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INSTALLATION RESTORATION PROGRAM

FIELD INVESTIGATION REPORT
HAZARDOUS WASTE STORAGE AREA

RICKENBACKER
AIR NATIONAL GUARD BASE
COLUMBUS, OHIO

October 1990

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For the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-840R21400

Report Document Page

Form Approved
OMB No. 0704-0188
(computer generated)

Public reporting burden for this information is estimated to average 1 hour per response, including the time to review instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Service Headquarters Services Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suit 1204, Arlington, VA 22202-4302 and to the Office of Management and Budget. Paperwork Reduction Project (0704-0188)Washington, DC 20503

1. Agency Use Only (Leave Blank)

2. Report Date
October 1990

3. Report Type and Dates Covered
Final Field Investigation Report

4. Title and Subtitle
Field Investigation Report
Hazardous Waste Storage Area
Rickenbacker Air National Guard Base, Columbus, Ohio

5. Funding Numbers

6. Author(s)

N/A

7. Performing Organization Name(s) and Address(es)

Engineering - Science
19101 Villaview Road - Suite 301
Clevland, Ohio 44119

8. Performing Organization Report number

9. Sponsoring/Monitoring Agency Name(s) and Address(es)
Hazardous Waste Remedial Action Program
Oak Ridge TN

Air National Guard Readiness Center
Andrews Air Force Base, Maryland 20331

10. Sponsoring/Monitoring Agency Report Number

11. Supplemental Notes

12. Distribution/Availability Statement

Approved for public release; distribution is unlimited

12b. Distribution Code

13. Abstract (maximum 200 words)

The Rickenbacker Air National Guard Base is located 12 miles southeast of Columbus, Ohio. Engineering Science was contracted to perform an environmental field investigation at the hazardous waste storage area (HWSA) located on the base. Portions of the HWSA have been used over the past 42 years for the storage of waste oils, waste fuels, deicing fluid and various solvents and cleaners. The materials stored at the HWSA were contained in either storage drums, or in the four 25,000 gallon underground storage tanks. The purpose of the investigation was to determine if the soil or ground water beneath the site have been contaminated due to spills or leak from the on-site storage. Contamination was confirmed at the site and additional investigations were recommended to define the lateral and vertical extent and magnitude of contamination

14. Subject Terms Rickenbacker Air National Guard Base, hazardous waste storage area, deicing fluid, underground storage tanks.

15. Number of Pages
215

16. Price Code

17. Security Classification of Report	18. Security Classification of this Page	19. Security Classification of Abstract	20. Limitation od Abstract
Unclassified	Unclassified	Unclassified	None

ES ENGINEERING-SCIENCE

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RICKENBACKER
AIR NATIONAL GUARD BASE
COLUMBUS, OHIO

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Availability Codes
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OCTOBER 1990

Submitted To:

NATIONAL GUARD BUREAU
ANGSC/DEVP
Andrews AFB, Maryland

Submitted By:

HAZARDOUS WASTE REMEDIAL ACTIONS PROGRAM
MARTIN MARIETTA ENERGY SYSTEMS, INC.
Oak Ridge, Tennessee

92-15405

Prepared By:

ENGINEERING-SCIENCE, INC.

For The

U.S. DEPARTMENT OF ENERGY
Under Contract No. DE-AC05-840R21400

92 6 12 009
1090DPC12-37#

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F	Soil-Gas Survey Data
G	Laboratory Results
H	Laboratory Quality Assurance Report

ACRONYM LIST
RICKENBACKER ANGB, OHIO

ANGB	Air National Guard Base
AB	Auger Boring
ASTM	American Society for Testing of Materials
BTX	Benzene, Toluene, ortho-Xylene
CERCLA	Comprehensive Environmental Response and Clean-up Liability Act
DOD	Department of Defence
DOE	Department of Energy
ES	Engineering-Science
GC	Gas Chromatograph
GS	Surface Soil Grab Sample
GW	Ground Water
HAZWRAP	Hazardous Waste Remedial Actions Program
HB	Shallow Soil Boring
HMTC	Hazardous Materials Technical Center
HWSA	Hazardous Waste Storage Area
ID/OD	Inner Diameter/Outer Diameter
JP4	Jet Fuel
MCL	Maximum Contaminant Level
MS	Matrix Spike Sample
MSD	Matrix Spike Duplicate Sample
MSL	Mean Sea Level
MW	Monitoring Well
ND	Non-Detectable
NGB	National Guard Bureau
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
PCBs	Polychlorinated Biphenyls
PID	Photoionization Detector
PR	Percent Recovery
QA	Quality Analysis
QC	Quality Control
RANGB	Rickenbacker Air National Guard Base
RCRA	Resource Conservation and Recovery Act
RPA	Rickenbacker Port Authority
RPD	Relative Percent Difference

ACRONYM LIST
RICKENBACKER ANGB, OHIo
(continued)

SS	Soil Sample (Split-Spoon or HB)
TCE	Trichloroethylene
TWWV	Total Well Water Volume
UST	Underground Storage Tank
VOC	Volatile Organic Compounds

SECTION 1.0

EXECUTIVE SUMMARY

The Rickenbacker Air National Guard Base (RANGB) is located 12 miles southeast of Columbus, Ohio. Engineering-Science (ES) was contracted to perform an environmental field investigation at the Hazardous Waste Storage Area (HWSA) located on the Base. Portions of the HWSA have been used over the past 39 years for the storage of waste oils, waste fuels, de-icing fluid and various solvents and cleaners. The materials stored at the HWSA were contained in either storage drums, or in the four 25,000 gallon underground storage tanks located at the site. The purpose of the field investigation was to determine if the soil or groundwater beneath the site have been contaminated due to spills or leaks from the on-site storage.

The scope of work for the field investigation consisted of surface soil sampling, soil-gas surveying, hand and auger borings, installation of three groundwater monitoring wells, and aquifer testing. Soil and groundwater samples were collected and analyzed for both organic and inorganic compounds.

The findings of the drilling program indicate the geologic profile beneath the HWSA consists of silty clay (0-14.5') underlain by sand and gravel to the end of boring at 20 feet. The Base water wells indicate that two aquifers are present in the glacial material beneath the Base; a shallow (3-35' below land surface) and deep (60-200' below land surface) aquifer. The depth to the shallow aquifer beneath the HWSA is approximately eight feet subgrade, while the groundwater flow direction is to the east.

The results of the soil and groundwater analyses are summarized below:

- Semi-volatile organic compounds (up to 37.9 mg/kg) and abnormally high metal concentrations were detected in the shallow soils at the site.

- Petroleum hydrocarbons in the form of benzene, ethylbenzene and xylenes are present in the soil (MW1: 32.9 mg/kg) and groundwater (MW1: 116 μg/l) beneath the site. The concentration of benzene (94 μg/l) measured in the groundwater from monitoring well MW1 exceeded the Federal drinking water Maximum Contaminant Level (MCL) by a factor of 18.8. The areal extent of the contamination has not been defined.

- Trichloroethylene was detected in the groundwater collected from monitoring well MW3 (44 μg/l). This TCE concentration exceeds the Federal drinking water MCL by a factor of 8.8.

- The total metal concentrations in the groundwater from each of the three monitoring wells exceeded the drinking water standards for arsenic, cadmium, chromium and lead. It is not known whether the metal concentrations were dissolved in the groundwater or present on suspended sediments.

Additional investigation of the HWSA is necessary to define the vertical and horizontal extent of volatile and semi-volatile organic compounds and metals in the soil and groundwater. The investigation activities should include surface soil sampling, soil sampling from borings and groundwater sampling from monitoring wells.

SECTION 2.0

BACKGROUND

2.1 BASE BACKGROUND

The U.S. Department of Defense (DOD) has initiated the Installation Restoration Program (IRP) to identify, evaluate, and remediate suspected environmental problems associated with past hazardous waste disposal and spill sites on DOD facilities. The Air National Guard (ANG), through a U.S. Air Force (USAF) interagency technical support agreement with the U.S. Department of Energy (DOE), uses Martin Marietta Energy Systems, Inc. (MMES) to provide technical assistance for implementation of the ANG IRP. Martin Marietta Energy Systems, Inc., has been contracted by DOE to carry out the Hazardous Waste Remdial Actions Program (HAZWRAP) at Air National Guard Bases. Engineering-Science (ES) as a subcontractor to HAZWRAP conducted the soil and groundwater sampling documented in this report. Authorization for the investigation is by General Order No. 18B-97387C, Task Order X-15.

The Rickenbacker Air National Guard Base (RANGB) is located 12 miles southeast of Columbus, Ohio and 0.5 miles east of the Village of Lockbourne, Ohio (Figure 2.1). The Base was known as Lockbourne Air Force Base until 1974. The current size of the Base is approximately 2,100 acres. The Base operations are managed by the Ohio Air National Guard. However, the Rickenbacker Port Authority (RPA) acquired a portion of the Base in 1982 which serves private aircraft, and as a base of operations for the Flying Tigers air delivery service. The Flying Tigers will be leaving the Base in the autumn of 1989. At one time, as many as 5,000 people have worked on the Base. Currently, 1,100 people are on the Base daily.

Land use adjacent to the Base is residential and agricultural. The houses and apartments in the northwest corner of the Base, which were formerly occupied by Base personnel, have been purchased by a private developer and are being rented and sold. The Base and former Base housing use water supplied from Base water wells.

North of the Base lies open agricultural land with some residential development along Alum Creek Drive. East of the Base is agricultural land and residential development along the major roads. South of the Base is the former Base golf course which is now privately-owned, and widely spaced single-family homes. To the west is the

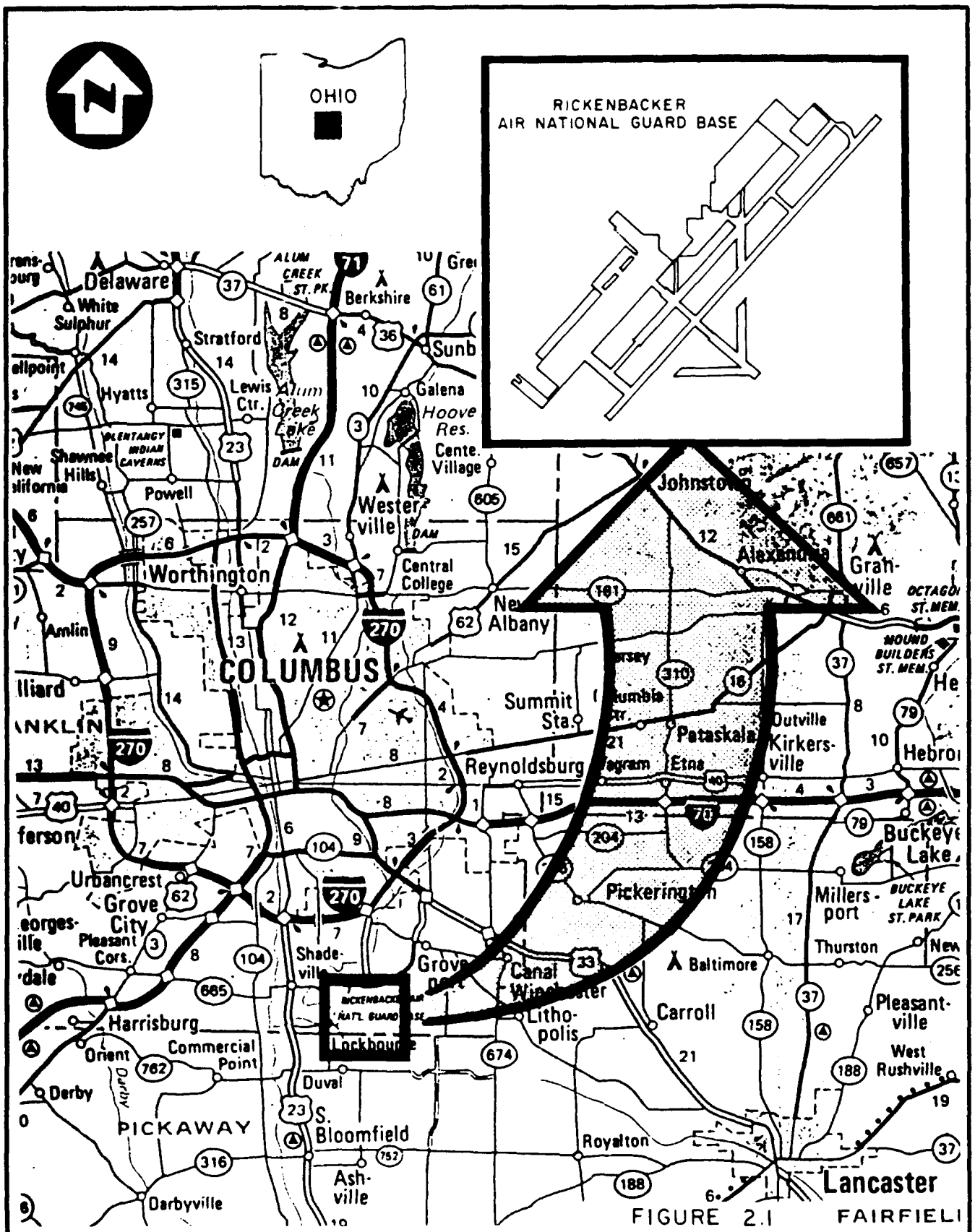

FIGURE 2.1

LOCATION MAP

RICKENBACKER AIR NATIONAL GUARD BASE

SOURCE:
MAP OF OHIO
AMERICAN AUTOMOBILE ASSOCIATION

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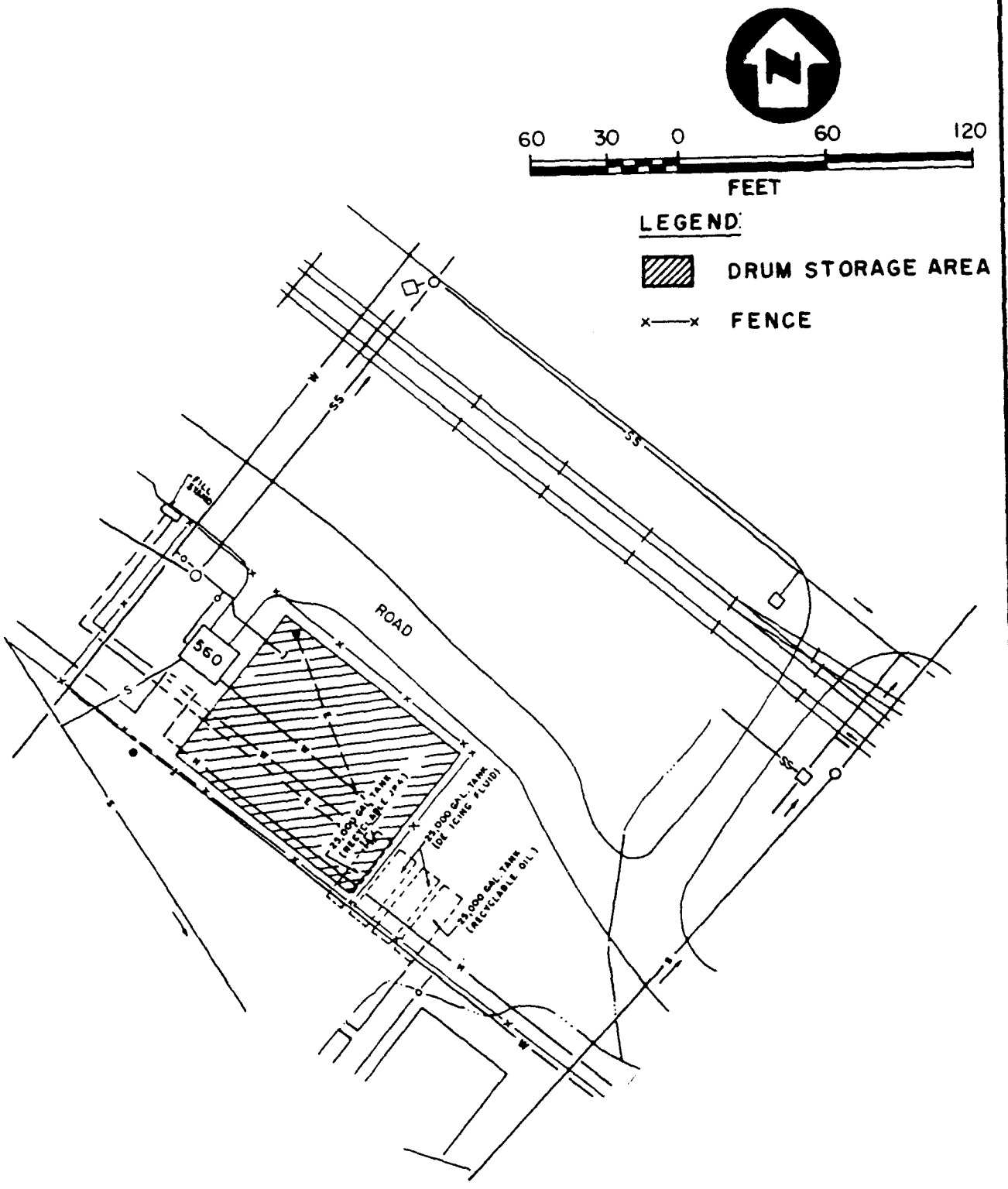

FIGURE 2.2

HAZARDOUS WASTE STORAGE AREA
RICKENBACKER ANGB, OHIO

SOURCE:
BASE DETAILED
SECTIONAL MAPS

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TABLE 2.1

UTILITY LEGEND FOR SITE PLANS

RICKENBACKER AIR NATIONAL GUARD BASE
COLUMBUS, OHIO

ABOVE GROUND UTILITIES AND FEATURES:

═══	RAILROAD
○	MANHOLE
○	VALVE
—x—	FENCE
◎	RUNWAY / TAXIWAY LIGHT
♀	FIRE HYDRANT
—H—	HEAT LINE
—JF—	JET FUEL LINE
△	ELECTRICAL TRANSFORMER
●	ELECTRIC SERVICE POLE

UNDERGROUND UTILITIES:

- -H- -	HEAT LINE
- -JF- -	JET FUEL LINE
- -E- -	ELECTRIC LINE
- -T- -	TELEPHONE LINE
—W—	WATER LINE
—S—	SANITARY SEWER
—SS—	STORM SEWER
□	JUNCTION BOX

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Norfolk and Western and Chesapeake and Ohio railroad tracks, the abandoned Ohio Canal, and the Village of Lockbourne with residential and light industrial development.

Future land use in adjacent areas will probably be residential and light industrial as the urban growth of Columbus extends to the southeast.

2.2 HAZARDOUS WASTE STORAGE AREA

The Hazardous Waste Storage Area at the RANGB consists of Building 560 and the Drum Storage Area to the southeast of the building (Figure 2.2). Table 2.1 is a legend for the various utilities shown on the site maps. The site had been operating under and interim hazardous waste storage area permit since 1983. There are four, steel 25,000 gallon underground storage tanks (USTs) beneath the site that are approximately 39 years old. Two of the tanks are actively being used for the storage of de-icing fluid. The two inactive tanks had previously been used for the storage of used oil and recyclable JP-4 fuel. Dielectric fluid drained from transformers had also been stored in the used oil UST. It is not known if the fluid contained PCBs. The used oil and JP-4 fuel tanks became inactive in the latter part of 1988. Present contents of the tank are unknown. The only recorded loss from any of the four tanks occurred in 1982 from a broken stand pipe. A precise record of the amount of waste released is not available.

The Drum Storage Area had been used to store drums containing liquid wastes such as spent solvents, cleaning fluids, acids and paint strippers. Dry wastes such as spent desiccants were also stored in Building 560. No wastes are currently being stopped at the site.

SECTION 3.0

PURPOSE AND SCOPE

The purpose of the investigation at the Hazardous Waste Storage Area was to determine if the soil or groundwater beneath the site have been contaminated due to spills or leaks from the on-site storage. This objective was accomplished through the following investigative techniques.

- A soil-gas survey was utilized as a reconnaissance tool to aid in the placement of monitoring wells.
- Soil samples were collected from the surface and during monitoring well installation. Laboratory analyses of the soil samples determined whether contaminants were present in the soil.
- Monitoring wells were installed to test for the presence or absence of phase-separated hydrocarbons, determine the direction of groundwater flow, and to collect groundwater samples for laboratory analysis.
- Aquifer tests (rising-head tests) were conducted on each of the monitoring wells to determine the aquifer hydraulic conductivity.

SECTION 4.0

ENVIRONMENTAL SETTING

The environmental setting of Rickenbacker ANGB is described in this Section with the primary emphasis directed toward identifying features that may affect the movement of hazardous waste contaminants off-base.

4.1 CLIMATE

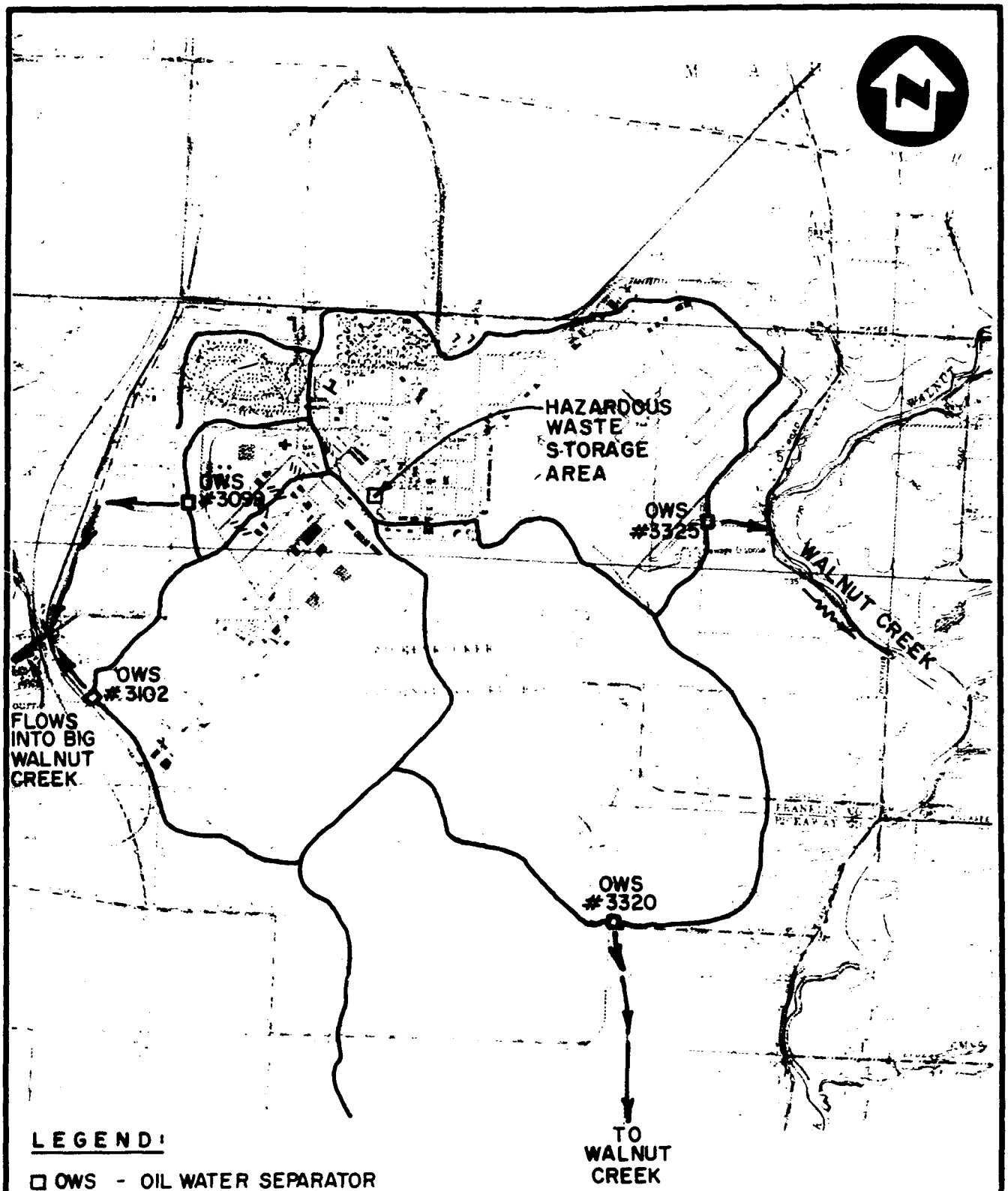
The climate of Columbus, Ohio is characterized as continental (Pierce, 1959). The mean annual temperature is 52°F. The coldest month is January, while the warmest month is July with mean temperatures of 30°F and 74°F, respectively. Mean annual precipitation is 38 inches with October being the driest and June the wettest months. Net precipitation is calculated to be 2.71 inches per year (HMTC, 1987).

4.2 SOILS

Soils mapped at the Base are of the Kokomo and Crosby Series (SCS, 1976). The soils are characterized as deep, very poorly drained, slowly to moderately slowly, permeable soils formed in glacial tills on uplands. The Crosby series soils are formed on slopes up to 6 percent grade while the Kokomo series soils form on gentler, 0-2 percent, slopes on the higher landscape positions. The Crosby soils exhibit permeabilities of 0.06 in/hr (4.23×10^{-5} cm/sec) in unleached horizons. The Kokomo soils have permeabilities of 0.2 to 2.0 in/hr (1.4×10^{-4} to 1.4×10^{-3} cm/sec).

4.3 SURFACE WATER HYDROLOGY

Rickenbacker ANGB occupies the drainage divide between Big Walnut Creek and Walnut Creek. Surface drainage from the Base is through an extensive storm drain network which includes corrugated metal and concrete drainage pipes and open drainage ditches. All of the surface water is routed through oil-water separators before release into surrounding surface streams. Figure 4.1 is a map illustrating the boundaries of the surface water drainage basins on the Base.



LEGEND:

□ OWS - OIL WATER SEPARATOR

DRAINAGE AREA DIVIDE

2000 1000 0 1000 2000 feet

SCALE

SOURCE:
BASE DETAILED SECTIONAL MAPS

FIGURE 4.1

OIL WATER SEPARATOR DRAINAGE AREAS

RICKENBACKER ANGB, OHIO

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4.4 REGIONAL GEOLOGY

The Base is located in the Glaciated Central Lowlands Province just west of the Appalachian Plateau Province. The geology of the area is characterized by 200 feet (±) of Pleistocene glacial outwash (sand and gravel), and silty and clayey till filling a preglacial bedrock valley (Smith and Goldthwaite, 1958). The bedrock types under the mixed drift fill are Devonian limestones and shales of the Columbus and Delaware Formations.

4.5 LOCAL HYDROGEOLOGY

The local hydrogeology in the vicinity of the Base was studied from data collected during the drilling operations of this investigation, and from reviewing local water well records. Local well records included well logs from five of the Base water wells, and well logs from eighteen domestic wells located in the vicinity of the Base. After reviewing the data and records listed above, it was determined that two aquifers are present in the glacial material beneath the Base.

The shallow geology beneath the Base is comprised of 10-20 feet of silt and clay at the surface, underlain by intermittent stringers and lenses of sand and gravel ranging in thickness from 1-10 feet. The depth to the shallow aquifer ranges from 3-20 feet, while the depth to the base of the aquifer ranges from 30-35 feet. The direction of groundwater flow in the shallow aquifer is affected by both the Big Walnut Creek to the west and the Walnut Creek to the east. The Base is within a recharge area of the shallow aquifer with groundwater flow to the west, south or east depending on where you are located.

The geologic material separating the shallow and deep aquifers beneath the Base consists of 30 to 40 feet of silty clay. The deep aquifer consists of fine-to-medium sand and gravel at a subsurface depth of approximately 50-60 feet. The bottom of the deep aquifer was defined in several of the Base water wells which encountered shale at an approximate depth of 200-210 feet beneath the surface.

4.6 LOCAL GROUNDWATER USE

There are seven water supply wells located on the Base. Five of the wells are located in the northwest portion of the Base and supply the drinking water for ANGB

personnel. Of the five drinking water wells, well #2 is no longer in service. The depth of the active ANGB drinking water wells ranges from 201 to 232 feet. The wells are screened in the glacial sands and gravels immediately above the shale bedrock. Static water levels in the drinking water wells range from 36 to 56 feet below grade. The two other water wells located on the Base are found at the heating plant, and at the golf course clubhouse in the southeast corner of the Base. The heating plant well (RB-7) was screened in sand and gravel from 85 to 100 feet beneath the surface, but is no longer in service. The clubhouse well (RB-6) was screened in sand and gravel from 63 to 73 feet beneath the surface.

Drillers' logs were obtained from the Ohio Department of Natural Resources (ODNR) for domestic water wells in the vicinity of the ANGB. Copies of the drilling records are submitted in Appendix A. Figure 4.2 is a map illustrating the locations of the domestic water wells, and the five active wells on the ANGB. The domestic wells in the Village of Lockbourne are not shown on the map because they are no longer in service. The Village currently receives water from the Base water system. Table 4.1 lists pertinent well data for those wells shown on Figure 4.2. As shown in Table 4.1, the local domestic wells are screened at various depths ranging from 24 to 172 feet.

4.7 SIGNIFICANCE OF ENVIRONMENTAL SETTING

The significance of the environmental setting when dealing with potential contaminants is determining if the setting will promote or inhibit the vertical and lateral migration of contaminants from the source area. This subsection discusses how the environmental setting at Rickenbacker ANGB will affect the migration of contaminants on and beneath the HWSA.

The geologic material in the first ten feet beneath the surface generally controls contaminant migration. At the HWSA, the soils present from 0-10 feet beneath the surface almost exclusively consisted of silty clays. This material has very low vertical and horizontal permeability, and would thus inhibit both the vertical and horizontal migration of contaminants. This is significant in that it vastly decreases the probability of contaminants spilled at the surface will reach the groundwater. However, contaminants released from USTs, will be more likely to impact the groundwater. Groundwater contamination is typically the main mode of transport for off-site migration of contaminants.

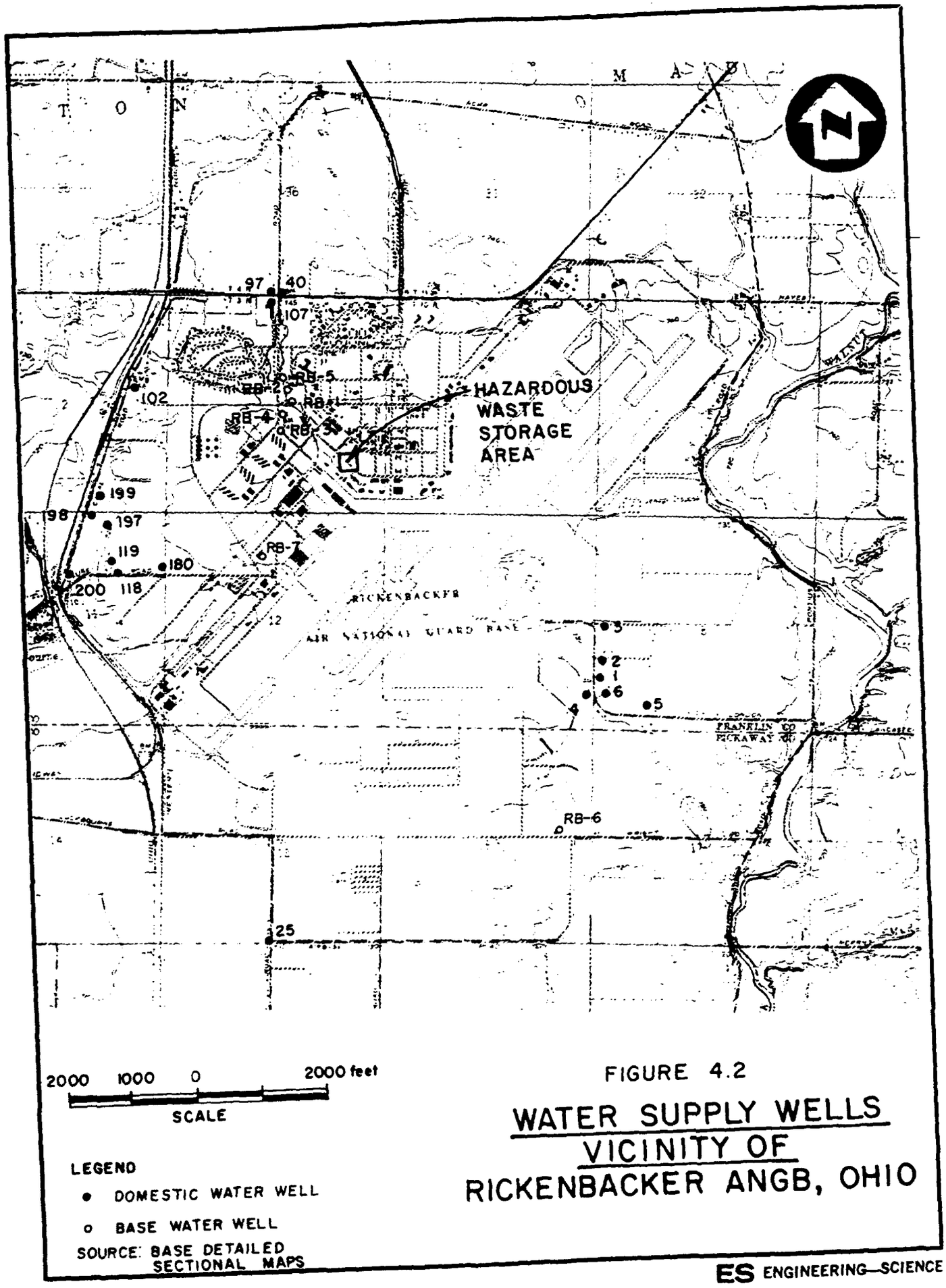

FIGURE 4.2

WATER SUPPLY WELLS VICINITY OF RICKENBACKER ANGB, OHIO

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TABLE 4.1

RICKENBACKER ANGB, OHIO
WATER WELL INFORMATION

Well No.	Well Diameter	Well Depth	Screened Interval	Static Water Level	Test Pump Rate	Drawdown
RB-1	12"	201′	181-201′	38′	434 GPM	5.3′
RB-2	--	--	--	--	--	--
RB-3	12"	212′	179-211′	46′	600 GPM	16′
RB-4	12"	212′	192-211′	--	578 GPM	57′
RB-5	12"	232′	212-232′	56′	473 GPM	--
RB-6	6"	74′	63-73′	9′	120 GPM	4.5′
RB-7	8"	100′	85-100′	35′	210 GPM	15′
102	6"	96′	Perf. Pipe	50′	13.GPM	15′
118	5"	40′	30-40′	10′	10 GPM	--
119	6"	144′	--	37′	30 GPM	None
180	6"	76′	75-76′	21′	15 GPM	4′
197	4"	56′	Perf. Pipe	17′	16 GPM	None
198	4"	65′	Perf. Pipe	12′	15 GPM	None
199	5"	60′	--	5′	20 GPM	--
200	4"	62′	--	20′	8 GPM	14′
25	6"	85′	83-85′	--	15 GPM	None
97	6"	172.5′	--	43′	10 GPM	None
107	6"	169′	--	--	--	--
40	4"	60′	--	35′	6 GPM	4′
1	4"	87′	69-87′	7′	20 GPM	None
2	4"	71′	Perf. Pipe	18′	16 GPM	2′
3	4"	24′	--	--	15 GPM	--
4	4"	43′	--	20′	10 GPM	3′
5	4"	63′	Perf. Pipe	27′	16 GPM	None
6	4"	68′	--	20′	16 GPM	None

-- Indicates that information was not available

There are two aquifers beneath the Base as discussed in Section 4.5. The shallow aquifer (8-32' below land surface), and the deep aquifer (64'-200'+ below land surface). As shown on Table 4.1, the local water supply wells are completed almost exclusively in the deep aquifer. As mentioned, the low permeability of the soil profile would reduce the probability of significant contamination reaching the shallow aquifer. Therefore, the probability of contaminants reaching the deep aquifer would be very low. However, the deep aquifer has not been sampled at this time.

SECTION 5.0

FIELD INVESTIGATION PROGRAM

The field investigation program conducted at the hazardous waste storage area consisted of several investigative techniques. This Section describes the methodology and construction specifications utilized during the investigation. The decontamination procedures, sample numbering method, and the sample packaging, shipping and handling techniques are described in Appendix B.

5.1 METHODOLOGY

5.1.1 Surface Soil and Shallow Boring Sampling

The purpose of surface soil and shallow boring sampling was to determine the presence and extent of contamination in the upper soil horizons. The shallow sampling methods were utilized to determine whether surface spills had occurred at the site, related to the storage of drums.

Surface soil samples were collected using a stainless steel trowel. Shallow boring samples were collected using either a hand auger or a driven split-spoon sampler. The HB prefix was retained to simplify identification of the samples. The shallow boring samples were collected down to a depth of four feet. Each four-foot boring was divided into three discrete-depth samples (SS1: 0-1.3'; SS2: 1.3-2.6'; SS3: 2.6-3.9'). Soil samples collected for volatile organic analysis were placed in jars as quickly as possible to minimize the loss of volatile organic compounds. The remainder of the sample was thoroughly mixed in a stainless steel bowl before filling the remaining sample jars.

5.1.2 Soil-Gas Surveying

The soil gas survey was used as a field reconnaissance tool in which shallow (2-10' deep) soil vapor samples were collected for immediate on-site chemical analysis of volatile organic compounds which are associated with surface and subsurface spills or leaks. The chemical analysis data were used to construct contour maps of contaminant vapor concentrations in the unsaturated zone. The contour maps then assisted in planning field activities for the placement of soil borings and monitoring wells.

The soil vapors were analyzed with a Photovac 10S50 portable gas chromatograph (GC) which utilizes a photoionization detector (PID) with a 10.6 eV light source and isothermal capillary column with a precolumn/backflush configuration. The GC was calibrated with a 1 ppm commercially prepared mixture containing benzene, toluene and ortho-xylene (BTX). These standard compounds were chosen since they are commonly associated with the reported spills and leaks at the Base. Because of the screening nature of the soil-gas survey, only the BTX compounds were quantified.

The GC compares the response of injected volumes of unknown soil vapor samples with the response of the standard, and then integrates and quantitates the peak.

An electric hammer drill was used to drive a 3/8 inch, hollow stainless steel probe (perforated on the down-hole end) into the ground to the desired sampling depth. A vacuum pump was then used to draw soil vapors from the probe into a vacuum chamber containing a 1 liter Tedlar sample bag. Prior to collecting each sample, all probes, Teflon lines and stainless steel fittings that contacted soil vapors were decontaminated by rinsing with methanol and purging the system with compressed air for approximately 2 minutes.

A number of QA/QC procedures were followed during the course of the soil gas survey. Standard calibration checks were obtained during the initial and final runs of each day by injecting the standard gas mixture into the GC. Decontamination procedures were checked by injecting samples of ambient air that were passed through the sampling train and needles. If contamination was detected, the decontamination process was repeated until no contamination appeared. These types of blanks were done prior to each day's testing or when significant amounts of compounds were noted in a sample.

5.1.3 Soil Borings/Monitoring Wells

Three soil borings were drilled at the site using 4-inch ID/6 inch OD hollow-stem augers. Split-spoon samples were collected during drilling operations according to ASTM method D-1586. Soil samples were collected continuously during the drilling of MW1 and MW2, and at 3.5 foot intervals during the drilling of MW3.

Soil samples were classified with respect to type, by the visual-manual procedure (ASTM D-2488) noting mineralogy, color, odor, staining, etc. The samples were also checked for the presence of organic vapors. The test for vapors involved placing a

portion of the sample, not intended for volatile analysis at the laboratory, in a jar, sealing the jar, allowing the sample to equilibrate for at least five minutes, then measuring the concentration of organic vapors in the headspace of the jar using a meter with a PID.

Soil samples selected for chemical analysis for non-volatile constituents were removed from the sampler and split among the various containers for shipment to the laboratory. Samples for volatile analysis were placed in bottles as quickly as possible to minimize volatilation.

Monitoring wells were installed in each of the three borings using two inch diameter, 0.010 inch slot, Schedule 40 PVC well material. The screen and casing have threaded flush joints and a threaded bottom cap. Ten feet of screen was used in each well to allow for seasonal water level fluctuations. The screen and casing were installed through the inside of the augers. The annular space between the screen and borehole was filled with sand while the augers were slowly withdrawn. The sand pack extended two feet above the screen and a minimum two-foot thick bentonite seal was placed above the sand. The remaining annular space between the casing and borehole was filled with a cement/bentonite grout mixture. The well construction was completed 2-3 feet above-grade utilizing steel protective casing (six feet long) equipped with a locking cap. The protective casing was set into the cement grout 3-4 feet below land surface and a concrete pad (6 inches thick) was placed around the steel casing. Three steel guard posts were installed around each monitoring well for well security. Each well was permanently marked by attaching a metal plate that records the well number, drilling date, and top of casing elevation. Figure 5.1 is a diagram illustrating the typical monitoring well construction.

The wells were developed by air-lift pumping and bailing to remove the fine sediments in the vicinity of the well-bore. This procedure enhances the hydraulic connection between the well and aquifer. The wells were developed until the groundwater pH and conductivity had stabilized to ± 10 percent.

5.1.4 Groundwater Sampling

Each well was purged prior to sampling to ensure that a representative groundwater sample was obtained. The wells were purged by bailing until the total well water volume (TWWV) had been removed, the pH, conductivity and temperature had

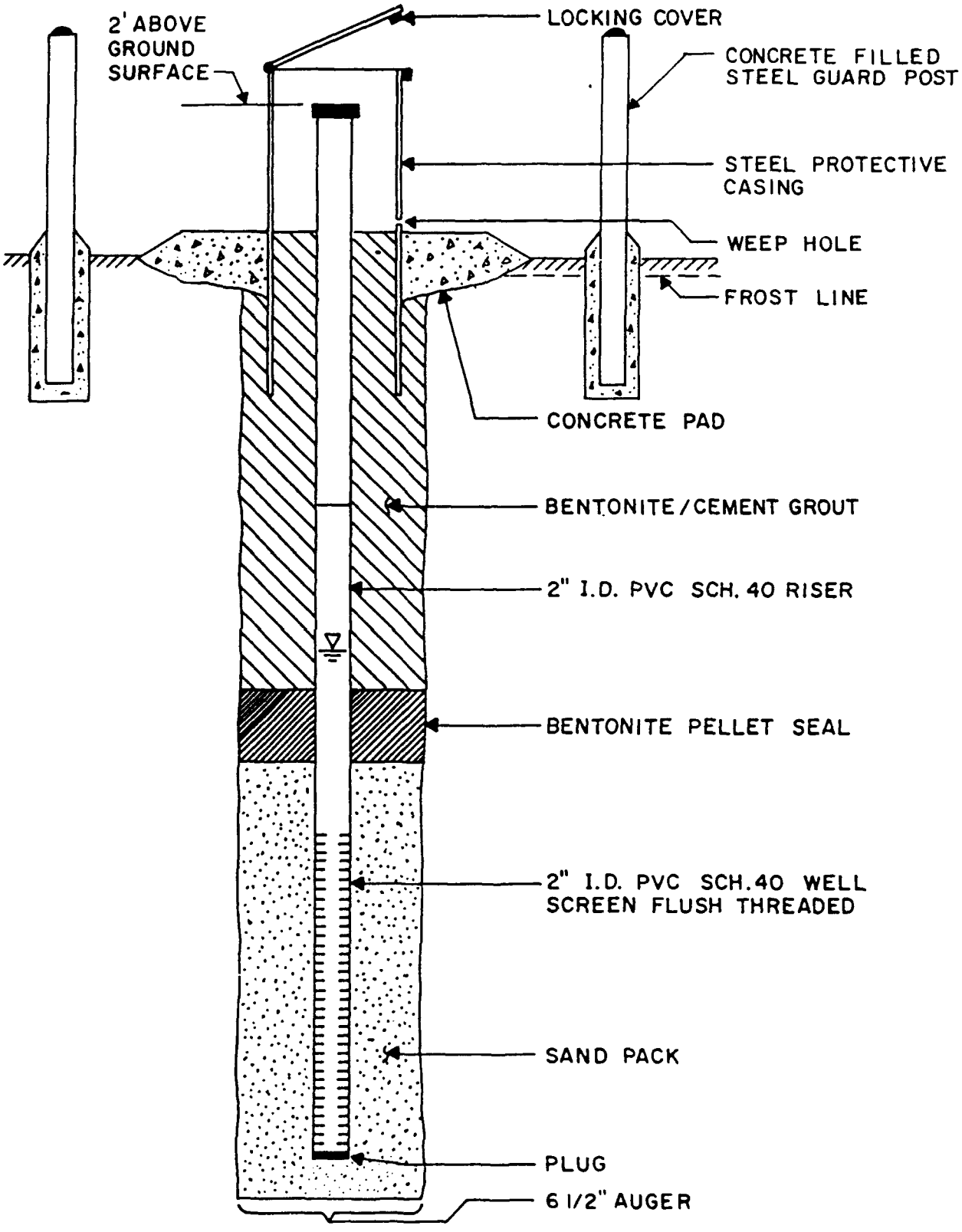


FIGURE 5.1

TYPICAL MONITORING WELL CONSTRUCTION

FOR SHALLOW AQUIFER WELLS
RICKENBACKER ANGB, OHIO

stabilized, or until the well was dry. The TWWV includes water in the screen, riser and sand pack. The pH, conductivity, and temperature of the water were determined at least three times while purging the well.

The groundwater samples were collected with a Teflon bailer with a dedicated polypropylene line. The first sample withdrawn was put in a container for volatile analysis. The remaining water was then poured into other sample bottles. Appropriate preservatives were added to the sample bottles after sample collection. All samples were shipped overnight to an environmental laboratory for analysis. Shipping and handling procedures are documented in Appendix B.

5.1.5 Aquifer Testing

In-situ Hydraulic conductivity (permeability) tests utilizing the rising head slug test technique were conducted on each monitoring well. Water level recovery data were collected with a HERMIT data logger (Model SE 1000B) connected to a down-well pressure transducer.

Prior to testing, static water levels were measured in each monitoring well with an electronic water level indicator. The transducer for the HERMIT data logger was inserted into each well to a depth of at least 5 feet below the static water level. A PVC bailer (5 ft. in length and 1.5 in. inside diameter) was then inserted and completely submerged in the well above the transducer. The water level in the well was allowed to return to the original static level.

Prior to initiation of the test, the static water level was remeasured with a water level indicator. The water level was entered into the data logger as a reference value from which changes in head over time during the test were measured. The data logger was then activated and the bailer containing water was quickly removed from the well.

During the test, water level changes in each well were checked periodically with an electronic water level indicator as a means of validating the transducer data. When water levels in each well approached the initial static level (within 0.1 ft.) recovery was determined to be complete and the test terminated.

5.2 SITE-SPECIFIC INVESTIGATION

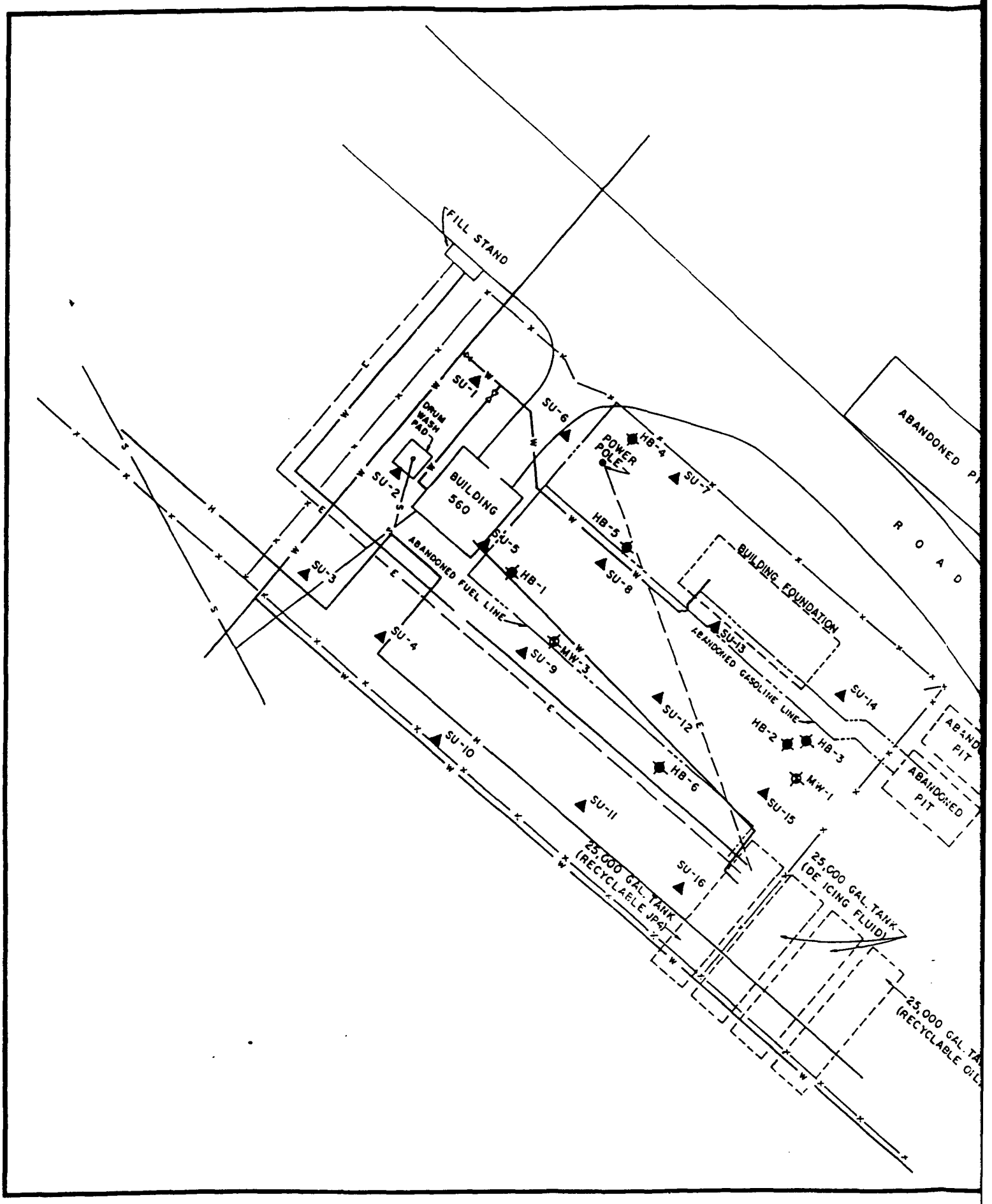
Sampling began at this site on 14 June 1988 with the collection of surface soil and shallow soil boring samples. The surface soil samples were collected from the locations identified on Figure 5.2 to identify possible contamination from drum spillage. Adjacent samples were composited before being contained and shipped to the laboratory. A duplicate of the RB1-SU1 & 2-GS1 sample was submitted for analysis (Dup# RB1-SU17 & 18-GS1). The surface soil samples were analyzed for herbicides, pesticides, PCBs, semi-volatile organics, and priority pollutant metals.

Soil samples from shallow soil borings (Figure 5.2) were collected on 14 June and 6 July 1988. Except for HB2, HB3 and HB5, the samples were collected using a hand auger as described in Section 5.1.1. HB2 and HB3 were to be composited due to their proximity. However, because of gravelly soil, the auger could not be advanced beyond a depth of 1 ft in HB3, so only the shallow soil samples from each boring were composited and the two deeper HB2 soil samples were collected. Sampling of HB5 below two feet was not possible due to a concentration of gravel at that depth. Shallow soil boring samples and monitoring well soil samples were analyzed for volatile organics, semi-volatile organics, PCBs, pesticides and priority pollutant metals.

An initial monitoring well was installed near HB2 and HB3 (RB1-MW1, Figure 5.2) on 20 July 1988. Two soil samples with the highest headspace PID response were selected from the well boring for chemical analysis (RB1-MW1-SS1, 12-14' and RB1-MW1-SS2, 14-16').

A 9 point soil-gas survey was conducted in and around the site on 25 July 1988. Based on the soil-gas results, two additional monitoring wells (MW2 and MW3, Figure 5.2), were installed on 29 July and 10 August 1988, respectively. The two soil samples from each well boring with the highest headspace PID response were selected for chemical analysis (RB1-MW2-SS1, 0-4'; RB1-MW2-SS3, 4-6'; RB1-MW3-SS1, 0-2' and RB1-MW3-SS2, 5-7'). Duplicates of samples RB1-MW2-SS1 (Dup# RB1-MW2-SS2) and RB1-MW3-SS2 (Dup# RB1-MW3-SS3) were also submitted for analysis.

The three monitoring wells were developed by air-lift pumping and bailing. Fifty gallons of water were removed from RB1-MW1 on 8/12/88 using the pump. The slow recovery of RB1-MW3 required hand bailing development rather than pumping. Six gallons of water were removed over three days (bailed dry each day) ending on 8/17/88.


FILL STAND
DRUM WASH PAD
BUILDING 560
SU-1
SU-2
SU-3
SU-4
SU-5
SU-6
SU-7
SU-8
SU-9
SU-10
SU-11
SU-12
SU-13
SU-14
SU-15
SU-16
HB-1
HB-2
HB-3
HB-4
HB-5
HB-6
MW-1
MW-3
POWER POLE
ABANDONED FUEL LINE
ABANDONED GASOLINE LINE
BUILDING FOUNDATION
ABANDONED PIT
ABANDONED PIT
ROAD
25,000 GAL. TANK (RECYCLABLE JP4)
25,000 GAL. TANK (DE ICING FLUID)
25,000 GAL. TA
(RECYCLABLE OIL

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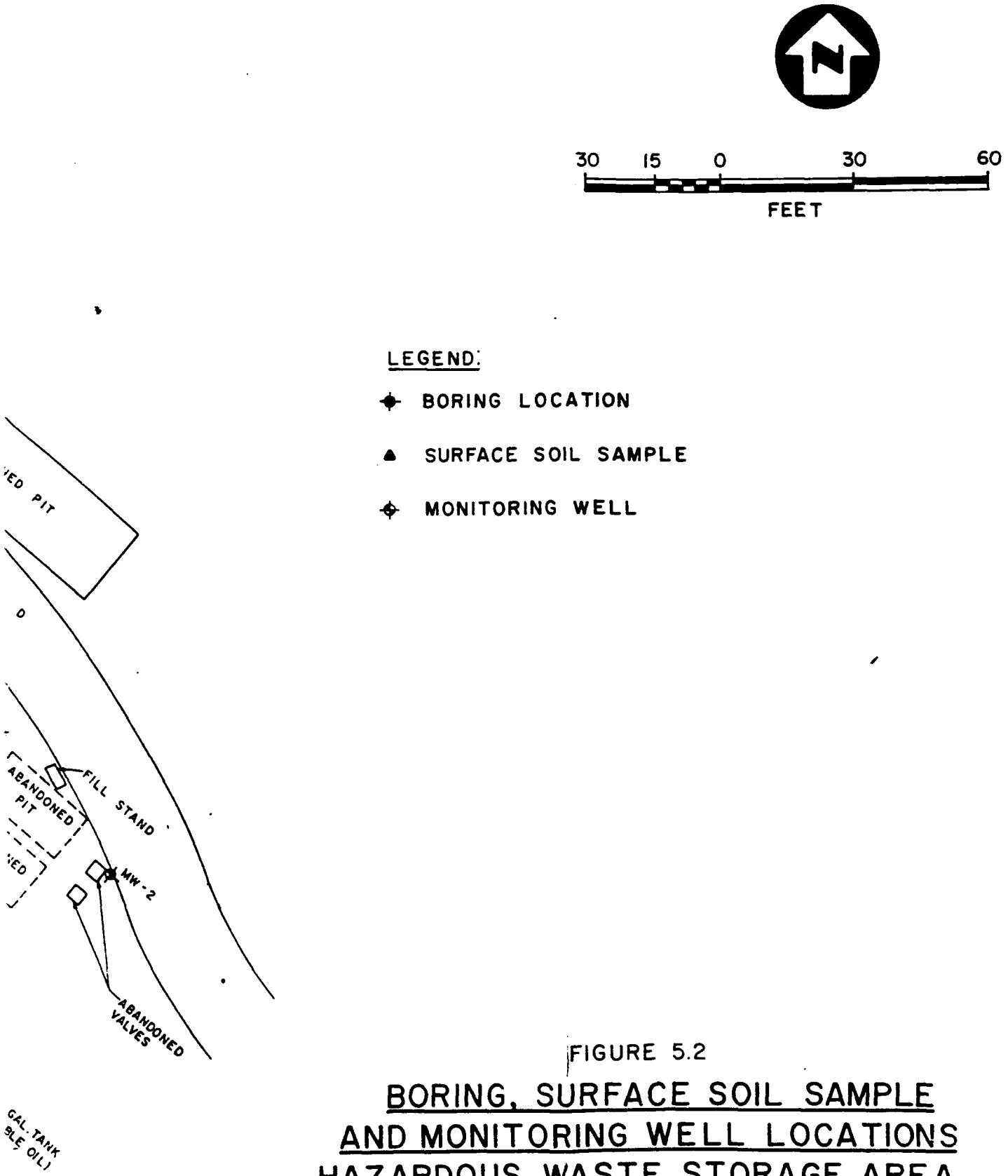

FIGURE 5.2

BORING, SURFACE SOIL SAMPLE AND MONITORING WELL LOCATIONS HAZARDOUS WASTE STORAGE AREA RICKENBACKER ANGB, OHIO

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B

Groundwater samples were collected from the monitoring wells on 19 and 22 September 1988. The groundwater was analyzed for the same constituents as the well boring soil samples. A duplicate water sample from RB1-MW1 was also submitted for analysis (Dup # RB30-MW1-GW1).

A repeat water sampling of MW3 was done on 17 October 1988 to replace samples contained in jars broken in a laboratory accident. The replacement samples were analyzed for semi-volatile organics, pesticides and PCBs.

In-situ hydraulic conductivity tests were performed on the wells on 16, 19 and 20 September 1988.

SECTION 6.0

FINDINGS OF INVESTIGATION

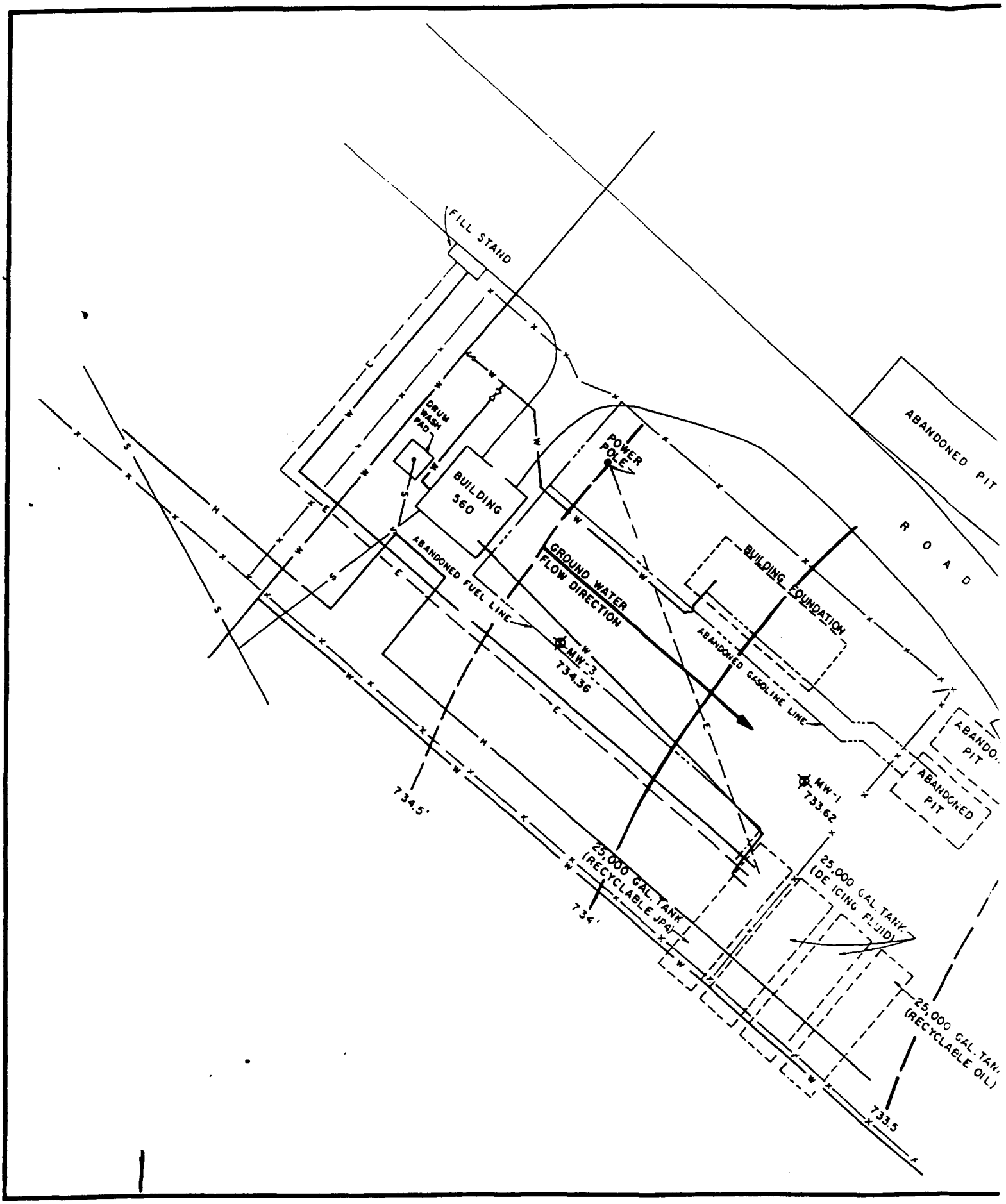
6.1 GEOLOGY/HYDROGEOLOGY

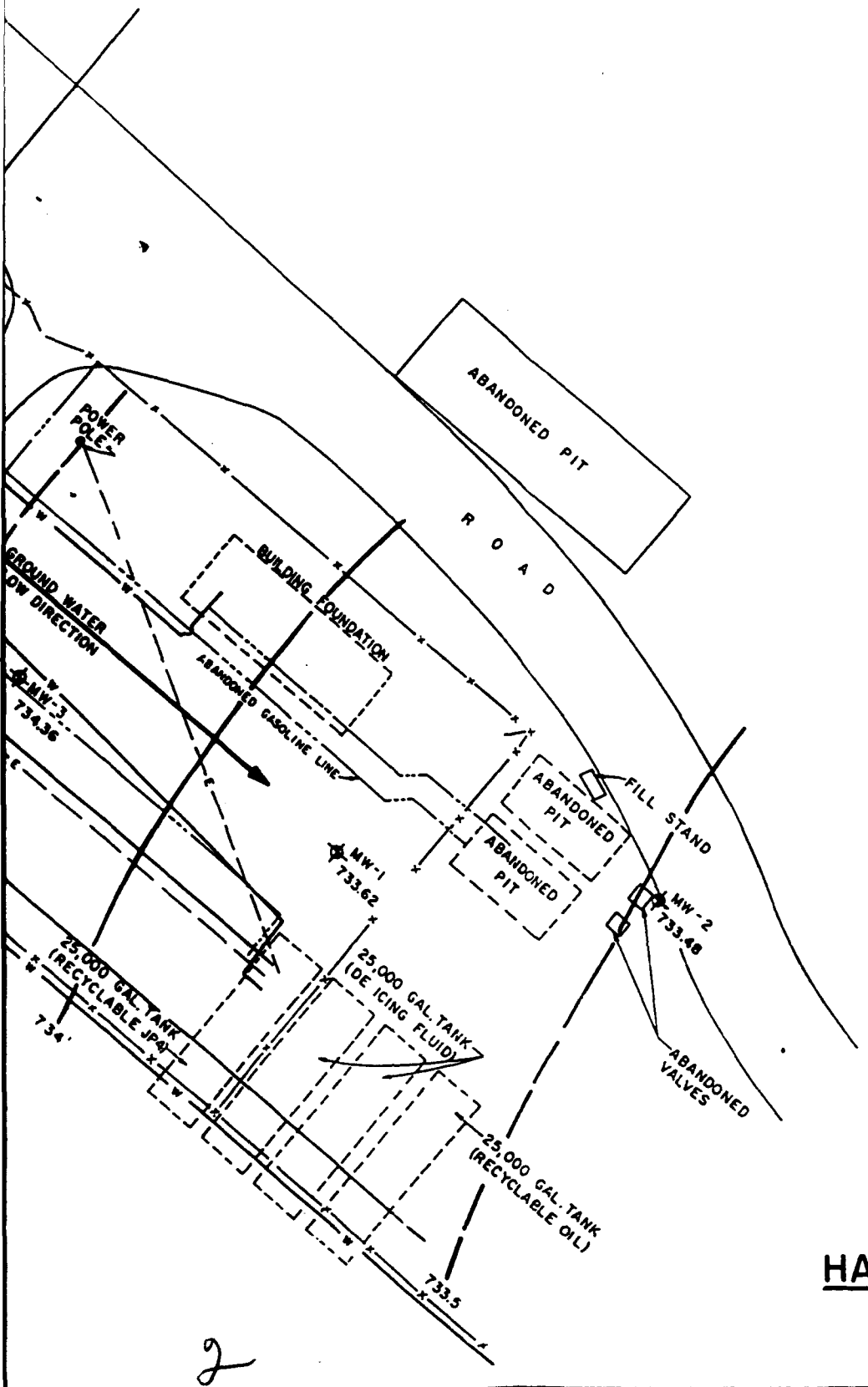
The soil boring for RB1-MW1 was drilled to a depth of twenty feet. The geologic profile logged during drilling consisted of 14.5 feet of brown, silty, clay with some sand and gravel, underlain by gray-to-brown sand and gravel to the end of boring. Headspace PID responses of 100 to 1,200 ppm were measured in soil samples collected below six feet, while hydrocarbon odors were noted over the same interval. RB1-MW1 was completed at a depth of 19 feet below grade with a ten foot screened interval from 9-19 feet. The screened interval was determined based on the wet sand and gravel deposits logged at 14.5 feet.

The borings for RB1-MW2 and RB1-MW3 encountered similar geologic profiles as logged in RB1-MW1. However, the soils did not have elevated PID readings or notable hydrocarbon odors. RB1-MW2 was completed at a depth of 15 feet below grade, while RB1-MW3 was set at 18 feet. Both wells utilized ten feet of screen. The drilling logs and well construction diagrams are included in Appendix C.

Water levels in the three wells between 16 September 1988 and 19 April 1989 ranged from seven to ten feet below land surface (732-735' MSL elevation). The aquifer is semi-confined as indicated by the water levels rising above the wet sand and gravel encountered at 14-15 feet. Ground water flow beneath the site is to the east towards Walnut Creek. Figures 6.1a, 6.1b and 6.1c are maps showing the groundwater elevations and flow direction on various dates. The water level data and well elevations are included in Appendix D.

In-situ testing of the aquifer from each of the wells indicated that the aquifer hydraulic conductivity (K) values vary significantly across the site. K values ranged from 0.009 feet/day (2.6×10^{-7} cm/sec) RB1-MW3 to 2.0 feet/day (5.76×10^{-5} cm/sec) in RB1-MW1 to 9.7 feet/day (2.9×10^{-4} cm/sec) in RB1-MW2. The aquifer test calculations are exhibited in Appendix E.


FILL STAND
DRUM WASH PAD
BUILDING 560
POWER POLE
ABANDONED PIT
ROAD
GROUND WATER FLOW DIRECTION
BUILDING FOUNDATION
ABANDONED FUEL LINE
MW-3
734.36
ABANDONED GASOLINE LINE
ABANDONED PIT
ABANDONED PIT
MW-1
733.62
734.5'
25,000 GAL. TANK (RECYCLABLE JP4)
734'
25,000 GAL. TANK (DE ICING FLUID)
25,000 GAL. TANK (RECYCLABLE OIL)
733.5



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LEGEND:

MONITORING WE

CONTOUR INTERVAL C

FIGURE 6.1a

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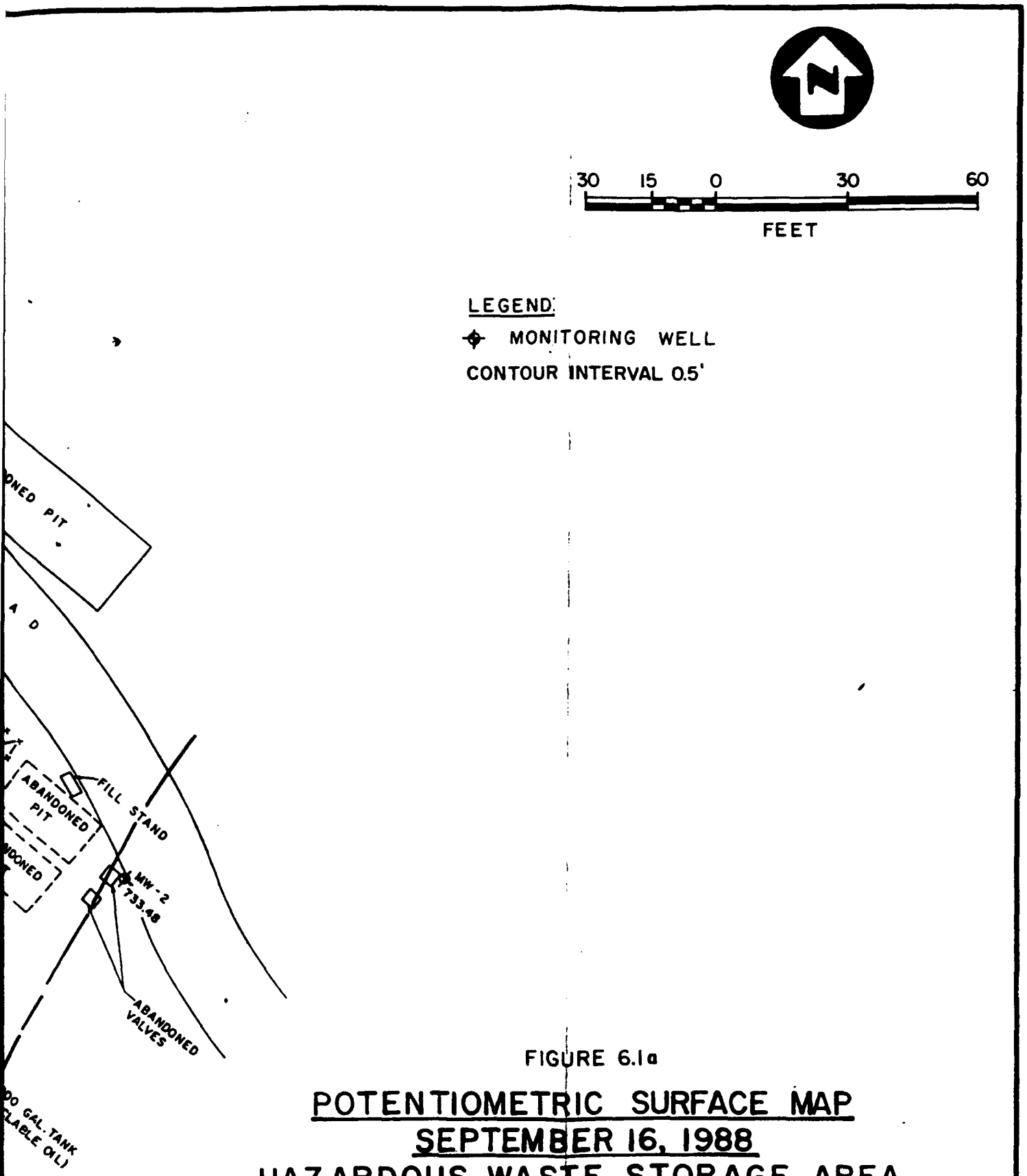

FIGURE 6.1a

POTENTIOMETRIC SURFACE MAP
SEPTEMBER 16, 1988
HAZARDOUS WASTE STORAGE AREA
RICKENBACKER ANGB, OHIO

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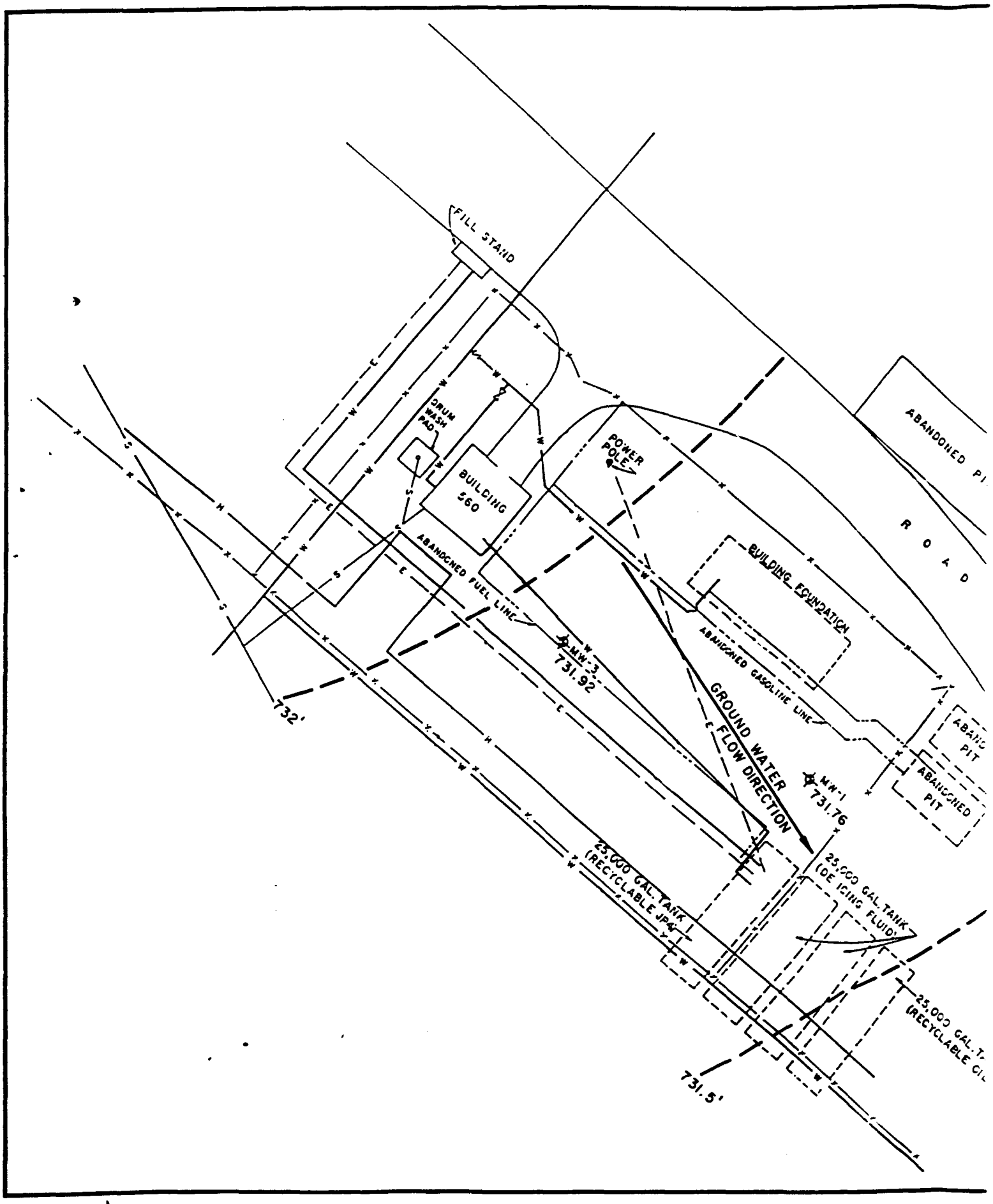
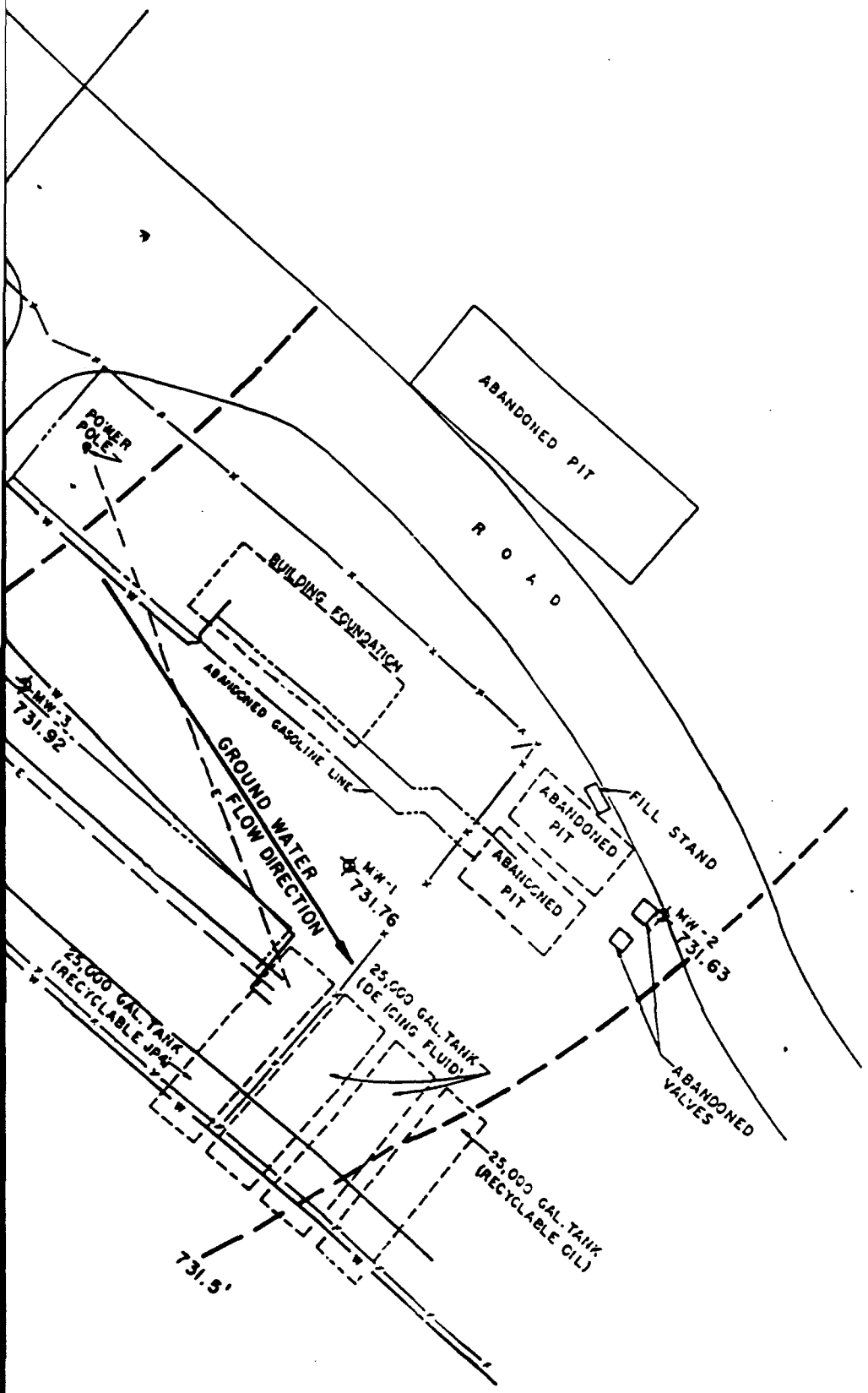

FILL STAND
DRUM WASH PAD
BUILDING 560
POWER POLE
ABANDONED PI
ROAD
BUILDING FOUNDATION
ABANDONED FUEL LINE
ABANDONED GASOLINE LINE
MW-3
731.92
GROUND WATER FLOW DIRECTION
MW-1
731.76
ABANDONED PIT
ABANDONED PIT
732'
25,000 GAL. TANK (DE ICING FLUID)
25,000 GAL. TANK I (RECYCLABLE JP4)
25,000 GAL. T (RECYCLABLE OIL
731.5'



30 15

LEGEND:

MONITORING

CONTOUR INTERVAL

FIGURE 6

POTENTIOMETRIC S

DECEMBER 17,

HAZARDOUS WASTE

RICKENBACKER

2

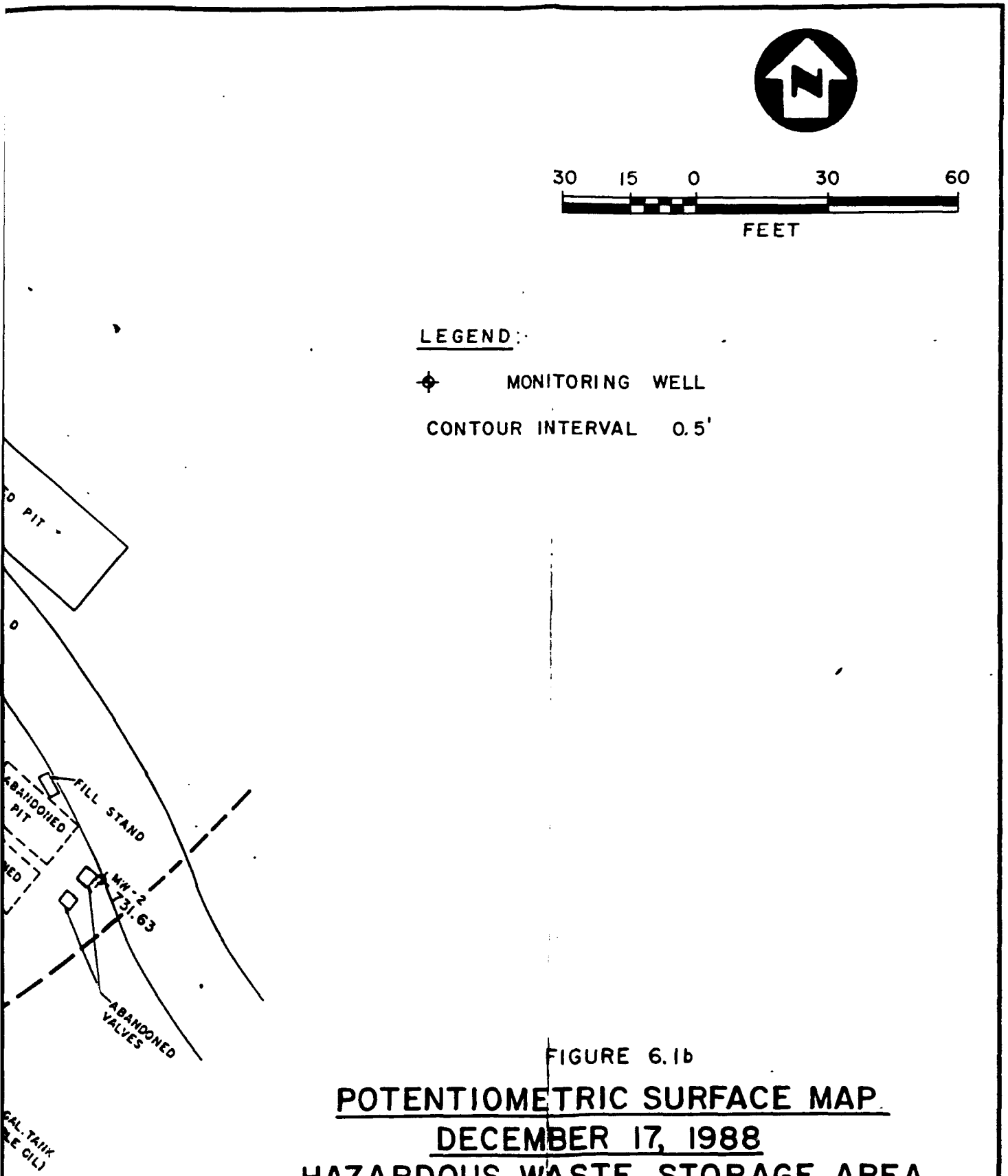


FIGURE 6.1b

POTENTIOMETRIC SURFACE MAP
DECEMBER 17, 1988
HAZARDOUS WASTE STORAGE AREA
RICKENBACKER ANGB, OHIO

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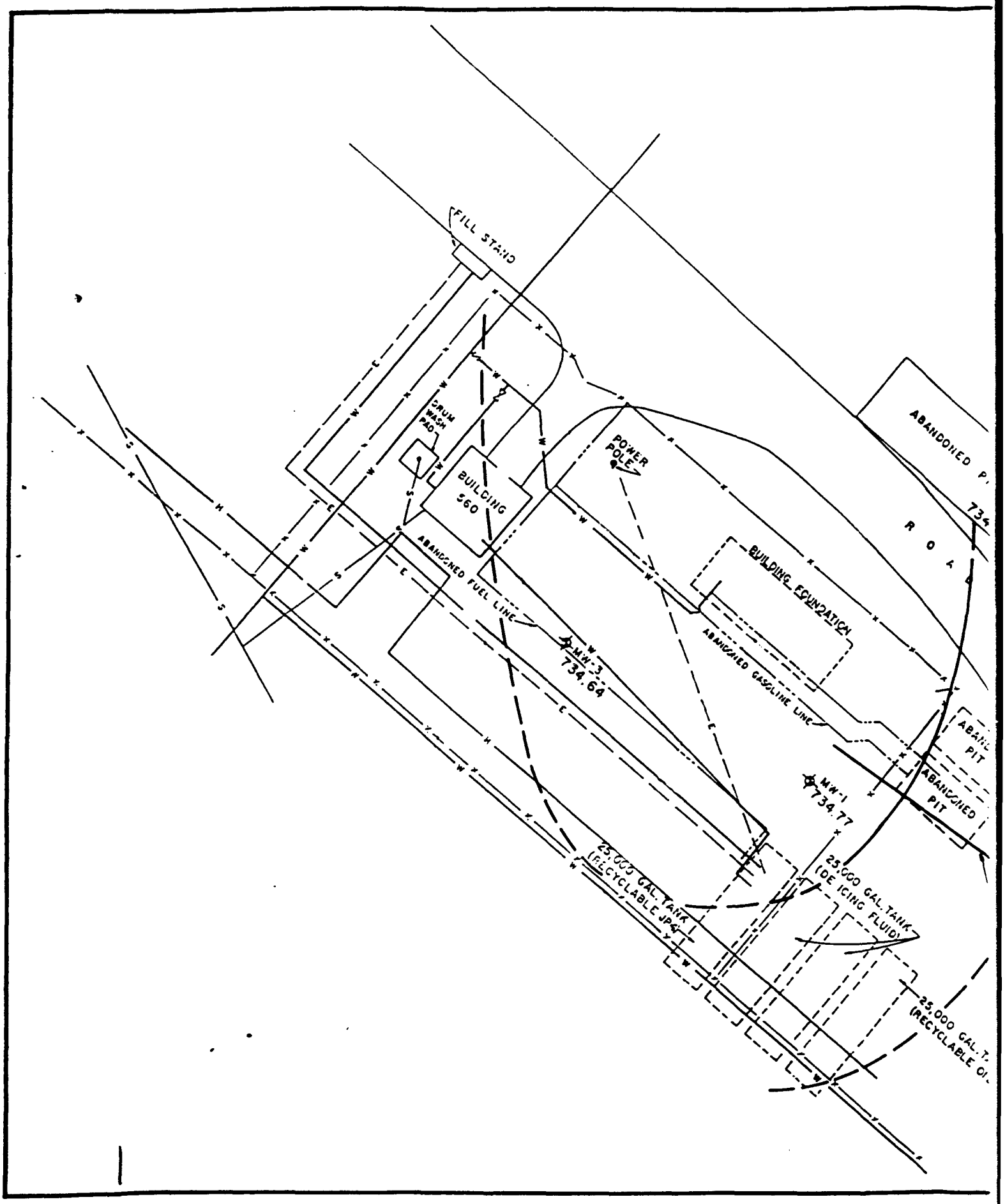
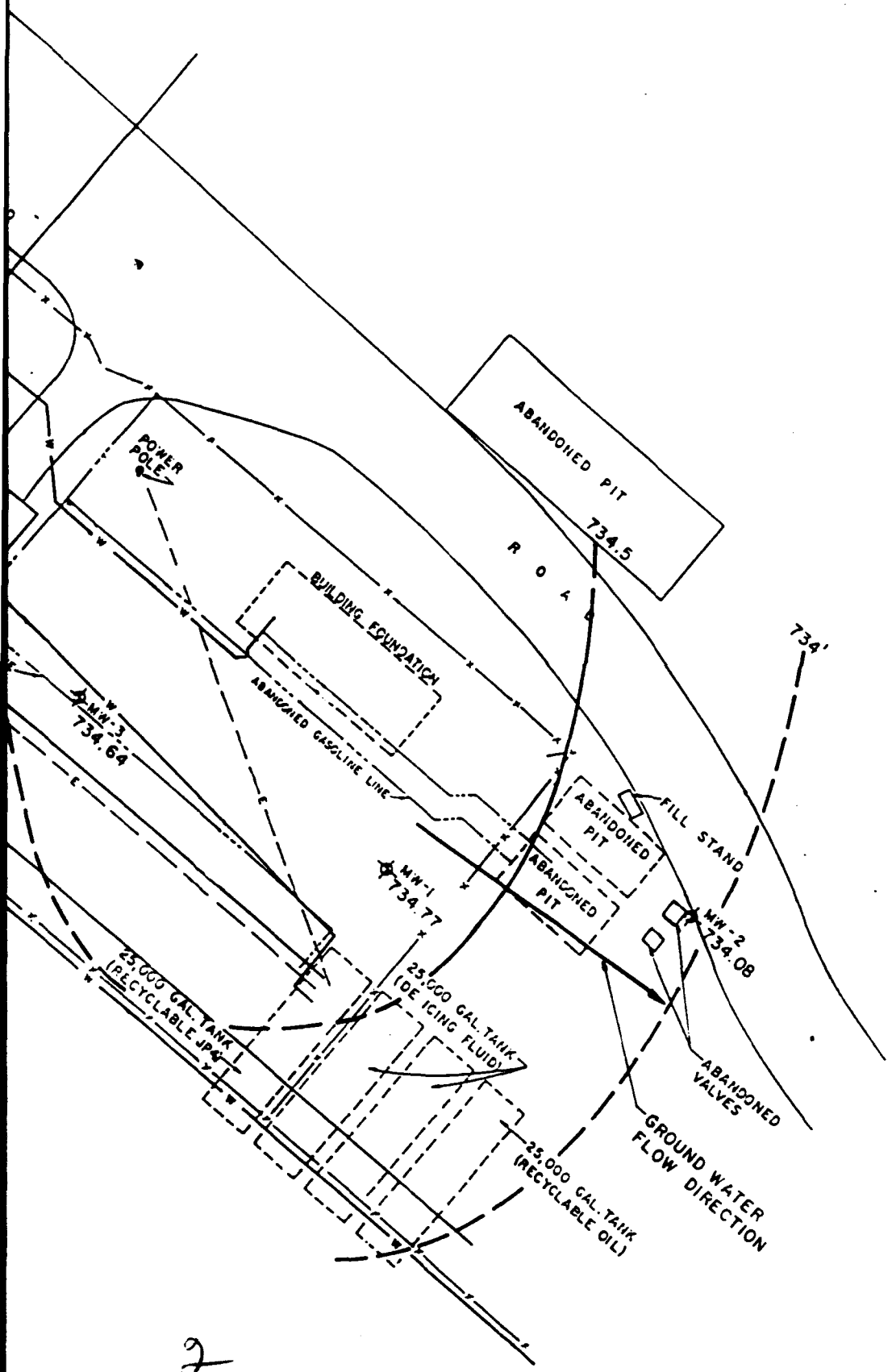

FILL STAND
DRUM WASH PAD
BUILDING 560
POWER POLE
ABANDONED P
734
R O A
BUILDING FOUNDATION
ABANDONED FUEL LINE
ABANDONED GASOLINE LINE
MW-3
734.64
MW-1
734.77
ABAND PIT
ABANDONED PIT
25,000 GAL. TANK (RECYCLABLE JP4)
25,000 GAL. TANK (DE ICING FLUID)
25,000 GAL. T (RECYCLABLE OI



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LEGEND:

MONITORIN

CONTOUR INTERVA

FIGUF

POTENTIOMETRI

APRIL

HAZARDOUS WAST

RICKENBACKE

2

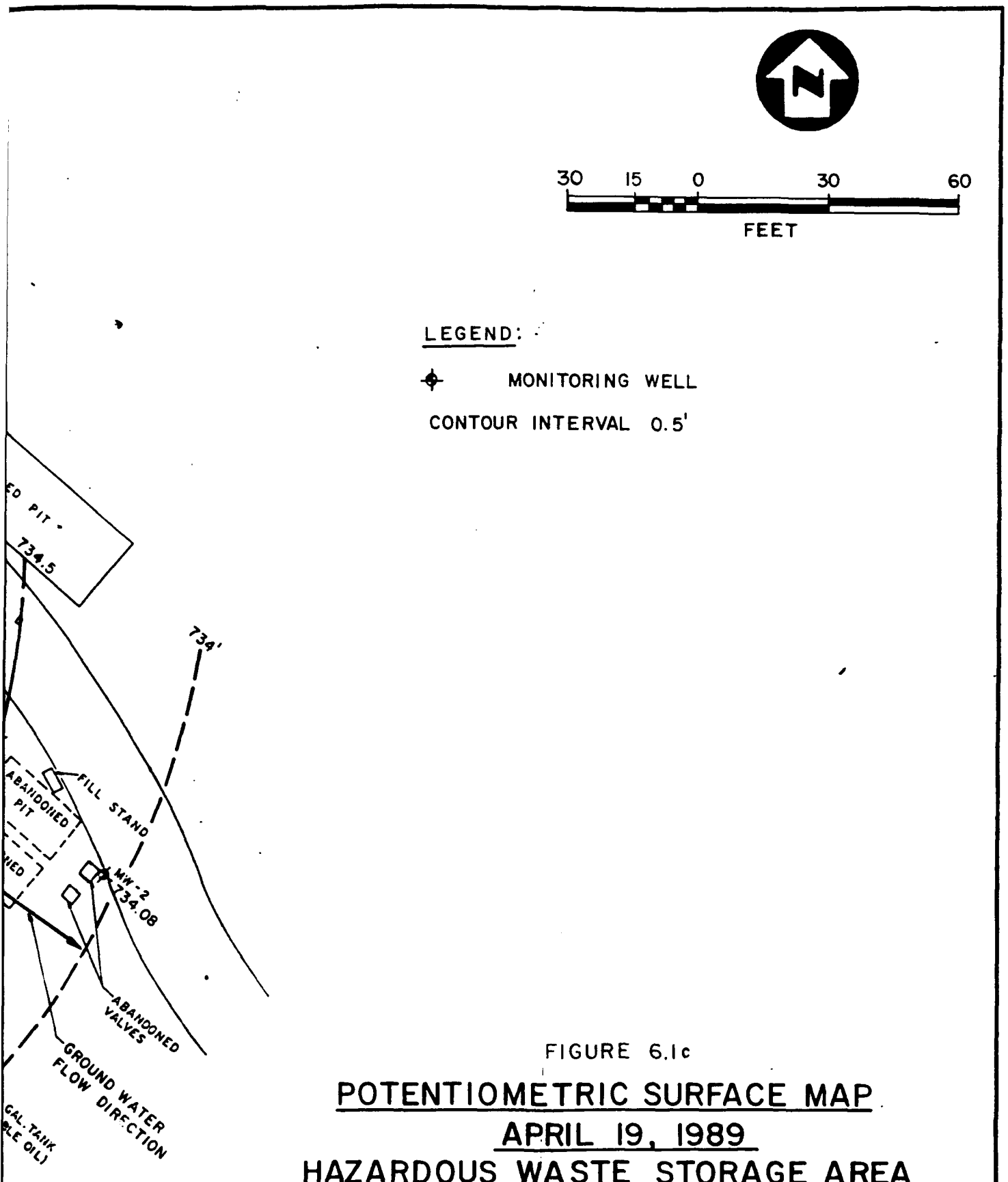

FIGURE 6.1c

POTENTIOMETRIC SURFACE MAP
APRIL 19, 1989
HAZARDOUS WASTE STORAGE AREA
RICKENBACKER ANGB, OHIO

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6.2 SOIL-GAS SURVEY

The soil-gas survey identified two areas of elevated BTX (benzene, toluene and o-xylene) concentration. The sample from SG-1 (Figure 6.2) contained the highest concentration (29.8 ppm), all of which was o-xylene. The only other point with detectable BTX was SB-6 where the chromatogram resembled a typical response to gasoline contamination. The remaining sampling points indicate that the concentration of volatile organic contamination in the soil profile beneath the site is very low. The soil-gas survey data are included in Appendix F.

6.3 ANALYTICAL RESULTS

The complete analytical results for soil and water samples are included in Appendix H. A discussion on the laboratory quality assurance and quality control results is presented in Appendix I.

6.3.1 Soil Results

Soil samples were collected from surface soils, hand borings, and during the drilling of the monitoring wells. Surface soil samples were analyzed for pesticides, PCBs, herbicides, semi-volatile organics and priority pollutant metals. Soil samples collected from the hand borings and during the drilling of the monitoring wells were analyzed for pesticides, PCBs, volatile and semi-volatile organics, and priority pollutant metals. The soil analytical results are summarized in Table 6.1. Figures 6.3a, 6.3b and 6.3c are maps illustrating the soil contaminants detected at various depths.

Several of the surface soil samples collected contained high concentrations of semi-volatile organics (coal tar components and phthalates). Some of these concentrations are flagged (J) due to high spiked sample recoveries. The values should be considered biased high although this should not affect the overall conclusions. See Appendix H for further discussion. In addition, several of the samples contained lead and zinc concentrations that exceeded the typical values found in Ohio soils. Table 6.2 is a summary of the standards for metal concentrations in soil and groundwater. No concentrations of volatile organics, pesticides, PCBs or herbicides were detected in the surface samples.

The cadmium levels in the surface soil samples were also elevated, however, the QA/QC results were not within control limits. The accuracy of the results is therefore questionable. Additional samples should be collected to verify the cadmium levels.

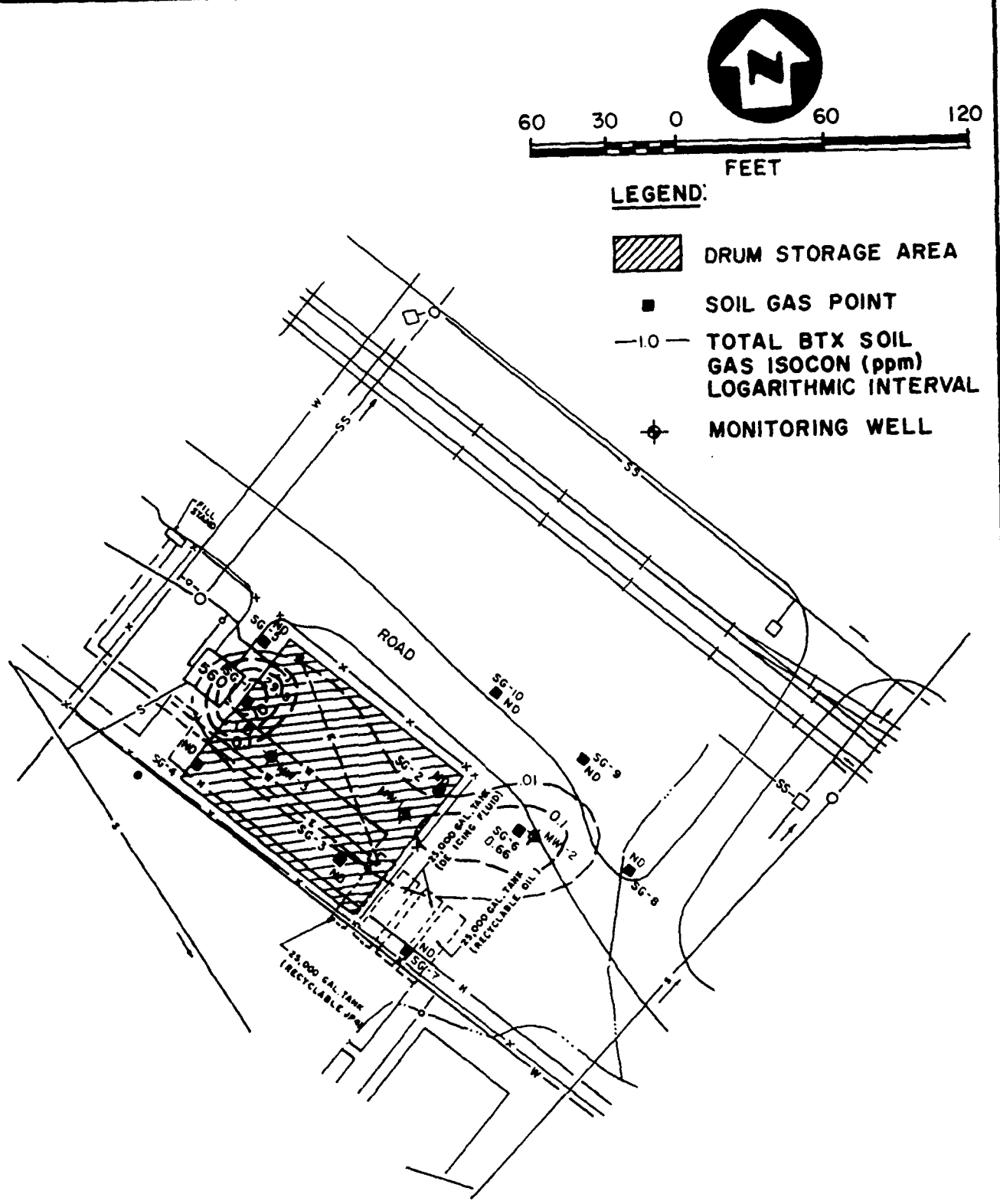

FIGURE 6.2

SOIL GAS CONCENTRATION MAP AND MONITORING WELL LOCATIONS HAZARDOUS WASTE STORAGE AREA

RICKENBACKER ANGB, OHIO

SOURCE: BASE DETAILED SECTIONAL MAPS

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TABLE 6.1

SITE 1 SOIL ANALYSIS - EXTRACT LIST
RICKENBACKER ANGB, OHIO

	DET. LIMIT	HB1-SS1 14-Jun-88	HB1-SS2 14-Jun-88	HB1-SS3 14-Jun-88	HB2+3-SS1 14-Jun-88	HB2-SS2 14-Jun-88	HB2-SS3 14-Jun-88	HB4-SS1 06-Jul-88	HB4-SS2 06-Jul-88	HB4-SS3 06-Jul-88
Sample Depth (ft.)		0-1.3	1.3-2.6	2.6-3.9	0-1.3	1.3-2.6	2.6-3.9	0-1.3	1.3-2.6	2.6-3.9
Volatile Compounds:										
Methylene chloride	5 ug/kg	92000 A	3000 A	130000 A	22 U	39 U	21 U	8 U	8 U	7 U
Ethylbenzene	5 ug/kg	ND f	ND f	120000 g	ND	ND e	ND	ND	ND	ND
o-Xylene	5 ug/kg	440000 f	300000 f	1900000 g	ND	43 e	ND	ND	ND	ND
Semi-Volatile compounds:										
Di-n-butyl phthalate	330 ug/kg	ND	ND	600	ND	3900	2900	ND	ND	ND
Fluorene	330 ug/kg	ND	ND	ND	ND	ND	480 J	ND	ND	ND
Naphthalene	330 ug/kg	ND	390 J	1600 J	870 J	5400 J	570 J	ND	ND	ND
Phenanthrene	330 ug/kg	ND	ND	ND	ND	5600	780	ND	ND	ND
Pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	530	ND	ND
2-Methylnapthalene	330 ug/kg	1100 J	960 J	2800 J	1900 J	23000 J	2800 J	ND	ND	ND
Metals:	BKGD. VALUES									
Arsenic	29.4 mg/kg	15	11.5 N	17.6	12.0 N	18.5	11.4 N	7.9 N	42 N	29 N
Beryllium	0.8 mg/kg	0.78	ND	0.84	ND	0.81	ND	0.4 B	0.9 *	0.6 *
Cadmium	0.3 mg/kg	4 G	ND G	6.9 G	ND	8.2 G	ND	ND	ND	ND
Chromium	26.3 mg/kg	16.3	16.2 N	18.4	14.1 N	17.7	10.0 N	10 G	15 G	12 G
Copper	37 mg/kg	19.7	21.9 N	22.7	19.5 N	24.4	18.2 N	26 *	38	35 *
Lead	22.5 mg/kg	15.7	10.0	10.0	27.0	9.8 N	8.2 B	27 *	20 *	18 *
Nickel	41 mg/kg	21.7	27.8 N	25.3	21.4 N	28.8	25 N	23 *	60 *	41 *
Zinc	164.9 mg/kg	72.5	62.1 N	83.3	86.1 N	85.5	73.4 N	109	131	108

Footnotes
e--detection limits 8240 list (see footnote list Table G-3)
f--detection limits 8240 list (see footnote list Table G-3)
g--detection limits 8240 list (see footnote list Table G-3)
A--analyte found in associated method blank but the sample concentration was greater than 10 times the blank concentration, therefore possibly significant
B--reported value is less than the reporting limit but greater than the MDL
G=N*
J--value is estimated due to high MS/MSD recoveries. Results are biased high.
N--spiked sample recovery not within control limits
ND-not detected
U-analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected
*--duplicate analysis not within control limits

TABLE 6.1(cont.)

SITE 1 SOIL ANALYSIS - EXTRACT LIST
RICKENBACKER ANGB, OHIO

	DET. LIMIT	HB5-SS1 06-Jul-88	HB6-SS1 06-Jul-88	HB6-SS2 06-Jul-88	HB6-SS3 06-Jul-88
Sample Depth (ft.)		0-1.3	0-1.3	1.3-2.6	2.6-3.9
Volatile Compounds:					
Methylene chloride	5 ug/kg	6 U	11 U	20 U	28 U
Ethylbenzene	5 ug/kg	ND	ND	ND	ND
o-Xylene	5 ug/kg	ND	ND	ND	ND
Semi-Volatile compounds:					
Di-n-butyl phthalate	330 ug/kg	ND	ND	ND	ND
Fluorene	330 ug/kg	ND	ND	ND	ND
Naphthalene	330 ug/kg	ND	ND	ND	ND
Phenanthrene	330 ug/kg	ND	ND	ND	ND
Pyrene	330 ug/kg	ND	ND	ND	ND
2-Methylnapthalene	330 ug/kg	ND	ND	ND	ND
Metals:	BKGD. VALUES				
Arsenic	29.4 mg/kg	8.4	4.1	15	13
Beryllium	0.8 mg/kg	0.5	0.5	0.5	0.6
Cadmium	0.3 mg/kg	ND	ND	ND	ND
Chromium	26.3 mg/kg	10	10	12	14
Copper	37 mg/kg	23	22	32	25
Lead	22.5 mg/kg	19 *	11 *	18 *	15 *
Nickel	41 mg/kg	25	18	25	28
Zinc	164.9 mg/kg	83 N	79 N	86 N	92 N

Footnotes
e--detection limits 8240 list (see footnote list Table G-3)
f--detection limits 8240 list (see footnote list Table G-3)
g--detection limits 8240 list (see footnote list Table G-3)
A--analyte found in associated method blank but the sample concentration was greater than 10 times the blank concentration, therefore possibly significant
B--reported value is less than the reporting limit but greater than the MDL
G=N*
J--value is estimated due to high MS/MSD recoveries. Results are biased high.
N--spiked sample recovery not within control limits
ND-not detected
U-analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected
*--duplicate analysis not within control limits

TABLE 6.1(cont.)

SITE 1 SOIL ANALYSIS - EXTRACT LIST
RICKENBACKER ANGB, OHIO

	DET. LIMIT	MW1-SS1 20-Jul-88	MW1-SS2 20-Jul-88	MW2-SS1 29-Jul-88	MW2-SS2 29-Jul-88	MW2-SS3 29-Jul-88	MW3-SS1 10-Aug-88	MW3-SS2 10-Aug-88	SU1+2-GS1 14-Jun-88	SU3+4-GS1 14-Jun-88
Sample Depth (ft.)		12-14	14-16	0-2	4-6	4-6	0-2	5-7		
Volatile Compounds:										
Benzene	5 ug/kg	ND	1900	ND	ND	ND	--	--	--	--
Ethylbenzene	5 ug/kg	1700	11000	ND	ND	ND	--	--	--	--
o-Xylene	5 ug/kg	1600	20000	ND	ND	ND	--	--	--	--
Semi-Volatile compounds:										
Anthracene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)flouranthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	560	500
Bis(2-ethylhexyl)phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	330 ug/kg	3500 U	3100 U	2800 U	2600 U	2200 U	ND	ND	ND	ND
Fluoranthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	420	570
Fluorene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-CD)pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	330 ug/kg	ND	630	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnapthalene	330 ug/kg	ND	1200	ND	ND	ND	ND	ND	ND	ND
Metals:	BKGD. VALUE									
Arsenic	29.4 mg/kg	7.8 N	16.9 N	15 N	7.6 N	8.6 N	15.3	16.1	14.1	19.7
Beryllium	0.8 mg/kg	ND	ND	ND	0.2 B	ND	ND N	ND N	0.79	0.8
Cadmium	0.3 mg/kg	ND	ND N	ND	ND	ND	ND	ND	6.3 N	8.3 N
Chromium	26.3 mg/kg	4.5 B	8.4 N	15	12	8	13.1	14.1	22.1	22.4
Copper	37 mg/kg	12.7 N	17.2	21	21	24	20.5	19.1	29.3	28.1
Lead	22.5 mg/kg	ND	8.6 B	17	31	26	15.6	13.7	41.9	35.3
Nickel	41 mg/kg	13.3 N	22.2 N	25	21	9.2 B	24.1	24.9	28.2	28.3
Thallium	1 mg/kg	ND N	ND N	ND	ND	ND	ND	10.5	ND	ND
Zinc	164.9 mg/kg	56.1 N	63.8	66 N	74 N	76 N	87.1	83.7	422	134

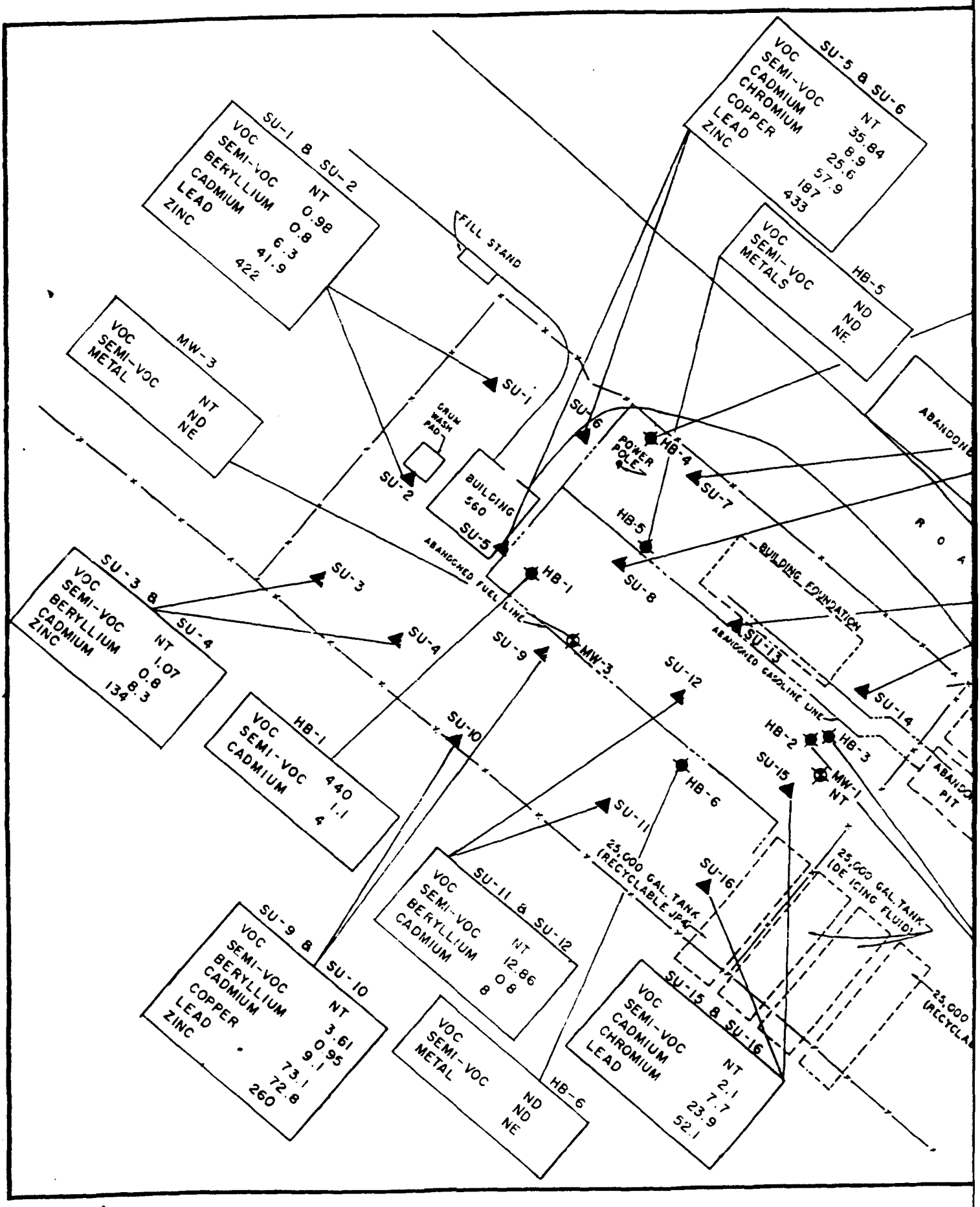
Footnotes
B--reported value is less than the reporting limit but greater than the MDL
G=N*
J--value is estimated due to high MS/MSD recoveries. Results are biased high.
N--spiked sample recovery not within control limits
ND-not detected
U-analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected
*--duplicate analysis not within control limits
-- not tested

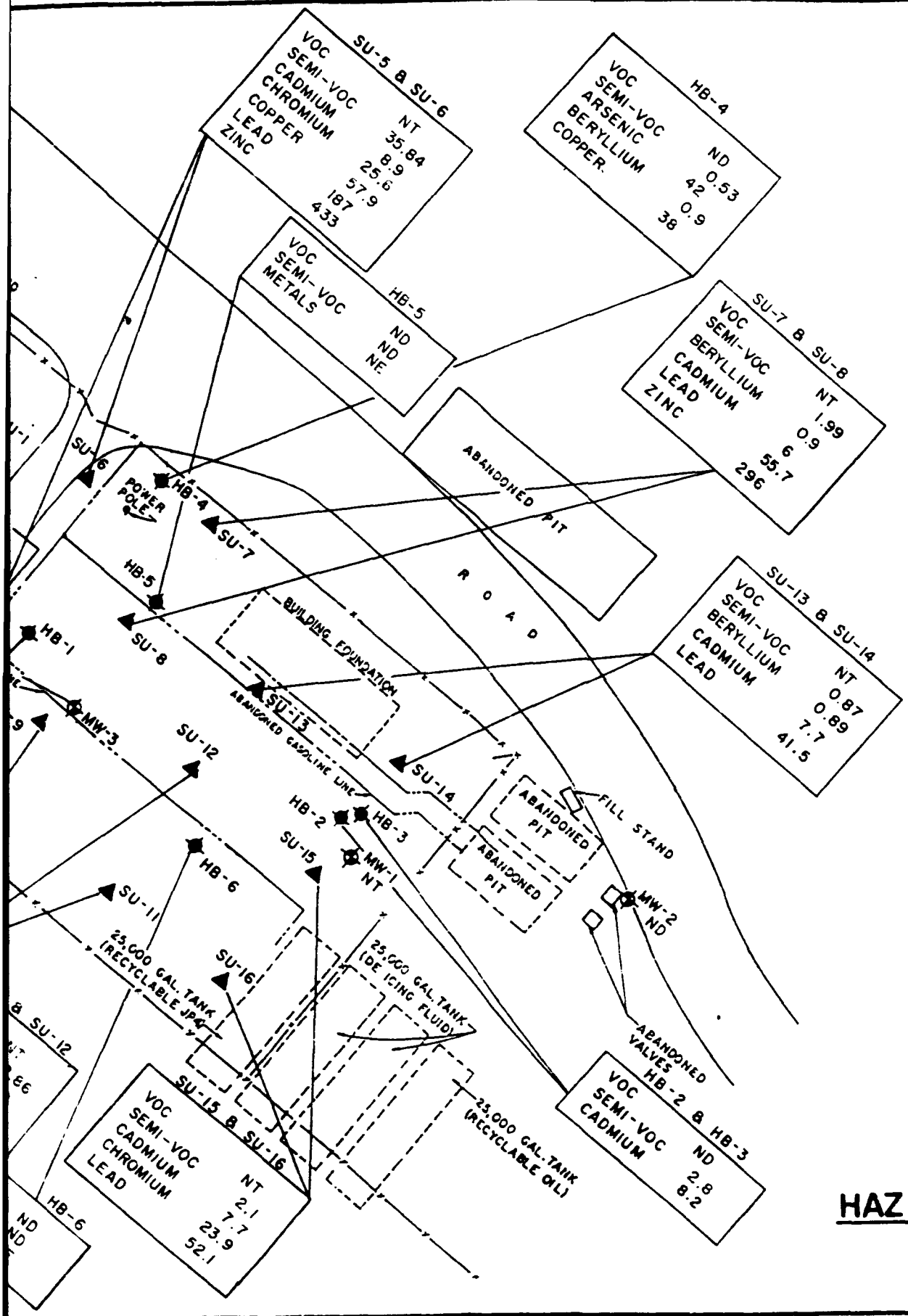
TABLE 6.1(cont.)

SITE 1 SOIL ANALYSIS - EXTRACT LIST
RICKENBACKER ANGB, OHIO

	DET. LIMIT	SU5+6-GS1 14-Jun-88	SU7+8-GS1 14-Jun-88	SU9+10-GS1 14-Jun-88	SU11+12-GS1 14-Jun-88	SU13+14-GS1 14-Jun-88	SU15+16-GS1 14-Jun-88	SU17+18-GS1 14-Jun-88
Sample Depth (ft.)								
Volatile Compounds:								
Benzene	5 ug/kg	--	--	--	--	--	--	--
Ethylbenzene	5 ug/kg	--	--	--	--	--	--	--
o-Xylene	5 ug/kg	--	--	--	--	--	--	--
Semi-Volatile compounds:								
Anthracene	330 ug/kg	580	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	330 ug/kg	2100 J	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	330 ug/kg	2600	ND	360	530	ND	ND	ND
Benzo(b)flouranthene	330 ug/kg	3200	530	570	850	430	840	760
Benzo(ghi)perylene	330 ug/kg	1700	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	330 ug/kg	2800	ND	380	460	ND	ND	ND
Bis(2-ethylhexyl)phthalate	330 ug/kg	4100 J	ND	ND	480 J	ND	ND	ND
Chrysene	330 ug/kg	2800 J	ND	420 J	540 J	ND	ND	ND
Dibenzo(a,h)anthracene	330 ug/kg	360	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	330 ug/kg	ND	940	ND	6500	ND	ND	1400
Fluoranthene	330 ug/kg	4100	520	840	ND	440	740	630
Fluorene	330 ug/kg	ND	ND	ND	1400 J	ND	ND	ND
Indeno(1,2,3-CD)pyrene	330 ug/kg	1700	ND	ND	ND	ND	ND	ND
Naphthalene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	330 ug/kg	4200	ND	410	1100	ND	ND	ND
Pyrene	330 ug/kg	5600 J	ND	630 J	1000 J	ND	520 J	430 J
2-Methylnapthalene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND
Metals:	BKGD. VALUE							
Arsenic	29.4 mg/kg	17.7	15.2	17.9	17.7	12.8	17.2	20.0
Beryllium	0.8 mg/kg	0.75	0.9	0.95	0.78	0.89	0.75	0.78
Cadmium	0.3 mg/kg	8.9 N	6 N	9.1 N	8 N	7.7 G	7.7 G	7.9 G
Chromium	26.3 mg/kg	25.6	22.1	20.1	19.5	19.6	23.9	17.8
Copper	37 mg/kg	57.9	23.1	73.1	29.7	19.7	30.7	32.2
Lead	22.5 mg/kg	187	55.7	72.8	35	41.5	52.1	35.2
Nickel	41 mg/kg	19.1	20.6	26.6	26.5	14.8	26.4	26.9
Thallium	1 mg/kg	ND	ND	ND	ND	ND	ND	ND
Zinc	164.9 mg/kg	433	296	260	113	120	135	300

Footnotes
B--reported value is less than the reporting limit but greater than the MDL
G=N*
J--value is estimated due to high MS/MSD recoveries. Results are biased high.
N--spiked sample recovery not within control limits
ND-not detected
U-analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected
*--duplicate analysis not within control limits
-- not tested


SU-1 & SU-2
VOC NT
SEMI-VOC 0.98
BERYLLIUM 0.8
CADMIUM 6.3
LEAD 41.9
ZINC 422
SU-5 & SU-6
VOC NT
SEMI-VOC 35.84
CADMIUM 8.9
CHROMIUM 25.6
COPPER 57.9
LEAD 187
ZINC 433
HB-5
VOC ND
SEMI-VOC ND
METALS NE
MW-3
VOC NT
SEMI-VOC ND
METAL NE
SU-3 & SU-4
VOC NT
SEMI-VOC 1.07
BERYLLIUM 0.8
CADMIUM 8.3
ZINC 134
HB-1
VOC 440
SEMI-VOC 1.1
CADMIUM 4
SU-9 & SU-10
VOC NT
SEMI-VOC 3.61
BERYLLIUM 0.95
CADMIUM 9.1
COPPER 73.1
LEAD 72.8
ZINC 260
SU-11 & SU-12
VOC NT
SEMI-VOC 12.86
BERYLLIUM 0.8
CADMIUM 8
HB-6
VOC ND
SEMI-VOC ND
METAL NE
SU-15 & SU-16
VOC NT
SEMI-VOC 2.1
CADMIUM 7.7
CHROMIUM 23.9
LEAD 52.1
FILL STAND
CAUM WASH PAD
BUILDING 560
SU-5
ABANDONED FUEL LINE
POWER POLE
HB-4
HB-5
HB-1
MW-3
BUILDING FOUNDATION
SU-13
ABANDONED GASOLINE LINE
HB-2
HB-3
MW-1
NT
25,000 GAL. TANK (RECYCLABLE JP4)
25,000 GAL. TANK (DE ICING FLUID)
ABANDONED PIT
SU-1
SU-2
SU-3
SU-4
SU-5
SU-6
SU-7
SU-8
SU-9
SU-10
SU-11
SU-12
SU-14
SU-15
SU-16



30

LEGEND:

BORING

SURFACE

MONITORIN

VOC: VOLATILE

SEMI-VOC: SEMI-

ALL VALUES IN

ND: NOT DETE

NT: NOT TEST

NE: VALUE DO
CRITERIA
CONCENTR

FIGUR

MAP OF SOIL
DEPTH:
HAZARDOUS WAST
RICKENBACKE

2

6-11

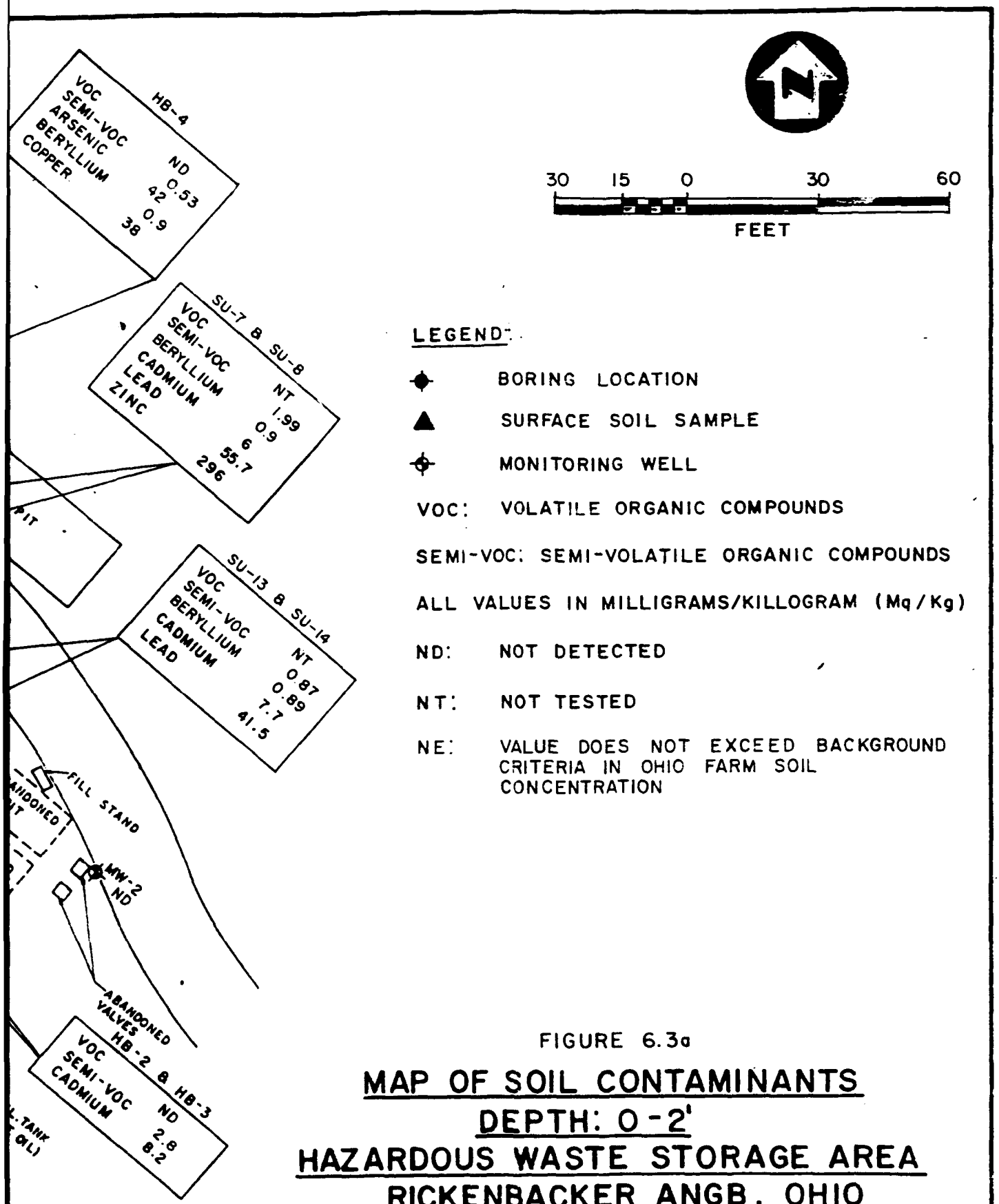


FIGURE 6.3a

MAP OF SOIL CONTAMINANTS
DEPTH: 0-2'
HAZARDOUS WASTE STORAGE AREA
RICKENBACKER ANGB, OHIO

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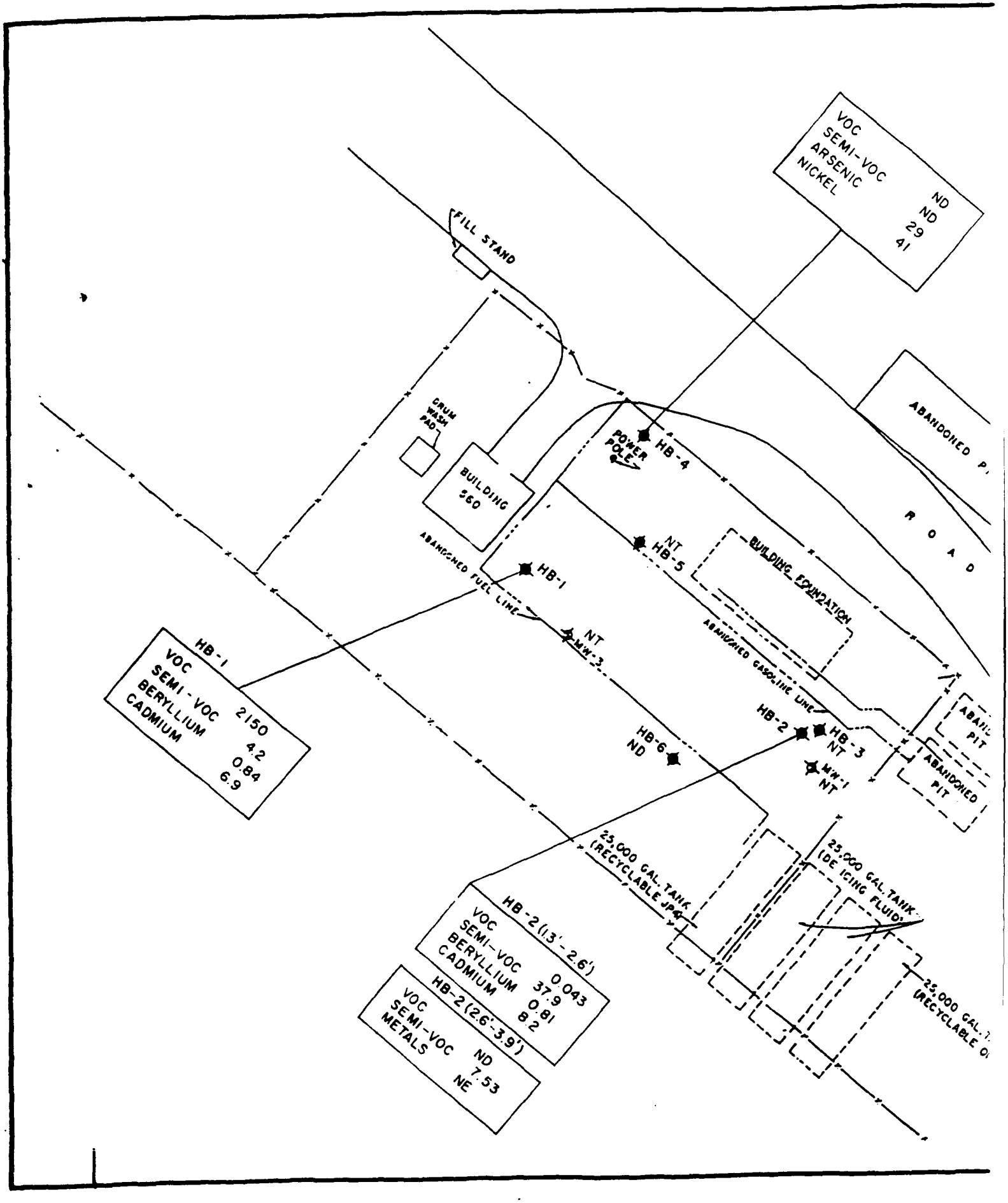
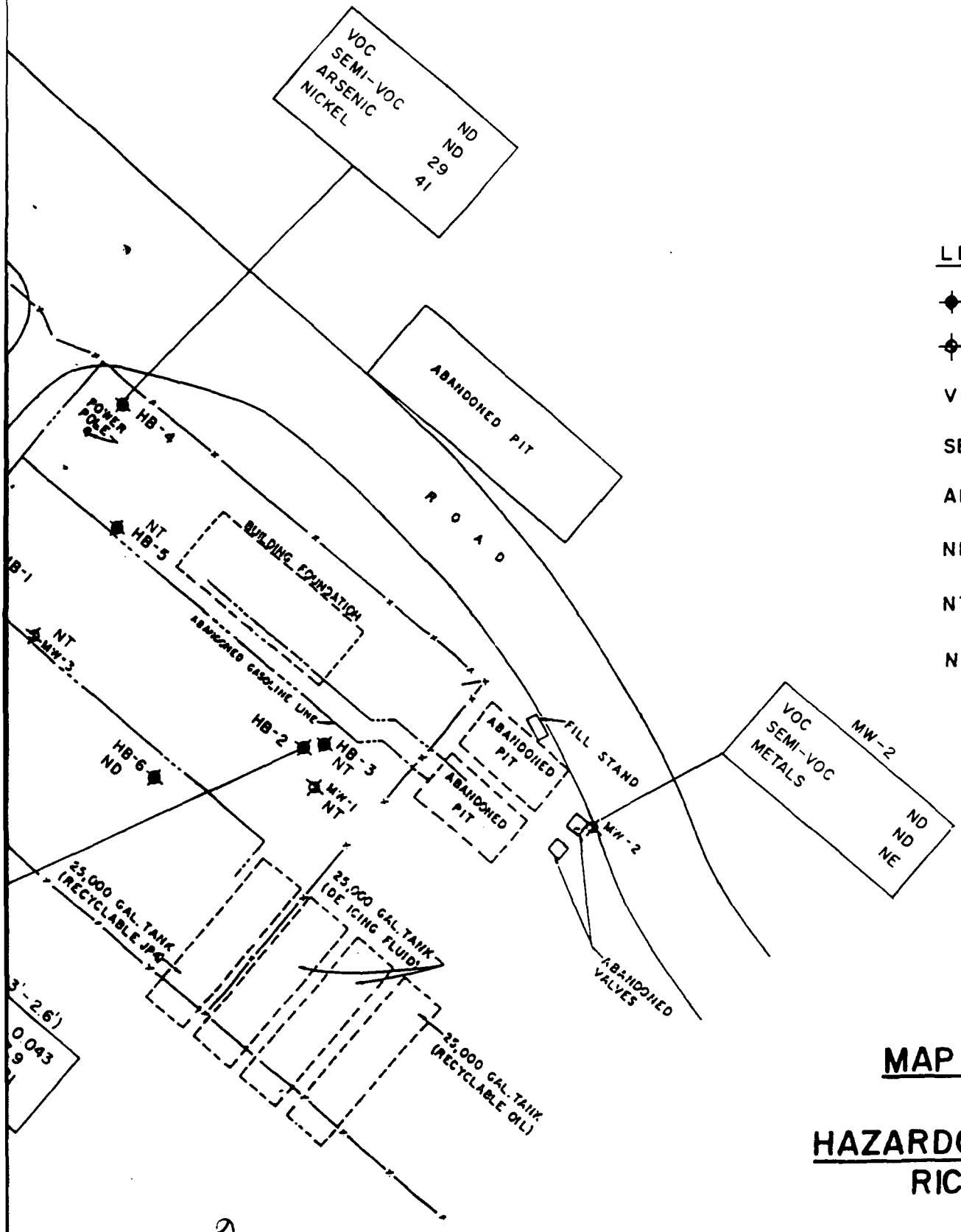
3


VOC
SEMI-VOC
ARSENIC
NICKEL
ND
ND
29
41
FILL STAND
DRUM WASH PAD
BUILDING 560
POWER POLE
HB-4
ABANDONED P
ROAD
NT
HB-5
BUILDING FOUNDATION
HB-1
ABANDONED FUEL LINE
NT
MW-3
ABANDONED GASOLINE LINE
HB-1
VOC
SEMI-VOC 2150
BERYLLIUM 4.2
CADMIUM 0.84
6.9
HB-6
ND
HB-2
HB-3
NT
MW-1
NT
ABANDONED PIT
25,000 GAL. TANK (RECYCLABLE JP4)
25,000 GAL. TANK (DE ICING FLUID)
HB-2 (1.3'-2.6')
VOC
SEMI-VOC 0.043
BERYLLIUM 37.9
CADMIUM 0.81
8.2
HB-2 (2.6'-3.9')
VOC
SEMI-VOC ND
METALS 7.53
NE



30 15

LEGEND:

BORING LOC

MONITORING

VOC: VOLATILE O

SEMI-VOC: SEMI-VO

ALL VALUES IN MIL

ND: NOT DETECT

NT: NOT TESTED

NE: VALUE DOES CRITERIA IN CONCENTRAT

FIGURE

MAP OF SOIL CC

DEPTH: 3

HAZARDOUS WASTE

RICKENBACKER

2

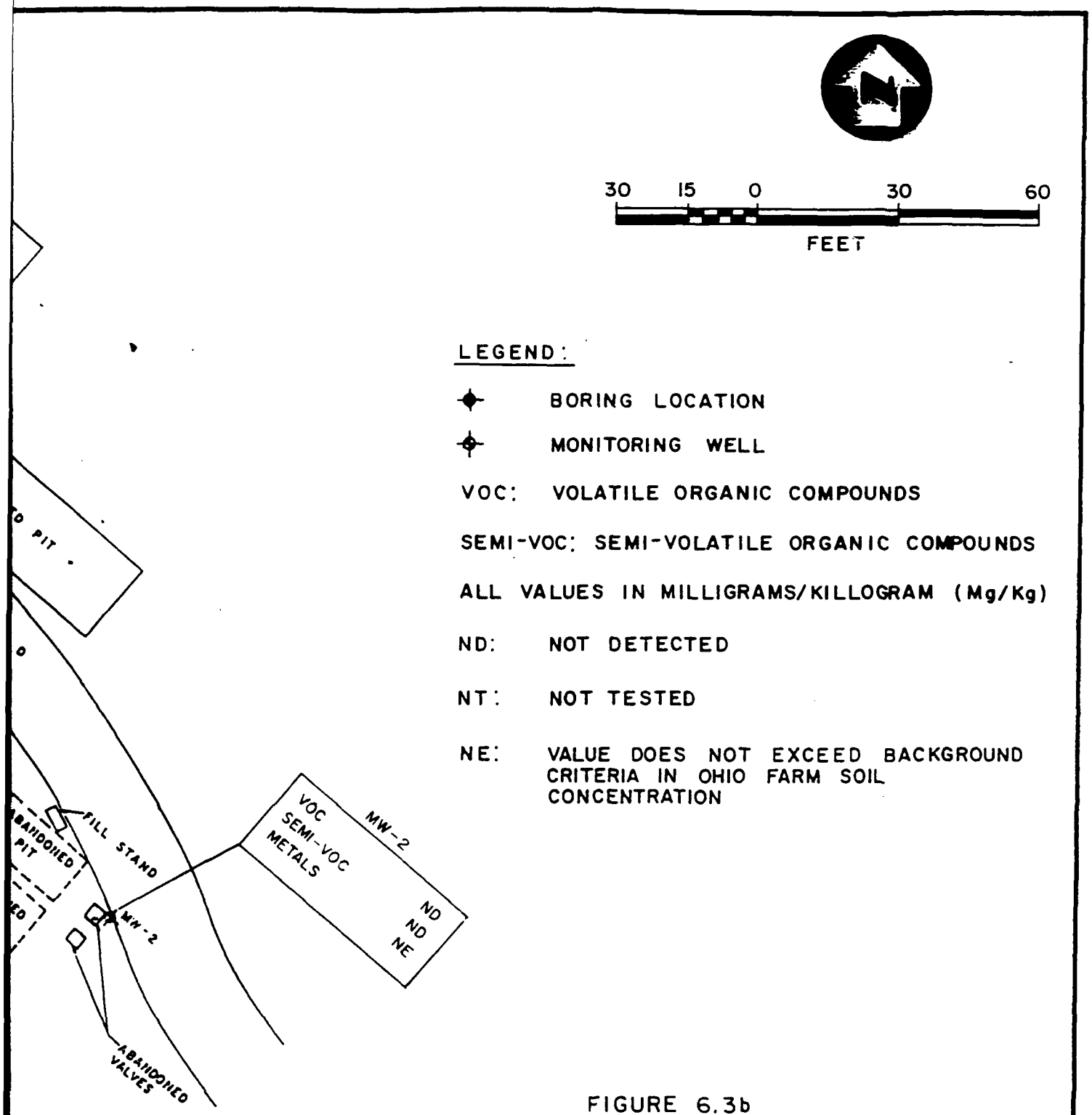
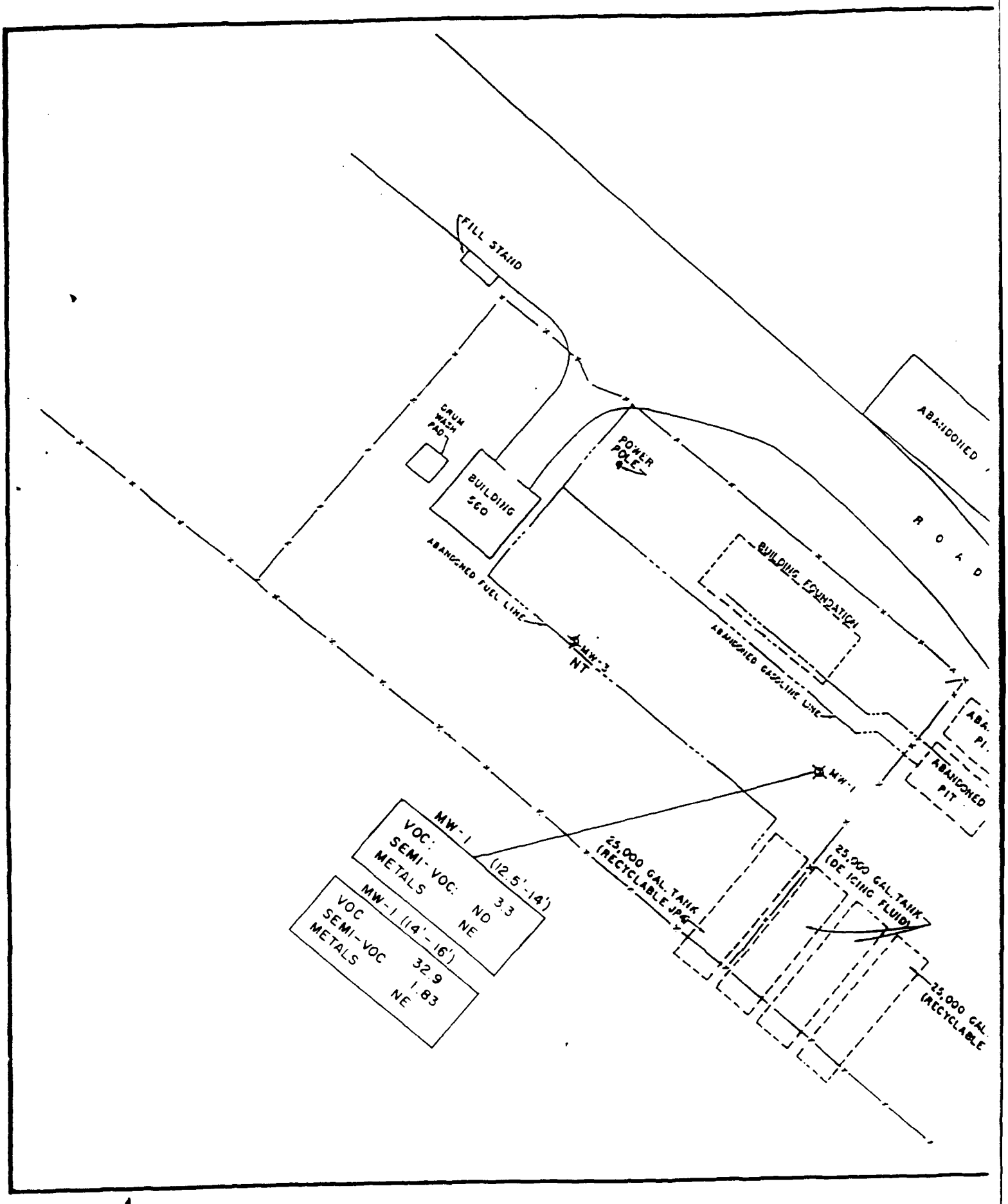


FIGURE 6.3b

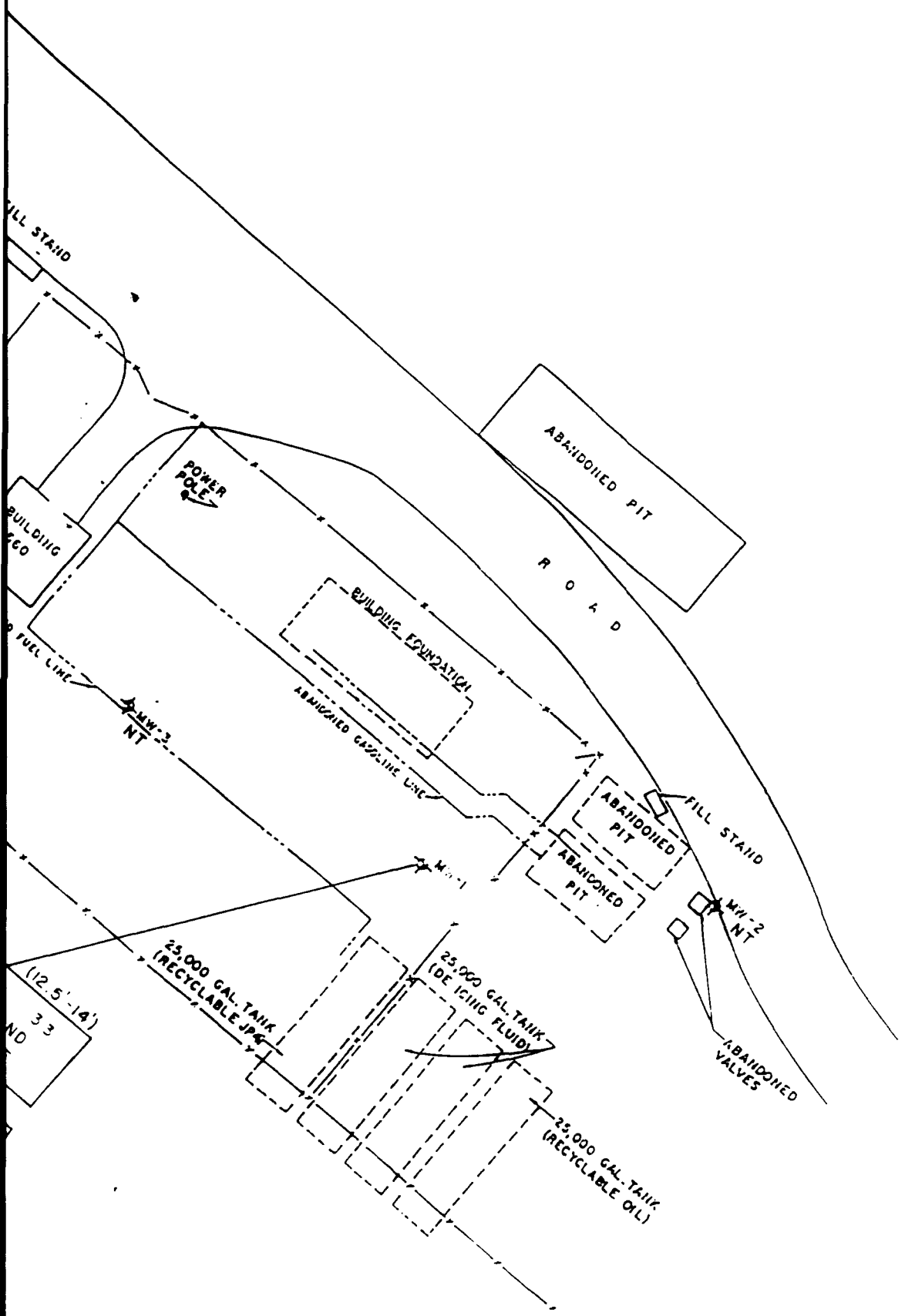
MAP OF SOIL CONTAMINANTS
DEPTH: 3 - 5.5'
HAZARDOUS WASTE STORAGE AREA
RICKENBACKER ANGB, OHIO

3

ES ENGINEERING—SCIENCE


FILL STAND
DRUM WASH PAD
BUILDING 560
POWER POLE
ABANDONED
ROAD
BUILDING FOUNDATION
ABANDONED FUEL LINE
MW-3
NT
ABANDONED GASOLINE LINE
ABANDONED PIT
MW-1
MW-1
VOC:
SEMI-VOC: 3.3
METALS ND
NE
(12.5'-14')
MW-1 (14'-16')
VOC
SEMI-VOC 32.9
METALS 1.83
NE
25,000 GAL. TANK (RECYCLABLE JP4)
25,000 GAL. TANK (DE ICING FLUID)
25,000 GAL. (RECYCLABLE

1



LEGEND:

MONI

VOC: VOLA

SEMI-VOC: S

ALL VALUES

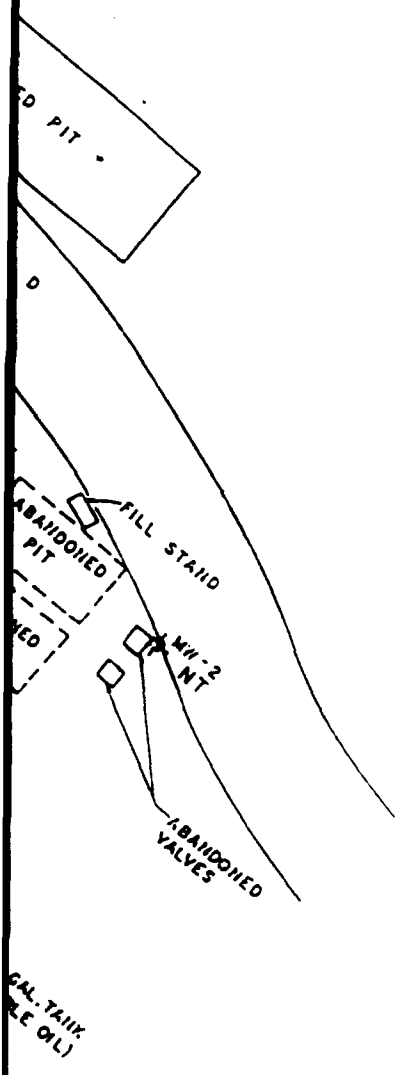
NT: NOT T

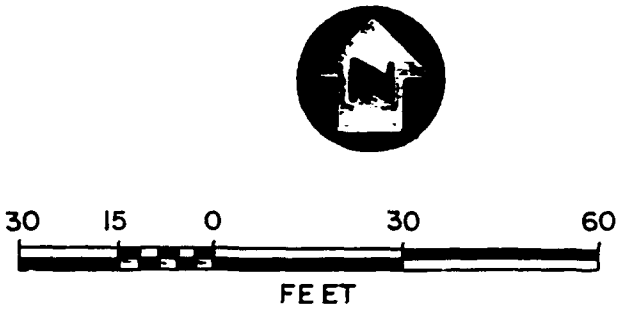
NE: VALUE
CRITE
CONC

FIG

MAP OF SOI
DEF
HAZARDOUS WA
RICKENBA

2





LEGEND:

MONITORING WELL

VOC: VOLATILE ORGANIC COMPOUNDS

SEMI-VOC: SEMI-VOLATILE ORGANIC COMPOUNDS

ALL VALUES IN MILLIGRAMS/KILLOGRAM (Mg/Kg)

NT: NOT TESTED

NE: VALUE DOES NOT EXCEED BACKGROUND CRITERIA IN OHIO FARM SOIL CONCENTRATION

FIGURE 6.3c

MAP OF SOIL CONTAMINANTS
DEPTH: > 10'
HAZARDOUS WASTE STORAGE AREA
RICKENBACKER ANGB, OHIO

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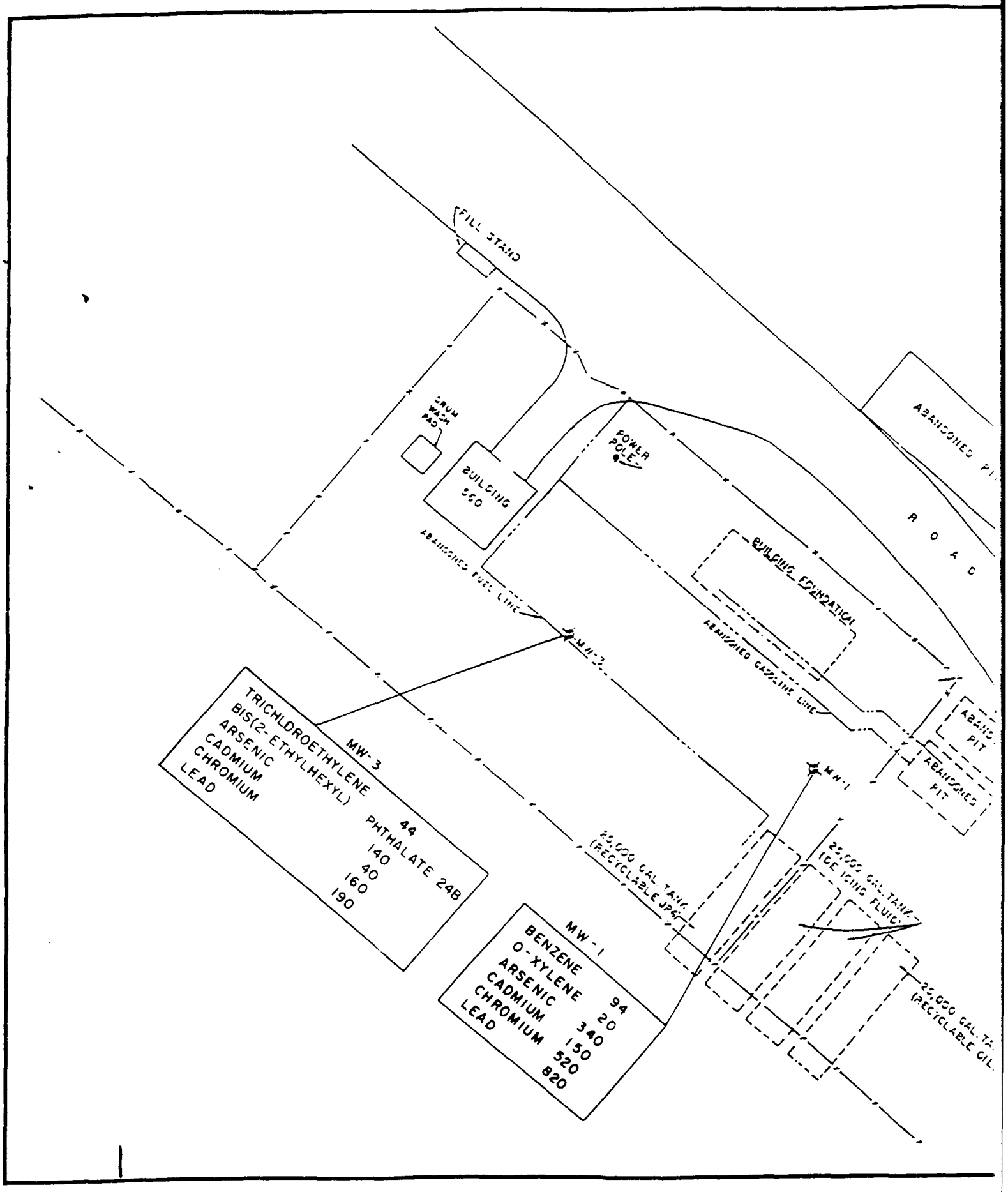
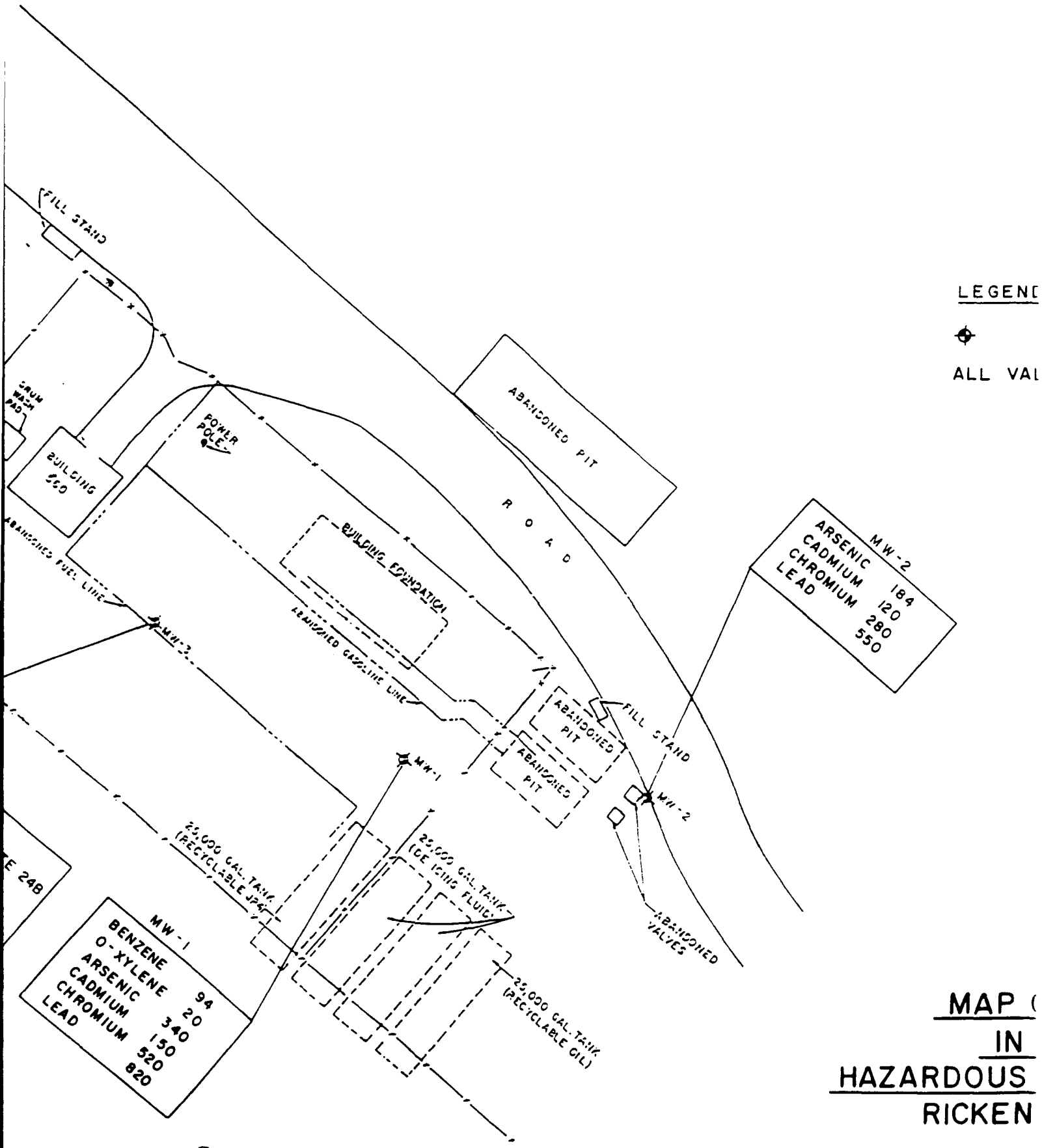
3


FILL STAND
DRUM WASH PAD
BUILDING 500
POWER POLE
ABANDONED PI
R O A D
BUILDING FOUNDATION
ABANDONED FUEL LINE
ABANDONED GASOLINE LINE
MW-3
MW-1
ABANDONED PIT
ABANDONED PIT
TRICHLOROETHYLENE 44
BIS(2-ETHYLHEXYL) PHTHALATE 248
ARSENIC 140
CADMIUM 40
CHROMIUM 160
LEAD 190
MW-3
25,000 GAL. TANK (RECYCLABLE JP4)
25,000 GAL. TANK (DE ICING FLUID)
25,000 GAL. TA (RECYCLABLE OIL
MW-1
BENZENE 94
O-XYLENE 20
ARSENIC 340
CADMIUM 150
CHROMIUM 520
LEAD 820



MAP (
IN
HAZARDOUS
RICKEN

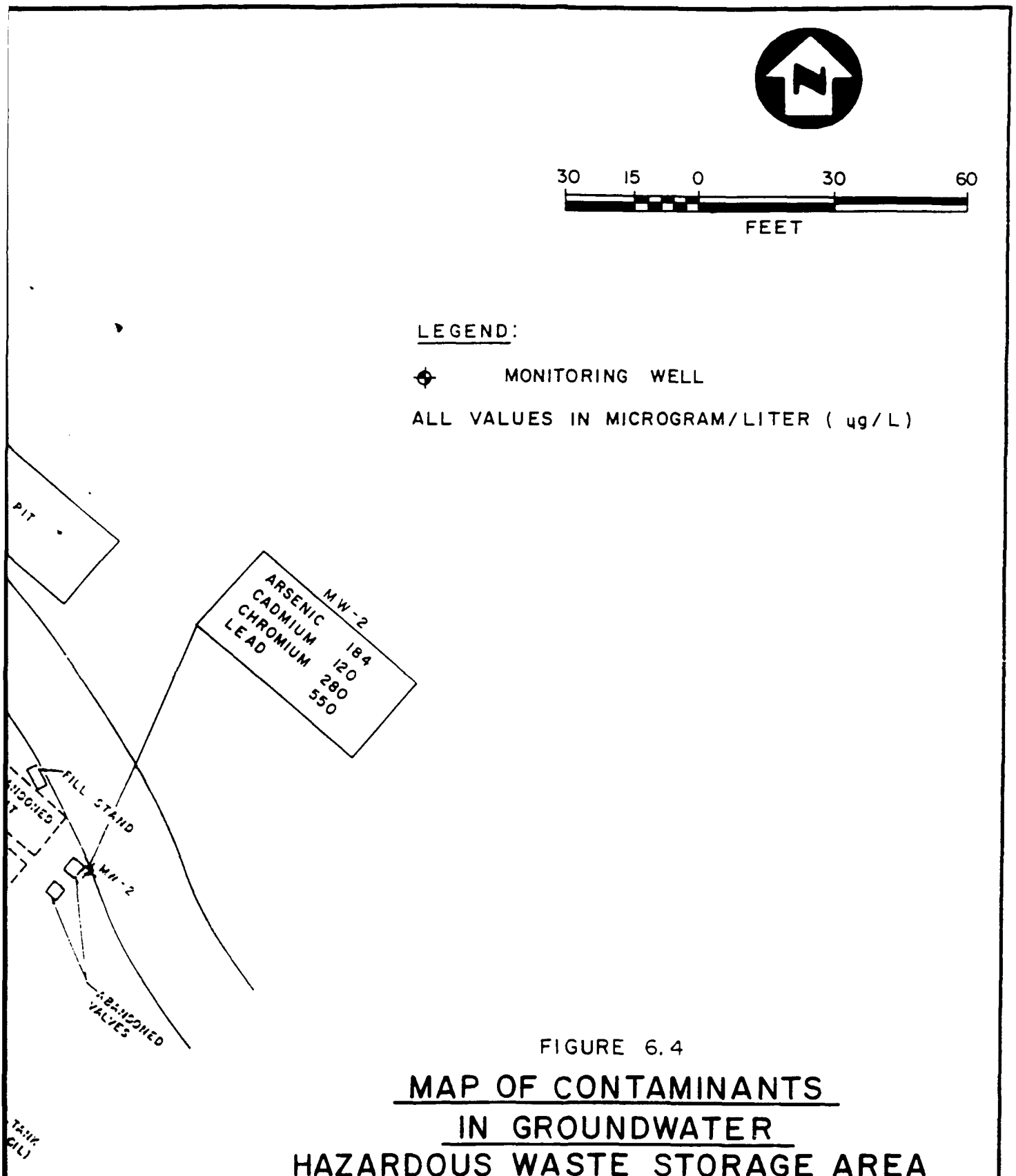


FIGURE 6.4

MAP OF CONTAMINANTS IN GROUNDWATER HAZARDOUS WASTE STORAGE AREA RICKENBACKER ANGB, OHIO

3

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TABLE 6.2

STANDARDS FOR METALS CONCENTRATIONS IN SOIL AND DRINKING WATER RICKENBACKER ANGB, OHIO

Metal	Typical Ohio Soil Concentration (mg/kg)		Federal Water MCL (μg/l)	
Antimony	0 - 6	(4)	--	(5)
Arsenic	5 - 20	(4)	50	(2)
Beryllium	0.6 - 6	(4)	--	(5)
Cadmium	0 - 2.9	(1)	10	(2)
Chromium	4 - 23	(1)	50	(2)
Copper	11 - 37	(1)	1000	(3)
Lead	9 - 39	(1)	50	(2)
Mercury	0 - 0.5	(4)	2	(2)
Nickel	9 - 38	(1)	--	(5)
Selenium	0 - 0.5	(4)	10	(2)
Silver	0 - 1.0	(4)	50	(2)
Thallium	0 - 10	(4)	--	(5)
Zinc	47 - 133	(1)	5000	(3)

1) Researched Background Levels in Ohio Farm Soils (Logan, T.J., Miller, R.H., 1983)

2) Primary Drinking Water MCL

3) Secondary Drinking Water Standard

4) ES Experience in Ohio

5) No Data Available

Soil samples collected from hand boring HB1 contained high concentrations (up to 2,150 mg/kg) of volatile organic contaminants (methylene chloride, ethylbenzene and o-xylenes). The presence of ethylbenzene and xylenes would indicate petroleum hydrocarbon contamination. Semi-volatile organics, such as coal tar components and phthalates, were detected in HB1, HB2 and HB3. Again, some of these concentrations are flagged as estimated (J). See Appendix H for a complete discussion. Metal concentrations in the hand boring samples did not exceed typical values, and no pesticides or PCBs were detected.

The soil samples collected during the drilling of MW1 contained high levels (up to 32.9 mg/kg) of volatile petroleum hydrocarbons (benzene, ethylbenzene and xylenes). Coal tar components and phthalates were also detected in soil from MW1, as well as MW2. The soil samples from MW3 contained no detectable semi-volatile organic compounds and were not analyzed for VOCs due to exceeding the sample holding time. Metal concentrations in the well boring samples did not exceed typical values, and no pesticides or PCBs were detected.

6.3.2 Groundwater Results

The groundwater samples collected from the hazardous waste storage area were analyzed for pesticides, PCBs, volatile and semi-volatile organic compounds, and priority pollutant metals. Table 6.3 is a summary of the groundwater analytical results and the Federal Drinking Water Standards for the compounds detected.

The groundwater collected from MW1 contained concentrations of benzene (94 μg/l) and xylenes (20 μg/l). The concentration of benzene exceeded the Federal maximum contaminant level (MCL) (5 μg/l) by a factor of 18.8. The groundwater from MW3 contained 44 μg/l of trichloroethylene (TCE), which exceeds the MCL for TCE (5 μg/l) by a factor of 8.8. The only semi-volatile organic compounds detected in the groundwater were Bis(2-ethylhexyl) phthalate (24 μg/l) in MW3, and 2-Methylnapthalene (13 μg/l) in the duplicate sample from MW1. There are no MCLs for the semi-volatile compounds. No pesticides or PCBs were detected in the groundwater samples from the three monitoring wells.

The total metal concentrations in the groundwater samples from each well exceed the drinking water standards for arsenic, cadmium, chromium and lead. However, it is unknown whether these metals were dissolved in the groundwater or present on

TABLE 6.3
SITE 1 WATER ANALYSIS - EXTRACT LIST
RICKENBACKER ANGB, OHIO

	DET.LIMIT	MW1-GW1 19-Sep-88	MW1GW1 19-Sep-88	MW2-GW1 19-Sep-88	MW3-GW1 22-Sep-88	MW3-GW2 17-Oct-88	FEDERAL WATER STANDARD(ug/L)
Volatile Organics:							
Benzene	5 ug/L	94	--	ND	ND	--	5 (1)
Trichloroethylene	5 ug/L	ND	--	ND	44	--	5 (1)
Acetone	100 ug/L	120 U	--	ND	ND	--	NA
o-Xylene	5 ug/L	20	--	ND	ND	--	10000 (2)
Semi-Volatile Organics:							
Bis(2-ethylhexyl)phthalate	10 ug/L	ND	ND	ND	ND	24 B	NA
2-Methylnapthalene	10 ug/L	ND	13	ND	ND	ND	NA
Metals, total:							
Arsenic	5 ug/L	340	400	184	140	--	50 (1)
Cadmium	10 ug/L	150	180	120	40	--	10 (1)
Chromium	10 ug/L	520	660	280	160	--	50 (1)
Copper	10 ug/L	880	1100	660	200	--	1300 (3)
Lead	5 ug/L	820	990	550	190	--	50 (1)
Mercury	0.2 ug/L	0.3	0.3	0.2	ND	--	2 (1)
Nickel	10 ug/L	840	1000	450	270	--	NA
Selenium	5 ug/L	ND T	ND T	ND Y	8.2 S	--	10 (1)
Zinc	10 ug/L	3600	4300	2400	940	--	500 (4)

Footnotes

B--reported value is less than reporting limit but greater than the MDL
ND--not detected
U--analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected
-- not tested
(1)--Researched Background Levels in Ohio Farm Soils(Logan, T.J., Miller, R.H., 1983)
(2)--Primary Drinking Water MCL
(3)--Secondary Drinking Water Standard
(4)--ES Experience in Ohio

NOTE: See footnote listing immediately following the water analysis tables.

suspended sediment. Figure 6.4 is a map illustrating the concentration of contaminants measured in the groundwater from the three wells at the HWSA.

In addition to the dissolved contaminants in the groundwater, an immiscible hydrocarbon sheen has been observed in the water from MW1 during the monthly monitoring of the well.

SECTION 7.0

CONCLUSIONS

The conclusions from the field investigation are the following:

- Semi-volatile organic compounds (up to 37.9 mg/kg) and abnormally high metal concentrations were detected in the shallow soils at the site.
- Petroleum hydrocarbons in the form of benzene, ethylbenzene and xylenes, are present in the soil (MW1: 32.9 mg/kg) and groundwater (MW1: 116 μg/l) beneath the site. The concentration of benzene (94 μg/l) measured in the groundwater from MW1 exceeded the Federal MCL by a factor of 18.8. The areal extent of the contamination has not been defined.
- Trichloroethylene (TCE) was detected in the groundwater collected from MW3 (44 μg/l). This TCE concentration exceeds the Federal MCL by a factor of 8.8.
- The total metal concentrations in the groundwater from each of the three monitoring wells exceeded the drinking water standards for arsenic, cadmium, chromium and lead. It is not known whether the metal concentrations were dissolved in the groundwater or present on suspended sediments.

SECTION 8.0

RECOMMENDATIONS

Additional investigation is needed at the HWSA to further define the vertical and horizontal extent of the contaminants in the soil and groundwater. All environmental samples collected should be analyzed for volatile and base-neutral semi-volatile organic compounds, and priority pollutant metals. Groundwater samples should be tested for both total and dissolved metals.

Shallow soil sampling should be performed on a grid system both inside and outside the fenced area to determine the extent of surface soil contamination. Additional soil samples should be collected from soil borings to determine the vertical extent of the soil contamination. Monitoring wells should be installed in several locations to define the extent of the groundwater contaminants.

APPENDIX A

LOCAL WATER WELL LOGS

Industrial

WELL LOG AND DRILLING REPORT

NO. 210790

County Franklin Township Hamilton Section of Township

Owner Lockbourne A.F.B. Address

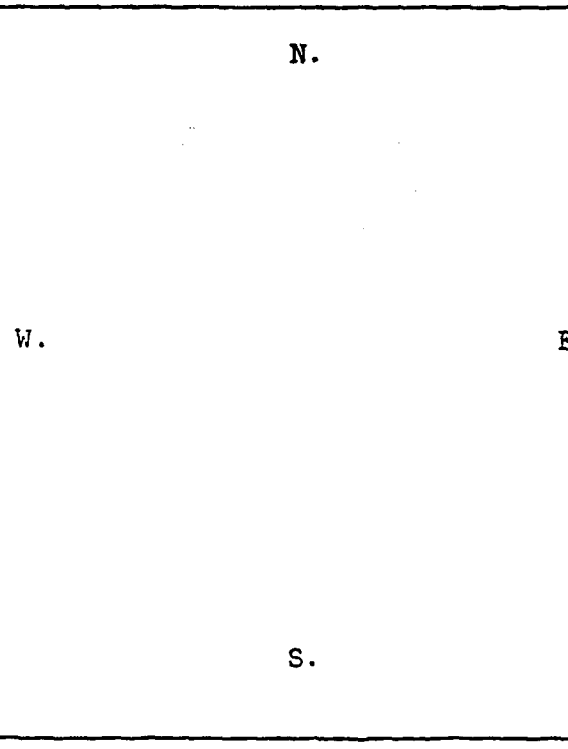
Location of property In well field center of base bldg.zone

Well #1

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter 12" Length of casing 18'	Pumping rate G.P.M.
Type of screen Johnson Length of screen 20'	Duration of test Hrs.
Type of pump	Drawdown ft. Date
Capacity of pump 450	Developed capacity
Depth of pump setting 135'	Static level - depth to water 38 Ft.
Date of completion June 20,1959	Pump installed by

WELL LOG		
Formation	From	To
Clay	0	8
Clay & Gravel	8	12
Gravel & Clay	12	22
Clay	22	28
Gravel & Clay	28	31
Clay	31	60
Gravel & Clay	60	70
Clay	70	77
Sandy Clay	77	95
Fine Sand & Clay	95	108
Hard Pan	108	130
Sandy Clay	130	145
Sand-some gravel	145	172
Sand & Gravel	172	201

SKETCH SHOWING LOCATION



Drilling Firm G.M.Baker & Son Inc. Date 7-10-59

Address Cols.O. Copied by j.c.

Industrial

WELL LOG AND DRILLING REPORT

NO. 179975

County Franklin Township Hamilton Section of Township

Owner Lockbourne Air Force Base Address Office of the Base Procurement Lockbourne Air Force Base Ohio

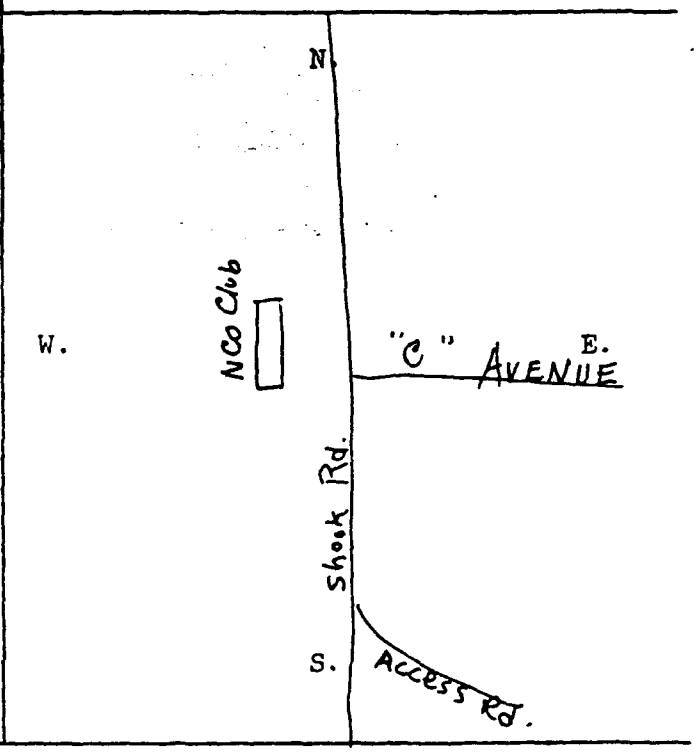
Location of property

Well #3

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter 12" Length of casing 180'	Pumping rate 600 G.P.M.
Type of screen Cook Length of screen 32'	Duration of test 24 Hrs.
Type of pump Byron Jackson Turbine	Drawdown 16 ft. Date 8-11-60
Capacity of pump 500 GPM	Developed capacity 500 GPM
Depth of pump setting 145'	Static level - depth to water 46 Ft.
Date of completion 6-10-60	Pump installed by Diehl Pump & Suppl;

WELL LOG	From	To
Formation		
Top Soil & Clay	0	13
Blue Clay & Boulders	13	35
Blue Clay & Boulders	35	55
Good Gravel & Some water	55	67
Muddy Sand & tight gravel	67	84
Good Sand & Gravel	84	90
Hard Pan, Caked Sand & Gravel	90	98
Coarse Sand & Gravel	98	105
Fine Sand, Some Gravel	105	110
Muddy Sand & Boulders	110	112
Blue Clay & Gravel	112	114
Fine Yellow tight sand	114	124
Blue Clay & Gravel	124	138
Fine Sand	138	150
Coarse Sand & Gravel	150	205
Gravel, Sand, Boulders	205	211
Shale	211	212

SKETCH SHOWING LOCATION



Drilling Firm Diehl Pump & Supply Co. Inc. Date Apr. 10, 1961

Address 3985 Race Rd. Cin. 11, Ohio Copied by j.c.

Industrial

at heating Plant

NOT used

WELL LOG AND DRILLING REPORT

NO. 210795

County Franklin Township Hamilton Section of Township

Owner Lockbourne A.F.B. Address

Location of property Above central heating plant

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter 8" Length of casing 85'	Pumping rate 210 G.P.M.
Type of screen Johnson Length of screen 15'	Duration of test Hrs.
Type of pump S.R.B.	Drawdown 15 ft. Date
Capacity of pump 200'	Developed capacity Above
Depth of pump setting 70'	Static level - depth to water 35 Ft.
Date of completion 9-1-59	Pump installed by US

WELL LOG		
Formation	From	To
Top Soil	0	1
Clay	1	9
Clay & Sand	9	59
Sand & Gravel	59	100

SKETCH SHOWING LOCATION

N.

W. E.

S.

Drilling Firm G.M.Baker & Son Inc. Date 10-5-59

Address Cols. O. Copied by j.c.

Industrial

Club House or ~~Trailer Park area?~~ Used

WELL LOG AND DRILLING REPORT

NO. 210789

County Franklin Township Hamilton Section of Township

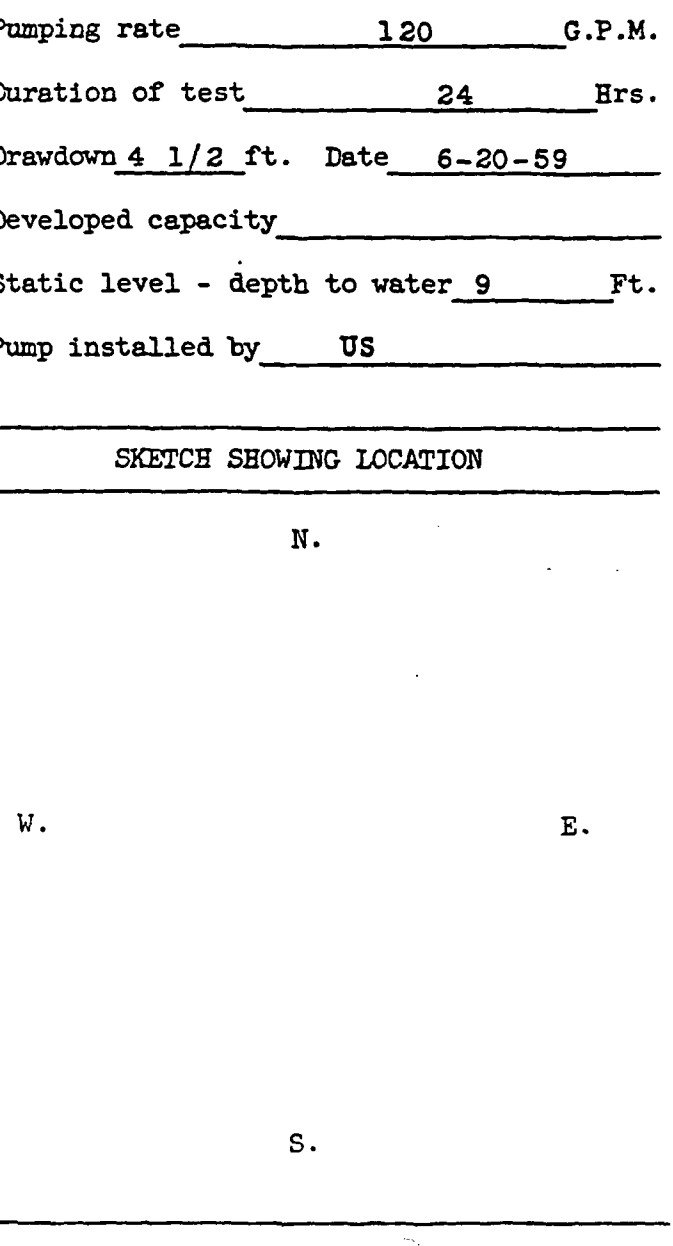
Owner Lockbourne A.F.B. Address

Location of property New recreational bldg. S.end of base

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter 6" Length of casing 64'	Pumping rate 120 G.P.M.
Type of screen Johnson Length of screen 10'	Duration of test 24 Hrs.
Type of pump	Drawdown 4 1/2 ft. Date 6-20-59
Capacity of pump	Developed capacity
Depth of pump setting	Static level - depth to water 9 Ft.
Date of completion	Pump installed by US

WELL LOG		
Formation	From	To
Top Soil	0	3
Clay	3	9
Sand & Gravel	9	16
Clay	16	22
Sand & Gravel	22	73
Clay	73	74

SKETCH SHOWING LOCATION



Drilling Firm G.M.Baker & Son Inc. Date 7-10-59

Address Cols. O. Copied by j.c.

RICHARDSON AFB BASE, OH

	PUMP 1	PUMP 3	PUMP 4	PUMP 5
BLDG	192	437	436	188
WELL DEPTH	194 FT/201'	201'/193'	212'/185'	232'/232'
MOTOR	US ELECT MOTOR INC.	U.S. ELECT MOTOR INC.	U.S. ELECT MOTOR INC.	U.S. ELECT MOTOR INC.
SERIAL	#2257624	#2262236	#2262235	#2864395
TYPE	CFU	CFU	CFU	HU
H.P.	25	25	25	25
RPM	1800	1800	1800	1800
FRAME	364-4	364-4	364-4	324
PHASE	3	3	3	3
CYCLE	60	60	60	60
VOLTS	220/440	220/440	220/440	220/240
PUMP	DEMING, SALEM, OH.	DEMING, SALEM, OH.	DEMING, SALEM, OH. PEERLESS	PEERLESS
CASING DIA.		12"		
LENGTH		180'		
SCREEN		COOK		
LENGTH		32'		
DEPTH OF PUMP		145'		
TOP OF SCREEN	181'	174		
STATIC LEVEL	36'-8"	36'	155	56'
AFTER CLEANING	434 GPM	519 GPM	578 GPM	473 GPM
PUMP LEVEL	120 FT	71 FT	97' 6"	98'
GAL. FT DRAW DOWN	5.3'	19.2	57' 6"	
PUMPING HEAD			120.5 PSI	
DEPTH TO TOP				202'
DISCHARGE PRESSURE				10 P.S.I.

LINE PRESSURE 400 GPM 300' HEAD

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

Madison

№ 124736

County Franklin Township ~~Hamilton~~ Madison Section of Township or Lot Number 9 M

Owner L B Moorhead Address Rt 1 Lockbourne

Location of property Old London Lancaster Rd 1 mile E of Air Base

CONSTRUCTION DETAILS

Casing diameter 4 Length of casing 43

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

PUMPING TEST

Pumping rate G.P.M. Duration of test hrs

Drawdown 3 ft. Date

Developed capacity 10

Static level—depth to water 20 ft

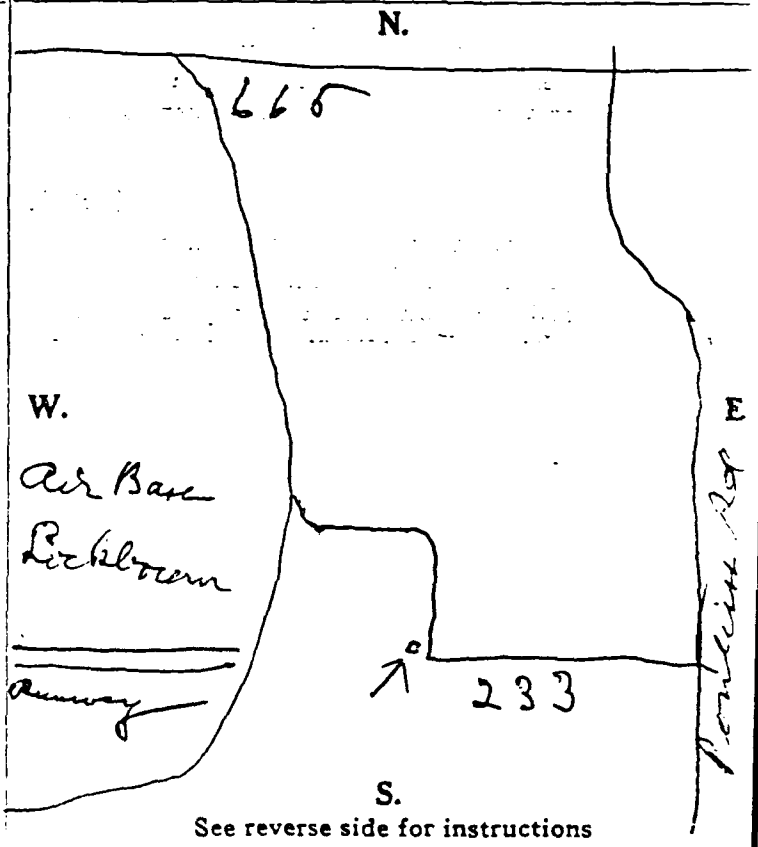
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay	0 Feet	15 Ft.
Sand	15	41
Sand + Gravel	41	43

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm R E Peacock Date Aug 15 54

Address 105 Dakota Col Ohio Signed R E Peacock

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

454526

County FRANKLIN Township Madison Section of Township

Owner JAMES M INKROT Address 5016 HARBOR BUD Columbus Ohi

Location of property 4 Miles East of Lockborne on London & Lancas

CONSTRUCTION DETAILS

Casing diameter 4½ OD Length of casing 24

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 15 G.P.M. Duration of test 2 hrs.

Drawdown ft. Date

Static level-depth to water ? ft.

Quality (clear, cloudy, taste, odor)

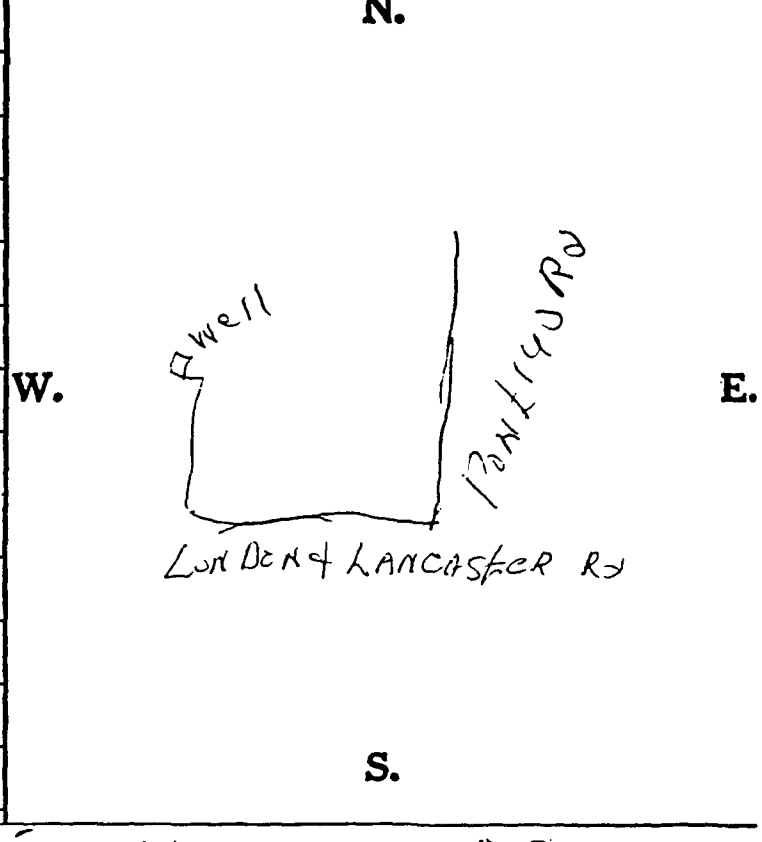
Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
	0 Feet	Ft.
SOIL	0	2
CLAY	2	12
SAND & GRAVE	12	24

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm C & P Well Drilling Date 11 - 3 - 73

Address 5057 Nelson Dr Ashville Signed Howard Conley

*If additional space is needed to complete well log, use next consecutive numbered form.

3

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

461572

County FRANKLIN Township MADISON Section of Township

Owner BILL VARNEY Address BOX 89P LONDON LANCASTER

Location of property E. Side RD

CONSTRUCTION DETAILS

Casing diameter 4½ OD Length of casing 87

Type of screen PERF Length of screen 19'

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

~~Test~~ BAIL Rate 20 G.P.M. Duration of test 1 hrs

Drawdown NONE ft. Date 4-11-74

Static level-depth to water 7 FT ft.

Quality (clear, cloudy, taste, odor) CLEAR

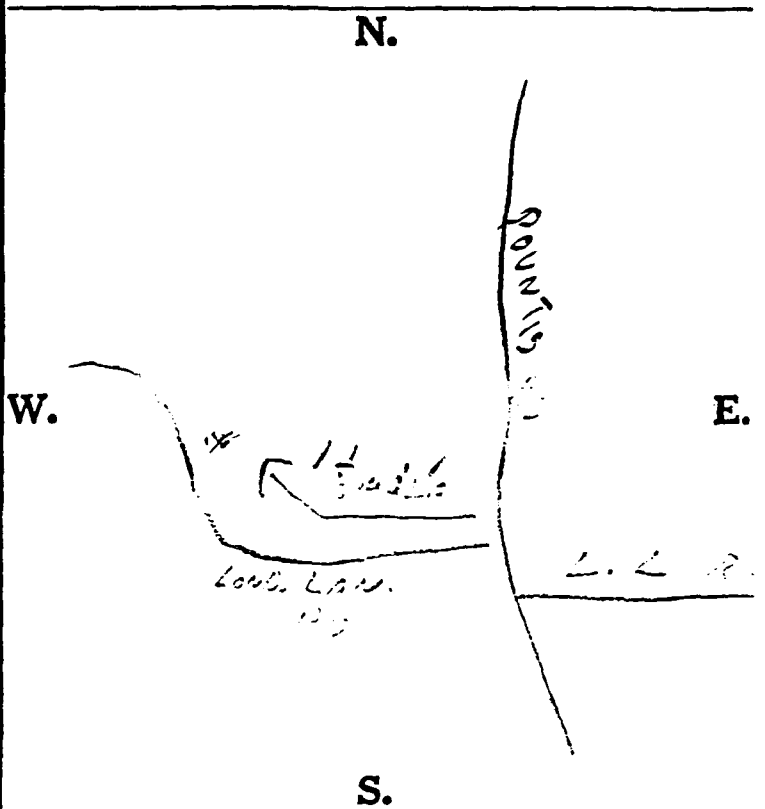
Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
CLAY	0 Feet	21 Ft.
CLAY + GRAVEL	21	32
CLAY	32	84
SAND + GRAVEL	84	87

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm [illegible] Date [illegible]

Address [illegible] Signed [illegible]

*If additional space is needed to complete well log, use next consecutive numbered form.

1

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY - SELF-TRANSCRIBING

593332

COUNTY FRANKLIN TOWNSHIP MADISON SECTION OF TOWNSHIP

OWNER HUBERT ARTHURS ADDRESS 3424 LONDON-LANCASTER

LOCATION OF PROPERTY 3424 LONDON-LANCASTER RD.

CONSTRUCTION DETAILS

Casing diameter 4 1/4 Length of casing 71

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 16 gpm Duration of test 3 hr

Drawdown 2 ft Date

Static level (depth to water) 18

Quality (clear, cloudy, taste, odor)

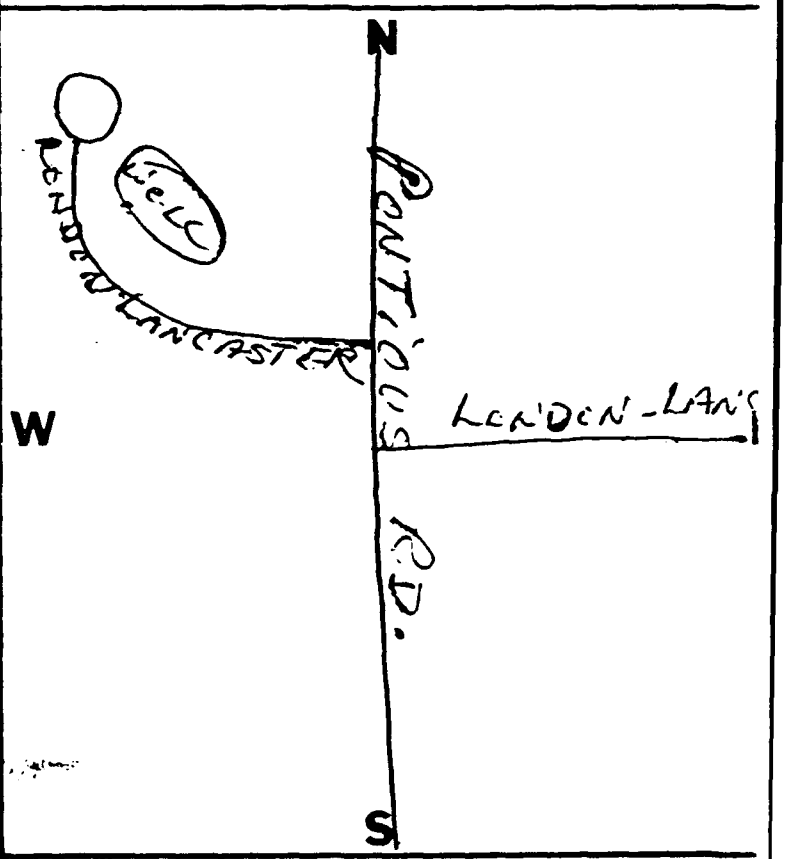
Pump installed by

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
CLAY	0 ft	6 ft
SAND + GRAVEL	6	20
CLAY	20	26
SAND + GRAVEL	26	31
CLAY	31	64
SAND + GRAVEL	64	71
PERF. CASING		

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM SAM LEWIS DATE SEPT. 20, 1983

ADDRESS 1913 TODD AVE. SIGNED Sam Lewis

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

2

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

441619

County FRANKLIN Township [illegible] Section of Township _____

Owner [illegible] Address [illegible]

Location of property [illegible]

CONSTRUCTION DETAILS

Casing diameter [illegible] Length of casing [illegible]

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate [illegible] G.P.M. Duration of test [illegible] hrs

Drawdown [illegible] ft. Date _____

Static level-depth to water [illegible] ft

Quality (clear, cloudy, taste, odor) _____

Pump installed by _____

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
[illegible]	0 Feet	[illegible] Ft.
SAND	[illegible]	5[illegible]
[illegible] GRAVEL	5[illegible]	[illegible]
[illegible]		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

W. E.

S.

Drilling Firm [illegible] Date [illegible]

Address [illegible] Signed _____

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

441604

County [illegible] Township [illegible] Section of Township _____

Owner [illegible] Address [illegible]

Location of property [illegible]

CONSTRUCTION DETAILS

Casing diameter [illegible] Length of casing [illegible]

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate [illegible] G.P.M. Duration of test _____ hrs

Drawdown [illegible] ft. Date _____

Static level-depth to water [illegible] ft.

Quality (clear, cloudy, taste, odor) _____

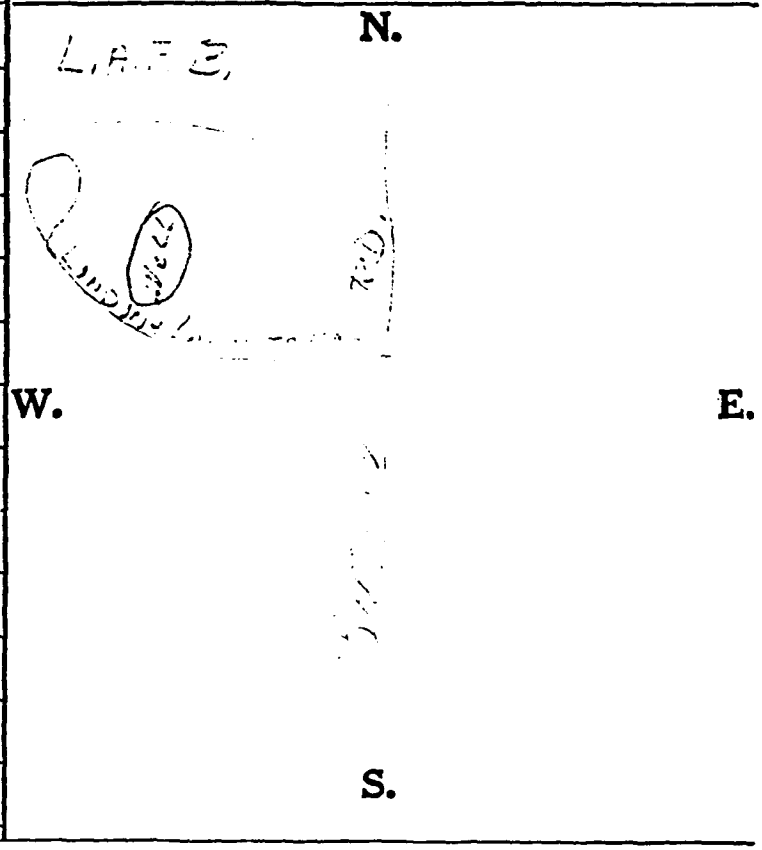
Pump installed by _____

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
[illegible]	0 Feet	11 Ft.
SAND	11	12
CLAY	12	61
SAND [illegible]	61	62
[illegible] CASING		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm [illegible] Date [illegible]

Address [illegible] Signed _____

*If additional space is needed to complete well log, use next consecutive numbered form.

6

WEL LOG AND DRILLING REPC T

ORIGINA

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

Nº 316649

County Pickaway Township Harrison Section of Township

Owner C. Glenn Parsons Address Lockbourne, O. R.F.D. #1

Location of property End of Bellen Pierce on Lockbourne Ashville Rd

CONSTRUCTION DETAILS

Casing diameter 6" O.D. Length of casing 84'10"

Type of screen 1/4 Hole 1/2 Length of screen 2'

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST

Pumping Rate 15 G.P.M. Duration of test 2 hrs.

Drawdown NONE ft. Date 10-8-64

Static level-depth to water ft.

Quality (clear, ~~cloudy, taste, odor~~)

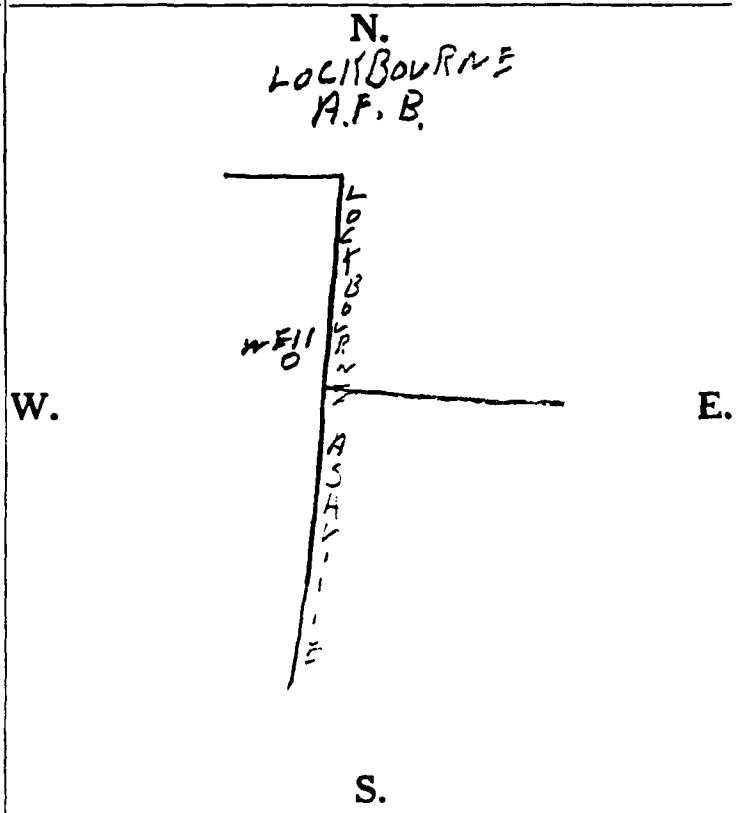
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
yellow clay + gravel	0 Feet	22 Ft.
Blue clay + gravel	22	75
sand	75	80
gravel	80	84'10"

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Short Bros Date 10-8-64

Address [illegible] Signed [illegible]

25

WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

No 109580

County Franklin Township Hamilton Section of Township or Lot Number

Owner Mr. N. Archer Address Lockbourne Rd. R.R.

Location of property on Rt 665 at end of Ashville Rd.

CONSTRUCTION DETAILS

Casing diameter 4" Length of casing 60-7'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

PUMPING TEST

Pumping rate 6 G.P.M. Duration of test 1 hr

Drawdown 4 ft. Date Oct. 15. 53

Developed capacity

Static level—depth to water 35

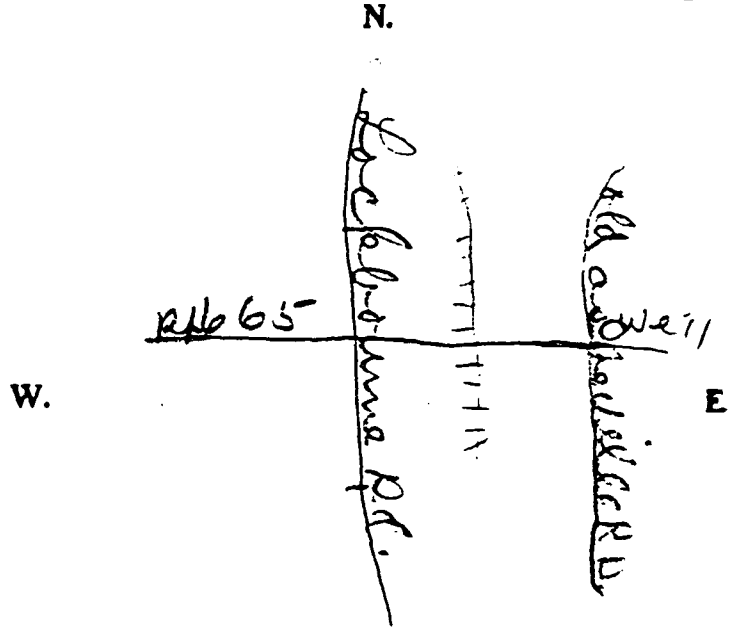
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Yellow clay	0 Feet	10 Ft.
Blue clay	10	54
Sand + gravel	54	60

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Shut Bros. Date Oct. 15. 53

Address Lithopolis, Ohio, Signed Leonard Shut.

(40)

ORIGINAL

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1500 Dublin Road
Columbus, Ohio

No. 224678

County Franklin Township Hamilton Section of Township

Owner N. G. [illegible] Address Lockbourne O.

Location of property End of Shook Rd and 665

CONSTRUCTION DETAILS

Casing diameter 5" O.D. Length of casing 172'6"

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST

Pumping rate 0 G.P.M. Duration of test 1 hr

Drawdown — ft. Date 11-21-58

Developed capacity

Static level—depth to water 43

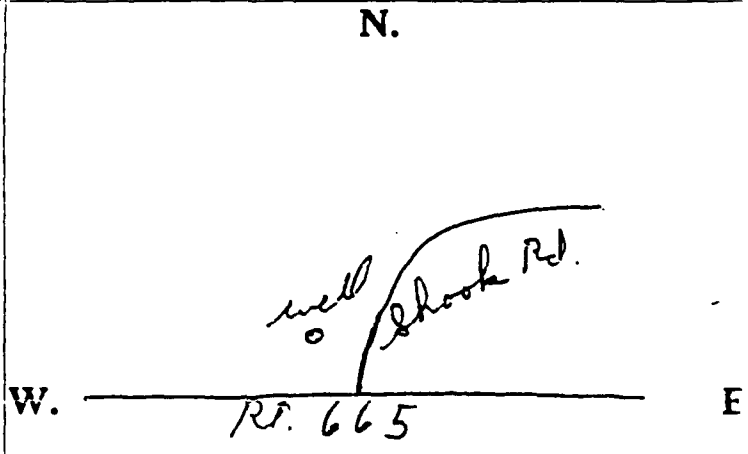
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
[illegible] clay + gravel	0 Feet	20 Ft.
[illegible] clay + gravel	20	74
yellow clay + gravel	74	90
[illegible] clay	90	
blue clay + sand		145
yellow sand	145	158
blue sand	158	168
sand + gravel	168	172'6"

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Shut Bros Date 11-21-58

Address Lithopolis O. Signed Lemuel Shut

97

Franklin Co.

1835
Hamilton
Twp.

THE LAYNE OHIO COMPANY

COLUMBUS, OHIO

LOG OF TEST WELL No. 2 (6")

For W. E. Anderson Sons Co. City Lockbourne State Ohio

Location Corner of Shook Road and Route 665

Date Started 8-10-51 Date Finished 8-22-51

FORMATIONS

DEPTH TO TOP OF STRATUM	DEPTH TO BOTTOM OF STRATUM	THICKNESS OF STRATUM	STATIC WATER LEVEL	1-HOUR BAILING TEST		HOW FAR DID FORMATION HEAVE	FORMATION FOUND	REMARKS
				AVERAGE G. P. M.	DRAWDOWN FEET			
0'	14'	14'					Yellow clay	
14	45	31					Gray clay	
45	84	39	46'				Sandy clay	
84	98	14					Dry gravel	
98	138	40					Gray hardpan	
138	140	2	46				Fine brown sand	
140	143	3					Dirty gravel	
143	154	11					Gray clay	
154	156	2					Coarse sand	
156	169	13	45				Good sand and gravel	

DRILLER R. H. Goodwin

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)

G. M-1997

107

WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Columbus, Ohio

№ 162154

County Franklin Township Hamilton Section of Township or Lot Number

Owner W. L. Johnson Address

Location of property Carnual Road Lockbourne Air Base

CONSTRUCTION DETAILS

Casing diameter 6 Length of casing 96 Ft.

Type of screen Perf. ~~Length of screen~~ Pipe

Type of pump

Capacity of pump

Depth of pump setting

PUMPING TEST

Pumping rate G.P.M. Duration of test h

Drawdown 15- ft. Date Nov. 55

Developed capacity 800 - Per. Hr.

Static level—depth to water 50 —

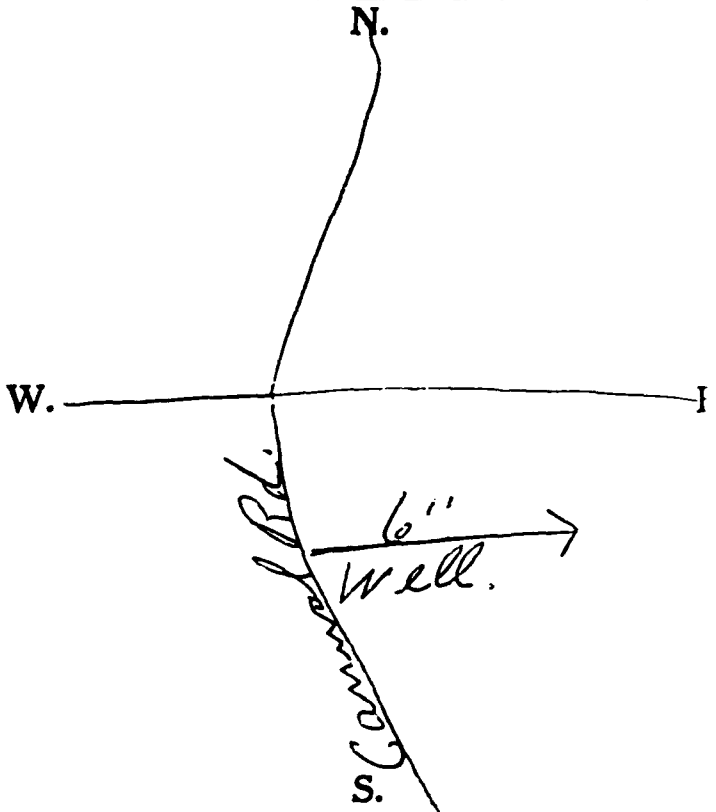
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Yellow clay	0 Feet	7 Ft.
Sandy clay	7	22
Gray Hard Pan	22	63
Muddy Gravel	63	72
Hard Pan	72	90
Clean Gravel	90	96

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm R. H. Goodwin Date Nov 55

Address 4005 E. Livingston Signed R. H. Goodwin

(102)

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY – SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

492742

COUNTY Franklin TOWNSHIP Hamilton SECTION OF TOWNSHIP OR LOT NUMBER

OWNER Okey Clark ADDRESS 4100 Alum Creek Dr.

LOCATION OF PROPERTY 301-B Vause Rd.

CONSTRUCTION DETAILS

Casing diameter 5" Length of casing 30'

Type of screen .040 Length of screen 10'

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 10 gpm Duration of test 1 hr

Drawdown ft Date 4-5-76

Static level (depth to water) 10'

Quality (clear, cloudy, taste, odor)

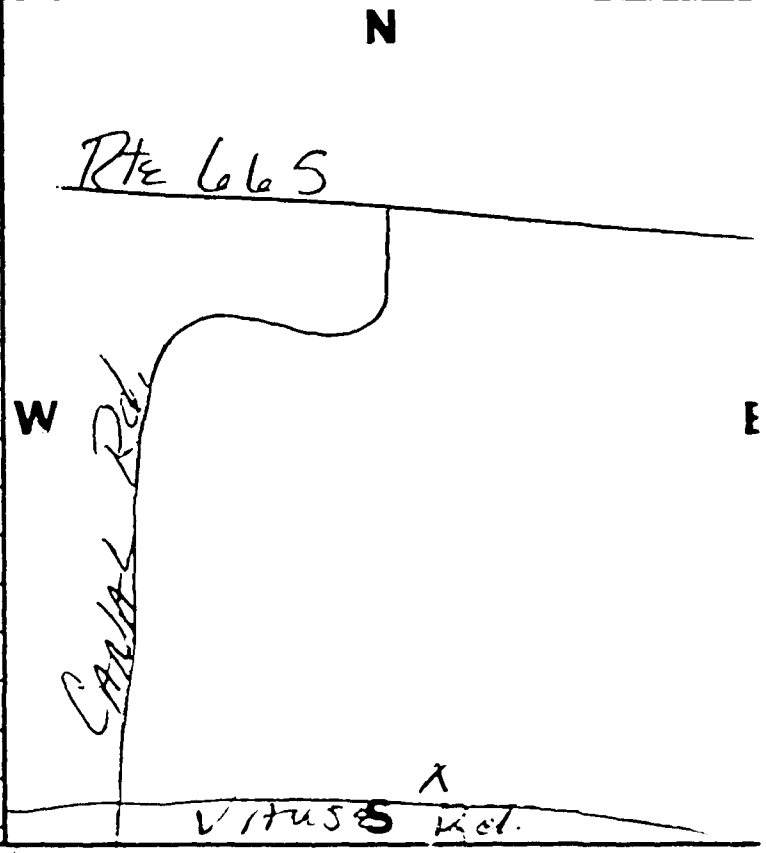
Pump installed by

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
CLAY	0 ft	20 ft
GRAVEL	20	40

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM NW Rome Pumps Inc DATE 4-5-76

ADDRESS Galloway O. SIGNED [illegible]

118

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

NO CARBON PAPER NECESSARY - SELF-TRANSCRIBING

478142

COUNTY Franklin TOWNSHIP Hamilton SECTION OF TOWNSHIP OR LOT NUMBER

OWNER Okey Clark ADDRESS 301 - Vance Rd -

LOCATION OF PROPERTY Lockbourne Ohio

CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 144

Type of screen None Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 30 gpm Duration of test 10 hr.

Drawdown None ft Date July 30, 1976

Static level (depth to water) 37 ft.

Quality (clear, cloudy, taste, odor) Clear

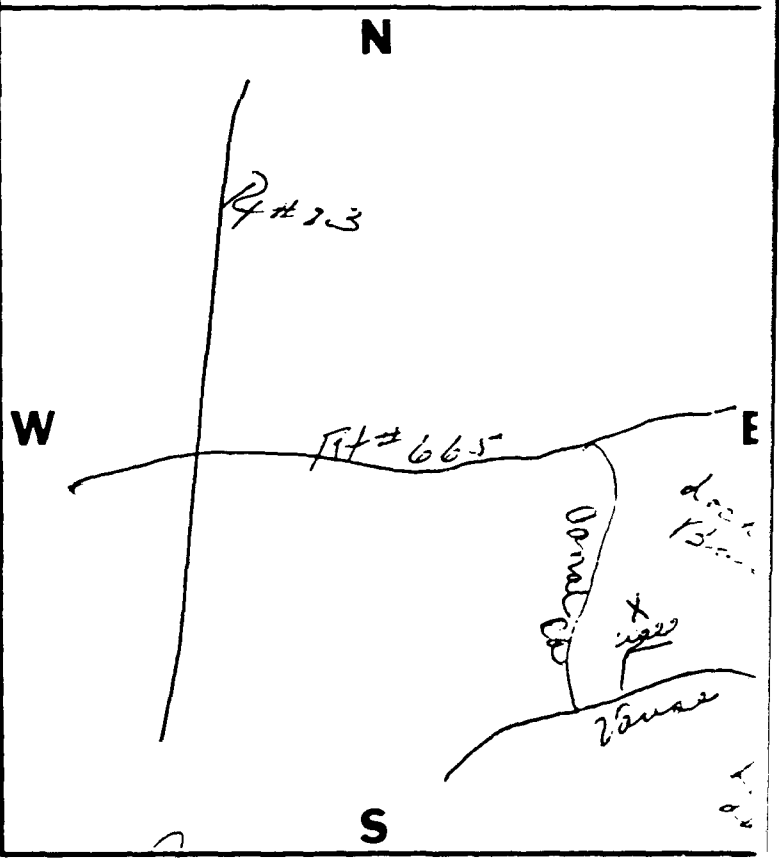
Pump installed by

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
Yellow Clay	0 ft	40 ft
Blue Clay	40	135
Sand & Gravel	135	144

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM Paul C Wright DATE July 30 - 1976

ADDRESS Circleville Rd Rt #3 Orient Ohio SIGNED Paul C Wright

119

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY - SELF-TRANSCRIBING

15
601129

COUNTY Franklin TOWNSHIP Hamilton SECTION OF TOWNSHIP

OWNER Eugene Williams ADDRESS 2895 S. High St Col. O.

LOCATION OF PROPERTY East End of Vause Rd.

CONSTRUCTION DETAILS

Casing diameter 6" O.D Length of casing 77'

Type of screen 1/4 Hole Length of screen 1'

Type of pump SUBM

Capacity of pump 600 G.P.H

Depth of pump setting 45'

Date of completion 11-6-81

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 15 gpm Duration of test 1 h

Drawdown 4 ft Date 11-6-81

Static level (depth to water) 21

Quality (clear, cloudy, taste, odor)

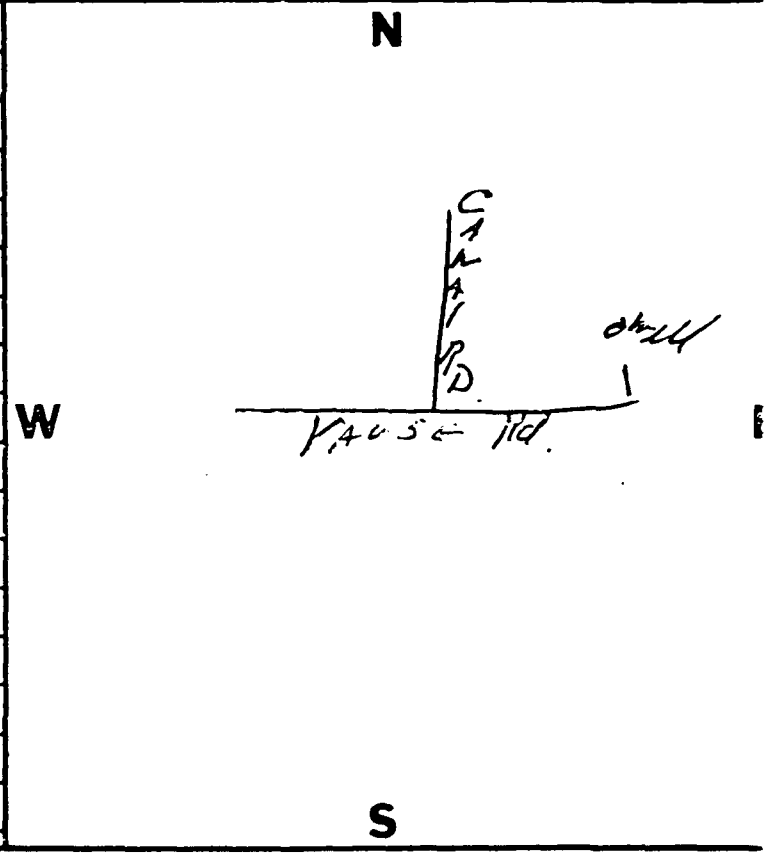
Pump installed by Short Drlg.

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
yellow clay + Gravel	0 ft	15 ft
Blue clay	15	65
Gravel	65	67
sand + Gravel	67	73
Gravel	73	76

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM Short Drlg DATE 11-6-81

ADDRESS Lithopolis, O SIGNED Karl Short

*If additional space is needed to complete well log, use next consecutive numbered form.

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WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY – SELF-TRANSCRIBING

~~40~~ 20

618124
23.835
BY PLINES

COUNTY FRANKLIN TOWNSHIP HAMILTON SECTION OF TOWNSHIP

OWNER LARRY E. SLONE ADDRESS 7266 CANAL RD.

LOCATION OF PROPERTY 1/2 MIN. OF LOCKBOURNE, OHIO ON CANAL RD.

CONSTRUCTION DETAILS

Casing diameter 4 1/4 Length of casing 56

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 16 gpm Duration of test 2 hr

Drawdown NONE ft Date

Static level (depth to water) 17 ft.

Quality (clear, cloudy, taste, odor)

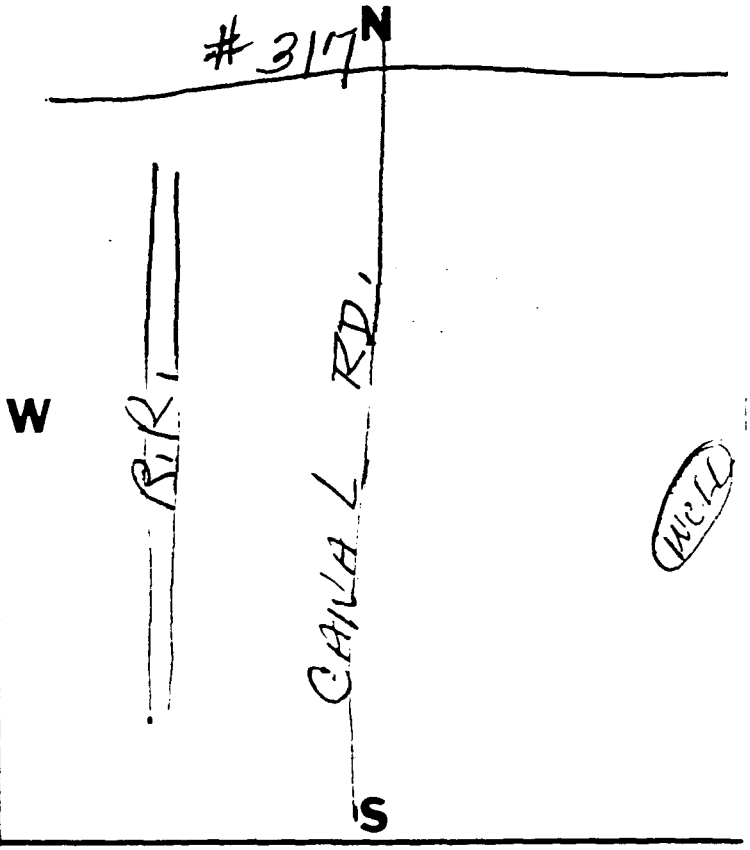
Pump installed by

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
CLAY	0 ft	4 ft
MOSTLY SAND + GRAVEL	4	22
CLAY	22	30
SAND	30	34
BLUE CLAY	34	46
SAND + GRAVEL	46	56
PERF. CASING		

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM SAM LEWIS DATE AUG. 20, 1986

ADDRESS 1913 TODD AVE. SIGNED Sam Lewis

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

197

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY - SELF-TRANSCRIBING

23.4 (19)

618123

COUNTY FRANKLIN TOWNSHIP HAMILTON SECTION OF TOWNSHIP

OWNER WILLIAM PHILLIPS ADDRESS 7250 CANAL RD.

LOCATION OF PROPERTY 1/2 M. N. OF LOCK FOURNC, OHIO ON CANAL RD.

CONSTRUCTION DETAILS

Casing diameter 4 1/4 Length of casing 65

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 15 gpm Duration of test 20 h

Drawdown NONE ft Date _____

Static level (depth to water) 12 ft.

Quality (clear, cloudy, taste, odor) _____

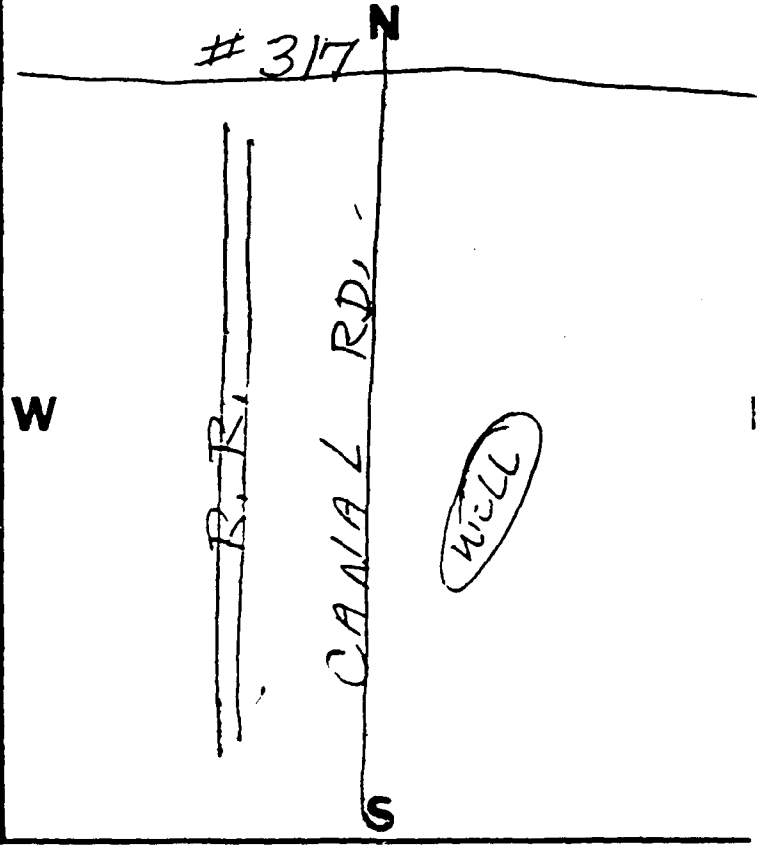
Pump installed by _____

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
CLAY & SAND, & GRAVEL	0 ft	22 ft
SAND	22	28
BLUE CLAY	28	55
SAND & GRAVEL	55	65
PERF. CASING		

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM SAM LEWIS DATE JULY 20, 1986

ADDRESS 1913 TODD AVE. SIGNED Sam Lewis

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

(19)

WELL LOG AND DRILLING REPORT

23.8 18

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

632817

COUNTY Franklin TOWNSHIP Hamilton SECTION OF TOWNSHIP

OWNER Berkshire Homes ADDRESS P.O. Box 707

LOCATION OF PROPERTY 7178 Canal Road

CONSTRUCTION DETAILS

Casing diameter 5" Length of casing 60'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 20 gpm Duration of test 1

Drawdown ft Date 12-31-85

Static level (depth to water) 5

Quality (clear, cloudy, taste, odor)

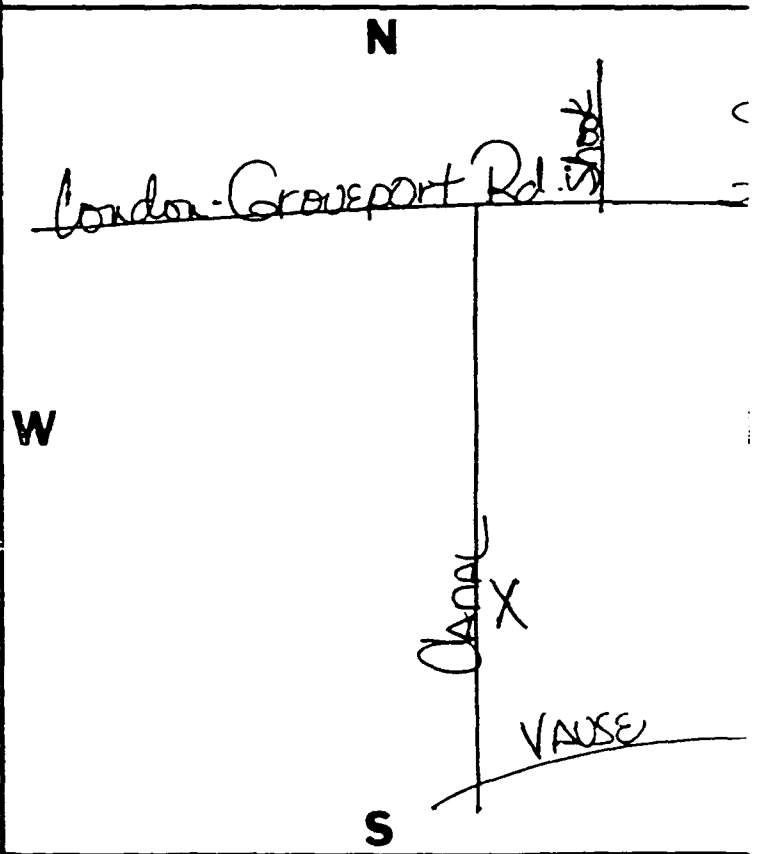
Pump installed by

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
Clay	0 ft	12 ft
Sand & Gravel	12	58
Clay	58	60

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM R.C. Barry Inc DATE December 31, 1985

ADDRESS Galloway, Ohio 43119 SIGNED Everett Neenach

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

17

605888

COUNTY Franklin TOWNSHIP Hamilton SECTION OF TOWNSHIP

OWNER Russ Babbert ADDRESS 5101 Thompson Rd

LOCATION OF PROPERTY Hague & Canal Rd Galena

CONSTRUCTION DETAILS

Casing diameter 4½" Length of casing 62'

Type of screen Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 8 gpm Duration of test hr

Drawdown 14 ft Date

Static level (depth to water) 20

Quality (clear, cloudy, taste, odor)

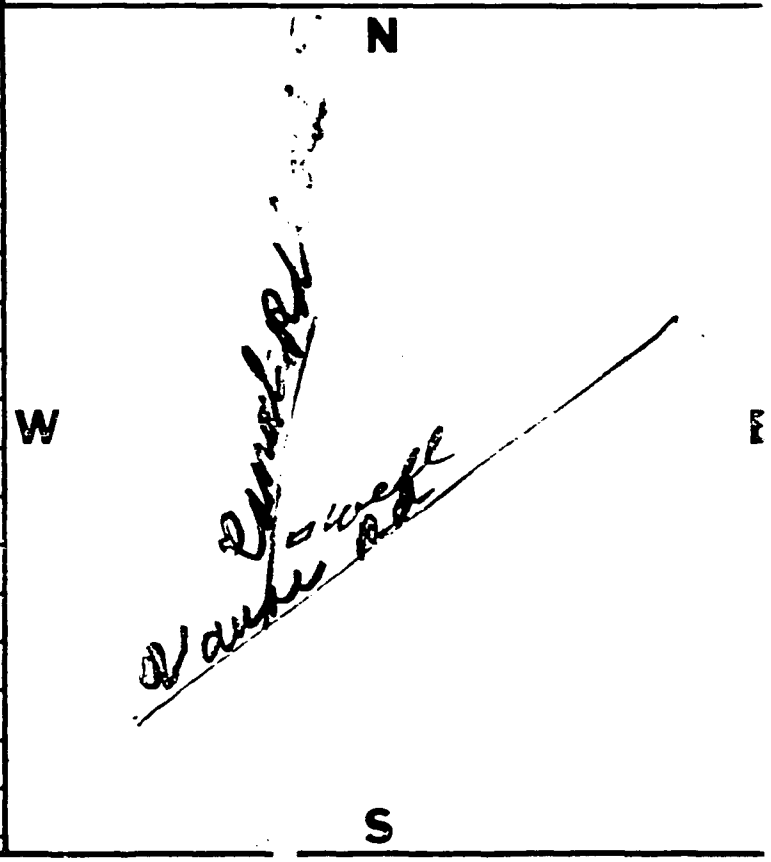
Pump installed by

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
Clay	0 ft	3 ft
Bank run gravel	3	26
Clay	26	44
sand	44	47
Clay	47	56
sand & gravel	56	62

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.



DRILLING FIRM Sam Plummer & Sons DATE Sept 13 1982

ADDRESS Route 2 Dublin Ohio SIGNED Bill Plummer

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

APPENDIX B

DECONTAMINATION PROCEDURES, SAMPLE NUMBERING METHOD, SAMPLE PACKAGING, SHIPPING AND HANDLING TECHNIQUES

APPENDIX B

DECONTAMINATION PROCEDURES, SAMPLE NUMBERING METHOD, SAMPLE PACKAGING, SHIPPING AND HANDLING TECHNIQUES

Decontamination Procedures

All split-spoon samplers, sampling trowels, hand augers, bailers, pumps and other sampling equipment were decontaminated between samples by washing with soap and tap water, rinsing with tap water, rinsing with distilled water, and finally rinsing with isopropyl or methyl alcohol.

Augers and drill pipes were cleaned between borings by steam cleaning with tap water, washing with soap and tap water, rinsing with tap water, rinsing with distilled water and finally rinsing with isoproponal. The drill rig was steam cleaned between borings.

Decontamination wastes (water and soil) generated in the drill rig decontamination area were contained in a decontamination pad and placed in drums for later sampling and disposal. The wastes from decontamination during drilling at the HWSA were placed into drums. The decontamination water from cleaning hand augers and sampling spoons was dumped into a sanitary sewer or spread on the ground surface at the site.

Sample Numbering System

Each sample submitted for laboratory analysis was assigned a unique sample identification number that describes where the sample was collected and what type of sample it is. Each sample number consists of a group of letters and numbers separated by hyphens. A summary of the system is presented in Table B-1. For example, the first water sample collected from monitoring well 3 at Site 1 was labeled RB1-MW3-GW1. The second ground-water sample collected from monitoring well 3 at Site 1 was then labeled RB1-MW3-GW2.

Numbering of duplicate, rinseate, field blank and trip blank samples incorporated some aspects of the basic numbering system. Duplicate soil samples were assigned numbers identifying the actual site number, but utilizing fictitious sample source and sample numbers.

TABLE B-1

SAMPLE NUMBERING SYSTEM

RICKENBACKER ANGB, COLUMBUS, OH

Project Identification: RB

Site Identification and Number: Site Number: 1

Sample Source Number (sequential):

MW _____	Monitor Well #
HB _____	Shallow Soil Boring #
AB _____	Auger Boring #

Sample Number:

GW _____	Ground Water
SS _____	Soil Sample (Split-Spoon or HB)
GS _____	Surface Soil Grab Sample

Example:

RB-01-MW1-SS1

First soil sample from Monitoring Well #1 drilled at the HWSA.

Sample Handling, Packaging and Shipping

All water, sediment and soil samples collected for chemical analysis were obtained with equipment that was decontaminated prior to each use. The samples were placed in pre-cleaned glass and plastic jars and bottles supplied by I-Chem Research, Inc., via VWR Scientific. Prior to sampling, each of the sample containers was labeled with waterproof ink. Information on the labels included:

- Sample identification number;
- Preservatives added;
- Date and time of sample collection; and
- Required analytical method.

Sample containers were wrapped in packing material to minimize the chance of breakage during shipment and packed in plastic coolers. The coolers were then packed with sealed, ice-filled plastic bags. A chain-of-custody form was prepared for the contents of each cooler prior to packing. Information on each chain-of-custody form included sampling information recorded on the label of each sample bottle, the total number of sample bottles for each sample and the headspace PID screening results for soil samples. The form was then signed by the sampler(s), signed and dated by one of the samplers in the "relinquished by" box and the Federal Express airbill number was written in the "received by" box. The form was then placed in a sealed plastic bag and taped to the inside of the cooler lid. Each cooler was sealed with tape and a security seal and shipped by Federal Express to the ES Laboratories in Berkeley, California.

Upon receipt of a sample set, the laboratory inspected the shipping container for security seals before opening. The container was inspected for the chain-of-custody documents and other information or instructions. The sample custodian verified that the information on the sample bottles matched that on the chain-of-custody forms and signed for receipt. Any discrepancy between the samples received and the chain-of-custody information, broken or leaking sample bottles, or other abnormalities were reported to the laboratory supervisor. Notation of the problem and resolution was made on the chain-of-custody form, initialed and dated by the sample custodian.

Each sample was assigned a unique chronological laboratory number. A sample number label was attached to each bottle. All identifying information was recorded in a bound sample log book. The information documented included:

- Laboratory sample number;
- Date of receipt;
- Client name;
- Client identifying number or description;
- Project number;
- Analyses required, and
- Storage location.

Upon completion of the log-in procedure, the samples were stored in a secure area under the environmental conditions required to maintain sample integrity. A work order form was prepared and provided to the laboratory to assist in scheduling and completion of the tests within required holding times.

APPENDIX C

DRILLING LOGS AND WELL CONSTRUCTION DIAGRAMS

Unified Soil Classification System
Soil Classification Abreviations

GW	Well graded gravels, gravel-sand mixtures, little or no fine
GP	Poorly graded gravels, gravel - sand mixtures, little or no fine
GM	Silty gravels, gravel - sand - silt mixtures
GC	Clayey gravels, gravel - sand - clay mixtures
SW	Well graded sands, gravelly sands, little or no fines
SP	Poorly graded sands, gravelly sands, little or no fines
SM	Silty sands, sand - silt mixtures
SC	Clayey sands, sand - clay mixtures
ML	Inorganic silts and very fine sands or clayey silts with slight plasticity
CL	Inorganic clays of low to medium plasticity
OL	Organic silts and organic silty clays of low plasticity
MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils
CH	Inorganic clays of high plasticity, fat clays
OH	Organic clays of medium to high plasticity, organic silts
PT	Peat, humus, swamp soils with high organic contents

ENGINEERING SCIENCE
DRILLING RECORD

DRILLER: BOMSER MORNER
INSPECTOR: CHRIS VIANI
METHOD: HOLLOW STEM AUGERING
RIG TYPE:

WL	10.40'	10.70'	TOC
DATE	9/16/88	9/19/88	
TIME	1205	1304	

PROJECT: RICKENBACKER ANGB
PROJECT NO: CL115.13
WEATHER:
START: 7/19/88 1400
FINISH: 7/20/88 1130

BORING NO: RB-01-MW1
SHEET 1 OF 2
LOCATION: 75FT E OF BLDG 560 INSIDE FENCED AREA

PLOT PLAN

PHOTOVAC	DEPTH	% RECOVERY	SPT	USCS	SOIL DESCRIPTION	WELL DESIGN	COMMENTS
			SS				PROTECTIVE CASING AND LOCK
	0						2FT STICK-UP 2IN. DIA PVC RISER
27		65	12	CL	BRN, SILTY CLAY W/TRACE OF GRAVEL, SAMP. DRY		
			48				
			52				
58	2	65	12		DAMP		CEMENT/ BENTONITE GROUT
			12				
			9				
53		35	5				
	4		6				
			9				
16		100	7		MOIST		
			12				2FT BENTONITE PELLET SEAL
	6		12				
900		100	6		MOTTLED, (BRN-RED BRN-GRY) W/SOME GRAVEL, SAMP. HAS SLIGHT HYDROCARBON ODOR		
			8				
			12				
1100	8	100	5		BRN, NO MOTTLING, VY MOIST		SAND PACK
			9				
			13				
800		100	10				10FT WELL SCREEN
	10		10				
			13	CH	BRN-GRY, SANDY SILTY CLAY W/SOME GRAVEL, SAMP. VY MOIST		
560		100	5				
			9				
	12		14				
1130		100	6	CL	BRN, SILTY CLAY W/SOME SAND AND GRAVEL, SAMP. VY MOIST		
SS1			9				
			10				
1200	14	80	6				
SS2			17	SW	GRY-WHT, F-MED SAND, SAMP. WET AND HAS SHEEN ON WATER		
			14				
400		100	19				
	16		18	SW	RED BRN, GRAVELLY CO. SAND, SAMP. WET		
			27				
340		100	14				
			26	SW	GRY-WHT, MED. SAND, SAMP. WET		
	18		30				

STANDARD PENETRATION TEST
SS = SPLIT SPOON A = AUGER CUTTINGS C = CORED

SUMMARY: 0-10 SILTY CLAY SOME GRAVEL, 10-12 SANDY SILTY CLAY SOME GRAVEL, 12-14.3 SILTY CLAY SOME SAND AND GRAVEL, 14.3-19.5 SAND

DRILLER BOMBER MORNER
INSPECTOR CHRIS VIANI
METHOD HOLLOW STEM AUGERING
RIG TYPE

WL			
DATE			
TIME			

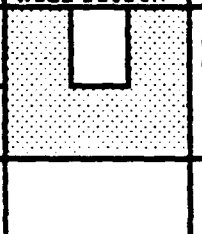
ENGINEERING SCIENCE
DRILLING RECORD

PROJECT RICKENBACKER ANGB
PROJECT NO CL115.13

WEATHER
START
FINISH

BORING NO RB-01-MW1
SHEET 2 OF 2
LOCATION

PLOT PLAN

PHOTOVAC	DEPTH	% RECOVERY	SPT	USCS	SOIL DESCRIPTION	WELL DESIGN	COMMENTS
100	18	100	10	SW	RED-BRN, SAME AS ABOVE, SAMP. WET		WELL BOTTOM 19FT
			18				
			24	SW	GRY, CO. SAND W/SOME GRAVEL, SAMP. WET		
	20						
					BORING AUGERED TO 20FT		

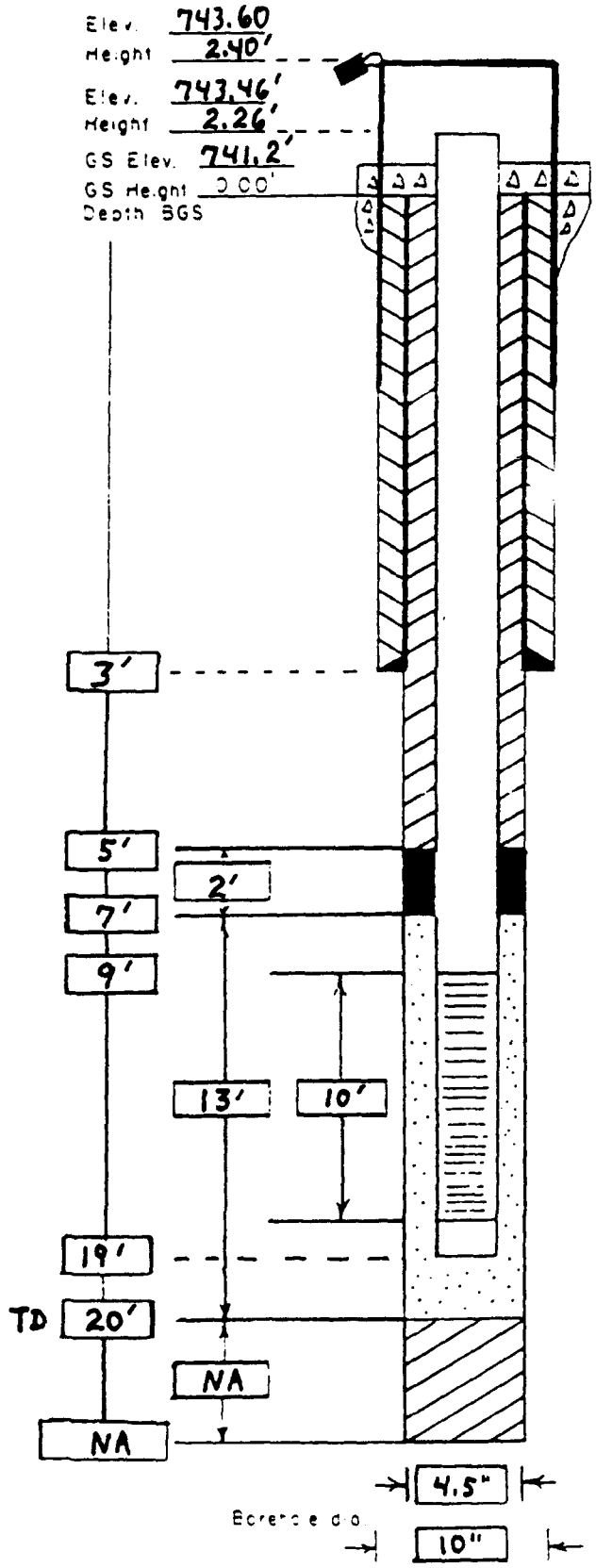
STANDARD PENETRATION TEST
SS = SPLIT SPOON A = AUGER CUTTINGS C = CORED

SUMMARY

REV. DATE JAN 1989

MONITORING WELL CONSTRUCTION LOG - Double Cased

WELL NO.: MW1	Installation: Rickenbacker ANGB, Ohio	Site: HWSA
Project No. CL115	Client/Project:	
HAZWRAP Contractor: Engineering-Science	Drlg Contractor: Bowser-Morner	
Comp. Start: 7/19/88 (: m)	Comp. End: 7/20/88 (: m)	
Built By:	Well Coord: Chris Viani	



PROTECTIVE CSG
Material/Type: Steel
Diameter: 6"
Depth BGS: 3' Weep Hole (Y/N)

GUARD POSTS (Y/N)
No.: 3 Type: 2.5" steel (concrete filled)

SURFACE PAD
Composition & Size: Concrete (2' x 2')

SURFACE CSG
Type: NA
Diameter: Total Length:
GROUT: Setup/Hydration Time:
Composition & Proportions:
Interval BGS:
Tremied (Y/N)

RISER PIPE
Type: PVC
Diameter: 2"
Total Length (TOC to TOS): 11'

GROUT
Composition & Proportions: 10% bentonite 90% concrete
Interval BGS: 0-5'
Tremied (Y/N)

CENTRALIZERS (Y/N)
Depth(s):

SEAL
Type: Bentonite
Source: NA
Setup/Hydration Time: NA Vol Fluid Added: NA
Tremied (Y/N)

FILTER PACK
Type: Quartz SAND
Amount Used:
Source:
Gr. Size Dist:
Tremied (Y/N)

SCREEN
Type: PVC
Diameter: 2"
Slot Size & Type: 0.010

SUMP (Y/N)
Interval BGS: Length:
Bottom Cap (Y/N)

BACKFILL PLUG
Material: NA
Setup/Hydration Time:
Tremied (Y/N)

ENGINEERING SCIENCE DRILLING RECORD

DRILLER: BOMSER MORNER
INSPECTOR: CHRIS VIANI
METHOD: HOLLOW STEM AUGERING
RIG TYPE:

WL	10.59'	TOC	
DATE	9/19/88		
TIME	1459		

PROJECT: RICKENBACKER ANGB
PROJECT NO: CL115.13

WEATHER:
START: 7/29/88 0815
FINISH: 7/29/88 1000

BORING NO: RB-01-MW2
SHEET 1 OF 1
LOCATION: NEXT TO PUMPS ON NE MARGIN OF BLDG 560 GROUNDS

PLOT PLAN

PHOTOVAC	DEPTH	% RECOVERY	SPT	USCS	SOIL DESCRIPTION	WELL DESIGN	COMMENTS
			SS				PROTECTIVE CASING AND LOCK
	0						
0		75	8	CL	BRN, SILTY CLAY W/TRACE OF SAND AND GRAVEL, SAMP. MOIST		2FT STICK-UP 2IN. DIA PVC RISER
SS1			9				
SS2			7				
	2		10				CEMENT/ BENTONITE GROUT
2		75	5				
SS1			6				
SS2			6				
	4		5		← GRY		2FT BENTONITE PELLET SEAL
2		100	4		← BRN		
SS3			3				
			6				
	6		2				SAND PACK
NA		NONE	7		NO RECOVERY		
			7				
			10				10FT WELL SCREEN
	8		11				
0		100	5	CL	SAME AS ABOVE, SAMP. VY MOIST		
			8				
			8				
	10		16				
0		100	11				
			21				
			27				
	12		28				
0		75	6				
			11				
			12				
	14		13				
					BORING AUGERED TO 15FT		WELL BOTTOM 15FT
	16						
	18						

STANDARD PENETRATION TEST
SS = SPLIT SPOON A = AUGER CUTTINGS C = CORED

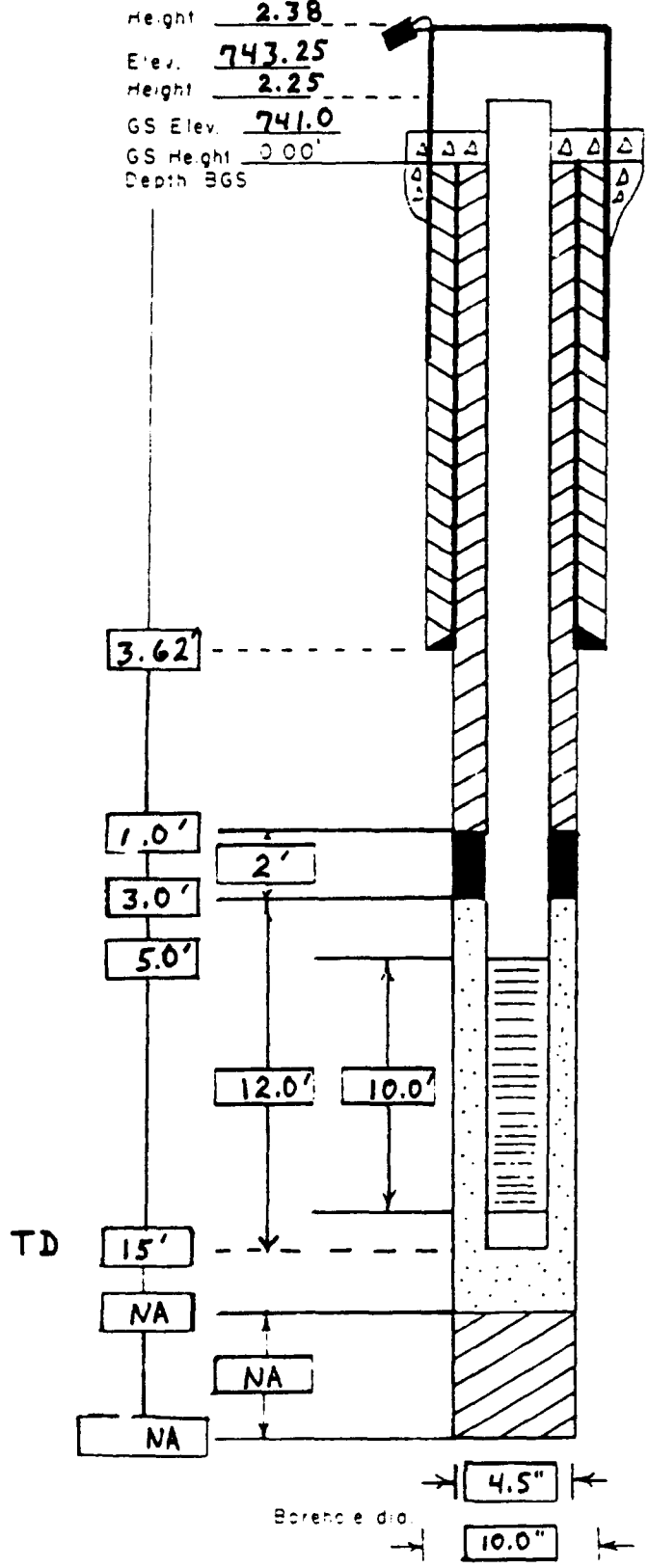
SUMMARY: 0-14SILTY CLAY TRACE OF SAND AND GRAVEL

REV. DATE: JAN 1989

MONITORING WELL CONSTRUCTION LOG - Double Cased

WELL NO.: MW2	Installation: Rickenbacker ANGB, Ohio	Site: HWSA
Project No. CL115	Client/Project:	
HAZWRAP Contractor: Engineering - Science	Drlg Contractor: Bowser Morner	
Comp. Start: 7/29/88 (: m)	Comp. End: 7/29/88 (: m)	
Built By	Well Coord: Chris Viani	

Elev. 743.38
Height 2.38
Elev. 743.25
Height 2.25
GS Elev. 741.0
GS Height 0.00'
Depth BGS



PROTECTIVE CSG
Material/Type: Steel
Diameter: 6"
Depth BGS: 3.62' Weep Hole (Y/N)

GUARD POSTS (Y/N)
No. 3 Type: 2.5" Steel (concrete filled)

SURFACE PAD
Composition & Size: concrete (2' x 2')

SURFACE CSG
Type: NA
Diameter: Total Length:
GROUT: Setup/Hydration Time:
Composition & Proportions:
Interval BGS:
Tremied (Y/N)

RISER PIPE
Type: PVC
Diameter: 2"
Total Length (TOC to TOS): 7.25'

GROUT
Composition & Proportions: 90% Concrete, 10% bentonite
Interval BGS: 0-3'
Tremied (Y/N)

CENTRALIZERS (Y/N)
Depth(s):

SEAL
Type: Bentonite
Source: NA
Setup/Hydration Time: NA Vol. Fluid Added: NA
Tremied (Y/N)

FILTER PACK
Type: Quartz SAND
Amount Used:
Source:
Gr. Size Dist:
Tremied (Y/N)

SCREEN
Type: PVC
Diameter: 2"
Slot Size & Type: 0.010

SUMP (Y/N)
Interval BGS: Length:
Bottom Cap (Y/N)

BACKFILL PLUG
Material: NA
Setup/Hydration Time:
Tremied (Y/N)

ENGINEERING SCIENCE
DRILLING RECORD

DRILLER: BOBBER MORNER
INSPECTOR: MARK J SCHUMACHER
METHOD: HOLLOW STEM AUGERING
RIG TYPE:

WL	10.87'	TOC	
DATE	8/19/88		
TIME	1345		

PROJECT: RICKENBACKER ANGB
PROJECT NO: CL115.13

WEATHER: 90 + HAZY
START: 8/10/88 1305
FINISH: 8/10/88 1600

BORING NO: RB-01-MW3
SHEET 1 OF 1
LOCATION: ADJACENT TO BLDG 560

PLOT PLAN

PROTOVAC	DEPTH	% RECOVERY	SPT	USCS	SOIL DESCRIPTION	WELL DESIGN	COMMENTS
			SS				PROTECTIVE CASING AND LOCK
	0						2FT STICK-UP 2IN. DIA PVC RISER
10		100	8	OL	BRN, SILT W/LITTLE PEBBLES AND TRACE OF CLAY, SAMP. MOTTLED FROM 1.0 - 2.0FT, DRY		
SS1			12				
			11				
	2		8				CEMENT/ BENTONITE GROUT
					NOT SAMPLED		
	4						2FT BENTONITE PELLET SEAL
8.0		75	5	ML	BRN, CLAYEY SILT W/SOME PEBBLES AND TRACE OF SAND SAMP. MOIST AND PLASTIC		
SS2	6		5				
			5				SAND PACK
			7				
					NOT SAMPLED		
	8						WELL SCREEN 10FT
	10						
4.0		40	3	ML	SAME AS ABOVE		
			4				
			4				
	12		5				
					NOT SAMPLED		
	14						
5.0		100	15	SW	BRN, F. - MED SAND W/SOME MED. GRAVEL, SAMP. WET		
	16		32				
			35				
			32				
					BORING AUGERED TO 19FT, THEN BACKFILLED TO 18FT		WELL BOTTOM 18FT
	18						

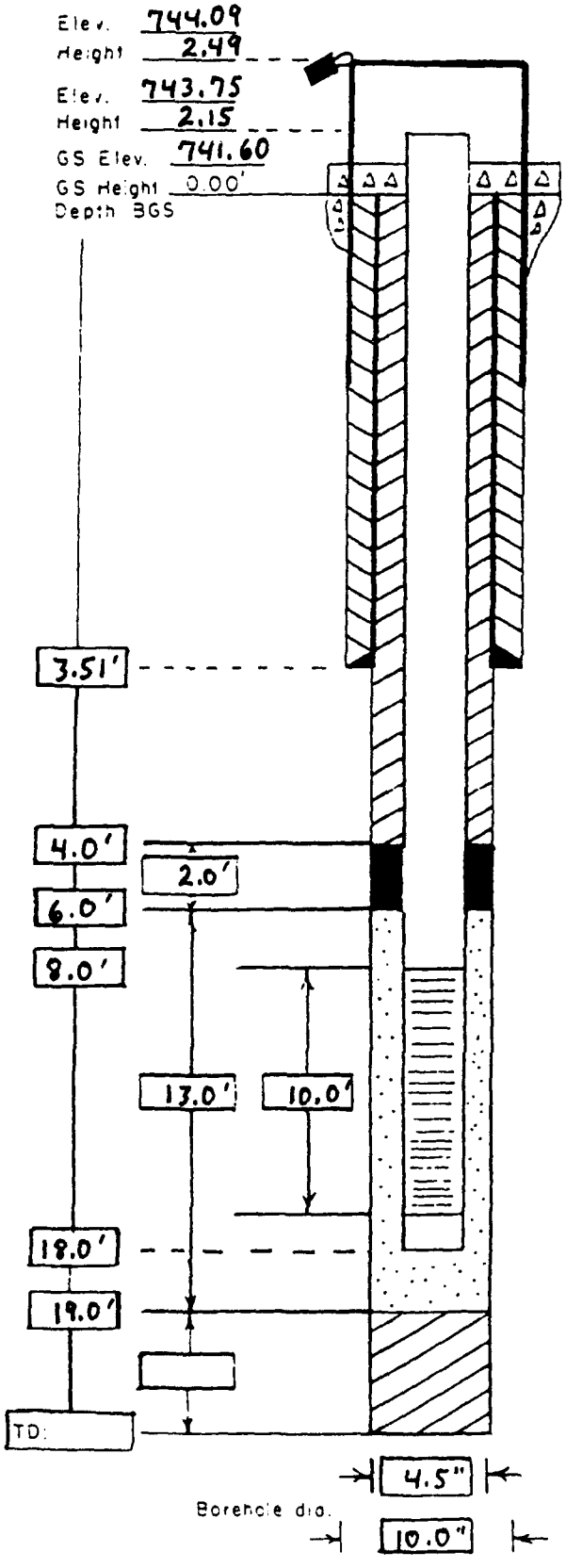
STANDARD PENETRATION TEST
SS = SPLIT SPOON A = AUGER CUTTINGS C = CORED

SUMMARY: 0-2 SILT LITTLE PEBBLE, 5-7 CLAYEY SILT SOME PEBBLES, 10-12 SAME, 15-17 SAND AND GRAVEL

REV. DATE: JAN 1989

MONITORING WELL CONSTRUCTION LOG - Double Cased

WELL NO.: MW3	Installation: Rickenbacker ANGB, Ohio	Site: HWSA
Project No. CL115	Client/Project:	
HAZWRAP Contractor: Engineering-Science	Drlg Contractor: Bowser-Morner	
Comp. Start: 8/10/88 (: m)	Comp. End: 8/10/88 (: m)	
Built By:	Well Coord: Mark Schumacher	



PROTECTIVE CSG
Material/Type: Steel
Diameter: 6"
Depth BGS: 3.51' Weep Hole (Y/N)

GUARD POSTS (Y/N)
No. 3 Type 2.5" steel (concrete filled)

SURFACE PAD
Composition & Size: Concrete (2' x 2')

SURFACE CSG
Type: NA
Diameter: Total Length:
GROUT: Setup/Hydration Time:
Composition & Proportions:
Interval BGS:
Tremied (Y/N)

RISER PIPE
Type: PVC
Diameter: 2"
Total Length (TOC to TOS): 9.15'

GROUT
Composition & Proportions: Concrete (90%) and bentonite (10%)
Interval BGS: 0-4'
Tremied (Y/N)

CENTRALIZERS (Y/N)
Depth(s):

SEAL
Type: Bentonite
Source: NA
Setup/Hydration Time: NA Vol. Fluid Added: NA
Tremied (Y/N)

FILTER PACK
Type: Quartz Sand
Amount Used:
Source:
Gr. Size Dist.:
Tremied (Y/N)

SCREEN
Type: PVC
Diameter: 2"
Slot Size & Type: 0.010

SUMP (Y/N)
Interval BGS: Length:
Bottom Cap (Y/N)

BACKFILL PLUG
Material: NA
Setup/Hydration Time:
Tremied (Y/N)

APPENDIX D

WATER LEVEL DATA

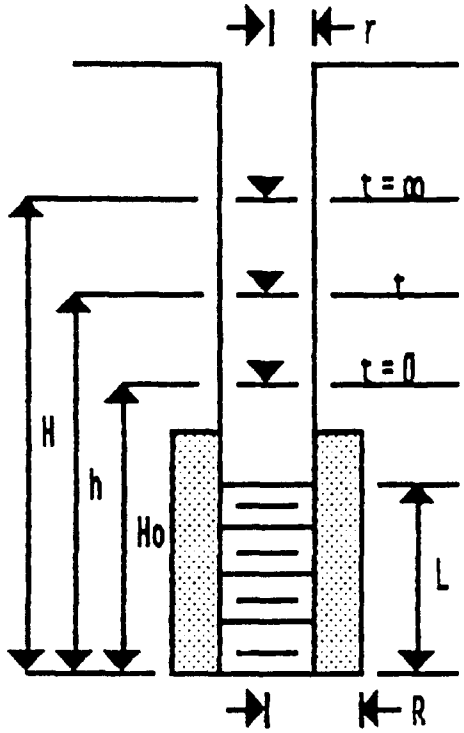
WATER LEVEL MONITORING
HAZARDOUS WASTE STORAGE AREA
RICKENBACKER AIR NATIONAL GUARD BASE

DATE	WELL	DEPTH TO WATER FT	CASING ELEVATION	WATER ELEVATION
16-Sep-88	RB 1-MW1	10.40	743.60	733.20
17-Oct-88	RB 1-MW1	12.11	743.60	731.49
17-Nov-88	RB 1-MW1	10.72	743.60	732.88
17-Dec-88	RB 1-MW1	11.84	743.60	731.76
20-Jan-89	RB 1-MW1	10.30	743.60	733.30
15-Feb-89	RB 1-MW1	10.15	743.60	733.45
15-Mar-89	RB 1-MW1	9.98	743.60	733.62
19-Apr-89	RB 1-MW1	8.83	743.60	734.77
16-Sep-88	RB 1-MW2	10.35	743.38	733.03
17-Oct-88	RB 1-MW2	12.00	743.38	731.38
17-Nov-88	RB 1-MW2	10.78	743.38	732.60
17-Dec-88	RB 1-MW2	11.75	743.38	731.63
16-Jan-89	RB 1-MW2	9.46	743.38	733.92
15-Feb-89	RB 1-MW2	10.10	743.38	733.28
15-Mar-89	RB 1-MW2	9.90	743.38	733.48
19-Apr-89	RB 1-MW2	9.30	743.38	734.08
16-Sep-88	RB 1-MW3	10.50	744.09	733.59
17-Oct-88	RB 1-MW3	12.42	744.09	731.67
17-Nov-88	RB 1-MW3	10.82	744.09	733.27
17-Dec-88	RB 1-MW3	12.17	744.09	731.92
20-Jan-89	RB 1-MW3	10.21	744.09	733.88
15-Feb-89	RB 1-MW3	9.71	744.09	734.38
15-Mar-89	RB 1-MW3	9.73	744.09	734.36
19-Apr-89	RB 1-MW3	9.45	744.09	734.64

APPENDIX E

AQUIFER TEST CALCULATIONS

ELEVATION TOC 743.60'	ENGINEERING SCIENCE HYDRAULIC CONDUCTIVITY TEST	WELL NO. R6-01-MW1
ELEVATION PVC 743.46'		DATE 9/16/88
ELEVATION GS 741.20'	PROJECT RICKENBACKER ANGB	LOCATION APPROX 75FT EAST OF BLDG 560. IN FENCED AREA
WATER LEVEL TOC 10.65'	PROJECT NO CL115.15	



STATIC HEAD (H) 10.76'

PIPE RADIUS (r) 0.08'

BOREHOLE RADIUS (R) 0.33'

SCREEN LENGTH (L) 10'

INITIAL HEAD (Ho) 8.41'

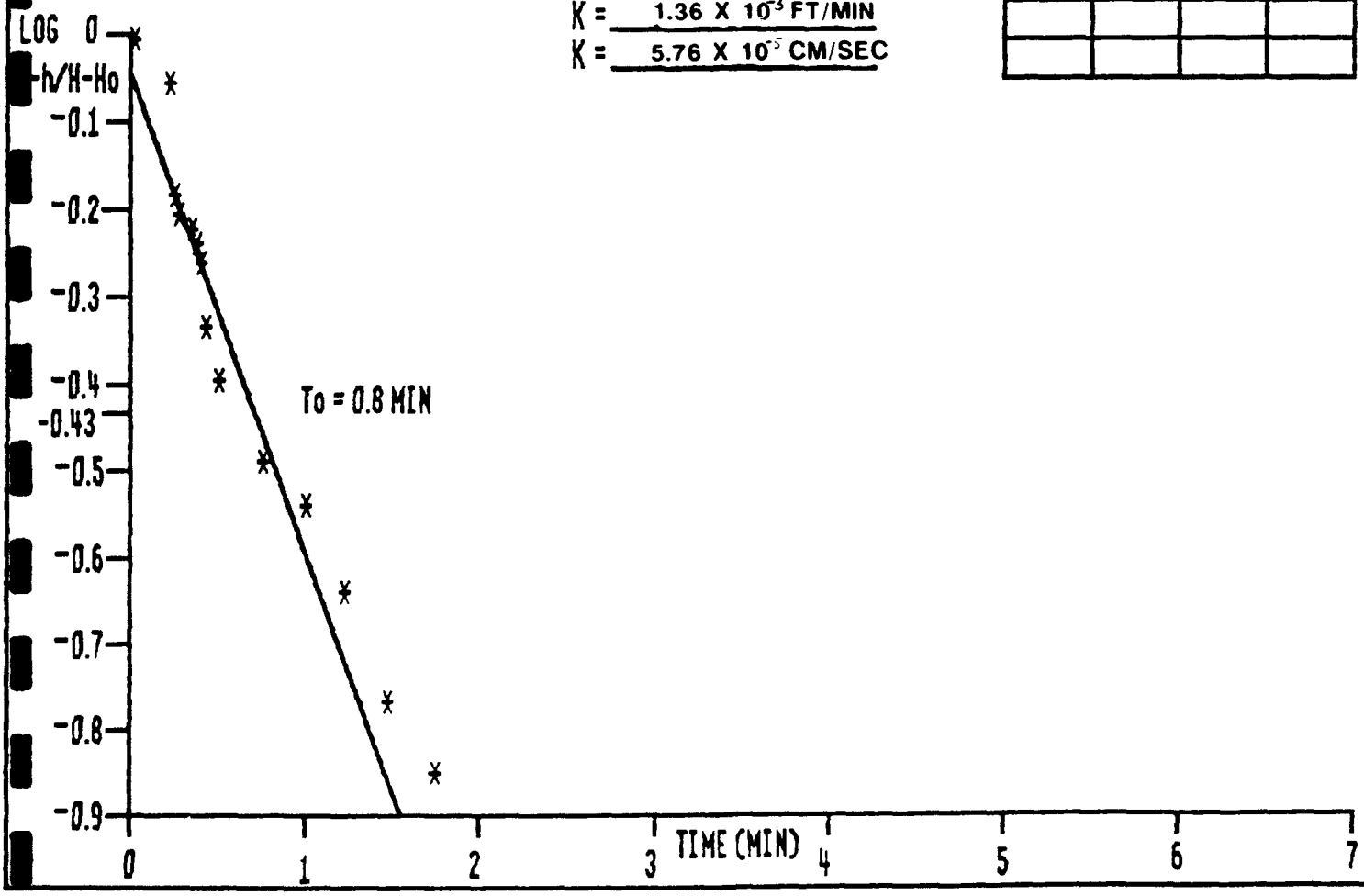
HYDRAULIC CONDUCTIVITY:

$$K = \frac{r^2 \ln(L/R)}{2 L T_o}$$

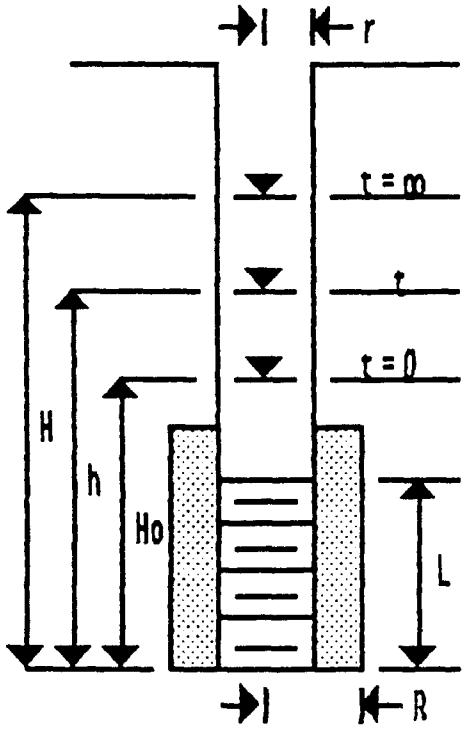
K = 1.36 X 10^{-3} FT/MIN

K = 5.76 X 10^{-5} CM/SEC

TIME	WATER DEPTH	h	H-h / H-Ho
0.0000	10.76'	8.41'	1.0
0.2500		8.71'	0.87
0.2666		9.25'	0.64
0.2833		9.32'	0.61
0.3000		9.37'	0.59
0.3166		9.42'	0.57
0.3333		9.47'	0.55
0.4167		9.68'	0.46
0.5000		9.81'	0.40
0.7500		10.0'	0.32
1.0 min		10.09'	0.29
1.25		10.20'	0.23
1.50		10.35'	0.17
1.75		10.44'	0.14
2.00		10.51'	0.11



ELEVATION TOC 743.60'	ENGINEERING SCIENCE HYDRAULIC CONDUCTIVITY TEST	WELL NO. RB-01-MW2
ELEVATION PVC 743.46		DATE 9/19/88
ELEVATION GS 741.00	PROJECT RICKENBACKER ANGB	LOCATION EAST OF BLDG 560
WATER LEVEL TOC 10.64'	PROJECT NO CL115.15	OUTSIDE FENCE, ADJ TO PUMPS



STATIC HEAD (H) 6.76'

PIPE RADIUS (r) 0.08'

BOREHOLE RADIUS (R) 0.33'

SCREEN LENGTH (L) 5.25'

INITIAL HEAD (Ho) 5.12'

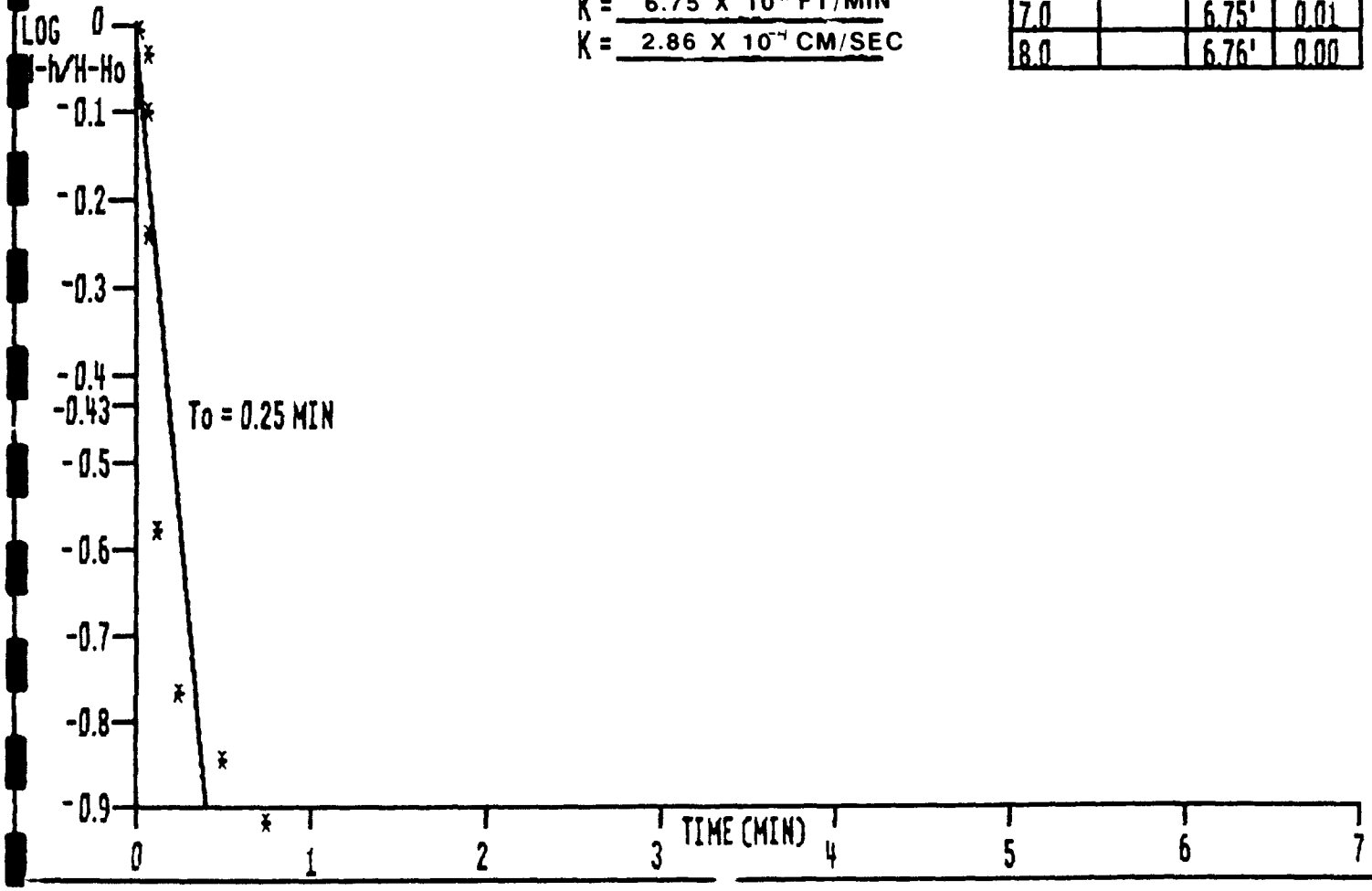
HYDRAULIC CONDUCTIVITY:

$$K = \frac{r^2 \ln(L/R)}{2 L T_o}$$

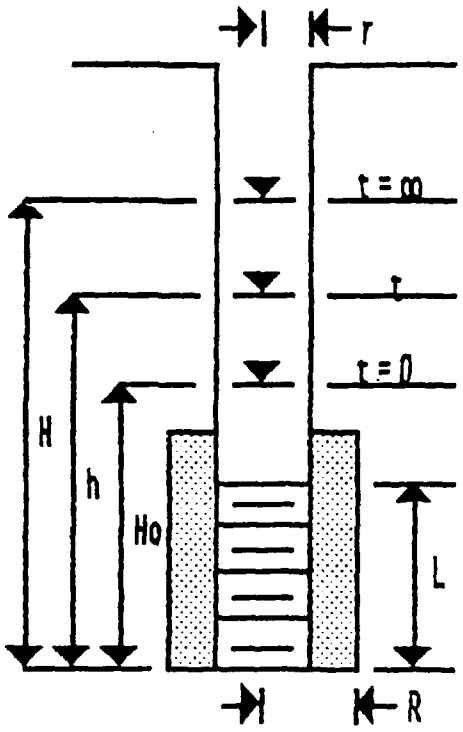
K = 6.75×10^{-3} FT/MIN

K = 2.86×10^{-4} CM/SEC

TIME	WATER DEPTH	h	$\frac{H-h}{H-Ho}$
0.00	6.76'	5.12'	1.00
0.02		5.23'	0.93
0.03		5.45'	0.80
0.05		5.80'	0.59
0.10		6.31'	0.27
0.25		6.48'	0.17
0.50		6.53'	0.14
0.75		6.56'	0.12
1.00		6.58'	0.11
1.25		6.59'	0.10
1.50		6.61'	0.09
2.0		6.63'	0.08
3.0		6.68'	0.05
4.0		6.70'	0.04
5.0		6.73'	0.02
6.0		6.74'	0.01
7.0		6.75'	0.01
8.0		6.76'	0.00



ELEVATION TOC 744.09'	ENGINEERING SCIENCE HYDRAULIC CONDUCTIVITY TEST	WELL NO. RB-01-MW3
ELEVATION PVC 743.75'		DATE 9/20/88
ELEVATION GS 741.60'	PROJECT RICKENBACKER ANGB	LOCATION APPROX 25FT EAST OF BLDG 560
WATER LEVEL TOC 11.08'	PROJECT NO CL115.15	



STATIC HEAD (H) 9.41'

PIPE RADIUS (r) 0.08'

BOREHOLE RADIUS (R) 0.33'

SCREEN LENGTH (L) 8.0'

INITIAL HEAD (Ho) 8.74'

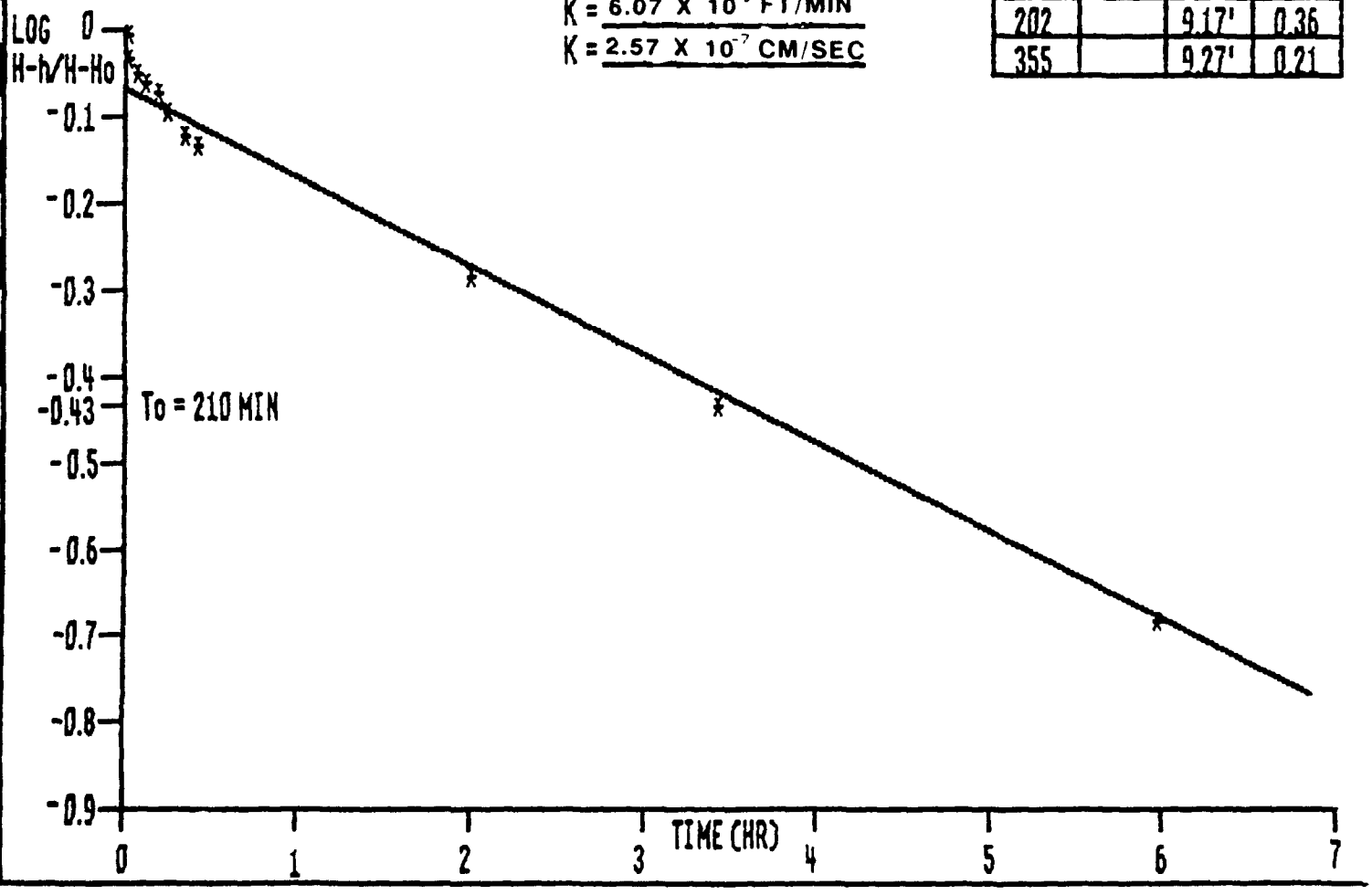
HYDRAULIC CONDUCTIVITY:

$$K = \frac{r^2 \ln(L/R)}{2 L T_o}$$

$K = 6.07 \times 10^{-6}$ FT/MIN

$K = 2.57 \times 10^{-7}$ CM/SEC

TIME	WATER DEPTH	h	$\frac{H-h}{H-Ho}$
0 SEC	9.41'	8.74'	1.0
55		8.77'	0.96
65		8.77'	0.96
1.25M		8.79'	0.93
1.50		8.79'	0.93
2.0		8.82'	0.88
2.5		8.82'	0.88
3.0		8.83'	0.87
3.5		8.84'	0.85
4.0		8.84'	0.85
5.0		8.84'	0.85
10.0		8.87'	0.81
16.08		8.87'	0.76
28.83		8.90'	0.72
119.5		9.06'	0.52
202		9.17'	0.36
355		9.27'	0.21



APPENDIX F

SOIL-GAS SURVEY DATA

APPENDIX F

SOIL-GAS SURVEY DATA

The following table summarizes the soil-gas survey results for the HWSA. The table presents the benzene, toluene and o-xylene and the total BTX concentration of each sample. The soil-gas survey map (Figure 6.2) was made based on Total BTX.

The sample number identifier used in the table identifies the soil-gas point and the depth of sample collection. For example, Sample #1SG9-5 is from soil-gas point 9 collected at a depth of five feet.

Although the chromatograph was not routinely calibrated for solvents, when likely solvent peaks were noted on the chromatogram, a footnote appears on the table. Copies of the chromatograms are not included in this appendix, but will be retained indefinitely.

SOIL-GAS SURVEY RESULTS

RICKENBACKER AIR NATIONAL GUARD BASE

HAZARDOUS WASTE STORAGE AREA

25 July 1988

SAMPLE	BENZENE	TOLUENE	O-XYLENE	TOTAL BTX
1SG1-5	ND	ND	29.81	29.81
1SG2-5	ND	ND	ND	ND
1SG3-5	ND	ND	ND	ND
1SG4-5	ND	ND	ND	ND
1SG5-5	ND	ND	ND	ND
1SG6-5	0.49	0.10	0.07	0.66
1SG7-5	ND	ND	ND	ND
1SG8-3.5	ND	ND	ND	ND
1SG9-5	ND	ND	ND	ND

APPENDIX G

LABORATORY RESULTS

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	HB1-SS1 14-Jun-88	HB1-SS2 14-Jun-88	HB1-SS3 14-Jun-88	HB2+3-SS1 14-Jun-88	HB2-SS2 14-Jun-88	HB2-SS3 14-Jun-88	HB4-SS1 06-Jul-88	HB4-SS2 06-Jul-88	HB4-SS3 06-Jul-88	HB5-SS1 06-Jul-88
Volatile Compounds											
Acrolein	10 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Acrylonitrile	10 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Benzene	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Bromoform	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Carbon tetrachloride	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Chlorobenzene	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Chlorodibromomethane	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Chloroethane	10 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	10 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Chloroform	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Dichlorobromomethane	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
1,1-Dichloroethane	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
1,2-Dichloroethane	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
1,1-Dichloroethylene	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
1,2-Dichloropropane	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
1,3-Dichloropropylene	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Ethylbenzene	5 ug/kg	ND f	ND f	120000 g	ND	ND e	ND	ND	ND	ND	ND
Methyl Bromide	10 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Methyl Chloride	10 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Methylene chloride	5 ug/kg	92000 A	30000 A	130000 A	22 U	39 U	21 U	8 U	8 U	7 U	6 U
1,1,2,2-Tetrachloroethane	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Tetrachloroethylene	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Toluene	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
1,2-Trans-Dichloroethylene	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Trichloroethylene	5 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Trichlorofluoromethane	10 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Vinyl chloride	10 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Acetone	100 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
2-Butanone (MEK)	100 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Carbondisulfide	10 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
2-Hexanone	50 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (MIK)	50 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
Vinyl Acetate	50 ug/kg	ND f	ND f	ND g	ND	ND e	ND	ND	ND	ND	ND
o-Xylene	5 ug/kg	440000 f	300000 f	1900000 g	ND	43 e	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the soil analyis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	HB6-SS1 06-Jul-88	HB6-SS2 06-Jul-88	HB6-SS3 06-Jul-88	MW1-SS1 20-Jul-88	MW1-SS2 20-Jul-88	MW2-SS1 29-Jul-88	MW2-SS2 29-Jul-88 DupMW2-SS1	MW2-SS3 29-Jul-88	MW3-SS1 10-Aug-88	MW3-SS2 10-Aug-88	SU1+2-GS1 14-Jun-88
Volatile Compounds												
Acrolein	10 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Acrylonitrile	10 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Benzene	5 ug/kg	ND	ND	ND	ND	1900	ND	ND	ND	--	--	--
Bromoform	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Carbon tetrachloride	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Chlorobenzene	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Chlorodibromomethane	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Chloroethane	10 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
2-Chloroethylvinyl ether	10 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Chloroform	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Dichlorobromomethane	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
1,1-Dichloroethane	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
1,2-Dichloroethane	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
1,1-Dichloroethylene	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
1,2-Dichloropropane	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
1,3-Dichloropropylene	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Ethylbenzene	5 ug/kg	ND	ND	ND	1700	11000	ND	ND	ND	--	--	--
Methyl Bromide	10 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Methyl Chloride	10 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Methylene chloride	5 ug/kg	11 U	20 U	28 U	ND	ND	ND	5	5	--	--	--
1,1,2,2-Tetrachloroethane	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Tetrachloroethylene	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Toluene	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
1,2-Trans-Dichloroethylene	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
1,1,1-Trichloroethane	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
1,1,2-Trichloroethane	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Trichloroethylene	5 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Trichlorofluoromethane	10 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Vinyl chloride	10 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Acetone	100 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
2-Butanone (MEK)	100 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Carbondisulfide	10 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
2-Hexanone	50 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
4-Methyl-2-Pentanone (MIK)	50 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
Vinyl Acetate	50 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--
o-Xylene	5 ug/kg	ND	ND	ND	1600	20000	ND	ND	ND	--	--	--

NOTE: See footnote listing immediately following the soil analyis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	SU3+4-GS1 14-Jun-88	SU5+6-GS1 14-Jun-88	SU7+8-GS1 14-Jun-88	SU9+10-GS1 14-Jun-88	SU11+12-GS1 14-Jun-88	SU13+14-GS1 14-Jun-88	SU15+16-GS1 14-Jun-88	SU17+18-GS1 14-Jun-88 DupSU1+2-GS1
Volatile Compounds									
Acrolein	10 ug/kg	--	--	--	--	--	--	--	--
Acrylonitrile	10 ug/kg	--	--	--	--	--	--	--	--
Benzene	5 ug/kg	--	--	--	--	--	--	--	--
Bromoform	5 ug/kg	--	--	--	--	--	--	--	--
Carbon tetrachloride	5 ug/kg	--	--	--	--	--	--	--	--
Chlorobenzene	5 ug/kg	--	--	--	--	--	--	--	--
Chlorodibromomethane	5 ug/kg	--	--	--	--	--	--	--	--
Chloroethane	10 ug/kg	--	--	--	--	--	--	--	--
2-Chloroethylvinyl ether	10 ug/kg	--	--	--	--	--	--	--	--
Chloroform	5 ug/kg	--	--	--	--	--	--	--	--
Dichlorobromomethane	5 ug/kg	--	--	--	--	--	--	--	--
1,1-Dichloroethane	5 ug/kg	--	--	--	--	--	--	--	--
1,2-Dichloroethane	5 ug/kg	--	--	--	--	--	--	--	--
1,1-Dichloroethylene	5 ug/kg	--	--	--	--	--	--	--	--
1,2-Dichloropropane	5 ug/kg	--	--	--	--	--	--	--	--
1,3-Dichloropropylene	5 ug/kg	--	--	--	--	--	--	--	--
Ethylbenzene	5 ug/kg	--	--	--	--	--	--	--	--
Methyl Bromide	10 ug/kg	--	--	--	--	--	--	--	--
Methyl Chloride	10 ug/kg	--	--	--	--	--	--	--	--
Methylene chloride	5 ug/kg	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	5 ug/kg	--	--	--	--	--	--	--	--
Tetrachloroethylene	5 ug/kg	--	--	--	--	--	--	--	--
Toluene	5 ug/kg	--	--	--	--	--	--	--	--
1,2-Trans-Dichloroethylene	5 ug/kg	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	5 ug/kg	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	5 ug/kg	--	--	--	--	--	--	--	--
Trichloroethylene	5 ug/kg	--	--	--	--	--	--	--	--
Trichlorofluoromethane	10 ug/kg	--	--	--	--	--	--	--	--
Vinyl chloride	10 ug/kg	--	--	--	--	--	--	--	--
Acetone	100 ug/kg	--	--	--	--	--	--	--	--
2-Butanone (MEK)	100 ug/kg	--	--	--	--	--	--	--	--
Carbondisulfide	10 ug/kg	--	--	--	--	--	--	--	--
2-Hexanone	50 ug/kg	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone (MIK)	50 ug/kg	--	--	--	--	--	--	--	--
Vinyl Acetate	50 ug/kg	--	--	--	--	--	--	--	--
o-Xylene	5 ug/kg	--	--	--	--	--	--	--	--

NOTE: See footnote listing immediately following the soil analyis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	HB1-SS1 14-Jun-88	HB1-SS2 14-Jun-88	HB1-SS3 14-Jun-88	HB2+3-SS1 14-Jun-88	HB2-SS2 14-Jun-88	HB2-SS3 14-Jun-88	HB4-SS1 06-Jul-88	HB4-SS2 06-Jul-88	HB4-SS3 06-Jul-88	HB5-SS1 06-Jul-88
Semi-Volatile compounds:	base neutrals										
Acenaphthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzidine	2000 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)flouranthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroisopropyl)ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	330 ug/kg	ND	ND	600	ND	3900	2900	ND	ND	ND	ND
2,4-Dinitrotoluene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	330 ug/kg	ND	ND	ND	ND	ND	480 J	ND	ND	ND	ND
Hexachlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-CD)pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	330 ug/kg	ND	390 J	1600 J	870 J	5400 J	570 J	ND	ND	ND	ND

NOTE: See footnote listing immediately following the soil analyis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	HB1-SS1 14-Jun-88	HB1-SS2 14-Jun-88	HB1-SS3 14-Jun-88	HB2+3-SS1 14-Jun-88	HB2-SS2 14-Jun-88	HB2-SS3 14-Jun-88	HB4-SS1 06-Jul-88	HB4-SS2 06-Jul-88	HB4-SS3 06-Jul-88	HB5-SS1 06-Jul-88
Nitrobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	330 ug/kg	ND	ND	ND	ND	5600	780	ND	ND	ND	ND
Pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	530	ND	ND	ND
1,2,4-Trichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Alcohol	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnapthalene	330 ug/kg	1100 J	960 J	2800 J	1900 J	23000 J	2800 J	ND	ND	ND	ND
2-Nitroaniline	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the soil analyis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	HB6-SS1 06-Jul-88	HB6-SS2 06-Jul-88	HB6-SS3 06-Jul-88	MW1-SS1 20-Jul-88	MW1-SS2 20-Jul-88	MW2-SS1 29-Jul-88	MW2-SS2 29-Jul-88 DupMW2-SS1	MW2-SS3 29-Jul-88	MW3-SS1 10-Aug-88	MW3-SS2 10-Aug-88	SU1+2-GS1 14-Jun-88
Semi-Volatile compounds:	base neutrals											
Acenaphthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzidine	2000 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)flouranthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	560
Bis(2-chloroethoxy)methane	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroisopropyl)ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	330 ug/kg	ND	ND	ND	3500 U	3100 U	2800 U	2600 U	2200 U	ND	ND	ND
2,4-Dinitrotoluene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	420
Fluorene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-CD)pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	330 ug/kg	ND	ND	ND	ND	630	ND	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the soil analyis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	HB6-SS1 06-Jul-88	HB6-SS2 06-Jul-88	HB6-SS3 06-Jul-88	MW1-SS1 20-Jul-88	MW1-SS2 20-Jul-88	MW2-SS1 29-Jul-88	MW2-SS2 29-Jul-88 DupMW2-SS1	MW2-SS3 29-Jul-88	MW3-SS1 10-Aug-88	MW3-SS2 10-Aug-88	SU1+2-GS1 14-Jun-88
Nitrobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Alcohol	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnapthalene	330 ug/kg	ND	ND	ND	ND	1200	ND	ND	ND	ND	ND	ND
2-Nitroaniline	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the soil analyis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	SU3+4-GS1 14-Jun-88	SU5+6-GS1 14-Jun-88	SU7+8-GS1 14-Jun-88	SU9+10-GS1 14-Jun-88	SU11+12-GS1 14-Jun-88	SU13+14-GS1 14-Jun-88	SU15+16-GS1 14-Jun-88	SU17+18-GS1 14-Jun-88 DupSU1+2-GS1
Semi-Volatile compounds:	base neutrals								
Acenaphthene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	330 ug/kg	ND	580	ND	ND	ND	ND	ND	ND
Benzidine	2000 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	330 ug/kg	ND	2100 J	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	330 ug/kg	ND	2600	ND	360	530	ND	ND	ND
Benzo(b)flouranthene	330 ug/kg	ND	3200	530	570	850	430	840	760
Benzo(ghi)perylene	330 ug/kg	ND	1700	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	330 ug/kg	500	2800	ND	380	460	ND	ND	ND
Bis(2-chloroethoxy)methane	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroisopropyl)ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	330 ug/kg	ND	4100 J	ND	ND	480 J	ND	ND	ND
4-Bromophenyl phenyl ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	330 ug/kg	ND	2800 J	ND	420 J	540 J	ND	ND	ND
Dibenzo(a,h)anthracene	330 ug/kg	ND	360	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	330 ug/kg	ND	ND	940	ND	6500	ND	ND	1400
2,4-Dinitrotoluene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	330 ug/kg	570	4100	520	840	ND	440	740	630
Fluorene	330 ug/kg	ND	ND	ND	ND	1400 J	ND	ND	ND
Hexachlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-CD)pyrene	330 ug/kg	ND	1700	ND	ND	ND	ND	ND	ND
Isophorone	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the soil analyis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	SU3+4-GS1 14-Jun-88	SU5+6-GS1 14-Jun-88	SU7+8-GS1 14-Jun-88	SU9+10-GS1 14-Jun-88	SU11+12-GS1 14-Jun-88	SU13+14-GS1 14-Jun-88	SU15+16-GS1 14-Jun-88	SU17+18-GS1 14-Jun-88 DupSU1+2-GS1
Nitrobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	330 ug/kg	ND	4200	ND	410	1100	ND	ND	ND
Pyrene	330 ug/kg	ND	5600 J	ND	630 J	1000 J	ND	520 J	430 J
1,2,4-Trichlorobenzene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Alcohol	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnapthalene	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the soil analyis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	HB1-SS1 14-Jun-88	HB1-SS2 14-Jun-88	HB1-SS3 14-Jun-88	HB2+3-SS1 14-Jun-88	HB2-SS2 14-Jun-88	HB2-SS3 14-Jun-88	HB4-SS1 06-Jul-88	HB4-SS2 06-Jul-88	HB4-SS3 06-Jul-88	HB5-SS1 06-Jul-88
Semi-Volatile compounds:	acids										
2-Chlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl-4,6-dinitrophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzoic Acid	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Method 8080 Pesticides											
Aldrin	1.3 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
Alpha-BHC	0.99 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
Beta-BHC	2.0 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
Delta-BHC	3.0 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
Gamma-BHC	1.3 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
Chlordane	4.6 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
4,4'-DDD	3.6 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
4,4'-DDE	1.3 ug/kg	ND b	ND b	ND c	ND c	ND c	ND b	ND h	ND h	ND h	ND h
4,4'-DDT	4.0 ug/kg	ND b	ND b	ND c	ND c	ND c	ND b	ND h	ND h	ND h	ND h
Dieldrin	0.66 ug/kg	ND b	ND b	ND c	ND c	ND c	ND b	ND h	ND h	ND h	ND h
Endosulfan I	4.6 ug/kg	ND b	ND b	ND c	ND c	ND c	ND b	ND h	ND h	ND h	ND h
Endosulfan II	1.3 ug/kg	ND b	ND b	ND c	ND c	ND c	ND b	ND h	ND h	ND h	ND h
Endosulfan Sulfate	22 ug/kg	ND b	ND b	ND c	ND c	ND c	ND b	ND h	ND h	ND h	ND h
Endrin	2.0 ug/kg	ND b	ND b	ND c	ND c	ND c	ND b	ND h	ND h	ND h	ND h
Methoxychlor	58 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
Heptachlor	0.99 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
Heptachlor Epoxide	27 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
Toxaphene	79 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h

NOTE: See footnote listing immediately following the soil analysis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc. Semi-Volatile compounds:	DET. LIMIT	HB6-SS1 06-Jul-88	HB6-SS2 06-Jul-88	HB6-SS3 06-Jul-88	MW1-SS1 20-Jul-88	MW1-SS2 20-Jul-88	MW2-SS1 29-Jul-88	MW2-SS2 29-Jul-88 DupMW2-SS1	MW2-SS3 29-Jul-88	MW3-SS1 10-Aug-88	MW3-SS2 10-Aug-88	SU1+2-GS1 14-Jun-88
acids												
2-Chlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl-4,6-dinitrophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzoic Acid	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Method 8080 Pesticides												
Aldrin	1.3 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Alpha-BHC	0.99 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Beta-BHC	2.0 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Delta-BHC	3.0 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Gamma-BHC	1.3 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Chlordane	4.6 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
4,4'-DDD	3.6 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
4,4'-DDE	1.3 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
4,4'-DDT	4.0 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Dieldrin	0.66 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Endosulfan I	4.6 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Endosulfan II	1.3 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Endosulfan Sulfate	22 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Endrin	2.0 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Methoxychlor	58 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Heptachlor	0.99 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Heptachlor Epoxide	27 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Toxaphene	79 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d

NOTE: See footnote listing immediately following the soil analysis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	SU3+4-GS1 14-Jun-88	SU5+6-GS1 14-Jun-88	SU7+8-GS1 14-Jun-88	SU9+10-GS1 14-Jun-88	SU11+12-GS1 14-Jun-88	SU13+14-GS1 14-Jun-88	SU15+16-GS1 14-Jun-88	SU17+18-GS1 14-Jun-88 DupSU1+2-GS
Semi-Volatile compounds:	acids								
2-Chlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl-4,6-dinitrophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	660 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Benzoic Acid	1600 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	330 ug/kg	ND	ND	ND	ND	ND	ND	ND	ND
Method 8080 Pesticides									
Aldrin	1.3 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Alpha-BHC	0.99 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Beta-BHC	2.0 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Delta-BHC	3.0 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Gamma-BHC	1.3 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Chlordane	4.6 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
4,4'-DDD	3.6 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
4,4'-DDE	1.3 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
4,4'-DDT	4.0 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Dieldrin	0.66 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Endosulfan I	4.6 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Endosulfan II	1.3 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Endosulfan Sulfate	22 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Endrin	2.0 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Methoxychlor	58 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Heptachlor	0.99 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Heptachlor Epoxide	27 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND
Toxaphene	79 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND

NOTE: See footnote listing immediately following the soil analysis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	HB1-SS1 14-Jun-88	HB1-SS2 14-Jun-88	HB1-SS3 14-Jun-88	HB2+3-SS1 14-Jun-88	HB2-SS2 14-Jun-88	HB2-SS3 14-Jun-88	HB4-SS1 06-Jul-88	HB4-SS2 06-Jul-88	HB4-SS3 06-Jul-88	HB5-SS1 06-Jul-88
PCB Analysis											
PCB-1016	33 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
PCB-1221	130 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
PCB-1232	99 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
PCB-1242	66 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
PCB-1248	66 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
PCB-1254	66 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
PCB-1260	66 ug/kg	ND b	ND b	ND c	ND c	ND c	ND c	ND h	ND h	ND h	ND h
Metals Analysis, total											
Antimony	6 mg/kg	ND N	ND N	ND N	ND N	ND N	ND N	ND N	ND N	ND N	ND N
Arsenic	0.5 mg/kg	15	11.5 N	17.6	12.0 N	18.5	11.4 N	7.9 N	42 N	29 N	8.4
Beryllium	0.1 mg/kg	0.78	ND N	0.84	ND N	0.81	ND N	0.4 B	0.9 *	0.6 *	0.5
Cadmium	1 mg/kg	4 G	ND N	6.9 G	ND N	8.2 G	ND N	ND	ND	ND	ND
Chromium	1 mg/kg	16.3	16.2 N	18.4	14.1 N	17.7	10.0 N	10 G	15 G	12 G	10
Copper	1 mg/kg	19.7	21.9 N	22.7	19.5 N	24.4	18.2 N	26 *	38	35 *	23
Lead	5 mg/kg	15.7	10.0	10.0	27.0	9.8 N	8.2 B	27 *	20 *	18 *	19 *
Mercury	0.1 mg/kg	ND	ND	ND	ND	ND	ND	ND u	ND u	ND u	ND u
Nickel	1 mg/kg	21.7	27.8 N	25.3	21.4 N	28.8	25.0 N	23 *	60 *	41 *	25
Selenium	0.5 mg/kg	ND W	ND	ND	ND W	ND W	ND	ND N	ND N	ND N	ND N
Silver	1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	10 mg/kg	ND	ND	ND	ND	ND	ND	ND N	ND N	ND N	ND
Zinc	1 mg/kg	72.5	82.1 N	83.3	86.1 N	85.5	73.4 N	109	131	108	83 N
Chlorinated Herbicides											
2,4-D	1 mg/kg	--	--	--	--	--	--	--	--	--	--
2,4-DB	1 mg/kg	--	--	--	--	--	--	--	--	--	--
2,4,5-T	1 mg/kg	--	--	--	--	--	--	--	--	--	--
2,4,5-TP	1 mg/kg	--	--	--	--	--	--	--	--	--	--
Dalapon	4 mg/kg	--	--	--	--	--	--	--	--	--	--
Dicamba	1 mg/kg	--	--	--	--	--	--	--	--	--	--
Dichloroprop	1 mg/kg	--	--	--	--	--	--	--	--	--	--
Dinoseb	1 mg/kg	--	--	--	--	--	--	--	--	--	--
MCPA	100 mg/kg	--	--	--	--	--	--	--	--	--	--
MCPP	100 mg/kg	--	--	--	--	--	--	--	--	--	--

NOTE: See footnote listing immediately following the soil analysis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	HB6-SS1 06-Jul-88	HB6-SS2 06-Jul-88	HB6-SS3 06-Jul-88	MW1-SS1 20-Jul-88	MW1-SS2 20-Jul-88	MW2-SS1 29-Jul-88	MW2-SS2 29-Jul-88 DupMW2-SS1	MW2-SS3 29-Jul-88	MW3-SS1 10-Aug-88	MW3-SS2 10-Aug-88	SU1+2-GS1 14-Jun-88
PCB Analysis												
PCB-1016	33 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
PCB-1221	130 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
PCB-1232	99 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
PCB-1242	66 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
PCB-1248	66 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
PCB-1254	66 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
PCB-1260	66 ug/kg	ND h	ND h	ND h	ND j	ND j	ND j	ND j	ND j	ND	ND	ND d
Metals Analysis, total												
Antimony	6 mg/kg	ND N	ND N	ND N	ND N	ND N	ND N	ND N	ND N	ND N	ND N	ND N
Arsenic	0.5 mg/kg	4.1	15	13	7.8 N	16.9 N	15 N	7.6 N	8.6 N	15.3	16.1	14.1
Beryllium	0.1 mg/kg	0.5	0.5	0.6	ND N	ND N	ND	0.2 B	ND	ND N	ND N	0.79
Cadmium	1 mg/kg	ND	ND	ND	ND N	ND N	ND	ND	ND	ND	ND	6.3 G
Chromium	1 mg/kg	10	12	14	4.5 B	8.4 N	15	12	8	13.1	14.1	22.1
Copper	1 mg/kg	22	32	25	12.7 N	17.2 N	21	21	24	20.5	19.1	29.3
Lead	5 mg/kg	11 *	18 *	15 *	ND N	8.6 B	17	31	26	15.6	13.7	41.9
Mercury	0.1 mg/kg	ND u	ND u	ND u	DNU	DNU	ND	ND	ND	ND	ND	ND
Nickel	1 mg/kg	18	25	28	13.3 N	22.2 N	25	21	9.2 B	24.1	24.9	28.2
Selenium	0.5 mg/kg	ND N	ND N	ND N	ND W	ND W	ND N	ND N	ND N	ND W	ND	ND W
Silver	1 mg/kg	ND	ND	ND	ND N	ND N	ND	ND	ND	ND N	ND N	ND
Thallium	10 mg/kg	ND	ND	ND	ND N	ND N	ND	ND	ND	ND	10.5	ND
Zinc	1 mg/kg	79 N	86 N	92 N	56.1 N	63.8	66 N	74 N	76 N	87.1	83.7	422
Chlorinated Herbicides												
2,4-D	1 mg/kg	--	--	--	--	--	--	--	--	--	--	ND
2,4-DB	1 mg/kg	--	--	--	--	--	--	--	--	--	--	ND
2,4,5-T	1 mg/kg	--	--	--	--	--	--	--	--	--	--	ND
2,4,5-TP	1 mg/kg	--	--	--	--	--	--	--	--	--	--	ND
Dalapon	4 mg/kg	--	--	--	--	--	--	--	--	--	--	ND
Dicamba	1 mg/kg	--	--	--	--	--	--	--	--	--	--	ND
Dichloroprop	1 mg/kg	--	--	--	--	--	--	--	--	--	--	ND
Dinoseb	1 mg/kg	--	--	--	--	--	--	--	--	--	--	ND
MCPA	100 mg/kg	--	--	--	--	--	--	--	--	--	--	ND
MCPP	100 mg/kg	--	--	--	--	--	--	--	--	--	--	ND

NOTE: See footnote listing immediately following the soil analysis tables.

TABLE G-1. HAZARDOUS WASTE STORAGE AREA SOIL ANALYSIS

Priority Pollutant Conc.	DET. LIMIT	SU3+4-GS1 14-Jun-88	SU5+6-GS1 14-Jun-88	SU7+8-GS1 14-Jun-88	SU9+10-GS1 14-Jun-88	SU11+12-GS1 14-Jun-88	SU13+14-GS1 14-Jun-88	SU15+16-GS1 14-Jun-88	SU17+18-GS1 14-Jun-88 DupSU1+2-GS1
PCB Analysis									
PCB-1016	33 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND c
PCB-1221	130 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND c
PCB-1232	99 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND c
PCB-1242	66 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND c
PCB-1248	66 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND c
PCB-1254	66 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND c
PCB-1260	66 ug/kg	ND d	ND d	ND d	ND d	ND d	ND d	ND d	ND c
Metals Analysis, total									
Antimony	6 mg/kg	ND N	ND N	ND N	ND N	ND N	ND N	ND N	ND N
Arsenic	0.5 mg/kg	19.7	17.7 S	15.2	17.9	17.7	12.8	17.2	20.0
Beryllium	0.1 mg/kg	0.8	0.75	0.9	0.95	0.78	0.89	0.75	0.78
Cadmium	1 mg/kg	8.3 G	8.9 G	6 G	9.1 G	8 G	7.7 G	7.7 G	7.9 G
Chromium	1 mg/kg	22.4	25.6	22.1	20.1	19.5	19.6	23.9	17.8
Copper	1 mg/kg	28.1	57.9	23.1	73.1	29.7	19.7	30.7	32.2
Lead	5 mg/kg	35.3	187	55.7	72.8	35	41.5	52.1	35.2
Mercury	0.1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	1 mg/kg	28.3	19.1	20.6	26.6	26.5	14.8	26.4	26.9
Selenium	0.5 mg/kg	ND	ND W	ND	ND	ND S	ND	ND W	ND
Silver	1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	10 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	1 mg/kg	134	433	296	260	113	120	135	300
Chlorinated Herbicides									
2,4-D	1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
2,4-DB	1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-T	1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-TP	1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
Dalapon	4 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
Dicamba	1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
Dichloroprop	1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
Dinoseb	1 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
MCPA	100 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND
MCPP	100 mg/kg	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the soil analysis tables.

Footnotes

b--detection limits 8080 list (see footnote list Table G-3)
c--detection limits 8080 list (see footnote list Table G-3)
d--detection limits 8080 list (see footnote list Table G-3)
e--detection limits 8240 list (see footnote list Table G-3)
f--detection limits 8240 list (see footnote list Table G-3)
g--detection limits 8240 list (see footnote list Table G-3)
j--detection limits 8080 list (see footnote list Table G-3)
u--multiple of 2 times the detection limit given
A--analyte found in associated method blank but the sample concentration was greater than 10 times the blank concentration, therefore possibly significan
B--reported value is less than the reporting limit but greater than the MDL
DNU--data not usable
G=N*
J--value estimated due to high MS/MSD recoveries. Results are biased high.
N--spiked sample recovery not within control limits
ND-not detected
S--reported value was determined by the method of standard additions
U-analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected
W--post digestion spike for Furnace AA analysis out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance
*--duplicate analysis not within control limits
-- not tested

TABLE G-2. HAZARDOUS WASTE STORAGE AREA WATER ANALYSIS

Priority Pollutant Conc.	DET.LIMIT	MW1-GW1 19-Sep-88	MW1-SW1 19-Sep-88 RINSE	MW1GW1 19-Sep-88 DupMW1-GW1	MW2-GW1 19-Sep-88	MW2-SW1 29-Jul-88 RINSE	MW3-GW1 22-Sep-88	MW3-GW2 17-Oct-88	MW3-SW1 17-Oct-88 RINSE
Volatile Compounds									
Benzene	5 ug/L	94	ND	--	ND	ND	ND	--	ND
Bromoform	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
Carbon tetrachloride	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
Chlorobenzene	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
Chlorodibromomethane	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
Chloroethane	10 ug/L	ND	ND	--	ND	ND	ND	--	ND
2-Chloroethylvinyl ether	10 ug/L	ND	ND	--	ND	ND	ND	--	ND
Chloroform	5 ug/L	ND	11	--	ND	ND	ND	--	7
Dichlorobromomethane	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
1,1-Dichloroethane	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
1,2-Dichloroethane	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
1,1-Dichloroethylene	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
1,2-Dichloropropane	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
1,3-Dichloropropylene	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
Ethylbenzene	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
Methyl Bromide	10 ug/L	ND	ND	--	ND	ND	ND	--	ND
Methyl Chloride	10 ug/L	ND	ND	--	ND	ND	ND	--	ND
Methylene chloride	5 ug/L	ND	ND	--	ND	7 U	ND	--	ND
1,1,2,2-Tetrachloroethane	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
Tetrachloroethylene	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
Toluene	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
1,2-Trans-Dichloroethylene	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
1,1,1-Trichloroethane	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
1,1,2-Trichloroethane	5 ug/L	ND	ND	--	ND	ND	ND	--	ND
Trichloroethylene	5 ug/L	ND	ND	--	ND	ND	44	--	ND
Trichlorofluoromethane	10 ug/L	ND	ND	--	ND	ND	ND	--	ND
Vinyl chloride	10 ug/L	ND	ND	--	ND	ND	ND	--	ND
Acetone	100 ug/L	120 U	ND	--	ND	ND	ND	--	ND
2-Butanone (MEK)	100 ug/L	ND	ND	--	ND	ND	ND	--	ND
Carbondisulfide	10 ug/L	ND	ND	--	ND	ND	ND	--	ND
2-Hexanone	50 ug/L	ND	ND	--	ND	ND	ND	--	ND
4-Methyl-2-Pentanone (MIK)	50 ug/L	ND	ND	--	ND	ND	ND	--	ND
Vinyl Acetate	50 ug/L	ND	ND	--	ND	ND	ND	--	ND
o-Xylene	5 ug/L	20	ND	--	ND	ND	ND	--	ND

NOTE: See footnote listing immediately following the water analysis tables.

TABLE G-2. HAZARDOUS WASTE STORAGE AREA WATER ANALYSIS

Priority Pollutant Conc. Semi-Volatile compounds:	DET.LIMIT base neutrals	MW1-GW1 19-Sep-88	MW1-SW1 19-Sep-88 RINSE	MW1GW1 19-Sep-88 DupMW1-GW1	MW2-GW1 19-Sep-88	MW2-SW1 29-Jul-88 RINSE	MW3-GW1 22-Sep-88	MW3-GW2 17-Oct-88	MW3-SW1 17-Oct-88 RINSE
Acenaphthene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzidine	60 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)flouranthene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroisopropyl)ether	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	10 ug/L	ND	ND	ND	ND	ND	ND	24 B	ND
4-Bromophenyl phenyl ether	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	20 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-CD)pyrene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the water analysis tables.

TABLE G-2. HAZARDOUS WASTE STORAGE AREA WATER ANALYSIS

Priority Pollutant Conc.	DET.LIMIT	MW1-GW1 19-Sep-88	MW1-SW1 19-Sep-88 RINSE	MW1GW1 19-Sep-88 DupMW1-GW1	MW2-GW1 19-Sep-88	MW2-SW1 29-Jul-88 RINSE	MW3-GW1 22-Sep-88	MW3-GW2 17-Oct-88	MW3-SW1 17-Oct-88 RINSE
N-Nitrosodi-n-propylamine	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Alcohol	20 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	20 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnapthalene	10 ug/L	ND	ND	13	ND	ND	ND	ND	ND
2-Nitroaniline	50 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	50 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	50 ug/L	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the water analysis tables.

TABLE G-2. HAZARDOUS WASTE STORAGE AREA WATER ANALYSIS

Priority Pollutant Conc.	DET.LIMIT	MW1-GW1 19-Sep-88	MW1-SW1 19-Sep-88 RINSE	MW1GW1 19-Sep-88 DupMW1-GW1	MW2-GW1 19-Sep-88	MW2-SW1 29-Jul-88 RINSE	MW3-GW1 22-Sep-88	MW3-GW2 17-Oct-88	MW3-SW1 17-Oct-88 RINSE
Semi-Volatile compounds:	acids								
2-Chlorophenol	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl-4,6-dinitrophenol	50 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	50 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	50 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	20 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	50 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Benzoic Acid	50 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Method 8080 Pesticides									
Aldrin	0.004 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	0.003 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	0.006 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	0.009 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	0.004 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	0.014 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	0.011 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	0.004 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	0.012 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.002 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	0.014 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	0.004 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	0.066 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	0.006 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	0.18 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	0.003 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	0.083 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	0.24 ug/L	ND	ND	ND	ND	ND	ND	ND	ND

NOTE: See footnote listing immediately following the water analysis tables.

TABLE G-2. HAZARDOUS WASTE STORAGE AREA WATER ANALYSIS

Priority Pollutant Conc.	DET.LIMIT	MW1-GW1 19-Sep-88	MW1-SW1 19-Sep-88 RINSE	MW1GW1 19-Sep-88 DupMW1-GW1	MW2-GW1 19-Sep-88	MW2-SW1 29-Jul-88 RINSE	MW3-GW1 22-Sep-88	MW3-GW2 17-Oct-88	MW3-SW1 17-Oct-88 RINSE
PCB Analysis									
PCB-1016	0.10 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	0.40 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	0.30 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	0.20 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	0.20 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	0.20 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	0.20 ug/L	ND	ND	ND	ND	ND	ND	ND	ND
Metals Analysis, total									
Antimony	0.06 mg/L	ND	ND	ND	ND	ND	ND	--	--
Arsenic	0.005 mg/L	0.34	ND	0.40	0.184	ND	0.14	--	--
Beryllium	0.001 mg/L	ND N	ND N	ND N	ND N	ND	ND N	--	--
Cadmium	0.01 mg/L	0.15	ND	0.18	0.12	ND	0.040	--	--
Chromium	0.01 mg/L	0.52	ND	0.66	0.28	ND	0.16	--	--
Copper	0.01 mg/L	0.88	ND	1.1	0.66	ND	0.20	--	--
Lead	0.005 mg/L	0.82	ND	0.99	0.55	ND	0.19	--	--
Mercury	0.0002 mg/L	0.0003	ND	0.0003	0.0002	ND	ND	--	--
Nickel	0.01 mg/L	0.84	ND	1.0	0.45	ND	0.27	--	--
Selenium	0.005 mg/L	ND T	ND	ND T	ND Y	ND	0.0082 S	--	--
Silver	0.01 mg/L	ND N	ND N	ND N	ND N	ND	ND N	--	--
Thallium	0.1 mg/L	ND	ND	ND	ND	ND	ND	--	--
Zinc	0.01 mg/L	3.6	ND	4.3	2.4	0.01 B	0.94	--	--
Miscellaneous Parameters									
Temperature	-- deg F	65.8	--	--	70.2	--	65	66	--
pH	-- SU	6.95	--	--	7.2	--	7.2	7	--
Conductivity	-- umohs	700	--	--	700	--	875	875	--

NOTE: See footnote listing immediately following the water analysis tables.

Footnotes

k--detection limits 8080 list (see footnote list Table G-3)
B--reported value is less than reporting limit but greater than the MDL
N--spiked sample recovery not within control limits
ND--not detected
S--reported value was determined by the method of standard additions
T--multiple of 10 times the detection limit given
U--analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected
Y=WT; where W--post digestion spike for Furnace AA analysis out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance
-- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List a DET.LIM.	List b DET.LIM.	List c DET.LIM.	List d DET.LIM.	List e DET.LIM.	List f DET.LIM.	List g DET.LIM.	List h DET.LIM.	List i DET.LIM.	List j DET.LIM.	List k DET.LIM.
Priority Pollutant Volatile Compounds												
Benzene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Bromoform	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Carbon tetrachloride	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Chlorobenzene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Chlorodibromomethane	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Chloroethane	10 ug/kg	--	--	--	--	25	25000	63000	--	--	--	--
2-Chloroethylvinyl ether	10 ug/kg	--	--	--	--	25	25000	63000	--	--	--	--
Chloroform	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Dichlorobromomethane	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
1,1-Dichloroethane	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
1,2-Dichloroethane	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
1,1-Dichloroethylene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
1,2-Dichloropropane	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
1,3-Dichloropropylene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Ethylbenzene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Methyl Bromide	10 ug/kg	--	--	--	--	25	25000	63000	--	--	--	--
Methyl Chloride	10 ug/kg	--	--	--	--	25	25000	63000	--	--	--	--
Methylene chloride	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
1,1,2,2-Tetrachloroethane	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Tetrachloroethylene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Toluene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
1,2-Trans-Dichloroethylene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
1,1,1-Trichloroethane	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
1,1,2-Trichloroethane	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Trichloroethylene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--
Trichlorofluoromethane	10 ug/kg	--	--	--	--	25	25000	63000	--	--	--	--
Vinyl chloride	10 ug/kg	--	--	--	--	25	25000	63000	--	--	--	--
Acetone	100 ug/kg	--	--	--	--	250	250000	630000	--	--	--	--
2-Butanone (MEK)	100 ug/kg	--	--	--	--	250	250000	630000	--	--	--	--
Carbondisulfide	10 ug/kg	--	--	--	--	25	25000	63000	--	--	--	--
2-Hexanone	50 ug/kg	--	--	--	--	130	130000	310000	--	--	--	--
4-Methyl-2-Pentanone (MIK)	50 ug/kg	--	--	--	--	130	130000	310000	--	--	--	--
Vinyl Acetate	50 ug/kg	--	--	--	--	130	130000	31000	--	--	--	--
o-Xylene	5 ug/kg	--	--	--	--	13	13000	31000	--	--	--	--

Footnotes: -- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List l DET.LIM.	List m DET.LIM.	List n DET.LIM.	List o DET.LIM.	List p DET.LIM.	List q DET.LIM.	List r DET.LIM.	List s DET.LIM.	List w DET. LIM.
Priority Pollutant Volatile Compounds										
Benzene	5 ug/kg	--	--	--	625	--	--	--	--	--
Bromoform	5 ug/kg	--	--	--	625	--	--	--	--	--
Carbon tetrachloride	5 ug/kg	--	--	--	625	--	--	--	--	--
Chlorobenzene	5 ug/kg	--	--	--	625	--	--	--	--	--
Chlorodibromomethane	5 ug/kg	--	--	--	625	--	--	--	--	--
Chloroethane	10 ug/kg	--	--	--	1250	--	--	--	--	--
2-Chloroethylvinyl ether	10 ug/kg	--	--	--	1250	--	--	--	--	--
Chloroform	5 ug/kg	--	--	--	625	--	--	--	--	--
Dichlorobromomethane	5 ug/kg	--	--	--	625	--	--	--	--	--
1,1-Dichloroethane	5 ug/kg	--	--	--	625	--	--	--	--	--
1,2-Dichloroethane	5 ug/kg	--	--	--	625	--	--	--	--	--
1,1-Dichloroethylene	5 ug/kg	--	--	--	625	--	--	--	--	--
1,2-Dichloropropane	5 ug/kg	--	--	--	625	--	--	--	--	--
1,3-Dichloropropylene	5 ug/kg	--	--	--	625	--	--	--	--	--
Ethylbenzene	5 ug/kg	--	--	--	625	--	--	--	--	--
Methyl Bromide	10 ug/kg	--	--	--	1250	--	--	--	--	--
Methyl Chloride	10 ug/kg	--	--	--	1250	--	--	--	--	--
Methylene chloride	5 ug/kg	--	--	--	625	--	--	--	--	--
1,1,2,2-Tetrachloroethane	5 ug/kg	--	--	--	625	--	--	--	--	--
Tetrachloroethylene	5 ug/kg	--	--	--	625	--	--	--	--	--
Toluene	5 ug/kg	--	--	--	625	--	--	--	--	--
1,2-Trans-Dichloroethylene	5 ug/kg	--	--	--	625	--	--	--	--	--
1,1,1-Trichloroethane	5 ug/kg	--	--	--	625	--	--	--	--	--
1,1,2-Trichloroethane	5 ug/kg	--	--	--	625	--	--	--	--	--
Trichloroethylene	5 ug/kg	--	--	--	625	--	--	--	--	--
Trichlorofluoromethane	10 ug/kg	--	--	--	1250	--	--	--	--	--
Vinyl chloride	10 ug/kg	--	--	--	1250	--	--	--	--	--
Acetone	100 ug/kg	--	--	--	12500	--	--	--	--	--
2-Butanone (MEK)	100 ug/kg	--	--	--	12500	--	--	--	--	--
Carbondisulfide	10 ug/kg	--	--	--	1250	--	--	--	--	--
2-Hexanone	50 ug/kg	--	--	--	6250	--	--	--	--	--
4-Methyl-2-Pentanone (MIK)	50 ug/kg	--	--	--	6250	--	--	--	--	--
Vinyl Acetate	50 ug/kg	--	--	--	6250	--	--	--	--	--
o-Xylene	5 ug/kg	--	--	--	625	--	--	--	--	--

Footnotes: -- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List a DET.LIM.	List b DET.LIM.	List c DET.LIM.	List d DET.LIM.	List e DET.LIM.	List f DET.LIM.	List g DET.LIM.	List h DET.LIM.	List i DET.LIM.	List j DET.LIM.	List k DET.LIM.
Priority Pollutant Semi-Volatile compounds:	base neutrals											
Acenaphthene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Anthracene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Benzidine	2000 ug/kg	6600	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Benzo(b)flouranthene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroethyl)ether	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Bis(2-chloroisopropyl)ether	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl)phthalate	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Chrysene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	660 ug/kg	6600	--	--	--	--	--	--	--	--	--	--
Diethyl phthalate	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
1,2-Diphenylhydrazine	330 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Fluorene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-CD)pyrene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Isophorone	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Naphthalene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
N-Nitrosodimethylamine	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--

Footnotes: -- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List a DET.LIM.	List b DET.LIM.	List c DET.LIM.	List d DET.LIM.	List e DET.LIM.	List f DET.LIM.	List g DET.LIM.	List h DET.LIM.	List i DET.LIM.	List j DET.LIM.	List k DET.LIM.
Priority Pollutant												
N-Nitrosodi-n-propylamine	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Phenanthrene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Pyrene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Aniline	330 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Benzyl Alcohol	660 ug/kg	6600	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	660 ug/kg	6600	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2-Methylnapthalene	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	1600 ug/kg	16000	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	1600 ug/kg	16000	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	1600 ug/kg	16000	--	--	--	--	--	--	--	--	--	--

Footnotes: -- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List l DET.LIM.	List m DET.LIM.	List n DET.LIM.	List o DET.LIM.	List p DET.LIM.	List q DET.LIM.	List r DET.LIM.	List s DET.LIM.	List w DET. LIM.
Priority Pollutant Semi-Volatile compounds:	base neutrals									
Acenaphthene	330 ug/kg	--	--	--	--	--	--	--	--	--
Acenaphthylene	330 ug/kg	--	--	--	--	--	--	--	--	--
Anthracene	330 ug/kg	--	--	--	--	--	--	--	--	--
Benzidine	2000 ug/kg	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	330 ug/kg	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	330 ug/kg	--	--	--	--	--	--	--	--	--
Benzo(b)flouranthene	330 ug/kg	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	330 ug/kg	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	330 ug/kg	--	--	--	--	--	--	--	--	--
Bis(2-chloroethoxy)methane	330 ug/kg	--	--	--	--	--	--	--	--	--
Bis(2-chloroethyl)ether	330 ug/kg	--	--	--	--	--	--	--	--	--
Bis(2-chloroisopropyl)ether	330 ug/kg	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl)phthalate	330 ug/kg	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	330 ug/kg	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	330 ug/kg	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	330 ug/kg	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	330 ug/kg	--	--	--	--	--	--	--	--	--
Chrysene	330 ug/kg	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	330 ug/kg	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	330 ug/kg	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	330 ug/kg	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	330 ug/kg	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	660 ug/kg	--	--	--	--	--	--	--	--	--
Diethyl phthalate	330 ug/kg	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	330 ug/kg	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	330 ug/kg	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	330 ug/kg	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	330 ug/kg	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	330 ug/kg	--	--	--	--	--	--	--	--	--
1,2-Diphenylhydrazine	330 ug/kg	--	--	--	--	--	--	--	--	--
Fluoranthene	330 ug/kg	--	--	--	--	--	--	--	--	--
Fluorene	330 ug/kg	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	330 ug/kg	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	330 ug/kg	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	330 ug/kg	--	--	--	--	--	--	--	--	--
Hexachloroethane	330 ug/kg	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-CD)pyrene	330 ug/kg	--	--	--	--	--	--	--	--	--
Isophorone	330 ug/kg	--	--	--	--	--	--	--	--	--
Naphthalene	330 ug/kg	--	--	--	--	--	--	--	--	--
Nitrobenzene	330 ug/kg	--	--	--	--	--	--	--	--	--
N-Nitrosodimethylamine	330 ug/kg	--	--	--	--	--	--	--	--	--

Footnotes: -- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List l DET.LIM.	List m DET.LIM.	List n DET.LIM.	List o DET.LIM.	List p DET.LIM.	List q DET.LIM.	List r DET.LIM.	List s DET.LIM.	List w DET. LIM.
Priority Pollutant										
N-Nitrosodi-n-propylamine	330 ug/kg	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	330 ug/kg	--	--	--	--	--	--	--	--	--
Phenanthrene	330 ug/kg	--	--	--	--	--	--	--	--	--
Pyrene	330 ug/kg	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	330 ug/kg	--	--	--	--	--	--	--	--	--
Aniline	330 ug/kg	--	--	--	--	--	--	--	--	--
Benzyl Alcohol	660 ug/kg	--	--	--	--	--	--	--	--	--
4-Chloroaniline	660 ug/kg	--	--	--	--	--	--	--	--	--
Dibenzofuran	330 ug/kg	--	--	--	--	--	--	--	--	--
2-Methylnapthalene	330 ug/kg	--	--	--	--	--	--	--	--	--
2-Nitroaniline	1600 ug/kg	--	--	--	--	--	--	--	--	--
3-Nitroaniline	1600 ug/kg	--	--	--	--	--	--	--	--	--
4-Nitroaniline	1600 ug/kg	--	--	--	--	--	--	--	--	--

Footnotes: -- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List a DET.LIM.	List b DET.LIM.	List c DET.LIM.	List d DET.LIM.	List e DET.LIM.	List f DET.LIM.	List g DET.LIM.	List h DET.LIM.	List i DET.LIM.	List j DET.LIM.	List k DET.LIM.
Priority Pollutant Semi-Volatile compounds:	acids											
2-Chlorophenol	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2-Methyl-4,6-dinitrophenol	1600 ug/kg	16000	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	1600 ug/kg	16000	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	1600 ug/kg	16000	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	660 ug/kg	6600	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	1600 ug/kg	16000	--	--	--	--	--	--	--	--	--	--
Phenol	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Benzoic Acid	1600 ug/kg	16000	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	330 ug/kg	3300	--	--	--	--	--	--	--	--	--	--
Method 8080 Pesticides												
Aldrin	1.3 ug/kg	--	26	260	2.6	--	--	--	1.3	0.13	ND	0.004
Alpha-BHC	0.99 ug/kg	--	20	200	2	--	--	--	0.99	0.099	ND	0.003
Beta-BHC	2 ug/kg	--	40	400	4	--	--	--	2	0.2	ND	0.006
Delta-BHC	3 ug/kg	--	60	600	6	--	--	--	3	0.3	ND	0.009
Gamma-BHC	1.3 ug/kg	--	26	260	2.6	--	--	--	1.3	0.13	0.13	0.004
Chlordane	4.6 ug/kg	--	92	920	9.2	--	--	--	4.6	0.46	0.46	0.014
4,4'-DDD	3.6 ug/kg	--	72	720	7.2	--	--	--	3.6	0.36	0.36	0.011
4,4'-DDE	1.3 ug/kg	--	26	260	2.6	--	--	--	1.3	0.13	0.13	0.004
4,4'-DDT	4 ug/kg	--	80	800	8	--	--	--	4	0.4	0.4	0.012
Dieldrin	0.66 ug/kg	--	13	130	1.3	--	--	--	0.66	0.066	0.066	0.002
Endosulfan I	4.6 ug/kg	--	92	920	9.2	--	--	--	4.6	0.46	0.46	0.014
Endosulfan II	1.3 ug/kg	--	26	260	2.6	--	--	--	1.3	0.13	0.13	0.004
Endosulfan Sulfate	22 ug/kg	--	440	4400	44	--	--	--	22	2.2	2.2	0.066
Endrin	2 ug/kg	--	40	40	4	--	--	--	2	0.2	0.2	0.006
Endrin Aldehyde	-- ug/kg	--	--	--	--	--	--	--	--	--	--	--
Heptachlor	0.99 ug/kg	--	20	200	2	--	--	--	0.99	0.099	0.099	0.003
Heptachlor Epoxide	27 ug/kg	--	540	5400	54	--	--	--	27	2.7	2.7	0.083
Toxaphene	79 ug/kg	--	1600	16000	160	--	--	--	79	7.9	7.9	0.24

Footnotes: -- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List l DET.LIM.	List m DET.LIM.	List n DET.LIM.	List o DET.LIM.	List p DET.LIM.	List q DET.LIM.	List r DET.LIM.	List s DET.LIM.	List w DET. LIM.
Priority Pollutant Semi-Volatile compounds:	acids									
2-Chlorophenol	330 ug/kg	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	330 ug/kg	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	330 ug/kg	--	--	--	--	--	--	--	--	--
2-Methyl-4,6-dinitrophenol	1600 ug/kg	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	1600 ug/kg	--	--	--	--	--	--	--	--	--
2-Nitrophenol	330 ug/kg	--	--	--	--	--	--	--	--	--
4-Nitrophenol	1600 ug/kg	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	660 ug/kg	--	--	--	--	--	--	--	--	--
Pentachlorophenol	1600 ug/kg	--	--	--	--	--	--	--	--	--
Phenol	330 ug/kg	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	330 ug/kg	--	--	--	--	--	--	--	--	--
Benzoic Acid	1600 ug/kg	--	--	--	--	--	--	--	--	--
2-Methylphenol	330 ug/kg	--	--	--	--	--	--	--	--	--
4-Methylphenol	330 ug/kg	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	330 ug/kg	--	--	--	--	--	--	--	--	--
Method 8080 Pesticides										
Aldrin	1.3 ug/kg	0.04	0.13	260	--	--	2.6	0.004	--	0.130
Alpha-BHC	0.99 ug/kg	0.03	0.1	200	--	--	2	0.003	--	0.099
Beta-BHC	2 ug/kg	0.06	0.2	400	--	--	4	0.006	--	0.200
Delta-BHC	3 ug/kg	0.09	0.3	600	--	--	6	0.009	--	0.300
Gamma-BHC	1.3 ug/kg	0.04	0.13	260	--	--	2.6	0.004	--	0.130
Chlordane	4.6 ug/kg	0.14	0.46	92	--	--	9.2	0.014	--	0.460
4,4'-DDD	3.6 ug/kg	0.11	0.36	72	--	--	7.2	0.011	--	0.360
4,4'-DDE	1.3 ug/kg	0.04	0.13	26	--	--	2.6	0.004	--	0.130
4,4'-DDT	4 ug/kg	0.12	0.4	80	--	--	8	0.012	--	0.400
Dieldrin	0.66 ug/kg	0.02	0.07	13	--	--	1.3	0.002	--	0.066
Endosulfan I	4.6 ug/kg	0.14	0.46	92	--	--	9.2	0.014	--	0.460
Endosulfan II	1.3 ug/kg	0.04	0.13	26	--	--	2.6	0.004	--	0.130
Endosulfan Sulfate	22 ug/kg	0.66	2.2	440	--	--	44	0.066	--	2.200
Endrin	2 ug/kg	0.06	0.2	40	--	--	4	0.006	--	0.200
Endrin Aldehyde	-- ug/kg	--	--	--	--	--	--	0.023	--	0.760
Heptachlor	0.99 ug/kg	0.03	0.76	200	--	--	2	0.003	--	0.099
Heptachlor Epoxide	27 ug/kg	0.83	0.1	5400	--	--	54	0.083	--	2.700
Toxaphene	79 ug/kg	2.4	5.8	1600	--	--	160	0.24	--	7.900

Footnotes: -- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List a DET.LIM.	List b DET.LIM.	List c DET.LIM.	List d DET.LIM.	List e DET.LIM.	List f DET.LIM.	List g DET.LIM.	List h DET.LIM.	List i DET.LIM.	List j DET.LIM.	List k DET.LIM.
Priority Pollutant PCB Analysis												
PCB-1016	33 ug/kg	--	660	6600	66	--	--	--	33	3.3	3.3	0.1
PCB-1221	130 ug/kg	--	2600	26000	260	--	--	--	130	13	13	0.4
PCB-1232	99 ug/kg	--	2000	20000	200	--	--	--	99	9.9	9.9	0.3
PCB-1242	66 ug/kg	--	1300	13000	130	--	--	--	66	6.6	6.6	0.2
PCB-1248	66 ug/kg	--	1300	13000	130	--	--	--	66	6.6	6.6	0.2
PCB-1254	66 ug/kg	--	1300	13000	130	--	--	--	66	6.6	6.6	0.2
PCB-1260	66 ug/kg	--	1300	13000	130	--	--	--	66	6.6	6.6	0.2
Metals Analysis, total												
Antimony	10 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Arsenic	1 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.5 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Chromium	5 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Copper	2.5 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Lead	10 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Mercury	20 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Nickel	4 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Selenium	1 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Silver	5 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Thallium	10 ug/kg	--	--	--	--	--	--	--	--	--	--	--
Zinc	2 ug/kg	--	--	--	--	--	--	--	--	--	--	--

Footnotes: -- not tested

TABLE G-3. RANGB DETECTION LIMIT FOOTNOTE VARIATIONS

RICKENBACKER ANGB APPENDIX LISTINGS: RANGB DATA	STANDARD DET. LIMIT	List l DET.LIM.	List m DET.LIM.	List n DET.LIM.	List o DET.LIM.	List p DET.LIM.	List q DET.LIM.	List r DET.LIM.	List s DET.LIM.	List w DET. LIM.
Priority Pollutant PCB Analysis										
PCB-1016	33 ug/kg	1	7.9	6600	--	0.1	66	0.1	66	3.300
PCB-1221	130 ug/kg	4	3.3	26000	--	0.4	260	0.4	260	13.000
PCB-1232	99 ug/kg	3	13	20000	--	0.3	200	0.3	200	9.900
PCB-1242	66 ug/kg	2	9.9	13000	--	0.2	130	0.2	130	6.600
PCB-1248	66 ug/kg	2	6.6	13000	--	0.2	130	0.2	130	6.600
PCB-1254	66 ug/kg	2	6.6	1300	--	0.2	130	0.2	130	6.600
PCB-1260	66 ug/kg	2	6.6	1300	--	0.2	130	0.2	130	6.600
Metals Analysis, total										
Antimony	10 ug/kg	--	--	--	--	--	--	--	--	--
Arsenic	1 ug/kg	--	--	--	--	--	--	--	--	--
Beryllium	0.5 ug/kg	--	--	--	--	--	--	--	--	--
Cadmium	1 ug/kg	--	--	--	--	--	--	--	--	--
Chromium	5 ug/kg	--	--	--	--	--	--	--	--	--
Copper	2.5 ug/kg	--	--	--	--	--	--	--	--	--
Lead	10 ug/kg	--	--	--	--	--	--	--	--	--
Mercury	20 ug/kg	--	--	--	--	--	--	--	--	--
Nickel	4 ug/kg	--	--	--	--	--	--	--	--	--
Selenium	1 ug/kg	--	--	--	--	--	--	--	--	--
Silver	5 ug/kg	--	--	--	--	--	--	--	--	--
Thallium	10 ug/kg	--	--	--	--	--	--	--	--	--
Zinc	2 ug/kg	--	--	--	--	--	--	--	--	--

Footnotes: -- not tested

APPENDIX H

LABORATORY QUALITY ASSURANCE REPORT

APPENDIX H

LABORATORY QUALITY ASSURANCE REPORT

This appendix presents a summary and review of quality assurance and quality control results for the laboratory analysis of water, soil and sediment samples collected from the Hazardous Waste Storage Area at Rickenbacker Air National Guard Base (RANGB) in Columbus, Ohio. This investigation was part of the Site Inspection during the period of June to August, 1988.

The analytical results of the environmental, duplicate and blank samples were evaluated to assess the completeness, representativeness, precision and accuracy of the data.

The completeness of the results was determined by the number of requested analyses completed within the appropriate holding times. This information is described in Table H-1 for soil samples and Table H-2 for ground water samples.

Representativeness was evaluated from the analytical results of the trip blanks, field blanks, rinseate blanks, method blanks and field duplicate samples. Analytical results of the blanks, except for the method blanks, are summarized in Table H-3. Comparison of the analytical results from duplicate samples are summarized in Table H-4 for soils and Table H-5 for water. The method blank summaries are included for each method after the tables.

Precision and accuracy were evaluated by reviewing the laboratory matrix spike sample (MS), matrix spike duplicate sample (MSD) and the surrogate spike sample. This information is shown in the Quality Control Results Summary sheets after the tables. Also included are the Case Narratives which discuss specific QC problems.

Tables H-6 and H-7 list all the soil and water samples collected at the Hazardous Waste Storage Area with their laboratory identification number for utilizing the laboratory Quality Control Results Summary sheets.

H.1 COMPLETENESS

The completeness of the data is the percentage of analyses which are judged to be valid and is determined by calculating the number of invalid analyses. The total number of invalid analyses included those analyses which were not performed by the lab and those analyses which were completed after the holding time had expired or were considered invalid for some other reasons.

Tables H-1 and H-2 summarize this information for soils and water samples, respectively. The sample ID's, date of sampling, date of extraction (if applicable) and date of analyses are indicated. The number of days elapsed from sampling to analysis and if appropriate to extraction, are shown for each analytical procedure. Analyses which exceed the holding times are marked with a dollar sign ($). Analyses which were requested and not performed are indicated with a pound sign (#).

The total number of analyses requested was 228. Two analyses were requested and not performed and three were performed out of holding time. No analyses were considered invalid for other reasons. These 5 incomplete analyses represent only two percent of the total number of analyses requested. It is felt that 98 percent completeness is acceptable.

H.2 REPRESENTATIVENESS

Representativeness expresses the degree to which sample data represents the characteristics of a population. Therefore, the level of representativeness of the data is often determined by the methodology of the field sampling program. The methods used for the sampling of the soil and groundwater at the HWSA are described in Section 5 of the text. The sampling protocol was followed to insure a high level of sample representativeness.

Field Blanks

A field blank is a sample of the deionized organic-free water used for decontamination. It is placed directly from the source bottle into an appropriate sample container. One field blank was associated with the sampling at the

Hazardous Waste Storage Area. No volatile organics were found in this sample. The field blank data is presented in Table H-3.

Trip Blanks

A trip blank consisted of deionized organic-free water in 40 ml vials filled by the laboratory for purposes of traveling with a cooler of samples back to the lab. The trip blanks were only analyzed for volatile organics. Three out of the four trip blanks showed no detectable volatile organics. The trip blank from 10 August 1988 showed detectable levels of methylene chloride and acetone, both common lab contaminants. Both of these compounds were detected at comparable levels in the associated method blanks. Therefore, the contaminants were not introduced during the shipping process. The trip blank data is presented in Table H-3.

Rinseate Blanks

Rinseate blanks consisted of deionized organic-free water poured through the decontaminated bailer or split-spoon into sample bottles. The only volatile organics found in the three rinseate blanks were methylene chloride and chloroform, both common laboratory contaminants. These were found at low concentrations and one of them was also detected in the method blank. Therefore, their presence is most likely not caused by incomplete equipment decontamination. No other compounds (pesticides/PCBs, semi-volatile organics or metals) were found in the rinseate blanks. The rinseate blank data is presented in Table H-3.

Method Blanks

Method blanks are aliquots of analyte-free water analyzed with a sample batch to identify contaminants introduced by the preparation or analysis procedure. Method Blank Summary sheets are included after the tables. If a compound found in an environmental sample is also found in the corresponding method blank, then the result is flagged or footnoted in the results table (Appendix G). For common lab contaminants, a footnote "U" indicates the analyte is less than ten times the concentration in the blank and therefore should be regarded as not detected. For

compounds which are not common lab contaminants, the factor used is five. A footnote "A" indicates that the analyte concentration is greater than allowed by the factor and may be actually present in the environmental sample. The method blank information sent by the lab is presented after the text of Appendix H.

Duplicate Samples

Tables H-4 and H-5 summarize the analytical results of the soil and water duplicate samples. The tables only list those compounds that were detected at the site. The relative percent difference (RPD) is calculated for each compound that was detected in a given duplicate set.

For soil samples, compounds detected in the sample are usually also detected in the duplicate sample. For some of the samples, the RPD was somewhat large for the volatile and semi-volatile organics. However, this usually happens when the analyte is present at a concentration less than five times the detection limit or the analyte found is a common laboratory contaminant. The metal results for the soil duplicate samples generally correspond well. The metals that were detected in the sample were usually also detected in the duplicate. Given the heterogeneous nature of soil and the volatility of the organic compounds, the data for soil samples should be considered representative.

One water sample was duplicated from the Hazardous Waste Storage Area. Two organic (acetone and benzene) compounds were found and neither could be confirmed by the duplicate sample because the volatiles were analyzed out of holding time and therefore considered estimated. Acetone was also found in the method blank so its presence is not significant.

The duplicate water results for the total metals were in agreement. The same metals were present in both samples at comparable concentrations. The analytical results for the ground water samples should be considered representative except for the benzene example noted above.

H.3 PRECISION AND ACCURACY

Precision and accuracy are assessed from the results obtained from the analysis of matrix spike and matrix spike duplicate samples.

Precision

Precision refers to the relative percent difference (RPD) in values obtained from two duplicate samples, in this case matrix spike duplicate samples. RPD is calculated as follows:

$$\text{Relative Percentage Difference (RPD)} = \frac{2\,(C_1 - C_2) \times 100}{C_1 + C_2}$$

where:

C1, C2 = The two values obtained by analyzing duplicate samples.

Acceptable levels of precision vary according to the sample matrix, the specific analytical method, and the analytical concentration relative to the method detection limit.

The precision obtained for metals analyses was evaluated based upon a control limit of 20 RPD for values greater than 5 times the detection limit. A control limit of 2 times the detection limit was used for values less than 5 times the detection limit. If either value was less than the detection limit, an RPD was not calculated.

The precision of the analyses of volatile halogenated compounds and volatile aromatic compounds was evaluated on the basis of the RPD calculated for quantitation on a single chromatograph column. The EPA methods for these analyses provide statistical precision data as a function of concentration for individual compounds. These values are used as a guideline to assess the precision of duplicate analyses.

Accuracy

Accuracy refers to the correctness of the value obtained from analysis of a sample, and is determined by analyzing a given sample and its corresponding matrix spike sample. Accuracy is expressed as percentage recovery (PR) and is calculated using the following formula.

$$\text{Percentage Recovery (PR)} = \frac{S_S - S_O}{S} \times 100$$

value:

S_O = Background value, the value obtained by analyzing the sample before spiking;

S = Concentration corresponding to the spike addition to the sample; and

S_S = Value obtained by analyzing the matrix spike sample with the spike added.

The degree of accuracy, or percentage recovery (PR), to be expected is dependent upon the sample matrix, specific analytical method, and the concentration of the analyte relative to its detection limit. The closer the measured value is to the detection limit, the lower the accuracy of analysis. Metals and other inorganic water quality parameters are normally determined within the range of 70 to 125 percent or as specified by ES Laboratory Control Charts.

The procedures for spike samples to be analyzed by gas chromotography Methods 8010, 8020, 8240, 8270 and 8150 are described in each respective method. The expected range for recoveries of each compound are also provided in the method descriptions.

The Laboratory Quality Control Results Summary sheets for each analytical test performed are included after the tables.

If quality control results demonstrated an out of control situation for the spiked sample or spiked duplicate sample, a corrective action was taken. This may have included checking the calculations, flagging data in accordance with the procedures

prescribed for the method, recalibration of the instrument, and/or re-analyses of the samples.

Semi-volatile organic analysis of spiked samples resulted in some high recoveries. Since the spiked blank samples were within an acceptable range, data associated with these batches were still considered usable, but flagged as estimated (J). Since the recoveries are generally high, the flagged analytical results should be considered biased high. If spiked blank recoveries were out of range but the spiked sample recoveries were within range, no furhter action was taken (eg., 1,2,4-trichlorobenzene for QC Report No. BNA-S-0032-88B).

QC Report No. BNA-S-0032-88B shows very poor, spiked blank recoveries. The Case Narrative associated with this report concludes that the lab does not feel the quality of the data are affected. Since the only sample associated with this report (RB-1-MW2-SW1) does not show any detected semi-volatile organics, no further action is necessary.

Analytical results of environmental samples marked with the following footnotes should be regarded as approximate:

N - Spike sample recovery not within control limits.

* - Duplicate analysis not within control limits.

W - Post digestion spike for Furnace AA analysis out of control limits (85-115 percent).

The abundance of the footnote "N" in the metal analytical results indicates that there may be a laboratory control problem for some of the metals.

TABLE H-1. SOIL ANALYSIS COMPLETENESS

HAZARDOUS WASTE STORAGE AREA

SAMPLE LOCATION AND ID	DATE SAMPLED	VOLATILE ORGANICS SW 8010/8020		VOLATILE ORGANICS SW 8240		PESTICIDES/ PCB'S SW 8080				HERBICIDES SW 8150			
		DATE ANALYZED (14 DAYS)	# OF DAYS	DATE ANALYZED (14 DAYS)	# OF DAYS	DATE EXTRACTED (14 DAYS)	# OF DAYS	DATE ANALYZED (40 DAYS)	# OF DAYS	DATE EXTRACTED (14 DAYS)	# OF DAYS	DATE ANALYZED (40 DAYS)	# OF DAYS
SITE 1. HAZARDOUS WASTE STORAGE AREA													
RB-1-SU1+2-GS1	14-Jun-88	--	--	--	--	17-Jun-88	3	30-Jun-88	13	22-Jun-88	8	30-Jun-88	8
RB-1-SU3+4-GS1	14-Jun-88	--	--	--	--	17-Jun-88	3	30-Jun-88	13	22-Jun-88	8	30-Jun-88	8
RB-1-SU5+6-GS1	14-Jun-88	--	--	--	--	17-Jun-88	3	30-Jun-88	13	22-Jun-88	8	30-Jun-88	8
RB-1-SU7+8-GS1	14-Jun-88	--	--	--	--	17-Jun-88	3	30-Jun-88	13	22-Jun-88	8	30-Jun-88	8
RB-1-SU9+10-GS1	14-Jun-88	--	--	--	--	17-Jun-88	3	30-Jun-88	13	22-Jun-88	8	30-Jun-88	8
RB-1-SU11+12-GS1	14-Jun-88	--	--	--	--	17-Jun-88	3	30-Jun-88	13	22-Jun-88	8	30-Jun-88	8
RB-1-SU13+14-GS1	14-Jun-88	--	--	--	--	17-Jun-88	3	30-Jun-88	13	22-Jun-88	8	30-Jun-88	8
RB-1-SU15+16-GS1	14-Jun-88	--	--	--	--	17-Jun-88	3	30-Jun-88	13	22-Jun-88	8	30-Jun-88	8
RB-1-SU17+18-GS1	14-Jun-88	--	--	--	--	17-Jun-88	3	30-Jun-88	13	22-Jun-88	8	30-Jun-88	8
RB-1-HB1-SS1	14-Jun-88	--	--	27-Jun-88	13	17-Jun-88	3	30-Jun-88	13	--	--	--	--
RB-1-HB1-SS2	14-Jun-88	--	--	27-Jun-88	13	17-Jun-88	3	30-Jun-88	13	--	--	--	--
RB-1-HB1-SS3	14-Jun-88	--	--	27-Jun-88	13	17-Jun-88	3	30-Jun-88	13	--	--	--	--
RB-1-HB2+3-SS1	14-Jun-88	--	--	28-Jun-88	14	17-Jun-88	3	30-Jun-88	13	--	--	--	--
RB-1-HB2-SS2	14-Jun-88	--	--	28-Jun-88	14	17-Jun-88	3	30-Jun-88	13	--	--	--	--
RB-1-HB2-SS3	14-Jun-88	--	--	28-Jun-88	14	17-Jun-88	3	30-Jun-88	13	--	--	--	--
RB-1-HB4-SS1	06-Jul-88	--	--	11-Jul-88	5	07-Jul-88	1	14-Jul-88	7	--	--	--	--
RB-1-HB4-SS2	06-Jul-88	--	--	11-Jul-88	5	07-Jul-88	1	14-Jul-88	7	--	--	--	--
RB-1-HB4-SS3	06-Jul-88	--	--	11-Jul-88	5	07-Jul-88	1	14-Jul-88	7	--	--	--	--
RB-1-HB5-SS1	06-Jul-88	--	--	11-Jul-88	5	07-Jul-88	1	14-Jul-88	7	--	--	--	--
RB-1-HB6-SS1	06-Jul-88	--	--	12-Jul-88	6	07-Jul-88	1	14-Jul-88	7	--	--	--	--
RB-1-HB6-SS2	06-Jul-88	--	--	12-Jul-88	6	07-Jul-88	1	14-Jul-88	7	--	--	--	--
RB-1-HB6-SS3	06-Jul-88	--	--	12-Jul-88	6	07-Jul-88	1	14-Jul-88	7	--	--	--	--
RB-1-MW1-SS1	20-Jul-88	--	--	22-Jul-88	2	22-Jul-88	2	04-Aug-88	13	--	--	--	--
RB-1-MW1-SS2	20-Jul-88	--	--	22-Jul-88	2	22-Jul-88	2	04-Aug-88	13	--	--	--	--
RB-1-MW2-SS1	29-Jul-88	--	--	04-Aug-88	6	04-Aug-88	6	17-Aug-88	13	--	--	--	--
RB-1-MW2-SS2	29-Jul-88	--	--	04-Aug-88	6	04-Aug-88	6	17-Aug-88	13	--	--	--	--
RB-1-MW2-SS3	29-Jul-88	--	--	04-Aug-88	6	04-Aug-88	6	17-Aug-88	13	--	--	--	--
RB-1-MW3-SS1	10-Aug-88	--	--	#	--	23-Aug-88	13	10-Sep-88	18	--	--	--	--
RB-1-MW3-SS2	10-Aug-88	--	--	#	--	23-Aug-88	13	10-Sep-88	18	--	--	--	--

NOTE: $--RESULTS WERE RECEIVED BUT MERCURY HOLDING TIMES WERE EXCEEDED
#--ANALYSIS WAS REQUESTED BUT NOT PERFORMED

TABLE H-1. SOIL ANALYSIS COMPLETENESS

HAZARDOUS WASTE STORAGE AREA

SAMPLE LOCATION AND ID	SEMI-VOLATILE ORGANICS SW 8270				PETROLEUM HYDROCARBONS EPA 418.1		PRIORITY POLLUTANT METALS SW METHODS	
	DATE EXTRACTED (14 DAYS)	# OF DAYS	DATE ANALYZED (40 DAYS)	# OF DAYS	DATE ANALYZED (28 DAYS)	# OF DAYS	DATE(1) ANALYZED (6 MONTHS)	# OF DAYS
SITE 1. HAZARDOUS WASTE STORAGE AREA								
RB-1-SU1+2-GS1	17-Jun-88	3	24-Jun-88	7	--	--	10-Aug-88	57
RB-1-SU3+4-GS1	17-Jun-88	3	24-Jun-88	7	--	--	10-Aug-88	57
RB-1-SU5+6-GS1	17-Jun-88	3	27-Jun-88	10	--	--	10-Aug-88	57
RB-1-SU7+8-GS1	17-Jun-88	3	24-Jun-88	7	--	--	10-Aug-88	57
RB-1-SU9+10-GS1	17-Jun-88	3	24-Jun-88	7	--	--	10-Aug-88	57
RB-1-SU11+12-GS1	17-Jun-88	3	24-Jun-88	7	--	--	10-Aug-88	57
RB-1-SU13+14-GS1	17-Jun-88	3	24-Jun-88	7	--	--	10-Aug-88	57
RB-1-SU15+16-GS1	17-Jun-88	3	24-Jun-88	7	--	--	10-Aug-88	57
RB-1-SU17+18-GS1	17-Jun-88	3	24-Jun-88	7	--	--	10-Aug-88	57
RB-1-HB1-SS1	17-Jun-88	3	27-Jun-88	10	--	--	10-Aug-88	57
RB-1-HB1-SS2	17-Jun-88	3	27-Jun-88	10	--	--	10-Aug-88	57
RB-1-HB1-SS3	17-Jun-88	3	27-Jun-88	10	--	--	10-Aug-88	57
RB-1-HB2+3-SS1	17-Jun-88	3	29-Jun-88	12	--	--	10-Aug-88	57
RB-1-HB2-SS2	17-Jun-88	3	29-Jun-88	12	--	--	10-Aug-88	57
RB-1-HB2-SS3	17-Jun-88	3	27-Jun-88	10	--	--	10-Aug-88	57
RB-1-HB4-SS1	08-Jul-88	2	26-Jul-88	18	--	--	27-Jul-88	21
RB-1-HB4-SS2	08-Jul-88	2	26-Jul-88	18	--	--	27-Jul-88	21
RB-1-HB4-SS3	08-Jul-88	2	26-Jul-88	18	--	--	27-Jul-88	21
RB-1-HB5-SS1	08-Jul-88	2	26-Jul-88	18	--	--	27-Jul-88	21
RB-1-HB6-SS1	08-Jul-88	2	26-Jul-88	18	--	--	27-Jul-88	21
RB-1-HB6-SS2	08-Jul-88	2	26-Jul-88	18	--	--	27-Jul-88	21
RB-1-HB6-SS3	08-Jul-88	2	26-Jul-88	18	--	--	27-Jul-88	21
RB-1-MW1-SS1	22-Jul-88	2	04-Aug-88	13	--	--	12-Sep-88	54
RB-1-MW1-SS2	22-Jul-88	2	04-Aug-88	13	--	--	12-Sep-88	54
RB-1-MW2-SS1	02-Aug-88	4	05-Aug-88	3	--	--	18-Aug-88	20
RB-1-MW2-SS2	02-Aug-88	4	05-Aug-88	3	--	--	18-Aug-88	20
RB-1-MW2-SS3	02-Aug-88	4	05-Aug-88	3	--	--	18-Aug-88	20
RB-1-MW3-SS1	22-Aug-88	12	28-Sep-88	37	--	--	16-Dec-88	128 $
RB-1-MW3-SS2	22-Aug-88	12	28-Sep-88	37	--	--	16-Dec-88	128 $

NOTE: $--RESULTS WERE RECEIVED BUT MERCURY HOLDING TIMES WERE EXCEEDED
#--ANALYSIS WAS REQUESTED BUT NOT PERFORMED

TABLE H-2. WATER ANALYSIS COMPLETENESS

HAZARDOUS WASTE STORAGE AREA

SAMPLE LOCATION AND ID	DATE SAMPLED	VOLATILE ORGANICS SW 8010/8020		VOLATILE ORGANICS SW 8240		PESTICIDES/ PCB'S SW 8080				HERBICIDES SW 8150			
		DATE ANALYZED (14 DAYS)	# OF DAYS	DATE ANALYZED (14 DAYS)	# OF DAYS	DATE EXTRACTED (14 DAYS)	# OF DAYS	DATE ANALYZED (40 DAYS)	# OF DAYS	DATE EXTRACTED (14 DAYS)	# OF DAYS	DATE ANALYZED (40 DAYS)	# OF DAYS
SITE 1. HAZARDOUS WASTE STORAGE AREA													
RB-1-MW2-SW1	29-Jul-88	--	--	02-Aug-88	4	05-Aug-88	7	18-Aug-88	13	--	--	--	--
RB-1-MW1-GW1	19-Sep-88	--	--	03-Oct-88	14	26-Sep-88	7	11-Oct-88	15	--	--	--	--
RB-1-MW1-SW1	19-Sep-88	--	--	03-Oct-88	14	26-Sep-88	7	11-Oct-88	15	--	--	--	--
RB-1-MW2-GW1	19-Sep-88	--	--	03-Oct-88	14	26-Sep-88	7	11-Oct-88	15	--	--	--	--
RB-30-MW1-GW1	19-Sep-88	--	--	14-Nov-88	56 $	26-Sep-88	7	11-Oct-88	15	--	--	--	--
RB-1-MW3-GW1	22-Sep-88	--	--	05-Oct-88	13	29-Sep-88	7	12-Oct-88	13	--	--	--	--
RB-1-MW3-GW2	17-Oct-88	--	--	--	--	19-Oct-88	2	27-Oct-88	8	--	--	--	--
RB-1-MW3-SW1	17-Oct-88	--	--	18-Oct-88	1	19-Oct-88	2	27-Oct-88	8	--	--	--	--

NOTE: $--RESULTS WERE RECEIVED BUT HOLDING TIMES WERE EXCEEDED

TABLE H-2. WATER ANALYSIS COMPLETENESS

HAZARDOUS WASTE STORAGE AREA

SAMPLE LOCATION AND ID	SEMI-VOLATILE ORGANICS SW 8270				PETROLEUM HYDROCARBONS EPA 418.1		PRIORITY POLLUTANT METALS SW METHODS		SULFATES	
	DATE EXTRACTED (14 DAYS)	# OF DAYS	DATE ANALYZED (40 DAYS)	# OF DAYS	DATE ANALYZED (28 DAYS)	# OF DAYS	DATE(1) ANALYZED (6 MONTHS)	# OF DAYS	DATE ANALYZED	# OF DAYS
SITE 1. HAZARDOUS WASTE STORAGE AREA										
RB-1-MW2-SW1	04-Aug-88	6	13-Sep-88	40	--	--	19-Aug-88	21	--	--
RB-1-MW1-GW1	26-Sep-88	7	04-Nov-88	39	--	--	08-Dec-88	80	--	--
RB-1-MW1-SW1	26-Sep-88	7	03-Nov-88	38	--	--	08-Dec-88	80	--	--
RB-1-MW2-GW1	26-Sep-88	7	03-Nov-88	38	--	--	08-Dec-88	80	--	--
RB-30-MW1-GW1	26-Sep-88	7	04-Nov-88	39	--	--	08-Dec-88	80	--	--
RB-1-MW3-GW1	29-Sep-88	7	07-Nov-88	39	--	--	08-Dec-88	77	--	--
RB-1-MW3-GW2	19-Oct-88	2	22-Nov-88	34	--	--	--	--	--	--
RB-1-MW3-SW1	20-Oct-88	3	22-Nov-88	33	--	--	--	--	--	--

NOTE: $--RESULTS WERE RECEIVED BUT HOLDING TIMES WERE EXCEEDED

TABLE H-3. RANGB BLANK ANALYSIS

HAZARDOUS WASTE STORAGE AREA

SAMPLE ID/LOCATION	DATE SAMPLED	VOLATILE ORGANICS SW 8010/8020	VOLATILE ORGANICS SW 8240	PESTICIDES/ PCB'S SW 8080	HERBICIDES SW8150	SEMI-VOLATILE ORGANICS SW 8270	PETROLEUM HYDROCARBONS EPA 418.1	PRIORITY POLLUTANT METALS SW METHODS	SULFATES
** RINSEATE BLANKS **									
RB-01-MW1-SW1	19-Sep-88	--	ND	ND	--	ND	--	ND	--
RB-01-MW2-SW1	29-Jul-88	--	Methylene chloride (7 ug/L)U	ND	--	ND	--	ND	--
RB-01-MW3-SW1	17-Oct-88	--	Chloroform (7 ug/L)	ND	--	ND	--	--	--
FIELD BLANKS									
RB-10-17	17-Oct-88	--	(16 ug/L) ND	ND	--	ND	--	--	--
TRIP BLANKS									
TB8-10/1	10-Aug-88	--	(7 ug/L) Methylene chloride (6 ug/L)U Acetone (88 ug/L)U	--	--	--	--	--	--
TB9-19	19-Sep-88	--	ND	--	--	--	--	--	--
TB9-22	22-Sep-88	--	ND	--	--	--	--	--	--
TB10-17/8-16	17-Oct-88	--	ND	--	--	--	--	--	--

NOTE:

ND--not detected
U--analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected
-- not tested

TABLE H-4. SOIL DUPLICATES-EXTRACT LIST

HAZARDOUS WASTE STORAGE AREA

DUPLICATE SOIL SAMPLES	DET. LIMIT	RB1 MW2-SS1 29-Jul-88	RB1 MW2-SS2 29-Jul-88	RPD1	RB1 SU1+2-GS1 14-Jun-88	RB1 SU17+18-GS1 14-Jun-88	RPD2
Volatile Organics:							
Chloroform	5 ug/kg	ND	ND		--	--	
Methylene Chloride	5 ug/kg	ND	5	0.0	--	--	
Trichloroethylene	5 ug/kg	ND	ND		ND	ND	
Semi-Volatile Organics:							
Benzo(b)flouranthene	330 ug/kg	ND	ND		ND	760	78.9
Benzo(k)fluoranthene	330 ug/kg	ND	ND		560	ND	51.7
Butyl benzyl phthalate	330 ug/kg	ND	ND		ND	ND	
Di-n-butyl phthalate	330 ug/kg	2800 U	2600 U	7.4	ND	1400	123.7
Fluoranthene	330 ug/kg	ND	ND		420	630	40.0
Pyrene	330 ug/kg	ND	ND		ND	430	26.3
Metals, total:							
Arsenic	0.5 mg/kg	15 N	7.6 N	65.5	14.1	20.0	34.6
Beryllium	0.1 mg/kg	ND	0.2 B	66.7	0.79	0.78	1.3
Cadmium	1 mg/kg	ND	ND		6.3 G	7.9 G	22.5
Chromium	1 mg/kg	15	12	22.2	22.1	17.8	21.6
Copper	1 mg/kg	21	21	0.0	29.3	32.2	9.4
Lead	5 mg/kg	17	31	58.3	41.9	35.2	17.4
Nickel	1 mg/kg	25	21	17.4	28.2	26.9	4.7
Zinc	1 mg/kg	66 N	74 N	11.4	422	300	33.8
Petroleum Hydrocarbons	100 mg/KG	--	--		--	--	

Footnotes

B--reported value is less than the reporting limit but greater than the MDL
G=N*
N--spiked sample recovery not within control limits
ND--not detected
U--analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected

TABLE H-5. WATER DUPLICATES-EXTRACT LIST

HAZARDOUS WASTE STORAGE AREA

SITE DUPLICATES: WATER	DET.LIMIT	RB1 1-MW1-GW1 19-Sep-88	RB1 1-MW1-GW1 19-Sep-88	RPD1
Volatile Organics:				
Benzene	5 ug/L	94	--	
Methylene chloride	5 ug/L	ND	--	
Acetone	100 ug/L	120 U	--	
Semi-Volatile Organics:				
Bis(2-ethylhexyl)phthalat	10 ug/L	ND	ND	
2-Methylnapthalene	10 ug/L	ND	13	26.1
Pesticides and PCB's:				
Chlordane	40 ug/L	ND	ND	
4,4'-DDD	3 ug/L	ND	ND	
PCB-1260	40 ug/L	ND	ND	
Herbicides:				
2,4,5-TP	1 ug/L	--	ND	
Metals, total:				
Arsenic	0.01 mg/L	0.34	0.40	16.2
Cadmium	0.01 mg/L	0.15	0.18	18.2
Chromium	0.05 mg/L	0.52	0.66	23.7
Copper	0.025 mg/L	0.88	1.1	22.2
Lead	0.02 mg/L	0.82	0.99	18.8
Mercury	0.0002 mg/L	0.0003	0.0003	0.0
Nickel	0.04 mg/L	0.8	1.0	17.4
Zinc	0.02 mg/L	3.6	4.3	17.7
Miscellaneous Parameters:				
Petroleum Hydrocarbons	1 mg/L	--	--	
Sulfate	1.0 mg/L	--	--	
Alkalinity	20 mg/L	--	--	

Footnotes

ND--not detected
U--analyte is less than 10 times the concentration in the blank, therefore it should be regarded as not detected
-- not tested

TABLE H-6

SOIL SAMPLE IDENTIFICATION VERSUS LAB ID

HAZARDOUS WASTE STORAGE AREA

SB-1-SU1+2-GS1	88061106
RB-1-SU3+4-GS1	88061107
RB-1-SU5+6-GS1	88061108
RB-1-SU7+8-GS1	88061109
RB-1-SU9+10-GS1	88061110
RB-1-SU11+12-GS1	88061111
RB-1-SU13+14-GS1	88601112
RB-1-SU15+16-GS1	88061113
RB-1-SU17+18-GS1	88061120
RB-1-HB1-SS1	88061114
RB-1-HB1-SS2	88061115
RB-1-HB1-SS3	88061116
RB-1-HB2+3-SS1	88061117
RB-1-HB2-SS2	88061118
RB-1-HB2-SS3	88061119
RB-1-HB4-SS1	88071315
RB-1-HB4-SS2	88071316
RB-1-HB4-SS3	88071317
RB-1-HB5-SS1	88071318
RB-1-HB6-SS1	88071321
RB-1-HB6-SS2	88071319
RB-1-HB6-SS3	88071320
RB-1-MW1-SS1	88071460
RB-1-MW1-SS2	88071461
RB-1-MW2-SS1	88071556
RB-1-MW2-SS2	88071557
RB-1-MW2-SS3	88071558
RB-1-MW3-SS1	88081769
RB-1-MW3-SS2	88081770

TABLE H-7

WATER SAMPLE IDENTIFICATION VERSUS LAB ID
HAZARDOUS WASTE STORAGE AREA

RB-1-MW2-SW1	88081571
RB-1-MW1-GW1	88092537
RB-1-MW1-SW1	88092534
RB-1-MW2-GW1	88092535
RB-30-MW1-GW1	88092536
RB-1-MW3-GW1	88092643
RB-1-MW3-GW2	88102961
RB-1-MW3-SW1	88102957

CASE NARRATIVES

QUALITY CONTROL SUMMARIES
METHOD BLANK SUMMARIES
CHAIN-OF-CUSTODY

897DPC12/106

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO.: BNA-W-0026-88

Since insufficient sample was available for QC purposes, a blank was designated as the QC sample for this batch. A sufficient portion of the first base neutral extract of the MSD was spilled. Rather than restart the extraction, the technician continued with the procedure. This should not happen in the future. This caused low recoveries in the spike duplicate and high RPD's in the spiked sample set. Subsequent spiked blank sets (see QC Report BNA-W-0025-88) gave results that met EPA QC quidelines, with the exception of slightly low recoveries for acenaphthene. This should not affect the quality of the sample data.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Samples No.: 88061106-88061124
QC REPORT NO.: BNA-S-0018-88

The sample selected to be the matrix spike and matrix spike duplicate for method SW8270 contained large amounts of hydrocarbon. Even after dilution, the sample contained interferences that made spike data inaccurate. A spiked blank and duplicate were analyzed for this set of samples. The percent recoveries of all spiked compounds were within EPA recommended guidelines but three of the base neutral relative percent differences were above EPA recommended limits.

Samples 88061114-88061116 were analyzed as high level samples because of high concentrations of hydrocarbons. High level extracts of sample 88061117 were used as QC for these samples. The values reported for 88061117 are from a low level analysis of this sample.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO.: BNA-S-0032-88
QC REPORT NO.: BNA-S-0032-88B

Analysis of matrix spike samples for this batch resulted in recoveries of several compounds that were higher than EPA QC limits, and a high RPD for pentachlorophenol. Analysis of spiked blanks resulted in a slightly low recovery for 1,2,4-trichlorobenzene and high RPD's for both dichloro and trichlorobenzene. The analytical data for these analyses was closely examined and no problems were discovered.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Samples No.: 88061106-88061120
Samples No.: 88071315-88071333
WORK ORDER NO.: 696

The nature of the sample used for matrix spikes required it to be diluted for analysis. This brought the spiking levels of the matrix spiking compounds below the practical quantitation limit, making quantitation uncertain. Analysis of laboratory control samples showed the laboratory to be in control.

Endrin recovery from one of the spiked blanks is higher than ES Laboratory control limits.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Samples No.: 88061106-88061120
Samples No.: 88071315-88071333
WORK ORDER NO.: 730

The nature of the sample used for matrix spikes required it to be diluted for analysis. This brought the spiking levels of the matrix spiking compounds below the practical quantitation limit, making quantitation uncertain. Analysis of laboratory control samples showed the laboratory to be in control.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88081769-88081770
WORK ORDER NO.: 824

The samples listed above did not receive an analytical spike for the analyte thallium. This was due to an oversight by the analyst who prepared the samples. There was insufficient sample to repeat the digestion with the proper spike added.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88092533-88092538
WORK ORDER NO.: 1011

The samples listed above did not receive an analytical spike for the analyte thallium. This was due to an oversight by the analyst who prepared the samples. There was insufficient sample to repeat the digestion with the proper spike added.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88092642-88092643, 88092646
WORK ORDER NO.: 1032

The samples listed above did not receive an analytical spike for the analyte thallium. This was due to an oversight by the analyst who prepared the samples. There was insufficient sample to repeat the digestion with the proper spike added.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO.: AAF-W-0040-88

The Relative Percent Difference for arsenic is not calculated since the sample values are less than five times the reporting limit. Acceptable RPD in this case is defined as duplicate values within one detection limit of each other.

Lead QC for furnace is applicable only to sample no(s). 88092534, 88092556, 88092558,88092686, 88092692, 88092641-88092644, 88092650-88092651 and 88092646.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Samples No.: 88061115, 88061117, 88061119
QC REPORT NO.: ICP-S-0017-88

Spike recovery outside acceptable limits for this batch of samples prepared on August 5, 1988 is attributed to the spiking solution and procedure used and not to sample matrix interference. Analytical (post-digest) spikes performed at the time of the analysis resulted in acceptable levels of recovery, unless noted below:

Beryllium - Analytical spike recovery - 60%

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Samples No.: 88071458-88071461, 88071477-88071478
QC REPORT NO.: ICP-S-0019-88

Spike recovery for this batch of samples prepared on July 25, 1988 is attributed to the spiking solution and procedure used and not to sample matrix interference. Analytical (post-digest) spikes performed at the time of the analysis resulted in acceptable levels of recovery, unless noted below:

Silver - Analytical spike recovery - 64%

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO.: ICP-S-0041-88

The Relative Percent Difference for chromium is not calculated since the sample values are less than five times the reporting limit. Acceptable RPD in this case is defined as duplicate values within one detection limit of each other.

Lead QC by ICP is applicable only to sample no(s). 88081769, 88081770, 88081775-88081778, 88081780, 88081783, 88081891, 88081893-88081894 and 88081918-88081919.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Samples No.: 88071460-88071461, 88071477-88071478
QC REPORT NO.: OCP-S-0018-88

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up used on these samples.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Samples No.: 88081762-88081765
Samples No.: 88081769-88081770
QC REPORT NO.: OCP-S-0026-88

Gamma-BHC in the matrix spike duplicate sample for this batch was masked by an unknown interference. Thus, the percent recovery and relative percent difference could not be calculated for this compound in this QC set. Spiked blanks were analyzed and the results were within EPA quidelines.

Heptachlor epoxide was inadvertently used instead of heptachlor in the matrix spiking solution.

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up required by these samples.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8240
WORK ORDER NO.: 1011

The 8240 analysis of samples 88092538 and 88092539 were performed less than two hours after the expiration of holding time. The first analysis of sample 88092536 showed a quantity of benzene, xylene and ethyl benzene that was above the calibrated range. It was not analyzed again until about one month later, when another vial with the same label was analyzed. This analysis (performed three times) showed only a small amount of benzene and no detectable amounts of xylenes or ethylbenzene. Examination of the chromatograms and spectra indicate a hydrocarbon envelope. If there had been a lens on the surface of the first bottle, that would explain this phenomenon. Results of the second analyses are presented in this report.

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Sample No.: 88071571
QC REPORT NO.: OCP-W-0019-88

Insufficient sample was available for quality control purposes. The laboratory control sample is designated as a quality control sample for this batch.

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up used on these samples.

Heptachlor epoxide was accidently substituted for Heptachlor in the matrix spiking solution.

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8240

QC Report No: VOA-S-0016-88
Sample Matrix: Soil (High level)
Conc. Unit: ug/KG
Date Received 6-15-88
Date Prepared: NA
Date Analyzed: 6-28-88
Date Reported: 7-19-88
Dilution Factor: NA
% Moisture: 12

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061114-88061116

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
VOA	1,1-Dichloroethene	7100	ND	8280	117	7840	110	5	22	59-172
LAB	Trichlorethene	7100	ND	9120	128	8760	123	4	24	62-137
SAMPLE #	Chlorobenzene	7100	ND	8360	118	8380	118	<1	21	60-133
	Toluene	7100	ND	8110	114	8080	114	<1	21	59-139
88061117*	Benzene	7100	ND	9820	138	9570	135	3	21	66-142

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* = See Case Narrative attached

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8240

QC Report No: VOA-S-0015-88
Sample Matrix: Soil (Low level)
Conc. Unit: ug/KG
Date Received 6-15-88
Date Prepared: NA
Date Analyzed: 6-28-88
Date Reported: 7-19-88
Dilution Factor: NA
% Moisture: 14

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061117-88061119

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
VOA	1,1-Dichloroethene	58	ND	48.6	84	50.1	86	3	22	59-172
LAB	Trichlorethene	58	ND	53.1	92	56.8	98	7	24	62-137
SAMPLE #	Chlorobenzene	58	ND	53.2	92	56.4	97	6	21	60-133
	Toluene	58	ND	54.7	94	60.2	104	10	21	59-139
88061118	Benzene	58	ND	62.5	108	65.6	113	5	21	66-142

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8240
CORRECTED REPORT - 8-15-88

QC Report No: VOA-S-0019-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received 6-25-88
Date Prepared: NA
Date Analyzed: 7-08-88
Date Reported: 7-26-88
Dilution Factor: NA
% Moisture: 16

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061266-88061273
88071315-88071321

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
VOA	1,1-Dichloroethene	59.5	ND	51.2	86	47.7	80	7	22	59-172
LAB	Trichlorethene	59.5	ND	60.4	102	60.0	101	1	24	62-137
SAMPLE #	Chlorobenzene	59.5	ND	62.8	106	60.5	102	4	21	60-133
	Toluene	59.5	2.4	71.5	116	67.0	108	7	21	59-139
88061266	Benzene	59.5	ND	70.4	118	67.6	114	4	21	66-142

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8240

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061266-88061273, 88071315-88071321

QC Report No: VOA-S-0018-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received 6-25-88
Date Prepared: NA
Date Analyzed: 7-08-88
Date Reported: 7-26-88
Dilution Factor: NA
% Moisture: 16

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
VOA	1,1-Dichloroethene	59.5	ND	51.2	86	47.7	80	7	22	59-172
LAB	Trichlorethene	59.5	ND	60.4	102	60.0	101	1	24	62-137
SAMPLE #	Chlorobenzene	59.5	ND	62.8	106	60.5	102	4	21	60-133
	Toluene	59.5	2.4	71.5	116	67.0	108	7	21	59-139
88061266	Benzene	59.5	ND	70.4	118	67.6	114	4	21	66-142

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8240

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report No: VOA-S-0022-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received 8-04-88
Date Prepared: NA
Date Analyzed: 8-10-88
Date Reported: 8-17-88
Dilution Factor: NA
% Moisture: 21

QC Report for Laboratory Sample No(s):
88071506-88071507, 88071513--88071515, 88071556-88071558, 88081604-88081605, 88081607, 88081625--88081627 88081629-88081634

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
VOA LAB SAMPLE # 88081632	1,1-Dichloroethene	63.3	ND	56.8	90	48.8	77	15	22	59-172
	Trichlorethene	63.3	ND	46.4	73	55.3	87	18	24	62-137
	Chlorobenzene	63.3	ND	60.2	95	59.9	95	<1	21	60-133
	Toluene	63.3	ND	60.8	96	60.1	95	1	21	59-139
	Benzene	63.3	ND	52.3	83	63.7	101	20	21	66-142

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

88-A1-RICK0114 1

QC-FRM2S

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8240

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071460-88071461
~~88071506~~

QC Report No: VOA-S-0020-88
Sample Matrix: Soil (medium)
Conc. Unit: ug/KG
Date Received 7-21-88
Date Prepared: 7-27-88
Date Analyzed: 7-27-88
Date Reported: 8-10-88
Dilution Factor: NA
% Moisture: 10

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
VOA	1,1-Dichloroethene	*	ND	5590	81	2540	81	1	22	59-172
LAB	Trichlorethene	*	ND	7060	102	3300	106	4	24	62-137
SAMPLE #	Chlorobenzene	*	ND	7470	108	3520	113	5	21	60-133
88071460	Toluene	*	ND	7010	101	3520	113	11	21	59-139
	Benzene	*	550	8130	109	4320	121	17	21	66-142

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* = MS spiked with 6940 ug/Kg; MSD with 3120 ug/Kg.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 624/8240

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88092686, 88092689, 88092692-88092693
88092536, 88092357

QC Report No: VOA-W-0055-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 09-26-88
Date Prepared: NA
Date Analyzed: 11-11-88
Date Reported: 02-07-89
Dilution Factor: NA

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limits RPD	Recovery
VOA	1,1-Dichloroethene	50.0	ND	48.1	96	45.8	92	5	14	61-145
LAB	Trichlorethene	50.0	ND	44.7	89	42.8	86	4	14	71-120
SAMPLE #	Chlorobenzene	50.0	ND	44.8	90	44.5	89	1	13	75-130
	Toluene	50.0	ND	41.6	83	41.0	82	1	13	76-125
88092686	Benzene	50.0	ND	41.4	83	40.3	81	3	11	76-127

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 624/8240

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88092533-88092558
88092641-88092646

QC Report No: VOA-W-0051-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 10-06-88
Date Prepared: NA
Date Analyzed: 10-17-88
Date Reported: 12-21-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limits RPD	Recovery
VOA	1,1-Dichloroethene	50	ND	51.0	102	57.1	114	11	14	61-145
LAB	Trichlorethene	50	ND	41.6	83	43.9	88	5	14	71-120
SAMPLE #	Chlorobenzene	50	ND	47.1	94	49.6	99	5	13	75-130
A0075	Toluene	50	ND	44.4	89	48.0	96	8	13	76-125
88102881	Benzene	50	ND	41.2	82	46.2	92	11	11	76-127

The quality control sample for this batch is from a different project.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 624/8240

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071448-88071451
88071571

QC Report No: VOA-W-0027-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 7-30-88
Date Prepared: NA
Date Analyzed: 8-02-88
Date Reported: 9-16-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limits RPD	Recovery
VOA	1,1-Dichloroethene	50	ND	30.5	61	30.7	61	1	14	61-145
LAB	Trichlorethene	50	ND	39.3	79	41.4	83	5	14	71-120
SAMPLE #	Chlorobenzene	50	ND	47.9	96	45.7	91	5	13	75-130
	Toluene	50	ND	46.2	92	44.7	89	3	13	76-125
88071448	Benzene	50	ND	41.0	82	42.7	85	4	11	76-127

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 624/8240

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88092397-88092398, 88092415-88092418
88092438, 88092454-88092459
88102869, 88102956-88102959

QC Report No: VOA-W-0046-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 9-16-88
Date Prepared: NA
Date Analyzed: 10-31-88
Date Reported: 12-09-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limits RPD	Recovery
VOA	1,1-Dichloroethene	50	ND	49.1	98	47.0	94	4	14	61-145
LAB	Trichlorethene	50	ND	45.4	91	44.3	89	2	14	71-120
SAMPLE #	Chlorobenzene	50	ND	46.7	93	45.4	91	3	13	75-130
	Toluene	50	ND	44.6	89	42.6	85	5	13	76-125
88092458	Benzene	50	ND	44.8	90	43.2	86	4	11	76-127

Trip blank was inadvertently used as a quality control sample for this batch.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 625/8270

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88081571

QC Report No: BNA-W-0026-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: NA
Date Prepared: 8-04-88
Date Analyzed: 9-13-88
Date Reported: 9-23-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limits RPD	RECOVERY
	1,2,4-Trichlorobenzene	100	ND	64.6	65	22.0	22*	98*	28	39-98
B/N	Acenaphthene	100	ND	68.3	68	21.0	21*	106*	31	46-118
Laboratory	2,4-Dinitrotoluene	100	ND	83.1	83	27.8	28	100*	38	24-96
Sample #	Pyrene	100	ND	64.3	64	43.4	43	39*	31	26-127
	N-Nitroso-di-n-Propylamine	100	ND	97.1	97	38.3	38*	87*	38	41-116
Blank	1,4-Dichlorobenzene	100	ND	64.4	64	18.8	19*	110*	28	36-97
ACID	Pentachlorophenol	200	ND	137	68	117	58	16	50	9-103
Laboratory	Phenol	200	ND	89.3	45	89.6	45	<1	42	12-89
Sample #	2-Chlorophenol	200	ND	133	66	124	62	7	40	27-123
	4-Chloro-3-Methylphenol	200	ND	159	80	142	71	11	42	23-97
Blank	4-Nitrophenol	200	ND	28.8	14	27.7	14	4	50	10-80

* See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8270

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88081730-88081731
88081769-88081773, 88081775-88081783

QC Report No: BNA-S-0032-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 8-11-88
Date Prepared: 8-22-88
Date Analyzed: 9-29-88
Date Reported: 10-18-88
Dilution Factor: NA
%Moisture: 13

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limit RPD	EPA QC Limit %Recovery
	1,2,4-Trichlorobenzene	3830	ND	2920	76	2810	73	4	23	38-107
B/N	Acenaphthene	3830	ND	4000	104	3880	101	3	19	31-137
Laboratory	2,4-Dinitrotoluene	3830	ND	5020	131*	4840	126*	4	47	28-89
Sample #	Pyrene	3830	ND	4210	110	4130	108	2	36	35-142
88081769	N-Nitroso-di-n-Propylamine	3830	ND	4210	110	4100	107	3	38	41-126
	1,4-Dichlorobenzene	3830	ND	1860	48	1760	46	6	27	28-104
	Pentachlorophenol	7660	ND	3370	44	8200	107	83*	47	17-109
ACID	Phenol	7660	ND	8430	110*	7820	102*	8	35	26-90
Laboratory	2-Chlorophenol	7660	ND	6050	79	5750	75	5	50	25-102
Sample #	4-Chloro-3-Methylphenol	7660	ND	7360	96	8120	106*	10	33	26-103
88081769	4-Nitrophenol	7660	ND	8430	110	6360	83	28	50	11-114

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8270

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88081730-88081731
88081769-88081773, 88081775-88081783

QC Report No: BNA-S-0032-88B
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: NA
Date Prepared: 8-22-88
Date Analyzed: 9-29-88
Date Reported: 10-18-88
Dilution Factor: NA
%Moisture: NA

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limit RPD	EPA QC Limit %Recovery
	1,2,4-Trichlorobenzene	3330	ND	1760	53	1240	37*	35*	23	38-107
B/N	Acenaphthene	3330	ND	2030	61	1940	58	5	19	31-137
Laboratory	2,4-Dinitrotoluene	3330	ND	2320	70	2330	70	<1	47	28-89
Sample #	Pyrene	3330	ND	2120	64	1980	59	7	36	35-142
Blank	N-Nitroso-di-n-Propylamine	3330	ND	1990	60	1920	58	4	38	41-126
	1,4-Dichlorobenzene	3330	ND	1520	46	930	28	48*	27	28-104
	Pentachlorophenol	6670	ND	6770	101	5650	85	18	47	17-109
ACID	Phenol	6670	ND	4250	64	4540	68	7	35	26-90
Laboratory	2-Chlorophenol	6670	ND	3160	47	3200	48	1	50	25-102
Sample #	4-Chloro-3-Methylphenol	6670	ND	4460	67	4060	61	9	33	26-103
Blank	4-Nitrophenol	6[illegible]0	ND	5280	79	4810	72	9	50	11-114

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8270

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106-88061124

QC Report No: BNA-S-0018-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 6-16-88
Date Prepared: 6-24-88
Date Analyzed: 6-28-88
Date Reported: 7-20-88
Dilution Factor: 10
%Moisture: 24

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limit RPD	%Recovery
	1,2,4-Trichlorobenzene	4390	ND	3910	89	3540	81	10	23	38-107
B/N	Acenaphthene	4390	1300	6630	121	4790	79	32*	19	31-137
Laboratory	2,4-Dinitrotoluene	4390	ND	4940	113*	4250	97*	15	47	28-89
Sample #	Pyrene	4390	18000	24600	150*	22300	98	10	36	35-142
88061121	N-Nitroso-Di-n-Propylamine	4390	ND	6700	153*	6720	153*	<1	38	41-126
	1,4-Dichlorobenzene	4390	ND	2910	66	2712	62	7	27	28-104
	Pentachlorophenol	8770	ND	7490	85	5520	63	30	47	17-109
ACID	Phenol	8770	ND	8970	102*	8140	93*	10	35	26-90
Laboratory	2-Chlorophenol	8770	ND	7970	91	7170	82	11	50	25-102
Sample #	4-Chloro-3-Methylphenol	8770	ND	9350	107*	8280	94	12	33	26-103
88061121	4-Nitrophenol	8770	ND	9190	105	8260	94	11	50	11-114

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* = See Case Narrative attached

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8270

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106-88061124

QC Report No: BNA-S-0018-88B
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: NA
Date Prepared: 6-17-88
Date Analyzed: 6-24-88
Date Reported: 7-20-88
Dilution Factor: NA
%Moisture: NA

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limit RPD	EPA QC Limit %Recovery
	1,2,4-Trichlorobenzene	3330	ND	2310	69	1720	52	29*	23	38-107
B/N	Acenaphthene	3330	ND	2390	72	1900	57	23*	19	31-137
Laboratory	2,4-Dinitrotoluene	3330	ND	2990	89	2420	73	21	47	28-89
Sample #	Pyrene	3330	ND	2600	78	1910	57	31	36	35-142
	N-Nitroso-Di-n-Propylamine	3330	ND	4170	125	3070	92	30	38	41-126
Blank	1,4-Dichlorobenzene	3330	ND	2000	60	1400	42	35*	27	28-104
	Pentachlorophenol	6670	ND	5290	79	3940	59	29	47	17-109
ACID	Phenol	6670	ND	5680	85	4400	66	25	35	26-90
Laboratory	2-Chlorophenol	6670	ND	4800	72	3760	56	24	50	25-102
Sample #	4-Chloro-3-Methylphenol	6670	ND	5720	86	4500	67	24	33	26-103
Blank	4-Nitrophenol	6670	ND	6000	90	4700	70	24	50	11-114

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* = See Case Narrative attached

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8270

QC Report No:	BNA-S-0020-88
Sample Matrix:	Soil
Conc. Unit:	ug/KG
Date Received:	7-07-88
Date Prepared:	7-08-88
Date Analyzed:	7-26-88
Date Reported:	7-27-88
Dilution Factor:	NA
%Moisture:	16

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071315-88071321

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limit RPD	%Recovery
	1,2,4-Trichlorobenzene	3970	ND	3130	79	2850	72	9	23	38-107
B/N	Acenaphthene	3970	ND	3100	78	3030	76	2	19	31-137
Laboratory	2,4-Dinitrotoluene	3970	ND	3380	85	3020	76	11	47	28-89
Sample #	Pyrene	3970	ND	2970	75	2800	71	6	36	35-142
88071319	N-Nitroso-Di-n-Propylamine	3970	ND	3360	85	3200	81	5	38	41-126
	1,4-Dichlorobenzene	3970	ND	2810	71	2300	58	20	27	28-104
	Pentachlorophenol	7940	ND	7560	95	7140	90	6	47	17-109
ACID	Phenol	7940	ND	5860	74	5540	70	6	35	26-90
Laboratory	2-Chlorophenol	7940	ND	5400	68	5240	66	3	50	25-102
Sample #	4-Chloro-3-Methylphenol	7940	ND	6230	78	6160	78	1	33	26-103
88071319	4-Nitrophenol	7940	ND	7230	91	6520	82	10	50	11-114

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 8270

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071506-88071507 ~~88071513-88071515~~
88071556-88071558

QC Report No: BNA-S-0023-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 7-28-88
Date Prepared: 7-30-88
Date Analyzed: 8-03-88
Date Reported: 8-17-88
Dilution Factor: NA
%Moisture: 14

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limit RPD	EPA QC Limit %Recovery
	1,2,4-Trichlorobenzene	3970	ND	2630	66	2490	63	5	23	38-107
B/N	Acenaphthene	3970	ND	2390	60	2310	58	3	19	31-137
Laboratory	2,4-Dinitrotoluene	3970	ND	2560	64	2430	61	5	47	28-89
Sample #	Pyrene	3970	ND	2260	57	2160	54	4	36	35-142
88071506	N-Nitroso-Di-n-Propylamine	3970	ND	2670	67	2450	62	8	38	41-126
	1,4-Dichlorobenzene	3970	ND	2230	56	2140	54	4	27	28-104
	Pentachlorophenol	7940	ND	7860	99	7420	93	6	47	17-109
ACID	Phenol	7940	ND	4520	57	4290	54	5	35	26-90
Laboratory	2-Chlorophenol	7940	ND	4320	54	4080	51	6	50	25-102
Sample #	4-Chloro-3-Methylphenol	7940	ND	5010	63	4810	60	4	33	26-103
88071506	4-Nitrophenol	7940	ND	6150	77	6000	76	2	50	11-114

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 625/8270

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report No: BNA-W-0068-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 09-20-88
Date Prepared: 09-26-88
Date Analyzed: 11-03-88
Date Reported: 02-07-89
Dilution Factor: NA

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88092533-88092538, 88092556, 88092558
88092686-88092692, 88092642-88092643, 88092646

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limits RPD	RECOVERY
	1,2,4-Trichlorobenzene	100	ND	51.7	52	45.4	45	13	28	39-98
B/N	Acenaphthene	100	ND	65.4	65	53.7	54	20	31	46-118
Laboratory	2,4-Dinitrotoluene	100	ND	86.1	86	80.3	80	7	38	24-96
Sample #	Pyrene	100	ND	53.2	53	51.5	52	3	31	26-127
	N-Nitroso-di-n-Propylamine	100	ND	91.9	92	69.9	70	27	38	41-116
88092534	1,4-Dichlorobenzene	100	ND	53.3	53	48.2	48	10	28	36-97
ACID	Pentachlorophenol	200	ND	170	85	180	90	6	50	9-103
Laboratory	Phenol	200	ND	82.7	41	101	50	20	42	12-89
Sample #	2-Chlorophenol	200	ND	124	62	128	64	3	40	27-123
	4-Chloro-3-Methylphenol	200	ND	180	90	179	90	1	42	23-97
88092534	4-Nitrophenol	200	ND	112	56	110	55	2	50	10-80

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 625/8270

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report No: BNA-W-0066-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 10-18-88
Date Prepared: 10-19-88
Date Analyzed: 11-22-88
Date Reported: 01-26-89
Dilution Factor: NA

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88102956-88102957
88102960-88102961

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limits RPD	RECOVERY
	1,2,4-Trichlorobenzene	100	ND	81.6	82	83.5	84	2	28	39-98
B/N	Acenaphthene	100	ND	73.7	74	80.4	80	9	31	46-118
Laboratory	2,4-Dinitrotoluene	100	ND	73.4	73	78.6	79	7	38	24-96
Sample #	Pyrene	100	ND	79.9	80	85.2	85	6	31	26-127
	N-Nitroso-di-n-Propylamine	100	ND	83.3	83	88.1	88	6	38	41-116
88102961	1,4-Dichlorobenzene	100	ND	70.7	71	76.0	76	7	28	36-97
ACID	Pentachlorophenol	200	ND	91.3	46	62.2	31	38	50	9-103
Laboratory	Phenol	200	ND	71.1	36	76.0	38	7	42	12-89
Sample #	2-Chlorophenol	200	ND	108	54	119	60	10	40	27-123
	4-Chloro-3-Methylphenol	200	ND	91.3	46	101	50	10	42	23-97
88102961	4-Nitrophenol	200	ND	64.1	32	82.1	41	25	50	10-80

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 625/8270

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88102956-88102957
88102960-88102961

QC Report No: BNA-W-0066-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 10-18-88
Date Prepared: 10-19-88
Date Analyzed: 11-22-88
Date Reported: 01-26-89
Dilution Factor: NA

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limits RPD	RECOVERY
	1,2,4-Trichlorobenzene	100	ND	81.6	82	83.5	84	2	28	39-98
B/N	Acenaphthene	100	ND	73.7	74	80.4	80	9	31	46-118
Laboratory	2,4-Dinitrotoluene	100	ND	73.4	73	78.6	79	7	38	24-96
Sample #	Pyrene	100	ND	79.9	80	85.2	85	6	31	26-127
	N-Nitroso-di-n-Propylamine	100	ND	83.3	83	88.1	88	6	38	41-116
88102961	1,4-Dichlorobenzene	100	ND	70.7	71	76.0	76	7	28	36-97
ACID	Pentachlorophenol	200	ND	91.3	46	62.2	31	38	50	9-103
Laboratory	Phenol	200	ND	71.1	36	76.0	38	7	42	12-89
Sample #	2-Chlorophenol	200	ND	108	54	119	60	10	40	27-123
	4-Chloro-3-Methylphenol	200	ND	91.3	46	101	50	10	42	23-97
88102961	4-Nitrophenol	200	ND	64.1	32	82.1	41	25	50	10-80

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA METHOD 625/8270

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report No: BNA-W-0068-88
Sample Matrix: Water
Conc, Unit: ug/L
Date Received: 09-20-88
Date Prepared: 09-26-88
Date Analyzed: 11-03-88
Date Reported: 02-07-89
Dilution Factor: NA

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88092533-88092538, 88092556, 88092558
88092686-88092692, 88092642-88092643, 88092646

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA QC Limits RPD	RECOVERY
	1,2,4-Trichlorobenzene	100	ND	51.7	52	45.4	45	13	28	39-98
B/N	Acenaphthene	100	ND	65.4	65	53.7	54	20	31	46-118
Laboratory	2,4-Dinitrotoluene	100	ND	86.1	86	80.3	80	7	38	24-96
Sample #	Pyrene	100	ND	53.2	53	51.5	52	3	31	26-127
	N-Nitroso-di-n-Propylamine	100	ND	91.9	92	69.9	70	27	38	41-116
88092534	1,4-Dichlorobenzene	100	ND	53.3	53	48.2	48	10	28	36-97
ACID	Pentachlorophenol	200	ND	170	85	180	90	6	50	9-103
Laboratory	Phenol	200	ND	82.7	41	101	50	20	42	12-89
Sample #	2-Chlorophenol	200	ND	124	62	128	64	3	40	27-123
	4-Chloro-3-Methylphenol	200	ND	180	90	179	90	1	42	23-97
88092534	4-Nitrophenol	200	ND	112	56	110	55	2	50	10-80

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 608/8080

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88102870-88102871,
88102956-88102957,
88102960-88102961

QC Report No: OCP-W-0043-88B
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 10-18-88
Date Prepared: 10-19-88
Date Analyzed: 10-27-88
Date Reported: 11-16-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
Blank	Aldrin	0.200	ND	0.168	84	0.150	75	11	22	40-120
	q-BHC(Lindane)	0.200	ND	0.188	94	0.176	88	7	15	56-123
	Dieldrin	0.500	ND	0.518	104	0.473	95	9	18	52-126
	Endrin	0.500	ND	0.380	76	0.327	65	15	21	56-121
	Heptachlor epoxide	0.200	ND	0.209	104	0.188	94	11	20	40-131
	4,4'-DDT	0.500	ND	0.457	91	0.393	79	15	27	38-127
	PCB-1260	NA	NA	NA	NC	NA	NC	NC	—	------

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 608/8080

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
38102870-88102871, 88102956-88102957
88102960-88102961

QC Report No: OCP-W-0043-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 10-18-88
Date Prepared: 10-19-88
Date Analyzed: 10-27-88
Date Reported: 11-16-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
88102960	Aldrin	0.400	ND	0.287	72	0.312	78	8	22	40-120
	q-BHC(Lindane)	0.400	ND	0.244	61	0.310	77	24*	15	56-123
	Dieldrin	1.00	ND	0.861	86	0.876	88	2	18	52-126
	Endrin	1.00	ND	0.758	76	0.742	74	2	21	56-121
	Heptachlor epoxide	0.400	ND	0.327	82	0.343	86	5	20	40-131
	4,4'-DDT	1.00	ND	0.729	73	0.662	66	10	27	38-127
	PCB-1260	NA	NA	NA	NC	NA	NA	NC	--	------

* See case narrative attached.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 608/8080

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88092533-88092538, 88092556, 88092558, 88092560, 88092567, 88092643, 88092646, 88092686, 88092692

QC Report No: OCP-W-0045-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 9-24-88
Date Prepared: 9-26-8[illegible]
Date Analyzed: 10-11-88
Date Reported: 11-16-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA*	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
88092534	Aldrin	0.400	ND	0.493	123*	0.491	123*	<1	22	40-120
	q-BHC(Lindane)	0.400	ND	0.584	146*	0.576	144*	1	15	56-123
	Dieldrin	1.00	ND	1.42	142*	1.36	136*	4	18	52-126
	Endrin	1.00	ND	1.19	119	1.44	144*	19	21	56-121
	Heptachlor epoxide	0.400	ND	0.572	143*	0.545	136*	5	20	40-131
	4,4'-DDT	1.00	ND	1.68	168*	1.56	156*	7	27	38-127
	PCB-1260	NA	NA	NA	NC	NA	NC	NC	--	------

* See case narrative attached.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 8080

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88081762-88081765
88081769-88081770

QC Report No: OCP-S-0026-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 8-11-88
Date Prepared: 8-23-88
Date Analyzed: 9-10-88
Date Reported: 9-23-88
Dilution Factor: 10
%Moisture: 6.6

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
88081762	Aldrin	71.3	ND	65.4	92	60.5	85	8	43	34-132
	q-BHC(Lindane)	71.3	ND	60.9	85	ND*	NC*	NC*	50	46-127
	Dieldrin	178	ND	165	93	153	86	8	38	31-134
	Endrin	178	ND	176	99	153	86	14	45	42-139
	Heptachlor	71.3	ND	63.3	89	57.6	81	9	31	35-130
	4,4'-DDT	178	ND	150	84	134	75	11	50	23-134
	PCB-1260	---	--	---	--	---	--	--	--	------

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 8080

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071460-88071461
88071477-88071478

QC Report No: OCP-S-0018-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 7-21-88
Date Prepared: 7-22-88
Date Analyzed: 8-04-88
Date Reported: 9-15-88
Dilution Factor: 10
%Moisture: 10.5

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
88071460	Aldrin	74.4	ND	46.7	63	50.5	68	8	43	34-132
	q-BHC(Lindane)	74.4	ND	49.7	67	55.6	75	11	50	46-127
	Dieldrin	186	ND	124	67	129	69	4	38	31-134
	Endrin	186	ND	133	72	140	75	5	45	42-139
	Heptachlor	74.4	ND	47.5	64	49.7	67	5	31	35-130
	4,4'-DDT	186	ND	108	58	115	62	6	50	23-134
	PCB-1260	---	--	---	--	---	--	-	--	------

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 8080

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071315-88071333

QC Report No: OCP-S-0011-88B
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: NA
Date Prepared: 7-07-88
Date Analyzed: 7-14-88
Date Reported: 8-17-88
Dilution Factor: NA
%Moisture: NA

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
Blank	Aldrin	6.67	ND	6.31	95	6.10	91	3	43	34-132
	q-BHC(Lindane)	6.67	ND	5.04	76	5.07	76	1	50	46-127
	Dieldrin	16.7	ND	18.4	110	17.6	105	4	38	31-134
	Endrin	16.7	ND	16.7	100	15.9	95	5	45	42-139
	Heptachlor	6.67	ND	7.43	111	6.94	104	7	31	35-130
	4,4'-DDT	16.7	ND	16.3	98	15.2	91	7	50	23-134
	PCB-1260	----	--	----	---	----	---	-	--	------

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 8080

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071494-88071500, 88071506-88071507
88071513-88071515, 88071556-88071558

QC Report No: OCP-S-0023-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 7-26-88
Date Prepared: 7-29-88
Date Analyzed: 8-31-88
Date Reported: 9-19-88
Dilution Factor: 10
%Moisture: 15.3

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
88071494	Aldrin	78.6	ND	50.8	65	60.1	76	17	43	34-132
	q-BHC(Lindane)	78.6	ND	59.6	76	70.1	89	16	50	46-127
	Dieldrin	197	ND	159	81	184	93	15	38	31-134
	Endrin	197	ND	171	87	190	96	11	45	42-139
	Heptachlor Epoxide*	78.6	ND	61.1	78	73.1	93	17	31	35-130
	4,4'-DDT	197	ND	180	91	184	93	2	50	23-134
	PCB-1260	---	--	---	--	---	--	-	--	------

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* See Case Narrative attached.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 8080

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071315-88071333

QC Report No: OCP-S-0011-88R
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 7-07-88
Date Prepared: 7-07-88
Date Analyzed: 8-02-88
Date Reported: 8-17-88
Dilution Factor: 10
%Moisture: 6

Laboratory Supervisor Approval:

RWBurton

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
88071318 Re-analysis	Aldrin	7.07	ND	3.60	51	4.20	59	15	43	34-132
	q-BHC(Lindane)	7.07	ND	4.10	58	2.79	39*	38	50	46-127
	Dieldrin	17.7	ND	11.8	67	10.7	60	10	38	31-134
	Endrin	17.7	ND	12.4	70	10.5	59	16	45	42-139
	Heptachlor	7.07	ND	8.94	126	8.34	118	7	31	35-130
	4,4'-DDT	17.7	ND	23.0	130	20.3	115	12	50	23-134
	PCB-1260	----	--	----	---	----	---	--	--	------

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* = See Case Narrative attached.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 8080

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071315-88071333

QC Report No: OCP-S-0011-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 7-07-88
Date Prepared: 7-07-88
Date Analyzed: 7-14-88
Date Reported: 8-17-88
Dilution Factor: 10
%Moisture: 6

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
88071318	Aldrin	7.07	ND	5.40	76	3.86	55	33	43	34-132
	q-BHC(Lindane)	7.07	ND	3.74	53	3.10	44*	19	50	46-127
	Dieldrin	17.7	ND	12.3	69	8.94	50	32	38	31-134
	Endrin	17.7	ND	9.63	54	8.67	49	10	45	42-139
	Heptachlor	7.07	ND	6.86	97	6.70	95	2	31	35-130
	4,4'-DDT	17.7	ND	12.7	72	7.21	41	55*	50	23-134
	PCB-1260	----	--	----	--	----	--	--	--	------

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* = See Case Narrative attached.
NOTE: Re-analysis was done in 2nd column on 8-02-88.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 8080

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106-88061120

QC Report No: OCP-S-0013-88B
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: NA
Date Prepared: 6-17-88
Date Analyzed: 7-25-88
Date Reported: 8-17-88
Dilution Factor: NA
%Moisture: NA

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
Blank	Aldrin	6.67	ND	6.08	91	4.89	73	22	43	34-132
	q-BHC(Lindane)	6.67	ND	5.19	78	4.27	64	19	50	46-127
	Dieldrin	16.7	ND	17.7	106	14.9	89	17	38	31-134
	Endrin	16.7	ND	24.5	147*	20.9	125	16	45	42-139
	Heptachlor	6.67	ND	6.68	100	5.59	84	18	31	35-130
	4,4'-DDT	16.7	ND	22.0	132	17.2	103	24	50	23-134
	PCB-1260	----	--	----	---	----	---	--	--	------

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* = See Case Narrative attached.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 8080

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106-88061120

QC Report No: OCP-S-0013-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 6-15-88
Date Prepared: 6-17-88
Date Analyzed: 7-25-88
Date Reported: 8-17-88
Dilution Factor: 10
%Moisture: 11.2

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
88061106	Aldrin	7.51	ND	3.51	47	8.86	118	86*	43	34-132
	q-BHC(Lindane)	7.51	ND	2.05	27	5.44	72	91*	50	46-127
	Dieldrin	18.8	ND	19.9	106	23.4	124	16	38	31-134
	Endrin	18.8	ND	21.1	112	43.5	231*	69*	45	42-139
	Heptachlor	7.51	ND	5.71	76	11.4	152*	66*	31	35-130
	4,4'-DDT	18.8	ND	40.5	215*	43.5	231*	7	50	23-134
	PCB-1260	----	--	----	---	----	---	--	--	------

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
* = See Case Narrative attached.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
ORGANOCHLORINE PESTICIDES AND PCB'S
SW METHOD 608/8080

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071571

QC Report No: OCP-W-0019-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: 8-01-88
Date Prepared: 8-05-88
Date Analyzed: 8-18-88
Date Reported: 9-15-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits %Recovery
Blank	Aldrin	0.2	ND	0.207	104	0.195	98	6	22	40-120
	q-BHC(Lindane)	0.2	ND	0.193	96	0.188	94	3	15	56-123
	Dieldrin	0.5	ND	0.507	101	0.498	100	2	18	52-126
	Endrin	0.5	ND	0.308	62	0.332	66	8	21	56-121
	Heptachlor	0.2	ND	0.217	108	0.209	104	4	20	40-131
	4,4'-DDT	0.5	ND	0.477	95	0.445	89	7	27	38-127
	PCB-1260	---	--	----	--	----	--	-	--	------

See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{(MS \text{ or } MSD) - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
EPA 8150

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106-88061113
88061127-88061132, 88061152

QC Report No: CLH-S-0001-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-14-88
Date Prepared: 6-22-88
Date Analyzed: 6-30-88
Date Reported: 8-01-88
Dilution Factor: NA
%Moisture: 6

Laboratory Supervisor Approval:

Analytical Parameter	Laboratory Duplicates	Sample Nos. Spike	SR	SA	Blank	MS	PR	MSD	PR	RPD	Notes
Dalapon	88061108	88061108	ND	21.3	<4	11.7	55	10.6	50	10	
Dicamba	88061108	88061108	ND	5.32	<1	4.26	80	4.26	80	0	
MCPP	88061108	88061108	ND	106	<100	89.4	84	93.6	88	5	
MCPA	88061108	88061108	ND	106	<100	34.0	32	33.0	31	3	
Dichloroprop	88061108	88061108	ND	5.32	<1	4.26	80	4.26	80	0	
2,4-D	88061108	88061108	ND	5.32	<1	4.26	80	4.26	80	0	
2,4,5-TP	88061108	88061108	ND	5.32	<1	4.26	80	4.26	80	0	
2,4,5-T	88061108	88061108	ND	5.32	<1	4.26	80	4.26	80	0	
2,4-DB	88061108	88061108	ND	5.32	<1	3.19	60	3.19	60	0	
Dinoseb	88061108	88061108	ND	5.32	<1	3.19	60	3.19	60	0	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

MS = Spike Sample
MSD = Spike Duplicate Sample

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
HERBICIDES
EPA 8150

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106-88061113, 88061120
88061127-88061132, 88061152

QC Report No: CLH-S-0001-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-14-88
Date Prepared: 6-22-88
Date Analyzed: 6-30-88
Date Reported: 8-01-88
Dilution Factor: NA
%Moisture: 6

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	Notes
88061108	Dalapon	21.3	<4	11.7	55	10.6	50	10	
	Dicamba	5.32	<1	4.26	80	4.26	80	0	
	MCPP	106	<100	89.4	84	93.6	88	5	
	MCPA	106	<100	34.0	32	33.0	31	3	
	Dichloroprop	5.32	<1	4.26	80	4.26	80	0	
	2,4-D	5.32	<1	4.26	80	4.26	80	0	
	2,4,5-TP	5.32	<1	4.26	80	4.26	80	0	
	2,4,5-T	5.32	<1	4.26	80	4.26	80	0	
	2,4-DB	5.32	<1	3.19	60	3.19	60	0	
	Dinoseb	5.32	<1	3.19	60	3.19	60	0	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

$$\text{Relative Percent Difference (RPD)} = \frac{MS - MSD}{(MS + MSD)/2} \times 100$$

$$\text{Percent Recovery (PR)} = \frac{(MS \text{ or } MSD) - SR}{SA} \times 100$$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: ICP-S-0016-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-16-88
Date Reported: 8-25-88
Dilution Factor: NA
%Moisture: 11.2

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106-88061114, 88061116,
88061118, 88061120-88061124

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate Spike Recovery C1	C2	RPD	SA	SR	SSR	PR	Notes
Antimony	88061106	88061106	8-10-88	6-20-88	6010	<10	<6.0	<6.0	NC	56.3	<6.0	23.2	41N	
Lead	88061106	88061106	8-10-88	6-20-88	6010	<10	41.9	37.8	10	56.3	41.9	103	108	
Silver	88061106	88061106	8-10-88	6-20-88	6010	<5	<1	<1	NC	5.63	<1	2.48	44N	
Beryllium	88061106	88061106	8-10-88	6-20-88	6010	<0.5	0.79	0.79	0	5.63	0.79	6.76	106	
Cadmium	88061106	88061106	8-10-88	6-20-88	6010	<1.0	6.3	7.8	21*	5.63	6.3	13.5	128N	
Chromium	88061106	88061106	8-10-88	6-20-88	6010	<5.0	22.1	19.9	10	22.5	22.1	44.5	100	
Copper	88061106	88061106	8-10-88	6-20-88	6010	<2.5	29.3	28.7	2	28.2	29.3	63.4	121	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
N - See legend attached.
* See legend attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106, 88061108
88061111, 88061122

QC Report No: AAF-S-0017-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-16-88
Date Reported: 8-29-88
Dilution Factor: NA
%Moisture: 11.2

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate			Spike Recovery				Notes
							C1	C2	RPD	SA	SR	SSR	PR	
Arsenic	88061106	88061106	8-08-88	6-27-88	7060	<1	14.1	17.8	2	9.0	14.1	21.9	87	
Selenium	88061106	88061106	8-16-88	6-27-88	7740	<1	<0.5	<0.5	NC	4.50	<0.5	5.63	125	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: AAF-S-0016-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-16-88
Date Reported: 8-29-88
Dilution Factor: NA
%Moisture: 10.2

Project: Rickenbacker ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88061107, 88061109-88061110
88061112-88061114, 88061116,
88061118, 88061121, 88061123

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate Spike Recovery C1	C2	RPD	SA	SR	SSR	PR	Notes
Arsenic	88061107	88061107	7-20-88	6-22-88	7060	1	19.7	18.9	4	4.57	19.7	20.9	NC	A
Selenium	88061107	88061107	8-25-88	6-22-88	7740	1	<0.5	<0.5	NC	4.45	<0.5	4.34	98	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
A See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: ICP-S-0014-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-25-88
Date Reported: 8-23-88
Dilution Factor: NA
%Moisture: 16

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061188-88061198 88061266-88061273
88071315-88071317

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate Spike Recovery C1	C2	RPD	SA	SR	SSR	PR	Notes
Antimony	88061266	88061266	7-22-88	7-21-88	6010	<10	<6.0	<6.0	NC	59.5	<6.0	33.9	57N	
Beryllium	88061266	88061266	7-22-88	7-21-88	6010	<0.5	0.31B	0.43B	36	5.95	0.31B	5.21	82	A
Cadmium	88061266	88061266	7-22-88	7-21-88	6010	<1	<1	<1	NC	5.95	<1	5.44	91	
Chromium	88061266	88061266	7-22-88	7-21-88	6010	<5	18	14	25*	23.8	17.8	28.3	44N	
Copper	88061266	88061266	7-22-88	7-21-88	6010	<2.5	18	35	64*	29.8	17.9	44.9	91	
Nickel	88061266	88061266	7-22-88	7-21-88	6010	<4	18	24	29*	59.5	18.4	67.3	82	
Silver	88061266	88061266	7-22-88	7-21-88	6010	<5	<1	<1	NC	5.95	<1	4.84	81	
Zinc	88061266	88061266	7-22-88	7-21-88	6010	<2	69	82	17	59.5	68.8	114	76	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
N = See Legend attached.
* = See Legend attached.
A = See Case Narrative attached.
B = See Legend attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: AAF-S-0011-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-25-88
Date Reported: 8-23-88
Dilution Factor: NA
%Moisture: 16

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061188-88061198 88061266-88061273
88071315-88071317

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate Spike Recovery C1	C2	RPD	SA	SR	SSR	PR	Notes
Arsenic	88061266	88061266	7-21-88	7-21-88	7060	<1	4.4	4.2	5	4.76	4.4	11	139N	
Lead	88061266	88061266	7-22-88	7-21-88	7421	<10	19	33	54*	3	19	30	NC	A
Selenium	88061266	88061266	7-21-88	7-21-88	7740	<1	<0.5	<0.5	NC	1.19	<0.5	0.57	48N	
Thallium	88061266	88061266	7-28-88	7-21-88	7841	<10	<1	<1	NC	5.95	<1	3.0	50N	A

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
N = See Legend attached.
* = See Legend attached.
A = See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061188-88061198 88061266-88061273
88071315-88071317

QC Report No: CVM-S-0002-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-25-88
Date Reported: 8-23-88
Dilution Factor: NA
%Moisture: 16

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate Spike Recovery C1	C2	RPD	SA	SR	SSR	PR	Notes
Mercury	88061266	88061266	7-25-88	7-21-88	7471	<20	<0.2	<0.2	NC	0.595	<0.2	0.65	109	A

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
A = See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: ICP-S-0015-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 7-08-88
Date Reported: 8-23-88
Dilution Factor: NA
%Moisture: 21

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071318-88071333
88071360-88071365

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate Spike Recovery C1	C2	RPD	SA	SR	SSR	PR	Notes
Antimony	88071333	88071333	7-22-88	7-21-88	6010	<10	<6	<6	NC	63.3	<6	20.9	33N	A
Beryllium	88071333	88071333	7-22-88	7-21-88	6010	<0.5	0.6	0.72	18	6.33	0.6	6.1	87	
Cadmium	88071333	88071333	7-22-88	7-21-88	6010	<1	<1	<1	NC	6.33	<1	4.9	77	
Chromium	88071333	88071333	7-22-88	7-21-88	6010	<5	13	15	14	25.3	12.7	33.6	83	
Copper	88071333	88071333	7-22-88	7-21-88	6010	<2.5	22	24	9	31.6	22.3	50.8	90	
Nickel	88071333	88071333	7-22-88	7-21-88	6010	<4	24	25	4	63.3	23.9	74.2	79	
Silver	88071333	88071333	7-22-88	7-21-88	6010	<5	<1	<1	NC	6.33	<1	4.57	72	A
Zinc	88071333	88071333	7-22-88	7-21-88	6010	<2	83	81	2	63.3	82.9	125	67N	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
N = See Legend attached.
A = See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: AAF-S-0012-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 7-08-88
Date Reported: 8-23-88
Dilution Factor: NA
%Moisture: 21

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071318-88071333
88071360-88071365

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate Spike Recovery C1	C2	RPD	SA	SR	SSR	PR	Notes
Arsenic	88071333	88071333	7-22-88	7-21-88	7060	<1	6.3	6.1	3.2	5.1	6.3	11	92	
Lead	88071333	88071333	7-22-88	7-21-88	7421	<10	15	19	24*	2.53	15	22	NC	A
Selenium	88071333	88071333	7-21-88	7-21-88	7740	<1	<0.5	<0.5	NC	1.27	<0.5	0.49	39N	
Thallium	88071333	88071333	7-26-88	7-21-88	7841	<10	<1	<1	NC	6.32	<1	5.7	90	A

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
N = See Legend attached.
A = See Case Narrative attached.
* = See Legend attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071318-88071333
88071360-88071365

QC Report No: CVM-S-0003-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 7-08-88
Date Reported: 8-23-88
Dilution Factor: NA
%Moisture: 21

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate Spike Recovery C1	C2	RPD	SA	SR	SSR	PR	Notes
Mercury	88071333	88071333	7-25-88	7-21-88	7471	<20	<0.2	<0.2	NC	0.63	<0.2	0.66	104	A

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
A = See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: ICP-S-0021-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 7-27-88
Date Reported: 9-12-88
Dilution Factor: NA
%Moisture: 11

Project: Rickenbacker ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88071494-88071500, 88071506-88071507
88071513-88071515, 88071556-88071558
88071562-88071566

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	RPD	SA	Spike Recovery SR	SSR	PR	Notes
Antimony	88071494	88071494	8-05-88	8-05-88	6010	<10	<6.0	<6.0	NC	56	<6.0	27.2	49N	
Beryllium	88071494	88071494	8-05-88	8-05-88	6010	<0.5	0.494B	0.472B	5	5.6	0.494	5.29	86	
Cadmium	88071494	88071494	8-05-88	8-05-88	6010	<1.0	<1.0	<1.0	NC	5.6	<1.0	5.20	93	
Chromium	88071494	88071494	8-05-88	8-05-88	6010	<5.0	10.9	12.2	11	22.5	10.9	27.6	74	
Copper	88071494	88071494	8-05-88	8-05-88	6010	<2.5	14.3	15.6	9	28.1	14.3	37.9	84	
Nickel	88071494	88071494	8-05-88	8-05-88	6010	<4.0	11.3	13.1	15	56	11.3	57.9	83	
Silver	88071494	88071494	8-05-88	8-05-88	6010	<5.0	<1.0	<1.0	NC	5.6	<1.0	4.92	88	
Zinc	88071494	88071494	8-05-88	8-05-88	6010	<2.0	49.8	55.7	11	56	49.8	88.1	68N	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
B See Legend attached.
N See Legend attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: AAF-S-0018-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 7-27-88
Date Reported: 9-12-88
Dilution Factor: NA
%Moisture: 11

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071494-88071500, 88071506-88071507
88071513-88071515, 88071556-88071558
88071562-88071566

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	Duplicate RPD	Spike Recovery SA	Spike Recovery SR	Spike Recovery SSR	Spike Recovery PR	Notes
Arsenic	88071494	88071494	8-05-88	8-05-88	7060	<1	5.17	4.49	14	4.49	5.17	5.17	ON	
Lead	88071494	88071494	8-05-88	8-05-88	7421	<10	13.3	12.7	4	2.25	13.3	15.2	84	
Selenium	88071494	88071494	8-05-88	8-05-88	7740	<1	<1	<1	NC	1.12	<1	0.247	22N	
Thallium	88071494	88071494	8-05-88	8-05-88	7841	<10	<1	<1	NC	5.62	<1	4.36	78	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

N See Legend attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: CVM-S-0007-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 7-27-88
Date Reported: 9-12-88
Dilution Factor: NA
%Moisture: 11

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071494-88071500, 88071506-88071507
88071513-88071515, 88071556-88071558
88071562-88071566

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	RPD	SA	Spike Recovery SR	SSR	PR	Notes
Mercury	88071494	88071494	8-24-88	8-05-88	7471	<0.1	<0.1	<0.1	NC	0.56	<0.1	0.597	106	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071458-88071461
88071477-88071478

QC Report No: ICP-S-0019-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 7-21-88
Date Reported: 8-25-88
Dilution Factor: NA
%Moisture: 10.7

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate Spike Recovery C1	C2	RPD	SA	SR	SSR	PR	Notes
Antimony	88071458	88071458	8-10-88	7-25-88	6010	<10	<6	<6	NC	56.0	<6	<6	ON	A
Beryllium	88071458	88071458	8-10-88	7-25-88	6010	<0.5	<0.1	<0.1	NC	5.6	<0.1	<0.1	ON	A
Cadmium	88071458	88071458	8-10-88	7-25-88	6010	<1	<1	<1	NC	5.6	<1	<1	ON	A
Chromium	88071458	88071458	8-10-88	7-25-88	6010	<5	11.5	11.1	4	22.4	11.5	14.3	12N	A
Copper	88071458	88071458	8-10-88	7-25-88	6010	<2.5	15.8	15.8	0	22.3	15.8	16.5	3N	A
Lead	88071458	88071458	8-10-88	7-25-88	6010	<10	15.8	16.6	5	56.0	15.8	13.5	ON	A
Nickel	88071458	88071458	8-10-88	7-25-88	6010	<4	15.9	13.2	18	56.0	15.9	14.6	ON	A
Silver	88071458	88071458	8-10-88	7-25-88	6010	<5	<1.0	<1.0	NC	5.6	<1.0	<1.0	ON	A
Thallium	88071458	88071458	8-10-88	7-25-88	6010	<10	<10	<10	NC	224	<10	<10	ON	A
Zinc	88071458	88071458	8-10-88	7-25-88	6010	<2	60.7	60.9	<1	56	60.7	60.1	ON	A

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
N See Legend attached.
A See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071458-88071459
88082086-88082098

QC Report No: CVM-S-0012-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 8-25-88
Date Reported: 9-21-88
Dilution Factor: NA
%Moisture: 8.3

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	Duplicate RPD	Spike Recovery SA	Spike Recovery SR	Spike Recovery SSR	Spike Recovery PR	Notes
Mercury	88082097	88082097	9-20-88	9-20-88	245.1	<0.1	<0.1	<0.1	NC	1.09	<0.1	1.21	111	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2}$ X 100

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA}$ x 100

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: ICP-S-0041-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 8-11-88
Date Reported: 1-26-89
Dilution Factor: NA
%Moisture: 12.8

Project: Rickenbacker ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88081769-88081770, 88081775-88081783
88081891-88081895, 88081918-88081919

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	Duplicate RPD	Spike Recovery SA	Spike Recovery SR	Spike Recovery SSR	Spike Recovery PR	Notes
Antimony	88081769	88081769	12-15-88	11-08-88	6010	<10	<6.0	<6.0	NC	57.3	<6.0	6.0	10N	
Beryllium	88081769	88081769	12-14-88	11-08-88	6010	<0.5	<0.1	<0.1	NC	5.73	<0.1	3.1	54N	
Cadmium	88081769	88081769	12-14-88	11-08-88	6010	<1.0	<1.0	<1.0	NC	5.73	<1.0	4.1	72	
Chromium	88081769	88081769	12-14-88	11-08-88	6010	<5.0	13.1	13.3	NC	22.9	13.1	35.1	96	A
Copper	88081769	88081769	12-14-88	11-08-88	6010	<2.5	20.5	18.4	11	28.7	20.5	48.7	98	
Nickel	88081769	88081769	12-14-88	11-08-88	6010	<4.0	24.1	22.4	7	57.3	24.1	75.3	89	
Silver	88081769	88081769	12-14-88	11-08-88	6010	<5.0	<1.0	<1.0	NC	5.73	<1.0	ND	ON	
Zinc	88081769	88081769	12-14-88	11-08-88	6010	<2.0	87.1	79.3	9	57.3	87.1	130	75	
Thallium	88081769	88081769	12-14-88	11-08-88	6010	<10	<10	<10	NC	NA	<10	NA	NC	A
Lead	88081769	88081769	12-14-88	11-08-88	6010	<10	15.6	25.5	NC	57.3	15.6	72.1	99	A

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
A See Case Narrative attached.
N See Legend attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.5

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: AAF-S-0044-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 8-11-88
Date Reported: 1-26-89
Dilution Factor: NA
%Moisture: 12.8

Project: Rickenbacker ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88081769-88081770, 88081775-88081783
88081891-88081895, 88081918-88081919

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	RPD	SA	Spike Recovery SR	Spike Recovery SSR	PR	Notes
Arsenic	88081769	88081769	12-13-88	11-08-88	7060	<1.0	15.3	15.3	0	4.60	15.3	21.0	124	
Selenium	88081769	88081769	12-16-88	11-08-88	7740	<1.0	<0.5W	<0.5	NC	4.60	<0.5W	4.09	89	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
W See Legend attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88081762-88081765, 88081769-88081770
88081775-88081783, 88081869-88081873

QC Report No: CVM-S-0025-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 08-11-88
Date Reported: 01-26-89
Dilution Factor: NA
%Moisture: 6.6

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	RPD	SA	Spike Recovery SR	SSR	PR	Notes
Mercury	88801762	88081762	9-09-88	9-09-88	7471	<0.1	<0.1	<0.1	NC	1.08	<0.1	1.44	108	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88081891-88081895, 88081901-88081906,
88081918-88081919, 88071460-88071461,
88071477-88071478

QC Report No: CVM-S-0009-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 8-16-88
Date Reported: 9-13-88
Dilution Factor: NA
%Moisture: 20.3

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	Duplicate RPD	Spike Recovery SA	Spike Recovery SR	Spike Recovery SSR	Spike Recovery PR	Notes
Mercury	88081891	88081891	9-12-88	9-12-88	245.1	<0.1	<0.1	<0.1	NC	1.25	<0.1	1.32	106	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: ICP-W-0057-88
Sample Matrix: Water
Conc. Unit: mg/L
Date Received: 9-26-88
Date Reported: 1-26-89
Dilution Factor: NA

Project: Rickenbacker ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88092533-88092537, 88092642-88092643, 88092646
88092686-88092688, 88092690-88092692, 88092558

Analyte	Laboratory Duplicates	Sample Nos. Spi	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	RPD	Spike Recovery SA	SR	SSR	PR	Notes
Antimony	88092692	88092692	12-02-88	11-02-88	E200.7	<0.1	<0.06	<0.06	NC	0.500	<0.06	0.0425	85	
Beryllium	88092692	88092692	12-02-88	11-02-88	E200.7	<0.005	<0.001	<0.001	NC	0.050	<0.001	0.024	48N	
Cadmium	88092692	88092692	12-03-88	11-02-88	E200.7	<0.01	<0.01	<0.01	NC	0.050	<0.01	0.043	86	
Chromium	88092692	88092692	12-02-88	11-02-88	E200.7	<0.05	<0.01	<0.01	NC	0.200	<0.01	0.184	92	
Copper	88092692	88092692	12-03-88	11-02-88	E200.7	<0.025	<0.01	<0.01	NC	0.250	<0.01	0.206	82	
Nickel	88092692	88092692	12-02-88	11-02-88	E200.7	<0.04	<0.01	<0.01	NC	0.500	<0.01	0.451	90	
Silver	88092692	88092692	12-05-88	11-02-88	E200.7	<0.05	<0.01	<0.01	NC	0.050	<0.01	ND	ON	
Thallium	88092692	88092692	12-05-88	11-02-88	E200.7	<0.1	<0.1	<0.1	NC	NA	<0.1	NA	NC	A
Zinc	88092692	88092692	12-05-88	11-02-88	E200.7	<0.025	0.013B	<0.01	NC	0.500	0.013B	0.516	101	
Lead	88092692	88092692	12-03-88	11-02-88	E200.7	<0.01	<0.05	<0.05	NC	0.500	<0.05	0.481	96	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
A See Case Narrative attached.
N See Legend attached.
B See Legend attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report No: AAF-W-0040-88
Sample Matrix: Water
Conc. Unit: mg/L
Date Received: 9-26-88
Date Reported: 1-26-89
Dilution Factor: NA

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88092533-88092538, 88092556, 88092558, 88092641-88092644
88092650-88092651, 88092686-88092688, 88092690-88092692

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	RPD	SA	Spike Recovery SR	Spike Recovery SSR	PR	Notes
Arsenic	88092692	88092692	12-08-88	11-02-88	206.2	<0.010	0.0131	0.0129	NC	0.040	0.0131	0.0524	98	A
Lead	88092692	88092692	11-16-88	11-02-88	239.2	<0.020	<0.005	<0.005	NC	0.040	<0.005	0.021	105	A
Selenium	88092692	88092692	12-15-88	11-02-88	270.2	<0.010	<0.005	<0.005	NC	0.040	<0.005	0.0382	96	

A See Case Narrative attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: CVM-W-0022-88
Sample Matrix: Water
Conc. Unit: mg/L
Date Received: 9-20-88
Date Reported: 1-06-89
Dilution Factor: NA

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88092533-88092538, 88092642-88092646
88092686-88092687

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	RPD	SA	Spike Recovery SR	Spike Recovery SSR	PR	Notes
Mercury	88092533	88092533	10-14-88	10-14-88	E245.1	<0.0002	<0.0002	<0.0002	NC	1.0	<0.0002	0.912	91	

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106-88061124

QC Report No: CVM-S-0004-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-16-88
Date Reported: 8-25-88
Dilution Factor: NA
%Moisture: 11.2

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate			Spike Recovery				Notes
							C1	C2	RPD	SA	SR	SSR	PR	
Mercury	88061106	88061106	6-23-88	6-23-88	245.1	<0.1	<0.1	<0.1	NC	1.0	<0.1	1.06	106	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2}$ X 100

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA}$ x 100

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: ICP-S-0016-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 6-16-88
Date Reported: 8-25-88
Dilution Factor: NA
%Moisture: 11.2

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88061106-88061114, 88061116,
88061118, 88061120-88061124

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate			Spike Recovery				Notes
							C1	C2	RPD	SA	SR	SSR	PR	
Nickel	88061106	88061106	8-10-88	6-20-88	6010	<4	28.2	29.1	3	56.3	28.2	85.7	102	
Thallium	88061106	88061106	8-10-88	6-20-88	6010	<10	<10	<10	NC	225	<10	245	109	
Zinc	88061106	88061106	8-10-88	6-20-88	6010	<2	422	486	14	56.3	422	516	NC	A

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
A - See case narrative attached.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071571

QC Report No: CVM-W-0008-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: NA
Date Reported: 9-14-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	MS	MSD	Duplicate RPD	SA	Spike Recovery SR	PR	PR	Notes
Mercury	Blank MSD	Blank MS	8-10-88	8-09-88	245.1	<0.0002	0.00101	0.000959	5	0.001000	-	101	96	

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(C1 + C2)/2}$ X 100

Percent Recovery (PR) = $\frac{MSD - MS}{SA}$ x 100

MS = Spike Blank
MSD = Spike Blank Duplicate

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: AAF-S-0021-88
Sample Matrix: Soil
Conc. Unit: mg/KG
Date Received: 7-23-88
Date Reported: 9-13-88
Dilution Factor: NA
%Moisture: 10.3

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071481, 88071458-88071461,
88071477-88071478

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	Duplicate RPD	Spike Recovery SA	Spike Recovery SR	Spike Recovery SSR	Spike Recovery PR	Notes
Arsenic	88071481	88071481	8-31-88	8-02-88	7060	<1.0	6.46	6.24	4	4.46	6.46	9.03	58N	
Selenium	88071481	88071481	8-31-88	8-02-88	7740	<1.0	<0.5	<0.5	NC	4.46	<0.5	3.12	70	

NOTE: If % moisture is reported, results are presented on a dry-weight basis.
N See legend attached

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: CVM-S-0013-88
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Received: 8-16-88
Date Reported: 10-10-88
Dilution Factor: NA
%Moisture: 20.3

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88081891-88081895, 88081918-88081919
88071460-88071461, 88071477-88071478

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate C1	Duplicate C2	Duplicate RPD	Spike Recovery SA	Spike Recovery SR	Spike Recovery SSR	Spike Recovery PR	Notes
Mercury	88081891	88081891	9-12-88	9-12-88	7471	<0.1	<0.1	<0.1	NC	1.25	<0.1	1.32	105	

NOTE: If moisture is reported, results are presented on a dry-weight basis.

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

C1 = Concentration One
C2 = Concentration Two

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071571

QC Report No: AAF-W-0024-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: NA
Date Reported: 9-14-88
Dilution Factor: NA

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate MS	Duplicate MSD	Duplicate RPD	Spike Recovery SA	Spike Recovery SR	Spike Recovery PR	PR	Notes
Arsenic	Blank MSD	Blank MS	8-19-88	8-09-88	206.2	<0.01	0.0336	0.0362	7	0.0400	-	84	90	
Selenium	Blank MSD	Blank MS	8-18-88	8-09-88	270.2	<0.01	0.0092	0.0086	7	0.0100	-	92	86	
Lead	Blank MSD	Blank MS	8-16-88	8-09-88	239.2	<0.02	0.0197	0.0193	2	0.0200	-	98	96	
Thallium	Blank MSD	Blank MS	8-11-88	8-09-88	279.2	<0.1	0.0459	0.0459	0	0.0500	-	92	92	

Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2} \times 100$

Percent Recovery (PR) = $\frac{MSD - MS}{SA} \times 100$

MS = Spike Blank
MSD = Spike Blank Duplicate

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY
METALS

Job No.: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

QC Report No: ICP-W-0045-88
Sample Matrix: Water
Conc. Unit: ug/L
Date Received: NA
Date Reported: 9-14-88
Dilution Factor: NA

Project: Rickenbacker ANGB

QC Report for Laboratory Sample No(s):
88071571

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	Duplicate MS	Duplicate MSD	Duplicate RPD	Spike Recovery SA	Spike Recovery SR	Spike Recovery PR	PR	Notes
Chromium	Blank MSD	Blank MS	8-10-88	8-09-88	200.7	<0.05	0.191	0.191	0	0.200	-	96	96	
Copper	Blank MSD	Blank MS	8-10-88	8-09-88	200.7	<0.025	0.964	0.967	3	1.00	-	96	97	
Nickel	Blank MSD	Blank MS	8-10-88	8-09-88	200.7	<0.04	0.470	0.467	1	0.500	-	94	93	
Silver	Blank MSD	Blank MS	8-10-88	8-09-88	200.7	<0.05	0.0439	0.0433	1	0.0500	-	88	87	
Zinc	Blank MSD	Blank MS	8-10-88	8-09-88	200.7	<0.02	0.479	0.481	4	0.500	-	96	96	

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2} \times 100$

Percent Recovery (PR) = $\frac{MSD - MS}{SA} \times 100$

MS = Spike Blank
MSD = Spike Blank Duplicate
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

METHOD BLANK SUMMARY

Job No: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Soil
Conc. Unit: ug/Kg
Date Reported: 7-20-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL.TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
V3573	6-27-88	VOA	2	75-09-2	Dichloromethane	2000	630	88061114-88061115
V3579	6-27-88	VOA	2	75-09-2	Dichloromethane	730	630	88061116
V3591	6-28-88	VOA	2	75-09-2	Dichloromethane	15	5	88061117-88061119
E5045	6-24-88	BNA	1	---	None Found	-	-	88061106-88061124

METHOD BLANK SUMMARY

Job No: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Soil
Conc. Unit: ug/Kg
Date Reported: 7-15-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL.TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
V3752	7-11-88	VOA	2	75.09.2	Dichloromethane	6.9	5.0	88071315-88071318
V3761	7-12-88	VOA	2	75.09.2	Dichloromethane	16	5	88071319-88071321
E5303	7-26-88	BNA	1	--	None found	--	--	88071315-88071321

METHOD BLANK SUMMARY

Job No: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Soil
Conc. Unit: ug/Kg
Date Reported: 8-10-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL.TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
V3852	7-27-88	VOA	2	67-64-1	Acetone	2100	12500	88071460, 88071460 MS
				78-93-3	2-Butanone	5600	12500	88071460 MSD
V3856	7-27-88	VOA	2	67-64-1	Acetone	1300	12500	88071461
				78-93-3	2-Butanone	5000	12500	

METHOD BLANK SUMMARY

Job No: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Work Order No.: 788
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Reported: 8-17-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL.TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
V3908	8-04-88	VOA	2	-	Not Detected	-	-	88071556-88071558

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Work Order No.: 1011

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 02-07-89

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
W0013	10-03-88	VOA	1	75-09-2 67-64-1	Dichloromethane Acetone	6 27J	5 100	88092533-88092535
W0018	10-03-88	VOA	1	67-64-1	Acetone	37J	100	88092537-88092539
V4815	11-14-88	VOA	2	75-09-2	Dichloromethane	14	5	88092536

J - See Legend attached

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Work Order No.: 1032

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 02-07-89

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
W0029	10-04-88	VOA	1	75-09-2	Dichloromethane	30	5	88092643, 88092645 88092646

METHOD BLANK SUMMARY

Job No: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Work Order No.: 780
Sample Matrix: Soil
Conc. Unit: ug/KG
Date Reported: 8-17-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL.TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
E5376	8-03-88	BNA	1	-	None Found	-	-	88071506-88071507
E5376	8-03-88	BNA	1	-	None Found	-	-	88071513-88071515
E5412	8-08-88	BNA	1	84-74-2	Di-n-butylphthalate PVC	1800	330	88071556-88071558

METHOD BLANK SUMMARY

Job No: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Soil
Conc. Unit: ug/Kg
Date Reported: 8-10-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL.TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
E5390	8-04-88	BNA	1	84-74-2	Di-n-butylphthalate	1500	330	88071458-88071461
				85-68-7	Butylbenzylphthalate	1100	330	
				117-81-7	bis(2ethylhexyl)phthalate	1900	330	

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 9-23-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
E5577	9-13-88	AC	2	-	None Found	-	-	88081571
E5580	9-13-88	BN	2	-	bis-2-ethylhexylphthalate	17	10	88081571

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Work Order No.: 1011

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 02-07-89

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
S0347	11-03-88	AC	1	-	None Found	-	-	88092533-88092538
S0346	11-03-88	BN	I	117-81-7	bis-2-ethylhexylphthalate	10	10	88092533-88092538

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Work Order No.: 1032

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 02-07-89

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
E6124	11-07-88	AC	2	-	None Detected	-	-	88092642, 88092643 88092646
E6125	11-07-88	BN	2	117-81-7	bis-2-ethylhexylphthalate	12	10	88092642, 88092643 88092646

METHOD BLANK SUMMARY

Job No: CL115

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Soil
Conc. Unit: ug/KG
Date Reported: 8-22-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL.TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
C725A06A	7-25-88	OCP	Mixed Phase	-	None Found	-	-	88061106-88061120

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Soil
Conc. Unit: ug/KG
Date Reported: 9-19-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
A831-30	8-31-88	OCP	Mixed Phase	-	None Found	-	-	88071494-88071495
A818A60A	8-19-88	OCP	OV-1	-	None Found	-	-	88071506-88071507
A816A21A	8-17-88	OCP	Mixed Phase	-	None Found	-	-	88071513-88071515
A818A68A	8-19-88	OCP	OV-1	-	None Found	-	-	88071556-88071558

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Soil
Conc. Unit: ug/KG
Date Reported: 9-15-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
A802A26A	8-04-88	OCP	Mixed Phase	-	None Found	-	-	88071460-88071461

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Soil
Conc. Unit: mg/Kg
Date Reported: 9-23-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
B912A13A	9-13-88	OCP	OV-1	-	None Found	-	-	88081762-88081765 88081769-88081770

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 11-15-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
PT101088-52	10-11-88	OCP	Mixed	-	None detected	-	-	88092533-88092538

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 11-16-88

Laboratory Supervisor Approval:

RW Burton

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
PT0108871	10-12-88	OCP	Mixed	-	None detected	-	-	88092643, 88092646, 88092721, 88092680, 88092692

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 11-15-88

Laboratory Supervisor Approval:

RWBurton

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
PT101088-71	10-12-88	OCP	Mixed	-	None detected	-	-	88092643, 88092647, 88092721, 88092686, 88092692

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 11-16-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
BA26A22A	10-27-88	OCP	OV-1	-	None detected	-	-	88102870-88102871, 88102956-88102957, 88102960-88102961

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 9-16-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
V3889	8-02-88	VOA	2	75-09-2	Dichloromethane	13	5	88071571

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 8-29-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
V4109	8-24-88	VOA	2	75-09-2	Dichloromethane	8	5	88081771
				67-64-1	Acetone	56	100	

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Work Order No.: 1104

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 02-09-89

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
A0087	10-18-88	VOA	1	-	None Detected	-	-	88102956, 88102958 88102959
A0103	10-19-88	VOA	1	75-09-2 67-64-1	Dichloromethane Acetone	5 20J	5 100	88102957

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Soil
Conc. Unit: ug/KG
Date Reported: 10-18-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
E5737	9-28-88	BNA	2	-	None Found	-	-	88081730-88081731 88081769-88081770 88081775-88081783

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Work Order No.: 1104

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 01-26-89

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
S0576	11-22-88	AC	1	-	None Detected	-	-	88102956, 88102957 88102960
S0577	11-22-88	BN	1	84-66-2	Diethylphthalate	28	10	88102956-88102957 88102960
				117-81-7	bis-2-ethylhexylphthalate	18	10	88102956-88102957 88102960
E6311	11-22-88	AC	2	-	None Detected	-	-	88102961 88102961 MS 88102961 MSD
E6312	11-22-88	BN	2	117-81-7	bis-2-ethylhexylphthalate	20	10	88102961 88102961 MS 88102961 MSD

METHOD BLANK SUMMARY

Job No: CL115.05

Client: ES Cleveland
Attn: Bill Hughes
Address: 19101 Villaview Road
Suite 301
Cleveland, Ohio 44119

Project: Rickenbacker ANGB

Sample Matrix: Water
Conc. Unit: ug/L
Date Reported: 9-15-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instrument ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.
A818A16A	8-18-88	OCP	Mixed Phase	-	None Found	-	-	88071571

ENGINEERING-SCIENCE

19101 VILLAVIEW ROAD, SUITE 301, CLEVELAND, OHIO 44119 • 216/486-9005

Chain-of Custody Record

696-1

PROJ. NO.: CL115

PROJECT NAME/LOCATION: Rickenbacker ANGB

SAMPLERS: (Signature) Chris Viani

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	Pesticides (8080) Herb (8150)	PCB (8080)	Pri. pollut. metals	Semi-vol (8270) priority pollutant scan			REMARKS	
	6/14/88				RB-01-SU1+2-GS1	3-8oz	X	X	X	X			Soil	881106
	6/14				RB-01-SU3+4-GS1	"	X	X	X	X				881107
	6/14				RB-01-SU5+6-GS1	"	X	X	X	X				881108
	6/14				RB-01-SU7+8-GS1	"	X	X	X	X				881109
	6/14				RB-01-SU9+10-GS1	"	X	X	X	X				881110
	6/14				RB-01-SU11+12-GS1	"	X	X	X	X				881111
	6/14				RB-01-SU13+14-GS1	"	X	X	X	X				881112
	6/14				RB-01-SU15+16-GS1	"	X	X	X	X				881113
	6/14				RB-01-HB1-SS1	2-8oz 1-4oz					X			881114
	6/14				RB-01-HB1-SS2	"					X		1-8oz. jar lid cracked. Do Not Use as per J. Bischop. 6-16-88	
	6/14				RB-01-HB1-SS3	"					X			881116
	6/14				RB-01-HB2+3-SS1	"					X		missing 4oz. container	881117
	6/14				RB-01-HB2-SS2	"					X			881118
	6/14				RB-01-HB2-SS3	"					X		1-8oz lid cracked - still useable missing 4oz jar use 8oz.	
	6/14				RB-01-SU17+18-GS1	3-8oz	X	X	X	X				881120

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Chris Viani	6/15 1300				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Bill Friedman	6/16/88 14:25	Proj. Mgr. Bill Hughes ES-Cleveland.	

Distribution Original Accompanies Shipment. Copy returned with Report.

ENGINEERING-SCIENCE

19101 VILLAVIEW ROAD, SUITE 301, CLEVELAND, OHIO 44119 • 216/486-9005

Chain-of Custody Record

729

PROJ. NO.: CL115

PROJECT NAME/LOCATION: Rickenbacker ANGB

SAMPLERS: (Signature) Chris Vorin / Mark J. Schumacher / W. D. Hughes

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	8240	8270	8080	Pr. Poll. Metals			Tip Screening	REMARKS
	7/6/88	1045			RB-01-HB4 SS1	3	X	X	X	X			1.7	881315
	7/6	1050			RB01 HB4 SS2	3	↓	↓	↓	↓			1.7	881316
	7/6	1055			RB01 HB4 SS3	3	↓	↓	↓	↓			2.0 ppm	881317
	7/6	1100			RB01 HB5 SS1	3	↓	↓	↓	↓			2.5 ppm	881318
	7/6	1500			RB01 HB6 SS2	3	↓	↓	↓	↓			2.0	881319
	7/6	1505			RB01 HB6 SS3	3	↓	↓	↓	↓			2.3 ppm	881320
	7/6	1515			RB01 HB6 SS1	3	↓	↓	↓	↓			1.9 ppm	881321

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
W. D. Hughes	7/6/88 1707	Fedex # 7849699642			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Bill Tudman	7/7/88 12:32	rec'd cold & intact. Parameters on COC are correct - do not run 8150 as on bottles re: J. Bisch 7-7-88	

Distribution Original Accompanies Shipment. Copy returned with Report.

ENGINEERING-SCIENCE

19101 VILLAVIEW ROAD, SUITE 301, CLEVELAND, OHIO 44119 • 216/486-9005

Chain-of Custody Record

835, 836, 837, 838, 839

PROJ. NO.: CL115

PROJECT NAME/LOCATION: RICKENBACKER ANGB

SAMPLERS: (Signature) Omar J Schmidt / C. VIANI

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	8080	8150	P.P. metals	~~PCBs~~ 8080's only per K²	418.1	LEAD	PRIORITY POLLUTANT SCAN	8240	REMARKS
	8-10/88	0900			RB-24-MW2-SS1	3	—	—	—	—					881762 Hnu Soil 50 835
		0930			RB-24-MW2-SS2	3	—	—	—	—					IF enough sample, also run 8240. 881763 100
		0845			RB-15-MW2-SS1	1					X	X			S.F. 881766 2 836
		0845			RB-15-MW2-SS2	1					X	X			881767 2
		0845			RB-15-MW2-SS3	1					X	X			881768 2
		1330			RB-24-MW3-SS2	3	—	—	—	—					run 8240 if 881764 5 835
		1315			RB-24-MW3-SS1	3	—	—	—	—					sufficient sample 881765 0
		1340			RB-1-MW3-SS1	3							X		881769 S.F. 10 837
		1340			RB-1-MW3-SS2	3							X		881770 8
		1700			TRIP BLANK - 8/10-1801	1								X	881771 838
		1600			RB-24-MW3-SW1	4	X	X	X	X					RINSE 881772 839

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Bill Douglas	8/10/88 1800	FED EXP. 7849699874			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature) [signature]	Date / Time 08/11/88 1700	Remarks All Samples received cold and intact (received only 2 samples of RB-24-MW2-SS2 JHS) Trip Blank has air bubble	

Distribution Original Accompanies Shipment. Copy returned with Report.

RB-24-MW3-SW1 metals split pH < 2, 8080 8150, split pH = 6 B.F.

ENGINEERING-SCIENCE

1011

19101 VILLAVIEW ROAD, SUITE 301, CLEVELAND, OHIO 44119 • 216/486-9005

Chain-of Custody Record

PROJ. NO. CL115

PROJECT NAME/LOCATION Rickenbacker ANGB, OH

SAMPLERS: (Signature) W D Hughes Richard W. Volpi

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	Total PP Metals	8240	8080	8270			REMARKS
	9/19/88	1130		X	RB9 MW1 GW1	6	X	X					882533 ** *
	9/19/88	1300		X	RB25 MW4 GW1	9	X	X	X	X			882538
	9/19/88	1615		X	RB1 MW1 SW1	6	X	X		88253			Rinseate Blank
	9/19/88	—		X	Trip Blank 9/19/88	1		X					Trip Blank 882539
	9/19/88	1700		X	RB1 MW2 GW1	6	X	X					882535
	9/19/88	1535		X	RB30 MW1 GW1	6	X	X					882536 *
	9/19/88	1530		X	RB1 MW1 GW1	6	X	X					882537 *

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
W D Hughes	9/19/88 1800	Fed Ex Airbill # 7849698813			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time		

Remarks: ** BOTH METALS BOTTLES ARRIVED UNPRESERVED
* 1 METALS BOTTLE UNPRESERVED PRESERVED IN LAB

Distribution Original Accompanies Shipment. Copy returned with Report.

ENGINEERING-SCIENCE

19101 VILLAVIEW ROAD, SUITE 301, CLEVELAND, OHIO 44119 • 216/486-9005

Chain-of Custody Record

762, 763, 764

PROJ. NO.: CL115

PROJECT NAME/LOCATION: Rickenbacker ANGB

SAMPLERS: (Signature) M D Hughes

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	PARAMETER: Total Pet. Hydrocarb. (added 5 ml HCL)	Pri. Poll Metals (added 5 ml HNO3)	8270	Sulfates	PH/Alkalinity & Acidity	8080, 8240	REMARKS
	7/20/88	820		X	RB19 DS1 SW1	7	X	X	X	X	X		WATER PHOTOVAC TIP 881456
	7/20/88	945		X	RB19 DS2 SW1	7	X	X	X	X	X		881457
	7/19/88	1430			RB-19-AB1-SS1	2	X	X	X	X	X		SOIL 881458 1.2 Do Not run Acid + Alk on soils as per T. Bisch 7/15/88
	7/19/88	1430			RB-19-AB1-SS2	2	X	X	X	X	X		881459 16.0
	7/20	1015			RB-1-MW1-SS1	3		X	X			X	881460 1130
	7/20	1030			RB-1-MW1-SS2	3		X	X			X	881461 1200
							H2O Samples		PH				
						all	1	1	6	6	6		All samples were preserved as noted

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
M D Hughes	7/20/88 1035	Mark J Schuster	Mark J Schuster	7/20/88 1700	FED EXP 7849699686
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature) Jackie Harold Santos Jr.	Date / Time 07/21/88 11:00	Remarks Samples received cold and intact	

Distribution Original Accompanies Shipment. Copy returned with Report.

ENGINEERING-SCIENCE

1011

19101 VILLAVIEW ROAD, SUITE 301, CLEVELAND, OHIO 44110 • 216/486-9005

Chain-of Custody Record

PROJ. NO.: CL115

PROJECT NAME/LOCATION: Rickenbacker ANGB, OH

SAMPLERS: (Signature) [signature] Richard W. Volpi

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	PARAMETER 8080	PARAMETER 8270					REMARKS
	9/19/88	1130		X	RB9 MW1 GW1	3	X	X					1 bottle arrived broken 882533
	9/19/88	~~1615~~		X	RB1 MW1 SW1	3	X	X					882534
	9/19/88	1700		X	RB1 MW2 GW1	3	X	X					882535
	9/19/88	1535		X	RB30 MW1 GW1	3	X	X					882536
	9/19/88	1530		X	RB1 MW1 GW1	3	X	X					882537

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	9/19/88 1805	Fed Ex Airbill # 7849698813			Floyd Abney 9/20 1500
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: ALL OTHER SAMPLES RECEIVED COLD + IN TACT. #1	

Distribution Original Accompanies Shipment. Copy returned with Report.

ENGINEERING-SCIENCE

10101 VILLAVIEW ROAD, SUITE 301, CLEVELAND, OHIO 44119 • 216/486-9005

1032

Chain-of Custody Record

PROJ. NO.: CL115

PROJECT NAME/LOCATION: RICKENBACKER ANGB

SAMPLERS: (Signature) Thomas W. Volpi

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	418.1	LEAD	PP METALS	8270	SULFATES ALKALINITY	8080	8240	REMARKS
	9-22	18:00			RB6 MW1 GW1	1	✓							882641 ~~882642~~ *
	9-22	17:00			RB20 MW2 GW1	6	✓	✓	✓	✓				882642
	9-22	18:45			RB1 MW3 GW1	9		✓	✓		✓	✓		882643
	9-22	8:00			RB16 MW1 SW1	2	✓							882644
	9-22				TRIP BLANK 9-22-88	1				882645		✓		TRIP BLANK 8/16/88
	9-22	17:50			RBHC MW1 GW1	4						✓		882646

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Thomas W. Volpi	9-22 20:00	FEDEX 7849698861			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Debra M. Navarro	09/24/88 14:00	Samples received cold + intact. * one extra 1 amber received for RB6-MW1-GW1, 418.1	

Distribution Original Accompanies Shipment. Copy returned with Report.

ENGINEERING-SCIENCE

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Chain-of Custody Record

788-1, 789-1, 790, 791 HYDROCARBONS

WO 788 - As per J. Bischop 8-1-88 run P. Poll. Scan not whats on COC.

PROJ. NO.	PROJECT NAME/LOCATION
CL115	Rickenbacker ANGB

SAMPLERS: (Signature) Chris Vian / Mark J Schuler

STA. NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	PARAMETER: Priority pollutants	Priority pollutants	Metals	Total petroleum	8020			REMARKS: Hnu (ppm)
	7/29/88	0900			RB-1-MW2-SS1	3		X	X	X			Soil	881556 0
		0915			RB-1-MW2-SS2									881557 0 788
		1000			RB-1-MW2-SS3									881558 0
		1:00			RB-1-MW2-SW1	8					881557		Water	- rinseate blank AS per bottle not COC. ~~790~~ 791
		0815			RB-12-HB11-SS1	2							Soil	881559 20 789
		0815			RB-12-HB11-SS2	2								881560 14
		0815			RB-12-HB11-SS3	2								881561 40
		1050			RB-21-HB7-SS1	2								881562 16 790
		1050			RB-21-HB7-SS2	2								881563 30
		1050			RB-21-HB7-SS3	2								881564 14
		1030			RB-21-HB6-SS1	2								881565 70
		1030			RB-21-HB6-SS2	2								881566 50
		1030			RB-21-HB6-SS3	2								881567 60
		1030			RB-21-HB5-SS1	2								881568 150
		1030			RB-21-HB5-SS2	2								881569 100

Get 8010, 8020, TRC, 418.1

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Mark J Schuler	7/29 1400	FED EXP 7849699782			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time		
		Bill Friedman	7-30-88 13:30		

Remarks: RB-21-HB6-SS1 8oz. broken & 4oz. cracked & put intact. RB21-HB7-SS3 lid cracked and not screwed on (2 8oz). pH<2 confirmed for metals splits. pH = 7 for 8080/8270 splits B.F. 7-30-88

Distribution Original Accompanies Shipment. Copy returned with Report.

ENGINEERING-SCIENCE

19101 VILLAVIEW ROAD, SUITE 301, CLEVELAND, OHIO 44119 • 216/486-9005

1104

Chain-of Custody Record

PROJ. NO.: CL115

PROJECT NAME/LOCATION: Rickenbacker ANGB, Ohio

SAMPLERS: (Signature) [illegible] / Gregory O. Carpenter

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	8080	8270					REMARKS
	17 Oct 88	1215			RB23 MW2 GW2	3	X	X					282060
	17 Oct 88	1600			RB1 MW3 GW2	3	X	X					282061

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	17 Oct 88 / 1615	Fed Ex Airbill # 7849711785			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[illegible] Navarro	10/18/88 / 1030	Samples received cold + intact.	

Distribution Original Accompanies Shipment. Copy returned with Report.

ENGINEERING-SCIENCE

19101 VILLAVIEW ROAD, SUITE 301, CLEVELAND, OHIO 44119 • 216/486-9005

1104, 1105

Chain-of Custody Record

PROJ. NO.: CL115

PROJECT NAME/LOCATION: Rickenbacker ANGB, Ohio

SAMPLERS: (Signature) W D Hughes / Gregory O. Carpenter

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	Total PP Metals	8240	8270	8080			REMARKS
	17 Oct 88	1510		X	RB25 DS14 BS2	2	X						882962
	17 Oct 88	1515		X	RB25 DS15 BS2	2	X						882963
	17 Oct 88	1530		X	RB25 DS16 BS2	2	X						882964
	17 Oct 88	1440		X	RB27 DS2 BS2	2	X						882965
	17 Oct 88	1440		X	RB27 DS1 BS2	2	X						882966
	17 Oct 88	1510		X	RB25 DS32 BS2	2	X						882967
	17 Oct 88	1440		X	RB25 DS12 BS2	1	X						882968
	17 Oct 88	1130		X	RB25 DS22 BS2	1	X						882969
	17 Oct 88	1430		X	RB25 DS11 BS2	1	X						882970
	17 Oct 88	1500		X	RB25 DS13 BS2	1	X						882971
				X	Trip Blank 10/17/88-8/16/88	1		X					882952
	17 Oct 88	1620		X	Field Blank 10/17/88	7		X	X	X			Field Blank 882956
	17 Oct 88	1615		X	RB1 MW3 SW1	7		X	X	X			Rinse Blank 882957
	17 Oct 88	1115		X	RB25 MW1 GW2	4		X					882958 ~~882957~~ DN

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
W D Hughes	10/17/88 1815	Fed Ex 7849 Airbill 1711785			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Velma Navarro	10/18/88 1025	Samples received cold + intact.	

Distribution Original Accompanies Shipment. Copy returned with Report.