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March 30, 2001

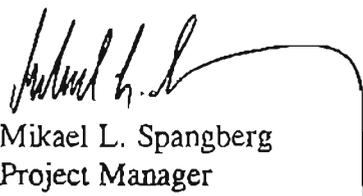
U.S. Army Engineer District, Huntington
ATTN: CELRH-ED-AE (Mr. Rick Meadows)
502 Eighth Street
Huntington, West Virginia 25701-2070

**Submittal of Surface Water and Sediment Sampling Analytical Results for
Mr. Gilbert Steinen's Property in Sandusky, Ohio (Plum Brook Ordnance Works);
Contract Number DACA62-00-D-0002; IT Project Number 807111**

Dear Mr. Meadows:

As discussed and in accordance with the requirements of Delivery Order 0003 of Contract Number DACA62-00-D-0002, IT Corporation is pleased to submit the analytical results for the surface water and sediment sampling of Mr. Gilbert Steinen's Property in Sandusky, Ohio. Enclosed are five copies of the sampling results memorandum. Should you have any questions or require additional information regarding this submittal, please do not hesitate to call.

Sincerely,



Mikael L. Spangberg
Project Manager

Enclosures

cc: U.S. Army Engineer District, Nashville (2 Copies)
ATTN: CELRN-EC-R-M (Mrs. Linda Ingram)

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**Former Plum Brook Ordnance Works
Surface Water and Sediment Sampling Analytical Results
for the Gilbert Steinen's Property
Sandusky, Ohio**

Introduction

In September and October 2000, IT Corporation, under contract to the U.S. Army Corps of Engineers, conducted surface water and sediment sampling on the property owned by Mr. Gilbert Steinen (Figure 1). Site photographs are presented in Figures 2 and 3. This sampling was performed as part of study being conducted by the by the U.S. Army evaluating the environmental impact of suspected hazardous waste sites at the former Plum Brook Ordnance Works. The U.S. Army Corps of Engineers currently oversees this work under the Defense Environmental Restoration Program for Formerly Used Defense Sites. The laboratory results for the surface water and sediment samples collected from the Steinen property are presented on Tables 1 and 2, respectively. For comparison purposes, the analytical data are compared to EPA Region 9 preliminary remediation goals (PRGs). PRGs are chemical-specific, risk-based concentration values used for evaluating environmental media (soil, water, and air) at contaminated sites. PRGs are derived using standard exposure factors that are designed to be health protective of humans, even of sensitive groups, over a lifetime. Chemical concentrations that exceed these levels indicate that further evaluation and/or cleanup action is necessary. It is noted that PRGs are based on the presence of individual contaminants; where multiple contaminants are present, their concentrations and mechanisms of effects should also be considered to rule out the possibility of additive or synergistic effects of these chemicals. PRGs have been developed for both industrial and residential use scenarios. The soil PRGs used in this memorandum reflect the more conservative residential use for soil. The surface water analytical data were compared to tapwater PRGs. Although tapwater PRGs are based on residential ingestion of water that is not directly applicable to surface water data presented, this comparison provides conservative evaluation criteria for analytes in surface water.

Surface Water and Sediment Sampling.

One surface water sample (AA2016) and five composite sediment samples (AA1013 through AA1017) were collected from the Steinen property. Although five surface water samples were planned, only sample AA2016, collected from location SW14, could be collected due to the creek being dry. The surface water and sediment samples collected were analyzed for nitroaromatics, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and metals.

Surface Water Results. Laboratory analysis of this sample determined the presence of two VOC compounds and several metals. One of the VOCs found, methylene chloride, was determined to be present as a result of sample handling at the laboratory that performed the analyses. The other, acetone, is used to make plastic, fibers, pharmaceuticals, and other chemicals. It is also used as a solvent. The metals present in the sample could be naturally occurring or they may be the result of human activities such as manufacturing or the burning of fossil fuels. Only the metal arsenic was present at a concentration above the PRG.

Sediment Results. The sediment samples were also analyzed for nitroaromatics, VOCs, SVOCs, PCBs, and metals. The nitroaromatic compound nitrobenzene was found in all of the sediment samples collected at a concentration below the PRG. Nitrobenzene is used in the manufacture of explosives, dyes, pesticides, and pharmaceuticals.

Along with acetone and methylene chloride, the VOC carbon disulfide was also present. The methylene chloride detected was again determined to have come from sample handling at the laboratory. Carbon disulfide is used in various manufacturing processes. None of the VOCs were detected at concentrations above their respective PRGs.

Several SVOCs, mostly polycyclic aromatic hydrocarbons (PAHs), were found in the samples. PAHs are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. Some PAHs are manufactured and can be found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides. The PCB Aroclor 1260 was found in four of the five sediment samples. PCBs were widely used as a coolant and lubricant in capacitors and transformers. They are also found in old fluorescent lighting fixtures, some electrical appliances, and hydraulic fluids. The manufacture of PCBs was stopped in the United States in 1977. Five PAH compounds were detected at concentrations above the PRGs in sample AA1013. PAHs were not detected above the PRGs in the remaining samples collected.

As with the surface water sample, several metals were found in the sediment samples. Only arsenic was detected at a concentration above the PRG. It should be noted that all of these arsenic concentrations were below the naturally occurring concentrations in Plum Brook Ordnance Works background soils. The established maximum and mean concentrations for arsenic in background samples collected from Plum Brook Ordnance Works were 36.5 mg/kg and 10.8 mg/kg, respectively.

Table 1

**Summary of Analytical Detections in Surface Water
Mr. Gilbert Steinen's Property
Former Plum Brook Ordnance Works, Sandusky, Ohio**

(Page 1 of 1)

Location Code		TNTA-SW14			
Sample Number		AA2016			
Sample Date		18-OCT-00			
Parameter	Units	PRG	Result	LQ	VQ
VOLATILES					
Acetone	ug/L	610	13.3		J
Methylene chloride	ug/L	4.3	1	B	B
METALS					
Aluminum	ug/L	36000	892		
Arsenic	ug/L	0.045	3.69	B	B
Barium	ug/L	2600	42.4		
Beryllium	ug/L	73	0.123	B	J
Calcium	ug/L	-	64600		
Chromium	ug/L	110	2.72	B	J
Cobalt	ug/L	2200	1.57	B	J
Copper	ug/L	1400	8.93		
Iron	ug/L	11000	1330		
Magnesium	ug/L	-	20600		
Manganese	ug/L	880	57.7		
Nickel	ug/L	730	6.76		
Potassium	ug/L	-	3720		
Silver	ug/L	180	1.35	B	B
Sodium	ug/L	-	22700		
Vanadium	ug/L	260	3.31	B	J
Zinc	ug/L	11000	13.3	B	J

PRG - Preliminary remediation goals for tapwater as given by U.S. Environmental Protection Agency Region 9 guidance dated November 2000.

LQ - Laboratory data qualifier

ug/L - Micrograms per liter

NA - Not available.

ND - Not detected.

VQ - Data validation qualifier

Table 2

**Summary of Analytical Detections in Sediment
Mr. Gilbert Steinen's Property
Former Plum Brook Ordnance Works, Sandusky, Ohio**

(Page 1 of 2)

Location Code Sample Number Sample Date			TNTA-SD11 AA1013 20-SEP-00	TNTA-SD12 AA1014 20-SEP-00	TNTA-SD13 AA1015 20-SEP-00	TNTA-SD14 AA1016 20-SEP-00	TNTA-SD15 AA1017 20-SEP-00										
Parameter	Units	PRG	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ
NITROAROMATICS																	
Nitrobenzene	mg/kg	20	0.0501	J	J	0.0765	J	J	0.2700			0.0631	J	J	0.0550	J	J
VOLATILES																	
Acetone	mg/kg	1600	0.0283			0.0284			0.0168			0.0283			ND		
Carbon disulfide	mg/kg	360	0.0026	J	J	ND			ND			0.0046	J	J	ND		
Methylene chloride	mg/kg	8.9	0.0357		B	0.0240		B	0.0202		B	0.0203		B	0.0141		B
SEMIVOLATILES																	
Benzo(a)anthracene	mg/kg	0.62	2.81			0.0881	J	J	ND			ND			0.0683	J	J
Benzo(a)pyrene	mg/kg	0.062	1.93			0.077	J	J	ND			0.0578	J	J	0.0791	J	J
Benzo(b)fluoranthene	mg/kg	0.62	2.34			ND			ND			ND			0.1040	J	J
Benzo(g,h,i)perylene	mg/kg	NA	0.8610			ND			ND			ND			ND		
Benzo(k)fluoranthene	mg/kg	6.2	1.11			ND			ND			ND			ND		
Bis(2-ethylhexyl)phthalate	mg/kg	35	ND			0.0686	J	J	0.0354	J	J	ND			ND		
Carbazole	mg/kg	24	0.0896	J	J	ND			ND			ND			ND		
Chrysene	mg/kg	62	2.92			0.0742	J	J	ND			ND			0.0664	J	J
Dibenz(a,h)anthracene	mg/kg	0.062	0.327	J	J	ND			ND			ND			ND		
Fluoranthene	mg/kg	2300	5.95			0.1610	J	J	ND			0.1430	J	J	0.1750	J	J
Fluorene	mg/kg	2600	0.2230	J	J	ND			ND			ND			ND		
Indeno(1,2,3-cd)pyrene	mg/kg	0.62	0.778			ND			ND			ND			ND		
Phenanthrene	mg/kg	NA	3.58			ND			ND			ND			0.1010	J	J
Pyrene	mg/kg	2300	4.74			0.119	J	J	ND			ND			0.1320	J	J
PCBs																	
Aroclor 1260	mg/kg	0.22	0.116	J	J	0.059	J	J	0.029	J	J	ND			0.019	J	J

Table 2

Summary of Analytical Detections In Sediment
 Mr. Gilbert Steinen's Property
 Former Plum Brook Ordnance Works, Sandusky, Ohio

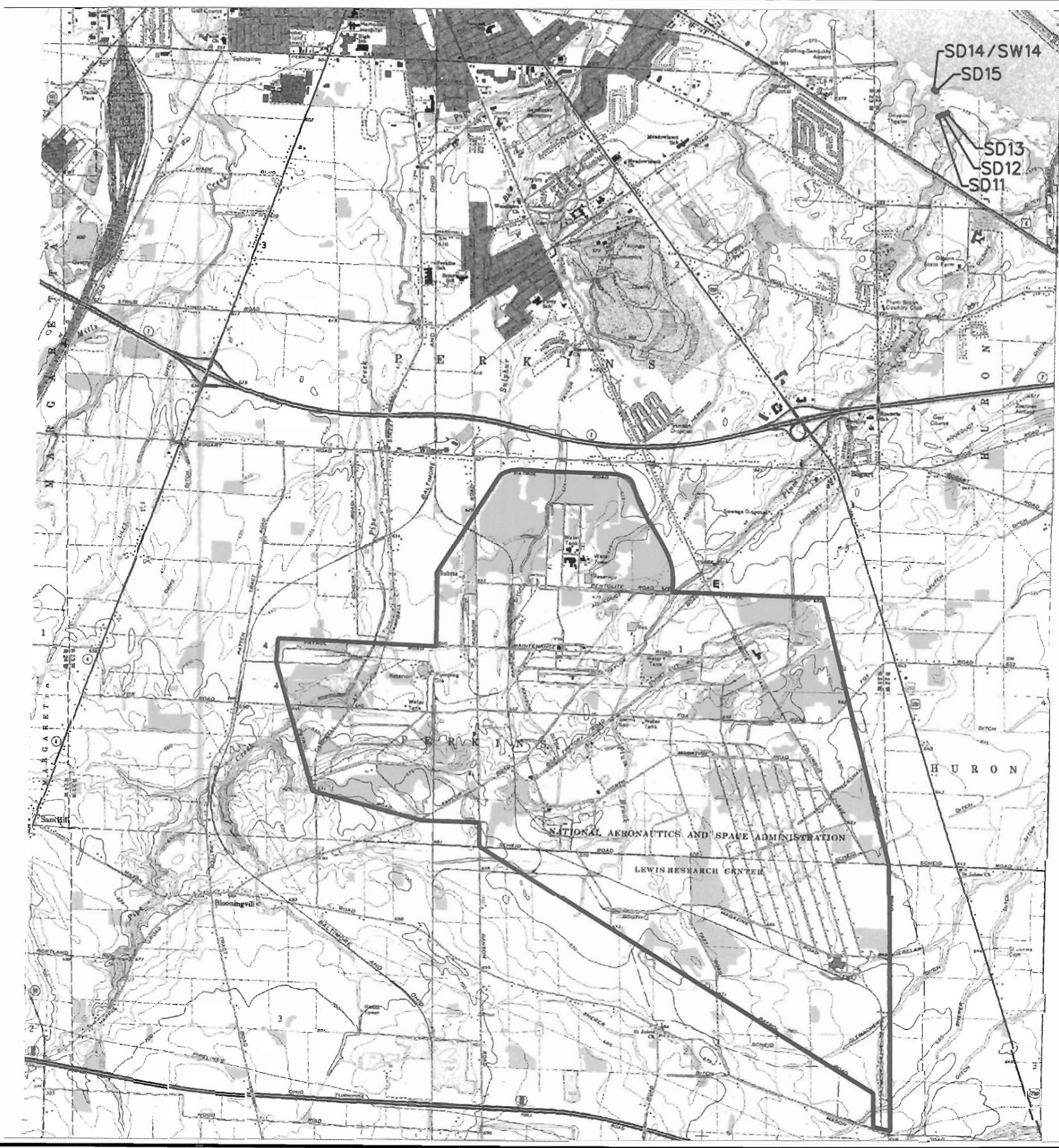
(Page 2 of 2)

Location Code Sample Number Sample Date			TNTA-SD11 AA1013 20-SEP-00	TNTA-SD12 AA1014 20-SEP-00	TNTA-SD13 AA1015 20-SEP-00	TNTA-SD14 AA1016 20-SEP-00	TNTA-SD15 AA1017 20-SEP-00										
Parameter	Units	PRG	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ	Result	LQ	VQ			
METALS																	
Aluminum	mg/kg	76000	10400			9860			10500			11400			9750		
Arsenic	mg/kg	0.39	6.69			3.53			6.48			6.67			3.66		
Barium	mg/kg	5400	63.6			62.3			60.5			68.2			70		
Beryllium	mg/kg	150	0.732			0.528			0.665			0.695			0.525		
Cadmium	mg/kg	37	0.673	J	J	0.228	J	J	0.487	J	J	0.584	J	J	0.274	J	J
Calcium	mg/kg	NA	15800			8300			14500			10200			5360		
Chromium	mg/kg	210	20.8			15.8			25.6			31.8			16.4		
Cobalt	mg/kg	4700	17.8			7.87			13.4			12.2			7.39		
Copper	mg/kg	2900	29.5			21.8			27.6			28.7			20.1		
Iron	mg/kg	23000	21900			14500			18600			20200			13400		
Lead	mg/kg	400	31.3			13.4			25.3			32.4			31.4		
Magnesium	mg/kg	NA	4850			3230			4650			4210			2680		
Manganese	mg/kg	1800	331			178			273			277			144		
Mercury	mg/kg	23	0.117			0.037	J	J	0.087			0.097			0.044	J	J
Nickel	mg/kg	1600	49.9			24.8			39.3			39.6			21.1		
Potassium	mg/kg	NA	1380			1010			1290			1400			860		
Selenium	mg/kg	390	ND			1.23	J	J	1.39	J	B	ND			ND		
Sodium	mg/kg	NA	168	J	J	ND			174	J	J	ND			132	J	J
Vanadium	mg/kg	550	19.7			20.6			20.3			20.6			20.1		
Zinc	mg/kg	23000	107			54.5			115			107			56		

PRG - Preliminary remediation goals for soil as given by U.S. Environmental Protection Agency Region 9 guidance dated November 2000.

- LQ - Laboratory data qualifier
- mg/kg - Milligrams per kilogram.
- NA - Not available.
- ND - Not detected.
- VQ - Data validation qualifier

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 STARTING DATE: 11/29/00
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 DRAWN BY:
 DRAFT. CHCK. BY: C. TUMLIN
 ENGR. CHCK. BY: GUNDERSON
 INITIATOR: D. KESSLER
 PROJ. MGR.: SPANGBERG
 DWG. NO.: 771481es.190
 PROJ. NO.: 771481



LEGEND:

- SD11 SEDIMENT SAMPLE ID
- SD14/SW14 SURFACE WATER SAMPLE ID

NOTES:

BASE MAP FROM KIMBALL AND SANDUSKY QUADRANGLES, 7.5 MINUTE SERVICES, (TOPOGRAPHIC), 1969. SANDUSKY MAP WAS PHOTOREVISED 1979.



FIGURE 1
REGIONAL LOCATION OF OFF-SITE
SURFACE WATER/SEDIMENT
SAMPLING

FORMER PLUM BROOK ORDNANCE WORKS
 NASA PLUM BROOK STATION
 SANDUSKY, OHIO



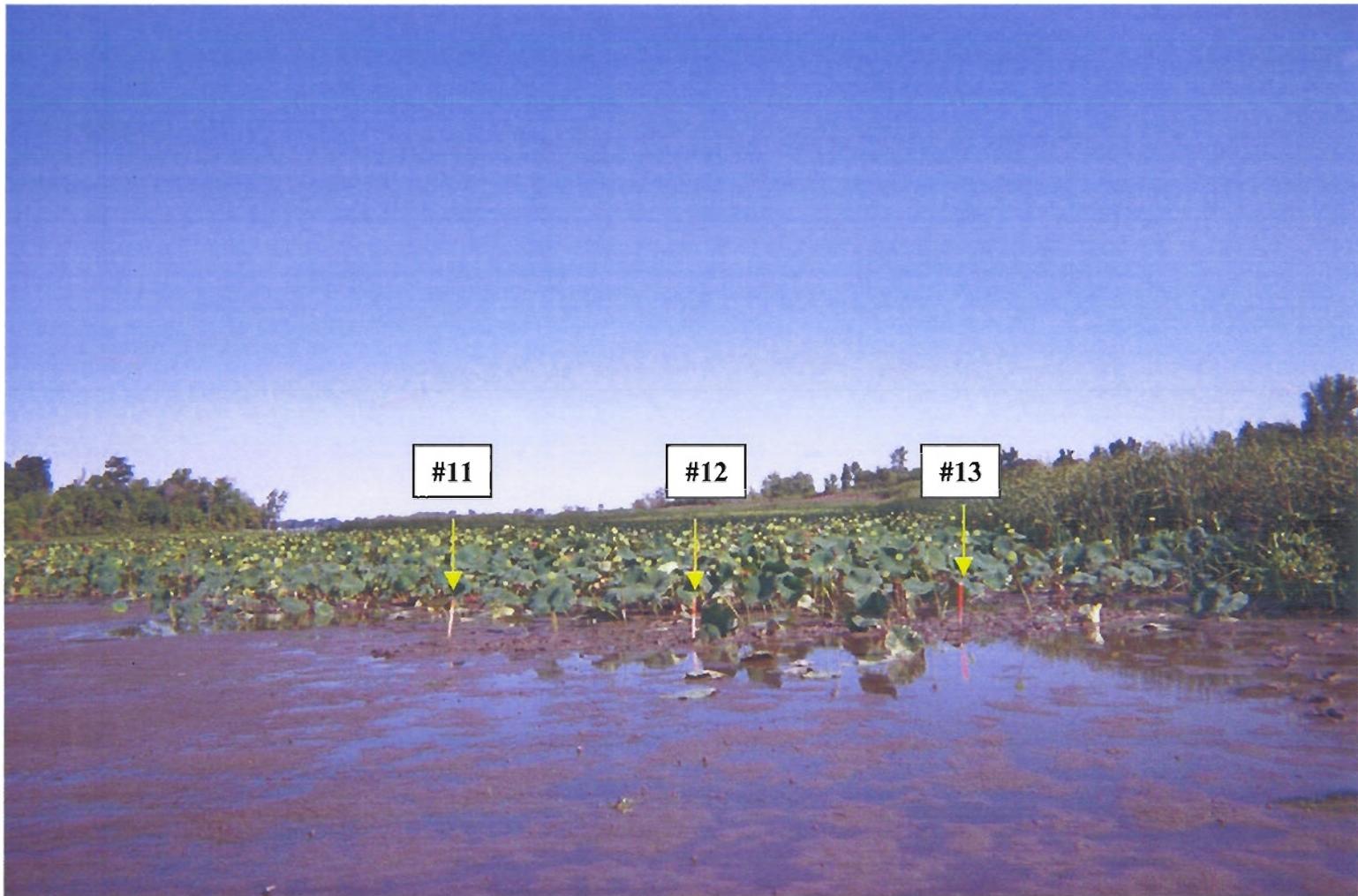


Figure 2. Off-site sediment sampling locations (SD11, SD12, and SD13) in Plum Brook collected on Mr. Gilbert Steinen's property. Photograph taken looking to the north. Date of photograph: 9/13/00.



Figure 3. Off-site surface water and sediment sampling locations SW14/SD14 and SD15 near final discharge of Plum Brook into bay. Collected on Mr. Gilbert Steinen's property. Photograph taken looking to the north. Date of photograph: 9/13/00.