DECISION DOCUMENT FOR THE FINAL REMEDIAL ACTION AT THE TAC-X LANDFILL (SWMU 3)

FORT STEWART, GEORGIA

15 MAR 2001

PURPOSE

This decision document describes the selected Final Remedial Action (FRA) for the TAC-X Landfill (SWMU 3) located at Fort Stewart, Georgia, which consists of Institutional Controls (ICs). Specifically, the ICs proposed for FST-03 includes documentation in the Base Master Plan (BMP), deed recordation, zoning controls, maintenance of existing physical barriers, installing warning signs, and implementation of the Operation & Maintenance (O&M) plan. The selected ICs are described in detail in the *Final Corrective Action Plan for the TAC-X Landfill (Solid Waste Management Unit 3),* dated March 2001. The document will be reviewed by Georgia Environmental Protection Division (GA EPD) and comments and/or tentative approval is anticipated in June 2001. FST-03 is a Defense Site Environmental Restoration Tracking System (DSERTS) site and the FRA will be funded using fiscal year (FY) 2001 Environment, Restoration Account (E,RA) funds.

This decision document presents the justification for the selected FRA and specifically provides details on the following:

- Site Location and History
- Nature and Extent of Contamination
- Remedial Response Objectives
- Conceptual Design and Implementation
- Public Notification
- Declaration

Site Location and History

SWMU 3, which is approximately 3.5 miles south-southwest of Pembroke, Georgia, and less than 1 mile southeast of Dean Field and the TAC-X (Noncommissioned Officers' Academy), was active from the 1960s until 1982. The waste disposed of at the landfill from the 1960s to 1979 included residential waste, food cans, brush, plastic, and cardboard boxes. From 1979 to 1982, the wastes included grass clippings, tree branches, root stumps, and chunks of asphalt and concrete.

The TAC-X Landfill comprises approximately 6.3 acres, with two trenchlike depressions present at the site. One of the trenches is reportedly unused. The reported dimensions of the disposal trench are 20 feet wide by 400 feet long by 5 feet to 6 feet deep. A site reconnaissance in November 1993 observed household-type debris (e.g., plastic spoons and bags) within the overburden pile on the western side of the disposal trench. Aged refuse is reported to be present at the bottom of the disposal trench (Geraghty and Miller 1992). A site reconnaissance in September 1996 indicated no evidence of any landfill operations. The site is nearly flat, but slopes gently toward the south. Pine trees, brush, and grass cover most of the site. The southernmost portion of the site is marshy, with surface water present.

Nature and Extent of Contamination

The results of chemical analyses performed during the Phase I and Phase II RCRA Facility Investigations (RFIs) indicated that soil, groundwater, and sediment contain organic and metal

contaminants at concentrations greater than their reference background concentrations. No contaminants were detected in surface water. A tabular summary of site-related contaminants for SWMU 3 is presented in Table 1.

SOIL Eleven surface soil samples were collected from four monitoring well boring locations, three soil boring locations, and four surface soil samples during the Phase I and Phase II RFIs. No VOCs were detected in surface soil. Low, isolated concentrations of bis(2-ethylhexyl)phthalate (an SVOC) and four pesticides (alpha-BHC, gamma-BHC, heptachlor epoxide, and methoxychlor) were detected in surface soil. Arsenic, chromium, and lead were detected at concentrations above reference background criteria in one of ten surface soil samples. Bis(2-ethylhexyl)phthalate, alpha-BHC, gamma-BHC, heptachlor epoxide, methoxychlor, arsenic, chromium, and lead were considered to be site-related contaminants (SRCs) in surface soil.

Seven subsurface soil samples were collected during the Phase II RFI from four monitoring well boring locations and three soil boring locations. Two VOCs (2-butanone and acetone), one SVOC [bis(2-ethylhexyl)phthalate], and three pesticides (4,4'-DDE; aldrin; and methoxychlor) were detected in subsurface soil. Chromium and cadmium were detected at concentrations above reference background criteria in one (MW6) of seven subsurface soil samples. Acetone, 2-Butanone; bis(2-ethylhexyl)phthalate; 4,4'-DDE; aldrin; methoxychlor; cadmium; and chromium were considered to be SRCs in subsurface soil at SWMU 3.

GROUNDWATER Low, isolated concentrations of acetone (a VOC) and three pesticides (4,4'-DDT; beta-BHC; and delta-BHC) were detected in groundwater collected from Geoprobe locations. Barium, cadmium, chromium, lead, and mercury were detected at concentrations above reference background criteria in groundwater collected from Geoprobe locations. However, corresponding dissolved metal concentrations for all five constituents were below reference background concentrations, indicating that the total metals might be associated with particulates in the groundwater.

A low, isolated concentration of 2-hexanone (a VOC) was detected in groundwater collected from monitoring well MW6. Mercury was detected at concentrations (0.15 µg/L and 0.16 µg/L) slightly above the reference background criteria (0.14 µg/L) in two of eight groundwater samples collected from the monitoring wells.

Acetone, 2-Hexanone; 4,4'-DDT; beta-BHC; delta-BHC; barium; cadmium; chromium; lead; and mercury were considered to be SRCs in groundwater.

SURFACE WATER AND SEDIMENT One SVOC [benzo(b)fluoranthene] was detected in surface water. Arsenic, barium, chromium, and lead were detected in surface water at concentrations above reference background criteria.

Seven VOCs were detected in sediment. However, after resampling, only six of the seven VOCs are considered to be SRCs in sediment: 2-butanone, 2-hexanone, acetone, benzene, carbon disulfide, and toluene.

Arsenic, barium, chromium, lead, mercury, and selenium were detected in sediment at concentrations above reference background criteria. Sediment samples from SWS1 had significantly higher concentrations than did those from SWS2.

RISK ASSESSEMENT A Baseline Human Health Risk Assessment (BHHRA) and an Ecological Risk Assessment was conducted for the site. The BHHRA addressed the risks associated with exposure to the following human health constituents of potential concern (COPCs): arsenic (surface soil, surface water, and sediment), chromium (surface water), lead (surface water), mercury (groundwater), delta-BHC (groundwater), and benzo(*b*)fluoranthene (surface water). No contaminant migration COPCs were identified for this site. Based on the required assessment only two constituents were identified as Contaminants of Concern (COCs) at the site and are summarized in Table 2.The ecological risk assessment concluded that there is no present ecological risk at SWMU 3 and that the site is unlikely to pose an ecological risk in the future; therefore further investigation and/or evaluation of ecological COPCs was not required.

Remedial Response Objectives

Based on the findings of the site characterization at SWMU 3, the primary goal and purpose for implementing corrective measures at this site is limited to protection of human health and safety. To achieve this goal, the following remedial response objective has been established for the site: to prohibit the ingestion of shallow groundwater from the subject site and to prohibit the disturbance of surface and subsurface soil to minimize contact with soil and buried waste. Any corrective measures that pose a significant threat to human health and safety during implementation (e.g., methods that would involve disturbance of subsurface soil) will not be evaluated. Implementation of the selected remedial response will achieve the best overall results with respect to such factors as long-term reliability and effectiveness, short-term effectiveness, implementability, and cost.

Conceptual Design and Implementation

This section presents a conceptual design and plan for implementation of the selected corrective action alternative for SWMU 3. Based on the level and type of soil contamination, a cost-effective corrective action was selected that would adequately protect human health and safety. The technology evaluation presented in Chapter 4.0 of the March 2001 Corrective Action Plan for the site compared different corrective action alternatives based on their effectiveness at protecting human health and safety, life-cycle costs, and technical factors. All the alternatives evaluated included institutional controls (ICs): BMP, deed recordation, zoning controls, maintenance of existing physical barriers, well abandonment, post-mounted warning signs, and implementation of an O&M Plan. Variations of alternatives included groundwater monitoring and installation of fencing. The selected corrective action alternative involves a multi-layered approach to restricting human activity within the boundaries of the subject site. The selected set of institutional controls comprising this alternative will provide a combination of land-use restrictions and prohibitions. Land-use restrictions will be documented and/or enforced through deed recordation, the BMP, zoning restrictions, and signage.

Alternative 1 has been selected because it will provide effective protection of human health at a relatively low cost. Although the installation of fencing would provide an additional degree of protection, Alternative 2 is not considered cost-effective. The additional protection that the fence would provide against inadvertent access to the site and unauthorized soil excavation would be minimal and would not justify the significantly greater expense of implementing Alternative 2. Groundwater monitoring as described under Alternatives 1a and 2a does not provide enough additional protection to human health to justify its increased costs. The groundwater presently does not present a risk to human health. The institutional controls described for Alternative 1 will provide a sufficient level of protection of human health and an adequate degree of long-term reliability and effectiveness as well as short-term effectiveness. The institutional controls under

Alternative 1 can be easily and cost-effectively implemented. Justification for selection of this corrective action alternative is further detailed in the following evaluations of effectiveness, implementability, and cost.

Effectiveness Post-mounted warning signs and documented land-use restrictions will be highly effective and provide long-term reliability with respect to preventing human exposure to physical contact with the buried waste within the boundaries of SWMU 3. To maintain an acceptable level of long-term reliability and effectiveness, the BMP will establish land-use controls during ownership by the Department of Defense. Prior to the planning of any construction activities at the Installation, the BMP must be reviewed. In addition, the Base Master Planner and the DPW will review all construction projects during the planning stages for approval. These land-use controls will remain in effect after transfer of Department of Defense ownership by restrictions imposed through deed recordation.

Additionally, the proposed abandonment of monitoring wells (MW1, MW2, MW3, MW4, MW5, MW6, MW7, and MW8) and the groundwater-use restrictions will provide an effective method for preventing the use of groundwater for drinking water or for irrigation at the site. The surficial aquifer is not an adequate source of drinking water at the Installation and is not used. The BMP will be modified to officially restrict its use, further preventing use of the surficial groundwater at the site.

An annual O&M program will be administered to replace or repair warning signs, which may deteriorate over time (see Appendix A in the Corrective Action Plan). Implementation of the O&M Plan will ensure the effectiveness of this program. The O&M program for this Corrective Action Plan will involve inspection as well as potential replacement or repair of warning signs.

Providing institutional controls over the short term will be a very effective means of minimizing or eliminating human exposure to buried waste within the boundaries of SWMU 3. Warning signs will be most effective over the short term. Current risk is below remedial levels, and use of the site is limited to outdoor classroom-style training, so access is already limited.

Implementability Very few factors limit implementability of the institutional controls under evaluation. On-site personnel or contractors can readily perform posting of signs. The materials for the installation of warning signs are readily available to local contractors. Annual O&M inspections require few resources with respect to inspection personnel and materials for repair. Establishment of an adequate combination of land-use management tools will require additional time and effort for development, preparation, and processing of the necessary paperwork; however, the time and resources are available to administer and acquire the necessary land-use controls because the property is not expected to be sold or leased in the near future. Administrative provisions already exist to allow for incorporation of land-use controls into the BMP and to facilitate deed recordation.

Cost The estimated total life-cycle cost of installation of warning signs, well abandonment, administrative activities associated with acquisition of legal controls, O&M activities, and management and oversight is $174,154 (E,RA funds). This alternative provides adequate protection of human health and the environment.

Public Notification

GA EPD will prepare a notification which explicitly describes the FRA selected for SWMU 3, and per Fort Stewart's Hazardous Waste Permit HW-045(S&T) the public will be afforded the

opportunity to review the notification and/or the entire Corrective Action Plan for a period of thirty days. At the conclusion of the review period, GA EPD will either grant final approval of the selected FRA or revise their tentative approval based on review and comments received by the public. It is anticipated that this review period will occur in July 2001 (i.e., after receipt of projected GA EPD June 2001 tentative approval) and final approval (i.e., after public review period) from GA EPD will be provided to the Installation in early September 2001; however, GA EPD will provide tentative approval of the Corrective Action Plan prior to this timeframe which will allow Fort Stewart to proceed with implementation of the recommended FRA.

Declaration

The selected Final Remedial Action for SWMU 3 is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to the FRA, and will be cost-effective.

As the selected course of action for SWMU 3 was presented in the March 2001 Corrective Action Plan and will be approved by GA EPD, the five-year review will not apply to the proposed FRA.

This decision document was developed by the Fort Stewart Directorate of Public Works, with support from the U.S. Army Corps of Engineers and SAIC.

Table 1. Summary of Site-Related Contaminants, SWMU 3

Analyte	Maximum Concentration (mg/kg)			Maximum Concentration (μg/L)	
	Surface Soil	Subsurface Soil	Sediment	Groundwater	Surface Water
Volatile Organic Compounds					
2-Butanone	ND	0.0044	0.495	ND	ND
2-Hexanone	ND	ND	0.0034	5.6	ND
Acetone	ND	0.0932	0.618	264	ND
Benzene	ND	ND	0.0033	ND	ND
Carbon disulfide	ND	ND	0.006	ND	ND
Methylene chloride	ND	ND	ND	ND	ND
Toluene	ND	ND	0.212	ND	ND
Semivolatile Organic Compounds					
Benzo(*b*)fluoranthene	ND	ND	ND	ND	6.6
Bis(2-ethylhexyl)phthalate	0.248	0.387	ND	ND	ND
Pesticides/PCBs					
4,4'-DDE	ND	0.00064	ND	ND	ND
4,4'-DDT	ND	ND	ND	0.025	ND
Aldrin	ND	0.00061	ND	ND	ND
alpha-BHC	0.00047	ND	ND	ND	ND
beta-BHC	ND	ND	ND	0.016	ND
delta-BHC	ND	ND	ND	0.082	ND
gamma-BHC (Lindane)	0.0012	ND	ND	ND	ND
Heptachlor epoxide	0.00054	ND	ND	ND	ND
Methoxychlor	0.0086	0.0048	ND	ND	ND
Metals					
Arsenic	24[a]	BRBC	29.7	ND	7.3
Barium	BRBC	BRBC	60	92.3	59.6
Cadmium	ND	0.25	ND	0.82	ND
Chromium	7.8	25.5	23.3	6.8	13.9
Lead	73.97[a]	BRBC	14.7	11.1	9
Mercury	BRBC	BRBC	0.08	0.46	ND
Selenium	BRBC	BRBC	2.6	BRBC	ND

[a]Phase I RFI data.
BRBC = Below reference background criteria.
ND = Not detected.

Table 2. Remedial Levels, SWMU 3

Constituent of Concern	Maximum Detected Concentration (mg/kg)	Risk-based Remedial Levels (mg/kg)		
		ILCR		
		1×10^{-6}	1×10^{-5}	5×10^{-5}
Surface Soil				
Arsenic	24	0.6	6.1	**30.3**
Surface Water				
Benzo(*b*)fluoranthene	0.0066	0.0010	0.0101	**0.0505**

Bold indicates concentrations above recommended remedial levels.
ILCR = Incremental Lifetime Cancer Risk