

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action Environmental Indicator (EI) RCRAInfo Code (CA725) Current Human Exposures Under Control

Facility Name: McGuire Air Force Base
Facility Address: Wrightstown-Cookstown Road, Wrightstown, New Jersey 08641
Facility EPA ID#: NJ2571824018

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EIs) are measures being used by the Resource Conservation and Recovery Act (RCRA) Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved) to track changes in the quality of the environment. The two EIs developed to date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of “Current Human Exposures Under Control” EI

A positive “Current Human Exposures Under Control” EI determination (“YE” status code) indicates that there are no unacceptable human exposures to “contamination” (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all contamination subject to RCRA corrective action at or from the identified facility [i.e., site-wide]).

Relationship of EI to Final Remedies

While final remedies remain the long-term objectives of the RCRA Corrective Action program, the EIs are near-term objectives, which are currently being used as program measures for the Government Performance and Results Act of 1993 (GPRA). The “Current Human Exposures Under Control” EI is for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and does not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program’s overall mission to protect human health and the environment requires that final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI determination status codes should remain in the Resource Conservation and Recovery Act Information System (RCRAInfo) national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Information

McGuire Air Force Base (McGuire AFB) is located on approximately 3,700 acres in the borough of Wrightstown, New Jersey. Most of the area surrounding the base is rural. The base is bordered to the north by the borough of Wrightstown, and land to the north is primarily used for agriculture. The base is bordered to the east, south, and west by the U.S. Army Fort Dix Military Reservation, which is used **for U.S. Army training. Four off-base areas also fall under the jurisdiction of McGuire AFB (McGuire**

Middle Marker, Boeing Michigan Aeronautical Research Center [BOMARC] Missile Facility, Burlington petroleum, oil, and lubricants [POL] off-loading facility, and McGuire AFB approach lights) but are not included under the McGuire AFB EPA ID number on the GPRA baseline list and will not be considered in this EI determination.

In 1937, a single dirt runway and several associated buildings were constructed on a portion of Fort Dix and adjacent farmland. The U.S. Army Air Corps operated the airfield (Rudd Field). Between 1940 and 1942, extensive improvements were made to meet World War II training needs, including paving and expanding landing strips. In 1948, the airfield and associated facilities were transferred to the U.S. Air Force, and the installation was designated McGuire AFB. A variety of commands oversaw the base from 1945 through 1954. In 1954, it was assigned for use by Air Force airlift-oriented operations and several tenant organizations, including the New Jersey Air National Guard. In 1992, the Air Mobility Command (AMC) became the base's parent command, and McGuire AFB eventually became AMC's East Coast mobility base, with the capability of providing quick, large-scale airlifts to place military forces into combat situations. In September 1994, the 305th Air Mobility Wing assumed operation of the base.

The central/southwest portion of the base contains an air field with active and inactive runs, taxiways, and parking aprons. The central-east portion of the base contains industrial areas used for maintenance, storage, and supply functions. Temporary and permanent housing are located along the perimeter of the base; miscellaneous administrative areas are located throughout the base. Four base elementary schools located in the residential area of the base provide schooling for approximately 1,060 students, and two on-base facilities provide day care services for about 355 young children. Aircraft fueling and maintenance have occurred primarily in a broad area in and near a series of industrial facilities bordering the east end of the runway area, as well as in the 3300-series buildings in the northwest corner of the base. Historically, bulk fuel storage has been located just to the east of the industrial area at a bermed tank farm with eight aboveground storage tanks containing aircraft fuel or heating oil.

In 1982, McGuire AFB began investigating areas of the base where hazardous materials might have been released to the environment through the U.S. Department of Defense (DOD) Installation Restoration Program (IRP). McGuire AFB investigations conducted under the IRP confirmed the presence of contamination in groundwater, soil, and surface water at the base. On October 22, 1999, the U.S. Environmental Protection Agency (EPA) placed McGuire AFB on the National Priorities List (NPL), primarily for contamination associated with several landfills used for base refuse. Since then, a total of 36 Environmental Restoration Program (ERP) sites (formerly known as IRP sites and/or areas of concern [AOCs]) have been identified on McGuire AFB and are being addressed through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. **A Preliminary Assessment (PA) Report was prepared in December 1996, followed by a Site Inspection (SI) Report in December 1998 for the 11 AOCs identified at the time.** Numerous investigations and studies have been conducted for the ERP sites on a site-specific basis, including Remedial Investigations/Feasibility Studies (RI/FSs), Focused Feasibility Studies and Treatability Studies (FFS/TS), and Long-Term Monitoring (LTM). A Basewide Background Study for McGuire AFB was submitted to **EPA and New Jersey Department of Environmental Protection (NJDEP)** in March 2002. The Agency for Toxic Substances and Disease Registry (ATSDR) prepared a Public Health Assessment (PHA) for McGuire AFB on September 17, 2002. An Environmental Baseline Survey for Housing Privatization was submitted in July 2004. McGuire AFB and the AMC are currently working with EPA and NJDEP to prioritize and implement planned investigations, including a base-wide ecological evaluation and an RI for LF-02, LF-03, and LF-04.

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from solid waste management units (SWMUs), regulated units (RUs), and areas of concern (AOCs)), been **considered** in this EI determination?

If yes - check here and continue with #2 below.

If no - re-evaluate existing data, or

If data are not available skip to #6 and enter IN (more information needed) status code

Summary of ERP Sites and AOCs:

Attachment 1 provides an overview of the 36 ERP sites, including site descriptions/comments, impacted media and contaminants of concern (COCs), and current status. It should be noted that sediment and surface water impacts to the on-site surface water bodies are discussed separately in Question 2. This information was excerpted from the Strategic Management Action Plan (SMAP and SMAP Fact Sheets (Refs. **2, 4**), with additional details obtained from other sources (Refs. 1, 5, 6). Currently, none of the ERP sites has an approved RI/FS or signed Record of Decision (ROD) for the selected final remedy, although SS-18 and SS-42 have been recommended for no further action designation. **Figure 1-1** from the February 2005 ERP Sites Summary Status Report provides a site map outlining the ERP sites.

Attachment 2 provides an overview of the 43 Environmental Compliance (EC) Sites/AOCs and eight Military Family Housing Sites, which are underground storage tank (UST) and spill sites managed in accordance with the New Jersey Administrative Code (N.J.A.C.) 7:14B-1.1 *et seq.* Most of these sites/AOCs have not been fully investigated yet, or they lack confirmation sampling to support site closure. Attachment 2 summarizes the associated building number, McGuire AFB tank ID, tank size, tank contents, and future investigation/remediation efforts for these tank and spill sites, as applicable. This information was extracted from the Environmental Compliance Cleanup Sites List (ECCSL) (Ref. **3**). The 43 EC Sites/AOCs were separated into three categories: completely addressed by ERP sites (14); partially addressed by ERP sites (five); and requires further action (24). If known or potential contamination from these EC Sites/AOCs has commingled with contamination from a nearby ERP site, McGuire has indicated that it will be addressed with the applicable ERP site; in five cases, the groundwater will be addressed by the ERP site, while soil investigations will be addressed under the EC Site/AOC (Ref. **3**). McGuire is seeking a no further action designation or case closure from NJDEP for 74 sites on the ECCSL, and these sites are not summarized in Attachment 2 because the ECCSL indicates that appropriate spill response/removal actions were performed or that no contamination was present above applicable NJDEP soil cleanup criteria (Ref. **3**).

References:

1. Public Health Assessment, McGuire Air Force Base #1. Prepared by the Agency for Toxic Substances and Disease Registry. Dated September 17, 2002.
2. McGuire Air Force Base Strategic Management Action Plan Fact Sheets. Prepared by McGuire Air Force Base. Dated January - March, 2003.
3. Environmental Compliance Cleanup Sites List. Prepared by Ellis Environmental Group, LC. Dated March 2005.

4. McGuire Air Force Base Strategic Management Action Plan. Prepared by McGuire Air Force Base. Dated April 2005.
5. Personal communication between **Michele Benschouk, Booz Allen Hamilton, and McGuire AFB personnel, during a file review dated April 7 and 8, 2005.**
6. McGuire AFB Response to Information Needs Related to Potential Exposure at McGuire Air Force Base (AFB) - CA725 Environmental Indicator (EI) Evaluation. Prepared by McGuire AFB. Dated July 14, 2005.

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be “**contaminated**”¹ above appropriately protective risk-based levels (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			Metals, Pesticides, SVOCs, TPH, VOCs
Air (indoors) ²		X		
Surface Soil (e.g., <2 ft)	X			Metals, Pesticides, SVOCs, TPH
Surface Water	X			Metals, Pesticides, SVOCs, VOCs
Sediment	X			Pesticides
Subsurface Soil (e.g., >2 ft)	X			Metals, Pesticides, SVOCs, TPH, VOCs
Air (Outdoor)		X		

_____ If no (for all media) - skip to #6, and enter YE, status code after providing or citing appropriate levels, and referencing sufficient supporting documentation demonstrating that these levels are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each contaminated medium, citing appropriate levels (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter IN status code.

Rationale:

Groundwater

Groundwater beneath McGuire AFB exists in two principal aquifer systems: shallow and deep. The 75-foot shallow aquifer system beneath the base consists of two connected layers, the Cohansey Sand/Kirkwood Formation and the Vincentown Formation. This aquifer system generally exists under unconfined conditions, and groundwater is first encountered between five to 15 feet below ground surface (bgs) across the base (**Ref. 2**). Regional groundwater flow is toward the east/southeast in the

¹ “Contamination” and “contaminated” describe media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Department of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

Vincentown Formation; thus, shallow groundwater from the base typically flows toward streams and drainage channels, as evidenced by the fact that groundwater discharge comprises about 90% of streamflow in this region (Ref. 11). A series of aquifers and confining layers separate the shallow aquifer system from the deeper aquifer system, which is made up of three hydrogeologically connected formations (Potomoc/Raritan/Magothy). These confining layers contain clay and range in thickness from 75 to 175 feet, thus effectively preventing shallow groundwater from reaching the deeper aquifer system. Water in the deep aquifer system is generally obtained under confined or artesian conditions from 500 to 1,000 feet bgs, and groundwater flow is toward the southeast (Ref. 5).

Shallow groundwater at McGuire AFB has been impacted by site-related activities, and contamination is expected to present a concern over most of the base but has not been delineated to date (Ref. 11). There is no internal or perimeter groundwater monitoring program in place. Groundwater investigations were performed on a site-wide basis in the 1996/1997 SI (Ref. 4), and in site-specific RIs that are summarized in the fact sheet for each ERP site in the SMAP maintained by McGuire AFB (Ref. 7). The most recent groundwater sampling results are also summarized by ERP site in the SMAP. In 1996, an LTM program was implemented at three site landfills (LF-19, LF-20, and LF-23) with low levels of metals, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs) detected in groundwater. According to McGuire officials, this LTM program was discontinued at EPA's direction after the December 2001 round (Ref. 11).

A table summarizing the maximum detected contaminant concentrations in groundwater was not prepared for several reasons. There is no site-wide groundwater monitoring program at McGuire AFB; thus, the most recent data are nearly ten years old for the majority of ERP sites that have not been investigated since 1996. Additionally, groundwater investigations have not yet been performed for most EC Sites/AOCs and Military Family Housing Sites for which they are indicated. Thus, it was determined that an incomplete and outdated table for such a large number of sites would not serve the purposes of this CA725 EI determination. Refer to Attachment 1 for a summary of the major COC classes that were detected above applicable New Jersey Ground Water Quality Criteria (NJ GWQC) by ERP site. While groundwater has not been investigated at most of the 51 EC Sites/AOCs and Military Family Housing Sites, sampling results from several EC Sites/AOCs indicate that VOCs and total petroleum hydrocarbons (TPH) are the primary COCs; contaminated groundwater has not been verified at any Military Family Housing Sites to date (Ref. 10).

Although the extent of groundwater contaminated by McGuire AFB activities has not been fully delineated, available shallow groundwater contour lines from 1995 indicate that shallow groundwater flows inward from most locations toward portions of South Run located at the center and east side of the base; refer to Figure 3-29 from the November 1995 Draft Well Evaluation Report for details. Thus, it does not appear likely that contaminated groundwater from most ERP sites or EC AOCs/SWMUs is migrating off site and posing concerns for direct contact for off-site construction workers and/or residents.

However, shallow groundwater from the northern section of the base around the 2800/2900 building series flows in a northerly direction and likely does not completely discharge to North Run before flowing off site. There are no ERP sites in this vicinity, but releases from five removed motor vehicle gasoline (MOGAS) USTs (E102 - 106) located at Facility 2913 (AAFES Gasoline Service Station) are of concern. Shallow groundwater occurs at a depth of approximately 7.5 and 13.3 feet bgs in this area, based on water level measurements from January 1998 (Ref. 1). Investigations revealed a plume consisting primarily of benzene, toluene, ethylbenzene, and xylene (BTEX) components and total volatile

hydrocarbons (TVHCs; hydrocarbons C4 through C9) and an estimated areal extent of 150 feet by 150 feet in 1998 (Ref. 2). The site is located approximately 300 feet south of the closest base boundary (Wrightstown-Cookstown Road North Gate #1), and the plume had not moved off site as of the January 1998 sampling event, as evidenced by non-detect concentrations for all VOCs in downgradient well U1PW4S located across Wrightstown-Cookstown Road (Ref. 2). The BIOSCREEN model, a fate and transport model developed by Air Force Center for Environmental Excellence [AFCEE] and distributed by EPA, was run for the BTEX constituents as described in the August 1998 Natural Attenuation Report (Ref. 3). The model was calibrated against available field-measured groundwater data and the calibrated results predicted that all constituents of the BTEX plume would migrate off site in the future except benzene (Ref. 3). Maximum concentrations of each constituent at the installation border were predicted and only xylenes (500 ppb) will exceed NJ GWQC (40 ppb), anticipated between 2013 and 2018 (Ref. 3). Thus, based on available information, it appears that site-related shallow groundwater contamination in this area is still maintained within site boundaries. However, this should be confirmed with future groundwater monitoring.

Air (Indoors)

No assessment of impacts to indoor air had been conducted at McGuire AFB prior to this EI determination. EPA's Office of Solid Waste and Emergency Response (OSWER) Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (EPA Guidance), dated November 2002 (Ref. 6), was used to screen ERP sites for potential vapor intrusion to indoor air. However, groundwater data within a lateral distance of 125 feet of occupied buildings was used instead of 100 feet, based on personal communication with EPA personnel (Ref. 12). Groundwater concentrations were not detected above EPA Target Indoor Air Concentrations for 1×10^{-5} risk within a lateral distance of 125 feet of occupied buildings at the ERP sites. A daycare center is located approximately 250 feet to the north of the Bulk Fuel Storage Area (ST-09), on the opposite side of a tributary to South Run. Although the distance exceeds 125 feet, this area was examined closely for potential indoor air impacts due to the sensitive population and significant groundwater impacts. A free-product layer of varying thickness has been formed underneath ST-09, and VOCs (benzene = 740 $\mu\text{g/l}$, toluene = 5,000 $\mu\text{g/l}$) have been detected in groundwater above EPA Target Indoor Air Concentrations for 1×10^{-5} risk (benzene = 14 $\mu\text{g/l}$, toluene = 1,500 $\mu\text{g/l}$) (Refs. 1, 8). However, contour lines for the shallow aquifer in **Figure 3-7** of the November 1997 Draft Final Focused Feasibility Study and Treatability Study shows that groundwater flowing through the Bulk Fuel Storage Area either discharges directly to the South Run tributary (small influence) or discharges to a larger branch of South Run further east (significant influence) (Ref. 1). Additionally, two wells located between the tributary to South Run and the daycare building (08-WL-55 and 08-WL-56) were sampled in September 1996. VOCs were non-detect in both wells, except for methylene chloride in 08-WL-55 (detected at an estimated concentration of 1 $\mu\text{g/L}$). Finally, a soil gas survey was conducted in July 1995 at 22 sample locations north of OT-09 and the tributary to South Run. BTEX and TVHCs were non-detect at all locations except one, where TVHCs were detected at a low concentration of 2 $\mu\text{g/L}$ (Ref. 1). Thus, migration of volatile constituents into indoor air at the McGuire AFB daycare center is not considered a concern based on available information.

However, the EPA Guidance is not recommended for use at UST sites (i.e., EC Sites/AOCs). Instead, the EPA guidance recommends the use of a risk-based decision making approach, as described in OSWER Directive 9610.17: Use of Risk-Based Decision Making in UST Corrective Action Program, to address this pathway. NJDEP does not provide guidance specifically applicable to indoor air screening for UST sites. Additionally, McGuire AFB data for the EC Sites/AOCs are presented primarily as TPH

concentrations in soil and/or groundwater, with VOC data available for most sites and limited SVOC/PAH data. The Oregon Department of Environmental Quality (DEQ) guidance, Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, dated September 22, 2003 (Ref. 8), was chosen to screen the EC Sites/AOCs because it contains risk-based concentrations (RBCs) for TPH in soil and groundwater for the vapor intrusion pathway for occupational and residential exposure, based on a generic tank product (e.g., gasoline, diesel/heating oil, and mineral/insulating oil). Oregon DEQ also has compound-specific RBCs for a variety of VOC/SVOC compounds in soil and groundwater for the vapor intrusion pathway for occupational and residential exposure. This approach is considered to be conservative because Oregon DEQ's RBCs were calculated assuming relatively fresh product (Ref. 8), and the majority of the EC AOCs/Sites were investigated approximately five to ten years ago or more.

The EC Sites/AOCs were screened for potential indoor air impacts by comparing available soil and/or groundwater data to the Oregon DEQ RBCs for TPH and specific VOCs, where available. If the site data exceeded one or more of these values, Booz Allen searched available file material for additional site information. If the sample location was found to be more than 125 lateral feet from a building, the site was not considered to be of concern, based on personal communication with EPA personnel (Ref. 12). The potential for vapor intrusion to indoor air, or a lack of sufficient information to make this determination, was identified at two ERP sites (ST-22 and SS-24) and four EC Sites/AOCs (Buildings 1701, 1933, 3002, and 3446). Specific questions regarding potential indoor air exposures (e.g., building use, construction, air exchange rates) at these areas were posed to McGuire AFB on June 1, 2005 (Ref. 13). The response provided by McGuire AFB on July 14, 2005, contained information indicating that such exposures were not a concern at ST-22, SS-24, or Building 1701, because active buildings were not present within 125 feet of identified contamination and/or recent soil gas sampling indicated no vapor intrusion impacts (Ref. 14). **Further information was provided on Building 1933 to indicate that vapor intrusion was not a concern at this site because all fuel spills were contained on concrete or asphalt and immediately cleaned up (Ref. 14).**

However, information provided by McGuire AFB for buildings 3002 and 3446 indicated that both were active buildings used for approximately eight hours per day, five days a week (Ref. 14). Benzene was detected in soil at 19 ppm within 125 feet of Building 3002, and benzene was detected in soil gas at up to 7,600 ppm approximately 100 feet from Building 3446 (Ref. 13). Therefore, EPA Region 2 performed subslab soil gas and indoor (ambient) air sampling at these two buildings between September 13 and 20, 2005 (Ref. 16). Four subslab soil gas samples and four ambient air samples were collected from Building 3002, and four subslab soil gas samples and five ambient air samples were collected from Building 3446 and analyzed by Modified Method TO-15 for VOCs (Ref. 16). The target constituent, benzene, was not detected above the reporting limit of 8 parts per billion by volume (ppbv) in subslab soil gas or indoor air at either building. By contrast, the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) for benzene is 1 ppm as an eight-hour time-weighted average (TWA), or 5 ppm averaged over any 15-minute period. Ethanol, trichlorofluoromethane, m&p-xylenes, and acetone were detected above the 8 ppbv detection limit at the two buildings, but at very low concentrations (i.e., orders of magnitude below the relevant OSHA PELs, with the exception of trichlorofluoromethane, which does not have a PEL). Thus, indoor air is not known or reasonably suspected to be contaminated above appropriate risk-based levels on the McGuire AFB site.

Although information regarding distance to off-site buildings along Wrightstown-Cookstown Road is not available, potential indoor air impacts from UST Site 2913 (discussed above in response to Question 2, groundwater) were assessed. As a conservative indoor air screen, it was assumed that residential buildings were located within 125 feet of the McGuire AFB border in the downgradient (i.e., north)

direction from UST Site 2913. The BIOSCREEN-predicted maximum toluene, ethylbenzene, and xylenes concentrations in shallow groundwater at the site border were compared with EPA Target Indoor Air Concentrations for 1×10^{-5} risk, although these concentrations are not predicted to occur until 2013, 2018, and 2023 at the earliest for xylenes, ethylbenzene, and toluene, respectively. None of these concentrations exceeded the EPA Target Indoor Air Concentrations for 1×10^{-5} risk; thus, indoor air impacts to off-site residences are not expected under current site conditions.

Surface/Subsurface Soil

Surface soil (less than 2 feet bgs) and subsurface soil (more than 2 feet bgs) have been impacted at the ERP sites and EC Sites/AOCs **by metals, pesticides, SVOCs, and TPH above** the New Jersey Non Residential Direct Contact Soil Cleanup Criteria (NJ NRDCSCC). Subsurface soil has also been impacted by VOCs at EC Sites/AOCs. Only those contaminants exceeding the NJ NRDCSCC are of concern for most ERP sites and EC Sites/AOCs because these sites are located in industrial (i.e., nonresidential) sections of the base. Subsurface soil has been impacted with TPH above the NJDEP limit of 10,000 milligrams per kilogram (mg/kg) at one Military Family Housing Site.

A table summarizing the maximum detected contaminant concentrations in soil was also not prepared, due primarily to the large number of sites. Refer to Attachment 1 for a summary of the major COC classes that were detected in surface and subsurface soil above applicable NJ NRDCSCC or NJ RDCSCC by ERP site. In some cases, available information did not specify whether samples were obtained from surface or subsurface soil; these contaminants are simply designated as “soil” impacts.

It should also be noted that lead (estimated value of 3,818 mg/kg) was detected above the **NJ RDCSCC (400 mg/kg)** in surface soil at housing Building 2837 during a **December 2002 sampling event in support of the** Environmental Baseline Survey at Military Family Housing units (**Ref. 9**). The lead source was identified as lead-based paint (**Ref. 9**), which is regulated under the Toxic Substances Control Act (TSCA). While the lead in surface soil does pose a public health concern, particularly for direct exposure for children, McGuire AFB plans to complete sampling and characterization of this site during October 2005 (**Ref. 15**). The analytical data should be available during November 2005, with the final report to follow in December 2005; any required remediation will be scheduled accordingly (**Ref. 15**). During the Environmental Baseline Survey, pesticides were also detected in surface soil above applicable NJ RDCSCC **at multiple residential sampling locations. The source of pesticides was identified as pesticide applications to the housing areas on an as-needed basis (Ref. 9)**. As such, the pesticides were applied as directed in this area and are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); associated soil remediation does not appear to be required. Thus, these lead and pesticide exceedances do not reflect releases from RCRA units and will not be considered further in this EI determination.

Surface Water/Sediment

McGuire AFB is located within the Pinelands National Reserve, which is subject to oversight by the New Jersey Pinelands Commission. The base is drained by overland flow to a series of on-site streams, including North Run, South Run, Jack’s Run, and Larkin’s Run (see **Figure 1-1** from the February 2005 ERP Sites Summary Status Report). North Run is a shallow, narrow stream that flows east along the northern boundary of the base, downgradient of LF-03, LF-04, and ST-07. Previous investigations suggest that metals and VOCs from these three ERP sites have entered the shallow groundwater beneath the site and are discharging into North Run; additionally, seeps (pools) of reddish-brown leachate have

formed downgradient of LF-03 and ST-07 (Ref. 5). A trailer park currently used for base housing is located on the north side of North Run, a larger base housing area is located about a half mile to the northeast, and a school is located about one to two miles away. South Run is a shallow stream that flows east through the southeastern portion of the base, passing through or adjacent to **multiple ERP sites (including SS-36, SS-18, SS-37, SS-42, ST-09, SS-26, SS-35, LF-19, and LF-20)** before exiting the base at its **southeastern boundary**. Additional ERP sites are located adjacent to tributaries that feed into South Run before it exits the base, including FT-13, AT-28, SS-32, SS-41, LF-02, and WP-21. Small areas of the base also drain into Jack's Run (i.e., ERP sites OT-14 and AT-29) and Larkin's Run, which exit the base **near the southern border**.

Surface water and sediment sampling was conducted at multiple locations along North Run, South Run, and tributaries to South Run during 1991/1992 field activities and as part of the 1996/1997 SI, including one surface water and sediment sample where North Run and South Run exit the base property. The North Run seeps were sampled again in 2000 and 2001 for all constituents except metals, and no constituents were detected above applicable NJ SWQC in 2001 (Ref. 5). The most recent analytical results for surface water in North Run, South Run, and the South Run tributaries are presented in Table 1. Results from the 1996/1997 sediment sampling round did not detect any constituents above applicable NJ RDCSCC and/or NRDCSCC in sediment at North Run or South Run. Analytical results for sediment in the South Run tributaries are presented in Table 2; these results were compared to NJ NRDCSCC because the South Run tributary samples were collected in industrial (non-residential) areas of the base.

More limited surface water and sediment sampling was also conducted at Jack's Run and Larkin's Run where each stream crosses the southern base boundary during the **1996/1997 SI**. Several metals and bis(2-ethylhexyl)phthalate were detected in surface water above applicable NJ SWQC. Metals were detected in sediment at both streams, but below applicable **NJ RDCSCC/NRDCSCC**.

Table 1: Maximum Contaminant Concentrations in Surface Water in ppb

Contaminant	NJ SWQC	North Run		South Run		South Run Tributaries	
		Max. Conc.	Location	Max. Conc.	Location	Max. Conc.	Location
Benzene	0.15	ND		0.7	ST-09	120	ST-22 storm line
Trichloroethylene	1.09	ND		ND		5	ST-09
Arsenic	0.014	96.4	LF-03/ST-07	ND		4.5 B	ST-09
Chromium	160	478	LF-03/ST-07	ND		17.6	ST-09
Lead	5	327	LF-03/ST-07	ND		13 S	ST-09
bis(2-Ethylhexyl)phthalate	1.76	ND		7,000 J	LF-02	ND	ST-09
Chlordane alpha	0.000277	ND		ND		0.74	ST-09
Chlordane gamma	0.000277	ND		ND		0.33 J	OT-06 ditch
Dieldrin	0.000135	ND		ND		0.47 J	OT-06 ditch
DDD	0.000832	ND		ND		8.5	OT-06 ditch
DDE	0.000588	ND		ND		1.2	OT-06 ditch
DDT	0.000588	ND		ND		8.4	OT-06 ditch

B - trace concentrations of the constituent were present in the associated blank

J - reported value is estimated

S - reported value was determined by the Method of Standard Addition

Bolded values exceed applicable **NJ SWQC for** FW2 waters

**Table 2: Maximum Contaminant Concentrations in Sediment
in South Run Tributaries in parts per million (ppm)**

Contaminant	NJ NRDCSCC	Maximum Concentration	Location
Dieldrin	0.18	1.32	OT-06 ditch
DDE	9	31	OT-06 ditch
DDT	9	13	OT-06 ditch

Air (Outdoors)

No assessment of impacts to outdoor air has been conducted at McGuire AFB. However, limited migration of contaminants bound to airborne particulate matter is expected at this site based on the amount of surface cover in the industrial areas (e.g., runways, buildings, and parking lots) and pattern of contamination. VOCs were not detected above NJ NRDCSCC in surface soil, and detections of SVOCs were limited in surface and subsurface soil. In addition, volatile emissions of detected VOCs from groundwater to outdoor air are not expected to be of concern due to the natural dispersion of these contaminants once they reach the surface. Thus, the migration of particulates entrained on dust and/or volatile emissions is not expected to represent a complete exposure pathway at the McGuire AFB site.

References:

1. Draft Final Focused Feasibility Studies and Treatability Studies at Five Sites, Volume 1 of 2. Prepared by URS Greiner, Inc. and Louis Berger & Associates, Inc. Dated November 1997.
2. Draft Final Long Term Monitoring Report, Phase 1, Round 1, McGuire Air Force Base. Prepared by EA Engineering, Science, and Technology. Dated March 1998.
3. Natural Attenuation Report, Former UST Sites. Prepared by Tetra Tech, Inc. Dated August 1998.
4. Final Site Inspection (SI) Report for McGuire Air Force Base. Prepared by EA Engineering, Science, and Technology. Dated December 1998.
5. Public Health Assessment, McGuire Air Force Base #1. Prepared by the Agency for Toxic Substances and Disease Registry. Dated September 17, 2002.
6. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). Prepared by EPA. Dated November 2002.
7. McGuire Air Force Base Strategic Management Action Plan Fact Sheets. Prepared by McGuire Air Force Base. Dated January - March, 2003.
8. Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites. Prepared by the State of Oregon Department of Environmental Quality. Dated September 22, 2003.
9. Environmental Baseline Survey for Housing Privatization at McGuire Air Force Base, New Jersey. Prepared by Parsons. Dated July 2004.
10. Environmental Compliance Cleanup Sites List. Prepared by Ellis Environmental Group, LC. Dated March 2005.
11. **Personal communication between Michele Benchouk, Booz Allen Hamilton, and McGuire AFB personnel, during a file review dated April 7 and 8, 2005.**
12. **Personal communication between Amy Brezin, Booz Allen Hamilton, and Henry Schuver, EPA Headquarters. Dated May 23, 2005.**
13. Information Needs Related to Potential Exposure at McGuire Air Force Base (AFB) CA725 Environmental Indicator (EI) Evaluation. Prepared by Booz Allen Hamilton. Dated June 1, 2005.

14. McGuire AFB Response to Information Needs Related to Potential Exposure at McGuire AFB CA725 EI Evaluation. Prepared by McGuire AFB. Dated July 14, 2005.
15. E-mail from Leo Hamersky, McGuire Air Force Base, to Alan Straus, EPA Region 2, re: EI Information Needs – CA725 EI (Housing Unit 2837). Dated September 2, 2005.
16. E-mail from Mark Anthony Denno, EPA Region 2, to Alan Straus, EPA Region 2, re: McGuire Sample Results. Dated September 23, 2005.

3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table
*Potential **Human Receptors** (Under Current Conditions)*

“Contaminated” Media	Residents	Workers	Day-Care	Construction	Trespasser	Recreation	Food ³
Groundwater	No	No	No	Yes	–	–	No
Air (indoor)	No	No	No	–	–	–	–
Surface Soil (e.g. < 2 ft)	No	Yes	No	Yes	Yes	No	No
Surface Water	Yes	Yes	–	Yes	Yes	No	No
Sediment	No	No	–	Yes	No	No	No
Subsurface Soil (e.g., > 2 ft)	–	–	–	Yes	–	–	No
Air (outdoors)						–	–

Instruction for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated” as identified in #2 above.
2. Enter “yes” or “no” for potential “completeness” under each “Contaminated”Media — Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces. These spaces instead have dashes (“--”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter “YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code

Rationale:

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish)

For the purposes of this EI determination, on-site residents are defined as those residents living in base housing within McGuire AFB property. By contrast, trespassers are defined as potential receptors who can enter McGuire AFB property (inside or outside the fence line) from surrounding locations. Food was not designated a potentially complete pathway for any media because it was considered unlikely that on-site residents would grow gardens on an active military base, particularly in light of the digging restrictions (Ref. 6).

Groundwater

As discussed in response to Question 2, base activities have impacted the shallow aquifer system, but the presence of a thick confining layer effectively prevents migration to the deeper aquifer. The water supply for McGuire AFB and on-base housing is drawn from deep aquifer wells screened in the Potomac/Raritan/Magothy aquifer system (about 1,000 feet bgs); Wrightstown also derives its water supply from wells screened in this system (Ref. 2). Water from four on-base deep aquifer wells is chlorinated, aerated, filtered, and fluoridated before entering the distribution system, at which point water from the four wells is mixed before delivery to base users (Ref. 4). NJDEP requires monitoring of untreated drinking water for VOCs, SVOCs, and secondary contaminants every three years, and these test results have indicated that the base water supply meets safe drinking water standards (Ref. 4). A well search conducted in 1996 using NJDEP well records identified three additional active water supply wells of 100,000 gallons per day or more within a one-mile radius of McGuire AFB, and 45 domestic wells within a one-mile radius of the base (Ref. 4). Five domestic wells, located to the north and west of McGuire AFB in Wrightstown, had listed depths that were shallow enough (i.e., depths of less than 100 feet bgs) to possibly draw from the **Vincentown** formation (Ref. 2). However, these wells are located in an upgradient direction relative to the base; thus, shallow groundwater from the base is unlikely to affect those wells (Refs. 2, 4). Because shallow groundwater is not used for potable purposes at the site or in the surrounding area downgradient of the base, exposure to contaminated groundwater associated with the site via ingestion is not a concern for any receptor at this time.

Given that shallow groundwater can be encountered at depths less than ten feet bgs, there is potential for on-site remedial workers (considered to be construction workers for the purposes of this EI determination) to come into contact with contaminated groundwater during sampling and excavation/remedial activities. Thus, direct contact with shallow groundwater is being considered a potentially complete exposure pathway for an on-site remedial worker.

As discussed in response to Question 2, available information indicates that site-related shallow groundwater contamination from UST Site 2913 is still maintained within site boundaries. Thus, direct exposures to contaminated shallow groundwater in the downgradient, off-site area do not pose a direct contact concern for off-site construction workers. However, it is recommended that McGuire AFB continue to monitor the VOC plume and take appropriate measures to prevent future off-site receptor exposure to contaminated shallow groundwater, either through direct contact or via the vapor intrusion pathway to indoor air (if occupied buildings are located in this area).

Surface/Subsurface Soil

As presented in response to Question 2, metals, pesticides, SVOCs, TPH, and VOCs were detected in surface and subsurface soil above NJ NRDCSCC. The surface of the base is mostly covered with mowed grass, runways, buildings, parking aprons for aircraft, parking lots, and moderate vegetation, except for the areas adjacent to active runways (Ref. 5). ATSDR did not consider direct contact with

on-site contaminated surface soil to be a complete exposure pathway for any receptors in the PHA dated September 17, 2002, and stated that surface soil contamination poses no apparent public health hazard (Ref. 4). However, for the purposes of this EI determination, potentially complete exposure pathways for surface soil impacts will be examined and discussed in response to subsequent questions, as appropriate.

On-site workers have access to restricted areas on the base, and thus could potentially come into direct contact with contaminated surface soil. Additionally, because investigative and remedial activities are ongoing, direct contact with on-site contaminated surface and subsurface soil is being considered a potentially complete exposure pathway for on-site remedial workers (i.e., construction workers) at this time.

As discussed in response to Question 2, TPH (28,984 mg/kg) was detected in subsurface soil at housing Building 2733 above NJDEP soil cleanup criterion of 10,000 mg/kg. However, this is not of concern for direct contact exposure for residents because the TPH contamination is located in the subsurface. Residents cannot access the contamination through recreational activities and would not be allowed to perform intrusive excavation near their heating oil tank by base regulations on digging permits (Ref. 6).

McGuire AFB is sufficiently secured to protect other receptors (e.g., trespassers, recreators) from exposure to surface soil contamination in on-site areas. The base is completely surrounded by a fence, with the exception of a small area containing ERP sites LF-03, LF-04, and ST-07, and proper DOD identification is required in order to gain base access (Ref. 6). Additionally, McGuire AFB is patrolled by the base Security Forces on a regular basis (Ref. 6). Thus, all areas inside the base fenceline are restricted and not accessible to the general public (Ref. 6). Although residences and day care facilities are present within the base, these receptors are not located in areas with surface soil contamination, with the exception of the non-RCRA regulated lead and pesticide contamination discussed in response to Question 2. Additionally, these receptors would be prevented from accessing the industrial areas of the base by the fact that such areas are restricted to authorized base personnel, with some areas surrounded by fencing (e.g., LF-20, ST-09, and other industrial areas) (Ref. 6).

ERP site LF-03 is located along the northwest boundary of the base, outside of the McGuire AFB fenceline and adjacent to Wrightstown-Cookstown Road. The results of composite surface soil sampling conducted at LF-03 in 1991/1992 indicated relatively low levels of benzo(a)pyrene (1.7 mg/kg; NJ RDCSCC/NRDCSCC = 0.66 mg/kg) and dieldrin (0.059 mg/kg; NJ RDCSCC = 0.042 mg/kg, NJ NRDCSCC = 0.18 mg/kg). Contact with contaminated surface soil at LF-03 is being considered a potentially complete exposure pathway for an on-site worker and trespasser.

Surface Water/Sediment

As discussed in response to Question 2, the following constituents were detected in surface water above NJ SWQC: metals in North Run; SVOCs and VOCs in South Run; metals, pesticides, SVOCs, and VOCs in South Run tributaries; and metals and SVOCs in Jack's Run/Larkin's Run. Pesticides were also detected above NJ NRDCSCC in sediment in the OT-06 ditch (South Run tributary). The on-site and adjacent off-site areas of the streams are not used for drinking water intake, and are not known to be used for recreation (Refs. 3, 4). East of the base, North Run and South Run both drain into Crosswicks Creek, which eventually empties into the Delaware River. Approximately two to three miles south of the base's southern boundary, the Jack's Run and Larkin's Run streams lead into Little Pine Lake, which feeds into Mirror Lake. Both lakes are used for recreation and located in the community of Brown Mills. Eventually, the streams meet the Roncocas Creek before it drains into the Delaware River.

With the exception of metals in North Run surface water, all surface water and sediment exceedances were detected within base boundaries. Furthermore, surface water/sediment samples did not show exceedances for North Run or South Run where the streams exit the base, indicating that off-site exposure to contaminated surface water/sediment is not expected to be a potentially complete exposure pathway downgradient of the base. **As discussed in response to Question 2, several metals and bis(2-ethylhexyl)phthalate were detected in Larkins' Run/Jack's Run surface water above applicable NJ SWQC where the streams exit the base. However, these exceedances were relatively low and were all below corresponding ATSDR Cancer Risk Evaluation Guide (CREG) values (Ref. 4). ATSDR further indicated that the area immediately south of the base, where these streams exit, is not known to be used for drinking water or widely used for recreation (Ref. 4); thus, exposure to contaminated surface water from Larkin's Run and Jack's Run is not being considered a potentially complete exposure pathway for on-base or off-base receptors.** As mentioned above, metals were detected in North Run seeps downgradient of LF-03/ST-07 and outside of the base perimeter fence, although still on McGuire AFB property. Children from the school located adjacent to North Run are not allowed to approach the stream (Ref. 4). However, exposure to contaminated surface water in North Run is being considered a potentially complete exposure pathway for residents, base workers, and trespassers.

Although surface water and sediment contamination was detected in South Run, the creek and its tributaries run through industrial areas of the base; thus, only on-site workers are potential receptors. According to McGuire AFB, it is likely that South Run is rarely accessed by any receptors on base (Ref. 6). The creek is channeled into culverts along portions of its length, is not easily accessible aboveground due to steep banks, and access is impeded further in some areas by heavy scrub vegetation (Ref. 6). Thus, direct contact by base workers to contaminated on-site surface water and sediment in South Run and its tributaries is not being considered a potentially complete exposure pathway at this time.

Further investigation of on-site streams is planned as part of a base-wide ecological evaluation; thus, the potential for on-site remedial workers (i.e., construction workers) to come in direct contact with contaminated surface water/sediment is being considered a potentially complete exposure pathway at this time.

References:

1. Final Remediation and Remedial Alternative Analysis for Former Underground Storage Tank Sites, Volume I. Prepared by Tetra Tech, Inc. Dated August 1998.
2. Draft Final Remedial Investigation Report, Pesticide Wash Area (OT-06). Prepared by EA Engineering, Science and Technology. Dated **October 1998**.
3. Final Work Plan: Basewide Background Study and Ecological Assessment for McGuire Air Force Base. **Prepared by URS Greiner Woodward-Clyde. Dated September 1999.**
4. Public Health Assessment, McGuire Air Force Base #1. Prepared by the Agency for Toxic Substances and Disease Registry. Dated September 17, 2002.
5. Personal communication between Alan Straus, EPA Region 2, and Amy Brezin, Booz Allen Hamilton, dated March 4, 2005.
6. McGuire AFB Response to Information Needs Related to Potential Exposure at McGuire Air Force Base (AFB) - CA725 Environmental Indicator (EI) Evaluation. Prepared by McGuire AFB. Dated July 14, 2005.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **significant**⁴ (i.e., potentially “unacceptable”) because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks?

 X If no (exposures cannot be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

_____ If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

_____ If unknown (for any complete pathway) - skip to #6 and enter “IN” status code.

Rationale:

Groundwater

As discussed in response to Question 3, the potential for on-site remedial workers to come into direct contact with contaminated shallow groundwater is being considered a potentially complete exposure pathway at this time. However, any exposures that may occur are not expected to be significant. Remedial workers are assumed to wear personal protective equipment (PPE) and adhere to strict Occupational Safety and Health Administration (OSHA) guidelines to minimize exposure to contamination per the site- or contract-specific Health and Safety Plan required by McGuire AFB (Ref. 2). Thus, direct exposures to on-site contaminated groundwater for construction (e.g., remedial) workers conducting remedial activities are not expected to pose a significant risk

Surface/Subsurface Soil

McGuire AFB indicated that they are unaware of any instances where base personnel (i.e., on-site workers) have had prolonged contact with surface soil in industrial areas (Ref. 2).

As discussed in response to Question 3, the potential for trespassers to come in direct contact with contaminated surface soil at LF-03 is being considered a potentially complete exposure pathway at this time. However, exposure to surface soil at this site is limited because LF-03 is overgrown with vegetation (Ref. 1), and the majority of the site is wooded and unpopulated; McGuire AFB maintains that contact with these sites is unlikely (Ref. 2). Additionally, ATSDR analyzed potential trespasser exposures at this

⁴ If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a Human Health Risk Assessment specialist with appropriate education, training, and experience.

site in the 2001 PHA and noted that there was no evidence suggesting that people routinely engaged in disturbances of the surface soil at this area (Ref. 1). Furthermore, ATSDR concluded that any infrequent and brief contact with contaminants at the levels found at LF-03 (see the response to Question 3) would not pose a public health hazard (Ref. 1). Thus, potential direct exposures to contaminated surface soil at LF-03 are not expected to pose a significant risk to trespassers.

As discussed in response to Question 3, the potential for on-site remedial workers to come in direct contact with contaminated surface/subsurface soil is being considered a potentially complete exposure pathway at this time. However, any exposures that may occur are not expected to be significant because remedial workers are assumed to wear PPE and adhere to strict OSHA guidelines to minimize exposure to contamination, per the site- or contract-specific Health and Safety Plan required by McGuire AFB (Ref. 2). Thus, direct exposures to on-site contaminated surface/subsurface soil for construction (e.g., remedial) workers conducting remedial activities are not expected to pose a significant risk.

Surface Water/Sediment

As mentioned in response to Question 3, exposure to contaminated North Run surface water is being considered a potentially complete exposure pathway for residents, base workers, and trespassers. However, ATSDR analyzed possible exposure to North Run surface water contamination in the 2001 PHA and concluded that contact with the surface water does not pose an apparent public health hazard, based on the fact that direct contact is expected to be infrequent and of brief duration (Ref. 1). Additionally, metals found in surface water are not absorbed thoroughly into the skin, so only small amounts (if any) could enter the body through skin contact (Ref. 1). ATSDR considered the hypothetical situation of a child wading daily in North Run for several months (i.e., during warm weather seasons), and determined that harmful effects still would not develop (Ref. 1). As a precautionary measure, ATSDR recommended that McGuire AFB post warning signs near North Run seeps to keep potential receptors away. The Air Force posted signs at all access paths within 15 feet of the leachate outfall at North Run that alert visitors to “Keep Out Unsafe Water” (Ref. 1); **see attached photo taken on March 1, 2005.** Thus, direct exposure of residents, base workers, or trespassers to contaminated surface water is not expected to pose a significant risk.

As discussed in response to Question 3, the potential for on-site remedial workers to come in direct contact with contaminated surface water/sediment is being considered a potentially complete exposure pathway at this time. However, any exposures that may occur are not expected to be significant because remedial workers are assumed to wear PPE and adhere to strict OSHA guidelines to minimize exposure to contamination, per the site- or contract-specific Health and Safety Plan required by McGuire AFB (Ref. 2). Thus, direct exposures to on-site contaminated surface water for construction (e.g., remedial) workers conducting remedial activities are not expected to pose a significant risk.

References:

1. Public Health Assessment, McGuire Air Force Base #1. Prepared by the Agency for Toxic Substances and Disease Registry. Dated September 17, 2002.
2. McGuire AFB Response to Information Needs Related to Potential Exposure at McGuire Air Force Base (AFB) - CA725 Environmental Indicator (EI) Evaluation. Prepared by McGuire AFB. Dated July 14, 2005.

5. Can the “significant” **exposures** (identified in #4) be shown to be within acceptable limits?
- _____ If yes (all “significant” exposures have been shown to be within acceptable limits) - continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
 - _____ If no (there are current exposures that can be reasonably expected to be “unacceptable”) - continue and enter “NO” status code after providing a description of each potentially “unacceptable” exposure.
 - _____ If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code.

This question is not applicable. See the response to Question 4.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the McGuire Air Force Base site, EPA ID# NJ0570024018, located at Wrightstown-Cookstown Road in Wrightstown, Burlington Country, New Jersey, under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

NO - "Current Human Exposures" are NOT "Under Control."

IN - More information is needed to make a determination.

Completed by: _____ Date: _____
Amy Brezin
Environmental Consultant
Booz Allen Hamilton

Reviewed by: _____ Date: _____
Kristin McKenney
Risk Assessor
Booz Allen Hamilton

Also Reviewed by: _____ Date: _____
Alan Straus, RPM
RCRA Programs Branch
EPA Region 2

Barry Tornick, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: Original signed by: _____ Date: September 28, 2005
Adolph Everett, Chief
RCRA Programs Branch
EPA Region 2

Locations where references may be found:

References reviewed to prepare this EI determination are identified after each response. Reference materials are available at the EPA Region 2, RCRA Records Center, located at 290 Broadway, 15th Floor, New York, New York, and the New Jersey Department of Environmental Protection Office located at 401 East State Street, Records Center, 6th Floor, Trenton, New Jersey.

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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

Attachments

The following attachments have been provided to support this EI determination.

- ▶ Attachment 1 – Summary of ERP Site Status

- ▶ Attachment 2 – Summary of Environmental Compliance Sites and Military Family Housing Sites Status

**Attachment 1 - Summary of ERP Site Status
McGuire Air Force Base**

Sites	Description/Comments	Media and COCs	Status
LF-02: Landfill No. 4	LF-02 was active from 1958 to the early 1970s. This 18-acre, relatively flat landfill is at the eastern property boundary of the base and adjacent to a tributary of South Run. The main branch of South Run is about 300 feet downgradient of the landfill. LF-02 is also adjacent to the former Waste Water Treatment Plant. The landfill operated by excavating trenches to the water table, a depth of about 15 feet. General base refuse, coal ash, and miscellaneous industrial chemicals (possibly in 55-gallon drums) were placed in the trenches and covered with sandy soil to grade.	<u>Groundwater:</u> Metals, VOCs <u>Surface Soil:</u> Metals, pesticides	Additional RI and an FS are required, and the RI work plan was being developed in April 2005 (in conjunction with WP-21). A reasonable worst-case scenario remedial alternative will likely consist of partial source removal of hot spots, a landfill cap to prevent infiltration of water into waste material, a subsurface containment wall to prevent groundwater from discharging into North Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
LF-03: Landfill No. 2	LF-03 was active from 1950 until 1956 and possibly into the 1960s. The 12.7-acre landfill is relatively flat and bordered on the north by a steep bank dropping to North Run and on the south by Wrightstown-Cookstown Road. The southeastern toe of the landfill extends beneath ST-07, although its exact extent is unknown. Base-generated wastes, possibly including drums of waste oil and miscellaneous industrial chemicals, were placed in the approximately 20-foot deep trenches. Daily burning was conducted to reduce the volume of waste. Subsequent to EPA inspections in 1974 and 1975, all exposed waste material was removed and the landfill leveled with a cover of sandy soil. An estimated 200,000 cubic yards of material are buried at the site. The site is currently overgrown with vegetation.	<u>Groundwater:</u> VOCs, metals <u>Surface Soil:</u> Pesticides, SVOCs	Additional RI and an FS are required, and the RI work plan was being developed in April 2005. A geophysical survey was planned for this location. A reasonable worst-case scenario remedial alternative for LF-03 (and ST-07) will likely consist of partial source removal of hot spots, a landfill cap to prevent infiltration of water into waste material, a subsurface containment wall to prevent groundwater from discharging into North Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
LF-04: Landfill No. 3	LF-04 was active between 1956 and 1957. The 2.5-acre site abuts the north boundary of the base and is bounded by the base trailer park to the east, North Run to the south, and bisected by the Defense Access Highway, which was built over sections of the landfill. The downgradient south toe of LF-04 is about 100 ft from North Run. General refuse, including drums of unknown chemicals, scrap materials, and coal ash were buried in 18 to 20 foot deep excavations. The excavations extended to the water table. LF-04 extends across both sides of the highway and is covered with sandy soils that currently supports vegetation and trees. Groundwater beneath the site flows south toward North Run. There is at least one groundwater seep on the north side and one on the south side of North Run.	<u>Groundwater:</u> VOCs	Additional soil, groundwater, sediment, and surface water RI, followed by an FS, is required for the site. The RI work plan was under review in April 2005, and a geophysical survey was planned for this location. A reasonable worst-case scenario remedial alternative for LF-04 will likely consist of partial source removal of hot spots, a landfill cap to prevent infiltration of water into waste material, a subsurface containment wall to prevent groundwater from discharging into North Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
OT-06: Pesticide Wash Area	Since 1974, OT-06 has operated as a pesticide wash area (Entomology Shop - Building 3450). Past practices included washing and rinsing pesticide application equipment on a paved wash area and allowing the rinse water to run down a steep grassy slope into a drainage channel that is a tributary of South Run. The channel drains to the south-southeast toward a culvert that extends underneath Broidy Road and ultimately discharges into South Run. The exposed portion of the channel adjacent to the site is about 950 ft long and the slopes of the channel are vegetated with short grasses. Standing or flowing water has usually been observed in the channel. Based on the limited available data, the base of the drainage channel intersects the water table and acts as a groundwater discharge area. In 1994, the upper two feet of soil and sediment was excavated from the sides and bottom of the channel, and about 2,000 tons of material was removed and disposed. The channel was backfilled immediately after collection of the post-excavation samples. Concentrations of dieldrin and DDD were detected in sediment above NJ NRDCSCC in post excavation samples. Pesticides were detected in surface water above NJ SWQC in 1997.	None detected	Additional RI work is required to find the source of pesticide contamination and an FS is required to select a remedy. A reasonable worst-case scenario remedial alternative for OT-06 will likely consist of source removal of contaminated soil, a subsurface containment wall to prevent groundwater from discharging into South Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.

Sites	Description/Comments	Media and COCs	Status
<p>ST-07: DRMO Storage Facility</p>	<p>ST-07 is a flat, four-acre site in the northwestern portion of the base that is bounded by Wrightstown-Cookstown Road to the south and LF-03 to the northwest. Immediately north is a steep vegetated bank dropping to North Run. All facilities and equipment have been removed. The site began as the Defense Property Disposal Office (DPDO) in 1960 and was used to store, repair, and sell surplus equipment such as vehicles, appliances and furniture. ST-07 was also used to transfer and dispose of used petroleum products and hazardous wastes generated by the base, and occasionally Fort Dix. An open, unpaved area located in the northwest area was used to store drums containing chemical and petroleum product wastes, some of which were reported to leak. Out-of-service transformers, possibly containing PCBs, were also stored and reported to leak. Bulk liquid wastes (waste oils, fuels, solvents, and hydraulic fluids) were stored in a 10,000-gallon UST formerly located in the northeastern corner of the yard. The UST was taken out of service in 1979, and it was removed and taken off site for proper disposal in 1994. Two hundred tons of contaminated soil were removed; however, contaminated soil was left in the excavation, which is commingled with soil contamination potentially associated with LF-03. In 1999, more than 1,660 tons of hazardous soil (PCB concentrations greater than 50 mg/kg) and more than 9,500 tons of nonhazardous soil (PCB concentrations between 0.49 mg/kg and 50 mg/kg) were excavated and properly disposed of at off-site facilities. The excavated areas were graded with clean fill and seeded. The site is currently unfenced and overgrown with vegetation.</p>	<p>Groundwater: Pesticides, VOCs</p> <p>Subsurface Soil: TPH</p>	<p>Additional RI and an FS are required. A reasonable worst-case scenario remedial alternative for ST-07 (and LF-03) will likely consist of partial source removal of hot spots, a landfill cap to prevent infiltration of water into waste material, a subsurface containment wall to prevent groundwater from discharging into North Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.</p>
<p>FT-08: Fire Protection Training Area 1</p>	<p>FT-08 is located in the northern portion of the runway triangle, about 200 feet south of an active runway and approximately 500 feet north of a South Run tributary. FT-08 encompasses a flat, open area of about three acres within the grassy fields of the triangle. FT-08 was used from the late 1940s to 1958. Various types of combustible waste chemicals generated at the base (e.g., waste oils, aviation gasoline [AVGAS], jet fuel, hydraulic fluid, spent solvent, and alcohol) were stored and burned there during fire department training exercises. Reportedly, combustible materials were transported to the site in 55-gallon drums and temporarily stored in the same drums. Extinguishing agents used at the site included carbon dioxide, protein foam, and water. No precautions were taken to prevent or retard the percolation of waste chemicals into the soil at the burn or storage areas.</p>	<p>Groundwater: Metals</p> <p>Soil: Metals, Pesticides</p>	<p>Additional RI work may be required to address pesticide issues, and an FS will be required to select a remedy for the site. A reasonable worst-case scenario remedial alternative for FT-08 will likely consist of removal of soil above NJDEP action levels, a subsurface containment wall to prevent groundwater from discharging into South Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.</p>

Sites	Description/Comments	Media and COCs	Status
ST-09: Bulk Fuel Storage Area	ST-09 is a 14-acre fuel storage facility operating since 1963 and located in the central portion of the base near a tributary of South Run. ST-09 consists of five aboveground storage tanks (ASTs) containing jet propulsion (JP)-8 and three ASTs containing heating oil , with capacities that range from about 500,000 to 850,000 gallons. Fuels previously stored included AVGAS and JP-4. Earthen berms were removed beginning about 1996 and replaced with a concrete secondary containment system. Fuels are delivered to aircraft by underground hydrant systems or fuel trucks. ST-09 is a controlled access area and staffed 24 hours a day. Several large historic spills of JP-4 have occurred (ranging from approximately 10,000 to 500,000 gallons), and discharges of heating oil have also been reported. A major concern at ST-09 is a free product plume (believed to be mostly JP-4 fuel) floating on groundwater beneath the site. The plume contains an estimated 400,000 to 500,000 gallons of free product that has not reached surface water. Free product recovery equipment began operation in April 2002, and recovered about 620 gallons of product and about 170 gallons of water during the first quarter of operation.	<u>Groundwater:</u> Metals, VOCs <u>Soil: Metals, SVOCs</u>	Additional RI and an FS are required. A reasonable worst-case scenario remedial alternative for ST-09 will likely consist of source removal of soil above NJDEP action levels, a subsurface containment wall to prevent groundwater from discharging into South Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
OT-10: Civil Engineering Compound	OT-10 covers approximately two acres and is located in the northwestern portion of McGuire AFB. The area is bordered by Building 3411 on the east and a drainage ditch (tributary to South Run) to the west and south. The compound is paved and surrounded by a chain-link fence on three sides. The area is currently used as a parking and storage area for vehicles and miscellaneous equipment and supplies. An equipment operator reported that he buried 50 55-gallon drums of waste oil about six feet bgs around 1950. Based on the negative results of several investigations, the drums do not appear to be buried at OT-10 and may have been removed at a later time. SVOCs were detected above NJ NRDCSCC in one presumed surface soil sample in 1991; however, verification sampling conducted in 1993 to support a removal action did not detect any constituents above NJ NRDCSCC.	<u>Groundwater:</u> Metals	Additional RI and an FS are required to evaluate potential soil contamination and groundwater impacts by inorganic contamination and select a remedy. A reasonable worst-case scenario remedial alternative for OT-10 will likely consist of source removal of contaminated soil, a subsurface containment wall to prevent groundwater from discharging into South Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
FT-11: Fire Protection Training Area 2	FT-11 is located south of the main runway area, adjacent to a concrete Aircraft Power Check Pad. The training area operated from 1958 to 1973 and consisted of an unpaved area about 50 to 75 feet in diameter. JP-4 fuel was brought to the area by tanker truck for each fire training exercise. The unlined burn area was flooded with water to float the jet fuel, which inhibited fuel percolation into the ground. A nearby drainage swale was blocked to prevent fuel-contaminated fire-fighting water and other extinguishing agents from flowing off site. The extinguishing agents consisted of carbon dioxide, protein foam, and water.	<u>Groundwater:</u> Metals, VOCs <u>Surface Soil:</u> TPH	Additional RI and an FS are required. A reasonable worst-case scenario remedial alternative for FT-11 will likely consist of removal of soil above NJDEP action levels and a pump and treat system to remediate contaminated groundwater.
FT-13: Fire Protection Training Area 3	FT-13 is in the center of the flight triangle, a grassy, relatively flat, predominantly undisturbed area of more than 200 acres. The land immediately surrounding FT-13 is grassy and marshy in some areas. A tributary to South Run is 100 feet east of the site. FT-13 operated from 1973 until the early 1980s. The burn exercises were generally contained within a well-defined circular area 300 feet in diameter. The training area was flooded to make the fuel float and to inhibit fuel infiltration into the soil. Aqueous film-forming foam was used as an extinguishing agent in the early 1980s. Reportedly, a clay liner, fuel storage tanks, fuel distribution system, and oil-water separator (OWS) were installed in the early 1980s, just before fire-training exercises ended at that location. Approximately 3,400 tons of potentially fuel-contaminated soils from various UST removals and excavations across McGuire AFB have been stockpiled at FT-13 since the early- to mid-1990s. The stockpiles consist of soil, gravel, macadam, and concrete debris, and are vegetated with shrubs and small trees.	<u>Groundwater:</u> Metals, SVOCs <u>Surface Soil:</u> Metals	As part of a Non-Time Critical (NTC) Removal Action and Remedial Investigation, McGuire plans to remove and dispose of the soil stockpile, the OWS, and a 1,000-gallon UST; and conduct a soil, groundwater, surface water, and sediment remedial investigation of these areas once the structures are removed. A reasonable worst-case scenario remedial alternative for FT-13 will consist of source removal of soil above NJDEP action levels, a subsurface containment wall to prevent groundwater from discharging into South Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.

Sites	Description/Comments	Media and COCs	Status
OT-14: NDI Shop Drain Field	OT-14 is a non-destructive inspection (NDI) shop (Building 1623) that specializes in finding aircraft structural defects hidden to the human eye. Aircraft parts are inspected for minute structural defects, without destroying or disassembling them, using methods such as x-rays and dye penetrants. OT-14 is located within the runway triangle area. A drainage field associated with OT-14 is east of the building in a depressed grassy swale. Between 1966 and 1972, wastes consisting of penetrants, emulsifiers, and developers were discharged into the drain field through a pipe located on the north side of the NDI Shop (outfall 1). Reportedly, approximately 55 gallons of each waste were released to the drain field every 18 to 20 months to percolate into the surrounding subsurface soils. A second drain outfall (outfall 2) was identified west of the shop. After 1972, two 5,000-gallon USTs were installed at the northeast corner of the shop and used to collect the waste materials. As of 1996, a contractor pumped out the USTs on a monthly basis for disposal. EA Engineering, Science, and Technology, Inc. (EA), reports that the USTs were removed but a removal date and details were not provided. EA also reports that a former septic tank and a 3,000-gallon fuel tank may be present.	<u>Groundwater:</u> Metals, Pesticides <u>Soil:</u> Pesticides	Additional RI and an FS are required. A reasonable worst-case scenario remedial alternative for OT-14 will consist of removal of soil above NJDEP action levels and a pump and treat system to remediate contaminated groundwater.
SS-18: PCB Spill Site	The SS-18 spill site is a driveway that extends from Radin Road to the Hazardous Waste Storage Area (Building 2310). In January 1982, an electrical transformer containing oil with PCBs accidentally fell off a transport truck during a salvage job. The transformer ruptured and between 75 and 200 gallons of oil spilled onto the ground; the actual spill area was estimated to be about 360 square feet. Historic references indicate that a large soil cleanup effort was conducted immediately after the oil spill and that several soil investigations and cleanup efforts were conducted thereafter. The driveway between Radin Road and Building 2310 is currently paved and covers most of the former spill. PCBs remain in soil above NJ RDCSCC, but below NJ NRDCSCC	None remaining	In a January 4, 1999, comment letter, NJDEP agreed with the Air Force recommendation that further investigation of PCBs in soil or groundwater was not required, although McGuire AFB was required to establish a deed notice for the residual PCB impacts in soil. NJDEP also required that additional groundwater investigation be conducted to delineate VOC and inorganic groundwater contamination in the vicinity of the site.
LF-19: Landfill No 5	LF-19 is a narrow, five-acre parcel of land between the access road to the former Waste Water Treatment Plant and South Run. The site is unpaved and vegetated with seasonal grass, shrubs, and trees. The landfill surface is relatively level but a steep bank drops to South Run, which forms the northern boundary of LF-19. The landfill operated from 1970 to 1973 and was reportedly used for disposal of construction debris, coal ash, and scrap metal wastes; chemical wastes were also possibly placed in the landfill. Waste material was routinely burned to reduce the volume of fill. The landfill contains an estimated 82,000 cubic yards of waste material. LF-19 was closed in 1973 with about two feet of tan, fine to medium grained sand. General refuse occasionally protrudes the surface. The base of the material was about 8-12 ft below the ground surface. Groundwater flows to the northeast and discharges into South Run. Waste material does not intersect the water table.	<u>Groundwater:</u> Metals <u>Soil:</u> Metals, Pesticides, SVOCs	Additional RI and an FS are required. A reasonable worst-case scenario remedial alternative for LF-19 will consist of partial source removal of hot spots, a landfill cap to prevent infiltration of water into waste material, a subsurface containment wall to prevent groundwater from discharging into South Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.

Sites	Description/Comments	Media and COCs	Status
LF-20: Landfill No 6	LF-20 is a 5.5-acre landfill at the eastern edge of the McGuire AFB property, bordered to the east by the installation boundary with Fort Dix and to the south by South Run. The central and northern part of the landfill is flat with low mounds of earth and the land slopes moderately southward to South Run. Demolition debris of concrete and rebar is exposed in some areas of this slope. The landfill is unpaved and bare earth is exposed in the central part of the site because of vehicular traffic, while the edges of the site are vegetated with grass, shrubs, and trees. LF-20 operated from 1973 to 1976 and was reportedly used primarily for the disposal of general refuse (e.g., concrete, metal, wood, glass, paper, and plastic). The landfill contains an estimated 120,000 cubic yards of waste material. In 1976, the landfill was closed with about two feet of tan, fine to medium sands that covers the refuse. Some of the landfill waste is in the saturated zone.	<u>Groundwater:</u> Metals <u>Surface Soil:</u> SVOCs	Additional RI and an FS are required. A reasonable worst-case scenario remedial alternative for LF-20 will consist of partial source removal of hot spots, a landfill cap to prevent infiltration of water into waste material, a subsurface containment wall to prevent groundwater from discharging into South Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
WP-21: WWTP Sludge Disposal Area	Beginning in 1953, sanitary and industrial wastewater at McGuire AFB was processed by a former Waste Water Treatment Plant. The treated effluent was discharged into South Run and sludge was treated by anaerobic digestion. The sludge was dewatered in sludge drying beds. After dewatering, the sludge was taken to the Fort Dix Landfill for disposal. Between 1970 and 1980, an unlined area about one acre in size was used to stockpile excess dewatered sludge generated in the plant (WP-21). WP-21 is located in the northeast corner of the base immediately downgradient and nearly surrounded by LF-02. The stockpiles eventually grew to be about eight feet tall before the sludge was removed from the area by 1994. Earlier reports suggest the sludge contained PCBs and metals above regulatory criteria. Use of the Waste Water Treatment Plant stopped in 1994. Most of the soil and groundwater investigations that have been conducted in the area have focused on the landfill, and not on the former sludge disposal area.	<u>Surface soil:</u> Pesticides	An RI/FS will be implemented at WP-21 in combination with LF-02 during summer/fall 2005. Soil samples will be collected and submitted for synthetic precipitation leachate procedure (SPLP) analysis. Based on current information, it appears that no further action will be required for WP-21 upon completion of the RI/FS.
ST-22: Aircraft Apron Fuel Leak	ST-22 is located in the McGuire AFB runway system on the aircraft parking apron. Jet fuel for refueling aircraft is distributed to the parking apron from a Bulk Fuel Storage Area (ST-09) via an underground piping and hydrant system. Currently, the concrete parking apron is about 18 inches thick. In 1988, a JP-4 fuel pipeline ruptured beneath the reinforced concrete flightline ramp and an unknown volume of fuel was released. The jet fuel, forced vertically through the subsurface soil, blew a concrete core out of the flightline ramp and discharged onto the ground surface. The jet fuel flowed into a grassy swale south of the flightline ramp. At the time of the fuel leak, base personnel excavated collection ditches and sumps in the grassy area to contain the spill and recovered an unknown volume of fuel. Large diameter (nine to ten feet) concrete storm drains are present beneath the apron, channel a branch of South Run, and terminate as outfalls to a tributary to South Run. The potential exists for free product and contaminated groundwater to discharge into the storm drain lines (and permeable pipebed material) beneath the apron. Fuel odors have been reported at the outfalls, as well as in an excavation advanced during repair work on a storm drain line near the passenger terminal. However, soil gas hot spots are not located within 125 feet of active buildings. Fuel contamination at the Aircraft Apron is widespread and attributable to sources other than just the J-4 hydrant spill.	<u>Groundwater:</u> Metals, VOCs	Additional RI and an FS are required at ST-22 (as well as across the entire apron) to delineate the horizontal and vertical extent of groundwater and soil contamination. A remedial alternative for ST-22 will likely consist of source removal of contaminated soil, a subsurface containment wall to prevent groundwater from discharging into the storm drains and South Run, and a pump and treat system to treat contaminated groundwater.

Sites	Description/Comments	Media and COCs	Status
LF-23: Landfill No 1	LF-23 is a former landfill encompassing a flat, predominantly paved area of about 30 acres that is mostly covered with buildings, runway ramps, roadways, and parking lots; approximately 90 percent of the site is paved. Construction activities were ongoing in the area of the former landfill in 1998 with the addition of new hangers, terminals, and roadways. South Run is located about 1,000 feet north (downgradient) of LF-23. LF-23 was used in the 1940s to dispose of waste generated by the base; the composition is unknown, but it probably contained little or no hazardous materials because the base was still in the early stages of development. As the base expanded, the waste material was reportedly removed, disposed of at an unknown location, and the landfill area backfilled for the construction of aircraft ramps and buildings. In 1990, subsidence of a portion of an aircraft ramp in the south-central part of LF-23 (near Building 1817) led to the discovery of remnants of buried general refuse. This pocket of waste material was removed and replaced with clean fill.	<u>Groundwater:</u> Metals, VOCs	Data collected during the RI and LTM phase may not be sufficient for preparation of an FS. A reasonable worst-case scenario remedial alternative for LF-23 will likely consist of partial source removal of hot spots, a subsurface containment wall to prevent groundwater from discharging into South Run, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
SS-24: Building 2227 Leach Field	SS-24 is located immediately northwest of the fuel hydrant system and is focused on former Building 2227, a washrack for military aircraft. Interviews with former workers of Building 2227 revealed that cleaning chemicals such as PD-680 type and type II were used at this facility since the 1950s. An OWS was located outside of Building 2227 and old engineering drawings show an old leach field tied into the OWS. A piped surface water feature exists on the north side of the site and surface water drains off into surrounding streams. According to McGuire AFB, a trichloroethylene spill previously occurred at the site and a VOC plume was identified during the course of construction. but plume delineation is complete and indicates that the plume is fully contained on site.	<u>Groundwater:</u> VOCs <u>Soil:</u> Pesticides, SVOCs	An RI has been completed for SS-24, and an interim removal action completely removed and disposed of the source material. Natural attenuation is occurring and McGuire AFB plans to install two wells to monitor breakdown and migration. A reasonable worst-case scenario remedial alternative for the industrial areas formerly known as AOC 6 (i.e., SS-24, SS-33 through SS-42) will likely consist of removal of soil above NJDEP action levels, a subsurface containment wall to prevent groundwater from discharging into neighboring streams, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
SS-25: Buildings 3207, 3205, 3208 (Former Entomology Shops)	Before 1974, pesticide operations such as mixing, application, equipment cleaning, and disposal of pesticides, were conducted at Buildings 3207, 3205, and 3208. Building 3207 was apparently located along Wrightstown-Cookstown Road opposite ST-07 (DRMO). Buildings 3205 and 3208 were located about 600 feet south and 600 feet east of Building 3207, respectively. The site contains a small area of mowed grass and some planted pine trees. Since 1974, pesticide operations have been conducted at the Building 3450 Entomology Shop (OT-06 - Pesticide Wash Area). EA recommended additional soil and groundwater investigations to determine the extent of contamination.	<u>Groundwater:</u> Metals, pesticides <u>Surface Soil:</u> Pesticides	An RI/FS is required for SS-25. A reasonable worst-case scenario remedial alternative for SS-25 likely consists of removal of soil above NJDEP action levels and a pump and treat system to treat contaminated groundwater.
SS-26: Former Golf Course Pesticide Mixing Shop	Before 1974, pesticide operations such as mixing, application, equipment cleaning, and disposal of pesticides, were conducted at SS-26. The former mixing shop was located in the middle of the McGuire AFB golf course north of LF-23 (Landfill No. 1), but has subsequently been demolished. Since 1974, pesticide operations have been conducted at the Building 3450 Entomology Shop (OT-06 - Pesticide Wash Area). EA recommended additional soil and groundwater investigations to determine the extent of contamination.	<u>Groundwater:</u> Metals, pesticides <u>Surface Soil:</u> Pesticides	An RI/FS is required for SS-26. A reasonable worst-case scenario remedial alternative for SS-26 likely consists of removal of soil above NJDEP action levels and a pump and treat system to treat contaminated groundwater.

Sites	Description/Comments	Media and COCs	Status
SS-27: Former Roads and Grounds Pesticide Mixing Shop	Before 1974, pesticide operations such as mixing, application, equipment cleaning, and disposal of pesticides, were conducted at SS-27. The former mixing shop building was subsequently demolished, but the site is located inside OT-10 (Civil Engineering Compound), across a narrow stream channel from OT-06 (Pesticide Wash Area). The site has limited vegetation, consisting of mowed grass and a few trees. Since 1974, pesticide operations have been conducted at the Building 3450 Entomology Shop (OT-06 - Pesticide Wash Area). EA recommended additional soil, sediment, and groundwater investigations to determine the extent of contamination.	<u>Groundwater:</u> Metals, VOCs	An RI/FS is required for SS-26. A reasonable worst-case scenario remedial alternative for SS-26 likely consists of removal of soil above NJDEP action levels and a pump and treat system to treat contaminated groundwater.
AT-28: Suspected Fire Training Area 4	Suspected Fire Training Area 4 is located in the flight line triangle area, about 1,000 feet north of FT-13 (Fire Training Area 3). Activities associated with the Runway Triangle include aircraft operations, weed control, and cleaning operations. The triangle area is bounded by active, restricted runways. A drainage swale is located to the west of AT-28 and transports surface water runoff across the main flight line to the east. The site has limited vegetation consisting of an open mowed grass area. EA recommended additional soil and groundwater investigation for SVOCs to determine if a no further action recommendation was appropriate for soil and groundwater.	<u>Soil:</u> SVOCs	An RI/FS is required for AT-28. A reasonable worst-case scenario remedial alternative for AT-28 will likely consist of removal of soil above NJDEP action levels, a subsurface containment wall to prevent groundwater from discharging into neighboring streams, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
AT-29: Suspected Fire Training Area 5	Suspect Fire Training Area 5 is located in the flight line triangle area, about 2,000 feet south of FT-11 (Fire Training Area 2) along the McGuire AFB fence line. A tributary to Jacks Run flows eastward about 200 feet north of the site and surface water runoff from the site generally drains to the culvert entering the underground pipe to Jack's Run. The site has vegetation consisting of open mowed grass, shrubs, and phragmites, in addition to a small wetland area. McGuire AFB recommended no further action for this site in 1998, but NJDEP stated in a comment letter that they would not consider this recommendation until the following four AOCs identified in the PA Report were addressed in an SI: two subsurface pits containing dark fluid, structures and buildings of the Hazardous Cargo Parking Area, a potential dumping area, and widespread distribution of pesticide soil contamination.	<u>Groundwater:</u> Metals	An SI is required for four additional AOCs within AT-29 that were not investigated during the 1996 SI. An RI/FS is required for the remainder of AT-29. A reasonable worst-case scenario remedial alternative for AT-29 will likely consist of removal of soil above NJDEP action levels, a subsurface containment wall to prevent groundwater from discharging into neighboring streams, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
SS-30: South of Buildings 2251, 2253	SS-30 is located within the fuel hydrant system and corresponds with three soil gas hot spots identified by ENSR Consulting and Engineering in 1995 (76 and 120 meters south of Building 2251, and 240 meters south of Building 2253). The hydrant system delivers jet fuel to aircraft on the parking apron. This is a highly restricted area where aircraft are parked and fueled, and is covered by 18 inches of concrete. JP-4 fuel was used initially but the system was converted over to JP-8 fuel in 1994. TPH contamination is widespread across the entire apron and additional investigation is required for all of the hydrant system (i.e., SS-30, SS-31, and SS-32), also known as former AOC 3.	<u>Groundwater:</u> TPH, VOCs	An RI/FS is required for SS-30, SS-31, and SS-32. A reasonable worst-case scenario remedial alternative for former AOC 3 will likely consist of removal of soil above NJDEP action levels, a subsurface containment wall to prevent groundwater from discharging into neighboring streams, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
SS-31: South of Buildings 1706, 1731	SS-31 is located within the fuel hydrant system and corresponds with a soil gas hot spot identified by ENSR Consulting and Engineering in 1995. The hydrant system delivers jet fuel to aircraft on the parking apron. This is a highly restricted area where aircraft are parked and fueled, and is covered by 18 inches of concrete. JP-4 fuel was used initially but the system was converted over to JP-8 fuel in 1994. TPH contamination is widespread across the entire apron and additional investigation is required for all of former AOC 3 (i.e., SS-30, SS-31, and SS-32).	<u>Groundwater:</u> VOCs	

Sites	Description/Comments	Media and COCs	Status
SS-32: Hydrant Line Crossings, Under- ground Storm Drains, and Former Streambeds	SS-32 is located within the fuel hydrant system and corresponds with potential preferential pathways for contaminated groundwater created by storm sewers, crossing hydrant lines, and former stream beds, as identified by ENSR Consulting and Engineering in 1995. The hydrant system delivers jet fuel to aircraft on the parking apron. This is a highly restricted area where aircraft are parked and fueled, and is covered by 18 inches of concrete. JP-4 fuel was used initially but the system was converted over to JP-8 fuel in 1994. TPH contamination is widespread across the entire apron and additional investigation is required for all of former AOC 3 (i.e., SS-30, SS-31, and SS-32).	<u>Groundwater:</u> TPH, VOCs	
SS-33: Buildings 1750, 1751	Buildings 1750 and Building 1751 are located immediately south of the Bulk Fuel Storage Area (ST-09). They are used for maintenance and storage of heavy equipment used on the flight line, such as cargo loaders. The maintenance operations generate waste oils and used antifreeze, and one or more OWSs are connected to the building floor drains. EA recommended further soil sampling for the site.	None detected	An RI/FS is required for the industrial areas formerly known as AOC 6 (i.e., SS-24, SS-33 through SS-42). A reasonable worst-case scenario remedial alternative for the industrial areas formerly known as AOC 6 will likely consist of removal of soil above NJDEP action levels, a subsurface containment wall to prevent groundwater from discharging into neighboring streams, a pump and treat system to treat contaminated groundwater, and sediment removal and restoration.
SS-34: Buildings 1708, 1800 Series	Building 1708 and the 1800 series buildings are within the footprint of LF-23 (Landfill No. 1). Building 1708 housed the base fire department. There is an OWS connected to the floor drain and truck maintenance fluids are used and stored in the building. Industrial activities, including maintenance and testing operations for flight line support vehicles and equipment, are performed in buildings 1801, 1803, 1811, 1817, 1823, 1832, and 1836. Wastes generated during these operations include waste oils, waste jet fuel, spent solvents, waste paints and paint remover, and used antifreeze. EA recommended the installation of temporary wells to monitor the extent of groundwater contamination in the Final SI Report (December 1998). EA also recommended low flow groundwater sampling, and soil sampling to pinpoint sources of contamination. The closest surface water body is about 800 feet northeast of the site.	<u>Groundwater:</u> VOCs	
SS-35: Buildings 1908, 1925, 1929, 1931, 1932, and 1937	Building 1908 is located in the east-central part of McGuire AFB, about 2,000 feet north of LF-23 (Landfill No. 1). The building contains a generator for backup heat supply for the adjacent Semi-Automatic Ground Environment (SAGE) Facility. The building has an adjacent tank farm that houses a 30,000-gallon diesel UST for the generator and USTs for fuel oil, Bunker "C" fuel, and de-icing fluid. Waste oil is generated from this facility during annual generator oil changes. Buildings 1925, 1929, 1931, 1932, and 1937 are located between LF-23 (Landfill No. 1) and LF-19 (Landfill No. 5). The operations in these buildings involve maintenance activities for aircraft and support vehicle. Wastes generated from these operations include oils, hydraulic fluids, solvents, electrolyte drained from batteries, sludge from OWSs, and saturated absorbent materials. One or more OWSs are connected to the building floor drains.	<u>Groundwater:</u> Metals, VOCs	

Sites	Description/Comments	Media and COCs	Status
<p>SS-36: Building 2300 Series and 3200 Series</p>	<p>SS-36 is located immediately northwest of the Hydrant System and contains industrial facilities in the 2300 and 3200 series buildings. The 2300 Area facilities are associated with structural repair operations in Buildings 2305, 2311, and 2315. Large quantities of waste oil, waste hydraulic fluids, waste solvent, waste alodine solution, waste thinner, sandblasting material, and water curtain sludge are used and generated in these buildings. The 2300 Area also includes the Hazardous Waste Storage Yard (Building 2310), which is the collection point for the hazardous waste program on base. Waste paints, spent batteries, asbestos, PCB transformers, spent solvents, corrosives, waste oils, and waste fuels are collected and stored there before being transported off base. The 3200 Area industrial facilities are associated with aircraft maintenance or refurbishment. General maintenance on aircraft is done in Building 3209 and Building 3211, which generates waste oils, fuels, hydraulic fluids, paints, and thinners. Painting activities in Building 3210 generate paint sweepings that may contain metals from sanding operations.</p>	<p><u>Groundwater:</u> Metals, VOCs</p>	
<p>SS-37: Building 2415</p>	<p>Building 2415, the Auto Hobby Shop, is located about 600 feet northwest of ST-09 (Bulk Fuel Storage Area). General vehicle maintenance activities are conducted in the building. Various petroleum-based materials are used and wastes oils, waste antifreeze, and spent absorbent and rags are generated. A stream is located nearby. EA noted in 1996 that an OWS is connected to the building floor drains, which was reportedly not functioning properly. NJDEP stated in a June 3, 1998, comment letter that additional groundwater investigation is required to delineate inorganics and other contaminants.</p>	<p><u>Groundwater:</u> Metals, VOCs</p>	
<p>SS-38: Building 3001</p>	<p>Building 3001 is in the north part of McGuire AFB, about 1,200 feet south of LF-04 (Landfill No. 3). Building 3001 is the Base Transportation Motorpool that conducts general vehicle maintenance and utilizes various petroleum-based materials. Storage of bulk fluids, waste materials, and vehicles occurs outside on asphalt paved lots. Reportedly, steam cleaning of vehicles was formerly conducted outside of the building, resulting in runoff to an adjacent grassy area. Waste oils, used antifreeze, waste paints and thinners, and spent batteries are generated at the Motorpool. EA noted in the 1996 PA that OWS is connected to the building floor drains. Free product was observed in one monitoring well in 1996. Petroleum-contaminated soils exist at the former location of a waste oil UST near Building 3001. The UST was formerly located on the northeast side of the building.</p>	<p><u>Groundwater:</u> VOCs, metals <u>Soil: Metals, VOCs</u></p>	
<p>SS-39: Building 3300 Series and Building 3362</p>	<p>SS-39 contains Buildings 3321, 3322, 3325, and 3350, which are used by the Air National Guard (ANG) stationed at the base and are located about 2,000 feet south of OT-6 (Pesticide Wash Area). Operations within these buildings are primarily associated with aircraft maintenance and support activities. Wastes generated from these facilities typically include waste oils (engine oil, gear oil, lube oil, hydraulic fluids), paints and paint thinners, penetrants, antifreeze (ethylene glycol), saturated absorbent materials, oily rags, and empty aerosol cans. OWSs are associated with some of the buildings. SS-39 also contains Building 3362, located about 1,000 feet east of the other 3300 series buildings. Building 3362 housed the Aerospace Ground Equipment (AGE) Division of the ANG. The building was used to repair ground power units for aircraft start-ups. Large quantities of hazardous substances, including toluene, PD-680 (a petroleum distillate solvent), diesel fuel, oils, antifreeze, and hydraulic fluids are used during maintenance and repair. EA reported that the building was vacant at the time of their inspection for the 1996/1997 SI.</p>	<p><u>Groundwater:</u> Metals, VOCs</p>	

Sites	Description/Comments	Media and COCs	Status
SS-40: Building 3401	Building 3401 is located about 600 feet east of OT-6 (Pesticide Wash Area) and OT-10 (Civil Engineering Compound). Building 3401 is a large aircraft hanger, which has been partitioned to facilitate the Aero Club maintenance operations and storage of large construction or maintenance vehicles (e.g., snow plows, street sweepers) for McGuire AFB. Roads and Grounds personnel formerly used this building for pesticide storage, although there is no evidence that these materials impacted the environment. Aircraft repair operations at this facility generate waste oils, hydraulic fluids, coolants, antifreeze, and some solvents. OWSs were reportedly associated with Building 3401. Petroleum-contaminated soil at the drainage ditch in the 3400 Area (i.e., between Building 3469 and the southern end of Building 3411 in OT-10) was remediated in 1994 as part of the cleanup for OT-06.	<u>Groundwater:</u> TPH, VOCs	
SS-41: Facilities 1940, 1942, 1043	SS-41 is located in the northeast part of McGuire AFB, about 1,000 feet northwest of LF-19 (Landfill No. 5). Golf course maintenance is performed at these buildings. Hazardous substances associated with the maintenance activities include large quantities of engine/lube oil, hydraulic oil, gear oil, and small quantities of paints, gasoline, grease, and antifreeze. In addition to golf course vehicle maintenance activities, pesticide mixing is currently conducted on the asphalt pavement in this area, adjacent to an area of exposed soil. EA recommended additional soil and groundwater monitoring.	<u>Groundwater:</u> Metals, VOCs <u>Soil:</u> SVOCs	
SS-42: Central Heat Plant (Building 2101)	Building 2101 is the Central Heat Plant located west of ST-09 (Bulk Fuel Storage Area). Building 2101 provides high temperature steam to heat various facilities on base. Current operations involve the transfer of large quantities of natural gas and fuel oil via underground pipelines and general maintenance activities on plant equipment. Wastes generated during normal operations consist of waste oils from oil changes of the compressor and spent absorbent from cleaning up small spills within the plant. Former use of coal to fuel the plant involved the storage of large quantities of coal and the generation of large quantities of coal ash. Arsenic (21.4 mg/kg) slightly exceeded the NJ NRDCSCC of 20 mg/kg. Based on the results of a qualitative risk evaluation, EA recommended no further action at Building 2101. NJDEP accepted this proposal in a June 3, 1998, comment letter. However, groundwater treatment is still projected to occur in the industrial areas formerly known as AOC 6.	<u>Soil:</u> Metals	

References 1, 2, 4, 5, 6.

**Attachment 2 - Summary of Environmental Compliance Sites/AOCs and Military Family Housing Sites Status
McGuire Air Force Base**

Building	Tank ID	Tank Size*	Contents	Future Actions
Military Family Housing Sites				
2728/2730	E078	Unknown	Fuel oil	Further sampling
2733	E080	550 N/A	Fuel oil spill Fuel oil leak	Release assessment
2757	E089	Unknown	Fuel oil	Further sampling
2758/2762	E088	Unknown	Fuel oil	Further sampling
2759	E087	Unknown	Fuel oil	Further sampling
2760/2761	E090	Unknown	Fuel oil	Further sampling
Environmental Compliance Sites/AOCs to be Fully Addressed by ERP Sites				
1747	E217	5,000	Aviation fuel	ERP Site SS-33
2253	P070	Unknown	Unknown	ERP Site SS-30
2415	LUST E236	Unknown 500	Unknown Waste Oil	ERP Site SS-37
3001	E111	Unknown	Unknown	ERP Site SS-38
3303C	E120	1,000	No. 2 fuel oil	ERP Site SS-39
3304	E121	1,000	No. 2 fuel oil	ERP Site SS-39
3305	E122	1,000	No. 2 fuel oil	ERP Site SS-39
3321	E128	5,000	No. 2 fuel oil	ERP Site SS-39
3378	E238	1,000	Waste Oil	ERP Site SS-39
3411	N/A	N/A	Oil spill	ERP Site OT-06
3446	4 USTs	25,000	AVGAS	ERP Site SS-30
3607/3609	LUST	Unknown	Unknown	ERP Site ST-07
Airfield	N/A	N/A	Jet fuel spills	ERP Site SS-32
Airfield	N/A	N/A	Jet fuel spills	ERP Site SS-32
Environmental Compliance Sites/AOCs to be Partially Addressed by ERP Sites				
1811	E231	290	Unknown	Groundwater: SS-34 Soil: further sampling
3310	E123	550	No. 2 fuel oil	Groundwater: SS-39 Soil: release assessment
3323	E130 E129	10,000 Unknown	No. 4 heating oil Fuel oil	Groundwater: SS-39 Soil: release assessment

Building	Tank ID	Tank Size*	Contents	Future Actions
Environmental Compliance Sites/AOCs Requiring Further Action				
1621	E286	300	Diesel fuel	Release assessment
1701	E010-E016 E197 N/A	25,000 5,000 N/A	Jet fuel Jet fuel JP-8 spill	Release assessment
1707	E018 - E023	Unknown	Unknown	Further sampling
1735	Unknown	Day tank	Diesel fuel	Release assessment
1754	E187	1,000	Diesel fuel	Release assessment
1808	E040-043, E206, E198, fuel hydrant pit	Unknown	Aviation fuel	Further sampling
1835	Pipeline	N/A	Aviation fuel	Further sampling
1907	Unknown	Unknown	Fuel oil	Further sampling
1914	E051 N/A N/A	5,000 N/A N/A	Fuel oil Heating oil spill Heating oil spill	Further sampling
1933	E200 N/A	5,000 N/A	JP-8 Unknown spill	Further sampling
2220	E235	290	Waste oil	Further sampling
2415	Unknown	2,000	No. 2 fuel oil	Further sampling
2913	E102-105, E106 E107 E183-184	4,000, 6,000 Unknown Unknown	MOGAS Unknown No. 2 fuel oil	Corrective action Corrective Action Release assessment
3002/3006	E112	5,000	MOGAS	Further sampling
3426	E150	550	No. 2 fuel oil	Release assessment
3438	LUSTs	Unknown	Unknown	Corrective action
3819	E168	250	Diesel fuel	Further sampling

Reference 3.
*** in gallons**

Building	Tank ID	Tank Size*	Contents	Future Actions
3350	E237	Unknown	Unknown	Groundwater: SS-39 Soil: release assessment

Building	Tank ID	Tank Size*	Contents	Future Actions
Environmental Compliance Sites/AOCs Requiring Further Action				
1621	E286	300	Diesel fuel	Release assessment
1701	E010-E016 E197 N/A	25,000 5,000 N/A	Jet fuel Jet fuel JP-8 spill	Release assessment
1707	E018 - E023	Unknown	Unknown	Further sampling
1735	Unknown	Day tank	Diesel fuel	Release assessment
1754	E187	1,000	Diesel fuel	Release assessment
1808	E040-043, E206, E198, fuel hydrant pit	Unknown	Aviation fuel	Further sampling
1835	Pipeline	N/A	Aviation fuel	Further sampling
1907	Unknown	Unknown	Fuel oil	Further sampling
1914	E051 N/A N/A	5,000 N/A N/A	Fuel oil Heating oil spill Heating oil spill	Further sampling
1933	E200 N/A	5,000 N/A	JP-8 Unknown spill	Further sampling
2220	E235	290	Waste oil	Further sampling
2415	Unknown	2,000	No. 2 fuel oil	Further sampling
2913	E102-105, E106 E107 E183-184	4,000, 6,000 Unknown Unknown	MOGAS Unknown No. 2 fuel oil	Corrective action Corrective Action Release assessment
3002/3006	E112	5,000	MOGAS	Further sampling
3426	E150	550	No. 2 fuel oil	Release assessment
3438	LUSTs	Unknown	Unknown	Corrective action
3819	E168	250	Diesel fuel	Further sampling

Reference 3.
*** in gallons**