FIELD SAMPLING PLAN ADDENDUM
PIPELINE INVESTIGATION

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

Contract: DACW-49-97-D-001

Prepared For:

U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

January 2001
9905006

MAXIM TECHNOLOGIES INC

1908 Innerbelt Business Center Drive
St. Louis, Missouri 63114
(314) 426-0880

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1.0 INTRODUCTION

As part of the ongoing Remedial Investigation (RI) being performed at the Niagara Falls Storage Site (NFSS), this Pipeline Investigation Field Sampling Plan (FSP) Addendum summarizes the activities that will be conducted to characterize the sanitary, process, and storm sewers at the site. These sewers and associated piping were constructed as part of the former trinitrotoluene (TNT) facility on the Lake Ontario Ordnance Works (LOOW) property. This plan provides the strategy and rationale for performing this characterization. Information regarding the site history is provided in the November 1999 Final *Field Sampling Plan – Phase I Edition Remedial Investigation* for the NFSS. The activities suggested in this document are based on the August 2000 Scope of Work (SOW) for *Sampling to Characterize the Piping Network Contents at the Niagara Falls Storage Site* issued by the Buffalo District of the United States Army Corps of Engineers (USACE) and the subsequent negotiations.

The characterization of the underground physical plant (i.e., the NFSS pipelines) in relation to the potential for direct and potential pathway contamination migration will be assessed through the investigation described in this FSP. The overall strategy for this investigation will be to: determine the potential for contamination, collect samples of sediment/sludge and/or wastewater contained within the pipelines, analyze those samples for potential contaminants of concern (PCOC), and detail the locations of contamination that exceeds applicable limits and/or screening values in a report.

The data quality objectives (DQOs) of this investigation include:

- Examination of the manholes, sumps, and pipelines on the NFSS property;
- Collection of area-specific samples to determine concentrations of PCOC; and
- Developing a report which summarizes the findings of the investigation.

This FSP contains sections that describe the specific data needs to achieve the above objectives and planned activities designed to achieve these objectives. Tables are included that justify planned sample locations and types of analytes. Figures are included to detail the locations of the samples to be collected and a potential time-line (Gantt Chart) for conducting these activities.

Field procedures developed in the Phase I and Phase II RI FSPs and subsequent addenda will be followed for the Pipeline Investigation activities unless otherwise specified. Radiation Protection Plan (RPP), Quality Control Plan (QCP), and Site Safety and Health Plan (SSHP) Addenda will be submitted separately in order to address field activities not included during previous investigation activities.

2.0 RECONNAISSANCE ACTIVITIES AND PREVIOUS SAMPLING RESULTS

2.1 Previous Sampling Results

The results of the previous pipeline network investigation (conducted in 1998 by EA Engineering Science and Technology, Inc. [EA]) are documented in the August 2000 SOW. During that investigation, eight acid process sewers, 11 storm sewers, and eight sanitary sewer manholes were identified. Twelve samples were collected in that investigation. Wastewater and sediment/sludge samples were collected from two storm sewer and one sanitary sewer locations. Wastewater samples only were collected from two additional sanitary sewers. Additionally, sludge samples were collected from two pipes and two sumps during excavation activities.

A brief overview of these results indicates that metals, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides exceeded the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Manual (TAGM) screening levels in four samples. It should be noted that the samples from the EA investigation were not analyzed for any radioactive constituents.

2.2 Previous Site Reconnaissance

During the Summer of 2000 the USACE completed a reconnaissance of the NFSS piping network. Fifteen manholes were found on the sanitary, storm, and acid process sewer lines during those activities. Seven of these manholes were not formerly identified by the EA study. The USACE reconnaissance also identified six additional features (pipes, water valves, and manholes not associated with the sanitary, acid/process, or storm sewers) that were not located on the NFSS acid process, sanitary, and storm sewer lines. No sampling was conducted as part of this effort.

2.3 November 2000 Maxim Site Reconnaissance

Prior to a field reconnaissance, using the "as-built" plans for the LOOW, Maxim identified several additional manhole locations that were not located during the EA study or the USACE reconnaissance. Portions of the as-built map were field checked during the Phase II Remedial Investigation (RI) activities currently underway at the NFSS. Some of the manhole locations were obscured due to piles of concrete, rubble, or soil from earthwork activities completed by the United States Department of Energy (DOE) during remedial activities of the NFSS in the 1980's. Additionally, there are dozens of inlets into the acid process sewers from sumps that are shown to be located within and around the structures and tank cradles in the acidification area of the NFSS.

During November of 2000, Maxim conducted a site reconnaissance of the sanitary, process, and storm sewer manholes and the sumps, pipes, and outfalls associated with the former TNT production areas of the NFSS. The following features were identified during the reconnaissance:

- 46 manholes were identified on the as-built diagram. Of these 46 manholes, five (designated MH 11, MH 18, MH 21, MH 28, and MH 39 on Figure 1) were not located during the reconnaissance. The manholes that were not located include: two acid sewer manholes (one is depicted at the east end of the acidification area north of the former ammonia plant and the other is in the heavily disturbed area west of the sulfuric acid concentrator house), two storm

sewer manholes (one south of the former fuel oil storage location north of "O" Street and one at the east end of the storm sewer line north of "O" Street), and one sanitary manhole (believed to be filled and buried or removed from the open area northeast of the IWCS and west of Campbell Street). Three of the located manholes were buried under three to 12 inches of soil.

- Two storm sewer outfalls were located. These locations are marked as manholes on the "as-built" map, but no manholes were located.

- 77 pipes (predominately 10-inch vitrified clay pipe [VCP] at each major acid tank location) were located; and

- 35 sumps (predominately 30 by 45-inches in length and width, respectively, that have varying depths, brick lined, with a 10-inch VCP drain) were located.

3.0 STRATEGY AND METHODOLOGY

This sampling plan incorporates a review of the records received from the USACE for the NFSS site and the sampling results from Phase I and Phase II of the NFSS RI to provide a listing of PCOCs that could be present in the pipelines around the NFSS. Samples will be collected from media exhibiting stain, odors, or elevated readings measured with field instruments. Additional PCOCs, such as metals, are recommended for analysis based on findings at similar ordnance sites. This is particularly a concern considering that the acidification process conducted at the site could leach metals, making them mobile in soil, surface water, and groundwater. For example, the potential for mercury contamination exists around the former tank locations due to the manometers that may have been used to measure fluid levels in the tanks.

This document is a flexible plan, written to meet the goals outlined in Section 1.0. Unforeseen situations encountered in the field will require professional judgement and consultation with the USACE, and these decisions will be documented in daily field reports and subsequent reports. The following sections describe the methodology to be used in the collection of the samples. Planned sampling activities are described in Section 4.0.

3.1 Samples From Manholes

In manholes where both water and sediment/sludge samples are scheduled to be collected, the wastewater samples will be collected prior to the collection of the sediment samples in an attempt to minimize the turbidity of the water sample.

3.1.1 Water

For consistency with the previous sampling methodology developed for the Phase II RI at the NFSS, water samples will be collected using low-voltage submersible “Whale” pumps or low-flow peristaltic pumps equipped with Teflon tubing, depending on the depth of the water column. Sampling will be conducted as specified in the Phase I and Phase II RI FSPs for temporary well points.

3.1.2 Sediment/Sludge

Samples of sediment and/or sludge from the bottom of the manholes will be collected with a decontaminated Ekman dredge or similarly designed scooping device. The dredge will be extended to the bottom of the manhole and then the locking mechanism will be released to close the jaws of the dredge. The dredge will then be slowly lifted to the surface of the ground and the contents will be placed in a decontaminated stainless steel bowl. Free water will be decanted from the sample material. The dredge will then be reset to collect additional sample volume if necessary. The dredging procedure will be repeated until enough sample volume is obtained.

3.2 Samples From Pipes And Sumps

In pipes and sumps where both water and sediment/sludge samples are scheduled to be collected, the wastewater samples will be collected prior to the collection of the sediment samples. It will be necessary to expose subsurface horizontal sections of the piping/sumps. It is recommended that a backhoe be used to unearth these features in order to collect representative samples. This is a similar method that was used in the EA investigation.

3.2.1 Water Samples

For consistency with the previous sampling methodology developed for the Phase II RI at the NFSS, water samples will be collected using low-voltage submersible "Whale" pumps or low-flow peristaltic pumps equipped with Teflon tubing, depending on the depth of the water column. Sampling will be conducted as specified in the Phase I and Phase II RI FSPs for temporary well points.

3.2.2 Sediment/Sludge

Samples of sediment and/or sludge from the bottom of the manholes will be collected with a decontaminated Ekman dredge or similarly designed scooping device. The dredge will be extended to the bottom of the manhole and then the locking mechanism will be released to close the jaws of the dredge. The dredge will then be slowly lifted to the surface of the ground and the contents will be placed in a decontaminated stainless steel bowl. Free water will be decanted from the sample material. The dredge will then be reset to collect additional sample volume if necessary. The dredging procedure will be repeated until enough sample volume is obtained.

3.3 Manhole Sample Location Selection

Samples to be collected from manholes on the NFSS property were selected based on the quantity of material (water and sediment/sludge) within the manholes as identified during the site reconnaissance. Since the manholes and connecting piping are strong migration pathways, almost all locations that exhibited sufficient material for sample analyses were chosen to be sampled.

3.4 Pipe and Sump Sample Location Selection

Samples to be collected from pipe and sump locations on the NFSS property were selected to provide an overall estimation of the potential nature and extent of contamination without collecting samples at each feature. The locations were optimized to represent the potential contamination pathways and were adjusted to complement the samples collected in the Phase I and II RI.

3.5 Analyte Selection

Analytes selected for each sample were based on the process that occurred in the vicinity of the proposed location, Phase I and II RI results, EA study results, and a review of the historical documents for the NFSS. Also, if a sheen was identified on the water from a potential sampling location, volatile organic compounds (VOCs) were proposed to be collected from that location.

In general, samples near Building 401 will include analyses for metals, radiological constituents, and semi-volatile organic compounds (SVOCs). Due to the presence of several PCOCs in the Interim Waste Containment Structure (IWCS), PAHs and PCBs will be collected from samples near that structure to verify their presence. In the acidification area, metals, SVOCs, PCBs, and VOCs will be added as PCOCs. Since previous sampling results have indicated the potential for the detected SVOCs to be in the PAH range, PAHs will be collected in lieu of SVOCs in some of the proposed locations. Pesticides were identified in samples collected from sumps and pipes from previous investigations and will be collected in some sample from this investigation. Limited nitroaromatic samples will be collected during this investigation to confirm the absence of those compounds during the previous investigations.

3.6 Sampling Hierarchy

During this investigation, the potential exists for samples that were planned to be collected to be removed form the lists for analytical testing based on lack of required sample volumes. The absolute minimum volumes required for sample analysis is shown on Table 5. The Site Manager or designee will confer with the proper USACE personnel to appropriately use judgement to determine which samples are the most critical and which subsequent samples can be analyzed with the volume of material obtained. Other information, such as sample containers, preservatives, and holding times are specified in the Phase I and Phase II Quality Assurance Project Plans (QAPP).

4.0 PLANNED PIPEINE SAMPLING ACTIVITES

Sampling locations and the Gantt Chart for the pipeline characterization sampling are shown on Figures 1 and 2, respectively.

The following is a listing of the tasks to be performed during the Pipeline Characterization Investigation field activities. Tasks will be performed in accordance with the procedures developed in the Final Phase I and Phase II RI FSP and subsequent addenda or as described in procedures included in this FSP.

Procedural note: Water samples for total and dissolved radionuclides will be collected at each location if sufficient water exists. The total samples will be analyzed. The dissolved samples will be held. Where the radionuclide risk-based screening level developed in the RI is exceeded in the total samples, the corresponding dissolved sample will be analyzed.

1. Collection of Water and Sediment/Sludge Samples from Sanitary, Storm, and Process Sewer Manholes

    - Twenty-three water samples will be collected from the manholes that had sufficient water during the November 2000 site reconnaissance.

    - Twenty-three sediment/sludge samples will be collected from the manholes where sufficient sediment/sludge was present to allow for samples during the November 2000 site reconnaissance.

    Justification for these proposed sample locations is shown in Table 1 and specific analytes, QA/QC samples, and MS/MSD samples, for each location is shown in Table 2.

2. Collection of Water and Sediment/Sludge Samples from Pipes and Sumps Related to the Former Process Activities and Storage Tanks of the former LOOW Activities

    - Two water samples will be collected from the pipes that had sufficient water during the November 2000 site reconnaissance.

    - Eleven sediment/sludge samples will be collected from the pipes. The approximate location has been identified. The specific location will be selected after excavation, visual inspection, and field instrument (photoionization detector and rad meter) readings are completed in areas near the pipes.

    - One water sample will be collected from a sump that had sufficient water during the November 2000 site reconnaissance.

    - Eight sediment/sludge samples will be collected from the sumps. The approximate location has been identified. The specific location will be

selected after excavation, visual inspection, and field instrument (photoionization detector and rad meter) readings are completed in areas near the sumps.

Justification for these proposed sample locations is shown in Table 3 and specific analytes, QA/QC samples, and MS/MSD samples, for each location are shown in Table 4.

3. Survey of the Sample Points From the Pipeline Investigation Activities

- A topographic survey of all the locations sampled during the Pipeline Characterization activities will be completed after the collection of the samples.

5.0 PLANNED ANALYTES, METHODS, AND LABORATORIES FOR PIPELINE CHARACTERIZATION

5.1 Samples for Chemical and Radiological Analysis

Samples will be analyzed for:

- volatile organics (by USEPA SW846 Methods 5035/8260B);
- semi-volatile organics (by USEPA SW846 Methods 3550B/8270C);
- pesticides and PCBs (by USEPA SW846 Methods 3550B/8081A/8082);
- TAL metals (by USEPA SW846 Methods 3050B/6010B/7000);
- Mercury (by USEPA SW846 Method 7471A);
- radiological speciation:
  - actinium-227, americium-241, cobalt-60, cesium-137, protoatinium-231, radium-226, radium-228, thorium-228, uranium-235, and uranium-238 (by HASL 300 – gamma spectroscopy, note: radium-226 in water samples will be analyzed by radon emanation);
  - thorium-228, thorium-230, thorium-232, and uranium-234, uranium-235, and uranium-238 (by HASL 300 – alpha spectroscopy);
- total alpha and beta radiation (by Method 900);
- total uranium (by ASTM D5174); and
- nitroaromatics (by USEPA SW846 Method 8330).

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

5.2 Quality Assurance (QA) Split Samples

A systems audit for this project will consist of collection and shipment of split samples for each analytical parameter to Nuclear Technology Services (the USACE contracted laboratory). Non-primary parameters (gross alpha and total uranium) will not be analyzed in the QA samples. Unless otherwise instructed, split 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

TABLES

TABLE 1

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPELINE MANHOLES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

The following locations represent the manholes identified on the NFSS property during the November 2000 Site Reconnaissance.

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-01	Building 401	Sanitary Sewer manhole located north of the northwest corner of Building 401 and south of the east/west trending street. Upstream manhole: none Downstream manhole: MH-09	56	72	Clear water and little sediment was noted in the manhole. Primary sewer connection for Building 401. Lateral line connections are submerged.	MH01W	Water	Building 401 formerly housed coal fired steam generation operations for the LOOW, production of Boron-10 isotopes, and has stored radioactive residues and wastes.	Metals-total Metals-dissolved Radionuclides SVOC
MH-02	Building 401	Storm Sewer grated manhole located south of Building 401. Upstream manhole: none Downstream manhole: none	12	15.5	Little sediment was noted in manhole. Unsure where this manhole is connected or where the outfall is. Grate would not come off.	MH02W MH02S	Water Sediment	Building 401 formerly housed coal fired steam generation operations for the LOOW, production of Boron-10 isotopes, and has stored radioactive residues and wastes. Additionally, this grated inlet is near boring 203, where 1,120 pCi/g of radium was detected.	Metals-total Metals-dissolved Radionuclides SVOC
MH-03	Building 401	Manhole to 12’ x 12’ concrete box marked as sanitary sewer (sump or water valve location) located west of Campbell St northeast of former Building 403. Upstream manhole: none Downstream manhole: none	46.125	72	Clear water and approximately 2” of gray sediment was noted within this manhole. Some structures were noted, but no valves, inlet pipes, or outlet pipes were observed.	MH03W MH03S	Water Sediment	This location is northwest of Building 401 and is northeast of the site decontamination pad. Additionally, it is northeast of the former Building 403 pad and east of the IWCS.	Metals-total Metals-dissolved Radionuclides SVOC
MH-04	Building 401	Manhole to 8’ octagonal concrete box marked as sanitary sewer (sump or water valve location) located west of Campbell St northeast of former Building 403. Upstream manhole: none Downstream manhole: none	56.25	84	Clear water and approximately 1” of gray sediment was noted within this manhole. Some structures were noted, but no valves, inlet pipes, or outlet pipes were observed.	MH04W MH04S	Water Sediment	This location is northwest of Building 401 and is northeast of the site decontamination pad. Additionally, it is northeast of the former Building 403 pad and east of the IWCS.	Metals-total Metals-dissolved Radionuclides SVOC

TABLE 1

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPELINE MANHOLES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-05	Building 401	Manhole to concrete box marked as water located east of Campbell St northwest of Building 401, west of the north/south trending fence. Upstream manhole: none Downstream manhole: none	43.25	99	Water in manhole has sheen and little sediment was noted. No valves, inlet pipes, or outlet pipes were observed.	MH05W	Water	This location is northwest of Building 401 and west of former above and underground storage tanks.	VOC Metals-total Metals-dissolved Radionuclides SVOC
MH-06	IWCS	Sanitary Sewer manhole located north of the South 31 Ditch and east of the IWCS fence line. Near the confluence of the South 31 and Central Ditches Upstream manhole: MH-07 Downstream manhole: MH-09	84.25	86	The lower section of this manhole has been filled with concrete. Water in this manhole is murky brown in nature. A pipe was observed heading west from this manhole towards the Central Ditch or the former water treatment plant for the LOOW (now included in the IWCS). Top of the manhole is broken.	MH06W	Water	This sample location may be directly connected to the former water treatment plant of the LOOW (now incorporated into the IWCS) through the observed pipe in the manhole. Additionally, the location is southeast of the IWCS.	Radionuclides PCB PAH
MH-07	IWCS	Sanitary Sewer manhole located east of the Central Ditch and southeast of the IWCS. Upstream manhole: MH-08 Downstream manhole: MH-06	50	112	Water and approximately 6” of gray sediment was noted within this manhole. Top of the manhole is broken.	MH07W MH07S	Water Sediment	This location is southeast of the IWCS.	Radionuclides
MH-08	Uninvestigated Area	Sanitary Sewer manhole located west of the Central Ditch and southeast of the IWCS. Upstream manhole: off the NFSS property to the south Downstream manhole: MH-07	51.75	121	Water in the manhole has a sheen and approximately 4” of sediment was noted.	MH08W MH08S	Water Sediment	This manhole location is the first manhole on the NFSS property from a line coming from the south. From the NFSS documents to date, it is unclear whether this manhole drains to the north or the south. Additionally, the location is southeast of the IWCS.	Radionuclides Metals-total Metals-dissolved VOC SVOC

TABLE 1

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPELINE MANHOLES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-09	Uninvestigated Area	Sanitary Sewer manhole located northeast of the Sudhakar shed and northwest of former Building 403. Manhole under at least 1.75" of soil. Upstream manholes: MH-06 and MH-01 Downstream manhole: MH-10	81	121.5	Water in the manhole has a sheen and approximately 7" of sediment was noted.	MH09W MH09S	Water Sediment	This location is northwest of Building 401 and is northeast of the site decontamination pad. Additionally, it is northeast of the former Building 403 pad and east of the IWCS.	VOC Radionuclides Metals-total Metals-dissolved SVOC PCB
MH-10	Uninvestigated Area	Sanitary Sewer manhole located north of the South 16 Ditch and west of Campbell St. Upstream manhole: MH-09 Downstream manhole: MH-11	77	99	The lower section of this manhole has been filled with concrete. Water in this manhole is murky brown in nature and little sediment was noted. Top of the manhole is broken.	MH10W	Water	This is located downgradient of Building 401, Building 403, and the decontamination pad. Since this manhole has been filled with concrete, it is unclear where the water found within the manhole came from.	Radionuclide SVOC
MH-11	Uninvestigated Area	This Sanitary Sewer manhole was not located during the pipeline reconnaissance. Upstream manhole: MH-10 Downstream manhole: MH-14	NA	NA	This manhole was not located during the pipeline reconnaissance.	No samples			
MH-12	Shops Area	Sanitary Sewer manhole located east of Campbell St and halfway between X and Z Streets. This manhole was completely buried with soil. Upstream manhole: MH-44 Downstream manhole: MH-11	19.25	96.5	Water in the manhole has a sheen and approximately 6" of gray sediment was noted. Manhole had a septic odor.	MH12W MH12S	Water Sediment	This location is the main drainage sewer connection for the Shops area.	VOC Radionuclides Metals-total Metals-dissolved SVOC
MH-13	Uninvestigated Area	Storm Sewer manhole located west of Campbell St and north of O Street. Upstream manhole: MH-29 Downstream: Outfall-01	Dry	57	Manhole had leaf litter and some sediment.	MH13S	Sediment	This location potentially drained the former radium storage vault in the western acidification area.	Radionuclides

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LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-14	Uninvestigated Area	Sanitary Sewer manhole located west of Campbell St and north of O Street. Upstream manhole: MH-11 Downstream manhole: MH-16	Dry	35.5	Manhole was previously filled with concrete. Some leaf litter noted in the manhole. Lid to manhole was not present.	No samples due to lack of material			
MH-15	Acidification Area	Storm Sewer manhole located east of Campbell St and south of N Street. Upstream manhole: MH-17 Downstream: Outfall-02	42.5	51.5	Approximately 0.25” of sediment noted in manhole.	MH15W	Water	This location potentially receives the runoff from the northern half of the acidification area.	Radionuclides PAH
MH-16	Acidification Area	Sanitary Sewer manhole located west of Campbell St and between N and O Streets. Upstream manhole: MH-14 Downstream manhole: off of NFSS property to the north	102.75	178	Approximately 0.5” of sediment and bricks noted in manhole.	MH16W MH16S	Water Sediment	This is the northernmost sanitary sewer manhole located on the NFSS property.	Radionuclides SVOC Metals-total Metals-dissolved Nitroaromatics
MH-17	Acidification Area	Storm Sewer manhole located east of Campbell St and south of N Street. Upstream manhole: MH-20 Downstream manhole: MH-15	Dry	70.5	This manhole is open without a lid. Rubble (bricks and mortar) were observed on the bottom.	No samples due to lack of material			
MH-18	Acidification Area	This Acid/Process Sewer manhole was not located during the pipeline reconnaissance. Upstream manhole: none Downstream manhole: off the NFSS property to the north	NA	NA	This manhole was not located during the pipeline reconnaissance.	No samples			

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LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-19	Acidification Area	Sanitary Sewer manhole located east of Campbell St and between N and O Streets along unnamed north/south trending road. Upstream manhole: MH-31 Downstream manhole: MH-16	Dry	88	This manhole was open with a plywood covering. Some leaf litter present in the manhole. May have been filled with concrete.	MH19S	Sediment	This manhole is located on the edge of a heavily disturbed area north of the sulfuric acid concentrator house and northeast of the TNT mix storage location.	Radionuclides SVOC Nitroaromatics
MH-20	Acidification Area	Storm Sewer manhole located south of N Street and east of unnamed north/south trending road. Upstream manhole: MH-21 Downstream manhole: MH-17	Dry	38	Little sediment and leaf litter was noted in the manhole.	No samples due to lack of material			
MH-21	Acidification Area	This Storm Sewer manhole was not located during the pipeline reconnaissance. Upstream manhole: MH-40 Downstream manhole: MH-20	NA	NA	This manhole was not located during the pipeline reconnaissance. It is possibly located under some rubble piles that were placed near the expected location of the manhole.	No samples			
MH-22	Acidification Area	Storm Sewer manhole located south of N Street and east of the Castle Garden Road cut through in the central Acidification area. Upstream manhole: none Downstream manhole: MH-40	Dry	21	A little detritus was noted in this manhole.	MH22S	Sediment	This location is in an area north of several tank cradles and north of a known area of soil and VOC groundwater contamination.	PAH Radionuclides VOC
MH-23	Acidification Area	Storm Sewer manhole located south of N Street and east of the Castle Garden Road cut through in the central Acidification area. Upstream manhole: MH-24 Downstream manhole: MH-40	Dry	36.25	Detritus and bricks noted in the bottom of the manhole. A 10" VCP angles northwest across N Street toward a concrete slab from this manhole.	No samples due to lack of material			

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RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPELINE MANHOLES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-24	Acidification Area	Storm Sewer manhole located south of N Street and east of the Castle Garden Road cut through in the central Acidification area and near the western end of the area of standing water. Upstream manhole: none Downstream manhole: MH-23	Dry	46	This manhole is wet with 0.25" of sediment noted on the bottom.	MH24S	Sediment	This sample is located near the former railroad tracks. This location is also along former haul routes when the former K-65 tower was removed.	Radionuclides PAH
MH-25	Acidification Area	This Storm Sewer manhole was not located during the pipeline reconnaissance. Upstream manhole: none Downstream manhole: MH-26	NA	NA	This manhole was not located during the pipeline reconnaissance.	No samples			
MH-26	Acidification Area	Storm Sewer manhole located north of O Street and east of the intersection of Castle Garden Road. Upstream manhole: MH-25 Downstream manhole: MH-27	49.25	56.5	A minor amount of sediment was noted in the manhole.	MH26W	Water	This location drains the area where PCB concentrations over 1 ppm have been observed in laboratory analyses.	Radionuclides PCB Metals-total Metals-dissolved
MH-27	Acidification Area	Storm Sewer manhole located north of O Street and west of the intersection of Castle Garden Road. Upstream manhole: MH-26 Downstream manhole: MH-28	Dry	59	A little detritus was noted in this manhole.	No samples due to lack of material			
MH-28	Acidification Area	This Storm Sewer manhole was not located during the pipeline reconnaissance. Upstream manhole: MH-27 Downstream manhole: MH-29	NA	NA	This manhole was not located during the pipeline reconnaissance.	No samples			

TABLE 1

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPELINE MANHOLES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-29	Acidification Area	Storm Sewer manhole located at the northeast corner of the intersection of O Street and Campbell Street. Upstream manhole: MH-28 Downstream manhole: MH-13	Dry	38	The west side of this manhole has collapsed. The bottom of the manhole is filled with soil.	MH29S	Sediment	This location is southwest of the site's former cellite plant and is downgradient of the acidification area fuel oil storage location. Additionally, this location is downgradient of several former radioactive material (bars, ingots) and residue storage areas. This storm sewer manhole drains the southern half of the acidification area.	Radionuclides PCB PAH Metals
MH-30	Acidification Area	Acid/Process Sewer manhole located south of N Street and east of the former sulfuric acid concentrator house. Upstream manhole: MH-32 Downstream manhole: off the NFSS property to the north-northwest	Dry	150	This manhole has no lid. About 1" of sediment and detritus was noted in this manhole. Also noted in this manhole was 6" and 12" VCP's that trended to the northeast.	MH30S	Sediment	This location is northwest of the central courtyard of the acidification area tank cradles.	Radionuclides SVOC
MH-31	Acidification Area	Sanitary Sewer manhole located south of N Street in the northwestern corner of the courtyard between the tank cradles. Upstream manhole: MH-37 Downstream manhole: MH-19	110.5	125.5	Manhole has septic smell. Water is murky and has a sheen. Manhole has an 8" VCP trending to the south.	MH31W	Water	This location is north of the nitric acid concentrator house.	Radionuclides SVOC VOC
MH-32	Acidification Area	Acid/Process Sewer manhole located south of N Street and west of the Castle Garden Road cut through in the northeastern corner of the courtyard between the tank cradles. Upstream manhole: MH-33 Downstream manhole: MH-30	142	142	Sheen present on the water in this manhole. Debris present also. Manhole has a 12" VCP trending towards the southwest.	MH32W	Water	This location is north of the central courtyard of the acidification area tank cradles.	VOC

TABLE 1

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPELINE MANHOLES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-33	Acidification Area	Acid/Process Sewer manhole located in the southeast corner of the intersection of N Street and the Castle Garden Road cut through in the northwestern corner of the courtyard between the tank cradles. Upstream manhole: MH-34 Downstream manhole: MH-32	135	135	Some debris noted in the manhole. A 24" line trends to the east and a 16" line trends to the south from this manhole.	MH33S	Sediment	This location is northeast of the central courtyard of the acidification area tank cradles.	Radionuclides SVOC
MH-34	Acidification Area	Acid/Process Sewer manhole located in the southeast corner of the intersection of N Street and the Castle Garden Road cut through. Upstream manhole: MH-35 Downstream manhole: MH-33	Wet, but little water	138	Minor amount of sediment noted in the bottom of the manhole. A 24" line trends to the east and a 24" line trends to the south from this manhole.	No samples due to lack of material			
MH-35	Acidification Area	Acid/Process Sewer manhole located south of N Street and east of the Castle Garden Road cut through near storm sewer inlet (MH-22). Upstream manhole: MH-36 Downstream manhole: MH-34	127	128	Approximately 0.5" of sediment noted in the bottom of the manhole. A 24" line trends to the east and a 24" line trends to the west from this manhole.	MH35W MH35S	Water Sediment	This location is in an area north of several tank cradles and north of a known area of soil and VOC groundwater contamination.	Radionuclides PAH VOC
MH-36	Acidification Area	Acid/Process Sewer manhole located south of N Street and east of the Castle Garden Road cut through northwest of the former ammonia oxidation plant. Upstream manhole: MH-38 Downstream manhole: MH-35	Wet, but little water	119	No sediment in manhole. A 24" line trends to the east and a 24" line trends to the west from this manhole.	No samples due to lack of material			

TABLE 1

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPELINE MANHOLES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-37	Acidification Area	Sanitary Sewer manhole located south of N street near the east end of the acidification area. Upstream manhole: none Downstream manhole: MH-31	Dry	99	Sediment noted in the bottom of the manhole. A 6" VCP trends to the southeast from this manhole.	MH37S	Sediment	This is the easternmost sanitary sewer location in the acidification area.	Radionuclides
MH-38	Acidification Area	Acid/Process Sewer manhole located south of N Street and east of the Castle Garden Road cut through near the east end of the acidification area. Upstream manhole: MH-39 Downstream manhole: MH-36	Dry	115	A minor amount of sediment was noted in this manhole.	No samples due to lack of material			
MH-39	Acidification Area	This Acid/Process Sewer manhole was not located during the pipeline reconnaissance. Upstream manhole: none Downstream manhole: MH-38	NA	NA	This manhole was not located during the pipeline reconnaissance.	No samples			
MH-40	Acidification Area	Storm Sewer manhole located south of N Street and east of the Castle Garden Road cut through in the central Acidification area. Upstream manholes: MH-22 and MH-23 Downstream manhole: MH-21	Wet, but little water	61	This manhole is connected to MH-22 and the main east-west storm sewer line. Not much sediment in this manhole.	No samples due to lack of material			
MH-41	Shops Area	This Sanitary Sewer manhole is located northwest of the intersection of Castle Garden Road and Y Street. Upstream manholes: has been covered/destroyed (was to the east on the Modern Landfill property) Downstream manhole: MH-42	32	79	Approximately 1" of sediment noted in the bottom of the manhole.	MH41W MH41S	Water Sediment	This location received drainage from the former locomotive shop and LOOW laboratory.	Radionuclides SVOC PCB

TABLE 1

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPELINE MANHOLES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
MH-42	Shops Area	Sanitary Sewer manhole located in the pavement of Seventh Street between X and Z Streets. Upstream manholes: MH-41 and MH-46 Downstream manhole: MH-43	37	108	Approximately 1" of sediment noted in the bottom of the manhole.	MH42W MH42S	Water Sediment	This location is south of the former combined shops building where radioactive residues were stored. In this area of the site were several buildings that were used to repair materials and equipment for the LOOW.	Radionuclides PAH PCB
MH-43	Shops Area	This Sanitary Sewer manhole is located in-between X and Z Streets and west of Seventh St and east of Campbell Street. Upstream manhole: MH-42 Downstream manhole: MH-44	26	97	Water in manhole has a sheen. Approximately 1" of sediment noted in the bottom of the manhole.	MH43W MH43S	Water Sediment	This location is a connection to all the former surrounding buildings that have had residue storage.	VOC Radionuclides SVOC
MH-44	Shops Area	This Sanitary Sewer manhole is located in-between X and Z Streets and west of Seventh St and east of Campbell Street. Upstream manholes: MH-43 and MH-45 Downstream manhole: MH-12	26	106	A dead rodent was observed in this open manhole. About 0.5" of sediment was noted in the manhole. The lid of this manhole was replaced prior to leaving the site.	MH44W MH44S	Water Sediment	This location is a connection to all the former surrounding buildings that have had residue storage.	Radionuclides
MH-45	Shops Area	This Sanitary Sewer manhole is located south of Z Street and west of Seventh St. Upstream: sump and 10" VCP from former garage area Downstream manhole: MH-44	31	60	This manhole was covered with a minimum of 7" of soil. A slight sheen was visible on the water in the manhole. Approximately 0.5" of sediment was noted in the manhole.	MH45W MH45S	Water Sediment	This location was the primary sanitary connection for the former parking garage and garage and repair shop buildings. Uranium rods were inferred to be stored in these buildings.	VOC Radionuclides PAH
MH-46	Shops Area	This Sanitary Sewer manhole is located south of the intersection of Z Street and Seventh St. Upstream manhole: none Downstream manhole: MH-42	44	108	A slight sheen was visible on the water in the manhole. Approximately 0.5" of sediment was noted in the manhole.	MH46W MH46S	Water Sediment	Directly east of this manhole location were the former material shed and general storehouse buildings where drums of K-65 residue were stored. Directly west of this location was a fuel oil pipeline and to the south was a rail spur.	VOC Radionuclides SVOC

TABLE 1

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPELINE MANHOLES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

Notes:

1 Depth to Water and Depth to Invert were measured from the top of the manhole cover or, if the manhole cover was missing, where the cover is anticipated to have formerly existed.

NA Not Applicable

VOC Volatile Organic Compounds

SVOC Semi-volatile Organic Compounds

PAH Polynuclear Aromatic Hydrocarbons

PCB Polychlorinated Biphenyls

VCP Vitrified Clay Pipe

Dissolved metals will be analyzed for water samples only. Dissolved radionuclide analyses will be conducted only if the total radionuclide concentrations exceed the screening criteria.

TABLE 2

MANHOLE SAMPLE LOCATIONS AND ANALYSES REQUIRED
NIAGARA FALLS STORAGE SITE - PIPELINE 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	Pesticides	PCBs	Metals	Radiological Isotopes	Total U	PAHs	Nitroaromatics
NFSS01MH01W-2000	Building 401 Area	MARSSIM UNIT 2E	Water			X			X	X			
NFSS01MH02W-2001	Building 401 Area	MARSSIM UNIT 2J	Water			X			X	X			
NFSS01MH02S-2002	Building 401 Area	MARSSIM UNIT 2J	Sediment	QC-2003		X			X	X			
NFSS01MH03W-2004	Building 401 Area	MARSSIM UNIT 2A	Water			X			X	X			
NFSS01MH03S-2005	Building 401 Area	MARSSIM UNIT 2A	Sediment			X			X	X			
NFSS01MH04W-2006	Building 401 Area	MARSSIM UNIT 2A	Water			X			X	X			
NFSS01MH04S-2007	Building 401 Area	MARSSIM UNIT 2A	Sediment			X			X	X			
NFSS01MH05W-2008	Building 401 Area	MARSSIM UNIT 2A	Water	QA	X	X			X	X			
NFSS01MH06W-2009	IWCS	MARSSIM UNIT 1C	Water	QC-2010				X		X		X	
NFSS01MH07W-2011	IWCS	MARSSIM UNIT 1C	Water							X			
NFSS01MH07S-2012	IWCS	MARSSIM UNIT 1C	Sediment							X			
NFSS01MH08W-2013	Uninvestigated Area	MARSSIM UNIT 8A	Water	QC-2014	X	X			X	X			
NFSS01MH08S-2015	Uninvestigated Area	MARSSIM UNIT 8A	Sediment		X	X			X	X			
NFSS01MH09W-2016	Uninvestigated Area	MARSSIM UNIT 8A	Water	MS/MSD	X	X		X	X	X			
NFSS01MH09S-2017	Uninvestigated Area	MARSSIM UNIT 8A	Sediment	QA	X	X		X	X	X			
NFSS01MH10W-2018	Uninvestigated Area	MARSSIM UNIT 8A	Water			X				X			
NFSS01MH12W-2019	Shops Area	MARSSIM UNIT 3A	Water		X	X			X	X			

TABLE 2

MANHOLE SAMPLE LOCATIONS AND ANALYSES REQUIRED
NIAGARA FALLS STORAGE SITE - PIPELINE 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	Pesticides	PCBs	Metals	Radiological Isotopes	Total U	PAHs	Nitroaromatics
NFSS01MH12S-2020	Shops Area	MARSSIM UNIT 3A	Sediment	MS/MSD	X	X			X	X			
NFSS01MH13S-2021	Uninvestigated Area	MARSSIM UNIT 8E	Sediment	QC-2022						X			
NFSS01MH15W-2023	Acidification Area	MARSSIM UNIT 4A	Water							X		X	
NFSS01MH16W-2024	Acidification Area	MARSSIM UNIT 4A	Water	QC-2025		X			X	X			X
NFSS01MH16S-2026	Acidification Area	MARSSIM UNIT 4A	Sediment	QC-2027		X			X	X			X
NFSS01MH19S-2028	Acidification Area	MARSSIM UNIT 4C	Sediment			X				X			X
NFSS01MH22S-2029	Acidification Area	MARSSIM UNIT 4D	Sediment	QC-2030	X					X		X	
NFSS01MH24S-2031	Acidification Area	MARSSIM UNIT 4F	Sediment							X		X	
NFSS01MH26W-2032	Acidification Area	MARSSIM UNIT 4D	Water					X	X	X			
NFSS01MH29S-2033	Acidification Area	MARSSIM UNIT 4A	Sediment					X	X	X		X	
NFSS01MH30S-2034	Acidification Area	MARSSIM UNIT 4C	Sediment			X				X			
NFSS01MH31W-2035	Acidification Area	MARSSIM UNIT 4C	Water		X	X				X			
NFSS01MH32W-2036	Acidification Area	MARSSIM UNIT 4C	Water		X								
NFSS01MH33S-2037	Acidification Area	MARSSIM UNIT 4D	Sediment			X				X			
NFSS01MH35W-2038	Acidification Area	MARSSIM UNIT 4D	Water		X					X		X	
NFSS01MH35S-2039	Acidification Area	MARSSIM UNIT 4D	Sediment		X					X		X	
NFSS01MH37S-2040	Acidification Area	MARSSIM UNIT 4F	Sediment							X			

TABLE 2

MANHOLE SAMPLE LOCATIONS AND ANALYSES REQUIRED
NIAGARA FALLS STORAGE SITE - PIPELINE 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	Pesticides	PCBs	Metals	Radiological Isotopes	Total U	PAHs	Nitroaromatics
NFSS01MH41W-2041	Shops Area	MARSSIM UNIT 3D	Water			X		X		X			
NFSS01MH41S-2042	Shops Area	MARSSIM UNIT 3D	Sediment			X		X		X			
NFSS01MH42W-2043	Shops Area	MARSSIM UNIT 3C	Water					X		X		X	
NFSS01MH42S-2044	Shops Area	MARSSIM UNIT 3C	Sediment					X		X		X	
NFSS01MH43W-2045	Shops Area	MARSSIM UNIT 3B	Water		X	X				X			
NFSS01MH43S-2046	Shops Area	MARSSIM UNIT 3B	Sediment		X	X				X			
NFSS01MH44W-2047	Shops Area	MARSSIM UNIT 3B	Water							X			
NFSS01MH44S-2048	Shops Area	MARSSIM UNIT 3B	Sediment							X			
NFSS01MH45W-2049	Shops Area	MARSSIM UNIT 3B	Water		X					X		X	
NFSS01MH45S-2050	Shops Area	MARSSIM UNIT 3B	Sediment		X					X		X	
NFSS01MH46W-2051	Shops Area	MARSSIM UNIT 3C	Water	QC-2052	X	X				X			
NFSS01MH46S-2053	Shops Area	MARSSIM UNIT 3C	Sediment		X	X				X			

Note: See Section 5.0 of the Pipeline Investigation FSP for methods and specific analytes

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

The following locations represent the pipes, sumps, and outfalls identified on the NFSS property during the November 2000 Site Reconnaissance.

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE01	Building 401	This 4" steel pipe is located approximately 40 feet southeast of Building 401.	NA	NA	This pipe rose above the ground surface and was unopened. This is potentially a fill tube for an UST or a sewer cleanout line.			No sample planned for this location	
PIPE02	Acidification Area	This 10" VCP is located at the northernmost end of the former residual sulfuric acid storage tanks in the western portion of the acidification area	NA	NA	This pipe has been disturbed and/or excavated.			No sample planned for this location	
PIPE03	Acidification Area	This 10" VCP is located at the northern end of the former residual sulfuric acid storage tanks in the western portion of the acidification area	Dry	51	Elbow to the northwest. Has detritus at the bottom of the elbow.			No sample planned for this location	
PIPE04	Acidification Area	This 10" VCP is located in the north central area of the former residual sulfuric acid storage tanks in the western portion of the acidification area	NA	NA	Pipe covered with pile of wood.			No sample planned for this location	
PIPE05	Acidification Area	This 10" VCP is located in the south central area of the former residual sulfuric acid storage tanks in the western portion of the acidification area	Dry	39	Elbow to the northwest.			No sample planned for this location	
PIPE06	Acidification Area	This 10" VCP is located at the southern end of the former residual sulfuric acid storage tanks in the western portion of the acidification area	Dry	38	Elbow to the northwest.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE07	Acidification Area	This 10” VCP is located at the southernmost end of the former residual sulfuric acid storage tanks in the western portion of the acidification area	Dry	22	Depth to detritus in the pipe.			No sample planned for this location	
PIPE08	Acidification Area	This 4” steel pipe is located in the southeastern area of the foundation of the former sulfuric acid concentrator house.	Dry	87	None			No sample planned for this location	
PIPE09	Acidification Area	This 4” steel pipe is located in the southern east-central area of the foundation of the former sulfuric acid concentrator house.	Dry	28	None			No sample planned for this location	
PIPE10	Acidification Area	This 4” VCP is located in the southwestern area of the foundation of the former sulfuric acid concentrator house.	Dry	32	None			No sample planned for this location	
PIPE11	Acidification Area	This 4” steel pipe is located in the northern west-central area of the foundation of the former sulfuric acid concentrator house.	Dry	0	Filled with soil to surface.			No sample planned for this location	
PIPE12	Acidification Area	This 10” VCP is located at the westernmost end of the former north acid storage tanks	Dry	32	Elbow to the south.			No sample planned for this location	
PIPE13	Acidification Area	This 10” VCP is located at the western end of the former north acid storage tanks	Dry	35	Elbow to the south. Some detritus noted in the pipe.			No sample planned for this location	
PIPE14	Acidification Area	This 10” VCP is located at the west-central end of the former north acid storage tanks	Dry	36	Elbow to the south.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE15	Acidification Area	This 10" VCP is located at the east-central end of the former north acid storage tanks	Dry	37	Elbow to the south.	PIPE15S	Sediment	This location is in a central part of the north acid storage tanks, northwest of previously identified VOC concentrations that exceeded screening values from soil and water samples. Metals, PCBs, and PAHs have been detected in sediment from previous pipe samples.	Metals VOCs PAHs Radionuclides PCBs
PIPE16	Acidification Area	This 10" VCP is located at the eastern end of the former north acid storage tanks	Dry	33	Elbow to the southwest.			No sample planned for this location	
PIPE17	Acidification Area	This 10" VCP is located at the easternmost end of the former north acid storage tanks	Dry	45	Elbow to the south.			No sample planned for this location	
PIPE18	Acidification Area	This 10" VCP is located at the northernmost end of the former concentrated mix storage tanks	Dry	NA	Filled to surface with soil.			No sample planned for this location	
PIPE18A	Acidification Area	This 10" VCP was not located, but should be at the northern end of the former concentrated mix storage tanks	NA	NA	Pipe not located and may have been covered with soil or destroyed.			No sample planned for this location	
PIPE19	Acidification Area	This 10" VCP is located at the north-central area of the former concentrated mix storage tanks	Dry	32	Elbow to the west.			No sample planned for this location	
PIPE20	Acidification Area	This 10" VCP is located at the south-central area of the former concentrated mix storage tanks	Dry	36	Elbow to the west.			No sample planned for this location	
PIPE21	Acidification Area	This 10" VCP is located at the southern end of the former concentrated mix storage tanks	Dry	31	Elbow to the west. Detritus noted in the elbow.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE22	Acidification Area	This 10" VCP is located at the southernmost end of the former concentrated mix storage tanks	Dry	34	Elbow to the west.			No sample planned for this location	
PIPE23	Acidification Area	This 20" VCP is located at the southernmost end of the former TNT mix storage tanks.	Dry	24	Pipe filled with gravel and detritus.	PIPE23S	Sediment	This pipe is located south of previously discovered soil VOC contamination and northeast of previously known PCB contamination. Metals, PCBs, and PAHs have been detected in sediment from previous pipe samples.	Metals VOCs PAHs Radionuclides PCBs
PIPE24	Acidification Area	This 20" VCP is located at the southern end of the former TNT mix storage tanks. Approximately 20' north of PIPE23.	Dry	23	Pipe filled with gravel and detritus.			No sample planned for this location	
PIPE25	Acidification Area	This 20" VCP is located at the southern end of the former TNT mix storage tanks. Approximately 20' north of PIPE24.	Dry	23	Pipe filled with gravel and detritus.			No sample planned for this location	
PIPE26	Acidification Area	This 10" VCP is located at the northern end of the former TNT mix storage tanks.	Dry	36	Elbow to the east.			No sample planned for this location	
PIPE27	Acidification Area	This 10" VCP is located at the northernmost end of the former TNT mix storage tanks.	Dry	34	Elbow to the east.			No sample planned for this location	
PIPE28	Acidification Area	This 10" steel pipe with a flange is located in the southern end of the former nitric acid concentrator plant foundation.	10	32	Sediment in the bottom of the pipe.	PIPE28W PIPE28S	Water Sediment	Based on the heavy flange present on the pipe, this pipe potentially was used for transferring fluids under pressure. The type of fluids were transferred are unknown.	Metals-total Metals-dissolved VOCs SVOCs Radionuclides

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE29	Acidification Area	This 10" VCP is located at the westernmost end of the former south sulfuric acid storage tanks.	Dry	20	Pipe broken at depth.			No sample planned for this location	
PIPE30	Acidification Area	This 10" VCP is located at the western end of the former south sulfuric acid storage tanks.	Dry	36	Elbow to the north. Detritus noted in the pipe.			No sample planned for this location	
PIPE31	Acidification Area	This 10" VCP is located at the west-central area of the former south sulfuric acid storage tanks.	Dry	20	Elbow to the north. Detritus noted in the pipe.			No sample planned for this location	
PIPE32	Acidification Area	This 10" VCP is located at the central area of the former south sulfuric acid storage tanks.	Dry	30	Elbow to the north. Detritus noted in the pipe.			No sample planned for this location	
PIPE33	Acidification Area	This 10" VCP is located at the east-central area of the former south sulfuric acid storage tanks.	Dry	26	Broken elbow to the north.	PIPE33S	Sediment	It is unknown whether this pipe was broken prior to the dismantling of the LOOW piping network. Metals, pesticides, and PAHs have been detected in sediment from previous pipe samples.	Metals PAHs Radionuclides Pesticides
PIPE34	Acidification Area	This 10" VCP is located at the eastern end of the former south sulfuric acid storage tanks.	Dry	36	Elbow to the north. Detritus noted in the pipe. Joints in pipe coming apart.			No sample planned for this location	
PIPE35	Acidification Area	This 10" VCP is located at the easternmost end of the former south sulfuric acid storage tanks.	Dry	32	Elbow to the north. Detritus noted in the pipe.			No sample planned for this location	
PIPE36	Acidification Area	This 10" VCP is located at the southern tank of a 2-tank cradle south of the TNT mix tanks.	Dry	34	Elbow to the north.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE37	Acidification Area	This 10" VCP is located at the northern tank of a 2-tank cradle south of the TNT mix tanks.	Dry	45	North-south tee at this junction connects to PIPE36.			No sample planned for this location	
PIPE38	Acidification Area	This 10" VCP is located at the westernmost end of the former south acid storage tanks	Dry	39	Elbow to the north.			No sample planned for this location	
PIPE38A	Acidification Area	This 10" VCP is located at the western end of the former south acid storage tanks	Dry	NA	Pipe destroyed.			No sample planned for this location	
PIPE39	Acidification Area	This 10" VCP is located at the central area of the former south acid storage tanks	Dry	34	Elbow to the north.			No sample planned for this location	
PIPE40	Acidification Area	This 10" VCP is located at the eastern end of the former south acid storage tanks	Dry	31	Elbow to the north. Detritus noted in the pipe.			No sample planned for this location	
PIPE41	Acidification Area	This 10" VCP is located at the easternmost end of the former south acid storage tanks	Dry	32	Elbow to the north.	PIPE41S	Sediment	This sample is located at the southeastern corner of the acidification area. This area has not undergone extensive investigation and is placed to potentially bound the findings of the other samples collected during this investigation.	Metals PAHs Radionuclides
PIPE42	Acidification Area	This 4" VCP is located at the southeast end of the former concentrated mix area.	Dry	54	None	PIPE42S	Sediment	Due to the unknown nature of this pipe, samples will be collected for assessment of its prior use.	Metals VOCs SVOCs Radionuclides
PIPE43	Acidification Area	This 10" VCP is located at the southern end of the former concentrated mix area.	Dry	35	Elbow to the west.			No sample planned for this location	
PIPE44	Acidification Area	This 10" VCP is located at the southern end of the former concentrated mix area.	Dry	42	Elbow to the west.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE45	Acidification Area	This 10" VCP is located at the south-central area of the former concentrated mix area.	Dry	47	Elbow to the west.			No sample planned for this location	
PIPE46	Acidification Area	This 10" VCP is located at the north-central area of the former concentrated mix area.	Dry	41	Elbow to the west. Detritus noted in the pipe.			No sample planned for this location	
PIPE47	Acidification Area	This 10" VCP is located at the northern end of the former concentrated mix area.	Dry	41	Elbow to the west. Detritus noted in the pipe. Pipe has metal collar.	PIPE47S	Sediment	Due to the differences in construction for this pipe (the metal collar) and its unknown use, samples will be collected at this location.	Metals PAHs Radionuclides
PIPE48	Acidification Area	This 10" VCP is located at the northernmost end of the former concentrated mix area.	Dry	38	Elbow to the west. Detritus noted in the pipe.			No sample planned for this location	
PIPE48A	Acidification Area	This 10" VCP is located at the northernmost end of the former dark sulfuric acid storage tanks.	Dry	41	Elbow to the east. Some detritus was noted in the pipe.			No sample planned for this location	
PIPE49	Acidification Area	This 10" VCP is located at the northern end of the former dark sulfuric acid storage tanks.	Dry	40	Elbow to the east. Detritus noted in the pipe.			No sample planned for this location	
PIPE50	Acidification Area	This 10" VCP is located at the north-central area of the former dark sulfuric acid storage tanks.	Dry	30	Elbow to the east.			No sample planned for this location	
PIPE51	Acidification Area	This 10" VCP is located at the central area of the former dark sulfuric acid storage tanks.	Dry	NA	Pipe was found to be destroyed.			No sample planned for this location	
PIPE52	Acidification Area	This 10" VCP is located at the south-central area of the former dark sulfuric acid storage tanks.	Dry	35	Elbow to the east. Some detritus was noted in the pipe.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE53	Acidification Area	This 10” VCP is located at the southern end of the former dark sulfuric acid storage tanks.	Dry	37	Elbow to the east.			No sample planned for this location	
PIPE54	Acidification Area	This 10” VCP is located at the southernmost end of the former dark sulfuric acid storage tanks.	Dry	34	Elbow to the east.			No sample planned for this location	
PIPE55	Acidification Area	This 10” VCP is located at the northernmost end of the former concentrated nitric acid storage tanks.	Dry	40	Detritus noted in the pipe.			No sample planned for this location	
PIPE56	Acidification Area	This 10” VCP is located at the northern end of the former concentrated nitric acid storage tanks.	Dry	12	Detritus/sediment noted in the pipe.			No sample planned for this location	
PIPE57	Acidification Area	This 10” VCP is located at the central area of the former concentrated nitric acid storage tanks.	Dry	8	Detritus/sediment noted in the pipe.	PIPE57S	Sediment	This sample is located to determine the presence of potential contamination from the concentrated nitric acid tanks. Metals, pesticides, and PAHs have been detected in sediment from previous pipe samples.	Metals PAHs Radionuclides Pesticides
PIPE58	Acidification Area	This 10” VCP is located at the southern end of the former concentrated nitric acid storage tanks.	Dry	20	Detritus/sediment noted in the pipe.			No sample planned for this location	
PIPE59	Acidification Area	This 10” VCP is located at the southernmost end of the former concentrated nitric acid storage tanks.	Dry	38	Elbow to the east.			No sample planned for this location	
PIPE60	Acidification Area	This 6” steel pipe is located in the southernmost pit at the former ammonia oxidation plant.	Dry	8	Detritus/sediment noted in the pipe.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE61	Acidification Area	This 6” steel pipe is located in the south-central pit at the former ammonia oxidation plant.	Dry	0	Detritus/sediment noted to the surface in the pipe.			No sample planned for this location	
PIPE62	Acidification Area	This 6” steel pipe is located in the north-central pit at the former ammonia oxidation plant..	Dry	0	Detritus/sediment noted to the surface in the pipe.			No sample planned for this location	
PIPE63	Acidification Area	This 6” steel pipe is located in the northernmost pit at the former ammonia oxidation plant.	Dry	20	Broken joint noted in the pipe. Some detritus in the bottom of the pipe.	PIPE63S	Sediment	It is unknown whether this pipe was broken prior to the dismantling of the LOOW piping network. Metals, PCBs, and PAHs have been detected in sediment from previous pipe samples.	Metals PAHs Radionuclides PCBs
PIPE64	Acidification Area	This 10” VCP is located at the southernmost end of the former TNT mix storage tanks.	Dry	28	Elbow to the west. Some detritus noted in the pipe.			No sample planned for this location	
PIPE65	Acidification Area	This 10” VCP is located at the southern end of the former TNT mix storage tanks.	Dry	28	Elbow to the west. Some detritus noted in the pipe.			No sample planned for this location	
PIPE66	Acidification Area	This 10” VCP is located at the southern end of the former TNT mix storage tanks.	Dry	29	Elbow to the west. Some detritus noted in the pipe.			No sample planned for this location	
PIPE67	Acidification Area	This 10” VCP is located at the southern-central end of the former TNT mix storage tanks.	Dry	31	Elbow to the west. Some detritus noted in the pipe.			No sample planned for this location	
PIPE68	Acidification Area	This 10” VCP is located at the south-central end of the former TNT mix storage tanks.	Dry	30	Elbow to the west. Some detritus noted in the pipe.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
PIPE69	Acidification Area	This 10" VCP is located at the north-central end of the former TNT mix storage tanks.	Dry	33	Elbow to the west. Some detritus noted in the pipe.			No sample planned for this location	
PIPE70	Acidification Area	This 10" VCP is located at the northern-central end of the former TNT mix storage tanks.	Dry	35	Cracked elbow to the west. Some detritus noted in the pipe.			No sample planned for this location	
PIPE71	Acidification Area	This 10" VCP is located at the northern end of the former TNT mix storage tanks.	Dry	27	Pipe filled to surface with detritus and sediment.			No sample planned for this location	
PIPE72	Acidification Area	This 10" VCP is located at the northern end of the former TNT mix storage tanks.	Dry	0	Pipe filled to surface with detritus and sediment.	PIPE72S	Sediment	This area is directly adjacent to the former fuel oil storage location and by the TNT mix storage area. Metals, PCBs, and PAHs have been detected in sediment from previous pipe samples.	Metals SVOCs Radionuclides Pesticides PCBs
PIPE73	Acidification Area	This 10" VCP is located at the northernmost end of the former TNT mix storage tanks.	Dry	0	Elbow to the west at the surface. Some detritus noted in the pipe.			No sample planned for this location	
PIPE74	Shops Area	This 10" VCP is located on the Garage and Repair Shop foundation slab south of Z Street.	20	59	Water in pipe has sheen.	PIPE74W PIPE74S	Water Sediment	It is unknown whether this pipe was broken prior to the dismantling of the LOOW piping network. Metals and PAHs have been detected in sediment from previous pipe samples.	Metals VOCs PAHs Radionuclides
SUMP01	Building 401	This sump is located northeast of Building 401.	Dry	12	This shallow concrete sump is approximately 2' x 3'. Minor vegetation noted in the sump.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
SUMP02	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the southern end of the former residual sulfuric acid storage tanks	Dry	0	Sump filled with detritus to surface and is also covered with utility poles.	SUMP02S	Sediment	This sump potentially received drainage from the former sulfuric acid storage tanks and from the sulfuric acid concentrator house.	Metals PAHs Radionuclides
SUMP03	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located in the southwestern corner of the former sulfuric acid concentrator house foundation.	Dry	0	Location is assumed to be a sump due to the bricks found at the surface. Filled to surface with debris.			No sample planned for this location	
SUMP04	Acidification Area	This L-shaped concrete sump is located in the southeastern corner of the former sulfuric acid concentrator house foundation.	Dry	28	Filled with concrete pieces. Slab of concrete covering most of this feature.			No sample planned for this location	
SUMP05	Acidification Area	This 1’ x 2’ concrete sump is located in the northern section of the former sulfuric acid concentrator house foundation.	Dry	0	Filled with soil and sediment to the surface.			No sample planned for this location	
SUMP06	Acidification Area	This 2’ x 12’ concrete sump is located in the southern section of the former sulfuric acid concentrator house foundation.	Dry	0	Filled with gravel.			No sample planned for this location	
SUMP07	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the western end of the former northern acid storage tanks.	Dry	0	Filled to surface with soil and detritus.	SUMP07S	Sediment	This location drained the north acid tanks and potentially received runoff from the former rail lines in the immediate vicinity. Pesticides have been detected in sediment from previous sump samples.	Pesticides SVOC Radionuclides

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
SUMP08	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located in the central area of the former northern acid storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.			No sample planned for this location	
SUMP09	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the eastern end of the former northern acid storage tanks	Dry	18	Partially filled with soil and detritus.			No sample planned for this location	
SUMP10	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located in the central area of the former concentrated mix storage tanks.	Dry	0	Filled to surface with soil and detritus.			No sample planned for this location	
SUMP11	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the southern end of the former concentrated mix storage tanks.	Dry	0	Filled to surface with soil and detritus.			No sample planned for this location	
SUMP12	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the north-central end of the former TNT mix storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.			No sample planned for this location	
SUMP13	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the northern end of the former TNT mix storage tanks.	Dry	0	Filled to surface with detritus.	SUMP13S	Sediment	This sump in adjacent to previously found VOC soil concentrations that exceed the NYSDEC TAGM values. PAHs and PCBs have been detected in sediment from previous sump samples.	VOC PCBs PAHs Radionuclides

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
SUMP14	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the western end of the former south sulfuric acid storage tanks.	Dry	0	Filled to surface with soil and detritus.	SUMP14S	Sediment	This sump drained the south sulfuric acid storage. Pesticides have been detected in sediment from previous sump samples.	Pesticides SVOC Radionuclides
SUMP15	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the west-central area of the former south sulfuric acid storage tanks.	Dry	0	Filled to surface with soil and detritus.			No sample planned for this location	
SUMP16	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the east-central area of the former south sulfuric acid storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.			No sample planned for this location	
SUMP17	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the eastern end of the former south sulfuric acid storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.			No sample planned for this location	
SUMP18	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located between 2 former tanks of a small 2-tank cradle located south of the TNT mix tanks.	Dry	12	Filled halfway to surface with soil and detritus.			No sample planned for this location	
SUMP19	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the western end of the former south acid storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.	SUMP19S	Sediment	This area is adjacent to known PCB contamination that exceeded the TAGM screening values. PCBs and pesticides have been detected in sediment from previous sump samples.	PCBs Pesticides SVOC Radionuclides

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
SUMP20	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the central area of the former south acid storage tanks.	Dry	22	Approximately 2” of soil and detritus noted in the sump.			No sample planned for this location	
SUMP21	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the eastern end of the former south acid storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.			No sample planned for this location	
SUMP22	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the southernmost end of the former concentrated mix storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.			No sample planned for this location	
SUMP23	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the southern end of the former concentrated mix storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.			No sample planned for this location	
SUMP24	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the south-central area of the former concentrated mix storage tanks.	Dry	23.5	Some detritus noted in the sump.			No sample planned for this location	
SUMP25	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the north-central area of the former concentrated mix storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.	SUMP25S	Sediment	This sump drained the concentrated mix storage tanks in the east-central portion of the acidification area.	PAHs Radionuclides

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
SUMP26	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the northern end of the former dark sulfuric acid storage tanks.	Dry	0	Filled to surface with soil and detritus.			No sample planned for this location	
SUMP27	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the north-central area of the former dark sulfuric acid storage tanks.	Dry	0	Filled to surface with soil and detritus.			No sample planned for this location	
SUMP28	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the south-central area of the former dark sulfuric acid storage tanks.	Dry	0	Filled to surface with soil and detritus.			No sample planned for this location	
SUMP29	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the southern end of the former dark sulfuric acid storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.			No sample planned for this location	
SUMP30	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the southern end of the former TNT mix storage tanks.	Dry	22	Some detritus noted in the sump.			No sample planned for this location	
SUMP31	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the south-central area of the former TNT mix storage tanks.	Dry	22	Some detritus noted in the sump.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Feature Number	Area of Investigation	Feature Location	Depth to Water (inches)[1]	Depth to Invert (inches)[1]	Remarks	Sample Number	Matrix	Justification for Sample point	Parameters to be collected
SUMP32	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the central area of the former TNT mix storage tanks.	Dry	12	Filled halfway to surface with soil and detritus.	SUMP32S	Sediment	This location is near the presumed location where EA Engineering collected a sediment sample. PCBs, Pesticides, and PAHs were detected in sediment from previous sump samples.	Metals PCBs PAHs Pesticides Radionuclides
SUMP33	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the north-central area of the former TNT mix storage tanks.	Dry	22	Some detritus noted in the sump.			No sample planned for this location	
SUMP34	Acidification Area	This standard 30” x 45” brick lined sump with a 10” VCP is located at the northern end of the former TNT mix storage tanks.	Dry	12	This sump is halfway filled to the surface with soil and detritus. It appears as if this sump had been previously excavated.			No sample planned for this location	
SUMP35	Shops Area	This concrete sump is located on the Garage and Repair Shop foundation slab south of Z Street.	14	35	This sump is a 3’ x 25’ pit filled with concrete rubble. A sheen was present on the water in the sump and 5” of sediment was noted.	SUMP35W SUMP35S	Water Sediment	Due to the location of this sump and the indicated sheen on the water, samples will be collected at this point.	VOC SVOC Radionuclides
OUTFALL 01	Uninvestigated Area	This outfall is located north of O Street and east of the Central Ditch.	NA	NA	This outfall is a pipe buried within the side slope of the Central Ditch. No exposed pipe or manhole was present.			No sample planned for this location	
OUTFALL 02	Uninvestigated Area	This outfall is located south of N Street and east of the Central Ditch.	NA	NA	This outfall is an exposed wood pipe banded with steel buried within the side slope of the Central Ditch. The pipe is in bad repair.			No sample planned for this location	

TABLE 3

RESULTS OF SURVEY AND RATIONALE FOR SELECTION OF SAMPLING LOCATIONS FROM PIPES, ASSOCIATED SUMPS, AND OUTFALLS NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION LEWISTON, NEW YORK

Notes:

1	Depth to Water and Depth to Invert were measured from the top of the pipe rim or sump rim. Depth to invert was measured to the detritus or to the bottom of the pipe or sump, whichever was encountered first.
NA	Not Applicable
VOC	Volatile Organic Compounds
SVOC	Semi-volatile Organic Compounds
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
VCP	Vitrified Clay Pipe
TNT	Trinitrotoluene
NYSDEC	New York State Department of Environmental Conservation
TAGM	Technical and Administrative Guidance Manual

Dissolved metals will be analyzed for water samples only. Dissolved radionuclide analyses will be conducted only if the total radionuclide concentrations exceed the screening criteria.

TABLE 4

PIPE AND SUMP SAMPLE LOCATIONS AND ANALYSES REQUIRED
NIAGARA FALLS STORAGE SITE - PIPELINE 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	Pesticides	PCBs	Metals	Radiological Isotopes	Total U	PAHs	Nitroaromatics
NFSS01PIPE15S-2054	Acidification Area	MARSSIM UNIT 4D	Sediment		X			X	X	X		X	
NFSS01PIPE23S-2055	Acidification Area	MARSSIM UNIT 4D	Sediment		X			X	X	X		X	
NFSS01PIPE28W-2056	Acidification Area	MARSSIM UNIT 4C	Water	QC-2057, QA, MS/MSD	X	X			X	X			
NFSS01PIPE28S-2058	Acidification Area	MARSSIM UNIT 4C	Sediment		X	X			X	X			
NFSS01PIPE33S-2059	Acidification Area	MARSSIM UNIT 4C	Sediment				X		X	X		X	
NFSS01PIPE41S-2060	Acidification Area	MARSSIM UNIT 4D	Water	QC-2061 (PAHs only)					X	X		X	
NFSS01PIPE42S-2062	Acidification Area	MARSSIM UNIT 4D	Sediment		X	X			X	X			
NFSS01PIPE47S-2063	Acidification Area	MARSSIM UNIT 4F	Sediment						X	X		X	
NFSS01PIPE57S-2064	Acidification Area	MARSSIM UNIT 4F	Sediment				X		X	X		X	
NFSS01PIPE63S-2065	Acidification Area	MARSSIM UNIT 4F	Sediment					X	X	X		X	
NFSS01PIPE72S-2066	Acidification Area	MARSSIM UNIT 4B	Sediment	MS/MSD		X	X	X	X	X			
NFSS01PIPE74W-2067	Shops Area	MARSSIM UNIT 3B	Sediment		X				X	X		X	
NFSS01PIPE74S-2068	Shops Area	MARSSIM UNIT 3B	Sediment	QA	X				X	X		X	
NFSS01SUMP02S-2069	Acidification Area	MARSSIM UNIT 4C	Sediment						X	X		X	
NFSS01SUMP07S-2070	Acidification Area	MARSSIM UNIT 4C	Sediment			X	X			X			
NFSS01SUMP13S-2071	Acidification Area	MARSSIM UNIT 4D	Sediment		X			X		X		X	
NFSS01SUMP14S-2072	Acidification Area	MARSSIM UNIT 4C	Sediment			X	X			X			

TABLE 4

PIPE AND SUMP SAMPLE LOCATIONS AND ANALYSES REQUIRED
NIAGARA FALLS STORAGE SITE - PIPELINE 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	Pesticides	PCBs	Metals	Radiological Isotopes	Total U	PAHs	Nitroaromatics
NFSS01SUMP19S-2073	Acidification Area	MARSSIM UNIT 4D	Sediment			X	X	X		X			
NFSS01SUMP25S-2074	Acidification Area	MARSSIM UNIT 4D	Sediment							X		X	
NFSS01SUMP32S-2075	Acidification Area	MARSSIM UNIT 4B	Sediment	QC-2076			X	X	X	X		X	
NFSS01SUMP35W-2077	Shops Area	MARSSIM UNIT 3B	Water		X	X				X			
NFSS01SUMP35S-2078	Shops Area	MARSSIM UNIT 3B	Sediment	QC-2079	X	X				X			

TABLE 5

MINIMUM SAMPLE VOLUMES
NIAGARA FALLS STORAGE SITE – PIPELINE INVESTIGATION
LEWISTON, NEW YORK

Following is a listing of minimum sample volumes/weights required for one analysis of each individual parameter. Please note that these quantities do not allow sufficient sample for any reanalysis necessitated by QC requirements or as additional sample volume in the case of broken sample bottles or samples where the integrity of the sample has been jeopardized.

WATER SAMPLES

PARAMETER	*MATRIX*	*MINIMUM SAMPLE VOLUME*
Volatiles	Water	40 mls
SVOCs	Water	1 liter
PCBs	Water	1 liter
Total Metals	Water	0.5 liter
Dissolved Metals	Water	0.5 liter
Rad (α and δ spec, Tot U)	Water	4.5 liter
Gross α/β	Water	0.1 liter
Nitroaromatics	Water	1 liter

SEDIMENT SAMPLES

PARAMETER	*MATRIX*	*MINIMUM SAMPLE VOLUME*
Volatiles	Sediment	Approx. 50 grams (*)
SVOCs	Sediment	50 grams
Pesticides	Sediment	50 grams
PCBs	Sediment	50 grams
Total Metals	Sediment	100 grams
Rad (α and δ spec, Tot U)	Sediment	200 grams
Gross α/β	Sediment	50 grams
Nitroaromatics	Sediment	50 grams

* (one 5 gram water preserved aliquot plus one 5 gram methanol preserved aliquot and an additional 50 grams for percent moisture determination)

FIGURES

CVVM CHEMICAL SERVICES, INC.

NIAGARA MOHAWK POWER CORPORATION

MH 15
MH 16
MH 13
MH 29
MH 12
MH 43
MH 44
MH 42
MH 41
MH 45
SUMP 35
PIPE 74
MH 46
DEBRIS
MH 10
MH 03
MH 05
MH 04
MH 09
MH 01
BLDG 403
BLDG 429
BLDG 401
DECON PAD
JOB TRAILER
PARKING LOT
MH 02
MH 06
MH 07
MH 08
INTERIM WASTE CONTAINMENT STRUCTURE
PROPERTY BOUNDARY
MODERN LANDFILL INC.
OPEN STORAGE
SCALE
SCALE

RUBBLE FILLED DEPRESSION
RUBBLE FILLED DEPRESSION
PIPE 15
SUMP 07
MH 32
MH 19
MH 30
MH 31
MH 33
SUMP 13
PIPE 28
SUMP 02
PIPE 72
SUMP 32
SUMP 14
PIPE 33
PIPE 23
MH 26
SUMP 19
PIPE 41
MH 35
MH 22
PIPE 47
PIPE 63
SUMP 25
PIPE 42
PIPE 57
MH 37
MH 24

MODERN LANDFILL INC.

LEGEND

- FOUNDATION
- FORMER RAILROAD LOCATIONS
- PROPERTY BOUNDARY
- BLDG., SLAB, OR RUIN
- FENCE
- PAVED ROAD
- MANHOLE SAMPLING LOCATION
- SUMP SAMPLING LOCATION
- PIPE SAMPLING LOCATION

N

300 150 0 150 300FT

SCALE: 1"= 300'

Revisions

Symbol	Descriptions	Date	Approved

MAXIM TECHNOLOGIES SAINT LOUIS

Site Reconnaissance: JLR/TCB

Drawn by: MEM

Checked by: TML

Reviewed by: JLR

Approved by:

US Army Corps of Engineers

MANHOLE, PIPELINE, AND SUMP SAMPLING LOCATIONS NIAGARA FALLS STORAGE SITE NIAGARA COUNTY NEW YORK

Scale: 1" = 300'

Date: 03-06-02

Drawing Number:

FIGURE NUMBER: 1

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Sheet 1 of 1

FIELD SAMPLING PLAN ADDENDUM
PIPELINE INVESTIGATION

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

Contract: DACW-49-97-D-001

Prepared For:

U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

August 2002
9905006

MAXIM TECHNOLOGIES INC

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Addendum to the Field Sampling Plan Addendum - Pipeline Investigation at the Niagara Falls Storage Site

This addendum provides an alternate methodology for sample collection in lieu of excavating near some of the vitrified clay pipes and concrete sumps. This addendum was prepared in response to USACE comment that Maxim refrain from trenching at several locations (detailed in Table 4 of the original addendum) not undergoing geophysical analysis at the NFSS. The addendum also addresses analytical methods and analytes to be used for polycyclic aromatic hydrocarbon (PAH) analysis.

Sample Collection Methodology Change

If existing material located within the vitrified clay pipes is insufficient for the sample analysis, as a replacement of the excavation of the existing pipelines, soil samples will be collected with a hand auger. The sample locations will be adjacent to or as close as possible to the vitrified clay pipe or elbow as previously discussed in the original addendum. While augering, examination of the soil strata with photoionization detectors and radiation meters, as well as visual and olfactory observations will be made. The top of the sample will be collected at the bottom of the pipe or pipe elbow invert. The base of the sample will be located 0.5 feet below the invert The depth below the ground surface of each invert is listed in Tables 1 and 3 of the original addendum.

PAHs

As stated in the second paragraph of Section 3.5, "Since previous sampling results have indicated the potential for the detected semi-volatile organic compounds (SVOCs) to be in the PAH range, PAHs will be collected in lieu of SVOCs in some of the proposed locations." The laboratory for this project, General Engineering Laboratories (GEL) does not perform PAH testing by HPLC methodology (Method 8310) and reports the PAH target compounds as a subset of their SVOC analysis (Method 8270). Since the same method is utilized to analyze both the scheduled PAH and SVOC samples, it is recommended that the full SVOC reporting list be generated for each of the planned SVOC and PAH samples.