTICAL RESULTS ABOVE ECRA GUIDELINES

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE June 1988	DRAFTED BY M. SMITH CHECKED BY J.L. CUTLER

845030784

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ENVIRON
210 CARNEGIE CENTER, SUITE 201, PRINCETON, NJ 08540
4350 FAIRFAX DR., ARLINGTON, VA 22203
5820 SHELLMOUND ST., SUITE 700, EMERYVILLE, CA 94608

PLATE: 6

PHASE I GROUND WATER ANALYTICAL RESULTS ABOVE ECRA GUIDELINES

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE: October 1990	DRAFTED BY: T. Fitzpatrick CHECKED BY: J. Mermelstein

845030785

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ENVIRON
210 CARNEGIE CENTER, SUITE 201, PRINCETON, N.J. 08540
1000 POTOMAC ST., N.W. WASHINGTON D.C. 20007

Plate 5

PHASE II METAL RESULTS ABOVE ECRA GUIDELINES IN DEEPER SOIL SAMPLES

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE	DRAFTED BY: M. SMITH
June 1988.	CHECKED BY: J.L. CUTLER

845030786

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ENVIRON
210 CARNEGIE CENTER, SUITE 201, PRINCETON, N.J. 08540
1000 POTOMAC ST., N.W. WASHINGTON D.C. 20007

Plate 4

PHASE II METAL RESULTS ABOVE ECRA GUIDELINES IN SURFACE SOIL SAMPLES

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE June 1988.	DRAFTED BY M. SMITH CHECKED BY J.L. CUTLER

845030787

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ENVIRON
210 CARNEGIE CENTER, SUITE 201 PRINCETON N J 08540
1000 POTOMAC ST , N W WASHINGTON D C 20007

Plate 3

HYDROCARBONS IN SOIL SAMPLES

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE	DRAFTED BY M. SMITH
June 1988	CHECKED BY J. Mermelstein

845030788

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ENVIRON

210 CARNEGIE CENTER, SUITE 201, PRINCETON, NJ 08540
4350 FAIRFAX DR., ARLINGTON, VA 22203
5820 SHELLMOUND ST., SUITE 700, EMERYVILLE, CA 94608

PLATE: 2

PHASE I
VOLATILE ORGANIC COMPOUNDS RESULTS

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE: October 1990	DRAFTED BY: T. Fitzpatrick CHECKED BY: J. Mermelstein

845030789

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ENVIRON
210 CARNEGIE CENTER SUITE 201 PRINCETON N J 08540
1000 POTOMAC ST . N W WASHINGTON D C 20007

Plate 1

AREAS OF ENVIRONMENTAL CONCERN AND ACTUAL SAMPLING LOCATIONS

Spencer Kellogg, formerly a Division of Textron Inc.
Newark, New Jersey

DATE	DRAFTED BY / CHECKED BY
January 1990	M. Smith / J. Mermelstein

845030790

APPENDIX A

Analytical Results of
Quarterly Ground Water Monitoring

845030791

TABLE A-1
Analytical Results of Quarterly Ground Water Monitoring[1]

Location	Compound	May 89	Aug 89	Nov 89	Feb 90	May 90	July 90
MW6[3]	Benzene	NS	NS	3	NS	NS	NS
	Toluene	NS	NS	ND	NS	NS	NS
	Ethylbenzene	NS	NS	ND	NS	NS	NS
	Total Xylenes	NS	NS	ND	NS	NS	NS
	Trichloroethene	NS	NS	ND	NS	NS	NS
MW10	Benzene	ND	ND	ND	7	ND	ND
	Toluene	15,000	4,300	5,500	37,000	33,000	6,000
	Ethylbenzene	ND	ND	ND	ND	ND	68
	Total Xylenes	ND	ND	ND	ND	ND	250
	Trichloroethene	ND	ND	ND	ND	ND	ND
MW10 (Duplicate Sample)							
	Benzene					ND	
	Toluene					34,000	
	Ethylbenzene					ND	
	Total Xylenes					ND	
	Trichloroethene					ND	
MW13	Benzene	ND	ND	ND	ND	ND	ND
	Toluene	33	ND	ND	ND	21	ND
	Ethylbenzene	40	ND	ND	ND	110	4
	Total Xylenes	ND	ND	ND	ND	410	85
	Trichloroethene	ND	ND	ND	ND	ND	ND
MW14[4]	Benzene	ND	ND	ND	ND	ND	NS
	Toluene	ND	ND	4	ND	ND	NS
	Ethylbenzene	ND	ND	ND	ND	ND	NS
	Total Xylenes	ND	ND	ND	ND	18	NS
	Trichloroethene	ND	ND	ND	ND	ND	NS

845030792

TABLE A-1
Analytical Results of Quarterly Ground Water Monitoring[1]

Location	Compound	May 89	Aug 89	Nov 89	Feb 90	May 90	July 90
MW15	Benzene	ND	ND	ND	ND	ND	ND
	Toluene	ND	ND	ND	ND	ND	ND
	Ethylbenzene	ND	ND	ND	ND	ND	ND
	Total Xylenes	ND	ND	ND	ND	ND	ND
	Trichloroethene	ND	ND	7	ND	ND	ND
MW20	Benzene	ND	ND	ND	ND	ND	ND
	Toluene	34	4	ND	92	38	26
	Ethylbenzene	34	14	13	38	29	36
	Total Xylenes	ND	ND	ND	ND	ND	ND
	Trichloroethene	ND	ND	ND	ND	ND	ND
MW20 (Duplicate Sample)							
	Benzene						7
	Toluene						30
	Ethylbenzene						28
	Total Xylenes						ND
	Trichloroethene						ND

Notes:

1. All concentrations are in parts per billion (ppb).
2. Abbreviations:
   ND = not detected.
   NS = not sampled.
3. At that time, hydrogeological data suggested that a component of ground water flow may have been moving towards MW6 from areas containing elevated levels of volatile organic compounds (VOCs). As a result, MW6 was sampled during the November 1989 quarterly ground water sampling. MW6 has not been included in subsequent ground water sampling rounds due to the absence of significant levels of VOCs evidenced by the November 1989 ground water results and due to general patterns of ground water flow in this area.
4. MW14 was not sampled in July 1990 due to physical damage to the well casing. The well will be replaced and sampled during subsequent quarterly ground water sampling.

288E:PAA005DB.W51

845030793

APPENDIX B

Summary of Analytical Results of Additional ECRA Sampling

845030794

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 2		
ENVIRON SAMPLE ID	288E-0202-SB01	288E-0202-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	0.43 J	
Benzo(a)Pyrene	0.34	
Benzo(b)Fluoranthene	0.61	
Benzo(k)Fluoranthene	ND	
Chrysene	0.58	
Dibenz(a,h)Anthracene	0.05 J	
Indeno(1,2,3-cd)Pyrene	0.18 J	
Total Carcinogens	2.19	
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	
Acenaphthene	ND	
Acenaphthylene	0.05 J	
Anthracene	0.10 J	
Benzo(g,h,i)Perylene	0.18 J	
bis(2-ethylhexyl)phthalate	3.20	
Butylbenzylphthalate	1.10	
Di-n-Butylphthalate	ND	
Di-n-Octyl Phthalate	0.31	
Diethylphthalate	ND	
Fluoranthene	0.64	
Fluorene	0.08 J	
Hexachlorobenzene	1.40	
Naphthalene	1.90	
Phenanthrene	0.58 J	
Pyrene	0.51	
Total Noncarcinogens	10.05	
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		ND
Methylene Chloride		ND
Toluene		ND
Total Xylenes		ND
Total Volatile Compounds		ND

845030795

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 3

ENVIRON SAMPLE ID	288E-0306-SB01	288E-0306-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	0.68	15.00
Benzo(a)Pyrene	0.70	3.60
Benzo(b)Fluoranthene	2.10	14.00
Benzo(k)Fluoranthene	ND	ND
Chrysene	1.20	19.00
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	0.73	2.70
Total Carcinogens	5.41	54.30
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	ND	34.00
Acenaphthylene	ND	ND
Anthracene	ND	12.00
Benzo(g,h,i)Perylene	0.69	1.90
bis(2-ethylhexyl)phthalate	0.54 B	ND
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	1.00	110.00
Fluorene	ND	37.00
Hexachlorobenzene	ND	ND
Naphthalene	0.91	76.00
Phenanthrene	0.59	130.00
Pyrene	1.00	56.00
Total Noncarcinogens	4.73	456.90
Volatile Organic Compounds		
Benzene		1.40
Ethylbenzene		11.00
Methylene Chloride		ND
Toluene		1.40
Total Xylenes		27.00
Total Volatile Compounds		40.80

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 5			
	ENVIRON SAMPLE ID	288E-0502-SB01	288E-0502-SB02
	MATRIX	Soil	Soil
	COLLECTION METHOD	HAB	HAB
	DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds			
	Benzo(a)Anthracene	1.10	
	Benzo(a)Pyrene	1.10	
	Benzo(b)Fluoranthene	2.10	
	Benzo(k)Fluoranthene	ND	
	Chrysene	1.40	
	Dibenz(a,h)Anthracene	0.17	
	Indeno(1,2,3-cd)Pyrene	1.10	
	Total Carcinogens	6.97	
Noncarcinogenic Base/Neutral Organic Compounds			
	1,2,4-Trichlorobenzene	0.12	
	Acenaphthene	0.17	
	Acenaphthylene	ND	
	Anthracene	0.28	
	Benzo(g,h,i)Perylene	1.30	
	bis(2-ethylhexyl)phthalate	0.62	
	Butylbenzylphthalate	ND	
	Di-n-Butylphthalate	0.06 J	
	Di-n-Octyl Phthalate	ND	
	Diethylphthalate	ND	
	Fluoranthene	2.10	
	Fluorene	0.10	
	Hexachlorobenzene	ND	
	Naphthalene	0.72	
	Phenanthrene	1.40	
	Pyrene	1.60	
	Total Noncarcinogens	8.46	
Volatile Organic Compounds			
	Benzene		ND
	Ethylbenzene		ND
	Methylene Chloride		ND
	Toluene		3000.00
	Total Xylenes		ND
	Total Volatile Compounds		3000.00

845030797

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 6			
ENVIRON SAMPLE ID	288E-0603-SB01	288E-0603-SB02	288E-0603-SB03
MATRIX	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	3.0-3.5
Carcinogenic Base/Neutral Organic Compounds			
Benzo(a)Anthracene	2.20		0.30 J
Benzo(a)Pyrene	2.20		0.30
Benzo(b)Fluoranthene	4.00		0.46
Benzo(k)Fluoranthene	ND		ND
Chrysene	2.50		0.32
Dibenz(a,h)Anthracene	ND		ND
Indeno(1,2,3-cd)Pyrene	1.80		0.18
Total Carcinogens	12.70		1.56
Noncarcinogenic Base/Neutral Organic Compounds			
1,2,4-Trichlorobenzene	ND		ND
Acenaphthene	ND		0.04 J
Acenaphthylene	ND		ND
Anthracene	0.29		0.09
Benzo(g,h,i)Perylene	1.80		0.20
bis(2-ethylhexyl)phthalate	0.46		ND
Butylbenzylphthalate	ND		ND
Di-n-Butylphthalate	ND		ND
Di-n-Octyl Phthalate	ND		ND
Diethylphthalate	ND		ND
Fluoranthene	4.10		0.70
Fluorene	ND		0.07 J
Hexachlorobenzene	ND		ND
Naphthalene	0.26		0.15
Phenanthrene	1.30		0.47
Pyrene	4.60		0.67
Total Noncarcinogens	12.81		2.39
Volatile Organic Compounds			
Benzene		ND	ND
Ethylbenzene		ND	ND
Methylene Chloride		0.01	0.01 J
Toluene		ND	ND
Total Xylenes		0.04	0.00 J
Total Volatile Compounds		0.04	0.01

8450307 98

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 9

ENVIRON SAMPLE ID	288E-0902-SB01	288E-0903-SB01	288E-0903-SB02	288E-0904-SB01	288E-0904-SB02	288E-0905-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HAB	HAB	HAB
DEPTH (feet)	1.0-1.2	0.0-0.5	0.5-0.8	0.0-0.5	1.5-1.7	1.3-1.5
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene		0.36		2.30		
Benzo(a)Pyrene		0.29		2.40		
Benzo(b)Fluoranthene		0.53		2.20		
Benzo(k)Fluoranthene		ND		1.60		
Chrysene		0.41		2.60		
Dibenz(a,h)Anthracene		ND		0.37		
Indeno(1,2,3-cd)Pyrene		0.16		1.70		
Total Carcinogens		1.75		13.17		
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene		ND		ND		
Acenaphthene		0.05 J		0.07 J		
Acenaphthylene		ND		0.06 J		
Anthracene		0.11		0.18		
Benzo(g,h,i)Perylene		ND		1.70		
bis(2-ethylhexyl)phthalate		ND		0.09		
Butylbenzylphthalate		ND		ND		
Di-n-Butylphthalate		ND		ND		
Di-n-Octyl Phthalate		ND		ND		
Diethylphthalate		ND		ND		
Fluoranthene		0.91		4.10		
Fluorene		0.04 J		0.05 J		
Hexachlorobenzene		ND		ND		
Naphthalene		ND		0.11		
Phenanthrene		0.77		1.50		
Pyrene		0.91		4.70		
Total Noncarcinogens		2.79		12.56		
Volatile Organic Compounds						
Benzene	ND		ND		ND	ND
Ethylbenzene	ND		ND		ND	ND
Methylene Chloride	ND		ND		ND	ND
Toluene	0.01		ND		ND	ND
Total Xylenes	ND		ND		ND	ND
Total Volatile Compounds	0.01		ND		ND	ND

8450307 99

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 10	↓
ENVIRON SAMPLE ID	288E-1003-SB01
MATRIX	Soil
COLLECTION METHOD	HSAB
DEPTH (feet)	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds	
Benzo(a)Anthracene	2.00
Benzo(a)Pyrene	2.30
Benzo(b)Fluoranthene	2.70
Benzo(k)Fluoranthene	ND
Chrysene	2.50
Dibenz(a,h)Anthracene	0.19
Indeno(1,2,3-cd)Pyrene	1.60
Total Carcinogens	11.29
Noncarcinogenic Base/Neutral Organic Compounds	
1,2,4-Trichlorobenzene	ND
Acenaphthene	0.12
Acenaphthylene	0.10
Anthracene	0.39
Benzo(g,h,i)Perylene	1.80
bis(2-ethylhexyl)phthalate	4.40 B
Butylbenzylphthalate	ND
Di-n-Butylphthalate	ND
Di-n-Octyl Phthalate	ND
Diethylphthalate	ND
Fluoranthene	4.80
Fluorene	0.14
Hexachlorobenzene	ND
Naphthalene	0.10
Phenanthrene	2.20
Pyrene	3.70
Total Noncarcinogens	17.75
Volatile Organic Compounds	
Benzene	
Ethylbenzene	
Methylene Chloride	
Toluene	
Total Xylenes	
Total Volatile Compounds	

845030800

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 13			
	ENVIRON SAMPLE ID	288E-1305-SB01	288E-1306-SB01
	MATRIX	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB
	DEPTH (feet)	0.0-0.5	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds			
	Benzo(a)Anthracene	0.41	0.29 J
	Benzo(a)Pyrene	0.37	0.26
	Benzo(b)Fluoranthene	0.77	0.49
	Benzo(k)Fluoranthene	ND	ND
	Chrysene	0.48	0.42
	Dibenz(a,h)Anthracene	ND	ND
	Indeno(1,2,3-cd)Pyrene	0.34	0.22
	Total Carcinogens	2.37	1.68
Noncarcinogenic Base/Neutral Organic Compounds			
	1,2,4-Trichlorobenzene	ND	ND
	Acenaphthene	0.03 J	ND
	Acenaphthylene	ND	ND
	Anthracene	0.08 J	0.06 J
	Benzo(g,h,i)Perylene	ND	0.29
	bis(2-ethylhexyl)phthalate	0.68 B	0.50 B
	Butylbenzylphthalate	ND	ND
	Di-n-Butylphthalate	0.02	ND
	Di-n-Octyl Phthalate	ND	ND
	Diethylphthalate	0.05 J	ND
	Fluoranthene	0.78	0.47
	Fluorene	0.04 J	ND
	Hexachlorobenzene	ND	ND
	Naphthalene	0.11	0.13
	Phenanthrene	0.41	0.42
	Pyrene	0.85	0.39
	Total Noncarcinogens	3.04	2.26
Volatile Organic Compounds			
	Benzene		
	Ethylbenzene		
	Methylene Chloride		
	Toluene		
	Total Xylenes		
	Total Volatile Compounds		

845030801

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 14

ENVIRON SAMPLE ID	288E-1405-SB01	288E-1405-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	ND	ND
Benzo(a)Pyrene	ND	ND
Benzo(b)Fluoranthene	ND	ND
Benzo(k)Fluoranthene	ND	ND
Chrysene	ND	ND
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND
Total Carcinogens	ND	ND
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	ND	ND
Acenaphthylene	ND	ND
Anthracene	ND	ND
Benzo(g,h,i)Perylene	ND	ND
bis(2-ethylhexyl)phthalate	8.50	0.51
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	0.51 J	0.10 J
Fluorene	ND	ND
Hexachlorobenzene	ND	ND
Naphthalene	11.00	0.04 J
Phenanthrene	0.40 J	0.08
Pyrene	0.37 J	ND
Total Noncarcinogens	20.78	0.73
Volatile Organic Compounds		
Benzene		
Ethylbenzene		
Methylene Chloride		
Toluene		
Total Xylenes		
Total Volatile Compounds		

84503080 2

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 15					
	ENVIRON SAMPLE ID	288E-1506-SB01	288E-1506-SB03	288E-1507-SB01	288E-1507-SB03
	MATRIX	Soil	Soil	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB
	DEPTH (feet)	0.0-0.5	1.0-1.5	0.0-0.5	2.0-4.0
Carcinogenic Base/Neutral Organic Compounds					
	Benzo(a)Anthracene	25.00	ND	0.98	ND
	Benzo(a)Pyrene	25.00	0.04 J	1.40	0.82
	Benzo(b)Fluoranthene	23.00	0.04 J	2.50	1.30 J
	Benzo(k)Fluoranthene	ND	ND	ND	ND
	Chrysene	25.00	ND	1.20	1.30
	Dibenz(a,h)Anthracene	4.40	ND	ND	ND
	Indeno(1,2,3-cd)Pyrene	20.00	ND	1.40	1.30
	Total Carcinogens	122.40	0.08	7.48	4.72
Noncarcinogenic Base/Neutral Organic Compounds					
	1,2,4-Trichlorobenzene	ND	ND	ND	ND
	Acenaphthene	2.70	ND	ND	ND
	Acenaphthylene	1.20	ND	ND	ND
	Anthracene	11.00	ND	ND	ND
	Benzo(g,h,i)Perylene	20.00	ND	1.50	1.30 J
	bis(2-ethylhexyl)phthalate	4.70	0.41	0.15 B	ND
	Butylbenzylphthalate	ND	ND	ND	ND
	Di-n-Butylphthalate	ND	0.04 J	ND	ND
	Di-n-Octyl Phthalate	ND	ND	ND	ND
	Diethylphthalate	ND	ND	ND	ND
	Fluoranthene	ND	0.06 J	1.10	1.60
	Fluorene	5.80	ND	ND	0.69
	Hexachlorobenzene	ND	ND	ND	ND
	Naphthalene	5.00	0.67	0.19	0.46 J
	Phenanthrene	0.21 J	0.05 J	0.42	2.50
	Pyrene	0.28	0.05 J	0.82	0.72
	Total Noncarcinogens	50.89	1.28	4.18	7.27
Volatile Organic Compounds					
	Benzene				
	Ethylbenzene				
	Methylene Chloride				
	Toluene				
	Total Xylenes				
	Total Volatile Compounds				

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 16

ENVIRON SAMPLE ID	288E-1605-SB01	288E-1605-SB02	288E-1605-SB22
MATRIX	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds			
Benzo(a)Anthracene	ND	ND	ND
Benzo(a)Pyrene	ND	ND	ND
Benzo(b)Fluoranthene	ND	ND	ND
Benzo(k)Fluoranthene	ND	ND	ND
Chrysene	ND	ND	ND
Dibenz(a,h)Anthracene	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	ND
Total Carcinogens	ND	ND	ND
Noncarcinogenic Base/Neutral Organic Compounds			
1,2,4-Trichlorobenzene	ND	ND	ND
Acenaphthene	ND	ND	ND
Acenaphthylene	ND	ND	ND
Anthracene	ND	ND	ND
Benzo(g,h,i)Perylene	ND	ND	ND
bis(2-ethylhexyl)phthalate	3.40	1.90	2.20
Butylbenzylphthalate	ND	ND	ND
Di-n-Butylphthalate	ND	ND	ND
Di-n-Octyl Phthalate	ND	ND	ND
Diethylphthalate	ND	ND	ND
Fluoranthene	ND	ND	ND
Fluorene	ND	ND	ND
Hexachlorobenzene	ND	ND	ND
Naphthalene	14.00	22.00	15.00
Phenanthrene	0.22 J	ND	ND
Pyrene	ND	ND	ND
Total Noncarcinogens	17.62	23.90	17.20
Volatile Organic Compounds			
Benzene		ND	
Ethylbenzene		410.00	
Methylene Chloride		ND	
Toluene		49.00 J	
Total Xylenes		1400.00	
Total Volatile Compounds		1859.00	

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 17

ENVIRON SAMPLE ID	288E-1706-SB01	288E-1706-SB03	288E-1707-SB01	288E-1707-SB03	288E-1707-SB11	288E-1707-SB33
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	0.0-0.5	0.5-1.0	0.0-0.5	0.5-1.0
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	ND	ND	5.10	ND	1.10	0.55 B
Benzo(a)Pyrene	ND	ND	6.40	ND	1.20	0.63
Benzo(b)Fluoranthene	ND	ND	6.40	ND	1.30	0.73 J
Benzo(k)Fluoranthene	ND	0.26	4.40	ND	ND	0.51
Chrysene	ND	0.50	5.60	ND	1.20	0.68
Dibenz(a,h)Anthracene	ND	ND	0.47	ND	0.17	0.12 J
Indeno(1,2,3-cd)Pyrene	ND	ND	5.60	ND	1.10	0.43 J
Total Carcinogens	ND	0.76	33.97	ND	6.07	3.65
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	0.08	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND	ND	ND
Anthracene	ND	0.11	0.43	ND	0.08	0.07 J
Benzo(g,h,i)Perylene	ND	ND	5.80	ND	1.30	0.45 J
bis(2-ethylhexyl)phthalate	0.42 B	0.19	0.15 B	ND	ND	0.10 J,B
Butylbenzylphthalate	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate	ND	ND	ND	0.13 J	ND	0.07 J
Di-n-Octyl Phthalate	ND	ND	ND	ND	ND	ND
Diethylphthalate	ND	0.03 J	ND	ND	ND	ND
Fluoranthene	0.08 J	ND	7.10	ND	1.20	0.74
Fluorene	ND	0.07 J	0.09	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND	ND	ND
Naphthalene	0.03 J	0.58	2.10	0.32	0.54	0.59
Phenanthrene	0.07	0.58	2.40	0.21 J	0.42	0.43 J
Pyrene	ND	1.10	5.00	ND	1.50	0.69
Total Noncarcinogens	0.60	2.66	23.15	0.66	5.04	3.13
Volatile Organic Compounds						
Benzene						
Ethylbenzene						
Methylene Chloride						
Toluene						
Total Xylenes						
Total Volatile Compounds						

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 17							
	ENVIRON SAMPLE ID	288E-1708-SB01	288E-1708-SB03	288E-1708-SB11	288E-1709-SB01	288E-1709-SB03	288E-M2401-SB01
	MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB	HSAB
	DEPTH (feet)	0.0-0.5	2.0-2.5	0.0-0.5	0.0-0.5	2.5-3.0	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds							
	Benzo(a)Anthracene	0.12 J	1.10	ND	1.50	1.10	0.83 J
	Benzo(a)Pyrene	0.11	1.20	0.07 J	ND	1.20	0.81
	Benzo(b)Fluoranthene	0.23	2.60	0.10 J	1.60	1.80	1.70
	Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	ND
	Chrysene	0.16	1.90	0.09 J	1.90	1.30	1.00
	Dibenz(a,h)Anthracene	ND	ND	ND	0.12	ND	ND
	Indeno(1,2,3-cd)Pyrene	0.09	1.10	0.08 J	1.10	0.69	1.00
	Total Carcinogens	0.71	7.90	0.34	6.22	6.09	5.34
Noncarcinogenic Base/Neutral Organic Compounds							
	1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND
	Acenaphthene	ND	ND	ND	0.05 J	ND	0.12 J
	Acenaphthylene	ND	ND	ND	ND	ND	ND
	Anthracene	ND	ND	ND	0.23	0.10	0.09 J
	Benzo(g,h,i)Perylene	0.09	1.30	0.11 J	1.20	0.82	0.83
	bis(2-ethylhexyl)phthalate	0.10	ND	0.10	0.10	ND	2.60
	Butylbenzylphthalate	ND	ND	ND	ND	ND	ND
	Di-n-Butylphthalate	ND	ND	ND	ND	ND	ND
	Di-n-Octyl Phthalate	ND	ND	ND	ND	ND	ND
	Diethylphthalate	ND	ND	ND	ND	ND	ND
	Fluoranthene	0.35	1.90	0.14	1.80	1.20	1.70
	Fluorene	ND	ND	ND	0.07 J	0.10	0.13 J
	Hexachlorobenzene	ND	ND	ND	ND	ND	ND
	Naphthalene	0.17	1.20	0.03 J	0.83	0.16	1.60
	Phenanthrene	0.18 J	1.30	0.10 J	1.30	0.78	1.20
	Pyrene	0.17	1.70	0.13	2.50	1.30	1.20
	Total Noncarcinogens	1.06	7.40	0.61	8.08	4.46	9.47
Volatile Organic Compounds							
	Benzene						
	Ethylbenzene						
	Methylene Chloride						
	Toluene						
	Total Xylenes						
	Total Volatile Compounds						

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 17

ENVIRON SAMPLE ID	288E-M2401-SB02	288E-M2401-SB22
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	1.5-2.0	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	2.70	
Benzo(a)Pyrene	3.50	
Benzo(b)Fluoranthene	5.40	
Benzo(k)Fluoranthene	3.50	
Chrysene	3.00	
Dibenz(a,h)Anthracene	0.71	
Indeno(1,2,3-cd)Pyrene	3.50	
Total Carcinogens	22.31	
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	
Acenaphthene	ND	
Acenaphthylene	ND	
Anthracene	0.15	
Benzo(g,h,i)Perylene	3.70	
bis(2-ethylhexyl)phthalate	0.07 J	
Butylbenzylphthalate	ND	
Di-n-Butylphthalate	ND	
Di-n-Octyl Phthalate	ND	
Diethylphthalate	ND	
Fluoranthene	2.60	
Fluorene	0.10	
Hexachlorobenzene	ND	
Naphthalene	0.69	
Phenanthrene	1.20	
Pyrene	1.70	
Total Noncarcinogens	10.21	
Volatile Organic Compounds		
Benzene	ND	ND
Ethylbenzene	0.00 J	0.00 J
Methylene Chloride	ND	0.01
Toluene	ND	ND
Total Xylenes	0.04	0.09
Total Volatile Compounds	0.04	0.10

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 18			
	ENVIRON SAMPLE ID	288E-1802-SB01	288E-1802-SB03
	MATRIX	Soil	Soil
	COLLECTION METHOD	HSAB	HSAB
	DEPTH (feet)	0.0-0.5	2.0-2.5
Carcinogenic Base/Neutral Organic Compounds			
	Benzo(a)Anthracene	3.60	1.60
	Benzo(a)Pyrene	3.30	1.70
	Benzo(b)Fluoranthene	3.40	1.20
	Benzo(k)Fluoranthene	ND	ND
	Chrysene	4.20	1.80
	Dibenz(a,h)Anthracene	ND	ND
	Indeno(1,2,3-cd)Pyrene	1.70	1.90
	Total Carcinogens	16.20	8.20
Noncarcinogenic Base/Neutral Organic Compounds			
	1,2,4-Trichlorobenzene	ND	ND
	Acenaphthene	ND	ND
	Acenaphthylene	ND	0.12 J
	Anthracene	1.20	0.60
	Benzo(g,h,i)Perylene	2.00	2.00
	bis(2-ethylhexyl)phthalate	ND	0.12
	Butylbenzylphthalate	ND	ND
	Di-n-Butylphthalate	ND	ND
	Di-n-Octyl Phthalate	ND	ND
	Diethylphthalate	ND	ND
	Fluoranthene	6.30	3.40
	Fluorene	ND	0.17 J
	Hexachlorobenzene	ND	ND
	Naphthalene	0.49	0.47
	Phenanthrene	4.60	2.30
	Pyrene	8.60	2.90
	Total Noncarcinogens	23.19	12.08
Volatile Organic Compounds			
	Benzene		
	Ethylbenzene		
	Methylene Chloride		
	Toluene		
	Total Xylenes		
	Total Volatile Compounds		

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 21

ENVIRON SAMPLE ID	288E-2105-SB01	288E-2105-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	ND	ND
Benzo(a)Pyrene	0.50 J	ND
Benzo(b)Fluoranthene	0.92 J	ND
Benzo(k)Fluoranthene	ND	ND
Chrysene	0.73 J	ND
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND
Total Carcinogens	2.15	ND
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	0.27 J	ND
Acenaphthylene	ND	ND
Anthracene	ND	ND
Benzo(g,h,i)Perylene	ND	ND
bis(2-ethylhexyl)phthalate	1.80	ND
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	1.40	0.53 J
Fluorene	ND	ND
Hexachlorobenzene	ND	ND
Naphthalene	19.00	19.00
Phenanthrene	1.30 J	0.48 J
Pyrene	0.85	0.37 J
Total Noncarcinogens	24.62	20.38
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		1800.00
Methylene Chloride		ND
Toluene		1400.00
Total Xylenes		5500.00
Total Volatile Compounds		8700.00

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

(* water analyses)

AEC 23

ENVIRON SAMPLE ID	288E-2303-SB01	288E-2303-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	1.70	1.30 J
Benzo(a)Pyrene	1.70	1.40
Benzo(b)Fluoranthene	3.30	3.00
Benzo(k)Fluoranthene	ND	ND
Chrysene	1.90	1.60
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	1.50	1.50 J
Total Carcinogens	10.10	8.80
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	0.48	0.39 J
Acenaphthylene	ND	ND
Anthracene	0.38	0.30 J
Benzo(g,h,i)Perylene	1.50	1.30 J
bis(2-ethylhexyl)phthalate	19.00	2.90
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	3.50	2.50
Fluorene	0.48	0.44 J
Hexachlorobenzene	ND	ND
Naphthalene	12.00	6.10
Phenanthrene	2.30	1.50 J
Pyrene	2.70	1.80
Total Noncarcinogens	42.34	17.23
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		ND
Methylene Chloride		ND
Toluene		ND
Total Xylenes		ND
Total Volatile Compounds		ND

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 25		
ENVIRON SAMPLE ID	288E-2503-SB01	288E-2503-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	0.52	0.16 J
Benzo(a)Pyrene	0.50	0.10
Benzo(b)Fluoranthene	0.83	0.18
Benzo(k)Fluoranthene	ND	ND
Chrysene	0.65	0.23
Dibenz(a,h)Anthracene	ND	ND
Indeno(1,2,3-cd)Pyrene	0.37	ND
Total Carcinogens	2.87	0.67
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	0.06 J	0.16
Acenaphthylene	ND	ND
Anthracene	0.13	0.05 J
Benzo(g,h,i)Perylene	0.41	ND
bis(2-ethylhexyl)phthalate	1.00	1.50
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	0.91	0.53
Fluorene	0.06 J	0.10
Hexachlorobenzene	ND	ND
Naphthalene	0.19	0.19
Phenanthrene	0.74	0.58
Pyrene	0.84	0.46
Total Noncarcinogens	4.34	3.57
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		ND
Methylene Chloride		ND
Toluene		0.01
Total Xylenes		ND
Total Volatile Compounds		0.01

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 26

ENVIRON SAMPLE ID	288E-2601-SB01	288E-2601-SB02	288E-2602-SB01	288E-2602-SB02	288E-2603-SB01	288E-2603-SB02
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HAB	HAB	HAB
DEPTH (feet)	0.0-0.5	1.0-1.2	0.2-0.5	1.7-2.0	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	ND		ND		ND	
Benzo(a)Pyrene	ND		ND		ND	
Benzo(b)Fluoranthene	ND		ND		ND	
Benzo(k)Fluoranthene	ND		ND		ND	
Chrysene	ND		ND		ND	
Dibenz(a,h)Anthracene	ND		ND		ND	
Indeno(1,2,3-cd)Pyrene	ND		ND		ND	
Total Carcinogens	ND		ND		ND	
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND		ND		ND	
Acenaphthene	ND		ND		ND	
Acenaphthylene	ND		ND		ND	
Anthracene	ND		ND		ND	
Benzo(g,h,i)Perylene	ND		ND		ND	
bis(2-ethylhexyl)phthalate	0.61		ND		ND	
Butylbenzylphthalate	ND		ND		ND	
Di-n-Butylphthalate	ND		ND		ND	
Di-n-Octyl Phthalate	ND		ND		ND	
Diethylphthalate	ND		ND		ND	
Fluoranthene	ND		ND		ND	
Fluorene	ND		ND		ND	
Hexachlorobenzene	ND		ND		ND	
Naphthalene	0.31		66.0		ND	
Phenanthrene	ND		ND		ND	
Pyrene	ND		ND		ND	
Total Noncarcinogens	0.92		66.0		ND	
Volatile Organic Compounds						
Benzene		ND		ND		ND
Ethylbenzene		ND		3.70		ND
Methylene Chloride		0.01		ND		ND
Toluene		ND		0.19 J		ND
Total Xylenes		ND		20.00		ND
Total Volatile Compounds		0.01		23.89		ND

84503081 2

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 26

ENVIRON SAMPLE ID	288E-2604-SB01	288E-2604-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	1.0-1.2
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	ND	
Benzo(a)Pyrene	ND	
Benzo(b)Fluoranthene	ND	
Benzo(k)Fluoranthene	ND	
Chrysene	ND	
Dibenz(a,h)Anthracene	ND	
Indeno(1,2,3-cd)Pyrene	ND	
Total Carcinogens	ND	
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	
Acenaphthene	ND	
Acenaphthylene	ND	
Anthracene	ND	
Benzo(g,h,i)Perylene	ND	
bis(2-ethylhexyl)phthalate	ND	
Butylbenzylphthalate	ND	
Di-n-Butylphthalate	ND	
Di-n-Octyl Phthalate	ND	
Diethylphthalate	ND	
Fluoranthene	ND	
Fluorene	ND	
Hexachlorobenzene	ND	
Naphthalene	ND	
Phenanthrene	ND	
Pyrene	ND	
Total Noncarcinogens	ND	
Volatile Organic Compounds		
Benzene		ND
Ethylbenzene		ND
Methylene Chloride		0.01
Toluene		ND
Total Xylenes		ND
Total Volatile Compounds		0.01

84503081 3

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

AEC 28

ENVIRON SAMPLE ID	288E-2802-SB01	288E-2802-SB11
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds		
Benzo(a)Anthracene	3.10	1.60
Benzo(a)Pyrene	3.20	1.70
Benzo(b)Fluoranthene	3.30	2.00
Benzo(k)Fluoranthene	ND	1.30
Chrysene	3.90	1.80
Dibenz(a,h)Anthracene	0.49	0.33
Indeno(1,2,3-cd)Pyrene	3.10	1.70
Total Carcinogens	17.09	10.43
Noncarcinogenic Base/Neutral Organic Compounds		
1,2,4-Trichlorobenzene	ND	ND
Acenaphthene	0.68	0.10
Acenaphthylene	0.10 J	0.02 J
Anthracene	0.78	0.30
Benzo(g,h,i)Perylene	3.10	1.80
bis(2-ethylhexyl)phthalate	22.00	0.56
Butylbenzylphthalate	ND	ND
Di-n-Butylphthalate	ND	ND
Di-n-Octyl Phthalate	ND	ND
Diethylphthalate	ND	ND
Fluoranthene	6.00	3.20
Fluorene	ND	0.11
Hexachlorobenzene	ND	ND
Naphthalene	2.60	0.17
Phenanthrene	4.20	1.50
Pyrene	5.40	2.40
Total Noncarcinogens	44.86	10.16
Volatile Organic Compounds		
Benzene		
Ethylbenzene		
Methylene Chloride		
Toluene		
Total Xylenes		
Total Volatile Compounds		

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TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

ENVIRON SAMPLE ID	288E-B-1-SB01	288E-B-1-SB02	288E-B-1-SB03	288E-B-2-SB01	288E-B-2-SB02	288E-B-2-SB03
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	1.5-2.0	0.0-0.5	2.0-3.0	3.0-3.5
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	0.72		3.40	2.90	0.69	ND
Benzo(a)Pyrene	0.73		6.00	2.90	0.67	ND
Benzo(b)Fluoranthene	1.80		7.80	3.00	0.80	ND
Benzo(k)Fluoranthene	ND		ND	ND	ND	ND
Chrysene	1.10		5.00	2.80	0.87	0.05 J
Dibenz(a,h)Anthracene	ND		0.73	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.61		6.80	3.30	0.60	ND
Total Carcinogens	4.96		29.73	14.90	3.63	0.05
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND		ND	ND	ND	ND
Acenaphthene	0.04 J		0.10	ND	ND	ND
Acenaphthylene	0.03 J		0.50	ND	ND	ND
Anthracene	0.12		0.69	0.83	0.22	ND
Benzo(g,h,i)Perylene	0.72		8.90	3.00	0.63	ND
bis(2-ethylhexyl)phthalate	2.60		0.29	2.00	2.10 B	0.08 J
Butylbenzylphthalate	ND		ND	ND	ND	ND
Di-n-Butylphthalate	0.03 J		ND	ND	0.13 J	ND
Di-n-Octyl Phthalate	ND		ND	ND	ND	ND
Diethylphthalate	ND		ND	ND	ND	ND
Fluoranthene	1.50		4.70	7.70	1.60	0.07 J
Fluorene	0.05 J		0.20	0.23	0.10 J	ND
Hexachlorobenzene	ND		ND	ND	ND	ND
Naphthalene	0.16		0.39	0.20	ND	0.03 J
Phenanthrene	0.82		3.90	3.80	1.20	0.09 J
Pyrene	1.60		4.30	5.30	1.20	0.04 J
Total Noncarcinogens	7.67		23.97	23.06	7.18	0.31
Volatile Organic Compounds						
Benzene		ND				
Ethylbenzene		0.00 J				
Methylene Chloride		ND				
Toluene		0.18				
Total Xylenes		0.03				
Total Volatile Compounds		0.21				

845030815

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

ENVIRON SAMPLE ID	288E-B-3-SB01	288E-B-3-SB03	288E-B-4-SB01	288E-B-5-SB01	288E-B-5-SB03	288E-B-5-SB11
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HAB	HAB	HAB
DEPTH (feet)	0.0-0.5	2.0-2.5	0.0-0.5	0.0-0.5	1.0-1.5	0.0-0.5
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	0.45	0.82	1.10	1.50	0.84	39.00
Benzo(a)Pyrene	0.47	1.20	1.10	1.50	2.10	33.00
Benzo(b)Fluoranthene	0.83	1.10	1.90	3.20	4.10	38.00
Benzo(k)Fluoranthene	ND	ND	ND	ND	ND	91.00
Chrysene	0.58	1.20	1.30	1.80	1.10	45.00
Dibenz(a,h)Anthracene	ND	0.16	0.16	ND	0.25	3.10
Indeno(1,2,3-cd)Pyrene	0.37	1.10	0.81	1.30	3.10	23.00
Total Carcinogens	2.70	5.58	6.37	9.30	11.49	272.10
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	0.28	0.07 J	ND	0.62
Acenaphthylene	ND	ND	ND	ND	0.15 J	ND
Anthracene	0.08	0.05 J	0.34	0.23	0.08 J	4.80
Benzo(g,h,i)Perylene	0.38	1.30	0.80	1.30	3.10	19.00
bis(2-ethylhexyl)phthalate	0.14	ND	0.30	0.93	0.44	0.88
Butylbenzylphthalate	ND	ND	ND	ND	ND	ND
Di-n-Butylphthalate	0.19	ND	ND	ND	ND	ND
Di-n-Octyl Phthalate	ND	ND	ND	ND	0.77	ND
Diethylphthalate	ND	ND	ND	ND	ND	ND
Fluoranthene	1.30	0.88	3.40	3.50	0.78	82.00
Fluorene	ND	ND	0.24	0.08	ND	0.69
Hexachlorobenzene	ND	ND	ND	ND	ND	ND
Naphthalene	0.21	0.52	0.45	0.16	ND	ND
Phenanthrene	0.66	0.72	2.60	1.40	0.22 J	23.00
Pyrene	0.55	1.10	1.70	2.20	0.94	56.00
Total Noncarcinogens	3.51	4.57	10.11	9.87	6.48	186.99
Volatile Organic Compounds						
Benzene						
Ethylbenzene						
Methylene Chloride						
Toluene						
Total Xylenes						
Total Volatile Compounds						

845030816

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

ENVIRON SAMPLE ID	288E-B-6-SB01	288E-M1501-SB01	288E-M1501-SB02
MATRIX	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB
DEPTH (feet)	0.0.2.0	0.0-0.5	1.5-2.0
Carcinogenic Base/Neutral Organic Compounds			
Benzo(a)Anthracene	1.40	0.65	93.00
Benzo(a)Pyrene	1.50	0.60	67.00
Benzo(b)Fluoranthene	1.70	1.00	96.00
Benzo(k)Fluoranthene	ND	ND	41.00
Chrysene	1.60	0.80	92.00
Dibenz(a,h)Anthracene	0.27	ND	9.60
Indeno(1,2,3-cd)Pyrene	1.20	0.37	65.00
Total Carcinogens	7.67	3.42	463.60
Noncarcinogenic Base/Neutral Organic Compounds			
1,2,4-Trichlorobenzene	ND	ND	ND
Acenaphthene	ND	0.05 J	0.52 J
Acenaphthylene	ND	ND	ND
Anthracene	0.10	0.10	7.60
Benzo(g,h,i)Perylene	1.40	0.41	52.00
bis(2-ethylhexyl)phthalate	ND	0.34	1.30 B
Butylbenzylphthalate	ND	ND	ND
Di-n-Butylphthalate	ND	ND	ND
Di-n-Octyl Phthalate	ND	ND	ND
Diethylphthalate	ND	ND	ND
Fluoranthene	1.30	1.30	150.00
Fluorene	ND	0.04 J	1.70
Hexachlorobenzene	ND	ND	ND
Naphthalene	0.29	0.18	5.10
Phenanthrene	0.60	0.66	37.00
Pyrene	1.30	1.30	110.00
Total Noncarcinogens	4.99	4.38	365.22
Volatile Organic Compounds			
Benzene			ND
Ethylbenzene			ND
Methylene Chloride			ND
Toluene			ND
Total Xylenes			ND
Total Volatile Compounds			ND

8450308 17

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

ENVIRON SAMPLE ID	288E-0306-WB01	288E-0723-WB01	288E-0724-WB01	288E-0725-TB01	288E-0725-WB01	288E-0725-WB02
MATRIX	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
COLLECTION METHOD						
DEPTH (feet)	NA	NA	NA	NA	NA	NA
	QA/QC	QA/QC	QA/QC	QA/QC	QA/QC	QA/QC
Carcinogenic Base/Neutral Organic Compounds						
Benzo(a)Anthracene	ND	ND	ND		ND	ND
Benzo(a)Pyrene	ND	ND	ND		ND	ND
Benzo(b)Fluoranthene	ND	ND	ND		ND	ND
Benzo(k)Fluoranthene	ND	ND	ND		ND	ND
Chrysene	ND	ND	ND		ND	ND
Dibenz(a,h)Anthracene	ND	ND	ND		ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	ND		ND	ND
Total Carcinogens	ND	ND	ND		ND	ND
Noncarcinogenic Base/Neutral Organic Compounds						
1,2,4-Trichlorobenzene	ND	ND	ND		ND	ND
Acenaphthene	ND	ND	ND		ND	ND
Acenaphthylene	ND	ND	ND		ND	ND
Anthracene	ND	ND	ND		ND	ND
Benzo(g,h,i)Perylene	ND	ND	ND		ND	ND
bis(2-ethylhexyl)phthalate	ND	0.00	0.00		ND	0.02
Butylbenzylphthalate	ND	ND	ND		ND	ND
Di-n-Butylphthalate	ND	ND	ND		ND	ND
Di-n-Octyl Phthalate	ND	ND	ND		ND	ND
Diethylphthalate	ND	ND	ND		ND	ND
Fluoranthene	ND	ND	ND		ND	ND
Fluorene	ND	ND	ND		ND	ND
Hexachlorobenzene	ND	ND	ND		ND	ND
Naphthalene	ND	ND	ND		ND	ND
Phenanthrene	ND	ND	ND		ND	ND
Pyrene	ND	ND	ND		ND	ND
Total Noncarcinogens	ND	0.00	0.00		ND	0.02
Volatile Organic Compounds						
Benzene	ND			ND	ND	ND
Ethylbenzene	ND			ND	ND	ND
Methylene Chloride	2.40			ND	ND	ND
Toluene	ND			ND	ND	ND
Total Xylenes	ND			ND	ND	ND
Total Volatile Compounds	2.40			ND	ND	ND

84503081 8

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

ENVIRON SAMPLE ID	288E-2501-WB01	288E-TB-900801	288E-TB900802
MATRIX	Aqueous	Aqueous	Aqueous
COLLECTION METHOD			
DEPTH (feet)	NA	NA	NA
	QA/QC	QA/QC	QA/QC
Carcinogenic Base/Neutral Organic Compounds			
Benzo(a)Anthracene	ND		
Benzo(a)Pyrene	ND		
Benzo(b)Fluoranthene	ND		
Benzo(k)Fluoranthene	ND		
Chrysene	ND		
Dibenz(a,h)Anthracene	ND		
Indeno(1,2,3-cd)Pyrene	ND		
Total Carcinogens	ND		
Noncarcinogenic Base/Neutral Organic Compounds			
1,2,4-Trichlorobenzene	ND		
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
bis(2-ethylhexyl)phthalate	0.00 J		
Butylbenzylphthalate	ND		
Di-n-Butylphthalate	ND		
Di-n-Octyl Phthalate	ND		
Diethylphthalate	ND		
Fluoranthene	ND		
Fluorene	ND		
Hexachlorobenzene	ND		
Naphthalene	ND		
Phenanthrene	ND		
Pyrene	ND		
Total Noncarcinogens	0.00		
Volatile Organic Compounds			
Benzene	ND	ND	ND
Ethylbenzene	ND	ND	ND
Methylene Chloride	0.02	ND	ND
Toluene	ND	ND	ND
Total Xylenes	ND	ND	ND
Total Volatile Compounds	0.02	ND	ND

84503081

TABLE B-1
Summary of Analytical Results of Additional ECRA Sampling

Summary of Analytical Results

NOTES

1. Depths are measured from the soil surface.

2. Explanation of abbreviations:

   HSAB: Hollow Stem Auger Boring
   HAB: Hand Auger Boring
   AQ: Aqueous
   NA: Not Applicable
   ND: Not Detected
   B: This flag is used when the analyte is found in the method blank as well as a sample. It indicates possible/probable laboratory contamination.
   J: Indicates an estimated value, based on an assumption of a 1:1 response factor for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

3. All concentrations are reported in parts per million (ppm).

0288E:PAA005D1.W51

845030820

APPENDIX C

Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

845030821

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0202-SB01	Soil	2-METHYLNAPHTHALENE	15.47	570
		BENZENE, 1,1'-OXYBIS-	17.4	27000
		BENZENE, 1,2,4-TRIMETHYL-	9.88	13000
		BICYCLO[2.2.1]HEPT-5-ENE-2,3- DICARBOXYL	26	37000
		DECANE	9.41	11000
		DIBENZOFURAN	19.35	79
		HEXACHLORO-, (ENDO,ENDO)-	26	37000
		NAPHTHALENE, 2-ETHENYL-	17	13000
		NONANE, 2-METHYL-5-PROPYL-	10.18	19000
		UNDECANE	11.59	22000
		UNKNOWN	10.82	15000
		UNKNOWN	8.67	16000
		UNKNOWN	10.62	21000
		UNKNOWN	9.24	27000
		UNKNOWN	8.51	29000
		UNKNOWN	6.36	31000
		UNKNOWN	6.18	32000
		UNKNOWN	6.9	98000
288E-0202-SB02	Soil	STYRENE	28.99	9
		STYRENE	28.99	9

845030822

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0306-SB01	Soil	1,3,5,7-CYCLOOCTATETRAENE	5.59	3600
		2-HEXANONE, 4-HYDROXY-3- PROPYL-	3.51	2900
		2-METHYLNAPHTHALENE	14.01	620
		3-HEXANONE	3.43	2200
		BENZENE, 1,2,3-TRIMETHYL-	7.9	620
		BENZENE, 1,2-DIMETHYL-	5.64	1400
		BENZENE, 1,2-DIMETHYL-	5.13	2700
		BENZENE, 2-ETHYL-1,4-DIMETHYL-	9.74	660
		BENZENE, ETHYL-	4.95	1400
		DECANE	8.11	510
		DECANE, 6-ETHYL-2-METHYL-	12.26	590
		DIBENZOFURAN	17.81	95
		DODECANE, 2,7,10-TRIMETHYL-	8.85	1200
		ETHANE, 1,2,2-TRICHLORO-1,1- DIFLUORO-	6.06	700
		HEPTANE, 2,2,3,4,6,6- HEXAMETHYL	9.27	880
		SULFUR, MOL. (S8)	25.15	4400
		UNDECANE	10.26	770

845030823

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0306-SB02	Soil	1-DECENE	7.05	55000
		2-BUTANONE	13.13	9600
		2-METHYLNAPHTHALENE	13.95	22000
		3-PENTEN-1-YNE, (E)-	8.4	37000
		4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	26.6	7000
		4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	8.68	180000
		BENZENE, 1,2-DIMETHYL-	5.11	73000
		BICYCLO[2.2.1]HEPT-2-ENE, 5- ETHENYL-	26.1	6100
		CARBON DISULFIDE	8.75	400
		CYCLOHEXANE, PENTYL-	10.97	180000
		CYCLOHEXANE, PROPYL-	6.45	69000
		CYCLOPENTANE, 1-METHYL-3- (2-METHYLP	7.77	59000
		DIBENZOFURAN	17.75	27000
		HEPTANE, 3-ETHYL-2-METHYL-	6.78	55000
		HEPTANE, 3-ETHYL-5-METHYL-	7.51	37000
		HEPTANE, 3-ETHYL-5-METHYL-	6.63	69000
		NONANE, 2,3-DIMETHYL	9.57	50000
		SULFUR, MOL. (S8)	25.13	190000
		UNDECANE, 5-METHYL-	10.64	190000
		UNKNOWN	33.39	1100
		UNKNOWN	24.24	1200
		UNKNOWN	34.4	3700
		UNKNOWN	35.99	3900
		UNKNOWN	27.88	5100
		UNKNOWN	29.78	10000
		UNKNOWN	18.66	96000
		UNKNOWN	19.35	110000
		VINYL ACETATE	16.15	880

845030824

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound		Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0502-SB01	Soil	1,1' :2',1''-TERPHENYL		23.87	4200
		2-METHYLNAPHTHALENE		14.59	1200
		2-PENTANONE, 3-METHYL-		3.18	2100
		2-PENTANONE, 3-METHYL-		3.33	72000
		2-PENTANONE, 4-METHYL-		3.86	2500
		BENZENE, 1,1'-	CYCLOHEXYL	26.26	19000
		BENZENE, 1,1'-OXYBIS-		16.49	1800
		BENZENE, ETHYL-		5.4	830
		BICYCLOHEXYL, 4-PHENYL-		25.8	16000
		BICYCLOHEXYL, 4-PHENYL-		25.21	25000
		PENTANE, 1,3-EPOXY-4-METHYL-		3.78	1600
		UNKNOWN		24.24	2900
		UNKNOWN		31.46	2900
		UNKNOWN		31.01	3700
		UNKNOWN		25.65	5700
		UNKNOWN		25.39	9500
		UNKNOWN (PHTHALATE)		35.16	3800
288E-0502-SB02	Soil	NO UNKNOWNS OR TICS		0	0
		NO UNKNOWNS OR TICS		0	0
288E-0603-SB01	Soil	2-HEXANONE, 4-HYDROXY-3-	PROPYL-	4.62	1600
		3-HEXANONE		4.52	1200
		BENZENE, 1,2-DIMETHYL-		6.93	2200
		BENZENE, 1,2-DIMETHYL-		6.39	5900
		BENZENE, 1-ETHYL-4-METHYL-		8.54	940
		BENZENE, ETHYL-		6.2	1500
		BENZENE, METHYL-		4.16	1500
		DECANE		9.42	1100
		HEPTANE, 4-ETHYL-2,2,6,6-	TETRAMETHY	10.63	1200
		OCTANE, 2,3,6-TRIMETHYL-		10.21	1100
		SULFUR, MOL. (S8)		26.95	3200
		UNDECANE		11.6	940
		UNDECANE, 3,6-DIMETHYL-		10.84	940
		UNKNOWN		11.1	1100
		UNKNOWN		3.91	1400

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TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0603-SB02	Soil	ACETONE	7.33	19
		CARBON DISLUFIDE	8.18	1
		UNKNOWN	27.83	7
		UNKNOWN	27.45	9
		UNKNOWN	21.46	12
		UNKNOWN	32.28	14
		UNKNOWN	25.86	25
288E-0603-SB03	Soil	1,1'-BIPHENYL	17.06	3000
		1,3,5-CYCLOHEPTATRIENE	4.14	590
		2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.6	1900
		2-METHYLNAPHTHALENE	15.52	96
		2-PENTANONE, 3-METHYL-	3.89	1700
		2-PENTANONE, 4-METHYL-	3.66	320
		2-PENTENE,3-ETHYL-4,4- DIMETHYL-	27.45	6
		3-HEXANONE	4.52	1900
		4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	10.01	550
		ACETONE	7.37	15
		BENZENE, 1,1'-OXYBIS-	17.5	17000
		BENZENE, 1,2-DIMETHYL-	6.92	350
		BENZENE, 1,2-DIMETHYL-	6.38	1700
		BENZENE, ETHYL-	6.19	710
		DIBENZOFURAN	19.4	41
		ETHANE, 1,1,2,2-TETRACHLORO-	7.37	390
		ETHANE, 1,1,2-TRICHLORO-	4.22	280
		HEXANE, 2,2,5,5-TETRAMETHYL-	10.64	470
		SULFUR, MOL. (S8)	27.02	7500
		UNKNOWN	25.86	5
		UNKNOWN	29.15	5
		UNKNOWN	26.17	6
		UNKNOWN	31.2	7
		UNKNOWN	11.42	14
		UNKNOWN	21.54	15
288E-0902-SB01	Soil	STYRENE	29.02	9

845030826

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0903-SB01	Soil	2-HEXANONE	4.61	2700
		2-PENTANONE, 3-METHYL-	3.9	2300
		2-PENTANONE, 4-METHYL-	3.67	410
		3-HEXANONE	4.52	1900
		5-HEXEN-2-ONE	4.34	330
		BENZENE, METHYL- (9CI)	4.15	200
		BICYCLO[4.2.0]OCTA-1,3,5- TRIENE	6.87	290
		DIBENZOFURAN	19.41	30
		ETHANE, 1,1,2-TRICHLORO-	4.22	410
		ETHANE,1,1,2,2-TETRACHLORO-	7.37	570
		UNKNOWN	25.33	570
288E-0903-SB02	Soil	NO UNKNOWNS OR TICS	0	0
288E-0904-SB01	Soil	1,3,5,7-CYCLOOCTATETRAENE	6.87	640
		1,3,5-CYCLOHEPTATRIENE	4.15	720
		11H-BENZO(B)FLUORENE	28.96	1400
		2,3-PENTANEDIONE	3.87	340
		2-BUTANONE	3.89	1500
		2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.61	2300
		2-PENTANONE, 4-METHYL-	3.66	380
		3-HEXANONE	4.52	1900
		5-HEXEN-2-ONE	4.34	300
		9,10-ANTHRACENEDIONE	25.97	380
		BENZALDEHYDE, 3,5-DICHLORO-2- HYDROXY	25.33	640
		BENZO [E] PYRENE	35.5	2000
		BENZO(GHI)FLUORANTHENE	31	890
		DIBENZOFURAN	19.39	49
		ETHANE, 1,1,2-TRICHLORO-	4.22	420
		ETHANE,1,1,2,2-TETRACHLORO-	7.37	760
288E-0904-SB02	Soil	NO UNKNOWNS OR TICS	0	0
288E-0905-SB01	Soil	NO UNKNOWNS OR TICS	0	0

84503082

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1003-SB01	Soil	2-METHYLNAPHTHALENE	14.69	66
		2-OCTENE, 2,6-DIMETHYL-	7.65	1800
		2-PENTANONE, 3-METHYL-	3.29	3300
		2H-1,2,3-TRIAZOLE-4-CARBOXALD-EHYDE, 2-(	36.46	3900
		3-HEXANONE	3.89	2600
		BENZENE, 1,2-DIMETHYL-	6.21	930
		BENZENE, 1,2-DIMETHYL-	5.68	970
		DIBENZOFURAN	18.53	79
		HEPTANE, 3-ETHYL-2-METHYL-	7.36	1200
		NAPHTHALENE, DECAHYDRO-TRANS-	9.88	1700
		NONANE, 2,5-DIMETHYL-	9.17	970
		NONANE, 2,6-DIMETHYL-	9.22	2200
		NONANE, 3,7-DIMETHYL-	9.56	1200
		OCTANE, 3,6-DIMETHYL-	7.22	930
		OXIRANE, 2-METHYL-2-(1-METHYL-ETHYL)	3.97	3900
		UNDECANE, 5-METHYL-	10.12	900
		UNKNOWN	37.25	5700
288E-1305-SB01	Soil	1,4-METHANOAZULENE,DECAHYDRO-4,8,8-TRIME	17.24	510
		2-HEXANONE, 4-HYDROXY-3-PROPYL-	4.25	2000
		2-METHYLNAPHTHALENE	15.1	130
		2-PENTANONE, 3-METHYL-	3.56	1700
		3-HEXANONE	4.17	1800
		9H-FLUORENE-2-CARBONITRILE	37.74	12000
		BENZENE, METHYL-	3.82	550
		DECANE, 2,3,5-TRIMETHYL-	16.94	510
		DECANE, 3,6-DIMETHYL-	18.62	350
		DODECANE	13.28	710
		ETHANE, 1,1,2,2-TETRACHLORO-	6.98	590
		PENTADECANE, 2,6,10,14- TETRAMETHY	21.78	1500
		SULFUR, MOL. (S8)	26.48	9000
		TRIDECANE	15.18	550
		UNDECANE	11.26	750
		UNKNOWN	38.88	3600

845030828

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1306-SB01	Soil	2-HEPTANONE	10.58	920
		2-HEPTANONE	6.07	1700
		2-METHYLNAPHTHALENE	14.58	120
		2-NONANONE	14.53	710
		2-PENTANONE, 3-METHYL-	3.18	2800
		BENZENE, METHYL- (9CI)	3.43	580
		DIBENZOFURAN	18.4	45
		DODECANE	12.81	460
		ETHANE,1,1,2,2-TETRACHLORO-	6.53	670
		HEPTANE	3.79	2200
		HEXANOIC ACID, HEXYL ESTER	16.18	620
		PENTANAL, 2-METHYL-	3.87	3300
		SULFUR, MOL. (S8)	25.81	5800
		UNDECANE	10.79	540
		UNKNOWN (DIMETHYLSILOXANES)	36.46	1700
		UNKNOWN (DIMETHYLSILOXANES)	34.15	2400
		UNKNOWN (DIMETHYLSILOXANES)	35.34	2400
288E-1405-SB01	Soil	2-METHYLNAPHTHALENE	13.83	960
		BENZENE, 1,2,3-TRIMETHYL-	7.11	62000
		BENZENE, 1,2-DIMETHYL-	5.1	81000
		BENZENE, 1,2-DIMETHYL-	5.62	95000
		BENZENE, 1-ETHYL-2,4-DIMETHYL-	9.24	27000
		CYCLOHEXANE, (1-METHYLPROPYL)	8.65	33000
		CYCLOHEXENE, 1-(1-PROPYNYL)-	7.79	36000
		DECANE, 2,3,4-TRIMETHYL-	8.74	40000
		DECANE, 2,3,5-TRIMETHYL-	12.13	27000
		HEPTANE, 3,3-DIMETHYL-	8.03	62000
		NONANE, 2,6-DIMETHYL-	8.51	44000
		OCTANE, 2,3,7,-TRIMETHYL-	9.39	36000
		PENTANE, 2,3-DIMETHYL-	9.16	44000
		UNDECANE	10.18	70000
		UNKNOWN	3.08	44000
		UNKNOWN	4.91	95000

845030829

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1405-SB02	Soil	2-HEXANONE, 4-HYDROXY-3- PROPYL-	3.4	2700
		3-HEXANONE	3.33	2300
		4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	8.47	2600
		BENZENE, (1-METHYLETHYL)-	6.22	1100
		BENZENE, 1,2,3-TRIMETHYL-	8.39	590
		BENZENE, 1,2,3-TRIMETHYL-	7.76	1500
		BENZENE, 1,2-DIMETHYL-	5.5	2200
		BENZENE, ETHYL-	4.82	2100
		BENZENE,1-ETHYL-2-METHYL-	7.07	780
		BICYCLO[2.2.1]HEPT-2-ENE, 5- ETHENYL-	7.22	1200
		CYCLOPENTENE, 1-ETHENYL-3- METHYLENE-	5.03	10000
		DECANE, 2,5,9-TRIMETHYL-	7.97	640
		SULFUR, MOL. (S8)	25.15	64000
		UNDECANE	10.12	1100
		UNKNOWN	8.92	780

845030830

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1506-SB01	Soil	1,3,5,7-CYCLOOCTATETRAENE	6.09	18000
		1,3,5,7-CYCLOOCTATETRAENE	6.09	18000
		11H-BENZO(B)FLUORENE	27.9	1200
		11H-BENZO(B)FLUORENE	27.9	1200
		2-METHYLNAPHTHALENE	14.59	2300
		2-METHYLNAPHTHALENE	14.59	2300
		4H-CYCLOPENTA[DEF]PHENANTHRENE	24.27	10000
		4H-CYCLOPENTA[DEF]PHENANTHRENE	24.27	10000
		BENZO(C)PHENANTHRENE	30.87	780
		BENZO(C)PHENANTHRENE	30.87	780
		BENZO[E]PYRENE	34.39	24000
		BENZO[E]PYRENE	34.39	24000
		CYCLOPENTA[CD]PYRENE	29.9	1000
		CYCLOPENTA[CD]PYRENE	29.9	1000
		DECANE, 2,2-DIMETHYL-	9.19	7300
		DECANE, 2,2-DIMETHYL-	9.19	7300
		DIBENZOFURAN	18.41	3400
		DIBENZOFURAN	18.41	3400
		HEXANE, 2,2,5-TRIMETHYL-	10.04	6900
		HEXANE, 2,2,5-TRIMETHYL-	10.04	6900
		NONANE, 3,7-DIMETHYL-	9.41	9300
		NONANE, 3,7-DIMETHYL-	9.41	9300
		PENTANE, 3-ETHYL-2,2-DIMETHYL-	9.83	13000
		PENTANE, 3-ETHYL-2,2-DIMETHYL-	9.83	13000
		SULFUR, MOL. (S8)	25.83	19000
		SULFUR, MOL. (S8)	25.83	19000

84503083

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1506-SB03	Soil	2-METHYLNAPHTHALENE	15.47	55
		2-METHYLNAPHTHALENE	15.47	55
		BENZENE, 1-METHYL-2-(1- METHYLETHY	11.93	15000
		BENZENE, 1-METHYL-2-(1- METHYLETHY	11.93	15000
		BENZENE, 2-ETHYL-1,4-DIMETHYL-	11.27	15000
		BENZENE, 2-ETHYL-1,4-DIMETHYL-	11.27	15000
		CYCLOHEXANE, PENTYL-	12.32	14000
		CYCLOHEXANE, PENTYL-	12.32	14000
		DECANE, 4-METHYL-	9.92	17000
		DECANE, 4-METHYL-	9.92	17000
		HEXANE, 2,2,5,5-TETRAMETHYL-	8.5	14000
		HEXANE, 2,2,5,5-TETRAMETHYL-	8.5	14000
		NAPHTHALENE, DECAHYDRO-2- METHYL-	11.84	7800
		NAPHTHALENE, DECAHYDRO-2- METHYL-	11.84	7800
		NONANE, 3,7-DIMETHYL-	10.28	24000
		NONANE, 3,7-DIMETHYL-	10.28	24000
		UNDECANE, 2,3-DIMETHYL-	12.62	8800
		UNDECANE, 2,3-DIMETHYL-	12.62	8800
		UNDECANE, 4-METHYL-	12.18	14000
		UNDECANE, 4-METHYL-	12.18	14000
		UNKNOWN (ALIPHATIC)	11.59	9000
		UNKNOWN (ALIPHATIC)	11.59	9000
		UNKNOWN (ALIPHATIC)	10.11	15000
		UNKNOWN (ALIPHATIC)	10.11	15000
		UNKNOWN (ALIPHATIC)	11.1	18000
		UNKNOWN (ALIPHATIC)	11.1	18000
		UNKNOWN (ALIPHATIC)	10.83	25000
		UNKNOWN (ALIPHATIC)	10.83	25000
		UNKNOWN (ALIPHATIC)	10.64	28000
		UNKNOWN (ALIPHATIC)	10.64	28000
		UNKNOWN (ALIPHATIC)	10.2	29000
		UNKNOWN (ALIPHATIC)	10.2	29000

845030832

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-1507-SB01	Soil	1-OCTENE, 3,7-DIMETHYL-	7.8	1000
		2-PENTANONE, 3-METHYL-	3.34	2100
		3-UNDECENE, 6-METHYL-	7.51	850
		BENZENE, 1,1'-(1,2-ETHANEDIYL)BIS[3,4-DI	26.81	1200
		BENZENE, METHYL- (9CI)	3.6	1000
		CYCLOHEXANE, 1,1,2-TRIMETHYL-	5.06	1400
		HEPTANE	3.95	1900
		NONANE, 2,6-DIMETHYL-	9.37	1200
		OCTANE, 3,5-DIMETHYL-	7.99	1200
		OCTANE, 3,6-DIMETHYL-	7.34	1700
		OCTANE, 3-METHYL-	5.9	1200
		OCTANE, 4-METHYL-	5.73	800
		PENTANAL, 2,2-DIMETHYL-	4.03	2800
		SULFUR, MOL. (S8)	26.11	5800
		UNKNOWN	3.76	890
288E-1507-SB03	Soil	2-METHYLNAPHTHALENE	14.28	1200
		CYCLOOCTANE, BUTYL	4.38	13000
		CYCLOPENTANONE, 2-METHYL-4-(2-METHYLPROP	7.74	9200
		DODECANE, 2,7,10-TRIMETHYL-	20.66	16000
		DODECANE, 6-METHYL-	12.52	6900
		HEPTADECANE, 2,6,10,15- TETRAMETHY	16.92	7600
		HEPTANE, 3-ETHYL-2-METHYL-	6.77	12000
		NAPHTHALENE, DECAHYDRO-, TRANS-	9.22	11000
		NONANE, 2,6-DIMETHYL-	8.62	21000
		OCTANE, 3,6-DIMETHYL-	6.61	20000
		SULFUR, MOL. (S8)	25.07	31000
		TRIDECANE, 6-PROPYL-	22.11	22000
		UNKNOWN	7.46	9900
		UNKNOWN	8.76	11000
		UNKNOWN	6.19	12000
		UNKNOWN	8.96	13000
		UNKNOWN	36.98	5700
		UNKNOWN (ALIPHATIC)	36.23	3400
		UNKNOWN (ALIPHATIC)	28.9	3800

84503083

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)	
288E-1708-SB11	Soil	2-PENTANONE, 4-METHYL-	3.4	2200	
		3-HEXANONE	3.33	1500	
		ETHANE, 1,1,2-TRICHLORO-	3.05	300	
		ETHANE,1,1,2,2-TETRACHLORO-	6.01	450	
		SULFUR, MOL. (S8)	25.06	3200	
		UNKNOWN	4.38	190	
		UNKNOWN	3.15	300	
288E-1708-SB03	Soil	UNKNOWN	3.23	19000	
		HEPTANE, 4-ETHYL-	3.38	13000	
		CYCLOHEXANE, 1,3-DIMETHYL-,CIS-	3.44	11000	
		CYCLOPENTANE, 1-ETHYL-3-METHYL	3.64	9900	
		CYCLOPENTANE, 1-ETHYL-2-METHYL-, CIS-	3.71	8800	
		CYCLOHEXANE, 1,2-DIMETHYL-, -TRANS-	3.81	6700	
		HEPTANE, 2,4-DIMETHYL-	3.90	9500	
		HEPTANE, 2,6-DIMETHYL-	4.51	11000	
		CYCLOPENTANE, 1-ETHYL-3-METHYL-, TRANS-	4.56	13000	
		CYCLOHEXANE, 1,1,2-TRIMETHYL-	4.65	15000	
		HEXANE, 2,3,4-TRIMETHYL-	5.30	10000	
		2-DECENE, 5-METHYL-	5.47	11000	
		CYCLOHEXENE, 1-METHYL-	6.48	6700	
		OCTANE, 3,6-DIMETHYL-	6.90	6700	
		2-METHYLNAPHTHALENE	14.31	770	J
		SULFUR, MOL. (S8)	25.47	24000	
288E-1709-SB01	Soil	1,3,5-CYCLOHEPTATRIENE	3.58	330	
		2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.01	2300	
		2-METHYLNAPHTHALENE	14.69	160	
		2-PENTANONE, 4-METHYL-	3.12	530	
		3-HEXANONE	3.93	2100	
		5-HEXEN-2-ONE	3.74	290	
		BENZENE, METHYL(1-METHYLETHYL)	9.22	240	
		BENZENE,1-ETHYL-2-METHYL-	7.8	200	
		BENZO [E] PYRENE	34.58	2100	
		CYCLOHEXANE, 1,1,3-TRIMETHYL-	4.98	200	
		DIBENZOFURAN	18.53	95	

845030834

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
		ETHANE, 1,1,2-TRICHLORO-	3.64	330
		ETHANE,1,1,2,2-TETRACHLORO-	6.63	570
		HEPTANE, 2,6-DIMETHYL-	4.84	200
		OCTANE, 3,6-DIMETHYL-	7.21	240
		PENTANE, 2,3-DIMETHYL-	3.33	2100
		SULFUR, MOL. (S8)	26.03	31000
288E-1709-SB03	Soil	2-PENTANONE, 4-METHYL-	3.64	2600
		BENZENE, 1,1'-ETHYLIDENEBIS [3,4-DIMET	26.22	3300
		DOCOSANE	28.4	1500
		DODECANE,2,7,10-TRIMETHYL-	20.97	730
		ETHANE,1,1,2,2-TETRACHLORO-	6.29	500
		HEPTANE	3.55	1800
		HEXADECANE	27.28	1500
		HEXADECANE	30.5	1600
		IRON, TRICARBONYL[N-(PHENYL-2-PYRIDINYLM	29.46	1300
		PENTADECANE, 2,6,10,14- TETRAMETHY	26.12	1300
		SULFUR, MOL. (S8)	25.57	96000
		UNKNOWN	24.47	640
		UNKNOWN	36.62	1500
		UNKNOWN (SULFUR)	17.85	770
		UNKNOWN (SULFUR)	22.16	960
288E-M2401-SB22	Soil	ACETONE	7.37	37
		CARBON DISULFIDE	8.14	5
		ETHANE, 1,1,2-TRICHLORO-1,2,2 -TRIFLUORO	12.31	10

845030835

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2303-SB02	Soil	1-HEXENE, 4-METHYL-	7.11	25000
		2-METHYLNAPHTHALENE	13.85	870
		2-PENTENE,3-ETHYL-4,4- DIMETHYL-	27.47	96
		3,4-OCTADIENE7-METHYL-	23.92	31
		9-OXABICYCLO[6.1.0]NONANE, 1-METHYL-C	34.82	37
		ACETONE	7.39	26
		BENZENE, 1,2-DIETHYL-	10.46	57000
		BENZENE, 2-ETHENYL-1,4-DI- METHYL-	11.13	28000
		BENZENE, METHYL(1- METHYLETHY	9.83	33000
		BICYCLO[4.1.0]HEPTANE, 3,7,7- TRIMETHYL-	28.09	68
		CYCLOHEXANE, (1-METHYLPROPYL)-	8.67	38000
		CYCLOHEXANE, 1,1,3,5- TETRAMETHY	31.73	280
		CYCLOHEXANE, 1,1,3-TRIMETHYL-	26.12	100
		CYCLOHEXANE, 1,1-DIMETHYL-	21.79	17
		CYCLOHEXANE, 1,2,4-TRIMETHYL-,(1.ALPHA.,	26.78	39
		CYCLOPENTANE, 2-ISOPROPYL- 1,3-DIMETH	29.99	70
		DIBENZOFURAN	17.65	270
		DODECANE, 2,7,10-TRIMETHYL-	8.87	23000
		HEXANE, 2,3,4-TRIMETHYL-	8.78	65000
		NAPHTHALENE, DECAHYDRO-, CIS-	35.44	110
		NORBORNANE, 2-ISOBUTYL-	33.35	100
		OCTANE, 2,2,6-TRIMETHYL-	7.59	25000
		OCTANE, 2,3,6-TRIMETHYL-	11.49	40000
		PENTALENE, OCTAHYDRO-2-METHYL-	26.43	23
		PENTANE, 3,3-DIMETHYL-	10.12	27000
		SULFUR, MOL. (S8)	25.01	91000
		TETRADECANE, 1-IODO-	8.56	41000
		TRICYCLO [3.3.1.13,7] DECANE	25.11	11
		UNKNOWN	32.38	39
		UNKNOWN	29.13	54
		UNKNOWN	9.41	44000
		UNKNOWN	9.19	100000
		UNKNOWN (AROMATIC FLAVOR)	10.89	57000

84503083 6

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2503-SB02	Soil	1,3,5-CYCLOHEPTATRIENE	4.18	12000
		2,3-HEPTADIEN-5-YNE, 2,4- DIMETHYL-	8.65	37000
		2,3-HEPTADIEN-5-YNE, 2,4-DI- METHYL-	8.74	2500
		2-HEXANONE, 4-HYDROXY-5-METHYL-3-PROPYL-	4.6	2500
		2-METHYLNAPHTHALENE	15.51	150
		2-PENTANONE, 3-METHYL-	3.9	1400
		3-HEXANONE	4.52	1800
		5-HEXEN-2-ONE	4.34	1000
		ACETONE	7.61	26
		BENZENE, 1,2-DIMETHYL-	6.38	1100
		BENZENE, 1-ETHENYL-3-METHYL-	9.38	4100
		BENZENE, 1-METHYL-4-PROPYL-	10.65	440
		BENZENE, ETHYL-	6.19	2400
		DIBENZOFURAN	19.39	62
		ETHANE, 1,1,2,2-TETRACHLORO-	7.36	740
		ETHANE, 1,1,2-TRICHLORO-	4.22	1700
		SULFUR, MOL. (S8)	26.97	1600
		UNKNOWN	3.87	390
288E-2601-SB01	Soil	2-METHYLNAPHTHALENE	15.54	63
		3-HEXANONE	4.52	2000
		BENZENE, 1,2,3,4-TETRAMETHYL-	12.74	400
		BENZENE, 1,2,3,4-TETRAMETHYL-	11.98	670
		BENZENE, 1,2-DIMETHYL-	6.4	620
		BENZENE,1-ETHYL-2-METHYL-	8.55	580
		DECANE, 2,6,7-TRIMETHYL-	10.3	840
		DECANE, 4-METHYL-	9.95	760
		ETHANE,1,1,2,2-TETRACHLORO-	7.38	580
		HEPTANE, 2,2,3,4,6,6-HEXA- METHYL-	10.66	890
		NAPHTHALENE, DECAHYDRO-2- METHYL-	11.88	530
		NONANE, 3-METHYL-5-PROPYL-	10.22	1200
		OCTANE, 2,3,6-TRIMETHYL-	12.99	490
		OXIRANE, 2-METHYL-2-(1-METHYL-ETHYL)	4.62	2900
		UNKNOWN	3.87	620
		UNKNOWN	3.9	1800

845030837

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2601-SB02	Soil	4,5-NONADIENE, 2-METHYL-	32.36	19
		4,5-NONADIENE, 2-METHYL-	32.36	19
		4-METHYL-2-PENTANONE	26.37	21
		4-METHYL-2-PENTANONE	26.37	21
		ACETONE	7.37	17
		ACETONE	7.37	17
		CYCLOPENTANE, (2-METHYLBUTYL)	31.74	24
		CYCLOPENTANE, (2-METHYLBUTYL)	31.74	24
		NAPHTHALENE, DECAHYDRO-	35.37	120
		NAPHTHALENE, DECAHYDRO-	35.37	120
		UNKNOWN	31.12	8
		UNKNOWN	31.12	8
		UNKNOWN	33.36	15
		UNKNOWN	33.36	15
288E-2602-SB01	Soil	4,7-METHANO-1H-INDENE, 3A,4,7,7A-TETRAHY	8.44	1500000
		BENZENE, 1,2-DIMETHYL-	4.96	1600000
		DECANE	7.95	1800000
		DECANE, 2,2,8-TRIMETHYL-	7.52	880000
		DECANE, 2,5,9-TRIMETHYL-	8.79	1300000
		HEPTANE, 2,2,3,4,6,6- HEXAMETHYL	7.05	2000000
		HEPTANE, 2,2,4,6,6-PENTAMETHYL-	8.62	2000000
		HEPTANE, 5-ETHYL-2-METHYL-	9.13	6000000
		HEXANE, 2,3,4-TRIMETHYL-	8.7	5500000
		NONANE, 3,7-DIMETHYL-	9.35	4100000
		OCTANE, 2,3,6-TRIMETHYL-	11.41	990000
		OCTANE, 6-ETHYL-2-METHYL-	9.85	930000
		PENTANE, 3-ETHYL-2,2-DIMETHYL-	8.49	3000000
		UNDECANE	10.11	4700000
		UNKNOWN	9.61	930000
288E-2602-SB02	Soil	2-BUTANONE	13.16	9400
		VINYL ACETATE	16.18	720

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TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2603-SB01	Soil	1-HEXENE, 4-METHYL-	7.77	110000
		1-HEXENE, 4-METHYL-	7.56	120000
		1-HEXENE, 4-METHYL-	7.31	180000
		DECANE, 2,2,3-TRIMETHYL-	10.77	290000
		DECANE, 3,3,5-TRIMETHYL-	11.12	120000
		HEPTANE, 2,4-DIMETHYL-	7.66	60000
		HEPTANE, 4-ETHYL-2,2,6,6- TETRAMETHY	10.89	210000
		HEXANE, 2,2,5,5-TETRAMETHYL-	10.11	110000
		NONANE, 2,6-DIMETHYL-	8.04	83000
		NONANE, 2,6-DIMETHYL-	9.48	300000
		OCTANE, 2,3,6-TRIMETHYL-	11.71	230000
		OCTANE, 2,4,6-TRIMETHYL-	7.97	120000
		OXIRANE, (1-METHYLETHYL)-	8.83	190000
		UNKNOWN (ALKYL)	9.67	180000
		UNKNOWN (ALKYL)	9.05	260000
288E-2603-SB02	Soil	1-BUTANOL	15.4	170
		3-TETRADECENE, (Z)-	29.15	180
		ACETONE	7.37	29
		CYCLOHEXANE, 1,1,3-TRIMETHYL-	26.13	150
		CYCLOHEXANE, 1,1-DIMETHYL-	21.81	81
		CYCLOHEXANE, 1,2,3-TRIMETHYL-	27.45	160
		CYCLOHEXANE, 1,2,4-TRIMETHYL-	30.23	240
		CYCLOHEXANE, 1,3,5-TRIMETHYL-,(1.ALPHA.,	31.12	43
		CYCLOHEXANE, 1-ETHYL-2- METHYL-, C	29.96	180
		CYCLOHEXANE, ISOCYANATO-	26.41	72
		OCTANE, 3-METHYL-	32.47	65
		UNKNOWN	31.86	62
		UNKNOWN	26.41	72
		UNKNOWN	26.87	140
		UNKNOWN	33.25	180
		UNKNOWN	28.22	290
		UNKNOWN	24.63	430

8450308 39

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2604-SB01	Soil	1-HEXENE, 3,4-DIMETHYL-	8.23	53000
		CYCLOHEXANE, (1,2-DIMETHYL- BUTYL)-	9.01	29000
		HEXANE, 3,3-DIMETHYL- (8CI9CI)	11.16	33000
		OCTANE, 2,4,6-TRIMETHYL-	9.96	110000
		UNDECANE, 3-METHYL-	9.71	150000
		UNDECANE, 5-METHYL-	7.77	38000
		UNKNOWN	7.11	62000
		UNKNOWN	11.59	72000
		UNKNOWN	8.78	100000
		UNKNOWN	9.46	110000
		UNKNOWN	9.24	150000
		UNKNOWN	29.18	200000
		UNKNOWN	29.04	320000
		UNKNOWN (ALKYL)	10.34	47000
		UNKNOWN (ALKYL)	11.52	110000
288E-2604-SB02	Soil	1,4-UNDECADIENE, (Z)-	33.36	69
		1-UNDECYNE	32.28	54
		4,5-NONADIENE, 2-METHYL-	30.69	26
		4,7-METHANO-1H, 3A,4,7,7A- TETRAHYDRO	24.7	470
		9-OCTADECYNE	34.71	40
		ACETONE	7.37	15
		BICYCLO[2.2.1]HEPTANE, 2,2,3- TRIMETHYL-	27.56	44
		CYCLOHEXANE, 1,1,3,5- TETRAMETHY	31.74	140
		OXONIN, 4,5,6,7-TETRAHYDRO-, (Z,Z)-	28.1	64
		TRICYCLO[3.3.1.13,7]DECANE, 1-NITRI-	29.15	56
		UNKNOWN	35.1	28
		UNKNOWN	35.22	38

84503084

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2802-SB01	Soil	1,1'-BIPHENYL	16.12	22000
		2-METHYLNAPHTHALENE	14.58	3400
		2-PENTANONE, 4-METHYL-	3.87	1900
		BENZENE, 1,1'-OXYBIS-	16.57	73000
		BENZENE, 1,2,3,4-TETRAMETHYL-	11.18	3800
		BENZENE, 1,2,3-TRIMETHYL-	8.43	1900
		BENZENE, 1,2,4,5-TETRAMETHYL-	11.1	2300
		BENZENE, 1,2,4-TRIMETHYL-	9.06	2000
		BENZENE, 1,2-DIMETHYL-	5.58	4400
		BENZENE, 1,4-DIMETHYL-2-(1- METHYLETHY	12.75	1800
		BENZENE, 1-METHYL-3- (1-METHYLE	11.84	1700
		DIBENZOFURAN	18.41	520
		HEXANE, 2,2,5-TRIMETHYL-	9.82	2200
		NAPHTHALENE, 1,8-DIMETHYL-	16.83	2700
		NAPHTHALENE, 1-METHYL-	14.89	3100
		UNDECANE	10.8	2200
		UNDECANE, 3,6-DIMETHYL-	10.04	2300
288E-2802-SB11	Soil	2-METHYLNAPHTHALENE	14.83	140
		2-PENTANONE, 3-METHYL-	3.34	1800
		2-PENTANONE, 4-METHYL-	4.03	2100
		BENZENE, 1,1'-OXYBIS-	16.77	11000
		BENZENE, 1,2-DIMETHYL-	5.79	1800
		BENZENE, 1,3-DIMETHYL-	6.32	640
		BENZENE, ETHYL-	5.6	480
		BENZENE, METHYL-	3.6	600
		BENZO[E]PYRENE	34.68	1800
		DECANE	8.86	440
		DECANE, 6-ETHYL-2-METHYL-	11.03	480
		DIBENZOFURAN	18.68	130
		ETHANE, 1,1,2,2-TETRACHLORO-	6.75	360
		HEPTANE	3.95	1400
		NAPHTHALENE, 2-ETHENYL-	16.36	2600
		NONANE, 2,6-DIMETHYL-	9.37	480
		SILANE, METHYLTRIPHENOXY-	36.18	880

84503084

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound		Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-1-SB01	Soil	1,5-HEPTADIEN-3-YNE		3.83	4700
		2-METHYLNAPHTHALENE		15.11	110
		3-HEXANONE		4.18	2100
		BENZENE, 1,2-DIMETHYL-		6.02	1300
		DECANE, 2,2,4-TRIMETHYL-		9.64	770
		DECANE, 2,2,6-TRIMETHYL-		12.7	650
		DIBENZOFURAN		18.97	60
		DODECANE, 2,7,10-TRIMETHYL-		12.63	820
		HEPTANE, 2,2,3,4,6,6-	HEXAMETHYL	10.3	1100
		HEXADECANE		21.68	1200
		NONACOSANE		18.61	520
		NONANE, 3-METHYL-5-PROPYL-		9.87	770
		OXIRANE, 2,3-DIMETHYL-		3.57	1900
		PENTANAL, 2-METHYL-		4.27	2200
		PENTANE, 3,3-DIMETHYL-		10.77	650
		UNDECANE		11.27	770
		UNDECANE, 3,6-DIMETHYL-		10.51	820
288E-B-1-SB11	Soil	2-HEXANONE, 4-HYDROXY-3-	PROPYL-	4.01	4500
		3-HEXANONE		3.93	2900
		4H-CYCLOPENTA[DEF]PHENANTHRENE		24.4	7200
		7H-BENZ[DE]ANTHRACEN-7-ONE		29.64	1400
		BENZO(C)PHENANTHRENE		31.06	1000
		BENZO(J)FLUORANTHENE		34.16	12000
		BENZO(J)FLUORANTHENE		34.6	36000
		BENZO[B]NAPHTHO[1,2-D]	THIOPHENE	29.96	1000
		UNKNOWN		3.34	3600
		UNKNOWN		25.08	7200
		UNKNOWN (AROMATIC)		28.45	1000
		UNKNOWN (AROMATIC)		30.28	1000
		UNKNOWN (AROMATIC)		28.05	1400
		UNKNOWN (AROMATIC)		30.08	1600
		UNKNOWN (AROMATIC)		37.33	11000

845030842

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound		Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-1-SB02	Soil	ACETONE		6.42	19
		XYLENE (TOTAL) (M-XYLENE)		29.16	12
		XYLENE (TOTAL) (O+P XYLENE)		29.85	14
288E-B-1-SB03	Soil	1,3-CYCLOPENTADIENE, 5-(1-	METHYLETHY	6.23	4300
		2-METHYLNAPHTHALENE		14.69	120
		2-PENTANONE, 3-METHYL-		3.33	2600
		3-HEXANONE		3.92	2300
		BENZENE, 1,3-DIMETHYL-		5.71	6900
		DECANE, 2,2,6-TRIMETHYL-		12.31	3000
		DECANE, 3,3,6-TRIMETHYL-		10.38	2900
		DIBENZOFURAN		18.53	250
		HEXANE, 2,2,3-TRIMETHYL-		9.26	4500
		NONANE, 3,7-DIMETHYL-		10.12	4700
		NONANE, 3-METHYL-5-PROPYL-		9.48	3600
		OCTANE, 2,2,6-TRIMETHYL-		7.82	2500
		OCTANE, 2,6-DIMETHYL-		9.91	4800
		OXIRANE, 2-METHYL-2-(1-	METHYLETHY	4	2900
		UNDECANE		10.88	2200
		UNKNOWN		3.62	17000
		UNKNOWN (ALIPHATIC)		12.24	3700

8450308 43

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound		Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-2-SB01	Soil	2-HEXANONE, 4-HYDROXY-3-	PROPYL-	3.86	1600
		2-METHYLNAPHTHALENE		14.46	130
		2-PENTANONE, 3-METHYL-		3.22	1200
		3-HEXANONE		3.79	1200
		BENZENE, 1,2-DIMETHYL-		5.35	1200
		BENZENE, 1,2-DIMETHYL-		6.05	1700
		BENZENE, 1,2-DIMETHYL-		5.53	5700
		BENZO(J)FLUORANTHENE		33.66	2000
		BENZO[A]PYRENE		34.31	2600
		DECANE		8.54	1300
		DIBENZOFURAN		18.3	160
		HEXANE, 2,2,5-TRIMETHYL-		9.72	2100
		NONANE, 3-METHYL-5-PROPYL-		9.29	1800
		OCTANE, 2,2,6-TRIMETHYL-		9.93	1300
		OCTANE, 2,6,6-TRIMETHYL-		10.18	940
		UNDECANE		10.69	1800
		UNKNOWN		36.19	2300
288E-B-2-SB02	Soil	1,3-ISOBENZOFURANDIONE		14.9	4300
		1-OCTENE, 3,7-DIMETHYL-		7.57	3300
		2-METHYLNAPHTHALENE		14.58	280
		BENZENE, 1,2,3-TRIMETHYL-		9.08	3500
		BENZENE, 1,2-DIMETHYL-		6.12	4100
		BENZENE, 1,2-DIMETHYL-		5.59	9200
		BENZENE, 1-METHYL-2-(1-	METHYLETHY	9.9	4000
		CYCLOHEXANE, (1-METHYLPROPYL)		9.31	3100
		DECANE, 3,4-DIMETHYL-		10.04	7600
		DODECANE,2,7,10-TRIMETHYL-		9.41	7400
		HEPTANE, 2,2,3,4,6,6-HEXA-	METHYL-	9.82	9900
		NONANE, 2,6-DIMETHYL-		9.14	8400
		OCTANE, 4-ETHYL-		8.64	11000
		UNDECANE		12.81	2700
		UNDECANE		10.81	13000
		UNDECANE, 5-METHYL-		11.17	3200

845030844

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-2-SB03	Soil	1,3,5,7-CYCLOOCTATETRAENE	5.53	330
		BENZENE, 1,2-DIMETHYL-	5.06	370
		ETHANE, 1,1,2,2 TETRACHLORO-	6.01	370
		ETHANE, 1,1,2-TRICHLORO-	3.04	250
		PENTANE, 1,3-EPOXY-4-METHYL-	3.33	2000
		SULFUR, MOL. (S8)	25.07	4500
		UNKNOWN	3.15	370
		UNKNOWN	3.4	2700
		UNKNOWN (DIMETHYLSILOXANES)	33.53	250
		UNKNOWN (DIMETHYLSILOXANES)	36.91	330
		UNKNOWN (DIMETHYLSILOXANES)	34.72	780
		UNKNOWN (DIMETHYLSILOXANES)	35.83	860
288E-B-3-SB01	Soil	2-METHYLNAPHTHALENE	13.97	290
		3-HEXANONE	3.32	1700
		BENZO [E] PYRENE	33.61	540
		DECANE, 2,3,5-TRIMETHYL-	15.88	740
		DIBENZOFURAN	17.77	67
		DODECANE,2,7,10-TRIMETHYL-	20.66	660
		ETHANE,1,1,2,2-TETRACHLORO-	6.01	540
		HEPTADECANE	20.56	1100
		HEXADECANE	17.52	700
		SULFUR, MOL. (S8)	25.06	1900
		TETRADECANE	23.3	430
		TRIDECANE	14.11	970
		TRIDECANE, 6-PROPYL-	19.09	430
		UNDECANE	12.25	660
		UNKNOWN	35.5	1000
		UNKNOWN	36.21	2100
		UNKNOWN	3.41	2600

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TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-3-SB03	Soil	2-HEXANONE, 4-HYDROXY-3- PROPYL-	4	3000
		2-PENTANONE, 3-METHYL-	3.34	2800
		2-PENTANONE, 4-METHYL-	3.12	680
		3-HEXANONE	3.92	2600
		5-HEXEN-2-ONE	3.74	430
		BENZO [E] PYRENE	33.91	23000
		CYCLOPENT[A]INDENE, 3,8-DI- HYDRO-1,2,	26.7	6300
		ETHANE, 1,1,2-TRICHLORO-	3.64	480
		ETHANE,1,1,2,2-TETRACHLORO-	6.64	770
		HEPTACOSANE	29.92	1300
		HEXATRIACONTANE	32.93	2300
		PHENANTHRENE, 1-METHYL-7-(1- METHYLETHY	28.13	22000
		SULFUR, MOL. (S8)	26.09	53000
		UNKNOWN	25.75	7200
		UNKNOWN (SULFUR)	22.72	1100
288E-B-4-SB01	Soil	1,3,5,7-CYCLOOCTATETRAENE	5.55	490
		1-PHENANTHRENECARBOXYLIC ACID,1,2,3,4,4A	28.61	2300
		2-HEXANONE	3.4	2600
		2-METHYLNAPHTHALENE	13.97	140
		BENZO [E] PYRENE	33.59	1100
		DIBENZOFURAN	17.76	250
		HEPTANE	3.33	1700
		SULFUR, MOL. (S8)	25.05	610
		UNKNOWN	24.23	450
		UNKNOWN	24.89	490
		UNKNOWN	27.35	2100
		UNKNOWN (DIMETHYLSILOXANES)	29.46	660
		UNKNOWN (DIMETHYLSILOXANES)	35.83	1100
		UNKNOWN (DIMETHYLSILOXANES)	30.92	1400
		UNKNOWN (DIMETHYLSILOXANES)	34.72	1800
		UNKNOWN (DIMETHYLSILOXANES)	32.27	2000
		UNKNOWN (DIMETHYLSILOXANES)	33.54	2000

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TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-5-SB01	Soil	1,3,5,7-CYCLOOCTATETRAENE	6.29	1300
		1,3,5,7-CYCLOOCTATETRAENE	6.29	1300
		2-METHYLNAPHTHALENE	14.86	88
		2-METHYLNAPHTHALENE	14.86	88
		2-PENTANONE, 3-METHYL-	3.33	820
		2-PENTANONE, 3-METHYL-	3.33	820
		BENZENE, 1,2-DIMETHYL-	6.34	410
		BENZENE, 1,2-DIMETHYL-	6.34	410
		BENZENE, 1,2-DIMETHYL-	5.8	700
		BENZENE, 1,2-DIMETHYL-	5.8	700
		BENZENE, METHYL-	3.6	580
		BENZENE, METHYL-	3.6	580
		BENZO(J)FLUORANTHENE	34.7	2500
		BENZO(J)FLUORANTHENE	34.7	2500
		BENZO[B]NAPHTHO[2,3-D]FURAN	27.13	530
		BENZO[B]NAPHTHO[2,3-D]FURAN	27.13	530
		DECANE, 2,6,8-TRIMETHYL-	11.05	660
		DECANE, 2,6,8-TRIMETHYL-	11.05	660
		DIBENZOFURAN	18.71	80
		DIBENZOFURAN	18.71	80
		OXIRANE, 2-METHYL-2-(1- METHYLETHY	4.04	740
		OXIRANE, 2-METHYL-2-(1- METHYLETHY	4.04	740
		PENOXALINE	26.26	660
		PENOXALINE	26.26	660
		PENTANE, 1,3-EPOXY-4-METHYL-	3.96	1200
		PENTANE, 1,3-EPOXY-4-METHYL-	3.96	1200
		UNDECANE	13.07	450
		UNDECANE	13.07	450
		UNKNOWN	37.38	2300
		UNKNOWN	37.38	2300
		UNKNOWN (DIMETHYLSILOXANES)	33.17	1200
		UNKNOWN (DIMETHYLSILOXANES)	34.45	1200
		UNKNOWN (DIMETHYLSILOXANES)	33.17	1200
		UNKNOWN (DIMETHYLSILOXANES)	34.45	1200

8450308 47

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-5-SB03	Soil	1,2-BENZENEDICARBOXYLIC ACID, ISODECYL O	35.16	2200
		1,2-BENZENEDICARBOXYLIC ACID, ISODECYL O	35.16	2200
		2-PENTANONE, 3-METHYL-	3.34	1800
		2-PENTANONE, 3-METHYL-	3.34	1800
		BENZO(J)FLUORANTHENE	34.26	1100
		BENZO(J)FLUORANTHENE	34.26	1100
		BENZO(J)FLUORANTHENE	34.68	2400
		BENZO(J)FLUORANTHENE	34.68	2400
		DIBENZO[DEF,MNO]CHRYSENE	37.43	1200
		DIBENZO[DEF,MNO]CHRYSENE	37.43	1200
		HEPTANE	3.95	1600
		HEPTANE	3.95	1600
		PENTANAL, 2-METHYL-	4.03	2100
		PENTANAL, 2-METHYL-	4.03	2100
		UNKNOWN (AROMATIC)	42	1200
		UNKNOWN (AROMATIC)	42	1200
		UNKNOWN (DIMETHYLSILOXANES)	18.39	400
		UNKNOWN (DIMETHYLSILOXANES)	18.39	400
		UNKNOWN (PHTHALATE)	32.35	1500
		UNKNOWN (PHTHALATE)	32.35	1500
		UNKNOWN (PHTHALATE)	31.4	1800
		UNKNOWN (PHTHALATE)	32.12	1800
		UNKNOWN (PHTHALATE)	31.4	1800
		UNKNOWN (PHTHALATE)	32.12	1800
		UNKNOWN (PHTHALATE)	32.51	2500
		UNKNOWN (PHTHALATE)	32.51	2500
		UNKNOWN (PHTHALATE)	32.55	2900
		UNKNOWN (PHTHALATE)	32.55	2900
		UNKNOWN (PHTHALATE)	31.96	3800
		UNKNOWN (PHTHALATE)	31.96	3800

3.5

845030848

TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-B-6-SB01	Soil	2-METHYLNAPHTHALENE	14.58	59
		2-PENTANONE, 3-METHYL-	3.19	2300
		5-HEXEN-2-ONE	3.6	320
		BENZENE, 1,2-DIMETHYL-	5.58	200
		BENZENE, METHYL- (9CI)	3.43	640
		BENZO [E] PYRENE	33.71	1600
		BENZO[E]PYRENE	34.36	1700
		ETHANE, 1,1,2-TRICHLORO-	3.49	320
		ETHANE,1,1,2,2-TETRACHLORO-	6.53	680
		HEPTADECANE, 2,6,10,15-TETRAMETHYL-	18.11	240
		HEPTANE	3.78	1900
		PENTANAL, 2-METHYL-	3.87	2800
		SULFUR, MOL. (S8)	25.8	4800
		UNKNOWN	36.99	990
		UNKNOWN	36.24	1500
		UNKNOWN (ALKYL)	9.82	160
288E-M1501-SB01	Soil	2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.61	1700
		2-HEXANONE, 6-BROMO-	4.34	190
		2-PENTANONE, 3-METHYL-	3.89	1100
		2-PENTANONE, 4-METHYL-	3.66	270
		3-HEXANONE	4.52	1700
		3-PENTANONE, 2-METHYL-	3.86	310
		BENZENE, 1,2-DIMETHYL-	6.39	150
		BENZENE, METHYL-	4.15	390
		BENZO[E]PYRENE	35.52	540
		DIBENZOFURAN	19.41	44
		DODECANE	13.65	150
		DODECANE, 2,6,10-TRIMETHYL-	19	310
		ETHANE, 1,1,2,2-TETRACHLORO-	7.38	310
		ETHANE, 1,1,2-TRICHLORO-	4.23	310
		TRIDECANE, 6-PROPYL-	20.57	190
		TRITETRACONTANE	17.32	310

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TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-M1501-SB02	Soil	2-HEXANONE, 4-HYDROXY-3- PROPYL-	3.38	23000
		2-METHYLNAPHTHALENE	13.83	390
		3-HEXANONE	3.31	20000
		5-HEXEN-2-ONE	3.14	3300
		7H-BENZ[DE]ANTHRACEN-7-ONE	28.63	2600
		ACETONE	7.33	170
		BENZENE, 1,2-DIMETHYL-	4.97	3300
		BENZO(C)PHENANTHRENE	29.07	3300
		BENZO(J)FLUORANTHENE	32.9	41000
		BENZO[B]NAPHTHO[2,3-D]FURAN	26	4100
		BENZO[E]PYRENE	33.55	36000
		DIBENZOFURAN	17.63	1100
		ETHANE, 1,1,2,2-TETRACHLORO-	5.91	4800
		ETHANE, 1,1,2-TRICHLORO-1,2,2 -TRIFLUORO	12.31	12
		NAPHTHALENE, 2-PHENYL-	24.13	10000
		PENTACOSANE	30.05	4800
		SULFUR, MOL. (S8)	25.03	240000
		TRIPHENYLENE, 2-METHYL-	31	2200
		UNKNOWN	26.83	6
		UNKNOWN	12.66	40
		UNKNOWN (AROMATIC FLAVOR)	36.19	13000
288E-0725-TB01	Aqueous	ACETONE	6.36	12
		ACETONE	6.36	12
		CARBON DISULFIDE	7.29	2
		CARBON DISULFIDE	7.29	2
288E-TB-900801	Aqueous	ACETONE	7.47	30
288E-0306-WB01	Aqueous	NO UNKNOWNS OR TICS	0	0
		NO UNKNOWNS OR TICS	0	0
288E-2501-WB01	Aqueous	2,3-PENTANEDIONE	3.31	27
		5,-HEXEN-2-ONE	3.13	6
		PENTANAL, 2-METHYL-	3.38	31
		UNKNOWN	28.91	31

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TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-2501-WB01	Aqueous	2,3-PENTANEDIONE	3.31	27
		5-HEXEN-2-ONE	3.13	6
		PENTANAL, 2-METHYL-	3.38	31
		UNKNOWN	28.91	31
288E-TB900802	Aqueous	ACETONE	7.82	80
288E-0723-WB01	Aqueous	2-PENTANONE, 4-METHYL-	3.27	7
		2-PROPANONE, 1-CYCLOPROPYL	3.94	4
		3-HEXANONE	4.13	29
		3-PENTANOL, 3-METHYL-	3.48	54
		BENZENE, METHYL- (9CI)	3.76	7
		PROPANE, 2-ETHOXY-2-METHYL-	3.14	13
		UNKNOWN	4.46	4
		UNKNOWN	4.21	44
		UNKNOWN (DIMETHYLSILOXANES)	34.78	4
288E-0724-WB01	Aqueous	2-HEXANONE, 4-HYDROXY-3- PROPYL-	4.19	52
		2-PENTANONE, 3-METHYL-	3.49	57
		2-PENTANONE, 4-METHYL-	3.27	8
		2-PROPANONE, 1-CYCLOPROPYL	3.93	5
		3-HEXANONE	4.11	36
		BENZENE, METHYL- (9CI)	3.75	8
		UNKNOWN	3.14	11
		UNKNOWN (DIMETHYLSILOXANES)	37.99	17
		UNKNOWN (DIMETHYLSILOXANES)	34.35	20
288E-0725-WB01	Aqueous	2-HEXANONE	4.2	11
		2-PENTANONE, 3-METHYL-	3.49	8
		3-HEXANONE	4.1	19
		3-PENTANONE, 2-METHYL-	3.47	6
		BENZENE, METHYL-	3.75	8
		NO UNKNOWNS OR TICS	0	0
		NO UNKNOWNS OR TICS	0	0
		UNKNOWN (DIMETHYLSILOXANES)	33.45	5
		UNKNOWN (DIMETHYLSILOXANES)	34.73	14

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TABLE C-1
Compilation of Tentatively Identified Compounds from the Analytical Results of Additional ECRA Sampling

ENVIRON Sample ID	Matrix	Compound	Retention Time (Minutes)	Estimated Concentrations (µg/Kg)
288E-0725-WB01	Aqueous	UNKNOWN (DIMETHYLSILOXANES)	35.92	26
		UNKNOWN (DIMETHYLSILOXANES)	41.78	29
		UNKNOWN (DIMETHYLSILOXANES)	37.07	40
		UNKNOWN (DIMETHYLSILOXANES)	39.9	43
		UNKNOWN (DIMETHYSILOXANES)	38.37	46
288E-0725-WB02	Aqueous	1,3,5-CYCLOHEPTATRIENE	3.75	8
		2-HEXANONE	4.2	9
		2-PENTANONE, 3-METHYL-	3.5	8
		3-HEXANONE	4.11	18
		3-PENTANONE, 2-METHYL-	3.47	4
		NO UNKNOWNS OR TICS	0	0
		NO UNKNOWNS OR TICS	0	0
		UNKNOWN (DIMETHYLSILOXANES)	34.41	5
		UNKNOWN (DIMETHYLSILOXANES)	34.73	8
		UNKNOWN (DIMETHYLSILOXANES)	35.91	8
		UNKNOWN (DIMETHYLSILOXANES)	37.08	10
		UNKNOWN (DIMETHYLSILOXANES)	39.9	11
		UNKNOWN (DIMETHYLSILOXANES)	41.75	18
		UNKNOWN (DIMETHYSILOXANES)	38.37	8
288E-2105-WB01	Aqueous	NO UNKNOWNS OR TICS	0	0

288E:PAA005D5.W51

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APPENDIX D

Summary of Results from Samples Analyzed at Tufts University

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 2

ENVIRON SAMPLE ID	288E-0202-SB01	288E-0202-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	19.10	
Acenapthylene	3.30	
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	
Chrysene & Benzo[a]anthracene	ND	
Fluoranthene & Pyrene	2.20	
Fluorene	1.30	
Naphthalene	7.50	
Phenanthrene & Anthracene	10.40	
Volatile Organic Compounds (ppb)		
Ethylbenzene		780.20
Toluene		ND
m & p Xylene		525.40
Benzene		ND

84503085 4

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 5

ENVIRON SAMPLE ID	288E-0502-SB01	288E-0502-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	1.5-2.0
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	ND	
Acenapthylene	ND	
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	
Chrysene & Benzo[a]anthracene	ND	
Fluoranthene & Pyrene	5.60	
Fluorene	ND	
Naphthalene	1.00	
Phenanthrene & Anthracene	2.70	
Volatile Organic Compounds		
Ethylbenzene		ND
Toluene		2526.70
m & p Xylene		ND
Benzene		ND

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 9

ENVIRON SAMPLE ID	288E-0902-SB01	288E-0903-SB01	288E-0903-SB02	288E-0904-SB01	288E-0904-SB02	288E-0905-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HAB	HAB	HAB
DEPTH (feet)	1.0-1.2	0.0-0.5	0.5-0.8	0.0-0.5	1.5-1.7	1.3-1.5
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene		ND		ND		
Acenapthylene		ND		ND		
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene		ND		111.30		
Chrysene & Benzo[a]anthracene		ND		29.30		
Fluoranthene & Pyrene		ND		18.50		
Fluorene		ND		ND		
Naphthalene		ND		ND		
Phenanthrene & Anthracene		ND		19.20		
Volatile Organic Compounds						
Ethylbenzene	34.90		38.00		20.80	13.20
Toluene	ND		ND		348.30	ND
m & p Xylene	85.20		123.00		36.80	245.70
Benzene			ND		ND	ND

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 10

	ENVIRON SAMPLE ID	288E-1003-SB01
	MATRIX	Soil
	COLLECTION METHOD	HSAB
	DEPTH (feet)	0.0-0.5
Polycyclic Aromatic Hydrocarbons (ppm)		
	Acenapthene	0.30
	Acenapthylene	0.80
	Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND
	Chrysene & Benzo[a]anthracene	2.30
	Fluoranthene & Pyrene	25.30
	Fluorene	2.60
	Naphthalene	0.70
	Phenanthrene & Anthracene	30.90
Volatile Organic Compounds		
	Ethylbenzene	
	Toluene	
	m & p Xylene	
	Benzene	

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 13

ENVIRON SAMPLE ID	288E-1305-SB01	288E-1306-SB01
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	0.0-0.5
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	ND	ND
Acenapthylene	ND	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	ND
Chrysene & Benzo[a]anthracene	ND	ND
Fluoranthene & Pyrene	16.20	0.10
Fluorene	ND	ND
Naphthalene	ND	ND
Phenanthrene & Anthracene	18.70	0.30
Volatile Organic Compounds		
Ethylbenzene		
Toluene		
m & p Xylene		
Benzene		

8450308 58

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 15

ENVIRON SAMPLE ID	288E-1506-SB01	288E-1506-SB03	288E-1507-SB01	288E-1507-SB03
MATRIX	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.0-1.5	0.0-0.5	2.0-4.0
Polycyclic Aromatic Hydrocarbons (ppm)				
Acenapthene	4.40	ND	ND	ND
Acenapthylene	4.20	ND	ND	2.40
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	424.80	ND	84.70	ND
Chrysene & Benzo[a]anthracene	595.80	ND	13.80	5.30
Fluoranthene & Pyrene	1108.10	ND	7.40	ND
Fluorene	563.30	ND	ND	ND
Naphthalene	18.60	ND	ND	ND
Phenanthrene & Anthracene	4816.20	ND	ND	ND
Volatile Organic Compounds				
Ethylbenzene				
Toluene				
m & p Xylene				
Benzene				

8450308 59

TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 17

ENVIRON SAMPLE ID	288E-1706-SB01	288E-1706-SB03	288E-1707-SB01	288E-1707-SB03	288E-1707-SB03A	288E-1708-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	0.0-0.5	0.5-1.0	0.5-1.0	0.0-0.5
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene	ND	ND	ND	ND	ND	ND
Acenapthylene	ND	0.40	ND	0.30	ND	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	ND	88.40	ND	ND	ND
Chrysene & Benzo[a]anthracene	ND	ND	76.80	ND	ND	ND
Fluoranthene & Pyrene	ND	0.70	56.80	0.10	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND
Naphthalene	ND	0.70	1.20	0.10	ND	ND
Phenanthrene & Anthracene	ND	0.70	31.00	0.20	ND	ND
Volatile Organic Compounds						
Ethylbenzene						
Toluene						
m & p Xylene						
Benzene						

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 17

ENVIRON SAMPLE ID	288E-1708-SB01	288E-1708-SB03	288E-1709-SB01	288E-1709-SB01	288E-1709-SB03
MATRIX	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	2.0-2.5	0.0-0.5	0.0-0.5	2.5-3.0
Polycyclic Aromatic Hydrocarbons (ppm)					
Acenapthene	ND	ND	0.50	ND	ND
Acenapthylene	ND	ND	0.50	ND	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	ND	80.10	ND	ND
Chrysene & Benzo[a]anthracene	ND	ND	43.00	ND	6.00
Fluoranthene & Pyrene	ND	ND	27.80	ND	5.60
Fluorene	ND	ND	1.40	ND	ND
Naphthalene	ND	ND	3.30	ND	ND
Phenanthrene & Anthracene	ND	0.50	53.00	0.80	3.00
Volatile Organic Compounds					
Ethylbenzene					
Toluene					
m & p Xylene					
Benzene					

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 18

ENVIRON SAMPLE ID	288E-1802-SB01	288E-1802-SB03
MATRIX	Soil	Soil
COLLECTION METHOD	HSAB	HSAB
DEPTH (feet)	0.0-0.5	2.0-2.5
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	ND	ND
Acenapthylene	0.20	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	13.40	53.00
Chrysene & Benzo[a]anthracene	2.40	10.80
Fluoranthene & Pyrene	1.70	8.80
Fluorene	ND	ND
Naphthalene	ND	ND
Phenanthrene & Anthracene	1.20	8.40
Volatile Organic Compounds		
Ethylbenzene		
Toluene		
m & p Xylene		
Benzene		

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 26

ENVIRON SAMPLE ID	288E-2601-SB01	288E-2601-SB02	288E-2602-SB01	288E-2602-SB02	288E-2603-SB01	288E-2603-SB02
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HAB	HAB	HAB
DEPTH (feet)	0.0-0.5	1.0-1.2	0.2-0.5	1.7-2.0	0.0-0.5	1.5-2.0
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene	ND		0.30		ND	
Acenapthylene	ND		1.80		ND	
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND		ND		ND	
Chrysene & Benzo[a]anthracene	ND		5.00		ND	
Fluoranthene & Pyrene	ND		9.30		ND	
Fluorene	ND		3.60		ND	
Naphthalene	ND		11.80		ND	
Phenanthrene & Anthracene	ND		33.30		ND	
Volatile Organic Compounds						
Ethylbenzene		10.50		513.70		ND
Toluene		116.90		ND		ND
m & p Xylene		48.90		1698.60		82.00
Benzene		ND		ND		ND

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 26

ENVIRON SAMPLE ID	288E-2604-SB01	288E-2604-SB02
MATRIX	Soil	Soil
COLLECTION METHOD	HAB	HAB
DEPTH (feet)	0.0-0.5	1.0-1.2
Polycyclic Aromatic Hydrocarbons (ppm)		
Acenapthene	ND	
Acenapthylene	ND	
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	
Chrysene & Benzo[a]anthracene	ND	
Fluoranthene & Pyrene	1.10	
Fluorene	ND	
Naphthalene	ND	
Phenanthrene & Anthracene	ND	
Volatile Organic Compounds		
Ethylbenzene		10.90
Toluene		ND
m & p Xylene		104.40
Benzene		ND

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

AEC 28

ENVIRON SAMPLE ID	288E-2802-SB01
MATRIX	Soil
COLLECTION METHOD	HAB
DEPTH (feet)	0.0-0.5
Polycyclic Aromatic Hydrocarbons (ppm)	
Acenapthene	2.20
Acenapthylene	0.30
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	42.50
Chrysene & Benzo[a]anthracene	12.60
Fluoranthene & Pyrene	10.90
Fluorene	ND
Naphthalene	ND
Phenanthrene & Anthracene	5.30
Volatile Organic Compounds	
Ethylbenzene	
Toluene	
m & p Xylene	
Benzene	

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

ENVIRON SAMPLE ID	288E-B-1-SB01	288E-B-1-SB02	288E-B-1-SB03	288E-B-2-SB01	288E-B-2-SB02	288E-B-2-SB03
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HAB	HAB	HAB	HSAB	HSAB	HSAB
DEPTH (feet)	0.0-0.5	1.5-2.0	1.5-2.0	0.0-0.5	2.0-3.0	3.0-3.5
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene	ND		ND	ND	ND	ND
Acenapthylene	0.50		4.70	ND	ND	0.20
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND		673.20	ND	ND	ND
Chrysene & Benzo[a]anthracene	5.00		264.40	0.80	ND	ND
Fluoranthene & Pyrene	2.80		155.50	2.00	4.30	ND
Fluorene	ND		6.90	ND	ND	ND
Naphthalene	ND		ND	ND	ND	ND
Phenanthrene & Anthracene	2.10		74.30	1.50	8.20	0.20
Volatile Organic Compounds						
Ethylbenzene		71.80				
Toluene		1262.00				
m & p Xylene		206.20				
Benzene		ND				

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TABLE D-1
Summary of Results from Samples Analyzed at Tufts University

ENVIRON SAMPLE ID	288E-B-3-SB01	288E-B-3-SB03	288E-B-4-SB01	288E-B-5-SB01	288E-B-5-SB03	288E-B-6-SB01
MATRIX	Soil	Soil	Soil	Soil	Soil	Soil
COLLECTION METHOD	HSAB	HSAB	HSAB	HAB	HAB	HSAB
DEPTH (feet)	0.0-0.5	2.0-2.5	0.0-0.5	0.0-0.5	1.0-1.5	0.0-2.0
Polycyclic Aromatic Hydrocarbons (ppm)						
Acenapthene	ND	0.50	ND	ND	ND	ND
Acenapthylene	ND	1.20	ND	ND	ND	ND
Benzo[b]&[k]fluoranthene & Benzo[a]pyrene	ND	ND	10.70	ND	26.80	ND
Chrysene & Benzo[a]anthracene	ND	7.40	4.70	ND	11.90	ND
Fluoranthene & Pyrene	ND	4.30	5.80	0.30	7.80	ND
Fluorene	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND
Phenanthrene & Anthracene	0.50	8.80	8.40	ND	5.90	ND
Volatile Organic Compounds						
Ethylbenzene						
Toluene						
m & p Xylene						
Benzene						

Note: ND = Not detected

288E:PAA00592.W51

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CENTRAL FILE

Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan for the Spencer Kellogg Facility Formerly a Division of Textron Inc. 400 Doremus Avenue Newark, Essex County, New Jersey

Volume I of V

ECRA Case No. 85403

June 1988

Prepared for:

Textron Inc.
Providence, Rhode Island 02903

Prepared by:

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845030868

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

L I S T O F F I G U R E S

		Page
Figure II-1:	Specifications for Shallow Monitoring Wells	19
Figure II-2:	Specifications for Deep Monitoring Wells	21
Figure III-1:	Shallow Ground Water Elevations and Flow Directions - Low Tide January 25, 1988	31
Figure III-2:	Shallow Ground Water Elevations and Flow Directions - High Tide January 25, 1988	32
Figure III-3:	Shallow Ground Water Elevations and Flow Directions - Low Tide March 2, 1988	33
Figure III-4:	Shallow Ground Water Elevations and Flow Directions - High Tide March 2, 1988	34
Figure III-5:	Shallow Ground Water Elevations and Flow Directions - High Tide March 16, 1988	35
Figure III-6:	Shallow Ground Water Elevations and Flow Directions - Low Tide April 13, 1988	36
Figure III-7:	Shallow Ground Water Elevations and Flow Directions - Low Tide April 29, 1988	37
Figure III-8:	Deep Aquifer Ground Water Elevations - January 25, 1988	38
Figure III-9:	Deep Aquifer Ground Water Elevations - March 2, 1988	39
Figure III-10:	Deep Aquifer Ground Water Elevations - High Tide March 16, 1988	40
Figure III-11:	Deep Aquifer Ground Water Elevations - High Tide April 13, 1988	41
Figure III-12:	Deep Aquifer Ground Water Elevations - High Tide April 29, 1988	42

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CENTRAL FILE

Presentation of the Phase II ECRA Sampling Plan Results and Remediation Strategy/Part I Cleanup Plan for the Spencer Kellogg Facility Formerly a Division of Textron Inc. 400 Doremus Avenue Newark, Essex County, New Jersey

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ECRA Case No. 85403

C O N T E N T S

		Page
	EXECUTIVE SUMMARY	i
I.	INTRODUCTION	1
	A. Purpose	1
	B. Site Description	2
	C. Summary of Phase I Sampling Plan Results	3
	1. Total Petroleum Hydrocarbons (TPHCs)	7
	2. Priority Pollutant Metals (PPMs)	8
	3. Volatile Organic Chemicals (VOCs)	10
	4. Other Contaminants	11
	D. Scope of Work for Phase II Sampling Plan	13
	1. Further Characterization of Site Hydrogeology	13
	2. Total Petroleum Hydrocarbons	14
	3. Metals and Cyanide	15
	4. Determine Discharge Point(s) for Building 26 Floor Drains	15
	E. Subsequent Modifications to the Phase II Sampling Plan	15
II.	METHODOLOGY	17
	A. Soil Borings	17
	1. Drilling Methods	17
	2. Sample Collection Methods	17
	B. Monitoring Wells	18
	1. Shallow Well Construction	18
	2. Deep Well Construction	18
	3. Well Completion	20
	4. Well Development	22
	5. Well Sampling Method	22
	C. Quality Assurance/Quality Control Measures	22
	1. Decontamination Procedures	22
	2. Control Samples	23
	D. Subcontractors	24
	1. Analytical Laboratories	24
	2. Surveyor	24
	3. Sewer Service Specialists	24
III.	GEOLOGIC AND HYDROGEOLOGIC RESULTS	26
	A. Hydrogeologic Setting	26
	B. Ground Water Flow Regime	27

845030871

C O N T E N T S (continued)

		Page
IV.	ANALYTICAL RESULTS	44
	A. General	44
	1. Analytical Data Packages	44
	2. Informal ECRA Cleanup Guidelines	45
	B. Summaries of Soil Results for Areas of Environmental Concern	45
	1. Area of Environmental Concern 3	45
	2. Area of Environmental Concern 4	47
	3. Area of Environmental Concern 10	47
	4. Area of Environmental Concern 13	48
	5. Area of Environmental Concern 14	49
	6. Area of Environmental Concern 15	49
	7. Area of Environmental Concern 16	50
	8. Area of Environmental Concern 17	51
	9. Area of Environmental Concern 19	52
	10. Area of Environmental Concern 21	53
	11. Area of Environmental Concern 23	53
	12. Area of Environmental Concern 25	54
	C. Summaries of Soil Results from Monitoring Well Locations	55
	1. Boring MW12	55
	2. Boring MW13	56
	3. Boring MW14	57
	4. Boring MW15	57
	5. Boring MW16	58
	6. Boring MW17	59
	7. Boring MW18	60
	8. Boring MW19	60
	9. Boring MW24	61
	10. Boring MW25	61
	11. Boring MW26	62
	D. Summaries of Soil Results from Background Borings	62
	1. Background Boring 001	62
	2. Background Boring 002	63
	3. Background Boring 003	63
	4. Background Boring 004	63
	5. Background Boring 005	64

C O N T E N T S (continued)

		Page
IV.	ANALYTICAL RESULTS (continued)	
	E. Shallow Ground Water	64
	1. Monitoring Well 1	64
	2. Monitoring Well 2	65
	3. Monitoring Well 3	65
	4. Monitoring Well 4	65
	5. Monitoring Well 5	66
	6. Monitoring Well 6	66
	7. Monitoring Well 7	66
	8. Monitoring Well 8	67
	9. Monitoring Well 9	67
	10. Monitoring Well 10	68
	11. Monitoring Well 11	68
	12. Monitoring Well 12	68
	13. Monitoring Well 13	69
	14. Monitoring Well 14	69
	15. Monitoring Well 15	69
	16. Monitoring Well 16	70
	17. Monitoring Well 17	70
	18. Monitoring Well 18	71
	19. Monitoring Well 19	71
	F. Deep Ground Water	71
	1. Monitoring Well 21	71
	2. Monitoring Well 22	72
	3. Monitoring Well 23	72
	4. Monitoring Well 24	72
	5. Monitoring Well 25	73
	6. Monitoring Well 26	73
	G. Building 26 Floor Drain Results	74
	H. March 1988 Ground Water Sampling Results	74
	1. General	74
	2. Analytical Results	77
V.	DISCUSSION	79
	A. Soils	79
	1. General	79
	2. Priority Pollutant Metals (PPMs)	79
	3. Total Petroleum Hydrocarbons (TPHCs)	81
	B. Shallow Ground Water	87
	1. General	87
	2. Priority Pollutant Metals (PPMs)	88
	3. Total Petroleum Hydrocarbons (TPHCs)	89
	4. Volatile Organic Compounds (VOCs)	90
	5. Cyanide	91
	C. Deep Aquifer Summary	91

C O N T E N T S (continued)

		Page
VI.	CONCLUSIONS	93
	A. General	93
	B. Contamination Related to On-Site Activities	93
	C. Contamination Related to Materials of the Fill Unit	94
	D. Interaction Between Fill Unit and Shallow Aquifer	95
	E. Deep Aquifer	97
VII.	REMEDIATION STRATEGY/PART I CLEANUP PLAN	98
	A. Introduction	98
	B. Evaluation of the Need for Cleanup	100
	1. General	100
	2. Soil	101
	3. Shallow Ground Water	103
	4. Deep Aquifer	105
	C. Proposed Potential Cleanup Methodology	105
	1. General	105
	2. Screening and Evaluation of In Situ Biodegradation	106
	a) Phase I: Bench-Scale Treatability Study	108
	b) Phase II: Field Demonstration Study	109
	c) Phase III: Pilot-Scale Testing	110
	d) Phase IV: Design and Implementation of the Selected Remediation Technology	110
	e) Schedule	111

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

L I S T O F T A B L E S

		Page
Table I-1:	Areas of Environmental Concern	4
Table III-1:	Water Level Measurements	29
Table IV-1:	Schedule of Analytical Parameters for March 1988 Ground Water Sampling	76

845030875

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

L I S T O F A P P E N D I C E S

Appendix A: Informal ECRA Guidelines in Soil and Ground Water

Appendix B: Boring Logs

Appendix C: Well Specifications

Appendix D: Summary of Well Data

Appendix E: Well Sampling Data

Appendix F: Sampling Location Elevations and Coordinates

Appendix G: Summary Tables

Appendix H: Description of Solute Transport Modeling Analyses

Appendix I: Plates

845030876

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

L I S T O F P L A T E S
(Appendix I)

Plate 1: Areas of Environmental Concern and Phase II Sampling Locations

Plate 2: Metals Above ECRA Guidelines in Surface Soil Samples

Plate 3: Metals Above ECRA Guidelines in Deeper Soil Samples

Plate 4: Hydrocarbons in Soil Samples

Plate 5: Phase II Ground Water Analytical Results Above ECRA Guidelines

Plate 6: March 1988 Ground Water Analytical Results at or Above ECRA Guidelines

845030877

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

EXECUTIVE SUMMARY

On July 25, 1985, Textron Inc. (Textron) signed an Administrative Consent Order under the New Jersey Environmental Cleanup Responsibility Act (ECRA), which allowed Textron to sell its Spencer Kellogg resin manufacturing facility (the Spencer Kellogg Facility) to NL Industries, Inc. As part of the ECRA process, ENVIRON received the New Jersey Department of Environmental Protection's (NJDEP) approval of a Phase I Sampling Plan for the Spencer Kellogg facility and implemented that plan from November 1986 to March 1987. ENVIRON submitted the results of the Phase I Sampling Plan to NJDEP in March 1987 in a report entitled "Presentation of the ECRA Sampling Plan Results." In April 1987, ENVIRON performed additional field work and reported the results to NJDEP in June 1987 in a report entitled "Presentation of the Interim Investigation Results."

The findings from the Phase I and Interim Investigation studies indicated that several classes of constituents were present in soil and ground water at the Spencer Kellogg facility. However, the data were insufficient to define fully the nature and extent of the constituents' presence in all areas of the site and to characterize completely the ground water flow patterns. In order to obtain additional critical data, ENVIRON implemented the NJDEP-approved Phase II Sampling Plan during November and December 1987.

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The specific objectives of the Phase II Sampling Plan were to: (1) delineate the extent of ground water contamination; (2) further define the direction of ground water flow in both the shallow and deep aquifers; (3) define the nature and pattern of metal contamination in both soils and ground water; (4) identify the oils that contribute to the observed hydrocarbon contamination in each area of environmental concern (AEC); and (5) determine the location of the discharge point(s) for the floor drains in Building 26.

The hydrogeologic results of the Phase II Sampling Plan were generally consistent with the data obtained during the previous site investigations. Shallow ground water flow is largely influenced by the presence of the underground flume, which acts as a discharge point during both low and high tides. Additionally, the data obtained from one newly installed monitoring well located along the easternmost portion of the on-site storm sewer system indicate that either the backfill of the storm sewer or the point of penetration of the storm sewer conduit through the breakwall along Newark Bay may be acting as a local area sink for shallow ground water during low tide. Ground water flow within the deeper aquifer appears to be towards Newark Bay during low tide and away from the bay during high tide. The effects of high tide appear to be most pronounced in the eastern portion of the site.

Analytical results of forty-two (42) soil samples collected from the shallow fill unit indicate the presence of priority pollutant metals and petroleum hydrocarbons at concentrations in excess of informal ECRA

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cleanup guidelines. Lead, zinc, copper, and mercury are the most common metals, particularly in the central and eastern areas of the site. The variability of metal concentrations in soil samples taken near the surface and the increase of metal concentrations with depth at some sampling locations suggest that the presence of priority pollutant metals was most likely caused by the fill material. This conclusion is supported by site history, as none of the priority pollutant metals is known to have been used at the Spencer Kellogg facility.

Hydrocarbon "fingerprinting" analyses, designed to determine the relative amounts of petroleum versus non-petroleum-based hydrocarbons, indicate that a significant portion of what were originally described as petroleum-based hydrocarbons are non-hazardous fish and vegetable oils. The "fingerprinted" petroleum-based hydrocarbons include fuel oils, lubricating oils, gasoline, paint thinner, and coal tar. In certain areas of the site these petroleum-based hydrocarbons are present in concentrations exceeding the informal ECRA cleanup guideline. These petroleum-based hydrocarbons could have resulted from either the use of contaminated fill material or on-site manufacturing activities.

Results of the shallow ground water analyses do not indicate the presence of dissolved metals which can be related to on-site activities and operations. Selenium was detected in the shallow aquifer at levels in excess of the informal ECRA cleanup guideline. Similar levels of selenium were reported for the sample collected from Newark Bay. Given the extent of tidal impact on the site's ground water, the bay is

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probably the source of selenium on the site. During implementation of the Phase II sampling plan, additional metals, including lead, cadmium, chromium and/or mercury, copper, arsenic and zinc were detected at levels above the informal ECRA cleanup guidelines. The results of filtered ground water samples collected during the March 1988 sampling round, however, indicate that these metals are associated with fine particulate sediment and were detected in the laboratory due to field acidification of unfiltered samples. The metals associated with the fine particulate sediment are likely to be related to the fill material.

Petroleum hydrocarbons in excess of informal ECRA cleanup guidelines were detected in two designated background wells monitoring the shallow fill unit. These data, combined with the absence of petroleum hydrocarbons in other site monitoring wells, indicate that the presence of petroleum hydrocarbons in the shallow ground water is the result of migration from an off-site source.

Volatile organics were also detected at levels above informal ECRA cleanup guidelines in two shallow monitoring wells. Results of the March 1988 sampling confirmed the existence of volatile organics in these wells and indicated relatively low levels of these constituents in two additional shallow wells. These data suggest, however, that the extent of volatile organics in the shallow ground water is limited to relatively small areas of the site.

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Analytical results of ground water samples collected from wells monitoring the deep aquifer do not indicate the presence of contaminants related to on-site activities. When sampled as part of the Phase II Sampling Plan, two wells (MW22 and MW26), located in the easternmost portion of the site, adjacent to Newark Bay, contained levels of petroleum hydrocarbons (MW26) or lead (MW22) slightly above the informal ECRA cleanup guidelines. However, neither well contained petroleum hydrocarbons or lead when resampled as part of the March 1988 sampling nor was lead found in MW22 during the first phase of sampling. Therefore, a pattern of contamination has not been observed. The well that contained lead also evidenced selenium contamination during the March 1988 sampling when similar levels of selenium were found in a sample collected from Newark Bay, suggesting that this contamination was related to the tidal impact of Newark Bay on this particular monitoring well.

Dye tests were performed on the floor drains inside Building 26 to determine their point of discharge. The results indicate that the drainage pipe may lack physical integrity.

The nature, patterns, extent and likely sources of contamination at the Spencer Kellogg facility have largely been determined and/or confirmed during the execution of the Phase II Sampling Plan.

In accordance with the requirements of ECRA, remedial strategies have been defined and are included as part of this document. Set forth, too, are evaluative criteria used to determine the need for and potential scope

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of remediation. These are consistent with the goal of protecting public health and the environment and take into consideration other relevant factors such as the source of contamination, location of the industrial establishment and surrounding ambient conditions. Although the need for remediation at the site appears to be minimal, this document proposes the implementation of a feasibility study for in-situ treatment of volatile organics in on-site soils.

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

I. INTRODUCTION

A. Purpose

On July 25, 1985, Textron Inc. (Textron) signed an Administrative Consent Order under the New Jersey Environmental Cleanup Responsibility Act (ECRA) which allowed Textron to sell its Spencer Kellogg resin manufacturing facility (the Spencer Kellogg facility or the site) to NL Industries, Inc. In order to assist Textron in complying with ECRA, ENVIRON received the New Jersey Department of Environmental Protection's (NJDEP) approval of a Phase I Sampling Plan and implemented that plan from November 1986 to March 1987. ENVIRON submitted the results to the NJDEP in March 1987 in a report entitled "Presentation of the ECRA Sampling Plan Results." In April 1987, ENVIRON performed additional field work and presented the results to the NJDEP in June 1987 in a report entitled "Presentation of the Interim Investigation Results."

Results of the Phase I Sampling Plan indicated the presence of soil and ground water contamination[1] at the Spencer Kellogg facility. ENVIRON implemented the NJDEP-approved Phase II Sampling Plan during November and December 1987 to define fully the nature and areal extent of

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1 For this report, "contamination" is defined as concentrations of a particular substance exceeding informal NJDEP-established ECRA cleanup guidelines for soil or ground water (Appendix A). ENVIRON is using these guidelines to simplify the presentation and interpretation of sampling results. Neither ENVIRON nor Textron suggests, however, that the informal ECRA cleanup guidelines provide an appropriate basis for determining the need for and/or scope of site cleanup.

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both soil and ground water contamination in certain areas of the site, to characterize ground water flow patterns, and to clarify other issues that were not resolved during the first phase of sampling.

In this report, ENVIRON provides a summary of background information and previous analytical results, presents the results of the Phase II Sampling Plan and additional sampling program conducted in March 1988, and sets forth a remediation strategy. The discussion of the Phase II Sampling Plan and the March 1988 sampling program includes the methodologies used to collect soil and ground water samples, presents the site-specific geologic, hydrogeologic and analytical results, and interprets these results in terms of ECRA requirements. The remediation strategy includes a discussion of the criteria used in evaluating cleanup requirements and a feasibility study for in situ treatment of on-site soils.

B. Site Description

The Spencer Kellogg facility is situated on the west bank of Newark Bay. The site, approximately 10 acres in size, is directly across from Kearny Point -- which marks the confluence of the Passaic and Hackensack Rivers, which join to form Newark Bay. Originally marshland, the site was filled in by the early 1900's and has since been subject to industrial activity.

Plate 1 (Appendix I) depicts the main features of the site. A breakwall consisting of concrete-covered rip rap is located along the eastern property edge adjacent to Newark Bay. West of the property is a

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landfill which drains into Plum Creek. Upon leaving the landfill, Plum Creek enters an underground conduit or flume, through which it flows under Doremus Avenue and beneath the site. This flume discharges from a pipe in the breakwall directly into Newark Bay.

According to plant personnel. the site has been used as a manufacturing facility since the first or second decade of this century. Before this, the site formerly housed an alcohol distillery. Resins and resin-related products have been manufactured on-site from the early 1930s to the present. For the past several decades, the facility manufactured coating resins used primarily in the paint industry. The site has been almost entirely paved for the last few decades.

C. Summary of Phase I Sampling Plan Results

Based on a series of initial site visits and a review of past and present operations, twenty-seven (27) areas of environmental concern (AECs) were identified. The rationale for selection of each AEC is provided in Table I-1, and the locations are illustrated on Plate 1 (Appendix I). To evaluate the effect of past site activities on the quality of soil and ground water and to determine the geologic and hydrogeologic characteristics of the site, ENVIRON completed forty-six (46) soil borings, and installed eleven (11) shallow monitoring wells and three (3) deep monitoring wells during execution of the Phase I Sampling Plan, primarily within the aforementioned AECs. Soil, surface water and ground water samples were collected and analyzed for those chemicals that may be present due to industrial activities within the AECs.

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Table I-1: Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
1	Area of apparent resin spill onto cracked pavement.
2	Area of possible discharge onto unpaved region from dumpster and compactor which receive waste from Buildings 31 and 32.
3	Area of potential spill of finished products (resins) during railroad car loading.
4	Area of possible discharge of vegetable oils and fish oils during railroad car unloading.
5	Area of possible discharge of phthalic anhydride during railroad car unloading.
6	Underground fuel oil tank.
7	Site of solvent tank truck unloading prior to and subsequent to area being paved.
8	"Underground" fuel oil tanks.[2]
9	Limited area of potential contamination beneath building on stilts possibly caused by a discharge of raw materials and finished products from the polyester resin manufacturing process through a hole in the building's floor.

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1 The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1 (Appendix I). The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

2 These tanks appear to be mostly above ground level, but are covered with earth.

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Table I-1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale for Selection
10	Current raw materials storage area. Before area was paved, area was used for finished product and raw materials storage.
11	Former aboveground storage tank located in unpaved area.
12	Building on stilts with potential for spills or discharges beneath.
13	Site of former aboveground storage tanks while area was unpaved.
14	Site of former aboveground storage tanks while area was unpaved.
15	Site of former drum storage while area was unpaved.
16	Site of former drum storage while area was unpaved.
17	Site of former drum storage while area was unpaved.
18	Site of fuel oil unloading in unpaved area with evidence of spills.

[1] The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1 (Appendix I). The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

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Table I-1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale
19	Tank previously used for solvent sludge storage. Area within dike unpaved.
20	Location of former underground gasoline tank.
21	Site of former aboveground tank farm while area was unpaved.
22	Concrete pad on which 1285 Premix (a hazardous waste) has been stored in drums.
23	Tank wagon loading area for Building 4 where 1285 Premix may be generated.
25	Tank wagon loading area for Building 26 where 1285 Premix may be generated.
26	Drains in large tank farm which may have discharged to the ground in past. Drains are now plugged.
27	Drum storage area on unpaved ground (observed during April 9, 1986, DEP site inspection).
28	Area around the break in the pipe which carries runoff from the northern railroad siding (observed during April 9, 1986, DEP site inspection).

[1] The locations of the Areas of Environmental Concern (AECs) are depicted on Plate 1 (Appendix I). The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

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The Phase I Sampling Plan results indicate that the primary soil contaminants at the site are total petroleum hydrocarbons (TPHCs) and volatile organic compounds (VOCs), specifically ethylbenzene and toluene. Base neutral organic compounds (BNs), priority pollutant metals (PPMs), and other VOCs, such as benzene, methylene chloride and chloroform, were detected in only a few soil samples. Soil contamination was limited to the shallow fill unit.

The primary ground water contaminants detected at the site were ethylbenzene and toluene. PPMs were detected above informal ECRA cleanup guidelines in two of five wells tested. TPHCs, benzene, and cyanide were each detected in only one ground water sample.

No other pollutants of concern were detected at concentrations above informal ECRA cleanup guidelines in soil or ground water samples collected during Phase I sampling. The informal ECRA cleanup guidelines for soil and ground water are provided in Appendix A. The pattern of contamination for each of these parameters is summarized below.

1. Total Petroleum Hydrocarbons (TPHCs)

All soil and ground water samples collected as part of the Phase I sampling program were analyzed for TPHCs. Only the ground water sample obtained from MW2 contained levels of TPHCs (70 ppm) in excess of the informal ECRA cleanup guideline. This contamination appears to be from an off-site source, because MW2 is a background well located upgradient of any possible source(s) of TPHC contamination associated with activities at the site. No

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industrial activity or handling of hazardous materials is reported to have occurred in the vicinity of MW2. Potential TPHC sources include a municipal landfill and several industrial facilities located off-site in the general area of the facility.

Fifty-three of the sixty-three Phase I soil samples contained concentrations of TPHCs exceeding the informal ECRA cleanup guideline. However, the standard TPHC analytical method used in the Phase I analysis detects both petroleum and non-petroleum-based hydrocarbons. Many of the hydrocarbon compounds which have been used at the Spencer Kellogg facility are not petroleum-based hydrocarbons, but would be detected and quantified as TPHCs by this standard method. These non-petroleum compounds include fish oil, linseed oil, castor oil, sunflower fatty acid, and soybean oil.

2. Priority Pollutant Metals (PPMs)

Phase I soil samples were analyzed for PPMs at five designated background locations -- MW1, MW6, MW9, MW21 and MW23. Arsenic and mercury were each found in concentrations exceeding informal ECRA cleanup guidelines at only one sampling location. Copper, lead, and zinc were found at levels exceeding informal ECRA cleanup guidelines at two or more locations.

The arsenic contamination was detected in the samples collected from MW23. In the soil samples collected from MW1, however, which is located within a few feet of MW23, arsenic was detected at

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concentrations below the informal ECRA cleanup guideline. These results suggest that the presence of arsenic may be indicative of the heterogeneous fill material.

Mercury contamination was found in one of two soil samples collected from MW9. In the sample collected from 0 to 2 feet, 66 ppm of mercury was detected. In the sample collected immediately below this, from a depth of 2 to 4 feet, a concentration of 5,600 ppm was detected. The difference in concentrations and the increase along the vertical soil profile suggest that the source of the mercury is the fill material rather than surficial industrial activities at the site.

Copper, lead and zinc contamination was detected in the soil samples collected from MW6 and MW9. Like the mercury contamination described above, the concentrations of each of these metals increased with depth at each location. High concentrations of copper and lead were also found in the soil sample collected from MW21. Again, because of the increasing concentrations of these metals with depth, it is likely that the presence of these constituents is related to the fill material, rather than to surficial industrial activities at the site.

Ground water samples from two of the shallow wells were analyzed for PPMs. MW6 was analyzed for all of the PPMs, while MW9 was analyzed only for lead. Lead was found in concentrations exceeding the informal ECRA cleanup guideline in samples from both of these wells.

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3. Volatile Organic Chemicals (VOCs)

All ground water samples and nearly all soil samples collected during the Phase I field program were analyzed for VOCs. In general, VOC contamination in ground water was found to be limited both in areal extent and in the number of compounds detected.

Ethylbenzene and toluene are the primary volatile contaminants detected in both soil and ground water at the site. Benzene, methylene chloride, and chloroform were found in a few soil samples where either ethylbenzene or toluene was present. Benzene was also found in one ground water sample that also contained both ethylbenzene and toluene.

Soil samples from 13 of the 22 tested AECs were found to contain total VOCs exceeding the informal ECRA cleanup guideline. The railroad car loading and unloading areas (AECs 3 and 4, respectively) are contaminated with ethylbenzene and, usually to a lesser extent, toluene. AEC 7, the site of tank unloading of solvents prior to and subsequent to the area being paved, is contaminated with ethylbenzene. The area under Building 4 (AEC 12) is contaminated with ethylbenzene and generally lower concentrations of toluene. AEC 15, a drum storage area while the site was unpaved, contains elevated levels of volatile organics, primarily toluene. The locations of some former aboveground storage tanks and drum storage areas (AECs 14, 16, part of AEC 17, and AEC 19) are contaminated with ethylbenzene and toluene. AEC 21, a former aboveground tank farm, is contaminated with ethylbenzene and, to a

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lesser extent, toluene. Soils impacted by resins from a hole in Building 16 (AEC 9) are contaminated with toluene only. AEC 23, a tank wagon loading area for Building 4 was slightly contaminated with ethylbenzene. AEC 25, a loading and unloading area for waste resin solutions, was contaminated primarily with toluene.

Volatile organics in the shallow ground water were found at levels exceeding informal ECRA cleanup guidelines in 4 of 11 Phase I monitoring wells (MW6, MW7, MW10, MW11). The highest concentrations were detected in MW10 (34 ppm; total VOC).

Phase I deep aquifer ground water samples contained levels of VOCs below informal ECRA cleanup guidelines, with the exception of MW22 (216 ppb; total VOC). This VOC contamination was originally thought to be the result of some hydrologic relationship with the underground flume created by an imperfect seal above the well screen because the concentration of VOCs detected in MW22 was similar to that detected in the flume. Additionally, no VOCs were detected in the soil sample collected immediately above the deep aquifer at this location. Results of field work associated with the Interim Investigation indicated, however, that the seal of MW22 had physical integrity. Therefore, the source of VOCs detected in this well must be something other than the water within the flume.

4. Other Contaminants

Ground water samples from MW6, MW10, MW11, MW21 and MW23 and soil samples from AEC 6, AEC 8, MW1, MW6, MW9, MW10, MW21, and MW23

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were analyzed for base neutral compounds (BNs) or polycyclic aromatic hydrocarbons (PAHs). No ground water samples contained BNs in concentrations greater than the informal ECRA cleanup guidelines. BNs were detected above informal ECRA cleanup guidelines in only one of four soil samples from AEC 8; one of two soil samples each from MW6 and MW10; both soil samples from MW9 and MW10; and one of three soil samples from MW23. The source of contamination in AEC 8 appears to be half-buried fuel oil tanks. Contaminants in MW9 may be associated with the former use of a nearby underground gasoline storage tank (AEC 20). The source of BN contamination in MW6 is unknown. The contamination found in the soil sample from MW10 may be the result of leaking drums which were previously stored in this area while it was unpaved. ENVIRON believes that the BNs found in MW23 may be from an off-site source, because MW23 is a background well located upgradient of any possible sources of contamination originating from the former Textron facility. Additionally, this well is located at the western boundary where the aquifers flow onto the property. Other potential sources of BN contamination are located off-site, including several industrial facilities.

During Phase I, ground water samples from MW6, MW21 and MW23 were tested for cyanide; however, it was not detected at levels above the informal ECRA cleanup guidelines. Soil samples from

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locations MW1, MW9, MW21 and MW23 were also tested for cyanide, but again it was not detected at concentrations above the informal ECRA cleanup guidelines.

D. Scope of Work for Phase II Sampling Plan

As previously stated, analytical results of the Phase I Sampling Plan indicate some on-site contamination of both soil and ground water. The Phase II Sampling Plan was developed to close the data gaps from the Phase I field investigation and to provide a more comprehensive data base required for determining the nature and extent of soil and ground water remediation. The specific objectives of the Phase II Sampling Plan were to: (1) delineate the extent of ground water contamination; (2) characterize further the ground water flow in both the shallow and the deep aquifers; (3) identify the oils that contribute to the TPHC contamination in each AEC; (4) define further the nature and pattern of metal contamination; and (5) determine the location of the discharge point(s) for the floor drains in Building 26. The scope of work and the approaches utilized to meet the objectives of the Phase II Sampling Plan are described below.

1. Further Characterization of Site Hydrogeology

ENVIRON installed 11 additional shallow and deep monitoring wells (Plate 1; Appendix I) to characterize further ground water quality and flow direction in both the shallow and deep aquifers. Some of the wells were installed downgradient of the most

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significant sources of known soil and ground water contamination to examine the impact, if any, of contaminated soils on the shallow ground water and to determine the extent, if any, of ground water contaminant migration. More specifically, the eight shallow monitoring wells were installed during Phase II to investigate further the shallow ground water flow direction in the central and eastern portions of the site and the nature and effects, if any, of the on-site storm sewer system on shallow ground water flow. Three deep monitoring wells were installed to enhance our understanding of ground water quality and flow in the deep aquifer. All of the Phase II wells were also used to evaluate the fate and transport of VOCs previously detected in the ground water and to examine the nature and pattern of PPM contamination.

2. Total Petroleum Hydrocarbons

In an effort to identify and quantify the concentrations of petroleum and non-petroleum-based hydrocarbons, ENVIRON had select surficial soil samples "fingerprinted" as part of the Phase II sampling program. The fingerprinted soil samples were collected from those AECs believed to contain significant concentrations of non-petroleum-based hydrocarbons. The samples were analyzed by Erco Laboratory, a division of Enseco Inc., using the "gasoline and oil fingerprinting" method, modified from the U.S. Coast Guard Oil Spill Identification System (Method CG-D-52-77). This method enabled the

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quantification of each type of oil, whether non-petroleum or petroleum.

3. Metals and Cyanide

The Phase I sampling results were insufficient to determine the pattern and extent of metal and cyanide contamination in the soil and/or ground water. All Phase II soil and ground water samples, with the exception of one surface grab sample, were analyzed for metals to evaluate further the nature and extent of potential metal contamination. The sampling protocol and schedule were designed to obtain site-wide data to determine whether metal contamination is related to previous site activities. All ground water samples collected during Phase II were analyzed for the presence of cyanide.

4. Determine Discharge Point(s) for Building 26 Floor Drains

Two dye tests were conducted during the implementation of the Phase I Sampling Plan to determine the discharge point(s) of the floor drains in Building 26. These two tests were unable to identify the discharge point. ENVIRON therefore arranged for a subcontractor to conduct additional tests to determine the outfall(s) of floor drains in Building 26.

E. Subsequent Modifications to the Phase II Sampling Plan

As part of the original Phase II Sampling Plan, ENVIRON proposed to conduct a soil gas survey to obtain the data necessary to determine the

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feasibility of using vacuum gas extraction (VGE) for the remediation of soil contaminated with VOCs. After submitting the Phase II Sampling Plan to NJDEP, ENVIRON held several meetings with potential subcontractors to discuss the range of technical options for site remediation. As a result of these discussions, ENVIRON submitted a November 4, 1987, letter to Ms. Christine Hylemon of NJDEP proposing to postpone the soil gas survey. NJDEP verbally approved this proposal in November 1987 and subsequently confirmed it with a January 5, 1988, letter to Mr. Paul Duff of Textron. The resulting changes to the Phase II Sampling Plan included: 1) the deletion of all soil VOC+15 analyses; 2) the deletion of all soil probe (OVA) analyses; and 3) the deletion of all physical parameter analyses which would have been required to determine the feasibility of a VGE remedial system.

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II. METHODOLOGY

A. Soil Borings

1. Drilling Methods

Most of the Phase II soil borings were drilled using a hollow stem auger. Where access to a sampling location by a drill rig was limited, such as inside a diked wall or under a railroad tanker car, a hand auger or trowel was used for sample collection. All soil borings were plugged with a cement-bentonite grout mixture following sample collection. The drilling and plugging methods used for each boring are described on the boring logs attached to this report as Appendix B. The boring logs also include the geologic log, the drilling specifications and descriptions of the collection depth and chemical analyses performed on each sample.

2. Sample Collection Methods

Soil samples were generally collected from each soil boring utilizing a split spoon sampling device. The proposed sampling depths included the first six-inch interval below the ground surface or asphalt and the six-inch interval immediately above the water table. Because of the high water table encountered at the site (usually between 2.5 and 3 feet below ground surface) and the presence of gravel below the asphalt at many boring locations, the surface sample was often within one foot of the water table. Thus,

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only one sample was collected at many locations. Additionally, poor split spoon recovery at some sampling locations made it difficult to determine the actual depth of the sample. In these instances, the sampling depth was recorded as the maximum depth range of the split spoon.

B. Monitoring Wells

1. Shallow Well Construction

In general, the borehole for each shallow well was drilled with a hollow stem auger rig through the water-bearing fill zone to the top of the semi-confining clay, silt and peat unit. The total depth of these wells typically ranged from 6 to 10 feet below grade. The wells were screened from the bottom of the fill unit to a depth equivalent to or just slightly above the water table. The typical construction of the shallow wells is illustrated in Figure II-1.

Detailed technical information concerning each of the shallow monitoring wells is provided in Appendix C. The permit numbers, ground surface elevations, inner and outer casing elevations, and total depths for all wells are summarized in Appendix D.

2. Deep Well Construction

The three deep wells were completed as telescoped wells to prevent the potential downward migration of contaminants from the shallow soils and/or ground water during drilling operations. The

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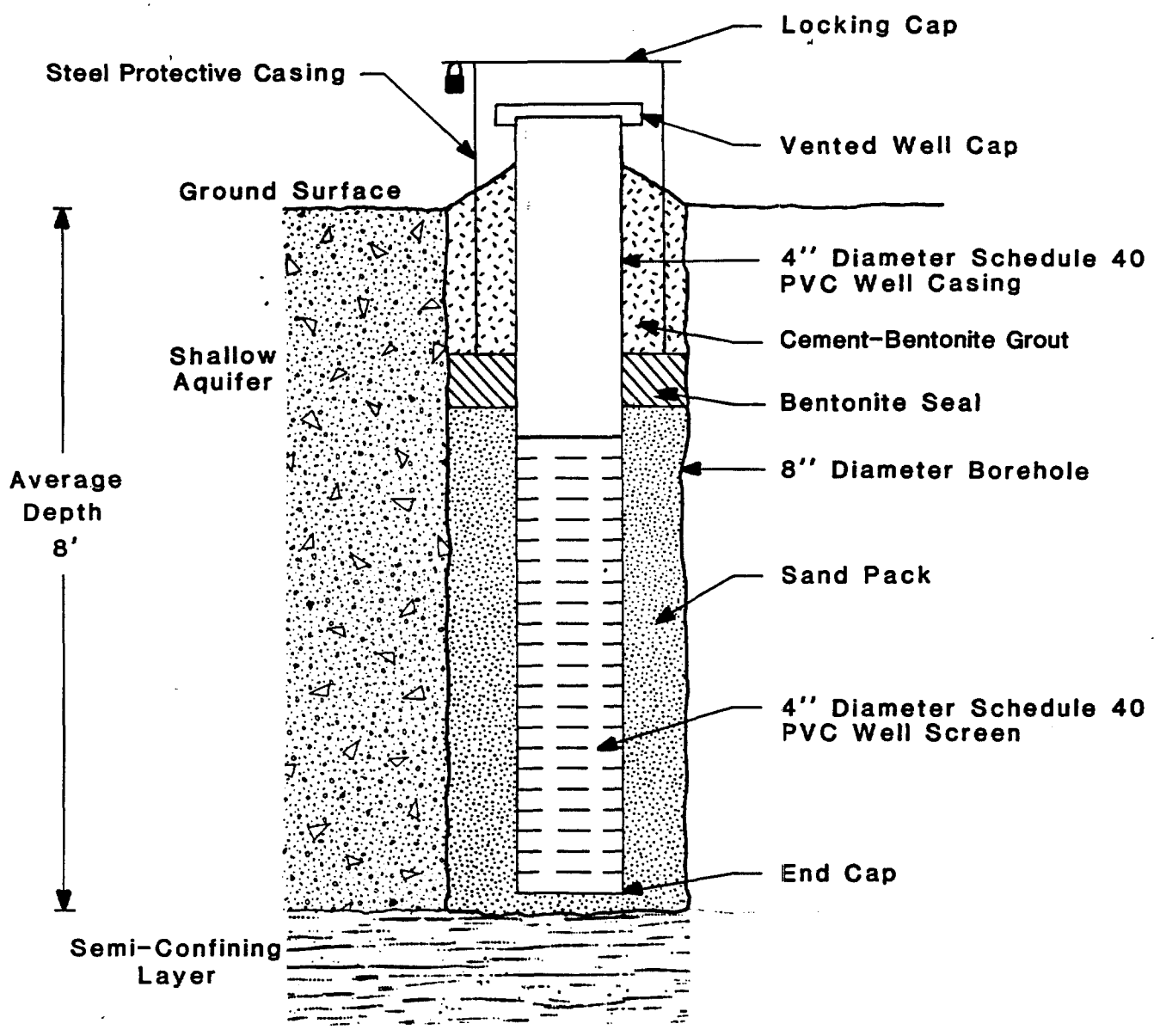

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SPECIFICATIONS FOR
SHALLOW MONITORING WELLS

Figure
II - 1

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boreholes were initially advanced using a hollow stem auger to a minimum of three feet into the semi-confining clay, silt and peat unit. Protective steel surface casings were then installed and the annular space of the boreholes filled with a cement-bentonite grout mixture. Tremie-grouting techniques were used to seal the boreholes. Approximately two feet of grout was then emplaced inside the protective steel surface casings to assure a proper seal. The grout was allowed to harden for 24 hours.

The boreholes were subsequently advanced through the outer protective surface casing using mud rotary drilling techniques until the confining layer beneath the lower aquifer was encountered, typically at depths between 40 and 45 feet below grade. The PVC well was then installed and the entire lower aquifer screened. The typical construction of the deep wells is illustrated in Figure II-2.

Detailed technical information concerning each of the deep monitoring wells is provided in Appendix C. The permit numbers, ground surface elevations, inner and outer casing elevations, and total depths for all wells are summarized in Appendix D.

3. Well Completion

All Phase II monitoring wells were completed approximately two feet above grade. Protective steel casings with locking caps were placed over all newly-installed monitoring wells. The inner casings were covered with vented caps.

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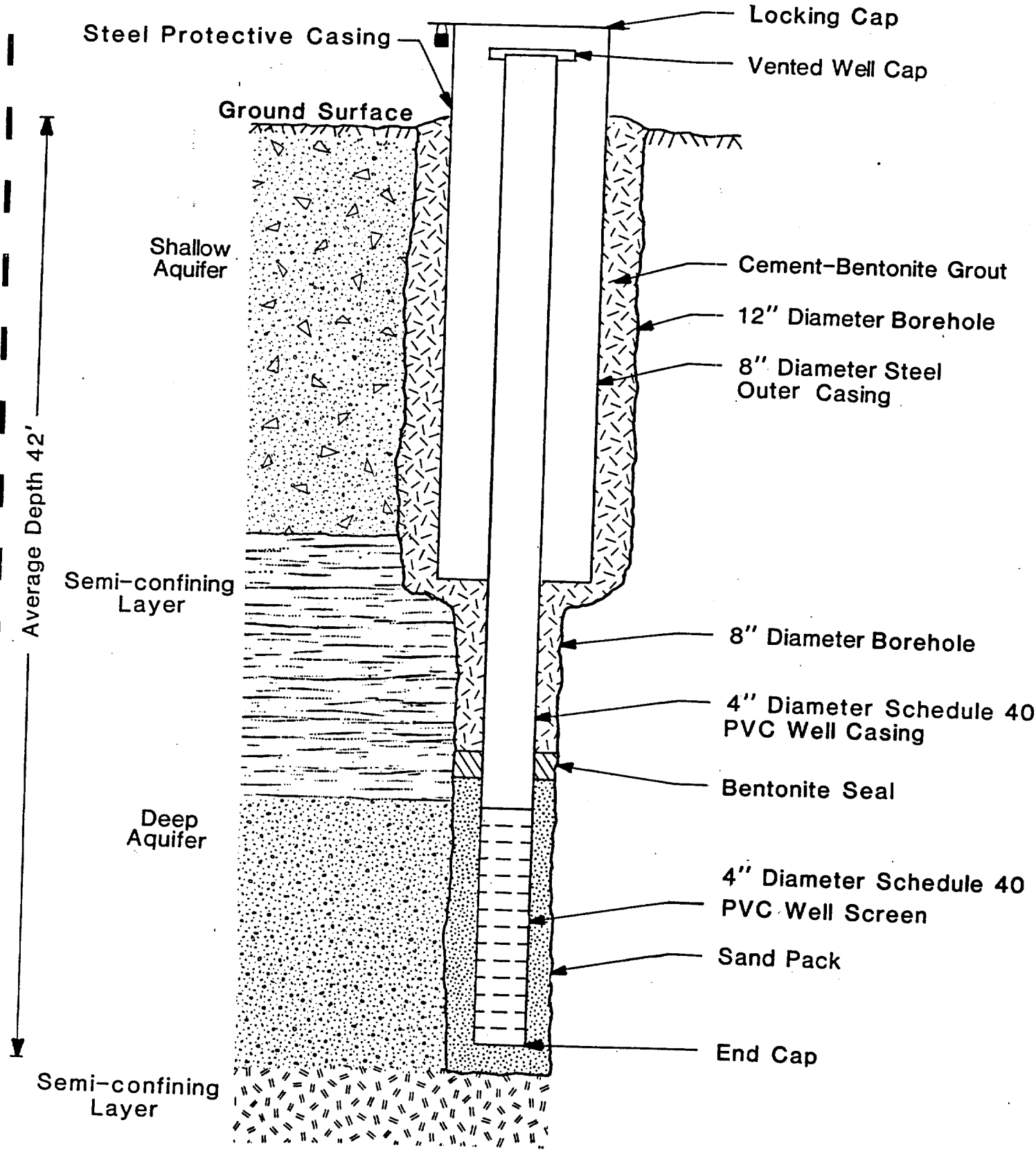

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SPECIFICATIONS FOR DEEP MONITORING WELLS

Figure II-2

4. Well Development

The shallow wells typically were pumped for a period of thirty minutes, and the deep wells for approximately one hour. All monitoring wells, however, were developed until the water appeared to be clear (devoid of fine sediment) or until it was apparent that the water would not become clearer.

5. Well Sampling Method

The monitoring wells were sampled by Century Laboratories, Inc., a state certified laboratory. In accordance with NJDEP requirements, a minimum of three well volumes of ground water were purged prior to sampling. All shallow and deep wells were purged with a centrifugal pump. During purging, temperature, pH and specific conductivity of the ground water were periodically measured. Ground water samples were collected only after these parameters had stabilized, or after the well had been pumped dry and allowed to recover. This ensured that the water was drawn from the aquifer, rather than from the stagnant zones around each well. The data collected while purging the wells is reported in Appendix E.

C. Quality Assurance/Quality Control Measures

1. Decontamination Procedures

Before the collection of every sample, all soil sampling equipment, including split spoons, hand augers and trowels, was decontaminated by steam cleaning with potable water. In addition,

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the augers and other downhole drilling equipment were steam cleaned between each borehole. To avoid cross-contamination between samples, fresh gloves were used to collect each sample. The teflon bailers, provided by Century Laboratories for ground water sampling, were decontaminated in the laboratory prior to sampling and used only once on-site.

2. Control Samples

Duplicate samples, wash blanks, and trip blanks were collected to provide quality control. Four duplicate soil samples were collected and analyzed for PPMs. Three duplicate ground water samples were collected and analyzed for TPHCs, VOCs, PPMs and cyanide. Five wash blanks were collected and analyzed for the same parameters scheduled to be tested in the samples collected during the day each wash blank was prepared. In addition, a total of three trip blanks were prepared by the laboratory and analyzed for VOCs plus a forward library search (VOC+15). Contaminants above informal ECRA cleanup guidelines were not detected in any Phase II wash blanks or trip blanks. Results of the duplicate analyses are provided in Section IV.

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D. Subcontractors

1. Analytical Laboratories

All ground water and soil samples collected at this site were analyzed by Century Laboratories, Inc. (Century) of Thorofare, New Jersey (State Certification No. 08153). Under ENVIRON's direction, Century also collected the ground water samples from each of the monitoring wells.

The fingerprinting analyses of select soil samples were performed by Erco Laboratory (a division of Enseco, Inc.) of Cambridge, Massachusetts.

2. Surveyor

The location and elevation of each new monitoring well and boring were surveyed in December 1987 by James M. Stewart, Inc. of Philadelphia, Pennsylvania, a licensed surveyor. These location coordinates and ground surface elevations are provided in Appendix F.

3. Sewer Service Specialists

Central Jersey Environmental, Inc., a sewer servicing specialist of Hightstown, New Jersey, was retained to determine the discharge point of the floor drains in Building 26. Smoke and dye tests were

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performed on November 13, 1987, to determine the outfall of the Building 26 floor drains. The results of these are discussed in Section IV.

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III. GEOLOGIC AND HYDROGEOLOGIC RESULTS

A. Hydrogeologic Setting

Examination of soil boring logs and monitoring well information from both Phase I and Phase II sampling indicates that four distinct stratigraphic zones underlie the site to a depth of approximately 40 feet below the ground surface. Zone 1 consists of fill material and is characterized by sandy soils, brick fragments, glass and cinders. The fill has an average thickness of 8 feet, but varies in thickness from 2 to 11 feet across the site. Zone 2 lies beneath the fill material and consists of a clay, silt and peat unit with an average thickness of 19 feet. Zone 3 is a well-sorted sand and gravel unit, which varies in thickness from 12 to 14 feet. Beneath this sand and gravel is Zone 4, a reddish-brown clay and silt unit of unknown thickness.

The fill material of Zone 1 and the well-sorted sand and gravel of Zone 3 constitute the two water-bearing units beneath the site. Ground water elevations collected from wells monitoring the fill unit range from 2 to 4 feet below the ground surface, while ground water in the wells monitoring the deeper transmissive zone was typically encountered at a depth of 4 feet below grade. This suggests a potential downward gradient from the upper zone to the lower transmissive unit. Ground water levels may vary, however, with seasonal changes and precipitation.

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B. Ground Water Flow Regime

From Phase I water level measurements, ENVIRON inferred the general direction of shallow ground water flow to be towards an underground flume that travels beneath the site and discharges into Newark Bay. The direction of ground water flow within the deeper aquifer was observed to be west to east towards Newark Bay. Additional investigation determined that both aquifers and the flume are tidally influenced. Tidal influence in the shallow aquifer extends approximately 130 feet from Newark Bay. The distance of tidal influence laterally from the flume is approximately 50 feet, provided no other obstructions are present, such as building foundations. The full extent of tidal influence in the deeper aquifer is unknown.

The results of the Phase I Sampling Plan also suggested that shallow ground water flow towards Newark Bay may be impaired by the breakwall located on the eastern border of the site and penetrated by both the underground flume and a storm sewer conduit. These points of penetration through the breakwall possibly act as discharge points for the shallow aquifer. Additionally, the storm sewer system, or its surrounding backfill, may be acting as a sink for the shallow aquifer and may play a major role in determining ground water flow patterns.

ENVIRON installed 11 additional monitoring wells and collected monthly ground water level measurements as part of the Phase II Sampling Plan in order to examine further (1) the direction of shallow ground water flow, particularly in the central and eastern portions of the site; (2) the effects of the on-site storm sewer system on ground water flow

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within the shallow aquifer; and (3) the general direction of ground water flow in the deep aquifer.

Ground water level measurements have been collected monthly during both low and high tides since January 1988. Top of casing elevations, depth to ground water measurements, and resultant ground water elevations relative to mean sea level are presented in Table III-1. Typical ground water contour maps illustrating the direction of ground water flow within the shallow fill unit at both low and high tides are provided in Figures III-1 through III-7. Generalized ground water elevation maps for the deep aquifer at both low and high tides are provided in Figures III-8 through III-12.

Results of the monthly ground water measurements confirm that the typical direction of shallow ground water flow during both low and high tides at the site is towards the underground flume. The most pronounced effect of the flume on shallow ground water flow, however, occurs during low tide. The steepest hydraulic gradients were observed during this tidal cycle, and it was determined during earlier site investigations that the flume is tidally influenced.

Monitoring wells 16 and 17 were installed during the execution of the Phase II Sampling Plan to monitor the influence, if any, of the on-site storm sewer system on shallow ground water flow. Results of recent ground water measurements indicate that the area in the vicinity of MW17 is acting as a local area sink during low tide (Figure III-1).

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Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table III-1: Water Level Measurements

Well Number	Top of Casing (ft./msl)	January 14, 1988 Mixed Tide Depth to Water (ft.)	January 14, 1988 Mixed Tide Elevation (ft/msl)	January 25, 1988 Low Tide Depth to Water (ft.)	January 25, 1988 Low Tide Elevation (ft/msl)	January 25, 1988 High Tide Depth to Water (ft.)	January 25, 1988 High Tide Elevation (ft/msl)	March 2, 1988 Low Tide Depth to Water (ft.)	March 2, 1988 Low Tide Elevation (ft/msl)
MW-1	7.72	6.06	1.66	5.27	2.45	5.28	2.44	5.20	2.52
MW-2	7.92	4.84	3.08	3.96	3.96	3.92	4.00	4.18	3.74
MW-3	6.24	*	*	3.34	2.90	3.36	2.88	3.51	2.73
MW-4	5.83	5.69	0.14	4.57	1.26	3.40	2.43	5.20	0.63
MW-5	7.67	5.18	2.49	4.32	3.35	4.31	3.36	4.59	3.08
MW-6	8.80	5.70	3.10	4.76	4.04	4.68	4.12	4.90	(4.90)
MW-7	7.44	6.83	0.61	8.93	(1.49)	4.34	3.10	6.98	ERR
MW-8	5.62	5.54	0.08	4.27	1.35	3.62	2.00	4.47	(4.47)
MW-9	8.76	5.99	2.77	5.05	3.71	4.97	3.79	5.19	(5.19)
MW-10	9.08	5.75	3.33	4.98	4.10	4.91	4.17	5.03	(5.03)
MW-11	8.61	5.74	2.87	4.82	3.79	4.82	3.79	4.80	(4.80)
MW-12	9.16	6.84	2.32	6.43	2.73	6.43	2.73	6.58	(6.58)
MW-13	8.85	5.35	3.50	4.63	4.22	4.56	4.29	4.71	(4.71)
MW-14	9.03	5.63	3.40	5.02	4.01	5.01	4.02	5.15	(5.15)
MW-15	9.04	5.71	3.33	5.08	3.96	5.06	3.98	5.22	(5.22)
MW-16	7.29	4.15	3.14	3.58	3.71	3.39	3.90	3.67	(3.67)
MW-17	6.64	6.12	0.52	5.81	0.83	3.43	3.21	5.82	(5.82)
MW-18	7.42	5.22	2.20	4.53	2.89	4.23	3.19	4.65	(4.65)
MW-19	8.00	5.02	2.98	4.23	3.77	4.24	3.76	4.34	(4.34)
MW-21	8.32	8.09	0.23	7.41	0.91	6.87	1.45	7.50	(7.50)
MW-22	5.43	5.21	0.22	5.06	0.37	3.92	1.51	5.30	(5.30)
MW-23	7.53	7.28	0.25	6.54	0.99	6.04	1.49	6.64	(6.64)
MW-24	9.03	9.33	(0.30)	8.50	0.53	7.46	1.57	8.85	(8.85)
MW-25	7.83	7.47	0.36	7.38	0.45	6.21	1.62	7.75	(7.75)
MW-26	6.43	6.10	0.33	6.07	0.36	4.73	1.70	6.56	(6.56)

Notes:
1. All ground water elevations are reported in feet above mean sea level, except values in parentheses, which are feet below mean sea level.

2. * = MW-3 could not be located on 01/14/88 due to heavy ice and snow on the ground surface.

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Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table III-1: Water Level Measurements (continued)

Well Number	Top of Casing (ft./msl)	March 2, 1988 High Tide		March 16, 1988 High Tide		April 13, 1988 Low Tide		April 29, 1988 Low Tide	
		Depth to Water (ft.)	Elevation (ft/msl)	Depth to Water (ft.)	Elevation (ft/msl)	Depth to Low Water (ft.)	Groundwater (ft.)	Depth to Low Water (ft.)	Groundwater (ft.)
MW-1	7.72	5.20	2.52	5.64	2.08	6.06	1.66	5.79	1.93
MW-2	7.92	4.19	3.73	4.58	3.34	4.87	3.05	4.67	3.25
MW-3	6.24	3.54	2.70	3.57	2.67	3.16	3.08	3.56	2.68
MW-4	5.83	3.74	2.09	2.95	2.88	3.16	2.67	5.40	0.43
MW-5	7.67	4.57	3.10	4.83	2.84	4.65	3.02	4.97	2.70
MW-6	8.80	4.93	3.87	5.28	3.52	5.46	3.34	5.31	3.49
MW-7	7.44	4.37	3.07	3.21	4.23	6.14	1.30	6.67	0.77
MW-8	5.62	4.90	0.72	2.79	2.83	3.81	1.81	3.98	1.64
MW-9	8.76	5.25	3.51	5.39	3.37	5.32	3.44	5.46	3.30
MW-10	9.08	5.09	3.99	5.34	3.74	5.49	3.59	5.46	3.62
MW-11	8.61	4.81	3.80	4.80	3.81	4.30	4.31	4.90	3.71
MW-12	9.16	6.62	2.54	6.44	2.72	5.88	3.28	6.58	2.58
MW-13	8.85	4.73	4.12	5.05	3.80	5.39	3.46	5.22	3.63
MW-14	9.03	5.16	3.87	5.35	3.68	5.46	3.57	5.52	3.51
MW-15	9.04	5.25	3.79	5.41	3.63	5.43	3.61	5.50	3.54
MW-16	7.29	3.83	3.46	3.82	3.47	3.82	3.47	3.63	3.66
MW-17	6.64	3.65	2.99	2.65	3.99	5.14	1.50	5.77	0.87
MW-18	7.42	4.42	3.00	3.67	3.75	4.06	3.36	4.66	2.76
MW-19	8.00	4.38	3.62	3.98	4.02	3.81	4.19	4.38	3.62
MW-21	8.32	7.03	1.29	6.84	1.48	6.21	2.11	7.14	1.18
MW-22	5.43	4.05	1.38	3.72	1.71	4.07	1.36	4.79	0.64
MW-23	7.53	6.21	1.32	6.05	1.48	5.47	2.06	6.27	1.26
MW-24	9.03	7.66	1.37	7.42	1.61	7.24	1.79	8.24	0.79
MW-25	7.83	6.35	1.48	6.07	1.76	6.30	1.53	7.19	0.64
MW-26	6.43	4.95	1.48	4.66	1.77	4.90	1.53	5.91	0.52

Notes:
1. All ground water elevations are reported in feet above mean sea level, except values in parentheses, which are feet below mean sea level.

2. * = MW-3 could not be located on 01/14/88 due to heavy ice and snow on

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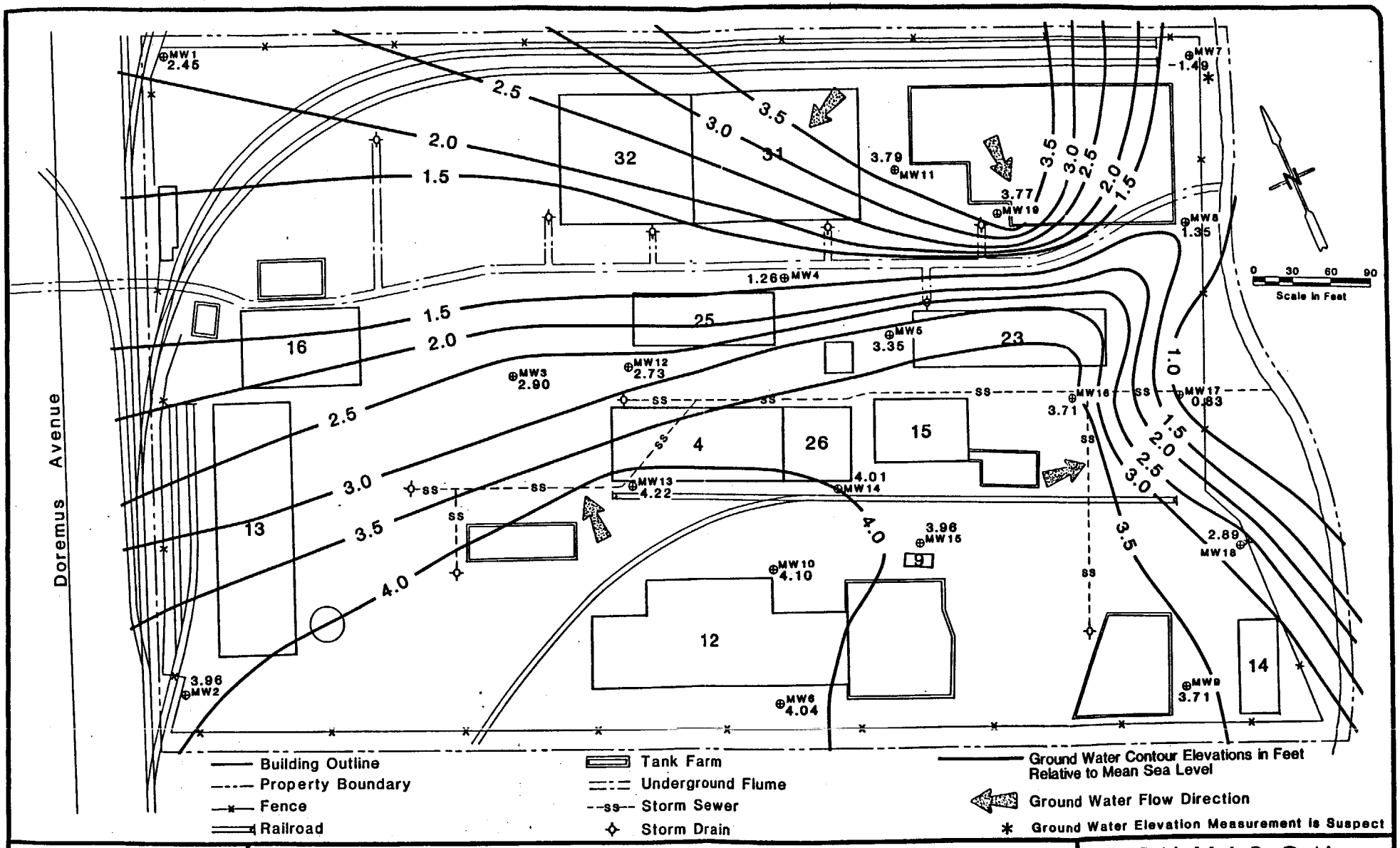

Figure III -1

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
LOW TIDE, JANUARY 25, 1988

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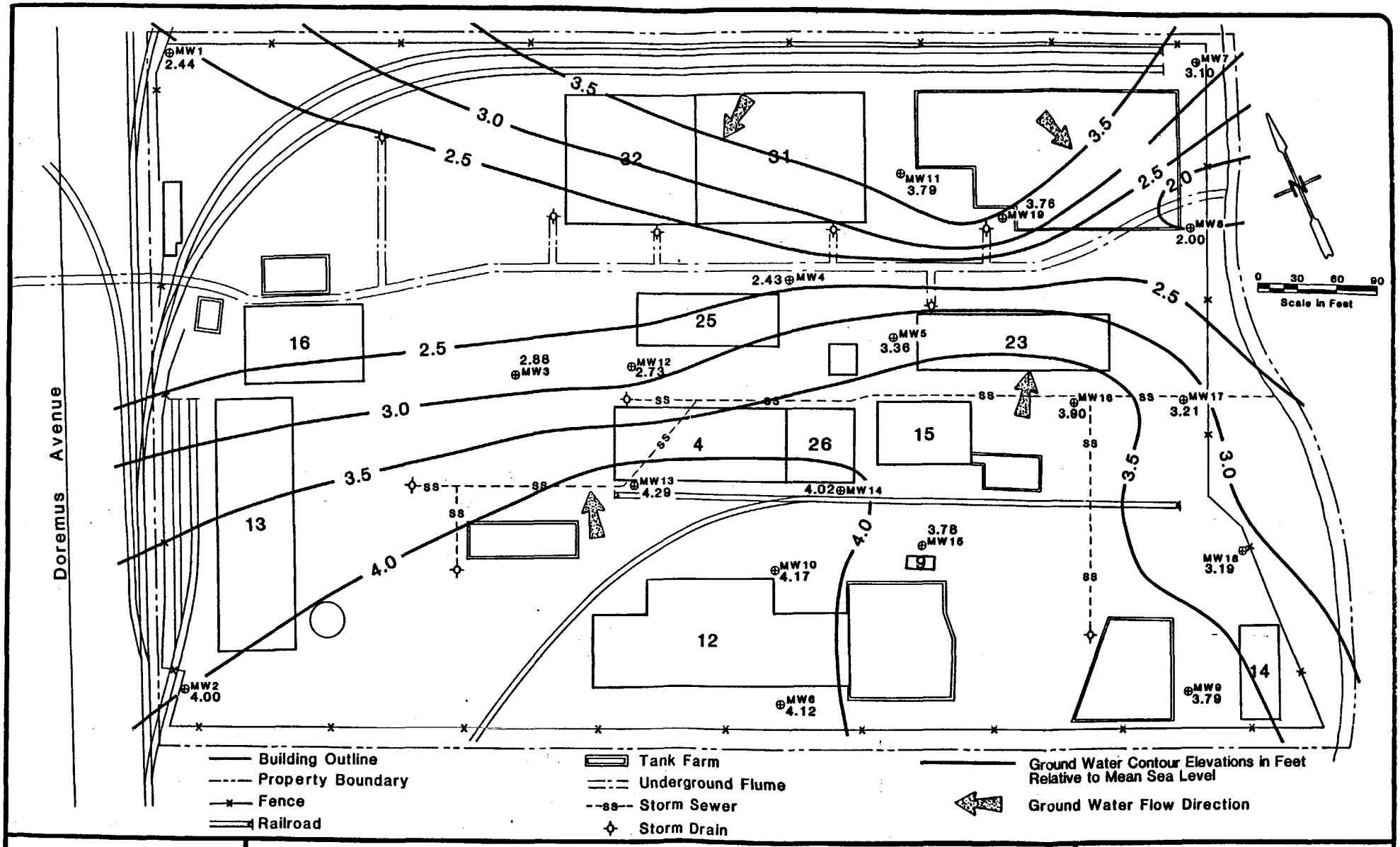

Figure III -2

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
HIGH TIDE, JANUARY 25, 1988

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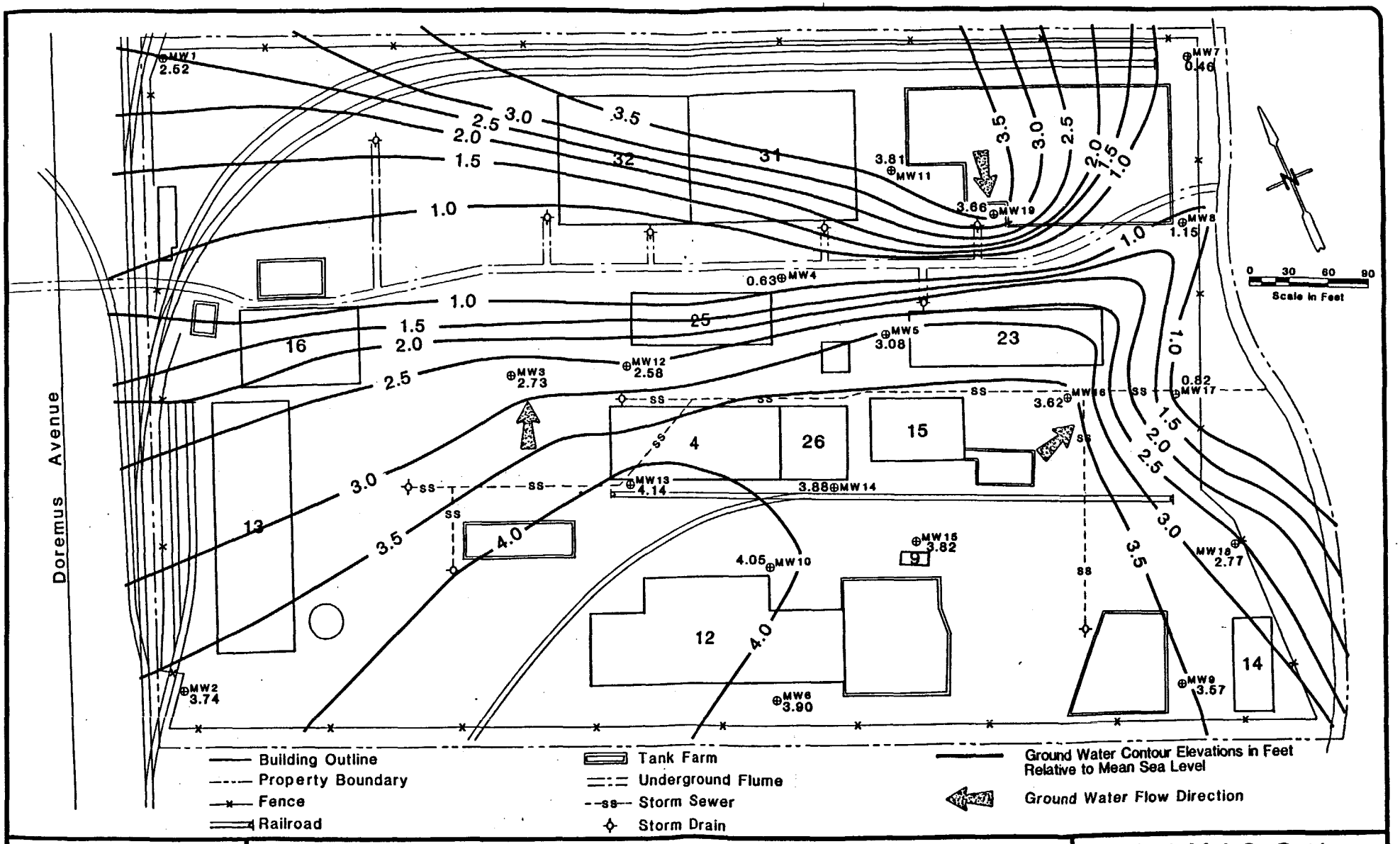

Figure III -3

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
LOW TIDE, MARCH 2, 1988

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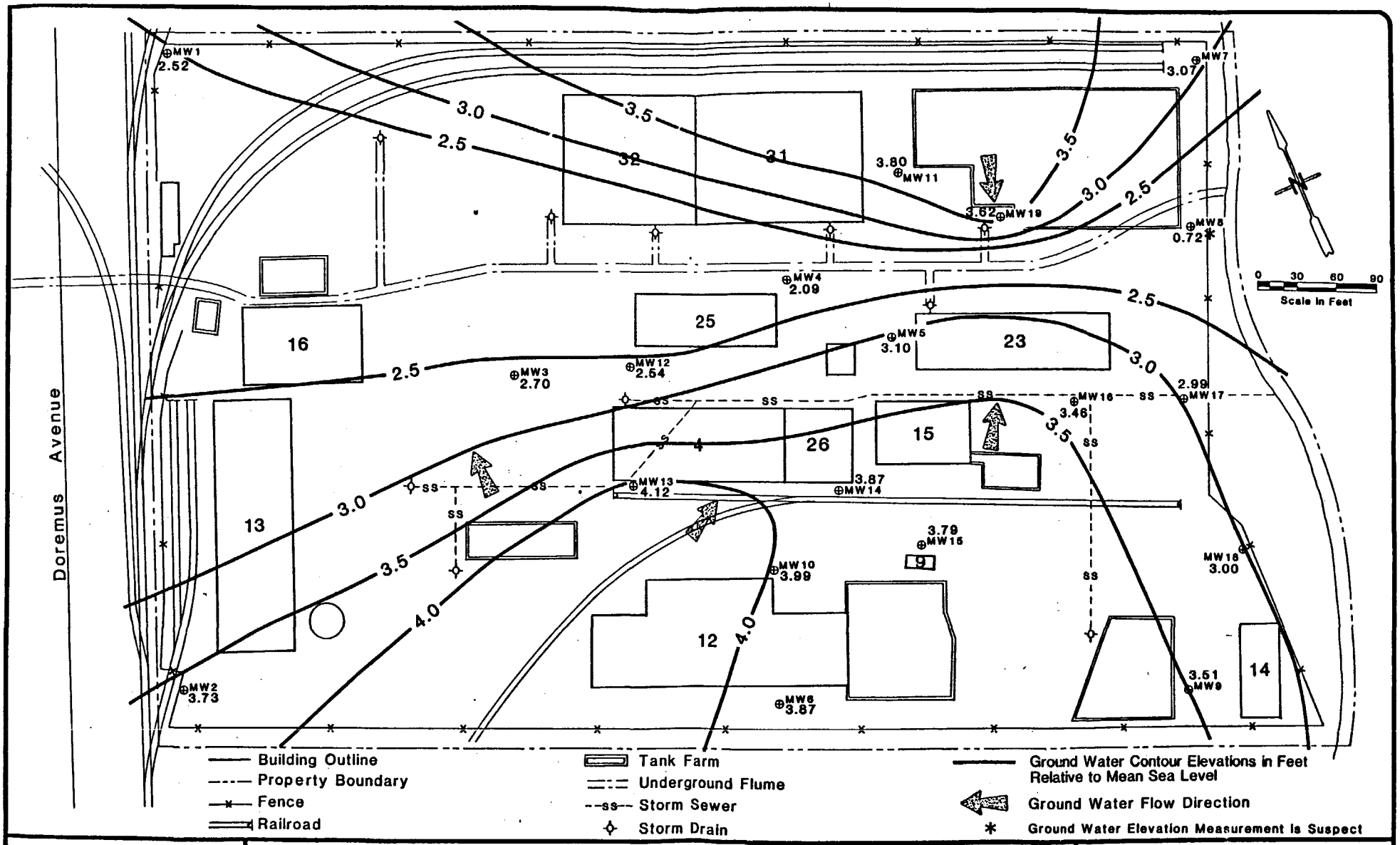

Figure III -4

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
HIGH TIDE, MARCH 2, 1988

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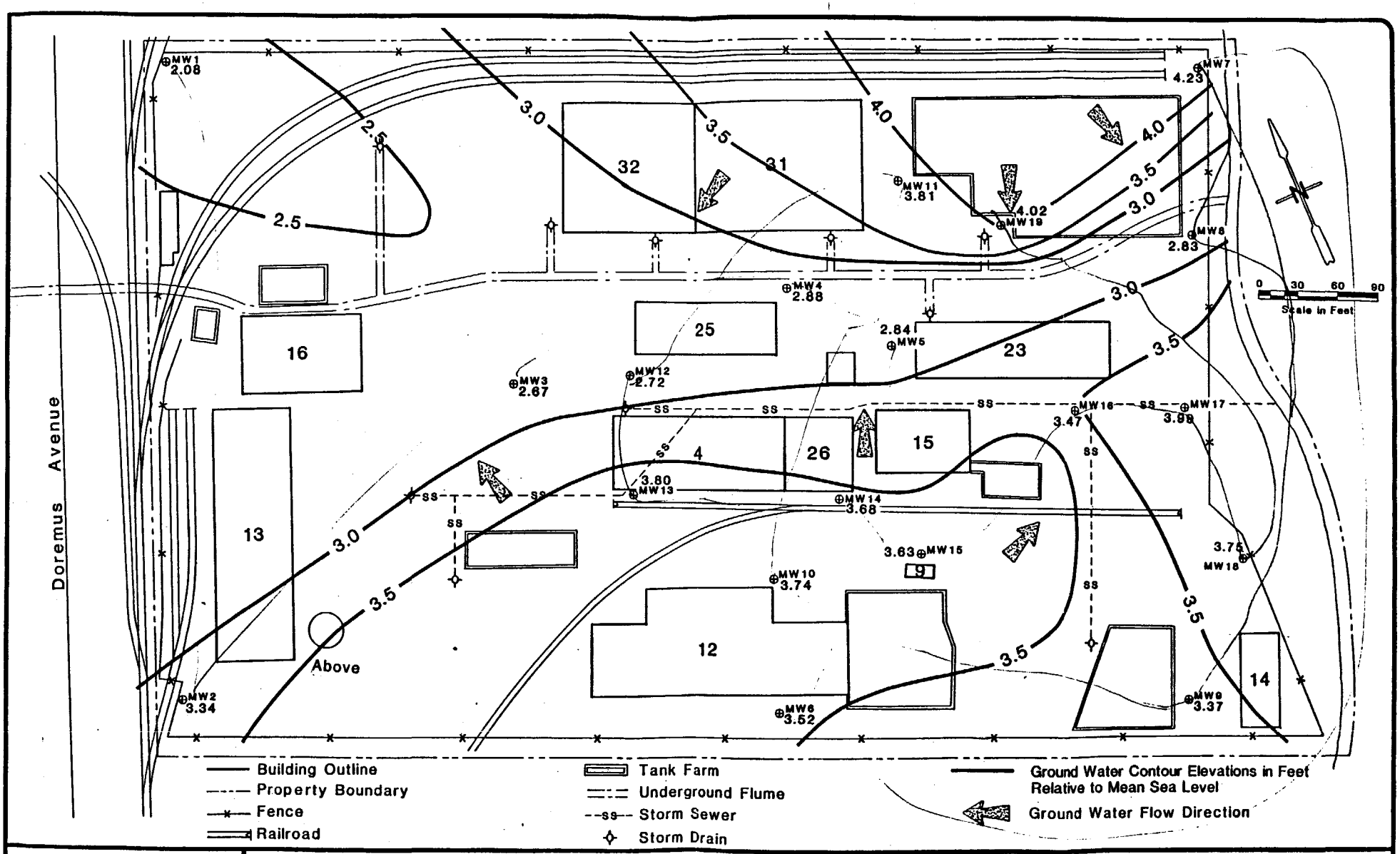

Figure III - 5

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
HIGH TIDE, MARCH 16, 1988

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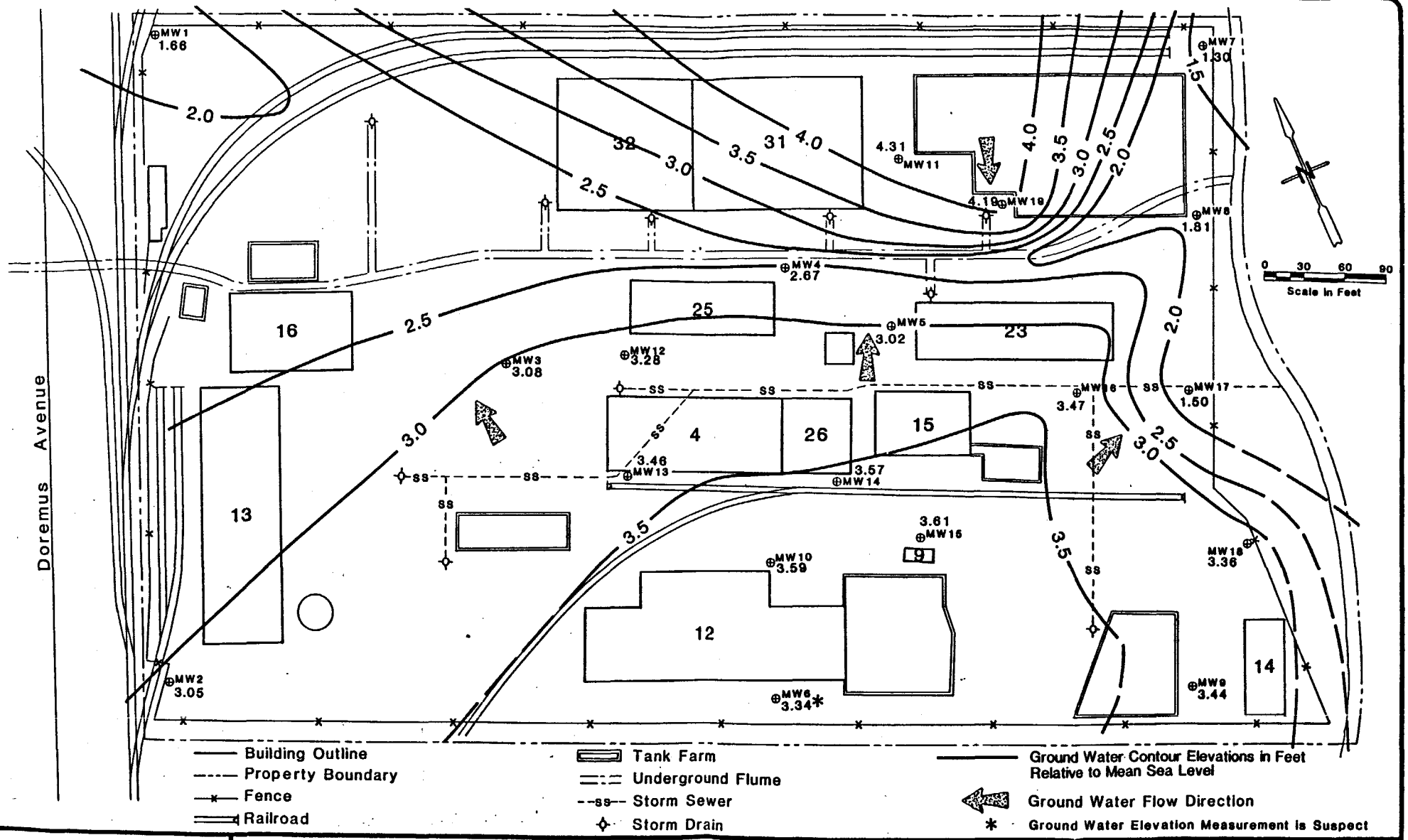

Figure III - 6

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
LOW TIDE, APRIL 13, 1988

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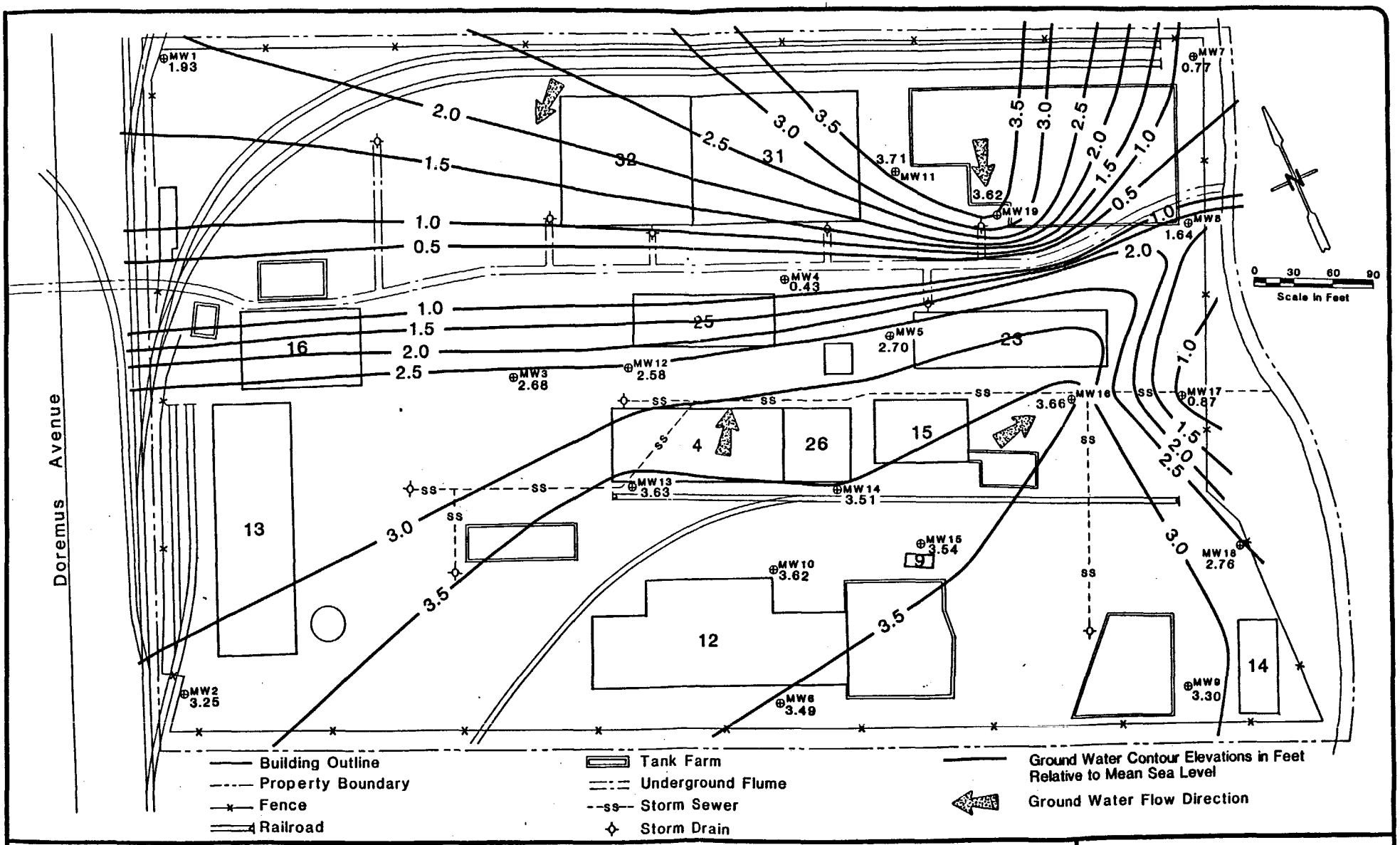

Figure III -7

SHALLOW GROUND WATER ELEVATIONS AND FLOW DIRECTIONS
LOW TIDE, APRIL 29, 1988

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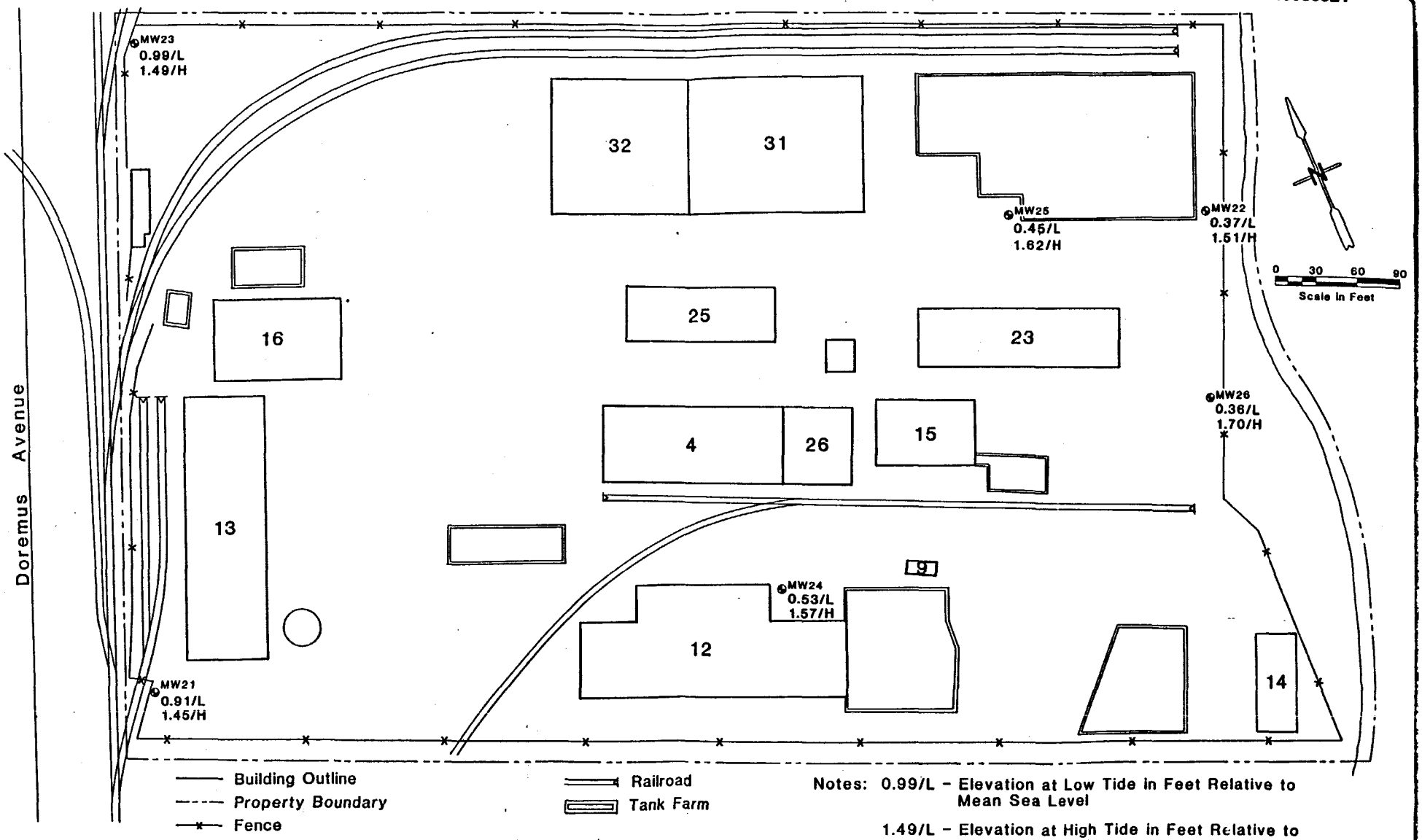

Figure III -8

DEEP AQUIFER GROUND WATER ELEVATIONS
JANUARY 25, 1988

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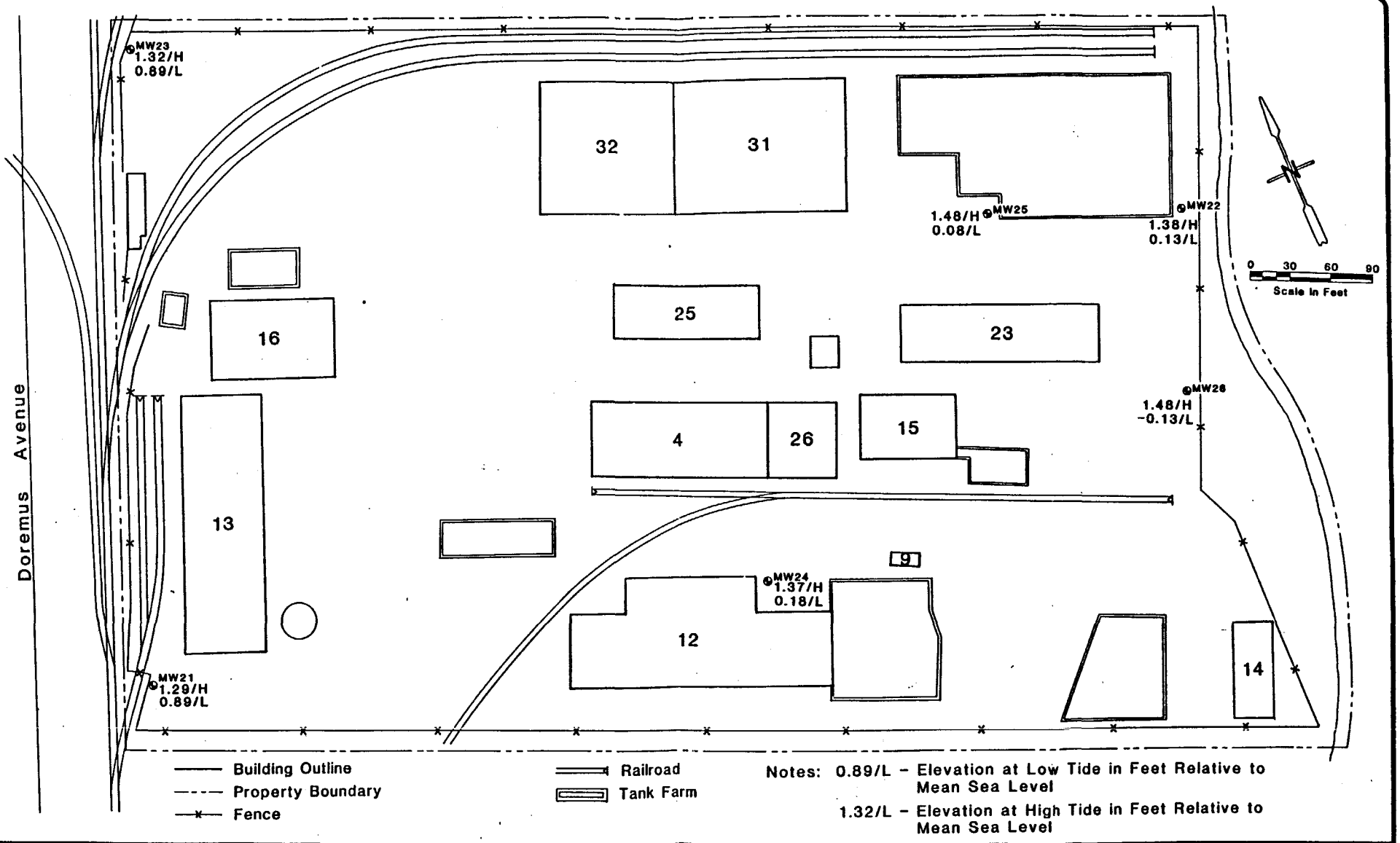

Figure III -9

DEEP AQUIFER GROUND WATER ELEVATIONS
MARCH 2, 1988

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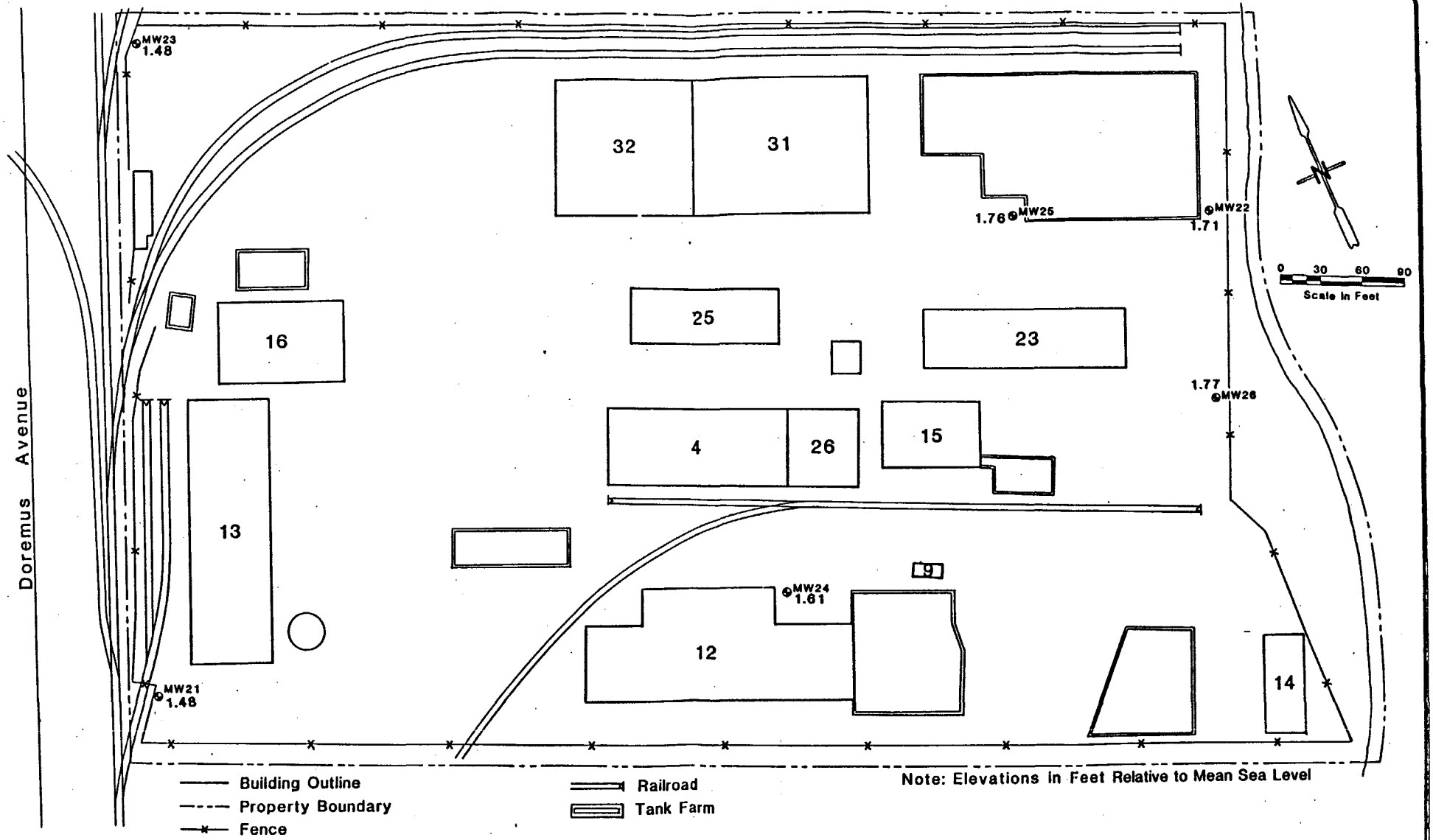

Figure III-10

DEEP AQUIFER GROUND WATER ELEVATIONS
HIGH TIDE MARCH 16, 1988

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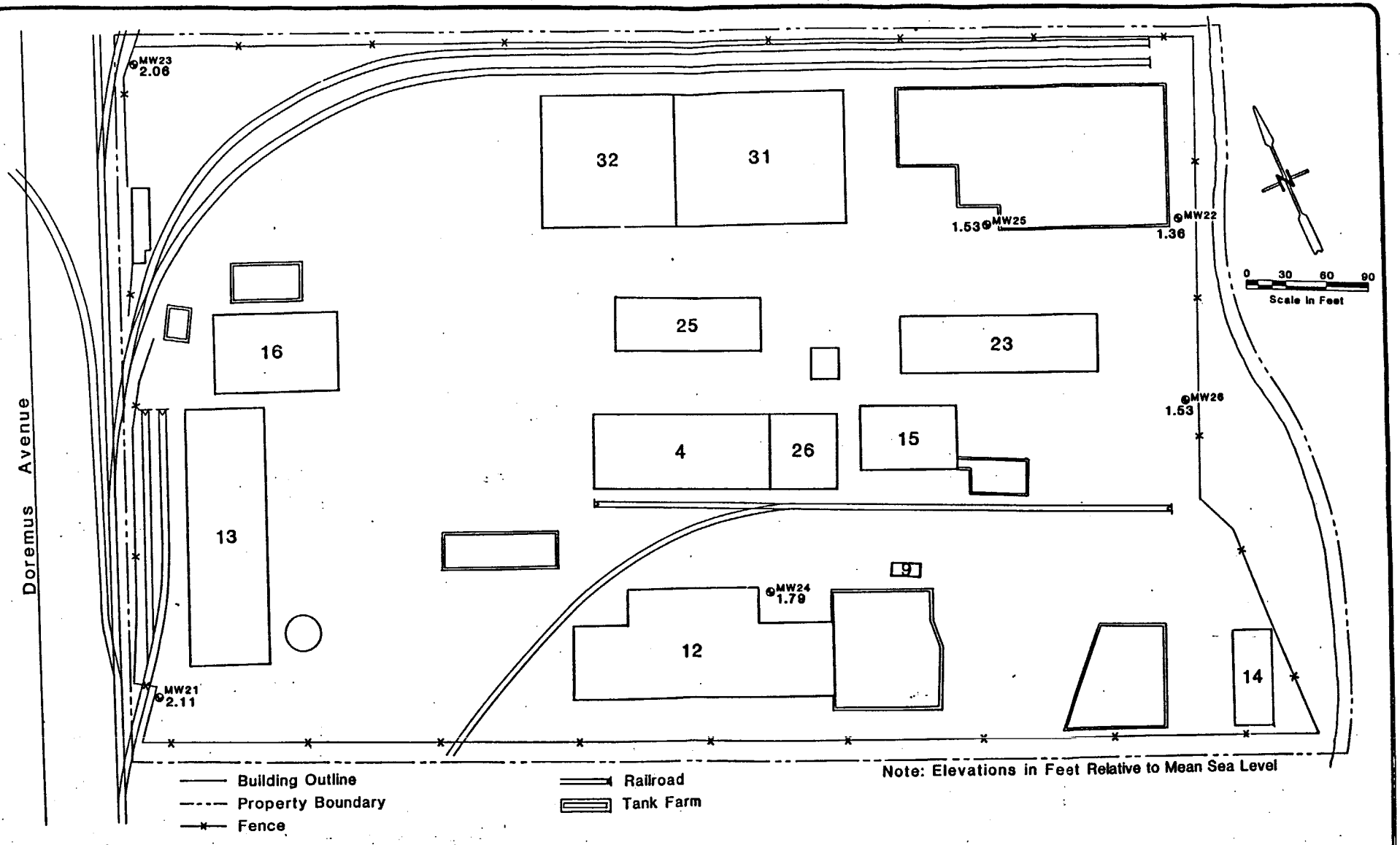

Figure III -11

DEEP AQUIFER GROUND WATER ELEVATIONS
LOW TIDE APRIL 13, 1988

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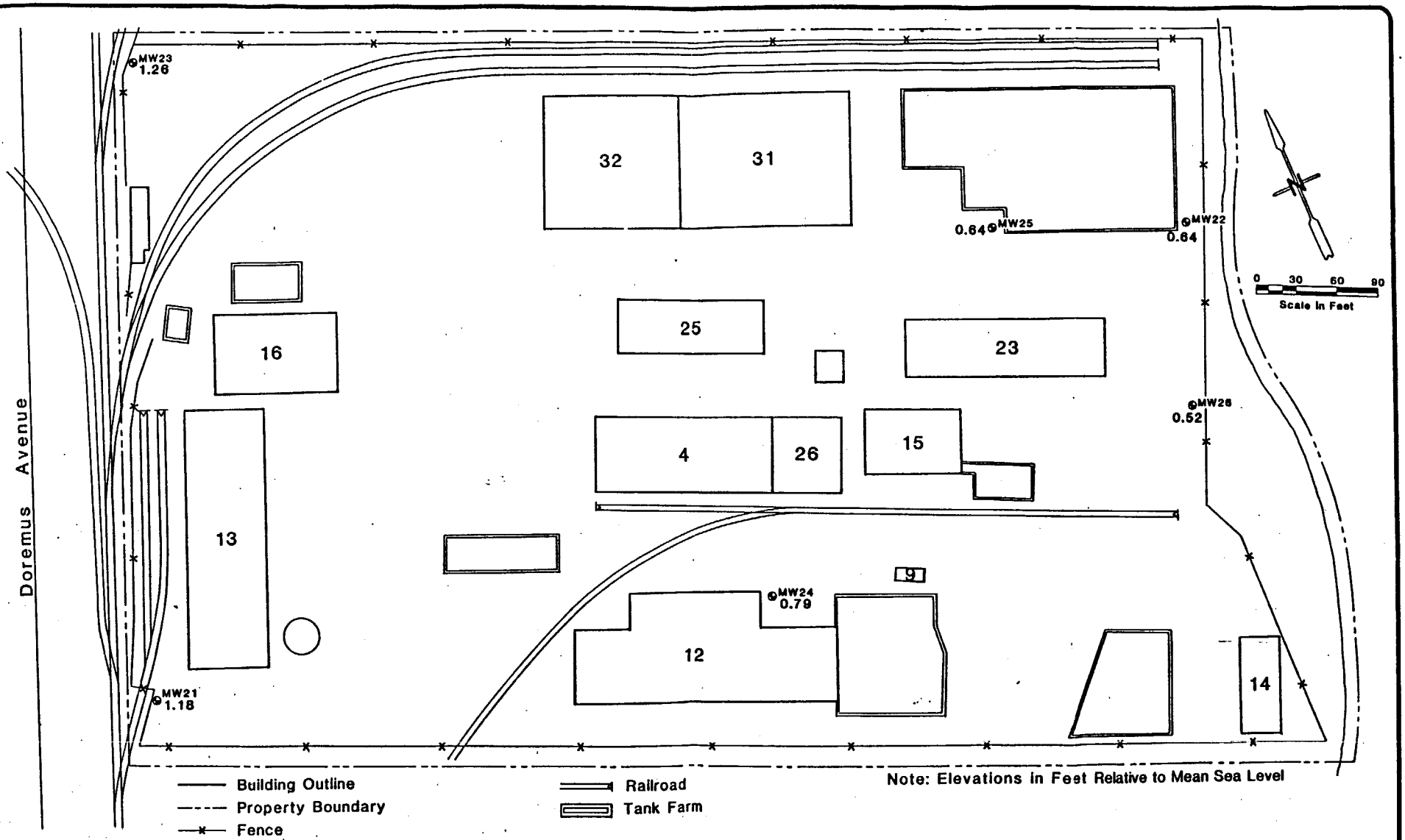

Figure III -12

DEEP AQUIFER GROUND WATER ELEVATIONS
LOW TIDE APRIL 29, 1988

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Counsel in Health and Environmental Science

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There is no data to suggest that the storm sewer lacks physical integrity, because the penetration of the storm sewer conduit through the breakwall is the most likely cause of this ground water low. The effect of this discharge point is significantly less pronounced during high tide (Figure III-2) due to the backflow of water associated with this portion of the tidal cycle.

Ground water level measurements collected from deep aquifer monitoring wells indicate tidally-influenced flow patterns. Generally, the direction of flow during low tide is west to east (towards Newark Bay). Ground water level measurements during high tide suggest that the flow direction reverses during this portion of the tidal cycle. These ground water measurements confirmed the previous belief that the deeper aquifer is tidally influenced. Although the full extent of this tidal influence is not known, the effects of high tide are believed to be most pronounced in the eastern portion of the site. The differences observed in ground water elevations over both high and low tides, however, are sufficient to indicate that the tidally-induced flow reversal extends across the entire site.

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IV. ANALYTICAL RESULTS

A. General

This section of the report provides the analytical results of the soil and ground water data collected during implementation of the Phase II Sampling Plan. Analytical results of soil samples collected from each tested AEC, monitoring well location and background location are provided in summary form. Overviews of the results from the dye testing in Building 26 and March 1988 ground water sampling are also provided within this section. The organization of the analytical data packages and the use of the informal ECRA cleanup guidelines are discussed below.

1. Analytical Data Packages

The analytical results received from Century Laboratories and Erco Laboratory are provided with this report under separate cover. These laboratory data packages meet NJDEP Tier II reporting requirements. The results of the analyses are tabulated by analytical parameter in Volumes II through V of this report. Volume II tabulates the PPM analyses for soil samples. Volume III tabulates the hydrocarbon fingerprinting analyses for soil samples. Volume IV tabulates the PPM, TPHC, VOC+15, and cyanide analyses for Phase II ground water samples. Volume V tabulates the PPM, TPHC and VOC+15 analyses for the March 1988 sampling round. Summary tables for all of these analyses, are provided in Appendix G.

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2. Informal ECRA Cleanup Guidelines

The informal ECRA cleanup guidelines have been used as a preliminary basis for evaluating the levels of contaminants detected at this site. These guideline levels are presented in Appendix A. To correspond with these guidelines, the results of the soil analyses have been reported in parts per million (ppm) and the water analyses in parts per billion (ppb). Samples which were found to have contaminant concentrations greater than these cleanup levels are noted in the text. Although these cleanup levels are being used to perform a preliminary assessment of the results, neither ENVIRON nor Textron suggests that the informal ECRA cleanup guidelines provide an appropriate criteria for final analysis of the results or for determining the need for cleanup at the Spencer Kellogg facility.

B. Summaries of Soil Results for Areas of Environmental Concern

1. Area of Environmental Concern 3

AEC 3 is an area of the site along the railroad tracks adjacent to Buildings 31 and 32 in which finished resin product may have been spilled during railroad car loading. Surface samples were collected from two locations (borings 304 and 305) and analyzed for PPMs and hydrocarbon fingerprinting. Mercury was found above the informal

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ECRA cleanup guideline in both soil samples. The sample collected from boring 304 also contained levels of chromium slightly above the informal ECRA cleanup guideline.

GC/FID and gravimetric fingerprinting analyses of the boring 304 soil sample indicate petroleum hydrocarbon concentrations of 720 ppm and 1330 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, kerosene, 4- to 5-ring polynuclear aromatic hydrocarbons and a petroleum product in the fuel oil/lubricating oil range. The fatty acid (non-petroleum hydrocarbon) fraction contained a total lipid equivalent concentration of 840 ppm and was qualitatively identified as soybean oil.

GC/FID and gravimetric fingerprinting analyses of the boring 305 sample indicate petroleum hydrocarbon concentrations of 5,900 ppm and 1,750 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, gasoline and coal tar. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 52,000 ppm and was qualitatively identified as soybean oil.

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2. Area of Environmental Concern 4

AEC 4 is located immediately east of AEC 3 along the railroad tracks. Two samples were collected from boring location 403. The first sample was collected just below the ground surface and fingerprinted for hydrocarbons as well as analyzed for PPMs. The second sample was collected from an interval just above the water table, approximately two feet below the ground surface, and analyzed for PPMs. Priority pollutant metals were not detected at levels above the informal ECRA cleanup guidelines in the surficial sample. Cadmium, however, was detected at levels in excess of the informal ECRA cleanup guideline in the deeper sample.

The GC/FID and gravimetric fingerprinting analyses indicate petroleum hydrocarbon concentrations of 1,440 ppm and 970 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of No. 6 fuel oil, gasoline and another petroleum product in the fuel oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 160,000 ppm and was qualitatively identified as soybean oil.

3. Area of Environmental Concern 10

AEC 10 is currently used for the storage of drummed raw materials. Two soil samples were collected from boring location 1002 and tested for PPMs. The surficial sample was also fingerprinted for hydrocarbons. The sampling depths corresponded to

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the interval immediately below the ground surface and the interval immediately above the water table, approximately two and a half to three feet below the ground surface. PPMs at levels above informal ECRA cleanup guidelines were not detected in either sample.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 36 ppm and 750 ppm, respectively. A duplicate analysis reported GC/FID and gravimetric analytical results of 30 ppm and 1,580 ppm of petroleum hydrocarbons, respectively. The petroleum hydrocarbon fractions from both samples were qualitatively identified by their GC/FID characteristic as 4- and 5- ring polynuclear aromatic hydrocarbons. Fatty acids were not detected in either sample.

4. Area of Environmental Concern 13

AEC 13 is an area where four aboveground storage tanks were located when this portion of the site was unpaved. One surficial soil sample, collected from boring 1304, was fingerprinted for hydrocarbons and analyzed for PPMs. Priority pollutant metals above informal ECRA cleanup guidelines were not detected in this sample.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 238 ppm and 1,080 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified as a petroleum product in the No. 6 fuel

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oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 16,000 ppm and was qualitatively identified as castor oil.

5. Area of Environmental Concern 14

AEC 14 is a portion of the site in which several aboveground storage tanks were previously located while this area was unpaved. One soil sample from boring 1404 was collected immediately below the ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. Results of the metal analyses do not indicate levels in excess of informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 670 ppm and 2,010 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, light and heavy fuel oils, gasoline and a petroleum product in the fuel oil or lubricating oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 520 ppm and was qualitatively identified as soybean oil.

6. Area of Environmental Concern 15

AEC 15 is a portion of the site formerly used for drum storage when the area was unpaved. One soil sample from boring 1505 was collected just below the pavement. This sample was analyzed for

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PPMs and hydrocarbon fingerprinting. Zinc marginally exceeded the informal ECRA cleanup guideline. Lead was also found at levels above informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 60 ppm and non-detect, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as gasoline. Fatty acids were not detected in this sample.

7. Area of Environmental Concern 16

AEC 16 is a portion of the site used for drum storage while the area was unpaved. One soil sample from boring 1604 was collected immediately below the ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. Levels of metals did not exceed informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting analyses indicate petroleum hydrocarbon concentrations of 1,260 ppm and 1,480 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 6,700 ppm and was qualitatively identified as soybean oil.

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8. Area of Environmental Concern 17

AEC 17 is an area formerly used for drum storage while this portion of the site was unpaved. Soil samples were collected immediately below the ground surface from borings 1704, 1705 and MW24. All samples were fingerprinted for hydrocarbons and analyzed for PPMs. Analytical results of soil samples collected within AEC 17 indicate levels of lead, mercury, and/or zinc, copper and antimony above informal ECRA cleanup guidelines. The highest concentration of metals in AEC 17 were detected in the soil sample collected from boring location MW24.

The GC/FID and gravimetric fingerprinting analyses for the soil sample collected from boring 1704 indicate petroleum hydrocarbon concentrations of 2,160 ppm and 4,900 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as lubricating oil with 4- to 5-ring polynuclear aromatic hydrocarbons. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 1,700 ppm and was qualitatively identified as soybean oil.

The GC/FID and gravimetric fingerprinting analyses for the soil sample collected from boring 1705 indicate petroleum hydrocarbon concentrations of 450 ppm and 500 ppm, respectively. The duplicate analysis indicated GC/FID and gravimetric values of 229 ppm and 460 ppm of petroleum hydrocarbons, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID

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characteristics as a petroleum product in the fuel oil/lubricating oil range and coal tar. Only one of the duplicate samples had a detectable fatty acid fraction. The fatty acid fraction of the duplicate sample contained a total lipid equivalent concentration of 48 ppm and was qualitatively identified as soybean oil.

The GC/FID and gravimetric fingerprinting analyses for the sample collected from boring location MW24 indicate petroleum hydrocarbon concentrations of 650 ppm and 2,070 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of a petroleum product in the fuel oil/lubricating oil range, gasoline and polynuclear aromatic hydrocarbons. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 67 ppm and was qualitatively identified as soybean oil.

9. Area of Environmental Concern 19

AEC 19 is located within the diked area around Tank 300. This tank was previously used to store a waste resin solution. One grab sample (1902) was collected at the surface and fingerprinted for hydrocarbons.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 1,030 ppm and 900 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a

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mixture of paint thinner, a petroleum product in the fuel oil/lubricating oil range and gasoline. The fatty acid fraction of this sample had a total lipid equivalent concentration of 16,000 ppm and was qualitatively identified as soybean oil.

10. Area of Environmental Concern 21

AEC 21 represents the former location of a number of aboveground tanks while the area was unpaved. One soil sample from boring 2104 was collected immediately below ground surface and analyzed for PPMs and fingerprinted for petroleum hydrocarbons. Seven metals, including antimony, arsenic, cadmium, copper, lead, mercury and zinc, were found to exceed informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 12,000 ppm and 1,860 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, gasoline and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample had a total lipid equivalent concentration of 5,100 ppm and was qualitatively identified as soybean oil.

11. Area of Environmental Concern 23

AEC 23, located adjacent to Building 4, is an active product loading area where a hazardous waste resin solution may have been generated in the past. Two samples were collected from boring

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location 2302. The first sample was collected immediately below ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. The second sample was collected from an interval just above the water table, approximately two to three feet below the ground surface, and analyzed for PPMs. Metals exceeding informal ECRA cleanup guidelines in both samples include cadmium, copper, lead, mercury and zinc. With the exception of cadmium, metal concentrations decreased with depth.

The GC/FID and gravimetric fingerprinting results of the surficial sample indicate petroleum hydrocarbon concentrations of 1,240 ppm and 8,800 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of paint thinner, fuel oils and 4- to 5-ring polynuclear aromatic hydrocarbons. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 250 ppm and was qualitatively identified as soybean oil.

12. Area of Environmental Concern 25

AEC 25 is a tank wagon loading area outside of Building 26 in which waste resin solutions may have been generated. One soil sample was collected immediately below ground surface from boring 2502 and fingerprinted for hydrocarbons and analyzed for PPMs. Two metals, lead and silver, were found to exceed informal ECRA cleanup guidelines, though the concentration of lead (268 ppm) was just

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slightly above the ECRA criterion. This is the only Phase II sample found to contain levels of silver in excess of informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 3,350 ppm and 1,880 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a petroleum product in the fuel oil/lubricating oil range and coal tar. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 16,000 ppm and was qualitatively identified as linseed oil.

C. Summaries of Soil Results from Monitoring Well Locations

1. Boring MW12

Monitoring well 12 is located between Buildings 4 and 25, adjacent to the tank farm which surrounds AEC 11. MW12 was installed to evaluate the potential impact on ground water quality downgradient from AEC 12, the area which contains the highest concentrations of VOCs and TPHCs in on-site soils. Soil samples were collected during the installation of MW12 immediately below the ground surface and from an interval immediately above the water table. A duplicate sample was also collected immediately below the ground surface. All samples were analyzed for PPMs and an

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additional surficial sample was collected and fingerprinted for hydrocarbons. Analytical results of the shallow duplicate samples indicate levels of lead, nickel, zinc and copper in excess of informal ECRA cleanup guidelines. The "at depth" sample contained concentrations of antimony, cadmium, copper and zinc above informal ECRA cleanup guidelines.

The fingerprinting results indicate GC/FID and gravimetric petroleum hydrocarbon concentrations of 930 ppm and 11,000 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as lubricating oil. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 120 ppm and was qualitatively identified as soybean oil.

2. Boring MW13

Monitoring well 13 is located near the southwest corner of Building 4. One soil sample was collected during the installation of MW13 immediately below ground surface and was analyzed for PPMs and fingerprinted for hydrocarbons. Copper, lead, mercury and zinc exceeded informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 1,170 ppm and 1,470 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a

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petroleum product in the fuel oil/lubricating oil range and coal tar. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 1,900 ppm and was qualitatively identified as soybean oil.

3. Boring MW14

Monitoring well 14 was installed adjacent to the southeast corner of Building 26. One soil sample was collected during the installation of MW14 just below the pavement and analyzed for PPMs and fingerprinted for hydrocarbons. Copper, lead, mercury and zinc were the only metals found above informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 650 ppm and 1,730 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of polynuclear aromatic hydrocarbons and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 170 ppm and was qualitatively identified as castor oil.

4. Boring MW15

Monitoring well 15 is located next to Building 9. Two soil samples were collected during the installation of MW15. The first sample, collected at a depth just below the pavement, was analyzed

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for PPMs and fingerprinted for hydrocarbons. The second sample was collected immediately above the ground water table (approximately three feet below grade) and analyzed for PPMs only.

The metal concentrations in the surficial sample contained lead and zinc above informal ECRA cleanup guidelines. The "at depth" sample also contained lead and zinc at even greater concentrations. In addition, copper and mercury above informal ECRA cleanup guidelines were detected in the deeper sample. Concentrations of metals typically increased with depth.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 660 ppm and 9,100 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of polynuclear aromatic hydrocarbons and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample contained a total lipid equivalent concentration of 100 ppm and was qualitatively identified as soybean oil.

5. Boring MW16

Monitoring well 16 was installed approximately 25 feet south of Building 23 near the juncture of two sewer lines. Soil samples were collected during the installation of MW16 immediately below the ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. A duplicate sample was also collected just below the ground surface and analyzed for PPMs. Both samples contained levels

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of some metals above informal ECRA cleanup guidelines, including cadmium, copper, lead, mercury, nickel and zinc.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 800 ppm and 1,150 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of coal tar and a petroleum product in the fuel oil/lubricating oil range. The fatty acid fraction of this sample had a total lipid equivalent concentration of 150 ppm and was qualitatively identified as castor oil.

6. Boring MW17

Monitoring well 17 is located near the discharge point of the storm sewer into Newark Bay. Two soil samples were collected during the installation of MW17, one just below the ground surface and the other just above the water table. The surface sample was analyzed for PPMs and fingerprinted for hydrocarbons. Only zinc was found to exceed informal ECRA cleanup guidelines in this sample. The deeper soil sample was also collected and analyzed for PPMs. Copper, lead, nickel and zinc were found to exceed informal ECRA cleanup guidelines in the deeper sample. Metal concentrations typically increased with depth.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 205 ppm and 220 ppm, respectively. The petroleum hydrocarbon fractions were

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qualitatively identified by their GC/FID characteristics as a petroleum product in the fuel oil/lubricating oil range. Fatty acids or non-petroleum hydrocarbons were not detected.

7. Boring MW18

Monitoring well 18 was placed adjacent to Newark Bay in a presumed downgradient direction from AEC 21. Soil samples, including a duplicate, were collected during the installation of MW18 at an interval just below the ground surface and analyzed for PPMs and fingerprinted for hydrocarbons. Lead, zinc, mercury and copper were found to be above the informal ECRA cleanup guidelines in both samples. Cadmium slightly exceeded the informal guideline in one of the samples.

The GC/FID and gravimetric fingerprinting analyses indicate petroleum hydrocarbon concentrations of 260 ppm and 630 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a mixture of a petroleum product in the fuel oil/lubricating oil range and polynuclear aromatic hydrocarbons.

8. Boring MW19

Monitoring well 19 was installed adjacent to the large tank farm which comprises AEC 26 to monitor the effects, if any, of the activities associated with AEC 26 on ground water quality in the shallow aquifer. Surface cover at this location consisted of thirty

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inches of steel reinforced concrete. A soil sample was collected immediately below the concrete during well installation and analyzed for both PPMs and hydrocarbon fingerprinting. No metals were found to exceed the informal ECRA cleanup guidelines.

The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 6 ppm and non-detect, respectively. Fatty acids or non-petroleum hydrocarbons were not detected.

9. Boring MW24

Monitoring well 24 is a telescoped deep well located adjacent to MW10 to monitor whether contamination in the shallow fill material has infiltrated through the confining layer and into the deep aquifer. The analytical results of soil samples collected from this location are included in the previous discussion of AEC 17.

10. Boring MW25

Monitoring well 25 is a telescoped deep well located immediately adjacent to MW19. Due to the existence of thick concrete and poor split spoon recovery, a soil sample could not be collected above the water table. A sample was collected below the apparent water table, however, and fingerprinted for hydrocarbons. The GC/FID and gravimetric fingerprinting results indicate petroleum hydrocarbon concentrations of 5.8 ppm and non-detect, respectively. Fatty acids or non-petroleum hydrocarbons were not detected.

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11. Boring MW26

Monitoring well 26 is a telescoped deep well located adjacent to MW17. Soil samples collected during well installation were analyzed for PPMs and fingerprinted for hydrocarbons. Duplicate samples were collected at the surface and also analyzed for PPMs. The samples contained chromium, copper, lead, nickel, zinc and/or antimony above informal ECRA cleanup guidelines. A second soil sample was collected just above the water table and analyzed for priority pollutant metals. This sample contained only lead, copper and zinc at levels above the guidelines.

The GC/FID and gravimetric fingerprinting analyses indicate petroleum hydrocarbon concentrations of 180 ppm and 236 ppm, respectively. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as a petroleum product in the fuel oil lubricating range. Additionally, no fatty acids or non-petroleum hydrocarbons were detected.

D. Summaries of Soil Results from Background Borings

1. Background Boring 001

Boring 001 is located near the fence along the southern property boundary. One soil sample was collected and analyzed for PPMs. No metals were found to exceed the informal ECRA cleanup guidelines.

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2. Background Boring 002

Boring 002 is located near the fence along the southern property boundary, south of AEC 22. Surficial and "at depth" soil samples were collected and analyzed for PPMs. The sample collected immediately below the pavement did not contain any metals in excess of informal ECRA cleanup guidelines. The sample collected immediately above the water table contained cadmium, copper, lead, mercury and zinc at levels above informal ECRA cleanup guidelines. Metal contamination increased with depth at this location.

3. Background Boring 003

Boring 003 is located east of Building 13. One sample was collected and analyzed for PPMs. Metals in excess of informal ECRA cleanup guidelines were not detected in this sample.

4. Background Boring 004

Boring 004 is located just south of Building 32. Two soil samples, one collected just below the pavement and the other just above the water table, were analyzed for PPMs. Neither sample contained levels of metals in excess of informal ECRA cleanup guidelines.

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5. Background Boring 005

Boring 005 is located near Newark Bay along the fence, adjacent to monitoring wells 8 and 22. One soil sample collected just below ground surface was analyzed for PPMs. Lead and zinc were found to exceed informal ECRA cleanup guidelines. A second soil sample collected immediately above the water table was also analyzed for PPMs. This sample did not contain any metals in excess of informal ECRA cleanup guidelines.

E. Shallow Ground Water

1. Monitoring Well 1

Monitoring well 1 is a Phase I shallow well which was installed in the northwest corner of the site to monitor flow and quality of the shallow ground water in this area. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead and TPHC were found to exceed informal ECRA cleanup guidelines. TPHC was not detected in this well during the previous sampling round associated with the Phase I Sampling Plan. All other analytical results indicate levels of constituents below the minimum laboratory detection limit or below informal ECRA cleanup guidelines.

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2. Monitoring Well 2

Monitoring well 2 is a Phase I shallow well which was installed in the southwest corner of the property to monitor flow and quality of the shallow ground water in this portion of the site. Duplicate ground water samples were collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. TPHCs were found in both samples to exceed informal ECRA cleanup guidelines. All other analytical results indicated levels of constituents below the informal ECRA cleanup guidelines.

3. Monitoring Well 3

Monitoring well 3 is a Phase I shallow well which was installed in the presumed downgradient direction from AEC 10 in order to monitor the quality of the shallow ground water in this portion of the site. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results indicated levels of constituents either below the minimum laboratory detection limits or below informal ECRA cleanup guidelines.

4. Monitoring Well 4

Monitoring well 4, a Phase I shallow well, is located along the underground flume near the middle of the site and was installed to monitor ground water quality in this area. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs.

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Only the levels of chromium, lead and cadmium were above informal ECRA cleanup guidelines.

5. Monitoring Well 5

Monitoring well 5 is a Phase I shallow well located approximately 15 feet west of Building 23. Monitoring well 5 was installed in the presumed downgradient direction from AEC 11 to monitor the quality of the shallow ground water in this portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results were below informal ECRA cleanup guidelines.

6. Monitoring Well 6

Monitoring well 6, a Phase I shallow well, was centrally located along the southern border of the property to monitor flow and quality of the shallow ground water in this portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results were below informal ECRA cleanup guidelines.

7. Monitoring Well 7

Monitoring well 7, a Phase I shallow well, was placed in the northeast corner of the property to monitor shallow ground water flow and quality in an apparent downgradient area of the site. A

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ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead was the only constituent found to exceed informal ECRA cleanup guidelines.

8. Monitoring Well 8

Monitoring well 8 is a Phase I shallow well located between the large tank farm and the fence along Newark Bay. Monitoring well 8 was installed in the presumed downgradient direction from AECs 7 and 26 to monitor the quality of the shallow ground water. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results were below informal ECRA cleanup guidelines, with the exception of cadmium (13 ppb) which slightly exceeded the informal ECRA cleanup guidelines.

9. Monitoring Well 9

Monitoring well 9, a Phase I shallow well located near the southeast corner of the site next to AEC 20, was installed to monitor the effects, if any, of AEC 20 on shallow ground water quality. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. With the exception of lead, all analytical results were below informal ECRA cleanup guidelines.

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10. Monitoring Well 10

Monitoring well 10, a Phase I shallow well located just north of Building 12, was installed to monitor the effects, if any, of the activities associated with AEC 17 on ground water quality in the shallow aquifer. A ground water sample was collected and analyzed for TPHCs, PPMs, cyanide and VOC+15. Most PPM, TPHC and cyanide results were below informal ECRA cleanup guidelines. Lead and total VOCs, however, exceeded informal ECRA cleanup guidelines. A single volatile compound, toluene, was detected in the VOC+15 search.

11. Monitoring Well 11

Monitoring well 11 is a Phase I shallow well installed between the large tank farm and Building 31 to monitor the effects, if any, of the activities associated with AECs 6, 27 and 28 on ground water quality in the shallow aquifer. One ground water sample was collected and analyzed for PPMs, cyanide, VOC+15 and TPHCs. All results were below informal ECRA cleanup guidelines.

12. Monitoring Well 12

Monitoring well 12, a Phase II shallow well, is located west of AEC 11. Monitoring well 12 was installed to monitor the quality of the shallow ground water downgradient from AEC 12, the area which contains the highest concentration of VOCs and TPHCs in soils

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on-site. One ground water sample was collected and analyzed for PPMs, cyanide, VOC+15 and TPHCs. All analytical results were below informal ECRA cleanup guidelines.

13. Monitoring Well 13

Monitoring well 13 is a Phase II shallow well installed near the southwest corner of Building 4 to monitor the extent, if any, of the contaminant plume emanating from the vicinity of MW10 and to monitor the shallow ground water upgradient from AEC 12. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead and total volatile organics exceeded informal ECRA cleanup guidelines. The only volatile compound found in MW13 was ethylbenzene (110 ppb).

14. Monitoring Well 14

Monitoring well 14 was installed near the southwest corner of Building 26 to monitor the extent, if any, of the contaminant plume emanating from the MW10 area. A ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead was the only constituent that exceeded informal ECRA cleanup guidelines.

15. Monitoring Well 15

Monitoring well 15 is a Phase II shallow well located north of Building 9 and was installed to monitor the extent, if any, of the contaminant plume emanating from the MW10 area. Duplicate ground

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water samples were collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Lead exceeded informal ECRA cleanup guidelines in both samples.

16. Monitoring Well 16

Monitoring well 16 is a Phase II shallow well installed near the juncture of two sewer lines, approximately 25 feet south of Building 23, to determine the effects, if any, of the sewer system on the shallow ground water. One ground water sample was collected and analyzed for PPMs, TPHCs, VOC+15 and cyanide. All of the TPHC, VOC+15 and cyanide analytical results were below informal ECRA cleanup guidelines. However, the levels of arsenic, cadmium, chromium, copper, lead, mercury and zinc were above informal ECRA guidelines.

17. Monitoring Well 17

Monitoring well 17 is a Phase II shallow well installed adjacent to the sewer line along Newark Bay to determine the effects, if any, of the sewer system on the shallow ground water. One ground water sample was collected and analyzed for PPMs, VOC+15, TPHCs and cyanide. The analytical results for volatiles, TPHCs and cyanide were below informal ECRA cleanup guidelines. The metal analyses, however, indicated levels of cadmium, chromium, lead and mercury exceeding informal ECRA cleanup guidelines.

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18. Monitoring Well 18

Monitoring well 18 is a Phase II shallow well located along Newark Bay approximately 50 feet north of Building 14. Monitoring well 18 was installed in the presumed downgradient direction from AEC 21 in order to monitor the quality and flow of the shallow ground water. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Only lead exceeded the informal ECRA cleanup guideline.

19. Monitoring Well 19

Monitoring well 19 is a Phase II shallow well located adjacent to the large tank farm comprising AEC 26 and was installed to monitor the effects, if any, of the activities associated with AEC 26 on ground water quality in the shallow aquifer. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. Arsenic, cadmium, chromium, lead and mercury exceeded informal ECRA cleanup guidelines.

F. Deep Ground Water

1. Monitoring Well 21

Monitoring well 21 is a Phase I telescoped deep well located adjacent to monitoring well 2 in the southwest corner of the property. MW21 was installed to monitor flow and quality of the

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deeper ground water in this portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines.

2. Monitoring Well 22

Monitoring well 22 is a Phase I telescoped deep well adjacent to monitoring well 8 and located between the large tank farm and Newark Bay. Monitoring well 22 was installed to monitor the quality of the deeper ground water in a presumed downgradient portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All analytical results were below informal ECRA cleanup guidelines with the exception of lead.

3. Monitoring Well 23

Monitoring well 23 is a Phase I telescoped deep well located adjacent to monitoring well 1 in the northwest corner of the property. MW23 was installed to monitor flow and quality of the deeper ground water in this portion of the site. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines.

4. Monitoring Well 24

Monitoring well 24 is a Phase II telescoped deep well located north of Building 12 and paired with Phase I shallow monitoring well 10. MW24 was installed to monitor whether the observed

contamination in the shallow aquifer at this location has infiltrated through the confining layer and into the deep aquifer. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines.

5. Monitoring Well 25

Monitoring well 25 is a Phase II telescoped deep well located near the southwest corner of the large tank farm and paired with Phase II shallow well monitoring well 19. Monitoring well 25 was installed to determine the nature and extent, if any, of deep ground water contamination in this area of the site. Duplicate ground water samples were collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines.

6. Monitoring Well 26

Monitoring well 26 is a Phase II telescoped deep well located near the storm sewer line along Newark Bay and paired with MW17, a Phase II shallow well. MW26 was installed to monitor both ground water elevation and ground water quality at the downgradient edge of the deep aquifer. One ground water sample was collected and analyzed for PPMs, VOC+15, cyanide and TPHCs. All results were below informal ECRA cleanup guidelines with the exception of TPHCs.

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G. Building 26 Floor Drain Results

Dye tests were conducted during the implementation of the Phase I Sampling Plan to determine the discharge point(s) of the floor drains in Building 26. The results of these Phase I tests did not conclusively identify the discharge point(s). One of the objectives of the Phase II Sampling Plan was to conduct additional tests to determine the location(s) of the outfall of the Building 26 floor drains.

A smoke test was initially performed because the Phase I dye testing did not provide conclusive results. No smoke leaks were detected that would indicate the outfall of the drain. Dye tracing was then performed in an attempt to locate the drain outfall. Visual observations of the test indicated dye exiting from the ground in an area near a roof drain pipe and along the northern base of Building 26, suggesting that the drainage pipe underneath the flooring lacks physical integrity.

H. March 1988 Additional Ground Water Sampling Results

1. General

ENVIRON conducted an additional ground water sampling round in March 1988 in order to examine the occurrence and concentrations of priority pollutant metals from both unfiltered and filtered samples, and to delineate further the extent of volatile organics and total petroleum hydrocarbons in the ground water. The samples were collected in accordance with the methods and procedures previously outlined in Section II. Additionally, the filtering of ground water

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samples for priority pollutant metal analyses was accomplished utilizing a vacuum-pumped 0.45 micron cellulose nitrate filtering apparatus. The schedule of analytical parameters for each tested monitoring well is provided in Table IV-1. In addition to samples from each of the nineteen shallow wells, samples from Newark Bay, Plum Creek and each of the deep wells that had previously been found to contain a tested parameter above informal ECRA cleanup guidelines, were analyzed for one or more of the aforementioned parameters. Newark Bay and Plum Creek were particularly targeted for sampling because of their influence on ground water flow and their respective potential for transporting constituents to the site. The analytical results are summarized in Appendix G (Table G-4) and the Tier II data package is provided in Volume IV.

This sampling round was primarily triggered by the presence of fine sediment in some monitoring wells and the occurrence of PPMs at concentrations greater than their possible solubility given the known pH range of ground water found on-site. The laboratory method for priority pollutant metal analysis requires acid spiking of the sample in the field. Any metals associated with the sediment would have an increased solubility in the unfiltered acidified water than in the non-acidified water. For this reason, some of the resultant data obtained during implementation of the Phase II Sampling Plan did not accurately represent the dissolved metal content in the ground water.

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Table IV-1: Schedule of Analytical Parameters for March 1988 Additional Ground Water Sampling Round

Sampling Location	ANALYSES			
	VOC+15	TPHC	PPMs Filtered	PPMs Unfiltered
MW01		X	X	X
MW02		X	X	X
MW03			X	X
MW04			X	X
MW05			X	X
MW06	X		X	X
MW07	X		X	X
MW08			X	X
MW09			X	X
MW10	X		X	X
MW11	X		X	X
MW12			X	X
MW13	X		X	X
MW14	X		X	X
MW15	X		X	X
MW16			X	X
MW17			X	X
MW18			X	X
MW19			X	X
MW22	X		X	X
MW26		X		
Plum Creek		X	X	X
Newark Bay			X	X

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2. Analytical Results

Unfiltered ground water samples from fourteen shallow wells contained between one and eight PPMs above informal ECRA cleanup guidelines. These results are consistent with those obtained during the Phase II Sampling Plan. With the exception of lead in MW16, only selenium was detected at concentrations above informal ECRA cleanup guidelines in the filtered ground water samples.* Selenium was detected in most of the tidally influenced wells (MW4, MW7, MW8, MW17, MW19, MW22) and Newark Bay. The concentrations of selenium are highest in Newark Bay, indicating that the bay is the most likely source of this metal. Only one upgradient well (MW12), located within the radius of influence of the underground flume, was found to contain selenium slightly above the informal ECRA cleanup guideline. The occurrence of selenium in this well may be the result of selenium migrating through the flume from Newark Bay during high tides. Priority pollutant metals were not detected in Plum Creek.

Petroleum hydrocarbons were detected at the informal ECRA cleanup guideline (1,000 ppb) in background monitoring well 1.

* Selenium has not previously been detected in the ground water at this site. The detection of selenium during this sampling round is apparently the result of new equipment in the laboratory which has greater sensitivity, particularly to selenium, than the instrument(s) used during other rounds of analyses.

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Volatile organics were detected in samples from wells MW7, MW10, MW11 and MW13. VOCs had been detected in these wells above the informal ECRA cleanup guideline during Phase 1 and/or Phase 2.

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V. DISCUSSION

A. Soils

1. General

Analytical results of 42 Phase II soil samples indicate the presence of PPMs and TPHCs at concentrations in excess of informal ECRA cleanup guidelines in many areas of the site. The pattern of contamination is discussed below.

2. Priority Pollutant Metals (PPMs)

The analytical results of the PPM analyses from the uppermost soil sample in each boring are illustrated on Plate 2 (Appendix I). The types and concentrations of PPMs varied considerably throughout the site, although lead, zinc, copper and mercury appear to be the most prevalent. The most significant levels of PPMs were detected in soil samples collected from the central and eastern portions of the site (MW16, MW18, MW26 and boring 2104).

Lead and zinc are the most common PPMs detected in the uppermost soils, exceeding informal ECRA cleanup guidelines in over 50 percent of the samples. The range of lead and zinc concentrations above informal ECRA cleanup guidelines varied between 262 to 1620 ppm and 352 to 2670 ppm, respectively. Antimony, arsenic, chromium and silver were found at levels in excess of informal ECRA cleanup guidelines in isolated areas.

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PPMs are generally not found above informal ECRA cleanup guidelines in the uppermost soils of the western and northern portions of the site. Soil samples from AEC 3, however, did contain levels of chromium and/or mercury slightly above informal ECRA cleanup guidelines.

The presence of PPMs does not appear to be the result of industrial activities at the site. None of the PPMs is known to have been used in any process during the operating history of the site, suggesting that their occurrence in the soils is most likely related to the fill material. Additionally, the variability of PPMs suggests that the fill material present beneath the site is extremely heterogeneous.

Plate 3 (Appendix I) illustrates the levels of PPMs above informal ECRA cleanup guidelines in deeper soil samples collected just above the water table. As previously mentioned, only 10 soil samples were collected from this interval, due to a very high water table and poor split spoon recovery. The analytical results again indicate the highest concentrations of metals in the central and eastern portions of the site. Concentrations of metals from these "at depth" soil samples are generally consistent with those observed in the surficial samples. It should be noted, however, that "at-depth" samples from boring locations MW15, MW17 and 002 showed significantly greater metal concentrations and numbers of metal species than the surficial samples taken from the same locations.

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This supports the conclusion that the presence of PPMs is most likely associated with the fill material. If the metals had been introduced into the soil by site activities, the higher concentrations would be expected in the near surface soil samples.

PPMs were typically not detected in deeper soil samples taken in the western and northern portions of the site. Cadmium, however, was detected at a level in excess of the informal ECRA cleanup guideline in the "at-depth" sample collected from boring 403, located along the northern railroad tracks.

3. Total Petroleum Hydrocarbons (TPHCs)

The nature of TPHCs in Phase II soil samples was determined by two distinct analytical methods. The gravimetric method, based on the weight of the various hydrocarbon fractions, was used initially. This method is most accurate for heavier and longer chained hydrocarbons, because lighter fractions may volatilize during the analytical procedure. The analytical data generated included the determination of the aliphatic (F_1), aromatic (F_2) and fatty acid (FA) fractions.

The gas chromatography/flame ionization detector (GC/FID) method (which is most accurate for the lighter and shorter chained hydrocarbons) was also utilized. This method detects only lighter and shorter chained hydrocarbons and not the heaviest hydrocarbons.

The combination of the two methods provided a balance and range of values (upper and lower limits) of the petroleum hydrocarbons

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found in the samples. It should be noted that the aliphatic plus the aromatic fractions provide the total petroleum hydrocarbon fraction found in the samples. The fatty acid fraction is the non-petroleum-based hydrocarbon material.

Plate 4 (Appendix I) illustrates the concentrations of petroleum hydrocarbons in excess of informal ECRA cleanup guidelines within the upper two feet of soil throughout the site. The values provided represent the highest concentrations detected by either analytical method. The average values detected by the gravimetric and GC/FID methods are 2,140 ppm and 1,350 ppm, respectively. The range is from non-detect to 12,000 ppm. Also illustrated on Plate 4 are qualitative descriptions of the petroleum hydrocarbon fractions and the concentrations of fatty acids or non-petroleum-based hydrocarbons for each sampling location.

Although the Phase II "fingerprinting" results indicate that a significant portion of the hydrocarbons detected in soil samples are non-petroleum-based oils, levels of petroleum-based hydrocarbons in excess of informal ECRA cleanup guidelines still remain in a number of areas on the site. The petroleum hydrocarbon fractions were qualitatively identified by their GC/FID characteristics as paint thinner, fuel oils, lubricating oils, gasoline, kerosene, coal tar and polynuclear aromatic hydrocarbons (PAHs). The fatty acid or non-petroleum-based fractions were typically identified as either soybean oil or linseed oil. In some instances, the type(s) of oil were similar to those used on the site. In other instances there

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was no correlation between known site activities and the observed-contamination, suggesting that petroleum hydrocarbons were present as part of the fill used on-site or released from an unidentified on-site source. A discussion of the type(s) of oil found within the tested AECs and possible sources is provided below.

The highest levels of petroleum hydrocarbons (12,000 ppm) were detected in the soil sample (boring 2104) located within AEC 21, a former aboveground storage tank area which was unpaved at the time of use. The hydrocarbon fraction consisted of a mixture of paint thinner, gasoline and a fuel or lubricating oil. The former contents of these tanks are unknown, and the tanks were removed in the early 1960s.

Similar values of petroleum hydrocarbons (11,000 ppm) were detected in the soil sample collected from boring MW12. The petroleum product at this location was qualitatively identified as lubricating oil and may be the result of past spills from Building 25. Prior to 1962, the maintenance shop was housed in Building 25, and lubricating oils were routinely used at this location.

Significant levels of total petroleum hydrocarbons were detected in Phase I samples collected from AECs 3 and 4. Although results of the "fingerprinting" analyses conducted on Phase II soil samples obtained from these AECs indicate that a substantial portion of the hydrocarbons are non-petroleum-based products such as linseed oil and soybean oil, levels of petroleum hydrocarbons above informal ECRA cleanup guidelines still remain. The petroleum hydrocarbon

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fractions were qualitatively identified by their GC/FID characteristics as paint thinner, coal tar and kerosene. Resins are considered to be the most likely source, because they contain paint thinner and are routinely loaded into Building 32, which is located immediately adjacent to AEC 3. The coal tar detected in this and other samples along the railroad tracks may be the result of the leaching of coal tar from the railroad ties, which are typically coated with coal tar or creosote. The presence of kerosene may be due to the possible use of this fuel for locomotives during the winter months, because kerosene is less likely to congeal. Gasoline and fuel oil were detected in samples from AEC 4. The fuel oil may be due to leakage associated with train engines using diesel fuel. The source of the gasoline is not known.

AEC 10 is an area where drummed raw materials were stored. Polynuclear aromatic hydrocarbons were qualitatively identified as the petroleum product at this location, though there is no evidence to suggest that previous activities associated with petroleum hydrocarbons had taken place in this area.

The soil sample from AEC 13 had significant quantities of non-petroleum hydrocarbons (16,000 ppm) and petroleum hydrocarbons (1,080 ppm), which were qualitatively identified as fuel oil #6. No fuel oil was known to have been stored in this area. The occurrence of the non-petroleum hydrocarbons is most likely the result of vegetable oil storage in this area while the site was unpaved.

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Gasoline, fuel oil/lubricating oil, and paint thinner petroleum products were qualitatively identified as the soil contaminants in AEC 14. The source of the paint thinner is most likely the 1285 Premix which was stored in Tanks 309 and 315 (Plate 4). No known sources exist in this area for the gasoline or fuel oil/lubricating oil products.

Petroleum products in the fuel oil and lubricating oil range and paint thinner were detected in the soil sample collected from AEC 16. The source of the paint thinner may be related to the possible leakage of 1285 Premix from drums that were previously stored in the area while it was unpaved.

Three soil samples were collected and "fingerprinted" from AEC 17. Lubricating oil, fuel oil, polynuclear aromatic hydrocarbons and coal tar were detected among the samples. A former coal pile in the area in which MW10 and MW24 now exist may have been the source for the polynuclear aromatic hydrocarbons and the coal tar. The lubricating oil from the boring 1704 sample may be the result of oils used for railroad cars along the adjacent tracks. Fuel oil and lubricating oil were qualitatively identified in boring 1705. There are no known on-site sources for these petroleum products in this area. It should be noted, however, that this portion of the site is adjacent to an industrial establishment that utilizes and stores petroleum products.

AEC 19 surrounds tank 300, which at different times in the past contained waste resin 1285 Premix and vegetable oils. The vegetable

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oils are the most likely source for the very high levels of non-petroleum-based hydrocarbons detected. The 1285 Premix would account for the paint thinner detected in the petroleum fractions.

AEC 23 is an area used for loading and unloading trucks of products which contain paint thinner and waste resin solutions. The trucks themselves may be the source of the fuel oil detected. Polynuclear aromatic hydrocarbons were also detected in this area, although a potential source is not apparent.

Significant quantities of vegetable oils were transferred in the vicinity of AEC 25 and would potentially account for the concentration (16,000 ppm) of linseed oil detected in this sample. Coal tar was also detected and may be related to leaching from the adjacent railroad ties. The occurrence of fuel oil/lubricating oil in this area may be attributed to their use in and on the railroad cars. Similar contamination was found near MW14, which is located immediately adjacent to AEC 25 along the same set of railroad tracks. The polynuclear aromatic hydrocarbons detected in this sample may be the result of coal ash that was previously stored less than 50 feet away. Typical railroad track contamination of fuel and lubricating oils was reported in the area of MW13, also located along the tracks approximately 100 feet west of AEC 25.

The soil sample collected from MW15 contained petroleum hydrocarbons that were qualitatively identified as polynuclear aromatic hydrocarbons and fuel and lubricating oils. The presence of the polynuclear aromatic hydrocarbon contamination could be

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attributed to the two nearby areas in which coal and ash were piled. However, there are no known sources of fuel or lubricating oils in this area.

The soil sample collected from MW16 is also near a former coal storage area, which could a source for the polynuclear aromatic hydrocarbons. No known sources exist for the fuel oil/lubricating oil detected in the sample from this area.

The soil samples collected from MW17 and MW26 contained relatively low levels of fuel oil/lubricating oil. There is no known potential source of these oils in this area and their presence may be attributable to background levels in the fill material.

The soil sample collected from boring MW18 contains relatively low levels of fuel oil/lubricating oil and polynuclear aromatic hydrocarbons, both of which have no evident source. The fill material in this area was reported to contain significant ash content. Ash is a possible source of polynuclear aromatic hydrocarbon contamination.

B. Shallow Ground Water

1. General

Analytical results of ground water samples from shallow fill unit monitoring wells indicate the presence of PPMs in excess of informal ECRA cleanup guidelines. Additionally, PHCs and VOCs were

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detected in localized areas. The pattern of contamination is discussed below.

2. Priority Pollutant Metals (PPMs)

The analytical results of PPM analyses of Phase II ground water samples are illustrated on Plate 5 (Appendix I). Lead was the predominant PPM observed in ground water samples throughout the site in concentrations ranging from 60 to 9450 ppb. Other PPMs, including cadmium, chromium and/or arsenic, copper, mercury and zinc, were detected at levels in excess of informal ECRA cleanup guidelines in ground water samples from MW4, MW16, MW17 and MW19.

The analytical results obtained from the March 1988 additional ground water sampling round (Plate 6 (Appendix I)) indicate, however, that the presence of lead in the shallow ground water beneath the site and the occurrence of additional metal species in monitoring wells MW4, MW16, MW17, and MW19 do not represent the dissolved metal contents but are the result of metals associated with fine particulate sediments in the shallow ground water. Because the laboratory method for priority pollutant metal analysis requires acid spiking of the sample in the field, metals associated with the sediment exhibited an increased solubility in the unfiltered acidified water.

Results of the filtered ground water samples indicate that, with the exception of lead detected in MW16, the only dissolved metal content in the ground water is selenium. The concentration of

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selenium in Newark Bay is similar to the levels reported for shallow ground water on-site, indicating that the source of selenium is probably Newark Bay especially given the extent of tidal impact on the site.

3. Total Petroleum Hydrocarbons (TPHCs)

All ground water samples collected as part of the Phase II Sampling Plan were analyzed for TPHCs. Analytical results at levels above informal ECRA cleanup guidelines are illustrated on Plate 5 (Appendix I). In the shallow aquifer, TPHCs were found above the 1,000 ppb informal ECRA cleanup guideline in two background wells in the very western portion of the site. These wells, MW01 and MW02, are located in the northwest and southwest corners of the site, respectively. Because general ground water flow direction is west to east, the locations of the wells indicate that the TPHC contamination is from an off-site source.

MW01, MW02 and other existing monitoring wells were previously tested for TPHCs during implementation of the Phase I Sampling Plan. At that time, only MW01 exceeded informal ECRA cleanup guidelines for TPHCs. The concentration of TPHCs measured in MW01 during Phase II is significantly lower than that obtained during Phase I. Additionally, the results from the additional ground water sampling (Plate 6 (Appendix I)) show TPHCs at the informal ECRA cleanup guideline (1,000 ppb) in MW01. TPHCs were not detected in other wells during this sampling round.

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4. Volatile Organic Compounds (VOCs)

All ground water samples collected during the Phase II Sampling Plan were tested for VOCs plus a forward library search for the next 15 constituents present in the highest concentrations (VOC+15). The analytical results above informal ECRA cleanup guidelines are shown on Plate 5 (Appendix I). Only two shallow wells, MW10 and MW13, contain volatiles in excess of informal ECRA cleanup guidelines. MW10 contained the highest concentrations of VOCs when sampled during Phase I. Though the concentrations detected in MW10 during the Phase II program are less, they are still the highest on-site. Phase II well MW13 was the only other to contain concentrations of total VOCs in excess of informal ECRA cleanup guidelines.

These wells, though close in proximity, do not necessarily share the same source for volatile contamination. This is evidenced by the fact that MW10 contains only toluene and MW13 contains only ethylbenzene. The source for the ethylbenzene in MW13 is likely the soil in AEC 12, which was found during Phase I to contain the highest concentrations of ethylbenzene on site. The source of toluene observed in MW10 is likely to be the soil in AEC 17 in which the highest concentrations of toluene were detected during Phase I.

Results of the March 1988 additional sampling (Plate 6 (Appendix I)) confirmed the existence of VOCs in monitoring wells MW10 and MW13. Levels of VOCs were also detected in wells MW7 and MW11, located in the northern portion of the site. Similar levels of VOCs were reported for MW7 and MW11 during the execution of the Phase I

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Sampling Plan. The VOCs detected in the ground water in this area could have come from AEC 26, a large tank farm containing drains that previously discharged directly to the ground. These drains have since been plugged. However, given the sporadic occurrence of VOCs in these wells and the steep hydraulic gradient observed in this area, the presence of VOCs may be the result of contaminant migration from an off-site source.

5. Cyanide

All Phase II ground water samples were analyzed for cyanide. Cyanide was below method detection limits in most samples and none of the samples contained levels in excess of informal ECRA cleanup guidelines.

C. Deep Aquifer Summary

All Phase II ground water samples collected from the deep aquifer were analyzed for PPMs, TPHCs, VOCs, and cyanide. No samples were found to contain cyanide or VOCs. Monitoring well 26, however, did contain TPHCs at a concentration (1,100 ppb) slightly exceeding the informal ECRA cleanup guideline (Plate 5 (Appendix I)). One possible source of this contamination is Newark Bay, given the proximity of this well to the bay and the hydrologic connection between the deep aquifer and the bay. A low level of lead (69 ppb) was also detected in the Phase II ground water sample collected from deep well MW22, although the occurrence of this

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metal is likely to be the result of field acidification. PPMs were not detected above informal ECRA cleanup guidelines in other deep well samples.

A level of selenium slightly exceeding ECRA cleanup guidelines was detected in MW22 during the March 1988 additional sampling (Plate 6 (Appendix I)). Similar concentrations were detected in Newark Bay, indicating that the bay is the likely source of selenium given the hydrologic connection between the deep aquifer and the bay.

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VI. CONCLUSIONS

A. General

The results of this sampling program helped to define the lateral and vertical extent, and type, of contamination present at the site. Additional characterization to define the areas and/or environmental media that potentially require remediation under ECRA is not required. The findings indicate that there is some contamination of soils and ground water at the site. These findings are discussed below in light of the probable sources of contamination.

B. Contamination Related to On-Site Activities

VOCs, particularly ethylbenzene and toluene, and petroleum hydrocarbons appear to have been introduced into the surficial soils of the fill unit by operations and activities that took place at the facility. The occurrence and relative concentrations of these compounds are generally consistent with known and possible uses within certain AECs.

Ethylbenzene and toluene are known to have been used at this facility. The only areas in which these two compounds were detected are areas in which it was suspected that they might be found due to past practices at the site.

Results of the Phase II sampling program indicate that a significant quantity of the TPHCs on the site are non-hazardous fish and vegetable oils. The data also indicate that petroleum-based hydrocarbons, such as fuel oils, lubricating oils, and gasoline, remain within most of the

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tested AECs. In many instances, the occurrence of both non-hazardous fish and vegetable oils and petroleum-based hydrocarbons can be related to past activities and operations of the facility.

C. Contamination Related to Materials of the Fill Unit

The analytical data indicate the occurrence of PPMs in soils from designated background sampling locations and from within the central and eastern portions of the site. The variability of the PPM concentrations throughout the site attests to the heterogeneity of the fill material. Additionally, the widespread occurrence of PPMs within the central and eastern portions of the site is most likely due to the emplacement of distinct fill material.

Because none of the detected PPMs has been used at the facility at any time during the operating history of the site, their presence is believed to be related to the underlying fill materials. Furthermore, the soil samples in which the highest concentrations of the metals were found were generally those from the deeper soil sample collected immediately above the water table. If the metals had been introduced into the soils by the practices at the site, the higher concentrations would be expected in the surficial samples.

In addition, some of the TPHC contamination, as well as detected base neutral concentrations in certain areas of the site, were found in unexpected locations. The presence of these compounds in areas of the site deemed to be unaffected by operations that could have potentially contaminated the soils with these constituents is most likely related to

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normal background levels of these compounds within the fill material. For example, significant concentrations of TPHCs were detected in soil samples collected from background monitoring well locations. The range of apparent background TPHCs varies considerably, however, even within a short distance. Base neutral organics were also detected in several unexpected locations. The data suggest that their presence may be related to background petroleum hydrocarbons.

D. Interaction Between Fill Unit and Shallow Aquifer

Despite the presence of VOCs and petroleum hydrocarbons within the shallow soils of the fill unit, little contamination has been detected in the shallow ground water. The pavement which covers the majority of the site is preventing the infiltration of rainwater from the surface, thus inhibiting the migration of contaminants from the soil matrix into the ground water.

Analytical results of ground water samples collected from site monitoring wells indicate that the TPHCs detected in the shallow aquifer were found only in the two upgradient background wells. Because these areas of the site have not been used for site operations, and given the proximity of these wells to other industrial establishments, the occurrence of petroleum hydrocarbons is believed to be caused by an off-site source.

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Volatile organic compounds at levels in excess of the informal ECRA cleanup guidelines were detected in only four of 19 shallow wells (MW7, MW10, MW11, MW13). Toluene and/or ethylbenzene were generally the detected constituents of concern, although low levels of benzene were occasionally reported. The concentrations of toluene are typically greater than ethylbenzene, which is consistent with the partition coefficients for these two compounds. Except for MW10, the concentrations of total VOCs in the ground water are relatively low. Based on the results of soil samples collected from MW10 and MW13, it appears that the contamination in these two monitoring wells is related to localized soil contamination. VOCs were detected in MW7 and MW11 at levels exceeding ECRA informal guidelines during the March 1988 additional sampling. This contamination could be due to activities in AEC 26 or to migration from off-site sources of contamination.

Results of the Phase II Sampling Plan indicate that the underground flume serves as the discharge point for much of the shallow ground water, although a component of flow is toward the area of the site where the on-site storm sewer conduit penetrates the breakwall adjacent to Newark Bay. As previously stated, levels of VOCs in the shallow ground water were detected in localized areas of the site and were not detected in Phase II wells installed in downgradient portions of the site. Although full plume definition is currently unknown, it is assumed that the underground flume is the likely discharge point for most constituents that have entered the ground water.

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E. Deep Aquifer

The analytical results of ground water samples collected from wells monitoring the deeper aquifer indicate that the deep ground water beneath the site has not been affected by site activities. No contamination has been detected in samples from either of the two upgradient background wells. Trace levels of VOCs were reported in one downgradient deep well (MW22) during the Phase I sampling activities. The presence of VOCs, however, was not detected during subsequent sampling rounds. During Phase II sampling, a low level of lead was detected in MW22 and a low level of TPHC was detected in MW26. The lead level is believed to be due to field acidification and the TPHC contamination probably results from the tidal influence of Newark Bay. A low level of selenium was also detected in the ground water sample from MW22 during implementation of the March 1988 additional sampling. Similar levels of this metal were detected in a sample from Newark Bay. This suggests that the bay is the most likely source for selenium, especially given that the deep aquifer is tidally influenced.

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VII. REMEDIATION STRATEGY/PART I CLEANUP PLAN

A. Introduction

As presented in preceding sections of this report, several classes of constituents are present in soil and ground water at concentrations exceeding informal ECRA cleanup guidelines. These guidelines are used by the NJDEP as "action levels" to determine where cleanup may be necessary at ECRA sites. However, comparisons of analytical results to the informal ECRA cleanup guidelines do not alone establish whether or not soil or ground water cleanup is actually necessary. Under ECRA, such a decision must take into account the need to protect public health and the environment, as well as other factors, including the origin of the contaminants and surrounding ambient conditions. In fact, the ECRA statute (see N.J.S.A. 13:1K-10.a) and regulations specifically address the need to establish cleanup standards that consider both protection of public health and the environment and other relevant factors:

> The Department shall review, approve or disapprove negative declarations and cleanup plans on a case-by-case basis for soil, ground water and surface water quality necessary for cleanup of an industrial establishment, including buildings and equipment, to ensure that the potential for harm to public health and the environment is minimized to the maximum extent practicable, taking

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into consideration the location of the industrial establishment, surrounding ambient conditions, and other relevant factors. (N.J.A.C. 7:26 B-11.1; emphasis added.)

Consistent with the ECRA regulations, in determining if cleanup is necessary, ENVIRON has considered several relevant factors, including the nature of contamination attributable to site-specific background levels within the fill unit, former site activities and operations, off-site sources of contamination, and potential health and environmental risks of constituents found at the Spencer Kellogg facility. Results of this evaluation indicate that, at a minimum, the continued operation of the facility with the existing levels of constituents in soil and ground water does not threaten public health or the environment and therefore extensive remediation of the site is not warranted. However, because VOCs have leached into the site's ground water and because VOCs in the soil are largely the result of past site operations, Textron proposes to evaluate the use of in situ soil remediation for reducing the level of VOCs in the soil. (Although Textron is not proposing a remediation program specifically to address TPHCs, Textron notes that the in situ biodegradation program it is proposing to evaluate to address VOCs should also be quite effective in dealing with the non-petroleum based hydrocarbons and the petroleum hydrocarbons at the site.)

Textron will implement this remediation program if it can be applied in a cost-effective manner without disrupting the ongoing activities at this industrial site. Should in situ remediation prove impracticable,

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Textron will propose a different remediation approach or demonstrate more fully why extensive remediation is not warranted. To be considered, alternative remedial approaches would also have to be cost-effective and non-disruptive of ongoing site activities.

Presented below is a more detailed explanation of the proposed cleanup approach and a description of the phased approach ENVIRON proposes for studying the feasibility of in situ bioremediation of contaminated soil at the Spencer Kellogg site.

B. Evaluating the Need for Cleanup

1. General

As noted above, a number of relevant factors were considered in determining the need for remediation of soil and ground water at the site. The specific evaluative criteria included: 1) the nature of any contamination resulting from activities and operations when the facility was owned by Textron; 2) the nature and concentrations of chemical constituents associated with the fill materials; 3) the nature of contamination caused by off-site sources; 4) surrounding ambient conditions; and 5) whether existing levels of constituents pose an unacceptable health and environmental risk. Presented below is a discussion of these criteria as they apply to constituents detected in soil and ground water.

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2. Soil

An evaluation of soils data indicates that PPMs, TPHCs, and VOCs are present in broad areas of the site at levels above the informal ECRA cleanup guidelines. BNs or PAHs were also detected at a few sampling locations.

The presence of PPMs in the soil is believed to have resulted from on-site fill materials rather than past industrial activities because none of the metals detected is known to have been used during the operating history of the site. In addition, the variability of metal concentrations and noted increases of metal concentrations with depth at several sampling locations are indicative of heterogeneous fill material rather than the effect of site operations. The occurrence of PPMs is virtually limited to the central and eastern portions of the site, areas where distinct fill material was apparently emplaced. For these reasons, Textron believes that any cleanup activity should not include PPMs in soils.

Like PPMs, TPHCs appear to be present in the fill material. However, unlike PPMs, the past use and handling of raw materials, products and wastes appears to have contributed to the levels of TPHCs found in soil. In a number of cases, a significant portion of what was originally reported as TPHC contamination is attributable to the presence of non-hazardous fish and vegetable oils. These materials do not warrant remediation because they are non-hazardous and are not ECRA-listed hazardous substances.

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Despite the presence of TPHCs in soils, Textron does not believe remediation of TPHCs is necessary.* This conclusion is largely based on the observation that TPHCs are not leaching from the fill material into the shallow ground water. Concentrations of TPHCs in excess of informal ECRA cleanup guidelines were detected in only two monitoring wells, both upgradient background wells. The presence of TPHCs in these wells is related to off-site sources because these wells are located in areas unaffected by past site activities and immediately adjacent to upgradient industrial establishments known to use or handle petroleum hydrocarbons.

Total BNs or PAHs were detected at concentrations exceeding the informal ECRA cleanup guidelines in a few soil samples. The concentration of each of the individual compounds was relatively low. The source of these constituents at some sampling locations may be related to the presence of TPHCs, although the occurrence of total BNs or PAHs in other areas, where no apparent source exists, suggests that they are associated with the fill material. As with TPHCs, Textron does not believe that remediation is necessary because neither BNs nor PAHs have been detected in the ground water.**

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* Although Textron is not proposing a remediation program specifically to address TPHCs, Textron notes that the in situ biodegradation program it is proposing to evaluate to address VOCs should also be effective in dealing with the non-petroleum based hydrocarbons and the petroleum hydrocarbons at the site.

** Although Textron is not proposing a remediation program specifically to address BNs and PAHs, Textron notes that the in situ biodegradation program it is proposing to evaluate to address VOCs should also be effective in dealing with the BNs and the PAHs at the site.

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VOCs, particularly ethylbenzene and toluene, appear to have been introduced into the soil of the fill unit in certain areas of the site by historical industrial operations and activities at the facility. In general, the presence and relative concentrations of these compounds are consistent with known and suspected uses in certain AECs. VOCs have been detected in the shallow ground water in localized areas of the site, although the level of these constituents are typically within the parts per billion (ppb) range. These results suggest that the shallow ground water has been affected by soils contaminated with VOCs. However, as discussed below, modeling of the shallow ground water indicates that current VOC levels in the shallow ground water pose no environmental or public health risk at the nearest receptor boundary (Newark Bay).

3. Shallow Ground Water

As described above, the presence of TPHCs, PPMs and BNs in shallow soils has had little or no impact on the quality of shallow ground water. TPHCs at levels slightly above informal ECRA cleanup guidelines are present in the upgradient wells and are attributable to off-site sources. With one exception, the only dissolved PPM detected at levels above the informal ECRA cleanup guideline is selenium, the source of which is apparently Newark Bay. BNs have never been detected in ground water. VOCs detected in the shallow ground water are for the most part likely related to contaminated on-site soils, but the impact appears to be limited in areal extent.

In determining the need for additional investigation and/or shallow ground water remediation, mathematical analyses were performed to evaluate the potential migration of VOC contamination in the shallow aquifer. The analyses were based on hydrogeologic and analytical data collected from November 1986 to March 1988. Utilizing an analytical contaminant transport model, toluene concentrations in the ground water at downgradient discharge locations were simulated. Toluene was selected for the modeling because this VOC compound was detected in the highest concentrations observed at the site. The results indicate that the toluene concentration at the nearest receptor boundary (Newark Bay) would be insignificant and pose no risk to public health or the environment. Therefore, ENVIRON and Textron believe that additional characterization or remediation of the shallow ground water is not required. A description of the analytical model, assumptions used, and calculations are provided in Appendix H.

In addition, if ground water remediation were demonstrated to be necessary, traditional pump and treat methods would be inappropriate due to off-site sources of contamination and the extensive tidal influence of Newark Bay. Pumping the ground water would only create a sink, drawing additional constituents to the site. Moreover, the source of VOCs affecting the shallow ground water should be extensively reduced if the in situ soil treatment methodology that will be evaluated proves to be a cost-effective method of VOC treatment.

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4. Deep Aquifer

As previously outlined in Section VI, the analytical results of samples from wells monitoring the deep aquifer indicate that the deeper transmissive zone is not contaminated. Lead and VOCs were detected in MW22 but this contamination was noted in only one of three sampling rounds. A number of factors could have caused this incidental detection of lead and VOCs (field acidification of samples, tidal influence of Newark Bay, contamination during well construction, etc.), but none are linked to past industrial operations at the site. Therefore, no additional investigation or remedial action with respect to the deep aquifer is required.

C. Proposed Potential Cleanup Methodology

1. General

As noted above, ENVIRON and Textron believe that continued operation of the Spencer Kellogg facility with the levels of constituents found in soil and shallow ground water does not threaten public health or the environment. Moreover, a portion of the soil contamination, particularly the PPMs, is attributable to the nature of the fill material. Similarly, TPHCs and dissolved PPMs detected in shallow ground water come from off-site industrial activities or Newark Bay. For these reasons, Textron does not believe that extensive remediation of the site is necessary.

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Textron does recognize, however, that some of the soil contamination, particularly the VOCs, can be linked to historical on-site industrial activities. In addition, the ground water data show that the VOCs are leaching into the shallow ground water in a limited portion of the site. Accordingly, although ground water fate and transport modeling indicates that the VOCs in the shallow ground water pose no threat to public health or the environment at the nearest receptor boundary (Newark Bay), Textron believes that it is appropriate to evaluate the technical feasibility and cost-effectiveness of an in situ soil remediation program for VOCs. Although the primary goal of this program would be to address the VOC soil contamination, an additional benefit would include a reduction in the VOCs entering the shallow ground water and probable reductions of TPHCs, non-hazardous fish and vegetable oils, and BNs in the soil. For these reasons, Textron proposes to explore the technical feasibility and cost-effectiveness of a soil remediation program for VOCs utilizing in situ treatment.

2. Screening and Evaluation of In Situ Biodegradation

This section describes the approach ENVIRON proposes for evaluating the technical feasibility and effectiveness of in situ biodegradation of contaminated soils. In situ biodegradation involves the injection of nutrients and oxygen into the subsurface to

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stimulate the growth of naturally occurring microorganisms. Under aerobic conditions, the microorganisms can utilize hydrocarbons as an energy source, metabolizing them to carbon dioxide and water.

The treatment goal is the reduction of VOCs to the maximum extent possible in a cost-effective manner without disrupting activities at the site. Although significant reductions are anticipated, the exact reductions achievable are currently unknown because the potential treatment is innovative and depends on site-specific factors. These factors include the type of indigenous bacteria present in site soils, the rate of biodegradability, moisture content of the soil, soil texture, pH and nutrient availability.

A phased approach will be necessary for studying this bioremediation program. During Phase I, parameters critical to the proper design and successful implementation of a remedial program, including the physical and chemical properties of the soil must be determined. These factors not only influence the broad remedial strategy, but also the selection of specific treatment, methods and levels of engineering parameters (e.g., nutrient dose and frequency of application) required. Accordingly, Phase I will involve initial testing at a bench-scale level with soils procured from the site. Phase II will consist of a field demonstration study to determine the most effective method for moving nutrients and/or oxygen through the soil. Phase III will be a pilot-scale test and Phase IV, if Phases I through III demonstrate that in situ bioremediation is a technically

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feasible and cost-effective remedy for VOC soil contamination at this site, will set forth the final remedial design and schedule for Part II Cleanup Plan implementation.

This phased approach will permit Textron the flexibility necessary to evaluate after each step the technical feasibility and cost-effectiveness of the in situ treatment program. In this way, if after any phase it becomes apparent that in situ treatment is not a practical remediation technique for this site, Textron will be able to change course. Textron would then propose a different remediation approach consistent with the goals of cost-effectiveness and minimal site disruption or demonstrate more fully why extensive remediation is not warranted for protecting public health or the environment at the Spencer Kellogg site.

a) Phase I: Bench-Scale Treatability Study

ENVIRON will select a subcontractor with experience in remediating sites similar to the Spencer Kellogg site to conduct a bench-scale treatability study of in situ biodegradation. Under ENVIRON's supervision, the subcontractor will review the existing site data and collect representative soil samples to evaluate on-site treatment. The major tasks associated with the laboratory testing include:

- Screening for indigenous bacterial populations;
- Screening for metal content to assess potential bioinhibitory effects of metals; and

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- Testing degradation rates utilizing sterile samples, samples with bacterial populations, and distinct nutrient blends.

Results of the bench-scale tests will be used to evaluate the practicality of implementing this technology.

b) Phase II: Field Demonstration Study

If the results of Phase I are encouraging and in situ biodegradation appears to offer a feasible and cost-effective method of remediation, ENVIRON will conduct a field demonstration study. This study will be conducted subsequent to the laboratory work to determine the method of nutrient introduction and dispersement. Evaluation of nutrient transport techniques are critical to determine the practicality of this in situ remedial method. The specific types of nutrient introduction and dispersement methodologies that may be field tested include the use of:

- Individual wells;
- Excavating strips and utilizing perforated pipes (e.g., trenching); and
- Drilling holes through the pavement.

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c) Phase III: Pilot-Scale Testing

If the results of the Phase I and Phase II studies indicate that in situ biodegradation may be practical, a pilot-scale test will be designed to demonstrate the effectiveness of the most appropriate treatment solution and dispersion methodology. Information obtained during this phase will be critical for optimizing the final remediation design (sizing, chemical requirements, time required) and will be necessary to develop an accurate cost estimate for a final cleanup plan as required under ECRA.

d) Phase IV: Design and Implementation of the Selected Remediation Technology

If the results of the first three phases indicate that in situ biodegradation will be a technically feasible and cost-effective method of remediating the site without causing disruption of current site operations, a recommended Part II Cleanup Plan will be developed and submitted to the NJDEP for final approval. The final plan will describe the remedial design selected for the site, set forth an implementation schedule and propose the cleanup levels to be achieved based on the results of Phases I, II, and III. As required under ECRA, a schedule of activities for completion of the cleanup, and an accurate and detailed cost estimate will be provided as part of

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the final cleanup plan. In addition, the final cleanup plan will provide details of soil (and possible ground water) monitoring to the extent deemed necessary.

e) Schedule

The Phase I laboratory studies are estimated to take two to three months to complete from the date of NJDEP approval of this phased cleanup proposal. The field demonstration tests of Phase II will require an additional two to three months to complete. The pilot-scale test of Phase III will likely require another six to eight months to complete.

845030994

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX A

Informal ECRA Cleanup Guidelines in Soil and Ground Water

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Informal ECRA Cleanup Guidelines in Soil and Ground Water

Parameter	Soil	Ground Water
Total Petroleum Hydrocarbons (TPHCs)	100 ppm	1,000 ppb
Priority Pollutants:		
Acid Extractable Organics (AEs)	Case-by-case	50 ppb
Base/Neutral Extractable Organics (BNs)	10 ppm	50 ppb
Pesticides	Case-by-case	Case-by-case
Polychlorinated Biphenyls (PCBs)	1-5 ppm	0.001 ppb
Volatile Organics (VOCs)	1 ppm	10 ppb
Phenols	Case-by-case	3,500 ppb
Cyanide (CN)	12 ppm	200 ppb
Priority Pollutant Metals (PPMs)		
Antimony (Sb)	2 ppm	--
Arsenic (As)	20 ppm	50 ppb
Beryllium (Be)	1 ppm	-- ppb
Cadmium (Cd)	3 ppm	10 ppb
Chromium (Cr)	100 ppm	50 ppb
Copper (Cu)	170 ppm	1,000 ppb
Lead (Pb)	250 ppm	50 ppb
Nickel (Ni)	100 ppm	--
Mercury (Hg)	1 ppm	2 ppb
Selenium (Se)	4 ppm	10 ppb
Silver (Ag)	5 ppm	50 ppb
Thallium (Th)	5 ppm	--
Zinc (Zn)	350 ppm	5,000 ppb
Polycyclic Aromatic Hydrocarbons (PAHs)	10 ppm	50 ppb
Dioxins	NA	NA
Furans	NA	NA

ppm: Parts per million (mg/kg)
ppb: Parts per billion (ug/l)
--: Indicates no cleanup level was found in NJAC 7:9-6.6
NA: Not available

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ECRA Case No. 85403

APPENDIX B

Boring Logs

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 001

Geologic Log

0.0' - 2.0'	Black-grey sandy and silty fill material
2.0' - 4.0'	Fill material is similar to the 0-2' interval, though saturated. Oil is found throughout sample.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	13,15,18,8	Fair
2	2-4'	7,5,4,3	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-001-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 002

Geologic Log

0.0' - 2.0'	Black sandy fill material.
2.0' - 4.0'	Black sandy fill material.
	Water encountered at 3.0'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	16,22,31,16	Good
2	2-4'	11,10,7,3	Good

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-002-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-1'
288E-002-02	11/16/87	Priority Pollutant Metals	2-3'

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 003

Geologic Log

0.0' - 0.5'	Asphalt.
0.5' - 2.0'	Oily layer approximately 1 inch thick. Sandy fill material containing some terra cotta tile fragments.
2.0' - 4.0'	Saturated sandy fill material.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	13,15,14,13	Fair
2	2-4'	13,15,11,5	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-003-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0.5-2.0'

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 004

Geologic Log

0.0' - 2.0'	White sand with black sandy fill material. Red clay with brick fragments mixed throughout.
2.0' - 4.0'	Black sandy fill material. Water encountered at 3.8'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	19,8,5,5	Fair
2	2-4'	8,5,5,8	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-004-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-004-02	11/13/87	Priority Pollutant Metals	2-3.8'

845031001

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 005

Geologic Log

0.0' - 2.0'	Fine grained black sandy and silty fill material with rock clasts and pebbles.
2.0' - 4.0'	Black sandy gravel-rich fill material. Water encountered at 3.6'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	11,6,6,3	Fair
2	2-4'	13,19,51,27	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-005-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-005-02	11/13/87	Priority Pollutant Metals	2-3.6'

845031002

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 304

Geologic Log

0.0' - 2.0'	Black-grey sandy oily fill material. Water encountered at 0.5'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	10,13,10,13	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-304-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

845031003

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 305

Geologic Log

0.0' - 2.0'	Black sandy fill material with coal slag and pebbles.
2.0' - 4.0'	Saturated black, sandy, oily fill material. Large wood chunks encountered.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	21,13,10,9	Fair
2	2-4'	12,13,13,4	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-305-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

845031004

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 403

Geologic Log

0.0' - 0.5'	Black sandy fill material containing gravel and resinous material.
0.5' - 1.5'	Moist black sandy fill material.

Drilling Specifications

Drilling Method:	Hand Augered Boring
Drilling Rig:	None
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 17, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
NA	-	-	-

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-403-01	11/17/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-0.5'
288E-403-02	11/17/87	Priority Pollutant Metals	0.5-1.5'

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1002

Geologic Log

0.0' - 2.0'	Black fill material with white sand and gravel.
2.0' - 3.4'	Black sandy fill material with gravel similar to 0-2' interval, though no white sand. Concrete fragments encountered.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	31,9,7,3	Fair
2	2-3.4'	15,18,100/3	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1002-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-1002-02	11/16/87	Priority Pollutant Metals	2-3.4"

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1304

Geologic Log

0.0' - 2.0'	Mostly gravel in a sandy fill material.
2.0' - 4.0'	Gravelly sandy fill material.
	Water encountered at 2.2'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	22,18,11,6	Poor
2	2-4'	3,4,4,2	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1304-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0 - 2'

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Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1404

Geologic Log

0.0' - 2.0'	Black sandy fill with some gravel. Oily.
2.0' - 4.0'	Similar to above; no gravel.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	26,16,9,6	Fair
2	2-4'	9,6,3,2	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1404-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

845031008

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1505

Geologic Log

0.0' - 2.0'	Black-grey sandy and silty fill material with 1" band of oil-like material.
2.0' - 4.0'	Saturated black-grey sandy and silty fill material.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	17,19,25,23	Poor
2	2-4'	15,16,17,7	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1505-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

845031009

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1604

Geologic Log

0.0' - 2.0'	Black-grey sandy and silty fill material. Oil-stained.
2.0' - 4.0'	Saturated oily fill material. Oil content appears to increase with depth. Water encountered at 2.4'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 10, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	6,7,11,9	Fair
2	2-4'	4,4,3,4	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1604-01	11/10/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

845031010

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1704

Geologic Log

0.0' - 2.0'	Black sandy and silty fill material.
2.0' - 4.0'	Black saturated gravelly fill material.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	18,8,3,4	Fair
2	2-4'	3,4,3,1	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1704-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

845031011

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 1705

Geologic Log

0.0' - 2.0'	Very compact black sandy and silty fill material white rock fragments present.
2.0' - 4.0'	Saturated fill material. Oily. Water encountered at 2.5'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	36,38,51,64	Good
2	2-4'	31,16,12,13	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-1705-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

845031012

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 2104

Geologic Log

0.0' - 1.0'	Concrete and asphalt.
1.0' - 2.0'	Sandy black fill material.
2.0' - 4.0'	Saturated sandy black fill material. Oily.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	7,3,2,1	Poor
2	2-4'	4,6,5,4	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-2104-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	1-2'

845031013

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 2302

Geologic Log

0.0' - 2.0'	Black sandy fill material with some red brick fragments.
2.0' - 4.0'	Black sandy fill material.
	Water encountered at approximately 3.5'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	10,11,4,5	Poor
2	2-4'	4,3,3,4	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-2302-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-2302-02	11/16/87	Priority Pollutant Metals	2-3.5'

845031014

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Boring No. 2502

Geologic Log

0.0' - 2.0'	Black sandy fill material with some coal slag.
2.0' - 4.0'	Black sandy fill material.
	Water encountered at 2.8'.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Drilling Rig:	CME 550
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 16, 1987
Plugging Material:	Cement-bentonite grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	6,5,5,5	Fair
2	2-4'	12,10,10,10	Poor

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-2502-01	11/16/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'

845031015

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX C

Well Specifications

845031016

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 12
Permit No. 2611924-2

Geologic Log

0.0' - 2.0'	Brown fill with brick fragments. Water encountered at 4'.
8.0' - 10.0'	Silty clay, poorly decomposed roots.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	8.0' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	8.0' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	18,18,11,8	10"
2	2-4'	18,38,8,7	6"
3	5-7'	1,1,0,0	None
4	8-10'	weight of driller	Fair

845031017

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 12 (Continued)
Permit No. 2611924-2

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW12-01	11/12/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW12-21	11/12/87	Priority Pollutant Metals	0-2'
288E-MW12-02	11/12/87	Priority Pollutant Metals	2-4'
288E-MW12-GW01	12/9/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

845031018

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 13
Permit No. 2611925-1

Geologic Log

0.0' - 2.0'	Brown-grey silty fill material.
5.0' - 7.0'	Black-grey silty fill material with gravel.
7.0' - 9.0'	Loosely packed black-grey silty fill material.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	7.0' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	7.0' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	14,11,6,6	Fair
2	5-7'	6,4,5,7	6"
3	7-9'	Weight of driller	4"

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW13-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW13-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

845031019

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 14
Permit No. 2611922-6

Geologic Log

0.0' - 2.0'	Unconsolidated black fill material.
2.0' - 4.0'	Brown-grey fill material with gravel.
5.0' - 7.0'	Fill material with gravel.
8.0' - 10.0'	Grey clay with poorly decomposed grass.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	8.0' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	8.0' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	6,4,5,5	9"
2	2-4'	5,3,3,4	14"
3	5-7'	28,21,12,9	18"
4	8-10'	Weight of driller	20"

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW14-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW14-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

845031020

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 15
Permit No. 2611921-8

Geologic Log

0.0' - 0.5'	Dark grey to black loose silty fill material.
2.0' - 4.0'	Brown-grey fill material.
	Water encountered at approximately 2.5'.
5.0' - 7.0'	Loose gravel and brown to grey fill material.
8.0' - 10.0'	Clay containing decomposed grass.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	8.0' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	8.0' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	6,37,15,11	14"
2	2-4'	13,17,19,11	14"
3	5-7'	1,3,6,17	Fair
4	8-10'	1,1,1,1	Good

845031021

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 15 (Continued)
Permit No. 2611921-8

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW15-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW15-02	11/11/87	Priority Pollutant Metals	2-4'
288E-MW15-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide VOC+15	NA
288E-MW15-GW02	12/8/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

845031022

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 16
Permit No. 2611916-1

Geologic Log

0.0' - 2.0'	Brown sandy fill material.
2.0' - 4.0'	Over-saturated brown sandy fill material.
5.0' - 7.0'	Peat and clay.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	5.5' bgs - 2.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	2.5' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	5.5' bgs - 2.0' bgs	No. 1 well sand	---	-----
Bentonite seal	2.0' bgs - 1.0' bgs	Bentonite pellets	---	-----
Grout	1.0' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	7,9,19,21	Fair
2	2-4'	29,41,100/5	Fair
3	5-7'	Weight of hammer	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW16-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW16-21	11/13/87	Priority Pollutant Metals	0-2'
288E-MW16-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide VOC+15	NA

845031023

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 17
Permit No. 2611918-8

Geologic Log

0.0' - 2.0'	Black, sandy fill material.
2.0' - 4.0'	Moist black sandy fill material.
5.0' - 7.0'	Grey clay with peat.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	5.5' bgs - 2.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	2.5' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	5.5' bgs - 2.0' bgs	No. 1 well sand	---	-----
Bentonite seal	2.0' bgs - 1.0' bgs	Bentonite pellets	---	-----
Grout	1.0' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	13,19,100/2	Fair
2	2-4'	1,3,6,2	None
3	5-7'	Weight of driller	2"

845031024

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 17 (Continued)
Permit No. 2611918-8

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW17-01	11/13/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW17-02	11/13/87	Priority Pollutant Metals	2-4'
288E-MW17-GW01	12/9/87	Priority Pollutant Metals, TPHC, Cyanide VOC+15	NA

845031025

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 18
Permit No. 2611926-9

Geologic Log

0.0' - 2.0'	Black, oily fill material.
2.0' - 4.0'	Black, oily fill material.
5.0' - 7.0'	Poorly compacted, black oily fill material.
8.0' - 10.0'	Poorly compacted fill material.
10.0' - 12.0'	Grey to black silty clay.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	10' bgs - 3.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	3.0' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	10' bgs - 2.5' bgs	No. 1 well sand	---	-----
Bentonite seal	2.5' bgs - 1.5' bgs	Bentonite pellets	---	-----
Grout	1.5' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	2,3,3,2	6"
2	2-4'	6,3,3,1	4"
3	5-7'	7,12,3,1	4"
4	8-10'	Weight of driller	3"
5	10-12'	Weight of driller	24"

845031026

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 18 (Continued)
Permit No. 2611926-9

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW18-01	11/12/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW18-21	11/12/87	Priority Pollutant Metals	0-2'
288E-MW18-GW01	12/8/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

845031027

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 19
Permit No. 2611917-0

Geologic Log

0.0' - 2.0'	Crushed terra cotta brick in a silty fill matrix.
5.0' - 7.0'	Grey clay.
7.0' - 9.0'	Grey clay.

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 550
Well Driller/License Number:	Jon Yeaton #1415
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	5.5' bgs - 2.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	2.5' bgs - 1.5' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.0' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	5.5' bgs - 2.0' bgs	No. 1 well sand	---	-----
Bentonite seal	2.0' bgs - 1.0' bgs	Bentonite Pellets	---	-----
Grout	1.0' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	17,5,1,6	6"
2	5-7'	Weight of driller	20"
3	7-9'	Weight of driller	24"

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW19-01	11/12/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW19-GW01	12/9/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

845031028

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 24
Permit No. 2611920-0

Geologic Log

0.0' - 2.0'	Black sandy fill material.
2.0' - 4.0'	Sandy fill; similar to 0-2' interval. Water encountered at approximately 2.5'.
7.0' - 8.0'	Peat layer with some clay intermixed.
8.0' - 10.0'	Solid grey clay, no peat.
12.0' - 14.0'	Grey clay.
20.0' - 22.0'	Dark green-black to black silty clay. Wood fragments present.
28.0' - 29.0'	Black silty clay.
29.0' - 30.0'	Fine to medium-grained sand.
33.0' - 35.0'	Coarse grey sand. Increased gravel content.
38.0' - 40.0'	Dark grey, fine to medium-grained saturated sand. Reddish-brown gravel between 39.3 - 39.7 feet.
40.0' - 42.0'	Reddish brown clay, sandy from 40-41 feet.

Drilling Specifications

Drilling Method:	Hollow Stem Auger Boring/Mud Rotary
Rig:	CME 750
Well Driller/License Number:	Rick Empson #1312
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987; November 13, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	40' bgs - 30' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	30' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	40' bgs - 28' bgs	No. 1 well sand	---	-----
Bentonite seal	28' bgs - 25' bgs	Bentonite pellets	---	-----
Grout	25' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

845031029

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 24 (Continued)
Permit No. 2611920-0

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0-2'	7,9,50/2	Fair
2	2-4'	10,6,4,3	Fair
3	4-6'	1,1,1,1	Fair
4	8-10'	1,1,1,1	Fair
5	12-14'	Weight of driller	Fair
6	28-30'	6,9,12,13	Fair
7	33-35'	21,10,9,9	Fair
8	38-40'	9,12,10,10	Fair
9	40-42'	Weight of driller	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW24-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW24-GW01	12/10/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

845031030

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 25
Permit No. 2611923-4

Geologic Log

0.0' - 8.0'	Sandy, gravelly fill material.
20.0' - 22.0'	Dark grey to greenish gray silty clay with plant fragments.
28.0' - 30.0'	Fine to medium-grained sand; brown to reddish brown clay at 28.0-28.3'.
38.0' - 40.0'	Coarse grained sand and gravel. Clay encountered at 40 feet.

Drilling Specifications

Drilling Method:	Mud Rotary
Rig:	CME 750
Well Driller/License Number:	Rick Empson #1312
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 11, 1987; November 13, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	40' bgs - 28' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	28' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	40' bgs - 27' bgs	No. 1 well sand	---	-----
Bentonite seal	27' bgs - 25' bgs	Bentonite pellets	---	-----
Grout	25' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0- 8'	10,7,5,1	Fair
2	20-22'	1,1,3,5	Fair
3	28-30'	8,15,15,17	Fair
4	38-40'	6,10,15,12	Fair

845031031

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 25 (Continued)
Permit No. 2611923-4

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW25-01	11/11/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW25-GW01	12/10/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA
288E-MW25-GW02	12/10/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

845031032

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 26
Permit No. 2611919-6

Geologic Log

0.0' - 2.0'	Gravelly dark black sand with wood fragments.
2.0' - 4.0'	Similar to 0-2' interval with increased moisture content.
4.0' - 6.0'	Very black fill material, peat and clay 6.0'.
6.0' - 8.0'	Dark green to black silty clay.
20.0' - 22.0'	Silty grey clay with shell and grass fragments.
25.0' - 27.0'	Grey silty clay.
30.0' - 32.0'	Wet medium-grey/green sand with quartz chunks.
38.0' - 40.0'	Gravel at top of sample, grading into clay toward bottom of sample.

Drilling Specifications

Drilling Method:	Hollow Stem Auger Boring/Mud Rotary
Rig:	CME 750
Well Driller/License Number:	Rick Empson #1312
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12, 1987, November 16, 1987

Monitoring Well Specifications

	Depth*	Material Type	Diameter	Cap
Well Screen	40' bgs - 30' bgs	PVC No. 10 slot	4 in.	PVC end cap
Well Casing	30' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	1.0' bgs - 2.5' ags	Steel Schedule 188	8 in.	Steel locking cap
Sand pack	40' bgs - 29' bgs	No. 1 well sand	---	-----
Bentonite seal	29' bgs - 27' bgs	Bentonite Pellets	---	-----
Grout	27' bgs - 0.5' ags	Cement-Bentonite mix	---	-----

* bgs = below ground surface, ags = above ground surface

845031033

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Monitoring Well No. 26 (Continued)
Permit No. 2611919-6

Split Spoons

Split Spoon No.	Depth	Blow Counts	Recovery
1	0- 2'	4,10,16,18	Fair
2	2- 4'	16,3,2,10	Fair
3	20-22'	Weight of driller	Fair
4	25-27'	Weight of driller	Fair
5	30-32'	11,7,9,14	Fair
6	38-40'	3,4,4,8	Fair

Samples Collected

Sample ID No.	Date	Analyses	Depth
288E-MW26-01	11/12/87	Priority Pollutant Metals, Fingerprinted for Petroleum Hydrocarbons	0-2'
288E-MW26-21	11/12/87	Priority Pollutant Metals	0-2'
288E-MW26-02	11/12/87	Priority Pollutant Metals	2-4'
288E-MW26-GW01	12/10/87	Priority Pollutant Metals, TPHC, Cyanide, VOC+15	NA

845031034

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX D

Summary of Well Data

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Number	Permit Number	A Ground Surface Elevation (ft amsl)	B Inner Casing Elevation (ft amsl)	C Outer Casing Elevation (ft amsl)	D Total Depth (feet)
1	2609839	5.40	7.72	8.20	6.10
2	2609840	6.01	7.92	8.15	10.51
3	2609841	6.62	6.24	6.62	6.33
4	2609842	6.56	5.83	6.56	7.48
5	2609843	6.33	7.67	8.53	8.73
6	2609844	6.48	8.80	9.25	6.75
7	2609845	5.28	7.44	7.69	12.74
8	2609846	5.89	5.62	5.89	10.64
9	2609847	6.46	8.76	8.94	12.82
10	2609848	6.94	9.08	9.40	8.10
11	2609849	6.35	8.61	9.00	10.96
12	2611924	6.76	9.16	9.29	7.71
13	2611925	6.85	8.85	9.18	7.15
14	2611922	6.68	9.03	9.13	7.55
15	2611921	6.81	9.04	9.14	7.96
16	2611916	5.22	7.29	7.38	4.79
17	2611918	4.60	6.64	6.80	4.30
18	2611926	5.41	7.42	8.08	8.99
19	2611917	6.11	8.00	8.63	4.22
21	2609851	5.94	8.32	8.48	45.83
22	2609852	5.88	5.43	5.88	41.67
23	2609850	5.48	7.53	7.81	39.92
24	2611920	6.93	9.03	9.23	39.06
25	2611923	6.11	7.83	8.01	39.58
26	2611919	6.61	6.43	6.61	36.90

ft amsl = feet above mean sea level

845031036

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX E

Well Sampling Data

845031037

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 1

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 6.7 (4 gallons), pumped dry three times

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	14:40	12.5	6.95	360
12/9/87	14:45	12.5	7.04	500
12/9/87	14:55	12.5	6.93	500
12/9/87	15:03	12.5	7.00	500

845031038

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 2

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	13:39	13.0	6.91	750
12/9/87	13:45	12.5	6.93	750
12/9/87	13:53	12.5	6.90	600
12/9/87	13:58	12.5	6.80	600
12/9/87	14:03	12.5	6.80	600

845031039

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 3

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.5 (7 gallons)

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	12:11	12.5	6.68	1300
12/9/87	12:13	12.0	6.57	1200
12/9/87	12:16	12.0	6.58	1200
12/9/87	12:19	12.0	6.57	1200

845031040

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 4

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: dry after ~5 gallons

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	10:44	13.0	6.81	15400
12/9/87	10:49	14.0	6.60	15600

845031041

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 5

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 4.4

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	13:40	14.0	6.98	1600
12/8/87	13:45	14.0	6.80	1520
12/8/87	13:50	14.0	6.73	1400
12/8/87	13:55	14.0	6.68	1300
12/8/87	14:00	14.0	6.77	1200
12/8/87	14:05	14.0	6.75	1200
12/8/87	14:10	14.0	6.74	1160

845031042

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 6

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.5

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	14:41	13.0	6.67	900
12/8/87	14:46	13.0	6.63	920
12/8/87	14:52	13.0	6.58	940
12/8/87	15:03	13.0	6.58	950
12/8/87	15:10	13.0	6.55	950

845031043

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 7

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: dry after 2.6 (~ 10 gallons)

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	2:16	11.5	7.01	16100
12/8/87	2:25	12.0	7.08	15500
12/8/87	2:29	12.0	7.06	15500
12/8/87	2:34	12.0	7.05	15600
12/8/87	2:43	12.0	7.22	15500

845031044

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 8

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 1.4 (~ 10 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	12:07	13.0	6.48	12200
12/9/87	12:14	12.5	6.98	12450
12/9/87	12:25	13.0	7.05	12200

845031045

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 9

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	11:31	14.0	6.50	1350
12/8/87	11:37	14.0	6.37	1330
12/8/87	11:45	14.0	6.28	1280
12/8/87	11:53	14.0	6.28	1330
12/8/87	11:57	14.0	6.25	1330

845031046

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 10

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	10:35	12.0	6.60	780
12/9/87	10:40	12.0	6.66	750
12/9/87	10:45	12.0	6.70	750
12/9/87	10:50	12.0	6.65	750

845031047

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 11

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0 (9 gallons)

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	11:12	12.0	7.02	2600
12/9/87	11:19	12.0	6.99	2250
12/9/87	11:23	12.0	6.90	2250
12/9/87	11:26	12.0	6.87	2300
12/9/87	11:28	12.0	6.87	2300

845031048

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 12

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0 (7 gallons)

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	11:28	12.5	6.99	1470
12/9/87	11:32	12.0	6.84	1410
12/9/87	11:36	12.0	7.02	1420
12/9/87	11:40	12.0	7.04	1420

845031049

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 13

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.3

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	15:28	12.0	6.76	485
12/8/87	15:32	12.0	6.74	515
12/8/87	15:36	12.0	6.79	950
12/8/87	15:40	12.0	6.80	1000
12/9/87	15:44	12.0	6.80	1000
12/9/87	15:49	12.0	6.78	1000

845031050

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 14

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.5

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	12:25	12.0	6.66	262
12/8/87	12:33	12.0	6.76	280
12/8/87	12:38	12.0	6.88	282
12/8/87	12:41	12.0	6.90	290
12/8/87	12:46	12.0	6.88	290

845031051

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 15

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.4

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	11:32	12.5	6.96	600
12/8/87	11:40	12.5	6.83	600
12/8/87	11:45	12.0	6.84	720
12/8/87	11:48	12.0	6.83	720
12/8/87	11:53	12.0	6.80	720

845031052

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 16

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 1.5 (4 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	1:39	11.0	6.69	4000
12/8/87	1:42	11.0	6.77	4000
12/8/87	1:51	11.0	6.83	4250

845031053

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 17

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0 (~ 2.5 - 3.0 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	14:39	14.0	7.79	14400
12/9/87	14:42	9.0	7.80	11100
12/9/87	14:44	9.0	7.70	11100

845031054

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 18

Date: 12/8/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/8/87	12:22	13.5	6.57	1560
12/8/87	12:30	14.0	6.52	1590
12/8/87	12:40	14.0	6.55	1660
12/8/87	12:44	14.0	6.49	1700
12/8/87	12:48	14.0	6.49	1670
12/8/87	12:57	14.0	6.49	1660

845031055

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 19

Date: 12/9/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of well volumes purged: 1.2 (2 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/9/87	1:45	10.5	8.23	12800

845031056

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 21

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 1.1 (31 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	15:05	15.0	12.50	9900
12/10/87	15:11	15.0	7.96	9900
12/10/87	15:15	15.0	8.04	10500
12/10/87	15:20	15.0	11.30	10400

845031057

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 22

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 1 (22 gallons), pumped dry

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	10:55	14.0	7.24	8000
12/10/87	11:05	14.0	7.20	11000
12/10/87	11:11	14.0	7.20	11000

Note: Well was under pressure

845031058

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 23

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	14:23	16.0	7.88	10500
12/10/87	14:31	16.0	7.14	11000
12/10/87	14:36	15.0	6.87	12500
12/10/87	14:41	16.0	6.91	12000
12/10/87	14:46	16.0	6.90	12000

845031059

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 24

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	12:11	16.0	6.98	10000
12/10/87	12:20	14.5	6.64	11500
12/10/87	12:25	14.5	6.60	11500
12/10/87	12:30	15.0	6.62	11500

845031060

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 25

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	13:33	16.0	6.75	9000
12/10/87	13:40	16.0	6.59	11000
12/10/87	13:45	16.0	6.60	11800
12/10/87	13:50	16.0	6.57	11800

845031061

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

Well Sampling Data from Monitoring Well 26

Date: 12/10/87

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of well volumes purged: 3.0

Time elapsed between purge completion and sample collection: Within two hours

Parameters Monitored During Purging

Date	Time	Temperature (°C)	pH	Specific Conductivity (umhos)
12/10/87	11:29	15.0	6.68	9800
12/10/87	11:35	15.0	6.78	11000
12/10/87	11:45	15.0	6.60	11500
12/10/87	11:51	15.0	6.59	11500

845031062

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX F

Sampling Location Elevations and Coordinates

845031063

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

SAMPLING LOCATION	GROUND SURFACE ELEVATION (MSL)	COORDINATES NORTH	COORDINATES EAST
Boring 001	6.19	9,887.99	10,240.08
Boring 002	6.38	9,721.22	10,595.29
Boring 003	5.33	10,062.96	10,243.87
Boring 004	6.14	10,130.55	10,542.45
Boring 005	6.00	9,962.27	10,896.95
Boring 101	6.60	10,243.41	10,231.97
Boring 201	6.15	10,272.92	10,493.96
Boring 301	6.02	10,249.80	10,556.47
Boring 302	6.08	10,214.96	10,628.52
Boring 303	5.90	10,176.16	10,707.92
Boring 304	5.92	10,255.92	10,542.02
Boring 305	5.94	10,181.05	10,701.10
Boring 401	6.11	10,136.33	10,791.96
Boring 402	6.01	10,122.01	10,825.50
Boring 403	5.97	10,138.39	10,781.25
Boring 501	6.07	10,085.44	10,915.42
Boring 701	6.23	9,971.20	10,827.43
Boring 801	6.93	10,235.83	10,229.86
Boring 802	6.97	10,212.35	10,211.26
Boring 803	6.89	10,199.43	10,206.84
Boring 804	5.86	10,173.61	10,206.98
Boring 1001	7.06	10,122.28	10,365.86
Boring 1002	7.04	10,119.93	10,368.20
Boring 1301	5.85	9,981.16	10,214.24
Boring 1302	5.68	10,013.35	10,204.12
Boring 1303	5.90	9,972.42	10,182.76
Boring 1304	5.89	9.983.48	10,214.49
Boring 1401	5.51	9.954.40	10,333.64
Boring 1402	5.24	9,956.97	10,305.71
Boring 1403	5.97	9,931.78	10,351.43
Boring 1404	5.33	9,964.06	10,302.41
Boring 1501	5.48	9,940.31	10,269.95
Boring 1502	6.10	9,909.64	10,310.41
Boring 1503	6.10	9,893.00	10,266.06
Boring 1505	5.42	9,940.42	10,272.94
Boring 1601	5.94	9,958.26	10,394.15
Boring 1602	6.08	9,939.19	10,388.73
Boring 1604	6.20	9,959.91	10,411.63
Boring 1701	6.71	9,907.50	10,396.45
Boring 1702	6.45	9,891.84	10,348.60
Boring 1703	6.55	9,843.37	10,355.78
Boring 1704	6.85	9,905.27	10,395.80
Boring 1705	6.51	9,841.28	10,353.17
Boring 1801	6.54	9,755.62	10,504.51
Boring 1902	5.81	9,676.08	10,735.80

845031064

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

SAMPLING LOCATION	GROUND SURFACE ELEVATION (MSL)	COORDINATES	
		NORTH	EAST
Boring 2101	5.87	9,766.83	10,763.19
Boring 2102	5.74	9,739.56	10,792.09
Boring 2103	5.90	9,747.94	10,764.09
Boring 2104	5.99	9,769.05	10,765.01
Boring 2201	7.71	9,759.32	10,600.92
Boring 2301	6.18	10,004.11	10,422.97
Boring 2302	6.32	9,996.88	10,418.86
Boring 2501	6.74	9,918.61	10,526.55
Boring 2502	6.75	9,915.70	10,527.06
Boring 2701	6.35	10,131.66	10,736.88
Boring 2801	6.18	10,082.08	10,726.41

845031065

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

WELL #	GROUND SURFACE ELEVATION (MSL)	COORDINATES	
		NORTH	EAST
MW-1	5.40	10,405.54	10,261.47
MW-2	6.01	9,989.70	10,072.27
MW-3	6.62	10,086.47	10,393.97
MW-4	6.56	10,060.40	10,606.55
MW-5	6.33	9,988.75	10,657.18
MW-6	6.48	9,789.44	10,467.75
MW-7	5.28	10,069.44	10,948.85
MW-8	5.89	9,963.56	10,891.26
MW-9	6.46	9,664.57	10,743.68
MW-10	6.94	9,875.28	10,505.48
MW-11	6.35	10,092.74	10,713.76
MW-12	6.76	10,056.92	10,472.66
MW-13	6.85	9,975.96	10,433.92
MW-14	6.68	9,908.29	10,570.72
MW-15	6.81	9,843.85	10,607.94
MW-16	5.22	9,890.45	10,756.20
MW-17	4.60	9,854.48	10,830.66
MW-18	5.41	9,740.41	10,822.85
MW-19	6.11	10,031.67	10,767.41
MW-21	5.94	9,993.49	10,075.52
MW-22	5.88	9,966.79	10,893.10
MW-23	5.48	10,401.90	10,258.58
MW-24	6.93	9,865.30	10,508.37
MW-25	6.11	10,025.44	10,765.47
MW-26	4.29	9,851.57	10,837.52

845031066

Spencer Kellogg Facility, Newark, New Jersey

ECRA Case No. 85403

APPENDIX G

Summary Tables

845031067

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403
Table G-1: Phase II Soils Data

	Informal ECRA Cleanup Guidelines	001-01	002-01	002-02	003-01	004-01	004-02	005-01	005-02	304-01	305-01	403-01	403-02
Priority Pollutant Metals (ppm)													
Antimony	2												
Arsenic	20												
Beryllium	400												
Cadmium	3			3.3									4.46
Chromium	100									106			
Copper	170			350									
Lead	250			863				262				213	
Mercury	1			1.86						1.17	1.4		
Nickel	100												
Selenium	4												
Thallium	5												
Zinc	350			728				483					
Silver	5												

Notes:
1. All values reported in parts per million (ppm).

2. Only those values above informal ECRA Cleanup Guidelines are provided.

845031068

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403
Table G-1: Phase II Soils Data (continued)

	Informal ECRA Cleanup Guidelines	1002-01	1002-02	1304-01	1404-01	1505-01	1604-01	1704-01	1705-01	2104-01	2302-01	2302-02	2502-01
Priority Pollutant Metals (ppm)													
Antimony	2									3.46			
Arsenic	20									2.4			
Beryllium	400												
Cadmium	3									3.98	3.42	3.71	
Chromium	100												
Copper	170							176		369	383	275	
Lead	250					371		332	375	1450	1280	978	268
Mercury	1							1.26	1.15	1.57	1.83	1.61	
Nickel	100												
Selenium	4												
Thallium	5												
Zinc	350					352			358		916	671	
Silver	5												9

Notes:
1. All values reported in parts per million (ppm).

2. Only those values above informal ECRA Cleanup Guidelines are provided.

845031069

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403
Table G-1: Phase II Soils Data (continued)

	Informal ECRA Cleanup Guidelines	MW12-01	MW12-21	MW12-02	MW13-01	MW14-01	MW15-01	MW15-02	MW16-01	MW16-21	MW17-01	MW17-02
Priority Pollutant Metals (ppm)												
Antimony	2			4.9								
Arsenic	20											
Beryllium	400											
Cadmium	3			3.81						4.24		
Chromium	100											
Copper	170	424	555	469	219	208		426		233		593
Lead	250	352	459		874	505	355	899	698	1330		477
Mercury	1				1.11	2.44		2	1.03	1.07		
Nickel	100	163	241							127		124
Selenium	4											
Thallium	5											
Zinc	350	1020	1200	857	521	441	435	847		411	489	1190
Silver	5											

Notes:
1. All values reported in parts per million (ppm).

2. Only those values above informal ECRA Cleanup Guidelines are provided.

845031070

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403
Table G-1: Phase II Soils Data (continued)

	Informal ECRA Cleanup Guidelines	MW18-01	MW18-21	MW19-01	MW24-01	MW26-01	MW26-21	MW26-02
Priority Pollutant Metals (ppm)								
Antimony	2						2.6	
Arsenic	20							
Beryllium	400							
Cadmium	3	3.11						
Chromium	100					180	127	
Copper	170	358	407		240	991	1390	404
Lead	250	1450	1420		882	816	1620	379
Mercury	1	6.48	2.37		1.65			
Nickel	100					267	212	
Selenium	4							
Thallium	5							
Zinc	350	659	746		591	2670	2040	895
Silver	5							

Notes:
1. All values reported in parts per million (ppm).

2. Only those values above informal ECRA Cleanup Guidelines are provided.

3. No sample was collected during the installation of Monitoring Well 25 due to a very high water table.

845031071

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-2: Ensaco Hydrocarbon Fingerprinting Data

ENVIRON ID	Erco ID	ppm GRAVIMETRIC	ppm GRAVIMETRIC F1 + F2	ppm GC\FID F1 + F2	ppm GC/FID	Reporting Limits for Individual Hydrocarbons	Reporting Limits for Total Product	Percent Solids	Total Fatty Acid Methyl Esters	Total Lipid Equivalents	Reporting Limits	Date Sampled	Comments	Qualitative Identifications
288E-1002-01	6007-01 (F2)	420			28	1	25	89				11/16/87		Similar to 4- & 5- ring polynuclear aromatic hydrocarbons.
288E-1002-01	6007-01 (F1)	330	750	35.6	7.6	1	25	89				11/16/87		NA
288E-1002-01	6007-01 (FA)	300						89	ND	ND	25	11/16/87		NA
288E-1002-01	6007-010 (F2	1000			24	1	25	89				11/16/87	Duplicate	Similar to 4-to 5- ring polynuclear aromatic hydrocarbons.
288E-1002-01	6007-010 (F1	580	1580	28.9	4.9	1	25	88				11/16/87	Duplicate	NA
288E-1002-01	6007-010 (FA	700						89	ND	ND	25	11/16/87	Duplicate	NA
288E-1304-01	5930-01 (F2)	610			7.8	1	25	81				11/10/87		NA
288E-1304-01	5930-01 (F1)	470	1080	237.8	230	1	25	81				11/10/87		Similar to a petroleum product in the Fuel Oil No. 6 range.
288E-1304-01	5930-01 (FA)	17000						81	16000	16000	500	11/10/87		Similar to castor oil.
288E-1404-01	5930-18 (F2)	1200			330	1	25	87				11/13/87		Similar to a mixture of gasoline and a petroleum product in the fuel oil/lubricating oil range
288E-1404-01	5930-18 (F1)	810	2010	670	340	1	25	87				11/13/87		Similar to a mixture of paint thinner and light and heavy fuel oils.
288E-1404-01	5930-18 (FA)	190						87	380	520	500	11/13/87		Similar to soybean oil.
288E-1505-01	5930-02 (F2)				52	1	25	77				11/10/87		Similar to gasoline.
288E-1505-01	5930-02 (F1)	ND	ND	59.7	7.7	1	25	77				11/10/87		NA
288E-1505-01	5930-02 (FA)							77	ND	ND	25	11/10/87		NA
288E-1604-01	5930-03 (F2)	680			330	1	25	86				11/10/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-1604-01	5930-03 (F1)	800	1480	1260	930	1	25	86				11/10/87		Similar to paint thinner & a petroleum product in the fuel oil/lubricating oil range.
288E-1604-01	5930-03 (FA)	2200						86	4900	6700	500	11/10/87		Similar to soybean oil.
288E-1704-01	5930-17 (F2)	1500			860	1	25	82				11/13/87		Similar to lubricating oil with 4- to 5-ring polynuclear hydrocarbons.
288E-1704-01	5930-17 (F1)	3400	4900	2160	1300	1	25	82				11/13/87		Similar to lubricating oil.
288E-1704-01	5930-17 (FA)	1700						82	1200	1700	250	11/13/87		Similar to soybean oil.
288E-1705-01	6007-02 (F2)	210			210	1	25	82				11/16/87		Similar to coal tar.
288E-1705-01	6007-02 (F1)	290	500	450	240	1	25	82				11/16/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-1705-01	6007-02 (FA)	220						82	ND	ND	25	11/16/87		NA
288E-1705-01	6007-020 (F2	240			120	1	25	82				11/16/87	Duplicate	This sample has GC/FID characteristics that are similar to coal tar.
288E-1705-01	6007-020 (F1	220	460	220	100	1	25	82				11/16/87	Duplicate	Similar to a petroleum product in the fuel oil/lubricating range.
288E-1705-01	6007-020 (FA	310						82	36	48	25	11/16/87	Duplicate	Similar to soybean oil.
288E-1902-01	5930-09 (F2)	360			200	1	25	65				11/12/87		Similar to gasoline & a petroleum product in the fuel oil/lubricating oil range.
288E-1902-01	5930-09 (F1)	540	900	1030	830	1	25	65				11/12/87		Similar to paint thinner & a petroleum product in the fuel oil/lubricating oil range.
288E-1902-01	5930-09 (FA)	7300						65	12000	16000	500	11/12/87		Similar to soybean oil.
288E-2104-01	6007-05 (F2)	360			3600	1	25	84				11/16/87		Similar to a mixture of gasoline & a petroleum product in the fuel oil/lubricating oil range.
288E-2104-01	6007-05 (F1)	1500	1860	12000	8400	20	500	84				11/16/87		Similar to paint thinner.
288E-2104-01	6007-05 (FA)	2600						84	3800	5100	500	11/16/87		Similar to soybean oil.
288E-2302-01	6007-04 (F2)	5000			540	1	25	85				11/16/87		Similar to a mixture of fuel oil & 4- to 5- ring polynuclear aromatic hydrocarbons.
288E-2302-01	6007-04 (F1)	3800	8800	1240	700	1	25	85				11/16/87		Similar to a mixture of paint thinner & fuel oils.
288E-2302-01	6007-04 (FA)	980						85	190	250	25	11/16/87		Similar to soybean oil.
288E-2502-01	6007-03 (F2)	1300			3100	1	25	80				11/16/87		Similar to coal tar.
288E-2502-01	6007-03 (F1)	580	1880	3350	250	1	25	80				11/16/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-2502-01	6007-03 (FA)	9700						80	18000	16000	1250	11/16/87		Similar to linseed oil.
288E-304-01	5930-16 (F2)	230			220	1	25	81				11/13/87		Similar to 4- to 5- ring polynuclear aromatic hydrocarbons & a petroleum product in the fuel oil/lubricating oil range.
288E-304-01	5930-16 (F1)	1100	1330	720	500	1	25	81				11/13/87		Similar to a mixture of paint thinner, kerosene, & a petroleum product in the fuel oil/lubricating oil range.
288E-304-01	5930-16 (FA)	420						81	620	840	250	11/13/87		Similar to soybean oil.

845031072

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-2: Enseco Hydrocarbon Fingerprinting Data

ENVIRON ID	Erco ID	ppm GRAVIMETRIC	ppm GRAVIMETRIC F1 + F2	ppm GC\FID F1 + F2	ppm GC/FID	Reporting Limits for Individual Hydrocarbons	Reporting Limits for Total Product	Percent Solids	Total Fatty Acid Methyl Esters	Total Lipid Equivalents	Reporting Limits	Date Sampled	Comments	Qualitative Identifications
288E-305-01	6007-06 (F2)	1000			1900	1	25	88				11/16/87		Similar to a mixture of gasoline & coal tar.
288E-305-01	6007-06 (F1)	750	1750	5900	4000	20	500	88				11/16/87		Similar to paint thinner.
288E-305-01	6007-06 (FA)	25000						88	39000	52000	1250	11/16/87		Similar to soybean oil.
288E-403-01	6007-07 (F2)	110			1000	1	25	96				11/16/87		Similar to a mixture of gasoline & fuel oil.
288E-403-01	6007-07 (F1)	860	970	1440	440	1	25	96				11/16/87		Similar to Fuel Oil No. 6.
288E-403-01	6007-07 (FA)	47000						96	120000	160000	2500	11/16/87		Similar to soybean oil.
288E-MW12-01	5930-12 (F2)	5800			500	1	25	92				11/12/87		Similar to lubricating oil.
288E-MW12-01	5930-12 (F1)	5200	11000	930	430	1	25	92				11/12/87		Similar to lubricating oil.
288E-MW12-01	5930-12 (FA)	1000						92	85	120	25	11/12/87		Similar to soybean oil.
288E-MW13-01	5930-07 (F2)	1200			880	1	25	91				11/11/87		Similar to coal tar.
288E-MW13-01	5930-07 (F1)	270	1470	1170	290	1	25	91				11/11/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-MW13-01	5930-07 (FA)	800						91	1400	1900	500	11/11/87		Similar to soybean oil.
288E-MW14-01	5930-06 (F2)	1100			260	1	25	81				11/11/87		Similar to a mixture of polynuclear aromatic hydrocarbons & a petroleum product in the fuel oil/lubricating oil range.
288E-MW14-01	5930-06 (F1)	630	1730	650	390	1	25	81				11/11/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-MW14-01	5930-06 (FA)	720						81	170	170	25	11/11/87		Similar to castor oil.
288E-MW15-01	5930-04 (F2)	5000			340	1	25	84				11/11/87		Similar to a mixture of polynuclear aromatic hydrocarbons & a petroleum product in the fuel oil/lubricating oil range.
288E-MW15-01	5930-04 (F1)	4100	9100	660	320	1	25	84				11/11/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-MW15-01	5930-04 (FA)	420						84	74	100	25	11/11/87		Similar to soybean oil.
288E-MW16-01	5930-15 (F2)	610			450	1	25	81				11/13/87		Similar to coal tar.
288E-MW16-01	5930-15 (F1)	540	1150	800	350	1	25	81				11/13/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-MW16-01	5930-15 (FA)	1000						81	150	150	25	11/13/87		Similar to castor oil.
288E-MW17-01	5930-14 (F2)	ND			4.6	1	25	81				11/13/87		NA
288E-MW17-01	5930-14 (F1)	220	220	204.6	200	1	25	81				11/13/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-MW17-01	5930-14 (FA)	360						81	ND	ND	25	11/13/87		NA
288E-MW18-01	5930-10 (F2)	340			120	1	25	78				11/12/87		Similar to polynuclear aromatic hydrocarbons & a petroleum product in the fuel oil/lubricating oil range.
288E-MW18-01	5930-10 (F1)	290	630	260	140	1	25	78				11/12/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-MW18-01	5930-10 (FA)	280						78	ND	ND	25	11/12/87		NA
288E-MW19-01	5930-13 (F2)	ND			6.4	1	25	85				11/12/87		NA
288E-MW19-01	5930-13 (F1)	ND	ND	6.4	ND	1	25	85				11/12/87		NA
288E-MW19-01	5930-13 (FA)	150						85	ND	ND	25	11/12/87		NA
288E-MW24-01	5930-05 (F2)	1100			280	1	25	84				11/11/87		Similar to a mixture of gasoline, polynuclear aromatic hydrocarbons, & a petroleum product in the fuel oil/lubricating oil range.
288E-MW24-01	5930-05 (F1)	970	2070	650	370	1	25	84				11/11/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-MW24-01	5930-05 (FA)	430						84	49	67	25	11/11/87		Similar to soybean oil.
288E-MW25-01	5930-08 (F2)	ND			5.8	1	25	82				11/11/87		NA
288E-MW25-01	5930-08 (F1)	ND	ND	5.8	ND	1	25	82				11/11/87		NA
288E-MW25-01	5930-08 (FA)	ND						82	ND	ND	25	11/11/87		NA
288E-MW26-01	5930-11 (F2)	ND			6.2	1	25	86				11/12/87		NA
288E-MW26-01	5930-11 (F1)	180	180	236.2	230	1	25	86				11/12/87		Similar to a petroleum product in the fuel oil/lubricating oil range.
288E-MW26-01	5980-11 (FA)	230						86	ND	ND	25	11/12/87		NA
Erco Blank	5930-188 (F2	ND			ND	1	25	NA				NA		NA
Erco Blank	5930-188 (F1	ND	ND	ND	ND	1	25	NA				NA		NA
Erco Blank	5930-188 (FA	ND						NA	ND	ND	25	NA		NA

845031073

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-2: Enseco Hydrocarbon Fingerprinting Data

ENVIRON ID	Erco ID	ppm GRAVIMETRIC	ppm GRAVIMETRIC F1 + F2	ppm GC\FID F1 + F2	ppm GC/FID	Reporting Limits for Individual Hydrocarbons	Reporting Limits for Total Product	Percent Solids	Total Fatty Acid Methyl Esters	Total Lipid Equivalents	Reporting Limits	Date Sampled	Comments	Qualitative Identifications
Erco Blank	6007-07B (F2	ND			ND	1	25	NA				NA		NA
Erco Blank	6007-07B (F1	ND	ND	ND	ND	1	25	NA				NA		NA
Erco Blank	6007-07B (FA	ND						NA	ND	ND	25	11/16/87		NA
Erco Blank	6007-10B (F2	ND			ND	0.12	3.1	NA				NA		NA
Erco Blank	6007-10B (F1	ND	ND	ND	ND	0.12	3.1	NA				NA		NA
Erco Blank	6007-10B (FA	ND							ND	ND	0.5	11/16/87		NA
288EWB-1116876007-08 (F2)		ND			ND	0.12	3.1	NA				11/16/87		NA
288EWB-1116876007-08 (F1)		1400	ND	ND	ND	0.12	3.1	NA				11/16/87		NA
288EWB-1116876007-08 (FA)		ND							ND	ND	0.5	11/16/87		NA
288EWB-1116876007-09 (F2)		ND			ND	0.12	3.1	NA				11/16/87		NA
288EWB-1116876007-09 (F1)		ND	ND	ND	ND	0.12	3.1	NA				11/16/87		NA
288EWB-1116876007-09 (FA)		ND							ND	ND	0.5	11/16/87		NA
288EWB-1116876007-10 (F2)		ND			ND	0.12	3.1	NA				11/16/87		NA
288EWB-1116876007-10 (F1)		ND	ND	ND	ND	0.12	3.1	NA				11/16/87		NA
288EWB-1116876007-10 (FA)		ND							ND	ND	0.5	11/16/87		NA
288E-1002-01	6007-01R (F2)				ND	1	25	89				11/16/87	Reextract	NA
288E-1002-01	6007-01R (F1)			ND	ND	1	25	89				11/16/87	Reextract	NA
288E-1002-01	6007-01R (FA)							74	ND	ND	25	11/16/87	Reextract	NA
288E-1404-01	5950-18R (F2	ND			ND	1	25	87				11/13/87		NA
288E-1404-01	5950-18RX (F	ND	ND	ND	ND	1	25	87				11/13/87	Reextract	NA
288E-403-01	6007-07R (F1)				ND		25	96				11/16/87	Reextract	NA
288E-403-01	6007-07R (F2)			ND	ND	1	25	96				11/16/87	Reextract	NA
288E-403-01	6007-07R (FA)							96	ND	ND	25	11/16/87	Reextract	NA

8450310 74

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-3: Phase II Ground Water Data

	Informal ECRA Cleanup Guidelines	MW01-GW01	MW02-GW01	MW02-GW02	MW03-GW01	MW04-GW01	MW05-GW01	MW06-GW01	MW07-GW01	MW08-GW01	MW09-GW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50										
Beryllium	--										
Cadmium	10					16				13	
Chromium	50					113					
Copper	1000										
Lead	50	87				77			60		158
Mercury	2										
Nickel	--										
Selenium	10										
Thallium	--										
Zinc	5000										
Total Volatile Organics (ppb)	10										
Toluene											
Ethylbenzene											
Chloroform											
Total Petroleum Hydrocarbons	1000	1600	2400	1700							
Cyanide	200										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

8450310475

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-3: Phase II Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW10-GW01	MW11-GW01	MW12-GW01	MW13-GW01	MW14-GW01	MW15-GW01	MW15-GW02	MW16-GW01	MW17-GW01	MW18-GW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50								86		
Beryllium	--										
Cadmium	10								22	15	
Chromium	50								319	100	
Copper	1000								3760		
Lead	50	217			281	197	603	829	9450	249	179
Mercury	2							2	23	6	
Nickel	--										
Selenium	10										
Thallium	--										
Zinc	5000								8220		
Total Volatile Organics (ppb)	10	11000			110						
Toluene		11000									
Ethylbenzene					110						
Chloroform											
Total Petroleum Hydrocarbons	1000										
Cyanide	200										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

845031076

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-3: Phase II Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW19-GW01	MW21-GW01	MW22-GW01	MW23-GW01	MW24-GW01	MW25-GW01	MW25-GW02	MW26-GW01
Priority Pollutant Metals									
Antimony	--								
Arsenic	50	91							
Beryllium	--								
Cadmium	10	29							
Chromium	50	209							
Copper	1000								
Lead	50	939		69					
Mercury	2	5							
Nickel	--								
Selenium	10								
Thallium	--								
Zinc	5000								
Total Volatile Organics (ppb)	10								
Toluene									
Ethylbenzene									
Chloroform									5
Total Petroleum Hydrocarbons	1000								1100
Cyanide	200								

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

845031077

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-4: March 1988 Ground Water Data

	Informal ECRA Cleanup Guidelines	MW01-GW01	MW01-FW01	MW02-GW01	MW02-FW01	MW03-GW01	MW03-FW01	MW04-GW01	MW04-FW01	MW05-GW01	MW05-FW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50							950			
Beryllium	--										
Cadmium	10							2430			
Chromium	50							2760			
Copper	1000							2950			
Lead	50					83		3950			
Mercury	2							25			
Nickel	--										
Selenium	10							45	14		
Thallium	--										
Zinc	5000							44900			
Total Volatile Organics	10										
Toluene											
Ethyibenzene											
Benzene											
Total Petroleum Hydrocarbons	1000	1000									

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

8450310 78

Spencer Kellogg Facility, Newark, New Jersey
ECRA Case # 85403

Table G-4: March 1988 Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW06-GW01	MW06-FW01	MW07-GW01	MW07-FW01	MW08-GW01	MW08-FW01	MW09-GW01	MW09-FW01	MW10-GW01	MW10-FW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50										
Beryllium	--										
Cadmium	10					12					
Chromium	50					60					
Copper	1000										
Lead	50	91				397		68		1790	
Mercury	2				3.2					5	
Nickel	--										
Selenium	10			26	26	18	17				
Thallium	--										
Zinc	5000										
Total Volatile Organics	10			62						17115	
Toluene				18						17000	
Ethylbenzene				36						110	
Benzene				8						5	
Total Petroleum Hydrocarbons	1000										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

845031079

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Table G-4: March 1988 Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW11-GW01	MW11-FW01	MW12-GW01	MW12-FW01	MW13-GW01	MW13-FW01	MW14-GW01	MW14-FW01	MW15-GW01	MW15-FW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50										
Beryllium	--										
Cadmium	10										
Chromium	50										
Copper	1000										
Lead	50					90				299	
Mercury	2										
Nickel	--										
Selenium	10				15						
Thallium	--										
Zinc	5000										
Total Volatile Organics	10	95				93					
Toluene		40									
Ethyibenzene		42				93					
Benzene		13									
Total Petroleum Hydrocarbons	1000										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

845031080

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Table G-4: March 1988 Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW16-GW01	MW16-FW01	MW17-GW01	MW17-FW01	MW18-GW01	MW18-FW01	MW19-GW01	MW19-FW01	MW22-GW01	MW22-FW01
Priority Pollutant Metals											
Antimony	--										
Arsenic	50	85		63							
Beryllium	--										
Cadmium	10			26						13	
Chromium	50	92		266							
Copper	1000			1130							
Lead	50	2320	84	1760		97		75			
Mercury	2	5.6		22							
Nickel	--										
Selenium	10	11		48	42			41	44	25	30
Thallium	--										
Zinc	5000	8220									
Total Volatile Organics	10										
Toluene											
Ethylbenzene											
Benzene											
Total Petroleum Hydrocarbons	1000										

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

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Table G-4: March 1988 Ground Water Data (continued)

	Informal ECRA Cleanup Guidelines	MW26-GW01	PC01-SW01	PC01-SW11	PC01-FW01	PC01-FW11	NB01-SW01	NB01-FW01
Priority Pollutant Metals								
Antimony	--							
Arsenic	50							
Beryllium	--							
Cadmium	10							
Chromium	50							
Copper	1000							
Lead	50							
Mercury	2							
Nickel	--							
Selenium	10						38	31
Thallium	--							
Zinc	5000							
Total Volatile Organics	10							
Toluene								
Ethylbenzene								
Benzene								
Total Petroleum Hydrocarbons	1000							

Notes:
1. All values reported in parts per billion (ppb).
2. Only those values above Informal ECRA Cleanup Guidelines are provided.

845031082

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APPENDIX H

Description of Solute Transport Modeling Analyses

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I. INTRODUCTION

This appendix presents a description of the modeling analysis performed to evaluate the potential migration of VOC contamination in the shallow aquifer. This information was used in determining the need for additional investigation and/or remediation of shallow ground water. The analyses were based on hydrogeologic and analytical data collected between November 1986 and March 1988.

Visual inspection of piezometric surface data shown in Figures III-1 through III-7 suggests that the general direction of ground water flow at the site is to the northeast towards the underground flume which discharges into Newark Bay. The ground water flow path emanating from the location where the highest levels of VOCs, particularly toluene, were noted (i.e., MW10) is towards monitoring well MW4 located immediately adjacent to the underground flume. While high levels of toluene (i.e., 11 to 34 parts per million) were detected at MW10 during the aforementioned sampling period, toluene has not been detected at downgradient monitoring well MW4 during this period of time. Therefore, the primary objective of this modeling analysis was to simulate potential contaminant levels of toluene in the vicinity of the underground flume (e.g., MW4) and their levels at the nearest discharge point into Newark Bay, in relation to the contributing source at MW10.

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II. DESCRIPTION OF SOLUTE TRANSPORT MODEL

In general, modeling of contaminant transport through an aquifer system is mathematically complex and requires a thorough understanding of the flow characteristics as well as the chemical and physical processes (e.g., degradation, adsorption, etc.) affecting contaminant migration via ground water. In addition, detailed information describing the source of contamination and its variation with respect to time and space is of primary importance in formulating the model simulation.

The model selected for this study was a two-dimensional analytical contaminant transport model, referred to as "Plume", developed by In-Situ Inc., Laramie, Wyoming (1985). The model is capable of incorporating both the physical and chemical behaviors of toluene during the transport process. The model has been widely used by other investigators in simulating the migration of toluene and other VOCs in an aquifer system (Griffin, 1986).

The basic application of the model is to predict or simulate the historical development of ground water contamination by imposing accurate descriptions of the flow characteristics and the nature of contaminant release. Specifically, the model can simulate the temporal variation of ground water contamination at any location within the flow region taking into account: (1) ground water flow velocity; (2) site-specific aquifer characteristics; (3) the location and size of the contaminant source area; (4) the strength of the contaminant source; and (5) the time frame

845031085

of the contaminant release. The hydrogeologic parameters that must be specified to represent the aquifer characteristics include dispersion coefficients, saturated depth and porosity of the aquifer. Simplifying assumptions adopted in the analytical model are as follows:

- Ground water flow velocity within the modeled flow region is constant along the longitudinal axis (e.g., uniform velocity).

- Saturated depth of the aquifer is uniform throughout the flow region.

- Contaminant concentration derived from the model represents an average concentration over the entire saturated depth.

- Dispersion only occurs in the x-y plane. This assumption is quite satisfactory for this site where the saturated depth of the shallow aquifer is less than three meters.

The partial differential equation employed in the analytical solute transport model is given below.

$$\frac{\delta C}{\delta t} = V_i \frac{\delta C}{\delta X_i} + D_{ij} \frac{\delta^2 C}{\delta X_i \delta X_j} - R_x \qquad \text{(Eqn. H1)}$$

845031086

where:

C = concentration $[M/L^3]$

t = time $[T]$

V_i = mean value of ith component of ground water flow velocity $[L/T]$

$X_i X_j$ = cartesian coordinates $[L]$

D_{ij} = i, j component of hydrodynamic dispersion tensor $[L^2/T]$

R_x = rate of conversion or adsorption of solute

The solution for a continuous but biodegrading contaminant source given by In-Situ, Inc. (1985) is as follows.

$$C(X,Y,t) = \frac{C_o}{4} \int_o^t \exp(-0.693\ \tau/t_{1/2}) \cdot \left[\operatorname{erf}\left(\frac{X + X_o/2 - V_x(t-\tau)/R}{(4D_x(t-\tau)/R)^{1/2}}\right) - \operatorname{erf}\left(\frac{X - X_o/2 - V_x(t-\tau)/R}{(4D_x(t-\tau)/R)^{1/2}}\right)\right] \cdot \left[\operatorname{erf}\left(\frac{Y + Y_o/2 - V_x(t-\tau)/R}{(4D_y(t-\tau)/R)^{1/2}}\right) - \operatorname{erf}\left(\frac{Y - Y_o/2 - V_y(t-\tau)/R}{(4D_y(t-\tau)/R)^{1/2}}\right)\right] d\tau \qquad \text{(Eqn. H2)}$$

845031087

where:

C_o = initial concentration of the contaminant at the source

$t_{1/2}$ = half-life for the biodegradation conversion of the contaminant source

τ = integration parameter

The solution given in Equation H2 reflects an "as-is" condition of the contaminant source at the site. Specifically, the assumption of Equation H2 is that the VOC source present in soils is not treated and/or eliminated, although the source will undergo a continuing reduction by biodegradation. Modeling analysis performed herein is based on the above solution given in Equation H2.

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III. INPUT PARAMETERS

A. Chemical Data

Toluene undergoes attenuation during the transport process in the subsurface environment by means of retardation and biodegradation. The retardation is mainly due to a physical-chemical process known as "adsorption". Toluene molecules tend to concentrate at solid-liquid interfaces of the porous media. Therefore, the migration of toluene along with ground water flow is retarded due to this mechanism. The retardation of a particular chemical is dependent on the organic content (foc) of the aquifer material and the partition coefficient (koc) of the chemical. The koc value of toluene used in the analyses was 300 cm^3/g (USEPA, 1985). An assumed foc value of 0.5 percent was used for this site. The basis for this assumption is that a typical range of foc values for the types of soil encountered at this site (e.g., sandy-silty soils) is 0.1 to 1 percent.

Attenuation by biodegradation is caused by microorganisms which break down organic substances. The rate of degradation is generally indicated by the parameter known as the rate constant (K). The rate constant for toluene was determined to be 4.7×10^{-4} day^{-1} (Wilson, Smith and Rees, 1986). This value is equivalent to the half-life value of 4.04 years. This means that every 4.04 years the source strength of toluene will be reduced to half of the original.

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B. Aquifer Data

The ground water model requires evaluation of a number of input variables relative to the aquifer. Much of the aquifer data such as ground water flow velocity and saturated depth can be determined utilizing site-specific data. Other required information, including effective porosity and dispersivity values, are typically estimated. A summary of the aquifer data employed for the modeling analysis is provided in Table H-1. A discussion of the determination of ground water flow velocity is presented below.

There are no site-specific hydraulic conductivity data available for the calculation of ground water flow velocity. One way of obtaining the flow velocity is to use a typical range of hydraulic conductivity values for the type of soils encountered at this site (e.g., 10^{-4} to 10^{-3} cm/s for sandy-silty soils). This information, along with hydraulic gradient and effective porosity values, can be used in the Darcy flow equation to calculate ground water flow velocity. The highest hydraulic gradient along the flow path from MW10 to MW4, based on the April 29, 1988 water level data shown in Figure III-7, was 0.0115 ft/ft. Therefore, the calculated flow velocity (V) corresponding to the above hydraulic gradient (i), assumed hydraulic conductivity (k) of 10^{-3} cm/s and an effective porosity (n_e) value of 0.1, is approximately 120 feet per year, where:

$$V = k \bullet i/n_e$$
$$= (10^{-3} \text{ cm/s})(0.0115 \text{ ft/ft})/0.1$$
$$\simeq 120 \text{ ft/yr}$$

845031090

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Table H-1: Summary of Aquifer Data

Parameters	Estimated Values
Ground Water Flow Velocity (e.g., Darcy velocity)	171 ft/yr(1)
Longitudinal Dispersivity	10 ft(2)
Transverse Dispersivity	1 ft(2)
Effective Porosity	0.10(2)
Saturated Depth	8.5 ft(3)
Grain Density of Aquifer Material	2.65 g/cm^3(3)

Source: (1) Estimation based on site-specific data.

(2) Typical values for sandy-silty soils given by Yeh (1981).

(3) Obtained from the site's boring logs.

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While a significant level of toluene was detected at MW10 in November, 1986, the most recent samples taken from a downgradient well (MW4) in March 1988 revealed that it was free of toluene. MW4 is located approximately 225 feet from MW10. This implies that the flow velocity along this path must be less than 171 feet per year. A higher toluene concentration would result at the downgradient well (MW4) if in fact the higher flow velocity (171 ft/day) were correct. This would be due primarily to less time allowed for the biodegradation process. Therefore, the upper limit flow velocity of 171 ft/yr was chosen for the modeling analysis to provide an added margin of conservatism.

C. Contaminant Source Data

An examination of toluene concentrations in and around the source location (MW10) suggests that the areal extent of the toluene source is likely to be relatively small (i.e., a localized point source). For example, 17,000 ppb of toluene were detected from MW10 during the latest sampling round in March 1988. Two downgradient monitoring wells (MW14 and MW15), located within a 100 foot radius, did not exhibit any toluene contamination. Based on these data, the size of the toluene source in the vicinity of MW10 was estimated to be 50 ft. by 50 ft. The entire source area was assumed to be contaminated to a level of 17,000 ppb. It is believed that this estimation of the toluene source is highly conservative.

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IV. MODEL SIMULATION AND RESULTS

All of the input data described in the previous section were incorporated into the transport model. A simulation was run to predict toluene concentrations at MW4 as a function of time.

The simulated toluene concentration levels at MW4 from years 1988 to 2034 are listed in Table H-2. The results indicate that the maximum level of toluene (23.2 ppb) will be observed in the year 2018, which is significantly lower than the initial source concentration of 17,000 ppb detected in MW10. The maximum concentration of toluene (23.2 ppb) will be reduced further to a non-detectable level as a result of mixing when discharged into the underground flume. A preliminary flow analysis around the flume indicates that dilution is expected to result in an approximate 60-fold reduction. Therefore, toluene concentrations at the nearest discharge point into Newark Bay will be on the order of 0.4 ppb, which is below the informal ECRA cleanup guideline of 10 ppb. This level poses no risk to public health or the environment.

845031093

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Table H-2: Simulated Toluene Concentrations at MW4

Time (yr)	Concentration in (ppb)	
1988	0.0	
1989	0.0	
1990	0.0	
1991	0.0	
1992	0.0	
1993	0.0	
1994	0.0	
1995	0.0	
1996	0.0	
1997	0.003	
1998	0.03	
1999	0.10	
2000	0.23	
2001	0.50	
2002	0.90	
2003	1.53	
2004	2.42	
2005	3.59	
2006	5.04	
2007	6.74	
2008	8.65	
2009	10.7	
2010	12.8	
2011	14.9	
2012	16.9	
2013	18.7	
2014	20.2	
2015	21.5	
2016	22.4	
2017	23.0	
2018	23.2	maximum
2019	23.2	
2020	22.9	
2021	22.3	
2022	21.5	
2023	20.5	
2024	19.4	
2025	18.2	
2026	17.0	
2027	15.7	
2028	14.4	
2029	13.2	
2030	12.0	
2031	10.8	
2032	9.93	
2033	8.71	
2034	7.76	

845031094

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APPENDIX I

Plates

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ENVIRON
210 CARNEGIE CENTER, SUITE 201, PRINCETON, N.J. 08540
1000 POTOMAC ST., N.W. WASHINGTON D.C. 20007

Plate 1

AREAS OF ENVIRONMENTAL CONCERN AND PHASE II SAMPLING LOCATIONS

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Newark, New Jersey

DATE	DRAFTED BY: M. Smith
June, 1988.	CHECKED BY: J.L. Cutler

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Plate 2

METALS ABOVE ECRA GUIDELINES IN SURFACE SOIL SAMPLES

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Newark, New Jersey

DATE June, 1988.	DRAFTED BY M. SMITH CHECKED BY J.L. CUTLER

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Plate 3

METALS ABOVE ECRA GUIDELINES IN DEEPER SOIL SAMPLES

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Plate 4

HYDROCARBONS IN SOIL SAMPLES

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Newark, New Jersey

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Plate 5 PHASE II

GROUND WATER ANALYTICAL RESULTS ABOVE ECRA GUIDELINES

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE June, 1988.	DRAFTED BY M. SMITH CHECKED BY J.L. CUTLER

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Plate 6

MARCH 1988 GROUND WATER ANALYTICAL RESULTS AT OR ABOVE ECRA GUIDELINES

Spencer Kellogg, Formerly a Division of Textron Inc.
Newark, New Jersey

DATE	DRAFTED BY
June, 1988.	M. SMITH
	CHECKED BY J.L. CUTLER

845031102

Presentation of the
ECRA Sampling Plan Results
for
SPENCER KELLOGG
FORMERLY A DIVISION OF TEXTRON
400 Doremus Avenue
Newark, Essex County
New Jersey
Volume I of IV

ECRA Case No. 85403

March, 1987

Prepared for

Textron Inc.
Providence, Rhode Island 02903

Prepared by

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845031103

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

C O N T E N T S

		Page
	EXECUTIVE SUMMARY	viii
I.	INTRODUCTION	1
	A. Purpose and Scope	1
	B. Site Description	1
	C. Regional Geology	4
	D. Rationale for the Sampling Program	5
II.	METHODOLOGY -- A TECHNICAL OVERVIEW	11
	A. Soil Borings	11
	1. Drilling Methods	11
	2. Soil Sample Collection Methods	11
	B. Monitoring Wells	12
	1. Shallow Well Construction	12
	2. Deep Well Construction	14
	3. Well Completion	16
	4. Monitoring Well Development	16
	5. Monitoring Well Sampling Methods	17
	6. Tidal Influence Investigation	18
	C. Underground Flume Sampling	19
	D. Quality Assurance/Quality Control Measures	20
	1. Decontamination Procedures	20
	2. Control Samples	20
	E. Deviations from the Revised Sampling Plan	20
	F. Analytical Laboratory	27
	G. Surveying of Sampling Locations	28
III.	GEOLOGIC AND HYDROGEOLOGIC RESULTS	29
	A. Site Geology	29
	1. Topography	29
	2. Site Stratigraphy	29
	3. Fill Unit	32
	4. Clay, Silt and Peat Unit	34
	5. Sand and Gravel Unit	34
	6. Deep Clay and Silt Unit	37

845031104

C O N T E N T S (continued)

	Page
B. Site Hydrogeology	37
1. Introduction	37
2. Shallow Aquifer	37
3. Semi-Confining Layer	40
4. Deep Aquifer	41
5. Tidal Influence	41
6. Interaction Between Shallow and Deep Aquifers	48
IV. ANALYTICAL RESULTS	50
A. General	50
1. Analytical Data Packages	50
2. Terminology	50
3. Cleanup Level Guidelines	52
B. Quality Assurance/Quality Control	53
1. Duplicate Samples	53
2. Field Blanks	53
3. Trip Blanks	54
4. Laboratory Internal Blanks	54
C. Areas of Environmental Concern	55
1. Area of Environmental Concern 1	55
2. Area of Environmental Concern 2	56
3. Area of Environmental Concern 3	56
4. Area of Environmental Concern 4	57
5. Area of Environmental Concern 5	59
6. Area of Environmental Concern 6	59
7. Area of Environmental Concern 7	60
8. Area of Environmental Concern 8	61
9. Area of Environmental Concern 9	61
10. Area of Environmental Concern 10	62
11. Area of Environmental Concern 11	63
12. Area of Environmental Concern 12	64
13. Area of Environmental Concern 13	64
14. Area of Environmental Concern 14	65
15. Area of Environmental Concern 15	66
16. Area of Environmental Concern 16	67
17. Area of Environmental Concern 17	67
18. Area of Environmental Concern 18	69
19. Area of Environmental Concern 19	69
20. Area of Environmental Concern 20	70
21. Area of Environmental Concern 21	71
22. Area of Environmental Concern 22	72

845031105

C O N T E N T S (continued)

	Page
23. Area of Environmental Concern 23	73
24. Area of Environmental Concern 25*	74
25. Area of Environmental Concern 26	74
26. Area of Environmental Concern 27	75
27. Area of Environmental Concern 28	75
D. Shallow Wells	75
1. Monitoring Well 1	75
2. Monitoring Well 2	76
3. Monitoring Well 3	76
4. Monitoring Well 4	77
5. Monitoring Well 5	77
6. Monitoring Well 6	77
7. Monitoring Well 7	79
8. Monitoring Well 8	80
9. Monitoring Well 9	81
10. Monitoring Well 10	81
11. Monitoring Well 11	81
12. Summary of Shallow Well Analytical Results	81
E. Deep Wells	83
1. Monitoring Well 21	83
2. Monitoring Well 22	83
3. Monitoring Well 23	84
4. Summary of Deep Well Analytical Results	85
F. Underground Flume	86
V. DYE TEST RESULTS	88
VI. DISCUSSION	89
A. Shallow Aquifer	89
1. General	89
2. Total Petroleum Hydrocarbons	89
3. Volatile Organics	90
4. Base Neutrals	93
5. Priority Pollutant Metals	94
B. Deep Aquifer	96
1. General	96
2. Volatile Organics at Monitoring Well 22	96
C. Underground Flume	98

* There is no Area of Environmental Concern (AEC) 24 because that AEC was combined with AEC 1.

845031106

C O N T E N T S (continued)

		Page
VII.	CONCLUSIONS AND RECOMMENDATIONS	100
	A. General	100
	B. Conclusions	100
	1. Contamination Related to On-site Activities	100
	2. Contamination Related to the Fill Materials	101
	3. Interaction Between Fill Unit and Shallow Aquifer	102
	4. Deep Aquifer	104
	C. Recommendations	105

APPENDIX A: Boring Logs
APPENDIX B: Well Specifications
APPENDIX C: Summary of Well Data
APPENDIX D: Well Development Data
APPENDIX E: Supplementary Well Sampling Data
APPENDIX F: Sampling Location Elevations and Coordinates

845031107

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ECRA Case No. 85403

L I S T O F T A B L E S

		Page
Table 1:	Areas of Environmental Concern	7
Table 2:	BISE Cleanup Guidelines for Soil and Ground Water	51

845031108

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

L I S T O F F I G U R E S

		Page
Figure 1:	USGS Topographic Map of Area Surrounding Site	3
Figure 2:	Specifications for the Shallow Wells	13
Figure 3:	Specifications for the Deep Wells	15
Figure 4:	Topographic Map	30
Figure 5:	Generalized Geologic Column	31
Figure 6:	Geologic Cross-Section from A to A'	33
Figure 7:	Geologic Cross-Section from B to B'	35
Figure 8:	Location of Geologic Cross-Sections	36
Figure 9:	Shallow Aquifer Water Table	39
Figure 10:	Deep Aquifer Water Elevations	42
Figure 11:	Tidal Variations in Monitoring Wells: MW7, MW8, & MW9	43
Figure 12:	Tidal Variations in Monitoring Wells: MW4, MW5, MW6, MW10, & MW11	44
Figure 13:	Tidal Variations in Monitoring Wells: MW1, MW2, & MW3	45
Figure 14:	Tidal Variations in Monitoring Wells: MW21, MW22, & MW23	46
Figure 15:	Concentrations of Total Volatile Organic Compounds in the Shallow Aquifer	92

845031109

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ECRA Case No. 85403

L I S T O F P L A T E S

Plate 1: Areas of Environmental Concern and Sampling Locations

Plate 2: Shallow Well Fence Diagram

Plate 3: Deep Well Fence Diagram

Plate 4: Concentrations of Total Petroleum Hydrocarbons in Soil

Plate 5: Concentrations of Total Volatile Organic Compounds in Soil

Plate 6: Concentrations of Ethylbenzene in Soil

Plate 7: Concentrations of Toluene in Soil

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Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

EXECUTIVE SUMMARY

To assist Textron Inc. in complying with the Environmental Cleanup Responsibility Act (ECRA), ENVIRON implemented the New Jersey Department of Environmental Protection (NJDEP) approved Revised Sampling Plan for the Spencer Kellogg facility in Newark, New Jersey. The work was performed from November, 1986 through March, 1987.

For the past several decades, the plant has manufactured coating resins which are used primarily in the paint industry. Based on a series of site visits, a review of past and present site operations, and a review of historical aerial photographs, twenty seven areas of environmental concern (AECs) were identified. To evaluate the effect of past activities at this site on the quality of the soil and the ground water, and as to determine the geologic and hydrogeologic characteristics of the site, forty six soil borings, eleven shallow monitoring wells and three deep monitoring wells were installed. Soil, surface water, and ground water samples were collected and analyzed for the chemicals potentially present due to activities within the AECs.

Four geologic units were encountered at the site. The uppermost unit is comprised of fill material and extends from the ground surface to an average depth of 8 feet. Beneath this lies a clay, silt and peat unit with an average thickness of 19 feet. A well sorted sand and gravel unit, which varies in thickness from 13 to 14 feet, underlies the clay,

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silt and peat. Beneath the sand and gravel is a reddish-brown clay and silt unit of unknown thickness.

Two aquifers were encountered at the site. The shallow aquifer lies within the fill unit. The shallow and deep aquifers are separated by the thick clay, silt and peat unit which acts as a semi-confining layer. The deep aquifer was encountered at an average depth of 27 feet below ground surface. The direction of ground water flow in the shallow aquifer is primarily toward an underground flume which travels beneath the site and discharges into Newark Bay. The direction of ground water flow in the deep aquifer is toward Newark Bay.

The analytical data suggest that ethylbenzene, toluene, and petroleum hydrocarbons in concentrations above the informal BISE cleanup guidelines have been introduced into the soil of the fill unit by operations and activities at the facility. Because of problems inherent with the analysis for total petroleum hydrocarbons, it is not possible to distinguish between petroleum hydrocarbons and the non-hazardous fish and vegetable oils which have been used in large quantities at this facility. Therefore, some of what is reported as petroleum hydrocarbons may be the non-hazardous fish and vegetable oils. In addition, the presence of petroleum hydrocarbons in widely varying concentrations in soil samples collected from areas in which no operations are known to have occurred suggests that the presence of some of the petroleum hydrocarbons detected at the site may be related to the fill material rather than to operations at the facility.

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Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Despite the presence of significant concentrations of ethylbenzene, toluene and petroleum hydrocarbons in certain areas of the fill unit, very little contamination was detected in the shallow aquifer. The pavement which covers the site appears to prevent the infiltration of rain water from the surface and thus inhibits the migration of contaminants from the soil matrix into the ground water. Petroleum hydrocarbons were detected in only one shallow well, the upgradient well MW2, and apparently originate from an off-site source. Relatively low concentrations of volatile organics were detected in three of the eleven shallow wells. In a fourth shallow well, more significant concentrations of volatile organics were detected, but this contamination appears to be related to localized soil contamination. The apparently low partitioning of contaminants from the soil to the ground water, as evidenced by the relatively low concentrations of contaminants in ground water, suggest that minimal contaminant transport from the site is occurring.

The results of analyses performed on water samples collected from the underground flume support this hypothesis as well. Only one contaminant, ethylbenzene, appears to be introduced into the flume as it travels beneath the site, and this contaminant may be entering the flume through storm drains that discharge to the flume, rather than from the infiltration of ground water.

In the deep aquifer, no contamination was found in either of the upgradient wells, but volatile organic contamination was detected in the downgradient well, MW22. The data suggest that the contamination

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detected may be due to a defect in the well, which may allow the infiltration of water from the flume to occur during purging of the well, rather than to actual contamination within the deep aquifer. Further investigation is necessary to evaluate this explanation.

In the Phase Two Sampling Plan, which will be submitted to NJDEP at a later date, sampling will be proposed to further delineate the areal extent of contamination in certain portions of the site, to refine the current understanding of the ground water flow patterns at this site, and to clarify other issues which were not resolved in this first phase of sampling. The second phase of sampling is likely to include the collection of additional measurements from existing wells and from the underground flume as well as the installation of additional soil borings. Additional monitoring wells may also be added. Finally, Textron may begin evaluating cleanup levels that might be appropriate should in a Cleanup Plan be necessary for this site. Thus, the Phase Two Sampling Plan may include an evaluation, based on available toxicity data, of the health and environmental risks associated with exposure to various levels of the contaminants found at this site.

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Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

I. INTRODUCTION

A. Purpose and Scope

In order to comply with the requirements of the New Jersey Environmental Cleanup Responsibility Act (ECRA), Textron Inc. ("Textron") submitted a Revised Sampling Plan for the Spencer Kellogg facility in Newark, New Jersey to the New Jersey Department of Environmental Protection (NJDEP) in July, 1986.* Conditional approval of the Revised Sampling Plan was received from NJDEP on October 7, 1986. On behalf of Textron, ENVIRON Corporation implemented the approved sampling program during November and December, 1986, and into early January, 1987. Additional field measurements were made during February and March, 1987. This report presents the data gathered during the implementation of the Revised Sampling Plan and an interpretation of the results obtained. Additional collection of data will be necessary before an appropriate Cleanup Plan for the site may be designed. A Phase Two Sampling Plan will be submitted to NJDEP to address these data needs.

B. Site Description

The Spencer Kellogg facility is situated on the west bank of Newark Bay. The site is located across from the tip of Kearny Point, where the

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* Spencer Kellogg was formerly a division of Textron Inc. As authorized by the July 25, 1985, Textron Inc. Administrative Consent Order under ECRA, Textron sold this Spencer Kellogg facility (among others) to NL Industries, Inc. NL Industries, Inc. currently owns and operates this facility.

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Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Passaic and Hackensack Rivers join to form Newark Bay. The location of the facility is depicted on Figure 1. This site, which was formerly marshland, had been filled in by the early part of this century as evidenced by historical aerial photographs.*.

Discussions with former Textron employees indicate that this site has been used as a manufacturing facility since the first or second decade of this century. Formerly, the site was used as an alcohol distillery. Since the late 1930s, it has been used for the manufacture of resins. Some of the materials used in the resin manufacturing process are considered hazardous under ECRA.

The main features of this site are depicted on Plate 1. A concrete breakwall is located along Newark Bay and the northeast corner of the property. West of the property (on the other side of Doremus Avenue) is a landfill which is drained by Plum's Creek. The creek enters an underground flume, through which it flows under Doremus Avenue and the Spencer Kellogg facility. The underground flume discharges from a pipe in the breakwall into Newark Bay. The site, which is now paved, was not entirely paved throughout the entire period during which resin manufacturing took place at this facility.

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* The historical aerial photographs (stereo pairs) from 1940, 1951, 1961, 1969 and 1974 were submitted previously to NJDEP for this site.

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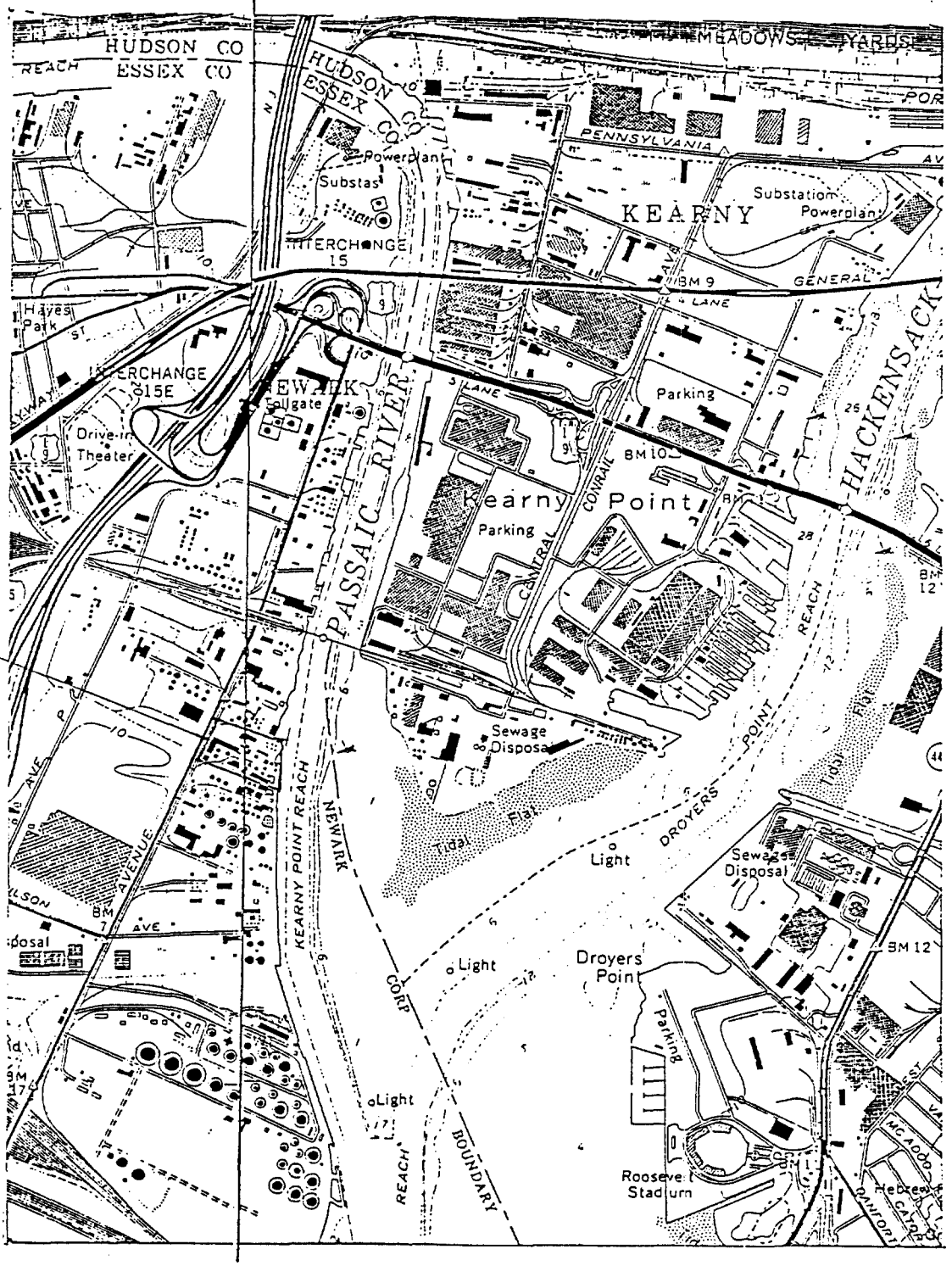
– Elizabeth, N.J., Quadrangle

Jersey City, N.J. Quadrangle –



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ENVIRON Counsel in Health and Environmental Science	USGS Topographic Map of Area Surrounding Site	Figure 1

C. Regional Geology

The Spencer Kellogg facility is located in the Piedmont Physiographic Province of New Jersey. The Triassic Brunswick Formation forms the bedrock beneath the site. In the Newark area, the top of the Brunswick Formation, which consists of non-marine, generally reddish-brown mudstone and siltstone, has eroded to form a bedrock valley. The axis of this valley runs north-south and is approximately 2 miles to the northwest of the Spencer Kellogg site. The valley floor along the axis lies about 200 feet below mean sea level (MSL). The bedrock at the site lies approximately 50 feet below mean sea level.*

The sediments between the top of the Brunswick Formation and the ground surface consist mainly of glacial till deposited during the Wisconsin Glacial Period in the Pleistocene Epoch. In central Newark, lacustrine and sandy clay overlain by stratified glacial drift fill the valley.

ENVIRON Corporation assisted in an ECRA soils and ground water investigation at a facility on Kearny Point, approximately one mile from the facility. The data gathered from this nearby site indicated the presence of two aquifers in this region. Therefore, a similar hydrogeology was expected at the site. The work performed by ENVIRON at the Spencer Kellogg site comfirmed the presence of two aquifers.

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* Nichols, William D., U.S. Geological Survey, Ground Water Resources of Essex County, New Jersey, Special Report No. 28, 1968.

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D. Rationale for the Sampling Program

Twenty-seven areas of environmental concern (AECs) were identified at this facility. Each area and the rationale for its selection as an AEC are described and discussed in the Revised Sampling Plan.* This information is summarized in Table 1. The AECs and each of the locations sampled during the implementation of the Revised Sampling Plan are depicted on Plate 1.

Soil borings were drilled in most of the AECs to determine if compounds defined as hazardous under ECRA were present and, if so, to determine the degree as well as the vertical extent of contamination. In some instances, monitoring wells were placed downgradient of AECs. This occurred where access with a drilling rig within an AEC was not possible and thus soils could not be sampled directly.

Additional shallow wells were installed to obtain ground water quality data at upgradient and downgradient locations as well as to supplement the hydrogeologic understanding of this site. Because of data obtained from another site in this area which suggested the presence of a deep aquifer, three clusters of deep and shallow wells were also installed to investigate the degree and extent of communication between the deep and shallow aquifers. Two of these well clusters (MW2, MW21,

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* The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

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and MW1, MW23) as well as the shallow well MW6 were placed to monitor the quality of the ground water entering the site based on the assumed direction of ground water flow toward the Bay.

To gain an understanding of the effect of the underground flume on the soil and water quality of the site, the sediments and the water were sampled at the point at which Plum's Creek enters the underground flume and at the outfall into Newark Bay. A background chloride sample was collected from Newark Bay.

In Building 26, several floor drains with an unknown point of discharge were identified. A dye test was conducted to determine where these drains discharge.

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Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Table 1: Areas of Environmental Concern

Area of Environmental Concern[1]	Rationale for Selection
1	Area of apparent resin spill onto cracked pavement.
2	Area of likely discharge onto unpaved region from dumpster and compactor which receive waste from buildings 31 and 32.
3	Area of potential spill of finished products (resins) during railroad car loading.
4	Area of likely discharge of vegetable oils and fish oils during railroad car unloading.
5	Area of likely discharge of phthalic anhydride during railroad car unloading.
6	Underground fuel oil tank.
7	Site of solvent tank truck unloading prior to and subsequent to area being paved.
8	"Underground" fuel oil tanks.[2]
9	Limited area of suspected contamination beneath building on stilts. Raw materials and finished products from polyester resin manufacturing process may have spilled through hole in the floor.
10	Current raw materials storage area. Before area was paved, area was used for finished product and raw materials storage.
11	Former above-ground storage tank located in unpaved area.

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1 The locations of the Areas of Environmental Concern are depicted in Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

2 These tanks appear to be mostly above ground level, but are covered with earth.

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Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Table 1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale
12	Building on stilts with apparent evidence of spills or discharges beneath.
13	Site of former above-ground storage tanks while area was unpaved.
14	Site of former above-ground storage tanks while area was unpaved.
15	Site of former drum storage while area was unpaved.
16	Site of former drum storage while area was unpaved.
17	Site of former drum storage while area was unpaved.
18	Site of fuel oil unloading in unpaved area with apparent evidence of spills.
19	Tank previously used for solvent sludge storage. Area within dike unpaved.
20	Location of former underground gasoline tank.
21	Site of former above-ground tank farm while area was unpaved.
22	Concrete pad on which 1285 Premix (a hazardous waste) has been stored in drums.
23	Tank wagon loading area for building 4 where 1285 Premix may be generated.

[1] The locations of the Areas of Environmental Concern are depicted in Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

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Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Table 1: Areas of Environmental Concern (continued)

Area of Environmental Concern[1]	Rationale
25	Tank wagon loading area for building 26 where 1285 Premix may be generated.
26	Drains in large tank farm which discharged to the ground in past. Drains are now plugged.
27	Drum storage area on unpaved ground (observed during April 9, 1986, DEP site inspection).
28	Area around the break in the pipe which carries runoff from the northern railroad siding (observed during April 9, 1986, DEP site inspection).

1 The locations of the Areas of Environmental Concern are depicted in Plate 1. The AECs are numbered 1 through 23 and 25 through 28. There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

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The Revised Sampling Plan describes in detail the proposed sampling program, including the locations and depths at which samples were to be collected and the analyses to be performed on each sample. Very few changes were made during the implementation of the sampling plan. These changes are described in Section II.F.

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II. METHODOLOGY -- A TECHNICAL OVERVIEW

A. Soil Borings

1. Drilling Methods

Most of the soil borings were drilled using a hollow stem auger. In some cases, other soil sampling methods were used including a hand auger, a split spoon driven with a sledge hammer, and a trowel. The soil borings were plugged with grout, and some were capped with asphalt. The drilling and plugging method used for each boring is described in the boring logs attached to this report as Appendix A. The boring logs also include the geologic log, the drilling specifications, a description of split spoons collected while drilling and a description of the collection depth and analysis to be performed on each sample collected for each boring.

2. Soil Sample Collection Methods

Soil samples were collected for analysis from each soil boring (except the pilot boring*) and from most of the wells. For the borings and the shallow wells, soil samples were collected at the surface (usually from a depth of 6 to 18 inches below the surface) and from the 1-foot segment of the soil column above the water

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* Before the deep wells were installed, a pilot boring was drilled down to the clay and silt layer beneath the deep aquifer to characterize the lithology at the site.

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table. Because of the high water table encountered at the site (usually between 2 and 4 feet below ground surface), the surface sample was often within one foot of the water table. Thus, at many locations only one sample was collected. From each of the deep wells in addition to the samples collected from near the surface, a soil sample was collected from immediately above the deep aquifer.

For the samples collected at the surface, the portion to be used for the volatile organics analysis was collected from the lower part of the sampling interval. Because of low split spoon recoveries in some of the split spoons collected, it was not possible to determine for these spoons what depth range the soil within the split spoon represented. Under these circumstances, the sample collected from the small quantity of soil within the split spoon was recorded as having been collected from the depth range of the entire split spoon.

B. Monitoring Wells

1. Shallow Well Construction

In general, the borehole for each shallow well was drilled with a hollow stem auger rig through the first water bearing unit to the top of the semi-confining unit. The well was then screened from the bottom of the aquifer to approximately 2 feet above the water table. The typical construction of the shallow wells is depicted on Figure 2.

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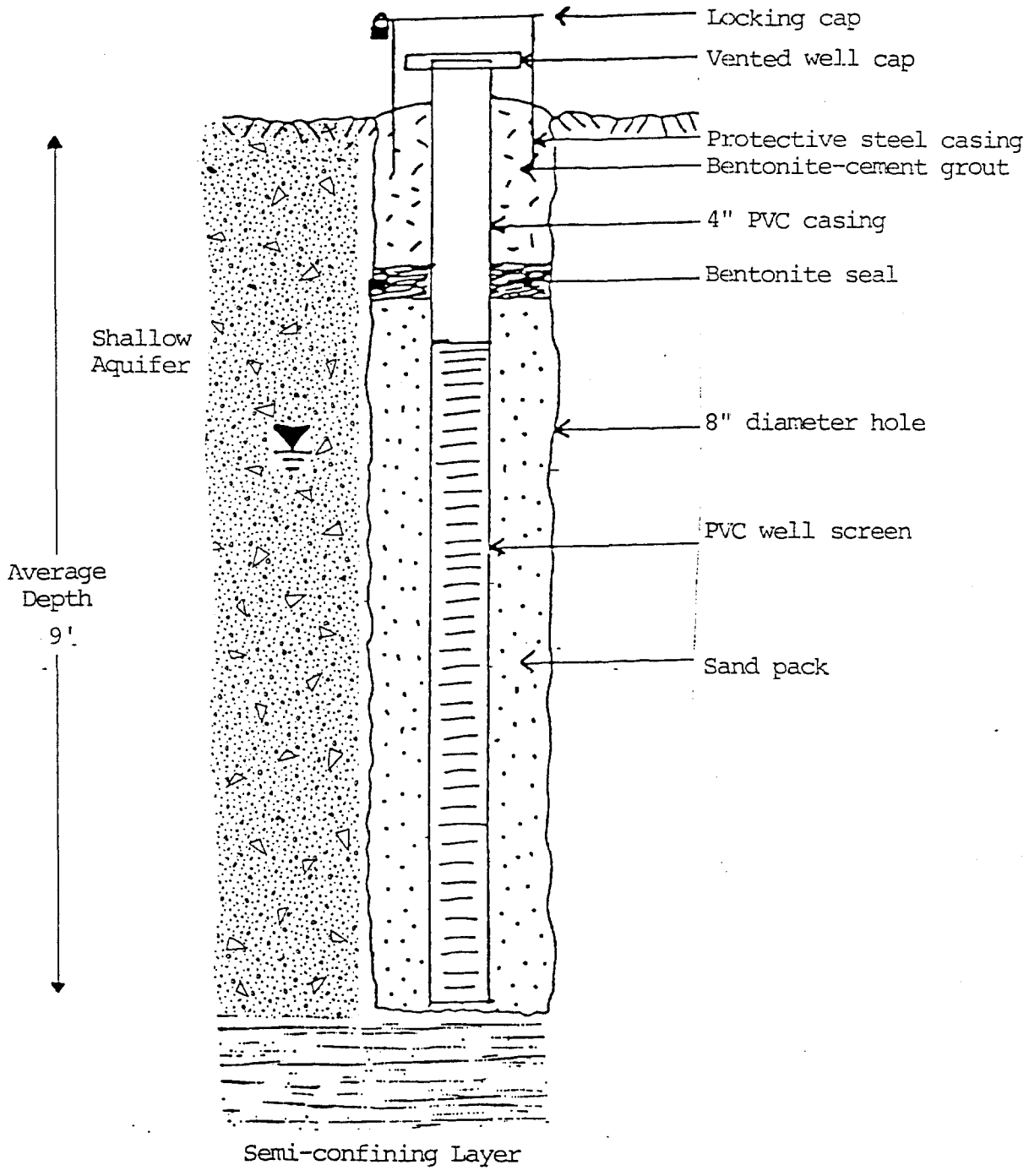

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SPECIFICATIONS FOR THE SHALLOW WELLS

Figure 2

Monitoring Wells 9 and 11, however, were not constructed in this fashion. These wells were installed to monitor underground tanks in AEC 20 and AEC 6, respectively. NJDEP requested that the wells be screened to the depth of the bottom of the underground tanks. To do so, each of these wells was installed and screened partially within the confining layer.

Detailed technical information on each of the monitoring wells is provided in the well specifications, included as Appendix B. The permit numbers, ground surface elevations, inner and outer casing elevations, and total depths for all of the shallow wells are summarized in the Summary of Well Data, included as Appendix C.

2. Deep Well Construction

The three deep wells are telescoped wells to prevent the downward migration of potentially contaminated ground water from the shallow aquifer. The boreholes for the outer casings were augered to a minimum of 1.5 feet into the semi-confining layer. The augers were then removed, the boreholes filled with cement grout, and outer steel casings installed. The grout was allowed to harden for at least 18 hours before construction continued.

The inner casing was installed by using mud rotary to drill through the outer casing and down to the confining layer beneath the lower aquifer. The well was screened over the entire lower aquifer. The typical construction of the deep wells is depicted on Figure 3.

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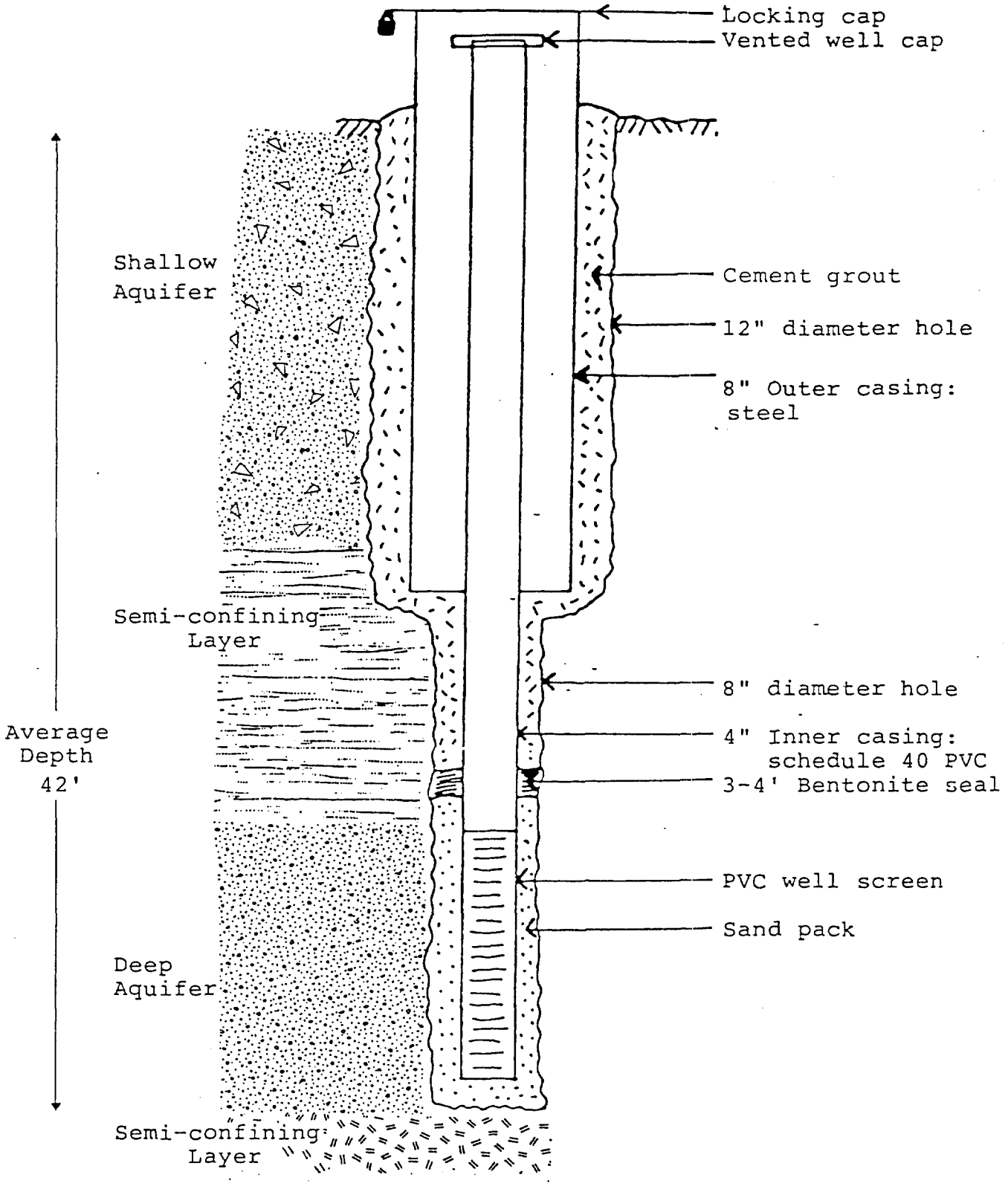

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SPECIFICATIONS FOR THE DEEP WELLS

Figure 3

Detailed information concerning the monitoring wells are included in Appendix B. The permit numbers, ground surface elevations, inner and outer casing elevations, and total depths for each of the deep wells are also included in the Summary of Well Data (Appendix C).

3. Well Completion

Two types of well completion were used: flush mounts and stick ups. To avoid obstructing operations at the facility, shallow wells MW3 and MW4 and the deep well/shallow well cluster MW8 and MW22 were completed flush with the ground surface. For each of these wells, the outer casing extends to the ground surface and is capped with a curb box. The inner casing was cut off approximately 0.5 feet below the ground surface and was covered with a locking cap.

All other monitoring wells were completed with a two foot stick up. The PVC inner casing and the stainless steel protective casing (for the shallow wells) or outer casing (for deep wells) were cut off approximately 2 feet above the ground surface. A vented cap was placed on the inner casing and a locking cap was placed on the stainless steel casing.

4. Monitoring Well Development

Empire Soils Investigations, Inc. developed all 14 monitoring wells between November 17 and November 24, 1986. Empire pumped each

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of the shallow wells, except MW7, using a centrifugal vacuum pump. MW7 and the three deep wells were developed using air surging. Each of the monitoring wells was developed properly to remove most of the fines from the well. Except for MW11, each of the wells was developed either for an hour or until 55 gallons of water had been removed. MW11 was developed for one-half hour and yielded 45 gallons. The rates of yield, estimated from development times, ranged from 0.08 to 16 gallons per minute. The well development data, including the type of pump used, the development time, the total yield, the rate of yield, and a description of the water removed is summarized in Appendix D.

5. Monitoring Well Sampling Methods

The monitoring wells were sampled by Century Laboratories, Inc., a state certified laboratory. Monitoring Wells 3 through 11 and 21 through 23 were purged of between 3 and 5 volumes of water or pumped until dry before sampling, as is consistent with NJDEP and RCRA* requirements. MW1 was purged in the same manner, however, due to an inadvertant omission, these data were not recorded. The temperature, pH, and conductivity of the water being purged were monitored at regular intervals during the purging of most of these wells. Because of equipment problems, for a few of the wells only two of these parameters were monitored. Water samples were not

* Resource Conservation and Recovery Act

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collected until these parameters had stabilized indicating that the water was being drawn from the aquifer rather than the stagnant zone around each well. The data collected while purging are summarized for each well in Appendix E.

After the purging was completed, each well was allowed to recover before a sample was collected. The time elapsed between the completion of the purging and the collection of the sample did not exceed two hours.

The sampling method, the number of well volumes removed and the time elapsed between purge completion and sample collection are included for each well in the Supplementary Well Sampling Data. This supplementary data can be found in Appendix E.

6. Tidal Influence Investigation

To characterize the nature and extent of tidal influence on the ground water, water levels were monitored in both the shallow wells and the deep wells. On December 10, 1986, water levels at each of the 14 monitoring wells were measured over a complete tidal period. Measurements were taken on approximately an hourly basis, with a total of 14 measurements per well. On February 24, 1987, a series of depth to water measurements were taken from each monitoring well near high tide and again near low tide to confirm the patterns observed in the December, 1986, measurements. On March 5, 1987, the water elevation of the Bay and of the three wells located nearest to

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the Bay (Monitoring Wells 7, 8 and 9) were measured near hightide. Water samples were collected from each of the wells for chloride analysis at the time each well was sampled for other analyses to determine the salinity of the ground water in each of these locations.

C. Underground Flume Sampling

To characterize the water quality of the underground flume, samples were collected simultaneously at the point at which Plum Creek enters the flume and at the outfall into Newark Bay (the Bay). Water and sediment samples were collected at the inflow location to the underground flume. Because no sediment was present at the outfall of the flume, only a water sample was collected from that sampling location. These samples were collected at low tide.

Chloride samples were taken to monitor the degree of tidal flushing within the flume. The chloride samples were collected from the inflow to the flume, the outfall to the Bay which is normally under water except at very low tides, and from the Bay at a point upgradient from the outfall. Because the samples were collected at low tide, the upgradient Bay sample, collected from north of the outfall, is likely to have a lower chloride concentration than a Bay sample collected at high tide. The sampling locations are indicated on Plate 1.

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D. Quality Assurance/Quality Control Measures

1. Decontamination Procedures

All sampling equipment, including split spoons, hand augers and trowels were decontaminated by steam cleaning with potable water before the collection of each sample. In addition, the augers and other downhole drilling equipment were steam cleaned between each hole. To avoid cross-contamination between samples, fresh gloves were used to collect each sample.

2. Control Samples

To provide quality control, duplicate samples, field blanks, and trip blanks were collected in the manner described in the Revised Sampling Plan. Twenty-three duplicate analyses were performed on samples collected during the sampling program. Eleven field blanks were collected and analyzed for the same parameters for which samples were collected during the day the field blank was collected. In addition, a total of seven trip blanks were collected and analyzed for volatile organic compounds plus a forward library search (VOC+15).

E. Deviations from the Revised Sampling Plan

Several minor changes were made to the Revised Sampling Plan, both before and during the implementation of the sampling program. Each of these changes is described below. Many of these modifications were

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discussed with NJDEP by telephone and in correspondence, and approval from NJDEP was received. Reference to specific conversations or correspondence, where appropriate, is incorporated into the descriptions provided below.

- The system for numbering soil borings was changed after the submission of the Revised Sampling Plan. In the new numbering system, the first one or two digits refer to the AEC number while the last two digits specify the particular boring within that AEC. For example, the three borings in AEC 12, formerly numbered 64, 74, and 75, are now numbered 1201, 1202, and 1203.
- The water table at the site was found to be quite high. At most locations it was found between 2 and 4 feet below ground surface. The Revised Sampling Plan had proposed the collection of two soil samples above the water table, one at the surface and one in the 1-foot segment above the water table. In several locations, the water table was so high that only one soil sample was collected. The AECs in which this occurred were AECs 2, 3, 7, 13, 14, 15, 16, 17, 18, 21, 25, 27, and 28. For the same reason, only one soil sample was collected above the water table in Monitoring Wells 5 and 21.
- As described in the September 26, 1986, letter to Christine Hylemon, the NJDEP Case Manager, the locations of the well cluster MW2 and MW21, as well as the shallow wells MW5 and MW6 were moved slightly to avoid obstructing operations at the plant. For this

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same reason, well clusters MW8 and MW22 and the shallow well MW3 were installed flush to the ground surface. The shallow well MW4, which ENVIRON had initially proposed to move to avoid obstructing operations, was installed flush to the ground because a suitable location which did not obstruct operations could not be found.

- In the October 2, 1986, conditional approval of the Revised Sampling Plan, NJDEP requested that Textron collect three random surface soil sample to analyze for metals. In a November 13, 1986, telephone conversation with Phil Sandine, the NJDEP Technical Coordinator for the case, ENVIRON discussed the reasons against performing this sampling at this time. It was agreed during this telephone conversation that sampling for background metal concentrations would be postponed until (1) it was established that priority pollutant metals in concentrations in excess of the Bureau of Industrial Site Evaluation (BISE) informal guidelines were indeed present at the site, and (2) an appropriate method for evaluating background metal levels was agreed upon. These issues are discussed in greater detail in the December 31, 1986, letter to Christine Hylemon from ENVIRON.
- Due to an error on the part of the analytical laboratory, the PCB/pesticide portion of the Priority Pollutant + 30 (PP+30) analysis was conducted on both soil and water samples undergoing the PP+30 analysis although this portion of the analysis had been specifically excluded in the Revised Sampling Plan.

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- In AECs 1, 2, 5, and 9, analysis of the samples for maleic anhydride and phthalic anhydride had been proposed. No methods for analyzing either of these compounds in soil have been established. Century Laboratories, however, after researching potential methods and discussing a variety of analytical approaches with both technical staff of the United States Environmental Protection Agency and with quality assurance/quality control staff of NJDEP, designed a method for analyzing for these two compounds. Due to difficulties encountered while attempting to extract the samples to prepare them for analysis, the laboratory has been unable to obtain any analytical results. At this time, Century Laboratories is not aware of any workable method for analyzing for either maleic anhydride or phthalic anhydride in soils.
- As described in ENVIRON's September 26, 1986, letter to Christine Hylemon, an additional boring was proposed in AEC 3 after an apparent spill was observed during a site visit.
- In the October 2, 1986, NJDEP conditional Sampling Plan approval, NJDEP requested that the samples in AEC 4 be analyzed for volatiles and total petroleum hydrocarbons (TPHC) in addition to the proposed fingerprint analysis. These analyses were performed as requested. In addition, NJDEP requested that the portion of the sample to be analyzed for volatiles be collected from 6 to 12 inches. This was done at Boring 401. However, at Boring 402 the

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sample to be analyzed for volatiles was inadvertently collected from 0 to 6 inches.

- Downgradient of AEC 6 (an underground fuel oil tank), MW11 was constructed as proposed. Because of underground obstructions encountered while attempting to drill MW11 (apparently foundations from former buildings in this area), this well was installed slightly further downgradient from the underground tank than originally proposed. The two borings in which obstructions were encountered were labeled Borings 601 and 602. The soil samples which were to have been collected from MW11 were collected from Boring 601 instead.
- To gain access to AEC 9, a hole was to be drilled through the floor of Building 16 so that soil samples could be collected from beneath the building. NJDEP requested in the October 2, 1986, conditional Sampling Plan approval that the sample to be analyzed for volatile organics be collected from a depth of 6 to 12 inches. When the concrete floor was cored through, a resin-type material was encountered, instead of the expected two-foot air space. This material could not be penetrated because of its hardness and therefore the soil beneath could not be reached. Instead, a split spoon was driven with a sledge hammer into this material and the material sampled.
- In the October 2, 1986, conditional approval, NJDEP requested that the samples to be analyzed for volatile organics in AEC 12 be

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collected from a depth of 6 to 12 inches. Because of the consistency of the soil encountered under Building 4, the difficult sampling conditions, and the constraints imposed by the necessary safety gear, it was not possible to go down to a depth of one foot for Borings 1202 and 1203. Therefore, for these two borings, the samples to be analyzed for volatile organics were collected from depths of 0.4 to 0.7 feet and 0.0 to 0.5 feet, respectively.

- A review of the historical aerial photographs and further discussions with former Textron employees at the facility revealed that the actual location of AEC 13, a former tank farm, is slightly south of where it was originally believed to have been present. Its adjusted location is indicated on Plate 1. The three soil borings proposed for this AEC were placed within the adjusted location.
- In the conditional approval of October 2, 1986, NJDEP requested that three borings instead of one boring be placed in each of the following AECs: 13, 14, 15, 16, and 21. These additional borings were drilled as requested.
- Boring 1702 from AEC 17 and the samples collected from it were inadvertently labeled Boring 1502. This error has been noted and corrected in the text and figures. The three borings from AEC 15 are labeled 1501, 1502 and 1503.

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- In AEC 18, the sample from Boring 1801 to be analyzed for polycyclic aromatic hydrocarbons (PAHs) was inadvertently not collected.
- As described in ENVIRON's letter to Christine Hylemon of September 26, 1986, ENVIRON proposed to place a boring within AEC 19. This boring, 1901, was collected and analyzed for TPHC and VOC+15.
- In AEC 22, ENVIRON had proposed to collect a soil sample from the thin layer of soil on top of the pad on which Tank 301 had been located. However, NL Chemicals which currently owns and operates the facility had cleaned all of the soil off of this pad. This step had been taken to comply with a request associated with NL Chemicals' attempt to delist the plant as a RCRA Treatment, Storage and Disposal facility. Because the soil was cleaned off of the pad and placed in a pile before the implementation of the sampling program began, ENVIRON discussed alternative sampling for this area with Christine Hylemon on October 16, 1986. ENVIRON was instructed to collect the soil sample from the pile of soil. This sample was collected during the implementation of the Revised Sampling Plan.
- As described in ENVIRON's September 26, 1986, letter to NJDEP, the area designated at AEC 24 was combined with the area designated as AEC 1 and is now called AEC 1. Therefore, there is no AEC 24.
- As described in the September 26, 1986, letter from ENVIRON to NJDEP, no sampling was performed in AEC 26 because the drains

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which were to have been sampled had been plugged by NL Chemicals in order to comply with Discharge Prevention Control and Countermeasure Plan requirements.

- At MW1, where no soil samples had been proposed, duplicate soil samples were collected above the water table and analyzed for the parameters proposed for MW23. Soil samples were collected from MW23 as well. MW1 and MW23 form the well cluster at the northwest corner of the property.
- At MW6, no soil sample was collected immediately above the water table. Instead, the lower soil sample was mistakenly collected from below the water table at a depth of 6 to 7 feet.
- At the well cluster of MW8 and MW22, the surface soil sample to be collected from MW22 had insufficient recovery for sample collection. This surface sample was collected from MW8 instead.
- At MW9, the full PP+30 analysis was performed on the soil samples collected instead of just the VOC+15 analysis which had been proposed.
- At sampling location 32, the outfall of the underground flume into Newark Bay, sediment samples as well as water samples had been proposed. There was no sediment present at the outfall, so only a water sample was collected from this location.

F. Analytical Laboratory

All of the samples collected at this site were analyzed by Century Laboratories, Inc., of Thorofare, New Jersey. This laboratory is a state

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certified laboratory. Under the direction of ENVIRON Corporation, Century Laboratories also collected the water samples from each of the monitoring wells.

G. Surveying of Sampling Locations

After the sampling program was completed, the physical features of this site as well as the locations and elevations of the monitoring wells and most of the borings were surveyed by James M. Stewart Inc. of Philadelphia, Pennsylvania, a licensed surveyor. ENVIRON personnel measured the locations of certain borings. The ground surface elevations and coordinates available from the surveyor are included in this report as Appendix G.

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III. GEOLOGIC AND HYDROGEOLOGIC RESULTS

A. Site Geology

1. Topography

The site, which is approximately 6 feet above sea level, is relatively flat. The ground surface elevation varies by less than 2 feet across the site. In some areas, the ground surface is somewhat uneven where the fill has subsided around the pilings which supported former structures on the site. The topographic map of the site is included as Figure 4.

2. Site Stratigraphy

Four distinct geologic units were encountered while drilling at this site. The upper unit is comprised of fill material. Beneath this lies a layer of clay, silt and peat. A unit of sand with some gravel lies beneath the clay, silt and peat layer. This sand and gravel unit is underlain by a clay and silt unit. Each of the geologic units and their average thicknesses are depicted on the Generalized Geologic Column, Figure 5. A discussion of each of the units is included below. A more detailed description of the geology encountered at each sampling location is provided in the boring logs and in the well specifications (Appendices A and B).

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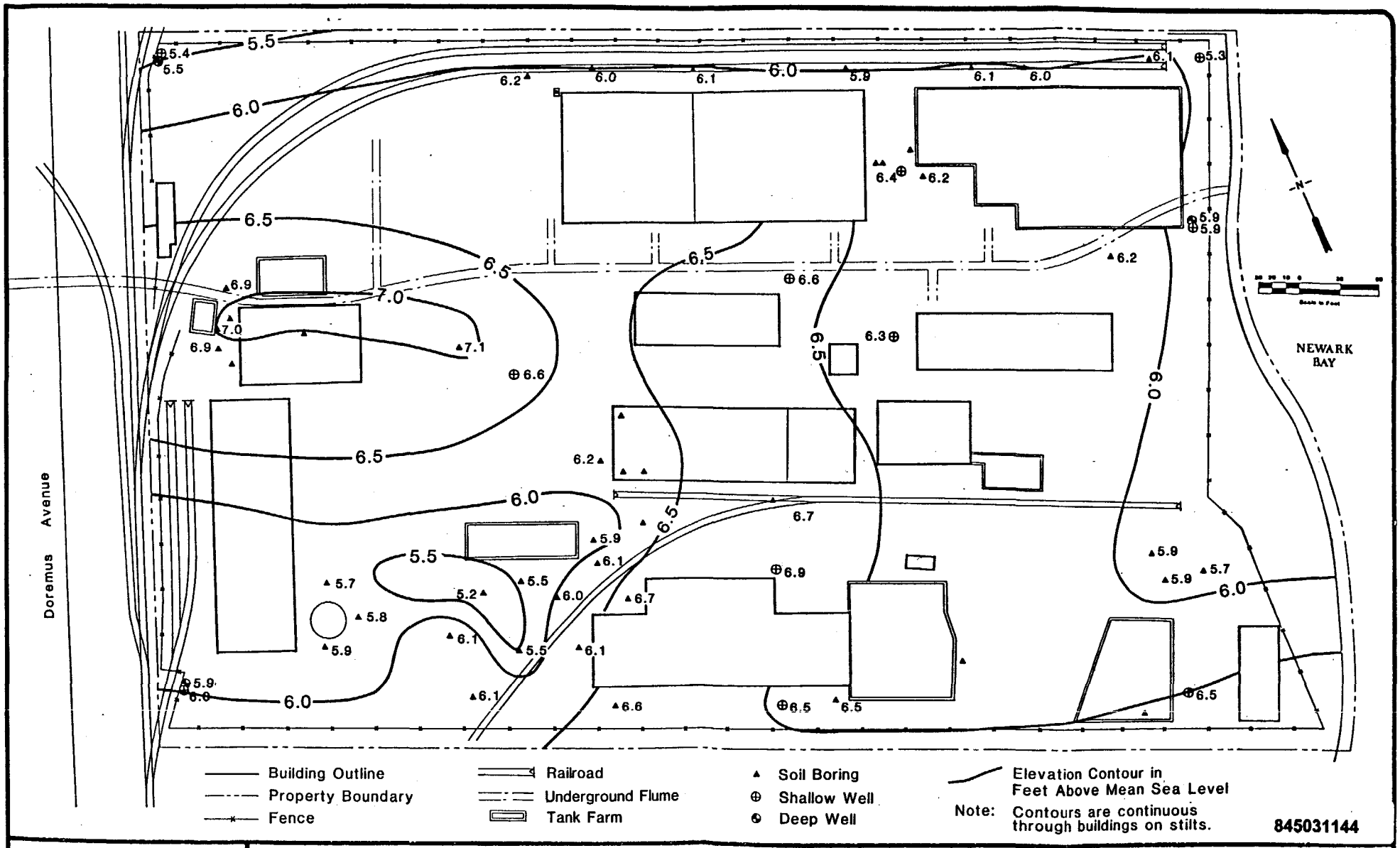

Figure: 4

Topographic Map

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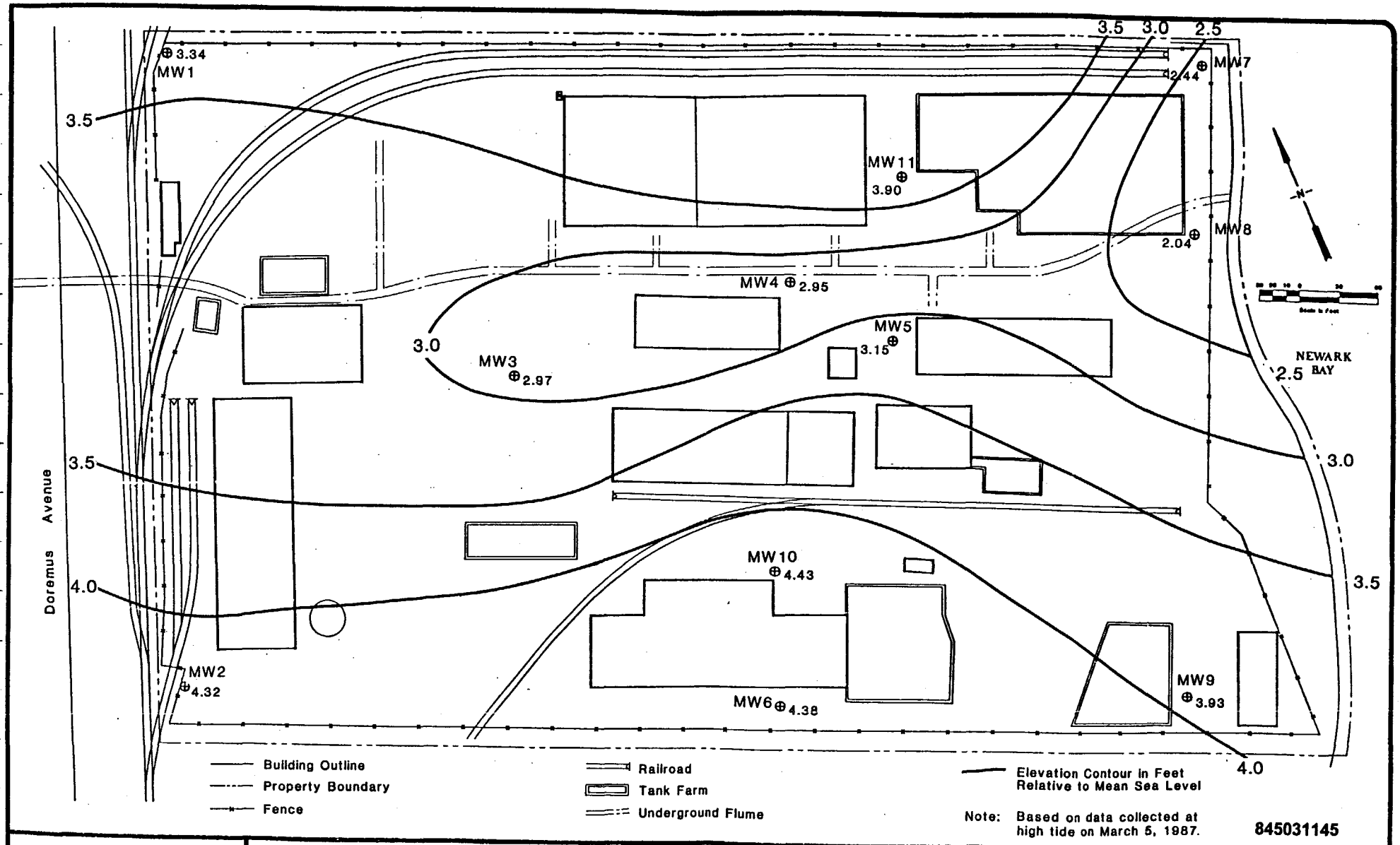

Figure: 9

Shallow Aquifer Water Table

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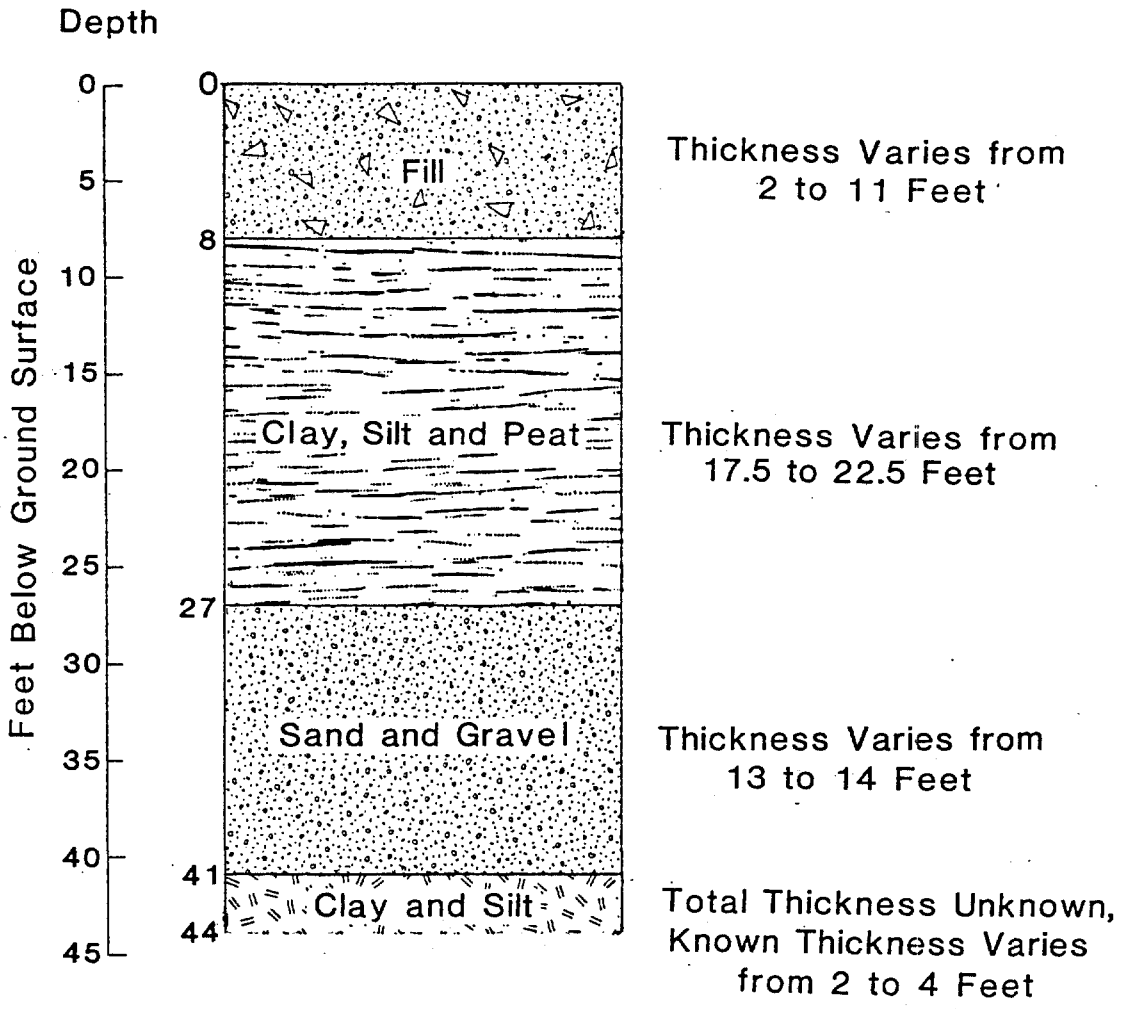

Thickness shown in column is an average thickness over the entire site compiled from the fourteen sets of well data.

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Generalized Geologic Column
Spencer Kellogg Site
Newark, New Jersey

Figure 5

3. Fill Unit

The upper unit is comprised of fill material. The fill has an average thickness of 8 feet, but varies in thickness from 2 to 11 feet across the site. The fill material is composed primarily of sand and gravel mixed with other materials including crushed brick, glass and pottery fragments, and cinders.

The fill unit is depicted in greater detail in the Shallow Well Fence Diagram (Plate 2). The fence diagram gives a three-dimensional view of the fill layer and the top of the underlying clay, silt and peat unit based on the geologic logs from each of the shallow wells. The depth of the fill unit is relatively constant throughout the site.

As the fence diagram indicates, native soils between the fill unit and the clay, silt and peat unit were encountered at two of the well locations. Around Monitoring Well 2, a sand and gravel layer was encountered, and at Monitoring Well 7, a silt and sand layer was encountered. Throughout the rest of the site, no other layers were found between the fill unit and the clay, silt and peat unit.

The interface between the fill unit and the clay, silt and peat unit generally follows the contours of the ground surface. Near Newark Bay, the interface slopes gently toward the south, as indicated on Figure 6, a geologic cross-section from MW9 to MW7. Near the center of the site, the clay, silt and peat unit is mounded around MW10 and MW11 and forms basins around MW6 and MW7 as depicted

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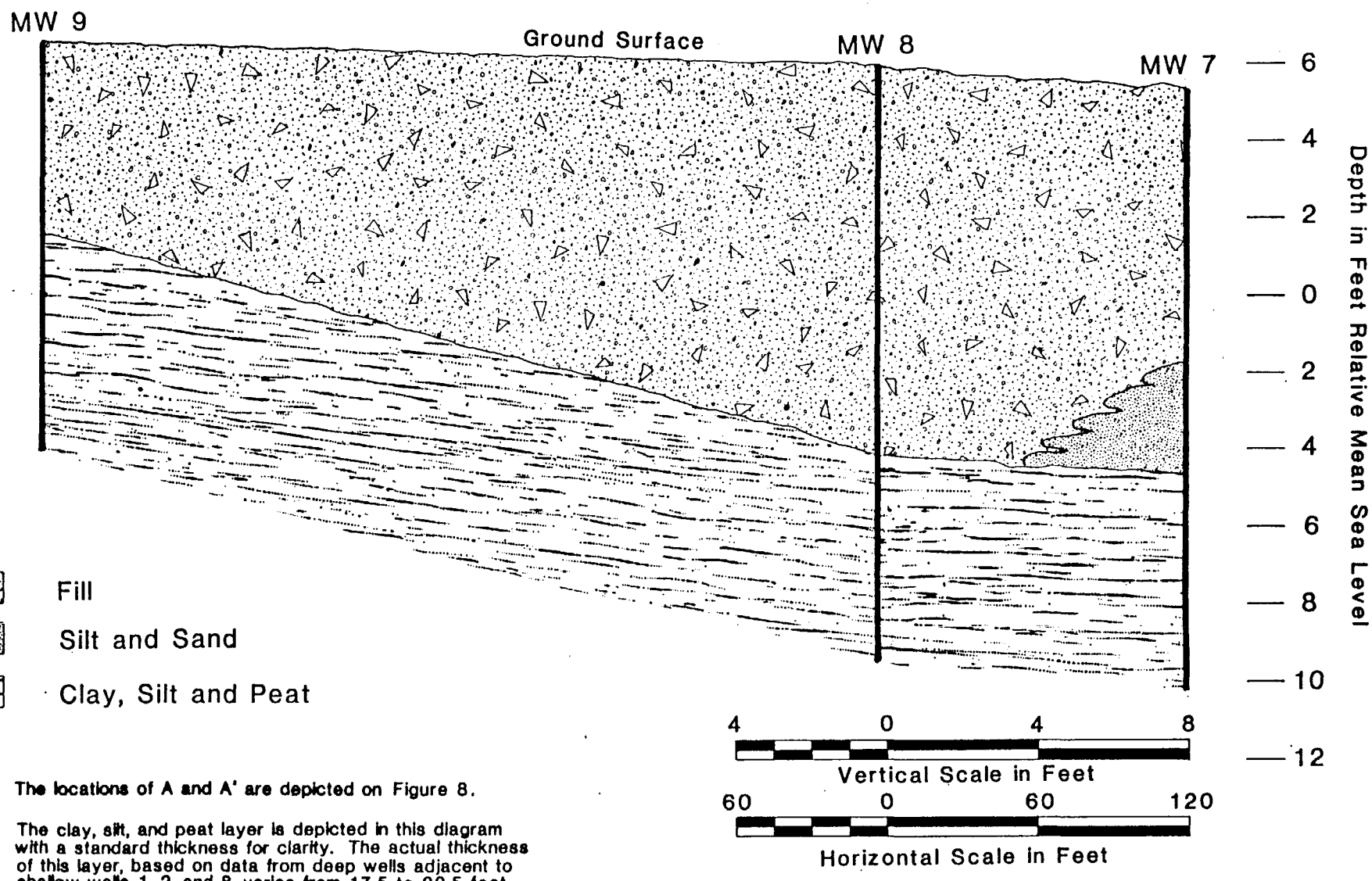

Note: The locations of A and A' are depicted on Figure 8.

Note: The clay, silt, and peat layer is depicted in this diagram with a standard thickness for clarity. The actual thickness of this layer, based on data from deep wells adjacent to shallow wells 1, 2, and 8, varies from 17.5 to 22.5 feet.

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Geologic Cross-Section From A to A'

Figure 6

on Figure 7. The locations of these cross-sections are shown on Figure 8.

4. Clay, Silt and Peat Unit

The unit which lies beneath the fill is comprised of clay, silt and peat. It extends to an average of 19 feet below the bottom of the fill unit. Its thickness appears to change very little across the site, ranging from 18 to 22 feet. The relative concentrations of the clay, silt and peat within this unit vary both vertically and horizontally throughout the site. This unit is characterized by a black to dark grey color. Fossil bivalves were sometimes found within this unit. The peat varied from poorly decomposed to well decomposed, depending on the location and depth. This unit appears to be a swamp deposit.

5. Sand and Gravel Unit

The third unit is composed primarily of well sorted sand with some gravel. The unit varies in thickness from 13 to 14 feet across the site. The sand is fine to medium-grained at the top of this layer and increases in coarseness with depth. This unit appears to be a fluvial deposit.

The Deep Well Fence Diagram (Plate 3) depicts the geology encountered while drilling the three deep wells and the pilot boring. The uniform thickness of this unit is illustrated by this diagram.

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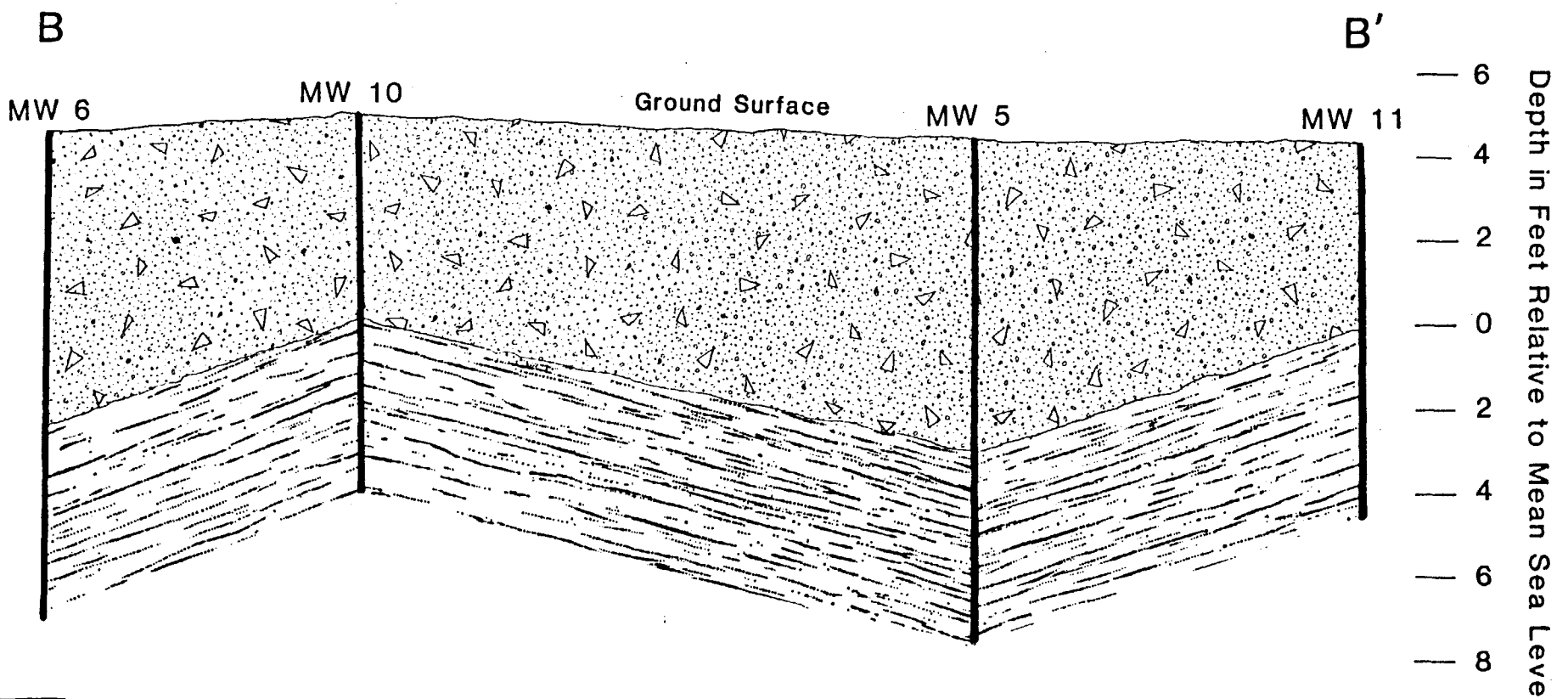

Note: The locations of B and B' are depicted on Figure 8.

Note: The clay, silt, and peat layer is depicted in this diagram with a standard thickness for clarity. The actual thickness of this layer, based on data from deep wells adjacent to shallow wells 1, 2, and 8, varies from 17.5 to 22.5 feet.

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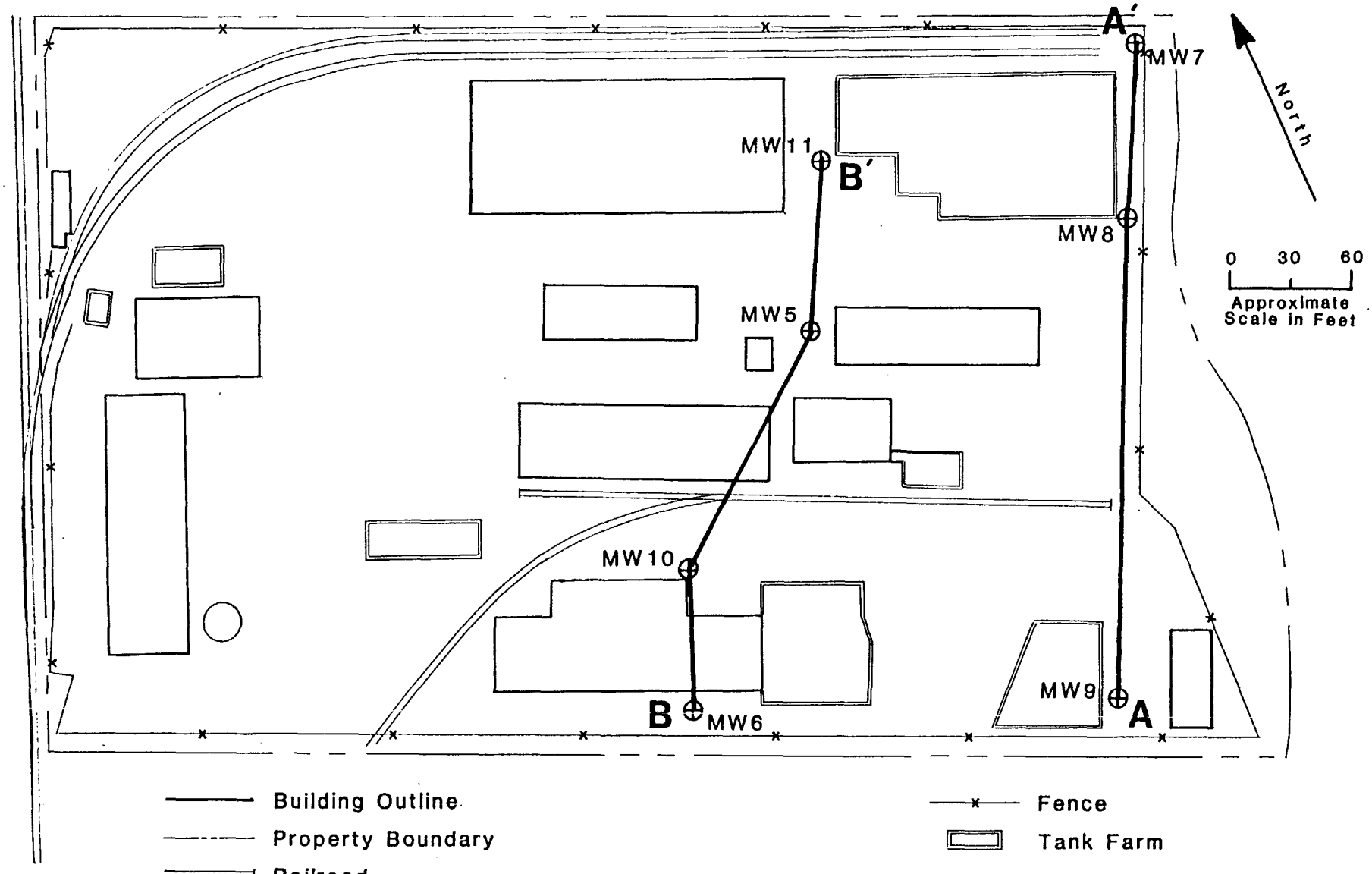
Geologic Cross-Section From B to B'

Figure 7



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Locations Of Geologic Cross-Sections

Figure 8

6. Deep Clay and Silt Unit

Beneath the sand and gravel unit lies a clay and silt unit. Because no drilling extended to more than 2 to 4 feet into this layer, the total thickness is unknown. The relative concentrations of the clay and silt varied among the locations at which this layer was encountered. This clay and silt layer is characterized by a reddish-brown color.

B. Site Hydrogeology

1. Introduction

Ground water beneath the Spencer Kellogg facility occurs in two aquifers separated by a semi-confining layer. The shallow aquifer, semi-confining layer and deep aquifer coincide with (1) the fill unit, (2) the clay, peat and silt unit and (3) the sand unit, respectively. These units have been described in Section A.

2. Shallow Aquifer

The fill unit in which the shallow aquifer is located consists of poorly sorted, coarse grained material with a relatively high porosity and permeability. The flume is located within this aquifer. It has its intake at Plum's Creek, west of the facility and its outfall at Newark Bay. The flume is believed to be constructed of half of a pipe originally approximately 36 inches in

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diameter and covered by wood. Its invert is believed to be located below the depth of the water table.

A map of the water table was constructed using depth to water measurements from the shallow wells, as shown in Figure 9. The depth to water across the site is approximately 2 to 4 feet. The water table appears to follow the general topography. For example, ground water in the vicinity of Monitoring Well 10, which is located on a slight topographic high, is relatively shallow.

The sides of Newark Bay drop off sharply just beyond the breakwall to form a deep shipping channel. Twenty-five feet east of the property, the depth of the channel is approximately 20 feet below mean sea level. Because the fill unit extends no more than 5 feet below mean sea level and the breakwall extends deeper than this, the shallow aquifer does not continue into the Bay, but ends at the breakwall.

The flow of ground water within the shallow aquifer is affected by several factors. The underground flume apparently acts as a lined sink for ground water flow. As depicted on Figure 9, the direction of ground water flow is toward the underground flume. The breakwall along Newark Bay is constructed of broken boulders and concrete blocks covered by poured cement and extends to a depth of at least 11 feet below the ground surface. This wall and the breakwalls of neighboring facilities to the south and north prevent the ground water from discharging directly into Newark Bay. As a

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result, shallow ground water flows parallel to the shore except where breaks in this barrier occur, such as at the flume outfall.

Building foundations appear to obstruct the flow of shallow ground water in some areas. For example, ground water in the vicinity of Monitoring Well 11 is relatively high. The area surrounding Monitoring Well 11 is one of the few unpaved areas at this site and may act as an area of recharge. However, flow away from this area appears to be restricted by a foundation of a former building in this area, and the foundations of Building No. 31, the large tank farm and the grain silo. These barriers may cause ground water to mound at this location.

3. Semi-Confining Layer

The clay, silt and peat unit, which underlies the fill unit across the site, acts as a semi-confining layer. This swamp deposit has low permeability and restricts the vertical flow of water between the shallow and the deep aquifers.

The permeability of the clay, silt and peat unit beneath Newark Bay is unknown. Because Newark Bay drops off to a depth of 20 feet below sea level very close to the facility, it is likely that the clay, silt and peat unit is partially eroded away under Newark Bay. In addition, this layer may undergo a facies change beneath the Bay, possibly grading into more permeable sediments.

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4. Deep Aquifer

The sand unit described in Section A constitutes the deep aquifer. These well sorted fluvial sediments possess moderate porosity and permeability. This aquifer is artesian, and water levels in the deep wells are approximately 4 feet below the ground surface. Water elevation measurements from the deep wells in this aquifer are shown in Figure 10. Ground water flow in this aquifer does not appear to be obstructed. The general flow direction is from west to east, into Newark Bay.

Underlying the deep aquifer is another semi-confining layer. This clay and silt unit was encountered by each of the deep wells. The clay and silt unit is dry and appears to be restricting vertical flow of ground water.

5. Tidal Influence

The proximity of the site to Newark Bay results in tidal fluctuations of water levels in several of the monitoring wells installed at the facility. Water level fluctuations of approximately five feet per tidal cycle are observed in Newark Bay. To determine if this fluctuation influences the direction of the flow of ground water at this site, several rounds of depth to water measurements were taken throughout a complete tidal cycle. These measurements and predicted water level elevations for Newark Bay are graphically presented in Figures 11 through 14.

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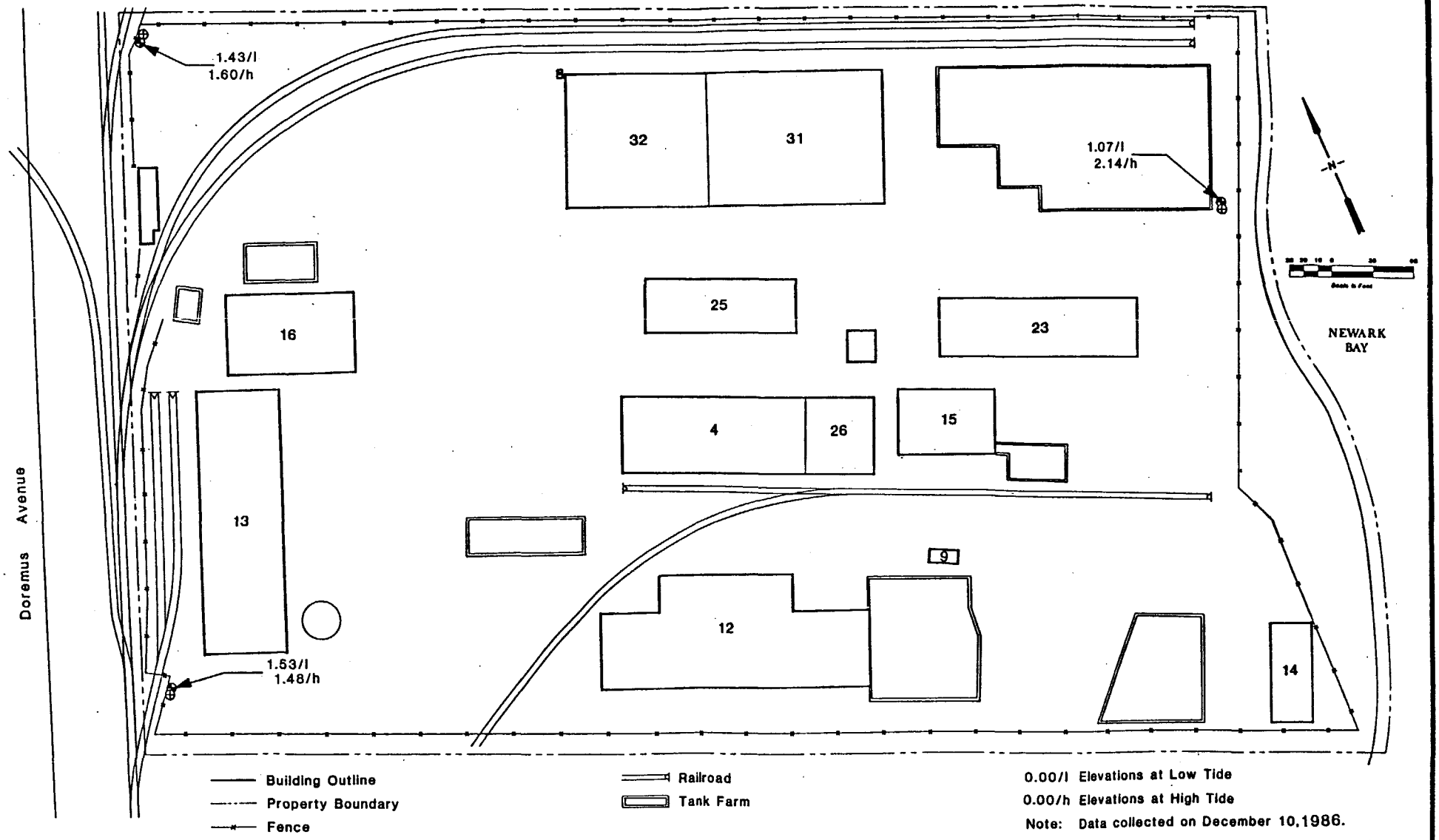

Figure: 10

Deep Aquifer Water Elevations

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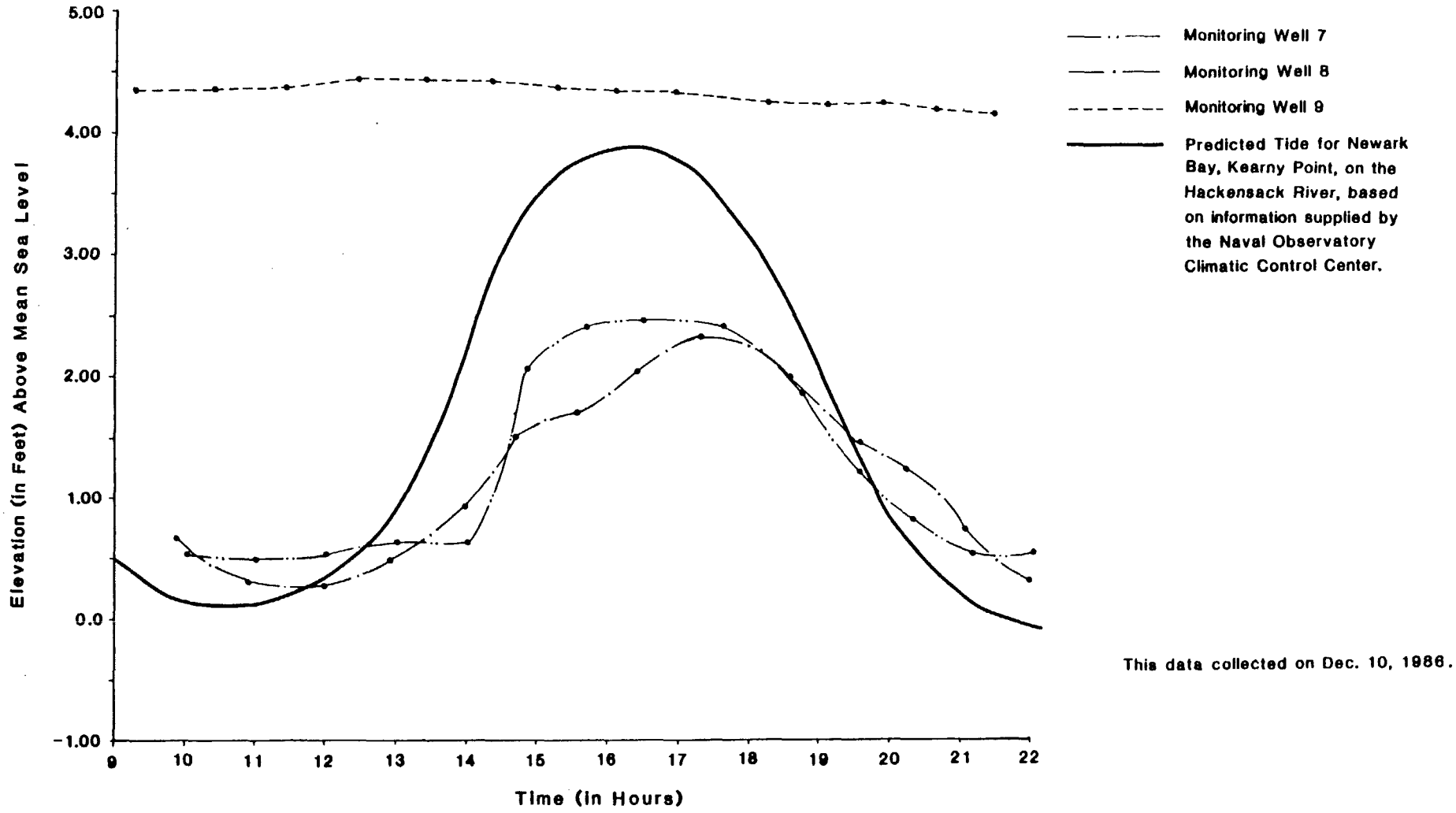

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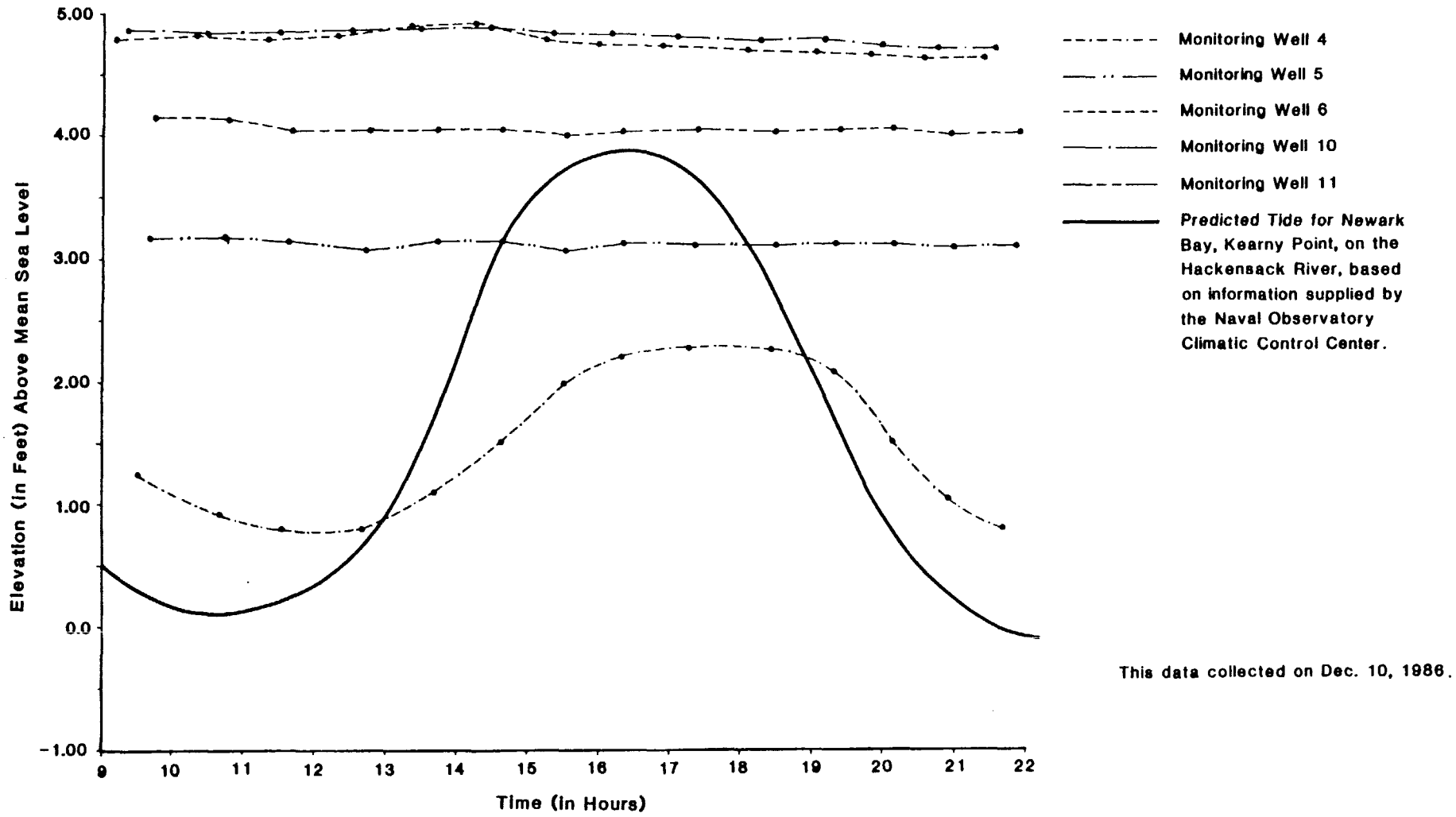
Tital Variations in Monitoring Wells:
MW7, MW8 and MW9

Figure
11



This data collected on Dec. 10, 1986.

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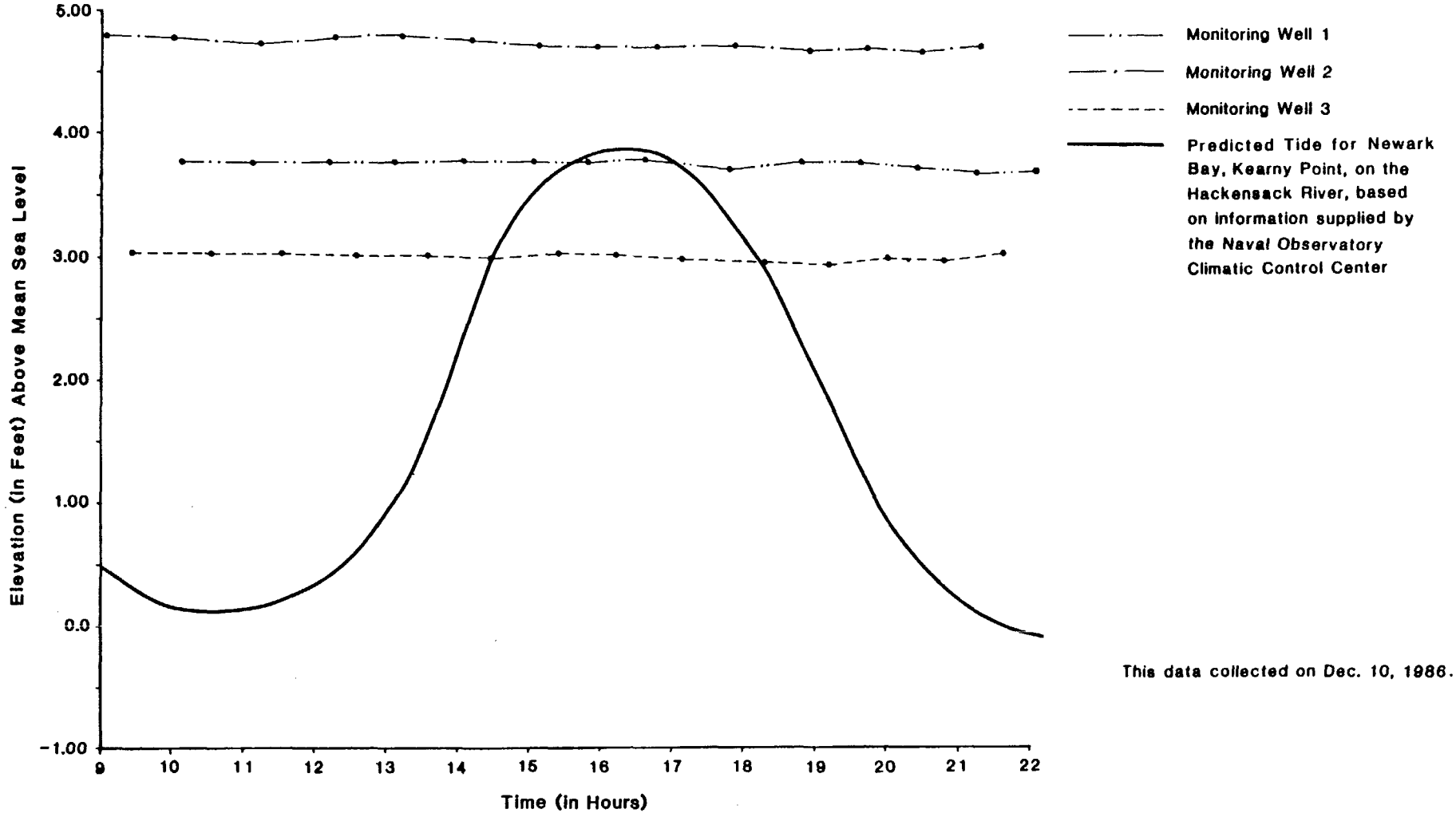
Tidal Variations in Monitoring Wells:
MW4, MW5, MW6, MW10 and MW11

Figure
12



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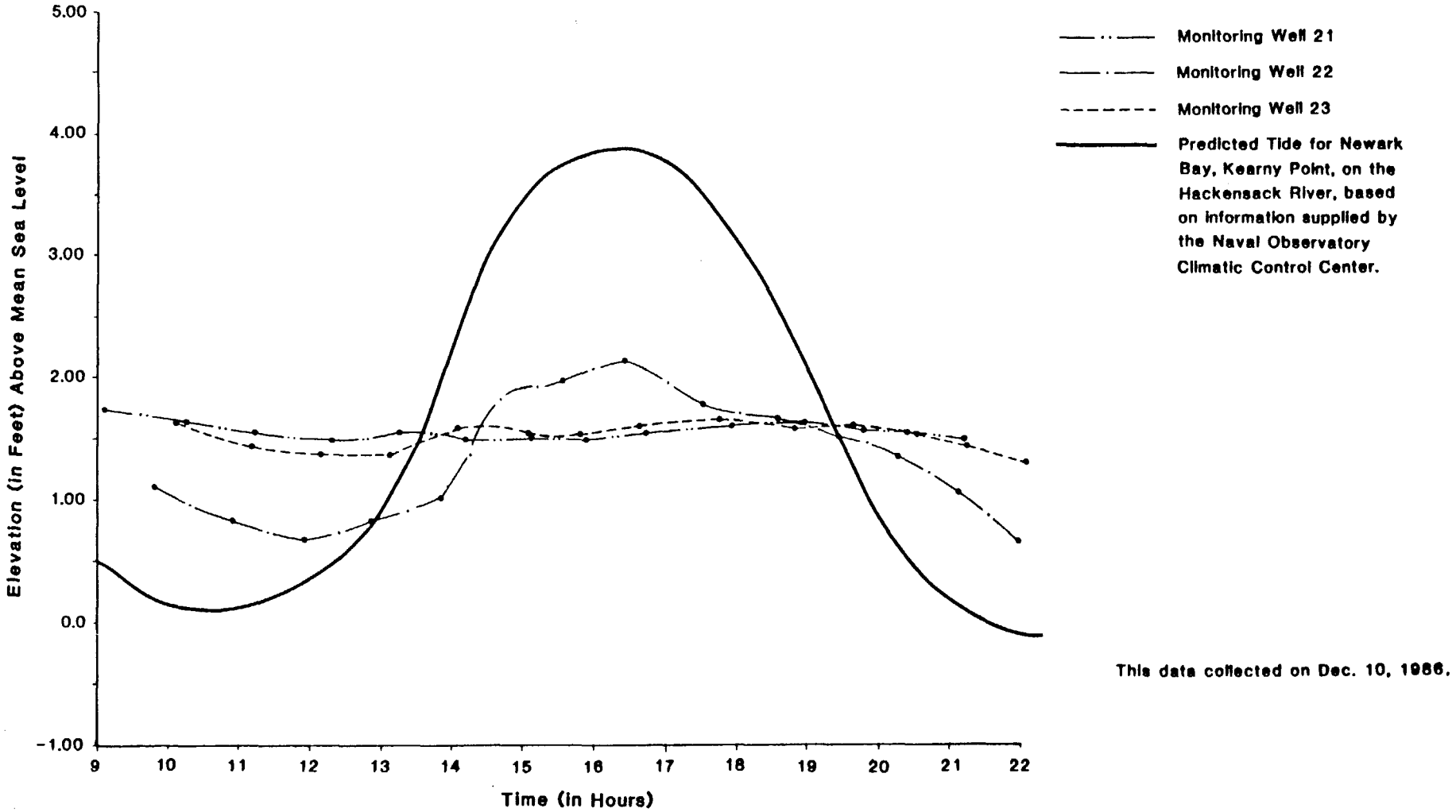
Tital Variations in Monitoring Wells:
MW1, MW2 and MW3

Figure
13



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Tidal Variations in Monitoring Wells:
MW21, MW22 and MW23

Figure
14

The shallow wells which displayed tidal fluctuations are Monitoring Wells 4, 7, and 8. Monitoring Wells 7 and 8, which are less than 30 feet from the Bay, showed fluctuations in water levels of 1.96 and 2.05 feet, respectively. Monitoring Well 9, which is located approximately 90 feet from the Bay, displayed no tidal influence. The lack of tidal influence at this well may be due to either the distance from the Bay or a restriction of flow by the foundation of Building 14 between the well and the Bay. A theoretical analysis by ENVIRON on the extent of the potential tidal influence through the type of soil encountered at the site suggests that the tidal influence will not exceed a distance of 35 feet from the Bay.

Monitoring Well 4 is located approximately 350 feet from the Bay and also displays a fluctuation in water level corresponding to the change in tide. No other monitoring wells at this distance display tidal fluctuation. The observed response of Monitoring Well 4 is likely due to its proximity to the flume. During high tide, it appears that the flume is recharging the ground water regime in the immediate vicinity of the flume, apparently extending to MW4, but not to MW10 or MW5. This observation is based on water level data and levels of chloride detected in MW4. Nevertheless, with respect to the overall ground water regime at the site, the flume appears to act as a sink during both high and low tidal periods.

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The only deep well which showed tidal influence was MW22. This deep well, which is located within 30 feet of the Bay, showed a fluctuation in water levels of 1.48 feet.

Chloride concentrations found in ground water samples taken from the shallow aquifer average 3,000 ppm in those wells experiencing tidal influence, including MW4, and 300 ppm in those wells not tidally influenced. This tends to support the premise that the flume recharges the shallow aquifer in its immediate vicinity at high tide. The chloride concentration in a sample taken from Newark Bay was 1,800 ppm at low tide, when the direction of flow within the Bay is from the rivers which flow into Newark Bay. The chloride concentration within the Bay thus would be expected to be lower at low tide than at high tide.

Chloride concentrations of ground water samples taken from the deep wells at the facility average 4,800 ppm. These concentrations are consistent with samples taken from other deep wells in the area. (Site Hydrogeologic Conditions, Kearny Works, AT&T Technologies, Inc.)

6. Interaction Between Shallow and Deep Aquifers

The water levels in the two upgradient deep wells, MW21 and MW23, are lower than the water levels in the adjacent shallow wells, thus indicating a likely vertical component of flow from the shallow aquifer to the deep aquifer in this portion of the site. The water

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levels throughout the tidal period in the downgradient deep well, MW22, are very close to the water levels in the adjacent shallow well MW8. Although this behavior may indicate that the two aquifers are in communication with each other in this portion of the site, it may instead be due to a defect in MW22. This is discussed further in Section VI.B.2. It appears that the semi-confining layer between the two aquifers limits the downward vertical migration between the shallow and deep aquifers in the western portion of the site. Further investigations are necessary, however, to determine if this is true for the eastern portion of the site as well.

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IV. ANALYTICAL RESULTS

A. General

1. Analytical Data Packages

The analytical results received from Century Laboratories are provided with this report under separate cover. The laboratory data packages meet all Tier II requirements. The results of the analyses are tabulated by analytical parameter in Volumes III and IV of this report. Volume III includes all analytical results for soil and surface water samples. Volume IV includes all analytical results for ground water samples. Volume II includes the summary tables which are referred to in the discussion of the analytical results for each AEC.

2. Terminology

Each sample number contains information about where the sample was collected. For the sample number, 288E-1702-01, the prefix, 288E is an internal code number for this site. The middle four digits refer to the boring location, while the numbers after the hyphen indicate to the particular sample collected from the boring.

The analyses performed are referred to by abbreviations. These abbreviations are defined in Table 2. In the text, cyanide has been grouped with the priority pollutant metals for convenience.

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Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

Table 2: Bureau of Industrial Site Evaluation Informal Cleanup Guidelines for Soil and Ground Water

Parameter	Soil	Ground Water
Total Petroleum Hydrocarbons (TPHC)	100 ppm	1,000 ppb
Priority Pollutants:		
Acid Extractables (AE)	Case-by-case	50 ppb
Base Neutrals (BN)	10 ppm	50 ppb
Pesticides	Case-by-case	Case-by-case
Polychlorinated Biphenyls (PCB)	1-5 ppm	0.001 ppb
Volatile Organics (VOC)	1 ppm	10 ppb
Phenol	Case-by-case	3,500 ppb
Cyanide	12 ppm	200 ppb
Priority Pollutant Metals (PPM)		
Antimony	2 ppm	--
Arsenic	20 ppm	50 ppb
Beryllium	400 ppm	--
Cadmium	3 ppm	10 ppb
Chromium	100 ppm	50 ppb
Copper	170 ppm	1,000 ppb
Lead	100 ppm	50 ppb
Nickel	100 ppm	--
Mercury	1 ppm	2 ppb
Selenium	4 ppm	10 ppb
Silver	5 ppm	50 ppb
Thallium	5 ppm	--
Zinc	350 ppm	5,000 ppb
Polycyclic Aromatic Hydrocarbons (PAH)	10 ppm	50 ppb

ppm: Parts per million (mg/kg)
ppb: Parts per billion (mg/l)
-- Indicates no cleanup level provided in NJAC 7:9-6.6

Note: The values in this table are informal cleanup guidelines used by the Bureau of Industrial Site Evaluation (BISE). They are compiled from BISE documents and from the levels set forth in NJAC 7:9-6.6.

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In the tables summarizing the analytical results, "NT" indicates that the sample did not undergo a particular analysis. Compounds which were not detected in an analysis are indicated by a "BMDL" (below minimum detection limit). Occasionally, a target compound is identified even though it is present in a concentration below the minimum detection limit. Under these circumstances, an estimated concentration is given.

3. Cleanup Level Guidelines

As a preliminary basis for evaluating the levels of contaminants detected at this site, the Bureau of Industrial Site Evaluation (BISE) informal cleanup level guidelines have been used. These guideline levels are presented in Table 2. To correspond with these guidelines, the results of the soil analyses have been reported in parts per million (ppm) and the water analyses in parts per billion (ppb). Samples which were found to have contaminant concentrations greater than these cleanup levels are noted in the text. Although these cleanup levels are being used to perform a preliminary assessment of the results, neither ENVIRON nor Textron is suggesting that the BISE guidelines are a proper or appropriate basis for any later or final analysis of the results. Textron may choose to use a health and environmental risk analysis of compounds found at the site to determine an appropriate cleanup level.

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B. Quality Assurance/Quality Control

1. Duplicate Samples

Fifty-one duplicate analyses were conducted and are reported in Volume II. The difference between the two duplicate values, calculated as a percentage of the smaller value, was less than 50 percent in 41 of the analyses. None of the duplicates differed by more than an order of magnitude. No analytical test showed consistently excessive variation between the results for duplicate samples.

2. Field Blanks

The analytical results of the field blanks collected during the drilling of the soil boring and monitoring wells are summarized in Volume II. Small concentrations of chloroform and toluene were detected in a few of the VOC+15 analyses. None of the concentrations exceeded 10 ppb. In one of the BN+10 analyses, 63 ppb of bis(2-ethylhexyl) phthalate were detected. In a few of the analyses low concentrations of zinc, lead and copper were detected.

Volume II summarizes the analytical results for field blanks collected during the sampling of the wells. In one of the BN+10 analyses, 6 ppb of bis(2-ethylhexyl) phthalate were detected. In two of the samples low concentrations of zinc were detected. In another sample, 5000 ppb of chloride was detected. The analytical

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results for the field blanks indicate that the field decontamination procedures were adequate and that sampling equipment did not significantly cross-contaminate the samples.

3. Trip Blanks

A total of 7 trip blanks were analyzed for VOC+15. The analytical results for these blanks are presented in Volume II. These analyses indicate that no significant cross-contamination of volatile organics occurred during sample storage or transport.

4. Laboratory Internal Blanks

The letter "B" following a value in the laboratory result sheets indicates that the chemical was also detected in the laboratory method blank analyzed for that set of samples. The purpose of this qualifier is to warn that the quantification of a chemical in a sample may have been affected by minor amounts of contamination in the analytical laboratory, as measured by the method blank. The State of New Jersey provides strict boundaries for method blank contamination.

Some samples in the volatile analysis were extracted with methanol. According to the laboratory, every attempt was made to utilize methanol with no background contamination. However, due to the holding time constraints for volatile analyses, the test was performed with contaminated methanol. The methanol utilized for the

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extraction contained low levels of a target compound (toluene) andseveral non-target compounds (acetone, 2-butanone, xylene). Century Laboratories received permission from Phil Sandine of NJDEP to use this methanol on the condition that the data for the contaminants was qualified by raising the detection limits to reflect concentrations of the contaminants in the methanol blank.

To correctly quantify the sample for method blank contamination, ENVIRON has subtracted the method blank value from the sample value. This correction is based on instrument measurements prior to calculation for sample dilution. For instance, a method blank concentration of 10 ppb acetone would be subtracted from a sample concentration of 30 ppb acetone, and the resultant sample value of 20 ppb would then be multiplied by a sample dilution factor, e.g., 4, to yield the final corrected value of 80 ppb acetone in the sample. ENVIRON has used the designation "C" to indicate sample concentrations which were corrected for method blank contamination.

C. Areas of Environmental Concern *

1. Area of Environmental Concern 1

AEC 1 is the loading area outside of Building 16 in which an apparent resin spill on a cracked pavement was observed. This AEC was sampled for volatile organics to determine if any of the

* See Plate 1 for the location of each Area of Environmental Concern.

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solvents used in the area were present in the soil. Soil samples were collected from Boring 101 from two depths, 0.5 to 1.5 feet and 3.5 to 4.0 feet. Duplicate samples were collected from the upper depth. Volume II summarizes the analytical results for AEC 1.

Ethylbenzene and toluene were the only volatile organics detected in AEC 1. The concentrations of each of these compounds at each sampling depth is summarized in Volume II.

2. Area of Environmental Concern 2

AEC 2 is a small unpaved region around a dumpster and compactor which receive waste from Buildings 31 and 32. The soil in this AEC was tested for the presence of volatile organics. One soil boring, Boring 201, was placed in this AEC. A soil sample was collected from a depth of 0.5 to 1.5 feet. The total concentration of volatile organics detected in the sample was well below the BISE cleanup guideline. The analytical results are summarized in Volume II.

3. Area of Environmental Concern 3

AEC 3 is the area along the railroad tracks in which finished resin products may have spilled during railroad car loading. The samples collected from this area were analyzed for the presence of

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petroleum hydrocarbons and volatile organics. The analytical results are summarized in Volume II.

A soil sample was collected from a depth of 0.5 to 1.5 feet from each of three soil boring locations. Petroleum hydrocarbons and volatile organics were found to be present in concentrations greater than the BISE cleanup guidelines at each of these locations. The highest concentrations of TPHCs and VOCs were found at Borings 301 and 303.

The compounds detected in the volatile organics analysis were ethylbenzene and toluene. The concentrations in which these two contaminants were found at each location are summarized in Volume II. In each of the three samples, ethylbenzene was present in greater concentrations than toluene.

4. Area of Environmental Concern 4

AEC 4 is located along the railroad tracks outside of the large tank farm. In this area, non-hazardous fish and vegetable oils were unloaded from railroad cars into the large tank farm. The soil samples collected from this AEC were analyzed for petroleum hydrocarbons and volatile organics. The results of the TPHC and VOC+15 analyses are summarized in Volume II. In addition a GC "fingerprint" analysis has been performed on these samples in an

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attempt to determine if the oils present were fish and vegetable oils or petroleum based oils. When these results are received and have been interpreted they will be made available to the Department.

Soil samples were collected from the surface at each of the two boring locations. At Boring 401, a duplicate sample for volatile organics analysis was collected, and at Boring 402 a duplicate sample for total petroleum hydrocarbons was collected. At Boring 402, an additional soil sample was collected from a depth of 2.0 to 3.0 feet.

The concentrations of both petroleum hydrocarbons and volatile organics was found to be in excess of the BISE cleanup guidelines for each of the samples collected from this AEC. The samples from Boring 402 had concentrations of petroleum hydrocarbons and volatile organics that were less than those collected from Boring 401. In addition, there appeared to be a slight decrease in concentration with depth for both petroleum hydrocarbons and toluene, one of the volatile organics detected at Boring 402. Volume II summarizes the volatile organics found within AEC 4.

The two volatile organics detected within this AEC were, again, ethylbenzene and toluene. Ethylbenzene was present in greater concentrations than the toluene in each of the samples except the one collected from 0.0 to 0.5 feet from Boring 402.

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5. Area of Environmental Concern 5

AEC 5 consists of the area at the end of the railroad tracks in which phthalic anhydride is loaded from the railroad cars into the tank farm. In this area, apparent spills of phthalic anhydride have been observed. Soil samples in this area were to be analyzed for phthalic anhydride. However, because no workable method for analyzing for this compound in soil could be found, the soil samples did not undergo this analysis. For a more complete discussion of this issue, see Section II. F.

6. Area of Environmental Concern 6

AEC 6 is an underground tank which was formerly used to store fuel oil. A soil sample was collected from Boring 601, located adjacent to the underground tank. Monitoring well 11 was placed further out from the tank to the depth of the invert of the tank. The soil sample was analyzed for TPHCs and PAHs. The water sample collected from MW11 was analyzed for petroleum hydrocarbons, volatile organics, base neutrals and acid extractables. The analytical results are summarized in Volume II.

Petroleum hydrocarbons were detected at a level slightly above the BISE cleanup guidelines in the soil sample. However, no petroleum hydrocarbons were detected in the water sample from MW11. The concentration of total volatile organics detected in MW11

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exceeded the BISE cleanup guidelines. The major volatile organic detected was toluene (110 ppb) with some benzene (15 ppb) and ethylbenzene (8 ppb). The concentrations of PAHs detected in the soil and the base neutrals and acid extractables detected in the well water sample were below the BISE cleanup guidelines.

7. Area of Environmental Concern 7

AEC 7 is the area in which solvent tank trucks unload solvents into the large tank farm. During a portion of the period during which this practice took place, the area was unpaved. To determine if any solvents were present in the soils in this area, a soil sample was collected from a boring within AEC 7 and analyzed for VOC+15. In addition, MW8 was placed downgradient of and outside of this AEC. A soil sample was collected from MW8 from a depth of 1.0 to 2.0 feet and analyzed for VOC+15. The water sample collected from MW8 was also analyzed for VOC+15.

The soil sample collected from Boring 701 contained volatile organics in concentrations exceeding the BISE cleanup guideline. The soil sample collected from MW8, located outside of the AEC, contained volatile organics in concentrations well below the BISE cleanup guideline. In the water sample from MW8, no volatile organics were detected. These results are summarized on Volume II.

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8. Area of Environmental Concern 8

AEC 8 consists of two tanks which were formerly used to store fuel oil. The tanks are only partially underground but are covered with earth above grade. Four soil borings were placed around these tanks to the depth of the invert of the tanks. Each of the samples was collected from the lower portion of the borings and was analyzed for petroleum hydrocarbons and PAHs. Duplicate samples were collected for TPHC analysis from Boring 802. The results of the analyses are summarized in Volume II.

At three of the four boring locations, petroleum hydrocarbons were detected in concentrations exceeding the BISE cleanup guidelines. The levels of TPHC's detected at boring 804 were within the BISE guidelines. The concentrations of petroleum hydrocarbons detected at Borings 801 and 803 were greater than those detected at Boring 802. The concentrations of PAHs detected at each of the boring locations were below the BISE cleanup guideline except for Boring 803. At Boring 804, no contaminants were detected in concentrations exceeding the BISE cleanup guidelines.

9. Area of Environmental Concern 9

AEC 9 is a small area beneath a former hole in the floor of Building 16. It was believed that raw materials and finished products from the polyester resin manufacturing may have spilled through this hole in the floor. Although sampling of the soil

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beneath this hole was proposed, a resinous material was encountered immediately below the bottom of the floor. Because this material could not be penetrated to reach the soil beneath it, the sample was collected from this material instead. Toluene was the only volatile organic detected.

10. Area of Environmental Concern 10

AEC 10 is a portion of the site which is currently used for drum storage of raw materials. Before this area was paved, it was used for the drum storage of finished products and raw materials. To determine if any soil or ground water contamination had occurred as a result of the drum storage in this area, a soil boring was placed within the AEC and a monitoring well was placed in the presumed downgradient direction from the AEC.

Soil samples were collected from Boring 1001 at a depth of 0.0 to 2.0 feet and 4.0 to 6.0 feet. Two soil samples were also collected from MW3, which is located outside of the AEC. The soil samples were collected at MW3 at 0.5 to 2.0 feet and 4.0 to 5.0 feet.

Each of the soil samples and the water sample from MW3 was analyzed for total petroleum hydrocarbons and volatile organics. The analytical results for the samples are summarized in Volume II.

Both the soil samples collected from within AEC 10 at Boring 1001 and those collected outside of AEC 10 from MW3 showed the

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presence of high concentrations of petroleum hydrocarbons. In both locations the concentration of petroleum hydrocarbon appeared to decrease with depth. However, no petroleum hydrocarbons were detected in the water sample from MW3. The concentrations of volatile organics in the soil samples collected from within AEC 10 and from MW3 were all well below the BISE cleanup guideline. No volatile organics were detected in water sample collected from MW3.

11. Area of Environmental Concern 11

AEC 11 is an area in which an above-ground storage tank was formerly located. The area was not paved during the period of time in which the storage tank was located in this AEC. Because a tank farm was constructed in this area after the removal of the above-ground storage tank, it was not possible to place a soil boring within this AEC. Instead, a monitoring well, MW5, was placed in the presumed downgradient direction from the AEC. A soil sample was collected from MW5 from a depth of 0.5 to 1.5 feet. The soil sample and the water sample collected from MW5 were analyzed for TPHC and VOC+15. The results are summarized in Volume II.

The soil sample contained petroleum hydrocarbons in a concentration greater than the BISE cleanup guideline. All of the other samples had concentrations of the target compounds which were either below the BISE cleanup guidelines or below the minimum detection limit.

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12. Area of Environmental Concern 12

AEC 12 consists of the soil beneath Building 4. Because of evidence of apparent spills or discharges beneath this building which is built on stilts, samples from three soil borings were analyzed for total petroleum hydrocarbons and volatile organics. The results of these analyses are summarized on Volume II.

Significant concentrations of petroleum hydrocarbons and volatile organics were found at each of the boring locations. The concentrations of petroleum hydrocarbons were particularly high at Borings 1201 and 1202. The concentration of volatile organics detected at Boring 1202 was much higher than detected at Borings 1201 or 1203.

Ethylbenzene was the major volatile organic contaminant at each of the locations sampled. Toluene was also present in Borings 1201 and 1202. No other volatile organic compounds were detected in this AEC. Volume II gives a breakdown of volatile organics detected beneath building 4.

13. Area of Environmental Concern 13

AEC 13 is the area in which four large above-ground storage tanks were located when this portion of the site was unpaved. Three soil borings were placed within this AEC to determine if any soil contamination occurred as a result of the use of these tanks. One

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soil sample was collected from each of the three soil borings from a depth of 0.5 to 1.5 feet. Each of the samples was analyzed for petroleum hydrocarbons and volatile organics. The results of the analyses are summarized in Volume II.

Petroleum hydrocarbons were found to be present in concentrations greater than the BISE cleanup guidelines in each of the three boring locations. No volatile organics, however, were found in excess of the BISE cleanup guideline in any of the borings.

14. Area of Environmental Concern 14

AEC 14 is an area in which several above-ground storage tanks formerly stood. During the period of time during which these tanks were used, this area of the site was unpaved. Three soil borings were placed within this AEC and the soil samples collected were analyzed for petroleum hydrocarbons and volatile organics. From each of the three borings, a soil sample was collected from a depth of 0.5 to 1.5 feet. The results of the analyses performed on these samples are summarized in Volume II.

Petroleum hydrocarbons were found to be present in concentrations greater than the BISE cleanup guideline at two of the boring locations, Borings 1401 and 1402. At Boring 1403, no petroleum hydrocarbons were detected. Volatile organics were found

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in each of the boring locations in excess of the BISE cleanup guidelines. The concentrations of both petroleum hydrocarbons and volatile organics ranged from less than 42 ppm to 8,040 ppm, and from 8 ppm to 1,245 ppm, respectively.

The concentrations of the different volatile organics detected within AEC 14 are summarized in Volume II. The two volatile organics detected in each of the borings were ethylbenzene and toluene. Although the total concentrations of volatile organics varied significantly among the three samples, the concentrations of ethylbenzene and toluene varied consistently with each other (i.e., the highest concentration of ethylbenzene coincided with the highest concentration of toluene and vice versa).

15. Area of Environmental Concern 15

AEC 15 is an area of the site formerly used for drum storage at a time when the area was unpaved. Three soil borings were placed in this AEC and a sample was collected from each at a depth of 0.5 to 1.5 feet. Each of the samples underwent a TPHC and VOC+15 analysis. The results of these analyses are summarized in Volume II.

Petroleum hydrocarbons were found in concentrations greater than the BISE cleanup guideline in two of the soil borings, Borings 1501 and 1504. The concentrations of volatile organics in these two borings, however, were well below the BISE cleanup guidelines. At Boring 1503, the concentration of total organics was slightly above the BISE cleanup guidelines.

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16. Area of Environmental Concern 16

AEC 16 is a former drum storage area which was unpaved during the period of its use. Three soil borings were placed within AEC 16 and one soil sample was collected from each soil boring. Each soil sample was collected from a depth of 1.0 to 1.5 feet. The samples collected were analyzed for petroleum hydrocarbons and volatile organics. The results of the analyses are summarized in Volume II.

The concentrations of petroleum hydrocarbons and volatile organics for each of the samples were in excess of the BISE cleanup guidelines. The highest concentrations of both petroleum hydrocarbons and volatile organics were found at boring 1603.

The compounds detected in the volatile organic analysis are summarized in Volume II. Ethylbenzene and toluene were, again, the only contaminants detected in the volatile organic analysis. Ethylbenzene appears to be the primary volatile organic contaminant in this AEC. Toluene was not detected at either Boring 1601 or 1602. At Boring 1603, where the highest concentration of ethylbenzene was detected, toluene was also detected.

17. Area of Environmental Concern 17

AEC 17 is another area in which drums formerly were stored during a period when that portion of the site was not paved. A soil sample to a depth of 1.5 feet was collected from each of the three borings placed within this AEC. In addition, a monitoring well,

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MW10, was placed within this AEC. Soil samples were collected from MW10 from a depth of 0.5 to 1.5 feet and 4.0 to 4.5 feet. The soil samples collected from the three borings were analyzed for petroleum hydrocarbons and volatile organics. The soil samples collected from MW10 and the water sample collected from MW10 were analyzed for petroleum hydrocarbons, volatile organics, base neutrals and acid extractables.

Volume II summarizes the analytical results for the samples collected from this AEC. Petroleum hydrocarbons were detected in concentrations greater than the BISE cleanup guidelines in two of the three borings (1701 and 1702) and in both of the soil samples collected from MW10. Low concentrations of volatile organics were detected in the three boring locations, but at MW10 concentrations greater than the BISE cleanup guideline were detected. Significant concentrations of base neutrals were also found in the soil samples for MW10. No acid extractables were detected. The concentrations of both volatile organics and the base neutrals appeared to decrease with depth in the soil samples from MW10. In the water sample from MW10, only the volatile organics were present in concentrations greater than the BISE cleanup guidelines.

Volume II summarizes the concentrations of the volatile organics detected. Again, ethylbenzene and toluene were the only volatile organics detected within this AEC. In both the soil samples and the water sample collected from MW10, toluene was present in

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significantly higher concentrations than was ethylbenzene. In each of these three samples, the concentration of toluene was approximately one order of magnitude greater than the concentration of ethylbenzene.

18. Area of Environmental Concern 18

AEC 18 is an area in which fuel oil is unloaded into a large tank located in Building 12. In this area, which is unpaved, there is evidence of apparent spills. A soil sample was collected from a depth of 1.0 to 1.5 feet from Boring 1801 and analyzed for total petroleum hydrocarbons. The concentration of petroleum hydrocarbons detected is in excess of the BISE cleanup guideline.

19. Area of Environmental Concern 19

AEC 19 is the area within the dike around Tank 300. Tank 300 previously was used to store waste resin solution (1285 Premix). Although there is a concrete pad beneath Tank 300, the entire area within the dike is unpaved and apparent spills have been observed within this area.

One soil boring was placed within this AEC. Soil samples were collected from a depth of 0.5 to 1.5 feet and 2.0 to 2.5 feet, and were analyzed for petroleum hydrocarbons and volatile organics. Concentrations of both these parameters were found at both depths in

concentrations which exceed the BISE cleanup guidelines. The concentrations of both the petroleum hydrocarbons and the volatile organics appear to increase with depth. The analytical results are summarized in Volume II.

Volume II summarizes the concentrations of the volatile organics detected within AEC 19. Ethylbenzene and toluene once again are the only volatile organics detected. Ethylbenzene is present in higher concentrations than toluene in both samples. The concentrations of both compounds increase significantly with depth.

20. Area of Environmental Concern 20

AEC 20 is the area in which an underground gasoline tank formerly was located. A monitoring well, MW9, was placed just outside of this AEC. Two soil samples were collected from this monitoring well, one from 0.0 to 2.0 feet and the other from 2.0 to 4.0 feet. The soil samples underwent TPHC and PP+30 analyses. The result of the analysis are summarized in Volume II.

In the soil samples collected from both depths, TPHCs and base neutrals were found to be present in concentrations greater than the BISE cleanup guidelines. In addition, two metals (lead and zinc) detected in the upper soil sample and five metals (cadmium, copper, lead, mercury, and zinc) detected in the lower soil sample were found to be present in concentrations greater than the BISE cleanup guidelines.

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The compounds detected in the base neutral analysis are not included in this table. Although nine base neutral compounds were detected, the primary contaminant was di-n-butylphthalate. This compound was present in a concentration of 22 ppm in the upper soil sample and 15 ppm in the lower soil sample. The other eight constituents were found to be present in concentrations of less than 2 ppm.

The concentrations of all five of the metals increased with depth. The most significant increase was for mercury which varied from a concentration of 0.066 ppm in the upper soil sample to 5.66 ppm in the lower soil sample.

The water samples collected from MW9 were tested for total petroleum hydrocarbons, volatile organics, methyl tertiary butyl ether (MTBE), diisopropyl ether (DIPE), tertiary butyl alcohol (TBA), methanol, and lead. Duplicate water samples were collected for each of the analyses except the volatile organics analyses. The results of the analyses are summarized in Volume II.

No petroleum hydrocarbons were detected in the water samples. No analysis was performed for base neutrals. The water sample was tested for only one metal. Lead was found to be present in a concentration greater than the BISE cleanup guideline.

21. Area of Environmental Concern 21

AEC 21 is the area in which an above-ground tank farm formerly was located. The tank farm was in use while this portion of the

site was unpaved. Three soil borings were placed within this AEC with one soil sample collected from each boring from a depth down to 1.5 feet. Each of the samples collected underwent a TPHC and VOC+15 analysis. The results of the analyses are summarized in Volume II.

Each of the samples collected were found to exceed the BISE cleanup guidelines for total petroleum hydrocarbons and volatile organics. The highest concentration in both categories of contaminants were found at Boring 2101. The concentration of volatile organics detected at Boring 2102 was significantly less than that detected at Borings 2101 and 2103. Boring 2102 is located near the border of AEC 21.

The concentrations of the volatile organic contaminants are summarized in Volume II. Again, the only volatile organic contaminants detected were ethylbenzene and toluene. In all three locations, ethylbenzene was present in concentrations greater than toluene.

22. Area of Environmental Concern 22

AEC 22 is a concrete pad on which 1285 Premix (a hazardous waste generated at the facility) was stored in drums. Initially, ENVIRON proposed to collect a soil sample from the dirt on top of the pad. As described in Section II.F, the dirt on top of the pad was swept up and placed in a large dirt pile beside the pad. Therefore, the sample was taken from this dirt pile. The sample collected underwent a TPHC and VOC+15 analysis.

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The analytical results are set forth in Volume II. The concentrations of the TPHCs and the volatile organics both exceeded the BISE cleanup guidelines. The primary volatile organic detected was toluene. In addition, chloroform and ethylbenzene were also detected.

23. Area of Environmental Concern 23

AEC 23 is the tank wagon loading area outside of Building 4 where 1285 Premix may have been generated. The pavement in this area is cracked. One boring was placed within this AEC and two samples were collected, from 0.1 to 1.5 feet and 2.0 to 2.5 feet in depth. The soil samples were analyzed for petroleum hydrocarbon and volatile organics. The analytical results for these samples are summarized in Volume II.

Petroleum hydrocarbons were detected in concentrations greater the BISE cleanup guideline in both soil samples. The concentration of petroleum hydrocarbons appears to decrease with depth. For the volatile organics, only the lower sample contained total VOCs in concentrations exceeding the BISE cleanup guidelines. The concentration of volatile organics appears to increase with depth.

The concentrations of the contaminants detected in the volatile organics analysis are summarized in Volume II. Again, the only two volatile organic compounds detected were ethylbenzene and toluene.

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In both of the samples ethylbenzene was present in concentrations greater than toluene.

24. Area of Environmental Concern 25*

AEC 25 is the tank wagon loading area outside of Building 26 in which 1285 Premix may have been generated. The pavement in this area is cracked. A soil boring was placed within this AEC and one soil sample was collected from a depth of 0.5 to 1.5 feet. The sample was analyzed for petroleum hydrocarbons and volatile organics. The TPHC concentration and the VOC+15 concentration both exceed the BISE cleanup guidelines. For the volatiles, toluene was the only compound detected. The results are summarized in Volume II.

25. Area of Environmental Concern 26

AEC 26 consists of the drains in the large tank farm which in the past discharged directly to the ground. As explained in Section II.F, those drains are now plugged; thus, it was not possible to sample this AEC.

* There is no AEC 24 because the area initially designated as AEC 24 has been combined with AEC 1.

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26. Area of Environmental Concern 27

AEC 27 is an area in which empty drums were observed during the April 9, 1986, NJDEP site inspection. A soil boring was placed in this AEC and a sample was collected from a depth of 1.0 to 1.5 feet. The soil sample underwent a TPHC and VOC+15 analyses. In both of these analyses, no contaminants were found.

27. Area of Environmental Concern 28

AEC 28 is the area around a break in a pipe which carries runoff from the northern railroad siding. A soil boring was placed within this AEC and a sample was collected from a depth of 1.0 to 1.5 feet. The sample underwent TPHC and VOC+15 analyses. Petroleum hydrocarbons were found to be present in a concentration slightly greater than the BISE cleanup guideline. No volatile organic compounds were detected.

D. Shallow Wells

1. Monitoring Well 1

MW1 was placed in the northwest corner of the site to monitor the quality of the ground water entering the site. Duplicate soil samples were collected from a depth of 1.5 to 2.5 feet from this well. The samples were analyzed for TPHCs and PP+30. The water

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samples collected from the well were analyzed for the same parameters. The analytical results for the samples collected from MW1 are summarized in Volume II.

The only compound found to be present in concentrations exceeding the BISE cleanup guideline was petroleum hydrocarbons in the soil. The analytical results for all of the other samples collected from this well were either below the minimum detection limit or below the BISE cleanup guidelines.

2. Monitoring Well 2

MW2 was placed in the southwest corner of the site to monitor the quality of the water entering the property at that point. No soil samples were collected from this monitoring well, although soil samples were collected from the deep well in this well cluster, MW21. The water samples collected from MW2 were analyzed for petroleum hydrocarbons and volatile organics. Petroleum hydrocarbons were found to be present in this well in a concentration of 70,000 ppb, however, no volatile organics were detected.

3. Monitoring Well 3

MW3 was placed in the presumed down gradient direction from AEC 10, to monitor the water quality of the ground water downgradient of

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AEC 10. The analytical results for MW3 are included in the discussion of AEC 10. which can be found in Section IV.C.10.

4. Monitoring Well 4

MW4 was placed near the middle of the site to monitor the quality of the ground water as it travels through the site. It is located approximately 25 feet south of the underground flume. Two soil samples were collected from this monitoring well, from 0.5 to 1.0 feet and from 3.0 to 3.5 feet in depth. Both the soil sample and the water samples collected from this well underwent a volatile organics analysis. The analytical results for MW4 are summarized in Volume II. None of the samples was found to contain concentrations of volatile organics which exceed the BISE cleanup guidelines.

5. Monitoring Well 5

MW5 was placed in the presumed downgradient direction from AEC 11 to monitor potential ground water contamination from this AEC. The analytical results for this monitoring well are included in the discussion of AEC 11 which can be found in Section IV.C.II.

6. Monitoring Well 6

MW6 was placed along the southern border of the property to monitor the quality of shallow ground water entering the site at that point. Two soil samples were collected from the monitoring

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well, at depths of 1.0 to 2.0 feet and from 6.0 to 7.0 feet. In addition, duplicate water samples were collected from this well. All the samples collected underwent TPHC and PP+30 analyses. The results of the analyses are summarized in Volume II.

Petroleum hydrocarbons were found in both of the soil samples in concentrations which exceed the BISE cleanup guidelines. The water samples, however, showed no presence of petroleum hydrocarbons. The total volatile organics in the soil also exceeded the BISE cleanup guidelines. In one of the duplicate water samples, no volatile organics were detected, while in the other 28 ppb were detected. For the base neutrals, the lower soil sample was found to have concentrations greater than the BISE cleanup guidelines, whereas the upper sample did not. The base neutrals detected in the water samples were below the BISE guidelines. Up to four metals were found to be present in concentrations greater than the BISE cleanup guidelines in the soil. In the water samples, one duplicate sample indicated that two metals exceeded the BISE guidelines while the other duplicate indicated that the concentration of only one metal exceeded the BISE guideline.

Volume II summarizes the concentrations of the contaminants detected above the BISE cleanup guidelines. Three volatile organics were detected in the analysis. These were chloroform, ethylbenzene, and toluene. Toluene was present in the greatest concentration of all the volatiles in the soil samples and was the only volatile organic detected in the water samples.

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The four metals which were detected in concentrations above the BISE guidelines in the lower soil sample are cadmium, copper, lead and zinc. Cadmium was present above the BISE cleanup guideline for soil in the lower soil sample only. One of the duplicate water samples contained a concentration of 11 ppb of cadmium (the BISE cleanup guideline is 10 ppb) and the other duplicate contained 7.5 ppb. For copper, the only sample which exceeded the BISE guidelines was the lower soil sample. Lead was the only metal found to exceed the BISE guidelines in all four of the samples. Zinc was found to exceed the BISE cleanup guidelines in the soil samples, but the concentrations detected in the water samples were well below the BISE cleanup guideline. The concentrations of each of these four metals increased with depth between the two soil samples collected.

Fourteen compounds were found in the base neutral analyses performed on the two soil samples. The concentrations detected ranged from non-detect to 22 ppm. None of the base neutral compounds detected in the soil samples were detected in the water samples. However, another base neutral compound, bis(2-ethylhexyl) phthalate was detected in low concentrations in the water samples.

7. Monitoring Well 7

MW7 was placed in the northeast corner of the property to monitor the quality of the shallow ground water in this presumed downgradient portion of the site. Two soil samples were collected

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from this monitoring well from depths of 0.5 to 1.5 feet and 4.0 to 6.0 feet. Both the soil samples and the water sample collected from this well underwent analysis for petroleum hydrocarbons and volatile organics. The results of these analyses are summarized in Volume II.

Petroleum hydrocarbons were found to be present in concentrations exceeding the BISE guidelines in both of the soil samples. No petroleum hydrocarbons, however, were detected in the water sample. The concentrations of volatile organics in the soil samples were very low. The concentration detected in the deeper soil sample just exceeded the BISE cleanup guideline of 1 ppm. The concentration of volatile organics detected in the water sample, however, significantly exceeds the BISE cleanup guideline.

The concentrations of the volatile organics detected are summarized in Volume II. Ethylbenzene and toluene were the only volatile organics detected. In all three samples, the toluene was present in significantly greater concentrations than the ethylbenzene.

8. Monitoring Well 8

MW8 is part of the deep well/shallow well cluster located on the presumed downgradient portion of the site. MW8 was placed in this location to monitor the shallow ground water near AEC 7. The results of the analyses performed on the samples collected from this well are summarized in the discussion of AEC 7. This can be found in Section IV.C.7.

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9. Monitoring Well 9

MW9 was placed in the southeast portion of the site in the area in which an underground gasoline tank had been located. It was placed in this location to monitor the potential effects of the underground gasoline tank on the soil and shallow ground water in AEC 20. The analytical results of the samples collected from MW9 are included in the discussion of AEC 20. This discussion can be found in Section IV.C.20.

10. Monitoring Well 10

MW10 is located within AEC 17 to monitor the effect of the former practices in this area on the soil and shallow ground water. The results of the analyses for this well are included in the discussion of AEC 17 and can be found in Section IV.C.17.

11. Monitoring Well 11

MW11 was placed near the underground fuel oil tank comprising AEC 6. The analytical results for this monitoring well are included in the discussion of AEC 6. This discussion can be found in Section IV.C.6.

12. Summary of Shallow Well Analytical Results

Volume II summarizes the analytical results of the water samples collected from each of the shallow wells. Only three of the

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parameters for which these wells were tested were found to have concentrations which exceeded the BISE cleanup guidelines. These parameters were total petroleum hydrocarbons, total volatile organics, and two of the priority pollutant metals.

Petroleum hydrocarbons were detected in only one of the shallow wells, MW2. The concentration detected in this well, however, significantly exceeded the BISE cleanup guideline of 1,000 ppb.

Volatile organics were detected in only four of the shallow wells. In each of these wells, the total concentration of volatiles exceeded the BISE cleanup guideline of 10 ppb. The concentration of total volatiles detected in MW10 was considerably greater than the concentrations detected in MW6, MW7, and MW11. In each of these four monitoring wells, the only volatile organics detected were toluene and ethylbenzene, except for MW11 in which a low level of benzene was detected as well. In each of these four shallow wells, toluene was the volatile organic detected in the greatest concentration.

Only two of the shallow wells were analyzed for the presence of metals. MW6 was analyzed for the presence of all of the priority pollutant metals, while MW9 was monitored only for the presence of lead. Lead was found to be present in concentrations greater than the BISE cleanup guidelines in both wells. In the duplicate samples collected from MW6, the concentration of cadmium just exceeded the BISE level in one duplicate and was below the BISE guideline in the other.

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E. Deep Wells

1. Monitoring Well 21

MW21 was placed in a deep well/shallow well cluster with MW2 in the southwest corner of the site. Two soil samples were collected from this monitoring well, one from 0.5 to 1.5 feet and the other from 31.0 to 32.0 feet. The deeper soil sample was collected from the bottom of the confining layer immediately above the deep aquifer. Both of the soil samples and the water sample collected from MW21 underwent a TPHC and PP+30 analysis. The results of these analyses are summarized in Volume II.

The only parameters which were found to be present in concentrations exceeding the BISE cleanup guidelines were in the shallow soil sample. The parameters which exceed the acceptable levels in this sample are total petroleum hydrocarbons and two metals, copper and lead.

2. Monitoring Well 22

MW22 is the deep well of the deep well/shallow well cluster located near Newark Bay. Two soil samples were collected from this well, one from 2.0 to 4.0 feet and the other from 27.0 to 27.5 feet in depth. The deeper soil sample was collected from the bottom of the confining layer, immediately above the deep aquifer. The well was sampled on two dates, December 18 and December 31, 1986. All of

the soil and water samples were analyzed for volatile organics. In addition, the deeper soil sample was analyzed for total petroleum hydrocarbons. The results of these analyses are summarized in Volume II.

Volatile organics were detected in concentrations exceeding the BISE cleanup guidelines in the surface soil samples. Neither petroleum hydrocarbons nor volatile organics were detected in the lower soil sample. In the water samples, volatile organics were also detected in concentrations exceeding the BISE cleanup guidelines.

The concentrations of the volatile organics detected are summarized in Volume II. In the upper soil sample, three volatile organics were detected. These compounds are chloroform, ethylbenzene and toluene. Toluene was the volatile organic present in the greatest concentration in this soil sample. For the water samples from MW22, only two volatile organics (ethylbenzene and toluene) were detected. In both of the water samples collected from this well, ethylbenzene was present in a significantly greater concentration than toluene.

3. Monitoring Well 23

MW23 is the deep well in the deep well/shallow well cluster in the upgradient northwest corner of the site. Three soil samples were collected from this well. The samples were collected from

depths of 0.5 to 1.0 feet, 2.0 to 3.0 feet, and 23.0 to 24.0 feet. The second soil sample was collected immediately above the water table. The deepest sample was collected from the bottom of the confining layer, immediately above the deep aquifer. These three soil samples and the water sample collected from MW23 were analyzed for petroleum hydrocarbons and priority pollutants, with the exception of the VOC+15 portion of the PP+30 analysis for MW23-03 which was not analyzed by the laboratory. The results of the analyses performed on these samples are summarized in Volume II.

Total bse neutrals were found to exceed the BISE cleanup level in the soil sample collected from immediately above the water table. Fifteen base neutral compounds were found to be present in this analysis. Arsenic was found in both of the upper soil samples in concentrations just exceeding the BISE guidelines.

4. Summary of Deep Well Analytical Results

Volume II summarizes the analytical results for the water samples collected from each of the deep wells. Only the volatile organics analysis for MW 22 found any compounds in concentrations greater than the BISE cleanup guidelines. No compounds were detected in concentrations in excess of BISE guidelines in either MW21 or MW23.

845031199

Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

F. Underground Flume

A sediment sample and a water sample were collected at the inflow of the underground flume, at the point at which Plum's Creek goes underground. Another water sample was collected from the outfall of the underground flume, at the point at which the underground flume discharges into Newark Bay. No sediment was present at the discharge point to be analyzed. Each of the samples collected was analyzed for total petroleum hydrocarbons and priority pollutants plus a forward library search. The results of the analyses in are summarized Volume II.

In the sediment sample, petroleum hydrocarbons were detected in a concentration just above the BISE cleanup guideline of 100 ppm. In the two water samples, no petroleum hydrocarbons were detected. The concentration of volatile organics detected in the sediment sample was well below the BISE cleanup guidelines.* However, for the two water samples, the total volatile organics exceeded the BISE cleanup guidelines. The concentrations of base neutrals detected in the sediment samples were slightly above the BISE cleanup guidelines level of 10 ppm. The concentrations of base neutrals detected in the water samples were within the BISE guidelines. Six priority pollutant metals were detected in concentrations exceeding the BISE guidelines in the sediment sample. Only two of these priority pollutant metals were detected above BISE levels in each of the two water samples.

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* Although the BISE cleanup guidelines do not directly apply to the water traveling through the underground flume, they are used here as a reference in this preliminary evaluation of the data.

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Spencer Kellogg, Newark, New Jersey

ECRA Case No. 85403

The concentrations of each of the contaminants detected are presented in Volume II. Seven volatile organics were detected in these three samples. In the sediment sample, the only volatile organics detected were chlorobenzene and toluene. In each of the two water samples, six volatile organics were detected in very similar concentrations. A seventh compound, ethylbenzene, which was not detected in the sample collected from the inflow to the underground flume, was found to be present at the outfall in a concentration of 220 ppb.

Only two of the six metals found in concentrations greater than the BISE cleanup guideline in the sediment sample were detected in the water samples. These two metals are cadmium and lead. As with the concentrations of volatile organics, the concentrations of these two metals in the two water samples are virtually identical.

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V. DYE TEST RESULTS

Dye tests were performed on two dates on the floor drains inside Building 26 to determine if these floor drains empty into the storm sewer which travels along the north side of this building. Because of the highly volatile nature of some of the chemicals used at the facility, smoke testing could not be used to investigate these floor drains. Dye tests were performed on these drains on two dates, November 13, 1986 and January 28, 1987. On both occasions, uranine was flushed down the drains with ample quantities of water and the storm drain outside of Building 15 was observed for 2.5 hours and 2 hours, respectively. On neither of the two occasions was any of the green dye observed in the storm sewer.

VI. DISCUSSION

A. Shallow Aquifer and Fill Unit

1. General

Soil samples from the fill unit in which the shallow aquifer lies indicate the presence of petroleum hydrocarbons, volatile organics, base neutrals, and a few of the priority pollutant metals in concentrations which exceed the BISE cleanup guidelines. Water samples collected from the shallow aquifer indicate that petroleum hydrocarbons, volatile organics, and lead are present in some of the shallow wells in concentrations greater than the BISE guidelines. No other contaminants were found to be present. A discussion of each of the above parameters is presented below.

2. Total Petroleum Hydrocarbons

Plate 4 gives the concentrations of petroleum hydrocarbons detected above BISE cleanup guidelines within the top 2 feet of soil throughout the site. The concentrations of petroleum hydrocarbons detected in the soil samples varied considerably throughout the site. The highest concentrations were found in AEC 12 (under Building 4), in AECs 3 and 4 (along the railroad tracks), AEC 8 (around two "underground" fuel oil tanks), in and around AEC 10 (a former drum storage area), and within AEC 21 (a former tank farm). Significant concentrations were also found in AECs 14, 16, 19, and 23.

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While some of the high concentrations of petroleum hydrocarbons appear to be related to certain AECs, there also appears to be a significant variation in the background levels around the site. Each of the monitoring wells except MW10 was placed in an area in which there was no evidence to suggest that previous activities associated with petroleum hydrocarbons had taken place. The levels of TPHCs detected in the soil samples collected from these wells, however, varied from 39 ppm to 16,000 ppm.

No petroleum hydrocarbons were detected in any of the shallow wells except for MW2, one of the upgradient wells. As the piezometric maps indicate, the ground water in this area of the site flows from off-site toward this monitoring well. It is believed that the significant petroleum hydrocarbon contamination detected in this well is due to an upgradient off-site source.

3. Volatile Organics

Plate 5 gives the concentrations of total volatile organics detected above the BISE cleanup guidelines within the top 2 feet of soil throughout the site. Two volatile organics, ethylbenzene and toluene, were found to be present in relatively high concentrations in several areas of the site. In general, the two compounds were found together. Plate 6 gives the concentrations of ethylbenzene and Plate 7 gives the concentration of toluene in the top 2 feet of soil. The highest concentrations were found in AECs 3 and 4 (along

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the railroad tracks), AEC 12 (under building 4), in the portion of AEC 17 around MW10 (a former drum storage area), and in AEC 21 (a former tank farm). Significant concentrations were also observed in AECs 1, 7, 14, a portion of AEC 15, AEC 16, and AEC 19.

The analyses of numerous other soil samples around the site indicate that the soil contamination by these two volatile organics is confined to the AECs mentioned above. The concentrations of volatile organics detected in the lower soil samples collected from MW6 and MW7, which are not located within any AEC, exceed the BISE cleanup levels. However, both of these samples were collected from below the water table.

In the water samples collected from the shallow wells, toluene appeared in significant concentrations in four of the wells. The concentrations of the total volatile organics detected in each of these four wells are shown on Figure 15. These shallow wells were MW6, MW7, MW10, and MW11. Relatively high concentrations of toluene were detected at MW10. MW10 was also the only shallow well in which ethylbenzene was found to be present in a significant concentration. MW10, which is the only shallow well located within an AEC, also had very high concentrations of these two volatile organics in both of the soil samples collected from this well. Similar to the water sample collected from MW10, toluene was present in much higher concentrations than ethylbenzene in both of the soil samples. Thus, it appears that the volatile organic contamination

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present in the ground water at MW10 is due to activities in this area which have also contaminated the soil.

4. Base Neutrals

Total base neutrals were detected in concentrations which exceed the BISE guidelines in a few soil samples. In each of these samples a broad range of base neutrals (as many as 15 compounds) were detected. Although the total concentrations of base neutrals in these samples exceeded the BISE guidelines, in general the concentration of each of the individual compounds was relatively low. For this reason, only the total concentrations of the base neutrals are discussed.

Base neutrals were found to be present in significant concentrations in the soil samples collected from MW10, which is located within AEC 17. Concentrations in excess of BISE cleanup guidelines were found in the soils collected from MW9 and MW23 as well. The source of the base neutrals at these three shallow well locations has not been determined. Their presence may be related to the fill material.

Total base neutrals were detected in a concentration greater than the BISE guideline in one of the soil samples collected from AEC 8, around the two "underground" fuel oil tanks. The base neutral contamination at this location appears to be related to the petroleum hydrocarbon contamination also detected in this area. The

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sample in which the high levels of base neutrals were detected was also the sample in which one of the highest concentrations of petroleum hydrocarbons in this AEC was detected.

None of the water samples collected from the shallow wells contained base neutrals in concentrations exceeding the BISE cleanup guidelines. Each of the four shallow wells in which base neutral contamination had been detected in the soil were sampled and were not found to have base neutral contamination in the ground water.

5. Priority Pollutant Metals

Soil samples were analyzed for the priority pollutant metals at five locations. These five locations are MW1, MW21, MW6, MW9 and MW23. Arsenic and mercury were found to be present in concentrations exceeding the BISE cleanup guidelines in only one location. Copper, lead, and zinc were found in two or more locations.

The arsenic contamination above the BISE guideline was detected only in the samples collected from MW23. This concentration is slightly above the BISE guideline. In the soil samples collected from MW1, however, which is located within a few feet of MW23, arsenic was detected in concentrations below the BISE guideline. These anomalous results suggest that the presence of arsenic is associated with the fill.

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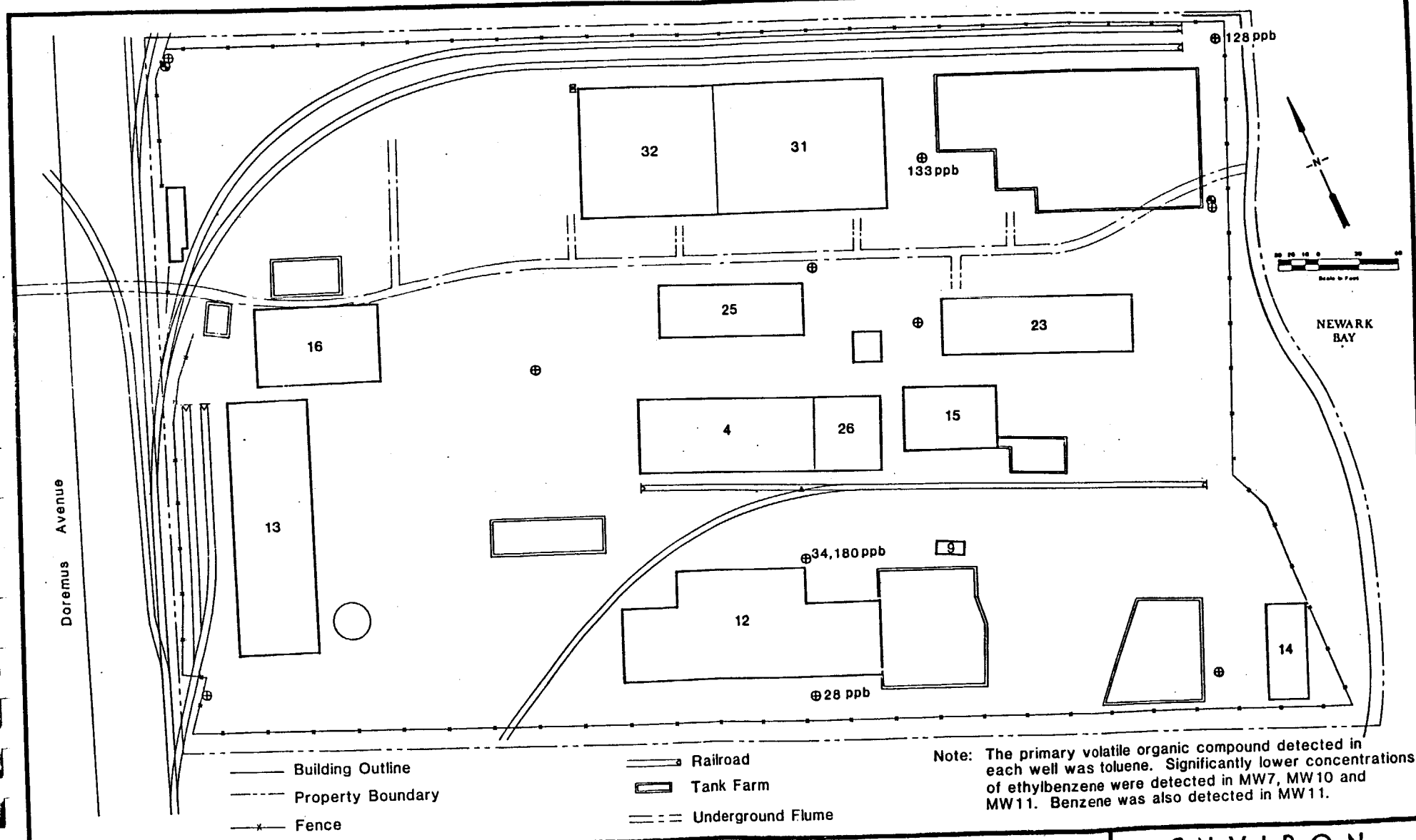

Note: The primary volatile organic compound detected in each well was toluene. Significantly lower concentrations of ethylbenzene were detected in MW7, MW10 and MW11. Benzene was also detected in MW11.

Figure 15

CONCENTRATIONS OF TOTAL VOLATILE ORGANIC COMPOUNDS IN SHALLOW AQUIFER

ENVIRON
Counsel in Health and Environmental Science

Mercury was found to be present in a concentration exceeding the BISE guideline in one of two soil samples collected from MW9. In the sample collected from 0 to 2 feet, 66 ppm of mercury was detected. In the sample collected immediately below this, from a depth of 2 to 4 feet, a concentration of 5,660 ppm were detected. This large difference in the concentrations detected at these two depths suggests that the source of the mercury is the fill. Had the presence of mercury been a result of activities at the site, a gradual decrease in concentration along the vertical profile would be expected.

Copper, lead and zinc were detected in concentrations greater than the BISE guidelines in the soil samples collected from MW6 and from MW9. The concentrations of each of these three metals increased with depth at each of these monitoring well locations. High concentrations of copper and lead were also found in the soil sample collected from MW21. Again, because of the increasing concentrations of these metals with depth, it is likely that this presence is related to the fill material rather than being a result of activities at the site.

Water samples from only two of the shallow wells were analyzed for metals. MW6 was analyzed for all of the priority pollutant metals, but MW9 was analyzed only for lead. Lead was found to be present in concentrations exceeding the BISE guidelines in both of these wells. The lead detected in the ground water may be due to

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the lead present in the soil or may originate from the Sun Oil property which is directly upgradient of these monitoring wells.

B. Deep Aquifer

1. General

From each of the three deep wells, a soil sample was collected from the bottom of the confining layer immediately above the deep aquifer. The samples collected from MW21 and MW23 underwent a TPHC and PP+30 analysis. The soil sample collected from MW22 underwent a volatile organics analysis. No contamination was detected in any of these three soil samples.

The water samples collected from MW21 and MW23 also were analyzed for TPHCs and PP+30. The water sample collected from MW22 was analyzed for volatile organics only. The only contamination detected in any of these three deep wells was for volatile organics at MW22.

2. Volatile Organics at Monitoring Well 22

The volatile organic contamination detected in the water samples from MW22 may be due to an imperfect seal around this deep well. The grout at the top of the seal has been observed to be soft and moist. The underground flume, which from the piezometric data appears to be in contact with the ground water of the shallow

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aquifer, is believed to be located approximately 2 feet from MW22. Contaminated water from the underground flume may be migrating into the deep well during pumping.

The volatile organics detected in MW22 are ethylbenzene (from 140 to 210 ppb) and toluene (6 ppb). These two compounds are the major contaminants detected in the water sample collected from the outfall of the flume. The concentrations of these two compounds detected in the flume are almost identical to the concentrations detected in MW22. In the underground flume, ethylbenzene was present at 220 ppb and toluene at 22 ppb.

In addition, no volatile organics were detected in the soil sample collected immediately above the deep aquifer in this location. If volatile organic contamination were present throughout the vertical extent of the aquifer at this location, the presence of at least detectable levels of the volatile organics would be expected in the soil immediately above the aquifer.

The elevation of the piezometric surface for MW22 is very close to the elevation of the water table at the adjacent shallow well, MW8, indicating that there may be communication between the two aquifers at this location. However, because there does not appear to be a gradient between these two wells, downward migration of contaminants from the shallow aquifer to the deep aquifer would not be expected. This is particularly true for compounds such as those detected in MW22 which are less dense than water. If MW22 is

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defective, it is likely that the ethylbenzene and toluene were drawn down into the deep well by the temporary gradient created when the well was purged prior to sampling.

An additional investigation will be necessary to determine if the well is defective or if the two aquifers are in communication with each other in this area. If the well is found to be defective, it will be removed and the borehole sealed.

C. Underground Flume

It appears that volatile organics as well as cadmium and lead are being introduced into the water which travels through the underground flume from off-site sources. The sediment sample collected at the inflow at the point where Plum's Creek goes underground also indicates that petroleum hydrocarbons, base neutrals and four other metals (chromium, mercury, silver, and zinc) may be introduced into the flume from off-site sources as well.

It appears that ethylbenzene is introduced into the underground flume at some point as it flows beneath the site. The sample collected at the inflow showed no ethylbenzene to be present; however, at the outfall, 220 ppb were reported present. The concentrations of the six other volatile organics detected as they flowed into the underground flume (chlorobenzene, 1,1-dichloroethane, trans-1,2-dichloroethane, methylene chloride, toluene, and 1,1,1-trichloroethane) remained constant as the water traveled beneath the site.

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Toluene was the primary target compound detected in the shallow ground water, yet no increase in the concentration of toluene was noted in the underground flume. Relatively low concentrations of toluene were detected in some of the shallow wells located near the flume. Because the concentration of toluene in these wells is so low, toluene may be entering the flume at a sufficiently slow rate that it is diluted to the point that no observable difference in its concentration in the flume can be seen. The concentration of toluene at MW10, however, is high enough that it is likely that a detectable level would be seen within the flume. Because no toluene was detected in MW5 either, which appears to be downgradient of MW10, it is likely that the ground water flow in this portion of the site follows a yet unidentified path. The foundations of Building 26 and 15 may be affecting the ground water flow in this area. Further analysis will be necessary to define the direction of ground water flow in this area of the site.

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VII. CONCLUSIONS AND RECOMMENDATIONS

A. General

A number of conclusions concerning the quality of the soil and ground water at the former Textron facility may be reached based on the data collected to date. To design an appropriate cleanup program, however, additional characterization of the site through further data collection and analysis will be necessary. The conclusions that can be reached based on the data presented in this report are summarized below. A Phase Two Sampling Plan to address additional sampling needs is being prepared for submission to NJDEP. The issues which will be investigated further in the second phase of sampling are described below.

B. Conclusions

1. Contamination Related to On-site Activities

Two volatile organics, ethylbenzene and toluene, as well as petroleum hydrocarbons, appear to have been introduced into the soil of the fill unit in certain areas of the site by operations and activities which took place at the facility. The presence and relative concentrations of these compounds are consistent with known and believed uses in certain AECs.

Significant quantities of ethylbenzene and toluene are known to have been used at this facility. The only areas in which these two

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compounds were detected are areas in which it was suspected they might be found because of past practices at the site.

Significant concentrations of TPHCs were also reported in areas in which materials used by the plant may have come into contact with the soil. However, the plant used large quantities of non-hazardous fish and vegetable oils. Because the TPHC analysis does not differentiate between the non-hazardous fish and vegetable oils and petroleum hydrocarbons it is impossible at the current time to identify the source of the TPHC contamination seen. However, ENVIRON believes that much of the TPHCs reported may be non-hazardous fish and vegetable oils based on the heavy use of these materials. The results of the GC "fingerprint," which may differentiate between the fish and vegetable oils and the petroleum hydrocarbons, were just received and have not yet been reviewed.

2. Contamination Related to the Fill Materials

As described below, some of the total petroleum hydrocarbon contamination as well as some base neutral and metal contamination were found in unexpected locations. The presence of these compounds at such unexpected locations may be related to normal background levels of these constituents in the fill material, rather than to operations at this facility.

Significant concentrations of TPHCs were detected in unexpected areas (i.e., from soil samples collected from background monitoring

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wells). The range of the apparent background petroleum hydrocarbon contamination varies considerably. Even within a short distance, significant variations in the TPHC concentrations were observed.

Base neutrals also were detected in a few areas in which they were not expected. It is possible that their presence may be related to the background petroleum hydrocarbons.

Some metals were detected in a few of the soil samples; however, the concentrations of these metals varied considerably, suggesting that they maybe due to the fill material. In only a limited number of cases do the concentrations exceed the BISE guidelines. In general, the values reported for metals were only marginally above the BISE cleanup guidelines. Further, the soil samples in which the highest concentrations of the metals were found were those collected from the lower depth. If the metals had been introduced into the soil by practices at the site, the higher concentrations would be expected near the surface. In addition, none of these metals is known to have been used at the facility.

3. Interaction Between Fill Unit and Shallow Aquifer

Despite the presence of significant concentrations of ethylbenzene, toluene and TPHCs in the fill unit, very little contamination was detected in the shallow aquifer. It appears that the pavement which covers the site is preventing the infiltration of rainwater from the surface, thus inhibiting the migration of the contaminants from the soil matrix into the ground water.

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The only TPHCs detected in the shallow aquifer were found in the upgradient well, MW2. This contamination apparently originated from an off-site source.

Volatile organics were detected in concentrations exceeding the the BISE guidelines in only 4 of the 11 shallow wells. The concentrations of toluene in the water are significantly greater than ethylbenzene, which is consistent with the partition coefficients for these two compounds. Except for MW10, the concentrations of total volatile organics are relatively low. Based on the results of the soil samples collected from MW10, it appears that the contamination in this monitoring well is related to localized soil contamination.

Much of the ground water of the shallow aquifer apparently flows into the underground flume, and thus the flume would be the expected discharge point for most of the contaminants which did enter the ground water. The water samples collected from the inflow and outflow of the underground flume, however, indicate that the concentrations of the contaminants which enter the flume remain constant as the flume flows beneath the site, with the exception of ethylbenzene. Ethylbenzene, which is not detected at the inflow but which is detected in a significant concentration at the outfall, appears to enter the flume at some point as it travels through the site. Ethylbenzene is not detected in significant concentrations in the ground water near the flume and may well enter the flume from

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the many storm drains which connect to it. Further investigations will be necessary to determine the entry point of ethylbenzene into the flume.

Toluene, which was detected in significant concentrations in four of the shallow wells, does not appear to be entering the flume at a detectable rate. This may be due to dilution of the toluene as it enters the flume, or another discharge area aside from the flume may exist at the site. An additional investigation will be necessary to further refine the current understanding of ground water flow in the shallow aquifer, in particular in the eastern portion of the site.

4. Deep Aquifer

No contamination was found to be present at either of the upgradient deep wells. Some volatile organic contamination was detected in the downgradient deep well, MW22. There is evidence to suggest that the contamination detected is due to a defect in the well rather than to actual contamination in the deep aquifer. The underground flume appears to be located within 2 feet of MW22. Because the same contaminants detected at the outfall of the flume were found in similar concentrations in the water samples collected from MW 22, it is believed that these contaminants may be introduced into the well when the well is purged prior to sampling. A further investigation will be necessary to evaluate this possibility.

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C. Recommendations

Before an appropriate cleanup plan for the facility can be designed, additional sampling will be necessary. One purpose of the sampling will be to further delineate the areal extent of the contamination within certain areas in which contamination has been identified in the soil matrix. In addition, further analyses must be performed to determine whether the TPHCs reported are due to the non-hazardous fish and vegetable oils or to petroleum hydrocarbons. Further sampling may also be necessary to determine the background levels of petroleum hydrocarbons in the fill.

To refine the current understanding of the ground water flow patterns at this site, additional measurements from existing wells and from the underground flume will need to be taken. It may also be necessary to install additional monitoring wells. The Phase Two Sampling Plan will focus on gathering further information about the underground flume as well as gaining a better understanding of ground water flow in the eastern portion of the site.

In addition, further tests must be performed on MW22 to determine if the well is defective, and whether the contamination observed reflects contaminants present in the flume rather than the deep aquifer. The floor drains in Building 26 will also be addressed in the second phase of sampling. Because the drains do not appear to discharge to the storm sewer, a further attempt will be made to determine their actual discharge point.

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Finally, Textron may begin evaluating cleanup levels that might be appropriate should a cleanup program be necessary for the site. This may involve an evaluation of the health and environmental risks associated with exposure to the contaminants found to be present at this site. Should Textron determine that this approach is appropriate, the Phase Two Sampling Plan may define an approach to evaluating the risks associated with exposure to various levels of the contaminants based on available toxicity data and predicted exposure patterns.

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APPENDIX A:

Boring Logs

845031221

Textron, Newark, New Jersey

Boring No. 101

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 0.8'	Green gravel fragments
0.8 - 2.0'	Gray, brown, and black sand and gravel fill, dry
2.0 - 4.0'	Black, oil saturated sand and gravel fill, some 1" gravel fragments, moist
4.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	87, 35, 13, 12	140/300	24"
2	2.0 - 4.0' bgs	8, 7, 6, 4	300 lbs	6"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-101-1	11/20/86	10:50	VOC+15, Maleic Anhydride, Phthalic Anhydride	0.5 - 1.5'
288E-101-2	11/20/86	10:50	VOC+15, Maleic Anhydride, Phthalic Anhydride	0.5 - 1.5'
288E-101-3	11/20/86	11:10	VOC+15, Maleic Anhydride, Phthalic Anhydride	3.5 - 4.0'

845031222

Textron, Inc., Newark, New Jersey

Boring No. 201 Located at northwest corner of dumpster pad outside Building No. 32

Geologic Log

0.0 - 0.5'	Sand and blue stone gravel up to 4 cm in diameter
0.5 - 2.0'	Sand and gravel fill, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	20, 14, 5, 4	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-201-1	11/19	12:20	VOC+15, Maleic & Phthalic Anhydride	0.5-1.5'

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Textron, Inc., Newark, New Jersey

Boring No. 301 Located along railroad tracks outside Building No. 32, level ground, railroad gravel

Geologic Log

0.0 - 0.5'	Sand and railroad gravel
0.5 - 2.0'	Sand and gravel fill, up to 2.5 cm, brown to black with fragments of anhydride

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	29, 15, 13, 10	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-301-1	11/19	11:45	VOC+15, TPHC	0.5-1.5'

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Textron, Inc., Newark, New Jersey

Boring No. 302 Located along railroad tracks outside Building No. 31

Geologic Log

0.0 - 0.5'	Sand and railroad gravel
0.5 - 2.0'	Sand and gravel fill, discolored brown to black

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

plit Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	20, 17, 13, 12	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-302-1	11/19	11:32	VOC+15, TPHC	0.5-1.5'

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Textron, Inc., Newark, New Jersey

Boring No. 303 Located along railroad tracks outside Building No. 31

Geologic Log

0.0 - 0.5'	Sand and railroad gravel
0.5 - 2.0'	Sand and gravel fill, oily, with wood fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	5, 6, 7, 9	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-303-1	11/19	12:00	VOC+15, TPHC	0.5-1.5'

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Textron, Inc., Newark, New Jersey

Boring No. 401 Located between the railroad tracks behind tank farm

Geologic Log

0.0 - 0.5'	Railroad gravel and resinous material
0.5 - 2.0'	Sand and gravel fill, discolored grey to black, oily

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	15, 14, 11, 9	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-401-1	11/19	10:55	VOC+15, GC Fingerprint, TPHC	0.0-1.0'
288E-401-2	11/19	10:55	VOC+15	0.0-1.0'

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Textron, Inc., Newark, New Jersey

Boring No. 402 Located between the railroad tracks behind tank farm

Geologic Log

0.0 - 0.5'	Railroad gravel and resin
0.5 - 4.0'	Sand and gravel fill, discolored grey to black

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.0' bgs	23, 25, 17, 23	300 lb.	24"
2	2.0 - 4.0' bgs	2, 2, 2, 2	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-402-1	11/19	10:45	VOC+15, GC Fingerprint, TPHC	0.0-0.5'
288E-402-2	11/19	10:45	GC Fingerprint, TPHC	0.0-0.5'
288E-402-3	11/19	10:45	VOC+15, GC Fingerprint, TPHC	2.0-3.0'

845031228

Textron, Inc., Newark, New Jersey

Boring No. 501 Located at the end of railroad tracks behind Tank Farm

Geologic Log

0.0 - 0.5'	Railroad gravel
0.5 - 4.0'	Sand and gravel fill, discolored grey to black, poorly sorted gravel up to 3 cm

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	__, __, __, __	300 lb.	16"
2	2.0 - 4.0' bgs	__, __, __, __	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-501-1	11/19	10:20	Phthalic Anhydride	0.0-0.5'
288E-501-2	11/19	10:30	Phthalic Anhydride	2.0-3.0'

845031229

Textron, Inc., Newark, New Jersey

Boring No. 601

Geologic Log

0.0 - 0.5'	Black sand and gravel
0.5 - 1.0'	Black cinders
1.0 - 1.5'	Sand and fill (red brick and gravel)
1.5 - 2.0'	Red silty sand, gravel and fill
2.0'	Concrete

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	17, 21, 16, 13	300 lb.	20"
2	2.0 - 2.1' bgs	100/2	300 lb.	None

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW11-1	11/18/86	10:45	TPHC, PAH	1.0-2.0'

845031230

Textron, Inc., Newark, New Jersey

Boring No. 602

Geologic Log

0.0 - 2.0'	Sand, gravel and fill
2.0 - 4.0'	Gray silt, sand and fill (much red brick fragments); wet
4.0 - 4.5'	Gray silt, sand and fill; wet; HNu readings of 1-2 ppm
4.5'- ?	Concrete, apparent former foundation

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	2.0 - 4.0' bgs	2, 6, 29, 58	300 lb.	20"
2	4.0 - 4.5' bgs	100/5	300 lb.	4"
3	5.0 - 5.1' bgs	100/5	300 lb.	None

845031231

Textron, Inc., Newark, New Jersey

Boring No. 701 Located where cement pad meets asphalt northeast of Building No. 23

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, red to brown, poorly sorted with brick fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/21/86
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	13, 16, 12, 12	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-701-1	11/21	10:30	VOC+15	0.5-1.5'

845031232

Textron, Inc., Newark, New Jersey

Boring No. 801

Geologic Log

0.0 - 2.0'	Black sand
2.0 - 2.5'	Black oily sand

Drilling Specifications

Drilling Method:	Hand Auger Boring
Rig:	Hand Auger
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86
Plugging Material:	Grout

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-801-1	11/20	13:15	TPHC, PAH	2.0-2.5'

845031233

Textron, Newark, New Jersey

Boring No. 802

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.9'	Gray, black, poorly sorted sand and gravel fill; 1-2 cm gravel fragments, brick fragments
2.9 - 3.0'	Silty clay, some peat and grass, wet, possible oil at bottom of sample
3.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 3' bgs	22, 11, 10, 6	300 lbs	15"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-802-1	11/20/86	12:00	TPHC, PAH	2.5-3.0'

845031234

Textron, Newark, New Jersey

Boring No. 803

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 0.8'	Brown silt
0.8 - 1.0'	Black sand and gravel fill
1.0 - 1.2'	Gray crushed stone
1.2 - 2.0'	Black sand and gravel fill
2.0 - 4.0'	Brown and black oily sand and gravel
4.0'	End of boring, moist

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	21, 8, 6, 5	300 lbs	18"
2	2 - 4' bgs	4, 3, 3, 2	300 lbs	2"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-803-1	11/20/86	11:35	TPHC, PAH	2.5-3.0'

845031235

Textron, Inc., Newark, New Jersey

Boring No. 804

Geologic Log

0.0 - 0.1'	Black sand
0.1 - 0.5'	Very clayey red sand
0.5 - 2.5'	Black sand and fill (red brick)

Drilling Specifications

Drilling Method:	Hand Auger
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86
Plugging Material:	Grout

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-804-1	11/20	14:00	TPHC, PAH	2.0-2.5'

845031236

Textron, Inc., Newark, New Jersey

Boring No. 901 Located inside Building No. 16

Geologic Log

0.0 - 0.5'	Concrete floor
0.8 - 1.0'	Resin and gravel up to 3 cm, brown to tan

Drilling Specifications

Drilling Method:	Sledge hammer and split spoon
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86
Plugging Material:	Covered with locking steel plate

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 1.0' below floor surface	9, __, __, __	20 lb.	6"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-901-1	11/18	15:40	VOC+15, Maleic & Phthalic Anhydride	0.8-1.0' below floor surface

845031237

Textron, Inc., Newark, New Jersey

Boring No. 1001

Geologic Log

0.0 - 0.3'	Asphalt
0.3 - 2.1'	Brown silt and muck gravel (angular, up to 6 cm in diameter)
2.1 - 2.5'	Coarse, poorly sorted brown sand and gravel
2.5 - 3.5'	Mottled, coarse, poorly sorted sand and gravel
3.5 - 6.0'	Fill (concrete, brick and cinders) with black sand and gravel

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86
Plugging Material:	Grout, asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	13, 9, 13, 14	300 lb.	8"
2	2.0 - 4.0' bgs	13, 17, 14, 16	300 lb.	16"
3	4.0 - 6.0' bgs	6, 2, 3, 2	300 lb.	15"
4	6.0 - 8.0' bgs	1, 1, 1, 1	300 lb.	None

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1001-1	11/18/86	12:15	TPHC	0.0-1.0'
288E-1001-1	11/18/86	12:15	VOC+15	1.0-2.0'
288E-1001-2	11/18/86	12:35	TPHC, VOC+15	4.0-6.0'

845031238

Textron, Inc., Newark, New Jersey

Boring 1201 — Hand auger boring underneath first hole in floor on southwest corner of Building 4

Geologic Log

0.0 - 0.5'	Grey and beige-colored sand and gravel mixed with very sticky black resin; black sections are oily and appear to be high in TPHC; HNu reads up to 500 ppm from the sample; 2 to 400 ppm at mouth of hole, 60 to 100 ppm in breathing zone
0.5 - 1.0'	Black oily sand and gravel fill; contains some unidentifiable fibers, possibly resins; HNu readings up to 500 ppm from sample; breathing zone reads up to 60 ppm

Drilling Specifications

Drilling Method:	Hand Auger
Driller:	ENVIRON Corporation
Date Drilled:	November 12, 1986
Plugging Material:	Cuttings

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1201-01	11/12/86	13:30	TPHC	0.0 - 0.5'
288E-1201-02	11/12/86	13:35	VOC+15	0.5 - 1.0'

845031239

Textron, Inc., Newark, New Jersey

Boring 1202 — Hole dug between the third and fourth post along the south wall of Building 4, east of the southwest corner; the sample point is located under the first hole inside the building, next to a puddle of black oily water

Geologic Log

0.0 - 0.1'	Resin layer
0.1 - 1.7'	Black sand and gravel fill with unidentifiable fibrous material; HNu reads 60 increasing to 150 ppm in the breathing zone, 100 ppm at the mouth of the hole, and 120 ppm in the sample and inside the hole

Drilling Specifications

Drilling Method:	Trowel
Driller:	ENVIRON Corporation
Date Drilled:	November 12, 1986
Plugging Material:	Cuttings

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1202-01	11/12/86	13:45	TPHC	0.0 - 0.4'
288E-1202-02	11/12/86	13:50	VOC+15	0.4 - 0.7'

845031240

Textron, Inc., Newark, New Jersey

Boring 1203 — This hole is located under the first hole in the floor, under the northwest corner of Building 4, at the edge of a puddle

Geologic Log

0.0 - 0.5'	Dark grey to black sand and gravel fill, mixed with fibrous resin; it contains white particles approximately 1 mm in diameter, possibly resin; HNu reads 2 to 3 ppm background before digging and remains below 10 ppm in the hole while digging

Drilling Specifications

Drilling Method:	Trowel
Driller:	ENVIRON Corporation
Date Drilled:	November 12, 1986
Plugging Material:	Cuttings

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1203-01	11/12/86	14:00	TPHC, VOC+15	0.0 - 0.5'

845031241

Textron, Inc., Newark, New Jersey

Boring No. 1301 Located east of Building No. 13 near nitrogen tank

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, brown to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	27, 21, 20, 25/3"	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1301-1	11/19	14:40	VOC+15, TPHC	0.5-1.5'

845031242

Textron, Inc., Newark, New Jersey

Boring No. 1302 Located east of Building No. 13 near nitrogen tank

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	4, 4, 4, 6	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1302-1	11/19	14:10	VOC+15, TPHC	0.5-1.5'

845031243

Textron, Inc., Newark, New Jersey

Boring No. 1303 Located east of Building No. 13 near nitrogen tank

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, with wood fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	15, 7, 9, 9	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1303-1	11/19	15:00	VOC+15, TPHC	0.5-1.0'

845031244

Textron, Inc., Newark, New Jersey

Boring No. 1401 Located south of tanks 309-311

Geologic Log

0.0 -	0.5'	Asphalt
0.5 -	2.5'	Sand and gravel fill, grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	27, 12, 8, 9	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1401-1	11/19	16:15	VOC+15, TPHC	0.5-1.5'

845031245

Textron, Inc., Newark, New Jersey

Boring No. 1402 Located south of tanks 309-311

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, wood fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	__, __, __, __	300 lb.	12"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1402-1	11/19	16:25	VOC+15, TPHC	0.5-1.5'

845031246

Textron, Inc., Newark, New Jersey

Boring No. 1403 Located south of tanks 309-311

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	42, 18, 12, 9	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1403-1	11/19	15:45	VOC+15, TPHC	0.5-1.5'

845031247

Textron, Inc., Newark, New Jersey

Boring No. 1501 Located on the south side of site between Buildings No. 12 and 13

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, brown to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	25, 18, 16, 12	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1501-1	11/19	15:25	VOC+15, TPHC	0.5-1.5'

845031248

Textron, Inc., Newark, New Jersey

Boring No. 1503 Located on the south side of site between Buildings No. 12 and 13

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	31, 15, 15, 11	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1503-1	11/19	15:10	VOC+15, TPHC	0.5-1.5'

845031249

Textron, Newark, New Jersey

Boring No. 1504

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, brick and coal fragments, wet
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 21, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	21, 14, 6, 5	300 lbs	16"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1504-1	11/21/86	09:05	VOC+15, TPHC	1.0-1.5'

845031250

Textron, Newark, New Jersey

Boring No. 1601

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, ½" gravel fragments, oily appearance and odor, wet
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	8, 7, 5, 4	140 lbs	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1601-1	11/20/86	13:54	VOC+15, TPHC	0.1-1.5'

845031251

Textron, Newark, New Jersey

Boring No. 1602

Geologic Log

0.0 - 0.5'	Asphalt pavement (HNu 1-5 ppm in breathing zone)
0.5 - 0.8'	Gravel layer
0.8 - 1.3'	Black, oily, poorly sorted sand and gravel fill, some silt, 2" gravel fragments, HNu 5-12 ppm, peak at 50 ppm
1.3 - 2.0'	Brown, oily, poorly sorted sand and gravel fill, some silt, 2" gravel fragments, HNu 5-12 ppm, peak at 50 ppm
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	28, 20, 17, 11	140 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1602-1	11/20/86	14:04	VOC+15, TPHC	1.0-1.5'

845031252

Textron, Newark, New Jersey

Boring No. 1603

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, gravel fragments up to 1", bottom 6" oily, oily odor
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	18, 11, 7, 5	140 lbs	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1603-1	11/20/86	13:45	VOC+15, TPHC	1.0-1.5'

845031253

Textron, Newark, New Jersey

Boring No. 1701

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, miscellaneous glass, wood, and coal fragments, bottom 6" oily appearance and odor, wet at bottom
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 21, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	12, 10, 7, 6	300 lbs	22"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1701-1	11/21/86	09:15	VOC+15, TPHC	1.0-1.5'

845031254

Textron, Inc., Newark, New Jersey

Boring No. 1702 a.k.a. 1502

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, brown to black, poorly sorted up to 2.0 cm in diameter

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	15, 11, 9, 8	300 lb.	12"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1502-1	11/19	15:35	VOC+15, TPHC	0.5-1.5'

845031255

Textron, Newark, New Jersey

Boring No. 1703

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 2.0'	Black, poorly sorted sand and gravel fill, brick and wood fragments, 1" gravel fragments, wet at bottom
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	37, 29, 23, 19	140 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1703-1	11/20/86	16:00	VOC+15, TPHC	1.0-1.5'

845031256

Textron, Newark, New Jersey

Boring No. 1801

Geologic Log

0.0 - 0.2'	Large (2") gravel fragments and asphalt
0.2 - 2.0'	Black, poorly sorted sand and gravel fill with brick, glass, and coal fragments, wet at bottom
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 21, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	15, 9, 8, 11	300 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1801-1	11/21/86	08:50	TPHC	1.0-1.5'

845031257

Textron, Inc., Newark, New Jersey

Boring No. 1901

Geologic Log

0.0 - 2.0'	Black, sandy, oily, resinous soil, HNu: 120 ppm at 1.0'; HNu: 19 ppm at 2.0'
2.0 - 2.5'	Black, sandy, very oily soil, HNu: 20 ppm at 2.5'

Drilling Specifications

Drilling Method:	Hand Auger
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86
Plugging Material:	Cuttings

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-1901-1	11/20	14:00	TPHC	0.5-1.0'
288E-1901-1	11/20	14:10	VOC+15	1.0-1.5'
288E-1901-2	11/20	14:30	TPHC, VOC+15	2.0-2.5'

845031258

Textron, Inc., Newark, New Jersey

Boring No. 2101 Located on asphalt on east side of site north of Building No. 14

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to dark grey, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/21/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	20, 14, 5, 4	300 lb.	8"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2101-1	11/21	9:50	VOC+15, TPHC	0.5-1.0'

845031259

Textron, Inc., Newark, New Jersey

Boring No. 2102 Located on asphalt on east side of site north of Building No. 14

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, grey to dark grey, poorly sorted with brick fragments

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/21/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	46, 35, 7, 9	300 lb.	18"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2102-1	11/21	10:15	VOC+15, TPHC	0.5-1.5'

845031260

Textron, Newark, New Jersey

Boring No. 2103

Geologic Log

0.0 - 0.5'	Asphalt pavement and concrete
0.5 - 2.0'	Black and brown, poorly sorted sand and gravel fill with brick and glass fragments, wet
2.0'	Water

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 21, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	9, 8, 6, 5	300 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2103-1	11/21/86	10:10	VOC+15, TPHC	1.0-1.5'

845031261

TTextron, Newark, New Jersey

Boring No. 2201

Geologic Log

0.0 - 1.3'	Miscellaneous coarse sand and gravel fill, black, oily appearance and strong oily odor
1.3'	End of boring

HNu
4 ppm at 1-2" (1 ppm background)
6 ppm at 6"
19 ppm at 12"
45 ppm at 15" (4-5 ppm background, and breathing zone)

Drilling Specifications

Drilling Method: Trowel
Drilling Company: ENVIRON Corporation
Date Drilled: November 13, 1986

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2201-1	11/13/86	11:10	VOC+15, TPHC	0.5-1.0'

845031262

Textron, Inc., Newark, New Jersey

Boring No. 2301

Geologic Log

0.0 - 0.3'	Asphalt
0.3 - 2.5'	Black sand and gravel
2.5'	Moist black sand and gravel

Drilling Specifications

Drilling Method:	Hand Auger Boring with Jack Hammer
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86
Plugging Material:	Grout and asphalt

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2301-1	11/20	15:00	TPHC	0.5-1.0'
288E-2301-1	11/20	15:05	VOC+15	1.0-1.5'
288E-2301-2	11/20	15:15	TPHC, VOC+15	2.0-2.5'

845031263

Textron, Inc., Newark, New Jersey

Boring No. 2501 Located next to railroad tracks south of Building No. 26

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 2.5'	Sand and gravel fill, discolored grey to black, poorly sorted

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-555
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/21/86
Plugging Material:	Grout and asphalt

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	38, 40, 45, 50	300 lb.	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2501-1	11/21	9:15	VOC+15, TPHC	0.5-1.5'

845031264

Textron, Newark, New Jersey

Boring No. 2701

Geologic Log

0.0 - 1.0'	Black silt, sand, and gravel, poorly sorted, 2" gravel fragments near top
1.0 - 2.0'	Brown silt, with sand and gravel mixed in. Bottom of spoon may have hit former concrete building footing, wet.
2.0'	End of boring

Drilling Specifications

Drilling Method:	Sledge hammer and spilt spoon
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	135 with 12 lb. sledge hammer	12 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2701-1	11/20/86	15:20	VOC+15, TPHC	1.0-1.5'

845031265

Textron, Newark, New Jersey

Boring No. 2801

Geologic Log

0.0 - 0.2'	Large (2") gravel fragments
0.2 - 2.0'	Brown and black sand and gravel with brick fragments, may have hit former concrete building footing, moist at bottom
2.0'	End of boring, water

Drilling Specifications

Drilling Method:	Sledge hammer and split spoon
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 20, 1986
Plugging Material:	Grout

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	90 with 12 lbs. sledge hammer	12 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-2801-1	11/20/86	15:00	VOC+15, TPHC	1.0-1.5'

845031266

Textron, Inc., Newark, New Jersey

Boring No. Pilot Boring

Geologic Log

0.0 - 0.1'	Asphalt
0.1 - 5.0'	Very coarse black and brown sand and gravel fill, water somewhere between 4.0' and 6.0'
5.0 - 13.0'	Gray-black silty clay, some gravel, wet with oily black water
13.0 - 23.5'	Gray-black silty clay; dry
23.5 - 24.1'	Dark brown, black peat, very fibrous, well decomposed
24.1 - 24.2'	Fine gray clay
24.2 - 30.0'	Fine gray sand, trace clay, wet
30.0 - 32.0'	More coarse gray sand, trace clay, wet
32.0 - 34.0'	Coarse, gray sand with some red sand, moderately, poorly, sorted becoming coarser with depth, small gravel (4mm-1cm), fairly well rounded to well rounded, primarily quartz with some feldspar, basalt and red sandstone, wet.
34.0 - 40.0'	Coarse sand with much gravel (.4-2cm) of various types, well rounded to angular, wet
40.0 - 45.0'	Red-brown silty clay, trace gravel
45.0 - 52.0'	Coarse, reddish brown sand with some 2" layers of very fine-grained sand and clay

Drilling Specifications

Drilling Method:	Mud Rotary
Rig:	CME 55
Driller:	Empire Soils Investigations, Inc.
Date Drilled:	11/10/86 and 11/11/86
Plugging Material:	Grout

845031267

Textron, Inc., Newark, New Jersey

Boring No. Pilot Boring - Cont'd.

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	3, 3, 4, 2	300 lb.	8"
2	2 - 4' bgs	3, 2, 2, 2	300 lb.	3"
3	4 - 6' bgs	2, 1, 0, 0	300 lb.	None
4	6 - 8' bgs	1, 0, 0, 0	300 lb.	None
5	8 - 10' bgs	1, 0, 0, 0	300 lb.	2"
6	10 - 12' bgs	1, 1, 1, 1	300 lb.	24"
7	12 - 14' bgs	1, 1, 1, 1	300 lb.	24"
8	14 - 16' bgs	1, 1, 1, 1	300 lb.	24"
10	22 - 24' bgs	1, 1, 1, 1	300 lb.	24"
11	24 - 26' bgs	7, 7, 7, 13	140 lb.	22"
12	26 - 28' bgs	11, 12, 13, 14	140 lb.	15"
13	28 - 30' bgs	8, 7, 10, 15	140 lb.	15"
14	30 - 32' bgs	7, 8, 7, 13	140 lb.	12"
15	32 - 34' bgs	11, 13, 17, 15	140 lb.	12"
16	34 - 36' bgs	10, 8, 12, 11	140 lb.	12"
17	40 - 42' bgs	14, 10, 9, 11	140 lb.	15"
18	45 - 47' bgs	21, 14, 17, 19	140 lb.	24"
19	50 - 52' bgs	13, 15, 17, 13	140 lb.	20"

845031268

APPENDIX B:

Well Specifications

845031269

Textron, Newark, NJ

Monitoring Well No. 1

Permit No. 2609839

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 4.5'	Sand and gravel fill, poorly sorted discolored grey to black, angular, with cinders
4.5 - 6.5'	Clay, light grey to grey, well sorted, dry

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Ken Bacorn
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	4.5' bgs - 1.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	1.0' bgs - 2.32' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	0.80'bgs - 2.80' ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	4.5' bgs - 0.75' bgs	No. 1 Well sand	---	---
Bentonite seal	0.75'bgs - 0.5' bgs	Pellets	---	---
Grout	0.5' bgs - 1.2' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	5, 4, 3, 2	140 lb.	16"
2	2.5 - 4.5' bgs	2, 1, 2, 2	140 lb.	8"
3	4.5 - 6.5' bgs	2, 2, 1, 1	140 lb.	10"

845031270

Textron, Newark, NJ

Monitoring Well No. 1 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW1-2	11/20/86	14:20	TPHC,PP+30	1.5 -- 2.5'
288E-MW1-3	11/20/86	14:20	TPHC,PP+30	1.5 -- 2.5'

Observations

Development time: 1 hour
Estimated yield: 0.8 gallons per minute

845031271

Textron, Newark, NJ

Monitoring Well No. 2

Permit No. 2609839

Geologic Log

0.0 - 8.0'	Coarse, poorly sorted sediments
8.0 - 9.0'	Peat in a matrix of clay and silt

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Ken Bacorn
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	8.0' bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 1.90' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.14'bgs - 2.14' ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	8.0' bgs - 1.5 ' bgs	No. 1 Well sand	---	---
Bentonite seal	1.5 'bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	7.0 - 9.0' bgs	__, __, __, __	300 lb.	

Observations

Development time: 7 minutes
Estimated yield: 16 gallons per minute

845031272

Textron, Newark, NJ

Monitoring Well No. 3

Permit No. 2609841

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 7.0'	Black, discolored, very poorly sorted sand and angular gravel, up to 2 cm in diameter; fill (brick fragments); water at 4.5 '
7.0 - 7.5'	Peat; grey to black, poorly decomposed with grass stems and roots
7.5 - 8.5'	Clay; light to dark grey, well sorted, dry

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Well Driller/ Licence Number:	Jerry Malack (1167), Chris O'Shaughnessy, and Doug Connery
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/17/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	7.0' bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 0.44'bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3 ' bgs - 0.00'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	7.0' bgs - 2.0' bgs	No. 1 Well sand	---	---
Bentonite seal	2.0' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5' bgs	17, 11, 16, 13	300 lb.	6"
2	2.5 - 4.5' bgs	3, 4, 4, 3	300 lb.	2"
3	4.5 - 6.5' bgs	1, 2, 1, 1	300 lb.	8"
4	6.5 - 8.5' bgs	1, 1, 1, 1	300 lb.	18"

845031273

Textron, Newark, NJ

Monitoring Well No. 3 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW3-1	11/17/86	12:00	TPHC,	0.5 - 1.5'
288E-MW3-1	11/17/86	12:05	VOC+15	1.5 - 2.0'
288E-MW3-2	11/17/86	13:10	TPHC, VOC+15	4.0 - 4.5'

Observations

Development time: 1 hour, 40 minutes
Estimated yield: 6 gallons per minute

845031274

Textron, Newark, New Jersey

Monitoring Well No. 4

Permit No. 2609842

Geologic Log

0.0 - 0.5'	Asphalt pavement
0.5 - 0.8'	Crushed stone
0.8 - 2.0'	Black sand and gravel fill, with coal traces; dry; H-Nu = 0 ppm
2.0 - 3.5'	Black and dark brown silty clay with sand and gravel fragments mixed in.; H-Nu = 1ppm
3.5 - 4.0'	White sand fill; water at 3.5 feet
4.0 - 5.0'	White and cream colored sand and gravel; fill (possibly crushed brick); wet
5.0 - 6.0'	Black sand and gravel (was white but is coated with oily water); wet; H-Nu = 0 ppm
6.0 - 8.0'	Black sand and gravel, traces of clay, traces of white/cream sand and gravel mixture; wet; H-Nu = 2 ppm
8.0 - 10.0'	Black plastic clay, traces of peat fibers

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Skid rig
Well Driller/ Licence Number:	Walter Ketter (1316) and Mike Dillon
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	8.0' bgs -2.0 ' bgs	PVC No. 20 slot	4 in.	PVC end cap
Inner casing	2.0' bgs -0.70' bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3 ' bgs -0.00' ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	8.0' bgs -1.5 ' bgs	No.1 Well sand	---	---
Bentonite seal	1.5' bgs -1.0 ' bgs	Pellets	---	---
Grout	1.0' bgs -0.70' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

845031275

Textron, Newark, New Jersey

Monitoring Well No. 4 (continued)

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	181, 27, 17, 15	140 lbs	12"
2	2 - 4' bgs	2, 4, 6, 7	140 lbs	8"
3	4 - 6' bgs	5, 2, 1, 1	140 lbs	6"
4	6 - 8' bgs	1, 1, 1, 2	140 lbs	6"
5	8 - 10' bgs	1/24"	140 lbs	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
228E-MW4-1	11/19/86	11:30	VOC+15	0.5 - 1.0' bgs
228E-MW4-2	11/19/86	11:35	VOC+15	3.0 - 3.5' bgs

Observations

Development time: 1 hour
Estimated yield: 0.08 gallons per minute

845031276

Textron, Newark, New Jersey

Monitoring Well No. 5

Permit No. 2609843

Geologic Log

0.0 - 0.2'	Gravel (angular) clay; some sand
0.2 - 4.0'	Fill (layers of black cinders, red brick and yellow brick); water at 4.0'
4.0 - 7.5'	Black, silty, poorly sorted, coarse sand: gravel (maximum 2 cm); wet
7.5 - 8.0'	Peat and clay

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	7.5' bgs -2.5 ' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.5' bgs -1.35' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.2' bgs -2.2 ' ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	7.5' bgs -1.5 ' bgs	No. 1 Well sand	---	---
Bentonite seal	1.5' bgs -1.0 ' bgs	Pellets	---	---
Grout	1.0' bgs -0.4 ' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	13, 16, 21, 10	140 lbs	18"
2	2.0 - 4.0' bgs	21, 23, 13, 17	140 lbs	4"
3	4.0 - 6.0' bgs	10, 9, 9, 6	140 lbs	6"
4	6.0 - 8.0' bgs	2, 2, 2, 1	140 lbs	6"

845031277

Textron, Newark, New Jersey

Monitoring Well No. 5 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
228E-MW5-1	11/18/86	11:30	TPHC	0.5 - 1.0' bgs
228E-MW5-2	11/18/86	11:35	VOC+15	1.0 - 1.5' bgs

Observations

Development time: 25 minutes
Estimated yield: 2.2 gallons per minute

845031278

Textron, Newark, NJ

Monitoring Well No. 6

Permit No. 2609844

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 7.0'	Discolored grey to black, poorly sorted sand; gravel up to 2.5 cm in diameter, angular; fill (glass and brick fragments); strong chemical odor; water at 5'
7.0 - 9.0'	Peat, dark grey to black, poorly decomposed, with clay interbedded; moist

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Well Driller/ Licence Number:	Jerry Malack (1167)
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/17/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	7.0' bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 2.33'bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.77'bgs - 2.77'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	7.0' bgs - 2.0' bgs	No. 1 Well sand	---	---
Bentonite seal	2.0' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	1.0 - 3.0' bgs	25, 20, 31, 12	300 lb.	24"
2	3.0 - 5.0' bgs	4, 5, 4, 4	300 lb.	3"
3	5.0 - 7.0' bgs	2, 1, 2, 2	300 lb.	1"
4	7.0 - 9.0' bgs	1, 1, 1, 1	300 lb.	24"

845031279

Textron, Newark, NJ

Monitoring Well No. 6 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW6-1	11/17/86	15:55	TPHC, PP+30 (except VOC)	1.0 - 2.0'
288E-MW6-1	11/17/86	15:55	VOC+15	2.0 - 3.0'
288E-MW6-2	11/17/86	16:30	TPHC, PP+30 (except VOC)	6.0 - 7.0'
288E-MW6-3	11/17/86	16:45	TPHC, PP+30 (except VOC)	Wash blank

Observations

Development time: 22.5 minutes
Estimated yield: 2 gallons per minute

845031280

Textron, Newark, NJ

Monitoring Well No. 7

Permit No. 2609845

Geologic Log

0.0 - 3.5'	Coarse, poorly sorted sand (some orange); angular gravel fill, up to 2 cm; moist
3.5 - 5.0'	Silty sand and gravel; wet; very oily
5.7 - 7.0'	Large stones, possibly from break-wall; black silt; wet; oily odor
7.0 - 11.0	Sand and silt; moist
11.0 - 12.0'	Silty clay; dry

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86 and 11/19/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	11.0'bgs - 1.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	1.5' bgs - 2.05'bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.41'bgs - 2.41'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	11.0'bgs - 1.0' bgs	No. 1 Well sand	---	---
Bentonite seal	1.0' bgs - 0.75'bgs	Pellets	---	---
Grout	0.75'bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

845031281

Textron, Newark, NJ

Monitoring Well No. 7 (continued)

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	4, 7, 9, 12	140 lb.	8"
2	2.0 - 4.0' bgs	9, 5, 5, 15	140 lb.	10"
3	4.0 - 6.0' bgs	7, 17, 21, 25	140 lb.	12"
4	6.0 - 8.0' bgs	1, 1, 1, 1	140 lb.	6"
5	8.0 - 10.0' bgs	2, 2, 3, 2	140 lb.	15"
6	10.0 - 12.0' bgs	7, 6, 7, 5	140 lb.	20"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW7-1	11/18/86	14:00	TPHC	0.5 - 1.0'
288E-MW7-1	11/18/86	14:05	VOC+15	1.0 - 1.5'
288E-MW7-2	11/18/86	14:30	TPHC,VOC+15	4.0 - 6.0'

Observations

Development time: 1 hour
Estimated yield: 0.5 gallons per minute

845031282

Textron, Newark, NJ

Monitoring Well No. 8

Permit No. 2609846

Geologic Log

0.0 - 0.4'	Asphalt and gravel
0.4 - 11.0'	Black silty sand; gravel fill (4" and 5" in diameter)

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acker AD II
Well Driller/ Licence Number:	Tom Brown (1311) and Dennis Bailey
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/20/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	11.0'bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 0.35'bgs	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3 ' bgs - 0.00'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	11.0 bgs - 1.5' bgs	No. 1 Well sand	---	---
Bentonite seal	1.5' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0 'bgs - 0.5' bgs	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	10, 15, 22, 17	300 lb.	12"

845031283

Textron, Newark, NJ

Monitoring Well No. 8 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW8-1	11/20/86	11:40	VOC+15	1.0 - 2.0'

Observations

Development time: 1 hour
Estimated yield: 0.7 gallons per minute

845031284

Textron, Inc., Newark, New Jersey

Monitoring Well No. 9

Permit No. 2609847

Geologic Log

0.0 - 6.0'	Very poorly sorted coarse textured sandy, gravelly, silty fill; gravel is angular with diameters up to 1 cm; extensive man-made fragments of crushed ceramic, bricks, coal; water at 3 feet; black and brown discolored wood fragments increase with depth
6.0 - 8.0'	Partly decomposed wood fragments mixed with angular platey gravel up to 1 cm in diameter; trace clay and sand; oily
8.0 - 11.0'	Peaty decomposed wood fragments mixed with black discolored silt and clay; also contains glass and ceramic fragments;
11.0 - 12.0'	Moist grey fine sand and clay

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13-14, 1986

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	10.0'bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 2.31'ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.48'bgs - 2.48'ags	Steel Schedule 40	8 in.	Steel with lock
Sand pack	10' bgs - 1.5' bgs	No. 1 Well sand	---	---
Bentonite seal	1.5' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0 - 2' bgs	32, 71, 28, 21		22"
2	2 - 4' bgs	25, 17, 7, 8		1.2' 15"
3	4 - 6' bgs	2, 6, 9, 100/5		12"
4	6 - 8' bgs	1, 1, 1, 1		24"
5	8 - 10' bgs	1, 1, 1, 1		18"'
6	10 - 12' bgs	1, 1, 1, 1		24"

845031285

Textron, Inc., Newark, New Jersey

Monitoring Well No. MW9 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW9-01	11/13/86	4:30 p.m.	TPHC,PP+30 (except VOCs)	0 to 18"
288E-MW9-01	11/13/86	4:30 p.m.	VOC+15	18 to 24"
288E-MW9-02	11/13/86	4:45 p.m.	TPHC,PP+30 (except VOCs)	6" interval somewhere between 2.0 to 3.5'
288E-MW9-02	11/13/86	4:45 p.m.	VOC+15	6" interval somewhere between 2.5 and 4.0'

Observations

Development time: 20 minutes
Estimated yield: 2.7 gallons per minute
Bubbling observed in well, probably due to decomposition of peat.

845031286

Textron, Inc., Newark, New Jersey

Monitoring Well No. 10

Permit No. 2609848

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 4.5'	Black, brown, poorly sorted sand; coarse angular gravel, up to 2 cm; fill (glass, cinders); H-Nu: 12 ppm at 4.5'
4.5'- 8.5'	Black peat, poorly decomposed with shell fragments; grey-black clay; water at 5'; chemical odor

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	Acher AD II
Well Driller/ Licence Number:	Jerry Malack (1167), Tom Brown (1311) and Chris O'Shaughnessy
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/18/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	6.5' bgs - 1.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	1.5' bgs - 2.0' ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.46'bgs - 2.46'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	6.5' bgs - 1.0' bgs	No. 1 Well sand	---	---
Bentonite seal	1.0' bgs - 0.5' bgs	Pellets	---	---
Grout	0.5' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.5 - 2.5 ' bgs	4, 4, 5, 4	140 lb	24"
2	2.5 - 4.5 ' bgs		140 lb	10"
3	4.5 - 6.5 ' bgs		140 lb	8"
4	6.5 - 8.5 ' bgs		140 lb	10"

845031287

Textron, Inc., Newark, New Jersey

Monitoring Well No. 10 (continued)

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW10-1	11/18/86	11:20	TPHC, BN+10, AE+5, VOC+15	0.5 - 1.5 '
288E-MW10-2	11/18/86	11:50	TPHC, BN+10, AE+5, VOC+15	4.0 - 5.0 '

Observations

Development time: 1 hour 45 minutes
Estimated yield: 0.3 gallons per minute

845031288

Textron, Inc., Newark, New Jersey

Monitoring Well No. 11

Permit No. 2609849

Geologic Log

0.0 - 4.5'	Fill (cinders, brick); black sand; gravel; some grey silt; water at 3'
4.5 - 9.0'	Silty peat

Drilling Specifications

Drilling Method:	Hollow Stem Auger
Rig:	CME 55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	11/19/86

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	9.0' bgs - 2.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	2.0' bgs - 2.23'ags	PVC Schedule 40	4 in.	PVC vented cap
Protective casing	3.5' bgs - 2.65'ags	Steel Schedule 40	8 in.	Steel locking cap
Sand pack	9.0' bgs - 1.5' bgs	No.1 Well sand	---	---
Bentonite seal	1.5' bgs - 1.0' bgs	Pellets	---	---
Grout	1.0' bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	5.0 - 7.0' bgs	2, 1, 2, 1	300 lb	24"
2	7.0 - 9.0' bgs	1, 1, 1, 1	300 lb	24"

Observations

Development time: 30 minutes
Estimated yield: 1.5 gallons per minute
Bubbling observed in well, probably due to decomposition of peat.

845031289

Textron, Inc., Newark, New Jersey

Monitoring Well No. 21

Permit No. 2609851

Geologic Log

0.0 - 0.5'	Very poorly sorted quartz gravel (well-rounded 1 mm to 2 cm in diameter) and coarse grey silty sand
0.5 - 1.5'	Hard, black, discolored, very poorly sorted gravel, sand and silt; oily odor
1.5 - 2.0'	Wood, possibly railroad tie; water at 2 feet
2.0 - 8.0'	Very poorly sorted black, oily discolored wet silt, sand, and fine gravel; gravel is up to 4 mm in diameter; strong chemical order, some partly decomposed organic matter, apparently a swamp deposit
8.0 - 10.0'	Partly decomposed, woody peat in a matrix of clay and silt; peat concentration decreases with depth
10.0 - 30.5'	Peat and black clayey silt; bivalve shell fossils from 13-15'; oil observed from 24 - 28'
30.5 - 37.0'	Sand and silt; water at 32.5 feet
37.0 - 43.0'	Poorly sorted sand and well rounded gravel (up to 2 cm); wet
43.0 - 44.5'	Very fine red sand and clay; moist
44.5 - 46.0'	Sandy red clay; some silt; moist

Drilling Specifications

Drilling Method:	Hollow Stem Auger-6¼ inch ID (outer casing) and Mud Rotary (inner casing)
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworsky (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 13 and 17, 1986

845031290

Textron, Inc., Newark, New Jersey

Monitoring Well No. 21 (continued)

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	45.0'bgs -35.0' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	35.0'bgs -2.41' ags	PVC Schedule 40	4 in.	PVC vent cap
Outer casing	9.46'bgs -2.54' ags	Steel Schedule 40	8 in.	
Outer casing seal	9.46'bgs -0.25' ags	Cement	---	---
Sand pack	45.0'bgs -32.5' bgs	No. 1 Well sand	---	---
Bentonite seal	32.5'bgs -28.0' bgs	Pellets	---	---
Grout	28.9 bgs - 0.5' ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	13, 70, 100/5	140 lb	8"
2	2.0 - 4.0' bgs	9, 11, 35, 6	140 lb	16"
3	4.0 - 6.0' bgs	6, 5, 3, 2	140 lb	2"
4	6.0 - 8.0' bgs	2, 2, 1, 1	140 lb	15"
5	8.0 -10.0' bgs	1/12, 1/12	140 lb	18"
6	10.0 -12.0' bgs	1/12, 1/12	140 lb	24"
7	13.0 -15.0' bgs	2, 3, 3, 4	140 lb	24"
8	22.0 -24.0' bgs	3, 3, 4, 3	140 lb	6"
9	24.0 -26.0' bgs	2, 2, 3, 4	140 lb	5"
10	26.0 -28.0' bgs	2, 2, 3, 4	140 lb	5"
11	28.0 -30.0' bgs	5, 4, 7, 6	140 lb	15"
12	30.0 -32.0' bgs	7, 15, 20, 26	140 lb	18"
13	32.0 -24.0' bgs	7, 5, 6, 8	140 lb	20"
14	37.0 -39.0' bgs	11, 11, 8, 10	140 lb	12"
15	42.0 -44.0' bgs	25, 21, 20, 18	140 lb	6"
16	44.0 -46.0' bgs	12, 13, 12, 10	140 lb	12"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW21-1	11/13/86	10:30	TPHC, PP+30 (except VOC+15)	0.5 - 1.5'
288E-MW21-1	11/13/86	10:30	VOC+15	1.0 - 1.5'
288E-MW21-2	11/17/86	14:00	TPHC, PP+30	31 - 32'

Observations

Development time: 1 hour
Estimated yield: 0.25 gallons per minute

845031291

Textron, Inc., Newark, New Jersey

Monitoring Well No. MW22

Permit No.2609852

Geologic Log

0.0 - 0.4'	Asphalt and gravel
0.4 - 4.0'	Poorly sorted black sand; gravel, up to 3cm; fill (wood chips, red brick, gravel); H-Nu: .5ppm at 4'; water at 4'
4.0 - 7.0'	Black, very discolored fine gravel, sand and silt; very poorly sorted; gravel is 1 to 2 cm in diameter and angular; sediment is wet and oily; H-Nu: 110 ppm at 6'
7.0 - 8.5'	Brown and black, very poorly sorted fine gravel, sand silt and clay; moist; H-Nu: 5 ppm at 8'
8.5 - 11.5'	Poorly sorted silty reddish-brown sand with trace rounded gravel 1 cm in diameter; becomes clay with depth; wet; H-Nu: background at 10'
11.5 - 15.0'	Black peaty clay (poorly decomposed peat); trace silt; trace gravel, angular; moist; H-Nu: background at 12 '; H-Nu = 12 ppm at 14'
15.0 - 26.0'	Black silty clay becoming grey clayey silt at depth with varying amounts of peat
26.0 - 27.5'	gray silt with fine grained sand stringers (2")
27.5 - 28.0'	Moderately coarse sand with shell fossils
28.0 - 29,0'	wet gray silt with gravel (up to 4 mm)
29.0 - 43.5'	Moderately well sorted, medium grain, reddish-grey sand; increasing in coarseness with depth; some gravel; wet
43.5 - 47.0'	Red brown clayey silt

Drilling Specifications

Drilling Method:	Hollow Stem Auger-6¼ inch ID (outer casing) and Mud Rotary (inner casing)
Rig:	CME-55
Well Driller Licence Number:	Jeff Jaworsky (1315) and Rick Weyant
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 12 and 14, 1986

845031292

Textron, Inc., Newark, New Jersey

Monitoring Well No. 22 (continued)

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	43.5' bgs -28.5' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	28.5' bgs - 0.5' bgs	PVC Schedule 40	4 in.	PVC vent cap
Outer casing	16.0' bgs - 0.00'ags	Steel Schedule 40	8 in.	---
Outer casing seal	16.0' bgs - 0.5' bgs	Cement	---	---
Sand pack	43.5' bgs -27.5' bgs	No. 1 Well sand	---	---
Bentonite seal	27.5' bgs -24.5' bgs	Pellets	---	---
Grout	24.5' bgs - 0.5' bgs	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	21, 10, 7, 21	140 lb	4"
2	2.0 - 4.0' bgs	9, 8, 4, 4,	140 lb	4"
3	4.0 - 6.0' bgs	1/12, 1/12	140 lb	3"
4	6.0 - 8.0' bgs	1,1,1,1	140 lb	15"
5	8.0 -10.0' bgs	4, 3, 4, 5	140 lb	18"
6	10.0 -12.0' bgs	1, 1, 1, 1	140 lb	24"
7	12.0 -14.0' bgs	1, 1, 1, 1	140 lb	24"
8	14.0 -16.0' bgs	1, 1, 1, 1	140 lb	18"
9	22.0 -24.0' bgs	2, 2, 2, 2	140 lb	24"
10	24.0 -26.0' bgs	1, 2, 1, 1	140 lb	24"
11	26.0 -28.0' bgs	1, 4, 5, 7	140 lb	24"
12	28.0 -30.0' bgs	6, 12, 13, 7	140 lb	24"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW22-1	11/12/86	15:15	VOC+15	4" interval somewhere between 2-4'
288E-MW22-3	11/14/86	15:00	VOC+15, TPHC	27 - 27.5'

Observations

Development time: 1 hour
Estimated yield: 0.33 gallons per minute
Substantial pressure build-up observed within this well. Cause unknown.

845031293

Textron, Newark, NJ

Monitoring Well No. 23

Permit No. 2609850

Geologic Log

0.0 - 0.5'	Asphalt
0.5 - 4.5'	Sand and gravel fill, discolored grey to black, poorly sorted, with cinders; water at 3 feet
4.5 - 13.0'	Silty peat, well decomposed, dark grey to black; wet
13.0 - 23.0'	Gray-black silty clay; dry
23.0 - 23.9'	Well decomposed peat, brown to dark brown; dry
23.9 - 24.0'	Fine gray clay
24.0 - 38.0'	Sand, becoming coarser with depth
38.0 - 40.0'	Red-brown silty clay

Drilling Specifications

Drilling Method:	Hollow Stem Auger-6¼ inch ID (outer casing) and Mud Rotary (inner casing)
Rig:	CME-55
Well Driller/ Licence Number:	Jeff Jaworski (1315) and Ken Bacorn
Drilling Company:	Empire Soils Investigations, Inc.
Date Drilled:	November 19 and 20, 1986

Monitoring Well Specifications

	Depth*	Material/Type	Diameter	Cap
Screen	38' bgs - 28' bgs	PVC No. 10 slot	4 in.	PVC end cap
Inner casing	28' bgs - 2.00'ags	PVC Schedule 40	4 in.	PVC vented cap
Outer casing	9.67'bgs - 2.33'ags	Steel Schedule 40	8 in.	---
Outer casing seal	9.67'bgs - 0.25'ags	Cement	---	---
Sand pack	38' bgs - 25' bgs	No. 1 Well sand	---	---
Bentonite seal	25' bgs - 22' bgs	Pellets	---	---
Grout	22' bgs - 0.25'ags	Bentonite: cement	---	---

* bgs = below ground surface, ags = above ground surface

845031294

Textron, Newark, NJ

Monitoring Well No. 23 (continued)

Split Spoons

Split Spoon No.	Depth	Blow Counts	Hammer	Recovery
1	0.0 - 2.0' bgs	-, 5, 3, 4	140 lb	12"
2	2.0 - 4.0' bgs	4, 3, 2, 2	140 lb	12"
3	4.0 - 6.0' bgs	1/24	140 lb	12"
4	6.0 - 8.0' bgs	1/24	140 lb	12"
5	22.0 - 24.0' bgs	1, 1, 1, 1	140 lb.	24"
6	38.0 - 40.0' bgs	12, 14, 17, 19	140 lb.	14"

Samples Collected

Sample ID No.	Date	Time	Analyses	Depth
288E-MW23-1	11/19/86	15:00	TPHC, PP+30	0.5 - 1.5'
288E-MW23-2	11/19/86	15:15	TPHC, PP+30	2.0 - 3.0'
288E-MW23-3	11/20/86	10:00	TPHC, PP+30	23.0 - 24.0'

Observations

Development time: 1 hour
Estimated yield: 0.25 gallons per minute

845031295

APPENDIX C:

Summary of Well Data

Appendix C

SUMMARY OF WELL DATA

Well Number	Permit Number	Ground Surface Elevation[1]	Inner Casing Elevation[1]	Outer Casing Elevation[1]	Total Depth[2]
1	2609839	5.40	7.72	8.20	6.10
2	2609840	6.01	7.92	8.15	10.51
3	2609841	6.62	6.24	6.62	6.33
4	2609842	6.56	5.83	6.56	7.48
5	2609843	6.33	7.67	8.53	8.73
6	2609844	6.48	8.80	9.25	6.75
7	2609845	5.28	7.44	7.69	12.74
8	2609846	5.89	5.62	5.89	10.64
9	2609847	6.46	8.76	8.94	12.82
10	2609848	6.94	9.08	9.40	8.10
11	2609849	6.35	8.61	9.00	10.96
21	2609851	5.94	8.32	8.48	45.83
22	2609852	5.88	5.43	5.88	41.67
23	2609850	5.48	7.53	7.81	39.92

1 All elevations are in feet and are given relative to mean sea level.
2 The total depth is given in feet and measured from the top of the inner casing.

845031297

APPENDIX D:

Well Development Data

Appendix D

WELL DEVELOPMENT DATA

Monitoring Well	Pump Type	Development Time	Total Yield (gals.)	Rate of Yield (gals./min.)	Description of Water
1	Centrifugal vacuum	1 hr.	50	0.8	Clear
2	Centrifugal vacuum	6.5 min.	110	16	Oily appearance, odor
3	Centrifugal vacuum	1 hr.,40 min.	165	6	Oil sheen, fairly clear, slightly bubbly
4	Centrifugal vacuum	1 hr.	~5	0.08	Cloudy
5	Centrifugal vacuum	25 min.	55	2.2	Clear
6	Centrifugal vacuum	22.5 min.	55	2	NA
7	Air surging	1 hr.	30	0.5	NA
8	Centrifugal vacuum	NA	NA	0.7	NA
9	Centrifugal vacuum	19 min.,45 sec.	55	2.7	Slight odor
10	Centrifugal vacuum	1 hr.,45 min.	35	0.3	Rust color, slight odor
11	Centrifugal	30 min.	45	1.5	Clear
21	Air surging	1 hr.	15	0.25	Clear
22	Air surging	1 hr.	20	0.33	Clear, foamy
23	Air surging	1 hr.	15	0.25	Clear

Note: NA indicates that the information is not available.

845031299

APPENDIX E:

Supplementary Well Sampling Data

845031300

Supplementary Sampling Data From Monitoring Well 1

Date: December 18, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: N/A

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/18/86	11:23	9.0	6.92	2500
12/18/86	11:32	9.0	6.70	2400
12/18/86	11:38	9.0	6.62	2400
12/18/86	11:44	9.0	6.58	2400

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW1	12/18/86	Sometime between 11:44 and 13:44	VOC+15, TPHC, Cl

Supplementary Sampling Data From Monitoring Well 2

Date: December 22, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: 3.9

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/22/86	12:23	11.5	6.87	N/A
12/22/86	12:30	11.0	6.70	N/A
12/22/86	12:36	11.0	6.62	N/A
12/22/86	12:45	11.0	6.58	N/A

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW2	12/22/86	Sometime between 12:45 and 14:45	VOC+15, TPHC, Cl

Supplementary Sampling Data From Monitoring Well 3

Date: December 12, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: 3.2

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/12/86	N/A	10.5	6.80	2200
12/12/86	N/A	11.5	6.72	1250
12/12/86	N/A	12.0	6.63	1260
12/12/86	N/A	12.0	6.65	1350
12/12/86	N/A	12.0*	6.59*	1280*

* These data are for the portion of water from which the sample 288E-MW3 was collected.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW3	12/12/86	N/A	VOC+15, TPHC, Cl

Note: N/A indicates that the information is not available.

Supplementary Sampling Data From Monitoring Well 22

Date: December 18, 1986 and December 31, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: American Standard submersible pump (12/18/86) and hand bailed (12/31/86)

Number of Column Volumes Purged: 12/18/86 - approximately 0.5 volumes (pumping equipment problems)
12/31/86 - bailed dry

Time Elapsed Between Purge Completion and Sample Collection: 12/18/86 -
12/31/86 - 1 hour, 30 minutes

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/18/86	13:56	13.5	11.72	11400
12/18/86	14:26	13.0	11.19	11600
12/18/86	15:18	13.0	11.34	11700
12/18/86	16:06	11.5	7.64	16250
12/31/86	13:27	12.0	N/A	17250
12/31/86	14:02	13.0	N/A	16500
12/31/86	15:30*	13.5*	N/A	13600*

* These data are for the portion of water from which the samples 288E-MW22 (12/18/86) and 288E-MW22 (12/31/86) were collected.

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW22	12/18/86		VOC+15, Cl
2883-MW22	12/31/86	15:30	VOC+15, Cl

Supplementary Sampling Data From Monitoring Well 23

Date: December 18, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: Lancaster submersible pump

Number of Column Volumes Purged: Approximately 3 volumes

Time Elapsed Between Purge Completion and Sample Collection: 28 minutes

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/18/86	10:10	10.5	7.19	14000
12/18/86	10:19	11.5	7.04	14500
12/18/86	10:24	11.5	6.96	15000
12/18/86	10:30	11.5	6.92	15500
12/18/86	10:43	11.5	6.90	15600

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW23	12/18/86	11:11	PP+30, TPHC, Cl

APPENDIX F:

Sampling Location Elevations and Coordinates

845031306

Appendix F

SAMPLING LOCATION ELEVATIONS AND COORDINATES

Sampling Location		Ground Surface Elevation (MSL)	Coordinates North	Coordinates East
Boring	101	6.93	10,235.83	10,229.86
	201	6.15	10,272.92	10,493.96
	301	6.02	10,249.80	10,556.47
	302	6.08	10,214,96	10,628.52
	303	5.90	10,176.16	10,707.92
	401	6.11	10,136.33	10,791,96
	402	6.01	10,122.01	10,825.50
	501	6.07	10,085.44	10,915.42
	701	6.23	9,971.20	10,827.43
	802	6.97	10,212.35	10,211.26
	803	6.89	10,199.43	10,206.84
	1001	7.06	10,122.28	10,365.86
	1301	5.85	9,981.16	10,214.24
	1302	5.68	10,013.35	10,204.12
	1303	5.90	9,972.42	10,182.76
	1401	5.51	9,954.40	10,333.64
	1402	5.24	9,956.97	10,305.71
	1403	5.97	9,931.78	10,351.43
	1501	6.10	9,909.64	10,310.41
	1503	5.48	9,940.31	10,269.95
	1504	6.10	9,893.00	10,266.06
	1601	5.94	9,958.26	10,394.15
	1602	6.08	9,939.19	10,388.73
	1701	6.71	9,907.50	10,396.45
	1702	6.10	9,891.84	10,348.60
	1703	6.35	9,843.37	10,355.78
	1801	6.54	9,775.62	10,504.51
	2101	5.87	9,766.83	10,763.19
	2102	5.74	9,739.56	10,792.09
	2103	5.90	9,747.94	10,764.09
	2201	Non-applicable	9,759.32	10,600.92
	2301	6.18	10,004.11	10,422.97
	2501	6.74	9,918.61	10,526.55
	2801	6.18	10,082.08	10,726.41

845031307

SAMPLING LOCATION ELEVATIONS AND COORDINATES (continued)

Sampling Location		Ground Surface Elevation (MSL)	Coordinates	
			North	East
Well	1	5.40	10,405.54	10,261.47
	2	6.01	9,989.70	10,072.27
	3	6.62	10,086.47	10,393.97
	4	6.56	10,060.40	10,606.55
	5	6.33	9,988.75	10,657.18
	6	6.48	9,789.44	10,467.75
	7	5.28	10,060.44	10,948.85
	8	5.89	9,963.56	10,891.26
	9	6.46	9,644.57	10,743.68
	10	6.94	9,875.28	10,505.48
	11	6.35	10,092.74	10,713.76
	21	5.94	9,993.49	10,075.52
	22	5.88	9,966.79	10,893.10
	23	5.48	10,401.90	10,258.58

845031308

Supplementary Sampling Data From Monitoring Well 4

Date: December 18, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: Pumped dry

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/18/86	14:10	12.0	7.73	7500
12/18/86	14:16	12.0	6.92	7400
12/18/86	14:32	12.0	7.17	7500
12/18/86	14:54	12.0	7.02	7400
12/18/86	15:36	11.0	7.26	7400

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW4	12/18/86	Sometime between 15:36 and 17:36	VOC+15, Cl

Supplementary Sampling Data From Monitoring Well 5

Date: December 12, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: 3.1

Time Elapsed Between Purge Completion and Sample Collection: 1 hour, 40 minutes

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/12/86	10:14	11.5	7.43	1920
12/12/86	N/A	12.0	7.23	2300
12/12/86	N/A	13.0	7.21	2300
12/12/86	N/A	13.0	7.15	1870
12/12/86	N/A	13.0	6.90	1900
12/12/86	13:20*	13.0*	7.23*	1880*

* These data are for the portion of water from which the sample 288E-MW5 was collected.

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW5	12/12/86	13:20	VOC+15, TPHC, Cl

Supplementary Sampling Data From Monitoring Well 6

Date: December 22, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: Pumped dry

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/22/86	9:35	10.5	6.69	N/A
12/22/86	9:45	12.0	6.56	N/A
12/22/86	10:25	12.0	6.54	N/A
12/22/86	10:30	12.0	6.52	N/A

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW6	12/22/86	Sometime between 10:30 and 12:30	PP+30, TPHC, Cl
288E-MW106	12/22/86	Sometime between 10:30 and 12:30	PP+30

Supplementary Sampling Data From Monitoring Well 7

Date: December 12, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: 3.0 (pumped dry)

Time Elapsed Between Purge Completion and Sample Collection: 1 hour, 46 minutes

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/12/86	10:10	13.0	7.35	14250
12/12/86	N/A	11.0	7.40	14250
12/12/86	11:14	11.0	7.40	14250
12/12/86	13:00*	10.5*	7.37*	14500*

* These data are for the portion of water from which the sample 288E-MW7 was collected.

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW7	12/12/86	13:00	VOC+15, TPHC, Cl

Supplementary Sampling Data From Monitoring Well 8

Date: December 12, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: 3.1

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/12/86	10:16	13.0	7.48	6900
12/12/86	N/A	11.5	7.46	8800
12/12/86	10:55	11.5	7.78	10000
12/12/86	N/A	11.0*	7.60*	10000*

* These data are for the portion of water from which the sample 288E-MW8 was collected.

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW8	12/12/86	Sometime between 10:55 and 12:55	VOC+15, Cl

Supplementary Sampling Data From Monitoring Well 9

Date: December 12, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO pump

Number of Column Volumes Purged: 3.0

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/12/86	14:55	11.0	6.65	1490
12/12/86	N/A	13.0	6.65	1230
12/12/86	N/A	13.0	6.65	1420
12/12/86	15:21	13.0	6.63	1180
12/12/86	N/A	12.5*	6.68*	1320*

* These data are for the portion of water from which the samples 288E-MW9 and 288E-MW109 were collected.

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW9	12/12/86	Sometime between 15:21 and 17:21	VOC+15, TPHC, MTBE, DIPE, TBA, Methanol, Pb, Cl
288E-MW109	12/12/86	Sometime between 15:21 and 17:21	TPHC, MTBE, DIPE, TBA Methanol, Cl

Supplementary Sampling Data From Monitoring Well 10

Date: December 22, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO peristaltic pump

Number of Column Volumes Purged: Pumped dry

Time Elapsed Between Purge Completion and Sample Collection: Within 2 hours

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/22/86	11:25	9.0	6.66	N/A
12/22/86	11:30	9.5	6.57	N/A
12/22/86	11:35	10.0	6.56	N/A
12/22/86	11:41	10.0	6.55	N/A

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW10	12/22/86	Sometime between 11:41 and 13:41	VOC+15, TPHC, BN+10, AE+5

Supplementary Sampling Data From Monitoring Well 11

Date: December 12, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: ISCO pump

Number of Column Volumes Purged: 3.0

Time Elapsed Between Purge Completion and Sample Collection: 1 hour, 30 minutes

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/12/86	10:18	9.5	7.45	3500
12/12/86	N/A	10.5	7.00	3000
12/12/86	N/A	11.0	7.04	3000
12/12/86	N/A	11.0	7.04	3000
12/12/86	12:02	11.0	6.96	3000
12/12/86	13:32*	9.5*	7.04*	3750*

* These data are for the portion of water from which the sample 288E-MW11 was collected.

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW11	12/12/86	13:32	TPHC, VOC+15, BN+10, AE+5

Supplementary Sampling Data From Monitoring Well 21

Date: December 31, 1986

Sampling Company: Century Laboratories, Inc.

Sampling Method: Meyers submersible pump

Number of Column Volumes Purged: Pumped dry

Time Elapsed Between Purge Completion and Sample Collection: 45 minutes

Parameters Monitored During Purging

DATE	TIME	TEMP.(°C)	pH	CONDUCTIVITY (μmhos)
12/31/86	10:50	13.0	N/A	11000
12/31/86	11:00	13.0	N/A	12250
12/31/86	11:42	13.5	N/A	17000
12/31/86	12:20	13.0	N/A	18500
12/31/86	12:49	13.0	N/A	15500
12/31/86	13:47	13.0	N/A	15250

Note: N/A indicates that the information is not available.

Samples Collected

Sample Number	Date	Time	Analyses
288E-MW21	12/31/86	14:32	PP+30, TPHC, Cl

NOTICE ABOUT UNSCANNABLE MAP

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ENVIRON
210 CARNEGIE CENTER SUITE 201 PRINCETON N J 08540
1000 POTOMAC ST N W WASHINGTON D C 20007

Plate: 1

AREAS OF ENVIRONMENTAL CONCERN AND SAMPLING LOCATIONS

Spencer Kellogg, formerly a Division of Textron Inc.
Newark New Jersey

DATE	DRAFTED BY M. Smith
February, 1987.	CHECKED BY R. H. Hiers

845031318

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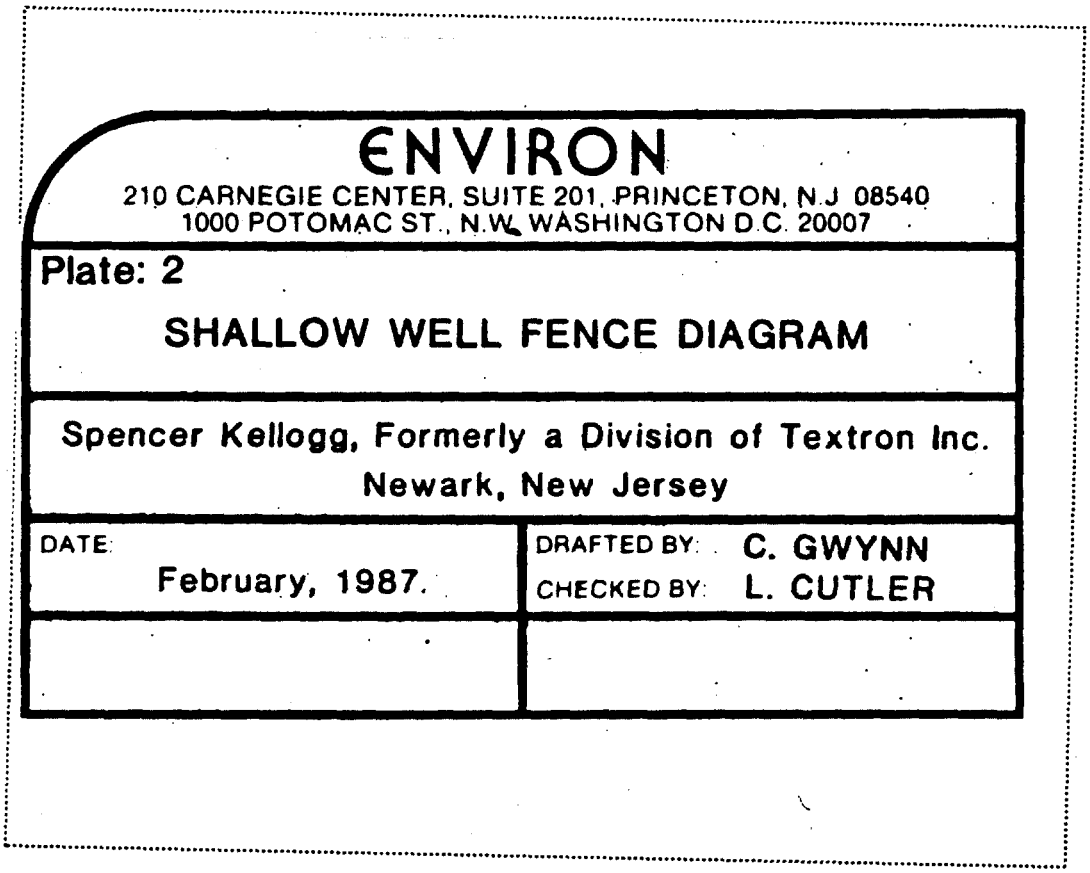

845031319

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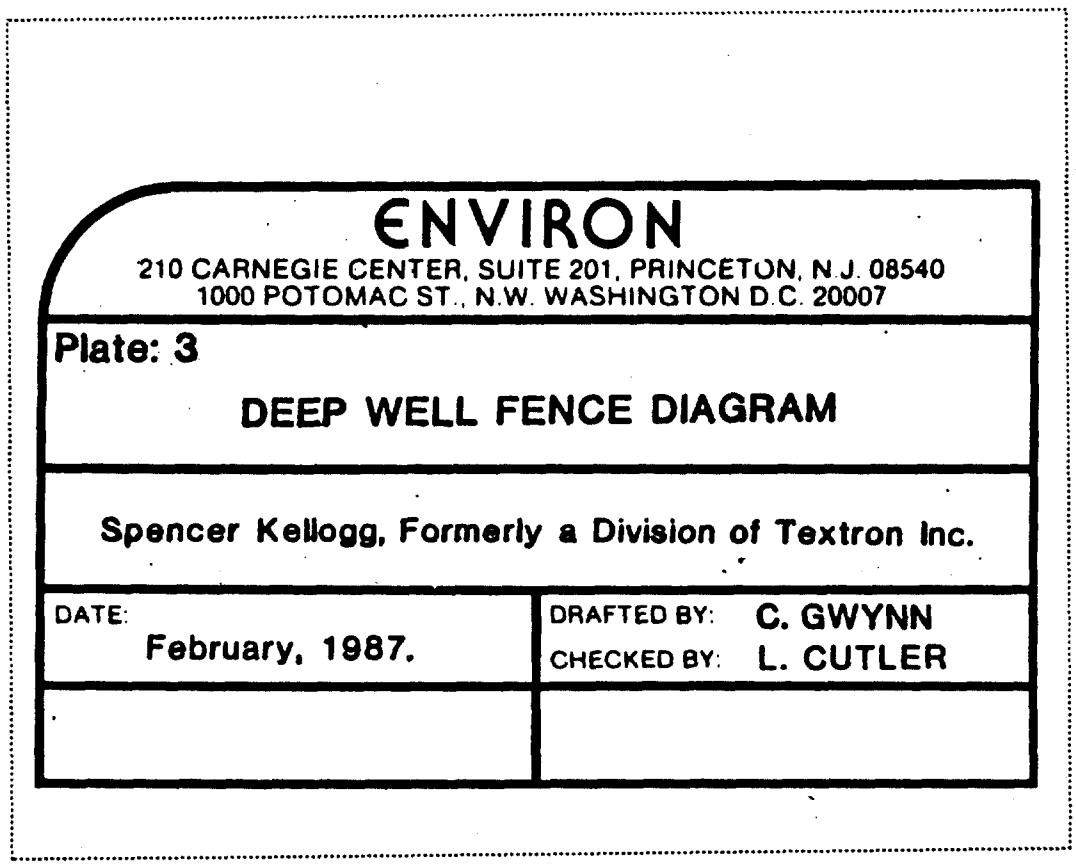

845031320

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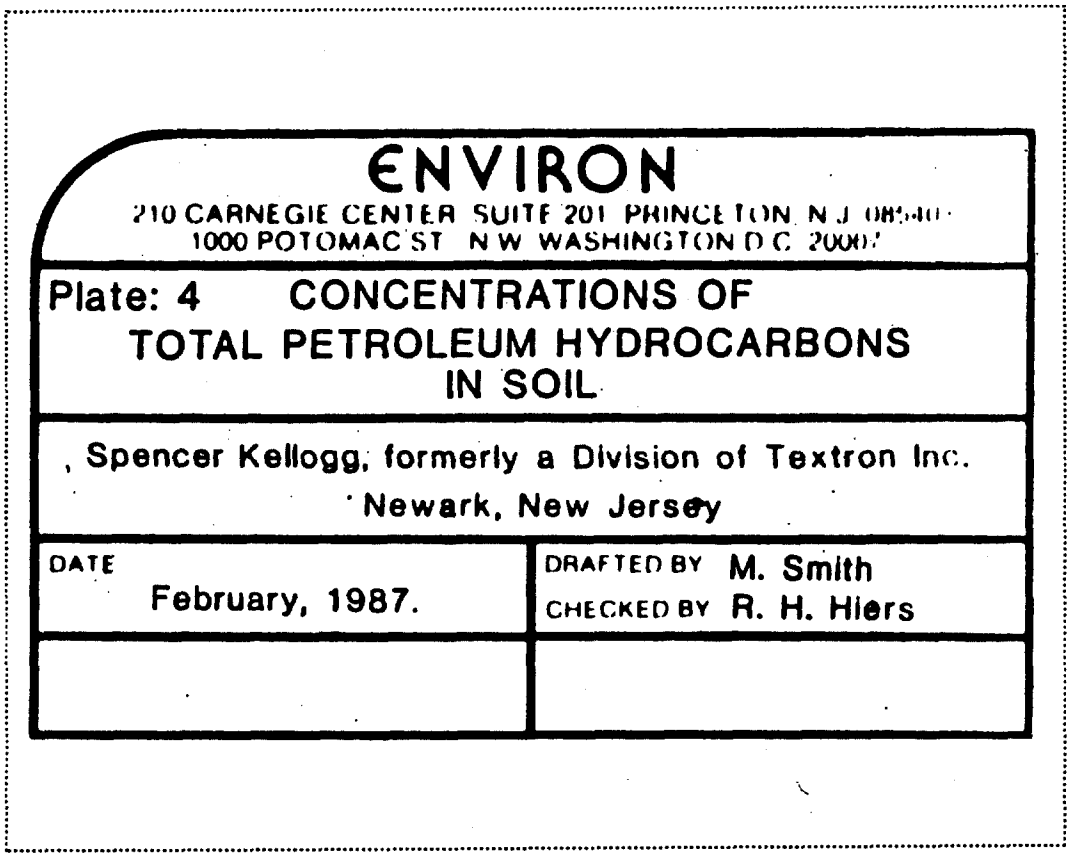

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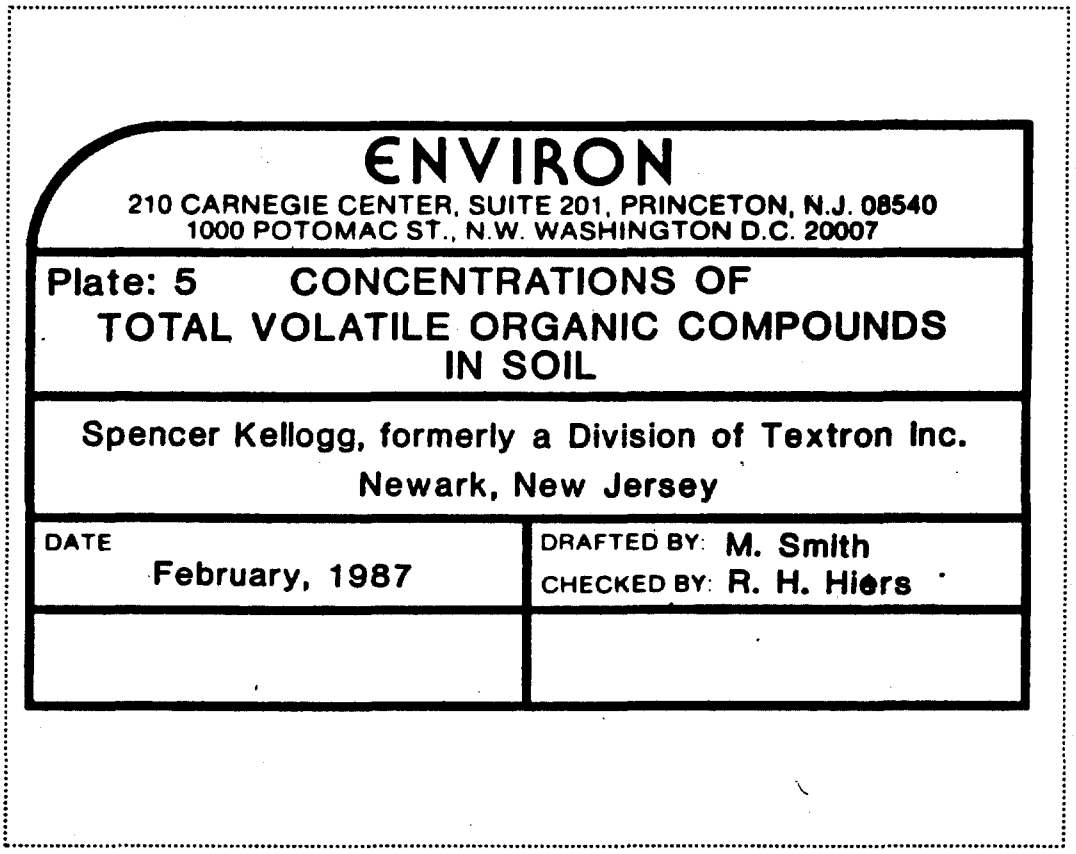

845031322

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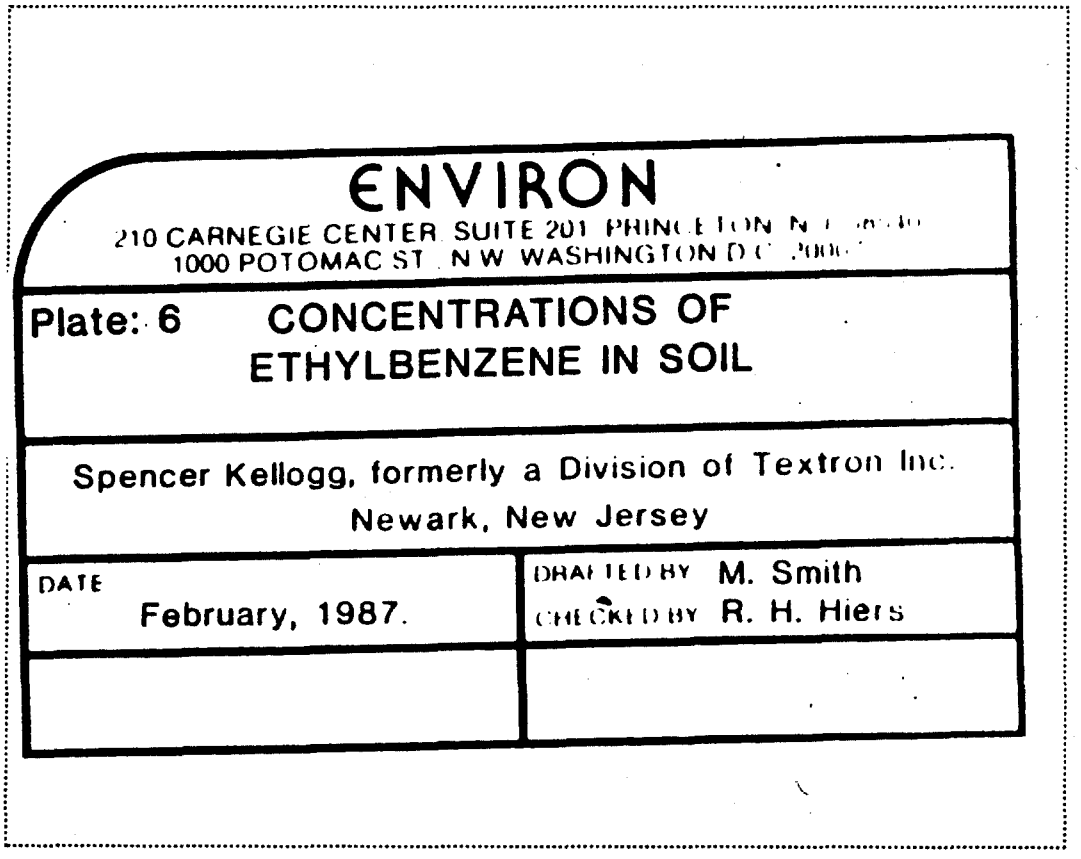

845031323

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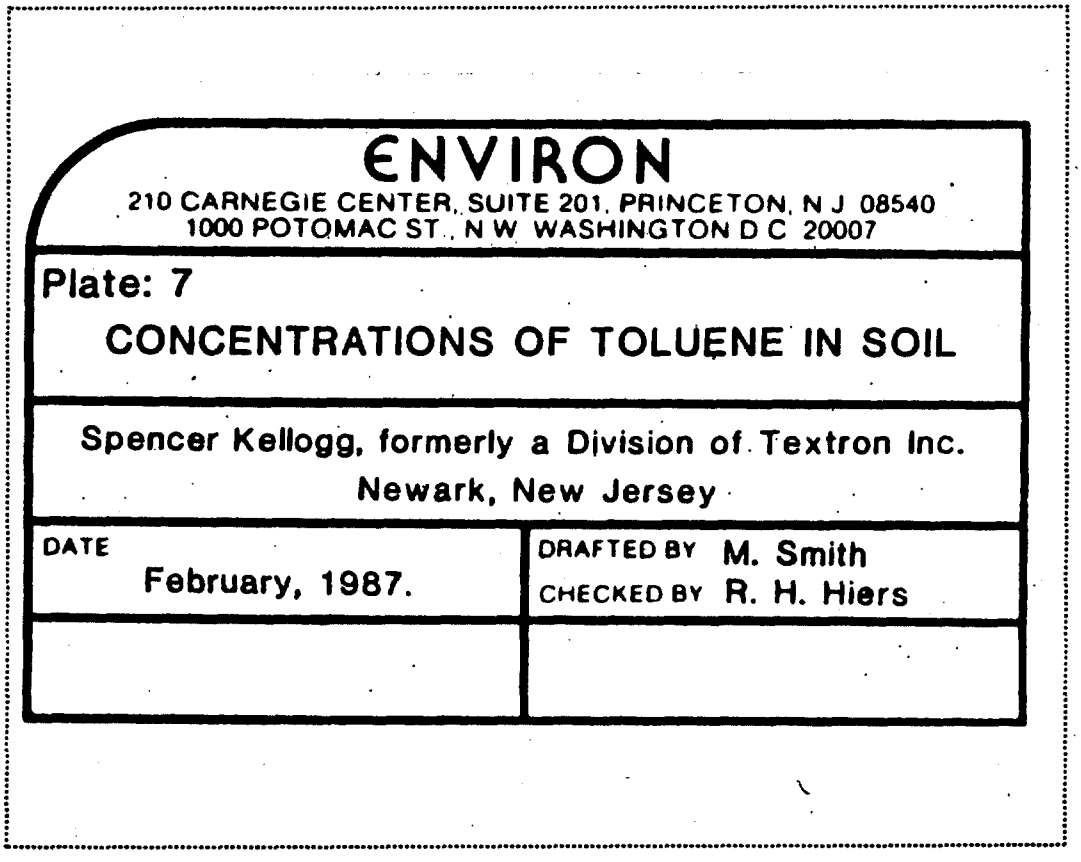

845031324

Presentation of the ECRA Sampling Plan Results for SPENCER KELLOGG FORMERLY A DIVISION OF TEXTRON INC.

400 Doremus Avenue
Newark, Essex County
New Jersey

Volume II of IV

Summary of Pertinent Analytical Results
as
Related to Areas of Environmental Concern
and
Quality Assurance/Quality Control Results

ECRA Case No. 85403

March, 1987

Prepared for:

Textron Inc.
Providence, Rhode Island 02903

Prepared by:

ENVIRON Corporation
210 Carnegie Center
Princeton, New Jersey 08540

845031325

Presentation of the ECRA Sampling Plan Results
for Spencer Kellogg, formerly a Division of Textron Inc.
Newark, New Jersey

ECRA Case No. 85403

VOLUME II - Summary of Pertinent Analytical Results as Related to Areas of Environmental Concern (AECs)
and Quality Assurance/Quality Control Results

TABLE OF CONTENTS

INTRODUCTION

TABLE II-1: Description of Century Laboratories Data Reporting Qualifiers and ENVIRON Data Reporting Designations

TABLE II-2: Summary of Analytical Results for AEC 01

TABLE II-3: Summary of Analytical Results for AEC 02

TABLE II-4: Summary of Analytical Results for AEC 03

TABLE II-5: Summary of Analytical Results for AEC 04

TABLE II-6: Summary of Analytical Results for AEC 06

TABLE II-7: Summary of Analytical Results for AEC 07

TABLE II-8: Summary of Analytical Results for AEC 08

TABLE II-9: Summary of Analytical Results for AEC 09

TABLE II-10: Summary of Analytical Results for AEC 10

TABLE II-11: Summary of Analytical Results for AEC 11

TABLE II-12: Summary of Analytical Results for AEC 12

845031326

Presentation of the ECRA Sampling Plan Results
for Spencer Kellogg, formerly a Division of Textron Inc.
Newark, New Jersey

ECRA Case No. 85403

VOLUME II - Summary of Pertinent Analytical Results as Related to Areas of Environmental Concern (AECs) and Quality Assurance/Quality Control Results

TABLE OF CONTENTS (continued)

TABLE II-13: Summary of Analytical Results for AEC 13

TABLE II-14: Summary of Analytical Results for AEC 14

TABLE II-15: Summary of Analytical Results for AEC 15

TABLE II-16: Summary of Analytical Results for AEC 16

TABLE II-17: Summary of Analytical Results for AEC 17

TABLE II-18: Summary of Analytical Results for AEC 18

TABLE II-19: Summary of Analytical Results for AEC 19

TABLE II-20: Summary of Analytical Results for AEC 20

TABLE II-21: Summary of Analytical Results for AEC 21

TABLE II-22: Summary of Analytical Results for AEC 22

TABLE II-23: Summary of Analytical Results for AEC 23

TABLE II-24: Summary of Analytical Results for AEC 25

TABLE II-25: Summary of Analytical Results for AEC 27

TABLE II-26: Summary of Analytical Results for AEC 28

8450313 27

Presentation of the ECRA Sampling Plan Results
for Spencer Kellogg, formerly a Division of Textron Inc.
Newark, New Jersey

ECRA Case No. 85403

VOLUME II - Summary of Pertinent Analytical Results as Related to Areas of Environmental Concern (AECs) and Quality Assurance/Quality Control Results

TABLE OF CONTENTS (continued)

TABLE II-27: Summary of Analytical Results for MW01

TABLE II-28: Summary of Analytical Results for MW02

TABLE II-29: Summary of Analytical Results for MW04

TABLE II-30: Summary of Analytical Results for MW06

TABLE II-31: Summary of Analytical Results for MW07

TABLE II-32: Summary of Analytical Results for MW21

TABLE II-33: Summary of Analytical Results for MW22

TABLE II-34: Summary of Analytical Results for MW23

TABLE II-35: Summary of Analytical Results for Surface Samples

TABLE II-36: Summary of Analytical Results for Wash Blanks and Field Blanks

TABLE II-37: Summary of Analytical Results for Duplicate Samples

8450313328

INTRODUCTION

This report contains a summary of data pertinent to the text of this report as presented in Volume I. The data presented in Tables II-2 through II-35 are primarily organized according to the Areas of Environmental Concern (AECs) described in the text. These data were summarized from Volumes III and IV, Compilation of Analytical Results, with the following exceptions:

- The results of acid extractable, base neutral, polycyclic aromatic hydrocarbon and volatile organic compound analyses have been summed and reported as Total AE, Total BN, Total PAH and Total VOC, respectively.

- The ENVIRON data reporting designation "C" denotes analytical results which have been corrected for method blank contamination. A full description of this practice is presented in Volume I.

- The ENVIRON data reporting designation "E" denotes specific contaminants identified in the volatile and extractable organic analyses for which the laboratory has reported only "estimated" concentrations. These data have not been incorporated in Total VOC, Total AE or Total BN designations because of this estimate.

Also included in this report are tables pertaining to Quality Assurance/Quality Control (QA/QC). These include duplicates, wash blanks and field blanks. Trip blanks were also collected at Textron during Phase One sampling, and were analyzed for volatile organic compounds. No volatile contaminants were detected. (Trip blanks were collected on November 13, 18, 19, 20, 21, 22, 1986, and December 12, 1986, and were labeled TB1113, TB1118, TB1119, TB1120, TB1121, TB1122 and TB1212, respectively.)

845031329

TABLE II-1

DESCRIPTION OF CENTURY LABORATORIES DATA
REPORTING QUALIFIERS AND ENVIRON DATA REPORTING DESIGNATIONS

Data Reporting Qualifier	Century Laboratories Description
*	Indicates insufficient sample volume was available for requested analysis.
U	Indicates compound was analyzed for but not detected (e.g. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

Data Reporting Qualifier	ENVIRON Description
C	Denotes analytical results which have been corrected for method blank contamination. A full description of this practice is presented in Volume I.
E	Denotes specific contaminants identified in the volatile and extractable organic analyses for which the laboratory has reported only estimated concentrations. These data have not been incorporated in Total VOC, Total AE or Total BN designations because of this estimate.
MW	Monitoring Well
NA	Not Applicable
ND	Not Detected
AE	Acid Extractable Organic Compounds
BN	Base Neutral Organic Compounds
VOC	Volatile Organic Compounds
PAH	Polycyclic Aromatic Hydrocarbons
SW	Surface Water
HSAB	Hollow Stem Auger Boring
--	Analysis Not Requested

845031330

Table II-1

Summary of Analytical Results for AEC 01

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Matrix:	Soil		Soil		Soil	
Sample ID:	288E-0101-01		288E-0101-02		288E-0101-03	
Depth (ft):	0.5-1.5		0.5-1.5		3.5-4.0	
Analysis Units:	ppb		ppb		ppb	
Total VOC	ND		ND		ND	
Ethylbenzene	31,000	E	32,000	E	ND	
Toluene	7,800	E	8,100	E	3,600	E

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313331

Table II-2

Summary of Analytical Results for AEC 02

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Sample ID:	Depth (ft):	Units:	
	Soil	288E-0201-01	0.5-1.5	ppb	
Total VOC				221	
Benzene				28	
Methylene Chloride				120	
Toluene				73	C

8450313332

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-3

Summary of Analytical Results for AEC 03

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil		Soil		Soil	
	Sample ID:	288E-0301-01		288E-0302-01		288E-0303-01	
	Depth (ft):	0.5-1.5		0.5-1.5		0.5-1.5	
Analysis	Units:	ppb		ppb		ppb	
Petroleum Hydrocarbons		57,000,000		2,040,000		39,400,000	
Total VOC		2,629,077		50,077		1,869,319	
Ethylbenzene		1,999,769	C	34,769	C	1,200,000	
Toluene		629,308	C	15,308	C	669,319	C

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313333

Table II-4

Summary of Analytical Results for AEC 04

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil		Soil		Soil		Soil	
	Sample ID:	288E-0401-01		288E-0401-02		288E-0402-01		288E-0402-02		288E-0402-03	
	Depth (ft):	0.0-1.0		1.0-2.0		0.0-0.5		0.0-0.5		2.0-3.0	
	Units:	ppb		ppb		ppb		ppb		ppb	
Petroleum Hydrocarbons		20,700,000		2,070,000		2,760,000		3,580,000		2,400,000	
Total VOC		849,077		359,319		28,073		--		15,873	
Ethylbenzene		679,769	C	170,000		7,500		--		12,000	
Toluene		169,308	C	189,319	C	19,573	C	--		3,873	C

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313334

Table II-5

Summary of Analytical Results for AEC 06

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil	Water
	Sample ID:	288E-0601-01	288E-MW11
	Depth (ft):	1.0-2.0	NA
Analysis	Units:	ppb	ppb
Petroleum Hydrocarbons		290,000	<500
Total VOC		--	133
Benzene		--	15
Toluene		--	110
Ethylbenzene		--	8
Total PAH		3,724	--
Total AE		--	21
Chloride		--	800,000

8450313335

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-6

Summary of Analytical Results for AEC 07

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil		Soil		Water
	Sample ID:	288E-0701-01		288E-MW08-01		288E-MW08
	Depth (ft):	0.5-1.5		1.0-2.0		NA
Analysis	Units:	ppb		ppb		ppb
Total VOC		6,100		217		ND
Ethylbenzene		6,100		61		ND
Toluene		3,300	E	156	C	ND
Chloride		--		--		3,100,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

84503133

Table II-7

Summary of Analytical Results for AEC 08

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil	Soil	Soil	Soil	Soil
	Sample ID:	288E-0801-01	288E-0802-01	288E-0802-02	288E-0803-01	288E-0804-01
	Depth (ft):	2.0-2.5	2.5-3.0	2.5-3.0	2.5-3.0	2.0-2.5
Analysis	Units:	ppb	ppb	ppb	ppb	ppb
Petroleum Hydrocarbons		13,500,000	1,760,000	3,200,000	10,900,000	35,700
Total PAH		7,300	540	--	23,200	490

See Table II-1 for data reporting qualifiers, designations and abbreviations.

84503133

Table II-8

Summary of Analytical Results for AEC 09

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	
	Sample ID:	288E-0901-01	
	Depth (ft):	0.8-1.0	
	Units:	ppb	
Total VOC		869,398	
Toluene		869,398	C

8450313 38

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-9

Summary of Analytical Results for AEC 10

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Water
Sample ID:	288E-1001-01	288E-1001-01	288E-1001-02	288E-MW03-01	288E-MW03-01	288E-MW03-02	288E-MW03
Depth (ft):	0.0-1.0	1.0-2.0	4.0-6.0	0.5-1.5	1.5-2.0	4.0-5.0	NA
Analysis Units:	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Petroleum Hydrocarbons	24,300,000	--	666,000	16,000,000	--	3,700,000	<500
Total VOC	--	20	154	--	33	20	ND
Toluene	--	20 C	59 C	--	7 C	5 C	ND
Ethylbenzene	--	ND	36	--	26	15	ND
Methylene chloride	--	ND	69	--	ND	ND	ND
Chloride	--	--	--	--	--	--	300,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313339

Table II-10

Summary of Analytical Results for AEC 11

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil	Soil		Water
	Sample ID:	288E-MW05-01	288E-MW05-01		288E-MW05
	Depth (ft):	0.5-1.0	1.0-1.5		NA
Analysis	Units:	ppb	ppb		ppb
Petroleum Hydrocarbons		341,000	--		<500
Total VOC		--	17		ND
Toluene		--	17	C	ND
Chloride		--	--		400,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 40

Table II-11

Summary of Analytical Results for AEC 12

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil	Soil	Soil	Soil	Soil
	Sample ID:	288E-1201-01	288E-1201-02	288E-1202-01	288E-1202-02	288E-1203-01
	Depth (ft):	0.0-0.5	0.5-1.0	0.0-0.5	0.4-0.7	0.0-0.5
Analysis	Units:	ppb	ppb	ppb	ppb	ppb
Petroleum Hydrocarbons		280,000,000	--	170,000,000	--	33,000,000
Total VOC		--	654,002	--	11,738,002	200,000
Ethylbenzene		--	590,000	--	11,000,000	200,000
Toluene		--	64,002 C	--	738,002 C	22,000 E

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 41

Table II-12

Summary of Analytical Results for AEC 13

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil	Soil	Soil
	Sample ID:	288E-1301-01	288E-1302-01	288E-1303-01
	Depth (ft):	0.5-1.5	0.5-1.5	0.5-1.0
Analysis	Units:	ppb	ppb	ppb
Petroleum Hydrocarbons		796,000	551,000	254,000
Total VOC		ND	77	54
Ethylbenzene		ND	14	ND
Toluene		ND	63 C	54 C

8450313 42

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-13

Summary of Analytical Results for AEC 14

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil		Soil		Soil	
	Sample ID:	288E-1401-01		288E-1402-01		288E-1403-01	
	Depth (ft):	0.5-1.5		0.5-1.5		0.5-1.5	
Analysis	Units:	ppb		ppb		ppb	
Petroleum Hydrocarbons		427,000		8,040,000		<42,000	
Total VOC		74,495		1,349,206		7,770	
Ethylbenzene		69,000		679,836	C	2,800	
Toluene		5,495	C	669,370	C	4,970	C

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 43

Table II-14

Summary of Analytical Results for AEC 15

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil		Soil		Soil
	Sample ID:	288E-1501-01		288E-1503-01		288E-1504-01
	Depth (ft):	0.5-1.5		0.5-1.5		1.0-1.5
Analysis	Units:	ppb		ppb		ppb
Petroleum Hydrocarbons		640,000		50,900		375,000
Total VOC		ND		1,709		ND
Toluene		ND	C	819	C	ND
Ethylbenzene		ND		890		ND

See Table II-1 for data reporting qualifiers, designations and abbreviations.

845031344

Table II-15

Summary of Analytical Results for AEC 16

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil		Soil		Soil	
	Sample ID:	288E-1601-01		288E-1602-01		288E-1603-01	
	Depth (ft):	1.0-1.5		1.0-1.5		1.0-1.5	
Analysis	Units:	ppb		ppb		ppb	
Petroleum Hydrocarbons		1,020,000		1,090,000		5,670,000	
Total VOC		16,000		100,000		869,861	
Ethylbenzene		16,000		100,000		730,000	
Toluene		3,400	E	13,000	E	139,861	C

8450313345

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-16

Summary of Analytical Results for AEC 17

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil		Soil		Soil		Soil		Water
	Sample ID:	288E-1701-01		288E-1502-01		288E-1703-01		288E-MW10-01		288E-MW10-02		288E-MW10
	Depth (ft):	1.0-1.5		0.5-1.5		1.0-1.5		0.5-1.5		4.0-5.0		NA
	Units:	ppb		ppb		ppb		ppb		ppb		ppb
Petroleum Hydrocarbons		1,390,000		157,000		80,900		710,000		1,900,000		<500
Total VOC		248		87		173		3,889,398		494,398		34,180
Ethylbenzene		120		ND		72		490,000		45,000		180
Toluene		128	C	87	C	101	C	3,399,398	C	449,398	C	34,000
Total AE		--		--		--		ND		ND		ND
Total BN		--		--		--		274,360		22,000		9
Chloride		--		--		--		--		--		90,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

845031346

Table II-17

Summary of Analytical Results for AEC 18

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil
	Sample ID:	288E-1801-01
	Depth (ft):	1.0-1.5
	Units:	ppb
Petroleum Hydrocarbons		767,000

8450313 47

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-18

Summary of Analytical Results for AEC 19

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	Soil		Soil	
	Sample ID:	288E-1901-01	288E-1901-01		288E-1901-02	
	Depth (ft):	0.5-1.5	1.0-1.5		2.0-2.5	
	Units:	ppb	ppb		ppb	
Petroleum Hydrocarbons		5,080,000	--		17,500,000	
Total VOC		--	79,998		980,000	
Ethylbenzene		--	54,000		980,000	
Toluene		--	25,998	C	140,000	E

See Table II-1 for data reporting qualifiers, designations and abbreviations.

845031348

Table II-19

Summary of Analytical Results for AEC 20

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	Soil		Water	Water
	Sample ID:	288E-MW09-01	288E-MW09-02		288E-MW09	288E-MW109
	Depth (ft):	0.0-1.5	2.0-3.5		NA	NA
	Units:	ppb	ppb		ppb	ppb
Petroleum Hydrocarbons		2,780,000	3,640,000		<500	<500
Total VOC		ND	6		ND	--
Toluene		ND	6	C	ND	--
Total AE		ND	ND		--	--
Total BN		27,370	22,690		--	--
Chloride		--	--		45,000	45,000
Cyanide		<110	<130		--	--
Phenols		<110	<130		--	--
PCBs		ND	ND		--	--
Pesticides		ND	ND		--	--
Antimony		<13,100	<15,500		--	--
Arsenic		14,000	13,700		--	--
Beryllium		<1,090	<1,290		--	--
Cadmium		1,630	4,810		--	--
Chromium		14,500	41,600		--	--
Copper		120,000	256,000		--	--
Lead		181,000	463,000		306	--
Mercury		66	5,660		--	--
Nickel		15,600	27,300		--	--
Selenium		<1,090	1,290		--	--
Silver		<2,180	<2,580		--	--
Thallium		<2,180	<2,580		--	--
Zinc		421,000	723,000		--	--

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313349

Table II-20

Summary of Analytical Results for AEC 21

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Matrix:	Soil		Soil		Soil	
Sample ID:	288E-2101-01		288E-2102-01		288E-2103-01	
Depth (ft):	0.5-1.5		0.5-1.5		1.0-1.5	
Analysis Units:	ppb		ppb		ppb	
Petroleum Hydrocarbons	14,140,000		1,220,000		3,960,000	
Total VOC	3,099,600		5,918		752,600	
Ethylbenzene	1,900,000		5,800		680,000	
Toluene	1,199,600	C	118	C	72,600	C

8450313 50

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-21

Summary of Analytical Results for AEC 22

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix: / Sample ID: / Depth (ft): / Units:		
	Matrix:	Soil	
	Sample ID:	288E-2201-01	
	Depth (ft):	0.5-1.0	
	Units:	ppb	
Petroleum Hydrocarbons		440,000	
Total VOC		2,771	
Chloroform		1,342	C
Ethylbenzene		597	C
Toluene		832	C

8450313S1

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-22

Summary of Analytical Results for AEC 23

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

	Matrix:	Soil	Soil	Soil	
	Sample ID:	288E-2301-01	288E-2301-01	288E-2301-02	
	Depth (ft):	1.0-1.5	0.5-1.0	2.0-2.5	
Analysis	Units:	ppb	ppb	ppb	
Petroleum Hydrocarbons		7,450,000	--	2,600,000	
Total VOC		--	860	2,597	
Ethylbenzene		--	860	1,500	
Toluene		--	ND	1,097	C

8450313 52

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-23

Summary of Analytical Results for AEC 25

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	
	Sample ID:	288E-2501-01	
	Depth (ft):	0.5-1.5	
	Units:	ppb	
Petroleum Hydrocarbons		608,000	
Total VOC		140,000	
Toluene		140,000	
Ethylbenzene		42,000	E

845031353

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-24

Summary of Analytical Results for AEC 27

Analysis	Matrix:	Soil
	Sample ID:	288E-2701-01
	Depth (ft):	1.0-1.5
	Units:	ppb
Petroleum Hydrocarbons		ND
Total VOC		ND

845031354

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-25

Summary of Analytical Results for AEC 28

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil
	Sample ID:	288E-2801-01
	Depth (ft):	1.0-1.5
	Units:	ppb
Petroleum Hydrocarbons		314,000
Total VOC		ND

8450313355

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-26

Summary of Analytical Results for MW01

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil	Water
	Sample ID:	288E-MW01-02		288E-MW01-03	288E-MW01
	Depth (ft):	1.5-2.5		1.5-2.5	NA
	Units:	ppb		ppb	ppb
Petroleum Hydrocarbons		5,080,000		3,780,000	<500
Total VOC		63		ND	ND
Toluene		63	C	ND	ND
Total AE		ND		ND	--
Total BN		516		3,140	--
Chloride		--		--	500,000
Cyanide		420		<130	--
Phenols		170		<130	--
PCBs		ND		ND	--
Pesticides		ND		ND	--
Antimony		<11,500		<14,000	--
Arsenic		17,040		8,390	--
Beryllium		<957		<1,160	--
Cadmium		1,350		<1,160	--
Chromium		10,800		9,060	--
Copper		36,500		47,800	--
Lead		59,900		86,800	--
Mercury		212		166	--
Nickel		6,640		7,300	--
Selenium		<957		<1,160	--
Silver		<1,910		<2,330	--
Thallium		<1,910		<2,330	--
Zinc		116,000		81,800	--

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 56

Table II-27

Summary of Analytical Results for MW02

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix: / Sample ID: / Depth (ft): / Units:	Water / 288E-MW02 / NA / ppb
Petroleum Hydrocarbons		70,000
Total VOC		ND
Chloride		200,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313357

Table II-28

Summary of Analytical Results for MW04

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil		Water
	Sample ID:	288E-MW04-01		288E-MW04-02		288E-MW04
	Depth (ft):	0.5-1.0		3.0-3.5		NA
	Units:	ppb		ppb		ppb
Total VOC		359		750		ND
Ethylbenzene		45		220		ND
Toluene		235	C	90	C	ND
Methylene chloride		79		460		ND
Chloride		--		--		1,700,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 58

Table II-29

Summary of Analytical Results for MW06

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil		Water	Water
	Sample ID:	288E-MW06-01		288E-MW06-02		288E-MW06	288E-MW106
	Depth (ft):	1.0-2.0		6.0-7.0		NA	NA
	Units:	ppb		ppb		ppb	ppb
Petroleum Hydrocarbons		240,000		940,000		<500	<500
Total VOC		7,501		10,790		ND	28
Chloroform		1,788	C	2,894	C	ND	ND
Ethylbenzene		928	C	ND		ND	ND
Toluene		4,785	C	7,896	C	ND	28
Total AE		ND		ND		--	--
Total BN		8,652		142,500		7	6
Chloride		--		--		55,000	50,000
Cyanide		*		<160		27	24
Phenols		<120		<160		18	20
PCBs		ND		ND		ND	ND
Pesticides		ND		ND		ND	ND
Antimony		<15,200		<17,200		<60	<60
Arsenic		9,910		14,100		16	11
Beryllium		<1,270		<1,400		<5	<5.0
Cadmium		1,930		7,350		11	7.5
Chromium		15,700		21,900		13	14
Copper		152,000		397,000		167	119
Iron		--		--		75,000	486,000
Lead		504,000		878,000		521	354
Mercury		317		5,210		<0.2	1.2
Nickel		19,300		21,900		<20	<20
Selenium		<1,270		<1,430		<5	5
Silver		<2,530		<2,860		<10	<10
Thallium		<2,540		<2,870		<10	<10
Zinc		473,000		1,188,000		562	388

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 59

Table II-30

Summary of Analytical Results for MW07

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	Soil	Soil	Water
	Sample ID:	288E-MW07-01	288E-MW07-01	288E-MW07-02	288E-MW07
	Depth (ft):	0.5-1.0	1.0-1.5	4.0-6.0	NA
	Units:	ppb	ppb	ppb	ppb
Petroleum Hydrocarbons		2,400,000	--	1,360,000	<500
Total VOC		--	677	1,727	128
Ethylbenzene		--	ND	31	8
Toluene		--	677 C	1,696 C	120
Chloride		--	--	--	4,200,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 60

Table II-31

Summary of Analytical Results for MW21

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	Soil	Water
	Sample ID:	288E-MW21-01	288E-MW21-02	288E-MW21
	Depth (ft):	0.0-1.5	31.0-32.0	NA
	Units:	ppb	ppb	ppb
Petroleum Hydrocarbons		2,820,000	<36,000	<500
Total VOC		ND	ND	ND
Total AE		ND	ND	ND
Total BN		1,090	343	24
Phenols		<120	<120	30
Chloride		--	--	4,700,000
Cyanide		<120	<120	<10
PCBs		ND	ND	ND
Pesticides		ND	ND	ND
Antimony		<14,600	<15,400	<60
Arsenic		12,700	4,890	<3
Beryllium		<1,220	<1,280	<5
Cadmium		2,410	1,540	<5
Chromium		22,200	18,950	<10
Copper		388,000	7,340	11
Lead		256,000	2,830	<5
Mercury		323	166	1.1
Nickel		24,600	8,050	<20
Selenium		<1,220	<1,290	<5
Silver		<2,430	<2,570	<10
Thallium		<2,430	<2,575	<10
Zinc		299,000	42,600	66

8450313 61

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-32

Summary of Analytical Results for MW22

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Matrix:	Soil		Soil	Water	Water
Sample ID:	288E-MW22-01		288E-MW22-03	288E-MW22(12/18/86)	288E-MW22(12/31/86)
Depth (ft):	2.0-4.0		27.0-27.5	NA	NA
Analysis Units:	ppb		ppb	ppb	ppb
Petroleum Hydrocarbons	--		<42,000	--	--
Total VOC	9,142		--	216	146
Chloroform	2,340	C	--	ND	ND
Ethylbenzene	1,300		--	210	140
Toluene	5,502	C	--	6	6
Chloride	--		--	5,150,000	4,400,000

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 62

Table II-33

Summary of Analytical Results for MW23

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil		Soil		Soil	Water
	Sample ID:	288E-MW23-01		288E-MW23-02		288E-MW23-03	288E-MW23
	Depth (ft):	0.5-1.0		2.0-3.0		23.0-24.0	NA
	Units:	ppb		ppb		ppb	ppb
Petroleum Hydrocarbons		39,800		54,000		<47,600	<500
Total VOC		187		84		--	ND
Ethylbenzene		31		ND		--	ND
Toluene		156	C	84	C	--	ND
Total AE		ND		ND		ND	ND
Total BN		1,220		20,290		570	10
Chloride		--		--		--	4,800,000
Cyanide		<130		<150		<160	<10
Phenols		<130		<150		<160	180
PCBs		ND		ND		ND	ND
Pesticides		ND		ND		ND	ND
Antimony		<15,100		<18,800		<14.1	<60
Arsenic		22,200		38,000		3.29	6
Beryllium		<1,260		<1,560		<1.2	<5.0
Cadmium		1,710		2,220		<1.2	6.8
Chromium		9,410		16,400		10.9	11
Copper		51,700		65,600		5.24	72
Lead		96,700		40,250		80.5	<5.0
Mercury		318		204		<0.1	<0.2
Nickel		7,250		16,400		4.92	<20
Selenium		<1,260		<1,560		<1.2	<5.0
Silver		<2,520		<3,130		<2.4	<10
Thallium		<2,530		<3,130		<2.4	<10
Zinc		90,100		224,000		19.04	50

84503136

See Table II-1 for data reporting qualifiers, designations and abbreviations.

Table II-34

Summary of Analytical Results for Surface Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

Analysis	Matrix:	Soil	Water	Water	Water	Water
	Sample ID:	288E-SW31-01	288E-SW31-02	288E-SW31-03	288E-SW32-02	288E-SW33-02
	Depth (ft):	NA	NA	NA	NA	NA
	Units:	ppb	ppb	ppb	ppb	ppb
Petroleum Hydrocarbons		112,000	--	<500	<500	--
Total VOC		91	--	73	282	--
1,1-Dichloroethane		ND	--	11	9	--
Chlorobenzene		72	--	15	12	--
Ethylbenzene		ND	--	ND	220	--
Toluene		19 C	--	18 C	20 C	--
trans-1,2-Dichloroethane		ND	--	13	11	--
Methylene chloride		ND	--	12	10	--
1,1,1-Trichloroethane		ND	--	41	ND	--
Total AE		ND	--	ND	ND	--
Total BN		15,970	--	7	18	--
Chloride		--	320,000	--	450,000	1,800,000
Cyanide		<200	--	32	26	--
Phenols		450	--	80	170	--
PCBs		ND	--	ND	ND	--
Pesticides		ND	--	ND	ND	--
Antimony		<23,600	--	<60	<60	--
Arsenic		19,300	--	4	6	--
Beryllium		<1,970	--	<5	<5	--
Cadmium		7,480	--	16	26	--
Chromium		126,000	--	24	25	--
Copper		152,000	--	20	21	--
Lead		585,000	--	137	140	--
Mercury		1,015	--	<0.2	0.5	--
Nickel		45,300	--	49	44	--
Selenium		<1,970	--	<5	<5	--
Silver		5,320	--	11	12	--
Thallium		<3,940	--	<10	<10	--
Zinc		736,000	--	188	169	--

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 64

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-0701-02	NA	Wash Blank	Total AE	ND	
288E-0701-02	NA	Wash Blank	Total BN	ND	
288E-0701-02	NA	Wash Blank	Antimony	<60	
288E-0701-02	NA	Wash Blank	Arsenic	<2	
288E-0701-02	NA	Wash Blank	Beryllium	<5	
288E-0701-02	NA	Wash Blank	Cadmium	<5	
288E-0701-02	NA	Wash Blank	Chromium	<10	
288E-0701-02	NA	Wash Blank	Copper	<10	
288E-0701-02	NA	Wash Blank	Lead	<5	
288E-0701-02	NA	Wash Blank	Mercury	<0.2	
288E-0701-02	NA	Wash Blank	Nickel	<20	
288E-0701-02	NA	Wash Blank	Selenium	<5	
288E-0701-02	NA	Wash Blank	Silver	<10	
288E-0701-02	NA	Wash Blank	Thallium	<10	
288E-0701-02	NA	Wash Blank	Zinc	<10	
288E-0701-02	NA	Wash Blank	Cyanide	<10	
288E-0701-02	NA	Wash Blank	Petroleum Hydrocarbons	*	
288E-0701-02	NA	Wash Blank	Phenols	<10	
288E-0701-02	NA	Wash Blank	Toluene	2	
288E-0701-02	NA	Wash Blank	Total VOC	2	
288E-1901-03	1901	Wash Blank	Total AE	ND	
288E-1901-03	1901	Wash Blank	Total BN	ND	
288E-1901-03	1901	Wash Blank	PCBs	ND	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

8450313 65

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-1901-03	1901	Wash Blank	Pesticides	ND	
288E-1901-03	1901	Wash Blank	Antimony	<60	
288E-1901-03	1901	Wash Blank	Arsenic	<2	
288E-1901-03	1901	Wash Blank	Beryllium	<5	
288E-1901-03	1901	Wash Blank	Cadmium	<5	
288E-1901-03	1901	Wash Blank	Chromium	<10	
288E-1901-03	1901	Wash Blank	Copper	<10	
288E-1901-03	1901	Wash Blank	Lead	<5	
288E-1901-03	1901	Wash Blank	Mercury	<0.2	
288E-1901-03	1901	Wash Blank	Nickel	<20	
288E-1901-03	1901	Wash Blank	Selenium	<5	
288E-1901-03	1901	Wash Blank	Silver	<10	
288E-1901-03	1901	Wash Blank	Thallium	<10	
288E-1901-03	1901	Wash Blank	Zinc	13	
288E-1901-03	1901	Wash Blank	Cyanide	<10	
288E-1901-03	1901	Wash Blank	Petroleum Hydrocarbons	*	
288E-1901-03	1901	Wash Blank	Phenols	<10	
288E-FB-1218	NA	Field Blank	Total AE	ND	
288E-FB-1218	NA	Field Blank	Total BN	ND	
288E-FB-1218	NA	Field Blank	PCBs	ND	
288E-FB-1218	NA	Field Blank	Pesticides	ND	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

8450313 66

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-0701-02	NA	Wash Blank	Total AE	ND	
288E-0701-02	NA	Wash Blank	Total BN	ND	
288E-0701-02	NA	Wash Blank	Antimony	<60	
288E-0701-02	NA	Wash Blank	Arsenic	<2	
288E-0701-02	NA	Wash Blank	Beryllium	<5	
288E-0701-02	NA	Wash Blank	Cadmium	<5	
288E-0701-02	NA	Wash Blank	Chromium	<10	
288E-0701-02	NA	Wash Blank	Copper	<10	
288E-0701-02	NA	Wash Blank	Lead	<5	
288E-0701-02	NA	Wash Blank	Mercury	<0.2	
288E-0701-02	NA	Wash Blank	Nickel	<20	
288E-0701-02	NA	Wash Blank	Selenium	<5	
288E-0701-02	NA	Wash Blank	Silver	<10	
288E-0701-02	NA	Wash Blank	Thallium	<10	
288E-0701-02	NA	Wash Blank	Zinc	<10	
288E-0701-02	NA	Wash Blank	Cyanide	<10	
288E-0701-02	NA	Wash Blank	Petroleum Hydrocarbons	*	
288E-0701-02	NA	Wash Blank	Phenols	<10	
288E-0701-02	NA	Wash Blank	Toluene	2	
288E-0701-02	NA	Wash Blank	Total VOC	2	
288E-1901-03	1901	Wash Blank	Total AE	ND	
288E-1901-03	1901	Wash Blank	Total BN	ND	
288E-1901-03	1901	Wash Blank	PCBs	ND	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

8450313 67

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-1901-03	1901	Wash Blank	Pesticides	ND	
288E-1901-03	1901	Wash Blank	Antimony	<60	
288E-1901-03	1901	Wash Blank	Arsenic	<2	
288E-1901-03	1901	Wash Blank	Beryllium	<5	
288E-1901-03	1901	Wash Blank	Cadmium	<5	
288E-1901-03	1901	Wash Blank	Chromium	<10	
288E-1901-03	1901	Wash Blank	Copper	<10	
288E-1901-03	1901	Wash Blank	Lead	<5	
288E-1901-03	1901	Wash Blank	Mercury	<0.2	
288E-1901-03	1901	Wash Blank	Nickel	<20	
288E-1901-03	1901	Wash Blank	Selenium	<5	
288E-1901-03	1901	Wash Blank	Silver	<10	
288E-1901-03	1901	Wash Blank	Thallium	<10	
288E-1901-03	1901	Wash Blank	Zinc	13	
288E-1901-03	1901	Wash Blank	Cyanide	<10	
288E-1901-03	1901	Wash Blank	Petroleum Hydrocarbons	*	
288E-1901-03	1901	Wash Blank	Phenols	<10	
288E-FB-1218	NA	Field Blank	Total AE	ND	
288E-FB-1218	NA	Field Blank	Total BN	ND	
288E-FB-1218	NA	Field Blank	PCBs	ND	
288E-FB-1218	NA	Field Blank	Pesticides	ND	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

8450313 68

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-FB-1218	NA	Field Blank	Antimony	<60	
288E-FB-1218	NA	Field Blank	Arsenic	<3	
288E-FB-1218	NA	Field Blank	Beryllium	<5	
288E-FB-1218	NA	Field Blank	Cadmium	<5	
288E-FB-1218	NA	Field Blank	Chromium	<10	
288E-FB-1218	NA	Field Blank	Copper	<10	
288E-FB-1218	NA	Field Blank	Lead	<5	
288E-FB-1218	NA	Field Blank	Mercury	<0.2	
288E-FB-1218	NA	Field Blank	Nickel	<20	
288E-FB-1218	NA	Field Blank	Selenium	<5	
288E-FB-1218	NA	Field Blank	Silver	<10	
288E-FB-1218	NA	Field Blank	Thallium	<10	
288E-FB-1218	NA	Field Blank	Zinc	29	
288E-FB-1218	NA	Field Blank	Chloride	<1,000	
288E-FB-1218	NA	Field Blank	Cyanide	<10	
288E-FB-1218	NA	Field Blank	Petroleum Hydrocarbons	<500	
288E-FB-1218	NA	Field Blank	Phenols	<10	
288E-FB-1222	NA	Field Blank	Total AE	ND	
288E-FB-1222	NA	Field Blank	Total BN	ND	
288E-FB-1222	NA	Field Blank	Chloride	<1,000	
288E-FB-1222	NA	Field Blank	Petroleum Hydrocarbons	<500	
288E-FB-1222	NA	Field Blank	Total AE	ND	
288E-FB-1222	NA	Field Blank	bis(2-Ethylhexyl)Phthalate	6	
288E-FB-1222	NA	Field Blank	Total BN	6	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

8450313 69

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-FB-1222	NA	Field Blank	PCBs	ND	
288E-FB-1222	NA	Field Blank	Pesticides	ND	
288E-FB-1222	NA	Field Blank	Antimony	<60	
288E-FB-1222	NA	Field Blank	Arsenic	<3	
288E-FB-1222	NA	Field Blank	Beryllium	<5	
288E-FB-1222	NA	Field Blank	Cadmium	<5	
288E-FB-1222	NA	Field Blank	Chromium	<10	
288E-FB-1222	NA	Field Blank	Copper	<10	
288E-FB-1222	NA	Field Blank	Lead	<5	
288E-FB-1222	NA	Field Blank	Mercury	0.3	
288E-FB-1222	NA	Field Blank	Nickel	<20	
288E-FB-1222	NA	Field Blank	Selenium	<5	
288E-FB-1222	NA	Field Blank	Silver	<10	
288E-FB-1222	NA	Field Blank	Thallium	<10	
288E-FB-1222	NA	Field Blank	Zinc	26	
288E-FB-1222	NA	Field Blank	Chloride	5,000	
288E-FB-1222	NA	Field Blank	Cyanide	<10	
288E-FB-1222	NA	Field Blank	Petroleum Hydrocarbons	<500	
288E-FB-1222	NA	Field Blank	Phenols	<10	
288E-MW06-03	MW06	Wash Blank	Total AE	ND	
288E-MW06-03	MW06	Wash Blank	bis(2-Ethylhexyl)Phthalate	63	
288E-MW06-03	MW06	Wash Blank	Total BN	63	

8450313 70

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW06-03	MW06	Wash Blank	PCBs	ND	
288E-MW06-03	MW06	Wash Blank	Pesticides	ND	
288E-MW06-03	MW06	Wash Blank	Antimony	<60	
288E-MW06-03	MW06	Wash Blank	Arsenic	8	
288E-MW06-03	MW06	Wash Blank	Beryllium	<5	
288E-MW06-03	MW06	Wash Blank	Cadmium	<5	
288E-MW06-03	MW06	Wash Blank	Chromium	<10	
288E-MW06-03	MW06	Wash Blank	Copper	<10	
288E-MW06-03	MW06	Wash Blank	Lead	8	
288E-MW06-03	MW06	Wash Blank	Mercury	<0.2	
288E-MW06-03	MW06	Wash Blank	Nickel	<20	
288E-MW06-03	MW06	Wash Blank	Selenium	<5	
288E-MW06-03	MW06	Wash Blank	Silver	<10	
288E-MW06-03	MW06	Wash Blank	Thallium	<10	
288E-MW06-03	MW06	Wash Blank	Zinc	36	
288E-MW06-03	MW06	Wash Blank	Cyanide	<10	
288E-MW06-03	MW06	Wash Blank	Petroleum Hydrocarbons	*	
288E-MW06-03	MW06	Wash Blank	Phenols	<10	
288E-MW06-03	MW06	Wash Blank	Chloroform	ND	C
288E-MW06-03	MW06	Wash Blank	Toluene	4	E
288E-MW06-03	MW06	Wash Blank	Total VOC	ND	
288E-MW07-03	MW07	Wash Blank	Petroleum Hydrocarbons	*	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

8450313 71

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW07-03	MW07	Wash Blank	Toluene	4	C
288E-MW07-03	MW07	Wash Blank	Total VOC	4	
288E-MW09-03	MW09	Wash Blank	Total AE	ND	
288E-MW09-03	MW09	Wash Blank	Total BN	ND	
288E-MW09-03	MW09	Wash Blank	PCBs	ND	
288E-MW09-03	MW09	Wash Blank	Pesticides	ND	
288E-MW09-03	MW09	Wash Blank	Antimony	<60	
288E-MW09-03	MW09	Wash Blank	Arsenic	<2	
288E-MW09-03	MW09	Wash Blank	Beryllium	<2	
288E-MW09-03	MW09	Wash Blank	Cadmium	<5	
288E-MW09-03	MW09	Wash Blank	Chromium	<10	
288E-MW09-03	MW09	Wash Blank	Copper	14	
288E-MW09-03	MW09	Wash Blank	Lead	6	
288E-MW09-03	MW09	Wash Blank	Mercury	<0.2	
288E-MW09-03	MW09	Wash Blank	Nickel	<20	
288E-MW09-03	MW09	Wash Blank	Selenium	<5	
288E-MW09-03	MW09	Wash Blank	Silver	<10	
288E-MW09-03	MW09	Wash Blank	Thallium	<10	
288E-MW09-03	MW09	Wash Blank	Zinc	39	
288E-MW09-03	MW09	Wash Blank	Cyanide	<10	
288E-MW09-03	MW09	Wash Blank	Petroleum Hydrocarbons	*	
288E-MW09-03	MW09	Wash Blank	Phenols	<10	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

8450313372

Table II-36

Summary of Analytical Results for Wash Blanks and Field Blanks

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sample Location	Comments	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW11-02	MW11	Wash Blank	Petroleum Hydrocarbons	<250	
288E-MW22-02	NA	Wash Blank	Chloroform	3	
288E-MW22-02	NA	Wash Blank	Ethylbenzene	1	E
288E-MW22-02	NA	Wash Blank	Toluene	4	E
288E-MW22-02	NA	Wash Blank	Total VOC	3	

See Table II-1 for data reporting qualifiers, designations, and abbreviations.

8450313 73

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-0101-01	0101	HSAB	0.5-1.5	Soil	Ethylbenzene	31,000	E
288E-0101-02	0101	HSAB	0.5-1.5	Soil	Ethylbenzene	33,000	E
288E-0101-01	0101	HSAB	0.5-1.5	Soil	Toluene	7,800	E
288E-0101-02	0101	HSAB	0.5-1.5	Soil	Toluene	8,100	E
288E-0101-01	0101	HSAB	0.5-1.5	Soil	Total VOC	ND	
288E-0101-02	0101	HSAB	0.5-1.5	Soil	Total VOC	ND	
288E-0402-01	0402	HSAB	0.0-0.5	Soil	Petroleum Hydrocarbons	2,760,000	
288E-0402-02	0402	HSAB	0.0-0.5	Soil	Petroleum Hydrocarbons	3,580,000	
288E-0802-01	0802	HSAB	2.5-3.0	Soil	Petroleum Hydrocarbons	1,760,000	
288E-0802-02	0802	HSAB	2.5-3.0	Soil	Petroleum Hydrocarbons	3,200,000	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Acenaphthylene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Acenaphthylene	30	E
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Antimony	<11,500	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Antimony	<14,000	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Arsenic	17,040	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Arsenic	8,390	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Benzo(a)Anthracene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Benzo(a)Anthracene	290	J

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 74

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Benzo(a)Pyrene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Benzo(a)Pyrene	170	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Benzo(b)Fluoranthene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Benzo(b)Fluoranthene	450	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Benzo(g,h,i)Perylene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Benzo(g,h,i)Perylene	180	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Beryllium	<957	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Beryllium	<1,160	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Cadmium	1,350	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Cadmium	<1,160	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Chromium	10,800	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Chromium	9,060	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Chrysene	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Chrysene	240	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Copper	36,500	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Copper	47,800	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Cyanide	420	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Cyanide	<130	

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 75

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Di-n-Butylphthalate	510	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Di-n-Butylphthalate	1,300	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Ethylbenzene	39	E
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Ethylbenzene	ND	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Fluoranthene	48	E
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Fluoranthene	530	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Lead	59,900	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Lead	86,800	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Mercury	212	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Mercury	166	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Nickel	6,640	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Nickel	7,300	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	PCBs	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	PCBs	ND	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Pesticides	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Pesticides	ND	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Petroleum Hydrocarbons	5,080,000	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Petroleum Hydrocarbons	3,780,000	

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 76

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Phenols	170	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Phenols	<130	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Pyrene	44	E
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Pyrene	270	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Selenium	<957	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Selenium	<1,160	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Silver	<1,910	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Silver	<2,330	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Thallium	<1,910	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Thallium	<2,330	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Toluene	63	C
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Toluene	16	E
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Total AE	ND	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Total AE	ND	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Total BN	516	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Total BN	3,140	
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Total VOC	63	
288E-MW01-02	MW03	HSAB	1.5-2.5	Soil	Total VOC	ND	

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313777

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW01-02	MW01	HSAB	1.5-2.5	Soil	Zinc	116,000	
288E-MW01-03	MW01	HSAB	1.5-2.5	Soil	Zinc	81,800	
288E-MW06	MW06	Well	NA	Water	Acenaphthene	0.9	E
288E-MW106	MW06	Well	NA	Water	Acenaphthene	0.8	E
288E-MW06	MW06	Well	NA	Water	Antimony	<60	
288E-MW106	MW06	Well	NA	Water	Antimony	<60	
288E-MW06	MW06	Well	NA	Water	Arsenic	16	
288E-MW106	MW06	Well	NA	Water	Arsenic	11	
288E-MW06	MW06	Well	NA	Water	Beryllium	<5.0	
288E-MW106	MW06	Well	NA	Water	Beryllium	<5.0	
288E-MW06	MW06	Well	NA	Water	bis(2-Ethylhexyl)Phthalate	7	
288E-MW106	MW06	Well	NA	Water	bis(2-Ethylhexyl)Phthalate	6	
288E-MW06	MW06	Well	NA	Water	Cadmium	11	
288E-MW106	MW06	Well	NA	Water	Cadmium	7.5	
288E-MW06	MW06	Well	NA	Water	Chloride	55,000	
288E-MW106	MW06	Well	NA	Water	Chloride	50,000	
288E-MW06	MW06	Well	NA	Water	Chromium	13	
288E-MW106	MW06	Well	NA	Water	Chromium	14	

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 78

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW06	MW06	Well	NA	Water	Copper	167	
288E-MW106	MW06	Well	NA	Water	Copper	119	
288E-MW06	MW06	Well	NA	Water	Cyanide	27	
288E-MW106	MW06	Well	NA	Water	Cyanide	24	
288E-MW06	MW06	Well	NA	Water	Fluoranthene	2	E
288E-MW106	MW06	Well	NA	Water	Fluoranthene	1	E
288E-MW06	MW06	Well	NA	Water	Iron	75,000	
288E-MW106	MW06	Well	NA	Water	Iron	486,000	
288E-MW06	MW06	Well	NA	Water	Lead	521	
288E-MW106	MW06	Well	NA	Water	Lead	354	
288E-MW06	MW06	Well	NA	Water	Mercury	<0.2	
288E-MW106	MW06	Well	NA	Water	Mercury	1.2	
288E-MW06	MW06	Well	NA	Water	Nickel	<20	
288E-MW106	MW06	Well	NA	Water	Nickel	<20	
288E-MW06	MW06	Well	NA	Water	PCBs	ND	
288E-MW106	MW06	Well	NA	Water	PCBs	ND	
288E-MW06	MW06	Well	NA	Water	Pesticides	ND	
288E-MW106	MW06	Well	NA	Water	Pesticides	ND	

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 79

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW06	MW06	Well	NA	Water	Petroleum Hydrocarbons	<500	
288E-MW106	MW06	Well	NA	Water	Petroleum Hydrocarbons	<500	
288E-MW06	MW06	Well	NA	Water	Phenanthrene	4	E
288E-MW106	MW06	Well	NA	Water	Phenanthrene	3	E
288E-MW06	MW06	Well	NA	Water	Phenols	18	
288E-MW106	MW06	Well	NA	Water	Phenols	20	
288E-MW06	MW06	Well	NA	Water	Pyrene	1	E
288E-MW106	MW06	Well	NA	Water	Pyrene	0.7	E
288E-MW06	MW06	Well	NA	Water	Selenium	<5.0	
288E-MW106	MW06	Well	NA	Water	Selenium	5	
288E-MW06	MW06	Well	NA	Water	Silver	<10	
288E-MW106	MW06	Well	NA	Water	Silver	<10	
288E-MW06	MW06	Well	NA	Water	Thallium	<10	
288E-MW106	MW06	Well	NA	Water	Thallium	<10	
288E-MW06	MW06	Well	NA	Water	Toluene	2	E
288E-MW106	MW06	Well	NA	Water	Toluene	28	
288E-MW06	MW06	Well	NA	Water	Total BN	7	
288E-MW106	MW06	Well	NA	Water	Total BN	6	

See Table II-1 for data reporting qualifiers, designations and abbreviations.

8450313 80

Table II-37

Summary of Analytical Results for Duplicate Samples

Spencer Kellogg, formerly a Division of Textron Inc.
ECRA Case No. 85403

ENVIRON Sample ID	Sampling Location	Sample Type	Sample Depth	Matrix	Chemical	Concentration (ppb)	Data Reporting Qualifier
288E-MW06	MW06	Well	NA	Water	Total VOC	ND	
288E-MW106	MW06	Well	NA	Water	Total VOC	28	
288E-MW06	MW06	Well	NA	Water	Zinc	562	
288E-MW106	MW06	Well	NA	Water	Zinc	388	
288E-MW09	MW09	Well	NA	Water	Chloride	45,000	
288E-MW109	MW09	Well	NA	Water	Chloride	45,000	
288E-MW09	MW09	Well	NA	Water	Di-isopropyl ether	7	U
288E-MW109	MW09	Well	NA	Water	Di-isopropyl ether	7	U
288E-MW09	MW09	Well	NA	Water	Methanol	10	U
288E-MW109	MW09	Well	NA	Water	Methanol	10	U
288E-MW09	MW09	Well	NA	Water	Petroleum Hydrocarbons	<500	
288E-MW109	MW09	Well	NA	Water	Petroleum Hydrocarbons	<500	
288E-MW09	MW09	Well	NA	Water	Tert-butyl alcohol	7	U
288E-MW109	MW09	Well	NA	Water	Tert-butyl alcohol	7	U
288E-MW09	MW09	Well	NA	Water	Tert-butyl ether	7	U
288E-MW109	MW09	Well	NA	Water	Tert-butyl ether	7	U
288E-MW09	MW09	Well	NA	Water	Toluene	2	E
288E-MW109	MW09	Well	NA	Water	Toluene	--	
288E-MW09	MW09	Well	NA	Water	Total VOC	ND	
288E-MW109	MW09	Well	NA	Water	Total VOC	--	

See Table II-1 for data reporting qualifiers, designations and abbreviations.

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