

Prepared in cooperation with the U.S. Department of the Army Environmental and Natural Resources Management Office of the U.S. Army Signal Center and Fort Gordon

Assessment of Groundwater, Soil-Gas, and Soil Contamination at the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010



Open-File Report 2011–1200

Cover photograph. Soil-gas sampler at the Vietnam Armor Training Facility, Fort Gordon, Georgia, June 3, 2010
(Wladimir B. Guimaraes, U.S. Geological Survey).

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By Wladimir B. Guimaraes, W. Fred Falls, Andral W. Caldwell, W. Hagan Ratliff, John B. Wellborn, and James E. Landmeyer

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Open-File Report 2011–1200

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
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U.S. Geological Survey, Reston, Virginia: 2011

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Suggested citation:

Guimaraes, W.B., Falls, W.F., Caldwell, A.W., Ratliff, W.H., Wellborn, J.B., and Landmeyer, J.E., 2011, Assessment of groundwater, soil-gas, and soil contamination at the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010: U.S. Geological Survey Open-File Report 2011–1200, 40 p.

Available online at <http://pubs.usgs.gov/of/2011/1200/>

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Conversion Factors and Datum

Inch/Pound to SI

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeters (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Acronyms and Abbreviations

BTEX	Benzene, toluene, ethylbenzene, and xylene (total)
VATF	Vietnam Armor Training Facility
mg/kg	milligram per kilogram
µg	microgram
µg/g	microgram per gram
mL	milliliter
µg/L	microgram per liter
MDL	Method detection level
MTBE	Methyl <i>tert</i> -butyl ether
PAH	Polycyclic aromatic hydrocarbon
PCE	Perchloroethylene (also known as tetrachloroethylene)
RCRA	Resource Conservation and Recovery Act
RSL	Regional screening level
SVOC	Semivolatile organic compound
TCE	Trichloroethylene
TPH	Total petroleum hydrocarbon
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VOC	Volatile organic compound

Assessment of Groundwater, Soil-Gas, and Soil Contamination at the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010

By Wladimir B. Guimaraes,¹ W. Fred Falls,¹ Andral W. Caldwell,¹ W. Hagan Ratliff,² John B. Wellborn,³ and James E. Landmeyer¹

Abstract

The U.S. Geological Survey, in cooperation with the U.S. Department of the Army Environmental and Natural Resources Management Office of the U.S. Army Signal Center and Fort Gordon, Georgia, assessed the groundwater, soil gas, and soil for contaminants at the Vietnam Armor Training Facility (VATF) at Fort Gordon, from October 2009 to September 2010. The assessment included the detection of organic compounds in the groundwater and soil gas, and inorganic compounds in the soil. In addition, organic contaminant assessment included organic compounds classified as explosives and chemical agents in selected areas. The assessment was conducted to provide environmental contamination data to the U.S. Army at Fort Gordon pursuant to requirements of the Resource Conservation and Recovery Act Part B Hazardous Waste Permit process.

Four passive samplers were deployed in groundwater wells at the VATF in Fort Gordon. Total petroleum hydrocarbons were detected above the method detection level at all four wells. The only other volatile organic compounds detected above their method detection level were undecane and pentadecane, which were detected in two of the four wells sampled. Soil-gas samplers were deployed at 72 locations in a grid pattern across the VATF. Total petroleum hydrocarbons were detected in 71 of the 72 samplers (one sampler was destroyed in the field and not analyzed) at levels above the method detection level, and the combined mass of benzene, toluene, ethylbenzene, and total xylene was detected above the detection level in 31 of the 71 samplers that were analyzed. Other volatile organic compounds detected above their respective method detection levels were naphthalene, 2-methyl-naphthalene, tridecane, 1,2,4-trimethylbenzene, and perchloroethene.

Subsequent to the soil-gas survey, four areas determined to have elevated contaminant mass were selected and sampled for explosives and chemical agents. No detections of explosives or chemical agents above their respective method detection levels were found at any of the sampling locations. The same four locations that were sampled for explosives and chemical agents were selected for the collection of soil samples. A fifth location also was selected on the basis of the elevated contaminant mass of the soil-gas survey. No metals that exceeded the Regional Screening Levels for Industrial Soils as classified by the U.S. Environmental Protection Agency were detected at any of the five VATF locations. The soil samples also were compared to values from the ambient, uncontaminated (background) levels for soils in South Carolina, as classified by the South Carolina Department of Health and Environmental Control. Because South Carolina is adjacent to Georgia and the soils in the coastal plain are similar, these comparisons are valid. No similar values are available for Georgia to use for comparison purposes. The metals that were detected above the ambient background levels for South Carolina, as classified by the South Carolina Department of Health and Environmental Control, include aluminum, arsenic, barium, beryllium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, and zinc.

Introduction

Fort Gordon is a U.S. Department of the Army facility located in east-central Georgia, approximately 10 miles (mi) southwest of Augusta, Georgia (fig. 1). A cantonment (military housing) area is located at the northwestern boundary of Fort Gordon. The Vietnam Armor Training Facility (VATF) is located in a relatively flat, open area in the south-central part of Fort Gordon adjacent to McDuffie Road, near the intersection with Forestry Road. Little historical information is available about the VATF except that armor training was conducted at the site (Hagan Ratliff, Applied Services and

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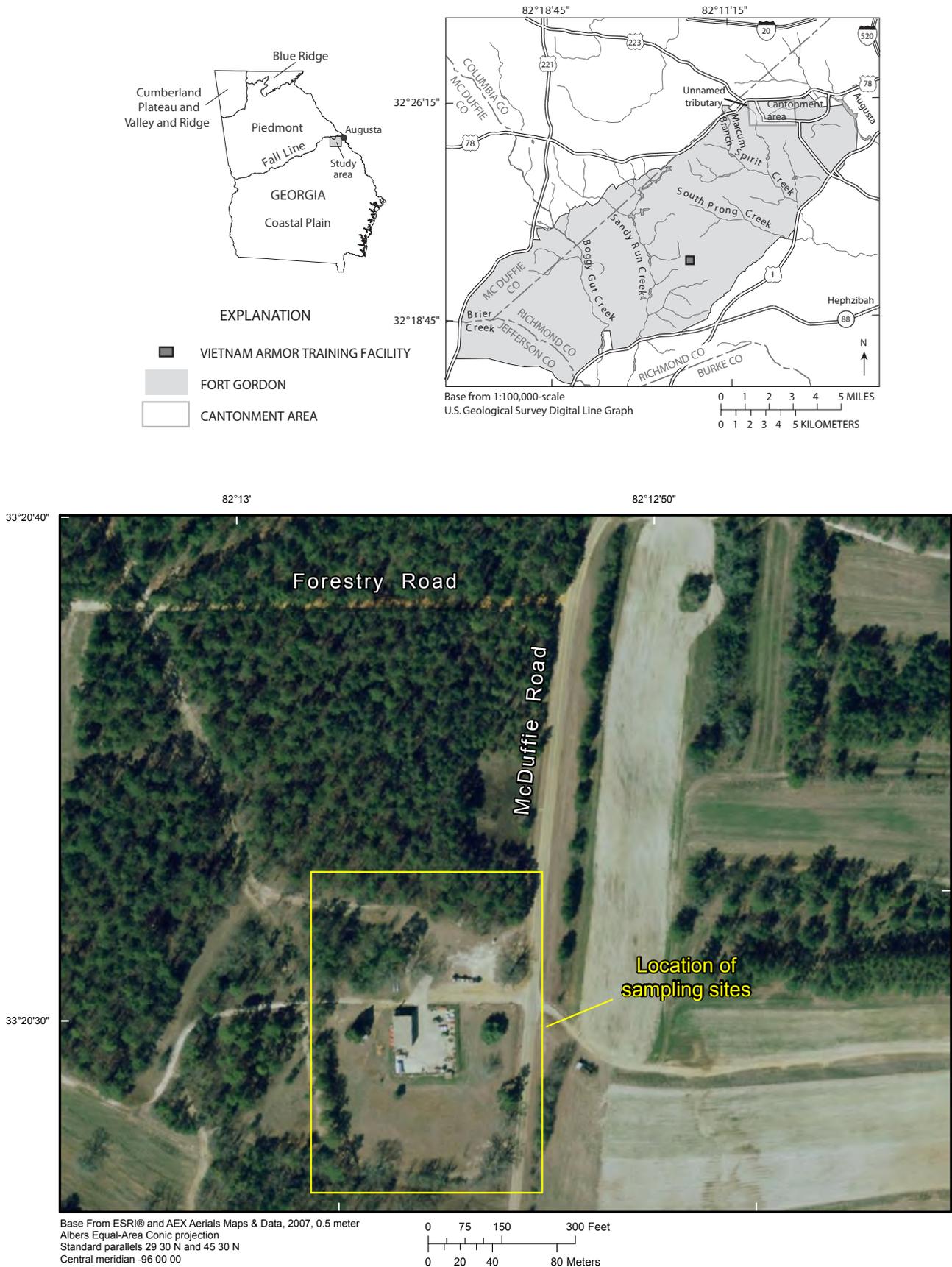


Figure 1. Location of Vietnam Armor Training Facility, Fort Gordon, Georgia.

Informational Systems, Inc., Installation Restoration Program Manager, oral commun., November 6, 2009). Presently in 2011, the VATF site is used by the Fort Gordon Fish and Wildlife Program of the Environmental Division of the Fort Gordon Directorate of Public Works. The site includes several buildings, a parking area, and a wash rack, with built-in drains, where vehicles are washed. An initial investigation to study the possible contamination of the soil and groundwater at the VATF is warranted because no historical information is available about the activities and use of the site during the Vietnam War era. Additionally, the site is located in the outcrop area for the Cretaceous-age aquifer system, which is used for drinking water farther downgradient (Williams, 2007). Groundwater from the VATF site may discharge to streams in the area, enabling potential contaminants to be transported off the Fort Gordon property.

Purpose and Scope

The purpose of this report is to provide the results of the analyses of samples collected by the U.S. Geological Survey, in cooperation with the U.S. Department of the Army Environmental and Natural Resources Management Office of the U.S. Army Signal Center and Fort Gordon, to assess the groundwater, soil gas, and soil for contaminants at the VATF at Fort Gordon, Georgia, from October 2009 to September 2010. The assessment was conducted to provide environmental contamination data to the U.S. Army at Fort Gordon. The assessment included passive samplers deployed in ground-water wells and in the soil in a grid pattern over the generalized extent of the VATF to determine the presence of organic contaminants, explosives, and chemical agents from the VATF. The presence of inorganic compounds was determined from soil samples. The report presents the analytical results for a total of 85 sites.

Description of the Study Area

Fort Gordon is an Army facility located in east-central Georgia, approximately 10 mi southwest of Augusta, Georgia (fig. 1). Fort Gordon lies in the northern part of the Coastal Plain Physiographic Province and south of the Fall Line. Surficial soil and sediments are characterized by unconsolidated sands, indurated sands and semiconsolidated sandstones, and layers of clay that include kaolinite (Gregory and others, 2001).

Methods

All samples were collected in February, June, and September 2010 and were analyzed by using standard laboratory practices (U.S. Geological Survey, variously dated). The methods were selected to provide data to determine the presence or absence of contamination in the groundwater, soil

gas, and soil at the VATF. The soil-gas method that was used provides results that are qualitative, and the groundwater and soil samples provide quantitative data.

Passive Survey

The passive survey was conducted by using the GORE™ Module (module), a commercially available passive diffusion sampler based on GORE-TEX® membrane technology (U.S. Environmental Protection Agency, 1998; W.L. Gore and Associates, Inc., 2004; American Society for Testing and Materials, 2006). The module consisted of an adsorbent material placed inside a shoestring-shaped GORE-TEX® tube (fig. 2A). The adsorbent material can adsorb a wide variety of volatile organic compounds (VOC), including solvents such as perchloroethylene (PCE; also known as tetrachloroethylene); trichloroethylene (TCE); benzene, toluene, ethylbenzene, and xylenes (collectively referred to as BTEX); methyl *tert*-butyl ether (MTBE); semivolatile organic compounds (SVOC); total petroleum hydrocarbons (TPH); and polycyclic aromatic hydrocarbons (PAH), such as naphthalene. The modules were deployed into the area of interest and then removed after a specified time period. For the groundwater wells survey, the modules were inserted into water. For the soil-gas survey and the explosives and chemical agents, the modules were tied to a string, attached to a cork plug to prevent the entrance of surface water and ambient surface sources of contamination, inserted into a shallow borehole, and later removed. Modules that were deployed in water were removed after 1 to 4 hours, whereas modules deployed in the soil were removed after 5 to

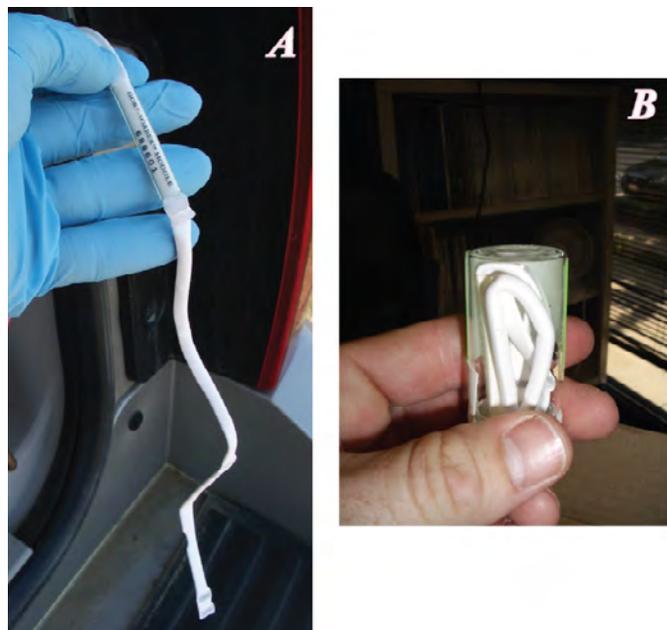


Figure 2. The soil-gas sampler (A) prior to being installed in a shallow borehole and (B) following retrieval from a borehole and prior to shipping to the laboratory for analysis.

10 days. After the modules were removed, they were placed in their original 20-milliliter (mL) gas-tight vial (fig. 2B) and sent to a commercial laboratory (W.L. Gore and Associates, Inc.) for analysis by gas chromatography/mass spectrometry using a modification of U.S. Environmental Protection Agency (USEPA) method 8260/8270 to include thermal desorption of the sample. The laboratory is in compliance with Good Laboratory Practices and ISO Guide 25 (International Organization for Standardization, 1990).

Passive Groundwater Wells Survey

Three monitoring wells were installed at the VATF in 2006 by Fort Gordon personnel to obtain an operating permit for a mixed nondomestic waste-septic system (Noel G. Simmons, P.G., State of Georgia, Department of Natural Resources, Environmental Protection Division, Georgia Geologic Survey, written commun., October 10, 2006). In addition, a discontinued U.S. Geological Survey monitoring well 332020082163101, 27AA02 located at the VATF was included in this study. Modules were installed in the four groundwater wells at the VATF on February 26, 2010 (fig. 3). The modules were placed below the water surface in the wells and removed after about 10 to 15 minutes because of the odor of petroleum products in the well. Three additional samplers were used as trip blanks, and one additional sampler was used as a method blank; these samplers were not deployed. The results of the passive groundwater survey are expressed in concentrations of contaminant in micrograms per liter ($\mu\text{g/L}$).

Passive Soil-Gas Survey

Seventy-two modules were deployed in a grid pattern to cover the generalized extent of the VATF (fig. 3). Two additional samplers were used as trip blanks, and four samplers were used as method blanks; these samplers were not deployed. Each sampler was placed in a borehole, created by a stainless-steel ship auger attached to a cordless drill, measuring 0.5 inches (in.) in diameter and 15 in. long. This depth is similar to what is recommended by the USEPA for soil-gas investigations (U.S. Environmental Protection Agency, 1998). The auger was cleaned with a paper towel prior to the drilling of each borehole. The 72 modules were installed on June 3, 2010, and were removed on June 9, 2010. The soil-gas contaminant results are expressed as mass of contaminant in micrograms (μg).

Explosives and Chemicals Agents

Subsequent to the soil-gas survey, four locations with elevated contaminant mass were selected as sampling sites for organic compounds classified as explosives and for chemical agents (fig. 4). On September 15, 2010, four soil-gas samplers were deployed in the VATF at those selected locations and removed on September 22, 2010. These samplers were

installed and retrieved, as previously described in the passive soil-gas survey, and analyzed for organic compounds classified as explosives and chemical agents. The results of the explosives and chemical agents survey are expressed in mass of contaminant in micrograms.

Soil Samples

Soil samples were collected at the same four locations that were sampled for explosives and chemical agents. In addition, a soil sample was collected at a fifth location in the VATF that was selected using the results of the soil-gas survey to identify an area of elevated contaminant mass. Composite soil samples were collected on August 25, 2010, from land surface to 6 in. below land surface at the five locations (fig. 4). These soil samples were analyzed for 37 metals, including 6 of the 8 Resource Conservation and Recovery Act (RCRA) metals (selenium and mercury were excluded). Soil-sample metal concentrations were compared to the USEPA Regional Screening Levels (RSL) for Industrial Soils (U.S. Environmental Protection Agency, 2009) to determine the extent of contamination. Soil-sample metal concentrations also were compared to values for ambient, uncontaminated (background) levels for soils across the adjacent State of South Carolina (South Carolina Department of Health and Environmental Control, 2002), because no similar values were available for Georgia. The comparison remains valid, because Georgia and South Carolina are located in similar physiographic provinces. Soil samples were analyzed for inorganic compounds using methods described by Briggs and Meier (2002).

Results

The results of the multiple passive surveys and soil samples are presented in this section of the report. Passive survey results can indicate the presence of particular contaminants. The results do not, however, reveal if the detection was derived from a free product, a residual-phase adsorbed material or vapors in the unsaturated zone, or the dissolved phase in shallow and deep groundwater (unless the module had been placed in water). In general, higher mass in a sample tends to be related to the presence of residual contamination or free product that is close to the land surface where the sampler is located. If such source material were located at greater depths, however, the contaminant mass generally would be lower. A lower value near known sources of contaminants could be caused by various attenuation processes that affect the mass prior to detection. In both cases, however, the modules help to rapidly indicate the presence or absence of contaminants. The passive approach was approved for use at the VATF site by the Hazardous Waste Management Branch, Georgia Environmental Protection Department (William Powell, P.E., Environmental Engineer, Department of Defense Remediation Unit, oral commun., December 10, 2008).

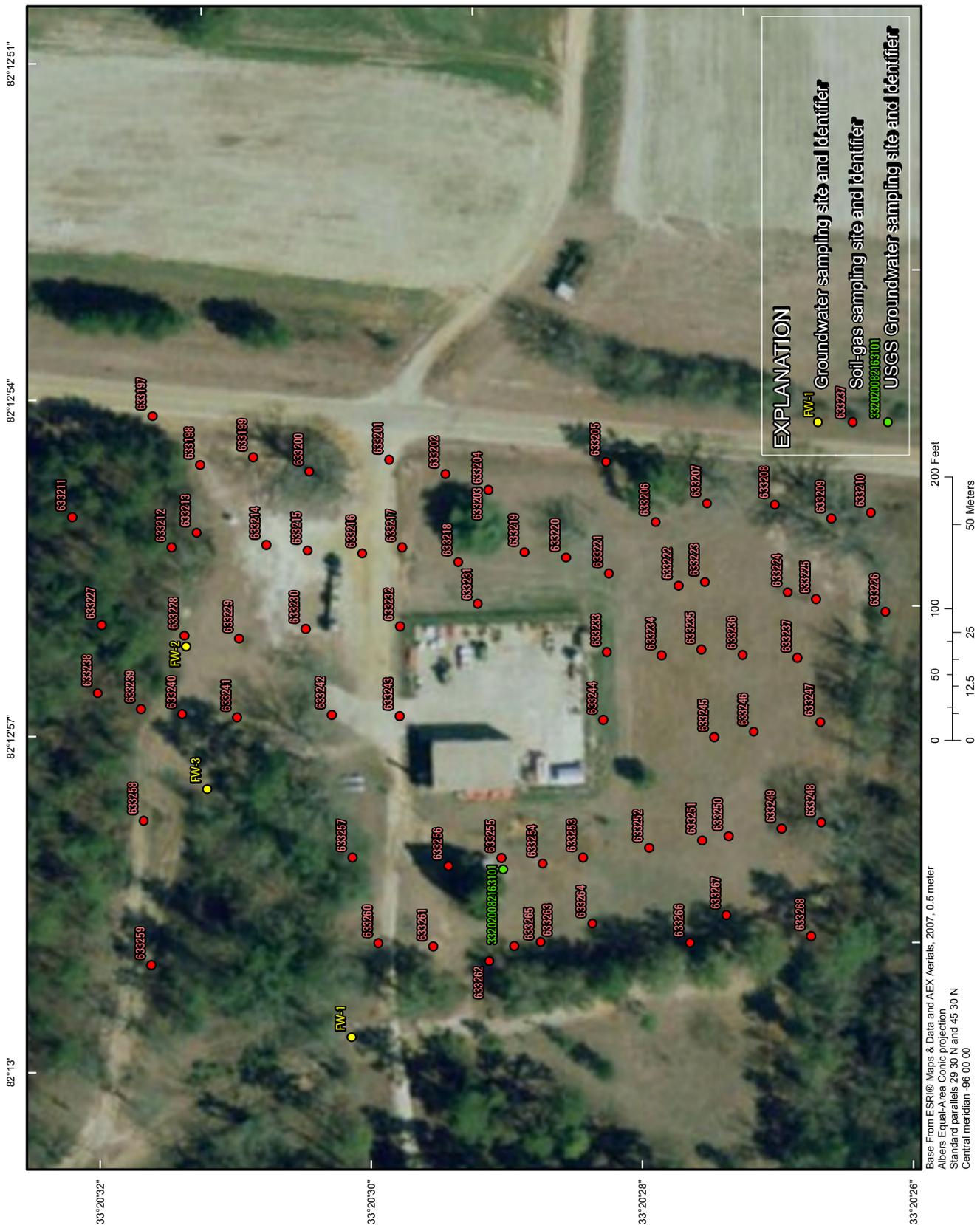


Figure 3. Locations of groundwater and soil-gas sampling sites, Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.



Figure 4. Locations of explosives and chemical agents and soil sampling sites, Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.

Passive Groundwater Survey

All four modules deployed in groundwater at the VATF wells detected TPH concentrations greater than the method detection level (MDL) of 2.32 µg/L (fig. 5; table 1). Concentrations of TPH ranged from 708.35 to 4,443.11 µg/L. Benzene and octane also were detected above their MDLs in all four samplers (figs. 6 and 7; table 1). The alkanes, undecane (sampling sites FW-2 and FW-3) and pentadecane (sampling sites FW-2 and USGS 332020082163101), were detected above their MDLs in two of the four samplers. The sampling locations and combined concentrations of undecane, tridecane, and pentadecane (C_{11} , C_{13} , and C_{15}) are shown in figure 8. No other VOCs were detected in the groundwater samplers. Pentadecane and TPH were detected in one of the three trip blanks (sampler number 618544), but were at levels below their MDL and above the nondetection level.

Passive Soil-Gas Survey

Seventy-one of the 72 soil-gas samplers (modules) deployed at the VATF detected TPH mass greater than the MDL of 0.02 µg (fig. 9; table 2). Soil-gas sampler number 633257 was destroyed and therefore not analyzed. The highest soil-gas TPH mass was 20.98 µg and was located at sample number 633226. The TPH mass ranged from 0.16 to 20.98 µg. The two trip blanks and three method blanks also detected TPH above the MDL, but at a mass ranging from 0.03 to 0.07 µg. The TPH masses detected in the trip and method blanks were considerably smaller than the masses detected in the samplers; therefore, the results of the environmental sample are considered reliable. BTEX was detected in 31 of the 71 samples in the VATF above the MDL (fig. 10; table 2). Benzene and toluene were the main components of the BTEX masses detected above their MDL; each was detected in 20 samplers, but total xylene also was detected at two samplers (sampler numbers 633231 and 633254, table 2). The two PAHs, naphthalene (sampler numbers 633231 and 633259) and 2-methyl-naphthalene (sampler number 633231), also were detected above their MDL (table 2). Tridecane was the only alkane detected above its MDL (sampler number 633259). Undecane, tridecane, and pentadecane also were detected at several locations below their MDL but above the nondetection level (table 2). Other VOCs detected in the soil-gas survey above their MDL included 1,2,4-trimethylbenzene at sampler number 633231 and PCE at sampler number 633254.

Explosives and Chemical Agents

Four soil-gas samplers were installed at selected locations at the VATF and analyzed for the presence of organic compounds classified as explosives or chemical agents (fig. 4), and the samplers had no detections above their respective MDLs (table 3). One organic compound (explosive and chemical agent) had masses below its MDL but was above its nondetection level: benzothiazole (table 3). Para-chlorophenyl methyl sulfone was detected above its MDL in all six samplers but also was detected above its MDL in all five trip blanks, and therefore, the results are not reliable. No other organic compounds classified as explosives and chemical agents were detected in the trip blanks.

Soil Samples

Five composite soil samples were collected at selected locations at the VATF (fig. 4). The soil samples detected no metal concentrations above the RSLs (tables 4–8). Some metal concentrations, however, were higher than background conditions reported for similar coastal plain sediments in South Carolina (South Carolina Department of Health and Environmental Control, 2002). These metals include aluminum, arsenic, barium, beryllium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, and zinc (tables 4–8).



Figure 5. Total petroleum hydrocarbons (TPH) concentrations in passive groundwater samplers, Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010. Method detection level is 2.32 micrograms per liter.



Figure 6. Benzene concentrations in passive groundwater samplers, Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010. Method detection level is 1.16 micrograms per liter.



Figure 7. Octane concentrations in passive groundwater samplers, Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010. Method detection level is 1.16 micrograms per liter.



Figure 8. Combined concentrations of undecane, tridecane, and pentadecane (C₁₁, C₁₃, and C₁₅) in passive groundwater samplers, Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010. Method detection level is 1.16 micrograms per liter for each compound.



Figure 9. Total petroleum hydrocarbons (TPH) mass in soil-gas samplers, Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010. Method detection level is 0.02 microgram.

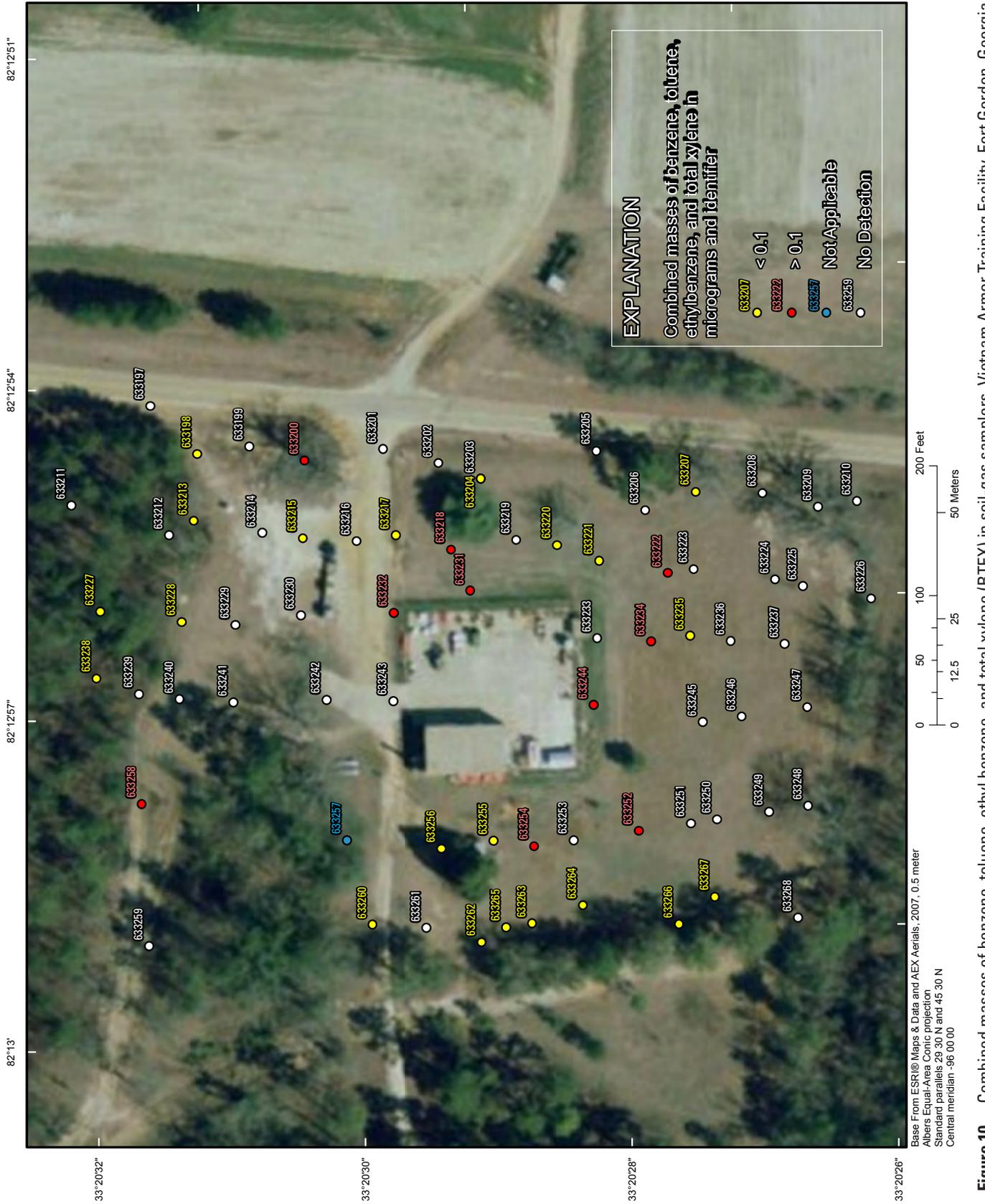


Figure 10. Combined masses of benzene, toluene, ethyl benzene, and total xylene (BTEX) in soil-gas samplers, Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010. Method detection level is 0.02 microgram.

Summary

The U.S. Geological Survey, in cooperation with the Environmental and Natural Resources Management Office of the U.S. Army Signal Center and Fort Gordon, assessed groundwater, soil gas, and soil for contaminants at the Vietnam Armor Training Facility (VATF) at Fort Gordon, Georgia, from October 2009 to September 2010. The assessment included the detection of organic compounds in the groundwater wells and in the soil gas as well as the detection of organic compounds classified as explosives and chemical agents in selected locations. Inorganic compounds were assessed in the soil. The assessment was conducted to provide environmental contamination data to the U.S. Army at Fort Gordon pursuant to requirements of the Resource Conservation and Resources Act Part B Hazardous Permit process.

Passive samplers were deployed in four groundwater wells in the VATF. The samplers detected total petroleum hydrocarbons, benzene, and octane concentrations, above their method detection levels at all four wells. The only other compounds detected above their method detection levels were the alkanes, undecane and pentadecane, which were detected at two of the four samplers. A total of 72 passive soil-gas samplers were deployed across the VATF, and total petroleum hydrocarbons mass was detected above the method detection level in 71 of the 72 samplers (one sampler was destroyed in the field and not analyzed); whereas, BTEX (combined masses of benzene, toluene, ethylbenzene, and total xylene) was detected above the method detection level in 31 of the 71 samplers that were analyzed. Other volatile organic compounds detected above their respective method detection levels in the soil-gas survey included naphthalene, 2-methyl-naphthalene, tridecane, 1,2,4-trimethylbenzene, and perchloroethylene.

Subsequent to the soil-gas survey, four areas determined to have elevated contaminant mass were selected and sampled for organic compounds classified as explosives and chemical agents. The results of this survey detected no organic compounds (explosives and chemical agents) above their respective method detection levels. One of the explosives and chemical agents was detected below its method detection level but above the nondetection level—benzothiazole.

The same four locations that were sampled for organic compounds classified as explosives and chemical agents were selected for the collection of soil samples. Additionally, a soil sample was collected at a fifth location, which was selected using the results of the soil-gas survey to identify an area with elevated contaminant mass. Soil samples were collected at the five locations of the VATF, and no metals were detected that exceeded the regional screening levels for industrial soils as classified by the U.S. Environmental Protection Agency. The soil samples also were compared to values from the ambient, uncontaminated (background) levels for soils in South Carolina as classified by the South Carolina Department of Health and Environmental Control. Because South Carolina is adjacent to Georgia and the soils in the coastal plain are similar, these comparisons are valid. No similar values are

available for Georgia to use for comparison purposes. The metals that were detected above the ambient background levels for South Carolina include aluminum, arsenic, barium, beryllium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, and zinc.

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Table 1. Concentrations of organic compounds detected in passive groundwater samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.

[TPH, total petroleum hydrocarbon; µg/L, microgram per liter; BTEX, combined mass of benzene, toluene, ethylbenzene, and total xylene; m, meta; p, para; o, ortho; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined concentrations of undecane, tridecane, and pentadecane; DCA, dichlorethane; TCA, trichloroethane; TCE, trichloroethylene; PCE, perchloroethylene; DCE, dichloroethylene; c, cis; t, trans; CCl₄, carbon tetrachloride; DCB, dichlorobenzene; MDL, method detection level; nd, not detected; USGS, U.S. Geological Survey; below detection level]

Groundwater sampling site	Sampler number	TPH (µg/L)	BTEX ^a (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl benzene (µg/L)	m-, p-Xylene (µg/L)	o-Xylene (µg/L)
MDL		2.32		1.16	1.16	1.16	1.16	1.16
FW-1	618534	1,218.96	31.66	31.66	nd	nd	nd	nd
FW-2	618533	4,443.11	37.99	37.99	nd	nd	nd	nd
FW-3	618527	1,218.96	31.66	31.66	nd	nd	nd	nd
USGS 332020082163101	618535	708.35	25.33	25.33	nd	nd	nd	nd
Trip blank	618528	nd	nd	nd	nd	nd	nd	nd
Trip blank	618544	bdl	nd	nd	nd	nd	nd	nd
Trip blank	618545	nd	nd	nd	nd	nd	nd	nd
Method blank		nd	nd	nd	nd	nd	nd	nd

Table 1. Concentrations of organic compounds detected in passive groundwater samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg/L, microgram per liter; BTEX, combined mass of benzene, toluene, ethylbenzene, and total xylene; m, meta; p, para; o, ortho; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined concentrations of undecane, tridecane, and pentadecane; DCA, dichlorethane; TCA, trichloroethane; TCE, trichloroethylene; PCE, perchloroethylene; DCE, dichloroethylene; c, cis; t, trans; CCl₄, carbon tetrachloride; DCB, dichlorobenzene; MDL, method detection level; nd, not detected; USGS, U.S. Geological Survey; below detection level]

Groundwater sampling site	Sampler number	Naphthalene (µg/L)	2-Methyl-naphthalene (µg/L)	MTBE (µg/L)	Octane (µg/L)
MDL		1.16	1.16	2.32	1.16
FW-1	618534	nd	nd	nd	22.80
FW-2	618533	nd	nd	nd	43.06
FW-3	618527	nd	nd	nd	36.73
USGS 332020082163101	618535	nd	nd	nd	27.86
Trip blank	618528	nd	nd	nd	nd
Trip blank	618544	nd	nd	nd	nd
Trip blank	618545	nd	nd	nd	nd
Method blank		nd	nd	nd	nd

Table 1. Concentrations of organic compounds detected in passive groundwater samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg/L, microgram per liter; BTEX, combined mass of benzene, toluene, ethylbenzene, and total xylene; m, meta; p, para; o, ortho; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined concentrations of undecane, tridecane, and pentadecane; DCA, dichlorethane; TCA, trichloroethane; TCE, trichloroethylene; PCE, perchloroethylene; DCE, dichloroethylene; c, cis; t, trans; CCl₄, carbon tetrachloride; DCB, dichlorobenzene; MDL, method detection level; nd, not detected; USGS, U.S. Geological Survey; below detection level]

Groundwater sampling site	Sampler number	C ₁₁ , C ₁₃ , C ₁₅ ^a (µg/L)	Undecane (µg/L)	Tridecane (µg/L)	Pentadecane (µg/L)
MDL			1.16	1.16	1.16
FW-1	618534	nd	nd	nd	nd
FW-2	618533	31.66	29.13	nd	2.53
FW-3	618527	15.20	15.20	nd	nd
USGS 332020082163101	618535	2.53	nd	nd	2.53
Trip blank	618528	nd	nd	nd	nd
Trip blank	618544	nd	nd	nd	bdl
Trip blank	618545	nd	nd	nd	nd
Method blank		nd	nd	nd	nd

Table 1. Concentrations of organic compounds detected in passive groundwater samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg/L, microgram per liter; BTEX, combined mass of benzene, toluene, ethylbenzene, and total xylene; m, meta; p, para; o, ortho; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined concentrations of undecane, tridecane, and pentadecane; DCA, dichlorethane; TCA, trichloroethane; TCE, trichloroethylene; PCE, perchloroethylene; DCE, dichloroethylene; c, cis; t, trans; CCl₄, carbon tetrachloride; DCB, dichlorobenzene; MDL, method detection level; nd, not detected; USGS, U.S. Geological Survey; below detection level]

Groundwater sampling site	Sampler number	Trimethyl benzene ^a (µg/L)	1,2,4-Trimethyl benzene (µg/L)	1,3,5-Trimethyl benzene (µg/L)	1,1-DCA (µg/L)	Chloroform (µg/L)	1,1,1-TCA (µg/L)	1,2-DCA (µg/L)
MDL			1.16	1.16	1.16	1.16	1.16	1.16
FW-1	618534	nd	nd	nd	nd	nd	nd	nd
FW-2	618533	nd	nd	nd	nd	nd	nd	nd
FW-3	618527	nd	nd	nd	nd	nd	nd	nd
USGS 3302020082163101	618535	nd	nd	nd	nd	nd	nd	nd
Trip blank	618528	nd	nd	nd	nd	nd	nd	nd
Trip blank	618544	nd	nd	nd	nd	nd	nd	nd
Trip blank	618545	nd	nd	nd	nd	nd	nd	nd
Method blank		nd	nd	nd	nd	nd	nd	nd

Table 1. Concentrations of organic compounds detected in passive groundwater samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg/L, microgram per liter; BTEX, combined mass of benzene, toluene, ethylbenzene, and total xylene; m, meta; p, para; o, ortho; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined concentrations of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; PCE, perchloroethylene; DCE, dichloroethylene; c, cis; t, trans; CCl₄, carbon tetrachloride; DCB, dichlorobenzene; MDL, method detection level; nd, not detected; USGS, U.S. Geological Survey; below detection level]

Groundwater sampling site	Sampler number	TCE (µg/L)	PCE (µg/L)	c-,t, 1,2-DCE ^a (µg/L)	t-,1,2-DCE (µg/L)	c-1,2-DCE (µg/L)
MDL		1.16	1.16		4.01	1.20
FW-1	618534	nd	nd	nd	nd	nd
FW-2	618533	nd	nd	nd	nd	nd
FW-3	618527	nd	nd	nd	nd	nd
USGS 332020082163101	618535	nd	nd	nd	nd	nd
Trip blank	618528	nd	nd	nd	nd	nd
Trip blank	618544	nd	nd	nd	nd	nd
Trip blank	618545	nd	nd	nd	nd	nd
Method blank		nd	nd	nd	nd	nd

Table 1. Concentrations of organic compounds detected in passive groundwater samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg/L, microgram per liter; BTEX, combined mass of benzene, toluene, ethylbenzene, and total xylene; m, meta; p, para; o, ortho; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined concentrations of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; PCE, perchloroethylene; DCE, dichloroethylene; c, cis; t, trans; CCl₄, carbon tetrachloride; DCB, dichlorobenzene; MDL, method detection level; nd, not detected; USGS, U.S. Geological Survey; below detection level]

Groundwater sampling site	Sampler number	CCl ₄ (µg/L)	1, 4-DCB (µg/L)	1,1,2-TCA (µg/L)	Chloro-benzene (µg/L)	1,1,1,2-Tetra-chloroethane (µg/L)	1,1,2,2-Tetra-chloroethane (µg/L)
MDL		1.16	1.16	1.16	1.16	1.16	1.16
FW-1	618534	nd	nd	nd	nd	nd	nd
FW-2	618533	nd	nd	nd	nd	nd	nd
FW-3	618527	nd	nd	nd	nd	nd	nd
USGS 332020082163101	618535	nd	nd	nd	nd	nd	nd
Trip blank	618528	nd	nd	nd	nd	nd	nd
Trip blank	618544	nd	nd	nd	nd	nd	nd
Trip blank	618545	nd	nd	nd	nd	nd	nd
Method blank		nd	nd	nd	nd	nd	nd

Table 1. Concentrations of organic compounds detected in passive groundwater samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg/L, microgram per liter; BTEX, combined mass of benzene, toluene, ethylbenzene, and total xylene; m, meta; p, para; o, ortho; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined concentrations of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; PCE, perchloroethylene; DCE, dichloroethylene; c, cis; t, trans; CCl₄, carbon tetrachloride; DCB, dichlorobenzene; MDL, method detection level; nd, not detected; USGS, U.S. Geological Survey; below detection level]

Groundwater sampling site	Sampler number	1,3-Dichlorobenzene (µg/L)	1,2-Dichlorobenzene (µg/L)
MDL		1.16	1.16
FW-1	618534	nd	nd
FW-2	618533	nd	nd
FW-3	618527	nd	nd
FW-4	618535	nd	nd
Trip blank	618528	nd	nd
Trip blank	618544	nd	nd
Trip blank	618545	nd	nd
Method blank		nd	nd

^aCombined concentration for two or more compounds with no method detection level provided by laboratory.

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.

[TPH, total petroleum hydrocarbon; μg , microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	TPH (μg)	BTEX ^a (μg)	Benzene (μg)	Toluene (μg)	Ethylbenzene (μg)	m-, p-, Xylene (μg)	o-Xylene (μg)
MDL	0.02		0.02	0.02	0.02	0.03	0.02
633197	6.43	nd	nd	nd	nd	nd	nd
633198	0.50	0.07	0.02	0.05	nd	nd	nd
633199	0.47	nd	nd	nd	nd	nd	nd
633200	0.57	0.23	0.03	0.20	nd	nd	nd
633201	0.38	nd	nd	nd	nd	nd	nd
633202	0.31	nd	nd	nd	nd	nd	nd
633203	3.13	nd	nd	nd	nd	nd	nd
633204	0.38	0.02	nd	0.02	nd	nd	nd
633205	0.54	nd	nd	nd	nd	nd	nd
633206	0.60	nd	nd	nd	nd	nd	nd
633207	0.42	0.04	0.04	nd	nd	nd	nd
633208	0.52	nd	nd	nd	nd	nd	nd
633209	0.43	nd	nd	nd	nd	nd	nd
633210	0.35	nd	nd	nd	nd	nd	nd
633211	0.54	nd	nd	nd	nd	nd	nd
633212	1.99	nd	nd	nd	nd	nd	nd
633213	12.27	0.04	nd	0.04	nd	nd	nd
633214	0.41	nd	nd	nd	nd	nd	nd
633215	0.38	0.03	nd	0.03	nd	nd	nd
633216	0.55	nd	nd	nd	nd	nd	nd
633217	0.24	0.05	0.03	0.03	nd	nd	nd
633218	0.91	0.10	0.08	0.02	nd	nd	nd
633219	0.48	nd	nd	nd	nd	nd	nd
633220	0.32	0.04	0.04	nd	nd	nd	nd
633221	0.24	0.05	0.05	nd	nd	nd	nd
633222	0.71	0.10	0.07	0.03	nd	nd	nd
633223	0.36	nd	nd	nd	nd	nd	nd
633224	0.47	nd	nd	nd	nd	nd	nd
633225	1.16	nd	nd	nd	nd	nd	nd
633226	20.98	nd	nd	nd	nd	nd	nd
633227	15.21	0.03	nd	0.03	nd	nd	nd
633228	4.48	0.04	nd	0.04	nd	nd	nd
633229	0.49	nd	nd	nd	nd	nd	nd
633230	0.45	nd	nd	nd	nd	nd	nd
633231	0.43	0.13	nd	nd	nd	0.08	0.05
633232	0.27	0.24	0.06	0.18	nd	nd	nd
633233	0.16	nd	nd	nd	nd	nd	nd
633234	0.52	0.11	0.11	nd	nd	nd	nd
633235	0.44	0.02	0.02	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg, microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	TPH (µg)	BTEX ^a (µg)	Benzene (µg)	Toluene (µg)	Ethylbenzene (µg)	m-, p-, Xylene (µg)	o-Xylene (µg)
633236	0.56	nd	nd	nd	nd	nd	nd
633237	0.36	nd	nd	nd	nd	nd	nd
633238	5.63	0.04	nd	0.04	nd	bdl	nd
633239	0.41	nd	nd	nd	nd	nd	nd
633240	0.44	nd	nd	nd	nd	nd	nd
633241	0.35	nd	nd	nd	nd	nd	nd
633242	2.48	nd	nd	nd	nd	nd	nd
633243	0.20	nd	nd	nd	nd	nd	nd
633244	0.18	0.19	0.19	nd	nd	nd	nd
633245	0.37	nd	nd	nd	nd	nd	nd
633246	0.52	nd	nd	nd	nd	nd	nd
633247	0.60	nd	nd	nd	nd	nd	nd
633248	0.64	nd	nd	nd	nd	nd	nd
633249	0.48	nd	nd	nd	nd	nd	nd
633250	0.51	nd	nd	nd	nd	nd	nd
633251	0.63	nd	nd	nd	nd	nd	nd
633252	0.69	0.15	0.13	0.02	nd	nd	nd
633253	0.34	nd	nd	nd	nd	nd	nd
633254	0.78	0.13	nd	nd	nd	0.07	0.06
633255	0.62	0.09	nd	0.09	nd	nd	nd
633256	0.81	0.03	nd	0.03	nd	nd	nd
633258	0.37	0.13	0.05	0.09	nd	nd	nd
633259	14.40	nd	nd	nd	nd	nd	nd
633260	0.70	0.08	0.04	0.03	nd	nd	nd
633261	0.63	nd	nd	nd	nd	nd	nd
633262	0.73	0.06	0.03	0.03	nd	nd	nd
633263	2.63	0.02	0.02	nd	nd	nd	nd
633264	0.61	0.02	0.02	nd	nd	nd	nd
633265	0.24	0.02	0.02	nd	nd	nd	nd
633266	0.46	0.03	0.03	bdl	nd	nd	nd
633267	0.35	0.03	nd	0.03	nd	bdl	bdl
633268	1.22	nd	nd	nd	nd	nd	nd
633269	0.05	nd	nd	nd	nd	nd	nd
633270	0.04	nd	nd	nd	nd	nd	nd
method blank	0.04	nd	nd	nd	nd	nd	nd
method blank	0.03	nd	nd	nd	nd	nd	nd
method blank	0.03	nd	nd	nd	nd	nd	nd
method blank	0.07	nd	nd	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; μg , microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	Naphthelene (μg)	2-Methyl-naphthelene (μg)	MTBE (μg)	Octane (μg)
MDL	0.02	0.02	0.03	0.02
633197	nd	nd	nd	nd
633198	nd	nd	nd	nd
633199	nd	nd	nd	nd
633200	nd	nd	nd	nd
633201	nd	nd	nd	nd
633202	nd	nd	nd	nd
633203	nd	nd	nd	nd
633204	nd	nd	nd	nd
633205	nd	nd	nd	nd
633206	nd	nd	nd	nd
633207	nd	nd	nd	nd
633208	nd	nd	nd	nd
633209	nd	nd	nd	nd
633210	nd	nd	nd	nd
633211	nd	nd	nd	nd
633212	nd	nd	nd	nd
633213	bdl	nd	nd	nd
633214	nd	nd	nd	nd
633215	nd	nd	nd	nd
633216	nd	nd	nd	nd
633217	nd	nd	nd	nd
633218	nd	nd	nd	nd
633219	nd	nd	nd	nd
633220	nd	nd	nd	nd
633221	nd	nd	nd	nd
633222	nd	nd	nd	nd
633223	nd	nd	nd	nd
633224	nd	nd	nd	nd
633225	nd	nd	nd	nd
633226	nd	nd	nd	nd
633227	nd	nd	nd	nd
633228	nd	nd	nd	nd
633229	nd	nd	nd	nd
633230	nd	nd	nd	nd
633231	0.06	0.03	nd	nd
633232	nd	nd	nd	nd
633233	nd	nd	nd	nd
633234	nd	nd	nd	nd
633235	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; μg , microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	Naphthelene (μg)	2-Methyl-naphthelene (μg)	MTBE (μg)	Octane (μg)
633236	nd	nd	nd	nd
633237	nd	nd	nd	nd
633238	nd	nd	nd	nd
633239	nd	nd	nd	nd
633240	nd	nd	nd	nd
633241	nd	nd	nd	nd
633242	nd	nd	nd	nd
633243	nd	nd	nd	nd
633244	nd	nd	nd	nd
633245	nd	nd	nd	nd
633246	nd	nd	nd	nd
633247	nd	nd	nd	nd
633248	nd	nd	nd	nd
633249	nd	nd	nd	nd
633250	nd	nd	nd	nd
633251	nd	nd	nd	nd
633252	nd	nd	nd	nd
633253	nd	nd	nd	nd
633254	nd	nd	nd	nd
633255	nd	bdl	nd	nd
633256	nd	nd	nd	nd
633258	nd	nd	nd	nd
633259	0.12	nd	nd	nd
633260	nd	nd	nd	nd
633261	nd	nd	nd	nd
633262	nd	nd	nd	nd
633263	nd	nd	nd	nd
633264	nd	nd	nd	nd
633265	nd	nd	nd	nd
633266	nd	nd	nd	nd
633267	nd	nd	nd	nd
633268	nd	nd	nd	nd
633269	nd	nd	nd	nd
633270	nd	nd	nd	nd
method blank	nd	nd	nd	nd
method blank	nd	nd	nd	nd
method blank	nd	nd	nd	nd
method blank	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; μg , microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C_{11} , C_{13} , C_{15} , combined masses of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl_4 , carbon tetrachloride]

Sampler number	C_{11} , C_{13} , C_{15} ^a (μg)	Undecane (μg)	Tridecane (μg)	Pentadecane (μg)
MDL		0.04	0.02	0.02
633197	nd	nd	nd	nd
633198	nd	nd	nd	nd
633199	nd	nd	nd	nd
633200	nd	nd	nd	nd
633201	nd	nd	nd	nd
633202	nd	nd	nd	nd
633203	bdl	nd	nd	bdl
633204	nd	nd	nd	nd
633205	nd	nd	nd	nd
633206	nd	nd	nd	nd
633207	nd	nd	nd	nd
633208	nd	nd	nd	nd
633209	nd	nd	nd	nd
633210	nd	nd	nd	nd
633211	nd	nd	nd	nd
633212	bdl	nd	bdl	bdl
633213	bdl	nd	bdl	nd
633214	nd	nd	nd	nd
633215	nd	nd	nd	nd
633216	nd	nd	nd	nd
633217	nd	nd	nd	nd
633218	nd	nd	nd	nd
633219	nd	nd	nd	nd
633220	bdl	nd	nd	bdl
633221	nd	nd	nd	nd
633222	nd	nd	nd	nd
633223	nd	nd	nd	nd
633224	nd	nd	nd	nd
633225	nd	nd	nd	nd
633226	bdl	bdl	nd	bdl
633227	nd	nd	nd	nd
633228	nd	nd	nd	nd
633229	nd	nd	nd	nd
633230	nd	nd	nd	nd
633231	bdl	bdl	nd	nd
633232	nd	nd	nd	nd
633233	nd	nd	nd	nd
633234	nd	nd	nd	nd
633235	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; μg , microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C_{11} , C_{13} , C_{15} , combined masses of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl_4 , carbon tetrachloride]

Sampler number	C_{11} , C_{13} , C_{15} ^a (μg)	Undecane (μg)	Tridecane (μg)	Pentadecane (μg)
633236	nd	nd	nd	nd
633237	nd	nd	nd	nd
633238	bdl	nd	bdl	bdl
633239	nd	nd	nd	nd
633240	nd	nd	nd	nd
633241	nd	nd	nd	nd
633242	nd	nd	nd	nd
633243	nd	nd	nd	nd
633244	bdl	bdl	nd	nd
633245	nd	nd	nd	nd
633246	bdl	bdl	nd	nd
633247	bdl	bdl	nd	nd
633248	nd	nd	nd	nd
633249	nd	nd	nd	nd
633250	nd	nd	nd	nd
633251	bdl	bdl	nd	nd
633252	nd	nd	nd	nd
633253	bdl	bdl	nd	nd
633254	nd	nd	nd	nd
633255	bdl	nd	nd	bdl
633256	nd	nd	nd	nd
633258	nd	nd	nd	nd
633259	0.06	nd	0.06	nd
633260	nd	nd	nd	nd
633261	nd	nd	nd	nd
633262	nd	nd	nd	nd
633263	nd	nd	nd	nd
633264	nd	nd	nd	nd
633265	nd	nd	nd	nd
633266	nd	nd	nd	nd
633267	bdl	bdl	nd	bdl
633268	bdl	bdl	nd	nd
633269	nd	nd	nd	nd
633270	nd	nd	nd	nd
method blank	nd	nd	nd	nd
method blank	nd	nd	nd	nd
method blank	nd	nd	nd	nd
method blank	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg, microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichlorethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	Trimethyl benzene ^a (µg)	1,2,4-Trimethyl benzene (µg)	1,3,5-Trimethyl benzene (µg)	1,1-DCA (µg)	Chloroform (µg)	1,1,1-TCA (µg)	1,2-DCA (µg)
MDL		0.02	0.03	0.02	0.02	0.03	0.02
633197	nd	nd	nd	nd	nd	nd	nd
633198	nd	nd	nd	nd	nd	nd	nd
633199	nd	nd	nd	nd	nd	nd	nd
633200	nd	nd	nd	nd	nd	nd	nd
633201	nd	nd	nd	nd	nd	nd	nd
633202	nd	nd	nd	nd	nd	nd	nd
633203	nd	nd	nd	nd	nd	nd	nd
633204	nd	nd	nd	nd	nd	nd	nd
633205	nd	nd	nd	nd	nd	nd	nd
633206	nd	nd	nd	nd	nd	nd	nd
633207	nd	nd	nd	nd	nd	nd	nd
633208	nd	nd	nd	nd	nd	nd	nd
633209	nd	nd	nd	nd	nd	nd	nd
633210	nd	nd	nd	nd	nd	nd	nd
633211	nd	nd	nd	nd	nd	nd	nd
633212	nd	nd	nd	nd	nd	nd	nd
633213	nd	nd	nd	nd	nd	nd	nd
633214	nd	nd	nd	nd	nd	nd	nd
633215	nd	nd	nd	nd	nd	nd	nd
633216	nd	nd	nd	nd	nd	nd	nd
633217	nd	nd	nd	nd	nd	nd	nd
633218	nd	nd	nd	nd	nd	nd	nd
633219	nd	nd	nd	nd	nd	nd	nd
633220	nd	nd	nd	nd	nd	nd	nd
633221	nd	nd	nd	nd	nd	nd	nd
633222	nd	nd	nd	nd	nd	nd	nd
633223	nd	nd	nd	nd	nd	nd	nd
633224	nd	nd	nd	nd	nd	nd	nd
633225	nd	nd	nd	nd	nd	nd	nd
633226	nd	nd	nd	nd	nd	nd	nd
633227	nd	nd	nd	nd	nd	nd	nd
633228	nd	nd	nd	nd	nd	nd	nd
633229	nd	nd	nd	nd	nd	nd	nd
633230	nd	nd	nd	nd	nd	nd	nd
633231	0.03	0.03	bdl	nd	nd	nd	nd
633232	nd	nd	nd	nd	nd	nd	nd
633233	nd	nd	nd	nd	nd	nd	nd
633234	nd	nd	nd	nd	nd	nd	nd
633235	nd	nd	nd	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg, microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichlorethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	Trimethyl benzene ^a (µg)	1,2,4-Trimethyl benzene (µg)	1,3,5-Trimethyl benzene (µg)	1,1-DCA (µg)	Chloroform (µg)	1,1,1-TCA (µg)	1,2-DCA (µg)
633236	nd	nd	nd	nd	nd	nd	nd
633237	nd	nd	nd	nd	nd	nd	nd
633238	nd	nd	nd	nd	nd	nd	nd
633239	nd	nd	nd	nd	nd	nd	nd
633240	nd	nd	nd	nd	nd	nd	nd
633241	nd	nd	nd	nd	nd	nd	nd
633242	nd	nd	nd	nd	nd	nd	nd
633243	nd	nd	nd	nd	nd	nd	nd
633244	nd	nd	nd	nd	nd	nd	nd
633245	nd	nd	nd	nd	nd	nd	nd
633246	nd	nd	nd	nd	nd	nd	nd
633247	nd	nd	nd	nd	nd	nd	nd
633248	nd	nd	nd	nd	nd	nd	nd
633249	nd	nd	nd	nd	nd	nd	nd
633250	nd	nd	nd	nd	nd	nd	nd
633251	nd	nd	nd	nd	nd	nd	nd
633252	nd	nd	nd	nd	nd	nd	nd
633253	nd	nd	nd	nd	nd	nd	nd
633254	bdl	bdl	bdl	nd	nd	nd	nd
633255	nd	nd	nd	nd	nd	nd	nd
633256	nd	nd	nd	nd	nd	nd	nd
633258	nd	nd	nd	nd	nd	nd	nd
633259	nd	nd	nd	nd	nd	nd	nd
633260	nd	nd	nd	nd	nd	nd	nd
633261	nd	nd	nd	nd	nd	nd	nd
633262	nd	nd	nd	nd	nd	nd	nd
633263	nd	nd	nd	nd	nd	nd	nd
633264	nd	nd	nd	nd	nd	nd	nd
633265	nd	nd	nd	nd	nd	nd	nd
633266	nd	nd	nd	nd	nd	nd	nd
633267	nd	nd	nd	nd	nd	nd	nd
633268	nd	nd	nd	nd	nd	nd	nd
633269	nd	nd	nd	nd	nd	nd	nd
633270	nd	nd	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg, microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichlorethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	TCE (µg)	C,t-1,2-DCE ^a (µg)	t-1,2-DCE (µg)	c-1,2-DCE (µg)	PCE (µg)
MDL	0.02		0.04	0.03	0.02
633197	nd	nd	nd	nd	nd
633198	nd	nd	nd	nd	nd
633199	nd	nd	nd	nd	nd
633200	nd	nd	nd	nd	nd
633201	nd	nd	nd	nd	nd
633202	nd	nd	nd	nd	nd
633203	nd	nd	nd	nd	nd
633204	nd	nd	nd	nd	nd
633205	nd	nd	nd	nd	nd
633206	nd	nd	nd	nd	nd
633207	nd	nd	nd	nd	nd
633208	nd	nd	nd	nd	nd
633209	nd	nd	nd	nd	nd
633210	nd	nd	nd	nd	nd
633211	nd	nd	nd	nd	nd
633212	nd	nd	nd	nd	nd
633213	nd	nd	nd	nd	nd
633214	nd	nd	nd	nd	nd
633215	nd	nd	nd	nd	nd
633216	nd	nd	nd	nd	nd
633217	nd	nd	nd	nd	nd
633218	nd	nd	nd	nd	nd
633219	nd	nd	nd	nd	nd
633220	nd	nd	nd	nd	nd
633221	nd	nd	nd	nd	nd
633222	nd	nd	nd	nd	nd
633223	nd	nd	nd	nd	nd
633224	nd	nd	nd	nd	nd
633225	nd	nd	nd	nd	nd
633226	nd	nd	nd	nd	nd
633227	nd	nd	nd	nd	nd
633228	nd	nd	nd	nd	nd
633229	nd	nd	nd	nd	nd
633230	nd	nd	nd	nd	nd
633231	nd	nd	nd	nd	nd
633232	nd	nd	nd	nd	nd
633233	nd	nd	nd	nd	nd
633234	nd	nd	nd	nd	nd
633235	nd	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; μg , microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	TCE (μg)	C,t-1,2-DCE ^a (μg)	t-1,2-DCE (μg)	c-1,2-DCE (μg)	PCE (μg)
633236	nd	nd	nd	nd	nd
633237	nd	nd	nd	nd	nd
633238	nd	nd	nd	nd	nd
633239	nd	nd	nd	nd	nd
633240	nd	nd	nd	nd	nd
633241	nd	nd	nd	nd	nd
633242	nd	nd	nd	nd	nd
633243	nd	nd	nd	nd	nd
633244	nd	bdl	nd	bdl	nd
633245	nd	nd	nd	nd	nd
633246	nd	nd	nd	nd	nd
633247	nd	nd	nd	nd	nd
633248	nd	nd	nd	nd	nd
633249	nd	nd	nd	nd	nd
633250	nd	nd	nd	nd	nd
633251	nd	nd	nd	nd	nd
633252	nd	nd	nd	nd	nd
633253	nd	nd	nd	nd	nd
633254	nd	nd	nd	nd	0.07
633255	nd	nd	nd	nd	nd
633256	nd	nd	nd	nd	nd
633258	nd	nd	nd	nd	nd
633259	nd	nd	nd	nd	nd
633260	nd	nd	nd	nd	nd
633261	nd	nd	nd	nd	nd
633262	nd	nd	nd	nd	nd
633263	nd	nd	nd	nd	nd
633264	nd	nd	nd	nd	nd
633265	nd	nd	nd	nd	nd
633266	nd	nd	nd	nd	nd
633267	nd	nd	nd	nd	nd
633268	nd	nd	nd	nd	nd
633269	nd	nd	nd	nd	nd
633270	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg, microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichlorethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	1,4-DCB (µg)	CCl ₄ (µg)	1,1,2-TCA (µg)	Chlorobenzene (µg)	1,1,1,2-Tetra-chloroethane (µg)	1,1,2,2-Tetra-chloroethane (µg)
MDL	0.02	0.03	0.02	0.02	0.03	0.02
633197	nd	nd	nd	nd	nd	nd
633198	nd	nd	nd	nd	nd	nd
633199	nd	nd	nd	nd	nd	nd
633200	nd	nd	nd	nd	nd	nd
633201	nd	nd	nd	nd	nd	nd
633202	nd	nd	nd	nd	nd	nd
633203	nd	nd	nd	nd	nd	nd
633204	nd	nd	nd	nd	nd	nd
633205	nd	nd	nd	nd	nd	nd
633206	nd	nd	nd	nd	nd	nd
633207	nd	nd	nd	nd	nd	nd
633208	nd	nd	nd	nd	nd	nd
633209	nd	nd	nd	nd	nd	nd
633210	nd	nd	nd	nd	nd	nd
633211	nd	nd	nd	nd	nd	nd
633212	nd	nd	nd	nd	nd	nd
633213	nd	nd	nd	nd	nd	nd
633214	nd	nd	nd	nd	nd	nd
633215	nd	nd	nd	nd	nd	nd
633216	nd	nd	nd	nd	nd	nd
633217	nd	nd	nd	nd	nd	nd
633218	nd	nd	nd	nd	nd	nd
633219	nd	nd	nd	nd	nd	nd
633220	nd	nd	nd	nd	nd	nd
633221	nd	nd	nd	nd	nd	nd
633222	nd	nd	nd	nd	nd	nd
633223	nd	nd	nd	nd	nd	nd
633224	nd	nd	nd	nd	nd	nd
633225	nd	nd	nd	nd	nd	nd
633226	nd	nd	nd	nd	nd	nd
633227	nd	nd	nd	nd	nd	nd
633228	nd	nd	nd	nd	nd	nd
633229	nd	nd	nd	nd	nd	nd
633230	nd	nd	nd	nd	nd	nd
633231	nd	nd	nd	nd	nd	nd
633232	nd	nd	nd	nd	nd	nd
633233	nd	nd	nd	nd	nd	nd
633234	nd	nd	nd	nd	nd	nd
633235	nd	nd	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg, microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichlorethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	1,4-DCB (µg)	CCl ₄ (µg)	1,1,2-TCA (µg)	Chlorobenzene (µg)	1,1,1,2-Tetra-chloroethane (µg)	1,1,2,2-Tetra-chloroethane (µg)
633236	nd	nd	nd	nd	nd	nd
633237	nd	nd	nd	nd	nd	nd
633238	nd	nd	nd	nd	nd	nd
633239	nd	nd	nd	nd	nd	nd
633240	nd	nd	nd	nd	nd	nd
633241	nd	nd	nd	nd	nd	nd
633242	nd	nd	nd	nd	nd	nd
633243	nd	nd	nd	nd	nd	nd
633244	nd	nd	nd	nd	nd	nd
633245	nd	nd	nd	nd	nd	nd
633246	nd	nd	nd	nd	nd	nd
633247	nd	nd	nd	nd	nd	nd
633248	nd	nd	nd	nd	nd	nd
633249	nd	nd	nd	nd	nd	nd
633250	nd	nd	nd	nd	nd	nd
633251	nd	nd	nd	nd	nd	nd
633252	nd	nd	nd	nd	nd	nd
633253	nd	nd	nd	nd	nd	nd
633254	nd	nd	nd	nd	nd	nd
633255	nd	nd	nd	nd	nd	nd
633256	nd	nd	nd	nd	nd	nd
633258	nd	nd	nd	nd	nd	nd
633259	nd	nd	nd	nd	nd	nd
633260	nd	nd	nd	nd	nd	nd
633261	nd	nd	nd	nd	nd	nd
633262	nd	nd	nd	nd	nd	nd
633263	nd	nd	nd	nd	nd	nd
633264	nd	nd	nd	nd	nd	nd
633265	nd	nd	nd	nd	nd	nd
633266	nd	nd	nd	nd	nd	nd
633267	nd	nd	nd	nd	nd	nd
633268	nd	nd	nd	nd	nd	nd
633269	nd	nd	nd	nd	nd	nd
633270	nd	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd	nd
method blank	nd	nd	nd	nd	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; μg , microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C_{11} , C_{13} , C_{15} , combined masses of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl_4 , carbon tetrachloride]

Sampler number	1,3-Dichlorobenzene (μg)	1,2-Dichlorobenzene (μg)
MDL	0.02	0.02
633197	nd	nd
633198	nd	nd
633199	nd	nd
633200	nd	nd
633201	nd	nd
633202	nd	nd
633203	nd	nd
633204	nd	nd
633205	nd	nd
633206	nd	nd
633207	nd	nd
633208	nd	nd
633209	nd	nd
633210	nd	nd
633211	nd	nd
633212	nd	nd
633213	nd	nd
633214	nd	nd
633215	nd	nd
633216	nd	nd
633217	nd	nd
633218	nd	nd
633219	nd	nd
633220	nd	nd
633221	nd	nd
633222	nd	nd
633223	nd	nd
633224	nd	nd
633225	nd	nd
633226	nd	nd
633227	nd	nd
633228	nd	nd
633229	nd	nd
633230	nd	nd
633231	nd	nd
633232	nd	nd
633233	nd	nd
633234	nd	nd
633235	nd	nd

Table 2. Mass of organic compounds detected in soil-gas samplers collected from the Vietnam Armor Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

[TPH, total petroleum hydrocarbon; µg, microgram; BTEX, combined masses of benzene, toluene, ethylbenzene, and total xylenes; m-, meta; p-, para; o-, ortho; MDL, method detection level; nd, not detected; bdl, below detection level; 633269 and 633270 are trip blanks; MTBE, methyl *tert*-butyl ether; C₁₁, C₁₃^a, C₁₅, combined masses of undecane, tridecane, and pentadecane; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; CCl₄, carbon tetrachloride]

Sampler number	1,3-Dichlorobenzene (µg)	1,2-Dichlorobenzene (µg)
633236	nd	nd
633237	nd	nd
633238	nd	nd
633239	nd	nd
633240	nd	nd
633241	nd	nd
633242	nd	nd
633243	nd	nd
633244	nd	nd
633245	nd	nd
633246	nd	nd
633247	nd	nd
633248	nd	nd
633249	nd	nd
633250	nd	nd
633251	nd	nd
633252	nd	nd
633253	nd	nd
633254	nd	nd
633255	nd	nd
633256	nd	nd
633258	nd	nd
633259	nd	nd
633260	nd	nd
633261	nd	nd
633262	nd	nd
633263	nd	nd
633264	nd	nd
633265	nd	nd
633266	nd	nd
633267	nd	nd
633268	nd	nd
633269	nd	nd
633270	nd	nd
method blank	nd	nd

^aCombined concentration for two or more compounds with no method detection level provided by laboratory.

Table 3. Mass of explosives and chemical agents detected in soil-gas samplers collected from the Vietnam Area Training Facility, Fort Gordon, Georgia, 2009–2010.

[μg , microgram; MDL, method detection level; nd, not detected; bdl, below detection level; 644252, 644253, 644254, 644255, and 644256 are trip blanks; bdl, below detection level]

Sampler number	Dimethyl disulfide (μg)	Dimethyl methyl phosphonate (μg)	1,4-Thioxane (μg)	Nitrobenzene (μg)
MDL	0.10	0.10	0.10	0.10
644205	nd	nd	nd	nd
644207	nd	nd	nd	nd
644208	nd	nd	nd	nd
644209	nd	nd	nd	nd
644252	nd	nd	nd	nd
644253	nd	nd	nd	nd
644254	nd	nd	nd	nd
644255	nd	nd	nd	nd
644256	nd	nd	nd	nd

Table 3. Mass of explosives and chemical agents detected in soil-gas samplers collected from the Vietnam Area Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

Sampler number	Diisopropyl methylphosphonate (μg)	1,4-Dithiane (μg)	2-Nitrotoluene (μg)	3-Nitrotoluene (μg)	4-Nitrotoluene (μg)
MDL	0.10	0.10	0.10	0.10	0.10
644205	nd	nd	nd	nd	nd
644207	nd	nd	nd	nd	nd
644208	nd	nd	nd	nd	nd
644209	nd	nd	nd	nd	nd
644252	nd	nd	nd	nd	nd
644253	nd	nd	nd	nd	nd
644254	nd	nd	nd	nd	nd
644255	nd	nd	nd	nd	nd
644256	nd	nd	nd	nd	nd

Table 3. Mass of explosives and chemical agents detected in soil-gas samplers collected from the Vietnam Area Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

Sampler number	Thiodiglycol (µg)	Benzothiazole (µg)	Chloroacetophenones (µg)	p-Chlorophenyl methyl sulfide (µg)
MDL	0.20	0.10	0.10	0.10
644205	nd	bdl	nd	nd
644207	nd	bdl	nd	nd
644208	nd	bdl	nd	nd
644209	nd	bdl	nd	nd
644252	nd	nd	nd	nd
644253	nd	nd	nd	nd
644254	nd	nd	nd	nd
644255	nd	nd	nd	nd
644256	nd	nd	nd	nd

Table 3. Mass of explosives and chemical agents detected in soil-gas samplers collected from the Vietnam Area Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

Sampler number	1,3-Dinitrobenzene (µg)	2,6-Dinitrotoluene (µg)	2,4-Dinitrotoluene (µg)	1,3,5-Trinitrobenzene (µg)
MDL	0.10	0.10	0.10	0.10
644205	nd	nd	nd	nd
644207	nd	nd	nd	nd
644208	nd	nd	nd	nd
644209	nd	nd	nd	nd
644252	nd	nd	nd	nd
644253	nd	nd	nd	nd
644254	nd	nd	nd	nd
644255	nd	nd	nd	nd
644256	nd	nd	bdl	nd

Table 3. Mass of explosives and chemical agents detected in soil-gas samplers collected from the Vietnam Area Training Facility, Fort Gordon, Georgia, 2009–2010.—Continued

Sampler number	p-Chlorophenyl methyl sulfoxide (µg)	p-Chlorophenyl methyl sulfone (µg)	2,4,6-Trinitrotoluene (µg)
MDL	0.10	0.10	0.10
644205	bdl	bdl	nd
644207	bdl	bdl	nd
644208	bdl	bdl	nd
644209	bdl	bdl	nd
644252	nd	bdl	nd
644253	nd	bdl	nd
644254	nd	bdl	nd
644255	nd	bdl	nd
644256	nd	bdl	nd

Table 4. Inorganic compounds detected in the soil from land surface to 6 inches below land surface, site 1, Vietnam Armor Training Facility, Fort Gordon, Georgia, August 30, 2010.

[$\mu\text{g/g}$, microgram per gram; USEPA RSL, U.S. Environmental Protection Agency Regional Screening Level, Industrial Soil; mg/kg, milligram per kilogram; SCDHEC, South Carolina Department of Health and Environmental Control; --, not applicable; *, Resource Conservation and Recovery Act (RCRA) metal; yellow highlight indicates exceedance; nr, not reported. Note: 1 $\mu\text{g/g}$ is equivalent to 1 mg/kg, and 1 mg/kg is equivalent to 1 part per million (ppm); selenium and mercury were not analyzed]

Compound	Result ($\mu\text{g/g}$)	USEPA RSL (mg/kg)	SCDHEC background (mg/kg)
Aluminum	15,500	990,000	13,528
Antimony	0.31	410	--
Arsenic*	2.5	260	6.1
Barium*	70.9	190,000	38
Beryllium	0.31	2,000	0.6
Bismuth	nr	--	--
Cadmium*	0.04	800	1
Calcium	248	--	699
Cerium	141	--	--
Cesium	2.3	--	--
Chromium*	26.1	1,500,000	16
Cobalt	1.6	300	4
Copper	7.4	41,000	9
Gallium	5.9	--	--
Iron	6,850	720,000	15,608
Lanthanum	37.1	--	--
Lead*	12.5	800	16
Lithium	6.8	2,000	--
Magnesium	331	--	988
Manganese	174	23,000	120
Molybdenum	0.47	5,100	--
Nickel	5.9	47,000	6
Niobium	6.7	--	--
Phosphorus	198	--	--
Potassium	838	--	856
Rubidium	10.9	--	--
Scandium	3	--	--
Silver*	0.025	5,100	4
Sodium	107	--	194
Strontium	12.5	610,000	--
Thallium	0.12	--	4.5
Thorium	4.56	--	--
Titanium	nr	--	--
Uranium	1.29	--	--
Vanadium	24.6	5,200	--
Yttrium	27.1	--	--
Zinc	13.9	310,000	23

Table 5. Inorganic compounds detected in the soil from land surface to 6 inches below land surface, site 2, Vietnam Armor Training Facility, Fort Gordon, Georgia, August 30, 2010.

[$\mu\text{g/g}$, microgram per gram; USEPA RSL, U.S. Environmental Protection Agency Regional Screening Level, Industrial Soil; mg/kg, milligram per kilogram; SCDHEC, South Carolina Department of Health and Environmental Control; yellow highlight indicates exceedence; --, not applicable; *, Resource Conservation and Recovery Act (RCRA) metal; nr, not reported. Note: 1 $\mu\text{g/g}$ is equivalent to 1 mg/kg, and 1 mg/kg is equivalent to 1 part per million (ppm); selenium and mercury were not analyzed]

Compound	Result ($\mu\text{g/g}$)	USEPA RSL (mg/kg)	SCDHEC background (mg/kg)
Aluminum	24,800	990,000	13,528
Antimony	0.74	410	--
Arsenic*	4.7	260	6.1
Barium*	106	190,000	38
Beryllium	0.5	2,000	0.6
Bismuth	nr	--	--
Cadmium*	0.09	800	1
Calcium	404	--	699
Cerium	186	--	--
Cesium	2.9	--	--
Chromium*	46.8	1,500,000	16
Cobalt	2.1	300	4
Copper	10.6	41,000	9
Gallium	9.1	--	--
Iron	13,900	720,000	15,608
Lanthanum	46.5	--	--
Lead*	18	800	16
Lithium	10.5	2,000	--
Magnesium	475	--	988
Manganese	208	23,000	120
Molybdenum	0.94	5,100	--
Nickel	8.5	47,000	6
Niobium	8.7	--	--
Phosphorus	240	--	--
Potassium	1,200	--	856
Rubidium	13.9	--	--
Scandium	4.9	--	--
Silver*	0.035	5,100	4
Sodium	164	--	194
Strontium	23.4	610,000	--
Thallium	0.17	--	4.5
Thorium	6.47	--	--
Titanium	nr	--	--
Uranium	1.68	--	--
Vanadium	48.9	5,200	--
Yttrium	26.1	--	--
Zinc	30	310,000	23

Table 6. Inorganic compounds detected in the soil from land surface to 6 inches below land surface, site 3, Vietnam Armor Training Facility, Fort Gordon, Georgia, August 30, 2010.

[$\mu\text{g/g}$, microgram per gram; USEPA RSL, U.S. Environmental Protection Agency Regional Screening Level, Industrial Soil; mg/kg, milligram per kilogram; SCDHEC, South Carolina Department of Health and Environmental Control; yellow highlight indicates exceedance; --, not applicable; *, Resource Conservation and Recovery Act (RCRA) metal; nr, not reported. Note: 1 $\mu\text{g/g}$ is equivalent to 1 mg/kg, and 1 mg/kg is equivalent to 1 part per million (ppm); selenium and mercury were not analyzed]

Compound	Result ($\mu\text{g/g}$)	USEPA RSL (mg/kg)	SCDHEC background (mg/kg)
Aluminum	48,400	990,000	13,528
Antimony	1.1	410	--
Arsenic*	6.8	260	6.1
Barium*	130	190,000	38
Beryllium	0.69	2,000	0.6
Bismuth	nr	--	--
Cadmium*	0.2	800	1
Calcium	1,690	--	699
Cerium	137	--	--
Cesium	2.8	--	--
Chromium*	62.6	1,500,000	16
Cobalt	2.9	300	4
Copper	21.8	41,000	9
Gallium	13.5	--	--
Iron	22,100	720,000	15,608
Lanthanum	39.7	--	--
Lead*	117	800	16
Lithium	14.1	2,000	--
Magnesium	777	--	988
Manganese	120	23,000	120
Molybdenum	1.2	5,100	--
Nickel	16.5	47,000	6
Niobium	10	--	--
Phosphorus	309	--	--
Potassium	2,100	--	856
Rubidium	17.2	--	--
Scandium	6.9	--	--
Silver*	0.061	5,100	4
Sodium	1,010	--	194
Strontium	36.8	610,000	--
Thallium	0.18	--	4.5
Thorium	8.35	--	--
Titanium	nr	--	--
Uranium	1.86	--	--
Vanadium	66.4	5,200	--
Yttrium	16.4	--	--
Zinc	83.9	310,000	23

Table 7. Inorganic compounds detected in the soil from land surface to 6 inches below land surface, site 4, Vietnam Armor Training Facility, Fort Gordon, Georgia, August 30, 2010.

[$\mu\text{g/g}$, microgram per gram; USEPA RSL, U.S. Environmental Protection Agency Regional Screening Level, Industrial Soil; mg/kg , milligram per kilogram; SCDHEC, South Carolina Department of Health and Environmental Control; --, not applicable; *, Resource Conservation and Recovery Act (RCRA) metal; yellow highlight indicates exceedence; nr, not reported. Note: $1 \mu\text{g/g}$ is equivalent to 1 mg/kg , and 1 mg/kg is equivalent to 1 part per million (ppm); selenium and mercury were not analyzed]

Compound	Result ($\mu\text{g/g}$)	USEPA RSL (mg/kg)	SCDHEC background (mg/kg)
Aluminum	27,700	990,000	13,528
Antimony	0.6	410	--
Arsenic*	6.6	260	6.1
Barium*	101	190,000	38
Beryllium	0.47	2,000	0.6
Bismuth	nr	--	--
Cadmium*	0.05	800	1
Calcium	721	--	699
Cerium	154	--	--
Cesium	2.5	--	--
Chromium*	63.3	1,500,000	16
Cobalt	2	300	4
Copper	10.3	41,000	9
Gallium	9	--	--
Iron	16,900	720,000	15,608
Lanthanum	41.6	--	--
Lead*	26.5	800	16
Lithium	10.6	2,000	--
Magnesium	510	--	988
Manganese	189	23,000	120
Molybdenum	0.85	5,100	--
Nickel	9.8	47,000	6
Niobium	7.1	--	--
Phosphorus	254	--	--
Potassium	960	--	856
Rubidium	11.4	--	--
Scandium	4.6	--	--
Silver*	0.038	5,100	4
Sodium	135	--	194
Strontium	26.9	610,000	--
Thallium	0.14	--	4.5
Thorium	7.6	--	--
Titanium	nr	--	--
Uranium	1.44	--	--
Vanadium	51.9	5,200	--
Yttrium	19.6	--	--
Zinc	33.2	310,000	23

Table 8. Inorganic compounds detected in the soil from land surface to 6 inches below land surface, site 5, Vietnam Armor Training Facility, Fort Gordon, Georgia, August 30, 2010.

[$\mu\text{g/g}$, microgram per gram; USEPA RSL, U.S. Environmental Protection Agency Regional Screening Level, Industrial Soil; mg/kg, milligram per kilogram; SCDHEC, South Carolina Department of Health and Environmental Control; yellow highlight indicates exceedence; --, not applicable; *, Resource Conservation and Recovery Act (RCRA) metal; nr, not reported. Note: 1 $\mu\text{g/g}$ is equivalent to 1 mg/kg, and 1 mg/kg is equivalent to 1 part per million (ppm); selenium and mercury were not analyzed]

Compound	Result ($\mu\text{g/g}$)	USEPA RSL (mg/kg)	SCDHEC background (mg/kg)
Aluminum	28,300	990,000	13,528
Antimony	0.65	410	--
Arsenic*	6.2	260	6.1
Barium*	90.1	190,000	38
Beryllium	0.57	2,000	0.6
Bismuth	nr	--	--
Cadmium*	0.23	800	1
Calcium	2,130	--	699
Cerium	79.1	--	--
Cesium	2.2	--	--
Chromium*	35.7	1,500,000	16
Cobalt	2.7	300	4
Copper	16.8	41,000	9
Gallium	8.7	--	--
Iron	15,600	720,000	15,608
Lanthanum	26.2	--	--
Lead*	44.7	800	16
Lithium	11.6	2,000	--
Magnesium	1,510	--	988
Manganese	149	23,000	120
Molybdenum	0.72	5,100	--
Nickel	11.7	47,000	6
Niobium	7.8	--	--
Phosphorus	326	--	--
Potassium	2,240	--	856
Rubidium	16	--	--
Scandium	4.5	--	--
Silver*	0.089	5,100	4
Sodium	1,950	--	194
Strontium	45.3	610,000	--
Thallium	0.14	--	4.5
Thorium	4.95	--	--
Titanium	nr	--	--
Uranium	1.39	--	--
Vanadium	42.6	5,200	--
Yttrium	13.5	--	--
Zinc	109	310,000	23

Manuscript approved on July 15, 2011.

Prepared by:

USGS Science Publishing Network
Raleigh Publishing Service Center
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Raleigh, NC 27607

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