**DEPARTMENT OF THE ARMY**
U.S. ARMY ENGINEER DIVISION, GREAT LAKES AND OHIO RIVER
CORPS OF ENGINEERS
P. O. BOX 1159
CINCINNATI, OHIO 45201-1159

REPLY TO
ATTENTION OF

CELRD-ET (200- 1c) 20 July 2000

MEMORANDUM FOR Commander, Huntington District, ATTN: CELRH-PM-P

Subject: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) - Revised Inventory Project Report (INPR) for Site No. G05OH001800, Plum Brook Ordnance Works, Sandusky, Ohio

1. References:

a. CELRH-ED-CE memorandum, 14 December 1998, SAB (Encl 1).

b. Findings and Determination of Eligibility for subject project, signed 24 December 1992 (Encl 2).

2. The following recommended projects have been approved:

a. HTRW project G05OH001813 (TNT Area A)

b. HTRW project G05OH001814 (TNT Area B)

c. HTRW project G05OH001815 (TNT Area C)

d. HTRW project G05OH001816 (TNT Rail Car Loading Area)

e. HTRW project G05OH001817 (Wastewater Treatment Plants No. 1 and 3)

f. HTRW project G05OH001818 (Wastewater Treatment Plan No. 2)

g. HTRW project G05OH001819 (Pentolite Area Waste Lagoons)

h. HTRW project G05OH001820 (Red Water Ponds)

i. HTRW project G05OH001821 (Ash Pits No. 1 and 3)

j. HTRW project G05OH001822 (Powerhouse No. 2 Ash Pits)

k. HTRW project G05OH001823 (Acid Areas 1, 2 and 3)

l. HTRW project G05OH001824 (Lower Toluene Tanks)

Printed on Recycled Paper

CELRD-ET (200-1c) 20 July 2000
SUBJECT: Defense Environmental Restoration Program for Formerly Used Defense sites (DERP-FUDS) - Revised Inventory Project Report (INPR) for Site No. G05OH001800, Plum Brook Ordnance Works, Sandusky, Ohio

m. HTRW project G05OH001825 (Garage Maintenance Area)

n. HTRW project G05OH001826 (Groundwater)

2. Please ensure that FUDSMUS is updated, that a copy of this INPR is provided state and federal regulators, and that landowner notification is done.

2 Encls

PAUL D. ROBINSON, P.E.
Director of Engineering and Technical Services

CF:
CEMP-RF/Gibson
CEHNC-PM
CELRL-PM-M

**DEPARTMENT OF THE ARMY**
**HUNTINGTON DISTRICT, CORPS OF ENGINEERS**
**502 EIGHTH STREET**
**HUNTINGTON, WEST VIRGINIA 25701-2070**

REPLY TO
ATTENTION OF:

14 DEC 1994

CELRH-EC-CE (200-1c)

MEMORANDUM FOR Commander, Lakes and Rivers Division, ATTN: CELRD-PM-M

SUBJECT: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) - Revised Inventory Project Report (INPR) for Site No. G05OH001800, Plum Brook Ordnance Works, Sandusky, Ohio

1. This memorandum transmits the revised INPR for the subject DERP-FUDS site. The site was formerly used by the Army. The revised Findings and Determination of Eligibility was signed on 20 April 1994. A revised Site Survey Summary Sheet is attached at Encl 1.

2. We determined there is hazardous waste at the site eligible for clean-up under DERP-FUDS. The category of hazardous waste is HTRW. The Project Summary Sheets are at Encls 2 through 15.

3. I recommend that you forward a copy of this INPR to CEMP requesting approval for the HTRW projects.

15 Encls
as (4 cys ea)

DANA ROBERTSON
Colonel, Corps of Engineers
Commanding

Encl 1

PLUM BROOK
INPR

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

CEMP-RF (200-1a)

13 JAN 1993

MEMORANDUM FOR

COMMANDER, OHIO RIVER DIVISION, ATTN: CEORD-DL
COMMANDER, HUNTSVILLE DIVISION, ATTN: CEHND-PM-OT

SUBJECT: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) - Plum Brook Ordnance Works, Sandusky, Ohio (Site Number G05OH001800)

1. This memorandum authorizes:

a. A hazardous, toxic, and radioactive waste (HTRW) project (project number G05OH001803) as described in the Inventory Project Report (INPR). Subject to availability of funds, the next phase of the HTRW project shall be a remedial investigation and feasibility study (RI/FS). The RI/FS, however, shall be of lesser scope than that required for a National Priority List site.

b. An ordnance and explosive waste (OEW) project (project number G05OH001806) as described in the INPR. Subject to availability of funds, the next phase of the OEW project shall be an engineering evaluation and cost analysis (EE/CA) to determine removal alternatives at the site. Please note that the approved project number is consistent with the number assigned by CEORD, rather than the one used by CEHND-PM-OT.

2. Execution of the HTRW project is assigned to a designated HTRW design district in accordance with the recent USACE reorganization. Execution of the OEW project through the removal design phase is assigned to the Huntsville Division. The subsequent removal action phase of the OEW project is assigned to CEORD.

3. We request:

a. CEORD, within 60 days of the date of this memorandum, ensure the landowners are notified of the decision and provide copies of the notification letters to CEMP-RF. CEORD also ensure that either CEORH or the HTRW design district updates the DERP-FUDS database within 30 days after the database is functional.

b. CEHND must periodically screen the DERP-FUDS database to ensure that geographic divisions/districts have provided the required update.

CEMP-RF (200-1a)
SUBJECT: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) - Plum Brook Ordnance Works, Sandusky, Ohio (Site Number G05OH001800)

c. Both CEORD and CEHND must ensure that the respective projects are programed in the appropriate fiscal year workplans.

4. POC: T. Julian Chu, (202) 504-4695.

FOR THE DIRECTOR OF MILITARY PROGRAMS:

for Christopher L. Bond LTC, EN

MICHAEL H. FELLOWS
Colonel, Corps of Engineers
Chief, Environmental Restoration Division
Directorate of Military Programs

CF:
CEMRD-ED
CEORH-ED
CEORL-ED
CEHND-PM-ED

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DIVISION, OHIO RIVER
CORPS OF ENGINEERS
P. O. BOX 1159
CINCINNATI, OHIO 45201-1159

REPLY TO
ATTENTION OF

CEORD-DL-MS (200-1c)

DEC 24 1992

MEMORANDUM FOR CDRUSACE, ATTN: CEMP-RF/Chu, 20 Massachusetts Ave., NW, Washington, DC 20314-1000

SUBJECT: DERP-FUDS Inventory Project Report (INPR) for Site No. G05OH001800, Plum Brook Ordnance Works, Sandusky, Ohio

1. I am forwarding the INPR for Plum Brook Ordnance Works for appropriate action. The site is eligible for DERP-FUDS and the proposed HTRW (G05OH001803) and OEW (G05OH001806) projects are eligible for DERP-FUDS.

2. I recommend that:

a. CEMP-R approve the proposed HTRW project and assign it through this division to Huntington District for inclusion in the FY94 Workplan.

b. CEMP-R approve the proposed OEW project and assign it to CEHND for further investigation.

Encl

ALBERT J. GENETTI, Jr.
Brigadier General, US Army
Commanding

CF:
CEHND-PM-OT
CEHND-PM-EP

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF:
CEORH-ED-DC (1110)

1 APR 92

MEMORANDUM FOR Commander, Ohio River Division, ATTN: CEORD-DL-MS

SUBJECT: DERP-FUDS Inventory Project Report (INPR) for Site No. G05OH001800, Plum Brook Ordnance Works, Sandusky, Ohio

1. This revised INPR reports on the DERP-FUDS preliminary assessment of the Plum Brook Ordnance Works. A site visit was conducted on 8 May 1985 and a Confirmation Study was conducted in February 1990. The site survey summary sheet, site map and Chemical Contamination Summary are attached as Enclosure 1.

2. We determined that the site was formerly used by the Army. A recommended Findings and Determination of Eligibility is attached as Enclosure 2.

3. We also determined there is hazardous waste at the site eligible for clean-up under DERP-FUDS. The category of hazardous waste at the site is HTW and OEW. The Project Summary Sheets are attached as Enclosures 3 and 4.

4. I recommend that you:

a. Approve and sign the Findings and Determination of Eligibility.

b. Forward a copy of this INPR to CEMRD for a determination of the need for further study of the HTW project.

c. Forward a copy of this INPR to CEHND for the PA file, and for a determination of the need for further study at the site.

Encl
as (6 cys ea)

Wayne R. Reynolds, LTC
for JAMES R. VAN EPPS
Colonel, Corps of Engineers
Commanding

Encl 1

**DEFENSE ENVIRONMENTAL RESTORATION PROGRAM**
**FOR**
**FORMERLY USED DEFENSE SITES**
**FINDINGS AND DETERMINATION OF ELIGIBILITY**

**PLUM BROOK ORD WORKS**

Sandusky, Erie County, Ohio

Site No. G050H001800

## FINDINGS OF FACT

1. The Plum Brook Ordnance Works consisted originally of 9,071.06 acres of land [9020.66 acres fee, 50.40 acres easement] acquired by purchase and condemnation from various owners in 1941. The site, located 4.7 miles south of Sandusky, Ohio, and 59 miles west of Cleveland, lies in the townships of Huron, Milan, Perkins, and Oxford, in Erie County, Ohio.

2. The Plum Brook Ordnance Works was used by the Trojan Powder Company for the manufacture of explosives during World War II. The works was constructed by the U. S. Army in 1940 and operated by the Army until 1945. The works included production lines for TNT, DNT, and pentolites.

3. The Plum Brook Ordnance works ceased operations in 1945, and the area was renamed the Plum Brook Depot. Portions of the depot were operated as an ammunition storage facility for Erie Ordnance Depot. The Plum Brook Depot was placed in inactive status in 1961.

The land disposal occurred in several, fairly complicated, stages. At the end of World War II, continued use of the works by the Department of War was not contemplated, so the entire facility, except for 52.74 acres which was previously quitclaimed to the Baltimore and Ohio Railroad Company on 27 March 1943, was declared excess. Later, the Department of the Army decided that it was best to withdraw the magazine area [2800.46 acres fee] from excess, and on 11 March 1946 this withdrawal was approved. The War Assets Administration accepted custody of the remainder on 6 September 1946.

In 1947, the magazine area, 2800.46 acres fee, was redesignated The Plum Brook Depot Activity [hereinafter PBDA]. It was to become known also as the "retained area" and was not a part of the surplus to WAA. This acreage was also referred to as the Erie Ordnance Depot, and was utilized for powder storage.

On 15 March 1949, the retained magazine area was 2800.46 acres, and the surplus in the custody of WAA/GSA was 6167.86 acres, fee; and 50.40 acres, easement.

By letter of transfer dated 16 June 1954, effective 30 June 1954, the

Department of the Army reacquired from GSA the 3180.33 acres ordnance works and 50.40 acres easements, which thereafter was known as Plum Brook Ordnance Works [hereinafter PBOW]. The rest of the original site, previously declared excess to WAA, was disposed of to either NASA or third party grantees. This area, referred to as the WAA net disposal area, contained 2987.13 acres. No work is proposed in the net disposal area, which is now largely a subdivision of residential properties, so it is unknown if any conditions, etc., are present in those disposal transactions.

By letter dated 24 January 1958, the Department of the Army transmitted a copy of a permit entered into by NACA [predecessor of NASA] and Army, by which NACA accepted Plum Brook Ordnance Works [PBOW] "subject to existing contamination without fencing of such areas by the Department of the Army."

By SF 118 dated 3 October 1958, as amended 3 August 1959, the Department of the Army declared excess 3180.33 acres fee and 50.60 acres easements [PBOW]. The SF 118 states that "detailed information regarding contamination is not being furnished as it is understood that NACA is agreeable to the transfer of the installation subject to contamination." At the time of this excess, PBOW was permitted to NACA, as noted in the preceding paragraph.

By SF 118 dated 22 September 1961, the Department of the Army declared excess the magazine area,[PBDA], 2800.46 acres fee. The SF 118 states that "neutralization of any contamination has been completed." At the time of excessing, this area was subject to 8 revocable at will agricultural leases.

On 23 October 1961, NASA-Lewis Research Center requested transfer of all lands covered by SF118 dated 3 October 1958 as amended [PBOW], and of the PBDA, SF 118 as listed in the preceding paragraph, for a total of 6031.39 acres of land, of which 5980.79 acres were fee, 50.40 acres easement, and 0.2 acres license. [Figures do not add up to acquisition figures exactly due to differences in survey and to rounding] A Statement of Justification attached thereto reads:

> A Use Agreement was obtained from the Department of the Army on July 5, 1956, for approximately 500 acres (Pentolite Area, Plum Brook Ordnance Works). The reactor facility was constructed on this site with NACA, C&E appropriation of Fiscal Years 1956, 1958, and 1960. Subsequently, the balance of the land and structures of the Plum Brook Ordnance Works (excluding the Igloo Area) was turned over to NASA under a Use Agreement from the Department of the Army on January 22, 1958. This latter area (approximately 2700 acres) was and is used by the NASA for the construction of many rocket research facilities with NASA C&E and R&D appropriations of Fiscal Years 1958 and 1959.
>
> ...The current major research programs being conducted at Plum

Brook include the following:

1. Effect of radiation on materials.

2. Research on components for nuclear propulsion systems.

3. High energy chemical propulsion systems.

4. Nuclear rocket component research.

On 22 July 1962, NACA requested transfer of the entire 5980.79 acre fee and 50.40 acres easements [PBDA and PDOW]. The property was transferred to NACA on 15 March 1963 without reimbursement. NACA assumed accountability for and custody of the property on that date.

By corrected SF 118 dated 18 April 1978, NASA-Lewis Research Center declared excess 2152.15 acres of land and the structures thereon. Within this area lies two sites, both part of the old PBOW, which NASA accepted subject to contamination. The first of these was the Perkins School site. By indenture dated 2 June 1978, the Secretary of HEW quitclaimed unto the Perkins Board of Education, Sandusky, Ohio, 46.023 acres of land, subject to all legal highways. Exceptions included a right for the Government to maintain utilities; the exclusive use of the grantor and its assigns, together with rights of access, to a water reservoir and pumping station. Further, the grantee assumed maintenance of the roadways until they are dedicated. The Government also reserved for ten years the ownership of certain telephone equipment, the exclusive use thereof, and access to repair it. The restricted use of the property to educational purposes for thirty years. There was no recapture clause, nor did the Government promise to clean up the property, nor was any other type of restoration clause included in the deed. Also within the PBOW which NASA accepted subject to contamination was NASA designated Tract No. 59, consisting of 603.98 acres, which at the time of excess was under permit by NASA to EPA. This tract is currently under GSA control, but the SF118 indicates that EPA has a continuing need for all real property and improvements thereon, including buildings, roadways, utilities, and fencing. The Ohio National Guard has made it known to GSA that it has an interest in acquiring this property. Finally, GSA has indicated that should DoD restore or decontaminate this property, it contemplates sale to private parties. GSA has indicated that it is now their policy to not dispose of property which is or may be contaminated, so they are awaiting corrective action on the red water basins in order to process and dispose of this tract.

By SF 118 dated 10 October 1980, NASA-Lewis Research Center declared excess 142.663 acres of land and roadways, identified by NASA as parcels numbers 61 and 62. No work is contemplated by this report for either of these two parcels. Parcel Number 62, acreage unknown, was disposed of by GSA to the Department of the Army for use as an U. S. Army Reserve Center. GSA also has

made two other disposals in recent years, to Wensink Seed Farms on 19 December 1989, quitclaiming 5.63 acres, and to Edward Scott Schenk, on 25 October 1989, quitclaiming 10.3 acres. Both of these disposals were subject to certain covenants intended to maintain the archeological integrity of the sites, but to no other significant covenants or restrictions. There were no recapture clauses or reversions in these two disposals, and GSA required the clean-up of these sites prior to its disposal of them. GSA apparently has approximately 2090.2 acres plus parcel number 61 still in its current inventory, as no further disposal information was found.

NASA-Lewis Research Center remains a 3685.977 acre installation owned by the United States.

## DETERMINATION

Based on the foregoing findings of fact, the site has been determined to be formerly used by DoD. It is therefore eligible for the Defense Environmental Restoration Program - Formerly Used Defense Sites established under 10 USC 2701 et seq.

9/20/94
Date

ALBERT J. GENETTI, Jr.
Brigadier General, U.S. Army
Commanding

**DEFENSE ENVIRONMENTAL RESTORATION PROGRAM**
**FOR**
**FORMERLY USED DEFENSE SITES**
**FINDINGS AND DETERMINATION OF ELIGIBILITY**

**PLUM BROOK ORD WORKS**

Sandusky, Erie County, Ohio

Site No. G050H001800

## FINDINGS OF FACT

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2. The Plum Brook Ordnance Works was used by the Trojan Powder Company for the manufacture of explosives during World War II. The works was constructed by the U. S. Army in 1940 and operated by the Army until 1945. The works included production lines for TNT, DNT, and pentolites.

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...The current major research programs being conducted at Plum Brook include the following:

1. Effect of radiation on materials.

2. Research on components for nuclear propulsion systems.

3. High energy chemical propulsion systems.

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Department of the Army for use as an U. S. Army Reserve Center. GSA also has made two other disposals in recent years, to Wensink Seed Farms on 19 December 1989, quitclaiming 5.63 acres, and to Edward Scott Schenk, on 25 October 1989, quitclaiming 10.3 acres. Both of these disposals were subject to certain covenants intended to maintain the archeological integrity of the sites, but to no other significant covenants or restrictions. There were no recapture clauses or reversions in these two disposals, and GSA required the clean-up of these sites prior to its disposal of them. GSA apparently has approximately 2090.2 acres plus parcel number 61 still in its current inventory, as no further disposal information was found.

NASA-Lewis Research Center remains a 3685.977 acre installation owned by the United States, and as such, is not eligible for DERP-FUDS under existing program guidelines.

## DETERMINATION

Based on the foregoing findings of fact, the site has been determined to be formerly used by DoD. It is therefore eligible [with the exception of the active installation] for the Defense Environmental Restoration Program - Formerly Used Defense Sites established under 10 USC 2701 et seq.

24 Dec 92
Date

ALBERT J. GENETTI, Jr.
Brigadier General, U.S. Army
Commanding

PROPERTY SURVEY SUMMARY SHEET
DERP-FUDS PROPERTY NO. G05OH0018
PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO
6 OCTOBER 1999
(REVISED FROM 20 MAY 1999)

FUDS PROPERTY NAME: Plum Brook Ordnance Works (PBOW)

CURRENT PROPERTY NAME: Approximately 6,400 acres of the original 9,100 acres acquired for the site is now owned by the National Aeronautics Space Administration (NASA) and has been renamed *Plum Brook Station*. Remaining portions are owned by the General Services Administration (used by Ohio National Guard), Perkins Township Board of Education (used as a bus transportation center) or privately owned and used for farmland.

LOCATION: Sandusky, Erie County, Ohio. Latitude: 41° – 23' – 06" N, Longitude: 82° – 40' – 03" W (approximate site entrance) See attached site map.

SITE HISTORY: The Department of Defense (DoD) acquired the 9,100-acre site in 1938 to manufacture 2,4,6-trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. Production began on December 16, 1941 and continued through late 1945. In December 1945, custody of PBOW was transferred to the U.S. Army Ordnance Department, and the U.S. Army Corps of Engineers assumed responsibility for maintenance and custodial duties. In 1956, the National Advisory Committee for Aeronautics (now known as the National Aeronautics Space Administration, NASA) began leasing portions of PBOW from the Army. On March 15, 1963, NASA acquired approximately 6,400 acres of PBOW and presently utilizes the site aerospace research activities.

SITE VISIT: Robert P. Johannsen, CEORH-ED-D, conducted the initial site visit, 8 May 1985.

CATEGORY OF HAZARD: HTRW

PROJECT DESCRIPTION: Investigation of the Plum Brook Ordnance Works for Project No. G05OH001803, HTRW, has been separated into various areas of concern, and the following new HTRW projects are recommended or are currently in progress:

a. Project No. G05OH001811 Additional Burning Grounds. During operation of the PBOW facility from 1942-1945, burning grounds were used for destruction of off-specification TNT, explosives, acids, solvents, asbestos, and waste oil. The Additional Burning Grounds include the G-8, Taylor Road, Snake Road, Fox Road, and the "Additional" burning grounds. Records indicate that the Taylor Road, Fox Road, and Snake Road burning grounds were used by NASA for waste disposal and a fire training area was located at the Snake Road Burning Ground. A Site Investigation (SI) of the G-8 Burning Grounds has been accomplished and the final report was issued 14 March 1997. The SI discovered impacts from polynuclear aromatic hydrocarbons (PAH) and metals, recommended further evaluation of

constituents that were above Risk-Based Concentrations (RBCs), and the installation of one-bedrock monitoring well.

A SI of the Additional Burning Ground has been accomplished and the final report was issued 23 December 1997. PAH, PCB, nitroaromatics, and metals exceeded RBCs, and risk assessments were recommended. A Remedial Investigation (RI) is recommended for these five sites to obtain additional information to fill identified data gaps from the previous SI's, and complete the risk assessments. Previous investigations at the Fox Road, Taylor Road, and Snake Road burning grounds should be reviewed to identify data gaps and obtain the data necessary to prepare risk assessments for those sites. The need for and type of remedial actions at the five burning grounds will depend on the risk assessments' results.

b. Project No. G05OH001812 Reservoir No. 2 Burning Ground. During operation of the PBOW facility from 1942-1945, the Reservoir No. 2 Burning Ground was used for destruction of off-specification TNT, explosives, acids, solvents, asbestos, and waste oil. A SI has been accomplished and the final report was issued 23 December 1997. Semi-volatile organic compounds (SVOCs), PCB, nitroaromatics, and metals were discovered above RBCs. Additional sampling was recommended to determine the extent of contamination. Based upon the SI recommendations, a RI should be conducted, which would involve soil sampling and analysis to define the extent of site contamination, and preparation of human health and ecological risk assessments. The need for and type of remedial action at the Reservoir No. 2 Burning Ground will depend on the RI recommendations and risk assessment results.

c. Project No. G05OH001813 TNT Area A. The Department of Defense (DoD) utilized the Plum Brook Ordnance Works (PBOW) from 1941until 1945 for the manufacture of 2,4,6-trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. During this period, the PBOW facility housed operations for the manufacture of TNT and DNT in three primary areas, referred to as TNT Area A, TNT Area B, and TNT Area C. The project consists of the preparation of a RI/FS for TNT Area A. Objectives of the RI/FS would be to determine physical site characteristics; the nature and extent of site contamination; if contamination is attributed to former DoD activities; threats to human health and the environment; and potential remedial actions. The four-step RI/FS study for TNT Area B should be reviewed and used as a template for the investigation of TNT Area A. Previous investigations of this site should be reviewed to eliminate duplication of effort and identify any data gaps from those investigations.

d. Project No. G05OH001814 TNT Area B. From 1941 until 1945, the DoD utilized TNT Area B at the PBOW for the manufacture of TNT, DNT, and pentolite. A RI of surface and subsurface soil was accomplished in October – November 1998, and the draft report was submitted for regulator review in June 1999. Nitroaromatic contamination was discovered in various locations throughout the site, typically limited to the immediate vicinity of buildings or process areas. VOC, SVOC, and metal contamination were present, but not attributed to DoD activities. PCB contamination was also discovered, however, its use has not been documented at PBOW. Remaining work involves preparation of Human Health and Ecological risk assessments, and a focused Feasibility Study of potential remedial actions.

e. Project No. G05OH001815 TNT Area C. The DoD constructed and utilized TNT Area C at the Plum Brook Ordnance Works (PBOW) for the manufacture of TNT, DNT, and pentolite from 1941 until 1945. The project consists of the preparation of a RI/FS for TNT Area C. Objectives of the RI/FS would be to determine physical site characteristics; the nature and extent of site contamination; if contamination is attributed to former DoD activities; threats to human health and the environment; and potential remedial actions. The four-step RI/FS study for TNT Area B should be reviewed and used as a template for the investigation of TNT Area C. Previous investigations of this site should be reviewed to eliminate duplication of effort and identify any data gaps from those investigations.

f. Project No. G05OH001816 TNT Rail Car Loading. It is assumed that when the DoD utilized PBOW, TNT was loaded onto rail cars for shipment from the site and to on-site storage areas. The locations of these areas are unknown; however, remnants of blast-protection walls at TNT Area B suggest the possible location of one area that is referred to as TNT Rail Car Loading Area 1017. A limited SI has been accomplished and the draft report was submitted September 1999 for state regulator review. The investigation determined that there has been no significant environmental damage. Further project work includes SI finalization and coordination with state regulators for the preparation of a No Action Decision Document for this project.

g. Project No. G05OH001817 Wastewater Treatment Plants No. 1 and 3. When the DoD utilized PBOW, process wastewater ("red water") from TNT production was transported to WWTP No. 1 – TNT Area A, or WWTP No.3 – TNT Area C. The wastewater was then discharged through wooden flumes and elevated discharge pipes to settling ponds, known as the West Area Red Water Ponds A-1 and A-2, and the Pentolite Road Red Water Pond. A limited SI has been accomplished and the draft report submitted for review in September 1999. Further investigation will depend on the SI results and regulator review comments.

h. Project No. G05OH001818 Wastewater Treatment Plant No. 2. When the DoD utilized PBOW, process waste water ("red water") from TNT production was transported to Wastewater Treatment Plant No. 2 - TNT Area B, and then discharged through wooden flumes and elevated discharge pipes to settling ponds, known as the West Area and Pentolite Road Red Water Ponds. A Site Investigation of WWTP No. 2 has been accomplished, and the final report was issued 23 December 1997. It was determined that surface and subsurface soil contained PAH, PCB, and metals at concentrations that exceeded RBCs. The SI recommended additional soil sampling to establish the extent of site contaminants. A RI of WWTP No. 2 is recommended. Presently, a SI of WWTP Nos. 1 and 3, Project No. G05OH001817 is in progress. Any lessons learned from that SI should be incorporated into this project, as well as the recommendations from the December 1997 SI for WWTP No. 2, to prepare human health and ecological risk assessments. The need for and type of remedial action will depend on the RI recommendations and risk assessment results.

i. Project No. G05OH001819 Pentolite Area Waste lagoons. The DoD utilized PBOW to manufacture pentolite from March 1943 through August 1945. During this period, wastewater was generated and disposed of into two (2) wastewater lagoons, or settling basins. The lagoons have since been removed and the pentolite area re-graded by NASA for the construction of the Plum Brook Reactor Facility. A limited SI has been accomplished and the report submitted for regulator review in September 1999. At this time, there is no indication of DoD contamination. Further investigation of the Pentolite Area waste lagoons may depend on regulator review comments.

j. Project No. G05OH001820 Red Water Ponds. The DoD discharged TNT process wastewater, referred to as "red water", into two (2) settling ponds, the West Area and the Pentolite Road, Red Water Ponds. In 1997, a focused RI determined that explosives were present in soils, and that explosives, metals, and nitrates were present in overburden groundwater, at both red water pond areas. The RI also noted that explosives might be present in the bedrock groundwater. A Direct Push Investigation and Risk Assessment has been conducted and the draft report was submitted March 1999. The human health risk assessment (HHRA) determined that cancer risks or hazard indices did not exceed Ohio EPA limits; however, data was insufficient on metals in surface water. The report noted that the HHRA would be completed when the bedrock groundwater RI is completed. The Ecological RA predicted relatively high hazard quotients for some receptors; however, there were noted data gaps. Further investigation is recommended to eliminate these data gaps.

k. Project No. G05OH001821 Ash Pits No. 1 and 3. The DoD constructed and utilized three (3) coal-burning power plants in support of the PBOW activities. Ash pits served as disposal areas for ash that was generated from the power plants. Based on past site activities, heavy metals are the likely contaminants of concern at the ash pits. A limited SI has been accomplished for these ash pits the draft report submitted for regulator review in September 1999. There is indication that these areas may have been negatively impacted by DoD activities. Metals' contamination may be consistent with background metal concentrations; however, the concentrations are high enough to warrant further investigation. The focus of any additional work will also depend on regulator comments to the draft SI.

l. Project No. G05OH001822 Powerhouse No. 2 Ash Pits. The DoD constructed and utilized coal-burning Powerhouse No. 2 in support of the TNT production activities at PBOW. Ash that was generated from the plant was disposed in an adjacent pit. Heavy metals are the likely contaminants of concern at the ash pit. A SI of this ash pit has been accomplished and the final report issued 23 December 1997. It was determined that surface soil contained SVOCs and metals, and that subsurface soil contained metals, all at concentrations exceeding RBCs. The SI stated that soil sampling was adequate, and that risk assessments should be prepared. It is therefore recommended that human health and ecological risk assessments be prepared to determine the need for and any type of remedial action.

m. Project No. G05OH001823 Acid Areas No. 1, 2 and 3. The DoD constructed and utilized three (3) acid areas to manufacture nitric and sulfuric acids, for use in TNT and pentolite manufacture. Based on past site activities, the acid areas were likely to be contaminated from nitric and sulfuric acids. A SI has been completed and the final report was submitted 18 December 1998. The SI determined that surface soils at all areas have SVOC and PCB contamination. All areas had metals' contamination that was comparable to background concentrations, and an isolated occurrence of 2,4-DNT was found in Acid Area 3. The SI recommended that human health and ecological risk assessments be prepared. Additional investigation may be required if unacceptable risks are found.

n. Project No. G05OH001824 Lower Toluene Tanks. The DoD constructed and utilized the Lower Toluene Tanks to store toluene for use in the production of TNT and DNT. The DoD decommissioned the tanks in 1945. NASA removed one tank and uses it for fuel oil storage. A limited SI has been accomplished, with no indication of release from the USTs. The draft report was submitted for regulator review in September 1999. Additional project work involves seeking regulator concurrence on no further action and preparation of a No Further Action Decision Document.

o. Project No. G05OH001825. The project is the Garage Maintenance Area (GMA). During the period that DoD occupied PBOW, it constructed and utilized the GMA for the general maintenance and washing of equipment, vehicles, and railcars. Areas of concern at the GMA include the Locomotive Shop and Rail Car Washing Area. NASA presently occupies the Locomotive Shop, and the Rail Car Washing Area is an open field. A limited SI has been accomplished and the draft report submitted for regulator review in September 1999. Elevated levels of PCB and arsenic were discovered in the Locomotive Shop building's maintenance pit, and high levels of 2,4 DNT and arsenic were observed at the Rail Car Washing Area. Further investigation may be required to determine contamination extent and the need for remediation.

p. Project NO. G05OH001826. The project is site-wide groundwater. DoD utilization of the former PBOW for the manufacture of TNT, DNT, and pentolite may have led to groundwater contamination from leaks and spills, and decommissioning of the PBOW site. A SI is underway, which consists of a site-wide groundwater investigation. Sampling has been conducted, and additional monitoring wells have been installed. Further investigation, RI/FS, is recommended which involves sampling and analysis of existing wells throughout the site to determine the nature and extent of contamination. Additional wells may need to be installed, and supplementary groundwater background data may be required for risk assessment preparation. A hydrologic model should be developed to predict contaminant fate and transport.

AVAILABLE STUDIES AND REPORTS:

An Administrative Record has been established for the Plum Brook Ordnance Works FUDS property. The documents are located at the Huntington District Corps of Engineers and the following library near the PBOW site:

Firelands College Library
901 Rye Beach Road
Huron, Ohio 44839

Some of the available reports include:

a) War Department Industrial Facilities Inventory, 3/44, US Army Corps of Engineers
b) Site Management Plan, Plum Brook Ordnance Works, 9/95, ICI, Inc.
c) TNT Areas Site Investigation-Recommendations, 5/96, Author-Dames & Moore, Inc.
d) Report for the Site Investigation at the G-8 Burning Ground, 3/97, IT Corporation
e) Sitewide Groundwater Investigation - Final Report, 4/97, Dames & Moore, Inc.
f) Red Water Focused Remedial Investigation-Final Report, 4/97, Dames & Moore, Inc.

g) TNT Areas Site Investigation-Final Report, 4/97, Dames & Moore, Inc.
h) Site-Wide Groundwater Investigation, 9/97, IT Corp.
i) Site Investigations of the Reservoir No. 2 Burning Ground, Additional Burning Ground, Wastewater Disposal Plant No.2, and Powerhouse No.2 Ash Pit, 12/97, IT Corp.
j) Baseline Human Health Risk Assessment and Ecological Risk Assessment Work Plans – Red Water Ponds, 9/98, IT Corporation
k) Site Investigation of Acid Areas, 12/98, IT Corporation
l) Baseline Human Health Risk Assessment and Ecological Risk Assessment Work Plans – TNT Area B, 5/99, IT Corporation
m) Summary Report Site-Wide Groundwater Monitoring (1997-1998), 6/99, IT Corporation

USEPA REMEDIAL PROJECT MANAGER: A RPM from Region V EPA has not been assigned to the Plum Brook Ordnance Works FUDS property. The Ohio EPA is the lead regulatory agency at this time.

OHIO EPA PROJECT MANAGER:

Ron Nabors, OEPA NW District, (419) 373-3147
Archie Lunsey, OEPA NW District, (419) 373-3035

INSTALLATION POC: Keith M. Peecook, Environmental Coordinator, NASA Plum Brook Station, (419) 621-3234.

DISTRICT POC: Richard L. Meadows, CELRH-DL-M, (304) 529-5388, is the Geographic District Project Manager for the PBOW FUDS property. Linda S. Ingram, CELRN-EP-R-M, (615) 736-7122, and Doug A. Meadors, CELRL-DL-B, (502) 625-7015, are Design District Technical Coordinators for the various Plum Brook projects.

SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. G05OH001800
PLUM BROOK ORDNANCE WORKS, OHIO
21 NOVEMBER 1998

SITE NAME: Plum Brook Ordnance Works (PBOW)

LOCATION: Sandusky, Ohio

SITE HISTORY: The site was acquired by the Department of Defense (DoD) in 1938 to manufacture 2,4,6-trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. Production began on December 16, 1941 and continued through late 1945. In December 1945, custody of PBOW was transferred to the U.S. Army Ordnance Department, and the U.S. Army Corps of Engineers assumed responsibility for maintenance and custodial duties. In 1956, the National Advisory Committee for Aeronautics (now known as the National Aeronautics Space Administration, NASA) began leasing portions of PBOW from the Army. By 1963, approximately 6,400 acres of PBOW had been acquired by NASA for various aerospace research activities. NASA is the current major owner.

SITE VISIT: The initial site visit was conducted on 8 May 1985 by Robert P. Johannsen, CEORH-ED-D.

CATEGORY OF HAZARD: HTRW

PROJECT DESCRIPTION: Investigation of the Plum Brook Ordnance Works for Project No. G05OH001803, HTRW, has been separated into various areas of concern, and the following new HTRW projects are recommended:

a. Project No. G05OH001813. The project consists of the preparation of a Remedial Investigation/Feasibility Study (RI/FS) for TNT Area A.
b. Project No. G05OH001814. The project consists of the preparation of a Remedial Investigation/Feasibility Study (RI/FS) for TNT Area B.
c. Project No. G05OH001815. The project consists of the preparation of a Remedial Investigation/Feasibility Study (RI/FS) for TNT Area C.
d. Project No. G05OH001816. The project consists of the preparation of a Limited Site Investigation for the TNT Rail Car Loading Area.
e. Project No. G05OH001817. The project consists of the preparation of a Limited Site Investigation for Wastewater Treatment Plants No. 1 and 3.
f. Project No. G05OH001818. The project consists of the preparation of a Remedial Investigation/Feasibility Study (RI/FS) for Wastewater Treatment Plant No. 2.
g. Project No. G05OH001819. The project consists of the preparation of a Limited Site Investigation for the Pentolite Area Waste Lagoons.
h. Project No. G05OH001820. The project consists of the preparation of a Remedial Investigation/Feasibility Study (RI/FS) for the Red Water Pon

i. Project No. G05OH001821. The project consists of the preparation of a Limited Site Investigation for Ash Pits No. 1 and 3.
j. Project No. G05OH001822. The project consists of the preparation of a Remedial Investigation/Feasibility Study (RI/FS) for Powerhouse No. 2 Ash Pits.
k. Project No. G05OH001823. The project consists of the preparation of a Site Investigation for Acid Areas 1, 2 and 3.
l. Project No. G05OH001824. The project consists of the preparation of a Limited Site Investigation for the Lower Toluene Tanks.
m. Project No. G05OH001825. The project consists of the preparation of a Limited Site Investigation for the Garage Maintenance Area.
n. Project NO. G05OH001826. The project consists of a site-wide groundwater investigation (Site Investigation).

AVAILABLE STUDIES AND REPORTS:

a. Site Investigations of the Reservoir No. 2 Burning Ground, Additional Burning Ground, Wastewater Disposal Plant No.2, and Powerhouse No.2 Ash Pit, 12/97, IT Corp.
b. TNT Areas Site Investigation-Final Report, 4/97, Dames & Moore, Inc.
c. TNT Areas Site Investigation-Recommendations, 5/96, Author-Dames & Moore, Inc.
d. Sitewide Groundwater Investigation-Final Report, 4/97, Dames & Moore, Inc.
e. Site Investigation at the G-8 Burning Ground, Revision 1, 5/96, IT Corporation
f. Red Water Focused Remedial Investigation-Final Report, 4/97, Dames & Moore, Inc.
g. Report for the Site Investigation at the G-8 Burning Ground, Revision 1, 3/97, IT Corporation
h. Site-Wide Groundwater Investigation, 9/97, IT Corp.

District POC: Nancy O. Stouffer, CELRH-DL-M, (304) 529-5035, is the Geographic District Project Manager. Linda S. Ingram, CELRN-EP-R-M, (615) 736-7122, and Kevin L. Jasper, CELRL-DL-B, (502) 625-7015, are Design District Technical Coordinator, and Design District Project Manager, for the various projects.

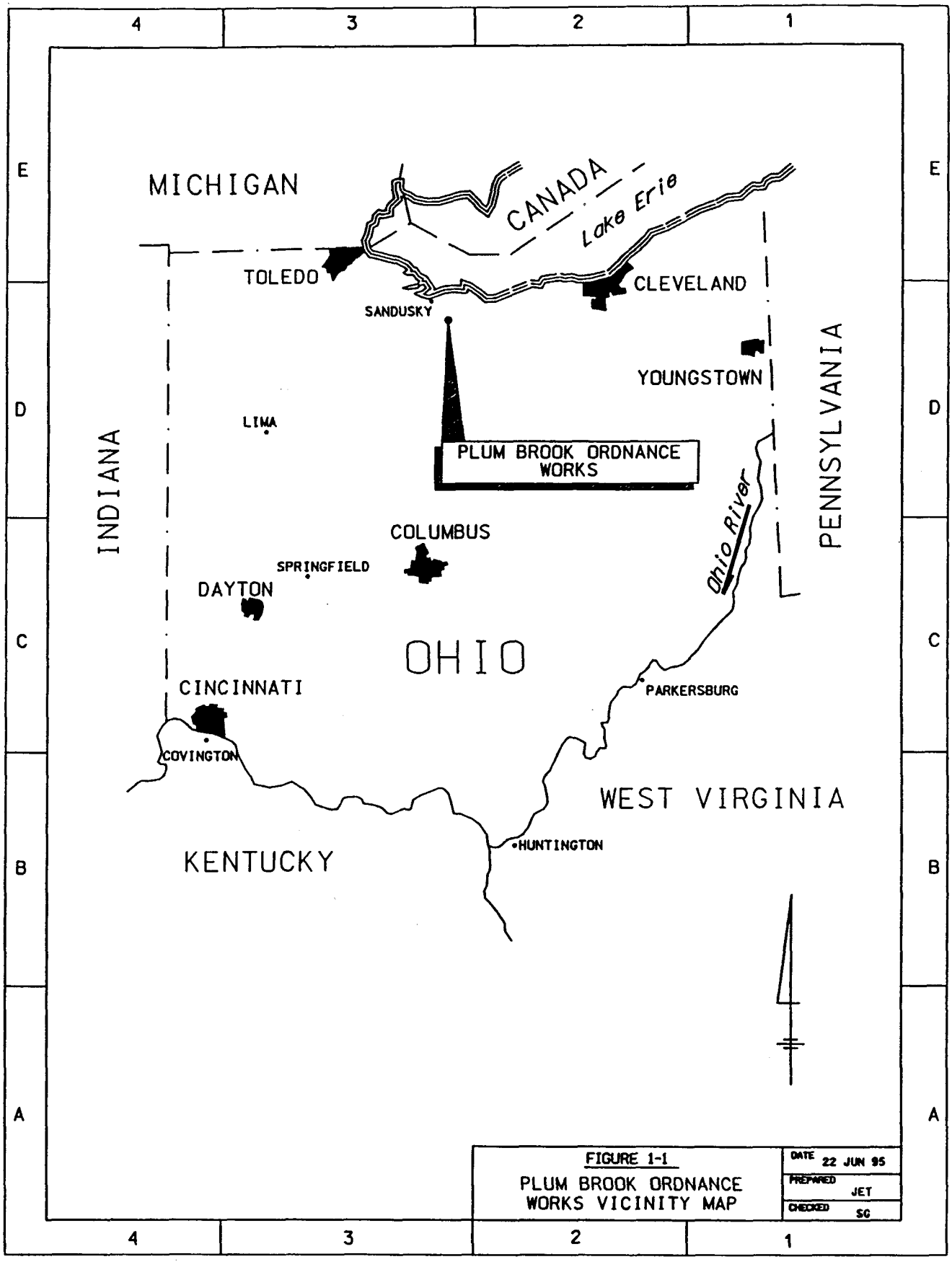



FIGURE 1-1
PLUM BROOK ORDNANCE WORKS VICINITY MAP

DATE 22 JUN 95
PREPARED JET
CHECKED SG

# SITE SURVEY SUMMARY SHEET
# FOR
# DERP-FUDS SITE NO. G05OH001800
# PLUM BROOK ORDNANCE WORKS, OHIO
# 20 March 1992

SITE NAME: Plum Brook Ordnance Works

LOCATION: Sandusky, Ohio

SITE HISTORY: Property was acquired in 1941 by purchase and condemnation for the construction and operations of an ordnance works. The site was excessed to GSA in various phases. The current major owner is NASA.

SITE VISIT: A site visit was conducted on 8 May 1985 by Robert P. Johannsen, CEORH-ED-D.

CATEGORY OF HAZARD: HTW and OEW

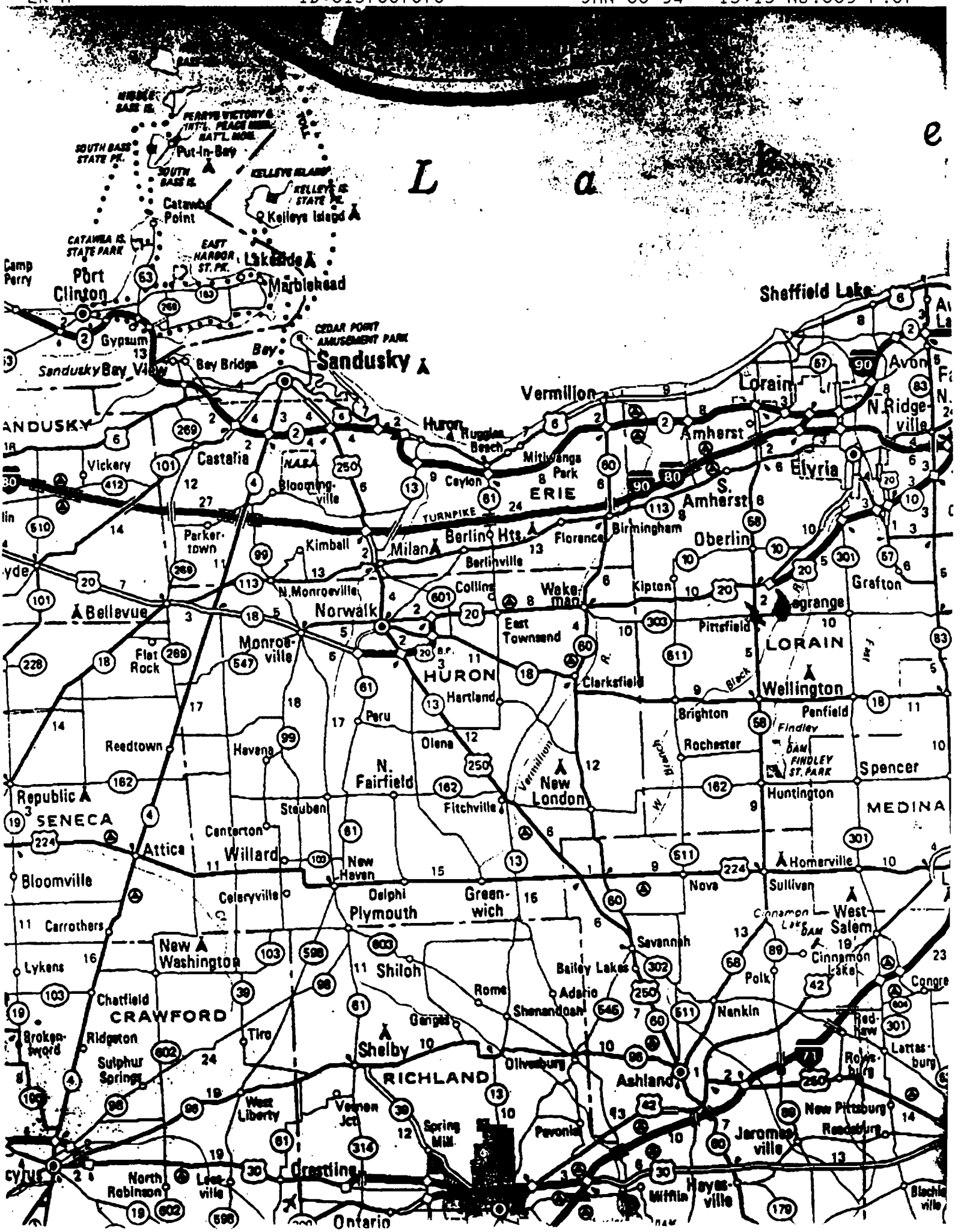
PROJECT DESCRIPTION:

a. HTW. The project consists of the preparation of a Remedial Investigation/Feasibility Study (RI/FS) for contaminated areas such as TNT deposits on the site.

b. OEW. Work involves a site inspection and preparation of a report on potential ordnance and explosive waste hazards that may exist at the site.

AVAILABLE STUDIES AND REPORTS: Confirmation Study by CEORN, February 1990. The Chemical Contamination Summary is attached.

PA POC: Frank R. Albert, Jr., (304) 529-5194, CEORH-ED-DC.


L a e
Put-In-Bay
Catawba Point
Kelleys Island
Lakeside
Marblehead
Port Clinton
Gypsum
Sandusky Bay View
Bay Bridge
Sandusky
Sheffield Lake
Vermilion
Lorain
Avon
N. Ridgeville
Huron
Ruggles Beach
Mitchanga Park
Amherst
Elyria
Castalia
Vickery
Bloomingville
Ceylon
ERIE
S. Amherst
Parkertown
Kimball
Milan
Berlin Hts.
Florence
Birmingham
Oberlin
Berlinville
N. Monroeville
Collins
Wakeman
Kipton
Grafton
Bellevue
Norwalk
East Townsend
Pittsfield
Elegrange
LORAIN
Flat Rock
Monroeville
HURON
Clarksfield
Wellington
Hartland
Brighton
Penfield
Peru
Reedtown
Havana
Olena
Rochester
Findley DAM FINDLEY ST. PARK
Spencer
N. Fairfield
New London
Republic
Steuben
Fitchville
Huntington
MEDINA
SENECA
Centerton
Attica
Willard
New Haven
Homerville
Bloomville
Celeryville
Delphi
Plymouth
Greenwich
Nova
Sullivan
West Salem
Carrothers
Savannah
Cinnamon Lake DAM
Cinnamon Lake
New Washington
Shiloh
Bailey Lakes
Lykens
Chatfield
Rome
Adario
Polk
CRAWFORD
Shenandoah
Nankin
Brokensword
Ridgeton
Tiro
Ganges
Shelby
Sulphur Springs
Olivesburg
RICHLAND
Ashland
West Liberty
Vernon Jct.
Spring Mill
Pavonia
New Pittsburg
Jeromesville
Rensselaer
Crestline
North Robinson
Leesville
Mifflin
Hayesville
Ontario

# CHEMICAL CONTAMINATION SUMMARY
# FOR
# THE FORMER PLUM BROOK ORDNANCE WORKS
# SANDUSKY, OHIO

1. A confirmation study was conducted at the former Plum Brook Ordnance Works, Sandusky, Ohio, to determine if chemical contamination from previous DOD-related activities was present and if groundwater degradation was resulting. The scope of the contamination evaluation included a records review and evaluation; visual site inspection; development of a site specific safety plan, sampling/analysis plan, monitoring well installation plan, and QA/QC plan; soils sampling during the monitoring well installation for geotechnical characterization; installation of four monitoring wells for ground-water sampling, chemical characterization, and in-situ permeability testing; collection of 20 composite soil samples from soil borings for chemical characterization; collection of four surface water samples from the streams at the site for chemical characterization; a site survey; and completion of hazardous ranking forms.

2. A summary of significant chemical concentrations found during this study is provided in Table 1. The overall hazard ranking score for chemical contamination is 0 since no users of this aquifer were found in the area. This score may not be accurate, as it was done using the Navy's HRS scoring method instead of the EPA's HRS scoring method. This study was begun before the EPA's HRS scoring method was required for confirmation studies.

3. Analytical results of the nitroaromatic analyses indicates extensive soil contamination at both waste disposal areas and minor soil contamination at the Sheid Road Burning Ground. Nitroaromatic contamination was also found in the groundwater at Waste Disposal Area 2. This contamination is directly attributable to past DOD actions at this facility.

4. Results of the volatile organics analyses indicated acetone in the soil and groundwater samples. This can be attributed to the decontamination procedures used during the contamination survey.

5. Analytical results of the metals analyses indicate significant concentrations of manganese in the soil at Waste Disposal Area 2. Elevated sodium levels were also found in the soil at both waste disposal areas. One soil sample from the Scheid Road burning ground also exhibited elevated levels of lead. Substantial concentrations of chromium were found in the groundwater samples. Elevated concentrations of Barium were also found in one groundwater sample. One soil sample from Waste Disposal Area 2 contained a elevated concentration of chromium. All of this contamination is a result of past DOD activities at the site.

6. Elevated sulfate concentrations were found in the groundwater and the soil at the waste disposal areas. Surface water and soil samples from the waste disposal areas exhibited elevated nitrate concentrations. All of this contamination probably resulted from DOD activities at the site.

7. A discrepancy between the contract laboratory results and the Quality Assurance laboratory results for explosives arose during this study. Analytical results were in question from a previous study conducted by the same laboratory. The contract laboratory did not detect TNT while the QA laboratory did. As a result of this conflict, all nitroaromatic analyses for all studies performed by this contractor were examined in detail. Based on this examination, it was determined that the nitroaromatic results for Plum Brook were low. Therefore, the nitroaromatic contamination found during this phase is probably more extensive than the results of this study show. This decision was based on discussions with CEMRD-ED-GL, CERL, and the contract laboratory.

RECOMMENDATION

It is recommended that an Remedial Investigation/Feasibility Study (RI/FS) be conducted at this site. This study should include:

- Installation and sampling of additional monitoring wells to determine the extent of explosives, metals, sulfate, and nitrate contamination.
- Collection of additional soil samples to determine the extent of the explosives and metals contamination at the waste disposal areas and metals contamination at the Scheid Road burning ground.
- Collection of sediment samples from the pond at Waste Disposal Area 2.
- Evaluation of preliminary hazards and a survey of sensitive receptors to determine if immediate action is required at the site.

TABLE 1

SUMMARY OF SIGNIFICANT CONCENTRATIONS FOUND
IN SAMPLES COLLECTED AT THE FORMER PLUM BROOK ORDNANCE WORKS

| Constituent | Location | Standard | Concentration (ppb) |
|---|---|---|---|
| Barium | MW02B | 1,000 ppb | 214,000 |
| Chromium | MW02B | | 20,000 |
| | SB-07 | | 17,000 |
| | MW-02 (dup) | 50 ppb | 120 |
| | MW-06 | | 120 |
| 1,3 - DNB | SB-12 | | 590 |
| | SB-13 | | 620 |
| | SB-14 | | 3,700 |
| | SB-16 | | 550 |
| | SB-16 (4-6') | | 6,400 |
| | SB-18 | | 5,000 |
| 2,6 - DNT | SB-14 | | 1,700 |
| | SB-16 | | 1,500 |
| | SB-18 | | 1,000 |
| | MW-02 | | 27 |
| | MW-02 (dup) | | 25 |
| 2,4 - DNT | SB-07 | | 230 |
| | SB-12 | | 910 |
| | SB-13 | | 2,200 |
| | SB-14 | | 20,000 |
| | SB-16 | | 3,200 |
| | SB-16 (4-6') | | 16,300 |
| | SB-17 | | 1,100 |
| | SB-18 | | 19,000 |
| | MW-02 | | 160 |
| | ME-02 (dup) | | 140 |
| Lead | SB-03 | | 50,000 |
| Manganese | SB-01 | | 300,000 |
| | SB-02 | | 180,000 |
| | SB-03 | | 71,300 |
| | SB-05 | | 35,000 |
| | SB-06 | | 129,000 |
| | MW02B | | 2,600,000 |
| | SB-07 | | 530,000 |
| | SB-09 | | 104,000 |
| | SB-10 | | 271,000 |
| | SB-11 | | 211,000 |

TABLE 1 (con't)

SUMMARY OF SIGNIFICANT CONCENTRATIONS FOUND
IN SAMPLES COLLECTED AT THE FORMER PLUM BROOK ORDNANCE WORKS

| Constituent | Location | Standard | Concentration (ppb) |
|---|---|---|---|
| Manganese | SB-12 | | 262,000 |
| | SB-13 | | 263,000 |
| | SB-14 | | 146,000 |
| | SB-15 | | 181,000 |
| | SB-15 (4-6') | | 244,000 |
| | SB-16 | | 78,200 |
| | SB-16 (4-6') | | 435,000 |
| | SB-17 | | 141,000 |
| | SB-18 | | 97,600 |
| | MW-01 | 50 ppb | 310 |
| | MW-02 | | 2,800 |
| | MW-02 (dup) | | 3,000 |
| | MW-06 | | 93 |
| Nitrate | SB-01 | | 2,000 |
| | SB-05 | | 2,000 |
| | SB-09 | | 12,000 |
| | SB-11 | | 5,000 |
| | SB-12 | | 7,000 |
| | SB-16 (4-6') | | 1,800,000 |
| | SB-18 | | 2,500,000 |
| | SW-01 | | 15,000 |
| Nitrobenzene | SB-16 | | 480 |
| Nitrotoluene | SB-16 | | 480 |
| Sodium | SB-02 | | 110,000 |
| | MW02B | | 578,000 |
| | SB-07 | | 1,360,000 |
| | SB-09 | | 205,000 |
| | SB-10 | | 174,000 |
| | SB-11 | | 539,000 |
| | SB-12 | | 1,660,000 |
| | SB-13 | | 2,590,000 |
| | SB-14 | | 3,420,000 |
| | SB-15 | | 96,900 |
| | SB-15 (4-6') | | 125,000 |
| | SB-16 | | 1,040,000 |
| | SB-16 (4-6') | | 2,820,000 |
| | SB-17 | | 1,240,000 |
| | SB-18 | | 1,980,000 |

TABLE 1 (con't)

SUMMARY OF SIGNIFICANT CONCENTRATIONS FOUND
IN SAMPLES COLLECTED AT THE FORMER PLUM BROOK ORDNANCE WORKS

| Constituent | Location | Standard | Concentration (ppb) |
|---|---|---|---|
| Sulfate | SB-12 | | 2,000,000 |
| | SB-13 | | 16,000 |
| | SB-14 | | 15,000 |
| | SB-16 | | 9,000 |
| | SB-16 (4-6') | | 120,000 |
| | SB-17 | | 10,000 |
| | SB-18 | | 190,000 |
| | MW-01 | | 130,000 |
| | MW-02 | | 950,000 |
| | MW-02 (dup) | | 950,000 |
| | MW-06 | | 60,000 |
| | SW-01 | | 100,000 |
| | SW-02 | | 110,000 |
| | SW-03 | | 110,000 |
| | SW-04 | | 180,000 |
| | SW-04 (dup) | | 180,000 |
| 1,3,5 - TNB | SB-03 | | 93 |
| | SB-07 | | 410 |
| | SB-12 | | 3,400 |
| | SB-13 | | 730 |
| | SB-14 | | 14,000 |
| | SB-16 | | 1,200 |
| | SB-16 (4-6') | | 15,000 |
| | SB-17 | | 670 |
| | SB-18 | | 10,000 |
| 2,4,6 - TNT | SB-12 | | 680 |
| | SB-16 | | 740 |

PROJECT SUMMARY SHEET
FOR
DERP-FUDS HTRW PROJECT NO. G05OH001814
TNT AREA B
PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO
SITE NO. G05OH001800
21 NOVEMBER 1998

PROJECT DESCRIPTION: The project area is former TNT Area B. Plum Brook Ordnance Works (PBOW) was utilized by the Department of Defense (DoD) from 1941 until 1945 for the manufacture of 2,4,6-trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. During this period, the PBOW facility housed operations for the manufacture of TNT and DNT in three primary areas, referred to as TNT Area A, TNT Area B, and TNT Area C.

PROJECT ELIGIBILITY: Records indicate that TNT Area B was utilized by DoD for the manufacture of TNT. Based on past site activities, nitroaromatics and residue from the TNT manufacturing process are likely contaminants of concern at the TNT areas.

POLICY CONSIDERATIONS: Current DoD policy dictates eligibility for remediation of DoD generated hazardous and toxic waste even though there was no evidence of a hazard when the property was transferred from DOD. Any nitroaromatic contamination present at TNT Area B would be from direct DoD use of the site.

PROPOSED PROJECT: An HTRW project is underway, which consists of the preparation of a Remedial Investigation/Feasibility Study of TNT Area B.

EPA Form 2070-12: Attached.

DD Form 1391: Attached.

District POC: Nancy O. Stouffer, CELRH-DL-M, (304) 529-5035, is the Geographic District Project Manager, and Linda S. Ingram, CELRN-EP-R-M, (615) 736-7122, is the Design District Technical Coordinator, for the PBOW site.

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# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
### PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

| I. IDENTIFICATION | |
|---|---|
| 01 STATE | 02 SITE NUMBER |
| | |

**II. HAZARDOUS CONDITIONS AND INCIDENTS** (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 ☐ OBSERVED (DATE: 2/90) ☐ POTENTIAL ☒ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: >100 — 04 NARRATIVE DESCRIPTION

SOIL CONTAMINATION DISCOVERED

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

**III. TOTAL POPULATION POTENTIALLY AFFECTED:** >100

**IV. COMMENTS**

**V. SOURCES OF INFORMATION** (Cite specific references, e. g., state files, sample analysis, reports)

CONFIRMATION STUDY FEB 1990
NASHVILLE DISTRICT CORPS OF ENGINEERS

PA G050H001814

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
### PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

| I. IDENTIFICATION | |
|---|---|
| 01 STATE | 02 SITE NUMBER |

## II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: 2/90)
04 NARRATIVE DESCRIPTION
[ ] POTENTIAL [X] ALLEGED

01 [X] B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: >100
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [ ] ALLEGED

01 [ ] C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[ ] POTENTIAL [ ] ALLEGED

01 [X] D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[ ] POTENTIAL [ ] ALLEGED

01 [ ] E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[ ] POTENTIAL [ ] ALLEGED

01 [X] F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: 35 ACRES (Acres)
02 [ ] OBSERVED (DATE: 2/90)
04 NARRATIVE DESCRIPTION
[ ] POTENTIAL [X] ALLEGED

01 [X] G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: >100
02 [ ] OBSERVED (DATE: 2/90)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [ ] ALLEGED

NO KNOWN USERS OF AFFECTED AQUIFER

01 [ ] H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[ ] POTENTIAL [ ] ALLEGED

01 [ ] I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[ ] POTENTIAL [ ] ALLEGED

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
## PART 2 - WASTE INFORMATION

**I. IDENTIFICATION**

| 01 STATE | 02 SITE NUMBER |
|---|---|
| | |

## II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

**01 PHYSICAL STATES** (Check all that apply)

A SOLID
B POWDER, FINES
C SLUDGE
D OTHER _____ (Specify)
E SLURRY
F LIQUID
G GAS

**02 WASTE QUANTITY AT SITE**
(Measures of waste quantities must be independent)

TONS _____
CUBIC YARDS UNKNOWN
NO OF DRUMS _____

**03 WASTE CHARACTERISTICS** (Check all that apply)

A TOXIC
B CORROSIVE
C RADIOACTIVE
D PERSISTENT
E SOLUBLE
F INFECTIOUS
G FLAMMABLE
H IGNITABLE
I HIGHLY VOLATILE
J EXPLOSIVE
K REACTIVE
L INCOMPATIBLE
M NOT APPLICABLE

## III. WASTE TYPE

| CATEGORY | SUBSTANCE NAME | 01 GROSS AMOUNT | 02 UNIT OF MEASURE | 03 COMMENTS |
|---|---|---|---|---|
| SLU | SLUDGE | | | |
| OLW | OILY WASTE | | | |
| SOL | SOLVENTS | | | |
| PSD | PESTICIDES | | | |
| OCC | OTHER ORGANIC CHEMICALS | | | |
| IOC | INORGANIC CHEMICALS | | | |
| ACD | ACIDS | | | |
| BAS | BASES | | | |
| MES | HEAVY METALS | | | |

## IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

| 01 CATEGORY | 02 SUBSTANCE NAME | 03 CAS NUMBER | 04 STORAGE/DISPOSAL METHOD | 05 CONCENTRATION | 06 MEASURE OF CONCENTRATION |
|---|---|---|---|---|---|
| | BARIUM | 10022-31-8 | LAND | 214,000 | ppb |
| | CHROMIUM | 7440-47-3 | LAND | 20,000 | ppb |
| | 1,3-DNB | 99-65-0 | LAND | 6,400 | ppb |
| | 2,6-DNT | 25321-14-6 | LAND | 1,200 | ppb |
| | 2,4-DNT | 25321-14-6 | LAND | 20,000 | ppb |
| | LEAD | 7439-92-1 | LAND | 50,000 | ppb |
| | MANGANESE | 7439-96-5 | LAND | 2,600,000 | ppb |
| | NITRATE | | LAND | 2,500,000 | ppb |
| | NITROBENZENE | 98-95-3 | LAND | 480 | ppb |
| | NITROTOLUENE | | LAND | 480 | ppb |
| | SODIUM | 1310-73-2 | LAND | 3,420,000 | ppb |
| | SULFATE | | LAND | 2,000,000 | ppb |
| | 1,3,5-TNB | 118-96-7 | LAND | 15,000 | ppb |
| | 2,4,6-TNT | 118-96-7 | LAND | 740 | ppb |
| | | | | | |
| | | | | | |

## V. FEEDSTOCKS (See Appendix for CAS Numbers)

| CATEGORY | 01 FEEDSTOCK NAME | 02 CAS NUMBER | CATEGORY | 01 FEEDSTOCK NAME | 02 CAS NUMBER |
|---|---|---|---|---|---|
| FDS | | | FDS | | |
| FDS | | | FDS | | |
| FDS | | | FDS | | |
| FDS | | | FDS | | |

## VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

FEB 1990 CONFIRMATION STUDY
NASHVILLE DISTRICT CORPS OF ENGINEERS
(MAX. CONCENTRATION SHOWN)

PN. G05OH001814

EPA

# POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
## PART 1 - SITE INFORMATION AND ASSESSMENT

**I. IDENTIFICATION**

| 01 STATE | 02 SITE NUMBER |
|---|---|
| | |

**II. SITE NAME AND LOCATION**

01 SITE NAME (Legal, common, or descriptive name of site): PLUM BROOK ORDNANCE WORKS

02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER:

03 CITY: SANDUSKY

04 STATE: OH | 05 ZIP CODE: | 06 COUNTY: ERIE | 07 COUNTY CODE: | 08 CONG DIST: 5

09 COORDINATES LATITUDE: 41 21 44 | LONGITUDE: 82 40 59

10 DIRECTIONS TO SITE (Starting from nearest public road): I 80, NORTH 0.1 MILE ON RT 4, EAST 0.2 MILE ON RT 13. SITE NEAR BLOOMINGVILLE

**III. RESPONSIBLE PARTIES**

01 OWNER (If known): US ARMY CORPS OF ENGRS

02 STREET (Business, mailing, residential): 502 8TH STREET

03 CITY: HUNTINGTON

04 STATE: WV | 05 ZIP CODE: 25701 | 06 TELEPHONE NUMBER: 304 529-5760

07 OPERATOR (If known and different from owner):

08 STREET (Business, mailing, residential):

09 CITY:

10 STATE: | 11 ZIP CODE: | 12 TELEPHONE NUMBER: ( )

13 TYPE OF OWNERSHIP (Check one)
☐ A. PRIVATE ☒ B. FEDERAL: NASA (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☒ F. OTHER: FORMER DOD USE (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: / / (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: / / (MONTH DAY YEAR) ☐ C. NONE

**IV. CHARACTERIZATION OF POTENTIAL HAZARD**

01 ON SITE INSPECTION
☒ YES DATE 2 / 90 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☒ F. OTHER: NASHVILLE CORPS (Specify)

CONTRACTOR NAME(S):

02 SITE STATUS (Check one)
☐ A. ACTIVE ☒ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
1941 (BEGINNING YEAR) | 1945 (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
TRI NITROTOLUENE AND DERIVATIVES
ACETONE, BARIUM, CHROMIUM
MANGANESE

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
SOIL AND GROUNDWATER CONTAMINATION

**V. PRIORITY ASSESSMENT**

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☒ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

**VI. INFORMATION AVAILABLE FROM**

| 01 CONTACT | 02 OF (Agency/Organization) | 03 TELEPHONE NUMBER |
|---|---|---|
| FRANK ALBERT | HUNTINGTON DISTRICT CORPS ENGINEERS | 304 529-5760 |

| 04 PERSON RESPONSIBLE FOR ASSESSMENT | 05 AGENCY | 06 ORGANIZATION | 07 TELEPHONE NUMBER | 08 DATE |
|---|---|---|---|---|
| SAME | | | ( ) | 11 21 98 (MONTH DAY YEAR) |

EPA FORM 2070-12 (7-81)

| 1. COMPONENT ARMY | FY 1999 MILITARY CONSTRUCTION PROJECT DATA | 2. DATE NOV 1998 |
|---|---|---|

| 3. INSTALLATION AND LOCATION | 4. PROJECT TITLE |
|---|---|
| Plum Brook Ordnance Works<br>Sandusky, Ohio | DERP-FUDS HTRW – RD |

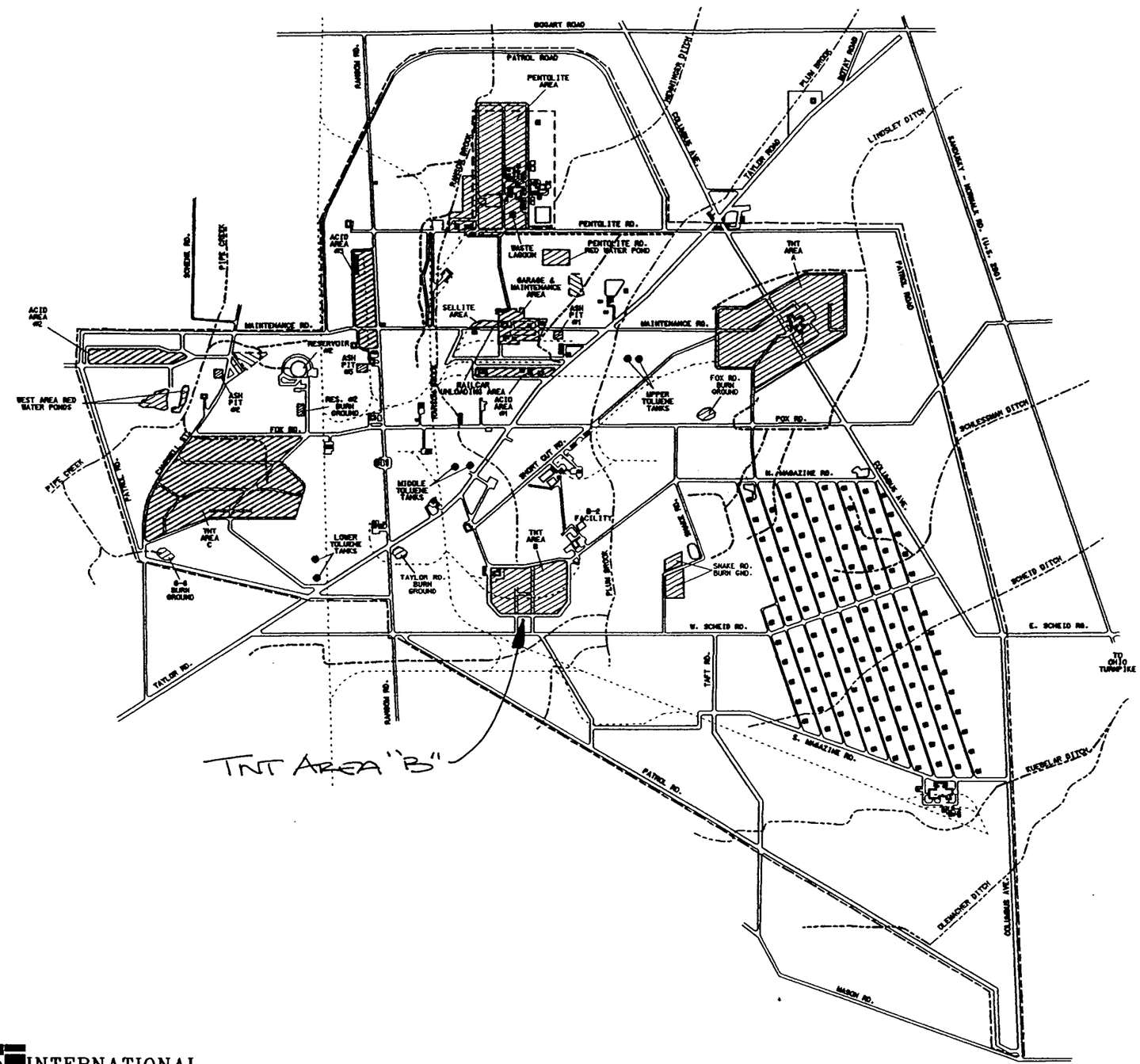
| 5. PROGRAM ELEMENT | 6. CATEGORY CODE | 7. PROJECT NUMBER | 8. PROJECT COST ($000) |
|---|---|---|---|
| DERP-FUDS | HTRW | G05OH001814 | $188.5 |

9. COST ESTIMATES

| ITEM | U/M | QUANTITY | UNIT COST | COST ($000) |
|---|---|---|---|---|
| Remedial Design | | | | $150.8 |
| Contract Administration and Supervision by CELRN | | | | $ 30.2 |
| Project Management by CELRH | | | | $ 7.5 |
| TOTAL | | | | $188.5 |

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Remedial design of selected alternative for treatment of soil and groundwater contamination at TNT Area B. Work includes contract administration and supervision by Nashville District, CELRN, and Project Management by Huntington District, CELRH.




PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO

0 500 1000 2000
SCALE IN FEET

LEGEND:
- STREAM
- RAILROAD
- PBS BOUNDARY FENCE
- AREA OF CONCERN
- MIS-LOCATED AOC (Sampled by M-K, 1994a)

G050H001814

INTERNATIONAL CONSULTANTS, INC.

FIGURE 1-2
LOCATIONS of AREAS of CONCERN (AOCs) at PBOW

| | |
|---|---|
| DATE | 12 JUL 95 |
| PREPARED | JET |
| CHECKED | DBJ |