Formerly Utilized Sites Remedial Action Program (FUSRAP)

FUSRAP

ENVIRONMENTAL SURVEILLANCE PLAN

ENVIRONMENTAL SURVEILLANCE PLAN
FOR NIAGARA FALLS STORAGE SITE

US Army Corps of Engineers Buffalo District

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(Continued)

FIGURES

TABLES

ACRONYMS

AEC	Atomic Energy Commission
ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate requirement
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	chain of custody
DCG	derived concentration guide
DOE	Department of Energy
DQO	data quality objective
EA	environmental assessment
ED	effective dose
EE/CA	engineering evaluation/cost analysis
EIS	environmental impact statement
EML	Environmental Measurements Laboratory
EPA	Environmental Protection Agency
ESP	environmental surveillance plan
FFA	federal facility agreement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FSRD	Former Sites Restoration Division
FUSRAP	Formerly Utilized Sites Remedial Action Program
GC-EC	gas chromatography/electron capture
GC/MS	gas chromatography/mass spectrometry
GFAA	graphite furnace atomic adsorption
HWP	hazardous work permit
ICPAES	inductively coupled plasma atomic emission spectrophotometry
ID	identification
IG	instruction guide
KPA	kinetic phosphorescence analysis
LCS	laboratory control sample
LEL	lower explosive limit
LOOW	Lake Ontario Ordnance Works
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MED	Manhattan Engineer District
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NFSS	Niagara Falls Storage Site
NHPA	National Historic Preservation Act
NIST	National Institute for Standards and Technology
NL	National Lead
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NYSDEC	New York State Department of Environmental Conservation
PCB	polychlorinated biphenyl

(Continued)

PERALS	photon/electron-rejecting alpha liquid scintillation
PI	project instruction
PP	project procedure
PPE	personal protective equipment
QA	quality assurance
QAP	Quality Assurance Plan
QAT	Quality Assurance Team
QC	quality control
RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
RPD	relative percent difference
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SRM	standard reference material
SSHR	site safety and health representative
S/RID	Standards/Requirements Identification Document
TCLP	toxicity characteristics leaching procedure
TDS	total dissolved solids
TETLD	tissue-equivalent thermoluminescent dosimeter
TLD	thermoluminescent dosimeter
TOC	total organic carbon
TOX	total organic halides
TPH	total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
USACE	United States Army Corps Of Engineers
VOC	volatile organic compound
WCS	waste containment structure

UNITS OF MEASURE

cm	centimeter
ft	foot
g	gram
h	hour
ha	hectare
km	kilometer
L	liter
µg	microgram
µmhos	micromhos
µR	microroentgen
m	meter
mg	milligram
mi	mile
mL	milliliter
mR	milliroentgen
mrem	millirem
pCi	picocurie
ppb	parts per billion
ppm	parts per million
yd	yard
yr	year

1.0 INTRODUCTION

1.1 BACKGROUND

1.1.1 SITE LOCATION AND DESCRIPTION

NFSS is located at 1397 Pletcher Road in the Township of Lewiston in northwestern New York, approximately 13 km (8 mi) northeast of Niagara Falls and 6 km (4 mi) south of Lake Ontario (Figure 1). Presently, the site is situated on approximately 77 ha (191 acres). The site property includes a three-story building (Building 401) with three adjacent silos, an office building (Building 429), a small storage shed, a storage building (Building 403), and a 10-acre waste containment structure (WCS). The WCS is a clay-lined, clay-capped, grass-covered storage pile. The containment cover consists of 1 m (3 ft) of compacted clay covered by 0.5 m (1.5 ft) of topsoil and grass. The material in the WCS consists of low-level radioactive residues and wastes of by-products of uranium extraction of pitchblende (uranium ore). The property is entirely fenced, and public access is restricted.

Land use in the region is predominantly rural; however, the site is bordered by a chemical waste disposal facility (ChemWaste) on the north, a solid waste disposal facility (Modern Disposal) on the east and south, and a Niagara Mohawk Power Corporation right-of-way on the west. The nearest residential areas are approximately 1.1 km (0.68 mi) southwest of the site; the residences are primarily single-family dwellings. The population within an 80-km (50-mi) radius is approximately 4.9 million (1990 Census).

1.1.2 SITE HISTORY

The site originated during World War II, when Manhattan Engineering District (MED), predecessor to the Atomic Energy Commission (AEC), used part of the Army's Lake Ontario Ordnance Works (LOOW) as a shipment and storage site for radioactive materials from the site. The site was also used for producing nonradioactive boron-10 (1954 through 1958 and 1964 through 1971). However, the primary use of the site (1944 to present) has been for the storage of radioactive byproducts of uranium production. The residues with the highest levels of radioactivity were stored in abandoned buildings, while low-level wastes were deposited in pits or piled on surface soils. As a result of storage operations, some of the stored radioactive materials migrated onto portions of the former LOOW (other than the present NFSS) due to erosion, chiefly through drainage ditches.

Remediation of radioactive residuals at NFSS began in 1982 and continued until 1986. Materials moved from vicinity properties and NFSS and soils excavated from onsite and offsite drainage areas were placed in the WCS waste storage area. Materials generated during remedial actions are encapsulated in the WCS [approximately 190,000 m^3 (249,000 yd^3)]. During 1996, Building 401 was partially decontaminated, but still requires extensive decon. Currently, the site is owned by the U.S. Department of Energy (DOE).

1.1.3 GEOLOGY/HYDROGEOLOGY/HYDROLOGY

The site is located in the Central Lowland Physiographic Province, a part of the Erie-Ontario Lowland. Regionally, the area has been significantly affected by glacial activity. Approximately 12 m (40 ft) of glacial till and glaciolacustrine deposits overlie the shale bedrock beneath the site. These deposits and tills have a high clay content.

Four unconsolidated units and one bedrock unit are readily identified in the subsurface at the site. The uppermost unit is referred to as the Brown Clay unit and is composed of a low-permeability silty clay till. Discontinuous sand lenses have been identified and mapped within this unit. The Brown Clay unit is underlain by the Gray Clay unit, a glaciolacustrine clay present across the entire site. The Gray Clay unit also exhibits a very low permeability. Below the Gray Clay is a second glaciolacustrine unit, the Sand and Gravel unit. This unit exhibits the highest permeability of the units identified in the shallow unconsolidated subsurface materials at the site. The Sand and Gravel unit is underlain by a dense, silty, glacial till referred to as the Red Silt unit, which exhibits very low permeability. Beneath the Red Silt is the bedrock unit, the Queenston Shale which occurs at depths of 40 to 45 feet.

Groundwater occurs in both the unconsolidated deposits and the bedrock shale. In the unconsolidated deposits, two distinct groundwater systems are identified: the upper groundwater system, which occurs within the Brown Clay unit, and the lower groundwater system, which occurs within the Sand and Gravel unit, the Red Silt unit, and the weathered portion of the bedrock shale. The glacial till, lacustrine clay, and Queenstown shale units are all poor aquifers with very low permeability and transmissivity.

The bedrock groundwater system occurs within the unweathered portion of the bedrock shale. Regionally, groundwater flows northwestward toward Lake Ontario. Locally, dewatering at the adjacent solid waste disposal facility is thought to have caused a reversal of groundwater flow in the lower groundwater system. This localized groundwater reversal in the lower groundwater system does not affect the entire site.

Surface drainage from the site originally entered Fourmile, which flows to Lake Ontario, Sixmile, and Twelvemile Creeks, which all flow northward to Lake Ontario. In the 1940s, a system of drainage ditches was installed to drain surface water to a central drainage ditch. Currently, surface runoff is diverted into the central drainage ditch, the west ditch, south-16 and the south-31 ditch. The west and south-31 ditches drain directly into the central drainage ditch, which flows northward and discharges into Fourmile Creek. Sixmile and Twelvemile Creeks do not currently receive NFSS runoff.

1.1.4 FUSRAP

The Formerly Utilized Sites Remedial Action Program (FUSRAP) is a U.S. Army Corps of Engineers (USACE) environmental cleanup program. Technical, administrative, and financial management of FUSRAP activities are the responsibility of the USACE. The need for implementing environmental surveillance and monitoring for constituents of concern will be assessed at the Niagara Falls Storage Site (NFSS). In keeping with the remedial activities and objectives of FUSRAP, USACE currently conducts environmental surveillance at NFSS.

Two distinct activities comprise the monitoring program at NFSS: environmental monitoring and environmental surveillance. Although they are similar, it is important to clearly establish the difference between these two activities. Environmental monitoring consists of measuring the quantities and concentrations of pollutants in solid wastes, liquid effluents, and air that discharge directly to the environment from onsite activities. Environmental surveillance documents the effects, if any, activities onsite and offsite environmental and natural resources. At FUSRAP sites, because there are no onsite waste treatment facilities with point discharges, the monitoring program consists primarily of environmental surveillance. The scope of this document is to provide the basic framework and site-specific activities associated with environmental surveillance. The surveillance program has been designed to achieve the following objectives:

- to ensure that the public and the environment are adequately protected from contaminants present at the sites;
- gathering data for evaluation to verify compliance with environmental commitments made by DOE in federal facility agreements (FFAs), environmental impact statements (EISs), environmental assessments (EAs), safety analysis reports, the Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC) regulations;
- to provide continuing assessment of the environmental media;
- to provide a continuing assessment of pollution abatement programs; and

- to identify and quantify new or existing environmental quality problems.
- use of DOE Order 5400.1 and 5400.5 as guidance.

Environmental surveillance activities are regulated by applicable federal, state, and local laws. Requirements for radioactive materials can be found in EPA and NYSDEC regulations.

Atmospheric releases of radioactive materials are regulated by 40 Code of Federal Regulations (CFR) Part 61 (Subparts H and Q) of the Clean Air Act, National Emission Standards for Hazardous Air Pollutants (NESHAPs).

In addition to DOE, EPA, and NYSDEC regulations, other federal acts and regulations may also apply to the NFSS site. Two federal acts with particular importance to environmental surveillance activities are the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Environmental Policy Act (NEPA). CERCLA provides the framework for the systematic investigation, remedial design, and Remediation of contaminated sites. Other relevant regulations include the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Safe Drinking Water Act (SDWA), and state and local regulations.

1.2 ESP SCOPE

This section presents the environmental surveillance plan (ESP) for NFSS where USACE currently conducts environmental surveillance.

The ESP is implemented by USACE, which details surveillance equipment and sampling protocols for external gamma radiation exposure, atmospheric surveillance (radon), groundwater, surface water, and sediment. This ESP has been developed to meet quality assurance (QA) objectives contained in the FUSRAP Quality Assurance Program Plan.

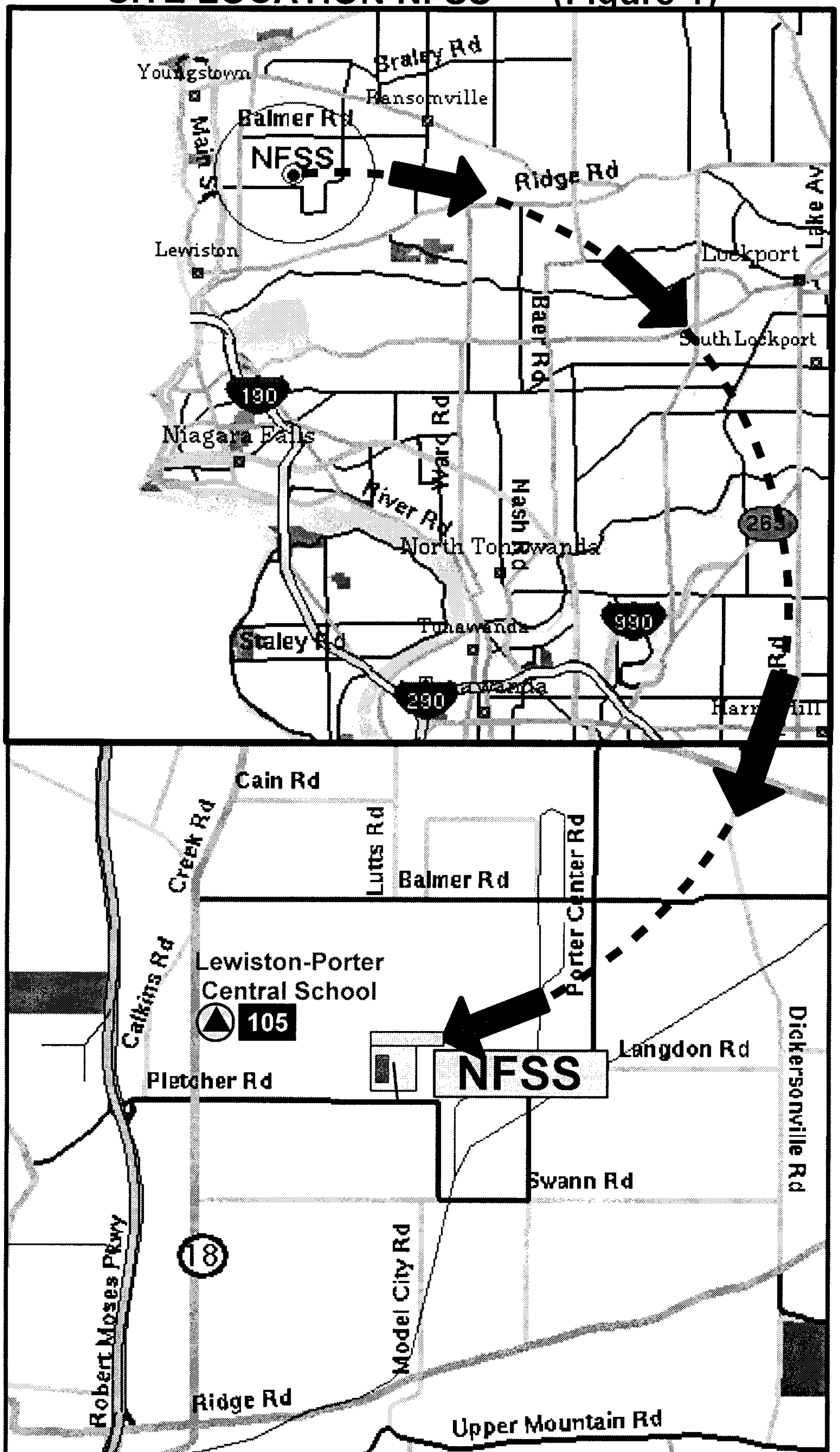
Table 1 presents an overview of the environmental surveillance program contained in this ESP.

1.3 ESP REVISION

This ESP will be revised annually by USACE and whenever a significant change occurs in site conditions, or when required by changes in the regulatory environment. The ESP will be revised if it does not adequately protect USACE and contract personnel, the general public, or the environment. It is the responsibility of USACE to revise the ESP as needed. Before the plan is implemented, the revised sections of the ESP will undergo internal multi disciplinary review by USACE.

The ESP is a controlled document that will be maintained by USACE. The ESP and approved revisions will be issued to document holders via a document issue memorandum by USACE.

SITE LOCATION NFSS (Figure 1)



Radon-220/Radon-222 Average Concentration Monitoring
External Gamma (Monitors located at Lewiston-Porter

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Table 1: Overview of NFSS Environmental Surveillance Program

Surveillance Parameter		Number of Surveillance Locations	Sampling Event Quarter
External gamma radiation:	TLD monitors used for 6 month .	21	Q1, Q3
Atmospheric:			
Radon-222/ Radon-220	Monitors used for 6 and 12 month for combined Radon-220 and Radon-222. Monitors placed in various locations on site and one(1) location off-site.	21	Q1,Q3
Radon Flux	Storage Pile for Radon-222 (NESHAP requirement)	180	Q3
Groundwater:			
Field parameters	Temp, pH, Specific Conductance, Dissolved Oxygen, Oxidation/Reduction Potential, Turbidity, Volume purged	8	Q2
Radiological	Radium-226&228, Thorium-230, Thorium-232, Uranium-234, Uranium-235, Uranium-238, Total Uranium	8	Q2
Metals	Copper, Lead, Vanadium	8	Q2
Water Quality	Alkalinity, Bicarbonate, Calcium, Carbonate, Chloride, Fluoride, Magnesium, Nitrate as N, Nitrite, Phosphate, Potassium, Sodium, Sulfate, Total dissolved solids	8	Q2
Water Level	Groundwater level measurements	66	Q1, Q2, Q3, Q4
Surface water:			
Field parameters	Temp, pH, Specific Conductance, Dissolved Oxygen, Oxidation/Reduction Potential, Turbidity	5	Q2
Radiological	Radium-226&228, Thorium-230, Thorium-232, Uranium-234, Uranium-235, Uranium-238, Total Uranium	5	Q2
Sediment:			
Radiological	Radium-226&228, Thorium-230, Thorium-232, Uranium-234, Uranium-235, Uranium-238, Total Uranium	5	Q2
Stormwater:			
Field parameters		--[a]	-
Radiological		--[a]	-
Settleable Solids		--[a]	-
Organic compounds		--[a]	-

a. Storm water permit does not require sample collection.

2.0 REGULATORY COMPLIANCE

The primary regulatory guidelines that affect activities at NFSS are found in major DOE Orders, federal statutes, and federal regulations. As NFSS is a DOE owned site, USACE will follow DOE Orders 5400.5 at a minimum, and follow more stringent regulations where they apply.

Clean Air Act

Section 112 of the Clean Air Act authorized EPA to promulgate NESHAPs, which is applicable to DOE owned sites such as NFSS under Subparts H, Q, and M. The soils containing radioactive material have been incorporated into the WCS, which is designed to prevent fugitive emission releases at a efficiency of 99.999 percent. Since 1992 radon flux monitoring results have been significantly less than 20pCi/m^2-s. This is in compliance with the NESHAPs Subpart Q standard. A Memorandum of Understanding (MOU) between EPA and DOE states that based on the successful demonstration of compliance with the standard, formal reports no longer are submitted to the EPA. Radon flux monitoring continues on a annual basis and data is provided informally to EPA Region II as requested by DOE. If future operations change the configuration of the WCS so that a potential release of radionuclide is created, then the notification and modeling requirements of 40 CFR Part 61, Subpart H, will once again be applicable to NFSS.

Compliance with the nonradon radionuclide standard (Subpart H) is verified by applying the EPA-approved CAP88-PC model. Radon flux monitoring is continuing in compliance with Subpart Q of NESHAPs.

Asbestos is present in an onsite burial area. Subpart M applies to the buried asbestos only if excavation occurs; however, long-term storage is planned for the buried material, and excavation is not anticipated.

Clean Water Act

USACE has obtained a general Storm water discharge permit from NYSDEC, as required by EPA Storm water regulations. The general permit does not require site monitoring unless changes in site activities are made that would influence Storm water discharge.

Resource Conservation and Recovery Act

No RCRA-regulated wastes at NFSS.

Toxic Substances Control Act

There are no TSCA-related substances at NFSS.

Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA, as amended by the Superfund Amendments and Rehabilitation Act (SARA), is the primary source of statutory authority for the remediation of sites containing hazardous substances. However, the NEPA ROD supported the storage of wastes and residues in the WCS in 1986, before SARA made CERCLA applicable to federal facilities. If further remedial activities at NFSS (such as the removal and management of the WCS wastes and residues) are necessary, they will be conducted under CERCLA authority.

National Environmental Policy Act

The remedial activities at NFSS were evaluated under the NEPA process. An EIS was issued in 1986 to evaluate long-term disposition of the WCS. Consistent with the EIS and the ROD, DOE had chosen long-term, in-place management of the waste pile. This has yet to be evaluated by USACE. The WCS was designed to meet the goals of protecting human health and the environment.

Other Major Environmental Statutes and Executive Orders

The following major environmental statutes and executive orders were also reviewed.

- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA): There are no substances regulated by this act at NFSS.

- Endangered Species Act: There are no endangered species at NFSS.

- MCLs and MCLGs established under the SDWA are potential remediation goals for groundwater at FUSRAP sites and may be identified as ARARs for CERCLA actions. NYSDEC has adopted these federal standards into its own regulations in 6 NYCRR Parts 700-705, "Water Quality Regulations for Surface and Groundwater." NFSS is a CERCLA potential site under the responsibility of USACE. NYSDEC MCLs and MCLGs have been identified as groundwater protection criteria at the site. Groundwater data collected at NFSS are compared with the New York water quality regulation to determine compliance.

- NHPA is the primary source of statutory authority related to the preservation of cultural and historic resources. The New York State Historic Preservation Office was contacted to determine whether NFSS was considered for inclusion in the National Registry for Historic Places; activities at NFSS are not affected at this time.

- Executive Order 11988 (Floodplain Management) requires federal agencies to provide protection to flood plains by reducing the risk of flood loss, minimizing the impact of floods on human safety, health, and welfare, and restoring and preserving the natural and beneficial values served by flood plains. Federal agencies must determine whether any proposed actions will occur in a floodplain. Except for the central drainage ditch, the site is above the 100-yr floodplain as noted in DOE's *Failure Analysis Report* (DOE 1994). Presently, no actions have affected flood plains at NFSS. Any proposed action will be evaluated to determine whether it will occur in a floodplain; the appropriate notifications would be implemented at that time.

- Executive Order 11990 (Protection of Wetlands) requires federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial value of wetlands. Federal agencies must determine whether any proposed action will affect the integrity and quality of wetlands. Presently, no actions have affected wetlands at NFSS. Proposed action will be evaluated to determine whether it will affect any delineated wetlands at the site.

3.0 SAMPLING RATIONALE

The overall goals of the environmental surveillance program at NFSS are to provide:
- a historical perspective of contaminant levels in various media;
- to provide a timely indication of releases or migration; and
- to provide an indication of the magnitude and extent of any release or migration that might occur.

Environmental surveillance activities are necessary at NFSS to ensure that onsite waste does not pose a threat to human health and the environment through inadvertent or unanticipated release or migration. These monitoring activities include the surveillance of all credible transport pathways; the selection of suitable surveillance locations; and the application of appropriate sampling methods, techniques, and analyses. To achieve this goal, the program has been designed to meet the applicable requirements of applicable federal, state, and local regulations.

Radioactive material at NFSS is primarily present in the WCS, although some radioactive material is present in and outside of Building 401. Since the radioactive material is isolated within the WCS, exposure is not likely to occur. However, potential exposure to this material through air, groundwater, surface water, or stream bed sediments is considered. The environmental surveillance program at NFSS has been developed to provide direct surveillance of these potential exposure routes through periodic sampling and analysis of radioactive, metal, and chemical constituents. Table 1 presents the environmental surveillance program implemented at NFSS and indicates surveillance parameters, frequency and media. Tables 2 through 4 provide supplemental information and detail the sampling locations, media, analytes, QC samples, and frequency.

The radioactive material at NFSS originated primarily from the storage and shipment of wastes and residues that resulted from the processing of uranium from ore at other facilities. NFSS was used by MED as a storage and shipment facility for radioactive materials. The stored wastes and residues contain elevated levels of radioactive constituents such as uranium, radium, and thorium and a variety of metals. The environmental surveillance program at NFSS requires analysis and measurement of these radioactive constituents and metals in the air, groundwater, surface water, and stream bed sediments.

Atmospheric monitoring and measurement include analysis for radon-222 and radon-220 and external gamma radiation at fence line locations surrounding NFSS and the WCS to assess potential exposure levels to the public and site workers. Atmospheric monitoring and measurement of radon-flux rates are periodically conducted at discrete grid intersections on top of the WCS.

Groundwater monitoring wells selected in Table 2, a subset of the total installed wells, explains location rationale for background, down gradient, and source-area groundwater quality conditions in both the upper and lower groundwater systems. Groundwater monitoring includes analysis for radioactive constituents and metals.

Surface water and stream bed sediment sampling occurs along the drainage ditch system to assess upstream, onsite, and downstream contamination levels. Surface water and stream bed monitoring includes analysis for radioactive constituents.

Sampling rationale for groundwater, surface water and sediment is presented in Table 2.

Table 2: **Sampling Rational for Groundwater, Surface Water, and Sediment at NFSS**

Sampling Location	Frequency	Radiological Analyses	Chemical Analyses	Sampling Location Rationale
Ground Water				
OWO4B	Annually	X	X	Intercepts groundwater flow between and central drainage ditch and potential contaminants released to the north of the waste containment structure (WCS).
OW06B	Annually	X	X	Intercepts groundwater flow between the pile and central drainage ditch.
OWO7B	Annually	X	X	Monitors potential contaminants released from the pile on the south.
OW15B	Annually	X	X	Monitors potential contaminants released from the pile on the west.
OW17B	Annually	X	X	Monitors potential contaminants released from the pile on the west
A45	Annually	X	X	Intercepts groundwater flow between pile and central drainage ditch.
A50	Annually	X	X	Intercepts groundwater flow between pile and central drainage ditch and potential contaminants released to the east of the WCS.
B02W20S	Annually	X	X	Up gradient - Background
Surface Water and Sediment				
SWSD009	Annually	X		Up gradient / background
SWSD010	Annually	X		Monitor potential contaminant migration from waste containment structure (WCS)
SWSD011	Annually	X		Down gradient - monitor potential contaminant migration from the WCS at site boundary.
SWSD021	Annually	X		At site boundary - monitor surface quality entering the site.
SWSD022	Annually	X		At confluence of South 16 Ditch and Central Drainage Ditch.

4.0 ENVIRONMENTAL MONITORING

As indicated in Section 1.0, activities include both environmental monitoring and environmental surveillance. Environmental monitoring consists of measuring the quantities and concentrations of pollutants in solid wastes as well as in liquid and airborne discharges from onsite waste treatment or disposal activities. Environmental monitoring activities are discussed in the following sections. Table 3 presents the analytes, detection limits, and media included in the environmental monitoring program at NFSS. Table 4 contains media preparation and determinative methods.

4.1 LIQUID EFFLUENTS

Liquid effluent monitoring is not conducted at the NFSS site because this site is not an operating facility, onsite waste treatment facilities with point discharges are not present. Liquid effluents generated at the site as a result of environmental surveillance activities (e.g., sampling equipment decontamination rinsate) or during site remediation (e.g., pile removal) may be retained onsite, sampled, and disposed of in accordance with federal and state regulations.

4.2 AIRBORNE EFFLUENTS

Since it is a DOE facility NFSS is required to comply with the requirements of 40 CFR Part 61, NESHAPs, Subparts H and Q. Radiological doses to the public from airborne contaminants are evaluated annually using the Environmental Protection Agency (EPA) CAP88-PC computer model (EPA 1992a).

Environmental surveillance data are used for radiological dose calculations to estimate the hypothetical dose received by individuals and collective populations from radioactive constituents originating at NFSS. Potential release modes, distances from release points to receptors, and climatological conditions are incorporated in this evaluation.

4.3 METEOROLOGICAL

NFSS is not an operating facility; therefore, detailed offsite meteorological data is obtained from the nearest National Weather Service Station (Niagara Falls International Airport).

Table 3
Analytes, Detection Limits, and Media

Contaminant	Media and Target detection Limits				
	Atmospheric	Groundwater	Surface Water	Sediment	Storm
RADIONUCLIDES					
Iso -Radium –226,-228	--	0.5 pCi/L	0.5 pCi/L	0.5 pCi/g	--
Iso –Uranium –234, 235, 238, by Summation	--	0.5 pCi/L	0.5 pCi/L	0.5 pCi/g	--
Iso –Thorium –230, -232	--	0.5 pCi/L	0.5 pCi/L	0.5 pCi/g	--
External gamma radiation	10 mrem/6 months	--	--	--	--
Radon-222 / Radon-220	0.3 pCi/L	--	--	--	--
Radon Flux	0.01 $pCi/m^2/s$	--	--	--	--
METALS					
Calcium	--	10 µg/L	--	--	--
Copper	--	6 µ g /L	--	--	--
Lead	--	1 µg / L	--	--	--
Magnesium	--	25 µg/L	--	--	--
Potassium	--	200 µg/L	--	--	--
Sodium	--	29 µg/L	--	--	--
Vanadium	--	8 µg /L	--	--	
WATER QUALITY					
Chloride	--	1 mg/L	--	--	--
Sulfate	--	0.5 mg/L	--	--	--
Phosphate -P	--	0.01 mg/L	--	--	--
Carbonate	--	5 mg/L	--	--	--
Bicarbonate	--	5 mg/L	--	--	--
Alkalinity	--	5 mg/L	--	--	--
Nitrate	--	0.05 mg/L	--	--	--
Total Dissolved Solids	--	10 mg/L	--	--	--

-- no analysis

Table 4
Media Determinative Methods

CONTAMINANT	ATMOSPHERIC	GROUNDWATER	SURFACE WATER	SEDIMENT
RADIONUCLIDES				
Isotopic Radium -223, 224, 226	--	DOE EML HASL 300 Series		
Isotopic Uranium –233/234, 235/236, 238	--	EPA 908.0		
IsotopicvThorium-228, 230, 232	--	DOE EML HASL 300 Series		
External gamma radiation	TLD	--	--	--
Radon-222 / Radon-220	RADONTRAK®	--	--	--
Radon Flux	Activated Carbon Canisters	--	--	--
METALS				
Calcium	--	EPA SW-846 6010B	--	--
Copper	--	EPA SW-846 6010B	--	--
Lead	--	EPA SW-846 6010B	--	--
Magnesium	--	EPA SW-846 6010B	--	--
Potassium	--	EPA SW-846 6010B	--	--
Sodium	--	EPA SW-846 6010B	--	--
Vanadium	--	EPA SW-846 6010B	--	--
WATER QUALITY				
Chloride	--	EPA 325.2	--	--
Sulfate	--	EPA 375.4	--	--
Phosphate –P	--	EPA 365.2	--	--
Carbonate	--	EPA 310.1	--	--
Bicarbonate	--	EPA 310.1	--	--
Alkalinity	--	EPA 310.1	--	--
Nitrate	--	EPA 353.2	--	--
Total Dissolved Solids	--	EPA 160.1	--	--

5.0 ENVIRONMENTAL SURVEILLANCE

Key components of the environmental surveillance program consist of:
- the monitoring of external gamma radiation exposure;
- the identification and quantification of contaminants of concern;
- the determination and surveillance of pathways through which contaminants might migrate or be migrating; and
- potential impact of contaminants on the environment and the public

Figure 3 illustrates the pathways by which the general public and the environment may be exposed to external gamma radiation and radioactive and/or chemical contaminants. Potential migration routes can occur via the atmosphere (as radon gas), surface water, sediment, and groundwater.

The following sections establish the plan for surveillance of the pathways that could potentially contribute to the exposure of individuals or the environment.

5.1 EXTERNAL GAMMA RADIATION SURVEILLANCE

The primary objectives of the external gamma radiation surveillance program are to:

- determine the external gamma radiation exposure rates in the vicinity of USACE operations;
- determine the hypothetical dose maximally exposed to members of the public;
- quantify maximum fence line and onsite exposure rates and total maximum exposure; and
- predict potential exposure to the public to determine whether near-term response actions are required

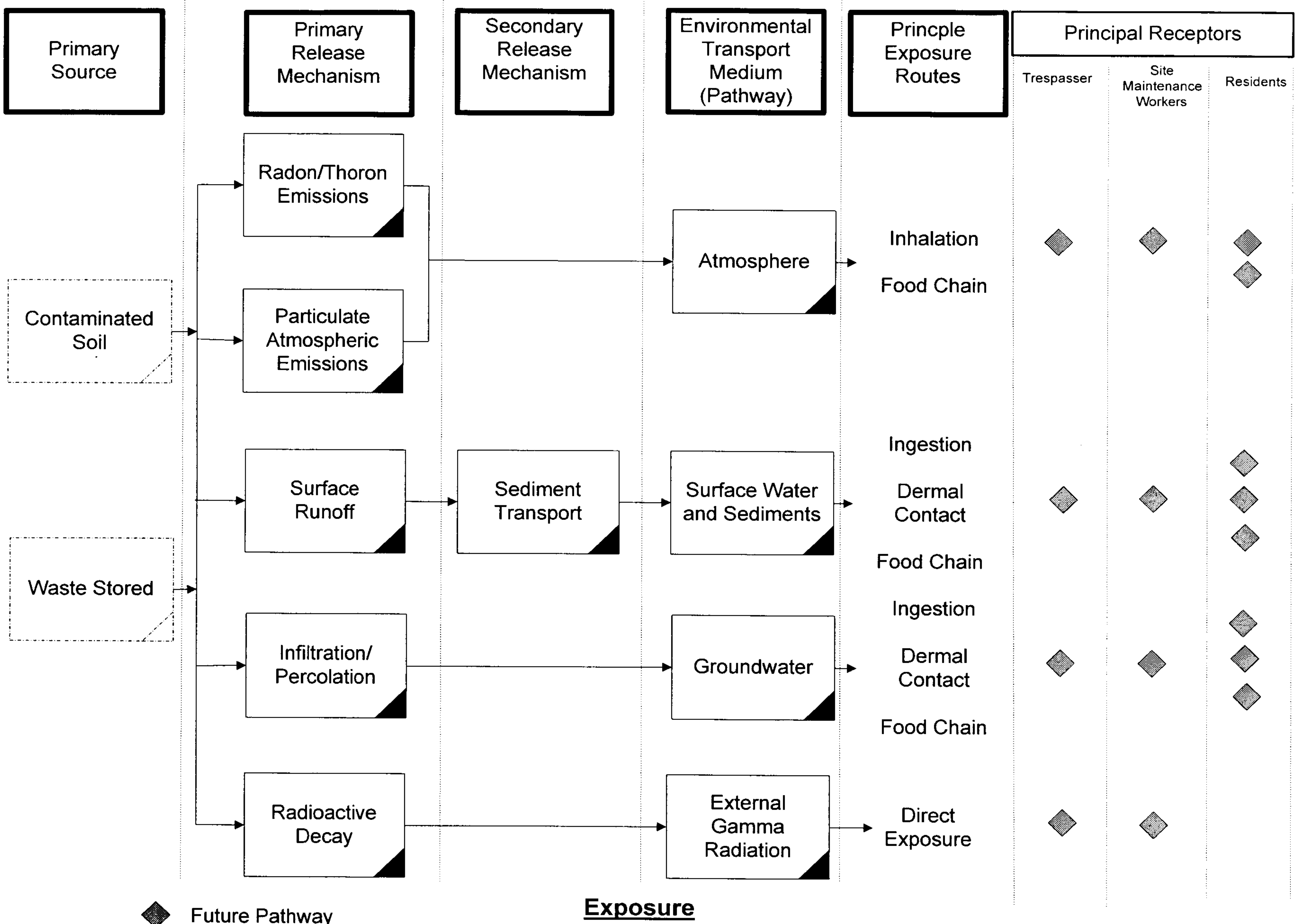
The external gamma radiation surveillance program must provide timely information on exposures rates considering information to potentially maximally exposed members of the public from both stable site conditions and unexpected releases. The information obtained from this program should be adequate to estimate the potential doses to the hypothetical maximally exposed individual and to site workers and the public in case of an accidental release.

5.1.1 External Gamma Radiation Detection Method

Gamma radiation exposure rates are determined using dosimeters that provide cumulative measurements. A thermoluminescent dosimeter (TLD), an integrating dosimeter, provides the total exposure at one location for a given time interval.
The TLD is aluminum oxide TLD dosimeter. When exposed to external gamma radiation, the aluminum oxide absorb and store a portion of the radiation energy. When heated, this stored energy is emitted as light, which can be amplified, measured, and used to calculate an equivalent dose. The response is corrected for the shielding effect of the housing; this corrected value is the committed effective radiation dose equivalent, expressed in mrem/yr.

A TLD station consists of a vertical support and a polyvinyl chloride holder assembly. Dosimeters are positioned approximately 1 m (3 ft) above the ground surface at both onsite and offsite locations.

Figure 3



Exposure Pathway Analysis

5.1.2 External Gamma Radiation Detector Location Rationale

The overall placement of external gamma radiation detectors is based on the ability of the TLDs to detect maximum exposure rates and on information obtained from radiological site characterization and previous gamma radiation surveillance results.

TLDs are positioned at onsite, fence line, and offsite locations according to the following specific rationale:

Onsite
- to determine the maximum exposure to onsite personnel, and
- to monitor known areas of elevated external gamma radiation;

Fence line
- to determine external gamma radiation exposures to potentially maximally exposed members of the public, and
- to demonstrate compliance with DOE environmental regulations and other applicable regulation guidance; and

Offsite
- to determine background external gamma radiation exposure rates.

Based on the data collected from the external gamma radiation surveillance, dosimeter locations may be added or deleted. Before these changes are made, the following factors must be considered:

- proximity to naturally occurring terrestrial radiation in geologic formations,
- proximity to buildings or structures that could alter measurements either by providing shielding or by contributing additional exposure to natural radioactivity associated with building materials,
- differences in local topography that could shield the dosimeters from gamma radiation being emitted from the site,
- security (from vandalism or theft) for offsite dosimeters, and
- legal access to offsite locations.

Table 5 presents the external gamma radiation location/rationale.

Table 5
External Gamma Radiation - Sampling Rationale

Sampling Location ID	Frequency	Radiological Analyses	Sampling Location Rationale
1	Semiannually	X	Onsite / along northern boundary
7	Semiannually	X	Onsite / along southern property boundary
8	Semiannually	X	Onsite / adjacent to WCS (western side)
10	Semiannually	X	Onsite / adjacent to WCS (western side)
11	Semiannually	X	Onsite / along property boundary (northwestern corner)
12	Semiannually	X	Onsite / along northern property boundary
13	Semiannually	X	Onsite / along western property boundary
15	Semiannually	X	Onsite / along western property boundary
18	Semiannually	X	Onsite / adjacent to WCS (northeastern side)
21	Semiannually	X	Onsite / adjacent to WCS (eastern side)
23	Semiannually	X	Onsite / adjacent to WCS (eastern side)
24	Semiannually	X	Onsite / adjacent to WCS (southern side)
28	Semiannually	X	Onsite / south central property boundary
29	Semiannually	X	Onsite / southwestern property boundary
36	Semiannually	X	Onsite / along western property boundary
105	Semiannually	X	Off-site / 1.0 mi west of NFSS
116	Semiannually	X	Off-site / 1.5 mi northeast of NFSS
120	Semiannually	X	Off-site / 1.5 mi southwest of NFSS
122	Semiannually	X	Onsite / along northern property boundary
123	Semiannually	X	Onsite / adjacent to South 16 Ditch and Campbell Street

5.1.3 External Gamma Radiation Measurement Frequency

One TLD will be placed at each station every January. Results from this surveillance program are used in the calculations that assess radiological exposure to the public. The number of TLDs required to complete the Gamma Radiation monitoring is displayed in Table 6.

5.1.4 Field Activities Quality Assurance

The specific QA requirements for external gamma radiation monitoring will be as follows:

- Chain-of-custody (COC) seals will be placed on the shipping containers.
- A "ship" dosimeter will accompany each shipment of gamma radiation dosimeters to and from the site to reveal any exposure incurred by the dosimeter before it is installed and after it is removed.
- Dosimeters will be installed as soon as practicable after receipt. Until they are installed, the dosimeters will be stored in a shielded pig or in an area with a general gamma radiation field of less than 7 μR/h. Storage area radiation exposure rates will be verified by instrument surveys every six months, and a record of the surveys will be maintained in the site files.
- After dosimeters are removed, they will be shipped as soon as practicable for analysis.
- "Ship" blanks will be used to ensure quality control.
- Dosimeter locations will be inspected for dosimeter loss, damage, proper housing height, signs of vandalism, theft, etc.

Table 6
External Gamma Radiation and Radon-222 / Radon-220

Measured Parameter	Station Identification	# Sample Locations				Sample Duplicate				Ship Blank/Control				TOTAL
		CY Quarter				CY Quarter				CY Quarter				
		1	2	3	4	1	2	3	4	1	2	3	4	
External gamma radiation (TLDs)[a]	1, 7, 8, 10, 11, 12, 13, 15,18, 21, 23, 24, 28, 29, 36, 105[b], 116[b], 120[b], 122, 123	20		20		1		1		1		1		44
Radon-222 / Radon-220		21		21		1		1						42
Radon-222 Flux	WCS (1-183)			183										183

a. TLD = Thermoluminescent Dosimeter
b. Background location.

5.2 RADON GAS SURVEILLANCE

The radon gas surveillance program includes the monitoring and evaluation of radon (radon-222 and radon-220). In addition, the NFSS storage pile will undergo radon flux measurements (radon-222) on an annual basis.

Radon gas consists of two isotopes, radon-220 and radon-222, which will be referred to in environmental surveillance documents as radon gas unless isotopic specificity is required. Radon-220 is the immediate decay product of radium-224, originating from thorium-232. Radon-222 is the immediate decay product of radium-226, originating from uranium-238.

Because radon is a gas, the main transport mechanism is via diffusion in air. Potential receptors of possible radon releases include onsite workers and members of the public who live or work near the site. Thus, the radon gas surveillance activities are designed to

- determine radon concentrations onsite and at the fence line,
- determine background radon concentrations, and
- provide site-specific radon data to the public.

The onsite detector locations help determine short- and long-term exposure levels for onsite workers. Radon detectors at the fence line or along site boundaries are used to evaluate potential levels of exposure to the public. Site boundary locations also serve to demonstrate site compliance with environmental regulations. Table 7 displays the sampling location rationale. Background stations are offsite. Site-specific radon gas data are provided to the public by USACE once a year.

The most significant factor affecting the sampling frequency is whether the radon source is stable or if instantaneous releases can occur. At NFSS, where the source is considered stable, the surveillance period is relatively long (semiannual). Detectors will remain at the sampling locations for the designated time to determine the integrated average radon concentration. The number of detectors required to complete the radon gas monitoring is presented in Table 7.

Table 7
Radon-222/Radon-220 Sampling Rationale

Sampling Location ID	Frequency	Radiological Analyses	Sampling Location Rationale
1	Semiannually	X	Onsite / along northern boundary
7	Semiannually	X	Onsite / along southern property boundary
8	Semiannually	X	Onsite / adjacent to waste containment structure (WCS) (western side)
10	Semiannually	X	Onsite / adjacent to WCS (western side)
11	Semiannually	X	Onsite / along property boundary (northwestern corner)
12	Semiannually	X	Onsite / along northern property boundary , QC -duplicate taken here
13	Semiannually	X	Onsite / along western property boundary
15	Semiannually	X	Onsite / along western property boundary
18	Semiannually	X	Onsite / adjacent to WCS (northeastern side)
21	Semiannually	X	Onsite / adjacent to WCS (eastern side)
23	Semiannually	X	Onsite / adjacent to WCS (eastern side)
24	Semiannually	X	Onsite / adjacent to WCS (southern side)
28	Semiannually	X	Onsite / south central property boundary
29	Semiannually	X	Onsite / southwestern property boundary
36	Semiannually	X	Onsite / along western property boundary
105*	Semiannually	X	Off-site / 1.0 mi west of NFSS
116*	Semiannually	X	Off-site / 1.5 mi northeast of NFSS
120*	Semiannually	X	Off-site / 1.5 mi southwest of NFSS
122	Semiannually	X	Onsite / along northern property boundary
123	Semiannually	X	Onsite / adjacent to South 16 Ditch and Campbell Street

*Background Location

5.2.1 Sampling Methods and Detectors

Radon concentrations are measured with an integrating alpha-track detector. This detector contains alpha-sensitive film enclosed in a small, two-piece cup. Radon diffuses through the membrane of the cup until the concentrations inside the cup are in equilibrium with atmospheric concentrations. Alpha particles from the radioactive decay of radon create tracks when they collide with the film. The film is then placed in a caustic etching solution to enlarge the tracks and, under strong magnification, these tracks are counted. The number of tracks per unit area correlates to the radon concentration in air.

Cumulative radon measurements are collected at 3 off-site locations, 11 locations along the site perimeter, 6 locations along the WCS perimeter. All detectors are situated at approximately 1.5 m (5.0 ft) above the ground surface, within the breathing zone.

5.2.2 Field Activities Quality Assurance

Various QA controls will be part of the radon surveillance program:

- Detectors will be shipped to the site in airtight packages that will remain unopened until installation;
- Exposed detectors will be immediately sealed upon removal to minimize the period of exposure.;
- COC seals will be placed on shipping containers;
- Monitoring location #12 is a duplicate radon surveillance location;
- Stations will be inspected for loss, damage, housing height, and signs of vandalism

Additional QA/QC procedures will be followed in accordance with the requirements in Section 4.0.

5.2.3 Radon Flux Measurements from Onsite Storage Pile

Radon flux data will be obtained annually (180 locations) from the WCS at NFSS to evaluate with 40 CFR Part 61, Subpart Q. To determine radon flux from the storage pile, charcoal canisters are placed on the pile at calculated grid intersections; the canisters remain on the pile for 24 h. The activated charcoal adsorbs radon-222 gas, if any, emitted from the pile. After 24 h, the canisters are sealed and sent for analysis. Radon flux measurements are not taken if severe storms or high winds are predicted during or if these weather conditions have occurred within the previous 12 h.

During routine site operations and maintenance, an unexpected release of radon gas is unlikely. However, if there is evidence of a release, trained site operations personnel and the site safety officer will notify the appropriate USACE personnel of any accidental release and will immediately take steps to minimize the potential for radon migration. USACE safety and health procedures will be followed.

5.3 GROUNDWATER SURVEILLANCE

Surveillance of groundwater that may be affected by USACE operations is conducted to determine the effects of such operations and to demonstrate compliance with applicable federal and state laws and local water quality regulations.

Groundwater surveillance will achieve the following objectives:

- obtain data to determine baseline conditions of groundwater quality and quantity;
- demonstrate compliance with and implementation of all applicable regulations;
- provide data to permit the early detection of groundwater contamination;
- provide a reporting mechanism for detected groundwater contamination;
- identify existing and potential groundwater contamination sources and maintain surveillance of these sources;
- provide data for making decisions about land disposal practices and the management and protection of groundwater resources; and
- provide an evaluation of any site releases and their impact on the public and the environment.

Detailed, site-specific groundwater surveillance information (Table 3 includes: analytical parameters, target detection limits, and analytical methods) is presented in Tables 8 and 9. Groundwater surveillance activities will follow EPA recommendations for groundwater at hazardous waste sites and will meet applicable requirements for environmental protection.

Groundwater conditions (flow velocities, estimated contaminant transport velocities, groundwater flow directions) and sampling data (e.g., the vertical and lateral distribution of radiological and chemical parameters) will be used on an ongoing basis to evaluate the effectiveness and necessity of groundwater surveillance activities at the site.

The following tables contain groundwater sampling (8) and groundwater & surface water sampling rationale (9) detail.

Table 8
GROUNDWATER SAMPLING

Measured Parameter	Station Identification	Number of Analyses or Measurements																								TOTAL
		# Sample Locations				Rinsate Blank				Trip Blank				Sample Duplicate				Matrix Spike				Matrix Spike Dup.				
		CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter				
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
FIELD MEASUREMENTS:	A45 A50 OW04B OW06B OW07B OW15B OW17B B02W20S																									
Dissolved Oxygen, Eh, Turbidity, Temperature, Specific Conductance, pH			8				1																			8
RADIOLOGICAL																										
Iso -Radium –226,-228			8				1								1											9
Iso –Uranium –234, 235, 238, by Summation			8				1								1											9
Iso –Thorium –230, -232			8				1								1											9
CHEMICAL																										
Metals: Copper, Vanadium, Lead, Magnesium, Potassium, Sodium, Calcium			8				1								1				1				1			11
Water Quality: Chloride, Sulfate, Phosphate –P, Carbonate, Bicarbonate, Alkalinity, Nitrate, Total Dissolved Solids			8				1								1				1				1			12

Table 9

Groundwater & Surface Water - Sampling Rationale

Sampling Location ID	Frequency	Radiological Analyses	Chemical Analyses	Sampling Location Rationale
OW04B	Annually	X	X	Intercepts groundwater flow between the pile and central drainage ditch and potential contaminants released to the north of the waste containment structure (WCS).
OW06B	Annually	X	X	Intercepts groundwater flow between the pile on the south .
OW07B	Annually	X	X	Monitors potential contaminants released from the pile on the south.
OW15B	Annually	X	X	Monitors potential contaminants released from the pile on the west.
OW17B	Annually	X	X	Monitors potential contaminants released from the pile on the west.
A45	Annually	X	X	Intercepts groundwater flow between the pile and central drainage ditch.
A50	Annually	X	X	Intercepts groundwater flow between pile and central drainage ditch and potential contaminants released to the east of the WCS.
B02W20	Annually	X	X	Up gradient - background

5.3.1 Groundwater Level Measurements and Well Inspections

Groundwater level measurements will be used to refine calculation of vertical infiltration rates, vertical hydraulic conductivity measurements, and response of the water table to storm events. Water levels will be measured manually.

Groundwater monitoring wells will be formally inspected annually to ensure their integrity. In addition, well integrity problems observed during sampling events or water level measurement activities will be reported. Based on these inspections, damage or deterioration will be documented, and repairs will be made if necessary. Water level data will be entered into a database, and any irregularities will be noted and reported. Table10 displays well ID, well construction and measurement frequency.

Table 10

Groundwater Level Measurement, Well Screen Bottom Depth and Locations – Measured Quarterly

Well ID	Well Construction	Well Screen Bottom Depth (ft)	Well ID	Well Construction	Well Screen Bottom Depth (ft)
A23A	Lower GWS	71.30	OW03A	Lower GWS	37.40
A42	Upper GWS	20.5	OW03B	Upper GWS	14.50
A43	Upper GWS	13.0	OW04A	Lower GWS	38.40
A45	Upper GWS	18.0	OW04B	Upper GWS	15.20
A50	Upper GWS	18.00	OW05A	Lower GWS	42.00
A52	Upper GWS	13.00	OW05B	Upper GWS	14.50
A54	Lower GWS	35.80	OW06A	Lower GWS	38.40
A55	Upper GWS	37.00	OW06B	Upper GWS	15.30
A56	Lower GWS	34.60	OW07A	Lower GWS	38.20
A57	Lower GWS	71.30	OW07B	Upper GWS	11.30
BH5	Lower GWS	44.00	OW08A	Lower GWS	43.00
BH12	Bedrock	95.00	OW08B	Upper GWS	10.50
BH15	Bedrock	104.50	OW09A	Lower GWS	38.90
BH48	Lower GWS	37.10	OW09B	Upper GWS	13.20
BH49	Lower GWS	47.20	OW10A	Lower GWS	38.50
BH49A	Upper GWS	18.50	OW10B	Upper GWS	27.60
BH50	Lower GWS	38.30	OW11A	Lower GWS	35.50
BH51	Lower GWS	44.10	OW11B	Upper GWS	12.50
BH57	Bedrock	101.50	OW12A	Lower GWS	35.90
BH59	Lower GWS	37.70	OW12B	Upper GWS	10.80
BH60	Lower GWS	40.50	OW13A	Lower GWS	39.70
BH61	Lower GWS	41.60	OW13B	Upper GWS	12.20
BH62	Bedrock	98.00	OW14A	Lower GWS	43.40
BH63	Lower GWS	48.40	OW14B	Upper GWS	13.50
BH64	Lower GWS	42.10	OW15A	Lower GWS	44.00
BH70	Lower GWS	39.50	OW15B	Upper GWS	10.70
B02W19D	Lower GWS	43.60	OW16A	Lower GWS	42.70
B02W20D	Lower GWS	44.50	OW16B	Upper GWS	11.90
B02W20S	Upper GWS	18.10	OW17A	Lower GWS	40.40
OW01A	Lower GWS	45.10	OW17B	Upper GWS	15.50
OW01B	Upper GWS	15.30	OW18A	Lower GWS	46.00
OW02A	Lower GWS	44.00	OW18B	Upper GWS	15.20
OW02B	Upper GWS	18.50			

5.3.2 Field Activities Quality Assurance

Sampling techniques, types of equipment, and decontamination procedures used for groundwater monitoring are selected in accordance with *RCRA Ground Water Monitoring: Draft Technical Guidance* (EPA 1992b), *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846, EPA 1992c), and *A Compendium of Superfund Field Operations Methods* (EPA 1987). Information on QC samples and data use is provided in Sections 4.0 and 5.0 of this ESP.

If planned site activities involve disturbance of areas of contamination, site operations personnel and the site safety officer will notify appropriate USACE personnel. Any groundwater sampling required to investigate the extent of contamination will be initiated in accordance with these instructions.

5.4 SURFACE WATER, SEDIMENT, AND STORM WATER SURVEILLANCE

The objectives of the surface water, sediment, and Storm water surveillance at the sites are as follows:

- continuing assessment of the physical, chemical, and radiological conditions of surface waters and waterways;
- to establish baseline surface water quality and sediment data;
- to provide a continuing assessment of water pollution control programs;
- to identify potential water quality problems; and
- to detect, characterize, and report unplanned releases and their effects on water quality.

Surface water sampling is required at some FUSRAP sites as a result of EPA Storm water discharge regulations (55 FR 47990 et seq., 56 FR 12098). The current permit does not require sample collection. Table 11 displays surface water and sediment sampling details. Table 12 presents the sampling rationale.

Surface water and sediment sampling frequency will be based on the mobility and solubility of contaminants of concern at the site, on contaminant distribution, and on the potential for sediment transport from the site.
Surface water and stream bed sediment sampling occurs along the drainage ditch system to assess upstream, onsite, and downstream contamination levels. Surface water and stream bed monitoring includes analysis for radioactive constituents.

Table 11
SURFACE WATER AND SEDIMENT SAMPLING

Measured Parameter	Station Identification	Number of Analyses or Measurements																								TOTAL
		# Sample Locations				Rinsate Blank				Trip Blank				Sample Duplicate				Matrix Spike				Matrix Spike Dup.				
		CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter				
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
FIELD MEASUREMENTS	SWSD009 SWSD010 SWSD011 SWSD021 SWSD022																									
-Dissolved Oxygen -Eh -Turbidity -Temperature -Specific Conductivity -pH			5																							5
			5																							5
			5																							5
			5																							5
RADIOLOGICAL																										
SURFACE WATER:																										
Iso -Radium –226,-228			5												1											6
Iso –Uranium –234, 235, 238, by Summation			5												1											6
Iso –Thorium –230, -232			5												1											6
SEDIMENT:																										
Iso -Radium –226,-228			5				1								1											7
Iso –Uranium –234, 235, 238, by Summation			5				1								1											7
Iso –Thorium –230, -232			5				1								1											7

Table 12
Surface Water and Sediment - Sampling Rationale

Sampling	Frequency	Radiological	Chemical	Sampling Location
SWSD009	Annually	X		Up gradient / background
SWSD010	Annually	X		Monitor potential contaminant migration from waste containment structure (WCS)
SWSD011	Annually	X		Down gradient - monitor potential contaminant migration from the WCS at site
SWSD021	Annually	X		At site boundary - monitor surface quality entering the site
SWSD022	Annually	X		At confluence of South 16 Ditch and Central Drainage Ditch

5.5 FIELD SAMPLING ACTIVITIES

The objective of sampling procedures is to ensure that samples obtained are representative of the environment being investigated. Control of field sampling activities will be established through implementation of the NFSS Environmental Surveillance Plan, and site-specific health and safety plans. In addition to the site-specific health and safety plans, all field sampling activities will be performed in accordance with any site-specific hazardous work permits.

5.5.1 Sample Identification and Shipment

This section describes the requirements for the labeling, packaging, and shipping of samples.
A standard sample identification (ID) system that tracks water, soil, and sediment samples will be used to maintain sample traceability and facilitate data retrieval. The field identification or sample number will be coded as follows:

NFSS-MTYY-SAMPID where

- NFSS = Niagara Falls Storage Site
- MT = Matrix Type: GW-groundwater, SW-surface water, SED-sediment
- YY = Year (2002 = 02)
- SAMPID= Sample Location (ex.: OW17B, SWSD021, SWSD022)

Examples: NFSS-GW00-OW17B
NFSS-SW00-SWSD021
NFSS-SED00-SWSD022

The sample ID convention will also be used in the environmental surveillance database to track all pertinent information generated in the program.

Contracted laboratories may use their own unique identifiers for in-house tracking of samples, but they will use the same sample ID format as described above to report analytical results. All environmental surveillance data will be retrievable by this sample ID convention.

Samples collected for the program will be packaged, and the packages will be monitored for radiation exposure and then shipped in accordance with applicable transportation regulations and requirements. COC forms will be used to track samples from collection locations to the laboratory.

6.0 QUALITY ASSURANCE PROGRAM

6.1 IMPLEMENTATION

Environmental surveillance QA is based on the DOE's DEC '96 ESP. However, Adherence to the EM 200-1-6 Environmental Quality – Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) 10 October 1997 and the draft Interagency MARLAP (Multi-Agency Radiological Laboratory Analytical Protocols) Manual is required for all services in support of the FUSRAP NFSS. QA requirements will also be incorporated into contracts for analytical services by adherence to this QA program. The Quality Assurance Team (QAT) is responsible for the implementation of the QAP.

Quality Assurance Team

Name	Discipline	Office
Judy Leithner	Project Manager	CELRB-PM-F
Fred Boglione	Environmental Engineering Team Leader	CELRB-ED-EE
Steve Buechi	Environmental Engineer	CELRB-ED-EE
Dave Conboy	Environmental Analysis Team Leader	CELRB-ED-EA
Craig Forget	Engineering Quality Manager	CELRB-ED-S
Tony Cappella	Industrial Hygienist	CELRB-ED-EA
Chris Hallam	Health Physicist	CELRB-ED-EA
Craig Rieman	Health Physicist	CELRB-ED-EA
Dick Leonard	Environmental Engineer	CELRB-ED-EE
Fred Kozminski	Chemist	CELRB-ED-EA
Mat Masset	Chemist	CELRB-ED-E
Dave Brancato	Risk Assessor	CELRL

6.2 QUALITY CONTROL PLAN AND CORRECTIVE ACTIONS

Quality control plan processes and surveillance are performed throughout the year in many areas of FUSRAP. These activities are scheduled so that performance-based assessments of project activities are examined for review, evaluation, and reporting on the effectiveness and status of the program.

Results of the QA audits and surveillance will be documented and reported to management. Findings requiring corrective actions will be documented in accordance with project procedures, clearly reported, assigned to a responsible individual, and tracked until effective solutions are implemented. The QAT will verify the implementation of corrective actions and will report the results to project management.

6.3 PROFESSIONAL LABORATORY SUBCONTRACTORS

Contractors will coordinate with USACE personnel in performing work on and for NFSS. The specification of laboratory methods, analytical requirements, and reporting formats for analyses performed by the USACE validated laboratories are outlined in the USACE chemical and radiological analytical services subcontracts. Compliance with subcontract requirements will be verified by USACE validation of the subcontractors' analytical data and facilities.

6.3.1 Compliance with FUSRAP QA Program

Each contractor's QA system will be implemented in a manner that is compatible with and equal to the FUSRAP QA program. Contractors not having their own QA program will work under the requirements of the FUSRAP QA program.

While professional laboratories maintain their own internal QA programs, professional laboratories will be audited by USACE to assess their compliance requirements.

6.3.2 Participation in Laboratory QA Assessment Programs

The laboratory conducting radiological analyses will participate in the EPA (Las Vegas, Nevada) collaborative testing and inter-laboratory comparison program. In this program, samples of various environmental media containing known amounts of one or more RADIONUCLIDES are prepared and distributed to participating laboratories for analysis. Results are forwarded to EPA for comparison with known values and with the results from other laboratories. This program enables the laboratory to regularly evaluate the accuracy of its analyses and take corrective action, if needed.

Inter-laboratory comparison of the TLD results will be provided by participation in the International Environmental Dosimeter Project sponsored jointly by DOE, EPA, and the Nuclear Regulatory Commission (NRC).

The professional laboratory conducting chemical analyses will participate in drinking water, wastewater, and/or hazardous waste certification programs. Its internal QA program will also include an independent overview by its project QA coordinator and a corporate vice president.

6.4 QUALITY CONTROL SAMPLES

QC samples will be analyzed to determine whether the QA objectives detailed in EM 200-1-6 and MARLAP are being met. If any QC sample indicates potential problems with the data (poor recovery, blank contamination, etc.), all the samples associated with those QC samples will be checked by USACE to determine whether the sample results may be used after appropriate annotation. The types of QC samples used in the environmental surveillance program are described below.

Method Blank

A method blank is a matrix to which all reagents are added in the same volumes or proportions as those used for preparing associated samples. This blank must be carried through the entire preparatory and analytical procedure.

Laboratory Duplicate

A laboratory duplicate is an environmental sample used to document the precision of an analytical procedure for a specific matrix but not matrix interferences or analytical accuracy.

Method Spike

A method spike is a known matrix spiked with compound(s) representative of the target analytes and is used to document the accuracy of a procedure by evaluating percent recovery. The method spike must be carried through the entire preparatory and analytical procedure.

Laboratory Control Samples

Laboratory control samples (LCSs) are used to validate a particular analytical procedure. LCSs usually originate from the EPA or National Institute for Standards and Technology (NIST). To meet the QA objective of accuracy, LCSs will be used for 5 percent of the samples for all matrices.

Trip Blank

A trip blank (travel blank/transport blank) is a water sample prepared in the laboratory, transported to the sampling site, and returned to the laboratory unopened. It is used to determine volatile organic compound contamination attributable to shipping and field handling procedures. The trip blank is acceptable if the concentration of any analyte of concern in the blank is less than two times the concentration of the same analyte in an associated sample.

Trip blanks are handled and processed in the same manner as other samples and are identified clearly on sample labels and COC records. Trip blanks can indicate interferences introduced in the field, during shipment, or in the laboratory. They do not, however, provide information on matrix effects, accuracy, or precision.

Rinse Blank

A rinse blank is a sample of water that has been poured over decontaminated sampling equipment. It is collected after completion of decontamination and before sampling. This blank is acceptable if the concentration of any analyte of concern in the blank is less than two times the concentration of the same analyte in an associated sample or less than the groundwater monitoring detection limit, whichever is greater.

Matrix Spike

A matrix spike is an aliquot of sample spiked with a known concentration of target analyte(s). This type of spike must be carried through the entire preparatory and analytical procedure. It is used to determine the precision of a method for a given matrix. Matrix spikes are used only to determine the precision of metals and organics analyses.

Matrix Spike Duplicate

A matrix spike duplicate is an aliquot of sample spiked with identical concentrations of target analyte(s) as the matrix spike. It is used to document the precision of a method for a given matrix. Matrix spike duplicates are used only to determine the precision of organics and some metals analyses.

Field Duplicate

A field duplicate indicates the representativeness of the samples collected. Field duplicates are independent samples collected as close as possible to the same point in space and time. They are two separate samples taken from the same source, stored in separate containers, and analyzed independently.

Ship Dosimeter

A ship dosimeter accompanies external gamma radiation dosimeters (TLDs) during transport to and from monitoring locations to measure any exposure incurred before or after the monitoring period.

6.5 SUMMARY OF LABORATORY PROCEDURE REQUIREMENTS

This section identifies acceptable analytical methods and laboratory protocols required for the environmental surveillance plan. These methods were selected based on the maximum number of analytes per method and the adequacy of method detection limits. This section also addresses laboratory procedures and practices used to maintain sample integrity and achieve consistently high-quality analytical results.

6.5.1 Documentation of Methods

Standard analytical methods approved and published by EPA will be used in the FUSRAP environmental surveillance program for chemical (i.e., all nonradiological) samples. The laboratory conducting radiological analyses will adhere to procedures developed by ASTM and the EPA-approved methods for analyzing groundwater, sediment, and surface water samples. Specific methods for chemical and radiological analyses used in this program are listed in Table 4. These methods have been selected to identify and determine the concentrations of potential contaminants in the site area. If an alternate method is available that has an advantage over the listed method, such as lower cost or increased sensitivity, and the method is consistent with EPA methodologies, the alternate method may be used with the permission of USACE.

Chemical analysis methods are based on standard methods in the EPA SW-846 manual (Revision 3). Analyses requested are based on previous site characterization studies and the history of chemical processes used.

6.5.2 Calibration

Laboratory equipment is calibrated with the frequency recommended by the manufacturers. The internal QA program for each subcontract laboratory provides applicable equipment calibration procedures and specifies appropriate maintenance requirements for all equipment.

The contractor's QA procedures for performing chemical analyses include identification and control of equipment calibration record requirements, frequency of calibration and calibration checks, corrective action required when equipment is out of calibration, and specific calibration and calibration check instructions. The QA procedures for performing radiological analyses include routine calibration of counting instruments, source and background counts, routine yield determination of radiochemical procedures, and replicate analyses to check for precision.

Calibration standards for equipment used during chemical or radiological analysis must be traceable to NIST primary standards. Documentation supporting the validity of the calibration standards used (e.g., calibration log books or calibration and maintenance files for all instruments used) will be maintained and accessible for auditing purposes. Field equipment calibration is handled in accordance with operational procedures.

6.5.3 Laboratory Quality Assurance

In addition to the general QA environmental surveillance program provisions outlined in this section, each subcontracted laboratory must be validated by USACE' s Center of Expertise.
Independent verification of compliance with the requirements of this section is accomplished through USACE QA audits of the contract laboratory facilities, personnel, and documentation. The scope of the auditing program includes the use of preplanned checklists as well as freedom to pursue lines of inquiry. This scope ensures that laboratory activities comply with calibration procedures in the subcontract agreements, sample integrity is maintained, and possible cross-contamination in the laboratory is minimized during the analytical process. Discrepancies identified during annual audits will be documented and tracked by USACE.

7.0 DATA EVALUATION

7.1 DATA REVIEW

To verify compliance with applicable federal, state, and local environmental laws and regulations, this FUSRAP NFSS QA Plan has established acceptable data review practices by using the following references:

- EPA QA/G-4 (*Guidance for Planning for Data Collection in Support of Environmental Decision Making Using Data Quality Objectives Process*, 1993) on data quality objectives (DQOs)
- HTRW CX Technical Project Planning, Guidance for HTRW data quality design
- EM 200-1-6 Environmental Quality - Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) 10 October 1997
- Draft Interagency MARLAP (Multi-Agency Radiological Laboratory Analytical Protocols) Manual

Data is submitted to USACE in data transmittal packages and electronic data files. The transmittal packages are subject to data review by USACE. The verification process consists of a review of data documentation, quality control provided by each contracted laboratory. Electronic data files received from the analytical contractor must be entered into the environmental surveillance database in a timely manner.

When the data review is completed, USACE will either approve the data for inclusion in a final data report, declare the data unacceptable, and then seek to resolve issues that render the data unacceptable, or include an explanation of data rejection.

Analytical results will be reported in an annual environmental surveillance technical memorandum (ESTM) after the data review is completed. All results will be compared with relevant and applicable standards and background concentrations to quantify levels of contaminants, and all valid data, including outliers, will be reported. Data will be excluded only after investigation confirms that an error has been made in the sample collection, preparation, measurement, or data analysis process. As each data point is collected, it will be compared with previous data to identify unusual results that require investigation.

7.2 DATA QUALITY OBJECTIVES

DQOs are qualitative and quantitative statements formulated at the start of the surveillance program to establish the quality and quantity of data required from the sampling and analysis procedures to support defensible decision-making. The objective of data collection is to obtain data that are precise, accurate, comparable, representative, and complete. The EPA definitions of these parameters are provided below (EPA 1980), along with the method by which chemical and radiological samples are evaluated.

7.2.1 Precision

Precision is a statistical measurement that represents the repeatability of the analytical system. It is a measurement of mutual agreement among individual measurements of the sample property, usually under prescribed similar conditions. Precision is determined based upon the relative percent difference (RPD) among field duplicates, laboratory splits, or laboratory replicate analyses. It is usually expressed as the RPD or as a standard deviation.

Radiological Samples

Laboratory precision is indicated by analysis of lab duplicates for each matrix. The RPD between the two determinations is compared to existing control charts.

Chemical Samples

The precision of analyses for chemical constituents is determined by the analysis of field and/or laboratory duplicate samples and by matrix spike duplicates. At least one laboratory duplicate is prepared for every sample batch or every 20 samples, whichever is more frequent.

Field duplicate samples provide relative measurement of the overall sampling precision and the variability within a given sampling matrix. One field duplicate is collected for every field event or 20 samples, whichever is more frequent.

7.2.2 Accuracy

Accuracy is a statistical measurement that represents the level of agreement between an observed value and an accepted reference value. It is a measurement of the bias of the measurement system. Accuracy is determined on the basis of percent recoveries associated with the laboratory control samples.

Radiological Samples

To check the accuracy of samples that are required to be analyzed for radiological constituents, laboratory control samples (LCSs) are used. LCS analyses are performed at a frequency of one analysis per 20 radiological-parameter analyses. The mean, +/- 2 standard deviations, of the LCS defines the acceptable radiological parameter accuracy range. The average of the results of the LCS analyses performed during an analysis run is compared to the known laboratory control activity level. The average of the results of the LCS analyses must fall within the defined range.

Chemical Samples

Accuracy of chemical analyses will be determined by the analysis of laboratory control samples.
LCSs are preparation blanks with known concentrations of target analytes. This type of spike is used to determine analytical (method) accuracy. LCSs are prepared at a frequency of one per 20 samples or every time samples are prepared.

7.2.3 Representativeness

Representativeness is a qualitative judgment that expresses the degree to which data accurately represent the conditions at the site where the samples have been obtained. Representativeness can be influenced by field and laboratory conditions.

Radiological and Chemical Samples

To minimize variability in and between sampling events, samples are taken in a uniform manner, appropriate to the matrix being sampled. Field duplicates and (where appropriate) rinsate blanks and trip blanks are taken to monitor representativeness. Rinsate blanks inform the data user whether sampling equipment is being adequately decontaminated between uses or is potentially contaminating samples collected with it. Field duplicates are used for surface water, groundwater, and co-located samples are used for air monitoring. Holding times and preservatives are also evaluated to determine data representativeness.

Chemical Samples Only

Trip blanks, used to accompany water samples for analyses for volatile organic compounds, show if any low levels of volatile organic contamination were acquired on the way to the laboratory. Method blanks are prepared for each parameter analyzed, with a frequency of one per batch of no more than 20 samples. Method blanks are used to determine whether contaminants are present in the laboratory that could affect the samples associated with that method blank.

7.2.4 Completeness

Data completeness is evaluated by comparing the amount of valid data obtained from a measurement system to the amount of data that was expected and needed to meet the project data goals.

7.2.5 Comparability

Comparability is a qualitative parameter that expresses the confidence with which one set of data can be compared with another. Comparability is achieved through the use of standard sample collection and analytical techniques. It is usually required that when two sets of analytical data are to be compared, both sets must be derived from samples analyzed by the same methods and collected in the same manner. The laboratories follow approved procedures that are consistent with industry-accepted practices.

7.3 LESS-THAN-DETECTABLE VALUES

Radiological Values

Less-than-zero radiological values will be reported when they occur. The negative values will be used as reported in the statistical calculations.

Chemical Values

Chemical analysis results are dependent on instrument detection limits and upon contractual requirements. For values that are reported as less than the detection limit, a review of previous analytical results will be conducted before the detection limit value is incorporated into statistical calculations.

7.4 CALCULATIONS

Applicable QA standards will be followed throughout the calculation procedure. Project calculations will be verified and validated by a qualified person.

8.0 RADIOLOGICAL DOSE CALCULATIONS

Radiological dose calculations use environmental surveillance data to estimate the hypothetical dose received by individuals and collective populations from radioactive contamination originating at the FUSRAP Niagara Falls Storage Site. Both hand calculations and computer models are used to produce these hypothetical dose estimates.

8.1 PERFORMANCE STANDARDS FOR DOSE CALCULATIONS

The goal in calculating hypothetical dose estimates is to verify that radioactive contamination at the sites is not endangering the safety and health of the general public. To ensure that the maximally exposed individual is included in the hypothetical dose estimates, the calculations are based on the distance to the nearest residence (24 h/day occupancy) and the nearest commercial/industrial facility (40 h/week occupancy). DOE has established a basic dose limit of 100 mrem/yr above background (DOE 1990a) for the maximally exposed individual and requires the evaluation of the collective dose to the population within 80 km (50 mi) of the site. Additionally, 40 CFR 61 Subpart H established an airborne particulate dose limit of 10 mrem/yr for the maximally exposed individual.

Based on the requirements discussed above, together with an understanding of the credible pathways discussed in Section 6.2, the specific goals of the dose calculations are to develop

- an estimate of the hypothetical external gamma dose to the maximally exposed individual,
- an estimate of the hypothetical airborne particulate dose to the maximally exposed individual, and
- an estimate of the hypothetical airborne particulate collective dose to the population within 80 km (50 mi) of the site.

8.2 EXPOSURE PATHWAYS FOR DOSE CALCULATIONS

Exposure pathways are discussed in Section 3.1 and shown in Figure 3. Contaminants of concern and site-specific exposure pathways are discussed in Part 2 of this document. The environmental surveillance data collected to date for these pathways indicate that the credible exposure pathways requiring calculations are limited to external gamma radiation and airborne particulate release. If future data indicate that other exposure pathways have become credible, these exposure pathways will be reconsidered.

8.3 DOSE CALCULATION METHODS

Dose calculation methods presented here are limited to the credible exposure pathways. Dose calculation methods will be added for other exposure pathways if future environmental surveillance data indicate a potential for significant exposure to the public from those pathways. A total hypothetical dose to the maximally exposed individual is the sum of the hypothetical doses from all credible exposure pathways.

8.3.1 External Gamma Dose

This method uses a hand calculation to estimate the external gamma hypothetical dose to the maximally exposed individual. External gamma exposure data are collected through the TLD program, which provides external gamma exposure rates at 1 m (3 ft) above the ground surface at intervals along the fence line of the site. The data from the side of the site displaying the highest radiation readings are averaged and corrected for time, fade, shelter/absorption, and background. The external gamma exposure rates at the distances to individuals at the nearest residence and the nearest commercial/industrial facility are then determined using the following equation:

where:

$$D_2 = D_1 \frac{h_1}{h_2} \frac{\tan^{-1}(\frac{L}{h_2})}{\tan^{-1}(\frac{L}{h_1})}$$

D_1 = exposure rate at the location of the TLDs
D_2 = exposure rate at the location of the nearest individual
h_1 = distance from the TLDs to the ground surface at the fence line
h_2 = distance from the individual to the ground surface at the fence line
L = half the length of the section of fence line with the highest TLD readings

The external gamma hypothetical doses are then determined by correcting the exposure rates for the occupancy of the nearest residence (24 h/day) and the nearest commercial/industrial facility (40 h/week). The higher of the two external gamma hypothetical doses (i.e., residential or commercial/industrial) then becomes the hypothetical external gamma dose to the maximally exposed individual for the site.

8.3.2 Airborne Particulate Dose

This method uses hand calculations to determine the input for a computer model that estimates the airborne particulate hypothetical dose to the maximally exposed individual and the airborne particulate hypothetical collective dose to the population within 80 km (50 mi) of the site. The hand calculation determines airborne particulate release rates from site soil contamination data using a limited reservoir surface, wind erosion model (EPA 1985). These airborne particulate release rates are input to the CAP88-PC computer model (EPA 1992a) in two runs. The first run estimates the hypothetical airborne particulate doses to individuals at the distances to the nearest residence and to the nearest commercial/industrial facility. These hypothetical doses are then corrected for the occupancy of the nearest residence (24 h/day) and the nearest commercial/industrial facility (40 h/week). The higher of the two hypothetical doses (i.e., residential or commercial/industrial) then becomes the hypothetical airborne particulate dose to the maximally exposed individual for the site. The second run estimates the hypothetical airborne particulate collective dose to the population within 80 km (50 mi) of the site. The second run also uses a population file generated by a hand calculation using county population densities to determine numbers of people in circular grid sections fanning out to 80 km (50 mi) from the center of the site.

8.4 QUALITY ASSURANCE

All calculations will be performed, checked, reviewed, and documented in accordance with Applicable QA procedures (Section 6.0).

9.0 REGULATORY FRAMEWORK

This section identifies the primary federal regulatory programs that direct the acquisition, evaluation, and maintenance of environmental surveillance data at the NFSS site.

9.1 PRIMARY FEDERAL AUTHORITIES

9.1.1 Comprehensive Environmental Response, Compensation, and Liability Act

Most DOE-owned FUSRAP sites are currently managed by DOE in accordance with CERCLA procedures and requirements as authorized by Executive Order 12850. CERCLA is a federal program to investigate and clean up releases of contamination to the environment.

Environmental surveillance information is used to support several primary CERCLA requirements, including (1) detection of releases of reportable quantities to the environment; (2) activities to investigate and characterize the nature and extent of environmental contamination; (3) design of cleanup strategies; and (4) the documentation requirements of the administrative record. Groundwater and surface water at CERCLA sites are required by statute to attain the standards for contaminants in drinking water promulgated under the SDWA, if the groundwater is or reasonably can be used as a source of drinking water. In addition, sampling and analysis data used to support the selection of a remedy must be included in the administrative record, which must be maintained for at least 10 years after implementation of a remedy.

9.1.2 Other Potential: Federal Statues and Regulations

The federal clean water program, authorized by the Clean Water Act, may also be applicable to DOE owned FUSRAP sites such as NFSS where Storm water runoff associated with industrial activity is discharged to surface water. In these cases, environmental surveillance is required by either the terms of letter agreements between a site and a sewage authority or the terms of a general or individual discharge permit.

Similarly, the radionuclide emissions standards of the federal clean air program may also applicable to FUSRAP sites. Radionuclide emissions calculations are performed annually to assess the dose to members of the general public. This information is included in an annual report that is transmitted to EPA.

In addition, flux monitoring of waste containment facilities is conducted annually. This monitoring is conducted at DOE owned FUSRAP sites such as NFSS pursuant to Subpart Q of 40 CFR 61 as implemented by the terms of letter correspondence between DOE and regional EPA offices (BI 1996b, BI 1996c).

Notification is on file with New York State for NFSS where radioactive mixed waste from past operations is stored. There are no active RCRA-permitted units at FUSRAP sites.
Finally, surveillance information is also used to support the environmental impact assessments required by impact assement requirements fo NEPA as integrated into the CERCLA process.

9.2 RECORDS AND REPORTS

This section outlines the reporting and record-keeping requirements of the major federal regulations applicable to the environmental and effluent surveillance program. Environmental statutes and regulations change frequently and are often amended or superseded; the surveillance program will be updated as necessary.

Proper record-keeping and reporting are essential to FUSRAP's overall compliance strategy. Appropriate FUSRAP personnel and other responsible authorities will be promptly notified of occurrences and all activities, as required. Records pertaining to USACE, EPA, or state agency audits of the surveillance program will be maintained; calculations, computer programs, and other data will be recorded and/or referenced.

40 CFR 300: Mandates preparation of reports describing the extent and/or status of CERCLA efforts and reporting of chemical and/or radionuclide hazardous substances releases that exceed "reportable quantities" to the National Response Center.

29 CFR 1904: Mandates preparation of notifications and reports on information having environmental protection, safety, or health protection significance related to accidental releases, thefts, or loss.

CERCLA: EPA record-keeping requirements under CERCLA are contained in 40 CFR Part 300, Subpart I, of the National Oil and Hazardous Substances Pollution Contingency Plan, which requires that an administrative record be established and maintained at or near the site. The administrative record contains documents that form the basis for the selected response actions at a particular site. Although entire data packages do not need to be included, verified sampling data and COC forms from surveillance activities, which form the basis for the selection of a remedial response, should be included in the record by reference. The location and availability of the complete data must be indicated in the administrative record index.

Clean Water Act: Any site that acquires a permit pursuant to the Clean Water Act should maintain a copy of the permit onsite. Clean Water Act permits issued under the National Pollutant Discharge Elimination System (NPDES) program contain record-keeping and monitoring requirements. Records and monitoring data required in the permit should also be kept onsite. Uncertainty about whether specific documents should be included may be resolved by seeking the assistance of the site's environmental compliance coordinator, who can provide support to the project manager in negotiations with the permit writer. Storm water discharges are regulated by NPDES under the Clean Water Act and are administered and monitored by the state. Documentation of the permitting process is subject to record-keeping requirements.

NESHAPs: Some record-keeping and reporting requirements applicable to certain DOE-owned or -leased sites are found under 40 CFR Part 61; Subpart Q of NESHAPs regulates atmospheric radon emissions. Subpart H of NESHAPs regulates atmospheric radionuclide emissions from DOE facilities. Compliance status is determined with an EPA-approved computer model such as CAP88-PC (and direct measurements, if necessary). The information is then used to support submittal of annual reports to EPA due at the end of June.

10.0 EMERGENCY CONTACTS

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below . For emergency situations, contact should first be made with the field team leader (or designee) who will notify emergency personnel who will then contact the appropriate response teams.

Contingency Contacts	Phone Number
Fire Department	911
Police	911
Poison Control Center	(800) 888-7655
Niagara County Health Department	(716) 284-3128 / (716) 439-6141
Pollution/Toxic Chemical/Oil Spills	(800) 424-8802

Medical Emergency

Ambulance Service	911
Mount St. Mary's Hospital	(716) 297-4800

Route to Hospital:

1. Turn right on Pletcher Road
2. Turn left onto Route 18 South
3. Turn left onto Route 104 South
4. Turn left onto Route 265 East (Military Road). Hospital is about ½ mile on the right side.

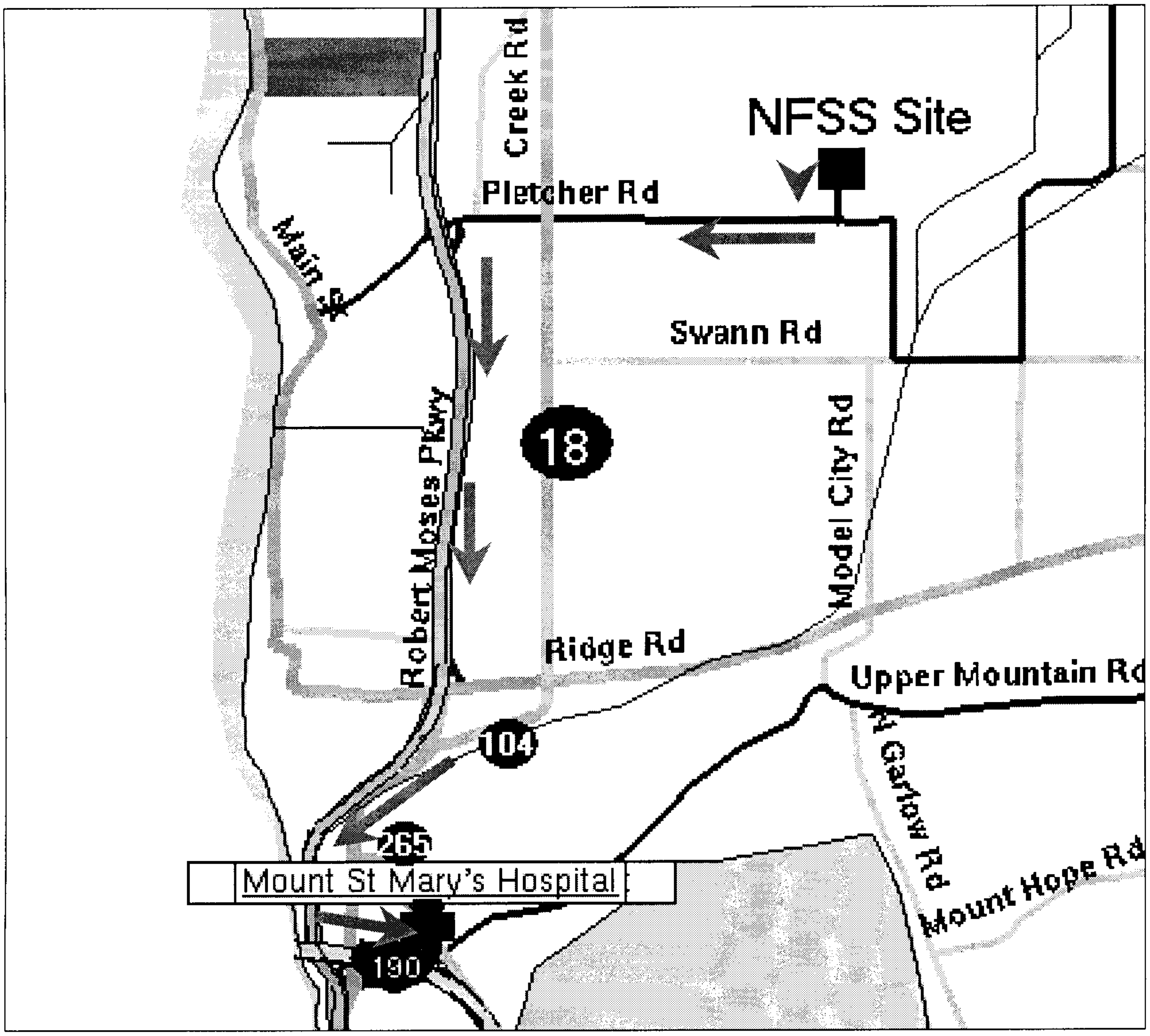


Figure 4
ROUTE TO HOSIPITAL

11.0 REPORTS

MONTH	REPORT
SEPT:	**Yearly Environmental Surveillance Results for Niagara Falls Storage Site**

To:

Robert J. Wing
U.S. EPA – Region II
Federal Facilities Section
290 Broadway
18th Floor
New York NY 10007-1866

Mr. Paul Merges Ph.D.
Director, Bureau of Radiation
Division of Hazardous Substances Regulation
Department of Environmental Conservation
50 Wolf Road
Albany NY 12233-7251

Ms.Janet Donzelle
Director
Lewiston Public Library
305 S. 8th Street
Lewiston NY 14092

Ms. Amy L. Dovydaitis
Environmental Research Technician
Niagara County Environmental Mgmt. Council
Courthouse
Lockport NY 14094

Mr. John Wylucki
President
Niagara County Board of Health
229 East Avenue
Lockport NY 14094

Chemical Waste Management, Inc.
P.O.Box 200
1550 Belmer Road
Model City NY 14107

NOVEMBER: **Yearly Radon Flux Results**

To:

Mr. Paul A. Giardina
Radiation Branch
Environmental Protection Agency, Region II
290 Broadway
New York, New York 10278

12.0 GENERAL REFERENCES

HTRW CX Technical Project Planning, Guidance for HTRW data quality design

EM 200-1-6 Environmental Quality - Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) 10 October 1997

Draft Interagency MARLAP (Multi-Agency Radiological Laboratory Analytical Protocols) Manual

Memorandum of Agreement with the DOE

Engineering Manual 200-1-3, USACE, September 1994

USACE Engineering Manual 200-1-3

USACE Shell for Analytical Chemistry Requirements, Version 1.0, NOV98

Code of Federal Regulations Title 10 Part 835 Occupational Radiation Protection

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EPA, 1985. *Rapid Assessment Exposure to Particulate Emissions from Surface Contamination Sites,* EPA/600/8-85/002 (February).

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Cember, H., 1983. *Introduction to Health Physics*, Pergamon Press, Oxford.

DOE, 1988. Order 5400.1 *General Environmental Protection Program.*

DOE, 1990a. Order 5400.5, *Radiation Protection of the Public and the Environment.*