DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
US ARMY ENVIRONMENTAL COMMAND
2455 REYNOLDS ROAD
JOINT BASE SAN ANTONIO FORT SAM HOUSTON, TX 78234-7588

AMIM-AEC-M (1200C) June 7, 2021

SUBJECT: Site Inspection Work Plan
Settling Pond 2
Badger Army Ammunition Plant
BRRTS #02-57-561617

Mr. Steve Martin
Wisconsin Department of Natural Resources
GEF2 Central Office
PO Box 7921
Madison, WI 53707-7921

Dear Mr. Martin:

The Department of the Army (Army) is proposing to collect soil samples to determine if shallow soil contamination remains at Settling Pond 2. On August 26, 2020, a prescribed burn by the Wisconsin Department of Natural Resources (WDNR) revealed potential contamination in Settling Pond 2 at the former Badger Army Ammunition Plant (BAAP). This Site Inspection Work Plan is being provided to describe the Army's proposed soil sampling activities to support the site inspection and evaluation.

Settling Pond 2 is part of a larger Settling Pond area that was constructed in 1942 to serve as an aeration and settling basin for the industrial and sanitary wastewater generated at BAAP. The Settling Pond area is in the southern portion of the BAAP and consists of Final Creek, four Settling Ponds, and five Spoils Disposal Areas, see Figure 1.

Between 2009 and 2012, the Army completed numerous remedial actions amounting to the removal of approximately 71,500 cubic yards of impacted soil from Final Creek, Settling Ponds, and the Spoils Disposal Areas. These remedial actions were described in the January 21, 2014, Parcel M1 and T1 Closure Request. The WDNR provided a Final Case Closure with Continuing Obligations determination on June 11, 2014. No further soil investigation or remediation was required at that time.

The WDNR's prescribed burn ignited unknown substances in Settling Pond 2. As described in the WDNR's Reopening of Closed Case letter dated September 16, 2020, the fire produced multi-colored smoke and high intensity flames. The WDNR requested a response action that includes additional soil investigation.

Figure 2 shows the estimated locations of the soil samples, Settling Pond 2 boundary, soil remedial excavations, 5-foot ground contours, and the 2010 aerial photo as the base map. Figure 2 also shows the approximate location of the former drainage path through the Settling Ponds based on the 1949 aerial photo. Between 1949 and 1953, the road that forms the eastern border of Settling Pond 2 was constructed. Prior to road construction, surface water naturally flowed through a narrow ditch from Settling Pond 2 to Settling Pond 3.

The Army is proposing to collect eight (8) shallow and three (3) deep soil samples from the area designated as Settling Pond 2, see Figure 2. We are proposing to collect the shallow samples from the top 12 inches of soil at locations 1 – 8. The soil samples will be distributed mainly across the bottom of Settling Pond 2 at locations 1 – 7. Soil sample locations 1, 2, 4 & 6 are located along the former drainage path (light blue line) through Settling Pond 2. Soil sample locations 1 & 6 are also located near the entry/exit points of Settling Pond 2. Soil sample locations 3, 5, & 7 are located in the most visibly burnt surface soil. Sample location 8 is located on northern upslope from Settling Pond 2 where sediment spoils removed from the pond bottom were potentially relocated. No soil samples will be collected in areas that were previously excavated. We are proposing to collect the deep samples from approximately 24 inches below ground surface at locations 6, 7 & 8.

During May 2021, a preliminary survey of the soil strata (color, layering, and type) was conducted in several locations in Settling Pond 2. Findings indicate that visibly burned areas have black charred soil at the surface that extends down to approximately 6 inches deep. Beneath the black soil is either a thin gray silt layer or gravelly sand. Other locations indicated sandy topsoil overlying gray silt and then gravelly sand. Gravelly sand was found at all locations below 12 inches deep.

Emphasis will be made to collect soil from various soil types, colors, and textures. This will provide a representative evaluation of the potential contamination at various soil strata. A minimum of one sample will be collected from soil that was visibly burnt. Black charred soil is only visible on the surface at the bottom of Settling Pond 2 and not on the higher ground to the north and south (above the 795 foot ground contour). Samples will also be collected from soil located beneath the black soil. These deeper samples maybe collected from a depth of 6 - 12 inches.

Each soil sample will be collected as a grab sample (from one location) and not composited with multiple locations. Soil samples will be collected using a reusable steel shovel or hand auger. The shovel or auger will be decontaminated between samples with alconox detergent and deionized water. Disposable plastic scoops and disposable gloves will be used transfer the soil to laboratory supplied containers. The sample containers will be placed into an ice filled cooler before transporting to the laboratory.

The soil samples will be located with a global positioning system (GPS) unit and mapped into the BAAP geographic information system (GIS).

The Army anticipates that the soil samples will be collected during June 2021. All field work and reporting will be conducted by SpecPro Professional Services, LLC (SPS).

The soil samples will be laboratory analyzed for explosives (includes 2,4-dinitrotoluene and 2,6-dinitrotoluene), flashpoint, metals (includes mercury), nitrocellulose, semi-volatile organic compounds (SVOCs) and volatile organic compounds (VOCs). Enclosed are analytical testing lists that include the analytes/compounds, test methods, and their estimated detection limits. All analytical testing will be completed by CT Laboratories, LLC, a WDNR Chapter NR 149 certified laboratory.

The Army will prepare a letter report to the WDNR that summarizes the soil sampling activities, field observations, laboratory sampling results, and discuss possible next steps.

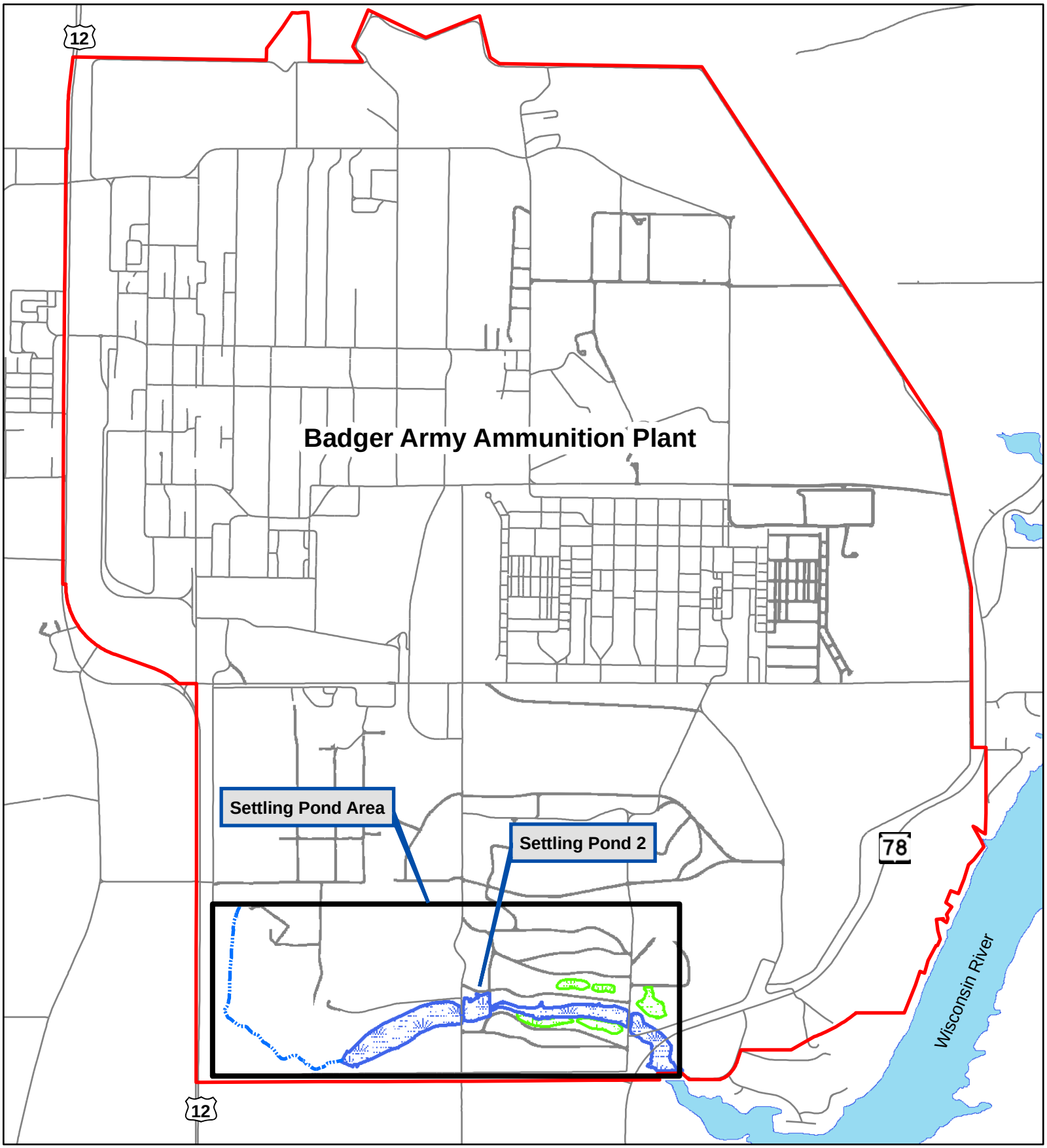
Please do not hesitate to contact me at 210-793-7881 if you have any questions.

Sincerely,

Digitally signed by
LYNCH.BRYAN.PATRICK.1021561254
Date: 2021.06.07 12:55:11 -05'00'

Bryan P. Lynch
Commander's Representative

Enclosure
Copy furn: Joel Janssen, SpecPro Professional Services, LLC



Legend

- Badger Army Ammunition Plant Boundary
- Road
- Final Creek
- Settling Pond
- Spoils Disposal Area

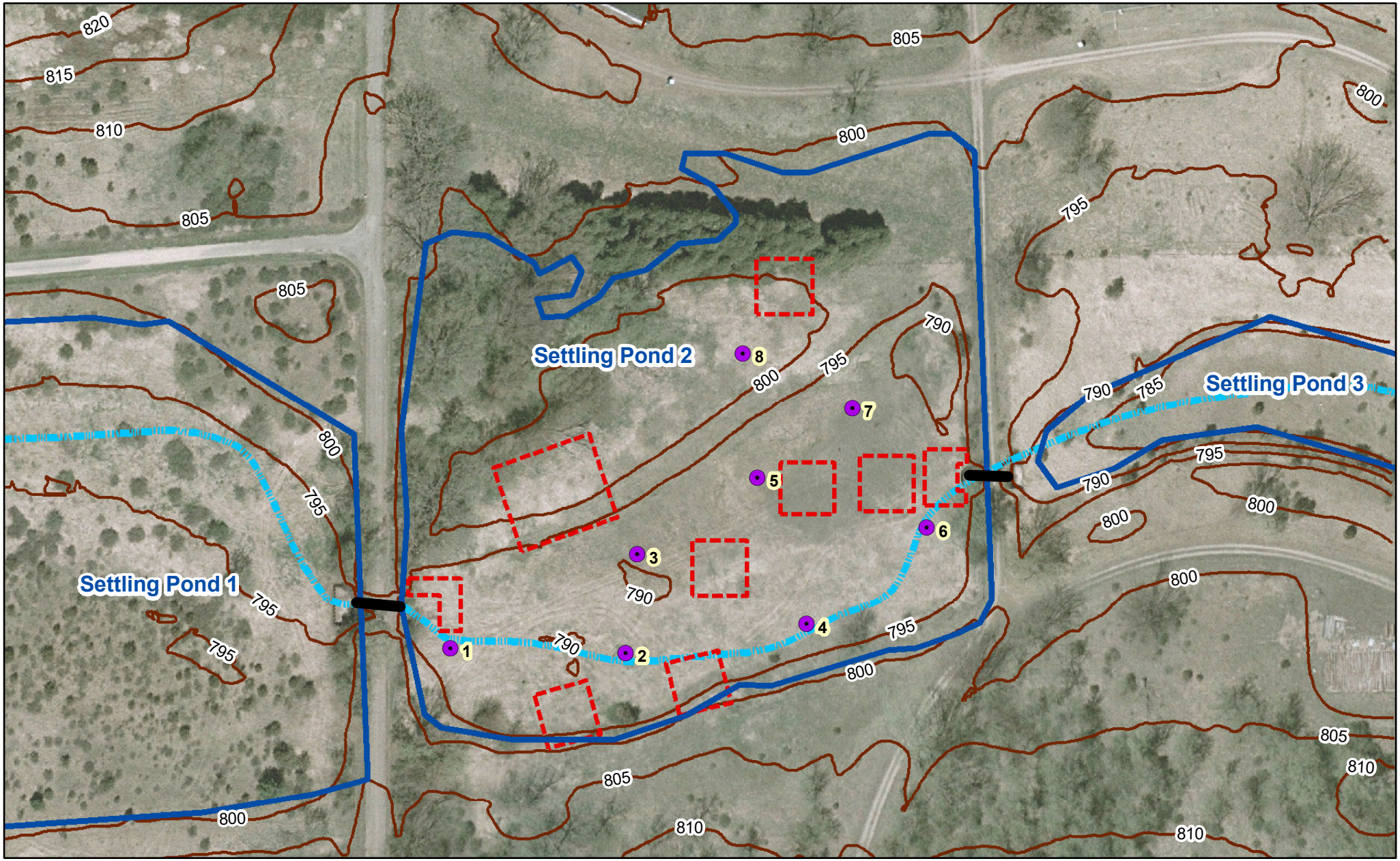
Figure 1

Site Location Map
Site Inspection Work Plan
Settling Pond 2
Badger Army Ammunition Plant

1 inch = 2,500 feet

0 1,750 3,500 7,000 Feet

SPS
SPECPRO PROFESSIONAL SERVICES



Legend

- 1 Proposed Soil Sample
- Settling Pond
- Soil Remedial Excavation
- Contour (5 ft Interval)
- Former Drainage Location (1949)
- Culvert

Figure 2

Soil Sample Locations
Site Inspection Work Plan
Settling Pond 2
Badger Army Ammunition Plant

0 85 170 340 Feet

1 inch = 120 feet

SPS SPECPRO PROFESSIONAL SERVICES

2010 Aerial Photo & Contours

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Test: **Explosives**
Method: **EPA 8330B**
Matrix: **Soil**

Analyte	CAS #	DL	LOQ	Units
1,3,5-Trinitrobenzene	99-35-4	0.07	0.20	mg/kg
1,3-Dinitrobenzene	99-65-0	0.06	0.20	mg/kg
2,4,6-Trinitrotoluene (TNT)	118-96-7	0.10	0.20	mg/kg
2,4-Dinitrotoluene	121-14-2	0.04	0.20	mg/kg
2,6-Dinitrotoluene	606-20-2	0.08	0.20	mg/kg
2-Amino-4,6-dinitrotoluene	35572-78-2	0.08	0.20	mg/kg
2-Nitrotoluene	88-72-2	0.08	0.20	mg/kg
3,5-Dinitroaniline	618-87-1	0.08	0.20	mg/kg
3-Nitrotoluene	99-08-1	0.09	0.20	mg/kg
4-Amino-2,6-dinitrotoluene	19406-51-0	0.07	0.20	mg/kg
4-Nitrotoluene	99-99-0	0.11	0.20	mg/kg
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	0.09	0.20	mg/kg
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	0.05	0.20	mg/kg
Nitrobenzene	98-95-3	0.06	0.20	mg/kg
Nitroglycerin	55-63-0	0.20	0.40	mg/kg
Pentaerythritol tetranitrate (PETN)	78-11-5	0.36	0.80	mg/kg
Trinitrophenylmethylnitramine (Tetryl)	479-45-8	0.06	0.20	mg/kg

Notes:
All values are represented in milligrams per kilogram (mg/kg)
All values are estimates
CAS - Chemical Abstract Service
DL - Detection Limit
LOQ - Limit of Quantification

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Test: **Mercury**
Method: **EPA 7471B**
Matrix: **Soil**

Analyte	CAS #	DL	LOQ	Units
Mercury	7439-97-6	0.0021	0.0083	mg/kg

Notes:
All values are represented in milligrams per kilogram (mg/kg)
All values are estimates
CAS - Chemical Abstract Service
DL - Detection Limit
LOQ - Limit of Quantification

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Test: **Metals by ICP**
Method: **EPA 6010C**
Matrix: **Soil**

Analyte	CAS #	DL	LOQ	Units
Aluminum	7429-90-5	0.04	0.24	mg/kg
Antimony	7440-36-0	0.13	0.80	mg/kg
Arsenic	7440-38-2	0.13	0.80	mg/kg
Barium	7440-39-3	0.009	0.050	mg/kg
Beryllium	7440-41-7	0.004	0.040	mg/kg
Cadmium	7440-43-9	0.006	0.040	mg/kg
Calcium	7440-70-2	0.24	1.40	mg/kg
Chromium	7440-47-3	0.023	0.140	mg/kg
Cobalt	7440-48-4	0.04	0.24	mg/kg
Copper	7440-50-8	0.07	0.40	mg/kg
Iron	7439-89-6	0.3	1.8	mg/kg
Lead	7439-92-1	0.04	0.25	mg/kg
Lithium	7439-93-2	0.06	0.36	mg/kg
Magnesium	7439-95-4	0.14	0.80	mg/kg
Manganese	7439-96-5	0.025	0.150	mg/kg
Molybdenum	7439-98-7	0.04	0.24	mg/kg
Nickel	7440-02-0	0.021	0.120	mg/kg
Selenium	7782-49-2	0.06	0.40	mg/kg
Silver	7440-22-4	0.017	0.100	mg/kg
Strontium	7440-24-6	0.013	0.080	mg/kg
Thallium	7440-28-0	0.08	0.48	mg/kg
Tin	7440-31-5	0.09	0.50	mg/kg
Titanium	7440-32-6	0.04	0.24	mg/kg
Tungsten	7440-33-7	0.10	0.60	mg/kg
Vanadium	7440-62-2	0.012	0.080	mg/kg
Zinc	7440-66-6	0.05	0.30	mg/kg

Notes:
All values are represented in milligrams per kilogram (mg/kg)
All values are estimates
CAS - Chemical Abstract Service
DL - Detection Limit
ICP - Inductively Coupled Plasma
LOQ - Limit of Quantification

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Test: **Nitrocellulose**
Method: **EPA Modified 9056**
Matrix: **Soil**

Analyte	CAS #	DL	LOQ	Units
Nitrocellulose	9004-70-0	33	200	mg/kg

Notes:
All values are represented in milligrams per kilogram (mg/kg)
All values are estimates
CAS - Chemical Abstract Service
DL - Detection Limit
LOQ - Limit of Quantification

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Test: **Semi-Volatile Organic Compounds (SVOCs)**
Method: **EPA 8270D**
Matrix: **Soil**

Analyte	CAS #	DL	LOQ	Units
1,2,4,5-Tetrachlorobenzene	95-94-3	100	200	ug/kg
1,2,4-Trichlorobenzene	120-82-1	83	200	ug/kg
1,2-Dichlorobenzene	95-50-1	40	100	ug/kg
1,3-Dichlorobenzene	541-73-1	40	100	ug/kg
1,4-Dichlorobenzene	106-46-7	40	100	ug/kg
1-Methylnaphthalene	90-12-0	50	100	ug/kg
2,3,4,6-Tetrachlorophenol	58-90-2	200	500	ug/kg
2,4,5-Trichlorophenol	95-95-4	200	500	ug/kg
2,4,6-Trichlorophenol	88-06-2	200	500	ug/kg
2,4-Dichlorophenol	120-83-2	230	500	ug/kg
2,4-Dimethylphenol	105-67-9	99	500	ug/kg
2,4-Dinitrophenol	51-28-5	200	500	ug/kg
2,4-Dinitrotoluene	121-14-2	50	100	ug/kg
2,6-Dichlorophenol	87-65-0	280	500	ug/kg
2,6-Dinitrotoluene	606-20-2	50	100	ug/kg
2-Chloronaphthalene	91-58-7	40	100	ug/kg
2-Chlorophenol	95-57-8	100	500	ug/kg
2-Methylnaphthalene	91-57-6	50	100	ug/kg
2-Methylphenol	95-48-7	200	500	ug/kg
2-Nitroaniline	88-74-4	80	200	ug/kg
2-Nitrophenol	88-75-5	300	500	ug/kg
3 & 4-Methylphenol	1319-77-3	300	500	ug/kg
3,3'-Dichlorobenzidine	91-94-1	80	200	ug/kg
3-Nitroaniline	99-09-2	40	100	ug/kg
4,6-Dinitro-2-methylphenol	534-52-1	200	500	ug/kg
4-Bromophenyl-phenyl ether	101-55-3	50	100	ug/kg
4-Chloro-3-methylphenol	59-50-7	200	500	ug/kg
4-Chloroaniline	106-47-8	39	200	ug/kg
4-Chlorophenyl-phenyl ether	7005-72-3	50	100	ug/kg
4-Nitroaniline	100-01-6	40	100	ug/kg
4-Nitrophenol	100-02-7	300	500	ug/kg
Acenaphthene	83-32-9	70	200	ug/kg
Acenaphthylene	208-96-8	50	100	ug/kg
Acetophenone	98-86-2	50	100	ug/kg
Anthracene	120-12-7	40	100	ug/kg
Azobenzene & 1,2-Diphenylhydrazine	103-33-3/122-66-7	100	200	ug/kg
Benzo(a)anthracene	56-55-3	40	100	ug/kg
Benzo(a)pyrene	50-32-8	40	100	ug/kg
Benzo(b)fluoranthene	205-99-2	50	100	ug/kg
Benzo(g,h,i)perylene	191-24-2	40	100	ug/kg
Benzo(k)fluoranthene	207-08-9	50	100	ug/kg

Analyte	CAS #	DL	LOQ	Units
Bis(2-chloroethoxy)methane	111-91-1	40	100	ug/kg
Bis(2-chloroethyl)ether	111-44-4	50	100	ug/kg
Bis(2-chloroisopropyl)ether	108-60-1	50	100	ug/kg
Bis(2-ethylhexyl)phthalate	117-81-7	50	100	ug/kg
Butylbenzylphthalate	85-68-7	73	200	ug/kg
Carbazole	86-74-8	60	200	ug/kg
Chrysene	218-01-9	40	100	ug/kg
Di-n-butylphthalate	84-74-2	100	200	ug/kg
Di-n-octylphthalate	117-84-0	40	100	ug/kg
Dibenzo(a,h)anthracene	53-70-3	50	100	ug/kg
Dibenzofuran	132-64-9	40	100	ug/kg
Diethylphthalate	84-66-2	40	100	ug/kg
Dimethylphthalate	131-11-3	50	100	ug/kg
Fluoranthene	206-44-0	40	100	ug/kg
Fluorene	86-73-7	50	100	ug/kg
Hexachlorobenzene	118-74-1	50	100	ug/kg
Hexachlorobutadiene	87-68-3	50	100	ug/kg
Hexachlorocyclopentadiene	77-47-4	50	100	ug/kg
Hexachloroethane	67-72-1	40	100	ug/kg
Indeno(1,2,3-cd)pyrene	193-39-5	40	100	ug/kg
Isophorone	78-59-1	40	100	ug/kg
N-Nitroso-di-n-propylamine	621-64-7	50	100	ug/kg
N-Nitrosodimethylamine	62-75-9	78	200	ug/kg
N-Nitrosodiphenylamine & Diphenylamine	86-30-6/122-39-4	100	200	ug/kg
N-Nitrosopyrrolidine	930-55-2	40	100	ug/kg
Naphthalene	91-20-3	40	100	ug/kg
Nitrobenzene	98-95-3	40	100	ug/kg
Pentachlorophenol	87-86-5	200	500	ug/kg
Phenanthrene	85-01-8	40	100	ug/kg
Phenol	108-95-2	200	500	ug/kg
Pyrene	129-00-0	50	100	ug/kg
Pyridine	110-86-1	70	200	ug/kg

Notes:

All values are represented in micrograms per kilogram (ug/kg)

All values are estimates

CAS - Chemical Abstract Service

DL - Detection Limit

LOQ - Limit of Quantification

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Test: **Volatile Organic Compounds (VOCs)**
Method: **EPA 8260C**
Matrix: **Soil**

Analyte	CAS #	DL	LOQ	Units
1,1,1,2-Tetrachloroethane	630-20-6	60	200	ug/kg
1,1,1-Trichloroethane	71-55-6	16	100	ug/kg
1,1,2,2-Tetrachloroethane	79-34-5	21	100	ug/kg
1,1,2-Trichloroethane	79-00-5	12	100	ug/kg
1,1-Dichloroethane	75-34-3	7	50	ug/kg
1,1-Dichloroethene	75-35-4	21	100	ug/kg
1,1-Dichloropropene	563-58-6	27	100	ug/kg
1,2,3-Trichlorobenzene	87-61-6	11	50	ug/kg
1,2,3-Trichloropropane	96-18-4	40	200	ug/kg
1,2,4-Trichlorobenzene	120-82-1	17	100	ug/kg
1,2,4-Trimethylbenzene	95-63-6	11	50	ug/kg
1,2-Dibromo-3-chloropropane	96-12-8	70	200	ug/kg
1,2-Dibromoethane	106-93-4	11	50	ug/kg
1,2-Dichlorobenzene	95-50-1	15	100	ug/kg
1,2-Dichloroethane	107-06-2	22	100	ug/kg
1,2-Dichloropropane	78-87-5	26	100	ug/kg
1,3,5-Trichlorobenzene	108-70-3	16	100	ug/kg
1,3,5-Trimethylbenzene	108-67-8	13	50	ug/kg
1,3-Dichlorobenzene	541-73-1	14	50	ug/kg
1,3-Dichloropropane	142-28-9	14	50	ug/kg
1,4-Dichlorobenzene	106-46-7	15	100	ug/kg
1-Chlorohexane	544-10-5	12	100	ug/kg
112Trichloro122trifluoroethane	76-13-1	30	200	ug/kg
2,2-Dichloropropane	594-20-7	21	100	ug/kg
2-Butanone	78-93-3	400	2000	ug/kg
2-Chlorotoluene	95-49-8	18	100	ug/kg
2-Hexanone	591-78-6	200	1000	ug/kg
2-Nitropropane	79-46-9	70	1000	ug/kg
4-Chlorotoluene	106-43-4	15	100	ug/kg
4-Methyl-2-pentanone	108-10-1	180	1000	ug/kg
Acetone	67-64-1	400	2000	ug/kg
Benzene	71-43-2	11	50	ug/kg
Bromobenzene	108-86-1	16	100	ug/kg
Bromochloromethane	74-97-5	17	100	ug/kg
Bromodichloromethane	75-27-4	14	50	ug/kg
Bromoform	75-25-2	60	200	ug/kg
Bromomethane	74-83-9	90	400	ug/kg
Carbon disulfide	75-15-0	40	200	ug/kg
Carbon tetrachloride	56-23-5	14	100	ug/kg
Chlorobenzene	108-90-7	10	50	ug/kg
Chloroethane	75-00-3	30	100	ug/kg

Analyte	CAS #	DL	LOQ	Units
Chloroform	67-66-3	16	100	ug/kg
Chloromethane	74-87-3	30	100	ug/kg
cis-1,2-Dichloroethene	156-59-2	27	100	ug/kg
cis-1,3-Dichloropropene	10061-01-5	14	50	ug/kg
Dibromochloromethane	124-48-1	40	200	ug/kg
Dibromomethane	74-95-3	21	100	ug/kg
Dichlorodifluoromethane	75-71-8	50	200	ug/kg
Dichlorofluoromethane	75-43-4	40	200	ug/kg
Diisopropyl ether	108-20-3	18	100	ug/kg
Ethyl ether	60-29-7	27	100	ug/kg
Ethylbenzene	100-41-4	11	50	ug/kg
Hexachlorobutadiene	87-68-3	23	100	ug/kg
Isopropylbenzene	98-82-8	13	50	ug/kg
m & p-Xylene	179601-23-1	25	100	ug/kg
Methyl tert-butyl ether	1634-04-4	16	100	ug/kg
Methylene chloride	75-09-2	60	400	ug/kg
n-Butylbenzene	104-51-8	17	100	ug/kg
n-Propylbenzene	103-65-1	13	50	ug/kg
Naphthalene	91-20-3	15	100	ug/kg
o-Xylene	95-47-6	7	50	ug/kg
p-Isopropyltoluene	99-87-6	13	50	ug/kg
sec-Butylbenzene	135-98-8	11	50	ug/kg
Styrene	100-42-5	16	100	ug/kg
tert-Butylbenzene	98-06-6	12	50	ug/kg
Tetrachloroethene	127-18-4	11	50	ug/kg
Tetrahydrofuran	109-99-9	250	1000	ug/kg
Toluene	108-88-3	16	100	ug/kg
trans-1,2-Dichloroethene	156-60-5	14	50	ug/kg
trans-1,3-Dichloropropene	10061-02-6	40	200	ug/kg
Trichloroethene	79-01-6	19	100	ug/kg
Trichlorofluoromethane	75-69-4	40	200	ug/kg
Vinyl Acetate	108-05-4	400	2000	ug/kg
Vinyl chloride	75-01-4	19	100	ug/kg

Notes:

All values are represented in micrograms per kilogram (ug/kg)

All values are estimates

CAS - Chemical Abstract Service

DL - Detection Limit

LOQ - Limit of Quantification