NASA

NASA Lewis Research Center

Site Insp[illegible]n Report

Plum Brook Station
Sandusky, Ohio

W.O. #4065-6128-004

Volume 1

January 1994

MORRISON KNUDSEN CORPORATION

MK-FERGUSON GROUP

200-1e

G05OH0018--_01.06_1044_a

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7. PMU 4
8. PMU 5
9. West Area Red Water Ponds
10. Pentolite Road Red Water Ponds
11. TNT Area "B"

ACRONYMS		PAGE
NASA	National Aeronautics and Space Administration	1.1
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980	1.1
MK	Morrison Knudsen Corporation	1.1
SI	Site Investigation, under CERCLA	1.1
PBS	Plum Brook Station	1.1
PA	Preliminary Assessment	1.1
HRS	Hazardous Ranking System	1.1
LeRC	Lewis Research Center	1.1
ACOE	Army Corps of Engineers	1.3
PBOW	Plum Brook Ordnance Works	1.3
TNT	Tri Nitro Toluene	1.3
DNT	Dinitrotoluene	1.3
D&D	Decontamination and Decommissioning	1.3
GSA	General Services Administration	1.3
NACA	National Advisory Committee for Aeronautics	1.3
PBRF	Plum Brook Reactor Facility	1.3
AEC	Atomic Energy Commission	1.4
NRC	Nuclear Regulatory Commission	1.4
HTF	Hypersonic Tunnel Facility	1.5
SPF	Space Power Facility	1.5
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	ACRONYMS	PAGE
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G Site	G Site Complex, demolished in 1964	1.4
I Site	Fluorine Pump Site	1.4
J Site	Oxidizer Hydraulics Lab	1.5
K Site	Cryogenic Propellant Tank Site	1.5
DOE	Department of Energy	1.5
NPDES	National Pollution Discharge Elimination System	1.6
OEPA	Ohio Environmental Protection Agency	1.6
NWDO	Northwest District Office (of OEPA)	1.6
USEPA	United States Environmental Protection Agency	1.7
RCRA	Resource Conservation and Recovery Act	1.7
CAA	Federal Clean Air Act	1.7
PTI	Permit to Install (air sources)	1.7
PTO	Permit to Operate (air sources)	1.7
EIS	Environmental Impact Statement	1.8
ERD	Environmental Resources Document	1.8
NEPA	National Environmental Policy Act	1.8
PCBs	Polychlorinated Biphenyls	1.8
DSHWM	Division of Solid and Hazardous Waste Management, under CERCLA	1.8
NRC	National Response Center	1.9
STP	Sewage Treatment Plant	1.10
ACM	Asbestos Containing Material	1.12
UST	Underground Storage Tank	1.12
SAIC	Science Applications International Corporation	1.13
IT	International Technology Corporation	1.13
NOAA	National Oceanic and Atmospheric Administration	2.2
ODNR	Ohio Department of National Resources	2.2

	ACRONYMS	PAGE
NAAQS	National Ambient Air Quality Standard	2.15
ASTM	American Society for Testing Materials	3.1
ID	Inner Diameter (drilling term)	3.1
USCS	United Soil Classification System	3.1
PVC	Polyvinyl Chloride	3.1
TOC	Top of Casing (monitor wells)	3.1
MSL	Mean Sea Level	3.1
PMU	Project Management Unit	4.1
MCL	Maximum Contaminant Level	4.9
SMCL	Secondary Maximum Contaminant Level	4.9
"SD"	Sediment Sample	4.10
"SW"	Surface Water Sample	4.10
POE	Point of Entry	4.10
MDL	Method Detection Limit	4.10
"SB"	Soil Boring Sample (with drill rig)	4.23
"SS"	Soil Sample (with hand auger)	4.23

SECTION 1
INTRODUCTION

Under the direction of the National Aeronautics and Space Administration (NASA) and in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Morrison Knudsen Corporation (MK) performed a Site Inspection (SI) at the NASA Plum Brook Station (PBS) facility in Sandusky, Ohio. The purpose of the investigation was to collect information concerning conditions at the facility sufficient to assess the threat posed to human health and the environment and to determine the need for any additional investigation. This investigation included reviewing previous information, sampling waste and environmental media to test Preliminary Assessment (PA) hypotheses, evaluating and documenting Hazardous Ranking System (HRS) factors, and collecting additional non-sampling information.

1.1 SITE BACKGROUND

PBS is a satellite operation of NASA's Lewis Research Center (LeRC) in Cleveland, Ohio. Most of the aerospace test facilities established in the 1960s at Plum Brook Station are in standby or inactive condition.

1.2 SITE DESCRIPTION AND HISTORY

PBS is located 50 miles west of LeRC and approximately 4 radial miles south of the Lake Erie port of Sandusky, Ohio. Areas surrounding Plum Brook Station are primarily agricultural and rural. Much of the agricultural lands are used for crop production. Most of PBS is situated on undisturbed forested land, located in Perkins and Oxford townships. The eastern edge of the site extends into Huron and Milan townships (See Figure 1-1).

The site is served by an internal paved road system totaling 62.5 miles and a currently unused 15.7-mile rail system. The site is bounded on the north by Bogart Road, on the south by Mason Road, on the east by U.S. Highway 250, and on the west by County Road 43.

Plum Brook Station is located on what was once a flat lake bottom formed from glacial melt waters. The original PBS consisted of 9,009 acres, approximately 6,500 acres of which currently make up the station. The northernmost boundary of PBS occurs at latitude 41°23'39". The site extends as far south as latitude 41°20'04'. The western most longitude occurs at 82°43'12" and the eastern boundary at 82°38'39". NASA LeRC controls the land associated with PBS through ownership of title, use of easements, leases, permits, and ownership of development rights.

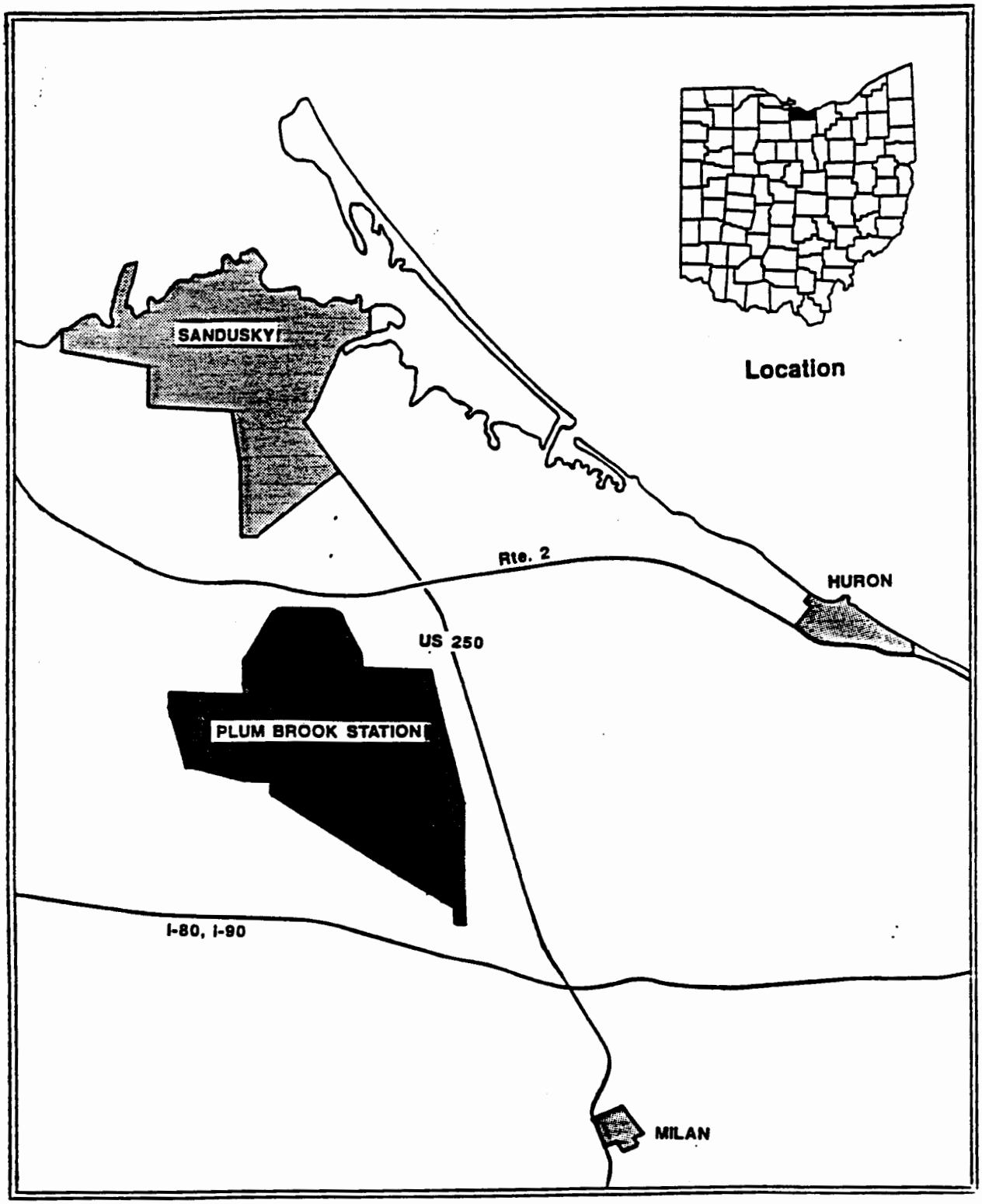


FIGURE 1.1
FACILITY LOCATION MAP

The U.S. Army established the Plum Brook Ordnance Works (PBOW) in the early 1940s to manufacture ordnance [trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite] for World War II, pursuant to a contract between the U.S. Army and Trojan Powder Company. Production began on December 16, 1941 and continued through late 1945. The official title for the site during this time was the PBOW. Production ceased two weeks after V-J Day. During the production period, more than one billion pounds of ordnance were manufactured.

PBOW was in standby condition from 1945 to 1946. During this time, the Army conducted decontamination and decommissioning (D&D) of many of the buildings and structures associated with the manufacture of ordnance. Decontamination efforts on all TNT and DNT lines began in September 1945. Decontamination of TNT lines, acid lines, pentolite lines, and DNT lines was halted during the last quarter of 1945. Typical D&D methods for buildings and structures involved removal and relocation of all explosives to a burning ground where they were burned. Where possible, remaining buildings and structures were burned to the ground. Steam lines and drain lines were flushed and dismantled. There is no indication in PBOW historical records of where lines were flushed. It is estimated that 65 percent of the necessary decontamination of PBOW was completed by December 1945. Physical custody of PBOW was transferred from Trojan Powder Company to the U.S. Army Ordnance Department in December 1945.

The Ordnance Department became the accountable agency and the U.S. Army Corps of Engineers (ACOE) assumed responsibility for maintenance and custodial duties at PBOW from January 1 through June 30, 1946. After further decontamination efforts were completed and the extent of contamination certified, PBOW was transferred to the War Assets Administration in August 1946. Matthew-Levio and Sons protected and maintained the property from 1946 to 1949. In 1949, PBOW/PBS was transferred to the General Services Administration (GSA), which maintained oversight of the facility until August 1954. Ravenna Arsenal conducted further decontamination efforts from 1954 to 1958.

The site remained virtually "mothballed" from 1945 until 1956, when the National Advisory Committee for Aeronautics (NACA) determined that the former PBOW was a suitable site to locate a new test reactor. An agreement was made in 1956 for a lease of 500 acres on the northern portion of the site to construct and operate the Plum Brook Reactor Facility (PBRF). In October 1958, NACA became the National Aeronautics and Space Administration (NASA).

NASA accepted the facility in 1963 after Ravenna Arsenal certified that PBOW had been completely decontaminated and was suitable for unrestricted future use. After acceptance, NASA identified further areas that required decontamination. In 1964, NASA continued site decontamination and removal of structures. NASA operated the PBRF from 1963 to 1973 under a license agreement with the Atomic Energy Commission

(AEC). NASA currently has a license agreement with the Nuclear Regulatory Commission (NRC) for safe protective storage of the PBRF.

NASA acquired an additional 6,000 acres of the former PBOW on March 15, 1963, for the purpose of conducting various aerospace research activities. Throughout the 1960s, NASA constructed various test and research activities at PBS to support their aerospace program. The major research facilities that evolved in the 1960s are:

- *Liquid Hydrogen Pump Site (A Site Complex)* - This facility was utilized to test liquid hydrogen research pumps of various designs up to pump speeds of 60,000 revolutions per minute.

- *High Energy Rocket Engine Research Facility (B1 Site Complex)* - This facility was designed to test propellant systems at high altitude conditions.

- *Space Propulsion Research Facility (B2 Site Complex)* - This facility was utilized to test space vehicles and upper stage rocket engines in a simulated space environment.

- *Rocket Dynamics and Control Facility (B3 Site Complex)* - This facility was utilized for altitude tests on various components for large rocket engines as well as for other research and development projects.

- *Turbo Pump Site (C Site Complex)* - This facility was utilized for research on liquid hydrogen turbo pumps and pump inducers.

- *Controls and Turbine Test Site (D Site Complex)* - This facility was utilized to test research turbines in order to design drive turbines for rocket propellant pumps for chemical and nuclear engines.

- *Dynamics Stand (E Site Complex) Space Power Facility* - This facility is a 144 feet test stand equipped with electromagnetic shake devices. It was used to simulate forces spacecraft are expected to encounter during launch and in flight.

- *Hydraulics Lab (F Site Complex)* - At this test site, cryogenic liquids such as liquid hydrogen were passed through test set-ups to obtain data on various fluid flow conditions.

- *G Site Complex* - This test site was utilized to test turbo pumps. During a 1964 test, hydrogen leaking from a pump caused an explosion and complete destruction of the G Site Complex. The research being conducted at the site was near completion at that time. The site was demolished and has not been used since.

- *Fluorine Pump Site (I Site Complex)* - At this site, liquid fluorine pumps with

speeds up to 20,000 revolutions per minute and flow rates of 50 pounds per second were tested.

- *Oxidizer Hydraulics Lab (J Site Complex)* - Rocket engine oxidizer system components were tested at this facility to determine how they reacted with other materials.

- *Cryogenic Propellant Tank Site (K Site Complex)* - This facility was used to test propellant tank insulation systems and to determine pressurizing gas requirements during propellant outflow. The tank served as a research test chamber where liquid hydrogen rocket fuel tanks were tested.

- *Hypersonic Tunnel Facility (HTF)* - In this facility, air velocities and temperatures were created to simulate rocket flight speeds up to seven times the speed of sound and altitude conditions up to 120,000 feet.

- *Space Power Facility (SPF)* - This facility is a very large vacuum tank used for the testing of spacecraft and/or their subsystems and components in a simulated space environment. The vacuum chamber is the largest in existence. It was also designed to accommodate tests involving reactor operations but was never utilized for that purpose. In 1979, the facility was modified for use by Garrett Corporation to produce uranium hexafluoride gas centrifuges for the Department of Energy (DOE). The facility was utilized for this purpose from August 1979 through November 1986.

On June 30, 1974, PBS was placed in a standby condition. A skeleton crew of NASA personnel provided maintenance and oversight of Plum Brook Station during its standby period. NASA declared approximately 2,152 acres of the original 9,009 acres as excess in April 1978. The Perkins Township Board of Education received 46 of the excess acres, which included buildings 7142, 7144, 7191, 7192, 7193, 7231, 7232, and 8232. The Perkins Township Board of Education uses the land as a bus transportation center.

From 1980 through 1986, the Space Power Facility (SPF) was utilized by Garrett Corporation to produce uranium hexafluoride gas centrifuges for the Department of Energy (DOE). In 1988 Plum Brook Station began emerging from standby status and began utilizing the following major aerospace facilities: SPF, Space Propulsion Research Facility (B-2 Facility), the Cryogenic Propellant Tank Site (K-Site), and Hypersonic Tunnel Facility (HTF).

NASA presently controls approximately 6,400 acres at the site. Additionally, NASA has a use permit with the Ohio Air National Guard for 604 acres. Local farmers lease approximately 900 acres.

There are approximately 106 permanent buildings and structures on the PBS site and 99

munitions bunkers which were constructed when the facility was an ordnance plant. The munitions bunkers are currently used for the storage of materials, equipment, and records. The remaining buildings and structures include offices, test facilities, mechanical or process equipment, and shipping and receiving areas. An additional 28 structures on the site include substations, sanitary wastewater treatment facilities, and cooling towers. All the test facilities located at the site are remotely located from each other.

Electric power is provided to the facility by the Ohio Edison Company. Potable water is supplied by the City of Sandusky. Raw water, used for cooling, testing, and fire protection, is provided by the City of Sandusky-owned intake in Lake Erie (Big Island Pump Station). Another raw water intake (Rye Beach Pump Station) was also used until 1985, when use was discontinued due to a blocked line. PBS has five sanitary waste treatment systems. Three are currently operating; the largest of which is a 110,000-gallon-per-day high-rate trickling-filter secondary treatment plant located on Taylor Road.

In addition to NASA activities currently conducted at PBS, the Department of Agriculture, Department of Interior, Department of Labor, the Immigration and Naturalization Services, and the Federal Bureau of Investigation have offices at Plum Brook Station for non-aerospace activities.

1.3 SITE REGULATORY HISTORY

This section of the report contains information on environmental permits, known hazardous material releases, and remediation activities.

1.3.1 Environmental Permits Issued or Applied For/Other Environmental Considerations

Environmental permits currently held by NASA LeRC PBS are as follows:

- Open Burning Permit
- National Pollutant Discharge Elimination System (NPDES) Permit

Open Burning Permit

The PBS Open Burning Permit is actually a written authorization obtained on a yearly basis from the Ohio Environmental Protection Agency (OEPA) Northwest District Office (NWDO). The Open Burning Permit is requested by PBS yearly in writing to allow the burning of open fields each spring. The field burning is conducted in order to eradicate noxious weeds and to propagate field grasses that the site wildlife feed upon. A burn campaign, lasting approximately three

months, is conducted and terminated prior to the nesting of PBS wildlife. Each year, the northern and southern halves of the station are alternately burned.

NPDES Permit

NASA LeRC PBS has a NPDES permit (Application No. OH0001392) for nine outfalls. The permit was originally issued by USEPA for seven outfalls. Two new outfalls were added to the permit in April 1991. USEPA has transferred primary authority for the NPDES permit program for federal facilities in Ohio to OEPA. Three of the nine permitted outfalls are process/stormwater discharges to Kuebeler Ditch (outfall 001), Ransom Brook (outfall 002), and Plum Brook at Pentolite Road (outfall 003). Four outfalls (004-007) are for effluent from PBS sewage treatment plants which discharge to Kuebeler Ditch, Ransom Brook, and the Plum Brook. Outfall 008 is for effluent from the B Control Building sewage package plant which ultimately discharges to the Box Factory Road Ditch. Outfall 009 is for non-contact cooling water from K Site that is discharged onto the ground 100 feet from the building. The most recent NPDES permit granted to Plum Brook Station by the OEPA (OEPA Permit No. 21000002*CD) has an effective date of December 22, 1988, and will expire at midnight on December 13, 1993. OEPA's NWDO in Bowling Green is the administrative and enforcement agency of PBS's permit. PBS has submitted their application for a NPDES permit renewal.

1.3.2 Other Permit Considerations and Environmental Documentation

Resource Conservation and Recovery Act

PBS has registered with the OEPA as a generator of Resource Conservation and Recovery Act (RCRA) hazardous waste and has received an EPA identification number (#OH3800015379). Wastes generated from routine operations are stored in Building 9206, which is managed as a less-than-90-day storage area. As no RCRA hazardous wastes are treated or disposed of on-site, PBS is not required to submit either a RCRA Part A or Part B permit application.

Air Permits

In order to comply with the Federal Clean Air Act (CAA), the State of Ohio through its CAA State Implementation Program requires Permits to Install (PTI) New Sources of Pollution for sources installed since 1974 and Permits to Operate (PTO) for all air pollution sources. Small emissions sources (typically less than 10 tons/year) often receive "Registration Status" or "T Status" on the OEPA records. In response to a 1972 request from the Ohio Board of Health, PBS pre-registered potential air pollution sources with the Ohio Air Pollution Control Board for information purposes only. PBS recently applied for OEPA air

permits. Many of the test facilities remain inactive today; therefore, many potential air emission sources are not operating at this time. Potential sources include rocket testing activities, gas/liquid storage, degreasers, cooling towers, boilers, a paint-spray booth, an incinerator, and construction activities. PBS is planning to conduct an air pollution source inventory during FY 1994. Additionally, if a significant portion of PBS was reactivated or a significant new source was installed, emissions would be evaluated to determine which, if any, required permitting.

Permission to Use Chemicals in Cooling Tower

PBS has applied to OEPA for permission to use additives (algicide and corrosion inhibitors) in two SPF cooling towers. A list of the proposed chemicals to be used in the cooling towers was provided to the OEPA on September 25, 1989. The OEPA approved some of the chemicals for use, but has yet to approve the use of all the proposed chemicals. PBS is currently gathering data in order to resubmit its request for permission to use additives in the cooling towers.

National Environmental Policy Act Documentation

NASA LeRC prepared an environmental impact statement (EIS) in 1971 for both the Cleveland and PBS sites. The 1971 EIS was superseded by a 1978 EIS which NASA submitted to the OEPA. Environmental Resources Documents (ERDs) were prepared to supplement the 1978 EIS. The current ERD was prepared in August 1990 and addresses management of hazardous substances and hazardous wastes at LeRC and PBS.

1.3.3 Environmental Remediation History

The OEPA conducted a PA of PBS in 1983. The areas of interest were the red water ponds and a 1981 spill of approximately 170 gallons of polychlorinated biphenyls (PCBs) that occurred at Building 9206. An on-site inspection of these sites was conducted by the OEPA Division of Solid and Hazardous Waste Management (DSHWM). The potential for groundwater and surface water contamination from the Army's production of explosives in the 1940s was assessed at that time as well as the possibility for the spilled PCBs to contaminate soil and groundwater. DSHWM recommended that further sampling be conducted in the areas of concern due to the limited amount of information available.

Red Water Discharges

PBS has two areas which contain "Red Water Ponds". These two areas are the "Pentolite Road Red Water Pond", and the "West Area Red Water Ponds". The

red water waste stream is a result of one of the final purification steps in the production of TNT. The manufacture of TNT involves the nitration of toluene by reacting toluene with nitric and sulfuric acids. A small percentage of the toluene is not fully converted to tri-nitrotoluene, but ends up as di-nitrotoluene, DNT. A purification step to remove this DNT is called the "Sellite" process. Aqueous sodium sulfate (Na_2SO_3) is used to wash the TNT product. DNT is sulfonated [has a sulfonate group (SO_3H) added to the molecule] and becomes soluble in water. This water solution is RED and is pumped to a pond for evaporation.

The red color arises from the chemical properties of the sulfonated/nitrated toluene compound. It is a type of chemical dye and is similar to a large group of Azo- and Diazo- dyes. The terms Azo- and Diazo- refer to chemical dye structures based on benzene molecules with attached nitrogen compounds. These compounds often are sulfonated and/or linked together through the nitrogen groups to form large, complex dye molecule structures. In a pure form, these dyes impart intense, long lasting color to solutions and base material.

Throughout the years that NASA has operated PBS, leakage/seepage has been observed from the red water ponds. On the afternoon of April 13, 1977, a small surface ditch adjacent to the Pentolite Road Red Water Pond was observed to contain localized pockets of reddish-brown water. It was discovered that one of the drain tiles on the southeast corner of the spoils area associated with the red water pond had broken. The spoils area was created by the Army in the early 1940s by spreading neutralized chemical waste from the production of explosives onto the ground. Retention dikes and sump pits were excavated immediately to prevent leakage of the red water to surface streams. The surface ditch was diverted. Approximately 60,000 gallons of red water were removed from the pond by a private disposal contractor and hauled off-site. The pond was backfilled and measures were taken to eliminate ponding and to provide better surface drainage to local drainage ditches.

On April 3, 1990 and again on February 19, 1991, reddish-brown water was observed discharging into Pentolite Ditch from an underground discharge pipe. It was assumed that the source of the red water was runoff. In both instances, the OEPA and the National Response Center (NRC) were contacted. The amount of red water released to the Pentolite Ditch is unknown, but the estimated flow rate during the April 1990 incident was 5 gallons per minute. Water samples were taken upstream of the discharge, at the discharge point, and downstream of the discharge at the Plum Brook weir but no toxic or hazardous substances were detected in the analyses.

The red water ponds are not inspected on a routine basis for overflow or discharge into the on-site steams or ditches. If a heavy rainfall occurs, it is

possible that these areas will be inspected at that time, particularly the discharge pipe into the Pentolite Ditch.

In 1989 the U.S. Army Corps of Engineers under the Defense Environmental Restoration Program conducted an environmental assessment of the potential areas of contamination caused by PBOW. The assessment involved an investigation of remaining Department of Defense structures and the contiguous groundwater, surface water, and soil for possible contamination by any hazardous substance associated with the PBOW. The U.S. Army has committed to remediate any sites identified as contaminated from PBOW operations.

PCB Spill at Building 9206

In 1981, a spill of approximately 170 gallons of PCB-contaminated oil occurred on the concrete floor of Building 9206 while a contractor was moving a PCB-contaminated transformer. One hundred twenty gallons of the spilled oil were recovered from the warehouse floor. The remaining PCB oil leaked under the concrete floor and contaminated the soil. Concentrations of PCBs were found in the soil up to 2,400 ppm. Some contaminated soil and all free liquids were removed, and four monitoring wells were installed to detect groundwater contamination. After several years of groundwater monitoring, no contamination was found. Total decontamination was performed in 1989. Post decontamination groundwater monitoring showed no PCB concentrations. The decision to discontinue groundwater monitoring was made in 1990 after discussions with USEPA.

<u>Other Releases</u>

Although the above releases were the focus of OEPA's 1983 PA of PBS, other releases of petroleum materials have been observed and documented as discussed below. The releases discussed below are not considered to include all releases that may have occurred at PBS; however, they are of large volumes and were recorded or reported to NASA officials or federal and state agencies.

Spill of Diesel Fuel at Space Power Facility

On October 4, 1980, a spill of several thousand gallons of diesel oil occurred at the SPF while Garrett Corporation was using the facility. The source of the spill was an underground tank which had overflowed. Diesel fuel was siphoning from a 100,000-gallon aboveground tank to the smaller underground tank, causing it to overflow. The spilled oil was released to the SPF sewage treatment plant, which discharges to Kuebeler Ditch, and was also found in a sump pit at SPF. Dams were constructed to preclude further release to the ditch, oil was skimmed from the STP and pumped from the sump pit, straw bales were brought in to

absorb the oil from the ditch water, and other on-site ditches that became contaminated were cleaned by means of a backhoe. All contaminated dirt and straw were disposed of at a county landfill. Recovered diesel fuel and contaminated water were collected and hauled off-site for disposal.

A Garrett Corporation employee, acting as a private citizen, contacted the U.S. Coast Guard and reported the spill. The Coast Guard investigated the spill on October 6, 1980. The Coast Guard was satisfied that no pollution had occurred. Due to the classified nature of Garrett Corporation's activities at the SPF, NASA had no involvement in the cleanup efforts or notification to federal, state, or local agencies.

Naphtha Spill at "A" Site Complex

On August 5, 1978, approximately 1600 gallons of raw, untreated coal tar-derived naphtha leaked from a fuel storage trailer at "A" Site Complex. The trailer was located at the site in an excavated earthen retention basin. The base of the retention basin was hard clay and considered to be impermeable. The spilled naphtha was contained in the retention basin and therefore did not result in a release to surface waters. An off-site disposal company was contracted to pump the spilled naphtha from the retention basin the same day the spill was discovered. Approximately 900 gallons of raw material were removed from the basin by the disposal company and hauled off-site for disposal. An unknown amount of naphtha was pumped into drums for use in fire training exercises conducted in the burn pit on Snake Road. After all the raw material had been removed from the basin, the basin was flushed with water.

No. 2 Fuel Oil Spill at PBRF

On December 28, 1976, 50 to 75 gallons of No. 2 fuel oil leaked from a 200-gallon aboveground tank which fed fuel to a boiler in the PBRF service building. The aboveground tank failed and its contents were released to a concrete catch basin that flows to the Pentolite Ditch. Approximately 1,000 feet of the ditch were contaminated with the released oil. Containment dams were constructed at the ditch to prevent the oil from flowing further down the ditch. Oil-contaminated water was pumped from the catch basin and absorbent pillows were used to absorb small pockets of oil in the ditch. All brush and reeds contaminated with the oil were excavated and removed and the surface area of the ditch cultivated for degradation. The catch basin and culvert were flushed with high-pressure hoses. Water samples were obtained daily from the ditch for a three-month period and analyzed to monitor the plume and to ensure that clean-up efforts were effective. The U.S. Coast Guard and USEPA were notified of the release. It was determined that there was no release to public streams or waterways.

Asbestos Abatement

A 1986 environmental audit of PBS showed that there was considerable degradation of the asbestos insulation on outside steam pipes and associated systems throughout the facility. It was apparent from the audit that an extensive asbestos abatement program needed to be implemented in order to remove or encapsulate asbestos-containing material (ACM). An area of particular concern was the ACM on the pipes leading from the B-boiler building (Building 5221) to the steam accumulators, at the accumulators, and pipes running from the accumulators to the B-2 Facility (Building 3211). Also of concern were the accumulator tanks, headers, transfer lines, and valves of the accumulator system. Large pieces of asbestos insulation were observed lying on the ground beneath the 30-inch steam line and around the associated system components. Air samples were taken downwind of the contaminated systems. Asbestos was detected in the samples. Visual observations indicated contamination in the soil and ponds in the area.

An asbestos abatement program was implemented at PBS in 1988. The program's purpose was to identify the extent of asbestos contamination at the facility and to identify areas requiring immediate abatement. In the abatement program, asbestos insulation was removed from the 30-inch steam line, the accumulators, and associated systems. Asbestos insulation that had fallen to the ground or accumulated in the trenches at the "B" Test Site was removed and disposed of by the abatement contractor. Top soil beneath the steam line was removed from areas where asbestos was observed on the soil and disposed of off-site with the asbestos. Post abatement visual inspection showed no significant residual ACM in the soil.

Underground Storage Tank Program

Following a 1989 assessment by Ebasco of 19 underground storage tanks (USTs) associated with Plum Brook Station operations, 19 tanks were identified for removal. These tanks were removed from July through February 1992. The 19 tanks were removed in the following order:

- 9 tanks at the Garage and Maintenance Area (Buildings 7121, 7131 and 7132);
- 2 tanks at the Space Power Facility (Building 1411);
- 1 tank at the Pump Station (Building 8133);
- 3 tanks at the Plum Brook Reactor Facility (Building 1131).

- 2 tanks at the "B" site Boiler Building (Building 5231)
- 2 tanks at the Fill Storage Tank (Building 8951).

Six of the tanks removed contained waste oil mixed with solvents or petroleum products (gasoline or diesel fuel). The remaining tanks contained water prior to their removal, but at some point during their operating lifetime contained solvents, gasoline, or diesel fuel. Four of the tanks contained fuel oil. All the tanks except for the last two showed evidence of leaking while in the ground. All excavations exhibited some amount of visible contamination. All visibly contaminated soil was removed from the excavations and the excavations were backfilled with clean sand. Based on preliminary post-removal sampling, further soil investigations at the tank removal sites are being initiated at this time.

1.3.4 Recent Environmental Investigations

A number of environmental investigations have occurred at the Plum Brook facility during the past five (5) years. Table 1-1 indicates several major environmental projects which have occurred at the Station.

UST Investigation

Ebasco's study of the UST associated with Plum Brook Station is discussed in Section 1.3.3.

Red Water Ponds/Burning Grounds

IT conducted a site investigation focusing on the areas associated with past Army operations, the Red Water Ponds and the Burning Grounds. IT installed six shallow monitoring wells to sample groundwater and collect subsoil samples from the Red Water Ponds and the Burning Grounds. IT also calculated in-situ hydraulic conductivity for the monitoring well zones and collected surface water samples from the streams that drain the site. Although several different volatile, semivolatile, nitroexplosive and metal compounds were found in the samples, IT preliminarily calculated the HRS to be zero (0.0).

Preliminary Assessment

The Preliminary Assessment evaluated past waste management and hazardous materials handling practices at Plum Brook Station. The PA was performed by SAIC who gathered existing information to identify potential sources of environmental contamination. From this information, SAIC was able to identify sites that required immediate response and determine if further action was necessary under CERCLA.

SAIC determined that only 10 sources had released hazardous substances to the environment out of 32 potential sources. The hazardous substances included nitroexplosives, heavy metals, acetone, methylene chloride, bisphthalate, solvents, petroleum hydrocarbons and asbestos. The releases were from the Red Water Ponds (three locations), the Burning Grounds (two locations), UST Removal Areas (four locations) and the steam piping systems. HRS scoring performed by SAIC resulted in a high score of 21.9 for Operable Unit 2, the Red Water Ponds. The remainder of the facility scored below a value of 8. The surface water pathways were determined to be the most significant factor leading to releases into the environment.

TABLE 1-1
Environmental Investigations in the last 5 Years
Plum Brook Station

Company	Scope	Date Completed
Morrison Knudsen	UST Investigation for Remedial Action	July 1993
Morrison Knudsen	Utility Line Investigation	June 1993
Morrison Knudsen	Utility Line Investigation	April 1992
H^+GCL	Snake Road Burn Pit	February 1992
SAIC	Preliminary Assessment	June 1991
IT Corp	Red Water Ponds	March 1990 (Draft)
IT Corp	Snake Road Burning Ground	March 1990 (Draft)
IT Corp	Taylor and Ransom Road Burning Ground	March 1990 (Draft)
Ebasco	UST Investigation	December 1989

Snake Road Burn Pit

H^+GCL conducted on investigation of the Snake Road Burn Pit to characterize possible surface soil and groundwater contamination due to the use of the area as an uncontrolled burn ground. Five soil borings to characterize surface soils and 4 monitor wells to help characterize groundwater contaminants were completed as part of the investigation. Based upon the results of the investigation and the presence of compounds detected in the soil and groundwater, H^+GCL did not recommended further site characterization or remediation.

Utility Line Investigation (1992)

MK conducted a drilling and analysis program along a natural gas line right-of-way to determine the presence of any hazardous and domestic water contaminants which could adversely affect the personnel working on the project. MK performed a total of 44 soil borings along the utility right-of-way at various location throughout the facility. The study revealed two areas of concern, the area around Building 3232 and the area around Building 2311. Both areas had moderate levels of organic solvents near exit doors.

Utility Line Investigation (1993)

MK conducted a drilling and analysis program along the sanitary sewer right-of-way to determine the presence of any hazardous contaminants which could adversely affect the personal safety of workers on the project. MK performed a total of 37 soil boring along the utility right-of-way. The study detected the presence of organic solvents in the vicinity of the Maintenance Garage. Much of the contamination was attributed to the USTs.

UST Investigation for Remedial Action

MK conducted a study of four UST areas to determine the appropriate action to be taken to remediate the impacted areas. The studies of these areas have been completed but the final determination of appropriate remedial actions has not been determined. Further remedial action may be required in the following three areas:

- Maintenance Garage
- Reactor Area
- Space Power Facility

SECTION 2
ENVIRONMENTAL SETTING

This section describes the environmental setting at Plum Brook Station (PBS). Information provided in this section includes descriptions of general environmental conditions and target populations.

2.1 ENVIRONMENTAL MEDIA SURROUNDING FACILITY

2.1.1 Climatic Data

The climate of northern Ohio is continental in character but is strongly influenced by Lake Erie. In north-central Ohio (Erie County), predominant westerly winds parallel the lake shore but do not come inland as frequently as they do on eastern reaches of Lake Erie. The weather changes every few days as warm and cold fronts move through the area.

Summers are moderately warm and humid. Temperatures occasionally exceed 90°F. Temperatures rarely exceed 100°F. Winters are cold and cloudy. Temperatures are sub-zero an average of five days per winter. Daily temperature range is greatest in summer and least in winter. Annual temperature extremes usually occur after late June and in December. On an average, the temperature first falls to freezing in October. The last freezing temperature normally occurs in April.

2.1.1.1 Precipitation

Climatic data prepared by NOAA are available for the City of Sandusky, 3.5 miles to the north of PBS. The normal annual precipitation at Sandusky is 33.90 inches, based on the 1951-1980 record. The two-year, 24-hour rainfall event for Sandusky is 2.45 inches.

Average annual water loss is estimated to be 22.5 inches for PBS. This figure is based on data compiled from 1951-1980. Water loss is defined as the difference between precipitation over a drainage area and stream flow from the drainage area. Water is lost through evapotranspiration, infiltration and evaporation.

2.1.1.2 Flood Plain Data

Peak discharges for Pipe Creek, Plum Brook, and Storrs-Hemminger Ditch are presented in Table 2-1. These data were obtained from the National Flood Insurance Program.

TABLE 2-1
PEAK DISCHARGES

Flooding Source and Location	Drainage Area (mi^2)	Peak Discharges (cfs)		
		10-year	100-year	500-year
Pipe Cr. above Taylor Ditch	23.6	2110	2525	2790
Storrs-Hemminger at Rte. 2	0.4	93	164	200
Plum Brook at Perkins Avenue	7.1	901	1603	1955

Two possible sources of contamination are within the 100-year and 500-year floodplains: West Area Red Water Ponds A-1 and A-2 and Disposal Area 2A. Red Water Pond A-2 is entirely within both the 100-year and 500-year floodplains. Red Water Pond A-1 is within the 500-year floodplain. Approximately half of Disposal Area 2A is within both the 100-year and 500-year floodplains.

2.1.1.3 Monthly Wind Rose Data

NOAA does not prepare a monthly wind rose diagram for Sandusky or Erie County. The most current wind rose for the PBS area was prepared in 1956 by NACA. This wind rose is presented in Figure 2-1. The wind direction is southwest 55 percent of the time through all 12 months. There is an increased frequency of northerly and northeasterly winds during spring and summer months due to onshore lake breezes created by temperature inversions.

2.1.2 Geologic Setting

2.1.2.1 Soil Formations Underlying Area

Two soil associations are present at PBS based on mapping by the Ohio Department of Natural Resources (ODNR) in cooperation with the U.S. Department of Agriculture. The Arkport-Galen association occurs in the northern and western portions of PBS, and the Prout association occurs in the southern and eastern portions of the site.

The Arkport-Galen association is characterized by deep, nearly level to moderately sloping, well drained to moderately well drained soils that have a subsoil of loamy fine sand and fine sand and occur on sandhills and ridges. These soils are formed in very fine sand and deposited by wind and water as beaches, sand bars, and sand dunes.

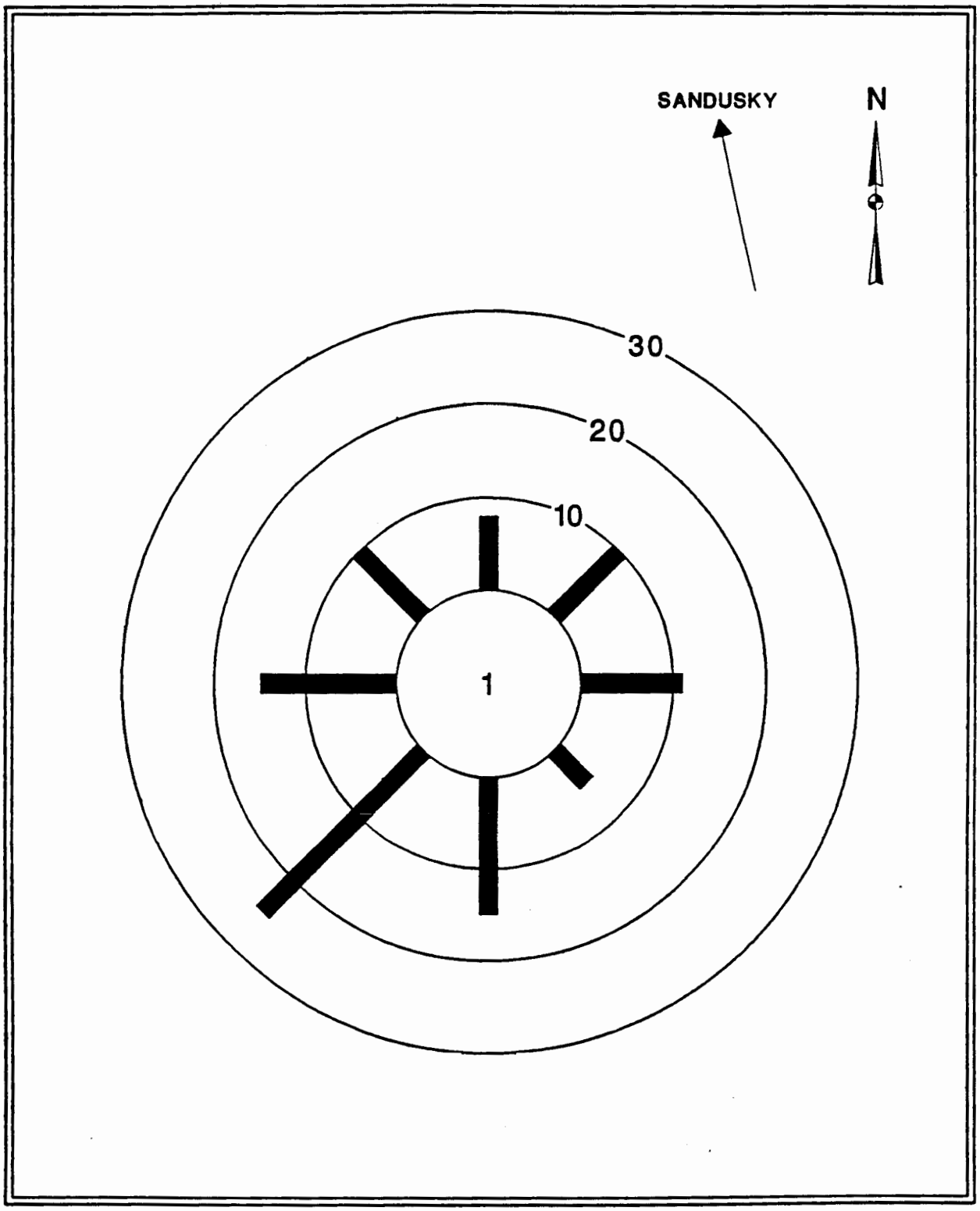


FIGURE 2-1
SANDUSKY WIND ROSE

This association is made up of about 40 percent Arkport soils, 30 percent Galen soils, and 30 percent minor soils.

The Arkport soils are gently to moderately sloping and well drained. The Galen soils are nearly level and moderately well drained. The minor soils occur in level to depressional areas and in the flat areas between the sandhills and ridges. The minor soil associations are either very poorly or somewhat poorly drained.

The Prout association, characteristic of the eastern and southern portion of Plum Brook Station, has moderately deep to deep, nearly level to gently sloping, somewhat poorly drained soils that have a subsoil of heavy silt loam to silty clay loam. This association occurs on uplands such as the sides of stream valleys, shale outcrop ridges, along drainageways and in some steeper areas.

The Prout soils are nearly level to gently sloping, dark colored, and somewhat poorly drained. These soils are underlain by shale bedrock at a depth ranging from 20 to 40 inches for the Prout soils, and at a depth ranging from 40 to 60 inches for the Prout soils, deep variant. The minor soils in this association include a broad spectrum from nearly level to depressional and very poorly drained to nearly level to gently sloping and well drained.

Soils across PBS are highly variable in terms of thickness and permeability. The Arkport soils are loamy fine sands with very high permeabilities. The Galen soils are loamy fine sands with high permeabilities. The Prout soils are very sandy loams with moderately low permeabilities. Estimated ranges for these parameters are provided in Table 2-2.

TABLE 2-2
ESTIMATED SOIL THICKNESSES AND PERMEABILITIES

Soil Type	Soil Description	Thickness (feet)	Permeability (In./hour)
Arkport	Loamy fine sand	0 - 5	12
Galen	Loamy fine sand	0 - 5	6.3 - 12
Prout	Very sandy loam	0 - 5	0.2 - 0.63

2.1.2.2 Bedrock Geology

The bedrock formations of northwestern Ohio consist of carbonates (limestone and dolomite) and clastics (sandstones and shales) that regionally dip to the east. The study area is underlain by a relatively flat-lying sequence of Paleozoic sedimentary rocks which range in age from Precambrian to Devonian. The Silurian and Devonian formations that outcrop in Erie County are illustrated on Figure 2-2. The approximate thickness of formations that underlay PBS is also illustrated on Figure 2-2. Bedrock at PBS consists of four Devonian Formations (from oldest to youngest): the Columbus Limestone, the Delaware Limestone, the Plum Brook Shale/Prout Limestone, and the Ohio Shale. The Columbus and Delaware Limestones occur in the northern and western portions of the study area, and the Plum Brook Shale/Prout Limestone and Ohio Shale occur in the eastern and southern portion of the site.

The Columbus Limestone consists of dolomite and limestone. The Delaware Limestone consists of finely crystalline, thin-bedded brown to gray fossiliferous limestone and dolomite. Karst topography has developed in some of the Silurian and Devonian carbonate bedrock in the northern and western portion of Erie County, resulting in cavernous porosity.

The Plum Brook Shale/Prout Limestone sequence consists of a blue-gray, calcareous shale or mudstone overlain by a thin, fossiliferous limestone or dolomitic mudstone. The Ohio Shale is black and thin-bedded. The lithologic changes in the bedrock across the site affect the groundwater potential of the area. The depth to bedrock across PBS is highly variable based on data obtained from soil borings and monitoring wells. Limestone bedrock was encountered at a depth of 25 feet below the surface at the PBRF. A monitoring well installed in the vicinity of the red water ponds located in the western portion of the site encountered limestone bedrock at an approximate depth of 19 feet. Shale bedrock in the southern portion of the station has been encountered at depths of 2 to 12 feet.

2.1.2.3 Site Topography

PBS is located on relatively flat country characterized by topography that slopes gently northward toward Lake Erie. The ground surface has an average slope of less than six percent. The surficial deposits and landforms were produced by glacial processes. The elevation of

Age	Formation/Group	Depth to Top (ft)	Thickness (ft)a	Hydrologic Unit b	Rock Description
DEVONIAN	Ohio State	c	300	Zone 3	Shale: *black, thin-bedded with bituminous and carbonaceous material.*
	Prout Limestone/ Plum Brook Shale	Surface	210		Shale: *light grey, calcareous.*
	Delaware-Limestone	40	50	Zone 1 and Zone 2	Limestone: *buff, earthy, foss. interbedded with brown crystalline dolomite.*
	Columbus Limestone	90	110		Limestone: *brown to grey, fine crystalline, foss. with tan to buff-grey, partly sandy dolomite at base.*
	Lucas Dolomite	200	70		Dolomite: *brown, crystalline, porous, chert.*
	Amherstburg Dolomite	270	20		Dolomite: *tan to grey, microcrystalline, sl. argillaceous.*
SILURIAN	Bass Island Dolomite	290	30		
	Salina	320	590		Dolomite: *anhydrite and shale sequence. interbedded and intercalated. Dolomite is tan to brown and mostly tight. Scattered shale laminae. Few scattered oil stains. Some dolomite is shaly. few massive beds of dolomite and anhydrite.*

a. Depth to formation thickness, and lithology based on deep borehole located at N 288+68, E 155+54.

b. Refer to Figure 5. for areal distribution of Zones 1, 2, and 3.

c. The Ohio shale was not encountered in the deep borehole, it outcrops in the southeastern most portion of Plum Brook Station.

FIGURE 2-2
GENERALIZED STRATIGRAPHIC SECTION OF SILURIAN AND DEVONIAN STRATA UNDERLYING PLUM BROOK STATION

the site ranges from approximately 625 feet in the northern portion to approximately 675 feet at the southern and western boundaries. Locally, the bedrock surface at PBS dips to the northeast towards Lake Erie.

2.1.3 Hydrologic Setting

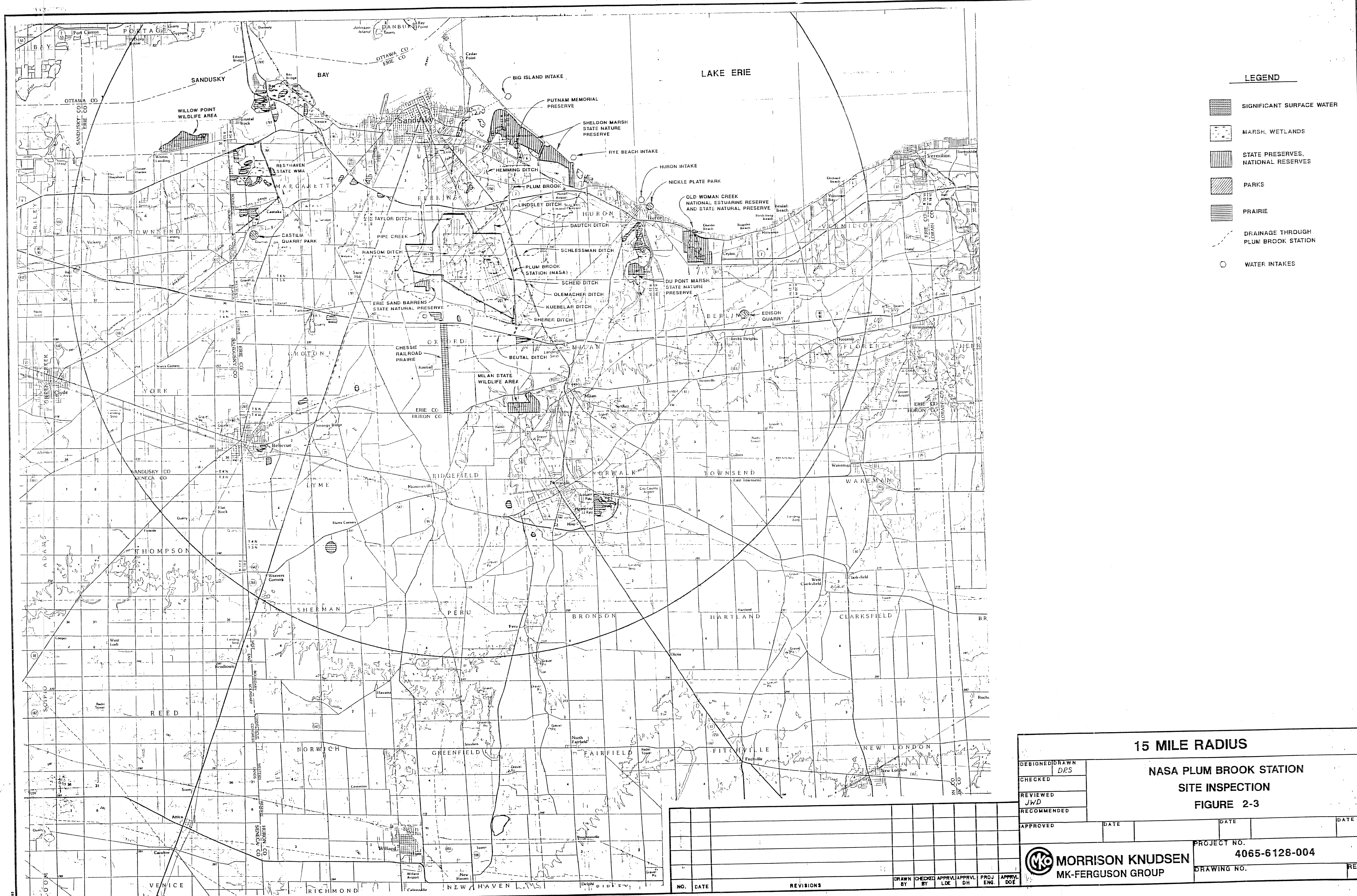
2.1.3.1 Surface Water Hydrology

Numerous ponds (man-made and natural) and streams lie within a 15-mile radius of PBS. Lake Erie and Sandusky Bay are the largest surface water bodies within that radius (approximately 4.5 miles to the north). Bellevue Reservoir #5 is approximately 14 miles to the South-Southwest. The Huron River and its branches, located approximately 3.5 miles east of PBS, are the major streams (refer to Figure 2-3).

The dominant surface water feature in northern Ohio is Lake Erie. The lake has an area of 9919 square miles and a volume of 113 cubic miles.

Eleven streams pass through or originate on PBS (Figure 2-3). Each of these streams could receive contaminants from runoff and groundwater discharge in the event of a spill at PBS. They flow north and northeastward to converge into Ransom Brook, Storrs Ditch, Plum Brook, and Sawmill Creek, which all flow to Lake Erie. Additionally, ditches totaling approximately 380,000 lineal feet are within PBS. Seventeen isolated ponds and reservoirs and three red water ponds are located on PBS (Figure 2-4). The ponds are probably fed by shallow surficial groundwater. Pond water levels remain high even during dry months.

FIGURE 2-3
MAJOR SURFACE WATER FEATURES WITHIN A 15-MILE RADIUS OF PLUM BROOK STATION



15 MILE RADIUS

NASA PLUM BROOK STATION

SITE INSPECTION

FIGURE 2-3

DESIGNED	DRAWN		
	DRS		
CHECKED			
REVIEWED	JWD		
RECOMMENDED			
APPROVED	DATE	DATE	DATE

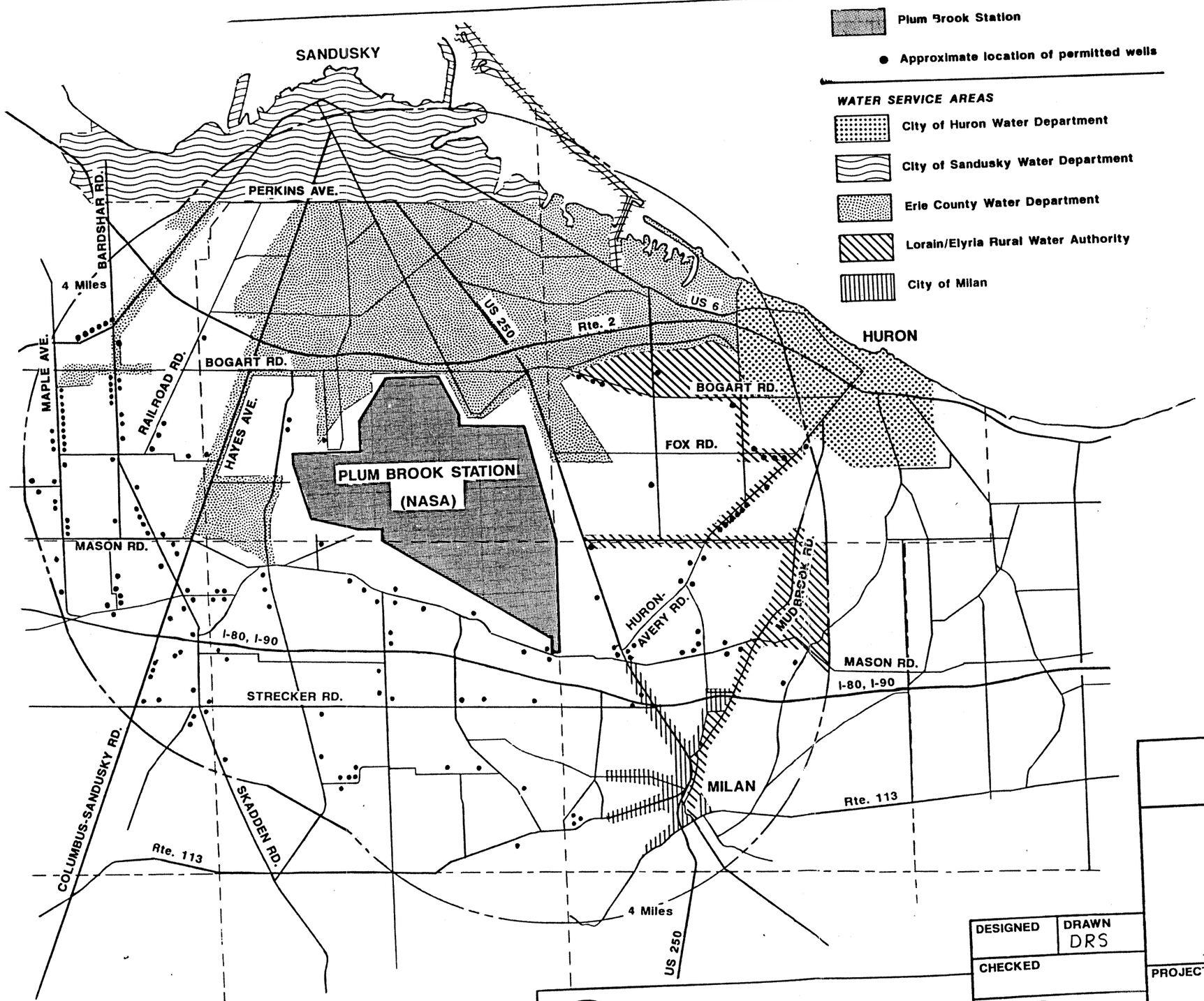
MORRISON KNUDSEN
MK-FERGUSON GROUP

PROJECT NO. 4065-6128-004

DRAWING NO.

REV.

NO.	DATE	REVISIONS	DRAWN BY	CHECKED BY	APPRVL LDE	APPRVL DH	PROJ ENG.	APPRVL DOE



4 MILE RADIUS

NASA PLUM BROOK STATION
SITE INSPECTION
FIGURE 2-7

DESIGNED	DRAWN DRS
CHECKED	
REVIEWED JWD	
RECOMMENDED	

PROJECT NO. 4065-6128-004

DRAWING NO.

REV.

MORRISON KNUDSEN
MK-FERGUSON GROUP

At this time, city and rural water systems serve residences north and east of PBS. Residences south and west of the Station continue to rely on wells and/or cisterns. The nearest recorded downgradient well is at 6115 Schenk Road. It is not known if the well is presently being used for drinking water. Many of the residences along Schenk and Campbell Roads haul water in and store the water in concrete cisterns. A list of local residental groundwater well users and their locations are listed in Appendix E along with well logs from the nearest users (< 1 mile). No well within Plum Brook Station is used as a drinking water supply. Major groundwater users in Erie and Huron counties, their locations, and amount of water withdrawn are listed in Appendix F.

Two wells serve as public (used by 25 or more people at least 60 days per year) drinking water supplies: Woussickett Golf Course clubhouse (6311 Mason Road) and Stanley's Tavern (4408 Mason Road). Most commercial and industrial water is obtained from the City of Sandusky. Groundwater yields (at 20 gpm in limestone and <2 gpm in shale) are too low to normal support large-scale production. Finally, no wells are used solely for crop irrigation, as Ohio's climate is humid with adequate precipitation.

All aquifers in the area of PBS are used as sources of drinking water.

2.2.3 Potential Impacted Wetlands, Parks, Protected or Sensitive Areas, Endangered Species

The Milan State Wildlife Area is located three miles south (upgradient) of PBS in Oxford and Milan townships, at the confluence of the West Branch and the East Branch of the Huron River. It is upstream of PBS. The Erie Sand Barrens State Nature Preserve is approximately 1,000 feet south of PBS, at the intersection of Taylor and Scheid Roads. It is upstream of PBS.

The Sheldon Marsh State Nature Preserve is approximately 3.75 miles northwest of PBS. It is downstream of PBS in an "intra-basin" area between Plum Brook and Sawmill Creek at their discharges to Lake Erie. The Resthaven Wildlife Area is located in Margaretta approximately six miles northwest of PBS. Old Woman Creek is a National Estuarine Research Reserve and State Nature Preserve. It is located two miles east of the City of Huron. The locations of these areas are shown on Figure 2-3.

The only federally endangered animal species in Erie County are the Indiana bat (Myotis sodalis) and the bald eagle (Haliaeetus leucocephalus). Approximately four breeding pairs of bald eagles occur within 5 to 10 miles of PBS. Putnam Memorial Reserve is a known habitat for bald eagles located to the north of PBS

along Sandusky Bay. No survey has been conducted to identify habitats of the Indiana bat in the Plum Brook area.

The Division of Natural Areas and Preserves of the Ohio Department of Natural Resources (ODNR) designates animals as state endangered, state threatened, potentially threatened and presumed extirpated. State threatened and potentially threatened are not legal definitions and will not be discussed in this report. The state endangered animal species in Erie County are the following: the western banded killifish (Fundulus diaphanous menona), the least bittern (Ixobrychus exilis), the eastern pondmussel (Ligumia nasuta), the sedge wren (Cistothorus platensis), the common tern (Sterna hirundo) and the bald eagle (Haliaeetus leucocephalus). The upland sandpiper (Bartramia longicauda) is the only animal within PBS on the Division of Natural Areas and Preserves list of state threatened animals.

The following seven state endangered moth species have been collected from RestHaven Wildlife Area and Old Woman's Creek State Natural Preserve.

- Speyeria idalia (Regal Fritillary) - its locale is listed only as "Erie Co";
- Papaipema silphii - associated with Prairie Dock (a prairie grass);
- Spartiniphaga inops - associated with wetlands;
- Hypocoena enervata - associated with wetlands;
- Trichoclea artesta - collected from Old Woman's Creek;
- Tricolita notata - collected from Rest Haven; and
- Papaipema beeriana - collected from Rest Haven.

Three of these species (Papaipema silphii, Spartiniphaga inops, and Hypocoena enervata) are associated with habitats (wetlands and Prairie Dock) that exist on PBS.

The Division of Natural Areas and Preserves of the ODNR designates plants as state endangered, state threatened, potentially threatened and presumed extirpated. Potentially threatened is not a legal definition and will not be discussed in this report. Table 2-6 lists the state endangered and state threatened plants in Erie County. The plants marked with an asterisk (*) in Table 2-6 designate plants in and near PBS.

TABLE 2-6
STATE ENDANGERED (E) AND STATE THREATENED (T) PLANT COMMUNITIES IN ERIE COUNTY

STATE ENDANGERED PLANTS

- Apocynum sibiricum - clasping-leaf dogbane
- Arabis hirsuta var. pycnocarpa - western hairy rock-cres
- Aster dumosus - bushy aster
- Carex bicknellii - bicknell's sedge
- Cypripedium candidum - white lady's-slipper
- Draba reptans - carolina whitlow-grass
- Eleocharis engelmannii - engelmann's spikerush
- Hypericum gymnanthum - least St. John's-wort
- Sagittarian cuneata - wapato

STATE THREATENED PLANTS

- Ammophila breviligulata - American beach grass
- Anemone clyindrica - prairie thimbleweed
- Artemisia campestris - beach wormwood
- Baptisia lactea - prairie false indigo*
- Carex aquatilis - leafy tussock sedge
- Carex bebbii - bebb's sedge
- Carex conoidea - field sedge*
- Carex lasiocarpa - slender sedge
- Carex retroflexa var. retroflexa - reflexed sedge
- Carex sartwellii - sartwell's sedge
- Descurainia pinnata - tansy-mustard
- Eleocharis compressa - flat-stem spikerush
- Eleocharis Olivacea - olivaceoius spikerush*
- Euthamia gymnospermoides - great plains goldenrod*
- Helianthus mollis - ashy sunflower*
- Helianthemum bicknellii - plains frostweed
- Hemicarpha micrantha - dwarf bulrush*
- Hypericum kalmianum - kalm's St. John's wort
- Juncus alpinus - alpine rush
- Juncus playtphyllus - flat-leaved rush*
- Potentialla paradoxa - bushy cinquefoil
- Salix candida - hoary willow
- Senecio pauperculus - balsam squaw-weed
- Smilax herbacea var. lasioneura - pale carrion-flower
- Xyris torta - twisted yellow-eyed grass*

* *Plants in and near PBS*

SECTION 3
SCOPE OF FIELD INVESTIGATION

3.0 INTRODUCTION

This section briefly describes the basic procedures used to obtain samples during the field investigation at Plum Brook Station. The Plum Brook Site Investigation involved sampling the soil, sediment, surface water and groundwater. Sampling locations were selected based upon the PA and other site historical records to focus on the most likely areas of contamination. No attempt was made to define the extent of contamination, merely its presence or absence.

3.1 GROUNDWATER SAMPLING

The drilling of monitoring wells was conducted in accordance with MK's Standard Procedures. All wells were installed through 4¼-inch Inside Diameter hollow stem augers. Samples were obtained using a 2-inch diameter by 24-inch long, split barrel sampler. MK followed ASTM D-1596 procedures with the exception that the sampler was driven 24 inches rather than the standard 18 inches. The first sample (0 to 24 inches) was the only soil sample obtained from each boring. The remainder of the boring was advanced without additional sampling.

Each boring was advanced to groundwater intersection or auger refusal. The depth of the borings was between 15 and 25 feet. Each boring was classified using the Unified Soil Classification System (USCS) description. Since there was no sampling after the first few feet, MK classified the remainder of the boring based upon drill cuttings.

The screened interval of the monitoring wells consists of 2-inch diameter, 0.010 slot, polyvinyl chloride screen; the typical length is 10 feet. An appropriate length of 2-inch diameter, schedule 40, flush threaded PVC casing was inserted to extend from the top of the screened interval to a height of 2 to 3 feet above ground surface.

MK placed a graded sand pack in the annulus around the well screen to a height of approximately 2 feet above the screened interval. In some areas, due to the shallowness of the monitoring wells, only one foot of sand was placed above the screened interval. A 1 to 2-foot thick bentonite seal was placed above the sand pack and the remainder of the annular space filled with a cement/bentonite grout. Each well was completed by cementing in place a cast-iron standpipe with locking cap. Cement was mounded slightly around the standpipe to promote stormwater drainage away from the well.

All sampled wells, newly installed and existing, were surveyed relative to top of casing (TOC) elevation above mean sea level (MSL) and ground elevation. This provides a common elevation datum to correlate groundwater elevation measurements. The casing of each well was marked or notched at the point where the elevation was

established to provide consistency in groundwater measurements. In addition, all monitoring wells were located horizontally so that they can be located on a scaled site map. Table 3.1 is an inventory of monitoring well information.

Following monitoring well installation, all new wells were developed. The objective of well development is to remove sediments from between the well and screened the interval, thereby restoring the natural hydraulic properties of the geologic formation that become disturbed during well installation. Well development was accomplished by a surge and bail/pump technique. Each well was developed until no sediments were observed in the expelled water, and the pH, and temperature of the purged water were steady. Following development, the wells were permitted to stabilize for a period of 24 hours before a sample was collected.

Prior to collection of the sample from the monitoring well, the well was purged to remove standing water and to ensure that the sample collected was representative of the aquifer water. The depth to groundwater was measured to calculate the volume of groundwater in the well. Groundwater level measurements were obtained using an electrical depth probe. The probe was capable of detecting the depth of groundwater to the nearest 0.01 foot. These measurements were used to construct a groundwater table contour map (See Figure 2.5).

Three to five volumes of groundwater, or until the well went dry, were removed from the well. The minimum volume of water purged from each well was calculated according to the equation:

$$V = 3x\ (\pi \times r^2 \times h \times 7.48 \text{ gallons/gals})$$

where:

π	= 3.14
r	= radius of casing in feet
h	= number of linear feet of static water
V	= Volume to be purged (gals)

The actual number of well volumes removed was determined by field measurements. The pH and temperature were measured during well sampling and logged. The wells were evacuated using a decontaminated, bottom loading, 1.66 inch diameter stainless steel bailers. After the well was purged, it was allowed to recharge before a clean teflon bailer was lowered into the well to withdraw groundwater for a sample. Teflon-coated, single strand stainless steel wire or polypropylene, monofilament rope was used to raise and lower the bailer. Samples were collected within twenty four hours of well evacuation. If well yields were low at the well site, the samples were collected as the well recovered and provided a sufficient volume of water for sample collection. Groundwater was collected for total and soluble metal

TABLE 3.1
MONITORING WELL INFORMATION

PMU	Well #	Ground Elevation	TOC Elevation	Boring Depth (feet)	Screen Interval (feet)	Sandpack Interval (feet)	Depth to Water (Elevation)
1	MK09	643.04	645.91	15	10	12	639.1
1	MK10	638.23	641.25	14	10	12	633.9
1	MK11	634.88	638.00	13	10	11	628.2
1	MK12	638.78	641.73	13	10	11	630.6
1	MK13	Shallow Rock, well was not installed					
1	MK14	679.04	681.93	11.5	5	7	673.2
1	MK15	678.35	681.45	9	5	7	673.1
2	MK16	671.45	674.64	8	5	6	666.3
2	MK17	661.43	661.90	6	4	5	658.9
2	MK18	Shallow Rock, well was not installed					
2	MK19	636.82	639.85	13	10	11	632.1
3	MK20	635.04	637.86	23	15	17	630.0
3	MK21	Did not produce water, well was not installed					
4	MK22	635.84	638.95	9.5	5	6	628.0
4	MK23	637.01	640.01	16	10	12	622.4
4	MK24	654.57	657.59	9.5	5	7	650.1
5	MK25	Shallow Rock, well was not installed					

analyses and was not field-filtered prior to transfer to sample containers. The laboratory filtered the groundwater samples prior to their analyses. A grab sample collected in a clean glass container was used to measure pH, and temperature. The measurement probes were rinsed with distilled water between samples.

3.2 SURFACE WATER

Surface water samples were collected by wading to the sample location. Surface water sampling was conducted starting at the furthest downstream location and proceeding upstream. Surface water samples were collected at each location prior to collection of the sediment sample at that location to minimize cross-contamination. The water sample was collected by immersing a laboratory-cleaned glass jar (sampling tool) immediately below the surface of the water and transferring the water to the appropriate sample container(s). A new clean glass jar was used as a sampling tool at each station to eliminate potential cross-contamination. A majority of the samples were collected from the middle of the creek, but depending upon the depth, some samples were taken closer to the bank. Field water quality parameters such as pH, conductivity, and temperature were measured in-situ at each sampling station. Table 3.2 is a summation of the field parameters measured during the stream sampling.

TABLE 3.2
SURFACE WATER FIELD MEASUREMENT

PMU	Sampling Point	pH	Temperature (°C)
1	SW01	8.25	20.9
1	SW02	8.33	20.1
1	SW03	8.42	18.1
1	SW04	8.39	18.2
1	SW05	8.28	18.4
1	SW06	7.54	19.1
2	SW07	6.85	21.2
2	SW08	No measurement recorded	
2	SW09	No measurement recorded	
2	SW10	No measurement recorded	
3	SW11	7.62	26.2
3	SW12	No measurement recorded	
3	SW13	No measurement recorded	
3	SW14	No measurement recorded	

TABLE 3.2
SURFACE WATER FIELD MEASUREMENT

PMU	Sampling Point	pH	Temperature (°C)
3	SW15	7.37	22.7
4	SW16	7.52	22.7
4	SW17	7.68	21.7
5	SW18	7.01	23.2
5	SW19	6.81	27.1
5	SW20	8.37	30.3

When a sample collection device was used to obtain a surface water sample, the sample bottles were filled directly from the sampling device. If the volume required to fill each sample bottle exceeded the volume contained in the collection device, an aliquot from each sample retrieved was placed in each sample bottle until all the bottles were filled. The sampling device was lowered to the same depth when more than one volume of the sample collection device was required to fill the bottles.

3.3 SEDIMENT SAMPLING

Sediment samples were collected at locations corresponding to surface water sample locations. The samples were collected by wading into the stream. Each was collected from a depositional area to ensure that areas with potential for contamination accumulation were sampled. Sediment samples were collected from the sediment bed surface to a maximum depth of 12 inches.

In sampling areas where the surface water was shallow, sediment samples were collected utilizing a decontaminated stainless steel trowel. In areas where water was greater than 6 inches in depth, a hand auger was used to collect the sample. The hand auger consisted of a sample bucket attached to the bottom of a length of pipe that has a crossbar at the tip. A hole is drilled by turning this crossbar at the same time the operator presses the auger into the ground. The hand auger was advanced to the desired depth to obtain the sample. Standing water from the top of the sampling tool was decanted off prior to obtaining the sample. When the hand auger was withdrawn from the sample area, a stainless steel spoon was used to obtain the sample from the sample bucket. The sample was then placed directly into the proper sample container or stainless steel bowl.

The stream sediment location was denoted in the field for future reference by a fluorescent painted stake or plastic flagging along the stream bank at each location.

3.4 SURFACE SOIL SAMPLING

All soil samples were collected using a hand auger and/or trowel. The hand auger consisted of a sample bucket attached to the bottom of a length of pipe that has a crossbar at the tip. A hole was drilled by turning the crossbar at the same time the operator pressed the auger into the ground. The hand auger was advanced two feet from the ground surface. When the hand auger was withdrawn from the sample area, a stainless steel spoon was used to obtain the sample from the sample bucket. The sample was then placed into a stainless steel bowl and the sample homogenized before being placed into the proper sample container. Large pebbles and cobbles were removed from the sample. Composite samples for chemical analyses were collected in the appropriate containers.

SECTION 4
SAMPLING RESULTS

4.0 INTRODUCTION

The SAIC assessment of Plum Brook Station (PBS) identified 14 operable units which may have experienced environmental contamination. The operable units identified during the 1991 PA had been grouped together for ease of investigation and future remedial actions. The operable units were identified as follows:

Unit 1:	TNT Areas A, B, and C
Unit 2:	Red Water Ponds
Unit 3:	Underground Wastewater Flumes
Unit 4:	Burning Grounds
Unit 5:	Waste Lagoon in Pentolite Area
Unit 6:	Fly Ash Spoil Piles
Unit 7:	Toluene Storage Tanks
Unit 8:	UST Removal Areas
Unit 9:	Asbestos contamination
Unit 10:	SPF Rubble Pile
Unit 11:	Disposal Area 1B
Unit 12:	Disposal Area 2
Unit 13:	Rail Car Unloading Area
Unit 14:	Lime Sludge Disposal Area

The asbestos contamination has been remediated and the Underground Storage Tank (UST) removal areas are presently being investigated by MK under a separate program.

The operable units and their corresponding locations were plotted on a large scale map in order to help determine possible Project Management Units (PMUs). Identification of the PMUs allows the characterization and remediation, if necessary, of the potential sources of environmental contamination to proceed in an organized manner. The development of the PMUs and assignment of sources was based upon four criteria:

1) Geographic layout of the PBS site and proximity of sources;

2) Similarities in suspected types of contamination and affected environmental media;

3) Existing level of knowledge regarding the nature of contamination and anticipated priority for further response action; and

4) Similarity in age, type, and usage of operable units.

MK established five PMUs based upon surface drainage patterns. SAIC had identified the surface water pathway as being the principal means of contaminant transport from the sources on Plum Brook to the receptors downstream. The five PMUs identified are:

- PMU 1 - Pipe Creek
- PMU 2 - Ransom Ditch/Brook
- PMU 3 - Plum Brook
- PMU 4 - Lindsley Ditch
- PMU 5 - Kuebelar, Scheid, and Schlessman Ditches

The boundaries between these PMUs were established by an inspection of the overland flow and the creek or ditch which would receive that flow. Figure 4.0 depicts the entire Plum Brooks facility with Figure 4-1, 4-2, and 4-3 illustrating the boundries of each PMU.

4.1 PMU 1 - PIPE CREEK

PMU 1 is located on the extreme western edge of PBS. Ransom Road borders it on the east and Patrol Road on the west. An eight foot high chain link fence delineates the northern border along Maintenance Road and the southern border along Patrol Road. A dense growth of mature hardwood trees covers the majority of approximately 900 acres of fairly flat surface topography. There are also a few cleared areas covered with tall grasses. The major topographic feature of PMU 1 is Pipe Creek which runs through the center of the PMU, generally along a north northeast line. Figure 4-1 shows the extent of PMU 1.

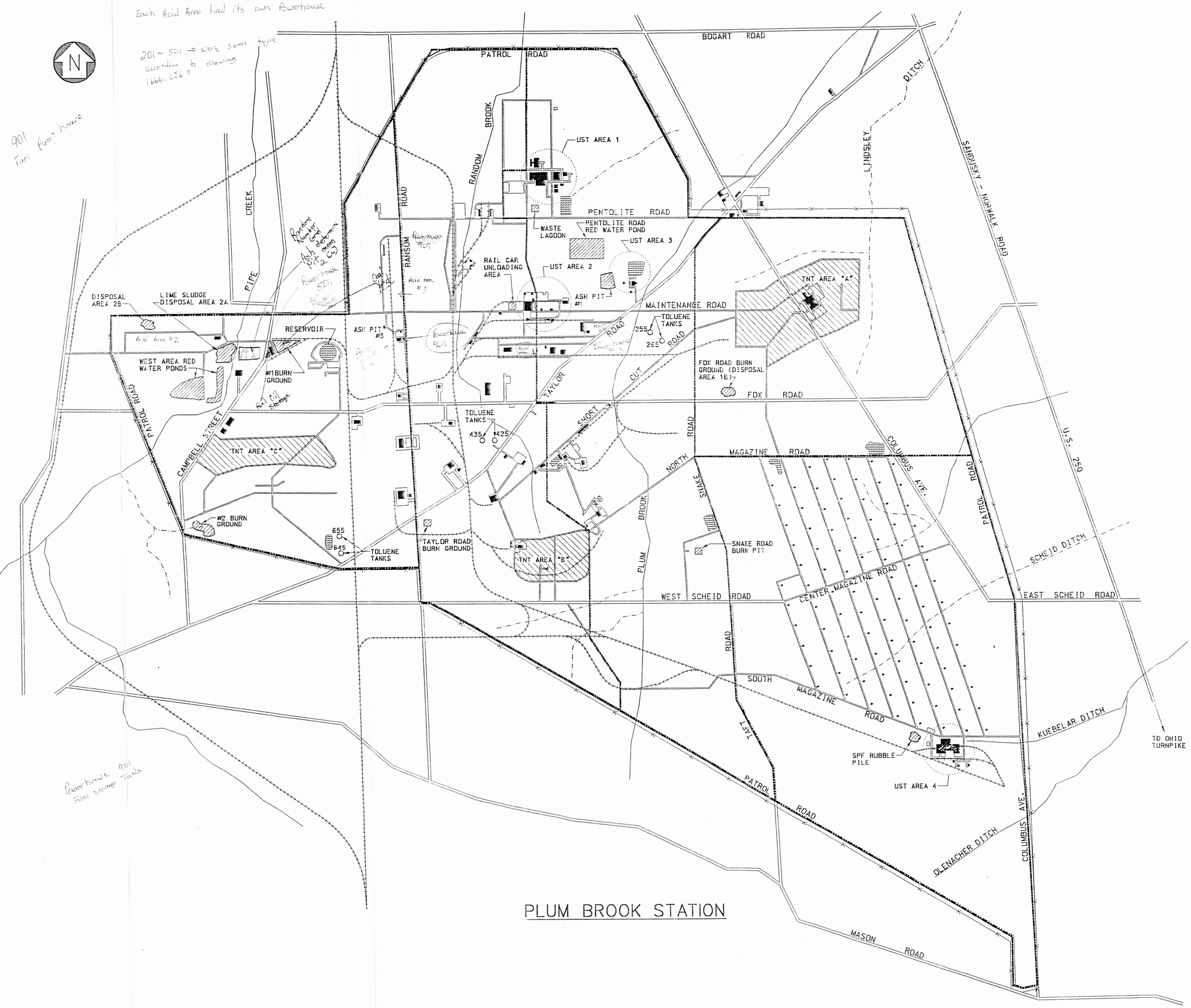
During the PA conducted by SAIC, eight areas were identified as potential points or areas of contamination within PMU 1. The largest and most noted area of contamination was the West Area Red Water Ponds. This area was studied by both the Department of the Army and the Ohio EPA. TNT Area "C" was the western most production area while the Station was a facility for TNT production. The PA also identified two disposal areas within PMU 1. Waste Disposal Area 2A is located close to the Red Water Ponds and was identified as an area of possible contamination by solvents. Waste Disposal Area 2B is located in the northwestern corner of the PMU. This area was used as a parking area and as a storage area for pipes. There are two former burn grounds located within PMU 1. Burn Ground 1 is close to an abandoned structure in the eastern section of the PMU. Burn Ground 2 is near the southwestern edge of the PMU near the head of a small ditch which feeds into Pipe Creek. Near the southeastern edge of the PMU are two toluene storage tank locations (#665 and 645). One of the two tanks was moved to the Reactor Area for petroleum storage. The final area investigated within PMU 1 was the Fly Ash Disposal Area. This area is presently the location of the "K"-Site Test Facility.

FIGURE 4-0
PMU BOUNDRIES WITHIN PLUM BROOK

Each Acid Area had its own Powerhouse

201 ~ 501 → were same type according to drawing 1664.226 ?

901 Fuel (Pump) house



Powerhouse 901 Fuel Storage Tanks

PLUM BROOK STATION

MORRISON KNUDSEN CORPORATION
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NASA PLUM BROOK STATION
SITE INSPECTION
FIGURE 4-0

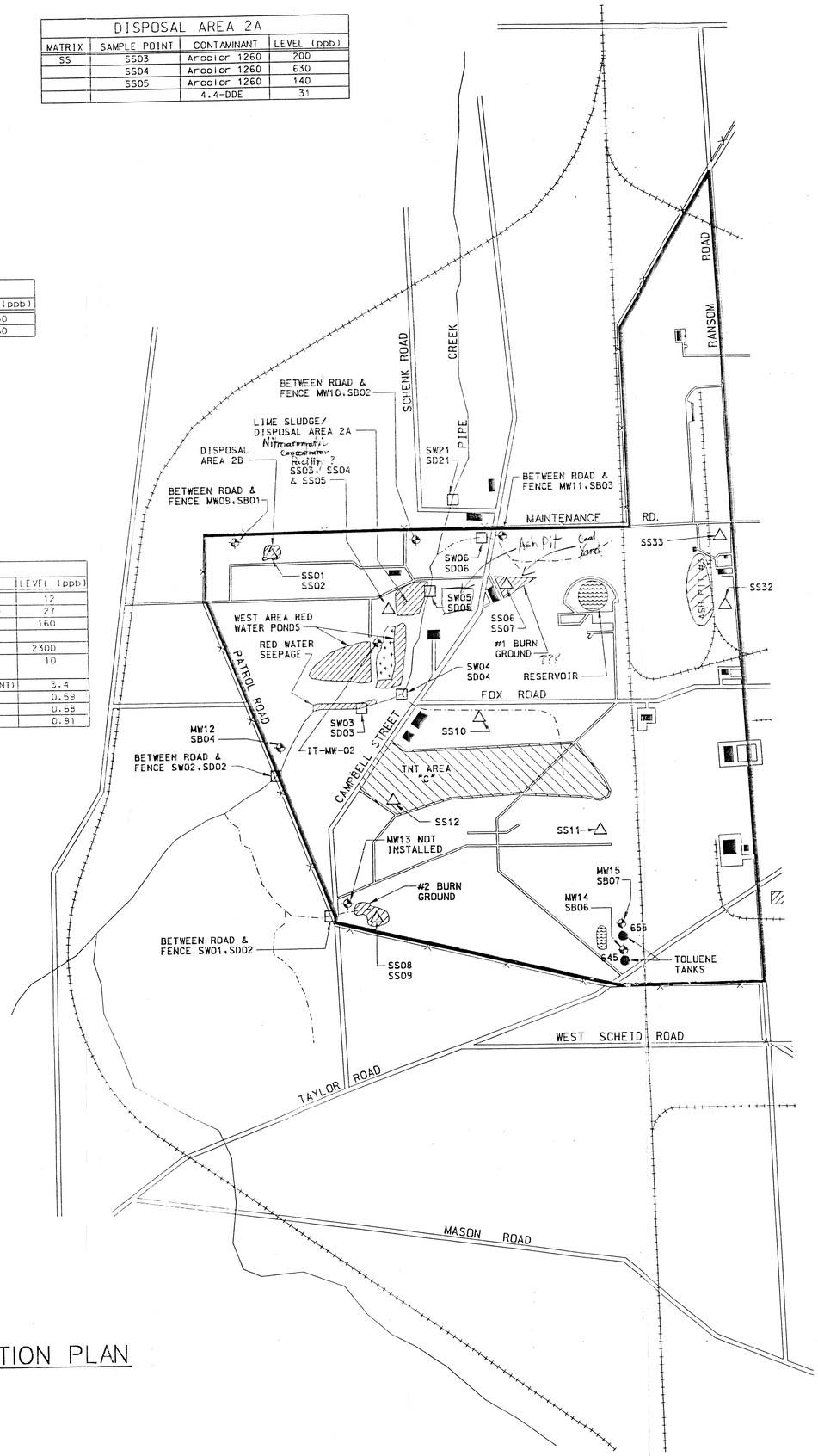
FILE NAME :	PBSMSTR.DGN	INCHES 1 2 / CM 1 2 3 4 5 6 7	
SCALE-ORIG. DWG.	AS NOTED		
DRAWN	J. LAMBERTY	DATE	JUNE 8, 1993
CHECKED	J. W. DULIN	DATE	
APPROVED		DATE	

FIGURE 4-1
SAMPLING LOCATIONS WITHIN PMU 1

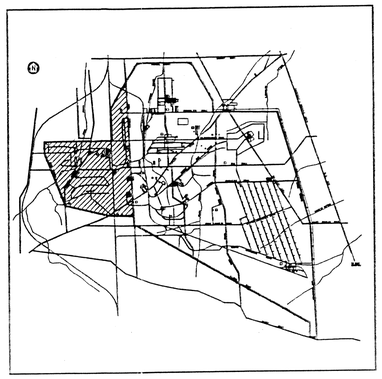
DISPOSAL AREA 2A			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
SS	SS03	Aroclor 1260	200
	SS04	Aroclor 1260	630
	SS05	Aroclor 1260	140
		4,4-DDE	31

DISPOSAL AREA 2B			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
SS	SS01	AROCLOR 1260	550
	SS02	AROCLOR 1260	360

WEST AREA RED WATER PONDS			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
GW	ITMW02	ACETONE	12
		2,6-DINITROTOLUENE (DNT)	27
		2,4,-DNT	160
SS	ITSB07	ACETONE	2300
		METHYLENE CHLORIDE	10
		1,3,5-TRINITROTOLUENE (TNT)	3.4
		1,3-DNT	0.59
		2,4,6-TNT	0.68
		2,4-DNT	0.91



PMU 1
SAMPLE LOCATION PLAN
SCALE: 1"=1000'



KEY PLAN
SCALE: N.T.S.

BURN GROUND 1			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
SS	SS07	TOLUENE	19

NOTES:

1. MW13 NOT INSTALLED BECAUSE OF SHALLOW ROCK (2 FEET)
2. TOLUENE TANK #645 MOVED TO REACTOR AREA.

LEGEND:

- MONITORING WELL SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- SOIL SAMPLE
- EXISTING MONITORING WELL
- GW GROUNDWATER SAMPLE
- SW SURFACE WATER SAMPLE
- SS SURFACE SOIL SAMPLE
- SD SEDIMENT SAMPLE
- SB SOIL BORING SAMPLE
- MW MONITORING WELL

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FIGURE 4-1

FILE NAME :	PBS-1.DGN	INCHES 1 2 / CM 1 2 3 4 5 6 7
SCALE-ORIG. DWG.	AS NOTED	
DRAWN	J. LAMBERTY	DATE JUNE 10, 1993
CHECKED	J. W. DULIN	DATE
APPROVED		DATE

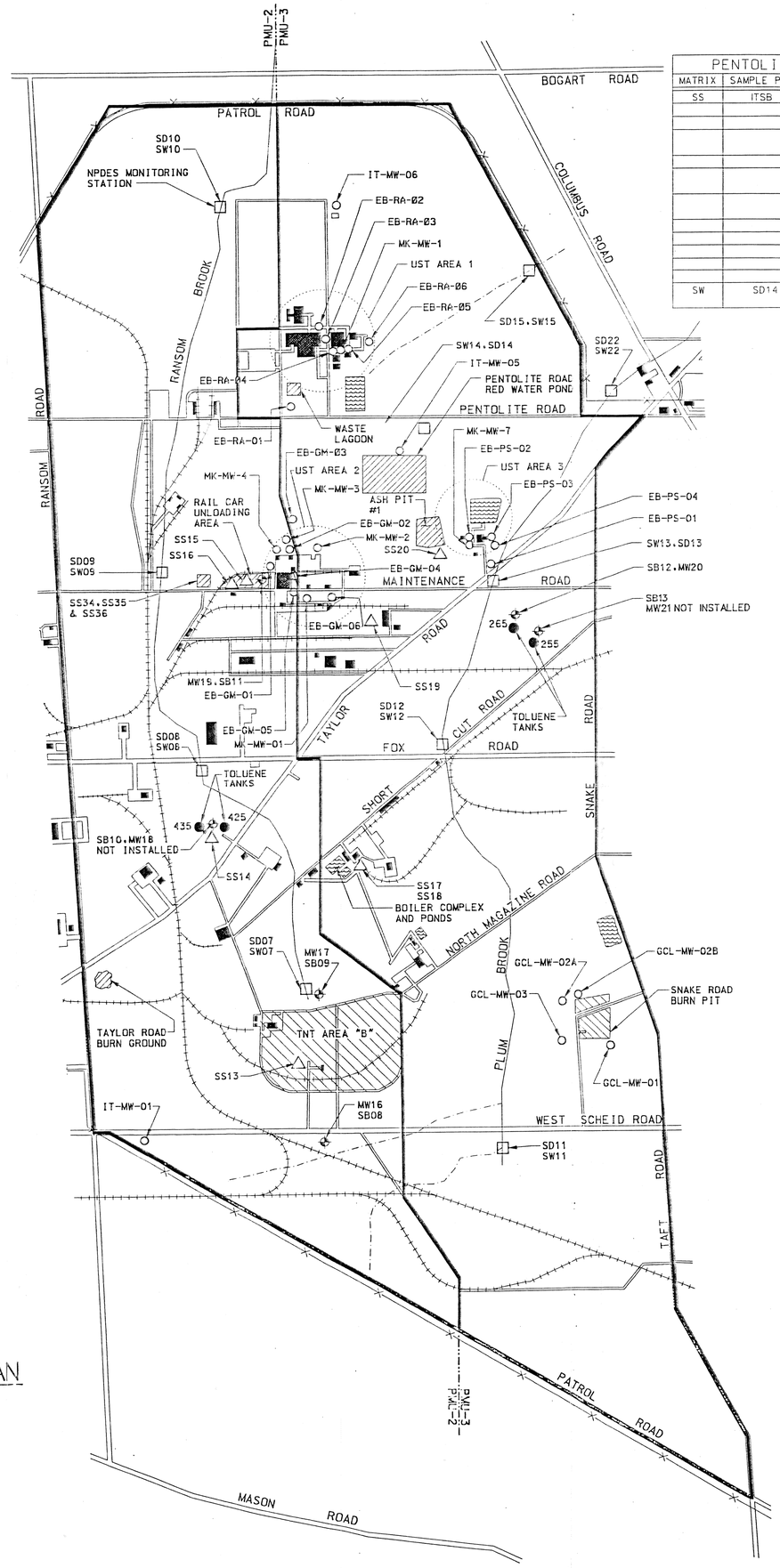
$$$$$SYTIME$$$$$$
$DGNSPEC$$$$$$$$$$$$$$$$$$$$

FIGURE 4-2
SAMPLING LOCATIONS WITHIN PMU 2 & 3

RAIL UNLOADING FACILITY			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
SW	SD09	ACETONE	94
SS	SS34	BIS(2-ethylhexyl) PHTHALATE	1200
		FLUORANTHENE	460
		PYRENE	410
	SS35	BENZO(a)ANTHRACENE	920
		BENZO(a)PYRENE	680
		BENZO(b)FLUORANTHENE	2400
		BENZO(k)FLUORANTHENE	800
		BIS(2-ethylhexyl) PHTHALATE	4800
		CHRYSENE	1500
		FLUORANTHENE	2100
		INDENO(1,2,3-cd)PYRENE	430
		PHENANTHRENE	460
		PYRENE	
SS	SS36	BIS(2-ethylhexyl) PHTHALATE	23000
SS	SB11	FLUORANTHENE	510
		PYRENE	390

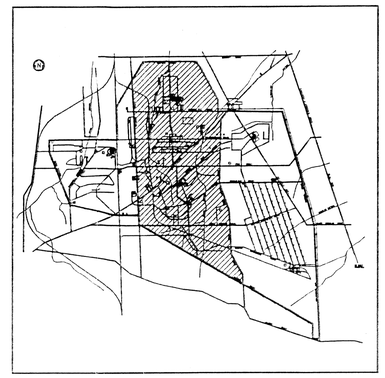
MIDDLE TOLUENE			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
SW	SD08	ACETONE	21

TNT AREA "B"			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
GW	MW17	BIS(2-ethylhexyl) PHTHALATE	12
SW	SD07	ACETONE	53
		2,4,6-TRINITROTOLUENE (TNT)	25000
SS	SS13	TOLUENE	33
SS	SB09	2,4,6-TNT	12000
SS	SB09	2,6-DINITROTOLUENE (DNT)	60



PENTOLITE ROAD RED WATER PONDS			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL* (ppb)
SS	ITSB	ACETONE	3000
		TOLUENE	9
		METHYLENE CHLORIDE	9
		2,6-DINITROTOLUENE (DNT)	1700
		2,4-DNT	11000
		BIS(2-ethylhexyl) PHTHALATE	450
		1,3,5-TRINITROTOLUENE (TNT)	14
		1,3-DINITROBENZENE	5
		2,4,6-TNT	0.74
		2,6-DNT	0.53
		NITROTOLUENE	0.48
		NITROBENZENE	0.48
SW	SD14	BIS(2-ethylhexyl) PHTHALATE	570

* HIGHEST READINGS FROM SEVERAL SAMPLES



KEY PLAN
SCALE: N.T.S.

NOTES:

1. MW18 NOT INSTALLED BECAUSE OF SHALLOW ROCK (2 FEET).
2. MW21 NOT INSTALLED BECAUSE OF NEGLIGIBLE WATER PRODUCTION (DRY WELL)
3. PENTOLITE RED WATER PONDS HAVE BEEN BACKFILLED.

LEGEND:

- MONITORING WELL SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- SOIL SAMPLE
- EXISTING MONITORING WELL
- GW GROUNDWATER SAMPLE
- SW SURFACE WATER SAMPLE
- SS SURFACE SOIL SAMPLE
- SD SEDIMENT SAMPLE
- SB SOIL BORING SAMPLE
- MW MONITORING WELL

UPPER TOLUENE TANKS			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
GW	MW20	TOLUENE	36000
		2-METHYLPHENOL	520
		4-METHYLPHENOL	190
		BENZL ALCOHOL	13
SW	SD13	BENZO(a)ANTHRACENE	730
		BENZO(a)PYRENE	560
		BENZO(b)FLUORANTHENE	680
		CHRYSENE	530
		FLUORANTHENE	970
		PYRENE	1100

BOILER COMPLEX			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
SW	SD12	BENZO(a)ANTHRACENE	960
		BENZO(a)PYRENE	660
		BENZO(b)FLUORANTHENE	1100
		CHRYSENE	730
		FLUORANTHENE	1400
		PHENANTHENE	850
		PYRENE	1500

PMU 2 AND 3
SAMPLE LOCATION PLAN
SCALE: 1"=1000'

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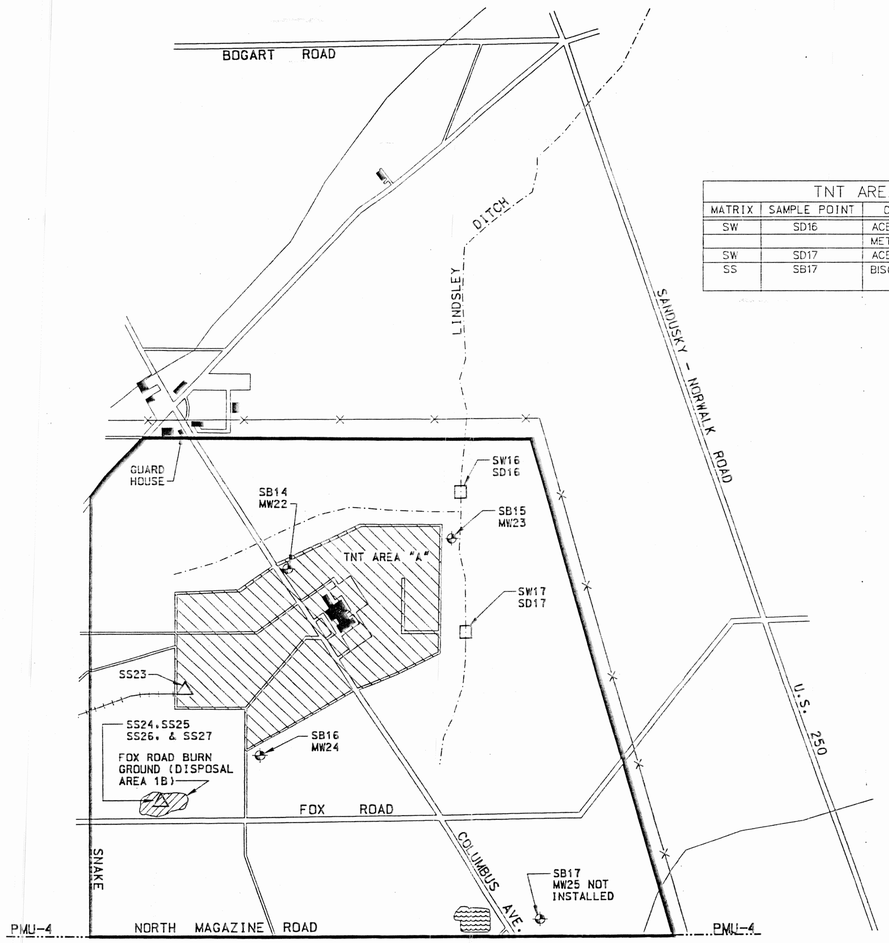
SITE INSPECTION
FIGURE 4-2

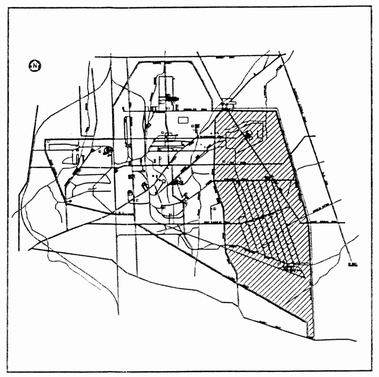
FILE NAME: PBS-2.DGN	INCHES 1 2 / CM 1 2 3 4 5 6 7
SCALE-ORIG. DWG. AS NOTED	
DRAWN J.LAMBERTY	DATE JUNE 10, 1993
CHECKED J.W.DULIN	DATE
APPROVED	DATE

$$$$$SYTIME$$$$$$
$DGNSPEC$$$$$$$$$$$$$$$$$$$$$

FIGURE 4-3
SAMPLING LOCATIONS WITHIN PMU 4 & 5



TNT AREA "A"			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
SW	SD16	ACETONE	25
		METHOXYCHLOR	29
SW	SD17	ACETONE	21
SS	SB17	BIS(2-ethylhexyl) PHTHALATE	1200



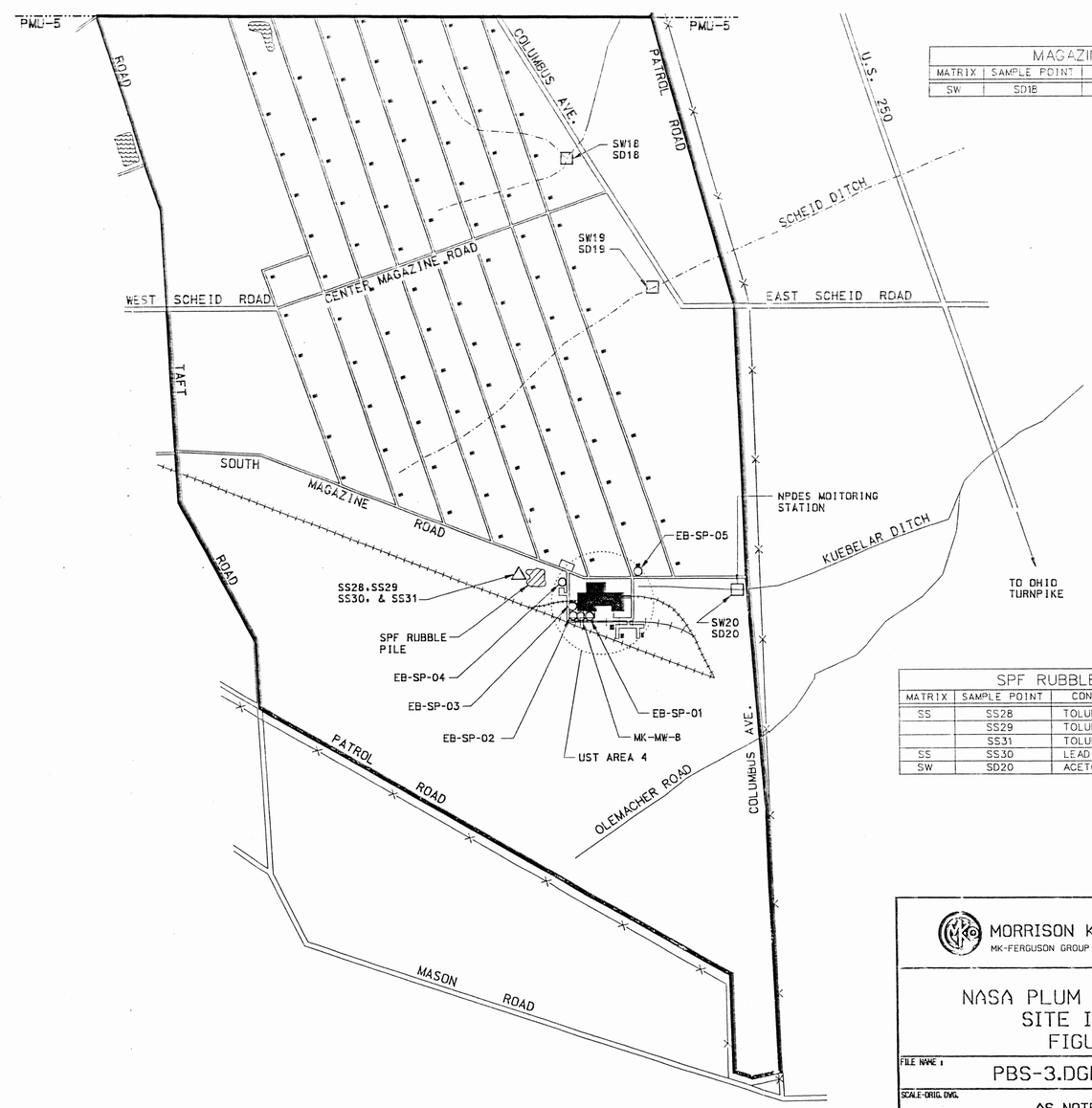
KEY PLAN
SCALE: N.T.S.

NOTES:

1. MW25 NOT INSTALLED BECAUSE OF SHALLOW ROCK (2 FEET).

LEGEND:

- MONITORING WELL SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- SOIL SAMPLE
- EXISTING MONITORING WELL
- GW GROUNDWATER SAMPLE
- SW SURFACE WATER SAMPLE
- SS SURFACE SOIL SAMPLE
- SD SEDIMENT SAMPLE
- SB SOIL BORING SAMPLE
- MW MONITORING WELL



MAGAZINE AREA			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
SW	SD18	ACETONE	57

SPF RUBBLE PILE			
MATRIX	SAMPLE POINT	CONTAMINANT	LEVEL (ppb)
SS	SS28	TOLUENE	22
	SS29	TOLUENE	13
	SS31	TOLUENE	15
SS	SS30	LEAD	1310
SW	SD20	ACETONE	32

PMU 4 AND 5
SAMPLE LOCATION PLAN
SCALE: 1"=1000'

MORRISON KNUDSEN CORPORATION
MK-FERGUSON GROUP

NASA PLUM BROOK STATION
SITE INSPECTION
FIGURE 4-3

FILE NAME :	PBS-3.DGN	INCHES / CM	
SCALE-ORIG. DWG.	AS NOTED		
DRAWN	J. LAMBERTY	DATE	JUNE 10, 1993
CHECKED	J. W. DULIN	DATE	
APPROVED		DATE	

TABLE 4-1
CONTAMINATION SOURCES IN PMU 1

PMU 1	Identified Source	Possible Contaminants	Affected Media	Volume (V) or Area (A)	Detected Contaminated
	TNT Area "C"	Nitroexplosives Organic Volatiles Pesticides/PCB Metals	Surface Soils Surface Water Sediments	40 Acres	None
	Waste Disposal Area 2A/Lime Sludge	Organic Volatiles Pesticides/PCB Metals Nitroexplosives	Surface Soils Surface Water Sediments Groundwater	7 acres	PEST/PCB's
	Waste Disposal Area 2B	Organic Volatiles Pesticides/PCB Metals Nitroexplosives	Surface Soils Groundwater	5 acres	PCB's
	Burn Ground 1	Organic Volatiles Petroleum based product Nitroexplosives Pesticides/PCB	Surface Soil Surface Water Sediment	3 acres	Organic Volatiles
	Burn Ground 2	Organic Volatiles Petroleum based product Nitroexplosives Pesticides/PCB	Surface Soil Surface Water Sediment	2 acres	None
	Fly Ash Areas	Metals	Surface Soil	5 acres	None
	Toluene Tanks	Organic Volatiles and Semi-Volatiles Pesticides	Groundwater Surface Soils	5 acres 400,000 gallons	None
	West Area Red Water Ponds	Organic Volatiles Nitroexplosives Metals	Surface Soils Groundwater Surface water Sediments	120,000 yd^3	Organic Volatiles Nitroexplosives

As expressed in the PA, the greatest concern for the transport of environmental contaminates at PBS is through surface water and groundwater. The areas having the highest probability of groundwater contamination were the Red Water Ponds, the Toluene Tanks and Burn Ground 2. The other areas are all suspected areas of surface contamination. All of the sources in the PMU are related through their association with Pipe Creek. This creek was tested along its run at all points where entry of a contaminant was likely. Table 4-1 is a summation of the sources and their associated contaminants.

4.1.1 GROUNDWATER INVESTIGATION

4.1.1.1 Monitoring Well Location

MK installed seven monitoring wells in PMU 1 during the Site Inspection, as shown in Figure 4-1. MK located three of these wells to sample groundwater which may have been influenced by the Red Water Ponds. Wells MK-MW-09, 10 and 11, were installed downgradient of the West Area Red Water Ponds along Maintenance Road. These three wells installed along the northern edge of the PMU between the roadway and the fence line, were all terminated before auger refusal or before rock was encountered. Water was encountered at nine, six and three feet below the ground surface in wells MK-MW-09, 10 and 11, respectively.

MK-MW-12 was installed along the western edge of PMU 1 near Pipe Creek. This well encountered bedrock at a depth of 13 feet with water at a depth of approximately 12.5 feet. It was installed in an area far removed from any present or past PBS activities to act as a background well along the western section of the station. MK-MW-13 was to be installed in a potential source area, but rock was encountered at depths of approximately 2.0 feet. Because of the shallow rock, it was not possible to install a monitoring well. The area was sampled by obtaining two surface soil samples and a surface water and sediment samples. The surface soil samples were obtained using a hand auger in the area of the proposed monitoring well.

The final two monitoring wells were installed in the southeast corner of the PMU. Wells MK-MW-14 and 15 were placed near the toluene tanks. These tanks (#665 and #645) are 200,000 gallon aboveground storage tanks. Rock was encountered at depths of 11.5 and 9 feet in MK 14 and 15, respectively. Water was encounter at depths of 6 feet below the ground surface at MK 14 and at 4 feet below the ground surface at MK 15.

In October of 1989, IT conducted a study of the West Area Red Water Ponds for the ACOE. As part of their investigation, IT installed a monitoring well adjacent to the red water ponds. The well is located northeast of the pond. This well, IT-MW-02, was installed to a depth of 18.3 feet. Ground water was encountered 10.7 feet below the ground surface.

4.1.2 Monitoring Well Results

4.1.2.1 Organic Compounds

In the analyses completed by MK no organic contaminant was detected in the surficial aquifer of PMU 1. The earlier analysis by IT Corporation did detect the presence of some organic constituents in the shallow aquifer next to the West Area Red Water Ponds (See Figure 4-1). Table 4-2 lists the finding of the IT study.

TABLE 4-2
VOLATILE AND SEMIVOLATILE ORGANIC COMPOUNDS
IT GROUNDWATER RESULTS IN PMU 1

Parameter	IT MW-02 (μg/l)
Acetone	12
2,6-dinitrotoluene	27
2,4-dinitrotoluene	160

U = Compound was analyzed for but not detected

4.1.2.2 Inorganic Compounds

Neither the analyses by MK nor those of IT detected any inorganic constituents in the groundwater of PMU 1 above the maximum contaminant level (MCL) or Secondary MCL (SMCL) for human consumption.

4.1.3 SURFACE WATER INVESTIGATION

4.1.3.1 Surface Water Sampling Location

Seven surface water locations were sampled by MK during the Site Inspection. At each location, a sediment sample (SD) and a surface water sample (SW) were collected. The locations were selected because each was identified as a possible point of entry (POE) from a suspected contaminant source. All of the surface water locations within PMU 1 were inside of the Station's property limits except for one (See Figure 4-1). It was collected directly outside of the perimeter fence. In each case, the water sample was collected first and then the sediment sample in order to reduce or eliminate suspended solids in the water sample.

SW01 and SD01 were collected at the head of a small stream which feeds Pipe Creek in the southwest corner of the facility. These samples were collected to evaluate the release of contaminants from Burn Ground 2 into Pipe Creek. The samples were collected on the east side of the concrete culvert between Patrol Road and the Perimeter fence. SW02 and SD02 were collected at the point where Pipe Creek enters Plum Brook Station. These samples were collected close to the north bank just east of the barricade fence across the creek. These samples were collected to help establish a background level for surface water before it enters into the red water pond area. SW03 and SD03 were collected at a point of entry for the West Area Red Water Ponds. These samples were taken along the northern bank near the southern portion of the main pond. It was noted during the sampling that red water was seeping out of the north bank of the stream bed. SW03 and SD03 were located directly below one of the seep points. These samples were collected to identify any release into the surface water from the West Area Red Water Ponds.

SW04 and SD04 were collected just downstream of the confluence of Pipe creek and a small feed stream from TNT Area "C". These samples were collected along the north bank of the stream bed to identify any release from TNT Area "C". The sampling point was considered the most likely Point of Entry from TNT Area "C". SW05 and SD05 were considered a possible point of entry from Waste Disposal Area 2A. This sampling location is along the western edge of the stream bed as it passes along the disposal area. SW06 and SD06 were collected in a small stream which feeds into Pipe Creek. The stream passes through the area originally identified as Burn Ground 1. This sampling point is the most likely possible point of

entry from that burn ground. The point is to the west of Pipe Creek near the intersection of Campbell and Maintenance Roads. The last sampling point is located off of PBS property along Pipe Creek. The sample was collected to identify any release of contaminants from Plum Brook Station. These samples, SW21 and SD21, were collected on the north side of the bridge crossing over Pipe Creek along Schenk Road.

4.1.4 Surface Water Results

4.1.4.1 Organic Compounds

The analyses performed for MK did not detect the presence of organic compounds in surface water, but did detect low levels in sediment samples. Table 4-3 lists the constituents found in the sediment samples in PMU 1. Methylene chloride was detected in the sample matrix for SD04. This sample was flagged as a blank contaminated sample but, because the contamination level was five times greater than the blank contamination, the sample is considered potentially contaminated. The level of contamination is less than the reported 170 μg/kg, but the exact level of contamination is not known. The symbol "J" indicates that the constituent was detected above the method detection limit (MDL) but below the quantitation limit. 2-Butanone was detected in the water matrix on samples SW01 and SW02. Semi-volatile contaminants above the MDL, but below quantitation limits, were detected in some sediment samples.

The previous sampling by IT did not include a surface water sample from the West Area Red Water Pond. The pond's color (dark red) seems to indicate the presence of contamination. During MK's investigation, several areas along Pipe Creek behind the red water ponds were observed to seep red water.

In 1984, Battelle performed an analysis of the red water for the Ohio National Guard. Their analysis did not detect the presence of explosives or related compounds in the surface water. Battelle used their own method of analysis (BCL Method No.6) developed in conjunction with the US Army Toxic and Hazardous Agency.

4.1.4.2 Inorganic Compounds

MK did not detect the presence of any inorganic compounds in PMU 1 above the MCL or SCML for human consumption.

4.1.5 Surface Soil Investigation

Surface soil samples were obtained by two different methods during this investigation, by drilling rig and by hand auger. Samples collected by the drill rig were obtained through the use of a split spoon sampler. Only the first two feet of the ground surface was sampled. A hand auger was also used to sample the first two feet of surface soils. See Figure 4-1 for the sampling locations.

TABLE 4-3
SEMI-VOLATILE COMPOUNDS
SEDIMENT SAMPLE RESULTS IN PMU 1
(μg/kg)

PARAMETER	SD01	SD04	SD06	SD21
2- Methylphenol	U	U	54J	U
Acenaphthene	U	U	U	16J
Acenaphthylene	U	U	U	44J
Anthracene	U	U	U	66J
Benzo(a)anthracene	450J	U	U	210J
Benzo(a)pryene	710J	U	U	160J
Benzo(b)fluoranthene	730J	U	82J	210J
Benzo(ghi)perylene	490J	U	U	130J
Benzo(k)fluoranthene	780J	U	U	100J
Bis(2-ethylhexyl)phthalate	U	U	U	47J
Chrysene	730J	U	51J	190U
Dibenzo(a,h)anthracene	U	U	U	34J
Fluoranthene	1000J	180J	40J	350J
Indeno(1,2,3-cd)pyrene	610J	U	U	110J
Naphthalene	U	U	U	23J
Phenanthrene	380J	160J	U	230J
Pyrene	1100J	120J	U	340J

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

4.1.5.1 Surface Soil Sampling Locations

Soil samples collected with the drill rig were obtained in the same locations where monitoring wells were installed. These samples have been differentiated from hand auger samples through the use of the symbol "SB" for soil boring. The remainder of the surface soil samples were collected at other potential contaminants sources. Surface Samples 01 and 02 (SS01 and SS02) were collected in Waste Disposal Area 2B. Waste Disposal Area 2B covers approximately 5 acres. This disposal area was at one time a parking area for workers. SS01 was collected along the center of the south side of the parking area. A junk pile is located adjacent to this sampling point. SS02 was collected in the northeast corner of the parking area in a wooded area. The parking area appears to have become a storage area for pipe with a few areas becoming junk piles.

Who burned there is this documented Maybe it is just coal!!

SS03, 04 and 05 were collected in an area covered by steel and concrete debris. This area is known as Waste Disposal Area 2A and covers approximately 7 acres. SS03 was collected along the northwest side of the area in stained soil next to some smashed drums. SS04 was collected in the southwest section of the area in stained soil with smashed drums. The final sample in the area, SS05, was collected in a small gully next to Pipe Creek. The gully had been backfilled with debris with evidence of water seepage through the debris into the gully. SS06 and 07 were collected in Burn Ground 1 behind an abandoned building along Campbell Street. This burning ground currently exhibits no visual limits; therefore it is estimated that it covers less than 3 acres. Both samples were collected along the northeast side of the building in an area of tall grass. In addition to being a burning ground, this area may have been used for coal storage based upon the existence of small mounds of coal in the area. ?

Surface soil samples 08 and 09 (SS08 and SS09) were collected in the Burn Ground 2 located in the southwest corner of the facility along Patrol Road. A clearing runs east to west with a small ditch bordering the north side. Samples were collected in the center of the clearing on the east and west side. The area covered by the old burn ground is estimated to be 2 acres. SS10, 11, and 12 were collected in TNT Area "C". SS10 was collected near the location of the storage tanks used in the production of TNT. These tanks were located along Fox Rd. SS11 was collected in the southeast corner of the TNT Area near the remains of a building and SS12 was collected in a clearing near the location of a TNT flume. TNT Area "C" covers approximately 40 acres. SS32 and 33 were collected in the vicinity of K site. This 5

55-32 33 No where close to old ash pits

acre area used to be a storage area for Fly Ash. During the 1960's the power plant facility was remodelled to become a test facility. The area was graded and the fly ash removed to an unknown area. These samples were collected on the north and south side of the building.

IT sampled surface soils near the West Area Red Water Pond during their investigation in 1989. There were five (5) samples collected throughout the pond area. Figure 4-1 shows the location of these samples. At the time of their investigation, IT estimated that the red water ponds covered an area of 14 acres.

4.1.6 Surface Soil Results

4.1.6.1 Organic Compounds

MK detected low levels of volatile and semi-volatile contaminants in some of the source areas. Table 4-4 summarizes the volatile results where a contaminant was detected. Toluene was the only volatile organic detected in the soil boring samples and contamination was below the quantitation limit.

During IT's investigation of the West Area Red Water Ponds, organic contaminants and nitroexplosives were detected in shallow soil samples. Table 4-5 contains the results of the IT analyses. Volatile and semivolatile results are reported in ppb while the nitroexplosives are in ppm. All of IT samples were collected within the pond area and surrounding swamps.

MK's analyses detected many semi-volatile compounds in the surface and soil boring samples. The majority of the detected compounds are coal tar derivatives. Table 4-6 summarizes the semi-volatile results for surface and soil boring samples in PMU 1. In addition, the analyses detected the presence of pesticide/PCB contaminants. All of the source samples showed low concentrations of Aroclor 1260, a PCB. Table 4-7 illustrates the pesticide/PCB contaminants found in the surface soils.

4.1.6.2 Inorganic Compounds

Neither MK nor IT detected the presence of inorganic compounds in PMU 1 above the MCL or SCML for human consumption.

TABLE 4-4
VOLATILE COMPOUNDS
SURFACE SOIL SAMPLE RESULTS IN PMU 1
(μg/kg)

PARAMETER	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS08	SS09	SS10	SS11	SS12
Acetone	U	U	U	U	U	U	10J	U	U	U	U	U
Toluene	9J	5J	U	U	U	4J	19	1J	U	4J	4J	2J
T. Xylenes	U	U	U	U	U	U	1J	U	U	U	U	U

U = Compound was analyzed for but not detected
J = Indicates an estimated value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit QL)

TABLE 4-5
VOLATILE, SEMIVOLATILE, AND NITROEXPLOSIVE COMPOUNDS SOIL SAMPLE RESULTS IN WEST AREA RED WATER PONDS IT'S INVESTIGATION-1989
(µg/kg)

PARAMETER	SB-07	SB-09	SB-10	SB-11	SB-12
Acetone	2300E	J	J	J	56
Toluene	U	U	U	J	U
Methylene Chloride	J	8	J	10	8
1,3,5-Trinitrobenzene	0.41	U	U	U	3.4
1,3-Dinitrobenzene	U	U	U	U	.59
2,4,6-Trinitrobenzene	U	U	U	U	.68
2,4-Dinitrobenzene	0.23	U	U	U	.91

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)
E = Compound concentration exceeds calibration range of the GC/MS Instrument.

TABLE 4-6
PESTICIDE/PCB COMPOUNDS SURFACE SOIL SAMPLE RESULTS IN PMU 1
(µg/kg)

PARAMETER	SS01	SS02	SS03	SS04	SS05
4,4-DDE	U	9.3J	8.6J	5J	31
Aldrin	U	3.4J	3.9J	U	U
Aroclor 1260	550	360	200	630	140
Dieldrin	11J	12J	U	U	7.8J
Heptachlor	3.3J	4.4J	U	U	U

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

TABLE 4-7
SEMI-VOLATILE COMPOUNDS
SURFACE AND SOIL BORING SAMPLE RESULTS IN PMU 1
(µg/kg)

PARAMETER	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS09	SS10	SB03	SB06	SB07
2-Methylnaphthalene	U	U	14J	U	U	320J	U	U	U	U	U	U
2,4-Dinitrotoluene	300J	530J	U	U	U	U	U	U	U	U	U	U
Acenaphthene	490	U	26J	U	U	U	U	U	U	U	U	U
Acenaphthylene	69J	U	130J	U	U	U	U	U	U	U	U	U
Anthracene	2800	U	100J	U	U	U	U	U	U	U	U	U
Benzoic Acid	48J	90J	U	U	140J	U	U	U	U	U	U	U
Benzo(a)anthracene	8400	140J	960	U	U	U	U	U	U	U	U	U
Benzo(a)pyrene	4200	120J	770	U	U	U	U	U	140J	U	U	U
Benzo(b)fluoranthene	5900	250J	1400	76J	36J	46J	U	92J	190J	U	U	U
Benzo(ghi)perlene	1400	U	200J	U	U	U	U	U	U	U	U	U
Benzo(k)fluoranthene	2100	110J	710	U	U	U	U	41J	79J	U	U	U
Bis(2-ethylhexyl)phthalate	99J	91J	61J	59J	59J	U	U	99J	U	U	130J	970
Chrysene	6500	210J	920	U	U	U	U	U	U	U	U	U
Dibenzofuran	270J	U	25J	U	U	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene	55J	U	U	U	U	U	U	U	U	U	U	U
Di-n-butyl phthalate	U	U	U	U	U	U	U	U	U	130J	U	U
Fluoranthene	17000	400	1500	35J	U	U	U	140J	340J	89J	U	U
Fluorene	730	U	43J	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	1700	U	330J	U	U	U	U	U	U	U	U	U
Naphthalene	U	U	U	U	U	240J	U	U	U	U	U	U
Phenanthrene	12000	360J	400J	U	U	130J	U	61J	160J	U	U	U
Pyrene	18000	270J	1700	U	U	U	U	110J	350J	U	U	U

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

4.2 PMU 2 -RANSOM BROOK

PMU 2 is situated along the Ransom Brook drainage area. Ransom Road borders PMU 2 on the west and Patrol Road borders it on the north and south. The eastern edge of the area follows the border of the Plum Brook drainage area. PMU 2 covers approximately 1200 acres. The majority of the area is covered with tall grasses. The northern and southern portions are heavily wooded. Ransom Brook originates in PMU 2 near TNT Area "B" and runs south to north, bisecting the PMU. Figure 4-2 shows the extent of PMU 2.

SAIC identified four possible areas of contamination during their PA. The largest identified area within this PMU is TNT Area "B". TNT Area "B" was used for production of TNT. The Rail Unloading Facility is in PMU 2 near the garage maintenance area. This area was used for unloading of toluene during the early 1940's. MK is investigating the possible extent of contamination from the Garage Maintenance UST system under a separate program. The Middle Toluene (#425 and #435) Tanks were used for the storage of toluene needed in the production of TNT in the immediate area. Both tanks have a 200,000 gal capacity. The groundwater in all of these areas was investigated for potential contamination. Sediment and surface water samples were collected at possible points of entry for each identified source. Soil samples were collected in the suspected source areas. Table 4-8 is a summation of the sources investigated and their associated potential contaminants.

where are the toluene storage tank for unloading

4.2.1 Groundwater Investigation

4.2.1.1 Monitoring Well Location

MK installed three monitoring wells within PMU 2. An existing IT monitoring well was also included in the groundwater investigation. The monitoring well locations are shown in Figure 4-2. Surficial groundwater flow is generally to the north northeast. MK placed the wells to intercept and monitor groundwater flow through the potential sites of contamination and to provide background control.

MK installed the southernmost monitoring well, MK16, along West Scheid Road directly behind (upgradient of) TNT Area "B". This well was drilled to auger refusal at 8 feet. Groundwater intercepted along the soil/rock interface will help provide background information and to establish a migration path for any contaminants entering PMU 2.

TABLE 4-8
CONTAMINATION SOURCES IN PMU 2

PMU 2	Identified Sources	Possible Contaminates	Affected Media	Volume (V) or Area (A)	Detected Contaminates
	TNT Area "B"	Nitroexplosives Organic Volatiles Pesticides/PCBs Metals	Surface Soils Surface Water Groundwater Sediments	35 Acres	Organic Semi-Volatile Nitroexplosives
	Rail Unloading Facility	Organic Volatiles and Semi-Volatiles Pesticides/PCB Solvents	Surface Soils Groundwater	5 Acres	Semi-Volatiles and Volatile Organics
	Taylor and Ransom Roads Burning Ground	Tested by IT during their investigation. Sampled surface soils only			None
	Middle Toluene Tanks	Organic Volatiles Pesticides/PCBs Solvents	Surface Soils Groundwater	5 Acres 400,000 gals	Organic Volatiles
	Garage Maintenance USTs	Being investigated under separate program.			

MK installed MK17 to determine whether any contaminants had entered groundwater as a result of TNT production in TNT Area "B". The well is located along the north side of North Magazine Road across from TNT Area "B" near the starting point of Ransom Brook. This well was installed in the vicinity of several storage tanks used during TNT production. The well was drilled to auger refusal at 6 feet and intercepted groundwater at a depth of 3 feet below the ground surface.

MK had planned to install a monitoring well, MK18, between the Middle Toluene Tanks located along Taylor Road in the south section of PMU 2. Shallow bedrock prevented MK18 installation.

MK19 is located along the western edge of the Garage Maintenance Area between the railroad spur and Maintenance Road. The well was installed to determine whether any contaminants had impacted the groundwater during rail unloading of materials. This well was drilled to a depth of 13 feet and encountered groundwater at a depth of 3.5 feet.

The IT monitoring well (IT MW-01) installed during an earlier investigation is located in the southwest corner of the PMU, near the intersection of West Scheid and Patrol Roads. MK sampled the groundwater in this well during the Site Investigation.

4.2.2 Monitoring Well Results

4.2.2.1 Organic Compounds

MK detected the presence of volatile organic contaminants in the groundwater at the Garage Maintenance Area. The analysis of the sample collected from MK19 showed levels of 1,1-dichlorethane at 180 μg/l 1,1-dichlorethane at 8 μg/l and 1,1,1-trichloroethane at >360 μg/l. Additionally, toluene was detected at levels above the method detection limit (MDL) but below the quantitation limit. The solvents are suspected to be a result of UST leakage and not rail unloading activities.

The only semi-volatile detected was Bis(2-ethylhexyl)phthalate in MW17 and 19. The level of Bis(2-ethylhexyl)phthalate detected in MW 17 was 12 μg/l. In MW19, it was detected above the MDL but below the quantitation limit.

4.2.2.2 Inorganic Compounds

No inorganics were detected in the groundwater analyses for inorganics at levels above the MCL or SCML for human consumption.

4.2.3 Surface Water Investigation

4.2.3.1 Surface Water Sampling Locations

MK sampled four locations along Ransom Brook in PMU 2. SD07 and SW07 were collected near the beginning of Ranson Brook just north of TNT Area "B". This sampling point is near a former location of TNT storage tanks and is considered to be a possible POE for surface water contaminants. The sample was collected to determine if there has been any release to the environment as a result of TNT production in Area "B".

SD08 and SW08 were collected from the north side of Fox Road along Ransom Brook. This sampling point is considered to be a possible POE for the Middle Toluene Storage Tanks.

The sampling point for SD09 and SW09 is a possible POE for contaminants from the Rail Unloading Facility. This sampling point is located north of Maintenance Road just off a small service road.

The SD10 and SW10 samples were collected in the northern section of PMU 2 at the NPDES sampling station. The NPDES station is located in Ransom Brook near the Reactor Facilities Loop Road. A concrete weir monitors Ransom Brook for the NPDES program. The samples were collected within the upstream holding area of this weir. See Figure 4-2 for the sampling locations.

4.2.4 Surface Water Results

4.2.4.1 Organic Compounds

No organic compounds were detected in the surface water, but numerous organic compounds were detected at low concentrations in the sediments. Acetone was detected in all of the sediment samples collected in PMU 2. Other volatile organic contaminates were detected in the sediments, but most were below the quantitation limit. Table 4-9 illustrates the results of the analyses of the sediment samples for volatile compounds.

TABLE 4-9
VOLATILE ORGANIC COMPOUNDS
SEDIMENT SAMPLE RESULTS IN PMU 2
(μg/kg)

	SD07	SD08	SD09	SD10
1,1-Dichloroethane	2J	U	U	U
2-Butanone	10J	U	11J	31J
Acetone	53	21	94	210J
Chloromethane	U	U	4J	U
Methylene Chloride	1J	U	5J	U
Toluene	U	1J	13J	U

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

Semivolatile organic contaminates were detected in PMU 2 sediments, but the levels of contamination were below the quantitation limit. A nitroexplosive was detected in sample SD07. SD07 was located in the general vicinity of the storage tanks used in the production of TNT. Table 4-10 illustrates the results of the semivolatile and nitroexplosive analyses on sediment samples in PMU 2.

4.2.4.2 Inorganic Compounds.

No inorganic compounds were detected in surface water or sediment samples in PMU 2 at levels above the MCL or SMCL for human consumption.

4.2.5 Surface Soil Investigation

A total of 11 surface soil samples were collected within PMU 2. These samples were obtained using both a drill rig and a hand auger. Soil samples collected with a split spoon sampler are associated with monitoring wells in the PMU and are labeled with the letters "SB". Hand augers were used within the source areas and are symbolized by the letters "SS". All soil samples were limited to the first two feet below the ground surface.

TABLE 4-10
SEMIVOLATILE AND NITROEXPLOSIVE COMPOUNDS
SEDIMENT SAMPLES RESULTS IN PMU 2
(μg/kg)

PARAMETER	SD07	SD08	SD09	SD10
2-Methylnaphthalene	60J	U	U	U
2,4-Dinitrotoluene	200J	U	U	U
Benzoic Acid	U	U	10J	U
Benzo(a)anthracene	U	60J	46J	U
Benzo(a)pyrene	100J	46J	U	U
Benzo(b)fluoranthene	260J	66J	59J	U
Benzo(ghi)perylene	87J	U	U	U
Benzo(k)fluoranthene	U	28J	26J	U
Bis(2-ethylhexyl)phthalate	3800B	61J	U	U
Chrysene	150J	49J	43J	U
Fluoranthene	240J	100J	U	U
Phenanthrene	140J	26J	23J	U
Pyrene	200J	80J	U	U
2,4,6-Trinitrotoluene	25000	U	U	U

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)
B = Compound found in the associated blank as well as in the sample

4.2.6 Surface Soil Sampling Location

SS13 and SB09 were collected in or near TNT Area "B". SS13 was located near a trough used to carry TNT product to the storage areas. This area is heavily covered with tall grass and is approximately 25 feet from an access road. SB09 was collected in the upper two feet of MW17 near the storage tanks for this area. This area is sparsely covered with tall grass.

SS14 and SB10 were collected in the Middle Toluene Tank area on the south section of Taylor Road. These tanks are surrounded by a low soil dike. The samples were collected within the diked area between the two tanks. This area is covered with dense, tall grass with a few hardwood trees nearby.

SB11, SS15 and SS16 were collected near the Rail Unloading Facility west of the Garage Maintenance area along Maintenance Road. These samples were all collected along the rail spur going into the Maintenance Garage Area. This area is covered with tall dense grass. The samples located in the rail unloading area are approximately 50 feet apart.

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SS34, SS35 and SS36 were obtained from an area void of vegetation and covered with lumps of sulfur and coke just west of the intersection of Maintenance Road and the rail spur. Broken timbers were found that indicate that a wooden structure of some sort used to exist in this area.

4.2.7 Surface Soil Results

4.2.7.1 Organic Compounds

Organic compounds were detected at low levels in the upper two feet of soil in PMU 2. In TNT Area "B", volatile organic compounds and nitroexplosives were found in the surface soils. A low level of 33 μg/kg, was detected in SS13. Nitroexplosive compounds were found in SB09; 2,4,6-trinitrotoluene was detected at a level of 12000 μg/kg and 2,6-dinitrotoluene was detected at a level of 60 μg/kg. Table 4-11 illustrates the results of the volatile organic analyses on the surface soil and soil boring samples in PMU 2.

Semivolatiles were also detected in the surface soil and soil boring samples in PMU 2. The waste area west of the rail unloading facility had high levels of Bis(2-ethylhexyl)phthalate and coal tar derivatives. Table 4-12 gives the results of semivolatile constituents detected in the surface soil and soil boring samples in PMU 2.

4.2.7.2 Inorganic Compounds

Inorganic compounds were not detected at levels exceeding the MCL or SMCL for human consumption.

TABLE 4-11
VOLATILE ORGANIC COMPOUNDS
SURFACE SOIL AND SOIL BORING SAMPLE RESULTS IN PMU 2
(μg/kg)

PARAMETER	SS13	SS14	SS15	SS16	SS34	SS35	SS36	SB08	SB09	SB10	SB11
Chloroform	J	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	U	U	U	2J	U	U	U	U	U	U	U
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	1BJ
Toluene	33	1J	0J	2J	54B	82J	25B	U	U	U	U
Total Xylenes	U	U	U	U	U	U	U	U	4J	U	U
Trichloroethene	U	U	U	U	U	1J	1J	U	U	U	U

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)
B = Analyte found in blank as well as in samples

TABLE 4-12
SEMI-VOLATILE ORGANIC COMPOUNDS
SURFACE SOIL AND SOIL BORING SAMPLE RESULTS IN PMU 2
(μg/kg)

	SS13	SS14	SS15	SS16	SS34	SS35	SS36	SB08	SB09	SB10	SB11
2-Methylnaphthalene	U	U	U	U	U	U	U	32J	U	U	79J
Acenaphthylene	U	U	U	U	U	190J	U	U	U	U	60J
Anthracene	U	U	U	U	U	98J	U	U	U	U	56J
Benzoic Acid	U	U	U	U	U	U	U	U	U	U	28J
Benzo(a)anthracene	U	U	U	27J	220J	920	89J	U	U	U	260J
Benzo(a)pyrene	U	U	U	22J	130J	680	U	U	U	U	230J
Benzo(b)fluoranthene	U	U	U	34J	310J	2400	U	32J	U	U	340J
Benzo(ghi)perylene	U	U	U	U	63J	280J	U	U	U	U	100J
Benzo(k)fluoranthene	U	U	U	18J	130J	800	U	U	U	U	160J
Bis(2-ethylhexyl)phthalate	44J	230J	110J	U	1200	4800	23000E	U	U	U	60J
Chrysene	U	U	U	28J	310J	1500	97J	U	U	U	240J
Dibenzo(a,h)anthracene	U	U	U	U	U	91J	U	U	U	U	27J
Fluoranthene	U	U	U	64J	460	2100	180J	23J	U	U	510
Indeno(1,2,3-cd)pyrene	U	U	U	U	85J	430	U	U	U	U	140J
Naphthalene	U	U	U	U	U	U	U	13J	72J	U	U
Phenanthrene	U	U	U	25J	110J	460	48J	39J	U	U	220J
Pyrene	U	U	U	46J	410	1500	130J	U	U	U	390

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)
E = Compound concentration exceeds calibration range of the GC/MS Instrument.

4.3 PMU 3 - PLUM BROOK

PMU 3 is situated along the surface drainage pattern for Plum Brook east of PMU 2. The eastern boundary is a line running north south through the intersection of Maintenance Road and Columbus Road. Patrol Road is the border for the northern and southern limits of PMU 3. PMU 3 covers approximately 1000 acres. The northern and southern portions are covered with a mature growth of hardwood trees. The remaining area is dominated by tall grasses. Plum Brook runs south to north through PMU 3 and exits the facility near the intersection of Pentolite Road and Columbus Avenue. Figure 4-2 shows the extent of PMU 3.

During their investigation in 1991, SAIC identified six areas as possible points or areas of contamination within PMU 3. The Snake Road Burning Ground was investigated by IT as part of their SI in 1990 and then again by H^+GCL in 1992. There are two areas in close proximity that were identified as fly ash disposal areas for the old power generation station. Both of the areas are along Maintenance Road. A set of Toluene tanks, the "Upper Toluene Tanks", are in PMU 3. These two tanks #255 and #265 are both encircled by an earthen dike. PMU 3 is the location of a second red water pond area. The pond is no longer there, having been backfilled with soil. The red water was pumped out of the pond and the pond backfilled with local soils. Because of its location, the red water pond area is called "Pentolite Red Water Pond". IT installed a monitoring well in the area of the abandoned pond during their study in 1990. During periods of heavy rain there are small areas of standing water.

The potential sources of PMU 3 are all related in that they all ultimately flow into Plum Brook. The sources of potential groundwater contamination include the toluene tanks and the red water ponds. Monitoring wells were either installed in these areas or previous studies were relied upon for information about possible groundwater contamination. The other potential sources within PMU 3 present a possibility for surface soil and surface water contamination. There were samples collected in these areas or at possible points of entry from these areas. Table 4-13 is a summation of the sources and their associated potential contaminants.

TABLE 4-13
CONTAMINATION SOURCES IN PMU 3

PMU 3	Identified Sources	Possible Contaminates	Affected Media	Volume (V) or Area (A)	Detected Contaminates
	Fly Ash Areas	Metals	Surface Soils	Combined, 5 Acres	None
	Upper Toluene Tanks	Toluene Pesticides/PCB Organic Solvents	Surface Soils Groundwater Surface Water Sediments	3 Acres 400,000 gallons	Toluene Semi-Volatile Solvents
	Boiler Complex and Ponds	Metals	Surface Soils Sediments	7 Acres	Nones
	Reactor Facility	Radioactivity Solvents Pesticides/PCB	Surface Water Sediments	2 Acres	None
	Pump Stations USTs	Being investigated under separate program			
	Pentolite Road Red Water Ponds	Nitroexplosives Metals Organic Volatiles	Surface Soil Groundwater Surface Water Sediments	182,000 yd^3	Nitroexplosive Organic Volatiles
	Snake Road Burn Pit	IT did the analysis of this area. Surface soil samples			None

4.3.1 Groundwater Investigation

4.3.1.1 Monitoring Well Location

MK planned to install two groundwater monitoring wells, MW20 and MW21, in PMU 3 adjacent to the Upper Toluene Tanks. The Upper Toluene tanks each have a 200,000 gallon capacity. Figure 4-3 shows the locations of these monitoring wells. The surficial groundwater flow is generally to the north northeast. The wells were to be installed to determine if was contaminants were released into the surficial aquifer from the Toluene Tanks.

MW20 is located within the earthen dike surrounding Tank #265, the most western of the two tanks in this area. The monitoring well was installed in the northwestern corner of the diked area in tall grass. MW20 was drilled to a depth of 23 feet and encountered groundwater at a depth of 17 feet below the ground surface. The boring encountered a layer of grey plastic clay which initially reduced the flow of groundwater into the well.

MW21 was to be installed in the earthen dike on the north edge of Tank #255. This boring was drilled to a depth of 15 feet below the ground surface before encountering auger refusal. However, since the boring did not produce water, a monitoring well was not installed.

IT installed a monitoring well near the Pentolite Road Red Water Pond during their 1990 investigation. This well was installed in the northwest corner of the former pond location in tall grass at the edge of a grove of trees. The red water pond had been removed prior to the study conducted by IT. The well was installed to a depth of 21 feet, intercepting the surficial groundwater at a depth of approximately 16 feet below the ground surface.

4.3.2 Monitoring Well Results

4.3.2.1 Organic Compounds

MK detected the presence of volatile and semivolatile compounds in the groundwater at MW20. Table 4-14 lists the results of groundwater analyses for samples collected from MW20. The IT investigation did not detect the presence of organic compounds in the groundwater.

TABLE 4-14
VOLATILE AND SEMI-VOLATILE COMPOUNDS
GROUNDWATER RESULTS IN PMU 3
(μg/l)

Parameter	Concentration
2-Butanone	33J
Acetone	110J
Benzene	10J
Toluene	36000D
Total Xylenes	8J
2-Methylphenol	520D
Benzoic Acid	13J
Benzyl Alcohol	13
4-Methylphenol	190D

J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)
D = Analysis at a secondary dilution factor

4.3.2.2 Inorganic Compounds

Neither MK nor IT detected inorganic compounds with constituent levels above the MCL or SCML for human consumption.

4.3.3 Surface Water Investigation

4.3.3.1 Surface Water Sampling Location

MK sampled six surface water locations within PMU 3 (see Figure 4-2). Four sampling points were in Plum Brook, one in a drainage ditch from the Reactor Facility and one in the drainage ditch north of the Red Water Pond along Pentolite Road. These sampling points were chosen as potential POEs from identified sources.

SD11 and SW11 were collected at the southern most sampling location within PMU 3. It is located south of the intersection of West Scheid Road and Plum Brook.

SD12 and SW12 were collected at the intersection of Fox and Short Cut Roads just north of the bridge over Plum Brook.

A possible POE from the toluene tanks is located north of Maintenance Road on Plum Brook. SD13 and SW13 were collected north of the bridge over Plum Brook on Maintenance Road.

MK sampled one location outside of the facility's property line to determine if there had been a release of contaminants into the surface water. SD22 and SW22 were located to the west of the Maintenance Garage for Perkins Township School Buses. The sampling point is north on Plum Brook about 500 feet from its intersection with Pentolite Road.

SD14 and SW14 were located north of the red water pond at the intersection of Pentolite Road and a drainage swale flowing north past the former pond area. There have been reported discharges of red water into this drainage ditch from field tile underlying the former pond area.

Along Patrol Road northeast of the Reactor Facility, SD15 and SW15 were collected from a ditch just prior to its passing under the fence. The ditch flows through a concrete conduit under the fence. The sampling point is a possible point of entry for contaminants from the Reactor Area.

IT sampled one surface water location during their study in 1990. IT-SW04 was collected in the center of the former red pond area.

4.3.4 Surface Water Results

4.3.4.1 Organic Compounds

MK's analyses of samples collected within PMU 3 detected the presence of low quantities of volatile compounds in the sediments. Table 4-15 illustrates the results of the analyses for volatile organics on sediment samples from PMU 3.

TABLE 4-15
VOLATILE ORGANIC COMPOUNDS
SEDIMENT SAMPLE RESULTS IN PMU 3
(μg/kg)

PARAMETER	SD11	SD12	SD13	SD14	SD15	SD22
2-Butanone	U	U	U	2J	U	U
Acetone	28	U	U	17	66	U
Carbon Disulfide	U	2J	U	U	U	U
Chloroform	U	U	U	U	2J	U
Methylene Chloride	U	U	U	U	U	U
Toluene	3J	9	2J	2J	U	U

U = Compound was analyzed for but not detected
J = Indicates an estimated value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

Analyses of the sediment samples also revealed low concentrations of a few semivolatile contaminants. Most of the contaminants detected are derived from coal tar. Table 4-16 illustrates the results of the analyses for semivolatile contaminants in PMU 3.

TABLE 4-16
SEMI-VOLATILE COMPOUNDS
SEDIMENT SAMPLE RESULTS IN PMU 3
(μg/kg)

	SD11	SD12	SD13	SD14	SD22
2-Methylnaphthalene	110J	39J	U	U	U
2,4-Dinitrotoluene	U	U	140J	U	U
Acenaphthene	U	26J	U	U	U
Acenaphthylene	U	140J	110J	U	U
Anthracene	U	270J	110J	U	17J
Benzo(a)anthracene	U	960	730	U	67J
Benzo(a)pyrene	U	660	560	U	54J
Benzo(b)fluoranthene	U	1100	880	U	65J
Benzo(ghi)perylene	U	160J	130J	U	37J
Benzo(k)fluoranthene	U	420J	370J	U	26J
Bis(2-ethylhexyl)phthalate	460J	130J	U	570	180J
Chrysene	U	730	530	U	70J
Dibenzo(a,h)anthracene	U	46J	44J	U	U
Fluoranthene	U	1900	970	U	82J
Fluorene	U	110J	U	U	U
Indeno(1,2,3-cd)pyrene	U	210J	180J	U	U
Phenanthrene	67J	850	200J	U	64J
Pyrene	U	1500	1100	U	98J

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

4.3.4.2 Inorganic Compounds

Neither MK nor IT detected inorganic compounds with constituent levels above the MCL or SCML for human consumption.

4.3.5 Surface Soils Investigation

4.3.5.1 Surface Soils Location

MK collected six soils samples in PMU 3. Four samples were surface soil samples collected with a hand auger and two were soil boring samples collected from a split spoon. SS17 and SS18 were collected on the south side of Building 3111. This area is the site of a previous mercury spill. SS17 was collected in a small area south of the reported spill and SS18 was collected from the edge of the holding pond west of the building area. These samples were only analyzed for metals.

SS19 and SS20 were collected near old ash disposal sites. SS19 was collected in an area west of Building 8531 off Taylor Road. The sampling area was covered with a tall growth of grass. SS20 was collected north of Maintenance Road next to the Pentolite Red Water Pond. This sampling point is located just west of the pump station. These samples were only analyzed for metals.

MK also took two soil boring samples in PMU 3. Both soil boring samples were collected near the Upper Toluene tanks. SB12 and SB13 were collected from the upper two feet of soil obtained during the installation of monitoring wells MK20 and MK21. During their 1989 study, IT obtained nine soil samples from the red water pond area. IT took samples at two foot intervals to a depth of six feet in four locations.

4.3.6 Soil Sampling Results

4.3.6.1 Organic Compounds

The analyses performed by MK detected the presence of volatile and semivolatile organic compounds in the soil borings. The soil borings were in the vicinity of the Upper Toluene Tanks. Contamination was found at levels above the MDL, but below the quantitation limit. Table 4-17 illustrates the results of the analyses on the soil boring samples.

The IT study found organic contamination in the red water pond area. Volatiles, semivolatiles and nitroexplosives were detected during the IT study. Table 4-18 outlines the results of IT's analyses.

4.3.6.2 Inorganic Compounds

Analyses by MK and IT did not detect inorganic compounds with constituent levels above the MCL or SCML for human consumption.

TABLE 4-17
VOLATILE AND SEMI-VOLATILE COMPOUNDS
SOIL BORING SAMPLE RESULTS IN PMU 3
(μg/kg)

PARAMETER	SB12	SB13
Acetone	U	36J
Toluene	U	4J
Anthracene	U	24J
Benzo(a)anthracene	U	92J
Benzo(a)pyrene	U	60J
Benzo(b)fluoranthene	U	86J
Benzo(ghi)perylene	U	32J
Benzo(k)fluoranthene	U	39J
Bis(2-ethylhexyl)phthalate	U	83J
Chrysene	U	76J
Fluoranthene	U	210J
Indeo(1,2,3-cd)pyrene	U	39J
Phenanthrene	U	120J
Pyrene	U	150J

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

TABLE 4-18
VOLATILES, SEMIVOLATILE, AND NITROEXPLOSIVES COMPOUNDS SOIL SAMPLES RESULTS OBTAINED DURING IT INVESTIGATION-1990
(μg/kg)

	SB-14	SB-15a	SB-15b	SB-16a	SB-16b	SB-17	SB-18	SB-19
Acetone	80	U	U	160	54	150	U	3000
Toluene	U	J	U	U	U	J	J	9
Methylene chloride	9	7	7	J	8	J	U	7
2,6-Dinitrotoluene	1700	U	U	J	1500	J	1000	U
2,4-Dinitrotoluene	11000	U	U	1900	7300	740	5900	U
Bis(2-ethylhexyl) phthalate	J	J	450	J	J	J	J	J
1,3,5-Trinitrotoluene	14	U	U	1.2	15	0.67	10	U
1,3- Dinitrobenzene	3.7	U	U	0.55	6.4	U	5	U
2,4,6- Trinitrotoluene	U	U	U	0.74	U	U	U	U
2,6-Dinitrotoluene	U	U	U	0.53	U	U	U	U
2,4- Dinitrotoluene	2.2	20	U	U	3.2	16	1.1	19
Nitrotoluene	U	U	U	0.48	U	U	U	U
Nitrobenzene	U	U	U	0.48	U	U	U	U

a = Upper two feet
b = Deeper than two feet
U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

4.4 PMU 4 - LINDSLEY DITCH

PMU 4 is located along the eastern border of PBS. Pentolite Road borders PMU 4 on the north and Patrol Road on the east. North Magazine Road sets the southern limit of the PMU. The western boundary is an arbitrary line running north-south along the general lines of Snake Road. The most prominent feature of PMU 4 is the present Engineering Building which was constructed on an old TNT production area. This area was originally called TNT Area "A". Lindsley Ditch is the major stream or surface water body in this PMU. Lindsley Ditch flows to the north northeast and empties into Plum Brook at Bogart Road. PMU 4 covers approximately 600 acres of tall grass lands and some small wooded lots in its southwestern and northeastern corners. The land is fairly flat with the Engineering Building built on a prominent knoll. Figure 4-3 shows the extent of PMU 4.

Two possible source areas were identified by SAIC during their PA in 1991. The major source of possible contamination is TNT Area "A". The Engineering Building now sits on the location of a former ammunition manufacturing site. The possible pathways of contamination from this source are groundwater, surface water and surface soil. Monitoring wells were placed around the former production area to monitor the possible contamination of groundwater. Surface water samples were collected from Lindsley Ditch. Lindsley Ditch flows into Plum Brook north of the Station. Because of the close proximity of facility workers, soil samples were collected near the Engineering Building.

The second possible source identified by SAIC was the Fox Road Burning Ground. The Fox Road Burning Ground was identified in the SAIC report as Disposal Area 1A and Burn Pit 5. Surface soil samples were collected to test for residual contamination of the soil in the upper two feet of this site. Table 4-18 is a summation of the sources and their associated potential contaminants.

TABLE 4-19
POTENTIAL CONTAMINATION SOURCES IN PMU 4

PMU 4	Identified Sources	Possible Contaminates	Affected Media	Volume (V) or Area (A)	Detected Contaminates
	TNT Area "A"	Nitroexplosives Organic Volatiles Metals Pesticides/PCBs	Surface Soils Surface Water Sediments Groundwater	100 Acres	Organic Volatile Pesticides
	Fox Road Burning Ground	Nitroexplosives Organic Solvents Metals Pesticides/PCBs	Surface Soils Surface Water Sediments	5 Acres	None

4.4.1 Groundwater Investigation

4.4.1.1 Monitoring Well Location

Groundwater flow in PMU 4 is generally to the north. Bedrock is a fairly shallow shale or interbedded shale and limestone. MK planned to install four monitoring wells in this area to determine if a contaminant was released into the groundwater from the TNT production area, but could only install three. (MK22, MK23 and MK24) MK22 is located on the north side of the Engineering Building along Columbus Avenue. Bedrock was encountered at a depth of 9.5 feet below the ground surface. Due to the low water table in this area and the clay that smeared on the well's outer wall, MK22 produced very little water. MK23 is located on the loop road surrounding the Engineering Building in the northeast corner of PMU 4. The well was installed to 16 feet below the ground surface where bedrock was encountered. MK24 is in the southwest corner of the PMU. The well was installed to bedrock at a depth of 9.5 feet below the ground surface. MK 25 was not installed because of the shallow rock (<2ft). See Figure 4-3 for the location of the monitoring wells.

4.4.2 Monitoring Well Results

4.4.2.1 Organic Compounds

Only MK24 produced enough water to have a complete analysis performed on the sample. Results indicate the presence of 22 (μg/l) of Bis(2-ethylhexyl)phthalate in the groundwater at MK24. MK performed volatile analyses only at MK22 and MK23. The results of these analyses were that no volatile organic constituents were detected in the groundwater. No nitroexplosives were detected in the groundwater.

4.4.2.2 Inorganic Compounds

MK did not detect any inorganic compounds with constituent levels above the MCL or SCML for human consumption.

4.4.3 Surface Water Investigation

4.4.3.1 Surface Water and Sediment Sampling Locations

MK sampled two surface water locations within PMU 4. SD16 and SW16 were collected immediately downstream of the convergence of

Lindsley Ditch and a small perimeter ditch running along the north side of TNT Area "A". This sampling point is in the northeast corner of PMU 4. SD17 and SW17 were collected east of TNT Area"A" in Lindsley Ditch. See Figure 4-3 for the locations of these sampling points.

4.4.4 Surface Water and Sediment Results

4.4.4.1 Organic Compounds

No organic compounds were detected in the surface water samples, but low levels of volatile and pesticide contamination were found in the associated sediment samples. The analysis of SD16 and SD17 revealed the presence of acetone in the samples. SD16 had an acetone level of 25 μg/kg and SD17 had 21 μg/kg. Sample SD16 revealed low levels of Methoxychlor, a pesticide, in the sediment at 29 μg/kg. There were also low level detections of 4,4-DDT and Dieldrin. Table 4-20 illustrates the results of the analyses for volatile and semivolatile compounds in PMU 4.

4.4.4.2 Inorganic Compounds

MK did not detected inorganic compounds with constituent levels above the MCL or SCML for human consumption.

4.4.5 Surface Soil Investigation

4.4.5.1 Surface Soil Sampling Locations

MK sampled eight surface soil locations within PMU 4. Four of the samples were obtained through the use of a hand auger (SS23 through SS27) while the remaining four were obtained with a split spoon sampler (SB14 through SB17). One soil duplicate sample was collected in the Fox Road Burning Ground. SB23 was collected in the southwestern edge of TNT Area"A" near a rail spur. This sample was collected on the south side of the railroad right-a-way. SS24, SS25, SS26 and SS27 were collected in the Fox Road Burning Ground. The Burning Ground is in the southwestern corner of PMU 4. The burning ground was surrounded by a two foot high earthen dike. There is debris littered around the burning grounds. SS24 was collected in the western edge of the diked area. SS25 and SS26 were collected in the northern edge of the site. SS26 was collected as a field duplicate. SS27 was collected in the eastern edge of the site. All samples were of a silty sand. The burning grounds cover approximately 2 acres.

TABLE 4-20
VOLATILE AND SEMI-VOLATILE COMPOUNDS IN SEDIMENT SAMPLE RESULTS IN PMU 4
(μg/kg)

PARAMETER	SD16	SD17
Acetone	25	21
Methylene Chloride	0.9J	U
Toluene	U	1J
2,4-Dinitrotoluene	170J	U
Benzo(a)pyrene	70J	76J
Benzo(b)fluoranthene	190J	200J
Chrysene	120J	91J
Fluoranthene	220J	180J
Phenanthrene	82J	52J
Pyrene	160J	140J

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

The remaining four soil samples were obtained in the same location as the monitoring wells. The soil boring samples were collected in the upper two feet of each monitoring well. See Figure 4-3 for the sampling locations of the surface soil and soil boring samples in PMU 4.

4.4.6 Surface Soil Results

4.4.6.1 Organic Compounds

MK's analyses detected the presence of organic compounds in PMU 4. Samples SS24 through SS27 collected within the Fox Road Burning Ground contained low levels of toluene. The values of toluene in the soil ranged from 23 μg/kg in SS25 to less than 5 μg/kg in SS23. Semivolatile analyses of the surface soil and soil boring samples detected small quantities of contaminants.

Volatile organics were detected in the soil borings. SB14 detected 11 μg/kg of toluene, while the remaining borings had levels of toluene below the quantitation limit. A semivolatile contaminant was detected in SB17. Bis(2-ethylhexyl)phthalate was found at a level of 1200 μg/kg. Table 4.21 illustrates the results of the analyses for semivolatile organics. Nitroexplosives and pesticides/PCBs were not detected in the surface soil and soil boring samples.

4.4.6.2 Inorganic Compounds

MK's did not detected inorganic compounds with constituent levels above the MCL or SCML for human consumption.

TABLE 4-21
SEMI-VOLATILE COMPOUNDS IN
SURFACE SOIL AND SOIL BORING SAMPLE RESULTS IN PMU 4
(μg/kg)

	SS25	SS26	SB14	SB15	SB16	SB17
Acenaphthylene	U	U	33J	U	U	U
Benzo(a)anthracene	U	U	220J	U	55J	91J
Benzo(a)pyrene	U	U	160J	U	U	U
Benzo(b)fluoranthene	32J	31J	230J	U	78J	110J
Benzo(ghi)prylene	U	U	74J	U	U	U
Benzo(k)fluoranthene	U	U	110J	U	36J	50J
Bis(2-ehtylhexyl)phthalate	U	U	U	U	U	1200
Chrysene	U	U	160J	U	73J	110J
Fluoranthene	U	U	300J	U	110J	180J
Indeo(1,2,3-cd)pyrene	U	U	96J	U	U	U
Phenanthrene	U	U	91J	U	41J	68J
Pyrene	U	U	250J	U	U	160J

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

4.5 PMU 5 - KUEBELAR, SCHEID, AND SCHLESSMAN DITCHES

PMU 5 is in the southeast corner of PBS. Columbus Avenue and Patrol Road borders PMU 5 on the east and Taft Road borders it on the west. North Magazine Road borders PMU 5 on the north and Patrol Road on the south. The dominant feature of PMU 5 is the ammunition storage bunkers in the center of the area. Hardwood trees and tall grasses surround the bunkers. The southern most area in PMU 5 is used by the Ohio National Guard as a training facility. Figure 4-3 shows the extent of PMU 5.

SAIC identified two sources within PMU 5. The Space Power Facility (SPF) Rubble Pile, which is west of the SPF and mostly contains construction rubble, and the UST area behind the SPF. Both of the sources border on and are drained by small ditches feeding Kuebelar Ditch. The ammunition storage bunkers are drained by two small ditches, Scheid and Schlessman Ditches. Bedrock in the area is very shallow and groundwater flow is connected to the surface water. The samples collected in this PMU focus on the surface waters leaving the Station. There were also samples collected of the surface soils in the rubble pile.

4.5.1 Groundwater Investigation

MK did not install groundwater monitoring wells as part of the SI in PMU 5. No evidence suggests contaminant sources other than the underground storage tank (UST) area at the SPF. An existing series of 5 monitoring wells are located near the site of the UST. The tanks have already been removed and an investigation program following RCRA guidance is presently underway.

4.5.2 Surface Water Investigation

4.5.2.1 Surface Water and Sediment Sampling Locations

MK sampled three locations within PMU 5 for surface water contamination. SD18 and SW18 were collected on the west side of the overpass of Columbus Avenue at Schlessman Ditch. Schlessman Ditch is located in the northern section of PMU 5 and drains the upper section of the ammunition bunkers. It runs west to east and empties into Sawmill Creek.

SD19 and SW19 were collected on the west side of the overpass of Columbus Avenue at Scheid Ditch. Scheid Ditch also runs in a west to east direction and empties into Sawmill Creek. Scheid Ditch drains the lower section of ammunition bunkers in PMU 5.

SD20 and SW20 were collected at the NPDES station along Kuebelar Ditch near the intersection of Columbus Avenue and South Magazine Road. Kuebelar Ditch drains the area around the SPF and empties into Sawmill Creek.

4.5.3 Surface Water Sampling Results

4.5.3.1 Organic Compounds

No organic constituents were detected in surface water samples from PMU 5. The analyses of sediment samples in PMU 5 did detect the presence of low levels of organic constituents. Acetone was detected in two of the sediment samples collected from the ditches. SD18, collected from Schlessman Ditch, had a level of 57 μg/l of toluene. SD20, collected from Kuebelar Ditch had a Toluene level of 32 μg/l. Other low levels of contaminants were detected in the sediment samples. See Table 4-22 for detected volatile organic compounds.

TABLE 4-22
VOLATILE COMPOUNDS
SEDIMENT SAMPLE RESULTS IN PMU 5
(μg/kg)

PARAMETER	SD18	SD19	SD20
2-Butanone (MEK)	8J	U	U
Acetone	57	U	32
Methylene Chloride	1J	1J	1J
Toluene	U	U	1J

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

In addition to the volatile organic compounds detected in the sediment samples, semivolatile compounds were also detected. The semivolatile results were above the quantitation limits set in the quality assurance plan , but not above the method levels. See Table 4-23 for detected semivolatiles.

TABLE 4-23
SEMI-VOLATILE COMPOUNDS
IN SEDIMENT SAMPLE RESULTS IN PMU 5
(μg/kg)

PARAMETER	SD18	SD19	SD20
2-Methylaphthalene	76J	92J	U
Benzo(a)pyrene	U	67J	U
Benzo(b)fluoranthene	U	130J	U
Benzo(ghi)perylene	U	41J	U
Chrysene	U	92J	U
Fluoranthene	U	130J	U
Indeno(1,2,3-cd)pyrene	U	45J	U
Naphthalene	U	29J	U
Phenanthrene	80J	130J	U
Pyrene	U	120J	U

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

Analyses of both surface water and sediment samples detected the presence of pesticides. Table 4-24 shows the results of the detectable pesticides found in the surface water and sediment samples.

TABLE 4-24
PESTICIDE/PCB COMPOUNDS IN
SURFACE WATER AND SEDIMENT SAMPLE RESULTS IN PMU 5
(µg/kg)

	SW18	SW19	SW20	SD18	SD19	SD20
4,4-DDD	U	U	U	U	1.3J	U
4,4-DDE	U	U	U	U	11J	U
Dieldrin	U	U	U	1.9J	1.9J	U
Endosulfan Sulfate	0.076J	0.040J	U	4.5BJ	U	U
Methoxychlor	U	U	U	1.6J	2.1J	3.7J

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

4.5.3.2 Inorganic Compounds

MK's analyses did not detect inorganic compounds with contaminant levels above the MCL or SCML for human consumption.

4.5.4 Surface Soil Investigation

4.5.4.1 Surface Soil Sampling Locations

Surface soil samples were obtained in and around the SPF Rubble Pile located to the west of the SPF along South Magazine Road. The rubble pile consists mostly of concrete debris and steel rebar. There are also a couple of lead plates in the southwest corner of the area. There are piles of sand along the western edge of the soil berm surrounding the area. The sand is light brown and black in color. It appears that the sand was used for sand blasting due to the paint flakes present in the sand.

Four samples were collected in this area, two from the soil and two from the sand. SS28 was collected from soil in the western section of the rubble pile near the edge of the concrete debris. SS29 was collected from soil in the eastern section of the rubble pile, also near

the edge of the concrete debris. SS30 was collected from light brown sand and SS31 was collected from black sand. The sand samples were only analyzed for total metals and volatile organics.

4.5.5 Surface Soil Sampling Results

4.5.5.1 Organic Compounds

The analyses revealed the presence of volatile organic compounds in surface soils. Most results were below quantitation limits, but higher levels of toluene were found in the soil and the sand. Table 4-25 shows the results of detected volatile organic compounds in the surface soils.

TABLE 4-25
VOLATILE ORGANIC COMPOUNDS
SURFACE SOIL SAMPLE RESULTS IN PMU 5
(μg/kg)

PARAMETER	SS28	SS29	SS30	SS31
Methylene Chloride	U	U	0.9J	U
Toluene	22	13	1J	15
Trichloroethene	U	U	U	0.8J

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

Pesticide and PCB analyses of the surface samples in PMU 5 detected low levels of constituents. Table 4-26 lists detected pesticide/PCB compounds found in the surface soil samples.

TABLE 4-26
PESTICIDE/PCB COMPOUNDS
SURFACE SOIL SAMPLE RESULTS IN PMU 5
(μg/kg)

PARAMETER	SS28	SS29
Aroclor 1248 (PCB)	15J	21J
Endosulfan Sulfate	0.94J	0.72J

U = Compound was analyzed for but not detected
J = Indicates an estimate value. Compound was detected above the Method Detection Limit (MDL) but below the Quantitation Limit (QL)

4.5.5.2 Inorganic Compounds

Analyses of the sand indicated elevated levels of lead in the sands found near the rubble pile. SS30 shows a level of total lead of 1,310 mg/kg. This high level of lead may be the result of lead in the paint chips and paint particles attached to the sand.

4.5.6 RADIOACTIVITY SAMPLING

In addition to the sampling performed on PBS for the contaminates listed as hazardous, MK collected a small number of samples to analyze for radioactive contaminates. A complete study of the site was completed in 1986-1987 by Teledyne Isotopes for NASA. At the time of the study, Teledyne determined that over half of the site was underlain by a layer of shale which exhibited varying and often elevated levels of background radioactivity. The shale layer is known as the Huron Shale and extends approximately from the center of Erie County in Ohio to Erie, Pennsylvania.

MK collected samples at three locations on the project site. A groundwater and soil sample were taken in PMU 1 at sample point MW12/SB04. This well is located along Patrol Road in the Western Section of the Station. The second sampling location was at the exit point of a small drainage ditch exiting PMU 3 north of the Reactor Facility. A surface water and a sediment sample were taken at sampling point SW15 and SD15, respectively. The final sampling location was at the head of Plum Brook north of West Scheid Road. A surface water and sediment sample were taken at sampling point SW11 and SD11.

All six samples were tested for Gross Alpha and Beta as well as for Radium 226 and 228. The samples all showed signs of low radioactivity. The samples collected at the

head of Plum Brook showed the highest readings but, are not outside of what is expected for this area given that the underlying material is the Huron Shale. Table 4-27 details the readings for each sampling point.

TABLE 4-27
RADIOACTIVITY SAMPLING RESULTS
(pCi/g or pCi/l)

PARAMETER	GROSS ALPHA	GROSS BETA	RA-226	RA-228
Water Samples				
SW-11	15±7	27±4	0.2±0.5	1.3±2.7
SW-15	0.0±2.2	4.4±1.9	1.2±0.8	1.9±2.7
MW-12	0.0±8.0	18±8	1.1±0.7	2.6±2.5
Soil Samples				
SD-11	49±10	54±5	4.9±1.1	0.1±1.5
SD-15	2.7±5.3	20±4	0.6±0.5	0.8±1.5
SB-04	12±5	20±4	1.1±0.6	0.9±1.5

SECTION 5
HAZARD RANKING SYSTEM SCORING

5.0 INTRODUCTION

Morrison Knudsen used the Preliminary Ranking Evaluation Score (PREscore) Version 2.0 computer program to assist in Hazard Ranking System (HRS) site scoring of Plum Brook Station. PREscore automates operations to assign HRS factor values, allowing entry and evaluation of site information, including sampling data, hazardous waste quantity and waste characteristics, physical parameters of the site, population data, and other target information. This program calculates HRS factors from raw data, retrieves values from hazardous substance look-up tables, calculates site scores, and generates HRS documentation and other records.

The HRS is the scoring system used by EPA's Superfund program to assess the relative threat associated with actual or potential releases of hazardous substances. The HRS is the primary screening tool for determining whether a site is to be included on the National Priorities List (NPL), EPA's list of sites that are priorities for further investigation and, if necessary, response action under CERCLA.

Any site scoring 28.50 or greater is eligible for the NPL. This score does not represent a specified level of risk, but is merely a cutoff point that serves as a screening-level indicator of the highest priority releases or threatened releases. Sites that score below 28.50 are normally addressed under non-Superfund Federal and state response authorities.

5.1 Site Definition

Plum Brook Station is a very large federal facility encompassing multiple sources of known or potential hazardous substance contamination. Because of common ownership, the similarity of wastes throughout the site, the proximity of sources to each other, and the similarity of targets, PBS was scored as one site rather than several. Additionally, all data available indicated that PBS does not represent a significant health risk nor would it become difficult to score as a single site due to complexity and severity of sources. It was also felt that the most conservative approach would be to score the entire site rather than individual areas.

5.2 HRS Score

Morrison Knudsen's evaluation of the groundwater migration, surface water migration, soil exposure and air migration pathways resulted in an overall site score for Plum Brook Station of 7.99. Individual pathway scores were 2.09 for groundwater migration, 0.18 for surface water migration, 12.88 for soil exposure, and 9.22 for air migration. In addition to the overall site score presented above, the individual PMUs, the Red Water Ponds, and TNT Area "B" were scored separately to assess the relative influence on overall score of each of these areas.

All individual scores were below the overall site score except for PMU 3 and the e site score with Plum Brook Creek as its major surface water body. These high score due to the presence of several coal tar derivatives that were detected in sediment samples collected near the intersections of asphalt roads and the creek. There is no known source for these compounds other than the road materials. PMU 3 was rescored without including the semivolatile results the score for this scenario is shown as PMU 3A.

All scores are presented in Table 5.1 with the PREscore generated HRS scores by migration pathway. The full PREscore documentation supporting these scores is attached as Appendix G.

TABLE 5.1
HRS Results

	Ground Water Migration	Surface Water Migration	Soil Exposure	Air Migration	Site Score
Entire Facility with Pipe Creek as Main Surface Water Pathway	2.09	0.18	12.88	9.22	7.99
Entire Facility with Plum Brook as Main Surface Water Pathway	2.09	42.84	12.88	9.22	22.86
PMU 1	1.18	0.18	12.88	9.22	7.94
PMU 2	0.65	0.18	12.88	1.44	6.49
PMU 3	0.65	42.84	12.88	5.18	22.52
PMU 3A*	0.65	4.38	12.88	5.18	7.29
PMU 4	0.00	0.00	0.00	0.00	0.00
PMU 5	0.07	0.04	4.00	0.58	2.02
West Area Red Water Ponds	2.09	0.11	7.24	3.12	4.08
Pentolite Road Red Water Ponds	0.65	4.38	12.88	4.03	7.10
TNT Area "B"	0.65	0.06	7.24	1.44	3.71

* Rescore of PMU 3 without semivolatiles.

5.3 Pathway Scoring

The statutory mandate of the HRS is to assess, to the maximum extent feasible, the relative degree of risk to human health and the environment posed by the site under review. All pathways and threats identified that posed potentially significant risks to human health and the environment were scored to reflect the importance of that pathway or threat to the overall evaluation of the site. The following criteria were considered when deciding whether a pathway or threat should be scored:

- Existence of documented release or contaminated target,
- Potential magnitude of the pathway score,
- Availability of scoring data, and
- Likely range of the overall site score (well below 28.50).

For the surface water pathway three drainage systems were evaluated, Pipe Creek, Plum Brook and Saw Mill Creek. Scoring for the Plum Brook drainage system resulted in a surface water pathway score of 42.84 and an overall site score of 22.86. However, the major contaminants accounting for this score were coal tar derivatives detected in the sediment samples taken immediately downstream of an asphalt road crossing. Since there were no known sources of these contaminants in the source area, they were deemed to have come from the road and therefore did not represent contaminants that should be included in the pathway scoring. When these contaminants were not included in the Plum Brook Drainage System pathway scores they were lower than Pipe Creek scores.

The Pipe Creek drainage system evaluation is the score used to calculate overall environmental potential of the Plum Brook facility. MK feels that this scoring scenario offers the most conservative representation of the site. Scoring for the Saw Mill drainage area is represented by the PMU 5 score. This drainage system evaluation resulted in a score of 2.02.

The Hazardous Materials Quantities (HMQ) were estimated in the most conservative method possible. In each area where contamination was measured, it was most likely measured in one of the more contaminated spots within the area (the idea of an SI being to take samples in the most likely areas of contamination). In the HRS scoring each contaminated area was assumed to be contaminated at the measured level over the entire area to a depth of 2 feet. Thus, the HMQ was assumed to consist of the entire volume within the known boundaries of the unit to a depth of 2 feet, with the entire volume having contaminant concentrations equal to those measured.

Based upon our evaluation of the facility and historic records, MK recommends that no further action under CERCLA is necessary. Areas which indicated levels of contamination above background should be scheduled and remediated under different federal and state authorities.

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #1

This PMU contains sources which influence Pipe Creek. The PMU is primarily bordered to the east by Ransom Road, to the west and south by Patrol Road and to the north by Maintenance Road.

Surface Soil Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS01	MK01SS01RE	MK01SS02	MK01SS02RE	MK01SS03	MK01SS04	MK01SS05
1,1-Dichloroethane	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
1,1-Dichloroethene	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
1,1,1-Trichloroethane	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
1,1,2-Trichloroethane	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
1,1,2,2-Tetrachloroethane	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
1,2-Dichloroethane	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
1,2-Dichloroethene (Total)	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
1,2-Dichloropropane	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
2-Butanone	12 UJ	12 UJ	12 UJ	12 UJ	13 U	13 U	15 UJ
2-Hexanone	12 UJ	12 UJ	12 UJ	12 UJ	13 U	13 U	15 UJ
4-Methyl-2-pentanone	12 UJ	12 UJ	12 UJ	12 UJ	13 U	13 U	15 UJ
Acetone	12 UJ	12 UJ	12 UJ	12 UJ	13 U	13 U	15 UJ
Benzene	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Bromodichloromethane	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Bromoform	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Bromomethane	12 UJ	12 UJ	12 UJ	12 UJ	13 U	13 U	15 UJ
Carbon Disulfide	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Carbon Tetrachloride	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Chlorobenzene	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Chloroethane	12 UJ	12 UJ	12 UJ	12 UJ	13 U	13 U	15 UJ
Chloroform	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Chloromethane	12 UJ	12 UJ	12 UJ	12 UJ	13 U	13 U	15 UJ
cis-1,3-Dichloropropene	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Dibromochloromethane	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Ethyl benzene	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Methylene chloride	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Styrene	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Tetrachloroethene	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Toluene	9 J	4 J	5 J	2 J	9 U	6 U	7 UJ
Total Xylenes	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
trans-1,3-Dichloropropene	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Trichloroethene	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U	7 UJ
Vinyl acetate	12 UJ	12 UJ	12 UJ	12 UJ	13 U	13 U	15 UJ
Vinyl chloride	12 UJ	12 UJ	12 UJ	12 UJ	13 U	13 U	15 UJ

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #1

Surface Soil Samples (CONTINUED)

Volatile Organic Analysis

Parameter	Sample Number (Units - ug/kg) MK01SS05RE	MK01SS06	MK01SS07	MK01SS08	MK01SS09	MK01SS09RE	MK01SS10
1,1-Dichloroethane	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
1,1-Dichloroethene	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
1,1,1-Trichloroethane	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
1,1,2-Trichloroethane	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
1,1,2,2-Tetrachloroethane	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
1,2-Dichloroethane	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
1,2-Dichloroethene (Total)	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
1,2-Dichloropropane	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
2-Butanone	15 UJ	12 U	12 U	14 U	12 UJ	12 UJ	13 U
2-Hexanone	15 UJ	12 U	12 U	14 U	12 UJ	12 UJ	13 U
4-Methyl-2-pentanone	15 UJ	12 U	12 U	14 U	12 UJ	12 UJ	13 U
Acetone	15 UJ	12 U	10 J	14 U	12 UJ	12 UJ	13 U
Benzene	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Bromodichloromethane	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Bromoform	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Bromomethane	15 UJ	12 U	12 U	14 U	12 UJ	12 UJ	13 U
Carbon Disulfide	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Carbon Tetrachloride	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Chlorobenzene	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Chloroethane	15 UJ	12 U	12 U	14 U	12 UJ	12 UJ	13 U
Chloroform	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Chloromethane	15 UJ	12 U	12 U	14 U	12 UJ	12 UJ	13 U
cis-1,3-Dichloropropene	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Dibromochloromethane	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Ethyl benzene	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Methylene chloride	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Styrene	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Tetrachloroethene	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Toluene	8 UJ	4 J	19	1 J	3 UJ	1 UJ	4 J
Total Xylenes	8 UJ	6 U	1 J	7 U	6 UJ	6 UJ	6 U
trans-1,3-Dichloropropene	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Trichloroethene	8 UJ	6 U	6 U	7 U	6 UJ	6 UJ	6 U
Vinyl acetate	15 UJ	12 U	12 U	14 U	12 UJ	12 UJ	13 U
Vinyl chloride	15 UJ	12 U	12 U	14 U	12 UJ	12 UJ	13 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Surface Soil Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS11	MK01SS12	MK01SS32	MK01SS33
1,1-Dichloroethane	6 U	6 U	No	No
1,1-Dichloroethene	6 U	6 U	analysis	analysis
1,1,1-Trichloroethane	6 U	6 U	conducted	conducted
1,1,2-Trichloroethane	6 U	6 U	for this	for this
1,1,2,2-Tetrachloroethane	6 U	6 U	sample.	sample.
1,2-Dichloroethane	6 U	6 U		
1,2-Dichloroethene (Total)	6 U	6 U		
1,2-Dichloropropane	6 U	6 U		
2-Butanone	11 U	12 U		
2-Hexanone	11 U	12 U		
4-Methyl-2-pentanone	11 U	12 U		
Acetone	11 U	12 U		
Benzene	6 U	6 U		
Bromodichloromethane	6 U	6 U		
Bromoform	6 U	6 U		
Bromomethane	11 U	12 U		
Carbon Disulfide	6 U	6 U		
Carbon Tetrachloride	6 U	6 U		
Chlorobenzene	6 U	6 U		
Chloroethane	11 U	12 U		
Chloroform	6 U	6 U		
Chloromethane	11 U	12 U		
cis-1,3-Dichloropropene	6 U	6 U		
Dibromochloromethane	6 U	6 U		
Ethyl benzene	6 U	6 U		
Methylene chloride	6 U	6 U		
Styrene	6 U	6 U		
Tetrachloroethene	6 U	6 U		
Toluene	4 J	2 J		
Total Xylenes	6 U	6 U		
trans-1,3-Dichloropropene	6 U	6 U		
Trichloroethene	6 U	6 U		
Vinyl acetate	11 U	12 U		
Vinyl chloride	11 U	12 U		

Surface Water Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK01SW01	MK01SW02	MK01SW03	MK01SW04	MK01SW05	MK01SW06	MK01SW21
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (Total)	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	7 J	7 J	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethyl benzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene chloride	10 U	5 U	10 U	10 U	10 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Xylenes	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl acetate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Sediment Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SD01	MK01SD02	MK01SD03	MK01SD04	MK01SD05	MK01SD06	MK01SD21
1,1-Dichloroethane	9 U	6 U	7 U	6 U	6 U	7 U	6 U
1,1-Dichloroethene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
1,1,1-Trichloroethane	9 U	6 U	7 U	6 U	6 U	7 U	6 U
1,1,2-Trichloroethane	9 U	6 U	7 U	6 U	6 U	7 U	6 U
1,1,2,2-Tetrachloroethane	9 U	6 U	7 U	6 U	6 U	7 U	6 U
1,2-Dichloroethane	9 U	6 U	7 U	6 U	6 U	7 U	6 U
1,2-Dichloroethene (Total)	9 U	6 U	7 U	6 U	6 U	7 U	6 U
1,2-Dichloropropane	9 U	6 U	7 U	6 U	6 U	7 U	6 U
2-Butanone	18 U	12 U	13 U	12 U	12 U	14 U	12 U
2-Hexanone	18 U	12 U	13 U	12 U	12 U	14 U	12 U
4-Methyl-2-pentanone	18 U	12 U	13 U	12 U	12 U	14 U	12 U
Acetone	72 U	29 U	63 U	110 U	74 U	14 U	12 U
Benzene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Bromodichloromethane	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Bromoform	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Bromomethane	18 U	12 U	13 U	12 U	12 U	14 U	12 U
Carbon Disulfide	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Carbon Tetrachloride	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Chlorobenzene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Chloroethane	18 U	12 U	13 U	12 U	12 U	14 U	12 U
Chloroform	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Chloromethane	18 U	12 U	13 U	12 U	12 U	14 U	12 U
cis-1,3-Dichloropropene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Dibromochloromethane	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Ethyl benzene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Methylene chloride	43 U	25 U	27 U	170 B	96 U	7 U	6 U
Styrene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Tetrachloroethene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Toluene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Total Xylenes	9 U	6 U	7 U	6 U	6 U	7 U	6 U
trans-1,3-Dichloropropene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Trichloroethene	9 U	6 U	7 U	6 U	6 U	7 U	6 U
Vinyl acetate	18 U	12 U	13 U	12 U	12 U	14 U	12 U
Vinyl chloride	18 U	12 U	13 U	12 U	12 U	14 U	12 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Soil Boring Samples

Volatile Organic Analysis

Sample Number [Units - ug/kg]

Parameter	MK01SB01	MK01SB02	MK01SB03	MK01SB03RE	MK01SB04	MK01SB05	MK01SB06
1,1-Dichloroethane	6 U	6 U	6 UJ	6 U	6 U	Unable to	6 U
1,1-Dichloroethene	6 U	6 U	6 UJ	6 U	6 U	install well.	6 U
1,1,1-Trichloroethane	6 U	6 U	6 UJ	12 U	6 U	No sample	6 U
1,1,2-Trichloroethane	6 U	6 U	6 UJ	6 U	6 U	taken.	6 U
1,1,2,2-Tetrachloroethane	6 U	6 U	6 UJ	6 U	6 U		6 U
1,2-Dichloroethane	6 U	6 U	6 UJ	6 U	6 U		6 U
1,2-Dichloroethene (Total)	6 U	6 U	6 UJ	6 U	6 U		6 U
1,2-Dichloropropane	6 U	6 U	6 UJ	6 U	6 U		6 U
2-Butanone	12 U	12 U	12 UJ	12 U	11 U		12 U
2-Hexanone	12 U	12 U	12 UJ	12 U	11 U		12 U
4-Methyl-2-pentanone	12 U	12 U	12 UJ	12 U	11 U		12 U
Acetone	12 U	20 U	51 UJ	25 U	26 U		12 U
Benzene	6 U	6 U	6 UJ	6 U	6 U		6 U
Bromodichloromethane	6 U	6 U	6 UJ	6 U	6 U		6 U
Bromoform	6 U	6 U	6 UJ	6 U	6 U		6 U
Bromomethane	12 U	12 U	12 UJ	12 U	11 U		12 U
Carbon Disulfide	6 U	6 U	6 UJ	6 U	6 U		6 U
Carbon Tetrachloride	6 U	6 U	6 UJ	6 U	6 U		6 U
Chlorobenzene	6 U	6 U	6 UJ	6 U	6 U		6 U
Chloroethane	12 U	12 U	12 UJ	12 U	11 U		12 U
Chloroform	6 U	6 U	6 UJ	6 U	6 U		6 U
Chloromethane	12 U	12 U	12 UJ	12 U	11 U		12 U
cis-1,3-Dichloropropene	6 U	6 U	6 UJ	6 U	6 U		6 U
Dibromochloromethane	6 U	6 U	6 UJ	6 U	6 U		6 U
Ethyl benzene	6 U	6 U	6 UJ	6 U	6 U		6 U
Methylene chloride	55 U	49 U	52 UJ	41 U	12 U		6 U
Styrene	6 U	6 U	6 UJ	6 U	6 U		6 U
Tetrachloroethene	6 U	6 U	6 UJ	6 U	6 U		6 U
Toluene	6 U	6 U	7 J	5 J	2 J		6 U
Total Xylenes	6 U	6 U	6 UJ	6 U	6 U		6 U
trans-1,3-Dichloropropene	6 U	6 U	6 UJ	6 U	6 U		6 U
Trichloroethene	6 U	6 U	6 UJ	6 U	6 U		6 U
Vinyl acetate	12 U	12 U	12 UJ	12 U	11 U		12 U
Vinyl chloride	12 U	12 U	12 UJ	12 U	11 U		12 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #1

Soil Boring Samples (CONTINUED)

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SB07
1,1-Dichloroethane	5 U
1,1-Dichloroethene	5 U
1,1,1-Trichloroethane	5 U
1,1,2-Trichloroethane	5 U
1,1,2,2-Tetrachloroethane	5 U
1,2-Dichloroethane	5 U
1,2-Dichloroethene (Total)	5 U
1,2-Dichloropropane	5 U
2-Butanone	10 U
2-Hexanone	10 U
4-Methyl-2-pentanone	10 U
Acetone	10 U
Benzene	5 U
Bromodichloromethane	5 U
Bromoform	5 U
Bromomethane	10 U
Carbon Disulfide	5 U
Carbon Tetrachloride	5 U
Chlorobenzene	5 U
Chloroethane	10 U
Chloroform	5 U
Chloromethane	10 U
cis-1,3-Dichloropropene	5 U
Dibromochloromethane	5 U
Ethyl benzene	5 U
Methylene chloride	5 U
Styrene	5 U
Tetrachloroethene	5 U
Toluene	5 U
Total Xylenes	5 U
trans-1,3-Dichloropropene	5 U
Trichloroethene	5 U
Vinyl acetate	10 U
Vinyl chloride	10 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Monitoring Well Samples

Volatile Organic Analysis

Sample Number [Units - ug/l]

Parameter	MK01MW09	MK01MW10	MK01MW11	MK01MW12	MK01MW13	MK01MW14	MK01MW15
1,1-Dichloroethane	5 U	5 U	5 U	5 U	Unable to	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	install well.	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	No sample	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	taken.	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U		5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U		5 U	5 U
1,2-Dichloroethene (Total)	5 U	5 U	5 U	5 U		5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U		5 U	5 U
2-Butanone	10 U	10 U	10 U	10 U		10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U		10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U		10 U	10 U
Acetone	10 U	10 U	10 U	10 U		10 U	10 U
Benzene	5 U	5 U	5 U	5 U		5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U		5 U	5 U
Bromoform	5 U	5 U	5 U	5 U		5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U		10 U	10 U
Carbon Disulfide	5 U	5 U	5 U	5 U		5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U		5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U		5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U		10 U	10 U
Chloroform	5 U	5 U	5 U	5 U		5 U	5 U
Chloromethane	10 U	10 U	10 U	10 U		10 U	10 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U		5 U	5 U
Dibromochloromethane	5 U	5 U	5 U	5 U		5 U	5 U
Ethyl benzene	5 U	5 U	5 U	5 U		5 U	5 U
Methylene chloride	5 U	5 U	5 U	5 U		5 U	5 U
Styrene	5 U	5 U	5 U	5 U		5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U		5 U	5 U
Toluene	5 U	5 U	5 U	5 U		5 U	5 U
Total Xylenes	5 U	5 U	5 U	5 U		5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U		5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U		5 U	5 U
Vinyl acetate	10 U	10 U	10 U	10 U		10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U		10 U	10 U

PMU #1 This PMU contains sources which influence Pipe Creek. The PMU is primarily bordered to the east by Ransom Road, to the west and south by Patrol Road and to the north by Maintenance Road.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS01	MK01SS01DL	MK01SS02	MK01SS03	MK01SS04	MK01SS05	MK01SS06
1,2-Dichlorobenzene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
1,2,4-Trichlorobenzene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
1,3-Dichlorobenzene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
1,4-Dichlorobenzene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
2-Chloronaphthalene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
2-Chlorophenol	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
2-Methylnaphthalene	390 U	1600 U	390 U	14 J	420 U	490 U	320 J
2-Methylphenol	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
2-Nitroaniline	1900 U	7600 U	1900 U	2100 U	2000 U	2400 U	2000 U
2-Nitrophenol	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
2,4-Dichlorophenol	390 U	7600 U	390 U	440 U	420 U	490 U	410 U
2,4-Dimethylphenol	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
2,4-Dinitrophenol	1900 U	1600 U	1900 U	2100 U	2000 U	2400 U	2000 U
2,4-Dinitrotoluene	300 J	1600 U	530 J	440 U	420 U	490 U	410 U
2,4,5-Trichlorophenol	1900 U	7600 U	1900 U	2100 U	2000 U	2400 U	2000 U
2,4,6-Trichlorophenol	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
2,6-Dinitrotoluene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
3-Nitroaniline	1900 U	7600 U	1900 U	2100 U	2000 U	2400 U	2000 U
3,3'-Dichlorobenzidine	780 U	3100 U	770 U	880 U	840 U	980 U	810 U
4-Bromophenyl phenyl ether	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
4-Chloro-3-methylphenol	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
4-Chloroaniline	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
4-Chlorodiphenylether	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
4-Methylphenol	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
4-Nitroaniline	1900 U	7600 U	1900 U	2100 U	2000 U	2400 U	2000 U
4-Nitrophenol	1900 U	7600 U	1900 U	2100 U	2000 U	2400 U	2000 U
4,6-Dinitro-2-methylphenol	1900 U	7600 U	1900 U	2100 U	2000 U	2400 U	2000 U
Acenaphthene	500	490 DJ	390 U	26 J	420 U	490 U	410 U
Acenaphthylene	69 J	1600 U	390 U	130 J	420 U	490 U	410 U
Anthracene	2700	2800 D	390 U	100 J	420 U	490 U	410 U
Benzoic acid	48 J	7600 U	90 J	2100 U	2000 U	140 J	2000 U
Benzo(a)anthracene	6100	8400 D	140 J	960	420 U	490 U	410 U
Benzo(a)pyrene	3300	4200 D	120 J	770	420 U	490 U	410 U
Benzo(b)fluoranthene	5400	5900 D	250 J	1400	76 J	36 J	46 J

PMU #1 This PMU contains sources which influence Pipe Creek. The PMU is primarily bordered to the east by Ransom Road, to the west and south by Patrol Road and to the north by Maintenance Road.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS01	MK01SS01DL	MK01SS02	MK01SS03	MK01SS04	MK01SS05	MK01SS06
Benzo(ghi)perylene	640	1400 DJ	390 U	200 J	420 U	490 U	410 U
Benzo(k)fluoranthene	2200	2100 D	110 J	710	420 U	490 U	410 U
Benzyl alcohol	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Bis(2-chloroethoxy) methane	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Bis(2-chloroethyl) ether	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Bis(2-chloroisopropyl) ether	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Bis(2-ethylhexyl) phthalate	99 J	1600 U	91 J	61 J	59 J	59 J	410 U
Butyl benzyl phthalate	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Chrysene	5200	6500 D	210 J	920	420 U	490 U	410 U
Dibenzofuran	270 J	280 DJ	390 U	25 J	420 U	490 U	410 U
Dibenzo(a,h)anthracene	55 J	340 DJ	390 U	440 U	420 U	490 U	410 U
Diethyl phthalate	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Dimethyl phthalate	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Di-n-butyl phthalate	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Di-n-octyl phthalate	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Fluoranthene	11000 E	17000 D	400	1500	35 J	490 U	410 U
Fluorene	770	730 DJ	390 U	43 J	420 U	490 U	410 U
Hexachlorobenzene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Hexachlorobutadiene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Hexachlorocyclopentadiene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Hexachloroethane	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Indeno(1,2,3-cd)pyrene	930	1700 D	390 U	330 J	420 U	490 U	410 U
Isophorone	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Naphthalene	390 U	1600 U	390 U	440 U	420 U	490 U	240 J
Nitrobenzene	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
N-Nitroso-Di-n-propylamine	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
N-nitrosodiphenylamine	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Pentachlorophenol	1900 U	7600 U	1900 U	2100 U	2000 U	2400 U	2000 U
Phenanthrene	8700 E	12000 D	360 J	400 J	420 U	490 U	130 J
Phenol	390 U	1600 U	390 U	440 U	420 U	490 U	410 U
Pyrene	12000 E	18000 D	270 J	1700	420 U	490 U	410 U

Surface Soil Samples (CONTINUED)

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS07	MK01SS08	MK01SS09	MK01SS10	MK01SS11	MK01SS12	MK01SS32	MK01SS3
1,2-Dichlorobenzene	400 U	420 U	390 U	410 U	360 U	390 U	No analysis conducted for this sample.	No analysis conducted for this sample.
1,2,4-Trichlorobenzene	400 U	420 U	390 U	410 U	360 U	390 U		
1,3-Dichlorobenzene	400 U	420 U	390 U	410 U	360 U	390 U		
1,4-Dichlorobenzene	400 U	420 U	390 U	410 U	360 U	390 U		
2-Chloronaphthalene	400 U	420 U	390 U	410 U	360 U	390 U		
2-Chlorophenol	400 U	420 U	390 U	410 U	360 U	390 U		
2-Methylnaphthalene	400 U	420 U	390 U	410 U	360 U	390 U		
2-Methylphenol	400 U	420 U	390 U	410 U	360 U	390 U		
2-Nitroaniline	2000 U	2000 U	1900 U	2000 U	1700 U	1900 U		
2-Nitrophenol	400 U	420 U	390 U	410 U	360 U	390 U		
2,4-Dichlorophenol	400 U	420 U	390 U	410 U	360 U	390 U		
2,4-Dimethylphenol	400 U	420 U	390 U	410 U	360 U	390 U		
2,4-Dinitrophenol	2000 U	2000 U	1900 U	2000 U	1700 U	1900 U		
2,4-Dinitrotoluene	400 U	420 U	390 U	410 U	360 U	390 U		
2,4,5-Trichlorophenol	2000 U	2000 U	1900 U	2000 U	1700 U	1900 U		
2,4,6-Trichlorophenol	400 U	420 U	390 U	410 U	360 U	390 U		
2,6-Dinitrotoluene	400 U	420 U	390 U	410 U	360 U	390 U		
3-Nitroaniline	2000 U	2000 U	1900 U	2000 U	1700 U	1900 U		
3,3'-Dichlorobenzidine	810 U	840 U	770 U	810 U	710 U	790 U		
4-Bromophenyl phenyl ether	400 U	420 U	390 U	410 U	360 U	390 U		
4-Chloro-3-methylphenol	400 U	420 U	390 U	410 U	360 U	390 U		
4-Chloroaniline	400 U	420 U	390 U	410 U	360 U	390 U		
4-Chlorodiphenylether	400 U	420 U	390 U	410 U	360 U	390 U		
4-Methylphenol	400 U	420 U	390 U	410 U	360 U	390 U		
4-Nitroaniline	2000 U	2000 U	1900 U	2000 U	1700 U	1900 U		
4-Nitrophenol	2000 U	2000 U	1900 U	2000 U	1700 U	1900 U		
4,6-Dinitro-2-methylphenol	2000 U	2000 U	1900 U	2000 U	1700 U	1900 U		
Acenaphthene	400 U	420 U	390 U	410 U	360 U	390 U		
Acenaphthylene	400 U	420 U	390 U	410 U	360 U	390 U		
Anthracene	400 U	420 U	390 U	410 U	360 U	390 U		
Benzoic acid	2000 U	2000 U	1900 U	2000 U	1700 U	1900 U		
Benzo(a)anthracene	400 U	420 U	390 U	410 U	360 U	390 U		
Benzo(a)pyrene	400 U	420 U	390 U	140 J	360 U	390 U		
Benzo(b)fluoranthene	400 U	420 U	92 J	190 J	360 U	390 U		

Surface Soil Samples (CONTINUED)

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS07	MK01SS08	MK01SS09	MK01SS10	MK01SS11	MK01SS12	MK01SS32	MK01SS3
Benzo(ghi)perylene	400 U	420 U	390 U	410 U	360 U	390 U	No analysis conducted for this sample.	No analysis conducted for this sample.
Benzo(k)fluoranthene	400 U	420 U	41 J	79 J	360 U	390 U		
Benzyl alcohol	400 U	420 U	390 U	410 U	360 U	390 U		
Bis(2-chloroethoxy) methane	400 U	420 U	390 U	410 U	360 U	390 U		
Bis(2-chloroethyl) ether	400 U	420 U	390 U	410 U	360 U	390 U		
Bis(2-chloroisopropyl) ether	400 U	420 U	390 U	410 U	360 U	390 U		
Bis(2-ethylhexyl) phthalate	400 U	420 U	99 J	410 U	240 J	390 U		
Butyl benzyl phthalate	400 U	420 U	390 U	410 U	360 U	390 U		
Chrysene	400 U	420 U	390 U	410 U	360 U	390 U		
Dibenzofuran	400 U	420 U	390 U	410 U	360 U	390 U		
Dibenzo(a,h)anthracene	400 U	420 U	390 U	410 U	360 U	390 U		
Diethyl phthalate	400 U	420 U	390 U	410 U	360 U	390 U		
Dimethyl phthalate	400 U	420 U	390 U	410 U	360 U	390 U		
Di-n-butyl phthalate	400 U	420 U	390 U	410 U	360 U	390 U		
Di-n-octyl phthalate	400 U	420 U	390 U	410 U	360 U	390 U		
Fluoranthene	400 U	420 U	140 J	340 J	360 U	390 U		
Fluorene	400 U	420 U	390 U	410 U	360 U	390 U		
Hexachlorobenzene	400 U	420 U	390 U	410 U	360 U	390 U		
Hexachlorobutadiene	400 U	420 U	390 U	410 U	360 U	390 U		
Hexachlorocyclopentadiene	400 U	420 U	390 U	410 U	360 U	390 U		
Hexachloroethane	400 U	420 U	390 U	410 U	360 U	390 U		
Indeno(1,2,3-cd)pyrene	400 U	420 U	390 U	410 U	360 U	390 U		
Isophorone	400 U	420 U	390 U	410 U	360 U	390 U		
Naphthalene	400 U	420 U	390 U	410 U	360 U	390 U		
Nitrobenzene	400 U	420 U	390 U	410 U	360 U	390 U		
N-Nitroso-Di-n-propylamine	400 U	420 U	390 U	410 U	360 U	390 U		
N-nitrosodiphenylamine	400 U	420 U	390 U	410 U	360 U	390 U		
Pentachlorophenol	2000 U	2000 U	1900 U	2000 U	1700 U	1900 U		
Phenanthrene	400 U	420 U	61 J	160 J	360 U	390 U		
Phenol	400 U	420 U	390 U	410 U	360 U	390 U		
Pyrene	400 U	420 U	110 J	350 J	360 U	390 U		

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK01SW01	MK01SW02	MK01SW03	MK01SW04	MK01SW05	MK01SW06	MK01SW21
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U	50 U
3,3'-Dichlorobenzidine	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Bromophenyl phenyl ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorodiphenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4,6-Dinitro-2-methylphenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic acid	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number (Units - ug/l) MK01SW01	MK01SW02	MK01SW03	MK01SW04	MK01SW05	MK01SW06	MK01SW21
Benzo(ghi)perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl alcohol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroethoxy) methane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroethyl) ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroisopropyl) ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-ethylhexyl) phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butyl benzyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-octyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-propylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Sediment Samples

SemiVolatile Organic Analysis

Sample Number [Units - ug/kg]

Parameter	MK01SD01	MK01SD02	MK01SD03	MK01SD04	MK01SD05	MK01SD06	MK01SD21
1,2-Dichlorobenzene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
1,2,4-Trichlorobenzene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
1,3-Dichlorobenzene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
1,4-Dichlorobenzene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
2-Chloronaphthalene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
2-Chlorophenol	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
2-Methylnaphthalene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
2-Methylphenol	1200 U	800 U	880 U	770 U	780 U	54 J	390 U
2-Nitroaniline	5700 U	3900 U	4300 U	3700 U	3800 U	2200 U	1900 U
2-Nitrophenol	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
2,4-Dichlorophenol	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
2,4-Dimethylphenol	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
2,4-Dinitrophenol	5700 U	3900 U	4300 U	3700 U	3800 U	2200 U	1900 U
2,4-Dinitrotoluene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
2,4,5-Trichlorophenol	5700 U	3900 U	4300 U	3700 U	3800 U	2200 U	1900 U
2,4,6-Trichlorophenol	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
2,6-Dinitrotoluene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
3-Nitroaniline	5700 U	3900 U	4300 U	3700 U	3800 U	2200 U	1900 U
3,3'-Dichlorobenzidine	2400 U	1600 U	1800 U	1500 U	1600 U	910 U	790 U
4-Bromophenyl phenyl ether	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
4-Chloro-3-methylphenol	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
4-Chloroaniline	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
4-Chlorodiphenylether	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
4-Methylphenol	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
4-Nitroaniline	5700 U	3900 U	4300 U	3700 U	3800 U	2200 U	1900 U
4-Nitrophenol	5700 U	3900 U	4300 U	3700 U	3800 U	2200 U	1900 U
4,6-Dinitro-2-methylphenol	5700 U	3900 U	4300 U	3700 U	3800 U	2200 U	1900 U
Acenaphthene	1200 U	800 U	880 U	770 U	780 U	450 U	16 J
Acenaphthylene	1200 U	800 U	880 U	770 U	780 U	450 U	44 J
Anthracene	1200 U	800 U	880 U	770 U	780 U	450 U	66 J
Benzoic acid	5700 U	3900 U	4300 U	3700 U	3800 U	2200 U	1900 U
Benzo(a)anthracene	450 J	800 U	880 U	770 U	780 U	450 U	210 J
Benzo(a)pyrene	710 J	800 U	880 U	770 U	780 U	450 U	160 J
Benzo(b)fluoranthene	730 J	800 U	880 U	770 U	780 U	82 J	210 J

Sediment Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SD01	MK01SD02	MK01SD03	MK01SD04	MK01SD05	MK01SD06	MK01SD21
Benzo(ghi)perylene	490 J	800 U	880 U	770 U	780 U	450 U	130 J
Benzo(k)fluoranthene	780 J	800 U	880 U	770 U	780 U	450 U	100 J
Benzyl alcohol	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Bis(2-chloroethoxy) methane	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Bis(2-chloroethyl) ether	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Bis(2-chloroisopropyl) ether	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Bis(2-ethylhexyl) phthalate	1200 U	800 U	880 U	770 U	780 U	450 U	47 J
Butyl benzyl phthalate	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Chrysene	730 J	800 U	880 U	770 U	780 U	51 J	190 J
Dibenzofuran	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Dibenzo(a,h)anthracene	1200 U	800 U	880 U	770 U	780 U	450 U	34 J
Diethyl phthalate	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Dimethyl phthalate	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Di-n-butyl phthalate	1200 U	800 U	880 U	140 J	780 U	450 U	390 U
Di-n-octyl phthalate	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Fluoranthene	1000 J	800 U	880 U	180 J	780 U	40 J	350 J
Fluorene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Hexachlorobenzene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Hexachlorobutadiene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Hexachlorocyclopentadiene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Hexachloroethane	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Indeno(1,2,3-cd)pyrene	610 J	800 U	880 U	770 U	780 U	450 U	110 J
Isophorone	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Naphthalene	1200 U	800 U	880 U	770 U	780 U	450 U	23 J
Nitrobenzene	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
N-Nitroso-Di-n-propylamine	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
N-nitrosodiphenylamine	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Pentachlorophenol	5700 U	3900 U	4300 U	3700 U	3800 U	2200 U	1900 U
Phenanthrene	380 J	800 U	880 U	160 J	780 U	450 U	230 J
Phenol	1200 U	800 U	880 U	770 U	780 U	450 U	390 U
Pyrene	1100 J	800 U	880 U	120 J	780 U	450 U	340 J

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Soil Boring Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK01SB01	MK01SB02	MK01SB03	MK01SB04	MK01SB05	MK01SB06	MK01SB07
1,2-Dichlorobenzene	800 U	800 U	780 U	760 U	Unable to	370 U	360 U
1,2,4-Trichlorobenzene	800 U	800 U	780 U	760 U	install well.	370 U	360 U
1,3-Dichlorobenzene	800 U	800 U	780 U	760 U	No sample	370 U	360 U
1,4-Dichlorobenzene	800 U	800 U	780 U	760 U	taken.	370 U	360 U
2-Chloronaphthalene	800 U	800 U	780 U	760 U		370 U	360 U
2-Chlorophenol	800 U	800 U	780 U	760 U		370 U	360 U
2-Methylnaphthalene	800 U	800 U	780 U	760 U		370 U	360 U
2-Methylphenol	800 U	800 U	780 U	760 U		370 U	360 U
2-Nitroaniline	3900 U	3900 U	3800 U	3700 U		1800 U	1700 U
2-Nitrophenol	800 U	800 U	780 U	760 U		370 U	360 U
2,4-Dichlorophenol	800 U	800 U	780 U	760 U		370 U	360 U
2,4-Dimethylphenol	800 U	800 U	780 U	760 U		370 U	360 U
2,4-Dinitrophenol	3900 U	3900 U	3800 U	3700 U		1800 U	1700 U
2,4-Dinitrotoluene	800 U	800 U	780 U	760 U		370 U	360 U
2,4,5-Trichlorophenol	3900 U	3900 U	3800 U	3700 U		1800 U	1700 U
2,4,6-Trichlorophenol	800 U	800 U	780 U	760 U		370 U	360 U
2,6-Dinitrotoluene	800 U	800 U	780 U	760 U		370 U	360 U
3-Nitroaniline	3900 U	3900 U	3800 U	3700 U		1800 U	1700 U
3,3'-Dichlorobenzidine	1600 U	1600 U	1600 U	1500 U		750 U	710 U
4-Bromophenyl phenyl ether	800 U	800 U	780 U	760 U		370 U	360 U
4-Chloro-3-methylphenol	800 U	800 U	780 U	760 U		370 U	360 U
4-Chloroaniline	800 U	800 U	780 U	760 U		370 U	360 U
4-Chlorodiphenylether	800 U	800 U	780 U	760 U		370 U	360 U
4-Methylphenol	800 U	800 U	780 U	760 U		370 U	360 U
4-Nitroaniline	3900 U	3900 U	3800 U	3700 U		1800 U	1700 U
4-Nitrophenol	3900 U	3900 U	3800 U	3700 U		1800 U	1700 U
4,6-Dinitro-2-methylphenol	3900 U	3900 U	3800 U	3700 U		1800 U	1700 U
Acenaphthene	800 U	800 U	780 U	760 U		370 U	360 U
Acenaphthylene	800 U	800 U	780 U	760 U		370 U	360 U
Anthracene	800 U	800 U	780 U	760 U		370 U	360 U
Benzoic acid	3900 U	3900 U	3800 U	3700 U		1800 U	1700 U
Benzo(a)anthracene	800 U	800 U	780 U	760 U		370 U	360 U
Benzo(a)pyrene	800 U	800 U	780 U	760 U		370 U	360 U
Benzo(b)fluoranthene	800 U	800 U	780 U	760 U		370 U	360 U

Soil Boring Samples

SemiVolatile Organic Analysis

Sample Number [Units - ug/kg]

Parameter	MK01SB01	MK01SB02	MK01SB03	MK01SB04	MK01SB05	MK01SB06	MK01SB07
Benzo(ghi)perylene	800 U	800 U	780 U	760 U	Unable to	370 U	360 U
Benzo(k)fluoranthene	800 U	800 U	780 U	760 U	install well.	370 U	360 U
Benzyl alcohol	800 U	800 U	780 U	760 U	No sample	370 U	360 U
Bis(2-chloroethoxy) methane	800 U	800 U	780 U	760 U	taken.	370 U	360 U
Bis(2-chloroethyl) ether	800 U	800 U	780 U	760 U		370 U	360 U
Bis(2-chloroisopropyl) ether	800 U	800 U	780 U	760 U		370 U	360 U
Bis(2-ethylhexyl) phthalate	800 U	800 U	780 U	760 U		130 J	970
Butyl benzyl phthalate	800 U	800 U	780 U	760 U		370 U	360 U
Chrysene	800 U	800 U	780 U	760 U		370 U	360 U
Dibenzofuran	800 U	800 U	780 U	760 U		370 U	360 U
Dibenzo(a,h)anthracene	800 U	800 U	780 U	760 U		370 U	360 U
Diethyl phthalate	800 U	800 U	780 U	760 U		370 U	360 U
Dimethyl phthalate	800 U	800 U	780 U	760 U		370 U	360 U
Di-n-butyl phthalate	800 U	800 U	130 J	760 U		370 U	360 U
Di-n-octyl phthalate	800 U	800 U	780 U	760 U		370 U	360 U
Fluoranthene	800 U	800 U	89 J	760 U		370 U	360 U
Fluorene	800 U	800 U	780 U	760 U		370 U	360 U
Hexachlorobenzene	800 U	800 U	780 U	760 U		370 U	360 U
Hexachlorobutadiene	800 U	800 U	780 U	760 U		370 U	360 U
Hexachlorocyclopentadiene	800 U	800 U	780 U	760 U		370 U	360 U
Hexachloroethane	800 U	800 U	780 U	760 U		370 U	360 U
Indeno(1,2,3-cd)pyrene	800 U	800 U	780 U	760 U		370 U	360 U
Isophorone	800 U	800 U	780 U	760 U		370 U	360 U
Naphthalene	800 U	800 U	780 U	760 U		370 U	360 U
Nitrobenzene	800 U	800 U	780 U	760 U		370 U	360 U
N-Nitroso-Di-n-propylamine	800 U	800 U	780 U	760 U		370 U	360 U
N-nitrosodiphenylamine	800 U	800 U	780 U	760 U		370 U	360 U
Pentachlorophenol	3900 U	3900 U	3800 U	3700 U		1800 U	1700 U
Phenanthrene	800 U	800 U	780 U	760 U		370 U	360 U
Phenol	800 U	800 U	780 U	760 U		370 U	360 U
Pyrene	800 U	800 U	780 U	760 U		370 U	360 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Monitoring Well Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK01MW09	MK01MW10	MK01MW11	MK01MW12	MK01MW13	MK01MW14	MK01MW15
1,2-Dichlorobenzene	12 U	10 U	10 U	10 U	Unable to	10 U	10 U
1,2,4-Trichlorobenzene	12 U	10 U	10 U	10 U	install well.	10 U	10 U
1,3-Dichlorobenzene	12 U	10 U	10 U	10 U	No sample	10 U	10 U
1,4-Dichlorobenzene	12 U	10 U	10 U	10 U	taken.	10 U	10 U
2-Chloronaphthalene	12 U	10 U	10 U	10 U		10 U	10 U
2-Chlorophenol	12 U	10 U	10 U	10 U		10 U	10 U
2-Methylnaphthalene	12 U	10 U	10 U	10 U		10 U	10 U
2-Methylphenol	12 U	10 U	10 U	10 U		10 U	10 U
2-Nitroaniline	62 U	50 U	50 U	50 U		50 U	50 U
2-Nitrophenol	12 U	10 U	10 U	10 U		10 U	10 U
2,4-Dichlorophenol	12 U	10 U	10 U	10 U		10 U	10 U
2,4-Dimethylphenol	12 U	10 U	10 U	10 U		10 U	10 U
2,4-Dinitrophenol	62 U	50 U	50 U	50 U		50 U	50 U
2,4-Dinitrotoluene	12 U	10 U	10 U	10 U		10 U	10 U
2,4,5-Trichlorophenol	62 U	50 U	50 U	50 U		50 U	50 U
2,4,6-Trichlorophenol	12 U	10 U	10 U	10 U		10 U	10 U
2,6-Dinitrotoluene	12 U	10 U	10 U	10 U		10 U	10 U
3-Nitroaniline	62 U	50 U	50 U	50 U		50 U	50 U
3,3'-Dichlorobenzidine	25 U	20 U	20 U	20 U		20 U	20 U
4-Bromophenyl phenyl ether	12 U	10 U	10 U	10 U		10 U	10 U
4-Chloro-3-methylphenol	12 U	10 U	10 U	10 U		10 U	10 U
4-Chloroaniline	12 U	10 U	10 U	10 U		10 U	10 U
4-Chlorodiphenylether	12 U	10 U	10 U	10 U		10 U	10 U
4-Methylphenol	12 U	10 U	10 U	10 U		10 U	10 U
4-Nitroaniline	62 U	50 U	50 U	50 U		50 U	50 U
4-Nitrophenol	62 U	50 U	50 U	50 U		50 U	50 U
4,6-Dinitro-2-methylphenol	62 U	50 U	50 U	50 U		50 U	50 U
Acenaphthene	12 U	10 U	10 U	10 U		10 U	10 U
Acenaphthylene	12 U	10 U	10 U	10 U		10 U	10 U
Anthracene	12 U	10 U	10 U	10 U		10 U	10 U
Benzoic acid	62 U	50 U	50 U	50 U		50 U	50 U
Benzo(a)anthracene	12 U	10 U	10 U	10 U		10 U	10 U
Benzo(a)pyrene	12 U	10 U	10 U	10 U		10 U	10 U
Benzo(b)fluoranthene	12 U	10 U	10 U	10 U		10 U	10 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #1

Monitoring Well Samples

SemiVolatile Organic Analysis

Sample Number [Units - ug/l]

Parameter	MK01MW09	MK01MW10	MK01MW11	MK01MW12	MK01MW13	MK01MW14	MK01MW15
Benzo(ghi)perylene	12 U	10 U	10 U	10 U	Unable to	10 U	10 U
Benzo(k)fluoranthene	12 U	10 U	10 U	10 U	install well.	10 U	10 U
Benzyl alcohol	12 U	10 U	10 U	10 U	No sample	10 U	10 U
Bis(2-chloroethoxy) methane	12 U	10 U	10 U	10 U	taken.	10 U	10 U
Bis(2-chloroethyl) ether	12 U	10 U	10 U	10 U		10 U	10 U
Bis(2-chloroisopropyl) ether	12 U	10 U	10 U	10 U		10 U	10 U
Bis(2-ethylhexyl) phthalate	12 U	10 U	10 U	10 U		10 U	10 U
Butyl benzyl phthalate	12 U	10 U	10 U	10 U		10 U	10 U
Chrysene	12 U	10 U	10 U	10 U		10 U	10 U
Dibenzofuran	12 U	10 U	10 U	10 U		10 U	10 U
Dibenzo(a,h)anthracene	12 U	10 U	10 U	10 U		10 U	10 U
Diethyl phthalate	12 U	10 U	10 U	10 U		10 U	10 U
Dimethyl phthalate	12 U	10 U	10 U	10 U		10 U	10 U
Di-n-butyl phthalate	12 U	10 U	10 U	10 U		10 U	10 U
Di-n-octyl phthalate	12 U	10 U	10 U	10 U		10 U	10 U
Fluoranthene	12 U	10 U	10 U	10 U		10 U	10 U
Fluorene	12 U	10 U	10 U	10 U		10 U	10 U
Hexachlorobenzene	12 U	10 U	10 U	10 U		10 U	10 U
Hexachlorobutadiene	12 U	10 U	10 U	10 U		10 U	10 U
Hexachlorocyclopentadiene	12 U	10 U	10 U	10 U		10 U	10 U
Hexachloroethane	12 U	10 U	10 U	10 U		10 U	10 U
Indeno(1,2,3-cd)pyrene	12 U	10 U	10 U	10 U		10 U	10 U
Isophorone	12 U	10 U	10 U	10 U		10 U	10 U
Naphthalene	12 U	10 U	10 U	10 U		10 U	10 U
Nitrobenzene	12 U	10 U	10 U	10 U		10 U	10 U
N-Nitroso-Di-n-propylamine	12 U	10 U	10 U	10 U		10 U	10 U
N-nitrosodiphenylamine	12 U	10 U	10 U	10 U		10 U	10 U
Pentachlorophenol	62 U	50 U	50 U	50 U		50 U	50 U
Phenanthrene	12 U	10 U	10 U	10 U		10 U	10 U
Phenol	12 U	10 U	10 U	10 U		10 U	10 U
Pyrene	12 U	10 U	10 U	10 U		10 U	10 U

PMU #1

This PMU contains sources which influence Pipe Creek. The PMU is primarily bordered to the east by Ransom Road, to the west and south by Patrol Road and to the north by Maintenance Road.

Surface Soil Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS01	MK01SS02	MK01SS03	MK01SS04	MK01SS05	MK01SS06	MK01SS07
4,4'-DDD	19 U	19 U	11 U	10 U	24 U	No analysis conducted on this sample.	No analysis conducted on this sample.
4,4'-DDE	19 U	9.3 J	8.6 J	5.0 J	31		
4,4'-DDT	19 UJ	19 UJ	11 J	10 UJ	24 UJ		
Aldrin	9.4 UJ	3.4 J	3.9 J	5.0 UJ	12 UJ		
Aroclor 1016	94 U	94 U	53 U	50 U	120 U		
Aroclor 1221	190 U	190 U	110 U	100 U	240 U		
Aroclor 1232	94 U	94 U	53 U	50 U	120 U		
Aroclor 1242	94 U	94 U	53 U	50 U	120 U		
Aroclor 1248	94 U	94 U	53 U	50 U	120 U		
Aroclor 1254	94 U	94 U	53 U	50 U	120 U		
Aroclor 1260	550	360	200	630	140		
Chlordane	94 U	94 U	53 U	50 U	120 U		
Dieldrin	11 J	12 J	11 U	10 U	7.8 J		
Endosulfan I	19 U	19 U	11 U	10 U	24 U		
Endosulfan II	19 U	19 U	11 U	10 U	24 U		
Endosulfan Sulfate	19 U	19 U	11 U	10 U	24 U		
Endrin	19 U	19 U	11 U	10 U	24 U		
Endrin ketone	19 U	19 U	11 U	10 U	24 U		
Heptachlor	3.3 J	4.4 J	5.3 U	5.0 U	12 U		
Heptachlor epoxide	9.4 U	9.4 U	5.3 U	5.0 U	12 U		
Methoxychlor	94 U	94 U	53 U	50 U	120 U		
Toxaphene	190 U	190 U	110 U	100 U	240 U		
alpha - BHC	9.4 U	9.4 U	5.3 U	5.0 U	12 U		
beta - BHC	9.4 U	9.4 U	5.3 U	5.0 U	12 U		
delta - BHC	9.4 U	9.4 U	5.3 U	5.0 U	12 U		
gamma - BHC (Lindane)	9.4 U	9.4 U	5.3 U	5.0 U	12 U		

Surface Soil Samples (CONTINUED)

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS08	MK01SS09	MK01SS10	MK01SS11	MK01SS12	MK01SS32	MK01SS33
4,4'-DDD	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this
4,4'-DDE							
4,4'-DDT							
Aldrin							
Aroclor 1016							
Aroclor 1221							
Aroclor 1232							
Aroclor 1242							
Aroclor 1248							
Aroclor 1254							
Aroclor 1260							
Chlordane							
Dieldrin							
Endosulfan I							
Endosulfan II							
Endosulfan Sulfate							
Endrin							
Endrin ketone							
Heptachlor							
Heptachlor epoxide							
Methoxychlor							
Toxaphene							
alpha - BHC							
beta - BHC							
delta - BHC							
gamma - BHC (Lindane)							

Surface Water Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/l] MK01SW01	MK01SW02	MK01SW03	MK01SW04	MK01SW05	MK01SW06	MK01SW21
4,4'-DDD	No analysis	0.10 U	No analysis	No analysis	No analysis	No analysis	No analysis
4,4'-DDE	conducted	0.10 U	conducted	conducted	conducted	conducted	conducted
4,4'-DDT	on this	0.10 U	on this	on this	on this	on this	on this
Aldrin	sample.	0.050 UJ	sample.	sample.	sample.	sample.	sample.
Aroclor 1016		0.50 U					
Aroclor 1221		1.0 U					
Aroclor 1232		0.50 U					
Aroclor 1242		0.50 U					
Aroclor 1248		0.50 U					
Aroclor 1254		0.50 U					
Aroclor 1260		0.50 U					
Chlordane		0.50 U					
Dieldrin		0.10 UJ					
Endosulfan I		0.10 U					
Endosulfan II		0.10 U					
Endosulfan Sulfate		0.10 U					
Endrin		0.10 U					
Endrin ketone		0.10 U					
Heptachlor		0.050 U					
Heptachlor epoxide		0.050 U					
Methoxychlor		0.50 U					
Toxaphene		1.0 U					
alpha - BHC		0.050 U					
beta - BHC		0.050 U					
delta - BHC		0.050 U					
gamma - BHC (Lindane)		0.050 U					

Sediment Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK01SD01	MK01SD02	MK01SD03	MK01SD04	MK01SD05	MK01SD06	MK01SD21
4,4'-DDD	No analysis	2.7 J	No analysis	No analysis	No analysis	No analysis	No analysis
4,4'-DDE	conducted	2.7 J	conducted	conducted	conducted	conducted	conducted
4,4'-DDT	on this	4.8 J	on this	on this	on this	on this	on this
Aldrin	sample.	4.8 UJ	sample.	sample.	sample.	sample.	sample.
Aroclor 1016		48 UJ					
Aroclor 1221		97 UJ					
Aroclor 1232		48 UJ					
Aroclor 1242		48 UJ					
Aroclor 1248		48 UJ					
Aroclor 1254		48 UJ					
Aroclor 1260		48 UJ					
Chlordane		48 UJ					
Dieldrin		5.1 J					
Endosulfan I		9.7 UJ					
Endosulfan II		9.7 UJ					
Endosulfan Sulfate		9.7 UJ					
Endrin		9.7 UJ					
Endrin ketone		9.7 UJ					
Heptachlor		4.8 UJ					
Heptachlor epoxide		4.8 UJ					
Methoxychlor		48 UJ					
Toxaphene		97 UJ					
alpha - BHC		4.8 UJ					
beta - BHC		4.8 UJ					
delta - BHC		4.8 UJ					
gamma - BHC (Lindane)		4.8 UJ					

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Soil Boring Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK01SB01	MK01SB02	MK01SB03	MK01SB04	MK01SB05	MK01SB06	MK01SB07
4,4'-DDD	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	9.0 U	Unable to install well. No sample taken.	No analysis conducted on this sample.	No analysis conducted on this sample.
4,4'-DDE				9.0 U			
4,4'-DDT				9.0 U			
Aldrin				4.5 U			
Aroclor 1016				45 U			
Aroclor 1221				90 U			
Aroclor 1232				45 U			
Aroclor 1242				45 U			
Aroclor 1248				45 U			
Aroclor 1254				45 U			
Aroclor 1260				45 U			
Chlordane				45 U			
Dieldrin				9.0 U			
Endosulfan I				9.0 U			
Endosulfan II				9.0 U			
Endosulfan Sulfate				9.0 U			
Endrin				9.0 U			
Endrin ketone				9.0 U			
Heptachlor				4.5 U			
Heptachlor epoxide				4.5 U			
Methoxychlor				45 U			
Toxaphene				90 U			
alpha - BHC				4.5 U			
beta - BHC				4.5 U			
delta - BHC				4.5 U			
gamma - BHC (Lindane)				4.5 U			

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Monitoring Well Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/l] MK01MW09	MK01MW10	MK01MW11	MK01MW12	MK01MW13	MK01MW14	MK01MW15
4,4'-DDD	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	0.11 U	Unable to install well. No sample taken.	No analysis conducted on this sample.	No analysis conducted on this sample.
4,4'-DDE				0.11 U			
4,4'-DDT				0.11 UJ			
Aldrin				0.056 UJ			
Aroclor 1016				0.56 U			
Aroclor 1221				1.10 U			
Aroclor 1232				0.56 U			
Aroclor 1242				0.56 U			
Aroclor 1248				0.56 U			
Aroclor 1254				0.56 U			
Aroclor 1260				0.56 U			
Chlordane				0.56 U			
Dieldrin				0.11 U			
Endosulfan I				0.11 U			
Endosulfan II				0.11 U			
Endosulfan Sulfate				0.023 J			
Endrin				0.11 U			
Endrin ketone				0.11 U			
Heptachlor				0.056 U			
Heptachlor epoxide				0.056 U			
Methoxychlor				0.56 U			
Toxaphene				1.10 U			
alpha - BHC							
beta - BHC							
delta - BHC							
gamma - BHC (Lindane)							

PMU #1

This PMU contains sources which influence Pipe Creek. The PMU is primarily bordered to the east by Ransom Road, to the west and south by Patrol Road and to the north by Maintenance Road.

Surface Soil Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS01	MK01SS02	MK01SS03	MK01SS04	MK01SS05	MK01SS06	MK01SS07
2-Nitrotoluene	64 U	64 U	71 U	67 U	81 U	65 U	63 U
2,4-Dinitrotoluene	57 U	57 U	63 U	59 U	72 U	57 U	56 U
2,4,6-Trinitrotoluene	38 U	37 U	41 U	39 U	47 U	38 U	37 U
2,6-Dinitrotoluene	57 U	57 U	63 U	59 U	72 U	57 U	56 U
3-Nitrotoluene	86 U	86 U	95 U	90 U	110 U	87 U	84 U
4-Nitrotoluene	80 U	80 U	88 U	84 U	100 U	81 U	78 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	66 U	65 U	72 U	68 U	82 U	66 U	64 U
m-Dinitrobenzene	32 U	31 U	35 U	33 U	40 U	32 U	31 U
Methyl-2,4,6-trinitrophenylnitramine	45 U	44 U	49 U	47 U	56 U	45 U	44 U
Nitrobenzene	41 U	41 U	45 U	43 U	52 U	42 U	40 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	34 U	34 U	37 U	35 U	43 U	34 U	33 U
sym-Trinitrobenzene	47 U	47 U	52 U	49 U	59 U	48 U	46 U

Surface Soil Samples (CONTINUED)

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS08	MK01SS09	MK01SS10	MK01SS11	MK01SS12	MK01SS32	MK01SS33
2-Nitrotoluene	73 U	65 U	68 U	59 U	64 U	No analysis conducted for this sample.	No analysis conducted for this sample.
2,4-Dinitrotoluene	65 U	58 U	60 U	52 U	57 U		
2,4,6-Trinitrotoluene	43 U	38 U	39 U	34 U	38 U		
2,6-Dinitrotoluene	65 U	58 U	60 U	52 U	57 U		
3-Nitrotoluene	98 U	88 U	90 U	79 U	86 U		
4-Nitrotoluene	91 U	81 U	84 U	73 U	80 U		
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	74 U	66 U	69 U	60 U	66 U		
m-Dinitrobenzene	36 U	32 U	33 U	29 U	32 U		
Methyl-2,4,6-trinitrophenylnitramine	51 U	46 U	47 U	41 U	45 U		
Nitrobenzene	47 U	42 U	43 U	38 U	41 U		
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	39 U	34 U	36 U	31 U	34 U		
sym-Trinitrobenzene	54 U	48 U	50 U	43 U	47 U		

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Surface Water Samples

Nitroexplosives Analysis

Parameter	Sample Number (Units - ug/l) MK01SW01	MK01SW02	MK01SW03	MK01SW04	MK01SW05	MK01SW06	MK01SW21
2-Nitrotoluene	53 U	53 U	53 U	53 U	53 U	53 U	53 UJ
2,4-Dinitrotoluene	47 U	47 U	47 U	47 U	47 U	47 U	47 UJ
2,4,6-Trinitrotoluene	31 U	31 U	31 U	31 U	31 U	31 U	31 UJ
2,6-Dinitrotoluene	47 U	47 U	47 U	47 U	47 U	47 U	47 UJ
3-Nitrotoluene	71 U	71 U	71 U	71 U	71 U	71 U	71 UJ
4-Nitrotoluene	66 U	66 U	66 U	66 U	66 U	66 U	66 UJ
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	54 U	54 U	54 U	54 U	54 U	54 U	54 UJ
m-Dinitrobenzene	26 U	26 U	26 U	26 U	26 U	26 U	26 UJ
Methyl-2,4,6-trinitrophenylnitramine	37 U	37 U	37 U	37 U	37 U	37 U	37 UJ
Nitrobenzene	34 U	34 U	34 U	34 U	34 U	34 U	34 UJ
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	28 U	28 U	28 U	28 U	28 U	28 U	28 UJ
sym-Trinitrobenzene	39 U	39 U	39 U	39 U	39 U	39 U	39 UJ

Sediment Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK01SD01	MK01SD02	MK01SD03	MK01SD04	MK01SD05	MK01SD06	MK01SD21
2-Nitrotoluene	94 U	65 U	70 U	62 U	63 U	74 U	65 U
2,4-Dinitrotoluene	84 U	58 U	62 U	55 U	56 U	65 U	57 U
2,4,6-Trinitrotoluene	55 U	38 U	41 U	36 U	37 U	43 U	38 U
2,6-Dinitrotoluene	84 U	58 U	62 U	55 U	56 U	65 U	57 U
3-Nitrotoluene	130 U	87 U	94 U	83 U	84 U	99 U	86 U
4-Nitrotoluene	120 U	81 U	88 U	77 U	78 U	92 U	80 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	96 U	66 U	72 U	63 U	64 U	75 U	66 U
m-Dinitrobenzene	46 U	32 U	35 U	30 U	31 U	36 U	32 U
Methyl-2,4,6-trinitrophenylnitramine	66 U	45 U	49 U	43 U	44 U	51 U	45 U
Nitrobenzene	60 U	42 U	45 U	40 U	40 U	47 U	41 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	50 U	34 U	37 U	33 U	33 U	39 U	34 U
sym-Trinitrobenzene	69 U	48 U	52 U	45 U	46 U	54 U	48 U

Soil Boring Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK01SB01	MK01SB02	MK01SB03	MK01SB04	MK01SB05	MK01SB06	MK01SB07
2-Nitrotoluene	64 U	64 U	62 U	61 U	Unable to	62 U	58 U
2,4-Dinitrotoluene	56 U	56 U	55 U	54 U	install well.	55 U	51 U
2,4,6-Trinitrotoluene	37 U	37 U	36 U	36 U	No	36 U	34 U
2,6-Dinitrotoluene	56 U	56 U	55 U	54 U	samples	55 U	51 U
3-Nitrotoluene	85 U	85 U	83 U	81 U	were taken.	84 U	77 U
4-Nitrotoluene	79 U	79 U	77 U	76 U		78 U	72 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	65 U	65 U	63 U	62 U		64 U	59 U
m-Dinitrobenzene	31 U	31 U	30 U	30 U		30 U	28 U
Methyl-2,4,6-trinitrophenylnitramine	44 U	44 U	43 U	42 U		44 U	40 U
Nitrobenzene	41 U	41 U	40 U	39 U		40 U	37 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	34 U	34 U	33 U	32 U		33 U	30 U
sym-Trinitrobenzene	47 U	47 U	46 U	45 U		46 U	42 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Monitoring Well Samples

Nitroexplosives Analysis

Sample Number [Units - ug/l]

Parameter	MK01MW09	MK01MW10	MK01MW11	MK01MW12	MK01MW13	MK01MW14	MK01MW15
2-Nitrotoluene	53 U	53 UJ	53 UJ	53 UJ	Unable to	53 UJ	53 UJ
2,4-Dinitrotoluene	47 U	47 UJ	47 UJ	47 UJ	install well.	47 UJ	47 UJ
2,4,6-Trinitrotoluene	31 U	31 UJ	31 UJ	31 UJ	No sample	31 UJ	31 UJ
2,6-Dinitrotoluene	47 U	47 UJ	47 UJ	47 UJ	taken.	47 UJ	47 UJ
3-Nitrotoluene	71 U	71 UJ	71 UJ	71 UJ		71 UJ	71 UJ
4-Nitrotoluene	66 U	66 UJ	66 UJ	66 UJ		66 UJ	66 UJ
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	54 U	54 UJ	54 UJ	54 UJ		54 UJ	54 UJ
m-Dinitrobenzene	26 U	26 UJ	26 UJ	26 UJ		26 UJ	26 UJ
Methyl-2,4,6-trinitrophenylnitramine	37 U	37 UJ	37 UJ	37 UJ		37 UJ	37 UJ
Nitrobenzene	34 U	34 UJ	34 UJ	34 UJ		34 UJ	34 UJ
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	28 U	28 UJ	28 UJ	28 UJ		28 UJ	28 UJ
sym-Trinitrobenzene	39 U	39 UJ	39 UJ	39 UJ		39 UJ	39 UJ

PMU #1

This PMU contains sources which influence Pipe Creek. The PMU is primarily bordered to the east by Ransom Road, to the west and south by Patrol Road and to the north by Maintenance Road.

Surface Soil Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK01SS01	MK01SS02	MK01SS03	MK01SS04	MK01SS05	MK01SS06	MK01SS07
Aluminum - Soluble							
Antimony - Soluble				Not Applicable.			
Arsenic - Soluble							
Barium - Soluble							
Beryllium - Soluble							
Cadmium - Soluble							
Calcium - Soluble							
Chromium - Soluble							
Cobalt - Soluble							
Copper - Soluble							
Iron - Soluble							
Lead - Soluble							
Magnesium - Soluble							
Manganese - Soluble							
Mercury - Soluble							
Nickel - Soluble							
Potassium - Soluble							
Selenium - Soluble							
Silver - Soluble							
Sodium - Soluble							
Thallium - Soluble							
Vanadium - Soluble							
Zinc - Soluble							

Surface Soil Samples (CONTINUED)

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS08	MK01SS09	MK01SS10	MK01SS11	MK01SS12	MK01SS32	MK01SS33
Aluminum - Soluble							
Antimony - Soluble	Not Applicable.						
Arsenic - Soluble							
Barium - Soluble							
Beryllium - Soluble							
Cadmium - Soluble							
Calcium - Soluble							
Chromium - Soluble							
Cobalt - Soluble							
Copper - Soluble							
Iron - Soluble							
Lead - Soluble							
Magnesium - Soluble							
Manganese - Soluble							
Mercury - Soluble							
Nickel - Soluble							
Potassium - Soluble							
Selenium - Soluble							
Silver - Soluble							
Sodium - Soluble							
Thallium - Soluble							
Vanadium - Soluble							
Zinc - Soluble							

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #1

Surface Water Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/l] MK01SW01	MK01SW02	MK01SW03	MK01SW04	MK01SW05	MK01SW06	MK01SW21
Aluminum - Soluble	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	76.6 B
Antimony - Soluble							5.0 U
Arsenic - Soluble							3.0 U
Barium - Soluble							41.1 B
Beryllium - Soluble							3.0 U
Cadmium - Soluble							0.20 U
Calcium - Soluble							66400
Chromium - Soluble							10.0 U
Cobalt - Soluble							20.0 U
Copper - Soluble							5.0 U
Iron - Soluble							107
Lead - Soluble							2.0 U
Magnesium - Soluble							16400
Manganese - Soluble							213
Mercury - Soluble							0.20 U
Nickel - Soluble							30.0 U
Potassium - Soluble							3990 B
Selenium - Soluble							3.0 U
Silver - Soluble							10.0 U
Sodium - Soluble							23600
Thallium - Soluble							4.0 U
Vanadium - Soluble							20.0 U
Zinc - Soluble							10.0 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #1

Sediment Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK01SD01	MK01SD02	MK01SD03	MK01SD04	MK01SD05	MK01SD06	MK01SD21
Aluminum - Soluble							
Antimony - Soluble	Not Applicable.						
Arsenic - Soluble							
Barium - Soluble							
Beryllium - Soluble							
Cadmium - Soluble							
Calcium - Soluble							
Chromium - Soluble							
Cobalt - Soluble							
Copper - Soluble							
Iron - Soluble							
Lead - Soluble							
Magnesium - Soluble							
Manganese - Soluble							
Mercury - Soluble							
Nickel - Soluble							
Potassium - Soluble							
Selenium - Soluble							
Silver - Soluble							
Sodium - Soluble							
Thallium - Soluble							
Vanadium - Soluble							
Zinc - Soluble							

W.O. #4065-6128-004

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

Soil Boring Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK01SB01	MK01SB02	MK01SB03	MK01SB04	MK01SB05	MK01SB06	MK01SB07
Aluminum - Soluble	Not Applicable.						
Antimony - Soluble							
Arsenic - Soluble							
Barium - Soluble							
Beryllium - Soluble							
Cadmium - Soluble							
Calcium - Soluble							
Chromium - Soluble							
Cobalt - Soluble							
Copper - Soluble							
Iron - Soluble							
Lead - Soluble							
Magnesium - Soluble							
Manganese - Soluble							
Mercury - Soluble							
Nickel - Soluble							
Potassium - Soluble							
Selenium - Soluble							
Silver - Soluble							
Sodium - Soluble							
Thallium - Soluble							
Vanadium - Soluble							
Zinc - Soluble							

PMU #1 This PMU contains sources which influence Pipe Creek. The PMU is primarily bordered to the east by Ransom Road, to the west and south by Patrol Road and to the north by Maintenance Road.

Surface Soil Samples

Total Metals Analysis

Parameter	Sample Number (Units - mg/kg) MK01SS01	MK01SS02	MK01SS03	MK01SS04	MK01SS05	MK01SS06	MK01SS07
Aluminum - Total	4340	5430	6650	9810	6160	9730	11900
Antimony - Total	1.2 BN	0.59 UN	0.67 U	0.63 U	0.90 BN	0.61 UN	0.61 UN
Arsenic - Total	11.0 N	7.5 N	6.8	5.8	3.0 N	6.0 N	13.7 N
Barium - Total	47.2	51.3	57.9	74.3	47.1	72.9	80.6
Beryllium - Total	0.35 B	0.43 B	0.40 U	0.38 U	0.44 U	0.37 U	0.39 B
Cadmium - Total	1.3 BN	0.27 BN	1.1 B	0.21 B	0.44 BN	0.22 BN	0.80 BN
Calcium - Total	7800	6010	26000	3190	17100 B	19900 B	24000 B
Chromium - Total	9.8	10.7	33.9	14.7	11.0	16.9	20.1
Cobalt - Total	9.6	4.1 B	23.2	12.4	11.0	10.7	15.0
Copper - Total	33.5	20.6	47.8	17.1	12.1	5.7	12.6
Iron - Total	30900	17500	37000	23800	17700	25200	31700
Lead - Total	55.8 N	85.7 N	52.0	11.1	30.0 N	11.8 N	12.0 N
Magnesium - Total	1720 *	1260 *	9800	2660	3340 *	9120 *	7690 *
Manganese - Total	411	155	494	455	297	677	1190
Mercury - Total	0.07	0.06	0.11	0.03	0.04	0.02 U	0.03
Nickel - Total	29.0	16.6	48.9	23.7	25.7	29.5	39.3
Potassium - Total	1840	2420	1180	897	1070	1460	1480
Selenium - Total	0.35 U	0.35 U	0.40 U	0.38 U	0.45 U	0.37 U	0.37 U
Silver - Total	0.07 B	0.09 B	0.07 B	0.05 U	0.03 B	0.02 U	0.02 U
Sodium - Total	171 B	197 B	355 B	142 B	221 B	209 B	197 B
Thallium - Total	0.46 U	0.47 U	0.53 U	0.50 U	0.60 U	0.49 U	0.49 U
Vanadium - Total	23.0 U*	17.8 *	26.7 U	21.5	14.7 *	25.7 *	32.8 B*
Zinc - Total	121 *	162 *	793	71.3	81.4 *	61.4 *	99.5 *

Surface Soil Samples (CONTINUED)

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK01SS08	MK01SS09	MK01SS10	MK01SS11	MK01SS12	MK01SS32	MK01SS33
Aluminum - Total	9250	6410	11900	2010	11200	5680 *	9050 *
Antimony - Total	0.65 UN	0.60 UN	0.63 UN	0.55 UN	0.60 UN	0.58 U	0.59 U
Arsenic - Total	10.6 N	5.20 N	8.20 N	1.60 N	11.90 N	4.6	8.5
Barium - Total	287	245	101	44.00	79.60	34.6 *	65.1 *
Beryllium - Total	1.2	0.74	0.57 B	0.33 U	0.60 B	0.35 U	0.36 U
Cadmium - Total	2.5 BN	0.72 BN	0.35 BN	0.10 BN	0.13 BN	0.15 BN	0.15 BN
Calcium - Total	5710 B	7280	11700	19400 B	4370 B	8970 *	3570 *
Chromium - Total	10.9	8.4	18.7	3.6	17.8	7.7 *	13.7 *
Cobalt - Total	16.5	12.7	9.1	2.2 U	21.0	4.1 B*	4.7 B*
Copper - Total	12.3	5.8	17.7	0.55 U	23.9	0.58 U	0.60 U
Iron - Total	54500	45800	22100	4960	31000	12200 *	17400 *
Lead - Total	23.3 N	20.5 N	104.00 N	800 N	12.2 N	6.1 *	6.9 *
Magnesium - Total	2110 *	2900 *	4,510.00 *	785 *	4610 *	3460 *	2550 *
Manganese - Total	3880	3540	376	73.7	834	207 *	218 *
Mercury - Total	0.05	0.06	0.10	0.11	0.02 U	0.02 U	0.02 U
Nickel - Total	61.2	51.7	24.3	3.3 U	50.2	9.9	14.6
Potassium - Total	657	415 B	2620	315 B	1040	494 B*	713 *
Selenium - Total	0.39 U	0.36 U	0.38 U	0.33 U	0.36 U	0.35 U	0.35 U
Silver - Total	0.03 B	0.06 B	0.04 B	0.02 U	0.04 B	1.2 U	1.2 U
Sodium - Total	148 B	124 B	172 B	150 B	146 B	125 B	149 B
Thallium - Total	0.52 U	0.48 U	0.50 U	0.44 U	0.48 U	0.47 U	0.47 U
Vanadium - Total	26.2 U*	24.1 U*	28.2 *	5.1 B*	24.4 U*	14.2 *	20.4 *
Zinc - Total	173 *	140 *	137 *	28.3 *	114 *	32.9	67.1

Surface Water Samples

Total Metals Analysis

Parameter	Sample Number [Units - ug/l] MK01SW01	MK01SW02	MK01SW03	MK01SW04	MK01SW05	MK01SW06	MK01SW21
Aluminum - Total	320	790	720	2370	660	300	483 *
Antimony - Total	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Arsenic - Total	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	3.0 BN
Barium - Total	49.2 B	35.9 B	36.0 B	49.7 B	41.6 B	31.6 B	45.3 B
Beryllium - Total	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Cadmium - Total	0.20 UN	0.20 UN	0.20 UN	0.20 UN	0.20 UN	0.20 U	0.20 UN
Calcium - Total	86500	84100	85800	87800	86100	43300	73800 N
Chromium - Total	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Cobalt - Total	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Copper - Total	5.0 U	5.0 U	5.0 U	5.0 U	8.4 B	5.0 U	5.0 U
Iron - Total	268	954	1000	4660	861	782	1060 *
Lead - Total	2.0 UN	2.0 UN	2.0 UN	4.0 N	19.0 N	2.0 U	5.0 N
Magnesium - Total	22700	20400	20700	21600	20700	12000	15900
Manganese - Total	50.5	31.2	37.7	114	44.4	209	241 *
Mercury - Total	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel - Total	30.0 U	30.0 U	30.0 U	30.0 U	30.0 U	30.0 U	30.0 U
Potassium - Total	3880 B	3860 B	4030 B	4600 B	3870 B	1830 B	3880 B
Selenium - Total	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Silver - Total	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	10.0 UN
Sodium - Total	5870	21700	22200	22700	22300	11400	23600
Thallium - Total	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Vanadium - Total	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Zinc - Total	12.8 B	16.6 B	191	33.0	24.5	65.0	10.0 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #1

W.O. #4065-6128-004

Sediment Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK01SD01	MK01SD02	MK01SD03	MK01SD04	MK01SD05	MK01SD06	MK01SD21
Aluminum - Total	14400	3570	4080	3650	3510	8190	3270 *
Antimony - Total	1.0 U	0.55 U	0.60 U	0.69 U	0.66 U	0.69 U	0.58 U
Arsenic - Total	7.3 N	7.3 N	4.0 N	8.4 N	7.9 N	8.1	2.1
Barium - Total	209	28.5	34.0	29.0	36.1	65.6	27.1 *
Beryllium - Total	3.8	0.34 U	0.37 U	0.40 U	0.38 U	0.42 U	0.35 U
Cadmium - Total	2.4 BN	0.13 BN	0.16 BN	0.15 BN	0.18 BN	0.34 B	0.12 BN
Calcium - Total	7940	48000	7230	18600	19400	8370	23800 *
Chromium - Total	14.4 *	6.1 *	6.1 *	6.4 *	5.3 *	13.5	5.8 *
Cobalt - Total	130	10.0	6.8	14.6	9.7	11.8	9.9 *
Copper - Total	58.3	15.1	8.8	14.9	12.7	18.6	8.3
Iron - Total	46600	16800	10300	21800	14800	20900	19600 *
Lead - Total	40.5 N*	8.2 N*	6.2 N*	7.6 N*	9.0 N*	11.2	5.0 *
Magnesium - Total	2300	3960	2070	4440	3010	3990	3550 *
Manganese - Total	3430 N*	489 N*	350 N*	550 N*	447 N*	487	405 *
Mercury - Total	0.10	0.02 U	0.02 U	0.03 U	0.03 U	0.03 U	0.02 U
Nickel - Total	282 *	21.1 *	17.6 *	33.6 *	22.4 *	26.5	24.2
Potassium - Total	1200	952	782	719	734	1360	720 *
Selenium - Total	0.61 U	0.33 U	0.36 U	0.41 U	0.40 U	0.41 U	0.35 U
Silver - Total	0.14 B	0.04 U	0.05 U	0.05 U	0.05 U	0.06 U	1.20 U
Sodium - Total	224 B	179 B	268 B	182 B	164 B	184 B	159 B
Thallium - Total	0.81 U	0.44 U	0.48 U	0.55 U	0.53 U	0.55 U	0.46 U
Vanadium - Total	23.9	9.8	9.8	11.0	9.3	21.2	8.8 *
Zinc - Total	433 *	50.4 *	59.3 *	83.5 *	55.9 *	71.2	51.1

Soil Boring Samples

Total Metals Analysis

Sample Number [Units - mg/kg]

Parameter	MK01SB01	MK01SB02	MK01SB03	MK01SB04	MK01SB05	MK01SB06	MK01SB07
Aluminum - Total	10500	8130	10100	4770	Unable to	4800	3370
Antimony - Total	0.61 U	0.61 U	0.57 U	0.58 U	install well.	0.56 U	0.53 U
Arsenic - Total	3.9 N	6.4 N	8.0 N	3.4 N	No sample	0.90 B	0.74 B
Barium - Total	85.0	53.5	61.6	23.4	taken.	25.0	11.0 B
Beryllium - Total	0.37 U	0.36 U	0.33 U	0.33 U		0.33 U	0.31 U
Cadmium - Total	0.17 BN	0.11 BN	0.22 BN	0.14 BN		0.06 B	0.03 B
Calcium - Total	3390	1830	3210	4710		740	620
Chromium - Total	17.1 *	14.0 *	17.5 *	7.1 *		4.2	3.7
Cobalt - Total	6.6	6.2	11.5	5.1 B		2.2 U	2.3 B
Copper - Total	14.9	15.3	23.6	6.0		2.0 B	1.8 B
Iron - Total	20000	18300	27200	9970		4640	3740
Lead - Total	7.9 N*	8.0 N*	11.6 N*	4.6 N*		19.1	2.1
Magnesium - Total	2630	1980	3450	1540		431.00 B	645.00
Manganese - Total	259 N*	337 N*	515 N*	322 N*		43.20	31.00
Mercury - Total	0.04	0.12	0.03	0.02 U		0.02 U	0.02 U
Nickel - Total	17.4 *	17.0 *	32.8 *	12.2 *		4.5	4.5
Potassium - Total	749	718	1110	543 B		111 B	217 B
Selenium - Total	0.37 U	0.36 U	0.34 U	0.35 U		0.34 U	0.32 U
Silver - Total	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U	0.04 U
Sodium - Total	144 B	140 B	142 B	137 B		124 B	111 B
Thallium - Total	0.49 U	0.49 U	0.46 U	0.46 U		0.45 U	0.43 U
Vanadium - Total	29.2	25.3	27.0 B	13.5		8.6	5.6
Zinc - Total	57.4 *	39.6 *	74.1 *	28.4 *		16.4	12.5

Monitoring Well Samples

Total Metals Analysis

Parameter	Sample Number [Units - ug/l] MK01MW09	MK01MW10	MK01MW11	MK01MW12	MK01MW13	MK01MW14	MK01MW15
Aluminum - Total	2880 N*	16600 N*	480 N*	8280 N*	Unable to	15800 N*	4840 N*
Antimony - Total	5.00 U	5.00 U	5.00 U	5.00 U	install well.	5.00 U	5.00 U
Arsenic - Total	3.00 U	14.00	3.00 B	4.00 B	No sample	43.00	15.00
Barium - Total	73.1 B	155.0 B	190.0 B	91.5 B	taken.	320.0	52.1 B
Beryllium - Total	3.00 U	3.00 U	3.00 U	3.00 U		3.00 U	3.00 U
Cadmium - Total	0.20 UN	0.50 BN	0.20 UN	0.30 BN		1.40 BN	0.40 BN
Calcium - Total	81000 B*	13900 B*	14900 B*	14200 B*		108000 B*	41600 B*
Chromium - Total	10.0 U	22.7	10.0 U	18.6		18.6	10.0 U
Cobalt - Total	20.0 U	20.0 U	20.0 U	20.0 U		76.9	20.0 U
Copper - Total	5.0 U	48.5	5.0 U	9.8 B		126.0	39.3
Iron - Total	4930 N*	41800 N*	1100 N*	28000 N*		98200 N*	14600 N*
Lead - Total	2.0 B	23.0	2.0 U	13.0		46.0	18.0
Magnesium - Total	29200	44500	44300	29200		26600	5980
Manganese - Total	149 *	740 *	178 *	1790 *		1060 *	141 *
Mercury - Total	0.20 UN	0.20 UN	0.20 UN	0.20 UN		0.20 UN	0.20 UN
Nickel - Total	30.0 U	55.6	30.0 U	73.8		207	50.6
Potassium - Total	1640 B	4320 B	2360 B	6840		6850	2510 B
Selenium - Total	3.0 U	3.0 U	3.0 U	3.0 U		3.0 U	3.0 U
Silver - Total	10.0 U	10.0 U	10.0 U	10.0 U		10.0 U	10.0 U
Sodium - Total	7860	5670	11100	6470		4330 B	1650 B
Thallium - Total	4.0 U	4.0 U	4.0 U	4.0 U		4.0 U	4.0 U
Vanadium - Total	20.0 U	35.8 B	20.0 U	20.0 U		42.6 B	20.0 U
Zinc - Total	30.3	166	10.0 U	79.9		225	67.0

PMU #2

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered to the east by Pentolite Road and passing through the intersection of Fox and Taylor Roads, to the west by Ransom Road, and to the north and south by Patrol Rd.

Surface Soil Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK02SS13	MK02SS14	MK02SS15	MK02SS16	MK02SS34	MK02SS35	MK02SS35RE
1,1-Dichloroethane	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
1,1-Dichloroethene	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
1,1,1-Trichloroethane	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
1,1,2-Trichloroethane	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
1,1,2,2-Tetrachloroethane	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
1,2-Dichloroethane	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
1,2-Dichloroethene (Total)	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
1,2-Dichloropropane	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
2-Butanone	11 U	12 U	12 U	12 U	11 U	10 UJ	10 UJ
2-Hexanone	11 U	12 U	12 U	12 U	11 U	10 UJ	10 UJ
4-Methyl-2-pentanone	11 U	12 U	12 U	12 U	11 U	10 UJ	10 UJ
Acetone	11 U	12 U	12 U	12 U	11 U	10 UJ	10 UJ
Benzene	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Bromodichloromethane	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Bromoform	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Bromomethane	11 U	12 U	12 U	12 U	11 U	10 UJ	10 UJ
Carbon Disulfide	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Carbon Tetrachloride	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Chlorobenzene	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Chloroethane	11 U	12 U	12 U	12 U	11 U	10 UJ	10 UJ
Chloroform	0 J	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Chloromethane	11 U	12 U	12 U	12 U	11 U	10 UJ	10 UJ
cis-1,3-Dichloropropene	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Dibromochloromethane	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Ethyl benzene	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Methylene chloride	6 U	6 U	6 U	2 J	6 U	5 UJ	5 UJ
Styrene	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Tetrachloroethene	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Toluene	33	1 J	0 J	2 J	54 B	82 J	43 J
Total Xylenes	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
trans-1,3-Dichloropropene	6 U	6 U	6 U	6 U	6 U	5 UJ	5 UJ
Trichloroethene	6 U	6 U	6 U	6 U	6 U	1 J	5 UJ
Vinyl acetate	11 U	12 U	12 U	12 U	11 U	10 UJ	10 UJ
Vinyl chloride	11 U	12 U	12 U	12 U	11 U	10 UJ	10 UJ

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Surface Soil Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK02SS36
1,1-Dichloroethane	6 U
1,1-Dichloroethene	6 U
1,1,1-Trichloroethane	6 U
1,1,2-Trichloroethane	6 U
1,1,2,2-Tetrachloroethane	6 U
1,2-Dichloroethane	6 U
1,2-Dichloroethene (Total)	6 U
1,2-Dichloropropane	6 U
2-Butanone	12 U
2-Hexanone	12 U
4-Methyl-2-pentanone	12 U
Acetone	12 U
Benzene	6 U
Bromodichloromethane	6 U
Bromoform	6 U
Bromomethane	12 U
Carbon Disulfide	6 U
Carbon Tetrachloride	6 U
Chlorobenzene	6 U
Chloroethane	12 U
Chloroform	6 U
Chloromethane	12 U
cis-1,3-Dichloropropene	6 U
Dibromochloromethane	6 U
Ethyl benzene	6 U
Methylene chloride	6 U
Styrene	6 U
Tetrachloroethene	6 U
Toluene	25 B
Total Xylenes	6 U
trans-1,3-Dichloropropene	6 U
Trichloroethene	1 J
Vinyl acetate	12 U
Vinyl chloride	12 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Surface Water Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK02SW07	MK02SW08	MK02SW09	MK02SW10
1,1-Dichloroethane	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U
1,2-Dichloroethene (Total)	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U
2-Butanone	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U
Acetone	10 U	10 U	10 U	10 U
Benzene	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U
Carbon Disulfide	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U	5 U
Ethyl benzene	5 U	5 U	5 U	5 U
Methylene chloride	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U
Total Xylenes	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U
Vinyl acetate	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Sediment Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK02SD07	MK02SD08	MK02SD09	MK02SD10
1,1-Dichloroethane	2 J	7 U	14 U	8 U
1,1-Dichloroethene	9 U	7 U	14 U	8 U
1,1,1-Trichloroethane	9 U	7 U	14 U	8 U
1,1,2-Trichloroethane	9 U	7 U	14 U	8 U
1,1,2,2-Tetrachloroethane	9 U	7 U	14 U	8 U
1,2-Dichloroethane	9 U	7 U	14 U	8 U
1,2-Dichloroethene (Total)	9 U	7 U	14 U	8 U
1,2-Dichloropropane	9 U	7 U	14 U	8 U
2-Butanone	10 J	13 U	11 J	31 J
2-Hexanone	19 U	13 U	28 U	17 U
4-Methyl-2-pentanone	19 U	13 U	28 U	17 U
Acetone	53	21	94	210 J
Benzene	9 U	7 U	14 U	8 U
Bromodichloromethane	9 U	7 U	14 U	8 U
Bromoform	9 U	7 U	14 U	8 U
Bromomethane	19 U	13 U	28 U	17 U
Carbon Disulfide	9 U	7 U	14 U	8 U
Carbon Tetrachloride	9 U	7 U	14 U	8 U
Chlorobenzene	9 U	7 U	14 U	8 U
Chloroethane	19 U	13 U	28 U	17 U
Chloroform	9 U	7 U	14 U	8 U
Chloromethane	19 U	13 U	4 J	17 U
cis-1,3-Dichloropropene	9 U	7 U	14 U	8 U
Dibromochloromethane	9 U	7 U	14 U	8 U
Ethyl benzene	9 U	7 U	14 U	8 U
Methylene chloride	1 J	7 U	5 J	8 U
Styrene	9 U	7 U	14 U	8 U
Tetrachloroethene	9 U	7 U	14 U	8 U
Toluene	9 U	1 J	13 J	8 U
Total Xylenes	9 U	7 U	14 U	8 U
trans-1,3-Dichloropropene	9 U	7 U	14 U	8 U
Trichloroethene	9 U	7 U	14 U	8 U
Vinyl acetate	19 U	13 U	28 U	17 U
Vinyl chloride	19 U	13 U	28 U	17 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Soil Boring Samples

Volatile Organic Analysis

Sample Number [Units - ug/kg]

Parameter	MK02SB08	MK02SB09	MK02SB10	MK02SB11
1,1-Dichloroethane	6 U	6 U	6 U	6 U
1,1-Dichloroethene	6 U	6 U	6 U	6 U
1,1,1-Trichloroethane	6 U	6 U	6 U	2 J
1,1,2-Trichloroethane	6 U	6 U	6 U	6 U
1,1,2,2-Tetrachloroethane	6 U	6 U	6 U	6 U
1,2-Dichloroethane	6 U	6 U	6 U	6 U
1,2-Dichloroethene (Total)	6 U	6 U	6 U	6 U
1,2-Dichloropropane	6 U	6 U	6 U	6 U
2-Butanone	12 U	13 U	12 U	12 U
2-Hexanone	12 U	13 U	12 U	12 U
4-Methyl-2-pentanone	12 U	13 U	12 U	12 U
Acetone	12 U	13 U	12 U	12 U
Benzene	6 U	6 U	6 U	6 U
Bromodichloromethane	6 U	6 U	6 U	6 U
Bromoform	6 U	6 U	6 U	6 U
Bromomethane	12 U	13 U	12 U	12 U
Carbon Disulfide	6 U	6 U	6 U	6 U
Carbon Tetrachloride	6 U	6 U	6 U	6 U
Chlorobenzene	6 U	6 U	6 U	1 BJ
Chloroethane	12 U	13 U	12 U	12 U
Chloroform	6 U	6 U	6 U	6 U
Chloromethane	12 U	13 U	12 U	12 U
cis-1,3-Dichloropropene	6 U	6 U	6 U	6 U
Dibromochloromethane	6 U	6 U	6 U	6 U
Ethyl benzene	6 U	6 U	6 U	6 U
Methylene chloride	6 U	6 U	6 U	6 U
Styrene	6 U	6 U	6 U	6 U
Tetrachloroethene	6 U	6 U	6 U	6 U
Toluene	6 U	6 U	6 U	6 U
Total Xylenes	6 U	4 J	6 U	6 U
trans-1,3-Dichloropropene	6 U	6 U	6 U	6 U
Trichloroethene	6 U	6 U	6 U	6 U
Vinyl acetate	12 U	13 U	12 U	12 U
Vinyl chloride	12 U	13 U	12 U	12 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Monitoring Well Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK02MW16	MK02MW17	MK02MW18	MK02MW19
1,1-Dichloroethane	5 U	5 U	Unable to	18
1,1-Dichloroethene	5 U	5 U	install well.	8
1,1,1-Trichloroethane	5 U	5 U	No	360 E
1,1,2-Trichloroethane	5 U	5 U	samples	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	taken.	5 U
1,2-Dichloroethane	5 U	5 U		5 U
1,2-Dichloroethene (Total)	5 U	5 U		5 U
1,2-Dichloropropane	5 U	5 U		5 U
2-Butanone	10 U	10 U		10 U
2-Hexanone	10 U	10 U		10 U
4-Methyl-2-pentanone	10 U	10 U		10 U
Acetone	10 U	10 U		10 U
Benzene	5 U	5 U		5 U
Bromodichloromethane	5 U	5 U		5 U
Bromoform	5 U	5 U		5 U
Bromomethane	10 U	10 U		10 U
Carbon Disulfide	5 U	5 U		5 U
Carbon Tetrachloride	5 U	5 U		5 U
Chlorobenzene	5 U	5 U		5 U
Chloroethane	10 U	10 U		10 U
Chloroform	5 U	5 U		5 U
Chloromethane	10 U	10 U		10 U
cis-1,3-Dichloropropene	5 U	5 U		5 U
Dibromochloromethane	5 U	5 U		5 U
Ethyl benzene	5 U	5 U		5 U
Methylene chloride	5 U	5 U		5 U
Styrene	5 U	5 U		5 U
Tetrachloroethene	5 U	5 U		5 U
Toluene	5 U	5 U		2 J
Total Xylenes	5 U	5 U		5 U
trans-1,3-Dichloropropene	5 U	5 U		5 U
Trichloroethene	5 U	5 U		5 U
Vinyl acetate	10 U	10 U		10 U
Vinyl chloride	10 U	10 U		10 U

PMU #2

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered to the east by Pentolite Road and passing through the intersection of Fox and Taylor Roads, to the west by Ransom Road, and to the north and south by Patrol Rd.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK02SS13	MK02SS14	MK02SS15	MK02SS16	MK02SS34	MK02SS35	MK02SS36
1,2-Dichlorobenzene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
1,2,4-Trichlorobenzene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
1,3-Dichlorobenzene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
1,4-Dichlorobenzene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2-Chloronaphthalene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2-Chlorophenol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2-Methylnaphthalene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2-Methylphenol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2-Nitroaniline	1800 U	1800 U	1900 U	1800 U	1800 U	2000 U	2000 U
2-Nitrophenol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2,4-Dichlorophenol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2,4-Dimethylphenol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2,4-Dinitrophenol	1800 U	1800 U	1900 U	1800 U	1800 U	2000 U	2000 U
2,4-Dinitrotoluene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2,4,5-Trichlorophenol	1800 U	1800 U	1900 U	1800 U	1800 U	2000 U	2000 U
2,4,6-Trichlorophenol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
2,6-Dinitrotoluene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
3-Nitroaniline	1800 U	1800 U	1900 U	1800 U	1800 U	2000 U	2000 U
3,3'-Dichlorobenzidine	760 U	760 U	790 U	750 U	730 U	810 U	810 U
4-Bromophenyl phenyl ether	380 U	380 U	390 U	380 U	370 U	410 U	410 U
4-Chloro-3-methylphenol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
4-Chloroaniline	380 U	380 U	390 U	380 U	370 U	410 U	410 U
4-Chlorodiphenylether	380 U	380 U	390 U	380 U	370 U	410 U	410 U
4-Methylphenol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
4-Nitroaniline	1800 U	1800 U	1900 U	1800 U	1800 U	2000 U	2000 U
4-Nitrophenol	1800 U	1800 U	1900 U	1800 U	1800 U	2000 U	2000 U
4,6-Dinitro-2-methylphenol	1800 U	1800 U	1900 U	1800 U	1800 U	2000 U	2000 U
Acenaphthene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Acenaphthylene	380 U	380 U	390 U	380 U	370 U	190 J	410 U
Anthracene	380 U	380 U	390 U	380 U	370 U	98 J	410 U
Benzoic acid	1800 UJ	1800 UJ	1900 UJ	1800 U	1800 U	2000 U	2000 U
Benzo(a)anthracene	380 U	380 U	390 U	27 J	220 J	920	89 J
Benzo(a)pyrene	380 U	380 U	390 U	22 J	130 J	680	410 U
Benzo(b)fluoranthene	380 U	380 U	390 U	34 J	310 J	2400	410 U
Benzo(ghi)perylene	380 U	380 U	390 U	380 U	63 J	280 J	410 U

PMU #2

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered to the east by Pentolite Road and passing through the intersection of Fox and Taylor Roads, to the west by Ransom Road, and to the north and south by Patrol Rd.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK02SS13	MK02SS14	MK02SS15	MK02SS16	MK02SS34	MK02SS35	MK02SS36
Benzo(k)fluoranthene	380 U	380 U	390 U	18 J	130 J	800	410 U
Benzyl alcohol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Bis(2-chloroethoxy) methane	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Bis(2-chloroethyl) ether	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Bis(2-chloroisopropyl) ether	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Bis(2-ethylhexyl) phthalate	44 J	230 J	110 J	380 U	1200	4800	23000 E
Butyl benzyl phthalate	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Chrysene	380 U	380 U	390 U	28 J	310 J	1500	97 J
Dibenzofuran	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Dibenzo(a,h)anthracene	380 U	380 U	390 U	380 U	370 U	91 J	410 U
Diethyl phthalate	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Dimethyl phthalate	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Di-n-butyl phthalate	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Di-n-octyl phthalate	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Fluoranthene	380 U	380 U	390 U	64 J	460	2100	180 J
Fluorene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Hexachlorobenzene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Hexachlorobutadiene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Hexachlorocyclopentadiene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Hexachloroethane	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Indeno(1,2,3-cd)pyrene	380 U	380 U	390 U	380 U	85 J	430	410 U
Isophorone	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Naphthalene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Nitrobenzene	380 U	380 U	390 U	380 U	370 U	410 U	410 U
N-Nitroso-Di-n-propylamine	380 U	380 U	390 U	380 U	370 U	410 U	410 U
N-nitrosodiphenylamine	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Pentachlorophenol	1800 U	1800 U	1900 U	1800 U	1800 U	2000 U	2000 U
Phenanthrene	380 U	380 U	390 U	25 J	110 J	460	48 J
Phenol	380 U	380 U	390 U	380 U	370 U	410 U	410 U
Pyrene	380 U	380 U	390 U	46 J	410	1500	130 J

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number (Units - ug/l) MK02SW07	MK02SW08	MK02SW09	MK02SW10	MK02SD08	MK02SD09	MK02SD10
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2-Chlorophenol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2-Methylphenol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2-Nitroaniline	50 U	50 U	50 U	50 U	2200 U	4400 U	3000 U
2-Nitrophenol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2,4-Dinitrophenol	50 U	50 U	50 U	50 U	2200 U	4400 U	3000 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2,4,5-Trichlorophenol	50 U	50 U	50 U	50 U	2200 U	4400 U	3000 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
3-Nitroaniline	50 U	50 U	50 U	50 U	2200 U	4400 U	3000 U
3,3'-Dichlorobenzidine	20 U	20 U	20 U	20 U	900 U	1800 U	1200 U
4-Bromophenyl phenyl ether	10 U	10 U	10 U	10 U	450 U	900 U	610 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
4-Chloroaniline	10 U	10 U	10 U	10 U	450 U	900 U	610 U
4-Chlorodiphenylether	10 U	10 U	10 U	10 U	450 U	900 U	610 U
4-Methylphenol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
4-Nitroaniline	50 U	50 U	50 U	50 U	2200 U	4400 U	3000 U
4-Nitrophenol	50 U	50 U	50 U	50 U	2200 U	4400 U	3000 U
4,6-Dinitro-2-methylphenol	50 U	50 U	50 U	50 U	2200 U	4400 U	3000 U
Acenaphthene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Acenaphthylene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Anthracene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Benzoic acid	50 U	50 U	50 U	50 U	2200 UJ	10 J	3000 UJ
Benzo(a)anthracene	10 U	10 U	10 U	10 U	60 J	46 J	610 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	46 J	900 U	610 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	66 J	59 J	610 U
Benzo(ghi)perylene	10 U	10 U	10 U	10 U	450 U	900 U	610 U

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK02SW07	MK02SW08	MK02SW09	MK02SW10	MK02SD08	MK02SD09	MK02SD10
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	28 J	26 J	610 U
Benzyl alcohol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Bis(2-chloroethoxy) methane	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Bis(2-chloroethyl) ether	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Bis(2-chloroisopropyl) ether	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Bis(2-ethylhexyl) phthalate	10 U	10 U	10 U	10 U	61 J	900 U	610 U
Butyl benzyl phthalate	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Chrysene	10 U	10 U	10 U	10 U	49 J	43 J	610 U
Dibenzofuran	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Diethyl phthalate	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Dimethyl phthalate	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Di-n-butyl phthalate	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Di-n-octyl phthalate	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Fluoranthene	10 U	10 U	10 U	10 U	100 J	900 U	610 U
Fluorene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Hexachloroethane	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Isophorone	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Naphthalene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Nitrobenzene	10 U	10 U	10 U	10 U	450 U	900 U	610 U
N-Nitroso-Di-n-propylamine	10 U	10 U	10 U	10 U	450 U	900 U	610 U
N-nitrosodiphenylamine	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Pentachlorophenol	50 U	50 U	50 U	50 U	2200 U	4400 U	3000 U
Phenanthrene	10 U	10 U	10 U	10 U	26 J	23 J	610 U
Phenol	10 U	10 U	10 U	10 U	450 U	900 U	610 U
Pyrene	10 U	10 U	10 U	10 U	80 J	900 U	610 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Soil Boring Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK02SB08	MK02SB09	MK02SB10	MK02SB11
1,2-Dichlorobenzene	390 U	410 U	390 U	390 U
1,2,4-Trichlorobenzene	390 U	410 U	390 U	390 U
1,3-Dichlorobenzene	390 U	410 U	390 U	390 U
1,4-Dichlorobenzene	390 U	410 U	390 U	390 U
2-Chloronaphthalene	390 U	410 U	390 U	390 U
2-Chlorophenol	390 U	410 U	390 U	390 U
2-Methylnaphthalene	32 J	410 U	390 U	79 J
2-Methylphenol	390 U	410 U	390 U	390 U
2-Nitroaniline	1900 U	2000 U	1900 U	1900 U
2-Nitrophenol	390 U	410 U	390 U	390 U
2,4-Dichlorophenol	390 U	410 U	390 U	390 U
2,4-Dimethylphenol	390 U	410 U	390 U	390 U
2,4-Dinitrophenol	1900 U	2000 U	1900 U	1900 U
2,4-Dinitrotoluene	390 U	410 U	390 U	390 U
2,4,5-Trichlorophenol	1900 U	2000 U	1900 U	1900 U
2,4,6-Trichlorophenol	390 U	410 U	390 U	390 U
2,6-Dinitrotoluene	390 U	410 U	390 U	390 U
3-Nitroaniline	1900 U	2000 U	1900 U	1900 U
3,3'-Dichlorobenzidine	790 U	830 U	770 U	770 U
4-Bromophenyl phenyl ether	390 U	410 U	390 U	390 U
4-Chloro-3-methylphenol	390 U	410 U	390 U	390 U
4-Chloroaniline	390 U	410 U	390 U	390 U
4-Chlorodiphenylether	390 U	410 U	390 U	390 U
4-Methylphenol	390 U	410 U	390 U	390 U
4-Nitroaniline	1900 U	2000 U	1900 U	1900 U
4-Nitrophenol	1900 U	2000 U	1900 U	1900 U
4,6-Dinitro-2-methylphenol	1900 U	2000 U	1900 U	1900 U
Acenaphthene	390 U	410 U	390 U	390 U
Acenaphthylene	390 U	410 U	390 U	60 J
Anthracene	390 U	410 U	390 U	56 J
Benzoic acid	1900 U	2000 U	1900 U	28 J
Benzo(a)anthracene	390 U	410 U	390 U	260 J
Benzo(a)pyrene	390 U	410 U	390 U	230 J
Benzo(b)fluoranthene	32 J	410 U	390 U	340 J
Benzo(ghi)perylene	390 U	410 U	390 U	100 J

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Soil Boring Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK02SB08	MK02SB09	MK02SB10	MK02SB11
Benzo(k)fluoranthene	390 U	410 U	390 U	160 J
Benzyl alcohol	390 U	410 U	390 U	390 U
Bis(2-chloroethoxy) methane	390 U	410 U	390 U	390 U
Bis(2-chloroethyl) ether	390 U	410 U	390 U	390 U
Bis(2-chloroisopropyl) ether	390 U	410 U	390 U	390 U
Bis(2-ethylhexyl) phthalate	390 U	410 U	390 U	60 J
Butyl benzyl phthalate	390 U	410 U	390 U	390 U
Chrysene	390 U	410 U	390 U	240 J
Dibenzofuran	390 U	410 U	390 U	390 U
Dibenzo(a,h)anthracene	390 U	410 U	390 U	27 J
Diethyl phthalate	390 U	410 U	390 U	390 U
Dimethyl phthalate	390 U	410 U	390 U	390 U
Di-n-butyl phthalate	390 U	410 U	390 U	390 U
Di-n-octyl phthalate	390 U	410 U	390 U	390 U
Fluoranthene	23 J	410 U	390 U	510
Fluorene	390 U	410 U	390 U	390 U
Hexachlorobenzene	390 U	410 U	390 U	390 U
Hexachlorobutadiene	390 U	410 U	390 U	390 U
Hexachlorocyclopentadiene	390 U	410 U	390 U	390 U
Hexachloroethane	390 U	410 U	390 U	390 U
Indeno(1,2,3-cd)pyrene	390 U	410 U	390 U	140 J
Isophorone	390 U	410 U	390 U	390 U
Naphthalene	13 J	72 J	390 U	390 U
Nitrobenzene	390 U	410 U	390 U	390 U
N-Nitroso-Di-n-propylamine	390 U	410 U	390 U	390 U
N-nitrosodiphenylamine	390 U	410 U	390 U	390 U
Pentachlorophenol	1900 U	2000 U	1900 U	1900 U
Phenanthrene	39 J	410 U	390 U	220 J
Phenol	390 U	410 U	390 U	390 U
Pyrene	390 U	410 U	390 U	390

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #2

Monitoring Well Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK02MW16	MK02MW17	MK02MW18	MK02MW19
1,2-Dichlorobenzene	10 U	10 U	Unable to	10 U
1,2,4-Trichlorobenzene	10 U	10 U	install well.	10 U
1,3-Dichlorobenzene	10 U	10 U	No sample	10 U
1,4-Dichlorobenzene	10 U	10 U	taken.	10 U
2-Chloronaphthalene	10 U	10 U		10 U
2-Chlorophenol	10 UJ	10 U		10 U
2-Methylnaphthalene	10 U	10 U		10 U
2-Methylphenol	10 UJ	10 U		10 U
2-Nitroaniline	50 U	50 U		50 U
2-Nitrophenol	10 UJ	10 U		10 U
2,4-Dichlorophenol	10 UJ	10 U		10 U
2,4-Dimethylphenol	10 UJ	10 U		10 U
2,4-Dinitrophenol	50 UJ	50 U		50 U
2,4-Dinitrotoluene	10 U	10 U		10 U
2,4,5-Trichlorophenol	50 UJ	50 U		50 U
2,4,6-Trichlorophenol	10 UJ	10 U		10 U
2,6-Dinitrotoluene	10 UJ	10 U		10 U
3-Nitroaniline	50 U	50 U		50 U
3,3'-Dichlorobenzidine	20 U	20 U		20 U
4-Bromophenyl phenyl ether	10 U	10 U		10 U
4-Chloro-3-methylphenol	10 UJ	10 U		10 U
4-Chloroaniline	10 U	10 U		10 U
4-Chlorodiphenylether	10 U	10 U		10 U
4-Methylphenol	10 UJ	10 U		10 U
4-Nitroaniline	50 U	50 U		50 U
4-Nitrophenol	50 UJ	50 U		50 U
4,6-Dinitro-2-methylphenol	50 UJ	50 U		50 U
Acenaphthene	10 U	10 U		10 U
Acenaphthylene	10 U	10 U		10 U
Anthracene	10 U	10 U		10 U
Benzoic acid	50 UJ	50 UJ		50 UJ
Benzo(a)anthracene	10 U	10 U		10 U
Benzo(a)pyrene	10 U	10 U		10 U
Benzo(b)fluoranthene	10 U	10 U		10 U
Benzo(ghi)perylene	10 U	10 UJ		10 UJ

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Monitoring Well Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK02MW16	MK02MW17	MK02MW18	MK02MW19
Benzo(k)fluoranthene	10 U	10 U	Unable to	10 U
Benzyl alcohol	10 U	10 U	install well.	10 U
Bis(2-chloroethoxy) methane	10 U	10 U	No sample	10 U
Bis(2-chloroethyl) ether	10 U	10 U	taken.	10 U
Bis(2-chloroisopropyl) ether	10 U	10 U		10 U
Bis(2-ethylhexyl) phthalate	10 U	12		3 J
Butyl benzyl phthalate	10 U	10 U		10 U
Chrysene	10 U	10 U		10 U
Dibenzofuran	10 U	10 U		10 U
Dibenzo(a,h)anthracene	10 U	10 U		10 U
Diethyl phthalate	10 U	10 U		10 U
Dimethyl phthalate	10 U	10 U		10 U
Di-n-butyl phthalate	10 U	10 U		10 U
Di-n-octyl phthalate	10 U	10 U		10 U
Fluoranthene	10 U	10 U		10 U
Fluorene	10 U	10 U		10 U
Hexachlorobenzene	10 U	10 U		10 U
Hexachlorobutadiene	10 U	10 U		10 U
Hexachlorocyclopentadiene	10 U	10 U		10 U
Hexachloroethane	10 U	10 U		10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U		10 U
Isophorone	10 U	10 U		10 U
Naphthalene	10 U	10 U		10 U
Nitrobenzene	10 U	10 U		10 U
N-Nitroso-Di-n-propylamine	10 U	10 U		10 U
N-nitrosodiphenylamine	10 U	10 U		10 U
Pentachlorophenol	50 UJ	50 U		50 U
Phenanthrene	10 U	10 U		10 U
Phenol	10 UJ	10 U		10 U
Pyrene	10 U	10 U		10 U

PMU #2

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered to the east by Pentolite Road and passing through the intersection of Fox and Taylor Roads, to the west by Ransom Road, and to the north and south by Patrol Rd.

Surface Soil Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK02SS13	MK02SS14	MK02SS15	MK02SS16	MK02SS34	MK02SS35	MK02SS36
4,4'-DDD	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.
4,4'-DDE							
4,4'-DDT							
Aldrin							
Aroclor 1016							
Aroclor 1221							
Aroclor 1232							
Aroclor 1242							
Aroclor 1248							
Aroclor 1254							
Aroclor 1260							
Chlordane							
Dieldrin							
Endosulfan I							
Endosulfan II							
Endosulfan Sulfate							
Endrin							
Endrin ketone							
Heptachlor							
Heptachlor epoxide							
Methoxychlor							
Toxaphene							
alpha - BHC							
beta - BHC							
delta - BHC							
gamma - BHC (Lindane)							

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Surface Water Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/l] MK02SW07	MK02SW08	MK02SW09	MK02SW10
4,4'-DDD	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.
4,4'-DDE				
4,4'-DDT				
Aldrin				
Aroclor 1016				
Aroclor 1221				
Aroclor 1232				
Aroclor 1242				
Aroclor 1248				
Aroclor 1254				
Aroclor 1260				
Chlordane				
Dieldrin				
Endosulfan I				
Endosulfan II				
Endosulfan Sulfate				
Endrin				
Endrin ketone				
Heptachlor				
Heptachlor epoxide				
Methoxychlor				
Toxaphene				
alpha - BHC				
beta - BHC				
delta - BHC				
gamma - BHC (Lindane)				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Sediment Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK02SD07	MK02SD08	MK02SD09	MK02SD10
4,4'-DDD	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.
4,4'-DDE				
4,4'-DDT				
Aldrin				
Aroclor 1016				
Aroclor 1221				
Aroclor 1232				
Aroclor 1242				
Aroclor 1248				
Aroclor 1254				
Aroclor 1260				
Chlordane				
Dieldrin				
Endosulfan I				
Endosulfan II				
Endosulfan Sulfate				
Endrin				
Endrin ketone				
Heptachlor				
Heptachlor epoxide				
Methoxychlor				
Toxaphene				
alpha - BHC				
beta - BHC				
delta - BHC				
gamma - BHC (Lindane)				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Soil Boring Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK02SB08	MK02SB09	MK02SB10	MK02SB11
4,4'-DDD	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.	No analysis conducted on this sample.
4,4'-DDE				
4,4'-DDT				
Aldrin				
Aroclor 1016				
Aroclor 1221				
Aroclor 1232				
Aroclor 1242				
Aroclor 1248				
Aroclor 1254				
Aroclor 1260				
Chlordane				
Dieldrin				
Endosulfan I				
Endosulfan II				
Endosulfan Sulfate				
Endrin				
Endrin ketone				
Heptachlor				
Heptachlor epoxide				
Methoxychlor				
Toxaphene				
alpha - BHC				
beta - BHC				
delta - BHC				
gamma - BHC (Lindane)				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Monitoring Well Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/l] MK02MW16	MK02MW17	MK02MW18	MK02MW19
4,4'-DDD	No analysis conducted on this sample.	No analysis conducted on this sample.	Unable to install well. No sample taken.	No analysis conducted on this sample.
4,4'-DDE				
4,4'-DDT				
Aldrin				
Aroclor 1016				
Aroclor 1221				
Aroclor 1232				
Aroclor 1242				
Aroclor 1248				
Aroclor 1254				
Aroclor 1260				
Chlordane				
Dieldrin				
Endosulfan I				
Endosulfan II				
Endosulfan Sulfate				
Endrin				
Endrin ketone				
Heptachlor				
Heptachlor epoxide				
Methoxychlor				
Toxaphene				
alpha - BHC				
beta - BHC				
delta - BHC				
gamma - BHC (Lindane)				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #1

This PMU contains sources which influence Pipe Creek. The PMU is primarily bordered to the east by Ransom Road, to the west and south by Patrol Road and to the north by Maintenance Road.

Surface Soil Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK01SS01	MK01SS02	MK01SS03	MK01SS04	MK01SS05	MK01SS06	MK01SS07
2-Nitrotoluene	64 U	64 U	71 U	67 U	81 U	65 U	63 U
2,4-Dinitrotoluene	57 U	57 U	63 U	59 U	72 U	57 U	56 U
2,4,6-Trinitrotoluene	38 U	37 U	41 U	39 U	47 U	38 U	37 U
2,6-Dinitrotoluene	57 U	57 U	63 U	59 U	72 U	57 U	56 U
3-Nitrotoluene	86 U	86 U	95 U	90 U	110 U	87 U	84 U
4-Nitrotoluene	80 U	80 U	88 U	84 U	100 U	81 U	78 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	66 U	65 U	72 U	68 U	82 U	66 U	64 U
m-Dinitrobenzene	32 U	31 U	35 U	33 U	40 U	32 U	31 U
Methyl-2,4,6-trinitrophenylnitramine	45 U	44 U	49 U	47 U	56 U	45 U	44 U
Nitrobenzene	41 U	41 U	45 U	43 U	52 U	42 U	40 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	34 U	34 U	37 U	35 U	43 U	34 U	33 U
sym-Trinitrobenzene	47 U	47 U	52 U	49 U	59 U	48 U	46 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #2

Surface Water Samples

Nitroexplosives Analysis

Parameter	Sample Number (Units - ug/l) MK02SW07	MK02SW08	MK02SW09	MK02SW10
2-Nitrotoluene	53 U	53 U	53 U	53 U
2,4-Dinitrotoluene	47 U	47 U	47 U	47 U
2,4,6-Trinitrotoluene	31 U	31 U	31 U	31 U
2,6-Dinitrotoluene	47 U	47 U	47 U	47 U
3-Nitrotoluene	71 U	71 U	71 U	71 U
4-Nitrotoluene	66 U	66 U	66 U	66 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	54 U	54 U	54 U	54 U
m-Dinitrobenzene	26 U	26 U	26 U	26 U
Methyl-2,4,6-trinitrophenylnitramine	37 U	37 U	37 U	37 U
Nitrobenzene	34 U	34 U	34 U	34 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	28 U	28 U	28 U	28 U
sym-Trinitrobenzene	39 U	39 U	39 U	39 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Sediment Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK02SD07	MK02SD08	MK02SD09	MK02SD10
2-Nitrotoluene	160 U	74 U	120 U	84 U
2,4-Dinitrotoluene	140 U	65 U	100 U	75 U
2,4,6-Trinitrotoluene	25000	43 U	67 U	49 U
2,6-Dinitrotoluene	140 U	65 U	100 U	75 U
3-Nitrotoluene	210 U	99 U	150 U	110 U
4-Nitrotoluene	190 U	92 U	140 U	100 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	160 U	75 U	120 U	86 U
m-Dinitrobenzene	76 U	36 U	56 U	41 U
Methyl-2,4,6-trinitrophenylnitramine	110 U	51 U	80 U	59 U
Nitrobenzene	100 U	47 U	74 U	54 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	82 U	39 U	61 U	44 U
sym-Trinitrobenzene	110 U	54 U	85 U	62 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Soil Boring Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK02SB08	MK02SB09	MK02SB10	MK02SB11
2-Nitrotoluene	64 U	68 U	64 U	64 U
2,4-Dinitrotoluene	57 U	60 U	57 U	57 U
2,4,6-Trinitrotoluene	37 U	12000	38 U	38 U
2,6-Dinitrotoluene	57 U	60	57 U	57 U
3-Nitrotoluene	86 U	90 U	86 U	86 U
4-Nitrotoluene	80 U	84 U	80 U	80 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	65 U	69 U	66 U	66 U
m-Dinitrobenzene	31 U	33 U	32 U	32 U
Methyl-2,4,6-trinitrophenylnitramine	44 U	47 U	45 U	45 U
Nitrobenzene	41 U	43 U	41 U	41 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	34 U	36 U	34 U	34 U
sym-Trinitrobenzene	47 U	50 U	47 U	47 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Monitoring Well Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/l] MK02MW16	MK02MW17	MK02MW18	MK02MW19
2-Nitrotoluene	53 UJ	53 U	Unable to	53 U
2,4-Dinitrotoluene	47 UJ	47 U	install well.	47 U
2,4,6-Trinitrotoluene	31 UJ	31 U	No sample	31 U
2,6-Dinitrotoluene	47 UJ	47 U	taken.	47 U
3-Nitrotoluene	71 UJ	71 U		71 U
4-Nitrotoluene	66 UJ	66 U		66 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	54 UJ	54 U		54 U
m-Dinitrobenzene	26 UJ	26 U		26 U
Methyl-2,4,6-trinitrophenylnitramine	37 UJ	37 U		37 U
Nitrobenzene	34 UJ	34 U		34 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	28 UJ	28 U		28 U
sym-Trinitrobenzene	39 UJ	39 U		39 U

PMU #2

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered to the east by Pentolite Road and passing through the intersection of Fox and Taylor Roads, to the west by Ransom Road, and to the north and south by Patrol Rd.

Surface Soil Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK02SS13	MK02SS14	MK02SS15	MK02SS16	MK02SS34	MK02SS35	MK02SS36
Aluminum - Soluble							
Antimony - Soluble				Not Applicable.			
Arsenic - Soluble							
Barium - Soluble							
Beryllium - Soluble							
Cadmium - Soluble							
Calcium - Soluble							
Chromium - Soluble							
Cobalt - Soluble							
Copper - Soluble							
Iron - Soluble							
Lead - Soluble							
Magnesium - Soluble							
Manganese - Soluble							
Mercury - Soluble							
Nickel - Soluble							
Potassium - Soluble							
Selenium - Soluble							
Silver - Soluble							
Sodium - Soluble							
Thallium - Soluble							
Vanadium - Soluble							
Zinc - Soluble							

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Surface Water Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/l] MK02SW07	MK02SW08	MK02SW09	MK02SW10
Aluminum - Soluble	200 U	200 U	200 U	200 U
Antimony - Soluble	5.0 U	5.0 U	5.0 U	5.0 U
Arsenic - Soluble	3.0 U	3.0 U	3.0 U	3.0 U
Barium - Soluble	38.7 B	68.2 B	61.1 B	31.1 B
Beryllium - Soluble	3.0 U	3.0 U	3.0 U	3.0 U
Cadmium - Soluble	0.20 U	0.20 U	0.20 U	0.20 U
Calcium - Soluble	93600	76900	46100 B	53700
Chromium - Soluble	10.0 U	10.0 U	10.0 U	10.0 U
Cobalt - Soluble	20.0 U	20.0 U	20.0 U	20.0 U
Copper - Soluble	5.0 U	5.0 U	5.0 U	5.0 U
Iron - Soluble	70.0 U	80.0 B	360	120
Lead - Soluble	2.0 U	2.0 U	2.0 U	2.0 U
Magnesium - Soluble	26400	26700	14000	20700
Manganese - Soluble	1860	2020	3600	1130
Mercury - Soluble	0.20 U	0.20 U	0.20 U	0.20 U
Nickel - Soluble	30.0 U	30.0 U	41.8	30.0 U
Potassium - Soluble	3410 B	8110	3950 B	3510 B
Selenium - Soluble	3.0 U	3.0 U	3.0 U	3.0 U
Silver - Soluble	10.0 U	10.0 U	10.0 U	10.0 U
Sodium - Soluble	16900	14800	14100	10100
Thallium - Soluble	4.0 U	4.0 U	4.0 U	4.0 U
Vanadium - Soluble	20.0 U	20.0 U	20.0 U	20.0 U
Zinc - Soluble	10.0 U	10.0 U	10.0 U	10.0 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Sediment Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK02SD07	MK02SD08	MK02SD09	MK02SD10
Aluminum - Soluble	Not Applicable.			
Antimony - Soluble				
Arsenic - Soluble				
Barium - Soluble				
Beryllium - Soluble				
Cadmium - Soluble				
Calcium - Soluble				
Chromium - Soluble				
Cobalt - Soluble				
Copper - Soluble				
Iron - Soluble				
Lead - Soluble				
Magnesium - Soluble				
Manganese - Soluble				
Mercury - Soluble				
Nickel - Soluble				
Potassium - Soluble				
Selenium - Soluble				
Silver - Soluble				
Sodium - Soluble				
Thallium - Soluble				
Vanadium - Soluble				
Zinc - Soluble				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Soil Boring Samples Not Applicable

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK02SB08	MK02SB09	MK02SB10	MK02SB11
Aluminum - Soluble	Not Applicable.			
Antimony - Soluble				
Arsenic - Soluble				
Barium - Soluble				
Beryllium - Soluble				
Cadmium - Soluble				
Calcium - Soluble				
Chromium - Soluble				
Cobalt - Soluble				
Copper - Soluble				
Iron - Soluble				
Lead - Soluble				
Magnesium - Soluble				
Manganese - Soluble				
Mercury - Soluble				
Nickel - Soluble				
Potassium - Soluble				
Selenium - Soluble				
Silver - Soluble				
Sodium - Soluble				
Thallium - Soluble				
Vanadium - Soluble				
Zinc - Soluble				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #2

Monitoring Well Samples

Soluble Metals Analysis

Sample Number (Units - ug/l)

Parameter	MK02MW16	MK02MW17	MK02MW18	MK02MW19
Aluminum - Soluble	2450	70.0 U	Unable to	230
Antimony - Soluble	5.0 U	5.0 UN	install well.	5.0 UN
Arsenic - Soluble	4.0 B	4.0 U	No sample	4.0 U
Barium - Soluble	83.4 B	32.6 B	taken.	71.3 B
Beryllium - Soluble	3.0 U	3.0 U		3.0 U
Cadmium - Soluble	0.20 U	0.20 UN		0.20 UN
Calcium - Soluble	118000 B	125000 N		147000 N
Chromium - Soluble	10.0 U	10.0 U		10.0 U
Cobalt - Soluble	20.0 U	21.6 B		20.0 U
Copper - Soluble	5.0 U	9.2 B		6.9 B
Iron - Soluble	774	19500		174
Lead - Soluble	2.0 U	2.0 U		2.0 U
Magnesium - Soluble	49800	27600		38500
Manganese - Soluble	2440	1180 N		128 N
Mercury - Soluble	0.20 U	0.20 U		0.20 U
Nickel - Soluble	98.0	71.7		30.0 U
Potassium - Soluble	14200	4700 B		1720 B
Selenium - Soluble	3.0 U	3.0 UN		3.0 UN
Silver - Soluble	10.0 U	0.20 U		0.20 U
Sodium - Soluble	9590	9100		13100
Thallium - Soluble	4.0 U	4.0 U		4.0 U
Vanadium - Soluble	20.0 U	20.0 U		20.0 U
Zinc - Soluble	10.0 U	10.0 U		10.0 U

PMU #2

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered to the east by Pentolite Road and passing through the intersection of Fox and Taylor Roads, to the west by Ransom Road, and to the north and south by Patrol Rd.

Surface Soil Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK02SS13	MK02SS14	MK02SS15	MK02SS16	MK02SS34	MK02SS35	MK02SS36
Aluminum - Total	2530	6100	5460	5510	1450	233	3800
Antimony - Total	0.56 U	0.58 U	0.60 U	0.58 U	0.56 UN	0.62 UN	0.61 UN
Arsenic - Total 7 J	39.4 –	3.1	21.7	19.7	4.4	0.87 B	4.4
Barium - Total	90.4	22.6 B	23.3 B	40.4	37.7	44.00	91.3
Beryllium - Total	0.72	0.35 U	0.36 U	0.35 U	0.33 U	0.37 U	0.37 U
Cadmium - Total	0.05 B	0.07 B	0.13 B	0.17 B	0.02 BN	0.02 UN	0.04 BN
Calcium - Total	4130 B	898	2650 B	2190 B	841	687	3180 B
Chromium - Total >20	10.4	8.6	9.9	10.0	2.1	1.2 U	8.0
Cobalt - Total	5.1 B	3.6 B	5.4 B	4.0 B	2.2 U	2.5 U	2.5 U
Copper - Total	44.7	4.5	6.9	8.8	0.56 U	0.62 U	0.61 U
Iron - Total	38700	9450	13400	11300	4380	1060	10800
Lead - Total >~~2~~ 40-50	29.3	7.6	10.7	10.0	21.4	10.3	12.0
Magnesium - Total	2020	1030	1200	1320	164 B	37.1 U	742
Manganese - Total	202	70.3	415	241	10.5 N	4.2 N	42.1 N
Mercury - Total	0.12	0.02	0.02	0.03	0.02 U	0.02 U	0.05
Nickel - Total	31.2	8.4	12.4	9.6	3.3 U	3.7 U	4.5 B
Potassium - Total	2780	371 B	448 B	686	461 B	132 B	582 B
Selenium - Total	0.34 U	0.35 U	0.36 U	0.35 U	0.34 UN	0.37 UN	0.37 UN
Silver - Total	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	0.02 U
Sodium - Total	177 B	171 B	160 B	160 B	149 B	118 B	199 B
Thallium - Total	0.45 U	0.46 U	0.48 U	0.46 U	0.45 U	0.5 U	0.49 U
Vanadium - Total	22.3 U	16.4	22.3	19.1	6.6	2.5 U	15.1
Zinc - Total	32.3	21.2	24.6	35.7	6.6	1.2 U	14.5

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Surface Water Samples

Total Metals Analysis

Parameter	Sample Number [Units - ug/l] MK02SW07	MK02SW08	MK02SW09	MK02SW10
Aluminum - Total	891	2000	7510	387
Antimony - Total	5.0 U	5.0 U	5.0 U	5.0 U
Arsenic - Total	21.0	8.0 B	8.0 B	9.0 B
Barium - Total	74.2 B	99.4 B	124 B	35.5 B
Beryllium - Total	3.0 U	3.0 U	3.0 U	3.0 U
Cadmium - Total	0.20 U	0.20 U	0.30 B	0.20 U
Calcium - Total	95700	8400 B	61900	60800
Chromium - Total	10.0 U	10.0 U	10.3	10.0 U
Cobalt - Total	20.0 U	20.0 U	20.0 U	20.0 U
Copper - Total	10.5 B	5.0 U	8.6 B	5.0 U
Iron - Total	48400	3920	19500	1470
Lead - Total	4.0	2.0 U	64.0	2.0 U
Magnesium - Total	25500	26000	18000	19400
Manganese - Total	1930	1960	4260	1220
Mercury - Total	0.20 U	0.20 U	0.20 U	0.20 U
Nickel - Total	32.2 B	36.9 B	89.3	30.0 U
Potassium - Total	3450 B	8150	5240	3370 B
Selenium - Total	3.0 U	3.0 U	3.0 U	3.0 U
Silver - Total	0.40 U	0.40 U	0.40 U	0.40 U
Sodium - Total	16900	14600	14100	9970
Thallium - Total	4.0 U	4.0 U	4.0 U	4.0 U
Vanadium - Total	20.0 U	20.0 U	20.0 U	20.0 U
Zinc - Total	34.5	21.2	89.8	18.7 B

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Sediment Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK02SD07	MK02SD08	MK02SD09	MK02SD10
Aluminum - Total	9220 *	8650	8220	9540
Antimony - Total	1.5 UN	0.69 U	1.4 U	0.89 U
Arsenic - Total	29.3 N*	12.6	8.0	7.3
Barium - Total	56.5 B	285	102	69.5
Beryllium - Total	0.87 U	0.84	0.86 U	0.51 U
Cadmium - Total	0.50 BN	0.96 B	0.37 B	0.16 B
Calcium - Total	5740 B	11200	114000 B	54600 B
Chromium - Total	13.6	18.1	20.9	18.6
Cobalt - Total	54.2	47.1	25.9	12.9
Copper - Total	46.0	23.6	28.1	28.9
Iron - Total	59500	44700	25300	26600
Lead - Total	27.5	24.7	83.0	16.1
Magnesium - Total	2340 *	4330	11300	8470
Manganese - Total	165 *	3450	1790	463
Mercury - Total	0.05 U	0.03	0.06 U	0.03 U
Nickel - Total	110	136	75.5	39.7
Potassium - Total	1680	2420	3390	2740
Selenium - Total	0.88 U	0.41 U	0.86 U	0.53 U
Silver - Total	2.9 U	0.05 U	0.11 U	0.07 U
Sodium - Total	335 B	237 B	472 B	295 B
Thallium - Total	1.2 U	0.55 U	1.1 U	0.71 U
Vanadium - Total	25.1 *	31.8 B	30.5	24.8
Zinc - Total	188 *	174	212	104

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Soil Boring Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK02SB08	MK02SB09	MK02SB10	MK02SB11
Aluminum - Total	4720	4240	4870	5790
Antimony - Total	0.60 U	0.62 BN	0.6 UN	0.57 UN
Arsenic - Total	25.4	14.6 N	2.0 N	6.3 N
Barium - Total	26.1	47.8	19.3 B	22.4
Beryllium - Total	0.36 U	0.37 U	0.36 U	0.34 U
Cadmium - Total	0.06 B	0.25 BN	0.07 BN	0.14 BN
Calcium - Total	673	2730 B	2920 B	2890 B
Chromium - Total	7.5	7.8	8.50	10.10
Cobalt - Total	7.8	7.7	3.70 B	6.80
Copper - Total	41.2	32.1	0.59 U	0.56 U
Iron - Total	19500	19700	8,070.00	12,300.00
Lead - Total	2.4	25.9 N	3.70 N	35.40 N
Magnesium - Total	1430	757 *	976.00 *	1,280.00 *
Manganese - Total	176	44.3	65.40	190.00
Mercury - Total	0.04	0.03	0.04	0.02 U
Nickel - Total	18.60	19.90	6.10	11.80
Potassium - Total	1,880.00	821.00	258.00 B	681.00
Selenium - Total	0.36 U	0.37 U	0.36 U	0.34 U
Silver - Total	0.05 U	0.06 B	0.13 B	0.02 U
Sodium - Total	158.00 B	145.00 B	149.00 B	154.00 B
Thallium - Total	0.48 U	0.49 U	0.48 U	0.46 U
Vanadium - Total	10.50	15.10 *	16.10 *	20.00 *
Zinc - Total	70.50	29.80 *	18.80 *	34.60 *

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #2

W.O. #4065-6128-004

Monitoring Well Samples

Total Metals Analysis

Parameter	Sample Number [Units - ug/l] MK02MW16	MK02MW17	MK02MW18	MK02MW19
Aluminum - Total	15200 *	116000	Unable to	63300
Antimony - Total	5.0 U	5.0 UN	install well.	5.0 UN
Arsenic - Total	40.0 N	124	No sample	54.0
Barium - Total	206	1480	taken.	518
Beryllium - Total	3.0 U	9.0		3.0 U
Cadmium - Total	0.60 BN	2.0 BN		1.5 BN
Calcium - Total	135000 BN	163000 N		627000 N
Chromium - Total	24.6	159		103
Cobalt - Total	64.3	207		66.1
Copper - Total	121	659		112
Iron - Total	53700 *	361000		148000
Lead - Total	42.0 N	340		160
Magnesium - Total	55800	49700		179000
Manganese - Total	2770 *	2510 N		3080 N
Mercury - Total	0.20 U	0.25		0.20 U
Nickel - Total	209	542		210
Potassium - Total	18100	19400		12300
Selenium - Total	3.0 U	3.0 BN		3.0 UN
Silver - Total	10.0 UN	0.20 U		0.20 U
Sodium - Total	10300	10800		15700
Thallium - Total	4.0 U	4.0 U		4.0 U
Vanadium - Total	37.0 B	294 B		140
Zinc - Total	191	852		473

PMU #3

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered on the east by a "zig-zag" of roads including Pentolite, Fox and Taylor Roads, on the west by Ransom Road and on the south and north by Patrol Road.

Surface Soil Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK03SS17	MK03SS18	MK03SS19	MK03SS20
1,1-Dichloroethane	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.
1,1-Dichloroethene				
1,1,1-Trichloroethane				
1,1,2-Trichloroethane				
1,1,2,2-Tetrachloroethane				
1,2-Dichloroethane				
1,2-Dichloroethene (Total)				
1,2-Dichloropropane				
2-Butanone				
2-Hexanone				
4-Methyl-2-pentanone				
Acetone				
Benzene				
Bromodichloromethane				
Bromoform				
Bromomethane				
Carbon Disulfide				
Carbon Tetrachloride				
Chlorobenzene				
Chloroethane				
Chloroform				
Chloromethane				
cis-1,3-Dichloropropene				
Dibromochloromethane				
Ethyl benzene				
Methylene chloride				
Styrene				
Tetrachloroethene				
Toluene				
Total Xylenes				
trans-1,3-Dichloropropene				
Trichloroethene				
Vinyl acetate				
Vinyl chloride				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Surface Water Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK03SW11	MK03SW12	MK03SW13	MK03SW14	MK03SW15	MK03SW22
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (Total)	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	5 U
Ethyl benzene	5 U	5 U	5 U	5 U	5 U	5 U
Methylene chloride	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U	5 U	5 U
Total Xylenes	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl acetate	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U	10 U	10 U	10 U

Sediment Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK03SD11	MK03SD12	MK03SD13	MK03SD14	MK03SD15	MK03SD22
1,1-Dichloroethane	11 U	6 U	6 U	7 U	12 U	10 U
1,1-Dichloroethene	11 U	6 U	6 U	7 U	12 U	50 U
1,1,1-Trichloroethane	11 U	6 U	6 U	7 U	12 U	10 U
1,1,2-Trichloroethane	11 U	6 U	6 U	7 U	12 U	10 U
1,1,2,2-Tetrachloroethane	11 U	6 U	6 U	7 U	12 U	10 U
1,2-Dichloroethane	11 U	6 U	6 U	7 U	12 U	10 U
1,2-Dichloroethene (Total)	11 U	6 U	6 U	7 U	12 U	10 U
1,2-Dichloropropane	11 U	6 U	6 U	7 U	12 U	10 U
2-Butanone	21 U	13 U	12 U	2 J	23 U	10 U
2-Hexanone	21 U	13 U	12 U	14 U	23 U	10 U
4-Methyl-2-pentanone	21 U	13 U	12 U	14 U	23 U	10 U
Acetone	28	13 U	12 U	17	66	10 U
Benzene	11 U	6 U	6 U	7 U	12 U	10 U
Bromodichloromethane	11 U	6 U	6 U	7 U	12 U	50 U
Bromoform	11 U	6 U	6 U	7 U	12 U	10 U
Bromomethane	21 U	13 U	12 U	14 U	23 U	10 U
Carbon Disulfide	11 U	2 J	6 U	7 U	12 U	10 U
Carbon Tetrachloride	11 U	6 U	6 U	7 U	12 U	50 U
Chlorobenzene	11 U	6 U	6 U	7 U	12 U	50 U
Chloroethane	21 U	13 U	12 U	14 U	23 U	10 U
Chloroform	11 U	6 U	6 U	7 U	2 J	50 U
Chloromethane	21 U	13 U	12 U	14 U	23 U	20 U
cis-1,3-Dichloropropene	11 U	6 U	6 U	7 U	12 U	10 U
Dibromochloromethane	11 U	6 U	6 U	7 U	12 U	10 U
Ethyl benzene	11 U	6 U	6 U	7 U	12 U	10 U
Methylene chloride	11 U	6 U	6 U	7 U	12 U	10 U
Styrene	11 U	6 U	6 U	7 U	12 U	10 U
Tetrachloroethene	11 U	6 U	6 U	7 U	12 U	50 U
Toluene	3 J	9	2 J	2 J	12 U	50 U
Total Xylenes	11 U	6 U	6 U	7 U	12 U	50 U
trans-1,3-Dichloropropene	11 U	6 U	6 U	7 U	12 U	10 U
Trichloroethene	11 U	6 U	6 U	7 U	12 U	10 U
Vinyl acetate	21 U	13 U	12 U	14 U	23 U	10 U
Vinyl chloride	21 U	13 U	12 U	14 U	23 U	50 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #3

Soil Boring Samples

Volatile Organic Analysis

Parameter	Sample Number (Units - ug/kg) MK03SB12	MK03SB13
1,1-Dichloroethane	6 U	6 U
1,1-Dichloroethene	6 U	6 U
1,1,1-Trichloroethane	6 U	6 U
1,1,2-Trichloroethane	6 U	6 U
1,1,2,2-Tetrachloroethane	6 U	6 U
1,2-Dichloroethane	6 U	6 U
1,2-Dichloroethene (Total)	6 U	6 U
1,2-Dichloropropane	6 U	6 U
2-Butanone	11 U	12 U
2-Hexanone	11 U	12 U
4-Methyl-2-pentanone	11 U	12 U
Acetone	11 U	36 J
Benzene	6 U	6 U
Bromodichloromethane	6 U	6 U
Bromoform	6 U	6 U
Bromomethane	11 U	12 U
Carbon Disulfide	6 U	6 U
Carbon Tetrachloride	6 U	6 U
Chlorobenzene	6 U	6 U
Chloroethane	11 U	12 U
Chloroform	6 U	6 U
Chloromethane	11 U	12 U
cis-1,3-Dichloropropene	6 U	6 U
Dibromochloromethane	6 U	6 U
Ethyl benzene	6 U	6 U
Methylene chloride	6 U	6 U
Styrene	6 U	6 U
Tetrachloroethene	6 U	6 U
Toluene	6 U	4 J
Total Xylenes	6 U	6 U
trans-1,3-Dichloropropene	6 U	6 U
Trichloroethene	6 U	6 U
Vinyl acetate	11 U	12 U
Vinyl chloride	11 U	12 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Monitoring Well Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK03MW20	MK03MW20DL	MK03MW21
1,1-Dichloroethane	5 UJ	1000 U	Well not
1,1-Dichloroethene	5 UJ	1000 U	installed.
1,1,1-Trichloroethane	5 UJ	1000 U	No sample
1,1,2-Trichloroethane	5 UJ	1000 U	taken.
1,1,2,2-Tetrachloroethane	5 UJ	1000 U	
1,2-Dichloroethane	5 UJ	1000 U	
1,2-Dichloroethene (Total)	5 UJ	1000 U	
1,2-Dichloropropane	5 UJ	1000 U	
2-Butanone	33 J	2000 U	
2-Hexanone	10 UJ	2000 U	
4-Methyl-2-pentanone	10 UJ	2000 U	
Acetone	110 J	2000 U	
Benzene	10 J	1000 U	
Bromodichloromethane	5 UJ	1000 U	
Bromoform	5 UJ	1000 U	
Bromomethane	10 UJ	2000 U	
Carbon Disulfide	5 UJ	1000 U	
Carbon Tetrachloride	5 UJ	1000 U	
Chlorobenzene	5 UJ	1000 U	
Chloroethane	10 UJ	2000 U	
Chloroform	5 UJ	1000 U	
Chloromethane	10 UJ	2000 U	
cis-1,3-Dichloropropene	5 UJ	1000 U	
Dibromochloromethane	5 UJ	1000 U	
Ethyl benzene	5 UJ	1000 U	
Methylene chloride	5 UJ	1000 U	
Styrene	5 UJ	1000 U	
Tetrachloroethene	5 UJ	1000 U	
Toluene	3700 EJ	36000 D	
Total Xylenes	8 J	1000 U	
trans-1,3-Dichloropropene	5 UJ	1000 U	
Trichloroethene	5 UJ	1000 U	
Vinyl acetate	10 UJ	2000 U	
Vinyl chloride	10 UJ	2000 U	

PMU #3

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered on the east by a "zig-zag" of roads including Pentolite, Fox and Taylor Roads, on the west by Ransom Road and on the south and north by Patrol Road.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK03SS17	MK03SS18	MK03SS19	MK03SS20
1,2-Dichlorobenzene	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.
1,2,4-Trichlorobenzene				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
2-Chloronaphthalene				
2-Chlorophenol				
2-Methylnaphthalene				
2-Methylphenol				
2-Nitroaniline				
2-Nitrophenol				
2,4-Dichlorophenol				
2,4-Dimethylphenol				
2,4-Dinitrophenol				
2,4-Dinitrotoluene				
2,4,5-Trichlorophenol				
2,4,6-Trichlorophenol				
2,6-Dinitrotoluene				
3-Nitroaniline				
3,3'-Dichlorobenzidine				
4-Bromophenyl phenyl ether				
4-Chloro-3-methylphenol				
4-Chloroaniline				
4-Chlorodiphenylether				
4-Methylphenol				
4-Nitroaniline				
4-Nitrophenol				
4,6-Dinitro-2-methylphenol				
Acenaphthene				
Acenaphthylene				
Anthracene				
Benzoic acid				
Benzo(a)anthracene				
Benzo(a)pyrene				
Benzo(b)fluoranthene				
Benzo(ghi)perylene				

PMU #3

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered on the east by a "zig-zag" of roads including Pentolite, Fox and Taylor Roads, on the west by Ransom Road and on the south and north by Patrol Road.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK03SS17	MK03SS18	MK03SS19	MK03SS20
Benzo(k)fluoranthene	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.
Benzyl alcohol				
Bis(2-chloroethoxy) methane				
Bis(2-chloroethyl) ether				
Bis(2-chloroisopropyl) ether				
Bis(2-ethylhexyl) phthalate				
Butyl benzyl phthalate				
Chrysene				
Dibenzofuran				
Dibenzo(a,h)anthracene				
Diethyl phthalate				
Dimethyl phthalate				
Di-n-butyl phthalate				
Di-n-octyl phthalate				
Fluoranthene				
Fluorene				
Hexachlorobenzene				
Hexachlorobutadiene				
Hexachlorocyclopentadiene				
Hexachloroethane				
Indeno(1,2,3-cd)pyrene				
Isophorone				
Naphthalene				
Nitrobenzene				
N-Nitroso-Di-n-propylamine				
N-nitrosodiphenylamine				
Pentachlorophenol				
Phenanthrene				
Phenol				
Pyrene				

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK03SW11	MK03SW12	MK03SW13	MK03SW14	MK03SW15	MK03SW22
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	52 U	50 U	50 U	50 U	50 U	50 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	52 U	50 U	50 U	50 U	50 U	50 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	52 U	50 U	50 U	50 U	50 U	50 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	52 U	50 U	50 U	50 U	50 U	50 U
3,3'-Dichlorobenzidine	21 U	20 U	20 U	20 U	20 U	20 U
4-Bromophenyl phenyl ether	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorodiphenylether	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	52 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	52 U	50 U	50 U	50 U	50 U	50 U
4,6-Dinitro-2-methylphenol	52 U	50 U	50 U	50 U	50 U	50 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic acid	52 U	50 U	50 U	50 U	50 U	50 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(ghi)perylene	10 U	10 U	10 U	10 U	10 U	10 UJ

PMU #3

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK03SW11	MK03SW12	MK03SW13	MK03SW14	MK03SW15	MK03SW22
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl alcohol	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroethoxy) methane	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroethyl) ether	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-chloroisopropyl) ether	10 U	10 U	10 U	10 U	10 U	10 U
Bis(2-ethylhexyl) phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Butyl benzyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U	10 U	10 U	10 U
Diethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-octyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-propylamine	10 U	10 U	10 U	10 U	10 U	10 U
N-nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	52 U	50 U	50 U	50 U	50 U	50 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U
Phenol	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Sediment Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK03SD07	MK03SD11	MK03SD12	MK03SD13	MK03SD14	MK03SD15	MK03SD22
1,2-Dichlorobenzene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
1,2,4-Trichlorobenzene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
1,3-Dichlorobenzene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
1,4-Dichlorobenzene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
2-Chloronaphthalene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
2-Chlorophenol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
2-Methylnaphthalene	60 J	110 J	39 J	400 U	430 U	810 U	370 U
2-Methylphenol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
2-Nitroaniline	4600 U	3500 U	2200 U	1900 U	2100 U	3900 U	1800 U
2-Nitrophenol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
2,4-Dichlorophenol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
2,4-Dimethylphenol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
2,4-Dinitrophenol	4600 U	3500 U	2200 U	1900 U	2100 U	3900 U	1800 U
2,4-Dinitrotoluene	200 J	710 U	440 U	140 J	430 U	810 U	370 U
2,4,5-Trichlorophenol	4600 U	3500 U	2200 U	1900 U	2100 U	3900 U	1800 U
2,4,6-Trichlorophenol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
2,6-Dinitrotoluene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
3-Nitroaniline	4600 U	3500 U	2200 U	1900 U	2100 U	3900 U	1800 U
3,3'-Dichlorobenzidine	1900 U	1400 U	890 U	800 U	860 U	1600 U	750 U
4-Bromophenyl phenyl ether	950 U	710 U	440 U	400 U	430 U	810 U	370 U
4-Chloro-3-methylphenol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
4-Chloroaniline	950 U	710 U	440 U	400 U	430 U	810 U	370 U
4-Chlorodiphenylether	950 U	710 U	440 U	400 U	430 U	810 U	370 U
4-Methylphenol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
4-Nitroaniline	4600 U	3500 U	2200 U	1900 U	2100 U	3900 U	1800 U
4-Nitrophenol	4600 U	3500 U	2200 U	1900 U	2100 U	3900 U	1800 U
4,6-Dinitro-2-methylphenol	4600 U	3500 U	2200 U	1900 U	2100 U	3900 U	1800 U
Acenaphthene	950 U	710 U	26 J	400 U	430 U	810 U	370 U
Acenaphthylene	950 U	710 U	140 J	110 J	430 U	810 U	370 U
Anthracene	950 U	710 U	270 J	110 J	430 U	810 U	17 J
Benzoic acid	4600 UJ	3500 U	2200 U	1900 U	2100 U	3900 U	1800 U
Benzo(a)anthracene	950 U	710 U	960	730	430 U	810 U	67 J
Benzo(a)pyrene	100 J	710 U	660	560	430 U	810 U	54 J
Benzo(b)fluoranthene	260 J	710 U	1100	880	430 U	810 U	65 J
Benzo(ghi)perylene	87 J	710 U	160 J	130 J	430 U	810 U	37 J

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #3

Sediment Samples

SemiVolatile Organic Analysis

Parameter	Sample Number MK02SD07	Sample Number MK03SD11	[Units - ug/kg] MK03SD12	MK03SD13	MK03SD14	MK03SD15	MK03SD22
Benzo(k)fluoranthene	950 U	710 U	420 J	370 J	430 U	810 U	26 J
Benzyl alcohol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Bis(2-chloroethoxy) methane	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Bis(2-chloroethyl) ether	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Bis(2-chloroisopropyl) ether	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Bis(2-ethylhexyl) phthalate	3800 U	460 J	130 J	400 U	570	810 U	180 J
Butyl benzyl phthalate	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Chrysene	150 J	710 U	730	530	430 U	810 U	70 J
Dibenzofuran	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Dibenzo(a,h)anthracene	950 U	710 U	46 J	44 J	430 U	810 U	370 U
Diethyl phthalate	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Dimethyl phthalate	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Di-n-butyl phthalate	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Di-n-octyl phthalate	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Fluoranthene	240 J	710 U	1900	970	430 U	810 U	82 J
Fluorene	950 U	710 U	110 J	400 U	430 U	810 U	370 U
Hexachlorobenzene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Hexachlorobutadiene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Hexachlorocyclopentadiene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Hexachloroethane	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Indeno(1,2,3-cd)pyrene	950 U	710 U	210 J	180 J	430 U	810 U	370 U
Isophorone	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Naphthalene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Nitrobenzene	950 U	710 U	440 U	400 U	430 U	810 U	370 U
N-Nitroso-Di-n-propylamine	950 U	710 U	440 U	400 U	430 U	810 U	370 U
N-nitrosodiphenylamine	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Pentachlorophenol	4600 U	3500 U	2200 U	1900 U	2100 U	3900 U	1800 U
Phenanthrene	140 J	67 J	850	200 J	430 U	810 U	64 J
Phenol	950 U	710 U	440 U	400 U	430 U	810 U	370 U
Pyrene	200 J	710 U	1500	1100	430 U	810 U	98 J

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Soil Boring Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK03SB12	MK03SB13
1,2-Dichlorobenzene	380 U	400 U
1,2,4-Trichlorobenzene	380 U	400 U
1,3-Dichlorobenzene	380 U	400 U
1,4-Dichlorobenzene	380 U	400 U
2-Chloronaphthalene	380 U	400 U
2-Chlorophenol	380 U	400 U
2-Methylnaphthalene	380 U	400 U
2-Methylphenol	380 U	400 U
2-Nitroaniline	1800 U	2000 U
2-Nitrophenol	380 U	400 U
2,4-Dichlorophenol	380 U	400 U
2,4-Dimethylphenol	380 U	400 U
2,4-Dinitrophenol	1800 U	2000 U
2,4-Dinitrotoluene	380 U	400 U
2,4,5-Trichlorophenol	1800 U	2000 U
2,4,6-Trichlorophenol	380 U	400 U
2,6-Dinitrotoluene	380 U	400 U
3-Nitroaniline	1800 U	2000 U
3,3'-Dichlorobenzidine	760 U	810 U
4-Bromophenyl phenyl ether	380 U	400 U
4-Chloro-3-methylphenol	380 U	400 U
4-Chloroaniline	380 U	400 U
4-Chlorodiphenylether	380 U	400 U
4-Methylphenol	380 U	400 U
4-Nitroaniline	1800 U	2000 U
4-Nitrophenol	1800 U	2000 U
4,6-Dinitro-2-methylphenol	1800 U	2000 U
Acenaphthene	380 U	400 U
Acenaphthylene	380 U	400 U
Anthracene	380 U	24 J
Benzoic acid	1800 U	2000 U
Benzo(a)anthracene	380 U	92 J
Benzo(a)pyrene	380 U	60 J
Benzo(b)fluoranthene	380 U	86 J
Benzo(ghi)perylene	380 U	32 J

PMU #3

Soil Boring Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK03SB12	MK03SB13
Benzo(k)fluoranthene	380 U	39 J
Benzyl alcohol	380 U	400 U
Bis(2-chloroethoxy) methane	380 U	400 U
Bis(2-chloroethyl) ether	380 U	400 U
Bis(2-chloroisopropyl) ether	380 U	400 U
Bis(2-ethylhexyl) phthalate	380 U	83 J
Butyl benzyl phthalate	380 U	400 U
Chrysene	380 U	76 J
Dibenzofuran	380 U	400 U
Dibenzo(a,h)anthracene	380 U	400 U
Diethyl phthalate	380 U	400 U
Dimethyl phthalate	380 U	400 U
Di-n-butyl phthalate	380 U	400 U
Di-n-octyl phthalate	380 U	400 U
Fluoranthene	380 U	210 J
Fluorene	380 U	400 U
Hexachlorobenzene	380 U	400 U
Hexachlorobutadiene	380 U	400 U
Hexachlorocyclopentadiene	380 U	400 U
Hexachloroethane	380 U	400 U
Indeno(1,2,3-cd)pyrene	380 U	39 J
Isophorone	380 U	400 U
Naphthalene	380 U	400 U
Nitrobenzene	380 U	400 U
N-Nitroso-Di-n-propylamine	380 U	400 U
N-nitrosodiphenylamine	380 U	400 U
Pentachlorophenol	1800 U	2000 U
Phenanthrene	380 U	120 J
Phenol	380 U	400 U
Pyrene	380 U	150 J

Monitoring Well Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK03MW20	MK03MW20DL	MK03MW21
1,2-Dichlorobenzene	10 U	50 U	Unable to
1,2,4-Trichlorobenzene	10 U	50 U	install well.
1,3-Dichlorobenzene	10 U	50 U	No sample
1,4-Dichlorobenzene	10 U	50 U	taken.
2-Chloronaphthalene	10 U	50 U	
2-Chlorophenol	10 U	50 U	
2-Methylnaphthalene	10 U	50 U	
2-Methylphenol	590 E	520 D	
2-Nitroaniline	50 U	250 U	
2-Nitrophenol	10 U	50 U	
2,4-Dichlorophenol	10 U	50 U	
2,4-Dimethylphenol	10 U	50 U	
2,4-Dinitrophenol	50 U	250 U	
2,4-Dinitrotoluene	10 U	50 U	
2,4,5-Trichlorophenol	50 U	250 U	
2,4,6-Trichlorophenol	10 U	50 U	
2,6-Dinitrotoluene	10 U	50 U	
3-Nitroaniline	50 U	250 U	
3,3'-Dichlorobenzidine	20 U	100 U	
4-Bromophenyl phenyl ether	10 U	50 U	
4-Chloro-3-methylphenol	10 U	50 U	
4-Chloroaniline	10 U	50 U	
4-Chlorodiphenylether	10 U	50 U	
4-Methylphenol	200 E	190 D	
4-Nitroaniline	50 U	250 U	
4-Nitrophenol	50 U	250 U	
4,6-Dinitro-2-methylphenol	50 U	250 U	
Acenaphthene	10 U	50 U	
Acenaphthylene	10 U	50 U	
Anthracene	10 U	50 U	
Benzoic acid	13 J	13 DJ	
Benzo(a)anthracene	10 U	50 U	
Benzo(a)pyrene	10 U	50 U	
Benzo(b)fluoranthene	10 U	50 U	
Benzo(ghi)perylene	10 UJ	50 U	

PMU #3

Monitoring Well Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK03MW20	MK03MW20DL	MK03MW21
Benzo(k)fluoranthene	10 U	50 U	Unable to
Benzyl alcohol	13	50 U	install well.
Bis(2-chloroethoxy) methane	10 U	50 U	No sample
Bis(2-chloroethyl) ether	10 U	50 U	taken.
Bis(2-chloroisopropyl) ether	10 U	50 U	
Bis(2-ethylhexyl) phthalate	10 U	50 U	
Butyl benzyl phthalate	10 U	50 U	
Chrysene	10 U	50 U	
Dibenzofuran	10 U	50 U	
Dibenzo(a,h)anthracene	10 U	50 U	
Diethyl phthalate	10 U	50 U	
Dimethyl phthalate	10 U	50 U	
Di-n-butyl phthalate	10 U	50 U	
Di-n-octyl phthalate	10 U	50 U	
Fluoranthene	10 U	50 U	
Fluorene	10 U	50 U	
Hexachlorobenzene	10 U	50 U	
Hexachlorobutadiene	10 U	50 U	
Hexachlorocyclopentadiene	10 U	50 U	
Hexachloroethane	10 U	50 U	
Indeno(1,2,3-cd)pyrene	10 U	50 U	
Isophorone	10 U	50 U	
Naphthalene	10 U	50 U	
Nitrobenzene	10 U	50 U	
N-Nitroso-Di-n-propylamine	10 U	50 U	
N-nitrosodiphenylamine	10 U	50 U	
Pentachlorophenol	50 U	250 U	
Phenanthrene	10 U	50 U	
Phenol	10 U	50 U	
Pyrene	10 U	50 U	

PMU #3

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered on the east by a "zig-zag" of roads including Pentolite, Fox and Taylor Roads, on the west by Ransom Road and on the south and north by Patrol Road.

Surface Soil Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK03SS17	MK03SS18	MK03SS19	MK03SS20
4,4'-DDD	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.
4,4'-DDE				
4,4'-DDT				
Aldrin				
Aroclor 1016				
Aroclor 1221				
Aroclor 1232				
Aroclor 1242				
Aroclor 1248				
Aroclor 1254				
Aroclor 1260				
Chlordane				
Dieldrin				
Endosulfan I				
Endosulfan II				
Endosulfan Sulfate				
Endrin				
Endrin ketone				
Heptachlor				
Heptachlor epoxide				
Methoxychlor				
Toxaphene				
alpha - BHC				
beta - BHC				
delta - BHC				
gamma - BHC (Lindane)				

Surface Water Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/l] MK03SW11	MK03SW12	MK03SW13	MK03SW14	MK03SW15	MK03SW22
4,4'-DDD	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.
4,4'-DDE						
4,4'-DDT						
Aldrin						
Aroclor 1016						
Aroclor 1221						
Aroclor 1232						
Aroclor 1242						
Aroclor 1248						
Aroclor 1254						
Aroclor 1260						
Chlordane						
Dieldrin						
Endosulfan I						
Endosulfan II						
Endosulfan Sulfate						
Endrin						
Endrin ketone						
Heptachlor						
Heptachlor epoxide						
Methoxychlor						
Toxaphene						
alpha - BHC						
beta - BHC						
delta - BHC						
gamma - BHC (Lindane)						

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Sediment Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK03SD11	MK03SD12	MK03SD13	MK03SD14	MK03SD15	MK03SD22
4,4'-DDD	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.
4,4'-DDE						
4,4'-DDT						
Aldrin						
Aroclor 1016						
Aroclor 1221						
Aroclor 1232						
Aroclor 1242						
Aroclor 1248						
Aroclor 1254						
Aroclor 1260						
Chlordane						
Dieldrin						
Endosulfan I						
Endosulfan II						
Endosulfan Sulfate						
Endrin						
Endrin ketone						
Heptachlor						
Heptachlor epoxide						
Methoxychlor						
Toxaphene						
alpha - BHC						
beta - BHC						
delta - BHC						
gamma - BHC (Lindane)						

Soil Boring Samples

Pesticide/PCB Analysis

Parameter	Sample Number MK03SB12	[Units - ug/kg] MK03SB13
4,4'-DDD	No analysis conducted for this sample.	No analysis conducted for this sample.
4,4'-DDE		
4,4'-DDT		
Aldrin		
Aroclor 1016		
Aroclor 1221		
Aroclor 1232		
Aroclor 1242		
Aroclor 1248		
Aroclor 1254		
Aroclor 1260		
Chlordane		
Dieldrin		
Endosulfan I		
Endosulfan II		
Endosulfan Sulfate		
Endrin		
Endrin ketone		
Heptachlor		
Heptachlor epoxide		
Methoxychlor		
Toxaphene		
alpha - BHC		
beta - BHC		
delta - BHC		
gamma - BHC (Lindane)		

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #3

Monitoring Well Samples

Pesticide/PCB Analysis

Parameter	Sample Number MK03MW20	[Units - ug/l] MK03MW21
4,4'-DDD	No analysis conducted for this sample.	Well not installed. No sample taken.
4,4'-DDE		
4,4'-DDT		
Aldrin		
Aroclor 1016		
Aroclor 1221		
Aroclor 1232		
Aroclor 1242		
Aroclor 1248		
Aroclor 1254		
Aroclor 1260		
Chlordane		
Dieldrin		
Endosulfan I		
Endosulfan II		
Endosulfan Sulfate		
Endrin		
Endrin ketone		
Heptachlor		
Heptachlor epoxide		
Methoxychlor		
Toxaphene		
alpha - BHC		
beta - BHC		
delta - BHC		
gamma - BHC (Lindane)		

PMU #3

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered on the east by a "zig-zag" of roads including Pentolite, Fox and Taylor Roads, on the west by Ransom Road and on the south and north by Patrol Road.

Surface Soil Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK03SS17	MK03SS18	MK03SS19	MK03SS20
2-Nitrotoluene	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.
2,4-Dinitrotoluene				
2,4,6-Trinitrotoluene				
2,6-Dinitrotoluene				
3-Nitrotoluene				
4-Nitrotoluene				
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)				
m-Dinitrobenzene				
Methyl-2,4,6-trinitrophenylnitramine				
Nitrobenzene				
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)				
sym-Trinitrobenzene				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #3

Surface Water Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/l] MK03SW11	MK03SW12	MK03SW13	MK03SW14	MK03SW15	MK03SW22	MK02SD07
2-Nitrotoluene	53 U	53 U	53 U	53 U	53 U	53 UJ	160 U
2,4-Dinitrotoluene	47 U	47 U	47 U	47 U	47 U	47 UJ	140 U
2,4,6-Trinitrotoluene	31 U	31 U	31 U	31 U	31 U	31 UJ	25000
2,6-Dinitrotoluene	47 U	47 U	47 U	47 U	47 U	47 UJ	140 U
3-Nitrotoluene	71 U	71 U	71 U	71 U	71 U	71 UJ	210 U
4-Nitrotoluene	66 U	66 U	66 U	66 U	66 U	66 UJ	190 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	54 U	54 U	54 U	54 U	54 U	54 UJ	160 U
m-Dinitrobenzene	26 U	26 U	26 U	26 U	26 U	26 UJ	76 U
Methyl-2,4,6-trinitrophenylnitramine	37 U	37 U	37 U	37 U	37 U	37 UJ	110 U
Nitrobenzene	34 U	34 U	34 U	34 U	34 U	34 UJ	100 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	28 U	28 U	28 U	28 U	28 U	28 UJ	82 UJ
sym-Trinitrobenzene	39 U	39 U	39 U	39 U	39 U	39 UJ	110 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #3

Sediment Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK03SD11	MK03SD12	MK03SD13	MK03SD14	MK03SD15	MK03SD22
2-Nitrotoluene	120 U	71 U	66 U	76 U	120 U	61 U
2,4-Dinitrotoluene	100 U	63 U	59 U	68 U	110 U	54 U
2,4,6-Trinitrotoluene	68 U	42 U	39 U	45 U	73 U	36 U
2,6-Dinitrotoluene	100 U	63 U	59 U	68 U	110 U	54 U
3-Nitrotoluene	160 U	96 U	88 U	100 U	170 U	82 U
4-Nitrotoluene	140 U	89 U	82 U	95 U	160 U	76 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	120 U	73 U	67 U	78 U	130 U	62 U
m-Dinitrobenzene	57 U	35 U	32 U	37 U	61 U	30 U
Methyl-2,4,6-trinitrophenylnitramine	81 U	50 U	46 U	53 U	87 U	42 U
Nitrobenzene	74 U	46 U	42 U	49 U	80 U	39 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	61 U	38 U	35 U	40 U	66 U	32 U
sym-Trinitrobenzene	85 U	52 U	49 U	56 U	92 U	45 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Soil Boring Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK03SB12	MK03SB13
2-Nitrotoluene	61 U	66 U
2,4-Dinitrotoluene	54 U	59 U
2,4,6-Trinitrotoluene	36 U	39 U
2,6-Dinitrotoluene	54 U	59 U
3-Nitrotoluene	82 U	89 U
4-Nitrotoluene	76 U	82 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	62 U	68 U
m-Dinitrobenzene	30 U	32 U
Methyl-2,4,6-trinitrophenylnitramine	43 U	46 U
Nitrobenzene	39 U	42 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	32 U	35 U
sym-Trinitrobenzene	45 U	49 U

Monitoring Well Samples

Nitroexplosives Analysis

Parameter	Sample Number MK03MW20	[Units - ug/l] MK03MW21
2-Nitrotoluene	53 U	Well not
2,4-Dinitrotoluene	47 U	installed.
2,4,6-Trinitrotoluene	31 U	No sample
2,6-Dinitrotoluene	47 U	taken.
3-Nitrotoluene	71 U	
4-Nitrotoluene	66 U	
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	54 U	
m-Dinitrobenzene	26 U	
Methyl-2,4,6-trinitrophenylnitramine	37 U	
Nitrobenzene	34 U	
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	28 U	
sym-Trinitrobenzene	39 U	

PMU #3

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered on the east by a "zig-zag" of roads including Pentolite, Fox and Taylor Roads, on the west by Ransom Road and on the south and north by Patrol Road.

Surface Soil Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/kg] MK03SS17	MK03SS18	MK03SS19	MK03SS20
Aluminum - Soluble				
Antimony - Soluble	Not Applicable!			
Arsenic - Soluble				
Barium - Soluble				
Beryllium - Soluble				
Cadmium - Soluble				
Calcium - Soluble				
Chromium - Soluble				
Cobalt - Soluble				
Copper - Soluble				
Iron - Soluble				
Lead - Soluble				
Magnesium - Soluble				
Manganese - Soluble				
Mercury - Soluble				
Nickel - Soluble				
Potassium - Soluble				
Selenium - Soluble				
Silver - Soluble				
Sodium - Soluble				
Thallium - Soluble				
Vanadium - Soluble				
Zinc - Soluble				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #3

Surface Water Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/l] MK03SW11	MK03SW12	MK03SW13	MK03SW14	MK03SW15	MK03SW22
Aluminum - Soluble	282	70.0 U	70.0 U	70.0 U	70.0 U	252
Antimony - Soluble	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Arsenic - Soluble	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	3.0 U
Barium - Soluble	50.6 B	47.9 B	50.4 B	59.4 B	44.1 B	52.2 B
Beryllium - Soluble	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Cadmium - Soluble	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Calcium - Soluble	58700	84300	91200	35500 B	44200 B	55600
Chromium - Soluble	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Cobalt - Soluble	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Copper - Soluble	5.0 B	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Iron - Soluble	767	84.0 B	111	250	986	233
Lead - Soluble	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Magnesium - Soluble	23700	28600	23800	15600	15500	21400
Manganese - Soluble	921	132	712	617	720	217
Mercury - Soluble	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel - Soluble	47.7	30.0 B	43.2	30.0 U	30.0 U	30.0 U
Potassium - Soluble	6720	6320	6210	2100 B	3850 B	4880 B
Selenium - Soluble	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Silver - Soluble	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Sodium - Soluble	10600	22300	15400	8360	15600	16600
Thallium - Soluble	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Vanadium - Soluble	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Zinc - Soluble	10.0 U	10.0 U	10.0 U	10.0 U	34.5	10.0 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #3

Sediment Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/kg] MK03SD11	MK03SD12	MK03SD13	MK03SD14	MK03SD15	MK03SD22
Aluminum - Soluble	Not Applicable.					
Antimony - Soluble						
Arsenic - Soluble						
Barium - Soluble						
Beryllium - Soluble						
Cadmium - Soluble						
Calcium - Soluble						
Chromium - Soluble						
Cobalt - Soluble						
Copper - Soluble						
Iron - Soluble						
Lead - Soluble						
Magnesium - Soluble						
Manganese - Soluble						
Mercury - Soluble						
Nickel - Soluble						
Potassium - Soluble						
Selenium - Soluble						
Silver - Soluble						
Sodium - Soluble						
Thallium - Soluble						
Vanadium - Soluble						
Zinc - Soluble						

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Soil Boring Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/kg] MK03SB12	MK03SB13
Aluminum - Soluble	Not Applicable.	
Antimony - Soluble		
Arsenic - Soluble		
Barium - Soluble		
Beryllium - Soluble		
Cadmium - Soluble		
Calcium - Soluble		
Chromium - Soluble		
Cobalt - Soluble		
Copper - Soluble		
Iron - Soluble		
Lead - Soluble		
Magnesium - Soluble		
Manganese - Soluble		
Mercury - Soluble		
Nickel - Soluble		
Potassium - Soluble		
Selenium - Soluble		
Silver - Soluble		
Sodium - Soluble		
Thallium - Soluble		
Vanadium - Soluble		
Zinc - Soluble		

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #3

Monitoring Well Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/l] MK03MW20	MK03MW21
Aluminum - Soluble	70.0 U	Unable to
Antimony - Soluble	5.0 UN	install well.
Arsenic - Soluble	4.0 U	No sample
Barium - Soluble	51.7 B	taken.
Beryllium - Soluble	3.0 U	
Cadmium - Soluble	0.20 UN	
Calcium - Soluble	161000 N	
Chromium - Soluble	10.0 U	
Cobalt - Soluble	20.0 U	
Copper - Soluble	5.4 B	
Iron - Soluble	40.0 U	
Lead - Soluble	2.0 U	
Magnesium - Soluble	99400	
Manganese - Soluble	205 N	
Mercury - Soluble	0.20 U	
Nickel - Soluble	46.1	
Potassium - Soluble	32700	
Selenium - Soluble	3.0 UN	
Silver - Soluble	0.20 U	
Sodium - Soluble	246000	
Thallium - Soluble	4.0 U	
Vanadium - Soluble	20.0 U	
Zinc - Soluble	10.0 U	

PMU #3

This PMU contains sources which influence Ransom Brook. The PMU is primarily bordered on the east by a "zig-zag" of roads including Pentolite, Fox and Taylor Roads, on the west by Ransom Road and on the south and north by Patrol Road.

Surface Soil Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK03SS17	MK03SS18	MK03SS19	MK03SS20
Aluminum - Total	8320	9910	4880	3740
Antimony - Total	0.68 U	0.70 U	0.54 U	0.50 U
Arsenic - Total	4.0	2.8	10.7	1.8
Barium - Total	66.6	46.4	45.8	22.8
Beryllium - Total	0.41 U	0.60 B	0.32 U	0.31 U
Cadmium - Total	0.23 BN	0.07 BN	0.32 BN	0.12 BN
Calcium - Total	7380 *	57200 *	25700 B*	4260 B*
Chromium - Total	13.9	16.7	8.2	5.1
Cobalt - Total	6.8 B	10.1	5.1 B	2.1 U
Copper - Total	2.5 B	13.5	1.9 B	0.5 U
Iron - Total	24500 N*	25700 N*	19200 N*	6460 N*
Lead - Total	16.4	7.5	18.5	5.9
Magnesium - Total	1810	5570	6450	685
Manganese - Total	648 *	815 *	213 *	122 *
Mercury - Total	0.03 N	0.03 UN	0.07 N	0.02 N
Nickel - Total	18.6	35.7	13.9	6.1
Potassium - Total	537 B	2450	958	258 B
Selenium - Total	0.41 U	0.42 U	0.33 U	0.30 U
Silver - Total	1.4 U	1.4 U	1.1 U	1.0 U
Sodium - Total	212 B	300 B	199 B	140 B
Thallium - Total	0.55 U	0.56 U	0.43 U	0.40 U
Vanadium - Total	20.9	16.6	16.8	9.0
Zinc - Total	39.5	39.2	38.0	22.1

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Surface Water Samples

Total Metals Analysis

Parameter	Sample Number [Units - ug/l] MK03SW11	MK03SW12	MK03SW13	MK03SW14	MK03SW15	MK03SW22	MK02SD07
Aluminum - Total	17000	296	1030	363	363	413 *	9220 *
Antimony - Total	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	1.5 UN
Arsenic - Total	13.0	4.0 U	4.0 U	4.0 U	4.0 U	3.0 UN	29.3 N*
Barium - Total	169 B	52.4 B	57.7 B	68.9 B	68.9 B	51.9 B	56.5 B
Beryllium - Total	4.1 B	3.0 U	3.0 U	3.0 U	3.0 U	3.00 U	0.87 U
Cadmium - Total	1.7 B	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UN	0.50 BNJ
Calcium - Total	82100	84000 B	99400	40400 B	40400 B	55800 N	5740 B
Chromium - Total	13.4	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	13.6
Cobalt - Total	98.0	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	54.2
Copper - Total	55.2	5.0 B	5.0 U	5.0 U	5.0 U	5.8 B	46.0
Iron - Total	32000	690	1980	1680	1680	864 *	59500
Lead - Total	28.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 UN	27.5
Magnesium - Total	25100	28300	23400	15600	15600	20900	2340 *
Manganese - Total	1230	217	811	718	718	245 *	165 *
Mercury - Total	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.05 U
Nickel - Total	225	36.7 B	41.4	30.0 U	30.0 U	30.0 U	110
Potassium - Total	8470	6270	6280	2200 B	2200 B	4880 B	1680
Selenium - Total	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	0.88 U
Silver - Total	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 UN	2.9 U
Sodium - Total	11500	22900	15900	8950	8950	17300	335 B
Thallium - Total	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	1.2 U
Vanadium - Total	21.7 B	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	25.1 *
Zinc - Total	544	10.0 U	17.8 B	16.0 B	16.0 B	10.5 B	188 *

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Sediment Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK03SD11	MK03SD12	MK03SD13	MK03SD14	MK03SD15	MK03SD22
Aluminum - Total	16900	10700	4740	2160	6510	4360 *
Antimony - Total	1.1 U	0.67 U	0.61 U	0.66 U	1.2 U	0.56 U
Arsenic - Total	17.6	7.8	9.8	2.5	4.7	10.0
Barium - Total	90.2	32.8	127	17.3 B	83.3	39.0 *
Beryllium - Total	2.70	0.65 B	0.49 B	0.40 U	0.72 U	0.58
Cadmium - Total	0.64 B	0.37 B	0.33 B	0.07 B	0.39 B	0.26 BN
Calcium - Total	3590 B	33700 B	45100 B	19900 B	7910 B	69700 *
Chromium - Total	12.5	19.8	7.4	3.7	10.9	6.6 *
Cobalt - Total	58.1	26.2	59.9	3.8 B	10.8 B	26.7 *
Copper - Total	70.4	13.5	47.0	0.66 U	1.2 U	11.2
Iron - Total	34300	28800	41800	5420	15900	15600 *
Lead - Total	30.5	11.2	9.4	3.2	10.5	64.9 *
Magnesium - Total	1500	8740	9470	7090	2330	9930 *
Manganese - Total	169	657	995	288	379	591 *
Mercury - Total	0.04	0.03 U	0.03	0.03 U	0.05 U	0.02 U
Nickel - Total	137	57.6	89.9	9.5	25.0	46.3
Potassium - Total	1860	2960	938	372 B	629 B	1040 *
Selenium - Total	0.86 B	0.40 U	0.37 U	0.40 U	0.98 B	0.34 U
Silver - Total	2.2 U	1.4 U	1.2 U	1.3 U	2.4 U	1.2 U
Sodium - Total	320 B	289 B	205 B	206 B	312 B	168 B
Thallium - Total	0.86 U	0.53 U	0.49 U	0.53 U	0.98 U	0.45 U
Vanadium - Total	22.9	18.3	24.7 U	6.9	17.4	10.1 *
Zinc - Total	348	303	956	36.3	101	76.5

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #3

W.O. #4065-6128-004

Soil Boring Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK03SB12	MK03SB13
Aluminum - Total	10800	6710
Antimony - Total	0.55 UN	0.59 U
Arsenic - Total	15.4 N	5.5
Barium - Total	59.3	28.1
Beryllium - Total	0.61	0.56 B
Cadmium - Total	0.23 BN	0.02 B
Calcium - Total	38100 B	31300 B
Chromium - Total	18.1	16.7
Cobalt - Total	13.0	12.6
Copper - Total	25.0	11.0
Iron - Total	29000	19700
Lead - Total	15.4 N	9.2
Magnesium - Total	8960 *	4840
Manganese - Total	494	382
Mercury - Total	0.02 U	0.02 U
Nickel - Total	40.7	35.2
Potassium - Total	3170	2430
Selenium - Total	0.33 U	0.35 U
Silver - Total	0.03 B	0.05 U
Sodium - Total	226 B	289 B
Thallium - Total	0.44 U	0.47 U
Vanadium - Total	22.9 U*	18.2
Zinc - Total	113 *	95.1

Monitoring Well Samples

Total Metals Analysis

Parameter	Sample Number MK03MW20	[Units - ug/l] MK03MW21
Aluminum - Total	30900	Well not
Antimony - Total	5.0 UN	installed.
Arsenic - Total	20.0	No sample
Barium - Total	89.7 B	taken.
Beryllium - Total	3.0 U	
Cadmium - Total	0.20 BN	
Calcium - Total	356000 N	
Chromium - Total	57.1	
Cobalt - Total	53.1	
Copper - Total	33.0	
Iron - Total	64900	
Lead - Total	23.0	
Magnesium - Total	118000	
Manganese - Total	1960 N	
Mercury - Total	0.20 U	
Nickel - Total	187	
Potassium - Total	37800	
Selenium - Total	3.0 UN	
Silver - Total	0.20 U	
Sodium - Total	246000	
Thallium - Total	4.0 U	
Vanadium - Total	48.1 B	
Zinc - Total	158	

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #4

This PMU contains sources which influence Lindsley Ditch. The PMU is primarily bordered on the east by a Patrol Road, on the west by Snake Road, on the south by North Magazine Road and on the north by Patrol Road.

Surface Soil Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK04SS23	MK04SS24	MK04SS25	MK04SS26	MK04SS27
1,1-Dichloroethane	5 U	7 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	7 U	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	7 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	7 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	7 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	7 U	5 U	5 U	5 U
1,2-Dichloroethene (Total)	5 U	7 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	7 U	5 U	5 U	5 U
2-Butanone	10 U	13 U	11 U	11 U	10 U
2-Hexanone	10 U	13 U	11 U	11 U	10 U
4-Methyl-2-pentanone	10 U	13 U	11 U	11 U	10 U
Acetone	10 U	13 U	11 U	11 U	10 U
Benzene	5 U	7 U	5 U	5 U	5 U
Bromodichloromethane	5 U	7 U	5 U	5 U	5 U
Bromoform	5 U	7 U	5 U	5 U	5 U
Bromomethane	10 U	13 U	11 U	11 U	10 U
Carbon Disulfide	5 U	7 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	7 U	5 U	5 U	5 U
Chlorobenzene	5 U	7 U	5 U	5 U	5 U
Chloroethane	10 U	13 U	11 U	11 U	10 U
Chloroform	5 U	7 U	5 U	5 U	5 U
Chloromethane	10 U	13 U	11 U	11 U	10 U
cis-1,3-Dichloropropene	5 U	7 U	5 U	5 U	5 U
Dibromochloromethane	5 U	7 U	5 U	5 U	5 U
Ethyl benzene	5 U	7 U	5 U	5 U	5 U
Methylene chloride	5 U	7 U	5 U	5 U	5 U
Styrene	5 U	7 U	5 U	5 U	5 U
Tetrachloroethene	5 U	7 U	5 U	5 U	5 U
Toluene	0.9 J	5 J	23	14	8
Total Xylenes	5 U	7 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	7 U	5 U	5 U	5 U
Trichloroethene	5 U	7 U	5 U	5 U	5 U
Vinyl acetate	10 U	13 U	11 U	11 U	10 U
Vinyl chloride	10 U	13 U	11 U	11 U	10 U

Surface Water Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK04SW16	MK04SW17
1,1-Dichloroethane	5 U	5 U
1,1-Dichloroethene	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U
1,2-Dichloroethane	5 U	5 U
1,2-Dichloroethene (Total)	5 U	5 U
1,2-Dichloropropane	5 U	5 U
2-Butanone	10 U	10 U
2-Hexanone	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U
Acetone	10 U	10 U
Benzene	5 U	5 U
Bromodichloromethane	5 U	5 U
Bromoform	5 U	5 U
Bromomethane	10 U	10 U
Carbon Disulfide	5 U	5 U
Carbon Tetrachloride	5 U	5 U
Chlorobenzene	5 U	5 U
Chloroethane	10 U	10 U
Chloroform	5 U	5 U
Chloromethane	10 U	10 U
cis-1,3-Dichloropropene	5 U	5 U
Dibromochloromethane	5 U	5 U
Ethyl benzene	5 U	5 U
Methylene chloride	5 U	5 U
Styrene	5 U	5 U
Tetrachloroethene	5 U	5 U
Toluene	5 U	5 U
Total Xylenes	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U
Trichloroethene	5 U	5 U
Vinyl acetate	10 U	10 U
Vinyl chloride	10 U	10 U

Sediment Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK04SD16	MK04SD17
1,1-Dichloroethane	7 U	7 U
1,1-Dichloroethene	7 U	7 U
1,1,1-Trichloroethane	7 U	7 U
1,1,2-Trichloroethane	7 U	7 U
1,1,2,2-Tetrachloroethane	7 U	7 U
1,2-Dichloroethane	7 U	7 U
1,2-Dichloroethene (Total)	7 U	7 U
1,2-Dichloropropane	7 U	7 U
2-Butanone	14 U	14 U
2-Hexanone	14 U	14 U
4-Methyl-2-pentanone	14 U	14 U
Acetone	25	21
Benzene	7 U	7 U
Bromodichloromethane	7 U	7 U
Bromoform	7 U	7 U
Bromomethane	14 U	14 U
Carbon Disulfide	7 U	7 U
Carbon Tetrachloride	7 U	7 U
Chlorobenzene	7 U	7 U
Chloroethane	14 U	14 U
Chloroform	7 U	7 U
Chloromethane	14 U	14 U
cis-1,3-Dichloropropene	7 U	7 U
Dibromochloromethane	7 U	7 U
Ethyl benzene	7 U	7 U
Methylene chloride	0.9 J	7 U
Styrene	7 U	7 U
Tetrachloroethene	7 U	7 U
Toluene	7 U	1 J
Total Xylenes	7 U	7 U
trans-1,3-Dichloropropene	7 U	7 U
Trichloroethene	7 U	7 U
Vinyl acetate	14 U	14 U
Vinyl chloride	14 U	14 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #4

W.O. #4065-6128-004

Soil Boring Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK04SB14	MK04SB15	MK04SB16	MK04SB17
1,1-Dichloroethane	6 U	6 U	7 U	7 U
1,1-Dichloroethene	6 U	6 U	7 U	7 U
1,1,1-Trichloroethane	6 U	6 U	7 U	7 U
1,1,2-Trichloroethane	6 U	6 U	7 U	7 U
1,1,2,2-Tetrachloroethane	6 U	6 U	7 U	7 U
1,2-Dichloroethane	6 U	6 U	7 U	7 U
1,2-Dichloroethene (Total)	6 U	6 U	7 U	7 U
1,2-Dichloropropane	6 U	6 U	7 U	7 U
2-Butanone	12 U	11 U	13 U	15 U
2-Hexanone	12 U	11 U	13 U	15 U
4-Methyl-2-pentanone	12 U	11 U	13 U	15 U
Acetone	12 U	11 U	13 U	15 U
Benzene	6 U	6 U	7 U	7 U
Bromodichloromethane	6 U	6 U	7 U	7 U
Bromoform	6 U	6 U	7 U	7 U
Bromomethane	12 U	11 U	13 U	15 U
Carbon Disulfide	6 U	6 U	7 U	7 U
Carbon Tetrachloride	6 U	6 U	7 U	7 U
Chlorobenzene	6 U	6 U	7 U	7 U
Chloroethane	12 U	11 U	13 U	15 U
Chloroform	6 U	6 U	7 U	7 U
Chloromethane	12 U	11 U	13 U	15 U
cis-1,3-Dichloropropene	6 U	6 U	7 U	7 U
Dibromochloromethane	6 U	6 U	7 U	7 U
Ethyl benzene	6 U	6 U	7 U	7 U
Methylene chloride	6 U	6 U	7 U	7 U
Styrene	6 U	6 U	7 U	7 U
Tetrachloroethene	6 U	6 U	7 U	7 U
Toluene	11	3 J	4 J	7 U
Total Xylenes	6 U	6 U	7 U	7 U
trans-1,3-Dichloropropene	6 U	6 U	7 U	7 U
Trichloroethene	6 U	6 U	7 U	7 U
Vinyl acetate	12 U	11 U	13 U	15 U
Vinyl chloride	12 U	11 U	13 U	15 U

Monitoring Well Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK04MW22	MK04MW23	MK04MW24
1,1-Dichloroethane	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U
1,2-Dichloroethene (Total)	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U
Acetone	10 U	10 U	10 U
Benzene	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U
Carbon Disulfide	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U
cis-1,3-Dichloropropene	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U
Ethyl benzene	5 U	5 U	5 U
Methylene chloride	5 U	5 U	5 U
Styrene	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U
Toluene	5 U	5 U	5 U
Total Xylenes	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U
Vinyl acetate	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U

PMU #4

This PMU contains sources which influence Lindsley Ditch. The PMU is primarily bordered on the east by a Patrol Road, on the west by Snake Road, on the south by North Magazine Road and on the north by Patrol Road.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK04SS23	MK04SS24	MK04SS25	MK04SS26	MK04SS27
1,2-Dichlorobenzene	350 U	370 U	370 U	350 U	420 U
1,2,4-Trichlorobenzene	350 U	370 U	370 U	350 U	420 U
1,3-Dichlorobenzene	350 U	370 U	370 U	350 U	420 U
1,4-Dichlorobenzene	350 U	370 U	370 U	350 U	420 U
2-Chloronaphthalene	350 U	370 U	370 U	350 U	420 U
2-Chlorophenol	350 U	370 U	370 U	350 U	420 U
2-Methylnaphthalene	350 U	370 U	370 U	350 U	420 U
2-Methylphenol	350 U	370 U	370 U	350 U	420 U
2-Nitroaniline	1700 U	1800 U	1800 U	1700 U	2000 U
2-Nitrophenol	350 U	370 U	370 U	350 U	420 U
2,4-Dichlorophenol	350 U	370 U	370 U	350 U	420 U
2,4-Dimethylphenol	350 U	370 U	370 U	350 U	420 U
2,4-Dinitrophenol	1700 U	1800 U	1800 U	1700 U	2000 U
2,4-Dinitrotoluene	350 U	370 U	370 U	350 U	420 U
2,4,5-Trichlorophenol	1700 U	1800 U	1800 U	1700 U	2000 U
2,4,6-Trichlorophenol	350 U	370 U	370 U	350 U	420 U
2,6-Dinitrotoluene	350 U	370 U	370 U	350 U	420 U
3-Nitroaniline	1700 U	1800 U	1800 U	1700 U	2000 U
3,3'-Dichlorobenzidine	700 U	740 U	730 U	690 U	830 U
4-Bromophenyl phenyl ether	350 U	370 U	370 U	350 U	420 U
4-Chloro-3-methylphenol	350 U	370 U	370 U	350 U	420 U
4-Chloroaniline	350 U	370 U	370 U	350 U	420 U
4-Chlorodiphenylether	350 U	370 U	370 U	350 U	420 U
4-Methylphenol	350 U	370 U	370 U	350 U	420 U
4-Nitroaniline	1700 U	1800 U	1800 U	1700 U	2000 U
4-Nitrophenol	1700 U	1800 U	1800 U	1700 U	2000 U
4,6-Dinitro-2-methylphenol	1700 U	1800 U	1800 U	1700 U	2000 U
Acenaphthene	350 U	370 U	370 U	350 U	420 U
Acenaphthylene	350 U	370 U	370 U	350 U	420 U
Anthracene	350 U	370 U	370 U	350 U	420 U
Benzoic acid	1700 U	1800 UJ	1800 U	1700 UJ	2000 U
Benzo(a)anthracene	350 U	370 U	370 U	350 U	420 U
Benzo(a)pyrene	350 U	370 U	370 U	350 U	420 U
Benzo(b)fluoranthene	350 U	370 U	32 J	31 J	420 U
Benzo(ghi)perylene	350 UJ	370 UJ	370 UJ	350 UJ	420 U

PMU #4

This PMU contains sources which influence Lindsley Ditch. The PMU is primarily bordered on the east by a Patrol Road, on the west by Snake Road, on the south by North Magazine Road and on the north by Patrol Road.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK04SS23	MK04SS24	MK04SS25	MK04SS26	MK04SS27
Benzo(k)fluoranthene	350 U	370 U	370 U	350 U	420 U
Benzyl alcohol	350 U	370 U	370 U	350 U	420 U
Bis(2-chloroethoxy) methane	350 U	370 U	370 U	350 U	420 U
Bis(2-chloroethyl) ether	350 U	370 U	370 U	350 U	420 U
Bis(2-chloroisopropyl) ether	350 U	370 U	370 U	350 U	420 U
Bis(2-ethylhexyl) phthalate	75 J	370 U	370 U	350 U	420 U
Butyl benzyl phthalate	350 U	370 U	370 U	350 U	420 U
Chrysene	350 U	370 U	370 U	350 U	420 U
Dibenzofuran	350 U	370 U	370 U	350 U	420 U
Dibenzo(a,h)anthracene	350 U	370 U	370 U	350 U	420 U
Diethyl phthalate	350 U	370 U	370 U	350 U	420 U
Dimethyl phthalate	350 U	370 U	370 U	350 U	420 U
Di-n-butyl phthalate	350 U	370 U	370 U	350 U	420 U
Di-n-octyl phthalate	350 U	370 U	370 U	350 U	420 U
Fluoranthene	350 U	370 U	370 U	350 U	420 U
Fluorene	350 U	370 U	370 U	350 U	420 U
Hexachlorobenzene	350 U	370 U	370 U	350 U	420 U
Hexachlorobutadiene	350 U	370 U	370 U	350 U	420 U
Hexachlorocyclopentadiene	350 U	370 U	370 U	350 U	420 U
Hexachloroethane	350 U	370 U	370 U	350 U	420 U
Indeno(1,2,3-cd)pyrene	350 U	370 U	370 U	350 U	420 U
Isophorone	350 U	370 U	370 U	350 U	420 U
Naphthalene	350 U	370 U	370 U	350 U	420 U
Nitrobenzene	350 U	370 U	370 U	350 U	420 U
N-Nitroso-Di-n-propylamine	350 U	370 U	370 U	350 U	420 U
N-nitrosodiphenylamine	350 U	370 U	370 U	350 U	420 U
Pentachlorophenol	1700 U	1800 U	1800 U	1700 U	2000 U
Phenanthrene	350 U	370 U	370 U	350 U	420 U
Phenol	350 U	370 U	370 U	350 U	420 U
Pyrene	350 U	370 U	370 U	350 U	420 U

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK04SW16	MK04SW17
1,2-Dichlorobenzene	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U
2-Chloronaphthalene	10 U	10 U
2-Chlorophenol	10 U	10 U
2-Methylnaphthalene	10 U	10 U
2-Methylphenol	10 U	10 U
2-Nitroaniline	50 U	50 U
2-Nitrophenol	10 U	10 U
2,4-Dichlorophenol	10 U	10 U
2,4-Dimethylphenol	10 U	10 U
2,4-Dinitrophenol	50 U	50 U
2,4-Dinitrotoluene	10 U	10 U
2,4,5-Trichlorophenol	50 U	50 U
2,4,6-Trichlorophenol	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U
3-Nitroaniline	50 U	50 U
3,3'-Dichlorobenzidine	20 U	20 U
4-Bromophenyl phenyl ether	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U
4-Chloroaniline	10 U	10 U
4-Chlorodiphenylether	10 U	10 U
4-Methylphenol	10 U	10 U
4-Nitroaniline	50 U	50 U
4-Nitrophenol	50 U	50 U
4,6-Dinitro-2-methylphenol	50 U	50 U
Acenaphthene	10 U	10 U
Acenaphthylene	10 U	10 U
Anthracene	10 U	10 U
Benzoic acid	50 U	50 U
Benzo(a)anthracene	10 U	10 U
Benzo(a)pyrene	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U
Benzo(ghi)perylene	10 U	10 U

PMU #4

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK04SW16	MK04SW17
Benzo(k)fluoranthene	10 U	10 U
Benzyl alcohol	10 U	10 U
Bis(2-chloroethoxy) methane	10 U	10 U
Bis(2-chloroethyl) ether	10 U	10 U
Bis(2-chloroisopropyl) ether	10 U	10 U
Bis(2-ethylhexyl) phthalate	10 U	10 U
Butyl benzyl phthalate	10 U	10 U
Chrysene	10 U	10 U
Dibenzofuran	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U
Diethyl phthalate	10 U	10 U
Dimethyl phthalate	10 U	10 U
Di-n-butyl phthalate	10 U	10 U
Di-n-octyl phthalate	10 U	10 U
Fluoranthene	10 U	10 U
Fluorene	10 U	10 U
Hexachlorobenzene	10 U	10 U
Hexachlorobutadiene	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U
Hexachloroethane	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U
Isophorone	10 U	10 U
Naphthalene	10 U	10 U
Nitrobenzene	10 U	10 U
N-Nitroso-Di-n-propylamine	10 U	10 U
N-nitrosodiphenylamine	10 U	10 U
Pentachlorophenol	50 U	50 U
Phenanthrene	10 U	10 U
Phenol	10 U	10 U
Pyrene	10 U	10 U

Sediment Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK04SD16	MK04SD17
1,2-Dichlorobenzene	510 U	510 U
1,2,4-Trichlorobenzene	510 U	510 U
1,3-Dichlorobenzene	510 U	510 U
1,4-Dichlorobenzene	510 U	510 U
2-Chloronaphthalene	510 U	510 U
2-Chlorophenol	510 U	510 U
2-Methylnaphthalene	510 U	510 U
2-Methylphenol	510 U	510 U
2-Nitroaniline	2500 U	2500 U
2-Nitrophenol	510 U	510 U
2,4-Dichlorophenol	510 U	510 U
2,4-Dimethylphenol	510 U	510 U
2,4-Dinitrophenol	2500 U	2500 U
2,4-Dinitrotoluene	170 J	510 U
2,4,5-Trichlorophenol	2500 U	2500 U
2,4,6-Trichlorophenol	510 U	510 U
2,6-Dinitrotoluene	510 U	510 U
3-Nitroaniline	2500 U	2500 U
3,3'-Dichlorobenzidine	1000 U	1000 U
4-Bromophenyl phenyl ether	510 U	510 U
4-Chloro-3-methylphenol	510 U	510 U
4-Chloroaniline	510 U	510 U
4-Chlorodiphenylether	510 U	510 U
4-Methylphenol	510 U	510 U
4-Nitroaniline	2500 U	2500 U
4-Nitrophenol	2500 U	2500 U
4,6-Dinitro-2-methylphenol	2500 U	2500 U
Acenaphthene	510 U	510 U
Acenaphthylene	510 U	510 U
Anthracene	510 U	510 U
Benzoic acid	2500 U	2500 U
Benzo(a)anthracene	510 U	510 U
Benzo(a)pyrene	70 J	76 J
Benzo(b)fluoranthene	190 J	200 J
Benzo(ghi)perylene	510 U	510 U

PMU #4

Sediment Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK04SD16	MK04SD17
Benzo(k)fluoranthene	510 U	510 U
Benzyl alcohol	510 U	510 U
Bis(2-chloroethoxy) methane	510 U	510 U
Bis(2-chloroethyl) ether	510 U	510 U
Bis(2-chloroisopropyl) ether	510 U	510 U
Bis(2-ethylhexyl) phthalate	510 U	2100 U
Butyl benzyl phthalate	510 U	510 U
Chrysene	120 J	91 J
Dibenzofuran	510 U	510 U
Dibenzo(a,h)anthracene	510 U	510 U
Diethyl phthalate	510 U	510 U
Dimethyl phthalate	510 U	510 U
Di-n-butyl phthalate	510 U	510 U
Di-n-octyl phthalate	510 U	510 U
Fluoranthene	220 J	180 J
Fluorene	510 U	510 U
Hexachlorobenzene	510 U	510 U
Hexachlorobutadiene	510 U	510 U
Hexachlorocyclopentadiene	510 U	510 U
Hexachloroethane	510 U	510 U
Indeno(1,2,3-cd)pyrene	510 U	510 U
Isophorone	510 U	510 U
Naphthalene	510 U	510 U
Nitrobenzene	510 U	510 U
N-Nitroso-Di-n-propylamine	510 U	510 U
N-nitrosodiphenylamine	510 U	510 U
Pentachlorophenol	2500 U	2500 U
Phenanthrene	82 J	52 J
Phenol	510 U	510 U
Pyrene	160 J	140 J

Soil Boring Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK04SB14	MK04SB15	MK04SB16	MK04SB17
1,2-Dichlorobenzene	450 U	370 U	370 U	460 U
1,2,4-Trichlorobenzene	450 U	370 U	370 U	460 U
1,3-Dichlorobenzene	450 U	370 U	370 U	460 U
1,4-Dichlorobenzene	450 U	370 U	370 U	460 U
2-Chloronaphthalene	450 U	370 U	370 U	460 U
2-Chlorophenol	450 U	370 U	370 U	460 U
2-Methylnaphthalene	450 U	370 U	370 U	460 U
2-Methylphenol	450 U	370 U	370 U	460 U
2-Nitroaniline	2200 U	1800 U	1800 U	2200 U
2-Nitrophenol	450 U	370 U	370 U	460 U
2,4-Dichlorophenol	450 U	370 U	370 U	460 U
2,4-Dimethylphenol	450 U	370 U	370 U	460 U
2,4-Dinitrophenol	2200 U	1800 U	1800 U	2200 U
2,4-Dinitrotoluene	450 U	370 U	370 U	460 U
2,4,5-Trichlorophenol	2200 U	1800 U	1800 U	2200 U
2,4,6-Trichlorophenol	450 U	370 U	370 U	460 U
2,6-Dinitrotoluene	450 U	370 U	370 U	460 U
3-Nitroaniline	2200 U	1800 U	1800 U	2200 U
3,3'-Dichlorobenzidine	900 U	740 U	740 U	920 U
4-Bromophenyl phenyl ether	450 U	370 U	370 U	460 U
4-Chloro-3-methylphenol	450 U	370 U	370 U	460 U
4-Chloroaniline	450 U	370 U	370 U	460 U
4-Chlorodiphenylether	450 U	370 U	370 U	460 U
4-Methylphenol	450 U	370 U	370 U	460 U
4-Nitroaniline	2200 U	1800 U	1800 U	2200 U
4-Nitrophenol	2200 U	1800 U	1800 U	2200 U
4,6-Dinitro-2-methylphenol	2200 U	1800 U	1800 U	2200 U
Acenaphthene	450 U	370 U	370 U	460 U
Acenaphthylene	33 J	370 U	370 U	460 U
Anthracene	450 U	370 U	370 U	460 U
Benzoic acid	2200 UJ	1800 UJ	1800 U	2200 U
Benzo(a)anthracene	220 J	370 U	55 J	91 J
Benzo(a)pyrene	160 J	370 U	370 U	460 U
Benzo(b)fluoranthene	230 J	370 U	78 J	110 J
Benzo(ghi)perylene	74 J	370 UJ	370 U	460 U

PMU #4

Soil Boring Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK04SB14	MK04SB15	MK04SB16	MK04SB17
Benzo(k)fluoranthene	110 J	370 U	36 J	50 J
Benzyl alcohol	450 U	370 U	370 U	460 U
Bis(2-chloroethoxy) methane	450 U	370 U	370 U	460 U
Bis(2-chloroethyl) ether	450 U	370 U	370 U	460 U
Bis(2-chloroisopropyl) ether	450 U	370 U	370 U	460 U
Bis(2-ethylhexyl) phthalate	450 U	370 U	370 U	1200
Butyl benzyl phthalate	450 U	370 U	370 U	460 U
Chrysene	160 J	370 U	73 J	110 J
Dibenzofuran	450 U	370 U	370 U	460 U
Dibenzo(a,h)anthracene	450 U	370 U	370 U	460 U
Diethyl phthalate	450 U	370 U	370 U	460 U
Dimethyl phthalate	450 U	370 U	370 U	460 U
Di-n-butyl phthalate	450 U	370 U	370 U	460 U
Di-n-octyl phthalate	450 U	370 U	370 U	460 U
Fluoranthene	300 J	370 U	110 J	180 J
Fluorene	450 U	370 U	370 U	460 U
Hexachlorobenzene	450 U	370 U	370 U	460 U
Hexachlorobutadiene	450 U	370 U	370 U	460 U
Hexachlorocyclopentadiene	450 U	370 U	370 U	460 U
Hexachloroethane	450 U	370 U	370 U	460 U
Indeno(1,2,3-cd)pyrene	96 J	370 U	370 U	460 U
Isophorone	450 U	370 U	370 U	460 U
Naphthalene	450 U	370 U	370 U	460 U
Nitrobenzene	450 U	370 U	370 U	460 U
N-Nitroso-Di-n-propylamine	450 U	370 U	370 U	460 U
N-nitrosodiphenylamine	450 U	370 U	370 U	460 U
Pentachlorophenol	2200 U	1800 U	1800 U	2200 U
Phenanthrene	91 J	370 U	41 J	68 J
Phenol	450 U	370 U	370 U	460 U
Pyrene	250 J	370 U	370 U	160 J

Monitoring Well Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK04MW22	MK04MW23	MK04MW24
1,2-Dichlorobenzene	Unable to	Unable to	10 U
1,2,4-Trichlorobenzene	collect	collect	10 U
1,3-Dichlorobenzene	adequate	adequate	10 U
1,4-Dichlorobenzene	sample.	sample.	10 U
2-Chloronaphthalene	No	No	10 U
2-Chlorophenol	analysis	analysis	10 U
2-Methylnaphthalene	conducted	conducted	10 U
2-Methylphenol	for this	for this	10 U
2-Nitroaniline	sample.	sample.	50 U
2-Nitrophenol			10 U
2,4-Dichlorophenol			10 U
2,4-Dimethylphenol			10 U
2,4-Dinitrophenol			50 U
2,4-Dinitrotoluene			10 U
2,4,5-Trichlorophenol			50 U
2,4,6-Trichlorophenol			10 U
2,6-Dinitrotoluene			10 U
3-Nitroaniline			50 U
3,3'-Dichlorobenzidine			20 U
4-Bromophenyl phenyl ether			10 U
4-Chloro-3-methylphenol			10 U
4-Chloroaniline			10 U
4-Chlorodiphenylether			10 U
4-Methylphenol			10 U
4-Nitroaniline			50 U
4-Nitrophenol			50 U
4,6-Dinitro-2-methylphenol			50 U
Acenaphthene			10 U
Acenaphthylene			10 U
Anthracene			10 U
Benzoic acid			50 UJ
Benzo(a)anthracene			10 U
Benzo(a)pyrene			10 U
Benzo(b)fluoranthene			10 U
Benzo(ghi)perylene			10 UJ

PMU #4

Monitoring Well Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK04MW22	MK04MW23	MK04MW24
Benzo(k)fluoranthene	Unable to	Unable to	10 U
Benzyl alcohol	collect	collect	10 U
Bis(2-chloroethoxy) methane	adequate	adequate	10 U
Bis(2-chloroethyl) ether	sample.	sample.	10 U
Bis(2-chloroisopropyl) ether	No	No	10 U
Bis(2-ethylhexyl) phthalate	analysis	analysis	22
Butyl benzyl phthalate	conducted	conducted	10 U
Chrysene	for this	for this	10 U
Dibenzofuran	sample.	sample.	10 U
Dibenzo(a,h)anthracene			10 U
Diethyl phthalate			10 U
Dimethyl phthalate			10 U
Di-n-butyl phthalate			10 U
Di-n-octyl phthalate			10 U
Fluoranthene			10 U
Fluorene			10 U
Hexachlorobenzene			10 U
Hexachlorobutadiene			10 U
Hexachlorocyclopentadiene			10 U
Hexachloroethane			10 U
Indeno(1,2,3-cd)pyrene			10 U
Isophorone			10 U
Naphthalene			10 U
Nitrobenzene			10 U
N-Nitroso-Di-n-propylamine			10 U
N-nitrosodiphenylamine			10 U
Pentachlorophenol			50 U
Phenanthrene			10 U
Phenol			10 U
Pyrene			10 U

PMU #4

This PMU contains sources which influence Lindsley Ditch. The PMU is primarily bordered on the east by a Patrol Road, on the west by Snake Road, on the south by North Magazine Road and on the north by Patrol Road.

Surface Soil Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK04SS23	MK04SS24	MK04SS25	MK04SS26	MK04SS27
4,4'-DDD	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.
4,4'-DDE					
4,4'-DDT					
Aldrin					
Aroclor 1016					
Aroclor 1221					
Aroclor 1232					
Aroclor 1242					
Aroclor 1248					
Aroclor 1254					
Aroclor 1260					
Chlordane					
Dieldrin					
Endosulfan I					
Endosulfan II					
Endosulfan Sulfate					
Endrin					
Endrin ketone					
Heptachlor					
Heptachlor epoxide					
Methoxychlor					
Toxaphene					
alpha - BHC					
beta - BHC					
delta - BHC					
gamma - BHC (Lindane)					

Surface Water Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/l] MK04SW16	MK04SW17
4,4'-DDD	0.11 U	No analysis
4,4'-DDE	0.11 U	conducted
4,4'-DDT	0.11 U	for this
Aldrin	0.056 U	sample.
Aroclor 1016	0.56 U	
Aroclor 1221	1.1 U	
Aroclor 1232	0.56 U	
Aroclor 1242	0.56 U	
Aroclor 1248	0.56 U	
Aroclor 1254	0.56 U	
Aroclor 1260	0.56 U	
Chlordane	0.56 U	
Dieldrin	0.11 U	
Endosulfan I	0.11 U	
Endosulfan II	0.11 U	
Endosulfan Sulfate	0.11 U	
Endrin	0.11 U	
Endrin ketone	0.11 U	
Heptachlor	0.056 U	
Heptachlor epoxide	0.056 U	
Methoxychlor	0.56 U	
Toxaphene	1.1 U	
alpha - BHC	0.056 U	
beta - BHC	0.056 U	
delta - BHC	0.056 U	
gamma - BHC (Lindane)	0.056 U	

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #4

W.O. #4065-6128-004

Sediment Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK04SD16	MK04SD17
4,4'-DDD	13 U	No analysis
4,4'-DDE	13 U	conducted
4,4'-DDT	9.8 J	for this
Aldrin	6.6 U	sample.
Aroclor 1016	66 U	
Aroclor 1221	130 U	
Aroclor 1232	66 U	
Aroclor 1242	66 U	
Aroclor 1248	66 U	
Aroclor 1254	66 U	
Aroclor 1260	66 U	
Chlordane	66 U	
Dieldrin	2.7 J	
Endosulfan I	13 U	
Endosulfan II	13 U	
Endosulfan Sulfate	13 U	
Endrin	13 U	
Endrin ketone	13 U	
Heptachlor	6.6 U	
Heptachlor epoxide	6.6 U	
Methoxychlor	29	
Toxaphene	130 U	
alpha - BHC	6.6 U	
beta - BHC	6.6 U	
delta - BHC	6.6 U	
gamma - BHC (Lindane)	6.6 U	

Soil Boring Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK04SB14	MK04SB15	MK04SB16	MK04SB17
4,4'-DDD	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.	No analysis conducted for this sample.
4,4'-DDE				
4,4'-DDT				
Aldrin				
Aroclor 1016				
Aroclor 1221				
Aroclor 1232				
Aroclor 1242				
Aroclor 1248				
Aroclor 1254				
Aroclor 1260				
Chlordane				
Dieldrin				
Endosulfan I				
Endosulfan II				
Endosulfan Sulfate				
Endrin				
Endrin ketone				
Heptachlor				
Heptachlor epoxide				
Methoxychlor				
Toxaphene				
alpha - BHC				
beta - BHC				
delta - BHC				
gamma - BHC (Lindane)				

Monitoring Well Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/l] MK04MW22	MK04MW23	MK04MW24
4,4'-DDD	Unable to collect adequate sample. No analysis conducted for this sample.	Unable to collect adequate sample. No analysis conducted for this sample.	0.10 U
4,4'-DDE			0.10 U
4,4'-DDT			0.10 U
Aldrin			0.05 U
Aroclor 1016			0.50 U
Aroclor 1221			1.0 U
Aroclor 1232			0.50 U
Aroclor 1242			0.50 U
Aroclor 1248			0.50 U
Aroclor 1254			0.50 U
Aroclor 1260			0.50 U
Chlordane			0.50 U
Dieldrin			0.10 U
Endosulfan I			0.10 U
Endosulfan II			0.10 U
Endosulfan Sulfate			0.13 U
Endrin			0.10 U
Endrin ketone			0.10 U
Heptachlor			0.05 U
Heptachlor epoxide			0.05 U
Methoxychlor			0.50 U
Toxaphene			1.0 U
alpha - BHC			0.05 U
beta - BHC			0.05 U
delta - BHC			0.05 U
gamma - BHC (Lindane)			0.05 U

PMU #4

This PMU contains sources which influence Lindsley Ditch. The PMU is primarily bordered on the east by a Patrol Road, on the west by Snake Road, on the south by North Magazine Road and on the north by Patrol Road.

Surface Soil Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK04SS23	MK04SS24	MK04SS25	MK04SS26	MK04SS27
2-Nitrotoluene	53 U	60 U	60 U	57 U	68 U
2,4-Dinitrotoluene	47 U	53 U	53 U	50 U	60 U
2,4,6-Trinitrotoluene	31 U	35 U	35 U	33 U	40 U
2,6-Dinitrotoluene	47 U	53 U	53 U	50 U	60 U
3-Nitrotoluene	71 U	81 U	80 U	76 U	91 U
4-Nitrotoluene	66 U	75 U	74 U	71 U	85 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	54 U	61 U	61 U	58 U	69 U
m-Dinitrobenzene	26 U	30 U	29 U	28 U	33 U
Methyl-2,4,6-trinitrophenylnitramine	37 U	42 U	42 U	40 U	47 U
Nitrobenzene	34 U	39 U	38 U	36 U	44 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	28 U	32 U	31 U	30 U	36 U
sym-Trinitrobenzene	39 U	44 U	44 U	42 U	50 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #4

W.O. #4065-6128-004

Surface Water Samples

Nitroexplosives Analysis

Parameter	Sample Number (Units - ug/l) MK04SW16	MK04SW17
2-Nitrotoluene	53 U	53 U
2,4-Dinitrotoluene	47 U	47 U
2,4,6-Trinitrotoluene	31 U	31 U
2,6-Dinitrotoluene	47 U	47 U
3-Nitrotoluene	71 U	71 U
4-Nitrotoluene	66 U	66 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	54 U	54 U
m-Dinitrobenzene	26 U	26 U
Methyl-2,4,6-trinitrophenylnitramine	37 U	37 U
Nitrobenzene	34 U	34 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	28 U	28 U
sym-Trinitrobenzene	39 U	39 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #4

W.O. #4065-6128-004

Sediment Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK04SD16	MK04SD17
2-Nitrotoluene	84 U	82 U
2,4-Dinitrotoluene	75 U	72 U
2,4,6-Trinitrotoluene	49 U	48 U
2,6-Dinitrotoluene	75 U	72 U
3-Nitrotoluene	110 U	110 U
4-Nitrotoluene	100 U	100 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	86 U	83 U
m-Dinitrobenzene	41 U	40 U
Methyl-2,4,6-trinitrophenylnitramine	59 U	57 U
Nitrobenzene	54 U	52 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	44 UJ	43 UJ
sym-Trinitrobenzene	62 U	60 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #4

W.O. #4065-6128-004

Soil Boring Samples

Nitroexplosives Analysis

Parameter	Sample Number (Units - ug/kg) MK04SB14	MK04SB15	MK04SB16	MK04SB17
2-Nitrotoluene	73 U	60 U	72 U	80 U
2,4-Dinitrotoluene	64 U	53 U	64 U	70 U
2,4,6-Trinitrotoluene	42 U	35 U	42 U	46 U
2,6-Dinitrotoluene	64 U	53 U	64 U	70 U
3-Nitrotoluene	97 U	80 U	97 U	110 U
4-Nitrotoluene	90 U	74 U	90 U	99 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	74 U	61 U	74 U	81 U
m-Dinitrobenzene	36 U	29 U	36 U	39 U
Methyl-2,4,6-trinitrophenylnitramine	51 U	42 U	50 U	56 U
Nitrobenzene	46 U	38 U	46 U	51 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	38 U	31 U	38 U	42 U
sym-Trinitrobenzene	53 U	44 U	53 U	58 U

Monitoring Well Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/l] MK04MW22	MK04MW23	MK04MW24
2-Nitrotoluene	Unable to	Unable to	53 U
2,4-Dinitrotoluene	collect	collect	47 U
2,4,6-Trinitrotoluene	adequate	adequate	31 U
2,6-Dinitrotoluene	sample.	sample.	47 U
3-Nitrotoluene	No	No	71 U
4-Nitrotoluene	analysis	analysis	66 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	conducted	conducted	54 U
m-Dinitrobenzene	for this	for this	26 U
Methyl-2,4,6-trinitrophenylnitramine	sample.	sample.	37 U
Nitrobenzene			34 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)			28 U
sym-Trinitrobenzene			39 U

PMU #4

This PMU contains sources which influence Lindsley Ditch. The PMU is primarily bordered on the east by a Patrol Road, on the west by Snake Road, on the south by North Magazine Road and on the north by Patrol Road.

Surface Soil Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK04SS24	MK04SS25	MK04SS26	MK04SS27
Aluminum - Soluble				
Antimony - Soluble	Not Applicable.			
Arsenic - Soluble				
Barium - Soluble				
Beryllium - Soluble				
Cadmium - Soluble				
Calcium - Soluble				
Chromium - Soluble				
Cobalt - Soluble				
Copper - Soluble				
Iron - Soluble				
Lead - Soluble				
Magnesium - Soluble				
Manganese - Soluble				
Mercury - Soluble				
Nickel - Soluble				
Potassium - Soluble				
Selenium - Soluble				
Silver - Soluble				
Sodium - Soluble				
Thallium - Soluble				
Vanadium - Soluble				
Zinc - Soluble				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #4

W.O. #4065-6128-004

Surface Water Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/l] MK04SW16	MK04SW17
Aluminum - Soluble	70.0 U	70.0 U
Antimony - Soluble	5.0 U	5.0 U
Arsenic - Soluble	4.0 U	4.0 U
Barium - Soluble	20.0 U	86.2 B
Beryllium - Soluble	3.0 U	3.0 U
Cadmium - Soluble	0.20 U	0.20 U
Calcium - Soluble	42100 B	95700
Chromium - Soluble	10.0 U	10.0 U
Cobalt - Soluble	20.0 U	20.0 U
Copper - Soluble	5.0 U	5.0 U
Iron - Soluble	175	40.0 U
Lead - Soluble	2.0 U	2.0 U
Magnesium - Soluble	10700	37900
Manganese - Soluble	74.9	457
Mercury - Soluble	0.20 U	0.20 U
Nickel - Soluble	30.0 U	30.0 U
Potassium - Soluble	2150 B	6000
Selenium - Soluble	3.0 U	3.0 U
Silver - Soluble	10.0 U	10.0 U
Sodium - Soluble	11600	35200
Thallium - Soluble	4.0 U	4.0 U
Vanadium - Soluble	20.0 U	20.0 U
Zinc - Soluble	10.0 U	59.3

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #4

Sediment Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK04SD16	MK04SD17
Aluminum - Soluble		
Antimony - Soluble	Not Applicable.	
Arsenic - Soluble		
Barium - Soluble		
Beryllium - Soluble		
Cadmium - Soluble		
Calcium - Soluble		
Chromium - Soluble		
Cobalt - Soluble		
Copper - Soluble		
Iron - Soluble		
Lead - Soluble		
Magnesium - Soluble		
Manganese - Soluble		
Mercury - Soluble		
Nickel - Soluble		
Potassium - Soluble		
Selenium - Soluble		
Silver - Soluble		
Sodium - Soluble		
Thallium - Soluble		
Vanadium - Soluble		
Zinc - Soluble		

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #4

W.O. #4065-6128-004

Soil Boring Samples

Soluble Metals Analysis

Parameter	Sample Number (Units - mg/kg) MK04SB14	MK04SB15	MK04SB16	MK04SB17
Aluminum - Soluble				
Antimony - Soluble	Not Applicable			
Arsenic - Soluble				
Barium - Soluble				
Beryllium - Soluble				
Cadmium - Soluble				
Calcium - Soluble				
Chromium - Soluble				
Cobalt - Soluble				
Copper - Soluble				
Iron - Soluble				
Lead - Soluble				
Magnesium - Soluble				
Manganese - Soluble				
Mercury - Soluble				
Nickel - Soluble				
Potassium - Soluble				
Selenium - Soluble				
Silver - Soluble				
Sodium - Soluble				
Thallium - Soluble				
Vanadium - Soluble				
Zinc - Soluble				

Monitoring Well Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/l] MK04MW22	MK04MW23	MK04MW24
Aluminum - Soluble	Unable to	Unable to	999 B
Antimony - Soluble	collect	collect	5.0 UN
Arsenic - Soluble	adequate	adequate	4.0 U
Barium - Soluble	sample.	sample.	58.0 B
Beryllium - Soluble	No	No	3.0 U
Cadmium - Soluble	analysis	analysis	0.20 UN
Calcium - Soluble	conducted	conducted	654000 N
Chromium - Soluble	for this	for this	10.0 U
Cobalt - Soluble	sample.	sample.	20.0 U
Copper - Soluble			23.0 B
Iron - Soluble			1180
Lead - Soluble			2.0 U
Magnesium - Soluble			49600
Manganese - Soluble			516 N
Mercury - Soluble			0.20 U
Nickel - Soluble			34.0 B
Potassium - Soluble			7970
Selenium - Soluble			3.0 UN
Silver - Soluble			0.20 U
Sodium - Soluble			9970
Thallium - Soluble			4.0 U
Vanadium - Soluble			20.0 U
Zinc - Soluble			10.0 U

PMU #4

This PMU contains sources which influence Lindsley Ditch. The PMU is primarily bordered on the east by a Patrol Road, on the west by Snake Road, on the south by North Magazine Road and on the north by Patrol Road.

Surface Soil Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK04SS23	MK04SS24	MK04SS25	MK04SS26	MK04SS27
Aluminum - Total	4460 *	5220 *	5240 *	5480 *	5730 *
Antimony - Total	0.54 U	3.7 B	0.54 U	0.54 U	0.62 U
Arsenic - Total	2.3	2.0	3.0	2.9	2.1
Barium - Total	17.5 B*	16.2 B*	19.7 B*	18.8 B*	20.9 B*
Beryllium - Total	0.32 U	0.34 U	0.34 U	0.32 U	0.39 U
Cadmium - Total	0.06 BN	0.07 BN	0.43 BN	0.43 BN	0.10 BN
Calcium - Total	1050 *	820 *	734 *	824 *	970 *
Chromium - Total	5.0 *	5.2 *	7.3 *	8.2 *	5.1 *
Cobalt - Total	2.5 B*	2.3 U*	2.3 B*	2.7 B*	3.2 B*
Copper - Total	0.54 U	0.57 U	19.2	24.0	0.64 U
Iron - Total	6170 *	6270 *	7690 *	9150 *	6910 *
Lead - Total	3.8 *	2.4 *	7.7 *	20.4 *	3.5 *
Magnesium - Total	761 *	756 *	773 *	826 *	768 *
Manganese - Total	105 *	65.2 *	63.2 *	72.1 *	64.4 *
Mercury - Total	0.02 U	0.02 U	0.04	0.06	0.08
Nickel - Total	4.9	4.6	7.1	6.2	6.0
Potassium - Total	298 B*	242 B*	299 B*	333 B*	272 B*
Selenium - Total	0.32 U	0.33 U	0.33 U	0.32 U	0.37 U
Silver - Total	1.1 U	1.1 U	1.1 U	1.1 U	1.3 U
Sodium - Total	137 B	129 B	137 B	131 B	135 B
Thallium - Total	0.43 U	0.44 U	0.43 U	0.43 U	0.49 U
Vanadium - Total	8.6 *	9.3 *	8.7 *	12.0 *	8.2 *
Zinc - Total	18.1	17.4	24.7	26.6	18.7

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #4

W.O. #4065-6128-004

Surface Water Samples

Total Metals Analysis

Parameter	Sample Number [Units - ug/l] MK04SW16	MK04SW17
Aluminum - Total	404 *	1450 *
Antimony - Total	5.0 U	5.0 U
Arsenic - Total	4.0 U	4.0 U
Barium - Total	23.2 B	97.5 B
Beryllium - Total	3.0 U	3.0 U
Cadmium - Total	0.20 U	0.20 U
Calcium - Total	45400 BN	106000 N
Chromium - Total	10.0 U	10.0 U
Cobalt - Total	20.0 U	20.0 U
Copper - Total	5.0 U	5.0 U
Iron - Total	994 *	1920 *
Lead - Total	2.0 U	2.0 U
Magnesium - Total	10300	37800
Manganese - Total	151	591
Mercury - Total	0.20 U	0.20 U
Nickel - Total	30.0 U	35.4 B
Potassium - Total	2340 B	6430
Selenium - Total	3.0 U	3.0 U
Silver - Total	10.0 U	10.0 U
Sodium - Total	11700	35500
Thallium - Total	4.0 U	4.0 U
Vanadium - Total	20.0 U	20.0 U
Zinc - Total	10.0 U	40.8

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #4

W.O. #4065-6128-004

Sediment Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK04SD16	MK04SD17
Aluminum - Total	5510 *	8050 *
Antimony - Total	0.80 UN	0.76 UN
Arsenic - Total	30.3 N*	6.1 N*
Barium - Total	131	113
Beryllium - Total	2.2	2.7
Cadmium - Total	1.8 BNJ	2.3 BNJ
Calcium - Total	28000 B	29600 B
Chromium - Total	8.3	10.3
Cobalt - Total	107	68.3
Copper - Total	18.9	21.0
Iron - Total	47900	33500
Lead - Total	38.3	19.1
Magnesium - Total	2930 *	3190 *
Manganese - Total	3230 *	2490 *
Mercury - Total	0.03 U	0.05
Nickel - Total	183	128
Potassium - Total	912	1110
Selenium - Total	0.48 U	0.45 U
Silver - Total	15.6 U	1.5 U
Sodium - Total	178 B	255 B
Thallium - Total	0.64 U	0.61 U
Vanadium - Total	32.7 B*	17.9 *
Zinc - Total	247 *	199 *

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #4

Soil Boring Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK04SB14	MK04SB15	MK04SB16	MK04SB17
Aluminum - Total	4770	3640	3710	23500
Antimony - Total	0.61 U	0.57 U	0.55 U	0.70 U
Arsenic - Total	3.1	2.8	2.2	10.9
Barium - Total	18.4 B	20.9 B	14.9 B	102
Beryllium - Total	0.36 U	0.34 U	0.33 U	0.71
Cadmium - Total	0.09 B	0.10 B	0.07 B	0.07 B
Calcium - Total	3150 B	4920 B	2100 B	6010 B
Chromium - Total	9.0	5.3	3.7	17.0
Cobalt - Total	3.1 B	3.1 B	3.1 B	21.5
Copper - Total	6.0	6.9	0.55 U	62.1
Iron - Total	12600	10300	5140	37800
Lead - Total	6.2	7.5	5.6	28.0
Magnesium - Total	1000	915	630	1520
Manganese - Total	124	162	63.1	124
Mercury - Total	0.03	0.02 U	0.08	0.10
Nickel - Total	7.9	8.3	4.7	108
Potassium - Total	456 B	478 B	175 B	1120
Selenium - Total	0.37 U	0.34 U	0.33 U	0.56 B
Silver - Total	0.05 U	0.05 U	1.10 U	1.40 U
Sodium - Total	170 B	153 B	145 B	295 B
Thallium - Total	0.49 U	0.45 U	0.44 U	0.56 U
Vanadium - Total	20.2	10.8	7.4	26.3
Zinc - Total	20.7	22.6	65.3	76.9

Monitoring Well Samples

Total Metals Analysis

Parameter	Sample Number [Units - ug/l] MK04MW22	MK04MW23	MK04MW24
Aluminum - Total	Unable to	Unable to	26000
Antimony - Total	collect	collect	5.0 UN
Arsenic - Total	adequate	adequate	21.0
Barium - Total	sample.	sample.	184 B
Beryllium - Total	No	No	3.0 U
Cadmium - Total	analysis	analysis	0.40 BN
Calcium - Total	conducted	conducted	769000 N
Chromium - Total	for this	for this	51.8
Cobalt - Total	sample.	sample.	26.5 B
Copper - Total			35.0
Iron - Total			93800
Lead - Total			18.0
Magnesium - Total			70800
Manganese - Total			1530 N
Mercury - Total			0.20 U
Nickel - Total			115
Potassium - Total			12700
Selenium - Total			4.0 BN
Silver - Total			0.20 U
Sodium - Total			11300
Thallium - Total			4.0 U
Vanadium - Total			51.0
Zinc - Total			166

PMU #5

This PMU contains sources which influence Scheid, Kuebelar and Olenacher Ditches. The PMU is primarily bordered on the east by Patrol Rd and Columbus Ave, on the west by Snake and Taft Rd, on the south by Patrol and on the north by N Magazine Rd.

Surface Soil Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK05SS28	MK05SS29	MK05SS30	MK05SS31
1,1-Dichloroethane	6 U	6 U	5 U	5 U
1,1-Dichloroethene	6 U	6 U	5 U	5 U
1,1,1-Trichloroethane	6 U	6 U	5 U	5 U
1,1,2-Trichloroethane	6 U	6 U	5 U	5 U
1,1,2,2-Tetrachloroethane	6 U	6 U	5 U	5 U
1,2-Dichloroethane	6 U	6 U	5 U	5 U
1,2-Dichloroethene (Total)	6 U	6 U	5 U	5 U
1,2-Dichloropropane	6 U	6 U	5 U	5 U
2-Butanone	12 U	12 U	10 U	10 U
2-Hexanone	12 U	12 U	10 U	10 U
4-Methyl-2-pentanone	12 U	12 U	10 U	10 U
Acetone	12 U	12 U	10 U	10 U
Benzene	6 U	6 U	5 U	5 U
Bromodichloromethane	6 U	6 U	5 U	5 U
Bromoform	6 U	6 U	5 U	5 U
Bromomethane	12 U	12 U	10 U	10 U
Carbon Disulfide	6 U	6 U	5 U	5 U
Carbon Tetrachloride	6 U	6 U	5 U	5 U
Chlorobenzene	6 U	6 U	5 U	5 U
Chloroethane	12 U	12 U	10 U	10 U
Chloroform	6 U	6 U	5 U	5 U
Chloromethane	12 U	12 U	10 U	10 U
cis-1,3-Dichloropropene	6 U	6 U	5 U	5 U
Dibromochloromethane	6 U	6 U	5 U	5 U
Ethyl benzene	6 U	6 U	5 U	5 U
Methylene chloride	6 U	6 U	0.9 J	5 U
Styrene	6 U	6 U	5 U	5 U
Tetrachloroethene	6 U	6 U	5 U	5 U
Toluene	22	13	1 J	15
Total Xylenes	6 U	6 U	5 U	5 U
trans-1,3-Dichloropropene	6 U	6 U	5 U	5 U
Trichloroethene	6 U	6 U	5 U	0.8 J
Vinyl acetate	12 U	12 U	10 U	10 U
Vinyl chloride	12 U	12 U	10 U	10 U

Surface Water Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK05SW18	MK05SW19	MK05SW20
1,1-Dichloroethane	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U
1,2-Dichloroethene (Total)	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U
2-Butanone	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U
4-Methyl-2-pentanone	10 U	10 U	10 U
Acetone	10 U	10 U	10 U
Benzene	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U
Carbon Disulfide	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U
cis-1,3-Dichloropropene	5 U	5 U	5 U
Dibromochloromethane	5 U	5 U	5 U
Ethyl benzene	5 U	5 U	5 U
Methylene chloride	5 U	5 U	5 U
Styrene	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U
Toluene	5 U	5 U	5 U
Total Xylenes	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U
Vinyl acetate	10 U	10 U	10 U
Vinyl chloride	10 U	10 U	10 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Sediment Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK05SD18	MK05SD19	MK05SD20
1,1-Dichloroethane	7 U	7 U	8 U
1,1-Dichloroethene	7 U	7 U	8 U
1,1,1-Trichloroethane	7 U	7 U	8 U
1,1,2-Trichloroethane	7 U	7 U	8 U
1,1,2,2-Tetrachloroethane	7 U	7 U	8 U
1,2-Dichloroethane	7 U	7 U	8 U
1,2-Dichloroethene (Total)	7 U	7 U	8 U
1,2-Dichloropropane	7 U	7 U	8 U
2-Butanone	8 J	14 U	15 U
2-Hexanone	15 U	14 U	15 U
4-Methyl-2-pentanone	15 U	14 U	15 U
Acetone	57	14 U	32
Benzene	7 U	7 U	8 U
Bromodichloromethane	7 U	7 U	8 U
Bromoform	7 U	7 U	8 U
Bromomethane	15 U	14 U	15 U
Carbon Disulfide	7 U	7 U	8 U
Carbon Tetrachloride	7 U	7 U	8 U
Chlorobenzene	7 U	7 U	8 U
Chloroethane	15 U	14 U	15 U
Chloroform	7 U	7 U	8 U
Chloromethane	15 U	14 U	15 U
cis-1,3-Dichloropropene	7 U	7 U	8 U
Dibromochloromethane	7 U	7 U	8 U
Ethyl benzene	7 U	7 U	8 U
Methylene chloride	1 J	1 J	1 J
Styrene	7 U	7 U	8 U
Tetrachloroethene	7 U	7 U	8 U
Toluene	7 U	7 U	1 J
Total Xylenes	7 U	7 U	8 U
trans-1,3-Dichloropropene	7 U	7 U	8 U
Trichloroethene	7 U	7 U	8 U
Vinyl acetate	15 U	14 U	15 U
Vinyl chloride	15 U	14 U	15 U

Soil Boring Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/kg]
1,1-Dichloroethane	
1,1-Dichloroethene	No monitoring wells installed in this PMU.
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	
1,1,2,2-Tetrachloroethane	
1,2-Dichloroethane	
1,2-Dichloroethene (Total)	
1,2-Dichloropropane	
2-Butanone	
2-Hexanone	
4-Methyl-2-pentanone	
Acetone	
Benzene	
Bromodichloromethane	
Bromoform	
Bromomethane	
Carbon Disulfide	
Carbon Tetrachloride	
Chlorobenzene	
Chloroethane	
Chloroform	
Chloromethane	
cis-1,3-Dichloropropene	
Dibromochloromethane	
Ethyl benzene	
Methylene chloride	
Styrene	
Tetrachloroethene	
Toluene	
Total Xylenes	
trans-1,3-Dichloropropene	
Trichloroethene	
Vinyl acetate	
Vinyl chloride	

Monitoring Well Samples

Volatile Organic Analysis

Parameter	Sample Number [Units - ug/l]
1,1-Dichloroethane	
1,1-Dichloroethene	No monitoring wells installed in this PMU.
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	
1,1,2,2-Tetrachloroethane	
1,2-Dichloroethane	
1,2-Dichloroethene (Total)	
1,2-Dichloropropane	
2-Butanone	
2-Hexanone	
4-Methyl-2-pentanone	
Acetone	
Benzene	
Bromodichloromethane	
Bromoform	
Bromomethane	
Carbon Disulfide	
Carbon Tetrachloride	
Chlorobenzene	
Chloroethane	
Chloroform	
Chloromethane	
cis-1,3-Dichloropropene	
Dibromochloromethane	
Ethyl benzene	
Methylene chloride	
Styrene	
Tetrachloroethene	
Toluene	
Total Xylenes	
trans-1,3-Dichloropropene	
Trichloroethene	
Vinyl acetate	
Vinyl chloride	

PMU #5

This PMU contains sources which influence Scheid, Kuebelar and Olenacher Ditches. The PMU is primarily bordered on the east by Patrol Rd and Columbus Ave, on the west by Snake and Taft Rd, on the south by Patrol and on the north by N Magazine Rd.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK05SS28	MK05SS29	MK05SS30	MK05SS31
1,2-Dichlorobenzene	390 U	390 U	No analysis conducted for this sample.	No analysis conducted for this sample.
1,2,4-Trichlorobenzene	390 U	390 U		
1,3-Dichlorobenzene	390 U	390 U		
1,4-Dichlorobenzene	390 U	390 U		
2-Chloronaphthalene	390 U	390 U		
2-Chlorophenol	390 U	390 U		
2-Methylnaphthalene	390 U	390 U		
2-Methylphenol	390 U	390 U		
2-Nitroaniline	1900 U	1900 U		
2-Nitrophenol	390 U	390 U		
2,4-Dichlorophenol	390 U	390 U		
2,4-Dimethylphenol	390 U	390 U		
2,4-Dinitrophenol	1900 U	1900 U		
2,4-Dinitrotoluene	390 U	390 U		
2,4,5-Trichlorophenol	1900 U	1900 U		
2,4,6-Trichlorophenol	390 U	390 U		
2,6-Dinitrotoluene	390 U	390 U		
3-Nitroaniline	1900 U	1900 U		
3,3'-Dichlorobenzidine	790 U	780 U		
4-Bromophenyl phenyl ether	390 U	390 U		
4-Chloro-3-methylphenol	390 U	390 U		
4-Chloroaniline	390 U	390 U		
4-Chlorodiphenylether	390 U	390 U		
4-Methylphenol	390 U	390 U		
4-Nitroaniline	1900 U	1900 U		
4-Nitrophenol	1900 U	1900 U		
4,6-Dinitro-2-methylphenol	1900 U	1900 U		
Acenaphthene	390 U	390 U		
Acenaphthylene	390 U	390 U		
Anthracene	390 U	390 U		
Benzoic acid	1900 U	1900 U		
Benzo(a)anthracene	390 U	390 U		
Benzo(a)pyrene	390 U	390 U		
Benzo(b)fluoranthene	390 U	390 U		

PMU #5

This PMU contains sources which influence Scheid, Kuebeler and Olenacher Ditches. The PMU is primarily bordered on the east by Patrol Rd and Columbus Ave, on the west by Snake and Taft Rd, on the south by Patrol and on the north by N Magazine Rd.

Surface Soil Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK05SS28	MK05SS29	MK05SS30	MK05SS31
Benzo(ghi)perylene	390 U	390 U	No analysis	No analysis
Benzo(k)fluoranthene	390 U	390 U	conducted	conducted
Benzyl alcohol	390 U	390 U	for this	for this
Bis(2-chloroethoxy) methane	390 U	390 U	sample.	sample.
Bis(2-chloroethyl) ether	390 U	390 U		
Bis(2-chloroisopropyl) ether	390 U	390 U		
Bis(2-ethylhexyl) phthalate	390 U	390 U		
Butyl benzyl phthalate	390 U	390 U		
Chrysene	390 U	390 U		
Dibenzofuran	390 U	390 U		
Dibenzo(a,h)anthracene	390 U	390 U		
Diethyl phthalate	390 U	390 U		
Dimethyl phthalate	390 U	390 U		
Di-n-butyl phthalate	390 U	390 U		
Di-n-octyl phthalate	390 U	390 U		
Fluoranthene	390 U	390 U		
Fluorene	390 U	390 U		
Hexachlorobenzene	390 U	390 U		
Hexachlorobutadiene	390 U	390 U		
Hexachlorocyclopentadiene	390 U	390 U		
Hexachloroethane	390 U	390 U		
Indeno(1,2,3-cd)pyrene	390 U	390 U		
Isophorone	390 U	390 U		
Naphthalene	390 U	390 U		
Nitrobenzene	390 U	390 U		
N-Nitroso-Di-n-propylamine	390 U	390 U		
N-nitrosodiphenylamine	390 U	390 U		
Pentachlorophenol	1900 U	1900 U		
Phenanthrene	390 U	390 U		
Phenol	390 U	390 U		
Pyrene	390 U	390 U		

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number (Units - ug/l) MK05SW18	MK05SW19	MK05SW20
1,2-Dichlorobenzene	10 U	10 U	12 U
1,2,4-Trichlorobenzene	10 U	10 U	12 U
1,3-Dichlorobenzene	10 U	10 U	12 U
1,4-Dichlorobenzene	10 U	10 U	12 U
2-Chloronaphthalene	10 U	10 U	12 U
2-Chlorophenol	10 U	10 U	12 U
2-Methylnaphthalene	10 U	10 U	12 U
2-Methylphenol	10 U	10 U	12 U
2-Nitroaniline	51 U	50 U	62 U
2-Nitrophenol	10 U	10 U	12 U
2,4-Dichlorophenol	10 U	10 U	12 U
2,4-Dimethylphenol	10 U	10 U	12 U
2,4-Dinitrophenol	51 U	50 U	62 U
2,4-Dinitrotoluene	10 U	10 U	12 U
2,4,5-Trichlorophenol	51 U	50 U	62 U
2,4,6-Trichlorophenol	10 U	10 U	12 U
2,6-Dinitrotoluene	10 U	10 U	12 U
3-Nitroaniline	51 U	50 U	62 U
3,3'-Dichlorobenzidine	20 U	20 U	25 U
4-Bromophenyl phenyl ether	10 U	10 U	12 U
4-Chloro-3-methylphenol	10 U	10 U	12 U
4-Chloroaniline	10 U	10 U	12 U
4-Chlorodiphenylether	10 U	10 U	12 U
4-Methylphenol	10 U	10 U	12 U
4-Nitroaniline	51 U	50 U	62 U
4-Nitrophenol	51 U	50 U	62 U
4,6-Dinitro-2-methylphenol	51 U	50 U	62 U
Acenaphthene	10 U	10 U	12 U
Acenaphthylene	10 U	10 U	12 U
Anthracene	10 U	10 U	12 U
Benzoic acid	51 U	50 U	62 U
Benzo(a)anthracene	10 U	10 U	12 U
Benzo(a)pyrene	10 U	10 U	12 U
Benzo(b)fluoranthene	10 U	10 U	12 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

PMU #5

W.O. #4065-6128-004

Surface Water Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l] MK05SW18	MK05SW19	MK05SW20
Benzo(ghi)perylene	10 U	10 U	12 U
Benzo(k)fluoranthene	10 U	10 U	12 U
Benzyl alcohol	10 U	10 U	12 U
Bis(2-chloroethoxy) methane	10 U	10 U	12 U
Bis(2-chloroethyl) ether	10 U	10 U	12 U
Bis(2-chloroisopropyl) ether	10 U	10 U	12 U
Bis(2-ethylhexyl) phthalate	10 U	10 U	12 U
Butyl benzyl phthalate	10 U	10 U	12 U
Chrysene	10 U	10 U	12 U
Dibenzofuran	10 U	10 U	12 U
Dibenzo(a,h)anthracene	10 U	10 U	12 U
Diethyl phthalate	10 U	10 U	12 U
Dimethyl phthalate	10 U	10 U	12 U
Di-n-butyl phthalate	10 U	10 U	12 U
Di-n-octyl phthalate	10 U	10 U	12 U
Fluoranthene	10 U	10 U	12 U
Fluorene	10 U	10 U	12 U
Hexachlorobenzene	10 U	10 U	12 U
Hexachlorobutadiene	10 U	10 U	12 U
Hexachlorocyclopentadiene	10 U	10 U	12 U
Hexachloroethane	10 U	10 U	12 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	12 U
Isophorone	10 U	10 U	12 U
Naphthalene	10 U	10 U	12 U
Nitrobenzene	10 U	10 U	12 U
N-Nitroso-Di-n-propylamine	10 U	10 U	12 U
N-nitrosodiphenylamine	10 U	10 U	12 U
Pentachlorophenol	51 U	50 U	62 U
Phenanthrene	10 U	10 U	12 U
Phenol	10 U	10 U	12 U
Pyrene	10 U	10 U	12 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Sediment Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK05SD18	MK05SD19	MK05SD20
1,2-Dichlorobenzene	540 U	480 U	400 U
1,2,4-Trichlorobenzene	540 U	480 U	400 U
1,3-Dichlorobenzene	540 U	480 U	400 U
1,4-Dichlorobenzene	540 U	480 U	400 U
2-Chloronaphthalene	540 U	480 U	400 U
2-Chlorophenol	540 U	480 U	400 U
2-Methylnaphthalene	76 J	92 J	400 U
2-Methylphenol	540 U	480 U	400 U
2-Nitroaniline	2600 U	2300 U	1900 U
2-Nitrophenol	540 U	480 U	400 U
2,4-Dichlorophenol	540 U	480 U	400 U
2,4-Dimethylphenol	540 U	480 U	400 U
2,4-Dinitrophenol	2600 U	2300 U	1900 U
2,4-Dinitrotoluene	540 U	480 U	400 U
2,4,5-Trichlorophenol	2600 U	2300 U	1900 U
2,4,6-Trichlorophenol	540 U	480 U	400 U
2,6-Dinitrotoluene	540 U	480 U	400 U
3-Nitroaniline	2600 U	2300 U	1900 U
3,3'-Dichlorobenzidine	1100 U	970 U	790 U
4-Bromophenyl phenyl ether	540 U	480 U	400 U
4-Chloro-3-methylphenol	540 U	480 U	400 U
4-Chloroaniline	540 U	480 U	400 U
4-Chlorodiphenylether	540 U	480 U	400 U
4-Methylphenol	540 U	480 U	400 U
4-Nitroaniline	2600 U	2300 U	1900 U
4-Nitrophenol	2600 U	2300 U	1900 U
4,6-Dinitro-2-methylphenol	2600 U	2300 U	1900 U
Acenaphthene	540 U	480 U	400 U
Acenaphthylene	540 U	480 U	400 U
Anthracene	540 U	480 U	400 U
Benzoic acid	2600 U	2300 UJ	1900 U
Benzo(a)anthracene	540 U	480 U	400 U
Benzo(a)pyrene	540 U	67 J	400 U
Benzo(b)fluoranthene	540 U	130 J	400 U

Sediment Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/kg] MK05SD18	MK05SD19	MK05SD20
Benzo(ghi)perylene	540 U	41 J	400 U
Benzo(k)fluoranthene	540 U	480 U	400 U
Benzyl alcohol	540 U	480 U	400 U
Bis(2-chloroethoxy) methane	540 U	480 U	400 U
Bis(2-chloroethyl) ether	540 U	480 U	400 U
Bis(2-chloroisopropyl) ether	540 U	480 U	400 U
Bis(2-ethylhexyl) phthalate	940 U	480 U	1100 U
Butyl benzyl phthalate	540 U	480 U	400 U
Chrysene	540 U	92 J	400 U
Dibenzofuran	540 U	480 U	400 U
Dibenzo(a,h)anthracene	540 U	480 U	400 U
Diethyl phthalate	540 U	480 U	400 U
Dimethyl phthalate	540 U	480 U	400 U
Di-n-butyl phthalate	540 U	480 U	400 U
Di-n-octyl phthalate	540 U	480 U	400 U
Fluoranthene	540 U	130 J	400 U
Fluorene	540 U	480 U	400 U
Hexachlorobenzene	540 U	480 U	400 U
Hexachlorobutadiene	540 U	480 U	400 U
Hexachlorocyclopentadiene	540 U	480 U	400 U
Hexachloroethane	540 U	480 U	400 U
Indeno(1,2,3-cd)pyrene	540 U	45 J	400 U
Isophorone	540 U	480 U	400 U
Naphthalene	540 U	29 J	400 U
Nitrobenzene	540 U	480 U	400 U
N-Nitroso-Di-n-propylamine	540 U	480 U	400 U
N-nitrosodiphenylamine	540 U	480 U	400 U
Pentachlorophenol	2600 U	2300 U	1900 U
Phenanthrene	80 J	130 J	400 U
Phenol	540 U	480 U	400 U
Pyrene	540 U	120 J	400 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

SemiVolatile Organic Analysis	Soil Boring Samples Sample Number [Units - ug/kg]
Parameter	
1,2-Dichlorobenzene	
1,2,4-Trichlorobenzene	No monitoring wells installed in this PMU.
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
2-Chloronaphthalene	
2-Chlorophenol	
2-Methylnaphthalene	
2-Methylphenol	
2-Nitroaniline	
2-Nitrophenol	
2,4-Dichlorophenol	
2,4-Dimethylphenol	
2,4-Dinitrophenol	
2,4-Dinitrotoluene	
2,4,5-Trichlorophenol	
2,4,6-Trichlorophenol	
2,6-Dinitrotoluene	
3-Nitroaniline	
3,3'-Dichlorobenzidine	
4-Bromophenyl phenyl ether	
4-Chloro-3-methylphenol	
4-Chloroaniline	
4-Chlorodiphenylether	
4-Methylphenol	
4-Nitroaniline	
4-Nitrophenol	
4,6-Dinitro-2-methylphenol	
Acenaphthene	
Acenaphthylene	
Anthracene	
Benzoic acid	
Benzo(a)anthracene	
Benzo(a)pyrene	
Benzo(b)fluoranthene	

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

SemiVolatile Organic Analysis	Soil Boring Samples
Parameter	Sample Number [Units - ug/kg]
Benzo(ghi)perylene	
Benzo(k)fluoranthene	No monitoring wells installed in this PMU.
Benzyl alcohol	
Bis(2-chloroethoxy) methane	
Bis(2-chloroethyl) ether	
Bis(2-chloroisopropyl) ether	
Bis(2-ethylhexyl) phthalate	
Butyl benzyl phthalate	
Chrysene	
Dibenzofuran	
Dibenzo(a,h)anthracene	
Diethyl phthalate	
Dimethyl phthalate	
Di-n-butyl phthalate	
Di-n-octyl phthalate	
Fluoranthene	
Fluorene	
Hexachlorobenzene	
Hexachlorobutadiene	
Hexachlorocyclopentadiene	
Hexachloroethane	
Indeno(1,2,3-cd)pyrene	
Isophorone	
Naphthalene	
Nitrobenzene	
N-Nitroso-Di-n-propylamine	
N-nitrosodiphenylamine	
Pentachlorophenol	
Phenanthrene	
Phenol	
Pyrene	

Monitoring Well Samples

SemiVolatile Organic Analysis

Parameter	Sample Number [Units - ug/l]
1,2-Dichlorobenzene	
1,2,4-Trichlorobenzene	No monitoring wells installed in this PMU.
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
2-Chloronaphthalene	
2-Chlorophenol	
2-Methylnaphthalene	
2-Methylphenol	
2-Nitroaniline	
2-Nitrophenol	
2,4-Dichlorophenol	
2,4-Dimethylphenol	
2,4-Dinitrophenol	
2,4-Dinitrotoluene	
2,4,5-Trichlorophenol	
2,4,6-Trichlorophenol	
2,6-Dinitrotoluene	
3-Nitroaniline	
3,3'-Dichlorobenzidine	
4-Bromophenyl phenyl ether	
4-Chloro-3-methylphenol	
4-Chloroaniline	
4-Chlorodiphenylether	
4-Methylphenol	
4-Nitroaniline	
4-Nitrophenol	
4,6-Dinitro-2-methylphenol	
Acenaphthene	
Acenaphthylene	
Anthracene	
Benzoic acid	
Benzo(a)anthracene	
Benzo(a)pyrene	
Benzo(b)fluoranthene	

SemiVolatile Organic Analysis	Monitoring Well Samples
Parameter	Sample Number [Units - ug/l]
Benzo(ghi)perylene	
Benzo(k)fluoranthene	No monitoring wells installed in this PMU.
Benzyl alcohol	
Bis(2-chloroethoxy) methane	
Bis(2-chloroethyl) ether	
Bis(2-chloroisopropyl) ether	
Bis(2-ethylhexyl) phthalate	
Butyl benzyl phthalate	
Chrysene	
Dibenzofuran	
Dibenzo(a,h)anthracene	
Diethyl phthalate	
Dimethyl phthalate	
Di-n-butyl phthalate	
Di-n-octyl phthalate	
Fluoranthene	
Fluorene	
Hexachlorobenzene	
Hexachlorobutadiene	
Hexachlorocyclopentadiene	
Hexachloroethane	
Indeno(1,2,3-cd)pyrene	
Isophorone	
Naphthalene	
Nitrobenzene	
N-Nitroso-Di-n-propylamine	
N-nitrosodiphenylamine	
Pentachlorophenol	
Phenanthrene	
Phenol	
Pyrene	

PMU #5

This PMU contains sources which influence Scheid, Kuebelar and Olenacher Ditches. The PMU is primarily bordered on the east by Petrol Rd and Columbus Ave, on the west by Snake and Taft Rd, on the south by Petrol and on the north by N Magazine Rd.

Surface Soil Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK05SS28	MK05SS29	MK05SS30	MK05SS31
4,4'-DDD	10 U	9.5 U	No analysis	No analysis
4,4'-DDE	10 U	9.5 U	conducted	conducted
4,4'-DDT	10 U	9.5 U	for this	for this
Aldrin	5.0 U	4.8 U	sample.	sample.
Aroclor 1016	50 U	48 U		
Aroclor 1221	100 U	95 U		
Aroclor 1232	50 U	48 U		
Aroclor 1242	50 U	48 U		
Aroclor 1248	15 J	21 J		
Aroclor 1254	50 U	48 U		
Aroclor 1260	50 U	48 U		
Chlordane	50 U	48 U		
Dieldrin	10 U	9.5 U		
Endosulfan I	10 U	9.5 U		
Endosulfan II	10 U	9.5 U		
Endosulfan Sulfate	0.94 J	0.72 J		
Endrin	10 U	9.5 U		
Endrin ketone	10 U	9.5 U		
Heptachlor	5.0 U	4.8 U		
Heptachlor epoxide	5.0 U	4.8 U		
Methoxychlor	50 U	48 U		
Toxaphene	100 U	95 U		
alpha - BHC	5.0 U	4.8 U		
beta - BHC	5.0 U	4.8 U		
delta - BHC	5.0 U	4.8 U		
gamma - BHC (Lindane)	5.0 U	4.8 U		

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Surface Water Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/l] MK05SW18	MK05SW19	MK05SW20
4,4'-DDD	0.11 UJ	0.11 UJ	0.11 UJ
4,4'-DDE	0.11 U	0.11 U	0.11 U
4,4'-DDT	0.11 UJ	0.11 UJ	0.11 UJ
Aldrin	0.056 UJ	0.056 UJ	0.056 UJ
Aroclor 1016	0.56 U	0.56 U	0.56 U
Aroclor 1221	1.1 U	1.1 U	1.1 U
Aroclor 1232	0.56 U	0.56 U	0.56 U
Aroclor 1242	0.56 U	0.56 U	0.56 U
Aroclor 1248	0.56 U	0.56 U	0.56 U
Aroclor 1254	0.56 U	0.56 U	0.56 U
Aroclor 1260	0.56 U	0.56 U	0.56 U
Chlordane	0.56 U	0.56 U	0.56 U
Dieldrin	0.11 U	0.11 U	0.11 U
Endosulfan I	0.11 U	0.11 U	0.11 U
Endosulfan II	0.11 U	0.11 U	0.11 U
Endosulfan Sulfate	0.076 J	0.040 J	0.11 U
Endrin	0.11 U	0.11 U	0.11 U
Endrin ketone	0.11 U	0.11 U	0.11 U
Heptachlor	0.056 U	0.056 U	0.056 U
Heptachlor epoxide	0.056 U	0.056 U	0.056 U
Methoxychlor	0.56 U	0.56 U	0.56 U
Toxaphene	1.10 U	1.10 U	1.10 U
alpha - BHC	0.056 U	0.056 U	0.056 U
beta - BHC	0.056 U	0.056 U	0.056 U
delta - BHC	0.056 U	0.056 U	0.056 U
gamma - BHC (Lindane)	0.056 UJ	0.056 UJ	0.056 UJ

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #5

Sediment Samples

Pesticide/PCB Analysis

Parameter	Sample Number [Units - ug/kg] MK05SD18	MK05SD19	MK05SD20
4,4'-DDD	14 U	1.3 J	10 U
4,4'-DDE	14 U	11 J	10 U
4,4'-DDT	14 UJ	11 UJ	10 UJ
Aldrin	7.3 UJ	5.4 UJ	5.3 UJ
Aroclor 1016	73 U	54 U	53 U
Aroclor 1221	140 U	110 U	100 U
Aroclor 1232	73 U	54 U	53 U
Aroclor 1242	73 U	54 U	53 U
Aroclor 1248	73 U	54 U	53 U
Aroclor 1254	73 U	54 U	53 U
Aroclor 1260	73 U	54 U	53 U
Chlordane	73 U	54 U	53 U
Dieldrin	1.9 J	1.9 J	10 U
Endosulfan I	14.00 U	11.00 U	10 U
Endosulfan II	14.00 U	11.00 U	10 U
Endosulfan Sulfate	4.50 BJ	11.00 U	10 U
Endrin	14.00 U	11.00 U	10 U
Endrin ketone	14.00 U	11.00 U	10 U
Heptachlor	7.3 U	5.4 U	5.3 U
Heptachlor epoxide	7.3 U	5.4 U	5.3 U
Methoxychlor	1.6 J	2.1 J	3.7 J
Toxaphene	140 U	110 U	100 U
alpha - BHC	7.3 U	5.4 U	5.3 U
beta - BHC	7.3 U	5.4 U	5.3 U
delta - BHC	7.3 U	5.4 U	5.3 U
gamma - BHC (Lindane)	7.3 U	5.4 U	5.3 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Pesticide/PCB Analysis	Soil Boring Samples Sample Number [Units - ug/kg]
Parameter	
4,4'-DDD	
4,4'-DDE	No monitoring wells installed in ths PMU.
4,4'-DDT	
Aldrin	
Aroclor 1016	
Aroclor 1221	
Aroclor 1232	
Aroclor 1242	
Aroclor 1248	
Aroclor 1254	
Aroclor 1260	
Chlordane	
Dieldrin	
Endosulfan I	
Endosulfan II	
Endosulfan Sulfate	
Endrin	
Endrin ketone	
Heptachlor	
Heptachlor epoxide	
Methoxychlor	
Toxaphene	
alpha - BHC	
beta - BHC	
delta - BHC	
gamma - BHC (Lindane)	

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #5

Pesticide/PCB Analysis

Parameter	Monitoring Well Samples Sample Number [Units - ug/l]
4,4'-DDD	
4,4'-DDE	No monitoring wells installed in ths PMU.
4,4'-DDT	
Aldrin	
Aroclor 1016	
Aroclor 1221	
Aroclor 1232	
Aroclor 1242	
Aroclor 1248	
Aroclor 1254	
Aroclor 1260	
Chlordane	
Dieldrin	
Endosulfan I	
Endosulfan II	
Endosulfan Sulfate	
Endrin	
Endrin ketone	
Heptachlor	
Heptachlor epoxide	
Methoxychlor	
Toxaphene	
alpha - BHC	
beta - BHC	
delta - BHC	
gamma - BHC (Lindane)	

PMU #5

This PMU contains sources which influence Scheid, Kuebelar and Olenacher Ditches. The PMU is primarily bordered on the east by Patrol Rd and Columbus Ave, on the west by Snake and Taft Rd, on the south by Patrol and on the north by N Magazine Rd.

Surface Soil Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK05SS28	MK05SS29	MK05SS30	MK05SS31
2-Nitrotoluene	64 U	64 U	No analysis	No analysis
2,4-Dinitrotoluene	57 U	57 U	conducted	conducted
2,4,6-Trinitrotoluene	37 U	37 U	for this	for this
2,6-Dinitrotoluene	57 U	57 U	sample.	sample.
3-Nitrotoluene	86 U	86 U		
4-Nitrotoluene	80 U	80 U		
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	65 U	65 U		
m-Dinitrobenzene	31 U	31 U		
Methyl-2,4,6-trinitrophenylnitramine	44 U	44 U		
Nitrobenzene	41 U	41 U		
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	34 U	34 U		
sym-Trinitrobenzene	47 U	47 U		

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Surface Water Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/l] MK05SW18	MK05SW19	MK05SW20
2-Nitrotoluene	53 U	53 U	53 U
2,4-Dinitrotoluene	47 U	47 U	47 U
2,4,6-Trinitrotoluene	31 U	31 U	31 U
2,6-Dinitrotoluene	47 U	47 U	47 U
3-Nitrotoluene	71 U	71 U	71 U
4-Nitrotoluene	66 U	66 U	66 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	54 U	54 U	54 U
m-Dinitrobenzene	26 U	26 U	26 U
Methyl-2,4,6-trinitrophenylnitramine	37 U	37 U	37 U
Nitrobenzene	34 U	34 U	34 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	28 U	28 U	28 U
sym-Trinitrobenzene	39 U	39 U	39 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Sediment Samples

Nitroexplosives Analysis

Parameter	Sample Number [Units - ug/kg] MK05SD18	MK05SD19	MK05SD20
2-Nitrotoluene	88 U	79 U	64 U
2,4-Dinitrotoluene	78 U	70 U	57 U
2,4,6-Trinitrotoluene	52 U	46 U	37 U
2,6-Dinitrotoluene	78 U	70 U	57 U
3-Nitrotoluene	120 U	100 U	86 U
4-Nitrotoluene	110 U	98 U	80 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	90 U	80 U	65 U
m-Dinitrobenzene	43 U	39 U	31 U
Methyl-2,4,6-trinitrophenylnitramine	62 U	55 U	44 U
Nitrobenzene	57 U	51 U	41 U
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	47 UJ	42 UJ	34 UJ
sym-Trinitrobenzene	65 U	58 U	47 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Nitroexplosives Analysis	Soil Boring Samples Sample Number (Units - ug/kg)
Parameter	
2-Nitrotoluene	
2,4-Dinitrotoluene	No monitoring wells installed in this PMU.
2,4,6-Trinitrotoluene	
2,6-Dinitrotoluene	
3-Nitrotoluene	
4-Nitrotoluene	
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	
m-Dinitrobenzene	
Methyl-2,4,6-trinitrophenylnitramine	
Nitrobenzene	
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	
sym-Trinitrobenzene	

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Nitroexplosives Analysis

Parameter	Monitoring Well Samples Sample Number [Units - ug/l]
2-Nitrotoluene	
2,4-Dinitrotoluene	No monitoring wells installed in this PMU.
2,4,6-Trinitrotoluene	
2,6-Dinitrotoluene	
3-Nitrotoluene	
4-Nitrotoluene	
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	
m-Dinitrobenzene	
Methyl-2,4,6-trinitrophenylnitramine	
Nitrobenzene	
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	
sym-Trinitrobenzene	

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #5

This PMU contains sources which influence Scheid, Kuebelar and Olenacher Ditches. The PMU is primarily bordered on the east by Patrol Rd and Columbus Ave, on the west by Snake and Taft Rd, on the south by Patrol and on the north by N Magazine Rd.

Surface Soil Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK05SS28	MK05SS29	MK05SS30	MK05SS31
Aluminum - Soluble				
Antimony - Soluble	Not Applicable.			
Arsenic - Soluble				
Barium - Soluble				
Beryllium - Soluble				
Cadmium - Soluble				
Calcium - Soluble				
Chromium - Soluble				
Cobalt - Soluble				
Copper - Soluble				
Iron - Soluble				
Lead - Soluble				
Magnesium - Soluble				
Manganese - Soluble				
Mercury - Soluble				
Nickel - Soluble				
Potassium - Soluble				
Selenium - Soluble				
Silver - Soluble				
Sodium - Soluble				
Thallium - Soluble				
Vanadium - Soluble				
Zinc - Soluble				

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #5

Surface Water Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - ug/l] MK05SW18	MK05SW19	MK05SW20
Aluminum - Soluble	70 U	70 U	70 U
Antimony - Soluble	5.0 U	5.0 U	5.0 U
Arsenic - Soluble	4.0 U	4.0 U	4.0 U
Barium - Soluble	20.0 U	38.6 B	131 B
Beryllium - Soluble	3.0 U	3.0 U	3.0 U
Cadmium - Soluble	0.20 U	0.20 U	0.20 U
Calcium - Soluble	40800 B	24100 B	63300
Chromium - Soluble	10.0 U	10.0 U	10.0 U
Cobalt - Soluble	20.0 U	20.0 U	20.0 U
Copper - Soluble	5.0 U	5.0 U	5.0 U
Iron - Soluble	365	826	182
Lead - Soluble	2.0 U	2.0 U	2.0 U
Magnesium - Soluble	15100	9350	25400
Manganese - Soluble	1530	2290	227
Mercury - Soluble	0.20 U	0.20 U	0.20 U
Nickel - Soluble	38.20 B	54.10	30.00 U
Potassium - Soluble	3250 B	3310 B	8510
Selenium - Soluble	3.0 U	3.0 U	3.0 U
Silver - Soluble	10.0 U	10.0 U	10.0 U
Sodium - Soluble	15200	3160 B	66800
Thallium - Soluble	4.0 U	4.0 U	4.0 U
Vanadium - Soluble	20.0 U	20.0 U	20.0 U
Zinc - Soluble	10.7 B	10.0 U	10.0 U

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Sediment Samples

Soluble Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK05SD18	MK05SD19	MK05SD20
Aluminum - Soluble			
Antimony - Soluble	Not Applicable.		
Arsenic - Soluble			
Barium - Soluble			
Beryllium - Soluble			
Cadmium - Soluble			
Calcium - Soluble			
Chromium - Soluble			
Cobalt - Soluble			
Copper - Soluble			
Iron - Soluble			
Lead - Soluble			
Magnesium - Soluble			
Manganese - Soluble			
Mercury - Soluble			
Nickel - Soluble			
Potassium - Soluble			
Selenium - Soluble			
Silver - Soluble			
Sodium - Soluble			
Thallium - Soluble			
Vanadium - Soluble			
Zinc - Soluble			

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY

W.O. #4065-6128-004

PMU #5

Soluble Metals Analysis	Soil Boring Samples
	Sample Number (Units - mg/kg)
Parameter	
Aluminum - Soluble	No monitoring wells installed within this PMU.
Antimony - Soluble	
Arsenic - Soluble	
Barium - Soluble	
Beryllium - Soluble	
Cadmium - Soluble	
Calcium - Soluble	
Chromium - Soluble	
Cobalt - Soluble	
Copper - Soluble	
Iron - Soluble	
Lead - Soluble	
Magnesium - Soluble	
Manganese - Soluble	
Mercury - Soluble	
Nickel - Soluble	
Potassium - Soluble	
Selenium - Soluble	
Silver - Soluble	
Sodium - Soluble	
Thallium - Soluble	
Vanadium - Soluble	
Zinc - Soluble	

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Monitoring Well Samples

Soluble Metals Analysis

Sample Number [Units - ug/l]

Parameter	
Aluminum - Soluble	
Antimony - Soluble	No monitoring wells installed within this PMU.
Arsenic - Soluble	
Barium - Soluble	
Beryllium - Soluble	
Cadmium - Soluble	
Calcium - Soluble	
Chromium - Soluble	
Cobalt - Soluble	
Copper - Soluble	
Iron - Soluble	
Lead - Soluble	
Magnesium - Soluble	
Manganese - Soluble	
Mercury - Soluble	
Nickel - Soluble	
Potassium - Soluble	
Selenium - Soluble	
Silver - Soluble	
Sodium - Soluble	
Thallium - Soluble	
Vanadium - Soluble	
Zinc - Soluble	

PMU #5

This PMU contains sources which influence Scheid, Kuebelar and Olenacher Ditches. The PMU is primarily bordered on the east by Patrol Rd and Columbus Ave, on the west by Snake and Taft Rd, on the south by Patrol and on the north by N Magazine Rd.

Surface Soil Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK05SS28	MK05SS29	MK05SS30	MK05SS31
Aluminum - Total	10600 *	11200 *	4350 *	281 *
Antimony - Total	0.59 U	0.57 U	0.50 U	0.49 U
Arsenic - Total	10.0	9.5	0.30 B	0.29 U
Barium - Total	93.0 *	86.1 *	58.9 *	6.9 B*
Beryllium - Total	0.84	0.71	0.30 U	0.30 U
Cadmium - Total	0.25 BN	0.20 BN	0.13 BN	0.06 BN
Calcium - Total	5210 *	3080 *	3870 *	2610 *
Chromium - Total	13.1 *	14.0 *	16.4 *	1.0 U*
Cobalt - Total	5.9 B*	6.7 *	2.0 U*	2.0 U*
Copper - Total	20.7	18.3	0.50 U	0.50 U
Iron - Total	22200 *	26600 *	6960 *	1230 *
Lead - Total	8.9 *	9.7 *	1310 *	155 *
Magnesium - Total	2230 *	2260 *	377 B*	271 B*
Manganese - Total	141 *	143 *	28.4 *	26.2 *
Mercury - Total	0.02	0.03	0.02 U	0.02 U
Nickel - Total	30.2	27.6	3.0 U	3.0 U
Potassium - Total	1380 *	1210 *	567 *	54.9 B*
Selenium - Total	0.36 U	0.34 U	0.30 U	0.29 U
Silver - Total	1.2 U	1.2 U	1.0 U	1.0 U
Sodium - Total	125 B	132 B	228 B	89.5 B
Thallium - Total	0.47 U	0.45 U	0.40 U	0.39 U
Vanadium - Total	23.6 *	24.4 *	6.8 *	2.0 U*
Zinc - Total	131	97.4	49.4	64.7

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Surface Water Samples

Total Metals Analysis

Parameter	Sample Number [Units - ug/l] MK05SW18	MK05SW19	MK05SW20
Aluminum - Total	145 B*	402 *	952 *
Antimony - Total	5.0 U	5.0 U	5.0 U
Arsenic - Total	4.0 U	4.0 U	4.0 U
Barium - Total	29.6 B	40.7 B	133 B
Beryllium - Total	3.0 U	3.0 U	3.0 U
Cadmium - Total	0.20 U	0.20 U	0.20 U
Calcium - Total	42000 BN	28800 BN	64700 N
Chromium - Total	10.0 U	10.0 U	10.0 U
Cobalt - Total	20.0 U	20.0 U	20.0 U
Copper - Total	5.0 U	5.0 U	5.0 U
Iron - Total	2630 *	4820 *	1570 *
Lead - Total	2.0 B	2.0 U	2.0 U
Magnesium - Total	14800	8780	23800
Manganese - Total	1580	2220	266
Mercury - Total	0.20 U	0.20 U	0.20 U
Nickel - Total	52.5	62.8	30.0 U
Potassium - Total	3300 B	3200 B	8220
Selenium - Total	3.0 U	3.0 U	3.0 U
Silver - Total	10.0 U	10.0 U	10.0 U
Sodium - Total	15600	3660 B	63300
Thallium - Total	4.0 U	4.0 U	4.0 U
Vanadium - Total	20.0 U	20.0 U	20.0 U
Zinc - Total	10.0 U	11.7 B	20.1

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Sediment Samples

Total Metals Analysis

Parameter	Sample Number [Units - mg/kg] MK05SD18	MK05SD19	MK05SD20
Aluminum - Total	6730 *	6090 *	8110 *
Antimony - Total	0.81 UN	1.10 BN	0.59 UN
Arsenic - Total	10.5 N*	16.2 N*	7.1 N*
Barium - Total	46.0	112.0	97.0
Beryllium - Total	2.1	1.4	0.35 B
Cadmium - Total	0.27 BNJ	0.36 BNJ	0.36 BNJ
Calcium - Total	6720 B	4620 B	10900 B
Chromium - Total	6.2	10.5	13.1
Cobalt - Total	55.9	40.5	16.2
Copper - Total	33.7	44.6	16.3
Iron - Total	22500	42600	27000
Lead - Total	18.6	19.5	20.1
Magnesium - Total	793 B*	753 *	4480 *
Manganese - Total	347 *	524 *	683 *
Mercury - Total	0.03 U	0.04	0.02
Nickel - Total	65.8	68.3	44.6
Potassium - Total	978	1380	1290
Selenium - Total	0.48 U	0.45 U	0.36 U
Silver - Total	1.7 U	1.4 U	1.2 U
Sodium - Total	186 B	164 B	185 B
Thallium - Total	0.65 U	0.60 U	0.47 U
Vanadium - Total	13.2 *	32.4 B*	23.2 U*
Zinc - Total	76.4 *	123 *	130 *

Total Metals Analysis

Parameter	Soil Boring Samples Sample Number [Units - mg/kg]
Aluminum - Total	
Antimony - Total	No monitoring wells installed in this PMU.
Arsenic - Total	
Barium - Total	
Beryllium - Total	
Cadmium - Total	
Calcium - Total	
Chromium - Total	
Cobalt - Total	
Copper - Total	
Iron - Total	
Lead - Total	
Magnesium - Total	
Manganese - Total	
Mercury - Total	
Nickel - Total	
Potassium - Total	
Selenium - Total	
Silver - Total	
Sodium - Total	
Thallium - Total	
Vanadium - Total	
Zinc - Total	

NASA PLUMBROOK SI
SAMPLE RESULT SUMMARY
PMU #5

W.O. #4065-6128-004

Total Metals Analysis	Monitoring Well Samples
Parameter	Sample Number (Units - ug/l)
Aluminum - Total	
Antimony - Total	No monitoring wells installed in this PMU.
Arsenic - Total	
Barium - Total	
Beryllium - Total	
Cadmium - Total	
Calcium - Total	
Chromium - Total	
Cobalt - Total	
Copper - Total	
Iron - Total	
Lead - Total	
Magnesium - Total	
Manganese - Total	
Mercury - Total	
Nickel - Total	
Potassium - Total	
Selenium - Total	
Silver - Total	
Sodium - Total	
Thallium - Total	
Vanadium - Total	
Zinc - Total	

DATA QUALITY ASSESSMENT

1.0 INTRODUCTION

This data quality assessment reviews and summarizes data validation performed on sample analysis results for the NASA Plumbrook Site Investigation. This assessment reviews nine sample delivery groups containing surface and ground water, soil and sediment matrices and reports which data is estimated or unusable due to noncompliance with analytical protocol.

The laboratory followed U.S. EPA SW-846 methodology when analyzing samples for Volatiles, Semivolatiles, Pesticides/PCBs, Nitroaromatics and Nitroamines, Metals and Radionuclides. Level C data validation procedures followed the Department of Energy's Hazardous Waste Remedial Actions Program (HAZWRAP), DOE/HWP-65/R1. Organic and inorganic data qualifiers and their definitions used during this data validation include the following:

- "U" indicates analyte not detected and reported at the sample quantitation limit,
- "J" indicates analyte concentration is estimated,
- "UJ" indicates analyte reported at an estimated sample quantitation limit, and
- "R" indicates analyte data are unusable (compound may or may not be present).

Additional validation procedures not incorporated in the HAZWRAP include surrogate recovery compliance criteria for Pesticides/PCBs and Volatile and Semivolatile initial/continuing calibration exceedence for analytes not detected in associated samples. In these instances, professional judgement has been used where %RSD or %D is greater than or equal to 50% and less than 90% for an analyte historically not present (reported "U") and data were not qualified during this validation. If the compound has been reported as present in any of the nine sample delivery groups then that analyte result in the samples associated with the calibration criteria exceedence was qualified "UJ" during these data validation procedures.

Finally, this assessment will summarize overall data quality. It will list problems encountered during sampling and analytical procedures that influence data qualification and interpretation.

2.0 SAMPLE DELIVERY GROUP: MK01

2.1 Volatiles

The analytes in Table 2.1 have been qualified for the corresponding samples according to data validation procedures for blank contamination and should not be considered present in the samples.

Table 2.1

ANALYTE	AFFECTED SAMPLES			QUALIFICATION
Methylene Chloride	MK-01-SB01	MK-01-SD01	MK-01-SW01	"U" analyte not present
	MK-01-SB02	MK-01-SD02	MK-01-SW02	" "
	MK-01-SB03RE	MK-01-SD03	MK-01-SW03	" "
	MK-01-SB04	MK-01-SD05	MK-01-SW04	" "
			MK-01-SW05	" "
Acetone	MK-01-SB02	MK-01-SD01	MK-01-SW01	"U" analyte not present
	MK-01-SB03RE	MK-01-SD02	MK-01-SW03	" "
	MK-01-SB04	MK-01-SD03	MK-01-SW04	" "
		MK-01-SD04	MK-01-SW05	" "
		MK-01-SD05		" "
2-Butanone	MK-01-SB02	MK-01-SD02	MK-01-SD04	"U" analyte not present
	MK-01-SD01	MK-01-SD03	MK-01-SD05	" "

MK-01-SB03 has all volatile analytes, including nondetects, qualified as estimated values ("J") due to internal standard QC criteria exceedence. MK-01-01EB062992 cannot be used to validate any samples due to the time of day it was taken, therefore, any contamination in this equipment blank does not apply.

2.2 Semivolatiles

No qualification required for data validation.

2.3 Pesticides/PCBs

MK-01-SB04 and MK-01-SW02 have been qualified as estimated ("J") for aldrin and 4,4'-DDT due to calibration criteria exceedence. All data for sample MK-01-SD02 have been qualified as estimated ("J") for all analytes, including the reported nondetects, due to extraction time violation.

2.4 Nitroaromatics and Nitroamines

No qualification required for data validation.

2.5 Metals

No qualification required for data validation.

2.6 Radionuclides

No qualification required for data validation.

3.0 SAMPLE DELIVERY GROUP: MK02

3.1 Volatiles

The analytes in Table 3.1 have been qualified for the corresponding samples according to data validation procedures for blank contamination and should not be considered present in the samples.

Table 3.1

ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Toluene	MK-01-SB06 MK-01-SB07 MK-02-SB08 MK-01-SD06 MK-01-SS03 MK-01-SS04	"U" analyte not present " " " " " " " "
Chlorobenzene	MK-01-SD06	"U" analyte not present

MK-01-SW06 has been qualified as estimated ("J") for acetone due to continuing calibration criteria exceedence.

3.2 Semivolatiles

No qualification required for data validation.

3.3 Pesticides/PCBs

MK-01-SS03 and MK-01-SS04 have been qualified as estimated ("J") for aldrin and 4,4'-DDT due to calibration criteria exceedence. MK-01-SS04 has been qualified as estimated ("J") for 4,4'-DDE due to surrogate recovery exceedence.

3.4 Nitroaromatics and Nitroamines

No qualification required for data validation.

3.5 Metals

No qualification required for data validation.

3.6 Radionuclides

No qualification required for data validation.

4.0 SAMPLE DELIVERY GROUP: MK03

4.1 Volatiles

The analytes in Table 4.1 have been qualified for the corresponding samples according to data validation procedures for blank contamination and should not be considered present in the samples.

Table 4.1

ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Toluene	MK-02-SB09 MK-02-SB10 MK-02-SB12	"U" analyte not present " " " "
Chlorobenzene	MK-02-SB11	"U" analyte not present

The following samples have all volatile analytes, including reported nondetects, qualified as estimated values due to internal standard QC criteria exceedence: MK-01-SS01, MK-01-SS01RE, MK-01-SS02, MK-01-SS02RE, MK-01-SS05, MK-01-SS05RE, MK-01-SS09 and MK-01-SS09RE. MK-01-SS07 has been qualified as estimated ("J") for acetone due to calibration criteria exceedence.

4.2 Semivolatiles

MK-01-SS01 and MK-01-SS02 have been qualified as estimated ("J") for 2,4-Dinitrotoluene due to continuing calibration criteria exceedence.

4.3 Pesticides/PCBs

The following data have been qualified as estimated ("J") for aldrin and 4,4'-DDT due to calibration criteria exceedence: MK-01-SS01, MK-01-SS02 and MK-01-SS05. MK-01-SS01 and MK-01-SS02 have been qualified as estimated ("J") for heptachlor and MK-01-SS02 has been qualified as estimated ("J") for 4,4'-DDE and dieldrin due to surrogate recovery exceedence.

4.4 Nitroaromatics and Nitroamines

No qualification required for data validation.

4.5 Metals

No qualification required for data validation.

4.6 Radionuclides

No qualification required for data validation.

5.0 SAMPLE DELIVERY GROUP: MK04

5.1 Volatiles

The analytes in Table 5.1 have been qualified for the corresponding samples according to data validation procedures for continuing calibration criteria exceedence.

Table 5.1

ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Acetone	MK-02-SB13 MK-02-SD08 MK-02-SD09 MK-02-SD10	"J" estimated result " " " " " "
2-Butanone	MK-02-SD10	"J" estimated result

5.2 Semivolatiles

The analytes in Table 5.2 have been qualified for the corresponding samples according to data validation procedures for continuing calibration criteria exceedence.

Table 5.2

ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Benzo(g,h,i)perylene	MK-04-SB13	"J" estimated result
	MK-04-SB14	" "
	MK-04-SB15	"UJ" estimated nondetect
Benzoic Acid	MK-03-SB13	"UJ" estimated nondetect
	MK-04-SB14	" "
	MK-04-SB15	" "
	MK-02-SD08	" "
	MK-02-SD09	"J" estimated result
	MK-02-SD10	"UJ" estimated nondetect
	MK-02-SS13	" "
	MK-02-SS14	" "
	MK-02-SS15	" "

5.3 Pesticides/PCBs

There are no samples analyzed for pesticides/PCBs in sample delivery group MK04.

5.4 Nitroaromatics and Nitroamines

No qualification required for data validation.

5.5 Metals

No qualification required for data validation.

5.6 Radionuclides

No qualification required for data validation.

6.0 SAMPLE DELIVERY GROUP: MK05

6.1 Volatiles

The analytes in Table 6.1 have been qualified for the corresponding samples according to

data validation procedures for blank contamination and should not be considered present in the samples.

Table 6.1		
ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Methylene Chloride	MK-02-SD12 MK-03-SD14 MK-03-SD15	"U" analyte not present " " " "

6.2 Semivolatiles

No qualification required for data validation.

6.3 Pesticides/PCBs

There are no samples analyzed for pesticides/PCBs in sample delivery group MK05.

6.4 Nitroaromatics and Nitroamines

No qualification required for data validation.

6.5 Metals

No qualification required for data validation.

6.6 Radionuclides

No qualification required for data validation.

7.0 SAMPLE DELIVERY GROUP: MK06

7.1 Volatiles

No qualification required for data validation.

7.2 Semivolatiles

The analytes in Table 7.2a have been qualified for the corresponding samples according to data validation procedures for blank contamination and should not be considered present in

the samples.

Table 7.2a		
ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Bis(2-ethylhexyl)phthalate	MK-03-SD07 MK-04-SD16 MK-04-SD17 MK-05-SD18 MK-05-SD19 MK-05-SD20	"U" analyte not present " " " " " " " " " "

The analytes in Table 7.2b for the corresponding samples have been qualified according to data validation procedures for continuing calibration criteria exceedence.

Table 7.2b		
ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Benzo(g,h,i)perylene	MK-03-SD07 MK-05-SD19	"J" estimated result " "
Benzoic Acid	MK-03-SD07 MK-05-SD19	"UJ" estimated nondetect " "
Indeno(1,2,3-cd)pyrene	MK-05-SD19	"J" estimated result

7.3 Pesticides/PCBs

No qualification required for data validation.

7.4 Nitroaromatics and Nitroamines

The analytes in Table 7.4 for the corresponding samples have been qualified according to data validation procedures for continuing calibration criteria exceedence.

Table 7.4		
ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Octahydro-1,3,5,7-tetranitro-tetrazocine(HMX)	MK-03-SD07 MK-04-SD16 MK-04-SD17 MK-05-SD18 MK-05-SD19 MK-05-SD20	"UJ" estimated nondetect " " " " " " " " " "

7.5 Metals

The analytes in Table 7.5 have been qualified for the corresponding samples according to data validation procedures for continuing calibration criteria exceedence.

Table 7.5

ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Cadmium	MK-03-SD07	"J" estimated result
	MK-04-SD16	" "
	MK-04-SD17	" "
	MK-05-SD18	" "
	MK-05-SD19	" "
	MK-05-SD20	" "

7.6 Radionuclides

No qualification required for data validation.

8.0 SAMPLE DELIVERY GROUP: MK07

8.1 Volatiles

The analytes in Table 8.1 have been qualified for the corresponding samples according to data validation procedures for blank contamination and should not be considered present in the samples.

Table 8.1

ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Toluene	MK-01-MW09	"U" analyte not present
	MK-01-MW10	" "
	MK-01-MW11	" "
	MK-01-MW12	" "
	MK-01-MW13	" "
	MK-01-MW14	" "

8.2 Semivolatiles

No qualification required for data validation.

8.3 Pesticides/PCBs

The analytes in Table 8.3 have been qualified for the corresponding samples according to data validation procedures for calibration criteria exceedence.

Table 8.3

ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Aldrin	MK-01-MW12	"UJ" estimated nondetect
	MK-05-SD18	" "
	MK-05-SD19	" "
	MK-05-SD20	" "
	MK-05-SW18	" "
	MK-05-SW19	" "
	MK-05-SW20	" "
4,4'-DDT	MK-01-MW12	"UJ" estimated nondetect
	MK-05-SD18	" "
	MK-05-SD19	" "
	MK-05-SD20	" "
	MK-05-SW18	" "
	MK-05-SW19	" "
	MK-05-SW20	" "

MK-05-SD19 also has its endosulfan sulfate value changed to nondetect ("U") due to blank contamination and should not be considered present in the sample.

8.4 Nitroaromatics and Nitroamines

The following samples have all nitroaromatic and nitroamine analytes qualified as estimated, including nondetects, due to surrogate exceedence: MK-01-MW10, MK--01-MW11, MK-01-MW12, MK-01-MW14, MK-01-MW15.

8.5 Metals

No qualification required for data validation.

8.6 Radionuclides

No qualification required for data validation.

9.0 SAMPLE DELIVERY GROUP: MK08

9.1 Volatiles

MK-05-SS31 has been qualified as estimated ("J") for trichloroethane due to continuing calibration criteria exceedence.

9.2 Semivolatiles

The analytes in Table 9.2 have been qualified for the corresponding samples according to data validation procedures for continuing calibration criteria exceedence.

Table 9.2

ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Benzo(g,h,i)perylene	IT-MW01	"UJ" estimated nondetect
	MK-01-SW21	" "
	MK-02-MW16	" "
	MK-02-MW16RE	" "
	MK-03-SW22	" "
	MK-04-SS23	" "
	MK-04-SS24	" "
	MK-04-SS25	" "
	MK-04-SS26	
Benzoic Acid	MK-04-SS24	"UJ" estimated nondetect
	MK-04-SS26	" "

MK-02-MW16 and MK-02-MW16RE have the following phenols/acids qualified as estimated ("J") due to surrogate exceedence: Phenol, 2-chlorophenol, 2-methylphenol, 4-methylphenol, 2-nitrophenol, 2,4-dimethylphenol, benzoic acid, 4-chloro-3-methylphenol, 2,4,6-trichlorophenol, 2,4,5-trichlorophenol, 2,4-dinitrophenol, 4-nitrophenol, 4,6-dinitro-2-methylphenol and pentachlorophenol.

9.3 Pesticides/PCBs

No qualification required for data validation.

9.4 Nitroaromatics and Nitroamines

The following samples have all analytes qualified as estimated ("J"), including nondetects, due to surrogate recovery exceedence: IT-MW01, MK-02-MW16, MK-01-SW21 and MK-03-SW22.

9.5 Metals

No qualification required for data validation.

9.6 Radionuclides

No qualification required for data validation.

10.0 SAMPLE DELIVERY GROUP: MK09

10.1 Volatiles

MK-02-SS35, MK-02-SS35RE and MK-03-MW20 have all volatile analytes, including reported nondetects, qualified as estimated ("J") due to surrogate exceedence.

10.2 Semivolatiles

The analytes in Table 10.2 have been qualified for the corresponding samples according to data validation procedures for continuing calibration criteria exceedence.

Table 10.2

ANALYTE	AFFECTED SAMPLES	QUALIFICATION
Benzo(g,h,i)perylene	EBRA01	"UJ" estimated nondetect
	MK-02-MW17	" "
	MK-02-MW19	" "
	MK-03-MW20	" "
	MK-03-MW20DL	" "
	MK-04-MW24	" "
Benzoic Acid	EBRA01	"UJ" estimated nondetect
	MK-02-MW17	" "
	MK-02-MW19	" "
	MK-03-MW20	"J" estimated result
	MK-03-MW20DL	" "
	MK-04-MW24	" "

10.3 Pesticides/PCBs

MK-04-MW24 has been qualified as non-detect ("U") for endosulfan sulfate due to blank contamination and should not be considered present in the sample.

10.4 Nitroaromatics and Nitroamines

No qualification required for data validation.

10.5 Metals

No qualification required for data validation.

10.6 Radionuclides

No qualification required for data validation.

11.0 OVERALL DATA QUALITY

There is a general problem with low level blank contamination for common lab contaminants. Also, since trip blanks were not associated with samples in a particular cooler on the chain-of-custody forms, trip blank contamination had to be applied to all samples taken the day of the trip blank. Therefore, more sample results required qualification due to trip blank contamination indicating that the analyte should not be considered present in the sample than if trip blanks were associated with a particular cooler.

Calibration criteria exceedence, as noted, has also required a number of samples to be qualified, changing reported results to estimated ("J"). As such, these results should not be considered as quantitative. Nondetects reported as "U" by the laboratory and qualified with a "J" during data validation indicate that the sample quantitation level, the level above which the analyte is reported as being quantitatively present, is now estimated. In most instances (except for two) the laboratory followed analytical protocol for calibration. However, for data validation purposes, all compounds are required to meet minimum QC criteria, otherwise, associated data must be qualified.

It should be noted for qualification of internal standard exceedence, the laboratory followed analytical protocol and reanalyzed samples. Matrix interference is indicated when the internal standard QC criteria were exceeded for the second analyses.

There appeared to be a general problem with surrogate recovery for the water samples for Nitroaromatics and Nitroamines. Also, since the laboratory did not follow analytical protocol for continuing calibration criteria, six samples were required to be qualified as "UJ" in sample delivery group MK06.

Although uncommon, the laboratory experienced contamination for endrin endosulfate, requiring one sample to be qualified in sample delivery group MK07. Qualification during data validation is to indicate that endrin endosulfate, reported as present in the sample, can

be attributed to laboratory contamination. Also of concern are the calibration exceedences for aldrin and DDT, requiring qualification for fourteen samples as "UJ" for these analytes.

SDG: MK01

VOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
ok

%RSD/FLAGS:

Lab File ID	Compounds	%RSD	Assoc. Samples
70011	Acetone	43.2	Trip, EB, SW01-05, SW05 MS/MSD, VBLK1I, VBLK1H -flagged hits J, SW01-05 already U for BLK contam.
70033	Methylene Choride	36.3	SB01, 04, VBLK3W, VBLK3X
	Acetone	59.4	-all U's for CPD's exceeding, some due to BLK contam.
	2-Butanone	32.5	
	2-Hexanone	30.5	
70055	Acetone	43.4	SD01-05, SD05 MS/MSD, SB02, SB03, SB03RE
	2-Butanone	35.0	-all U's due to BLK contam.

D. CONTINUING CALIBRATION (FORM 7)
RRF/FLAGS:
ok

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
XK781	Chloromethane	40.3	EB, SW01-05, Trip, VBLK1H
(IC=70011)	Acetone	67.3	-all U's except TB for Acetone
	1,1,1-Trichloroethane	28.7	
	Carbon Tet	36.0	
	4-Methyl-2-Pent	48.2	
	2-Hex	51.9	
	Tetrachloro	29.9	
XK796	Vinyl Acetate	28.7	SW05 MS/MSD, VBLK1I
(IC=70011)	2-Hex	25.7	
ZK807	Chlorometh	35.8	SB01, VBLK3X
(IC=70033)			-all U's due to BLK contam.

ZK798	Chlorometh	38.2	SB04, VBLK3W
(IC=70033)	Carbon Tet	41.9	-all U's due to BLK contam.
	Bromoform	31.3	
	Tetrachloroethene	43.7	
VK745	1,2-Dichloroeth	29.8	SD01-03, SB03, VBLK5L
(IC=70055)	4-Methyl-2-Pent	37.2	-all U's due to BLK contam.
	2-Hex	52.9	
	Trans-1,3-DCP	27.7	
VK766	2-But	44.0	SB02-03RE, SD04-05, SD05 MS/MSD
(IC=70055)	4-Methyl-2-Pent	37.2	-all U's, J's with BLK qual.
	2-Hex	39.5	

E. BLANKS (FORM 4)

Blank/Compound		Assoc. Sample(s) Flagged	Corrections/Comments
Method Blank	MeCl (11)	SD01-03, SB03	corrected to non-detect
(VBLK5L)	Acetone (23)	SD01-03, SB03	" "
	MEK (7J)	SD01-03, SB03	" "
Method Blank	MEK (7J)	SB02, SB03RE, SD05	corrected to non-detect
(VBLK5M)	MeCl (7)		used TB MeCl
	Acetone (7J)		used TB Acetone
Trip Blank	MeCl (10)	SB04, SB01, SW01-05,	corrected to non-detect
(MK-01-		SB02,SB03RE,SD05	" "
01TB062993)			SD04 [Sample] > SQL & [Blank]adj
	Acetone (17)	SB04,SB02,SB03RE,	corrected to non-detect
		SD04,SD05,SW01,SW03-05	" "

F. SURROGATES (FORM 2)

ok

G. MS/MSD (FORM 3)

ok

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)

flag all results: all hits "J", all U's "UJ" for MK01SB03 (see attached exceedences)

SDG: MK01

SEMIVOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
ok

%RSD/FLAGS:
ok

D. CONTINUING CALIBRATION (FORM 7)
RRF/FLAGS:
ok

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
YI115	Benzoic Acid	28.0	EB, SW01-05, SWO5 MS/MSD
	2,4-Dinitrophenol	30.6	
YI134	Benzoic Acid	51.7	SB01-04, SD02-04, SD05 MS/MSD
	2,4-Dinitrophenol	40.8	
YI156	Benzoic Acid	32.0	SD01, SD05
YI168	Benzoic Acid	29.2	SBLK
	2,4-Dinitrophenol		

E. BLANKS (FORM 4)

Blank /Type	Assoc. Sample(s) Flagged	Corrections/Comments
ok		

F. SURROGATES (FORM 2)
Associated Sample(s) Flagged
EB06, SW03, SB04, SD04, SD05, SD05 MSD only 1 surrogate out of QC limits, no surrogate <10%

MS/MSD (Form 3)

Sample #	Comments
SW05 MS/MSD	%rec 1,2,4-Trichlorobenze (105D, 103) lim=98

Prepared by Minden Hudak & Lynn Rogozinski
Reviewed and Revised by Nancy Mount

		4-Nitrophenol (85D, 82) lim=80
SD05 MSD	%rec	Phenol (92) lim=90
		1,2,4-Trichlorobenzene (126) lim=107
		4-chloro-3-methylphenol (105) lim=103
		2,4-Dinitrotoluene (99) lim=89
	%rpd	acenaphthene

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)

ok

SDG: MK01

PESTICIDES/PCBs

A. HOLDING TIMES

MK-01-SD02 was not extracted within 7 days of collection (8 days)

B. INSTRUMENT PERFORMANCE

DDT retention time > 12 minutes
DDT breakdown < 20%
Endrin breakdown < 20%
DBC retention time shift < 1.5%

C. CALIBRATION

%RSD > 10% aldrin (11.7)
endrin (9.54)
DDT (11.67)
DBC (?)

(Qualify aldrin and DDT with "J" due to %RSD exceedence, per DOE requirements)

D. BLANKS

ok

E. COMPOUND IDENTIFICATION

ok

F. COMPOUND QUANTITATION

ok

G. SURROGATES

ok

SDG: MK01

NITROEXPLOSIVES

A. BLANKS

HITS:	Sample #	Flag (Y/N)	Comments
ok			

B. INITIAL CALIBRATION (FORM 6)

Min. Correlation Coefficient	Sample #	Comments
ok		

C. CONTINUING CALIBRATION (FORM 7)

Frequency	Sample #	Comments
ok		

D. ACCURACY, PRECISION

MS/MSD (Form 3)

EXCEEDENCES/FLAGS:	Sample #	Comments
ok		

E. SURROGATES

EXCEEDENCES/FLAGS:	Soil/Water	Sample #	Comments
ok			

SDG: MK01

METALS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)

ok

B. CALIBRATION

ICP:	Sample #	Flag (Y/N)	Comments
ok			

AA:	Sample #	Flag (Y/N)	Comments
ok			

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

D. INITIAL AND CONTINUING CALIBRATION VERIFICATION (FORM 2A)

MERCURY:	Sample #	Comments
ok		

OTHER METALS:	Analyte	Comments
ok		

E. METHOD BLANKS (FORM 3)

Blank #	Assoc. Sample(s) Flagged	Comments
ok		

F. EQUIPMENT BLANKS

Blank #	Assoc. Sample(s) Flagged	Comments
EB06 Al, Fe	none flagged	

G. LABORATORY CONTROL SAMPLES (FORM 7)

Analyte	Comments
ok	

SDG: MK02

VOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
ok

%RSD/FLAGS:

Lab File ID	Compounds	%RSD	Assoc. Samples
ok			

D. Continuing Calibration (Form 7)
RRF/FLAGS:
ok

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
H1907	Acetone	39.2	SB06-08, SD06, SS03-04, trip0701932, VBLK34
	2-Butanone	36.0	
	4-Methyl-2-Pent	27.8	
	2-Hexanol	26.4	
K5984	Chloroethane	27.9	SW06, trip0701931, VBLK62
	Acetone	56.6	
	2-Butanone	39.7	
	4-Methyl-2-Pent	26.6	

E. BLANKS (FORM 4)

Blank/Compound		Assoc. Sample(s) Flagged	Corrections/Comments
Method Blank (VBLK34)	Toluene (2J)	SB06,SB07,SS03,SS04, SB08	corrected to non-detect
	Chlorobenz (2J)	SD06	" "
Trip Blank (MK-01-02TB070193)	Chlorobenz (0.7BJ)		No chlorobenzene "hits"

Toluene - raise sample results to SQL since "hits" are <SQL and < adj[BLK] or set SQL at reported [sample] since < [BLK]adj adn >SQL

F. SURROGATES (FORM 2)
ok

G. MS/MSD (FORM 3)
ok written on COC, MS not specified, therefore, lab did not analyze

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
ok

SDG: MK02

SEMIVOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS Tuning (Form 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
ok

%RSD/FLAGS:

Instrument ID	Compounds	%RSD	Assoc. Samples
150Y	Hexachlorocyclopentadiene	37.2	SD06, SS03-04, SB06-08

D. CONTINUING CALIBRATION (FORM 7)
RRF/FLAGS:
ok

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
14433Y	bis(2-Chloroisop)Ether	37.6	SD06, SS03-04, SB08
	Benzoic Acid	38.4	
	Hexachlorocyclopent.	47.6	
	Dibenz(a,h)anthracene	29.5	
14529X	Hexachlorobenzene	25.9	SW06, SBLK04
	2,4-Dinitrophenol	25.6	
	n-Nitrosodiphenylamine	37.1	
14417Y	bis92-Chloroisop)Ether	35.7	SB06-07, SBLK17
	Benzoic Acid	32.0	
	Hexachlorocyclopent.	48.4	

NOTE: No hits for PCP under this calibration

E. BLANKS (FORM 4)

Blank /Type	Assoc. Sample(s) Flagged	Corrections/Comments
ok		

F. SURROGATES (FORM 2)
Associated Sample(s) Flagged
Soil SD06 - only 1 usrrogate out of QC limits (none flagged)

G. MS/MSD (FORM 3)

Sample #	Comments
none written on COC; not specified, therefore, lab did not run	

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)

ok

SDG: MK02

PESTICIDES/PCBs

A. HOLDING TIMES
ok

B. INSTRUMENT PERFORMANCE
DDT retention time > 12 minutes
DDT breakdown < 20%
Endrin breakdown < 20%
DBC retention time shift < 1.5%

C. CALIBRATION
%RSD > 10% aldrin (12)
endrin (9.5)
DDT (12)
DBC (?)

(Qualify aldrin and DDT with "J" due to %RSD exceedence, per DOE requirements)

. BLANKS
ok

E. COMPOUND IDENTIFICATION
ok

F. COMPOUND QUANTITATION
ok

G. SURROGATES
DBC exceeded QC limits 24-150, at 293% - flag all "hits"

SDG: MK02

NITROEXPLOSIVES

A. BLANKS

Sample #	Flag (Y/N)	Comments
ok		

B. INITIAL CALIBRATION (FORM 6)

Min. Correlation Coefficient	Sample #	Comments
ok		

C. CONTINUING CALIBRATION (FORM 7)

Sample #	Comments
ok	

D. ACCURACY, PRECISION

MS/MSD (Form 3)

EXCEEDENCES/FLAGS:	Sample #	Comments
ok		

E. SURROGATES

EXCEEDENCES/FLAGS:	Comments
ok	

SDG: MK02

METALS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)

ok

B. CALIBRATION

ICP:	Sample #	Flag (Y/N)	Comments
ok			

AA:	Sample #	Flag (Y/N)	Comments
ok			

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

D. INITIAL AND CONTINUING CALIBRATION VERIFICATION (FORM 2A)

MERCURY:	Sample #	Comments
ok		

OTHER METALS:	Analyte	Comments
ok		

E. METHOD BLANKS (FORM 3)

Blank #	Comments
ok	

F. EQUIPMENT BLANKS

Blank #	Comments
ok	

G. LABORATORY CONTROL SAMPLES (FORM 7)

Analyte	Comments
ok	

SDG: MK03

VOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
ok

%RSD/FLAGS:

Lab File ID	Compounds	%RSD	Assoc. Samples
ok			

D. CONTINUING CALIBRATION (FORM 7)
RRF/FLAGS:
ok

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
G6269	Vinyl Acetate	37.6	EB070793, SS01, SS01RE, SS02, SS02RE, SS05-12, SS05RE, SS09RE, trip076931, VBLK80
H1919	Acetone	60.4	SB09-12, trip0706932, SB12MS/MSD
	2-Butanone(MEK)	45.4	

E. BLANKS (FORM 4)

Blank/Compound		Assoc. Sample(s) Flagged	Corrections/Comments
Method Blank	Toluene (0.6J)	SB09, SB10, SB12	changed to non-detects
(VBLK35)	Chlorobenz (0.8J)	SB11	[SB11] > SQL & [BLK]adj

F. SURROGATES (FORM 2)
Soil SS01, SS01RE, SS02, SS02RE - all analytes J for each sample (flag "hits" and non-detects w/J

G. MS/MSD (FORM 3)
COC states "assumed QC" on sample MK-03-SB12, but not done for Volatiles

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
see attached

SDG: MK03

SEMIVOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
ok

%RSD/FLAGS:

Instrument ID	Compounds	%RSD	Assoc. Samples
ok			

D. CONTINUING CALIBRATION (FORM 7)
RRF/FLAGS:
ok

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
12608W	Hexachlorocyclopent.	56.0	SS07-08,SS10-12,SB09-10,SB12,SB12MS/MSD, SBLK09
	Fluoranthene	27.3	flag "hits" for analytes exceeding "J", NDs "PJ" (did not
	Pyrene	33.9	flag since not >50% except hexachloro which has not been
	Indeno(1,2,3-cd)Pyrene	28.0	present
	Dibenz(a,h)Anthracene	27.3	
	Benzo(g,h,i)Perylene	31.3	
14554X	2,6-Dinitrotoluene	27.1	SS01-02,SS05-06,SS09,SB11
	2,4-Dinitrophenol	43.8	-no hits for the contaminants
			except SS01 & SS02 have DNT "J"
14569X	Benzoic Acid	43.8	SS01DL
	4-Bromo-di-phenylether	29.6	-no hits

E. BLANKS (FORM 4)

Blank /Type	Assoc. Sample(s) Flagged	Corrections/Comments
ok		

F. SURROGATES (FORM 2)
Associated Sample(s) Flagged
EB07,SS01DL,SS08,SS11,SB09,SB12,SB12MS only 1 surrogate out of QC limits - none flagged

G. MS/MSD (FORM 3)

Sample #	Comments	
SB12 MS/MSD	%rec	N-Nitroso-di-n-prop. (39, 34) lim=41
	%rpd	1,2,4-Trichlorobenzene (24) lim=38

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)

ok

SDG: MK03

PESTICIDES/PCBs

A. HOLDING TIMES
ok

B. INSTRUMENT PERFORMANCE
DDT retention time > 12 minutes
DDT breakdown < 20%
Endrin breakdown < 20%
DBC retention time shift < 1.5%

C. CALIBRATION
%RSD > 10% aldrin (14)
endrin (16)
DDT (35)
DBC (?)

(Qualify aldrin and DDT with "J" due to %RSD exceedence, per DOE requirements)

D. BLANKS
ok

E. COMPOUND IDENTIFICATION
ok

F. COMPOUND QUANTITATION
ok

G. SURROGATES
% not given for SS1 & 2, but "matrix interference", flag all positive data ("hits")

SDG: MK03

NITROEXPLOSIVES

A. BLANKS

Sample #	Flag (Y/N)	Comments
SB09 hit for Trinitrotoluene	No flag	Sample > 5 x Method Blank

B. INITIAL CALIBRATION (FORM 6)

Min. Correlation Coefficient	Sample #	Comments
ok		

C. CONTINUING CALIBRATION (FORM 7)

Sample #	Comments
ok	

D. ACCURACY, PRECISION

MS/MSD (Form 3)

EXCEEDENCES/FLAGS:	Sample #	Comments
ok		

E. SURROGATES

EXCEEDENCES/FLAGS:	Comments
Water 02EB070793	outside of QC limits

SDG: MK03

METALS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)

ok

B. CALIBRATION

ICP:	Sample #	Flag (Y/N)	Comments
ok			

AA:	Sample #	Flag (Y/N)	Comments
ok			

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

D. INITIAL AND CONTINUING CALIBRATION VERIFICATION (FORM 2A)

MERCURY:	Sample #	Comments
ok		

OTHER METALS:	Analyte	Comments
ok		

E. METHOD BLANKS (FORM 3)

Blank #	Comments	
Method Blank	Aluminum	no flags - [sample] > 5 * [blank]
	Calcium	no flags - [sample] > 5 * [blank]

F. EQUIPMENT BLANKS

Blank #	Comments	
Equip Blank	Iron (soil)	no flags - [sample] > 5 * [blank]
	Lead	no flags -[sample] > 5 * [blank]

G. LABORATORY CONTROL SAMPLES (FORM 7)

Analyte	Comments
Samples 7877, 7878, 7879 run on ICP - reported as AA	

SDG: MK04

VOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
ok

%RSD/FLAGS:

Instrument ID	Compounds	Assoc. Samples
ok		

D. CONTINUING CALIBRATION (FORM 7)
RRF/FLAGS:
ok

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
G6290	Chloroethane	31.0	SD08, SD10, SS13-15, SB13-15, Trip0708931,Trip0708932
	Acetone	41.3	none > 50%D, therefore flagged assoc. hits only
	2-Butanone	31.7	
	Vinyl Acetate	31.2	
	4-Methyl-2-Pentanone	35.3	
	2-Hexanone	39.0	
G6307	Acetone	44.0	SD09, SS16, VBLK82
	Chloroform	25.6*	none > 50%D, therefore flagged assoc. hits only
	1,2-Dichloropropane	26.1*	*are contractual limit requirements, lab should achieve
	Trichloroethene	27.1	
	1,1,2-Trichloroethane	39.3	
	Bromoform	27.7	
L4800	Chloromethane	40.9	SW07-10, VBLK09
	Bromomethane	40.4	no hits for any of these cpds
	Chloroethane	34.6	
	Vinyl Acetate	41.5	

E. BLANKS (FORM 4)

Blank /Compound	Assoc. Sample(s) Flagged	Corrections/Comments

not specified on COC

F. SURROGATES (FORM 2)

Soil/Water	Associated Sample(s) Flagged
ok	

G. MS/MSD (FORM 3)

none analyzed

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)

ok

SDG: MK04

SEMIVOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
ok

%RSD/FLAGS:
ok

D. CONTINUING CALIBRATION (FORM 7)
RRF/FLAGS:
ok

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
14586X	Benzo(g,h,i)Perylene	26.8	SB13-15 hits for Benzoperylene
	Benzoic Acid	50.8	SD08-10, SS13-16, SB13-15, SBLK09 Benzoic acid has been reported as being present in sample SD09, therefore flag for this excedence in assoc. samples

E. BLANKS (FORM 4)

Blank /Type	Assoc. Sample(s) Flagged	Corrections/Comments
ok		

F. SURROGATES (FORM 2)
Associated Sample(s) Flagged
SW10 - only 1 surrogate out of QC limits none flagged

G. MS/MSD (FORM 3)

Sample #	Comments
none analyzed - not specified on COC	

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
ok

SDG: MK04

PESTICIDES/PCBs

NONE ANALYZED IN MK04

SDG: MK04

NITROEXPLOSIVES

A. BLANKS

Sample #	Flag (Y/N)	Comments
ok		

B. INITIAL CALIBRATION (FORM 6)
ok

C. CONTINUING CALIBRATION (FORM 7)
ok

D. ACCURACY, PRECISION
MS/MSD (Form 3)

Sample #	Comments
ok	

E. SURROGATES

Soil/Water	Sample #	Comments
ok		

SDG: MK04

METALS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. CALIBRATION

ICP:	Sample #	Flag (Y/N)	Comments
ok			

AA:	Sample #	Flag (Y/N)	Comments
ok			

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

D. INITIAL AND CONTINUING CALIBRATION VERIFICATION (FORM 2A)

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

OTHER METALS:	Analyte	Comments
ok		

E. METHOD BLANKS (FORM 3)

Blank/Compound	Assoc. Sample(s) Flagged	Comments
ok		

F. EQUIPMENT BLANKS

Blank/Compound	Assoc. Sample(s) Flagged	Comments
none analyzed		

G. LABORATORY CONTROL SAMPLES (FORM 7)
ok

SDG: MK05

VOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
none

B. GS/MS TUNING (FORM 5)
none

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
none

%RSD/FLAGS:

Instrument ID	Compounds	Assoc. Samples
none		

D. CONTINUING CALIBRATION (FORM 7)
RRF/FLAGS:
none

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
L4881	Vinyl Acetate	45.1	SW11(W), SW12(W), SW 13(W), SW14, SW15, trip0712932, trip0712933, VBLK45

E. BLANKS (FORM 4)

Blank/Compound	Assoc. Sample(s) Flagged	Corrections/Comments
Method Blank/Meth Chloride (0.4)	SD14,SD15,SW12(S)	corrected to non-detect
(VBLK83)	SW11(S),SW13(S),04EB,SB16-17,TB	no change

F. SURROGATES (FORM 2)

Soil/Water	Associated Sample(s) Flagged
none	

G. MS/MSD (FORM 3)
none analyzed - more than 20 samples have been analyzed since MK03 w/out a MS/MSD - not specified on COC

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
none

SDG: MK05

SEMIVOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
none

B. GS/MS TUNING (FORM 5)
none

C. INITIAL CALIBRATION (FORM 6)
RRF/FLAGS:
none

%RSD/FLAGS:

Instrument ID	Compounds	%RSD	Assoc. Samples
I50Z	Hexachlorocyclopentadiene	34.6	SW11(W),SW12(W),SW13(W),SW14-15,04EB

D. CONTINUING CALIBRATION (FORM 7)
RRF/FLAGS:
none

%D/FLAGS:

Lab File ID	Compounds	%D	Assoc. Samples
14602X	4-Nitrophenol	35.6	SD14, SW11(S), SW12(S), SW13(S), SB16-17
14989Z	2,4-Dinitrophenol	29.3	SW11(W), SW12(W), SW13(W), SW14-15, 04EB, SBLK86

E. BLANKS (FORM 4)

Blank /Type	Assoc. Sample(s) Flagged	Corrections/Comments
none		

F. SURROGATES (FORM 2)
Associated Sample(s) Flagged
04EB - only 1 surrogate out of QC limits - none flagged

G. MS/MSD (FORM 3)
none analyzed since MK03

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
none

SDG: MK05

PESTICIDES/PCBs

NONE ANALYZED IN MK05

SDG: MK05

NITROEXPLOSIVES

A. BLANKS

Sample #	Flag (Y/N)	Comments
none		

B. INITIAL CALIBRATION (FORM 6)
none

C. CONTINUING CALIBRATION (FORM 7)
none

D. ACCURACY, PRECISION
MS/MSD (Form 3)
none

E. SURROGATES
Water Method Blank, SW13-15, 03EB071293 / S1*

SDG: MK05

METALS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
none

B. CALIBRATION

ICP:	Sample #	Flag (Y/N)	Comments
none			

AA:	Sample #	Flag (Y/N)	Comments
none			

MERCURY:	Sample #	Flag (Y/N)	Comments
none			

D. INITIAL AND CONTINUING CALIBRATION VERIFICATION (FORM 2A)

MERCURY:	Sample #	Flag (Y/N)	Comments
none			

OTHER METALS:	Analyte	Comments
ok		

E. METHOD BLANKS (FORM 3)

Blank/Compound	Assoc. Sample(s) Flagged	Comments
none		

F. EQUIPMENT BLANKS

Blank/Compound	Assoc. Sample(s) Flagged	Comments
03EB071293 (SB)/Lead	none flagged	[sample] > 5 * [blank]

G. LABORATORY CONTROL SAMPLES (FORM 7)
none

SDG: MK06

VOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF:
ok

%RSD:

Instrument ID	Compounds	Assoc. Samples

ok

D. CONTINUING CALIBRATION (FORM 7)
RRF:
ok

%D:

Lab File ID	Compounds	%D	Assoc. Samples
L4881	Vinyl Acetate	45.1	EB0715,SW16-20,Trip0714931,Trip0714932,SW20MS/MSD

E. BLANKS (FORM 4)

Blank/Compound	Assoc. Sample(s) Flagged	Corrections/Comments

ok

F. SURROGATES (FORM 2)

Soil/Water	Associated Sample(s) Flagged

ok

G. MS/MSD (FORM 3)
ok

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
ok

SDG: MK06

SEMIVOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF:
ok

%RSD:

Instrument ID	Compounds	Assoc. Samples
ok		

D. CONTINUING CALIBRATION (FORM 7)
RRF:
ok

%D:

Lab File ID	Compounds	%D	Assoc. Samples
14542Y	Benzyl Alcohol	25.6	SD07,SD19, SBLK23
	Benzoic Acid	50.7	historically present & > 50%D, therefore flag"U" as "UJ"
	2,4-Dinitrophenol	28.0	
	Indeno(1,2,3-cd)pyrene	37.0	
	Dibenz(a,h)anthracene	32.5	
	Benzo(g,h,i)perylene	63.3	
14675Y	Benzyl Alcohol	38.6	SD20MS, SD20MSD, SD16
	bis(2-Chloroisopr)Eth	25.6	no hits for these assoc. samples
	Benzoic Acid	30.7	
	2-Methylnapthelene	26.9	
	Hexachlorocyclopent.	40.3	

E. BLANKS (FORM 4)

Blank/Compound		Assoc. Sample(s) Flagged	Corrections/Comments
Method Blank	Di-n-Butylphthal (47)	SD20, SD20MS, SD20MSD	
(SBLK23)	Bis(2-Ethylhexyl)Phthal (850)	SD16,SD17,SD18,SD19,SD20,SD07	corrected to non-detect

SD19-contained Napthalene, as did equipment blank taken at end of the day, therefore not applicable

F. SURROGATES (FORM 2)
SW16,SD20MS - only 1 surrogate out of QC limits - none flagged

Prepared by Minden Hudak & Lynn Rogozinski
Reviewed and Revised by Nancy Mount

G. MS/MSD (FORM 3)

Sample #	Comments	
SD20 MS/MSD	%REC	Phenol (108/108) lim=90
		4-Chloro-3-methylphenol (118/124) lim=103
		4-Nitrophenol (138/142) lim=114
		2,4-Dinitrotoluene (114/116) lim=89
		Pentachlorophenol (144/138) lim=109
SD20 MSD	%RPD	Pentachlorophenol (79) lim=103

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
ok

SDG: MK06

PESTICIDES/PCBs

A. HOLDING TIMES
ok

B. INSTRUMENT PERFORMANCE
DDT retention time > 12 minutes
DDT breakdown < 20%
Endrin breakdown < 20%
DBC retention time shift < 1.5%

C. CALIBRATION
%RSD > 10% aldrin (12)
endrin (9.4)
DDT (41)
DBC (?)

D. BLANKS
ok

E. COMPOUND IDENTIFICATION
ok

F. COMPOUND QUANTITATION
ok

G. SURROGATES
ok

SDG: MK06

NITROEXPLOSIVES

A. BLANKS

Sample #	Comments
SDO7 hit for Methyl-2,4,6-trinitrophenylnitramine	[sample]>5*[method blank] - none flagged

B. INITIAL CALIBRATION (FORM 6)

ok

C. CONTINUING CALIBRATION (FORM 7)

VIAL #1 - HMX = 48.9%

VIAL#11-HMX = 26.6% only samples ran after 7/22, 7:59 ok, from 7/21, 12:29 to 7/22, 7:59 flag "hits" J. If %D > 2 x lim(30%), flag "U"s as "UJ"

D. ACCURACY, PRECISION

MS/MSD (Form 3)

WATER - SW20 MS/MSD:

%REC Octahydro-1,3,5,7-tet(1), Hexahydro-1,3,5-trini(2), m-Dinitrobenzene, Nitrobenzene, Methyl-2,4,6-trinitro(3), 2,4,6-Trinitrotoluene, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Nitrotoluene, 4-nitrotoluene, 3-Nitrotoluene
- all limits low for %REC

%RPD Nitrobenzene (27) lim=20

E. SURROGATES

Water Surrogates out of QC limits for Method Blank, EB0715, SW16-20, SW20 MS/MSD

SDG: MK06

METALS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
VIOLATIONS/FLAGS:
ok

B. CALIBRATION

ICP:	Sample #	Flag (Y/N)	Comments
ok			

AA:	Sample #	Flag (Y/N)	Comments
ok			

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

D. INITIAL AND CONTINUING CALIBRATION VERIFICATION (FORM 2A)

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

OTHER METALS:	Analyte	Comments
	Cadmium CCV 7th-14th	SD07, SD16-20 -->BJ, estimated result below CRDL

E. METHOD BLANKS (FORM 3)

Blank/Compound	Assoc. Sample(s) Flagged	Comments
ok		

F. EQUIPMENT BLANKS

Blank/Compound	Assoc. Sample(s) Flagged	Comments
04EB071593 (SD)/Lead	none flagged	[sample] > 5 * [blank]

G. LABORATORY CONTROL SAMPLES (FORM 7)
ok

SDG: MK07

VOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF:
ok

%RSD:

Instrument ID	Compounds	Assoc. Samples
ok		

D. CONTINUING CALIBRATION (FORM 7)
RRF:
ok

%D:

Lab File ID	Compounds	%D	Assoc. Samples
K6162	Chloroethane	33.7	FB071693, MW09-15, TB0714931, 2, 3, MW09 MS/MSD
	Acetone	38.2	No "hits" in any assoc samples for analytes exceeding %D
	Carbon tet	27.8	

E. BLANKS (FORM 4)

Blank/Compound	Assoc. Sample(s) Flagged	Corrections/Comments
Trip Blank/Toluene (0.6) MK-05-07TB071693	MW09-14	Corrected to nondetect

(apply to all, since cannot correlate to samples on COC)

F. SURROGATES (FORM 2)

Soil/Water	Associated Sample(s) Flagged
ok	

G. MS/MSD (FORM 3)
ok

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
ok

SDG: MK07

SEMIVOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF:
ok

%RSD:

Instrument ID	Compounds	Assoc. Samples
1181V	4-Chloroaniline	MW09-12, MW14, 15, MW09 MS/MSD, SBLK12
	2-Nitroaniline	no "hits" in any associated samples for analytes exceeding %D

D. CONTINUING CALIBRATION (FORM 7)
RRF:
none - run only initial calibration

%D

Lab File ID	Compounds	Assoc. Samples
ok		

E. BLANKS (FORM 4)
ok

F. SURROGATES (FORM 2)

Associated Sample(s) Flagged		
SBLK12	S1(30), S2(31)	No "hits" in any samples, except for SBLK at 2J for DEHP, which is in the same fraction (Base/Newtral) as S1 & S2. Flag all Base/Neutral results for SBLK with "J", including NDs. However, no impact, since no sample hits.

G. MS/MSD (FORM 3)
VIOLATIONS/FLAGS:

Sample #	Comments	
MW09 MS	%REC	4-Chloro-3-methylphenol
MW09 MSD	%REC	4-Chloro-3-methylphenol
		2,4-Dinitrotoluene
	%RPD	1,4-Dichlorobenzene
		1,2,4-Trichlorobenzene no impact on data, snce bias is high and no sample "hits"

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)

ok

SDG: MK07

PESTICIDES/PCBs

A. HOLDING TIMES
ok

B. INSTRUMENT PERFORMANCE
DDT retention time > 12 minutes
DDT breakdown < 20%
Endrin breakdown < 20%
DBC retention time shift < 1.5%

C. CALIBRATION
%RSD > 10% aldrin (12)
endrin (9.4)
DDT (41)
DBC (?)

(Qualify aldrin and DDT with "J" due to %RSD exceedence, per DOE requirements)

D. BLANKS
PBLK03 endosulfan sulfate at 2.1J (soil), soil hits in SD18 & SD19
- only qualify SD19 as non-detect and raise to PQL = 11

E. COMPOUND IDENTIFICATION
ok

F. COMPOUND QUANTITATION
ok

G. SURROGATES
ok

SDG: MK07

NITROEXPLOSIVES

A. BLANKS

Sample #	Comments
ok	

B. INITIAL CALIBRATION (FORM 6)

ok

C. CONTINUING CALIBRATION (FORM 7)

ok

D. ACCURACY, PRECISION

MS/MSD (Form 3)

WATER - MW09 MS:	%REC	Octahydro-1,3,5,7-tet(1), Hexahydro-1,3,5-trini(2), sym-Trinitrobenzene, m-Dinitrobenzene, Nitrobenzene, Methyl-2,4,6-trinitro(3), 2,4,6-Trinitrotoluene, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Nitrotoluene, 4-nitrotoluene, 3-Nitrotoluene
MW09 MSD:	%REC	Octahydro-1,3,5,7-tet(1), Hexahydro-1,3,5-trini(2), m-Dinitrobenzene, Nitrobenzene, Methyl-2,4,6-trinitro(3)
	%RPD	sym-Trinitrobenzene, Nitrobenzene

E. SURROGATES

Water Surrogates out of QC limits for Method Blank, MW09MS, MW10-12, MW14-15
- flag all sample results (for exceedences) including NDs with "J" (&UJ) & note possible low recovery of analytes of interest; quantitation level for NDs "estimated."

SDG: MK07

METALS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. CALIBRATION

ICP:	Sample #	Flag (Y/N)	Comments
ok			

AA:	Sample #	Flag (Y/N)	Comments
ok			

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

D. INITIAL AND CONTINUING CALIBRATION VERIFICATION (FORM 2A)

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

OTHER METALS:	Analyte	Comments
ok		

E. METHOD BLANKS (FORM 3)

Blank/Compound	Assoc. Sample(s) Flagged	Comments
ok		

F. EQUIPMENT BLANKS

Blank/Compound	Assoc. Sample(s) Flagged	Comments
none analyzed		

G. LABORATORY CONTROL SAMPLES (FORM 7)
ok

SDG: MK08

VOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF:
ok

%RSD

Instrument ID	Compounds	Assoc. Samples
ok		

D. CONTINUING CALIBRATION (FORM 7)
RRF:
ok

%D:

Lab File ID	Compounds	%D	Assoc. Samples
G6365	Trichloroethene	37.8	SD21, 22, SD22 MS/MSD, SS23-31
	1,1,2,2-Tetrachloroeth	40.6	SS31 flagged for trichloroethane, only
K6209	Acetone	45.1	SW21, MW16, SW22, ITMW01, TB0719931, 2, 3 ,
	Chloroethane	46.2	SW22 MS/MSD
	Bromomethane	26.6	
	1,2-Dichloroethane	39.3	

E. BLANKS (FORM 4)

Blank/Compound	Assoc. Sample(s) Flagged	Corrections/Comments
ok		

F. SURROGATES (FORM 2)

Soil/Water	Associated Sample(s) Flagged
ok	

G. MS/MSD (FORM 3)
ok

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
ok

SDG: MK08

SEMIVOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF:
ok

%RSD:

Lab File ID	Compounds	%RSD	Assoc. Samples
I50V	Benzyl alcohol	33.7	SD21, 22, SS27-29 not detected & not a site cpd

D. CONTINUING CALIBRATION (FORM 7)
RRF:
ok

%D:

Lab File ID	Compounds	%D	Assoc. Samples
14564Y	2,4-Dinitrophenol	46.3	SW21, 22, SW22 MS/MSD, SS23, SS25, ITMW01, MW16, SBLK26
	Indeno(1,2,3-cd)pyrene	43.3	
	Dibenz(a,h)anthracene	37.5	
	Benzo(g,h,i)perylene	72.7	
14580Y	Benzoic acid	56.0	SS24, SS26, SD22 MS/MSD
	Hexachlorocyclopent	27.5	
	2,4-Dinitrophenol	42.7	
	Indeno(1,2,3-cd)pyrene	34.5	
	Dibenz(a,h)anthracene	38.6	
	Benzo(g,h,i)perylene	57.3	
14612Y	Benzoic acid	38.7	MW16re, SBLK30
	Indeno(1,2,3-cd)pyrene	34.3	
	Dibenz(a,h)anthracene	33.4	
	Benzo(g,h,i)perylene	73.6	

NOTE: flag NDs with J -> "UJ" since site cpd if >50%

E. BLANKS (FORM 4)

Blank/Compound	Assoc. Sample(s) Flagged	Corrections/Comments

ok

F. SURROGATES (FORM 2)

Associated Sample(s) Flagged

MW16	S4(1), S5(2), S6(6)	all phenol fraction, flag acids
MW16re	S4(1), S5(1)	both phenol fraction, flag phenols

ITMW01 and SW21 - 1 surrogate out of QC limits, no results flagged
SS27 - 1 surrogate out of QC limits, no results flagged

G. MS/MSD (FORM 3)

Sample #	Comments	
SW22 MS/MSD	%REC	4-Chloro-3-methylphenol 2,4-Dinitrotoluene
SD22 MS/MSD	%REC	Phenol 4-Chloro-3-methylphenol 4-Nitrophenol
SD22 MSD	%REC	2,4-Dinitrotoluene

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)

ok

SDG: MK08

PESTICIDES/PCBs

A. HOLDING TIMES
ok

B. INSTRUMENT PERFORMANCE
DDT retention time > 12 minutes
DDT breakdown < 20%
Endrin breakdown < 20%
DBC retention time shift < 1.5%

C. CALIBRATION
%RSD > 10% aldrin (7.2)
endrin (8.0)
DDT (6.7)
DBC (3.1)

D. BLANKS
ok

COMPOUND IDENTIFICATION
ok

F. COMPOUND QUANTITATION
ok

G. SURROGATES
ok

SDG: MK08

NITROEXPLOSIVES

A. BLANKS

Sample #	Comments
ok	

B. INITIAL CALIBRATION (FORM 6)

ok

C. CONTINUING CALIBRATION (FORM 7)

ok

D. ACCURACY, PRECISION

MS/MSD (Form 3)

WATER - SW22 MS:	%REC	Octahydro-1,3,5,7-tet(1), Hexahydro-1,3,5-trini(2), sym-Trinitrobenzene, m-Dinitrobenzene, Nitrobenzene, Methyl-2,4,6-trinitro(3), 2,4,6-Trinitrotoluene, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Nitrotoluene, 4-nitrotoluene, 3-Nitrotoluene
SW22 MSD:	%REC	Octahydro-1,3,5,7-tet(1), Hexahydro-1,3,5-trini(2), sym-Trinitrobenzene, m-Dinitrobenzene, Nitrobenzene, Methyl-2,4,6-trinitro(3), 2,4,6-Trinitrotoluene, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Nitrotoluene, 4-nitrotoluene, 3-Nitrotoluene
	%RPD	sym-Trinitrobenzene, Methyl-2,4,6-trinitro(1)
SOIL - SD22 MSD:	%REC	Nitrobenzene

E. SURROGATES

EXCEEDENCES: Sample #/Comments

Water Surrogates out of QC limits for Method Blank, ITMW01, SW21-22, SW22 MS/MSD, MW16 - all low, flag all assoc samples with "J", inc NDs

SDG: MK08

METALS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. CALIBRATION

ICP:	Sample #	Flag (Y/N)	Comments
ok			

AA:	Sample #	Flag (Y/N)	Comments
ok			

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

D. INITIAL AND CONTINUING CALIBRATION VERIFICATION (FORM 2A)

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

OTHER METALS:	Analyte	Comments
ok		

E. METHOD BLANKS (FORM 3)

Blank/Compound	Assoc. Sample(s) Flagged	Comments
ok		

F. EQUIPMENT BLANKS

Blank/Compound	Assoc. Sample(s) Flagged	Comments
none analyzed		

G. LABORATORY CONTROL SAMPLES (FORM 7)
ok

SDG: MK09

VOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF:
ok

%RSD:

Instrument ID	Compounds	Assoc. Samples
ok		

D. CONTINUING CALIBRATION (FORM 7)
RRF:
ok

%D:

Lab File ID	Compounds	%D	Assoc. Samples
H2082	Carbon Disulfide	27.5	SS34-36, VBLK45
	2-Butanone	30.2	
H2102	Acetone	40.6	SS35RE, VBLK46
	Carbon Disulfide	31.8	
K6274	Chloromethane	27.1	MW17, MW19, MW19DL, MW20DL, MW24, MW20MSDDL, MW20MSDL
	Bromomethane	30.4	
	Chloroethane	48.2	
	Vinyl Acetate	31.4	
	4-Methyl-2-Pentanone	38.5	
	2-Hexanone	38.4	
L5031	Chloromethane	40.2	EBRA01, FB02721931-2, FB072293, MW20, MW22, MW23, TB072193, TB0721932, MW20MS/MSD, VBLK22
	Chloroethane	54.0	
	Vinyl Acetate	33.4	

E. BLANKS (FORM 4)

Blank/Compound		Assoc. Sample(s) Flagged	Corrections/Comments
VBLK45	Toluene (1J)	none	[sample] > SQL & [blank]adj
	Chloroben (1J)	none	

VBLS46	Toluene (0.7J)	none	[sample] > SQL & [blank]ad
	Chloroben (1J)	none	[sample] > SQL & [blank]ad

F. SURROGATES (FORM 2)

Associated Sample(s) Flagged

MW20	S1=52 (lim=88-117)
MW20 MS	S1=55
MW20 MSD	S1=59
SS35	S1=120
SS35RE	S1=118

G. MS/MSD (FORM 3)

MW20MS High level Toluene in sample gave low MS recovery on MW20. Lab ran MW20DL spike and all within limits.

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)

ok

SDG: MK09

SEMIVOLATILE ORGANICS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. GS/MS TUNING (FORM 5)
ok

C. INITIAL CALIBRATION (FORM 6)
RRF:
ok

%RSD:

Instrument ID	Compounds	Assoc. Samples
ok		

D. CONTINUING CALIBRATION (FORM 7)
RRF:
ok

%D:

Lab File ID	Compounds	Assoc. Samples
14580Y	Benzoic Acid Hexachlorocyclopentadiene 2,4-Dinitrophenol Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene 2,4,6-Tribromophenol	EBRA01, MW17, MW19, MW20, MW24, MW20MS/MSD
14612Y	Benzoic acid Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene 2,4,6-Tribromophenol	MW20DL

E. BLANKS (FORM 4)

Blank/Compound	Assoc. Sample(s) Flagged	Corrections/Comments
ok		

F. SURROGATES (FORM 2)
Associated Sample(s) Flagged
MW20DL, SS36DL - surrogates diluted out
EBRA01, MW17, MW24 - 1 surrogate out of QC, no results flagged

G. MS/MSD (FORM 3)

Sample #	Comments	
MW20 MS	%REC	4-Chloro-3-methylphenol
		Pentachlorophenol
MW20 MSD	%REC	Pentachlofophenol
		4-Chloro-3-methylphenol
		4-Nitrophenol
MW20 MSD	%RPD	1,4-Dichlorobenzene
		1,2,4-Trichlorobenzene

H. INTERNAL STANDARD (IS) AREA PERFORMANCE (FORM 8)
ok

SDG: MK09

PESTICIDES/PCBs

A. HOLDING TIMES
ok

B. INSTRUMENT PERFORMANCE
DDT retention time > 12 minutes
DDT breakdown < 20%
Endrin breakdown < 20%
DBC retention time shift < 1.5%

C. CALIBRATION
%RSD > 10% aldrin (7.2)
endrin (8.0)
DDT (6.7)
DBC (3.1)

D. BLANKS
PBLK17 endosulfan sulfate at 0.3J,
- only qualify MW24 hit as non-detect (not present)

COMPOUND IDENTIFICATION
ok

F. COMPOUND QUANTITATION
ok

G. SURROGATES
ok

SDG: MK09

NITROEXPLOSIVES

A. BLANKS

Sample #	Comments
ok	

B. INITIAL CALIBRATION (FORM 6)

ok

C. CONTINUING CALIBRATION (FORM 7)

ok

D. ACCURACY, PRECISION

MS/MSD (Form 3)

WATER - MW20 MS:	%REC	Octahydro-1,3,5,7-tet(1), Hexahydro-1,3,5-trini(2), sym-Trinitrobenzene, m-Dinitrobenzene, Nitrobenzene, Methyl-2,4,6-trinitro(3), 2,4,6-Trinitrotoluene, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Nitrotoluene, 4-nitrotoluene, 3-Nitrotoluene
MW20 MSD:	%REC	Octahydro-1,3,5,7-tet(1), Hexahydro-1,3,5-trini(2), sym-Trinitrobenzene, m-Dinitrobenzene, Nitrobenzene, Methyl-2,4,6-trinitro(3), 2,4,6-Trinitrotoluene, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Nitrotoluene, 4-nitrotoluene, 3-Nitrotoluene

E. SURROGATES

EXCEEDENCES: Sample #/Comments

Water Surrogates out of QC limits for Method Blank, EBRA01, MW17, MW19, MW20, MW20 MS/MSD, MW24

SDG: MK09

METALS

A. HOLDING TIMES (CHAIN/SUMMARY TABLE)
ok

B. CALIBRATION

ICP:	Sample #	Flag (Y/N)	Comments
ok			

AA:	Sample #	Flag (Y/N)	Comments
ok			

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

D. INITIAL AND CONTINUING CALIBRATION VERIFICATION (FORM 2A)

MERCURY:	Sample #	Flag (Y/N)	Comments
ok			

OTHER METALS:	Analyte	Comments
ok		

E. METHOD BLANKS (FORM 3)

Blank/Compound	Assoc. Sample(s) Flagged	Comments
ok		

F. EQUIPMENT BLANKS

Blank/Compound	Assoc. Sample(s) Flagged	Comments
ok		

G. LABORATORY CONTROL SAMPLES (FORM 7)
ok

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW09

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 6/29/93 / FINISHED: 6/29/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 15'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							3-2-3-6			0-1' SILTY CLAY, POORLY GRADED, NO GRAVEL, DARK BROWN, TRACE SAND, TRACE ORGANICS 1'-15' SILTY CLAY, POORLY SORTED, NO GRAVEL, BROWN, TRACE SAND
	5									
▽										9' ENCOUNTERED WATER
	10									
										AUGERED TO 15'
	15									TERMINATION @ 15'
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 3/25/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW10

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 6/29/93 / FINISHED: 6/29/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 14'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							2-3-5-7			0-1' SILTY CLAY, POORLY GRADED, NO GRAVEL, DARK BROWN, MOIST, TRACE CLAY, SOME ORGANICS
										1'-14' SILTY CLAY, POORLY GRADED, NO GRAVEL, BROWN, MOIST, TRACE SAND
	5									
▽										6' ENCOUNTERED WATER
	10									
										AUGERED TO 14'
										TERMINATION @ 14'
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 3/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW11

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 6/30/93 / FINISHED: 6/30/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 13'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
▽							2-3-4-3			0-1' SANDY SILT, NO GRAVEL, DARK BROWN, MOIST, TRACE CLAY, SOME ORGANICS 1'-13' SILTY CLAY, NO GRAVEL, BROWN, MOIST, TRACE SAND 3' ENCOUNTERED WATER AUGERED TO 13'
	5									
	10									
										TERMINATION @ 13'
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 5/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW12

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 6/30/93 / FINISHED: 6/30/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 13'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	SAMPLE: METHOD	SAMPLE: RECOVERY (INCHES)	SAMPLE: RETAINED (INCHES)	SAMPLE: OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							3-3-4-6			0-1' SILTY CLAY, SOME GRAVEL, BROWN, MOIST, TRACE SAND 1'-13' SILTY SAND, NO GRAVEL, BROWN, MOIST, TRACE CLAY
	5									
	10									12.5' ENCOUNTERED WATER AND LIMESTONE FRAGMENTS AUGER REFUSAL AT 13' WHERE ROCK (LIMESTONE) WAS ENCOUNTERED
▽										
										TERMINATION @ 13'
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 3/25/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW13

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 6/30/93 / FINISHED: 6/30/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 2'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: BOREHOLE	SAMPLE: METHOD	SAMPLE: RECOVERY (INCHES)	SAMPLE: RETAINED (INCHES)	SAMPLE: OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							3-2-3-6			0-2' TOPSOIL WITH ORGANICS, DARK BROWN, MOIST 2' BEDROCK (LIMESTONE) AUGER REFUSAL NO WELL INSTALLATION ATTEMPTED TO AUGER IN THREE DIFFERENT PLACES, APPROXIMATELY 10' APART NO WATER ENCOUNTERED BACKFILLED BOREHOLES WITH AUGER CUTTINGS TERMINATION @ 2'
	5									
	10									
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 3/25/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW14

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/01/93 / FINISHED: 7/01/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 11.5'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							2-2-2-3			0-11.5' SILTY SAND, NO GRAVEL, BROWN, MOIST, TRACE CLAY, SOME ORGANICS
	5									
▽										6' ENCOUNTERED WATER
	10									AUGERED TO 11.5' ENCOUNTERED BEDROCK @ 11.5', AUGER REFUSAL
										TERMINATION @ 11.5'
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 5/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW15

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/01/93 / FINISHED: 7/01/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 9'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							2-3-4-5			0-9' SILTY SAND, BROWN, DRY TO SLIGHTLY MOIST, TRACE CLAY, SOME ORGANICS
▽										4' ENCOUNTERED WATER
	5									
										AUGERED TO 9', AUGER REFUSAL
										BEDROCK AT 9'
										TERMINATION @ 9'
	10									
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

BOTL-LOB 5/25/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW16

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/02/93 / FINISHED: 7/02/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 8'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	SAMPLE: METHOD	SAMPLE: RECOVERY (INCHES)	SAMPLE: RETAINED (INCHES)	SAMPLE: OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							6-5-5-9			0-1' SILT W/WEATHERED SHALE FRAGMENTS, NO GRAVEL, BROWN, MOIST TO DRY, TRACE CLAY, TRACE SAND 1'-4' SILT, NO GRAVEL, BROWN, MOIST, TRACE SAND, TRACE CLAY, SOME WEATHERED SHALE FRAGMENTS 4' WEATHERED SHALE BEDROCK AUGERED TO 8' THROUGH WEATHERED SHALE NO WATER ENCOUNTERED
	5									
	10									TERMINATION @ 8'
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 1/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW17

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/06/93 / FINISHED: 7/06/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 6'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	SAMPLE: METHOD	SAMPLE: RECOVERY (INCHES)	SAMPLE: RETAINED (INCHES)	SAMPLE: OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	SPT N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							3-4-3-3			0-5' SILTY CLAY, POORLY GRADED, BROWN, TRACE SAND, SOME SHALE FRAGMENTS
▽										3' ENCOUNTERED WATER
	5									5' ENCOUNTERED WEATHERED SHALE BEDROCK 6' AUGER REFUSAL
										TERMINATION @ 6'
	10									
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 3/25/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW18

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/06/93 / FINISHED: 7/06/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 9'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: BOREHOLE	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING (-)	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
▽	5									0-1' SILTY SAND, POORLY GRADED, DARK BROWN, MOIST, TRACE CLAY, SOME ORGANICS 1'-6' SILTY SAND, POORLY GRADED, BROWN, MOIST, TRACE CLAY 3' ENCOUNTERED WATER 6' ENCOUNTERED WEATHERED SHALE W/CLAY SEAMS 9' AUGER REFUSAL
	10									TERMINATION @ 9' 7/07/93 NO WATER IN BOREHOLE, BACKFILLED WITH SAND
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 5/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW19

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/07/93 / FINISHED: 7/07/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 13'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
▽							3-8-9-7			0-1' SILTY SAND, POORLY GRADED, DARK BROWN, MOIST, SOME WEATHERED SHALE FRAGMENTS, SOME ORGANICS
										1'-13' SILTY SAND, POORLY GRADED, MOIST TO WET, NO GRAVEL, BROWN
										3.5' ENCOUNTERED WATER
	5									10' STOPPED AUGERING TO CHECK GROUND WATER RECHARGE. WATER LEVEL AT 8' AFTER 20 MIN.
	10									AUGERED TO 13'
										TERMINATION @ 13'
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 5/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW20

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/07/93 / FINISHED: 7/07/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 23'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							4-8-9-11			0-0.5' TOPSOIL, SILTY SAND, DARK BROWN, DRY, SOME ORGANICS 0.5'-6' SILTY CLAY, POORLY GRADED, MOIST, BROWN, SOME WEATHERED SHALE FRAGMENTS 6'-23' SILTY CLAY, POORLY GRADED, MOIST, GRAY, GRAVEL LENS @ 6' WHERE CHEMICAL ODORS WERE ENCOUNTERED, SOME LIMESTONE FRAGMENTS NO WATER ENCOUNTERED DURING DRILLING, STRONG CHEMICAL ODOR (TOLUENE) AT 6'-10' (4000 PPM W/PID IN BOREHOLE, 0 PPM WORKSPACE) LEFT BOREHOLE OPEN 24 HOURS TO INSPECT FOR WATER, POURED CLEAN WATER IN BOREHOLE TO CLEAR SMEARED CLAY FROM BOREHOLE WALL WATER WAS LATER OBSERVED @ 17' TERMINATION @ 23'
	5									
	10									
	15									
▽	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 8/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW21

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/08/93 / FINISHED: 7/09/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 15'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: BOREHOLE	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
	5									0-6' FILL MATERIAL (EARTH DIKE) 6'-7' SILTY CLAY, NO GRAVEL, BROWN, MOIST, TRACE SAND 7'-15' SILTY CLAY, NO GRAVEL, GRAY, MOIST, TRACE SAND, AUGER REFUSEL @ 15' NO WATER ENCOUNTERED DURING DRILLING POURED WATER INTO BOREHOLE (10 GAL.) TO LOOSEN SMEARED CLAY ON BOREHOLE WALLS 7/09/93 NO WATER IN BOREHOLE (ONLY POURED WATER FROM YESTERDAY) SANDED UP BOREHOLE FROM 15' TO 8' THEN BENTONITE PELLETS FROM 8' TO 6' THEN SAND FROM FROM 6' TO SURFACE. BENTONITE PELLETS WERE INSTALLED TO SEAL BOREHOLE AT GROUND LEVEL INSIDE DIKE. DIKE IS APPROXIMATELY 6' HIGH.
	10									
	15									TERMINATION @ 15'
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 5/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW22

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/09/93 / FINISHED: 7/12/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 9.5'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	SAMPLE: METHOD	SAMPLE: RECOVERY (INCHES)	SAMPLE: RETAINED (INCHES)	SAMPLE: OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							2-3-3-2			0-1' SILTY SAND, NO GRAVEL, DARK BROWN, MOIST, TRACE CLAY, SOME ORGANICS
										1'-5' SILTY SAND, NO GRAVEL, BROWN, MOIST, TRACE CLAY
										5'-9' BROWN, SILTY CLAY, MOIST
										9'-9.5' GRAY, SILTY CLAY, MOIST
	5									AUGERED TO 9.5'
	10									TERMINATION @ 9.5'
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 5/25/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW23

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/09/93 / FINISHED: 7/09/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 16'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							3-4-5-3			0-5' SILTY SAND, NO GRAVEL, BROWN, MOIST, TRACE CLAY, SOME ORGANICS 5'-7' SILTY CLAY, NO GRAVEL, BROWN, MOIST, TRACE SAND 7'-16' SILTY CLAY, NO GRAVEL, GRAY, MOIST, TRACE SAND
	5									
	10									
	15									16' AUGER REFUSAL
										TERMINATION @ 16'
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

SOIL-LOG 5/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW24

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/12/93 / FINISHED: 7/12/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 9.5'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: WELL SCREEN	METHOD	RECOVERY (INCHES)	RETAINED (INCHES)	OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							2-3-3-3			0-0.5' SANDY SILT, NO GRAVEL, DARK BROWN, MOIST, TRACE CLAY, SOME ORGANICS
										0.5'-9' SILTY SAND, NO GRAVEL, BROWN, MOIST, TRACE CLAY
										9' SILTY CLAY, NO GRAVEL, GRAY, MOIST, TRACE SAND
	5									
▽										6' ENCOUNTERED WATER
										AUGERED TO 9.5' INTO GRAY SILTY CLAY
	10									TERMINATION @ 9.5'
	15									
	20									

BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

[illegible] 5/26/93

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

SOIL BOREHOLE LOG

SHEET 1 OF 1

BOREHOLE NUMBER: MW25

PROJECT: PLUM BROOK SI	LOCATION: SANDUSKY, OHIO
EXCAVATION AUTHORIZATION NO.:	DRILLING SUB-CON: TOLTEST / RIG MODEL: TRACK
DATE START: 7/12/93 / FINISHED: 7/12/93	GEOLOGIST: T. BENSON / TOTAL DEPTH: 3.5'
ELEVATION: / COORDINATES:	BORING METHOD AND EQUIPMENT: HOLLOW STEM AUGER/SPLIT SPOON

GROUNDWATER LEVEL	DEPTH BELOW SURFACE (FEET)	SAMPLE: BOREHOLE	SAMPLE: METHOD	SAMPLE: RECOVERY (INCHES)	SAMPLE: RETAINED (INCHES)	SAMPLE: OVA/HNU SCREENING ( )	SPT 6" -6" -6" -6"	N	USCS CLASIFICATION	SOIL DESCRIPTION: name, gradation, percent gravel, color, moisture content, relative density or consistency, soil structure, mineralogy, staining.
							3-2-2-4			0-1' SILTY CLAY, POORLY GRADED, NO GRAVEL, DARK BROWN, MOIST, TRACE SAND, SOME ORGANICS
										1'-2' SILTY CLAY, POORLY GRADED, NO GRAVEL, BROWN, MOIST, TRACE SAND, WEATHERED SHALE FRAGMENTS @ 2'
										2'-3.5' AUGERED INTO WEATHERED SHALE
	5									TERMINATION @ 3.5' IN WEATHERED SHALE
										BACKFILLED BORING W/SOIL CUTTINGS
										NO WATER ENCOUNTERED
	10									
	15									
	20									

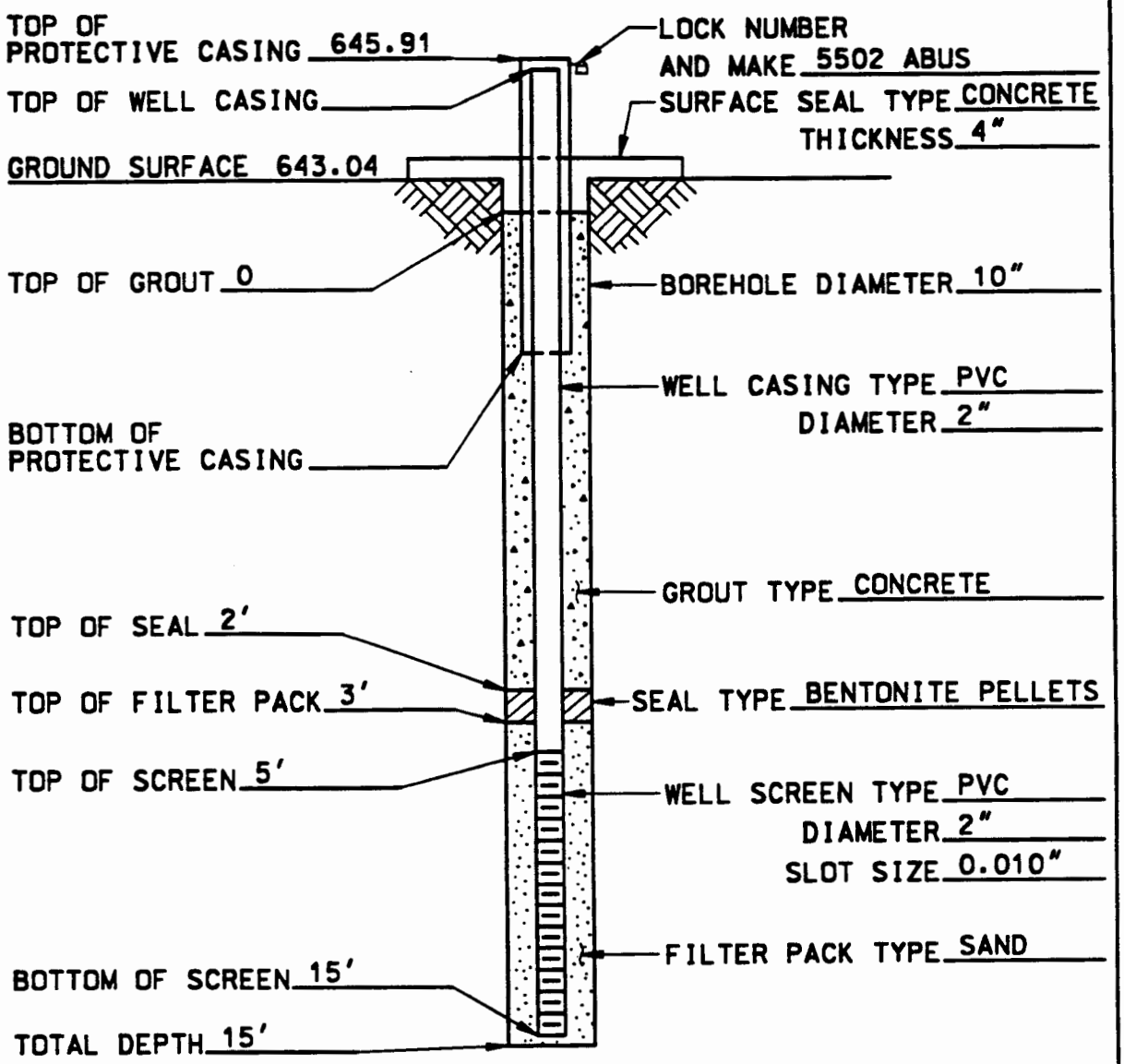
BOREHOLE WATER LEVELS (NON-STATIC CONDITIONS)

WHILE SAMPLING: ft.	CASING DEPTH: ft.	WHILE DRILLING: ft.	CASING DEPTH: ft.
BEFORE REMOVING CASING: ft.	TOTAL CASING DEPTH: ft.	IMMEDIATELY AFTER REMOVING CASING: ft.	
AFTER COMPLETION: ft. DAY/TIME		AFTER COMPLETION: ft. DAY/TIME	

[illegible]

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW09
DATE INSTALLED 6/29/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

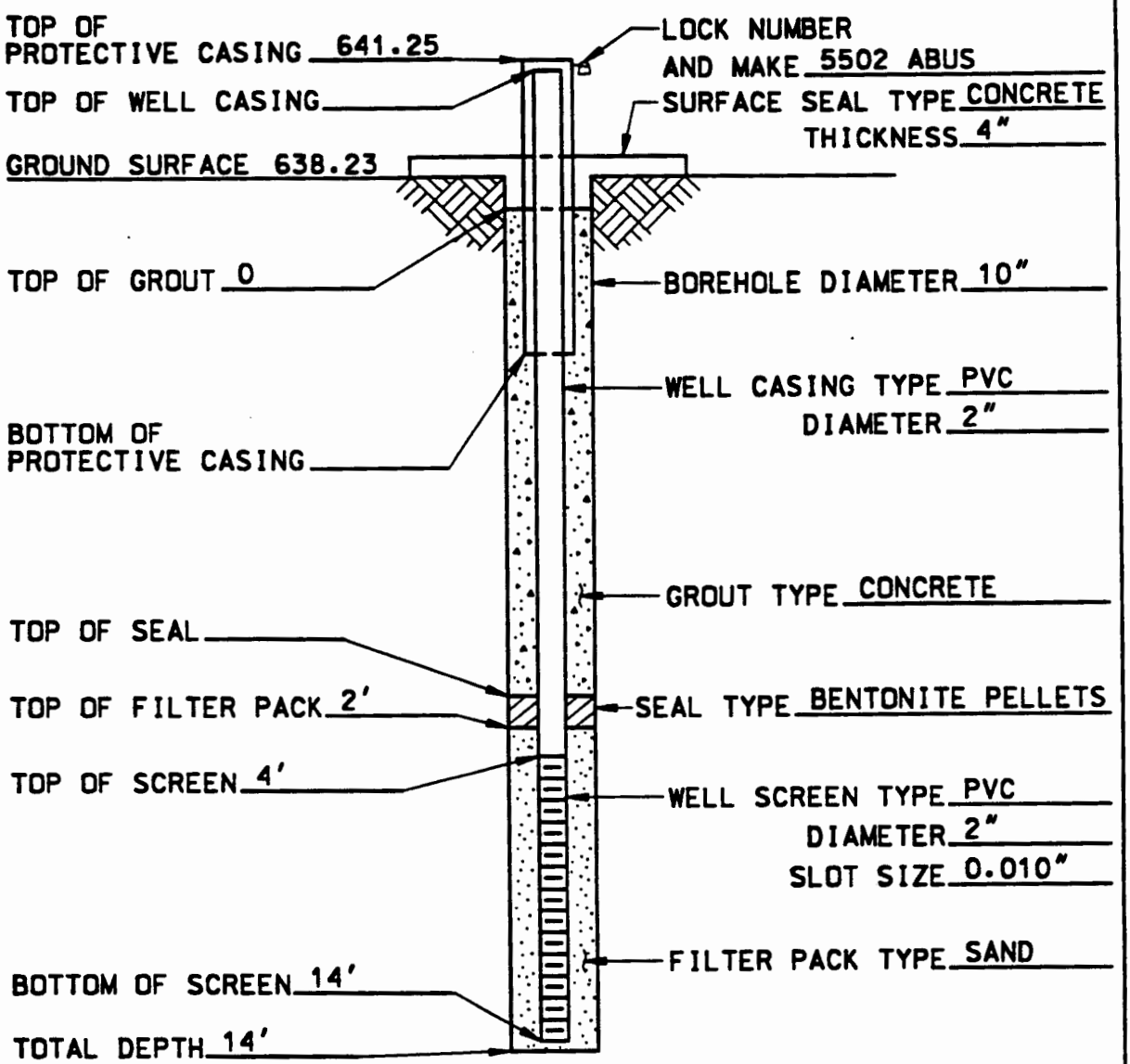
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW10
DATE INSTALLED 6/29/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

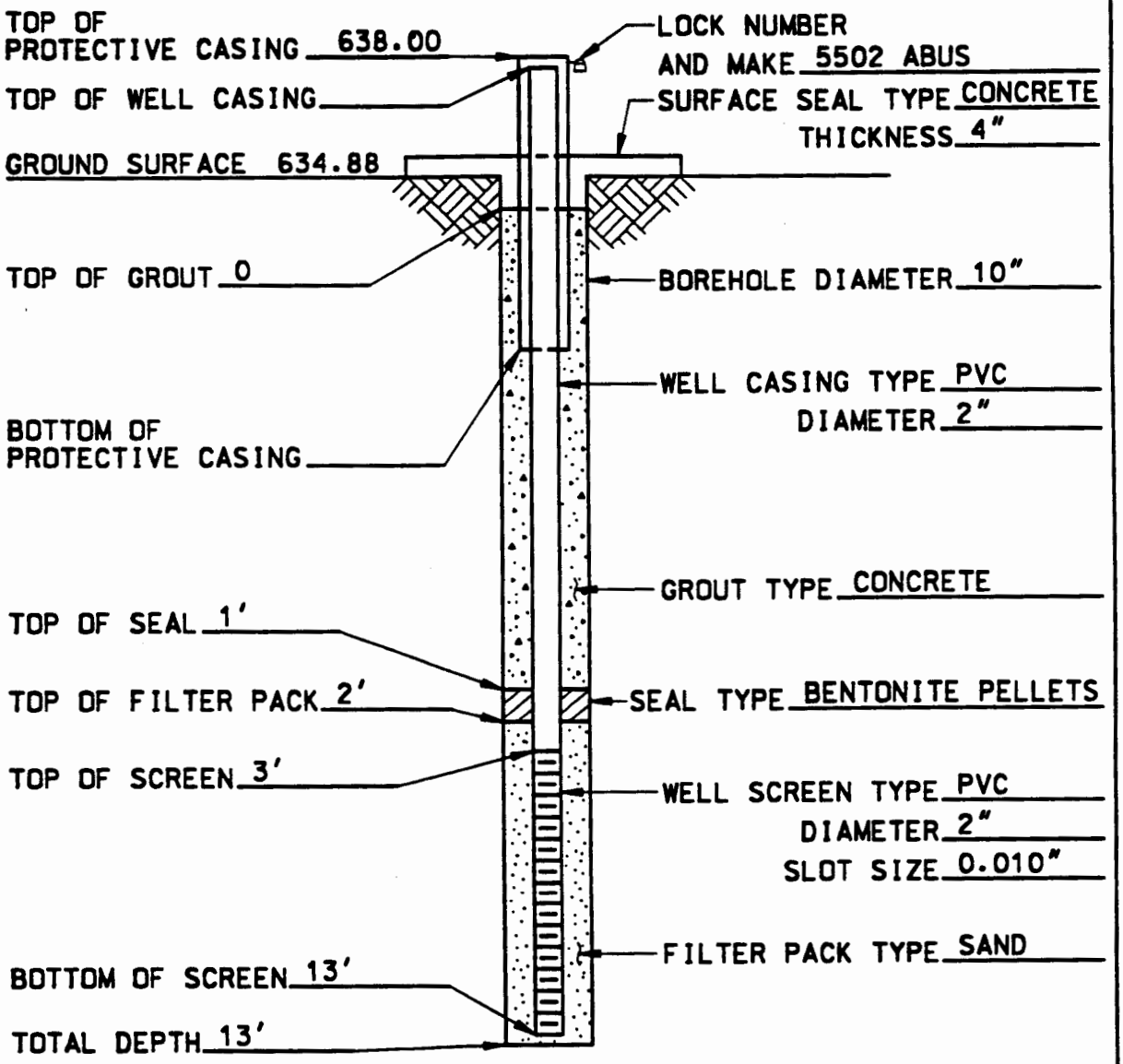
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY. OHIO
WELL NUMBER MW11
DATE INSTALLED 6/30/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

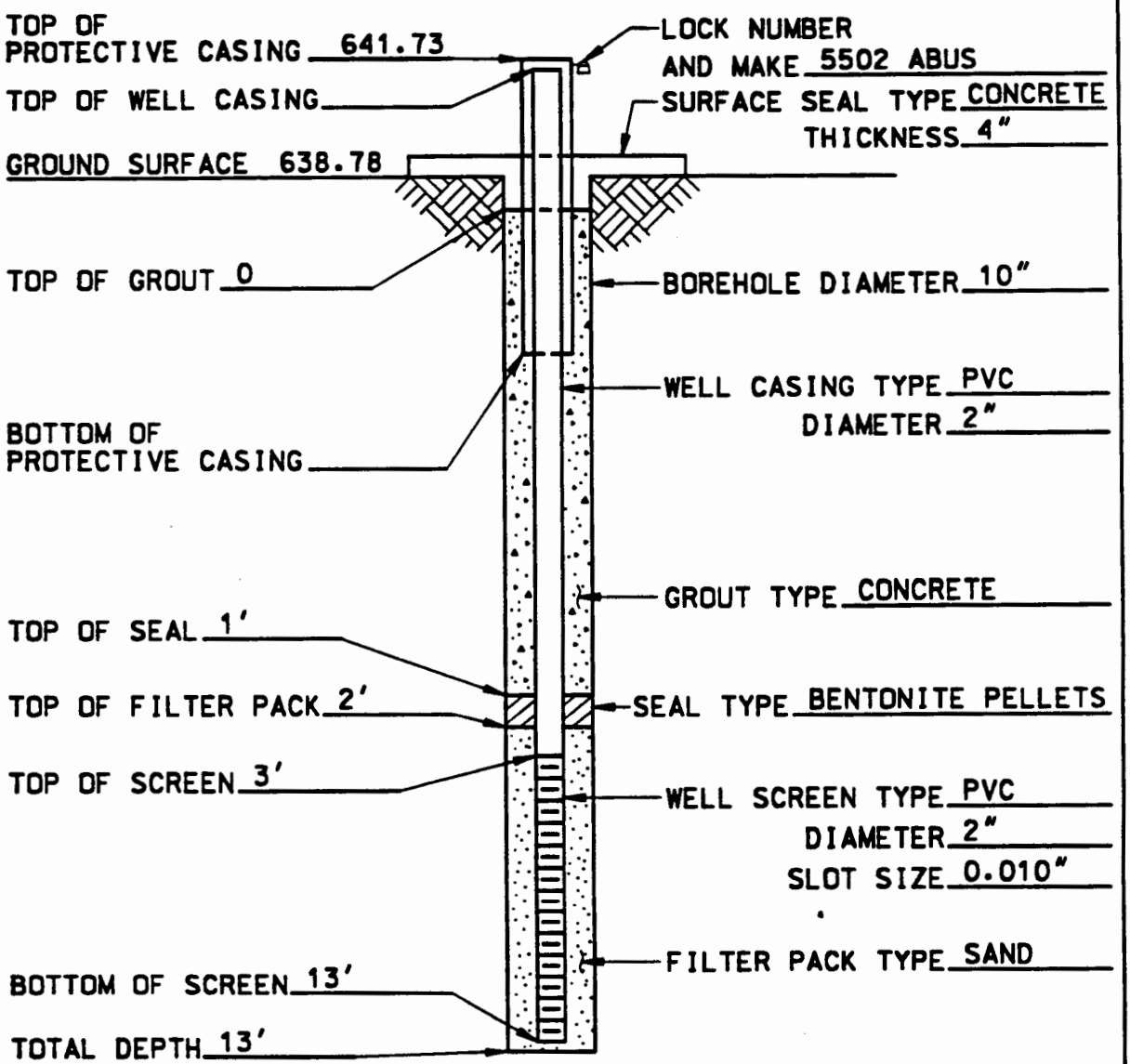
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW12
DATE INSTALLED 6/30/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

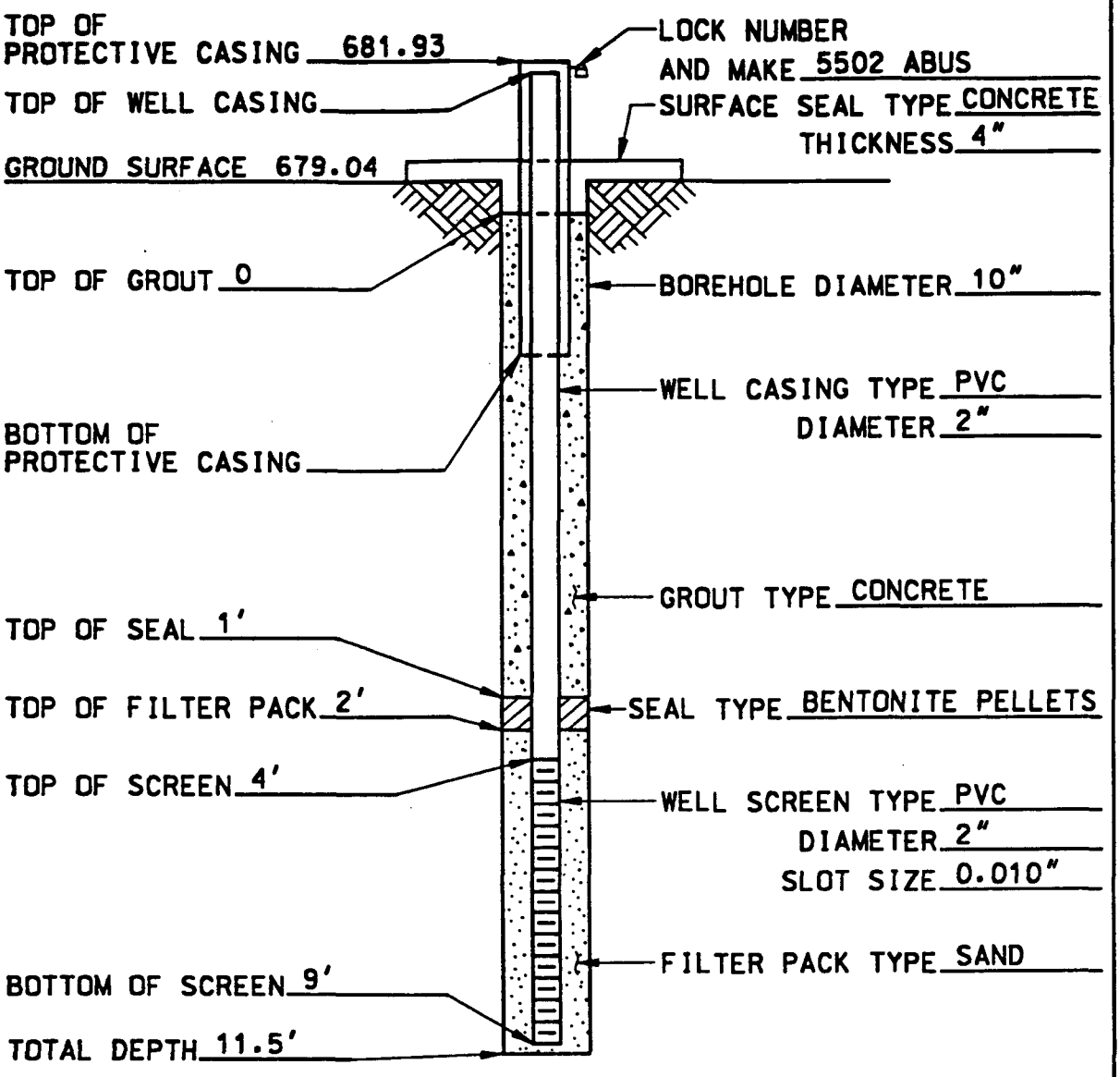
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW14
DATE INSTALLED 7/01/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

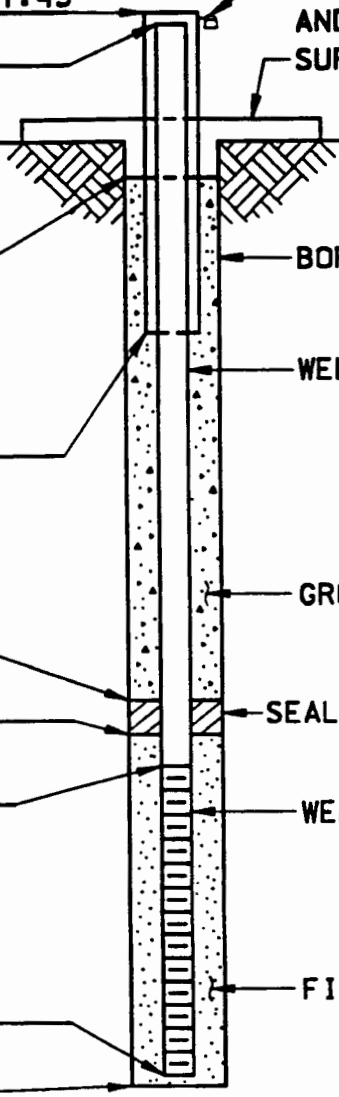
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW15
DATE INSTALLED 7/01/93
MKE REP. T. BENSON
DRILLER TOLTEST



TOP OF PROTECTIVE CASING 681.45
TOP OF WELL CASING
GROUND SURFACE 678.35
TOP OF GROUT 0
BOTTOM OF PROTECTIVE CASING
TOP OF SEAL 1'
TOP OF FILTER PACK 2'
TOP OF SCREEN 4'
BOTTOM OF SCREEN 9'
TOTAL DEPTH 9'

LOCK NUMBER AND MAKE 5502 ABUS
SURFACE SEAL TYPE CONCRETE
THICKNESS 4"
BOREHOLE DIAMETER 10"
WELL CASING TYPE PVC
DIAMETER 2"
GROUT TYPE CONCRETE
SEAL TYPE BENTONITE PELLETS
WELL SCREEN TYPE PVC
DIAMETER 2"
SLOT SIZE 0.010"
FILTER PACK TYPE SAND

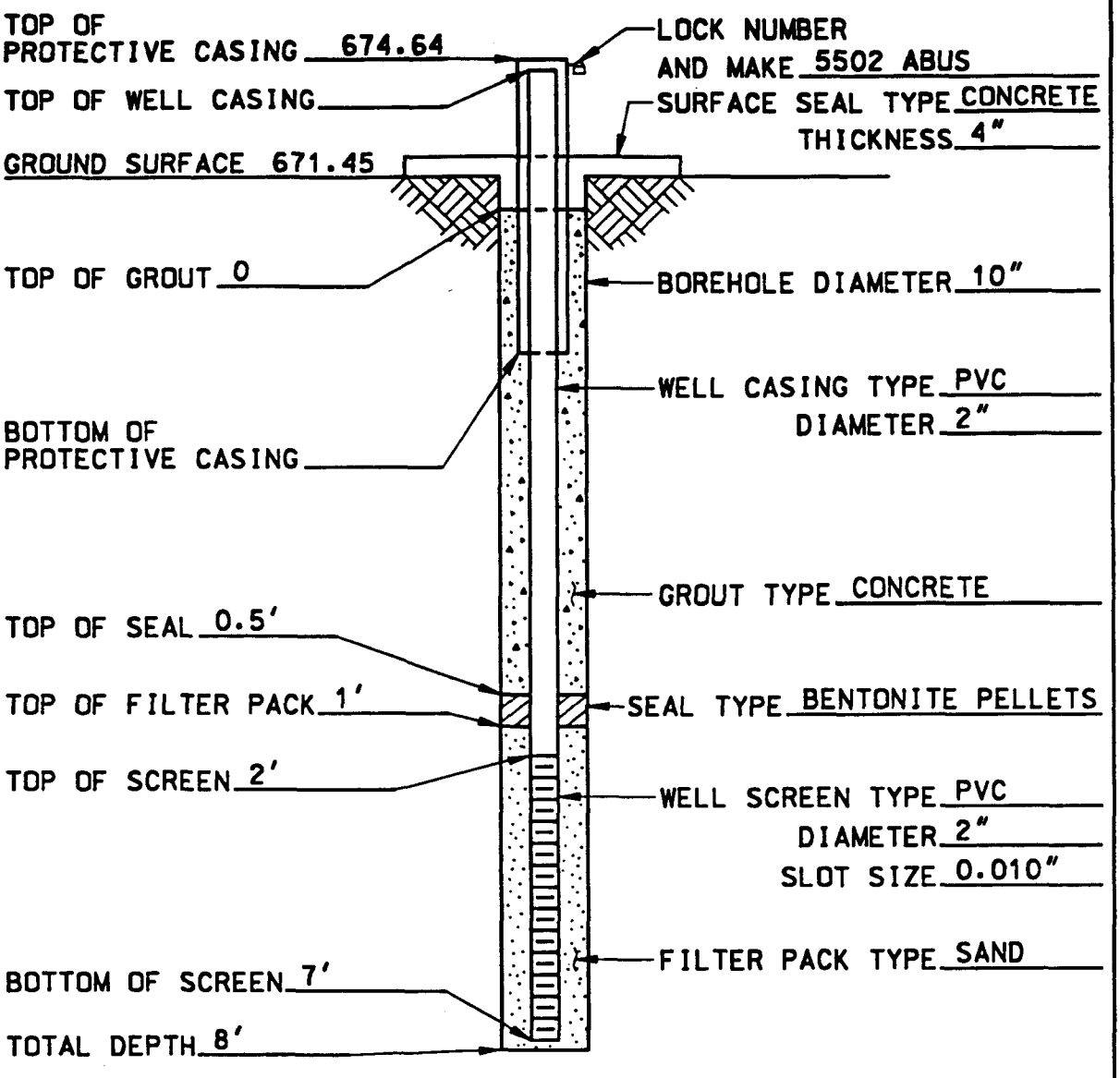
COMMENTS

REP. SIGNATURE
DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW16
DATE INSTALLED 7/02/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

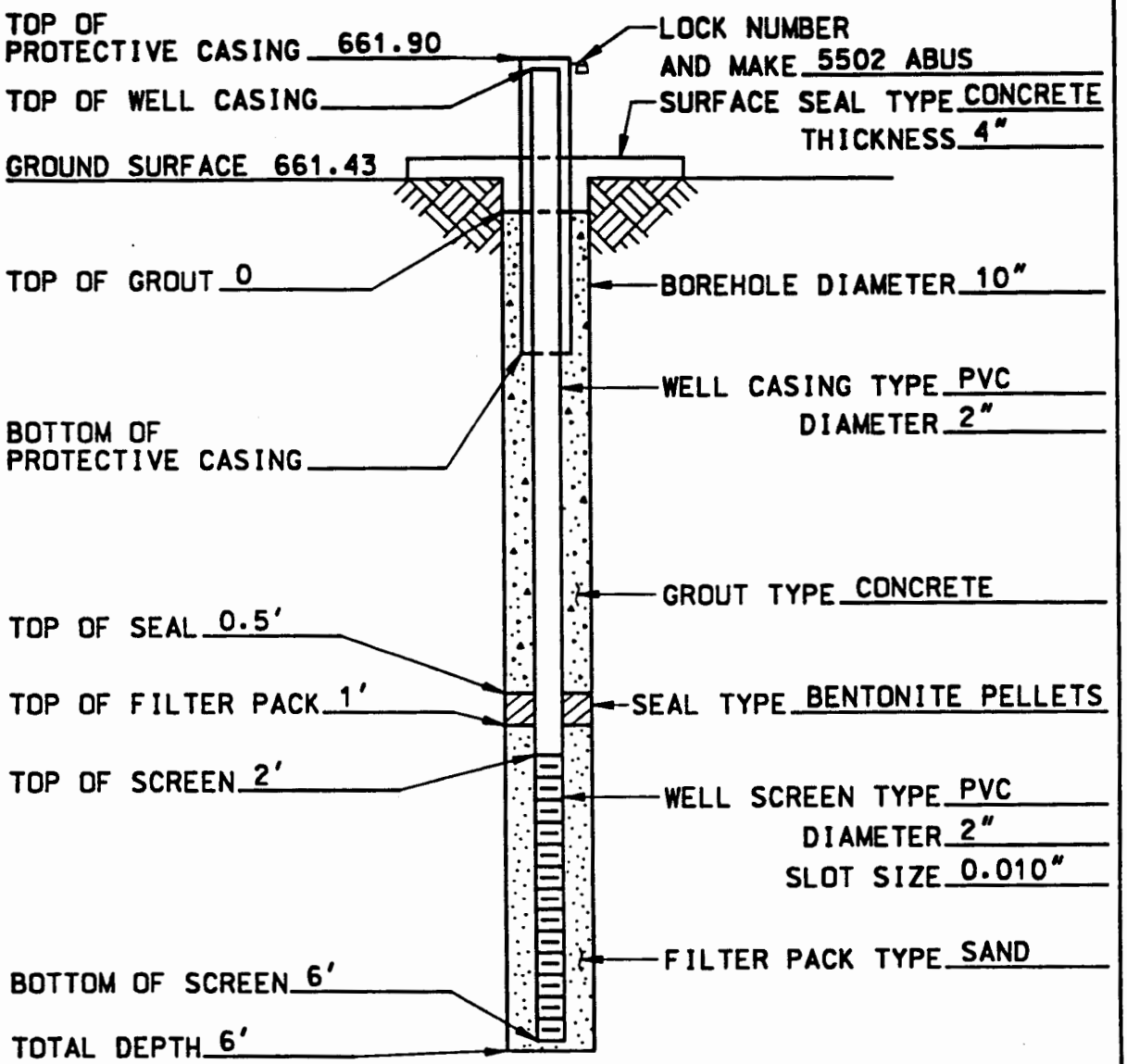
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW17
DATE INSTALLED 7/06/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

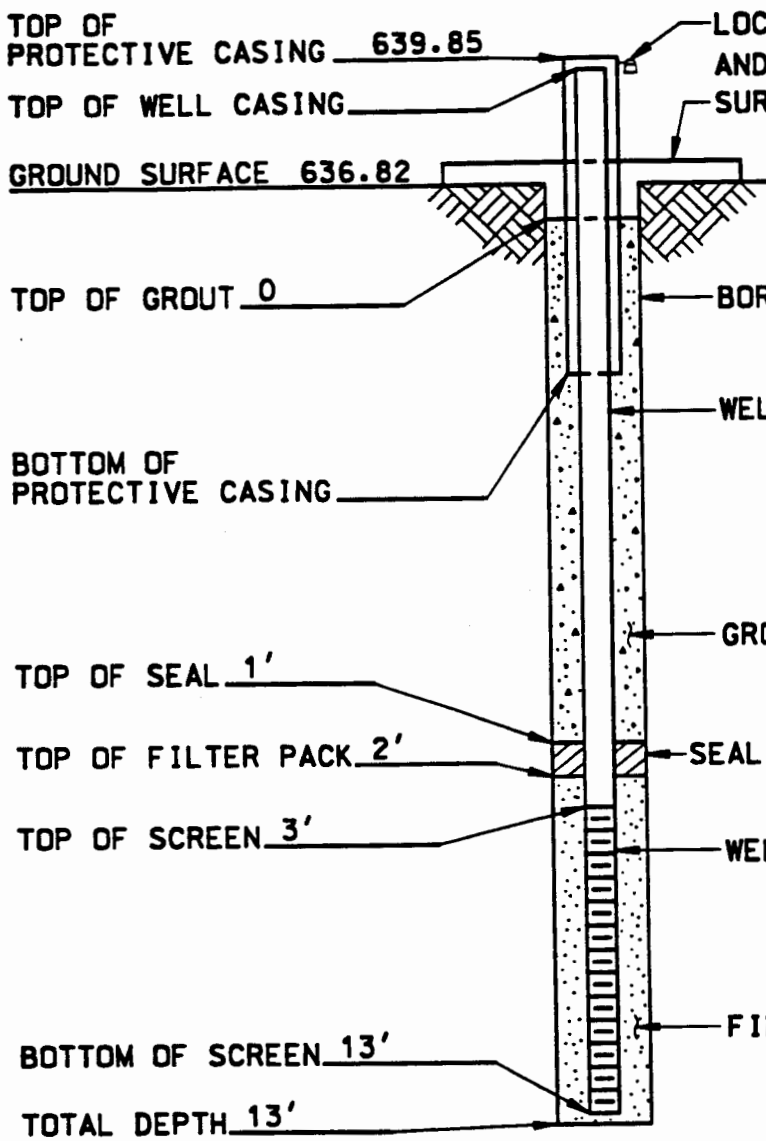
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW19
DATE INSTALLED 7/07/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

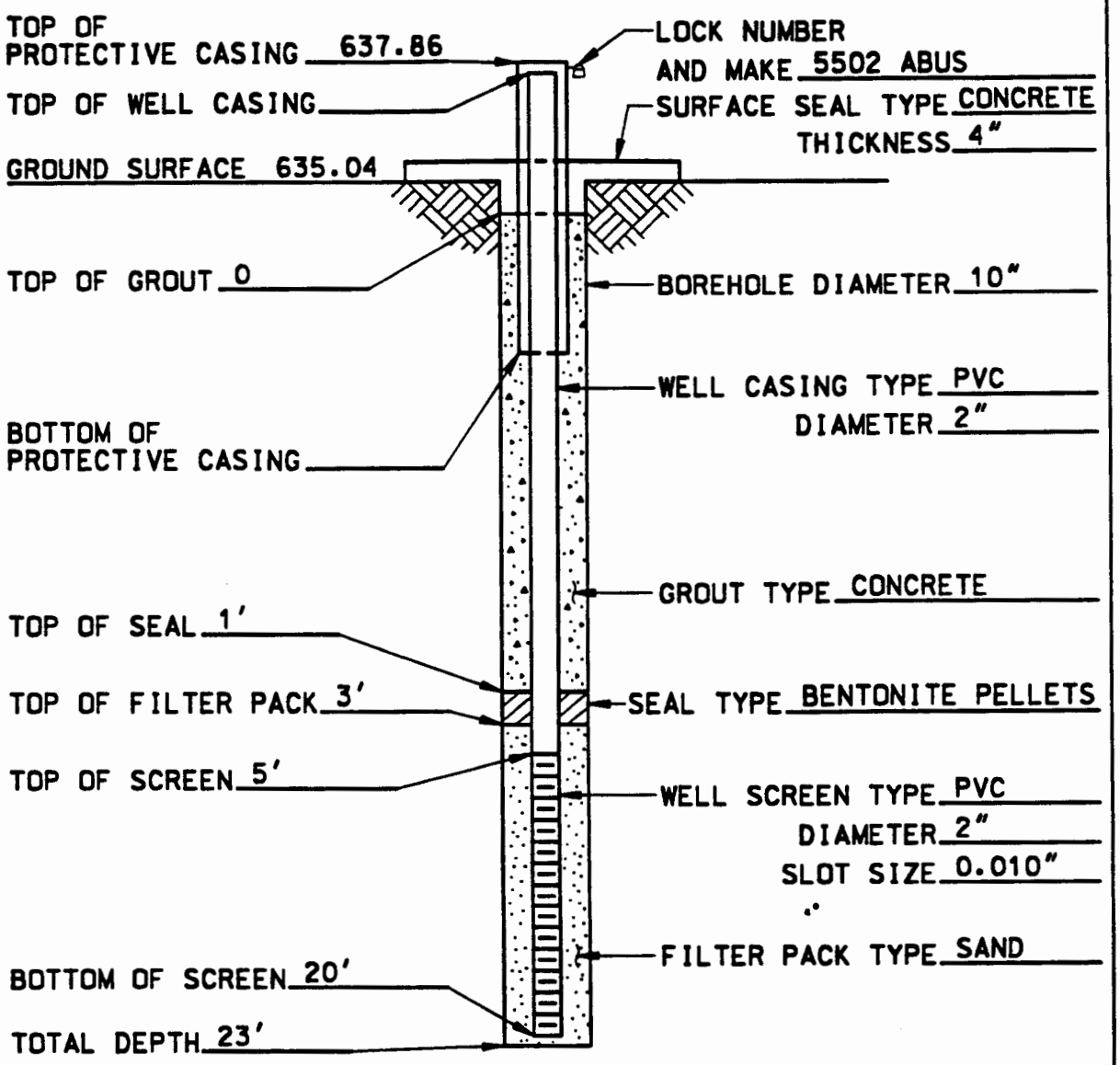
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW20
DATE INSTALLED 7/07/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

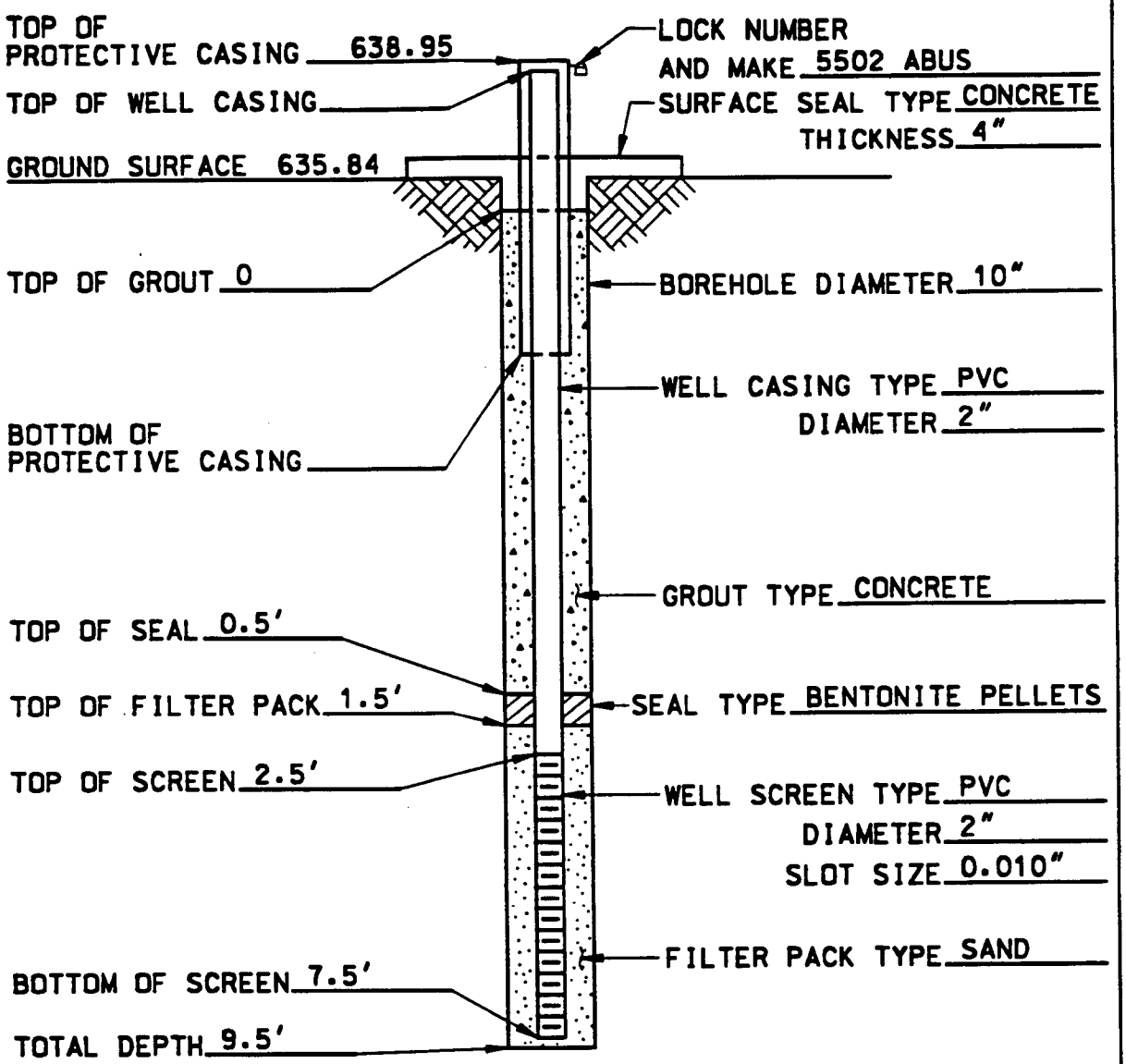
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW22
DATE INSTALLED 7/12/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

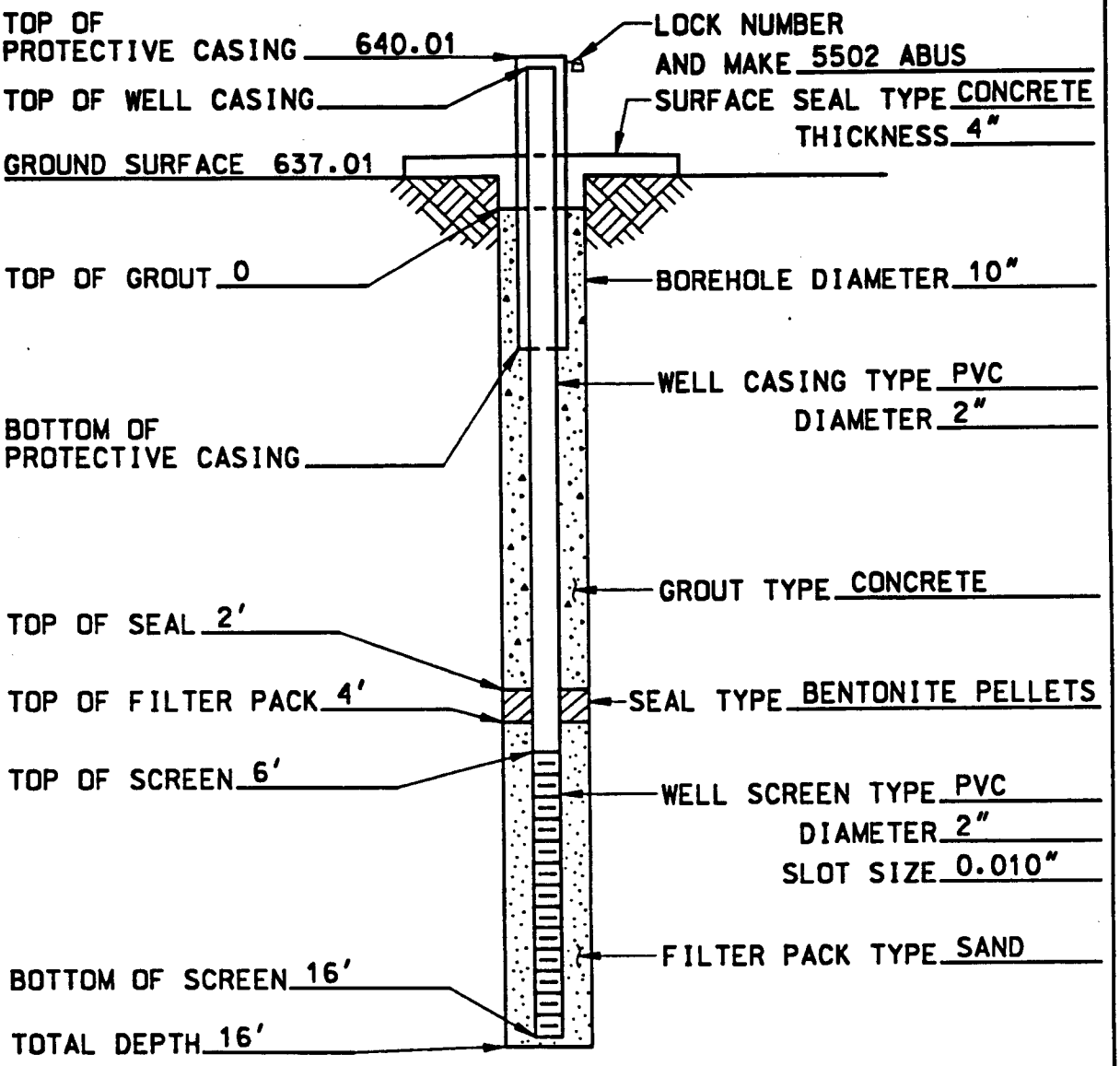
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW23
DATE INSTALLED 7/09/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

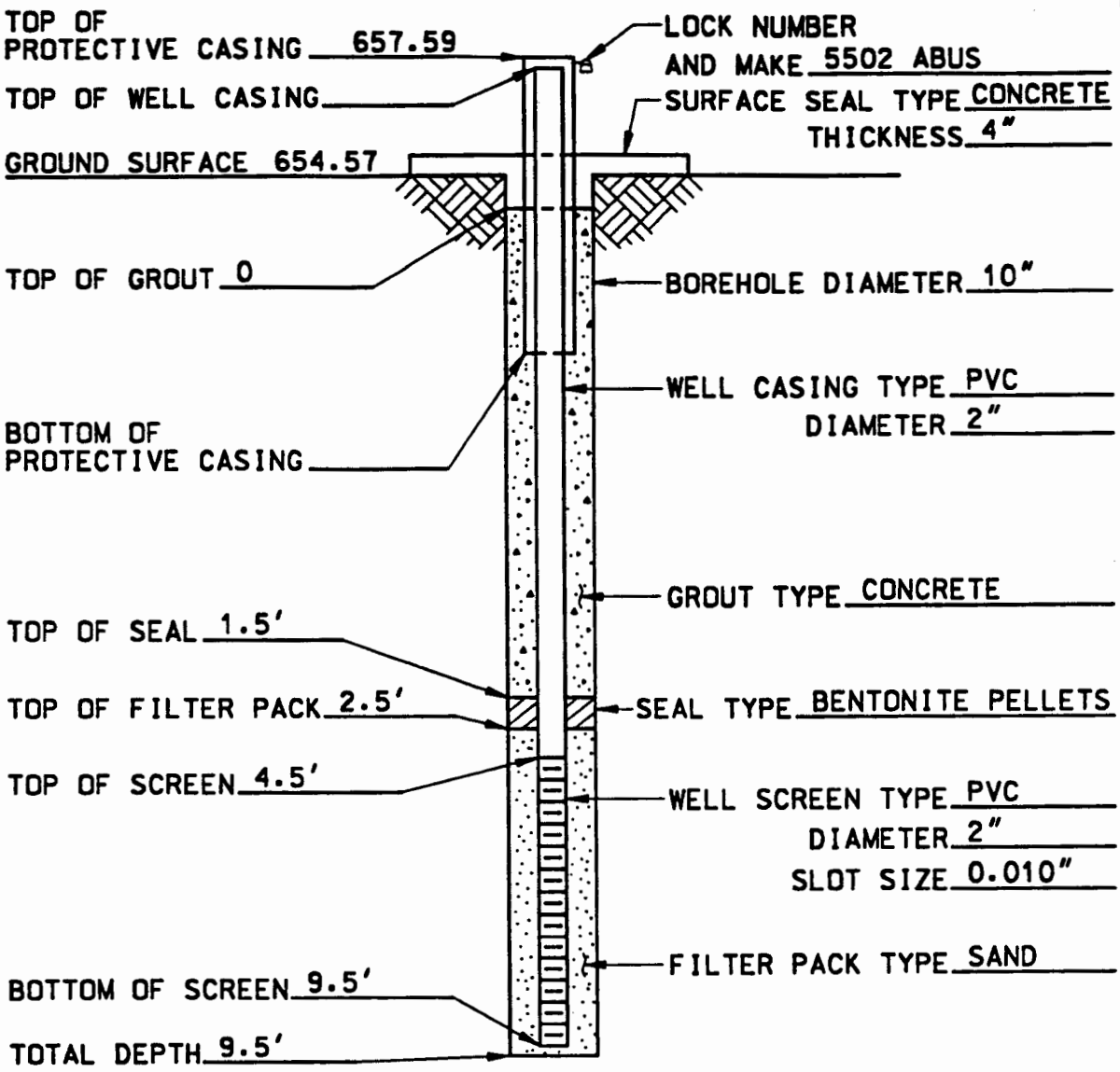
REP. SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

WELL COMPLETION RECORD

PROJECT PLUM BROOK SI
LOCATION SANDUSKY, OHIO
WELL NUMBER MW24
DATE INSTALLED 7/12/93
MKE REP. T. BENSON
DRILLER TOLTEST



COMMENTS

REP.· SIGNATURE

DATE

MORRISON KNUDSEN CORP.
ENVIRONMENTAL SERVICES GROUP

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

606041

COUNTY Fair TOWNSHIP Perkins SECTION OF TOWNSHIP South

OWNER Donald M. Ostrem ADDRESS 6114 Patton Tract Rd Sandusky, Ohio

LOCATION OF PROPERTY Same as Above.

CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 27'

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion 4-5-83

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 8 gpm Duration of test 12 hrs

Drawdown 20 ft Date 4-5-83

Static level (depth to water) 18' ft

Quality (clear, cloudy, taste, odor) Sulphur Odor

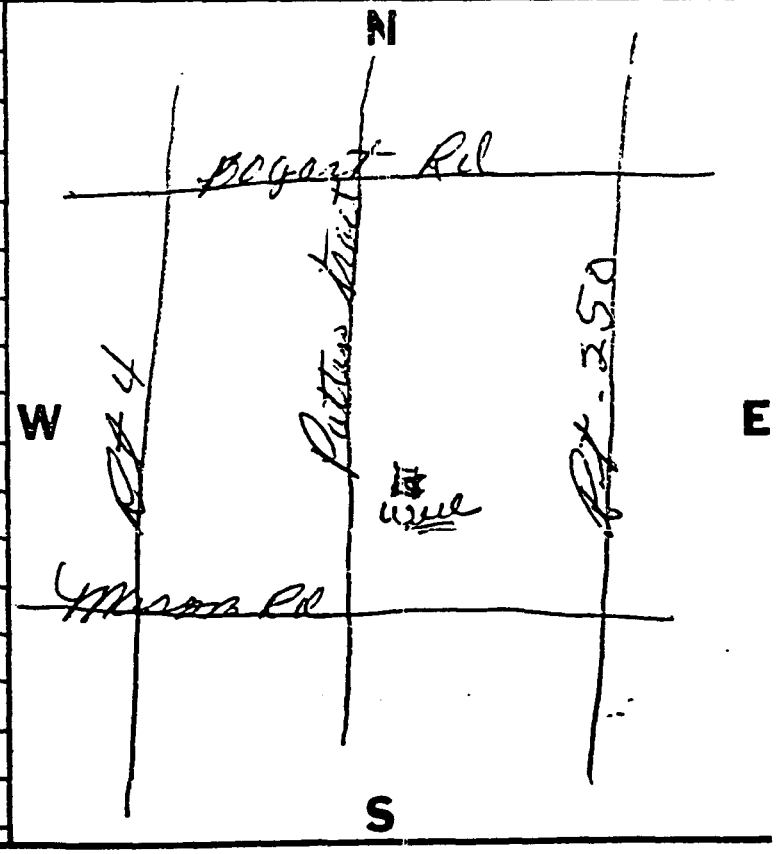
Pump installed by Owner

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
top Soil	0 ft	3' ft
Clay & Sand	3'	25'
Limestone	25'	55'
Water 34 to 36'		

SKETCH SHOWING LOCATION

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



DRILLING FIRM Jones Drilling DATE 4-6-83

ADDRESS Chapin Rd Birlin Hts. SIGNED Jasper W. Jones

*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 4

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

606001

COUNTY Erie TOWNSHIP Perkins SECTION OF TOWNSHIP South West

OWNER Randall H. Koch ADDRESS 1222 Walsh Rd Sandusky

LOCATION OF PROPERTY 5912 Patterson Tract Rd. Sandusky, Ohio

CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 25'

Type of screen None Length of screen

Type of pump

Capacity of pump

Depth of pump setting

Date of completion 2-17-82

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 5 gpm Duration of test 12 hrs

Drawdown 75 ft Date 2-16-82

Static level (depth to water) 12 ft

Quality (clear) cloudy, taste, (odor) Sulphur Odor

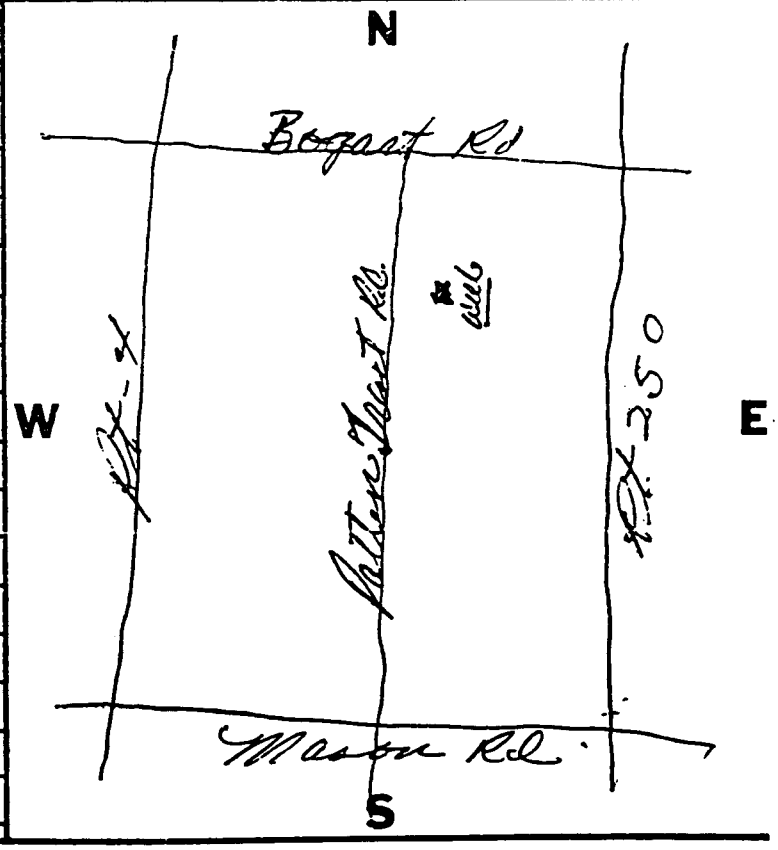
Pump installed by Owner

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
Clay	0 ft	23 ft
Lime Stone	23'	89'
Water At 32'		

SKETCH SHOWING LOCATION

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



DRILLING FIRM Jones Drilling DATE 2-17-82

ADDRESS Chapin Rd Berlin Hts. O SIGNED Jacquel A. Jones

*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

5

WEI' LOG AND DRILLING REP^RT

ORIGINAL

NO CARBON PAPER NECESSARY— LF-TRANSCRIBING

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

No. 402636

County Erie Township Perrin Section of Township

Owner Schenk Address

Location of property Schenk Rd

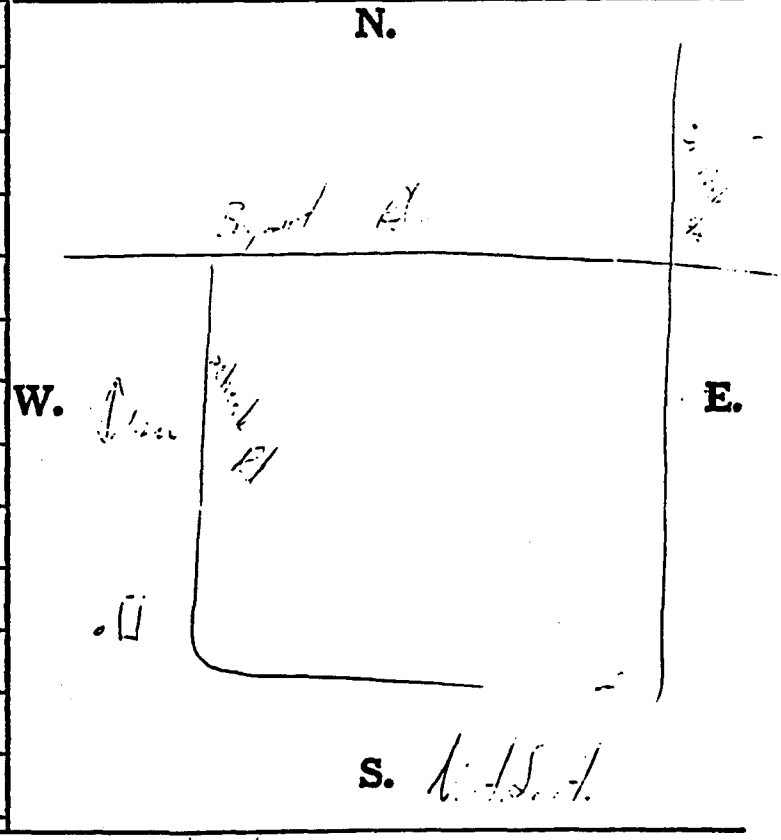
CONSTRUCTION DETAILS	BAILING OR PUMPING TEST (Specify one by circling)
Casing diameter 5 5/8 Length of casing 21'5"	Test Rate 3 to 4 G.P.M. Duration of test 1/2 hrs.
Type of screen — Length of screen —	Drawdown ft. Date
Type of pump Deep Well	Static level-depth to water ft.
Capacity of pump	Quality (clear, cloudy, taste, odor) Black Sulfur
Depth of pump setting 110	
Date of completion April 9, 1970	Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Soil	0 Feet	8 Ft.
Yellow Clay	8	19
Hard Limestone	19	121
Sulphur Vein at 121		

SKETCH SHOWING LOCATION

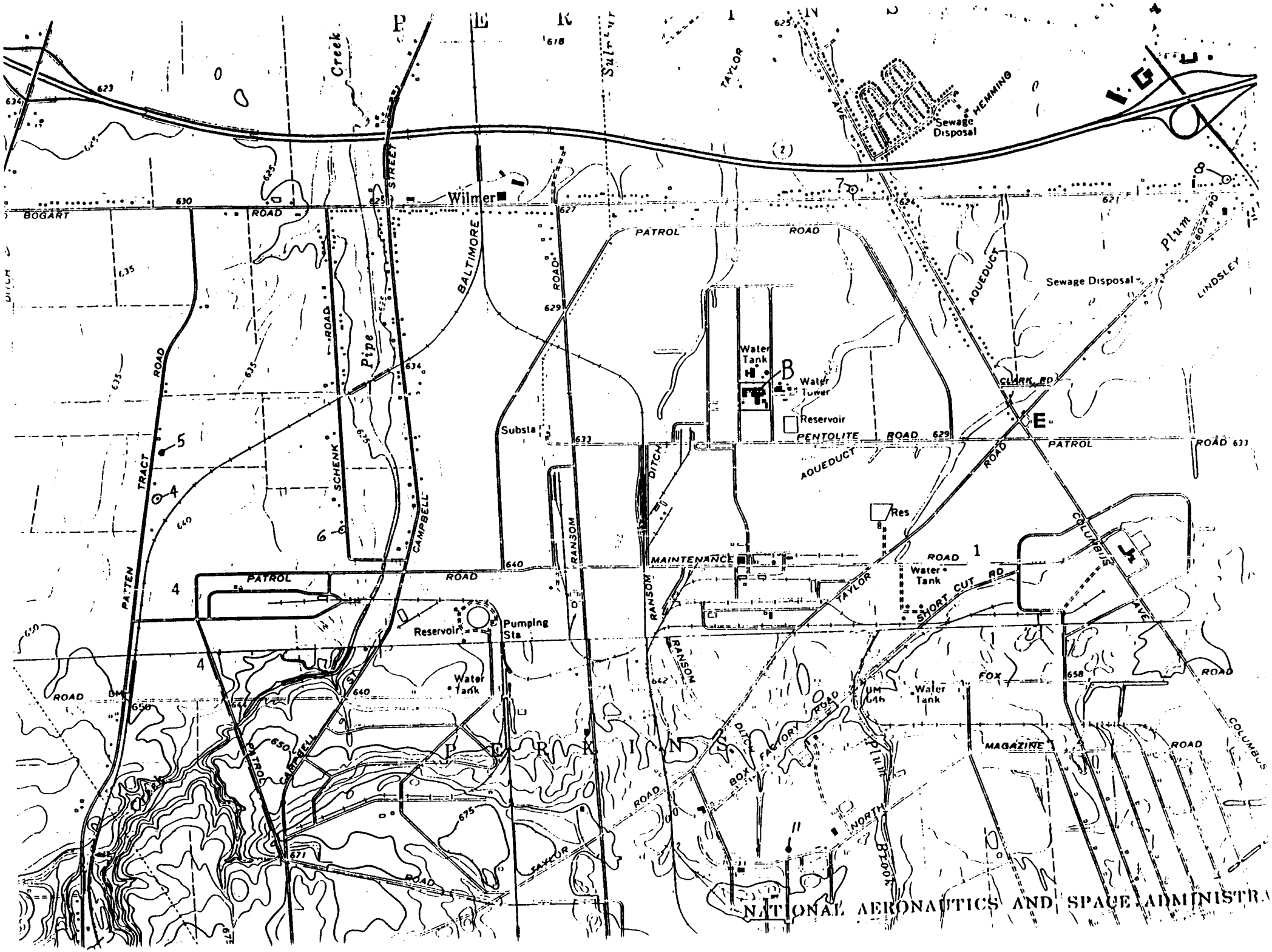
Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm Date

Address Signed

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


P E R K I N S
Creek
Pipe
Wilmer
BOGART ROAD
PATROL ROAD
BALTIMORE STREET
PATTEN TRACT ROAD
SCHENK ROAD
CAMPBELL
RANSOM ROAD
RANSOM DITCH
TAYLOR AVE
HEMMING
Sewage Disposal
AQUEDUCT ROAD
Plum
LINDLEY
Sewage Disposal
Water Tank
Water Tower
Reservoir
Substa
PENTOLITE ROAD
CLARK RD
MAINTENANCE ROAD
Res
Water Tank
SHORT CUT RD
COLUMBUS AVE
Reservoir
Pumping Sta
Water Tank
FOX ROAD
Water Tank
BOX FACTORY ROAD
MAGAZINE ROAD
NORTH BLOOM
P E R K I N S
NATIONAL AERONAUTICS AND SPACE ADMINISTRA

WELL LOG AND DRILLING REPORT

NO. _____

County Erie Township Perkins or Oxford Section of Township _____

Owner Trojan Powder Co, Plum Brook Ordinance Works Address Sandusky

Location of property Behind Water Clarification Bldg. - Bldg # 420B

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter ____ Length of casing ____	Pumping rate _____ G.P.M.
Type of screen ____ Length of screen ____	Duration of test _____ hrs.
Type of pump _____	Drawdown ____ ft. Date _____
Capacity of pump _____	~~Developed~~ Estimated capacity 20 GPM
Depth of pump setting _____	Static level - depth to water 60 ft.
Date of completion 6/9/42	Pump installed by _____

WELL LOG		
Formation	From	To
Clay	0	3
Brown shale	3 -	13
Flint rock	13	21
Blue shale	21	"82"
Gray shale	"83"	85
Limestone + fossils	85	90
Buff colored rock indicating SS	90	130
Hard blue rock	130	185
Buff colored LS. Color indicated carbonated Lime	185	188
Grayish brown rock	188	202
Gray rock	202	214
Very hard brown rock @ flint streaks	214	217½
Soft gray rock	217	218½
Hard brown rock @ black streaks	218½	260

SKETCH SHOWING LOCATION

NOTE: From old Dr. Stout file. Four stone analyses given in report.

N.

Soft brown rock	260 - 285
Same - more solid	285 - 300
Grayish brown rock	300 - 315
Gray rock - sharp	315 - 320
Last sample - Gray rock	
Chunks of blue shale + soft mud	320 - 330
Same - brownish cast	330 - 336' 10"

W. E.

Gas picked up between 58'-60'
Oil found intermittently
Water level highest [illegible]
Water flash and [illegible]

S.

Drilling Firm _____ Date _____

Address _____ Copied by MDB

Record from Mark R. Woodward, Chief Eng. of Maintenance.

WELL LOG AND DRILLING REPORT

ORIGINAL

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

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 266839

County Erie (Eire) Township Perkins Section of Township

Owner N.A.S.A. Address R.D. Sandusky

Location of property 2 mi. South of Sandusky on U.S. 250

CONSTRUCTION DETAILS

Casing diameter 8" Length of casing 5'

Type of screen — Length of screen —

Type of pump Vertical Turbine

Capacity of pump 500 G.P.M.

Depth of pump setting 39 Feet

Date of completion 3-23-64

BAILING OR PUMPING TEST

Pumping rate 95 G.P.M. Duration of test 2-4 hrs.

Drawdown 35.38 ft. Date 3-23-64

Developed capacity 95 G.P.M.

Static level—depth to water 5½' ft.

Pump installed by Robertson's

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Soil & Clay	0 Feet	4 Ft.
Blue Shale	4	14
Lime Stone	14	18
Gray Shale	18	30
Lime Stone	30	32
White Shale	32	40
Water At 14-16-27'		

SKETCH SHOWING LOCATION

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

N.

W. N.A.S.A. Sandusky Ohio E.

S.

See reverse side for instructions

Drilling Firm Robertson's Date 3-23-64

Address Bellevue, O. Signed [illegible]

B

ORIGINAL

WELL LOG AND DRILLING REPORT

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

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 244868

County Erie Township Perkins Section of Township 21000 Brookpark Rd.

Owner U.S. Gov't. N.A.S.A. Address Cleveland 35, Ohio

Location of property Plum Brook Ordinance Sandusky, Ohio

#1 CONSTRUCTION DETAILS

Casing diameter 8" Length of casing 34'4"

Type of screen — Length of screen —

Type of pump —

Capacity of pump —

Depth of pump setting —

Date of completion 6/3/60

BAILING OR PUMPING TEST

Pumping rate 15 G.P.Hr. Duration of test 2 hrs.

Drawdown ft. Date 6/3/60

Developed capacity 15 gal. per Hr.

Static level—depth to water 36'2" ft.

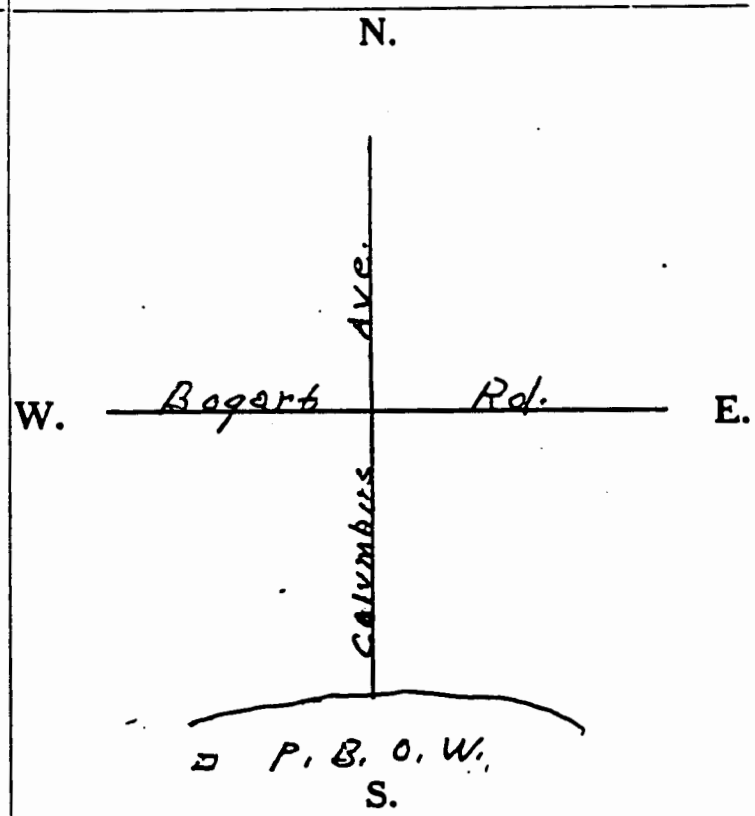
Pump installed by —

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay Muck	0 Feet	23 Ft.
Hardpan	23	25'11"
Limestone	25'11"	80
Water Approx. 36' + 75'		

SKETCH SHOWING LOCATION

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



See reverse side for instructions

Drilling Firm Robertson's Date 6/10/60

Address Bellevue, Ohio Signed H. W. Robertson

B

ORIGINAL

WELL LOG AND DRILLING REPORT

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

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 244867

County Erie Township Perkins Section of Township

Owner U.S. Gov't. N.A.S.A. Address 21000 Brookpark Rd. Cleveland 35, Ohio

Location of property Plum Brook Ordinance Sandusky, Ohio

CONSTRUCTION DETAILS

#2

Casing diameter 8" 2'2" Length of casing 33'1"

Type of screen — Length of screen —

Type of pump —

Capacity of pump —

Depth of pump setting —

Date of completion 5/24/60

BAILING OR PUMPING TEST

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

Drawdown ..... ft. Date .....

Developed capacity .....

Static level—depth to water Dry Hole ft.

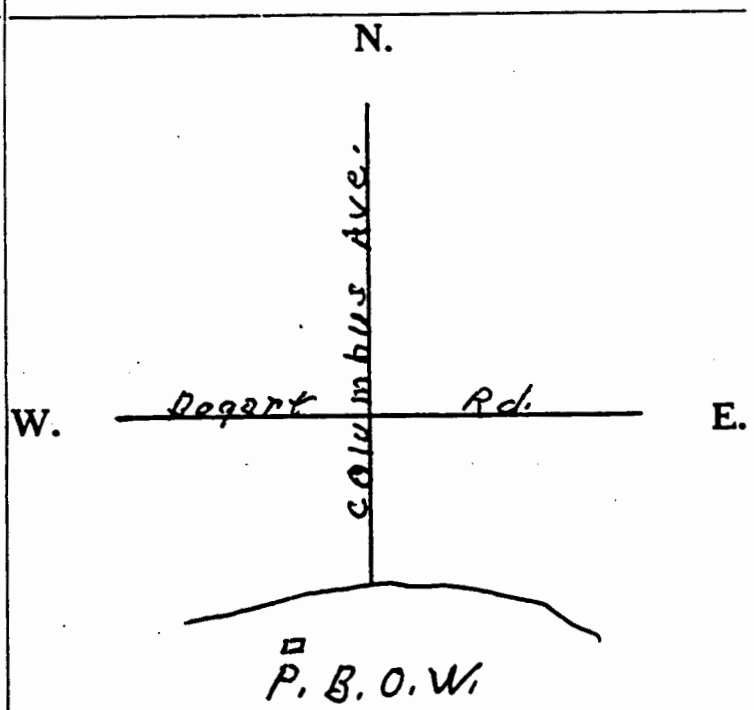
Pump installed by .....

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Gray Muck	0 Feet	25 Ft.
Limestone	25	40

SKETCH SHOWING LOCATION

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



See reverse side for instructions

Drilling Firm Robertson's Date 6/10/60

Address Bellevue, Ohio Signed H.W. Robertson

B

ORIGINAL

WELL LOG AND DRILLING REPORT

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

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 244866

County Erie Township Perkins Section of Township

Owner U.S. Gov't. N.A.S.A. Address 21000 Brookpark Rd. Cleveland 35, Ohio

Location of property Plum Brook Ordinance, Sandusky, Ohio

#4 CONSTRUCTION DETAILS

Casing diameter 8" Length of casing 1'8" +

Type of screen — Length of screen —

Type of pump —

Capacity of pump —

Depth of pump setting —

Date of completion 5/19/60

BAILING OR PUMPING TEST

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

Drawdown ft. Date

Developed capacity

Static level—depth to water Dry Hole ft.

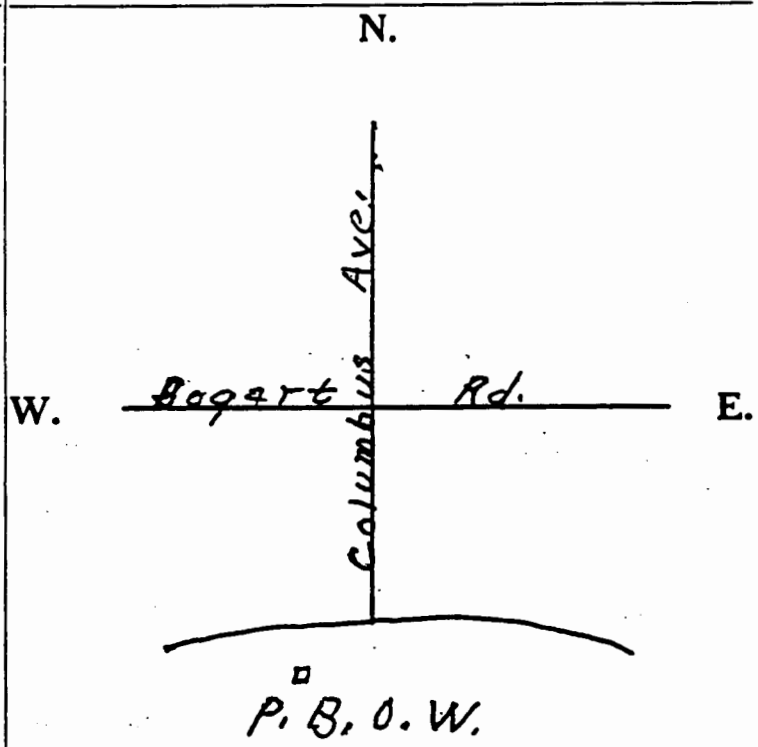
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay Muck	0 Feet	25 Ft.
Limestone	25	50

SKETCH SHOWING LOCATION

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



See reverse side for instructions

Drilling Firm Robertson's Date 6/10/60

Address Bellevue, Ohio Signed H. W. Robertson

B

ORIGINAL

WELL LOG AND DRILLING REPORT

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

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

No. 244865

County Erie Township Perkins Section of Township

Owner U.S. Gov't. N.A.S.A. Address 21000 Brookpark Rd. Cleveland 35, Ohio

Location of property Plum Brook Ordinance, R.D. Sandusky, Ohio

#3 CONSTRUCTION DETAILS

Casing diameter 8" 1" 8" + Length of casing 32'

Type of screen — Length of screen —

Type of pump —

Capacity of pump —

Depth of pump setting —

Date of completion 5/16/60

BAILING OR PUMPING TEST

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

Drawdown ..... ft. Date .....

Developed capacity .....

Static level—depth to water Dry Hole ft.

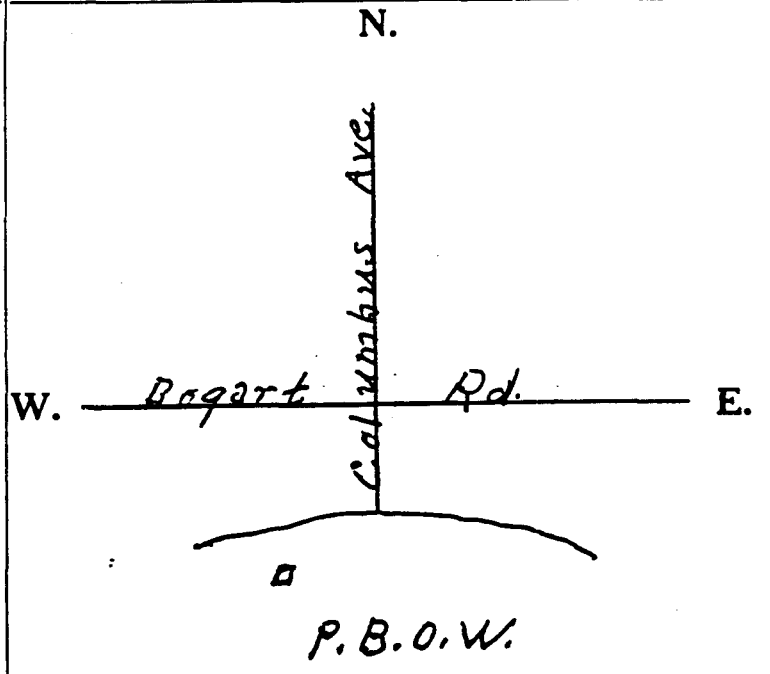
Pump installed by .....

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
ay Muck	0 Feet	24 Ft.
Limestone	24	40

SKETCH SHOWING LOCATION

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



See reverse side for instructions

Drilling Firm Robertson's Date 6/10/60

Address Bellevue, Ohio Signed H. W. Robertson

Crews: Kemper
Says: [illegible]

ORIGINAL

WELL LOG AND DRILLING REPORT

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

No. 221217

County ERIE Township PERKINS Section of Township

Owner BAY VIEW REAT. Address R. D. SANDUSKY, O.

Location of property PATTEN TRACT RD AT PERKINS AND OXFORD TWS. LINE

CONSTRUCTION DETAILS

Casing diameter 5 5/8" Length of casing 35 1/2

Type of screen — Length of screen —

Type of pump —

Capacity of pump —

Depth of pump setting —

Date of completion 9-22-58

BAILING OR PUMPING TEST

Pumping rate 5 G.P.M. Duration of test 1 hrs.

Drawdown 35 ft. Date 9-22-58

Developed capacity 5 G.P.M.

Static level—depth to water 30 ft.

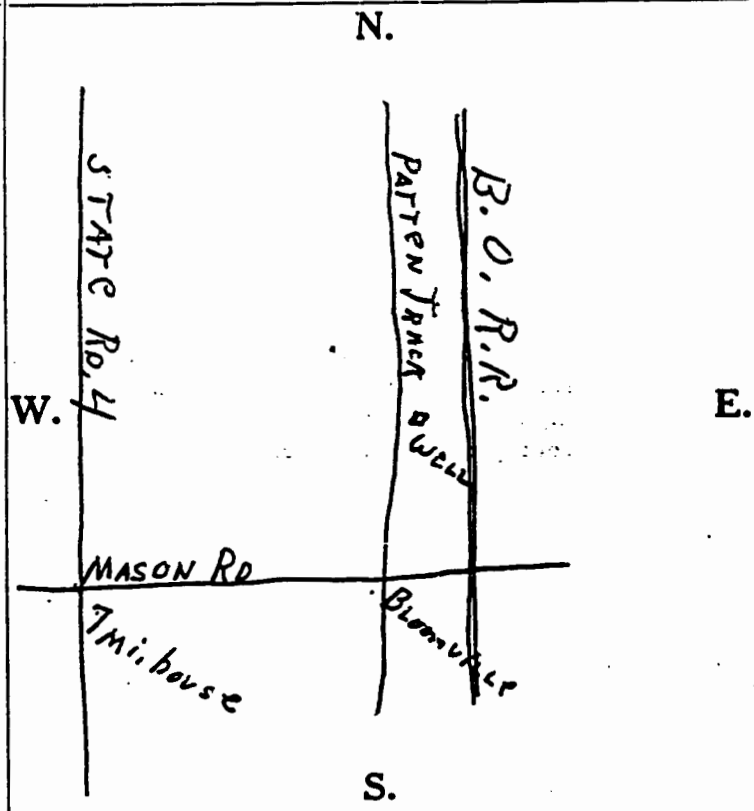
Pump installed by —

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
CLAY	0 Feet	12 Ft.
WHITE SHALE	12	34
LIMESTONE	34	65 1/2

SKETCH SHOWING LOCATION

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



See reverse side for instructions

Drilling Firm Robertson's Date 9-22-58

Address Bellevue, O. Signed H. W. Robertson

3

RegNo	Year	WellNo	GWYrTot	County 5	Lat D	Lat M	Lat S	Long D	Long M	Long S	Company Name 0	Address 0	City 0	St 0	Zip 0	Phone 0	SIC
00222	1992	2	23	ERIE	41	17	25	82	35	10	WATER PLANT	9 E CHURCH ST	MILAN	OH	44846	419/499-2133	4941
00222	1992	3	19	ERIE	41	17	25	82	35	10	WATER PLANT	9 E CHURCH ST	MILAN	OH	44846	419/499-2133	4941
00222	1992	4	17	ERIE	41	17	25	82	35	10	WATER PLANT	9 E CHURCH ST	MILAN	OH	44846	419/499-2133	4941
00222	1992	5	18	ERIE	41	17	25	82	35	10	WATER PLANT	9 E CHURCH ST	MILAN	OH	44846	419/499-2133	4941
00726	1992	1	4	ERIE	41	20	20	82	46	45	SANDUSKY CRUSHED STONE COMPANY	P.O. BOX 338	SANDUSKY	OH	44871-0338	419/625-8493	5541
00726	1992	2	4	ERIE	41	20	20	82	46	45	SANDUSKY CRUSHED STONE COMPANY	P.O. BOX 338	SANDUSKY	OH	44871-0338	419/625-8493	5541
00726	1992	3	4	ERIE	41	20	20	82	46	45	SANDUSKY CRUSHED STONE COMPANY	P.O. BOX 338	SANDUSKY	OH	44871-0338	419/625-8493	5541
00726	1992	BURY	412	ERIE	41	20	20	82	46	45	SANDUSKY CRUSHED STONE COMPANY	P.O. BOX 338	SANDUSKY	OH	44871-0338	419/625-8493	5541
00757	1992	1	0	ERIE	41	23	45	82	50	10	DIVISION OF WILDLIFE	1840 BELCHER DR, B-3	COLUMBUS	OH	43224		0971
01543	1992	1	275	ERIE	41	24	25	82	46	15	ERIE BLACKTOP, INC	4507 TIFFIN AVE, BOX 230B	SANDUSKY	OH	44870	419/625-7374	2951
00155	1992	4	0	HURON	41	04	05	82	39	15	WATER TREATMENT PLANT	P.O. BOX 367	WILLARD	OH	44890	419/933-4001	4941
00229	1992	1-4	0	HURON	41	00	10	82	40	35	WATER DEPARTMENT	49 SANDUSKY ST	PLYMOUTH	OH	44865	419/687-4231	4941
00377	1992	1	11	HURON	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941
00377	1992	3	4	HURON	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941
00377	1992	4	3	HURON	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941
00377	1992	5	13	HURON	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941
00377	1992	6	14	HURON	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941
00377	1992	7	12	HURON	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941
00550	1992	1	9	HURON	41	06	20	82	36	55	WATER DEPARTMENT	PO BOX 133	NORTH FAIRFIELD	OH	44855	419/744-2231	4941
00550	1992	2	7	HURON	41	06	20	82	36	55	WATER DEPARTMENT	PO BOX 133	NORTH FAIRFIELD	OH	44855	419/744-2231	4941
01214	1992	2-8	17	HURON	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941
01214	1992	9	2	HURON	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941
01265	1992			HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	1	3	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	10	3	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	11	10	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	13	4	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	14	0	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	15	2	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	16	0	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	2	2	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	3	2	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	4	1	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	5	7	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	9	1	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01272	1992	1	2	HURON	41	01	55	82	42	05	DUTCH MAID PRODUCE INC.	4465 S.R. 103 S.	WILLARD	OH	44890	419/935-0131	0111
01272	1992	2	10	HURON	41	01	55	82	42	05	DUTCH MAID PRODUCE INC.	4465 S.R. 103 S.	WILLARD	OH	44890	419/935-0131	0111
01272	1992	3	12	HURON	41	01	55	82	42	05	DUTCH MAID PRODUCE INC.	4465 S.R. 103 S.	WILLARD	OH	44890	419/935-0131	0111
01287	1992	1&2	1	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	11	0	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	12	3	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	3&4	1	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	5&6	1	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	7&8	1	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	9&10	3	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01291	1992	1W	4	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	3W	2	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	4W	2	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	W-5	2	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	W-7	2	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01333	1992	1	4	HURON	41	04	40	82	24	55	MILLSTONE HILLS GOLF CLUB	2240 EUCLID RD.	NEW LONDON	OH	44851	419/929-6477	7992

RegNo	Year	WellNo	GWYrTot	County S	Lat D	Lat M	Lat S	Long D	Long M	Long S	Company Name O	Address O	City O	St O	Zip O	Phone O	SIC
01405	1992	CH-1	0	HURON	41	12	20	82	36	35	NORWALK ELKS GOLF CLUB	109 FAIRWAY CIRCLE	NORWALK	OH	44857	419/668-8535	7992
01405	1992	MNT2	0	HURON	41	12	20	82	36	35	NORWALK ELKS GOLF CLUB	109 FAIRWAY CIRCLE	NORWALK	OH	44857	419/668-8535	7992
01607	1992	N-F1	1	HURON	41	06	05	82	36	30	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811
01608	1992	1	2	HURON	41	06	00	82	33	25	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811
01609	1992	FIT1	0	HURON	41	05	00	82	30	40	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811

RegNo	Year	IntakeNo	SWYrTot	County 5	Lat D	Lat M	Lat S	Long D	Long M	Long S	Company Name 0	Address 0	City 0	St 0	Zip 0	Phone 0	SIC
00209	1992	1	25	ERIE	41	35	35	82	42	35	WATER DEPARTMENT	PO BOX 726	KELLEYS ISLAND	OH	43438	419/746-2555	4941
00397	1992	A	129	ERIE	41	29	00	82	41	35	CEDAR POINT	P.O. BOX 5006	SANDUSKY	OH	44870	419/626-0830	7996
00416	1992	1	496	ERIE	41	25	30	82	21	55	WATER TREATMENT PLANT	5511 LIBERTY AVE	VERMILION	OH	44089	216/967-4114	4941
00483	1992	1	14	ERIE	41	24	55	82	40	50	THE WAGNER QUARRIES CO INC	4203 MILAN RD	SANDUSKY	OH	44870	419/625-8141	3274
00549	1992	1	527	ERIE	41	24	10	82	32	50	WATER DEPARTMENT	PO BOX 468	HURON	OH	44839	419/433-5000	4941
00558	1992	1-3	0	ERIE	41	17	50	82	38	00	BITTERSWEET FARMS	1108 SR 113 W.	MILAN	OH	44846	419/499-4049	0111
00796	1992	1	4	ERIE	41	22	55	82	29	05	WILLOWAY NURSERIES, INC.	PO BOX 299	AVON	OH	44011	216/934-4435	0181
01021	1992	1	4	ERIE	41	25	05	82	38	30	PLUM BROOK C.C.	3712 GALLOWAY RD	SANDUSKY	OH	44870	419/625-5394	7997
01021	1992	2	4	ERIE	41	25	05	82	38	30	PLUM BROOK C.C.	3712 GALLOWAY RD	SANDUSKY	OH	44870	419/625-5394	7997
01038	1992	A	185	ERIE	41	22	25	82	33	20	GOLF, INC.	1316 MUDBROOK RD	HURON	OH	44839	419/433-4552	7992
01340	1992	FW-2	63	ERIE	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714
01340	1992	FW-3	63	ERIE	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714
01340	1992	PMP1	485	ERIE	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714
01340	1992	PMP2	546	ERIE	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714
01340	1992	PMP3	1279	ERIE	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714
01543	1992	2	56	ERIE	41	24	25	82	46	15	ERIE BLACKTOP, INC	4507 TIFFIN AVE, BOX 2308	SANDUSKY	OH	44870	419/625-7374	2951
01685	1992	1	3463	ERIE	41	27	35	82	38	50	SANDUSKY WATER WORKS	222 MEIGS STREET	SANDUSKY	OH	44870	(419)627-5904	4941
00010	1992	1	65	HURON	41	14	00	82	41	10	MONROEVILLE WATER DEPARTMENT	BOX 304	MONROEVILLE	OH	44847	419/465-4149	4941
00155	1992	1	866	HURON	41	04	05	82	39	15	WATER TREATMENT PLANT	P.O. BOX 367	WILLARD	OH	44890	419/933-4001	4941
00308	1992	1	175	HURON	41	04	00	82	26	10	WATER DEPARTMENT	42 E. MAIN ST.	NEW LONDON	OH	44851		4941
00342	1992	1	32	HURON	41	15	10	82	23	50	WAKEMAN WATER WORKS	52 RIVER STREET	WAKEMAN	OH	44889	216/839-2622	4941
00345	1992	A	681	HURON	41	14	25	82	35	25	WATER TREATMENT PLANT	38 WHITTLESEY AVE.	NOWALK	OH	44857	419/663-6700	4941
00608	1992	2	256	HURON	41	16	10	82	49	35	BELLEVUE WATER PLANT	117 N. SANDUSKY ST.	BELLEVUE	OH	44811	419/483-3819	4941
00608	1992	3	289	HURON	41	16	10	82	49	35	BELLEVUE WATER PLANT	117 N. SANDUSKY ST.	BELLEVUE	OH	44811	419/483-3819	4941
00608	1992	4	77	HURON	41	16	10	82	49	35	BELLEVUE WATER PLANT	117 N. SANDUSKY ST.	BELLEVUE	OH	44811	419/483-3819	4941
00608	1992	5	224	HURON	41	16	10	82	49	35	BELLEVUE WATER PLANT	117 N. SANDUSKY ST.	BELLEVUE	OH	44811	419/483-3819	4941
00698	1992	1	1	HURON	41	14	30	82	35	25	SYCAMORE HILLS GOLF CLUB, INC	14 SYCAMORE DR.	NORWALK	OH	44857	419/668-8460	7992
01265	1992	30	11	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	31	12	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	32	13	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	33	12	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	34	3	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	35	0	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	36	0	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	37	1	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	38	4	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	39	3	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	40	1	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	41	4	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	42	6	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	43	3	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01265	1992	44	4	HURON	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111
01287	1992	1	1	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	10	1	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	2	2	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	3	0	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	4	0	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	5	2	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	6	0	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	7	1	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111
01287	1992	8	1	HURON	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111

RecNo	Year	IntakeNo	SWYrTot	County 5	Lat D	Lat M	Lat S	Long D	Long M	Long S	Company Name 0	Address 0	City 0	St 0	Zip 0	Phone 0	SIC
01291	1992	1-E	2	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	10E	2	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	11E	8	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	12E	1	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	2-E	1	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	3-E	0	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	4-E	0	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	5E	3	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	6E	17	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	7E	19	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	8E	6	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	P-1	5	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	P-2	4	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	P-3	4	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01291	1992	P-4	3	HURON	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111
01294	1992	1	43	HURON	40	59	30	82	43	00	CELERYVILLE CONSERVANCY DISTRICT	111 MYRTLE AVE	WILLARD	OH	44890	419/935-0171	0111
01333	1992	1	6	HURON	41	04	40	82	24	55	MILLSTONE HILLS GOLF CLUB	2240 EUCLID RD.	NEW LONDON	OH	44851	419/929-6477	7992
01405	1992	1	1	HURON	41	12	20	82	36	35	NORWALK ELKS GOLF CLUB	109 FAIRWAY CIRCLE	NORWALK	OH	44857	419/668-8535	7992
01607	1992	G-1	4	HURON	41	06	05	82	36	30	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811
01607	1992	NF1	7	HURON	41	06	05	82	36	30	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811
01608	1992	FOS1	3	HURON	41	06	00	82	33	25	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811
01609	1992	FIT1	0	HURON	41	05	00	82	30	40	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811

RegNo	Lat D	Lat M	Lat S	Long D	Long M	Long S	Company Name O	Address O	City O	St O	Zip O	Phone O	SIC	County 5	Well no	AU	Intake no	Waterbody name	Source
00209	41	35	35	82	42	35	WATER DEPARTMENT	PO BOX 726	KELLEYS ISLAND	OH	43438	419/746-2555	4941	ERIE			1	LAKE ERIE	L
00222	41	17	25	82	35	10	WATER PLANT	9 E CHURCH ST	MILAN	OH	44846	419/499-2133	4941	ERIE	2	SG			
00222	41	17	25	82	35	10	WATER PLANT	9 E CHURCH ST	MILAN	OH	44846	419/499-2133	4941	ERIE	3	SG			
00222	41	17	25	82	35	10	WATER PLANT	9 E CHURCH ST	MILAN	OH	44846	419/499-2133	4941	ERIE	4	SG			
00222	41	17	25	82	35	10	WATER PLANT	9 E CHURCH ST	MILAN	OH	44846	419/499-2133	4941	ERIE	5	SG			
00397	41	29	00	82	41	35	CEDAR POINT	P.O. BOX 5006	SANDUSKY	OH	44870	419/626-0830	7996	ERIE			1	LAKE ERIE	L
00416	41	25	30	82	21	55	WATER TREATMENT PLANT	5511 LIBERTY AVE	VERMILION	OH	44089	216/967-4114	4941	ERIE			1	LAKE ERIE	L
00416	41	25	30	82	21	55	WATER TREATMENT PLANT	5511 LIBERTY AVE	VERMILION	OH	44089	216/967-4114	4941	ERIE			2	VERMILION RIVER	R
00483	41	24	55	82	40	50	THE WAGNER QUARRIES CO INC	4203 MILAN RD	SANDUSKY	OH	44870	419/625-8141	3274	ERIE	SUMP1	LS			
00483	41	24	55	82	40	50	THE WAGNER QUARRIES CO INC	4203 MILAN RD	SANDUSKY	OH	44870	419/625-8141	3274	ERIE	SUMP2	LS			
00549	41	24	10	82	32	50	WATER DEPARTMENT	PO BOX 468	HURON	OH	44839	419/433-5000	4941	ERIE			1	LAKE ERIE	L
00558	41	17	50	82	38	00	BITTERSWEET FARMS	1108 SR 113 W.	MILAN	OH	44846	419/499-4049	0111	ERIE			1	HURON RIVER	R
00558	41	17	50	82	38	00	BITTERSWEET FARMS	1108 SR 113 W.	MILAN	OH	44846	419/499-4049	0111	ERIE			2	LAKE	L
00558	41	17	50	82	38	00	BITTERSWEET FARMS	1108 SR 113 W.	MILAN	OH	44846	419/499-4049	0111	ERIE			3	SPRING-FED POND	L
00726	41	20	20	82	46	45	SANDUSKY CRUSHED STONE COMPANY	P.O. BOX 338	SANDUSKY	OH	44871-0338	419/625-8493	5541	ERIE	1	LS	1	QUARRY	L
00726	41	20	20	82	46	45	SANDUSKY CRUSHED STONE COMPANY	P.O. BOX 338	SANDUSKY	OH	44871-0338	419/625-8493	5541	ERIE	2	LS			
00726	41	20	20	82	46	45	SANDUSKY CRUSHED STONE COMPANY	P.O. BOX 338	SANDUSKY	OH	44871-0338	419/625-8493	5541	ERIE	3	LS			
00757	41	23	45	82	50	10	DIVISION OF WILDLIFE	1840 BELCHER DR, G-3	COLUMBUS	OH	43224		0971	ERIE	1	LS			
00757	41	23	45	82	50	10	DIVISION OF WILDLIFE	1840 BELCHER DR, G-3	COLUMBUS	OH	43224		0971	ERIE	2	LS			
00757	41	23	45	82	50	10	DIVISION OF WILDLIFE	1840 BELCHER DR, G-3	COLUMBUS	OH	43224		0971	ERIE	3	LS			
00761	41	26	25	82	52	15	DIVISION OF WILDLIFE (INACTIVE)	1840 BELCHER DR., G-3	COLUMBUS	OH	43224-1329	614/265-6300	0971	ERIE			1	SANDUSKY BAY	L
00796	41	22	55	82	29	05	WILLOWAY NURSERIES, INC.	PO BOX 299	AVON	OH	44011	216/934-4435	0181	ERIE			1	LAKE ERIE	L
00983	41	20	15	82	22	20	CLEVELAND QUARRIES, L.P.	P.O. BOX 261	AMHERST	OH	44001	216/986-4501	3281	ERIE	BIRM	SS			
00983	41	20	15	82	22	20	CLEVELAND QUARRIES, L.P.	P.O. BOX 261	AMHERST	OH	44001	216/986-4501	3281	ERIE	W-2	SS			
01021	41	25	05	82	38	30	PLUM BROOK C.C.	3712 GALLOWAY RD	SANDUSKY	OH	44870	419/625-5394	7997	ERIE			1	PLUM BROOK	R
01021	41	25	05	82	38	30	PLUM BROOK C.C.	3712 GALLOWAY RD	SANDUSKY	OH	44870	419/625-5394	7997	ERIE			2	PLUM BROOK	R
01038	41	22	25	82	33	20	GOLF, INC.	1316 MUDBROOK RD	HURON	OH	44839	419/433-4552	7992	ERIE			1	HURON RIVER	R
01340	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714	ERIE			FW2	QUARRY	L
01340	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714	ERIE			FW3	QUARRY	L
01340	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714	ERIE			PUMP1	QUARRY	L
01340	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714	ERIE			PUMP2	QUARRY	L
01340	41	25	00	82	44	35	SANDUSKY PLASTICS PLANT	3020 TIFFIN AVENUE	SANDUSKY	OH	44870	419/627-3406	3714	ERIE			PUMP3	QUARRY	L
01543	41	24	25	82	46	15	ERIE BLACKTOP, INC	4507 TIFFIN AVE, BOX 2308	SANDUSKY	OH	44870	419/625-7374	2951	ERIE	1	LS			
01543	41	24	25	82	46	15	ERIE BLACKTOP, INC	4507 TIFFIN AVE, BOX 2308	SANDUSKY	OH	44870	419/625-7374	2951	ERIE	2	LS			
01685	41	27	35	82	38	50	SANDUSKY WATER WORKS	222 MEIGS STREET	SANDUSKY	OH	44870	(419)627-5904	4941	ERIE			1	LAKE ERIE	LAKE
01728	41	24	40	82	48	10	CASTALIA TROUT FARMS, INC	12400 WILLIAMS RD	PERRYSBURG	OH	43551	(419)874-9251	0273	ERIE			1	COLD CREEK	CREEK
00010	41	14	00	82	41	10	MONROEVILLE WATER DEPARTMENT	BOX 304	MONROEVILLE	OH	44847	419/465-4149	4941	HURON			1	HURON RIVER, W. BR.	R
00155	41	04	05	82	39	15	WATER TREATMENT PLANT	P.O. BOX 367	WILLARD	OH	44890	419/933-4001	4941	HURON	4	SG	1	HURON RIVER W BR	R
00229	41	00	10	82	40	35	WATER DEPARTMENT	49 SANDUSKY ST	PLYMOUTH	OH	44865	419/687-4331	4941	HURON	1				
00229	41	00	10	82	40	35	WATER DEPARTMENT	49 SANDUSKY ST	PLYMOUTH	OH	44865	419/687-4331	4941	HURON	2				
00229	41	00	10	82	40	35	WATER DEPARTMENT	49 SANDUSKY ST	PLYMOUTH	OH	44865	419/687-4331	4941	HURON	3				
00229	41	00	10	82	40	35	WATER DEPARTMENT	49 SANDUSKY ST	PLYMOUTH	OH	44865	419/687-4331	4941	HURON	4				
00308	41	04	00	82	26	10	WATER DEPARTMENT	42 E. MAIN ST.	NEW LONDON	OH	44851		4941	HURON			1	NEW LONDON RESERVOIR	L
00342	41	15	10	82	23	50	WAKEMAN WATER WORKS	52 RIVER STREET	WAKEMAN	OH	44889	216/839-2622	4941	HURON			1	VERMILLION RIVER	R
00345	41	14	25	82	35	25	WATER TREATMENT PLANT	38 WHITTLESEY AVE.	NOWALK	OH	44857	419/663-6700	4941	HURON			1	LOWER RESERVOIR	L
00345	41	14	25	82	35	25	WATER TREATMENT PLANT	38 WHITTLESEY AVE.	NOWALK	OH	44857	419/663-6700	4941	HURON			2	MEMORIAL RESERVOIR	L
00345	41	14	25	82	35	25	WATER TREATMENT PLANT	38 WHITTLESEY AVE.	NOWALK	OH	44857	419/663-6700	4941	HURON			3	HURON RIVER/EAST BR.	R
00377	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941	HURON	1	SS			
00377	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941	HURON	3	SS			
00377	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941	HURON	4	SG			
00377	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941	HURON	5	SS			

RegNo	Lat D	Lat M	Lat S	Long D	Long M	Long S	Company Name O	Address O	City O	St O	Zip O	Phone O	SIC	County 5	Well no	AU	Intake no	Waterbody name	Source
00377	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941	HURON	6	SG			
00377	41	01	40	82	33	25	GREENWICH WATER & LIGHT	45 MAIN ST	GREENWICH	OH	44837	419/752-2441	4941	HURON	7	SG			
00550	41	06	20	82	36	55	WATER DEPARTMENT	PO BOX 133	NORTH FAIRFIELD	OH	44855	419/744-2231	4941	HURON	1	SH			
00550	41	06	20	82	36	55	WATER DEPARTMENT	PO BOX 133	NORTH FAIRFIELD	OH	44855	419/744-2231	4941	HURON	2	SH			
00608	41	16	10	82	49	35	BELLEVUE WATER PLANT	117 N. SANDUSKY ST.	BELLEVUE	OH	44811	419/483-3819	4941	HURON			2	BIG DITCH	R
00608	41	16	10	82	49	35	BELLEVUE WATER PLANT	117 N. SANDUSKY ST.	BELLEVUE	OH	44811	419/483-3819	4941	HURON			3	BIG DITCH	R
00608	41	16	10	82	49	35	BELLEVUE WATER PLANT	117 N. SANDUSKY ST.	BELLEVUE	OH	44811	419/483-3819	4941	HURON			4	MILLER & BARRY DITCH	R
00608	41	16	10	82	49	35	BELLEVUE WATER PLANT	117 N. SANDUSKY ST.	BELLEVUE	OH	44811	419/483-3819	4941	HURON			5	FINK RUN	R
00898	41	14	30	82	35	25	SYCAMORE HILLS GOLF CLUB, INC.	14 SYCAMORE DR.	NORWALK	OH	44857	419/668-8460	7992	HURON			1	EAST BRANCH, HURON R	R
01214	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941	HURON	2	SG			
01214	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941	HURON	3	SG			
01214	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941	HURON	4	SG			
01214	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941	HURON	5	SG			
01214	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941	HURON	6	SG			
01214	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941	HURON	7	SG			
01214	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941	HURON	8	SG			
01214	41	05	35	82	42	20	UTILITIES, INC. / HOLIDAY SERVICE CORP	2335 SANDERS RD.	NORTHBROOK	IL	60062	419/935-9171	4941	HURON	9	SG			
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	1	SA	30	SHED POND	L
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	10	SA	39	SWALE	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	11	SA	40	SWALE	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	12	SA	41	BUURMA HERSH. DITCH	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	13	SA	42	FARMERS DITCH	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	14	SA	43	CLEAR RUN	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	15	SA	44	CLEAR RUN	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	16	SA			
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	17	SA			
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	18	SA			
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	2	SA	31	SHED POND	L
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	3	SA	32	SHED POND	L
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	4	SA	33	ROAD DITCH	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	5	SA	34	CUKENDALL DITCH	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	6	SA	35	SHARPLESS DITCH	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	7	SA	36	SHARPLESS DITCH	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	8	SA	37	MARSH RUN	R
01265	41	01	10	82	43	55	BUURMA FARMS INC.	3909 KOK RD	WILLARD	OH	44890	419/935-6411	0111	HURON	9	SA	38	MARSH RUN	R
01272	41	01	55	82	42	05	DUTCH MAID PRODUCE INC.	4465 S.R. 103 S.	WILLARD	OH	44890	419/935-0131	0111	HURON	1	SA			
01272	41	01	55	82	42	05	DUTCH MAID PRODUCE INC.	4465 S.R. 103 S.	WILLARD	OH	44890	419/935-0131	0111	HURON	2	SA			
01272	41	01	55	82	42	05	DUTCH MAID PRODUCE INC.	4465 S.R. 103 S.	WILLARD	OH	44890	419/935-0131	0111	HURON	3	SA			
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON					
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	1		1	SHARPLESS DITCH	R
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	10		10	ROADSIDE DITCH	R
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	11				
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	12				
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	2		2	SHARPLESS DITCH	R
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	3		3	SHED POND	L
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	4		4	SHARPLESS DITCH	R
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	5		5	HONEY CREEK DITCH	R
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	6		6	HONEY CREEK DITCH	R
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	7		7	HONEY CREEK DITCH	R
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	8		8	MAIN CANAL DITCH	R
01287	41	01	00	82	43	45	HOLTHOUSE FARMS OF OHIO	4373 ST. RT. 103	WILLARD	OH	44890	419/935-0151	0111	HURON	9		9	SHARPLESS DITCH	R
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON			11E	HESS-NOBLE	

RegNo	Lat D	Lat M	Lat S	Long D	Long M	Long S	Company Name O	Address O	City O	St O	Zip O	Phone O	SIC	County 5	Well no	AU	Intake no	Waterbody name	Source
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON			12E	ROAD DITCH	R
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON			P-1	MARSH RUN	
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON			P-2	WEST BRANCH	R
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON			P-3	FARMERS DITCH	R
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON			P-4	CLEAR RUN	R
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	10W		SG	10E	BARTH POND	L
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	1W		SA	1E	MARSH RUN	
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	2W		SA	2E	MARSH RUN	
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	3W		SA	3E	WIERS POND	L
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	4W		SA	4E	SHARPLESS DITCH	R
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	5W		SA	5E	STAMBAUGH POND	L
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	6W		SA	6E	MARSH RUN	R
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	7W		SH	7E	MARSH RUN	
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	8W		SH	8E	CUUKENDALL DITCH	
01291	41	01	15	82	42	55	WIERS FARM INC.	4465 SR 103 S	WILLARD	OH	44890	419/935-0131	0111	HURON	9W		SH	9E	MARSH RUN	
01294	40	59	30	82	43	00	CELERYVILLE CONSERVANCY DISTRICT	111 MYRTLE AVE	WILLARD	OH	44890	419/935-0171	0111	HURON				1	MARSH RUN	R
01333	41	04	40	82	24	55	MILLSTONE HILLS GOLF CLUB	2240 EUCLID RD.	NEW LONDON	OH	44851	419/929-6477	7992	HURON	1			1	POND	L
01405	41	12	20	82	36	35	NORWALK ELKS GOLF CLUB	109 FAIRWAY CIRCLE	NORWALK	OH	44857	419/668-8535	7992	HURON	1			1	CRANE CREEK	R
01405	41	12	20	82	36	35	NORWALK ELKS GOLF CLUB	109 FAIRWAY CIRCLE	NORWALK	OH	44857	419/668-8535	7992	HURON	2					
01607	41	06	05	82	36	30	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811	HURON	G-1		SS	NF1	N. CREEK	STREAM
01607	41	06	05	82	36	30	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811	HURON	G-2		SS	NF2	N. CREEK	STREAM
01607	41	06	05	82	36	30	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811	HURON	NF-1		SG	S1	E.BRANCH HURON	POND
01607	41	06	05	82	36	30	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811	HURON	NF-2		SG			
01608	41	06	00	82	33	25	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811	HURON	1		SS	FOSTER	E. BRANCH HURON R	RIVER
01608	41	06	00	82	33	25	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811	HURON	2		SS			
01608	41	06	00	82	33	25	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811	HURON	F-1		SG			
01609	41	05	00	82	30	40	DOUG WALCHER FARMS	866 ST RT 162	NORTH FAIRFIELD	OH	44855	419/744-2427	8811	HURON	FITCH1		SG	FTCH-1		POND
01768	41	16	10	82	50	00	ARMSTRONG AIR COND., INC.	421 MONROE STREET	BELLEVUE	OH	44811	(419)483-4840	3585	HURON	BD31					
01768	41	16	10	82	50	00	ARMSTRONG AIR COND., INC.	421 MONROE STREET	BELLEVUE	OH	44811	(419)483-4840	3585	HURON	BLD2					