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STATEMENT OF BASIS SOLID WASTE MANAGEMENT UNIT 5 (SWMU 5) AIRCRAFT FIRE FIGHTING TRAINING FACILITY MILLINGTON SUPPACT TN
12/01/2005
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

STATEMENT OF BASIS

SWMU 5 – Aircraft Fire Fighting Training Facility
Naval Support Activity Mid-South
Millington, Tennessee

Purpose of the Statement of Basis

This Statement of Basis (SB) has been prepared to inform the public and provide an opportunity to comment on a proposed remedy at solid waste management unit (SWMU) 5 — Aircraft Fire Fighting Training Facility (AFFTF), formerly part of the Naval Support Activity (NSA) Mid-South, Millington, Tennessee. NSA Mid-South is responsible for corrective action at SWMU 5 as required by a Resource Conservation and Recovery Act (RCRA) permit. The United States Environmental Protection Agency (USEPA) Region 4 and the Tennessee Department of Environment and Conservation (TDEC) have determined that the proposed remedy, land-use controls prohibiting the use of groundwater and residential reuse, is protective of human health and the environment.

Before the remedy is finalized the USEPA and TDEC would like to give the public an opportunity to comment on the proposed remedy. At any time during the comment period, the public may comment as described in the following section "How Can You Participate?" Upon closure of the public comment period the USEPA and TDEC will evaluate all comments and determine if there is a need to modify the proposed remedy.

Site Description

SWMU 5 was used from 1949 until October 1996 to simulate burning aircraft and fire-rescue situations. Underground pipes transferred jet fuel from underground storage tanks to two bermed concrete mats with aircraft cockpits, where students ignited the fuel and then extinguished it with high-pressure water and/or foam sprays. Waste water and fuel drained to a 5,000 gallon oil-water separator where fuel was reused and wastewater was sent to the sanitary sewer. Potential impacts associated with spills, leaking tanks, and ruptured fuel lines, resulted in the site being designated as Solid Waste Management Unit (SWMU) 5, prompting its characterization within the RCRA program.

How Can You Participate?

The USEPA and TDEC solicit public review and comment on this SB prior to implementation of the proposed remedy as the final. The final remedy for SWMU 5 will be incorporated in the Hazardous and Solid Waste Amendments (HSWA) Permit TNHW-094 for NSA Mid-South, scheduled to be updated in 2006.

Figure 1 – SWMU 5 at NSA Mid-South in Millington, Tennessee

Public comment on this SB and the proposed remedy will begin on the date that a notice of the SB's availability is published in *The Millington Star* and *The Commercial Appeal* local daily newspapers. Since community input could affect selection of a final remedy for SWMU 5, a public comment period has been established for 45 days from ***(insert date)***. If requested during the comment period, the USEPA and TDEC will hold a public meeting to respond to any oral comments or questions regarding the proposed remedy. To request a hearing or to provide comments, contact the following person in writing within the 45-day comment period:

Mr. Roger Donovan
TDEC — Division of Solid Waste Management
5th Floor, L&C Annex
401 Church Street
Nashville, TN 37243-1538

Telephone: (615) 532-0864
E-mail: roger.donovan@state.tn.us

Investigative reports and documents related to SWMU 5 are referenced at the end of this SB and are included in the Administrative Record, which can be reviewed in the Information Repository that was established to provide public access to documents pertaining to the Navy's environmental restoration program. The Information Repository is maintained at:

Millington Civic Center
8077 Wilkinsville Road
Millington, Tennessee 38053
(901) 873-5770

Background Summary

Past operations at the former Naval Air Station (NAS) Memphis included metal plating, repair work, and other operations that involved the use of toxic and hazardous materials. Land use changed as a result of the 1990 Base Closure and Realignment (BRAC) Act, and the name of the facility was changed from NAS Memphis to NSA Mid-South.

A significant portion of NSA Mid-South's Northside was transferred to the City of Millington, including SWMU 5, while the remaining property was realigned (i.e., an operation was reassigned from NSA Mid-South to another facility, and/or an operation from another facility was reassigned to NSA Mid-South). Three facility operations changed: (1) Navy airfield operations ceased in October 1995, (2) training operations were realigned to NAS Pensacola in 1996, and (3) administrative operations for the Navy Bureau of Personnel were realigned from Washington, D.C., to NSA Mid-South in 1997.

The former AFFTF contained two 75-foot-diameter fire burn mats, five fuel tanks (aboveground and below ground), an oil-water separator, and associated piping. A 1990 RCRA Facility Assessment (RFA; ERC/EDGe, 1990) concluded that a history of spills, overflows, and leaking tanks warranted that the site undergo further evaluation (ERC/EDGe, 1990).

As required by the Navy's RCRA Permit, NSA Mid-South is required to assess all SWMUs for potential environmental impacts. Due to the former operations at the site and their potential impact to the environment, the AFFTF was designated a SWMU.

The subsequent RCRA Facility Investigation (RFI; EnSafe, 1999a) identified several areas where soil and groundwater were impacted from petroleum constituents, resulting in two Voluntary Corrective Actions (VCAs; EnSafe, 1998 and EnSafe, 1999b) that removed petroleum-contaminated soil exceeding TDEC action levels.

In December 1999, SWMU 5 was transferred to the City of Millington's Industrial Development Board and Municipal Airport Authority through two quitclaim deeds (Deed Area 4 and Airfield Deed). To ensure that future users of the site were protected, land-use controls that restricted excavating, drilling, or any disturbance to soil were incorporated in the deeds. Additionally, restrictions against future residential reuse and use of the site groundwater were included in the deeds.

The RFI report recommended that the site undergo additional groundwater monitoring to verify the initial indications that the VCA effectively removed the petroleum constituents in groundwater. The monitoring data demonstrated that cleanup goals were achieved as groundwater contaminants remained absent through the monitoring period, enabling the USEPA and TDEC to lift the land-use controls that prohibited excavating, drilling, or disturbing site soil, while the restrictions against residential reuse and the site groundwater were left as the selected remedy for the site. The basis for the remedy selection is provided under the "Summary of Contaminant Evaluation" and "Summary of Site Risk" sections of the SB.

Summary of Contaminant Evaluation

Soil and groundwater sample locations from the RFI and a 1992 underground storage tank (UST) investigation were the basis for the site evaluation and are provided in Figures 2 and 3 (Attachment 1), respectively. A summary of the number of samples collected from each media is provided below with a discussion of the chemicals detected above health-based screening criteria.

Soil

Fourteen surface and 29 subsurface soil samples were collected to evaluate potential impacts to site soil. As indicated in Table 1, contaminants identified above USEPA's risk-based concentration (RBC) criteria during the RFI and UST investigation consisted of the volatile organic compounds (VOCs) benzene and methylene chloride; the pesticide dieldrin (applied aerially over the base in the 1950s and 1960s); the semivolatile compound (SVOC) benzo(a)pyrene, which is commonly associated with vehicle exhaust; and finally dioxin, a by-product associated with burning chlorine-based chemical compounds. As indicated in the table and shown on Figure 2, some of these sample locations coincide with locations where soil removals have since taken place, therefore they are no longer present at the site.

Table 1
Surface-Soil Contaminants (Max) Exceeding Risk-Based Screening Criteria (ppb)[a]

Sample Location	Analyte	Result	RBC-Res[b]	RBC-Ind[b]
B-15*	Benzene	110	22	200
B-15*	Methylene chloride	120J	85	760
05S007	Benzo(a)pyrene	150	87	780
05SB0003	Dieldrin[c]	290J	40	360
005S001*	Dioxin[d]	0.037	0.0043	0.038

Notes:

[a] – Units of parts per billion

[b] – Denotes risk-based concentrations (RBCs), either residential (RBC-Res) or industrial (RBC-Ind); taken from *Risk-Based Concentration Table,* October 7, 1999 (USEPA, 1999).

[c] – Only dieldrin detections above the background reference concentration (262 ppb) and the USEPA's RBC screening values are listed on the table.

* – Denotes sample location that was later removed through either tank closure or VCA.

Groundwater

Two groundwater units were evaluated as part of the SWMU 5 RFI; groundwater in the shallower clay and silt loess deposits (approximately 15 feet below land surface) and that in the sand and gravel fluvial deposits (approximately 35 feet in depth). Since the groundwater beneath the Northside of the base has been designated as a separate area of concern (Area of Concern A), which is currently undergoing corrective measures, this groundwater unit is excluded from the SWMU 5 SB. Therefore the below groundwater discussion pertains only to the loess groundwater.

Loess Groundwater — Three UST and five RFI monitoring wells were sampled to characterize the loess groundwater. Table 2 lists sample locations and contaminants that exceeded either a USEPA screening value and/or a regulatory drinking water standard.

Monitoring well FFMW-8 contained 3,900 parts per billion (ppb) of benzene, well above the 5 ppb regulatory threshold and the most impacted well at the site. The source for this contamination was speculated to be the former fire extinguisher pits, northeast of the monitoring well, prompting the removal of soil over a 60-square-foot area through a VCA (EnSafe, 1999a). Initial indications from a single monitoring event of replacement well FFMW-8 indicated the removal action was effective, as groundwater contaminants were absent.

TCE was detected at FFMW-5 above the RBC but below the drinking water MCL. A comparison of concentrations to USEPA's target groundwater threshold of 5.3 ppb (USEPA, 2002) that is used to gauge whether TCE could pose an indoor air quality/inhalation concern to future occupants of the site, shows concentrations are below the air quality screening value.

The metals lead, antimony, and beryllium originally exceeded their respective action levels. Because these metals were not detected during

a subsequent sampling event, the original exceedances were attributed to turbidity associated with the loess groundwater.

Table 2
Contaminants (Max) in Loess Groundwater Above Screening/Regulatory Criteria (ppb)

Sample Location	Analyte	Result	MCL[a]	RBC-Tap Water[b]
FFMW-5	TCE	2	5	1.6
FFMW-5	Lead	37.7	15[c]	DNE
FFMW-5	Antimony	64.8	6	15
FFMW-5	Beryllium	4	4	1.3
FFMW-7	EPH[d]	1,000	1,000[e]	DNE
FFMW-8*	Benzene	3,900	5	0.36
FFMW-8*	Methylene Chloride	31	5	4.1
FFMW-8*	Arsenic	159	50	0.045
05MW06S	Cadmium	18.1	5	18

Notes:
[a] — Maximum Contaminant Levels (MCLs) in drinking water are from the *Drinking Water Regulations and Health Advisories* (USEPA, 1996)
[b] — Tap water RBC is from the *Risk-Based Concentration Table*, 1999 (USEPA, 1998)
[c] — Treatment Technology Action Level
[d] — Extractable petroleum hydrocarbons
[e] — TDCE Division of Underground Storage Tanks Cleanup Level for total petroleum hydrocarbons in a non-drinking water aquifer
* — Monitoring well removed during VCA and replaced with MW-8a, which was subsequently sampled and shown to have concentrations below the USEPA's and TDEC's actionable levels

Removal Actions

VCAs were implemented by the Navy to remove petroleum contaminated soil identified during the RFI. One was completed in August 1997 by U.S. Army Corps of Engineers to remove the oil-water separator (EnSafe, 1998) and the second was in November of the same year to address contamination beneath the fire mat and the fire extinguisher pits (EnSafe, 1999a). Collectively, these two VCAs removed 6,100 cubic yards of petroleum contaminated soil. As indicated on Figure 3 (Attachment 1), the area surrounding the most contaminated well (FFMW-8) was included in the removal actions. All tanks, piping, and structures that could be a possible source of contamination have been similarly removed from the site.

Summary of Site Risk

As part of the RFI, risks to human health and the environment from the contaminants identified at SWMU 5 were evaluated using human health and ecological risk assessments, which were developed in accordance with existing USEPA and TDEC methods.

Human Health Risk

Risk assessments use estimated intake as part of the calculations. Intake is affected by the land-use scenarios, where one scenario may account for lifetime exposure to soil and groundwater, and another scenario may only include occasional exposure to soil with no groundwater exposure. Human health risk at SWMU 5 was assessed using four scenarios: site worker, child trespasser, construction worker, and future site resident. A discussion of each media, the chemicals of concern associated with that media, and populations that could be at risk are discussed below.

- ***Soil***
  The risk assessment concluded that no chemicals of concern were present in soil that would pose a risk to any of the evaluated scenarios.

- ***Groundwater***
  Chemicals of concern in loess groundwater that would pose a risk to a future resident or site worker include antimony, arsenic, barium, benzene, cadmium, methylene chloride, 2-methyl naphthalene, naphthalene, and vanadium. While the risk associated with benzene in groundwater has been removed, metals in loess groundwater would remain a risk to a future user of site groundwater.

Ecological Risk

The RFI concluded that no quality habitat is available at SWMU 5, limiting the exposure of potential ecological receptors. Therefore, no ecological exposure pathways are considered complete (EnSafe, 1999a). To clarify the

decision-making process for SWMU 5, a Supplemental Screening Level Ecological Risk Assessment (SLERA) was performed (EnSafe, 2005). The SLERA concluded there are no unacceptable ecological risks associated with SWMU 5.

The RFI report recommended additional groundwater monitoring to verify the initial indications that the petroleum source in soil and groundwater was effectively removed during the VCA (EnSafe, 1999a). TDEC and USPEA approved the RFI May and June 1999.

Selected Remedy for SWMU 5

The RFI recommendations were addressed in a *Technical Memorandum* (EnSafe, 2003) submitted to TDEC and USEPA with a recommendation of no further action. The basis for the recommendation was two years of groundwater data that demonstrated petroleum constituents were absent or below actionable levels. The TDEC and USEPA concurred with the recommendation in May and August of 2003, respectively.

The selected remedies for the site are the following land-use controls:

- The site must be reused for nonresidential purposes only.
- The use of shallow (loess) groundwater is prohibited. The installation of wells in the Memphis Sand or deeper aquifers must be double-cased to prevent any downward migration of contamination.

These land-use controls have been incorporated into the *Land-Use Control Implementation Plans (LUCIPs)* for SWMU 5, which are included as part of the Airfield and Non-Airfield deeds (*Quitclaim Deed JY7103* and *JY7108*, respectively). The LUCIPs include a *Land-Use Control Compliance Certification* form to be completed annually which ensures the protections remain in place and includes the following:

- Location of land subject to LUC
- Explanation of LUC (e.g., signage and fencing requirements, restrictions, etc.)
- Duration of the LUC
- Requirements and frequency of LUC inspections, including documentation requirements.

Since the USEPA and TDEC's goals for human health and ecological risks have been met, no other remedial alternatives were evaluated. The proposed remedy of land-use controls is considered protective of human health and the environment. The remedy meets the four general standards of corrective measures, which are:

- Overall protection of human health and the environment
- Attainment of media cleanup standards
- Controlling the sources of release
- Compliance with standards for management

References

EnSafe Inc. (2005). *Technical Memorandum — Supplementary Screening Level Ecological Risk Assessment, SWMU 5 — Aircraft Fire Fighting Training Facility, NSA Mid-South.* Memphis, Tennessee.

EnSafe Inc. (1998). *Oil-Water Separator Removal Aircraft Fire Fighting Training Facility — SWMU 5. Technical Memorandum.* Memphis, Tennessee.

EnSafe Inc. (1999a). *RCRA Facility Investigation Report; Aircraft Fire Fighting Training Facility — SWMU 5. Revision 03. Naval Air Station Memphis, Millington, Tennessee.* Memphis, Tennessee.

EnSafe Inc. (1999b). *Voluntary Corrective Action Report; SWMU 5 — Fire Mat 305 and Fire Extinguisher Pits (005G08LS Area); SWMU 60 (Northside Landfill); North Fuel Farm; Former Building N-6 (Underground Waste Tank); Revision 01. Naval Air Station Memphis, Millington, Tennessee.* Memphis, Tennessee.

EnSafe Inc. (2003). *Recommendation for Site Closure; Aircraft Fire Fighting Training Facility — SWMU 5. Naval Air Station Memphis, Millington, Tennessee.* Memphis, Tennessee.

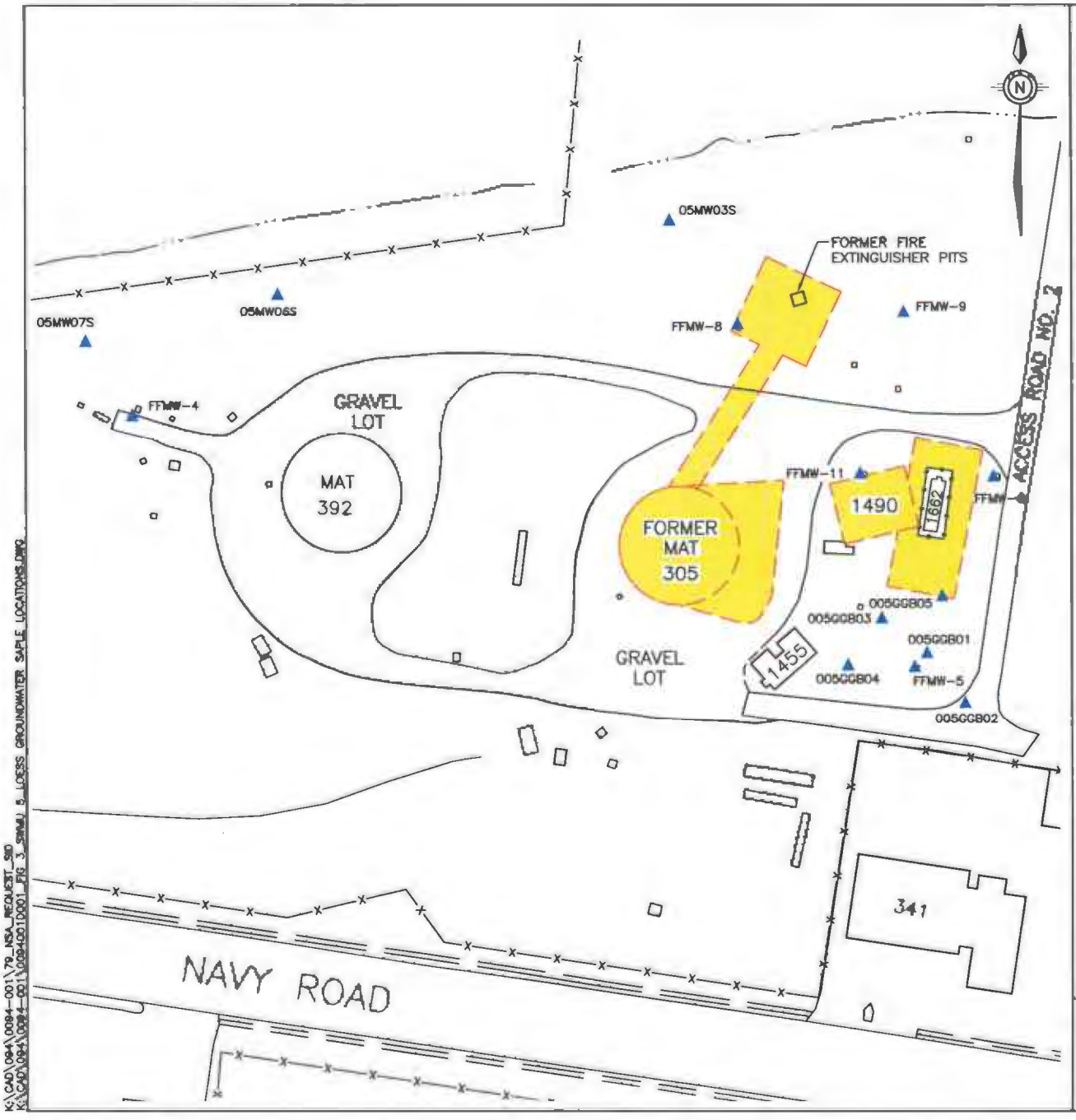
EnSafe/Allen & Hoshall. (1992). *Environmental Assessment Report, Tank Systems 1489 and 1508, Aircraft Fire Fighting Training Facility, Naval Air Station Memphis, Millington, Tennessee.* Memphis, Tennessee.

ERC/EDGe. (1990). *RCRA Facility Assessment (RFA) NAS Memphis, Millington, Tennessee.* Knoxville, Tennessee.

TDEC. (2003). TDEC Division of Solid Waste letter to Jim Reed with U.S. Navy. May 8, 2003. TDEC, Memphis, TN.

USEPA. (2002). *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils.* USEPA, 2002.

USEPA. (2003). USEPA letter to Jim Reed with U.S. Navy. June 30, 2003. USEPA, Atlanta, Georgia.



LEGEND

- ▲ – LOESS GROUNDWATER SAMPLE LOCATION
- – AREAS REMOVED DURING VOLUNTARY CORRECTIVE ACTION (VCA) AND TANK CLOSURES.
- – NSA MID-SOUTH BOUNDARY
- – AREA OF INVESTIGATION

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FIGURE 3
SWMU 5 STATEMENT OF BASIS
LOESS GROUNDWATER
SAMPLE LOCATIONS

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