Final
Action Memorandum

for

TNT Area B
Interim Removal Action

at the

Plum Brook Ordnance Works,
Sandusky, Ohio

Prepared for:

U.S. Army Corps of Engineers
Huntington District
Huntington, West Virginia

June 2003

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1.0 Purpose.

The purpose of this Action Memorandum is to set forth the selected response action for the former TNT Area B (TNTB). The United States Army Corps of Engineers (USACE) is the responsible authority under the Defense Environmental Restoration Program (DERP) at the former TNTB. Based on the results of the completed Remedial Investigation/Feasibility Study (RI/FS) for soils, the USACE will conduct a Non-Time Critical Removal Action (NTCRA) in TNTB. The removal action will be taken to prevent human exposure to site soil containing any of the 12 constituents of concern (COCs) at concentrations that exceed remediation goals. The removal action will also serve to reduce potential ecological hazards. The remediation goals are chemical- and receptor-specific risk based remedial criteria that capture all the exposure assumptions and toxicological data used in the risk assessment. The removal action will consist of the excavation of approximately 3,300 cubic yards of material, backfilling of the excavation pit with clean material, ex-situ stabilization of the excavated material, and off-site disposal of stabilized waste.

The removal alternative selected in this Action Memorandum may be the final response action for soils at this site. If after completing the selected alternative, the results of this response action are found to have been sufficient to remediate soils at this site, the next procedural step for soils at this site would be a "no further action" Record of Decision. Additional remedial or removal actions might be required if it is determined during the site-wide remedial investigation of groundwater, that soils are a continuing source of groundwater contamination that pose a risk to human health.

1.1 Site History and Location.

The site of the former Plum Brook Ordnance Works (PBOW) is located approximately 4 miles south of Sandusky, Ohio and 59 miles west of Cleveland, Ohio. Although primarily in Perkins and Oxford Townships, the eastern edge of the site extends into Huron and Milan Townships. PBOW is bounded on the north by Bogart Road, on the south by Mason Road, on the west by County Road 43, and on the east by U.S. Highway 250 (Figure 1-1). The surrounding area is mostly agricultural and residential.

The 9,009-acre PBOW site was built in early 1941 as a manufacturing plant for 2,4,6-trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. Production of explosives at PBOW began in December 1941 and continued until 1945. It is estimated that more than 1 billion pounds of nitroaromatic explosives were manufactured during the 4-year operating period. The three explosive manufacturing

areas were designated TNT Area A (TNTA), TNT Area B (TNTB), and TNT Area C (TNTC). Twelve process lines were used in the manufacture of TNT, four lines at TNTA, three lines at TNTB, and five lines at TNTC.

The TNTB manufacturing site consisted of widely scattered buildings of wood frame construction with asbestos and sheet metal coverings. It also included a series of buried and/or overhead flumes and pipes used to transport various liquids associated with the manufacturing process.

After plant operations ceased, TNTB's manufacturing lines were decontaminated by the War Department in late 1945. During decontamination, all structures, equipment, and manufacturing debris were either removed and salvaged or removed and burned. After decontamination the property was initially transferred to the Ordnance Department, then to the War Assets Administration after it was certified by the U.S. Army to be decontaminated. In 1949, PBOW was transferred to the General Services Administration (GSA). In 1955, GSA completed further decontamination of TNTB. This effort supposedly focused on surface contamination detected by visual inspection. It is unknown whether the underground flumes were addressed by this decontamination effort.

The National Aeronautics and Space Administration (NASA) acquired the property on March 15, 1963 and currently utilizes the site. GSA performed further decontamination efforts during 1963 to facilitate this transfer. The decontamination process included removing contaminated surface soils above the drain tiles, flumes, etc., destruction of all buildings by fire, then removal of all soil, debris, sumps, and concrete foundations. All materials, including the soil in those areas, were flashed; the area was then rough graded. The decontamination process also included the burning of nitroaromatic-filled flumes that were excavated.

NASA currently operates the Plum Brook Station (PBS) of the John Glenn Research Center at Lewis Field. Most of the aerospace testing facilities built in the 1960s at the site are in standby or inactive status. On April 18, 1978, NASA declared approximately 2,152 acres of PBOW as excess. The Perkins Township Board of Education acquired 46 acres of the excess acreage and uses this area as a bus transportation area. GSA retains ownership of the remaining excessed acreage and currently has a use agreement with the Ohio National Guard for 604 acres of this land. NASA presently controls approximately 6,400 acres and is using the site to conduct space research as a satellite operation of the John Glenn Research Center at Lewis Field in Cleveland, Ohio. The details of land transactions are listed in the site management plan (ICI, 1995) and can be found at the NASA PBS.

TNTB consists of an area of approximately 55 acres at the south-central portion of PBOW immediately north of West Scheid Road (Figure 1-2). Significant evidence of former PBOW facilities exist at TNTB in the form of roads, hydrants, and ditches; all buildings and structures associated with the manufacturing process have been demolished and removed. Two NASA facilities are present at the site and are currently active for research purposes, the Hypersonic Tunnel Facility (HTF) and Nitrogen Dewar Tanks.

The HTF is located in the northwest portion of TNTB and consists of a single building, above and below ground piping and utilities, and paved parking areas. The Nitrogen Dewar Tanks are located in the center of TNTB with aboveground piping and underground utilities leading to the northwest, toward HTF, and to the northeast, offsite.

1.2 Site Characteristics.

To provide a basis for taking an action at this site, Remedial Investigation (RI) fieldwork was conducted in 1998. As part of the RI, nitroaromatic field screening analysis involved the collection of 391 soil samples. To supplement the on-site screening analysis, 40 confirmation soil samples were collected for standard laboratory analysis using SW-846 Method 8330 with second column confirmation. A human health risk assessment was conducted for TNTB. Thirteen constituents of concern (COC) were identified in surface and subsurface soil. Six of those COCs are nitroaromatics (2-amino-4,6-dinitrotoluene (DNT); 4-amino-2,6-DNT; 2,6-DNT; 2,4-DNT; 2-nitrotoluene, and 2,4,6-TNT) and are clearly site related. The remaining seven COCs are polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAH).

Total lifetime incremental cancer risks for the groundskeeper and indoor worker reasonable maximum exposure to surface soil are 1E-4 and 5E-5 respectively. The hazard indices for the groundskeeper and indoor worker reasonable maximum exposure to surface soil are 20 and 7, respectively. Total lifetime incremental cancer risks for the construction worker and resident reasonable maximum exposure to total soil are 2E-5 and 1E-3, respectively. The hazard indices for the construction worker and resident reasonable maximum exposure to total soil are 70 and 244, respectively. Risk-based remedial criteria based on human health were developed for all the COCs and may be found in Tables 5-13 through 5-16 of the RI Vol. II. No unacceptable hazards or carcinogenic risks to human health were associated with exposure to surface water and sediment on the site.

In addition, a screening level ecological risk assessment was performed for TNTB. Surface soil hazard quotients due to modeled exposure resulted in summed HQs of 40,000, 20,000, 5000, 4000, and 1000 for the marsh wren, shrew, deer mouse, raccoon, and cottontail rabbit, respectively. 2,4,6-TNT and 4-Amino-2,6-DNT are responsible for the majority of the summed HQ values as derived through food chain modeling, not direct contact. Based on biased high exposure modeling of indicator species risk estimation parameters, uncertainty in food chain modeling, limited aquatic habitat at the site, and the fact that no rare, threatened or endangered species have been confirmed at the site remedial action objectives based on ecological risk were not recommended in the RI. Instead, human health remedial goal options are considered as surrogate clean-up objectives for ecological concerns, and will produce acceptable HQs in the conservative exposure models.

1.3 Evaluated Alternatives.

The RI investigation and human health risk assessment revealed that approximately 3,300 cubic yards of material located in TNTB presents an unacceptable risk to human health through exposure to contaminated soils. The following alternatives were considered to achieve the remedial objectives for soils at TNTB:

- Alternative 1 - No Action
- Alternative 2- In-Situ Chemical Oxidation, Excavation, and Off-Site Disposal
- Alternative 3 - Excavation, Ex-Situ Stabilization, and Off-Site Disposal
- Alternative 4 - Excavation, On-Site Composting, and Off-Site Disposal of all contaminated soil

These alternatives were screened based on effectiveness, implementability, and cost. Detailed analysis of each remedial alternative is included in sections 4 and 5 of the feasibility study.

All alternatives, with the exception of Alternative 1, would permanently treat/remove contaminated soil, thereby reducing human health risks to within levels considered acceptable by the US Environmental Protection Agency (USEPA). All alternatives involving excavation and/or treatment of contaminated soil (Alternatives 2 through 4) are expected to provide a corollary benefit to long-term groundwater and surface water quality by removing or mitigating the most significant source areas that contribute to contamination in these media. Alternative 1 does not employ removal, containment, or treatment response actions that would mitigate the impact of source areas on receptors or other environmental media. Therefore, Alternative 1, No Action, was not considered the recommended alternative.

Alternative 2, in-situ chemical oxidation, is the only alternative that evaluates an in-situ treatment technology. In-situ treatment is preferred over ex-situ treatment because it avoids the possibility of generating large quantities of hazardous wastes, and it eliminates, in most cases, the need for off-site disposal. A main drawback to Alternative 2 is that chemical oxidation would not treat the recalcitrant PCBs detected in soils at various locations. Therefore, soil portions contaminated with PCBs above the preliminary remediation goals would have to be excavated and disposed off-site (approximately 400 cubic yards). However, the soil might be classified as a hazardous waste due to the presence of 2,4-DNT and lead (both on the toxic characteristic leaching procedure (TCLP) list) at high concentrations in soil. Treatment with an oxidizing agent would not transform or decrease the toxicity of lead in soil.

Alternatives 3 and 4 both require excavation of 3,300 cubic yards of contaminated soil at TNTB. This is followed by on-site ex-situ treatment of the excavated soil prior to off-site disposal. Under Alternative 3 the portion of the excavated soil classified as a hazardous waste is treated using stabilization. Based on 2,4 DNT concentrations across the site, it is

estimated that 560 cubic yards of material would be classified as hazardous waste after subjecting soil samples from all the excavated soil to the TCLP test. The advantage of stabilization over other technologies is its ability to stabilize all the COCs in soil. Stabilization would immobilize nitroaromatics, PAHs, PCBs, and lead. No other treatment technology is required following stabilization, and the stabilized soil would most likely pass the TCLP test. The main drawback to stabilization when compared to other technologies is that it does not destroy, transform, or remove the contaminants from the soil. It only alters their mobility and bioavailability. Therefore, it is not recommended to use the stabilized soil as backfill or fill material on-site. Composting will not reduce the toxicity of lead; hence the composted soil might fail the TCLP test thereby requiring further treatment or disposal at a hazardous waste landfill. Based on this comparison, Alternative 3 is recommended over Alternative 4.

1.4 Community Involvement

Community relations activities are required under the 1990 National Oil and Hazardous Substance Pollution Contingency Plan (NCP) and Superfund Amendments and Reauthorization Act of 1986 (SARA). The objective of this program is to provide a mechanism for the communication and exchange of information among army agencies, government agencies and residences of local communities and those adjacent to Plum Brook downgradient from PBOW. In January 1997, a Restoration Advisory Board (RAB), comprised of local citizens with varying backgrounds, was established to promote a two-way dialog to not only keep local citizens informed about site progress, but to also allow them the opportunity to provide input to site decisions.

In compliance with CERCLA (Section 113), USACE has developed the Administrative Records (AR) to provide documentation as to how and why decisions specific to the remediation of the site are made. To date, the investigations completed for TNTB are as follows: Remedial Investigation (RI - dated August 2000) and Feasibility Study (FS - dated July 2001). The AR contains these final documents as well as all others for the PBOW site. The RI/FS reports were prepared from data collection activities and other research that form the basis for the decisions affecting the remediation process for the Proposed Alternative 3. The RAB has been briefed on both reports and are aware of the recommendations for TNTB. Currently, the Final RI/FS reports are located in the AR, located at USACE Huntington District Office (Huntington, WV), while the Public Repository is located at the BGSU Firelands Library (Huron, Ohio). All documents are available for public viewing.

As part of the community relations program, this Action Memorandum will be made available to the public for a 30-day review and comment period. To initiate this period and promote public understanding and awareness, a public meeting (in conjunction with the March 2002 RAB meeting) will be held to present the proposed Alternative 3 and tentative construction schedule. Notices announcing date, location and time of meeting will be placed in the local newspapers. At the end of the 30-day review period, all comments will documented in the AR as well as evaluated and incorporated into the overall remediation plans, if deemed feasible by USACE.

2.0 Proposed Action and Estimated Costs

2.1 Proposed Action Description

Based on the results of the alternatives evaluation, Alternative 3, the excavation, ex-situ stabilization of soil, off-site disposal of stabilized material, and backfilling using clean fill material is the preferred alternative. The proposed approach is to excavate all the areas in which the concentration of the COCs in soil exceed the PRGs. The estimated volume of contaminated soil from all over TNTB is 3,300 cubic yards. Following excavation of the contaminated soil, representative soil samples from each area will be analyzed using the TCLP test. Using existing soil data, the estimated volume of excavated soil that may be classified as hazardous waste based on 2,4-DNT concentrations in the extract is about 560 cubic yards. An additional 400 cubic yards of material might be identified as a hazardous waste due to the high lead levels. Based on the results of the TCLP tests, non-hazardous waste would be disposed of in an off-site, non-hazardous waste landfill. Any soil identified, as hazardous waste would be treated to achieve non-hazardous waste classification prior to land disposal in a non-hazardous waste landfill.

Assuming a successful treatability study, chemical stabilization would be used to treat the excavated soil classified as hazardous waste. A mix box on-site would be used to mix stabilizing agents with the contaminated soil. Representative samples of the stabilized soil would be taken for every 150 tons of processed soil. The samples would be tested for hazardous characteristics using the TCLP test. If the soil tests non-hazardous, it will be disposed in a non-hazardous waste landfill. If the soil tests hazardous, further stabilization would be needed or an alternative treatment would be required.

Since stabilization only alters the physical availability of the contaminants, using stabilized material as backfill at the site will be prohibited. Therefore, clean fill material will be placed in the excavation pits, rough graded as necessary to achieve proper drainage, and reseeded.

2.2 Contribution to Remedial Performance

2.2.1 Overall Protection of Human Health and the Environment

Excavation of contaminated soil followed by treatment of any hazardous waste and disposal of all wastes would permanently remove contaminated soil, thereby reducing human health risks to within levels considered acceptable by the EPA, and would significantly reduce ecological hazards, as assessed using the hazard quotient method.

2.2.2 Compliance with Applicable or Relevant and Appropriate Requirements

The ARARs that need to be considered for Alternative 3 are presented in Appendix A. No location-specific ARARs have been identified that need to be considered for this

alternative. The response action would comply with all action-specific ARARs, specifically regulations that deal with the TCLP test and storage/disposal of hazardous waste.

2.2.3 Long-Term Effectiveness

This alternative would result in the permanent removal of the COCs in soil that currently exceed PRGs. Human health risks caused by current (or future) human exposure to contaminated soil at the site would be reduced to within levels considered acceptable by the EPA and the Ohio Environmental Protection Agency (OEPA).

2.2.4 Reduction of Toxicity, Mobility, or Volume

Alternative 3 would permanently reduce the toxicity and mobility of contaminants in soil by stabilizing the COCs in excavated site soil followed by disposal. No actual volume reduction would result because COCs would be transferred to another location.

2.2.5 Short-Term Effectiveness

This alternative would not pose any risk to the community or the environment during implementation. Measures would be taken to prevent excessive dust formation during excavation and stabilization activities. Remedial workers would be equipped with protective gear to prevent exposure.

2.2.6 Implementability

This alternative is technically and administratively implementable. No engineering or regulatory restrictions stand in the way of implementation. The stabilizing agents and equipment needed for the remedial alternative are readily available.

2.3 Project Schedule

The estimated time to complete the alternative is 9 – 12 months. This includes writing and review of work plans (including quality control and site-specific health and safety plans), mobilization, excavation of 3,300 cubic yards of contaminated soil, ex-situ stabilization of excavated soil classified as hazardous waste (about 560 cubic yards), confirmatory sampling, disposal of treated and nonhazardous soil, and demobilization.

2.4 Estimated Costs

The detailed cost evaluation associated with the implementation of Alternative 3 is presented in Table 4-2 of the Feasibility Study. The estimated capital cost for this alternative is $358,000. There are no long-term O&M costs associated with this alternative. Therefore, the present value of this alternative is the same as its capital cost.

3.0 Threat to Public Health or Welfare or the Environment, and Statutory and Regulatory Authorities

3.1 Threats to Public Health or Welfare

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), at 40 CFR §300.415, lists the factors to be considered in determining the appropriateness of a Removal Action. The following paragraphs of Section 300.415 of the NCP apply to the TNTB site:

- [Section 300.415(b)(2)(i)] - "Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants."

- [Section 300.415(b)(2)(ii)] - "Actual or potential contamination of drinking water supplies or sensitive ecosystems."

- [Section 300.415(b)(2)(iv)] - "High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate."

Hazardous substances have been found in both surface and subsurface soil samples collected from various locations across the site. These substances consist mainly of nitroaromatic compounds, PCBs, and PAHs. These are hazardous substances as defined in Section 101(14) of CERCLA, 42 U.S.C. §9601(14). Concentrations of two constituents of concern, 2,4-DNT and lead, in soils indicate that the potential exists for a small quantity of material to be classified as a characteristic hazardous waste if excavation of the material occurs. The potential exits for nearby human populations, animals, or the food chain to be exposed to these hazardous substances or pollutants or contaminants if not addressed by this response action.

In addition, samples collected from groundwater bearing zones indicate that these zones have been impacted by nitroaromatic contamination emanating from sources located on the site. Therefore, the constituents of concern found at the surface and near surface, if not addressed by this response action, may migrate, or result in actual or potential contamination of drinking water supplies.

3.2 Threats to the Environment

Based on uncertainties of toxicity, limited aquatic habitat at the site, and the fact that no rare, threatened or endangered species have been confirmed at the site, remedial action objectives based on ecological risk were not recommended in the RI. However, human health remedial goal options are considered as surrogate clean-up objectives for

ecological concerns, and will produce acceptable HQs, as predicted using conservative exposure models.

3.3 Statutory and Regulatory Authorities

Regulatory efforts for remediation activities within TNTB fall under the Defense Environmental Restoration Program – Formerly Used Defense Sites (DERP-FUDS) program. Because the original PBOW was acquired by DOD in 1941 for the U.S. Army Plum Brook Ordnance Works and operated under their direction until late 1945, the PBOW is considered as a FUD and any contamination on the property that is a result of these activities is the responsibility of the Army under the DERP-FUDS program. This program has three major phases:

- Inventory – site id, records review to verify DOD ownership or usage and a preliminary assessment

- Study – site inspection if required to identify contamination, engineering, evaluations and costs analyses for removal action; remedial investigation/feasibility study (RI/FS); and/or litigation, negotiation, and settlement with other parties to define and resolve DOD liability

- Removal/Remediation – engineering design, removal and/or remedial actions, and/or operations and maintenance during remediation and/or for long-term monitoring, if required.

TNTB Alternative 3 would be covered under the removal/remediation phase.

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the President delegated authority to DOD (Secretary of Defense) for clean up of active and formerly used defense sites. In addition, the Superfund Amendments and Reauthorization Act of 1986 (Section 211) required the Secretary of Defense to carry out the Defense Environmental Restoration Program (DERP), who in turn delegated these authorities to USACE, thereby granting USACE the authority to conduct removal/remediation projects such as TNTB. The legislative context of DERP includes the following: the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Resource Conservation and Recovery Act of 1976 (RCRA), the Federal Facility Compliance Act of 1992 (FFCA), the National Environmental Policy Act (NEPA), and other environmental, safety, and occupational health laws and regulations (i.e., Clean Water Act, Clean Air Act, Toxic Substance Control Act, Safe Drinking Water Act, Occupational Safety and Health Act, endangered Species Act, National Historic Preservation Act of 1966). A detailed description of these laws can be found in the Plum Brook Site Management Plan, Part A, Section 2.0 Regulatory Framework. All ARARs that pertain to the TNTB Alternative 3 removal action have been addressed in Section 2.2.2 and Appendix A of this Action Memorandum.

The Defense and State Memorandum of Agreement (DSMOA) Cooperative Agreement (CA) program was developed to involve states and territories in the cleanup of DOD installation through the DERP. Ohio EPA is currently working under this agreement to provide the necessary technical services required for remediation of PBOW TNT Area B.

4.0 Expected Change in the Situation Should Action Be Delayed or Not Taken.

Delayed or no action at the site would permit continued exposure of humans to nitroaromatics, PCBs, and PAHs. Additionally, contamination from these source areas could potentially migrate to groundwater and the surrounding environment, resulting in exposure to on-site and off-site receptors.

5.0 Outstanding Policy Issues

The NCP provides that in selecting a NTCR action, the alternatives must be evaluated in an engineering evaluation/cost assessment (EE/CA) which must be provided to the public for no less than a thirty (30) day comment period prior to the selection of the action. (See 40 CFR 300. 415 (b) (4) and (m) (4)). The project team has not prepared an EE/CA for this site; instead a Focused Feasibility Study (FFS) for soils at TNT Area B has been prepared. This FFS is equivalent to the EE/CA and has been reviewed by the project team and Restoration Advisory Board (RAB). The RAB will be provided with the Action Memorandum during the public notification and comment and response period.

6.0 Public Notification

This Proposed Action Memorandum can be found in the Administrative Record file maintained at the USACE Huntington District located at 502 8th Street, Huntington, WV 25701 and in the Public Repository located at the BGSU Firelands Library, Huron, Ohio. The 30 day public comment period begins 27 March through 24 April 2002. In addition, a public meeting is to be held on 27 March 2002 to present the Proposed Action Memorandum. USACE representatives will answer questions about the removal action alternative now being proposed. Responses to comments received during the comment period will be included in the revised Action Memorandum, which will then be signed and placed in the Administrative Record. The newspaper announcement detailing date, time and location of public meeting as well as the request for public comments on the Proposed Action Memorandum will be published two weeks in advance of the public meeting (i.e., 13 March 2002).

7.0 Recommendation

This decision document represents the Removal Action for soil contaminated with nitroaromatics, PCBs, and PAHs at the PBOW's TNTB site, in Sandusky, Ohio. This decision document was developed in accordance with CERCLA, as amended, and is consistent with the NCP. This action is based on the Administrative Record for the site.

8.0 Responsiveness Summary

The purpose of this responsiveness summary is to provide the public with a summary of citizen comments, concerns, and questions relating to the TNTB site. This summary details the USACE responses to these comments, concerns, and questions.

The selected remedy for the TNTB site is that a Non-Time Critical Removal Action (NTCRA) will be conducted. The removal action will be taken to prevent human exposure to site soil and will also serve to reduce potential ecological hazards. The Ohio EPA and NASA concur that the selected remedy is protective of human health and the environment.

No comments were received from the public during the public comment period.

Background on Community Involvement. Community relations activities for the final selected remedy include:

- A Restoration Advisory Board (RAB) was established for the PBOW in 1997. The RAB meets once every three months to discuss the status of each project. The RAB includes representatives of the Ohio EPA, USACE-Huntington and Nashville Districts, NASA, and the public. Meetings are typically held in the evening at 7:00 p.m. BGSU Firelands Library, Huron, Ohio.

- A copy of the remedial investigation report and the Proposed Action Memorandum were placed in a public repository at the BGSU Firelands Library, Huron, Ohio. A copy of the Proposed Action Memorandum was also placed at the Perkins Township Offices building in Sandusky, OH.

- Newspaper announcements on the availability of the documents, the public comment period, and the public meeting were placed in the *Sandusky Register* on March 13, 2002.

- The USACE established a public comment period from March 28, 2002 through April 30, 2002, to present the Proposed Action Memorandum.

- A public meeting was held on March 27, 2002, to present the Proposed Action Memorandum for the TNTB Site. Ten people met with representatives of the USACE, the Ohio EPA, and NASA, at the BGSU Firelands Library. No comments were received from the public at the public meeting or during the public comment period.

9.0 Declaration

Conditions at the Site continue to meet the criteria set forth in Section 300.415 of the NCP for a Removal Action. I approve the selection of Alternative 3 as the Removal Action at this site.

APPROVED: _____ DATE: 23 June 2003

Col. John D. Rivenburgh, District Engineer
U.S. Army Corps of Engineers, Huntington District
Huntington, West Virginia

Table A-1: Applicable or Relevant and Appropriate Requirements
TNT Area B, Plum Brook Ordnance Works
Sandusky, Ohio

Action/Requirement	Requirement	Prerequisite(s)	Federal Citation	Ohio Citation	Type of ARAR	Comments
Waste Generation/Management						
Characterization of Solid Waste (e.g. contaminated PPE, equipment wastewater	Must determine if the waste is hazardous waste or if waste is excluded under 40 CFR 261.4; and	Generation of solid waste as defined in 40 CFR 261.2 **-Applicable**	40 CFR 262.11(a)	3745-52-11(a)	Action-Specific	Remedial Activities might generate hazardous waste
	Must determine if waste is listed under 40 CFR Part 261;		40 CFR 262.11(b)	3745-52-11(b)	Action-Specific	Excavated contaminated soil is not classified as a listed hazardous waste because there is no definitive documentation regarding the dates of disposal
	Must Characterize waste by using prescribed testing methods or applying generator's knowledge based on information regarding material or processes used. If waste is determined to be hazardous, it must be managed in accordance with pertinent provisions of 40 CFR 261 through 268		40 CFR 262.11(c) and (d)	3745-52-11(c) through (e)	Action-Specific	Remedial Activities might generate characteristic hazardous waste.
Characterization of hazardous waste	Must obtain a detailed chemical and physical analysis of a representative sample of the wastes(s) which at a minimum contains all of the information which must be known to treat, store, or dispose of the waste in accordance with 40 CFR 264 and 268	Generation of RCRA hazardous waste for storage, treatment or disposal - **Applicable**	40 CFR 264.13(a)(1)	3745-52-11(a)(1)	Action-Specific	Remedial Activities might generate characteristic hazardous waste.

Table A-1: Applicable or Relevant and Appropriate Requirements
TNT Area B, Plum Brook Ordnance Works
Sandusky, Ohio

Action/Requirement	Requirement	Prerequisite(s)	Federal Citation	Ohio Citation	Type of ARAR	Comments
Waste Generation/Management						
Characterization of hazardous waste	Must determine if the waste is restricted from land disposal under 40 CFR 268 et seq. by testing in accordance with prescribed methods or use of generator knowledge of waste		40 CFR 268.7	3745-59-07	Action-Specific	Remedial Activities might generate characteristic hazardous waste
	Must determine alternative land disposal restrictions under 40 CFR 268.49 by treating soil to 10x UTS levels prior to land disposal	Generation of RCRA hazardous waste for storage, treatment or disposal - **Applicable**	40 CFR 268.49	None Identified	Action-Specific	
Accumulation of hazardous waste in containers (e.g. PPE, rags, etc.)	A generator may accumulate hazardous waste at the facility provided that: o Waste is placed in containers the comply with 40 CFR 265.171 through 173 (Subpart I); and o Container is marked with the words "*hazardous waste*" or o Container may be marked with other words that identify the contents.	Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10 - **Applicable** Accumulation of 55 gallons or less of RCRA hazardous waste at or near any point of generation - **Applicable**	40 CFR 262.34(a) 40 CFR 262.34(c)(1)	3745-52-34(a) 3745-52-34(c)(1)	Action-Specific	This applies to the accumulation in 55-gallon drums at or near the point of generation, before the drum is filled. Upon filling the drum, it must be moved within 3 days to a designated container storage area. Upon a drum's placement in the container storage area, if a temporary storage area, it must be disposed with allowed time frame.

Table A-1: Applicable or Relevant and Appropriate Requirements
TNT Area B, Plum Brook Ordnance Works
Sandusky, Ohio

Action/Requirement	Requirement	Prerequisite(s)	Federal Citation	Ohio Citation	Type of ARAR	Comments
Waste Generation/Management						
Temporary storage of hazardous waste in containers	Except as noted below, a generator may accumulate (store) hazardous waste on-site for 90 days or less without a permit or without having interim status: o A generator who generates greater than 100 kg but less than 1000 kg of hazardous waste in a calendar month may accumulate hazardous waste on-site for 180 days or less without need to meet long-term storage requirements (40 CFR 262.34(d)). o A generator who generates greater than 1000 kg of hazardous waste in a calendar month and who must transport his waste, or offer his waste for transportation over a distance of 200 miles or more for off-site treatment, storage, or disposal may accumulate hazardous waste for 270 days without need to meet long-term storage requirements (40 CFR 262.34(d)). o A generator who generates greater than 100 kg but less than 1000 kg of hazardous waste in a calendar month and who accumulates hazardous waste in a quantity less than 6000 kg or for fewer than 180 days (or for less than 270 days if he must transport his waste, or offer his waste for transportation, over a distance of 200 miles or more), is not required to meet long-term storage requirements (40 CFR 262.34(f)).	A generator providing temporary storage pending off-site treatment, storage, and disposal	40 CFR 262.34	3745-525-34	Action-Specific	Remedial activities might generate characteristic hazardous waste. On-site storage prior to disposal/treatment might be necessary.

Table A-1: Applicable or Relevant and Appropriate Requirements
TNT Area B, Plum Brook Ordnance Works
Sandusky, Ohio

Action/Requirement	Requirement	Prerequisite(s)	Federal Citation	Ohio Citation	Type of ARAR	Comments
Waste Generation/Management						
Requirements for temporary storage of hazardous waste in containers	Except as previously noted, a generator may accumulate hazardous waste on-site for 90 days or less without the need to meet requirements for long-term storage, provided that: o The waste is placed in containers and the generator complies with Subpart I of 40 CFR 265.	Temporary storage of RCRA hazardous waste pending an off-site treatment, storage and disposal	40 CFR 262.34(a)(1)(I)	3745-52-34(a)(1)(1)	Action-Specific	Remedial activities might generate characteristic hazardous waste.
Requirements for temporary storage of hazardous waste in containers	o The date upon which each period of accumulation begins is clearly marked and visible for inspection on each container. o While being accumulated on-site, each container and tank is labeled or marked clearly with the words, *"Hazardous Waste"*, and o The generator complies with the requirements for owners and operators in Subparts C (Emergency Preparedness), and D (Contingency Plan) in 40 CFR 265, with 265.16 (closure survey plat) and with 268.7(a)(4) [testing and documentation for disposal].		40 CFR 262.34(a)(2) 40 CFR 262.34(a)(3) 40 CFR 262.34(a)(4)	3745-52-34(a)(2) 3745-52-34(a)(3) 3745-52-34(a)(4)	Action-Specific	Remedial activities might generate characteristic hazardous waste.

Table A-1: Applicable or Relevant and Appropriate Requirements
TNT Area B, Plum Brook Ordnance Works
Sandusky, Ohio

Action/Requirement	Requirement	Prerequisite(s)	Federal Citation	Ohio Citation	Type of ARAR	Comments
Waste Generation/Management						
Use and management of hazardous waste in containers	If container is not in good condition (e.g. severe rusting, structural defects) or if it begins to leak, waste must be transferred into container in good condition	Storage of RCRA hazardous waste in containers - **Applicable**	40 CFR 264.171	3745-55-71	Action-Specific	Remedial Activities might generate hazardous waste
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired		40 CFR 264.172	3745-55-72		
	Keep containers closed during storage, except to add/remove waste		40 CFR 264.173(a)	3745-55-73(a)		
	Open, handle and store containers in a manner that will not cause containers to rupture or leak		40 CFR 264.173(b0	3745-55-73(b)		
Design and operation of a RCRA storage container storage area (no free liquids)	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or containers must be elevated or otherwise protected from contact with accumulated liquid	Long-term storage of RCRA hazardous waste in containers that do not contain free liquids - **Applicable**	40 CFR 265.175(c)	3745-55-75(c)		

Table A-1: Applicable or Relevant and Appropriate Requirements
TNT Area B, Plum Brook Ordnance Works
Sandusky, Ohio

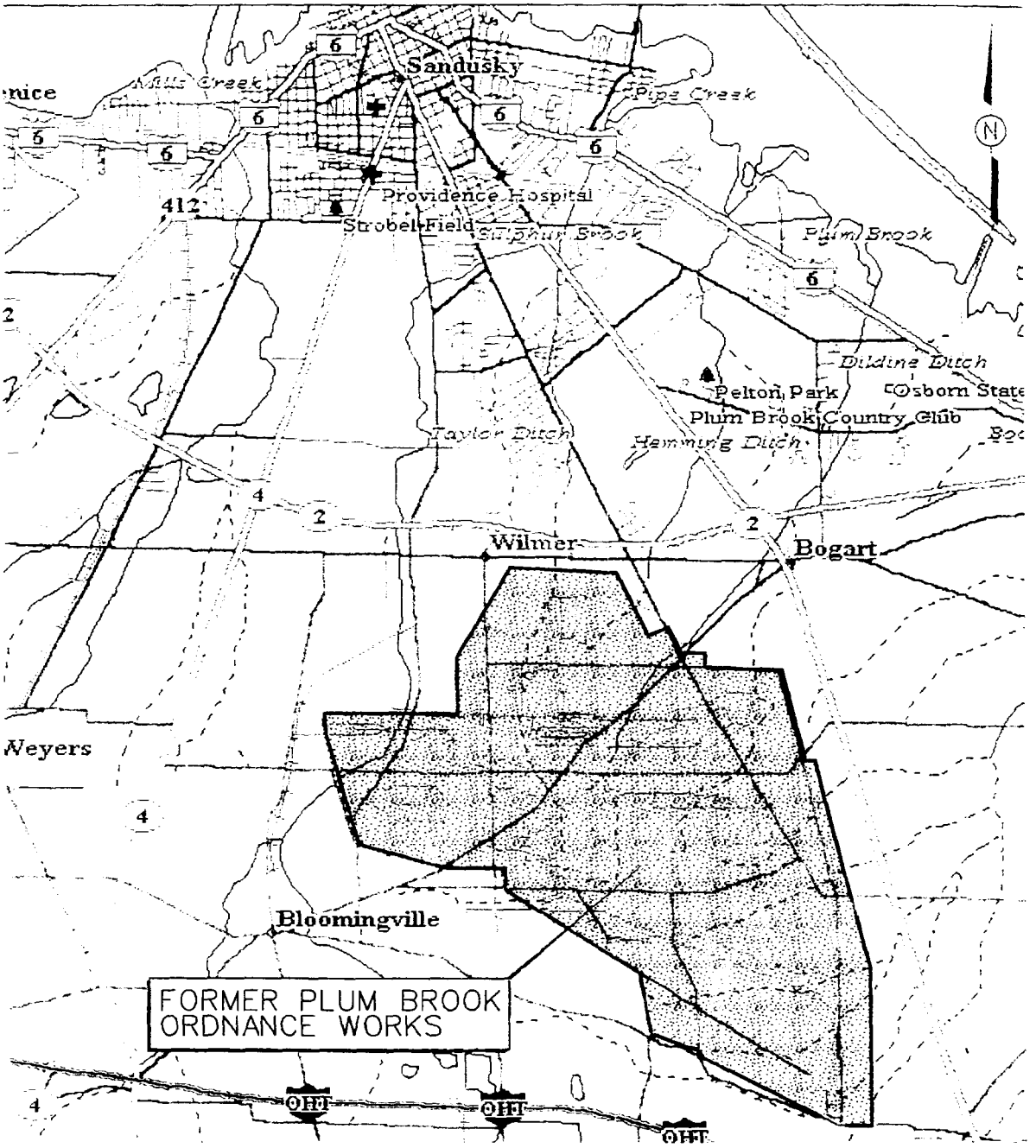
Action/Requirement	Requirement	Prerequisite(s)	Federal Citation	Ohio Citation	Type of ARAR	Comments
General Facility Requirements						
Security System	Must prevent the unknowing entry and minimize the possibility for unauthorized entry of persons or livestock onto active portion of the facility or comply with provisions of 40 CFR 264.14(b) and (c).	Operation of Long-term container storage facility - **Relevant and Appropriate**	40 CFR 264.14	3745-54-14	Action-Specific	Land use restriction will be implemented as part of remedial activities.
General Inspections	Must inspect facility for malfunctions and deterioration, operator errors, and discharges, often enough to identify and correct any problems		40 CFR 264.15(a)	3745-54-15(a)		Inspections are part of O&M activities.
Personnel Training	Must ensure personnel are adequately trained in hazardous waste, emergency response, monitoring equipment maintenance, alarm system procedures, etc.		40 CFR 264.16	3745-66-16		
Contingency Plan	Must have a contingency plan, designed to minimize hazards to human health and the environment from fires, explosions, or other unplanned sudden releases of hazardous waste to air, soil, or surface water in accordance with 40 CFR 264.52		40 CFR 264.51	3745-54-51		Requirement for both temporary and long-term storage of hazardous waste.
	Must be at least one emergency coordinator on the facility premises responsible for emergency response measures in accordance with 40 CFR 264.56		40 CFR 264.55	3745-54-55		Contingency plan can refer to PBOW site wide, not to TNT Area B alone.

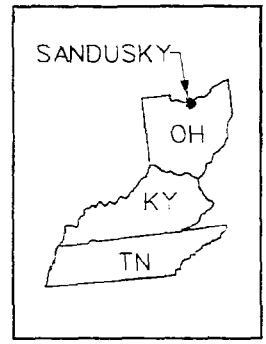
Table A-1: Applicable or Relevant and Appropriate Requirements
TNT Area B, Plum Brook Ordnance Works
Sandusky, Ohio

Action/Requirement	Requirement	Prerequisite(s)	Federal Citation	Ohio Citation	Type of ARAR	Comments
General Facility Requirements						
Preparedness and Prevention	Facilities must be designed, constructed, maintained, and operated to prevent any unplanned release of hazardous waste or hazardous waste constituents into the environment and minimize the possibility of fire or explosion. All facilities must be equipped with communication and fire suppression equipment and undertake additional measures as specified in 40 CFR 264.30 et seq.	Operation of Long-term container storage facility - **Relevant and Appropriate**	40 CFR 264.30 - 264.37	3745-54-30 through 37	Action-Specific	Requirement for both temporary and long-term storage.
Closure of RCRA Storage Area						
Clean closure of RCRA container storage area	Must close the facility in a manner that: o Minimizes the need for further maintenance o Controls, minimizes or eliminates potential hazards to human health and the environment, post-closure escape of hazardous waste, hazardous constituents, contaminated runoff, or hazardous waste decomposition products to the ground surface or surface waters or to the atmosphere; and o Complies with closure requirements of 40 CFR 264.178	Management of RCRA hazardous waste in long-term storage (>90 days) facility - **Relevant and Appropriate**	40 CFR 264.112	3745-66-11	Action Specific	
Transportation of Hazardous Materials and Waste						
Transportation of hazardous waste off-site	Must comply with the requirements of 40 CFR 263.11 - 263.31	Off-site transportation of RCRA hazardous waste - **Applicable**	40 CFR 263.10(a)	3745-53-10(a)	Action-Specific	Off-site disposal of hazardous waste might be part of Remedial Action.

Table A-1: Applicable or Relevant and Appropriate Requirements
TNT Area B, Plum Brook Ordnance Works
Sandusky, Ohio

Action/Requirement	Requirement	Prerequisite(s)	Federal Citation	Ohio Citation	Type of ARAR	Comments
Transportation of Hazardous Materials and Waste						
Transportation of hazardous waste off-site	Must comply with the generator requirements of 40 CFR 262.20-23 for manifesting, section 262.30 for packaging, Section 262.31 for labeling, Section 262.32 for marking, Section 262.33 for placarding, and Section 262.40, 262.41(a) for record keeping requirements and Section 262.12 to obtain EPA ID number	Off-site transportation of RCRA hazardous waste - **Applicable**	40 CFR 262.10(h)	3745-52-10(f)	Action-Specific	Off-site disposal of hazardous waste might be part of remedial alternative
	A transporter who meets all applicable requirements of 49 CFR 171-179 and the requirements of 40 CFR 263.11 and 263.31 will be deemed in compliance with 40 CFR 263.	Transportation of hazardous waste within United States requiring a manifest	40 CFR 263.10(a)	3745-53-10(a)	Action-Specific	
Transportation of hazardous materials	Shall be subject to and must comply with all applicable provisions of the HMTA and HMR (49 CFR 171-180)	Any person, who under contract with a department or agency of the federal government, transports in commerce or causes to be transported or shipped a hazardous material - **Applicable**	49 CFR 171.1(c)	NA	Action-Specific	Transportation of hazardous waste might be part of remedial alternative.





NOT TO SCALE

FIGURE 1-1
VICINITY MAP

FORMER PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO

STARTING DATE: 12/16/97	DATE LAST REV.: 03/12/02	DRAFT CHCK. BY:	INITIATOR: D. KESSLER	DWG. NO. 773701FS001.DGN
DRAWN BY: D. BILLINGSLEY	DRAWN BY: bvanderg	ENGR. CHCK. BY: D. KESSLER	PROJ. MGR.: M. SPANGBERG	PROJ. NO.: 773701

09:34:09 03/12/02

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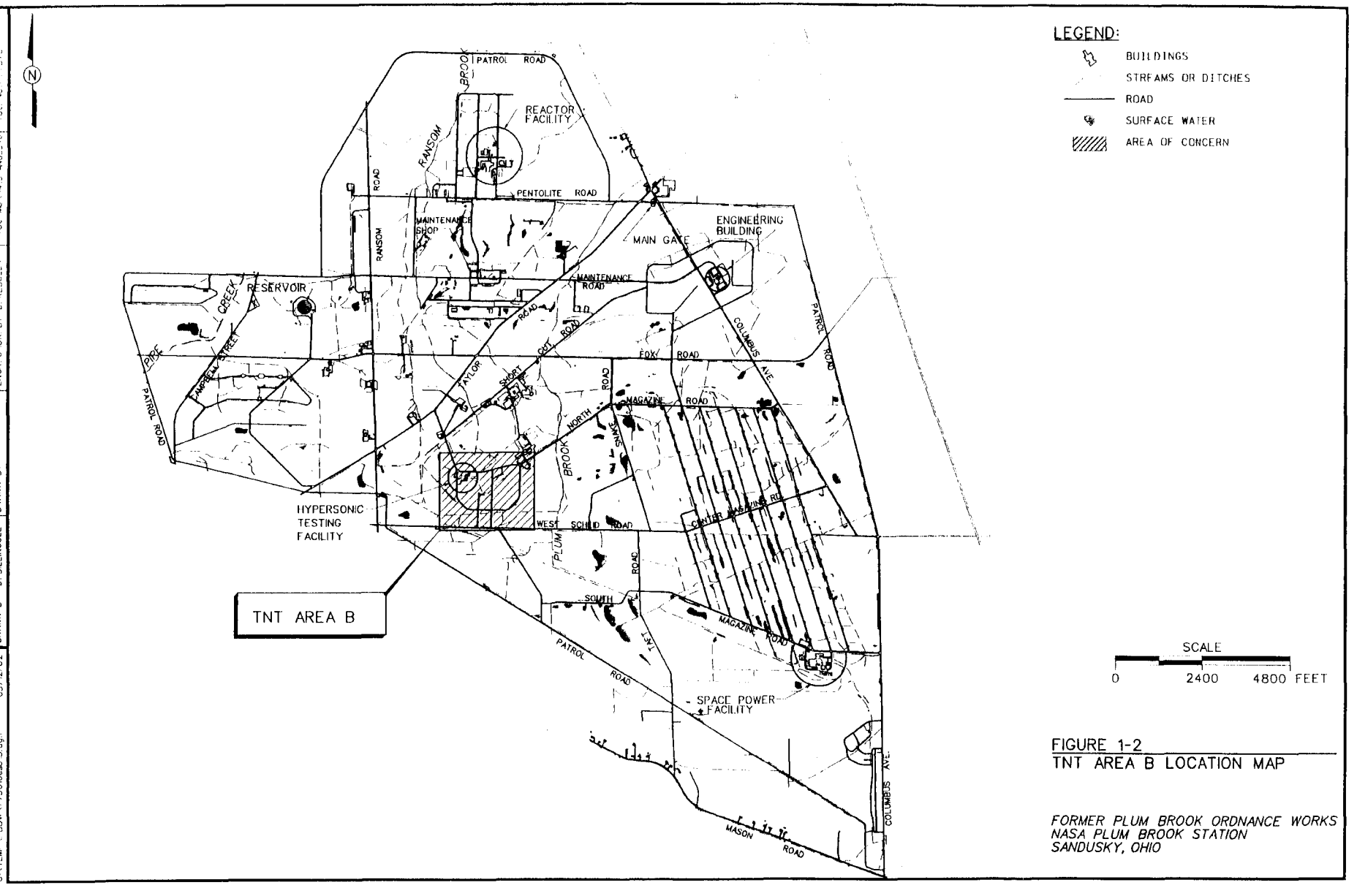

FIGURE 1-2
TNT AREA B LOCATION MAP

FORMER PLUM BROOK ORDNANCE WORKS
NASA PLUM BROOK STATION
SANDUSKY, OHIO