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Reviewer: JUAN E. Davila
Document: SIP
Reviewed: 9/30/92
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SITE INSPECTION

CELANESE CORPORATION OF AMERICA

AKA: HOECHST CELANESE

NEWARK, ESSEX COUNTY

EPA ID NO.: NJD986610848

New Jersey Department of Environmental Protection and Energy
Division of Responsible Party Site Remediation
Bureau of Site Assessment

CELANESE CORPORATION OF AMERICA
AKA: HOECHST CELANESE
ST. CHARLES STREET
CITY OF NEWARK, ESSEX COUNTY, NEW JERSEY

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NARRATIVE

CELANESE CORPORATION OF AMERICA
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GENERAL INFORMATION AND SITE HISTORY

The St. Charles Street portion of the Celanese Corporation was a manufacturer of tricresyl phosphate, a component of plasticizers, hydraulic oils and a lead scavenger in gasoline. Other portions of the St. Charles Street facility were designated as an Acetate Celluloid Plant and Scrap Plant. The 11.41-acre site, listed as Block 2052, Lot 1 (formerly Lots 1, 12, 16, 29, 24) is situated in an urban/industrial area of the Ironbound section of Newark, with the New Jersey Turnpike 1,500 feet to the east and Newark Airport 1.0 mile to the south. The Tidewater Baling Co. and Grammer, Dempsey and Hudson Steel Co., mark the northern site boundary, with St. Charles Street to the east and Berlin Street (now referred to as Rome Street) to the south. A variety of industrial and commercial businesses, schools, churches and residential dwellings are situated within a 0.5-mile radius of the site.

The St. Charles Street facility was once part of a large industrial complex owned and operated by the Celluloid Co., which encompassed approximately three city blocks. The Celluloid Co. operated from 1873 to the 1930s as one of the first successful plastics industries in the United States and is credited with the discovery of the first synthetic plastic. The Celanese Corp. merged with Celluloid on March 17, 1941 and operated from plants along Ferry Street and St. Charles Street until 1956. The southeast portion of the St. Charles Street operation was referred to as the Lindol Plant, which manufactured lindol, the trade name for tricresyl phosphate. Although some of the original buildings along Ferry Street remain in truncated form, the Lindol, Acetate Celluloid and Scrap Plants were demolished by 1959. Among the entities appearing in the chain of title after 1959 for one or more of the five lots are Rome-Charles Corporation; Enterprise Judy, Inc.; Tolan Machinery Co., Inc.; Adco Chemical Company; Thibant and Walker Co., Inc.; VGR Corp.; Charter Bulk Service Inc.; and Cook and Dunn Paint Corporation. Portions of the property were purchased by the City of Newark over a period of years during the 1960s to develop the Ironbound Recreation Center, which consists of an indoor skating rink, stadium grandstand, playing fields and a planned indoor swimming pool. Construction of the facility began in 1968 and continues to the present.

There are approximately 450,000 residents within a 4-mile radius of the facility, with the nearest residence situated 100 feet to the southwest.

SITE OPERATIONS OF CONCERN

The original Celluloid Co. manufactured over 1,000 synthetic plastic products, such as harness buckles, combs and shaving brush handles. Ingredients were mixed into pliable form, worked into hot rolls, pressed into blocks and made into sheets. Information pertaining to raw material type and storage, and hazardous waste generation and disposal were not available for this period of operation.

The lindol portion of the facility owned and operated by the Celanese Corp. manufactured tricresyl phosphates used as flame retardant plasticizers and fire resistant fluids. The manufacturing process involved the condensation, purification, decolorization and filtration of raw materials. The conditions required for the condensation step included temperatures ranging from 150 to 300 degrees Centigrade. The reaction mixture was passed through a series of reactors at successively higher temperatures. The mixture was transferred from the last reactor through a heat exchanger and condenser prior to the purification process. The preliminary purification process involved washing the crude reaction product with a dilute caustic solution. Final purification involved a water wash treatment with a dilute permanganate solution, dehydration by heating under reduced pressure, bleaching with activated carbon and final filtration.

Known raw materials used in the production of lindol products were cresol, phosphoric oxychloride, oxalic acid, phosphorus pentachloride, phosphoric acid, potassium permanganate, phenols, phosphate esters, sulfuric acid, dilute caustic soda and magnesium chloride. Approximately 120,000 pounds of raw materials were used on a weekly basis. The materials were stored in vertical, rubber-lined, aboveground storage tanks. The capacity and level of secondary containment are not known. Raw materials may also have been received in 55-gallon drums. Although the storage and handling of drums on site is unclear, aerial photograph interpretation indicates haphazard handling practices throughout the site's operational history.

Known waste streams generated from production practices included hydrochloric acid, still residues and a variety of end cuts. The disposal methods and handling of these wastes remains unclear.

Aerial photograph interpretation dating from 1940 to 1989 indicates significant features of concern, including concentrations of drums, possible fill areas, stains, standing liquids, mounded material and a potential 20-foot by 20-foot landfill, where the northern section of the grandstand now sits.

All of the original standing structures no longer exist. The site is currently a partially inactive recreational center owned and operated by the City of Newark. The center consists of baseball, soccer and football fields and a skating rink. Construction of a planned 0.4 acre indoor swimming pool began in August 1987 and was stopped when strong phenol type odors were detected by workers. As a result, a multiphase investigation was initiated to determine the potential sources of contaminantion. The ongoing investigation, involving both state and city agencies, calls for the installation of monitoring wells, sampling of soil and groundwater, and the search for potential responsible parties. Use of the center is currently restricted to the baseball and soccer fields.

GROUNDWATER ROUTE

This section of Newark is underlain by Pleistocene age, stratified glacial drift which includes fluvial and lacustrine deposits. The fluvial glacial deposits are generally stratified sand and gravel; the glacial lacustrine deposits are usually bedded or laminated silt and clay. The unconsolidated deposits are underlain by the Triassic age Brunswick Formation which generally consists of reddish-brown sandstone and shale. The depth to bedrock below the site is reportedly 20 feet, although the depth can vary from 52 to 110 feet below the ground surface within a 0.25 mile radius. Subsurface deposits consist of fill to a depth of 4 to 8 feet below grade with the thickest section along the northwest corner of the site. A medium- to fine-grained sand with gravel underlies the fill material.

Groundwater is encountered at a depth of 8 to 10 feet below grade with groundwater flow toward the southeast. The depth to the primary aquifer is approximately 95 to 135 feet below ground surface. Saltwater intrusion has made the water unsuitable for drinking or irrigation. There are no known sole source aquifers or domestic potable wells in use within a 4-mile radius of the site.

Six groundwater monitoring wells ranging in depth from 17 to 20 feet were installed between September 14 and 17, 1987 by Environmental Drilling of Mount Arlington, New Jersey. The wells are concentrated along the southeast corner of the site where the indoor swimming pool was being constructed. The six monitoring wells (MW-1 through MW-6) were sampled on September 28, 1987 by Geraghty and Miller, Inc., of Jersey City, New Jersey an environmental consulting firm retained by the City of Newark. Samples were analyzed by Analytikem of Cherry Hill, New Jersey for volatile and semivolatile organic compounds, priority pollutant metals and phenols. Volatile organic compounds (VOC) were detected in MW-2, MW-4 and MW-6. The highest total VOC concentration was 269 parts per billion (ppb) with 180 ppb of xylene. Semivolatile organic compounds were found in substantial concentrations in MW-6 with phenols ranging from 24,000 ppb to 120,000 ppb. In MW-1, MW-2 and MW-4, 2-methyl phenol, 4-methyl phenol and 2,4-dimethyl

phenol were detected in concentrations ranging from 133 to 5,032 ppb. Tricresyl phosphate was detected at a concentration of 2,200 ppb in MW-4 and low concentrations in MW-1, MW-2 and MW-3.

Four additional monitoring wells (MW-7 through MW-10), ranging in depth from 17.5 to 19.5 feet below ground surface, were installed between April 21 and 25, 1988. Samples were collected on May 9, 1988 by Geraghty and Miller and analyzed for the parameters on the USEPA priority pollutants list and total tricresyl phosphate (TCP).

MW-11 and MW-12 were installed in May 1988 to depths of 18 and 34 feet, respectively. Samples collected on October 6, 1988, revealed 2,4-dimethyl phenol and tricresyl phosphate at respective concentrations of 36,300 ppb in MW-11 and 620 ppb in MW-12. A dense nonaqueous phase liquid was identified in MW-11. The liquid contained 53,000 ppb TCP and lower concentrations of 2-methyl phenol, 4-methyl phenol, 2,4-dimethyl phenol, phosphoric and phenol esters, ortho-tricresyl phosphate, meta-tricresyl phosphate and para-tricresyl phosphate.

Suspected contributors to the groundwater contamination include the former industries that occupied the site, the Tidewater Baling Co. to the northwest, a railroad to the north and Grammer, Dempsey and Hudson Steel to the northeast.

The New Jersey Atlas Geologic Overlay lists 1 public supply well, 40 industrial wells and 16 unsuccessful rock wells within a 4-mile radius of the site. The public well located 1.5 miles to the southwest is owned by the New York Port Authority. The well, which was drilled in 1968 into the Triassic age Brunswick Formation to a depth of 370 feet, is no longer in use.

SURFACE WATER ROUTE

The facility is situated within the Arthur Kill Drainage Basin which flows predominantly toward the southeast. Bodies of water situated within the drainage route 2 miles to the south are Dead Creek and Bound Creek, both of which empty into Newark Bay, a major shipping and receiving station for industrial commerce 2.5 miles to the southeast. Site topography is generally flat.

Tidal wetlands are situated approximately 2.0 miles to the southwest of the site.

The spread of contaminants on site via surface water drainage route is unlikely as the areas of contamination are subsurface and below grade.

AIR ROUTE

There were no records of releases or air permits at the respective state and local government agencies retaining site files.

Strong phenolic odors have been reported from an open hole excavated in August 1987 during pool construction, from monitoring wells on site and in the basements of some nearby homes along St. Charles Street. It is not known whether the resident's complaints are attributed to conditions on site.

SOIL

Surficial soil on the playing fields was imported from an unspecified location. The artificial fill material extends to a depth of 8 feet below grade with the thickest section along the northwest portion of the site. A fine-grained sand with gravel underlies the fill material.

Six soil borings (S-1 through S-6) were drilled between September 16 and 17, 1987 by Environmental Drilling. Borings were drilled along the southeast corner of the site to a depth of 6 feet, except for S-2, which was drilled to a depth of 14 feet. One sample was collected from each boring with the exception of S-2 where two samples were collected, one from the unsaturated zone and the other from the saturated zone. Samples were

analyzed for volatile organic compounds, semivolatile organic compounds, priority pollutant metals, cyanide and total phenolics. The distribution of detected contaminants are presented in the Summary of Sampling Data Section.

S-5 displayed the highest concentration of total VOCs at 240,000 ppb. All of the samples displayed high concentrations of semivolatile organics such as tricresyl phosphate, phenol, 2-methyl phenol, 4-methyl phenol and 2,4-dimethyl phenol. Heavy metals detected in all of the unsaturated samples were arsenic, chromium, copper, lead, nickel and zinc. One PCB compound (Aroclor-1260) was detected in S-2 at a concentration of 150 ppb.

Current proposals to remediate this portion of the site call for the excavation of an estimated 1,000 to 2,500 cubic yards of soil and backfilling with clean soil.

A total of 64 soil samples were collected on April 11 and 12, 1988 by the NJDEP, Division of Hazardous Site Mitigation, Bureau of Environmental Evaluation and Risk Assessment. The samples, collected at depths ranging from 0 to 6 inches and 6 to 15 inches, were collected from the football, baseball and soccer fields. The samples were analyzed for PCBs by Analytikem of Cherry Hill, New Jersey.

The sample results indicated PCB contamination as high as 120 ppm at depths of 6 to 15 inches on the football field, with lower concentrations (2 ppm) found at depths of 0 to 6 inches. Samples collected from the baseball and soccer fields indicate minimal levels of below 1 ppm. Remedial plans for the playing fields call for a cover of clean fill material to be placed over the areas of concern.

In order to more effectively delineate the potential spread of contaminants along the playing fields, another round of sampling was conducted on April 29, 1991 by the NJDEPE, Division of Responsible Party Site Remediation (DRPSR), Bureau of Site Assessment (BSA). Twenty-five soil samples were collected from depths ranging from surficial to 6 feet below grade. Samples were analyzed for petroleum hydrocarbons and contaminants on EPA's Target Compound List. The distribution of detected contaminants are presented in the Summary of Sampling Data Section.

Prior to recognition that the soil on site might be contaminated, approximately 150 cubic yards of excavated soil was transported to the ABC Baling Co. in Hoboken, New Jersey for use as fill material. The fill has since been classified as ID 27, dry industrial waste, and disposed of at the Wayne Disposal Landfill in Michigan.

Although manufacturing no longer occurs on site, a potential source of significant contamination may exist from the Tidewater Baling facility situated along the northwest property boundary. State and local government agencies have observed on numerous occasions, an oily liquid saturating the soils of the Tidewater site as well as running off onto the Recreation Center property. Tidewater has recently agreed to sign an Administrative Consent Order to sample and remediate these areas. The City of Newark hs refused to initiate any remedial effort until Tidewater Baling ceases this discharge.

DIRECT CONTACT

Although the entire site is enclosed by a wire-mesh fence, a number of access points exist and evidence of trespassers and vandals is evident. Use of the baseball field, recently granted by the City of Newark, may also present a chronic health risk to the players and fans attending the games.

An estimated fifty 55-gallon drums are currently stored on the south end of the football field. The drums, which are in poor condition and in some cases lacking lids, contain contaminated soil excavated from the pool area. These drums are situated in an open area that can be easily reached from any of the numerous entry points along the perimeter of the fence.

FIRE AND EXPLOSION
The potential for a fire or explosion to occur due to site characteristics is negligible as there are no combustible materials used or stored on site and site activity is restricted to recreation.

ADDITIONAL CONSIDERATIONS
As the site is situated in an urban/industrial area, species of flora and fauna likely to be affected by site conditions is limited.

Adjacent properties, principally the Tidewater Baling Co., may pose more of a direct threat of contamination as evidence of spills and severe soil disturbance (oily discoloration) observed on April 29, 1991 by NJDEPE personnel during an on-site walk through.

ENFORCEMENT ACTIONS
An Administrative Consent Order was negotiated between the City of Newark and the NJDEP, Division of Hazardous Waste Management (DHWM), Bureau of State Case Management, between September and December 1989, and executed in February 1990. The order requires the City of Newark and Hoechst Celanese Corporation to determine the nature and extent of the problem presented by the discharge of pollutants at the site and to develop a remedial investigation and feasibility study of remedial action alternatives.

SUMMARY OF SAMPLING DATA

1. Sampling dates: September 16 and 17, 1987

Sampled by: Geraghty and Miller
Jersey City, New Jersey

Samples: 7 soil samples

Laboratory: Analytikem (#04012)
Cherry Hill, New Jersey

Parameters: Volatile organics, semivolatile organics, priority pollutant metals, cyanide, total phenolics

Sample description: Six soil borings with one sample from each with the exception of S-2 where one sample was collected from the saturated zone and one from the unsaturated zone.

Contaminants detected:

SAMPLE #	CONTAMINANT	CONCENTRATION (ppb)
S-1	methylene chloride	420
	2-methylphenol	8,900
	4-methylphenol	27,000
	2,4-dimethylphenol	47,000
	tricresyl phosphate	540,000
	arsenic	5,300
	beryllium	610
	chromium	7,400
	copper	69,000
	lead	210,000
	mercury	4,500
	nickel	16,000
	zinc	250,000
	total phenolics	32,000

SAMPLE #	CONTAMINANT	CONCENTRATION (ppb)
S-2	methylene chloride	1,000
	naphthalene	7,100
	2-methylnaphthalene	770
	fluoranthene	1,200
	pyrene	940
	benzo(a)anthracene	760
	bis(2-ethylhexyl) phthalate	970
	chrysene	930
	tricresyl phosphate	540,000
	arsenic	6,600
	beryllium	700
	cadmium	1,200
	copper	180,000
	lead	160,000
	mercury	2,800
	nickel	16,000
	zinc	280,000
	total phenolics	32,000
S-3	methylene chloride	1,300
	phenol	110,000
	2-methylphenol	180,000
	4-methylphenol	710,000
	2,4-dimethylphenol	420,000
	tricresyl phosphate	4,000,000
	arsenic	9,600
	beryllium	730
	chromium	11,000
	copper	58,000
	lead	240,000
	mercury	1,500
	nickel	24,000
	zinc	170,000
S-4	methylene chloride	1,300
	2-methylphenol	8,400
	4-methylphenol	22,000
	2,4-dimethylphenol	19,000
	tricresyl phosphate	1,100,000
	arsenic	7,000
	beryllium	860
	cadmium	1,300
	chromium	13,000
	copper	84,000
	lead	1,400,000
	mercury	1,500
	nickel	48,000
	zinc	100,000
S-5	methylene chloride	1,000
	toluene	12,000
	ethyl benzene	150,000
	total xylene	78,000
	4-methylphenol	11,000
	2,4-dimethylphenol	15,000
	naphthalene	24,000
	2-methyl phthalate	13,000
	tricresyl phosphate	94,000
	arsenic	3,600
	berylium	800
	chromium	22,000
	copper	58,000
	lead	360,000
	nickel	16,000
	zinc	66,000

S-6	methylene chloride	1,400
	total xylenes	1,100
	2-methylphenol	1,500
	4-methylphenol	6,700
	2,4-dimethylphenol	7,900
	naphthalene	5,300
	2-methylnaphthalene	4,300
	acenaphthene	840
	dibenzofuran	800
	phenanthrene	940
	tricresyl phosphate	820,000
	arsenic	7,100
	beryllium	780
	chromium	6,300
	copper	34,000
	lead	76,000
	mercury	760
	nickel	11,000
	zinc	100,000

QA/QC: QA/QC requirements were within the guidelines established by the State

File location: Attachments A16 and A17
NJDEPE, DRPSR, RPIU
300 Horizon Center
Robbinsville, New Jersey

2. Sampling date: September 28, 1987

Sampled by: Geraghty and Miller
Jersey City, New Jersey

Samples: 6 groundwater

Laboratory: Analytikem (#04012)
Cherry Hill, New Jersey

Parameters: Volatile organis semivolatile organics, priority pollutant metals and phenols

Sample description: MW-1 through MW-6

Contaminants detected:

MONITORING WELL	CONTAMINANT	CONCENTRATION (ppb)
MW-1	tricresyl phosphate	85
MW-2	benzene	48
	toluene	26
	ethyl benzene	11
	total xylenes	87
	phenol	15
	4-methylphenol	24
	2,4-dimethylphenol	1,000
	2-methylnaphthalene	47
	tricresyl phosphate	290
MW-4	benzene	13
	toluene	15
	phenol	42
	2-methylphenol	130
	4-methylphenol	150
	2,4-dimethylphenol	2,500
	tricresyl phosphate	2,200
MW-6	chloroform	23
	toluene	14

MONITORING WELL	CONTAMINANT	CONCENTRATION (ppb)
MW-6	ethyl benzene	34
	total xylenes	180
	phenol	120,000
	2-methylphenol	2,300
	4-methylpheonol	41,000
	2,4-dimethylphenol	36,000

QA/QC: QA/QC requirements were within the guidelines established by the State

File location: Attachment A-19
NJDEPE, DRPSR, RPIU
300 Horizon Center
Robbinsville, New Jersey

3. Sampling dates: May 9, 1988 (MW-7 through MW-10) and October 6, 1988 (MW-11, MW-12)

Sampled by: Geraghty and Miller
Jersey City, New Jersey

Samples: 6 groundwater

Laboratory: Analytikem (#04012)
Cherry Hill, New Jersey

Parameters: USEPA priority pollutants, total tricresyl phosphates

Sample Description: MW-7 through MW-12

Contaminants detected:

MONITORING WELL	CONTAMINANT	CONCENTRATION (ppb)
MW-8	trichlorofluoromethane	22
	arsenic	12
	thallium	3.4
MW-9	2,4-dimethylphenol	553
	thallium	41
	selenium	12.2
	total phenol	889
MW-10	benzene	5.4
	ethyl benzene	9.7
	phenol	393
	2,4-dimethylphenol	15,400
	naphthalene	15
	diethylphthalate	13
	total tricresyl phosphate	1,160
	antimony	3.6
	arsenic	10
	thallium	2
MW-11	tricresyl phosphate	36,300
MW-12	benzene	501
	trans-1,2-dichloroethene	4,080
	trichlorofluoromethane	1,710
	total xylenes	340

QA/QC: QA/QC requirements were within the guidelines established by the State

File location:	Attachments C-51, C-52, C-53 NJDEPE, RPSR, RPIU 300 Horizon Center Robbinsville, New Jersey

4. Sampling date: June 26, 1991

Sampled by:	NJDEPE/DRPSR/BSA 300 Horizon Center Robbinsville, New Jersey
Samples:	25 soil samples
Laboratory:	TCT St. Louis (TCL) (#6477) St. Louis, Missouri Analytikem (PHC) #04012 Cherry Hill, New Jersey
Parameters:	Total USEPA Target Compound List, petroleum hydrocarbons
Sample description:	S-2 through S-8 (0 to 6 feet, football field) S-9 through S-25 (0 to 6 feet, baseball and soccer fields
Contaminants detected:	Refer to attachments I-16 through I-40, I-48 through I-61, I-75 through I-90 and I-98 through I-109
QA/QC:	Quality assurance review was conducted by Roy F. Weston Inc. of West Chester, Pennsylvania and is summarized in attachments I-2 through I-13, I-42 through I-43, I-63 through I-69 and I-92 through I-93.
File location:	Attachments I-16 through I-109 NJDEPE, DRPSR, BSA 300 Horizon Center Robbinsville, New Jersey

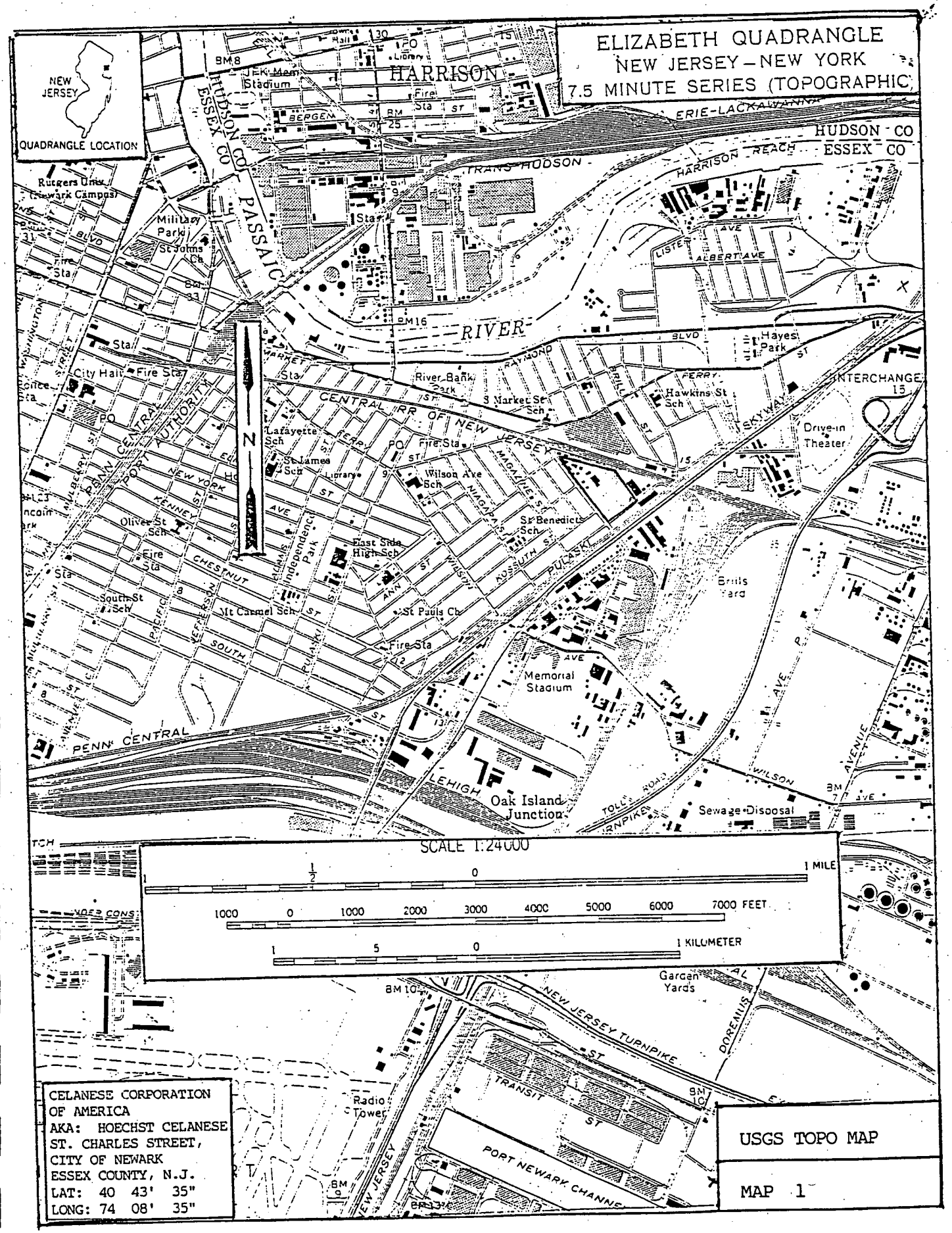
RECOMMENDATIONS

Extensive soil and groundwater sampling has confirmed the presence of a variety of contaminants in both medium. Proposals to remediate these areas of concern are currently pending the outcome of an Administrative Consent Order to be signed by the adjacent Tidewater Baling Co. to the northwest. Futher action taken by the City of Newark will be contingent on Tidewater's commitment to cease the spread of contamination known to exist at the facility. As the City of Newark is committed to remediating and developing the site, a no further action under CERCLA is recommended at this time.

Submitted by:

David E. Triggs
Bureau of Site Assessment
March 19, 1992

MAPS



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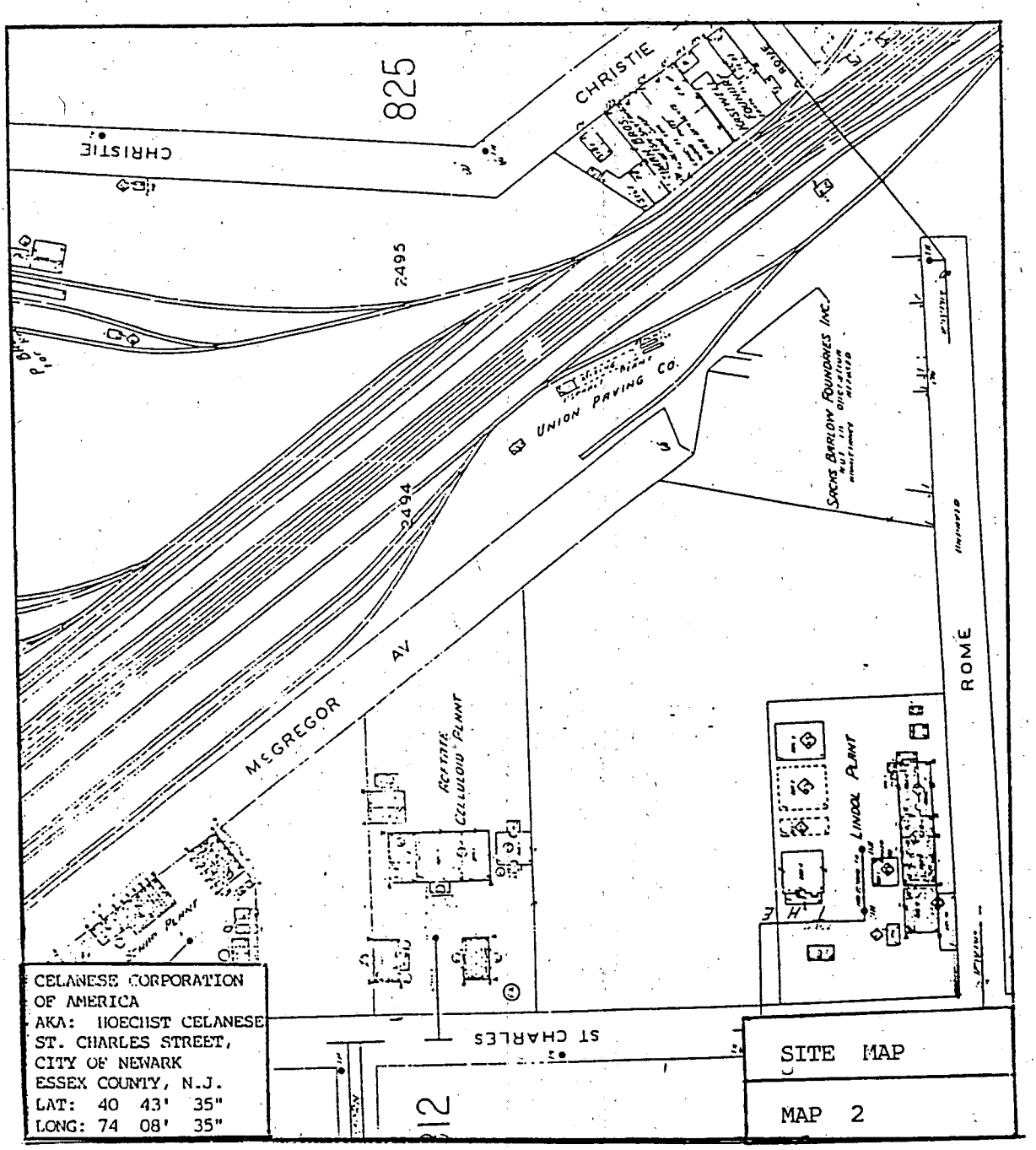
LAT: 40 43' 35"
LONG: 74 08' 35"

USGS TOPO MAP

MAP 1



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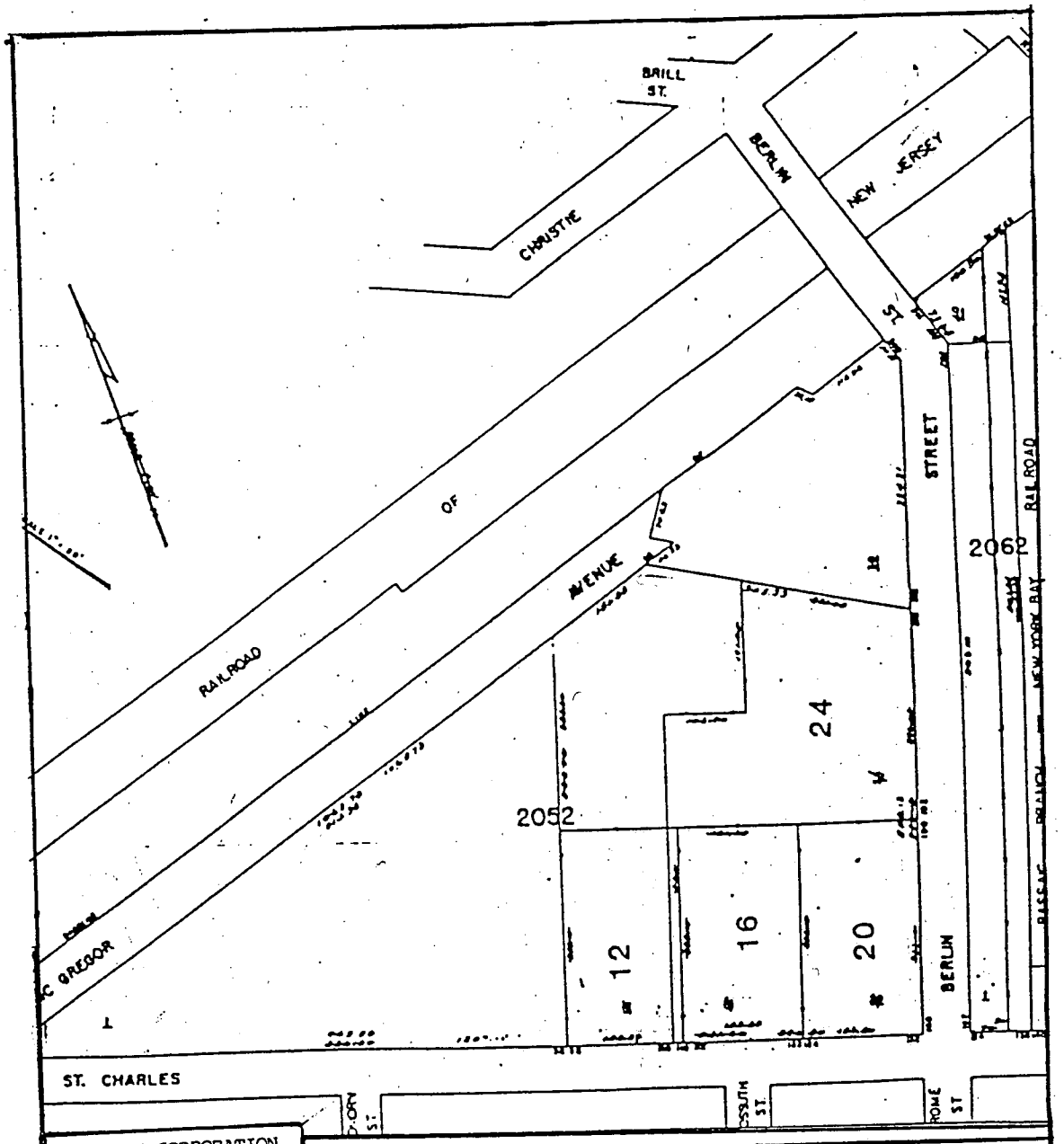
SITE MAP

MAP 2



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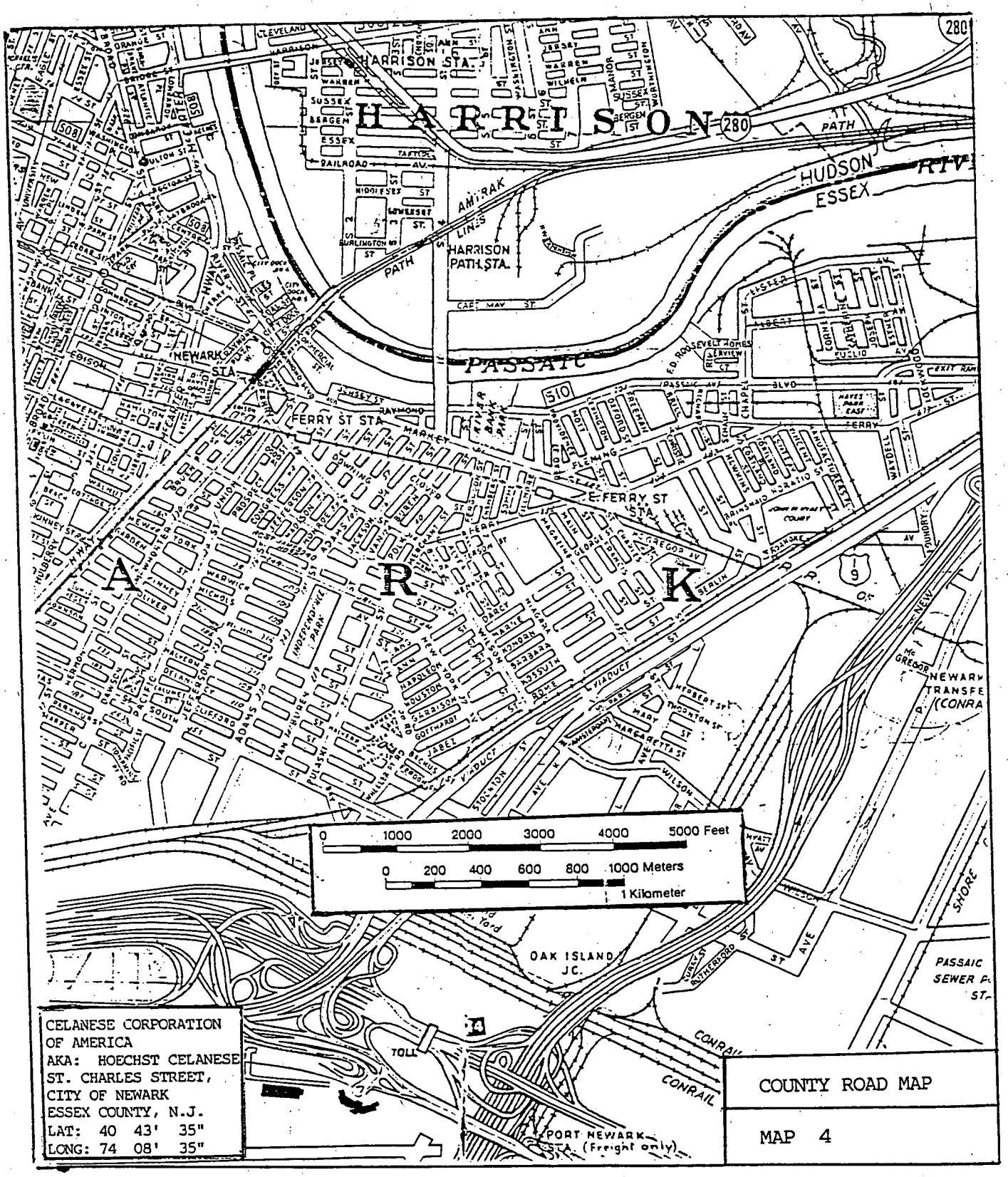
TAX MAP

MAP 3



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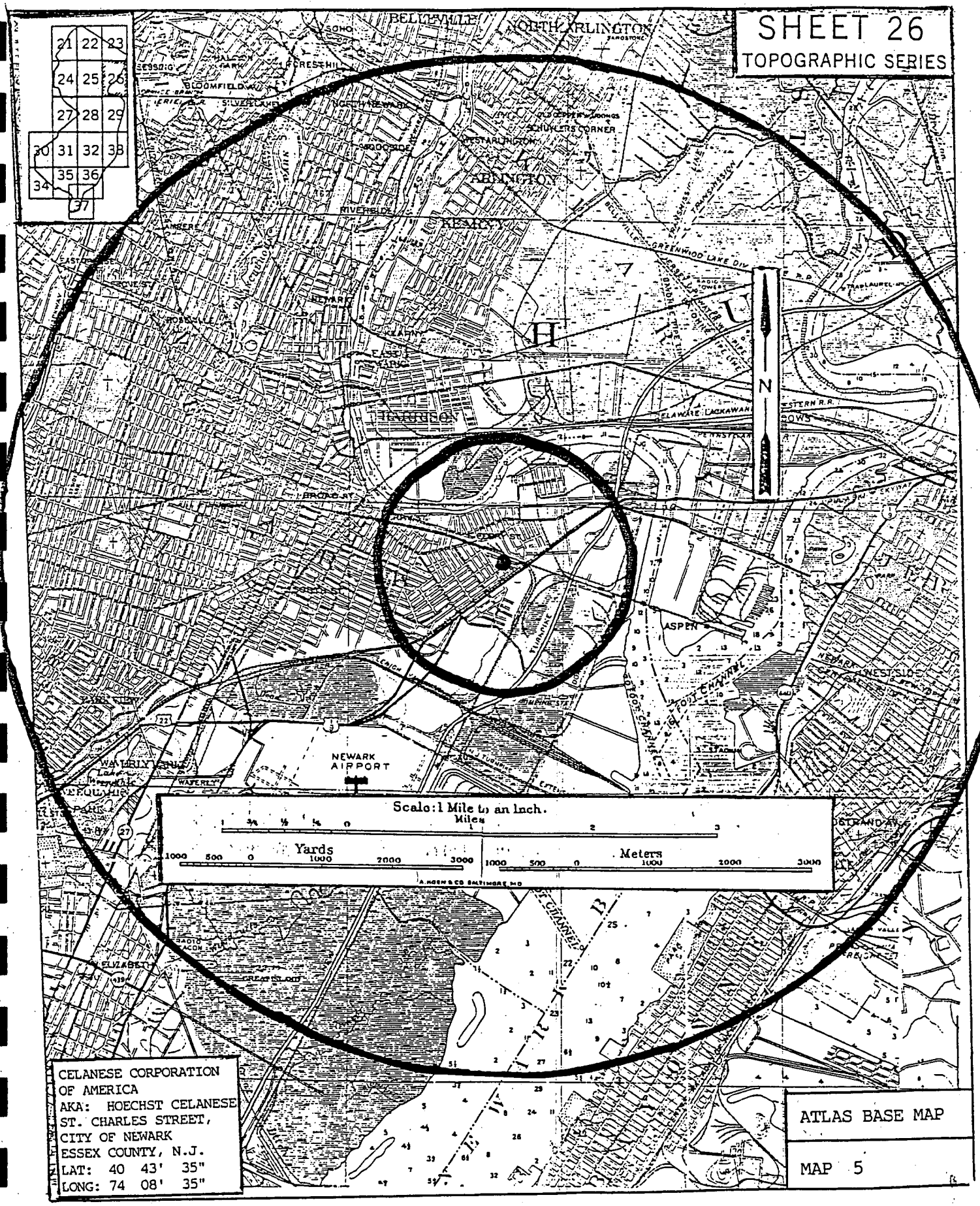
COUNTY ROAD MAP

MAP 4



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ATLAS BASE MAP

MAP 5

LEGEND

TER SUPPLY

- AREA SERVED BY PRIVATE WATER SERVICE COMPANIES
- AREA SERVED BY REGIONALLY OWNED WATER SERVICE COMPANIES
- AREA SERVED BY MUNICIPALLY OWNED WATER SERVICE COMPANIES
- AREA NOT PRESENTLY SERVED BY WATER SERVICE
- PUBLIC SUPPLY WELLS
- WATER MAIN ACROSS HIGHWAY FOR FUTURE USE
- SURFACE WATER INTAKE
- W — MAJOR WATER MAINS

EWAGE, LANDFILL

- AREA SERVED BY PUBLIC SEWAGE SERVICE
- AREA NOT PRESENTLY SERVED BY SEWAGE SERVICE
- SANITARY LANDFILLS
- SEWAGE TREATMENT PLANTS (CAPACITY <0.3mgd)
- SEWAGE TREATMENT PLANTS (CAPACITY ≥0.3mgd)
- S — MAJOR SEWAGE TRANSMISSION LINES

RAINAGE BASIN

- DRAINAGE BASIN BOUNDARY
- RIVER BASIN BOUNDARY
- HUDSON — DRAINAGE BASIN NAME
- STREAMS AND RIVERS
- FLOOD PRONE AREAS

POPULATION

- COUNTY BOUNDARY
- MUNICIPAL BOUNDARY
- ( ) — POPULATION DENSITY IN PERSONS PER SQUARE MILE
- [ ] — AREA IN SQUARE MILES
- % — PERCENT AREA OF MUNICIPALITY ON BLOCK
- MARKET ROADS
- BUILT UP AREAS
- STATE BOUNDARY

△ — INDUSTRIAL WELL YIELD OVER 70 GALLONS PER MINUTE (INCLUDING PRIVATE WELLS)

□ — PUBLIC SUPPLY WELL YIELDING OVER 70 GALLONS PER MINUTE

⊕ — UNSUCCESSFUL ROCK WELL YIELDING LESS THAN 70 GALLONS PER MINUTE

⊙ — UNSUCCESSFUL SAND WELL YIELDING LESS THAN 70 GALLONS PER MINUTE

⊞ — NO TEST — NO DATA ON YIELD

FAULT (DASHED WHERE INFERRED)

CONTACT (DASHED WHERE INFERRED)

PHYSIOGRAPHIC PROVINCE BOUNDARY

WATER SUPPLY TRANSMISSION LINE

NOTE: WHERE THE PRECAMBRIAN FORMATION-BOUNDARIES TERMINATE ABRUPTLY, IT IS THE GEOLOGIST'S OPINION THAT THE GEOLOGICAL COMPLEXITY OF THE AREA PREVENTS FURTHER INTERPRETATIONS.

Kmr — CRETACEOUS MAGOTHY AND RARITAN FORMATIONS (SAND AND CLAY)

$\overline{R}$b — TRIASSIC BRUNSWICK FORMATION

$\overline{R}$c — TRIASSIC CONGLOMERATE BEDS OF THE STOCKTON FORMATION

$\overline{R}$l — TRIASSIC LOCKATONG FORMATION

$\overline{R}$db — TRIASSIC DIABASE

$\overline{R}$bs — TRIASSIC BASALT FLOWS

Sd — SILURIAN DECKER LIMESTONE AND LONGWOOD SHALE FORMATIONS

Sgp — SILURIAN GREEN POND CONGLOMERATE

Omb — ORDOVICIAN MARTINSBURG SHALE

€Ok — CAMBRO ORDOVICIAN KITTATINNY LIMESTONE

€h — CAMBRIAN HARDYSTON SANDSTONE

PRECAMBRIAN:

gh - HORNBLENDE GRANITE WITH PYROXENE GRANITE

ga - ALASKITE

am - AMPHIBOLITE

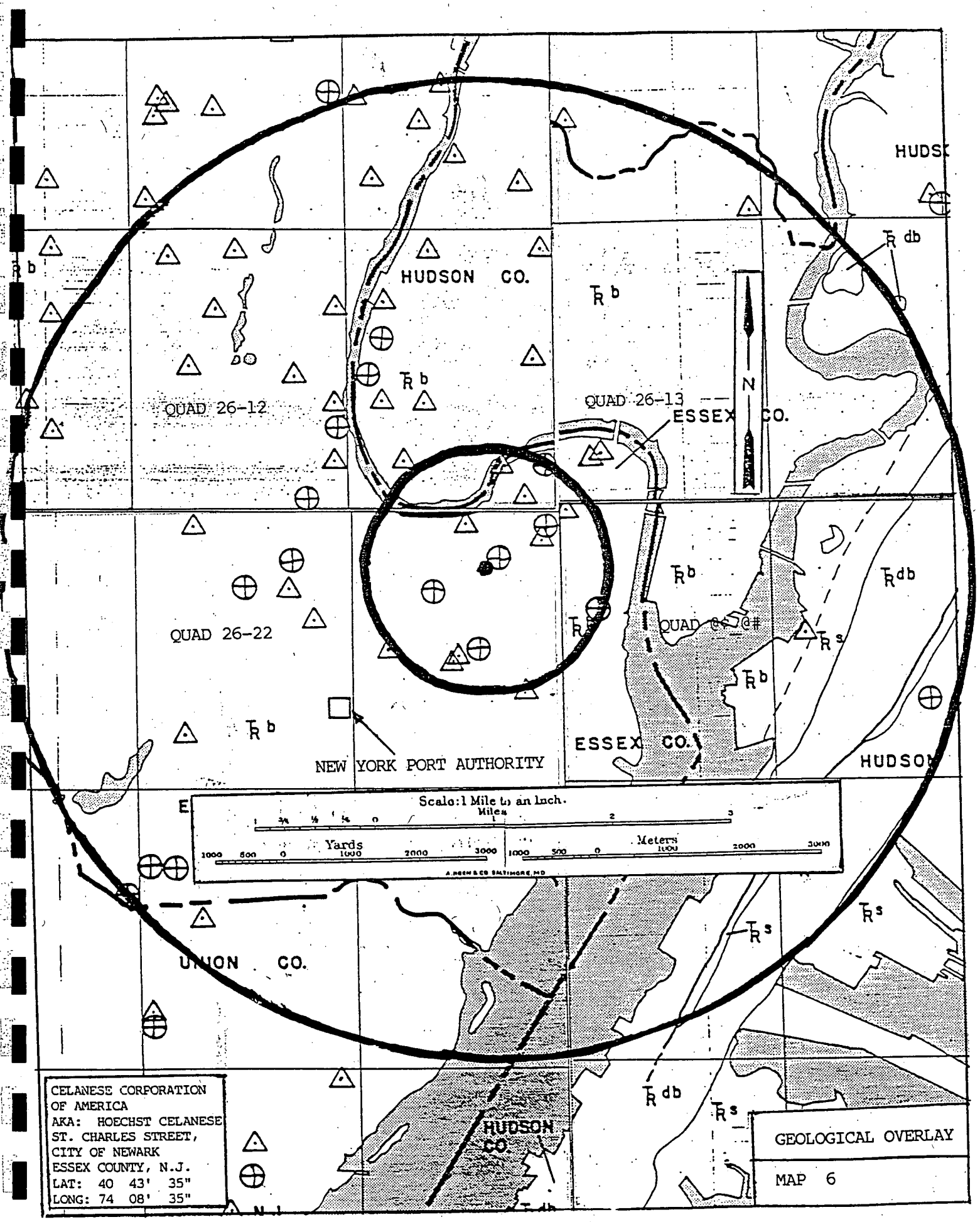
px - PYROXENE GNEISS

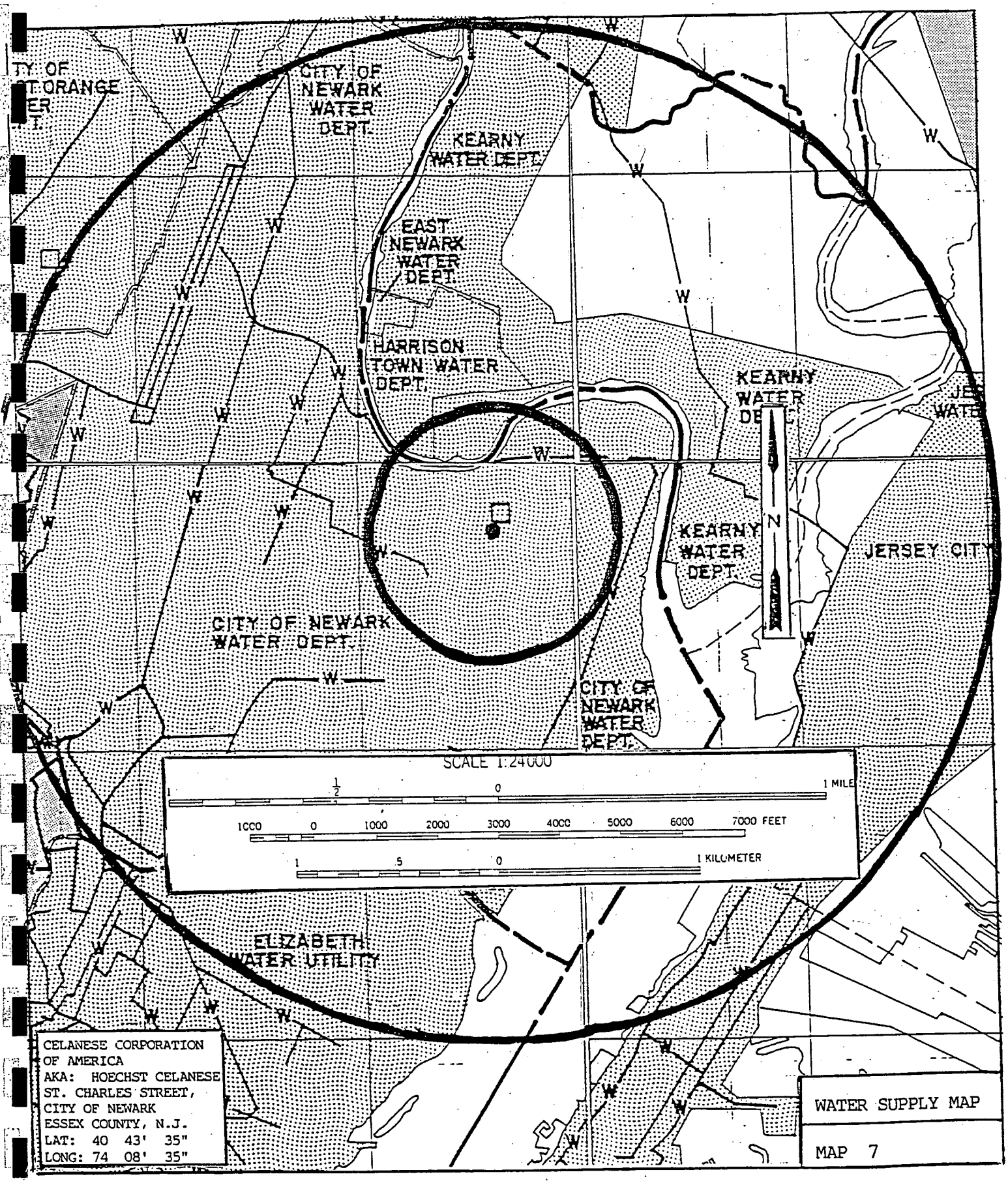
gnq - QUARTZ PLAGIOCLASE GNEISS

gnb - BIOTITE GNEISS

sk - SKARN, GRAPHITE SCHIST

fnd — FORMATION NOT DETERMINED


HUDSON CO.
QUAD 26-12
QUAD 26-13
ESSEX CO.
QUAD 26-22
NEW YORK PORT AUTHORITY
ESSEX CO.
HUDSON
UNION CO.
HUDSON CO.
N
Scale: 1 Mile to an Inch.
Miles
Yards
Meters
CELANESE CORPORATION
OF AMERICA
AKA: HOECHST CELANESE
ST. CHARLES STREET,
CITY OF NEWARK
ESSEX COUNTY, N.J.
LAT: 40 43' 35"
LONG: 74 08' 35"
GEOLOGICAL OVERLAY
MAP 6


CITY OF NEWARK WATER DEPT.
KEARNY WATER DEPT.
EAST NEWARK WATER DEPT.
HARRISON TOWN WATER DEPT.
KEARNY WATER DEPT.
KEARNY WATER DEPT.
JERSEY CITY
CITY OF NEWARK WATER DEPT.
CITY OF NEWARK WATER DEPT.
ELIZABETH WATER UTILITY
N
SCALE 1:24000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER
CELANESE CORPORATION OF AMERICA
AKA: HOECHST CELANESE
ST. CHARLES STREET,
CITY OF NEWARK
ESSEX COUNTY, N.J.
LAT: 40 43' 35"
LONG: 74 08' 35"
WATER SUPPLY MAP
MAP 7

BLOCK #26-12

A. Elizabeth, Orange

B. Arthur Kill-Elizabeth, Rahway; Hackensack-Hackensack; Passaic-Lower Passaic

C. 2.

Map No.	Location	Period of Record
63	Second River at Brighton Ave.,East Orange	7/23/38
64	Second River at Bloomfield Ave., Bloomfield	7/23/38
65	Second River at Belleville	1937-1961
66	Second River at Newark Pipe, Belleville	7/23/38
67	Elizabeth River at Irvington	1931-1938
3. 262	Passaic River at Harrison	1967-1971

Water Quality Standards: (explained in Atlas Sheet description)
FW3, TW2 except where classified TW3

D. Brunswick Formation (Trb), Basalt Flows (Trbs)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Red Sandstone Plain, Watchung Ridges
Elevations (ft.above sea level): ridges 650, valleys 0
Relief (ft.): 650

2. a. Normal Year: 45"
Dry Year: 37"
Wet Year: 55"

b. January: 31°F
July: 74°F

c. 243 days. Last killing frost: 4/15; first killing frost: 10/20

F. Bergen County:
Riverside County Park and Hackensack River Area
Essex County:
Eagle Rock Reservation
Branch Brook Park

H. Montclair Railroad Terminal, Montclair
Israel Crane House, Montclair
Sydenham House, Newark
Kruegar Mansion, Newark
Penn Station, Newark
First Baptist Peddie Memorial Church, Newark
Saint James A.M.E., Newark
Saint Stephan's Church, Newark
Saint James's Church, Newark
Saint Mary's Church, Newark
Saint Barnabas, Newark
Saint Columba's Church, Newark
Saint John's Church, Newark
Saint Patricks Procathedral, Newark
Queen of Angels Church, Newark

H. (contd.)

Cathedral Evangelica Reformada, Newark
New Point Baptist Church, Newark
South Park Presbyterian Church, Newark
Pan American C.M.A. Church, Newark
First United Methodist Church, Newark
House of Prayer Episcopal Church and Rectory, Newark
Grace Church, Newark
North Reformed Church, Newark
The Old First Presbyterian Church, Newark
Trinity Episcopal Church, Newark

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
26-12-157	Hahne & Co.			505	240	Trb
26-12-164	Quadrel, Michael	1955	18	151	75	"
26-12-194	Town of Montclair	1966	21/41	300	950	"
26-12-194	Montclair Water Bureau	1966	16/36	300	470	"
26-12-218	Glen Ridge Country Club	1967	40	300	200	"
26-12-222	Bloomfield Savings Bank	1956		145	100	"
26-12-313	Hoffman-LaRoche			902	128	"
26-12-327	Food Fair Stores, Inc.			209	70	"
26-12-334	Kingsland's Paper Mills			400	125	"
26-12-335	Wiggins Plastics, Inc.	1963	24'-3/12"	378	180	"
26-12-338	Federal Telecommunications Lab	1958	39'6"	500	114	"
26-12-386	Liquid Carbonic Corp.			518	100	"
26-12-389	National Yeast Corp.			512	126	Trbs
26-12-394	Federal Leather Co.			802	60	Trb
26-12-417	Schering Corp.			478	127	"
26-12-423	Kidde W. & Co.			400	400	"
26-12-448	Orange Dairy Co.			250	75	"
26-12-449	City of Orange	1970	61'5"	500	524	"
26-12-478	"	1971	56	506	500	"
26-12-486	Colonial Life Ins. Co.			357	323	"
26-12-513	Leonora Corp.	1957	33	200	70	"
26-12-526	Eastern Tool & Mfg.Co.			550	126	"
26-12-537	National Grain & Yeast Corp.			457	125	"
26-12-545	MGM Records (Div.of Loews)	1959	23	211	115	"
26-12-545	"	1960	36	579	120	"
26-12-547	"			400	275	"
26-12-557	Warner Mfg. Co.			395	220	"
26-12-566	Tiffany & Co.			800	50	"
26-12-577	Bloomfield Moulding Co.	1968	18	350	200	"
26-12-622	Mansol Ceramics Co.			250	100	"
26-12-644	Droll Molding Co., Inc.	1962	50	300	80	"
△ 26-12-655	Summit Chemical Prod.Corp.			414	150	"
△ 26-12-657	Crowhurst, A.J. & Sons			83	325	Q
△ 26-12-675	Aluminum Finishing Co.			150	100	Trb
△ 26-12-682	North Newark Ice Co.			250	123	"
△ 26-12-695	V.H. Swenson Co.	1962	49	40	170	"

26-12-723	Mountain Ice Co.			634	300	Trb
26-12-729	Vinton Apartments Inc.	1955	52	255	160	"
26-12-747	Columbia Theaters, Inc.	1953	26	312	140	"
26-12-751	Woolworth & Co.	1965	76'10"	300	80	"
26-12-758	Food Fair Stores	1956	73	214	180	"
△ 26-12-783	Pabst Brewing Co.			535	300	"
△ 26-12-812	Ward Baking Co.			200	111	"
△ 26-12-822	Crabb, W. & Co.			600	300	"
△ 26-12-827	Trent Hat Corp.			200	150	"
△ 26-12-839	Reid Ice Cream Co.			600	100	"
△ 26-12-846	Fagin Brothers Coal Yard			150	100	"
△ 26-12-864	Barton Realty Co., Inc.	1965		385	100	"
△ 26-12-869	Alderney Dairy Co.			450	113	"
⊕ 26-12-893	Ballantine & Son Ale			1200	0	"
△ 26-12-896	Mutual Benefit Life Ins.Co.	1965	44'8"	312	219	"
△ 26-12-898	Prudential Life Ins. Co.			1225	15	"
△ 26-12-918	Abbey Record Co.	1962	24	697	135	"
△ 26-12-921	Two Guys from Harrison	1959	99	405	628	"
△ 26-12-933	DuPont			202	148	"
⊕ 26-12-942	N.J. Rolling Mills	1963	99	400	20	"
⊕ 26-12-944	Harrison Supply Co.	1966	88	174	50	"
26-12-948	Mountain Ice & Fuel Co.			350	122	"
△ 26-12-957	Doelger Brewery			400	175	"
△ 26-12-966	Verzelano, N.	1959	146	235	150	"
△ 26-12-976	Driver-Harris Co.	1946	241	337	600	Q
26-12-994	Acme Refining Co.	1960	144	500	150	Trb
⊕ 26-12-996	Lister Brothers			1200	0	"
△ 26-12-998	Stanley Tools			637	125	"

J. Geodetic Control Survey monuments described
Index Maps 21,26; adjacent Index Maps 20,25

BLOCK #26-13

8/76

A. Jersey City, Orange, Weehawken

B. Hudson-Hudson; Hackensack-Hackensack; Passaic-Lower Passaic

C. 3.

Map No.	Location	Period of Record
242	Berry's Creek at Moonachie, Moonachie Ave.	1964-
263	Hackensack River at Harrison, Belleville Tpk.	1967-

Water Quality Standards: (explained in Atlas Sheet description)
TW2 except where classified TW3

D. Brunswick Formation (Trb), Stockton Formation (Trs), Diabase (Trdb), Manhattan Schist (Oms)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Red Sandstone Plain, Palisades Ridge, Hackensack Meadows
Elevations (ft.above sea level): ridges 250, valleys 0
Relief (ft.): 250

2. a. Normal Year: 43"
Dry Year: 36"
Wet Year: 53"

b. January: 32°F
July: 74°F

c. 245 days. Last killing frost: 4/10; first killing frost: 10/20

F. Bergen County:
Riverside County Park and Hackensack River Area

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
26-13-157	Pennick, S.B. Co.	1966	42	352	180/200	Trb
26-13-177	Breyer Ice Cream Co.			702	200	"
26-13-195	Omni Chemical Corp.	1968	39	300	157	"
26-13-195	Sika Chemical Corp.	1966	25	302	220	"
26-13-214	Trubeck Laboratories	1956	191	201	105	Q
26-13-215	Beckton & Dickinson	1966	118	363	251	Trb
26-13-216	Marijon Piece Dye Co.	1965	45	285	135	"
26-13-226	Hackensack Water Co.	1954	92'11"	103	No test	Q
26-13-234	U.S. Printing Ink Co.	1965	70	220	60	Trb
26-13-268	Top Notch Plating Co.	1965	21	300	190	"
26-13-298	Alpha Refining Co.			400	115	"
26-13-415	Minit-Man Auto Car Wash	1957	39	180	90	"
△ 26-13-447	Food Fair Stores, Inc.	1956	30	320	82	"
~~△ 26-13-499~~	~~Pfaff Tool & Mfg. Co.~~	~~1963~~	~~66.5~~	~~740~~	~~145~~	~~"~~

26-13-598	Erie Railroad			184	200	Trs
26-13-598	"			182	4	Trb
26-13-615	Keystone Metal Finishers	1968	20	200	312	"
26-13-642	"	1950	18	200	76	"
26-13-655/6	"	1960	21	150	150	Trs
26-13-668	Kiesewetter			380	0	Trdb-Trs
26-13-695	North Bergen Realty Co.			72	90	Q
△26-13-775	Fairmount Chemical Co.	1965	114	300	300	Trb
△26-13-775	United Shellac Co.			475	200	"
26-13-921	Miller & Co.			135	925	Q
26-13-924	DeAngelis Packing Co.	1948		45	0	"
26-13-983	Mehl, John & Co.	1913		1020	150	Trdb
26-13-983	"	1923		1050	40	"
26-13-984	Mountain Ice Co.			950	0	Trdb-PG
26-13-987	Steel Laundry Co.			1028	130	" "
26-13-994	General Refrigerator			1350	0	Trs-PG
26-13-995	Columbia Amusement Park			200	100	Trs

J. Geodetic Control Survey monuments described
Index Maps 21,26; adjacent Index Map 16

BLOCK #26-22

A. Elizabeth

B. Arthur Kill-Elizabeth, Elizabeth Channel, Morses Creek; Passaic-Lower Passaic

C. 1. Newark WSO AP - Detailed meteorologic data

2.

Map No.	Location	Period of Record
67	Elizabeth River at Irvington	1931-1938
68	Elizabeth River at Nye Ave., Irvington	7/23/38
72	Elizabeth River at Elizabeth	1921-

3.

262	Passaic River at Harrison	1967-1971
272	Elizabeth River at Morris Ave., Elizabeth	1964-

Water Quality Standards: (explained in Atlas Sheet description)
FW3, TW2 except where classified TW3

D. Brunswick Formation (Trb), Stockton Formation (Trs), Diabase (Trdb)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Wisconsin Terminal Moraine, Red Sandstone Plain, Hackensack Meadows, Newark Bay, Palisades Ridge
Elevations (ft.above sea level): ridges 300, valleys 0
Relief (ft.): 200

2. a. Normal Year: 44"
Dry Year: 36"
Wet Year: 53"

b. January: 32°F
July: 74°F

c. 243 days. Last killing frost: 4/15; first killing frost 10/20

F. Essex County:
Weequahic Park
Union County:
Elizabeth River Park
Warinanco Park

H. Boxwood Hall/Boudinot Mansion, Elizabeth (State Owened)

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
26-22-143	Irvington Smelting & Ref.Wks.	1953	71	209	192	Trb
26-22-143	"	1953	62'4"	304	300	"
26-22-145	Associated Mech.Devices	1960	83	250	80	"
26-22-149	Gallo Asphalt Co.	1961	107	201	200	"
△26-22-213	Krueger Brewing Co.			656	435	"
⊕26-22-228	Smith & Smith Funeral Parlor			776	25	"
⊕26-22-234	U.S. Navy			565	39	"
△26-22-237	Conmar Corp.			300	450	"
△26-22-262	National Lock Washer Co.			800	100	"
△26-22-275	Linde Air Products Co.	1954	44'5"	500	124	"
□26-22-293	New York Port Authority	1968	60	370	260	"
△26-22-322	Standard Bitulithic Co.	1964	89'11"	406	360	"
⊕26-22-327	Pfeiffer, H.			505	12	"
⊕△26-22-333	Arkansas Co., Inc.	1965	72'9"	400	65	"
△26-22-333	Ronson Metals Corp.	1965	80	300	220	"
⊕26-22-334	Wilson, H.A. Co.			778	8	"
△26-22-345	Chem-Fleur	1965	97	306	200	"
△26-22-355	Englehard Ind., Inc.	1966	54/79'8"	428	167	"
△26-22-355	"	1965	80'7"	400	401	"
⊕26-22-356	"	1966	78.5/92	495	4	"
△26-22-368	Rutherford & Delaney Hldg.Co.	1956	42	220	100	"
26-22-411	Bristol Meyers	1967	49	500	159	"
26-22-418	Dillon-Beck Mfg. Co.			379	100	"
26-22-449	Elizabethtown Water Co.			400	550	"
⊕26-22-463	Orbis Products Corp.	1958	157	350	12	"
⊕26-22-517	Pennick, S.B. Co.	1961	64'10"	585	24	"
⊕26-22-518	Pure Carbonic			600	30	"
△26-22-546	Black Diamond Grit Co.	1960	92	265	150	"
△26-22-574	Londat Aetz Fabric Co.	1965	50	600	30	"
⊕26-22-574	Elizabeth Abbatoir			641	75	"
26-22-744	Morey LaRue Laundry			700	15	"
26-22-745	"			600	14	"
26-22-785	Stevenson Car Co.			300	95	"
26-22-786	Feldman Brothers			805	54	"
26-22-795	Reichold Chemical Co.	1967	39'6"	400	415	"
26-22-828	Singer Mfg. Co.			1200	90	"
26-22-833	General Chemical Co.	1965	106	500	70	"
26-22-842	Clauss Bottling Works			500	50	"
26-22-847	Elizabethtown Gas & Light			300	0	"
26-22-852	Riker Motor Co.			500	0	"
26-22-854	Thomas & Betts Co., Inc.			500	264	"

J. Geodetic Control Survey monuments described
Index Map 26; adjacent Index Map 31

BLOCK #26-23,24 8/76

A. Elizabeth, Jersey City

B. Arthur Kill-Elizabeth Channel, Passaic-Upper Passaic

C. 1. Jersey City - Non-recording temperature and precipitation gauges

Water Quality Standards: (explained in Atlas Sheet description)
TW2 except where classified TW3

D. Brunswick Formation (Trb), Stockton Formation (Trs), Diabase (Trdb), Manhattan Schist (Oms), serpentine (sp)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Red Sandstone Plain, Palisades Ridge, Hackensack Meadows, Newark Bay, New York Bay
Relief: 10'

2. a. Normal Year: 43"
Dry Year: 35"
Wet Year: 49"
b. January: 32°F
July: 74°F
c. 245 days. Last killing frost: 4/10; first killing frost: 10/20

F. Hudson County:
Lincoln Park
Div. of Parks and Forestry:
Liberty State Park
Little Basin Area

G. U.S. National Park Service:
Statue of Liberty National Monument (Ellis Island)
U.S. Army:
Military Ocean Terminal

H. Statue of Liberty National Monument
Hudson County Courthouse, Jersey City

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
26-23-111	Pfaff & Kendall	1965	81.5	200	100	Trb
⊕26-23-142	Lincoln Farm Prod.Co.			109	25	Trbs
△26-23-245	Spalding & Jennings			422	75	Trb-PG
⊕26-23-291	Berkeley Industries	1956	115/140	335	60	Trbd
26-23-293/6	Snead & Co.			300	60	Q
26-23-333	Erie Railroad			197	157	Oms
26-23-334	Lembeck & Betz's Brewery			1000	33	Trs
26-23-344	Burnett Ave. (228) Co.			438	55	"
26-23-763	Esso Standard Oil Co.	1959	114/252	505	3	"

J. Geodetic Control Survey monuments described
Index Map 26; adjacent Index Maps 31,21,16

SUBJECT TO REVISION

WATER WITHDRAWAL POINTS AND NJGS CASE INDEX SITES WITHIN 5.0 MILES OF:

LATITUDE 404335
LONGITUDE 740835

DRAFT

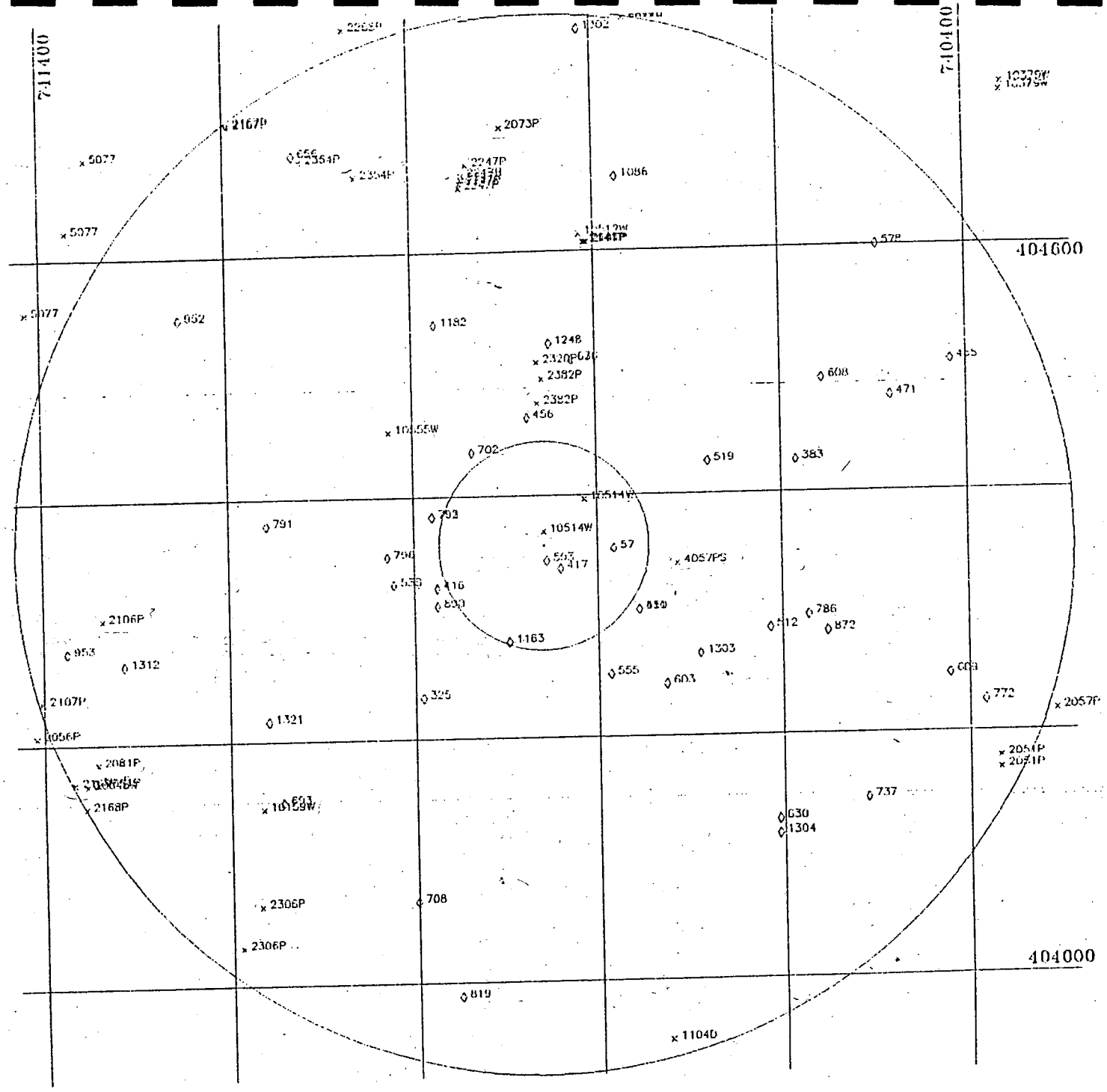
SCALE: 1:63,360
(1 Inch = 1 Mile)

× WATER WITHDRAWAL POINTS
0 NJGS CASE INDEX SITES
1 MILE AND 5 MILE RADII INDICATED

NJGS CASE INDEX DATA RETRIEVED FROM:
NEW JERSEY GEOLOGICAL SURVEY
ON 12/22/87

PLOT PRODUCED BY:
NJDEP
DIVISION OF WATER RESOURCES
BUREAU OF WATER ALLOCATION
CN-029
TRENTON, NJ 08625

DATE: 04/24/91



SUBJECT TO REVISION

Page 1 of NJDEP CASE INFO - SITES WITHIN 5.0 MILES OF 404335 LAT, 740842 LON AS OF 10/13/87 (IN ORDER BY DECREASING LONGITUDE) - 6/24/91

SITENUM	NAME	LAT	LON	DISTANCE	DIRECT	PRIORITY	PROGRESS	STATUS1	STATUS2
953	COX RESIDENCE, MONTCLAIR, ESSEX CO.	404345	741345	4.8	0	0140	3070	1	A
1083	APCO ENGINEERING, HILLSIDE, UNION CO.	404141	741326	4.8	53	0000	0	1	B
1012	KUMER CHEMICAL, LAVALLETTE, ESSEX CO.	404335	741302	4.1	00	0140	3070	1	A
922	ORANGE WATER DEPT., ORANGE, ESSEX CO.	404520	741230	4.1	00	0130	3070	1	A
791	GENERAL ELECTRIC CO-EWAR, LAMP PLANT	404347	741132	2.6	00	0103	3070	1	B
1208	J.F.HENRY CHEMICAL CO., NEWARK, ESSEX CO.	404210	741135	3.1	63	0110	3070	1	A
543	J.T. BAKER, PHILLIPSBURG, WARREN CO.	404129	741136	3.5	00	130	3010	1	C
656	COOPER INC (FORMLMORAN EDISON), BELLEVILLE, ESSEX CO.	404648	741115	4.4	00	3070	130	1	B
791	J & R METALLIZING CO., INC., NEWARK, ESSEX CO.	404330	741017	1.5	00	0110	3070	1	
539	J.L. ARMITAGE + CO., NEWARK, ESSEX CO.	404316	741013	1.5	0	130	3070	1	
708	KARKOWSKI RD. LANDFILL, ELIZABETH, UNION CO.	404040	741000	3.6	50	100	3070	0	
325	FRONTAGE ROAD DRUM DUMP, NEWARK, ESSEX CO.	404220	740955	1.9	1	0130	0	1	B
792	GEORGIA-PACIFIC CORP--COATING OPER, NEWARK, ESSEX CO.	404350	740946	1.1	00	0110	3070	1	B
793	GEORGIA-PACIFIC CORP--POLYMER MATE, NEWARK, ESSEX CO.	404350	740949	1.1	00	0110	3070	1	B
416	ALBERT STEEL DRUM/ PRENTISS DRUG, NEWARK, ESSEX CO. (DIOXIN)	404314	740945	1.1	72	103	130	1	E
894	CHEM-FLEUR, NEWARK, ESSEX CO.	404308	740945	1.2	00	0110	.	1	B
1102	FRANKLIN PLASTICS, KEARNY, HUDSON CO.	404325	740945	2.3	34	0100	3070	1	B
819	NUTEX, INC - ELIZABETH PLANT, UNION CO.	403953	740932	4.3	00	0103	0100	1	B
702	HARRISON COAL GAS SITE, HUDSON CO.	404432	740921	1.1	70	0110	3070	1	C
1157	OAK ISLAND-CONRAIL TERMINAL, NEWARK, ESSEX CO.	404247	740838	1.0	32			3	
466	CONRAIL-HEADLUS YARD, KEARNY, HUDSON CO.	404439	740845	1.3	52	101	130	1	
593	PRESERVED METALS, NEWARK, ESSEX CO.	404327	740833	0.2	0	130	3070	9	
1245	GUTGNON & GREEN, KEARNY, HUDSON CO.	404315	740830	1.9	53	0130	0101	1	C
417	TROY CHEM., NEWARK, ESSEX CO.	404333	740824	0.3	38	130	3070	1	
533	SH-LISTER AVENUE, NEWARK, (DIOXIN CASE), ESSEX CO.	404307	740815	1.5	72	103	0130	1	G
574	120 LISTER AVE (DIOXIN), NEWARK, ESSEX CO.	404307	740815	1.9	72	0103	0130	1	A
1302	RESEARCH CHEMICAL/INTERNATIONAL CHEM CORP,BELLEVILLE, ESSEX CO.	404747	740808	4.8	00	0130	3070	1	E
555	CENTRAL STEEL DRUM, NEWARK, ESSEX CO.	404330	740752	1.4	1	130	3070	0	
57	ASHLAND CHEM., NEWARK, ESSEX CO.	404333	740749	0.7	53	130	3070	1	
1121	G M 2 CONCRETE, NORTH ARLINGTON, BERGEN CO.	404635	740745	3.5	53	0103	0	1	B
410	INLAND CHEM., NEWARK, ESSEX CO.	404302	740733	1.1	00	3070	0	9	
521	SUMMIT INC., NEWARK, ESSEX CO.	404302	740733	1.1	63	130	3070	9	
603	TEXACO TERMINAL, NEWARK, ESSEX CO.	404325	740716	1.9	53	130	3070	9	
1330	DRAWERS POINT, JERSEY CITY, HUDSON CO.	404240	740654	1.9	39	0101	0130	1	A
519	SYNCON PERING, KEARNY, HUDSON CO.	404416	740648	1.7	00	100	3070	1	B
512	ROOSEVELT DRIVE-IN (DAVLIN/GRACE), JERSEY CITY, HUDSON CO.	404252	740608	2.3	39	103	101	5	E
630	MOBAY CHEMICAL CORP., BAYONNE CITY, HUDSON CO.	404117	740603	3.4	00	103	0	9	
1304	ROUTE 185, JERSEY CITY, HUDSON CO.	404110	740603	3.6	39	0130	0101	1	B
383	PSEG, KEARNY, HUDSON CO.	404416	740550	2.5	38	130	3070	0	
786	ENGLER INSTRUMENTS, JERSEY CITY, HUDSON CO.	404258	740543	2.6	35	0103	3050	1	B
608	STANDARD CHLORINE, KEARNY, HUDSON CO.	404456	740533	3.1	39	103	101	0	
872	TEXTILE PROOFERS, JERSEY CITY, HUDSON CO.	404250	740531	2.8	63	0103	3050	1	B
737	PJP LANDFILL, JERSEY CITY, HUDSON CO.	404127	740506	3.9	58	103	101	9	
579	CONRAIL SECAUCUS, HUDSON CO.	404500	740457	4.2	1	103	102	1	
471	KOPPERS, KEARNY, HUDSON CO.	404447	740449	3.6	1	103	130	9	
609	GARFIELD AVE., 880, JERSEY CITY, HUDSON CO.	404228	740413	4.0	39	103	102	1	
455	DIAMOND SHAMROCK, S. KEARNY, HUDSON CO.	404504	740410	4.2	35	103	101	1	
772	COLUMBIA PAINT, INC., JERSEY CITY, HUDSON CO.	404215	740350	4.4	00	0103	0110	1	B

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SITENUM	NAME	LAT	LON	DISTANCE	CONTAM	FMCODE1	FMCODE2	STATUS1	STATUS2
57	ASHLAND CHEM., NEWARK, ESSEX CO.	404333	740749	0.7	53	130	3070	1	
325	FRONTAGE ROAD DRUM DUMP, NEWARK, ESSEX CO.	404220	740655	1.9	1	0130	0	1	B
383	PSE&G, KEARNY, HUDSON CO.	404416	740550	2.5	39	130	3070	0	
410	INLAND CHEM., NEWARK, ESSEX CO.	404302	740733	1.1	00	3070	0	9	
416	ALBERT STEEL DRUM/ PRENTISS DRUG, NEWARK, ESSEX CO. (DIOXIN)	404314	740945	1.1	72	103	130	1	E
417	TROY CHEM., NEWARK, ESSEX CO.	404323	740824	0.3	32	130	3070	1	
455	DIAMOND SHAMROCK, S. KEARNY, HUDSON CO.	404504	740410	4.2	35	103	101	1	
456	CONRAIL-HEADONS YARD, KEARNY, HUDSON CO.	404439	740845	1.2	52	101	130	1	
471	KOPPERS, KEARNY, HUDSON CO.	404447	740449	3.6	1	103	130	9	
512	ROOSEVELT DRIVE-IN (DAYLIN/GRACE), JERSEY CITY, HUDSON CO.	404252	740606	2.3	39	103	101	5	B
519	DYNON RESINS, KEARNY, HUDSON CO.	404416	740648	1.7	00	100	3070	1	G
533	J.L. ARMITAGE + CO., NEWARK, ESSEX CO.	404316	741013	1.5	0	130	3070	1	
551	SUNMARK IND., NEWARK, ESSEX CO.	404302	740733	1.1	63	130	3070	9	
555	CENTRAL STEEL DRUM, NEWARK, ESSEX CO.	404230	740752	1.4	1	130	3070	0	
579	CONRAIL SECAUCUS, HUDSON CO.	404600	740457	1.2	1	103	102	1	
593	FEDERATED METALS, NEWARK, ESSEX CO.	404327	740833	0.2	0	130	3070	9	
603	TEXACO TERMINAL, NEWARK, ESSEX CO.	404235	740716	1.8	53	130	3070	9	
608	STANDARD CHLORINE, KEARNY, HUDSON CO.	404456	740533	3.1	39	103	101	0	
609	GARFIELD AVE., 880, JERSEY CITY, HUDSON CO.	404228	740413	4.0	39	103	102	1	
630	NEWAY CHEMICAL CORP., BAYONNE CITY, HUDSON CO.	404117	740603	3.4	00	103	0	9	
635	90-LISTER AVENUE, NEWARK, (DIOXIN CASE), ESSEX CO.	404507	740815	1.9	72	103	0130	1	G
656	COOPER IND (FORM.MCGRAW EDISON), BELLEVILLE, ESSEX CO.	404648	741115	4.4	00	3070	130	1	C
676	120 LISTER AVE (DIOXIN), NEWARK, ESSEX CO.	404507	740815	1.9	72	0103	0130	1	G
693	J.T. BAKER, PHILLIPSBURG, WARREN CO.	404129	741125	3.5	00	130	8010	1	A
702	HARRISON COAL GAS SITE, HUDSON CO.	404432	740921	1.1	70	0110	3070	1	C
706	KARKOWSKI RD. LANDFILL, ELIZABETH, UNION CO.	404040	741000	3.6	50	100	3070	0	
737	PIP LANDFILL, JERSEY CITY, HUDSON CO.	404127	740606	3.9	53	103	101	9	
772	COLUMBIA PAINT, INC., JERSEY CITY, HUDSON CO.	404215	740550	4.4	00	0103	0110	1	B
786	EHELER INSTRUMENTS, JERSEY CITY, HUDSON CO.	404258	740543	2.6	35	0103	3050	1	B
791	GENERAL ELECTRIC CO-NEWARK LAMP PLANT	404347	741135	2.6	00	0103	3070	1	B
792	GEORGIA-PACIFIC CORP--CASTING OPER, NEWARK, ESSEX CO.	404350	740948	1.1	00	0110	3070	1	B
793	GEORGIA-PACIFIC CORP--POLYMER MFTE, NEWARK, ESSEX CO.	404350	740948	1.1	00	0110	3070	1	B
796	J & R METALLIZING CO, INC., NEWARK, ESSEX CO.	404330	741017	1.5	00	0110	3070	1	B
819	NOUDEX, INC - ELIZABETH PLANT, UNION CO.	404553	740932	4.3	00	0103	0100	1	B
872	TEXTILE PROCESSORS, JERSEY CITY, HUDSON CO.	404250	740531	2.9	63	0103	3050	1	B
890	CHEM-FLEUR, NEWARK, ESSEX CO.	404305	740945	1.2	00	0110		1	B
952	ORANGE WATER DEPT., ORANGE, ESSEX CO.	404530	741230	4.1	00	0130	3070	1	C
953	COX RESIDENCE, MONTCLAIR, ESSEX CO.	404245	741345	4.6	0	0140	3070	1	C
1026	G M Z CONCRETE, NORTH ARLINGTON, BERGEN CO.	404635	740745	3.5	53	0103	0	1	B
1095	ARROW ENGINEERING, HILLSIDE, UNION CO.	404141	741328	4.8	53	0000	0	1	B
1163	OAK ISLAND-CONRAIL TERMINAL, NEWARK, ESSEX CO.	404247	740658	1.0	52			3	
1182	FRANKLIN PLASTICS, KEARNY, HUDSON CO.	404525	740945	2.3	34	0100	3070	1	B
1248	GUIGNON & GREEN, KEARNY, HUDSON CO.	404515	740830	1.9	53	0130	0101	1	C
1302	RESEARCH ORGANIC/INORGANIC CHEM CORP, BELLEVILLE, ESSEX CO.	404747	740808	4.8	00	0130	3070	1	E
1303	DROYERS POINT, JERSEY CITY, HUDSON CO.	404240	740554	1.8	39	0101	0130	1	A
1304	ROUTE 185, JERSEY CITY, HUDSON CO.	404110	740603	3.6	39	0130	0101	1	B
1312	RUBER CHEMICAL, IRVINGTON, ESSEX CO.	404238	741308	4.1	00	0140	3070	1	C
1321	J.F.HENRY CHEMICAL CO., NEWARK, ESSEX CO.	404210	741125	3.1	63	0110	3070	1	B

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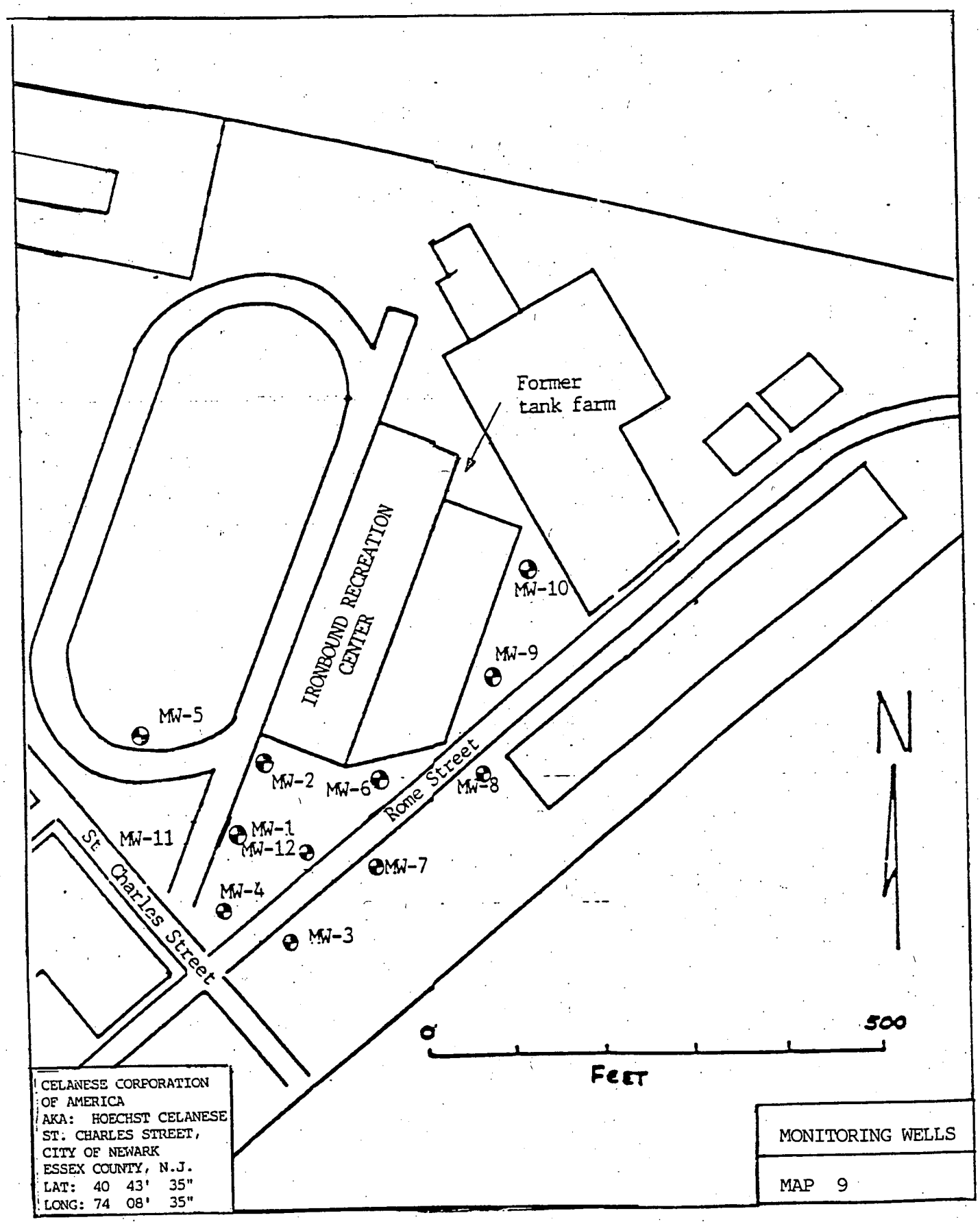
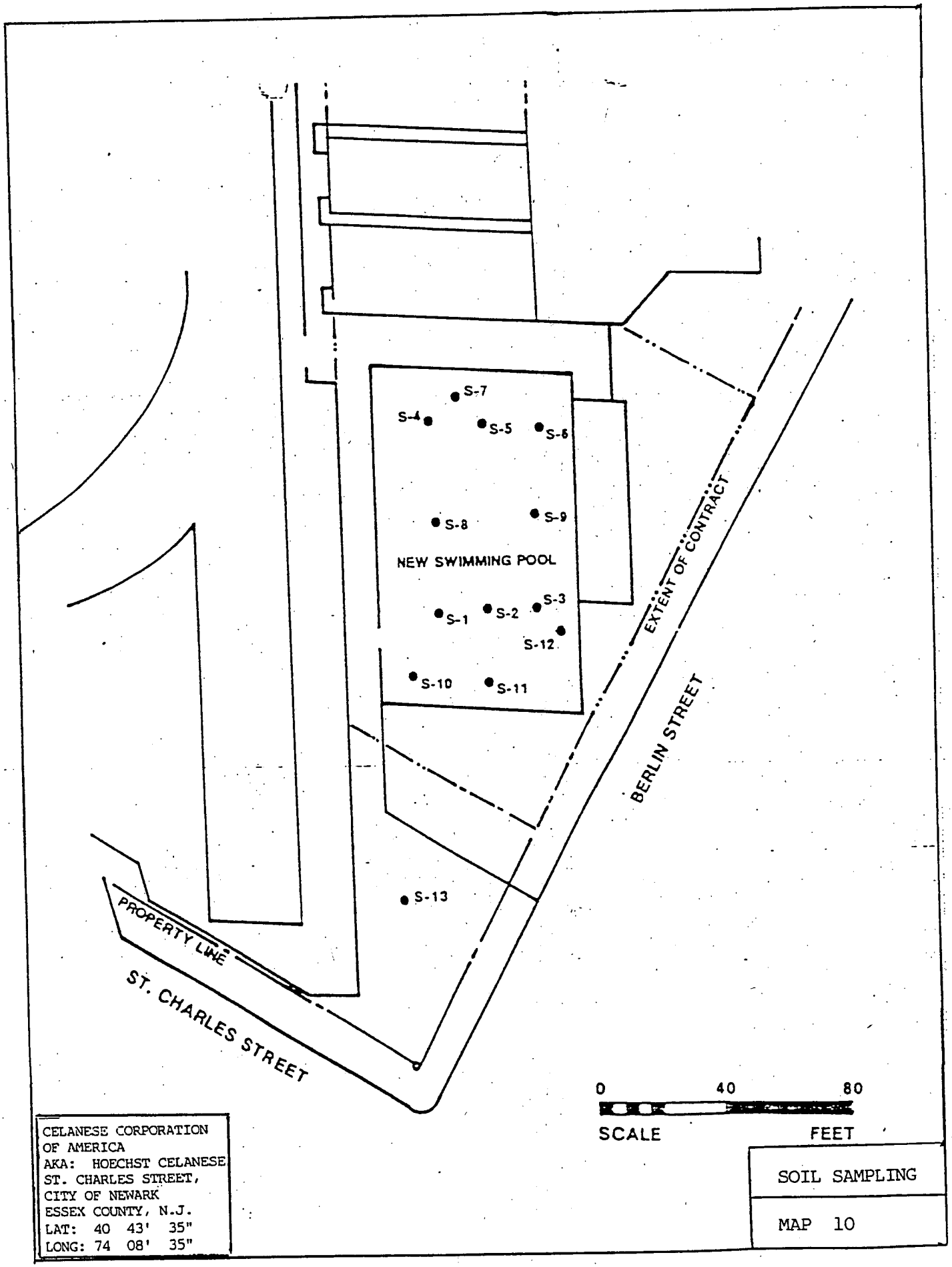
NUMBER	NAME	SOURCEID	LOCID	LAT	LON	LLACC	DISTANCE	COUNTY	MUN	DEPTH	GED1	GED2	CAPACITY
5077	ORANGE CITY	2603440	7	404534	741409	S	5.4	13	17	551	GTRB		350
2068P	ATLAS TOOL COMPANY, INC.	2601171		404204	741405		5.1	39	07	138	GTRB		200
2068P	ATLAS TOOL COMPANY, INC.	2602079		404204	741405		5.1	39	07	300	GTRB		200
2107P	TUSCAN DAIRY FARMS INC	4600102	1	404221	741401		5.0	39	19	300	GTRB		250
2107P	TUSCAN DAIRY FARMS INC	2604886	2	404221	741401		5.0	39	19	620	GTRB		350
5077	ORANGE CITY	2604444	9	404613	741343	F	5.4	13	17	506	GTRB		500
2168P	SECUR-IMAGE TECHNOLOGIES INC.	2600865	1	404140	741341		5.0	39	07	352	GTRB		200
2168P	SECUR-IMAGE TECHNOLOGIES INC.	2603615	2	404128	741334		5.0	39	07	461	GTRB		200
10645W	RONALD MARK ASSOCIATES	2600237	1	404139	741333	T	4.9	39	07	379	GTRB		100
5077	ORANGE CITY	2604322	8	404649	741330	S	5.7	13	17	500	GTRB		600
2081P	CERTIFIED PROCESSING CORP.	4600094	1	404140	741326	F	4.8	39	07	202	GTRB		100
2081P	CERTIFIED PROCESSING CORP.	2600265	2	404150	741326	F	4.7	39	07	630	GTRB		250
2081P	CERTIFIED PROCESSING CORP.	2604624	3	404140	741326	F	4.8	39	07	250	GTRB		
2106P	JERSEY PLASTIC MOLDERS, INC.	2604728	2	404301	741322		4.2	13	09	330	GTRB		330
2167P	SCHERING PLOUGH LABS	2600921	1	404704	741157		5.0	13	02	478	GTRB		160
2167P	SCHERING PLOUGH LABS	2604498	2	404703	741157		5.0	13	02	400	GTRB		130
2306P	HAYWARD MANUFACTURING PRODUCTS	2604712	1	404019	741154		4.7	39	19	274	GTRB		100
2306P	HAYWARD MANUFACTURING PRODUCTS	2606867	2	404039	741141		4.3	39	19	275	GTRB		100
10157W	M. POLANER, INC.	2604164		404126	741139		3.6	13	18	389	GTRB		275
2354P	ESSEX COUNTY DEPT. OF PARKS	2604394	2	404645	741110	T	4.3	13	14	450	GTRB		180
2355P	FOREST HILL FIELD CLUB	2604258	1	404749	741041	S	5.2	13	02	238	GTRB		60
2354P	ESSEX COUNTY DEPT. OF PARKS	4600216	1	404637	741035	S	3.9	13	14	200	GTRB		240
10553W	NEW JERSEY BELL TELEPHONE	2603173	1	404433	741015		1.8	13	14	215	GTRB		80
2247P	SETON COMPANY	2604969	5	404631	740927	F	3.5	13	14	400	GTRB		500
2247P	SETON COMPANY	4600162	4	404633	740926	F	3.5	13	14	300	GTRB		200
2247P	SETON COMPANY	4600160	2	404637	740925	F	3.6	13	14	300	GTRB		200
2247P	SETON COMPANY	4600161	3	404635	740925	F	3.5	13	14	250	GTRB		75
2247P	SETON COMPANY	2604968	6	404642	740922	F	3.6	13	14	400	GTRB		100
2073P	VAN DYK,MALLINCKRODT SPECIALTY	4600092	1	404700	740900	T	3.9	13	01	352	GTRB		100
2073P	VAN DYK,MALLINCKRODT SPECIALTY	4600093	2	404700	740900	T	3.9	13	01	400	GTRB		150
2073P	VAN DYK,MALLINCKRODT SPECIALTY	2605113	3	404700	740900	T	3.9	13	01	400	GTRB		150
2320P	HONEYCOMB PLASTICS CORP.	4600152	1	404506	740838	S	1.7	17	07	500	GTRB		210
2320P	HONEYCOMB PLASTICS CORP.	2602384	2	404506	740838	S	1.7	17	07	900	GTRB		500
2382P	KARLSHAMNS USA,INC.	2604523	NORTH WELL	404446	740838	S	1.4	17	07	584	GTRB		500
10514W	RONSON METALS CORP.	2604993	3	404342	740835	T	0.1	13	14	165			100
2382P	KARLSHAMNS USA,INC.	2604614	SOUTH WELL	404458	740835	F	1.6	17	07	615	GTRB		1000
10512W	V.H. SWENSON CO., INC.	2602717	1	404608	740809	F	3.0	17	07	400	GTRB		150
10514W	RONSON METALS CORP.	2603406	1	404358	740808	T	0.6	13	14	300	GTRB		150
2141P	PFAFF TOOL & MANUFACTURING CO.	2604269	3	404604	740806	F	2.9	17	07	550	GTRB		155
2141P	PFAFF TOOL & MANUFACTURING CO.	2604711	4	404604	740806	F	2.9	17	07	333	GTRB		
2141P	PFAFF TOOL & MANUFACTURING CO.	2602735	2	404604	740805	F	2.9	17	07	740	GTRB		140
2141P	PFAFF TOOL & MANUFACTURING CO.	2602162	1	404604	740804	F	2.9	17	07	590	GTRB		175
2044P	GRAND UNION CO.	4600002		404752	740738	S	5.0	03	39	300	GTRB		80
1104D	NEW JERSEY DEPT. OF TRANS.			403930	740715		4.8	12	01	11			1000
4057PS	RTC PROPERTIES INC	PASSAIC RIVER	INTAKE 1	404325	740708	F	1.3	17	07		SPLMP		1500
2051P	LIBERTY HILLSIDE ASSOC.	4600077	STANDBY	404147	740341		4.8	39	07	275	GTRB		250
2051P	LIBERTY HILLSIDE ASSOC.	4600078	STANDBY A	404141	740341		4.8	39	07	186	GTRB		250
2051P	LIBERTY HILLSIDE ASSOC.	4600079	MAIN B	404141	740341		4.8	39	07	400	GTRB		465
2051P	LIBERTY HILLSIDE ASSOC.	2600418	MAIN D	404141	740341		4.8	39	07	400	GTRB		350
10379W	KEYSTONE METAL FINISHERS, INC.	2604201	3	404713	740336	T	6.0	17	09	312	GTRB		300
10379W	KEYSTONE METAL FINISHERS, INC.	2602297	2	404717	740335	T	6.1	17	09	150	GTRB		130
2057P	SPINNERIN YARN CO., INC.	4600174	1	404210	740305	F	5.1	03	59	230	GTRB		120

NUMBER	NAME	SOURCEID	LOCID	LAT	LON	LLACC	DISTANCE	COUNTY	MUN	DEPTH	GED1	GED2	CAPACITY
10159W	M. POLANER, INC.	2604164		404126	741139		3.4	13	18	389	GTRB		375
10379W	KEYSTONE METAL FINISHERS, INC.	2602297	2	404717	740335	T	6.1	17	05	150	GTRB		130
	KEYSTONE METAL FINISHERS, INC.	2604291	3	404713	740336	T	6.0	17	09	312	GTRB		300
10512W	V.H. SWENSON CO., INC.	2602717	1	404608	740809	F	3.0	17	07	400	GTRB		150
10514W	RONSON METALS CORP.	2603408	1	404358	740808	T	0.6	13	14	300	GTRB		150
	RONSON METALS CORP.	2604993	3	404342	740835	T	0.1	13	14	165			100
10555W	NEW JERSEY BELL TELEPHONE	2603173	1	404433	741015		1.8	13	14	215	GTRB		80
10645W	RONALD MARK ASSOCIATES	2600237	1	404139	741333	T	4.9	39	07	379	GTRB		100
1104D	NEW JERSEY DEPT. OF TRANS.			403930	740715		4.8	13	01	11			1000
2044P	GRAND UNION CO.	4600002		404752	740738	S	5.0	03	39	300	GTRB		80
2051P	LIBERTY HILLSIDE ASSOC.	4600077	STANDBY	404147	740341		4.8	39	07	275	GTRB		250
	LIBERTY HILLSIDE ASSOC.	4600078	STANDBY A	404141	740341		4.8	39	07	156	GTRB		250
	LIBERTY HILLSIDE ASSOC.	4600079	MAIN B	404141	740341		4.8	39	07	400	GTRB		465
	LIBERTY HILLSIDE ASSOC.	2600418	MAIN D	404141	740341		4.8	39	07	400	GTRB		350
2056P	ATLAS TOOL COMPANY, INC.	2601171		404204	741405		5.1	39	07	138	GTRB		200
	ATLAS TOOL COMPANY, INC.	2602079		404204	741405		5.1	39	07	300	GTRB		200
2057P	SPINNERIN YARN CO., INC.	4600174	1	404210	740305	F	5.1	03	59	230	GTRB		120
2073P	VAN DYK,MALLINCKRODT SPECIALTY	4600092	1	404700	740900	T	3.9	13	01	352	GTRB		100
	VAN DYK,MALLINCKRODT SPECIALTY	4600093	2	404700	740900	T	3.9	13	01	400	GTRB		150
	VAN DYK,MALLINCKRODT SPECIALTY	2605113	3	404700	740900	T	3.9	13	01	400	GTRB		150
2081P	CERTIFIED PROCESSING CORP.	4600094	1	404140	741326	F	4.8	39	07	202	GTRB		100
	CERTIFIED PROCESSING CORP.	2600265	2	404150	741326	F	4.7	39	07	630	GTRB		250
	CERTIFIED PROCESSING CORP.	2604824	3	404140	741326	F	4.6	39	07	250	GTRB		
2106P	JERSEY PLASTIC MOLDERS, INC.	2604728	2	404301	741322		4.2	13	09	330	GTRB		320
2107P	TUSCAN DAIRY FARMS INC	4600102	1	404221	741401		5.0	39	19	300	GTRB		250
	TUSCAN DAIRY FARMS INC	2604596	2	404221	741401		5.0	39	19	620	GTRB		350
2141P	PFAFF TOOL & MANUFACTURING CO.	2602162	1	404604	740804	F	2.9	17	07	590	GTRB		175
	PFAFF TOOL & MANUFACTURING CO.	2602735	2	404604	740805	F	2.9	17	07	740	GTRB		140
	PFAFF TOOL & MANUFACTURING CO.	2604269	3	404604	740806	F	2.9	17	07	550	GTRB		155
	PFAFF TOOL & MANUFACTURING CO.	2604711	4	404604	740806	F	2.9	17	07	333	GTRB		
2167P	SCHERING PLOUGH LABS	2600921	1	404703	741157		5.0	13	02	478	GTRB		160
	SCHERING PLOUGH LABS	2604498	2	404703	741157		5.0	13	02	400	GTRB		130
2169P	SECUR-IMAGE TECHNOLOGIES INC.	2600055	1	404140	741341		5.0	39	07	352	GTRB		200
	SECUR-IMAGE TECHNOLOGIES INC.	2603615	2	404128	741334		5.0	39	07	461	GTRB		200
2247P	SETON COMPANY	4600160	2	404637	740925	F	3.6	13	14	300	GTRB		200
	SETON COMPANY	4600161	3	404635	740925	F	3.5	13	14	250	GTRB		75
	SETON COMPANY	4600162	4	404633	740926	F	3.5	13	14	200	GTRB		200
	SETON COMPANY	2604969	5	404631	740927	F	3.5	13	14	400	GTRB		500
	SETON COMPANY	2604968	6	404642	740922	F	3.6	13	14	400	GTRB		100
2268P	FOREST HILL FIELD CLUB	2604258	1	404749	741041	S	5.2	13	02	238	GTRB		60
2306P	HAYWARD MANUFACTURING PRODUCTS	2604712	1	404019	741154		4.7	39	19	274	GTRB		100
	HAYWARD MANUFACTURING PRODUCTS	2606867	2	404039	741141		4.3	39	19	275	GTRB		100
2320P	HONEYCOMB PLASTICS CORP.	4600182	1	404506	740838	S	1.7	17	07	500	GTRB		210
	HONEYCOMB PLASTICS CORP.	2602334	2	404506	740838	S	1.7	17	07	700	GTRB		500
2354P	ESSEX COUNTY DEPT. OF PARKS	2604894	2	404645	741110	T	4.3	13	14	450	GTRB		180
	ESSEX COUNTY DEPT. OF PARKS	4600216	1	404637	741035	S	3.9	13	14	200	GTRB		240
2382P	KARLSHAMNS USA,INC.	2604523	NORTH WELL	404446	740838	S	1.4	17	07	584	GTRB		500
	KARLSHAMNS USA,INC.	2604614	SOUTH WELL	404458	740835	F	1.6	17	07	615	GTRB		1000
4057PS	RTC PROPERTIES INC	PASSAIC RIVER	INTAKE 1	404335	740708	F	1.3	17	07		SPLMP		1500
5077	ORANGE CITY	2603440	7	404534	741409	S	5.4	13	17	551	GTRB		350
	ORANGE CITY	2604322	8	404648	741330	S	5.7	13	17	500	GTRB		600
	ORANGE CITY	2604444	9	404613	741343	F	5.4	13	17	506	GTRB		500

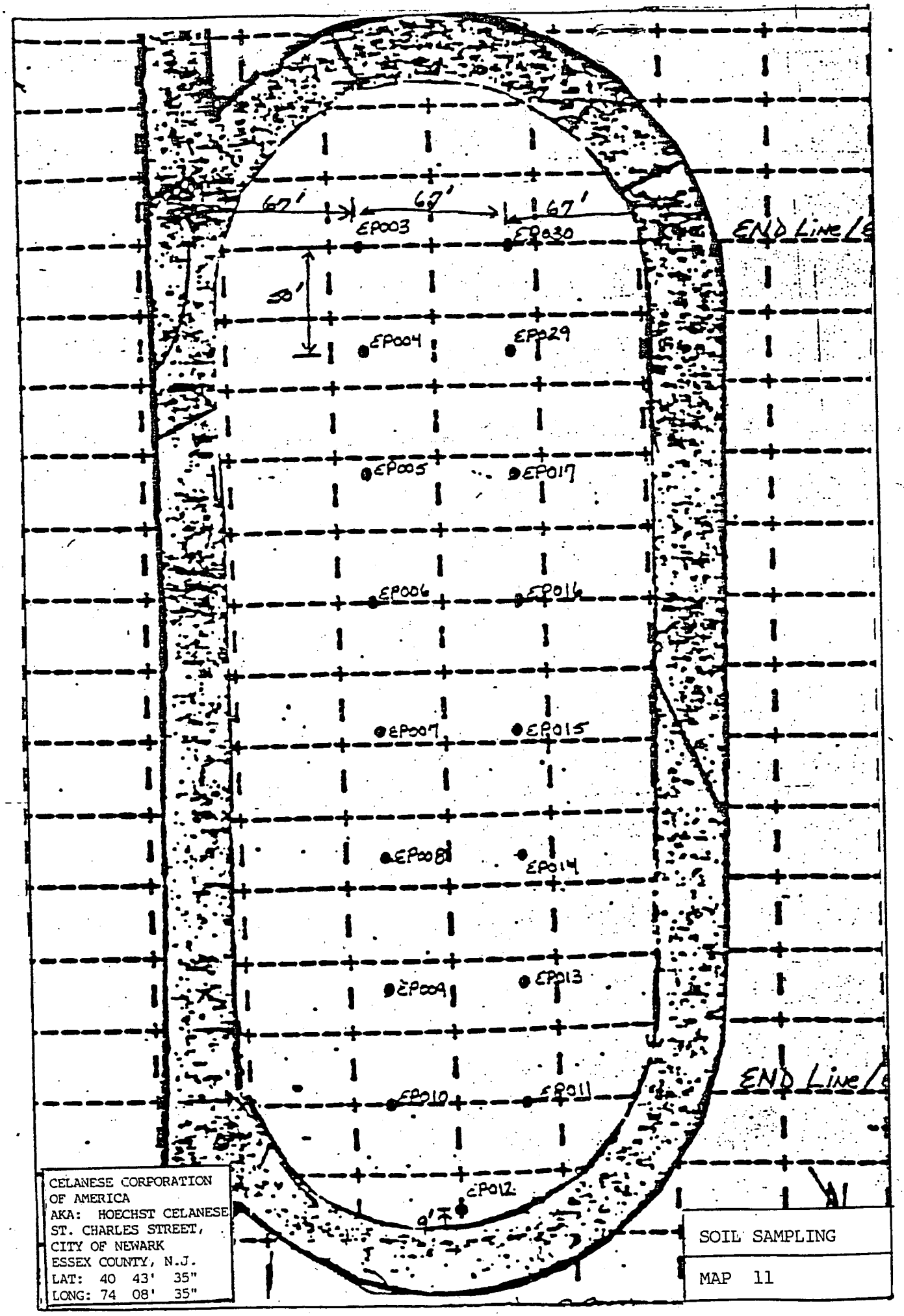

Former
tank farm
IRONBOUND RECREATION
CENTER
MW-10
MW-9
MW-5
MW-2
MW-6
MW-8
Rome Street
MW-11
MW-1
MW-12
MW-7
MW-4
MW-3
St Charles Street
N
0
500
FEET
CELANESE CORPORATION
OF AMERICA
AKA: HOECHST CELANESE
ST. CHARLES STREET,
CITY OF NEWARK
ESSEX COUNTY, N.J.
LAT: 40 43' 35"
LONG: 74 08' 35"
MONITORING WELLS
MAP 9

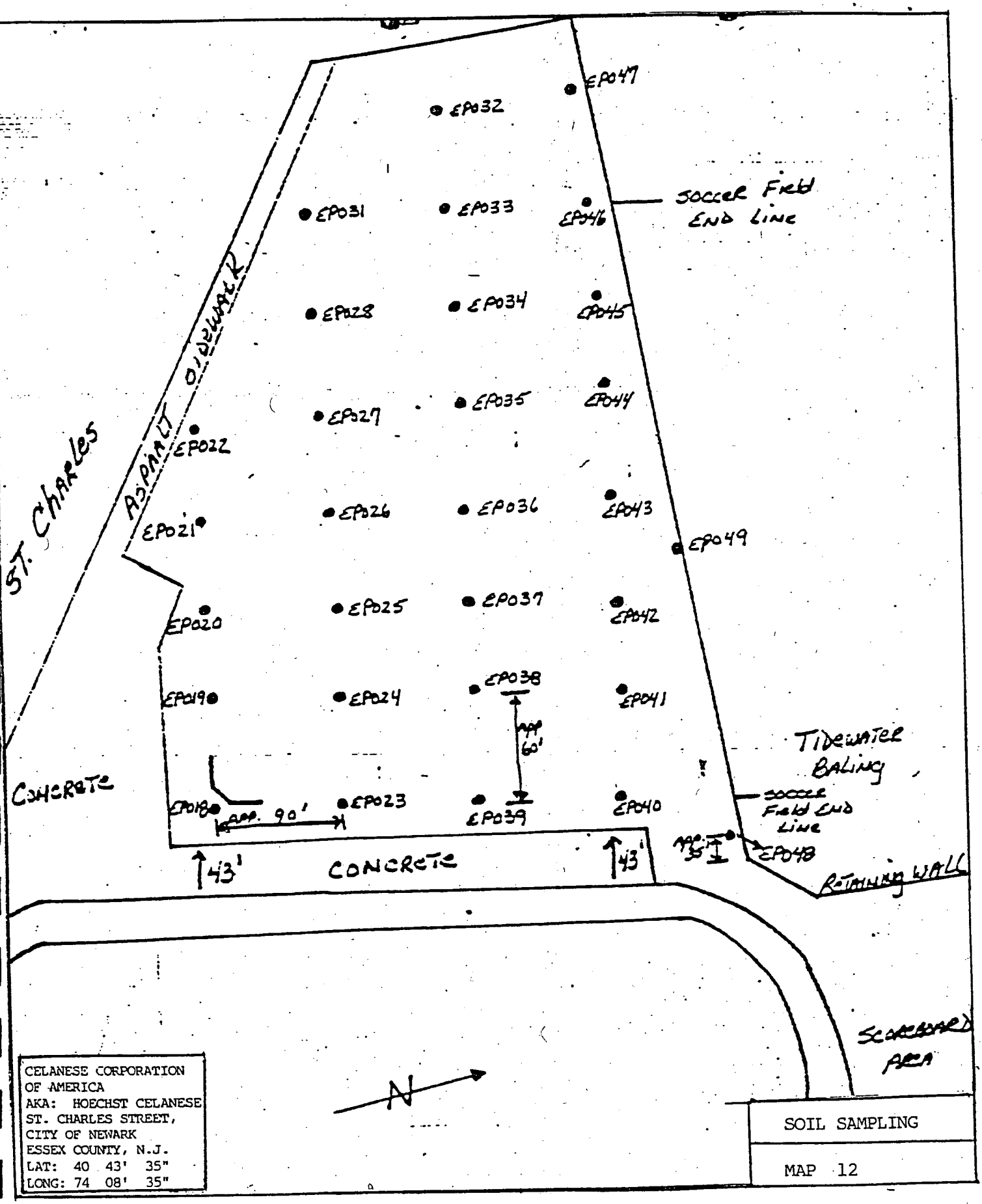


CELANESE CORPORATION
OF AMERICA
AKA: HOECHST CELANESE
ST. CHARLES STREET,
CITY OF NEWARK
ESSEX COUNTY, N.J.
LAT: 40 43' 35"
LONG: 74 08' 35"

SOIL SAMPLING

MAP 10


67'
67'
67'
EP003
EP030
END Line
50'
EP004
EP029
EP005
EP017
EP006
EP016
EP007
EP015
EP008
EP014
EP009
EP013
END Line
EP010
EP011
EP012
9'
CELANESE CORPORATION
OF AMERICA
AKA: HOECHST CELANESE
ST. CHARLES STREET,
CITY OF NEWARK
ESSEX COUNTY, N.J.
LAT: 40 43' 35"
LONG: 74 08' 35"
SOIL SAMPLING
MAP 11


EP047
EP032
EP031
EP033
EP046
SOCCER FIELD END LINE
EP028
EP034
EP045
EP027
EP035
EP044
EP022
EP026
EP036
EP043
EP021
EP049
EP025
EP037
EP042
EP020
EP019
EP024
EP038
EP041
APP. 60'
TIDEWATER BALING
CONCRETE
EP018
APP. 90'
EP023
EP039
EP040
SOCCER FIELD END LINE
APP. 35'
EP048
43'
CONCRETE
43'
RETAINING WALL
ST. CHARLES
ASPHALT SIDEWALK
SCOREBOARD AREA
N
CELANESE CORPORATION
OF AMERICA
AKA: HOECHST CELANESE
ST. CHARLES STREET,
CITY OF NEWARK
ESSEX COUNTY, N.J.
LAT: 40 43' 35"
LONG: 74 08' 35"
SOIL SAMPLING
MAP 12

ATTACHMENT A

GERAGHTY & MILLER, INC.

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1. Monitoring Well Construction Details.
2. Analytical Parameters for Soil Samples.
3. Analytical Parameters for Ground-Water Samples.
4. Constituent Concentrations in Soil Samples.
5. Concentrations of RCRA and Miscellaneous Parameters in Soil Samples
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7. Estimated Costs for Installation of Recovery System.

FIGURES

1. Monitoring Well and Soil Boring Location Map.
2. Water-Table Contour Map.
3. Distribution of Chemical Constituents in Soil Samples.
4. Distribution of Chemical Constituents in Ground-Water Samples.

APPENDICES

A. Geologic Logs for Monitoring Wells and Soil Borings.
B. Laboratory Analytical Results for EPA/NIH/NBS Non-Targetted Library Search.
C. Alternative Treatment System and Associated Costs.

ATTACHMENT A'

ASSESSMENT OF SOIL AND GROUND-WATER QUALITY CONDITIONS AT THE IRONBOUND RECREATION CENTER NEWARK, NEW JERSEY

INTRODUCTION

In August 1987, Geraghty & Miller, Inc. was retained by Dresdner, Robin & Associates of Jersey City, New Jersey to conduct a site evaluation at the location of a proposed indoor swimming pool at the Ironbound Recreation Center in Newark, New Jersey. The primary objective of this investigation was to determine soil quality conditions in the unsaturated zone and ground-water quality conditions in the upper unconsolidated aquifer unit.

Background

The Ironbound Recreation Center is located at the northeast corner of the intersection of Berlin and St. Charles Streets in Newark, New Jersey. An indoor swimming pool is proposed adjacent to the existing Ironbound Recreation Center. The entire site is owned by the City of Newark.

Demolition and excavation activities at the pool site were initiated in August 1987. Strong odors were detected during the initial phases of excavation and the New Jersey Department of Environmental Protection (NJDEP) was notified. Grab samples (one each) of soil and ground water from the pool site were collected by NJDEP representatives. The NJDEP laboratory analytical results indicated the presence of high concentrations of 2,4-dimethylphenol and phenol in the ground-water and soil samples. In addition, aldrin was detected in the ground water sample and methylene chloride in the soil sample.

Construction at the proposed pool site has been stopped. The excavation was backfilled with the excavated soil and covered with polyethylene to reduce odor emissions. Approximately 15 truckloads of the excavated soil were taken by a contractor to a site in Hoboken, New Jersey prior to the recognition that the soil might contain organic chemicals. The situation at the site in Hoboken is being remediated in coordination with NJDEP and Hudson County Regional Health Commission and is not addressed in this report.

Scope of Work

The principal objective of the site investigation was to assess soil and ground-water quality conditions at the proposed swimming pool site at the Ironbound Recreation Center. In order to accomplish these objectives, the following tasks were carried out:

- Utility clearance from the utility companies serving the area.

- The installation of six (6) shallow monitoring wells in the upper unconsolidated aquifer unit and the collection of water samples for chemical analysis.

- The collection of six soil samples in the unsaturated zone and one soil sample in the saturated zone for chemical analysis at the deep and shallow ends of the proposed swimming pool.

- The collection and analysis of a ground-water sample from the dewatering pit.

FIELD PROGRAM

Site Reconnaissance

The subject site was inspected by Geraghty & Miller, Inc., Dresdner, Robin & Associates and NJDEP personnel on August 20, 1987 in order to select soil and ground-water sampling locations.

On August 21, 1987 a meeting was held at the NJDEP office in West Orange, New Jersey. Representatives attending the meeting included NJDEP officials, Dresdner, Robin & Associates, Geraghty & Miller, Inc., Newark City officials, Austin Healy Construction, and Palmer Paving. During this meeting public health and safety issues and field investigation requirements were addressed; agreement was reached regarding the locations for six soil borings and six monitoring wells. In addition, analytical parameters for soil and water samples were established.

This meeting was followed by the preparation of a sampling plan incorporating NJDEP recommendations for assessing soil and ground-water quality conditions at the subject site. The sampling plan outlined the field methodologies and quality assurance/quality control requirements for the installation and sampling of six soil borings and six monitoring wells; all soil and ground-water sampling locations are shown on Figure 1.

Monitoring Well Drilling and Installation

Between September 14 and 17, 1987, six monitoring wells ranging in depth from 17 to 20 feet were installed at the proposed swimming pool site in Newark, New Jersey, by Environmental Drilling, Inc. of Mount Arlington, New Jersey under the supervision of a Geraghty & Miller, Inc. hydrogeologist. The locations of these monitoring wells (designated MW-1 through MW-6) are shown on Figure 1.

The boreholes were drilled using 8-1/2 inch inside diameter hollow-stem augers and the finished holes were 12 inches in diameter.

Continuous formation samples were collected from monitoring well MW-6 using a split-spoon sampler. Formation samples were collected at five-foot intervals in the remaining monitoring wells. The split-spoon soil samples were monitored at the time of collection using an organic vapor analyzer with a photoionization detector. The geologic logs are presented in Appendix A.

The monitoring wells are constructed of four-inch diameter, flush-jointed PVC casing and 0.020-inch slot well screen. The casing and screen assemblies were installed in the open boreholes and an appropriate gravel pack was placed in the annular space between the screen and the borehole. Well construction details are provided in Table 1. The wells were developed by pumping with a submersible pump until sediments were removed and clean water was pumped. The monitoring wells are protected with six-inch diameter flush mount, protective casings.

Construction Surveyors, Inc. of Oakland, New Jersey was retained by Geraghty & Miller, Inc. to determine monitoring well locations and the elevations of the top of well casings.

Soil Sampling

Six soil borings (designated S-1 through S-6) were drilled between September 16 and 17, 1987 by Environmental Drilling under the supervision of a Geraghty & Miller, Inc. hydrogeologist. Soil boring S-2 was drilled to a depth of 14 feet below ground surface (bgs) and the other soil borings were limited to depths of 6 feet bgs as the depth to ground water at these soil boring locations ranges from 5 to 7 feet bgs.

One soil sample from each boring was collected for chemical analysis with the exception of soil boring S-2. Two soil samples, one from the unsaturated zone and the other from the saturated zone, were collected from soil boring S-2. Samples for an analysis of

volatile organic compounds (VOCs) were selected from the split-spoon samples that showed evidence of contamination from the organic vapor detector reading or visual discoloration. Composite samples (0 to 6 feet) were collected for the analysis of other analytical parameters. Sample depths and analytical parameters are presented in Table 2.

The sampling tools were decontaminated prior to sampling and in between the soil borings, using a laboratory-grade detergent solution scrub and rinse followed by a rinse with distilled water. At the end of each sampling day, the sample bottles were labelled, packed in an ice cooler and shipped to Analytikem of Cherry Hill, New Jersey for chemical analysis. Sample collection and decontamination procedures were according to protocols outlined in the sampling plan prepared in September, 1987 by Geraghty & Miller, Inc. The geologic logs for the soil borings are presented in Appendix A.

Ground-Water Sampling

The six monitoring wells (MW-1 through MW-6) and the sump at the proposed swimming pool site were sampled on September 28, 1987 by Geraghty & Miller, Inc. The protocols outlined in the Sampling Plan were adhered to during the sampling activities.

A blind replicate sample was collected from monitoring well MW-6 and was labelled as MW-7. A field blank was also collected prior to the completion of sampling. Analytical parameters for ground-water samples are presented in Table 3. The samples were shipped to Analytikem of Cherry Hill, New Jersey for chemical analysis.

Water-level measurements were made in each monitoring well prior to well evacuation for sampling. These water-level measurements were used to construct the water-level contour map provided on Figure 2.

ANALYTICAL RESULTS

Soil Samples

Analytical data for the soil samples are presented in Tables 4 and 5. Table 4 lists concentrations of volatile organic compounds, semivolatile organic compounds, Priority Pollutant metals, cyanide and total phenolics in soil samples. Table 4 includes only the total concentrations of Priority Pollutant volatile organic and semivolatile organic compounds. All volatile and semivolatile organic compounds found in the EPA/NIH/NBS library search are listed in Appendix B. Table 5 presents the concentrations of RCRA parameters for waste classification (EP Toxicity, Reactivity, Ignitability and Corrosiveness), total petroleum hydrocarbons and percent solids.

The distributions of total volatile and semivolatile organic compounds and total metals are presented on Figure 3. Soil boring S-5 showed the highest concentration of volatile organic compounds (240,000 ug/kg). All soil samples showed high concentrations of semivolatile organic compounds. Tricresyl phosphate, phenol, 2-Methylphenol, 4-Methylphenol, and 2,4-Dimethylphenol were the major semivolatile organic compounds detected.

Selected heavy metals constituents were detected at elevated concentrations in all unsaturated soil samples. Arsenic, chromium, copper, lead, nickel, and zinc were the major heavy metal constituents detected.

Pesticides were detected in soil samples S-1, S-3, S-4 and S-5 at concentrations below the laboratory method detection limit. One PCB compound (Arochlor 1260) was detected in one soil sample S-2(u) at an estimated concentration of 150 ppb.

Low concentrations of chromium, cadmium and mercury were detected (below method detection limit) in selected soil samples by EP extractable tests. These concentrations were substantially lower than the EP toxicity limits that are used to define hazardous levels.

Reactive sulfide was detected in five of the six soil samples but none of the samples appeared to be reactive from laboratory observations as indicated in Table 5 and in the laboratory reports. Soil pH ranged from 6.7 to 8.8. Elevated levels of total petroleum hydrocarbons were observed in all unsaturated soil samples. None of the constituents were detected in travel blanks or field blank samples.

Ground-Water Samples

Constituent concentrations in ground-water samples are presented in Table 6. Specific volatile and semi-volatile organic compounds detected by EPA/NIH/NBS library search of non-targetted compounds are presented in Appendix B.

Volatile organic compounds were detected in samples from monitoring wells MW-2, MW-4 and MW-6 and from the sump (Table 6). The highest VOC concentration, 269 ug/L, was in the sample from MW-6, in which xylene was the chief VOC at a concentration of 180 ug/L.

Semivolatile organic compounds were found in ground water samples from all the monitoring wells (except MW-5) and the sump (Table 6). Samples from MW-6 and the sump contained relatively substantial concentrations of semivolatiles: phenol ranged from 24,000 ug/L to 120,000 ug/L and 2-methylphenol, 4-methylphenol, and 2,4-dimethylphenol were also found in high concentrations. Samples from MW-1, MW-2, and MW-4 showed a range of these and other semivolatile organic constituents, in concentrations ranging from 133 ug/L to 5,032 ug/L; MW-3 showed a total semivolatile concentration of only 18 ug/L. Tricresyl phosphate was found at a concentration of 2,200 ug/L in a sample from MW-4 and at low concentrations in samples from MW-1, MW-2, MW-3.

Samples from monitoring well MW-5 and the sump were also analyzed for other Priority Pollutant parameters. Heptachlor was detected at an estimated concentration of 1 ug/L in the sump sample. No Priority Pollutant metals were detected in a sample from MW-5; the sump sample showed zinc at a concentration of 11,000 ug/L. Arsenic, berylium,

copper and nickel were also found in the sump sample but at much lower concentrations.

Total phenolics at a concentration of 86,000 ug/L were found in the sample from the sump.

ATTACHMENT A9

REMEDIAL ALTERNATIVES

Based on a review of the soil and ground-water quality data for the subject site, it is apparent that additional site-specific characterization will be necessary for a detailed assessment of potential remedial alternatives. Therefore, the discussion that follows is conceptual in nature and based on the results generated from site-specific studies to date.

Soil

The high concentrations of semivolatile organic chemicals in the soil samples collected in proximity to the proposed pool excavation possibly necessitate the removal of the subject soil in the unsaturated zone to an approved disposal facility.

Other alternatives that might be investigated include containment and biodegradation. However, additional field studies would be needed to assess whether biodegradation might be a viable option.

The principal concern regarding the removal process relates to the potential for odor emission and public exposure.

Ground Water

The concentrations of volatile and semivolatile organic compounds in samples from selected monitoring wells exceed NJDEP cleanup guidelines. The existing monitoring well network has enabled, to an extent, an understanding of ground-water flow and quality conditions. Additional site-specific characterization will be necessary prior to the implementation of a pumping remedial system. The specific elements that would need to be conducted include:

- The installation of at least five additional monitoring wells in order to define the vertical and horizontal extent and movement dynamics of the ground-water contaminant plume.

- The conductance of controlled aquifer pumping tests to develop an understanding of aquifer hydraulic characteristics.

- The design of a recovery system which would include the number, locations, and design characteristics for recovery wells.

- The installation of a recovery well system and associated piping and treatment equipment.

The estimated costs associated with the implementation of a recovery system installation are provided in Table 7.

In summary, the contaminated soil at the subject facility could be remediated by removal or possibly by in-situ containment or treatment. The contaminated ground water could be controlled by a pumping remediation system but a more extensive characterization would be essential for proper design and installation.

Sincerely,

GERAGHTY & MILLER, INC.

Chittaranjan Ray

Chittaranjan Ray
Scientist

Vincent W. Uhl

Vincent W. Uhl, Jr.
Vice President

#J1058NW1\093087.TXT

Table 1. Monitoring Well Construction Details

Well Number	Date Installed	Total Depth (ft, bgs)	Diameter (inches)	Screen Setting (ft-ft, bgs)	Protective Casing
MW-1	9/16/87	18.0	4.0	3.0-18.0	Flush mount
MW-2	9/15/87	20.0	4.0	5.0-20.0	Flush mount
MW-3	9/17/87	17.5	4.0	2.5-17.5	Flush mount
MW-4	9/16/87	17.5	4.0	2.5-17.5	Flush mount
MW-5	9/15/87	20.0	4.0	5.0-20.0	Flush mount
MW-6	9/14/87	20.0	4.0	5.0-20.0	Flush mount

Note:

bgs - Below Ground Surface

ATTACHMENT A12

Table 2. Analytical Parameters for Soil Samples.

Sample No	Date	Depth (ft-ft)	Organic Vapor Reading (ppm)	Parameters
S-1	9/18/87	0-2	400	VOCs+15
		0-6	150-400	PP+40 (except for VOCs+15), TPHC, Waste Classification*
S-2(u)	9/18/87	2-4	10.5	VOCs+15
		0-6	3.0-10.5	PP+40 (except for VOCs+15), TPHC, Waste Classification*
S-2(s)	9/18/87	6-8	16.2	VOCs+15
		6-14	5.0-16.2	PP+40 (except for VOCs+15), TPHC, Waste Classification*
S-3	9/18/87	2-4	3.5	VOCs+15
		0-6	3.0-3.5	PP+40 (except for VOCs+15), TPHC, Waste Classification*
S-4	9/17/87	4-6	37.0	VOCs+15
		0-6	2.8-37.0	PP+40 (except for VOCs+15), TPHC, Waste Classification*
S-5	9/17/87	4-6	235	VOCs+15
		0-6	20.5-235	PP+40 (except for VOCs+15), TPHC, Waste Classification*
S-6	9/17/87	0-2	15.5	VOCs+15
		0-6	3.0-15.5	PP+40 (except for VOCs+15), TPHC, Waste Classification*
Field Blank	9/17/87	-	-	PP+40
Trip Blank	9/17/87	-	-	VOCs +15
Field Blank	9/18/87	-	-	PP+40
Trip Blank	9/18/87	-	-	VOCs +15

Note:

VOCs - Volatile Organic Compounds
TPHC - Total Petroleum Hydrocarbons
PP - Priority Pollutants
* - Includes EP Toxicity, reactivity, corrosiveness and ignitability.

ATTACHMENT A13

Table 7. Estimated Costs for Installation of Recovery System.

Items	Cost ($)
1. Installation of Five Additional Monitoring Wells	
Driller	14,000
Consultant	7,000
2. Conductance of Controlled Aquifer Pumping Tests (#)	
Driller	10,000
Consultant	8,000
3. Design of Recovery System	
Consultant	10,000
4. Installation of Recovery System and Associated Treatment Plant	
Recovery System	20,000 to 30,000
Consultant	5,000
Treatment System (*)(**)	125,000 to 200,000
Total	199,000 to 284,000

Note:

- Costs do not include disposal costs for pumped water.
* - Treatment alternatives are provided in Appendix C.
** - If the recovered water is pumped directly to the sanitary sewer system, the estimated costs associated with piping etc. are on the order of $10,000 to $15,000.

ATTACHMENT A14

Table 3. Analytical Parameters for Ground-Water Samples.

Sample Number	Date	Parameters
MW-1	9/28/87	VOCs+15, Semivolatiles+25*, pH, Specific Conductance
MW-2	9/28/87	VOCs+15, Semivolatiles+25*, pH, Specific Conductance
MW-3	9/28/87	VOCs+15, Semivolatiles+25*, pH, Specific Conductance
MW-4	9/28/87	VOCs+15, Semivolatiles+25*, pH, Specific Conductance
MW-5	9/28/87	PP+40*, pH, Specific Conductance
MW-6	9/28/87	VOCs+15, Semivolatiles+25*, pH, Specific Conductance
MW-7#	9/28/87	VOCs+15, Semivolatiles+25*, pH, Specific Conductance
SUMP	9/28/87	PP+40*, pH, Specific Conductance
Field Blank	9/28/87	PP+40*, pH, Specific Conductance
Trip Blank	9/28/87	VOCs+15

Note:

VOCs - Volatile Organic Compounds
PP - Priority Pollutants
- Blind Replicate of MW-6
* - Includes Tricresyl Phosphate

ATTACHMENT A5

Table 4. Constituent Concentrations in Soil Samples.

Constituents	S-1	S-2(u)	S-2(s)	S-3	S-4	S-5	S-6	Field Blank 9/17/87	Trip Blank 9/17/87	Field Blank 9/18/87	Trip Blank 9/18/87
Volatile Organics											
Methylene Chloride*	420	1000	1100	1300	1300	1100	1400				
Toluene*						12000					
Ethylbenzene						150000					
Total Xylenes					570J	78000	1100				
Total Volatile Organics	420	1000	1100	1300	1870	241100	2500				
Semivolatile Organics											
(Dilution Factors)	100	10	10	100	100	100	10				
Phenol	4600J	3000		110000					NA		NA
1,2-Dichlorobenzene				4800J					NA		NA
2-Methylphenol	8900	3600	830	180000	8400	6200J	1500		NA		NA
4-Methylphenol	27000	12000	1100	710000	22000	11000	6700		NA		NA
2,4-Dimethylphenol	47000	19000	8400	420000	19000	15000	7900		NA		NA
Naphthalene		1100				24000	5300		NA		NA
2-Methylnaphthalene		770				13000	4300		NA		NA
Dimethyl Phthalate		610J		4500J					NA		NA
Acenaphthene							840		NA		NA
Dibenzofuran							800		NA		NA
Fluorene							530J		NA		NA
Phenanthrene							940		NA		NA
Di-n-butyl Phthalate		470J			4800J				NA		NA
Fluoranthene		1200					400J		NA		NA
Pyrene		940							NA		NA
Benzo(a)anthracene		760							NA		NA
bis(2-Ethylhexyl) Phthalate		970					630J	11J	NA		NA
Chrysene		930							NA		NA
Indeno(1,2,3-cd)pyrene		1000							NA		NA
Tricresyl Phosphate	540000	670000	730000	4000000	1100000	94000	820000		NA		NA
Total Semivolatiles	627500	716350	740330	5429300	1154200	163000	849840	11J	NA		NA

(continued next page)

ATTACHMENT A-12

Table 4. Constituent Concentrations in Soil Samples.
(Continued)

Constituents	S-1	S-2(u)	S-2(s)	S-3	S-4	S-5	S-6	Field Blank 9/17/87	Trip Blank 9/17/87	Field Blank 9/18/87	Trip Blank 9/18/87
Pesticides and PCBs											
(Dilution Factors)	1000	100	10	100	10000	10000	100				
Aldrin	18000J				760000J				NA		NA
Dieldrin	3900J			3000J	120000J				NA		NA
Endosulfan I	20000J				110000J				NA		NA
Heptachlor Epoxide					440000J	54000J			NA		NA
Total Pesticides	41900			3000	1430000	54000			NA		NA
Arochlor 1260		150J									
Total PCBs		150J									
Total Metals, Cyanide and Phenolics											
Antimony				1500J					NA		NA
Arsenic	5300	6600		9600	7000	3600	7100		NA		NA
Beryllium	610	700	400J	730	860	800	780		NA		NA
Cadmium	1100J	1200			1300				NA		NA
Chromium	7400	5400J	7000	11000	13000	22000	6300		NA		NA
Copper	69000	180000	18000	58000	84000	58000	34000		NA		NA
Lead	210000	160000		240000	1400000	360000	76000		NA		NA
Mercury	4500	2800	270J	1500	1500	220J	760		NA		NA
Nickel	16000	16000	7700	24000	48000	16000	11000		NA		NA
Zinc	250000	280000	28600	170000	100000	66000	100000		NA		NA
Total Metals	563910	652700	51270	516330	1655660	526620	235940		NA		NA
Cyanide									NA		NA
Total Phenolics	32000	13000	6700	660000	18000	17000	14000		NA		NA
EPA/NIH/NBS Nontargetted Library Search											
Total Volatiles	4800			4300	900	39000	2700				
Total Semivolatiles	39000	17000		610000	3800000	6100000	75000		NA		NA

Note:

All concentrations are in ug/kg.
Samples were collected between 9/17/87 and 9/18/87.
Analysis performed by Analytikem of Cherry Hill, New Jersey.
J - Constituent determined below Method Detection Limit (MDL).
NA - Not Analyzed.
* - Identification of these compounds at low levels is sometimes attributed to laboratory contamination.
Blank space indicates constituent was analyzed for but not detected.

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ATTACHMENT A2

Table 5. Concentrations of RCRA and Miscellaneous Parameters in Soil Samples.

Constituents	S-1	S-2(u)	S-2(s)	S-3	S-4	S-5	S-6	EP Toxicity Limits
EP Extractable Metals, Pesticides and Herbicides (ug/L)								
Cadmium	11J							1000
Chromium	26J	12J	25J	25J	12J			5000
Mercury						4.1J	2.1J	200
Reactivity* (ug/kg)								
Sulfide	15000J	41000J	26000J	45000J	46000J	73000		
Cyanide								
Corrosiveness								
pH (units)	7.7	8.0	8.8	8.4	7.5	6.7	7.3	
Flash Point (Closed Cup)								
Degree Celcius	>180	>180	>180	>180	>180	>180	>180	
Miscellaneous Parameters								
Total Petroleum Hydrocarbons by IR (ug/kg)	1700000	82000	30000	800000	820000	400000	270000	
Total Solids (%)	89	87	84	88	87	86	86	

Note:

Samples were collected between 9/17/87 and 9/18/87.
Analyses performed by Analytikem of Cherry Hill, New Jersey.
J - Compound detected below MDL. Quantitation may be approximate.
* - Observations for reactivity were as follows:
Samples did not undergo violent changes under normal conditions.
Samples did not react violently or form a potentially explosive mixture with water.
Samples did not appear readily capable of detonation, explosive decomposition or reaction at standard temperature and pressure.
Samples did not generate toxic gases, vapors or fumes when exposed to pH conditions between 2 and 12.5.
Blank space indicates constituent was analyzed for but not detected.

ATTACHMENT A18

Table 6. Constituent Concentrations in Ground-Water Samples.

Constituents	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	Sump	Field Blank	Trip Blank
Volatile Organics										
Methylene Chloride*						3.1J				
Chloroform						23	17J			
Benzene		48		13		5.8J		48		
Tetrachloroethene						9.0J				
Toluene*		26		15		14		29		
Ethylbenzene		11				34	24J			
Total Xylenes		87		23J		180	150	6.0J		
Total Volatiles		172		51		269	201	93		
Semivolatile Organics										
(Dilution Factors)	1	1	1	1		100	120	10		
Phenol	21J	15		42		120000	99000	24000		NA
2-Methylphenol	4.8J		0.6J	130		23000	21000	45000		NA
4-Methylphenol	11J	24	3.7J	150		41000	34000	66000		NA
2,4-Dimethylphenol	7.1J	1000	1.4J	2500		36000	32000	68000		NA
Naphthalene		130		9.6J						NA
2-Methylnaphthalene		47								NA
Acenaphthene	0.71J									NA
Fluorene	1.3J									NA
Phananthrene	0.76									NA
Di-n-butyl Phthalate	0.64J		0.6J							NA
bis(2-Ethylhexyl) Phthalate	1.2J		0.9J							NA
Tricresyl Phosphate	85	290	11J	2200						NA
Total Semivolatiles	133	1500	18J	5032		220000	196000	203000		NA
Pesticides and PCBs										
Heptachlor	NA	NA	NA	NA		NA	NA	1J		NA

(Continued next page)

ATTACHMENT A12

Table 6. Constituent Concentrations in Ground-Water Samples.
(Continued)

Constituents	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	Sump	Field Blank	Trip Blank
Total Metals, Cyanide and Phenolics										
Arsenic	NA	NA	NA	NA		NA	NA	35		NA
Beryllium	NA	NA	NA	NA		NA	NA	3J		NA
Copper	NA	NA	NA	NA		NA	NA	21J		NA
Nickel	NA	NA	NA	NA		NA	NA	12J		NA
Selenium	NA	NA	NA	NA		NA	NA	3.5J		NA
Zinc	NA	NA	NA	NA		NA	NA	11000		NA
Total Metals	NA	NA	NA	NA		NA	NA	11074		NA
Cyanide	NA	NA	NA	NA		NA	NA			NA
Total Phenolics	NA	NA	NA	NA		NA	NA	86000		NA
Miscellaneous Parameters										
pH (units)	7.6	7.1	7.2	7.6	8.2	7.4	7.4	9.1	8.0	NA
Specific Conductance (umhos/cm)	370	600	450	650	300	1100	1200	320	10	8.0
EPA/NIH/NBS Nontargetted Library Search										
Total Volatiles		97				130	40	27	16	
Total Semivolatiles	120	4900	66	2600		19000	20000	69000		NA

Note:

All concentrations are reported in ug/L unless otherwise noted.
Samples were collected on 9/28/87.
Analyses performed by Analytiken of Cherry Hill, New Jersey.
* - Constituent identified at low levels is sometimes attributed to laboratory contamination.
NA- Not Analyzed.
J - Compound determined below minimum detection level. Quantitation is approximate.
Total concentrations are rounded to two significant figures.
Blank space indicates constituent was analyzed for but not detected.

File:NWKDRS3.WK1

ATTACHMENT A 20

ATTACHMENT B

SITE INVESTIGATION
PROPOSED SWIMMING POOL SITE
IRONBOUND RECREATION CENTER
NEWARK, NEW JERSEY

Prepared for:
City of Newark
Department of Engineering

Prepared by:

Dresdner, Robin & Associates
in association with
Geraghty & Miller, Inc.

December 1987

ATTACHMENT B1

Dresdner, Robin & Associates
PLANNING AND ENVIRONMENTAL MANAGEMENT

P.O. Box 469, 43 Montgomery St., Jersey City, New Jersey 07302 (201) 432-9800
170 Broadway, Suite 201, New York, N.Y. 10038 (212) 619-4114

December 3, 1987
No. 078

Mr. Alvin L. Zach
Newark Department of Engineering
920 Broad Street
Newark, NJ 07102

Re: Ironbound Recreation
Center Site
Newark, New Jersey

Dear Mr. Zach:

Dresdner, Robin & Associates submits herewith this summary report on the results of an investigation of the soil and ground water at the site of a proposed indoor swimming pool at the Ironbound Recreation Center in Newark, New Jersey. The purpose of the investigation was to evaluate the extent of environmental contamination present on the site that might require remedial action.

Background

The excavation for construction of an indoor pool was started in August, 1987. The excavated material from the site was moved to a site in Weehawken/Hoboken. Strong odors were detected during the initial excavation, resulting in the notification of the NJ Department of Environmental Protection (NJDEP) and the halting of excavation at the pool site. The NJDEP collected one soil and one ground water sample from the excavation; both samples contained elevated levels of phenol and 2, 4-dimethyl phenol.

Before proceeding further with the excavation and construction, Newark, in coordination with NJDEP, required that the soil and ground water conditions at the Ironbound site be more fully assessed so as to provide the basis for remediation of the site.

ATTACHMENT B2

The field sampling program was conducted by Geraghty & Miller, Inc., our subcontractor, and sample analysis was performed by Analytikem of Cherry Hill, New Jersey. A copy of Geraghty & Miller's draft report describing the sampling program in more detail is attached, along with Analytikem's analytical report.

Although the site is not subject to the Environmental Cleanup Responsibility Act (ECRA), the sampling results are compared with the ECRA thresholds for the targeted parameters. These thresholds (Table 3) are guidelines used by the NJDEP to determine when remedial action is required on an ECRA site.

Soil Samples and Analysis (Figure 1, Table 1)

Soil samples were taken from six soil borings located on the site of the proposed pool. The samples from each boring were analyzed for total petroleum hydrocarbons, priority pollutants +40 and waste disposal classification. Figure 1 shows the sampling locations and Table 1 summarizes the analytical results.

The findings are summarized below.

1. The total petroleum hydrocarbons concentration in samples S-1, S-3, S-4, S-5, S-6 exceeded the NJDEP remedial guideline of 100 mg/kg.

2. All of the samples showed high concentrations (163-1154 mg/kg) of targeted semivolatile organic compounds compared to the ECRA remedial guidelines of 10 mg/kg. The principal semivolatile compounds detected were phenol, cresol*, dimethyl phenol and tricresyl phosphate. Samples S-2 from both the saturated and unsaturated zones contained 700+ mg/kg of phenols and phosphate.

3. Several heavy metals were detected in the soil samples with elevated levels of lead (>250 mg/kg) in samples S-4 and S-5, and elevated levels of mercury (>1 mg/kg) in samples S-1, S-2, S-3 and S-4.

4. All of the soil samples tested to be non-hazardous in the EPA waste classification test and could be disposed of as non-hazardous wastes, ID-27.

Ground Water Sampling and Analysis (Figure 1, Table 2)

Six monitoring wells were installed (see Figure 1) and water samples were obtained from these wells and a sump hole. Six water samples were analyzed for volatile and semivolatile

*cresol=methyl phenol

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ATTACHMENT B3

organic compounds, pH and specific conductance. Two samples were analyzed for priority pollutants +40, pH and specific conductance. Table 2 summarizes the analytical results.

The findings are summarized below:

1. The volatile organic compound concentration in MW-2, MW-4 and MW-6 exceeded the ECRA guideline of 10 ug/l. Xylene was the principal chemical detected.

2. The level of targeted semivolatile compounds in MW-1, MW-3 and MW-5 was low (<100 ug/l). In MW-2 and MW-4, targeted semivolatile content was at moderate levels (1500-5000 ug/l), while the level of semivolatiles was fairly high (200,000 ug/l) in MW-6 and the sump. The semivolatile compounds were a mixture of phenols and tricresyl phosphate in MW-2 and MW-4, and essentially all phenols (phenol, cresol and dimethyl phenol) in MW-6 and the sump. The ECRA remedial guideline for semivolatile acid extractable compounds, such as phenols, is 50 ug/l.

3. Water samples from MW-5 and the sump were analyzed for pesticides and heavy metals. Pesticides were not detected in MW-5 or the sump. Heavy metals were not detected in MW-5 while zinc (11,000 ug/l) was detected in the sump water.

Conclusions

Based on the above data, we conclude that:

1. The soil at the proposed location of the indoor swimming pool is contaminated with high levels (above the ECRA guideline) of phenols and tricresyl phosphate. Previously, a phosphate plant was located on this site (see Figure 2). It produced triphenyl, tricresyl, and tri (dimethyl phenyl) phosphates from the corresponding phenols. Thus, the contamination on the site likely resulted from spillage at the phosphate plant during manufacture and storage.

2. Based on the analyses of the samples from S-2, the phenols and phosphate contamination in the soil extends below the water table.

3. The wells (MW-4, MW-6) and the sump, located on the site of the old phosphate plant, contain elevated levels of phenols and tricresyl phosphate. No phenol or phosphate contamination was found in upgradient well MW-5; while low levels of phenol and phosphate contamination were found in upgradient wells MW-1 and

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ATTACHMENT B4

MW-2. Likewise, phenols and phosphate levels were below the method detection limits in the downgradient well MW-3. This indicates that ground water contamination is probably localized to the old phosphate plant site.

4. Elevated levels of lead and mercury were found in some of the soil samples but they were not detected in the ground water from the sump and MW-5, and were not leached in the EP Toxicity test.

5. The soil samples tested to be non-hazardous in the EPA waste classification test and could be disposed of as a non-hazardous waste, ID-27.

6. Phenol, cresol, triphenyl phosphate and triorthocresyl phosphate have established Threshold Limit Values (TLV) and OSHA exposure standards-Time Weighted Average (TWA) in air as outlined below:

   - Phenol
     OSHA-air: TWA 5ppm (skin)
     TLV: TWA 5 ppm, 19 mg/m^3 (skin)

   - Cresol
     OSHA-air: TWA 5 ppm (skin)
     TLV: TWA 5 ppm, 22 mg/m^3 (skin)

   - Triphenyl phosphate
     OSHA-air: TWA 3 mg/m^3
     TLV: TWA 3 mg/m^3

   - Triorthocresyl phoshate
     OSHA-air: TWA 0.1 mg/m^3
     TLV: TWA 0.1 mg/m^3 (skin)

   The skin notation refers to the potential contribution to the overall exposure by the skin route including, mucous membranes and eye, either by airbone or direct contact with the substances. Substances with a skin notation and a low TLV can present a problem at high airbone concentrations, particularly if a significant skin area is exposed for a long time period.

   Since the phenols and phosphate have relatively low TLV's and a skin notation, exposure to these chemicals needs to be controlled and monitored during excavation of the contaminated soil at the pool site. Appropriate protective clothing should be worn by field personnel to limit skin contact. A respirator should be worn if concentrations exceed the TLV's.

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ATTACHMENT B5

The phenols also have noticeable odors at low concentration. Confining the odor to only the excavation site will present a special challenge.

Recommendations

Assuming that Newark chooses to proceed with the construction of the indoor pool at this site, we recommend that:

1. Excavation of the contaminated soil be monitored and controlled to minimize odor and exposure of field personnel and neighbors to phenols and phosphates. Field personnel should wear appropriate protective clothing and have respirators available.

   Odor control methods should be investigated and implemented, if feasible. A public information program is also recommeded.

2. Contaminated soils excavated to build the pool should be removed from the site and disposed of as ID-27, non-hazardous waste.

3. A capillary break/vapor barrier of sand and plastic sheeting should be placed between the soil and the indoor pool structure to eliminate seepage of contaminated ground water into the building and pool.

4. Elsewhere on the site where excavation of soil is not planned or necessary to build the pool and building, the contaminated soil could either be removed or contained in place and the pathways of contaminant passage controlled. In the containment case, the pathways could be controlled through the application of a capillary/ vapor barrier (eg. plastic sheeting, coarse gravel) and a cover layer (eg. asphalt, concrete or two feet of clean fill). The containment approach should reduce the likelihood of exposure to the contaminated soil. The vapor barrier and cover layer also would help to reduce the infiltration of rainwater through the soil to the ground water. This, in turn, would reduce the potential for rainwater moving contaminants from the soil to the ground water.

   Thus, containment should provide the environmental protection desired and at a lower cost than soil removal. The actual cost of containment would depend on the final design for the site and has not been estimated for this report.

5. The ground water on the pool site contains phenols and phosphates. The existing monitoring wells have given

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ATTACHMENT B6

some preliminary information on ground water flow and quality conditions. However, additional site specific characterization is necessary before addressing the need for and content of a ground water remedial plan. The key elements of the site characterization would likely include:

- additional monitoring well(s) downgradient to better define the ground water contaminant plume

- aquifer pumping tests

A sampling and remediation program for the ground water could be addressed independent of the pool construction, if the pool were redesigned to be built above the water table and/or if an appropriate vapor barrier were placed between the pool/building and the contaminated soil/ground water.

6. Ground water pumped on the site during construction should be suitably treated before discharge or sent through the sanitary sewer to the Passaic Valley Sewage Commission plant (assuming the sewerage commission agrees).

7. A detailed comprehensive remedial plan should be developed for the site once a conceptual remedial approach has been approved by Newark and the NJDEP. This remedial plan would specify worker protection, soil handling procedures, specific barriers to be placed, replacement fill and cover, monitoring operations to be conducted during construction and the format for a public information program.

Cost Estimate of Contaminated Soil Removal

Based on a review of the engineering drawings for the proposed pool, estimates were made of the cost of soil disposal. Two estimates are given below: 1) excavation to a twelve-foot depth at the deepest point, as currently designed and 2) excavation to a five-foot depth at the deepest point to keep the pool above the ground water table. The estimates cover the disposal of soil excavated for the basement and pool area only; contaminated soil disposal from elsewhere on the site is not included. The costs include the disposal site fee and the cost of tranport to the disposal site.

1. Current design -Excavation to twelve-foot depth.

Approximately 2,500 cubic yards of soil will be excavated for the pool and the basement of the pool

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ATTACHMENT B2

building with the current design. The estimated cost for disposal of this soil as non-hazardous waste, ID-27, would be approximately $125/yd^3 or $312,500.

2. Excavation to five-foot depth

If the excavation for the pool and basement could be limited to a five-foot depth (above the water table), approximately 1000 cubic yards of soil would be removed. The estimated cost of disposal would be $125,000.

Sincerely,

DRESDNER, ROBIN & ASSOCIATES

Allen J. Dresdner

James R. Michael

AJD:kb

cc: F. Sudol

DRA

ATTACHMENT B8

TABLE 1

Constituent Concentrations in Soil Samples.

Constituents	S-1	S-2(u)	S-2(s)	S-3	S-4	S-5	S-6	Field Blank 9/17/87	Trip Blank 9/17/87	Field Blank 9/18/87	Trip Blank 9/18/87
Volatile Organics											
Methylene Chloride*	420	1000	1100	1300	1300	1100	1400				
Toluene*						12000					
Ethylbenzene						150000					
Total Xylenes					570J	78000	1100				
Total Volatile Organics	420	1000	1100	1300	1870	241100	2500				
Semivolatile Organics											
(Dilution Factors)	100	10	10	100	100	100	10				
Phenol	4600J	3000		110000					NA		NA
1,2-Dichlorobenzene				4800J					NA		NA
2-Methylphenol	8900	3600	830	180000	8400	6200J	1500		NA		NA
4-Methylphenol	27000	12000	1100	710000	22000	11000	6700		NA		NA
2,4-Dimethylphenol	47000	19000	8400	420000	19000	15000	7900		NA		NA
Naphthalene		1100				24000	5300		NA		NA
2-Methylnaphthalene		770				13000	4300		NA		NA
Dimethyl Phthalate		610J		4500J					NA		NA
Acenaphthene							840		NA		NA
Dibenzofuran							800		NA		NA
Fluorene							530J		NA		NA
Phenanthrene							940		NA		NA
Di-n-butyl Phthalate		470J			4800J				NA		NA
Fluoranthene		1200					400J		NA		NA
Pyrene		940							NA		NA
Benzo(a)anthracene		760							NA		NA
bis(2-Ethylhexyl) Phthalate		970					630J	11J	NA		NA
Chrysene		930							NA		NA
Indeno(1,2,3-cd)pyrene		1000							NA		NA
Tricresyl Phosphate	540000	670000	730000	4000000	1100000	94000	820000		NA		NA
Total Semivolatiles	627500	716350	740330	5429300	1154200	163000	849840	11J	NA		NA

(continued next page)

ATTACHMENT B9

TABLE 1

Constituent Concentrations in Soil Samples.
(Continued)

Constituents	S-1	S-2(s)	S-2(s)	S-3	S-4	S-5	S-6	Field Blank 9/17/87	Trip Blank 9/17/87	Field Blank 9/18/87	Trip Blank 9/18/87
Pesticides and PCBs											
(Dilution Factors)	1000	100	10	100	10000	10000	100				
Aldrin	18000J				760000J				NA		NA
Dieldrin	3900J			3000J	120000J				NA		NA
Endosulfan I	20000J				110000J				NA		NA
Heptachlor Epoxide					440000J	54000J			NA		NA
Total Pesticides	41900			3000	1430000	54000			NA		NA
Aroclor 1260		150J									
Total PCBs		150J									
Total Metals, Cyanide and Phenolics											
Antimony				1500J					NA		NA
Arsenic	5300	6600		9600	7000	3600	7100		NA		NA
Beryllium	610	700	400J	730	860	800	780		NA		NA
Cadmium	1100J	1200			1300				NA		NA
Chromium	7400	5400J	7000	11000	13000	22000	6300		NA		NA
Copper	69000	180000	18000	58000	84000	58000	34000		NA		NA
Lead	210000	160000		240000	1400000	360000	76000		NA		NA
Mercury	4500	2800	170J	1500	1500	220J	760		NA		NA
Nickel	16000	16000	7700	24000	48000	16000	11000		NA		NA
Zinc	250000	280000	28000	170000	100000	66000	100000		NA		NA
Total Metals	563910	652700	61270	516330	1655660	526620	235940		NA		NA
Cyanide									NA		NA
Total Phenolics	32000	13000	6700	660000	18000	17000	14000		NA		NA
EPA/NIH/NBS Nontargetted Library Search											
Total Volatiles	4800			4300	900	39000	2700				
Total Semivolatiles	39000	17000		610000	3800000	5100000	75000		NA		NA

Note:

All concentrations are in ug/kg.
Samples were collected between 9/17/87 and 9/18/87.
Analysis performed by Analytikon of Cherry Hill, New Jersey.
J - Constituent determined below Method Detection Limit (MDL).
NA - Not Analyzed.
B - Identification of these compounds at low levels is sometimes attributed to laboratory contamination.

ATTACHMENT B 10

TABLE 1

Concentrations of RCRA and Miscellaneous Parameters in Soil Samples.

Constituents	S-1	S-2(s)	S-2(s)	S-3	S-4	S-5	S-6	EP Toxicity Limits
EP Extractable Metals, Pesticides and Herbicides (ug/L)								
Cadmium	11J							1000
Chromium	26J	12J	25J	25J	12J			5000
Mercury						4.1J	2.1J	200
Reactivity* (ug/kg)								
Sulfide	15000J	41000J	26000J	45000J	46000J	73000		
Cyanide								
Corrosiveness								
pH (units)	7.7	8.0	8.8	8.4	7.5	6.7	7.3	
Flash Point (Closed Cup)								
Degree Celcius	>180	>180	>180	>180	>180	>180	>180	
Miscellaneous Parameters								
Total Petroleum Hydrocarbons by IR (ug/kg)	1700000	82000	30000	800000	820000	400000	270000	
Total Solids (%)	89	87	84	88	87	86	86	

Note:

Samples were collected between 9/17/87 and 9/18/87.

Analyses performed by Analytiken of Cherry Hill, New Jersey.

J - Compound detected below MDL. Quantitation may be approximate.

* - Observations for reactivity were as follows:

Samples did not undergo violent changes under normal conditions.

Samples did not react violently or form a potentially explosive mixture with water.

Samples did not appear readily capable of detonation, explosive decomposition or reaction at standard temperature and pressure.

Samples did not generate toxic gases, vapors or fumes when exposed to pH conditions between 2 and 12.5.

Blank space indicates constituent was analyzed for but not detected.

ATTACHMENT B11

TABLE 2

Constituent Concentrations in Ground-Water Samples.

Constituents	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	Sump	Field Blank	Trip Blank
Volatile Organics										
Methylene Chloride*						3.1J				
Chloroform						23	17J			
Benzene		48		13		5.8J		48		
Tetrachloroethene						9.0J				
Toluene*		26		15		14		29		
Ethylbenzene		11				34	24J			
Total Xylenes		87		23J		180	150	6.0J		
Total Volatiles		172		51		269	201	83		
Semivolatile Organics										
(Dilution Factors)	1	1	1	1		100	120	10		
Phenol	21J	15		42		120000	99000	24000		NA
2-Methylphenol	4.8J		0.6J	130		23000	21000	45000		NA
4-Methylphenol	11J	24	3.7J	150		41000	34000	66000		NA
2,4-Dimethylphenol	7.1J	1000	1.4J	2500		36000	32000	68000		NA
Naphthalene		130		9.6J						NA
2-Methylnaphthalene		47								NA
Acenaphthene	0.71J									NA
Fluorene	1.3J									NA
Phenanthrene	0.76									NA
Di-n-butyl Phthalate	0.64J		0.6J							NA
bis(2-Ethylhexyl) Phthalate	1.2J		0.9J							NA
Tricresyl Phosphate	85.	290	11J	2200						NA
Total Semivolatiles	133	1500	18J	5032		220000	186000	203000		NA
Pesticides and PCBs										
Heptachlor	NA	NA	NA	NA		NA	NA	1J		NA

(Continued next page)

ATTACHMENT B-12

TABLE 2

Constituent Concentrations in Ground-Water Samples.
(Continued)

Constituents	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	Sump	Field Blank	Trip Blank
Total Metals, Cyanide and Phenolics										
Arsenic	NA	NA	NA	NA		NA	NA	35		NA
Beryllium	NA	NA	NA	NA		NA	NA	3J		NA
Copper	NA	NA	NA	NA		NA	NA	21J		NA
Nickel	NA	NA	NA	NA		NA	NA	12J		NA
Selenium	NA	NA	NA	NA		NA	NA	3.5J		NA
Zinc	NA	NA	NA	NA		NA	NA	11000		NA
Total Metals	NA	NA	NA	NA		NA	NA	11074		NA
Cyanide	NA	NA	NA	NA		NA	NA			NA
Total Phenolics	NA	NA	NA	NA		NA	NA	86000		NA
Miscellaneous Parameters										
pH (units)	7.6	7.1	7.2	7.6	9.2	7.4	7.4	8.1	8.0	NA
Specific Conductance (umhos/cm)	370	600	450	650	300	1100	1200	920	10	8.0
EPA/NIH/NBS Nontargetted Library Search										
Total Volatiles		97				130	40	27	16	
Total Semivolatiles	120	4900	66	2600		19000	20000	69000		NA

Note:

All concentrations are reported in ug/L unless otherwise noted.
Samples were collected on 9/28/87.
Analyses performed by Analytiken of Cherry Hill, New Jersey.
a - Constituent identified at low levels is sometimes attributed to laboratory contamination.
NA- Not Analyzed.
J - Compound determined below minimum detection level. Quantitation is approximate.
Total concentrations are rounded to two significant figures.
Blank space indicates constituent was analyzed for but not detected.

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ATTACHMENT B13

TABLE 3

NJDEP REMEDIAL GUIDELINES FOR SOILS AND WATER

Contaminant	WATER Concentration Limit (µg/ℓ) H_2O	SOIL Concentration Limit (ppm or mg/Kg) Soil
Antimony	—	5
Arsenic	50	20
Barium	1000	400
Berillium	—	15
Cadmium	10	3
Chromium (total)	50	100
Copper	1000	170
Lead	50	250-400
Nickel	—	100
Selenium	10	4
Silver	50	5
Thallium	—	5
Zinc	5000	350
Molybdenum	—	—
Titanium	—	—
Vanadium	—	—
Mercury	2	1
Cyanide	200	12
Phenol (total)	300	1-5
Petroleum Hydrocarbons	1000	100
Volatile Organics	10	1
Base-Neutrals +15 (PAH)	50	10
Acid +10	50	10
PCB's	.001	1-5

ATTACHMENT B4

ATTACHMENT C

PHASE II SITE INVESTIGATION

IRONBOUND POOL SITE

NEWARK, NEW JERSEY

PART 1

SITE HISTORY AND OPERATIONS

Prepared by:

DRESDNER, ROBIN & ASSOCIATES

APRIL 1990

ATTACHMENT C'

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PHASE II SITE INVESTIGATION

IRONBOUND POOL SITE

NEWARK, NEW JERSEY

INTRODUCTION

This report describes activities and summarizes findings of site investigation work addressing the Ironbound Pool Site, Newark, New Jersey conducted during the period February 1988 through September 1989. This report consists of two parts:

Part 1: A site history, including a description of former land uses, a summary of Pool Site project history and a review of manufacturing operations (prepared by Dresdner, Robin & Associates); and

Part 2: A Phase II Assessment of Soil and Ground-Water Quality Conditions, including a description of all field activities conducted during the period (prepared by Geraghty & Miller).

The Phase II Site Investigation Report (Phase II Report) has been prepared by Dresdner, Robin & Associates and Geraghty & Miller, Inc. on behalf of the City of Newark and Hoechst Celanese Corporation who are Respondents to an Administrative Consent Order (ACO) addressing the Ironbound Pool Site. The ACO was executed February 15, 1990.

The objective of the Phase II Report is to provide in one document a summary of all work activities and data obtained subsequent to the Phase I Investigation through September 1989 when ACO negotiations began. The Phase I Investigation was described in the report "Site Investigation, Proposed Swimming Pool Site, Ironbound Recreation Center, Newark, New Jersey prepared by

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Dresdner, Robin & Associates and Geraghty & Miller in December, 1987. Portions of the Phase II Report address information submission requirements of the ACO.

All of the field activities reported in the Phase II Report were coordinated with the New Jersey Department of Environmental Protection (NJDEP) Metro Field Office and, with the exception of certain ground-water monitoring activities, were conducted with the objective of constructing the Ironbound Pool, an indoor public swimming pool, in a safe and environmentally sound manner. Most of the data presented in this report have been previously submitted to NJDEP.

SITE DESCRIPTION

The Ironbound Pool Site is located on a portion of Block 2052, Lot 1 at the northeast corner of the intersection of St. Charles and Rome Streets in the Ironbound section of Newark, New Jersey. The regional location of the Ironbound Pool Site is shown on Figure 1.1. The ACO defines the Site as consisting of approximately 2.5 acres and including the existing building and grandstands of the Ironbound Recreation Center, but excluding the playing fields and running track associated with the Recreation Center. The City of Newark owns and operates the Ironbound Recreation Center and plans to construct an indoor swimming pool on a 0.4 acre parcel of vacant land immediately southwest of the existing Recreation Center building. The site was formerly owned by the Celanese Corporation (now Hoechst Celanese) which operated a chemical manufacturing facility at the location.

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INTRODUCTION TO PART 1

Part 1 of this Phase II Site Investigation Report provides a description of the history of the Pool Site. Specifically, it presents the following:

- a summary of the Pool Site project history -- the events since contaminated soil and ground water were encountered in August 1987;
- a summary of the site history, including ownership and operational history and land use history;
- a discussion of the current understanding of the former Celanese plant operations.

POOL SITE PROJECT HISTORY

Newark initiated excavation activities for construction of the indoor swimming pool in August 1987, but in consultation with NJDEP voluntarily stopped when odors associated with potential soil and ground water contamination were encountered. NJDEP representatives collected grab samples (one each) of excavated soil and groundwater from the excavation site. The laboratory analytical results indicated the presence of high concentrations of 2,4-dimethylphenol and phenol in the ground-water and soil samples.

Prior to recognition that the soil might contain organic chemicals, some of the excavated soil was taken by a contractor to a site on the Hoboken/Weehawken, New Jersey border. The situation at the site in Hoboken/Weehawken was voluntarily remediated by Newark in coordination with the NJDEP and the Hudson County Regional Health Commission.

In autumn 1987, the initial excavation at the Pool Site was backfilled with the remaining excavated soil and the disturbed soil surface was covered with polyethylene sheeting to reduce odor emissions. The polyethylene was secured in place by used automobile tires. The site was fenced

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and no trespassing signs were posted. The Recreation Center building was temporarily closed pending air sampling for phenol. No phenol was detected in the building air and the Recreation Center reopened.

During September 1987, Newark conducted an initial assessment of soil and ground-water conditions at the Pool Site. The investigation, based on an NJDEP-approved sampling plan, included installation and sampling of six ground-water monitoring wells (MW-1 through MW-6) and six soil borings (S-1 though S-6). The results of this investigation are summarized in the Phase I Report.

In February 1988, NJDEP specified the locations and depths of four additional ground-water monitoring wells to be installed by Newark (MW-7 through MW-10). These wells were installed, developed and sampled in April and May 1988.

In February 1988, a draft Administrative Consent Order (ACO) was prepared by the NJDEP addressing a remedial investigation and feasibility study (RI/FS) at the site. The City of Newark and Hoechst Celanese Corporation were identified as potentially responsible parties. The draft ACO was not executed, but considerable additional remedial investigation work was conducted at the site from February 1988 through September 1989, including installation of two additional monitoring wells (MW-11 and MW-12), seven additional soil borings (S-7 through S-13) and short term pumping tests on two monitoring wells. The pumping tests were conducted to evaluate dewatering and ground-water treatment parameters that would have been required for the original pool design, which called for excavation up to 14 feet. Descriptions and results of this work are provided in Part 2 of this report. Based on the soil sampling results, NJDEP issued a waste classification opinion that the soil within the footprint of the proposed pool structure is ID-27 non-hazardous dry industrial waste. Based on the ground-water sampling results, the Passaic Valley Sewage Commissioners (PVSC) preliminarily advised Newark that the ground water at the site must be pretreated prior to discharge to the PVSC sewage treatment system.

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In October 1988, the City of Newark submitted a Remedial Plan for Construction of the Ironbound Swimming Pool (also known as Pool Construction Mitigation Plan) to NJDEP. The purpose of the Pool Construction Mitigation Plan was to specify mitigative measures to be employed during construction of the pool so as to minimize health risks to construction workers during construction and to the general public during and after pool construction. The Plan was developed in conjunction with a health risk assessment for the excavation phase of pool construction. NJDEP did not issue comments on the Plan.

In February 1989, administration of the Pool Site case was transferred within the NJDEP Division of Hazardous Waste Management from the Metro Field Office in West Orange to the Bureau of State Case Management in Trenton.

In June 1989, Newark decided to raise the base of the pool above the seasonal high ground water table (approximately 3 feet below ground surface) by modifying the existing pool design to eliminate the diving facilities, eliminate the deep end of the pool to produce a shallow constant-depth pool and raise the overall structure.

On June 20, 1989, a meeting was held at NJDEP with Newark and Hoechst Celanese. At this meeting a conceptual approach was developed to allow Newark to proceed with construction of a raised pool while concurrently investigating and remediating ground-water contamination. This conceptual approach is memorialized in letters dated June 26, 1989, August 1, 1989 and September 26, 1989 between NJDEP and Newark.

In autumn of 1989, Newark determined that the existing pool design could not be satisfactorily modified to be above the ground water table and abandoned the original pool design in favor of a new redesign effort. The original pool design could not be adapted due to an uncompacted fill condition resulting from backfilling of the original 14 foot deep pool excavation, the need to

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provide ramps for handicapped access to the raised structure and other design constraints and considerations resulting from the decision to raise the base of the pool above the water table.

During the period of September through December 1990, Newark, Hoechst Celanese and NJDEP negotiated the terms of the ACO which was executed on February 15, 1990.

SITE HISTORY

An investigation into the land use, operational and ownership history of the Pool Site, initiated as part of the Phase I Investigation, was continued through the Phase II Investigation and is on-going. This investigation is based on review of historical maps and photographs, a property title search and other historical documents and records as referenced. The property title search contained several breaks in the title and consequently does not reliably document the complete ownership sequence or dates.

BLOCK AND LOT DESIGNATION

According to the City of Newark tax maps, the present day Block 2052, Lot 1, which includes the entire Ironbound Recreation Center Site, was formerly Lots 12, 16, 20, 24 and two additional lots without identified lot numbers on one or more unidentified blocks. All of the lots were apparently consolidated into Block 2052, Lot 1 when they were acquired by Newark in or about 1966. Figure 1.2 shows a copy of the current tax map which still shows the lot lines of the former lots.

The Site, as defined by the ACO, includes most of the former Lot 24, all of the former Lot 20 and a small portion of the former Lot 16. According to several historical maps, including a 1950 Sanborn map and a 1948 Celanese map, the former Celanese "Lindol Plant" was also located on these same lots.

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OWNERSHIP AND OPERATIONAL HISTORY

Due to the breaks in the chain of title and historical conveyance of the Pool Site as five separate tracts that do not correspond to identifiable lot lines, the precise ownership history of the site is uncertain. The following summarizes the current understanding of the precise ownership and operational history.

As of 1911, the Pool Site was owned entirely by The Celluloid Corporation. There is no record of a date of conveyance of deed from The Celluloid Corporation to Celanese Corporation of America; however, the Celluloid Corporation merged with Celanese on March 17, 1941. Hoechst Celanese believes that Celanese operated the Lindol Plant from approximately 1941 to 1956. Title records indicate numerous conveyances between 1957 and 1965. Among the entities appearing in the chain of title after 1957 for one or more of the five tracts appearing to contain at least a portion of the Pool Site are Rome-Charles Corporation; Enterprise Judy, Inc.; Tolan Machinery Co., Inc.; Adco Chemical Company; Thibant and Walker Co., Inc.; JGR Corp.; Charter Bulk Service Inc. (formerly Continental Bulk System Inc.); and Cook & Dunn Paint Corporation. The City of Newark acquired all of Lots 12, 16, 20 and 24 by 1966.

LAND USE HISTORY

The following historic maps and aerial photographs were reviewed to document the land use history at the Pool Site:

- 1908 Sanborn Map
- 1931 Sanborn Map
- April 6, 1940 Aerial Photo
- April 28, 1947 Aerial Photo
- October 8, 1948 Celanese Facility Map

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- 1950 Sanborn Map
- April 7, 1951 Aerial Photo
- April 16, 1959 Aerial Photo
- January 14, 1963 Aerial Photo
- March 29, 1966 Aerial Photo
- August 11, 1968 Aerial Photo
- May 30, 1970 Aerial Photo
- April 15, 1973 Aerial Photo
- April 9, 1978 Aerial Photo
- October 23, 1982 Aerial Photo
- May 18, 1989 Aerial Photo

Copies of the maps and aerial photos are provided at the end of Part 1 of this Phase II Report as Attachment 1.

The 1908 Sanborn map shows a single structure facing Berlin Street (Rome Street) approximately 175' east of the intersection with St. Charles Street. The structure is approximately 75' x 100'. The right-of-way for Kossuth Street is shown as a "paper street" and appears to be the basis for a separate Block designation of 2061 for the area bounded by Berlin Street (Rome Street), St. Charles Street, Kossuth Street right-of-way and McGregor Avenue. A series of buildings labeled The Celluloid Company are shown on a Block labeled 2059 approximately 450 feet northwest of the single structure. Block 2059 is shown as the area bounded by the extension of Komorn Street, McGregor Avenue, the paper street right-of-way of Barbara Street and St. Charles Street. The facilities shown at the Celluloid Company are labeled "Refinery Dept.", "Camphor Dept.", and "Oil Boiling". No other adjacent land uses are shown.

The 1931 Sanborn map shows considerable development of the site and the surrounding area. A facility labeled "The Celluloid Corp. Lindol Plant" has replaced the single structure. A 200' x 50'

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row of structures has been constructed fronting on Rome Street with five additional structures immediately northwest as part of the same Lindol Plant operation. All of the present day Ironbound Recreation Center property (including the playing fields) is shown as The Celluloid Corp. The Celluloid Company buildings that appeared on the 1908 map on Block 2059 appear unchanged accept for the addition of one small building and the label "Acetate.Celluloid Plant". The triangular parcel northwest of the Acetate Celluloid Plant that is bounded by St. Charles Street and McGregor Avenue contains seven small structures and is labeled "Scrap Plant". The land area of the Scrap Plant is shown as Block 2052. All of the paper streets shown transversing the present-day Ironbound Recreation Center fields on the 1908 map are deleted on the 1931 map. The present-day Block 2052, Lot 30 parcel is labeled "Sacks Barlow Foundries, Inc., not in operation". Immediately northwest of this facility on the opposite side of McGregor Avenue is shown the "Union Paving Company asphalt mixing plant". Two asphalt tanks are shown approximately 200 feet north of the Pool Site. Numerous railroad tracks have been constructed on the north side of McGregor Avenue as well as south of Rome Street since the 1908 map. Land uses to the southwest of St. Charles Street are not shown on the map.

The April 6, 1940 aerial photograph shows the Lindol Plant facilities to be the same as shown on the 1931 Sanborn map with the addition of a structure fronting on St. Charles Street approximately 175 feet from the intersection with Rome Street and two areas of disturbed soil located north and northeast of the Lindol Plant. A large structure is shown at the Sacks Barlow Foundries site immediately north-northeast of the Lindol Plant site on present-day Lot 30. The present day Cook and Dunn building and residences on the southwest side of St. Charles Street are present. The facilities previously labeled as the Acetate Celluloid Plant and the Scrap Plant remain.

The April 28, 1947 aerial photograph shows essentially the same land uses at the Lindol Plant. However, an above-ground tank farm has been constructed at the northwest corner and the two disturbed areas shown in the 1940 photograph are now large stockpiles of dark material. The northwest stockpile shows conical piles on top of a large mound suggesting that individual

truckloads of solid materials were being added to the pile. The north stockpile is larger, but more level and shows a steep cut face suggesting that material was being removed from the stockpile. A railroad spur enters the Lindol Plant site from the north and curves between the two stockpiles to the plant facilities. The adjacent land uses do not appear significantly changed except that the asphalt mixing plant appears to have been removed.

The October 8, 1948 Celanese Facility map which is titled "Celanese Corp. of America, Plastics Division" provides a detailed layout of the Lindol Plant. (It should be noted that the operational descriptor labeling on this map (in small bold type) such as "tank farm", "landfill", "pilot plant", etc. is not original to the map and was added to the base map for use in the Phase I Report based upon Hoechst Celanese' interpretation and understanding of the operation; there are no confirming records). The building outlines of the Lindol Plant closely correspond to the 1947 aerial photograph. The 1948 map shows the tank farm as "Raw Material Storage" and the north stockpile as a "Coal Yard".

The 1950 Sanborn map shows no significant land use changes except that a scrap iron and junk yard is shown on the northwest side of McGregor Avenue at the present-day location of The Tidewater Baling Company (this operation can also be identified in the 1947 aerial photograph).

The April 7, 1951 aerial photograph is at a very small scale, but no significant land use changes are apparent. Both stockpile areas appear to be smaller in size.

The April 16, 1959 aerial photograph shows dramatic land use changes. All of the structures at the Lindol Plant have been demolished except for two which are believed to be a small office building fronting on St. Charles Street and a pilot plant. The two stockpiles are gone, but a large white area appears where the coal stockpile (north stockpile) had been. The raw material above-ground storage tanks at the northwest corner of the Lindol Plant site have been removed, but the foundations and supports for the tanks remain. The railroad siding has been removed.

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Considerable rubble remains on-site. A new, small white structure has been constructed next to the building that is believed to be the pilot plant. The adjacent land uses are not significantly different from the 1951 aerial photograph.

The January 14, 1963 aerial photograph shows no noticeable change in land use at the site or adjacent sites since the 1959 photograph.

The March 29, 1966 aerial photograph shows that all structures at the Lindol Plant have been demolished. The supports for the above-ground tanks at the raw materials storage area remain. The rubble observed in previous photographs has been removed. A small area off St. Charles Street is used for automobile parking.

The August 11, 1968 aerial photograph shows that construction of the Ironbound Recreation Center skating rink and stadium has begun. Foundation structures for the new building are visible. The Acetate Celluloid Plant has been demolished, as has the Scrap Plant so that the entire area of the present-day Ironbound Recreation Center, including the playing fields, is clear of structures. A new building has been constructed across Rome Street from the site.

The May 30, 1970 aerial photograph shows that the Ironbound Recreation Center skating rink, stadium and running track appear complete and cover much of the former Lindol Plant site. The present-day football/soccer field and baseball fields are not yet complete. A small playground has been completed on the southwest side of the skating rink at the location of the proposed pool.

The April 15, 1973 aerial shows the completed Ironbound Recreation Center and playing fields. The Tidewater Baling operating has expanded noticeably.

The April 9, 1978 aerial photograph shows no noticeable changes in land use.

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The October 23, 1982 aerial photograph shows no indications of land use changes except for an addition to the northwest side of the former Sacks Barlow Foundries building. The addition appears to extend over the location of the former asphalt mixing plant identified on the 1931 Sanborn Map.

The May 18, 1989 aerial photograph shows the site as it has been during the Phase I and Phase II investigations. The small playground area has been demolished in preparation for pool construction.

PLANT OPERATIONS

There is little documentation of the plant operations at the Celanese Lindol Plant and, to date, no documentation of the plant operations by The Celluloid Company. The Celanese Division that operated the Lindol Plant has gone through several organizational changes over the past 40 years and few records have been discovered. Hoechst Celanese does not produce Lindol today. The 1948 Celanese Facility map shows the outline of the various structures at the Lindol Plant. The operational descriptor labels (in small block type) have been added to the base map based on best current interpretation and understanding of the operation, but cannot be documented at this time. Similarly, all of the site-specific information described below is based on incomplete records and unconfirmed sources and, consequently, is subject to correction.

PRODUCTS

Lindol is a trade name for tricresyl phosphate. The Lindol Plant is believed to have primarily manufactured tricresyl phosphate but also tri-2,4 dimethylphenol phosphate, tri-phenol phosphate, and tri-orthophenol phosphate. It is believed that the meta and para isomers of tricresyl phosphate were produced and that operations were controlled to minimize the unintentional production of the

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ortho isomer so that less than one percent of the manufactured tricresyl phosphate was in the ortho form (which is significantly more toxic).

The products produced are all triaryl phosphates. Celanese is noted in the literature as the first producer of triaryl phosphates (Van Wazer, 1961). Table 1.1 provides a summary obtained from reference documents of the triaryl phosphates produced by Celanese, the Celanese trademark and the primary use. It is not known which of the trademarked triaryl phosphates, other than Lindol, were produced at the Newark Lindol Plant.

Tricresyl phosphate (para isomer) is reported as an oily, practically colorless, nonvolatile liquid. It is slightly soluble in water and is soluble in alcohol, ether, benzene and chloroform. Quantitative solubility in water is reported as less than 0.002% @ 85 deg. C. Additional quantitative chemical data are summarized as follows:

Boiling Point	244 C @ 3.5 mg Hg
Melting Point	77-78 deg. C
Density	1.247 @ 25 deg. C
Vapor Pressure	10 mm Hg @ 265 C
Flash Point	410 deg. F

RAW MATERIALS

The raw materials believed to have been used at the Lindol Plant include phenol, persilicic acid, phosphoric acid, potassium permanganate, oxalic acid, magnesium chloride, cresylic acids, sulfuric acid and caustic soda.

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TABLES

BY-PRODUCTS

It is believed that the by-products of the Lindol Plant operation included hydrochloric acid, light fraction hydrocarbons and still ends.

MANUFACTURING PROCESS

The following is a generic description of the typical manufacturing process used to produce tricresyl phosphate. The process description was obtained from reference documents. The specific manufacturing process used at the Lindol Plant is not known; however, it is reported that all tricresyl phosphate manufacturing processes are based on the condensation of phenolic compounds and phosphorus oxychloride (Van Wazer, 1961). The reaction equation with phenol is

$$3C(6)H(5)OH + POCl(3) \longrightarrow (C(6)H(5))(3)PO + 3HCl$$

A detailed process flow diagram is shown in Figure 1.3 (Van Wazer, 1961; Kirk - Othmer, 1982). It is noted that processing techniques vary depending of the length of time the manufacturer has been involved in production, the equipment available, whether the plant is multipurpose or designed for production of only one ester and the grade of the phenolic to be processed (Van Wazer, 1961). The major processing steps are: condensation of the raw materials, preliminary purification, final purification, dehydration, decolorization and filtration.

The Condensation Step

The raw materials necessary for the production process include phosphorus oxychloride, cresylic acid and a catalyst. Metal halides are considered the favored catalyst (Van Wazer, 1961). The conditions required for the condensation step include temperatures in the range of 150 to 300 deg. C (depending on the catalyst used) and an excess of the cresylic acid. These temperatures and raw material ratios facilitate the formation of the triaryl phosphate while minimizing the

TABLES

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production of cresyl phosphate and dicresyl phosphate. The reported temperature when using metal halides is 200 deg. C, with a reaction time of six to nine hours (Van Wazer, 1961; Faith, 1975). Since the reaction mixture is highly corrosive, the reactor is glass lined or an alloy kettle (Van Wazer, 1961). The process can be either batch or continuous. In a continuous operation, the reaction mixture is passed through a series of reactors at successively higher temperatures. The crude reaction mixture from the last reactor is passed through a heat exchanger and condenser prior to the purification process (Faith, 1975). HCl is evolved during the reaction and is passed through reflux condensers to a recovery system (Faith, 1975). Loss of phosphorus oxychloride with evolution of HCl is reduced by either operating under moderate pressures or venting through a condenser (Van Wazer, 1961).

Magnesium chloride is believed to have been a raw material at the Lindol Plant and would be a likely catalyst. Cresylic acid is also believed to have been a raw material at the Lindol Plant. There is no indication of phosphorus oxychloride having been a raw material at the Lindol Plant. However, synthesis of phosphorus oxychloride could have occurred at the Lindol Plant since two of the required chemicals, phosphorus and oxalic acid, are believed to have been raw materials. Chlorine would also have been required for the on-site synthesis of phosphorus oxychloride; hydrochloric acid, a by-product of triaryl phosphate production, could have provided a source of chlorine.

The Refining Steps

The refining techniques are reported as fairly standardized among producers (Van Wazer, 1961). Variations include the sequence of techniques, batch washing versus column washes and the extent of purification. Plasticizer grades are more refined than the gasoline additive grades.

The preliminary purification may first include washing of the crude reaction product with dilute caustic solution, approximately 2 percent (Faith, 1975). This step neutralizes any hydrogen

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chloride and hydrolyzes and extracts traces of partial esterification products and unreacted phenolic compounds. The next step is flash distillation. Preliminary purification may exclude the caustic acid wash (Van Wazer, 1961).

The final purification process includes washing with dilute caustic and water to remove traces of organic acidity, treatment with dilute permanganate solution to improve color and oxidation stability of the product, dehydration by heating under reduced pressure, bleaching with activated carbon and/or earth and final filtration (Van Wazer, 1961).

Since it is believed that caustic soda, potassium permanganate and sulfuric acid were raw materials at the Lindol Plant, it appears that caustic washes and permanganate washes may have been used. Distillation and filtration operations are also believed to have been present at the Lindol Plant.

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PHASE II FIELD INVESTIGATION OF SOIL AND GROUND-WATER QUALITY CONDITIONS, IRONBOUND POOL SITE, NEWARK, NEW JERSEY

INTRODUCTION

In August 1987, Geraghty & Miller, Inc. was retained by Dresdner, Robin & Associates of Jersey City, New Jersey, consultants to the City of Newark, to conduct hydrogeologic investigations at the proposed swimming pool site at the Ironbound Recreation Center in Newark, New Jersey. This report summarizes Phase II field investigation activities carried out at the Ironbound Pool Site from February 1988 through September 1989 and describes the results of ground-water recovery and treatment testing.

The Phase I investigation, conducted in September 1987, focused on assessing soil and ground-water quality conditions in the vicinity of the proposed pool site, and evaluating ground-water recovery and treatment needs associated with anticipated construction dewatering activities. Phase I involved soil sampling in the area of the proposed pool excavation and the installation and sampling of six shallow monitoring wells. The results of the Phase I investigation were summarized in Geraghty & Miller's December 1987 report, entitled "Assessment of Soil and Ground-Water Quality Conditions at the Ironbound Recreation Center, Newark, New Jersey." This report was submitted to the New Jersey Department of Environmental Protection (NJDEP) as part of Dresdner, Robin & Associates' December 1987 report (Dresdner, Robin & Associates 1987).

In a letter to the City of Newark, dated February 11, 1988, the NJDEP specified the locations of four additional monitoring wells to be installed at the Ironbound Pool Site. A draft Administrative Consent Order (ACO) regarding an investigation and remediation of the site was sent by the NJDEP to the City of Newark in February 1988. Subsequently, the following additional work was carried out at the site from February 1988 through September 1989:

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- The installation and sampling of four additional shallow monitoring wells (Monitoring Wells MW-7 through MW-10) at locations specified by the NJDEP to better define the horizontal extent of ground-water contamination (during April and May 1988).

- The drilling and sampling of seven additional soil borings (Soil Borings S-7 through S-13) at, and in proximity to, the pool excavation area (during April 1988). The collected soil samples were analyzed for waste classification parameters and other parameters to determine soil-quality conditions in the vicinity of the proposed pool excavation (during April 1988).

- The installation and sampling of a deeper monitoring well (Monitoring Well MW-11) that was used for a controlled aquifer pumping test for construction dewatering purposes (during May 1988).

- The installation and sampling of a shallow monitoring well (Monitoring Well MW-12) at a location where soil borings had shown the presence of nonaqueous phase liquid in the saturated zone (during May, June, and October 1988).

- The implementation of two controlled pumping tests on Monitoring Wells MW-6 and MW-11 for construction dewatering design purposes. Two granulated activated carbon (GAC) units were concurrently pilot-tested for ground-water treatment. Water samples were collected during the testing to assess the effectiveness of the GAC units (during June 1988).

- A bench-scale treatability test on water pumped from on-site Monitoring Wells MW-6, MW-11 and MW-12, carried out at the laboratory of Calgon Carbon Corporation in Pittsburgh, Pennsylvania (conducted from September 1988 through February 1989).

- The collection of two rounds of synoptic water-level data from all on-site monitoring wells (in June and September 1988).

- The collection of continuous water-level data through the installation of an automatic water-level recorder on Monitoring Well MW-12 (from September 1988 to the present).

FIELD PROGRAM

Monitoring Well Installation

Between April 21 and April 25, 1988, four shallow monitoring wells (Monitoring Wells MW-7 through MW-10), ranging in depth from 17.5 to 19.5 feet below ground surface, were installed in the vicinity of the proposed swimming pool site by Environmental Drilling, Inc., Mount Arlington, New Jersey. Monitoring Wells MW-11 and MW-12 were installed in May 1988. Monitoring Well MW-12 is a shallow well, 18 feet in depth, and Monitoring MW-11 is a deeper well that was installed to a depth of 34 feet below ground surface. A Geraghty & Miller hydrogeologist was present to describe the geologic samples and document monitoring well construction. The locations of all on-site monitoring wells are shown on Figure 1.

Monitoring Well MW-11 was installed at a location where dewatering would have been required for the deeper end of the originally proposed swimming pool. The depth of dewatering was to be approximately 16 feet below ground surface at this location. Monitoring Well MW-11 was installed to provide a sufficient saturated thickness (screened interval) to allow for the originally anticipated dewatering. The pool has now been redesigned as a totally aboveground facility.

The monitoring wells were drilled by using 6 1/2-inch inside diameter hollow-stem augers. The finished boreholes were 10 to 12 inches in diameter. Split-spoon samples were collected continuously in each borehole from ground surface to the top of the water table,

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and at 5-foot intervals from the top of the water table to the bottom of the borehole. The split-spoon soil samples were monitored at the time of collection by using an organic vapor analyzer with a photoionization detector. The geologic logs for the monitoring wells are provided in Appendix A.

The monitoring wells were constructed using 4-inch diameter, flush-jointed PVC casing and 0.020-inch slot well screen. The casing and screen assemblies were installed in the open boreholes, and a filter pack compatible with the screen slot size was placed in the annular space between the screen and the borehole. Well construction details are summarized in Table 1. The wells were developed by pumping with a submersible pump until clear water was produced. The monitoring wells are protected by 6-inch diameter, flush-mount protective casings, except for Monitoring Wells MW-11 and MW-12, which have aboveground steel protective casings. Schematic monitoring well construction diagrams are shown on Figure 2.

New Jersey-licensed land surveyors, Alfred J. Clark, Inc., Passaic Park, New Jersey, surveyed the monitoring well locations and elevations of the tops of each well casing for Monitoring Wells MW-7 through MW-12. Monitoring well elevation and water-level measurement data for all 12 monitoring wells installed at the site are summarized in Table 2. Construction Surveyors, Inc., Oakland, New Jersey, surveyed Monitoring Wells MW-1 through MW-6.

Soil Borings

Six soil borings (Soil Borings S-7 through S-12) were drilled on April 25, 1988 by Environmental Drilling, Inc., Mount Arlington, New Jersey, to further characterize soil quality within and below the proposed pool excavation. A separate boring, located to the south of the proposed pool site (Soil Boring S-13), was advanced by using a hand auger to collect a shallow soil sample. Sample depths, analytical parameters, and observations during sampling are summarized in Table 3; soil boring locations are shown on Figure 3. The geologic logs for the soil borings are provided in Appendix A.

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The soil sampling tools were decontaminated prior to sampling and between successive soil borings with a laboratory-grade detergent solution scrub and rinse, followed by a rinse with distilled water. Field blanks were also collected during sampling. The samples, field blanks, and a trip blank were analyzed by Envirotech Research, Inc., Edison, New Jersey. The soil sampling protocols are presented in Appendix B.

Ground-Water Sampling

Geraghty & Miller personnel sampled Monitoring Wells MW-7 through MW-10 on May 9, 1988 in accordance with the protocols outlined in Appendix C. The sample set included a blind replicate sample from Monitoring Well MW-10, a field blank sample, and a trip blank sample. All ground-water samples and the field blank were analyzed for parameters on the U.S. Environmental Protection Agency (USEPA) Priority Pollutant List and total tricresyl phosphate (TCP). The trip blank was analyzed for volatile organic compounds (VOCs). The samples were analyzed by Envirotech Research, Inc., Edison, New Jersey.

During the sampling of Monitoring Well MW-12 (in June 1988), the well was pumped for approximately 8 minutes at a rate of approximately 6 gallons per minute (gpm). The pumped water was placed in a 55-gallon drum. The purpose of this short-term pumping was to determine if a free, nonaqueous phase liquid, with a density greater than water, was present in the water pumped from this monitoring well.

Water samples from Monitoring Well MW-12 were collected in clear glass bottles and a trace of a nonaqueous phase liquid was noted in the water samples. Water samples were retained for analysis for total petroleum hydrocarbon, (TPHC), base/neutral and acid extractable organic compounds (BNAs), and TCP. An additional sample was collected from Monitoring Well MW-12 on October 6, 1988 and analyzed for VOCs.

Water samples from Monitoring Wells MW-6 and MW-11 were collected in June 1988 during the pilot testing of GAC units. These samples were analyzed for parameters

on the USEPA Priority Pollutant List (excluding metals, cyanide, and phenols), TCP, biological oxygen demand (BOD), total suspended solids, and pH.

Aquifer Pumping Tests

Pumping tests were conducted on Monitoring Wells MW-11 and MW-6 on June 2 and 3, 1988, respectively. The primary objective of the pumping tests was to develop an estimate of aquifer hydraulic characteristics that would be used to estimate pumping rates for a pump and treat system associated with construction dewatering. The original pool design called for an in-ground construction, with the deepest portion of the pool being at the southern end. The site was to be dewatered to a depth of 16 feet below ground surface, according to the original pool design. An electric-powered submersible pump with a control valve was used for the pumping test and a gasoline-powered generator supplied electric power to the pump.

Monitoring Well MW-11 Pumping Test

On June 2, 1988, a 4-hour, constant-rate pumping test was conducted on deeper Monitoring Well MW-11 located near the southwestern end of the proposed pool. This well was chosen for pumping because it would provide a sufficient saturated thickness to allow for dewatering to a depth of 16 feet. The well was pumped at a rate of 7.75 gpm, and the pumped discharge was passed through two GAC units in parallel. (Two parallel GAC units were necessary because the individual GAC units can only handle a maximum flow rate of 5 gpm).

Prior to the initiation of the pumping test, water levels were measured in all of the monitoring wells. An automatic water-level recorder was placed on Monitoring Well MW-1, the most proximate shallow well to Monitoring Well MW-11, to provide a continuous record of water-level behavior in this well during the period of pumping.

Monitoring Well MW-6 Pumping Test

On June 3, 1988, a 4-hour, constant rate pumping test was conducted on Monitoring Well MW-6. This well, which is located near the northeast end of the proposed swimming pool, was selected for pumping because it showed the highest concentrations of BNAs in ground water during the Phase I investigation. The well was pumped at a rate of approximately 2 gpm and the pumped discharge was passed through two GAC units. As previous water samples from this well had shown high phenol concentrations, the two GAC units were used in a series arrangement to provide increased time for contact. During the Monitoring Well MW-6 pumping test, water-level measurements were made periodically in Monitoring Wells MW-7, MW-8, and MW-12.

Pilot-Scale Ground-Water Treatability Test

During the aquifer pumping tests, the pumped water was passed through GAC units for treatment and a series of water samples was taken to assess pre-treatment (influent) and post-treatment (effluent) water-quality. The objective of the GAC unit pilot test was to assess the effectiveness of the GAC units in removing organic constituents.

The GAC units were purchased from the Calgon Carbon Corporation, Pittsburgh, Pennsylvania. Each unit contained 160 pounds of GAC in a 55-gallon, high-molecular-weight polyethylene drum. A 3,500-gallon tanker truck was provided by Environmental Services, Inc., Newark, New Jersey for the temporary storage of the water that was pumped and treated during the tests.

During the pumping tests, composite influent and effluent samples were collected for an analysis of USEPA Priority Pollutant constituents (with the exception of VOCs), TCP, BOD, total suspended solids, and TPHC. Since composite sampling for VOCs can cause reduction in concentration through volatilization, grab samples for VOCs were collected from the influent and effluent of the GAC treatment units after approximately 2 hours of

pumping. Specific conductance and pH were measured periodically in both influent and effluent samples during the pumping tests.

Bench-Scale Ground-Water Treatability Test

A bench (or laboratory)-scale treatability test was conducted by Calgon Carbon Corporation on ground-water samples collected from Monitoring Wells MW-6, MW-11, and MW-12. The purpose of these tests was to determine the applicability of the GAC treatment process and to estimate GAC consumption rates. The wells were sampled on September 19, 1988. A submersible pump, powered by an electric generator, was used to evacuate the wells and collect water samples.

Prior to sampling, approximately 275 gallons of water were pumped from Monitoring Well MW-11 at a rate of 4 gpm. The water had discontinuous, non-aqueous films on the surface and a strong odor. Although the water was initially grayish-black, it became clearer as pumping continued. The flow was reduced to prevent aeration of the sample and approximately 3 gallons of water were pumped into a 5-gallon glass container.

Approximately 100 gallons of water were pumped from Monitoring Well MW-12 at a rate of 2.5 gpm. A reduction of flow to 1 gpm occurred as the well was dewatering. The water was white and foamy when pumped. After the water was allowed to remain quiescent in drums, bits of foam and a non-aqueous film were observed on the water surface. The water was then observed to be grayish-black in color and had an extremely strong odor. Five gallons of water were collected in a second glass container.

Approximately 160 gallons of water were pumped from Monitoring Well MW-6. The water had no film, but it was odorous and was slightly gray in color. Prior to sampling, the flow rate was reduced and 2 gallons of water were pumped into the container that held the 3 gallons of water from Monitoring Well MW-11.

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Samples were shipped to Calgon Carbon Corporation laboratory, Pittsburgh, Pennsylvania, for testing. The report from Calgon is provided in Appendix D.

Water-Level Monitoring

Water level were measured in all monitoring wells installed to date on June 2 and September 6, 1988; these data are summarized in Table 2. In September 1988, an automatic water-level recorder was installed in Monitoring Well MW-12 to continuously monitor water levels. The results of this water-level monitoring study are discussed in the Water Level Fluctuations section of this report.

Daily precipitation data have been obtained from the National Oceanic and Atmospheric Administration (NOAA, 1988; 1989) and the Newark Airport meteorological weather station since the installation of the water-level recorder in Monitoring Well MW-12; these data have been compared with the water-level data to characterize the shallow water-table aquifer's reaction to precipitation events.

AQUIFER CHARACTERISTICS

Site Geology and Hydrogeology

According to Nichols (1968), a certain portion of Newark is underlain by Pleistocene age stratified glacial drift (Figure 4). Glacial drift includes fluvial (river) and lacustrine (lake) deposits. The fluvial glacial deposits are generally stratified sand and gravel; the glacial lacustrine deposits are usually bedded or laminated silt and clay. The unconsolidated deposits in this area are underlain by the Triassic age Brunswick Formation, which generally consists of reddish-brown sandstone and shale. The depth to bedrock below the site is reportedly on the order of 70 feet, although the depth varies from 52 to 110 feet below ground surface within approximately 0.25-mile of the site (Nichols 1968; Nemickas 1974).

Based on data collected during the Phase I and Phase II investigations, the site is underlain by artificial fill and unconsolidated deposits to a depth of at least 35 ft below ground surface. The thickness of artificial fill under the site ranges from zero to approximately 7 feet. The fill is generally thickest in the northwestern portion of the site, according to the lithologic logs of Monitoring Wells MW-1, MW-2, and MW-5. The unconsolidated deposits are comprised of brownish-gray, fine-to-medium sand with varying amounts of silt. The amount of silt appears to increase with depth. The depth to water at the site ranges from approximately 3 to 7 feet below ground surface. Bedrock was not encountered during drilling at the site.

Water-level contour maps were constructed from water-level measurements made on June 2 and September 6, 1988 (Figures 5 and 6, respectively). The principal direction of shallow ground-water flow is to the southeast and the hydraulic gradient in the proposed pool area ranges from 0.003 ft/ft to 0.015 ft/ft.

The water-level drawdown data from the short-term pumping tests conducted on Monitoring Wells MW-6 and MW-11 were plotted on semi-logarithmic graph paper (Figures 7 and 8, respectively) and analyzed using the Cooper-Jacob modified non-equilibrium equation (Cooper and Jacob 1946). Calculated values of aquifer transmissivity range from 1,900 to 2,400 gallons per day per foot (gpd/ft). Based on a saturated thickness of 28 feet, estimates of hydraulic conductivity range from 68 to 86 gallons per day per foot squared (gpd/ft^2), equivalent to 9 to 11 ft/day. The value of 28 feet was calculated by subtracting the depth to water in Monitoring Well MW-11 from the total depth of the well.

As a result of pumping Monitoring Well MW-11, the water-level drawdown in Monitoring Well MW-1, which is located 21 feet northwest of Monitoring Well MW-11, was 0.31 foot, whereas the water-level drawdown in Monitoring Well MW-12, which is 75 feet east of Monitoring Well MW-11, was approximately 0.74 foot. In that Monitoring Well MW-1 is much closer to Monitoring Well MW-11 than Monitoring Well MW-12, this water-level drawdown response may indicate that the aquifer is anisotropic, that is, the zone connecting Monitoring Wells MW-11 and MW-12 is more permeable than the zone

connecting Monitoring Wells MW-11 and MW-1. The thickness of fill at the location of Monitoring Well MW-1 is approximately 7 feet. At the locations of Monitoring Wells MW-11 and MW-12, the thickness is no more than 4 feet. It is possible that the fill inhibits the shallow hydraulic connection between Monitoring Wells MW-1 and MW-11. An alternative explanation is that a physical barrier, such as a building foundation, is present between Monitoring Wells MW-11 and MW-1.

The hydraulic gradient measurements and hydraulic conductivity values were used to estimate ground-water travel times in the shallow aquifer system. A summary of calculated ground-water travel times and the assumptions used in the calculations is provided in Table 4.

Water-Level Fluctuations

Ground water fluctuations below the site of the proposed swimming pool have been monitored since September 1988 using a Stevens Model 68 automatic water-level recorder installed in Monitoring Well MW-12. The daily precipitation record for NOAA's Newark Airport meteorological weather station from September 1988 through September 1989 is shown on Figure 9. A comparison of this record with the water-level hydrograph on the same figure provides an indication of water-table fluctuations in response to precipitation. In general, the effects of recharge at the site are apparent immediately following rainfall events. During winter months, the water table's response to precipitation is slower. Following a rainfall-induced water-level rise, the water level begins to drop within approximately 3 or 4 days following rainfall events, provided there is no additional precipitation.

Since the installation of the water-level recorder, the highest recorded water-level elevations were in May, June, and August 1989, in response to an unusually wet spring and summer. During these three months, the water table reached peak levels of approximately 2.9 feet below ground surface.

A peak in the water-table level of approximately 4.1 feet below ground surface was also observed in early December 1988 in response to precipitation in the latter part of November 1988. With the exception of this peak, the recorded water-table level from September 1988 through most of February 1989 remained between approximately 5.0 and 5.9 feet below ground surface.

Normal monthly precipitation for Newark is provided in Table 5, along with the precipitation record for the period from September 1988 through September 1989. The deviation from normal precipitation for this period is also shown in this table.

SOIL AND GROUND-WATER QUALITY CHARACTERISTICS

Soil Quality

The analytical results for soil samples collected during the Phase II investigation are summarized in Tables 6 and 7. Table 6 provides a summary of USEPA Priority Pollutant parameters and TPHC concentrations, and Table 7 presents hazardous waste characteristics and TPHC concentrations for the collected soil samples. Soil boring locations are shown on Figure 3; the collection dates and depths of soil samples and the analytical parameters are summarized in Table 3.

The soil samples exhibited a number of BNAs and to a lesser degree, VOCs. The most prevalent compounds were tricresyl phosphate and 2,4-dimethylphenol which were detected in all soil samples. Detectable levels of tricresyl phosphate ranged from 3,000 micrograms per kilogram (ug/kg) in Soil Boring S-7 (0 to 4 feet) to 2,900,000 ug/kg in Soil Boring S-12 (5 to 12 feet). Concentrations of 2,4-dimethylphenol ranged from 1,000 ug/kg in Soil Boring S-7 (4 to 6 feet) to 172,000 ug/kg in Soil Boring S-12 (5 to 12 feet).

Priority Pollutant metals were detected in Soil Borings S-7, S-9, S-10, and S-13. Lead and zinc showed the highest concentrations in Soil Borings S-7 (0 to 4 feet) and S-13

(1 to 2 feet). (The 0 to 4 feet sample from Soil Boring S-7 was taken from the auger flight. The proximity of a gas pipeline prevented the use of a split-spoon sampler in this area.)

Total phenols were analyzed by the standard wet chemistry method and were detected in all soil samples. The highest concentration, 368 milligrams per kilogram (mg/kg), was detected in Soil Boring S-8 (9 to 10 feet) and the lowest concentration, 17.1 mg/kg, was detected in Soil Boring S-12 (13 to 14 feet). TPHC concentrations were detected in all samples with the exception of Soil Borings S-11 (13 to 14 feet), S-12 (0 to 5 feet) and S-12 (13 to 14 feet). The highest concentration of TPHC (1,290 mg/kg) was detected in Soil Boring S-8 (0 to 5 feet).

The soil samples which were analyzed for waste classification did not exhibit the characteristics of EP toxicity (Table 7). Arsenic was detected in several soil samples which were analyzed for waste classification. The highest detected concentration was 0.023 mg/L in Soil Boring S-9 (0-5 feet). This concentration is well below the EP toxicity characteristic concentration for arsenic of 5 mg/L. Chromium was detected at a concentration of 0.22 mg/L is one sample for waste classification (Soil Boring S-10, 0-5 feet). This concentration is also well below the EP toxicity characteristic concentration of 5 mg/L for chromium. The herbicide 2,4-D was detected in several soil samples analyzed for waste classification. The highest detected concentration was 0.099 in Soil Boring S-11 (0-5 feet). This is well below the EP toxicity characteristic concentration of 10 mg/L for 2,4-D. The soil samples did not exhibit the characteristics of ignitability, corrosivity, or reactivity. TPHC was detected in all samples analyzed for waste classification with the exception of Soil Boring S-12 (0-5 feet). Concentrations of TPHC in these samples ranged from 35 to 1,290 mg/kg. Based on these analytical results, the NJDEP issued a waste classification opinion that the sampled soil is ID-27 (non-hazardous) waste.

Ground-Water Quality

Geraghty & Miller sampled four of the five new shallow monitoring wells (Monitoring Wells MW-7 through MW-10) on May 9, 1988, in accordance with the

protocols presented in Appendix C. The sample set included blind replicate samples from Monitoring Well MW-10, a field blank sample, and a trip blank sample. All ground-water samples and the field blank were analyzed for parameters on the USEPA Priority Pollutant List and TCP, and the trip blank was analyzed for VOCs. The samples were analyzed by Envirotech Research. The laboratory analytical results are summarized in Table 8.

Monitoring Well MW-12 was pumped for a brief period on June 3, 1988 to collect ground-water samples so that the water could be examined for the presence of a nonaqueous phase liquid. The water pumped from Monitoring Well MW-12 was initially black in color; however, it changed to a white foamy color after 1 to 2 minutes of pumping. The odor was very strong, and white-colored vapors were observed emanating from the surface of the water in the drum. Samples collected from this well were analyzed for BNAs and TPHC. The analytical results are shown in Table 11. Monitoring Well MW-12 exhibited 2,4-dimethylphenol and tricresyl phosphate at respective concentrations of 36,300 ug/L and 620 ug/L. Based on these results, a sample from Monitoring Well MW-12 was collected on October 6, 1988 and analyzed for VOCs. These results are summarized in Table 8.

The analytical results for acid extractable organic compounds indicate that phenols are present at high concentrations in Monitoring Well MW-10 and at lower concentrations in Monitoring Well MW-9. The replicate samples from Monitoring Well MW-10 exhibited 370 to 393 ug/L of phenol and 14,900 to 15,400 ug/L of 2,4-dimethylphenol. The results were confirmed by the total phenolic tests which indicated 889 ug/L total phenols in Monitoring Well MW-9 and 15,600 to 18,500 ug/L total phenols in Monitoring Well MW-10. Phenols were not detected in Monitoring Wells MW-7 and MW-8.

The analytical results for base/neutral extractable organic compounds indicate that several of these compounds, polynuclear aromatic hydrocarbons (PAHs) and phthalates, may be present in the gound water at trace to very low concentrations. Naphthalene and dimethylphthalate were detected in the duplicate samples from Monitoring Well MW-10 at concentrations of 15 to 17 ug/L and 13 to 14 ug/L, respectively. Other PAHS and

phthalates were found below the method detection limit. The samples from Monitoring Wells MW-8 and MW-9 showed trace concentrations of PAHs and phthalates below the method detection limit. No base/neutral extractable organic compounds were detected in the sample from Monitoring Well MW-7.

TCP was detected in the replicate samples from Monitoring Well MW-10 at concentrations of 1,160 to 1,690 ug/L. This compound was not detected in the samples from Monitoring Wells MW-7, MW-8 and MW-9.

The analytical results for VOCs indicate that benzene, toluene, ethyl benzene, and xylene (BTEX) are present in the ground water at the Monitoring Well MW-12 location. The total BTEX concentration found in this well was 6,631 ug/L. Very low concentrations of one or more of these constituents were also detected in two other monitoring wells. The replicate samples from Monitoring Well MW-10 showed benzene concentrations of 5.2 to 5.4 ug/L, toluene concentrations of 4.7 to 4.8 ug/L, and total xylene concentrations of 8.3 to 9.7 ug/L. (The toluene concentrations were below the reported method detection limit.) Toluene was also detected in the sample from Monitoring Well MW-8 at a concentration of 22 ug/L. The samples from Monitoring Wells MW-7 and MW-9 showed only trace concentrations of one or two chlorinated VOCs which were below the reported method detection limits.

Tentatively identified BNA organic compounds (TICs) were detected in all of the monitoring wells with the exception of Monitoring Well MW-7. The TICs and their estimated concentrations are shown in Table 9. The wells which contained the highest priority pollutant and TCP concentration exhibited the highest concentrations of TICs. For example, Monitoring Well MW-10, which contained approximately 17,000 ug/L of priority pollutant BNAs and TCP, exhibited over 40,000 ug/L of TICs. Monitoring Well MW-9 showed 555 ug/L of priority pollutant BNAs and TCP and 1,370 ug/L of TICs; Monitoring Well MW-8 showed 1.8 ug/L of priority pollutants BNAs and 296 ug/L of TICs; Monitoring Well MW-7 exhibited neither priority pollutants or TICs. The TICs were comprised mainly of 4-methyl phenol and a number of other methylated and ethylated phenol isomers which

were not individually identifiable. The TIC analysis, in conjunction with the priority pollutant BNA and TCP analysis indicates that phenols and TCP are the major chemical constituents in the ground water.

Several pesticides were detected at concentrations up to 10.6 ug/L in Monitoring Wells MW-7 and MW-8. However, the laboratory has indicated that these compounds were searched for but not detected in the BNA fraction, and their presence was not confirmed by the GC/MS tests.

Arsenic, lead, thallium and zinc were detected in all or most of the ground-water samples; antimony and nickel were detected in one sample each. The lead and zinc results were qualified by the laboratory, since these analytes were also detected in the laboratory blanks. In general, the metal concentrations are low and do not appear to be elevated.

The field measurements of pH, temperature, and specific conductance for the ground-water samples collected from the four new shallow monitoring wells are summarized in Table 10. These measurements were collected following well evacuation for sampling. Ground-water concentrations of tricresyl phosphate and 2,4-dimethylphenol are shown on Figure 10.

GROUND-WATER TREATABILITY

Pilot-Scale Test Results

The influent and effluent chemical characteristics of the ground-water sample collected during the pilot testing of the GAC units are summarized in Table 11. This table shows the constituent concentrations of influent and effluent samples from the Monitoring Well MW-11 and MW-6 tests, and the combined effluent samples collected from the tanker truck.

Visible traces of nonaqueous phase liquid (NAPL) were observed in the influent throughout the duration of the pumping test conducted on Monitoring Well MW-11. The influent samples were characterized by strong odors during the entire period of the test. A trace of NAPL and odor appeared in the effluent samples toward the end of the pumping test. It is expected that this NAPL is denser than water and is located at depth in the aquifer.

The analytical results for the influent from Monitoring Well MW-11 indicate that this water/dense nonaqueous phase liquid (DNAPL) mixture contained very high concentrations of TCP (53,000 ug/L), 2,4-dimethylphenol (27,900 ug/L), and BNA, TICs (over 120,000 ug/L methylated and ethylated phenols and unknowns). Some phenol (390 ug/L), naphthalene (230 ug/L), and trace levels of other PAHs and phthalates were also detected. BTEX were also present (330 ug/L total).

During the test on Monitoring Well MW-6, no evidence of a NAPL was observed in either the influent or effluent samples. The influent sample had a strong odor; no odors were detected in the effluent samples.

The analytical results for the influent from Monitoring Well MW-6 indicated that similar constituents were present as in the influent from Monitoring Well MW-11; however, the Monitoring Well MW-6 influent generally contained lower concentrations. The Monitoring Well MW-6 influent exhibited TCP at 130 ug/L, 2,4-dimethylphenol at 17,700 ug/L, phenol at 9,040 ug/L, BNA TICs at 39,070 ug/L (total), naphthalene at 80 ug/L, traces of other PAHs, and 204 ug/L total BTEX.

The effluent sample analytical results indicate that the GAC units removed most Priority Pollutant parameters. Concentrations of TCP in samples from Monitoring Wells MW-11 and MW-6 were lowered by approximately 94 percent and 38 percent, respectively.

Bench-Scale Test Results

Treatability testing of ground-water samples collected on September 19, 1988 (refer to the Field Program Section) was carried out at the Calgon Carbon Corporation laboratory in Pittsburgh, Pennsylvania. The report provided by Calgon of the procedures and results is presented in Appendix D. Laboratory-scale units were used at flow rates designed to simulate a full-scale GAC treatment unit under the following conditions:

- carbon type: Calgon F-300
- adsorber diameter: 10 feet
- carbon mass: 20,000 pounds
- flow rate: 51 gpm
- contact time: 88 minutes

Ground-water samples were first pretreated through columns containing a proprietary mixture of clays and anthracite (Calgon Klensorb™) to remove the oily NAPL and then through diatomaceous earth filters to remove suspended solids. Both oil and solids can render GAC adsorbers ineffective in a short time. This pretreatment process removed greater than 90 percent of the petroleum hydrocarbons from the samples and 45 to 70 percent of the total phenols.

Influent water to the GAC columns contained 16 mg/L (Monitoring Well MW-12) and 2.7 mg/L (Monitoring Wells MW-6 and MW-11) of total phenols. In both cases, immediate breakthrough of phenols occurred. However, effluent concentrations were very low (<0.03 mg/L for the MW-12 effluent and <0.07 mg/L for the MW-6 and MW-11 effluent).

For the sample from Monitoring Well MW-12, a significant breakthrough occurred between 38 and 48 simulated days when effluent concentrations of phenols rose for a time to levels exceeding the influent concentration (see Figure 1 of Calgon's report in Appendix D). For the sample from Monitoring Wells MW-6 and MW-11, phenol effluent

concentrations stayed low throughout the test, with a slight increase from less than 0.06 mg/L to 0.20 mg/L between 78 and 138 simulated days (see Figure 2 of Calgon's report in Appendix D).

Assuming the low level breakthrough of phenols to be acceptable, Calgon calculated maximum carbon usage rates of 7 pounds of carbon per 1,000 gallons of water treated from Monitoring Well MW-12, and 3.5 pounds per 1,000 gallons of the composited water treated from the Monitoring Wells MW-6 and MW-11.

ADDITIONAL DATA NEEDS

The soil and ground-water quality data collected through September 1989 indicate soil and ground-water contamination. Additional work is necessary to fully delineate the extent of this contamination, including:

- The nature, extent, and remediability of nonaqueous phases: Nonaqueous phases were detected during the drilling and pumping of Monitoring Wells MW-11 and MW-12. The lateral and vertical extent of the nonaqueous phase is not currently known. It is possible that other nonaqueous phases exist at unknown depths within the ground-water system. Some of the soil samples excavated from the proposed swimming pool location showed evidence of nonaqueous phase liquids and very high organic vapor readings were detected in the field. Chemical analysis of these soil samples indicates very high levels of phenolic compounds and TCP.

- The extent of soil contamination: No subsurface soil samples have been collected outside the area of the proposed swimming pool excavation.

- Upgradient ground-water quality: Monitoring Well MW-5 provides upgradient ground-water quality for the northwestern portion of the facility. However,

no well exists upgradient of Monitoring Well MW-10, which shows ground-water contamination in the northeastern portion of the facility.

- Horizontal extent of ground-water contamination: High concentrations of ground-water contaminants were detected in Monitoring Wells MW-4, MW-6, MW-10, MW-12, and the sump. The downgradient horizontal extent of this contamination has not been fully delineated.

- Vertical extent of ground-water contamination: The existing monitoring well network includes eleven wells that have been drilled to a depth of approximately 20 feet below ground surface. One well, Monitoring Well MW-11, was installed to a depth of 34 feet below ground surface. Several of the shallow wells and Monitoring Well MW-11 indicate the presence of ground-water contamination. The vertical extent of this contamination has not been delineated.

- Treatability of highly contaminated ground water: Toward the end of the 4-hour pilot treatment test on Monitoring Well MW-11, a breakthrough of a NAPL and an odor through the GAC treatment system was detected. Analytical results showed the presence of significant concentrations of TCP in the effluent. The uncertainty regarding the extent of the NAPL creates further uncertainty concerning the development of a design basis for cost-effective treatment facilities. Although GAC treatment is effective for the

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removal of dissolved organic contaminants, other unit processes may be required for the prior removal of a NAPL.

Respectfully submitted,

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Table 1. Monitoring Well Construction Details.

Monitoring Well	Date Installed	Total Depth (feet below ground surface)	Diameter (inches)	Screen Setting (feet below ground surface)	Protective Casing	Maximum Organic Vapor Readings (with Depths recorded)	Special Notes
MW-1	09-16-87	18.0	4	3.0-18.0	Flush Mount	3 ppm at 10-12 feet	Mostly fine to medium sand, some patchy black layers.
MW-2	09-15-87	20.0	4	5.0-20.0	Flush Mount	0.2 ppm at 0-2 feet	Fine to medium sand, some running sands.
MW-3	09-17-87	17.5	4	2.5-17.5	Flush Mount	4 ppm at 5 to 7 feet	Mostly fine to medium sand.
MW-4	09-16-87	17.5	4	2.5-17.5	Flush Mount	2 ppm at 15-17 feet	Mostly fine to medium sand, odorous.
MW-5	09-15-87	20.0	4	5.0-20.0	Flush Mount	4 ppm at 5-7 feet	Fill to approximately 7 feet.
MW-6	09-14-87	20.0	4	5.0-20.0	Flush Mount	7 ppm at 10-12 feet	Medium sand and some fine sand, gray to black, oily.
MW-7	04-22-88	17.5	4	2.5-17.5	Flush Mount	8 ppm at 4-6 feet	Mostly fine to medium sand in the screened zone. Odor.
MW-8	04-22-88	17.5	4	2.5-17.5	Flush Mount	3 ppm at 0-4 feet	Fine to medium sand with trace silt in the screened zone, less odorous than MW-7.
MW-9	04-21-88	19.5	4	4.5-19.5	Flush Mount	1 ppm at 18-20 feet	Fine to medium sand in the screened zone, slight odor.
MW-10	04-21-88	17.5	4	2.5-17.5	Flush Mount	20 ppm at 4-6 feet	Fine to medium sand in the screened zone with trace silt, strong odor. 10-12 foot sample appeared to have some product. Development water had odor.
MW-11	05-06-88	34.0	4	4.0-34.0	Stick-up	69 ppm at 25-27 feet	Fine to medium sand in the screened zone, soil samples appeared oily, odor (fuel oil/phenolics).
MW-12	05-09-88	18.0	4	3.0-18.0	Stick-up	30 ppm at 15-17 feet	Fine to medium sand in the screened zone, strong odor. Development water was foamy.

ppm Parts per million.
Water table encountered 5 to 6 feet below ground surface.
Monitoring Well MW-12 was drilled at Soil Boring S-12. Volatile organic compound readings at 10-12 feet during the drilling of Soil Boring S-12 exceeded 2,000 ppm.
Shading indicates monitoring wells installed during the Phase II investigation.

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GERAGHTY & MILLER, INC.

Table 2. Monitoring Well Elevation and Water-Level Data.

Monitoring Well No.	Elevation of MP (ft amsl)	June 2, 1988 Depth to Water (ft bmp)	June 2, 1988 Elevation of Water Level (ft amsl)	September 6, 1988 Depth to Water (ft bmp)	September 6, 1988 Elevation of Water Level (ft amsl)
MW-1	10.92	5.43	5.49	6.85	4.07
MW-2	11.01 *	5.64	5.37	7.00	4.12
MW-3	7.89	3.90	3.99	4.62	3.27
MW-4	8.00	3.36	4.64	4.31	3.69
MW-5	9.93	4.49	5.44	5.85	4.08
MW-6	9.86	5.39	4.47	6.38	3.48
MW-7	8.08	4.09	3.99	4.82	3.26
MW-8	8.97	4.79	4.18	5.52	3.45
MW-9	10.18	6.10	4.08	6.94	3.24
MW-10	10.57	6.45	4.12	7.46	3.11
MW-11	12.82	7.65	5.17	8.83	3.99
MW-12	10.73	6.22	4.51	7.13	3.60

MP Measuring point, refers to top of PVC casing.
ft feet.
amsl above mean sea level.
bmp below measuring point.
Monitoring Wells MW-1 through MW-6 were surveyed by Construction Surveyors, Oakland, New Jersey.
Monitoring Wells MW-7 through MW-12 were surveyed by Alfred J. Clark, Inc., Passaic Park, New Jersey.
Each surveyor used a different datum/bench mark for the survey.
For uniform data reporting, all the surveyed data are expressed in accordance with the datum provided by Alfred J. Clark, Inc.
* The collar on the top of the casing moved; elevation of measuring point reestablished from ground-surface elevation.

J1058TB2

ATTACHMENT C44

Table 1. Analytical Parameters for Soil Samples.

Soil Boring No.	Date	Depth (ft)	Organic Vapor Reading (ppm)	Analytical Parameters	Special Notes
S-7	04-25-88	0-4	5.6-9.0	Priority Pollutants Plus 40 (with metals), TPHC, Phenols, Cn	Some odor
S-7	04-25-88	4-6	70.1	Priority Pollutants Plus 40 (with metals), TPHC, Phenols, Cn	
S-8	04-25-88	0-5	6.2-15.2	Waste Classification, TPHC	Odor, gray color
S-8	04-25-88	5-8	15.2-73.3	Waste Classification, TPHC	Odor, gray color
S-8	04-25-88	9-10	67.5	Priority Pollutants Plus 40 (without metals), TPHC, Phenols, Cn	
S-9	04-25-88	0-5	2.2-15.0	Waste Classification, TPHC	Blackish-gray color
S-9	04-25-88	5-8	10.0-15.0	Waste Classification, TPHC	Strong odors, blackish-gray color
S-9	04-25-88	9-10	100.0	Priority Pollutants Plus 40 (with metals), TPHC, Phenols, Cn	
S-10	04-25-88	0-5	1.2-74.3	Waste Classification, TPHC	
S-10	04-25-88	5-12	3.0-74.3	Waste Classification, TPHC	Sample appeared to have product stain.
S-10	04-25-88	13-14	12.0	Priority Pollutants Plus 40 (with metals), TPHC, Phenols, Cn	
S-11	04-25-88	0-5	1.6-4.1	Waste Classification with Priority Pollutants Plus 40 (without metals), TPHC, Phenols, Cn	Oily, strong odor, blackish-gray color.
S-11	04-25-88	5-12	3.3-70.0	Waste Classification, TPHC	Oily, strong odor, blackish-gray color.
S-11	04-25-88	13-14	937.2	Priority Pollutants Plus 40 (with metals), TPHC, Phenols, Cn	
S-12	04-25-88	0-5	1.2-36.0	Waste Classification, TPHC	Oily, solvent soaked, odor, blackish-gray color.
S-12	04-25-88	5-12	32.2->2000	Waste Classification, TPHC, BNA Plus 25	Oily, solvent soaked, odor, blackish-gray color.
S-12	04-25-88	13-14	71.0	Priority Pollutants Plus 40 (without metals), TPHC, Phenols, Cn	Collected by hand auger
S-13	04-25-88	1-2	1.0	Priority Pollutants Plus 40 (with metals), TPHC, Phenols, Cn	
Field Blank				Priority Pollutants Plus 40 (with metals), TPHC, Phenols, Cn	
Trip Blank				VOCs Plus 15	

Auger refusal (twice) at S-9 because of bouldery conditions.
Extremely strong odors at Soil Boring S-12; free product in spoon.

VOCs Volatile organic compounds.
BNA Base neutral and acid extractable compounds.
TPHC Total petroleum hydrocarbons.
ft Feet.
ppm Parts per million.
Cn Cyanide.

J1058TB3

ATTACHMENT C45

GERAGHTY & MILLER, INC.

Table 4. Ground-Water Flow Velocity Calculations.

Effective Porosity (n)	Northeast Area	Southwest Area
0.1	0.64 ft/day	0.90 ft/day
0.3	0.21 ft/day	0.29 ft/day

Calculations based on water-level measurements taken June 2, 1988.

Saturated aquifer thickness assumed to be 28 feet.

Effective porosity (n) assumed to range from 10 to 30 percent (based on Driscoll 1986).

Northeast Area: Transmissivity = 2,400 gallons per day per foot (gpd/ft).
Hydraulic gradient = 0.0056 ft/ft.

Southwest Area: Transmissivity = 1,900 gpd/ft.
Hydraulic gradient = 0.0098 ft/ft.

Values are based on the following equation:

$$v = [T/(7.48 \times b)](i)(1/n)$$

where:

v = velocity of ground-water flow, ft/day
T = Transmissivity, gpd/ft
i = hydraulic gradient, ft/ft
n = effective porosity, dimensionless
b = aquifer thickness, ft

J1058TB9

ATTACHMENT C46

Table 5. Monthly Precipitation Data for Newark Airport, New Jersey, September 1988 through September 1989.

	Total Precipitation (inches)	Normal Precipitation for Month (inches)	Departure from Normal Precipitation (inches)	Monthly Ground-Water Peaks Monitoring Well MW-12 (ft bgs)
1988				
September	1.66	3.66	-2.00	5.10
October	2.45	3.09	-0.64	5.44
November	7.71	3.59	4.12	4.56
December	0.98	3.42	-2.44	4.14
1989				
January	1.98	3.13	-1.15	5.05
February	2.70	3.05	-0.35	4.70
March	4.42	4.15	0.27	4.39
April	3.24	3.57	-0.33	3.86
May	8.80	3.59	5.21	2.87
June	5.41	2.94	2.74	2.89
July	5.23	3.85	1.38	3.51
August	7.03	4.30	2.73	2.88
September	6.45	3.66	2.79	3.25

ft bgs Feet below ground surface at the location of Monitoring Well MW-12.
Precipitation data obtained from NOAA, and the Newark Airport Meteorological Station.
Water-Level data obtained from automatic water-level recorder, Monitoring Well MW-12, Ironbound site.

J1058TB10

ATTACHMENT C47

Table 6. Priority Pollutant Analytical Results in Soil Samples, Phase II Investigation, Ironbound Pool Site.

Parameters	S-7 0 - 4 ft	S-7 4 - 6 ft	S-8 9 - 10 ft	S-9 9 - 10 ft	S-10 13 - 14 ft	S-11 0 - 5 ft	S-11 3 - 14 ft	S-12 5 - 12 ft	S-12 13 - 14 ft	S-13 1 - 2 ft	Field Blank	Trip Blank
Volatile Organics (ug/kg)												
Benzene			110	230		44	1,34	NA	34			
Chlorobenzene							1	NA				
Chloroform								NA				
trans-1,2-Dichloroethene	19J							NA				
Ethylbenzene		120	328	100		48	36	NA	87			2.7J
Methylene chloride	17JB	13JB	18JB	17JB	12JB	12JB	1	NA	15JB	20JB		
Tetrachloroethene	21J							NA				1.8J
Toluene	12J	30	813	286	6.3J		1.80	NA	628			
1,1,1-Trichloroethene			12J					NA				
Trichloroethene	54							NA				1.5JB
Trichlorofluoromethane								NA				
Total Xylenes	15J	767	2,000	440	13J	350	2.23	NA	490			
Base/Neutral Extractables (ug/kg)												
1,2-Dichlorobenzene						80J	64J					NA
Naphthalene	410J	44,500	1,230	2,760	370	930		1,600	250J	1,300		NA
Acenaphthylene	100J				10J	200J		40J	20J	520J		NA
Acenaphthene	100J		160J	430	64J	200J		90J	20J	1,400		NA
Fluorene	100J		120J	290J	110J	300J		80J	20J	1,600		NA
Diethylphthalate	420J		120J									NA
Phenanthrene	1,400		270J	580	640	1,800	2	640J	200J	8,300		NA
Anthracene	300J		110J	220J	100J	410J		200J	40J	2,500		NA
Dibutyl phthalate	950				1,480	490J	4	90J	60J	100J		NA
Fluoranthene	2,100		210J	100J	220J	2,300	2	770	220J	9,570		NA
Pyrene	1,700		180J	70J	460	2,200	2	820	200J	7,880		NA
Butyl benzyl phthalate										100J		NA
bis(2 Ethylhexyl)phthalate	1,400					1,500			320J	420J		NA
Chrysene	1,200					1,200		380J	100J	4,890		NA
Benzo(a)anthracene	1,000		85J			2,700			100J	4,490		NA
Benzo(b)fluoranthene	1,900		67J			1,700			100J	8,240		NA
Benzo(a)pyrene	1,000		66J		30J	730		90J	200J	5,930		NA
Indeno(1,2,3-c,d)pyrene	530J		30J						100J	2,800		NA
Dibenzo(a,h)anthracene					49J	600J				2,300		NA
Benzo(ghi)perylene	500J		30J									NA
Tricresyl Phosphate	3,000	10,000	170,000	74,000	160,000	360,000	260.00	2,900,000	70,000	140,000		NA

Blanks indicate analyte was not detected.
mg/kg Milligrams per kilogram.
ug/kg Micrograms per kilogram.
Analyses performed by Envirotech Research, Inc., Edison, New Jersey.
NA Not analyzed.
J The result is less than the specified detection limit but greater than zero.
B The analyte was found in the laboratory blank as well as the sample.

NJ03102/J1058TB6

ATTACHMENT C48

GERAGHTY & MILLER, INC.

Table 6. Priority Pollutant Analytical Results in Soil Samples, Phase II Investigation, Ironbound Pool Site.

Parameters	S-7 0 - 4 ft	S-7 4 - 6 ft	S-8 9 - 10 ft	S-9 9 - 10 ft	S-10 13 - 14 ft	S-11 0 - 5 ft	S-11 3 - 14 ft	S-12 5 - 12 ft	S-12 13 - 14 ft	S-13 1 - 2 ft	Field Blank	Trip Blank
Acid Extractables (ug/kg)												
Phenol	890		280J		2,450	7,310	2,860	2,900	500	2,400		NA
2,4-Dimethylphenol	2,400	1,000	41,900	64,800	6,710	48,100	138,000	172,000	3,350	10,800		NA
2,4-Dichlorophenol			10J		5.0J							NA
Total Metals (mg/kg)												
Antimony	5.10	0.51	NA	0.50		NA	NA	NA	NA	3.0		NA
Arsenic	18.1		NA	2.4	0.64	NA	NA	NA	NA	30.5		NA
Cadmium	2.1		NA			NA	NA	NA	NA	1.1		NA
Chromium	23	17	NA			NA	NA	NA	NA	23		NA
Copper	121	9.6B	NA	33B	11B	NA	NA	NA	NA	133		NA
Lead	1,270		NA	24	13	NA	NA	NA	NA	386	5.4B	NA
Mercury	2.27		NA	0.18	0.35	NA	NA	NA	NA	1.99		NA
Nickel	28		NA	46		NA	NA	NA	NA	27		NA
Selenium	1.0		NA			NA	NA	NA	NA	0.63		NA
Zinc	892	24B	NA	19B	17B	NA	NA	NA	NA	659		NA
Total Phenols (mg/kg)	83.5	25.9	368	70.2	28.4	159	65.3		17.1	129		NA
Total Petroleum Hydrocarbons (mg/kg)	825	348	113	36	200	207		125		107		NA
Tentatively Identified Compounds (ug/kg)												
VOCs		171	816	479.4		178.7	982		324			NA
BNAs	199,000	2,714,000	402,800	333,700	388,640	621,900	479,00	3,315,900	82,460	222,600		

Blanks indicate analyte was not detected.
mg/kg Milligrams per kilogram.
ug/kg Micrograms per kilogram.
Analyses performed by Envirotech Research, Inc., Edison, New Jersey.
NA Not analyzed.
J The result is less than the specified detection limit but greater than zero.
B The analyte was found in the laboratory blank as well as the sample.

NJ03102/J1058TB4

ATTACHMENT C-49

Table 7. Summary of Hazardous Waste Classification Parameters in Soil Samples, Phase II Investigation, Ironbound Pool Site.

Characteristics	S-8 0 - 5 ft	S-8 5 - 8 ft	S-9 0 - 5 ft	S-9 5 - 8 ft	S-10 0 - 5 ft	S-10 5 - 12 ft	S-11 0 - 5 ft	S-11 5 - 12 ft	S-12 0 - 5 ft	S-12 5 - 12 ft
EP-Toxicity Metals, Pesticides and Herbicides (mg/L):										
Arsenic	ND	0.006	0.023	ND	0.020	0.013	0.011	0.012	0.014	0.007
Chromium	ND	ND	ND	ND	0.22	ND	ND	ND	ND	ND
2,4-D	0.064	0.059	0.052	0.045	ND	0.076	0.099	0.087	ND	0.060
Reactivity (ug/kg):										
Sulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH:	8.7	8.0	8.6	8.5	7.8	8.5	8.0	7.5	7.1	8.0
Ignitability:	>160 F	>160 F	>160 F	>160 F	>160 F	>160 F	>160 F	>160 F	>160 F	>160 F
Total Petroleum Hydrocarbons (mg/kg):	1,290	69	597	35	1,160	270	207	274	ND	125

ND Not detected.
Ignitability in degrees Farenheit.
ft Feet.
mg/L Milligrams per liter.
ug/kg Micrograms per kilogram.
mg/kg Milligrams per kilogram.
Analysis performed by Envirotech Research, Inc., Edison, New Jersey.

NJ03102/J1058TB5

ATTACHMENT C 50

Table 8. Priority Pollutant and Tricresyl Phosphate Concentrations in Ground-Water Samples, Phase II Investigation, Ironbound Pool Site.

Parameters	MW-7	MW-8	MW-9	MW-10	MW-10 Duplicate	Field Blank	Trip Blank	MW-12
Volatile Organic Compounds (ug/L):								
Benzene				5.4	5.2			501
Chloroethane	9.3J							
Chloroform		1.5J						
trans-1,2-Dichloroethene			3.4J					
Toluene	1.6J	22		4.7J	4.8J	2.4J		4,080
Trichlorofluoromethane						1.1JB		
Total Xylenes				9.7	8.3J			1,710
Ethyl Benzene								340
Acid Extractables (ug/L):								
Phenol				393	370		NA	NA
2,4-Dimethylphenol			553	15,400	14,900		NA	NA
Base/Neutral Extractables (ug/L):								
Naphthalene		0.8J		15	17		NA	NA
Acenaphthene					4.4J		NA	NA
Fluorene				1.0J	1.0J		NA	NA
Diethylphthalate				13	14		NA	NA
Phenanthrene				1.0J	2.0J		NA	NA
Dibutyl phthalate		1.0J	1.0J	1.0J			NA	NA
Fluoranthene					0.5J		NA	NA
Bis(2-ethylhexyl) phthalate			1.0J	1.0J		2.0J		
Total Tricresyl Phosphate (ug/L):				1,160	1,690		NA	NA
Metals and Wet Chemistry (ug/L):								
Antimony				3.6			NA	NA
Arsenic	3.3	12		10	10		NA	NA
Lead	15B	24B	16B	11B			NA	NA
Nickel			41				NA	NA
Thallium	2.0	3.4	2.7	2.0	2.9		NA	NA
Zinc		26B	83B	36B	24B		NA	NA
Selenium			12.2					
Total Phenols (ug/L):			889	15,600	18,500		NA	NA
Organichlorine Pesticides and PCBs (ug/L):								
4-4'-DDT		10.6 *					NA	NA
Endosulfan I	0.38 *						NA	NA
Heptachlor	2.1 *	0.30 *					NA	NA

Monitoring Wells MW-7 through MW-10 were sampled 5/9/88.
Monitoring Well MW -12 was sampled 10/6/88.
Blank space indicates analyte was not detected.
NA Not Analyzed.
J The result is less than the specified detection limit but greater than zero.
B The analyte was found in the laboratory blank as well as in the sample.
* Not confirmed by GC/MS; compounds searched for on fraction but not detected.
Analyses performed by Envirotech Research, Inc. Edison, New Jersey.

NJ03102/J1058T06

GERAGHTY & MILLER, INC.

ATTACHMENT C5

Table 9. Tentatively Identified Compounds in Ground-Water Samples, Phase II Investigation, Ironbound Pool Site.

	MW-7	MW-8	MW-9	MW-10	MW-10 DUPLICATE	FIELD BLANK	TRIP BLANK	MW-12
VOLATILE ORGANIC COMPOUNDS (ug/L):								
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE								47
DIMETHYL DISULFIDE								37
METHYL CYCLOPENTENE ISOMER								64
2-METHYL-2-(METHYLTHIO) PROPANE								47
METHL THIOPHENE ISOMER								130
2-METHYL-2-(METHYLTHIO) BUTANE								48
TETRAHYDROMETHYL 2H-THIOPYRAN								45
METHYLTHIO CYCLOHEXANE								36
UNKNOWNS								533
TOTAL	ND	ND	ND	ND	ND	ND	ND	987
ACID AND BASE/NEUTRAL EXTRACTABLES (ug/L):								
4-METHYL PHENOL		58		9,400	8,300			
METHYL PHENOL ISOMERS				1,500	1,400			
DIMETHYL PHENOL ISOMERS			364	15,800	14,700			
TRIMETHL PHENOL ISOMERS			356	3,810	3,800			
ETHYL PHENOL ISOMERS			40	1,000	1,000			
2-ETHYL-5-METHYL PHENOL			14	910				
ETHYL METHYL PHENOL ISOMERS			224	3,200	4,600			
2-METHL-5-(1-METHYLETHYL)-PHENOL			58	710				
3,5-DIETHYL PHENOL			32					
DIETHYL PHENOL ISOMER			34					
C3 SUBSITITUTED PHENOL ISOMERS			50	2,300	1,700		4	
C4 SUBSITITUTED PHENOL ISOMERS			26	610	1,100			
4-METHYL-2-NITROPHENOL		14						
2-METHL-2,2-DIMETHYL-1-(2-HYDROXY-1-METHYLETHL) PROPYL ESTER PROPANOIC ACID		4						
N,N-BIS(2-HYDROXYETHL) DODECANAMIDE		6						
HEXADECANOIC ACID		6						
2,3-DIHYDRO-1H-INDEN-5-OL			92					
DIHYDRO-1H-INDEN-5-OL ISOMERS			18					
PENTAMETHYL BENZENE ISOMERS			20	273	150			
UNSATURATED HYDROCARBON		4						
C12 H18 HYDROCARBON					84			
UNKNOWN KEYTONE		10						
UNKNOWN ORGANIC ACID		8						
UNKNOWNS		186	42	685	714			
TOTAL	ND	296	1,370	40,198	37,548	ND	NA	NA

Monitoring Wells MW-7 through MW-10 were sampled 5/9/88.
Monitoring Well MW-12 was sampled 10/6/88.
Trip and Field blanks were not collected when MW-12 was sampled.
NA Not Analyzed.
ND Not Detected.
ug/L Micrograms per liter.
All concentrations are estimated concentrations.
Analysis performed by Envirotech Research, Inc., Edison, New Jersey.
Blanks space indicates analyte was not detected.

NJ03102/NJ03102T

Table 11. Influent and Effluent Water Characteristics during the Pilot Testing of GAC Units.

Parameter	Inf MW-11 ug/L	Eff MW-11 ug/L	Inf MW-6 ug/L	Eff MW-6 ug/L	Tank ug/L	MW-12 ug/L
Volatile Organics (VOCs)						
Benzene	96.4		6.6			NA
Chlorobenzene	1.2J					NA
Chloroform	1.1J		15			NA
Ethylbenzene	19		27			NA
Methylene chloride	2.5J		2.9J			NA
Tetrachloroethene			10			NA
Toluene	92.1		14			NA
Trichloroethene			1.3J			NA
Total Xylenes	123	1.1J	157			NA
Acid Extractables						
Phenol	390J		9,040			
2,4-Dimethylphenol	27,900	4.7J	17,700	3.1J	2J	36,300
2,4,6-Trichlorophenol	2J					
Base/Neutral Extractables						
1,2-Dichlorobenzene	2.1J		5.1J			0.6J
Naphthalene	230J	3.1J	80J		2.3J	100.0
Acenaphthene	4.3J					
Fluorene	4.1J					
Diethylphthalate	2.1J		2.8J			5.0J
Phenanthrene	13	0.5J				
Anthracene	2.2J					
Dibutyl phthalate	8.5J		2J			
Pyrene	3.8J					
bis(2-Ethylhexyl)phthalate						3.2JB
Tricresyl phosphate	53,000	3,400	130	80	1,870	620
Total Phenols	NA	NA	NA	NA	66.7	NA
Total Metals						
Antimony	NA	NA	NA	NA	2.2	NA
Arsenic	NA	NA	NA	NA	37.4	NA
Lead	NA	NA	NA	NA	55.1B	NA
Zinc	NA	NA	NA	NA	22B	NA
Cyanide	NA	NA	NA	NA		NA
BOD (mg/L)	200	4.0	110	16	14	NA
Total Suspended Solids (mg/L)	32	12	170	<2	6.0	NA
pH (standard units)	7.0	7.0	6.6	7.2	6.2	NA
TPHC (mg/L)	NA	NA	NA	NA	NA	5.4
Tentatively Identified Compounds						
VOCs	19.5	ND	NR	ND	ND	NA
BNAs	121,400	3,054	39,070	148	866	108,600

Concentrations in ug/L unless otherwise noted.
ug/L Micrograms per liter.
mg/L Milligrams per liter.
Tank Refers to the mixed sample collected from the holding tank.
GAC Granular Activated Carbon.
Blank indicates analyte not detected in sample.
Analysis performed by Envirotech Research, Inc. Edison, New Jersey
NA Not Analyzed.
TPHC Total petroleum hydrocarbons.
BNAs Base neutral and acid extractable compounds.
BOD Biological oxygen demand.
TSS Total suspended solids.
NR Concentrations not reported by laboratory.

Note:
Only detected analytes are listed. Influent and effluent samples were analyzed for Priority Pollutants+40 (without metals, cyanide, and total phenols), BOD, pH, TSS and tricresyl phosphate. The tank sample was analyzed for Priority Pollutants+40, cyanide, total phenols, BOD, TSS, and tricresyl phosphate. The MW-12 sample was analyzed for BNA+25, tricresyl phosphate, and TPHC.

NJ03102/J1058TB8

ATTACHMENT D

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
Trenton, N.J. 08625-0029

Office of
the Director

(609) 292-1637
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M E M O R A N D U M

JUN 12 1990

TO: KEN DRAKE, BUREAU OF CASE MANAGEMENT, DHWM
Gil Oudijk

FROM: GIL OUDIJK THROUGH JILL MONROE, SUPERVISOR, BUREAU OF GROUND-WATER POLLUTION ABATEMENT, DWR

SUBJECT: IRONBOUND RECREATION CENTER POOL SITE, ST. CHARLES AND ROME STREETS, CITY OF NEWARK, ESSEX COUNTY - REVIEW OF APRIL 1990 INTERIM REMEDIAL MEASURES WORK PLAN AND REMEDIAL INVESTIGATION WORKPLAN

I have reviewed the Interim Remedial Measures (IRM) Workplan and the Remedial Investigation (RI) Workplan dated April 1990 prepared by Dresdner & Robin, Associates, Inc. (DRA) for the Ironbound Recreation Center Pool Site in Newark.

The IRM workplan details only the activities to be conducted concerning the installation of the swimming pool. The RI workplan details activities to be conducted concerning investigation and remediation of subsurface contamination. A Phase II site investigation report was also presented by DRA. This report included a ground-water investigation report by Geraghty & Miller, Inc.

Both DRA workplans are acceptable with the comments and recommendations outlined below. My specific recommendations are numbered.

LOCATION OF DENSE NON-AQUEOUS PHASE LIQUID

Several inches of a dense non-aqueous phase liquid (DNAPL) were identified in the bottom of monitor well MW-11 at the location shown in figure 1. The well is 34 feet deep and is in the

ATTACHMENT D'

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location of the proposed swimming pool. According to the drilling log of monitor well MW-11, product was identified at the 14- to 18-foot interval and the 18- to 29-foot interval. A summary of drillings logs for MW-11, two additional area wells and three soil borings are shown in table 1. The location of these boreholes are also shown in figure 1.

Based on these drilling logs, it appears that a layer of product may exist at the -12- to 16-foot depth interval and possibly deeper. Based on the drilling log of MW-11, an oily substance was detected until a depth of 29 feet. During installation of MW-11, product may have been allowed to migrate down the borehole to this depth. Additionally, product may have migrated to the bottom of the well after installation. Monitor well MW-11 is screened from 4 to 34 feet below grade. However, confirmation of this possible cross-contamination is not available. According to Dan Nachman [of Geraghty & Miller], the oily substance appeared to be part of the formation until 29 feet. Therefore, cross-contamination may be very limited, if at all.

The composition of the DNAPL is not presently known and must be determined before remediation [product recovery] can be initiated. However, analysis of a water sample from MW-11 disclosed concentrations of tricresyl phosphate (TCP) at 53,000 parts per billion (ppb). TCP was a raw product formerly used on this property [when it was owned by Celanese Corporation]. TCP has a solubility of less than 20 parts per million [or 20,000 ppb]. Therefore, the water sample collected from MW-11 contained product [which was more than likely TCP]. According to Bill Staehle of DRA, a product sample was collected from MW-11 for analysis during the first week of May 1990. Verbal results from the laboratory indicates the following composition of the DNAPL: 2-methyl phenol (3%), 4-methyl phenol (1%), 2,4-dimethyl phenol (8%), phosphoric and phenol esters (5%), dichrysolphenol phosphate (2%), ortho-tricresyl phosphate (4.5%), meta-tricresyl phosphate (5.7%) and para-tricresyl phosphate (9.5%).

TCP has a density of 1.247 g/cm^3. It is also much more viscous than water , similar to no. 4 fuel oil.

A map outlining TCP concentrations in ground water for 28 September 1987 is shown in figure 2. Based on these data, a pool of TCP may exist in an area outlined by the monitor wells MW-1, MW-4 and MW-12. According to figure 2 [in the DRA report], monitor well MW-11 is in the vicinity of a former "rundown" tank. The tank was used by Celanese and may have contained TCP. This

ATTACHMENT D2

tank may have been the source of the DNAPL in the area of MW-11. The rundown tank was removed sometime before 1960.

A map outlining TCP concentrations in ground water for 10 October 1987 is shown in figure 3. Because of high concentrations of TCP at monitor well MW-10, a pool of TCP may also exist beneath the Recreation Center. This location coincides with a former Celanese tank farm as shown in figure 1. Because the Recreation Center covers most of this former tank farm, investigation of possible DNAPL pools may be much more difficult.

1. Monitor well MW-11 should not presently be sealed. However, future investigations may indicate the need for such action.

2. DRA proposes several exploratory borings across the site, however, only one boring (S-22) is near the former rundown tank, the suspected DNAPL-source area. At least six additional exploratory borings should be installed surrounding and within the area of the rundown tank and between monitor wells MW-4, MW-12 and MW-1. The six exploratory borings should extend to the depth of no greater than 29 feet, however, the exact depth should be field determined. Split-spoon soil samples should be collected continuously. The borings should not penetrate any confining layer, if product is encountered. The borings should be installed with hollow-stem auger and casing should be driven beforehand. An NJDEP geologist should be present during installation of the boreholes. Appropriate health and safety gear should be worn during drilling.

3. At least five additional exploratory borings should be conducted in the area of the former tank farm on the northern portion of the property. This is the location of proposed monitor well MW-14. The purpose of these borings is to locate any possible layers of DNAPL. The depth of each boring should not exceed 29 feet, however, the exact depth should be field determined as described above. If a confining layer is encountered, the boring should be completed at this depth.

4. Split-spoon soil samples should be examined to determine the quantity of free product in the soils. It must be determined whether soils are product saturated. Two methods of making such a determination are as follows:

   a. Mixing soils in a water-filled jar and examining the amount of free product at the bottom;

ATTACHMENT D3

b. Placing soils in a centrifuge to allow separation of soils and product;

A determination of product saturation may not be possible. However, relative amounts of free product may be estimated which may indicate saturation.

5. Soil borings alone will not determine whether DNAPL-saturated conditions exist. It must be determined whether DNAPL will collect in the bottom of a well. If DNAPL-saturated conditions exist, a product-recovery system can be initiated. Therefore, upon completion of drilling, each borehole [described in item nos. 2 and 3] should be converted to a piezometer. The screened interval should be located within the layer of product saturation, if known. The purpose of the piezometer is to delineate the extent of DNAPL and measure its thickness. The piezometers should be constructed of 2-inch diameter, Schedule 40, stainless steel (or galvanized steel) casing and 5 feet of 0.02 slot wire-wrapped screen. The piezometers must be screened to the very bottom of the well so that DNAPL will be permitted to enter. Each piezometer should be flush mounted.

6. Based on product thicknesses in the piezometers, additional exploratory borings or piezometers may be necessary, if the extent of DNAPL has not been delineated. If the location of greatest product thickness is determined, a product-recovery system may be installed.

INTERIM REMEDIAL MEASURES

As shown in figures 2 and 3, high concentrations of dissolved contaminants have been detected in the ground water. These contaminants include tricresyl phosphate and several phenol compounds. These contaminants are migrating with the ground water toward Rome Street and St. Charles Street. Underground utilities beneath these streets are likely conduits for contaminant migration. It is likely that [through one of these utilities] contamination is migrating into the basement of the adjacent Cook & Dunn facility as shown in figure 4. The following are recommendations concerning the design of a ground-water and vapour recovery system. Additional design is necessary, however, these recommendations should be used as the basis for the recovery system.

1. A ground-water and vapour recovery system should be installed expeditiously to control the offsite migration of dissolved

ATTACHMENT D4

contaminants in ground water and contaminant vapour in the unsaturated zone. The focus of this recovery system should be to prevent contaminant migration into the utility lines along St. Charles Street and Rome Street. An additional recovery system will be necessary in the future for removal of the DNAPL. The recommended approach is to install an L-shaped recovery trench as shown in figure 4.

2. The recovery trench should extend to at least 6 feet below the water table which is total depth of 10 to 12 feet. At least two recovery sumps should be installed into the trench. One sump should be at the apex of the "L" shape as shown in figure 4. Each sump should be constructed of 4-inch diameter, Schedule 40, galvanized or stainless steel, wire-wrapped screen and riser pipe. The sumps should be screened beginning at a depth of 3 feet below grade. The sumps must be screened across the water table.

3. The trench should be backfilled with a washed pea gravel or 3/4-inch bluestone (gravel) to a depth of 3 feet below grade. Two-inch diameter, PVC [or steel, wire wrapped] screen should be placed horizontally across the gravel. This screen will be used for the vapour-recovery system. The screen should be mainfolded to the ground surface at the location of one sump. Gravel should cover the screen. A cross-section of the recovery trench is shown in figure 5.

4. Plastic sheeting should cover the gravel to at least 1 foot below grade. One-half foot of clay or quarry dust should cover the plastic. The purpose of the clay is to prevent buckling or puncturing of the plastic. Native (clean) soil should cover the clay.

5. A jack pump should be installed at each sump location. A jack pump rests on top of the well and is similar in construction to an oil-field well pump [but smaller]. Drawdown in each sump should not exceed 4 feet. Therefore, the pump intake should be placed at 8 to 9 feet below grade. The pump can run continuously. When the water table is drawn to the depth of the pump intake, the jack pump will slurp water, allowing a constant drawdown. Jack pumps are electrically powered. Therefore, an electrical connection will be necessary.

6. The 2-inch diameter screen [of the vapour-recovery system] should be connected to a rotron blower. This blower induces a vacuum on the system allowing recovery of vapours. The vapours should be directed to a treatment system such as

ATTACHMENT D5

granular activated carbon. An air permit may be necessary for this discharge. The rotron blower is also electrically powered.

7. A small shed around each sump will be necessary for protection and heating during the winter months. The sheds will need to be winterized.

3. A treatment unit will also need to be designed for the vapour and water effluent. The treatment unit must be capable of removing the type of contaminants at the Ironbound site. Treatability studies conducted by Geraghty & Miller indicated that granular activated carbon may be a viable treatment method, however, additional testing will be necessary.

4. During excavation for the trench, odor control may be necessary.

ADDITIONAL MONITOR WELLS AND SOIL BORINGS

DRA proposes the installation of 12 additional soil borings, 8 additional shallow monitor wells and 6 deep monitor wells. Two soil samples will be collected from each soil boring [S-14 through S-26]. One soil sample will be collected from just above the water table. The remaining sample will be based on photoionization detector (PID) readings.

1. The locations of the soil borings [S-14 through S-26] are acceptable.

2. Based on an automatic water-level recorder placed on monitor well MW-12, the depth to ground water fluctuates from ~2.5 to 5.5 feet below grade. Therefore, a soil sample collected from above the "apparent" water table may not disclose much information. Collection of both soil samples should be based on visual and PID observations.

3. Product-saturated soils need not be sent for chemical analysis unless the composition of the product is not known.

4. DRA proposes the installation of exploratory borings to the depth of bedrock. These borings, if necessary, should be conducted hydraulically upgradient of the site.

5. The number of proposed additional monitor wells is acceptable for this phase of the investigation. However, installation of these monitor wells should be conducted only after

ATTACHMENT D6

installation of the piezometers and the extent of DNAPL has been delineated horizontally and vertically. Knowledge of the extent and composition of the DNAPL may alter future monitor well locations and depths. If DNAPL is restricted to the 10- to 20-foot depth interval, deep monitor wells on the site may be unwise.

POOL INSTALLATION

Based on figure 2 of the DRA report, MW-11 is in the location of the proposed swimming pool. Therefore, a pool of DNAPL may be present beneath the proposed pool site.

1. It is strongly recommended that complete recovery of the DNAPL, if necessary, be completed before the pool is installed, or an alternative location for the pool be made.

AQUIFER-PUMPING TEST

DRA proposes an aquifer-pumping test to determine aquifer characteristics. Theis and Cooper-Jacob method will be used to analyse the data.

1. The aquifer pumping test should be conducted only after the horizontal and vertical extent of DNAPL has been delineated. Ground-water pumping conducted at an elevation lower than the DNAPL may cause downward migration of the product.

GROUND-WATER CONTOUR MAPS

Geraghty & Miller (G & M) presented two ground-water elevation contour maps. These maps represent the shallow ground-water flow direction. However, the ground-water elevation for monitor well MW-11 is also included with the map. MW-11 is a deep well extending to 34 feet. Water-level measurements from this well may give anomolous readings. Correct ground-water contour maps are shown in figures 6 and 7. Based on these maps, ground-water mounding may be occurring from the soil pile on the southern portion of the property. The pile contains contaminated soil excavated in 1988 from the proposed pool site. The ground-water flow direction ranges from southeast, east to northeast. This flow direction coincides with that of G & M. The hydraulic gradient (dh/dl) from figures 4 and 5 is 0.002 to 0.006 (9-6-88) and 0.003 to 0.01 (6-2-88).

1. Subsequent shallow ground-water contour maps should not include the water level from monitor well MW-11. If monitor

ATTACHMENT D7

well MW-11 is to be sealed, this is obviously not necessary.

2. To prevent infiltration of contamination, the soil pile should be covered with plastic sheeting.

HWENF

cc: John Sacco, BEERA
FILE

ATTACHMENT D8

Table 1. -- Summary of drilling logs for selected monitor wells and soil borings at the Ironbound Recreation Center, City of Newark

Well/boring	Description	Depth (ft)
MW-10	Top soil, black, dry	0.0-0.5
	Fill: Fine- to coarse-grained sand with silt, gravel and cinders, gray-black color, moist, odorous	0.5-4.0
	Fine- to medium-grained sand with silt, gray-brown color, odorous, wet at 5.5 ft	4.0-17.0
MW-11	Same as soil boring S-10	0.0-14.0
	Fine-grained sand with silt, slightly cohesive, appeared oily	14.0-18.0
	Fine- to medium-grained sand with trace silt, brown color, odorous, oily	18.0-29.0
	Fine-grained sand with silt	29.0-34.0
MW-12	Drilled at soil boring S-12	0.0-14.0
	Fine-grained sand, gray to brown color, odor	14.0-17.0
S-10	Stone fragments, brick, fine- to coarse-grained sand with silt, black color	0.0-4.0
	Fine- to medium-grained sand with silt, gray color, wet at 5 ft, odor	4.0-6.0
	Fine-grained sand with silt, gray color	6.0-12.0
	Fine- to medium-grained sand, gray color, oily, strong odor	12.0-14.0
S-11	Fine-grained sand with silt and brick fragments, gray-brown color, wet at 5 feet	0.0-6.0
	Fine- to medium-grained sand, black-gray color, odor, sample from 13 to 14 feet appears to be soaked with product	6.0-14.0
S-12	Stone fragments, fine- to coarse-grained sand with gravel and silt, black-gray color, dry to moist	0.0-4.0

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Table 1. -- continued

Well/boring	Description	Depth (ft)
	Fine-grained sand, gray-black color, wet	4.0-10.0
	Fine-grained sand, black color, very strong odor	10.0-12.0
	Medium- to coarse-grained sand, black-gray color, appears to be soaked with product	12.0-14.0

ATTACHMENT D10

ATTACHMENT E

Newark

Sharpe James
Mayor

Department of Engineering

920 Broad Street
Newark, New Jersey 07102
201 733-8520

Alvin L. Zach, P.E; L.S.
Director

RECEIVED
FEB 15 1989

January 19, 1989

File #1
Item #30

Mr. Ed Phillips
NJ Department of Environmental Protection
Division of Hazardous Waste Management
Metro Field Office
2 Babcok Place
West Orange, New Jersey 07052

Re: Ironbound Pool Remedial Plan

Dear Mr. Phillips,

I have received a copy of the December 1, 1988 letter to you from Lenny Bulwin and Janet Martin on behalf of the St. Charles Street Area Residents. I offer the following response to their comments on the Remedial Plan for Construction of the Ironbound Swimming Pool. The responses are numerically keyed to the comments.

1. A revised Table 1.1 has been prepared and is attached. The revised table shows the mean concentrations of soil contaminants present for each of the two rounds of sampling (September 1987 [S1-S6] and April 1988 [S7-S12]). It should be noted that mean concentrations of contaminants were provided in the Remedial Plan for the September 1987 sampling (see Table 2-2 of Appendix B). The revised Table 1.1 shows that with a few exceptions the mean concentrations of contaminants in the April 1988 samples are generally lower than the mean concentrations of contaminants in the September 1987 sampling. As you are aware, the pool site has been extensively sampled. A total of 24 samples were collected from 13 locations within the 17,000 sq. ft. (.4 acre) pool site (see Figure 1, Boring Location Map). Samples were collected at different depths within borings. The City conducted considerably more soil sampling than was requested by NJDEP.

2. The purpose of the Remedial Plan is to focus on the mitigative measures necessary to safely construct the

ATTACHMENT E'

pool and to isolate the finished building from the contaminated soil and ground water. Construction of the pool will take into account the need for ground water remediation. The City is committed to addressing the ground water contamination associated with the Recreation Center Site and is proceeding with its evaluation of the extent of ground water contamination and possible remedial approaches. As for the soil contamination at the adjacent field, the extent of PCB contaminated soils was identified by an NJDEP sampling program. As you know the PCB's are in a shallow sub-surface zone at moderately low concentrations with the exception of one small area with higher concentrations. The City has recently conducted additional sampling of the playing field to further refine the delineation of this one area of higher PCB contamination. The City will prepare a remedial plan to address the PCB contamination when the supplemental sampling results are available. However, since the playing field contamination is removed from the area immediately adjacent to the pool site and PCBs are not known to mobilize in soil, we believe that the PCB contamination does not have any bearing on the clean up the pool site. This is supported by the finding that the pool site is free of PCB contamination.

3. The City coordinated closely with NJDEP to develop a waste classification sampling plan. The sampling was conducted in accordance with NJDEP and USEPA protocols and the analysis was conducted by an NJDEP certified laboratory. The laboratory results were reviewed by NJDEP prior to the Department's determination that the soil should be classified as ID-27.

4. The City has an ongoing water-level monitoring program at the site. An automatic water level recorder is positioned on one well to collect additional data. We have also investigated historical ground water level data for the region. Water level data is summarized in the attached Table 2. As for the pumping of "toxic fumes to the surface" as the result of ground water level fluctuations, the ground water contamination at this site has existed for at least 30 years and probably considerably longer. Accordingly, the fluctuations of the water table have had 30 years to push the vapors to the soil surface. Prior to excavation of the site there were no complaints of odors emanating from the site. There is no odor in the Recreation Center Building which has existed for over 20 years above the same ground water. Even now, there is little or no odor emanating from the pool site despite the bare, disturbed soil conditions. Since the odor threshold

ATTACHMENT F2

concentration of phenol is considerably below the toxicity threshold concentration, I find it difficult to accept the implication that toxic gases would be pushed out of the soil surface at a harmful concentration. However, the remedial plan addresses this situation by calling for the site to be capped with clean fill and impervious pavement.

5. Spent carbon will be sent to a reprocessing facility for treatment and recycling, if possible. Otherwise the carbon will be disposed of in accordance with State and federal law.

6.& 7. It is misleading, if not inaccurate, to refer to phenol as a carcinogen. The U.S. Environmental Protection Agency has developed a scheme for categorization of the weight of evidence of carcinogenicity of a chemical for humans.

The EPA scheme categorizes chemicals into five groups as follows:

Group A - Human Carcinogen
Group B - Probable Human Carcinogen
Group C - Possible Human Carcinogen
Group D - Not Classifiable as to Human Carcinogenicity
Group E - Evidence of Non-Carcinogenicity for Humans

The EPA published the results of its Assessment of Phenol as a Potentially Toxic Air Pollutant in the June 23, 1986 Federal Register (Volume 51, Number 120).

Based on the Assessment, the Agency classified phenol as a Group D carcinogen under its weight-of-evidence criteria for cancer data and decided not to regulate phenol emissions to the atmosphere under the Clean Air Act. EPA further describes Group D agents as "agents with inadequate human and animal evidence of carcinogenicity or for which no data are available". The National Cancer Institute Carcinogenesis Technical Report Series (NCITR) reports that a carcinogenesis bioassay for phenol has been completed and the results were negative (NCITR, NCI-CG-TR-203,80). The NCITR findings are also reported in N. Irving Sax' Dangerous Properties of Industrial Materials and in the National Institute for Occupational Safety and Health (NIOSH) Registry of Toxic Effects of Chemical Substances (RTECS).

It is accepted practice and consistent with EPA guidance to treat Group D agents as non-carcinogens when performing risk assessments.

ATTACHMENT E3

8. The Remedial Plan requires extensive site control provisions which include all reasonable measures to secure the site. The potential circumvention of these measures should not be a basis for preventing construction from proceeding.

9. See response to 6 and 7 above:

10. Visual observation has been successfully used as a means of detecting petroleum hydrocarbons on water at other cleanup sites. However, due to the desirability of a closed system for dewatering, all dewatering effluent will be pumped through an on-line absorbent such as Klensorb for separation and collection of petroleum hydrocarbons prior to passing through the carbon treatment system.

5-10ppm produces visible sheen

11. The City has not at this time identified other odor control measures suitable for the pool site. However, the City does not wish to preclude the contractor from proposing alternate techniques.

12. The statement "a thick baggy" is misleading; each of the two liners will be at least 100 times thicker than a "Baggy".

13. The Ironbound Pool and virtually all modern pools are designed so that they can be emptied without floating or popping out of the ground.

The Remedial Plan has prescribed redundant ground water isolation safety elements for the design and operation of the pool facility to prevent users of the pool from being exposed to contaminated ground water. These redundant safety elements include:

i. An outer liner of high density polyethylene (HDPE) with heat welded seams serves as the primary impermeable barrier to ground water, isolating the contamination from the pool facility.

ii. An identical inner liner which is separated from the outer liner by 12 inches of granular material, serves as a second impermeable barrier should any ground water ever seep through the outer liner.

iii. A collection system installed within the 12 inches of granular material between the inner and outer liners that can collect ground water for removal if ever any ground water seeped through the outer liner.

ATTACHMENT E4

iv. A monitoring program based on sampling and analysis of any water recovered from the collection system positioned between the liners to insure that the integrity of the liners is intact.

v. A reinforced concrete pool that, obviously, is specifically designed to be impermeable to water. If a crack were to develop in the pool, the hydraulic head created by the pool water would make it impossible for any ground water (which would have to have seeped through both the outer and inner liners and also have gone undetected by the collection system monitoring program) to seep into the pool, provided the pool is filled above the level of the ground-water table (which it would have to be in order to be open to swimmers). In the unlikely event that any cracks penetrated the thickness of the concrete pool and both the outer and inner HDPE liners were compromised, the pool water would leak out until the water level in the pool equilibrated with the ground water level outside the pool. The equilibrium could not occur until the water level in the pool had dropped at least four feet, a drop in water level that obviously could not go unnoticed (the shallow end of the pool would be almost empty).

vi. A pool water monitoring program based on sampling and analysis to confirm that the water in the pool is safe.

vii. A pool maintenance program that requires special measures when the pool must be emptied for maintenance.

In the event that all of the Remedial Plan ground water isolation safety elements described above were compromised, there is still an additional measure of protection in that the odor associated with the ground water would serve as a warning signal.

14. The Remedial Plan statement on page 40 actually says ". . . a separate remedial program will be developed to address the situation through the use of the previously installed collection system or other measures". The collection system provides a system of piping between the liners that could be used to either collect contaminated ground water or flush it out should the outer liner permit ground water seepage. If such a situation were to occur, it might indicate a need for increased monitoring of the pool water, but it would not present any harm to users of the pool. Depending on the nature

ATTACHMENT E5

of damage to the liner, appropriate alternatives to address it would be evaluated and an appropriate remedial program would be developed to respond to the conditions. However, even if the liner could not be repaired and ground water collection or flushing with clean water were not feasible, and no other remedial alternatives were feasible, the other safety elements for ground water isolation identified in response #13 above would still be intact. This is one purpose of providing redundant ground water isolation systems.

Since it is the City's intent to pursue cleanup of the ground water, it is also possible that ground water contamination at the site would no longer be a concern.

15. See response to 13 and 14 above.

16. The statement on page 37 of the Remedial Plan regarding the placement of clean fill around the side walls of the pool reads "Site soil adjacent to side walls of the pool structure <u>and above the water table</u> will be excavated to distance of three feet from the side walls and replaced with clean fill (emphasis added).

17. Impervious pavement is intended to mean concrete or asphalt. The purpose of the pavement is threefold: 1) it eliminates the potential for unintentional human contact with the remaining contaminated soil; ii) it significantly reduces percolation of precipitation which in-turn reduces the potential for migration of contaminated ground water; iii) it prevents contaminated soil particles from migrating. I am sure you will agree that such a capping strategy is an accepted practice for contaminated sites and that the proposed cap is clearly superior to the conditions which have existed at this site for at least the past 30 years.

18. Page 38 of the Remedial Plan states "All exterior potable water pipes will be wrapped or sleeved in polyethylene for their entire length on-site". Polyethylene is generally resistent to most chemicals diluted in ground water and is widely used for the purpose specified in the Remedial Plan. The polyethylene to be used will comply with the ANSI AWWA C105/A21.5 standard for polyethylene encasement and will be certified by the manufacturer as suitable for the environmental conditions at the pool site. However, I believe it is important to keep this issue in perspective. Water pipes are under pressure and if they leak, they leak out, not in. Also, there are

ATTACHMENT E6

numerous existing utility lines serving the Recreation Center that have not shown signs of degradation.

In summary, the City is proposing to remediate a contaminated site through the process of constructing a public facility. Currently, and for at least the past 30 years, the public has been subject to potential exposure to the contaminated soil at the site. Through the course of construction, a substantial volume of the contaminated soil will be removed for off-site disposal in accordance with State and federal laws and the entire site will be capped to prevent future public contact with the soil.

The construction process will require dewatering of a substantial volume of contaminated ground water. This dewatering process will effectively initiate the ground water remediation program for the pool site. In addition, the City is prepared to take extraordinary measures to safeguard the users of the pool, as described in the Remedial Plan. We believe that there are advantages to promptly remediating the site and locating the pool adjacent to an existing recreation center.

The City is hopeful of starting construction before the onset of warm weather. Please advise me of the status of your review of the Remedial Plan at your earliest convenience.

Please call if you have any questions.

Sincerely,

Alvin, L. Zach, P.E., L.S.
Director

ALZ:kb
doc: 086

Enclosure(s)

c: L. Bulwin
J. Martin
G. Rowen
W. Staehle
Sharpe James, Mayor
Henry Martinez, Council President
Richard Monteilh, Business Administrator

ATTACHMENT E7

ATTACHMENT F

Let's protect our earth

APR 6 1990

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
Trenton, N.J. 08625-0029

Eric J. Evenson
Acting Director

(609) 292-1637
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APR 04 1990

M E M O R A N D U M

TO: KEN DRAKE, BUREAU OF CASE MANAGEMENT, DHWM

FROM: GIL OUDIJK THROUGH SUSAN DENGLER, SECTION CHIEF, BUREAU OF GROUND-WATER POLLUTION ABATEMENT, DWR

SUBJECT: IRONBOUND RECREATION CENTER, SAINT CHARLES AND ROME STREETS, CITY OF NEWARK, ESSEX COUNTY - RECOMMENDATION FOR ADDITIONAL SAMPLING AND INSTALLATION OF A GROUND-WATER RECOVERY SYSTEM

BACKGROUND

A site inspection was conducted on 29 March 1990 of the basement at 140 Rome Street, Newark. The inspection was conducted by Ken Drake (DHWM-BCM) and the writer. The basement is owned by D & J Realty Company and is directly across St. Charles Street from the Ironbound Recreation Center. The inspection was conducted because of odor complaints by workers and local residents.

An organic-vapour analyser was used to determine the concentration of organic chemicals in the air within the basement. Respiratory protection was necessary during the inspection. Table 1 documents the readings observed.

Twelve monitor wells have been installed at the Ironbound Recreation Center. Analysis of ground-water samples from the wells disclosed high concentrations of phenol, 2-methyl phenol, 4-methyl phenol, 2,4-dimethyl phenol and tricresyl phosphate. The ground-water flow direction is to the southeast which is toward the basement at 140 Rome Street. Because of the high contaminant concentrations detected in the ground water at the IRC site and the direction of ground-water flow, it is likely that these

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ATTACHMENT F'

Table 1. -- Organic-vapour concentrations in basement of 140 Rome Street, City of Newark, 29 March 1990

Location	Concentration (ppm)
Top of stairs	2.5
Base of stairs	5.0
Ambient in basement	10.0
Immediately above sump	40.0

contaminants have migrated into the basement sump. The contaminants in the sump water are causing the vapour problem in the basement.

It should be noted that 140 Rome Street was previously owned by the Cook & Dunn Company which manufactured paints and varnishes. It is not known whether Cook & Dunn contributed to the ground-water contamination.

According to Mr. Bill Staehle of Dresdner, Robin Associates, consultants for IRC, a DNAPL [dense nonaqueous phase liquid] was found in monitor well MW-11 at a depth of 31 to 34 feet. A silt layer begins at a depth of 28 feet. The DNAPL may be pooling on this layer. The composition of the product is not known, however, it is reported to be syrupy and has a brown color. The color may have changed through the time it was in the ground.

CHEMICAL USED ON CELANESE SITE

The Ironbound Recreation Center was formerly owned by the Celanese Corporation of America [now Hoechst Celanese Corporation]. The property was used for the manufacturing of Lindol [tricresyl phosphate (TCP) or tritolyl phosphate] which is a component of plasticizers, hydraulic oils and a lead scavenger in gasoline. According to Doolittle [1980], there are three isomers of tricresyl phosphate: triparacresyl phosphate [TPCP], trimetacresyl phosphate [TCMP] and triorthocresyl phosphate [TOCP]. Approximately 99% of the production of TCP is of the meta and para isomers. The remaining 1% of the production is the ortho isomer which is considered a waste. TOCP is the most toxic of the compounds. It is not known whether TOCP was disposed of on the present site.

ATTACHMENT F2

According to the Merck Index [1983], the raw materials for manufacturing Lindol are cresol [also known as cresylic acid or 2-methyl phenol and 4-methyl phenol], phosphoric oxychloride, oxalic acid, phosphoric pentachloride, phosphoric acid and potassium permanganate.

The compounds detected in the ground water generally do not have high vapour pressures. Therefore, it is unlikely that these compounds are in the basement vapours. However, the raw products, such as phosphoric acid and phosphoric oxychloride, have a higher vapour pressure and according to the Merck Index, have a syrupy texture. These inorganic compounds were not analysed for in the previous ground-water investigation. Therefore, the DNAPL detected beneath the IRC site may be one of these compounds and may be causing the vapour problem in the basement.

RECOMMENDATIONS

1. A survey should be conducted of the basements in the IRC neighborhood. The purpose of the survey is to determine whether additional basements have been impacted by the contamination.

2. A ventilation system should be installed into the basement of 140 Rome Street. The purpose of the ventilation system is to prevent the accumulation of vapours in the basement and prevent migration to the upper floors. If additional basements in the neighborhood have been impacted, ventilation systems should be installed accordingly.

3. A water sample should be collected from the basement sump at 140 Rome Street. The sample should be analysed for the following parameters:

   a. Volatile-organic compounds using EPA Method 624 plus o,m,p-xylenes plus the identification and quantification of the fifteen highest non-targeted compounds. The total number of peaks should be reported;

   b. Base/neutral and acid-extractable compounds using EPA Method 625 plus the identification and quantification of the fifteen highest non-targeted compounds. The total number of peaks should be reported;

   c. Tricresyl phosphate [ortho, meta and para isomers], phosphoric acid, phosphorus oxychloride, phosphorous pentachloride, oxalic acid and potassium permanganate;

ATTACHMENT F3

and

d. Field pH, specific conductance, dissolved oxygen (DO) or oxidation potential and temperature.

4. Ground-water samples should be collected from all twelve onsite monitor wells. Contamination by volatile-organic and acid-extractable compounds has already been documented. Therefore, analysis should be limited to the inorganic compounds as specified in item nos. 3b (base/neutrals), 3c and 3d.

5. A sample of the DNAPL should be collected from monitor well MW-11. Because of possible corrosivity and toxicity, extreme care should be taken when handling the sample. The sample should be analysed for the same parameters given in item nos. 3a through 3c.

6. Several additional deep monitor wells should be installed in the area surrounding monitor well MW-11. The purpose of these monitor wells is to delineate the extent of DNAPL. Split-spoon samples should be collected continuously to define the stratigraphy and subsequently, delineate any low-permeability zones which may be trapping the DNAPL. The total number of monitor wells should be field determined based on the location and extent of the DNAPL.

7. The monitor wells should extend to the top of the low-permeability zone and should <u>not</u> penetrate this zone. Based on analysis of the DNAPL, a casing material [PVC, stainless steelor galvanized steel] will be chosen.

8. If DNAPL is detected at the bottom of the monitor well, the collection of ground-water samples will not be necessary. If DNAPL is not detected, ground-water samples should be analysed for the parameters given in item no. 3.

9. To prevent the further migration of contaminants, a ground-water recovery system should be installed. Therefore, the recommendations cited in item nos. 1 through 8 should be completed expeditiously. The design of the recovery system should be based on the analyses recommended above and the location and composition of the DNAPL. Based on the types and number of contaminants, the design of a treatment system for the ground water may be difficult. Therefore, all the types of contaminants present must be documented before a treatment system can be designed.

ATTACHMENT E4

REFERENCES

Doolittle, A. K., 1980, Technology of solvents and plasticizers: John Wiley & sons, Inc., New York, p. 994-997.

Windolz, M., editor, 1983, The Merck Index, An encyclopedia of chemicals, drugs and biologicals: Merck & Co., Inc., Rahway, NJ, p. 368.

HWBCM

cc: FILE

ATTACHMENT E5

ATTACHMENT G

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Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
John J. Trela, Ph.D., Acting Director
2 Babcock Place
West Orange, N.J. 07052
201 - 669 - 3960

IN THE MATTER OF	:	ADMINISTRATIVE
	:	
Ironbound Recreation Center	:	CONSENT
City of Newark	:	
Hoechst Celanese Corporation	:	ORDER

This Administrative Consent Order is entered into pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP" or the "Department") by N.J.S.A. 13:1D-1 et seq., and 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, N.J.S.A. 58:10-23.11 et seq., and duly delegated to the Director of the Division of Hazardous Waste Management pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1) The City of Newark (hereinafter "respondent") is the owner and operator of the Ironbound Recreation Center, located at Block 2052, Lot 1, corner of St. Charles and Berlin Streets, City of Newark, County of Essex, State of New Jersey, (hereinafter "the site").

2) Hoechst Celanese Corporation (hereinafter "respondent") through its merger with the Celanese Corporation, owned and operated a "Lindol" (tricresyl-phosphate) manufacturing facility at the site previous to the ownership of the City of Newark. A principle raw material used in the manufacturing process was phenol.

3) On August 12, 1987, The Department became aware of a discharge of hazardous substances/pollutants (including but not limited to phenol) at the site.

4) Subsequent analysis of soil and groundwater at the site revealed the presence of several hazardous substances/pollutants including but not limited to phenol, 2,4-dimethylphenol, and tricresylphosphate.

5) The Department has determined that the respondents are responsible for the discharge at the site.

6) Based on the facts presented in paragraphs 3,4 and 5 above, the Department has determined that the respondents have violated the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., specifically N.J.S.A. 58:10A-6, and the regulations promulgated pursuant thereto, N.J.A.C. 7:14A-1 et seq., specifically N.J.A.C. 7:14A-1.2(c).

ATTACHMENT G'

7) Pursuant to N.J.S.A. 58:10-23.11g(c), respondents are stricly liable, jointly and severally without regard to fault, for all costs of the remediation, cleanup and removal of the hazardous substances/pollutants at the site.

8) To determine the nature and extent of the problem presented by the discharge of pollutants at the site and to develop environmentally sound remedial actions, it is necessary to conduct an additional remedial investigation and to conduct a feasibility study of remedial action alternatives (hereinafter "RI/FS") for the site. To correct the problems presented by the discharge, it is necessary to implement a remedial action plan.

9) To resolve this matter without the necessity for litigation, The respondents have agreed to conduct an RI/FS and to implement the remedial action alternative selected by the Department to remedy all pollution at and/or emanating from the site.

ORDER

NOW THEREFORE IT IS HEREBY ORDERED AND AGREED THAT:

I. Additional Remedial Investigation and Cleanup

A. General Site Work Requirements

10) All excavations of the site shall be performed in accordance with a site specific health and safety plan approved by the Department. This plan shall be submitted to the Department fourteen (14) calender days prior to the start of excavation.

11) Any soil excavated during remedial investigation, cleanup, or site improvement which is found to be contaminated shall be removed from the site and disposed of in accordance with all Federal, State, and local statutes, regulations and ordinances.

B. Additional Remedial Investigation

12) Within sixty (60) calendar days after the effective date of this Administrative Consent Order, the respondents shall submit to the Department a detailed draft Remedial Investigation Work Plan (hereinafter the "RI Work Plan") in accordance with the scope of work set forth in Appendix A, and Appendix B, which are attached hereto and made a part hereof.

13) Within fifteen (15) calendar days after receipt of the Department's written comments on the draft RI Work Plan, the respondents shall modify the draft RI Work Plan to conform to the Department's comments and shall submit the modified RI Work Plan to the Department. The determination as to whether or not the modified RI Work Plan, as resubmitted, conforms to the Department's comments shall be made solely by the Department.

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14) Upon receipt of the Department's written final approval of the RI Work Plan, the respondents shall conduct the additional remedial investigation in accordance with the approved RI Work Plan and the schedule therein.

15) The respondents shall submit to the Department a draft Remedial Investigation Report (hereinafter "RI Report") in accordance with Appendix A and the RI Work Plan and the schedule therein.

16) If upon review of the draft RI Report the Department determines that additional remedial investigation is required, the respondents shall conduct additional remedial investigation as directed by the Department and submit a second draft RI Report.

17) Within fifteen (15) calendar days after receipt of the Department's written comments on the draft or second draft (if applicable pursuant to the preceding paragraph) RI Report, the repondents shall modify the draft or second draft RI Report to conform to the Department's comments and shall submit the modified RI Report to the Department. The determination as to whether or not the modified RI Report, as resubmitted, conforms with the Department's comments shall be made solely by the Department.

C. Feasibility Study

18) Within sixty (60) calendar days after receipt of the Department's written final approval of the RI Report, or as otherwise directed by the Department, the respondents shall submit to the Department a draft Feasibility Study Work Plan (hereinafter, "FS Work Plan") in accordance with the scope of work set forth in Appendix C which is attached hereto and made a part hereof.

19) Within fifteen (15) calendar days after receipt of the Department's written comments on the draft FS Work Plan, the respondents shall modify the draft FS Work Plan to conform to the Department's comments and shall submit the modified FS Work Plan to the Department. The determination as to whether or not the modified FS Work Plan, as resubmitted, conforms to the Department's comments shall be made solely by the Department.

20) Upon receipt of the Department's written final approval of the FS Work Plan, the respondents shall conduct the feasibility study in accordance with the approved FS Work Plan and the schedule therein.

21) The respondents shall submit to the Department a draft Feasibility Study Report (hereinafter "FS Report") in accordance with Appendix C and the approved FS Work Plan and the schedule therein.

22) Within fifteen (15) calendar days after receipt of the Department's written comments on the draft FS Report, the respondents shall modify the draft FS Report to conform to the Department's comments and shall submit the modified FS Report to the Department. The determination as to whether or not the modified FS Report, as resubmitted, conforms to the Department's comments shall be made solely by the Department.

D. Remedial Action Plan

23) The Department will approve or disapprove of the remedial action alternative.

24) Within sixty (60) calendar days upon receipt of the Department's written final approval of the FS report the respondents shall submit to the Department a detailed draft Remedial Action Plan in accordance with the scope of work set forth in Appendix D which is attached hereto and made a part hereof.

25) Within fifteen (15) calendar days after receipt of the Department's written comments on the draft Remedial Action Plan, the respondents shall modify the draft Remedial Action Plan to conform to the Department's comments and shall submit the modified Remedial Action Plan to the Department. The determination as to whether or not the modified Remedial Action Plan, as resubmitted, conforms to the Department's comments shall be made solely by the Department.

26) Upon receipt of the Department's written final approval of the Remedial Action Plan, the respondents shall implement the approved Remedial Action Plan in accordance with the schedule therein.

E. Additional Remedial Investigation and Remediation

27) If the Department determines at any time that additional remedial investigation and/or remediation is required to protect human health or the environment, the respondents shall conduct such additional activities as directed by the Department.

F. Progress Reports

28) The respondents shall submit to the Department quarterly progress reports; the quarters being January through March, April through June, July through September, and October through December of each calendar year. Each progress report shall be submitted on or before the 30th day of the month following the quarter being reported. The respondent's shall submit the first progress report to the Department by April 30, 1988, for the January through March 1988 quarter. Each progress report shall detail the status of the respondents compliance with this Administrative Consent Order and shall include the following:

1 Identification of site and reference to this Administrative Consent Order;

2. Status of work at the site and progress to date;

3. Difficulties or problems encountered during the reporting period;

4. Actions taken or to be taken to rectify difficulties or problems;

5. Activities planned for the next reporting period;

6. Required and actual completion dates for each item required by this Administrative Consent Order;

7. An explanation of any noncompliance with the approved work plan(s), Remedial Action Plan or schedule(s);

8. All data collected, including quality assurance evaluations with supporting documentation, and field observations;

9. A discussion of performance evaluation of all remedial measures implemented to date.

II. Permits

29) Within fifteen (15) calendar days after the effective date of this Administrative Consent Order, the respondents shall apply for all necessary Federal, State and local permits for existing activities and, where applicable, former activities, in accordance with the requirements of N.J.A.C. 7:14A-1 et seq., N.J.A.C. 7:26-1 et seq., and N.J.A.C. 7:27-8, and other applicable statutes and regulations.

30) The respondents shall submit complete applications for all Federal, State and local permits required to carry out the obligations of this Administrative Consent Order in accordance with the preceding paragraph and the approved time schedules.

31) Within ten (10) calendar days of receipt of written comments concerning any permit application to a Federal, State or local agency, or sooner if required by the permitting agency, the respondents shall modify the permit application to conform to the agency's comments and resubmit the permit application to the agency. The determination as to whether or not the permit application, as resubmitted, conforms with the agency's comments shall be made solely by the agency.

32) This Administrative Consent Order shall not relieve the respondents from obtaining and complying with all applicable Federal, State and local permits, as well as all applicable statutes and regulations while carrying out the obligations imposed by this Administrative Consent Order.

33) This Administrative Consent Order shall not preclude the Department from requiring that the respondents apply for any permit or permit modification issued by the Department 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/or any other statutory authority for the matters covered herein. The terms and conditions of any such permit shall not be preempted by the terms and conditions of this Administrative Consent Order even if the terms and conditions of any such permit are more stringent than the terms and conditions of this Administrative Consent Order.

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III. Project Coordination

34) The respondents shall submit to the Department all documents required by this Administrative Consent Order, including but not limited to correspondence relating to force majeure issues, by certified mail, return receipt requested or by hand delivery with an acknowledgement of receipt form for the Department's signature. The date that the Department executes the receipt or acknowledgement will be the date the Department uses to determine the respondent's compliance with the requirements of this Administrative Consent Order and the applicability of stipulated penalties.

35) Within seven (7) calendar days after the effective date of this Administrative Consent Order, the respondents shall submit to the Department the name, title, address and telephone number of the individual who will be the Department's contact with the respondents for all matters concerning this Administrative Consent Order. The respondents shall contact the individual identified in the following paragraph for all matters concerning this Administrative Consent Order.

36) The respondents shall submit two (2) copies of all documents required by this Administrative Consent Order to:

Michael Hastry
Metro Field Office
Division of Hazardous Waste Management
2 Babcock Place
West Orange, New Jersey 07052

37) The respondents shall notify the Department two weeks prior to the initiation of all field activities. Notification shall be directed to:

Edward Phillips
Metro Field Office
Division of Hazardous Waste Management
2 Babcock Place
West Orange, New Jersey 07052

IV. Stipulated Penalties

38) Respondents shall pay stipulated penalties to the Department for its failure to comply with any of the paragraphs in this Administrative Consent Order according to the following schedule, unless the Department has modified the compliance dates pursuant to the Force Majeure provisions herein below:

Calander Days After Due Date	Stipulated Penalties
1 - 7	$100.00 per calander day
8 - 28	$200.00 per calander day
29 - over	$500.00 per calander day

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39) Any such penalty shall be due and payable fourteen (14) days following receipt of a written demand by the Department or, if no such demand is received, on the 30th calander day following the date the penalty accrues, and shall be due and payable every 30th calander day thereafter. Payment of such stipulated penalties shall be made by cashier's or certified check payable to the "Treasurer, State of New Jersey". Each Payment shall include a letter describing the basis for the penalty.

IV. Force Majeure

40) If any event occurs which the respondents believes will or may cause delay in the achievement of any provision of this Administrative Consent Order, the respondents shall notify the Department in writing within seven (7) calendar days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length of the delay, the precise cause or causes of the delay, any measures taken or to be taken to minimize the delay, and the time required to take any such measures to minimize the delay. The respondents shall take all necessary action to prevent or minimize any such delay.

41) If the Department finds that: (a) respondents have complied with the notice requirements of the preceding paragraph and; (b) that any delay or anticipated delay has been or will be caused by fire, flood, riot, strike or other circumstances beyond the control of the respondents, the Department shall extend the time for performance hereunder for a period no longer than the delay resulting from such circumstances. If the Department determines that either respondent has not complied with the notice requirements of the preceding paragraph, or the event causing the delay is not beyond the control of the respondents failure to comply with the provisions of this Administrative Consent Order shall constitute a breach of the requirements of this Administrative Consent Order. The burden of proving that any delay is caused by circumstances beyond the control of the respondents and the length of any such delay attributable to those circumstances shall rest with the respondents. Increases in the cost or expenses incurred by the respondents in fulfilling the requirements of this Administrative Consent Order shall not be a basis for an extension of time. Delay in an interim requirement shall not automatically justify or excuse delay in the attainment of subsequent requirements.

V. General Provisions

42) This Administrative Consent Order shall be binding on the respondents, its principals, directors, officers, agents, successors, assignees and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

43) The respondents shall perform all work conducted pursuant to this Administrative Consent Order in accordance with prevailing professional standards.

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44) The respondents shall conform all actions pursuant to this Administrative Consent Order with all applicable Federal, State, and local laws and regulations. The respondents shall be responsible for obtaining all necessary permits, licenses and other authorizations.

45) All appendices referenced in this Administrative Consent Order, as well as the RI Report, the FS Report, and all other reports, work plans and documents required under the terms of this Administrative Consent Order are, upon approval by the Department, incorporated into this Administrative Consent Order by reference and made a part hereof.

46) The respondents shall make available to the Department all data and information, including raw sampling and monitoring data, concerning pollution at and/or emanating from the site.

47) The respondents shall make available to the Department all technical records and contractual documents maintained or created by the respondents or its contractors in connection with this Administrative Consent Order.

48) The respondents shall preserve, during the pendency of this Administrative Consent Order and for a minimum of six (6) years after its termination, all data, records and documents in their possession or in the possession of their divisions, employees, agents, accountants, contractors, or attorneys which relate in any way to the implementation of work under this Administrative Consent Order, despite any document retention policy to the contrary. After this six year period, the respondents shall notify the Department within twenty-eight (28) days prior to the destruction of any such documents. If the Department requests in writing that some or all of the documents be preserved for a longer time period, the respondents shall comply with that request. Upon request by the Department, the respondents shall make available to the Department such records or copies of any such records.

49) No obligations imposed by this Administrative Consent Order are intended to constitute a debt, claim, penalty or other civil action which should 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 powers of the State of New Jersey intended to protect human health or the environment.

50) In addition to the Department's statutory and regulatory rights to enter and inspect, the respondents shall allow the Department and its authorized representatives access to the site at all times for the purpose of monitoring the respondent's compliance with this Administrative Consent Order.

51) The Department reserves the right to require the respondents to take additional actions should the Department determine that such actions are necessary to protect human health or the environment. Nothing in this Administrative Consent Order shall constitute a waiver of any statutory right of the Department pertaining to any of the laws of the State of New Jersey should the Department determine that such measures are necessary.

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52) The respondents shall not construe any informal advice, guidance, suggestions, or comments by the Department, or by persons acting on behalf of the Department, as relieving the respondents of its obligation to obtain written approvals as may be required herein, unless such advice, guidance, suggestions, or comments by the Department shall be submitted in writing to the respondents.

53) No modification or waiver of this Administrative Consent Order shall be valid except by written amendment to this Administrative Consent Order duly executed by the respondents and the Department.

54) The respondents hereby consent to and agree to comply with this Administrative Consent Order which shall be fully enforceable as an Order in the New Jersey Superior Court upon the filing of a summary proceeding for compliance pursuant to N.J.S.A. 13:1D-1 et seq., the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and/or the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq..

55) The respondents agree not to contest the authority or jurisdiction of the Department to issue this Administrative Consent Order and also agree not to contest the terms of this Administrative Consent Order in any action to enforce its provisions.

56) The respondents shall give written notice of this Administrative Consent Order to any successor in interest prior to transfer of ownership of the respondent's facilities which are the subject of this Administrative Consent Order, and shall simultaneously verify to the Department that such notice has been given.

57) The requirements of this Administrative Consent Order shall be deemed satisfied upon the receipt by the respondent's of written notice from the Department that the respondents have demonstrated, to the satisfaction of the Department, that all the terms of this Administrative Consent Order have been completed.

58) This Administrative Consent Order shall become effective upon the execution hereof by all parties; provided however, that this Administrative Consent Order shall be null and void unless all parties execute this Administrative Consent Order within twenty-eight (28) calendar days after the date of the Department's execution hereof and the Department receives the fully executed original within thirty-one (31) calendar days after the date of the Department's execution hereof.

59) The respondents are advised the the discharges referenced in this Administrative Consent Order may constitate violations of the Water Pollution Control Act, N.J.S.A. 58:10A-1 et. seq, and the Spill Compensation and Control Act, N.J.S.A, 58:10-23 et. seq. the Department reserves all rights and remedies under said Acts.

ATTACHMENT G-9

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DATE: _____ BY: _____

NAME: _____

TITLE: _____

DATE: _____ BY: _____

NAME: _____

TITLE: _____

DRAFT

DATE: _____ BY: _____

Ronald T. Corcory, Asst. Director
Division of Hazardous Waste Management
Enforcement Element

ATTACHMENT G10

LIST OF APPENDICES

APPENDIX	TITLE
A	ADDITIONAL REMEDIAL INVESTIGATION SCOPE OF WORK
B	MONITOR WELL SPECIFICATIONS
C	FEASIBILITY STUDY SCOPE OF WORK
D	REMEDIAL ACTION SCOPE OF WORK

ATTACHMENT "G"

APPENDIX A

ADDITIONAL REMEDIAL INVESTIGATION

SCOPE OF WORK

ATTACHMENT G12

ADDITIONAL REMEDIAL INVESTIGATION SCOPE OF WORK

I. REQUIREMENTS OF ADDITIONAL REMEDIAL INVESTIGATION

A. Fully determine the horizontal and vertical extent of pollution at and/or emanating from the site.

B. Fully determine migration paths of pollutants through groundwater.

C. Fully determine impact of the pollution on human health and the environment.

D. Collect, present and discuss all data necessary to adequately support the development of a feasibility study and the selection of a remedial action alternative that will remediate the adverse impacts of the pollution on human health and the environment

II. CONTENTS OF REMEDIAL INVESTIGATION WORK PLAN

IMPORTANT NOTE: All of the following items shall be included in the RI Work Plan. If any of the items have previously been submitted or completed, it shall be so stated in the RI Work Plan. For these items, the following shall be included in the RI Work Plan:

- Description of items submitted and/or summary of investigation completed.
- Date(s) of submission or completion.
- Any known changes or new information developed since submission or completion.
- The Department will determine the extent to which prior submissions or completions may satisfy specific items required by this Scope of Work.

A. A statement of requirements for the remedial investigation pursuant to Section I., above

B. A detailed schedule for all additional remedial investigation activities set forth in this Administrative Consent Order and in this Scope of Work including:

1. Dates for submission of all required permit applications.

2. Dates for start and ending of all field investigations.

3. Dates for submission of all reports.

C. Curriculum vitae of all key personnel who will participate in the remedial investigation.

ATTACHMENT G13

D. A field sampling plan including:

1. Ground water investigation

a. Install four (4) additional monitor wells in accordance with the locations specified on the attached site plan.

b. Explain the type of data which will be collected, justification for collection, and intentions for use of the data.

c. Specify number,type and frequency of groundwater samples require to accurately define the horizontal and vertical extent of groundwater pollution at and/or emanating from the site.

d. Specify EPA analytical procedures, including test parameters for groundwater analysis.

e. Specify chain-of-custody procedures.

f. Specify the name of the State certified laboratory the respondents will use for analysis of all samples.

g. Specify when Tier I [and Tier II] quality assurance deliverable requirements will be submitted.

h. Specify frequency of synoptic static water level measurements.

i. Specify all Federal, State and local permits required.

j. Specify investigation procedures in accordance with the following:

i. Have a qualified hydrogeologist with substantial experience in groundwater pollution investigations oversee all site activities.

ii. Obtain well drilling permits pursuant to N.J.S.A. 58:4A-14.

iii. Drill all wells under the direct supervision of a New Jersey licensed well driller and a qualified hydrogeologist.

iv. Install wells in accordance with the monitor well specifications in Appendix B, which is attached hereto and made a part hereto.

ATTACHMENT G14

IMPORTANT NOTE: Improperly constructed monitor wells can compound a pollution problem. Therefore, particular attention shall be given to the details of these specifications. The Department has the authority to shut down a drilling operation which is not adhering to the approved procedures. Data derived from improperly constructed wells shall not be accepted by the Department.

v. Decontaminate drilling and sampling equipment after each drilling and sampling event according to the approved decontamination plan.

vi. Survey all well casings, to the nearest hundredth (0.01) foot above mean sea level and horizontally to an accuracy of one-tenth (1/10) of a second latitude and longitude by a New Jersey licensed land surveyor.

vii. Obtain synoptic static water levels to the nearest hundredth (0.01) foot in each monitor well.

viii. Collect all ground-water samples pursuant to N.J.A.C. 7:14A-6.12.

ix. Well samples shall not be collected within 14 calendar days of installation and development of the wells.

x. Comolete sufficient pumping and packer tests to adequately define aquifer characteristics and develop recovery well design for aquifer restoration.

xi. Complete geophysical surveys and/or groundwater modeling as appropriate for the site.

E. A health and safety plan based on EPA protocols for on site personnel to minimize the risk of personal injury, illness and potential environmental impairment associated with the site investigation, including:

1. Listing of personal protective equipment (including respiratory protection) to be used and guidelines for their use, including manufacturer, model, duration of safety period, and any required certification documentation.

2. Listing of safety equipment (including manufacturer, expiration date and model) to be used, such as fire extinguishers, portable eye wash stations, air monitoring equipment, gamma survey instrument, etc. (equipment shall meet OSHA standards or other acceptable industrial standards).

3. Contingency plans for emergency procedures, spill prevention/response, and evacuation plans.

4. On site monitoring for personnel safety (e.g. PID, FID).

5. Criteria for selecting proper level of personal protection.

6. Medical surveillance program for all on site personnel involved in remedial investigation.

7. Personal hygiene requirements.

8. Training program including training protocol.

9. Special medical procedures to be available at site.

10. Telephone numbers of emergency medical facility and personnel.

F. An equipment decontamination plan including:

1. List the items to be decontaminated:

a. Drilling equipment, paying particular attention to down hole tools, back of drilling rig and drilling rod racks.

b. Sampling equipment including split spoons, shelby tubes, trowels, spatulas, etc.

c. Bailers, pumps, hoses, etc.

d. Personnel clothing

2. Procedures for decontamination.

IMPORTANT NOTE: Use of dedicated sampling equipment is recommended.

III. CONTENTS OF REMEDIAL INVESTIGATION REPORT

A. Presentation of data

1. Results of all analysis , laboratory data sheets and the required quality assurance documentation.

2. Summary table(s) of all analysis.

3. As-built construction diagrams for each soil boring and monitor well.

4. Well casing elevations to the nearest hundredth (0.01) foot above mean sea level, taken at the top of casing with locking cap removed.

ATTACHMENT G-16

5. Depth to ground water to the nearest hundredth (0.01) foot above mean sea level, taken at the top of well casing prior to sampling with cap removal.

6. All support data including graphs, equations, references, raw data, etc.

B. Maps

1. Site map

a. Property boundaries

b. Structures and improvements

c. All underground piping and utilities

d. Scale and orientation

e. Sample location map(s)

i. Monitor well locations and casing elevations

ii. Sample collection locations

iii. Soil boring locations

2. Groundwater contour maps and contamination isopleth maps.

C. Discussion of Data

1. Description of site/regional hydrogeology and its relation to migration of pollutants.

2. Direction and rate of groundwater flow in the aquifer(s), both horizontally and vertically.

3. Levels of groundwater pollution as compared to applicable standards pursuant to N.J.A.C. 7:14A-1 et seq., 7:9-5, 7:9-6, and guidelines, or background levels where pertinent.

4. Extent of groundwater pollution both on and off site.

5. Pollutant behavior, stability, biological and chemical degradation, mobility and any other relevant factors pertinent to the investigation.

6. Projected rate(s) of pollution movement.

7. Identification of critical pollutants.

D. Assessment of impact of pollution on human health and the environment

1. Identification of human receptors in the paths of pollution migration; mobility of pollutants and specific routes to target organs (e.g., liver).

2. Identification of the receiving media and/or ecological groups and migration pathways of critical pollutants.

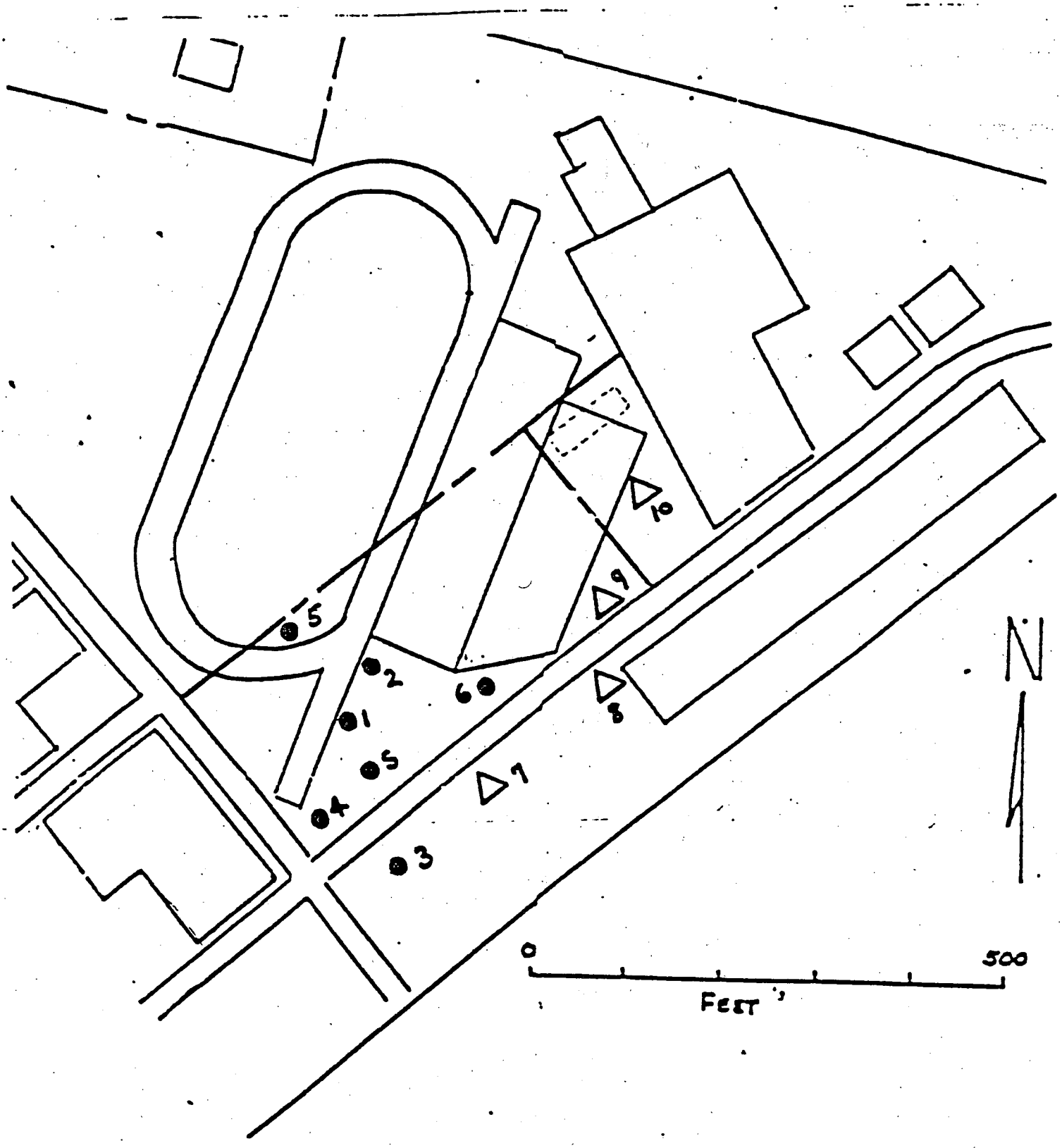
3. Toxicology of each critical pollutant (acute and chronic toxicity for short and long-term exposure, carcinogenicity, mutagenicity, tetratogenicity, synergistic and/or antagonistic associations, aquatic toxicity, ecological impacts on flora and fauna, etc.).

4. Migration potential and environmental fate of each critical pollutant in site-specific terms (e.g., attenuation, dispersion and biodegradation are factors in the groundwater pathway).

5. Evaluation of potential for biomagnification and/or bioaccumulation of critical pollutants in the food chain.

IMPORTANT NOTE: Particular attention should be paid to future site use. (i.e. swimming pool; recreation center)

E. Recommendations For Additional Investigations



△ - PROPOSED MONITORING WELLS

● - EXISTING WELLS

ATTACHMENT GA

FIGURE __ IRONBOUND RECREATION CENTER

APPENDIX B

MONITOR WELL SPECIFICATIONS

ATTACHMENT 620

MONITOR WELL SPECIFICATIONS

A. Requirements

1. Notification to the NJDEP is required two weeks prior to drilling.

2. State well permits are required for each monitoring well constructed by the driller. The well permit tag must be permanently affixed to each monitoring well.

3. Copies of the site specific well specifications must be maintained at the drilling site by the driller.

4. The monitorong well must be installed by a New Jersey licensed well driller.

5. Monitoring well design must conform with NJAC 7:9-7, 8 and 9.

6. At minimum, each well must contain 15 feet of screen. Three feet of this screen must extend above the water table.

7: Only threaded joints are acceptable as couplings.

8. The driller must maintain an accurate written log of all materials encountered, record construction details for each well, and record the depths water bearing zones. This information must be submitted to the Bureau of Water Allocation as required by N.J.S.A. 58:4A

9. A length of protective steel casing with a locking cap must be securely set in cement around the well casing. Flush mount monitoring wells are acceptable provided they have manholes, locking caps, and seals to prevent leakage of surface water into the well.

10. Top of each well casing (excluding cap) must be surveyed to the nearest 0.01 foot by a New Jersey licensed surveyor. The survey point must be marked on each well.

11. Wells must be developed to a turbidity-free discharge.

12. Modifications to designs are allowed only with NJDEP approval.

Notice is Hereby Given of the Following:

Review by the Department of well locations and depths is limited solely to review for compliance with the law and Department rules.

The Department does not review well locations or depths to ascertain the presence of, nor the potential for, damage to any pipeline, cable, or other structures.

ATTACHMENT G21

The permittee (applicant) is solely responsible for the safety and adequacy of the design and construction of monitoring well(s) required by the Department.

The permittee (applicant) is solely responsible for any harm or damage to person or property which results from the construction or maintenance of any well; this provision is not intended to relieve third parties of any liabilities or responsibilities which are legally theirs.

ATTACHMENT G22

APPENDIX C

FEASIBILITY STUDY

SCOPE OF WORK

ATTACHMENT G23

FEASIBILITY STUDY SCOPE OF WORK

I. REQUIREMENTS OF FEASIBILITY STUDY

A. Recommend the most environmentally sound remedial action alternative which will, in a timely manner:

1. Clean up pollution at and/or emanating from the site.

2. Achieve and maintain applicable groundwater quality standards pursuant to N.J.A.C. 7:14A-1 et seq., 7:9-5, 7:9-6, and guidelines established by the Department.

3. Return area to background conditions.

4. Effectively remediate damage to and provide adequate protection of human health and the environment.

II. CONTENTS OF FEASIBILITY STUDY WORK PLAN

A. Presentation of procedure concerning recommendation of remedial action alternative in accordance with the following:

1. Based on the detailed evaluation process, recommend the most environmentally sound remedial action alternative which will, in the most timely manner, meet the requirements in Section I. A. above.

2. Prepare a detailed rationale for recommending the remedial action alternative, stating the advantages over other alternatives considered. The rationale should include but not be limited to the following:

a. Level of cleanup achievable

b. Time to achieve cleanup

c. Feasibility

d. Implementability

e. Reliability

f. Ability to minimize adverse impacts during action.

g. Ability to minimize off site impacts caused by action.

h. Legal constraints

3. Prepare a conceptual design of the recommended alternative including:

a. Engineering and hydrogeologic approaches

ATTACHMENT G24

b. Implementation schedules

c. Any special implementation requirements

d. Applicable design criteria

e. Preliminary site layout(s)

f. Operation and maintenance requirements

g. Safety plan(s)

III. CONTENT OF FEASIBILITY STUDY REPORT

A. Recommendation of, rationale for the most environmentally sound remedial alternative which meets the requirements in Section I. A., above, in the most timely manner and according to the approved FS Work Plan.

B. Conceptual design of recommended remedial alternative.

ATTACHMENT G25

APPENDIX D

REMEDIAL ACTION

SCOPE OF WORK

ATTACHMENT G26

REMEDIAL ACTION SCOPE OF WORK

I. Detailed Engineering Design

II. Schedule for Construction, Operation and Maintenance

III. Generation, Maintenance, Monitoring and Reporting Requirements

IV. Performance Evaluation

A. The selected remedial action alternative shall meet or exceed the Requirements of the Feasibility Study in Appendix C, item I.A.

B. Procedure

1. During implementation of groundwater aspect of the alternative, the recovery wells' radius of influence shall be adequately recovering all polluted groundwater.

a. Adequate performance evaluation monitoring.

b. Submission of monitoring data:

i. Groundwater quality contour map(s)

ii. Groundwater elevation contour map(s)

iii. Time/concentration graphs for all recovery wells and all monitor wells.

iv. Time/volume pumped per month histogram for all recovery wells.

2. Post cleanup sampling:

a. Groundwater

V. Complete and Detailed Cost Estimate

ATTACHMENT G22

ATTACHMENT H

AnalytiKEM An American NuKEM Company

AnalytiKEM Inc.
28 Springdale Road
Cherry Hill, NJ 08003
609/751-1122
215/923-2068

Analytical Data Report Package

for the

New Jersey Department of Environmental Protection

Trenton, New Jersey 08625

Case Name	Field Sample #	Laboratory Sample #	Date of Collection
Ironbound	EP-003-D	A15945-1	4/11/88
	EP-003-S	A15945-2	4/11/88
	EP-004-D	A15945-3	4/11/88
	EP-004-S	A15945-4	4/11/88
	EP-005-D	A15945-5	4/11/88
	EP-005-S	A15945-6	4/11/88
	EP-006-D	A15945-7	4/11/88
	EP-006-S	A15945-8	4/11/88
	EP-007-D	A15945-9	4/11/88
	EP-007-S	A15945-10	4/11/88
	EP-008-D	A15945-11	4/11/88
	EP-008-S	A15945-12	4/11/88
	EP-009-D	A15945-13	4/11/88
	EP-009-S	A15945-14	4/11/88
	EP-010-D	A15945-15	4/11/88
	EP-010-S	A15945-16	4/11/88
	EP-011-D	A15945-17	4/11/88
	EP-011-S	A15945-18	4/11/88
	EP-012-D	A15945-19	4/11/88

ATTACHMENT H

AnalytiKEM

Case Name	Field Sample #	Laboratory Sample #	Date of Collection
Ironbound	EP-012-S	A15945-20	4/11/88
	EP-013-D	A15945-21	4/11/88
	EP-013-S	A15945-22	4/11/88
	EP-014-D	A15945-23	4/11/88
	EP-014-S	A15945-24	4/11/88
	EP-015-D	A15945-25	4/11/88
	EP-015-S	A15945-26	4/11/88
	EP-106-D	A15945-27	4/11/88
	EP-016-S	A15945-28	4/11/88
	EP-017-D	A15945-29	4/11/88
	EP-017-S	A15945-30	4/11/88
	Field Blank	A15945-31	4/11/88
	Trip Blank	A15945-32	4/11/88

Laboratory Name: AnalytiKEM, Inc.

Certification #: NJ 04012

Supervisor/Manager Signature: Michael Shmookler

Printed Name: Michael Shmookler, Ph.D.

ATTACHMENT H2

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ATTACHMENT H3

AnalytiKEM

I. Definition of Terms

Term	Definition
D	Detected; result must be greater than zero.
DI	Deionized Water
J	Compound was detected at levels below the practical quantitation limit. The level reported is approximate.
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NA	Analysis not applicable to the sample matrix.
ND	Not Detected
NR	Not Requested
NTU	Nephelometric Turbidity Units
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
TON	Threshold Odor Number
U	Compound was analyzed for but not detected. The preceding number is the practical quantitation limit for the compound.
ppb	Parts-per-billion; may be converted to ppm by dividing by 1,000.
ppm	Parts-per-million; may be converted to ppb by multiplying by 1,000.
ug/l	Micrograms of constituent per liter of sample; equivalent to parts-per-billion.
ug/kg	Micrograms of constituent per kilogram of sample; equivalent to parts-per-billion.
ug/kg dw	Micrograms of constituent per kilogram of sample reported on a dry weight basis.
CCC	Calibration Check Compound; used to verify the precision of a GC/MS calibration curve.
SPCC	System Performance Check Compound; used to verify the correct operation of a GC/MS instrument.
PQL	Practical Quantitation Limit; the minimum level at which compounds can be dependably quantitated.

II. Methodology

Polychlorinated Biphenyls

Aqueous

- Method 608, Organochlorine Pesticides and PCBs, Federal Register, Vol. 49, No. 209, October 26, 1984.

Nonaqueous

- Method 3550, Sonication Extraction, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Second Edition, USEPA, July 1982.
- Method 8080, Organochlorine Pesticides and PCBs, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, Second Edition, USEPA, July 1982.

General Chemistry

Residue, total (TS)

- Standard Methods for Examination of Water and Wastewater, American Public Health Association, 16th edition, Method 209A, 1985.

ATTACHMENT H5

III. Laboratory Chronicle

	DATE I	DATE II
Receipt/Refrigeration	4/11/88	
Organics Extraction		
PCBs	4/15/88	
Analyses		
PCBs	4/22-4/28/88	
Other Analyses		
Residue, total	4/13/88	

QA Officer Review & Approval
(Signature) Lee F. Cramer
(Printed Name) Lee F. Cramer
(Date) 5/10/88

NOTE: If fractions are reextracted and reanalyzed because the initial endeavors failed to meet the required quality control criteria, the dates of reextraction and/or reanalysis will be entered in column II additionally.

ATTACHMENT H6

IV. Case Narrative

Polychlorinated Biphenyls

Sample Numbers A15945-1-32

Surrogate not recoverable due to matrix interference for sample(s) 17.

ATTACHMENT H2

V. Extraction Log

Polychlorinated Biphenyls

AnalytiKEM Designation	Initial Sample Size	Final Volume	Dilution
Method Blank	—	10.0	—
A15945-2 Spike (PCB)	10.06	10.0	—
A15945-2 Spike Dup. (PCB)	10.05	10.0	—
A15945-26 Spike (PCB)	10.02	10.0	—
A15945-26 Spike Dup. (PCB)	10.16	10.0	—
DI Water Spike (PCB)	—	10.0	—
A15945-1	10.93	10.0	—
A15945-2	10.44	10.0	—
A15945-3	10.50	10.0	1:10
A15945-4	10.52	10.0	—
A15945-5	10.78	10.0	—
A15945-6	10.16	10.0	—
A15945-7	10.23	10.0	1:10
A15945-7	10.23	10.0	1:100
A15945-8	10.39	10.0	—
A15945-9	10.96	10.0	—
A15945-10	10.64	10.0	1:10
A15945-11	10.31	10.0	—
A15945-12	10.66	10.0	—
A15945-13	10.00	10.0	1:10
A15945-14	10.20	10.0	—
A15945-15	10.46	10.0	1:10
A15945-16	10.53	10.0	1:10
A15945-17	10.80	10.0	1:10
A15945-18	10.36	10.0	1:10
A15945-19	11.55	10.0	1:10
A15945-20	10.03	10.0	—
A15945-21	10.10	10.0	—
A15945-22	10.76	10.0	—
A15945-23	10.75	10.0	—
A15945-24	10.76	10.0	—
A15945-25	10.34	10.0	—
A15945-26	10.13	10.0	—
A15945-27	10.85	10.0	—
A15945-28	10.53	10.0	—
A15945-29	10.04	10.0	—
A15945-30	10.17	10.0	—
A15945-31	580*	10.0	—
A15945-32	960*	10.0	—
Units	(g)	(ml)	

* (ml)

ATTACHMENT H8

VI. ANALYSIS DATA SHEETS

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-003-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-1

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.93 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/22/88

% Moisture: not dec. 18 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H10

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-003-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL Lab Sample ID: A15945-2

Sample wt/vol: 10.44 (g/mL) 10 Date Received: 4/11/88

Level: (low/med) Date Extracted: 4/15/88

% Moisture: not dec. 13 dec. Date Analyzed: 4/22/88

Extraction: (SepF/Cont) Dilution Factor: —

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	380	U
11141-16-5	Aroclor-1232	380	U
53469-22-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260		

ATTACHMENT H''

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-004-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-3

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.50 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/22/88

% Moisture: not dec. 10 dec.

Dilution Factor: 1:10

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016	3,700	U
11104-28-2	Aroclor-1221	3,700	U
11141-16-5	Aroclor-1232	3,700	U
53469-22-9	Aroclor-1242	3,700	U
12672-29-6	Aroclor-1248	29,000	
11097-69-1	Aroclor-1254	3,700	U
11096-82-5	Aroclor-1260	3,700	U

ATTACHMENT H12

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-004-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-4

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.52 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/22/88

% Moisture: not dec. 12 dec.

Dilution Factor: —

Extraction: (Sep/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	380	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	380	U
11141-16-5	Aroclor-1232	380	U
53469-22-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260		

ATTACHMENT H13

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-005-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL Lab Sample ID: A15945-5

Sample wt/vol: 10.78 (g/mL) 10 Date Received: 4/11/88

Level: (low/med) Date Extracted: 4/15/88

% Moisture: not dec. 12 dec. Date Analyzed: 4/22/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	380	U
11141-16-5	Aroclor-1232	380	U
53469-22-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	5,000	
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260	380	U

ATTACHMENT H14

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-005-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-6

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.16 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/22/88

% Moisture: not dec. 20 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	410	U
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	410	U
11096-82-5	Aroclor-1260		

ATTACHMENT H15

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-006-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-7

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.23 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med) _____

Date Analyzed: 4/22/88

% Moisture: not dec. 13 dec. _____

Dilution Factor: 1:10; 1:100

Extraction: (SepF/Cont) _____

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	38,000	U
12674-11-2	Aroclor-1016	38,000	U
11104-28-2	Aroclor-1221	38,000	U
11141-16-5	Aroclor-1232	38,000	U
53469-22-9	Aroclor-1242	120,000	
12672-29-6	Aroclor-1248	38,000	U
11097-69-1	Aroclor-1254	38,000	U
11096-82-5	Aroclor-1260		

ATTACHMENT H16

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-006-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-8

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.39 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/22/88

% Moisture: not dec. 19 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	NR	
319-85-7	beta-BHC	NR	
319-86-8	delta-BHC	NR	
58-89-9	gamma-BHC (Lindane)	NR	
76-44-8	Heptachlor	NR	
309-00-2	Aldrin	NR	
1024-57-3	Heptachlor epoxide	NR	
959-98-8	Endosulfan I	NR	
60-57-1	Dieldrin	NR	
72-55-9	4,4'-DDE	NR	
72-20-8	Endrin	NR	
33213-65-9	Endosulfan II	NR	
72-54-8	4,4'-DDD	NR	
1031-07-8	Endosulfan sulfate	NR	
50-29-3	4,4'-DDT	NR	
72-43-5	Methoxychlor	NR	
7421-93-4	Endrin aldehyde	NR	
57-74-9	T. Chlordane	NR	
5103-71-9	alpha Chlordane	NR	
5103-74-2	gamma Chlordane	NR	
8001-35-2	Toxaphene	410	U
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	410	U
11096-82-5	Aroclor-1260		

ATTACHMENT 117

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-007-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-9

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.96 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/22/88

% Moisture: not dec. 18 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H18

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-007-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-10

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.64 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/23/88

% Moisture: not dec. 15 dec.

Dilution Factor: 1:10

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	3,900	U
12674-11-2	Aroclor-1016	3,900	U
11104-28-2	Aroclor-1221	3,900	U
11141-16-5	Aroclor-1232	3,900	U
53469-22-9	Aroclor-1242	3,900	U
12672-29-6	Aroclor-1248	3,900	U
11097-69-1	Aroclor-1254	3,900	U
11096-82-5	Aroclor-1260		

ATTACHMENT H19

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-008-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-11

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.31 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/23/88

% Moisture: not dec. 20 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

pH:

GPC Cleanup: (Y/N) N

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	410	U
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	410	U
11096-82-5	Aroclor-1260		

ATTACHMENT H-20

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-008-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL Lab Sample ID: A15945-12

Sample wt/vol: 10.66 (g/mL) 10 Date Received: 4/11/88

Level: (low/med) Date Extracted: 4/15/88

% Moisture: not dec. 17 dec. Date Analyzed: 4/23/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H24

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-009-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-13

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.0 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/23/88

% Moisture: not dec. 15 dec.

Dilution Factor: 1:10

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	3,900	U
12674-11-2	Aroclor-1016	3,900	U
11104-28-2	Aroclor-1221	3,900	U
11141-16-5	Aroclor-1232	3,900	U
53469-22-9	Aroclor-1242	31,000	
12672-29-6	Aroclor-1248	3,900	U
11097-69-1	Aroclor-1254	1,800	
11096-82-5	Aroclor-1260		

ATTACHMENT H 22

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-009-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-14

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.20 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/23/88

% Moisture: not dec. 18 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	2,600	
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H23

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-010-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-15

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.46 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/23/88

% Moisture: not dec. 13 dec.

Dilution Factor: 1:10

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	3,800	U
12674-11-2	Aroclor-1016	3,800	U
11104-28-2	Aroclor-1221	3,800	U
11141-16-5	Aroclor-1232	3,800	U
53469-22-9	Aroclor-1242	15,000	
12672-29-6	Aroclor-1248	3,800	U
11097-69-1	Aroclor-1254	1,100	
11096-82-5	Aroclor-1260		

ATTACHMENT H24

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-010-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-16

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.53 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/23/88

% Moisture: not dec. 21 dec.

Dilution Factor: 1:10

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	4,200	U
12674-11-2	Aroclor-1016	4,200	U
11104-28-2	Aroclor-1221	4,200	U
11141-16-5	Aroclor-1232	4,200	U
53469-22-9	Aroclor-1242	4,200	U
12672-29-6	Aroclor-1248	4,200	U
11097-69-1	Aroclor-1254	4,200	U
11096-82-5	Aroclor-1260		

ATTACHMENT H25

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-011-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL Lab Sample ID: A15945-17

Sample wt/vol: 10.80 (g/mL) 10 Date Received: 4/11/88

Level: (low/med) Date Extracted: 4/15/88

% Moisture: not dec. 11 dec. Date Analyzed: 4/23/88

Extraction: (SepF/Cont) Dilution Factor: 1:10

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	3,700	U
12674-11-2	Aroclor-1016	3,700	U
11104-28-2	Aroclor-1221	3,700	U
11141-16-5	Aroclor-1232	3,700	U
53469-22-9	Aroclor-1242	11,000	
12672-29-6	Aroclor-1248	3,700	U
11097-69-1	Aroclor-1254	2,700	
11096-82-5	Aroclor-1260		

ATTACHMENT H26

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-011-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL

Lab Sample ID: A15945-18

Sample wt/vol: 10.36 (g/mL) 10

Date Received: 4/11/88

Level: (low/med)

Date Extracted: 4/15/88

% Moisture: not dec. 16 dec.

Date Analyzed: 4/23/88

Extraction: (SepF/Cont)

Dilution Factor: 1:10

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	3,900	U
12674-11-2	Aroclor-1016	3,900	U
11104-28-2	Aroclor-1221	3,900	U
11141-16-5	Aroclor-1232	3,900	U
53469-22-9	Aroclor-1242	3,900	U
12672-29-6	Aroclor-1248	3,900	U
11097-69-1	Aroclor-1254	3,900	U
11096-82-5	Aroclor-1260		

ATTACHMENT H22

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-012-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-19

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 11.55 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/23/88

% Moisture: not dec. 14 dec.

Dilution Factor: 1:10

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	3,800	U
12674-11-2	Aroclor-1016	3,800	U
11104-28-2	Aroclor-1221	3,800	U
11141-16-5	Aroclor-1232	3,800	U
53469-22-9	Aroclor-1242	3,800	U
12672-29-6	Aroclor-1248	3,800	U
11097-69-1	Aroclor-1254	1,000	
11096-82-5	Aroclor-1260		

ATTACHMENT #28

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-012-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-20

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.03 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/23/88

% Moisture: not dec. 36 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	520	U
12674-11-2	Aroclor-1016	520	U
11104-28-2	Aroclor-1221	520	U
11141-16-5	Aroclor-1232	520	U
53469-22-9	Aroclor-1242	520	U
12672-29-6	Aroclor-1248	520	U
11097-69-1	Aroclor-1254	520	U
11096-82-5	Aroclor-1260		

ATTACHMENT H29

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-013-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL

Lab Sample ID: A15945-21

Sample wt/vol: 10.10 (g/mL) 10

Date Received: 4/11/88

Level: (low/med)

Date Extracted: 4/15/88

% Moisture: not dec. 20 dec.

Date Analyzed: 4/23/88

Extraction: (SepF/Cont)

Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	410	U
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	410	U
11096-82-5	Aroclor-1260		

ATTACHMENT H30

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-013-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL

Lab Sample ID: A15945-22

Sample wt/vol: 10.76 (g/mL) 10

Date Received: 4/11/88

Level: (low/med)

Date Extracted: 4/15/88

% Moisture: not dec. 15 dec.

Date Analyzed: 4/23/88

Extraction: (SepF/Cont)

Dilution Factor: - -

GPC Cleanup: (Y/N) N. pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	390	U
12674-11-2	Aroclor-1016	390	U
11104-28-2	Aroclor-1221	390	U
11141-16-5	Aroclor-1232	390	U
53469-22-9	Aroclor-1242	390	U
12672-29-6	Aroclor-1248	390	U
11097-69-1	Aroclor-1254	390	U
11096-82-5	Aroclor-1260		

ATTACHMENT H 3L

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-014-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-23

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.75 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/23/88

% Moisture: not dec. 18 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H32

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-014-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL Lab Sample ID: A15945-24

Sample wt/vol: 10.76 (g/mL) 10 Date Received: 4/11/88

Level: (low/med) Date Extracted: 4/15/88

% Moisture: not dec. 17 dec. Date Analyzed: 4/23/88

Extraction: (SepF/Cont) Dilution Factor: ==

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-015-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL Lab Sample ID: A15945-25

Sample wt/vol: 10.34 (g/mL) 10 Date Received: 4/11/88

Level: (low/med) Date Extracted: 4/15/88

% Moisture: not dec. 21 dec. . Date Analyzed: 4/23/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260		

ATTACHMENT H 34

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-015-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-26

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.13 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/27/88

% Moisture: not dec. 9 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	360	U
12674-11-2	Aroclor-1016	360	U
11104-28-2	Aroclor-1221	360	U
11141-16-5	Aroclor-1232	360	U
53469-22-9	Aroclor-1242	360	U
12672-29-6	Aroclor-1248	360	U
11097-69-1	Aroclor-1254	360	U
11096-82-5	Aroclor-1260		

ATTACHMENT H35

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-016-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL Lab Sample ID: A15945-27

Sample wt/vol: 10.85 (g/mL) 10 Date Received: 4/11/88

Level: (low/med) Date Extracted: 4/15/88

% Moisture: not dec. 16 dec. Date Analyzed: 4/23/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	390	U
12674-11-2	Aroclor-1016	390	U
11104-28-2	Aroclor-1221	390	U
11141-16-5	Aroclor-1232	390	U
53469-22-9	Aroclor-1242	390	U
12672-29-6	Aroclor-1248	390	U
11097-69-1	Aroclor-1254	390	U
11096-82-5	Aroclor-1260		

ATTACHMENT H36

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-016-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL Lab Sample ID: A15945-28

Sample wt/vol: 10.53 (g/mL) 10 Date Received: 4/11/88

Level: (low/med) Date Extracted: 4/15/88

% Moisture: not dec. 17 dec. Date Analyzed: 4/24/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H37.

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-017-D

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) SOIL Lab Sample ID: A15945-29

Sample wt/vol: 10.04 (g/mL) 10 Date Received: 4/11/88

Level: (low/med) Date Extracted: 4/15/88

% Moisture: not dec. 24 dec. Date Analyzed: 4/24/88

Extraction: (SepF/Cont) Dilution Factor: --

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	430	U
12674-11-2	Aroclor-1016	430	U
11104-28-2	Aroclor-1221	430	U
11141-16-5	Aroclor-1232	430	U
53469-22-9	Aroclor-1242	430	U
12672-29-6	Aroclor-1248	430	U
11097-69-1	Aroclor-1254	430	U
11096-82-5	Aroclor-1260		

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-017-S

Lab Name: AnalytiKEM Inc.

Lab Code: 4012 Case No.: 87-8-14-12-M Contract No.: X-195

Lab Sample ID: A15945-30

Matrix: (soil/water) SOIL

Date Received: 4/11/88

Sample wt/vol: 10.17 (g/mL) 10

Date Extracted: 4/15/88

Level: (low/med)

Date Analyzed: 4/24/88

% Moisture: not dec. 27 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	450	U
12674-11-2	Aroclor-1016	450	U
11104-28-2	Aroclor-1221	450	U
11141-16-5	Aroclor-1232	450	U
53469-22-9	Aroclor-1242	450	U
12672-29-6	Aroclor-1248	450	U
11097-69-1	Aroclor-1254	450	U
11096-82-5	Aroclor-1260		

ATTACHMENT #39

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

FIELD BLANK

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) Water

Lab Sample ID: A15945-31

Sample wt/vol: 580 (g/mL) 10

Date Received: 4/11/88

Level: (low/med)

Date Extracted: 4/15/88

% Moisture: not dec. dec. 100

Date Analyzed: 4/24/88

Extraction: (SepF/Cont) SepF

Dilution Factor: —

GPC Cleanup: (Y/N) pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	10	U
12674-11-2	Aroclor-1016	10	U
11104-28-2	Aroclor-1221	10	U
11141-16-5	Aroclor-1232	10	U
53469-22-9	Aroclor-1242	10	U
12672-29-6	Aroclor-1248	10	U
11097-69-1	Aroclor-1254	10	U
11096-82-5	Aroclor-1260		

ATTACHMENT H40

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

TRIP BLANK

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-8-14-12-M Contract No.: X-195

Matrix: (soil/water) Water

Lab Sample ID: A15945-32

Sample wt/vol: 960 (g/mL) 10

Date Received: 4/11/88

Level: (low/med)

Date Extracted: 4/15/88

% Moisture: not dec. dec. 100

Date Analyzed: 4/24/88

Extraction: (SepF/Cont) SepF

Dilution Factor: - -

GPC Cleanup: (Y/N) pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	10	U
12674-11-2	Aroclor-1016	10	U
11104-28-2	Aroclor-1221	10	U
11141-16-5	Aroclor-1232	10	U
53469-22-9	Aroclor-1242	10	U
12672-29-6	Aroclor-1248	10	U
11097-69-1	Aroclor-1254	10	U
11096-82-5	Aroclor-1260		

ATTACHMENT H41

AnalytiKEM An American NuKEM Company

AnalytiKEM Inc.
28 Springdale Road
Cherry Hill, NJ 08003
609/751-1122
215/923-2068

Analytical Data Report Package

for the

New Jersey Department of Environmental Protection

Trenton, New Jersey 08625

Case Name	Field Sample #	Laboratory Sample #	Date of Collection
Ironbound	EP-018	A15960-1	4/12/88
	EP-019	A15960-2	4/12/88
	EP-020	A15960-3	4/12/88
	EP-021	A15960-4	4/12/88
	EP-022	A15960-5	4/12/88
	EP-023	A15960-6	4/12/88
	EP-024	A15960-7	4/12/88
	EP-025	A15960-8	4/12/88
	EP-026	A15960-9	4/12/88
	EP-027	A15960-10	4/12/88
	EP-028	A15960-11	4/12/88
	EP-029S	A15960-12	4/12/88
	EP-029D	A15960-13	4/12/88
	EP-030S	A15960-14	4/12/88
	EP-030D	A15960-15	4/12/88
	EP-031	A15960-16	4/12/88
	EP-032	A15960-17	4/12/88
	EP-033	A15960-18	4/12/88
	EP-034	A15960-19	4/12/88

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& TECHNICAL SERVICES

ATTACHMENT H42

AnalytiKEM

Case Name	Field Sample #	Laboratory Sample #	Date of Collection
Ironbound	EP-035	A15960-20	4/12/88
	EP-036	A15960-21	4/12/88
	EP-037	A15960-22	4/12/88
	EP-038	A15960-23	4/12/88
	EP-039	A15960-24	4/12/88
	EP-040	A15960-25	4/12/88
	EP-041	A15960-26	4/12/88
	EP-042	A15960-27	4/12/88
	EP-043	A15960-28	4/12/88
	EP-044	A15960-29	4/12/88
	EP-045	A15960-30	4/12/88
	EP-046	A15960-31	4/12/88
	EP-047	A15960-32	4/12/88
	EP-048	A15960-33	4/12/88
	EP-049	A15960-34	4/12/88
	Trip Blank	A15960-35	4/12/88
	Field Blank	A15960-36	4/12/88

Laboratory Name AnalytiKEM, Inc.

Certification # NJ 04012

Supervisor/Manager Signature Michael Shmookler

Printed Name Michael Shmookler, Ph.D.

ATTACHMENT H43

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ATTACHMENT H4

AnalytiKEM

I. Definition of Terms

Term	Definition
D	Detected; result must be greater than zero.
DI	Deionized Water
J	Compound was detected at levels below the practical quantitation limit. The level reported is approximate.
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NA	Analysis not applicable to the sample matrix.
ND	Not Detected
NR	Not Requested
NTU	Nephelometric Turbidity Units
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
TON	Threshold Odor Number
U	Compound was analyzed for but not detected. The preceding number is the practical quantitation limit for the compound.
ppb	Parts-per-billion; may be converted to ppm by dividing by 1,000.
ppm	Parts-per-million; may be converted to ppb by multiplying by 1,000.
ug/l	Micrograms of constituent per liter of sample; equivalent to parts-per-billion.
ug/kg	Micrograms of constituent per kilogram of sample; equivalent to parts-per-billion.
ug/kg dw	Micrograms of constituent per kilogram of sample reported on a dry weight basis.
CCC	Calibration Check Compound; used to verify the precision of a GC/MS calibration curve.
SPCC	System Performance Check Compound; used to verify the correct operation of a GC/MS instrument.
PQL	Practical Quantitation Limit; the minimum level at which compounds can be dependably quantitated.

ATTACHMENT H45

II. Methodology

Polychlorinated Biphenyls

Aqueous

- Method 608, Organochlorine Pesticides and PCBs, Federal Register, Vol. 49, No. 209, October 26, 1984.

Nonaqueous

- Method 3550, Sonication Extraction, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Second Edition, USEPA, July 1982.
- Method 8080, Organochlorine Pesticides and PCBs, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, Second Edition, USEPA, July 1982.

General Chemistry

Residue, total (TS)

- Standard Methods for Examination of Water and Wastewater, American Public Health Association, 16th edition, Method 209A, 1985.

III. Laboratory Chronicle

	DATE I	DATE II
Receipt/Refrigeration	4/13/88	
Organics Extraction		
PCBs	4/16/88	
Analyses		
PCBs	4/24-5/9/88	
Other Analyses		
Residue, total	4/15/88	

QA Officer Review & Approval
(Signature) _____
(Printed Name) Lee F. Cramer
(Date) _____

NOTE: If fractions are reextracted and reanalyzed because the initial endeavors failed to meet the required quality control criteria, the dates of reextraction and/or reanalysis will be entered in column II additionally.

IV. Case Narrative

Polychlorinated Biphenyls

Sample Numbers A15960-1-36

Surrogate not recoverable due to matrix interference for sample(s) 6.

Aroclor-like pattern present but did not meet Aroclor identification criteria for sample (s) 9, 10, 11, 13, 15, 33, 6, 25.

AnalytiKEM

V. Extraction Log

Polychlorinated Biphenyls

AnalytiKEM Designation	Initial Sample Size	Final Volume	Dilution
Method Blank	—	10.0	—
A15960-2 Spike (PCB)	10.19	10.0	—
A15960-2 Spike Dup. (PCB)	10.37	10.0	—
A15960-8 Spike (PCB)	10.09	10.0	—
A15960-8 Spike Dup. (PCB)	10.30	10.0	—
DI Water Spike (PCB)	—	10.0	—
A15960-1	10.25	10.0	—
A15960-2	10.48	10.0	—
A15960-3	10.24	10.0	—
A15960-4	10.45	10.0	1:10
A15960-5	10.44	10.0	—
A15960-6	10.22	10.0	1:10
A15960-6	10.22	10.0	1:100
A15960-7	10.68	10.0	—
A15960-8	10.17	10.0	—
A15960-9	10.16	10.0	—
A15960-10	10.35	10.0	—
A15960-11	10.29	10.0	—
A15960-12	10.45	10.0	—
A15960-13	10.04	10.0	—
A15960-14	10.04	10.0	—
A15960-15	10.21	10.0	—
A15960-16	10.27	10.0	—
A15960-17	10.25	10.0	—
A15960-18	10.32	10.0	—
A15960-19	10.16	10.0	—
A15960-20	10.35	10.0	—
A15960-21	10.44	10.0	—
A15960-22	10.52	10.0	1:10
A15960-23	10.22	10.0	—
A15960-24	10.20	10.0	—
A15960-25	10.24	10.0	—
A15960-26	10.17	10.0	—
A15960-27	10.14	10.0	—
A15960-28	10.49	10.0	—
A15960-29	10.66	10.0	—
A15960-30	10.20	10.0	—
A15960-31	10.25	10.0	—
A15960-32	10.38	10.0	—
A15960-33	10.41	10.0	—
A15960-34	10.34	10.0	—
A15960-35	10.17	10.0	—
A15960-36	590*	10.0	—
A15960-36	900*	10.0	—
Units	(g)	(ml)	

* (ml)

ATTACHMENT H49

VI. ANALYSIS DATA SHEETS

ATTACHMENT H50

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-018

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-1

Sample wt/vol: 10.25 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 22 dec. Date Analyzed: 04/24/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260	420	U

ATTACHMENT H51

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-019

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-2

Sample wt/vol: 10.48 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 2 dec. Date Analyzed: 5/09/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016	340	U
11104-28-2	Aroclor-1221	340	U
11141-16-5	Aroclor-1232	340	U
53469-22-9	Aroclor-1242	340	U
12672-29-6	Aroclor-1248	340	U
11097-69-1	Aroclor-1254	340	U
11096-82-5	Aroclor-1260	340	U

ATTACHMENT H52

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-020

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-3

Sample wt/vol: 10.48 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 21 dec. Date Analyzed: 4/24/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260		

ATTACHMENT H53

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-021

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL

Lab Sample ID: A15960- 4

Sample wt/vol: 10.45 (g/mL) 10

Date Received: 4/13/88

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/24 , 5/9/88

% Moisture: not dec. 28 dec.

Dilution Factor: 1:10

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	4600	U
12674-11-2	Aroclor-1016	4600	U
11104-28-2	Aroclor-1221	4600	U
11141-16-5	Aroclor-1232	4600	U
53469-22-9	Aroclor-1242	4600	U
12672-29-6	Aroclor-1248	460	U
11097-69-1	Aroclor-1254	560	
11096-82-5	Aroclor-1260		

ATTACHMENT H5

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-022

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-5

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.44 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 5/9/88

% Moisture: not dec. 19 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	410	U
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	400	J
11096-82-5	Aroclor-1260		

ATTACHMENT H55

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-023

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960- 6

Sample wt/vol: 10.22 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 13 dec. Date Analyzed: 4/25/88, 5/9/88

Extraction: (SepF/Cont) Dilution Factor: 1:10, 1:100

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	3800	U
12674-11-2	Aroclor-1016	3800	U
11104-28-2	Aroclor-1221	3800	U
11141-16-5	Aroclor-1232	3800	U
53469-22-9	Aroclor-1242	3800	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260		

ATTACHMENT H56

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-024

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL

Lab Sample ID: A15960-7

Sample wt/vol: 10.68 (g/mL) 10

Date Received: 4/13/88

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/25/88

% Moisture: not dec. 6 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	350	U
12674-11-2	Aroclor-1016	350	U
11104-28-2	Aroclor-1221	350	U
11141-16-5	Aroclor-1232	350	U
53469-22-9	Aroclor-1242	350	U
12672-29-6	Aroclor-1248	350	U
11097-69-1	Aroclor-1254	350	U
11096-82-5	Aroclor-1260		

ATTACHMENT H57

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-025

Lab.Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-8

Sample wt/vol: 10.17 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 4 dec. Date Analyzed: 4/25/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016	340	U
11104-28-2	Aroclor-1221	340	U
11141-16-5	Aroclor-1232	340	U
53469-22-9	Aroclor-1242	340	U
12672-29-6	Aroclor-1248	340	U
11097-69-1	Aroclor-1254	340	U
11096-82-5	Aroclor-1260	340	U

ATTACHMENT 458

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-026

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-9

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.16 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/25/88

% Moisture: not dec. 17 dec.

Dilution Factor: --

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H59

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-027

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-10

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.35 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/25/88

% Moisture: not dec. 17 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H60

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-028

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-11

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.29 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/25/88

% Moisture: not dec. 13 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	380	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	380	U
11141-16-5	Aroclor-1232	380	U
53469-22-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260		

ATTACHMENT H61

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-029S

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-12

Sample wt/vol: 10.45 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 21 dec. Date Analyzed: 4/25/88

Extraction: (SepF/Cont) Dilution Factor: --

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260		

ATTACHMENT H62

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-029D

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-13

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.04 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/25/88

% Moisture: not dec. 20 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	410	U
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	410	U
11096-82-5	Aroclor-1260		

ATTACHMENT H63

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-030S

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL

Lab Sample ID: A15960-14

Sample wt/vol: 10.04 (g/mL) 10

Date Received: 4/13/88

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/25/88

% Moisture: not dec. 21 dec.

Dilution Factor: --

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260		

ATTACHMENT H64

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-030D

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-15

Sample wt/vol: 10.21 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 13 dec. Date Analyzed: 4/25/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	380	U
11141-16-5	Aroclor-1232	380	U
53469-22-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260	380	U

ATTACHMENT H65

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-031

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-16

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.27 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/25/88

% Moisture: not dec. 14 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	380	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	380	U
11141-16-5	Aroclor-1232	380	U
53469-22-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260		

ATTACHMENT H66

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-032

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-17

Sample wt/vol: 10.25 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 19 dec. Date Analyzed: 4/25/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	410	U
11096-82-5	Aroclor-1260	410	U

ATTACHMENT H67

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-033

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-18

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.32 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/25/88

% Moisture: not dec. 16 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	390	U
12674-11-2	Aroclor-1016	390	U
11104-28-2	Aroclor-1221	390	U
11141-16-5	Aroclor-1232	390	U
53469-22-9	Aroclor-1242	390	U
12672-29-6	Aroclor-1248	390	U
11097-69-1	Aroclor-1254	390	U
11096-82-5	Aroclor-1260		

ATTACHMENT H68

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-034

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL

Lab Sample ID: A15960-19

Sample wt/vol: 10.16 (g/mL) 10

Date Received: 4/13/88

Level: (low/med)

Date Extracted: 4/16/88

% Moisture: not dec. 13 dec.

Date Analyzed: 4/25/88

Extraction: (SepF/Cont)

Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	380	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	380	U
11141-16-5	Aroclor-1232	380	U
53469-22-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260		

ATTACHMENT 1769

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-035

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-20

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.35 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/25/88

% Moisture: not dec. 18 dec.

Dilution Factor: - -

Extraction: (Sep?/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H20

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-036

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL

Lab Sample ID: A15960-21

Sample wt/vol: 10.44 (g/mL) 10

Date Received: 4/13/88

Level: (low/med)

Date Extracted: 4/16/88

% Moisture: not dec. 14 dec.

Date Analyzed: 4/25/88

Extraction: (SepF/Cont)

Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	380	U
11141-16-5	Aroclor-1232	380	U
53469-22-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260	380	U

ATTACHMENT H21

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-037

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL

Lab Sample ID: A15960-22

Sample wt/vol: 10.52 (g/mL) 10

Date Received: 4/13/88

Level: (low/med)

Date Extracted: 4/16/88

% Moisture: not dec. 16 dec.

Date Analyzed: 4/26/88, 5/9/88

Extraction: (SepF/Cont)

Dilution Factor: 1:10

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	3900	U
12674-11-2	Aroclor-1016	3900	U
11104-28-2	Aroclor-1221	3900	U
11141-16-5	Aroclor-1232	3900	U
53469-22-9	Aroclor-1242	3900	U
12672-29-6	Aroclor-1248	390	U
11097-69-1	Aroclor-1254	310	J
11096-82-5	Aroclor-1260		

ATTACHMENT H 22

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-038

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-23

Sample wt/vol: 10.22 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 19 dec. Date Analyzed: 4/25/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	410	U
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	410	U
11096-82-5	Aroclor-1260		

ATTACHMENT H 23

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-039

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL

Lab Sample ID: A15960-24

Sample wt/vol: 10.20 (g/mL) 10

Date Received: 4/13/88

Level: (low/med)

Date Extracted: 4/16/88

% Moisture: not dec. 19 dec.

Date Analyzed: 4/26/88

Extraction: (SepF/Cont)

Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	410	U
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	410	U
11096-82-5	Aroclor-1260		

ATTACHMENT H24

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-040

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-25

Sample wt/vol: 10.24 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 21 dec. Date Analyzed: 4/26/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260		

ATTACHMENT H 25

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-041

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960- 26

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.17 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/26/88

% Moisture: not dec. 18 dec.

Dilution Factor: --

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-22-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260		

ATTACHMENT H76

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-042

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL

Lab Sample ID: A15960-27

Sample wt/vol: 10.14 (g/mL) 10

Date Received: 4/13/88

Level: (low/med)

Date Extracted: 4/16/88

% Moisture: not dec. 22 dec.

Date Analyzed: 4/26/88

Extraction: (SepF/Cont)

Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260		

ATTACHMENT H77

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-043

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-28

Sample wt/vol: 10.49 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) _____ Date Extracted: 4/16/88

% Moisture: not dec. 22 dec. _____ Date Analyzed: 4/26/88

Extraction: (SepF/Cont) _____ Dilution Factor: - -

GPC Cleanup: (Y/N) N pH: _____

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene		
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260		

ATTACHMENT H78

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-044

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-29

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.66 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/26/88

% Moisture: not dec. 21 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260		

ATTACHMENT H29

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-045

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-30

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.20 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/26/88

% Moisture: not dec. 20 dec.

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	410	U
12674-11-2	Aroclor-1016	410	U
11104-28-2	Aroclor-1221	410	U
11141-16-5	Aroclor-1232	410	U
53469-22-9	Aroclor-1242	410	U
12672-29-6	Aroclor-1248	410	U
11097-69-1	Aroclor-1254	410	U
11096-82-5	Aroclor-1260		

ATTACHMENT H80

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X

Matrix: (soil/water) SOIL Lab Samp

Sample wt/vol: 10.25 (g/mL) 10 Date Rec

Level: (low/med) Date Ext

% Moisture: not dec. 16 dec. Date Anal

Extraction: (SepF/Cont) Dilution

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/

CAS NO.	COMPOUND	
319-84-6	alpha-BHC	
319-85-7	beta-BHC	
319-86-8	delta-BHC	
58-89-9	gamma-BHC (Lindane)	
76-44-8	Heptachlor	
309-00-2	Aldrin	
1024-57-3	Heptachlor epoxide	
959-98-8	Endosulfan I	
60-57-1	Dieldrin	
72-55-9	4,4'-DDE	
72-20-8	Endrin	
33213-65-9	Endosulfan II	
72-54-8	4,4'-DDD	
1031-07-8	Endosulfan sulfate	
50-29-3	4,4'-DDT	
72-43-5	Methoxychlor	
7421-93-4	Endrin aldehyde	
57-74-9	T. Chlordane	
5103-71-9	alpha Chlordane	
5103-74-2	gamma Chlordane	
8001-35-2	Toxaphene	
12674-11-2	Aroclor-1016	
11104-28-2	Aroclor-1221	
11141-16-5	Aroclor-1232	
53469-22-9	Aroclor-1242	
12672-29-6	Aroclor-1248	
11097-69-1	Aroclor-1254	
11096-82-5	Aroclor-1260	

ATTACHMENT 481

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-047

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960-32

Matrix: (soil/water) SOIL

Date Received: 4/13/88

Sample wt/vol: 10.38 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/26/88

% Moisture: not dec. 16 dec.

Dilution Factor: --

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	390	U
12674-11-2	Aroclor-1016	390	U
11104-28-2	Aroclor-1221	390	U
11141-16-5	Aroclor-1232	390	U
53469-22-9	Aroclor-1242	390	U
12672-29-6	Aroclor-1248	390	U
11097-69-1	Aroclor-1254	390	U
11096-82-5	Aroclor-1260		

ATTACHMENT H82

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-048

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL Lab Sample ID: A15960-33

Sample wt/vol: 10.41 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. 21 dec. Date Analyzed: 4/26/88

Extraction: (SepF/Cont) Dilution Factor: —

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	420	U
12674-11-2	Aroclor-1016	420	U
11104-28-2	Aroclor-1221	420	U
11141-16-5	Aroclor-1232	420	U
53469-22-9	Aroclor-1242	420	U
12672-29-6	Aroclor-1248	420	U
11097-69-1	Aroclor-1254	420	U
11096-82-5	Aroclor-1260		

ATTACHMENT H83

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

EP-049

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) SOIL

Lab Sample ID: A15960-34

Sample wt/vol: 10.34 (g/mL) 10

Date Received: 4/13/88

Level: (low/med)

Date Extracted: 4/16/88

% Moisture: not dec. 23 dec.

Date Analyzed: 4/26/88

Extraction: (SepF/Cont)

Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	430	U
12674-11-2	Aroclor-1016	430	U
11104-28-2	Aroclor-1221	430	U
11141-16-5	Aroclor-1232	430	U
53469-22-9	Aroclor-1242	430	U
12672-29-6	Aroclor-1248	430	U
11097-69-1	Aroclor-1254	430	U
11096-82-5	Aroclor-1260		

ATTACHMENT H84

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

TRIP BLANK

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Lab Sample ID: A15960- 35

Matrix: (soil/water) WATER

Date Received: 4/13/88

Sample wt/vol: 590 (g/mL) 10

Date Extracted: 4/16/88

Level: (low/med)

Date Analyzed: 4/26/88

% Moisture: not dec. dec. 100

Dilution Factor: - -

Extraction: (SepF/Cont)

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	10	U
12674-11-2	Aroclor-1016	10	U
11104-28-2	Aroclor-1221	10	U
11141-16-5	Aroclor-1232	10	U
53469-22-9	Aroclor-1242	10	U
12672-29-6	Aroclor-1248	10	U
11097-69-1	Aroclor-1254	10	U
11096-82-5	Aroclor-1260		

ATTACHMENT H85

PESTICIDE ORGANICS ANALYSIS DATA SHEET

DEP SAMPLE NO.

FIELD BLANK

Lab Name: AnalytiKEM Inc.

Lab Code: 04012 Case No.: 87-08-14-12M Contract No.: X195

Matrix: (soil/water) WATER Lab Sample ID: A15960-36

Sample wt/vol: 900 (g/mL) 10 Date Received: 4/13/88

Level: (low/med) Date Extracted: 4/16/88

% Moisture: not dec. dec. 100 Date Analyzed: 4/26/88

Extraction: (SepF/Cont) Dilution Factor: - -

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC		
319-85-7	beta-BHC		
319-86-8	delta-BHC		
58-89-9	gamma-BHC (Lindane)		
76-44-8	Heptachlor		
309-00-2	Aldrin		
1024-57-3	Heptachlor epoxide		
959-98-8	Endosulfan I		
60-57-1	Dieldrin		
72-55-9	4,4'-DDE		
72-20-8	Endrin		
33213-65-9	Endosulfan II		
72-54-8	4,4'-DDD		
1031-07-8	Endosulfan sulfate		
50-29-3	4,4'-DDT		
72-43-5	Methoxychlor		
7421-93-4	Endrin aldehyde		
57-74-9	T. Chlordane		
5103-71-9	alpha Chlordane		
5103-74-2	gamma Chlordane		
8001-35-2	Toxaphene	10	U
12674-11-2	Aroclor-1016	10	U
11104-28-2	Aroclor-1221	10	U
11141-16-5	Aroclor-1232	10	U
53469-22-9	Aroclor-1242	10	U
12672-29-6	Aroclor-1248	10	U
11097-69-1	Aroclor-1254	10	U
11096-82-5	Aroclor-1260		

ATTACHMENT H86

ATTACHMENT I

WESTON
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Linda Appel

ORGANIC QUALITY ASSURANCE REVIEW
NJDEP
CELANESE
CASE 00017

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 11-18-91
Kelly Muir Spittler
Unit Leader - Data Validation
Date

VERIFIED BY: Zohreh Hamid — 11-20-91
Zohreh Hamid, Ph.D.
Section Manager - Data Validation
Date

ATTACHMENT I

WESTON

NJDEP
CELANESE
CASE 00017

INTRODUCTION

This quality assurance review is based upon a review of all data generated from fourteen (14) soil samples collected on 06-26-91. The samples were analyzed according to criteria set forth in the Contract Laboratory Program (CLP) Method for TCL Volatile, Semivolatile, and Pesticide/PCB target compounds.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Section 2. All of the analytical data were examined to determine the usability of the analytical results and also to determine the contractual compliance relative to the analytical requirements and deliverables specified for NJDEP-CLP method. The applicable qualifier codes have been place next to the results in the data summary to assess the qualitative and/or quantitative reliability of any results. Details of this evaluation review are presented in the narrative section of this report under each specific function.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in the Standard Operating Procedure for the completion of the Data Validation Report Forms and preparation o the final data validation report issued on 04/16/90 (SOP No.: 5.A.4, 5.A.3). If you have any questions o comments on this data review, please call Zohreh Hamid or Kelly Spittler at (215) 344-3745.

QUALITY ASSURANCE REVIEW

The analysis of the samples was performed by TCT- St. Louis.

The findings offered in this report are based upon a rigorous review of holding times, blank analysis results, surrogate, spike and standard recoveries, GC/MS tuning, target compound confirmation quality, calibration system performance, peak results, and mass spectra quality.

Overall, the data quality is fair and most data is accepted with the applied codes.

ATTACHMENT I-2

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EVALUATION BY FRACTION

I. Volatiles

____ Holding Time
_X_ Surrogate Recovery
____ MS/MSD
_X_ Blank
____ GC/MS Tuning
_X_ Initial Calibration
_X_ Continuing Calibration
____ Compound ID (HSL, TIC)
____ Standards
____ Spectra Quality
____ Chromatography
____ Data Completeness

OVERVIEW

This portion of the case consisted of fourteen soil samples analyzed for TCL Volatile target compounds.

ISSUES

The relative response factors for 2-Butanone were below the 0.05 QC limit for the initial calibration on 07-03-91 and continuing calibrations on 07-04-91, 07-04-91 and 07-05-91. Therefore all associated quantitation limits for this compound are rejected.

The following surrogate recoveries and internal standard areas were outside the QC limits:

Sample (BSA0627)	Surrogate	Recovery	Internal Standard	Area
1431	Toluene	120	Chlorobenzene	Low
1431RE	Toluene	130	Bromochloromethane	Low
	1,2-Dichloro ethane	124	1,4-Difluorobenzene Chlorobenzene	Low Low
1428			Chlorobenzene	Low
1428RE	Toluene	124		
1436	Toluene	147	Bromochloromethane	Low

ATTACHMENT I 3

	Bromo fluoro benzene	62	1,4-Difluorobenzene	Low
			Chlorobenzene	Low
1436RE	Toluene	145	Bromochloromethane	Low
	1,2-Dichloro ethane	133	1,4-Difluorobenzene	Low
			Chlorobenzene	Low
1426	Toluene	117		

Samples (BSA0627) 1431, 1428 and 1436 were all reanalyzed and similar results were obtained. These samples are exhibiting matrix effects. The original analysis are to be used as the representative results; however the following qualification applies:

Samples BSA 06271431 and BSA 06271536 data is considered estimated due to the surrogate outlier.

For sample BSA06271428, only those compound results quantified in reference to chlorobenzene are qualified estimated.

Sample BSA06271426 was not reanalyzed. Therefore this sample data is qualified estimated.

The method blanks contained acetone and several tentatively identified compounds. Also, the field blank associated with these samples can be found in case 00017, SDG BSA06271438. This blank contained acetone and methylene chloride. All associated positive sample results are qualified accordingly.

Several compounds had %RSD and/or %D exceed the 30% and 25% QC limits in the initial and continuing calibrations. All associated positive results are considered estimated.

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EVALUATION BY FRACTION

II. Base/Neutral/Acids

____ Holding Time
____ Extraction Time
_X_ Surrogate Recovery
_X_ Blank
_X_ MS/MSD
____ GC/MS Tuning
_X_ Initial Calibration
_X_ Continuing Calibration
____ Compound ID (HSL, TIC)
_X_ Standards
____ Spectra Quality
____ Chromatography
_X_ Data Completeness

OVERVIEW

This portion of the case consisted of fourteen soil samples analyzed for TCL Semivolatile target compounds.

ISSUES

The following surrogate recoveries and internal standard areas were outside the QC limits:

Sample	Surrogate	Recovery	Internal Standard	Area
1424MS	2,4,6-Tribromophenol	142	Naphthalene	Low
			Acenaphthene	Low
			Chrysene	High
			Perylene	High
1424MSD			1,4-Dichlorobenzene	Low
			Naphthalene	Low
			Acenaphthene	Low
			Phenanthrene	Low
1414REDL	All surrogates	low		
*1424	2,4,6-Tribromophenol	123		

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Sample	Surrogate	Recovery	Internal Standard	Area
*1425	Terphenyl	172	Naphthalene	Low
			Acenaphthene	Low
			Phenanthrene	Low
			Chrysene	Low
			Perylene	Low
1425REDL	All Surrogates	low	Phenanthrene	Low
			Chrysene	Low
			Perylene	Low
*1427			Acenaphthene	Low
1427RE			Phenanthrene	Low
			Chrysene	Low
			Perylene	Low
*1428			Acenaphthene	Low
			Phenanthrene	Low
			Chrysene	Low
			Perylene	Low
1428REDL	All Surrogates Except for Terphenyl	low	Phenanthrene	Low
			Chrysene	Low
			Perylene	Low
1429	2,4,6-Tribromophenol	127	Naphthalene	Low
			Acenaphthene	Low
			Perylene	High
1429RE			Acenaphthene	Low
			Phenanthrene	Low
			Chrysene	Low
			Perylene	Low
1434REDL	All Surrogates except for Terphenyl	low		
1435REDL	All Surrogates	low		

ATTACHMENT I-6

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Sample	Surrogate	Recovery	Internal Standard	Area
1436REDL	All Surrogates	low		

The samples mentioned in the previous table were all reanalyzed and similar results were obtained. These samples are exhibiting matrix effects. Samples (BSA0627) 1424, 1425, 1427, 1428 should report the original analysis for most of the results. Only the results that exceeded the calibration range on the original analysis should be reported from the reanalyzed diluted analysis. The following qualification applies:

For sample BSA06271424, the acid extractable fraction is qualified estimated due to the surrogate outlier, all diluted results are also qualified due to numerous surrogate outliers.

The QC sample analyses for BSA06271424MS/MSD also showed a matrix effect, these results are also considered qualified according to the outliers.

Sample BSA06271425 has all base neutral results and all compounds quantified in reference to internal standards, naphthalene, acenaphthene, phenanthrene, chrysene and perylene qualified estimated. The diluted results may also be qualified due to internal standard outliers.

Sample BSA06271427 has only the compound results quantified in reference to acenaphthene qualified estimated.

Sample BSA06271428 hás those compound results quantified in reference to acenaphthene, phenanthrene, chrysene and perylene qualified estimated. All diluted results are also qualified estimated due to surrogate outliers.

Sample BSA06271429 was also reanalyzed and similar results were obtained, this sample is exhibiting a matrix effect. However the reanalysis is to be used as the representative results because it does not have any surrogate outliers. Only those compound results quantified in reference to acenaphthene, phenanthrene, chrysene and perylene are considered estimated. Also, the spectra were missing for the original analysis, the laboratory should submit these pages.

The remaining diluted reanalyses (1434REDL, 1435REDL, and 1436REDL) were analyzed because several compound results exceeded the calibration range on the original analysis. All diluted results

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are qualified estimated due to numerous surrogate outliers.

The method blanks contained di-n-butylphthalate, and bis (2 ethyl hexyl) phthalate along with several tentatively identified compounds. . All associated positive results are qualified accordingly.

The %D for surrogate compound 2,4,6-tribromophenol exceeded the 25% QC limits in the continuing calibrations on 07-12-91 and 07-16-91. The surrogate recovery concentrations and thus the recoveries are considered estimated. Therefore all positive results in the associated samples are also considered estimated. Several other %RSD and for %D exceeded the 30% and 25% QC limits in the initial and continuing calibrations. All associated positive results are qualified estimated.

The form V and the raw data were missing for the initial calibration on 07-11-91 Inst ID 59703F. The laboratory has been contacted for resubmission.

Ten spike recoveries and two RPD results exceeded the QC limits. All of these results are considered estimated due to surrogate and internal standard outliers. The unspiked sample has not been qualified in reference to these QC outliers.

The field blank associated with these samples can be found in case 00017, SDG BSA06271438. This blank was free of target compound contamination.

ATTACHMENT I

WESTON

EVALUATION BY FRACTION

III. Pesticides/PCB

___ Holding Time
___ Extraction Time
X Surrogate Recovery
X MS/MSD
___ Blank
X Linearity Calibration
___ DDT/Endrin Degradation
X Analytical Sequence
___ DBC Retention Time
X Continuing Calibration
___ Retention Time Window
___ Standards
___ Chromatography
___ HSL Compounds
___ Data Completeness

OVERVIEW

This portion of the case consisted of fourteen soil samples analyzed for TCL Pesticide/PCB target compounds.

ISSUES

The following dibutylchlorendate surrogate recoveries were outside the QC limits:

Sample	Recovery
1424	177
1425	300
1426	307
*1426	694
1430	187
*1431	703
1434	156
1436	331

*These analyses are considered estimated due to the dilution level, surrogate recovery and matrix interference. The remaining samples are not qualified based on these outliers.

The %RSD results for endrin, DDT, and DBC exceeded the 10% QC limit on the confirmation column. Since this column is not used to quantify results, no qualification is applied.

ATTACHMENT I9

WESTON

The Ind A and Ind B are not listed on the form VIII Pest 2 for the primary column (07-19-91 to 07-20-91). The chromatogram were supplied in the data package. However the laboratory should resubmit this page.

Several %D and retention time results were outside the QC limits on both columns. No qualification has been applied based on the retention time outliers; however, the quantitation limits for the %D compound outliers are qualified estimated.

Six spike recoveries and all RPD results were outside the QC limits. Since these compounds were not detected in the unspiked sample, and spike recoveries have advisory limits, no qualification is applied.

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ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes
2. Attachment II - Data Summary
3. Attachment III - NJDEP Data Validation Forms
   a) VOA
   b) BNA
   c) Pest/PCB
4. Attachment IV - Support Documentation

ATTACHMENT "I"

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ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

ATTACHMENT I12

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

B = NOT DETECTED, SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

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ATTACHMENT II
DATA SUMMARY

ATTACHMENT I 14

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FOOTNOTES FOR TARGET AND NON TARGET ANALYTE SUMMARY

1. The reported concentration is quantitatively qualified because the concentration is below the CRQL.

2. The reported concentration is quantitatively qualified due to surrogate recovery outliers.

3. The value reported is less than 3x the value in the method blank. It is the policy of NJDEP-DHSM to negate the reported value due to probable foreign contamination unrelated to the actual sample. The end-user, however, is alerted that a reportable quantity of the analyte/compound was detected.

4. The value reported is greater than five (5) times the value in the method blank and is considered "real". However, the reported value must be quantitatively qualified "J" due to the method blank contamination. The "B" qualifier alerts the end-user to the presence of this analyte/compound in the method blank.

5. The reported concentration is quantitatively qualified due to calibration deficiencies.

6. The non-detected value is rejected because the calibration response factor for the analyte is less than 0.05.

7. One internal standard area in the sample did not meet the QC criteria. Therefore, all compound results using this internal standard for quantitation are quantitatively estimated.

8. The value reported is between 3x and 5x the value in the method blank. The presence of that analyte/compound may be due to its "real presence" in the sample, and/or laboratory contamination. However, the reported value must be quantitatively qualified "J" due to the method blank contamination. The "B" qualifier alerts the end-user to the presence of this analyte/compound in the sample may be due to its "real presence" in the sample and/or possible foreign laboratory/field contamination unrelated to the actual sample. Resampling and reanalysis is recommended.

9. The % Difference for one or more surrogates were above the control limits, therefore, all of the positive results are qualified.

10. The value reported is less than 3x the value in the trip/field blank. It is the policy of NJDEP-DHSM to negate the reported value as due to probable foreign contamination unrelated to the actual sample. The end-user, however, is alerted that a reportable quantity of the analyte/compound was detected.

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

LAB NAME: TCT - ST. LOUIS

SITE NAME: CELANESE

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271424	METHYLENE CHLORIDE	5U	5J	5J	NEGATED	1,10
		ACETONE	10U	17B	17J	QUALIFIED	5
		1,1,1-TRICHLORO ETHANE	5U	3J	3J	QUALIFIED	1
		TOLUENE	5U	1J	1J	QUALIFIED	1
		NO TICS					
BNA/1.0	*BSA06271424	2-METHYLPHENOL	330U	48J	48J	QUALIFIED	1,2
		4-METHYLPHENOL	330U	72J	72J	QUALIFIED	1,2
		NAPHTHALENE	330U	230J	230J	QUALIFIED	1
		2-METHYL NAPTHALENE	330U	170J	170J	QUALIFIED	1
		DIMETHYLPHTHALATE	330U	78J	78J	QUALIFIED	1
		ACENAPHTHENE	330U	53J	53J	QUALIFIED	1
		ACENAPHTHYLENE	330U	370J	370J	QUALIFIED	1
		DIBENZOFURAN	330U	240J	240J	QUALIFIED	1
		DIETHYLPHTHALATE	330U	190J	190J	QUALIFIED	1
		FLUORENE	330U	490	490		
		PHENANTHRENE	330U	5900	5900		
		ARTHRACENE	330U	1500	1500		
		DI-N-BUTYLPHTHALATE	57J	400B	400JB	QUALIFIED	4
		FLUORANTHENE	330U	8500D	8500JD	QUALIFIED	2
		PYRENE	330U	12000D	12000JD	QUALIFIED	2
		BENZO(A) ANTHRACENE	330U	6500D	6500JD	QUALIFIED	2
		CHRYSENE	330U	5300D	5300JD	QUALIFIED	2
		BIS(2 ETHYLHEXYL) PHTHALATE	330U	950	950		
		DI-N-OCTYLPHTHALATE	330U	77J	77J	QUALIFIED	1
		BENZO(B) FLUORANTHENE	330U	8600D	8600JD	QUALIFIED	2
		BENZO(A) PYRENE	330U	5600D	5600JD	QUALIFIED	2
		INDENO (1,2,3-CD) PYRENE	330U	4000	4000		

ATTACHMENT I-16

		DIBENZ(A,H) ANTHRACENE	330U	1300	1300		
		BENZO(G,H,I) PERYLENE	330U	4200	4200		
		20 TICS					
PEST/10.0	BSA06271424	NONE					

THE ACID EXTRACTABLE FRACTION IS CONSIDERED ESTIMATED DUE TO SURROGATE OUTLIERS.

- REPORTED FORM THE 5-FOLD DILUTION.

ATTACHMENT I7

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

SITE NAME: CELANESE

LAB NAME: TCT - ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA406271425	METHYLENE CHLORIDE	5U	4J	4J	NEGATED	1,10
		ACETONE	8J	9BJ	9BJ	NEGATED	1,3
		2-BUTANONE	10U	12U	12R	REJECTED	6
		1 TIC					
BNA/1.0	*BSA06271425	PHENOL	330U	330J	330J	QUALIFIED	1,9
		2-METHYLPHENOL	330U	150J	150J	QUALIFIED	1,9
		4-METHYLPHENOL	330U	310J	310J	QUALIFIED	1,9
		2,4-DIMETHYLPHENOL	330U	140J	140J	QUALIFIED	1,7,9
		NATHALENE	330U	16000JD	16000J	QUALIFIED	1,2,7,9
		2-METHYLNAPTHALENE	330U	8000JD	8000JD	QUALIFIED	1,2,7,9
		ACENAPHTHENE	330U	2800JD	28000JD	QUALIFIED	1,2,7,9
		4-NITROPHENOL	330U	990J	990J	QUALIFIED	1,7,9
		DIBENZOFURAN	330U	14000JD	14000JD	QUALIFIED	1,2,7
		DIETHYLPHTHALATE	330U	93J	93J	QUALIFIED	1,2,7,9
		FLUORENE	330U	28000JD	28000JD	QUALIFIED	1,2,7,9
		ANTHRACENE	330U	45000D	45000JD	QUALIFIED	7,9
		DI-N-BUTYL PHTHALATE	61J	330BJ	330BJ	QUALIFIED	1,2,7,8,9
		FLUORANTHENE	330U	99000D	99000JD	QUALIFIED	7,9
		PYRENE	330U	180000D	180000JD	QUALIFIED	7,9
		BUTYL BENZYLPHTHALATE	330U	95J	95J	QUALIFIED	1,2,7,9
		3,3-DICHLOROBENZIDINE	330U	270J	270J	QUALIFIED	1,2,7,9
		BENZO(A) ANTHRACENE	330U	64000D	64000JD	QUALIFIED	7,9
		CHRYSENE	330U	67000D	67000JD	QUALIFIED	7,9
		BIS (2-ETHYHEXYL) PHTHALATE	42J	820B	820JB	QUALIFIED	7,4,9
		DI-N-OCTYL PHTHALATE	330U	40J	40J	QUALIFIED	1,2,7,9
		BENZO(B) FLUORANTHENE	330U	71000D	71000JD	QUALIFIED	7,9
		BENZO(A) PYRENE	330U	53000D	53000JD	QUALIFIED	7,9

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		INDENO (1,2,3-CD)PYRENE	330U	25000JD	25000JD	QUALIFIED	1,9
		DIBENZ(A,H) ANTHRACENE	330U	11000JD	11000JD	QUALIFIED	1,9
		BENZO (G,H,I)PERYLENE	330U	29000JD	29000JD	QUALIFIED	1,9
		19 TICS					
PEST/10.0	BSA06271425	NONE					

*ALL BASE NEUTRAL COMPOUNDS AND COMPOUND RESULTS QUANTIFIED IN REFERENCE TO NAPHTHALENE, ACENAPHTHENE, CHRYSENE, PHENANTHRENE, AND PERYLENE ARE QUALIFIED ESTIMATED.

ATTACHMENT I-19

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

SITE NAME: CELANESE

LAB NAME: TCT - ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	*BSA06271426	METHYLENE CHLORIDE	5U	5J	5J	NEGATED	1,2,10
		ACETONE	8J	11BJ	11BJ	NEGATED	1,2,3
		2-BUTANONE	10U	11U	11R	REJECTED	6
		1 TIC					
BNA/1.0	BSA06271426	PHENOL	330U	130J	130J	QUALIFIED	1
		2-METHYLPHENOL	330U	170J	170J	QUALIFIED	1
		4-METHYLPHENOL	330U	540	540		
		2,4-DINETHYLPHENOL	330U	990	990		
		NAPHTHALENE	330U	280J	280J	QUALIFIED	1
		2-METHYL NAPHTHALENE	330U	180J	180J	QUALIFIED	1
		DIBENZOFURAN	330U	86J	86J	QUALIFIED	1
		DIETHYLPHTHALATE	330U	180J	180J	QUALIFIED	1
		FLUORENE	330U	50J	50J	QUALIFIED	1
		PHENANTHRENE	330U	1040	1040		
		ANTHRACENE	330U	160J	160J	QUALIFIED	1
		DI-n-BUTYLPHTHALATE	330U	800B	800B		
		FLUORANTHENE	330U	1400	1400		
		PYRENE	330U	1300	1300		
		BENZO(a)ANTHRACENE	330U	870	870		
		CHRYSENE	330U	1000	1000		
		BIS(2ETHYLHEXYL) PHTHALATE	330U	2900B	2900		
		DI-n-OCTYLPHTHALATE	330U	75J	75J	QUALIFIED	1
		BENZO(b) FLUORANTHENE	330U	1600	1600		
		BENZO(a) PYRENE	330U	930	930		
		INDENO(1,2,3-CD)PYRENE	330U	660	660		
		DIBENZ(A,H) ANTHRACENE	330U	220J	220J	QUALIFIED	1
		BENZO (G,H,I) PERYLENE	330U	720	720		
		18 TICS					

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		2-PENTANONE,4-HYDROXY,4METHYL	16000J	11000J	11000JB	NEGATED	3
		UNKNOWN RT = 4.87	150J	220J	220JB	NEGATED	3
		UNKNOWN RT = 5.77	460J	230J	230JB	NEGATED	3
PEST/1.0	BSA06271426	NONE					

THE VOLATILE SAMPLE DATA IS QUALIFIED ESTIMATED DUE TO SURROGATE OUTLIERS

ATTACHMENT I21

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

LAB NAME: TCT - ST. LOUIS

SITE NAME: CELANESE

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271427	METHYLENE CHLORIDE	5U	4J	4J	NEGATED	1,10
		1,1,1-TRICHLOROETHANE	5U	1J	1J	QUALIFIED	1
		2-BUTANONE	10U	11U	11R	REJECTED	6
		NO TICS					
BNA/1.0	*BSA06271427	4-METHYLPHENOL	330U	150J	150J	QUALIFIED	1,5
		2,4-DIMETHYLPHENOL	330U	130J	130J	QUALIFIED	1
		NAPHTHALENE	330U	69J	69J	QUALIFIED	1
		2-METHYL NAPHTHALENE	330U	63J	63J	QUALIFIED	1
		ACENAPHTHENE	330U	91J	91J	QUALIFIED	1,7
		DIBENZOFURAN	330U	75J	75J	QUALIFIED	1,7
		DIETHYLPHTHALATE	330U	180J	180J	QUALIFIED	1,7
		FLUORENE	330U	95J	95J	QUALIFIED	1,7
		PHENANTHRENE	330U	1600	160		
		ANTHRACENE	330U	250J	250J	QUALIFIED	1
		DI-N-BUTYL PHTHALATE	57J	270BJ	270BJ	QUALIFIED	1,8
		FLUORANTHENE	330U	2200	2200		
		PYRENE	330U	1300	1300J	QUALIFIED	5
		BENZO(a) ANTHRACENE	330U	980	980		
		CHRYSENE	330U	980	980		
		BIS(2 ETHYL HEXYL) PHTHALATE	330U	410	410		
		BENZO (B) FLUORANTHENE	330U	1300	1300		
		BENZO(a) PYRENE	330U	7700	7700		
		INDENO(1,2,3-CD) PYRENE	330U	500	500		
		DIBENZO(A,H) ANTHRACENE	330U	140J	140J	QUALIFIED	1
		BENZO(G,H,I) PERYLENE	330U	520	520		
		12 TICS					

ATTACHMENT I

PEST/10.0	BSA06271427	4,4-DDE	16U	180U	180UJ	QUALIFIED	5
		ENDRIN	16U	180U	180UJ	QUALIFIED	5
		AROCHLOR-1248	80U	2100D	2100D		
		4,4-DDD	16U	180U	180UJ	QUALIFIED	5
		ENDRIN KETONE	16U	180U	180UJ	QUALIFIED	5

THE COMPOUND RESULTS QUANTIFIED IN REFERENCE TO ACENPHTHENE ARE QUALIFIED ESTIMATED

ATTACHMENT I-23

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

SITE NAME: CELANESE

LAB NAME: TCT - ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	*BSA06271428	METHYLENE CHLORIDE	5U	5J	5J	NEGATED	1,10
		ACETONE	12	12B	12JB	NEGATED	3
		1,1,1-TRICHLORO ETHANE	5U	8	8		
		TETRACHLORO ETHENE	5U	6	6J	QUALIFIED	1,2
		2-BUTANONE	10U	11U	11R	REJECTED	6
		1 TIC					
BNA/1.0	+BSA06271428	PHENOL	330U	52J	52J	QUALIFIED	1,9
		2-METHYLPHENOL	330U	70J	70J	QUALIFIED	1,9
		4-METHYLPHENOL	330U	290J	290J	QUALIFIED	1,9
		2,4-DIMETHYLPHENOL	33-U	360J	360J	QUALIFIED	1,9
		NAPHTHALENE	330U	120J	120J	QUALIFIED	1,9
		2-METHYL NAPHTHALENE	330U	68J	68J	QUALIFIED	1,9
		DIETHYL PHTHALATE	330U	102J	102J	QUALIFIED	1,7,9
		FLUORENE	330U	40J	40J	QUALIFIED	1,7,9
		PHENANTHRENE	330U	630J	630J	QUALIFIED	1,7,9
		ANTHRACENE	330U	130J	130J	QUALIFIED	1,7,9
		DI-N-BUTYLPHTHALATE	61J	380B	380JB	QUALIFIED	7,4,9
		FLUORANTHENE	330U	700	700J	QUALIFIED	7,9
		PYRENE	330U	1200	1200J	QUALIFIED	7,9
		BUTYLBENZYL PHTHALTE	330U	120J	120J	QUALIFIED	1,7,9
		BENZO(a) ANTHRACENE	330U	540	540J	QUALIFIED	7,9
		CHRYSENE	330U	670	670	QUALIFIED	7,9
		BIS(2 ETHYL HEXY) PHTHALATE	42J	9600D	9600JD	QUALIFIED	2,4,9
		BENZO(b) FLUORANTHENE	330U	900	900J	QUALIFIED	7,9
		BENZO(a) PYRENE	330U	540	540J	QUALIFIED	7,9
		INDENO(1,2,3-CD) PYRENE	330U	340J	340J	QUALIFIED	1,7,9

ATTACHMENT I 29

		DIBEN(A,H) ANTHRACENE	330U	103J	103J	QUALIFIED	1,7,9
		BENZO(G,H,I) PERYLENE	330U	360J	360J	QUALIFIED	1,7,9
		20 TICS					
		OCTANE,4-METHYL	330J	500J	500JB	NEGATED	3
		UNKNOWN RT = 6.13	200J	280J	280JB	NEGATED	3
		UNKNOWN RT = 7.67	200J	2300J	2300JB	QUALIFIED	4
PEST/100.0	BSA06271428	AROCHLOR-1248	80U	29000D	29000D		
		4,4-DDE	16U	1800U	1800UJ	QUALIFIED	5
		ENDRIN	16U	1800U	1800UJ	QUALIFIED	5
		E,E-DDD	16U	1800U	1800UJ	QUALIFIED	5
		ENDRIN KETONE	16U	1800U	1800UJ	QUALIFIED	5

* THE VOLATILE COMPOUND QUANTITATION LIMITS QUANTIFIED IN REFERENCE TO CHLOROBENZENE ARE CONSIDERED ESTIMATED.

♦ COMPOUND RESULTS QUANTIFIED IN REFERENCE TO ACENAPHTHENE, PHENANTHRENE, CHRYSENE, AND PERYLENE ARE QUALIFIED ESTIMATED.

D = REPORTED FROM THE 10-FOLD DILUTION

ATTACHMENT I25

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

SITE NAME: CELANESE

LAB NAME: TCT - ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271429	METHYLENE CHLORIDE	5U	17	17J	NEGATED	10
		ACETONE	8J	240B	240JB	QUALIFIED	4
		TRICHLOROETHENE	5U	5J	5J	QUALIFIED	1
		4-METHYL-2-PENTANONE	10U	51	51		
		TETRACHLOROETHENE	5U	21	21		
		2-BUTANONE	10U	12U	12R	REJECTED	6
		2 TICS					
BNA/1.0	*BSA06271429RE	2-METHYLPHENOL	330U	42J	42J	QUALIFIED	1,9
		4-METHYLPHENOL	330U	190J	190J	QUALIFIED	1,9
		NAPHTHALENE	330U	42J	42J	QUALIFIED	1,9
		DIETHYLPHTHALATE	330U	250J	250J	QUALIFIED	1,7,9
		PHENANTHRENE	330U	210J	210J	QUALIFIED	1,7,9
		DI-n-BUTYL PHTHALATE	57J	290BJ	290BJ	QUALIFIED	1,7,8,9
		FLUORANTHENE	330U	210J	210J	QUALIFIED	1,7,9
		PYRENE	330U	400J	400J	QUALIFIED	1,7,9
		BENZO(a) ANTHRACENE	330U	180J	180J	QUALIFIED	1,7,9
		CHRYSENE	330U	240J	240J	QUALIFIED	1,7,9
		BIS(2 ETHYL HEXYL) PHTHALATE	330U	450B	450J	QUALIFIED	7,9
		BENZO(b) FLUORANTHENE	330U	360J	360J	QUALIFIED	1,7,9
		BENZO(a) PYRENE	330U	150J	150J	QUALIFIED	1,7,9
		INDENO(1,2,3-CD) PYRENE	330U	93J	93J	QUALIFIED	1,7,9
		20 TICS					
		HEPTANE,2,3-DIMETHYL	320J	590J	590JB	NEGATED	3
PEST/10.0	BSA06271429	AROCHLOR-1248	80U	1400D	1400D		
		4,4-DDE	16U	200U	200UJ	QUALIFIED	5
		ENDRIN	16U	200U	200UJ	QUALIFIED	5
		4,4-DDD	16U	200U	200UJ	QUALIFIED	5

ATTACHMENT I-26

		ENDRIN KETONE	16U	200U	200UJ	QUALIFIED	5

COMPOUND RESULTS QUANTIFIED IN REFERENCE TO ACENAPHTHENE, PHENANTHENE, CHRYSENE AND PERYLENE ARE CONSIDERED ESTIMATED.

ATTACHMENT I 27

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

LAB NAME: TCT - ST. LOUIS

SITE NAME: CELANESE

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271430	METHYLENE CHLORIDE	5U	3J	3J	NEGATED	1,10
		ACETONE	12	8BJ	8BJ	NEGATED	1,3
		1,1,1-TRICHLORO ETHANE	5U	17	17		
		TETRACHLORO ETHENE	5U	2J	2J	QUALIFIED	1
		TOLUENE	5U	3J	3J	QUALIFIED	1
		2-BUTANONE	10U	11U	11R	REJECTED	6
		NO TICS					
BNA/1.0	BSA06271430	2-METHYLPHENOL	330U	48J	48J	QUALIFIED	1
		2,4-DIMETHYLPHENOL	330U	46J	46J	QUALIFIED	1
		NAPHTHALENE	330U	160J	160J	QUALIFIED	1
		2-METHYL NAPHTHALENE	330U	104J	104J	QUALIFIED	1
		ACENAPHTHENE	330U	430	430		
		DIBENZOFURAN	61J	250J	250JB	QUALIFIED	1,8
		FLUORENE	330U	370	370		
		PHENANTHRENE	330U	5400	5400		
		ANTHRACENE	330U	1030	1030		
		DI-n-BUTYL PHTHALATE	330U	103BJ	103J	QUALIFIED	1
		FLUORANTHENE	330U	8100D	8100D		
		PYRENE	330U	8400D	8400D		
		BUTYL BENZYLPHTHALATE	330U	83J	83J	QUALIFIED	1
		BENZO(A) ANTHRACENE	330U	5000	5000		
		CHRYSENE	330U	4500	4500		
		BIS(2-ETHYL HEXYL) PHTHALATE	42J	270BJ	270BJ	QUALIFIED	1,4
		DI-n-OCTYL PHTHALATE	330U	10J	10J	QUALIFIED	1
		BENZO(b) FLUORANTHENE	330U	6500D	6500D		
		BENZO(a) PYRENE	330U	4200	4200		

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		INDENO(1,2,3-CD)PYRENE	330U	2500	2500		
		DIBENZ(A,H) ANTHRACENE	330U	690	690		
		BENZO(G,H,I) PERYLENE	330U	2400	2400		
		20 TICS					
		HEPTANE,2,3-DIMETHYL	320J	250J	250JB	NEGATED	3
PEST/10.0	BSA06271430	NONE					

ATTACHMENT I 29

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

LAB NAME: TCT - ST. LOUIS

SITE NAME: CELANESE

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	*BSA06271431	METHYLENE CHLORIDE	5U	6	6J	NEGATED	2,10
		1,1,1-TRICHLORO ETHANE	5U	10	10J	QUALIFIED	2
		TETRACHLOROETHENE	5U	1J	1J	QUALIFIED	1,2
		TOLUENE	5U	2J	2J	QUALIFIED	1,2
		2-BUTANONE	10U	11U	11R	REJECTED	6
		7 TICS					
BNA/1.0	BSA06271431	PHENOL	330U	170J	170J	QUALIFIED	1
		2-METHYLPHENOL	330U	250J	250J	QUALIFIED	1
		4-METHYLPHENOL	330U	850	850		
		2,4-DIMETHYL PHENOL	330U	890	890		
		NAPHTHALENE	330U	220J	220J	QUALIFIED	1
		2-METHYL NAPHTHALENE	330U	140J	140J	QUALIFIED	1
		ACENAPHTHYLENE	330U	19J	19J	QUALIFIED	1
		ACENAPHTHENE	330U	94J	94J	QUALIFIED	1
		DIBENZOFURAN	330U	81J	81J	QUALIFIED	1
		FLUORENE	330U	88J	88J	QUALIFIED	1
		PHENANTHENE	330U	1400	1400		
		ANTHRACENE	330U	280J	280J		
		DI-n-BUTYL PHTHALATE	61J	170BJ	170BJ	NEGATED	1,3
		FLUORANTHENE	330U	2500	2500		
		PYRENE	330U	1800	1800		
		BUTYL BENZYLPHTHALATE	330U	130J	130J	QUALIFIED	1
		BENZO(a) ANTHRACENE	330U	1400	1400		
		CHRYSENE	330U	1400	1400		
		BIS(2 ETHYL HEXYL) PHTHALATE	42J	3300B	3300JB	QUALIFIED	4
		BENZO(b) FLUORANTHENE	330U	2600	2600		
		BENZO (a) PYRENE	330U	1600	1600		

ATTACHMENT I-30

		IDENO (1,2,3-CD) PYRENE	330U	1300	1300		
		DIBENZ (A,H) ANTHRACENE	330U	480	480		
		BENZO (G,H,I) PERYLENE	330U	1400	1400		
		HEXANEDIOIC ACID, DIOCYTL ESTER	510J	530J	530JB	NEGATED	3
PEST/10.0	BSA06271431	NONE					

THE VOLATILE FRACTION IS CONSIDERED ESTIMATED DUE TO A SURROGATE OUTLIER.

ATTACHMENT I-31

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

SITE NAME: CELANESE

LAB NAME: TCT - ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271432	ACETONE	12	8BJ	8BJ	NEGATED	1,3
		2-BUTANONE	10U	12U	12R	REJECTED	6
		1 TIC					
BNA/1.0	BSA06271432	DI-n-BUTYL PHTHALATE	61J	65BJ	65BJ	NEGATED	1,3
		FLUORANTHENE	330U	52J	52J	QUALIFIED	1
		PYRENE	330U	60J	60J	QUALIFIED	1
		CHRYSENE	330U	41J	41J	QUALIFIED	1
		BIS(2 ETHYL HEXYL) PHTHALATE	42J	53BJ	53BJ	NEGATED	1,3
		BENZO(b) FLUORANTHENE	330U	65J	65J	QUALIFIED	1
		10 TICS					
		HEPTANE,2,3-DIMETHYL	320J	440J	440JB	NEGATED	3
		HEXANEDIOIC ACID, DIOCTYL ESTER	510J	340J	340JB	NEGATED	3
PEST/1.0	BSA06271432	NONE					

ATTACHMENT I-32

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

SITE NAME: CELANESE

CASE NO: 00017

SAMPLE MATRIX: SOIL

SITE NAME: TCT - ST. LOUIS

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271433	ACETONE	12	10BJ	10BJ	NEGATED	1,3
		2-BUTANONE	10U	11U	11R	REJECTED	6
		NO TICS					
BNA/1.0	BSA06271433	DI-n-BUTYL PHTHALATE	61J	52BJ	57BJ	NEGATED	1,3
		BIS(2 ETHYL HEXYL) PHTHALATE	42J	51BJ	51BJ	NEGATED	1,3
		11 TICS					
		HEPTANE, 2,3-DIMETHYL	320J	530J	530JB	NEGATED	3
PEST/1.0	BSA06271433	4,4-DDE	16U	18U	18UJ	QUALIFIED	5
		ENDRIN	16U	18U	18UJ	QUALIFIED	5
		4,4-DDD	16U	18U	18UJ	QUALIFIED	5
		ENDRIN KETONE	16U	18U	18UJ	QUALIFIED	5

ATTACHMENT I-33

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

SITE NAME: CELANESE

LAB NAME: TCT - ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271434	METHYLENE CHLORIDE	5U	16	16J	NEGATED	4,10
		ACETONE	12	14B	14JB	NEGATED	3
		1,1-DICHLOROETHANE	5U	5J	5J	QUALIFIED	1
		1,2-DICHLOROEHENE	5U	44	44		
		1,1,1-TRICHLOROETHANE	5U	1J	1J	QUALIFIED	1
		TRICHLOROETHENE	5U	10	10		
		TETRACHLOROETHENE	5U	5J	5J	QUALIFIED	1
		2-BUTANONE	10U	12U	12R	REJECTED	6
		1 TIC					
BNA/1.0	BSA06271434	2-METHYLPHENOL	330U	450	450J	QUALIFIED	9
		4-METHYLPHENOL	330U	120J	120J	QUALIFIED	1,9
		NAPHTHALENE	330U	210J	210J	QUALIFIED	1,9
		2-METHYL NAPHTHALENE	330U	190J	190J	QUALIFIED	1,9
		DIMETHYL PHTHALATE	330U	60J	60J	QUALIFIED	1,9
		ACENAPHTHYLENE	330U	97J	97J	QUALIFIED	1,9
		ACENAPHTHENE	330U	230J	230J	QUALIFIED	1,9
		4-NITROPHENOL	330U	60J	60J	QUALIFIED	1,9
		DIBENZO FURAN	330U	220J	220J	QUALIFIED	1,9
		DIETHYL PHTHALATE	330U	210J	210J	QUALIFIED	1,9
		FLUORENE	330U	370J	370J	QUALIFIED	1,9
		PHENANTHRENE	330U	6600D	6600JD	QUALIFIED	2,9
		ANTHRACENE	330U	1200	1200J	QUALIFIED	9
		DI-n-BUTYLPHTHALATE	61J	450B	450JB	QUALIFIED	4,9
		FLUORANTHENE	330U	11000D	11000JD	QUALIFIED	2,9
		PYRENE	330U	12000D	12000JD	QUALIFIED	2,9
		BUTYL BENZYL PHTHALATE	330U	140J	140J	QUALIFIED	1,9
		BENZO (a) ANTHRACENE	330U	5500	5500J	QUALIFIED	9
		CHYSENE	330U	5700D	5700JD	QUALIFIED	2,9
		BIS (2 ETHYL HEXYL) PHTHALATE	42J	2100B	2100JB	QUALIFIED	4,9

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		BENZO(b) FLUORANTHENE	330U	10200D	10200JD	QUALIFIED	2,9
		BENZO(a) PYRENE	330U	5900	5900J	QUALIFIED	9
		INDENO (1,2,3-CD) PYRENE	330U	5500	5500J	QUALIFIED	9
		DIBENZ(A,H) ANTHRACENE	330U	1600	1600J	QUALIFIED	9
		BENZO(G,H,I) PERYLENE	330U	5900	5900J	QUALIFIED	9
		20 TICS					
PEST/10.0	BSA06271434	NONE					

D = REPORTED FROM THE 10.0 FOLD DILUTION

ATTACHMENT I-35

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

SITE NAME: CELANESE

CASE NO: 00017

SAMPLE MATRIX: SOIL

LAB NAME: TCT - ST. LOUIS

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271435	METHYLENE CHLORIDE	5U	9	9J	QUALIFIED	10
		ACETONE	12	17B	17JB	NEGATED	3
		TRICHLOROETHENE	5U	3J	3J	QUALIFIED	1
		TETRACHLOROETHENE	5U	2J	2J	QUALIFIED	1
		2-BUTANONE	10U	12U	12R	REJECTED	6
		NO TICS					
BNA/1.0	BSA06271435	2-METHYLPHENOL	330U	140J	140J	QUALIFIED	1,9
		4-METHYLPHENOL	330U	57J	57J	QUALIFIED	1,9
		NAPHTHALENE	330U	2000	2000J	QUALIFIED	9
		2-METHYL NAPHTHALENE	330U	2900	2900J	QUALIFIED	9
		ACENAPHTHENE	330U	3400	3400J	QUALIFIED	9
		4-NITRO PHENOL	330U	93J	93J	QUALIFIED	1,9
		DIBENZOFURAN	330U	1700	1700J	QUALIFIED	9
		DIETHYLPHTHALATE	330U	290J	290J	QUALIFIED	1,9
		FLUORENE	330U	3800	3800J	QUALIFIED	9
		HEXACHLORO BENZENE	330U	190J	190J	QUALIFIED	1,9
		PHENANTHRENE	330U	28000D	28000JD	QUALIFIED	2
		ANTHRACENE	330U	8100D	8100JD	QUALIFIED	2
		DI-n-BUTYL PHTHALATE	61J	910B	910JB	QUALIFIED	4,9
		FLUORANTHENE	330U	20000D	20000JD	QUALIFIED	2
		PYRENE	330U	26000D	26000JD	QUALIFIED	2
		BUTYLBENZYL PHTHALATE	330U	90J	90J	QUALIFIED	1,9
		BENZO(a) ANTHRACENE	330U	11000D	11000JD	QUALIFIED	2
		CHRYSENE	330U	10700D	10700JD	QUALIFIED	2
		BIS(2 ETHYL HEXYL) PHTHALATE	42J	4200B	4200JB	QUALIFIED	4,9
		BENZO(b) FLUORANTHENE	330U	1200D	1200JD	QUALIFIED	2
		BENZO(a) PYRENE	330U	7900D	7900JD	QUALIFIED	2

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		INDENO(1,2,3-CD) PYRENE	330U	4700	4700J	QUALIFIED	9
		DIBENZO(G,H) ANTHRACENE	330U	2200	2200J	QUALIFIED	9
		BENZO(G,H,I) PERYLENE	330U	4300	4300J	QUALIFIED	9
		20 TICS					
PEST/10.0	BSA06271435	NONE					

D=REPORTED FROM THE 10 FOLD DILUTION

ATTACHMENT I37

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

SITE NAME: CELANESE

LAB NAME: TCT - ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	*BSA06271436	METHYLENE CHLORIDE	5U	9	9J	NEGATED	2,10
		ACETONE	12	16B	16JB	NEGATED	2,3
		1,2-DICHLOROETHENE	5U	8	8J	QUALIFIED	2
		CHLOROFORM	5U	10	10J	QUALIFIED	2
		1,1,1-TRICHLORO ETHANE	5U	2J	2J	QUALIFIED	1,2
		TRICHLOROETHENE	5U	107	107J	QUALIFIED	2
		TETRACHLOROETHENE	5U	96	96J	QUALIFIED	2
		2-BUTANONE	10U	11U	11R	REJECTED	6
		NO TICS					
BNA/1.0	BSA06271436	PHENOL	330U	4200	4200J	QUALIFIED	9
		2-METHYLPHENOL	330U	3000	3000J	QUALIFIED	9
		4-METHYLPHENOL	330U	11000D	11000JD	QUALIFIED	9
		ISOPHORONE	330U	88J	88J	QUALIFIED	1,9
		1,2,4-TRICHLORO BENZENE	330U	860	860J	QUALIFIED	9
		NAPHTHALENE	330U	990	990J	QUALIFIED	9
		2-METHYL NAPHTHALENE	330U	2200	2200J	QUALIFIED	9
		DIMETHYLPHTHALTE	330U	660	660J	QUALIFIED	9
		DIBENZOFURAN	330U	200J	200J	QUALIFIED	1,9
		DIETHYL PHTHALATE	330U	930	930J	QUALIFIED	9
		PHENANTHENE	330U	1700	1700J	QUALIFIED	9
		ANTHRACENE	330U	270J	270J	QUALIFIED	1,9
		DI-n-BUTYL PHTHALATE	61J	3000B	3000JB	QUALIFIED	4,9
		FLUORANTHENE	330U	1200	1200J	QUALIFIED	9
		PYRENE	330U	1300	1300J	QUALIFIED	5,9
		BUTYL BENZYLPHTHALATE	330U	360J	360J	QUALIFIED	1,9
		BENZO(a) ANATHRACENE	330U	820	820J	QUALIFIED	9
		CHRYSENE	330U	960	960J	QUALIFIED	9
		BIS(2 ETHYL HEXYL) PHTHALATE	42J	41000D	41000JD	QUALIFIED	2,9,4

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		BENZO(b) FLUROANTHENE	330U	1500	1500J	QUALIFIED	9
		BENZO(a) PYRENE	330U	840	840J	QUALIFIED	9
		20 TICS					
PEST/10.0	BSA06271436	NONE					

*THE VOLATILE SAMPLE DATA IS CONSIDERED ESTIMATED DUE TO SURROGATE OUTLIERS

D = REPORTED FROM THE 10 FOLD DILUTION

ATTACHMENT I 39

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

SITE NAME: CELANESE

LAB NAME: TCT - ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271437	METHYLENE CHLORIDE	5U	2J	2J	NEGATED	1,10
		ACETONE	12	68B	68JB	QUALIFIED	4
		TRICHLOROETHENE	5U	1J	1J	QUALIFIED	1
		BENZENE	5U	1J	1J	QUALIFIED	1
		4-METHYL-2-PENTANONE	10U	11BJ	11J	QUALIFIED	1,5
		2-HEXANONE	3J	8J	8J	NEGATED	1,3,5
		TOLUENE	5U	1J	1J	QUALIFIED	1
		XYLENE(TOTAL)	5U	9	9		
		2-BUTANONE	10U	12U	12R	REJECTED	6
		1 TIC					
BNA/1.0	BSA06271437	4-METHYLPHENOL	330U	210J	210J	QUALIFIED	1,9
		PHENANTHRENE	330U	96J	96J	QUALIFIED	1,9
		DI-n-BUTYLPHTHALATE	61J	69BJ	69BJ	NEGATED	1,3,9
		FLUORANTHENE	330U	140J	140J	QUALIFIED	1,9
		PYRENE	330U	150J	150J	QUALIFIED	1,5,9
		BENZO(a) ANTHRACENE	330U	93J	93J	QUALIFIED	1,9
		CHRYSENE	330U	99J	99J	QUALIFIED	1,9
		BIS(2 ETHYL HEXYL) PHTHALATE	42J	240BJ	240BJ	QUALIFIED	1,8,9
		BENZO(b) FLUORANTHENE	330U	150J	150J	QUALIFIED	1,9
		BENZO(a) PYRENE	330U	75J	75J	QUALIFIED	1,9
		12 TICS					
PEST/1.0	BSA06271437	NONE					

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0000171

WESTON
MANAGERS DESIGNERS CONSULTANTS

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INORGANIC QUALITY ASSURANCE REVIEW
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
SITE: CELANESE
SDG: BSA06271424

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: _____ 11-20-91
Douglas J. Godfrey — Date
Project Scientist - Data Validation

VERIFIED BY: _____ 11-20-91
Zohreh Hamid, Ph.D. — Date
Section Manager - Data Validation

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WESTON

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
SITE: CELANESE
SDG: BSA06271424

The case consisted of fourteen soil samples analyzed for Inorganic Target Analyte List (TAL) parameters by TCT - St. Louis. One of the samples (BSA0627143) was prepared and analyzed along with batch BSA06271438, and is summarized summarized with batch BSA0621438.

The laboratory performed the analyses according to the procedures set forth in the NJDEP CLP method. Initial and continuing calibration verification samples were within acceptable control limits. The most significant problems affecting the data usability are associated with the QC performance requirements, and are addressed in the following sections.

Only the internal Chain of Custody forms were provided in the inorganic data package. All sample receipt dates obtained were based on Form Is.

Major Issues

All results for Cr and Pb are rejected because the CRDL percent recovery was greater than 150% or less than 50%.

Minor Issues

The CRDL sample percent recoveries for Cd, Mn and As were below the CLP validation control limits. All sample results for Cu, Mn and As are qualified as estimated.

The soil preparation blank contained Al, Fe, Ca and Mg above the IDL. The concentrations for Al and Fe were greater than the CRDL. Since all samples results for Al and Fe are greater than the preparation blank by more than 10 times, none of the sample results are rejected due to blank contamination. All sample results $\geq$ 5x the blank value are considered to be real but are qualified due to blank contamination.

The results for Sb, Ba and Se in all soil samples are qualified because the sample spike recovery for this analyte was less than the QC limit 75%. The positive results for Mn and Zn are qualified because the spike recovery exceeded the QC limit 125%.

The results for Al and Ba are qualified because the %D in the Duplicate analysis did not meet the QC limits.

All sample results between the IDL and CRDL are qualified as estimated for all associated analytes, since the value obtained is at the low end of the instrument's performance.

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NOTE

A water LCS was used for soil samples. Although a soil LCS was not digested, the water LCS can be used as a measure of digestion efficiency and is contractually acceptable when a soil LCS is not available to a laoboratory.

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INFORMATION REGARDING REPORT CONTENT

All data have been validated with regard usability according to NJDEP CLP guidelines. If you have any questions or comments to this review, please contact Zohreh Hamid at (215) 344-3747.

INORGANIC ATTACHMENTS

1.	Attachment I	Glossary of Qualifier Codes.
2.	Attachment II	Data Summary.
3.	Attachment III	Data Validation for Inorganics.
4.	Attachment IV	Support Documentation.

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED, SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIERS

ATTACHMENT II
DATA SUMMARY

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271424 SITE NAME: CELANESE

SDG NAME: TCT-ST. LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271424	91003701	ALUMINUM	90.2	5800J	5800J	QUALIFIED	8,51
		ANTIMONY		6.60J	6.60J	QUALIFIED	43,55
		ARSENIC		7.0	7.0J	QUALIFIED	41
		BARIUM		286J	286J	QUALIFIED	51,55
		BERYLLIUM		0.23J	0.23J	QUALIFIED	43
		CADMIUM		1.4	1.4J	QUALIFIED	41
		CALCIUM	8.8J	1280	1280J	QUALIFIED	8
		CHROMIUM		12.4	—	REJECTEDD	66
		COBALT		7.3U	7.3U		
		COPPER		60.7	60.7		
		IRON	38.8	9760	9760J	QUALIFIED	8
		LEAD		923J	—	REJECTED	66
		MAGNESIUM	55.6J	1640	1640J	QUALIFIED	8
		MANGANESE		238J	238J	QUALIFIED	41,54
		MERCURY		0.62	0.62		
		NICKEL		14.2	14.2		
		POTASSIUM		525J	525J	QUALIFIED	43
		SELENIUM		0.46UJ	0.46UJ	QUALIFIED	55,79
		SILVER		0.23U	0.23U		
		SODIUM		174J	174J	QUALIFIED	43
		THALLIUM		0.69UJ	0.69UJ	QUALIFIED	79
		VANADIUM		16.3	16.3		
		ZINC		392J	392J	QUALIFIED	54
		CYANIDE		0.29U	0.29U		

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271424 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271425	91003702	ALUMINUM	90.2	8550J	8550J	QUALIFIED	8,51
		ANTIMONY		5.70J	5.70J	QUALIFIED	43,55
		ARSENIC		13.9	13.9	QUALIFIED	41
		BARIUM		319J	319J	QUALIFIED	51,55
		BERYLLIUM		0.97J	0.97J	QUALIFIED	43
		CADMIUM		2.4	2.4J	QUALIFIED	41
		CALCIUM	8.8J	31600	31600	QUALIFIED	8
		CHROMIUM		15.2	—	REJECTEDD	66
		COBALT		8.0J	8.0J	QUALIFIED	43
		COPPER		178	178		
		IRON	38.8	17800	17800J	QUALIFIED	8
		LEAD		500J	—	REJECTED	66
		MAGNESIUM	55.6J	2900	2900J	QUALIFIED	8
		MANGANESE		321J	321J	QUALIFIED	41,54
		MERCURY		0.98	0.98		
		NICKEL		35.5	35.5		
		POTASSIUM		780J	780J	QUALIFIED	43
		SELENIUM		0.48UJ	0.48UJ	QUALIFIED	55,79
		SILVER		1.4J	1.4J	QUALIFIED	43
		SODIUM		216J	216J	QUALIFIED	43
		THALLIUM		0.72U	0.72U		
		VANADIUM		22.7	22.7		
		ZINC		1490J	1490J	QUALIFIED	54
		CYANIDE		0.52J	0.52J	QUALIFIED	43

mg/kg

ATTACHMENT II49

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271426	91003703	ALUMINUM	90.2	3520J	3520J	QUALIFIED	8,51
		ANTIMONY		2.4UJ	2.4UJ	QUALIFIED	55
		ARSENIC		7.9	7.9J	QUALIFIED	41
		BARIUM		80.3J	80.3J	QUALIFIED	51,55
		BERYLLIUM		0.22J	0.22J	QUALIFIED	43
		CADMIUM		0.87U	0.87UJ	QUALIFIED	41
		CALCIUM	8.8J	1930	1930J	QUALIFIED	8
		CHROMIUM		6.5	—	REJECTEDD	66
		COBALT		6.9U	6.9U		
		COPPER		37.4	37.4		
		IRON	38.8	9160	9160J	QUALIFIED	8
		LEAD		436J	436	REJECTED	66
		MAGNESIUM	55.6J	1830	1830J	QUALIFIED	8
		MANGANESE		269J	269J	QUALIFIED	41,54
		MERCURY		0.64	0.64		
		NICKEL		10.6	10.6		
		POTASSIUM		756J	756J	QUALIFIED	43
		SELENIUM		0.43UJ	0.43UJ	QUALIFIED	55,79
		SILVER		0.22U	0.22U		
		SODIUM		196J	196J	QUALIFIED	43
		THALLIUM		0.65UJ	0.65UJ	QUALIFIED	80
		VANADIUM		11.3	11.3		
		ZINC		508J	508J	QUALIFIED	54
		CYANIDE		0.27U	0.27U		

ATTACHMENT II 50

INORGANIC TARGET ANALYTE SUMMARY LIST

SE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

AB NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271427	91003704	ALUMINUM	90.2	4920J	4920J	QUALIFIED	8,51
		ANTIMONY		2.5UJ	2.5UJ	QUALIFIED	55
		ARSENIC		10.0J	10.0J	QUALIFIED	41,43
		BARIUM		96.1J	96.1J	QUALIFIED	51,55
		BERYLLIUM		0.45J	0.45J	QUALIFIED	43
		CADMIUM		0.90U	0.90UJ	QUALIFIED	41
		CALCIUM	8.8J	1440	1440J	QUALIFIED	8
		CHROMIUM		6.1	—	REJECTEDD	66
		COBALT		8.1J	8.1J	QUALIFIED	43
		COPPER		156	156		
		IRON	38.8	9670	9670J	QUALIFIED	8
		LEAD		182J	—	REJECTED	66
		MAGNESIUM	55.6J	1440	1440J	QUALIFIED	8
		MANGANESE		431J	431J	QUALIFIED	41,54
		MERCURY		1.3	1.3		
		NICKEL		15.3	15.3		
		POTASSIUM		487J	487J	QUALIFIED	43
		SELENIUM		0.52UJ	0.52UJ	QUALIFIED	55,79
		SILVER		0.22U	0.22U		
		SODIUM		186J	186J	QUALIFIED	43
		THALLIUM		0.67U	0.67U		
		VANADIUM		13.2	13.2		
		ZINC		187J	187J	QUALIFIED	54
		CYANIDE		0.28U	0.28U		

g/kg

ATTACHMENT I15

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271424 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271428	91003705	ALUMINUM	90.2	5340J	5340J	QUALIFIED	8,51
		ANTIMONY		2.4UJ	2.4UJ	QUALIFIED	55
		ARSENIC		9.10J	9.10J	QUALIFIED	41,43
		BARIUM		114J	114J	QUALIFIED	51,55
		BERYLLIUM		0.22J	0.22J	QUALIFIED	43
		CADMIUM		0.89U	0.89UJ	QUALIFIED	41
		CALCIUM	8.8J	1450	1450J	QUALIFIED	8
		CHROMIUM		15.1	—	REJECTEDD	66
		COBALT		7.1U	7.1U		
		COPPER		60.5	60.5		
		IRON	38.8	9280	9280J	QUALIFIED	8
		LEAD		256J	—	REJECTED	66
		MAGNESIUM	55.6J	783J	783J	QUALIFIED	8,43
		MANGANESE		150J	150J	QUALIFIED	41,54
		MERCURY		2.1	2.1		
		NICKEL		11.1	11.1		
		POTASSIUM		238J	238J	QUALIFIED	43
		SELENIUM		0.44UJ	0.44UJ	QUALIFIED	55,79
		SILVER		0.42J	0.42J	QUALIFIED	43
		SODIUM		162J	162J	QUALIFIED	43
		THALLIUM		0.67U	0.67U		
		VANADIUM		21.1	21.1		
		ZINC		194J	194J	QUALIFIED	54
		CYANIDE		0.41J	0.41J	QUALIFIED	43

mg/kg

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INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271429	91003706	ALUMINUM	90.2	6010J	6010J	QUALIFIED	8,51
		ANTIMONY		2.7J	2.7J	QUALIFIED	43,55
		ARSENIC		5.8J	5.80J	QUALIFIED	41
		BARIUM		206J	206J	QUALIFIED	51,55
		BERYLLIUM		0.49J	0.49J	QUALIFIED	43
		CADMIUM		1.5	1.5J	QUALIFIED	41
		CALCIUM	8.8J	1150	1150J	QUALIFIED	8
		CHROMIUM		16.7	—	REJECTEDD	66
		COBALT		7.9U	7.9U		
		COPPER		115	115		
		IRON	38.8	12000	12000J	QUALIFIED	8
		LEAD		258J	—	REJECTED	66
		MAGNESIUM	55.6J	964J	964J	QUALIFIED	8,43
		MANGANESE		75.1J	75.1J	QUALIFIED	41,54
		MERCURY		1.2	1.2		
		NICKEL		24.0	24.0		
		POTASSIUM		309J	309J	QUALIFIED	43
		SELENIUM		0.56J	0.56J	QUALIFIED	55,79
		SILVER		0.25U	0.25U		
		SODIUM		164J	164J	QUALIFIED	43
		THALLIUM		0.74U	0.74U		
		VANADIUM		13.3	13.3		
		ZINC		287J	287J	QUALIFIED	54
		CYANIDE		0.37J	0.37J	QUALIFIED	43

mg/kg

ATTACHMENT I 53

INORGANIC TARGET ANALYTE SUMMARY LIST

SE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

B NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271430	91003707	ALUMINUM	90.2	5060J	5060J	QUALIFIED	8,51
		ANTIMONY		4.4J	4.4J	QUALIFIED	43,55
		ARSENIC		23.4	23.4J	QUALIFIED	41,43
		BARIUM		238J	238J	QUALIFIED	51,55
		BERYLLIUM		0.65J	0.65J	QUALIFIED	43
		CADMIUM		2.4	2.4J	QUALIFIED	41
		CALCIUM	8.8J	4260	4260J	QUALIFIED	8
		CHROMIUM		23.1	—	REJECTEDD	66
		COBALT		6.9U	6.9U		
		COPPER		140	140		
		IRON	38.8	19500	19500J	QUALIFIED	8
		LEAD		2920J	—	REJECTED	66
		MAGNESIUM	55.6J	1340	1340J	QUALIFIED	8,43
		MANGANESE		324J	324J	QUALIFIED	41,54
		MERCURY		4.9	4.9		
		NICKEL		17.5	17.5		
		POTASSIUM		612J	612J	QUALIFIED	43
		SELENIUM		0.43UJ	0.43UJ	QUALIFIED	55,79
		SILVER		0.78J	0.78J	QUALIFIED	43
		SODIUM		221J	221J	QUALIFIED	43
		THALLIUM		0.65UJ	0.65UJ	QUALIFIED	79
		VANADIUM		21.2	21.2		
		ZINC		372J	372J	QUALIFIED	54
		CYANIDE		0.75	0.75		

g/kg

ATTACHMENT I-54

INORGANIC TARGET ANALYTE SUMMARY LIST

NO: 00017/SDGBSA06271424

NAME: TCT-ST.LOUIS

SITE NAME: CELANESE

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271431	91003708	ALUMINUM	90.2	4830J	4830J	QUALIFIED	8,51
		ANTIMONY		7.0J	7.0J	QUALIFIED	43,55
		ARSENIC		22.5	22.5J	QUALIFIED	41
		BARIUM		166J	166J	QUALIFIED	51,55
		BERYLLIUM		0.69J	0.69J	QUALIFIED	43
		CADMIUM		0.92J	0.92J	QUALIFIED	41,43
		CALCIUM	8.8J	7930	7930J	QUALIFIED	8
		CHROMIUM		11.5	—	REJECTEDD	66
		COBALT		7.3U	7.3U		
		COPPER		182	182		
		IRON	38.8	14200	14200J	QUALIFIED	8
		LEAD		570J	—	REJECTED	66
		MAGNESIUM	55.6J	1510	1510J	QUALIFIED	8
		MANGANESE		376J	376J	QUALIFIED	41,54
		MERCURY		6.6	6.6		
		NICKEL		18.3	18.3		
		POTASSIUM		438J	438J	QUALIFIED	43
		SELENIUM		0.46UJ	0.46UJ	QUALIFIED	55,79
		SILVER		0.5J	0.5J	QUALIFIED	43
		SODIUM		284J	284J	QUALIFIED	43
		THALLIUM		0.69U	0.69U		
		VANADIUM		20.4	20.4		
		ZINC		458J	458J	QUALIFIED	54
		CYANIDE		0.31J	0.31J	QUALIFIED	43

mg/kg

ATTACHMENT F-55

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271432	91003709	ALUMINUM	90.2	5370J	5370J	QUALIFIED	8,51
		ANTIMONY		2.6UJ	2.6UJ	QUALIFIED	55
		ARSENIC		6.6	6.6J	QUALIFIED	41
		BARIUM		66J	66J	QUALIFIED	51,55
		BERYLLIUM		0.24J	0.24J	QUALIFIED	43
		CADMIUM		0.94U	0.94U		
		CALCIUM	8.8J	857J	857J	QUALIFIED	8
		CHROMIUM		11.5	—	REJECTEDD	66
		COBALT		7.5U	7.5U		
		COPPER		32.0	32.0		
		IRON	38.8	8290	8290J	QUALIFIED	8
		LEAD		105J	—	REJECTED	66
		MAGNESIUM	55.6J	1190	1190J	QUALIFIED	8
		MANGANESE		197J	197J	QUALIFIED	41,54
		MERCURY		0.41	0.41		
		NICKEL		8.2J	8.2J		
		POTASSIUM		549J	549J	QUALIFIED	43
		SELENIUM		0.50J	0.50J	QUALIFIED	55,79
		SILVER		0.24U	0.24U		
		SODIUM		143J	143J	QUALIFIED	43
		THALLIUM		0.71U	0.71U		
		VANADIUM		18.4	18.4		
		ZINC		115J	115J	QUALIFIED	54
		CYANIDE		0.29U	0.29U		

ATTACHMENT I56

INORGANIC TARGET ANALYTE SUMMARY LIST

SE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

AB NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271433	91003710	ALUMINUM	90.2	5990J	5990J	QUALIFIED	8,51
		ANTIMONY		2.5UJ	2.5UJ	QUALIFIED	55
		ARSENIC		5.5	5.5J	QUALIFIED	41
		BARIUM		69.4J	69.4J	QUALIFIED	51,55
		BERYLLIUM		0.23J	0.23J	QUALIFIED	43
		CADMIUM		0.90U	0.90UJ	QUALIFIED	41
		CALCIUM	8.8J	1040	1040J	QUALIFIED	8
		CHROMIUM		4.3	—	REJECTEDD	66
		COBALT		7.2U	7.2U		
		COPPER		11.3	11.3		
		IRON	38.8	8500	8500J	QUALIFIED	8
		LEAD		16.4	—	REJECTED	66
		MAGNESIUM	55.6J	2190	2190J	QUALIFIED	8
		MANGANESE		409J	409J	QUALIFIED	41,54
		MERCURY		0.11U	0.11U		
		NICKEL		11.3	11.3		
		POTASSIUM		1070J	1070J	QUALIFIED	43
		SELENIUM		0.45UJ	0.45UJ	QUALIFIED	55,79
		SILVER		0.23U	0.23U		
		SODIUM		170J	170J	QUALIFIED	43
		THALLIUM		0.68UJ	0.68UJ	QUALIFIED	79
		VANADIUM		15.1	15.1		
		ZINC		56.9J	56.9J	QUALIFIED	54
		CYANIDE		0.28U	0.28U		

*mg/kg

ATTACHMENT I57

INORGANIC TARGET ANALYTE SUMMARY LIST

SE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

B NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271434	91003711	ALUMINUM	90.2	5450J	5450J	QUALIFIED	8,51
		ANTIMONY		2.6UJ	2.6UJ	QUALIFIED	55
		ARSENIC		10.0	10.0J	QUALIFIED	41,43
		BARIUM		139J	139J	QUALIFIED	51,55
		BERYLLIUM		0.71J	0.71J	QUALIFIED	43
		CADMIUM		2.8	2.8J	QUALIFIED	41
		CALCIUM	8.8J	2750	2750J	QUALIFIED	8
		CHROMIUM		20.1	—	REJECTEDD	66
		COBALT		7.6U	7.6U		
		COPPER		196	196		
		IRON	38.8	14200	14200J	QUALIFIED	8
		LEAD		443J	—	REJECTED	66
		MAGNESIUM	55.6J	1760	1760J	QUALIFIED	8
		MANGANESE		220J	220J	QUALIFIED	41,54
		MERCURY		1.0	1.0		
		NICKEL		25.8	25.8		
		POTASSIUM		382J	382J	QUALIFIED	43
		SELENIUM		0.87J	0.87J	QUALIFIED	55,79
		SILVER		1.5J	1.5J		
		SODIUM		239J	239J	QUALIFIED	43
		THALLIUM		0.71U	0.71U		
		VANADIUM		19.2	19.2		
		ZINC		794J	794J	QUALIFIED	54
		CYANIDE		0.34J	0.34J	QUALIFIED	43

mg/kg

ATTACHMENT I 58

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271435	91003712	ALUMINUM	90.2	5170J	5170J	QUALIFIED	8,51
		ANTIMONY		7.8J	7.8J	QUALIFIED	55
		ARSENIC		9.20J	9.20J	QUALIFIED	41,43
		BARIUM		354J	354J	QUALIFIED	51,55
		BERYLLIUM		0.93J	0.93J	QUALIFIED	43
		CADMIUM		5.6	5.6J	QUALIFIED	41
		CALCIUM	8.8J	2380	2380J	QUALIFIED	8
		CHROMIUM		42.7	—	REJECTEDD	66
		COBALT		8.9J	8.9J	QUALIFIED	43
		COPPER		220	220		
		IRON	38.8	25800	25800J	QUALIFIED	8
		LEAD		2100J	—	REJECTED	66
		MAGNESIUM	55.6J	1550	1550	QUALIFIED	8,43
		MANGANESE		284J	284J	QUALIFIED	41,54
		MERCURY		1.6	1.6		
		NICKEL		55.0	55.0		
		POTASSIUM		608J	608J	QUALIFIED	43
		SELENIUM		0.67J	0.67J	QUALIFIED	55,79
		SILVER		0.84J	0.84J	QUALIFIED	43
		SODIUM		215J	215J	QUALIFIED	43
		THALLIUM		0.70U	0.70U		
		VANADIUM		20.0	20.0		
		ZINC		1510J	1510J	QUALIFIED	54
		CYANIDE		0.46J	0.46J	QUALIFIED	43

*mg/kg

ATTACHMENT I 59

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271436	91003713	ALUMINUM	90.2	4860J	4860J	QUALIFIED	8,51
		ANTIMONY		8.4J	8.4J	QUALIFIED	43,55
		ARSENIC		21.7	21.7J	QUALIFIED	41
		BARIUM		315J	315J	QUALIFIED	51,55
		BERYLLIUM		1.4	1.4		
		CADMIUM		6.1	6.1J	QUALIFIED	41
		CALCIUM	8.8J	5250	5250J	QUALIFIED	8
		CHROMIUM		38.7	—	REJECTEDD	66
		COBALT		9.5J	9.5J	QUALIFIED	43
		COPPER		302	302		
		IRON	38.8	27000	27000J	QUALIFIED	8
		LEAD		1680J	—	REJECTED	66
		MAGNESIUM	55.6J	1810	1810J	QUALIFIED	8,43
		MANGANESE		329J	329J	QUALIFIED	41,54
		MERCURY		1.9	1.9		
		NICKEL		56.3	56.3		
		POTASSIUM		671J	671J	QUALIFIED	43
		SELENIUM		0.79J	0.79J	QUALIFIED	55,79
		SILVER		0.77J	0.77J	QUALIFIED	43
		SODIUM		1200	1200		
		THALLIUM		0.68U	0.68U		
		VANADIUM		32.0	32.0		
		ZINC		7960J	7960J	QUALIFIED	54
		CYANIDE		0.92J	0.92		

mg/kg

ATTACHMENT I60

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271424

SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS

SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271437	91003714	ALUMINUM		9220	9220		
		ANTIMONY		2.6UJ	2.6UJ	QUALIFIED	55
		ARSENIC		2.6	2.6J	QUALIFIED	41,55
		BARIUM		62.1	62.1		
		BERYLLIUM		0.7J	0.7J	QUALIFIED	43
		CADMIUM		1.2	1.2		
		CALCIUM		936J	936J	QUALIFIED	43,61
		CHROMIUM		12.8	12.8J	QUALIFIED	41
		COBALT		7.7J	7.7J	QUALIFIED	43
		COPPER		4.9J	4.9J	QUALIFIED	43,61
		IRON		12300	12300J	QUALIFIED	61
		LEAD		14.5	—	REJECTED	80
		MAGNESIUM		2160	2160		
		MANGANESE		226J	226J	QUALIFIED	54
		MERCURY		0.12U	0.12U		
		NICKEL		11.0	11.0		
		POTASSIUM		754J	754J	QUALIFIED	43
		SELENIUM		0.47UJ	0.47UJ	QUALIFIED	55
		SILVER		0.23U	0.23UJ	QUALIFIED	41
		SODIUM		2190	2190		
		THALLIUM		0.70U	0.70U		
		VANADIUM		21.0	21.0		
		ZINC	2.6J	41.3J	41.3J	QUALIFIED	8
		CYANIDE		0.29U	0.29U		

*mg/kg

ATTACHMENT I61

WESTON
MANAGERS DESIGNERS/CONSULTANTS
208 WELSH POOL ROAD
PICKERING CREEK INDUSTRIAL PARK
LIONVILLE, PA 19341-1313
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ORGANIC QUALITY ASSURANCE REVIEW
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
CELANESE
CASE: 00017
SDG#: 1438

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 11-19-91
Kelly Muir Spittler
Unit Leader - Data Validation
Date

VERIFIED BY: Zohreh Hamid — 11-20-91
Zohreh Hamid, Ph.D.
Section Manager - Data Validation
Date

ATTACHMENT I62

WESTON

NJDEP
CELANESE
CASE 00017, SDG 1438

INTRODUCTION

This quality assurance review is based upon a review of all data generated from eleven (11) soil samples and one field blank collected on 06/26/91. The samples were analyzed according to criteria set forth in the Contract Laboratory Program (CLP) Method for TCL Volatile, Semivolatile and Pesticide/PCB target compounds.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Section 2. All of the analytical data were examined to determine the usability of the analytical results and also to determine the contractual compliance relative to the analytical requirements and deliverables specified for NJDEP-CLP method. The applicable qualifier codes have been placed next to the results in the data summary to assess the qualitative and/or quantitative reliability of any results. Details of this evaluation review are presented in the narrative section of this report under each specific function.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in the Standard Operating Procedure for the completion of the Data Validation Report Forms and preparation of the final data validation report issued on 04-16-90 (SOP No.: 5.A.4, 5.A.3). If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly M. Spittler at (215) 344-3745.

QUALITY ASSURANCE REVIEW

The analysis of the samples was performed by TCT - St. Louis.

The findings offered in this report are based upon a rigorous review of holding times, blank analysis results, surrogate, spike and standard recoveries, GC/MS tuning, target compound confirmation quality, calibration system performance, peak results, and mass spectra quality.

Overall, the data quality is fair and most data is accepted with the applied qualifier codes.

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EVALUATION BY FRACTION

I. Volatiles

___ Holding Time
_X_ Surrogate Recovery
___ MS/MSD
___ Blank
___ GC/MS Tuning
_X_ Initial Calibration
_X_ Continuing Calibration
___ Compound ID (HSL, TIC)
_X_ Standards
___ Spectra Quality
___ Chromatography
___ Data Completeness

OVERVIEW

This portion of the case consisted of one water sample and eleven soil samples analyzed for TCL Volatile target compounds.

ISSUES

The following surrogate recoveries and internal standard areas were outside the QC limits:

Sample	Surrogate	Recovery	Internal Standard	Area
(BSA062) 1440	Toluene	131	Chlorobezene	Low
1441	Bromofluorobenzene	72	Chlorobezene	Low
1444	Toluene	183	1,4-Difluorobenzene	Low
	Bromofluorobenzene	57	Chlorobenzene	Low
			Bromochloromethane	
1440RE	Toluene	126	All standards	Low
	Bromofluorobenzene	68		Low
1441RE	Toluene	154	All standards	Low
	1,2-Dichloroethane	145		Low
144RE	Toluene	122	All standards	Low
	Bromofluorobenzene	55		Low

ATTACHMENT I-64

WESTON

Sample BSA06271440, 1441, and 1444 were reanalyzed and similar results were obtained. The original analyses should be used as the representative results; however, all of the sample data are qualified estimated.

The relative response factors for 2-butanone were below 0.05 in the initial calibration analyzed on 05/28/91, 07/03/91, and the continuing calibration on 07/06/91, 07/04/91, 07/05/91, and 07/06/91. All associated quantitation limits are rejected.

Several %RSD and/or %D exceeded the 30% and 25% QC limits in the initial and continuing calibrations. All associated positive results are qualified estimated.

The method blanks contained 4-methyl-2-Pentanone, 2-hexanone, 1,1,2,2-Tetrachloroethane, acetone, and 2-butanone. All associated sample data are qualified accordingly.

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EVALUATION BY FRACTION

II. Base/Neutral/Acids

____ Holding Time
____ Extraction Time
_X_ Surrogate Recovery
_X_ Blank
_X_ MS/MSD
____ GC/MS Tuning
_X_ Initial Calibration
_X_ Continuing Calibration
____ Compound ID (HSL, TIC)
_X_ Standards
____ Spectra Quality
____ Chromatography
____ Data Completeness

OVERVIEW

This portion of the case consisted of one water sample and eleven soil samples analyzed for TCL Semivolatile target compounds.

ISSUES

Up to six surrogate recoveries were diluted out for samples (BSA0627) 1439REDL, 1443REDL, and 1448REDL. The samples were analyzed at 1-fold dilution with no surrogate outliers. Therefore, the positive results that were outside the calibration range on the original are reported from the diluted analysis. These diluted results are qualified due to the surrogate outlier.

Sample BSA06271449 internal standard area for perlyene was below the control limit. The sample was reanalyzed and the perylene and chrysene areas were below QC limits along with the terphenyl (1167) surrogate recovery exceeding the QC limits. Therefore, the original sample analysis in reference to perylene are qualified estimated.

The method blanks contained di-n-butylphthalate and bis(2-ethylhexyl)phthalate along with several tentatively identified compounds. All associated positive results are qualified estimated.

ATTACHMENT I66

WESTON

The %D for surrogate compound 2,4,6-Tribromophenol was below the 25% QC limit in the continuing calibrations on 07/12/91 and 07/16/91. The surrogate concentrations and thus the recoveries are estimated; therefore, all associated positive results are estimated. Several %RSD and/or %D exceeded the 30% and 25% QC limit, positive results were not detected for these compounds. Therefore, no qualification is applied.

The 2,4-dinitro toluene matrix spike recoveries exceeded the QC limits. This compound was not detected in the unspiked samples; therefore, no qualification is applied.

WESTON

EVALUATION BY FRACTION

III. Pesticides/PCB

____ Holding Time
____ Extraction Time
_X_ Surrogate Recovery
____ MS/MSD
____ Blank
_X_ Linearity Calibration
____ DDT/Endrin Degradation
____ Analytical Sequence
____ DBC Retention Time
_X_ Continuing Calibration
____ Retention Time Window
____ Standards
____ Chromatography
____ HSL Compounds
_X_ Data Completeness

OVERVIEW

This portion of the case consisted of one water sample and eleven soil samples analyzed for TCL Pesticide/PCB target compounds.

ISSUES

The following di-n-butylchlorendate surrogate recoveries exceeded the QC limit.

Sample	Recovery
BSA06271439	168
*1444	534
1446	162
1441 (10)	216

* These sample results are considered estimated due to the level of dilution, matrix interference, and poor surrogate recovery. No action is taken on the other outliers.

The Ind B was not listed on the Form VIII for the primary column on 07/18/91 to 07/19/91. The laboratory should resubmit this form.

ATTACHMENT I68

WESTON

The %RSD for endrin, DDT, and DBC exceeded 10% in the confirmation column. Since this column is not used to quantify results, no qualification is applied.

Several %D and retention time results were outside the QC limits. All associated positive results are qualified estimated.

:gw

ATTACHMENT I69

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ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes
2. Attachment II - Data Summary
3. Attachment III - NJDEP Data Validation Forms

a) VOA

b) BNA

c) Pest/PCB

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ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED, SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

L = ANALYTE PRESENT. REPORTED VALUE MAY BE BIASED LOW. ACTUAL VALUE IS EXPECTED TO BE HIGHER.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

UL = NOT DETECTED. QUANTITATION LIMIT MAY BE HIGHER.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT I

WESTON

ATTACHMENT II
DATA SUMMARY

WESTON

Footnotes for Target and non Target Analyte Summary

1. The reported concentration is quantitatively qualified because the concentration is below the CRQL.

2. The reported concentration is quantitatively qualified due to surrogate recovery outliers.

3. The reported concentration is quantitatively qualified due to calibration deficiencies.

4. The non-detected value is rejected because the calibration response factor for the analyte is less than 0.05.

5. The value reported is less than 3x the value in the method blank. It is the policy of NJDEP-DHSM to negate the reported value due to probable foreign contamination unrelated to the actual sample. The end-user, however, is alerted that a reportable quantity of the analyte/compound was detected.

6. The value reported is greater than five (5) times the value in the method blank and is considered "real". However, the reported value must be quantitatively qualified "J" due to the method blank contamination. The "B" qualifier alerts the end-user to the presence of this analyte/compound in the method blank.

7. The value reported is between 3x and 5x the value in the method blank. The presence of that analyte/compound may be due to its "real presence" in the sample, and/or laboratory contamination. However, the reported value must be quantitatively qualified "J" due to the method blank contamination. The "B" qualifier alerts the end-user to the presence of this analyte/compound in the method blank. The presence of this analyte/compound in the sample may be due to its "real presence" in the sample and/or possible foreign laboratory/field contamination unrelated to the actual sample. Resampling and reanalysis is recommended.

8. The % RSD and/or % Difference for one or more surrogates were above the control limit, therefore, all of the positive results for the fraction are qualified.

ATTACHMENT I-4

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017 SDG

SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS

SAMPLE MATRIX: WATER

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
*VOA/1.0	BSA06271449	METHYLENE CHLORIDE	5U	27	27		
		ACETONE	10U	3J	3J	QUALIFIED	1,3
		2-BUTANONE	10U	10U	10R	REJECTED	4
		NO TIC'S					
BNA/1.0	*BSA06271449	NONE					
		2 TIC'S					
		UNKNOWN RT = 4.77	10J	8J	8JB	NEGATED	5
		PHENOL, 1,2,6-BIS(1,1-DICTHYL)	13J	13J	13JB	NEGATED	5
PEST/1.0	BSA06271449	NONE					

Quantitation limits quantified in reference to perylene are qualified estimate.

ATTACHMENT I 75

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

SE NO: 00017

SITE NAME: SOUTH JERSEY CONTAINER

B NAME: TCT-ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271438	2-BUTANONE	10U	11U	11R	REJECTED	4
		1 TIC					
BNA/1.0	BSA06271438	PHENANTHRENE	330U	140J	140J	QUALIFIED	1,8
		DI-N-BUTYLPHTHALATE	61J	170BJ	170BJ	NEGATED	1,5,8
		FLUORANTHENE	330U	230J	230J	QUALIFIED	1,8
		PYRENE	330U	210J	210J	QUALIFIED	1,8
		BENZO(A)-ANTHRACENE	330U	110J	110J	QUALIFIED	1,8
		CHRYSENE	330U	120J	120J	QUALIFIED	1,8
		BIS(2ETHYLHEXYL)-PHTHALATE	42J	260J	260BJ	QUALIFIED	1,6,8
		BENZO(B)-FLUORANTHENE	330U	220J	220J	QUALIFIED	1,8
		BENZO(A)PYRENE	330U	95J	95J	QUALIFIED	1,8
		INDENO(1,2,30CD)-PYRENE	330U	55J	55J	QUALIFIED	1,8
		14 TIC'S					
		HEPTNAE2,3-DRICETHYL	320J	350J	350JB	NEGATED	5
		OCTANE-4-METHYL	330J	490J	490JB	NEGATED	5
PEST/1.0	BSA06271438	NONE					

ATTACHMENT I-76

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

SITE NO: 00019 SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271439	ACETONE	6J	5BJ	5BJ	NEGATED	3,5
		1,1,1-TRICHLOROETHANE	5U	1J	1J	QUALIFIED	1
		2-BUTANONE	10U	11U	11R	REJECTED	4
		2 TIC'S					
BNA/1.0	BSA06271439	NAPHTHALENE	330U	270J	270J	QUALIFIED	1,8
		2-METHYL-NAPHTHALENE	330U	210J	210J	QUALIFIED	1,8
		ACENAPHTHENE	330U	590	590J	QUALIFIED	8
		DIBENZOFURAN	330U	450	450J	QUALIFIED	8
		FLUORENE	330U	650	650J	QUALIFIED	8
		PHENANTHRENE	330U	6100D	6100JD	QUALIFIED	2,8
		ANTHRACENE	330U	1300	1300J	QUALIFIED	8
		DI-N-BUTYLPHTHALATE	61J	190BJ	190BJ	NEGATED	5,8
		FLUORANTHENE	330U	4600	4600J	QUALIFIED	8
		PYRENE	330U	4800	4800J	QUALIFIED	8
		BETHYLBENZYL-PHTHALATE	330U	110J	110J	QUALIFIED	1,8
		BENZO(A)-ANTHRACENE	330U	2600	2600J	QUALIFIED	8
		CHRYSENE	330U	2200	2200J	QUALIFIED	8
		BIS(2ETHYLHEXYL)-PHTHALATE	41J	190J	190JB	QUALIFIED	7,8
		BENZO(B)-FLUORENTHENE	330U	3500	3500J	QUALIFIED	8
		BENZO(A)PYRENE	330U	1700	1700J	QUALIFIED	8
		INDENO(1,2,3-CD)-PYRENE	330U	1200	1200J	QUALIFIED	8
		BENZO(G,H,I)-PERYLENE	330U	1300	1300J	QUALIFIED	8
		16 TIC'S					
PEST/5.0	BSA06271439	NONE					

ATTACHMENT I

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00019

SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271440	METHYLENE CHLORIDE	5U	12	12J	QUALIFIED	2
		ACETONE	6J	15B	15JB	NEGATED	2,3,5
		1,1,1-TRICHLOROETHANE	5U	3J	3J	QUALIFIED	1,2
		TRICHLOROETHENE	5U	8	8J	QUALIFIED	2
		TETRACHLOROETHENE	5U	7	7J	QUALIFIED	2
		2-BUTONANE	10U	12U	12R	REJECTED	4
		2 TIC'S					
BNA/1.0	BSA06271440	2-METHYLNPHTHALENE	330U	49J	49J	QUALIFIED	1,8
		ACENAPHTHENE	330U	52J	52J	QUALIFIED	1,8
		DIETHYLPHTHALATE	330U	54J	54J	QUALIFIED	1,8
		FLUORENE	330U	54J	54J	QUALIFIED	1,8
		PHENANTHRENE	330U	690	690J	QUALIFIED	8
		ANTHRACENE	330U	140J	140J	QUALIFIED	1,8
		DI-N-BUTYLPHTHALATE	61J	190BJ	190BJ	NEGATED	5,8
		FLUORANTHENE	330U	760	760J	QUALIFIED	8
		PRYENE	330U	880	880J	QUALIFIED	8
		BUTYLBENZYL-PHTHALATE	330U	44J	44J	QUALIFIED	1,8
		BENZO(A)-ANTHRACENE	330U	470	470J	QUALIFIED	8
		CHRYSENE	330U	470	470J	QUALIFIED	8
		BIS(2ETHYLHEXYL)-PHTHALATE	42J	630	630JB	QUALIFIED	7,8
		BENZO(B)-FLUORANTHENE	330U	900	900J	QUALIFIED	8
		BENZO(A)PYRENE	330U	440	440T	QUALIFIED	8
		INDENO (1,2,3-CD)-PYRENE	330U	300J	300J	QUALIFIED	1,8
		DIBENZO(A,H)-ANTHRACENE	330U	120J	120J	QUALIFIED	1,8
		BENZO(G,H,I)-PERYLENE	330U	320J	320J	QUALIFIED	1,8

ATTACHMENT I-78

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
		19 TIC'S					
PEST/1.0	BSA06271440	4,4-DDD	16U	26	26J	QUALIFIED	3
		4,4-DDT	16U	25	25		

ATTACHMENT I-79

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

GE NO: 00019

SITE NAME: SOUTH JERSEY CONTAINER

B NAME: TCT-ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271441	METHYLENE CHLORIDE	5U	21	21J	QUALIFIED	2
		ACETONE	6J	13B	13JB	NEGATED	2,3,5
		1,1,1-TRICHLOROETHANE	5U	5J	5J	QUALIFIED	1,2
		TRICHLOROETHENE	5U	15	15J	QUALIFIED	2
		TETRACHLOROETHENE	5U	19	19J	QUALIFIED	2
		2-BUTANONE	10U	11U	11R	REJECTED	4
		NO TIC'S					
BNA/1.0	BSA06271441	ISOPHORONE	330U	86J	86J	QUALIFIED	1,8
		NAPHTHALENE	330U	41J	41J	QUALIFIED	1,8
		2-METHYL-NAPHTHALENE	330U	58J	58J	QUALIFIED	1,8
		ACENAPHTHENE	330U	39J	39J	QUALIFIED	1,8
		DIETHYLPHTHALATE	330U	64J	64J	QUALIFIED	1,8
		FLUORENE	330U	47J	47J	QUALIFIED	1,8
		PHENANTHRENE	330U	700	700J	QUALIFIED	8
		ANTHRACENE	330U	130J	130J	QUALIFIED	1,8
		DI-N-BUTYLPHTHALATE	61J	220BJ	220BJ	QUALIFIED	7,8
		FLUORANTHENEL	330U	1040	1040J	QUALIFIED	8
		PYRENE	330U	1060	1060J	QUALIFIED	8
		BENZO(A)-ANTHRACENE	330U	660	660J	QUALIFIED	8
		CHRYPENE	330U	680	680J	QUALIFIED	8
		BIS(2ETHYLHEXYL)-PHTHALATE	42J	540	540JB	QUALIFIED	6,8
		BENZO(B)-FLUORANTHENE	330U	1200	1200J	QUALIFIED	8
		BENZO(A)PYRENE	330U	590	590J	QUALIFIED	8
		INDENO(1,2,3-CD)-PYRENE	330U	440	440J	QUALIFIED	8
		DIBENZO(A,H)-ANTHRACENE	330U	160J	160J	QUALIFIED	1,8
		BENZO(G,H,I)-PERYLENE	330U	460	460J	QUALIFIED	8

ATTACHMENT I-80

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
		14 TIC'S					
		HEPTANE,2,3-DIETYL	320J	740JB	740J	NEGATED	5
PEST/1.0	BSA06271441	NONE					

ATTACHMENT I 81

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017 SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271442	ACETONE	6J	15B	15JB	NEGATED	3,5
		TETRACHLOROETHENE	5U	3J	3J	QUALIFIED	1
		2-BUTANONE	10U	11U	11R	REJECTED	4
		NO TIC'S					
BNA/1;0	BSA06271442	PHENANTHRENE	330U	120J	120J	QUALIFIED	1,8
		DI-N-BUTYLPHTHALATE	61J	190BJ	190BJ	NEGATED	5,8
		FLUORANTHENE	330U	290J	290J	QUALIFIED	1,8
		PYRENE	330U	250J	250J	QUALIFIED	1,8
		BENZO(A)-ANTHRACENE	330U	170J	170J	QUALIFIED	1,8
		CHRYSENE	330U	180J	180J	QUALIFIED	1,8
		BIS(2ETHYLHEXYL)-PHTHALATE	42J	120J	120J	NEGATED	5
		BENZO(B)-FLUORANTHENE	330U	320J	320J	QUALIFIED	1,8
		BENZO(A)PYRENE	330U	140J	140J	QUALIFIED	1,8
		INDENO(1,2,3-CD)-PYRENE	330U	80J	80J	QUALIFIED	1,8
		DIBENZ(A,H)-ANTHRACENE	330U	40J	40J	QUALIFIED	1,8
		BENZO(G,H,I)-PERYLENE	330U	85J	85J	QUALIFIED	5
		12 TIC'S					
		HEPTANE, 2,3-DIETHYL	320J	500J	500JB	NEGATED	5
PEST/1.0	BSA06271442	NONE					

ATTACHMENT F

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017

SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271443	ACETONE	10U	8BJ	8BJ	QUALIFIED	1,3
		TETRACHLORETHENE	5U	2J	2J	QUALIFIED	1
		NO TIC'S					
BNA/1.0	BSA06271443	ACENAPHTHENE	330U	180J	180J	QUALIFIED	1
		FLUORENE	330U	76J	76J	QUALIFIED	1
		PHENANTHRENE	330U	2400	2400		
		ANTHRACENE	330U	780	780		
		DI-N-BUTYLPHTHALATE	61J	210BJ	210BJ	QUALIFIED	7
		FLUORANTHENE	330U	6500D	6500D	QUALIFIED	2
		PYRENE	330U	5100	5100		
		BUTYLBENZYL-PHTHALATE	330U	41J	41J	QUALIFIED	1
		BENZO(A)-ANTHROCENE	330U	4300	4300		
		CHRYPENE	330U	3900	3900		
		BIS(2ETHYLHEXYL)-PHTHALATE	42J	120BJ	120BJ	NEGATED	5
		BENZO(B)-FLUORANTHENE	330U	5500	5500		
		BENZO(A)PYRENE	330U	3600	3600		
		INDENO(1,2,3-CD)-PYRENE	330U	2000	2000		
		DIBENZO(A,H)-ANTHRACENE	330U	900	900		
		BENZO(G,H,I)-PERYLENE	330U	2200	2200		
		20 TIC'S					
PEST/1.0	BSA06271443	NONE					

ATTACHMENT I 83

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017 SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271444	METHYLENE CHLORIDE	5U	36	36J	QUALIFIED	2
		ACETONE	6J	62JB	62JB	QUALIFIED	6
		1,1,1-TRICHLOROETHANE	5U	5J	5J	QUALIFIED	1,2
		4-METHYL-2-PENTHANONE	10U	91	91J	QUALIFIED	2
		TETRACHLOROETHENE	5U	4J	4J	QUALIFIED	1
		2-BUTANONE	10U	12U	12R	REJECTED	4
		1 TIC					
BNA/1.0	BSA06271444	NAPHTHALENE	330U	60J	60J	QUALIFIED	1
		2-METHYL-NAPHTHALENE	330U	63J	63J	QUALIFIED	1
		4-NITROPHENOL	330U	67J	67J	QUALIFIED	1
		PHENANTHRENE	330U	340J	340J	QUALIFIED	1
		ANTHRACENE	330U	53J	53J	QUALIFIED	1
		DI-N-BUTYLPHTHALATE	61J	64BJ	64BJ	NEGATED	5
		FLUORANTHENE	330U	530	530		
		PRYENE	330U	380J	380J	QUALIFIED	1
		BENZO(A)-ANTHRACENE	330U	310J	310J	QUALIFIED	1
		CHRYPENE	330U	460	460		
		BIS(2-ETHYLHEXYL)-PHTHALATE	42J	200BJ	300BJ	QUALIFIED	7
		BENZO(B)-FLUORANTHENE	330U	630	630		
		BENZO(A)PYRENE	330U	310J	310J	QUALIFIED	1
		INDENO(1,2,3-CD)-PYRENE	330U	230J	230J	QUALIFIED	1
		DIBENZO(A,H)-ANTHRACENE	330U	120J	120J	QUALIFIED	1
		BENZO(G,H,I)-PERYLENE	330U	300J	300J	QUALIFIED	1
		20 TIC'S					
		HEPTANE,2,3-DIMETHYL	320J	460J	460JB	NEGATED	5

ATTACHMENT 1-84

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
PEST/1.0	BSA06271444	NONE					

The sample data is qualified estimated due to poor QC results.

ATTACHMENT T85

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00019

SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS

SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271445	METHYLENE CHLORIDE	5U	2J	2J	QUALIFIED	1
		ACETONE	12	10BJ	10BJ	NEGATED	3,5
		2-BUTANONE	10U	11U	11R	REJECTED	4
		NO TIC'S					
BNA/1.0	BSA06271445	PHENANTHRENE	330U	130J	130J	QUALIFIED	1
		DI-N-BUTYLPHTHALATE	61J	45BJ	45BJ	NEGATED	5
		FLUORANTHENE	330U	240J	240J	QUALIFIED	1
		PYRENE	330U	200J	200J	QUALIFIED	1
		BENZO(A)-ANTHRACENE	330U	150J	150J	QUALIFIED	1
		CHRYSENE	330U	140J	140J	QUALIFIED	1
		BENZO(B)-FLUORANTHENE	330U	200J	200J	QUALIFIED	1
		BENZO(A)PYRENE	330U	106J	106J	QUALIFIED	1
		INDENO(1,2,3-CD)-PYRENE	330U	61J	61J	QUALIFIED	1
		8 TIC'S					
		HEPTANE, 2,3-DIETHYL	320J	480J	480JB	NEGATED	5
PEST/1.0	BSA06271445	NONE					

ATTACHMENT I 86

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017 SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271446	METHYLENE CHLORIDE	5U	3J	3J	QUALIFIED	1
		NO TIC'S					
BNA/1.0	BSA06271446	ACENAPHTHENE	330U	38J	38J	QUALIFIED	1
		FLUORENE	330U	44J	44J	QUALIFIED	1
		PHENANTHRENE	330U	890	890		
		ANTHRACENE	330U	170J	170J	QUALIFIED	1
		DI-N-BUTYLPHTHALATE	61J	130BJ	130BJ	NEGATED	5
		FLUORANTHENE	330U	1800	1800		
		PRYENE	330U	1500	1500		
		BUTYL-BENZYL-PHTHALATE	330U	44J	44J	QUALIFIED	1
		BENZO(A)-ANTHRACENE	330U	860	860		
		CHRPENE	330U	1000	1000		
		BIS(2-ETHYLHEXYL)-PHTHALATE	42J	190BJ	190BJ	QUALIFIED	7
		BENZO(B)-FLUORANTHANE	330U	1400	1400		
		BENZO(A)PYRENE	330U	880	880		
		INDENO(1,2,3-CD)-PYRENE	330U	540	540		
		DIBENZO(G,H)-ANTHRACENE	330U	200J	200J	QUALIFIED	1
		BENZO(G,H,I)-PERYLENE	330U	610	610		
		20 TIC'S					
		HIPTANE,2,3-DIETHYL	320J	550J	550JB	NEGATED	5
PEST/10.0	BSA06271446	NONE					

ATTACHMENT I 87

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017 SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271447	METHYLENE CHLORIDE	5U	1J	1J	QUALIFIED	1
		TETRACHLOROETHENE	5U	3J	3J	QUALIFIED	1
		NO TIC'S					
BNA/1.0	BSA06271447	NAPHTHALENE	330U	66J	66J	QUALIFIED	
		2-METHYL-NAPHTHALENE	300U	72J	72J	QUALIFIED	
		ACENAPHTHENE	330U	37J	37J	QUALIFIED	
		DIBENZOFURAN	330U	47J	47J	QUALIFIED	
		PHENANTHRENE	330U	680	680		
		ANTHRACENE	330U	110J	110J	QUALIFIED	1
		DI-N-BUTYLPHTHALATE	61J	210BJ	210BJ	QUALIFIED	1,7
		FLUORANTHENE	330U	1300	1300		
		PRYENE	330U	1030	1030		
		BENZO(A)-ANTHRACENE	330U	830	830		
		CHRYSENE	330U	980	980		
		BIS(2-ETHYLHEXYL)-PHTHALATE	42J	150BJ	150BJ	QUALIFIED	1,7
		BENZO(B)-FLUORANTHENE	330U	1400	1400		
		BENZO(A)PYRENE	330U	730	730		
		INDENO(1,2,3-CD) PYRENE	330U	540	540		
		DIBENZ(G,H)-ANTHRACENE	330U	250J	250J	QUALIFIED	1
		BENZO(G,H,I)-PERYLENE	330U	570	570		
		14 TIC'S					
		HEPTANE,2,3-DIETHYL	320J	410J	410JB	NEGATED	5
PEST/1.0	BSA06271447	NONE					

ATTACHMENT I 88

TARGET & NON-TARGET ANAYLTE DATA SUMMARY

CASE NO: 00017 SITE NAME: SOUTH JERSEY CONTAINER

LAB NAME: TCT-ST. LOUIS SAMPLE MATRIX: SOIL

FRACTION/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
VOA/1.0	BSA06271448	METHYLENE CHLORIDE	5U	8	8		
		1,1-DICHLOROETHANE	5U	2J	2J	QUALIFIED	1
		CHLOROFORM	5U	1J	1J	QUALIFIED	1
		TRICHLOROETHENE	5U	13	13		
		TETRACHLOROETHENE	5U	2J	2J	QUALIFIED	1
		NO TIC'S					
BNA/1.0	BSA06271448	PHENOL	330U	2800	2800		
		2-METHYLPHENOL	330U	1800	1800		
		2,4-DIMETHYLPHENOL	330U	1060	1060		
		1,2,4-TRICHLOROBENZENE	330U	360J	360J	QUALIFIED	1
		NAPHTHALENE	330U	550	550		
		4-CHLORO-3-METHYLPHENOL	330U	58J	58J	QUALIFIED	1
		2-METHYL-NAPHTHALENE	330U	980	980		
		DINETHYLPHTHALATE	330U	130J	130J	QUALIFIED	1
		ACENAPHTHENE	330U	130J	130J	QUALIFIED	1
		DIBENZOFURAN	330U	140J	140J	QUALIFIED	1
		DIETHYLPHTHALATE	330U	520	520		
		FLUORENE	330U	170J	170J	QUALIFIED	1
		PHENANTHRENE	330U	1500	1500		
		ANTHRACENE	330U	320J	320J	QUALIFIED	1
		DI-N-BUTYLPHTHALATE	61J	2400B	2400BJ	QUALIFIED	6
		FLUORANTHENE	330U	2100	2100		
		PYRENE	330U	1700	1700		
		BUTYLBENZYL-PHTHALATE	330U	190J	190J	QUALIFIED	1
		BENZO(A)-ANTHRACENE	330U	1200	1200		
		CHRYPENE	330U	1200	1200		
		BIS(2-ETHYLHEXYL)-PHTHALATE	42J	25000D	25000JD	QUALIFIED	2,6

[illegible]/D.F.	SAMPLE ID	ANALYTE	METHOD BLANK CONC.	LAB REPORT CONC.	QA REPORT CONC.	QA DECISIONS	FOOTNOTE
		DI-N-OCTYLPHTHALATE	330U	320J	320J	QUALIFIED	1
		BENZO(B)-FLUORANTHENE	330U	1900	1900		
		BENZO(A)PYRENE	330U	1200	1200		
		INDENO(1,2,3-CD)-PYRENE	330U	820	820		
		DIBENZO(G,H)-ANTHRACENE	330U	360J	360J	QUALIFIED	1
		BENZO(G,H,I)-PERYLENE	330U	950	950		
		20 TIC'S					
[illegible]BST/1.0	BSA06271448	NONE					

ATTACHMENT I

0000154

WESTON
DESIGNERS CONSULTANTS
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WEST CHESTER, PA 19380-1449
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INORGANIC QUALITY ASSURANCE REVIEW
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
SITE: CELANESE
SDG: BSA06271438

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: _____ 11-20-91
Douglas J. Godfrey — Date
Project Scientist - Data Validation

VERIFIED BY: _____ 11-20-91
Zohreh Hamid, Ph.D. — Date
Section Manager - Data Validation

ATTACHMENT I91

WESTON

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
SITE: CELANESE
SDG: BSA06271438

The case consisted of eleven soil samples and one aqueous sample analyzed for Inorganic Target Analyte List (TAL) parameters by TCT-St. Louis. However, one of the samples in batch BSA06271424 (BSA06271437) was prepared and analyzed along with this batch and is summarized in this section.

The laboratory performed the analyses according to the procedures set forth in the NJDEP CLP method. Initial and continuing calibration verification samples were within acceptable control limits. The most significant problems affecting the data usability are associated with the QC performance requirements, and are addressed in the following sections.

Only the internal Chain of Custody forms were provided in the inorganic data package. All sample receipt dates were obtained based on Form Is.

Major Issues

Both ICP and Graphite AA were used for Pb analyses. However, the spike recovery and duplicate analyses were only performed by ICP. As a result, the Pb results analyzed by graphite AA rejected. The affected samples are BSA06271437 and BSA06271449.

Minor Issues

The CRDL sample percent recoveries for Cr and Ag were below, and As exceeded the CLP validation control limits. All sample results for Cr and Ag, and positive results for As are qualified as estimated.

The soil preparation blank contained Zn above the IDL. All sample results ≥ 5x the blank value are considered to be real but are qualified due to blank contamination.

The results for Sb, As and Se in all soil samples are qualified because the sample spike recovery for this analyte was less than the QC limit 75%. The positive results for Mn and Hg are qualified because the spike recovery exceeded the QC limit 125%.

The %D for Ca, Cu and Fe in the Serial Dilution analysis did not meet the QC limits. Therefore, the results for Ca, Cu and Fe are qualified as estimated.

All sample results between the IDL and CRDL are qualified as estimated for all associated analytes, since the value obtained is at the low end of the instruments performance.

ATTACHMENT I-92

WESTON

NOTE

A water LCS was used for soil samples. Although a soil LCS was not digested, the water LCS can be used as a measure of digestion efficiency and is contractually acceptable when a soil LCS is not available to a laoboratory.

WESTON

INFORMATION REGARDING REPORT CONTENT

All data have been validated with regard usability according to NJDEP CLP guidelines. If you have any questions or comments to this review, please contact Zohreh Hamid at (215) 344-3747.

INORGANIC ATTACHMENTS

1. Attachment I — Glossary of Qualifier Codes.
2. Attachment II — Data Summary.
3. Attachment III — Data Validation for Inorganics.
4. Attachment IV — Support Documentation.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIERS

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED, SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
DATA SUMMARY

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271438	91003715	ALUMINUM		8720	8720		
		ANTIMONY		2.4UJ	2.4UJ	QUALIFIED	55
		ARSENIC		4.2	4.2J	QUALIFIED	41,55
		BARIUM		60.3	80.3		
		BERYLLIUM		1.1J	1.1J	QUALIFIED	43
		CADMIUM		1.7	1.7		
		CALCIUM		2800J	2800J	QUALIFIED	61
		CHROMIUM		13.2	13.2J	QUALIFIED	41
		COBALT		8.0J	8.0J	QUALIFIED	43
		COPPER		27.4	27.4J	QUALIFIED	61
		IRON		16400J	16400J	QUALIFIED	61
		LEAD		102	102		
		MAGNESIUM		2870	2870		
		MANGANESE		343J	343J	QUALIFIED	54
		MERCURY		0.53J	0.53J	QUALIFIED	54
		NICKEL		16.6	16.6		
		POTASSIUM		1080	1080		
		SELENIUM		0.43UJ	0.43UJ	QUALIFIED	55
		SILVER		0.22U	0.22UJ	QUALIFIED	41
		SODIUM		235J	235J	QUALIFIED	43
		THALLIUM		0.65U	0.65U		
		VANADIUM		24.2	24.2		
		ZINC	2.6J	191	191J	QUALIFIED	8
		CYANIDE		0.27U	0.27U		

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271439	91003716	ALUMINUM		10700	10700		
		ANTIMONY		2.4UJ	2.4UJ	QUALIFIED	55
		ARSENIC		5.1J	5.1J	QUALIFIED	41,55
		BARIUM		83.9	83.9		
		BERYLLIUM		1.5	1.5		
		CADMIUM		1.3	1.3		
		CALCIUM		2410J	2410J	QUALIFIED	61
		CHROMIUM		17.6	17.6J	QUALIFIED	41
		COBALT		11.1	11.1		
		COPPER		25.9	25.9J	QUALIFIED	61
		IRON		19100J	19100J	QUALIFIED	61
		LEAD		119	119		
		MAGNESIUM		4040	4040		
		MANGANESE		433J	433J	QUALIFIED	54
		MERCURY		0.43J	0.43J	QUALIFIED	54
		NICKEL		20.9	20.9		
		POTASSIUM		1360	1360		
		SELENIUM		0.50J	0.50J	QUALIFIED	43,55
		SILVER		0.22J	0.22J	QUALIFIED	41,43
		SODIUM		235J	235J	QUALIFIED	43
		THALLIUM		0.65U	0.65U		
		VANADIUM		25.9	25.9		
		ZINC	2.6J	202	202J	QUALIFIED	8
		CYANIDE		0.27U	0.27U		

mg/kg

ATTACHMENT I 99

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271440	91003717	ALUMINUM		6270	6270		
		ANTIMONY		2.6UJ	2.6UJ	QUALIFIED	55
		ARSENIC		10.3	10.3J	QUALIFIED	41,55
		BARIUM		112	112		
		BERYLLIUM		1.2J	1.2J	QUALIFIED	43
		CADMIUM		1.9	1.9		
		CALCIUM		3400J	3400J	QUALIFIED	61
		CHROMIUM		6.8	6.8J	QUALIFIED	41
		COBALT		7.5U	7.5U		
		COPPER		56.6	56.6J	QUALIFIED	61
		IRON		16300J	16300J	QUALIFIED	61
		LEAD		215	215		
		MAGNESIUM		1630	1630		
		MANGANESE		237J	237J	QUALIFIED	54
		MERCURY		1.04J	1.04J	QUALIFIED	54
		NICKEL		17.6	17.6		
		POTASSIUM		610J	610J	QUALIFIED	43
		SELENIUM		1.3J	1.3J	QUALIFIED	55
		SILVER		0.33J	0.33J	QUALIFIED	41,43
		SODIUM		227J	227J	QUALIFIED	43
		THALLIUM		0.70U	0.70U		
		VANADIUM		22.1	22.1		
		ZINC	2.6J	338	338J	QUALIFIED	8
		CYANIDE		0.40J	0.40J	QUALIFIED	43

mg/kg

ATTACHMENT I 100

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271441	91003718	ALUMINUM		6640	6640		
		ANTIMONY		3.3J	3.3J	QUALIFIED	43,55
		ARSENIC		8.5J	8.5J	QUALIFIED	41,55
		BARIUM		96.1	96.1		
		BERYLLIUM		0.92J	0.92J	QUALIFIED	43
		CADMIUM		1.8	1.8		
		CALCIUM		2850J	2850J	QUALIFIED	43,61
		CHROMIUM		10.8	10.8J	QUALIFIED	41
		COBALT		7.4U	7.4U		
		COPPER		51.7	51.7J	QUALIFIED	61
		IRON		13000	13000J	QUALIFIED	61
		LEAD		244	244		
		MAGNESIUM		1740	1740		
		MANGANESE		283J	283J	QUALIFIED	54
		MERCURY		0.69J	0.69J		
		NICKEL		15.6	15.6		
		POTASSIUM		648J	648J	QUALIFIED	43
		SELENIUM		0.84J	0.84J	QUALIFIED	43,55
		SILVER		0.51J	0.51J	QUALIFIED	41
		SODIUM		230J	230J	QUALIFIED	43
		THALLIUM		0.69U	0.69U		
		VANADIUM		16.8	16.8		
		ZINC	2.6J	347	347J	QUALIFIED	8
		CYANIDE		0.29U	0.29U		

mg/kg

ATTACHMENT I-101

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271442	91003719	ALUMINUM		8690	8690		
		ANTIMONY		2.4UJ	2.4UJ	QUALIFIED	55
		ARSENIC		2.7	2.7J	QUALIFIED	41,55
		BARIUM		62.6	62.6		
		BERYLLIUM		0.86J	0.86J	QUALIFIED	43
		CADMIUM		1.1	1.1		
		CALCIUM		1030J	1030J	QUALIFIED	43,61
		CHROMIUM		11.8	11.8J	QUALIFIED	41
		COBALT		8.2J	8.2J	QUALIFIED	43
		COPPER		20.9	20.9J	QUALIFIED	61
		IRON		12500J	12500J	QUALIFIED	61
		LEAD		102	102		
		MAGNESIUM		2430	2430		
		MANGANESE		243J	243J	QUALIFIED	54
		MERCURY		0.26J	0.26J	QUALIFIED	54
		NICKEL		14.6	14.6		
		POTASSIUM		953J	953J	QUALIFIED	43
		SELENIUM		0.43UJ	0.43UJ	QUALIFIED	55
		SILVER		0.22U	0.22UJ	QUALIFIED	41
		SODIUM		176	176J	QUALIFIED	43
		THALLIUM		0.65U	0.65U		
		VANADIUM		18.9	18.9		
		ZINC	2.6J	106	106J	QUALIFIED	8
		CYANIDE		0.27U	0.27U		

*mg/kg

ATTACHMENT 1102

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271443	91003720	ALUMINUM		6900	6900		
		ANTIMONY		2.4UJ	2.4UJ	QUALIFIED	55
		ARSENIC		2.4J	2.4J	QUALIFIED	41,55
		BARIUM		59.0	59.0		
		BERYLLIUM		0.65J	0.65J	QUALIFIED	43
		CADMIUM		0.86J	0.86J	QUALIFIED	43
		CALCIUM		1060J	1060J	QUALIFIED	61
		CHROMIUM		9.30	9.30J	QUALIFIED	41
		COBALT		6.9U	6.9U		
		COPPER		26.2	26.2J	QUALIFIED	61
		IRON		10500J	10500J	QUALIFIED	61
		LEAD		110	110		
		MAGNESIUM		1760	1760		
		MANGANESE		244J	244J	QUALIFIED	54
		MERCURY		0.33J	0.33J	QUALIFIED	54
		NICKEL		12.8	12.8		
		POTASSIUM		674J	674J	QUALIFIED	43
		SELENIUM		0.56J	0.56J	QUALIFIED	43,55
		SILVER		0.22U	0.22UJ	QUALIFIED	41
		SODIUM		159J	159J	QUALIFIED	43
		THALLIUM		0.65U	0.65U		
		VANADIUM		17.7	17.7		
		ZINC	2.6J	112	112J	QUALIFIED	8
		CYANIDE		0.27U	0.27U		

mg/kg

ATTACHMENT 1103

ORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271444	91003721	ALUMINUM		6280	6280		
		ANTIMONY		2.6UJ	2.6UJ	QUALIFIED	55
		ARSENIC		15.8	15.8J	QUALIFIED	41,55
		BARIUM		89.0	89.0		
		BERYLLIUM		1.4	1.4		
		CADMIUM		0.96U	0.96U		
		CALCIUM		2140J	2140J	QUALIFIED	61
		CHROMIUM		4.6	4.6J	QUALIFIED	41
		COBALT		8.9J	8.9J	QUALIFIED	43
		COPPER		63.3	63.3J	QUALIFIED	61
		IRON		12600J	12600J	QUALIFIED	61
		LEAD		245	245		
		MAGNESIUM		930J	930J	QUALIFIED	43
		MANGANESE		379J	379J	QUALIFIED	54
		MERCURY		0.91J	0.91J	QUALIFIED	54
		NICKEL		18.5	18.5		
		POTASSIUM		453J	453J	QUALIFIED	43
		SELENIUM		1.0J	1.0J	QUALIFIED	55
		SILVER		0.24U	0.24U	QUALIFIED	41,43
		SODIUM		198J	198J	QUALIFIED	43
		THALLIUM		0.72U	0.72U		
		VANADIUM		12.9	12.9		
		ZINC	2.6J	189	189J	QUALIFIED	8
		CYANIDE		0.39J	0.39J	QUALIFIED	43

mg/kg

ATTACHMENT I 104

INORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271445	91003722	ALUMINUM		7650	7650		
		ANTIMONY		2.5UJ	2.5UJ	QUALIFIED	55
		ARSENIC		1.5J	1.5J	QUALIFIED	41,43,55
		BARIUM		37.4J	37.4J	QUALIFIED	43
		BERYLLIUM		0.68J	0.68J	QUALIFIED	43
		CADMIUM		0.91U	0.91U		
		CALCIUM		3.4UJ	3.4UJ	QUALIFIED	61
		CHROMIUM		7.1	7.1J	QUALIFIED	41
		COBALT		7.3U	7.3U		
		COPPER		5.7	5.7J	QUALIFIED	61
		IRON		4.3UJ	4.3UJ	QUALIFIED	61
		LEAD		7.3	—	REJECTED	80
		MAGNESIUM		2280	2280		
		MANGANESE		122J	122J	QUALIFIED	54
		MERCURY		0.11U	0.11U		
		NICKEL		11.0	11.0		
		POTASSIUM		749J	749J	QUALIFIED	43
		SELENIUM		0.46J	0.46J	QUALIFIED	43,55
		SILVER		0.23U	0.23UJ	QUALIFIED	41
		SODIUM		188J	188J	QUALIFIED	43
		THALLIUM		0.68U	0.68U		
		VANADIUM		20.1	20.1		
		ZINC	2.6J	38.1	38.1J	QUALIFIED	8
		CYANIDE		0.29U	0.29U		

*mg/kg

ATTACHMENT I 105

TARGET ANALYTE SUMMARY LIST

/SDGBSA06271438 SITE NAME: CELANESE

RT-ST.LOUIS SAMPLE MATRIX: SOIL

	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
146	91003723	ALUMINUM		6430	6430		
		ANTIMONY		2.4UJ	2.4UJ	QUALIFIED	55
		ARSENIC		11.6	11.6J	QUALIFIED	41,55
		BARIUM		92.3	92.3		
		BERYLLIUM		0.88J	0.88J	QUALIFIED	43
		CADMIUM		1.1	1.1		
		CALCIUM		1470J	1470J	QUALIFIED	61
		CHROMIUM		5.7	5.7J	QUALIFIED	41
		COBALT		7.0U	7.0U		
		COPPER		44.7	44.7J	QUALIFIED	61
		IRON		9560J	9560J	QUALIFIED	61
		LEAD		134	134		
		MAGNESIUM		1420	1420		
		MANGANESE		289J	289J	QUALIFIED	54
		MERCURY		0.66J	0.66J	QUALIFIED	54
		NICKEL		13.2	13.2		
		POTASSIUM		649J	649J	QUALIFIED	43
		SELENIUM		0.68J	0.68J	QUALIFIED	43,55,79
		SILVER		0.22J	0.22J	QUALIFIED	41,43
		SODIUM		165J	165J	QUALIFIED	43
		THALLIUM		0.66U	0.66U		
		VANADIUM		15.4	15.4		
		ZINC	2.6J	186	186J	QUALIFIED	8
		CYANIDE		0.27U	0.27U		

ATTACHMENT I 106

ORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271447	91003724	ALUMINUM		6230	6230		
		ANTIMONY		2.4U	2.4UJ	QUALIFIED	55
		ARSENIC		7.8J	7.8J	QUALIFIED	41,55
		BARIUM		103	103		
		BERYLLIUM		0.88J	0.88J	QUALIFIED	43
		CADMIUM		0.88J	0.88J	QUALIFIED	43
		CALCIUM		1810J	1810J	QUALIFIED	61
		CHROMIUM		7.2	7.2J	QUALIFIED	41
		COBALT		7.0U	7.0U		
		COPPER		63.0	63.0J	QUALIFIED	61
		IRON		12400	12400J	QUALIFIED	61
		LEAD		114	114		
		MAGNESIUM		948J	948J	QUALIFIED	43
		MANGANESE		266J	266J	QUALIFIED	54
		MERCURY		0.34J	0.34J		
		NICKEL		15.4	15.4		
		POTASSIUM		571J	571J	QUALIFIED	43
		SELENIUM		0.57J	0.57J	QUALIFIED	43,55
		SILVER		0.22U	0.22UJ	QUALIFIED	41
		SODIUM		220J	220J	QUALIFIED	43
		THALLIUM		0.66U	0.66U		
		VANADIUM		16.5	16.5		
		ZINC	2.6J	224	224J	QUALIFIED	8
		CYANIDE		0.44J	0.44J	QUALIFIED	43

*mg/kg

ATTACHMENT I 107

ORGANIC TARGET ANALYTE SUMMARY LIST

CASE NO: 00017/SDGBSA06271438 SITE NAME: CELANESE

LAB NAME: TCT-ST.LOUIS SAMPLE MATRIX: SOIL

SAMPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
BSA06271448	91003725	ALUMINUM		3120	3120		
		ANTIMONY		4.9J	4.9J	QUALIFIED	43,55
		ARSENIC		14.8J	14.8J	QUALIFIED	41,55
		BARIUM		111	111		
		BERYLLIUM		0.66J	0.66J	QUALIFIED	43
		CADMIUM		1.1	1.1		
		CALCIUM		1650J	1650J	QUALIFIED	43,61
		CHROMIUM		3.1	3.1J	QUALIFIED	41
		COBALT		7.0U	7.0U	QUALIFIED	43
		COPPER		82.1	82.1J	QUALIFIED	61
		IRON		8560J	8560J	QUALIFIED	61
		LEAD		261	261		
		MAGNESIUM		911J	911J	QUALIFIED	43
		MANGANESE		419J	419J	QUALIFIED	54
		MERCURY		0.83J	0.83J	QUALIFIED	54
		NICKEL		11.2	11.2		
		POTASSIUM		476J	476J	QUALIFIED	43
		SELENIUM		0.80J	0.80J	QUALIFIED	55
		SILVER		0.35J	0.35J	QUALIFIED	41
		SODIUM		1070J	1070J	QUALIFIED	43
		THALLIUM		0.66U	0.66U		
		VANADIUM		12.3	12.3		
		ZINC	2.6J	342	342J	QUALIFIED	8
		CYANIDE		0.55	0.55		

mg/kg

ATTACHMENT I 108

NIC TARGET ANALYTE SUMMARY LIST

D: 00017/SDGBSA06271438 SITE NAME: CELANESE

ME: TCT-ST.LOUIS SAMPLE MATRIX: WATER

MPLE ID	LAB ID	ANALYTE	METHOD BLANK CONC.*	LAB REPORT CONC.*	QA REPORT CONC.*	QA DECISIONS	FOOTNOTE
A06271449	91003726	ALUMINUM		24.0U	24.0U		
		ANTIMONY		11.0U	11.0U		
		ARSENIC		2.0U	2.0U		
		BARIUM		6.0U	6.0U		
		BERYLLIUM		1.0U	1.0U		
		CADMIUM		4.0U	4.0U		
		CALCIUM		15.0U	15.0U		
		CHROMIUM		10.0U	10.0U		
		COBALT		32.0U	32.0U		
		COPPER		7.0U	7.0U		
		IRON		19.0U	19.0U		
		LEAD		1.0JU	—	REJECTED	80
		MAGNESIUM		17.0J	17.0J	QUALIFIED	43
		MANGANESE		3.0U	3.0U		
		MERCURY		0.20U	0.20J		
		NICKEL		9.0U	9.0U		
		POTASSIUM		36.0U	36.U		
		SELENIUM		2.0U	2.0U		
		SILVER		1.0U	1.0U		
		SODIUM		86.0J	86.0J	QUALIFIED	43
		THALLIUM		3.0U	3.0U		
		VANADIUM		11.0U	11.0U		
		ZINC	2.6J	8.0U	8.0U		
		CYANIDE		5.0U	5.0U		

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