



Public Health Assessment for

CHANUTE AIR FORCE BASE
RANTOUL, ILLINOIS

EPA FACILITY ID: IL1570024157

SEPTEMBER 30, 2008

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE**

Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

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PUBLIC HEALTH ASSESSMENT

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Prepared by:

Site and Radiological Assessment Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

Foreword

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment program allows the scientists flexibility in the format or structure of their response to the public health issues at hazardous waste sites. For example, a public health assessment could be one document or it could be a compilation of several public health assessments - the structure may vary from site to site. Nevertheless, the public health assessment process is not considered complete until the public health issues at the site are addressed.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies to determine the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further public health actions are needed.

Conclusions: The report presents conclusions about the public health threat, if any, posed by a site. When health threats have been determined for high risk groups (such as children, elderly,

chronically ill, and people engaging in high risk practices), they will be summarized in the conclusion section of the report. Ways to stop or reduce exposure will then be recommended in the public health action plan.

ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the relevant comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

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Acronyms and Abbreviations

AFCEE	Air Force Center for Environmental Excellence
AFRPA	Air Force Real Property Agency
AOC	area of concern
AST	above-ground storage tank
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
BCT	BRAC cleanup team
BEHP	bis(2-ethylhexyl)phthalate
BRAC	Base Realignment and Closure
CAFB	Chanute Air Force Base
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CREG	cancer risk evaluation guide (ATSDR)
CSF	cancer slope factor (EPA)
CV	comparison value
DoD	U.S. Department of Defense
EBS	Environmental Baseline Survey
EMEG	environmental media evaluation guide (ATSDR)
EPA	U.S. Environmental Protection Agency
FDA	U.S. Food and Drug Administration
FOSL	Finding of Suitability to Lease
FOST	Finding of Suitability to Transfer
FTA	Fire Training Area
HA	health advisory (EPA)
IDPH	Illinois Department of Public Health
IEPA	Illinois Environmental Protection Agency
IRP	Installation Restoration Program
ISGS	Illinois State Geological Survey
LOAEL	lowest-observed-adverse-effect level
LTHA	lifetime health advisory (EPA)
MCL	maximum contaminant level (EPA)
mg/day	milligrams per day
mg/kg/day	milligrams per kilogram body weight per day
MRL	minimal risk level (ATSDR)
NOAEL	no-observed-adverse-effects level
NPL	National Priorities List
OWS	oil-water separator
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PHA	public health assessment
PHAP	public health action plan
ppb	parts per billion
ppm	parts per million

Acronyms and Abbreviations

PRG	preliminary remediation goal (EPA Region 9)
RBC	risk-based concentration (EPA)
RCRA	Resource Conservation and Recovery Act
RfC	reference concentration (EPA)
RfD	reference dose (EPA)
RI	Remedial Investigation
RMEG	reference media evaluation guide (ATSDR)
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SVOC	semi-volatile organic compound
TACO	tiered approach to corrective action objectives (IEPA)
TCE	trichloroethylene
USAF	U.S. Air Force
UST	underground storage tank
VOC	volatile organic compound

Summary

The Agency for Toxic Substances and Disease Registry (ATSDR) prepared this public health assessment (PHA) to evaluate potential health hazards and community concerns associated with property at the former Chanute Air Force Base (CAFB). CAFB was a former Air Force training facility and served many functions since it became an active base in 1917. The former base property is within the incorporated limits of the village of Rantoul, approximately 12 miles north of Champaign and Urbana. The base officially closed in September 1993. Throughout CAFB's history, various activities resulted in releases of hazardous materials into the environment. Frequently detected contaminants include solvents (e.g., trichloroethylene [TCE]), polycyclic aromatic hydrocarbons (PAHs), metals (e.g., arsenic and lead), and petroleum compounds and their derivatives. Most of the contamination at CAFB has been associated with soil and groundwater as a result of spills or other unintentional releases onto the ground.

Environmental investigations at CAFB began in 1980. The Air Force conducted an initial base-wide Environmental Baseline Survey (EBS) in 1993. The EBS was conducted to delineate contaminated from the uncontaminated properties and to assist the Air Force and regulatory agencies in determining properties immediately suitable for transfer and those that required additional environmental evaluation and cleanup. Cleanup of numerous contaminated areas has been ongoing.

ATSDR conducted this PHA to evaluate possible health hazards associated with environmental contamination at CAFB. ATSDR's PHA process identifies populations who may have been, are, or could be exposed to hazardous substances and determines the public health implications of those exposures. As part of the process, ATSDR conducted site visits and met with representatives from CAFB in 2001. Using information gathered during the site visits and findings of site investigations conducted at CAFB, ATSDR examined the nature and extent of contamination associated with the site and identified four exposure situations and six community concerns requiring additional evaluation. A brief description of each exposure situation along with ATSDR's conclusions is presented below:

Drinking Water from the Public Water Supply or From Private Wells South of CAFB

Groundwater is used by the Village of Rantoul and surrounding areas as a source of drinking water. ATSDR evaluated the potential for groundwater contamination to enter public and private groundwater supplies and reviewed available sampling data for both the public water supply and private wells and concludes the following:

- The past quality of CAFB drinking water was not compromised by base-related activities since drinking water wells are in deep, confined aquifers.
- Elevated levels of sodium (> 20,000 parts per billion [ppb]) detected in private well water may be a health concern for people on sodium restricted diets. The naturally occurring (i.e., unrelated to base activities) levels of sodium detected in samples do not pose an immediate public health hazard. However, sodium above 20,000 ppb in drinking water may cause health problems for susceptible individuals (e.g., people with high blood pressure or heart conditions).

- ATSDR found elevated levels of arsenic, also believed to be unrelated to base activities, in one residential well that may be a health concern for the residents who may have drunk water from the same well over the course of a lifetime. ATSDR is working with the Illinois Department of Health to inform residents of the elevated arsenic levels in the private well and to suggest ways to reduce their exposure.
- Private off-base wells are not currently being impacted by trichloroethylene (TCE) groundwater plumes beneath CAFB. However, ATSDR recommends the Air Force continue periodic monitoring of plumes to ensure that contaminants do not migrate off site.

Exposure Situation #2: Participating in Recreational Activities at Heritage Lake

Heritage Lake is used for fishing, boating, and other recreational activities (e.g., playgrounds and picnicking) by residents of surrounding communities. The lake is located near three closed landfills and other potential sources of contamination associated with CAFB. Past activities and conditions could have resulted in contaminants migrating to surface soils near Heritage Lake and to the lake's surface water and sediments. The primary exposure concerns associated with Heritage Lake are anglers who may be eating contaminated fish from the lake and people coming in contact with contaminated soil, sediments, or surface water during recreational activities. ATSDR reviewed environmental data and evaluated the potential for site-related contaminants to cause harm to people who use the lake as a resource and concludes the following:

- Engaging in recreational activities (e.g., swimming or picnicking) at Heritage Lake and consuming fish from Heritage Lake do not pose a public health hazard.
- People who eat fish from Heritage Lake, especially children and pregnant women, should not eat more than one 8-ounce portion per week to ensure that they are not ingesting mercury at levels that may be unsafe.

Exposure Situation #3: Fishing and Consuming Fish from Salt Fork Creek

ATSDR evaluated the potential for Salt Fork Creek to contain contamination in sediments, surface water, and edible fish. ATSDR reviewed the most current information regarding Salt Fork Creek and concludes the following:

- The community's primary public health concern is associated with anglers consuming fish from both on- and off-site segments of the creek. ATSDR's evaluation indicates that none of the contaminants detected in Salt Fork Creek fish pose a public health hazard.
- It is unlikely that people are exposed to harmful levels of contamination in surface soil by their activities along the bank because the vegetation cover is very thick along most sections of the creek and generally low levels of contamination have been detected in surface soil.
- The levels of exposure to contaminants in surface water and sediment are too low to pose a public health hazard.

Exposure Situation #4: Contacting Surface Soil in Residential and Recreational Reuse Areas of CAFB

Activities at CAFB have resulted in surface soil contamination across portions of the site. Under the Installation Restoration Program (IRP), the Air Force has identified approximately 100 sites and areas of concern. Since 1980, the Air Force has addressed much of the surface soil contamination concern through investigations and subsequent remediation. ATSDR reviewed the decision criteria used as the basis for determining that an area with known or suspected surface soil contamination was suitable for unrestricted (including residential and recreational) reuse and concludes the following:

- The decision criteria, if strictly adhered to, are protective of public health during residential and recreational reuse.
- ATSDR reviewed surface soil sampling conducted at four sites where the status of future investigations and remediation is unclear. ATSDR did not identify contaminants in surface soil at levels that would pose a health hazard.

Community Health Concerns

ATSDR evaluated six specific health concerns that have been brought to ATSDR's attention during site visits, community meetings, a review of Restoration Advisory Board (RAB) meeting minutes, or through discussions with local or state health officials.

1. **Past quality of CAFB drinking water:** ATSDR concludes that the past quality of CAFB drinking water was not compromised by CAFB releases.
2. **Potential hazards associated with a military surplus business in southeast corner of CAFB:** Surplus materials could present a physical hazard to trespassers. ATSDR recommends the installation of fences to enclose open portions of the area or removal of remaining materials.
3. **Uptake of contaminants in agricultural crops at CAFB:** Crops such as alfalfa, corn, and soybeans are not known to excessively accumulate contaminants that have been detected in soils at CAFB. However, as a precautionary measure, ATSDR recommends that any agricultural crops grown on the former base not be sold for human consumption until the areas are sampled and contaminant levels are below acceptable health-based screening values.
4. **Contamination from CAFB landfills of irrigation wells used for farm crops:** Water from irrigation wells is from deep aquifers and is not expected to be impacted by site-related contaminants.
5. **Vapor intrusion into former base buildings:** ATSDR concludes that levels of VOCs in soil gas and indoor air of those base buildings evaluated do not currently pose a public health hazard. However, ATSDR is concerned that VOC levels may increase, or use of buildings with vapor intrusion may change. The Air Force should continue to monitor indoor air conditions until remediation goals are met at Building 343 and any other

buildings with vapor intrusion issues. After that, the Air Force should conduct 5-year reviews and sampling to evaluate vapor intrusion, groundwater and soil gas plume movement.

6. **Potential impact of groundwater plumes on private drinking water wells:** ATSDR concludes that private wells are not impacted by TCE groundwater plumes beneath CAFB.

Other Considerations for Reuse at Chanute AFB

ATSDR's evaluation of potential exposure pathways at the CAFB did not identify any public health hazards that warrant immediate action. However, a review of the current activities on the former base along with discussions with US Environmental Protection Agency, Illinois Environmental Protection Agency, and Air Force Real Property Agency representatives indicate that the oversight of leased or transferred property and the general adherence to land use controls is a concern to environmental and public health agencies responsible for protecting the welfare of the community and needs to be improved at this site. ATSDR will work with agencies and the village of Rantoul to fine tune land use management tools, standard operating procedures, and communication, to help ensure that people using the property are not exposed to safety hazards or unsafe levels of chemical contaminants from past uses, disposal, and releases into the environment.

The miscommunication between the responsible parties has resulted in: 1) reuse activities that are not always appropriate for the land use designations originally assigned by the Air Force; 2) property being leased prior to scheduled remedial activities; and 3) the increased risk of physical hazards due to unauthorized access of abandoned buildings.

Purpose and Scope

The Agency for Toxic Substances and Disease Registry (ATSDR) has prepared this public health assessment (PHA) for the former Chanute Air Force Base (CAFB) to evaluate any areas of contamination at the site that may pose a public health hazard or be of health concern to residents living on or near transferred property. In preparing this document, ATSDR relied on the information provided in the referenced documents and from discussions with people who have an interest in the facility. The validity of the analyses and conclusions drawn for this public health assessment are determined by the availability and reliability of the referenced information.

This report focuses on current and future exposures to the former CAFB property. ATSDR acknowledges that past exposures may have occurred from site-related releases to groundwater or other environmental media. ATSDR did review CAFB water supply well data from as far back as 1982 from the Illinois Environmental Protection Agency's Drinking Water Watch database. ATSDR found no contaminants at levels of health concern. Environmental studies began at CAFB with the start of the Air Force installation restoration (IR) program in 1980. However, most environmental sampling was conducted after a base-wide Environmental Baseline Survey (EBS) was initiated in 1993 (USAF 1993). The Air Force conducted the EBS to establish the environmental condition of installation property early in the planning process. The EBS was based on information obtained through a records search, interviews, and visual inspections. However, if specific populations (i.e., residents or former CAFB personnel) are identified as likely being exposed in the past to harmful levels of contaminants, ATSDR makes every effort to inform these individuals of the specific health-related issues and can, upon request, provide educational materials and resources to contact for additional information and medical evaluation.

One of the documents required to support the final transfer of a parcel is a Finding of Suitability to Transfer (FOST). A FOST is issued to document the Air Force's determination that the property is environmentally suitable for final deed transfer. The FOST is developed to conform to the statutory and regulatory requirements associated with transferring federal property by deed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Air Force also prepares a Finding of Suitability to Lease (FOSL), which is a document that conveys the result of the evaluation process used to determine that a property is environmentally suitable to lease. The FOSL and the process for preparing one are similar to the FOST. Under these requirements the Air Force must demonstrate that the property is either uncontaminated or discloses the type of hazard substances that remain and that all necessary remedies are in place and operating properly (USAF 1996). The State and the U.S. Environmental Protection Agency (EPA) review FOSTs and FOSLs developed by the Air Force and provide comments. The FOSTs and FOSLs are based on an extensive review of the environmental condition of the property which is done in consultation with federal and state environmental regulatory agencies. The Village of Rantoul acts as the on-site agent and the initial contact point for those wishing to lease property at CAFB. The Village of Rantoul representatives meet regularly with the Air Force Real Property Agency (AFRPA) project manager to discuss land use issues.

As a result of base closure, the state of Illinois and the Village of Rantoul are responsible for planning the future civilian reuse of property at CAFB. This consists of a comprehensive planning and marketing effort for the redevelopment of CAFB. ATSDR's evaluation considers the proposed reuse in its conclusions and recommendations about the potential for people to come in contact with contaminants from the former base.

Background

Site Description and Operational History

CAFB is a 2,125-acre inactive military installation in Champaign County, Illinois (Figure 1). The base is within the incorporated limits of the Village of Rantoul, approximately 12 miles north of Champaign and Urbana.

The U.S. military constructed CAFB in 1917 as Chanute Field to serve as a pilot training school during World War I. From 1918 to 1921, the base was used as a storage depot for aircraft engines, paints, and other miscellaneous items. CAFB served as a training facility for Air Corps mechanics from 1922 to 1938, and in 1941, it became the headquarters for the Air Corps Technical Training Command. During the World War II era, the military used the base for aircraft maintenance, metal processing, weather observation, and life support activities (URS 2003a; USAF 1993). With the creation of the Air Force after World War II, CAFB became a center for technical training for aerospace weapons system personnel, including those working with B-52 and B-58 long-range bombers and various missiles. During this period, CAFB operated under many names, including the Chanute Technical Training Center and the 3330th Technical Training Wing. The Air Force ended military flight operations in 1971, at which time CAFB became a non-flying training base. Full closure began in 1990, and the base officially closed in September 1993 (USAF 1993).

ATSDR refers to the former CAFB in this document simply as CAFB. The Air Force Real Property Agency (AFRPA), formerly the Air Force Base Conversion Agency, is responsible for investigating and restoring areas that were environmentally impacted by past military operations at the base, and leases the non-transferred buildings and land on the former base to the nearby Village of Rantoul (AFRPA 2006). The AFRPA is responsible for completing any required environmental investigation and restoration activities to ensure that the property is suitable for transfer of the property for civilian use. The AFRPA Base Realignment and Closure (BRAC) Environmental Coordinator, EPA Region 5 Remedial Project Manager (RPM), and the Illinois Environmental Protection Agency (IEPA) RPM comprise the BRAC Cleanup Team (BCT). This team acts as the primary forum for addressing environmental issues associated with CAFB and transfer of the property, which includes a variety of reuse activities, such as civil aviation, commercial and industrial use, civilian housing, and recreation.

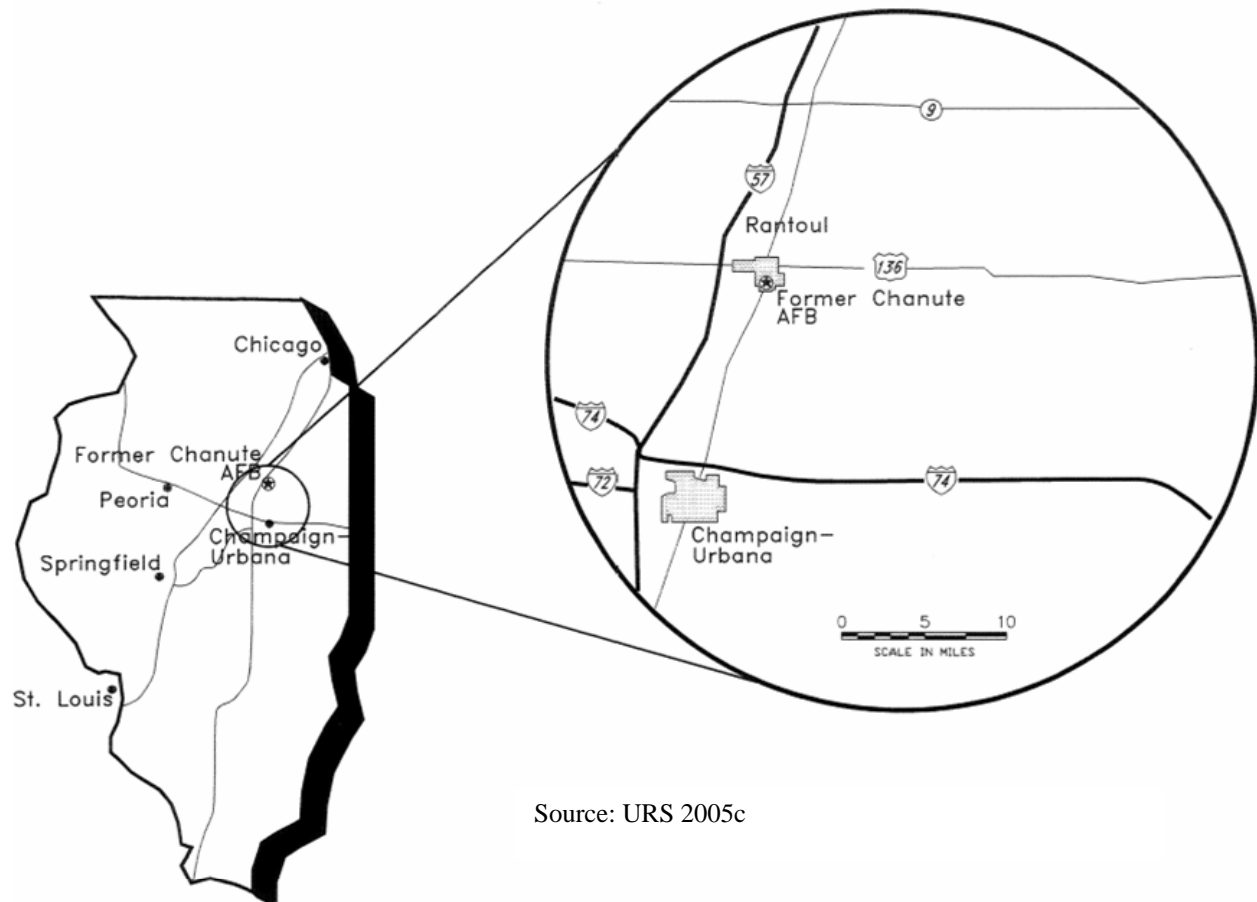
Throughout CAFB's history, various activities resulted in releases of hazardous materials into the environment, including fueling operations, aircraft maintenance, engine testing and maintenance, fire training, shooting ranges, and support operations such as wastewater treatment, motor vehicle maintenance, dry cleaning, and pest control (USAF 1993). Hazardous materials commonly used at CAFB included petroleum products such as aviation fuel, gasoline, diesel,

motor oil, lubricants, and hydraulic fluids; cleaning solvents; corrosives; pesticides; and paints and thinners (URS 2003a). Activities at CAFB generated waste oil and fuels, waste absorbents, antifreeze, bead blast media, wastewater treatment and oil-water separator sludge, batteries, solvent residues, and other chemical waste (USAF 1993). During much of CAFB's operational life, waste generated by the base was primarily placed in one of four landfills in the southeast corner of the base. The Air Force burned some flammable wastes for fire training activities. In later years, the Air Force disposed of hazardous wastes at permitted facilities off-base (USAF 1993). The last on-base landfill closed in 1974 (URS 2003b).

Physical Setting

CAFB's topography is relatively flat. The highest elevations occur in the northwest corner of the base and atop the landfills in the southeast corner. The lowest elevations occur along Salt Fork Creek, a small perennial stream that runs through the southeast corner of the base. The Air Force constructed a 15-acre lake, Heritage Lake, near Salt Fork Creek and the landfills in 1984 (URS 2005c). Heritage Lake and Salt Fork Creek will be described in greater detail in the "Potential Exposure Situations" section.

Figure 1. Location of CAFB



Source: URS 2005c

Geologically, the area around CAFB has deep bedrock covered by approximately 250 to 300 feet of unconsolidated sediments, which largely consist of glacial deposits. These sediments form three distinct layers, and each layer is associated with its own groundwater aquifer. Groundwater below the base is described in greater detail in the “Potential Exposure Situations” section.

The area around CAFB has a continental climate, with average monthly temperatures ranging from 27 degrees Fahrenheit (°F) in January to 75°F in July (URS 2003a). Mean annual precipitation is approximately 39 inches, with the highest rainfall typically occurring in May, July, and August. Winds are generally from the south and west, although northwest winds may prevail in the winter. Average wind speed at the surface is approximately 10 miles per hour (URS 2003a; USAF 1997b).

Demographics and Land Use

ATSDR examines demographic and land use data to identify sensitive populations (e.g., children or the elderly) and to determine whether these sensitive populations are exposed to any potential health risks. Demographics also provide details on population mobility and residential history in a particular area. This information helps ATSDR evaluate how long residents might have been exposed to contaminants.

CAFB is located within the incorporated limits of the Village of Rantoul, which had a population of 12,857 in 2000 (Census Bureau 2002). The former base is bordered on the north by residential and commercial land, and on the other three sides by farmland. According to the 2000 U.S. Census, 11,314 people live within 1 mile of CAFB, including 1,396 children aged 6 and younger and 1,347 adults aged 65 and older (Figure 2) (Census Bureau 2006). These statistics include over 3,200 people who live in residential areas within the former base.

AFRPA has divided the base into approximately 80 parcels, each designated for a particular reuse (Figure 3). The tarmac and runways will continue to be used for aviation, while several adjacent areas will be used for aviation support or industrial activities. Tracts of former military housing in the northeast and southwest portions of the base are being used for civilian housing, along with a mixed-use/residential area in the north-central part of the base. Other parcels are currently used for short-term housing, including temporary housing for migrant workers and a program for at-risk youth. Several areas have been designated for recreation, including a golf course in the northeast portion of the base, the area surrounding Heritage Lake in the southeast corner, and several playing fields. A portion of the southeast corner of the base has been designated for educational use; it serves as a materials testing facility for the University of Illinois, but does not house any students. The remaining parcels are zoned for industrial or commercial use (David Wacker, Booz Allen Hamilton, personal communication, September 5, 2006).

As of April 2008, the Air Force had transferred nearly two-thirds of the acres to new owners (1551 of 2173 acres), including the main residential and airfield areas. Most of the remaining parcels, located in the southeast portion of the base, are aviation support or industrial parcels, which have a higher concentration of sites where remediation is not yet complete (USAF 2008).

Figure 2. Demographic Characteristics of CAFB and Vicinity

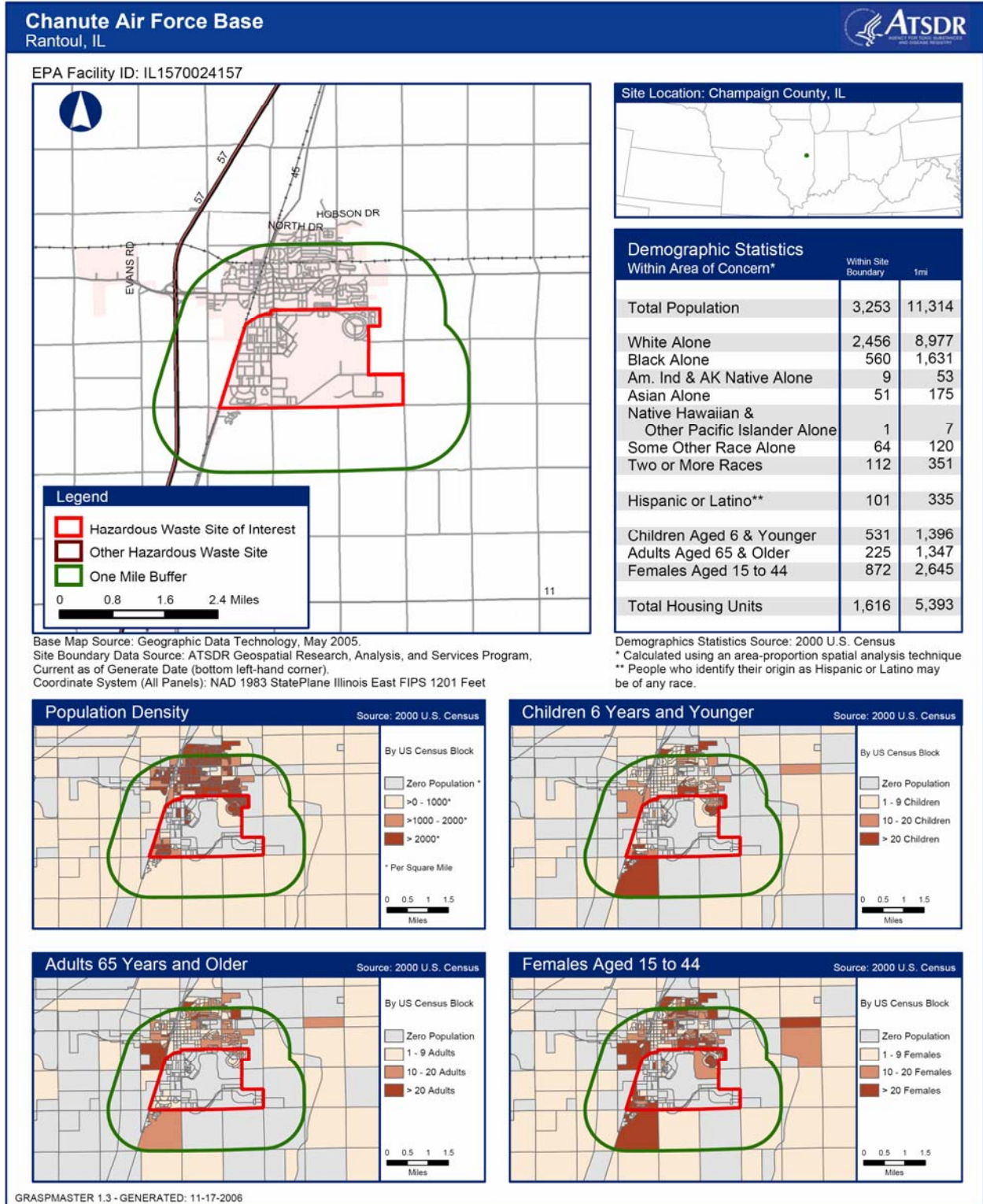
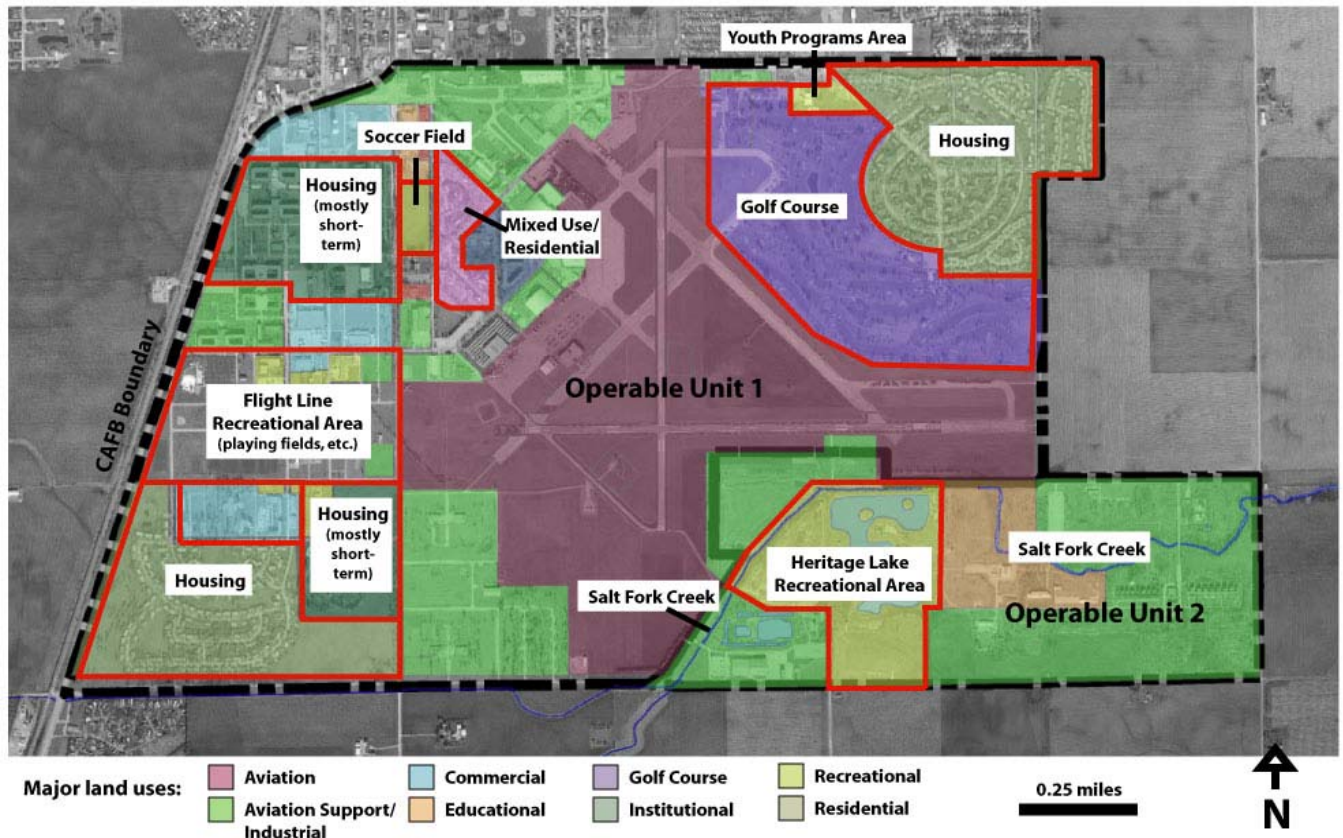


Figure 3. Land Reuse Plan for CAFB



Sources: URS 2006a; David Wacker, Booz Allen Hamilton, personal communication, September 5, 2006

Remedial and Regulatory History

After Congress passed CERCLA in 1980, the Air Force adopted an Installation Restoration Program (IRP) to investigate potential contamination that may have resulted from former practices at Air Force installations (IEPA 1999a). The IRP also specifies the process for controlling or cleaning up contamination that is found. In a Phase I investigation completed in 1983, the Air Force identified six sources of hazardous substances at CAFB (four landfills and two fire training areas); a 1986 Phase II investigation identified an additional source (a sludge disposal pit) (EPA 2000). EPA proposed CAFB for the National Priorities List in December 2000 (EPA 2004a). Remedial investigation (RI) activities were initiated in 2002 and are still ongoing.

To date, remedial activities at CAFB have included removal of several underground storage tanks (USTs), above-ground storage tanks (ASTs), oil-water separators (OWSs), and pipelines; excavation of contaminated soil at several sites; and consolidation and capping of three of the four landfills. The Air Force has sampled soil, groundwater, and other media throughout the base (DoD 2004; URS 2003a, 2003b). As of April 2008, the Air Force listed 81 IRP sites and 10 areas of concern at CAFB. All 10 areas of concern and 29 IRP sites have achieved regulatory closure with no further action required. Thirteen additional IRP sites are projected for no further action, but have not yet achieved regulatory concurrence. The remaining 39 IRP sites are projected to require remediation (USAF 2008). No additional investigations or remedial actions are planned for all other IRP sites and these have been designated as “closed” by the Air Force and suitable for reuse.

The Air Force has also investigated ten areas of concern (AOCs) (URS 2006a). The majority of these sites are located on aviation support or industrial parcels, where proposed reuse is generally consistent with past land use. However, a few AOCs are located on residential parcels. Depending on preliminary investigations and discussions with regulatory agencies, the Air Force may decide to take “no further response action;” conduct an initial removal action followed by a remedial investigation/feasibility study (RI/FS); or conduct a RI/FS and then decide whether to conduct additional investigations or remedial actions for these AOCs. ATSDR reviewed the decision criteria used in determining suitability for reuse of all identified IRP sites and AOCs at CAFB. Refer to Appendix A for a listing of IRP sites and AOCs identified during environmental investigations, along with a brief description of the sites and ATSDR’s evaluation of transferred or “to be transferred” property.

Areas of concern (AOCs) are parcels of land that are suspected of containing site-related contaminants based on preliminary environmental sampling or historical records, but have not been formally designated as IRP sites.

Fencing is not currently installed at most IRP sites being evaluated. In general, fencing has only been installed during the remedial investigation phase in order to restrict public access to areas where known health and safety hazards are present as a result of ongoing activities (e.g., open excavations, drilling operations, surface water impoundments, etc). Fencing was also installed at Landfills 1, 2, and 3 as part of the remedial action at these sites (USAF 2008). As a result of contamination found during fish sampling at Heritage Lake and Salt Fork Creek, the Air Force has posted advisories recommending catch-and-release practices at Heritage Lake and no fishing at Salt Fork Creek. The Air Force has also sampled environmental media in off-site areas adjacent to the base, including water, sediments, and fish in portions of Salt Fork Creek upstream and downstream from CAFB, as well as water from nearby residential wells.

ATSDR Involvement

ATSDR is required by law to conduct a PHA at sites proposed or listed on the National Priorities List. As part of the PHA process, ATSDR conducted an initial site visit to CAFB in June 2001. ATSDR collected information necessary to prioritize the site according to the potential public health hazard it represented and identified public health issues related to environmental contamination. During the visit, ATSDR staff met base representatives, toured the installation and surrounding areas, and collected community health concerns. At the time of the visit, ATSDR determined that no contaminated sites or public health issues posed an imminent public health hazard; however, ATSDR did identify a number of potential concerns requiring further evaluation. In September 2001, ATSDR published a health consultation outlining these concerns (ATSDR 2001). This PHA addresses the concerns raised in the 2001 health consultation and any additional public health issues or exposures to contaminants identified since the 2001 report.

In 1998, an off-base resident south of CAFB requested that IDPH and the Champaign County Health Department sample private wells. As a result of this request, IDPH worked with the Air Force to develop a sampling plan. The Air Force collected eleven rounds of samples between October 1998 and February 2004 from private wells at four homes south of the former base—the nearest of which is less than ¼ mile south of Landfill #3, which abuts the base's property line. As a precaution, the Air Force also supplied these residents with bottled water starting in 1999 (IDPH 2002). Under a cooperative agreement with ATSDR, IDPH prepared a health consultation addressing potential contamination of residential wells near CAFB. IDPH evaluated the results of the Air Force samples collected between 1998 and 2004 and concluded that under current conditions, exposures were not at levels expected to cause adverse health effects (IDPH 2002). IDPH classified this groundwater as “no apparent public health hazard.” After the final round of sampling in 2004, the Air Force stopped providing bottled water (USAF 2004b, 2004d).

Quality Assurance and Quality Control

In preparing this public health assessment, ATSDR reviewed and evaluated information provided in the referenced documents. Documents prepared for the CERCLA program must meet standards for quality assurance and control measures for chain-of-custody, laboratory procedures, and data reporting. The environmental data presented in this public health assessment come from two major sources: (1) site characterization and RI reports prepared by the Air Force under CERCLA and the Resource Conservation and Recovery Act (RCRA); and (2) an online database of environmental sampling results maintained by URS, an Air Force contractor (URS 2006a). The online database does not provide access to detection limits or sampling methodology; however, information about methodology can generally be found in published reports. Overall, ATSDR has found that the quality of environmental data available for CAFB is adequate for making public health decisions.

Evaluation of Environmental Contamination and Potential Exposure Situations

Introduction

ATSDR's public health assessment process emphasizes the importance of exposure pathways, or the different ways that people can come in contact with environmental contaminants. The release of a chemical into the environment does not always result in human exposure. Human exposure to a substance depends on whether a person comes in contact with the environmental contaminant, for example by breathing, eating, drinking, or touching a substance containing it. If an individual does not come in contact with a contaminant, then exposure and resulting health effects cannot occur. Furthermore, the release of a contaminant from a site does not always mean that the substance will have a negative impact on the health of a member of the off-site community. However, even if the site is inaccessible to the general public, contaminants can move through the environment to locations where people could come into contact with them.

What if a contaminant is detected above its CV?

- Chemicals at levels that exceed screening values do not necessarily indicate a hazard.
- Screening values are intentionally several orders of magnitude lower than levels shown to cause adverse health effects.
- ATSDR performs in depth analysis of chemicals that exceed screening values to determine if adverse health effects could occur under site specific conditions.
- ATSDR's public health hazard determinations are presented in the public health implications sections discussion.

ATSDR scientists evaluate site conditions to determine if people could be exposed to site-related contaminants. If exposure was, is, or could be possible, ATSDR scientists consider whether contamination is present at levels that might affect public health. ATSDR scientists select contaminants for further evaluation by comparing them against health-based comparison values (CVs). These are developed by ATSDR from available scientific literature related to exposure and health effects. CVs are derived for each of the different media and reflect an estimated contaminant concentration that is *not likely* to cause adverse health effects for a given chemical, assuming a standard daily contact rate (e.g., an amount of water or soil consumed or an amount of air breathed) and body weight.

See Appendix B. Comparison Values Used by ATSDR for a list of CVs Used by ATSDR and Appendix C. ATSDR's Methodology for a more detailed description of ATSDR's methodology. A glossary of terms used in this report (Appendix D. ATSDR Glossary of Environmental Health Terms) is also included for reference.

What potential exposure situations were evaluated for CAFB?

For this public health assessment, ATSDR identified four potential exposure situations meriting further evaluation:

- Drinking water from the public water supply that serves the Village of Rantoul (including CAFB) or from private wells south of CAFB
- Participating in recreational activities at Heritage Lake
- Fishing and consuming fish from Salt Fork Creek
- Contacting surface soil in residential or recreational reuse areas of CAFB

Table 1 summarizes ATSDR's findings for these four exposure situations. The remainder of this section presents more detailed information on these situations, describes how ATSDR evaluated the public health implications of exposure, and presents ATSDR's recommendations for reducing exposures.

Table 1. Summary of Current and Future Exposure Situations for CAFB

<i>Exposure Situation</i>	<i>Public Health Implications and Hazard Conclusions</i>	<i>Actions</i>	<i>ATSDR Recommendations</i>
<p>1. Drinking water from the public water supply or from private wells south of CAFB</p>	<p>Public (Municipal) Water Supply Sodium is present in public drinking water at levels that could pose a hazard to people with high blood pressure, heart conditions, or following a sodium-restricted diet. Sodium levels are safe for healthy individuals.</p>	<p>The Village of Rantoul's public water supply is monitored regularly in order to comply with the federal Safe Drinking Water Act. Water is routinely tested for a wide range of contaminants.</p>	<p>Residents with high blood pressure, heart conditions, or following a sodium-restricted diet should speak with their doctors if they are concerned about elevated sodium levels in their drinking water.</p>
	<p>Private Wells Elevated levels of sodium were found in one private well. The levels could pose a health concern for people with high blood pressure, heart conditions, or following a sodium-restricted diet. Sodium levels are safe for healthy individuals. Arsenic levels in one private well consistently exceed EPA's maximum contaminant level (MCL), indicating a potential health concern if lifetime exposure occurs. No other contaminants are present at levels that would be expected to cause adverse health effects.</p>	<p>ATSDR did not identify any specific action taken to reduce sodium levels in private wells or to inform residents of elevated sodium levels. As a precautionary measure, the Air Force provided some residents using private wells south of CAFB with bottled water beginning in 1999. The Air Force ceased providing bottled water in 2004, after sampling showed no site-related contaminants in the water at levels of health concern.</p>	<p>ATSDR recommends that residents who are following a sodium-restricted diet, have high blood pressure, or a heart condition, test their wells for sodium content. If the sodium level exceeds 20,000 ppb consult with your physician about specific actions or precautions to take. ATSDR is working with the IDPH to inform the residents about the health implications of their well sampling results and suggest way to reduce the health impact of drinking from their private well.</p>
<p>2. Participating in recreational activities at Heritage Lake</p>	<p>Exposure to surface soil, sediment, or surface water at Heritage Lake does not pose a health hazard for people who use the area for recreational activities. In general, recreational consumption of fish from Heritage Lake does not pose a current health hazard. However, children and pregnant women should avoid eating more than one fish meal per week from Heritage Lake to reduce their intake of mercury from Heritage Lake fish.</p>	<p>The Air Force has investigated potentially contaminated sites near the lake and has remediated these areas as needed. The Air Force has consolidated and capped the three landfills adjacent to the lake, and has installed leachate collection and treatment systems to prevent contaminated runoff from entering nearby water bodies. In 2001, the Air Force posted signs advising people to catch and release fish from Heritage Lake.</p>	<p>ATSDR recommends that children and pregnant women avoid eating more than one fish meal per week from Heritage Lake.</p>

<i>Exposure Situation</i>	<i>Public Health Implications and Hazard Conclusions</i>	<i>Actions</i>	<i>ATSDR Recommendations</i>
<p>3. Fishing and consuming fish from Salt Fork Creek</p>	<p>Some contaminants were detected in Salt Fork Creek fish, but none of these contaminants are present at levels that will cause adverse health effects if the fish are consumed. ATSDR concludes that contaminant concentrations in fish from Salt Fork Creek do not pose a health hazard for recreational fish consumers</p> <p>Based on the most current sampling data, swimming or wading in the creek does not pose a current public health hazard.</p>	<p>Portions of Salt Fork Creek near the landfills have been fenced off to restrict public access during remediation of the area.</p> <p>In 2004, the Air Force posted signs along the on-base portion of Salt Fork Creek that say "Environmental Area of Concern – No Fishing." The Air Force indicated that the signs would be removed once all investigations were completed, provided that fish sampling results do not indicate a health concern.</p> <p>In February, 2008, upon review of most current RI findings, EPA (Region 5) and IEPA agreed to remove the fencing and signs along Salt Fork Creek.</p>	<p>None</p>
<p>4. Contacting surface soil in residential and recreational reuse areas of CAFB</p>	<p>Contaminants have been detected at elevated levels in surface soil in some parts of CAFB that are designated for residential or recreational reuse. However, these areas have been or will be remediated.</p> <p>ATSDR reviewed the Air Force's cleanup goals and found that they are sufficient to protect public health during residential and recreational reuse.</p>	<p>The Air Force has addressed much of the surface soil contamination concern through investigation and remediation. Remaining areas of concern will be remediated before the land is transferred for reuse.</p>	<p>None</p>

Exposure Situation #1: Drinking Water from the Public Water Supply or From Private Wells South of CAFB

Summary

Groundwater serves as the primary source of drinking water for the Village of Rantoul and surrounding areas. Although not related to CAFB activities, ATSDR identified two groundwater contaminants (sodium and arsenic) that were detected at levels of health concern. As part of its mandate, ATSDR is obligated to disclose any significant public health findings during the public health assessment regardless of the source of contamination. The levels detected in groundwater samples **do not** pose an immediate public health hazard. However, the groundwater may cause health problems for susceptible individuals who rely on these sources for most of their drinking water over their lifetime. ATSDR reviewed available sampling data for both the public water supply and private wells.

Public Water Supply: Sodium, which is a naturally occurring mineral, was found in the public water supply system at levels greater than the health guideline of 20,000 ppb; which could pose a hazard to people with high blood pressure, heart conditions, or who are following a sodium-restricted diet. ATSDR recommends that these individuals consult their physicians if they are concerned about the sodium levels in their drinking water.

Private Wells: Arsenic was found in one private well (50 ppb) consistently above current drinking water standards of 10 ppb. The source of this arsenic is unclear, but is thought to be from past pesticide use on farms. The area is prime farmland used for growing corn. In the past, arsenic was a component of pesticides applied to soil and crops. Sodium was also detected at levels of concern in one of the private wells sampled. ATSDR is working with the IDPH to inform residents and suggests ways of reducing their exposure to arsenic and sodium.

Background

Environmental studies began at CAFB with the start of the Air Force IRP program in 1980. These studies included extensive groundwater sampling throughout the base and specifically at areas where past activities could have released chemicals to the environment. Groundwater studies are ongoing under remedial investigations at several locations at CAFB.

To assess possible impacts of groundwater contamination identified at CAFB, ATSDR evaluated the potential for groundwater contamination to enter public and private groundwater supplies. Understanding the location and movement of groundwater underlying CAFB, groundwater use, and results from groundwater and well sampling is critical to evaluating potential exposures and health effects.

Hydrogeology

Groundwater beneath CAFB is found in three zones.

- The Batestown saturated zone (commonly referred to as the Wisconsinan zone) consists of a shallow layer of discontinuous groundwater generally found 10 to 35 feet below ground surface (bgs). Water from the Wisconsinan zone is generally considered unsuitable for drinking or domestic use because yields are low and the two deeper aquifers provide more reliable water supplies. Groundwater in this zone typically flows toward surface water features. At CAFB, groundwater generally flows toward Salt Fork Creek, except in the extreme southeast corner of the base where groundwater flows to the southeast and in the northeast corner where groundwater flows to the northeast (Mitretek 2003).
- The Glasford aquifer (commonly referred to as the Illinoian aquifer), found 60 to 140 feet bgs, is separated from the Wisconsinan saturated zone by a low-permeability layer of approximately 8 to 16 feet of silty-clay till (Mitretek 2003). This till layer minimizes the movement of groundwater from the Wisconsinan saturated zone to the Illinoian aquifer. Within 1 mile of CAFB, the Illinoian aquifer serves as a water supply for private residential wells. Groundwater in this aquifer generally flows to the south-southwest (Sanderson and Zewde 1976; URS 2003a).
- The Mahomet Valley aquifer (commonly referred to as the Kansan aquifer), found 220 to 290 feet bgs, serves as the primary source of water for municipal wells in the Village of Rantoul and Champaign-Urbana (Mitretek 2003; URS 2003a). A layer of approximately 80 feet of till separates the Kansan aquifer and the Illinoian aquifer (Mitretek 2003). The regional flow direction in this aquifer is south-southwest, towards the low created by Champaign-Urbana's wells. Beneath CAFB, however, Kansan groundwater flows towards the northern portion of the base, where the Village of Rantoul's public supply wells are located (URS 2003a).

The layers of low-permeability till between the Wisconsinan saturated zone and the Illinoian aquifer and between the Illinoian aquifer and Kansan aquifer act as confining layers, minimizing vertical movement and mixing of water between the aquifers.

Groundwater Use

Public Water Supply: When active, CAFB obtained drinking water from nine wells that drew water from the Kansan aquifer at depths of at least 200 feet bgs. The Village of Rantoul currently operates a public water system that serves residents within the incorporated limits of the Village, including CAFB. The Village of Rantoul obtains drinking water from eight groundwater wells: five former CAFB wells on the northern portion of the base, two wells at Glenwood Park, and one well located at the Village's water treatment plant (IEPA 2006; Rantoul 2000). These eight wells extend 125 to 300 feet bgs and draw water from the Illinoian or Kansan aquifers. Groundwater from these wells is piped to the Village's water treatment facility where it is blended before distributed to taps (Rantoul 2006a).

A Village of Rantoul ordinance prohibits drilling a private well within the village limits (Rantoul 2003). Areas immediately west, south, and east of CAFB are unincorporated; however, residents in these areas rely primarily on private wells for drinking water.

Private Wells: The Illinois State Geological Survey maintains a database of wells drilled in Illinois; some of the records in the database date back to the 1800s. The database includes private wells, engineering wells, and stratigraphic wells. Engineering and stratigraphic wells are used to monitor or study groundwater and are not used for drinking. A query of this database in October 2006 identified a total of 66 nearby wells designated as “water wells,” indicating that a well may be used as a drinking water supply (ISGS 2006). Of these 66 wells, 23 are within CAFB and 43 are within a 1-mile radius of Chanute boundaries. All of these wells are found at a depth of 50 feet or greater bgs, with the exception of one well for which no depth data were available. This well is located east-northeast of CAFB and serves a private business.

Nature and Extent of Known Contamination

Groundwater Monitoring: The Air Force has conducted groundwater investigations throughout CAFB. The majority of groundwater contamination at the former base is contained in the Wisconsin saturated zone, which is not used as a source of drinking water (URS 2006a). Based on groundwater flow and sources of groundwater contamination, ATSDR identified the landfills in the southeastern portion of CAFB as possible sources of groundwater contamination that could flow beyond site boundaries and impact private drinking water wells. Chlorinated organic solvents such as TCE (max = 110,000 ppb have been detected in groundwater samples collected in the Wisconsin aquifer (see [Community Health Concerns](#) section for a discussion of potential impact of on-site groundwater plumes).

The Air Force sampled the Illinoian aquifer as part of its landfill investigations. This sampling identified two polycyclic aromatic hydrocarbons (PAHs)¹ (benzo[a]anthracene and benzo[a]pyrene), bis(2-ethylhexyl)phthalate, and inorganics at concentrations above screening values in at least one of the over 50 samples collected. Only manganese, which is a naturally occurring mineral, was detected at elevated levels in more than five samples. Manganese concentrations ranged from 364 to 1,900 ppb (URS 2006a). The source of PAHs is not known, but may be from previous contaminant releases when CAFB was still operating. Bis(2-ethylhexyl)phthalate has been found at the same locations as PAHs and is a common laboratory contaminant not usually present in the groundwater. It is also possible that this contaminant was released during CAFB operation. As previously mentioned, the manganese is probably naturally occurring and unrelated to activities associated with CAFB.

Public Water Supply: The Village of Rantoul monitors the public drinking water supply as required by the Safe Drinking Water Act (SDWA) and prepares annual reports summarizing monitoring results. The 2006 report—the most recent year available—indicated that the water supply met all federal and state drinking water standards. Even though no drinking water standards are available for sodium, the Village of Rantoul includes sodium in their annual reports because people on a sodium-restricted diet should be aware of sodium levels greater than

¹ PAHs are a group of over 100 chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances. PAHs can either be synthetic or occur naturally in the environment (ATSDR 1995).

20,000ppb. The 2006 report noted that sodium was detected at a concentration of 25,000 ppb (Rantoul 2006a). IEPA also maintains the Drinking Water Watch database, an online database reporting results from public water supply monitoring. Data reported in this database for the Village of Rantoul indicate that arsenic and lead have been detected above their respective health-based guidance values. Arsenic was reported above its maximum contaminant level (MCL), which are the highest levels of a contaminant that EPA allows in drinking water, of 10 parts per billion (ppb) in 4 of 33 samples (detections ranging from 0.64 to 95 ppb). Lead was reported above EPA's action level of 15 ppb in 1 of 60 samples (detections ranging from 5 to 21 ppb). Sodium was also detected above 20,000 ppb in 27 of 28 samples (detections ranging from 18,000 to 41,000 ppb) (IEPA 2006).

Private Wells: In 1998, residents using private wells south of the site expressed concern that groundwater contamination from CAFB was entering their wells. As a result, the Air Force conducted private well sampling at four homes south of CAFB in October 1998 (IDPH 2002). Between October 1998 and February 2004, the Air Force conducted as many as 11 sampling rounds at these four properties (Table 2) (IDPH 2001; USAF 2000a, 2004b, 2004c, 2004d).

Table 2 lists contaminants that exceed EPA's MCL or ATSDR's screening values at least one time during private well sampling. Arsenic (50.4 ppb²) was detected frequently above its MCL of 10 ppb in two of the three wells for which sampling data were available. Sodium (32,000 ppb²) was also detected above EPA's drinking water advisory level of 20,000 ppb in one private well during all 11 sampling rounds.

As shown in Table 2, other contaminants were detected in the private wells. In most cases the contaminants were detected once or twice and at levels that slightly exceeded the MCL or ATSDR's screening value. However, they were not detected frequently enough and at high enough concentrations to be of health concern. The inorganic compounds antimony, chromium, lead, and thallium were detected on at least one occasion above their respective screening values during the private well sampling events. The average concentrations reported for each of these compounds were below their respective screening value, and not at levels of health concern. Similarly, PAH and semi-volatile organic compounds (SVOC) compounds (i.e., benzo(a)anthracene, benzo(a)pyrene, dibenz(a,h)anthracene, and BEHP) were detected infrequently in drinking water samples. A review of the toxicological literature shows that the levels of these compounds detected in drinking water well samples are well below levels known to be associated with reported health effects (ATSDR 1995; 2002). Based on the results of the sampling data, ATSDR identified arsenic as a contaminant of concern and will discuss it further in the following section. ATSDR will also discuss the significance of elevated sodium levels detected in the one drinking water well.

² This represents the maximum concentration reported between 1998 and 2004 in the private wells sampled.

Table 2. Summary Statistics for Contaminants in Private Wells South of CAFB (1998-2004)

<i>Contaminant</i>	<i>Range All Detected Results (Average) [ppb]</i>	<i>Well 1 Exceed/Rounds¹ (Max Value [ppb])</i>	<i>Well 2 Exceed/Rounds¹ (Max Value [ppb])</i>	<i>Well 3 Exceed/Rounds¹ (Max Value [ppb])</i>	<i>Well 4 Exceed/Rounds¹ (Max Value [ppb])</i>
Antimony	0.1–12.6 (5.3)	1/11 (11.9)	2/11 (11.3)	1/10 (12.6)	NR
Arsenic	0.2–50.4 (21.1)	11/11 (50.4)	0/11 (8.4)	0/10 (8.9)	NR
Benzo(a)anthracene	0.04–0.05 (0.044)	2/11(0.05)	1/11 (0.04)	NR	NR
Benzo(a)pyrene	0.1–0.2 (0.16)	3/11 (0.2)	1/11 (0.11)	1/10 (0.2)	NR
BEHP	2–182 (34.5)	3/11 (182)	1/11 (4.1)	NR	0/4 (2)
Chromium	1–35.4 (6)	0/11 (2.2)	1/11 (35.4)	0/10 (2.2)	0/4 (1.6)
Cyanide	397	NR	NR	NR	1/1 (397)
Dibenz(a,h)anthracene	0.06	NR	NR	1/10 (0.06)	NR
Lead	0.4–25.7 (6.1)	0/11 (4.7)	1/11 (25.7)	NR	NR
Sodium	8,910–32,000 (17,070)	0/11 (18,800)	11/11 (32,000)	0/10 (16,200)	0/4 (13,100)
Thallium	0.02–5.9 (3)	NR	NR	1/10 (5.9)	NR

Source: IDPH 2001; USAF 2000a, 2004b, 2004c, 2004d

Notes:

Only contaminants that exceed their respective screening values at least one time during sampling are presented in the table.

¹ Exceed/Rounds = the total number of samples that exceeded EPA's MCL for drinking water (or ATSDR's screening value when MCLs are not available) over the reported number of sampling rounds for each well.

Screening values for listed chemicals

EPA MCLs: antimony = 6 ppb; arsenic = 10 ppb; cyanide = 200 ppb; thallium = 2 ppb.

EPA's RBC: benzo(a)anthracene = 0.03 ppb; benzo(a)pyrene = 0.003 ppb; dibenz(a,h)anthracene = 0.003 ppb; BEHP = 4.8 ppb.

EPA (action level): lead = 15 ppb.

EPA's drinking water advisory level: sodium = 20,000 ppb.

ATSDR (child RMEG): chromium (VI) = 30 ppb.

Abbreviations

BEHP = bis(2-ethylhexyl)phthalate

MCL = EPA's maximum contaminant level

NR = not reported

RBC = EPA's risk-based concentration from Region 3.

RMEG = Reference dose media evaluation guide

Contaminants in bold are considered a concern and are evaluated further in the Public Health Implication section.

Public Health Implications

Groundwater has served as the primary source of drinking water for CAFB, the village of Rantoul, and private homes. ATSDR considered that CAFB releases to groundwater could compromise the quality of these water supplies. To assess possible impacts to the village of Rantoul water supply, which also provides drinking water to CAFB facilities, ATSDR reviewed available sampling and monitoring data. To assess possible impacts to private wells, ATSDR reviewed private well sampling data collected in response to citizen concerns about these wells. These private wells are most likely to be impacted by CAFB contamination because they are down gradient of groundwater contamination associated with CAFB's landfills. ATSDR's public health evaluation for public and private water supplies is presented below.

Public Water Supplies

During 2006, the most current reporting year available, the village of Rantoul's municipal drinking water system met all federal and state drinking-water standards. Previous monitoring results reported arsenic at levels that exceeded its MCL of 10 ppb in a few samples from the village of Rantoul water supply (IEPA 2006). EPA derives MCLs based on the assumption that a person will consume 2 liters (about ½ gallon or 8 cups) of water every day for a lifetime. Arsenic was detected above its MCL very infrequently and would not be likely to cause adverse health effects. Lead was also detected one time above its action level of 15 ppb. Again, lead was not elevated in any other samples and is *not* a health concern.

Although there is no state or federal MCL for sodium, monitoring is required to provide information to residents and health officials that are concerned about sodium intake due to dietary precautions. Public drinking water wells contained elevated levels of sodium. Sodium is a naturally occurring mineral, and its presence in groundwater has been attributed to natural sources and possible use as a water softening agent, not past activities at CAFB (Rantoul 2006a). The sodium levels detected in the village of Rantoul water supply (18,000 to 41,000 ppb) exceeded the EPA drinking water advisory of 20,000 ppb for people following a reduced-sodium diet (500 mg/day). The detected levels, however, fall within or below the EPA taste threshold of 30,000 to 60,000 ppb (i.e., the concentration at which most people taste no change in water quality) (EPA 2006). The village of Rantoul and IDPH have recommended that residents with high blood pressure, heart conditions, or following a sodium-restricted diet speak with their physicians if they are concerned about sodium in their drinking water (IDPH 2002; Rantoul 2006a). ATSDR does not expect healthy individuals to experience any adverse health effects from drinking water with these sodium concentrations. ATSDR agrees, however, that concerned individuals should consult with their physicians about the sodium levels in their drinking water.

Private Wells

One private drinking water well south of CAFB contained elevated levels of sodium (23,900 to 32,000 ppb), which exceeded the EPA drinking water advisory of 20,000 ppb for people following a reduced-sodium diet. ATSDR does not expect healthy individuals to experience any adverse health effects from drinking water with these sodium concentrations. Concerned individuals should consult with their physicians about the sodium levels in their drinking water.

In 2002, IEPA and ATSDR released a Health Consultation evaluating the use of private wells located south of CAFB (IDPH 2002). IEPA and ATSDR assessed private well sampling data collected by the Air Force during eight sampling rounds completed at four wells between 1998 and 2001. As a precaution, the Air Force provided these homes with bottled water beginning in 1999. In the Health Consultation, IEPA and ATSDR concluded that only sodium concentrations in private wells were at levels of concern for people with high blood pressure, heart conditions, or following a sodium-restricted diet (IDPH 2002).

Since the release of the Health Consultation, the Air Force completed three more rounds of sampling. The Air Force also stopped providing bottled water to residents. For this public health assessment, ATSDR reviewed data from all 11 private well sampling rounds (refer to Table 2).

Arsenic concentrations in one private well south of CAFB ranged from 21.6 to 50.4 ppb during 11 sampling rounds. Prior to 2006, EPA enforced an MCL of 50 ppb for arsenic. Detected concentrations in this private well only slightly exceeded this level in only one sample. On January 23, 2006, however, EPA began enforcing a revised arsenic MCL of 10 ppb. Based on an extensive research and review effort, EPA concluded that the lower MCL would better protect members of the public from adverse health effects resulting from long-term exposure to arsenic. Private wells are not subject to the same regulations as public water supplies. As a prudent public health action, ATSDR advises private drinking water well owners to periodically test their well for contaminants due to historical agricultural practices and close proximity to CAFB. ATSDR is working with the IDPH to notify residents and suggest ways to reduce their exposure to arsenic in their well.

Residents using this well should not, however, infer that they will develop health problems based on past exposure to arsenic. EPA develops MCLs based on the assumption that a person drinks 2 liters (about ½ gallon or 8 cups) of water from a contaminated source every day over the course of their lifetime. ATSDR has prepared toxicological profiles for a number of chemicals that can cause illness or adverse health effects. For arsenic's toxicological profile, ATSDR conducted an extensive review of available scientific literature on arsenic's cancer and non-cancer effects. Much of the current understanding of arsenic's toxicity is based on studies of nutritionally deficient populations from other countries exposed to arsenic concentrations greater than 50 ppb. One of the most cited studies is a Taiwanese study in which the lowest exposure levels were associated with darkening of the skin and nail beds and the onset of skin cancer observed in people drinking water containing arsenic at levels from 170 to 800 ppb for 45 years. Other studies of people in Utah and Alaska exposed to arsenic in drinking water at concentrations ranging from 100 to 200 ppb found no increase in skin changes or cancer rates (ATSDR 2005a). The highest arsenic concentrations detected in the private well near CAFB are below health effect levels reported in the scientific literature and would not be expected to result in adverse health effects.

Exposure Situation #2: Participating in Recreational Activities at Heritage Lake

Summary

The primary exposure concerns associated with Heritage Lake are anglers who may be eating contaminated fish from the lake and people coming in contact with contaminated soil, sediments, or surface water during recreational activities. Heritage Lake is used for fishing, boating, and other recreational activities (e.g., playgrounds and picnicking) by residents of surrounding communities. The lake is located near three closed landfills previously used by the Air Force and other potential sources of contamination. Although the Air Force has now addressed many of the potential contamination sources, past activities and conditions could have resulted in contaminants migrating to surface soils near Heritage Lake and to the lake's surface water and sediments. The Air Force has collected and analyzed samples of soil, surface water, sediment, and fish tissue for contaminants that may have been associated with known source areas. ATSDR reviewed environmental data and evaluated the potential for site-related contaminants to cause harm to people who use the lake as a resource.

ATSDR concludes that exposure to surface soil, sediment, or surface water at or near Heritage Lake *does not pose a public health hazard* for people who use the lake for recreational activities. ATSDR concludes that consuming one 8-ounce fish meal per week from Heritage Lake *does not pose a current health hazard and should be safe in the future*. However, people, especially children and pregnant women, *should avoid* eating more than one fish meal per week from Heritage Lake to ensure that they are not ingesting mercury at levels that may be unsafe.

Background

Heritage Lake is a 15-acre man-made lake located in the southeast corner of CAFB (Figure 3), immediately east of Landfill #2 and north of Landfill #3. The Air Force constructed the lake in 1984 at the former location of two sewage lagoons that were used from 1969 to 1973 (URS 2006b). The area around the lake is maintained as a recreational area, with vegetation mowed regularly and shoreline repairs implemented where erosion has occurred (ATSDR 2001; Jacobs 1998b). Access to the lake is not restricted or limited. However, Landfills #1, #2, and #3 are separated from the Heritage Lake recreational area by a chain-link fence. No remedial actions had been implemented at Heritage Lake as of November 2006 (Donna Kozak, Booz Allen Hamilton, personal communication, October 25, 2006). In October 2001, on the basis of preliminary fish sampling data that indicated levels of mercury in fish above established health-based guidelines, the Air Force posted signs advising people to only catch and release fish from Heritage Lake (USAF 2001).



Heritage Lake.

Surface Water Hydrology

Heritage Lake is a relatively shallow water body, with maximum depths ranging from about 8 feet in the southern portion to 13 feet in the eastern portion of the lake (URS 2006b). The lake bottom consists of an engineered clay liner designed to help the lake retain water, with a thin layer of fine silt and organic matter on top.

Heritage Lake receives no perennial or intermittent stream flow and very little surface water runoff from adjacent banks. The lake has one outlet, which is manually controlled by a gate structure that is kept closed. This outlet drains to a ditch that leads into Salt Fork Creek (URS 2006b). Heritage Lake lies on a topographic high and would not typically receive runoff from any of the landfills (Jacobs 1998b). It is hydraulically connected with the Wisconsin groundwater zone, but water movement is likely from the lake to the aquifer because the lake's elevation is above that of the immediately surrounding area (USAF 1997a). Prior to 1994, the lake's water was supplied from the former base water supply system. In 1994, a production well was constructed and since that time groundwater from the Kansan aquifer has been pumped into the lake to maintain water levels (URS 2006b).

Use of Heritage Lake

Heritage Lake is a recreational lake with unrestricted public access. The lake is used for fishing and boating, and the area around the lake contains a boat dock, a paved walking trail and bridges, a picnic area, and a playground for children (ATSDR 2001). The Champaign County regional planning office estimates that up to 100 people use Heritage Lake for swimming and fishing during weekends of the summer months and an average of three to five people use the lake during weekdays of the summer months (Jacobs 1998b).

The village of Rantoul stocked Heritage Lake with channel catfish, largemouth bass, sunfish, and carp as recently as 1998. According to the most recent information ATSDR has received, the lake is no longer being stocked with fish (ATSDR 2001; URS 2006b). Edible game fish species observed to be present in Heritage Lake include channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), and bluegill (*Lepomis macrochirus*) (Jacobs 1998b).

A 2001 article indicated that the village of Rantoul also operates a campground near the lake (Mitchell 2001).

Nature and Extent of Known Contamination

Contamination Sources

Residual contamination in existing sediments is likely the primary source of potential contaminants in and around Heritage Lake. Disposal activities associated with the sludge lagoons stopped in 1973 due to effluent discharge problems into Salt Fork Creek. Trees and other vegetation were planted after the lagoons were no longer used in order to stabilize the soil along the shoreline (Jacobs 1998b).

In addition to the contamination from the former sewage lagoons that existed prior to Heritage Lake being constructed, there are other potential source areas in close proximity to the lake. Elevated levels of PAHs were found in soils near Heritage Lake. It is possible that these contaminants may have migrated from the landfills through the air. It is less likely that surface water runoff or sediment/soil migrated from the landfills to the lake because of the slightly higher elevation of the lake compared with the surrounding area. A more detailed description of the potential source areas is provided below.

Landfill #2, the closest landfill to the lake may have been a source of contamination in the past. This 23-acre landfill borders Heritage Lake to the west. However, surface water runoff from the landfill is to the northwest, draining into Salt Fork Creek. Landfill #2 operated from the early 1950s until 1967, and was used to dispose of office trash, shop wastes (including waste solvents), construction rubble, and possibly pesticides. According to site reports, wastes were periodically burned (Jacobs 1998b). Landfill #2 has now been consolidated, and a final cap was completed in 2003 (URS 2003b, 2004b). The Air Force has implemented surface water controls and installed a landfill gas passive vent system. A leachate collection and treatment system was partially complete at the time the work plan was written. The site is fenced, and excavated areas have been backfilled with clean soil (URS 2004b).

Other potential sources of contamination around Heritage Lake include closed Landfills #1 and #3 and Former Buildings 911 and 912. These potential source areas are described below:

- *Landfill #1* is located approximately 500 feet west of Heritage Lake, across Salt Fork Creek from Landfill #2. This 21.5-acre landfill was opened in the 1930s, acquired by the Air Force in 1941, and closed in 1960. Garbage, paper, wood, metal, aircraft parts, unrinsed pesticide drums, shop wastes, solvents, and construction debris were disposed of and routinely burned. The Air Force has consolidated this landfill and covered it with a multi-layer 11.4-acre cap; work was completed in December 2002 (URS 2003b, 2004b, 2007a).
- *Landfill #3* is approximately 1,000 feet south of the southern tip of Heritage Lake. This landfill operated from 1967 to 1970, and was used to dispose of garbage, rubble, and small quantities of oils, lubricants, and other shop wastes, including waste solvents. The landfill was consolidated and capped in 2002. The Air Force has implemented surface water controls, installed a landfill gas passive vent system, and installed a leachate collection and treatment system (URS 2003b, 2004b, 2007a). As part of the consolidation of Landfill #3, the Air Force removed waste from a 7-acre area north of the landfill and immediately south of Heritage Lake, known as the Northern Excavation Area. The Air Force plans to backfill the area with clean soil and then will transfer it to the village of Rantoul as recreational land (Donna Kozak, Booz Allen Hamilton, personal communication, November 14, 2006).

- Building 911 was located near where the eastern edge of Heritage Lake now lies. This building was constructed around 1955 and was used to store acids, and was demolished between 1975 and 1985 when Heritage Lake was constructed. An industrial waste drain line ran from this building to Salt Fork Creek. Releases could have occurred through runoff or surface/subsurface leaks (URS 2003b).
- Building 912 was located approximately 400 feet southeast of Heritage Lake and was used to store fuels, although the types of fuels stored here are not known. This building was demolished between 1975 and 1985 when Heritage Lake was constructed. Releases could have occurred through runoff or surface/subsurface leaks. The Air Force removed soil from the western portion of the Building 912 site as part of the Landfill #3 remedial action (URS 2003b).

Environmental Sampling Results

Analytical data collected from test pit excavations confirm that the landfills contain a variety of inorganic and organic contaminants, including volatile organic compounds (VOCs), SVOCs, chlorinated pesticides, polychlorinated biphenyls (PCBs), herbicides, dioxins/furans, and metals (Jacobs 1998a, 1998b). The organic contaminants found most consistently above preliminary screening levels include dioxins and PAHs. VOC and pesticide contamination was also detected at some test pit locations. The most prevalent inorganic contaminants detected above preliminary screening levels appear to be arsenic, beryllium, and lead, although many other inorganics were detected at multiple test pit locations. There is no evidence of ordnance disposal or explosives-related contamination at any of CAFB's landfills.

Surface Soil: Many of the soil samples evaluated near Heritage Lake were collected as part of the RI for Building 911 and Building 912 (URS 2005b). Other soil samples were collected during nearby site investigations. ATSDR evaluated the results of chemical analyses for surface soil samples (0-6 inches bgs) collected between September 2003 and October 2004 around Heritage Lake. Samples were collected from a total of 36 boreholes, identified as samples closest to Heritage Lake, and analyzed for VOCs, SVOCs, chlorinated pesticides, PCBs, herbicides, metals, and dioxins/furans (URS 2006a).

Four chemicals (arsenic, benzo[a]pyrene, benzo[b]fluoranthene, and dibenz[a,h]anthracene) were detected in surface soil (Table 3). Arsenic is a metal that can be naturally occurring as well as a contaminant associated with previous site-related activities. The other three chemicals are all PAHs, which are likely related to former CAFB activities. Arsenic (maximum 35.7 parts per million [ppm]) was detected at the Building 911 site, near the northeastern corner of Heritage Lake. One PAH (benzo[b]fluoranthene) (maximum 0.41 ppm) was detected immediately west of Building 912, and the other two PAHs (benzo[a]pyrene [maximum 0.2 ppm] and dibenz[a,h]anthracene [maximum 0.048 ppm]) were detected approximately 250 feet southwest of the Northern Excavation Area.

Groundwater: Samples collected through February 2005 did not indicate contaminant releases from Landfill #1 to the Wisconsinan, the aquifer closest to the surface. However, vinyl chloride, low levels of TCE, and arsenic were detected in groundwater samples collected from the Wisconsinan aquifer beneath Landfill #3 (URS 2007a).

Surface Water and Sediment: Surface water and sediment samples were collected from 1999 through 2001. The Air Force collected 13 surface water samples and 13 co-located sediment samples from Heritage Lake to characterize the nature and extent of contamination and risk to human health and the environment. Additional sediment and surface water samples were collected in 2004 to fill data gaps (URS 2006b).

Surface water samples were collected from a depth of 2 to 3 feet below the water surface at each of the 13 surface water sampling locations. Additional water samples were collected at each 3-foot interval (i.e., from a depth of 5 to 6 feet and from a depth of 8 to 9 feet, etc.) until reaching the surface water/sediment interface. Sediment samples were collected from the same locations identified for surface water sampling. Each sediment sample was collected from a depth interval of 0 to 6 inches.

All surface water and sediment samples were analyzed for VOCs, SVOCs, chlorinated pesticides, PCBs, herbicides, metals, and dioxins/furans (Jacobs 1998b). No chemicals were detected at levels of health concern in surface water. One chemical, bis(2-ethylhexyl)phthalate, was detected one time in sediment (Table 3).

Fish Tissue: Fish sampling at Heritage Lake targeted species that would reasonably be consumed by people. Three species (largemouth bass, channel catfish, and bluegill) were captured and analyzed for chemical contaminants. However, only the largemouth bass and channel catfish were considered large enough to be edible. Two largemouth bass were collected and a composite fillet sample was prepared for each fish collected. The Air Force analyzed one composite sample for VOCs, SVOCs, PAHs, pesticides, PCBs, and metals, and the other composite sample for dioxins. The Air Force also collected four channel catfish, from which three samples were prepared.³ One composite sample was analyzed for VOCs, SVOCs, PAHs, pesticides, PCBs, and metals, another composite sample was analyzed for dioxins, and the third fillet was analyzed for herbicides (URS 2006b).

Four chemicals (arsenic, bis[2-ethylhexyl]phthalate, mercury, and methylene chloride) were detected in fish tissue samples at levels that required further evaluation to determine whether levels pose a human health concern (Table 3). Arsenic (maximum 0.09 ppm) was detected in the largemouth bass, but not in the channel catfish (Table 3). Arsenic was also detected in the bluegill composite sample, but the bluegill fish collected from Heritage Lake were too small to be considered a common edible species. Mercury was detected in all fish samples collected from Heritage Lake, with the highest concentration (0.59 ppm) reported in the largemouth bass sample. Bis(2-ethylhexyl)phthalate was detected in the largemouth bass fillet (maximum 0.73 ppm) and methylene chloride (maximum 1.6 ppm) in the channel catfish fillet (Table 3).

³ One catfish sample was a composite of two catfish.

Table 3. Contaminants Detected in Surface Soil, Sediment, and Fish at Heritage Lake

<i>Contaminant</i>	<i>Exceedances/ Detects (# of Samples)¹</i>	<i>Range of Results (ppm) (Average)²</i>	<i>Evaluate Further (Yes/No)</i>	<i>Decision Rationale</i>
Surface Soil				
Arsenic	1/32 (32)	2–35.7 (6.8)	No	The contaminant was detected above its screening value in fewer than 10 percent of samples.
Benzo(a)pyrene	5/23 (32)	0.0009–0.2 (0.06)	Yes	Benzo(a)pyrene is more toxic than other PAH compounds and was detected slightly more frequently than other PAH compounds.
Benzo(b)fluoranthene	3/21 (32)	0.0008–0.41 (0.11)	No	The contaminant was detected above its screening value in fewer than 10 percent of samples.
Dibenz(a,h)anthracene	4/15 (32)	0.0006–0.048 (0.01)	No	The contaminant was detected above its screening value in fewer than 10 percent of samples.
Sediment				
BEHP	1/10 (13)	ND–57.6 (5.9)	No	The contaminant was detected above its screening value in fewer than 10 percent of samples.
Fish tissue ³				
Arsenic	1/2 (2)	ND–0.09 (0.06)	Yes	Each of these contaminants exceeded their respective screening value. Only two samples were collected and further evaluation is recommended to assess the potential for health effects from consuming fish.
BEHP	1/2 (2)	ND–0.73 (0.38)	Yes	
Mercury	2/2 (2)	0.23–0.59 (0.41)	Yes	
Methylene Chloride	1/2 (2)	ND–1.6 (estimated value)	No	Methylene chloride is a common laboratory contaminant. A review of other environmental data indicates that it was not released into the environment at levels of concern at CAFB. Cooking fish prior to eating would remove the methylene chloride from the fish tissue.

Source: URS 2006b; USAF 2000b

Notes: Only contaminants that exceed their respective screening values are presented in the table.

¹ Exceedances/Detects represents the number of times a contaminant level exceeds its respective health-based screening value over the total number of times that contaminant was detected in the medium it was sampled in.

² Numbers in parentheses represent arithmetic mean (average) concentration for detected values.

³ Fish sampling data are presented for largemouth bass and channel catfish filets. Data for bluegill and non-fillet portions of largemouth bass and channel catfish were not used in the Air Force Human Health Risk Assessment. ATSDR did review the data, but because the results were not substantially different from the results for largemouth bass and channel catfish, the findings are not presented in this table.

Screening values for listed chemicals (ppm)

Surface soil and sediment: Arsenic (20 – child-EMEG); benzo(a)pyrene (0.1– CREG); benzo(b)fluoranthene (0.22 – RBC); dibenz(a,h)anthracene (0.02 – RBC); BEHP (46– RBC).

Fish tissue–EPA’s RBC: Arsenic (0.0021); BEHP (0.23); Mercury ‘methyl’ (0.14); methylene chloride (0.42).

Abbreviations

BEHP = bis(2-ethylhexyl)phthalate; EMEG = environmental media evaluation guide; CREG = cancer risk evaluation guide; ND = not detected; PAH = polycyclic aromatic hydrocarbon; RBC = EPA’s risk-based concentration.

Public Health Implications

Heritage Lake is a popular fishing and picnic spot. ATSDR evaluated the potential for people to be exposed to contaminants by consuming fish in Heritage Lake or by participating in other recreational activities near the lake. ATSDR evaluated three situations that could potentially result in exposures:

- Contacting surface soil at recreational areas surrounding Heritage Lake
- Fishing, wading, or swimming in Heritage Lake
- Consuming fish from Heritage Lake

ATSDR evaluated whether contaminants are present at elevated concentrations in soils, surface water, sediments, and fish tissue, and considered whether people would likely come in contact with these contaminants with sufficient frequency to cause harm. It is important to emphasize that although sampling may identify some contaminants that exceed their screening values, a realistic depiction of actual exposure hazards are typically based on the average (not maximum) concentration an individual will be exposed to over his or her lifetime. When there is uncertainty about the actual concentrations or if the number of samples is not sufficient to adequately represent a large geographic area, ATSDR may decide to use the maximum detected concentration to calculate exposure dose.

- *Contacting surface soil at recreational areas surrounding Heritage Lake.* The Air Force collected soil samples around Heritage Lake. The samples were analyzed for a large number of chemicals commonly found at hazardous waste sites. The results of the analyses showed that PAHs were the only compounds detected at levels that warranted further evaluation.

At CAFB, people could have been exposed to PAHs by ingesting small amounts of soil or through dermal (skin) contact. During normal activities people can accidentally ingest soil and dust generated from soils. In fact, everyone ingests some soil or dust every day. Small children (especially those of preschool age) tend to swallow more soil or dust than any other age group. They tend to have more contact with soil because of play activities and because of a tendency toward hand-to-mouth activity. Older children, teenagers, and adults tend to swallow much smaller amounts of soil. The amount of grass cover in an area, the amount of time spent outdoors and indoors, and weather conditions also all influence how much contact with soil and dust people might have.

ATSDR calculated estimated exposure doses for benzo(a)pyrene, generally the most toxic and well studied PAH, based on certain assumptions about activities at Heritage Lake. ATSDR estimated exposure doses to PAHs in soil considering both adult and children, assuming exposure over a 30-year period. ATSDR assumed that a child might ingest 200 milligrams of soil per day (mg/day), which equals approximately 1/16th of teaspoon; adults are assumed to ingest 100 mg/day. These values represent average rates of soil ingestion based on studies examining a range of plausible exposure situations. ATSDR also assumed that 100 percent of the PAHs in the soils would be absorbed into the body.

EPA has not established reference doses for the individual PAH compounds. ATSDR reviewed the toxicological literature to determine whether benzo(a)pyrene levels found in soil are likely to cause health effects in people. The estimated dose for children (0.000002 mg/kg/day), the most sensitive population considered, is approximately 200,000 times lower than the lowest exposure dose found to cause measurable changes in the immune system such as reduced thymus weight and B-cell counts. Benzo(a)pyrene-induced tumors in animals are found only at even higher doses (ATSDR 1995). *ATSDR, therefore, concludes that people who come in contact with surface soil near Heritage Lake are not likely to develop adverse health effects from exposures to PAHs or other contaminants.*

- *Fishing, wading, or swimming in Heritage Lake (i.e., coming in contact with surface water and sediment).* Surface water and sediment samples collected during environmental investigations of Heritage Lake have not contained contaminants at levels of health concern. *ATSDR concludes that people who use the lake for fishing, or otherwise come in contact with surface water or sediments in the lake are not likely to be harmed.*
- *Consuming fish from Heritage Lake.* Heritage Lake is a popular location for fishing. ATSDR assumed that people consume, on average, one 8-ounce fish meal per week over the course of a year for a total of 30 years (i.e., 52 meals per year) from Heritage Lake. The ingestion rate is based on the 95th percentile of consumption rates reported by recreational freshwater anglers (EPA 1997). This is an overestimate of the average angler's fish consumption from Heritage Lake, as this lake's species diversity and overall numbers of fish are quite limited.

Because Heritage Lake is relatively small water body and does not support a large variety of edible fish species (the only fish in the lake are those that were placed there), the small number of samples collected and analyzed should be sufficient to characterize the nature and extent of contamination for the fish population in the lake. ATSDR reviewed the fish tissue data and identified three contaminants detected in fish that warranted further evaluation: arsenic, bis(2-ethylhexyl)phthalate, and mercury. Exposure doses for each of these contaminants were estimated using health-protective assumptions regarding average fish ingestion rates and frequency and duration of exposure (See Table 4).

- Exposure doses for arsenic were estimated for recreational fish consumers. Although not speciated in the laboratory, arsenic in fish is usually organic arsenic compounds that are non-toxic. Estimated arsenic doses were thousands of times below observed health effect levels (e.g., hyperpigmentation of skin and skin cancer) in humans.
- Bis(2-ethylhexyl)phthalate can be released into the environment through industrial activities. ATSDR's estimated doses for bis(2-ethylhexyl)phthalate were well below any levels reported to cause health effects in animals (ATSDR 2002). As mentioned previously, Heritage Lake does not contain enough fish species to support subsistence fishing. On the basis of the most current sampling data, *ATSDR concludes that estimated arsenic and bis(2-ethylhexyl)phthalate*

doses do not pose a current or future public health hazard to people who consume fish from Heritage Lake.

- The estimated mercury dose for people (adults and children) who consume one 8-ounce fish meal per week every week for 30 years slightly exceeded the reference dose (i.e., a dose of a specific contaminant that a person can be exposed to without having to be concerned about possible health effects) for mercury. The Food and Drug Administration (FDA) screening level guidance for daily exposure to seafood containing mercury is 1.0 ppm. *ATSDR concludes that consuming less than one 8-ounce fish meal per week from Heritage Lake does not pose a current health hazard and this is expected to be a safe level of consumption for recreational fishers in the future.*

Table 4. Comparisons of Estimated Dose and Corresponding Reference Doses for Contaminants Detected in Heritage Lake.

<i>Contaminant</i>	<i>Maximum Concentration (ppm)</i>	<i>Estimated Dose (mg/kg/day)</i>		<i>EPA Reference Dose (mg/kg/day)</i>	<i>Health Concern¹ Yes/No</i>
		Child	Adult		
Arsenic	0.09	0.000002	0.000003	0.0021	No
BEHP	0.73	0.00014	0.0003	0.02	No
Mercury	0.59	0.0006	0.0002	0.0001	Yes
Notes:					
¹ A concern indicates that recreational consumption of fish from Heritage Lake would likely pose a health risk and consumption of fish at the specified ingestion rates from that source should be avoided.					
<u>Abbreviations</u>					
BEHP = bis(2-ethylhexyl)phthalate; ppm = parts per million; mg/kg/day = milligrams per kilogram per day					

To be highly protective of developing fetuses and young children, as a prudent public health measure, pregnant women and children should avoid eating more than one fish meal per week from Heritage Lake. It is important to keep in mind that for most people who consume fish from Heritage Lake, those fish meals are expected to comprise only a small fraction of that individual's total diet. Therefore, it is also prudent to consider other potential sources of mercury exposure and avoid consuming specified fish species from any water bodies with posted fish advisories.

Exposure Situation #3: Fishing and Consuming Fish from Salt Fork Creek

Summary

During the site visit to CAFB in June 2001, ATSDR personnel expressed concern about the potential for Salt Fork Creek to contain contamination in sediments, surface water, and edible fish. The banks of Salt Fork Creek are heavily vegetated along most of the segments that run across the former CAFB property. The primary exposure concern is to anglers who may come in contact with sediments and surface water and who consume fish from the creek. At the time of the site visit, ATSDR requested available environmental data from the Air Force and also gathered information about the types of activities (e.g., fishing) that people are likely to engage in at Salt Fork Creek.

ATSDR reviewed the most current information regarding Salt Fork Creek and determined that the primary public health concern is associated with people consuming fish from both on- and off-site segments of the creek. Based on fish tissue sampling data, ATSDR identified several contaminants warranting further consideration and calculated exposure doses for these contaminants. ATSDR concludes that *none of the contaminants detected in Salt Fork Creek fish pose a public health hazard.*

ATSDR also considered the possibility of people swimming or wading in the creek, and determined that the levels of exposure to contaminants in surface water and sediment *do not pose a public health hazard.* Contact with surface soil at Salt Fork Creek has been eliminated as a potential health concern because the vegetation cover is very thick along most sections of the creek, and only low levels of contamination have been detected in surface soil. Based on this information, ATSDR does not believe that people are exposed to harmful levels of contamination by their activities along the banks, and thus the soil pathway will not be presented in this discussion.

Background

Salt Fork Creek is a small perennial stream that flows through the southeast corner of CAFB (Figure 3). Salt Fork Creek flows past several IRP sites, and historically received waste water from many areas of CAFB. Thus, many past activities on the base could have introduced contaminants into Salt Fork Creek. The on-base segment of Salt Fork Creek was designated an IRP site under previous investigations (Jacobs 2002).

Salt Fork Creek has been used for fishing (Jacobs 1998b). In September 2004, because of concerns about contamination in fish, the Air Force decided to post signs along the on-base portion of Salt Fork Creek that say “Environmental Area of Concern – No Fishing” (USAF 2004a).



Salt Fork Creek.

Surface Water Hydrology

Salt Fork Creek drains nearly all of CAFB, as well as agricultural areas west, south, and east of the base. Upstream of CAFB, Salt Fork Creek flows through farmland to the south and southwest of the base, and is joined by a small tributary that flows along the base's southwestern boundary (Jacobs 2002). The creek enters CAFB along the southern property line, then flows northeastward, passing between Landfill #1 and Landfill #2. This portion of the creek is channelized, with very steep banks (Jacobs 2002). At the intersection of South Perimeter Road and Titan Drive, the creek flows through an underground culvert for a distance of approximately 715 feet. From there, the creek flows in a generally eastward direction, exiting the base at the eastern boundary, along County Road (Jacobs 1998b). Downstream, Salt Fork Creek meanders in a natural streambed channel to the east and then to the south of CAFB. It joins the main trunk of Upper Salt Fork Drainage Ditch about 1 mile southeast of the base. The Upper Salt Fork Drainage Ditch eventually flows into the Vermillion River, a tributary of the Wabash River (Jacobs 2002).

Within CAFB, the creek receives surface water from a number of drainage ditches and surface water runoff from the on-base landfills (ATSDR 2001; Jacobs 1998b). Most of the storm water collection drainage systems on base, including those associated with the airfield, discharge to Salt Fork Creek through drainage ditches and outfalls (Jacobs 2002).

Salt Fork Creek receives groundwater discharge from the shallow Wisconsin saturated zone, which is present beneath Landfills #1, #2 and #3 from ground surface to a depth of approximately 45 to 60 feet. Groundwater discharge is sometimes visible in the form of seeps along the stream banks (Jacobs 1998b).

Typical water depths in the creek range from 4 inches to 4 feet; the greater depths are observed near beaver dams. Typical streambed widths range from 4 to 12 feet. The on-base segment of Salt Fork Creek drops about 10 feet in elevation over a distance of approximately 2 miles. Due to this relatively flat gradient, the creek flows very slowly during normal conditions (Jacobs 1998b).

Use of Salt Fork Creek

The public can access Salt Fork Creek from South Perimeter Road, especially near Landfills #1 and #2. The creek also flows past the public recreational areas at Heritage Lake. Carp and other fish have been observed in the creek, and people have been reported to pick mushrooms along its bank (Jacobs 1998b).

Recreational fishing by local residents has occurred along Salt Fork Creek in the past, and could still occur. ATSDR assumed that game fish taken from both of these water bodies may be eaten by local residents. Edible game fish species observed to be present in Salt Fork Creek include yellow bullhead (*Ameiurus natalis*), black bullhead (*Ameiurus melas*), largemouth bass (*Micropterus salmoides*), and carp (*Qyprinus carpio*). The amount of fish from Salt Fork Creek that residents catch and consume is not known.

Nature and Extent of Known Contamination

Contamination Sources

Contamination could potentially migrate to Salt Fork Creek from several sources. One possible source is shallow groundwater. Environmental investigations identified a VOC plume containing TCE and other solvents beneath the Building 975 IRP site—a former jet engine testing facility in the southeast corner of CAFB. The shallow groundwater beneath Building 975 flows north toward Salt Fork Creek, and contaminants in this plume could also migrate toward the creek (Jacobs 1996, 1998b).

Contaminants could also enter Salt Fork Creek through surface water runoff from adjacent landfills or other source areas (e.g., former Fire Training Areas or the Area 130 TCE Disposal Pit) (Jacobs 2002; URS 2007b). To address runoff, the Air Force has installed leachate collection systems at three of the on-base landfills.

Drainage from other areas of the base could also contain contaminants. Storm water from much of CAFB is routed to Salt Fork Creek through a network of drainage lines and storm sewers. Discharge of wastewater treatment effluent to the creek was discontinued in November 1987. However, private industries located on site may discharge to the creek through outfalls and culverts connected to the storm water drainage system (Jacobs 2002).

Environmental Sampling Results

Surface Water and Sediment: Sampling activities associated with Salt Fork Creek, drainage ditches, outfalls, and seeps began in August 1999 (Jacobs 2002). During the 2002 Salt Fork Creek environmental investigation, the Air Force collected surface water and sediment samples from 12 locations along the on-base segment of Salt Fork Creek, plus additional locations upstream for comparison. Sediment samples were collected at 0 to 6-inch depths from the area of lowest flow at each location, as identified through visual observation (Jacobs 1998b).

The Air Force collected additional surface water and sediment samples as part of the On-Base Salt Fork Creek Risk Assessment (URS 2004a). For this evaluation, the Air Force sampled sediment from 21 locations and surface water from 9 locations along the on-base portion of Salt Fork Creek. Additional surface water samples were collected from seeps and outfalls along the creek (URS 2004a).

Four chemicals were detected in Salt Fork Creek surface water at levels that could pose a health concern, but none of these chemicals were detected at a high frequency (Table 5). Arsenic (maximum 14.9 ppb) and two PAHs were mostly detected at low concentrations, below levels of health concern, while TCE (maximum 59 ppb) was detected in three water samples collected at outfalls. Nine contaminants were detected at levels that exceed screening values in sediment (Table 5). PAHs were detected in many sediment samples, whereas most other contaminants were detected infrequently.

Table 5. Contaminants Detected in Surface Water and Sediment at Salt Fork Creek

<i>Contaminant</i>	<i>Exceedances/ Detects (# of Samples)¹</i>	<i>Range of Results (Average)²</i>	<i>Evaluate Further (Yes/No)</i>	<i>Decision Rationale</i>
Surface water (ppb)				
Arsenic	1/50 (52)	ND—14.9 (1.3)	No	These contaminants were detected above their respective screening values in fewer than 10 percent of the total samples collected.
Dibenz(a,h)anthracene	4/4 (52)	ND—0.03 (0.01)	No	
Indeno(1,2,3-c,d)pyrene	2/7 (52)	ND—0.07 (0.03)	No	
TCE	3/14 (51)	ND—59 (8.8)	No	
Sediment (ppm)				
Aroclor 1254 (PCB)	1/1 (45)	ND—14	No	PCBs were detected above their respective screening values in fewer than 10 percent of the total samples collected.
Arsenic ²	2/45 (45)	1.9—32 (6.9)	No	Arsenic was detected above its respective screening values in fewer than 10 percent of the total samples collected.
Benzo(a)anthracene	24/45 (45)	0.001—12 (1.7)	Yes	These are all PAH compounds. ATSDR further evaluated the most toxic of the PAH compounds, benzo(a)pyrene, and assessed the potential for health effects given the levels detected in sediments and the frequency with which people may come in contact with sediments in Salt Fork Creek.
Benzo(a)pyrene	28/45 (45)	0.001—9.8 (1.5)	Yes	
Benzo(b)fluoranthene	26/45 (45)	0.002—16 (2)	Yes	
Benzo(k)fluoranthene	9/39 (45)	ND—15 (1.7)	Yes	
Dibenz(a,h)anthracene	21/39 (45)	ND—1.6 (0.2)	Yes	
Dieldrin	1/4 (45)	ND—0.3 (0.07)	No	These pesticides were detected above their respective screening values in fewer than 10 percent of the total samples collected.
Heptachlor epoxide	1/3 (45)	ND—0.1 (0.04)	No	
Source: URS 2006a				
Notes: Only contaminants that exceed their respective screening values are presented in the table.				
¹ Numbers in parentheses represent the total number of samples analyzed (i.e., includes samples where the analyte was not detected).				
² Numbers in parentheses represent the arithmetic mean (average) of samples with detected concentrations.				
<u>Screening values for listed chemicals</u>				
Surface water (ppb): Arsenic (10 – MCL); dibenz(a,h)anthracene (0.003– RBC); indeno(1,2,3-c,d)pyrene (0.03–RBC); TCE (5 – MCL).				
Sediment (ppm): Aroclor 1254 (1 – child EMEG); arsenic (0.0021– RBC); benzo(a)anthracene, benzo(b)fluoranthene (0.22 – RBC); benzo(a)pyrene, dibenz(a,h)anthracene (0.022 – RBC); benzo(k)fluoranthene (2.2 – RBC); dieldrin (0.04 – CREG); heptachlor epoxide (0.08 – CREG).				
<u>Abbreviations</u>				
MCL = EPA's maximum contaminant level for drinking water; ND = not detected				
PAH = polycyclic aromatic hydrocarbon; PCB = polychlorinated biphenyl;				
ppb = parts per billion; ppm = parts per million;				
RBC = EPA's risk-based concentration value;				
RMEG-child = ATSDR's reference dose media evaluation guide for children;				
TCE = trichloroethylene				

Fish Tissue: In 2000, the Air Force collected fish samples from four locations within the on-base portion of Salt Fork Creek, and analyzed these samples for VOCs, SVOCs, PAHs, metals, dioxins/furans, PCBs and herbicides (Jacobs 2002). Five species were sampled: carp (*Cyprinus carpio*), largemouth bass (*Micropertus salmoides*), shiner (*Notropis ludibundus*), sunfish (*Lepomis species*), and hornyhead chub (*Nocomis biguttatus*). Carp were caught with a hook and line; all other species were caught using a cast net and seine. Carp were the only fish large enough to fillet and be considered edible; and, therefore, carp was the only species included in the Air Force's human health risk assessment for Salt Fork Creek (Jacobs 2002; URS 2004a).

To assess contaminant levels in a greater variety of fish species, EPA requested that the Air Force collect additional samples from Salt Fork Creek. In October 2005, the Air Force collected edible-size fish from three species: a bottom feeder (bullhead), an omnivore (carp), and a predator (largemouth bass) (USAF 2005). Fish were collected starting at the downstream CAFB boundary and working upstream, dividing Salt Fork Creek into six reaches. Only reaches 5 and 6 contained fish of the proposed species and size for collection (URS 2005a). Seven chemicals were detected in fish tissue samples at levels that exceeded EPA's risk-based concentrations (RBCs) for fish tissue (Table 6). Arsenic (maximum 0.14 ppm in bullhead) was detected in all fish samples, as were four pesticides (aldrin, chlordane, dieldrin, and heptachlor epoxide), BEHP, and one PAH (benzo[a]pyrene). Mercury was also detected in all samples (maximum 0.1 ppm in largemouth bass).

Table 6. Summary Statistics for Contaminants Detected in Fish Tissue at Salt Fork Creek

<i>Contaminant</i>	<i>Exceedances/ Detects (# of Samples)¹</i>	<i>Range of Results (ppm)</i>	<i>RBC (ppm)</i>	<i>Evaluate Further (Yes/No)</i>	<i>Decision Rationale</i>
Aldrin	3/3 (3)	0.00024–0.00034	0.00019	Yes	Each of these contaminants exceeded its respective screening value based on a relatively small number of samples collected.
Arsenic	1/1 (1) 2/2 (3)	0.05 ND–0.14	0.0021	Yes	
Benzo(a)pyrene	1/1 (1) 3/3 (3)	0.19 0.00031–0.0029	0.00043	Yes	
BEHP	1/1 (1)	5.3	0.0029	Yes	
Chlordane	1/1 (1) 2/3 (3)	0.027 0.008–0.017	0.009	Yes	
Dieldrin	1/1 (1) 3/3 (3)	0.008 0.007–0.013	0.0002	Yes	
Heptachlor epoxide	1/1 (1) 3/3 (3)	0.005 0.001–0.003	0.0035	Yes	

Source: URS 2004a, 2005d

Notes:

Fish sampling results are reported for two separate sampling efforts. The species sampled include carp, bullhead, and largemouth bass. Only contaminants that exceed EPA's RBC for contaminants in fish tissue are presented in the table.

¹ Numbers in parentheses represent the total number of samples analyzed (i.e., includes samples where the analyte was not detected).

Abbreviations

BEHP = bis(2-ethylhexyl)phthalate; ND = not detected; ppm = parts per million; RBC = EPA's risk-based concentration

Public Health Implications

ATSDR evaluated the potential for people to be exposed to contaminants by contacting surface water or sediments in Salt Fork Creek or by consuming fish caught in the creek. ATSDR evaluated two primary situations that could potentially result in exposures:

- Fishing, wading, or swimming in Salt Fork Creek
- Consuming fish caught in Salt Fork Creek

ATSDR evaluated whether contaminants were at elevated concentrations in surface water, sediments, and fish tissue, and considered whether people would likely come in contact with these contaminants with sufficient frequency to cause harm. ATSDR also reviewed surface soil data for samples collected near the creek. Although some contaminants were detected, none were found at sufficient frequency or at levels that would result in harm if people were to come in contact with the soil. Frequent contact with surface soil near the creek is considered unlikely because of the dense vegetation cover along much of the creek.

- *Fishing, wading, or swimming in Salt Fork Creek (coming in contact with surface water and sediment).* The main contaminants detected in surface water and sediments were PAHs, pesticides, and arsenic. Most contaminants were detected infrequently and at relatively low concentrations in surface water. The most prevalent contaminants detected in sediments were PAHs.

People are generally unlikely to come in contact with sediments, which typically are submerged beneath water or are found in swampy or muddy areas. The primary concern with contaminants in sediments is that they can be taken up by plants or animals and accumulated through the food chain, eventually exposing people. This is the primary exposure pathway ATSDR evaluated for Salt Fork Creek. ATSDR did consider the possibility of people swimming or wading in the creek and concluded that the levels of exposure to contaminants *do not* pose a current or future public health hazard. Even if recreational fishers were to come in contact with surface water and sediments from the creek on a daily basis, which is not very likely, the estimated doses would be well below known health effect levels.

- *Consuming fish caught in Salt Fork Creek.* Salt Fork Creek has been used by local residents for fishing in the past. However, reliable estimates regarding the current frequency with which people utilize the creek as a fishing resource are not available. In August 2004, the Air Force posted “no fishing” signs as a precautionary measure along portions of Salt Fork Creek based on preliminary findings of the Draft Human Health and Screening Level Ecological Risk Assessment released in July 2004 (URS 2004a). In February, 2008, EPA (Region 5) and IEPA agreed to remove fencing and “no fishing” signage along the Salt Fork Creek. For purposes of this evaluation ATSDR assumes that at least some people continue to consume fish from the creek. However, current consumption of fish caught in the creek is likely lower than the assumptions ATSDR used in estimating exposure dose.

ATSDR reviewed the available fish tissue data and identified seven contaminants detected in fish that warranted further evaluation (see Table 6). Exposure doses for each of these contaminants⁴ were estimated using health-protective assumptions regarding average fish ingestion rates and frequency and duration of exposure.

ATSDR assumed that people consume, on average, one 8-ounce fish meal per week over the course of a year for a total of 30 years (i.e., 52 meals per year) from Salt Fork Creek. This ingestion rate is based on the 95th percentile of consumption rates reported by recreational freshwater anglers (EPA 1997). As noted previously, this is likely an overestimate of the average angler's fish consumption from this creek since its species diversity and overall numbers of fish are quite limited and the Air Force has posted "no fishing" signs.

Unlike fish sampled from Heritage Lake, mercury was *not* detected in Salt Fork Creek fish at levels that could pose a potential health concern for children or pregnant women. In addition, the estimated doses for the contaminants that were found to be elevated were all below their respective reference doses (Table 7) and well below levels that are known to cause cancer and non-cancer health effects. Therefore, on the basis of the most current sampling data, *ATSDR concludes that none of the contaminants detected in Salt Fork Creek fish pose a current public health hazard and recreational consumption of fish.*

Table 7. Comparisons of Estimated Dose and Corresponding Reference Doses for Contaminants Detected in Salt Fork Creek Fish.

Contaminant	Maximum Concentration (ppm)	Estimated Dose (mg/kg/day)		EPA Reference Dose (mg/kg/day)	Health Concern ¹ Yes/No
		Child	Adult		
Aldrin	0.00034	0.000003	0.000001	0.00003	No
Arsenic	0.14	0.00001	0.000005	0.0021	No
BEHP	5.3	0.005	0.002	0.02	No
Chlordane	0.027	0.00003	0.000009	0.0001	No
Dieldrin	0.007–0.013	0.00001	0.000004	0.00005	No
Heptachlor epoxide	0.005	0.000005	0.000002	0.000013	No
<p>Notes: Fish sampling results are reported for two separate sampling efforts. The species sampled include carp, bullhead, and largemouth bass.</p> <p>¹ A concern indicates that recreational consumption of fish from Salt Fork Creek would likely pose a health risk and consumption of fish at the specified ingestion rates from that source should be avoided. On the basis of ATSDR's evaluation, public health hazards from the chemicals detected in Salt Fork Creek fish are not expected.</p> <p><u>Abbreviations</u> BEHP = bis(2-ethylhexyl)phthalate; ppm = parts per million; mg/kg/day = milligrams per kilogram per day</p>					

⁴ An exposure dose for benzo(a)pyrene was not presented because there is no reference dose available. However, a review of the toxicological literature shows that measured concentrations in fish tissue were below those known to cause adverse health effects (ATSDR 1995).

Exposure Situation #4: Contacting Surface Soil in Residential and Recreational Reuse Areas of CAFB

Summary

Surface soil contamination has been present throughout CAFB as a result of past activities and releases. The Air Force, however, has addressed much of the surface soil contamination concern through investigation and remediation. ATSDR reviewed the decision criteria used as the basis for determining that an area with surface soil concerns was suitable for unrestricted (including residential and recreational) reuse. ATSDR agreed that the decision criteria would protect public health during residential and recreational reuse. ATSDR also reviewed surface soil sampling conducted at four sites where the status of future investigations and remediation is unclear. No contaminants were found in surface soil at levels of concern. As such, ATSDR concludes that exposure to surface soil *does not pose a public health hazard* under current residential and recreational reuse plans.

Background

Past activities at CAFB resulted in contaminant releases to surface soil at various locations throughout CAFB. Under the IRP program, the Air Force identified approximately 100 IRP sites and AOCs. For the majority of these sites, the Air Force has conducted site sampling and implemented remediation activities, if necessary. A number of sites, however, are still undergoing sampling and remediation (URS 2006a; Donna Kozak, Booz Allen Hamilton, personal communication, October 25, 2006). Appendix A lists the designated IRP sites and AOCs at CAFB along with the media most likely to be contaminated, a brief description of any remedial actions, and ATSDR's public health evaluation. ATSDR's evaluation of surface soil, which is presented below, focused on IRP sites that are within areas zoned for residential or recreational use.

To assess exposures to surface soil contamination, ATSDR reviewed current reuse and redevelopment plans for CAFB and identified 28 IRP sites or AOCs located within areas zoned for residential or recreational reuse, including areas zoned for short-term housing. This does not include the recreational area around Heritage Lake, which is covered in an earlier section of this report. With oversight provided by EPA and IEPA, the Air Force has addressed contamination concerns at 17 of these sites (URS 2006a; Donna Kozak, Booz Allen Hamilton, personal communication, October 25, 2006). At these sites, investigations have either found no contaminants at levels of concern or the Air Force has completed actions to remove or prevent contact with contaminants. At six sites, Air Force investigations and remedial activities are ongoing. At one site, the potential contamination source consists of buried debris or drums, and no surface soil contamination is present (URS 2003a).

ATSDR identified four sites for further evaluation because the status of future investigations or remediation at these sites is not clear.⁵ These four sites are located in residential or recreational reuse areas, and historical records indicate that they could potentially contain surface soil contamination (URS 2003a). The four sites are as follows:

⁵ These four sites are designated as "areas of concern," which means they are not tracked under the IRP program.

- **Former Playground Area:** This area is located in the central portion of CAFB northwest of the runways. This area is slated for reuse as a mixed residential and office area. Former CAFB structures and activities at this site may have contributed lead to the soil, including playground equipment with lead-based paint, radio antennas with large wires (with lead-based solder), and construction staging and pipe dismantling activities (URS 2003a).
- **Pistol Range 1:** This site is located in the southwest residential area. For approximately 7 to 9 years during the mid to late 1940s, this area was used as a small arms shooting range. Lead contamination from ammunition is present at low concentrations (URS 2003a).
- **Rifle Range 1:** This site is located in the northeast residential area. This area served as a rifle shooting range for approximately 4 to 7 years in the mid to late 1940s. Lead contamination from ammunition is also a concern at this site (URS 2003a).
- **South Wastewater Treatment Plant:** This area is located in the central portion of CAFB, west of the runways. Reuse plans for this area are unclear. Some plans show industrial and aviation support as the intended reuse, whereas other plans include this site as a recreational reuse area. This wastewater treatment plant operated from approximately 1940 to 1988. The Air Force originally operated a trickling filter and sludge drying beds at the wastewater treatment plant, but then installed septic tanks in 1956. PCBs and metals remaining in the sludge after treatment could have resulted in surface soil contamination (URS 2003a).

Nature and Extent of Known Contamination

At the Former Playground Area, Pistol Range 1, and Rifle Range 1, the Air Force collected a total of 85 surface soil (0 to 6 inches) samples and analyzed these samples for lead (URS 2006a). At the Former Playground Area, all 47 samples contained lead at concentrations ranging from 18.2 to 262 ppm. At Pistol Range 1, all 19 samples contained lead at concentrations ranging from 15.9 to 34.8 ppm. At Rifle Range 1, all 19 samples contained lead at concentrations ranging from 15.8 to 103 ppm. All samples were below the EPA soil screening level of 400 ppm.

At the South Wastewater Treatment Plant, the Air Force collected 14 surface soil samples and analyzed these samples for PCBs and metals (URS 2006a). No PCBs were detected. Of the metals, which are natural components of soil, only iron was found above the Air Force remediation decision criteria. Iron was found in all 14 samples at concentrations ranging from 18,000 to 28,000 ppm. Concentrations in two samples (24,000 ppm and 28,000 ppm) were above the decision criteria of 23,000 ppm.

Public Health Implications

The Air Force has completed sampling and, as needed, conducted remediation actions at sites with surface soil contamination exceeding the specified decision criteria at CAFB. Only a few remaining sites are currently undergoing additional sampling or remediation. ATSDR reviewed the Air Force decision criteria used to assess remediation requirements to confirm that these values were protective of public health. The decision criteria are based on available state and federal guidelines and site-specific background concentrations. The Air Force reviewed the EPA Region 9 Preliminary Remediation Goals (PRGs) and the IEPA Tiered Approach to Corrective Action Objectives (TACO) (USAF 2003). The PRGs and TACO used by the Air Force were

developed to protect human health during residential use of an area (EPA 2004b; IEPA 1997). For inorganic contaminants, the Air Force also considered site-specific background concentrations—the concentrations that are a natural part of the soil and not a result of CAFB or other industrial releases. The Air Force then selected the lowest of the available health-based guidelines as the decision criteria for CAFB remediation. For inorganics, the Air Force selected either the lowest health-based guideline or the background concentration, whichever was higher. After reviewing the decision criteria, ATSDR agreed that these values are protective of public health during residential reuse. As such, no public health hazards are expected at sites where activities are completed or activities are ongoing with regulatory oversight.

Of the four sites identified for further evaluation, only iron in surface soil at the South Wastewater Treatment Plant exceeded its screening level. Iron is an important mineral necessary to support good health. Without enough iron, a person's body cannot produce the hemoglobin (a component of blood) or myoglobin (a component of muscles) necessary to sustain life. Iron deficiency anemia is a condition occurring when the body does not receive enough iron and is treated with iron supplements (Anderson 2006). The greatest concern for harm from iron comes from accidental ingestion of large quantities of iron by children. Acute iron poisoning has been reported in children under 6 years old who have accidentally overdosed on iron-containing supplements for adults. According to the U.S. Food and Drug Administration (FDA), doses greater than 200 milligrams (mg) per event could poison a child (FDA 1997). Research indicates that between 3 and 35 percent of iron ingested is actually absorbed, with iron found in foods (e.g., beef and liver) absorbed at the highest level and iron found in the environment (e.g., soil) at the lowest level (Anderson 2006).

Assuming a 35 percent absorption rate, a child would need to eat approximately 0.7 ounces or almost 20 grams (20,000 mg) of soil (equivalent to the weight of eight pennies) from the area with the maximum iron concentration. ATSDR typically assumes that a child ingests 200 mg of soil per day. This is based on the recommended conservative estimate for a child's average soil ingestion in EPA's Exposure Factors Handbook (EPA 1997). The nearly 20 grams of soil a child would need to ingest before experiencing adverse health effects is nearly 100 times EPA's suggested value. This level of ingestion is unlikely; therefore, potential public health hazards resulting from iron concentrations in surface soil are not expected.

Community Health Concerns

Responding to community health concerns is an essential part of ATSDR's overall mission and commitment to public health. ATSDR typically identifies community health concerns through meetings or correspondence with community members, state and local officials, and site personnel, as well as through review of site documents, including records of decision (RODs) and Community Relations Plans. As a result, ATSDR identified the following community concerns:

A citizen expressed concern about the past quality of CAFB drinking water.

According to an RI conducted by the Air Force in 1991, nine groundwater wells have been used for providing drinking water to on-site facilities. Water from each of these nine wells is drawn from the Kansan aquifer at depth of at least 200 feet bgs (Engineering-Science 1991). Investigations of groundwater contamination at CAFB concluded that contamination is primarily restricted to shallow groundwater (i.e., Wisconsinan saturated zone), which is generally found at 10 to 35 feet bgs (Mitretek 2003; Christopher Hill, IEPA, personal communication, June 12, 2006). Drinking water in the Kansan aquifer and contaminated groundwater in the Wisconsinan saturated zone are separated by two layers of till that minimize vertical movement of groundwater, as well as another aquifer in between (Illinoian aquifer) (Mitretek 2003). Past contamination of CAFB wells was not likely because of the physical separation of groundwater contamination and the drinking water source.

IEPA maintains the Drinking Water Watch database, an online database of results from public water supply monitoring and testing. ATSDR reviewed available information for the village of Rantoul water supply, which now operates five of the former CAFB water supply wells. Data for these wells were available back to 1982. ATSDR found no contaminants detected at levels of concern. The database also lists violations and enforcement actions issued to a water supply; no violations for exceeding MCLs are listed for the village of Rantoul public water supply system (IEPA 2006).

Based on sampling results and the physical separation of the drinking water supply and groundwater contamination, ATSDR concludes that the past quality of CAFB drinking water was not compromised by CAFB releases.

ATSDR identified a military surplus business in the southeast corner of CAFB during the 2001 site visit. Concern exists about potential hazards associated with this business.

A scrap surplus business specializing in buying and reselling U.S. government surplus materials operated in the southeast corner of CAFB, near the former Building 995. Materials stored at the business have included several airplane fuselages. A court order is currently in place and limits activities at the business to removing existing inventory; no new inventory is allowed. Access to this area is discouraged, but not prohibited, by a locked gate along the roadway, fences along two sides of the area, Salt Fork Creek, and undeveloped woodland areas (David Wacker, Booz Allen Hamilton, personal communication, September 5, 2006). During the site visit, however, ATSDR observed evidence of trespassing in this area (e.g., discarded bottles and cans, fencing damaged

on backside near homes), but no visual signs of chemical contamination. Surplus materials could present a physical hazard to trespassers. As such, ATSDR recommends the installation of fences to enclose the open portions of the area or removal of remaining materials.

Although no environmental sampling of the business has been conducted, ATSDR did not identify evidence that contaminants have been released from the surplus materials (e.g., oils or fuels) during storage in the area. Trespassers accessing the area may contact contamination in surface soil, if present. Although no groundwater sampling has been conducted, residential wells located down gradient of the surplus business were sampled to address concerns about groundwater contamination from CAFB. One well contained elevated levels of naturally occurring sodium and another well contained elevated levels of arsenic from an unknown source (IDPH 2001; USAF 2000a, 2004b, 2004c, 2004d).

ATSDR evaluated these exposures in detail in the “Potential Exposure Situations” section. Based on this evaluation, ATSDR recommends that if the people who obtain drinking water from the well with elevated sodium have high blood pressure or heart conditions, or follow a sodium-restricted diet, they should consult their physicians. As a prudent public health action, ATSDR advises private drinking water well owners to periodically test their well for contaminants due to historical agricultural practices and close proximity to CAFB. ATSDR is working with the IDPH to notify residents and suggest ways to reduce their exposure to arsenic in their well. Fences or removal actions that would reduce physical hazards would also prevent exposure to possible contaminants in surface soil.

Agricultural crops (alfalfa, corn, and soybeans) have been grown in areas adjacent to the flight line at CAFB. Could these plants take up soil contaminants and present a public health hazard if eaten?

ATSDR is not aware of any sampling of specific crops (e.g., alfalfa, corn or soybeans) grown on-base. Therefore, ATSDR cannot make a definitive statement regarding the potential for people to be exposed from consuming these food crops. However, ATSDR has conducted extensive literature searches and convened expert panels to address similar issues at other contaminated sites around the country. The contaminants that would most likely be present in soils near the flight line include some heavy metals (lead, arsenic, and mercury), PAHs, and possibly some petroleum-based contaminants and VOCs (e.g., benzene, toluene, and possibly some solvents). Some general conclusions from experts and findings from the literature about biologic uptake are presented below. It is important to keep in mind that every exposure situation is different. However, in many cases there are overarching principles or experience-based knowledge that may provide useful guidance and help place concerns about consuming local crops into perspective.

A review of the scientific literature indicates that most plants do not contain chemical concentrations in their tissues that are higher than the contaminant levels in the soils in which they are grown. In fact, when soils contain adequate plant nutrients and are pH-balanced (i.e., not too acidic), metals and other contaminants are generally not absorbed much at all in plant tissues beyond the roots. There are, however, some exceptions to this general statement regarding plant accumulation of contaminants (e.g., some plant species hyperaccumulate certain elements). The

crops specifically mentioned (i.e., alfalfa, corn, and soybeans) are not known to hyperaccumulate contaminants that are known to be elevated in soils at CAFB.

Under normal conditions, organic contaminants (e.g., pesticides, PCBs, and other chlorinated compounds, and VOCs) and inorganic contaminants (i.e., metals) are rarely found at concentrations in plant tissues that would pose a human health hazard. Heavy metals such as arsenic, cadmium, lead, and mercury, which have high molecular weight, may be present in trace amounts in plant tissues. However, these metals do not usually accumulate in edible portions of the plant at levels that would be of human health concern (ERG 2001).

The most likely way for a person to be exposed to heavy metals in crops is through soil accumulation on the outside of the plant. Heavy metals are tightly bound to soil particles, which can readily adhere to roots and other parts of the plant that are near the ground. Thus, unwashed low-lying plants, leafy vegetables, and root crops could contain elevated levels of metals if grown in contaminated soil. Washing plant materials prior to eating significantly reduces the amount of contaminants present on the outer plant tissues. In addition, peeling the skin of certain plants used for food will remove much of the contaminated soil and minimize any potential exposure.

Organic compounds such as PCBs or pesticides are more likely to be deposited and adsorbed (i.e., adhered or bound) onto plant surfaces rather than being taken up into the root system. For example, when PCBs are released into the environment in industrialized areas, they typically volatilize in the air and are transported through the atmosphere and ocean. PCBs may eventually be deposited on terrestrial or aquatic vegetation a large distance from the original source. In most cases, deposition onto vegetation does not represent a significant human exposure pathway and what little is deposited is usually bound into the soil matrix.

The accumulation of PAHs from soil to plants is generally quite low. Some terrestrial plants can accumulate PAHs from soil via the roots or from air via the foliage. Mosses and lichens have been used to monitor atmospheric deposition of PAHs. Most studies indicate that atmospheric deposition on leaves largely exceeds accumulation from soil by roots as a route of PAH accumulation. In a study of PAH accumulation from cropland soils conducted in the United Kingdom, elevated concentrations of PAHs in soils were not correlated with concentrations in plant tissues. The PAH concentrations in above-ground plant parts were not strongly related to soil PAH levels but were probably the result of atmospheric deposition. The presence of PAHs in root crop tissues was probably due to soil adhering to the root surfaces. Transfer of PAHs from the root peel to the core appeared to be minimal. These observations suggest that simple adsorption onto the peel may be an important process (ATSDR 1995).

Long-term field studies (20-30 years) found no evidence of elevated PAH concentrations in the above-ground portions of several crop species grown in PAH-contaminated soils. Airborne sources of PAHs were regarded as the main origin of plant contamination in contaminated and non-contaminated soils. Transfer of PAHs from soil was minimal for root crops, and essentially zero for above-ground crops (NRC 1996).

Are contaminants migrating from Landfills #1-4 into the groundwater a source of contamination for farm crops that receive water from high volume irrigation wells?

Several farms operate just south of CAFB near Landfills #1-4. Some of these farms use irrigation systems supplied by groundwater wells. During ATSDR's site visit, citizens expressed concern about the potential for contaminants from the landfills to migrate into local farms' groundwater irrigation systems and possibly contaminate crops.

In general, most cases of crop contamination can be attributed either to high levels of contamination released directly in the soil (not from water being sprayed onto soil) or to direct atmospheric deposition of pollutants onto crops. In the case of CAFB, groundwater beneath the base *has* been contaminated by past activities. However, thorough testing of private drinking water wells immediately south of the CAFB landfills revealed only two contaminants of concern: elevated levels of arsenic in one well, and elevated levels of sodium in another. Both of these substances can occur naturally, and it is not clear that either case is related to contaminant migration from the base. Given that groundwater contamination south of the base is generally low, and given that most of the contaminated groundwater on the base is in the uppermost layer, which does not support high-yield irrigation wells, ATSDR believes that using groundwater from the deep confined aquifers for irrigation does not result in crop contamination that could pose a public health hazard.

Vapor Intrusion: Are VOCs migrating from contaminated groundwater and surface soil at the former CAFB into former base buildings?

At some hazardous waste sites, contaminant levels in soil, groundwater, or soil gas are high enough to cause concerns about indoor air quality in nearby buildings. Vapor intrusion occurs when volatile chemicals move from a subsurface source into the indoor air of overlying buildings. The buildings most vulnerable to vapor intrusion can often be identified by their general condition (e.g., presence of sumps or water intrusion, basement or ground floor slabs with cracks, or malfunctioning or lacking HVAC system). Vapor intrusion may cause unhealthy indoor air quality depending on the contaminant levels and the amount of time spent in the building (IDPH nd).

The Air Force initially conducted sampling at CAFB to determine whether VOCs were present under the building slabs. At some locations readings were detected above BCT agreed upon levels. Based on the sub-slab soil gas results, investigations progressed to indoor air sampling at 18 buildings to evaluate the nature and extent of vapor intrusion (URS 2007c).

The Air Force evaluated potential future risk from exposure to chemicals in indoor air based on groundwater or soil gas data and actual indoor air sampling. Five buildings (Bldg. 343, Hangar 2, Bldg. 923, Bldg. 927, and Bldg. 995) were determined to warrant further evaluation based on the estimated risk from vapor intrusion. Evaluation of measured indoor air concentrations at these buildings indicates that vapor intrusion is not currently occurring at levels of health concern to workers or other authorized personnel (URS 2007c).

Planned remedial activities at these sites are expected to reduce the source(s) of the sub-slab soil gas constituents and mitigate the vapor intrusion pathway. However, ATSDR is concerned that VOC levels may increase, or use of buildings with vapor intrusion may change. The Air Force should continue to monitor indoor air conditions until remediation goals are met at for several consecutive years at Building 343 and any other buildings with vapor intrusion issues to ensure that people are not breathing contaminated air from vapor intrusion of VOCs in groundwater and soil gas plume movement.

Are any groundwater contaminant plumes beneath the former CAFB impacting off-site private drinking water wells?

ATSDR reviewed available on- and off-site groundwater data collected during base-wide environmental investigations to evaluate the potential for groundwater plumes to impact private or public water supplies near the former CAFB. An initial screening of contaminants detected in groundwater beneath the base identified TCE (and breakdown products such as 1,2-dichloroethylene and vinyl chloride) as the only contaminant that warranted further evaluation. This was based on the frequency and magnitude of measured concentrations and the proximity of TCE groundwater plumes to the former base boundary.

The nature and extent of TCE contamination, both on- and off-site, was evaluated. A review of the data shows that only samples collected from the Wisconsin aquifer, which is the aquifer closest to the ground surface, contained TCE at levels greater than 5 ppb. The Wisconsin is not used as a drinking water source. Figure 4 displays groundwater samples collected between 2000 and 2007. Green points on Figure 4 represent samples containing TCE detected above its analytical detection limit, but below 5 ppb. Orange points on Figure 4 represent samples containing TCE concentrations above 5 ppb. Sample results collected prior to 2000 were not available because they did not meet required quality assurance standards.

ATSDR also reviewed samples collected from the Illinoian aquifer (> 60 feet bgs); the primary source of private well drinking water in the area. A total of 54 samples were collected from 15 wells between 2000 and 2004. Figure 5 displays the 15 monitoring wells in the Illinoian Aquifer that were sampled for TCE. Green circles on Figure 5 represent monitoring wells analyzed for TCE, but were below the analytical detection limit. Orange squares represent wells where TCE was reported above the analytical detection limit. TCE was detected in 5 of 15 wells (i.e., a 33 percent frequency of detection). However, TCE was not detected in any wells at concentrations greater than 1 ppb; below TCE's EPA MCL of 5 ppb.

ATSDR also confirmed that the Air Force sampled at least two of the residential wells for TCE. No samples contained detectable levels of TCE. These samples were collected in 2002 and 2004. Given that TCE has not been detected in the Illinoian aquifer on-site at levels of concern, it is unlikely that residential wells will be significantly impacted by TCE in the future. However, as a precautionary measure, ATSDR recommends that the Air Force continue periodic monitoring of the Illinoian aquifer near the southeastern site boundary.

Figure 4. TCE Detected in Wisconsian aquifer beneath the Former CAFB (2000—2007)

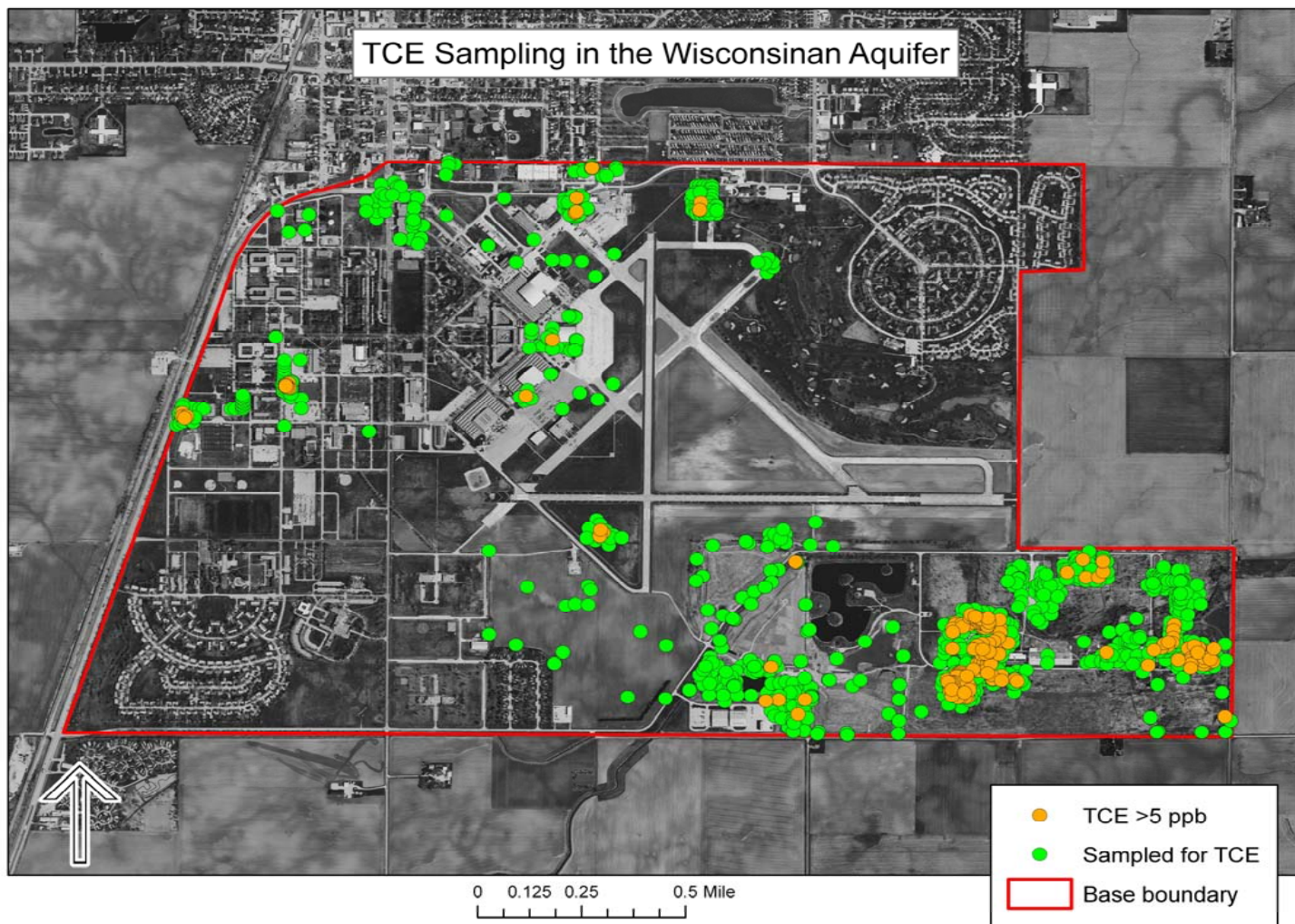
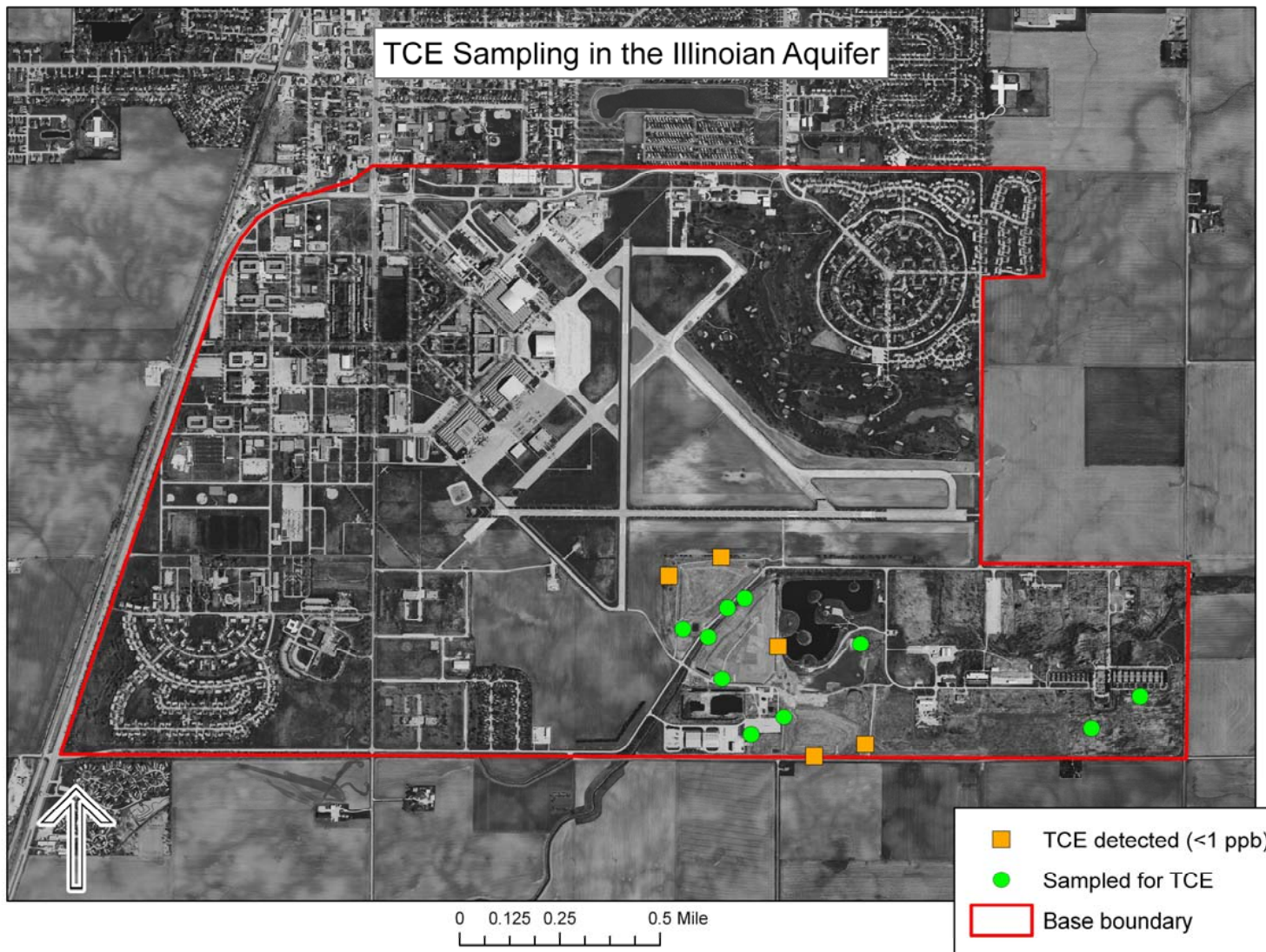


Figure 5. TCE Detected in the Illinoian Aquifer beneath the Former CAFB



Other Considerations for Transfer and Reuse at Chanute AFB

ATSDR's evaluation of potential exposure pathways at the former Chanute AFB did not identify any public health hazards that warrant immediate action. However, a review of the current activities on the former base along with discussions with USEPA, IEPA, and AFRPA representatives indicate that the oversight of leased or transferred property and the general adherence to land use controls is a concern to environmental and public health agencies responsible for protecting the welfare of the community and needs to be improved at this site. ATSDR will work with agencies and the village of Rantoul to help ensure that people are not exposed to unsafe levels of chemical contaminants from past uses, disposal, and releases into the environment. Miscommunication between the responsible parties has occasionally resulted in: 1) reuse activities that are not always appropriate for the land use designations originally assigned by the Air Force; 2) property being leased prior to scheduled remedial activities; and 3) increased risk of physical hazards due to unauthorized access of abandoned and deteriorating buildings.

ATSDR is specifically concerned with the following transfer/reuse issues:

1. Land at CAFB being leased for agricultural purposes prior to completion of remediation activities or not consistent with its land use designation.
2. Abandoned and deteriorating buildings containing asbestos, lead paint, or other chemical or physical hazards that are accessible to the public.
3. Miscommunication between Air Force and lease holders with respect to land use restrictions and proper institutional controls to prevent people from coming in contact with contamination or any potential hazards.
4. Need for future monitoring of landfill gasses to ensure that methane and other contaminant levels in close proximity to any residential areas are below established health guidelines.
5. Need for future monitoring of vapor intrusion in occupied buildings to ensure that VOCs and other air contaminants are below established health guidelines.

Although there is no evidence that these issues currently pose a public health hazards for people who live in close proximity to CAFB or utilize any of the leased lands or buildings at the former base, miscommunication is a concern to environmental and public health agencies responsible for protecting the welfare of the community. ATSDR will work with agencies and the village of Rantoul to fine tune land use management tools, standard operating procedures, and communication, to help ensure that people using the property are not exposed to safety hazards or unsafe levels of chemical contaminants from past uses, disposal, and releases into the environment.

Child Health Considerations

ATSDR recognizes that infants and children may be more sensitive to exposures than adults in communities with contamination in water, soil, air, or food. This sensitivity is the result of a number of factors. Children are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. Children are shorter than adults, which means they breathe dust, soil, and heavy vapors close to the ground. Children are also smaller, potentially resulting in higher doses of chemical exposure per unit body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. In addition, children depend completely on adults for risk identification and management decisions, housing decisions, and access to medical care. Therefore, ATSDR is committed to evaluating their special interests at sites such as CAFB.

Like other people living or working at or in the vicinity of CAFB, children may contact contaminated site media, as discussed in the Evaluation of Environmental Contamination and Potential Exposure Pathways section of this public health assessment. ATSDR considered that the populations identified and assessed at CAFB would include children as well as adults. As such, the evaluations of the following exposure situations considered exposures to children:

- Drinking water from the public water supply or from private wells south of CAFB
- Participating in recreational activities at Heritage Lake
- Fishing and consuming fish from Salt Fork Creek
- Contacting surface soil in residential and recreational reuse areas of CAFB

Using available information about potentially exposed children, site and area use, access restrictions, sampling data, and remedial actions, ATSDR evaluated to what extent, if any, children may be exposed to contaminants in groundwater, surface water, sediment, surface soil, and fish. ATSDR identified one potential health concern specific to children: consuming fish from Heritage Lake. Due to elevated levels of mercury in these fish, children are advised to eat no more than one fish meal per week from Heritage Lake.

Conclusions

After evaluating available environmental information, ATSDR determined that contamination at CAFB poses *no apparent public health hazard*. However, ATSDR did identify a single private well south of the former base that contains arsenic from an unknown source at levels of health concern. ATSDR's pathway-specific conclusions regarding potential exposure situations are as follows:

- Drinking water from the village of Rantoul's public water supply contains sodium, a naturally occurring mineral, at levels of health concern for people with high blood pressure, heart conditions, or following a sodium-restricted diet. No other contaminants, however, are present at levels of concern. Although contamination is present in shallow groundwater on CAFB, this contamination does not affect the quality of the public water supply, which is drawn from deep aquifers that are separated from the shallow groundwater.
- One private well south of CAFB consistently contained arsenic at levels above the current drinking water standard even though levels are lower than those shown to result in adverse health effects over a lifetime of exposure. Another private well contains sodium at levels of health concern for people with high blood pressure, heart conditions, or following a sodium-restricted diet. No other contaminants are present in these private wells at levels that would cause adverse health effects.
- Fish in Heritage Lake contain slightly elevated levels of mercury. Consuming one 8-ounce fish meal per week from Heritage Lake does not pose a current health hazard. However, people, especially children and pregnant women, are advised to avoid eating more than one fish meal per week from Heritage Lake.
- Exposure to surface soil, sediment, or surface water at or near Heritage Lake does not pose a public health hazard for people who use the lake for recreational activities.
- Recreational activities at Salt Fork Creek, including swimming, wading, and consuming fish caught from the creek, do not pose a current public health hazard.
- Although surface soil contamination has been found at areas of CAFB slated for residential or recreational reuse, ATSDR does not believe this contamination poses a public health hazard. At those sites where contamination has been detected at levels of potential concern, the Air Force has conducted or is in the process of conducting remedial activities. The Air Force's cleanup goals, along with regulatory oversight by EPA and IEPA, will ensure that no contaminants are present at levels of concern to human health.

In response to community concerns, ATSDR has made the following determinations:

- Based on a review of IEPA's Drinking Water Watch database and what is known about regional hydrogeology, ATSDR concludes that past on-base drinking water was safe to drink.
- The site where a military surplus dealer operates is a concern to ATSDR because surplus materials could present a physical hazard to trespassers. ATSDR observed evidence of trespassing (e.g., discarded bottles and cans, fencing damaged on backside near homes) during a site visit.
- ATSDR has conducted extensive reviews of the scientific literature regarding uptake of metals and other contaminants into plants. Considering the relatively low levels of contamination observed in CAFB soils, along with the information gathered from other site work, ATSDR concludes that current or future consumption of crops grown on or around CAFB does not pose a public health hazard.
- Irrigation systems from the deeper confined aquifers do not appear to be adversely impacted by site-related contaminants that have been detected in the shallow Wisconsinan zone. ATSDR concludes that using groundwater from the deeper aquifers will not result in the contamination of crops grown on or near the former CAFB with site chemicals.
- Vapor intrusion is not currently occurring at levels of public health concern to workers or other authorized personnel. Planned remedial activities at these sites are expected to reduce the source(s) of the sub-slab soil gas constituents and mitigate the vapor intrusion pathway. However, ATSDR is concerned that VOC levels may increase, or use of buildings with vapor intrusion may change. The Air Force should continue to monitor indoor air conditions until remediation goals are met for several consecutive years at Building 343 and any other buildings with vapor intrusion issues to ensure that people are not breathing contaminated air from vapor intrusion of VOCs in groundwater and soil gas plume movement. Additional investigations may be warranted if future reuse plans change for buildings that have been identified as higher risk.
- TCE groundwater plumes near the southeastern portion of CAFB have not significantly impacted the Illinoian aquifer, which is the primary source of drinking water for residents with private wells. Given that TCE has not been detected in private wells and has only been detected below levels of concern (i.e., 5 ppb) in the Illinoian aquifer, ATSDR concludes that TCE plumes do not pose a public health hazard for people drinking from private wells south of CAFB. However, it does pose a health concern for the future that will require future monitoring of plume movement.
- Miscommunication between the Air Force and the Village of Rantoul has resulted in: 1) reuse of parcels not appropriate for the land use designations originally assigned by the Air Force; 2) property being leased prior to scheduled remedial activities; and 3) the risk of physical hazards due to unauthorized access of abandoned buildings.

Recommendations

Based on the conclusions about potential exposure pathways, ATSDR makes the following recommendations:

- Residents with high blood pressure, heart conditions, or following sodium-restricted diets should consult their physicians if they are concerned about elevated sodium levels in the public drinking water or in private well water. ATSDR is working with IDPH to inform people about the sodium levels drinking water.
- ATSDR is working with IDPH to inform residents of the arsenic levels in their private well and suggesting ways to reduce their exposure.
- People, especially children and pregnant women, should avoid eating more than one fish meal per week from Heritage Lake to ensure that they are not ingesting mercury at levels that may be unsafe.
- To address public health concerns related to the operation of a military surplus business in the southeast corner of the former base, fencing should be installed along the open portions of the property in question, or remaining materials should be removed.
- The Air Force should continue to monitor indoor air conditions until remediation goals are met for several consecutive years at Building 343 and any other buildings with vapor intrusion issues to ensure that people are not breathing contaminated air from vapor intrusion of VOCs in groundwater and soil gas plume movement.
- As a precautionary measure, ATSDR recommends that the Air Force continue periodic monitoring of the Illinoisan aquifer near the southeastern site boundary.
- If new residential areas are proposed at locations that are in close proximity to any of the base landfills, ATSDR recommends that the transferring authority conduct a thorough review of the deed restrictions and intended land use for the parcel.
- ATSDR recommends that the Building 923 parcel not be used for agricultural, recreational, or residential land use until additional characterization studies are conducted and demonstrate that contamination in the soil are below levels of concern.
- ATSDR recommends that any agricultural crops grown on the former base not be sold for human consumption until the areas are sampled and contaminant levels are below acceptable health-based screening values.
- ATSDR will work with agencies and the village of Rantoul to fine tune land use management tools, standard operating procedures, and communication, to help ensure that people using the property are not exposed to safety hazards or unsafe levels of chemical contaminants from past uses, disposal, and releases into the environment.

Public Health Action Plan

The Public Health Action Plan (PHAP) for CAFB contains a description of actions taken and ongoing by the Air Force subsequent to the completion of this public health assessment. The purpose of the PHAP is to ensure that this public health assessment not only identifies potential and ongoing public health hazards, but also provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. The public health actions that are completed, ongoing, or planned are listed below.

Completed Actions

- The Air Force has removed storage tanks, piping, and contaminated material from numerous sites throughout the former base.
- The Air Force has consolidated and capped three of the four on-base landfills, and has installed leachate collection and treatment systems.
- As of April 2008, the Air Force has closed 29 IRP sites, meaning any remediation has been completed and the appropriate regulatory agencies agree that cleanup objectives have been achieved. Fifteen of these sites have achieved closure since June 2007.
- The Air Force has posted fishing advisory signs at Heritage Lake and Salt Fork Creek.

Ongoing Actions

- The Air Force is continuing to evaluate 15 IRP sites. Evaluation of all other sites has been completed.
- The Air Force intends to install a cap at Landfill 4 upon completion of the remedial investigation, feasibility study, and record of decision. These activities are planned for completion in fiscal year 2008.
- The Air Force expects to conduct monitoring of the Wisconsin aquifer at all IRP sites where contaminant concentrations in the Wisconsin groundwater exceed approved cleanup criteria. IRP sites will also be evaluated in the Five Year Review as long as contaminant concentrations exceed established maximum contaminant levels (USAF 2008).
- Monitoring of the Illinoian aquifer is planned as part of the ongoing Landfills Long Term Monitoring. Evaluation of the Illinoian aquifer is expected to be included in the Five Year Review (USAF 2008).

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References

[AFRPA] Air Force Real Property Agency. The Former Chanute Air Force Base. Chanute AR # 3357. February 2006.

[ATSDR 1995] Agency for Toxic Substances and Disease Registry. 1995. Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs). Atlanta: U.S. Department of Health and Human Services, August 1995. <<http://www.atsdr.cdc.gov/toxprofiles/tp69.html>>

[ATSDR 2001] Agency for Toxic Substances and Disease Registry. 2001. ATSDR Health Consultation: Outlining Various Exposure Issues from Initial Site Visit, June 25-28, 2001. Atlanta: U.S. Department of Health and Human Services, September 2001.

[ATSDR 2002] Agency for Toxic Substances and Disease Registry. 2002. Toxicological Profile for Di(2-Ethylhexyl)phthalate. Atlanta: U.S. Department of Health and Human Services, September 2002. <<http://www.atsdr.cdc.gov/toxprofiles/tp9.pdf>>

[ATSDR 2005a] Agency for Toxic Substances and Disease Registry. 2005. Draft Toxicological Profile for Arsenic (draft for public comment). Atlanta: U.S. Department of Health and Human Services, September 2005. <<http://www.atsdr.cdc.gov/toxprofiles/tp2.html>>

[ATSDR 2005b] Agency for Toxic Substances and Disease Registry. 2005. Public Health Assessment Guidance Manual (Update). Atlanta: U.S. Department Of Health and Human Services. Last accessed September 24, 2006. <<http://www.atsdr.cdc.gov/HAC/PHAManual/index.html>>

[Anderson 2006] Anderson J. 2006. Iron: An Essential Nutrient. Colorado State University, Cooperative Extension Program. No. 9.356. Prepared July 1996, Reviewed April 2006. Last accessed November 14, 2006. <<http://www.ext.colostate.edu/pubs/foodnut/09356.html>>

[Beland and Culp 1998] Beland F, Culp S. 1998. Chronic Bioassay of Two Composite Samples for Selected Manufactured Gas Plant Waste Sites. Technical Report 6722.02, Division of Biochemical Toxicology, National Center for Toxicological Research.

[De Jong et al. 1999] De Jong WH, Kroese ED, Vos JG, Van Loveren H. 1999. Detection of Immunotoxicity of Benzo[a]pyrene in a Subacute Toxicity Study after Oral Exposure in Rats. *Toxicol. Sci.* 50:214-20.

[DoD 2004] Department of Defense. 2004. Defense Environmental Restoration Program Annual Report to Congress: Fiscal Year 2003. <http://deparc.egovservices.net/DERPARC_FY03/do/home>

[ERG 2001] Eastern Research Group. 2001. Summary Report for the ATSDR Expert Panel Meeting on Tribal Exposures to Environmental Contaminants in Plants. Contract No. 205-95-0901. March 23, 2001. <http://www.engg.ksu.edu/CHSR/outreach/tosnac/docs/NAreport_fnl032301.pdf>

[Engineering-Science 1991] Engineering-Science. 1991. Draft Remedial Investigation Report, Chanute Air Force Base. August 1991.

[IDPH 2001] Illinois Department of Public Health. 2001. Letter to Michael Specchio from Mark Kuechler concerning results from residential well sampling. Champaign, IL, March 8, 2001.

[IDPH 2002]. 2002. Health Consultation: Rural Rantoul Residential Wells, Rantoul, Champaign County, Illinois. June 11, 2002.

IDPH nd (no date). IDPH Environmental Health Fact Sheet: Vapor Intrusion.

[IEPA 1997] Illinois Environmental Protection Agency. 1997. Tiered Approach to Corrective Action Objectives (TACO), Fact Sheet 1: Introduction. November 1997.
<<http://www.epa.state.il.us/land/taco/fact-sheet.html>>

[IEPA 1999a] Illinois Environmental Protection Agency. 1999. Former Chanute Air Force Base Environmental Restoration Program, Fact Sheet #1. January 1999.
<<http://www.epa.state.il.us/community-relations/fact-sheets/chanute-afb/chanute-1.html>>

[IEPA 1999b] Illinois Environmental Protection Agency. 1999. Former Chanute Air Force Base Environmental Restoration Program, Fact Sheet #2. April 1999.
<<http://www.epa.state.il.us/community-relations/fact-sheets/chanute-afb/chanute-2.html>>

[IEPA 2006] Illinois Environmental Protection Agency. 2006. Drinking Water Watch [electronic database]. Last accessed November 16, 2006. <<http://www.epa.state.il.us/water/drinking-water-watch/index.html>>

[ISGS 2006] Illinois State Geological Survey. 2006. Online Well Data [electronic database]. Last accessed November 16, 2006. <<http://www.isgs.uiuc.edu/wwdb/index.htm>>

[Jacobs 1996] Jacobs Engineering Group, Inc. 1996. Final Environmental Cleanup Plan, Buildings 700 and 975. February 1996.

[Jacobs 1998a] Jacobs Engineering Group, Inc. 1998. April 1998 Peer Review: Landfills Remedial Action. April 1998.

[Jacobs 1998b] Jacobs Engineering Group, Inc. 1998. RI, Final Work Plan, Landfills. October 1998.

[Jacobs 2002] Jacobs Engineering Group, Inc. 2002. Technical Memorandum for Salt Fork Creek, Drainage Ditches, and Outfalls, CAFB. July 2002.

[Mitchell 2001] Mitchell T. 2001. Former Landfills Considered for Rec Use. Champaign-Urbana News-Gazette. December 1, 2001; p. B-1.

[Mitretek 2003] Mitretek Systems. 2003. Draft Final Basewide Hydrogeologic Conceptual Site Model for the Former Chanute Air Force Base, Rantoul, Illinois. Technical Analysis and Recommendations. August 2003.

[NRC 1996] National Research Council. 1996. Use of Reclaimed Water and Sludge in Food Crop Production. Chapter 6: Public Health Concerns About Chemical Constituents in Treated Wastewater and Sludge. National Academy Press.
<<http://www.epa.gov/owm/pipes/sludmis/mstr-ch6.pdf>>

[Sanderson and Zewde 1976] Sanderson EW, Zewde E. 1976. Groundwater Availability in Champaign County, Illinois. Illinois State Water Survey Circular 124.

[URS 2003a] URS Corporation. 2003. Final Operable Unit 1 (OU-1) Remedial Investigation (RI) Work Plan. September 2003.

[URS 2003b] URS Corporation. 2003. Final Operable Unit 2 (OU-2) Remedial Investigation (RI) Work Plan. November 2003.

[URS 2004a] URS Corporation. 2004. Draft On-Base Salt Fork Creek Risk Assessment. July 2004.

[URS 2004b] URS Corporation. 2004. Final Operable Unit 2 (OU-2) Remedial Investigation (RI) Work Plan Addendum 4 – Landfills. September 2004.

[URS 2005a] URS Corporation. 2005. Discussion of Salt Fork Creek Fish Tissue Sampling. October 2005.

[URS 2005b] URS Corporation. 2005. Draft OU-2 Report Group G Remedial Investigation (RI) Report for Bldg. 911 Acid Storage Building (SS044) and Bldg. 912 Fuel Storage Building (SS045) Sites. September 2005.

[URS 2005c] URS Corporation. 2005. Final OU-1 Report Group J Remedial Investigation (RI) Report for Bldg. 52 Paint Storage Shed (SS068) and Bldg. 519 Auto Hobby Shop OWS (ST048). November 2005.

[URS 2005d] URS Corporation. 2005. Validated Results of Organic and Inorganic Analyses for Fish Tissue Samples, Former CAFB (OU-2) Salt Fork Creek.

[URS 2006a] URS Corporation. 2006. Chanute Internet Map Server [electronic database]. Last accessed November 16, 2006. <<http://arcims.urscorp.com/chanute>>

[URS 2006b] URS Corporation. 2006. Draft OU-2 Report Group E Remedial Investigation (RI) Report for Heritage Lake (SI034). June 2006.

[URS 2007a] URS Corporation. 2007. Final Operable Unit 2 (OU-2) Report Group H Remedial Investigation Report for Landfill 1 (LFO16), Landfill 2 (LFO17), and Landfill 3 (LFO18). August 2007.

[URS 2007b] URS Corporation. 2007. Final Operable Unit 2 (OU-2) Report Group M Remedial Investigation (RI) Report for Fire Training Area 2 (FT021) and Area 130 TCE Disposal Pit (WP080). November 2007.

[URS 2007c] URS Corporation. 2007. Final Evaluation of Future Risk from Vapor Intrusion Using Sub-Slab Soil Gas and Groundwater Results Technical Memorandum. August 2007.

[USAF 1993] U.S. Air Force. 1993. Basewide Environmental Baseline Survey for Chanute Air Force Base, Illinois. Rantoul, IL, December 1993.

[USAF 1996] U.S. Air Force. 1996. Air Force Base Conversion Handbook, BRAC 95 Update. September 1996. <<http://www.afropa.hq.af.mil/handbook/intro/toc.htm>>

[USAF 1997a] U.S. Air Force. 1997. Chanute Air Force Base Community Relations Plan. Air Force Base Conversion Agency, October 1997.

[USAF 1997b] U.S. Air Force. 1997. Summary Memorandum of Surface Wind Data for Chanute Air Force Base for the Period of 1936 to 1970. Air Force Climatology Center.

[USAF 2000a] U.S. Air Force. 2000. Letter to Michael Specchio from Timothy Brecheen concerning results from residential well sampling. Rantoul, IL: Air Force Base Conversion Agency, November 3, 2000.

[USAF 2000b] U.S. Air Force. 2000. Preliminary Human Health Risk Assessment Report for Ingestion of Fish from Heritage Lake. Air Force Base Conversion Agency, September 2000.

[USAF 2001] U.S. Air Force. 2001. Press Release: Air Force Restricts Heritage Lake to "Catch and Release Only." Air Force Base Conversion Agency, October 3, 2001.

[USAF 2003] U.S. Air Force. 2003. Letter to W. Owen Thompson and Christopher Hill from Andrew Mendoza concerning updated Preliminary Remediation Goals (PRGs) for groundwater and soil. Rantoul, IL: Air Force Real Property Agency, December 17, 2003.

[USAF 2004a] U.S. Air Force. 2004. Consensus Statement No. 04-09-01, Former Chanute AFB, Base Realignment and Closure Cleanup Team, Consensus Statement of Basis/Final Decision for No Fishing Signs along On-Base Salt Fork Creek. Air Force Real Property Agency, September 1, 2004.

[USAF 2004b] U.S. Air Force. 2004. Letter to Betty Panzer from Gary Koski concerning results from residential well sampling. Rantoul, IL: Air Force Real Property Agency, December 8, 2004.

[USAF 2004c] U.S. Air Force. 2004. Letter to Mr. and Mrs. Marc Clifton from William Harris concerning results from residential well sampling. Rantoul, IL: Air Force Real Property Agency, August 20, 2004.

[USAF 2004d] U.S. Air Force. 2004. Letter to Mr. and Mrs. Reggie Peters from Gary Koski concerning results from residential well sampling. Rantoul, IL: Air Force Real Property Agency, December 8, 2004.

[USAF 2005] U.S. Air Force. 2005. Letter to Christopher Hill from William Harris concerning proposed Salt Fork Creek fish sampling approach to address human health risk. Air Force Real Property Agency, September 7, 2005.

[USAF 2008] U.S. Air Force. 2008 Air Force Response to ATSDR Follow-up Questions for Chanute Air Force Base. Submitted April 30, 2008.

[Census Bureau 2002] U.S. Census Bureau. 2002. Profile of General Demographic Characteristics: 2000. Geographic Area: Rantoul Village, Illinois. Updated April 29, 2002. <<http://censtats.census.gov/data/IL/1601762783.pdf>>

[Census Bureau 2006] U.S. Census Bureau. 2006. Census 2000 TIGER/Line Shapefiles. Last accessed June 20, 2006.

[EPA 1997] U.S. Environmental Protection Agency. 1997. Exposure Factors Handbook. Washington, DC: Office of Research and Development, National Center for Environmental Assessment.

[EPA 2000] U.S. Environmental Protection Agency. 2000. NPL Site Narrative for Chanute Air Force Base. Federal Register notice, December 1, 2000. <<http://www.epa.gov/superfund/sites/npl/nar1615.htm>>

[EPA 2004a] U.S. Environmental Protection Agency. 2004. NPL Fact Sheets for Illinois: Chanute Air Force Base. Updated January 2004. <<http://www.epa.gov/R5Super/npl/illinois/IL1570024157.htm>>

[EPA 2004b] U.S. Environmental Protection Agency. 2004. Region 9 Preliminary Remediation Goals. Updated December 28, 2004. <<http://www.epa.gov/region9/waste/sfund/prg/index.html>>

[EPA 2006] U.S. Environmental Protection Agency. 2006. 2006 Edition of the Drinking Water Standards and Health Advisories. EPA 822-R-06-013. Updated August 2006. <<http://www.epa.gov/waterscience/criteria/drinking/dwstandards.pdf>>

[FDA 1997] U.S. Food and Drug Administration. 1997. Preventing Iron Poisoning in Children. FDA Backgrounder. January 15, 1997. Last accessed November 14, 2006. <<http://www.cfsan.fda.gov/~dms/bgiron.html>>

[Rantoul 2000] Village of Rantoul. 2000. 2000 Report to Consumers on Water Quality.
<<http://www.village.rantoul.il.us/publicworks/water/index.html>>

[Rantoul 2003] Village of Rantoul. 2003. Potable Water Within the Village. Village Code, Sec. 21.9. <<http://www.village.rantoul.il.us/villagehall/villagecode/ch21.html>>

[Rantoul 2006a] Village of Rantoul. 2006a. 2006 Annual Drinking Water Report.
<<http://www.village.rantoul.il.us/publicworks/water/index.html>>

[Rantoul 2006b] Village of Rantoul . 2006b. Official Comprehensive Plan. Adopted by Ordinance #2019, February 14, 2006. [This reference corresponds to information in Site Summary Table]

Appendix A. Summary of Site Evaluations

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Operable Unit 1								
Aircraft Washrack (Near Hangar 2)	A1b, A3b	•	•	NA	NA	NS	None identified	Zoned for aviation, aviation support, and industrial use. This site is part of the active tarmac and is paved. Site is managed under the installation restoration program (IRP). ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Area South of Former Enlisted Club	B-4	•	•	NA	NA	NS	None identified	Zoned for institutional use. Parcel currently being used by the National Guard for a 20-week residential program for at-risk youth. ATSDR determined that the site does not pose a health hazard.
Building 100 Underground Storage Tank (UST)	F	•	•	NA	NA	NS	None identified	Zoned for commercial use. Site was managed under the IRP and all environmental investigations and remedial actions are complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 125 Former Fire Truck Maintenance Area	A2b	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. Area of concern; not formally managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 136 Former Laundry	F	•	•	NA	NA	NS	None identified	Zoned for commercial use. Area of concern; not formally managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Building 1380 UST	A1a	•	•	NA	NA	NS	None identified	Zoned for aviation use. Site was managed under the IRP and all investigations and remedial actions are complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 257 (former Building 525) Indoor Shooting Range	B-2, B-4	•	•	NA	NA	NS	None identified	Zoned for institutional use. Parcel B-2 houses a residential retirement facility. Parcel B-4 currently being used by the National Guard for a 20-week residential program for at-risk youth. Site is managed under the IRP; recommended for no further action (NFA). ATSDR determined that the site does not pose a health hazard.
Building 298 UST	B-1	•	•	NA	NA	NS	The UST has been removed.	Zoned for institutional use. Current use is multi-family residential. Site was managed under the IRP and all investigations and remedial actions are complete. ATSDR determined that the site does not pose a health hazard.
Building 306 UST	A2c-2a	•	•	NA	NA	NS	In 1995, approximately 770 tons of soil around the tank site was excavated, treated, tested, and returned.	Zoned for aviation support and industrial use. Site was managed under the IRP and all investigations and remedial actions are complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 343 Laundromat	A2c-5, H	•	•	NA	NA	NS	None identified	Parcel A2c-5 is zoned for aviation support and industrial use. Parcel H is zoned for commercial use, but a portion of the parcel appears to be designated "open space" in the village of Rantoul's master plan, contiguous to recreational parcels. The site has vapor intrusion issues with plumes of VOCs migrating into indoor air. The Site is managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values. Continued monitoring is needed to ensure that indoor air quality remains safe for building users.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Building 349 UST	B-3	•	•	NA	NA	NS	Three tanks and surrounding soil were excavated in 1993 and 1994. Sidewall confirmation samples still exceeded cleanup criteria, so additional excavation was performed.	Zoned for institutional use. Currently light industrial or unused. Site was managed under the IRP and all investigations and remedial actions are complete. ATSDR determined that the site does not pose a health hazard.
Building 48 Photo Hut	A1b	•	•	NA	NA	NS	The building was removed between 1940 and 1954, along with any associated drain lines, etc.	Zoned for aviation use. Area of concern — not formally managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 502 UST	A2c-6	•	•	NA	NA	NS	The UST was removed in 1990. About 40 cubic yards of contaminated soil surrounding the tank was removed in 1990 and 1991.	Zoned for aviation support and Industrial use, but appears to be designated "open space" in the village of Rantoul's master plan. The site is contiguous to recreational parcels. Site is managed under the IRP and has been recommended for NFA. ATSDR determined that these parcels do not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 503 UST	A2c-6	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use, but appears to be designated "open space" in the village of Rantoul's master plan. The site is contiguous to recreational parcels. The site was managed under the IRP and all environmental investigations and remedial actions are complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Building 51 UST	A2b	•	•	NA	NA	NS	Approximately 13,310 tons of soil were excavated and removed. Remediation and confirmation sampling were complete as of 1995.	Zoned for aviation support and industrial use. Site was managed under the IRP and all environmental investigations and remedial actions are complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 519 Auto Hobby Shop OWS	O2c	•	•	NA	NA	NS	None identified	Zoned for recreational use. Parcel is currently being used for the village of Rantoul Recreation Dept. offices and Water Dept. vehicle maintenance shop. Site is managed under the IRP and has been recommended for NFA. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 52 Paint Storage Shed	A2b	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. Site is managed under the IRP and is recommended for NFA. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 523 UST	O2b	•	•	NA	NA	NS	The UST has been removed.	Zoned for recreational use. Parcel is an open field. Site was managed under the IRP and all environmental investigations and remedial actions are complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Building 53 UST	A2b	•	•	NA	NA	NS	USTs were removed in 1990, and as of 1995, soil removal, remediation and confirmation sampling were complete. Approximately 2,780 tons of soil was removed.	Zoned for aviation support and industrial use. Site was managed under the IRP and all environmental investigations and remedial actions are complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 66 Reciprocating Engine Test Cells/ Building 66 USTs	U, V1	•	•	NA	NA	NS	BTEX- and PAH-contaminated soil was excavated during the mid-1990s and replaced with clean soil. However, residual soil contamination may remain below buildings and utilities.	Parcel U is zoned for educational use; it is currently used for business/technology office space and an open area. Parcel V1 is zoned for office use. Site is managed under the IRP; RI Report being prepared; remedy TBD. ATSDR determined that these parcels do not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 7 Hangar 2	A2c-8, A3b, P	•	•	NA	NA	NS	None identified	Parcels A2c-8 and A3b are zoned for aviation support and industrial use. Parcel P is zoned for institutional and office use. ATSDR determined that these parcels do not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 700 USTs	A2b	•	•	NA	NA	NS	The five USTs have all been removed.	Zoned for aviation support and industrial use. Site is managed under the IRP; Corrective Action Plan being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Building 705 Gravel Pad/Solvent Drum Rinse Area	A2b	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. Site is managed under the IRP; awaiting regulatory concurrence on RI Report. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 720 Maintenance Squadron Solvent/Acid above ground storage tank (AST)	A2b	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. Site is managed under the IRP; awaiting regulatory concurrence on RI Report. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 728 Fuel Vehicle Maintenance OWS and UST	A2b	•	•	NA	NA	NS	The UST was removed between 1993 and 2002. The OWS, overflow tank, and piping remained as of 2003.	Zoned for aviation support and industrial use. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 732 Mule Barn/Post Exchange Garage	A1b, A2b	•	•	NA	NA	NS	The building was demolished between 1991 and 1993. As of 2003, several floor drains, sumps, and suspected OWSs remained in the paved area where the building once stood.	Parcel A1b is zoned for aviation use. Parcel A2b is zoned for aviation support and industrial use. Site is managed under the IRP and is recommended for NFA. ATSDR determined that the parcels do not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Building 739 Motor Pool OWS	A2b	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 747 Hangar/Auto Mechanics TCE Spill	A1b, N2	•	•	NA	NA	NS	None identified	Parcel A1b is zoned for aviation use. Parcel N2 is zoned as a golf course, but this IRP site is located in a support/maintenance area. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR determined that these parcels do not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 747 UST	N2	•	•	NA	NA	NS	The UST was removed in 1990, and contaminated soil was removed in 1999. The area was backfilled and paved.	This is part of the golf course, but this IRP site is located in a support/maintenance area. The site was managed under the IRP and all environmental investigations and remedial actions are complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 809 Former NavAid Station	A1c	•	•	NA	NA	•	None identified	Zoned for aviation use. Historically used for agriculture. Site is managed under the IRP; awaiting regulatory concurrence on RI Report. ATSDR determined that these parcels do not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Coal Storage Area 1 and 2	A2b, A3c	•	•	NA	NA	NS	Soil removal, remediation, and confirmation sampling at former UST sites and along a former fuel line in the 1990s. In 2000, contaminated soil was excavated from a road right-of-way in a Time Critical Removal Action.	Zoned for aviation support and industrial use. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Coal Storage Area 3	F	•	•	NA	NA	NS	None identified	Zoned for commercial use. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Coal Storage Area 4	B-3, B-4, H	•	•	NA	NA	NS	None identified	Parcels B-3 and B-4 are zoned for institutional use. Parcel B-3 currently being used for light industrial or unused. Parcel B-4 currently being used by the National Guard for a 20-week residential program for at-risk youth. ATSDR determined that these parcels do not pose a health hazard. Parcel H is zoned for commercial use, although another portion of this parcel appears as "open space" in the village of Rantoul's master plan. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR recommends that Parcel H should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Coal Storage Area 5	A1b, A2b	•	•	NA	NA	NS	None identified	Parcel A1b is zoned for aviation use. Parcel A2b is zoned for aviation support and industrial use. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
East Wastewater Treatment Plant	A2a-3	•	•	NA	NA	NS	The plant was closed in the early 1960s and demolished.	Zoned for commercial use. Area of concern; not formally managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Firefighting Demonstration Areas 1—5	A1b	•	•	NA	NA	NS	None identified	Zoned for aviation use. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Flessner Avenue and Doolittle Boulevard Intersection	A2c-2a, A2c-2b	•	•	NA	NA	NS	The UST was removed in 1990. In 1995, approximately 770 tons of soil were excavated, treated, tested, and returned. However, no remediation of the rest of this area (including VOC-contaminated groundwater) had taken place as of 2003.	Parcel A2c-2a is zoned for aviation support and industrial use. Parcel A2c-2b is zoned for aviation support, but is adjacent to recreational parcels and currently open space. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Former Playground Area	G	•	•	NA	NA	NS	None identified	Zoned for mixed use: residential & office. Area of concern; not formally managed under the IRP. ATSDR determined that the site does not pose a health hazard.
Former Training Movie Site	N1	•	•	NA	NA	NS	None identified	Part of the golf course. Site is managed under the IRP and has been recommended for NFA. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

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Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Hangar 3 Carbon Tetrachloride Disposal Area	A1b	•	•	NA	NA	NS	None identified	Zoned for aviation use. Site is managed under the IRP; responses to regulators' comments on RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
JP4 Fuel Line	A2b	•	•	NA	NA	NS	As of 1995, soil removal, remediation and confirmation sampling had been performed. Approximately 3,510 tons of soil were excavated and removed.	Zoned for aviation support and industrial use. Site was managed under the IRP and all environmental investigations and remedial actions are complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Pistol Range Area 1	I	•	•	NA	NA	NS	None identified	Former base housing, zoned for continued residential use. Lead contamination from ammunition is present at low concentrations below levels of health concern; not formally managed under the IRP.
Rifle Range Area 1	J1	•	•	NA	NA	NS	None identified	Former base housing, zoned for continued residential use. Area not formally managed under the IRP. ATSDR determined that this area poses no apparent public health hazard.
Skeet Range 1	A1b, A2c-7	•	•	NA	NA	NS	None identified	Parcel A1b zoned for aviation use; adjacent to runways. Parcel A2c-7 zoned for aviation support and industrial use. Historically used for agriculture. Site is managed under the IRP; RI Report complete. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values. This area was mistakenly used for growing crops in 2008, even though not an authorized use, which raises questions about the management tools used to communicate parcel information, levels of contaminants in soils are too low to cause adverse health effects in farmers working the field or in people ingesting the crops.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Sludge Drying Bed at Former Ferrosilicon Gas Plant	N1	•	•	NA	NA	NS	None identified	Part of the golf course, but this IRP site is located in a support/maintenance area. Area of concern; not formally managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
South Wastewater Treatment Plant	A2c-4	•	•	NA	NA	NS	The plant was closed in accordance with applicable federal, state, and local regulations, and was demolished in the late 1990s, although some buried concrete foundations/structures remain.	Zoned for aviation support and industrial use, but adjacent to recreational parcels and listed as "open space" in the village of Rantoul's master plan. Area of concern; not formally managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Suspected Demolition Disposal Area	A1d	•	•	NA	NA	NS	None identified	Zoned for aviation use. Site is managed under the IRP; The site was recommended for NFA. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Water Tower Facilities 120 & 122	F	•	•	NA	NA	NS	Both towers were reportedly sandblasted prior to their most recent paint jobs, but older coatings apparently were not completely removed.	Zoned for commercial use. Site is managed under the IRP; RI Report complete; A feasibility study (FS) is being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Water Tower Facility 44	A2b, A3c	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. Site is managed under the IRP; RI Report complete; An FS is being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

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Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Operable Unit 2								
Area 130 TCE Disposal Pit	A2f, D	•	•	•	•	NS	Soil was excavated and added to Landfill 3, which has since been capped.	Parcel A2f zoned for aviation support and industrial use. Parcel D zoned for recreational use, with public access to Heritage Lake, picnic areas, paddle boats, and playground. Site is managed under the IRP; responses to regulators' comments on RI Report have been submitted. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 911 (Acid Storage Building) and Building 912 (Fuel Storage Building)	D	•	•	•	•	NS	Soil was removed from the western portion of Building 912 as part of the Landfill 3 remedial action.	Zoned for recreational use, with public access to Heritage Lake, picnic areas, paddle boats, and playground. Site is managed under the IRP; this site was recommended for NFA. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 916 Concrete Tanks OWS	E	•	•	NA	NA	NS	None identified	Zoned for educational use. Currently used by University of Illinois as a materials testing facility. Site is managed under the IRP; RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 922 OWS	A2g	•	•	NA	NA	NS	Two USTs have been removed and backfilled.	Zoned for aviation support or industrial use. Site is managed under the IRP; RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

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Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Building 922 UST	A2g, E	•	•	NA	NA	NS	None identified	Parcel A2g zoned for aviation support and industrial use. Parcel E zoned for educational use; currently used by University of Illinois as a materials testing facility. Site is managed under the IRP; RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 923 Former Cryogenics Fuels Building	A2g	•	•	NA	NA	NS	None identified	Zoned for aviation support for industrial use. Site is managed under the IRP; RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values. This area was mistakenly used for growing crops in 2008, even though not an authorized use, which raises questions about the management tools used to communicate parcel information, levels of contaminants in soils are too low to cause adverse health effects in farmers working the field or in people ingesting the crops.
Building 927 ICBM/IRBM Training & LOX/Cryogenics Operations	E	•	•	NA	NA	NS	Two former OWS were removed in 1991.	Zoned for educational use; currently used by University of Illinois as a materials testing facility. Site is managed under the IRP; RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 927 oil and water separator (OWS)	E	•	•	NA	NA	NS	Two former OWS were removed in 1991. One was backfilled with gravel and clean fill; the other was replaced by a 300-gallon OWS connected to the sanitary sewer system.	Zoned for educational use; currently used by University of Illinois as a materials testing facility. Site is managed under the IRP; RI Report being prepared; remedy TBD. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

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Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Building 932 Aircraft Fuel Training Bladders	A2g, E	•	•	NA	NA	NS	Some soil removal has occurred in the vicinity.	Parcel A2g zoned for aviation support and industrial use. Parcel E zoned for educational use; currently used by University of Illinois as a materials testing facility. The site is managed under the IRP; responses to regulators' comments on RI Report have been submitted. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 932 Sludge Pit	A2g	•	•			NS	The sludge pit was excavated in 1991, and five USTs and associated pipelines were removed as of 1994. Additional removal actions were initiated in 2000, resulting in the excavation of approximately 1,600 cubic yards of soil.	Zoned for aviation support and industrial use. Site is managed under the IRP; responses to regulators' comments on RI Report have been submitted. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 937 (Airplane Engine Test Stands); Building 950 (Oil Spill); Building 950 (Sewage Sludge Disposal Area); and Building 950 (Tank Bottoms Disposal Pit)	A2g	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. The site is managed under the IRP; responses to regulators' comments on RI Report have been submitted. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

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		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Building 975/Building 995 TCE Spills	A2g	•	•	NA	NA	NS	USTs and fuel lines were excavated as of 1991, and a test cell used to store PCBs was decontaminated to EPA standards for unrestricted reuse. A former hazardous waste container storage area was closed and soil along a drainage ditch was removed.	Zoned for aviation support and industrial use. The site is managed under the IRP; RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 988/ Building 988 UST	A2g	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. The site was managed under the IRP; No additional environmental investigations or remedial actions are planned. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Building 995 Engine Test Cells	A2g	•	•			NS	USTs and fuel lines were excavated as of 1991.	Zoned for aviation support and industrial use. The site is managed under the IRP; RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Fire Training Area 1	A2e	•	•			NS	None identified	Zoned for aviation support and industrial use. The site is managed under the IRP; awaiting regulatory concurrence on RI Report. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Fire Training Area 2	A2f, D	•	•			NS	Approximately 4,325 linear ft of JP-4 fuel supply line and 5,055 ft of spider piping were removed in 1997, along with a valve house building. An OWS was cleaned and inspected in 1999-2000, and all ASTs were removed in 2000. Approximately 49,500 cubic yards of soil were removed from nine excavations in 2000.	Parcel A2f zoned for aviation support and industrial use. Parcel D zoned for recreational use, with public access to Heritage Lake, picnic areas, paddle boats, and playground. The site is managed under the IRP; responses to regulators' comments on RI Report have been submitted. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Former (900 Area) Wastewater Treatment Plant	A2g	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. The site is managed under the IRP; RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Former Post Dump and Incinerator	A2e	•	•	NA	NA	NS	The southern portion of the Former Post Dump was excavated and consolidated as part of the Landfill 1 remedial action. The incinerator was removed (date unknown) and assumed filled.	Zoned for aviation support and industrial use. The site is managed under the IRP; awaiting regulatory concurrence on RI Report. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Heritage Lake	D	•	•	•	•	•	None identified	Zoned for recreational use, with public access to Heritage Lake, picnic areas, paddle boats, and playground. Lake has been used for fishing. Site is managed under the IRP; responses to regulators' comments on RI Report have been submitted. ATSDR determined that the site does not currently pose a health hazard for swimming, playing, or catch and release fishing under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values. See Heritage Lake fish consumption discussion and evaluation for information regarding the food chain pathway.
Landfill 1	A2e	•	•	NA	NA	NS	Waste was consolidated and covered by a multi-layer, 11.4-acre cap in 2002. Excavated areas have been backfilled with clean soil, and a landfill gas passive vent system and leachate collection and treatment system have been installed.	Zoned for aviation support and industrial use. The landfill is fenced. The site is managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Landfill 2	D	•	•	NA	NA	NS	The landfill was consolidated and capped in 2003. Excavated areas have been backfilled with clean soil, and a landfill gas passive vent system and leachate collection and treatment system have been installed.	Zoned for recreational use, with public access to Heritage Lake, picnic areas, paddle boats, and playground. Landfill is fenced. Site is managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Landfill 3	A2g, D	•	•	NA	NA	NS	The landfill was consolidated and capped in 2002. A landfill gas passive vent system and leachate collection and treatment system have been installed. Backfilling of excavated areas in progress as of 2003.	Parcel A2g zoned for aviation support and industrial use. Parcel D zoned for recreational use, with public access to Heritage Lake, picnic areas, paddle boats, and playground. The landfill is fenced. The site is managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Landfill 4	A2g	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. The landfill is fenced. The site is being managed under the IRP; The RI/FS is being prepared.
Pistol Range Area 2	A2e	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. Site is managed under the IRP; awaiting regulatory concurrence on RI Report. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Salt Fork Creek	A2f, A2g, D, E	•	•	•	•	•	Landfill remedies were designed to mitigate vertical and lateral migration of leachate from the landfills to the creek.	Parcels A2f and A2g is zoned for aviation support and industrial use. Parcel D is zoned for recreational use, with public access to Heritage Lake, picnic areas, paddle boats, and playground. Parcel E zoned for educational use; currently used by University of Illinois as a materials testing facility. The creek has been known to be used for fishing. The site is managed under the IRP; An RI report is being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values. See Salt Fork Creek fish consumption discussion and evaluation for information regarding the food chain pathway.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
Salt Fork Creek Dredge Spoils	A2g, E		•			•	NS	None identified Parcel A2g zoned for aviation support and industrial use. Parcel E zoned for educational use; currently used by University of Illinois as a materials testing facility. Site is managed under the IRP; RI Report being prepared. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Test Cell Fuel Line	A2g	•	•	NA	NA	NS	Fuel line was cleaned and removed as of 1991.	Zoned for aviation support and industrial use. The site is managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
University of Illinois Boring Sites	E	•	•	NA	NA	NS	None identified	Zoned for educational use; the site is currently used by the University of Illinois as a materials testing facility. The site is managed under the IRP and has been recommended for NFA. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.
Water Tower Facility 968	A2g	•	•	NA	NA	NS	None identified	Zoned for aviation support and industrial use. The site is managed under the IRP. ATSDR determined that the site does not currently pose a health hazard under current land use designation, but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values.

Table A-1. Summary of Site Evaluations

Site Name	Parcel ¹	Potentially Contaminated Media ²					Remedial Actions ⁴	ATSDR's Evaluation of Property ⁵
		Ground-water	Soil	Surface Water	Sediment	Food Chain ³		
<p>Sources: Donna Kozak, Booz Allen Hamilton, personal communication, October 25, 2006; David Wacker, Booz Allen Hamilton, personal communication, September 5, 2006; Rantoul 2006b; URS 2003a, 2003b, 2006a.</p> <p>Notes:</p> <p>¹ Parcels based on site boundaries and parcel names in the URS online data viewer (URS 2006a) as of October 2006. Some parcel names may have changed since this table was prepared.</p> <p>² Potentially contaminated media based on site history and known or suspected releases.</p> <p>³ "Food Chain" includes plants and animals that are food sources for humans (for example, fish).</p> <p>⁴ Cleanup history based on information in the 2003 work plans. More remedial actions have occurred since 2003.</p> <p>⁵ RI and closure status based on information provided by the Air Force in October 2006 (Donna Kozak, Booz Allen Hamilton, personal communication, October 25, 2006).</p> <p>● = potential contamination</p> <p>BTEX = benzene, toluene, ethylbenzene, and xylenes; ICBM = intercontinental ballistic missile; IRBM = intermediate-range ballistic missile LOX = liquid oxygen; NA = Not applicable (for NA designations for surface water and sediments under potentially contaminated media — no permanent surface water feature is present at this site) NS = no sampling was conducted for that specific pathway; PAH = polycyclic aromatic hydrocarbon; TCE = trichloroethylene</p>								

Appendix B. Comparison Values Used by ATSDR

ATSDR scientists select contaminants for further evaluation by comparing them against health-based comparison values (CVs). These are developed by ATSDR from available scientific literature related to exposure and health effects. CVs are derived for each of the different media and reflect an estimated contaminant concentration that is *not likely* to cause adverse health effects for a given chemical, assuming a standard daily contact rate (e.g., an amount of water or soil consumed or an amount of air breathed) and body weight.

ATSDR comparison values are media-specific concentrations that are considered to be safe under default conditions of exposure. They are used as screening values in the preliminary identification of site-specific “contaminants of concern.” The latter term should not be misinterpreted as an implication of “hazard.” As ATSDR uses the phrase, a “contaminant of concern” is a chemical substance detected at the site in question and selected by the health assessor for further evaluation of potential health effects. Generally, a chemical is selected as a “contaminant of concern” because its maximum concentration in air, water, or soil at the site exceeds one of ATSDR's comparison values.

Nevertheless, it must be emphasized that comparison values are not thresholds of toxicity. Although concentrations at or below the relevant comparison values could reasonably be considered safe, it does not automatically follow that any environmental concentration that exceeds a comparison value would be expected to produce adverse health effects. The principal purpose behind conservative, health-based standards and guidelines is to enable health professionals to recognize and resolve potential public health hazards before they become actual public health consequences. Thus comparison values are designed to be preventive-rather than predictive-of adverse health effects. The probability that such effects will actually occur does not depend on environmental concentrations alone, but on a unique combination of site-specific conditions and individual lifestyle and genetic factors that affect the route, magnitude, and duration of actual exposure.

Listed and described below are the various comparison values that ATSDR uses to select chemicals for further evaluation, as well as other non-ATSDR values that are sometimes used to put environmental concentrations into perspective.

CREG	=	Cancer Risk Evaluation Guides
MRL	=	Minimal Risk Level
EMEG	=	Environmental Media Evaluation Guides
RMEG	=	Reference Dose Media Evaluation Guide
RfD	=	Reference Dose
RfC	=	Reference Concentration
RBC	=	Risk-Based Concentration
MCL	=	Maximum Contaminant Level

Cancer Risk Evaluation Guides (CREGs) are estimated contaminant concentrations expected to cause no more than one excess cancer in a million persons exposed over a lifetime. CREGs are calculated from EPA's cancer slope factors, or cancer potency factors, using default values for exposure rates. That said, however, neither CREGs nor cancer slope factors can be used to make realistic predictions of cancer risk. The true risk is always unknown and could be as low as zero.

Minimal Risk Levels (MRLs) are estimates of daily human exposure to a chemical (doses expressed in mg/kg/day) that are unlikely to be associated with any appreciable risk of deleterious non-cancer effects over a specified duration of exposure. MRLs are calculated using data from human and animal studies and are reported for acute (#14 days), intermediate (15-364 days), and chronic (≥365 days) exposures. MRLs for specific chemicals are published in ATSDR toxicological profiles.

Environmental Media Evaluation Guides (EMEGs) are concentrations that are calculated from ATSDR minimal risk levels by factoring in default body weights and ingestion rates. They factor in body weight and ingestion rates for acute exposures (Acute EMEGs — those occurring for 14 days or less), for intermediate exposures (Intermediate EMEGs — those occurring for more than 14 days and less than 1 year), and for chronic exposures (Chronic EMEGs — those occurring for one year [365 days] or greater).

Reference Dose Media Evaluation Guide (RMEG) is the concentration of a contaminant in air, water or soil that corresponds to EPA's RfD for that contaminant when default values for body weight and intake rates are taken into account.

Reference Dose (RfD) is an estimate of the daily exposure to a contaminant unlikely to cause noncarcinogenic adverse health effects. Like ATSDR's MRL, EPA's RfD is a dose expressed in mg/kg/day.

Reference Concentration (RfC) is a concentration of a substance in air that EPA considers unlikely to cause noncancer adverse health effects over a lifetime of chronic exposure.

Risk-Based Concentrations (RBCs) are media-specific concentrations derived by EPA Region 3 from RfDs, RfCs, or EPA's cancer slope factors. They represent concentrations of a contaminant in tap water, ambient air, fish, or soil (industrial or residential) that are considered unlikely to cause adverse health effects over a lifetime of chronic exposure. RBCs are based either on cancer ("c") or noncancer ("n") effects.

Maximum Contaminant Levels (MCLs) represent contaminant concentrations in drinking water that EPA deems protective of public health (considering the availability and economics of water treatment technology) over a lifetime (70 years) at an exposure rate of 2 liters of water per day.

More information about the ATSDR evaluation process can be found in ATSDR's Public Health Assessment Guidance Manual at <http://www.atsdr.cdc.gov/HAC/PHAManual/index.html>. A hard copy can be obtained by contacting the ATSDR information line toll-free at 1-888-42-ATSDR (1-888-422-8737).

Appendix C. ATSDR's Methodology

In public health assessments, ATSDR addresses the likelihood that exposure to contaminants, using the maximum or average concentrations detected, would result in adverse health effects. While the relative toxicity of a chemical is important, the response of the human body to a chemical exposure is determined by several additional factors, including the concentration (how much), the duration of exposure (how long), and the route of exposure (breathing, eating, drinking, or skin contact). Lifestyle factors (i.e., occupation and personal habits) also have a major impact on the likelihood, magnitude, and duration of exposure. Individual characteristics such as age, sex, nutritional status, overall health, and genetic constitution affect how a human body absorbs, distributes, metabolizes, and eliminates a contaminant. A unique combination of all these factors will determine the individual's physiologic response to a chemical contaminant and any adverse health effects the individual could suffer as a result of the chemical exposure.

ATSDR has determined levels of chemicals that can reasonably (and conservatively) be regarded as harmless, based on the scientific data the agency has collected in its toxicological profiles. The resulting comparison values and health guidelines, which include ample safety factors to ensure protection of sensitive populations, are used to screen contaminant concentrations at a site and to select substances ("chemicals of concern") that agency environmental health scientists and toxicologists scrutinize more closely.

It is a point of key importance that ATSDR's (as well as state and federal regulatory agencies') comparison values, screening numbers, and health guidelines define highly protective levels of environmental contamination. They are not thresholds for toxicity. This means that although concentrations at or below a comparison value could reasonably be considered safe, it does not automatically follow that any concentration above a comparison value will necessarily produce toxic effects. To the contrary, ATSDR's comparison values are intentionally designed to be much lower, usually by at least two or three orders of magnitude, than the corresponding no-effect levels (or lowest-effect levels) determined from scientific studies.

ATSDR uses comparison values (regardless of source) solely for the purpose of screening individual contaminants. In this procedure, ATSDR may decide that a compound warrants further evaluation if the highest single recorded concentration of that contaminant in the medium in question exceeds that compound's lowest available comparison value (e.g., cancer risk evaluation guides or other chronic exposure values) for the most sensitive individuals who could potentially be exposed (e.g., children). This health-protective process results in the selection of many contaminants as "chemicals of concern" that will not, upon closer scrutiny, be judged to pose any hazard to human health. Still, ATSDR judges it prudent to use a screen that "lets through" many harmless contaminants rather than one that overlooks even a single potential hazard to public health. Even those contaminants of concern that are ultimately labeled in the toxicological evaluation as potential public health hazards are often identified solely on the basis of the maximum concentration detected. The reader should keep in mind the protective nature of this approach when considering the potential health implications of ATSDR's evaluations.

Because a contaminant must first enter the body before it can produce any effect on the body, adverse or otherwise, the toxicological discussion in public health assessments focuses primarily on completed pathways of exposure (i.e., contaminants in media to which people are known to have been, or are reasonably expected to have been, exposed). For example, a public health assessment may discuss water that could be used for drinking and air in the breathing zone.

To determine whether people were, or continue to be, exposed to contaminants originating from a site, ATSDR evaluates the factors that lead to human exposure. These factors or elements include (1) a source of contamination, (2) transport through an environmental medium, (3) a point of exposure, (4) a route of human exposure, and (5) an exposed population. Exposure pathways fall into one of three categories:

- *Completed Exposure Pathway.* ATSDR calls a pathway “complete” if it is certain that people are exposed to contaminated media. Completed pathways require that the five elements exist and indicate that exposure to the contaminant has occurred, is occurring, or will occur.
- *Potential Exposure Pathway.* Potential pathways are those in which at least one of the five elements is missing but could exist. Potential pathways indicate that exposure to a contaminant could have occurred, could be occurring, or could occur in the future. Potential exposure pathways refer to those pathways where (1) exposure is documented, but there is not enough information available to determine whether the environmental medium is contaminated, or (2) an environmental medium has been documented as contaminated, but it is unknown whether people have been, or could be, exposed to the medium.
- *Eliminated Exposure Pathway.* In an eliminated exposure pathway, at least one of the five elements is missing and will never be present. From a human health perspective, pathways can be eliminated from further consideration if ATSDR is able to show that (1) an environmental medium is not contaminated, or (2) no one is exposed to contaminated media.

ATSDR’s evaluation of potential human exposures at CAFB identified completed exposure pathways and evaluated the potential for people to be exposed to contaminants in drinking water, residential and recreational areas, and fish from Heritage Lake and Salt Fork Creek.

ATSDR estimated exposure doses for consumption of fish. The exposure doses and assumptions used to calculate dose are presented in each pathway section.

Appendix D. ATSDR Glossary of Environmental Health Terms

ATSDR is a federal public health agency with headquarters in Atlanta, Georgia, and ten regional offices in the United States. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. ATSDR is not a regulatory agency, unlike EPA, which is the federal agency that develops and enforces environmental laws to protect the environment and human health. This glossary defines words used by ATSDR in communications with the public. It is not a complete dictionary of environmental health terms. If you have questions or comments, call ATSDR's toll-free telephone number, 1-888-42-ATSDR (1-888-422-8737).

Absorption

The process of taking in. For a person or an animal, absorption is the process of a substance getting into the body through the eyes, skin, stomach, intestines, or lungs.

Acute

Occurring over a short time [compare with chronic].

Acute exposure

Contact with a substance that occurs once or for only a short time (up to 14 days) [compare with intermediate duration exposure and chronic exposure].

Adverse health effect

A change in body function or cell structure that might lead to disease or health problems

Ambient

Surrounding (for example, ambient air).

Analyte

A substance measured in the laboratory. A chemical for which a sample (such as water, air, or blood) is tested in a laboratory. For example, if the analyte is mercury, the laboratory test will determine the amount of mercury in the sample.

Background level

An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.

Biologic uptake

The transfer of substances from the environment to plants, animals, and humans.

Biota

Plants and animals in an environment. Some of these plants and animals might be sources of food, clothing, or medicines for people.

Cancer

Any one of a group of diseases that occur when cells in the body become abnormal and grow or multiply out of control.

Cancer risk

A theoretical risk for getting cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.

Carcinogen

A substance that causes cancer.

CERCLA [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980]

Chronic

Occurring over a long time [compare with acute].

Chronic exposure

Contact with a substance that occurs over a long time (more than 1 year) [compare with acute exposure and intermediate duration exposure]

Comparison value (CV)

Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

Completed exposure pathway [see exposure pathway].

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)

CERCLA, also known as Superfund, is the federal law that concerns the removal or cleanup of hazardous substances in the environment and at hazardous waste sites. ATSDR, which was created by CERCLA, is responsible for assessing health issues and supporting public health activities related to hazardous waste sites or other environmental releases of hazardous substances. This law was later amended by the Superfund Amendments and Reauthorization Act (SARA).

Concentration

The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

Contaminant

A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.

Dermal

Referring to the skin. For example, dermal absorption means passing through the skin.

Dermal contact

Contact with (touching) the skin [see route of exposure].

Detection limit

The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.

Disease registry

A system of ongoing registration of all cases of a particular disease or health condition in a defined population.

Dose (for chemicals that are not radioactive)

The amount of a substance to which a person is exposed over some time period. Dose is a measurement of exposure. Dose is often expressed as milligram (amount) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink contaminated water, food, or soil. In general, the greater the dose, the greater the likelihood of an effect. An “exposure dose” is how much of a substance is encountered in the environment. An “absorbed dose” is the amount of a substance that actually got into the body through the eyes, skin, stomach, intestines, or lungs.

Environmental media

Soil, water, air, biota (plants and animals), or any other parts of the environment that can contain contaminants.

Epidemiology

The study of the distribution and determinants of disease or health status in a population; the study of the occurrence and causes of health effects in humans.

Exposure

Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [acute exposure], of intermediate duration, or long-term [chronic exposure].

Exposure pathway

The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has five parts: a source of contamination (such as an abandoned business); an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.

Groundwater

Water beneath the earth's surface in the spaces between soil particles and between rock surfaces [compare with surface water].

Hazard

A source of potential harm from past, current, or future exposures.

Hazardous waste

Potentially harmful substances that have been released or discarded into the environment.

Health consultation

A review of available information or collection of new data to respond to a specific health question or request for information about a potential environmental hazard. Health consultations are focused on a specific exposure issue. Health consultations are therefore more limited than a public health assessment, which reviews the exposure potential of each pathway and chemical [compare with public health assessment].

Health education

Programs designed with a community to help it know about health risks and how to reduce these risks.

Ingestion

The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see route of exposure].

Inhalation

The act of breathing. A hazardous substance can enter the body this way [see route of exposure].

Intermediate duration exposure

Contact with a substance that occurs for more than 14 days and less than a year [compare with acute exposure and chronic exposure].

In vivo

Within a living organism or body. For example, some toxicity testing is done on whole animals, such as rats or mice [compare with in vitro].

Lowest-observed-adverse-effect level (LOAEL)

The lowest tested dose of a substance that has been reported to cause harmful (adverse) health effects in people or animals.

Migration

Moving from one location to another.

Minimal risk level (MRL)

An ATSDR estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of harmful (adverse), noncancerous effects.

MRLs are calculated for a route of exposure (inhalation or oral) over a specified time period (acute, intermediate, or chronic). MRLs should not be used as predictors of harmful (adverse) health effects [see reference dose].

National Priorities List for Uncontrolled Hazardous Waste Sites (National Priorities List or NPL)

EPA's list of the most serious uncontrolled or abandoned hazardous waste sites in the United States. The NPL is updated on a regular basis.

No apparent public health hazard

A category used in ATSDR's public health assessments for sites where human exposure to contaminated media might be occurring, might have occurred in the past, or might occur in the future, but where the exposure is not expected to cause any harmful health effects.

No-observed-adverse-effect level (NOAEL)

The highest tested dose of a substance that has been reported to have no harmful (adverse) health effects on people or animals.

No public health hazard

A category used in ATSDR's public health assessment documents for sites where people have never and will never come into contact with harmful amounts of site-related substances.

NPL [see National Priorities List for Uncontrolled Hazardous Waste Sites]

Plume

A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater.

Point of exposure

The place where someone can come into contact with a substance present in the environment [see exposure pathway].

Population

A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

ppb

Parts per billion.

ppm

Parts per million.

Public comment period

An opportunity for the public to comment on agency findings or proposed activities contained in

draft reports or documents. The public comment period is a limited time period during which comments will be accepted.

Public health action

A list of steps to protect public health.

Public health advisory

A statement made by ATSDR to EPA or a state regulatory agency that a release of hazardous substances poses an immediate threat to human health. The advisory includes recommended measures to reduce exposure and reduce the threat to human health.

Public health assessment (PHA)

An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed from coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health [compare with health consultation].

Public health hazard

A category used in ATSDR's public health assessments for sites that pose a public health hazard because of long-term exposures (greater than 1 year) to sufficiently high levels of hazardous substances or radionuclides that could result in harmful health effects.

Public health hazard categories

Public health hazard categories are statements about whether people could be harmed by conditions present at the site in the past, present, or future. One or more hazard categories might be appropriate for each site. The five public health hazard categories are no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard.

Public health surveillance

The ongoing, systematic collection, analysis, and interpretation of health data. This activity also involves timely dissemination of the data and use for public health programs.

Public meeting

A public forum with community members for communication about a site.

RCRA [see Resource Conservation and Recovery Act (1976, 1984)]

Receptor population

People who could come into contact with hazardous substances [see exposure pathway].

Reference dose (RfD)

An EPA estimate, with uncertainty or safety factors built in, of the daily lifetime dose of a substance that is unlikely to cause harm in humans.

Registry

A systematic collection of information on persons exposed to a specific substance or having specific diseases [see exposure registry and disease registry].

Remedial investigation

The CERCLA process of determining the type and extent of hazardous material contamination at a site.

Resource Conservation and Recovery Act (1976, 1984) (RCRA)

This Act regulates management and disposal of hazardous wastes currently generated, treated, stored, disposed of, or distributed.

RfD [see reference dose]

Risk

The probability that something will cause injury or harm.

Route of exposure

The way people come into contact with a hazardous substance. Three routes of exposure are breathing [inhalation], eating or drinking [ingestion], or contact with the skin [dermal contact].

Safety factor [see uncertainty factor]

Sample

A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population [see population]. An environmental sample (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.

Sample size

The number of units chosen from a population or an environment.

Solvent

A liquid capable of dissolving or dispersing another substance (for example, acetone or mineral spirits).

Source of contamination

The place where a hazardous substance comes from, such as a landfill, waste pond, incinerator, storage tank, or drum. A source of contamination is the first part of an exposure pathway.

Statistics

A branch of mathematics that deals with collecting, reviewing, summarizing, and interpreting data or information. Statistics are used to determine whether differences between study groups are meaningful.

Substance

A chemical.

Superfund [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Superfund Amendments and Reauthorization Act (SARA)]

Surface water

Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs [compare with groundwater].

Surveillance [see public health surveillance]

Survey

A systematic collection of information or data. A survey can be conducted to collect information from a group of people or from the environment. Surveys of a group of people can be conducted by telephone, by mail, or in person. Some surveys are done by interviewing a group of people [see prevalence survey].

Toxic agent

Chemical or physical (for example, radiation, heat, cold, microwaves) agents that, under certain circumstances of exposure, can cause harmful effects to living organisms.

Toxicological profile

An ATSDR document that examines, summarizes, and interprets information about a hazardous substance to determine harmful levels of exposure and associated health effects. A toxicological profile also identifies significant gaps in knowledge on the substance and describes areas where further research is needed.

Toxicology

The study of the harmful effects of substances on humans or animals.

Uncertainty factor

Mathematical adjustments for reasons of safety when knowledge is incomplete. For example, factors used in the calculation of doses that are not harmful (adverse) to people. These factors are applied to the lowest-observed-adverse-effect level (LOAEL) or the no-observed-adverse-effect level (NOAEL) to derive a minimal risk level (MRL). Uncertainty factors are used to account for variations in people's sensitivity, for differences between animals and humans, and for differences between a LOAEL and a NOAEL. Scientists use uncertainty factors when they have some, but not all, the information from animal or human studies to decide whether an exposure will cause harm to people [also sometimes called a safety factor].

Volatile organic compounds (VOCs)

Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, methylene chloride, and methyl chloroform.

Other glossaries and dictionaries:

Environmental Protection Agency (<http://www.epa.gov/OCEPAterms/>)

National Center for Environmental Health (CDC) (<http://www.cdc.gov/nceh/dls/report/glossary.htm>)

National Library of Medicine (NIH) (<http://www.nlm.nih.gov/medlineplus/mplusdictionary.html>)

Appendix E. ATSDR’s Response to Public Comments

ATSDR released the Public Health Assessment (PHA) for the former Chanute Air Force Base (CAFB), Rantoul, IL for public comment on June 27, 2008. The public comment period ended on July 28, 2008. The document was made available for public comment at the Rantoul Public Library, 106 West Flessner Avenue, Rantoul, Illinois 61866, phone number (217) 893-3955 ext. 22.

In the following table, ATSDR responds to the comments received during the public comment period.

Table E-1. Response To Comments		
	Comment	ATSDR’s Response
1	<p>Vapor Intrusion of PCE at Building 343:</p> <p>Results from the Remedial Investigation (RI), Evaluation of Future Risk from Vapor Intrusion Using Sub-Slab Soil Gas and Groundwater Results, URS Corp, August 2007, show that many buildings at Chanute have significant vapor intrusion problems. Most of these buildings are either vacant or in some sort of passive industrial use, with one exception. Building 343 is located in a residential portion of OU-1, and is part of the Lincoln’s Challenge Academy. We believe the building is now used as a laundry by the teenage recruits. It would be interesting to get ATSDR’s independent evaluation of whether this exposure scenario is cause for concern.</p>	<p>ATSDR reviewed site information pertaining to soil gas including the August 2007 RI report and evaluated the vapor intrusion pathway in community health concerns section of this document [see Page 45; Vapor Intrusion: Are VOCs migrating from contaminated groundwater and surface soil at the former CAFB into former base buildings?].</p> <p>ATSDR concluded that vapor intrusion in these buildings does not pose a current public health hazard because of the estimated number of hours per day and years of exposure which is considerable less than residential use estimates. The indoor air concentrations of VOCs in Building 343 were elevated and would pose a health concern under a residential use scenario for adults and children. However, this building is currently being used as a coin operated laundry facility and the occasional short term exposure to people who work in or use this building is not expected to pose a health hazard.</p> <p>The Air Force is planning targeted remedial actions, which are expected to reduce the source(s) of the sub-slab soil gas constituents and mitigate the vapor intrusion pathway. If, under future reuse plans, any of the buildings that have not undergone remediation are converted to residential or office use, additional investigations may be needed to ensure the safety of people spending longer periods of time in the buildings.</p>

Table E-1. Response To Comments		
	Comment	ATSDR's Response
2	<p>Landfill Gas Releases:</p> <p>The risk assessment in the Landfills RI report (OU-2 Report Group H) contains a short evaluation of potential risk from chlorinated solvent releases from Landfill 3. It concludes that the measured gas volumes do not present a significant risk to the residential area across Chandler Road immediately south of the base. EPA agreed with the evaluation at the time because that seemed to be the only residential location of interest. However, since then, the Air Force has proposed to transfer other parts of OU-2 without any use restrictions (residential), including all of Salt Fork Creek and the areas adjacent to it (e.g., the land in between Landfills 1. Does ATSDR think that the landfill gases deserve further evaluation of a potential residential scenario?</p>	<p>ATSDR concurs with EPA's conclusion – based on the review of the Landfills RI Report, that chlorinated solvent releases from Landfill 3 do not pose a public health hazard given the current proximity of residences to the landfills.</p> <p>ATSDR expects that any transferred property at Chanute AFB will be evaluated in accordance with its intended land use and any deed restrictions imposed at the time of property transfer will be upheld and maintained. A representative from the AFRPA confirmed that the area will be deeded with land use restrictions for non-residential property use and no groundwater use (ATSDR Record of Communication with Paul Carroll, AFRPA, September 5, 2008).</p> <p>Per Air Force, ATSDR is aware of only two areas on the former Chanute property that are intended for residential land use; the southwest corner parcel and the northeast corner parcel. Any other proposals for residential areas are not consistent with intended land use at this site.</p>

Table E-1. Response To Comments

	Comment	ATSDR's Response
3	<p>Agricultural Use of Contaminated Sites:</p> <p>EPA non-concurred with the RI for Fire Training Area 1 (OU-2 Report Group 1) which includes inadequately defined dioxin contamination near the site of a former airplane mockup area. The Air Force continues to permit the agricultural use of this site, which is located on the airfield property. We would like to hear ATSDR's opinion as to whether dioxin intake into food chain crops might be a public health concern in this instance.</p>	<p>In order to address these concerns, ATSDR contacted the Air Force Real Property Agency (AFRPA) to obtain additional information regarding the current land use at Fire Training Area (FTA), which is part of OU 2. ATSDR also reviewed the scientific literature regarding the uptake of chlorinated organic compounds such as dioxins into plant tissues.</p> <p>A representative from the AFRPA confirmed that the FTA is being used for agricultural purposes, specifically as a soybean field. According to the Air Force, the FTA is considered a "No Further Action" site and was approved for leasing for agricultural uses (personal communication with Paul Carroll, AFRPA, September 5, 2008). ATSDR received a copy of a letter from the Village of Rantoul to the Air Force BRAC Environmental Coordinator, September 5, 2008 stating a misunderstanding on their part that the land was free from environmental issues. The letter further states that the [soy] "bean crop will [therefore] be harvest for Bio Diesel Fuel usage. No beans will be used for human or animal consumption."</p> <p>Soybeans, corn and other plant tissues typically accumulate chlorinated organic contaminants such as dioxin by vapor-to-plant transfer (i.e., dioxins that are volatilized and in a gaseous state in the air). Strong binding of chlorinated organic compounds to soil organic matter and clay inhibits the accumulation of chlorinated organic compounds in plants through the roots, as clearly demonstrated in bean and maize plants by McCrady in the late 1980s</p> <p>The updated "ATSDR Policy Guideline for Dioxins and Dioxin-Like Compounds in Residential Soil" concluded that because of the low water solubility of dioxins and the protective layer of plant cuticles, uptake of dioxins from soil into plant tissue is very low. Therefore, consumption of garden-grown vegetables is generally considered to be an insignificant exposure pathway (ATSDR 2006). Based on a review of the literature, dioxin contamination would not be expected to be taken up by crops that are grown on this parcel. However, workers who harvest the crops and are coming in frequent contact with the soil may be at greater risk of exposure to site-related contaminants.</p> <p>However, of greater public health significance are those of communication and land use management. ATSDR will work with agencies and the village of Rantoul to fine tune land use management tools, standard operating procedures, and communication, to help ensure that people using the property are not exposed to unsafe levels of chemical contaminants or safety hazards.</p>

Table E-1. Response To Comments		
	Comment	ATSDR's Response
4	<p>Agricultural Use of Contaminated Sites:</p> <p>The Air Force is also leasing property for agricultural use on the west side of the Building 923 Site. Corn was planted up to the fence line. This includes a large portion of the site on property currently moving forward to a CERCLA Feasibility study. We would like to know if ATSDR thinks that agricultural use of this site is appropriate from a human health perspective.</p>	<p>Building 923 served as a cryogenics generation and liquid oxygen (LOX) facility. It later became a pavement and grounds maintenance facility. VOCs have been detected in soil and groundwater on-site, and PAHs in soil.</p> <p>The accumulation of VOCs and PAHs into corn or other crops is likely to be very low. However, ATSDR shares EPA's concerns about the use of this site for growing crops used for human consumption before a Feasibility Study is completed. According to our review of Air Force documents, Building 923 is currently designated for aviation support/industrial use only. Therefore, ATSDR recommends that this parcel not be used for agricultural, recreational, or residential land use until additional characterization studies are conducted and demonstrate that contamination in the soil are below levels of concern.</p>

Table E-1. Response To Comments		
	Comment	ATSDR's Response
5	<p>Asbestos Exposure from Deteriorating Infrastructure:</p> <p>The base contains numerous deteriorating buildings and steam lines, some still owned by the Air Force and some not, that pose a potential health threat. We give the Air Force credit for beginning to address the steam line problem in OU-2, but the job is not done yet and the only progress so far is erecting fencing and signs. The most significant threat may be from large vacant buildings transferred from federal ownership a decade or more ago. Does ATSDR have any concerns or suggestions for how to address this festering problem at Chanute?</p>	<p>This is a common problem at any abandoned property including most base closure sites. ATSDR has discussed this issue with the AFRPA representative and will work with the stakeholders to develop plans for the protection of public health from hazardous substances in deteriorating buildings.</p>

Table E-1. Response To Comments		
	Comment	ATSDR's Response
6	<p>Over and over again in the report, the statement appears that "ATSDR determined that the site does not currently pose a risk under the current land use designation." What exactly does that mean? Does this refer to the designation under the Air Force's reuse designation because in many cases the Air Force has transferred property without any restrictive covenants in locations where ATSDR might be assuming that the land use is restricted?</p> <p>There are also ambiguities in the Reuse Plan designation. For example, what does "Aviation Support/Industrial" mean from an environmental perspective? This is the property that all the corn is being grown on, but it's called "Industrial" How about Educational? Can you build a dormitory, day care center, or full-time faculty housing on this property?</p>	<p>The statement referring to "land use designation" does pertain to the Air Force's reuse designation. According to the Air Force, restrictions are included in the deeds to parcels that have been or are expected to be transferred. ATSDR has added, "but should not be used for residential or child care purposes unless re-evaluated using long-term residential or child exposure values."</p>
<p>Reference</p> <p>Agency for Toxic Substances and Disease Registry. 2006. Update- ATSDR Policy Guideline for Dioxins and Dioxin-Like Compounds in Residential Soil. Federal Register Draft. November 7, 2006. Available at: http://www.atsdr.cdc.gov/substances/dioxin/policy/ATSDRUpdatedDioxinSoilPolicyDocument110706.pdf</p>		