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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 Soil-Gas and Soil Contamination at the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010

Open-File Report 2011–1080

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

Cover photograph. Soil sample being transferred to a sample container.

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

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U.S. Department of the Interior
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KEN SALAZAR, Secretary

U.S. Geological Survey
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Conversion Factors

Inch/Pound to SI

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (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).

Selected acronyms and abbreviations used in this report:

BTEX	Benzene, toluene, ethylbenzene, and xylene (total)
GC/MS	Gas chromatography/mass spectrometry
ICP-MS	Inductively coupled plasma – mass spectrometry
mg/kg	milligram per kilogram
mL	milliliter
µg	microgram
µg/g	microgram per gram
µg/L	microgram per liter
MDL	Method detection level
MTBE	Methyl *tert*-butyl ether
OMHA	Old Metal Workshop Hog Farm Area
PAH	Polycyclic aromatic hydrocarbon
PCE	Perchloroethylene (also known as tetrachloroethylene)
RCRA	Resource Conservation and Recovery Act
RSL	Regional screening level
SCDHEC	South Carolina Department of Health and Environmental Control
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 Soil-Gas and Soil Contamination at the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010

By Andral W. Caldwell,[1] W. Fred Falls,[1] Wladmir B. Guimaraes,[1] W. Hagan Ratliff,[2] John B. Wellborn,[3] and James E. Landmeyer[1]

Abstract

Soil gas and soil were assessed for contaminants at the Old Metal Workshop Hog Farm Area at Fort Gordon, Georgia, from October 2009 to September 2010. The assessment included delineating organic contaminants present in soil-gas and inorganic contaminants present in soil samples collected from the area estimated to be the Old Metal Workshop Hog Farm Area. This assessment was conducted to provide environmental contamination data to Fort Gordon personnel pursuant to requirements for the Resource Conservation and Recovery Act Part B Hazardous Waste Permit process.

All soil-gas samplers contained total petroleum hydrocarbons above the method detection level. The highest total petroleum hydrocarbon mass detected was 121.32 micrograms in a soil-gas sampler from the western corner of the Old Metal Workshop Hog Farm Area along Sawmill Road. The highest undecane mass detected was 73.28 micrograms at the same location as the highest total petroleum hydrocarbon mass. Some soil-gas samplers detected toluene mass greater than the method detection level of 0.02 microgram; the highest detection of toluene mass was 0.07 microgram.

Some soil-gas samplers were installed in areas of high-contaminant mass to assess for explosives and chemical agents. Explosives or chemical agents were not detected above their respective method detection levels for all soil-gas samplers installed.

Inorganic concentrations in five soil samples collected did not exceed regional screening levels established by the U.S. Environmental Protection Agency. Barium concentrations, however, were up to eight times higher than the background concentrations reported in similar Coastal Plain sediments of South Carolina.

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[3] Environmental and Natural Resources, Fort Gordon, Georgia.

Introduction

Fort Gordon is a U.S. Department of the Army (U.S. Army) facility located approximately 10 miles southwest of Augusta in east-central Georgia (fig. 1). A cantonment (military housing) area is located at the northwestern boundary of Fort Gordon. The Old Metal Workshop Hog Farm Area (OMHA) is located on a relatively flat and open area in the south-central part of Fort Gordon between Sawmill and Forestry Roads. Historically, little information is available about the OMHA other than that a metal workshop and hog farm were situated on the site (Hagan Ratliff, Environmental Branch, Fort Gordon, Georgia, oral commun., November 6, 2009); however, physical evidence suggests that a building and a parking lot also were once located at the site.

Because of the lack of historical information, the effects of past activities on environmental resources at the OMHA currently are unknown. The current assessment was conducted to provide environmental contamination data to Fort Gordon personnel to comply with the requirements of the Resource Conservation and Recovery Act (RCRA) Part B Hazardous Waste Permit process. An initial investigation to assess potential environmental effects is warranted because the OMHA is located in the outcrop area for the Cretaceous-age aquifer system, which is used for drinking water farther downgradient. Moreover, groundwater flowing from the OMHA may discharge to streams in the area and potentially enable contaminants to be transported off of the Fort Gordon property.

Purpose and Scope

From October 2009 to September 2010, the U.S. Geological Survey (USGS), in cooperation with the U.S. Department of the Army (U.S. Army) Environmental and Natural Resources Management Office of the U.S. Army Signal Center and Fort Gordon, Georgia, assessed soil gas and soil for contaminants at the OMHA. This assessment was conducted to provide environmental contamination data

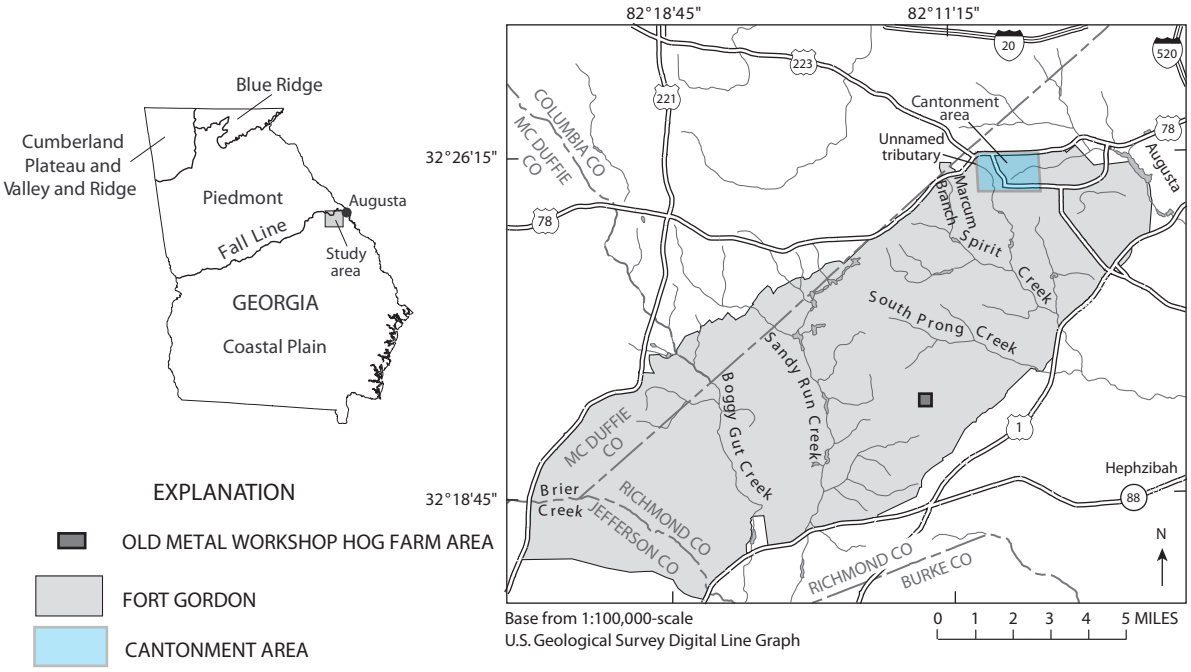

Figure 1. Location of Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia.

to the U.S. Army at Fort Gordon. The assessment included the delineation of organic contaminants present in soil-gas samplers collected from the OMHA. The assessment also included the delineation of inorganic contaminants in soil samples. This report presents the analytical results of the soil-gas and soil samples and delineates the area of contamination.

Description of the Study Area

Fort Gordon is a U.S. Army facility located approximately 10 miles southwest of Augusta in east-central Georgia (fig. 1). Fort Gordon is located in the northern part of the Coastal Plain Physiographic Province and south of the Fall Line. Surficial soil and sediment are characterized by unconsolidated sands, indurated sands, and semi-consolidated sandstones, and layers of clay that include kaolinite (Gregory and others, 2001; Williams, 2007).

Methods

The methods used in this assessment were selected to provide data to determine the presence or absence of contamination of soil gas and soil at the OMHA. The soil-gas method that was used provides results that are qualitative, and the soil samples provide quantitative data that can be compared to standards.

Passive Soil-Gas Survey

The assessment of soil-gas contamination was conducted using a passive soil-gas survey based on the GORE® Module, a commercially available passive diffusion sampler based on GORE-TEX® membrane technology (U.S. Environmental Protection Agency, 1998; W.L. Gore & Associates, Inc., 2004; American Society for Testing and Materials, 2006). The module is an adsorbent material placed inside a shoestring-shaped GORE-TEX® tube (fig. 2*A*). The material can adsorb a wide variety of volatile organic compounds (VOCs), 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 (SVOCs); total petroleum hydrocarbons (TPHs); and polycyclic aromatic hydrocarbons (PAHs), such as naphthalene. 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, and inserted into a shallow borehole. After 5 to 7 days, the modules were removed from the field, placed in their original 20-milliliter (mL) gas-tight vials (fig. 2*B*), and sent to the commercial laboratory (W.L. Gore & 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 adsorbed soil gas from the sampler. The laboratory is in compliance with Good Laboratory Practices and ISO Guide 25 (International Organization for Standardization, 1990). The soil-gas contaminant results are expressed as mass of contaminant (micrograms) and provide qualitative screening-level data.

Passive soil-gas results can indicate the presence of particular contaminants. The results, however, do not reveal whether the detection was derived from free product, from residual-phase adsorbed material or vapors in the unsaturated zone, or from the dissolved-phase material in shallow and deep groundwater (unless the module is placed in water). In general, higher soil-gas mass in a sampler tends to be related to the presence of residual contamination or free product that is close to the land surface where the soil-gas sampler is located. If such source material is located at greater depths, however, the soil-gas contaminant mass generally will be lower. A lower value near known sources may be due to

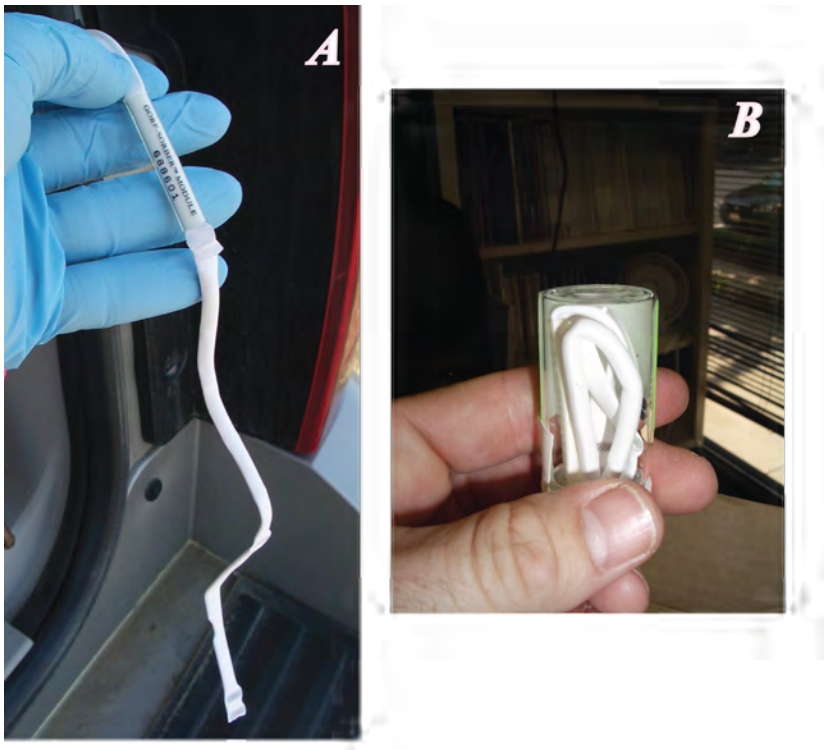

Figure 2. Soil-gas sampler (*A*) prior to being installed in a shallow borehole and (*B*) following retrieval from a borehole and prior to shipping to laboratory for analysis.

various attenuation processes that affect the soil-gas mass prior to detection. In both cases, however, the samplers help to rapidly indicate the presence or absence of contaminants. The passive soil-gas approach was approved for use at Fort Gordon 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).

A passive soil-gas survey was conducted at the OMHA site during June 2010 when 55 soil-gas samplers were deployed (fig. 3). The soil-gas samplers were placed in a grid pattern to cover the generalized extent of the OMHA. Four additional soil-gas samplers were used as trip-blank samplers and were not deployed. Each sampler was placed in a borehole that was 0.5-inch (in.) in diameter and 15-in. long, created by a stainless-steel ship-auger bit attached to a cordless drill. This depth is within the range specified by the USEPA for soil-gas investigations (U.S. Environmental Protection Agency, 1998). The auger was cleaned with a paper towel between each drilling. The 55 samplers were deployed on June 15, 2010, removed on June 21, 2010, placed in their original 20-mL gas-tight vials, and sent to the W.L. Gore & Associates, Inc., laboratory for analysis.

On September 15, 2010, five soil-gas samplers were installed and retrieved, as previously described, and analyzed for organic compounds classified as explosives and chemical agents (fig. 4). Three of the soil-gas samplers were deployed in areas defined by high contaminant mass as detected in the initial soil-gas survey of June 2010. The remaining two samplers were background samplers deployed in areas where no contaminants were detected. Five additional samplers were used as trip-blank samplers and were not deployed.

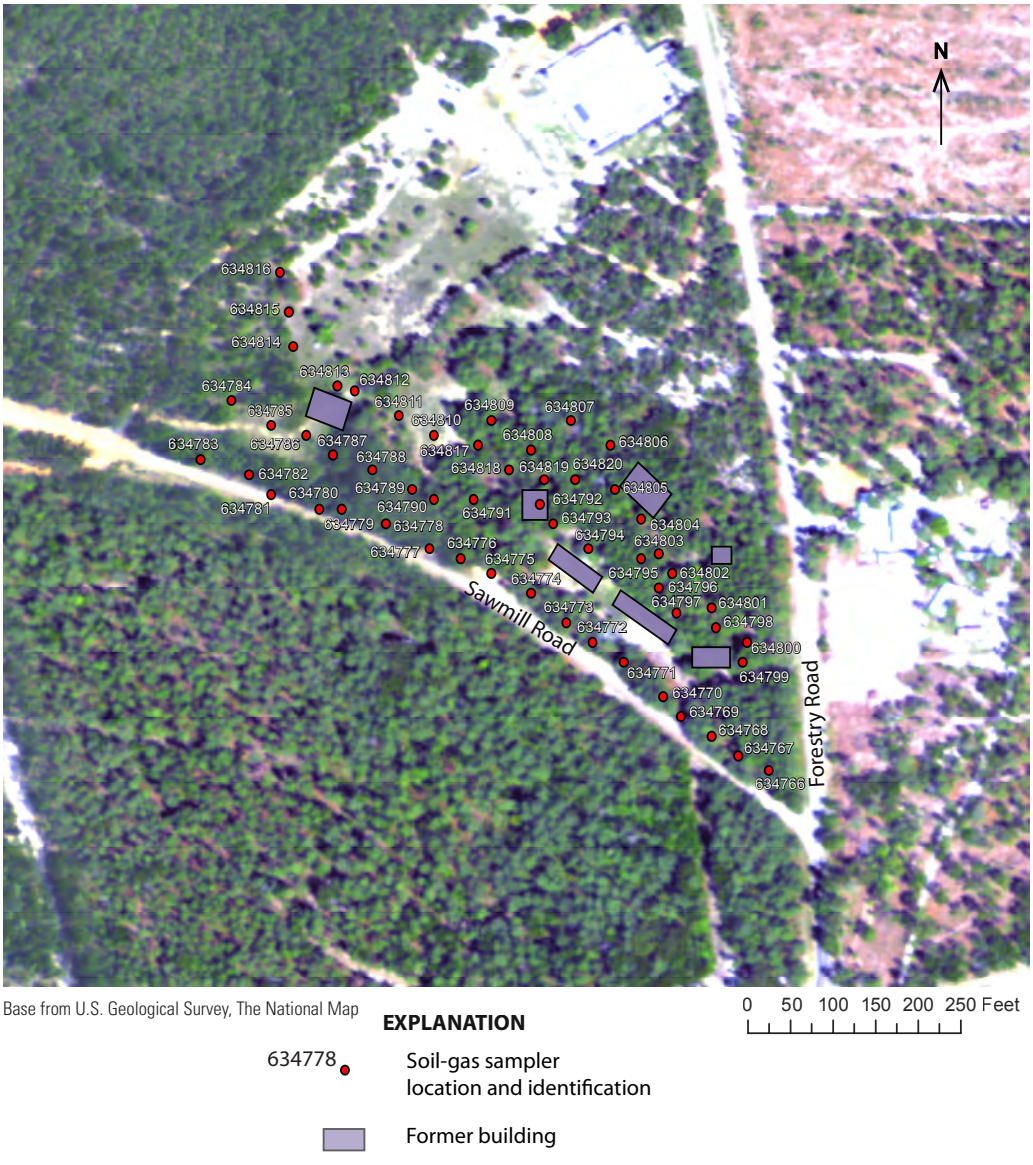

Figure 3. Locations of soil-gas samplers and sampler identification numbers, Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.

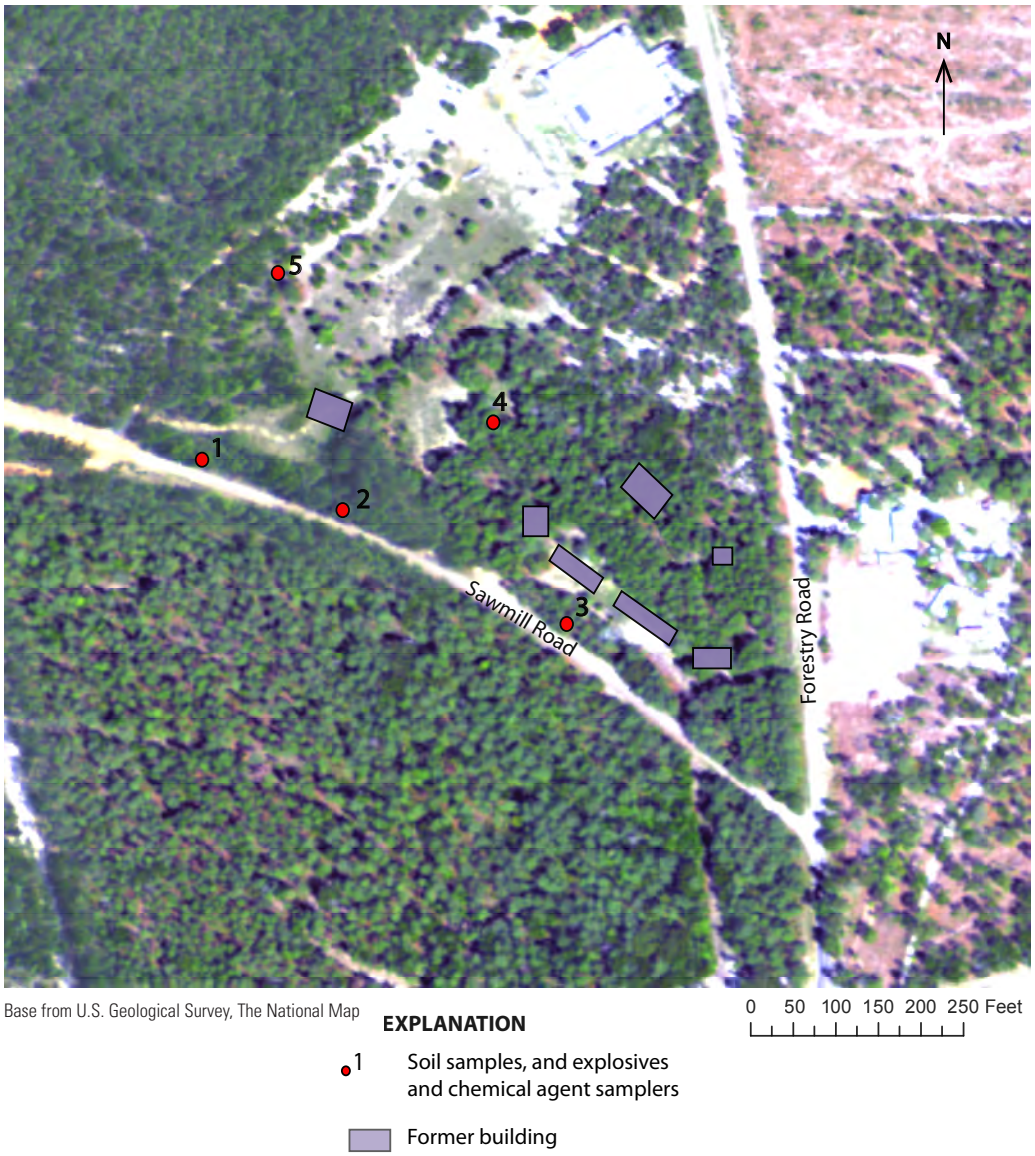

Figure 4. Locations of soil samples, and explosives and chemical agent samplers, Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.

Soil Samples

Composite soil samples were collected using a stainless-steel hand auger (fig. 5*A* and *B*) on August 25, 2010, to a depth of 6 in. below land surface at five locations (fig. 4). The soil samples were analyzed for 37 inorganic constituents. Soil samples were analyzed by using Inductively Coupled Plasma – Mass Spectrometry (ICP-MS; LaDonna Choate, Research Chemist, U.S. Geological Survey, Denver, Colorado, written commun., February 8, 2009). The samples were ground to a powder and processed by a multi-acid digestion technique prior to analysis (Briggs and Meier, 2002). The multi-acid digestion technique combined with ICP-MS is suited for the analysis of metals in rocks, soils, and sediments (Briggs and Meier, 2002).

Soil-sample concentrations were compared to USEPA regional screening levels (RSLs) 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 the State of Georgia. The comparison is valid because the geologic features of Georgia and South Carolina are similar, and the States share similar physiographic provinces.

Figure 5. Soil sample (*A*) extracted with stainless-steel auger and (*B*) transferred to sample container.

Results

The results of the passive soil-gas survey and soil sample analysis are presented in this section and used to further delineate the area of contamination related to the OMHA. The results of these sampling activities indicate that past activities at the OMHA have resulted in an environmental effect.

Passive Soil-Gas Survey

All of the 55 soil-gas samplers installed for this study at the OMHA site (fig. 3; table 1, at the back of the report) detected TPH mass greater than the method detection level (MDL) of 0.02 microgram (µg; fig. 6). The samplers with the two highest detections of TPH soil-gas mass of 121.32 and 105.39 µg were located in the western corner of the OMHA along Sawmill Road. A smaller area of TPH soil-gas mass of 15.07 and 21.29 µg was detected along the western corner of the OMHA, just south of where an old building once stood, and along Sawmill Road, respectively. Total petroleum hydrocarbon soil-gas mass between 12.1 and greater than 60 µg was detected in samplers located in the middle of the OMHA just north of where a building once stood. A smaller area of TPH soil-gas mass greater than 12.1 µg was detected in two samplers along the eastern side of the OMHA near where an old building existed and (or) a parking lot was located. Because all 55 soil-gas samplers contained TPH mass at levels greater than the MDL, it is possible that the boundary of the OMHA has not been fully assessed with respect to TPH. The TPH detections in all the samplers were higher than the reported TPH detections in the four trip blanks (0.03 µg, table 1).

Fewer than one-third of the soil-gas samplers installed at the OMHA had undecane (a petroleum derived product) mass greater than the MDL of 0.04 µg (fig. 7; table 1). The highest soil-gas undecane mass (greater than 12 µg) was detected in the western part of the OMHA along Sawmill Road and in the middle of OMHA just north of where an old building had existed. These locations coincide with the locations of high soil-gas TPH mass (fig. 6). Detections of undecane mass of 4.3 and 6.01 µg were in two samplers located along the western boundary of OMHA that coincide with the location of a former building.

Only 3 of the 55 soil-gas samplers detected toluene mass greater than the MDL of 0.02 µg (fig. 8, table 1). Two of the soil-gas samplers with toluene mass greater than the MDL were detected in samplers located in the middle of the OMHA and coincided with locations of TPH mass of 15.38 and 23.14 µg, respectively (fig. 6). The third detection of soil-gas toluene mass was located along the western boundary of the OMHA near where an old building once stood.

Explosives or chemical agents were not detected above their respective MDLs for all soil-gas samplers installed in areas of high contaminant mass. Some explosives and chemical agents had masses below the MDL but were above the non-detection level, indicating some level of presence (fig. 4; table 2).

For all soil-gas analyses, the presence of a contaminant above the MDL at a particular soil-gas sampler location suggests an environmental effect. Moreover, because all soil-gas samplers were installed to the same depth, a higher result for a particular contaminant in soil-gas may indicate a closer proximity to a contaminant source.

Soil Samples

Inorganic concentrations in all five of the soil samples did not exceed the RSLs (table 3). Barium concentrations were, however, up to eight times higher than the background concentrations reported for South Carolina Coastal Plain sediments (table 3).

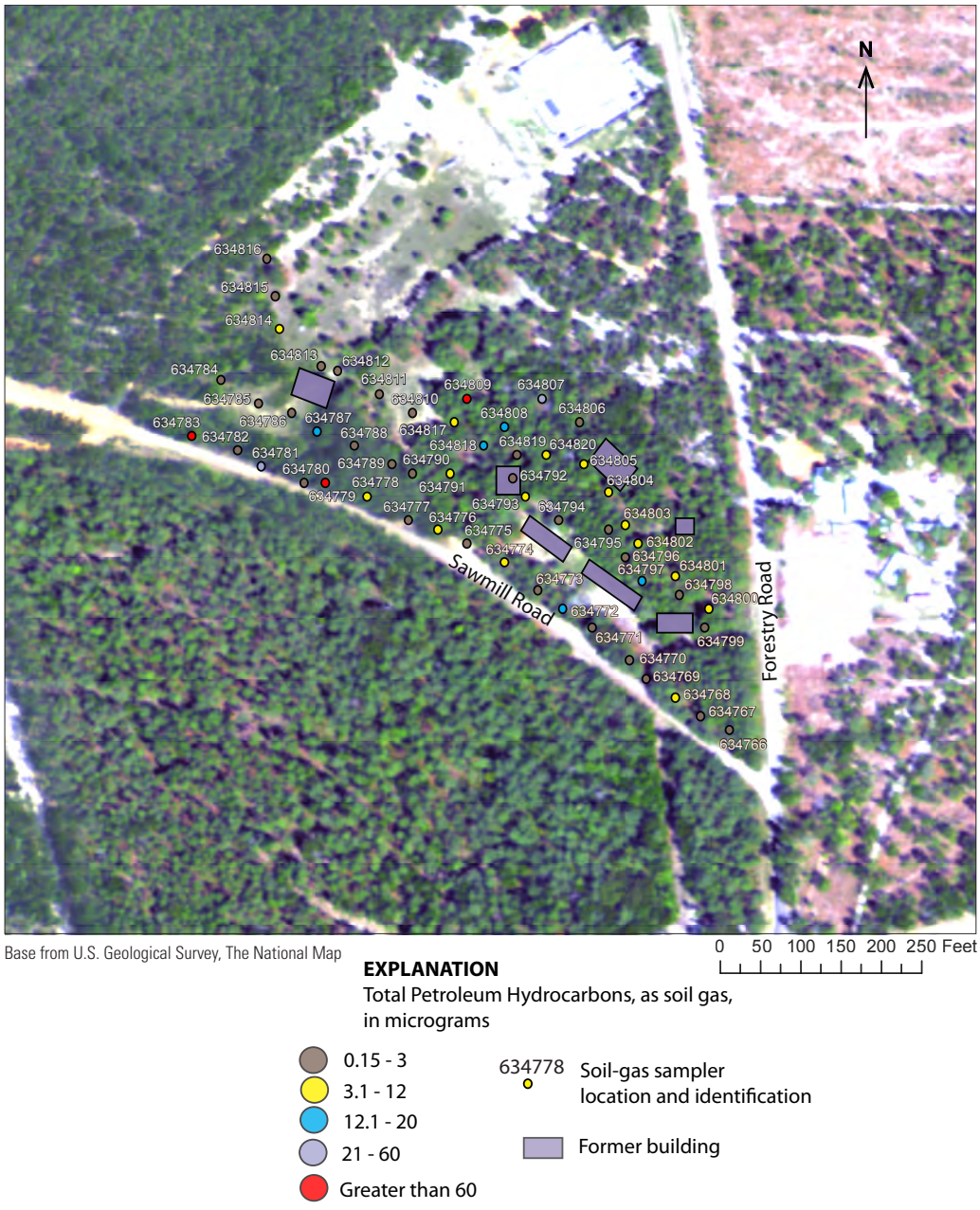

Figure 6. Detections of total petroleum hydrocarbon mass in soil-gas samplers, Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.

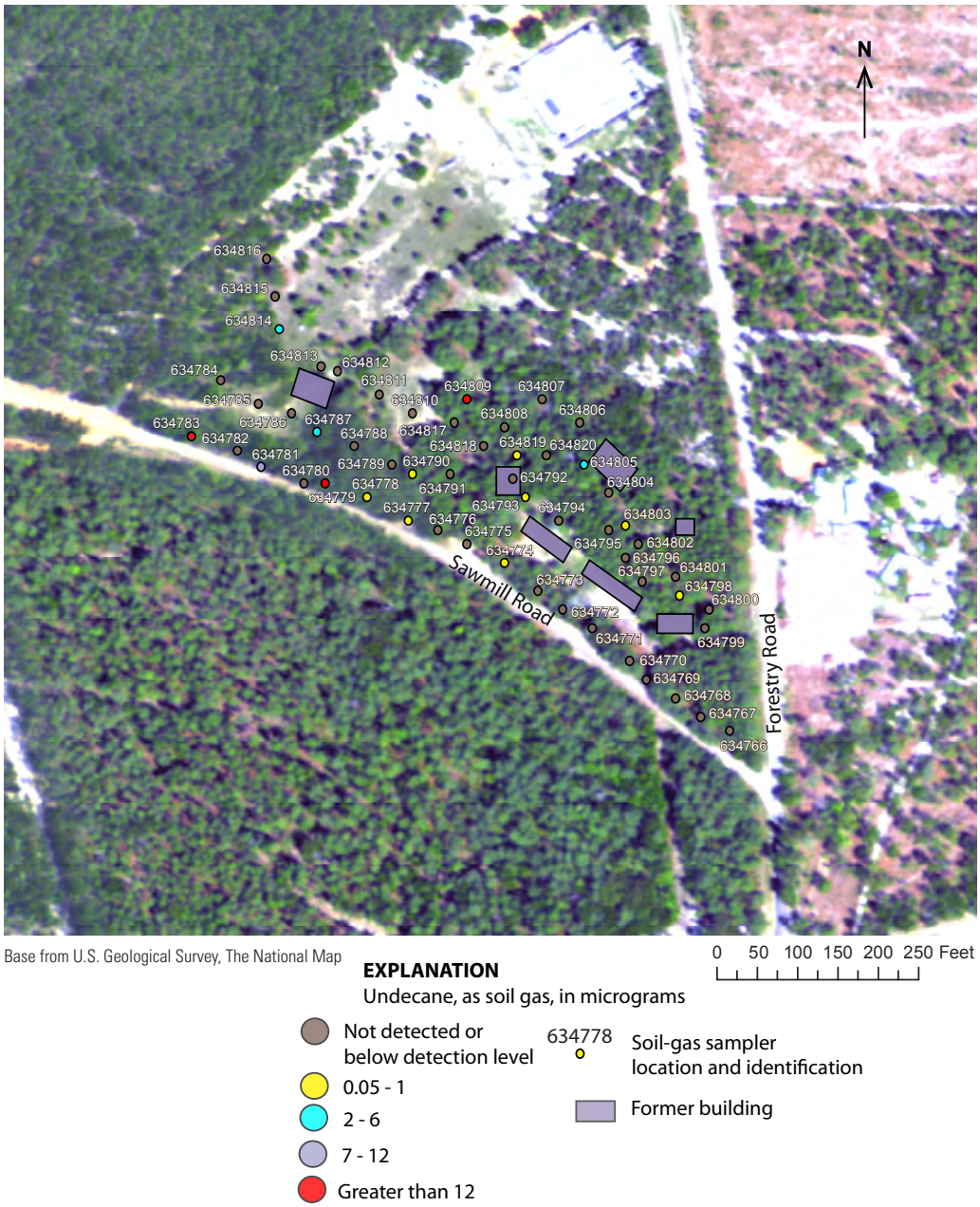

Figure 7. Detections of undecane mass in soil-gas samplers, Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.

Figure 8. Detections of toluene mass in soil-gas samplers, Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.

Table 2. Mass of explosive and chemical agents detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.

[µg, micrograms; MDL, method detection level; nd, not detected; bdl, below detection level; *p*, para]

Sampler number	Dimethyldisulfide (µg)	Dimethylmethylphosphonate (µg)	1,4-Thioxane (µg)	Nitrobenzene (µg)
MDL=	**0.10**	**0.10**	**0.10**	**0.10**
644210	nd	nd	nd	nd
644211	nd	nd	nd	nd
644212	nd	nd	nd	nd
644213	nd	nd	nd	nd
644214	nd	nd	nd	nd
Trip blanks				
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 2. Mass of explosive and chemical agents detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; bdl, below detection level; *p*, para]

Sampler number	Diisopropylmethylphosphonate (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**
644210	nd	nd	nd	nd	nd
644211	nd	nd	nd	nd	nd
644212	nd	nd	nd	nd	nd
644213	nd	nd	nd	nd	nd
644214	nd	nd	nd	nd	nd
Trip blanks					
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 2. Mass of explosive and chemical agents detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; bdl, below detection level; *p*, para]

Sampler number	Thiodiglycol (µg)	Benzothiazole (µg)	Chloroacetophenones (µg)	*p*-Chlorophenylmethylsulfide (µg)
MDL=	**0.20**	**0.10**	**0.10**	**0.10**
644210	nd	nd	nd	nd
644211	nd	nd	nd	nd
644212	nd	bdl	nd	nd
644213	nd	nd	nd	bdl
644214	nd	nd	nd	nd
Trip blanks				
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 2. Mass of explosive and chemical agents detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; bdl, below detection level; *p*, para]

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**
644210	nd	nd	nd	nd
644211	nd	nd	nd	nd
644212	nd	nd	nd	nd
644213	nd	nd	nd	nd
644214	nd	nd	bdl	nd
Trip blanks				
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 2. Mass of explosive and chemical agents detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; bdl, below detection level; *p*, para]

Sampler number	*p*-chlorophenylmethylsulfoxide (µg)	*p*-chlorophenylmethylsulfone (µg)	2,4,6-Trinitrotoluene (µg)
MDL=	**0.10**	**0.10**	**0.10**
644210	nd	nd	nd
644211	nd	bdl	nd
644212	nd	nd	nd
644213	nd	nd	nd
644214	bdl	bdl	nd
	Trip blanks		
644252	nd	bdl	nd
644253	nd	bdl	nd
644254	nd	bdl	nd
644255	nd	bdl	nd
644256	nd	bdl	nd

Table 3. Inorganic constituents detected in soil samples collected at the Old Metal Workshop Hog Farm Area from land surface to 6 inches, sites 1–5, Fort Gordon, Georgia, August 25, 2010.

[USEPA RSL, U.S. Environmental Protection Agency Regional Screening Level, Industrial Soil; SCDHEC, South Carolina Department of Health and Environmental Control; µg/g, micrograms per gram; mg/kg, milligrams per kilogram; --, not applicable; nr, not reportable; for soil, 1 µg/g is equivalent to 1 mg/kg, and 1 mg/kg is equivalent to 1 part per million (ppm); yellow shading indicates value higher than SCDHEC background; *, Resource Conservation and Recovery Act (RCRA) metal. Note: selenium and mercury were not analyzed]

Constituent	Site 1 (µg/g)	Site 2 (µg/g)	Site 3 (µg/g)	Site 4 (µg/g)	Site 5 (µg/g)	USEPA RSL (mg/kg)	SCDHEC Background (mg/kg)
Aluminum	14,100	40,400	15,800	8,650	25,300	990,000	13,528
Antimony	0.63	0.51	0.2	0.1	0.26	410	--
Arsenic*	1.6	3.9	1.8	<1	2.7	260	6.1
Barium*	123	312	69.1	49.4	99.3	190,000	38
Beryllium	0.54	1.5	0.27	0.17	0.45	2,000	0.6
Bismuth	nr	nr	nr	nr	nr	--	--
Cadmium*	0.01	0.02	0.01	0.01	0.01	800	1
Calcium	242	515	159	148	196	--	699
Cerium	53.9	137	32.5	35.7	59.5	--	--
Cesium	0.9	1.2	0.78	0.53	1.2	--	--
Chromium*	11	36.1	15.4	10.1	20.1	1,500,000	16
Cobalt	1.5	1.8	0.86	0.46	1.8	300	4
Copper	5.4	10.3	5.3	6.6	7.3	41,000	9
Gallium	4	11.6	4.2	2.6	6.6	--	--
Iron	5740	20,200	6290	3,930	11,100	720,000	15,608
Lanthanium	20.7	53.9	14.1	14.8	25	--	--
Lead*	6.49	16.2	6.75	6.52	9.12	800	16
Lithium	5.9	8.6	6.6	4.2	7.7	2,000	--
Magnesium	364	479	465	266	472	--	988
Manganese	353	131	47.9	37.3	134	23,000	120
Molybdenum	0.31	0.88	0.34	0.22	0.53	5,100	--
Nickel	4.3	9.6	4.2	2.2	7.1	47,000	6
Niobium	3.3	9.3	3	2.8	6.5	--	--
Phosphorus	290	587	244	355	279	--	--
Potassium	702	1,000	623	430	696	--	856
Rubidium	10.6	10.3	6.5	4.6	9.2	--	--
Scandium	2	5.9	1.7	1.2	3.5	--	--
Silver*	0.045	0.043	0.022	0.017	0.019	5,100	4
Sodium	76.4	107	64.3	50.5	63.5	--	194
Strontium	55.9	179	27.9	19.3	53.5	610,000	--
Thallium	0.21	0.14	<0.08	<0.08	0.08	--	4.5
Thorium	3.65	8.07	3.13	4.93	4.68	--	--
Titanium	nr	nr	nr	nr	nr	--	--
Uranium	0.96	2.44	0.88	0.92	1.17	--	--
Vanadium	18	59.6	21.7	14.8	32	5,200	--
Yttrium	8.4	12.3	2.7	3.2	5.2	--	--
Zinc	14.5	21.8	15.3	11.4	19.4	310,000	23

Summary

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 soil gas and soil for contaminants at the Old Metal Workshop Hog Farm Area (OMHA) at Fort Gordon, Georgia, from October 2009 to September 2010. All 55 soil-gas samplers for the study contained total petroleum hydrocarbons (TPHs) above the method detection level. The highest TPH mass was detected in the western corner of the OMHA along Sawmill Road. Other soil-gas samplers with elevated levels of TPH mass were collected where buildings had previously stood and at the western boundary of the Old Metal Workshop Hog Farm Area along Sawmill Road. Additional samplers would be required to fully delineate the contaminant boundary with respect to TPH. The highest undecane mass was detected at the same location as the highest TPH mass. Only three soil-gas samplers detected concentrations of toluene greater than the method detection level. Soil-gas samplers installed in areas of high contaminant mass had no detections of explosives or chemical agents above their respective method detection levels.

Inorganic concentrations for the five soil samples did not exceed U.S. Environmental Protection Agency values for their regional screening levels. Barium concentrations, however, were up to eight times higher than background concentrations reported for similar Coastal Plain sediments in South Carolina.

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Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.

[µg, micrograms; MDL, method detection level; nd, not detected; bdl, below detection level; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	TPH (µg)	BTEX (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**
634766	0.97	nd	nd	nd	nd	nd	nd
634767	0.47	nd	nd	nd	nd	nd	nd
634768	5.33	nd	nd	nd	nd	nd	nd
634769	2.38	nd	nd	nd	nd	nd	nd
634770	0.47	nd	nd	nd	nd	nd	nd
634771	0.39	nd	nd	nd	nd	nd	nd
634772	14.45	nd	nd	nd	nd	nd	nd
634773	0.66	nd	nd	nd	nd	nd	nd
634774	3.79	nd	nd	nd	nd	nd	nd
634775	0.35	nd	nd	nd	nd	nd	nd
634776	5.42	nd	nd	nd	nd	nd	nd
634777	2.36	nd	nd	nd	nd	nd	nd
634778	4.89	nd	nd	nd	nd	nd	nd
634779	121.32	nd	nd	nd	nd	nd	nd
634780	1.15	nd	nd	nd	nd	nd	nd
634781	21.29	nd	nd	nd	nd	nd	nd
634782	0.57	nd	nd	nd	nd	nd	nd
634783	105.39	nd	nd	nd	nd	nd	nd
634784	0.47	nd	nd	nd	nd	nd	nd
634785	1.51	nd	nd	nd	nd	nd	nd
634786	0.29	nd	nd	nd	nd	nd	nd
634787	15.07	bdl	nd	nd	nd	bdl	nd
634788	0.69	nd	nd	nd	nd	nd	nd
634789	0.49	nd	nd	nd	nd	nd	nd
634790	0.67	nd	nd	nd	nd	nd	nd
634791	4.33	nd	nd	nd	nd	nd	nd
634792	1.45	nd	nd	nd	nd	nd	nd
634793	3.94	nd	nd	nd	nd	nd	nd
634794	1.74	nd	nd	nd	nd	nd	nd
634795	2.32	nd	nd	nd	nd	nd	nd
634796	2.93	nd	nd	nd	nd	nd	nd
634797	18.87	nd	nd	nd	nd	nd	nd
634798	1.67	nd	nd	nd	nd	nd	nd
634799	1.40	nd	nd	nd	nd	nd	nd
634800	6.74	nd	nd	nd	nd	nd	nd
634801	7.09	nd	nd	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; bdl, below detection level; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	TPH (µg)	BTEX (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**
634802	7.50	nd	nd	nd	nd	nd	nd
634803	3.37	nd	nd	nd	nd	nd	nd
634804	8.06	nd	nd	nd	nd	nd	nd
634805	7.37	nd	nd	nd	nd	nd	nd
634806	1.86	nd	nd	nd	nd	nd	nd
634807	23.14	0.07	nd	0.07	nd	nd	nd
634808	12.10	nd	nd	nd	nd	nd	nd
634809	69.05	nd	nd	nd	nd	nd	nd
634810	0.56	nd	nd	nd	nd	nd	nd
634811	0.30	nd	nd	nd	nd	nd	nd
634812	0.38	0.04	nd	0.04	nd	nd	nd
634813	0.40	nd	nd	nd	nd	nd	nd
634814	8.45	nd	nd	nd	nd	nd	nd
634815	0.15	nd	nd	nd	nd	nd	nd
634816	0.17	nd	nd	nd	nd	nd	nd
634817	6.58	nd	nd	nd	nd	nd	nd
634818	15.38	0.03	nd	0.03	nd	nd	nd
634819	1.28	nd	nd	nd	nd	nd	nd
634820	8.85	nd	nd	nd	nd	nd	nd
			Trip blanks				
634821	0.03	nd	nd	nd	nd	nd	nd
634822	0.03	nd	nd	nd	nd	nd	nd
634823	0.03	nd	nd	nd	nd	nd	nd
634824	0.03	nd	nd	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	Naphthalene (µg)	2-Methyl-Naphthalene (µg)	MTBE (µg)	Octane (µg)
MDL=	**0.02**	**0.02**	**0.03**	**0.02**
634766	nd	nd	nd	nd
634767	nd	nd	nd	nd
634768	nd	nd	nd	nd
634769	nd	nd	nd	nd
634770	nd	nd	nd	nd
634771	nd	nd	nd	nd
634772	nd	nd	nd	nd
634773	nd	nd	nd	nd
634774	nd	nd	nd	nd
634775	nd	nd	nd	nd
634776	nd	nd	nd	nd
634777	nd	nd	nd	nd
634778	nd	nd	nd	nd
634779	nd	nd	nd	nd
634780	nd	nd	nd	nd
634781	nd	nd	nd	nd
634782	nd	nd	nd	nd
634783	nd	nd	nd	nd
634784	nd	nd	nd	nd
634785	nd	nd	nd	nd
634786	nd	nd	nd	nd
634787	nd	nd	nd	nd
634788	nd	nd	nd	nd
634789	nd	nd	nd	nd
634790	nd	nd	nd	nd
634791	nd	nd	nd	nd
634792	nd	nd	nd	nd
634793	nd	nd	nd	nd
634794	nd	nd	nd	nd
634795	nd	nd	nd	nd
634796	nd	nd	nd	nd
634797	nd	nd	nd	nd
634798	nd	nd	nd	nd
634799	nd	nd	nd	nd
634800	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	Naphthalene (µg)	2-Methyl-Naphthalene (µg)	MTBE (µg)	Octane (µg)
MDL=	**0.02**	**0.02**	**0.03**	**0.02**
634801	nd	nd	nd	nd
634802	nd	nd	nd	nd
634803	nd	nd	nd	nd
634804	nd	nd	nd	nd
634805	nd	nd	nd	nd
634806	nd	nd	nd	nd
634807	nd	nd	nd	nd
634808	nd	nd	nd	nd
634809	nd	nd	nd	nd
634810	nd	nd	nd	nd
634811	nd	nd	nd	nd
634812	nd	nd	nd	nd
634813	nd	nd	nd	nd
634814	nd	nd	nd	nd
634815	nd	nd	nd	nd
634816	nd	nd	nd	nd
634817	nd	nd	nd	nd
634818	nd	bdl	nd	nd
634819	nd	nd	nd	nd
634820	nd	nd	nd	nd
Trip blanks				
634821	nd	nd	nd	nd
634822	nd	nd	nd	nd
634823	nd	nd	nd	nd
634824	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	C_{11}, C_{13}, and C_{15} (µg)	Undecane (µg)	Tridecane (µg)	Pentadecane (µg)
MDL=	**---**	**0.04**	**0.02**	**0.02**
634766	nd	nd	nd	nd
634767	nd	nd	nd	nd
634768	nd	nd	nd	nd
634769	nd	nd	nd	nd
634770	nd	nd	nd	nd
634771	nd	nd	nd	nd
634772	nd	nd	nd	nd
634773	nd	nd	nd	nd
634774	0.05	0.05	nd	nd
634775	bdl	bdl	nd	nd
634776	bdl	bdl	nd	nd
634777	0.05	0.05	nd	nd
634778	0.09	0.09	nd	nd
634779	74.25	73.28	0.97	nd
634780	bdl	bdl	nd	nd
634781	11.71	11.71	nd	nd
634782	nd	nd	nd	nd
634783	62.25	61.62	0.62	nd
634784	nd	nd	nd	nd
634785	nd	nd	nd	nd
634786	nd	nd	nd	nd
634787	4.33	4.30	0.03	nd
634788	bdl	bdl	nd	nd
634789	nd	nd	nd	nd
634790	0.07	0.07	nd	nd
634791	nd	nd	nd	nd
634792	nd	nd	nd	nd
634793	0.05	0.05	nd	nd
634794	bdl	bdl	nd	nd
634795	nd	nd	nd	nd
634796	nd	nd	nd	nd
634797	bdl	nd	nd	bdl
634798	0.11	0.11	nd	nd
634799	nd	nd	nd	nd
634800	nd	nd	nd	nd
634801	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	C_{11}, C_{13}, and C_{15} (µg)	Undecane (µg)	Tridecane (µg)	Pentadecane (µg)
MDL=	**---**	**0.04**	**0.02**	**0.02**
634802	nd	nd	nd	nd
634803	0.85	0.85	bdl	nd
634804	nd	nd	nd	nd
634805	4.44	4.44	bdl	nd
634806	nd	nd	nd	nd
634807	nd	nd	nd	nd
634808	nd	nd	nd	nd
634809	40.93	40.61	0.33	nd
634810	bdl	nd	nd	bdl
634811	nd	nd	nd	nd
634812	nd	nd	nd	nd
634813	nd	nd	nd	nd
634814	6.01	6.01	bdl	nd
634815	nd	nd	nd	nd
634816	nd	nd	nd	nd
634817	nd	nd	nd	nd
634818	0.03	nd	0.03	bdl
634819	0.66	0.66	bdl	bdl
634820	nd	nd	nd	nd
		Trip blanks		
634821	nd	nd	nd	nd
634822	nd	nd	nd	nd
634823	nd	nd	nd	nd
634824	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	Trimethyl benzene (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**
634766	nd	nd	nd	nd	nd	nd	nd
634767	nd	nd	nd	nd	nd	nd	nd
634768	nd	nd	nd	nd	nd	nd	nd
634769	nd	nd	nd	nd	nd	nd	nd
634770	nd	nd	nd	nd	nd	nd	nd
634771	nd	nd	nd	nd	nd	nd	nd
634772	nd	nd	nd	nd	nd	nd	nd
634773	nd	nd	nd	nd	0.05	nd	nd
634774	nd	nd	nd	nd	0.11	nd	nd
634775	nd	nd	nd	nd	nd	nd	nd
634776	nd	nd	nd	nd	nd	nd	nd
634777	nd	nd	nd	nd	nd	nd	nd
634778	nd	nd	nd	nd	nd	nd	nd
634779	nd	nd	nd	nd	nd	nd	nd
634780	nd	nd	nd	nd	nd	nd	nd
634781	nd	nd	nd	nd	nd	nd	nd
634782	nd	nd	nd	nd	nd	nd	nd
634783	nd	nd	nd	nd	nd	nd	nd
634784	nd	nd	nd	nd	nd	nd	nd
634785	nd	nd	nd	nd	nd	nd	nd
634786	nd	nd	nd	nd	nd	nd	nd
634787	nd	nd	nd	nd	nd	nd	nd
634788	nd	nd	nd	nd	nd	nd	nd
634789	nd	nd	nd	nd	nd	nd	nd
634790	nd	nd	nd	nd	nd	nd	nd
634791	nd	nd	nd	nd	0.04	nd	nd
634792	nd	nd	nd	nd	nd	nd	nd
634793	nd	nd	nd	nd	nd	nd	nd
634794	nd	nd	nd	nd	nd	nd	nd
634795	nd	nd	nd	nd	0.16	nd	nd
634796	nd	nd	nd	nd	nd	nd	nd
634797	nd	nd	nd	nd	nd	nd	nd
634798	nd	nd	nd	nd	nd	nd	nd
634799	nd	nd	nd	nd	nd	nd	nd
634800	nd	nd	nd	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	Trimethyl benzene (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**
634801	nd	nd	nd	nd	0.09	nd	nd
634802	nd	nd	nd	nd	nd	nd	nd
634803	nd	nd	nd	nd	nd	nd	nd
634804	nd	nd	nd	nd	nd	nd	nd
634805	nd	nd	nd	nd	nd	nd	nd
634806	nd	nd	nd	nd	nd	nd	nd
634807	nd	nd	nd	nd	nd	nd	nd
634808	nd	nd	nd	nd	nd	nd	nd
634809	nd	nd	nd	nd	0.08	nd	nd
634810	nd	nd	nd	nd	nd	nd	nd
634811	nd	nd	nd	nd	nd	nd	nd
634812	nd	nd	nd	nd	nd	nd	nd
634813	nd	nd	nd	nd	nd	nd	nd
634814	nd	nd	nd	nd	nd	nd	nd
634815	nd	nd	nd	nd	nd	nd	nd
634816	nd	nd	nd	nd	nd	nd	nd
634817	nd	nd	nd	nd	nd	nd	nd
634818	nd	nd	nd	nd	nd	nd	nd
634819	nd	nd	nd	nd	nd	nd	nd
634820	nd	nd	nd	nd	nd	nd	nd
			Trip blanks				
634821	nd	nd	nd	nd	nd	nd	nd
634822	nd	nd	nd	nd	nd	nd	nd
634823	nd	nd	nd	nd	nd	nd	nd
634824	nd	nd	nd	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	TCE (µg)	*c,t*-1,2-DCE (µg)	*t*-1,2-DCE (µg)	*c*-1,2-DCE (µg)	PCE (µg)
MDL=	**0.02**	**---**	**0.04**	**0.03**	**0.02**
634766	nd	nd	nd	nd	nd
634767	nd	nd	nd	nd	nd
634768	nd	nd	nd	nd	nd
634769	nd	nd	nd	nd	nd
634770	nd	nd	nd	nd	nd
634771	nd	nd	nd	nd	nd
634772	nd	nd	nd	nd	nd
634773	nd	nd	nd	nd	nd
634774	nd	nd	nd	nd	nd
634775	nd	nd	nd	nd	nd
634776	nd	nd	nd	nd	nd
634777	nd	nd	nd	nd	nd
634778	nd	nd	nd	nd	nd
634779	nd	nd	nd	nd	nd
634780	nd	nd	nd	nd	nd
634781	nd	nd	nd	nd	nd
634782	nd	nd	nd	nd	nd
634783	nd	nd	nd	nd	nd
634784	nd	nd	nd	nd	nd
634785	nd	nd	nd	nd	nd
634786	nd	nd	nd	nd	nd
634787	nd	nd	nd	nd	nd
634788	nd	nd	nd	nd	nd
634789	nd	nd	nd	nd	nd
634790	nd	nd	nd	nd	nd
634791	nd	nd	nd	nd	nd
634792	nd	nd	nd	nd	nd
634793	nd	nd	nd	nd	nd
634794	nd	nd	nd	nd	nd
634795	nd	nd	nd	nd	nd
634796	nd	nd	nd	nd	nd
634797	nd	nd	nd	nd	nd
634798	nd	nd	nd	nd	nd
634799	nd	nd	nd	nd	nd
634800	nd	nd	nd	nd	nd
634801	nd	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	TCE (µg)	*c,t*-1,2-DCE (µg)	*t*-1,2-DCE (µg)	*c*-1,2-DCE (µg)	PCE (µg)
MDL=	**0.02**	**---**	**0.04**	**0.03**	**0.02**
634802	nd	nd	nd	nd	nd
634803	nd	nd	nd	nd	nd
634804	nd	nd	nd	nd	nd
634805	nd	nd	nd	nd	nd
634806	nd	nd	nd	nd	nd
634807	nd	nd	nd	nd	nd
634808	nd	nd	nd	nd	nd
634809	nd	nd	nd	nd	nd
634810	nd	nd	nd	nd	nd
634811	nd	nd	nd	nd	nd
634812	nd	nd	nd	nd	nd
634813	nd	nd	nd	nd	nd
634814	nd	nd	nd	nd	nd
634815	nd	nd	nd	nd	nd
634816	nd	nd	nd	nd	nd
634817	nd	nd	nd	nd	nd
634818	nd	nd	nd	nd	nd
634819	nd	nd	nd	nd	nd
634820	nd	nd	nd	nd	nd
			Trip blanks		
634821	nd	nd	nd	nd	nd
634822	nd	nd	nd	nd	nd
634823	nd	nd	nd	nd	nd
634824	nd	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	1,4-DCB (µg)	CCl_4 (µg)	1,1,2-TCA, (µg)	Chlorobenzene (µg)	1,1,1,2-Tetrachloroethane (µg)	1,1,2,2-Tetrachloroethane (µg)
MDL=	**0.02**	**0.03**	**0.02**	**0.02**	**0.03**	**0.02**
634766	nd	nd	nd	nd	nd	nd
634767	nd	nd	nd	nd	nd	nd
634768	nd	nd	nd	nd	nd	nd
634769	nd	nd	nd	nd	nd	nd
634770	nd	nd	nd	nd	nd	nd
634771	nd	nd	nd	nd	nd	nd
634772	nd	nd	nd	nd	nd	nd
634773	nd	nd	nd	nd	nd	nd
634774	nd	nd	nd	nd	nd	nd
634775	nd	nd	nd	nd	nd	nd
634776	nd	nd	nd	nd	nd	nd
634777	nd	nd	nd	nd	nd	nd
634778	nd	nd	nd	nd	nd	nd
634779	nd	nd	nd	nd	nd	nd
634780	nd	nd	nd	nd	nd	nd
634781	nd	nd	nd	nd	nd	nd
634782	nd	nd	nd	nd	nd	nd
634783	nd	nd	nd	nd	nd	nd
634784	nd	nd	nd	nd	nd	nd
634785	nd	nd	nd	nd	nd	nd
634786	nd	nd	nd	nd	nd	nd
634787	nd	nd	nd	nd	nd	nd
634788	nd	nd	nd	nd	nd	nd
634789	nd	nd	nd	nd	nd	nd
634790	nd	nd	nd	nd	nd	nd
634791	nd	nd	nd	nd	nd	nd
634792	nd	nd	nd	nd	nd	nd
634793	nd	nd	nd	nd	nd	nd
634794	nd	nd	nd	nd	nd	nd
634795	nd	nd	nd	nd	nd	nd
634796	nd	nd	nd	nd	nd	nd
634797	nd	nd	nd	nd	nd	nd
634798	nd	nd	nd	nd	nd	nd
634799	nd	nd	nd	nd	nd	nd
634800	nd	nd	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	1,4-DCB (µg)	CCl_4 (µg)	1,1,2-TCA (µg)	Chlorobenzene (µg)	1,1,1,2-Tetrachloroethane (µg)	1,1,2,2-Tetrachloroethane (µg)
MDL=	**0.02**	**0.03**	**0.02**	**0.02**	**0.03**	**0.02**
634801	nd	nd	nd	nd	nd	nd
634802	nd	nd	nd	nd	nd	nd
634803	nd	nd	nd	nd	nd	nd
634804	nd	nd	nd	nd	nd	nd
634805	nd	nd	nd	nd	nd	nd
634806	nd	nd	nd	nd	nd	nd
634807	nd	nd	nd	nd	nd	nd
634808	nd	nd	nd	nd	nd	nd
634809	nd	nd	nd	nd	nd	nd
634810	nd	nd	nd	nd	nd	nd
634811	nd	nd	nd	nd	nd	nd
634812	nd	nd	nd	nd	nd	nd
634813	nd	nd	nd	nd	nd	nd
634814	nd	nd	nd	nd	nd	nd
634815	nd	nd	nd	nd	nd	nd
634816	nd	nd	nd	nd	nd	nd
634817	nd	nd	nd	nd	nd	nd
634818	nd	nd	nd	nd	nd	nd
634819	nd	nd	nd	nd	nd	nd
634820	nd	nd	nd	nd	nd	nd
Trip blanks						
634821	nd	nd	nd	nd	nd	nd
634822	nd	nd	nd	nd	nd	nd
634823	nd	nd	nd	nd	nd	nd
634824	nd	nd	nd	nd	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	1,3-Dichlorobenzene (µg)	1,2-Dichlorobenzene (µg)
MDL=	**0.02**	**0.02**
634766	nd	nd
634767	nd	nd
634768	nd	nd
634769	nd	nd
634770	nd	nd
634771	nd	nd
634772	nd	nd
634773	nd	nd
634774	nd	nd
634775	nd	nd
634776	nd	nd
634777	nd	nd
634778	nd	nd
634779	nd	nd
634780	nd	nd
634781	nd	nd
634782	nd	nd
634783	nd	nd
634784	nd	nd
634785	nd	nd
634786	nd	nd
634787	nd	nd
634788	nd	nd
634789	nd	nd
634790	nd	nd
634791	nd	nd
634792	nd	nd
634793	nd	nd
634794	nd	nd
634795	nd	nd
634796	nd	nd
634797	nd	nd
634798	nd	nd
634799	nd	nd
634800	nd	nd

Table 1. Mass of volatile organic compounds detected in soil-gas samplers from the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010.—Continued

[µg, micrograms; MDL, method detection level; nd, not detected; TPH, total petroleum hydrocarbons; BTEX, benzene, toluene, ethylbenzene, and xylenes; MTBE, methyl *tert*-butyl ether; DCA, dichloroethane; TCA, trichloroethane; TCE, trichloroethylene; DCE, dichloroethylene; PCE, perchloroethylene; DCB, dichlorobenzene; *c*, cis; *t*, trans; *m*, meta; *p*, para; *o*, ortho; CCl_4, carbon tetrachloride; C_{11}, C_{13}, and C_{15}, undecane, tridecane, and pentadecane; --, not applicable]

Sampler number	1,3-Dichlorobenzene (µg)	1,2-Dichlorobenzene (µg)
MDL=	**0.02**	**0.02**
634801	nd	nd
634802	nd	nd
634803	nd	nd
634804	nd	nd
634805	nd	nd
634806	nd	nd
634807	nd	nd
634808	nd	nd
634809	nd	nd
634810	nd	nd
634811	nd	nd
634812	nd	nd
634813	nd	nd
634814	nd	nd
634815	nd	nd
634816	nd	nd
634817	nd	nd
634818	nd	nd
634819	nd	nd
634820	nd	nd
Trip blanks		
634821	nd	nd
634822	nd	nd
634823	nd	nd
634824	nd	nd

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Caldwell and others—**Assessment of Soil-Gas and Soil Contamination at the Old Metal Workshop Hog Farm Area, Fort Gordon, Georgia, 2009–2010**—Open-File Report 2011–1080