

**FIELD SAMPLING PLAN ADDENDUM
SEDIMENT CORE SAMPLING**

**REMEDIAL INVESTIGATION
AT THE NIAGARA FALLS
STORAGE SITE
NIAGARA COUNTY, NEW YORK**

Contract DACW-49-97-D-0001
Delivery Order 0012

Prepared For:

U.S. Army Corps of Engineers
Buffalo District
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Buffalo, New York 14207-3199

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1.0 Description of Work

This sediment core investigation field sampling plan addendum addresses the collection and analysis of sediment core samples collected from three shallow basins located at the NFSS. During periods of low rainfall, portions of these basins can be dry.

These basins could potentially serve as sinks for episodic deposition of contaminated materials. If this is the case, contaminated sediments will most likely occur as discrete layers within the sediment column. In order to determine if discrete layers of contamination are present in the basins, continuous sediment core samples will be collected and each core will be subdivided into six-inch intervals for analysis.

2.0 Sample Locations

Sediment samples will be collected at two locations within each of the three basins. The approximate sample locations are shown on Figure 1.

The three basins are oblong in shape and their major axes run in an east-west direction. Each basin will be divided into an 'east half' and a 'west half'. The sediment in each half will be probed using a thin metal rod and the location in each half with the deepest deposit of sediment will be designated as the sample location. Typically, sediment in a small basin has a lower density and is less stiff than the underlying native material and the interface between the sediment and the native material is easily determined by probing. Each sample location will then be staked and flagged and subsequently surveyed. A drawing of each basin showing the approximate locations where sediment depths were measured, along with the sediment depths, will be included in the field notes.

3.0 Sample Collection

Depending on the conditions encountered during the sample collection, the basins will be accessed by one of the following methods:

- 1) On foot,
- 2) On foot, using plywood mats,
- 3) On foot, using mud shoes, or
- 4) By small boat.

Continuous sediment core samples will be collected at each location using thin-walled steel tubes. The diameter of the steel tubes will be three inches. Depending on the depth of the sediment at each location, either two-foot or five-foot long thin-walled tubes will be used. The tubes may be equipped with catchers to help retain the sample in the tube.

At each location, the tube will be manually pushed through the sediment. After the tube is pushed to the bottom of the sediment layer, the tube will be advanced approximately two inches into the native soil. If necessary, a block of wood and a hammer will be used to advance the tube through the sediment and into the native soil. The native soil will form a plug in the bottom of the tube that will aid in retaining the sediment in the tube. The tube will be rotated to shear the native material to maintain the integrity of the plug upon removal of the tube.

After the tube has been advanced into the native soil, it will be manually extracted. If the force required is too great to allow manual extraction, a jack will be used to extract the tube from the sediment.

If the soil plug and the catcher are incapable of retaining the sediment core in the tube, sample collection will be re-attempted employing additional techniques to retain the sediment core in the tube. These additional techniques may include filling the headspace in the tube above the sediment with water and capping the tube or using a piston/tube assembly.

A large aluminum pan will be placed under the tube, after which the soil plug and catcher will be removed. The tube, held in a vertical position, will be gently tapped with a rubber mallet and the sediment core will be allowed to slide from the tube into the pan. The tube will be moved from side to side to allow the removal of the sediment core in continuous segments and the entire extracted sediment core will be field scanned using a PID and radiological survey meters. If the soil in the tube is too dry or stiff to slide from the tube in a continuous segment, the tube will be cut into six-inch sections and each section will be extruded using a hydraulic sample extruder. The soil plug will be removed from the pan and will not be included in the analytical samples. The textural qualities, color, and odors of the sediment, along with field scanning results and other information will be recorded in the field notes.

Measuring from the bottom, the total length of the sediment core will be measured and the core will be subdivided into six-inch intervals. If a given sample will be submitted for VOA analysis, the VOA sample containers will be filled immediately following the sample division. Each interval will be placed in a clean stainless steel bowl and homogenized prior to placing the sediment into sample containers. However, if distinct horizons are identified based on field measurements, textural qualities, or other criteria, these distinct horizons will be segregated prior to sample homogenization. The lengths of the adjoining subdivided segments will be lengthened or shortened, as necessary, so that two samples will be collected from each foot of sampled sediment. If such horizons are thin, it may be necessary to collect additional sediment cores from adjacent locations in order to provide the analytical laboratory with sufficient sample volume. If the sediment at any location is so heterogeneous that more than two samples per foot would be required to characterize the sediment, sampling at that location will be halted and the USACE representative will be consulted.

At locations where the sediment depth exceeds six inches, a minimum of two samples will be collected. If the sediment depth at a given location is less than one foot, it may be necessary to collect multiple cores at that location. All subdivided intervals from a given depth at a given location will be composited prior to filling the sample containers. At locations where the sediment depth is less than six inches, and where no distinct horizons are evident within the sediment column, a single sample will be submitted for analysis.

4.0 Analytical Requirements

Each subdivided sediment sample will be submitted to the analytical laboratory for analysis of radiological parameters. Additionally, two subdivided samples from each location will be submitted for the analysis of the following parameters: VOCs, PCBs, Metals, SVOCs, and Nitroaromatic Compounds. The subdivided samples submitted for these additional parameters will be determined in the field. In the absence of field data indicating suspected contamination, the bottom and top subdivided samples will be submitted for these additional parameters.

Target parameters and associated analytical methods will be:

Volatile organics by USEPA SW846 Methods 5035/8260B,
Semi-volatile organics by USEPA SW846 Methods 3550B/8270C,
PCBs by USEPA SW846 Methods 3550B/8082,
TAL metals by USEPA SW846 Methods 3050B/6010B/7000,
Mercury by USEPA SW846 Method 7471A,
Nitroaromatics by USEPA SW846 Method 8330,
Radiological speciation:
 actinium-227, americium-241, cobalt-60, cesium-137, protoactinium-231, radium-226, radium-228, thorium-228, uranium-235, and uranium-238 by gamma spectroscopy (HASL 300),
 thorium-228, thorium-230, thorium-232, and uranium-234, uranium-235, and uranium-238 by alpha spectroscopy (HASL 300/EPI A-011B),
Gross alpha and beta radiation by Method 900, and
Total uranium by ASTM D5174.

The primary and Quality Control (QC) samples will be shipped to General Engineering Laboratories' laboratory at the following address:

General Engineering Laboratories
Attn: Sample Custodian
3040 Savage Road
Charleston, SC 29407
Telephone: (843) 556-8171
Fax: (843) 766-1178

Five percent of all samples for each analytical parameter will be split in the field and will be designated as QA samples. QA samples will be shipped to Nuclear Technology Services (the USACE contracted laboratory). Non-primary parameters (gross alpha and beta radiation and total uranium) will not be analyzed in the QA samples. QA samples will be shipped to:

Nuclear Technology Services
Attn: Dr. Rao
635 Hembree PRWY
Roswell, GA 30076
Telephone: (770) 663-0711
Fax: (770) 663-0547

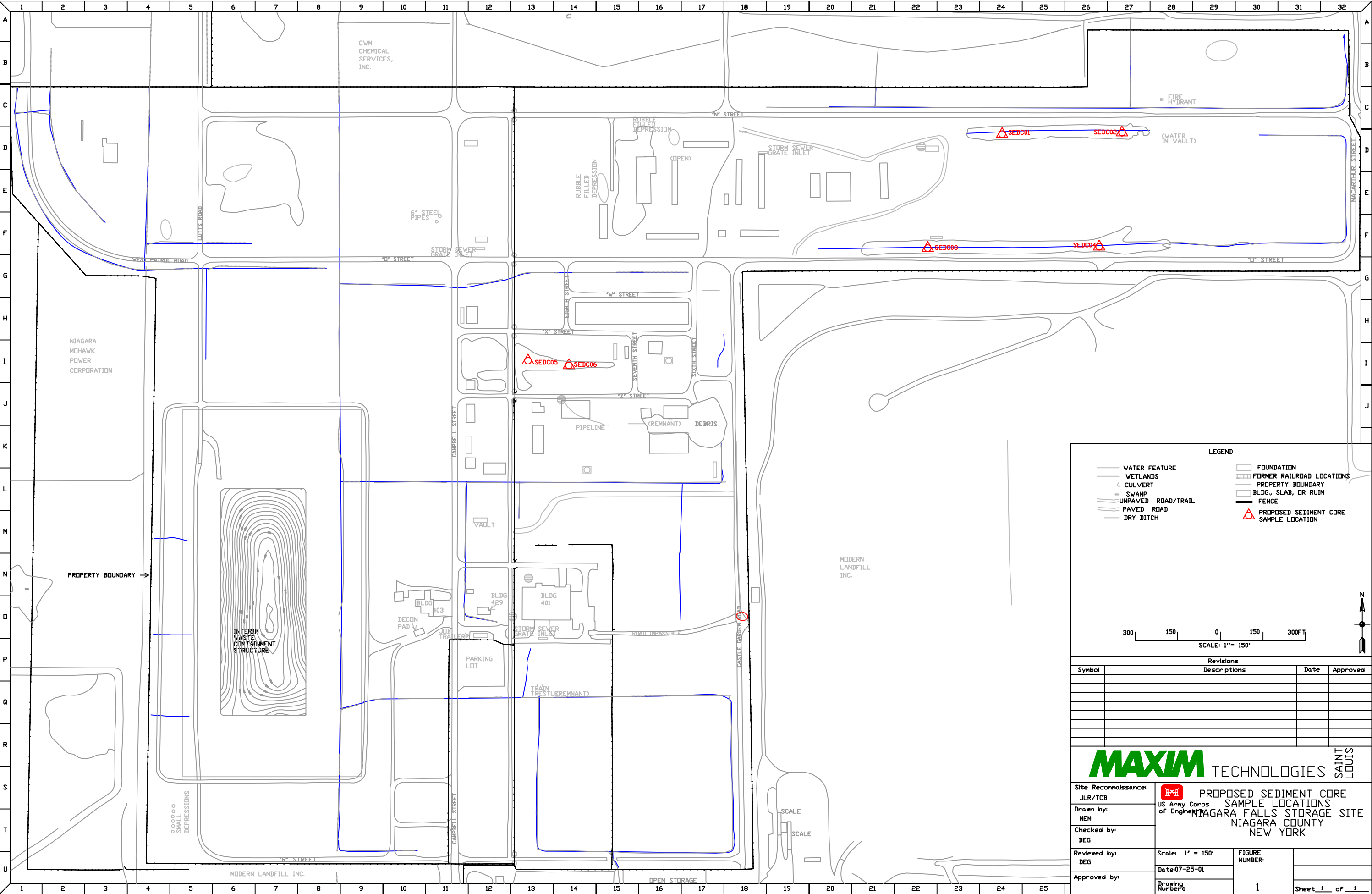
Ten percent of the samples will be collected as QC duplicates and five percent of the samples will be collected as MS/MSD samples. Table 1 shows the samples to be collected.

This sampling and analysis will be performed in accordance with the following documents:

Quality Assurance Project Plan
Remedial Investigation at the Niagara Falls Storage Site
Contract DACW-49-97-D-001
Delivery Order 0012
September 1999

Addendum Revision 1
Quality Assurance Project Plan
Remedial Investigation at the Niagara Falls Storage Site
Contact: DACW-49-97-D-001
August 2000

Depending on the conditions encountered in the field, some of the locations for the QA/QC samples may be moved. The number of QA/QC samples called out in Table 1 is based on the assumption that four samples will be collected at each sample location. If fewer than four samples are collected, some of the QA/QC samples may be dropped as long as the QA/QC sample frequencies specified above are maintained. If more than 30 samples are collected, additional QA/QC samples will be required. These samples should be named using the same convention shown on Table 1. The unique four-digit extension on the sample names should in that case start with 2150.



LEGEND

— WATER FEATURE	□ FOUNDATION
— WETLANDS	▤ FORMER RAILROAD LOCATIONS
— CULVERT	— PROPERTY BOUNDARY
— SWAMP	▭ BLDG., SLAB, OR RUIN
— UNPAVED ROAD/TRAIL	— FENCE
— PAVED ROAD	△ PROPOSED SEDIMENT CORE SAMPLE LOCATION
— DRY DITCH	

300 150 0 150 300 FT

SCALE: 1" = 150'

N

Revisions			
Symbol	Descriptions	Date	Approved

MAXIM TECHNOLOGIES SAINT LOUIS

Site Reconnaissance: JLR/TCB

Drawn by: MEM

Checked by: DEG

Reviewed by: DEG

Approved by: _____

PROPOSED SEDIMENT CORE SAMPLE LOCATIONS

US Army Corps of Engineers

NIAGARA FALLS STORAGE SITE

NIAGARA COUNTY

NEW YORK

Scale: 1" = 150'

Date: 07-25-01

Drawing Number: _____

FIGURE NUMBER: 1

Sheet 1 of 1

TABLE 1
SAMPLE LOCATIONS AND ANALYSES REQUIRED
NIAGARA FALLS STORAGE SITE - SEDIMENT CORE INVESTIGATION
LEWISTON, NEW YORK

Identification					Parameters							
Sample Number	Area of Investigation	Sample Location	Matrix	Field QC Duplicate, QA Split, or MS/MSD Samples	VOCs	SVOCs	PCBs	Metals	Total Radiological Isotopes	Total U	Gross a/b	Nitroaromatics
SEDC01-6-2123	Acidification Area	West half of pond south of "N" Street	Sediment	QC-2124	X	X	X	X	X	X	X	X
SEDC01-12-2125	Acidification Area	West half of pond south of "N" Street	Sediment	QA					X	X	X	
SEDC01-18-2126	Acidification Area	West half of pond south of "N" Street	Sediment						X	X	X	
SEDC01-24-2127	Acidification Area	West half of pond south of "N" Street	Sediment		X	X	X	X	X	X	X	X
SEDC02-6-2128	Former Storage Area	East half of pond south of "N" Street	Sediment	MS/MSD	X	X	X	X	X	X	X	X
SEDC02-12-2129	Former Storage Area	East half of pond south of "N" Street	Sediment						X	X	X	
SEDC02-18-2130	Former Storage Area	East half of pond south of "N" Street	Sediment						X	X	X	
SEDC02-24-2131	Former Storage Area	East half of pond south of "N" Street	Sediment		X	X	X	X	X	X	X	X
SEDC03-6-2132	Acidification Area	West half of pond north of "O" Street	Sediment		X	X	X	X	X	X	X	X
SEDC03-12-2133	Acidification Area	West half of pond north of "O" Street	Sediment						X	X	X	
SEDC03-18-2134	Acidification Area	West half of pond north of "O" Street	Sediment						X	X	X	
SEDC03-24-2135	Acidification Area	West half of pond north of "O" Street	Sediment		X	X	X	X	X	X	X	X
SEDC04-6-2136	Former Storage Area	East half of pond north of "O" Street	Sediment	QC-2137	X	X	X	X	X	X	X	X
SEDC04-12-2138	Former Storage Area	East half of pond north of "O" Street	Sediment						X	X	X	
SEDC04-18-2139	Former Storage Area	East half of pond north of "O" Street	Sediment						X	X	X	
SEDC04-24-2140	Former Storage Area	East half of pond north of "O" Street	Sediment		X	X	X	X	X	X	X	X

TABLE 1

**SAMPLE LOCATIONS AND ANALYSES REQUIRED
NIAGARA FALLS STORAGE SITE - SEDIMENT CORE INVESTIGATION
LEWISTON, NEW YORK**

Identification					Parameters							
Sample Number	Area of Investigation	Sample Location	Matrix	Field QC Duplicate, QA Split, or MS/MSD Samples	VOCs	SVOCs	PCBs	Metals	Total Radiological Isotopes	Total U	Gross a/b	Nitroaromatics
SEDC05-6-2141	Shops Area	West half of pond south of "X" Street	Sediment		X	X	X	X	X	X	X	X
SEDC05-12-2142	Shops Area	West half of pond south of "X" Street	Sediment	MS/MSD					X	X	X	
SEDC05-18-2143	Shops Area	West half of pond south of "X" Street	Sediment						X	X	X	
SEDC05-24-2144	Shops Area	West half of pond south of "X" Street	Sediment		X	X	X	X	X	X	X	X
SEDC06-6-2145	Shops Area	East half of pond south of "X" Street	Sediment	QA	X	X	X	X	X	X	X	X
SEDC06-12-2146	Shops Area	East half of pond south of "X" Street	Sediment	QC-2147					X	X	X	
SEDC06-18-2148	Shops Area	East half of pond south of "X" Street	Sediment						X	X	X	
SEDC06-24-2149	Shops Area	East half of pond south of "X" Street	Sediment		X	X	X	X	X	X	X	X

Note: See Section 4.0 of the FSP for methods and specific analytes

This sample naming convention presumes that a 24" depth of sediment and 6" strata exists at each core location. Based on conditions encountered in the field, the depths for these samples may change. If the depth changes, the sample name assigned to the QA/QC sample will be modified to show the new location or depth. Additionally, sample depths may be varied to account for strata observed in the field.

Sample depth will be measured from the bottom of the subdivided interval.

QA samples will not include gross alpha and beta and total uranium

Note: The sample depths may affect the number and type of field and QA/QC samples to be collected. Additional samples will be collected, if necessary, to ensure a rate of at least 10% QC field duplicate, 5% QA field split, and 5% MS/MSD samples.