

**ACTION MEMORANDUM
SITE 5 - FIRE TRAINING AREA
SOIL REMOVAL**

**NAVAL AIR STATION JOINT
RESERVE BASE
Willow Grove, Pennsylvania**



Engineering Field Activity Northeast
Naval Facilities Engineering Command
Contract No. N62472-03-D-0057
Contract Task Order 003

August 2005

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DECLARATION

SITE NAME AND LOCATION

Site 5 - Fire Training Area Soil
NAS JRB Willow Grove, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected removal action for Site 5 soils at the Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove, Pennsylvania. The removal action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on site-specific documentation provided in the Administrative Record for the site.

The Department of the Navy has obtained concurrence from the Pennsylvania Department of Environment (PADEP) and the U.S. Environmental Protection Agency (EPA) Region III on the selected removal action.

Groundwater at Site 5 is being dealt with separately. The draft feasibility study (FS) completed for groundwater was submitted for comment in February 2002. EPA and Restoration Advisory Board (RAB) comments requested that the Navy look further into another type of chemical or in situ treatment for groundwater. This issue is being pursued in a revised draft FS for Site 5 groundwater, which was submitted on September 21, 2004.

ASSESSMENT OF THE SITE

Polynuclear aromatic hydrocarbons (PAHs) were detected at elevated concentrations in site surface and shallow subsurface soils at Site 5. Human health and ecological risk screening evaluations identified unacceptable risks for several PAH compounds. Actual or threatened releases of hazardous substances from contaminated surface and shallow subsurface soil at Site 5, if not addressed by implementation of the removal action selected in this Action Memorandum, may pose a threat to human health and ecological receptors. The Department of the Navy has determined that this threat can be abated, minimized, or eliminated by undertaking a removal action.

DESCRIPTION OF PROPOSED REMOVAL ACTION

The proposed action for Site 5 soils is removal of contaminated surface and shallow subsurface soil from the Site 5 former burning ring area. Under this action, an estimated 230 cubic yards of soil will be removed. Based on the analytical results, the soil is not expected to be a hazardous waste and will be disposed at a permitted facility for solid (nonhazardous, nonresidual) waste in a Subtitle D landfill. Following excavation activities, verification sampling will be conducted to confirm that the concentrations of the remaining contaminants of concern are protective of human health, ecological receptors and the environment. The excavated areas will be restored to pre-excavation contours. No land use restrictions or controls will be needed after completion of the soil removal action.

STATUTORY DETERMINATIONS

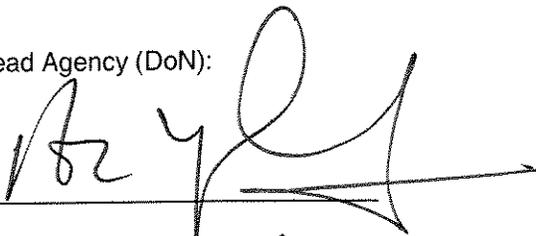
The selected removal action is protective of human health and the environment, complies with Federal and state requirements that are legally applicable or relevant and appropriate to the removal action, and is cost effective.

Conditions at Site 5 meet the criteria for non-time-critical removal actions as defined in NCP Section 300.415. The removal action will be conducted per all requirements in 40 Code of Federal Regulations (CFR) 300 and all Department of the Navy guidance. This removal action, excavation and off-site disposal, is recommended for approval.

The undersigned Department of the Navy representative, Commanding Officer of NAS JRB Willow Grove, has reviewed the information in this document and agrees with the conclusions presented. The EPA and PADEP have no objections to conducting a soil removal action at Site 5.

Authorizing Signature

For Lead Agency (DoN):



Captain H. L. Meyers, *HLM*
Commanding Officer
Naval Air Station Joint Reserve Base
Willow Grove. Pennsylvania

7 SEPT 2005

Date

1.0 PURPOSE

This Action Memorandum describes a non-time-critical removal action to be conducted under the authority of CERCLA, 40 CFR 300.415, at the Navy's Installation Restoration Program (IRP) Site 5, Fire Training Area Soil, at NAS JRB, Willow Grove, Pennsylvania.

This Action Memorandum follows the suggested format and guidance contained in the EPA Action Memorandum Guidance Document (EPA/540/P-90/004). This Action Memorandum was prepared for the Engineering Field Activity Northeast, Naval Facilities Engineering Command under Contract Number N62472-03-D-0057, Contract Task Order 003.

Objectives for this non-time-critical removal action address contaminated surface and shallow subsurface soil that is present at Site 5 in the vicinity of the former burning ring area and serve to:

- Protect human receptors from direct exposure to contaminated soil
- Protect ecological receptors from direct exposure to contaminated soil and exposure via the food chain
- Allow for unlimited use and unrestricted exposure to soil remaining in the area after the removal action

The proposed removal action will consist of excavation and off-site disposal of surface and shallow subsurface soil contaminated with PAH compounds. This Action Memorandum provides a summary of the site conditions, as well as the process for selection of the proposed removal alternative.

2.0 SITE CONDITIONS AND BACKGROUND

NAS JRB Willow Grove is located in Horsham Township, Montgomery County in southeastern Pennsylvania, approximately 20 miles north of the city of Philadelphia (Figure 1 found in Appendix A). NASJRB Willow Grove and the Willow Grove Air Reserve Station (ARS) share 1,200 acres owned and maintained by the Department of Defense (DoD). Figure 1 shows the location of NAS JRB Willow Grove and ARS. The Air Station is comprised of flat to slightly rolling terrain and is generally bounded by State Route 611 to the east, State Route 463 to the southwest, and Keith Valley Road to the north.

The primary mission of NAS JRB Willow Grove is to provide support for operations involving aviation training activities and to train Navy reservists. NAS JRB Willow Grove supports DoD tenants such as the Marine Reserve, Pennsylvania National Guard and the Army Reserve, and shares facilities/services with the Air Force Reserve. The base provides facilities, services, materials, and training in direct support of all assigned units. These units include anti-submarine warfare squadrons, a helicopter squadron, fleet logistic support squadrons, and other DoD units.

2.1 SITE DESCRIPTION

The Fire Training Area is located in the south-central portion of NAS JRB, approximately midway between Runway 10/28 and State Route 463 (Figures 1 and 2 found in Appendix A). The site is located immediately to the south of Taxiway Juliet and covers an irregularly shaped area of approximately 1.25 acres. The fire training area was used from 1942 to 1975 for large-scale firefighting exercises, which included the disposal and burning of flammable liquid wastes generated by the Naval Air Station. Wastes including solvents, paint chemicals, xylenes, toluene, and various petroleum compounds were consumed at the rate of up to 4,000 gallons or more per year in these firefighting exercises. The area was also reportedly used for the drum storage of these flammable materials during the periods between burning exercises.

The Fire Training Area is primarily covered by grasses, with some woody and brushy vegetation present within the southern portion of the area. The burn area is located in the south-central portion of the site. An asphalt roadway passes through the area of former drum storage. Additional site information can be found in the Remedial Investigation (RI) Report for Site 5 - Fire Training Area (Tetra Tech NUS, February 2002).

The final RI report for Site 5, completed in February 2002, documented halogenated VOC contaminants in groundwater and a range of organic compounds (mainly PAHs) in limited site surface and shallow subsurface soils. After submission of the RI report, the Navy contracted for installation an additional airport runway perimeter security fence. Part of the new security fencing was installed in or near the area of known PAH soil contamination. Due to the security fence construction activities and potential disturbance of known

PAH soil contamination, a field investigation for PAH sampling in Site 5 soils was performed in June 2004. The objective of the field investigation was to collect shallow surface and shallow subsurface soil samples from locations that generally mirrored the locations sampled in 1997 to see if construction of the new security fence caused a material change in the Site 5 soil conditions

Results from the June 2004 Site 5 soil sampling field investigation were submitted in a Draft RI Addendum report in January 2005. This comparison determined that the 2004 sample concentrations were similar to the 1997 RI sample concentrations. Four samples (05SS31, 05SS36, 05SS43, and 05SS45) from the 2004 sampling and analysis program exceeded PADEP residential medium-specific concentrations (MSCs). These results are in accord with previous findings. Soil concentrations in exceedance of EPA Region III risk-based concentration (RBCs) for residential soil are shown on Figure 2, which is presented in Appendix A.

The human health risk assessment indicated acceptable risk (reasonable maximum exposure [RME] $2.6E-05$) levels for the most probable anticipated future land use exposure scenario (continuation of occupational worker exposure) but excess risk (RME $1.4E-03$) above maximum acceptable guideline risk ($1E-04$) for potential future residential exposure scenario.

In agreement with the 2002 Site 5 RI report, potential PAH-related ecological risks were limited primarily to soil invertebrates and burrowing animals in the vicinity of four or five samples. These samples represented a relatively small area, and the potential for off site migration of PAHs was considered low.

2.2 OTHER ACTIONS TO DATE

No other enforcement activities, removal actions, or remediation activities have been performed at Site 5.

2.3 STATE AND LOCAL AUTHORITIES' ROLE

The PADEP is a support agency for CERCLA activities at NAS JRB Willow Grove.

3.0 THREATS TO PUBLIC HEALTH, WELFARE OR THE ENVIRONMENT

3.1 THREATS TO PUBLIC HEALTH OR WELFARE

Although Site 5 is currently unused land adjacent to the Marine Corps Reserve Center, NAS JRB Willow Grove does not want restrictions on future land use. Human health risk screening analysis conducted using the analytical data for soil samples collected at Site 5 identified potential unacceptable risks to human health associated with exposure to various PAH compounds in the surface and shallow subsurface soil. Exceedances of human health evaluation criteria were observed primarily in the surface and shallow subsurface soils in the vicinity of the former burning ring. Preliminary Remediation Goals (PRGs) for protection of human health were developed using EPA Region III RBCs for lifetime resident exposure scenarios. EPA Region III and the Navy developed the PRGs for the Site 5 soil removal action presented in Appendix B (Table 1).

3.2 THREATS TO THE ENVIRONMENT

Ecological risk screening was also conducted using the analytical data for soil samples collected at Site 5. The risk screening analysis identified potential unacceptable risk to ecological receptors associated with PAH compounds. Ecological risk exceedances were observed in the general vicinity of the former burning ring area. Potential PAH-related risks were limited primarily to soil invertebrates and burrowing animals in the vicinity of four or five samples. These samples comprise a relatively small area, and the potential for offsite migration of PAHs is considered low. No PRGs were developed or needed for protection of the environment.

4.0 ENDANGERMENT DETERMINATION

Actual or threatened release of hazardous substances from the site, if not addressed by implementing the soil removal response action selected in this Action Memorandum, may pose a threat to human health and the environment. The Department of the Navy has determined that this threat can be abated, minimized, or eliminated by undertaking a removal action.

5.0 PROPOSED ACTION AND ESTIMATED COSTS

5.1 PROPOSED ACTION DESCRIPTION

The proposed action for the contaminated surface and shallow subsurface soil at the Site 5 former burning ring area is removal, off-site landfill disposal, and site restoration. Under this action, an estimated 230 cubic yards of soil will be removed. This includes the upper two feet of soil within a 25 foot radius around the former burning ring area, the steel burn ring itself, and a trench 65 feet long, 10 feet wide, and two feet deep. The proposed excavation limits and number of confirmation samples are presented on Figure 3 (found in Appendix A). The goal is to reduce soil PAH concentrations to allow unrestricted use at Site 5. This alternative is not intended to remove all soil with concentrations above regulatory levels. For example, soil sample 05SS36 had multiple exceedances above residential RBCs; however this location is in close proximity of a roadway and the PAH contamination may likely be associated with vehicular traffic and the bituminous paving of the roadway.

Based on previous analytical results, the soil is not expected to be a hazardous waste and will be disposed off-site at a permitted facility for solid (nonhazardous, nonresidual) waste at a Subtitle D landfill. However, the excavated material will need to be characterized by the removal action contractor prior to disposal to confirm that it is not a hazardous waste. The disposal facility that is used will be selected by the contractor performing the removal action. Following excavation of the impacted soil, verification sampling will be conducted to confirm that the remaining PAH concentrations meet the soil cleanup criteria (PRGs) and are protective of human health, ecological receptors, and the environment. The excavation area will be restored with clean soil backfill covered with top soil and then seeded. No land use restrictions or controls will be needed after the removal action is complete.

5.2 CONTRIBUTION TO REMEDIAL PERFORMANCE

The non-time-critical removal action will eliminate a source of potential risks to human health and ecological receptors. After this removal action is completed, no further action is required for Site 5 soils. The proposed removal action is consistent with long-term actions proposed for the site.

5.3 ALTERNATIVE ACTIONS CONSIDERED

No other alternatives other than the “no action alternative” were considered.

5.4 EE/CA

An engineering evaluation and cost estimate (EE/CA) was prepared for this removal action and is included in the Addendum Remedial Investigation Report for Site 5 - Fire Training Area Soil (Tetra Tech NUS, Draft, January 2005).

Engineering Evaluation

The Navy is considering a "hotspot" removal to address the PAH concentrations in soil that would preclude unrestricted land use at Site 5 NAS JRB Willow Grove based on human health risk considerations. The Navy may wish to pursue a non-time-critical "hot spot" soil removal action for soil in the vicinity of samples 05SS45, 05SS31 and 05SS43. All three of these samples (as well as sample 05SS36) exceed PADEP MSCs for residential soil. Sample location 05SS36 would be left as is because it is next to the asphalt roadway. The PAHs encountered at sample location 05SS36 could just as likely be related to the asphalt roadway itself or vehicle traffic.

At this time, the Navy has considered the "No Action Alternative" and one other remedial alternative; soils excavation for hotspot soil removal. The soil removal would be limited to the three hotspot soil sample locations (mentioned above) in the vicinity of the former burn ring as well as soil within the former burn ring and the metal burning ring itself. The goal would be to reduce soil concentrations to allow unrestricted use at Site 5. This alternative is not intended to remove all soil with concentrations above regulatory levels. For example, soil sample 05SS36 had multiple exceedances above residential RBCs; however this location is in close proximity of a roadway and the PAH contamination may be associated with vehicular traffic and bituminous paving. Preliminary clean up goals proposed would be residential RBCs (i.e., residual risk correlating to approximately no more than 1 E-06) and can be found in Appendix B (Table 1).

Preliminary Cost Estimate

Figure 3 shows the approximate proposed excavation limits. The estimated volume of soil for disposal is 230 cubic yards. Soil to be disposed would be excavated from a trench; 65 feet long, 10 feet wide, and 2 feet deep, which includes hotspots 05SS45 and 05SS31. The excavation in the former burning ring area would include sample location 05SS43 and a 25 foot radius around the former burn ring, as well as the steel burn ring itself. Confirmation samples would be collected according to procedures outlined in Chapter 2 on Table 1 and Table 2 of the Pennsylvania Land Recycling Program (PA Act 2, 1995). Based on Table 1 and Table 2 of PA Act 2, 8 bottom samples and 12 sidewall samples will be collected from the excavation (Figure 3). Confirmation samples would be collected after soil removal and used in a risk ratio and

toxicological evaluation to determine if soil is within acceptable risk for residential risk based concentrations (RBCs). PRGs are included in Appendix B (Table 1).

5.4.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED CRITERIA

The removal action complies with all federal and state applicable or relevant and appropriate requirements (ARARs) and to be considered (TBC) criteria, including the following items:

- EPA Region III Risk Based Concentrations - Residential soil scenarios used to develop remediation goals for the protection of human health.
- Preliminary Remediation Goals (Appendix B, Table 1)

ARARs were used to develop clean-up criteria for the removal action and to identify removal action technologies.

5.5 PROPOSED PROJECT SCHEDULE

The estimated start of the removal action is summer/fall 2005. The estimated time to perform the removal action is one month or less.

5.6 ESTIMATED COST

The cost estimated for the proposed removal action is \$177,000. The removal action includes soil removal, disposal, confirmation sampling, clean soil backfill, site restoration, and oversight fees. A detailed cost estimate is presented in Appendix C.

6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If the removal action for Site 5 is delayed or not performed, the contaminated surface and shallow subsurface soil would remain. The site would not be available for unlimited use and unrestricted exposure.

7.0 OUTSTANDING POLICY ISSUES

None.

8.0 ENFORCEMENT

The Department of the Navy is the potentially responsible party for Site 5 soils and will perform the proposed removal action promptly and properly.

9.0 RECOMMENDATION

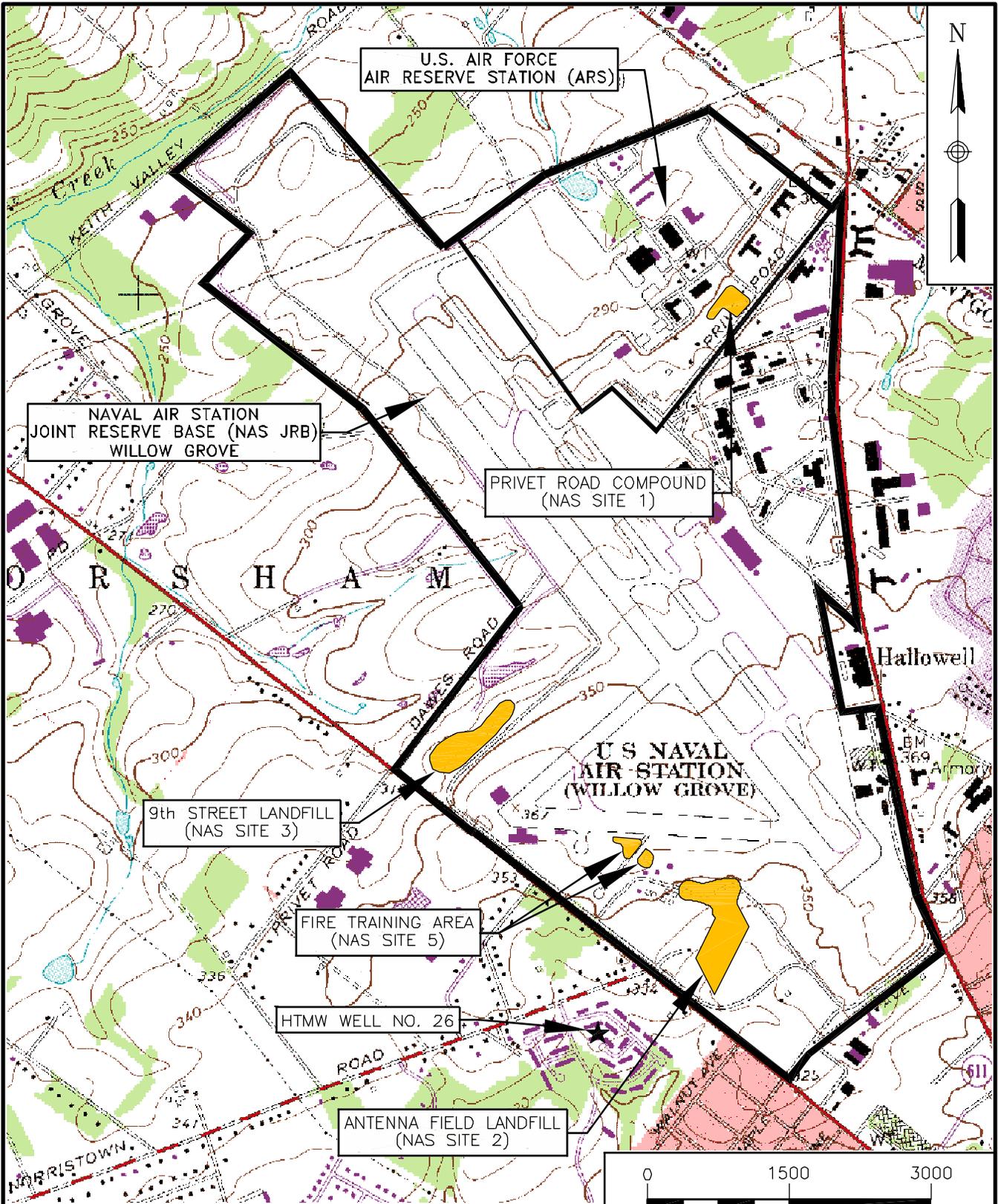
This document presents the recommended removal action for Site 5, Fire Training Area, at NAS JRB Willow Grove, Pennsylvania and was developed in accordance with CERCLA, as amended, and is consistent with the NCP. This decision is based on the Administrative Record for the site.

REFERENCES

1. TtNUS (Tetra Tech NUS, Inc.), 2005. Addendum Remedial Investigation Report for Site 5 - Fire Training Area Soil, NAS JRB Willow Grove, Pennsylvania, January 11, 2005.
2. TtNUS (Tetra Tech NUS, Inc.), 2002. Remedial Investigation Report for Site 5 - Fire Training Area, NAS JRB Willow Grove, Pennsylvania, February 2002.
3. EPA (United States Environmental Protection Agency), 1990. Superfund Removal Procedures Action Memorandum Guidance, EPA/540/P-90/004, December 1990.
4. EPA (United States Environmental Protection Agency), 40 Code of Federal Regulations, Title 40: Protection of Environment, Chapter 300.415, Removal Action, September 15, 1994.

APPENDIX A

FIGURES

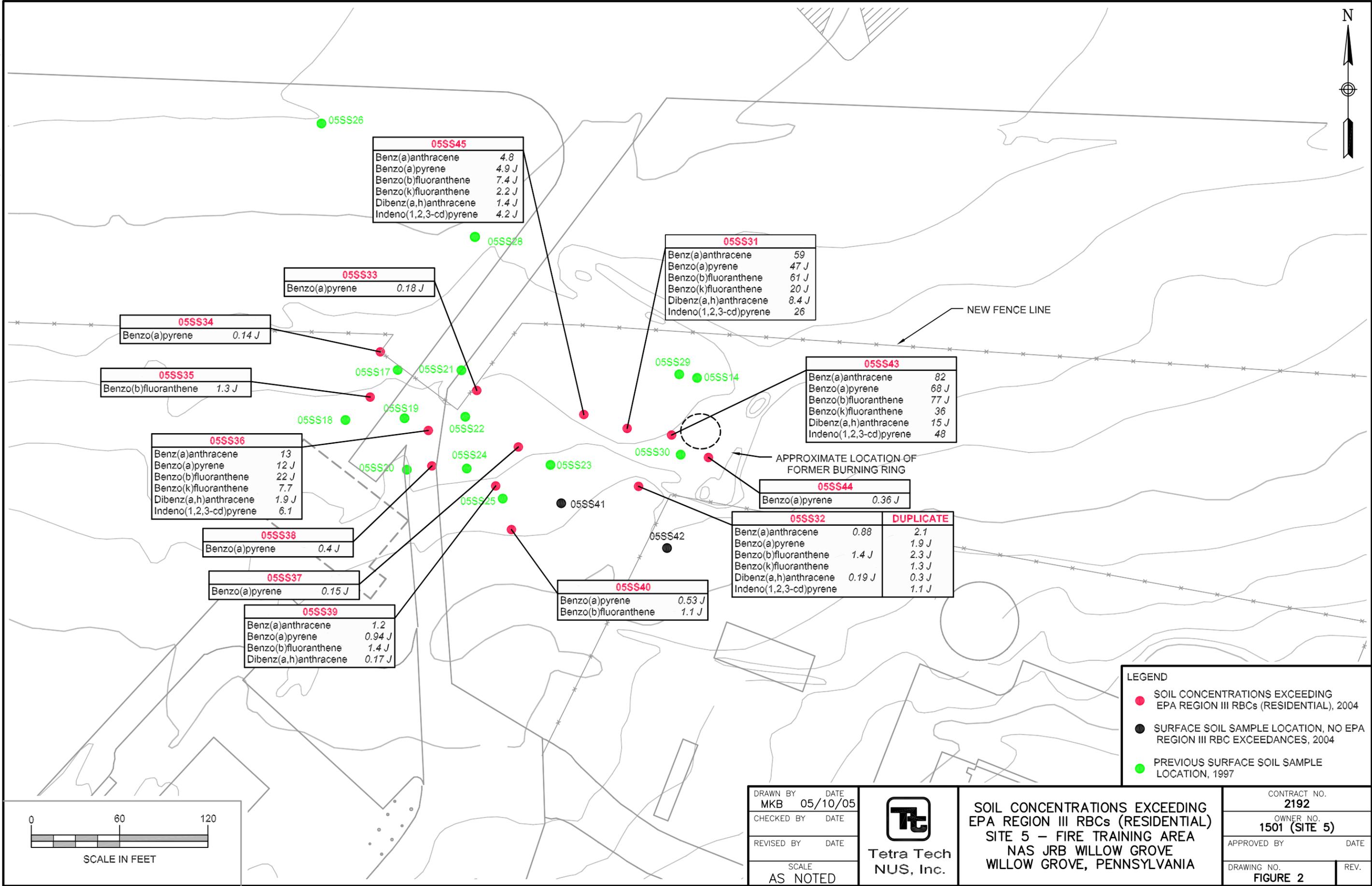


BASE MAP IS A PORTION OF THE AMBLER, PA U.S.G.S. 7.5 MINUTE QUADRANGLE MAP, DATED 1963, PHOTOREVISED IN 1983.



SCALE IN FEET

DRAWN BY MKB DATE 06/30/04	Tetra Tech NUS, Inc. LOCATION OF RI SITES SITE 5 – FIRE TRAINING AREA NAS JRB WILLOW GROVE WILLOW GROVE, PENNSYLVANIA	CONTRACT NO.: 2192	OWNER NO.: CTO 003
CHECKED BY DATE		DRAWING INFORMATION:	
REVISED BY DATE		APPROVED BY:	DATE
SCALE AS NOTED		DRAWING NO.: FIGURE 1	REV.



05SS45

Benz(a)anthracene	4.8
Benzo(a)pyrene	4.9 J
Benzo(b)fluoranthene	7.4 J
Benzo(k)fluoranthene	2.2 J
Dibenz(a,h)anthracene	1.4 J
Indeno(1,2,3-cd)pyrene	4.2 J

05SS31

Benz(a)anthracene	59
Benzo(a)pyrene	47 J
Benzo(b)fluoranthene	61 J
Benzo(k)fluoranthene	20 J
Dibenz(a,h)anthracene	8.4 J
Indeno(1,2,3-cd)pyrene	26

05SS33

Benzo(a)pyrene	0.18 J
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05SS34

Benzo(a)pyrene	0.14 J
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05SS35

Benzo(b)fluoranthene	1.3 J
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05SS43

Benz(a)anthracene	82
Benzo(a)pyrene	68 J
Benzo(b)fluoranthene	77 J
Benzo(k)fluoranthene	36
Dibenz(a,h)anthracene	15 J
Indeno(1,2,3-cd)pyrene	48

05SS36

Benz(a)anthracene	13
Benzo(a)pyrene	12 J
Benzo(b)fluoranthene	22 J
Benzo(k)fluoranthene	7.7
Dibenz(a,h)anthracene	1.9 J
Indeno(1,2,3-cd)pyrene	6.1

05SS44

Benzo(a)pyrene	0.36 J
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05SS38

Benzo(a)pyrene	0.4 J
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05SS32 **DUPLICATE**

Benz(a)anthracene	0.88	2.1
Benzo(a)pyrene	1.9 J	1.9 J
Benzo(b)fluoranthene	1.4 J	2.3 J
Benzo(k)fluoranthene		1.3 J
Dibenz(a,h)anthracene	0.19 J	0.3 J
Indeno(1,2,3-cd)pyrene		1.1 J

05SS37

Benzo(a)pyrene	0.15 J
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05SS40

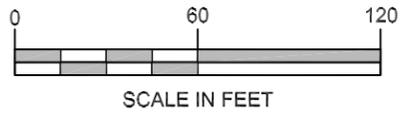
Benzo(a)pyrene	0.53 J
Benzo(b)fluoranthene	1.1 J

05SS39

Benz(a)anthracene	1.2
Benzo(a)pyrene	0.94 J
Benzo(b)fluoranthene	1.4 J
Dibenz(a,h)anthracene	0.17 J

LEGEND

- SOIL CONCENTRATIONS EXCEEDING EPA REGION III RBCs (RESIDENTIAL), 2004
- SURFACE SOIL SAMPLE LOCATION, NO EPA REGION III RBC EXCEEDANCES, 2004
- PREVIOUS SURFACE SOIL SAMPLE LOCATION, 1997

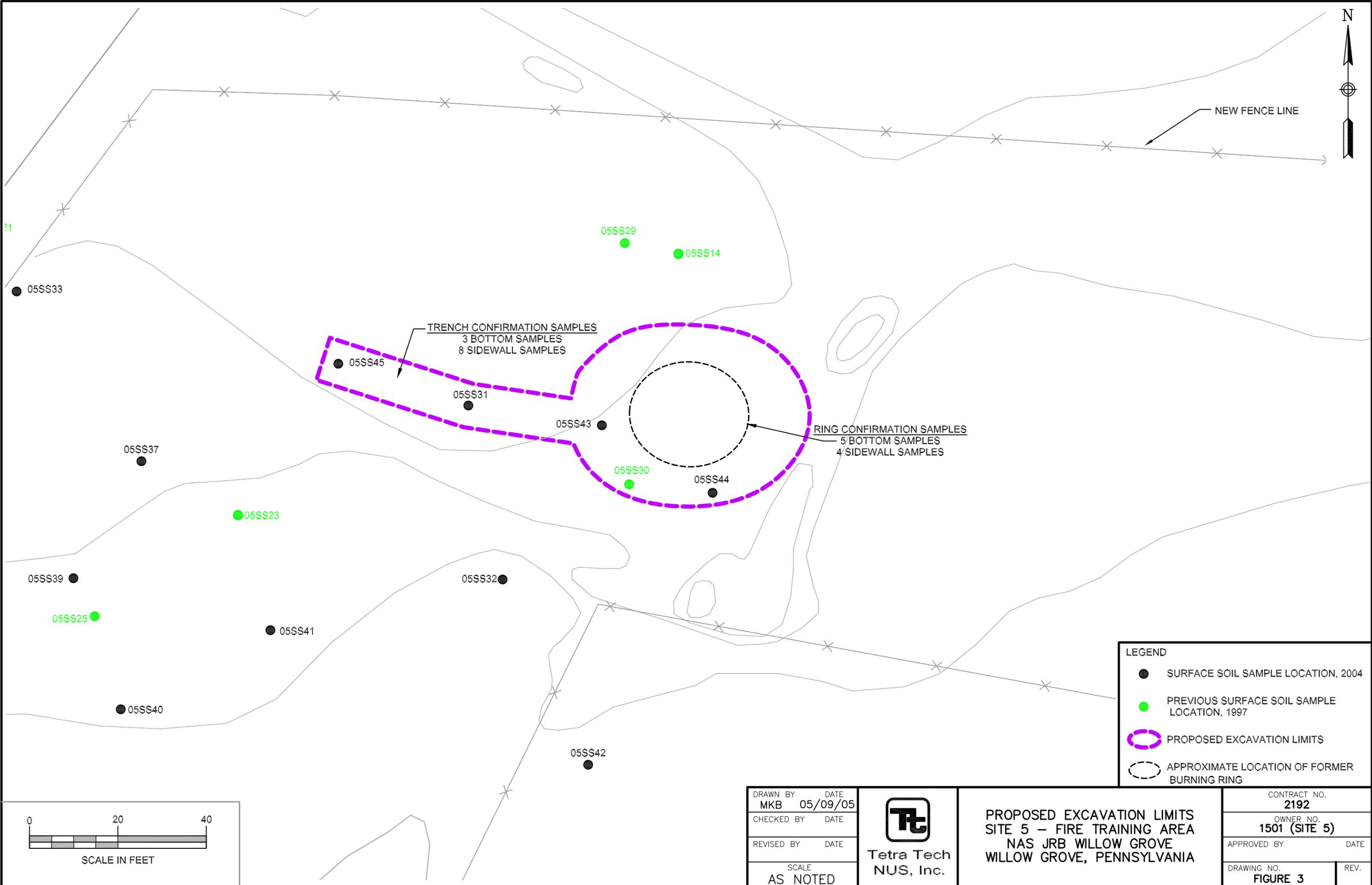


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SOIL CONCENTRATIONS EXCEEDING EPA REGION III RBCs (RESIDENTIAL)
SITE 5 – FIRE TRAINING AREA
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

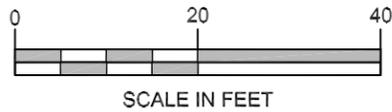
CONTRACT NO.	
2192	
OWNER NO.	
1501 (SITE 5)	
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 2	



TRENCH CONFIRMATION SAMPLES
3 BOTTOM SAMPLES
8 SIDEWALL SAMPLES

RING CONFIRMATION SAMPLES
5 BOTTOM SAMPLES
4 SIDEWALL SAMPLES

LEGEND	
	SURFACE SOIL SAMPLE LOCATION, 2004
	PREVIOUS SURFACE SOIL SAMPLE LOCATION, 1997
	PROPOSED EXCAVATION LIMITS
	APPROXIMATE LOCATION OF FORMER BURNING RING



DRAWN BY MKB	DATE 05/09/05
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	



Tetra Tech
NUS, Inc.

PROPOSED EXCAVATION LIMITS
SITE 5 – FIRE TRAINING AREA
NAS JRB WILLOW GROVE
WILLOW GROVE, PENNSYLVANIA

CONTRACT NO. 2192	
OWNER NO. 1501 (SITE 5)	
APPROVED BY	DATE
DRAWING NO. FIGURE 3	REV.

APPENDIX B

PRELIMINARY REMEDIATION GOALS

**TABLE 1
PRELIMINARY REMEDIATION GOALS
SITE 5 - FIRE TRAINING AREA
NASJRB WILLOW GROVE, PENNSYLVANIA**

Chemical	USEPA		Cancer Risk Levels					
	Region 3 RBC ⁽¹⁾		10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴
	Industrial	Residential	Occupational Workers			Lifelong Residents		
2,3,7,8-TCDD Equivalents	1.9E-05	4.3E+06	2.0E-05	2.0E-04	2.0E-03	4.0E-06	4.0E-05	4.0E-04
Benzo(a)anthracene	3.9	0.87	2.1	21	210	0.62	6.2	62
Benzo(a)pyrene	0.39	0.087	0.21	2.1	21	0.062	0.62	6.2
Benzo(b)fluoranthene	3.9	0.87	2.1	21	210	0.62	6.2	62
Benzo(k)fluoranthene	39	8.7	21	210	2100	6.2	62	620
Dibenzo(a,h)anthracene	0.39	0.087	0.21	2.1	21	0.062	0.62	6.2
Indeno(1,2,3-cd)pyrene	3.9	0.87	2.1	21	210	0.62	6.2	62

Notes:

All concentrations are in mg/kg.

1 - USEPA Region 3 Risk-Based Concentration Table, April 7, 2005.

APPENDIX C

DETAILED COST ESTIMATE

SITE 5 - FIRE TRAINING AREA
NAS JRB, WILLOW GROVE, PENNSYLVANIA
EPA REGION III
EXCAVATION AND OFF-SITE DISPOSAL
Capital Cost

Item	Quantity	Unit	Subcontract	Unit Cost			Subcontract	Extended Cost			Subtotal
				Material	Labor	Equipment		Material	Labor	Equipment	
PROJECT PLANNING											
Prepare Work Plan	150	hr			\$30.00		\$0	\$0	\$4,500	\$0	\$4,500
MOBILIZATION/DEMobilIZATION AND FIELD SUPPORT											
Post-Remediation Survey	1	ac	\$1,150.00				\$1,150	\$0	\$0	\$0	\$1,150
Equipment Mobilization/Demobilization	1	ea			\$53.00	\$111.00	\$0	\$0	\$53	\$111	\$164
DECONTAMINATION											
Equipment Decon Pad	1	ls		\$300.00	\$1,000.00		\$0	\$300	\$1,000	\$0	\$1,300
Decontamination Services	2	day		\$210.00	\$1,800.00	\$315.00	\$0	\$420	\$3,600	\$630	\$4,650
Decon Water Storage Tank, 6,000 gallon	2	day				\$635.00	\$0	\$0	\$0	\$1,270	\$1,270
Clean Water Storage Tank, 4,000 gallon	2	day				\$570.00	\$0	\$0	\$0	\$1,140	\$1,140
Disposal of Decon Waste (liquid & solid)	2	day	\$900.00				\$1,800	\$0	\$0	\$0	\$1,800
EXCAVATION											
Backhoe	2	day	\$5,000.00				\$10,000	\$0	\$0	\$0	\$10,000
Confirmation Soil Testing (PAHs)	100	ea	\$50.00	\$5.00	\$30.00	\$10.00	\$5,000	\$500	\$3,000	\$1,000	\$9,500
DISPOSAL											
Soil Excavation	345	tons	\$65.00				\$22,425	\$0	\$0	\$0	\$22,425
Non-Hazardous Waste Transportation and Off-Site Disposal	345	tons	\$65.00				\$22,425	\$0	\$0	\$0	\$22,425
Metal Disposal	1	cy		\$500.00			\$0	\$500	\$0	\$0	\$500
Waste Characterization Testing (TCLP), 1 per 1000 cy	1	ea	\$820.00	\$5.00	\$20.00	\$10.00	\$820	\$5	\$20	\$10	\$855
SITE RESTORATION											
Subsoil, 18" thick	160	cy		\$21.45	\$0.84	\$2.19	\$0	\$3,432	\$134	\$350	\$3,917
Topsoil, Furnish and Place, 6" thickness	103	sy		3.23	\$0.46	\$0.29	\$0	\$333	\$47	\$30	\$410
Fine Grading and seeding, incl. lime, fert, and seed	103	sy		\$0.34	\$1.31	\$0.21	\$0	\$35	\$135	\$22	\$192
MISCELLANEOUS											
Construction Oversight (2 days)	2	days			\$160.00		\$0	\$0	\$320	\$0	\$320
Post Construction Documents	150	hr			\$30.00		\$0	\$0	\$4,500	\$0	\$4,500
Subtotal							\$63,620	\$5,525	\$17,310	\$4,563	\$91,018
Local Area Adjustments							100.0%	100.0%	100.0%	100.0%	
							\$63,620	\$5,525	\$17,310	\$4,563	\$91,018
Overhead on Labor Cost @ 30%									\$5,193		\$5,193
G & A on Labor Cost @ 10%									\$1,731		\$1,731
G & A on Material Cost @ 10%								\$553			\$553
G & A on Subcontract Cost @ 10%							\$6,362				\$6,362
G & A on Equipment Cost @ 10%									\$456		\$456
Total Direct Cost							\$69,982	\$6,078	\$24,234	\$5,019	\$105,312
Indirects on Total Direct Cost @ 35%											\$20,987
Profit on Total Direct Cost @ 10%											\$10,531
Subtotal											\$136,830
Health & Safety Monitoring @ 2%											\$2,737
Total Field Cost											\$139,567
Contingency on Total Field Costs @ 20%											\$27,913
Engineering on Total Field Cost @ 10%											\$9,422
TOTAL COST											\$176,902