VERSAR

June 25, 2014

MEMORANDUM FOR: Kim Powell
914 MSG/CEV
2405 Franklin Drive
Niagara Falls, NY 14304-5063

FROM: Nathan Mullens
Versar, Inc.
498 Wando Park Blvd., Suite 500
Mt. Pleasant, SC 29464

SUBJECT: Final Quality Assurance Project Plan Addendum No.2
Contract Number FA8903-09-D-8588, Task Order 0006

The Versar Team is submitting this Final Pre-Design Investigation Quality Assurance Project Plan Addendum No. 2. This document is an addendum to the Final Pre-Design Investigation Quality Assurance Project Plan for sites FT005, LF008, ST010, SS014, DS002, and DS004. The addendum details investigations to be conducted at site DS003. Our Teaming Partner, EA Engineering, PC and its affiliate EA Science and Technology (EA) has prepared this document for review.

Please feel free to call me at 843-388-1851 if you have any questions. Thank you.

Nathan Mullens
Project Manager

Niagara Falls Air Reserve Station, New York

Final

Pre-Design Investigation Quality Assurance Project Plan Addendum No. 2

Investigation at Site DS003

June 2014

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EA Engineering, PC, and its affiliate EA Science and Technology.
6712 Brooklawn Parkway, Suite 104
Syracuse, NY 13211

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14. ABSTRACT
This Final Quality Assurance Project Plan Addendum No. 2 details soil sampling at Site DS003 at the Niagara Falls Air Reserve Station.

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Final

Pre-Design Investigation Quality Assurance Project Plan Addendum No. 2 Performance-based Remediation for Niagara Falls ARS, New York

Prepared for

Air Force Civil Engineer Center

Environmental Restoration Division
Lackland Air Force Base, Texas 78236-9853
Contract No: FA8903-09-D-8588, Task Order 0006

June 2014

Prepared by

VERSAR
Versar, Inc.
498 Wando Park Blvd, Suite 500
Mt. Pleasant, SC 29464

EA Engineering, PC and its affiliate EA Science and Technology
6712 Brooklawn Parkway, Suite 104,
Syracuse, NY 13211

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Acronyms and Abbreviations

AFCEC	Air Force Civil Engineer Center
AFRES	Air Force Reserves
ARS	Air Reserve Station
bgs	Below ground surface
COPC	Contaminant of Potential Concern
DoD	Department of Defense
DQO	Data quality objective
EA	EA Engineering, PC, and its affiliate EA Science, and Technology.
EB	Equipment Blank
E&E	Ecology and Environment, Inc.
EPA	U.S. Environmental Protection Agency
ERPIMS	Environmental Restoration Program Information Management System
FS	Feasibility Study
ft	Foot (feet)
HDR EOC	Henningson, Durham, and Richardson, Inc. , Englewood
in.	Inch(es)
mi	Mile(s)
mg/kg	Milligram(s) per kilogram
ms/msd	Matrix spike/matrix spike duplicate
NYSDEC	New York State Department of Environmental Conservation
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RI	Remedial Investigation
SCO	Soil Cleanup Objective
UU	Unrestricted Use
VOC	Volatile organic compound

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EXECUTIVE SUMMARY

This Quality Assurance Project Plan (QAPP) Addendum No. 2, which has been prepared for the U.S. Air Force Civil Engineer Center (AFCEC), applies to the environmental investigation to be performed at DS003–Site 12 at the Niagara Falls Air Reserve Station, New York. This is a performance-based remediation project, which was awarded on 26 September 2012, by the AFCEC to Versar Inc. and teaming partner EA Engineering P.C. and its affiliate EA Science and Technology (EA), as Task Order 0006 under Contract No. FA8903-09-D-8588.

This QAPP is an Addendum to the *Pre-Design Investigation QAPP for Sites FT005, LF008, ST010, SS014, DS002, and DS004* (EA 2014a); and will present project-specific information for additional data collection activities at DS003-Site 12. Only select worksheets are presented in this Addendum. Refer to the *Unrestricted Use Characterization QAPP for Sites DS001, DS003, ST009, ST011, TU956, and TU962* (EA 2013) and the *Pre-Design Investigation QAPP for Sites FT005, LF008, ST010, SS014, DS002, and DS004* for additional information.

Purpose

This QAPP Addendum No. 2 provides instruction and guidance associated with the collection, analysis, and reporting of data to ensure that the data collected are scientifically valid, meet the established quality control objectives, are legally defensible, and support project objectives. Project objectives include conducting a pre-design investigation at the site to provide site-specific data needed to design and implement potential future remedial strategies.

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2.0 References

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QAPP WORKSHEETS #1B AND 2B

Title Page

Site Name/Project Name:	Niagara Falls Air Reserve Station (ARS), Performance-Based Remediation
Site Location/Number:	Niagara Falls ARS, New York
Contract/Work Assignment:	FA8903-09-D-8588, Task Order 0006
Document Title:	Pre-Design Investigation Quality Assurance Project Plan (QAPP) Addendum No. 2
Lead Organization:	Air Force Civil Engineering Center
Preparation Date (Month/Year):	June 2014

The QAPP is (select one): ___ Generic ___X_ Site-Specific

List dates and titles of QAPP documents written for previous site work, if applicable:

Title	Approval Date
Unrestricted Use Characterization QAPP for Sites DS001, DS003, ST009, ST011, TU956, and TU962	August 2013

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QAPP WORKSHEET #10I

Conceptual Site Model for DS003–Site 12

This worksheet describes the conceptual site model (CSM) as applicable to the objectives of this Quality Assurance Project Plan (QAPP) for DS003–Site 12, including site history, environmental setting, project background, contaminant nature and extent, and data gaps in the current CSM.

Site History

DS003–Site 12 is a 0.28-acre open grassy area east of Building 850 that was used during the 1950s and early-1960s as an accumulation point for drums of waste oil and hazardous waste from a nearby hangar (Figure 10I-1). No spills have been documented at DS003–Site 12 and no corrective actions have occurred at the site.

The site was regulated under the Resource Conservation and Recovery Act (RCRA) program. This program is administered through the New York State Department of Environmental Conservation (NYSDEC) and managed under the Air Force Installation Restoration Program (IRP). The current status for DS003–Site 12 is No Further Action, which was approved by NYSDEC in 1992.

Environmental Setting

Topography

Topography at the site is relatively flat, with a gentle slope to the south. The average elevation at the site is 585 ft above mean sea level.

Land Use

The site is an open grassy area that is adjacent to the Air Force Reserves (AFRES) aircraft parking apron east of Building 850. The former drum storage area was located either on the corner of the pavement or in the grassy area east of Building 850. Current land use is not anticipated to change substantially in the near future.

Drainage

The nearest surface water body to DS003–Site 12 is Cayuga Creek, which is located approximately 0.3 mi south of the site. There is a drainage ditch located approximately 125 ft immediately east of the site, which flows south and discharges to Cayuga Creek.

Geology

Soil at the site consists of the Odessa Series, defined as gently sloping, poorly-drained, silty clay loams. The unconsolidated subsurface deposits (overburden) at the site consist of a relatively thin veneer of Pleistocene-age fine-grained glaciolacustrine and till deposits ranging from approximately 5.5- to 12-ft thick (Cadwell, et al., 1986).

The bedrock underlying the relatively thin cover of overburden is a brownish-gray to dark gray, fine- to medium-grained, thick-bedded dolostone (Upper Silurian, Lockport Group, Guelph Dolostone Formation, formerly the Oak Orchard Dolostone), which is weathered and highly fractured in the upper 10–25 ft. Horizontal fractures are closely spaced and are occasionally intercepted by high angle vertical fractures (Yager 1997). Regionally, the bedrock dips gently to the south, with fracture sets oriented east-northeast.

Hydrogeology

Hydrostratigraphic units at the site include overburden (saturated unconsolidated materials), shallow bedrock (the upper 5–15 ft of closely-fractured and more permeable bedrock), and the deep bedrock (the less fractured, more competent bedrock). There are no groundwater monitoring wells at this site. However, groundwater exists within the overburden at approximately 5–8 ft below ground surface (bgs), with flow generally to the southwest based on data from regional groundwater monitoring wells. Based on observations during the most recent characterization (2013), one soil boring was completed beyond 4 ft bgs and moist soil was observed at 5–8 ft bgs.

In the underlying bedrock, most groundwater flow is within secondary porosity features (i.e., along horizontal bedding planes, vertical fractures, and joints), particularly in the upper 5–15 ft where these openings may be weathered and/or expanded by dissolution. Shallow groundwater flows in bedrock is generally to the southwest.

Ecology

The site is located on the active airfield in the center of Niagara Falls ARS, which is a highly developed area consisting of paved roads, parking lots, buildings, and mowed lawns. The area is regularly used by base personnel and provides limited to low quality ecological habitat (E&E 1999a). Cayuga Creek provides some higher quality habitat, with riparian vegetation growing along the banks, but the site is not located within or near these riparian areas. There are no federal threatened or endangered species known to be located on the site (HDR EOC, Inc. 2012).

Project Background

Phase I/II and remedial investigation (RI)/feasibility study (FS) investigations were performed from 1983 through 1991 which included sampling site soil and surface water and sediment from a drainage ditch adjacent to the site (Science Application International Corporation [SAIC] 1986 and 1991).

In 1986 as part of the Phase II investigation, two surface water and two sediment samples were collected from the adjacent drainage ditch. Additionally, two soil samples were collected from two borings. Analytical results for the surface water samples indicated that DS003–Site 12 had not impacted surface water quality. Oil and grease were detected in the upstream sediment sample; however, it was concluded that this contamination was likely attributed to runoff from Wagner Drive. Analytical results for soil samples collected from the borings included detections of oil and grease, total organic carbon, and total organic halogens. The Phase II Report concluded that the source of contamination at DS003–Site 12 may not be the Building 850 Drum Storage Yard (SAIC 1986).

During the subsequent RI/FS, six soil samples and one duplicate sample were collected from two borings (B12-1 and B12-2). Samples were analyzed for total metals (U.S. Environmental Protection Agency [EPA] Method SW3050/6010), volatile organic compounds (VOCs) (EPA Method SW8240), semivolatile organic compounds (SVOCs) (EPA Method SW3550/8270), and total petroleum hydrocarbons (TPH). Soil analytical results indicated the presence of oil and grease and total organic halogens. Metal concentrations were generally within background ranges. A number of VOCs were detected, including trichloroethene (TCE) at an estimated concentration (0.55 mg/kg) which exceeds the current NYSDEC Unrestricted Use (UU) Soil Cleanup Objective (SCO) (0.47 mg/kg), *trans*-1,2-dichloroethene (DCE), benzene, tetrachloroethene (PCE), acetone, and methylene chloride. Acetone was detected in four of the six soil samples at concentrations greater than the UU SCO (0.05 mg/kg); however, similar detections were reported in two of three method blanks; therefore, the acetone concentrations were attributed to laboratory contamination.

In September 1991, DS003–Site 12 was recommended No Further Action due to the lack of significant impacts to soil at the site (HQ AFRES 1991). The NYSDEC concurred with this recommendation (NYSDEC 1992).

In September 2013, soil samples were collected from seven soil borings at the site (Figure 10I-1) to verify that the site met UU SCOs (EA 2014b). Subsurface soil samples were collected and analyzed for VOCs and SVOCs. In addition, one subsurface soil sample was also analyzed for metals (including chromium, cyanide, and mercury), pesticides, polychlorinated biphenyls, and herbicides. A second sample (from SB-01A) was collected adjacent to SB-01, at the same depth interval, on 6 November 2013 after vinyl chloride (a common breakdown compound of TCE) was detected in the field duplicate sample at a concentration that was significantly different than the SB-01 parent sample.

Results of the 2013 field investigation indicate concentrations of site-related contaminants of potential concern (COPCs) (i.e., *cis*-1,2-dichloroethene and vinyl chloride) in soil exceeded the NYSDEC UU SCOs at the two co-located soil boring; SB-01 and SB-01A. Vinyl chloride was detected in the field duplicate from SB-01 at a concentration (0.037 mg/kg) that exceeded the associated UU SCO (0.02 mg/kg). Vinyl chloride was also detected in parent sample SB-01 and SB-01A; however the detected concentrations were less than the UU SCOs. In addition to the vinyl chloride detection at SB-01A, *cis*-1,2-DCE was detected at a concentration 0.45 mg/kg that exceeded the UU SCO (0.25 mg/kg). No other VOCs or SVOCs were detected at concentrations that exceeded UU SCOs.

Nature and Extent of Contamination

Although there have been no reported spills at DS003–Site 12, its previous use as a drum storage area, the historical detections of similar compounds and the 2013 sampling results, indicate COPCs for the site are VOCs (specifically chlorinated VOCs). Contamination at the site appears to be limited to the location of soil borings SB-01 and SB-01A at a depth of 4–6 ft bgs, as there were no other VOCs or SVOCs that exceeded UU SCOs in soil samples collected from the other 6 soil borings advanced at the site.

Data Gaps

Additional subsurface soil data are necessary to delineate the area of impact at co-located soil borings SB-01 and SB-01A, and support a full evaluation of potential applicable remedial strategies.

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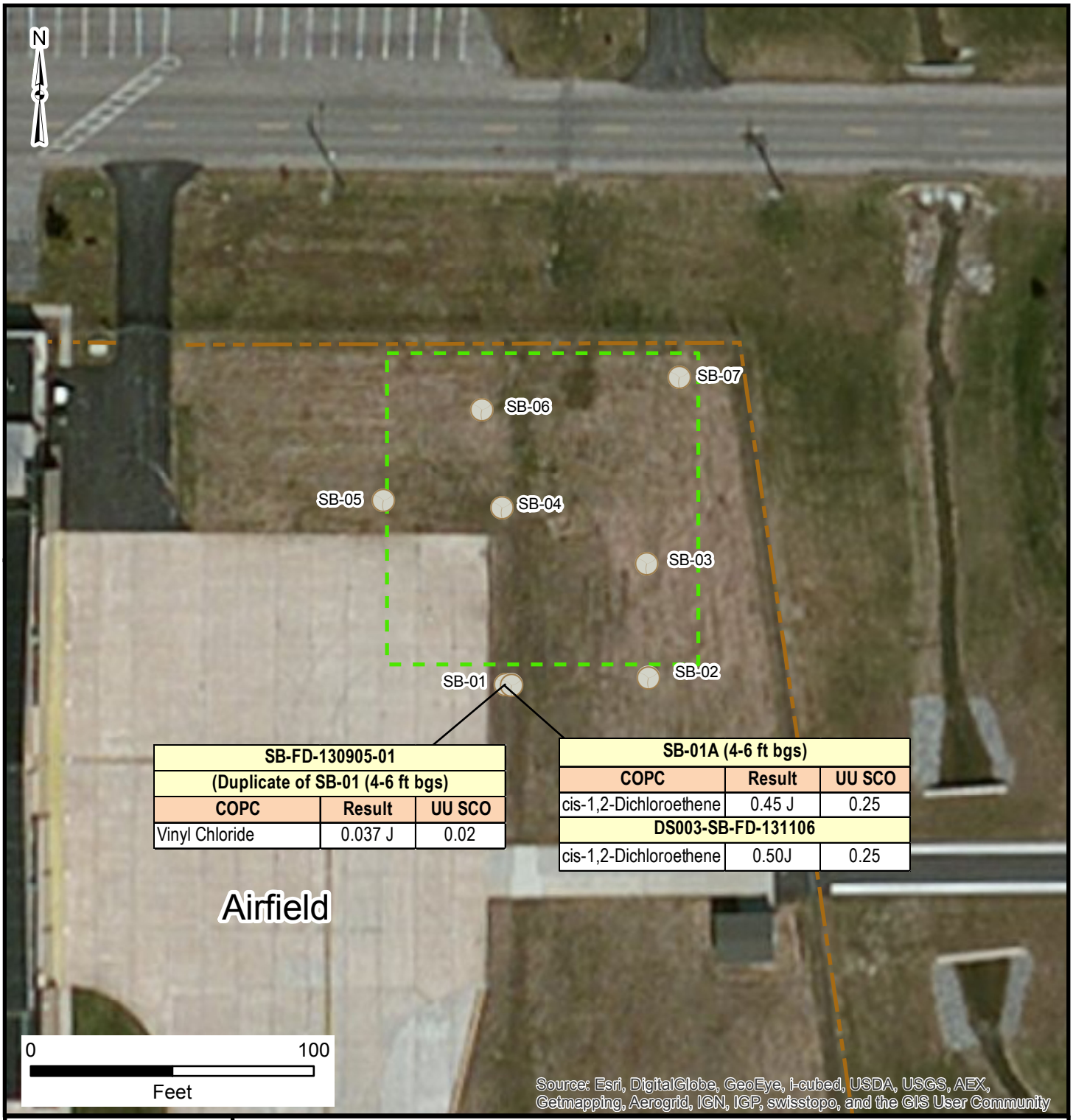
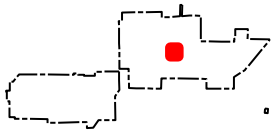


SB-FD-130905-01 (Duplicate of SB-01 (4-6 ft bgs))		
COPC	Result	UU SCO
Vinyl Chloride	0.037 J	0.02

SB-01A (4-6 ft bgs)		
COPC	Result	UU SCO
cis-1,2-Dichloroethene	0.45 J	0.25
DS003-SB-FD-131106		
cis-1,2-Dichloroethene	0.50J	0.25



Site Boundary
Fence Line
Soil Boring Location

NOTE: All concentrations in milligrams per kilogram (parts per million).

J Compound reported at an estimated concentration below the sample quantitation limit.
COPC Contaminant of Potential Concern
UU SCO 6 NY CRR Part 375 Unrestricted Use - Soil Cleanup Objective
ft bgs Feet Below Ground Surface

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Niagara Falls Air Reserve Station
Niagara Falls, New York

FIGURE 10I-1
2013 COPC Exceedances in Soil
DS003-Site 12

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QAPP WORKSHEET #11I

Project/Data Quality Objectives for DS003–Site 12

This worksheet is used to develop and document project data quality objectives (DQOs) using a systematic planning process that follows the U.S. Environmental Protection Agency (EPA) DQO Process, and documents the environmental decisions that need to be made and the level of data quality needed. The DQO process is outlined in the EPA 2006 guidance document entitled *Guidance on Systematic Planning Using the DQOs Process* (EPA/240/B-06/001, February 2006) (EPA 2006).

The seven steps are as follows: (1) State the Problem, (2) Identify the Goals of the Study, (3) Identify Information Inputs, (4) Define the Boundaries of the Study, (5) Develop the Analytic Approach, (6) Specify Performance or Acceptance Criteria, and (7) Develop a Detailed Plan for Data Collection. The specific quality assurance (QA)/quality control (QC) requirements developed for the site are consistent with those presented in the Department of Defense (DoD) Quality Systems Manual, Version 4.2 (DoD 2010).

1. State the Problem

Soil sampling was conducted in September and November 2013 at DS003–Site 12 in accordance with the *Unrestricted Use (UU) Characterization Quality Assurance Project Plan for Sites DS001, DS003, ST009, ST011, TU956, and TU962* (EA 2013). The analytical results for soil indicate that concentrations of constituents of potential concern, including volatile organic compounds (VOCs) (i.e., *cis*-1,2-dichloroethene and vinyl chloride), exceeded New York State Department of Environmental Conservation (NYSDEC) UU Soil Cleanup Objectives at two co-located soil borings. Additional subsurface soil data are necessary to delineate the area of impact and support a full evaluation of potential remedial strategies.

2. Identify the Goals of the Study

The data collected under this plan will be used to delineate the extent of VOC impacts in soil and to evaluate potential remedial strategies at the site.

3. Identify Information Inputs

To delineate soil contamination at DS003–Site 12, the following data will be collected:

1. Soil borings (DS003-SB-A1 through DS003-SB-D7) will be installed radiating outward from the airfield apron (Figure 11-I) to collect soil samples for laboratory analysis.
2. A lithological description of the soil retrieved from the soil boring will be created.

Soil samples will be submitted for VOCs. Sample design and rationale is discussed in Worksheet #17I. Worksheet #18B summarizes the sampling program (including target analytes, analytical groups, and sample collection methods) that is proposed to satisfy the scope of the investigation.

4. Define Boundaries of the Study

Figure 11-I presents the proposed soil sampling locations; thereby, defining the lateral boundaries for this media. Step 3 of the DQOs lists target analytes for soil and will be detailed further in Worksheet #18B. The vertical extent of the investigation will be 5–7 ft below ground surface (bgs) based on the previous sampling results.

The temporal extent of the field activities to be performed under this plan is June/July 2014.

5. Develop the Analytic Approach

Sub-surface soil samples, from 5 and 7 ft bgs, will be collected and analyzed for VOCs.

6. Specify Performance or Acceptance Criteria

The analyte groups need to be sufficient to allow for comparison of the data to the VOC list of UU criteria. Therefore, the laboratory reporting limits and achievable laboratory detection limits need to be below those criteria. Laboratory analyses will be conducted by a DoD and New York State Department of Health Environmental Laboratory Accreditation Program-certified laboratory, using the most current NYSDEC Analytical Services Protocol methods, as per NYSDEC Division of Environmental Remediation-10 guidance (2010). Category B laboratory data deliverables will be obtained. Following the receipt of analytical laboratory results, Data Usability Summary Reports will be prepared by an independent third party. The validated data will be compared to the appropriate regulatory criteria.

Additional detail on sampling methodology, analyses, and equipment is provided in subsequent Quality Assurance Project Plan (QAPP) worksheets.

7. Develop a Detailed Plan for Data Collection

The location for field activities was chosen based on results from the September 2013 soil sampling results. Worksheet #17I provides the sample design and rationale; Worksheet #18B provides additional detail on sample locations, media, suite of analytes, and sample collection tools; and Worksheet #20B provides information on QC samples.

How Will Data Be Reported

A technical memorandum will be prepared at the conclusion of the field operations and will consist of a comprehensive compilation of the data collected under this project. The memorandum will include a detailed narrative of each field activity; a summary of the sampling conducted; any deviations from the *Pre-Design Investigation QAPP for Sites FT005, LF008, ST010, SS014, DS002, and DS004* (EA 2014a) and this QAPP Addendum; data assessment and evaluation; an interpretation of data as per the scope of this plan. Site drawings, figures, laboratory analytical reports, field forms, and photographs documenting field activities will be included as attachments to the work plan.

How Will Data Be Archived

The electronic data deliverables and laboratory data reports will be collected in project archives in existing electronic formats provided by the analytical laboratory. Data will be submitted to, and archived with, AFCEC through the Environmental Resources Program Information Management System (ERPIMS). ERPIMS is the database that the Air Force uses for data management and validation from environmental projects at all Air Force Bases. Data will also be archived in the Niagara Falls Air Reserve Station base-specific database, as well as the NYSDEC Environmental Information Management System in the EQuIS™ electronic data deliverable format.

Soil Boring Location

Proposed Additional Borings

10-Foot Grid

Fence Line

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Niagara Falls, New York

FIGURE 11I-1
Proposed Supplemental Soil Boring Locations
DS003-Site12

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QAPP WORKSHEET #17I

Sample Design and Rationale for DS003-Site 12

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach)

The rationale for choosing the sampling approach is focused on obtaining additional data necessary to identify the extent of soil impacts at the site. As described in Worksheet #11I, the constituents of potential concern (COPCs) associated with the site are volatile organic compounds (VOCs). Based on sampling conducted in September and November 2013, sub surface soil impacts were observed in two co-located soil boring locations at the site. Supplemental soil sampling will be conducted in the vicinity of these locations to delineate the vertical and horizontal extent of contamination. The sampling approach consists of a establishing a systematic, semicircular sampling grid with 10 ft spacing. Soil samples will be collected in a step wise fashion from the initial soil boring locations (SB-01 and SB-01A) where previous exceedances of New York State Department of Environmental Conservation (NYSDEC) Unrestricted Use Soil Cleanup Objectives were observed. This sampling approach will provide a better understanding of the extent of any residual VOCs and also allow refinement of the area where VOC impacts may be located.

General Procedures

Field methodologies and activities will be consistent with those detailed in the *Pre-Design Investigation Quality Assurance Project Plan (QAPP) for Sites FT005, LF008, ST010, SS014, DS002, and DS004 (EA 2014a).*

Soil Sampling

The proposed soil boring locations are shown on Figure 11-I. The soil borings will be completed using direct-push drilling techniques with a targeted boring depth of 7 ft based on previous investigations. Soil will be recovered continuously, described by the onsite geologist according to the Unified Soil Classification System, and screened with a photoionization detector. A soil sample will be submitted for analysis from each soil boring location from a depth of 5 and 7 ft below ground surface.

Laboratory analysis will be completed in an iterative process based on the results from each depth of sampling; that is, if the soil from the 5 ft depth interval is impacted then the soil sample from the 7 ft depth interval will be analyzed. Similarly, if the soil samples collected along the B semicircle line are impacted then the C samples will be analyzed. Analytical of remaining sample depths and locations will not be completed if exceedances of COPCs are not observed in the previous set of samples.

Sampling will be conducted in accordance with the *Unrestricted Use Site Characterization QAPP for Site DS001, DS003, ST009, ST011, TU956, and TU962 (EA 2013)* and the *Pre-Design Investigation QAPP for Sites FT005, LF008, ST010, SS014, DS002, and DS004 (EA 2014a)*.

Additional information regarding the number of samples to be taken and sampling frequency is presented in Worksheets #18B and #20B.

Quality Assurance and Quality Control

The types of trip blanks, rinsate blanks, duplicates, and matrix spike/matrix spike duplicate sample sets to be collected during subsurface soil sampling are described below. The number of quality assurance / quality control samples to be collected is provided in Worksheet #18B.

Field Duplicates—One duplicate will be collected at a rate of 20 percent from pre-selected sampling locations.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)—MS/MSD samples will be collected at a rate of 20 percent from pre-selected sampling locations. One MS/MSD sample will be collected during each groundwater sampling event.

Equipment Blanks (EBs)—EBs will be collected by passing deionized water over non-dedicated, decontaminated sampling equipment. As tubing will be dedicated for single use and disposed of after sampling, tubing will not be included in EB sampling. One EB will be collected at a rate of 20 percent.

Trip Blanks—Trip blanks will be laboratory supplied and will be submitted with the sample delivery group.

Additional information regarding concentration levels, sampling locations, number of samples to be taken, and sampling frequency is presented in Worksheets #18B and #20B.

QAPP WORKSHEET #18B

Sampling Locations and Methods

Sampling Location/ Identification Number	Matrix/ Collection Method	Depth (ft bgs)	Analytical Group(s)	Number of Samples (identify field duplicates)	Sampling SOP Reference[1]	Rationale for Sampling Location
DS003-Site 12						
DS003-SB-(rest of ID based on grid coordinate and depth)	Subsurface Soil/direct-push drilling rig; VOCs collected with En Core® or similar.	5 and 7	• VOCs	• To Be Determined	1-5, 11, 15-16, 25, 31, 39, 47, and 59	Delineate extent of soil contamination

1. From the Project Sampling SOP References table (Worksheet #21 of Pre-Design Investigation QAPP [EA 2014A]).

NOTE: ft bgs = Feet below ground surface
SOP = Standard Operating Procedure
VOC = Volatile organic compound

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QAPP WORKSHEET #20B

Field Quality Control Summary

Matrix	Analytical Group	Concentration Level	Analytical Preparation Method/SOP Reference[1]	No. of Samples	No. of Trip Blanks	No. of Equipment Blanks	No. of Field Duplicate Pairs	No. of Matrix Spike/Matrix Spike Duplicate Pairs
DS003-Site 12								
Subsurface Soil	• VOCs	Low	EPA Method 8260C	TBD	1	1 per day	2	2

1. SOPs included in Appendices A (lab) and B (field) of the Pre-Design Investigation Quality Assurance Project Plan (EA 2013). Note that SOPs for standard methods are not included.

NOTE: SOP = Standard Operating Procedure
VOC = Volatile organic compound
EPA = U.S. Environmental Protection Agency
TBD = To Be Determined

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