DAMES & MOORE

A DAMES & MOORE GROUP COMPANY

REPORT
INVESTIGATION OF AREA A
BALLFIELDS
CHEVRON REFINERY
PHILADELPHIA, PENNSYLVANIA

JUNE 10, 1988

BOX #1

REPORT
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BALLFIELDS
CHEVRON REFINERY
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Dames & Moore

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1.0 INTRODUCTION

Dames & Moore is pleased to present our report entitled "Investigation of Area A - Ballfields, Chevron Refinery, Philadelphia, Pennsylvania." This investigation was conducted in accordance with our proposal dated October 23, 1987. The project was authorized on December 11, 1987, as Chevron Contract Number C-87-33-115. Site activities were planned and implemented in cooperation with Chevron representatives, who also provided Dames & Moore with historical background information.

1.1 SITE LOCATION AND DESCRIPTION

The Chevron Refinery is located in South Philadelphia approximately 1 mile north of the confluence of the Schuylkill and Delaware Rivers. The portion of the refinery known as the "Ballfields" is located east of the northern part of the Main Plant of the refinery (Figure 1).

Area A is a mound of soil 6 to 15 feet in height located near the center of the Ballfields. The mound covers approximately 30,000 square feet of surface area and contains approximately 10,000 cubic yards of soil.

1.2 SITE BACKGROUND INFORMATION

Dames & Moore reviewed several historical aerial photographs (1959, 1965, 1970, 1975, 1980, and 1985) to evaluate the history of the Area A soils. The mound was not visible in the 1980 photograph. However, in the 1985 photograph, the mound is present. According to Chevron personnel, the soil may have been derived from the area near the Passyunk Avenue Bridge about 3,000 feet north of the Ballfields (Figure 1). The aerial photographs indicate that the Passyunk Avenue Bridge was widened between 1980 and 1985.

2.0 OBJECTIVES AND SCOPE OF WORK

The objectives of this investigation were to:

- Identify and quantify compounds present in Area A soils
- Evaluate remedial alternatives, if necessary, for the Area A soils

To accomplish the project objectives, we performed a scope of work consisting of these tasks:

Task 1 - Sampling Grid Preparation
Task 2 - Soil Sample Collection
Task 3 - Laboratory Analysis
Task 4 - Data Evaluation
Task 5 - Remedial Alternative Evaluations
Task 6 - Report Preparation

Tasks 1 and 2 are discussed in Section 3.0. The results of Tasks 3 and 4 are presented in Section 4.0. Section 5.0 reviews our conclusions, and Section 6.0 discusses the remedial alternative evaluation and our recommendations.

3.0 FIELD PROCEDURES

To accomplish Tasks 1 and 2, Dames & Moore performed field procedures that involved sampling grid preparation, soil sampling, and field observations and measurements. This section discusses these procedures.

3.1 SAMPLING GRID PREPARATION

Dames & Moore collected soil samples for laboratory analysis by excavating five trenches across Area A (see Figure 2) using a backhoe. Excavation of the trenches began on January 19, 1988, and was completed by January 26, 1988. The trenches were approximately 8 to 12 feet wide and were dug to a depth of approximately 2 to 5 feet below the surrounding ground surface. Excavated soil was placed along the Area A perimeter and adjacent to the trench from which it was removed. In specified areas, the trench was widened and stepped so that field personnel could safely enter the trench to make observations and take samples.

3.2 SOIL SAMPLE COLLECTION

Soil samples were obtained for visual examination, photoionization detector (PID) headspace readings, and laboratory analysis from the 18 locations shown on Figure 2. At each location, samples were taken at approximate 3-foot depth intervals. Samples were collected directly from the sides of the trenches and from the center of the backhoe bucket. See Table 1 for sample point identification and depth.

Each sample was placed in a laboratory-prepared glass jar with a Teflon-lined cap. In addition, separate samples were placed in driller jars and transported to our soils laboratory in Trevose, Pennsylvania, where headspace measurements of volatile organic compounds (VOCs) were obtained using a PID (see Table 1 for PID headspace readings). Vertical PID scans were also conducted along the walls of each trench at each sample location (see Figures 3 and 4 for PID readings measured in the field). Photographs of all trenches were taken. The trenches were backfilled with excavated soil and the area was graded to a smooth surface.

For each of the 18 sampling locations, a vertical composite soil sample was prepared from the individual soil samples collected at that location. The 18 composite samples were packed in a cooler with ice and shipped to Century Laboratories of Thorofare, New Jersey, for chemical analysis as discussed under Section 4.2. The remaining individual samples were stored in Dames & Moore's laboratory until the analyses were completed.

Each day, prior to the commencement of field work, the PID was calibrated. The PID was also calibrated by Timely Environmental Service Technology of Trenton, New Jersey, prior to the beginning of field work. Timely Environmental's PID calibration graph and Dames & Moore's Equipment Calibration Maintenance and Repair Log are provided in Appendix A.

3.3 FIELD OBSERVATIONS AND MEASUREMENTS

Observations and measurements were made during excavation and sampling of the trenches. Our observations and measurements are:

- The Area A soil mound ranges in height from approximately 6 to 8 feet in the northwest corner to approximately 12 to 15 feet in the southeast corner, and covers approximately 25,000 to 30,000 square feet of surface area.
- Approximately 8,000 to 12,000 cubic yards of soil exist in the mound.
- The mound was vegetated prior to our excavations.
- No ponded water existed on top of the mound.
- The soil consists of a light-brown to brown silt with little clay, little to some gravel, and little sand.
- No stratification was observed in the mound.
- A coating was observed on rocks on the surface of Area A in the southwest corner. Reportedly, this coating was analyzed by Chevron and found to contain cyanide.
- Area A contains various types of debris scattered evenly throughout. The debris consists of metal, tires, rubber, concrete, macadam, wood, small nodules of thick tar, and other debris.
- The only PID reading greater than background measured in the field was 20 ppm (PID units) at sample location A10D (see Figures 3, 4, and 8).
- Pockets of black, apparently oily soil with a higher clay content than the surrounding soil and petroleum odor were noticed in all trenches (no PID readings greater than background were measured).
- Area A is underlain by approximately 2 feet of light-brown silty sand with gravel and trace to little clay, which, in turn, is underlain by 1 to 2 feet of black silty sand with gravel, tar, slag, wood, and other debris (bed of old railroad yard). This layer has a petroleum odor and had a PID reading no higher than 5 ppm (PID units). The black silty sand is underlain by a brown silty sand.

Because the soil in Area A is fairly homogeneous, only two cross sections, B-B' and E-E', are illustrated. These sections are shown on Figures 3 and 4.

4.0 RESULTS

This section contains the results of PID headspace analyses and laboratory analyses performed on selected soil samples.

4.1 PID HEADSPACE ANALYSIS

All soil samples collected were transported to our laboratory in Trevose, Pennsylvania, for PID headspace analysis (see Table 1). Significant positive readings were obtained from several soil samples. These samples and their respective PID readings are: A7E (30 ppm), A9C (70 ppm), A10D (120 ppm), A10E (110 ppm), A12D (120 ppm), and A19A (30 ppm). Figure 8 shows the locations of these samples.

4.2 CHEMICAL ANALYSIS

Dames & Moore performed the laboratory analyses in two phases, with the testing parameters for the second phase determined by the results of the first phase.

The Phase I composite samples (A2, A4, A8, A10, A13, and A15) were collected at the intersections of the five trenches. The six composite samples were analyzed for:

- EP toxicity metals, pesticides, and herbicides
- Polychlorinated biphenyls (PCBs)
- Total cyanide
- Base/neutral-extractable organics (B/Ns)
- Total phenols
- Corrosivity (pH)
- Reactivity
- Ignitability
- Volatile organic compounds (VOCs - if detected in the field or during PID headspace analysis)

Table 1 presents the locations and depths of the individual samples that were composited into the six Phase I samples.

In addition, five samples were gathered for VOC analysis and three samples were gathered for total petroleum hydrocarbons (TPH) analysis. The samples for VOC analysis were selected based on PID field readings and PID headspace readings. Samples for TPH analysis were selected in areas with black, slightly oily soil and slight petroleum odor. Table 2 is a summary of the analytical laboratory data for the Phase I composite samples, and Appendix B contains the laboratory reports.

The results of the analyses show that low levels of total B/Ns (greatest concentration of 22.78 ppm in sample A15) and total cyanide (greatest concentration of 13 ppm in sample A13) are present in Area A soils. In addition, low levels of total phenols (greatest concentration of 1.1 ppm in sample A10), total VOCs (greatest concentration of 1.93 ppm in sample A10E), and TPH (greatest concentration of 740 ppm in sample A12D) are also present.

After evaluating the Phase I analytical results, we decided to have 12 Phase II composite samples (A1, A3, A6, A7, A9, A11, A12, A14, A16, A17, A18 and A19) analyzed for total cyanide. Again, low levels of cyanide were detected. The greatest concentration was 16 ppm in samples A14 and A17.

Table 1 presents the locations and depths of the individual samples that were composited into the 12 Phase II samples. Table 3 is a summary of the analytical laboratory data for the Phase II composite samples. Appendix B contains the laboratory report.

Figures 5, 6 and 7 show the concentrations of total B/Ns, cyanide, and phenolics, respectively. The greatest concentrations for all parameters occur in the south and southwest corner of Area A.

5.0 CONCLUSIONS

Based on the data gathered and analyzed during this investigation, our conclusions are:

- The soil mound is homogeneous and consists predominantly of brown silt with little clay, small lenses of black soil, and various types of debris. The debris consists of metal, bars, tires, concrete, macadam, wood, and other materials.

- In comparison to cleanup guidelines or concentrations of concern typically used by state officials, the concentrations of B/Ns and cyanide are mostly low. However, eight samples (A4, A8, A10, A13, A14, A15, A16, and A17) slightly exceed these guidelines.

- Total phenols were detected in four of the six composite samples tested. Based on our experience, the reported concentrations are low.

- The total VOC concentrations are low and cover a small area (Figure 8). The TPH concentrations are low and confined to small lenses within the mound.

- Based on the RCRA characterization analysis (see Appendix B), the soil appears to be non-hazardous.

6.0 RECOMMENDATIONS

Dames & Moore recommends that little or no action be taken until the entire Ballfields study is complete. Which areas of the Ballfields may need remediation is uncertain at this time. Other areas that require remediation could ultimately affect Area A. For example, if another area within the Ballfields requires excavation, Area A could possibly be used as backfill.

At this time, Dames & Moore does not believe that the concentrations of contaminants detected in Area A soils warrant the cleanup and removal of the soils. However, we do recommend that Chevron continue to maintain a policy of restricting access into the Ballfield Area, especially Area A. To ensure limited access, Chevron may wish to construct a temporary fence around the Area A soils. In addition, we recommend that the mound be graded and seeded to prevent erosion and dust emissions.

This report was prepared by:

DAMES & MOORE
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FJV/RTG/DJW:jw
2284R

TABLE 1

GENERAL SOIL SAMPLING DATA

CHEVRON REFINERY
AREA A
PHILADELPHIA, PENNSYLVANIA
1/19/88 - 1/26/88

Sample Point I.D.	Approximate Depth (ft)	PID Headspace Readings (PID units)	Samples Composited For Phase I Laboratory Analysis*	Samples Composited For Phase II Laboratory Analysis*
A1 A	0-4	0		+
B	4-8	0		+
A2 A	3	4	X	
B	6	5	X	
C	9	6	X	
D	12	5	X	
E	15	14	X	
A3 A	0-4	0		+
B	4-8	0		+
C	8-12	1		+
A4 A	3	0	X	
B	6	3	X	
C	9	4	X	
D	12	9	X	
E	15	8		
A6 A	3	4		+
B	6	3		+
C	9	2		+
D	12	5		+
E	15	14		
A7 A	3	4		+
B	6	5		+
C	9	15		+
D	12	20		+
E	16	30		
F	18	11		
A8 A	3	6	X	
B	6	11	X	
C	9	16	X	
D	12	5		
E	15	10		

TABLE 1 (Cont'd)

GENERAL SOIL SAMPLING DATA

CHEVRON REFINERY
AREA A
PHILADELPHIA, PENNSYLVANIA
1/19/88 - 1/26/88

Sample Point I.D.	Approximate Depth (ft)	PID Headspace Readings (PID units)	Samples Composited For Phase I Laboratory Analysis*	Samples Composited For Phase II Laboratory Analysis*
A9 A	0-4	0		+
B	4-8	2		+
C	8-12	70		+
A10 A	3	0	X	
B	6	6	X	
C	9	2	X	
D	12	120	X	
E	15	110		
F	18	50		
A11 A	3	0		+
B	6	4		+
C	9	6		+
D	12	9		+
E	15	0		
A12 A	3	4		+
B	6	5		+
C	9	7		+
D	12	120		+
E	15	2		
A13 A	3	4	X	
B	6	4	X	
C	9	6	X	
D	12	8	X	
A14 A	0-4	1		+
B	4-8	2		+
C	8-12	3		+
A15 A	3	3	X	
B	6	3	X	
C	9	6	X	
D	12	9	X	
E	15	22		

TABLE 1 (Cont'd)

GENERAL SOIL SAMPLING DATA

CHEVRON REFINERY
AREA A
PHILADELPHIA, PENNSYLVANIA
1/19/88 - 1/26/88

Sample Point I.D.	Approximate Depth (ft)	PID Headspace Readings (PID units)	Samples Composited For Phase I Laboratory Analysis*	Samples Composited For Phase II Laboratory Analysis*
A16 A	3	2		+
B	6	5		+
C	9	12		+
D	12	13		+
E	16	3		
F	17-20	3		
A17 A	0-4	3		+
B	4-8	7		+
C	8-12	7		+
A18 A	0-4	0		+
B	4-8	0		+
A19 A	0-4	30		+
B	4-8	14		+

* Example - A8A + A8B + A8C = Composite Sample A8

TABLE 2

SUMMARY OF ANALYTICAL LABORATORY DATA
AREA A - PHASE I

CHEVRON REFINERY
PHILADELPHIA, PENNSYLVANIA
1/19/88 - 1/26/88

Composite Sample I.D.	A2	A4	A8	A10	A13	A15
Parameters						
Base/Neutral / Extractable Organics (ug/kg)						
Acenaphthene	U	U	U	U	120	U
Acenaphthylene	U	390	860	140	150	1,500
Anthracene	U	450	710	200	200	U
Benzo (a) Anthracene	U	1,200	1,100	430	960	J
Benzo (b) Fluoranthene	J	920	1,200	1,300	2,100	2,600
Benzo (g,h,i) Perylene	U	2,300	2,000	2,000	3,800	3,800
Benzo (a) Pyrene	190	1,400	1,400	850	1,900	2,000
Chrysene	190	1,500	1,400	540	1,400	1,700
Dibenz (a,h) Anthracene	U	U	U	U	U	J
Diethylphthalate	U	U	U	U	J	U
Di-n-Butylphthalate	U	U	U	U	100	U
Fluoranthene	120	1,500	2,200	560	880	2,300
Fluorene	U	240	450	100	85	U
Ideno (1,2,3-cd) Pyrene	U	820	1,600	1,600	2,800	2,500
Naphthalene	J	660	2,500	700	400	880
Phenanthrene	U	2,000	2,400	700	900	2,300
Pyrene	290	3,500	3,100	1,100	2,700	3,200
Total (ug/kg)	790	16,880	20,920	10,220	18,500	22,780

Composite Sample I.D.	A2	A4	A8	A10	A13	A15
Conventional Analysis Data(mg/kg)						
Cyanide, Total	3.4	U	U	U	13	4.9
Phenolics, Total	U	U	0.19	0.78	0.56	1.1

TABLE 2 (Cont'd)

SUMMARY OF ANALYTICAL LABORATORY DATA
AREA A - PHASE I

CHEVRON REFINERY
PHILADELPHIA, PENNSYLVANIA
1/19/88 - 1/26/88

Sample I.D.	BVOA	A9C	A10E	A12D	A15BVOA
Volatile Organics (ug/kg)					
Benzene	U	18	U	U	U
Ethylbenzene	U	45	940	U	11
Methylene Chloride	U	13	U	4	6B
Toluene	J	110	990	J	J
Total (ug/kg)	0.00	186	1930	4	11

Sample I.D.	BPH	A12D	A15BPH
Total Petroleum Hydrocarbons(mg/kg)	210	740	24

Explanation:

U - Compound was analyzed for but not detected.
J - Indicates an estimated value based on assumption of a 1:1 responses for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.
B - Indicates that the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

Note: 1. See Figures 3 and 4 for location of samples taken for volatile organic and total petroleum hydrocarbon analysis.
2. Only the compounds that were detected are present on this table. For the complete list of compounds analyzed see Section 4.0. For the complete laboratory reports see Appendix B.

TABLE 3

SUMMARY OF ANALYTICAL LABORATORY DATA
AREA A – PHASE II

CHEVRON REFINERY
PHILADELPHIA, PENNSYLVANIA
1/19/88 – 1/26/88

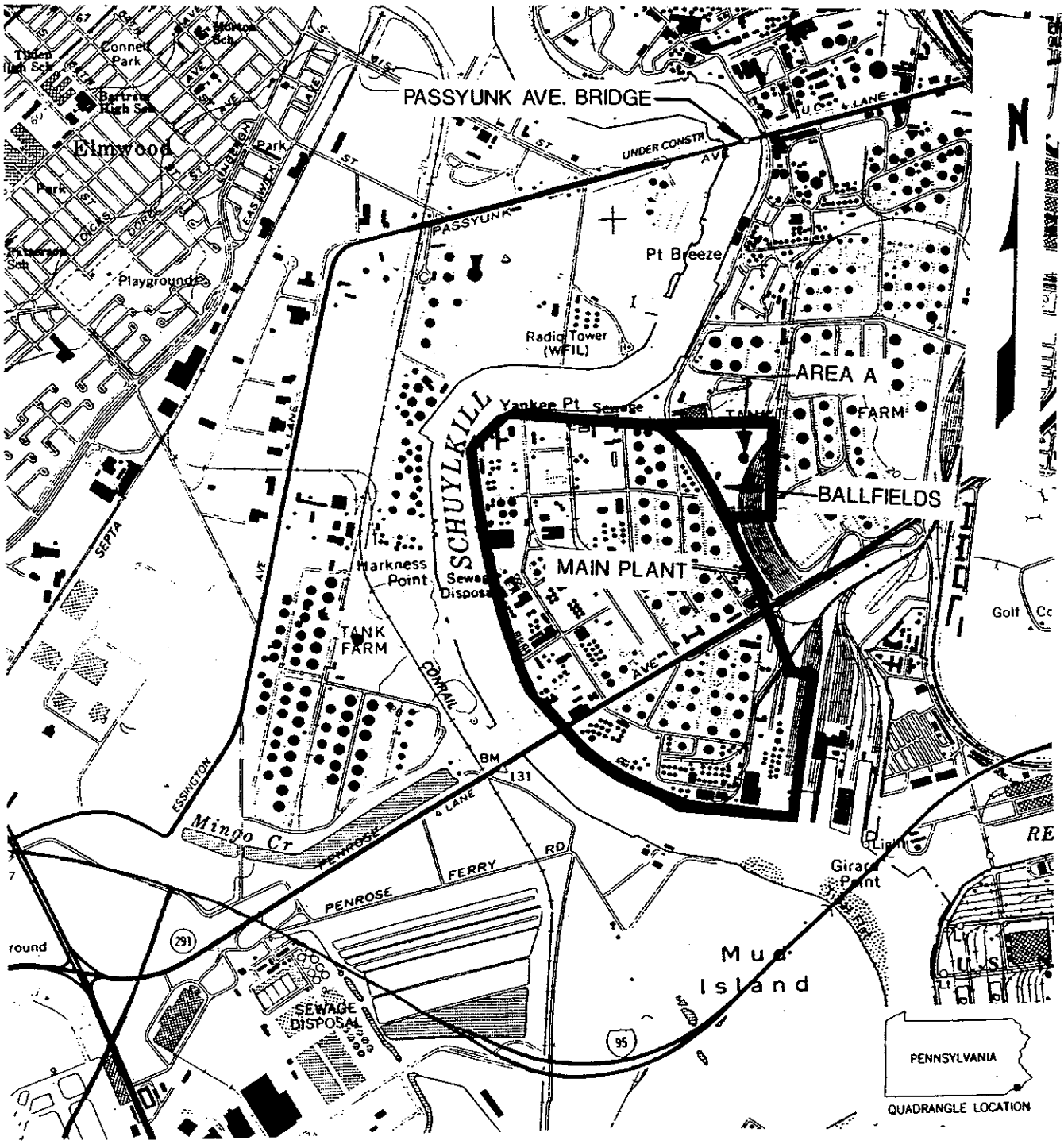
Composite Sample I.D.	A1	A3	A6	A7	A9	A11	A12	A14	A16	A17	A18	A19
Conventional Analysis Data (mg/kg)												
Cyanide, Total	U	U	0.27	6.0	4.7	0.17	7.2	16	14	16	2.9	2.5

Explanation:

U – Compound was analyzed for but not detected.

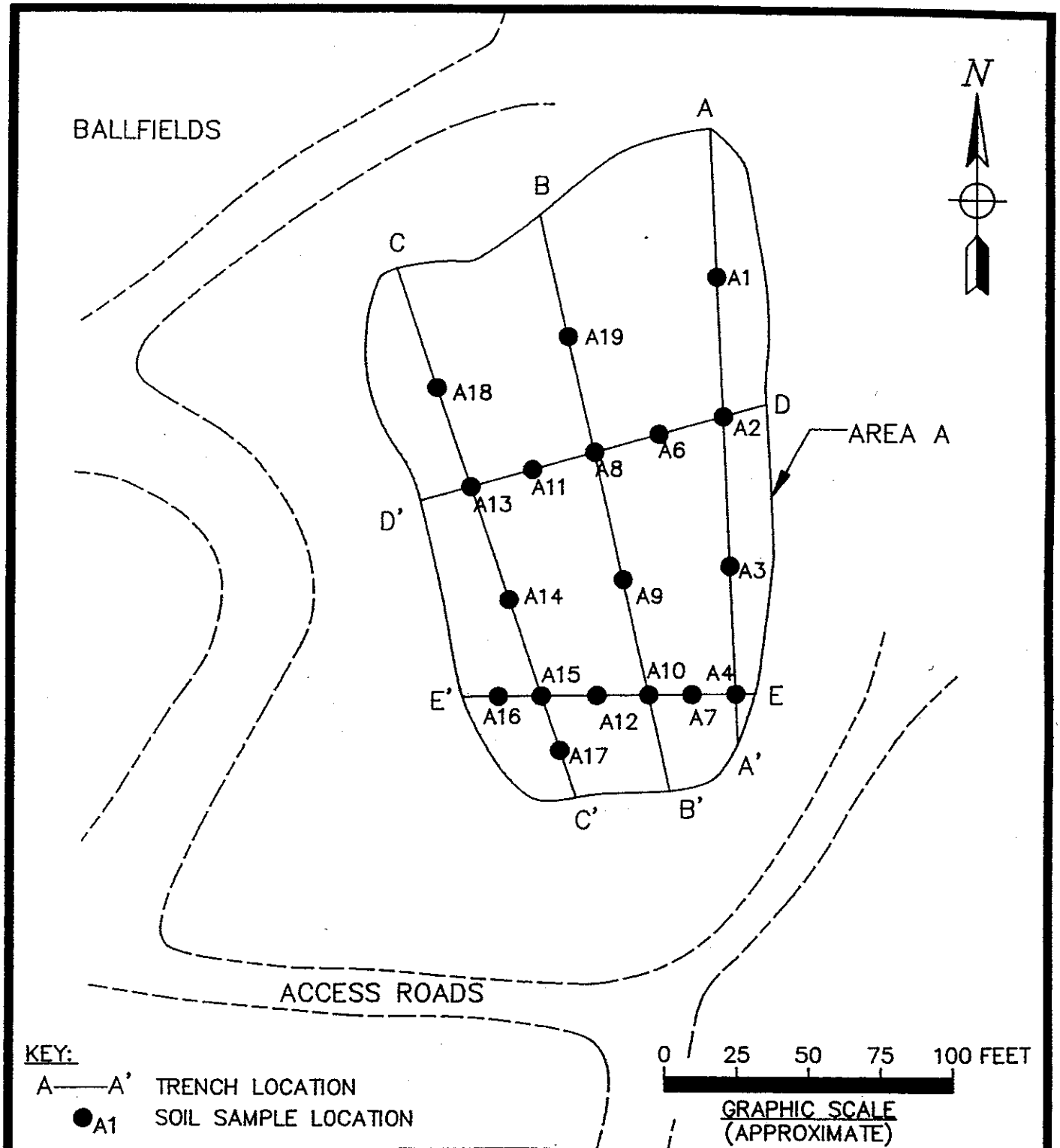
Note:

Laboratory reports are provided in Appendix B.



REFERENCE:
A PORTION OF USGS 7.5 MINUTE TOPOGRAPHIC MAP; PHILADELPHIA QUADRANGLE, PENNSYLVANIA, 1967, PHOTOREVISED 1985.

TITLE: SITE VICINITY MAP		
PROJECT: CHEVRON REFINERY PHILADELPHIA, PA.		
Dames & Moore TREVOSE, PENNSYLVANIA		
SCALE AS NOTED	DWN. BY G.E.B.	JOB NO. 16000-026
DATE 3/29/88	APPR. BY D.J.W.	FIG. NO. 1



KEY:

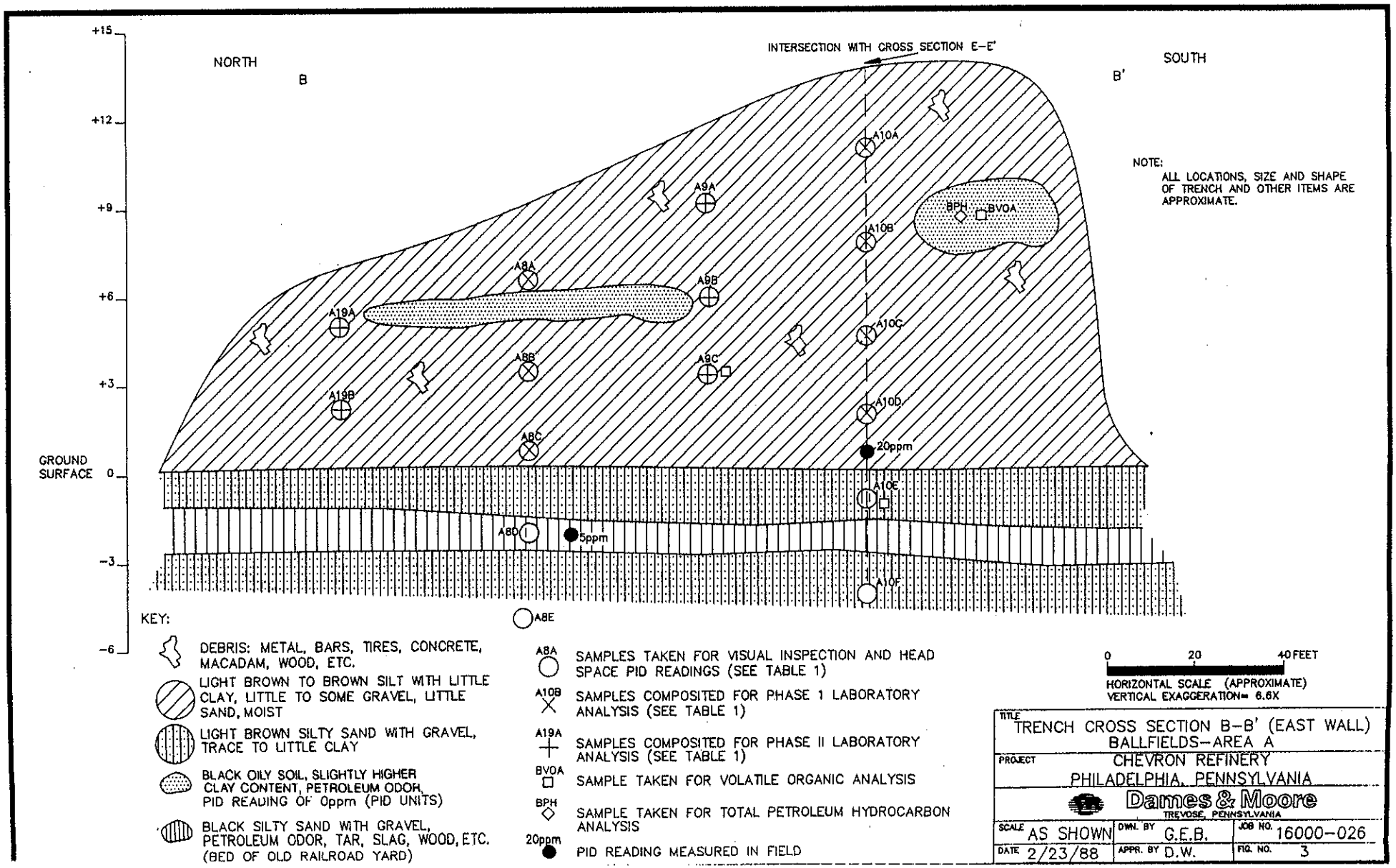
A——A' TRENCH LOCATION

●A1 SOIL SAMPLE LOCATION

NOTE:

ALL SAMPLING AND TRENCH LOCATIONS ARE APPROXIMATE. LOCATION, SIZE AND SHAPE OF MOUND ARE ALSO APPROXIMATE.

TITLE	PLOT PLAN BALLFIELDS–AREA A	
PROJECT	CHEVRON REFINERY PHILADELPHIA, PENNSYLVANIA	
	Dames & Moore TREVOSE, PENNSYLVANIA	
SCALE AS NOTED	DWN. BY R.G.B.	JOB NO. 16000–026
DATE 3/8/88	APPR. BY D.J.W.	FIG. NO. 2



TITLE: TRENCH CROSS SECTION B-B' (EAST WALL) BALLFIELDS-AREA A

PROJECT: CHEVRON REFINERY PHILADELPHIA, PENNSYLVANIA

Dames & Moore
TREVOSE, PENNSYLVANIA

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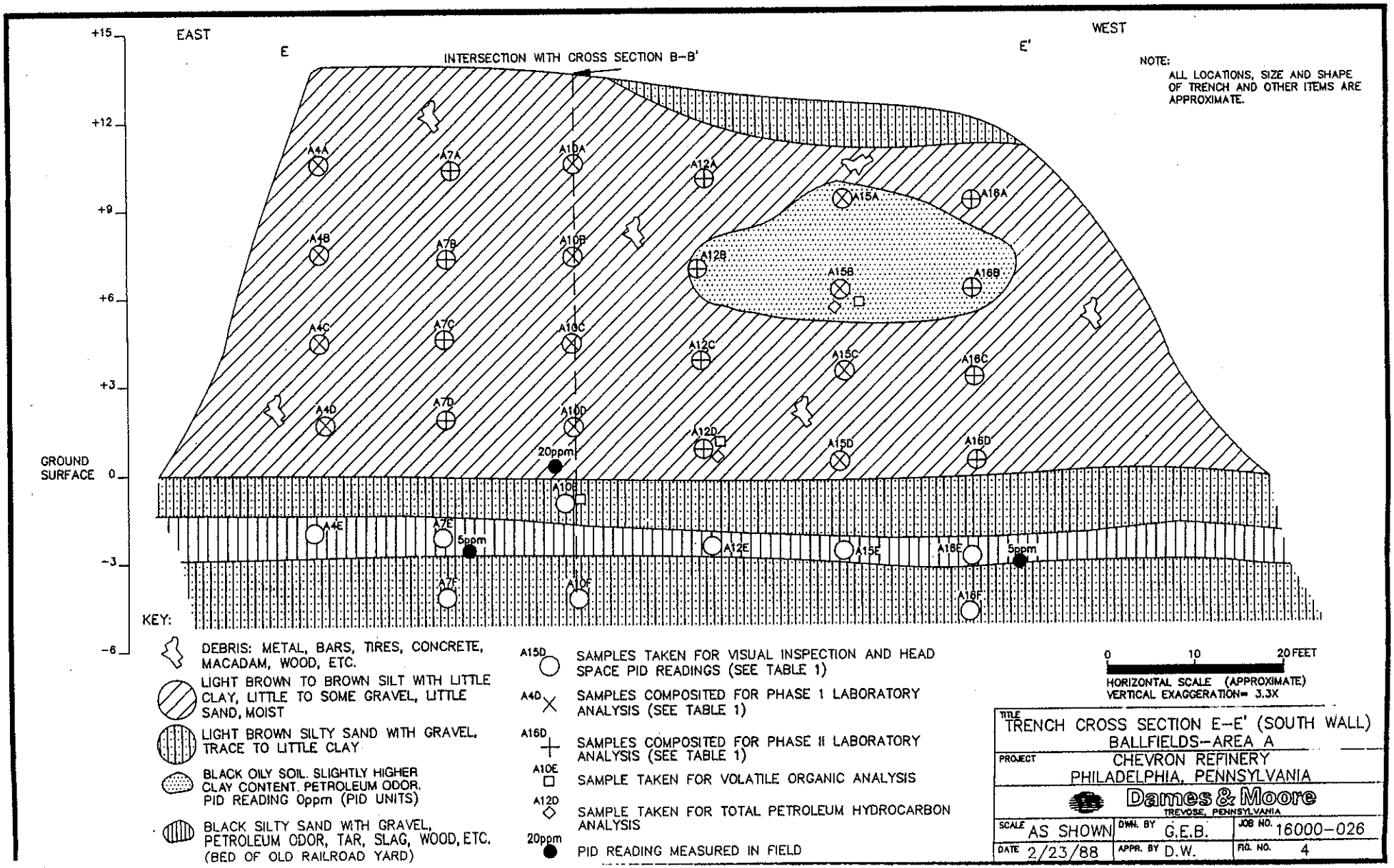
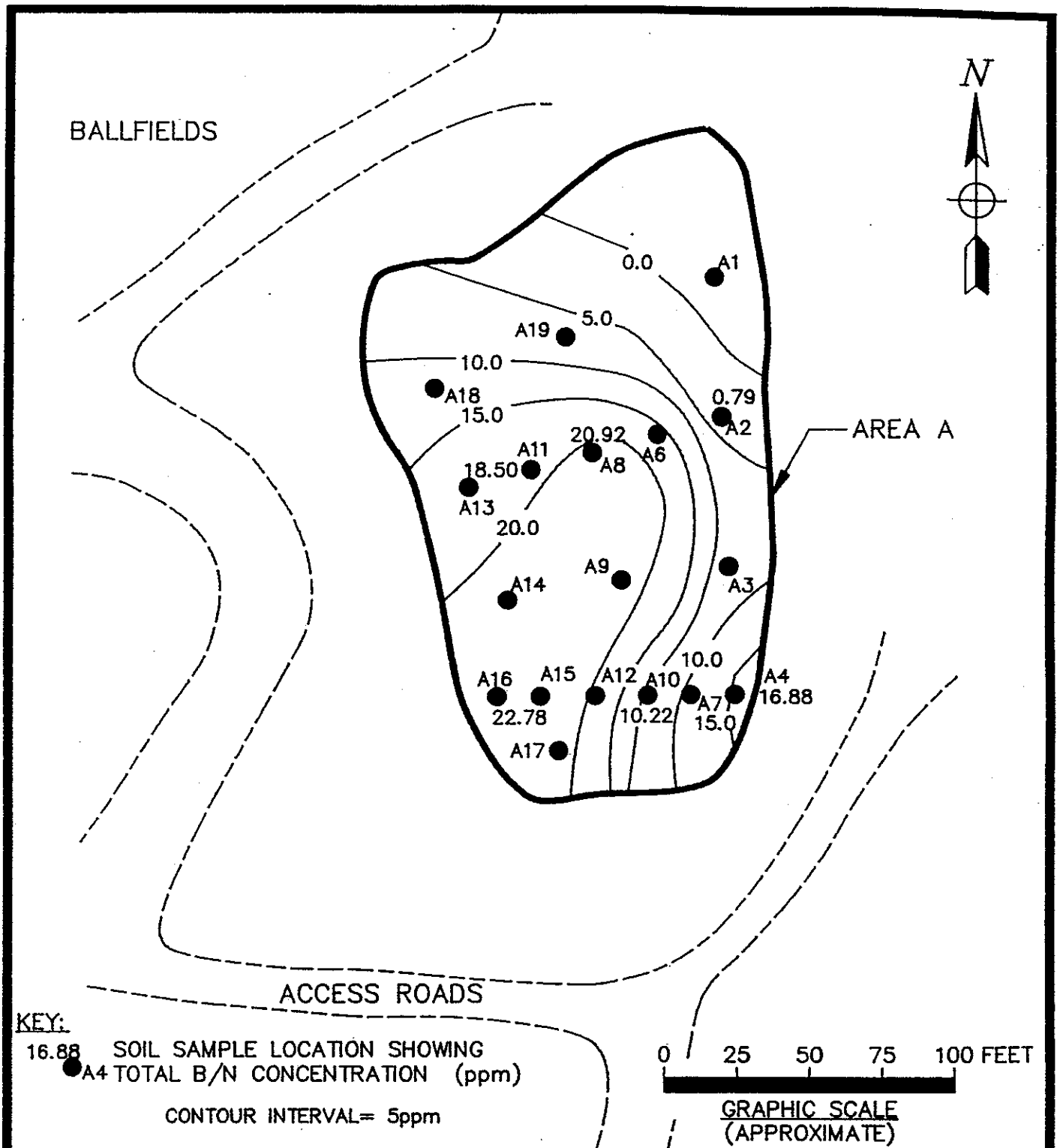
AS SHOWN	G.E.B.	16000-026
DATE 2/23/88	APPR. BY D.W.	FIG. NO. 3


EAST
WEST
E
E'
INTERSECTION WITH CROSS SECTION B-B'
NOTE:
ALL LOCATIONS, SIZE AND SHAPE OF TRENCH AND OTHER ITEMS ARE APPROXIMATE.
+15
+12
+9
+6
+3
GROUND SURFACE 0
-3
-6
A4A
A7A
A10A
A12A
A15A
A16A
A4B
A7B
A10B
A12B
A15B
A16B
A4C
A7C
A10C
A12C
A15C
A16C
A4D
A7D
A10D
A12D
A15D
A16D
20ppm
A10E
A4E
A7E
5ppm
A12E
A15E
A16E
5ppm
A7F
A10F
A16F
KEY:
DEBRIS: METAL, BARS, TIRES, CONCRETE, MACADAM, WOOD, ETC.
LIGHT BROWN TO BROWN SILT WITH LITTLE CLAY, LITTLE TO SOME GRAVEL, LITTLE SAND, MOIST
LIGHT BROWN SILTY SAND WITH GRAVEL, TRACE TO LITTLE CLAY
BLACK OILY SOIL. SLIGHTLY HIGHER CLAY CONTENT. PETROLEUM ODOR. PID READING 0ppm (PID UNITS)
BLACK SILTY SAND WITH GRAVEL, PETROLEUM ODOR, TAR, SLAG, WOOD, ETC. (BED OF OLD RAILROAD YARD)
A15D SAMPLES TAKEN FOR VISUAL INSPECTION AND HEAD SPACE PID READINGS (SEE TABLE 1)
A40 SAMPLES COMPOSITED FOR PHASE I LABORATORY ANALYSIS (SEE TABLE 1)
A16D SAMPLES COMPOSITED FOR PHASE II LABORATORY ANALYSIS (SEE TABLE 1)
A10E SAMPLE TAKEN FOR VOLATILE ORGANIC ANALYSIS
A12D SAMPLE TAKEN FOR TOTAL PETROLEUM HYDROCARBON ANALYSIS
20ppm PID READING MEASURED IN FIELD
0 10 20 FEET
HORIZONTAL SCALE (APPROXIMATE)
VERTICAL EXAGGERATION= 3.3X
TITLE TRENCH CROSS SECTION E-E' (SOUTH WALL)
BALLFIELDS-AREA A
PROJECT CHEVRON REFINERY
PHILADELPHIA, PENNSYLVANIA
Dames & Moore
TREVOSE, PENNSYLVANIA
SCALE AS SHOWN
DWN. BY G.E.B.
JOB NO. 16000-026
DATE 2/23/88
APPR. BY D.W.
FIG. NO. 4



NOTES:

1. ALL SAMPLING AND TRENCH LOCATIONS ARE APPROXIMATE. LOCATION, SIZE AND SHAPE OF MOUND ARE ALSO APPROXIMATE.

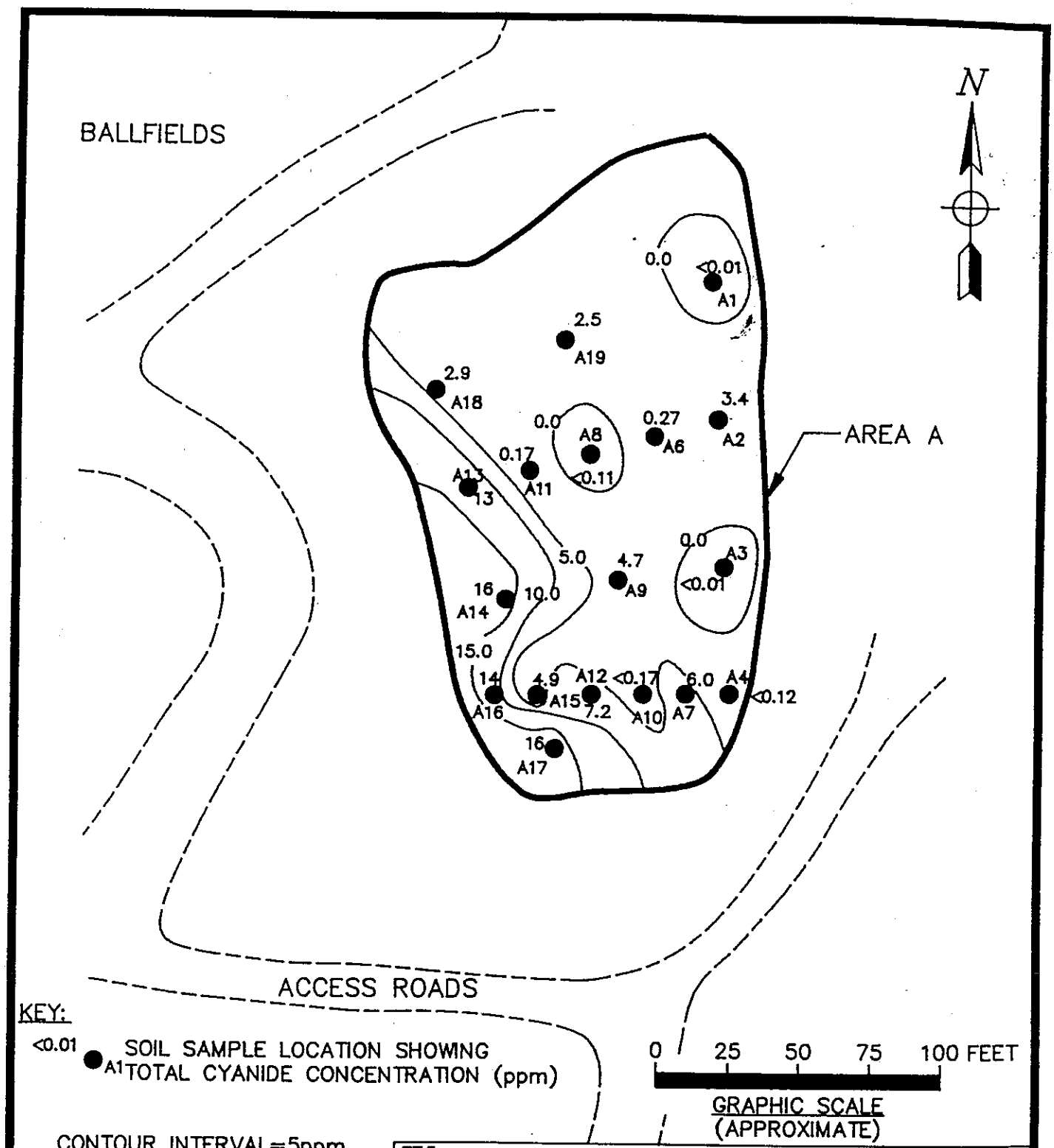
2. B/N—BASE NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS.

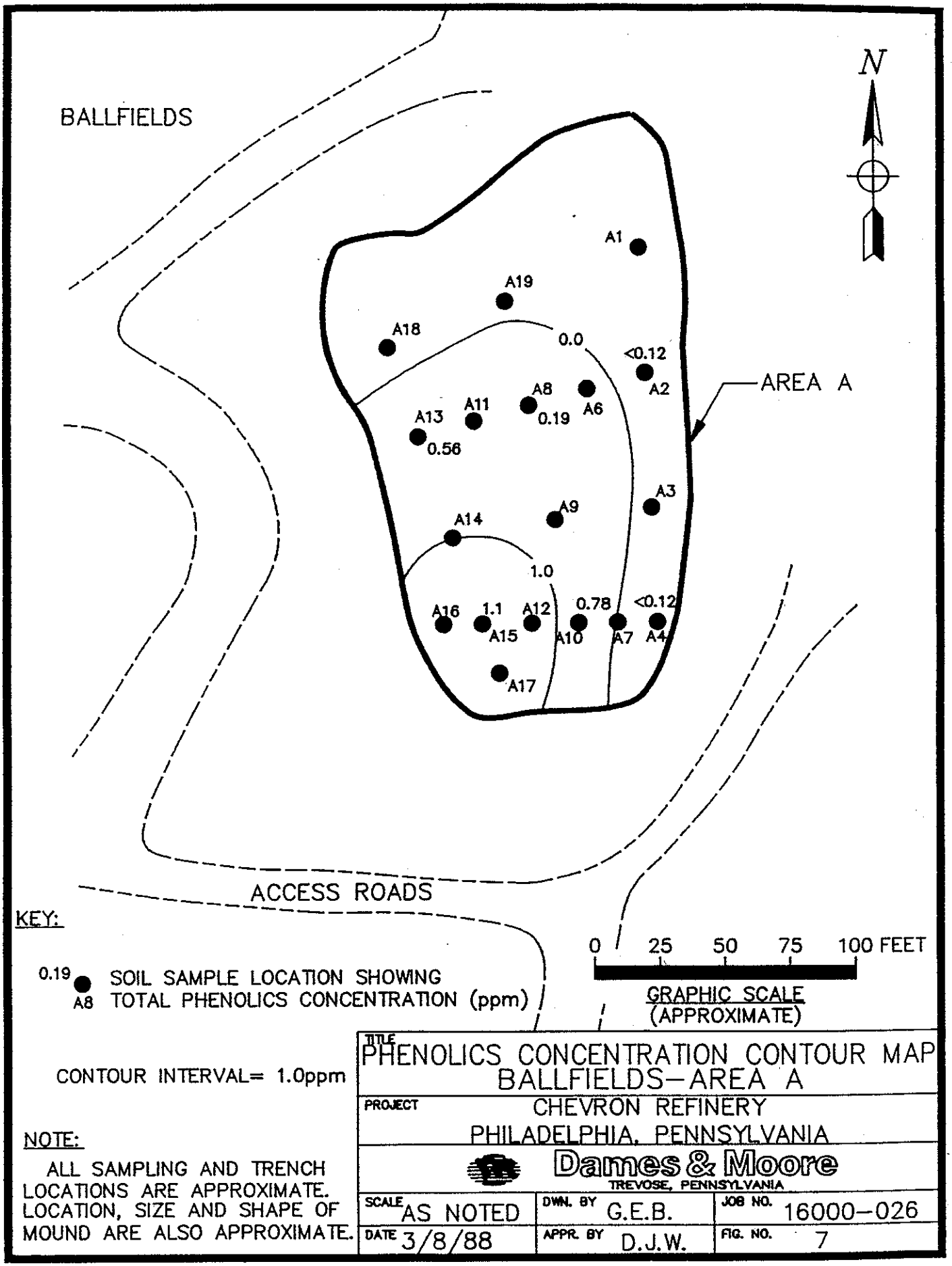
TITLE: B/N CONCENTRATION CONTOUR MAP
BALLFIELDS—AREA A

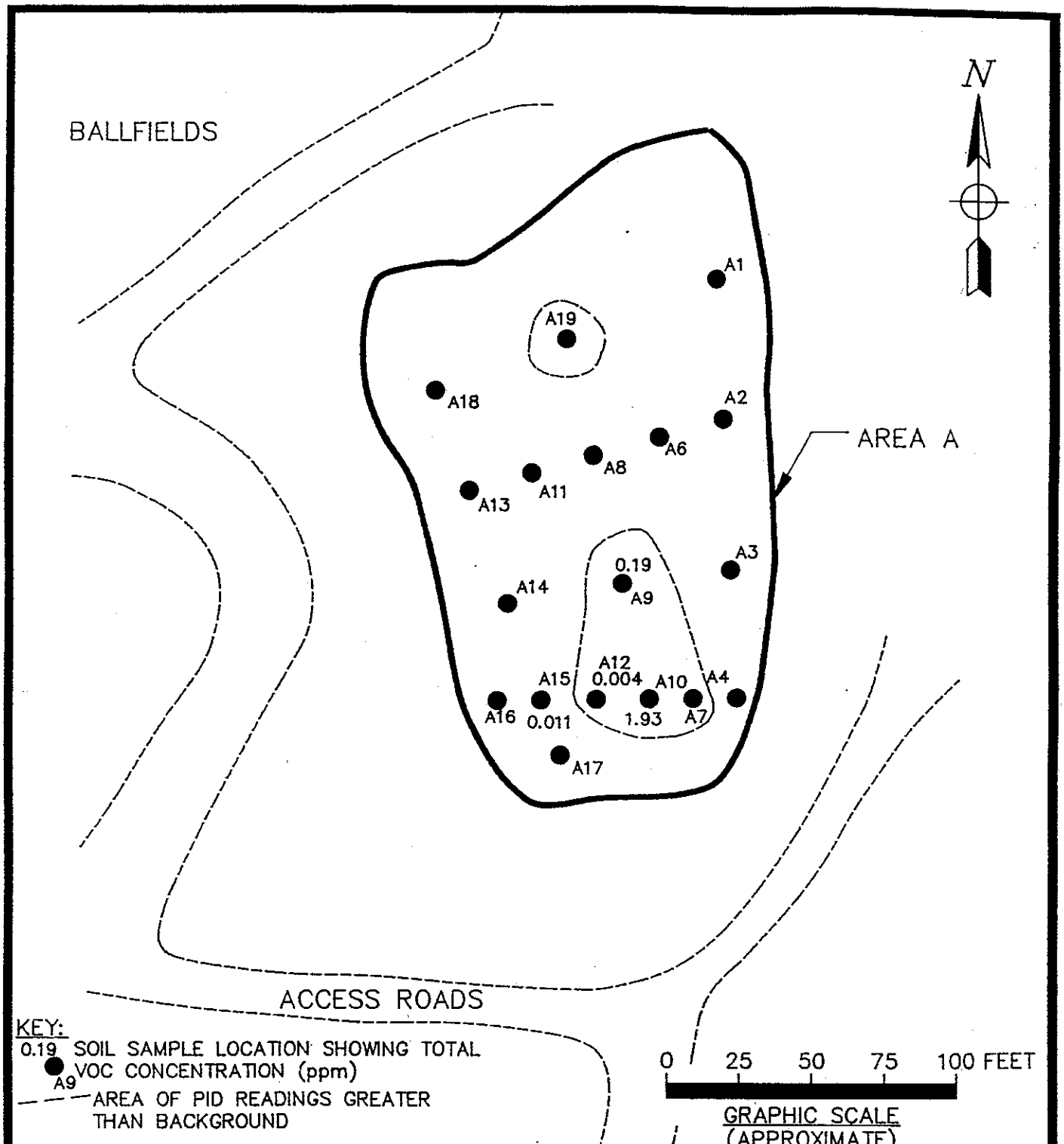
PROJECT: CHEVRON REFINERY
PHILADELPHIA, PENNSYLVANIA

Dames & Moore
TREVOSE, PENNSYLVANIA

SCALE	DWN. BY	JOB NO.
AS NOTED	G.E.B.	16000—026
DATE 3/8/88	APPR. BY D.J.W.	FIG. NO. 5


BALLFIELDS
N
AREA A
ACCESS ROADS
0.0
<0.01
A1
2.5
A19
2.9
A18
3.4
A2
0.27
A6
0.0
A8
<0.11
0.17
A11
A13
13
5.0
4.7
A9
0.0
A3
<0.01
16
A14
10.0
15.0
14
A16
4.9
A15
7.2
A12
<0.17
A10
6.0
A7
A4
<0.12
16
A17
KEY:
<0.01
A1 SOIL SAMPLE LOCATION SHOWING TOTAL CYANIDE CONCENTRATION (ppm)
CONTOUR INTERVAL=5ppm
0 25 50 75 100 FEET
GRAPHIC SCALE
(APPROXIMATE)
NOTE:
ALL SAMPLING AND TRENCH LOCATIONS ARE APPROXIMATE. LOCATION, SIZE AND SHAPE OF MOUND ARE ALSO APPROXIMATE.
TITLE
CYANIDE CONCENTRATION CONTOUR MAP
BALLFIELDS–AREA A
PROJECT
CHEVRON REFINERY
PHILADELPHIA, PENNSYLVANIA
Dames & Moore
TREVOSE, PENNSYLVANIA
SCALE AS NOTED
DWN. BY G.E.B.
JOB NO. 16000–026
DATE 3/8/88
APPR. BY D.J.W.
FIG. NO. 6


BALLFIELDS
N
A1
A19
A18
0.0
<0.12
A2
AREA A
A8
A6
A11
A13
0.19
0.56
A3
A9
A14
1.0
A16
1.1
A12
0.78
<0.12
A15
A10
A7
A4
A17
ACCESS ROADS
KEY:
0.19
A8
SOIL SAMPLE LOCATION SHOWING
TOTAL PHENOLICS CONCENTRATION (ppm)
0 25 50 75 100 FEET
GRAPHIC SCALE
(APPROXIMATE)
CONTOUR INTERVAL= 1.0ppm
NOTE:
ALL SAMPLING AND TRENCH LOCATIONS ARE APPROXIMATE. LOCATION, SIZE AND SHAPE OF MOUND ARE ALSO APPROXIMATE.
TITLE
PHENOLICS CONCENTRATION CONTOUR MAP
BALLFIELDS–AREA A
PROJECT
CHEVRON REFINERY
PHILADELPHIA, PENNSYLVANIA
Dames & Moore
TREVOSE, PENNSYLVANIA
SCALE AS NOTED
DWN. BY G.E.B.
JOB NO. 16000–026
DATE 3/8/88
APPR. BY D.J.W.
FIG. NO. 7



NOTES: 1. ALL SAMPLING AND TRENCH LOCATIONS ARE APPROXIMATE. LOCATION, SIZE AND SHAPE OF MOUND ARE ALSO APPROXIMATE.

2. VOC - VOLATILE ORGANIC COMPOUND.

TITLE: TOTAL VOC CONCENTRATIONS AND AREA OF PID READINGS GREATER THAN BACKGROUND BALLFIELDS – AREA A		
PROJECT: CHEVRON REFINERY PHILADELPHIA, PENNSYLVANIA		
Dames & Moore TREVOSE, PENNSYLVANIA		
SCALE: AS NOTED	DWN. BY: G.E.B.	JOB NO.: 16000-026
DATE: 3/8/88	APPR. BY: D.J.W.	FIG. NO.: 8

APPENDIX A

PID Calibration Data

TIMELY
ENVIRONMENTAL
SERVICE
TECHNOLOGY

P.O. BOX 11181 TRENTON, NEW JERSEY 08620
TEL. (609) 888-0685

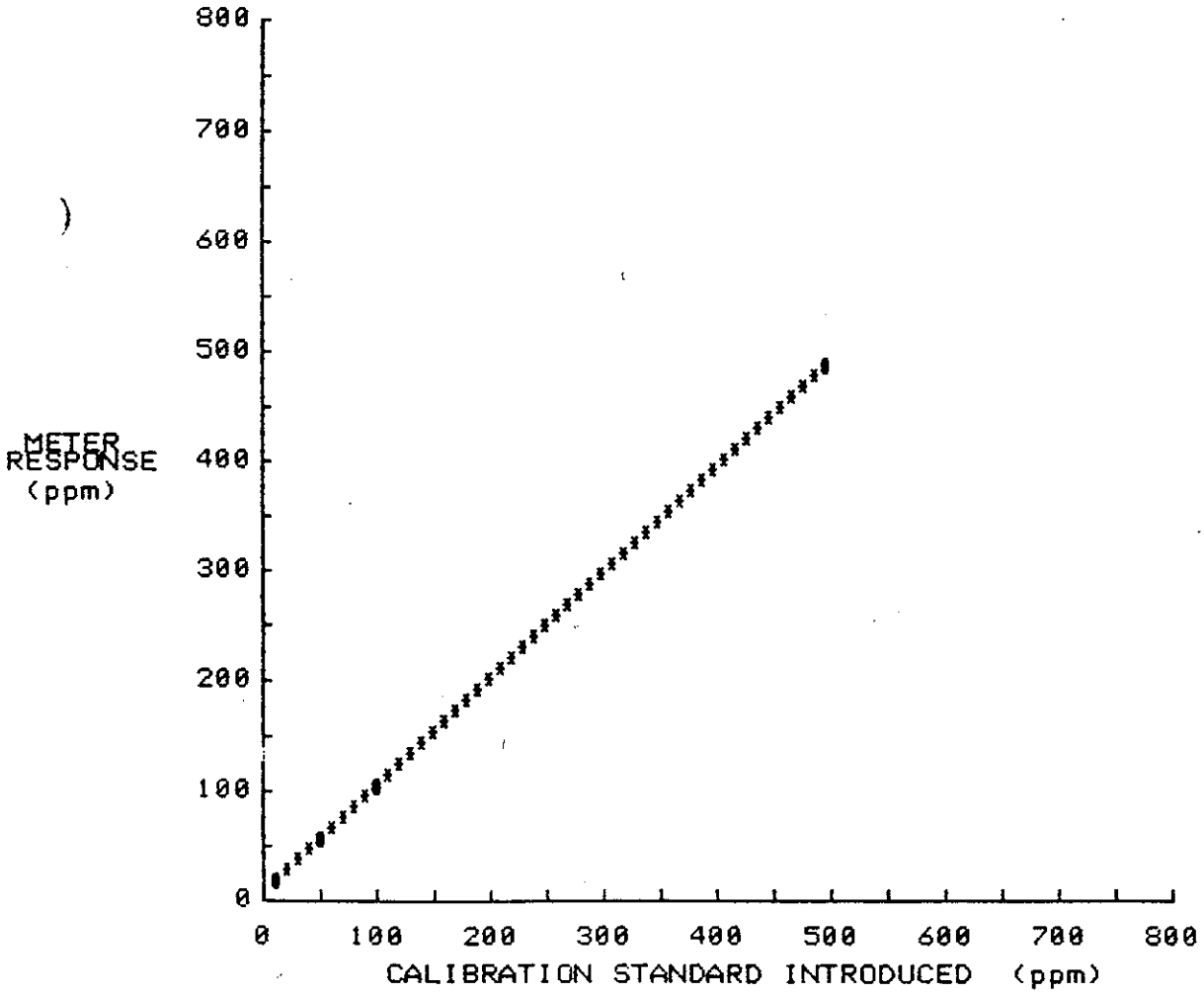
P.I.D. CALIBRATION GRAPH

CLIENT : DAMES AND MOORE ,PA.
MODEL NO. : HNU PI -101
SERIAL NO(S). : 52095 52073 D&M 2 2713

LAMP : 10.2EV
SPAN POT SETTING : 9.8
CALIBRATION TEMP : 74F

DATE : 12-29-87
TIME : 17:00
TECHNICIAN : TED WHITE

BENZENE STANDARD INTRODUCED (ppm)	METER RESPONSE (ppm)	RANGE (ppm)
10.67	13.20	0-20
49.72	51.00	0-200
95.24	96.00	0-200
503.90	480.00	0-2000



Instrument responded as per calibration graph above.
TIMELY ENVIRONMENTAL SERVICE TECHNOLOGY will not take responsibility for instrument performance after time and date stated above.

EQUIPMENT CALIBRATION MAINTENANCE & REPAIR LOG

TYPE OF EQUIPMENT: PHOTO IONIZATION DETECTOR (P.I.D)

MANUFACTURER: HNU SYSTEMS

MODEL: HNU PI-101

SERIAL #: 2-2713

MAINTENANCE PROCEDURES: CALIBRATE DAILY - IF UNIT NEEDS CALIBRATION CLEAN BULB AND OTHER PARTS THAT ARE SUSCEPTIBLE TO GRIME. CHARGE BATTERY WHEN NEEDED AND CLEAN FAN WHEN NEEDED.

DATE USED	BY	JOB #	CALIBRATION YES/NO	OPERATING PROCEDURES ATTACHED YES/NO	MAINTENANCE PERFORMED, WORKING CONDITION, PARTS REPLACED: DESCRIBE (i.e. replaced membrane, cleaned hoses, etc.)
1/19/88	S.W.	6300-026	Y	N	USING 64 ppm CALIBRATION GAS INSTRUMENT READ 60 ppm
1/21/88	S.W.	"	Y	N	CALIBRATION DID NOT CHANGE
1/22/88	S.W.	"	N	N	
1/25/88	S.W.	"	Y	N	INSTRUMENT DIRTY - BULB CLEANED AND CALIBRATION CHECKED - READ 59 ppm
1/26/88	S.W.	"	Y	N	READING CHANGED TO 60 ppm

APPENDIX B

Laboratory Reports

CENTURY LABORATORIES, INC.

1501 Grandview Ave., Thorofare, NJ 08086 609/848-3939

REPORT #: 88-0150
DATE: 03/15/88

REVISED

CLIENT

DAMES & MOORE
4620 Street Road
Trevose, Pennsylvania 19047

SUBJECT

Five (5) samples submitted by the client on January 27, 1988 and identified as: Project-Chevron Ballfields (1) BVOA, (2) BPH, (3) A8, (4) A10 and (5) A4. *(See attached sheet)

AUTHORIZATION

David Wagner

PURPOSE

Chemical Analysis

PROCEDURE

Samples were analyzed in accordance with procedures presented in the following:

1. "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", 2nd Ed., 1984 U.S. Environmental Protection Agency (SW-846)

2. "Methods for the Chemical Analysis of Water and Wastes", March, 1979, U.S. Environmental Protection Agency (EPA-600/4-79-020)

3. "Interim Method For The Determination of Reactive Cyanide and Sulfide Containing Wastes", NJDEP Division of Waste Management.

4. Flash Point - ASTM D-5 6

CENTURY LABORATORIES, INC.

Rodney T. Miller

Rodney T. Miller

1h
NJ DEP CERTIFICATION NO: 08153

As per client request, sample identifications were changed from the original chain of custody. Sample identified as 2VOA was changed to BVOA and sample identified as 1PH was changed to BPH.

CENTURY LABORATORIES, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: DAMES & MOORE
Sample ID: BVOA
% Moisture: 19.00

Report #: 0150
Century ID: 2745

	ug/kg		ug/kg
Chloromethane	12 U	1,2-Dichloropropane	7 U
Bromomethane	12 U	trans-1,3-Dichloropropene	6 U
Vinyl chloride	12 U	Trichloroethene	2 U
Chloroethane	12 U	Chlorodibromomethane	4 U
Methylene chloride	3 U	1,1,2-Trichloroethane	6 U
Benzene	5 U	cis-1,3-Dichloropropene	6 U
1,1-Dichloroethene	3 U	2-Chloroethyl vinyl ether	12 U
1,1-Dichloroethane	6 U	Bromoform	6 U
trans-1,2-Dichloroethene	2 U	Chloroform	2 U
1,2-Dichloroethane	3 U	Tetrachloroethene	5 U
1,1,2,2-Tetrachloroethane	9 U	1,1,1-Trichloroethane	5 U
Toluene	4 J	Carbon tetrachloride	3 U
Chlorobenzene	7 U	Ethylbenzene	9 U
Bromodichloromethane	3 U	1,2-&1,4-Dichlorobenzenes	12 U
1,3-Dichlorobenzene	6 U	Trichlorofluoromethane	2 U

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

CENTURY LABORATORIES, INC.
REVISED
CLIENT: Dames & Moore
REPORT #: 88-0150
CLIENT I.D.: Chevron Ballfields
BPH

February 29, 1988

PARAMETER	RESULTS (mg/kg)
Petroleum Hydrocarbons	210

CENTURY LABORATORIES, INC.

Report #: 88-0150

Client: Dames & Moore

February 29, 1988

Client ID: 01/26/88
A8

Parameter	Results (mg/kg)
Cyanide	<0.11
Phenols	0.19

CENTURY LABORATORIES, INC. DATE: 02/29/88

CLIENT: Dames & Moore
REPORT #: 88-0150

CERTIFICATE OF ANALYSIS
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

	*MAL	Chevron Ballfields A8
TOTAL SAMPLE ANALYSIS (mg/kg):		
Corrosivity (pH standard units)	2 - 12.5	6.8
Ignitability	60° C	>60° C
Reactivities:		
Cyanide	N.A.	<1
Sulfide	N.A.	<1
LEACHATE ANALYSIS (mg/l):		
Arsenic	5.0	0.011
Barium	100.0	0.35
Cadmium	1.0	<0.005
Chromium	5.0	<0.01
Lead	5.0	<0.10
Mercury	0.2	<0.0002
Selenium	1.0	<0.002
Silver	5.0	<0.01
Endrin	0.02	0.002 U
Lindane	0.4	0.04 U
Methoxychlor	10.0	1.0 U
Toxaphene	0.5	0.05 U
** 2,4-D	10.0	0.01 U
** 2,4,5-TP (Silvex)	1.0	0.003 U

*MAL - Maximum allowable level, as per 40 CFR 261
N.A. - Not applicable
< - Less than. Parameter not detected at or above value shown.
** - This analysis was subcontracted to another laboratory.

DEFINITIONS:

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

CENTURY LABORATORIES, INC.
Report of Results

BASE/NEUTRAL ORGANICS ANALYSIS

Client: DAMES & MOORE
Sample ID: A8
% Moisture: 11.96

Report #: 0150
Century ID: 2747

	ug/kg			ug/kg	
Acenaphthene	72	U	bis(2-Chloroethyl)Ether	220	U
1,3-Dichlorobenzene	72	U	1,4-Dichlorobenzene	170	U
2,4-Dinitrotoluene	220	U	2,6-Dinitrotoluene	72	U
1,2-Dichlorobenzene	72	U	Diethylphthalate	72	U
4-Chlorophenyl-phenylether	160	U	bis(2-chloroisopropyl)Ether	220	U
Fluorene	450		N-Nitroso-Di-n-Propylamine	380	U
Hexachloroethane	61	U	N-Nitrosodiphenylamine (1)	72	U
Nitrobenzene	72	U	4-Bromophenyl-phenylether	72	U
Isophorone	83	U	Hexachlorobenzene	72	U
Phenanthrene	2400		Anthracene	710	
bis(2-Chloroethoxy)Methane	200	U	Di-n-Butylphthalate	95	U
Fluoranthene	2200		1,2,4-Trichlorobenzene	72	U
Pyrene	3100		Naphthalene	2500	
Butylbenzylphthalate	95	U	3,3'-Dichlorobenzidine	620	U
Hexachlorobutadiene	34	U	Benzo(a)Anthracene	1100	
bis(2-ethylhexyl)phthalate	95	U	Chrysene	1400	
Hexachlorocyclopentadiene	380	U	Di-n-Octyl Phthalate	95	U
Benzo(b)Fluoranthene	1200		Benzo(k)Fluoranthene	95	U
2-Chloronaphthalene	72	U	Benzo(a)Pyrene	1400	
Indeno(1,2,3-cd)Pyrene	1600		Dimethyl Phthalate	61	U
Dibenz(a,h)Anthracene	95	U	Acenaphthylene	860	
Benzo(g,h,i)Perylene	2000				

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

(1) Cannot be separated from diphenylamine

CENTURY LABORATORIES, INC.

Report #: 88-0150

Client: Dames & Moore

February 29, 1988

Client ID: 01/26/88
A10

Parameter	Results (mg/kg)
Cyanide	<0.12
Phenols	0.78

CENTURY LABORATORIES, INC. DATE: 02/29/88

CLIENT: Dames & Moore
REPORT #: 88-0150

CERTIFICATE OF ANALYSIS
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

	*MAL	Chevron Ballfields A10
TOTAL SAMPLE ANALYSIS (mg/kg):		
Corrosivity (pH standard units)	2 - 12.5	7.0
Ignitability	60° C	>60° C
Reactivities:		
Cyanide	N.A.	<1
Sulfide	N.A.	<1
LEACHATE ANALYSIS (mg/l):		
Arsenic	5.0	<0.004
Barium	100.0	0.40
Cadmium	1.0	<0.005
Chromium	5.0	<0.01
Lead	5.0	<0.10
Mercury	0.2	<0.0002
Selenium	1.0	<0.002
Silver	5.0	<0.01
Endrin	0.02	0.002 U
Lindane	0.4	0.04 U
Methoxychlor	10.0	1.0 U
Toxaphene	0.5	0.05 U
** 2,4-D	10.0	0.01 U
** 2,4,5-TP (Silvex)	1.0	0.003 U

*MAL - Maximum allowable level, as per 40 CFR 261
N.A. - Not applicable
< - Less than. Parameter not detected at or above value shown.
** - This analysis was subcontracted to another laboratory.

DEFINITIONS:

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

CENTURY LABORATORIES, INC.
Report of Results

BASE/NEUTRAL ORGANICS ANALYSIS

Client: DAMES & MOORE
Sample ID: A10
% Moisture: 14.30

Report #: 0150
Century ID: 2748

	ug/kg			ug/kg	
Acenaphthene	74	U	bis(2-Chloroethyl)Ether	220	U
1,3-Dichlorobenzene	74	U	1,4-Dichlorobenzene	170	U
2,4-Dinitrotoluene	220	U	2,6-Dinitrotoluene	74	U
1,2-Dichlorobenzene	74	U	Diethylphthalate	74	U
4-Chlorophenyl-phenylether	160	U	bis(2-chloroisopropyl)Ether	220	U
Fluorene	100		N-Nitroso-Di-n-Propylamine	390	U
Hexachloroethane	63	U	N-Nitrosodiphenylamine (1)	74	U
Nitrobenzene	74	U	4-Bromophenyl-phenylether	74	U
Isophorone	86	U	Hexachlorobenzene	74	U
Phenanthrene	700		Anthracene	200	
bis(2-Chloroethoxy)Methane	210	U	Di-n-Butylphthalate	98	U
Fluoranthene	560		1,2,4-Trichlorobenzene	74	U
Pyrene	1100		Naphthalene	700	
Butylbenzylphthalate	98	U	3,3'-Dichlorobenzidine	650	U
Hexachlorobutadiene	35	U	Benzo(a)Anthracene	430	
bis(2-ethylhexyl)phthalate	98	U	Chrysene	540	
Hexachlorocyclopentadiene	390	U	Di-n-Octyl Phthalate	98	U
Benzo(b)Fluoranthene	1300		Benzo(k)Fluoranthene	98	U
2-Chloronaphthalene	74	U	Benzo(a)Pyrene	850	
Indeno(1,2,3-cd)Pyrene	1600		Dimethyl Phthalate	63	U
Dibenz(a,h)Anthracene	98	U	Acenaphthylene	140	
Benzo(g,h,i)Perylene	2000				

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

(1) Cannot be separated from diphenylamine

CENTURY LABORATORIES, INC.

Report #: 88-0150

Client: Dames & Moore

February 29, 1988

Client ID: 01/26/88
A4

Parameter	Results (mg/kg)
Cyanide	<0.12
Phenols	<0.12

CENTURY LABORATORIES, INC. DATE: 02/29/88

CLIENT: Dames & Moore
REPORT #: 88-0150

CERTIFICATE OF ANALYSIS
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

	*MAL	Chevron Ballfields A4
TOTAL SAMPLE ANALYSIS (mg/kg):		
Corrosivity (pH standard units)	2 - 12.5	7.1
Ignitability	60° C	>60° C
Reactivities:		
Cyanide	N.A.	<1
Sulfide	N.A.	<1
LEACHATE ANALYSIS (mg/l):		
Arsenic	5.0	0.006
Barium	100.0	0.16
Cadmium	1.0	<0.005
Chromium	5.0	<0.01
Lead	5.0	<0.10
Mercury	0.2	<0.0002
Selenium	1.0	<0.002
Silver	5.0	<0.01
Endrin	0.02	0.002 U
Lindane	0.4	0.04 U
Methoxychlor	10.0	1.0 U
Toxaphene	0.5	0.05 U
** 2,4-D	10.0	0.01 U
** 2,4,5-TP (Silvex)	1.0	0.003 U

*MAL - Maximum allowable level, as per 40 CFR 261
N.A. - Not applicable
< - Less than. Parameter not detected at or above value shown.
** - This analysis was subcontracted to another laboratory.

DEFINITIONS:

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

CENTURY LABORATORIES, INC.
Report of Results

BASE/NEUTRAL ORGANICS ANALYSIS

Client: DAMES & MOORE
Sample ID: A4
% Moisture: 13.45

Report #: 0150
Century ID: 2749

	ug/kg			ug/kg	
Acenaphthene	73	U	bis(2-Chloroethyl)Ether	220	U
1,3-Dichlorobenzene	73	U	1,4-Dichlorobenzene	170	U
2,4-Dinitrotoluene	220	U	2,6-Dinitrotoluene	73	U
1,2-Dichlorobenzene	73	U	Diethylphthalate	73	U
4-Chlorophenyl-phenylether	160	U	bis(2-chloroisopropyl)Ether	220	U
Fluorene	240		N-Nitroso-Di-n-Propylamine	390	U
Hexachloroethane	62	U	N-Nitrosodiphenylamine (1)	73	U
Nitrobenzene	73	U	4-Bromophenyl-phenylether	73	U
Isophorone	85	U	Hexachlorobenzene	73	U
Phenanthrene	2000		Anthracene	450	
bis(2-Chloroethoxy)Methane	200	U	Di-n-Butylphthalate	96	U
Fluoranthene	1500		1,2,4-Trichlorobenzene	73	U
Pyrene	3500		Naphthalene	660	
Butylbenzylphthalate	96	U	3,3'-Dichlorobenzidine	640	U
Hexachlorobutadiene	35	U	Benzo(a)Anthracene	1200	
bis(2-ethylhexyl)phthalate	96	U	Chrysene	1500	
Hexachlorocyclopentadiene	390	U	Di-n-Octyl Phthalate	96	U
Benzo(b)Fluoranthene	920		Benzo(k)Fluoranthene	96	U
2-Chloronaphthalene	73	U	Benzo(a)Pyrene	1400	
Indeno(1,2,3-cd)Pyrene	820		Dimethyl Phthalate	62	U
Dibenz(a,h)Anthracene	96	U	Acenaphthylene	390	
Benzo(g,h,i)Perylene	2300				

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

(1) Cannot be separated from diphenylamine

CENTURY LABORATORIES, INC.

Report #: 88-0150

February 29, 1988

CLIENT: Dames & Moores

LABORATORY ANALYSIS - PCB's (AROCLORS)

Results (ug/kg)

Parameter	Chevron Ballfields A8	A10	A4
Aroclor 1016	1,000 U	350 U	690 U
Aroclor 1221	1,000 U	1,200 U	690 U
Aroclor 1232	1,000 U	350 U	690 U
Aroclor 1242	1,000 U	350 U	690 U
Aroclor 1248	1,000 U	350 U	350 U
Aroclor 1254	1,000 U	350 U	350 U
Aroclor 1260	1,000 U	350 U	350 U
Aroclor 1268	1,000 U	350 U	350 U

DEFINITIONS:

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: CHEVRON BOULDERS

Project Title: BOULDERS SOIL PILE A

Job No.: 16000-026

Field Personnel (Signature): David Noyes

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/26/88		2 VOA	SOIL	2		NORMAL TURNAROUND
1/26/88		1 PH		1		PETROLEUM HYDROCARBONS Normal Turnaround
		A8		1		FOSSIL TURNAROUND POSSIBLE
		A10		1		" " "
		A4		1		" " "
						ANALYZE FOR:
						EP TOX METALS, PEST. &
						HERB., PCBS, TOTAL
						CYANIDE, B/N, PHENOLS,
						CORROSIVITY, IGNITABILITY
						REACTIVITY, & PH

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
David Noyes	1/27/88			1/28/88	2:25						
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

CENTURY LABORATORIES, INC.

1501 Grandview Ave., Thorofare, NJ 08086 609/848-3939

REPORT #: 88-0139
DATE: 02/29/88

CLIENT DAMES & MOORE
4620 Street Road
Trevose, Pa. 19047

SUBJECT Four (4) Samples submitted by the client on 01/25/88, and identified as: 01/25/88 (1) A12D-Pile A Ballfield-Pile A-Chevron, (2) A15BPH-Pile A-Ballfield-Chevron, (3) A15BVOA-Pile A-Ballfield-Chevron, (4) A15-Pile A-Ballfield-Chevron.

AUTHORIZATION David Wagner

PURPOSE Chemical Analysis

PROCEDURE Samples were analyzed in accordance with procedures presented in the following:

1. "Methods for the Chemical Analysis of Water and Wastes", March, 1979, U.S. Environmental Protection Agency (EPA-600/4-79-020)
2. "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", 2nd Ed., 1984 U.S. Environmental Protection Agency (SW-846)
3. "Interim Method For The Determination of Reactive Cyanide and Sulfide Containing Wastes", NJDEP Division of Waste Management.

CENTURY LABORATORIES, INC.

Rodney T. Miller

Rodney T. Miller

lh
NJ DEP CERTIFICATION NO: 08153

REPORT NARRATIVE

Sample A-15 Pile A Ballfield Chevron in the PCB analysis required a dilution. This raised the detection limits for the sample. The problem was excessive early eluting matrix which obscured the early aroclors and made identification of late ones difficult.

CENTURY LABORATORIES, INC.

REPORT OF ANALYSIS

Client: DAMES & MOORE

Date: 02-29-88
Job No: 88-0139

Date Received: 01-25-88 1149
Project: Chevron

Sample ID: A15 - Pile A Ballfield
01/25/88

Parameter	Results	Units
Cyanide	4.9	mg/kg
Phenols	1.1	mg/kg

Sample ID:	Petroleum Hydrocarbons	Units
01/21/88 A12D Ballfield Pile A	740	mg/kg
01/25/88 A15PH Ballfield Pile A	24	mg/kg

CENTURY LABORATORIES, INC. DATE: 02/29/88

CLIENT: Dames & Moore
REPORT #: 88-0139
CLIENT ID: A15 - PILE A
BALLFIELD-CHEVRON

CERTIFICATE OF ANALYSIS
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

	*MAL	RESULTS
TOTAL SAMPLE ANALYSIS (mg/kg):		
Corrosivity (pH standard units)	2 - 12.5	4.8
Ignitability	60°C	>60°C
Reactivities:		
Cyanide	N.A.	<1.2
Sulfide	N.A.	<1.2
LEACHATE ANALYSIS (mg/l):		
Arsenic	5.0	0.01
Barium	100.0	0.30
Cadmium	1.0	<0.005
Chromium	5.0	<0.01
Lead	5.0	<0.10
Mercury	0.2	<0.0002
Selenium	1.0	<0.002
Silver	5.0	<0.01
Endrin	0.02	0.0002 U
Lindane	0.4	0.0001 U
Methoxychlor	10.0	0.002 U
Toxaphene	0.5	0.010 U
** 2,4-D	10.0	0.01 U
** 2,4,5-TP (Silvex)	1.0	0.003 U

*MAL - Maximum allowable level, as per 40 CFR 261
N.A. - Not applicable
< - Less than. Parameter not detected at or above value shown.
** - Herbicides were sub-contracted to another laboratory.

DEFINITIONS:

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

CENTURY LABORATORIES, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: Dames & Moore
Sample ID: A15BV0A-Pile-A
Ballfield-Chevron
% Moisture: 17.50

Report #: 0139
Century ID: 2704

	ug/kg			ug/kg	
Chloromethane	12	U	1,2-Dichloropropane	7	U
Bromomethane	12	U	trans-1,3-Dichloropropene	6	U
Vinyl chloride	12	U	Trichloroethene	2	U
Chloroethane	12	U	Chlorodibromomethane	4	U
Methylene chloride	6	B (B=3)	1,1,2-Trichloroethane	6	U
Benzene	5	U	cis-1,3-Dichloropropene	6	U
1,1-Dichloroethene	3	U	2-Chloroethyl vinyl ether	12	U
1,1-Dichloroethane	6	U	Bromoform	6	U
trans-1,2-Dichloroethene	2	U	Chloroform	2	U
1,2-Dichloroethane	3	U	Tetrachloroethene	5	U
1,1,2,2-Tetrachloroethane	8	U	1,1,1-Trichloroethane	5	U
Toluene	6	J	Carbon tetrachloride	3	U
Chlorobenzene	7	U	Ethylbenzene	11	
Bromodichloromethane	3	U	1,2-&1,4-Dichlorobenzenes	12	U
1,3-Dichlorobenzene	6	U	Trichlorofluoromethane	2	U

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probabl contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

CENTURY LABORATORIES, INC.
Report of Results

BASE/NEUTRAL ORGANICS ANALYSIS

Client: Dames & Moore

Report #: 0139

Sample ID: A-15-Pile A
Ballfield - Chevron

Century ID: 2705

% Moisture: 13.85

	ug/kg			ug/kg	
Acenaphthene	440	U	bis(2-Chloroethyl)Ether	1300	U
1,3-Dichlorobenzene	440	U	1,4-Dichlorobenzene	1000	U
2,4-Dinitrotoluene	1300	U	2,6-Dinitrotoluene	440	U
1,2-Dichlorobenzene	440	U	Diethylphthalate	440	U
4-Chlorophenyl-phenylether	980	U	bis(2-chloroisopropyl)Ether	1300	U
Fluorene	440	U	N-Nitroso-Di-n-Propylamine	2300	U
Hexachloroethane	370	U	N-Nitrosodiphenylamine (1)	440	U
Nitrobenzene	440	U	4-Bromophenyl-phenylether	440	U
Isophorone	510	U	Hexachlorobenzene	440	U
Phenanthrene	2300		Anthracene	440	U
bis(2-Chloroethoxy)Methane	1200	U	Di-n-Butylphthalate	580	U
Fluoranthene	2300		1,2,4-Trichlorobenzene	440	U
Pyrene	3200		Naphthalene	880	
Butylbenzylphthalate	580	U	3,3'-Dichlorobenzidine	3800	U
Hexachlorobutadiene	210	U	Benzo(a)Anthracene	1300	J
bis(2-ethylhexyl)phthalate	580	U	Chrysene	1700	
Hexachlorocyclopentadiene	2300	U	Di-n-Octyl Phthalate	580	U
Benzo(b)Fluoranthene	2600		Benzo(k)Fluoranthene	580	U
2-Chloronaphthalene	440	U	Benzo(a)Pyrene	2000	
Indeno(1,2,3-cd)Pyrene	2500		Dimethyl Phthalate	370	U
Dibenz(a,h)Anthracene	460	J	Acenaphthylene	1500	
Benzo(g,h,i)Perylene	3800				

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

(1) Cannot be separated from diphenylamine

CENTURY LABORATORIES, INC.

Report #: 88-0139

CLIENT: Dames & Moore

February 29, 1988

LABORATORY ANALYSIS - PCB's (AROCLORS)

Results (ug/kg)

Parameter	A-15 - Pile A Ballfield - Chevron
Aroclor 1016	1,400 U
Aroclor 1221	2,800 U
Aroclor 1232	1,400 U
Aroclor 1242	1,400 U
Aroclor 1248	1,400 U
Aroclor 1254	1,400 U
Aroclor 1260	1,400 U
Aroclor 1268	1,400 U

DEFINITIONS:

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: CHEVRON Bollfield Soil File A

Project Title: Bollfield Soil File A

Job No. 16000-022

Field Personnel (Signature): [signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/21/88		A12D	Soil	1	Bollfield	PET. NON-HALOGEN TURNAROUND
1/26/88		~~A15CPH~~	SOIL	1		PET " " "
1/26/88		~~A15VOA~~ →	SOIL	2		VOA NORMAL TURNAROUND
1/27/88		A15	SOIL	1		FAST TURNAROUND
						ONLY FOR SOIL PARAMETERS LISTED FOR A15 AND A15-A13
		A15BPH				
		A15BVOA				

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	1/27/88	15 11	[signature]	1/28/88	1145				[signature]	1/28/88	1145
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

CENTURY LABORATORIES, INC.

1501 Grandview Ave., Thorofare, NJ 08086 609/848-3939

REPORT #: 88-0137
DATE: 02/29/88

CLIENT DAMES & MOORE
4620 Street Road
Trevose, Pennsylvania 19047

SUBJECT Four (4) samples submitted by the client on January 23, 1988 and identified as: Project Title- Chevron Ballfields- (1) A10 E, (2) A12 D, (3) A2, and (4) A13.

AUTHORIZATION Mr. David Wagner

PURPOSE Chemical Analysis

PROCEDURE Samples were analyzed in accordance with procedures presented in the following:

1. "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", 2nd Ed., 1984 U.S. Environmental Protection Agency (SW-846)
2. "Methods for the Chemical Analysis of Water and Wastes", March, 1979, U.S. Environmental Protection Agency (EPA-600/4-79-020)
3. "Interim Method For The Determination of Reactive Cyanide and Sulfide Containing Wastes", NJDEP Division of Waste Management.
4. Flash Point- ASTM D-56

CENTURY LABORATORIES, INC.

Rodney T. Miller

Rodney T. Miller

jnf
NJ DEP CERTIFICATION NO: 08153

Report Narrative

The sample identified as Chevron A10E was prepped as a volatile organic medium level sample to get target compounds into the linear range of the instrument. Detection limits were higher because of the procedure outlined above.

CENTURY LABORATORIES, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: Dames & Moore
Sample ID: A10 E Ballfield-Chevron
% Moisture: 14.06

Report #: 0137
Century ID: 2690

	ug/kg			ug/kg	
Chloromethane	1500	U	1,2-Dichloropropane	870	U
Bromomethane	1500	U	trans-1,3-Dichloropropene	730	U
Vinyl chloride	1500	U	Trichloroethene	280	U
Chloroethane	1500	U	Chlorodibromomethane	450	U
Methylene chloride	410	U	1,1,2-Trichloroethane	730	U
Benzene	640	U	cis-1,3-Dichloropropene	730	U
1,1-Dichloroethene	410	U	2-Chloroethyl vinyl ether	1500	U
1,1-Dichloroethane	680	U	Bromoform	680	U
trans-1,2-Dichloroethene	230	U	Chloroform	230	U
1,2-Dichloroethane	410	U	Tetrachloroethene	600	U
1,1,2,2-Tetrachloroethane	1000	U	1,1,1-Trichloroethane	550	U
Toluene	990		Carbon tetrachloride	410	U
Chlorobenzene	870	U	Ethylbenzene	940	
Bromodichloromethane	320	U	1,2-&1,4-Dichlorobenzenes	1500	U
1,3-Dichlorobenzene	730	U	Trichlorofluoromethane	290	U

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probabl contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, when mass spectral data indicate the presence of a compound at levels below the specified detection limit

CENTURY LABORATORIES, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: Dames & Moore
Sample ID: A12-D Ballfield-Chevron
% Moisture: 16.05

Report #: 0137
Century ID: 2691

	ug/kg		ug/kg
Chloromethane	12 U	1,2-Dichloropropane	7 U
Bromomethane	12 U	trans-1,3-Dichloropropene	6 U
Vinyl chloride	12 U	Trichloroethene	2 U
Chloroethane	12 U	Chlorodibromomethane	4 U
Methylene chloride	4	1,1,2-Trichloroethane	6 U
Benzene	5 U	cis-1,3-Dichloropropene	6 U
1,1-Dichloroethene	3 U	2-Chloroethyl vinyl ether	12 U
1,1-Dichloroethane	6 U	Bromoform	6 U
trans-1,2-Dichloroethene	2 U	Chloroform	2 U
1,2-Dichloroethane	3 U	Tetrachloroethene	5 U
1,1,2,2-Tetrachloroethane	8 U	1,1,1-Trichloroethane	5 U
Toluene	3 J	Carbon tetrachloride	3 U
Chlorobenzene	7 U	Ethylbenzene	9 U
Bromodichloromethane	3 U	1,2-&1,4-Dichlorobenzenes	12 U
1,3-Dichlorobenzene	6 U	Trichlorofluoromethane	2 U

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, c when mass spectral data indicate the presence of a compound at levels below the specified detection limit

CENTURY LABORATORIES, INC.

Report #: 88-0137

Client: Dames & Moore

Februrary 29, 1988

Date Collected: 01-22-88
Date Received: 01-23-88

Results
mg/kg

Sample Identification:	Cyanide	Phenols
A2 Ballfields- Chevron	3.4	<0.12
A13 Ballfields- Chevron	13	0.56

CENTURY LABORATORIES, INC. DATE: 02/29/88

CLIENT: Dames & Moore
REPORT #: 88-0137

CERTIFICATE OF ANALYSIS
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

	*MAL	Chevron Project Ballfields A2	A13
TOTAL SAMPLE ANALYSIS (mg/kg):			
Corrosivity (pH standard units)	2 - 12.5	5.5	6.3
Ignitability	60° C	>60° C	>60° C
Reactivities:			
Cyanide	N.A.	<1.2	<1.2
Sulfide	N.A.	<1.2	<1.2
LEACHATE ANALYSIS (mg/l):			
Arsenic	5.0	<0.004	<0.004
Barium	100.0	0.19	0.29
Cadmium	1.0	<0.005	<0.005
Chromium	5.0	<0.01	<0.01
Lead	5.0	<0.10	<0.10
Mercury	0.2	<0.0002	<0.0002
Selenium	1.0	<0.002	<0.002
Silver	5.0	<0.01	<0.01
Endrin	0.02	0.0002 U	0.0002 U
Lindane	0.4	0.0001 U	0.0001 U
Methoxychlor	10.0	0.002 U	0.002 U
Toxaphene	0.5	0.010 U	0.010 U
** 2,4-D	10.0	0.01 U	0.01 U
** 2,4,5-TP (Silvex)	1.0	0.003 U	0.003 U

*MAL - Maximum allowable level, as per 40 CFR 261
N.A. - Not applicable
< - Less than. Parameter not detected at or above value shown.
** - This analysis was subcontracted to another laboratory.

DEFINITIONS:

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

CENTURY LABORATORIES, INC.

Report #: 88-0137

Client: Dames & Moore

February 29, 1988

LABORATORY ANALYSIS - PCB's (AROCLORS)

Results (ug/kg)

Parameter	Chevron Project Ballfields	
	A2	A13
Aroclor 1016	900 U	1,200 U
Aroclor 1221	900 U	1,200 U
Aroclor 1232	900 U	1,200 U
Aroclor 1242	900 U	1,200 U
Aroclor 1248	300 U	300 U
Aroclor 1254	300 U	300 U
Aroclor 1260	300 U	300 U
Aroclor 1268	300 U	300 U

DEFINITIONS:

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

CENTURY LABORATORIES, INC.
Report of Results

BASE/NEUTRAL ORGANICS ANALYSIS

Client: Dames & Moore
Sample ID: A2 Ballfields
Chevron
% Moisture: 16.04

Report #: 0137
Century ID: 2692

	ug/kg			ug/kg	
Acenaphthene	75	U	bis(2-Chloroethyl)Ether	230	U
1,3-Dichlorobenzene	75	U	1,4-Dichlorobenzene	170	U
2,4-Dinitrotoluene	230	U	2,6-Dinitrotoluene	75	U
1,2-Dichlorobenzene	75	U	Diethylphthalate	75	U
4-Chlorophenyl-phenylether	170	U	bis(2-chloroisopropyl)Ether	230	U
Fluorene	75	U	N-Nitroso-Di-n-Propylamine	400	U
Hexachloroethane	64	U	N-Nitrosodiphenylamine (1)	75	U
Nitrobenzene	75	U	4-Bromophenyl-phenylether	75	U
Isophorone	87	U	Hexachlorobenzene	75	U
Phenanthrene	210	U	Anthracene	75	U
bis(2-Chloroethoxy)Methane	210	U	Di-n-Butylphthalate	99	U
Fluoranthene	120		1,2,4-Trichlorobenzene	75	U
Pyrene	290		Naphthalene	24	J
Butylbenzylphthalate	99	U	3,3'-Dichlorobenzidine	660	U
Hexachlorobutadiene	36	U	Benzo(a)Anthracene	310	U
bis(2-ethylhexyl)phthalate	99	U	Chrysene	190	
Hexachlorocyclopentadiene	400	U	Di-n-Octyl Phthalate	99	U
Benzo(b)Fluoranthene	160	J	Benzo(k)Fluoranthene	99	U
2-Chloronaphthalene	75	U	Benzo(a)Pyrene	190	
Indeno(1,2,3-cd)Pyrene	150	U	Dimethyl Phthalate	64	U
Dibenz(a,h)Anthracene	99	U	Acenaphthylene	140	U
Benzo(g,h,i)Perylene	160	U			

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, or when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

(1) Cannot be separated from diphenylamin

CENTURY LABORATORIES, INC.
Report of Results

BASE/NEUTRAL ORGANICS ANALYSIS

Client: Dames & Moore
Sample ID: A13 Ballfields
Chevron

Report #: 0137
Century ID: 2693

% Moisture: 13.81

	ug/kg			ug/kg	
Acenaphthene	120		bis(2-Chloroethyl)Ether	220	U
1,3-Dichlorobenzene	73	U	1,4-Dichlorobenzene	170	U
2,4-Dinitrotoluene	220	U	2,6-Dinitrotoluene	73	U
1,2-Dichlorobenzene	73	U	Diethylphthalate	66	J
4-Chlorophenyl-phenylether	160	U	bis(2-chloroisopropyl)Ether	220	U
Fluorene	85		N-Nitroso-Di-n-Propylamine	390	U
Hexachloroethane	62	U	N-Nitrosodiphenylamine (1)	73	U
Nitrobenzene	73	U	4-Bromophenyl-phenylether	73	U
Isophorone	85	U	Hexachlorobenzene	73	U
Phenanthrene	900		Anthracene	200	
bis(2-Chloroethoxy)Methane	200	U	Di-n-Butylphthalate	100	
Fluoranthene	880		1,2,4-Trichlorobenzene	73	U
Pyrene	2700		Naphthalene	400	
Butylbenzylphthalate	97	U	3,3'-Dichlorobenzidine	640	U
Hexachlorobutadiene	35	U	Benzo(a)Anthracene	960	
bis(2-ethylhexyl)phthalate	97	U	Chrysene	1400	
Hexachlorocyclopentadiene	390	U	Di-n-Octyl Phthalate	97	U
Benzo(b)Fluoranthene	2100		Benzo(k)Fluoranthene	97	U
2-Chloronaphthalene	73	U	Benzo(a)Pyrene	1900	
Indeno(1,2,3-cd)Pyrene	2800		Dimethyl Phthalate	62	U
Dibenz(a,h)Anthracene	97	U	Acenaphthylene	150	
Benzo(g,h,i)Perylene	3800				

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, o when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

ANALYZE FOR - PCBs
- Total Cr, Cd, Pb
- Base/Neutral Ext.
- Phenols
- Corrosivity

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client	BOLLFIELDS - CHEVRON					Field Personnel (Signature)
Project Title	CHEVRON SOIL PILE A				Job No.	David Wayne
Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/22/88		A2	A2 SOIL	1	BOLLFIELDS	FAST TURNAROUND
1/22/88		A8	A8	1		" "
1/22/88		A13	A13	1		" "
1/22/88		A10E	SOIL	2		NORMAL TURNAROUND VOA
1/22/88		A12D	SOIL	2		" VOA " "

1/23/88 Broken upon receipt

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
David Wayne	1/22/88	7:00 PM									
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

CENTURY LABORATORIES, INC.

1501 Grandview Ave., Thorofare, NJ 08086 609/848-3939

REPORT #: 88-0166
DATE: 03/15/88

REVISED

CLIENT DAMES & MOORE
4620 Street Road
Trevose, PA. 19047

SUBJECT One (1) sample submitted by the client on 01/28/88, and identified as: 01/26/88 A9C (* See attached sheet).

AUTHORIZATION David Wagner

PURPOSE Chemical Analysis

PROCEDURE Samples were analyzed in accordance with procedures presented in the following:

40 CFR 136, "Guidelines Establishing Test Methods for the Analysis of Pollutants Under the Clean Water Act: Final Rule and Interim Final Rule and Proposed Rule", October 26, 1984 (Method 601-Volatile Halogenated Organics, Method 602-Volatile Aromatic Organics, Method 603-Acrolein and Acrylonitrile, Method 608-Pesticides/PCB's, Method 624-Purgeable Organics, Method 625-Acid & Base Neutral Extractable Organics)

CENTURY LABORATORIES, INC.

Rodney T. Miller

Rodney T. Miller

lh
NJ DEP CERTIFICATION NO: 08153

As per client request, sample identification was changed from the orginal chain of custody. Samle identified as A9CV0A was changed to A9C.

CENTURY LABORATORIES, INC.
Report of Results

VOLATILE ORGANICS ANALYSIS

Client: Dames & Moore
Sample ID: A9C
% Moisture: 14.13

Report #: 0166
Century ID: 2882

	ug/kg		ug/kg
Chloromethane	12 U	1,2-Dichloropropane	7 U
Bromomethane	12 U	trans-1,3-Dichloropropene	6 U
Vinyl chloride	12 U	Trichloroethene	2 U
Chloroethane	12 U	Chlorodibromomethane	4 U
Methylene chloride	13	1,1,2-Trichloroethane	6 U
Benzene	18	cis-1,3-Dichloropropene	6 U
1,1-Dichloroethene	3 U	2-Chloroethyl vinyl ether	12 U
1,1-Dichloroethane	5 U	Bromoform	5 U
trans-1,2-Dichloroethene	2 U	Chloroform	2 U
1,2-Dichloroethane	3 U	Tetrachloroethene	5 U
1,1,2,2-Tetrachloroethane	8 U	1,1,1-Trichloroethane	4 U
Toluene	110	Carbon tetrachloride	3 U
Chlorobenzene	7 U	Ethylbenzene	45
Bromodichloromethane	3 U	1,2-&1,4-Dichlorobenzenes	12 U
1,3-Dichlorobenzene	6 U	Trichlorofluoromethane	2 U

U Indicates compound was analyzed for but not detected (eg. 10U), based on necessary concentration/dilution. The number is the minimum attainable detection limit for the sample.

B This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

J Indicates an estimated value, based on assumption of a 1:1 response for tentatively identified compounds, o when mass spectral data indicate the presence of a compound at levels below the specified detection limit.

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: CHEVRON – BAKERSFIELDS

Project Title: BAKERSFIELDS SOIL PILE A

Job No.: 16000-07.6

Field Personnel (Signature): David Wang

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/26/88		A9CVDA	SOIL	2	BAKERSFIELDS	NORMAL TURNAROUND

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
David Wang	1/27/88		Mary O'Brien	1/28/88	9:30 AM						
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

CENTURY LABORATORIES, INC.

1501 Grandview Ave., Thorofare, NJ 08086 609/848-3939

REPORT #: 88-0247
DATE: 02/19/88

CLIENT DAMES & MOORE
4620 Street Road
Trevose, Pennsylvania 19047

SUBJECT Twelve (12) samples submitted by the client on February 5, 1988 and identified as: Project- Chevron Ballfields, Job #: 16000-026.

AUTHORIZATION Mr. David Wagner

PURPOSE Chemical Analysis for Cyanide.

PROCEDURE Samples were analyzed in accordance with procedures presented in the following:

1. "Test Methods for Evaluating Solid Waste-Physical/Chemical Methods", 2nd Ed., 1984 U.S. Environmental Protection Agency (SW846)

CENTURY LABORATORIES, INC.

Rodney T. Miller

Rodney T. Miller

NJ DEP CERTIFICATION #: 08153

jnf

CENTURY LABORATORIES, INC.

REPORT OF ANALYSIS

Client: DAMES & MOORE

Date: 02-19-88

Date Received: 02-05-88 1552

Job No: 88-0247

Cyanide

Century Sample No.	Sample Description	Results	Units
	01/25/88 CHEVRON BALLFIELDS		
3094	A1	<0.01	mg/kg
3095	A3	<0.01	mg/kg
3096	A6	0.27	mg/kg
3097	A7	6.0	mg/kg
3098	A9	4.7	mg/kg
3099	A11	0.17	mg/kg
3100	A12	7.2	mg/kg
3101	A14	16	mg/kg
3102	A16	14	mg/kg
3103	A17	16	mg/kg
3104	A18	2.9	mg/kg
3105	A19	2.5	mg/kg

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: CANNON BOULEVARD

Project Title: BOULEVARD SOIL PILE A PHASE II — Job No. 16000-026

Field Personnel (Signature): David Wang

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
1/25/88		A1	SOIL	1		CYANIDE, TOTAL
1/25/88		A3		1		ARSENIC TURNAROUND
1/22/88		A6				
1/21/88		A7				
1/26/88		A9				
1/22/88		A11				
1/22/88		A12				
1/25/88		A14				
1/12/88		A16				
1/22/88		A17				
1/25/88		A18				
1/26/88		A19				

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
David Wang	2/5/88	3:00	Mary K Frank	2-5-88	3:00	Mary K Frank	2-5-88	3:52			
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time