



**US Army Corps  
of Engineers®**

Buffalo District

**BUILDING STRONG®**

**NIAGARA FALLS STORAGE SITE  
Formerly Utilized Sites Remedial Action Program**

**2010**

*(December 2009 - December 2010)*

**ENVIRONMENTAL SURVEILLANCE  
TECHNICAL MEMORANDUM**

*December 2011*

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## Acronyms and Abbreviations

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AEC	Atomic Energy Commission
ALARA	as low as reasonably achievable
ANL	Argonne National Laboratory
ARAR	applicable or relevant and appropriate requirement
ASTM	American Society for Testing and Materials
BOP	Balance of Plant
CAP88-PC	Clean Air Act Assessment Package – 1988 (USEPA)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CY	Calendar Year
DCG	derived concentration guide
DoD	Department of Defense
DoD QSM	Department of Defense Quality Systems Manual for Environmental Laboratories
DOH	Department of Health
EML	Environmental Measurements Laboratory
ESP	environmental surveillance program
ft	feet
FS	feasibility study
FSRD	Former Sites Restoration Division
FUSRAP	Formerly Utilized Sites Remedial Action Program
IG	instruction guide
IWCS	interim waste containment structure
KAPL	Knolls Atomic Power Laboratory
km	kilometers
LOOW	Lake Ontario Ordnance Works
LWBZ	Lower Water Bearing Zone
MCL	maximum contaminant level
MDA	Minimal Detectable Activity
MED	Manhattan Engineer District
MEI	Maximally Exposed off-site Individual
m	meters
m <sup>3</sup>	cubic meter
µg/g	micrograms per gram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/g	milligrams per gram
mSv	millisieverts
NCRP	National Council on Radiation Protection and Measurements
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants (USEPA)
NFSS	Niagara Falls Storage Site
NIST	National Institute for Standards and Technology
NPDES	National Pollutant Discharge Elimination System
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
OSL	optically stimulated luminescence
OUS	operable units
PAH	Polycyclic Aromatic Hydrocarbon

## Acronyms and Abbreviations (continued)

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PCB	Polychlorinated Biphenyls
pCi/g	picocuries per gram
pCi/L	picocuries per liter
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	Record of Decision
RPD	relative percent difference
SDWA	Safe Drinking Water Act
SMCLs	secondary maximum contaminant levels
TDS	total dissolved solids
TETLD	tissue-equivalent thermo luminescent dosimeter
TLD	thermo luminescent dosimeter
U	Lab Qualifier – non-detect
U of R	University of Rochester
USACE	United States Army Corps of Engineers
USAEC	United States Atomic Energy Commission
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
USNRC	United States Nuclear Regulatory Commission
UWBZ	Upper Water Bearing Zone
VOC	Volatile Organic Compound
yd <sup>3</sup>	cubic yard

## EXECUTIVE SUMMARY

**Purpose:** The purpose of this Technical Memorandum is to document the scientific methods, criteria, data, and findings of the Environmental Surveillance Program (ESP) at the Niagara Falls Storage Site (NFSS). The ESP quantifies and evaluates radiological, chemical, and water quality data from the environment at the NFSS. This program is executed by the U.S. Army Corps of Engineers (USACE) Buffalo District in support of our mission to protect human health and the environment at the NFSS. This Technical Memorandum is published annually by the Buffalo District.

**Key Findings:** This Technical Memorandum documents the evaluation of environmental data collected at the NFSS throughout the calendar year 2010 (December 2009 –December 2010). Radiological findings for external gamma radiation, radon gas and airborne particulate dose are consistent with results from previous years. Site radon-222 and radon-222 flux (taken on the interim waste containment structure (IWCS)) measurements were below the USDOE off-site limit of 3.0 pCi/L and the flux standard of 20 pCi/m<sup>2</sup>/s. External gamma radiation and airborne particulate dose are below the USDOE guideline of 10 mrem/year (excluding radon) for all pathways. USACE evaluation of this data indicates that measured parameters were within U.S. Department of Energy (USDOE) guidelines and calculated exposure rates to the general public were well within regulatory limits. The 2010 data confirm that site controls are continuing to perform as designed and are fully protective of human health and the environment.

**Site Description:** The NFSS is located at 1397 Pletcher Road in the Town of Lewiston, NY, approximately 19 miles (30.6 km) north of Buffalo, NY. The NFSS is a Federally owned property that is 191 acres in size. The NFSS was originally part of a World War II explosives plant called the Lake Ontario Ordnance Works (LOOW) which was approximately 7,500 acres in size. Between 1944 and 1954 the Manhattan Engineer District (MED) and the Atomic Energy Commission (AEC) brought radioactive wastes and residues to the LOOW Site. Through the 1970s the AEC gradually consolidated its operations and sold excess property to the public. In the 1980s the USDOE constructed a 10-acre IWCS on the NFSS to contain the radioactive wastes and residues.

**Background:** In 1974, the AEC, a predecessor to the USDOE, instituted the Formerly Utilized Sites Remedial Action Program (FUSRAP). In October 1997, Congress transferred the management of FUSRAP from the USDOE to the USACE. USACE is administering and executing cleanup at eligible FUSRAP sites pursuant to the provisions of the Energy and Water Development Appropriation Act, 1998 (Title I, Public Law 105-62, 111 Stat. 1320, 1326). USDOE shall be responsible for surveillance, operation and maintenance, including monitoring and enforcement of any institutional controls two years after USACE has achieved site closeout. In addition to investigating and remediating site contaminants at the NFSS, the USACE has been given responsibility for maintaining the site and conducting the ESP. The ESP at the NFSS was initiated by the USDOE in 1981 to monitor radioactive waste and residues stored on site in the IWCS. The program included the sampling of air, water, and sediments for radiological and chemical parameters with the purpose of ensuring that the NFSS did not pose a threat to human health and the environment. The USACE has continued to follow the USDOE program with some revisions over the years.

Prior to transfer of the FUSRAP to the USACE in 1997, the USDOE prepared reports based on USDOE Orders and guidance. USDOE Orders are not applicable to the activities of the USACE as the USACE is not under the authority or direction of the USDOE. However, the surveillance data continues to follow a format similar to that of the previous USDOE reports to provide the reader with a consistent presentation of data and to facilitate historical comparison between reports.

In December 2007, the USACE Buffalo District completed a RI Report for NFSS that defined the nature and extent of contaminants on the NFSS and assessed their potential long-term risks. Based upon findings from this investigation and public input, the USACE further enhanced the ESP to monitor those protective engineered controls that are in place for the IWCS, to ensure that they are functioning properly (Sections 1.2 - 4 ESP Enhancements for 2008, 2009 and 2010).

Additional information about the site and the ESP is available on the USACE Buffalo District website:  
<http://www.lrb.usace.army.mil/fusrap/nfss/index.htm>

**Scope:** The 2010 Environmental Surveillance Technical Memorandum presents the results of data obtained from samples collected during the 2010 monitoring program. To assess the data, the report compares the surveillance data with local background conditions and regulatory criteria. The structure of the report follows the format of previous USDOE reports to provide the reader with a consistent presentation of the data and to facilitate the interpretation of historical trends.

The Technical Memorandum provides a comparative analysis of local background conditions and regulatory criteria to results reported for external gamma radiation and for samples from the media investigated (including airborne radon gas, airborne particulates, surface waters, sediments, and groundwater). Data tables and figures referenced in the text are included at the end of the Technical Memorandum.

**Evaluation of Data:** The USDOE and U.S. Environmental Protection Agency (USEPA) guidelines are cited throughout this report to aid in the evaluation of environmental data. This memorandum compares data with USDOE guidelines because the USDOE has “property accountability” for the site. The guideline values do not represent cleanup criteria of a long-term remedy for the contaminants at the NFSS.

Results of the 2010 surveillance program at NFSS continue to show that measured parameters of the surveillance program did not exceed USDOE guidelines and dose rates of potential off-site radiation exposure to the public did not exceed USDOE or USEPA limits.

Radiological parameters including uranium, thorium, and radon isotopes in air, surface water, and sediments were all within USDOE limits, and radon flux measurements from the IWCS were within USEPA standards. Groundwater concentrations of radiological parameters were also well below USDOE guidelines.

As in the past, findings for total uranium levels in groundwater on site continue to exceed the USEPA safe drinking water concentration limits per their Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs) at several groundwater monitoring well locations. These wells consist of two monitoring wells from the original surveillance program and five wells added to the program in 2008 based on elevated findings from the RI (NFSS Remedial Investigation Report, December 2007). Most ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply; so sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation. Analytical results for iron, sodium and sulfates, as observed in previous reports, were found to be consistently above New York State Department of Environmental Conservation (NYSDEC) groundwater standards in on-site wells and background samples indicating that water quality is not suitable for drinking.

**Long-Term Remedy:** In addition to executing the ESP at the NFSS, the USACE Buffalo District is executing an environmental investigation to determine the long-term remedy for the contaminants at the NFSS. This investigation is being conducted in accordance with the Federal cleanup process created by Congress and developed by the USEPA. This process was authorized under the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). USACE is conducting remedial investigation/feasibility study (RI/FS) pursuant to the protocols set forth in the CERCLA. CERCLA activities at the NFSS have transitioned from the site RI activities to the FS evaluation of potential remediation alternatives.

USACE has implemented a focused CERCLA FS process and has established three separate operable units (OUs): the IWCS OU, the Balance of Plant (BOP) OU, and the Groundwater OU. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 Code of Federal Regulations [CFR] Section 300.430[a][ii][A]) states that sites be remediated in OUs when phased analysis is necessary. The OU approach to the FS process allows USACE to address the IWCS (high-activity radioactive residues), then the BOP OU and, lastly, the Groundwater OU.

The nature and extent of contamination and an assessment of associated risks are documented in the RI Report for NFSS which was published in December 2007 and the NFSS RI Addendum (April 2011). The results of these investigations and previous ESPs were used to enhance the current ESP to ensure the site is continually and fully protective of human health and the environment surrounding the NFSS.

- Groundwater wells and surface water and sediment sample locations have been added to the 2010 ESP to further evaluate the two groundwater zones in areas affected by past storage and handling of materials at NFSS.
- A Feasibility Study is being performed for the IWCS to identify and evaluate a wide range of long-term remedies to address the FUSRAP-related material in the structure.
- The USACE will identify and document a preferred long-term remedy (the Proposed Plan) for the IWCS.

- Additional Feasibility Studies and Proposed Plans for the site soils and infrastructure, and groundwater will follow.
- After public comment on the Proposed Plans, the USACE will select a long-term remedy for the IWCS, site soils and infrastructure, and groundwater and document this decision in their respective Records of Decision (RODs).
- Following completion of the RODs, the USACE will implement the long-term remedy through remedial design, construction, operations, and any required long-term monitoring.

## **1.0 INTRODUCTION**

The Niagara Falls Storage Site (NFSS) is located in the Town of Lewiston in northwestern New York State, northeast of Niagara Falls and south of Lake Ontario (Figure 1, Appendix A). NFSS is approximately 191 acres (77 hectares) in size which includes: one former process building foundation (Building 401- which was deconstructed in 2010), one office building (Building 429), an equipment shed (Hittman Building), a new storage shed for maintenance equipment, and a 9.9 acre (4 hectares) interim waste containment structure (IWCS). The property is fenced, electronically monitored, and public access is restricted.

Land use in the region is primarily rural residential; however, the site is bordered by a state and Federally regulated chemical waste disposal facility to the north, a solid waste disposal facility to the east and south, and a National Grid Power Corporation right-of-way to the west. A commercial greenhouse is operated just south of the site and a recreational campground is located southwest of the site. The nearest residential areas are approximately 3,281 feet (ft) (1-km) west, southwest of the site; the residences are primarily single-family dwellings.

Beginning in 1944, the NFSS was used as a storage facility for radioactive residues and wastes. The residues and wastes are the process by-products of uranium extraction from pitchblende (uranium ore). The residues originated at other sites and were transferred to the NFSS for storage in buildings, on-site pits, and surface piles.

Since 1971, activities at NFSS have been confined to residue and waste storage and remediation. On-site and off-site areas with residual radioactivity exceeding U.S. Department of Energy (USDOE) guidelines, were remediated by the USDOE, or one of its predecessors, between 1955 and 1992; materials generated during remedial actions (approximately 240,000 yd<sup>3</sup> or 183,493 m<sup>3</sup>) are encapsulated in the IWCS.

Through the Environmental Surveillance Program (ESP), the U.S. Army Corps of Engineers (USACE) monitors the air, water, and sediment at the site to ensure the protection of human health and the environment. The purpose of this ESP Technical Memorandum is to present the details of the ESP and the analytical results for 2010.

The tables in Appendix A (Table A.1 and A.2, Page T-1) list the units of measurement and appropriate abbreviations used in this document. Conventional units for radioactivity are used because the regulatory guidelines are generally provided in these terms.

## **1.1 Measured Parameters**

The key elements of the 2010 ESP at NFSS were:

- measurement of external gamma radiation and the calculation of external gamma dose to off-site receptors from radiation originating at the site (Appendix B);
- measurement of radon gas concentrations in air (combined contributions from radon-220 and radon-222);
- monitoring of radon-222 flux (rate of radon-222 emission from the IWCS);
- calculation of dose to off-site receptors from airborne emissions of site soils using annual weather data from Niagara Falls International Airport (Appendix C);
- sampling and analysis of surface water and streambed sediments for isotopic uranium (U-234, U-235, U-238) and total uranium (sum of these three isotopes), isotopic thorium (Th-228, Th-230, Th-232) and total thorium (sum of these three isotopes), isotopic radium (Ra-226, Ra-228) (referred to collectively as radioactive constituents), as well as metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, and volatile organic compounds (VOCs);
- additional radioactive constituents added fall of 2010: strontium (Sr-90), technetium (Tc-99), cesium (Cs-137), isotopic plutonium (Pu-238, Pu-239/240) and tritium (H-3);
- sampling and analysis of groundwater for radioactive constituents, metals, VOCs (limited to four wells), and water quality parameters.

## **1.2 ESP Enhancements for 2008**

Enhancements to the 2008 ESP based on Remedial Investigation (RI) findings are as follows:

- the addition of ten groundwater-monitoring well locations for radiological and water quality parameters for the purpose of monitoring those wells impacted by past activities (Appendix A: Table 1b, pg T-8 and Figure 2a, pg. F-2a);
- the addition of five streambed surface water and sediment locations for the purpose of monitoring where surface water enters the site and exits the site (three of which are located in the West Drainage Ditch) for radiological, metal and chemical parameters (Appendix A: Table 1c , pg. T-9 and Figure 2b, pg. F-2b) .

## **1.3 ESP Enhancements for 2009**

Enhancements to the 2009 ESP include the addition of five radiological monitoring locations along the site perimeter fence: four on the eastern fence and one on the northern fence. A radiological monitoring location also was added to the southeast corner of the perimeter fence surrounding the IWCS.

## **1.4 ESP Enhancements for 2010**

Portions of the former LOOW, including the NFSS, were used to temporarily store small volumes of waste from the Knolls Atomic Power Laboratory (KAPL) in Schenectady, NY containing mainly plutonium-238 and -239/240 and fission products such as cesium-137, strontium-90, technetium-99, and tritium.

From 1952 to 1954, wastes generated at the KAPL were shipped to the LOOW. The KAPL materials were originally stored near a railroad spur north of the NFSS and later moved to nearby buildings and stored in Building 401. The KAPL materials were transferred to the Oak Ridge Burial grounds in Oak Ridge, Tennessee, during the late 1950s and the storage buildings at the NFSS were later decommissioned and dismantled.

In addition, records indicate that wastes from University of Rochester (U of R), which included laboratory animals and radioactive chemicals containing plutonium and fission products, may have been disposed of in the U of R Burial Area (immediately north of the NFSS) in the 1950s. Although the original burial area was located outside of the NFSS property, the current disposal location of this waste stream is unknown and has the potential to have been consolidated into the IWCS at NFSS.

Plutonium or its fission products do not pose an immediate risk to current users of the site. According to RI and RI Addendum findings, the Corps has not detected significant quantities of plutonium or its associated fission products that would cause it to become a concern for future users of the site (i.e. human health) or the environment. In an effort to confirm those RI/RIR Addendum findings and continue to ensure the protection of human health and the environment, ongoing monitoring of plutonium and its associated fission products were added to the NFSS ESP for groundwater, surface water and sediment in fall 2010.

### **1.4.1 Groundwater Wells**

In the Fall sampling event, during the 2010 ESP, enhancements were added that included the addition of 21 new ground water wells (total of 39) and additional radiological parameters sampled biannually. (Appendix A, Table 1b –Environmental Surveillance Summary Spring and Fall Groundwater Sampling Niagara Falls Storage Site). Beginning in 2011, two of these groundwater monitoring wells, one of which is screened in the upper water bearing zone (OW04B) and the other in the lower water bearing zone (OW04A), also will be sampled during the summer and winter or on a quarterly basis (Appendix A, Table 1b - Environmental Surveillance Summary Spring and Fall Groundwater Sampling).

#### **1.4.2 Surface Water and Sediment**

Additional radiological parameters also were added to list of surface water and sediment parameters (Appendix A, Table 1c –Environmental Surveillance Spring and Fall Surface Water and Sediment Sampling). These additional parameters to the 2010 ESP starting with the fall sampling event include the addition of one surface water and sediment location. Beginning in the fall of 2010, the ESP was modified to include one additional surface water and sediment sampling location (SWSD025) situated north of the IWCS in the Central Drainage Ditch for the purpose of early detection of the unlikely breach of the IWCS. This location will be sampled on a quarterly basis (Appendix A, Table 1c - Environmental Surveillance Summary Spring and Fall Surface Water and Sediment Sampling).

## **2.0 REGULATORY GUIDELINES**

The primary regulatory guidelines that affect activities at FUSRAP sites are found in Federal statutes and in Federal, State, and local regulations. Regulatory criteria that were used to evaluate the results of the 2010 ESP at NFSS are summarized below, categorized by media and parameters. In several cases USDOE guidelines continue to be identified in the technical memorandum for comparison purposes of historical data collected by USDOE or their contractors. The USACE is not under the authority of the USDOE orders or directives and can rely on other applicable Federal or State regulations in relation to surveillance of the IWCS. The values are for comparison only.

### **2.1 External Gamma Radiation and Air (Radon Gas and Airborne Particulate)**

The regulatory guideline criteria used in evaluation of the calculated maximum doses from external gamma radiation and inhalation of radioactive particulate and the measured concentrations of radon gas include USDOE guidelines, United States Environmental Protection Agency (USEPA) standards, and USEPA guidance.

#### **2.1.1 USDOE Order 5400.5 (January 1993)**

Dose limits for members of the public from USDOE operations at USDOE-owned and USDOE-operated facilities are presented in USDOE Order 5400.5. The primary dose limit is expressed as an effective dose equivalent. The limit of 100-mrem total effective dose equivalent above background in a year from all sources (excluding radon) is specified in this Order; external gamma radiation dose and the calculated doses from airborne particulate releases are included in the calculation of the effective dose equivalent total. Also, this calculation includes contributions from other pathways, such as ingestion.

USDOE limits for radon concentrations in air from USDOE operations at USDOE-owned and USDOE-operated facilities are also presented in Order 5400.5. Based on the radioactive constituents in the wastes contained in the IWCS, it is unlikely that radon-220 would be emitted from the IWCS since the radon-220 half-life is approximately 55.6 seconds and this isotope would decay prior to permeating through the IWCS cap. It is, however, possible that radon-222 with a half-life of 3.8 days could be emitted. The USDOE limits for radon-222 concentrations in the atmosphere above facility surfaces or openings in addition to background levels are: 100 pCi/L at any given point; an annual average concentration of 30 pCi/L over the facility site; and an annual average concentration of 3.0 pCi/L at or above any location outside the facility site. To provide a conservative basis for comparison, on-site radon concentrations are evaluated against the off-site limit of 3.0 pCi/L.

## **2.1.2 USEPA Standards and USEPA Guidance**

### **Radon**

The USEPA also has a guidance action level of 4.0 pCi/L for radon concentrations for indoor air (homes and buildings), providing another conservative basis for comparison. Although these limits are specific to indoor air, they provide a conservative basis for comparison to the outdoor air results obtained during environmental surveillance activities, see Appendix C for details. For further comparison, the average radon level in U.S. homes is about 1.25 pCi/L and the average outdoor value is 0.4 pCi/L (NCRP Report 160, 2009).

### **Clean Air Act**

Section 112 of the Clean Air Act authorized the USEPA to promulgate the National Emission Standards for Hazardous Air Pollutants (NESHAPs) which are given in 40 CFR 61. Compliance with Subpart H (for non-radon, radioactive constituents) is verified by applying the USEPA-approved CAP88-PC model. Compliance with Subpart Q is verified by annual monitoring of the IWCS for radon-222 with an action level of 20 pCi/m<sup>3</sup>-sec (Appendix A, Table B, Page T-1).

## **2.2 Sediment, Surface Water, and Groundwater - Radioactive and Chemical Constituents**

Federal regulatory criteria (Appendix A, Table C and D, Page T-2 -6) for evaluating the measured concentrations of radionuclides and chemicals in sediment, surface water, and groundwater at NFSS are provided in the following sections.

### **2.2.1 USDOE Order 5400.5 (January 1993)**

USDOE Order 5400.5 provides guideline limits for radioactive contaminants in water and soil at USDOE-owned and USDOE-operated facilities. These limits are known as the USDOE derived concentration guide (DCG). The USDOE DCG for drinking water is used to compare against those radiological findings for surface water and groundwater. USDOE historically applied the residual soil cleanup guideline criteria specified in USDOE Order 5400.5 to sediments. However, those values are provided for comparative purposes only. Applicable or relevant and appropriate requirement ARARs and media-specific cleanup goals will be evaluated independently and presented in future CERCLA decision documents that will be available for public comment.

Section 5.5 presents the data for this 2010 Technical Memorandum and describes the basis for comparisons with USDOE Order 5400.5 limits in detail.

## 2.2.2 Safe Drinking Water Act (SDWA)

The Safe Drinking Water Act (SDWA) is the primary Federal law applicable to the operation of a public water system and the development of drinking water quality standards [*USEPA Drinking Water Regulations and Health Advisories* (USEPA 1996)]. The regulations in 40 CFR Part 141 (National Primary Drinking Water Regulations) set maximum permissible levels for organic, inorganic, radionuclides (including uranium and combined radium) and microbial contaminants in drinking water by specifying the maximum contaminant level (MCL) for each. In some cases, secondary maximum contaminant levels (SMCLs), which are not Federally enforceable (40 CFR 143.1), are provided as guidelines for the states. SMCLs are provided for a conservative comparison of analytical results and to provide consistency with previous reports and facilitate trend analysis.

The established (promulgated) MCL for combined concentrations of radium-226 and radium-228 is 5 pCi/L. The USEPA National Primary Drinking Water Regulation for Radionuclides (Final Rule – effective 2003) states a MCL of 30 µg/L for total uranium. Thorium-228, -230 and -232 utilize an adjusted gross alpha MCL of 15 pCi/L excluding radon and uranium (National Primary Drinking Water Regulations; Radionuclide; Final Rule (Federal Register December 7, 2000). The appropriate standard for thorium isotopes is the gross alpha MCL of 15 pCi/L; this MCL includes the concentration of radium-226 but excludes radon and uranium isotopes. The adjusted gross alpha MCL for thorium is used for comparison as it is more conservative than the individual USDOE DCGs for thorium-228 (400 pCi/L), thorium-230 (300 pCi/L) and thorium-232 (50 pCi/L).

The following MCLs for those new parameters added to the program in fall 2010 comply with either the 4 mrem/year for beta emitters or the gross alpha limit, according to the National Primary Drinking Water Regulations for radionuclides. The MCL for beta emitters are 8 pCi/L for strontium-90 and 20,000 pCi/L for tritium. In addition, concentrations limits to comply with the 4 mrem/year dose limit were calculated using an annual drinking water rate of 868.7 L/year for cesium-137 (92 pCi/L) and technetium-99 (3,200 pCi/L). The values for plutonium-238 and -239/240 will compare against the gross alpha MCL of 15 pCi/L; this MCL includes the concentration of radium-226 but excludes radon and uranium isotopes.

Although most ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results, maintaining consistency with previous reports and facilitating trend analysis (Table C and D in Appendix A, Tables section, pages T-2 thru T-6).

### **2.2.3 Groundwater – Water Quality**

Shallow groundwater resources at NFSS demonstrate uniformly poor groundwater quality and availability in the general region. Regional studies and studies conducted near the site (La Sala 1968, Wehran 1977, and Acres American 1981) conclude that groundwater quality is poor near the site because of high mineralization (see Section 5.6.2.2 Water Quality Parameters). Additionally, local studies (Wehran, 1977 and Acres American, 1981) indicate that the low permeabilities of the upper water bearing zone do not provide sustainable production quantities to standard wells for water supply use. On-site permeability testing at NFSS confirms the low permeabilities.

The USDOE conducted a well survey in 1988 and inventoried eight wells within three miles (4.8 km) of the site, none of which were reported as being used for drinking water but mainly for irrigation (USDOE 1994b). In 2007, the Niagara County Department of Health (DOH) updated its well inventory to include nine potable wells (two of which were a sole source for drinking water), eight non-potable wells, 20 abandoned wells and 77 idle wells within the survey area. Based on the USDOE report and the recent Niagara County DOH inventory, groundwater is not the main source of drinking water; however the NYSDEC Class GA groundwater standards were conservatively used to compare analytical results. Groundwater at NFSS consistently exceeds sodium and sulfate Class GA standards. Both the shallow and deep groundwater units at the NFSS exhibit over 1000 mg/L Total Dissolved Solids (TDS) and the deep groundwater commonly over 100 mg/L chloride, which indicates that the site groundwater can be classified as saline or Class GSA (NYCRR 701.16).

Though most ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative baseline (Appendix A, Table D, pg. T-3).

### **2.2.4 New York State Department of Environmental Conservation (NYSDEC) Water Quality Criteria for Groundwater**

NYSDEC has adopted the Federal SDWA standards into its own regulations in Title 6 New York Codes of Rules and Regulations (NYCRR) Parts 700-705, "Water Quality Regulations for Surface and Groundwater" (NYSDEC 1996). In addition, NYSDEC has independently established standards for some constituents. To apply established standards, the State of New York categorizes groundwater resources by groundwater quality and use.

The Division of Water Technical and Operational Guidance Series (TOGS) specifically address drinking water standards (NYSDEC –6 NYCRR Part 703 Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (August 1999)). These standards have been used to establish additional Class GA (related, conservative case) state water quality standards for comparison of analytical results, all of which indicate a Class GSA groundwater underlies the NFSS area.

## **2.2.5 New York State Department of Environmental Conservation (NYSDEC) Sediment Chemical Criteria**

New York State has published sediment screening guidance values which are designed to protect aquatic life from exposure to contamination that may exist in surface water bodies such as creeks, streams, and rivers. However, as noted in the Baseline Risk Assessment for the RI, surface water and moist sediments may only be present during part of the year for some areas, which limits the numbers and types of aquatic biota that survive in the ditches. Therefore, sediment sample results are compared to values developed for protection of human health for soil exposure, i.e., New York State regulatory criteria found in Title 6 of the Office Compilation of New York Codes, Rules and Regulations Part 375 (6 NYCRR 375) unrestricted and restricted use (industrial) soil clean up objectives (Appendix A, Table D, Page T-3). Unrestricted use values from 6 NYCRR 375 for certain metal and polycyclic aromatic hydrocarbons constituents are based on a survey of soil background concentrations. It should be noted that sediment background concentrations would differ from soil background in many instances.

### 3.0 SAMPLING LOCATIONS AND RATIONALE

Radioactive materials that exceed USDOE cleanup guidelines at NFSS are stored in the IWCS. Exposure of members of the public to this radioactively contaminated material at NFSS is unlikely because of site access restrictions (e.g., fences) and engineering controls (e.g., pile covers/clay cap). However, potential pathways to residual radioactivity that may exist outside the IWCS include direct exposure to external gamma radiation and inhalation of air containing radon or radioactively contaminated particulates from site soils; and contact with, or ingestion of, contaminated surface water, streambed sediments, or groundwater. The ESP at NFSS has been developed to provide surveillance of these exposure routes through periodic sampling and analysis for radioactive and chemical constituents. Figures 2a, 2b and 2c (Appendix A, pg. F-2a, 2b and 2c) presents sampling locations and media associated with the ESP at NFSS. Figure 1 (Appendix A, pg. F-1) shows those background locations for external gamma, radon gas and radon flux (radon-222) monitoring. A summary of the ESP at NFSS for external gamma radiation, radon gas, radon flux, surface water, sediment, and groundwater can be found in Appendix A, Tables 1a-c, pages T-7 thru T-9.

External gamma radiation monitoring and radon gas measurements occur at fence line locations surrounding the NFSS as well as interior portions of the site, including the perimeter of the IWCS, to assess potential exposures to the public and site workers. Measurement of radon-222 flux is conducted annually at discrete grid intersections on the IWCS. See Appendix A, Figure 2c, pg. F-2c for radiological monitoring (gamma and radon) locations at the site and radon-222 sample locations on the IWCS.

Groundwater monitoring wells have been selected to assess groundwater quality in areas representing background, potential source-areas (e.g., near the IWCS and past radiological material storage areas), and down gradient areas in the upper water-bearing zone (Appendix A, Figure 2a, page F-2a). Groundwater monitoring includes analysis for radioactive constituents, water quality parameters, and metals. The 2010 spring event included 16 upper water-bearing zone (UWBZ) wells and one lower water-bearing zone (LWBZ) well. The 2010 fall event included 26 UWBZ wells and 13 LWBZ wells; a total of 101 wells were sounded for water levels. Those wells selected in the UWBZ and LWBZ in the vicinity of the IWCS (Appendix A, Figure 7, page F-7) provide the earliest indication of an unlikely breach of the IWCS. The glacio-lacustrine clay aquitard that hydraulically separates the upper and lower water-bearing zones mitigates potential contaminant transport into the lower zone. The lower groundwater system had not been monitored actively since 1995 because previous monitoring indicated there were no groundwater impacts from site operations or constituents in excess of MCLs; RI sampling confirmed this. The current LWBZ monitoring effort is designed to re-affirm the site model and show protectiveness of the IWCS, as indicated by the 2010 sampling results. Monitoring in the LWBZ will be used to continue to evaluate the IWCS integrity.

Surface water and streambed sediment sampling of radioactive, metal, and chemical constituents is conducted along the drainage ditch system in upstream, on site, and downstream locations (Appendix A, Figure 2b, page F-2b) to assess the migration of constituents in these media should any occur.

#### **4.0 SURVEILLANCE METHODOLOGY**

Under the NFSS ESP, standard analytical methods approved and published by USEPA and the American Society for Testing and Materials (ASTM) are used for chemical (i.e., all non-radiological) analyses. The laboratories conducting the radiological analyses adhere to USEPA-approved methods and to procedures developed by the National Urban Security Technology (formerly the Laboratory Environmental Measurements Laboratory (EML)), ASTM and Standard Methods. Radiological and chemical laboratories are accredited through the Department of Defense (DoD) Environmental Laboratory Accredited Program (ELAP). That accreditation is based on conformance to the DoD Quality Systems Manual (DoD QSM) for Environmental Laboratories. A detailed listing of the specific procedures and the data quality objectives for the surveillance program are provided in the *Environmental Surveillance Plan* (USACE, June 2008).

All 2010 environmental surveillance activities at NFSS were conducted in accordance with the *Environmental Surveillance Plan* (USACE 2008) and surveillance methodology listed in Appendix A (Table E, page T-6).

## 5.0 ANALYTICAL DATA AND INTERPRETATION OF RESULTS

The analytical data for the 2010 ESP are presented in Tables 2 through 11 in Appendix A. Trend graphs that show analytical results for air, streambed sediment (spring collection data), surface water (spring collection data) and groundwater (spring collection data) between 1997 and 2010 are presented in Figures 9 through 26 in Appendix A.

As shown in the data tables, some of the analytical results for radioactive constituents may be expressed as negative numbers. Negative numbers can occur in the results when the average background activity of the laboratory counting instrument exceeds the measured sample activity. A negative result is generated when the instrument background activity is subtracted from the sample activity. For the purposes of interpretation, all values below the minimum detectable activity (MDA) are interpreted as having an unknown value between zero and the MDA. Therefore, a result below the MDA is referred to as non-detect in the text discussion.

Historical ranges in background concentrations for each radioactive analyte are determined from background sampling results from 1992 to 2010, unless otherwise noted. For gamma dose rates subtracting the calculated background from the sampling results for 2010 then gives an estimate of the above-background dose rate at each location; see Table 2 External Gamma Radiation Dose Rates (Appendix A, page T-7). When background is subtracted from the sampling result, it is possible that a negative number will be obtained much the same as a negative value may be obtained when the laboratory subtracts instrument background from a sample measurement.

Some of the historical data from NFSS used a method for analysis of total uranium, which yields results in micrograms per liter ( $\mu\text{g/L}$ ), or parts per billion for water samples and micrograms per kilogram ( $\mu\text{g/kg}$ ) or parts per billion for sediment samples. To allow direct comparison of results to the DCGs and soil guidelines, the data was converted to pCi/L and pCi/g, as appropriate. The specific activity for total uranium in drinking water sources has been estimated to be about 0.9 pCi/ $\mu\text{g}$  (USEPA 2000), which is the factor used in this report to convert groundwater data from  $\mu\text{g/L}$  to pCi/L. The specific activity for total uranium in soil sources is estimated to be 0.67 pCi/ $\mu\text{g}$  (USEPA 2000).

### 5.1 External Gamma Radiation

In 2010, external gamma radiation dose rates were measured continuously for the year using optically stimulated luminescence (OSL) dosimeters. These replaced the thermo luminescent dosimeters (TLDs) that had been used previously at the site. The OSL dosimeters are comparable to that of the previous TLDs used and have the advantage of allowing for multiple readouts and are used routinely to re-confirm reported radiation doses. The external gamma radiation dose results for 2010, including both raw data and data corrected for background, are presented in Table 2 (Appendix A, Tables, External Gamma Radiation at NFSS).

The data are used to calculate the external gamma radiation dose rate at both the nearest residence and the nearest commercial/industrial facility to determine the hypothetical maximally exposed off-site individual (MEI). The dose rate is a function of the site fence line dose, the distance of the individual from the fence line, and the amount of time the individual spends at that location. Results of this calculation are expressed as a dose to the individual in mrem for the year.

Distances to off-site receptors are based on the findings of a year 2005 canvas of areas near the site. Based on external gamma radiation results, the hypothetical MEI is a resident located 500 ft (152.4 meters) from the western perimeter fence, southwest of the site that received a dose of 0.024 mrem for calendar 2010. The hypothetical dose to the nearest off-site worker located 1,020 ft (310.9 meters) east of the site is 0.0027 mrem for calendar year 2010. Appendix B, Calendar Year (CY) 2010 Calculation of External Gamma Radiation Dose Rates for NFSS, Section 4.1 contains all pertinent calculations. External gamma dose rates from the NFSS and IWCS perimeters from 1998 thru 2010 are presented in Figures 9 and 10 of Appendix A. Both doses are well below the USDOE guideline of 100 mrem/year (excluding radon) for all pathways.

## 5.2 Radon Gas

Radon monitoring at NFSS is performed at a height that is representative of the human breathing zone (5.6 ft or 1.7 meters above ground level). Radon concentration diminishes significantly as distance from the ground increases and mixing with ambient air takes place.

Based on the radioactive constituents in the wastes contained in the IWCS, it is unlikely that radon-220 would be emitted from the IWCS; however, it is possible that radon-222 would be emitted. Air surveillance is conducted to determine the concentration of radon gas at NFSS using Radtrak® detectors that are designed to measure alpha particle emissions from both isotopes of radon (radon-220 and radon-222) and to collect passive, integrated data throughout the period of exposure. Because radon-220 is not a contaminant of concern at NFSS (due to the relatively low concentrations of radium-228 and the short half-life of radon-220), all concentrations are conservatively assumed to be radon-222. Results of semiannual monitoring for 2010 are presented in Appendix A, Table 3, pg. T-11. The corresponding surveillance locations are shown in Appendix A, Figure 2c, pg. F-2c.

Consistent with results from previous years, all site radon-222 results from the 2010 ESP were well below the USDOE off-site limit of 3.0 pCi/L above background. Results presented are without background subtracted and ranged from non-detect (less than 0.2 pCi/L) to 0.2 pCi/L. The background locations results were all non-detect (less than 0.2 pCi/L) to 0.3 pCi/L. Site average of 0.200 pCi/L (non-detects included in average) is comparable to that of the background average of less than 0.217 pCi/L and to that of the average outdoor value of 0.4 pCi/L (USEPA 1993). Radon concentrations at the NFSS perimeter for the first and second halves of the year are presented in Figures 11 and 12, respectively. Radon concentrations at the IWCS perimeter for the first half and second half of the year are presented by Figures 13 and 14, respectively.

### 5.2.1 Radon-222 Flux

Measurement of radon-222 flux provides an indication of the rate of radon-222 emission from a surface. Radon-222 flux is measured with activated charcoal canisters placed on a grid spaced 49.2 ft (15-meters) on center across the surface of the IWCS for a 24-hour exposure period. Measurements for 2010 are presented in Table 4; measurement locations are shown in Figure 2c, Appendix A.

Measured results for 2010 ranged from non-detect to 0.09301 pCi/m<sup>2</sup>/s, with an average (of detects and non-detects) result of 0.04606 pCi/m<sup>2</sup>/s (Appendix A, Table 4). Background measured results were all non-detect findings -0.008923, 0.05422 and -0.01009 pCi/m<sup>2</sup>/s. As in previous years, these results are well below the 20.0 pCi/m<sup>2</sup>/s standard specified in 40 CFR Part 61, Subpart Q, as well as comparable to background and demonstrate the effectiveness of the containment cell design and construction in mitigating radon-222 migration.

### 5.4 Airborne Particulate Dose

To determine the dose from airborne particulates potentially released from NFSS during 2010, airborne particulate release rates were calculated using NFSS RI soil data (collected between 1999 and 2004), and weather data for the year 2010 from the National Weather Service (Niagara Falls International Airport). Contributions from radon gas, which is not a particulate, are not considered in this calculation. The total airborne particulate release rate is input into the USEPA's CAP88-PC (Version 3.0) computer model to perform two calculations:

1. The first calculation estimates resultant doses from airborne particulates to hypothetical individuals at the distances to the nearest residences and to the nearest commercial/industrial facilities as measured from a central location on site. Hypothetical doses are then corrected for commercial/industrial facility occupancy at an assumed rate of 40 hours/week for 50 weeks/year. Residential occupancy is assumed to be full-time (i.e., 24 hours/day and 365 days/year [366 days for a leap year]). The hypothetical individual receiving the higher of these calculated doses is then identified as the hypothetical MEI for airborne particulate dose.
2. The second calculation estimates the hypothetical airborne particulate collective dose to the population within 50 miles (80 km) of the site using a population file (2000 census data for New York State and 2001 census data for the Province of Ontario) to determine the number of people in circular grid sections radiating to 50 miles (80 km) from the center of site.

The first calculation (Appendix C) indicates that the 2010 airborne particulate dose to the hypothetical MEI, a home resident, 2,999 ft (914 meters) south-southwest of the site, was 0.0014 mrem. These values are well below the 10 mrem per year standard, individual dose, specified in 40 CFR, Part 61, Subpart H, and the USDOE Order 5400.5. The second calculation indicates that the hypothetical airborne particulate collective dose to the population within 50 miles (80 km) of the site was 0.042 person-rem.

This compares to a yearly background dose to the same population of 5,425,000 person-rem, (see Figure 8, Appendix A, and note that the US per capita dose from background radiation has been increased to 620 mrem/person mainly due to increased use of nuclear medical imaging). Details of the calculations, including methodology are presented in Appendix C (FUSRAP CY 2010 NESHAP Annual Report For Niagara Falls Storage Site).

## 5.5 Surface Water and Sediment

As indicated in Section 1.2, ESP enhancements for surface water and sediment sampling in 2008 included the addition of a fall sampling event, which increased the sampling frequency from annual to semi-annual (spring and fall). In addition to semi-annual sampling, six new locations (SWSD023, SWSD024, WDD1, WDD2, WDD3 and SWSD025 (added fall 2010) were added, bringing the total number of surface water and sediment sampling locations to 11.

Samples are currently collected from the following locations:

- SWSD009, SWSD021, SWSD023 and SWSD024 along the upstream fence line
- SWSD010, SWSD011, SWSD022 and SWSD025 (added in fall 2010) along the central drainage ditch
- WDD1, WDD2 and WDD3 along the west drainage ditch (outside of the site perimeter fence)

Sampling locations are presented in Figure 2b, Appendix A, pg. F-2b.

### 5.5.1 Surface Water

Surface water sampling locations SWSD009, SWSD021, SWSD023 and SWSD024 were selected as “upstream” locations because they are located at the site boundary where surface water flows on to NFSS from offsite: SWSD009 is situated at the upstream boundary of the South 31 drainage ditch, which eventually joins the central drainage ditch; SWSD021 is located upstream, along the NFSS fence line, where the central drainage ditch first enters the property; SWSD023 is located along the southeast fence line where a drainage ditch enters the property from the south and flows north under “R” Street into South 31 drainage ditch; and SWSD024 is located where Castle Garden Road and “O” street meet (along the fence line) in the northeast portion of the site.

The spring samples were collected between May 17 and May 19, 2010. The fall samples were collected between October 25 and November 1, 2010, with the exception of the samples analyzed for the new radiological parameters (cesium-137, plutonium-238, plutonium-239/240, strontium-90, technetium-99, and tritium), which were collected on November 22, 2010. A total of 10 samples were collected in the spring and 11 samples in the fall when sample location SWSD025 was added.

Surface water samples were analyzed for radionuclides (radium-226, radium-228, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235, and uranium-238), metals, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides. The following radionuclides were added in fall 2010: cesium-137, plutonium-238, plutonium-239/240, strontium-90, technetium-99, and tritium.

Analytical results for surface water in 2010 are compared to USDOE DCGs, Federal Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) (drinking water regulations), and New York State (NYS) Water Quality Criteria in Appendix A, Table 6.

#### **5.5.1.1 Surface Water Radiological Findings**

The 2010 analytical results for radionuclides in surface water are presented on Table 6 in Appendix A. In general, the results were:

- consistently less than criteria
- indistinguishable from historical upstream concentrations
- comparable to past results

##### Radium

A total of 20 surface water samples were analyzed for radium-226 in the spring and fall of 2010, and the analytical results showed that 15 samples were non-detect and five samples were detects, with concentrations ranging from 0.374 pCi/L to 0.718 pCi/L.

Among the 21 samples analyzed for radium-228 in the spring and fall of 2010, 15 samples were non-detect and six samples were detects, with concentrations ranging from 0.387 pCi/L to 0.55 pCi/L.

A graph of total radium (radium-226 and radium-228) concentrations in surface water between 1997 and 2010 is shown in Figure 15; all of the data are well below the SDWA limit of 5 pCi/L and the USDOE DCG of 100 pCi/L.

##### Thorium

The analytical results for the 21 samples collected in the spring and fall of 2010 and analyzed for thorium-228 were all non-detect.

Among the 21 samples analyzed for thorium-230 in the spring and fall of 2010, 14 samples were non-detect and seven samples were detects, with concentrations ranging from 0.1738 pCi/L to 0.68 pCi/L. Thorium-230 concentrations in surface water between 1997 and 2010 (spring data) are below the adjusted gross alpha MCL SDWA limit of 15 pCi/L and the USDOE DCG of 300 pCi/L, as shown in Figure 16.

Thorium-232 results were non-detect in 19 of 21 samples collected in the spring and fall of 2010. The two remaining samples exhibited concentrations of 0.159 pCi/L and 0.336 pCi/L. As shown in Figure 17, thorium-232 concentrations in surface water from 1997 to 2010 (spring data) are below the adjusted gross alpha MCL SDWA limit of 15 pCi/L and the USDOE DCG of 50 pCi/L.

#### Uranium

Total uranium was detected in each of the 21 samples collected in the spring and fall of 2010, with concentrations ranging from 1.531 pCi/L to 12.242 pCi/L in the spring and 2.011 pCi/L to 9.979 pCi/L in the fall. These data are well below the Federal drinking water limit of 27 pCi/L (30 µg/L).

The spring analytical data for total uranium from 1997 to the present in on-site upstream sampling locations SWSD009 and SWSD021 range from 1.8 to 25.56 pCi/L or from 1.8 to 8.67 pCi/L from upstream surface water location SWSD009 only. All upstream locations (SWSD009, SWSD021, SWSD023 and SWSD024) for 2010 range from 2.060 to 9.833 pCi/L. As shown in Figure 18, concentrations of total uranium (spring data) concentrations in surface water demonstrate a trend that is below the SDWA limit of 30 µg/L (27 pCi/L), with the exception of SWSD010 in April 2004. That single anomaly was attributed to greater turbidity in that surface water sample.

#### Cesium-137, Plutonium-238 and 239/240, Strontium-90, Technetium-99, and Tritium

Surface water samples were collected during the 2010 fall sampling event from all sampling locations (for a total of 11) and analyzed for cesium-137, plutonium-238, plutonium-239/240, strontium-90, technetium-99, and tritium. The analytical results for all parameters except tritium were non-detect (and below their respective Federal drinking water MCLs). Tritium was detected at location SWSD009 at a concentration of 389 pCi/L, which is well below the federal MCL of 20,000 pCi/L.

#### **5.5.1.2 Surface Water Chemical Findings**

Surface water samples collected for organic and inorganic analysis are compared to Federal drinking water MCLs and NYS Water Quality Criteria. However, it should be noted that these standards apply to drinking water and site surface water is not a source of drinking water.

#### Metals

The analytical results for metals from upstream samples SWSD009, SWSD021, SWSD023 and SWSD024 were in exceedance of one or both of the following: the Federal drinking water MCLs and/or NYS Water Quality Criteria for aluminum, antimony, chromium, iron, manganese, selenium (SWSD009 only) and sodium. These findings up stream are similar to findings from the past two years (metals monitoring began 2008). Similar findings for site samples collected at locations WDD1, WDD2, WDD3, SWSD010, SWSD011, SWSD022 and SWSD025, which exhibited exceedances of the criteria for aluminum, iron, manganese and sodium for both the spring and fall sampling events. Sample SWSD022 exceeded the NYS Water Quality Criteria (class GA) per 6 NYCRR, Part 703 for boron for the spring sampling event.

VOCs

The analytical results for all samples collected during the spring and fall 2010 sampling events were within Federal drinking water and NYS Water Quality Criteria for VOCs.

PAHs

PAHs have only one established Federal drinking water MCL, 0.2 µg/L for benzo(a)pyrene; however, there are several NYS Water Quality Criteria for PAHs. Several of the NYS Water Quality Criteria for PAHs, including those for benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene, are very low at 0.002 µg/L, which is essentially non-detect and in most cases below laboratory detectability.

The analytical results for the 2010 spring and fall sampling events including that of upstream locations SWSD009, SWSD021, SWSD023 and SWSD024 showed that several of the PAHs with these very low criteria were exceeded, but concentrations were very low, ranging from 0.024 µg/L to 0.036 µg/L. As previously noted, however, these criteria are drinking water standards and site surface water is not a source of drinking water. No other PAHs exceeded their respective criteria.

PCBs

The analytical results for the 2010 spring and fall sampling events were non-detect for PCBs .

Pesticides

The analytical results for the 2010 spring and fall sampling events were non-detect for pesticides.

## **5.5.2 Sediment**

As previously stated, sediment sampling locations SWSD009, SWSD021, SWSD023 and SWSD024 were selected as upstream locations because they are located at the site boundary where surface water flows on to NFSS from offsite: SWSD009 is situated at the upstream boundary of the South 31 drainage ditch, which eventually joins the central drainage ditch; SWSD021 is located upstream, along the NFSS fence line, where the central drainage ditch first enters the property; SWSD023 is located along the southeast fence line where a drainage ditch enters the property and flows north under “R” Street into South 31 drainage ditch; and, SWSD024 is located where Castle Garden Road and “O” street meet (along the fence line) in the northeast portion of the site.

Sediment samples were analyzed for radionuclides (radium-226, radium-228, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235, and uranium-238), metals, VOCs, PAHs, PCBs, and pesticides. Several radionuclides were added in fall 2010, including cesium-137, plutonium-238, plutonium-239/240, strontium-90, and technetium-99. The 2010 environmental surveillance analytical results for sediment samples are presented on Table 7 in Appendix A.

Because there are no limits established for radionuclides in sediments, USDOE historically used the surface soil criterion of 5 pCi/g as a basis of comparison to radium-226, radium-228, thorium-230 and thorium-232 analytical results, and the derived site-specific criterion of 90 pCi/g for total uranium in surface soil. NRC screening values are in compliance with the 25 mrem/y (0.25 mSv) unrestricted release dose limit in 10CFR 20.1402 for the following radionuclides: plutonium-238, plutonium-239/240, strontium-90 and technetium-99. Analytical results for organics (VOCs, PAHs and pesticides) and inorganics (metals) in sediment are compared to NYS soil cleanup objectives specified in 6 NYCRR Part 375, Tables 375-6.8 a and b for unrestricted use and restricted (industrial) use. The spring samples were collected between May 17 and 19, 2010 and the fall samples were collected between October 25 and November 1, 2010.

### **5.5.2.1 Sediment Radiological Findings**

The 2010 analytical results for radionuclides in sediment are presented on Table 7 in Appendix A. In general, the results were:

- consistently less than criteria
- indistinguishable from historical upstream concentrations
- comparable to past results

#### Radium

Radium-226 was detected in all 21 sediment samples collected in the spring and fall of 2010, with concentrations ranging from 0.519 pCi/g to 1.79 pCi/g. These concentrations are fairly low and consistent with historic radium-226 data, which have ranged from non-detect to 3.40 pCi/g.

Radium-228 was detected in 16 of 21 sediment samples collected in the spring and fall of 2010, with concentrations ranging from 0.431 pCi/g to 2.661 pCi/g.

The combined radium-226 and radium-228 USDOE Guideline Limit for Residual Radioactivity in Surface Soil is 5 pCi/g above background for surface soil. The combined radium-226 and radium-228 in background surface soil reported in the NFSS Remedial Investigation (December, 2007) is 2.18 pCi/g. Therefore, the USDOE limit for residual radioactivity in surface soil is interpreted as 5 pCi/g plus 2.18 pCi/g or 7.18 pCi/g. As shown in Figure 19, the historical (1997 to 2010) spring sampling results for total radium (radium-226 and radium-228) in sediment were below this criterion.

#### Thorium

Thorium-228 was detected in all 21 sediment samples collected in the spring and fall of 2010, with concentrations ranging from 0.50 pCi/g to 1.533 pCi/g. These detections are fairly low and less than the USDOE surface soil criterion of 5 pCi/g above on-site background.

Thorium-230 was detected in 15 of 21 samples collected in the spring and fall of 2010, with fairly low concentrations ranging from 0.70 pCi/g to 1.611 pCi/g. As shown in Figure 20, these data are consistent with historical data and are less than the USDOE surface soil criterion of 5 pCi/g above on-site background.

Thorium-232 was detected in all 21 samples collected during the spring and fall of 2010. The concentrations ranged from 0.286 pCi/g to 1.525 pCi/g, which are consistent with historical data and are less than the USDOE surface soil cleanup criterion of 5 pCi/g above on-site background. Spring data collected between 1997 and 2010 for thorium-232 in sediment are shown on Figure 21.

### Uranium

The 2010 analytical results for total uranium, which is the sum of the isotopes uranium-234, uranium-235 and uranium-238, in sediment were detected in the majority of samples collected and are within the ranges established by historical analytical data. Among the detections, the concentrations ranged from 1.867 pCi/g to 5.290 pCi/g. All uranium concentrations in sediment are less than the USDOE derived surface soil cleanup criterion of 90 pCi/g above on-site background. As shown in Figure 22, the historic concentrations of total uranium in sediment from 1997 to 2010 also were below this criterion.

### Cesium-137, Plutonium-238 and 239/240, Strontium-90, and Technetium-99

During the 2010 fall sampling event, a total of 11 samples were collected for analysis for cesium-137. The analytical data showed that six samples were non-detect. Among the five detections, the concentrations ranged from 0.043 pCi/g to 0.080 pCi/g, which are well below the NRC surface soil screening value of 11 pCi/g for cesium-137.

A total of 11 samples collected in the fall of 2010 were analyzed for plutonium-238 and plutonium-239/240. All of the analytical results were non-detect and therefore, less than NRC surface soil screening values of 2 pCi/g for plutonium-238 and 2.3 for pCi/g for plutonium-239/240. During the 2010 fall sampling event, 11 samples were collected for analysis for strontium-90. The analytical results were all non-detect and less than the NRC surface soil screening value of 1.7 pCi/g for strontium-90.

A total of 11 samples collected in the fall of 2010 were analyzed for technetium-99. The analytical data were all non-detect and less than the NRC surface soil screening value of 19 pCi/g for technetium-99.

### **5.5.2.2 Sediment Chemical Findings**

Sediment samples collected for analysis for organic and inorganic parameters, which were added to the ESP in 2008, are compared to NYS Unrestricted Use (residential) and Restricted Use (industrial) Soil Cleanup Objectives (6 NYCRR Part 375, Subpart 375-6, Tables 6.8 [a and b]). Spring and fall 2010 sediment findings are presented in Table 7 of Appendix A and a summary of the findings is presented below.

- Several metals, including copper, lead, manganese, nickel and zinc, exceeded the NYS unrestricted use soil cleanup objectives, similar to findings from past two years (metals monitoring began 2008). In addition, samples collected from locations SWSD010, SWSD022, and SWSD024 equaled and/or exceeded the NYS Unrestricted Use Soil Cleanup Objectives for mercury for the spring and/or fall sampling event, with concentrations ranging from 0.19 mg/kg to 0.27 mg/kg. All sampling findings for mercury were below the NYS Restricted Use Soil Cleanup Objectives.
- VOCs in upstream samples SWSD009, SWSD021, SWSD023 and SWSD024 were non-detect with the exception of acetone, 2-butanone, dichloromethane and toluene. It should be noted that acetone and dichloromethane had several exceedances of the NYS Unrestricted Use criteria. All remaining samples exhibited VOCs below their respective NYS Unrestricted Use Soil Cleanup Objectives. Acetone, 2-butanone, dichloromethane and toluene are common laboratory contaminants used as solvents in the laboratory, so this data may represent false positives.
- The 2010 spring and fall analytical results for PAHs were primarily detectable findings below their respective NYS Unrestricted Use Soil Cleanup Objectives. One exception was the detection of dibenz(a,h)anthracene at locations SWSD023 (spring) and SWSD010 (fall); however, both were above below the NYS restricted Use Soil Cleanup Objective.
- The 2010 spring and fall analytical results for PCBs were either non-detect and/or below the NYS Unrestricted Use Soil Cleanup Objective.
- No pesticides were detected in any of the sediments samples collected in the spring and fall of 2010, with one exception: delta-BHC was detected at a concentration of 1.4 µg/kg in sample SWSD021 but this concentration is well below the NYS Unrestricted Use Soil Cleanup Objective of 40 µg/kg.

## 5.6 Groundwater

The locations of environmental surveillance groundwater monitoring wells at NFSS are shown in Figure 2b. On-site background information, descriptions of activities performed under the groundwater surveillance program, and surveillance results are discussed below.

### 5.6.1 Groundwater Flow System

#### 5.6.1.1 Natural System

Four unconsolidated geologic units and one bedrock unit are identified in the subsurface at the site. These units are grouped into the following three principle hydrostratigraphic zones (listed top to bottom): the Upper Water Bearing Zone (UWBZ - surface fill and an Upper Brown Clay Till Unit that contains sand lenses), an aquitard or confining unit (GLC - Glacio-Lacustrine Clay and Middle Silt Till Units), and the Lower Water Bearing Zone (LWBZ - Alluvial Sand and Gravel, Basal Red Till, and the upper 10 feet or 3 meters of the Queenston Formation). *See Figure-7: Schematic of Conceptualized Hydrostratigraphy in Appendix A, page F-7.*

Groundwater at the NFSS flows through the upper water-bearing zone via the surficial brown clay till unit and the lower water-bearing zone via both the alluvial sand and gravel unit and weathered portion of the Queenston Shale bedrock; the red till is a discontinuous layer that allows hydraulic communication between the coarse-grained deposits and Queenston Shale. As stated in Section 3.0, the glacio-lacustrine clay aquitard (GLC) that hydraulically separates the upper and lower water-bearing zones minimizes transport between the two zones. Regional groundwater flow in both the upper and lower groundwater systems is to the northwest towards Lake Ontario, although flow in the upper zone is interrupted by surface-water drainage ditches of significant depth and vegetative growth that promotes evapotranspiration in the summer periods.

Surface drainage from the site originally entered Four Mile, Six Mile, and Twelve Mile Creeks, which all flow northward to Lake Ontario. However during the 1940s, drainage modifications routed surface water to a series of ditches that eventually coalesce into the central drainage ditch north of the site. These ditches have variable depths that seasonally influence groundwater flow in the upper water-bearing zone on the site. The ditches affect groundwater conditions more in the summer months due to higher evapotranspiration from wetland vegetation in and along the ditches. Between rainfall events, groundwater baseflow does not create significant discharge in the ditches (i.e., surface drainage is the main contributor to flow). The current discharge from the central drainage ditch is routed to Four Mile Creek.

#### 5.6.1.2 Water Level Measurements

Groundwater levels were measured in one-hundred-and-one (101) NFSS wells with an electronic depth-to-water meter. Potentiometric data were recorded from fifty-nine (59) wells in the upper ground water system (including 10 new wells installed in 2009) and forty-two (42) wells in the lower groundwater system (including 6 bedrock wells).

Figures 3 through 6 in Appendix-A show the piezometric surfaces and groundwater flow directions in the upper and lower units during seasonally high and low groundwater conditions. Groundwater contours initially are hand drawn to account for site features (e.g., the IWCS and drainage ditches) and then digitized using ArcGIS® to present the groundwater flow directions and gradients in report-quality graphics.

The screened intervals for wells completed in the upper groundwater zone range from 3.02 to 27.6 ft (0.92 to 8.4 meters) below ground surface, while screened intervals for wells completed in the lower groundwater zone range from 22.4 to 104.5 ft (6.8 to 31.9 meters ) below ground surface. The 101 groundwater monitoring wells are located throughout the NFSS and provide significant areal coverage for groundwater flow characterization. A subset of eighteen (18) wells surrounding the IWCS provide adequate data to assess the structures performance and monitor specific areas of concern identified by the RI (Appendix A, Figure 2b).

In the upper water-bearing zone, the depth to water ranged from 0.11 to 19.82 ft (0.03 to 6.04 meters) below ground surface during 2010. The quarterly water-level fluctuations in the upper water-bearing zone averaged 1.44 ft (0.47 meters) and showed high and low elevations on May 18, 2010, and October 18, 2010, respectively. In the lower groundwater system, the depth to water ranged from 0.44 to 13.5 ft (0.13 to 4.11 meters) below ground surface during 2010. Quarterly water-level fluctuations in the lower groundwater system averaged 0.88 ft (0.27 meters) and also showed high and low elevations on May 18, 2010, and October 18, 2010, respectively.

The high-water elevations in the upper system ranged from 310.14 to 318.49 ft (94.53 to 97.06 meters) above mean sea level, whereas the low-water condition ranged from 299.44 to 318.33 ft (91.27 to 97.03 meters). The high-water elevation in the lower system ranged from 312.57 to 318.97 ft (95.27 to 97.22 meters) above mean sea level, whereas the low-water condition ranged from 303.00 to 317.14 ft (92.35 to 96.66 meters). See Figures 3 through 6 in Appendix A for a graphical representation of these data, interpreted groundwater flow directions, and conditions evident from local clay mining west of the NFSS.

Water-level data indicate that the upper water-bearing zone responds more rapidly to the recharge and discharge seasons (wet and dry periods) than the lower confined groundwater system due to the intervening GLC aquitard. The two water-bearing zones demonstrate hydraulic separation through independent water-level responses, as exemplified by the temporally different seasonal high and low conditions. The high-stress (dry) summer conditions normally lowered water levels in the upper water-bearing zone (i.e., October was the low-water period in the upper water-bearing) and the lower water-bearing zone usually lags by several months due to the hydraulic separation by the aquitard (i.e., February normally is the low-water period for the lower water-bearing zone).

However in 2010, the upper and lower water bearing zones had coincident seasonal high and low conditions (i.e., May was the high-water period and October was the low-water period for both the upper and lower water-bearing zones). This condition was derived from precipitation differences in 2010 with respect to previous years: year 2010 received only 25.84 inches of precipitation (8.1 inches or 24% below the normal 33.93 inches), whereas 2009 received 31.35 inches (Niagara Falls International Airport data). The greatest seasonal difference occurred in June through August, when 13.89 inches of precipitation fell in 2009 and only 10.38 inches in 2010. Potential recharge to the entire hydrologic system was also stressed by

greater potential evapotranspiration during 2010 due to temperature differences. The average high temperatures in 2010 for the months of June through August were 76.6, 83.6, and 81.8 degrees Fahrenheit, respectfully. In 2009, June through August average high temperatures were 74.4, 76.0, and 78.5 degrees Fahrenheit, respectfully.

### **5.6.1.3 Groundwater Flow**

The UWBZ and LWBZ hydrostratigraphy at the NFSS is hydraulically separated by the intervening glaciolacustrine clay unit, which is present across the entire site. The average horizontal gradients (or downward slope of the groundwater surface) in the upper system range between 0.0012 and 0.0074 ft/ft; the gradient varies seasonally and with the scale of the measurement (i.e., regional flow across the site versus near the central drainage ditch).

Local groundwater flow in the upper water-bearing zone is interrupted by the central drainage ditch throughout the year, whereas smaller tributary ditches appear to have a lesser influence on site-wide groundwater flow. The northwesterly regional flow gradient across the site is presented to illustrate the potential for long-term (and larger scale) flow and transport directions from the site.

Localized on-site flow towards the central drainage ditch east of the IWCS is consistently apparent due to the unique flow boundary conditions in this area (i.e., IWCS cut-off wall, low recharge due to a sloped [well drained] land surface, and proximate ditch). Other site ditches show various degrees of influence on groundwater levels, which are accounted for on the potentiometric map, where data allow. The drainage ditches at the NFSS have accumulated sediment and organic matter since their original installation (up to 10-ft or 3 meters deep); consequently they do not fully penetrate the upper water-bearing zone and some groundwater is assumed to pass beneath the ditches during high-water periods. Water-level contours may be drawn through the ditches to reflect some groundwater flow beneath them (where data allow). During the summer, vegetation throughout the site and specifically within and along the ditches will evapotranspire groundwater and promote lower heads near site ditches.

The lower groundwater system generally shows a northerly to northwesterly flow under gradients of 0.002 to 0.0043 ft/ft. This flow vector has been affected by the excavation of a clay borrow operation west of the site (mining the Glaciolacustrine Clay), where local surface-water recharges the lower water-bearing zone in the spring, which has caused the normally northwestern gradients to have a northerly component during the high-water period (May 2010). The local groundwater low underlying the IWCS is likely a combined artifact of impressed heads to the west and variations in the transmissivity of the LWBZ.. The October potentiometry in Figure 5 shows an alleviation of the impressed heads to the west and a return to normal flow westerly directions, which is due to the drier summer conditions in 2010, as discussed previously. By comparing historical potentiometry to current data, the local landfill operations (e.g., Modern and CWM) are not influencing flow patterns in the LWBZ under the NFSS.

A groundwater flow velocity of 38 cm/y (15 in/y) was estimated at NFSS in 1994 (USDOE 1994b). More recent RI modeling estimated an average flow velocity of 28 cm/y (11 in/yr) in off-site areas; this value is based upon the regional gradients and variable hydraulic conductivities presented in USACE (2008). Such velocities will vary based on local conditions (i.e., the spatial scale of hydraulic conductivity and gradient

estimations used). These velocity values do not represent contaminant migration rates since contaminant-soil partitioning retards (or slows) the rate of contaminant flow (transport) with respect to groundwater flow. This partitioning causes contaminants to adsorb, or bind, to local fine-grained soils in the upper water-bearing zone and aquitard sediments.

Vertical gradients derived from heads in monitoring well pairs usually vary with seasonality and show flow from the upper zone to the lower zone dominating the first and fourth quarterly measurements. However, during second and third quarters, the majority of elevations in the lower system were greater than those measured in the upper system. This seasonal variation in the direction and magnitude of vertical gradients will affect vertical flow between water-bearing zones and the long-term transport potential of contaminants between water-bearing zones, thereby maintaining the upper zone as the primary transport pathway at the NFSS.

In summary, the flow in the UWBZ is governed by low horizontal and vertical gradients interrupted by seasonal dewatering from evapotranspiration, which further limits advection; horizontal flow is enhanced locally by sand lenses that are non-contiguous. The groundwater flow in the LWBZ is predominantly horizontal due to confining gray clay or GLC that also mitigates the vertical transport of contaminants from the UWBZ. These hydrologic mechanisms, along with soil partitioning, limit the movement of potentially soluble contaminants in the upper water bearing zone, which is apparent through the proximity of groundwater impacts to historical sources. Most impacts are characterized by small plumes proximate to their historical sources (e.g., residue storage areas, operational corridors, or residue runoff areas) rather than large-scale contiguous plumes of distinctive concentration gradients advancing from distal sources.

## **5.6.2 Groundwater Analytical Results**

For comparative purposes, the NYSDEC Class GA (groundwater, which is considered potable) water quality standards (hereafter referred to as NYSDEC drinking water standards) are utilized when primary Federal drinking water standards are not available. It is noted that groundwater at the NFSS is not a source of drinking water and is naturally a Class GSA saline water.

### **5.6.2.1 Field Parameters**

Table 5a in Appendix A summarizes field measurements, which include temperature, pH, specific conductance, oxidation-reduction potential, and turbidity, for 2010 spring and fall environmental surveillance sampling. These measurements represent water conditions at the time of sampling.

### **5.6.2.2 Water Quality Parameters**

At the NFSS, water quality in the upper water-bearing zone is indicative of low recharge to a hydraulically slow flow system, which produces poor-quality (near-saline) groundwater containing high total dissolved solids and calcium/magnesium sulfates. Water quality in the lower water-bearing zone is poor due to high total dissolved solids. It is likely that the lower groundwater system receives recharge along the base of the Niagara Escarpment, situated approximately 2 miles (3.2 km) south of the site (USDOE 1994b) and, to a lesser extent, via downward flow from the upper unit during spring recharge. Water quality parameter data for 2010 spring and fall groundwater are provided in Table 8 of Appendix A.

Analytical results for sodium and sulfate were consistently above the NYS Class GA groundwater quality standards in site samples. Additional sampling of upgradient wells during the RI confirm that groundwater in the area is naturally saline and of poor quality because of high mineralization (see La Sala 1968; Wehran 1977; Acres American 1981). Groundwater at the NFSS is not used as a public water supply and is definable as a Class GSA water, although the comparison to the drinking water standards will continue to be used to provide a conservative evaluation of groundwater analytical results.

### **5.6.2.3 Groundwater - Radioactive Constituents**

In the spring of 2010, unfiltered groundwater samples were collected from 17 UWBZ wells and one LWBZ well and analyzed for uranium-234, uranium-235, uranium-238, radium-226, radium-228, thorium-230, thorium-228 and thorium-232, with one exception: insufficient water volume in well 505 restricted the analysis to uranium isotopes.

Beginning in the fall of 2010, the number of groundwater monitoring wells to be sampled increased to a total of 39 (26 upper water bearing zone wells and 13 lower water bearing zone wells). In addition, the list of radiological parameters was supplemented with cesium-137, plutonium-238, plutonium-239/240, strontium-90, technetium-99 and tritium. A couple of exceptions during the 2010 fall sampling event included well 505, which had insufficient water volume that restricted the analysis to uranium, radium, and thorium isotopes, and well 0W12B, which was dry and could not be sampled.

The full list of wells and radiological parameters are presented on Table 1b in Appendix A (page T-8). Environmental surveillance analytical results for radioactive constituents in groundwater are presented on Table 8 in Appendix A. Figures 23 through 26 present data trends for the years 1997 to 2010.

In general, the 2010 groundwater analytical results for radionuclides are:

- consistent with historical results suggesting that groundwater is contaminated with uranium from legacy residue/waste handling and/or surface-storage practices
- well below the USDOE DCGs for radium-226, radium-228, thorium-230, thorium-232, and total uranium in groundwater
- all non-detect for the parameters added in the fall of 2010, including cesium-137, plutonium-238, plutonium-239/240, strontium-90, and technetium-99; tritium was detected at four locations but the concentrations were below the calculated Federal drinking water standard

Details of the analytical data (background not subtracted) for the 2010 spring and fall sampling events are discussed below.

### Uranium

A total of 17 groundwater samples were collected during the 2010 spring sampling event for isotopic uranium analysis. The analytical data showed that total uranium concentrations were below the Federal drinking water standard (27 pCi/L) in 10 of 16 upper water bearing zone wells and the one lower water bearing zone well (OW04A). The six upper water bearing zone wells that exceeded the Federal drinking water standard include wells A45, OW04B, 313, 302A, A42, and OW11B. The concentrations detected in these wells ranged from 30.425 pCi/L in well A45 to 325.981 pCi/L in well OW11B.

A total of 38 groundwater samples were collected during the 2010 fall sampling event for isotopic uranium analysis (well OW12B was dry). The analytical data showed that all 13 lower water bearing zone wells and 18 of 24 upper water bearing zone wells exhibited total uranium concentrations below the Federal drinking water standard. The six upper water bearing zone wells that exceeded the Federal drinking water standard in the fall are the same wells that exceeded in the spring except well A45, and include OW04B, 313, 302A, A42, and OW11B, in addition to well OW07B. Total uranium concentrations in these five wells ranged from 29.375 pCi/L in well OW04B to 320.64 pCi/L in well OW11B.

The range of total uranium concentrations in the spring and fall differentiated by upper and lower water bearing zone is presented in the following tables:

2010 Spring Total Uranium Findings

Location	Concentration (pCi/L)
16 wells sampled in upper water-bearing zone	7.141 – 325.981
One well sampled in the lower water-bearing zone	1.766

2010 Fall Total Uranium Findings

Location	Concentration (pCi/L)
25 wells sampled in upper water-bearing zone	5.490 - 320.640
13 wells sampled in lower water-bearing zone	0.928-11.67

The wells that exceeded the Federal drinking water standard for total uranium and their respective concentrations are presented in the following table.

2010 Total Uranium exceedances of the Federal Drinking Water Standard (30 µg/L or 27 pCi/L)

Location	Spring	Fall
	pCi/L	pCi/L
A45	30.425	---
OW04B	38.638	29.375
313	42.226	34.431
OW07B	---	41.680
302A	101.939	104.41
A42	53.052	62.84
OW11B	325.981	320.640

Although compared to drinking water standards, groundwater at the NFSS is not a source of drinking water and is naturally a Class GSA saline water.

Generally, the 2010 total uranium analytical results are consistent with the historical data. Declining to dynamic steady-state (i.e., annually fluctuating about a mean) uranium trends in wells surrounding the IWCS are indicative of attenuating legacy sources (i.e., surface stored wastes) that impacted soil and groundwater prior to the IWCS construction. Since 1992, total uranium concentrations in all sampled wells have been less than (background not subtracted) the USDOE DCG of 600 pCi/L for water.

#### Radium

A total of 8 groundwater samples were collected during the 2010 spring sampling and analyzed for radium-226 and radium-228. The spring analytical data for radium-226 were non-detect in six of the eight samples analyzed. The two detections were found in wells OW13B (0.8937 pCi/L) and OW15B (0.6565 pCi/L). Radium-228 was not detected in any of the eight samples collected.

In the fall, 38 samples were analyzed for radium-226 and radium-228. Radium-226 was not detected in 23 samples. Among the remaining 15 samples, radium-226 concentrations ranged from 0.146 pCi/L in well BH49A to 0.674 pCi/L in well OW11B. Analytical results for radium-228 in the fall were 14 non-detects and 24 detections. Among the 24 detections, concentrations ranged from 0.363 pCi/L in well MW934 to 1.93 pCi/L in well OW03B.

Combined concentrations of radium-226 and radium-228 at NFSS for both the spring and the fall sampling events are well below the Federal drinking water standard of 5 pCi/L and the USDOE DCG of 100 pCi/L above background (for radium-226), as shown in Figure 23 from 1997 to 2010.

The range of radium concentrations in the spring and fall differentiated by upper and lower water bearing zone is presented in the following tables:

#### 2010 Spring Radium-226 findings

Location	Concentration (pCi/L)
8 wells sampled in UWBZ	Non-detect (U) - 0.894

#### 2010 Fall Radium-226 Findings

Location	Concentration (pCi/L)
25 wells sampled in UWBZ	Non-detect (U) - 0.674
13 wells sampled in LWBZ	Non-detect (U) - 0.348

#### 2010 Spring Radium-228 findings

Location	Concentration (pCi/L)
8 wells sampled in UWBZ	All Non-detect (U)

#### 2010 Fall Radium-228 findings

Location	Concentration (pCi/L)
25 wells sampled in UWBZ	Non-detect (U) – 1.93
13 wells sampled in LWBZ	Non-detect (U) – 1.580

#### Thorium

During the 2010 spring sampling event, a total of eight samples were collected for thorium-228, thorium 230, and thorium-232 analyses. In the fall of 2010, the number of samples collected for thorium analyses increased to 38.

The analytical data for thorium-228 showed that all eight samples collected in the spring were non-detect. In the fall, seven were non-detects and 31 were detections, with concentrations ranging from 0.093 pCi/L in well 415A to 0.28 pCi/L in well MW934.

The USDOE DCG for thorium-228 is 400 pCi/L above background and the Federal drinking water standard for thorium-228, thorium-230 and thorium-232 is 15 pCi/L. Thorium-228 concentrations in groundwater for both the 2010 spring and fall sampling event (as well as historical) are well below the Federal drinking water standard of 15 pCi/L and the USDOE DCG of 400 pCi/L.

The spring analytical data for thorium-230 indicated that six wells were non-detect and two wells, A50 and OW04B, exhibited concentrations of 0.3486 pCi/L and 0.3178 pCi/L, respectively. In the fall, thorium-230 was detected in five wells with concentrations ranging from 0.458 pCi/L in well MW934 to 0.591 pCi/L in well OW17B.

2010 spring and fall (as well as historical) thorium-230 concentrations are below USDOE DCGs (100 pCi/L and 50 pCi/L, respectively) and the Federal drinking water standard of 15 pCi/L, adjusted gross alpha, as shown in Figure 24.

Thorium-232 was detected in only one well, OW013B, with a concentration of 0.1079 pCi/L during the spring sampling event. In the fall, 16 wells were non-detect and the remaining 22 wells exhibited concentrations ranging from 0.046 pCi/L in well OW07B to 0.403 pCi/L in well A42.

2010 spring and fall (as well as historical) thorium-232 concentrations are below the USDOE DCG of 50 pCi/L above background and the Federal drinking water standard of 15 pCi/L, adjusted gross alpha MCL, as shown in Figure 25.

The range of concentrations differentiated by upper and lower water bearing zones for thorium-228, -230, and -232 is presented in the following tables:

#### 2010 Spring Thorium-228 Findings

Location	Concentrations pCi/L
8 wells sampled in UWBZ	All Non-detect (U)

#### 2010 Fall Thorium-228 Findings

Location	Concentrations pCi/L
25 wells sampled in UWBZ	Non-detect (U) – 0.280
13 wells sampled in LWBZ	Non-detect (U) – 0.172

#### 2010 Spring Thorium-230 Findings

Location	Concentrations pCi/L
8 wells sampled in UWBZ	Non-detect (U) – 0.349

#### 2010 Fall Thorium-230 Findings

Location	Concentrations pCi/L
25 wells sampled in UWBZ	Non-detect (U) – 0.591
13 wells sampled in LWBZ	Non-detect (U) – 0.585

## 2010 Spring Thorium-232 Findings

Location	Concentrations pCi/L
8 wells sampled in UWBZ	Non-detect (U) – 0.108

## 2010 Fall Thorium-232 Findings

Location	Concentrations pCi/L
25 wells sampled in UWBZ	Non-detect (U) – 0.403
13 wells sampled in LWBZ	Non-detect (U) – 0.287

Cesium-137, Plutonium-238 and 239/240, Strontium-90, Technetium-99, and Tritium

A total of three samples were submitted for analysis for cesium-137, plutonium-238 and 239/240, strontium-90, technetium-99, and tritium during the 2010 spring sampling event. The samples were collected from wells 201A, BH49A, and OW11B and all of the data were non-detect.

During the 2010 fall sampling event, a total of 37 samples (24 in the upper water bearing zone and 13 in the lower water bearing zone) were submitted for analysis for cesium-137, plutonium-238 and 239/240, strontium-90, technetium-99, and tritium and all of the data except tritium were non-detect. Four detections of tritium were orders of magnitude less than the calculated Federal drinking water standard.

#### **5.6.2.4 Groundwater - Chemical Constituents**

Though most ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative baseline. The 2010 environmental surveillance analytical results for metals and VOCs in groundwater are presented in Table 8, Appendix A, and discussed below.

##### **5.6.2.4.1 Metals**

Metals that exceed Federal and NYS drinking water criteria are discussed below:

- Aluminum - Wells OWO5A, OW07AB and OW13B had exceeded the National Secondary Drinking Water Regulations (40CFR143.3) of 200 µg/L (fall sampling event).
- Antimony -Well OW05B exceeded NYS Water Quality Criteria of 3 µg/L (fall sampling event).
- Arsenic - Wells 411A, OW05A, OW07A, OW11A, OW12A, OW13A, and OW15A exceeded the National Primary Drinking Water Regulations (40CFR141.62&63) of 10 µg/L (fall sampling event).
- Boron – Wells 415A and OW15A exceeded NYS Water Quality Criteria of 1,000 µg/L (fall sampling event)
- Iron – All wells with the exception of wells BH49, OW04A and OW17B exceeded the National Secondary Drinking Water Regulations (40CFR143.3) and NYS Water Quality Criteria of 300 µg/L (fall sampling event).
- Manganese – The spring event for wells A45 and OW06B exceeded the National Secondary Drinking Water Regulations (40CFR143.3) of 50 µg/L. The fall event had 25 of the 36 wells tested exceed the National Secondary Drinking Water Regulations (40CFR143.3) at 50 µg/L, with four of those wells (313, 302A, 415A and A45) exceeding the NYS water quality criteria of 1,000 µg/L.
- Nickel – Well OW05B met the NYS Water Quality Criteria of 100 µg/L (fall sampling event)
- Sodium - See Section 5.6.2.2 of this report.

Several elevated metals are indicative of both the reduction-oxidation states (redox) of the groundwater at the site and the residence time of the groundwater in the water bearing zones (i.e., in contact with glacial sediments). A slightly reducing environment is evident in the LWBZ due to the presence of aluminum, arsenic, iron and manganese, all of which become more soluble as the redox potential varies between an oxygenated and anoxic environment (i.e., these are indicator elements of lower or threshold redox conditions). In addition to those listed above, high concentrations of metals and anions without primary drinking-water criteria in the LWBZ indicate high mineralization and thus long residence times in the confined aquifer, which allows the geochemical saturation of groundwater with naturally occurring cations dissolved from glacial sediments. This hydrogeologic setting has produced a groundwater condition that meets the NYS Drinking Water classification of GSA for the site.

#### 5.6.2.4.2 VOCs

Groundwater samples analyzed for VOCs were taken for the purpose of monitoring two wells that exhibited detections in the RI. The two wells, 201A and 415A, that were added to the ESP in 2008, and an additional two wells, 411A and MW934, that were added in the fall of 2010, are located in areas that had been affected by past processing and handling of materials at NFSS. Analytical results for VOCs are presented in Table 8, Appendix A, and discussed below.

- No VOCs were detected in well 201A during the spring and fall sampling events.
- Well 415 exhibited exceedances of Federal drinking water and NYS Water Quality Criteria for the both the spring and fall sampling events, as shown in the table below.

Well 415 VOC exceedances ( $\mu\text{g}/\text{L}$ ) in 2010

VOC Compound	Spring	Fall	Federal drinking water stds.	NYS Water Quality Criteria
cis-1,2-Dichloroethylene	9,800	8,800	70	5
1,1-Dichloroethene	33	Non-detect (U) at 960**	7	5
Benzene	1.6	Non-detect (U) at 980**	5	1
Methylene chloride*	Non-detect (U)	3,500	5	5
Tetrachloroethylene	52,000	33,000	5	5
trans-1,2-Dichloroethene	180	Non-detect (U) at 920	100	5
Trichloroethylene	16,000	11,000	5	5
Vinyl chloride	780	Non-detect (U) At 1200**	2	2

\*methylene chloride is a common laboratory contaminant

\*\*elevated detection limit due to laboratory dilution

- No VOCs were detected in well 411A during the fall sampling event.
- Well MW934 exhibited exceedances of NYS Water Quality Criteria for the fall sampling event, as shown in the table below.

Well MW934 VOC exceedance ( $\mu\text{g}/\text{L}$ ) in 2010

VOC Compound	Spring	Fall	Federal drinking water stds.	NYS Water Quality Stds.
Chloroform*	NA	38	NE	7

\*chloroform is a common laboratory contaminant

## 6.0 GROUNDWATER TREND ANALYSIS

Total uranium and radium-226 groundwater concentrations over the course of the USACE Environmental Surveillance Program (1997-2010) were subjected to the Mann-Kendall test to determine if any surveillance well shows a statistically significant upward trend in concentration (Appendix D, Total Uranium and Radium-226 Evaluations). Before long-term trends can be evaluated, seasonal or repetitive cyclical trends should be identified as they can account for changes in concentration over time. Temporal data plots were inspected to identify seasonality, or predictable increases or decreases in concentration within a time cycle. The data, collected primarily in the spring and fall, do not indicate a consistent repeating pattern and as such did not support the use of the seasonal Kendall test.

The Mann-Kendall test, described in the EPA document: *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance* (USEPA, March 2009) and USACE Engineer Manual: *Environmental Quality – Environmental Statistics* (USACE, January 2008), is an accepted method for identifying the presence of a significant upward trend at surveillance wells. Under this method it is assumed that no discernible linear trend exists in concentration data over time (null hypothesis). If the Mann-Kendall statistic determined from the well data exceeds the established critical value (based on a 90 or 95% level of confidence) the assumption is rejected. A rejection of the assumption is considered to be strong evidence of an upward trend (alternative hypothesis); if the assumption is not rejected there is insufficient evidence for identifying a significant, non-zero trend. The test's statistical power (ability to accurately reject the null hypothesis) is limited by the sample size of data collected from the wells. As additional data is collected through the surveillance program the statistical power of the test will increase.

No increasing or decreasing trends in total uranium concentrations were identified in 10 of 13 wells used for analysis of trending near the IWCS. A decreasing trend in total uranium concentrations was identified at wells A45 and OW06B, while an increasing trend was identified at well OW11B. Due to a small number of available sample results, a non-definitive increasing trend was determined for well OW7B.

Groundwater trending results indicate that, at a 95% confidence level, the ESP background well, B02W20S, is the only well that definitively exhibits an increasing trend of radium-226, albeit at maximum concentrations below 1 pCi/L. Wells A50, OW06B, OW15B, and OW17B were identified with possible upward trends of radium-226 that are not definitive due a lack of statistical strength (e.g., a small number of available sample results). Additionally, wells OW04B and OW13B have positive correlation coefficients, which suggest that the concentration of radium-226 in groundwater could be increasing generally with time.

The observed total Uranium and Ra-226 trends warrant additional evaluation during the Balance of Plant Feasibility Study.

## Total uranium groundwater concentration trend evaluation (spring and fall data from 1997 to 2010)

Well	Sample size (n)	Test Statistic (Kendall's Tau)	Critical Value (p-value)
B02W20S	16	0.18	0.37
A45	18	-0.44	0.012
A50	18	-0.22	0.23
OW04B	21	-0.095	0.57
OW06B	19	-0.42	0.013
OW07B	7	0.52 **	0.13
OW13B	11	0.24	0.35
OW15B	18	-0.0065	1.0
OW17B	17	-0.10	0.59
A42	16	0.15	0.44
BH49A	8	-0.14	0.71
OW04A	8	0	1.0
OW11B	15	0.54 **	0.0056
OW18B	7	-0.52	0.13

## Radium-226 groundwater concentration trend evaluation (spring and fall data from 1997 to 2010)

Well	Sample size (n)	Test Statistic (Kendall's Tau)	Critical Value (p-value)
B02W20S	17	0.40 **	0.029
A45	18	-0.039	0.85
A50	18	0.24 **	0.17
OW04B	18	0.18	0.52
OW06B	18	0.26 **	0.13
OW07B	6	-0.20	0.71
OW13B	11	0.31 **	0.21
OW15B	18	0.31 **	0.081
OW17B	16	0.28 **	0.14
A42	9	-0.28	0.35
OW11B	8	0.14	0.71

Note: \*\*Increasing trends or correlations defined or inferred.

## **7.0 CONCLUSIONS**

### **7.1 External Gamma Radiation**

For 2010 the calculated hypothetical doses from external gamma radiation are 0.024 mrem for the nearest resident and 0.0027 mrem for the nearest off-site worker.

### **7.2 Radon Gas**

Results of the 2010 radon gas surveillance program indicate radon gas emissions are comparable to background. The radon gas concentrations at the site were consistently low (non-detect to 0.3 pCi/L, including background [Appendix A, Table 3]). All radon gas concentration analytical results at NFSS were well below the USDOE limit for radon-222 of 3.0 pCi/L above background (Appendix A, Table 3).

### **7.3 Radon-222 Flux**

The 2010 radon-222 flux measurements were indistinguishable from background. Results ranged from non-detect to 0.09301 pCi/m<sup>2</sup>/s, with an average (of detects and non-detects) result of 0.04606 pCi/m<sup>2</sup>/s (Appendix A, Table 4). The average value is less than one percent of the standard of 20 pCi/m<sup>2</sup>/s specified in 40 CFR Part 61, Subpart Q of the National Emission Standards for Hazardous Air Pollutants (NESHAPs), demonstrating the effectiveness of the containment cell design and construction in mitigating radon-222 migration.

### **7.4 Airborne Particulate Dose**

The 2010 airborne particulate annual dose from the wind erosion of soil to a hypothetical maximally exposed individual is calculated at 0.0014 mrem (Appendix C, FUSRAP CY2010 NESHAP Annual Report for Niagara Falls Storage Site (NFSS), section 4.3). The hypothetical annual dose to the individual can be compared to the 10 mrem/year dose standard in 40 CFR Part 61, Subpart H of NESHAPs. The 2010 hypothetical airborne particulate annual collective dose to the population within an 50 miles (80 km) radius of the site is calculated at 0.042 person-rem (Appendix C, FUSRAP CY2010 NESHAP Annual Report for Niagara Falls Storage Site (NFSS), section 5.1).

### **7.5 Cumulative Dose from External Gamma Radiation and Airborne Particulates**

The 2010 maximum annual total external gamma radiation and airborne particulate dose to a hypothetical individual is 0.025 mrem [0.024 + 0.0014 (assumes same individual receives both maximum doses from external and airborne dose pathways)], Appendix B, CY2010 Calculation Of External Gamma Radiation Dose Rates For Niagara Falls Storage Site (NFSS), Section 4.2 and Appendix C, FUSRAP CY2010 NESHAP ANNUAL REPORT FOR NIAGARA FALLS STORAGE SITE (NFSS), Section 4.3, respectively. This value can be compared to the USDOE limit of 100 mrem/year and the US average per capita background dose of approximately 620 mrem/year.

## **7.6 Surface Water**

In 2010, on-site radionuclide concentrations in surface water samples were consistent with radiological historical results that indicate no evidence of a release.

Metal concentrations, including that of upstream sampling locations, exceeded one or both the Federal drinking water MCLs and/or NYS Water Quality Criteria for aluminum, antimony, chromium, iron, manganese, selenium and sodium. There was one exceedance of the NYS Water Quality Criteria (class GA) per 6 NYCRR, Part 703 for boron.

## **7.7 Sediment**

In 2010, on-site radionuclide concentrations in sediment samples were consistent with historical radiological results that are comparable to upstream locations and indicate no evidence of a release. Metals (copper, lead, mercury, nickel and zinc) had exceedances, including that of upstream sampling locations, of the NYS Unrestricted Use Soil Cleanup Objectives at several locations, but did not exceed NYS Restricted Use Soil Cleanup Objectives (industrial), findings were comparable to upstream sampling locations. All VOC samples were below the NYS Unrestricted Use Soil Cleanup Objective, with the exception of several findings for methylene chloride which are below the NYS Restricted Use –Industrial criteria. One sample location had an exceedance of the NYS Unrestricted Use Soil Cleanup Objective for the PAH benzo(a)pyrene (spring sampling event) and indeno(1,2,3-cd)pyrene (fall sampling event). The benzo(a)pyrene finding also exceeded the NYS Restricted Use Soil Cleanup Objective (industrial).

## **7.8 Groundwater**

Current and past on-site radionuclide concentrations in groundwater samples from the upper water bearing zone indicate total uranium levels in several wells exceed the Federal drinking water standard. The latest data show that the wells that are exhibiting the most elevated uranium levels are those wells (1) added to the ESP following elevated detections during the RI and (2) those that historically exhibited elevated levels. The apparent source of these elevated uranium levels is past radioactive waste storage practices. Wells that are used to demonstrate IWCS integrity do not indicate an increasing trend (see Figure 26), and are generally coincident with historical use areas. The source of groundwater impacts at well OW11B will be further investigated in 2012. Uranium levels in groundwater will continue to be monitored as part of the ESP and the on-going CERCLA process.

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## **APPENDIX A**

### **NFSS 2010 ENVIRONMENTAL SUREVELLANCE TECHNICAL MEMORANDUM TABLES AND FIGURES**

#### **Environmental Monitoring at NFSS**

This appendix documents the results of environmental monitoring activities conducted in 2010 and supplements the environmental surveillance information included in the body of this technical memorandum. These activities are described to present a more complete picture of the site activities during the year and to provide technical reviewers with sufficient information to determine how much these activities influenced site conditions and ultimately the environmental surveillance program.

Two distinct activities compose the FUSRAP monitoring program at NFSS: environmental monitoring and environmental surveillance. Environmental monitoring consists of measuring the quantities and concentrations of pollutants in solid wastes, liquid effluents, and air that are discharged directly to the environment from on-site activities. Environmental surveillance documents the effects, if any, of USACE activities on on-site and off-site environmental and natural resources. At FUSRAP sites, because there are typically no on-site waste treatment facilities with routine point discharges, the monitoring program consists primarily of environmental surveillance (USACE 2008). The Environmental Surveillance Technical Memorandum specifically reports the results of routine environmental surveillance sampling and, at applicable sites, includes information about routine environmental monitoring (storm water discharges and radon flux measurement).

From 1999 to 2010, surface water, sediment, soil, groundwater, and other media was sampled to support a three-phased Remedial Investigation (RI) and Addendum at NFSS.

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**TABLES**

**ENVIRONMENTAL SURVEILLANCE TECHNICAL MEMORANDUM**

**Table A.1**

(Section 1.2 Unit Conversions)

**Units of Measurement and Conversion Factors – Dose and Radioactivity**

Parameter	Conventional	SI Units	Conversion Factor
Dose	millirem (mrem)	milliSievert (mSv)	1 mrem = 0.01 mSv
Activity	picoCurie (pCi)	becquerel (Bq)	1 pCi = 0.037 Bq

**Table A.2**

<b>Units of Measurement and Conversion Factors - Mass, Length, Area, and Volume</b>			
Parameter	SI Units	English Units	Conversion Factor
Mass	gram (g)	Ounce (oz)	1 g = 0.035 oz
	Kilogram (kg)	Pound (lb)	1 kg = 2.2046 lb
Length	centimeter (cm)	Inch (in.)	1 cm = 0.394 in.
	meter (m)	foot (ft)	1 m = 3.281 ft
	kilometer (km)	mile (mi.)	1 km = 0.621 mi.
Area	hectare (ha)	Acre	1 ha = 2.47 acres
Volume	Milliliter (mL)	Fluid ounce (fl. oz.)	1 mL = 0.0338 fl. oz.
	liter (L)	gallon (gal)	1 L = 0.264 gal
	cubic meter ( $m^3$ )	Cubic yard ( $yd^3$ )	1 $m^3$ = 1.307 $yd^3$

**Table B**

(Section: 2.1 External Gamma Radiations and Air (Radon Gas and Airborne Particulates))

**Summary of Radiological Standards and Guidelines for External Gamma Radiation and Air**

Parameter	USDOE Order 5400.5 <sup>a</sup>	Other Federal Standard or Guidelines
Radon-222 flux	20 pCi/ $m^2/s$	20 pCi/ $m^2/s$ <sup>b</sup>
Radon-222	3.0 pCi/L <sup>e</sup>	-
Radionuclide emissions (airborne particulates and radioactive gases excluding radon- 220 and radon-222)	10 mrem/y	10 mrem/y <sup>b</sup>
Effective dose equivalent (total contribution from all sources <sup>c</sup> )	100 mrem/y	100 mrem/y <sup>d</sup>

a. Guidelines provided in the USDOE Order are above background concentrations or exposure rates.

b. Federal (USEPA) Standard from 40 CFR, Part 61, subparts H (radionuclide emissions) and Q (radon-222 flux).

c. Contributing sources at NFSS consist of external gamma radiation exposure, radionuclide emissions listed above, and ingested radionuclides in water and soil/sediment (listed in the following table).

d. Federal (USNRC) Standard 10 CFR 20

e. The guideline of 3.0 pCi/L is based on an annual average value at or above any location outside of the facility site.

**Table C.1**  
**(Section: 2.2.2 Safe Drinking Water Act (SDWA))**  
**Summary of Radiological Standards and Guidelines for Water\***

Parameter	Analyte	Units	Federal Regualitons MCLs**	NY State Water Quality Stds.***	USDOE DCG for Water
RAD	Uranium-234	pCi/L	27 <sup>a</sup>	NE	600
RAD	Uranium-235	pCi/L	27 <sup>a</sup>	NE	600
RAD	Uranium-238	pCi/L	27 <sup>a</sup>	NE	600
RAD	Total Uranium (234, 235 & 238)	pCi/L	27 <sup>a</sup>	NE	600
RAD	Thorium-228	pCi/L	15 <sup>b</sup>	NE	400
RAD	Thorium-230	pCi/L	15 <sup>b</sup>	NE	300
RAD	Thorium-232	pCi/L	15 <sup>b</sup>	NE	50
RAD	Radium-226	pCi/L	5 <sup>c</sup>	5	100
RAD	Radium-228	pCi/L	5 <sup>c</sup>	5	100
RAD	Total Radium (226 & 228)	pCi/L	5 <sup>c</sup>	5	100
RAD	Cesium-137	pCi/L	92 <sup>d</sup>	NE	NE
RAD	Plutonium-238	pCi/L	15 <sup>b</sup>	NE	NE
RAD	Plutonium-239/240	pCi/L	15 <sup>b</sup>	NE	NE
RAD	Strontium-90	pCi/L	8 <sup>d</sup>	NE	NE
RAD	Technetium-99	pCi/L	3,200 <sup>d</sup>	NE	NE
RAD	Tritium (H3)	pCi/L	20,000 <sup>d</sup>	NE	NE

**Water Footnotes:**

a. 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

b. Gross alpha limit including radium-226, excluding radon and uranium

c. 5 pCi/L applies to sum of Ra-226 and Ra-228

d. Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

NE - Not Established

**\*Surface Water and Groundwater comparison criteria.**

Surface Water and Groundwater at NFSS is not a drinking water source.

Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

**\*\*Federal Regulations:**

National Primary Drinking Water Regulations 40CFR141.62&63

**Table C.2**  
**Summary of Radiological Standards and Guidelines for Sediment\***

Parameter	Analyte	units	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>c,d</sup>	NRC Soil Screening Values <sup>e</sup>	NY State-Unrestricted Use**	NY State- Restricted Use -Industrial**
RAD	Thorium-228	pCi/g	5	4.7	NE	NE
RAD	Thorium-232	pCi/g	5	1.8	NE	NE
RAD	Thorium-230	pCi/g	5	1.1	NE	NE
RAD	Cesium-137	pCi/g	NE	11	NE	NE
RAD	Plutonium-238	pCi/g	NE	2.5	NE	NE
RAD	Plutonium-239/240	pCi/g	NE	2.3	NE	NE
RAD	Strontium-90	pCi/g	NE	1.7	NE	NE
RAD	Technetium-99	pCi/g	NE	19	NE	NE
RAD	Tritium (H3)	pCi/g	NE	110	NE	NE
RAD	Radium-226	pCi/g	5 <sup>a</sup>	0.7	NE	NE
RAD	Radium-228	pCi/g	5 <sup>a</sup>	NA	NE	NE
	<i>Total Radium (226&amp;228)<sup>a</sup></i>	<i>pCi/g</i>	<i>5<sup>a</sup></i>	<i>NA</i>	<i>NE</i>	<i>NE</i>
RAD	Uranium-234	pCi/g	90 <sup>b</sup>	13	NE	NE
RAD	Uranium-235	pCi/g	90 <sup>b</sup>	8	NE	NE
RAD	Uranium-238	pCi/g	90 <sup>b</sup>	14	NE	NE
	<i>Total Uranium (234, 235 &amp; 238)<sup>b</sup></i>	<i>pCi/g</i>	<i>90<sup>b</sup></i>	<i>NA</i>	<i>NE</i>	<i>NE</i>

**Sediment Footnotes:**

a. Applies to the sum of Ra-226 and Ra-228 concentrations

NA - Not Applicable

NE - Not Established

b. Sum of uranium isotope concentrations (pCi/g).

c. Above -background concentrations in soil, averaged over the topmost 15-cm of soil.

d. There are no standards for sediment; therefore, the USDOE residual (radium and thorium) and site-specific (uranium) surface soil cleanup guideline criteria are used as a basis for evaluating analytical results for sediment. If a mixture of the radionuclides is present in soil, then the sum of the ratios of the concentration of each isotope to the allowable limit must be less than one. This guideline applies for total uranium in natural isotopic abundance.

e. These values represent superficial surface soil concentrations of individual radionuclides that would be deemed in compliance with the 25 mrem/y (0.25 mSv) unrestricted release dose limit in 10 CFR 20.1402. For radionuclides in a mixture, the "sum of fractions" rule applies. Screening values (pCi/g) equivalent to 25 mrem/y derived using DandD screening methodology (SNL Letter Report for NRC Project JCN W6227, January 30, 1998). These values were derived based on selection of the 90th Percentile of the output dose distribution for each specific radionuclide (or radionuclide with the specific decay chain). Behavioral parameters are set at Standard Man or at the mean of the distribution for an average man.

**\*Sediment comparison criteria:**

Values are provided for comparative purposes only. ARARs and media-specific cleanup goals will be evaluated independently and presented in future CERCLA decision documents that will be available for public comment.

**\*\*New York State:**

6 NYCRR PART 375

NY State- Unrestricted Use Soil Cleanup Objectives Table 375-6.8(a)

NY State- Restricted Use Soil Cleanup Objectives

Table 375-6.8(b)-Industrial

**Table D**  
**State and Federal Comparison Values for Groundwater, Surface Water and Sediment**

Parameter <sup>c</sup>	Analyte	Units <sup>d</sup>	Water <sup>a</sup>		Sediment <sup>b</sup>		
			Federal Regulations MCLs <sup>**</sup>	NY State Water Quality Sdls.*	Units <sup>d</sup>	NY State- Unrestricted Use <sup>**</sup>	NY State- Restricted Use - Industrial <sup>**</sup>
Water Quality	Alkalinity, Total as CaCO <sub>3</sub>	mg/L	500 <sup>1</sup>	500		NA	NA
Water Quality	Total Dissolved Solids	mg/L	NE	NE		NA	NA
Anion	Chloride	mg/L	250 <sup>1</sup>	250		NA	NA
Anion	Fluoride	mg/L	4.00	1.50		NA	NA
Anion	Nitrate	mg/L	10.00	10.00		NA	NA
Anion	Nitrite	mg/L	1.00	1.00		NA	NA
Anion	Ortho-phosphate	mg/L	NE	NE		NA	NA
Anion	Sulfate	mg/L	250 <sup>1</sup>	250.00		NA	NA
Metal	Aluminum	µg/L	50-200 <sup>1</sup>	NE	MG/KG	NE	NE
Metal	Antimony	µg/L	6.00	3.00	MG/KG	NE	NE
Metal	Arsenic	µg/L	10.00	25.00	MG/KG	13	16
Metal	Barium	µg/L	2000.00	1000.00	MG/KG	350	10000
Metal	Beryllium	µg/L	4.00	11.00	MG/KG	7	2700
Metal	Boron	µg/L	NE	1000.00	MG/KG	NE	NE
Metal	Cadmium	µg/L	5.00	5.00	MG/KG	3	60
Metal	Calcium	µg/L	NE	NE	MG/KG	NE	NE
Metal	Chromium	µg/L	100.00	50.00	MG/KG	NE	NE
Metal	Cobalt	µg/L	NE	NE	MG/KG	NE	NE
Metal	Copper	µg/L	1300.00	200.00	MG/KG	50	10000
Metal	Iron	µg/L	300 <sup>1</sup>	300.00	MG/KG	NE	NE
Metal	Lead	µg/L	15.00	25.00	MG/KG	63	3900
Metal	Lithium	µg/L	NE	NE	MG/KG	NE	NE
Metal	Magnesium	µg/L	NE	NE	MG/KG	NE	NE
Metal	Manganese	µg/L	50 <sup>1</sup>	300.00	MG/KG	1600	10000
Metal	Mercury	µg/L	2.00	0.70	UG/KG	180 <sup>4</sup>	5700 <sup>4</sup>
Metal	Nickel	µg/L	NE	100.00	MG/KG	30	10000
Metal	Potassium	µg/L	NE	NE	MG/KG	NE	NE
Metal	Selenium	µg/L	50.00	10.00	MG/KG	4	6800
Metal	Silver	µg/L	100 <sup>1</sup>	50.00	MG/KG	2	6800
Metal	Sodium	µg/L	NE	20000.00	MG/KG	NE	NE
Metal	Thallium	µg/L	2.00	NE	MG/KG	NE	NE
Metal	Vanadium	µg/L	NE	14.00	MG/KG	NE	NE
Metal	Zinc	µg/L	5000 <sup>1</sup>	NE	MG/KG	109	10000

**Table D**  
**State and Federal Comparison Values for Groundwater, Surface Water and Sediment**

Parameter <sup>c</sup>	Analyte	Units <sup>d</sup>	Water <sup>a</sup>		Sediment <sup>b</sup>		
			Federal Regulations MCLs <sup>**</sup>	NY State Water Quality Sdts. <sup>*</sup>	Units <sup>d</sup>	NY State- Unrestricted Use <sup>**</sup>	NY State- Restricted Use - Industrial <sup>**</sup>
VOC	1,1,1-Trichloroethane	µg/L	200.00	5.00	UG/KG	680	1000000
VOC	1,1,2,2-Tetrachloroethane	µg/L	NE	5.00	UG/KG	NE	NE
VOC	1,1,2-Trichloroethane	µg/L	5.00	1.00	UG/KG	NE	NE
VOC	1,1-Dichloroethane	µg/L	NE	5.00	UG/KG	270	480000
VOC	1,1-Dichloroethylene	µg/L	7.00	5.00	UG/KG	330	1000000
VOC	1,2-Dichloroethane	µg/L	5.00	0.60	UG/KG	20	60000
VOC	1,2-Dichloropropane	µg/L	5.00	1.00	UG/KG	NE	NE
VOC	2-Butanone	µg/L	NE	NE	UG/KG	120	1000000
VOC	2-Hexanone	µg/L	NE	NE	UG/KG	NE	NE
VOC	4-Methyl-2-pentanone	µg/L	NE	NE	UG/KG	NE	NE
VOC	Acetone	µg/L	NE	NE	UG/KG	50	1000000
VOC	Benzene	µg/L	5.00	1.00	UG/KG	60	89000
VOC	Bromodichloromethane	µg/L	NE	NE	UG/KG	NE	NE
VOC	Bromoform	µg/L	NE	NE	UG/KG	NE	NE
VOC	Bromomethane	µg/L	NE	5.00	UG/KG	NE	NE
VOC	Carbon disulfide	µg/L	NE	60.00	UG/KG	NE	NE
VOC	Carbon tetrachloride	µg/L	5.00	5.00	UG/KG	760	44000
VOC	Chlorobenzene	µg/L	100.00	5.00	UG/KG	1100	1000000
VOC	Chloroethane	µg/L	NE	5.00	UG/KG	NE	NE
VOC	Chloroform	µg/L	NE	7.00	UG/KG	370	700000
VOC	Chloromethane	µg/L	NE	5.00	UG/KG	NE	NE
VOC	cis-1,2-Dichloroethylene	µg/L	70.00	5.00	UG/KG	250	1000000
VOC	cis-1,3-Dichloropropylene	µg/L	NE	0.4 <sup>2</sup>	UG/KG	NE	NE
VOC	Ethylbenzene	µg/L	700.00	5.00	UG/KG	1000	780000
VOC	Methylene chloride	µg/L	5.00	5.00	UG/KG	50	1000000
VOC	Styrene	µg/L	100.00	5.00	UG/KG	NE	NE
VOC	Tetrachloroethylene	µg/L	5.00	5.00	UG/KG	1300	300000
VOC	Toluene	µg/L	1000.00	5.00	UG/KG	700	1000000
VOC	trans-1,2-Dichloroethylene	µg/L	100.00	5.00	UG/KG	190	1000000
VOC	trans-1,3-Dichloropropylene	µg/L	NE	0.4 <sup>2</sup>	UG/KG	NE	NE
VOC	Trichloroethylene	µg/L	5.00	5.00	UG/KG	470	400000
VOC	Vinyl chloride	µg/L	2.00	2.00	UG/KG	20	27000
VOC	Xylenes (total)	µg/L	1000.00	5 <sup>3</sup>	UG/KG	260	1000000

**Table D**  
**State and Federal Comparison Values for Groundwater, Surface Water and Sediment**

Parameter <sup>c</sup>	Analyte	Units <sup>d</sup>	Water <sup>a</sup>		Sediment <sup>b</sup>		
			Federal Regulations MCLs <sup>*</sup>	NY State Water Quality Sdts. <sup>*</sup>	Units <sup>d</sup>	NY State- Unrestricted Use <sup>**</sup>	NY State- Restricted Use - Industrial <sup>**</sup>
PAH	Acenaphthene	µg/L	NE	50 <sup>4</sup>	UG/KG	20000	1000000
PAH	Acenaphthylene	µg/L	NE	50 <sup>4</sup>	UG/KG	100000	1000000
PAH	Anthracene	µg/L	NE	50 <sup>4</sup>	UG/KG	100000	1000000
PAH	Benz(a)anthracene	µg/L	NE	.002 <sup>4</sup>	UG/KG	1000	11000
PAH	Benz(a)pyrene	µg/L	0.20	ND <sup>4</sup>	UG/KG	1000	1100
PAH	Benz(b)fluoranthene	µg/L	NE	.002 <sup>4</sup>	UG/KG	1000	11000
PAH	Benz(ghi)perylene	µg/L	NE	50 <sup>4</sup>	UG/KG	100000	1000000
PAH	Benz(k)fluoranthene	µg/L	NE	.002 <sup>4</sup>	UG/KG	800000	110000
PAH	Chrysene	µg/L	NE	.002 <sup>4</sup>	UG/KG	1000	110000
PAH	Dibenz(a,h)anthracene	µg/L	NE	50 <sup>4</sup>	UG/KG	330	1100
PAH	Fluoranthene	µg/L	NE	50 <sup>4</sup>	UG/KG	100000	1000000
PAH	Fluorene	µg/L	NE	50 <sup>4</sup>	UG/KG	30000	1000000
PAH	Indeno(1,2,3-cd)pyrene	µg/L	NE	0.002 <sup>4</sup>	UG/KG	500	11000
PAH	Naphthalene	µg/L	NE	10 <sup>4</sup>	UG/KG	12000	1000000
PAH	Phenanthrene	µg/L	NE	50 <sup>4</sup>	UG/KG	100000	1000000
PAH	Pyrene	µg/L	NE	50 <sup>4</sup>	UG/KG	100000	1000000
PCB	Aroclor-1016	µg/L	0.50	0.09 <sup>5</sup>	UG/KG	100	25000
PCB	Aroclor-1221	µg/L	0.50	0.09 <sup>5</sup>	UG/KG	100	25000
PCB	Aroclor-1232	µg/L	0.50	0.09 <sup>5</sup>	UG/KG	100	25000
PCB	Aroclor-1242	µg/L	0.50	0.09 <sup>5</sup>	UG/KG	100	25000
PCB	Aroclor-1248	µg/L	0.50	0.09 <sup>5</sup>	UG/KG	100	25000
PCB	Aroclor-1254	µg/L	0.50	0.09 <sup>5</sup>	UG/KG	100	25000
PCB	Aroclor-1260	µg/L	0.50	0.09 <sup>5</sup>	UG/KG	100	25000
Pesticide	4,4'-DDD	µg/L	NE	0.30	UG/KG	3	180000
Pesticide	4,4'-DDE	µg/L	NE	0.30	UG/KG	3	120000
Pesticide	4,4'-DDT	µg/L	NE	0.20	UG/KG	3	94000
Pesticide	Aldrin	µg/L	NE	ND	UG/KG	5	1400
Pesticide	alpha-BHC	µg/L	NE	0.01	UG/KG	20	6800
Pesticide	alpha-Chlordane	µg/L	NE	NE	UG/KG	94	47000
Pesticide	beta-BHC	µg/L	NE	0.04	UG/KG	36	14000
Pesticide	delta-BHC	µg/L	NE	0.40	UG/KG	40	1000000
Pesticide	Dieldrin	µg/L	NE	0.00	UG/KG	5	2800
Pesticide	Endosulfan I	µg/L	NE	NE	UG/KG	2,400 <sup>5</sup>	920,000 <sup>5</sup>
Pesticide	Endosulfan II	µg/L	NE	NE	UG/KG	2,400 <sup>5</sup>	920,000 <sup>5</sup>
Pesticide	Endosulfan sulfate	µg/L	NE	NE	UG/KG	2,400 <sup>5</sup>	920,000 <sup>5</sup>
Pesticide	Endrin	µg/L	2.00	ND	UG/KG	14	410000
Pesticide	Endrin aldehyde	µg/L	NE	5.00	UG/KG	NE	NE
Pesticide	Endrin ketone	µg/L	NE	5.00	UG/KG	NE	NE
Pesticide	gamma-BHC (Lindane)	µg/L	0.20	0.50	UG/KG	100	23000
Pesticide	gamma-Chlordane	µg/L	NE	NE	UG/KG	NE	NE
Pesticide	Heptachlor	µg/L	0.40	0.40	UG/KG	42	29000
Pesticide	Heptachlor epoxide	µg/L	0.20	0.30	UG/KG	NE	NE
Pesticide	Methoxychlor	µg/L	40.00	35.00	UG/KG	NE	NE
Pesticide	Toxaphene	µg/L	3.00	0.06	UG/KG	NE	NE

**Table D**  
**State and Federal Comparison Values for Groundwater, Surface Water and Sediment**

Parameter <sup>c</sup>	Analyte	Water <sup>a</sup>			Sediment <sup>b</sup>			
		Units <sup>d</sup>	Federal Regulations MCLs <sup>*</sup>	NY State Water Quality Sdls. <sup>*</sup>	Units <sup>d</sup>	NY State- Unrestricted Use <sup>**</sup>	NY State- Restricted Use - Industrial <sup>**</sup>	
<b>a. Surface Water and Groundwater comparison criteria.</b>								
Surface Water and Groundwater at NFSS is not a drinking water source.								
The above federal and state regulation concentrations are for comparative purposes only.								
<b>*Federal Regulations:</b>								
National Primary Drinking Water Regulations 40CFR141.62&63								
<b>*New York State:</b>								
New York State Standards -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.								
NE - Not Established								
<b>Note:</b>								
NA - Not applicable								
1. National Secondary Drinking Water Regulations (40CFR143.3)								
2. Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.								
3. Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2--Xylene, 1,3-Xylene and 1,4-Xylene individually.								
4. NYSDEC Groundwater Criteria TOGS (1.1.1) June 1998, Revised 2000,								
Class GA: and 10NYCRR Part 5, Subpart5-1, Public Water Systems, NYSDOH.								
5. Sum of Aroclors (polychlorinated biphenyls)								
<b>b. Sediment comparison criteria:</b>								
Values are provided for comparative purposes only. ARARs and media-specific cleanup								
goals will be evaluated independently and presented in future CERCLA decision documents that will								
be available for public comment.								
<b>**New York State:</b>								
6 NYCRR PART 375								
NY State- Unrestricted Use Soil Cleanup Objectives Table 375-6.8(a)								
NY State- Restricted Use Soil Cleanup Objectives Table 375-6.8(b) -Industrial								
NE - Not Established								
<b>Note:</b>								
NA - Not applicable								
4. Total Mercury								
5. Sum of endosulfan I, endosulfan II, and endosulfan sulfate								

**c. PARAMETER**

VOC - Volatile Organic Compound  
 PAH - Polynuclear Aromatic Hydrocarbon  
 PCB - Polychlorinated Biphenyl

**d. UNITS**

PCI/G - picocuries per gram  
 MG/KG - milligrams per kilograms (ppm)  
 UG/KG - micrograms per kilogram (ppb)

**Table E****(Section: 4.0 SURVEILLANCE METHODOLOGIES)****FUSRAP Instruction Guides Used for Environmental Surveillance Activities**

Document Number	Document Title
191-IG-007	Groundwater Level and Meteorological Measurements (BNI 1996b)
191-IG-011	Decontamination of Field Sampling Equipment at FUSRAP Sites (BNI 1996c)
191-IG-028	Surface Water and Sediment Sampling Activities (BNI 1993a)
191-IG-029	Radon/Thoron and TETLD Exchange (BNI 1993b)
EPA/540/S-95/504	EPA Ground Water Issue Low-Flow(Minimal Drawdown) Ground-Water Sampling Procedures.

**Table 1a**  
**Environmental Surveillance Summary**  
**External Radiation, Radon Gas and Radon-222 Flux**  
**Niagara Falls Storage Site**

Measured Parameter	Station Identification	Number of Analyses or Measurements												Total Analyses per Year	
		No. of Sample Locations				Sample Duplicate				Control					
		CY Quarter				CY Quarter				CY Quarter					
		1	2	3	4	1	2	3	4	1	2	3	4		
External gamma radiation (OSLs) <sup>a</sup>	1, 7, 8, 10, 11, 12, 13, 15, 18, 21, 23 24, 28, 29, 36, 40, 45, 50, 55, 60	26	26	1		1		1		1		26	26	108	
		26	26	1		1		1		1		1		54	
Radon gas	65, 105, 116, 120, 122, 123														
Radon-222 flux	Waste Containment Structure					183								183	

a. OSL = Optically Stimulated Luminescence

**Table 1b**  
**Environmental Surveillance Summary**  
**Spring and Fall Groundwater Sampling**  
**Niagara Falls Storage Site**

Well Location	UWBZ or LWBZ Well	Purpose	*Laboratory Analytical Parameters													**Field Parameters		
			Iso Uranium	Iso Thorium	Radium -226	Radium -228	Strontium-90	Technetium-99	Cesium-137	Iso Plutonium	Tritium (H-3)	Metals	VOCs	Alkalinity	TDS	Anions		
A45	UWBZ	N (IWCS)	X	X	X	X	X	X	X	X	X	X		X	X	X	X	
OW04A	LWBZ	N (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW04B	UWBZ	N (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
BH49A	UWBZ	N (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
BH49	LWBZ	N (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW05A	LWBZ	N (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW05B	UWBZ	N (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
A50	UWBZ	E (IWCS)	X	X	X	X	X	X	X	X	X		X		X	X	X	
MW862	UWBZ	E (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
MW863	LWBZ	E (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
OW11A	LWBZ	E (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW11B	UWBZ	E (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW12A	LWBZ	E (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
OW12B	UWBZ	E (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
OW06A	LWBZ	S (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW06B	UWBZ	S (IWCS)	X	X	X	X	X	X	X	X	X		X		X	X	X	
OW13A	LWBZ	S (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW13B	UWBZ	S (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW07A	LWBZ	S (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW07B	UWBZ	S (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW03A	LWBZ	W (IWCS)	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
OW03B	UWBZ	W (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
OW15A	LWBZ	W (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
OW15B	UWBZ	W (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
A42	UWBZ	W (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
OW17A	LWBZ	W (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
OW17B	UWBZ	W (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
OW18B	UWBZ	W (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
A55	LWBZ	W (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
505	UWBZ	EU 1	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
415A	UWBZ	EU 4	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
MW934	UWBZ	EU 4	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
411A	UWBZ	EU 4	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
BO2W20S	UWBZ	EU 5	X	X	X	X	X	X	X	X	X		X		X	X	X	
MW313	UWBZ	EU 8	X	X	X	X	X	X	X	X	X			X	X	X	X	
302A	UWBZ	EU 8	X	X	X	X	X	X	X	X	X			X	X	X	X	
MW921 or MW922 <sup>1</sup>	UWBZ	NW (off-site)	X	X	X	X	X	X	X	X	X			X	X	X	X	
MW935	UWBZ	NW (IWCS)	X	X	X	X	X	X	X	X	X			X	X	X	X	
201A	UWBZ	EU13	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
Field Duplicate	-	-	X	X	X	X	X	X	X	X	X		X	X	X	X	X	

**\*Laboratory Analytical Parameters**

VOC- Volatile Organic Compounds  
TDS- Total Dissolved Solids

**Anions:**

Chloride	Nitrite
Fluoride	Phosphate
Nitrate	Sulfate

**\*\*Field Parameters:**

pH  
Temperature  
Specific conductivity  
Oxidation-Reduction Potential  
Dissolved oxygen  
Turbidity

-If the turbidity reading for a sample is 50 NTUs or greater,  
the sample will be filtered in the field and both filtered and unfiltered  
samples at that location will be submitted to the lab for analysis.

UWBZ - upper water bearing zone

LWBZ - lower water-bearing zone

  - indicates new location and/or parameter

  - initiated in the Fall of 2010

  - indicates not sampled

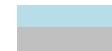
<sup>1</sup> MW921 was dry during the Fall 2010 sampling event so well MW922 was sampled as a substitute

**Table 1c****Environmental Surveillance****Spring and Fall****Surface Water and Sediment Sampling****Niagara Falls Storage Site**

Sample Location	*Laboratory Analytical Parameters																
	Iso Uranium	Iso Thorium	Radium -226	Radium -228	Strontium-90	Technetium-99	Cesium-137	Iso Plutonium	Tritium (H-3) <sup>2</sup>	Metals	PAHs	PCBs	Pesticides	VOCs	Anions	Alkalinity	TDS
SWSD009	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
SWSD010	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
SWSD011	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
SWSD021	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
SWSD022	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
SWSD023	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
SWSD024	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
SWSD025 <sup>1</sup>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WDD1	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
WDD2	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
WDD3	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Field Duplicate	X	X	X	X	X	X	X	X	X	X	X	X	X	X			

**\*Laboratory Analytical Parameters:**

- PAH - Polycyclic Hydrocarbons  
 PCB - Polycyclic Biphenyls  
 VOC - Volatile Organic Compounds

<sup>1</sup>SWSD025 is located north of the IWCS and is sampled quarterly for all parameters except PAHs, PCBs, pesticides, and VOCs.<sup>2</sup>Tritium analysis to begin in 2011 for sediment.**\*\*Field Parameters:**

- pH  
 Temperature  
 Specific conductivity  
 Oxidation-Reduction Potential  
 Dissolved oxygen  
 Turbidity (If the turbidity reading for a sample is 50 NTUs or greater, the sample will be filtered in the field and both filtered and unfiltered samples at that location will be submitted to the lab for analysis.)

**Table 2**  
**2010 External Gamma Radiation Dose Rates**  
**Niagara Falls Storage Site**

Monitoring Location	Monitoring Station	Gross OSLa Data <sup>b</sup> (mrem) (12/17/09 - 06/22/10) <sup>c</sup>	Gross OSLa Data <sup>b</sup> (mrem) (06/22/10 - 12/21/10) <sup>c</sup>	Normalized Gross TLD Data <sup>d</sup> (mrem/yr)	CY2010 Net OSL <sup>a</sup> Data (mrem/yr)
NFSS Perimeter	1	14	17	31	6.7
	1	15	16	31	6.7
	7	13	16	29	4.7
	7	14	12	26	1.7
	11	14	12	26	1.7
	11	13	13	26	1.7
	12	9	17	26	1.7
	12	12	12	24	-0.3
	13	12	18	30	5.7
	13	13	14	27	2.7
	15	17	15	32	7.7
	15	16	16	32	7.7
	28	19	18	37	12.7
	28	17	18	35	10.7
	29	20	20	40	15.7
	29	16	20	36	11.7
	32	13	14	27	2.7
	32	12	13	25	0.7
	36	15	15	30	5.7
	36	13	16	29	4.7
	45	15	14	29	4.7
	45	16	13	29	4.7
	50	18	18	36	11.7
	50	20	17	37	12.7
	55	16	14	30	5.7
	55	12	19	31	6.7
	60	14	18	32	7.7
	60	15	15	30	5.7
	65	19	22	41	16.7
	65	19	21	40	15.7
	122	14	15	29	4.7
	122	14	15	29	4.7
	123	15	14	29	4.7
	123	13	11	24	-0.3
IWCS Perimeter	8	7	13	20	-4.3
	8	10	12	22	-2.3
	10	15	20	35	10.7
	10	12	17	29	4.7
	18	13	15	28	3.7
	18	12	13	25	0.7
	21	13	15	28	3.7
	21	14	16	30	5.7
	23	14	16	30	5.7
	23	11	14	25	0.7
	24	13	13	26	1.7
	24	11	11	22	-2.3
	40	13	15	28	3.7
	40	12	13	25	0.7
Background <sup>f</sup>	105	16	10	26	
	105	14	9	23	
	116	12	10	22	
	116	11	13	24	
	120	10	13	23	
	120	12	16	28	
Average Background		12.5	11.8	24.3	

a OSL - Optically Stimulated Luminescence dosimeters

b All data reported from the vendor are gross results in mrem per monitoring period.

c Exposure period date format mm/dd/yy.

d Gross data for each period are normalized to a daily dose rate, averaged, and then normalized for the length of the year (365 days).

e Net data are corrected by subtracting the average normalized background value.

f Background Locations: 105-Lewiston-Porter School, 116-Balmer Road and 120-Lewiston Water Pollution Control Center

**Table 3**  
**2010 Radon Gas Concentrations<sup>a</sup>**

Average Daily Concentration (pCi/L)<sup>b</sup>

<b>Monitoring</b>		<b>Start Dates<sup>d</sup>:</b>	<b>12/17/2009</b>			<b>6/22/2010</b>		
<b>Location<sup>c</sup></b>	<b>Station</b>	<b>End Dates<sup>d</sup>:</b>	<b>6/22/2010</b>			<b>12/21/2010</b>		
NFSS Perimeter <sup>g</sup>	1	<0.2	±	0.02	<0.2	±	0.02	
	7	<0.2	±	0.02	0.2	±	0.02	
	11	0.2	±	0.03	<0.2	±	0.02	
	12	<0.2	±	0.02	<0.2	±	0.02	
	12 (dup <sup>e</sup> )	<0.2	±	0.02	<0.2	±	0.02	
	13	0.2	±	0.02	<0.2	±	0.02	
	15	0.2	±	0.03	<0.2	±	0.02	
	28	<0.2	±	0.02	0.2	±	0.02	
	29	<0.2	±	0.02	0.2	±	0.02	
	36	<0.2	±	0.02	<0.2	±	0.02	
	45	<0.2	±	0.03	<0.2	±	0.02	
	50	<0.2	±	0.02	<0.2	±	0.02	
	55	<0.2	±	0.02	<0.2	±	0.02	
	60	<0.2	±	0.02	<0.2	±	0.02	
	65	<0.2	±	0.02	<0.2	±	0.02	
IWCS <sup>f</sup> Perimeter	122	<0.2	±	0.02	<0.2	±	0.02	
	123	<0.2	±	0.02	<0.2	±	0.02	
	8	0.2	±	0.02	0.2	±	0.02	
	10	<0.2	±	0.02	<0.2	±	0.02	
	18	0.2	±	0.03	<0.2	±	0.02	
	21	0.2	±	0.02	0.2	±	0.02	
	23	<0.2	±	0.02	<0.2	±	0.02	
Background	24	<0.2	±	0.02	<0.2	±	0.02	
	40	<0.2	±	0.02	<0.2	±	0.02	
	105	<0.2	±	0.02	<0.2	±	0.02	
	116	<0.2	±	0.02	0.3	±	0.03	
	120	<0.2	±	0.02	<0.2	±	0.02	

a. Radon gas concentrations were measured with RadTrak® detectors.

These detectors measure the combined concentration of radon-220 and radon-222 in air.

b. pCi/L - picocuries per liter.

c. Monitoring locations are shown on site map.

d. Detectors were installed (start date) and removed (end date) on the dates listed.

e. A quality control duplicate is collected at the same time and location and is analyzed by the same method for evaluating precision in sampling and analysis.

f. Monitoring locations are at the perimeter of the interim waste containment structure (IWCS).

g. Monitoring locations are at the perimeter of the site with exception of monitoring location 123.

**Note:** DOE off-site limit for radon-222 concentration is 3.00 pCi/L above background.

(<0.2) Indicates detection limit is reported. Actual result is less than this value.

1 pCi = 0.037 becquerel

**Table 4**  
**2010 Radon Flux Monitoring Results<sup>a</sup>**  
**Niagara Falls Storage Site**

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NFSS Sample ID	Qualifier <sup>d</sup>	Radon-222 Flux			NFSS Sample ID	Qualifier <sup>d</sup>	Radon-222 Flux				
		(pCi/m <sup>2</sup> /s)		MDA			(pCi/m <sup>2</sup> /s)		MDA		
		±	±	±			±	±	±		
1	U	0.03619	±	0.02107	0.05773	51	U	0.03906	±	0.02258	0.06143
2	U	0.05365	±	0.04508	0.12760	52	U	0.03201	±	0.02292	0.05665
3	U	0.05149	±	0.02744	0.07260	53	U	0.11750	±	0.05830	0.15900
4	U	0.01725	±	0.05340	0.12040	54		0.07842	±	0.02127	0.04019
5	U	0.06687	±	0.03053	0.07981	55	U	0.16250	±	0.08956	0.21700
6	U	0.00604	±	0.04976	0.10920	56	U	0.01331	±	0.01789	0.04760
7	U	0.04673	±	0.02669	0.06789	57	U	0.02824	±	0.04361	0.11390
8	U	0.00775	±	0.05683	0.12070	58	U	0.04482	±	0.02352	0.06360
9		0.07985	±	0.02146	0.03526	59	U	0.00216	±	0.03154	0.08071
10	U	0.12550	±	0.07046	0.18140	60	U	0.01347	±	0.02024	0.05080
10-DUP <sup>b</sup>	U	0.10960	±	0.05928	0.16060	60-DUP <sup>b</sup>	U	0.01619	±	0.02310	0.05579
11	U	0.04222	±	0.02747	0.06305	61	U	0.08964	±	0.05529	0.15080
12	U	0.03320	±	0.02626	0.06087	62		0.06577	±	0.03337	0.06149
13	U	0.01138	±	0.06360	0.13250	63	U	0.03631	±	0.04679	0.12220
14	U	0.02008	±	0.02392	0.05806	64	U	0.04470	±	0.02865	0.07126
15	U	0.07675	±	0.05443	0.14750	65	U	0.01683	±	0.05410	0.12180
16	U	0.04141	±	0.03031	0.07068	66	U	0.01408	±	0.01567	0.04527
17	U	0.07913	±	0.05736	0.13640	67	U	0.08908	±	0.04636	0.13110
18	U	0.07169	±	0.03495	0.08544	68	U	0.03822	±	0.02273	0.06183
19	U	0.09834	±	0.05081	0.14070	69	U	0.04113	±	0.05586	0.13620
20	U	0.03475	±	0.03100	0.06207	70	U	0.04550	±	0.02939	0.07409
20-DUP <sup>b</sup>	U	0.03179	±	0.02522	0.05808	70-DUP <sup>b</sup>	U	0.03944	±	0.02761	0.06687
21	U	0.03716	±	0.03826	0.11160	71	U	0.00017	±	0.04933	0.10620
22	U	0.10460	±	0.04367	0.10470	72	U	0.11830	±	0.05905	0.15960
23	U	0.02886	±	0.03452	0.10300	73	U	0.06246	±	0.03009	0.07886
24	U	0.03046	±	0.01905	0.05309	74	U	0.00211	±	0.03078	0.07875
25	U	0.03769	±	0.03881	0.11320	75		0.04980	±	0.02091	0.04675
26	U	0.05375	±	0.02788	0.06884	76	U	-0.00084	±	0.04003	0.09079
27	U	0.00985	±	0.04442	0.10430	77	U	0.03328	±	0.02381	0.05899
28		0.09301	±	0.02158	0.03085	78	U	0.04083	±	0.05546	0.13520
29	U	0.04948	±	0.06361	0.14890	79	U	0.03563	±	0.02269	0.06173
30	U	0.08386	±	0.03626	0.09070	80	U	0.03834	±	0.03948	0.11510
30-DUP <sup>b</sup>	U	0.06516	±	0.03252	0.08167	80-DUP <sup>b</sup>	U	0.07027	±	0.05290	0.14650
31	U	0.00709	±	0.04309	0.10050	81	U	0.03919	±	0.02919	0.07095
32	U	0.04458	±	0.04944	0.12890	82	U	0.04574	±	0.05072	0.13220
33	U	0.00428	±	0.01907	0.04474	83	U	0.06659	±	0.03443	0.08918
34	U	0.08320	±	0.05718	0.14980	84	U	0.03651	±	0.05452	0.13250
35	U	0.04303	±	0.02987	0.06750	85	U	0.02832	±	0.02064	0.05700
36	U	0.08260	±	0.06431	0.14830	86	U	0.04363	±	0.02375	0.06423
37	U	0.02757	±	0.01989	0.05217	87	U	0.00318	±	0.01792	0.06447
38	U	0.07134	±	0.04934	0.13790	88		0.07344	±	0.01906	0.03606
39	U	0.03855	±	0.02631	0.06511	89	U	0.02796	±	0.01953	0.05443
40	U	0.12000	±	0.07361	0.16870	90	U	0.06712	±	0.03175	0.07940
40-DUP <sup>b</sup>	U	-0.00083	±	0.05488	0.11360	90-DUP <sup>b</sup>	U	0.07307	±	0.03375	0.08680
41	U	0.05135	±	0.03315	0.07555	91	U	0.05646	±	0.02850	0.07540
42	U	0.03378	±	0.05279	0.12810	92	U	0.04649	±	0.03021	0.07202
43	U	0.03982	±	0.02573	0.06649	93	U	0.06766	±	0.03670	0.08470
44	U	-0.00054	±	0.04786	0.10270	94	U	0.05333	±	0.04255	0.08903
45	U	0.03495	±	0.02910	0.06361	95	U	0.01226	±	0.04067	0.10560
46	U	0.05369	±	0.05237	0.13620	96	U	0.03391	±	0.02496	0.06512
47	U	0.06098	±	0.03002	0.07513	97	U	-0.02930	±	0.04294	0.07228
48	U	0.01844	±	0.04742	0.11320	98	U	0.04141	±	0.03075	0.07260
49	U	0.04528	±	0.02440	0.06563	99	U	0.15520	±	0.08606	0.20970
50	U	0.03792	±	0.03904	0.11390	100		0.05083	±	0.02001	0.04893
50-DUP <sup>b</sup>	U	0.04811	±	0.05335	0.13910	100-DUP <sup>b</sup>	U	0.04817	±	0.03406	0.07868

**Table 4**  
**2010 Radon Flux Monitoring Results<sup>a</sup>**

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Niagara Falls Storage Site

NFSS Sample ID	Qualifier <sup>d</sup>	Radon-222 Flux			NFSS Sample ID	Qualifier <sup>d</sup>	Radon-222 Flux						
		(pCi/m <sup>2</sup> /s)		MDA			(pCi/m <sup>2</sup> /s)		MDA				
101	U	0.02952	± 0.04815	0.12580	151	U	0.06573	± 0.05795	0.14180				
102	U	0.04294	± 0.03236	0.07527	152	U	-0.00755	± 0.03039	0.07387				
103	U	0.00243	± 0.03551	0.09087	153	U	0.03961	± 0.02354	0.06498				
104		0.08008	± 0.03744	0.07773	154	U	0.01549	± 0.06069	0.13570				
105	U	0.01063	± 0.03982	0.10330	155	U	0.03077	± 0.02854	0.06522				
106	U	0.04193	± 0.02966	0.07790	156	U	0.02075	± 0.04507	0.11760				
107	U	0.00019	± 0.05484	0.11810	157	U	0.04688	± 0.03118	0.07551				
108	U	0.04617	± 0.03093	0.07690	158	U	-0.01862	± 0.03749	0.07336				
109	U	0.03001	± 0.05717	0.13780	159	U	0.05579	± 0.03209	0.08379				
110	U	0.04580	± 0.03693	0.07859	160	U	0.03129	± 0.03903	0.11720				
110-DUP <sup>b</sup>	U	0.05586	± 0.04067	0.08630	160-DUP <sup>b</sup>	U	0.05131	± 0.04822	0.13870				
111	U	0.05049	± 0.06383	0.15590	161	U	0.03093	± 0.02868	0.06553				
112	U	0.04181	± 0.05313	0.13870	162	U	0.07174	± 0.06396	0.16610				
113	U	0.03078	± 0.02740	0.06386	163	U	0.04913	± 0.03729	0.08464				
114	U	0.00019	± 0.05494	0.11830	164	U	-0.00975	± 0.05176	0.10700				
115	U	-0.00153	± 0.02447	0.05214	165	U	0.08938	± 0.04158	0.10570				
116	U	0.03200	± 0.04941	0.12910	166	U	0.01885	± 0.05352	0.12740				
117	U	0.04612	± 0.03928	0.08381	167		0.08367	± 0.02177	0.03515				
118	U	0.03208	± 0.04953	0.12940	168	U	0.11230	± 0.06252	0.17170				
119	U	0.04338	± 0.03693	0.07906	169	U	0.04423	± 0.02901	0.07204				
120	U	0.04004	± 0.06075	0.14760	170	U	0.03839	± 0.05998	0.14560				
120-DUP <sup>b</sup>	U	0.00667	± 0.06499	0.13730	170-DUP <sup>b</sup>	U	0.00922	± 0.05803	0.12810				
121	U	0.04921	± 0.03277	0.07499	171	U	0.08725	± 0.03668	0.09541				
122	U	0.09152	± 0.05963	0.16510	172	U	0.01544	± 0.02319	0.05819				
123	U	0.04292	± 0.02819	0.06993	173	U	0.05998	± 0.05999	0.15610				
124	U	0.03795	± 0.06030	0.14630	174	U	0.03886	± 0.02459	0.06735				
125	U	0.05321	± 0.02799	0.07529	175	U	0.09938	± 0.06319	0.15610				
126	U	0.09867	± 0.06304	0.17310	176	U	0.02164	± 0.02002	0.05656				
127	U	0.06507	± 0.03976	0.09363	177	U	0.05041	± 0.06372	0.15570				
128	U	0.02922	± 0.05693	0.13710	178	U	0.02451	± 0.02348	0.06188				
129	U	0.05273	± 0.03911	0.08429	179	U	0.09084	± 0.05874	0.16090				
130	U	0.05816	± 0.05057	0.14380	180		0.07015	± 0.02023	0.04022				
130-DUP <sup>b</sup>	U	0.08088	± 0.04850	0.13900	180-DUP <sup>b</sup>	U	0.03577	± 0.02757	0.06616				
131	U	0.01249	± 0.02208	0.05528	181 <sup>c</sup>	U	-0.00892	± 0.04384	0.09557				
132	U	0.06164	± 0.02987	0.07846	182 <sup>c</sup>	U	0.05422	± 0.03000	0.07845				
133	U	-0.06714	± 0.07068	0.10330	183 <sup>c</sup>	U	-0.01009	± 0.05351	0.11060				
134	U	0.04811	± 0.03280	0.07971	Average background	U	0.01174 (pCi/m <sup>2</sup> /s)						
135	U	0.12440	± 0.06281	0.17250									
136	U	0.03827	± 0.03310	0.06822									
137	U	0.03230	± 0.04987	0.13030									
138	U	0.03662	± 0.03356	0.07526									
139	U	0.09333	± 0.04892	0.14020									
140	U	0.00000	± 0.00000	0.00000									
140-DUP <sup>b</sup>	U	0.04482	± 0.03113	0.07712									
141	U	0.08626	± 0.08050	0.19110									
142	U	0.03419	± 0.02841	0.06493									
143	U	0.10850	± 0.07154	0.16430									
144	U	0.05407	± 0.03384	0.08337									
145	U	0.13760	± 0.06722	0.18330									
146	U	0.04450	± 0.03078	0.07774									
147	U	0.04402	± 0.04532	0.13220									
148	U	0.00516	± 0.02482	0.05615									
149	U	0.00135	± 0.04730	0.10820									
150	U	0.05508	± 0.04004	0.08993									
150-DUP <sup>b</sup>	U	0.05222	± 0.02725	0.07103									

IWCS	Value	Units
Average <sup>e</sup>	0.04606	(pCi/m <sup>2</sup> /s)
High <sup>f</sup>	0.09301	(pCi/m <sup>2</sup> /s)
Low	-0.06714	(pCi/m <sup>2</sup> /s)

NOTE: The EPA Standard for Radon-222 Flux is 20 pCi/m<sup>2</sup>/sec

a. Radon-222 flux was performed on August 17-18, 2010

b. Every 10th canister is counted twice as a quality control (QC) duplicate to evaluate analytical precision.

c. Background: 181-Lewiston-Porter Central School  
182-Balmer Rd. (CWM Secondary Gate)  
183-Lewiston Water Pollution Control Center

d. Validated Qualifier: U - indicates that no analyte was detected (Non-Detect).

e. Average of all values (detects and non-detects)

f. Highest detectable finding.

**Table 5a**  
**2009 Field Parameter Summary**  
**Niagara Falls Storage Site**

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**GROUNDWATER**

Well ID	Date	Temperature (°F <sup>a</sup> )	pH	Spec. Cond. <sup>b</sup> (uS/cm <sup>c</sup> )	DO <sup>d</sup> (mg/L <sup>e</sup> )	ORP <sup>f</sup> (mV <sup>g</sup> )	Turbidity (NTU <sup>h</sup> )	Volume Purged (Liters <sup>i</sup> )	Discharge milliter PM <sup>j</sup>
313	5/19/2010	56.7	6.72	4530	0.36	125	0.0	3.0	85
505	5/17/2010	64.5	7.65	4120	*	53	7.6	**	**
201A	5/18/2010	61.1	7.42	1593	0.29	85	4.8	2.8	92
302A	5/19/2010	59.5	6.69	7820	1.91	105	0.0	2.7	108
415A	5/19/2010	53.7	6.53	2277	0.65	102	3.6	3.4	114
A42	5/18/2010	56.3	6.97	1290	0.44	104	6.3	2.4	80
A45	5/18/2010	59.0	6.99	2120	0.93	14	7.7	4.8	130
A50	5/17/2010	66.5	7.48	789	3.17	109	15.8	3.9	94
B02W20S	5/17/2010	62.3	6.87	524	0.20	81	25.1	5.6	101
BH49A	5/18/2010	56.5	7.65	1559	0.22	-97	4.5	3.2	106
OW04A	5/18/2010	55.3	8.73	1260	1.95	32	1.0	9.4	171
OW04B	5/18/2010	52.2	7.14	1850	0.68	33	3.5	7.5	249
OW06B	5/18/2010	54.2	6.58	1732	0.39	-16	5.6	2.6	128
OW11B	5/19/2010	54.2	7.43	1490	1.20	87	0.4	2.4	207
OW13B	5/17/2010	59.8	7.14	2730	*	11	*	3.3	109
OW15B	5/18/2010	51.2	6.87	1443	0.79	73	6.70	3.7	107
OW17B	5/17/2010	63.0	7.56	1460	0.78	18	5.7	4.0	134
OW18B	5/17/2010	55.1	7.66	2310	1.98	-52	0.0	4.1	137
313	10/28/2010	59.3	6.55	4760	1.63	83	0.0	4.2	140
505 <sup>3</sup>	10/26/2010								
201A	11/1/2010	55.1	7.05	1860	1.36	115	2.0	4.5	149
302A	10/28/2010	59.0	6.75	8850	0.69	-36	0.5	4.7	134
411A	10/28/2010	58.8	7.04	2580	4.96	0	0.0	4.5	148
415A	10/28/2010	55.7	6.59	2920	0.51	-47	0.0	3.5	254
A42	10/26/2010	60.0	6.97	1330	0.42	81	1.1	8.7	249
A45	10/25/2010	61.0	6.75	2200	2.39	-260	0.0	6.0	300
A50	10/25/2010	62.3	7.21	1780	5.01	-118	0.0	3.3	130
A55	10/26/2010	61.4	10.94	3450	1.11	-146	*	3.0	98
B02W20S	10/28/2010	57.8	7.80	1470	2.25	85	0.0	5.0	250
BH49	10/26/2010	68.1	8.39	1150	1.49	-167	0.0	5.4	141
BH49A	10/26/2010	67.4	7.33	1740	0.52	-161	0.0	3.0	100
MW862	10/25/2010	60.4	6.92	1960	5.83	102	0.0	6.0	170
MW863	10/25/2010	58.0	7.69	2120	1.79	-27	5.0	7.5	250
MW921 <sup>1</sup>	10/26/2010								
MW922 <sup>2</sup>	11/1/2010	55.7	7.07	4850	1.07	57	12.4	4.0	160
MW934	10/28/2010	56.7	7.44	3960	5.21	120	0.0	4.0	200
MW935	10/27/2010	67.0	6.82	3330	6.14	105	0.0	4.5	300
OW03A	10/25/2010	61.3	7.20	2080	1.28	-33	0.0	7.0	156
OW03B	10/25/2010	60.9	7.86	1920	7.79	161	0.0	6.0	200
OW04A	10/26/2010	58.6	7.96	1320	2.90	-92	0.0	6.3	250
OW04B	10/26/2010	60.2	7.07	1850	1.23	44	42.0	10.0	400
OW05A	10/26/2010	63.3	7.84	1400	1.95	5	40.6	4.0	200
OW05B	10/26/2010	66.2	7.27	1590	5.22	170	0.0	3.4	170
OW06A	10/25/2010	59.1	8.11	1940	1.09	-41	6.7	7.7	220
OW06B	10/25/2010	64.0	8.01	1970	9.52	167	0.0	6.0	200
OW07A	10/27/2010	64.8	7.52	2160	0.60	-75	0.0	3.7	122
OW07B	10/27/2010	71.0	7.70	1910	2.93	137	42.1	4.0	160
OW11A	10/28/2010	57.7	7.72	1740	0.88	-68	7.4	4.5	150
OW11B	10/28/2010	58.8	7.41	1700	0.91	113	0.0	6.6	265
OW12A	10/28/2010	55.4	7.32	1880	0.83	-45	47.5	3.3	165
OW12B <sup>1</sup>	10/26/2010								
OW13A	10/27/2010	60.9	9.90	1400	3.75	107	0.0	4.0	200
OW13B	10/27/2010	64.1	7.05	2910	4.09	184	8.3	6.0	200
OW15A	10/27/2010	55.0	7.64	2350	0.76	-67	0.2	6.8	450
OW15B	10/27/2010	59.1	7.27	1580	2.09	144	0.0	4.7	235
OW17A	10/27/2010	60.5	7.77	2520	1.93	87	0.0	2.5	98
OW17B	10/27/2010	58.7	7.34	1470	0.36	-1	0.0	6.0	171
OW18B	10/27/2010	58.3	7.87	2160	5.61	194	0.0	6.1	203

**Table 5a**  
**2009 Field Parameter Summary**  
**Niagara Falls Storage Site**

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**SURFACE WATER**

Surace Water	Date	Temperature (°F <sup>a</sup> )	pH	Spec. Cond. <sup>b</sup> (uS/cm <sup>c</sup> )	DO <sup>d</sup> (mg/L <sup>e</sup> )	ORP <sup>f</sup> (mV <sup>g</sup> )	Turbidity (NTU <sup>h</sup> )	Volume Purged (Liters <sup>i</sup> )	Discharge milliter PM <sup>j</sup>
SWSD009	5/19/2010	60.7	7.26	1591	12.26	205	8.3	NA	NA
SWSD010	5/18/2010	62.0	7.28	1510	9.10	135	32.3	NA	NA
SWSD011	5/17/2010	55.3	7.65	993	8.11	93	7.6	NA	NA
SWSD021	5/18/2010	61.5	7.70	644	9.21	178	137.0	NA	NA
SWSD022	5/18/2010	63.9	8.06	1480	*	131	10.2	NA	NA
SWSD023	5/19/2010	60.5	7.15	1291	12.4	210	6.8	NA	NA
SWSD024	5/19/2010	61.1	7.13	780	12	192	10.8	NA	NA
WDD1	5/18/2010	61.6	7.27	1040	*	190	27.5	NA	NA
WDD2	5/17/2010	61.5	7.61	938	10.96	101	7.4	NA	NA
WDD3	5/17/2010	61.1	7.11	979	10.97	188	7.8	NA	NA
SWSD009	11/1/2010	49.9	7.57	1780	9.13	174	25.2	NA	NA
SWSD010	10/28/2010	55.4	7.45	1210	7.98	172	48.5	NA	NA
SWSD011	10/25/2010	66.4	7.41	1150	10.52	190	7.6	NA	NA
SWSD021	10/28/2010	55.1	7.43	905	7.53	162	149.0	NA	NA
SWSD022	10/28/2010	56.0	7.38	1390	7.37	170	58.3	NA	NA
SWSD023	11/1/2010	46.7	7.18	1090	6.33	23	49.1	NA	NA
SWSD024	11/1/2010	46.2	6.80	913	6.47	227	4.3	NA	NA
SWSD025	10/26/2010	66.2	6.93	742	8.33	164	16.5	NA	NA
WDD1	11/1/2010	45.2	6.37	1270	11.47	249	8.4	NA	NA
WDD2	10/27/2010	60.5	7.34	1210	8.57	152	4.0	NA	NA
WDD3	10/26/2010	67.3	7.94	1220	10.22	170	1.0	NA	NA

a. °F - Degrees Fahrenheit.

b. Spec. Cond. - Specific conductance.

c. uS/cm - microSiemens/centimeter.

d. DO - Dissolved oxygen.

e. mg/L - milligrams per liter.

f. ORP - Oxidation-Reduction potential.

g. mV - milliVolts.

h. NTU - Nephelometric turbidity units.

i. 1-Liter = 0.26 gallons

j. Milliter PM = milliter per minute (1000ml = 1.0 liter) -averaged rate

NR - Not Recorded

\* - parameters not taken/meter malfunction

\*\*-Grab sample due to low recharge and purging dry

<sup>1</sup> Well was dry, no sample taken / purged dry -no recovery, no sample take

<sup>2</sup> MW921 was dry during the Fall 2010 sampling event so well MW92'

was sampled as a substitute

<sup>3</sup> Grab Sample Limited Parameter

Table 5b

**Summary of Water Level Measurements  
First Quarter 2010 (February 16, 2010)**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
A23A	321.90	6.94	314.96
A42	319.70	5.29	314.41
A43	320.50	5.45	315.05
A45	321.70	9.39	312.31
A50	321.30	10.40	310.90
A51	321.20	9.42	311.78
A52	321.10	7.02	314.08
A54	320.70	5.21	315.49
A55	320.60	4.99	315.61
A56	322.30	8.40	313.90
A57	321.40	8.97	312.43
BH5	321.32	6.80	314.52
BH12	320.85	4.81	316.04
BH15	320.16	4.15	316.01
BH48	322.04	5.64	316.40
BH49	320.23	6.33	313.90
BH49A	320.65	3.85	316.80
BH50	319.25	5.83	313.42
BH51	321.24	5.20	316.04
BH57	322.84	5.76	317.08
BH59	321.45	5.40	316.05
BH60	322.32	3.95	318.37
BH61	318.50	6.71	311.79
BH62	318.60	6.82	311.78
BH63	323.01	5.65	317.36
BH64	319.32	4.63	314.69
BH70	321.29	6.08	315.21
B02W19D	319.90	2.33	317.57
B02W20D	322.00	3.80	318.20
B02W20S	322.00	3.35	318.65
OW01A	321.95	Decommissioned	
OW01B	321.49	3.41	318.08
OW02A	321.50	6.86	314.64
OW02B	321.55	3.52	318.03
OW03A	321.67	6.78	314.89
OW03B	321.38	4.71	316.67
OW04A	320.52	5.82	314.70
OW04B	320.17	4.88	315.29
OW05A	319.59	4.93	314.66
OW05B	319.68	4.79	314.89
OW06A	322.34	6.49	315.85
OW06B	322.28	6.15	316.13
OW07A	319.77	4.03	315.74
OW07B	319.69	5.65	314.04
OW08A	318.91	3.75	315.16
OW08B	318.97	5.43	313.54
OW09A	318.66	3.10	315.56
OW09B	318.82	4.00	314.82
OW10A	320.01	4.34	315.67
OW10B	320.13	3.93	316.20
OW11A	319.05	2.99	316.06
OW11B	319.09	4.29	314.80
OW12A	320.42	4.30	316.12
OW12B	319.09	5.71	313.38
OW13A	321.54	5.72	315.82
OW13B	321.09	4.02	317.07
OW14A	320.52	6.03	314.49
OW14B	320.73	4.33	316.40

**NFSS 2010 Quarterly Water Level Measurements**
**Summary of Water Level Measurements  
Second Quarter 2010 (May 18, 2010)**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
A23A	321.90	6.46	315.44
A42	319.70	6.15	313.55
A43	320.50	5.75	314.75
A45	321.70	10.53	311.17
A50	321.30	11.16	310.14
A51	321.20	10.39	310.81
A52	321.10	7.89	313.21
A54	320.70	4.74	315.96
A55	320.60	4.59	316.01
A56	322.30	7.96	314.34
A57	321.40	8.45	312.95
BH5	321.32	6.22	315.10
BH12	320.85	4.23	316.62
BH15	320.16	3.58	316.58
BH48	322.04	5.17	316.87
BH49	320.23	5.88	314.35
BH49A	320.65	2.80	317.85
BH50	319.25	5.18	314.07
BH51	321.24	4.57	316.67
BH57	322.84	5.43	317.41
BH59	321.45	4.96	316.49
BH60	322.32	3.35	318.97
BH61	318.50	5.93	312.57
BH62	318.60	6.01	312.59
BH63	323.01	5.12	317.89
BH64	319.32	4.19	315.13
BH70	321.29	5.63	315.66
B02W19D	319.90	1.81	318.09
B02W20D	322.00	3.33	318.67
B02W20S	322.00	4.35	317.65
OW01A	321.95	Decommissioned	
OW01B	321.49	3.41	318.08
OW02A	321.50	6.86	314.64
OW02B	321.55	3.52	318.03
OW03A	321.67	6.78	314.89
OW03B	321.38	4.71	316.67
OW04A	320.52	5.82	314.70
OW04B	320.17	4.88	315.29
OW05A	319.59	4.93	314.66
OW05B	319.68	4.79	314.89
OW06A	322.34	6.49	315.85
OW06B	322.28	6.15	316.13
OW07A	319.77	4.03	315.74
OW07B	319.69	5.65	314.04
OW08A	318.91	3.75	315.16
OW08B	318.97	5.43	313.54
OW09A	318.66	3.10	315.56
OW09B	318.82	4.00	314.82
OW10A	320.01	4.34	315.67
OW10B	320.13	3.93	316.20
OW11A	319.05	2.99	316.06
OW11B	319.09	4.29	314.80
OW12A	320.42	4.30	316.12
OW12B	319.09	5.71	313.38
OW13A	321.54	5.72	315.82
OW13B	321.09	4.02	317.07
OW14A	320.52	6.03	314.49
OW14B	320.73	4.33	316.40

**Summary of Water Level Measurements  
Third Quarter 2010 (August 17, 2010)**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
A23A	321.90	8.43	313.47
A42	319.70	7.86	311.84
A43	320.50	6.64	313.86
A45	321.70	10.91	310.79
A50	321.30	12.43	308.87
A51	321.20	12.14	309.06
A52	321.10	8.83	312.27
A54	320.70	6.56	314.14
A55	320.60	6.18	314.42
A56	322.30	9.30	313.00
A57	321.40	9.51	311.89
BH5	321.32	8.34	312.98
BH12	320.85	5.04	315.81
BH15	320.16	4.72	315.44
BH48	322.04	6.05	315.99
BH49	320.23	7.81	312.42
BH49A	320.65	4.53	316.12
BH50	319.25	9.03	310.22
BH51	321.24	5.43	315.81
BH57	322.84	5.95	316.89
BH59	321.45	6.13	315.32
BH60	322.32	3.81	318.51
BH61	318.50	12.11	306.39
BH62	318.60	9.51	309.09
BH63	323.01	5.70	317.31
BH64	319.32	8.23	311.09
BH70	321.29	6.92	314.37
B02W19D	319.90	2.52	317.38
B02W20D	322.00	3.98	318.02
B02W20S	322.00	4.80	317.20
OW01A	321.95	Decommissioned	
OW01B	321.49	6.25	315.24
OW02A	321.50	8.67	312.83
OW02B	321.55	5.29	316.26
OW03A	321.67	8.30	313.37
OW03B	321.38	5.85	315.53
OW04A	320.52	7.34	313.18
OW04B	320.17	4.82	315.35
OW05A	319.59	4.45	315.14
OW05B	319.68	3.80	315.88
OW06A	322.34	6.05	316.29
OW06B	322.28	7.45	314.83
OW07A	319.77	3.61	316.16
OW07B	319.69	4.86	314.83
OW08A	318.91	3.28	315.63
OW08B	318.97	4.16	314.81
OW09A	318.66	2.65	316.01
OW09B	318.82	3.48	315.34
OW10A	320.01	3.95	316.06
OW10B	320.13	3.65	316.48
OW11A	319.05	2.60	316.45
OW11B	319.09	2.75	316.34
OW12A	320.42	3.86	316.56
OW12B	319.09	7.35	311.74
OW13A	321.54	5.25	316.29
OW13B	321.09	4.04	317.05
OW14A	320.52	5.50	315.02
OW14B	320.73	3.89	316.84

**Summary of Water Level Measurements  
Fourth Quarter 2010 (October 18, 2010)**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
A23A	321.90	10.23	311.67
A42	319.70	8.57	311.13
A43	320.50	8.20	312.30
A45	321.70	10.80	310.90
A50	321.30	13.20	308.10
A51	321.20	12.46	308.74
A52	321.10	8.78	312.32
A54	320.70	9.83	310.87
A55	320.60	9.27	311.33
A56	322.30	12.33	309.97
A57	321.40	12.52	308.88
BH5	321.32	11.08	310.24
BH12	320.85	7.82	313.03
BH15	320.16	7.14	313.02
BH48	322.04	7.98	314.06
BH49	320.23	10.76	309.47
BH49A	320.65	3.69	316.96
BH50	319.25	12.14	307.11
BH51	321.24	7.21	314.03
BH57	322.84	7.48	315.36
BH59	321.45	8.75	312.70
BH60	322.32	5.18	317.14
BH61	318.50	15.50	303.00
BH62	318.60	12.93	305.67
BH63	323.01	7.04	315.97
BH64	319.32	9.74	309.58
BH70	321.29	9.55	311.74
B02W19D	319.90	4.39	315.51
B02W20D	322.00	5.63	316.37
B02W20S	322.00	4.49	317.51
OW01A	321.95	Decommissioned	
OW01B	321.49	7.18	314.31
OW02A	321.50	11.76	309.74
OW02B	321.55	6.08	315.47
OW03A	321.67	11.11	310.56
OW03B	321.38	6.45	314.93
OW04A	320.52	10.30	310.22
OW04B	320.17	5.48	314.69
OW05A	319.59	9.31	310.28
OW05B	319.68	8.49	311.19
OW06A	322.34	7.22	315.12
OW06B	322.28	6.59	315.69
OW07A	319.77	5.64	314.13
OW07B	319.69	7.81	311.88
OW08A	318.91	4.90	314.01
OW08B	318.97	7.78	311.19
OW09A	318.66	3.93	314.73
OW09B	318.82	8.06	310.76
OW10A	320.01	5.17	314.84
OW10B	320.13		

Table 5b

**Summary of Water Level Measurements  
First Quarter 2010 (February 16, 2010)**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
OW15A	320.30	6.05	314.25
OW15B	320.12	4.23	315.89
OW16A	320.63	5.84	314.79
OW16B	320.06	4.68	315.38
OW17A	320.31	5.09	315.22
OW17B	320.29	4.02	316.27
OW18A	321.09	5.08	316.01
OW18B	320.76	4.32	316.44

**Summary of Water Level Measurements  
Second Quarter 2010 (May 18, 2010)**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
OW15A	320.30	5.47	314.83
OW15B	320.12	3.75	316.37
OW16A	320.63	5.32	315.31
OW16B	320.06	3.36	316.70
OW17A	320.31	4.62	315.69
OW17B	320.29	3.22	317.07
OW18A	321.09	4.62	316.47
OW18B	320.76	4.25	316.51

**Summary of Water Level Measurements  
Third Quarter 2010 (August 17, 2010)**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
OW15A	320.30	8.50	311.80
OW15B	320.12	6.68	313.44
OW16A	320.63	7.72	312.91
OW16B	320.06	5.53	314.53
OW17A	320.31	6.51	313.80
OW17B	320.29	5.22	315.07
OW18A	321.09	6.37	314.72
OW18B	320.76	6.19	314.57

**Summary of Water Level Measurements  
Fourth Quarter 2010 (October 18, 2010)**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
OW15A	320.30	11.81	308.49
OW15B	320.12	6.97	313.15
OW16A	320.63	10.97	309.66
OW16B	320.06	5.09	314.97
OW17A	320.31	9.78	310.53
OW17B	320.29	5.15	315.14
OW18A	321.09	9.52	311.57
OW18B	320.76	5.71	315.05

**Summary of Water Level Measurements**

**NEW WELLS - 2000**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
201A	321.47	5.00	316.47
203A	321.87	4.74	317.13
213A	321.37	6.19	315.18
215A	320.26	6.05	314.21
302A	320.53	4.22	316.31
303A	321.83	4.21	317.62
404A	323.73	5.98	317.75
411A	322.05	4.50	317.55
415A	321.27	3.95	317.32
505	317.80	3.82	313.98
603A*	320.57	2.20	318.37
606A	321.49	3.80	317.69
808A	319.27	2.52	316.75
810A	318.44	4.30	314.14
816	320.62	2.90	317.72

**Summary of Water Level Measurements**

**NEW WELLS - 2000**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
201A	321.47	4.39	317.08
203A	321.87	4.53	317.34
213A	321.37	5.91	315.46
215A	320.26	5.82	314.44
302A	320.53	4.41	316.12
303A	321.83	3.98	317.85
404A	323.73	5.62	318.11
411A	322.05	4.30	317.75
415A	321.27	3.64	317.63
505	317.80	3.23	314.57
603A	320.57	2.25	318.32
606A	321.49	4.11	317.38
808A	319.27	2.20	317.07
810A	318.44	3.80	314.64
816	320.62	2.46	318.16

**Summary of Water Level Measurements**

**NEW WELLS - 2000**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
201A	321.47	4.75	316.72
203A	321.87	4.45	317.42
213A	321.37	9.03	312.34
215A	320.26	12.85	307.41
302A	320.53	5.78	314.75
303A	321.83	6.40	315.43
404A	323.73	9.11	314.62
411A	322.05	7.06	314.99
415A	321.27	9.13	312.14
505	317.80	14.76	303.04
603A	320.57	4.08	316.49
606A	321.49	7.81	313.68
808A	319.27	8.04	311.23
810A	318.44	19.31	299.13
816	320.62	2.30	318.32

**Summary of Water Level Measurements**

**NEW WELLS - 2000**

Well No.	Reference Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
201A	321.47	4.14	317.33
203A	321.87	4.43	317.44
213A	321.37	11.36	310.01
215A	320.26	12.75	307.51
302A	320.53	5.63	314.90
303A	321.83	5.97	315.86
404A	323.73	9.95	313.78
411A	322.05	6.82	315.23
415A	321.27	10.76	310.51
505	317.80	18.36	299.44
603A	320.57	3.82	316.75
606A	321.49	7.13	314.36
808A	319.27	11.43	307.84
810A	318.44	15.99	302.45
816	320.62	2.29	318.33

**NEW WELLS - 2003**

Well No.	Reference Elevation (ft)	Groundwater Elevation (ft)
MW228	320.85	4.45
MW229	320.61	4.71
MW313	320.88	8.52
MW314	318.94	20.56
MW422	321.36	21.58
MW423	322.39	11.38
MW424	320.93	9.21
MW860	320.06	8.91
MW861	319.92	6.82
MW862	319.62	8.66
MW863	319.61	5.40

**NEW WELLS - 2009**

Well No.	Reference Elevation (ft)	Groundwater Elevation (ft)
MW921	319.88	11.98
MW922	318.56	8.40
MW923	319.53	14.45
MW930	323.16	11.47
MW934	322.20	11.21
MW935	319.33	6.68
MW936	320.64	5.67
MW938	319.54	7.27
MW941	318.98	5.41
MW943	321.60	5.75

\*603 - Water in casing frozen.

\*Dry - bottom well recored

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station:	SWSD009		SWSD009		SWSD010		SWSD010		SWSD011		SWSD011		
				Date Sampled:	05/19/2010		11/18&11/22/2010 <sup>a</sup>		05/18/2010		10/28&11/22/2010 <sup>a</sup>		05/17/2010		10/25&11/22/2010 <sup>a</sup>		
				Matrix:	Surface Water		Surface Water		Surface Water		Surface Water		Surface Water		Surface Water		
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	NE	92 <sup>4</sup>	NE	N/A		-1.53	U	N/A		-1.64	U	N/A		0.135	U
	Plutonium-238	pCi/l	NE	15 <sup>5</sup>	NE	N/A		0.06	U	N/A		0.213	U	N/A		0.082	U
	Plutonium-239/240	pCi/l	NE	15 <sup>5</sup>	NE	N/A		0.018	U	N/A		0.051	U	N/A		0.005	U
	Radium-226	pCi/l	100	5 <sup>6</sup>	5	0.2006	U	0.348	U	0.2732	U	0.691		0.144	U	0.374	
	Radium-228	pCi/l	100	5 <sup>6</sup>	5	0.5612	U	0.23	U	-0.3523	U	0.463		-0.1095	U	0.449	
	Total Radium (226&228)	pCi/l	100	5 <sup>6</sup>	5	Non-detect		Non-detect		Non-detect		1.154		Non-detect		0.823	
	Strontium-90	pCi/l	NE	8 <sup>4</sup>	NE	N/A		0.059	U	N/A		-0.168	U	N/A		0.148	U
	Techneium-99	pCi/l	NE	3200 <sup>4</sup>	NE	N/A		-0.5	U	N/A		0.4	U	N/A		0.5	U
	Thorium-228	pCi/l	400	15 <sup>5</sup>	NE	0.1241	U	-0.211	U	0.0848	U	0.029	U	0.0303	U	0.044	U
	Thorium-230	pCi/l	300	15 <sup>5</sup>	NE	0.2358	J	0.031	U	0.1035	U	0.044	U	0.38		0.028	U
	Thorium-232	pCi/l	50	15 <sup>5</sup>	NE	0	U	-0.05	U	0.0303	U	0.076	U	-0.0159	U	0.063	U
	Tritium (H3)	pCi/l	NE	20000 <sup>4</sup>	NE	N/A		389		N/A		186	U	N/A		140	U
	Uranium-234	pCi/l	600	27 <sup>7</sup>	NE	1.789		1.53		6.403		1.22		4.039		3.37	
	Uranium-235	pCi/l	600	27 <sup>7</sup>	NE	0.1534	U	0.103	U	0.7365		0.076	U	-0.0272	U	0.308	
	Uranium-238	pCi/l	600	27 <sup>7</sup>	NE	1.781		1.1		5.102		0.832		3.087		2.52	
	Total Uranium (234, 235 & 238)	pCi/l	600	27 <sup>7</sup>	NE	3.57		2.63		12.242		2.052		7.126		6.198	
Anion	Chloride	mg/L		250 <sup>1</sup>	250	360		N/A		180		N/A		100		N/A	
	Fluoride	mg/L		4	1.5	0.83		N/A		1		N/A		0.83		N/A	
	Nitrate	mg/L		10	10	0.23	J	N/A		0.078	U	N/A		0.21	J	N/A	
	Nitrite	mg/L		1	1	0.072	U	N/A		0.44	J	N/A		0.4	J	N/A	
	ortho-Phosphate-P	mg/L		NE	NE	0.13	U	N/A		0.13	U	N/A		0.13	U	N/A	
Metal	Sulfate	mg/L		250 <sup>1</sup>	250	340		N/A		210		N/A		150		N/A	
	Aluminum	µg/L		200 <sup>1</sup>	NE	250		110		210		380		110		240	
	Antimony	µg/L		6	3	4.4	J	5.2		1.4	U	2	J	3	J	4	
	Arsenic	µg/L		10	25	4.7		3.9		2.1		1.4		1.2		1.2	
	Barium	µg/L		2,000	1,000	79		92		81		76		63		76	
	Beryllium	µg/L		4	11	0.056	U	0.056	U	0.056	U	0.056	U	0.17	J	0.086	J
	Boron	µg/L		NE	1,000	480		630		530		290		400		950	
	Cadmium	µg/L		5	5	0.15	J	0.12	J	0.084	U	0.09	J	0.16	J	0.13	J
	Calcium	µg/L		NE	NE	150,000		160,000		130,000		140,000		120,000		120,000	
	Chromium	µg/L		100	50	1.7		1.6	J	4.3		6.5		5.4		4	
	Cobalt	µg/L		NE	NE	1.2	J	0.92	J	0.69	J	0.7	J	0.48	J	0.51	J
	Copper	µg/L		1,300	200	5.8		6.8		4		5.4		3.5		4.2	
	Iron	µg/L		300 <sup>1</sup>	300	1,300		810		1,100		940		780		810	
	Lead	µg/L		15	25	2.2		1.9		1.6		2.5		1		0.89	
	Lithium	µg/L		NE	NE	43		29		24		30		16		20	
	Magnesium	µg/L		NE	NE	50,000		52,000		39,000		38,000		39,000		29,000	
	Manganese	µg/L		50 <sup>1</sup>	300	270		220		310		110		97		48	
	Mercury	µg/L		2	0.7	0.027	U	0.027	U	0.027	U	0.027	J	0.027	U	0.027	U
	Nickel	µg/L		NE	100	11		11		7.6		7.6		5.4		5.9	
	Potassium	µg/L		NE	NE	14,000		16,000		9,200		8,700		5,900		8,400	
	Selenium	µg/L		50	10	13		13		7		4.8		3.7		5.1	
	Silver	µg/L		100 <sup>1</sup>	50	0.73	U	0.33	J	0.73	U	0.32	U	1.1	J	3.4	
	Sodium	µg/L		NE	20,000	180,000		120,000		110,000		53,000		59,000		50,000	
	Thallium	µg/L		2	NE	0.032	U	0.056	J	0.032	U	0.1	J	0.048	J	0.2	J
	Vanadium	µg/L		NE	14	3.7		2.5		2.1		1.6		1.2		0.78	J
	Zinc	µg/L		5000 <sup>1</sup>	NE	28		27		28		29		17	J	20	J

Table 6-1

Table 6. NFFS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station: Date Sampled: Matrix:	SWSD009 05/19/2010 Surface Water		SWSD009 11/18/11/22/2010 <sup>a</sup> Surface Water		SWSD010 05/18/2010 Surface Water		SWSD010 10/28&11/22/2010 <sup>a</sup> Surface Water		SWSD011 05/17/2010 Surface Water		SWSD011 10/25&11/22/2010 <sup>a</sup> Surface Water		
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
PAH	Acenaphthene	µg/L		NE	50 <sup>13</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.041	U
	Acenaphthylene	µg/L		NE	50 <sup>13</sup>	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.037	U
	Anthracene	µg/L		NE	50 <sup>13</sup>	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.04	U
	Benzo(a)anthracene	µg/L		NE	.002 <sup>13</sup>	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
	Benzo(a)pyrene	µg/L		0.2	ND <sup>13</sup>	0.024	U	0.027	J	0.024	U	0.027	J	0.024	U	0.024	U
	Benzo(b)fluoranthene	µg/L		NE	.002 <sup>13</sup>	0.023	U	0.023	U	0.023	U	0.026	J	0.023	U	0.023	U
	Benzo(ghi)perylene	µg/L		NE	50 <sup>13</sup>	0.024	U	0.024		0.024	U	0.024	U	0.024	U	0.074	J
	Benzo(k)fluoranthene	µg/L		NE	.002 <sup>13</sup>	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.036	U
	Chrysene	µg/L		NE	.002 <sup>13</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.031	U
	Dibeno(a,h)anthracene	µg/L		NE	50 <sup>13</sup>	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
	Fluoranthene	µg/L		NE	50 <sup>13</sup>	0.035	U	0.091	J	0.035	U	0.035	U	0.035	U	0.036	U
	Fluorene	µg/L		NE	50 <sup>13</sup>	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.039	U
	Indeno(1,2,3-cd)pyrene	µg/L		NE	0.002 <sup>13</sup>	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.029	J
	Naphthalene	µg/L		NE	10 <sup>13</sup>	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.039	U
	Phenanthrene	µg/L		NE	50 <sup>13</sup>	0.04	J	0.043	J	0.056	J	0.04	U	0.04	U	0.041	U
	Pyrene	µg/L		NE	50 <sup>13</sup>	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.027	U
PCB	Aroclor-1016	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1221	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1232	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1242	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1248	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1254	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1260	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1262	µg/L		0.5	0.09 <sup>8</sup>	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Pesticide	4,4'-DDD	µg/L		NE	0.3	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	4,4'-DDE	µg/L		NE	0.3	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	4,4'-DDT	µg/L		NE	0.2	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Aldrin	µg/L		NE	ND	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	alpha-BHC	µg/L		NE	0.01	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	alpha-Chlordane	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	beta-BHC	µg/L		NE	0.04	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	delta-BHC	µg/L		NE	0.4	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Dieldrin	µg/L		NE	0.001	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endosulfan I	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endosulfan II	µg/L		NE	NE	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	Endosulfan sulfate	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin	µg/L		2	ND	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin aldehyde	µg/L		NE	5	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin ketone	µg/L		NE	5	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	gamma-BHC (Lindane)	µg/L		0.2	0.5	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	gamma-Chlordane	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Heptachlor	µg/L		0.4	0.4	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Heptachlor epoxide	µg/L		0.2	0.3	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Methoxychlor	µg/L		40	35	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	Toxaphene	µg/L		3	0.06	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U

Table 6-2

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station:	SWSD009 05/19/2010		SWSD009 11/18&11/22/2010 <sup>a</sup> Surface Water		SWSD010 05/18/2010		SWSD010 10/28&11/22/2010 <sup>a</sup> Surface Water		SWSD011 05/17/2010		SWSD011 10/25&11/22/2010 <sup>a</sup> Surface Water				
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations	NY State Water Quality	MCLs <sup>10,11</sup>	Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L		200	5	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U
	1,1,2,2-Tetrachloroethane	µg/L		NE	5	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L		NE	5	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
	1,1,2-Trichloroethane	µg/L		5	1	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U
	1,1-Dichloroethane	µg/L		NE	5	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
	1,1-Dichloroethene	µg/L		7	5	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
	1,2,3-Trichlorobenzene	µg/L		NE	5	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U
	1,2,4-Trichlorobenzene	µg/L		70	5	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	1,2-Dibromo-3-chloropropane	µg/L		0.2	0.04	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
	1,2-Dichlorobenzene	µg/L		600	3	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
	1,2-Dichloroethane	µg/L		5	0.6	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
	1,2-Dichloropropane	µg/L		5	1	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
	1,3-Dichlorobenzene	µg/L		NE	3	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	1,4-Dichlorobenzene	µg/L		75	3	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	2-Butanone <sup>9</sup>	µg/L		NE	NE	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U
	2-Hexanone	µg/L		NE	NE	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	4-Methyl-2-pentanone	µg/L		NE	NE	0.4	U	1.3	J	0.4	U	1.8	J	0.4	U	0.95	J		
	Acetone <sup>9</sup>	µg/L		NE	NE	81		0.44	U	2.9	J	0.44	U	3.2	J	0.44	U		
	Benzene	µg/L		5	1	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Bromochloromethane	µg/L		NE	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Bromo dichloromethane	µg/L		NE	NE	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	Bromoform	µg/L		NE	NE	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
	Bromomethane	µg/L		NE	5	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U
	Carbon disulfide	µg/L		NE	60	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
	Carbon tetrachloride	µg/L		5	5	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
	Chlorobenzene	µg/L		100	5	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U
	Chloroethane	µg/L		NE	5	0.42	U	0.42	U	0.42	U	0.42	U	0.42	U	0.42	U	0.42	U
	Chloroform	µg/L		NE	7	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
	Chloromethane	µg/L		NE	5	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U
	cis-1,2-Dichloroethene	µg/L		70	5	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.66	J	0.17	U
	cis-1,3-Dichloropropene	µg/L		NE	0.4 <sup>2</sup>	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	Dibromochloromethane	µg/L		NE	5	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	Dichlorodifluoromethane	µg/L		NE	5	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
	Dichloromethane <sup>9</sup>	µg/L		5	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Ethylbenzene	µg/L		700	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Ethylene dibromide	µg/L		0.05	0.001	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	Isopropylbenzene	µg/L		NE	5	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	Methyl tert-butyl ether	µg/L		NE	NE	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	Naphthalene	µg/L		NE	NE	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
	Styrene	µg/L		100	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Tetrachloroethene	µg/L		5	5	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	1.4		0.26	U
	Toluene <sup>9</sup>	µg/L		1000	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	trans-1,2-Dichloroethene	µg/L		100	5	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	trans-1,3-Dichloropropene	µg/L		NE	0.4 <sup>2</sup>	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Trichloroethene	µg/L		5	5	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U
	Trichlorofluoromethane	µg/L		NE	5	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
	Vinyl chloride	µg/L		2	2	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
	Xylenes, Total	µg/L		10,000	5 <sup>3</sup>	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U

Table 6-3

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station:	SWSD009	SWSD009	SWSD010	SWSD010	SWSD011	SWSD011							
				Date Sampled:	05/19/2010	11/1&11/22/2010 <sup>a</sup>	05/18/2010	10/28&11/22/2010 <sup>a</sup>	05/17/2010	10/25&11/22/2010 <sup>a</sup>							
				Matrix:	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water							
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L		500 <sup>1</sup>	500	120	N/A	230	N/A	280	N/A						
	Total Dissolved Solids	mg/L		NE	NE	1,300	N/A	1,000	N/A	760	N/A						

<sup>a</sup> Samples collected for additional analysis on 11/22/2010.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene), applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium.

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Sum of Aroclors (polychlorinated biphenyls)

<sup>9</sup> Common laboratory contaminant.

<sup>10</sup> Surface Water comparison criteria. Surface Water at NFSS is not a drinking water source.

<sup>11</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>12</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>13</sup> NYSDEC Groundwater Criteria TOGS (1.1.1) June 1998, Revised 2000, Class GA; and 10NYCRR Part 5, Subpart5-1, Public Water Systems, NYSDOH.

J - Estimated value  
U - Non-detect  
R -Rejected

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station: Date Sampled: Matrix:	SWSD021 05/18/2010 Surface Water		SWSD021 10/28&11/22/2010 <sup>a</sup> Surface Water		SWSD022 05/18/2010 Surface Water		SWSD022 10/28&11/22/2010 <sup>a</sup> Surface Water		SWSD023 05/19/2010 Surface Water		SWSD023 11/18/11/22/2010 <sup>a</sup> Surface Water		
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	NE	92 <sup>4</sup>	NE	N/A		0.732	U	N/A		-1.92	U	N/A		0.177	U
	Plutonium-238	pCi/l	NE	15 <sup>5</sup>	NE	N/A		0.058	U	N/A		0.033	U	N/A		0.147	U
	Plutonium-239/240	pCi/l	NE	15 <sup>5</sup>	NE	N/A		0.007	U	N/A		0.086	U	N/A		0.057	U
	Radium-226	pCi/l	100	5 <sup>6</sup>	5	0.215	U	0.509	U	N/A		0.197	U	0.1559	U	0.582	
	Radium-228	pCi/l	100	5 <sup>6</sup>	5	0.7702	U	0.164	U	-0.0521	U	0.489		0.4382	U	0.056	U
	Total Radium (226&228)	pCi/l	100	5 <sup>6</sup>	5	Non-detect		Non-detect		Non-detect		0.489		Non-detect		0.582	
	Strontium-90	pCi/l	NE	8 <sup>4</sup>	NE	N/A		-0.266	U	N/A		-0.227	U	N/A		0.081	U
	Techneium-99	pCi/l	NE	3200 <sup>4</sup>	NE	N/A		0.7	U	N/A		0.4	U	N/A		0	U
	Thorium-228	pCi/l	400	15 <sup>5</sup>	NE	0.1214	U	0	U	0.0599	U	-0.044	U	0.0443	U	0.018	U
	Thorium-230	pCi/l	300	15 <sup>5</sup>	NE	0.1833		0.68		0.1529	U	0.124	U	0.1738	J	0.023	U
	Thorium-232	pCi/l	50	15 <sup>5</sup>	NE	0.1149	U	0.336		0.0544	U	0.091	U	0.0247	U	0.146	U
	Tritium (H3)	pCi/l	NE	20000 <sup>4</sup>	NE	N/A		165	U	N/A		231	U	N/A		157	U
	Uranium-234	pCi/l	600	27 <sup>7</sup>	NE	4.049		2.51		3.521		4.98		1.405		1.79	
	Uranium-235	pCi/l	600	27 <sup>7</sup>	NE	0.1509	U	0.15		0.2555		0.339		-0.014	U	0.108	U
	Uranium-238	pCi/l	600	27 <sup>7</sup>	NE	3.125		1.84		3.357		4.66		0.6551		0.899	
	Total Uranium (234, 235 & 238)	pCi/l	600	27 <sup>7</sup>	NE	7.174		4.5		7.134		9.979		2.06		2.689	
Anion	Chloride	mg/L		250 <sup>1</sup>	250	20		N/A		170		N/A		190		N/A	
	Fluoride	mg/L		4	1.5	0.49	J	N/A		0.87		N/A		0.6		N/A	
	Nitrate	mg/L		10	10	0.078	U	N/A		0.078	U	N/A		0.078	U	N/A	
	Nitrite	mg/L		1	1	0.26	J	N/A		0.44	J	N/A		0.47	J	N/A	
	ortho-Phosphate-P	mg/L		NE	NE	0.13	U	N/A		0.13	U	N/A		0.13	U	N/A	
	Sulfate	mg/L		250 <sup>1</sup>	250	77		N/A		180		N/A		260		N/A	
Metal	Aluminum	µg/L		200 <sup>1</sup>	NE	2,200		1,000		630		530		79		310	
	Antimony	µg/L		6	3	1.4	U	0.45	J	1.4	U	3.3		1.4	U	1.6	
	Arsenic	µg/L		10	25	1.7		0.96		8.5		1.7		2.7		1.8	
	Barium	µg/L		2,000	1,000	72		68		350		94		43		91	
	Beryllium	µg/L		4	11	0.088	R	0.12	J	0.28	U	0.056	U	0.056	U	0.056	U
	Boron	µg/L		NE	1,000	200	U	61	J	2,500		460		210		190	J
	Cadmium	µg/L		5	5	0.084	U	0.084	U	0.47	J	0.084	U	0.098	J	0.096	J
	Calcium	µg/L		NE	NE	87,000		120,000		130,000		140,000		140,000		140,000	
	Chromium	µg/L		100	50	8.8		270		11		4.5		1.3		0.91	J
	Cobalt	µg/L		NE	NE	1	J	1.1	J	2.3	J	0.73	J	0.63	J	0.75	J
	Copper	µg/L		1,300	200	6		3.8		21		4.9		5.4		3.9	
	Iron	µg/L		300 <sup>1</sup>	300	2,500		1,400		780		1,000		1,200		950	
	Lead	µg/L		15	25	1.8		0.63		5.9		1.8		2.2		2.1	
	Lithium	µg/L		NE	NE	6.7		16		23		25		16		12	
	Magnesium	µg/L		NE	NE	26,000		110,000		39,000		34,000		34,000		38,000	
	Manganese	µg/L		50 <sup>1</sup>	300	130		130		730		120		190		250	
	Mercury	µg/L		2	0.7	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
	Nickel	µg/L		NE	100	5.8		7		34		7.9		9.2		9.7	
	Potassium	µg/L		NE	NE	2,100		3,700		7,600		11,000		6,600		7,100	
	Selenium	µg/L		50	10	0.94	J	3.5		27		7		2.1		1.5	J
	Silver	µg/L		100 <sup>1</sup>	50	0.73	U	0.18	J	0.73	U	0.32	U	0.73	U	0.26	J
	Sodium	µg/L		NE	20,000	19,000		48,000		92,000		64,000		160,000		70,000	
	Thallium	µg/L		2	NE	0.034	R	0.032	U	0.16	U	0.11	J	0.032	U	0.048	J
	Vanadium	µg/L		NE	14	3.6		0.16	U	8		1.7		1.8		0.94	
	Zinc	µg/L		5000 <sup>1</sup>	NE	21		18	J	130		24		41		45	

Table 6-5

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station: Date Sampled: Matrix:	SWSD021 05/18/2010 Surface Water		SWSD021 10/28&11/22/2010 <sup>a</sup> Surface Water		SWSD022 05/18/2010 Surface Water		SWSD022 10/28&11/22/2010 <sup>a</sup> Surface Water		SWSD023 05/19/2010 Surface Water		SWSD023 11/1&11/22/2010 <sup>a</sup> Surface Water		
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
PAH	Acenaphthene	µg/L		NE	50 <sup>13</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Acenaphthylene	µg/L		NE	50 <sup>13</sup>	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
	Anthracene	µg/L		NE	50 <sup>13</sup>	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
	Benzo(a)anthracene	µg/L		NE	.002 <sup>13</sup>	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
	Benzo(a)pyrene	µg/L		0.2	ND <sup>13</sup>	0.024	U	0.024	U	0.024	U	0.028	J	0.024	U	0.024	U
	Benzo(b)fluoranthene	µg/L		NE	.002 <sup>13</sup>	0.023	U	0.023	U	0.023	U	0.024	J	0.023	U	0.023	U
	Benzo(ghi)perylene	µg/L		NE	50 <sup>13</sup>	0.024	U	0.055	J	0.024	U	0.024	U	0.024	U	0.024	U
	Benzo(k)fluoranthene	µg/L		NE	.002 <sup>13</sup>	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
	Chrysene	µg/L		NE	.002 <sup>13</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Dibeno(a,h)anthracene	µg/L		NE	50 <sup>13</sup>	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
	Fluoranthene	µg/L		NE	50 <sup>13</sup>	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U	0.043	J
	Fluorene	µg/L		NE	50 <sup>13</sup>	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
	Indeno(1,2,3-cd)pyrene	µg/L		NE	0.002 <sup>13</sup>	0.02	U	0.025	J	0.02	U	0.02	U	0.02	U	0.02	U
	Naphthalene	µg/L		NE	10 <sup>13</sup>	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
	Phenanthrene	µg/L		NE	50 <sup>13</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.042	J	0.04	U
	Pyrene	µg/L		NE	50 <sup>13</sup>	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U
PCB	Aroclor-1016	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1221	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1232	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1242	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1248	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1254	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1260	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1262	µg/L		0.5	0.09 <sup>8</sup>	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Pesticide	4,4'-DDD	µg/L		NE	0.3	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	4,4'-DDE	µg/L		NE	0.3	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	4,4'-DDT	µg/L		NE	0.2	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Aldrin	µg/L		NE	ND	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	alpha-BHC	µg/L		NE	0.01	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	alpha-Chlordane	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	beta-BHC	µg/L		NE	0.04	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	delta-BHC	µg/L		NE	0.4	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Dieldrin	µg/L		NE	0.001	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endosulfan I	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endosulfan II	µg/L		NE	NE	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	Endosulfan sulfate	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin	µg/L		2	ND	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin aldehyde	µg/L		NE	5	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin ketone	µg/L		NE	5	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	gamma-BHC (Lindane)	µg/L		0.2	0.5	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	gamma-Chlordane	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Heptachlor	µg/L		0.4	0.4	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Heptachlor epoxide	µg/L		0.2	0.3	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Methoxychlor	µg/L		40	35	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	Toxaphene	µg/L		3	0.06	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U

Table 6-6

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station: Date Sampled: Matrix:	SWSD021 05/18/2010 Surface Water		SWSD021 10/28&11/22/2010 <sup>a</sup> Surface Water		SWSD022 05/18/2010 Surface Water		SWSD022 10/28&11/22/2010 <sup>a</sup> Surface Water		SWSD023 05/19/2010 Surface Water		SWSD023 11/1&11/22/2010 <sup>a</sup> Surface Water		
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L		200	5	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U
	1,1,2,2-Tetrachloroethane	µg/L		NE	5	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L		NE	5	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
	1,1,2-Trichloroethane	µg/L		5	1	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U
	1,1-Dichloroethane	µg/L		NE	5	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
	1,1-Dichloroethene	µg/L		7	5	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
	1,2,3-Trichlorobenzene	µg/L		NE	5	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U
	1,2,4-Trichlorobenzene	µg/L		70	5	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	1,2-Dibromo-3-chloropropane	µg/L		0.2	0.04	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
	1,2-Dichlorobenzene	µg/L		600	3	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
	1,2-Dichloroethane	µg/L		5	0.6	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
	1,2-Dichloropropane	µg/L		5	1	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
	1,3-Dichlorobenzene	µg/L		NE	3	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	1,4-Dichlorobenzene	µg/L		75	3	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	2-Butanone <sup>9</sup>	µg/L		NE	NE	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U
	2-Hexanone	µg/L		NE	NE	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	4-Methyl-2-pentanone	µg/L		NE	NE	0.4	U	0.4	U	0.4	U	1.3	J	0.4	U	0.4	U
	Acetone <sup>9</sup>	µg/L		NE	NE	2.9	J	0.44	U	3.1	J	0.44	U	4.7	J	0.44	U
	Benzene	µg/L		5	1	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Bromochloromethane	µg/L		NE	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Bromo(dichloromethane)	µg/L		NE	NE	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	Bromoform	µg/L		NE	NE	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
	Bromomethane	µg/L		NE	5	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U
	Carbon disulfide	µg/L		NE	60	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
	Carbon tetrachloride	µg/L		5	5	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
	Chlorobenzene	µg/L		100	5	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U
	Chloroethane	µg/L		NE	5	0.42	U	0.42	U	0.42	U	0.42	U	0.42	U	0.42	U
	Chloroform	µg/L		NE	7	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
	Chloromethane	µg/L		NE	5	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U
	cis-1,2-Dichloroethene	µg/L		70	5	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	cis-1,3-Dichloropropene	µg/L		NE	0.4 <sup>2</sup>	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	Dibromochloromethane	µg/L		NE	5	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	Dichlorodifluoromethane	µg/L		NE	5	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
	Dichloromethane <sup>9</sup>	µg/L		5	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.7	J
	Ethylbenzene	µg/L		700	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Ethylene dibromide	µg/L		0.05	0.001	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	Isopropylbenzene	µg/L		NE	5	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	Methyl tert-butyl ether	µg/L		NE	NE	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	Naphthalene	µg/L		NE	NE	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
	Styrene	µg/L		100	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Tetrachloroethene	µg/L		5	5	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
	Toluene <sup>9</sup>	µg/L		1000	5	0.48	J	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	trans-1,2-Dichloroethene	µg/L		100	5	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	trans-1,3-Dichloropropene	µg/L		NE	0.4 <sup>2</sup>	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Trichloroethene	µg/L		5	5	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U
	Trichlorofluoromethane	µg/L		NE	5	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
	Vinyl chloride	µg/L		2	2	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
	Xylenes, Total	µg/L		10,000	5 <sup>3</sup>	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U

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Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station:	SWSD021	SWSD021	SWSD022	SWSD022	SWSD023	SWSD023					
				Date Sampled:	05/18/2010	10/28&11/22/2010 <sup>a</sup>	05/18/2010	10/28&11/22/2010 <sup>a</sup>	05/19/2010	11/1&11/22/2010 <sup>a</sup>					
				Matrix:	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water					
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L		500 <sup>1</sup>	500	220	N/A	260	N/A	140	N/A				
	Total Dissolved Solids	mg/L		NE	NE	440	N/A	920	N/A	1,100	N/A				

<sup>a</sup> Samples collected for additional analysis on 11/22/2010.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene), applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium.

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Sum of Aroclors (polychlorinated biphenyls)

<sup>9</sup> Common laboratory contaminant.

<sup>10</sup> Surface Water comparison criteria. Surface Water at NFSS is not a drinking water source.

<sup>11</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>12</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>13</sup> NYSDEC Groundwater Criteria TOGS (1.1.1) June 1998, Revised 2000, Class GA; and 10NYCRR Part 5, Subpart5-1, Public Water Systems, NYSDOH.

J - Estimated value  
U - Non-detect  
R -Rejected

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station: Date Sampled: Matrix:	SWSD024 05/19/2010 Surface Water		SWSD024 11/1&11/22/2010 <sup>a</sup> Surface Water		SWSD025 10/26&11/22/2010 <sup>a</sup> Surface Water		WDD1 05/18/2010 Surface Water		WDD1 11/1&11/22/2010 <sup>a</sup> Surface Water		
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	NE	92 <sup>4</sup>	NE	N/A		1.85	U	0.817	U	N/A		-2.31	U
	Plutonium-238	pCi/l	NE	15 <sup>5</sup>	NE	N/A		0.139	U	0.097	U	N/A		-0.092	U
	Plutonium-239/240	pCi/l	NE	15 <sup>5</sup>	NE	N/A		0	U	-0.03	U	N/A		0.007	U
	Radium-226	pCi/l	100	5 <sup>6</sup>	5	0.3647	U	0.718		0.009	U	0.1134	U	0.638	
	Radium-228	pCi/l	100	5 <sup>6</sup>	5	0.2984	U	0.387		0.4	J	0.645	U	0.078	U
	Total Radium (226&228)	pCi/l	100	5 <sup>6</sup>	5	Non-detect		1.105		0.4		Non-detect		0.638	
	Strontium-90	pCi/l	NE	8 <sup>4</sup>	NE	N/A		-0.107	U	-0.012	U	N/A		0.033	U
	Techneium-99	pCi/l	NE	3200 <sup>4</sup>	NE	N/A		-1	U	0.2	U	N/A		0.1	U
	Thorium-228	pCi/l	400	15 <sup>5</sup>	NE	0.1426	U	0.073	U	-0.067	U	-0.0688	U	-0.078	U
	Thorium-230	pCi/l	300	15 <sup>5</sup>	NE	0.1859	J	-0.142	U	-0.014	U	-0.0512	U	-0.061	U
	Thorium-232	pCi/l	50	15 <sup>5</sup>	NE	0.0638	U	0.159		0.022	U	0.005	U	0.064	U
	Tritium (H3)	pCi/l	NE	20000 <sup>4</sup>	NE	N/A		351	U	155	U	N/A		161	U
	Uranium-234	pCi/l	600	27 <sup>7</sup>	NE	5.43		5.1		2.17		1.463		1.25	
	Uranium-235	pCi/l	600	27 <sup>7</sup>	NE	0.223	U	0.213		0.124	U	0.1586	U	0.066	U
	Uranium-238	pCi/l	600	27 <sup>7</sup>	NE	4.453		3.96		2.26		0.5476		1.4	
	Total Uranium (234, 235 & 238)	pCi/l	600	27 <sup>7</sup>	NE	9.883		9.273		4.43		2.011		2.65	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		26		N/A		N/A		92		N/A	
	Fluoride	mg/L	4	1.5		0.74		N/A		N/A		0.26	J	N/A	
	Nitrate	mg/L	10	10		0.15	J	N/A		N/A		14	J	N/A	
	Nitrite	mg/L	1	1		0.32	J	N/A		N/A		0.53	J	N/A	
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	N/A		N/A		2.2	J	N/A	
	Sulfate	mg/L	250 <sup>1</sup>	250		160		N/A		N/A		110		N/A	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		180		66		380		430		97	
	Antimony	µg/L	6	3		1.4	U	0.82	J	3.6		1.4	U	0.87	J
	Arsenic	µg/L	10	25		1.7		2.3		1.8		2.6		2.7	
	Barium	µg/L	2,000	1,000		46		77		100		34		40	
	Beryllium	µg/L	4	11		0.056	U	0.056	U	0.056	U	0.056	U	0.056	U
	Boron	µg/L	NE	1,000		200		220		540		200	U	170	J
	Cadmium	µg/L	5	5		0.084	U	0.11	J	0.1	J	0.094	J	0.088	J
	Calcium	µg/L	NE	NE		130,000		120,000		130,000		85,000		130,000	
	Chromium	µg/L	100	50		0.77	J	0.71	J	2		2.1		0.91	J
	Cobalt	µg/L	NE	NE		0.71	J	0.61	J	0.57	J	1.2	J	1.6	J
	Copper	µg/L	1,300	200		2.4		4		3.9		13		6	
	Iron	µg/L	300 <sup>1</sup>	300		1,300		950		910		980		590	
	Lead	µg/L	15	25		0.78	J	0.68		1.3		1.4		0.65	
	Lithium	µg/L	NE	NE		10		16		27		13		11	
	Magnesium	µg/L	NE	NE		50,000		58,000		36,000		32,000		43,000	
	Manganese	µg/L	50 <sup>1</sup>	300		390		220		94		68		52	
	Mercury	µg/L	2	0.7		0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
	Nickel	µg/L	NE	100		6.3		6.5		7.4		7.3		10	
	Potassium	µg/L	NE	NE		5,100		7,200		9,800		32,000		34,000	
	Selenium	µg/L	50	10		1.9	J	2.1		6		1.9	J	1.8	J
	Silver	µg/L	100 <sup>1</sup>	50		0.73	U	0.41	J	1.3		0.73	U	0.38	J
	Sodium	µg/L	NE	20,000		25,000		29,000		67,000		56,000		90,000	
	Thallium	µg/L	2	NE		0.032	U	0.074	J	0.074	J	0.032	U	0.04	J
	Vanadium	µg/L	NE	14		0.92		0.82		1		2.4		0.68	J
	Zinc	µg/L	5000 <sup>1</sup>	NE		24		26		20		75		70	

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Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station: Date Sampled: Matrix:	SWSD024 05/19/2010 Surface Water		SWSD024 11/1&11/22/2010 <sup>a</sup> Surface Water		SWSD025 10/26&11/22/2010 <sup>a</sup> Surface Water		WDD1 05/18/2010 Surface Water		WDD1 11/1&11/22/2010 <sup>a</sup> Surface Water		
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
PAH	Acenaphthene	µg/L		NE	50 <sup>13</sup>	0.04	U	0.63	J	0.04	U	0.04	U	0.04	U
	Acenaphthylene	µg/L		NE	50 <sup>13</sup>	0.036	U	0.036	U	0.036	U	0.036	U	0.036	U
	Anthracene	µg/L		NE	50 <sup>13</sup>	0.039	U	0.039	U	0.039	U	0.039	U	0.039	U
	Benzo(a)anthracene	µg/L		NE	.002 <sup>13</sup>	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
	Benzo(a)pyrene	µg/L		0.2	ND <sup>13</sup>	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U
	Benzo(b)fluoranthene	µg/L		NE	.002 <sup>13</sup>	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
	Benzo(ghi)perylene	µg/L		NE	50 <sup>13</sup>	0.024	U	0.024	U	0.024	U	0.024	U	0.024	U
	Benzo(k)fluoranthene	µg/L		NE	.002 <sup>13</sup>	0.035	U	0.035	U	0.035	U	0.035	U	0.035	U
	Chrysene	µg/L		NE	.002 <sup>13</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Dibeno(a,h)anthracene	µg/L		NE	50 <sup>13</sup>	0.023	U	0.023	U	0.023	U	0.023	U	0.023	U
	Fluoranthene	µg/L		NE	50 <sup>13</sup>	0.035	U	0.078	J	0.035	U	0.035	U	0.035	U
	Fluorene	µg/L		NE	50 <sup>13</sup>	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
	Indeno(1,2,3-cd)pyrene	µg/L		NE	0.002 <sup>13</sup>	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
	Naphthalene	µg/L		NE	10 <sup>13</sup>	0.038	U	0.038	U	0.038	U	0.038	U	0.038	U
	Phenanthrene	µg/L		NE	50 <sup>13</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Pyrene	µg/L		NE	50 <sup>13</sup>	0.026	U	0.026	U	0.026	U	0.026	U	0.026	U
PCB	Aroclor-1016	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1221	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1232	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1242	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1248	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1254	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1260	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1262	µg/L		0.5	0.09 <sup>8</sup>	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Pesticide	4,4'-DDD	µg/L		NE	0.3	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	4,4'-DDE	µg/L		NE	0.3	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	4,4'-DDT	µg/L		NE	0.2	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Aldrin	µg/L		NE	ND	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	alpha-BHC	µg/L		NE	0.01	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	alpha-Chlordane	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	beta-BHC	µg/L		NE	0.04	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	delta-BHC	µg/L		NE	0.4	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Dieldrin	µg/L		NE	0.001	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endosulfan I	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endosulfan II	µg/L		NE	NE	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	Endosulfan sulfate	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin	µg/L		2	ND	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin aldehyde	µg/L		NE	5	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin ketone	µg/L		NE	5	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	gamma-BHC (Lindane)	µg/L		0.2	0.5	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	gamma-Chlordane	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Heptachlor	µg/L		0.4	0.4	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Heptachlor epoxide	µg/L		0.2	0.3	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
	Methoxychlor	µg/L		40	35	0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
	Toxaphene	µg/L		3	0.06	0.04	U	0.04	U	0.04	U	0.04	U	0.04	U

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station: SWSD024 05/19/2010 Surface Water	SWSD024 11/1&11/22/2010 <sup>a</sup> Surface Water	SWSD025 10/26&11/22/2010 <sup>a</sup> Surface Water	WDD1 05/18/2010 Surface Water	WDD1 11/1&11/22/2010 <sup>a</sup> Surface Water							
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup> Stds. <sup>10,12</sup>	NY State Water Quality	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L		200	5	0.16	U	0.16	U	0.16	U	0.16	U	0.16	U
	1,1,2,2-Tetrachloroethane	µg/L		NE	5	0.29	U	0.29	U	0.29	U	0.29	U	0.29	U
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L		NE	5	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
	1,1,2-Trichloroethane	µg/L		5	1	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U
	1,1-Dichloroethane	µg/L		NE	5	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
	1,1-Dichloroethene	µg/L		7	5	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
	1,2,3-Trichlorobenzene	µg/L		NE	5	0.38	U	0.38	U	0.38	U	0.38	U	0.38	U
	1,2,4-Trichlorobenzene	µg/L		70	5	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	1,2-Dibromo-3-chloropropane	µg/L		0.2	0.04	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
	1,2-Dichlorobenzene	µg/L		600	3	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
	1,2-Dichloroethane	µg/L		5	0.6	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
	1,2-Dichloropropane	µg/L		5	1	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
	1,3-Dichlorobenzene	µg/L		NE	3	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	1,4-Dichlorobenzene	µg/L		75	3	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	2-Butanone <sup>9</sup>	µg/L		NE	NE	0.28	U	0.28	U	0.28	U	0.28	U	0.28	U
	2-Hexanone	µg/L		NE	NE	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	4-Methyl-2-pentanone	µg/L		NE	NE	0.4	U	0.4	U	0.4	U	0.4	U	0.4	U
	Acetone <sup>9</sup>	µg/L		NE	NE	3.9	J	0.44	U	0.44	U	2.9	J	8.9	
	Benzene	µg/L		5	1	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Bromochloromethane	µg/L		NE	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Bromodichloromethane	µg/L		NE	NE	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	Bromoform	µg/L		NE	NE	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U
	Bromomethane	µg/L		NE	5	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U
	Carbon disulfide	µg/L		NE	60	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U
	Carbon tetrachloride	µg/L		5	5	0.36	U	0.36	U	0.36	U	0.36	U	0.36	U
	Chlorobenzene	µg/L		100	5	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U
	Chloroethane	µg/L		NE	5	0.42	U	0.42	U	0.42	U	0.42	U	0.42	U
	Chloroform	µg/L		NE	7	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U
	Chloromethane	µg/L		NE	5	0.22	U	0.22	U	0.22	U	0.22	U	0.22	U
	cis-1,2-Dichloroethene	µg/L		70	5	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	cis-1,3-Dichloropropene	µg/L		NE	0.4 <sup>2</sup>	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	Dibromochloromethane	µg/L		NE	5	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	Dichlorodifluoromethane	µg/L		NE	5	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
	Dichloromethane <sup>9</sup>	µg/L		5	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Ethylbenzene	µg/L		700	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Ethylene dibromide	µg/L		0.05	0.001	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	Isopropylbenzene	µg/L		NE	5	0.21	U	0.21	U	0.21	U	0.21	U	0.21	U
	Methyl tert-butyl ether	µg/L		NE	NE	0.17	U	0.17	U	0.17	U	0.17	U	0.17	U
	Naphthalene	µg/L		NE	NE	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
	Styrene	µg/L		100	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Tetrachloroethene	µg/L		5	5	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
	Toluene <sup>9</sup>	µg/L		1000	5	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	trans-1,2-Dichloroethene	µg/L		100	5	0.18	U	0.18	U	0.18	U	0.18	U	0.18	U
	trans-1,3-Dichloropropene	µg/L		NE	0.4 <sup>2</sup>	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
	Trichloroethene	µg/L		5	5	0.27	U	0.27	U	0.27	U	0.27	U	0.27	U
	Trichlorofluoromethane	µg/L		NE	5	0.26	U	0.26	U	0.26	U	0.26	U	0.26	U
	Vinyl chloride	µg/L		2	2	0.24	U	0.24	U	0.24	U	0.24	U	0.24	U
	Xylenes, Total	µg/L		10,000	5 <sup>3</sup>	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U

Table 6-11

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station:	SWSD024	SWSD024	SWSD025	WDD1	WDD1				
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Date Sampled:	05/19/2010	11/1&11/22/2010 <sup>a</sup>	10/26&11/22/2010 <sup>a</sup>	05/18/2010	11/1&11/22/2010 <sup>a</sup>				
				Matrix:	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water				
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L		Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
	Total Dissolved Solids	mg/L		500 <sup>1</sup> NE	500 NE	350 750	N/A N/A	N/A N/A	N/A	170 670	N/A N/A		

<sup>a</sup> Samples collected for additional analysis on 11/22/2010.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene), applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium.

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Sum of Aroclors (polychlorinated biphenyls)

<sup>9</sup> Common laboratory contaminant.

<sup>10</sup> Surface Water comparison criteria. Surface Water at NFSS is not a drinking water source.

<sup>11</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>12</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>13</sup> NYSDEC Groundwater Criteria TOGS (1.1.1) June 1998, Revised 2000, Class GA; and 10NYCRR Part 5, Subpart5-1, Public Water Systems, NYSDOH.

J - Estimated value  
U - Non-detect  
R -Rejected

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water									Station: WDD2 05/17/2010 Surface Water				WDD2 10/27&11/22/2010 <sup>a</sup> Surface Water				WDD3 05/17/2010 Surface Water				WDD3 10/26&11/22/2010 <sup>a</sup> Surface Water			
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.							
RAD	Cesium-137	pCi/l	NE	92 <sup>4</sup>	NE	N/A		-0.057	U	N/A		3.28	U											
	Plutonium-238	pCi/l	NE	15 <sup>5</sup>	NE	N/A		0.005	U	N/A		-0.029	U											
	Plutonium-239/240	pCi/l	NE	15 <sup>5</sup>	NE	N/A		0.025	U	N/A		-0.015	U											
	Radium-226	pCi/l	100	5 <sup>6</sup>	5	0.1658	U	-0.173	U	0.2939	U	0.077	U											
	Radium-228	pCi/l	100	5 <sup>6</sup>	5	-0.0249	U	0.55	J	-0.7842	U	0.123	U											
	Total Radium (226&228)	pCi/l	100	5 <sup>6</sup>	5	Non-detect		0.55		Non-detect		Non-detect												
	Strontium-90	pCi/l	NE	8 <sup>4</sup>	NE	N/A		0.17	U	N/A		-0.075	U											
	Technetium-99	pCi/l	NE	3200 <sup>4</sup>	NE	N/A		-0.8	U	N/A		0.2	U											
	Thorium-228	pCi/l	400	15 <sup>5</sup>	NE	0.0155	U	-0.013	U	-0.0204	U	0	U											
	Thorium-230	pCi/l	300	15 <sup>5</sup>	NE	0.2128		-0.153	U	0.1107	U	0.228	U											
	Thorium-232	pCi/l	50	15 <sup>5</sup>	NE	0.0216	U	0.032	U	0.0528	U	0.021	U											
	Tritium (H3)	pCi/l	NE	20000 <sup>4</sup>	NE	N/A		103	U	N/A		130	U											
	Uranium-234	pCi/l	600	27 <sup>7</sup>	NE	0.8659		1.14		0.8922		1.01												
	Uranium-235	pCi/l	600	27 <sup>7</sup>	NE	0.2081		0.492		0.1029	U	0.109												
	Uranium-238	pCi/l	600	27 <sup>7</sup>	NE	0.7557		1.14		0.6384		0.892												
	Total Uranium (234, 235 & 238)	pCi/l	600	27 <sup>7</sup>	NE	1.83		2.772		1.531		2.011												
Anion	Chloride	mg/L		250 <sup>1</sup>	250	75				73		N/A												
	Fluoride	mg/L		4	1.5	0.27	J			0.27	J	N/A												
	Nitrate	mg/L		10	10	17	J			16	J	N/A												
	Nitrite	mg/L		1	1	0.33	J			0.34	J	N/A												
	ortho-Phosphate-P	mg/L		NE	NE	1.6	J			1.6	J	N/A												
	Sulfate	mg/L		250 <sup>1</sup>	250	140				140		N/A												
Metal	Aluminum	µg/L		200 <sup>1</sup>	NE	130		160		140		130												
	Antimony	µg/L		6	3	1.4	U	0.4	J	1.4	U	1.5	J											
	Arsenic	µg/L		10	25	2.2		1.9		2.1		2												
	Barium	µg/L		2,000	1,000	35		45		35		44												
	Beryllium	µg/L		4	11	0.056	U	0.056	U	0.056	U	0.056	U											
	Boron	µg/L		NE	1,000	220		240		220		230												
	Cadmium	µg/L		5	5	0.12	J	0.19	J	0.12	J	0.16	J											
	Calcium	µg/L		NE	NE	96,000		110,000		93,000		110,000												
	Chromium	µg/L		100	50	1.4		0.97	J	1.4		0.5	J											
	Cobalt	µg/L		NE	NE	1.2	J	1.8	J	1.1	J	1.7	J											
	Copper	µg/L		1,300	200	13		13		12		11												
	Iron	µg/L		300 <sup>1</sup>	300	610		620		610		560												
	Lead	µg/L		15	25	1.1		0.93		1		0.89												
	Lithium	µg/L		NE	NE	12		15		11		14												
	Magnesium	µg/L		NE	NE	34,000		41,000		33,000		30,000												
	Manganese	µg/L		50 <sup>1</sup>	300	42		64		32		21												
	Mercury	µg/L		2	0.7	0.054	J	0.027	U	0.082	J	0.027	U											
	Nickel	µg/L		NE	100	7.7		9.4		7.7		9.2												
	Potassium	µg/L		NE	NE	44,000		57,000		43,000		54,000												
	Selenium	µg/L		50	10	1.6	J	1.6	J	1.7	J	1.7	J											
	Silver	µg/L		100 <sup>1</sup>	50	0.73	U	0.32	U	0.73	U	0.68												
	Sodium	µg/L		NE	20,000	47,000		50,000		44,000		50,000												
	Thallium	µg/L		2	NE	0.032	U	0.05	J	0.032	U	0.032	U											
	Vanadium	µg/L		NE	14	1.4		0.68	J	1.4		0.7	J											
	Zinc	µg/L		5000 <sup>1</sup>	NE	92		170		86		130												

Table 6. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station: Date Sampled: Matrix:	WDD2 05/17/2010 Surface Water		WDD2 10/27&11/22/2010 <sup>a</sup> Surface Water		WDD3 05/17/2010 Surface Water		WDD3 10/26&11/22/2010 <sup>a</sup> Surface Water		
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
PAH	Acenaphthene	µg/L		NE	50 <sup>13</sup>	0.04	U	0.041	U	0.04	U	0.041	U
	Acenaphthylene	µg/L		NE	50 <sup>13</sup>	0.036	U	0.037	U	0.036	U	0.037	U
	Anthracene	µg/L		NE	50 <sup>13</sup>	0.039	U	0.04	U	0.039	U	0.04	U
	Benzo(a)anthracene	µg/L		NE	.002 <sup>13</sup>	0.02	U	0.021	U	0.02	U	0.021	U
	Benzo(a)pyrene	µg/L		0.2	ND <sup>13</sup>	0.024	U	0.025	U	0.024	U	0.025	U
	Benzo(b)fluoranthene	µg/L		NE	.002 <sup>13</sup>	0.023	U	0.024	U	0.023	U	0.024	U
	Benzo(ghi)perylene	µg/L		NE	50 <sup>13</sup>	0.024	U	0.06	J	0.024	U	0.06	J
	Benzo(k)fluoranthene	µg/L		NE	.002 <sup>13</sup>	0.035	U	0.036	U	0.035	U	0.036	U
	Chrysene	µg/L		NE	.002 <sup>13</sup>	0.03	U	0.031	U	0.03	U	0.031	U
	Dibeno(a,h)anthracene	µg/L		NE	50 <sup>13</sup>	0.023	U	0.024	U	0.023	U	0.024	U
	Fluoranthene	µg/L		NE	50 <sup>13</sup>	0.035	U	0.036	U	0.035	U	0.036	U
	Fluorene	µg/L		NE	50 <sup>13</sup>	0.038	U	0.039	U	0.038	U	0.039	U
	Indeno(1,2,3-cd)pyrene	µg/L		NE	0.002 <sup>13</sup>	0.02	U	0.023	R	0.02	U	0.024	J
	Naphthalene	µg/L		NE	10 <sup>13</sup>	0.038	U	0.039	U	0.038	U	0.039	U
	Phenanthrene	µg/L		NE	50 <sup>13</sup>	0.04	U	0.041	U	0.04	U	0.041	U
	Pyrene	µg/L		NE	50 <sup>13</sup>	0.026	U	0.027	U	0.026	U	0.027	U
PCB	Aroclor-1016	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1221	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1232	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1242	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1248	µg/L		0.5	0.09 <sup>8</sup>	0.03	U	0.03	U	0.03	U	0.03	U
	Aroclor-1254	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1260	µg/L		0.5	0.09 <sup>8</sup>	0.04	U	0.04	U	0.04	U	0.04	U
	Aroclor-1262	µg/L		0.5	0.09 <sup>8</sup>	0.05	U	0.05	U	0.05	U	0.05	U
Pesticide	4,4'-DDD	µg/L		NE	0.3	0.003	U	0.003	U	0.003	U	0.003	U
	4,4'-DDE	µg/L		NE	0.3	0.002	U	0.002	U	0.002	U	0.002	U
	4,4'-DDT	µg/L		NE	0.2	0.002	U	0.002	U	0.002	U	0.002	U
	Aldrin	µg/L		NE	ND	0.003	U	0.003	U	0.003	U	0.003	U
	alpha-BHC	µg/L		NE	0.01	0.002	U	0.002	U	0.002	U	0.002	U
	alpha-Chlordane	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U
	beta-BHC	µg/L		NE	0.04	0.003	U	0.003	U	0.003	U	0.003	U
	delta-BHC	µg/L		NE	0.4	0.002	U	0.002	U	0.002	U	0.002	U
	Dieldrin	µg/L		NE	0.001	0.002	U	0.002	U	0.002	U	0.002	U
	Endosulfan I	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U
	Endosulfan II	µg/L		NE	NE	0.003	U	0.003	U	0.003	U	0.003	U
	Endosulfan sulfate	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin	µg/L		2	ND	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin aldehyde	µg/L		NE	5	0.002	U	0.002	U	0.002	U	0.002	U
	Endrin ketone	µg/L		NE	5	0.002	U	0.002	U	0.002	U	0.002	U
	gamma-BHC (Lindane)	µg/L		0.2	0.5	0.002	U	0.002	U	0.002	U	0.002	U
	gamma-Chlordane	µg/L		NE	NE	0.002	U	0.002	U	0.002	U	0.002	U
	Heptachlor	µg/L		0.4	0.4	0.002	U	0.002	U	0.002	U	0.002	U
	Heptachlor epoxide	µg/L		0.2	0.3	0.002	U	0.002	U	0.002	U	0.002	U
	Methoxychlor	µg/L		40	35	0.003	U	0.003	U	0.003	U	0.003	U
	Toxaphene	µg/L		3	0.06	0.04	U	0.04	U	0.04	U	0.04	U

Table 6-14

**Table 6.**  
**NFSS - 2010 Spring and FALL**  
**Environmental Surveillance Program Findings for Surface Water**

				Station:	WDD2		WDD2		WDD3		WDD3		
				Date Sampled:	05/17/2010		10/27&11/22/2010 <sup>a</sup>		05/17/2010		10/26&11/22/2010 <sup>a</sup>		
				Matrix:	Surface Water		Surface Water		Surface Water		Surface Water		
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup>	NY State Water Quality Stds. <sup>10,12</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L		200	5	0.16	U	0.16	U	0.16	U	0.16	U
	1,1,2,2-Tetrachloroethane	µg/L		NE	5	0.29	U	0.29	U	0.29	U	0.29	U
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L		NE	5	0.26	U	0.26	U	0.26	U	0.26	U
	1,1,2-Trichloroethane	µg/L		5	1	0.27	U	0.27	U	0.27	U	0.27	U
	1,1-Dichloroethane	µg/L		NE	5	0.25	U	0.25	U	0.25	U	0.25	U
	1,1-Dichloroethene	µg/L		7	5	0.19	U	0.19	U	0.19	U	0.19	U
	1,2,3-Trichlorobenzene	µg/L		NE	5	0.38	U	0.38	U	0.38	U	0.38	U
	1,2,4-Trichlorobenzene	µg/L		70	5	0.17	U	0.17	U	0.17	U	0.17	U
	1,2-Dibromo-3-chloropropane	µg/L		0.2	0.04	0.25	U	0.25	U	0.25	U	0.25	U
	1,2-Dichlorobenzene	µg/L		600	3	0.25	U	0.25	U	0.25	U	0.25	U
	1,2-Dichloroethane	µg/L		5	0.6	0.19	U	0.19	U	0.19	U	0.19	U
	1,2-Dichloropropane	µg/L		5	1	0.35	U	0.35	U	0.35	U	0.35	U
	1,3-Dichlorobenzene	µg/L		NE	3	0.21	U	0.21	U	0.21	U	0.21	U
	1,4-Dichlorobenzene	µg/L		75	3	0.18	U	0.18	U	0.18	U	0.18	U
	2-Butanone <sup>9</sup>	µg/L		NE	NE	0.28	U	0.28	U	0.28	U	0.28	U
	2-Hexanone	µg/L		NE	NE	0.21	U	0.21	U	0.21	U	0.21	U
	4-Methyl-2-pentanone	µg/L		NE	NE	0.4	U	0.4	U	0.4	U	0.4	U
	Acetone <sup>9</sup>	µg/L		NE	NE	0.44	U	0.44	U	4.2	J	0.44	U
	Benzene	µg/L		5	1	0.2	U	0.2	U	0.2	U	0.2	U
	Bromochloromethane	µg/L		NE	5	0.2	U	0.2	U	0.2	U	0.2	U
	Bromo dichloromethane	µg/L		NE	NE	0.18	U	0.18	U	0.18	U	0.18	U
	Bromoform	µg/L		NE	NE	0.33	U	0.33	U	0.33	U	0.33	U
	Bromomethane	µg/L		NE	5	1.2	U	1.2	U	1.2	U	1.2	U
	Carbon disulfide	µg/L		NE	60	0.15	U	0.15	U	0.15	U	0.15	U
	Carbon tetrachloride	µg/L		5	5	0.36	U	0.36	U	0.36	U	0.36	U
	Chlorobenzene	µg/L		100	5	0.22	U	0.22	U	0.22	U	0.22	U
	Chloroethane	µg/L		NE	5	0.42	U	0.42	U	0.42	U	0.42	U
	Chloroform	µg/L		NE	7	0.19	U	0.19	U	0.19	U	0.19	U
	Chloromethane	µg/L		NE	5	0.22	U	0.22	U	0.22	U	0.22	U
	cis-1,2-Dichloroethene	µg/L		70	5	0.17	U	0.17	U	0.17	U	0.17	U
	cis-1,3-Dichloropropene	µg/L		NE	0.4 <sup>2</sup>	0.17	U	0.17	U	0.17	U	0.17	U
	Dibromochloromethane	µg/L		NE	5	0.21	U	0.21	U	0.21	U	0.21	U
	Dichlorodifluoromethane	µg/L		NE	5	0.24	U	0.24	U	0.24	U	0.24	U
	Dichloromethane <sup>9</sup>	µg/L		5	5	0.2	U	0.2	U	0.2	U	0.2	U
	Ethylbenzene	µg/L		700	5	0.2	U	0.2	U	0.2	U	0.2	U
	Ethylene dibromide	µg/L		0.05	0.001	0.18	U	0.18	U	0.18	U	0.18	U
	Isopropylbenzene	µg/L		NE	5	0.21	U	0.21	U	0.21	U	0.21	U
	Methyl tert-butyl ether	µg/L		NE	NE	0.17	U	0.17	U	0.17	U	0.17	U
	Naphthalene	µg/L		NE	NE	0.24	U	0.24	U	0.24	U	0.24	U
	Styrene	µg/L		100	5	0.2	U	0.2	U	0.2	U	0.2	U
	Tetrachloroethene	µg/L		5	5	0.26	U	0.26	U	0.26	U	0.26	U
	Toluene <sup>9</sup>	µg/L		1000	5	0.2	U	0.2	U	0.2	U	0.2	U
	trans-1,2-Dichloroethene	µg/L		100	5	0.18	U	0.18	U	0.18	U	0.18	U
	trans-1,3-Dichloropropene	µg/L		NE	0.4 <sup>2</sup>	0.2	U	0.2	U	0.2	U	0.2	U
	Trichloroethene	µg/L		5	5	0.27	U	0.27	U	0.27	U	0.27	U
	Trichlorofluoromethane	µg/L		NE	5	0.26	U	0.26	U	0.26	U	0.26	U
	Vinyl chloride	µg/L		2	2	0.24	U	0.24	U	0.24	U	0.24	U
	Xylenes, Total	µg/L		10,000	5 <sup>3</sup>	0.66	U	0.66	U	0.66	U	0.66	U

NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Surface Water				Station: Date Sampled: Matrix:	WDD2 05/17/2010 Surface Water	WDD2 10/27&11/22/2010 <sup>a</sup> Surface Water	WDD3 05/17/2010 Surface Water	WDD3 10/26&11/22/2010 <sup>a</sup> Surface Water					
FRACTION	ANALYTE	UNITS	USDOE DCG for Water	Federal Regulations MCLs <sup>10,11</sup> Stds. <sup>10,12</sup>	NY State Water Quality	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L		500 <sup>1</sup>	500	160	N/A	160	N/A				
	Total Dissolved Solids	mg/L		NE	NE	740	N/A	730	N/A				

<sup>a</sup> Samples collected for additional analysis on 11/22/2010.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene), applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium.

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Sum of Aroclors (polychlorinated biphenyls)

<sup>9</sup> Common laboratory contaminant.

<sup>10</sup> Surface Water comparison criteria. Surface Water at NFSS is not a drinking water source.

<sup>11</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>12</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>13</sup> NYSDEC Groundwater Criteria TOGS (1.1.1) June 1998, Revised 2000, Class GA; and 10NYCRR Part 5, Subpart5-1, Public Water Systems, NYSDOH.

J - Estimated value

U - Non-detect

R -Rejected

Table 7. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Sediment											Station: Date Sampled: Matrix:		SWSD009 05/19/2010 Sediment		SWSD009 11/01/2010 Sediment		SWSD010 05/18/2010 Sediment		SWSD010 10/28/2010 Sediment		SWSD011 05/17/2010 Sediment		SWSD011 10/25/2010 Sediment	
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>1,6</sup>	NY State- Unrestricted Use <sup>1,7</sup>	NY State- Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.				
RAD	Cesium-137	pCi/g	NE	11	NE	NE	N/A		0.08		N/A		0.043		N/A		0.045	U						
	Plutonium-238	pCi/g	NE	2.5	NE	NE	N/A		0.003	U	N/A		0.027	U	N/A		-0.14	U						
	Plutonium-239/240	pCi/g	NE	2.3	NE	NE	N/A		0.027	U	N/A		0	U	N/A		-0.04	U						
	Radium-226	pCi/g	5 <sup>2</sup>	0.7	NE	NE	0.9664		1.07		1.0754		1.1		0.9106		1.57							
	Radium-228	pCi/g	5 <sup>2</sup>	NA	NE	NE	1.6511		0.973		0.4261	U	1.08		0.9127	U	0.873							
	Total Radium (226&228)	pCi/g	5 <sup>2</sup>	NA	NE	NE	2.617		2.043		1.075		2.18		0.911		2.443							
	Strontium-90	pCi/g	NE	1.7	NE	NE	N/A		0.034	U	N/A		-0.539	U	N/A		-0.765	U						
	Technetium-99	pCi/g	NE	19	NE	NE	N/A		-0.3	U	N/A		-0.9	U	N/A		-0.7	U						
	Thorium-228	pCi/g	5	4.7	NE	NE	1.242		0.596	J	1.083		1.18		1.054		1.21							
	Thorium-230	pCi/g	5	1.8	NE	NE	1.251		0.382	U	1.131		1.33		1.611		1.07							
	Thorium-232	pCi/g	5	1.1	NE	NE	1.229		0.646		1.105		1.24		0.9296		0.936							
	Uranium-234	pCi/g	90 <sup>3</sup>	13	NE	NE	1.332		1.35		2.134		2.3		1.39		1.17							
	Uranium-235	pCi/g	90 <sup>3</sup>	8	NE	NE	0.1469		0.141	U	0.1223		0.264		0.0602	U	0.127	U						
	Uranium-238	pCi/g	90 <sup>3</sup>	14	NE	NE	0.9876		0.969		2.351		1.61		1.188		1.2							
	Total Uranium (234, 235 & 238)	pCi/g	90 <sup>3</sup>	NA	NE	NE	2.467		2.319		4.607		4.174		2.578		2.37							
Metal	Aluminum	µg/kg			NE	NE	21,000,000		17,000,000		31,000,000		22,000,000		30,000,000		19,000,000							
	Antimony	µg/kg			NE	NE	1,000		3,000		1,800		2,700		2,800		1,800							
	Arsenic	µg/kg		13,000	16,000		4,700		5,900		9,700		8,900		6,700		6,300							
	Barium	µg/kg		350,000	10,000,000	120,000		130,000		140,000		150,000		160,000		130,000								
	Beryllium	µg/kg		7,200	2,700,000	670		730	J	1,100		940	J	980		970	J							
	Boron	µg/kg		NE	NE	15,000		26,000		31,000		29,000		26,000		28,000								
	Cadmium	µg/kg		2,500	60,000	840		1,900		1,200		2,000		790		1,400								
	Calcium	µg/kg		NE	NE	44,000,000		44,000,000		51,000,000		40,000,000		46,000,000		43,000,000								
	Chromium	µg/kg		NE	NE	29,000		48,000		83,000		88,000		57,000		54,000								
	Cobalt	µg/kg		NE	NE	8,300		11,000		14,000		15,000		13,000		12,000								
	Copper	µg/kg		50,000	10,000,000	41,000		64,000		87,000		96,000		52,000		51,000								
	Iron	µg/kg		NE	NE	21,000,000		19,000,000		34,000,000		26,000,000		31,000,000		24,000,000								
	Lead	µg/kg		63,000	3,900,000	35,000		47,000		73,000		86,000		39,000		38,000								
	Lithium	µg/kg		NE	NE	22,000		21,000		34,000		35,000		33,000		30,000								
	Magnesium	µg/kg		NE	NE	12,000,000		11,000,000		15,000,000		14,000,000		12,000,000		8,600,000								
	Manganese	µg/kg		1,600,000	10,000,000	610,000		470,000		840,000		640,000		1,300,000		750,000								
	Mercury	µg/kg		180 <sup>8</sup>	5,700 <sup>8</sup>	120		140		270		220		150	J	100								
	Nickel	µg/kg		30,000	10,000,000	21,000		29,000		35,000		40,000		32,000		31,000								
	Potassium	µg/kg		NE	NE	2,900,000		2,800,000		4,600,000		4,600,000		4,500,000		4,000,000								
	Selenium	µg/kg		3,900	6,800,000	490		870	J	1,200		1,300	J	670		1,000	J							
	Silver	µg/kg		2,000	6,800,000	240		230		400		270	J	700		460								
	Sodium	µg/kg		NE	NE	320,000	J	370,000		590,000		420,000		390,000		420,000								
	Thallium	µg/kg		NE	NE	140	J	210	J	250	J	260	J	230	J	260	J							
	Vanadium	µg/kg		NE	NE	24,000		31,000		42,000		43,000		38,000		36,000								
	Zinc	µg/kg		109,000	10,000,000	220,000		270,000		410,000		430,000		310,000		330,000								
PAH	Acenaphthene	µg/kg			20,000	1,000,000	450		130	J	13	U	370		11	U	11	U						
	Acenaphthylene	µg/kg			100,000	1,000,000	53		8.4	U	15	U	11	U	12	U	13	U						
	Anthracene	µg/kg			100,000	1,000,000	74		48	J	29	J	43	J	16	J	14	J						
	Benzo(a)anthracene	µg/kg			1,000	11,000	450		230		190		350		110		120	J						
	Benzo(a)pyrene	µg/kg			1,000	1,100	550		250		490		640		290		110	J						
	Benzo(b)fluoranthene	µg/kg			1,000	11,000	440		300		420		530		240	J	190	J						
	Benzo(ghi)perylene	µg/kg			100,000	1,000,000	290		240		290		14	J	160	J	270	J						
	Benzo(k)fluoranthene	µg/kg			800,000	110,000	200		73	J	120		13	J	80	J	55	J						
	Chrysene	µg/kg			1,000	110,000	410		190	J	180		490		130		86	J						
	Dibenzo(a,h)anthracene	µg/kg			330	1,100	95		210	J	83	J	400		100	J	21	J						
	Fluoranthene	µg/kg			100,000	1,000,000	960		880		810		1,400		400		590							
	Fluorene	µg/kg			30,000	1,000,000	76		22	J	5.1	U	240	J	4.1	U	50	J						
	Indeno(1,2,3-cd)pyrene	µg/kg			500	11,000	220		45	J	210		160	J	140	J	200	J						
	Naphthalene	µg/kg			12,000	1,000,000	110		5.8	U	23	J	8	U	8.3	U	8.7	U						
	Phenanthrene	µg/kg			100,000	1,000,000	340		200	J	180		280	J	120		100	J						
	Pyrene	µg/kg			100,000	1,000,000	760		370		470		980		230		190	J						

Table 7-1

Table 7. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Sediment												Station: SWSD009		Date Sampled: 05/19/2010		Matrix: Sediment		SWSD009		SWSD010		SWSD010		SWSD011		SWSD011	
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>4,6</sup>	NY State-Unrestricted Use <sup>1,7</sup>	NY State-Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.					
PCB	Aroclor-1016	µg/kg			100	25,000	5.8	U	6.3	U	11	U	8.8	U	9.3	U	9.6	U									
	Aroclor-1221	µg/kg			100	25,000	5.8	U	6.2	U	11	U	8.8	U	9.2	U	9.5	U									
	Aroclor-1232	µg/kg			100	25,000	8.7	U	9.4	U	17	U	13	U	14	U	14	U									
	Aroclor-1242	µg/kg			100	25,000	7.2	U	7.8	U	14	U	11	U	11	U	12	U									
	Aroclor-1248	µg/kg			100	25,000	6.8	U	7.3	U	13	U	10	U	11	U	11	U									
	Aroclor-1254	µg/kg			100	25,000	25	J	8.8	U	19	J	12	U	18	J	13	U									
	Aroclor-1260	µg/kg			100	25,000	5.7	U	11	J	11	U	8.6	U	9	U	9.3	U									
	Aroclor-1262	µg/kg			100	25,000	7.7	U	8.3	U	15	U	12	U	12	U	13	U									
Pesticide	4,4'-DDD	µg/kg			3.3	180,000	1	U	1.1	U	2.1	U	1.6	U	1.7	U	1.5	U									
	4,4'-DDE	µg/kg			3.3	120,000	0.39	U	0.41	U	0.76	U	0.58	U	0.62	U	0.54	U									
	4,4'-DDT	µg/kg			3.3	94,000	0.39	U	0.42	U	0.77	U	0.59	U	0.62	U	0.54	U									
	Aldrin	µg/kg			5	1,400	0.36	U	0.39	U	0.71	U	0.55	U	0.58	U	0.5	U									
	alpha-BHC	µg/kg			20	6,800	0.31	U	0.33	U	0.6	U	0.46	U	0.49	U	0.42	U									
	alpha-Chlordane	µg/kg			94	47,000	0.37	U	0.4	U	0.73	U	0.56	U	0.59	U	0.51	U									
	beta-BHC	µg/kg			36	14,000	0.37	U	0.4	U	0.73	U	0.56	U	0.59	U	0.52	U									
	delta-BHC	µg/kg			40	1,000,000	0.3	U	0.32	U	0.59	U	0.45	U	0.48	U	0.42	U									
	Dieldrin	µg/kg			5	2,800	0.35	U	0.38	U	0.7	U	0.53	U	0.56	U	0.49	U									
	Endosulfan I	µg/kg			24002 <sup>9</sup>	920000 <sup>5</sup>	0.35	U	0.38	U	0.69	U	0.53	U	0.56	U	0.49	U									
	Endosulfan II	µg/kg			24002 <sup>9</sup>	920000 <sup>9</sup>	0.45	U	0.48	U	0.88	U	0.67	U	0.71	U	0.62	U									
	Endosulfan sulfate	µg/kg			24002 <sup>9</sup>	920000 <sup>9</sup>	0.45	U	0.48	U	0.88	U	0.67	U	0.71	U	0.62	U									
	Endrin	µg/kg			14	410,000	0.49	U	0.52	U	0.96	U	0.74	U	0.78	U	0.68	U									
	Endrin aldehyde	µg/kg			NE	NE	0.42	U	0.45	U	0.82	U	0.63	U	0.67	U	0.58	U									
	Endrin ketone	µg/kg			NE	NE	0.41	U	0.44	U	0.8	U	0.62	U	0.65	U	0.57	U									
	gamma-BHC (Lindane)	µg/kg			100	23,000	0.35	U	0.37	U	0.68	U	0.52	U	0.55	U	0.48	U									
	gamma-Chlordane	µg/kg			NE	NE	0.47	U	0.5	U	0.92	U	0.71	U	0.75	U	0.65	U									
	Heptachlor	µg/kg			42	29,000	0.39	U	0.41	U	0.76	U	0.58	U	0.62	U	0.54	U									
	Heptachlor epoxide	µg/kg			NE	NE	0.37	U	0.4	U	0.74	U	0.57	U	0.6	U	0.52	U									
	Methoxychlor	µg/kg			NE	NE	0.51	U	0.55	U	1	U	0.77	U	0.81	U	0.7	U									
	Toxaphene	µg/kg			NE	NE	9.7	U	10	U	19	U	15	U	15	U	13	U									
VOC	1,1,1-Trichloroethane	µg/kg			680	1,000,000	0.32	U	17	U	0.63	U	24	U	0.51	U	26	U									
	1,1,2,2-Tetrachloroethane	µg/kg			NE	NE	0.6	U	32	U	1.2	U	45	U	0.96	U	48	U									
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg			NE	NE	0.59	U	32	U	1.2	U	45	U	0.95	U	47	U									
	1,1,2-Trichloroethane	µg/kg			NE	NE	0.41	U	22	U	0.81	U	31	U	0.66	U	33	U									
	1,1-Dichloroethane	µg/kg			270	480,000	0.41	U	22	U	0.8	U	31	U	0.65	U	32	U									
	1,1-Dichloroethene	µg/kg			330	1,000,000	0.42	U	22	U	0.82	U	31	U	0.67	U	33	U									
	1,2,3-Trichlorobenzene	µg/kg			NE	NE	0.58	U	31	U	1.1	U	44	U	0.94	U	47	U									
	1,2,4-Trichlorobenzene	µg/kg			NE	NE	0.76	U	40	U	1.5	U	57	U	1.2	U	61	U									
	1,2-Dibromo-3-chloropropane	µg/kg			NE	NE	1.7	U	89	U	3.3	U	130	U	2.7	U	130	U									
	1,2-Dichlorobenzene	µg/kg			1,100	1,000,000	0.47	U	25	U	0.92	U	35	U	0.75	U	37	U									
	1,2-Dichloroethane	µg/kg			20	60,000	0.36	U	19	U	0.71	U	27	U	0.58	U	29	U									
	1,2-Dichloropropane	µg/kg			NE	NE	0.53	U	28	U	1	U	40	U	0.85	U	42	U									
	1,3-Dichlorobenzene	µg/kg			2,400	560,000	0.42	U	22	U	0.82	U	31	U	0.67	U	33	U									
	1,4-Dichlorobenzene	µg/kg			1,800	250,000	0.37	U	20	U	0.73	U	28	U	0.59	U	30	U									
	2-Butanone <sup>10</sup>	µg/kg			120	1000000	1.3	U	70	U	5.6	J	100	U	9.8	J	110	U									
	2-Hexanone	µg/kg			NE	NE	0.66	U	35	U	1.3	U	50	U	1.1	U	53	U									
	4-Methyl-2-pentanone	µg/kg			NE	NE	0.51	U	27	U	1	U	38	U	0.82	U	41	U									
	Acetone <sup>10</sup>	µg/kg			50	1000000	11	J	56	U	19	J	80	U	45	J	460	J									
	Benzene	µg/kg			60	89,000	0.32	U	17	U	0.63	U	24	U	0.51	U	25	U									
	Bromochloromethane	µg/kg			NE	NE	0.59	U	31	U	1.2	U	44	U	0.94	U	47	U									
	Bromodichloromethane	µg/kg			NE	NE	0.31	U	16	U	0.61	U	23	U	0.5	U	25	U									
	Bromoform	µg/kg			NE	NE	0.41	U	22	U	0.81	U	31	U	0.66	U	33	U									
	Bromomethane	µg/kg			NE	NE	3.1	U	170	U	6.2	U	240	U	5.1	U	250	U									
	Carbon disulfide	µg/kg			NE	NE	0.89	U	47	U	2	J	67	U	1.4	U	71	U									
	Carbon tetrachloride	µg/kg			760	44,000	0.38	U	20	U	0.74	U	28	U	0.61	U	30	U									
	Chlorobenzene	µg/kg			1,100	1,000,000	0.34	U	18	U	0.66	U	25	U	0.54	U	27	U									
	Chloroethane	µg/kg			NE	NE	3.5	U	190	U	6.9	U	260	U	5.6	U	280	U									

Table 7-2

Table 7. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Sediment				Station: Date Sampled: Matrix:	SWSD009 05/19/2010 Sediment	SWSD009 11/01/2010 Sediment	SWSD010 05/18/2010 Sediment	SWSD010 10/28/2010 Sediment	SWSD011 05/17/2010 Sediment	SWSD011 10/25/2010 Sediment								
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>4,6</sup>	NY State- Unrestricted Use <sup>1,7</sup>	NY State- Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.		
VOC	Chloroform	µg/kg		370	700,000		0.32	U	17	U	0.63	U	24	U	0.51	U	26	U
(cont)	Chloromethane	µg/kg		NE	NE		0.44	U	23	U	0.86	U	33	U	0.7	U	35	U
	cis-1,2-Dichloroethene	µg/kg		250	1,000,000		0.42	U	22	U	0.82	U	31	U	0.67	U	33	U
	cis-1,3-Dichloropropene	µg/kg		NE	NE		0.28	U	15	U	0.55	U	21	U	0.45	U	22	U
	Dibromochloromethane	µg/kg		NE	NE		0.33	U	17	U	0.64	U	24	U	0.52	U	26	U
	Dichlorodifluoromethane	µg/kg		NE	NE		0.38	U	20	U	0.75	U	29	U	0.62	U	31	U
	Dichloromethane <sup>10</sup>	µg/kg		50	1,000,000		2.7	J	150	J	5	J	220	J	2.2	J	210	J
	Ethylbenzene	µg/kg		1,000	780,000		0.41	U	22	U	0.8	U	31	U	0.65	U	32	U
	Ethylene dibromide	µg/kg		NE	NE		0.45	U	24	U	0.89	U	34	U	0.73	U	36	U
	Isopropylbenzene	µg/kg		NE	NE		0.34	U	18	U	0.66	U	25	U	0.54	U	27	U
	Methyl tert-butyl ether	µg/kg		930	1,000,000		0.47	U	25	U	0.92	U	35	U	0.76	U	38	U
	Naphthalene	µg/kg		12,000	1,000,000		0.57	U	30	U	1.1	U	43	U	0.91	U	45	U
	Styrene	µg/kg		NE	NE		0.31	U	17	U	0.61	U	23	U	0.5	U	25	U
	Tetrachloroethene	µg/kg		1,300	300,000		0.46	U	24	U	0.9	U	34	U	0.73	U	37	U
	Toluene <sup>10</sup>	µg/kg		700	1,000,000		0.4	U	21	U	2.1	J	30	U	0.65	U	32	U
	trans-1,2-Dichloroethene	µg/kg		190	1,000,000		0.31	U	17	U	0.62	U	24	U	0.51	U	25	U
	trans-1,3-Dichloropropene	µg/kg		NE	NE		0.4	U	21	U	0.78	U	30	U	0.64	U	32	U
	Trichloroethene	µg/kg		470	400,000		0.75	U	40	U	1.5	U	56	U	1.2	U	60	U
	Trichlorofluoromethane	µg/kg		NE	NE		0.39	U	21	U	0.76	U	29	U	0.62	U	31	U
	Vinyl chloride	µg/kg		20	27,000		0.38	U	20	U	0.75	U	29	U	0.62	U	31	U
	Xylenes, Total	µg/kg		260	1,000,000		1.2	U	63	U	2.3	U	90	U	1.9	U	95	U

<sup>1</sup> Sediment comparison criteria: Values are provided for comparative purposes only. ARARs and media-specific cleanup goals will be evaluated independently and presented in future CERCLA decision documents that will be available for public comment.

<sup>2</sup> Applies to the sum of Ra-226 and Ra-228 concentrations

<sup>3</sup> Sum of uranium isotope concentrations (pCi/g).

<sup>4</sup> Above background concentrations in soil, averaged over the topmost 15-cm of soil.

<sup>5</sup> There are no standards for sediment; therefore, the USDOE residual (radium and thorium) and site-specific (uranium) surface soil cleanup guideline criteria are used as a basis for evaluating analytical results for sediment. If a mixture of the radionuclides is present in soil, then the sum of the ratios of the concentration of each isotope to the allowable limit must be less than one. This guideline applies for total uranium in natural isotopic abundance.

<sup>6</sup> These values represent superficial surface soil concentrations of individual radionuclides that would be deemed in compliance with the 25 mrem/y (0.25 mSv) unrestricted release dose limit in 10 CFR 20.1402. For radionuclides in a mixture, the "sum of fractions" rule applies.

<sup>7</sup> 6 NYCRR PART 375: NY State- Unrestricted Use Soil Cleanup Objectives Table 375-6.8(a)

<sup>8</sup> Total Mercury

<sup>9</sup> Sum of endosulfan I, endosulfan II, and endosulfan sulfate

<sup>10</sup> Common laboratory contaminant

J - Estimated value

U - Non-detect

R -Rejected

Table 7. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Sediment												Station: Date Sampled: Matrix:		SWSD021 05/18/2010 Sediment		SWSD021 10/28/2010 Sediment		SWSD022 05/18/2010 Sediment		SWSD022 10/28/2010 Sediment		SWSD023 05/19/2010 Sediment		SWSD023 11/01/2010 Sediment	
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>1,6</sup>	NY State- Unrestricted Use <sup>1,7</sup>	NY State- Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.					
RAD	Cesium-137	pCi/g	NE	11	NE	NE	N/A		0.06		N/A		0.045		N/A		0.008	U							
	Plutonium-238	pCi/g	NE	2.5	NE	NE	N/A		0.053	U	N/A		0	U	N/A		0.008	U							
	Plutonium-239/240	pCi/g	NE	2.3	NE	NE	N/A		0.021	U	N/A		-0.006	U	N/A		0.029	U							
	Radium-226	pCi/g	5 <sup>2</sup>	0.7	NE	NE	0.6363		1.24		0.8469		1.79		0.759		0.519								
	Radium-228	pCi/g	5 <sup>2</sup>	NA	NE	NE	1.3055	U	0.711		1.1346	U	0.878		1.1006		0.562								
	Total Radium (226&228)	pCi/g	5 <sup>2</sup>	NA	NE	NE	0.636		1.951		0.847		2.668		1.86		1.081								
	Strontium-90	pCi/g	NE	1.7	NE	NE	N/A		-1.16	U	N/A		-0.225	U	N/A		-0.433	U							
	Technetium-99	pCi/g	NE	19	NE	NE	N/A		0.4	U	N/A		-1.2	U	N/A		0.2	U							
	Thorium-228	pCi/g	5	4.7	NE	NE	1.511		0.828		1.533		1.12		1.152		0.774								
	Thorium-230	pCi/g	5	1.8	NE	NE	1.351		0.7		1.409		0.083	U	1.036		0.391	U							
	Thorium-232	pCi/g	5	1.1	NE	NE	1.525		1.11		1.322		0.776		1.126		0.72								
	Uranium-234	pCi/g	90 <sup>3</sup>	13	NE	NE	1.144		1.66		2.594		3		1.13		1.43								
	Uranium-235	pCi/g	90 <sup>3</sup>	8	NE	NE	0.0419	U	0.371		0.0697	U	0.27		0.0949	U	0.025	U							
	Uranium-238	pCi/g	90 <sup>3</sup>	14	NE	NE	1.215		1.43		2.569		2.02		0.8181		1.15								
	Total Uranium (234, 235 & 238)	pCi/g	90 <sup>3</sup>	NA	NE	NE	2.359		3.461		5.163		5.29		1.948		2.58								
Metal	Aluminum	µg/kg			NE	NE	34,000,000		33,000,000		35,000,000		25,000,000		22,000,000		11,000,000								
	Antimony	µg/kg			NE	NE	120		340	J	2,000		2,200		720		2,400								
	Arsenic	µg/kg		13,000	16,000		4,200		5,600		11,000		7,600		6,500		5,400								
	Barium	µg/kg		350,000	10,000,000	160,000	240,000		210,000		200,000		170,000		84,000										
	Beryllium	µg/kg		7,200	2,700,000	1,000	1,200	J	1,100		1,100	J	720		540	J									
	Boron	µg/kg		NE	NE	15,000		19,000	U	33,000		27,000		13,000		19,000	U								
	Cadmium	µg/kg		2,500	60,000	180	J	1,300		910		1,700		490		1,300									
	Calcium	µg/kg		NE	NE	48,000,000		53,000,000		37,000,000		41,000,000		63,000,000		34,000,000									
	Chromium	µg/kg		NE	NE	74,000		50,000		64,000		53,000		23,000		20,000									
	Cobalt	µg/kg		NE	NE	14,000		16,000		16,000		16,000		9,300		7,200									
	Copper	µg/kg		50,000	10,000,000	36,000		39,000		69,000		59,000		44,000		61,000									
	Iron	µg/kg		NE	NE	34,000,000		34,000,000		38,000,000		29,000,000		25,000,000		14,000,000									
	Lead	µg/kg		63,000	3,900,000	11,000		19,000		54,000		45,000		62,000		66,000									
	Lithium	µg/kg		NE	NE	47,000		37,000		40,000		34,000		22,000		14,000									
	Magnesium	µg/kg		NE	NE	14,000,000		13,000,000		15,000,000		13,000,000		21,000,000		13,000,000									
	Manganese	µg/kg		1,600,000	10,000,000	730,000		610,000		1,500,000		1,000,000		820,000		320,000									
	Mercury	µg/kg		180 <sup>8</sup>	5,700 <sup>8</sup>	28	J	29	J	190		95		130		130									
	Nickel	µg/kg		30,000	10,000,000	37,000		40,000		40,000		37,000		23,000		23,000									
	Potassium	µg/kg		NE	NE	4,800,000		5,800,000		5,100,000		4,700,000		3,200,000		2,100,000									
	Selenium	µg/kg		3,900	6,800,000	260	J	560	U	770	J	1,100	J	300	J	540	U								
	Silver	µg/kg		2,000	6,800,000	130		150	U	320		210	U	440		260									
	Sodium	µg/kg		NE	NE	280,000	U	260,000		370,000		330,000		320,000	J	230,000									
	Thallium	µg/kg		NE	NE	180	J	270	J	230	J	U		140	J	180	U								
	Vanadium	µg/kg		NE	NE	42,000		51,000		47,000		43,000		28,000		21,000									
	Zinc	µg/kg		109,000	10,000,000	85,000		110,000		320,000		270,000		290,000		400,000									
PAH	Acenaphthene	µg/kg			20,000	1,000,000	9.5	U	8.5	U	16	U	11	U	460		7.4	U							
	Acenaphthylene	µg/kg			100,000	1,000,000	11	U	240	J	18	U	13	U	8.7	U	190	J							
	Anthracene	µg/kg			100,000	1,000,000	3.3	J	6.4	J	30	J	13	J	44	J	27	J							
	Benzo(a)anthracene	µg/kg			1,000	11,000	20	J	65	J	200		98	J	320		190	J							
	Benzo(a)pyrene	µg/kg			1,000	1,100	200		170	J	550		200	J	670		370								
	Benzo(b)fluoranthene	µg/kg			1,000	11,000	61	J	90	J	450		140	J	480		300								
	Benzo(ghi)perylene	µg/kg			100,000	1,000,000	37	J	290		370		110	J	450		420								
	Benzo(k)fluoranthene	µg/kg			800,000	110,000	6.3	J	30	J	140		4.9	J	240		160	J							
	Chrysene	µg/kg			1,000	110,000	35	J	57	J	210		160	J	370		170	J							
	Dibenzo(a,h)anthracene	µg/kg			330	1,100	19	J	73	J	96	J	110	J	380		180	J							
	Fluoranthene	µg/kg			100,000	1,000,000	230		310		840		460		1,100		750								
	Fluorene	µg/kg			30,000	1,000,000	3.7	U	3.3	U	6.2	U	56	J	130		72	J							
	Indeno(1,2,3-cd)pyrene	µg/kg			500	11,000	19	J	68	J	270		13	J	340		430								
	Naphthalene	µg/kg			12,000	1,000,000	7.4	U	6.7	U	64	J	8.9	U	130		5.8	U							
	Phenanthrene	µg/kg			100,000	1,000,000	69		85	J	210		130	J	280		200	J							
	Pyrene	µg/kg			100,000	1,000,000	33	J	120	J	440		150	J	580		280								

Table 7-4

Table 7. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Sediment												Station: SWSD021		Date Sampled: 05/18/2010		Matrix: Sediment		SWSD021		SWSD022		SWSD022		SWSD023		SWSD023	
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>4,6</sup>	NY State-Unrestricted Use <sup>1,7</sup>	NY State-Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.							
PCB	Aroclor-1016	µg/kg			100	25,000	8.3	U	7.3	U	14	U	10	U	6.7	U	6.4	U									
	Aroclor-1221	µg/kg			100	25,000	8.2	U	7.3	U	14	U	10	U	6.7	U	6.4	U									
	Aroclor-1232	µg/kg			100	25,000	12	U	11	U	21	U	15	U	10	U	9.6	U									
	Aroclor-1242	µg/kg			100	25,000	10	U	9.1	U	17	U	13	U	8.3	U	7.9	U									
	Aroclor-1248	µg/kg			100	25,000	9.7	U	8.6	U	16	U	12	U	7.8	U	7.5	U									
	Aroclor-1254	µg/kg			100	25,000	12	U	10	U	19	J	14	U	9.4	U	9	U									
	Aroclor-1260	µg/kg			100	25,000	8	U	7.1	U	13	U	9.9	U	6.5	U	6.2	U									
	Aroclor-1262	µg/kg			100	25,000	11	U	9.7	U	18	U	13	U	8.8	U	8.5	U									
Pesticide	4,4'-DDD	µg/kg			3.3	180,000	1.5	U	1.3	U	2.5	U	1.8	U	1.2	U	1.1	U									
	4,4'-DDE	µg/kg			3.3	120,000	0.55	U	0.49	U	0.92	U	0.67	U	0.45	U	0.42	U									
	4,4'-DDT	µg/kg			3.3	94,000	0.55	U	0.49	U	0.93	U	0.68	U	0.45	U	0.43	U									
	Aldrin	µg/kg			5	1,400	0.52	U	0.46	U	0.86	U	0.63	U	0.42	U	0.4	U									
	alpha-BHC	µg/kg			20	6,800	0.43	U	0.39	U	0.73	U	0.53	U	0.35	U	0.33	U									
	alpha-Chlordane	µg/kg			94	47,000	0.52	U	0.47	U	0.88	U	0.64	U	0.43	U	0.4	U									
	beta-BHC	µg/kg			36	14,000	0.53	U	0.47	U	0.89	U	0.65	U	0.43	U	0.41	U									
	delta-BHC	µg/kg			40	1,000,000	0.43	U	1.4	J	0.71	U	0.52	U	0.35	U	0.33	U									
	Dieldrin	µg/kg			5	2,800	0.5	U	0.45	U	0.84	U	0.61	U	0.41	U	0.39	U									
	Endosulfan I	µg/kg			24002 <sup>9</sup>	920000 <sup>9</sup>	0.5	U	0.44	U	0.83	U	0.61	U	0.4	U	0.38	U									
	Endosulfan II	µg/kg			24002 <sup>9</sup>	920000 <sup>9</sup>	0.63	U	0.57	U	1.1	U	0.77	U	0.51	U	0.49	U									
	Endosulfan sulfate	µg/kg			24002 <sup>9</sup>	920000 <sup>9</sup>	0.63	U	0.57	U	1.1	U	0.77	U	0.51	U	0.49	U									
	Endrin	µg/kg			14	410,000	0.69	U	0.62	U	1.2	U	0.85	U	0.56	U	0.53	U									
	Endrin aldehyde	µg/kg			NE	NE	0.6	U	0.53	U	1	U	0.73	U	0.48	U	0.46	U									
	Endrin ketone	µg/kg			NE	NE	0.58	U	0.52	U	0.97	U	0.71	U	0.47	U	0.45	U									
	gamma-BHC (Lindane)	µg/kg			100	23,000	0.49	U	0.44	U	0.82	U	0.6	U	0.4	U	0.38	U									
	gamma-Chlordane	µg/kg			NE	NE	0.67	U	0.59	U	1.1	U	0.81	U	0.54	U	0.51	U									
	Heptachlor	µg/kg			42	29,000	0.55	U	0.49	U	0.92	U	0.67	U	0.45	U	0.42	U									
	Heptachlor epoxide	µg/kg			NE	NE	0.53	U	0.48	U	0.89	U	0.65	U	0.43	U	0.41	U									
	Methoxychlor	µg/kg			NE	NE	0.72	U	0.64	U	1.2	U	0.88	U	0.59	U	0.55	U									
	Toxaphene	µg/kg			NE	NE	14	U	12	U	23	U	17	U	11	U	11	U									
VOC	1,1,1-Trichloroethane	µg/kg			680	1,000,000	0.46	U	20	U	0.75	U	27	U	0.37	U	17	U									
	1,1,2,2-Tetrachloroethane	µg/kg			NE	NE	0.86	U	37	U	1.4	U	51	U	0.7	U	33	U									
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg			NE	NE	0.85	U	37	U	1.4	U	51	U	0.69	U	32	U									
	1,1,2-Trichloroethane	µg/kg			NE	NE	0.59	U	26	U	0.97	U	35	U	0.48	U	22	U									
	1,1-Dichloroethane	µg/kg			270	480,000	0.58	U	25	U	0.95	U	35	U	0.47	U	22	U									
	1,1-Dichloroethene	µg/kg			330	1,000,000	0.6	U	26	U	0.98	U	36	U	0.48	U	23	U									
	1,2,3-Trichlorobenzene	µg/kg			NE	NE	0.84	U	36	U	1.4	U	50	U	0.68	U	32	U									
	1,2,4-Trichlorobenzene	µg/kg			NE	NE	1.1	U	47	U	1.8	U	65	U	0.88	U	41	U									
	1,2-Dibromo-3-chloropropane	µg/kg			NE	NE	2.4	U	100	U	3.9	U	140	U	1.9	U	91	U									
	1,2-Dichlorobenzene	µg/kg			1,100	1,000,000	0.67	U	29	U	1.1	U	40	U	0.55	U	26	U									
	1,2-Dichloroethane	µg/kg			20	60,000	0.52	U	22	U	0.84	U	31	U	0.42	U	20	U									
	1,2-Dichloropropane	µg/kg			NE	NE	0.76	U	33	U	1.2	U	45	U	0.62	U	29	U									
	1,3-Dichlorobenzene	µg/kg			2,400	560,000	0.6	U	26	U	0.98	U	36	U	0.48	U	23	U									
	1,4-Dichlorobenzene	µg/kg			1,800	250,000	0.53	U	23	U	0.87	U	32	U	0.43	U	20	U									
	2-Butanone <sup>10</sup>	µg/kg			120	1000000	24		83	U	9.1	J	110	U	9.9	J	72	U									
	2-Hexanone	µg/kg			NE	NE	0.95	U	41	U	1.6	U	57	U	0.77	U	36	U									
	4-Methyl-2-pentanone	µg/kg			NE	NE	0.73	U	32	U	1.2	U	44	U	0.6	U	28	U									
	Acetone <sup>10</sup>	µg/kg			50	1000000	140		66	U	31	J	91	U	170	J	300	J									
	Benzene	µg/kg			60	89,000	0.46	U	20	U	0.75	U	27	U	0.37	U	17	U									
	Bromochloromethane	µg/kg			NE	NE	0.84	U	37	U	1.4	U	50	U	0.68	U	32	U									
	Bromodichloromethane	µg/kg			NE	NE	0.44	U	19	U	0.73	U	26	U	0.36	U	17	U									
	Bromoform	µg/kg			NE	NE	0.59	U	26	U	0.96	U	35	U	0.48	U	22	U									
	Bromomethane	µg/kg			NE	NE	4.5	U	200	U	7.4	U	270	U	3.7	U	170	U									
	Carbon disulfide	µg/kg			NE	NE	1.3	U	55	U	3.5	J	76	U	3.5	J	48	U									
	Carbon tetrachloride	µg/kg			760	44,000	0.54	U	24	U	0.89	U	32	U	0.44	U	21	U									
	Chlorobenzene	µg/kg			1,100	1,000,000	0.48	U	21	U	0.79	U	29	U	0.39	U	18	U									
	Chloroethane	µg/kg			NE	NE	5	U	220	U	8.2	U	300	U	4.1	U	190	U									

Table 7-5

Table 7. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Sediment				Station: Date Sampled: Matrix:	SWSD021 05/18/2010 Sediment	SWSD021 10/28/2010 Sediment	SWSD022 05/18/2010 Sediment	SWSD022 10/28/2010 Sediment	SWSD023 05/19/2010 Sediment	SWSD023 11/01/2010 Sediment							
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>4,6</sup>	NY State- Unrestricted Use <sup>1,7</sup>	NY State- Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	
VOC	Chloroform	µg/kg		370	700,000	0.46	U	20	U	0.75	U	27	U	0.37	U	17	U
(cont)	Chloromethane	µg/kg		NE	NE	0.63	U	27	U	1	U	38	U	0.51	U	24	U
	cis-1,2-Dichloroethene	µg/kg		250	1,000,000	0.6	U	26	U	3.2	J	36	U	0.49	U	23	U
	cis-1,3-Dichloropropene	µg/kg		NE	NE	0.4	U	17	U	0.66	U	24	U	0.33	U	15	U
	Dibromochloromethane	µg/kg		NE	NE	0.47	U	20	U	0.77	U	28	U	0.38	U	18	U
	Dichlorodifluoromethane	µg/kg		NE	NE	0.55	U	24	U	0.9	U	33	U	0.45	U	21	U
	Dichloromethane <sup>10</sup>	µg/kg		50	1,000,000	3.3	J	190	J	5.4	J	250	J	2.9	J	140	J
	Ethylbenzene	µg/kg		1,000	780,000	0.58	U	25	U	0.95	U	35	U	0.47	U	22	U
	Ethylene dibromide	µg/kg		NE	NE	0.65	U	28	U	1.1	U	39	U	0.53	U	25	U
	Isopropylbenzene	µg/kg		NE	NE	0.48	U	21	U	0.79	U	29	U	0.39	U	18	U
	Methyl tert-butyl ether	µg/kg		930	1,000,000	0.68	U	29	U	1.1	U	40	U	0.55	U	26	U
	Naphthalene	µg/kg		12,000	1,000,000	0.81	U	35	U	1.3	U	49	U	0.66	U	31	U
	Styrene	µg/kg		NE	NE	0.45	U	19	U	0.73	U	27	U	0.36	U	17	U
	Tetrachloroethene	µg/kg		1,300	300,000	0.66	U	29	U	1.1	U	39	U	0.53	U	25	U
	Toluene <sup>10</sup>	µg/kg		700	1,000,000	190		25	U	0.95	U	35	U	52		22	U
	trans-1,2-Dichloroethene	µg/kg		190	1,000,000	0.45	U	20	U	0.74	U	27	U	0.37	U	17	U
	trans-1,3-Dichloropropene	µg/kg		NE	NE	0.57	U	25	U	0.93	U	34	U	0.46	U	22	U
	Trichloroethene	µg/kg		470	400,000	1.1	U	47	U	2.6	J	64	U	0.87	U	41	U
	Trichlorofluoromethane	µg/kg		NE	NE	0.56	U	24	U	0.91	U	33	U	0.45	U	21	U
	Vinyl chloride	µg/kg		20	27,000	0.55	U	24	U	0.9	U	33	U	0.45	U	21	U
	Xylenes, Total	µg/kg		260	1,000,000	1.7	U	75	U	2.8	U	100	U	1.4	U	65	U

<sup>1</sup> Sediment comparison criteria: Values are provided for comparative purposes only. ARARs and media-specific cleanup goals will be evaluated independently and presented in future CERCLA decision documents that will be available for public comment.

<sup>2</sup> Applies to the sum of Ra-226 and Ra-228 concentrations

<sup>3</sup> Sum of uranium isotope concentrations (pCi/g).

<sup>4</sup> Above background concentrations in soil, averaged over the topmost 15-cm of soil.

<sup>5</sup> There are no standards for sediment; therefore, the USDOE residual (radium and thorium) and site-specific (uranium) surface soil cleanup guideline criteria are used as a basis for evaluating analytical results for sediment. If a mixture of the radionuclides is present in soil, then the sum of the ratios of the concentration of each isotope to the allowable limit must be less than one. This guideline applies for total uranium in natural isotopic abundance.

<sup>6</sup> These values represent superficial surface soil concentrations of individual radionuclides that would be deemed in compliance with the 25 mrem/y (0.25 mSv) unrestricted release dose limit in 10 CFR 20.1402. For radionuclides in a mixture, the "sum of fractions" rule applies.

<sup>7</sup> 6 NYCRR PART 375: NY State- Unrestricted Use Soil Cleanup Objectives Table 375-6.8(a)

<sup>8</sup> Total Mercury

<sup>9</sup> Sum of endosulfan I, endosulfan II, and endosulfan sulfate

<sup>10</sup> Common laboratory contaminant

J - Estimated value

U - Non-detect

R -Rejected

Table 7. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Sediment										Station: SWSD024		SWSD024		SWSD025		WDD1			
										Date Sampled: 05/19/2010	Matrix: Sediment	Date Sampled: 11/01/2010	Matrix: Sediment	Date Sampled: 10/26/2010	Matrix: Sediment	Date Sampled: 05/18/2010	Matrix: Sediment	Date Sampled: 11/01/2010	Matrix: Sediment
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>1,6</sup>	NY State-Unrestricted Use <sup>1,7</sup>	NY State-Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	
RAD	Cesium-137	pCi/g	NE	11	NE	NE	N/A		0.013	U	0.027	U	N/A		0.078				
	Plutonium-238	pCi/g	NE	2.5	NE	NE	N/A		0.072	U	0.007	U	N/A		0.074	U			
	Plutonium-239/240	pCi/g	NE	2.3	NE	NE	N/A		0.053	U	0.011	U	N/A		0.022	U			
	Radium-226	pCi/g	5 <sup>2</sup>	0.7	NE	NE	1,0396		1.06		1.44		1.56		1.72				
	Radium-228	pCi/g	5 <sup>2</sup>	NA	NE	NE	1,466		1.04		1.18		1,4104		0.887				
	Total Radium (226&228)	pCi/g	5 <sup>2</sup>	NA	NE	NE	2,506		2.1		2.62		2.97		2,607				
	Strontium-90	pCi/g	NE	1.7	NE	NE	N/A		-0.944	U	-1.19	U	N/A		0.193	U			
	Technetium-99	pCi/g	NE	19	NE	NE	N/A		-1	U	-1	U	N/A		-0.6	U			
	Thorium-228	pCi/g	5	4.7	NE	NE	1,523		1.12		1.07		1,174		0.5	J			
	Thorium-230	pCi/g	5	1.8	NE	NE	1,06		0.89		-0.291	U	1,005		-0.332	U			
	Thorium-232	pCi/g	5	1.1	NE	NE	1,323		1.15		0.762		1.01		0.286				
	Uranium-234	pCi/g	90 <sup>3</sup>	13	NE	NE	2,271		2.22		1.71		1,323		1.33				
	Uranium-235	pCi/g	90 <sup>3</sup>	8	NE	NE	0.1419		0.17		0.087		0.0546	U	0.174				
	Uranium-238	pCi/g	90 <sup>3</sup>	14	NE	NE	2,119		2.07		1.76		1,362		1.04				
	Total Uranium (234, 235 & 238)	pCi/g	90 <sup>3</sup>	NA	NE	NE	4,532		4.46		3,557		2,685		2,544				
Metal	Aluminum	µg/kg			NE	NE	29,000,000		27,000,000		25,000,000		46,000,000		31,000,000				
	Antimony	µg/kg			NE	NE	480		1,500		2,700		400		400	J			
	Arsenic	µg/kg			13,000	16,000	7,700		9,300		10,000		4,400		4,800				
	Barium	µg/kg			350,000	10,000,000	160,000		160,000		180,000		210,000		240,000				
	Beryllium	µg/kg			7,200	2,700,000	1,100		1,100	J	1,000	J	1,400		1,300	J			
	Boron	µg/kg			NE	NE	35,000		26,000	U	33,000	U	27,000		32,000	U			
	Cadmium	µg/kg			2,500	60,000	1,000		1,500		1,900		390		1,300				
	Calcium	µg/kg			NE	NE	30,000,000		27,000,000		51,000,000		38,000,000		34,000,000				
	Chromium	µg/kg			NE	NE	28,000		34,000		61,000		53,000		44,000				
	Cobalt	µg/kg			NE	NE	13,000		16,000		17,000		19,000		16,000				
	Copper	µg/kg			50,000	10,000,000	59,000		65,000		68,000		53,000		54,000				
	Iron	µg/kg			NE	NE	31,000,000		31,000,000		36,000,000		43,000,000		32,000,000				
	Lead	µg/kg			63,000	3,900,000	30,000		37,000		53,000		20,000		27,000				
	Lithium	µg/kg			NE	NE	32,000		35,000		36,000		65,000		38,000				
	Magnesium	µg/kg			NE	NE	12,000,000		15,000,000		14,000,000		18,000,000		12,000,000				
	Manganese	µg/kg			1,600,000	10,000,000	700,000		540,000		1,300,000		1,300,000		910,000				
	Mercury	µg/kg			180 <sup>8</sup>	5,700 <sup>8</sup>	190		150		160		71	J	64	J			
	Nickel	µg/kg			30,000	10,000,000	33,000		38,000		41,000		46,000		39,000				
	Potassium	µg/kg			NE	NE	4,000,000		4,600,000		4,900,000		8,100,000		7,100,000				
	Selenium	µg/kg			3,900	6,800,000	1,100		850	J	1,100	J	850		920	U			
	Silver	µg/kg			2,000	6,800,000	230		210	U	200	U	210		210	U			
	Sodium	µg/kg			NE	NE	200,000		270,000		560,000		370,000	U	450,000				
	Thallium	µg/kg			NE	NE	230	J	330	J	320	U	270	J	310	U			
	Vanadium	µg/kg			NE	NE	38,000		44,000		45,000		56,000		51,000				
	Zinc	µg/kg			109,000	10,000,000	430,000		420,000		340,000		250,000		240,000				
PAH	Acenaphthene	µg/kg			20,000	1,000,000	12	U	360		14	U	12	U	12	U			
	Acenaphthylene	µg/kg			100,000	1,000,000	13	U	200	J	16	U	14	U	590				
	Anthracene	µg/kg			100,000	1,000,000	27	J	25	J	28	J	5.6	J	3.5	J			
	Benzo(a)anthracene	µg/kg			1,000	11,000	120		120	J	170	J	24	J	35	J			
	Benzo(a)pyrene	µg/kg			1,000	1,100	320		110	J	190	J	67	J	70	J			
	Benzo(b)fluoranthene	µg/kg			1,000	11,000	230		170	J	250	J	72	J	56	J			
	Benzo(ghi)perylene	µg/kg			100,000	1,000,000	200		590		700		11	U	350	J			
	Benzo(k)fluoranthene	µg/kg			800,000	110,000	69	J	32	J	7.4	J	2.4	J	19	J			
	Chrysene	µg/kg			1,000	110,000	140		170	J	140	J	36	J	45	J			
	Dibenzo(a,h)anthracene	µg/kg			330	1,100	180		170	J	220	J	20	U	40	J			
	Fluoranthene	µg/kg			100,000	1,000,000	820		540		870		180		260	J			
	Fluorene	µg/kg			30,000	1,000,000	36	J	4.2	U	120	J	4.7	U	4.8	U			
	Indeno(1,2,3-cd)pyrene	µg/kg			500	11,000	140		37	J	90	J	5.2	U	29	J			
	Naphthalene	µg/kg			12,000	1,000,000	9.3	U	8.4	U	11	U	9.5	U	9.6	U			
	Phenanthrene	µg/kg			100,000	1,000,000	160		110	J	150	J	71	J	62	J			
	Pyrene	µg/kg			100,000	1,000,000	260		120	J	280	J	170		99	J			

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Table 7. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Sediment											Station: SWSD024		Date Sampled: 05/19/2010		Matrix: Sediment		SWSD024		SWSD025		WDD1		WDD1	
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>4,6</sup>	NY State-Unrestricted Use <sup>1,7</sup>	NY State-Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.				
PCB	Aroclor-1016	µg/kg			100	25,000	10	U	9.4	U	12	U	11	U	10	U								
	Aroclor-1221	µg/kg			100	25,000	10	U	9.3	U	12	U	11	U	10	U								
	Aroclor-1232	µg/kg			100	25,000	15	U	14	U	18	U	16	U	16	U								
	Aroclor-1242	µg/kg			100	25,000	13	U	12	U	15	U	13	U	13	U								
	Aroclor-1248	µg/kg			100	25,000	12	U	11	U	14	U	12	U	12	U								
	Aroclor-1254	µg/kg			100	25,000	16	J	13	U	17	U	15	U	15	U								
	Aroclor-1260	µg/kg			100	25,000	10	U	9.1	U	12	U	10	U	10	U								
	Aroclor-1262	µg/kg			100	25,000	14	U	12	U	16	U	14	U	14	U								
Pesticide	4,4'-DDD	µg/kg			3.3	180,000	1.9	U	1.7	U	2.2	U	1.9	U	1.9	U								
	4,4'-DDE	µg/kg			3.3	120,000	0.69	U	0.63	U	0.8	U	0.7	U	0.7	U								
	4,4'-DDT	µg/kg			3.3	94,000	0.7	U	0.63	U	0.8	U	0.71	U	0.71	U								
	Aldrin	µg/kg			5	1,400	0.65	U	0.59	U	0.75	U	0.66	U	0.66	U								
	alpha-BHC	µg/kg			20	6,800	0.54	U	0.49	U	0.63	U	0.55	U	0.55	U								
	alpha-Chlordane	µg/kg			94	47,000	0.66	U	0.6	U	0.76	U	0.67	U	0.67	U								
	beta-BHC	µg/kg			36	14,000	0.66	U	0.6	U	0.77	U	0.68	U	0.68	U								
	delta-BHC	µg/kg			40	1,000,000	0.53	U	0.48	U	0.62	U	0.54	U	0.54	U								
	Dieldrin	µg/kg			5	2,800	0.63	U	0.57	U	0.73	U	0.64	U	0.64	U								
	Endosulfan I	µg/kg			24002 <sup>9</sup>	920000 <sup>9</sup>	0.62	U	0.57	U	0.72	U	0.64	U	0.64	U								
	Endosulfan II	µg/kg			24002 <sup>9</sup>	920000 <sup>9</sup>	0.8	U	0.72	U	0.92	U	0.81	U	0.81	U								
	Endosulfan sulfate	µg/kg			24002 <sup>9</sup>	920000 <sup>9</sup>	0.8	U	0.72	U	0.92	U	0.81	U	0.81	U								
	Endrin	µg/kg			14	410,000	0.87	U	0.79	U	1	U	0.89	U	0.89	U								
	Endrin aldehyde	µg/kg			NE	NE	0.75	U	0.68	U	0.86	U	0.76	U	0.76	U								
	Endrin ketone	µg/kg			NE	NE	0.73	U	0.66	U	0.84	U	0.74	U	0.74	U								
	gamma-BHC (Lindane)	µg/kg			100	23,000	0.62	U	0.56	U	0.71	U	0.63	U	0.63	U								
	gamma-Chlordane	µg/kg			NE	NE	0.84	U	0.76	U	0.97	U	0.85	U	0.85	U								
	Heptachlor	µg/kg			42	29,000	0.69	U	0.63	U	0.8	U	0.7	U	0.7	U								
	Heptachlor epoxide	µg/kg			NE	NE	0.67	U	0.61	U	0.77	U	0.68	U	0.68	U								
	Methoxychlor	µg/kg			NE	NE	0.91	U	0.82	U	1	U	0.92	U	0.92	U								
	Toxaphene	µg/kg			NE	NE	17	U	16	U	20	U	18	U	18	U								
	VOC	1,1,1-Trichloroethane	µg/kg		680	1,000,000	0.58	U	26	U	33	U	0.58	U	29	U								
VOC	1,1,2,2-Tetrachloroethane	µg/kg			NE	NE	1.1	U	48	U	61	U	1.1	U	53	U								
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg			NE	NE	1.1	U	47	U	61	U	1.1	U	53	U								
	1,1,2-Trichloroethane	µg/kg			NE	NE	0.74	U	33	U	42	U	0.74	U	37	U								
	1,1-Dichloroethane	µg/kg			270	480,000	0.73	U	32	U	42	U	0.73	U	36	U								
	1,1-Dichloroethene	µg/kg			330	1,000,000	0.75	U	33	U	43	U	0.75	U	37	U								
	1,2,3-Trichlorobenzene	µg/kg			NE	NE	1.1	U	47	U	60	U	1	U	52	U								
	1,2,4-Trichlorobenzene	µg/kg			NE	NE	1.4	U	61	U	78	U	1.4	U	67	U								
	1,2-Dibromo-3-chloropropane	µg/kg			NE	NE	3	U	130	U	170	U	3	U	150	U								
	1,2-Dichlorobenzene	µg/kg			1,100	1,000,000	0.84	U	37	U	48	U	0.84	U	42	U								
	1,2-Dichloroethane	µg/kg			20	60,000	0.65	U	29	U	37	U	0.65	U	32	U								
	1,2-Dichloropropane	µg/kg			NE	NE	0.95	U	42	U	54	U	0.95	U	47	U								
	1,3-Dichlorobenzene	µg/kg			2,400	560,000	0.75	U	33	U	43	U	0.75	U	37	U								
	1,4-Dichlorobenzene	µg/kg			1,800	250,000	0.66	U	29	U	38	U	0.66	U	33	U								
	2-Butanone <sup>10</sup>	µg/kg			120	1000000	28		110	U	140	U	9.1	J	120	U								
VOC	2-Hexanone	µg/kg			NE	NE	1.2	U	53	U	68	U	1.2	U	59	U								
	4-Methyl-2-pentanone	µg/kg			NE	NE	0.92	U	41	U	52	U	0.92	U	46	U								
	Acetone <sup>10</sup>	µg/kg			50	1000000	360	J	85	U	110	U	23	J	94	U								
	Benzene	µg/kg			60	89,000	0.57	U	25	U	33	U	0.57	U	28	U								
	Bromochloromethane	µg/kg			NE	NE	1.1	U	47	U	60	U	1.1	U	52	U								
	Bromodichloromethane	µg/kg			NE	NE	0.55	U	25	U	32	U	0.55	U	27	U								
	Bromoform	µg/kg			NE	NE	0.74	U	33	U	42	U	0.74	U	37	U								
	Bromomethane	µg/kg			NE	NE	5.7	U	250	U	320	U	5.7	U	280	U								
	Carbon disulfide	µg/kg			NE	NE	1.6	U	71	U	91	U	1.6	U	79	U								
	Carbon tetrachloride	µg/kg			760	44,000	0.68	U	30	U	39	U	0.68	U	34	U								
	Chlorobenzene	µg/kg			1,100	1,000,000	0.6	U	27	U	34	U	0.6	U	30	U								
	Chloroethane	µg/kg			NE	NE	6.3	U	280	U	360	U	6.3	U	310	U								

Table 7-8

**Table 7.**  
**NFSS - 2010 Spring and FALL**  
**Environmental Surveillance Program Findings for Sediment**

				Station:	SWSD024	SWSD024	SWSD025	WDD1	WDD1							
				Date Sampled:	05/19/2010	11/01/2010	10/26/2010	05/18/2010	11/01/2010							
				Matrix:	Sediment	Sediment	Sediment	Sediment	Sediment							
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>4,6</sup>	NY State-Unrestricted Use <sup>1,7</sup>	NY State-Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC (cont)	Chloroform	µg/kg		370	700,000	0.58 U	26 U	33 U	0.58 U	29 U						
	Chloromethane	µg/kg		NE	NE	0.79 U	35 U	45 U	0.79 U	39 U						
	cis-1,2-Dichloroethene	µg/kg		250	1,000,000	0.75 U	33 U	43 U	0.75 U	37 U						
	cis-1,3-Dichloropropene	µg/kg		NE	NE	0.5 U	22 U	29 U	0.5 U	25 U						
	Dibromochloromethane	µg/kg		NE	NE	0.59 U	26 U	33 U	0.59 U	29 U						
	Dichlorodifluoromethane	µg/kg		NE	NE	0.69 U	31 U	39 U	0.69 U	34 U						
	Dichloromethane <sup>10</sup>	µg/kg		50	1,000,000	4.4 J	190 J	320 J	4.4 J	250 J						
	Ethylbenzene	µg/kg		1,000	780,000	0.73 U	32 U	42 U	0.73 U	36 U						
	Ethylene dibromide	µg/kg		NE	NE	0.81 U	36 U	46 U	0.81 U	40 U						
	Isopropylbenzene	µg/kg		NE	NE	0.6 U	27 U	34 U	0.6 U	30 U						
	Methyl tert-butyl ether	µg/kg		930	1,000,000	0.85 U	38 U	48 U	0.85 U	42 U						
	Naphthalene	µg/kg		12,000	1,000,000	1 U	45 U	58 U	1 U	50 U						
	Styrene	µg/kg		NE	NE	0.56 U	25 U	32 U	0.56 U	28 U						
	Tetrachloroethene	µg/kg		1,300	300,000	0.82 U	36 U	47 U	0.82 U	41 U						
	Toluene <sup>10</sup>	µg/kg		700	1,000,000	0.73 U	32 U	74 J	0.73 U	36 U						
	trans-1,2-Dichloroethene	µg/kg		190	1,000,000	0.57 U	25 U	32 U	0.56 U	28 U						
	trans-1,3-Dichloropropene	µg/kg		NE	NE	0.71 U	32 U	41 U	0.71 U	35 U						
	Trichloroethene	µg/kg		470	400,000	1.3 U	60 U	77 U	1.3 U	67 U						
	Trichlorofluoromethane	µg/kg		NE	NE	0.7 U	31 U	40 U	0.7 U	35 U						
	Vinyl chloride	µg/kg		20	27,000	0.69 U	31 U	39 U	0.69 U	34 U						
	Xylenes, Total	µg/kg		260	1,000,000	2.1 U	95 U	120 U	2.1 U	110 U						

<sup>1</sup> Sediment comparison criteria: Values are provided for comparative purposes only. ARARs and media-specific cleanup goals will be evaluated independently and presented in future CERCLA decision documents that will be available for public comment.

<sup>2</sup> Applies to the sum of Ra-226 and Ra-228 concentrations

<sup>3</sup> Sum of uranium isotope concentrations (pCi/g).

<sup>4</sup> Above background concentrations in soil, averaged over the topmost 15-cm of soil.

<sup>5</sup> There are no standards for sediment; therefore, the USDOE residual (radium and thorium) and site-specific (uranium) surface soil cleanup guideline criteria are used as a basis for evaluating analytical results for sediment. If a mixture of the radionuclides is present in soil, then the sum of the ratios of the concentration of each isotope to the allowable limit must be less than one. This guideline applies for total uranium in natural isotopic abundance.

<sup>6</sup> These values represent superficial surface soil concentrations of individual radionuclides that would be deemed in compliance with the 25 mrem/y (0.25 mSv) unrestricted release dose limit in 10 CFR 20.1402. For radionuclides in a mixture, the "sum of fractions" rule applies.

<sup>7</sup> 6 NYCRR PART 375: NY State- Unrestricted Use Soil Cleanup Objectives Table 375-6.8(a)

<sup>8</sup> Total Mercury

<sup>9</sup> Sum of endosulfan I, endosulfan II, and endosulfan sulfate

<sup>10</sup> Common laboratory contaminant

J - Estimated value

U - Non-detect

R -Rejected

**Table 7.**  
**NFSS - 2010 Spring and FALL**  
**Environmental Surveillance Program Findings for Sediment**

				Station:	WDD2		WDD2		WDD3		WDD3			
				Date Sampled:	05/17/2010	Sediment	10/27/2010	Sediment	05/17/2010	Sediment	10/26/2010	Sediment		
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>1,6</sup>	NY State-Unrestricted Use <sup>1,7</sup>	NY State-Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/g	NE	11	NE	NE	N/A		0.035	U	N/A		0.027	U
	Plutonium-238	pCi/g	NE	2.5	NE	NE	N/A		0.015	U	N/A		0.055	U
	Plutonium-239/240	pCi/g	NE	2.3	NE	NE	N/A		0.018	U	N/A		-0.005	U
	Radium-226	pCi/g	5 <sup>2</sup>	0.7	NE	NE	0.7157		1.01		0.819		1.55	
	Radium-228	pCi/g	5 <sup>2</sup>	NA	NE	NE	0.6638	U	0.54		2.6609		0.431	
	Total Radium (226&228)	pCi/g	5 <sup>2</sup>	NA	NE	NE	0.716		1.55		3.48		1.981	
	Strontium-90	pCi/g	NE	1.7	NE	NE	N/A		-0.741	U	N/A		-0.129	U
	Technetium-99	pCi/g	NE	19	NE	NE	N/A		-1.1	U	N/A		-0.4	U
	Thorium-228	pCi/g	5	4.7	NE	NE	0.8961		0.724		1.033		0.955	
	Thorium-230	pCi/g	5	1.8	NE	NE	0.9402		0.911		1.112		0.156	U
	Thorium-232	pCi/g	5	1.1	NE	NE	0.8755		0.933		1.058		1.27	
	Uranium-234	pCi/g	90 <sup>3</sup>	13	NE	NE	1.152		1.02		1.44		1.11	
	Uranium-235	pCi/g	90 <sup>3</sup>	8	NE	NE	0.1314		0.043	U	0.0908		0.062	U
	Uranium-238	pCi/g	90 <sup>3</sup>	14	NE	NE	1.24		0.945		1.553		0.757	
	Total Uranium (234, 235 & 238)	pCi/g	90 <sup>3</sup>	NA	NE	NE	2.523		1.965		3.084		1.867	
Metal	Aluminum	µg/kg			NE	NE	16,000,000		15,000,000		25,000,000		21,000,000	
	Antimony	µg/kg			NE	NE	100	U	280	J	230		210	J
	Arsenic	µg/kg		13,000	16,000		3,900		3,100		4,000		5,600	
	Barium	µg/kg		350,000	10,000,000	94,000		110,000		160,000		120,000		
	Beryllium	µg/kg		7,200	2,700,000	510		610	J	830		880	J	
	Boron	µg/kg		NE	NE	13,000		15,000	U	21,000	J	16,000	U	
	Cadmium	µg/kg		2,500	60,000	280		790		140	U	1,000		
	Calcium	µg/kg		NE	NE	19,000,000		30,000,000		12,000,000		69,000,000		
	Chromium	µg/kg		NE	NE	19,000		22,000		26,000		26,000		
	Cobalt	µg/kg		NE	NE	7,300		8,600		10,000		13,000		
	Copper	µg/kg		50,000	10,000,000	29,000		27,000		31,000		25,000		
	Iron	µg/kg		NE	NE	19,000,000		18,000,000		24,000,000		29,000,000		
	Lead	µg/kg		63,000	3,900,000	9,000		12,000		15,000		11,000		
	Lithium	µg/kg		NE	NE	19,000		22,000		30,000		29,000		
	Magnesium	µg/kg		NE	NE	5,800,000		6,500,000		7,600,000		11,000,000		
	Manganese	µg/kg		1,600,000	10,000,000	750,000		660,000		1,800,000		1,000,000		
	Mercury	µg/kg		180 <sup>8</sup>	5,700 <sup>8</sup>	29	J	31	J	67	J	53	J	
	Nickel	µg/kg		30,000	10,000,000	18,000		20,000		23,000		30,000		
	Potassium	µg/kg		NE	NE	2,500,000		2,800,000		4,300,000		3,600,000		
	Selenium	µg/kg		3,900	6,800,000	340	J	540	J	910	J	610	J	
	Silver	µg/kg		2,000	6,800,000	250		100	U	130		110	U	
	Sodium	µg/kg		NE	NE	120,000		190,000		230,000	J	230,000		
	Thallium	µg/kg		NE	NE	93	J	150	U	180	U	160	U	
	Vanadium	µg/kg		NE	NE	21,000		24,000		31,000		33,000		
	Zinc	µg/kg		109,000	10,000,000	160,000		160,000		140,000		110,000		
PAH	Acenaphthene	µg/kg		20,000	1,000,000	6.7	U	6.3	U	15	U	6.7	U	
	Acenaphthylene	µg/kg		100,000	1,000,000	7.5	U	110	J	17	U	130	J	
	Anthracene	µg/kg		100,000	1,000,000	5	J	0.73	J	5.1	J	0.39	U	
	Benzo(a)anthracene	µg/kg		1,000	11,000	120		20	J	27	J	5	J	
	Benzo(a)pyrene	µg/kg		1,000	1,100	200		37	J	82	J	16	J	
	Benzo(b)fluoranthene	µg/kg		1,000	11,000	190		35	J	57	J	15	J	
	Benzo(ghi)perylene	µg/kg		100,000	1,000,000	110		94	J	76	J	35	J	
	Benzo(k)fluoranthene	µg/kg		800,000	110,000	85		9.9	J	16	J	1.3	U	
	Chrysene	µg/kg		1,000	110,000	110		37	J	30	J	9.6	J	
	Dibenzo(a,h)anthracene	µg/kg		330	1,100	80		66	J	37	J	27	J	
	Fluoranthene	µg/kg		100,000	1,000,000	300		100	J	130		50	J	
	Fluorene	µg/kg		30,000	1,000,000	2.6	U	2.5	U	6	U	2.6	U	
	Indeno(1,2,3-cd)pyrene	µg/kg		500	11,000	95		15	J	28	J	16	J	
	Naphthalene	µg/kg		12,000	1,000,000	5.2	U	5	U	12	U	24	J	
	Phenanthrene	µg/kg		100,000	1,000,000	42	J	27	J	39	J	15	J	
	Pyrene	µg/kg		100,000	1,000,000	220		49	J	39	J	28	J	

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**Table 7.**  
**NFSS - 2010 Spring and FALL**  
**Environmental Surveillance Program Findings for Sediment**

				Station:	WDD2	WDD2	WDD3	WDD3
				Date Sampled:	05/17/2010	10/27/2010	05/17/2010	10/26/2010
				Matrix:	Sediment	Sediment	Sediment	Sediment
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>4,6</sup>	NY State-Unrestricted Use <sup>1,7</sup>	NY State-Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.
PCB	Aroclor-1016	µg/kg		100	25,000	5.8 U	5.6 U	13 U
	Aroclor-1221	µg/kg		100	25,000	5.8 U	5.6 U	13 U
	Aroclor-1232	µg/kg		100	25,000	8.7 U	8.4 U	20 U
	Aroclor-1242	µg/kg		100	25,000	7.2 U	6.9 U	16 U
	Aroclor-1248	µg/kg		100	25,000	6.8 U	6.5 U	16 U
	Aroclor-1254	µg/kg		100	25,000	8.2 U	7.9 U	19 U
	Aroclor-1260	µg/kg		100	25,000	5.6 U	5.4 U	13 U
	Aroclor-1262	µg/kg		100	25,000	7.7 U	7.4 U	18 U
Pesticide	4,4'-DDD	µg/kg		3.3	180,000	1 U	1 U	2.4 U
	4,4'-DDE	µg/kg		3.3	120,000	0.39 U	0.37 U	0.88 U
	4,4'-DDT	µg/kg		3.3	94,000	0.39 U	0.37 U	0.89 U
	Aldrin	µg/kg		5	1,400	0.36 U	0.35 U	0.83 U
	alpha-BHC	µg/kg		20	6,800	0.3 U	0.29 U	0.7 U
	alpha-Chlordane	µg/kg		94	47,000	0.37 U	0.35 U	0.84 U
	beta-BHC	µg/kg		36	14,000	0.37 U	0.36 U	0.85 U
	delta-BHC	µg/kg		40	1,000,000	0.3 U	0.29 U	0.68 U
	Dieldrin	µg/kg		5	2,800	0.35 U	0.34 U	0.81 U
	Endosulfan I	µg/kg		24002 <sup>9</sup>	920000 <sup>9</sup>	0.35 U	0.34 U	0.8 U
	Endosulfan II	µg/kg		24002 <sup>9</sup>	920000 <sup>9</sup>	0.45 U	0.43 U	1 U
	Endosulfan sulfate	µg/kg		24002 <sup>9</sup>	920000 <sup>9</sup>	0.45 U	0.43 U	1 U
	Endrin	µg/kg		14	410,000	0.49 U	0.47 U	1.1 U
	Endrin aldehyde	µg/kg		NE	NE	0.42 U	0.4 U	0.96 U
	Endrin ketone	µg/kg		NE	NE	0.41 U	0.39 U	0.93 U
	gamma-BHC (Lindane)	µg/kg		100	23,000	0.35 U	0.33 U	0.79 U
	gamma-Chlordane	µg/kg		NE	NE	0.47 U	0.45 U	1.1 U
	Heptachlor	µg/kg		42	29,000	0.39 U	0.37 U	0.88 U
	Heptachlor epoxide	µg/kg		NE	NE	0.37 U	0.36 U	0.86 U
	Methoxychlor	µg/kg		NE	NE	0.51 U	0.49 U	1.2 U
	Toxaphene	µg/kg		NE	NE	9.7 U	9.3 U	22 U
VOC	1,1,1-Trichloroethane	µg/kg		680	1,000,000	0.32 U	15 U	0.75 U
	1,1,2,2-Tetrachloroethane	µg/kg		NE	NE	0.59 U	28 U	1.4 U
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg		NE	NE	0.59 U	27 U	1.4 U
	1,1,2-Trichloroethane	µg/kg		NE	NE	0.41 U	19 U	0.96 U
	1,1-Dichloroethane	µg/kg		270	480,000	0.4 U	19 U	0.95 U
	1,1-Dichloroethene	µg/kg		330	1,000,000	0.41 U	19 U	0.97 U
	1,2,3-Trichlorobenzene	µg/kg		NE	NE	0.58 U	27 U	1.4 U
	1,2,4-Trichlorobenzene	µg/kg		NE	NE	0.75 U	35 U	1.8 U
	1,2-Dibromo-3-chloropropane	µg/kg		NE	NE	1.7 U	77 U	3.9 U
	1,2-Dichlorobenzene	µg/kg		1,100	1,000,000	0.46 U	22 U	1.1 U
	1,2-Dichloroethane	µg/kg		20	60,000	0.36 U	17 U	0.84 U
	1,2-Dichloropropane	µg/kg		NE	NE	0.52 U	25 U	1.2 U
	1,3-Dichlorobenzene	µg/kg		2,400	560,000	0.41 U	19 U	0.97 U
	1,4-Dichlorobenzene	µg/kg		1,800	250,000	0.36 U	17 U	0.86 U
	2-Butanone <sup>10</sup>	µg/kg		120	1000000	5.5 J	61 U	3.1 U
	2-Hexanone	µg/kg		NE	NE	0.66 U	31 U	1.5 U
	4-Methyl-2-pentanone	µg/kg		NE	NE	0.51 U	24 U	1.2 U
	Acetone <sup>10</sup>	µg/kg		50	1000000	16 J	49 U	2.5 U
	Benzene	µg/kg		60	89,000	0.31 U	15 U	0.74 U
	Bromochloromethane	µg/kg		NE	NE	0.58 U	27 U	1.4 U
	Bromodichloromethane	µg/kg		NE	NE	0.3 U	14 U	0.72 U
	Bromoform	µg/kg		NE	NE	0.41 U	19 U	0.96 U
	Bromomethane	µg/kg		NE	NE	3.1 U	150 U	7.3 U
	Carbon disulfide	µg/kg		NE	NE	0.88 U	41 U	2.1 U
	Carbon tetrachloride	µg/kg		760	44,000	0.37 U	17 U	0.88 U
	Chlorobenzene	µg/kg		1,100	1,000,000	0.33 U	16 U	0.78 U
	Chloroethane	µg/kg		NE	NE	3.5 U	160 U	8.1 U
								170 U

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**Table 7.**  
**NFSS - 2010 Spring and FALL**  
**Environmental Surveillance Program Findings for Sediment**

				Station: Date Sampled: Matrix:	WDD2 05/17/2010 Sediment		WDD2 10/27/2010 Sediment		WDD3 05/17/2010 Sediment		WDD3 10/26/2010 Sediment			
FRACTION	ANALYTE	UNITS	USDOE Guideline Limit for Residual Radioactivity in Surface Soil <sup>1,4,5</sup>	NRC Soil Screening Values <sup>4,6</sup>	NY State- Unrestricted Use <sup>1,7</sup>	NY State- Restricted Use - Industrial <sup>1,7</sup>	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	Chloroform	µg/kg		370	700,000		0.32	U	15	U	0.75	U	16	U
(cont)	Chloromethane	µg/kg		NE	NE		0.43	U	20	U	1	U	21	U
	cis-1,2-Dichloroethene	µg/kg		250	1,000,000		0.41	U	19	U	0.97	U	20	U
	cis-1,3-Dichloropropene	µg/kg		NE	NE		0.28	U	13	U	0.65	U	14	U
	Dibromochloromethane	µg/kg		NE	NE		0.32	U	15	U	0.76	U	16	U
	Dichlorodifluoromethane	µg/kg		NE	NE		0.38	U	18	U	0.89	U	19	U
	Dichloromethane <sup>10</sup>	µg/kg		50	1,000,000		1.6	J	130	J	3.7	J	150	J
	Ethylbenzene	µg/kg		1,000	780,000		0.4	U	19	U	0.95	U	20	U
	Ethylene dibromide	µg/kg		NE	NE		0.45	U	21	U	1.1	U	22	U
	Isopropylbenzene	µg/kg		NE	NE		0.33	U	16	U	0.78	U	16	U
	Methyl tert-butyl ether	µg/kg		930	1,000,000		0.47	U	22	U	1.1	U	23	U
	Naphthalene	µg/kg		12,000	1,000,000		0.56	U	26	U	1.3	U	27	U
	Styrene	µg/kg		NE	NE		0.31	U	14	U	0.72	U	15	U
	Tetrachloroethene	µg/kg		1,300	300,000		0.45	U	21	U	1.1	U	22	U
	Toluene <sup>10</sup>	µg/kg		700	1,000,000		0.4	U	19	U	0.94	U	20	U
	trans-1,2-Dichloroethene	µg/kg		190	1,000,000		0.31	U	15	U	0.73	U	15	U
	trans-1,3-Dichloropropene	µg/kg		NE	NE		0.39	U	18	U	0.92	U	19	U
	Trichloroethene	µg/kg		470	400,000		0.74	U	35	U	1.7	U	36	U
	Trichlorofluoromethane	µg/kg		NE	NE		0.38	U	18	U	0.91	U	19	U
	Vinyl chloride	µg/kg		20	27,000		0.38	U	18	U	0.89	U	19	U
	Xylenes, Total	µg/kg		260	1,000,000		1.2	U	55	U	2.8	U	58	U

<sup>1</sup> Sediment comparison criteria: Values are provided for comparative purposes only. ARARs and media-specific cleanup goals will be evaluated independently and presented in future CERCLA decision documents that will be available for public comment.

<sup>2</sup> Applies to the sum of Ra-226 and Ra-228 concentrations

<sup>3</sup> Sum of uranium isotope concentrations (pCi/g).

<sup>4</sup> Above-background concentrations in soil, averaged over the topmost 15-cm of soil.

<sup>5</sup> There are no standards for sediment; therefore, the USDOE residual (radium and thorium) and site-specific (uranium) surface soil cleanup guideline criteria are used as a basis for evaluating analytical results for sediment. If a mixture of the radionuclides is present in soil, then the sum of the ratios of the concentration of each isotope to the allowable limit must be less than one. This guideline applies for total uranium in natural isotopic abundance.

<sup>6</sup> These values represent superficial surface soil concentrations of individual radionuclides that would be deemed in compliance with the 25 mrem/y (0.25 mSv) unrestricted release dose limit in 10 CFR 20.1402. For radionuclides in a mixture, the "sum of fractions" rule applies.

<sup>7</sup> 6 NYCRR PART 375: NY State- Unrestricted Use Soil Cleanup Objectives Table 375-6.8(a)

<sup>8</sup> Total Mercury

<sup>9</sup> Sum of endosulfan I, endosulfan II, and endosulfan sulfate

<sup>10</sup> Common laboratory contaminant

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater													
			Station:		201A		201A		302A		302A		313
			Date Sampled:		05/18/2010		11/01/2010		05/19/2010		10/28/2010		05/19/2010
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	-1.871	U	-0.39	U	N/A		0.288	U
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	-0.0049	U	0.063	U	N/A		0.155	U
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	0	U	0.011	U	N/A		0.006	U
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	N/A		0.016	U	N/A		0.548	
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	N/A		0.195	U	N/A		0.179	U
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	N/A		Non-detect		N/A		0.548	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	0.5995	U	-0.048	U	N/A		0.104	U
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	N/A		0	U	N/A		1.4	U
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	N/A		-0.007	U	N/A		0.003	U
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	N/A		-0.11	U	N/A		0.175	U
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	N/A		0.08		N/A		0.11	
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	N/A		300	U	N/A		279	U
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	N/A		6.99		55.71		58.1	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	N/A		0.457		1.889		3.51	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	N/A		6.62		44.34		42.8	
Total Uranium (234, 235 & 238)			pCi/l	27 <sup>7</sup>	NE	600	N/A	14.067		101.939		104.41	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		6		6.4		470		480	
	Fluoride	mg/L	4	1.5		0.17	U	0.53	J	0.22	J	0.31	J
	Nitrate	mg/L	10	10		0.078	U	0.078	U	0.078	U	0.078	U
	Nitrite	mg/L	1	1		0.42	J	0.39		0.072	U	0.072	U
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		620		610		5,200		5,100	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		N/A		67		N/A		4.1	J
	Antimony	µg/L	6	3		N/A		0.44	J	N/A		0.27	U
	Arsenic	µg/L	10	25		N/A		5.3		N/A		4.1	
	Barium	µg/L	2,000	1,000		N/A		23		N/A		11	
	Beryllium	µg/L	4	11		N/A		0.41		N/A		0.056	U
	Boron	µg/L	NE	1,000		N/A		310		N/A		150	J
	Cadmium	µg/L	5	5		N/A		0.68		N/A		0.18	J
	Calcium	µg/L	NE	NE		N/A		180,000		N/A		450,000	
	Chromium	µg/L	100	50		N/A		1.7	J	N/A		0.59	J
	Cobalt	µg/L	NE	NE		N/A		1.2	J	N/A		7.5	
	Copper	µg/L	1,300	200		N/A		4		N/A		5.7	
	Iron	µg/L	300 <sup>1</sup>	300		N/A		980		N/A		1,700	
	Lead	µg/L	15	25		N/A		3.6		N/A		0.076	J
	Lithium	µg/L	NE	NE		N/A		55		N/A		360	
	Magnesium	µg/L	NE	NE		N/A		190,000		N/A		960,000	
	Manganese	µg/L	50 <sup>11</sup>	300		N/A		100		N/A		1,800	
	Mercury	µg/L	2	0.7		N/A		0.027	U	N/A		0.027	U
	Nickel	µg/L	NE	100		N/A		9.1		N/A		20	
	Potassium	µg/L	NE	NE		N/A		3,600		N/A		9,000	
	Selenium	µg/L	50	10		N/A		4.1		N/A		3.6	
	Silver	µg/L	100 <sup>1</sup>	50		N/A		0.42	J	N/A		0.32	U
	Sodium	µg/L	NE	20,000		N/A		86,000		N/A		360,000	
	Thallium	µg/L	2	NE		N/A		0.67	J	N/A		0.13	J
	Vanadium	µg/L	NE	14		N/A		1.6		N/A		0.28	J
	Zinc	µg/L	5000 <sup>1</sup>	NE		N/A		23		N/A		20	

Table 8-1

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		201A		201A		302A		302A		313		
			Date Sampled:		05/18/2010		11/01/2010		05/19/2010		10/28/2010		05/19/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		0.16	U	0.16	U	N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		0.29	U	0.29	U	N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		0.26	U	0.26	U	N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		0.27	U	0.27	U	N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		0.25	U	0.25	U	N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		0.19	U	0.19	U	N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		0.38	U	0.38	U	N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		0.17	U	0.17	U	N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		0.25	U	0.25	U	N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		0.25	U	0.25	U	N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		0.19	U	0.19	U	N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		0.35	U	0.35	U	N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		0.21	U	0.21	U	N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		0.18	U	0.18	U	N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		0.28	U	0.28	U	N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		0.21	U	0.21	U	N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		0.4	U	0.4	U	N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		0.44	U	0.44	U	N/A		N/A		N/A	
	Benzene	µg/L	5	1		0.2	U	0.2	U	N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		0.2	U	0.2	U	N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		0.18	U	0.18	U	N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		0.33	U	0.33	U	N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		1.2	U	1.2	U	N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		0.15	U	0.15	U	N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		0.36	U	0.36	U	N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		0.22	U	0.22	U	N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		0.42	U	0.42	U	N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		0.19	U	0.19	U	N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		0.22	U	0.22	U	N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		0.17	U	0.17	U	N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		0.17	U	0.17	U	N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		0.21	U	0.21	U	N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		0.24	U	0.24	U	N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		0.2	U	0.2	U	N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		0.2	U	0.2	U	N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		0.18	U	0.18	U	N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		0.21	U	0.21	U	N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		0.17	U	0.17	U	N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		0.24	U	0.24	U	N/A		N/A		N/A	
	Styrene	µg/L	100	5		0.2	U	0.2	U	N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		0.26	U	0.26	U	N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		0.2	U	0.2	U	N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		0.18	U	0.18	U	N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		0.2	U	0.2	U	N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		0.27	U	0.27	U	N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		0.26	U	0.26	U	N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		0.24	U	0.24	U	N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		0.66	U	0.66	U	N/A		N/A		N/A	

Table 8-2

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	201A	201A	302A	302A	313		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:	05/18/2010	11/01/2010	05/19/2010	10/28/2010	05/19/2010
						Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500			470	500	550	550	540
	Total Dissolved Solids	mg/L	NE	NE			1,800	1,400	9,200	9,000	4,800

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		313		411A		415A		415A		505		
			Date Sampled:		10/28/2010		10/28/2010		05/19/2010		10/28/2010		05/17/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	-1.85	U	0.997	U	N/A		-3.12	U	N/A	
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	0.046	U	0.069	U	N/A		0.082	U	N/A	
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	0.01	U	0.006	U	N/A		-0.052	U	N/A	
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.375		0.323	U	N/A		0.276		N/A	
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	0.058	U	0.055	U	N/A		0.135	U	N/A	
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	0.375		Non-detect		N/A		0.276		N/A	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	-0.079	U	-0.188	U	N/A		-1.195	U	N/A	
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	2.1	U	0.7	U	N/A		0.9	U	N/A	
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	-0.02	U	0.074	U	N/A		0.093		N/A	
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	-0.011	U	0.056	U	N/A		-0.187	U	N/A	
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.067	U	0.082	U	N/A		0.069	U	N/A	
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	153	U	324	U	N/A		502		N/A	
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	19.6		6.88		8.866		9.65		12.45	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	0.731		0.48		0.6221		0.497		0.7313	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	14.1		6.35		6.99		7.66		11.05	
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	34.431		13.71		16.478		17.807		24.231	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		38		16		140		140		150	
	Fluoride	mg/L	4	1.5		0.21	J	0.77		2.1		2.6		0.2 J	
	Nitrate	mg/L	10	10		0.078	U	0.078	U	0.078	U	0.078	U	0.078 U	
	Nitrite	mg/L	1	1		0.8		0.42		0.64	J	1.9		1 J	
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	0.13	U	0.13	U	0.13 U	
	Sulfate	mg/L	250 <sup>1</sup>	250		2,700		760		1,000		900		2,000	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		4	J	6	J	N/A		43		N/A	
	Antimony	µg/L	6	3		0.74	J	0.66	J	N/A		2.2		N/A	
	Arsenic	µg/L	10	25		2.4		12		N/A		3.9		N/A	
	Barium	µg/L	2,000	1,000		12		17		N/A		14		N/A	
	Beryllium	µg/L	4	11		0.056	U	0.056	U	N/A		0.15	J	N/A	
	Boron	µg/L	NE	1,000		220		730		N/A		17,000		N/A	
	Cadmium	µg/L	5	5		0.094	J	0.084	U	N/A		0.23	J	N/A	
	Calcium	µg/L	NE	NE		460,000		190,000		N/A		220,000		N/A	
	Chromium	µg/L	100	50		3.1	J	0.49	J	N/A		0.95	J	N/A	
	Cobalt	µg/L	NE	NE		4.2		0.76	J	N/A		3		N/A	
	Copper	µg/L	1,300	200		1.6	J	3.4		N/A		4.4		N/A	
	Iron	µg/L	300 <sup>1</sup>	300		2,200		3,200		N/A		1,200		N/A	
	Lead	µg/L	15	25		0.046	J	0.1	J	N/A		0.26	J	N/A	
	Lithium	µg/L	NE	NE		140		80		N/A		55		N/A	
	Magnesium	µg/L	NE	NE		520,000		440,000		N/A		260,000		N/A	
	Manganese	µg/L	50 <sup>11</sup>	300		1,700		82		N/A		1,700		N/A	
	Mercury	µg/L	2	0.7		0.027	U	0.027	U	N/A		0.027	U	N/A	
	Nickel	µg/L	NE	100		20		7.6		N/A		11		N/A	
	Potassium	µg/L	NE	NE		7,200		4,100		N/A		5,400		N/A	
	Selenium	µg/L	50	10		1.4	J	1.8	J	N/A		1 J		N/A	
	Silver	µg/L	100 <sup>1</sup>	50		0.48	J	0.5	J	N/A		1.7		N/A	
	Sodium	µg/L	NE	20,000		100,000		200,000		N/A		140,000		N/A	
	Thallium	µg/L	2	NE		0.052	J	0.06	J	N/A		0.058	J	N/A	
	Vanadium	µg/L	NE	14		1.1		0.49	J	N/A		0.68	J	N/A	
	Zinc	µg/L	5000 <sup>1</sup>	NE		16	J	15	J	N/A		31		N/A	

Table 8-4

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		313		411A		415A		415A		505	
			Date Sampled:		10/28/2010 Groundwater		10/28/2010 Groundwater		05/19/2010 Groundwater		10/28/2010 Groundwater		05/17/2010 Groundwater	
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water MCLs <sup>a,b</sup>	USDOE DCG for Water Quality Stds. <sup>a,c</sup>	Matrix:	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A	0.16	U	0.16	U	800	U	N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A	0.29	U	0.29	U	1,400	U	N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A	0.26	U	0.26	U	1,300	U	N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A	0.27	U	0.27	U	1,300	U	N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A	0.25	U	0.64	J	1,200	U	N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A	0.19	U	33		960	U	N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A	0.38	U	0.38	U	1,900	U	N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A	0.17	U	0.17	U	840	U	N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A	0.25	U	0.25	U	1,200	U	N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A	0.25	U	0.25	U	1,300	U	N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A	0.19	U	0.19	U	940	U	N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A	0.35	U	0.35	U	1,700	U	N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A	0.21	U	0.21	U	1,100	U	N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A	0.18	U	0.18	U	920	U	N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A	0.28	U	0.28	U	1,400	U	N/A	
	2-Hexanone	µg/L	NE	NE		N/A	0.21	U	0.21	U	1,000	U	N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A	0.4	U	2	J	2,000	U	N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A	0.44	U	27		2,200	U	N/A	
	Benzene	µg/L	5	1		N/A	0.2	U	1.6		980	U	N/A	
	Bromochloromethane	µg/L	NE	5		N/A	0.2	U	0.2	U	980	U	N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A	0.18	U	0.18	U	920	U	N/A	
	Bromoform	µg/L	NE	NE		N/A	0.33	U	0.33	U	1,700	U	N/A	
	Bromomethane	µg/L	NE	5		N/A	1.2	U	1.2	U	5,900	U	N/A	
	Carbon disulfide	µg/L	NE	60		N/A	0.15	U	0.15	U	760	U	N/A	
	Carbon tetrachloride	µg/L	5	5		N/A	0.36	U	0.36	U	1,800	U	N/A	
	Chlorobenzene	µg/L	100	5		N/A	0.22	U	0.22	U	1,100	U	N/A	
	Chloroethane	µg/L	NE	5		N/A	0.42	U	0.42	U	2,100	U	N/A	
	Chloroform	µg/L	NE	7		N/A	0.19	U	0.96	J	940	U	N/A	
	Chloromethane	µg/L	NE	5		N/A	0.22	U	0.22	U	1,100	U	N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A	0.4	J	9,800		8,800		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A	0.17	U	0.17	U	840	U	N/A	
	Dibromochloromethane	µg/L	NE	5		N/A	0.21	U	0.21	U	1,000	U	N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A	0.24	U	0.52	J	1,200	U	N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A	0.2	U	1.8	J	3,500	J	N/A	
	Ethylbenzene	µg/L	700	5		N/A	0.2	U	0.2	U	980	U	N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A	0.18	U	0.18	U	900	U	N/A	
	Isopropylbenzene	µg/L	NE	5		N/A	0.21	U	0.21	U	1,000	U	N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A	0.17	U	1.1		860	U	N/A	
	Naphthalene	µg/L	NE	NE		N/A	0.24	U	0.24	U	1,200	U	N/A	
	Styrene	µg/L	100	5		N/A	0.2	U	0.2	U	1,000	U	N/A	
	Tetrachloroethene	µg/L	5	5		N/A	0.26	U	52,000		33,000		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A	0.2	U	0.91	J	980	U	N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A	0.18	U	180		920	U	N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A	0.2	U	0.2	U	1,000	U	N/A	
	Trichloroethene	µg/L	5	5		N/A	0.27	U	16,000		11,000		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A	0.26	U	0.26	U	1,300	U	N/A	
	Vinyl chloride	µg/L	2	2		N/A	0.24	U	780		1,200	U	N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A	0.66	U	0.66	U	3,300	U	N/A	

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Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	313	411A	415A	415A	505		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:	10/28/2010	10/28/2010	05/19/2010	10/28/2010	05/17/2010
						Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500		Results	Qual.	Results	Qual.	Results	Qual.
	Total Dissolved Solids	mg/L	NE	NE		540		670		610	
						4,400		1,800		2,500	
										2,200	
										4,300	

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		505		862		863		A42		A42		
			Date Sampled:		10/26/2010		10/25/2010		10/25/2010		05/18/2010		10/26/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	N/A		3.3	U	-3.14	U	N/A		0.09	U
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	N/A		-0.311	U	0.052	U	N/A		-0.006	U
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	N/A		-0.046	U	-0.037	U	N/A		-0.015	U
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.227	U	0.175	U	0.329		N/A		-0.866	U
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	0.454		1.02		1.09		N/A		0.258	U
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	0.454		1.02		1.419		N/A		Non-detect	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	N/A		-0.932	U	-0.354	U	N/A		-0.532	U
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	N/A		-0.2	U	1.6	U	N/A		2	U
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	0.22		0.148	U	-0.033	U	N/A		0.007	U
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	-0.013	U	0.221	U	0.103	U	N/A		0.509	
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.261		0.202	U	0.079	U	N/A		0.403	
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	N/A		366	U	359	U	N/A		243	U
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	13		10.4		2.12		27.74		34.1	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	0.537		0.532		0.253	U	1.862		2.34	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	9.43		8.48		1.05		23.45		26.4	
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	22.967		19.412		3.17		53.052		62.84	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		N/A		33		30		16		16	
	Fluoride	mg/L	4	1.5		N/A		0.23	J	0.17	U	0.17	U	0.17	U
	Nitrate	mg/L	10	10		N/A		2.4		0.078	U	0.078	U	0.078	U
	Nitrite	mg/L	1	1		N/A		0.42		0.22	J	0.38	J	0.65	
	ortho-Phosphate-P	mg/L	NE	NE		N/A		0.13	U	0.13	U	0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		N/A		560		940		280		270	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		N/A		53		13	J	N/A		14	J
	Antimony	µg/L	6	3		N/A		2		1.7		N/A		0.69	J
	Arsenic	µg/L	10	25		N/A		7.9		9.9		N/A		0.53	J
	Barium	µg/L	2,000	1,000		N/A		23		12		N/A		34	
	Beryllium	µg/L	4	11		N/A		0.056	U	0.056	U	N/A		0.056	U
	Boron	µg/L	NE	1,000		N/A		250		860		N/A		130	J
	Cadmium	µg/L	5	5		N/A		0.11	J	0.084	U	N/A		0.084	U
	Calcium	µg/L	NE	NE		N/A		110,000		150,000		N/A		170,000	
	Chromium	µg/L	100	50		N/A		0.49	J	0.25	J	N/A		0.13	U
	Cobalt	µg/L	NE	NE		N/A		1.3	J	0.39	J	N/A		0.59	J
	Copper	µg/L	1,300	200		N/A		1.4	J	1.8	J	N/A		2.8	
	Iron	µg/L	300 <sup>1</sup>	300		N/A		2,500		1,400		N/A		620	
	Lead	µg/L	15	25		N/A		0.24	J	0.086	J	N/A		0.068	J
	Lithium	µg/L	NE	NE		N/A		73		120		N/A		32	
	Magnesium	µg/L	NE	NE		N/A		160,000		140,000		N/A		70,000	
	Manganese	µg/L	50 <sup>11</sup>	300		N/A		170		84		N/A		240	
	Mercury	µg/L	2	0.7		N/A		0.027	U	0.027	U	N/A		0.027	U
	Nickel	µg/L	NE	100		N/A		4.2		4.6		N/A		5.9	
	Potassium	µg/L	NE	NE		N/A		3,400		27,000		N/A		3,600	
	Selenium	µg/L	50	10		N/A		1.7	J	1.9	J	N/A		1.6	J
	Silver	µg/L	100 <sup>1</sup>	50		N/A		3.1		2.9		N/A		0.66	
	Sodium	µg/L	NE	20,000		N/A		60,000		110,000		N/A		38,000	
	Thallium	µg/L	2	NE		N/A		0.084	J	0.07	J	N/A		0.058	J
	Vanadium	µg/L	NE	14		N/A		0.71	J	0.34	J	N/A		0.16	U
	Zinc	µg/L	5000 <sup>1</sup>	NE		N/A		26		21		N/A		13	J

Table 8-7

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		505		862		863		A42		A42		
			Date Sampled:		10/26/2010		10/25/2010		10/25/2010		05/18/2010		10/26/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		N/A		N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		N/A		N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		N/A		N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		N/A		N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		N/A		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		N/A		N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		N/A		N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		N/A		N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		N/A		N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		N/A		N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		N/A		N/A		N/A		N/A	

Table 8-8

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	505	862	863	A42	A42		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:	10/26/2010	10/25/2010	10/25/2010	05/18/2010	10/26/2010
						Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500			N/A	470	200	440	470
	Total Dissolved Solids	mg/L	NE	NE			N/A	1,400	1,800	930	930

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		A45		A45		A50		A50		A55		
			Date Sampled:		05/18/2010		10/25/2010		05/17/2010		10/25/2010		10/26/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	N/A		0.387	U	N/A		0.1	U	-2.06	U
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	N/A		0.009	U	N/A		0.013	U	0.012	U
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	N/A		-0.004	U	N/A		0.035	U	0	U
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.075	U	-0.072	U	0.6332	U	0.414		0.338	
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	0.7276	U	0.259	U	0.4133	U	0.894		1.3	J
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	Non-detect		Non-detect		Non-detect		1.308		1.638	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	N/A		-0.551	U	N/A		-0.557	U	-0.464	U
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	N/A		0.1	U	N/A		-0.1	U	0.2	U
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	0.0816	U	0.101		0.0952	U	-0.207	U	0.071	U
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	0.0099	U	-0.156	U	0.3486		-0.178	U	-0.071	U
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.0355	U	0.074		0.0271	U	0.033	U	0.009	U
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	N/A		343	U	N/A		202	U	210	U
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	16.18		13.3		6.535		5.45		0.529	
Anion	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	1.175		0.639		0.691		0.458		0.086	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	13.07		10.2		5.855		5.19		0.313	J
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	30.425		24.139		13.081		11.098		0.928	
	Chloride	mg/L	250 <sup>1</sup>	250		58		61		18		21		55	
	Fluoride	mg/L	4	1.5		0.17	U	0.17	U	0.21	J	0.17	U	0.17	U
	Nitrate	mg/L	10	10		0.12	J	0.078	U	0.078	U	0.078	U	0.78	U
Metal	Nitrite	mg/L	1	1		0.57	J	0.46		0.39	J	0.34		0.72	U
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		730		720		700		570		2,100	
	Aluminum	µg/L	200 <sup>1</sup>	NE		10	J	16	J	2.7	J	27		29	
	Antimony	µg/L	6	3		1.4	U	1		1.4	U	1.3		1	J
	Arsenic	µg/L	10	25		1.4		2		1.2		3.5		1.4	
Metal	Barium	µg/L	2,000	1,000		9.3	J	11		11		13		58	
	Beryllium	µg/L	4	11		0.056	U	0.058	J	0.056	U	0.056	U	0.056	U
	Boron	µg/L	NE	1,000		200	U	58	J	200	U	230		190	J
	Cadmium	µg/L	5	5		0.5		0.15	J	0.084	U	0.1	J	0.1	J
	Calcium	µg/L	NE	NE		260,000		260,000		120,000		120,000		270,000	
	Chromium	µg/L	100	50		0.54	J	0.2	J	0.64	J	0.26	J	1	J
	Cobalt	µg/L	NE	NE		0.93	J	0.71	J	0.26	J	1.8	J	0.51	J
	Copper	µg/L	1,300	200		14		1	J	1.9	J	2.1		3.8	
	Iron	µg/L	300 <sup>1</sup>	300		2,200		1,500		490		600		950	
	Lead	µg/L	15	25		2.9		0.51		1.1		0.51		0.45	
	Lithium	µg/L	NE	NE		54		61		45		60		120	
	Magnesium	µg/L	NE	NE		150,000		130,000		150,000		150,000		210,000	
	Manganese	µg/L	50 <sup>11</sup>	300		270		410		5.9		200		7.9	
	Mercury	µg/L	2	0.7		0.027	U	0.027	U	0.047	J	0.027	U	0.027	U
	Nickel	µg/L	NE	100		20		8.1		4.7		5		15	
	Potassium	µg/L	NE	NE		4,300		4,800		1,800		5,100		15,000	
	Selenium	µg/L	50	10		1.4	J	1.9	J	1.8	J	2.2		1.7	J
	Silver	µg/L	100 <sup>1</sup>	50		0.73	U	1.4		0.73	U	2.1		0.32	U
	Sodium	µg/L	NE	20,000		48,000		47,000		75,000		79,000		200,000	
	Thallium	µg/L	2	NE		0.032	U	0.22	J	0.032	U	0.12	J	0.066	J
	Vanadium	µg/L	NE	14		0.47	J	0.17	J	0.33	J	0.22	J	0.24	J
	Zinc	µg/L	5000 <sup>1</sup>	NE		340		19	J	12	J	34		15	J

Table 8-10

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		A45		A45		A50		A50		A55		
			Date Sampled:		05/18/2010		10/25/2010		05/17/2010		10/25/2010		10/26/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		N/A		N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		N/A		N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		N/A		N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		N/A		N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		N/A		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		N/A		N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		N/A		N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		N/A		N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		N/A		N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		N/A		N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		N/A		N/A		N/A		N/A	

Table 8-11

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	A45	A45	A50	A50	A55
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	Date Sampled:	05/18/2010	10/25/2010	05/17/2010	10/25/2010	10/26/2010
				Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500		460	500	420	410
	Total Dissolved Solids	mg/L	NE	NE		1,900	1,800	1,400	1,400
									3,200

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		B02W20S		B02W20S		BH49		BH49A		BH49A		
			Date Sampled:		05/17/2010		10/28/2010		10/26/2010		05/18/2010		10/26/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	N/A		-0.029	U	-0.439	U	1.945	U	0.4	U
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	N/A		0.059	U	-0.53	U	-0.0041	U	0	U
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	N/A		0.095	U	-0.037	U	-0.0041	U	0.006	U
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.2777	U	0.155	U	-0.426	U	N/A		0.146	
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	0.6236	U	0.253	U	0.743	J	N/A		0.546	J
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	Non-detect		0.743		N/A		0.692			
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	N/A		-0.454	U	-0.704	U	0	U	-0.252	U
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	N/A		0.5	U	0.6	U	N/A		-0.3	U
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	-0.0043	U	0.013	U	0.052	U	N/A		0.015	U
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	0.0209	U	-0.152	U	0.055	U	N/A		0.461	
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	-0.0086	U	-0.009	U	0.104		N/A		0.22	
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	N/A		399		184	U	N/A		291	U
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	5.199		5.21		7		7.625		5.11	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	0.2771	U	0.159		0.216	U	0.4577		0.497	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	4.003		4.46		4.67		5.449		3.63	
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	9.202		9.829		11.67		13.532		9.237	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		14		21		38		43		49	
	Fluoride	mg/L	4	1.5		0.48	J	0.72		0.2	J	0.22	J	0.27	J
	Nitrate	mg/L	10	10		0.078	U	0.078	U	0.21	J	0.078	U	0.3	J
	Nitrite	mg/L	1	1		0.38	J	0.37		0.072	U	0.43	J	0.63	
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		290		330		430		490		530	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		6.8	J	78		36		N/A		28	
	Antimony	µg/L	6	3		1.4	U	0.27	U	0.74	J	N/A		1.5	J
	Arsenic	µg/L	10	25		0.36	J	0.2	J	2.9		N/A		2.9	
	Barium	µg/L	2,000	1,000		18		23		78		N/A		18	
	Beryllium	µg/L	4	11		0.056	U	0.056	U	0.056	U	N/A		0.056	U
	Boron	µg/L	NE	1,000		210		230		270		N/A		200	J
	Cadmium	µg/L	5	5		0.34	J	0.084	U	0.11	J	N/A		0.084	J
	Calcium	µg/L	NE	NE		80,000		87,000		64,000		N/A		110,000	
	Chromium	µg/L	100	50		0.63	J	17		0.13	U	N/A		0.13	U
	Cobalt	µg/L	NE	NE		0.42	J	0.52	J	0.19	U	N/A		0.61	J
	Copper	µg/L	1,300	200		1.2	J	1.7	J	1.2	J	N/A		3.2	
	Iron	µg/L	300 <sup>1</sup>	300		340		320		230		N/A		670	
	Lead	µg/L	15	25		0.82		0.064	J	0.12	J	N/A		0.27	J
	Lithium	µg/L	NE	NE		50		59		34		N/A		85	
	Magnesium	µg/L	NE	NE		130,000		110,000		81,000		N/A		140,000	
	Manganese	µg/L	50 <sup>11</sup>	300		18		23		21		N/A		41	
	Mercury	µg/L	2	0.7		0.045	J	0.027	U	0.027	U	N/A		0.027	U
	Nickel	µg/L	NE	100		4.6		9.6		2.4	J	N/A		4.6	
	Potassium	µg/L	NE	NE		1,500		2,000		6,600		N/A		4,300	
	Selenium	µg/L	50	10		0.66	J	0.87	J	1.7	J	N/A		1.4	J
	Silver	µg/L	100 <sup>1</sup>	50		0.73	U	0.32	U	0.9		N/A		0.99	
	Sodium	µg/L	NE	20,000		60,000		45,000		70,000		N/A		57,000	
	Thallium	µg/L	2	NE		0.032	U	0.034	J	0.042	J	N/A		0.046	J
	Vanadium	µg/L	NE	14		0.41	J	0.53	J	0.16	U	N/A		0.34	J
	Zinc	µg/L	5000 <sup>1</sup>	NE		17	J	12	J	13	J	N/A		15	J

Table 8-13

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station: B02W20S		B02W20S		BH49		BH49A		BH49A				
			Date Sampled: 05/17/2010		Matrix: Groundwater		10/28/2010		10/26/2010		05/18/2010		10/26/2010		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		N/A		N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		N/A		N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		N/A		N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		N/A		N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		N/A		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		N/A		N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		N/A		N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		N/A		N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		N/A		N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		N/A		N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		N/A		N/A		N/A		N/A	

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Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	B02W20S	B02W20S	BH49	BH49A	BH49A		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:	05/17/2010	10/28/2010	10/26/2010	05/18/2010	10/26/2010
						Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500		Results	430	470	130	410	410
	Total Dissolved Solids	mg/L	NE	NE		Qual.		970	960	870	1,300

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		MW922		MW934		MW935		MW935		OW03A		
			Date Sampled:		11/01/2010		10/28/2010		10/27/2010		11/01/2010		10/25/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	0.137	U	3.47	U	0.162	U	N/A		0.21	U
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	0.052	U	0.066	U	0.037	U	N/A		0.034	U
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	0.015	U	0.047	U	-0.008	U	N/A		-0.008	U
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.085	U	0.143	U	0.057	U	N/A		-0.061	U
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	0.161	U	0.363		0.221	U	N/A		1.58	
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	Non-detect		0.363		Non-detect		N/A		1.58	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	0.398	U	-0.034	U	-0.418	U	N/A		0.057	U
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	-0.9	U	0.3	U	0.6	U	N/A		0.7	U
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	0.231		0.28		0.111	U	N/A		-0.019	U
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	0.066	U	0.458		0.156	U	N/A		-0.038	U
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.237		0.085		0.254		N/A		0.114	U
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	260	U	283	U	246	U	N/A		86	U
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	11.2		11.5		13.8		N/A		5.55	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	0.824		0.414		0.68		N/A		0.376	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	9.02		8.58		11.3		N/A		4.27	
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	21.044		20.494		25.78		N/A		10.196	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		37		43		N/A		51		120	
	Fluoride	mg/L	4	1.5		0.39	J	0.62		N/A		0.53	J	0.17	U
	Nitrate	mg/L	10	10		0.49		0.12	J	N/A		0.078	U	0.078	U
	Nitrite	mg/L	1	1		0.74		0.82		N/A		0.79		0.47	
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	N/A		0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		2,700		1,700		N/A		1,600		1,400	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		16	J	97		16	J	N/A		28	
	Antimony	µg/L	6	3		0.73	J	0.78	J	0.72	J	N/A		1.2	J
	Arsenic	µg/L	10	25		2.6		1		3.2		N/A		4.8	
	Barium	µg/L	2,000	1,000		9	J	24		8.4	J	N/A		15	
	Beryllium	µg/L	4	11		0.056	U	0.056	U	0.056	U	N/A		0.056	U
	Boron	µg/L	NE	1,000		270		230		160	J	N/A		270	
	Cadmium	µg/L	5	5		0.37	J	0.084	U	0.13	J	N/A		0.084	U
	Calcium	µg/L	NE	NE		270,000		160,000		270,000		N/A		120,000	
	Chromium	µg/L	100	50		0.71	J	0.88	J	0.62	J	N/A		0.3	J
	Cobalt	µg/L	NE	NE		2.3		0.63	J	2	J	N/A		1.3	J
	Copper	µg/L	1,300	200		5.8		4.1		4.2		N/A		1.6	J
	Iron	µg/L	300 <sup>1</sup>	300		1,500		510		1,300		N/A		600	
	Lead	µg/L	15	25		0.23	J	0.19	J	0.15	J	N/A		0.16	J
	Lithium	µg/L	NE	NE		110		83		120		N/A		88	
	Magnesium	µg/L	NE	NE		580,000		350,000		570,000		N/A		170,000	
	Manganese	µg/L	50 <sup>11</sup>	300		280		58		260		N/A		80	
	Mercury	µg/L	2	0.7		0.027	U	0.027	U	0.027	U	N/A		0.027	U
	Nickel	µg/L	NE	100		12		6.7		12		N/A		7.3	
	Potassium	µg/L	NE	NE		7,200		4,900		6,700		N/A		4,400	
	Selenium	µg/L	50	10		2.5		2.6		3		N/A		2	J
	Silver	µg/L	100 <sup>1</sup>	50		0.53	J	0.32	U	0.49	J	N/A		1.3	
	Sodium	µg/L	NE	20,000		310,000		170,000		240,000		N/A		86,000	
	Thallium	µg/L	2	NE		0.054	J	0.088	J	0.064	J	N/A		0.082	J
	Vanadium	µg/L	NE	14		0.51	J	2.4		0.75	J	N/A		0.16	U
	Zinc	µg/L	5000 <sup>1</sup>	NE		30		19	J	19	J	N/A		19	J

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Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		MW922		MW934		MW935		MW935		OW03A		
			Date Sampled:		11/01/2010		10/28/2010		10/27/2010		11/01/2010		10/25/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		0.16	U	N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		0.29	U	N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		0.26	U	N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		0.27	U	N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		0.25	U	N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		0.19	U	N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		0.38	U	N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		0.17	U	N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		0.25	U	N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		0.25	U	N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		0.19	U	N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		0.35	U	N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		0.21	U	N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		0.18	U	N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		0.28	U	N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		0.21	U	N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		0.4	U	N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		0.44	U	N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		0.2	U	N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		0.2	U	N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		0.18	U	N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		0.33	U	N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		1.2	U	N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		0.15	U	N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		0.36	U	N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		0.22	U	N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		0.42	U	N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		38		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		0.22	U	N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		0.17	U	N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		0.17	U	N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		0.21	U	N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		0.24	U	N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		0.2	U	N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		0.2	U	N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		0.18	U	N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		0.21	U	N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		0.17	U	N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		0.24	U	N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		0.2	U	N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		0.26	U	N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		0.2	U	N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		0.18	U	N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		0.2	U	N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		0.27	U	N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		0.26	U	N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		0.24	U	N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		0.66	U	N/A		N/A		N/A	

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Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	MW922	MW934	MW935	MW935	OW03A	
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled: 11/01/2010	Date Sampled: 10/28/2010	Date Sampled: 10/27/2010	Date Sampled: 11/01/2010	Date Sampled: 10/25/2010
						Matrix: Groundwater	Matrix: Groundwater	Matrix: Groundwater	Matrix: Groundwater	Matrix: Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500		430	660	N/A	600	500
	Total Dissolved Solids	mg/L	NE	NE		4,500	3,000	N/A	2,900	1,600

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW03B		OW03B		OW04A		OW04A		OW04B		
			Date Sampled:		10/25/2010		10/27/2010		05/18/2010		10/26/2010		05/18/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	8.98	U	N/A	N/A	-4.96	U	N/A	N/A		
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	0.042	U	N/A	N/A	0.019	U	N/A	N/A		
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	0.008	U	N/A	N/A	-0.006	U	N/A	N/A		
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	-0.42	U	N/A	N/A	-0.325	U	0.2855	U		
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	1.93	J	N/A	N/A	0.651	J	0.7584	U		
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	1.93		N/A	N/A	0.651		Non-detect			
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	-0.572	U	N/A	N/A	-0.888	U	N/A	N/A		
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	0.4	U	N/A	N/A	-1	U	N/A	N/A		
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	0.049	U	N/A	N/A	0.031	U	0.0689	U		
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	0.084	U	N/A	N/A	0.585		0.3178	J		
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.159		N/A	N/A	0.209		0.0458	U		
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	138	U	N/A	N/A	140	U	N/A	N/A		
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	8.9		N/A	0.9909	0.928		18.29			
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	0.332		N/A	0.0725	U	0.101		0.9877		
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	6.48		N/A	0.7752	0.7		19.36			
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	15.712		N/A	1.766	1.729		38.638			
Anion	Chloride	mg/L	250 <sup>1</sup>	250		N/A		24	29	35		100			
	Fluoride	mg/L	4	1.5		N/A		0.3	J	0.28	J	0.4	J		
	Nitrate	mg/L	10	10		N/A		0.078	U	0.14	J	0.26	J	0.078	U
	Nitrite	mg/L	1	1		N/A		0.51		0.25	J	0.35	J	0.44	J
	ortho-Phosphate-P	mg/L	NE	NE		N/A		0.13	U	0.13	U	0.13	U		
	Sulfate	mg/L	250 <sup>1</sup>	250		N/A		670	480	980		590			
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		9	J	N/A	N/A	10	J	91			
	Antimony	µg/L	6	3		1	J	N/A	N/A	0.81	J	1.4	U		
	Arsenic	µg/L	10	25		0.53	J	N/A	N/A	7.5		1			
	Barium	µg/L	2,000	1,000		9.4	J	N/A	N/A	13		18			
	Beryllium	µg/L	4	11		0.056	U	N/A	N/A	0.056	U	0.08	R		
	Boron	µg/L	NE	1,000		120	J	N/A	N/A	500		290			
	Cadmium	µg/L	5	5		0.14	J	N/A	N/A	0.084	U	0.11	J		
	Calcium	µg/L	NE	NE		110,000		N/A	N/A	64,000		190,000			
	Chromium	µg/L	100	50		1.6	J	N/A	N/A	0.13	U	0.83	J		
	Cobalt	µg/L	NE	NE		0.64	J	N/A	N/A	0.3	J	0.52	J		
	Copper	µg/L	1,300	200		4		N/A	N/A	2.4		2.8			
	Iron	µg/L	300 <sup>1</sup>	300		380		N/A	N/A	290		840			
	Lead	µg/L	15	25		0.2	J	N/A	N/A	0.18	J	0.87	J		
	Lithium	µg/L	NE	NE		96		N/A	N/A	34		31			
	Magnesium	µg/L	NE	NE		170,000		N/A	N/A	70,000		130,000			
	Manganese	µg/L	50 <sup>11</sup>	300		4.7		N/A	N/A	52		43			
	Mercury	µg/L	2	0.7		0.027	U	N/A	N/A	0.027	U	0.027	U		
	Nickel	µg/L	NE	100		6.5		N/A	N/A	6		7.4			
	Potassium	µg/L	NE	NE		3,800		N/A	N/A	7,800		1,700			
	Selenium	µg/L	50	10		1.7	J	N/A	N/A	2		2.6			
	Silver	µg/L	100 <sup>1</sup>	50		1.2		N/A	N/A	0.83		0.73	U		
	Sodium	µg/L	NE	20,000		98,000		N/A	N/A	88,000		56,000			
	Thallium	µg/L	2	NE		0.052	J	N/A	N/A	0.048	J	0.042	R		
	Vanadium	µg/L	NE	14		0.71	J	N/A	N/A	0.16	U	0.92			
	Zinc	µg/L	5000 <sup>1</sup>	NE		19	J	N/A	N/A	22		14	J		

Table 8-19

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW03B		OW03B		OW04A		OW04A		OW04B		
			Date Sampled:		10/25/2010		10/27/2010		05/18/2010		10/26/2010		05/18/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		N/A		N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		N/A		N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		N/A		N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		N/A		N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		N/A		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		N/A		N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		N/A		N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		N/A		N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		N/A		N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		N/A		N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		N/A		N/A		N/A		N/A	

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Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	OW03B	OW03B	OW04A	OW04A	OW04B		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:	10/25/2010	10/27/2010	05/18/2010	10/26/2010	05/18/2010
						Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500		Results	N/A	480	140	150	320
	Total Dissolved Solids	mg/L	NE	NE		Qual.		N/A	1,500	960	970
											1,700

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW04B		OW05A		OW05B		OW06A		OW06B		
			Date Sampled:		10/26/2010		10/26/2010		10/26/2010		10/25/2010		05/18/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	-0.388	U	5.96	U	1.34	U	-1.08	U	N/A	
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	0.02	U	0.089	U	-0.048	U	-0.151	U	N/A	
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	-0.015	U	0.05	U	0.013	U	-0.05	U	N/A	
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.159		-0.037	U	0.516		0.188		0.5123	U
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	1.4	J	0.705	J	-0.035	U	0.8		1.5407	U
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	1.559		0.705		0.516		0.988		Non-detect	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	-0.807	U	-0.234	U	-1.3	U	-0.863	U	N/A	
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	2	U	0.4	U	1	U	0.8	U	N/A	
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	0.038	U	0.004	U	0.098		-0.098	U	0.0222	U
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	0.094	U	-0.165	U	0.067	U	0.345	U	0.0855	U
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.217		0.089		0.056		0.287	J	0	U
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	241	U	314	U	326	U	380	U	N/A	
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	14.6		0.631		8.19		1.04	J	7.732	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	0.675		0.118	U	0.556		0.346	U	0.716	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	14.1		0.402	J	6.76		0.973		6.914	
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	29.375		1.033		15.506		2.013		15.362	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		94		43		15		32		35	
	Fluoride	mg/L	4	1.5		0.52	J	0.27	J	0.32	J	0.17	U	0.25	J
	Nitrate	mg/L	10	10		0.078	U	0.078	U	0.56		0.078	U	0.54	J
	Nitrite	mg/L	1	1		0.49		0.4		0.48		0.39		0.47	J
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		560		430		500		780		490	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		7.4	J	380		180		9.5	J	5.4	J
	Antimony	µg/L	6	3		0.64	J	0.86	J	3.3		1.2		1.4	U
	Arsenic	µg/L	10	25		1.8		16		2.6		4.7		0.98	
	Barium	µg/L	2,000	1,000		19		13		16		11		13	
	Beryllium	µg/L	4	11		0.47		0.056	U	0.056	U	0.056	U	0.056	U
	Boron	µg/L	NE	1,000		300		440		150	J	730		200	U
	Cadmium	µg/L	5	5		0.69		0.088	J	0.13	J	0.1	J	0.22	J
	Calcium	µg/L	NE	NE		170,000		68,000		120,000		120,000		130,000	
	Chromium	µg/L	100	50		0.58	J	1.1	J	14		1	J	0.92	J
	Cobalt	µg/L	NE	NE		0.96	J	0.47	J	1.7	J	0.37	J	1.7	J
	Copper	µg/L	1,300	200		2.3		2.5		16		3		3	
	Iron	µg/L	300 <sup>1</sup>	300		610		770		1,300		1,000		550	
	Lead	µg/L	15	25		0.73		0.32	J	4.7		0.76		1	
	Lithium	µg/L	NE	NE		39		62		85		84		81	
	Magnesium	µg/L	NE	NE		100,000		99,000		120,000		120,000		180,000	
	Manganese	µg/L	50 <sup>11</sup>	300		32		56		59		100		110	
	Mercury	µg/L	2	0.7		0.027	U	0.027	U	0.027	U	0.027	U	0.027	U
	Nickel	µg/L	NE	100		8.3		2.9	J	100		7.4		21	
	Potassium	µg/L	NE	NE		2,200		6,800		4,000		9,300		2,500	
	Selenium	µg/L	50	10		2.3		1.6	J	1.6	J	1.8	J	2.3	
	Silver	µg/L	100 <sup>1</sup>	50		1.1		0.66		0.32	J	1.3		0.73	U
	Sodium	µg/L	NE	20,000		46,000		93,000		52,000		95,000		69,000	
	Thallium	µg/L	2	NE		0.76	J	0.13	J	0.044	J	0.062	J	0.032	U
	Vanadium	µg/L	NE	14		0.62	J	0.58	J	1.4		0.16	U	0.45	J
	Zinc	µg/L	5000 <sup>1</sup>	NE		19	J	15	J	26		15	J	24	

Table 8-22

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW04B		OW05A		OW05B		OW06A		OW06B		
			Date Sampled:		10/26/2010		10/26/2010		10/26/2010		10/25/2010		05/18/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		N/A		N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		N/A		N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		N/A		N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		N/A		N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		N/A		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		N/A		N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		N/A		N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		N/A		N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		N/A		N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		N/A		N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		N/A		N/A		N/A		N/A	

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Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	OW04B	OW05A	OW05B	OW06A	OW06B		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:	10/26/2010	10/26/2010	10/26/2010	10/25/2010	10/18/2010
						Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500			340	260	370	220	540
	Total Dissolved Solids	mg/L	NE	NE			1,300	990	1,200	1,600	1,400

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW06B		OW07A		OW07B		OW11A		OW11B		
			Date Sampled:		10/25/2010		10/27/2010		10/27/2010		10/28/2010		05/17/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	-2.97	U	1.44	U	0.723	U	1.23	U	-1.084	U
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	-0.038	U	0.086	U	0.083	U	0.071	U	0.0033	U
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	0.01	U	0.035	U	0.038	U	0.012	U	-0.0222	U
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.334		0.229	U	0.084	U	0.165	U	N/A	
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	0.645		0.515		0.492		0.073	U	N/A	
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	0.979		0.229		0.492		Non-detect		N/A	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	-0.62	U	-1.195	U	-0.899	U	-0.151	U	0.4931	U
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	0.3	U	2.1	U	0.7	U	1.9	U	N/A	
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	0.082	U	0.075	U	0.058	U	0.065	U	N/A	
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	-0.114	U	-0.073	U	-0.155	U	0.165	U	N/A	
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.055	U	0.007	U	0.046		0.129		N/A	
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	140	U	382		275	U	411		N/A	
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	12.3		1.28		22.6		1.49		157.2	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	0.963		0.077	U	1.58		0.263	U	6.881	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	9.29		0.759		17.5		0.445	U	161.9	
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	22.553		2.039		41.68		1.49		325.981	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		33		42		19		26		13	
	Fluoride	mg/L	4	1.5		0.2	J	0.27	J	0.28	J	0.55	J	0.23	J
	Nitrate	mg/L	10	10		0.36		0.078	U	0.16	J	0.078	U	0.078	U
	Nitrite	mg/L	1	1		0.072	U	0.42		0.55		0.21	J	0.33	J
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		600		930		710		680		570	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		11	J	16	J	240		20		N/A	
	Antimony	µg/L	6	3		1.2		0.34	R	0.27	U	0.27	U	N/A	
	Arsenic	µg/L	10	25		0.85		15		1.1		14		N/A	
	Barium	µg/L	2,000	1,000		14		7.9	J	12		10		N/A	
	Beryllium	µg/L	4	11		0.056	U	0.056	U	0.056	U	0.056	U	N/A	
	Boron	µg/L	NE	1,000		150	J	680		220		620		N/A	
	Cadmium	µg/L	5	5		0.18	J	0.084	U	0.084	U	0.084	U	N/A	
	Calcium	µg/L	NE	NE		130,000		120,000		130,000		110,000		N/A	
	Chromium	µg/L	100	50		8.1		1.2	J	6.3		0.37	J	N/A	
	Cobalt	µg/L	NE	NE		0.21	J	0.4	J	0.48	J	0.22	J	N/A	
	Copper	µg/L	1,300	200		3.1		2.8		5.7		1.4	J	N/A	
	Iron	µg/L	300 <sup>1</sup>	300		450		610		630		780		N/A	
	Lead	µg/L	15	25		0.32	J	0.5		0.95		0.046	U	N/A	
	Lithium	µg/L	NE	NE		86		85		100		68		N/A	
	Magnesium	µg/L	NE	NE		170,000		130,000		160,000		130,000		N/A	
	Manganese	µg/L	50 <sup>11</sup>	300		8		100		27		61		N/A	
	Mercury	µg/L	2	0.7		0.027	U	0.027	U	0.027	U	0.027	U	N/A	
	Nickel	µg/L	NE	100		17		5.4		9.2		3.8	J	N/A	
	Potassium	µg/L	NE	NE		5,300		7,700		4,000		7,100		N/A	
	Selenium	µg/L	50	10		1.6	J	1.6	J	1.1	J	0.97	J	N/A	
	Silver	µg/L	100 <sup>1</sup>	50		1.5		0.32	U	0.32	U	0.32	U	N/A	
	Sodium	µg/L	NE	20,000		70,000		110,000		67,000		88,000		N/A	
	Thallium	µg/L	2	NE		0.062	J	0.14	J	0.076	J	0.058	J	N/A	
	Vanadium	µg/L	NE	14		0.29	J	0.22	J	0.78	J	0.26	J	N/A	
	Zinc	µg/L	5000 <sup>1</sup>	NE		18	J	20		28		11	J	N/A	

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Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW06B		OW07A		OW07B		OW11A		OW11B		
			Date Sampled:		10/25/2010		10/27/2010		10/27/2010		10/28/2010		05/17/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		N/A		N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		N/A		N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		N/A		N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		N/A		N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		N/A		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		N/A		N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		N/A		N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		N/A		N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		N/A		N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		N/A		N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		N/A		N/A		N/A		N/A	

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Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	OW06B	OW07A	OW07B	OW11A	OW11B		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:	10/25/2010	10/27/2010	10/27/2010	10/28/2010	05/17/2010
						Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500			520	200	420	220	330
	Total Dissolved Solids	mg/L	NE	NE			1,500	1,700	1,500	1,300	1,200

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW11B		OW12A		OW13A		OW13B		OW13B		
			Date Sampled:		10/28/2010		10/28/2010		10/27/2010		05/17/2010		10/27/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	-1.78	U	-1.58	U	0.145	U	N/A		-0.973	U
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	0.045	U	0.053	U	0.07	U	N/A		0.111	U
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	0.02	U	0.004	U	0.01	U	N/A		0.003	U
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.674		0.21	U	0.232		0.8937	J	0.073	U
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	1.59		0.368		0.356	U	0.7053	U	0.439	
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	2.264		0.368		0.232		0.894		0.439	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	-0.286	U	-0.157	U	-0.623	U	N/A		0.74	U
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	1.4	U	1.9	U	0.7	U	N/A		1.4	U
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	0.032	U	0.172		0.094	U	0.0174	U	-0.04	U
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	0.111	U	0.193	U	0.134	U	0.0673	U	-0.116	U
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.226		0.159		0.079	U	0.1079	J	0.048	U
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	254	U	372	U	206	U	N/A		169	U
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	157		2.12		1.46		12.29		12.6	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	6.64		0.179		0.276	U	0.716		0.611	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	157		1.53		0.824		9.379		10.8	
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	320.64		3.829		2.284		22.385		24.011	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		15		27		39		39		45	
	Fluoride	mg/L	4	1.5		0.58	J	0.41	J	0.31	J	0.23	J	0.3	J
	Nitrate	mg/L	10	10		0.078	U	0.13	J	0.078	U	0.078	U	0.078	U
	Nitrite	mg/L	1	1		0.22	J	0.26	J	0.44		0.54	J	0.84	
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		550		770		870		980		1,200	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		22		4.3	J	4.9	J	8.4	J	410	
	Antimony	µg/L	6	3		0.48	J	0.6	J	0.27	U	1.4	U	0.35	R
	Arsenic	µg/L	10	25		0.77		25		33		0.46	J	1.9	
	Barium	µg/L	2,000	1,000		12		8.8	J	9.9	J	9.2	J	13	
	Beryllium	µg/L	4	11		0.29	J	0.056	U	0.056	U	0.056	U	0.056	U
	Boron	µg/L	NE	1,000		71	J	900		880		200	U	130	J
	Cadmium	µg/L	5	5		0.38	J	0.084	U	0.09	J	0.084	U	0.092	J
	Calcium	µg/L	NE	NE		150,000		150,000		140,000		200,000		220,000	
	Chromium	µg/L	100	50		1.2	J	0.4	J	0.13	U	0.96		5.6	
	Cobalt	µg/L	NE	NE		0.7	J	0.28	J	0.25	J	0.67	J	0.62	J
	Copper	µg/L	1,300	200		2.4		1.7	J	1.4	J	28		6.2	
	Iron	µg/L	300 <sup>1</sup>	300		510		1,200		970		800		1,200	
	Lead	µg/L	15	25		0.68		0.1	J	0.046	U	1.7		0.44	
	Lithium	µg/L	NE	NE		63		69		95		70		94	
	Magnesium	µg/L	NE	NE		180,000		120,000		120,000		300,000		250,000	
	Manganese	µg/L	50 <sup>11</sup>	300		90		91		53		23		20	
	Mercury	µg/L	2	0.7		0.027	U	0.027	U	0.027	U	0.052	J	0.027	U
	Nickel	µg/L	NE	100		8.9		6		4.5		17		23	
	Potassium	µg/L	NE	NE		3,300		12,000		10,000		1,600		3,000	
	Selenium	µg/L	50	10		0.96	J	1.4	J	1.7	J	2.1		1.9	J
	Silver	µg/L	100 <sup>1</sup>	50		0.51	J	0.43	J	0.32	U	0.73	U	0.32	U
	Sodium	µg/L	NE	20,000		42,000		110,000		97,000		78,000		69,000	
	Thallium	µg/L	2	NE		0.32	J	0.052	J	0.07	J	0.032	U	0.072	J
	Vanadium	µg/L	NE	14		0.73	J	0.16	U	0.16	U	0.45	J	1.1	
	Zinc	µg/L	5000 <sup>1</sup>	NE		21		9	J	9.6	J	34		18	J

Table 8-28

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW11B		OW12A		OW13A		OW13B		OW13B		
			Date Sampled:		10/28/2010		10/28/2010		10/27/2010		05/17/2010		10/27/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		N/A		N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		N/A		N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		N/A		N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		N/A		N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		N/A		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		N/A		N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		N/A		N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		N/A		N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		N/A		N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		N/A		N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		N/A		N/A		N/A		N/A	

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Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	OW11B	OW12A	OW13A	OW13B	OW13B	OW13B	OW13B
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:	10/28/2010	10/28/2010	10/27/2010	05/17/2010	10/27/2010
						Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500		Results	Qual.	Results	Qual.	Results	Qual.
	Total Dissolved Solids	mg/L	NE	NE		370		210		530	
						1,200		1,400		1,600	
										2,500	
											2,400

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW15A		OW15B		OW15B		OW17A		OW17B		
			Date Sampled:		10/27/2010		05/18/2010		10/27/2010		10/27/2010		05/17/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	1.46	U	N/A		1.34	U	-2.62	U		N/A
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	0.059	U	N/A		0.015	U	0.049	U		N/A
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	-0.023	U	N/A		-0.031	U	0.033	U		N/A
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.348		0.6565	J	0.243		0.127	U	0.3631	U
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	0.902	J	0.8951	U	0.3	U	0.578	J	0.2119	U
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	1.25		0.656		0.243		0.578		Non-detect	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	-0.58	U	N/A		-0.758	U	-0.401	U		N/A
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	-0.3	U	N/A		1	U	-0.2	U		N/A
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	0.11	U	0.2146	U	0.058	U	0.092	U	0.1484	U
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	0.166	U	0.1164	U	0.159	U	0.115	U	-0.0069	U
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.044	U	0.0387	U	0.058	U	0.155	U	0.0819	U
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	242	U	N/A		262	U	202	U		N/A
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	0.605	J	6.534		6.62		1.09		3.866	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	0.157		0.4577		0.32		0.125	U	0.5639	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	0.397	J	4.546		4.55		0.813		2.711	
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	1.159		11.538		11.49		1.903		7.141	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		64		5.7		7.8		35		8.9	
	Fluoride	mg/L	4	1.5		0.28	J	0.47	J	0.4	J	0.17	J	0.3	J
	Nitrate	mg/L	10	10		0.078	U	0.18	J	0.19	J	0.11	J	0.078	U
	Nitrite	mg/L	1	1		0.072	U	0.4	J	0.43		0.49		0.4	J
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	0.13	U	0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		1,000		460		510		1,100		330	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		26		4.2	J	150		5.7	J	2.9	J
	Antimony	µg/L	6	3		0.27	U	1.4	U	0.27	U	0.27	U	1.4	U
	Arsenic	µg/L	10	25		15		0.38	J	1.2		2.9		0.69	
	Barium	µg/L	2,000	1,000		7	J	25		21		8.1	J	9.2	J
	Beryllium	µg/L	4	11		0.056	U	0.056	U	0.056	U	0.056	U	0.056	U
	Boron	µg/L	NE	1,000		1,100		200	U	130	J	660		200	U
	Cadmium	µg/L	5	5		0.1	J	0.084	U	0.084	J	0.096	J	0.2	J
	Calcium	µg/L	NE	NE		200,000		110,000		120,000		130,000		73,000	
	Chromium	µg/L	100	50		0.31	J	3.8		1.2	J	0.19	J	4.6	
	Cobalt	µg/L	NE	NE		0.33	J	0.2	J	0.46	J	0.38	J	0.2	J
	Copper	µg/L	1,300	200		2.7		4		3.8		2.3		3	
	Iron	µg/L	300 <sup>1</sup>	300		1,000		460		570		650		310	
	Lead	µg/L	15	25		0.11	J	0.72	J	0.65		0.12	J	0.76	
	Lithium	µg/L	NE	NE		120		18		68		59		52	
	Magnesium	µg/L	NE	NE		94,000		130,000		120,000		160,000		150,000	
	Manganese	µg/L	50 <sup>11</sup>	300		130		1	J	37		130		6.5	
	Mercury	µg/L	2	0.7		0.027	U	0.027	U	0.027	U	0.027	U	0.038	J
	Nickel	µg/L	NE	100		7.1		7		6.5		7.1		6.9	
	Potassium	µg/L	NE	NE		11,000		1,100		2,600		7,700		1,800	
	Selenium	µg/L	50	10		2.4		1.9	J	1.2	J	1.4	J	2.1	
	Silver	µg/L	100 <sup>1</sup>	50		0.32	U	0.73	U	0.32	U	0.32	U	0.73	U
	Sodium	µg/L	NE	20,000		170,000		56,000		65,000		130,000		68,000	
	Thallium	µg/L	2	NE		0.086	J	0.032	U	0.056	J	0.056	J	0.032	U
	Vanadium	µg/L	NE	14		0.16	U	0.5	J	0.51	J	0.19	J	0.42	J
	Zinc	µg/L	5000 <sup>1</sup>	NE		14	J	16	J	17	J	13	J	16	J

Table 8-31

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station:		OW15A		OW15B		OW15B		OW17A		OW17B		
			Date Sampled:		10/27/2010		05/18/2010		10/27/2010		10/27/2010		05/17/2010		
			Matrix:		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater		
FRACTION	ANALYTE	UNITS	Federal Regulations	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		N/A		N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		N/A		N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		N/A		N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		N/A		N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		N/A		N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		N/A		N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		N/A		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		N/A		N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		N/A		N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		N/A		N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		N/A		N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		N/A		N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		N/A		N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		N/A		N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		N/A		N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		N/A		N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		N/A		N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		N/A		N/A		N/A		N/A	

Table 8-32

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	OW15A	OW15B	OW15B	OW17A	OW17B		
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:	10/27/2010	05/18/2010	10/27/2010	10/27/2010	05/17/2010
						Matrix:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500		Results	Qual.	Results	Qual.	Results	Qual.
	Total Dissolved Solids	mg/L	NE	NE				89	430	450	130
								1,900	1,400	1,200	2,000
											420
											1,000

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station: OW17B		OW18B		OW18B				
			Date Sampled: 10/27/2010		Matrix: Groundwater		10/27/2010				
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.
RAD	Cesium-137	pCi/l	92 <sup>4</sup>	NE	NE	3.03	U	N/A		3.41	U
	Plutonium-238	pCi/l	15 <sup>5</sup>	NE	NE	0.134	U	N/A		0.163	U
	Plutonium-239/240	pCi/l	15 <sup>5</sup>	NE	NE	0.011	U	N/A		-0.047	U
	Radium-226	pCi/l	5 <sup>6</sup>	5	100	0.084	U	N/A		-0.331	U
	Radium-228	pCi/l	5 <sup>6</sup>	5	100	1.09	J	N/A		0.681	J
	Total Radium (226&228)	pCi/l	5 <sup>6</sup>	5	100	1.09		N/A		0.681	
	Strontium-90	pCi/l	8 <sup>4</sup>	NE	NE	-0.195	U	N/A		-1.07	U
	Technetium-99	pCi/l	3200 <sup>4</sup>	NE	NE	0.3	U	N/A		0.5	U
	Thorium-228	pCi/l	15 <sup>5</sup>	NE	400	0.086	U	N/A		-0.032	U
	Thorium-230	pCi/l	15 <sup>5</sup>	NE	300	0.591		N/A		0.102	U
	Thorium-232	pCi/l	15 <sup>5</sup>	NE	50	0.316		N/A		0.134	
	Tritium (H3)	pCi/l	20000 <sup>4</sup>	NE	NE	374	U	N/A		314	U
	Uranium-234	pCi/l	27 <sup>7</sup>	NE	600	2.99		4.009		5.79	
	Uranium-235	pCi/l	27 <sup>7</sup>	NE	600	0.19	U	0.4413		0.498	
	Uranium-238	pCi/l	27 <sup>7</sup>	NE	600	2.5		4.058		4.11	
	Total Uranium (234, 235 & 238)	pCi/l	27 <sup>7</sup>	NE	600	5.49		8.508		10.398	
Anion	Chloride	mg/L	250 <sup>1</sup>	250		7.9		20		12	
	Fluoride	mg/L	4	1.5		0.35	J	0.19	J	0.38	J
	Nitrate	mg/L	10	10		0.078	U	0.078	U	0.37	
	Nitrite	mg/L	1	1		0.41		0.43	J	0.59	
	ortho-Phosphate-P	mg/L	NE	NE		0.13	U	0.13	U	0.13	U
	Sulfate	mg/L	250 <sup>1</sup>	250		350		890		560	
Metal	Aluminum	µg/L	200 <sup>1</sup>	NE		12	J	N/A		24	
	Antimony	µg/L	6	3		0.27	U	N/A		0.27	U
	Arsenic	µg/L	10	25		0.43	J	N/A		0.62	
	Barium	µg/L	2,000	1,000		12		N/A		12	
	Beryllium	µg/L	4	11		0.056	U	N/A		0.056	U
	Boron	µg/L	NE	1,000		96	J	N/A		86	J
	Cadmium	µg/L	5	5		0.09	J	N/A		0.53	
	Calcium	µg/L	NE	NE		78,000		N/A		95,000	
	Chromium	µg/L	100	50		0.67	J	N/A		5.4	
	Cobalt	µg/L	NE	NE		0.46	J	N/A		0.2	J
	Copper	µg/L	1,300	200		2.5		N/A		5.2	
	Iron	µg/L	300 <sup>1</sup>	300		270		N/A		380	
	Lead	µg/L	15	25		0.24	J	N/A		0.19	J
	Lithium	µg/L	NE	NE		61		N/A		91	
	Magnesium	µg/L	NE	NE		120,000		N/A		170,000	
	Manganese	µg/L	50 <sup>11</sup>	300		23		N/A		20	
	Mercury	µg/L	2	0.7		0.027	U	N/A		0.027	U
	Nickel	µg/L	NE	100		6.5		N/A		15	
	Potassium	µg/L	NE	NE		2,100		N/A		2,400	
	Selenium	µg/L	50	10		2.2		N/A		1.4	J
	Silver	µg/L	100 <sup>1</sup>	50		0.32	U	N/A		0.32	U
	Sodium	µg/L	NE	20,000		54,000		N/A		95,000	
	Thallium	µg/L	2	NE		0.034	R	N/A		0.042	J
	Vanadium	µg/L	NE	14		0.24	J	N/A		0.37	J
	Zinc	µg/L	5000 <sup>1</sup>	NE		17	J	N/A		25	

Table 8-34

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater			Station: OW17B		OW18B		OW18B				
			Date Sampled: 10/27/2010		Matrix: Groundwater		10/27/2010				
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Results	Qual.	Results	Qual.	Results	Qual.
VOC	1,1,1-Trichloroethane	µg/L	200	5		N/A		N/A		N/A	
	1,1,2,2-Tetrachloroethane	µg/L	NE	5		N/A		N/A		N/A	
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NE	5		N/A		N/A		N/A	
	1,1,2-Trichloroethane	µg/L	5	1		N/A		N/A		N/A	
	1,1-Dichloroethane	µg/L	NE	5		N/A		N/A		N/A	
	1,1-Dichloroethene	µg/L	7	5		N/A		N/A		N/A	
	1,2,3-Trichlorobenzene	µg/L	NE	5		N/A		N/A		N/A	
	1,2,4-Trichlorobenzene	µg/L	70	5		N/A		N/A		N/A	
	1,2-Dibromo-3-chloropropane	µg/L	0.2	0.04		N/A		N/A		N/A	
	1,2-Dichlorobenzene	µg/L	600	3		N/A		N/A		N/A	
	1,2-Dichloroethane	µg/L	5	0.6		N/A		N/A		N/A	
	1,2-Dichloropropane	µg/L	5	1		N/A		N/A		N/A	
	1,3-Dichlorobenzene	µg/L	NE	3		N/A		N/A		N/A	
	1,4-Dichlorobenzene	µg/L	75	3		N/A		N/A		N/A	
	2-Butanone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A	
	2-Hexanone	µg/L	NE	NE		N/A		N/A		N/A	
	4-Methyl-2-pentanone	µg/L	NE	NE		N/A		N/A		N/A	
	Acetone <sup>8</sup>	µg/L	NE	NE		N/A		N/A		N/A	
	Benzene	µg/L	5	1		N/A		N/A		N/A	
	Bromochloromethane	µg/L	NE	5		N/A		N/A		N/A	
	Bromodichloromethane	µg/L	NE	NE		N/A		N/A		N/A	
	Bromoform	µg/L	NE	NE		N/A		N/A		N/A	
	Bromomethane	µg/L	NE	5		N/A		N/A		N/A	
	Carbon disulfide	µg/L	NE	60		N/A		N/A		N/A	
	Carbon tetrachloride	µg/L	5	5		N/A		N/A		N/A	
	Chlorobenzene	µg/L	100	5		N/A		N/A		N/A	
	Chloroethane	µg/L	NE	5		N/A		N/A		N/A	
	Chloroform	µg/L	NE	7		N/A		N/A		N/A	
	Chloromethane	µg/L	NE	5		N/A		N/A		N/A	
	cis-1,2-Dichloroethene	µg/L	70	5		N/A		N/A		N/A	
	cis-1,3-Dichloropropene	µg/L	NE	0.4 <sup>12</sup>		N/A		N/A		N/A	
	Dibromochloromethane	µg/L	NE	5		N/A		N/A		N/A	
	Dichlorodifluoromethane	µg/L	NE	5		N/A		N/A		N/A	
	Dichloromethane <sup>8</sup>	µg/L	5	5		N/A		N/A		N/A	
	Ethylbenzene	µg/L	700	5		N/A		N/A		N/A	
	Ethylene dibromide	µg/L	0.05	0.001		N/A		N/A		N/A	
	Isopropylbenzene	µg/L	NE	5		N/A		N/A		N/A	
	Methyl tert-butyl ether	µg/L	NE	NE		N/A		N/A		N/A	
	Naphthalene	µg/L	NE	NE		N/A		N/A		N/A	
	Styrene	µg/L	100	5		N/A		N/A		N/A	
	Tetrachloroethene	µg/L	5	5		N/A		N/A		N/A	
	Toluene <sup>8</sup>	µg/L	1000	5		N/A		N/A		N/A	
	trans-1,2-Dichloroethene	µg/L	100	5		N/A		N/A		N/A	
	trans-1,3-Dichloropropene	µg/L	NE	0.4 <sup>2</sup>		N/A		N/A		N/A	
	Trichloroethene	µg/L	5	5		N/A		N/A		N/A	
	Trichlorofluoromethane	µg/L	NE	5		N/A		N/A		N/A	
	Vinyl chloride	µg/L	2	2		N/A		N/A		N/A	
	Xylenes, Total	µg/L	10,000	5 <sup>3</sup>		N/A		N/A		N/A	

Table 8-35

Table 8. NFSS - 2010 Spring and FALL Environmental Surveillance Program Findings for Groundwater				Station:	OW17B	OW18B	OW18B				
FRACTION	ANALYTE	UNITS	Federal Regulations MCLs <sup>a,b</sup>	NY State Water Quality Stds. <sup>a,c</sup>	USDOE DCG for Water	Date Sampled:		Matrix:		Date Sampled:	
						10/27/2010		Groundwater		05/17/2010	
Water Quality	Alkalinity, Total (As CaCO <sub>3</sub> )	mg/L	500 <sup>1</sup>	500		440		Results	Qual.	520	570
	Total Dissolved Solids	mg/L	NE	NE		970		Results	Qual.	1,700	1,400

<sup>a</sup> Groundwater comparison criteria. Ground water at the NFSS site classifies as GSA saline ground waters and is not used as a public drinking water supply, sampling results are compared to Federal drinking water standards and NYS Water Quality criteria as a conservative basis for evaluation of analytical results.

<sup>b</sup> Federal Regulations: National Primary Drinking Water Regulations 40CFR141.62&63

<sup>c</sup> New York State Statndatds -Water Quality Criteria (class GA) per 6 NYCRR, Part 703.

<sup>1</sup> National Secondary Drinking Water Regulations (40CFR143.3)

<sup>2</sup> Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.

<sup>3</sup> Not a sum total for Dimethyl Benzene (Xylene) , applies to 1,2-Xylene, 1,3-Xylene and 1,4-Xylene individually.

<sup>4</sup> Calculated to comply with 4 mrem/year for beta emitters, using annual drinking water rate of 868.7 L/year

<sup>5</sup> Gross alpha limit including radium-226, excluding radon and uranium

<sup>6</sup> 5 pCi/L applies to sum of Ra-226 and Ra-228

<sup>7</sup> 30 ug/L or 27 pCi/L; applies to sum of uranium isotopes (total uranium)

<sup>8</sup> Common laboratory contaminant.

J - Estimated value

U - Non-detect

R -Rejected



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**2010**

## **FIGURES**

**ENVIRONMENTAL SURVEILLANCE TECHNICAL MEMORANDUM**

## NFSS SITE LOCATION

Figure 1

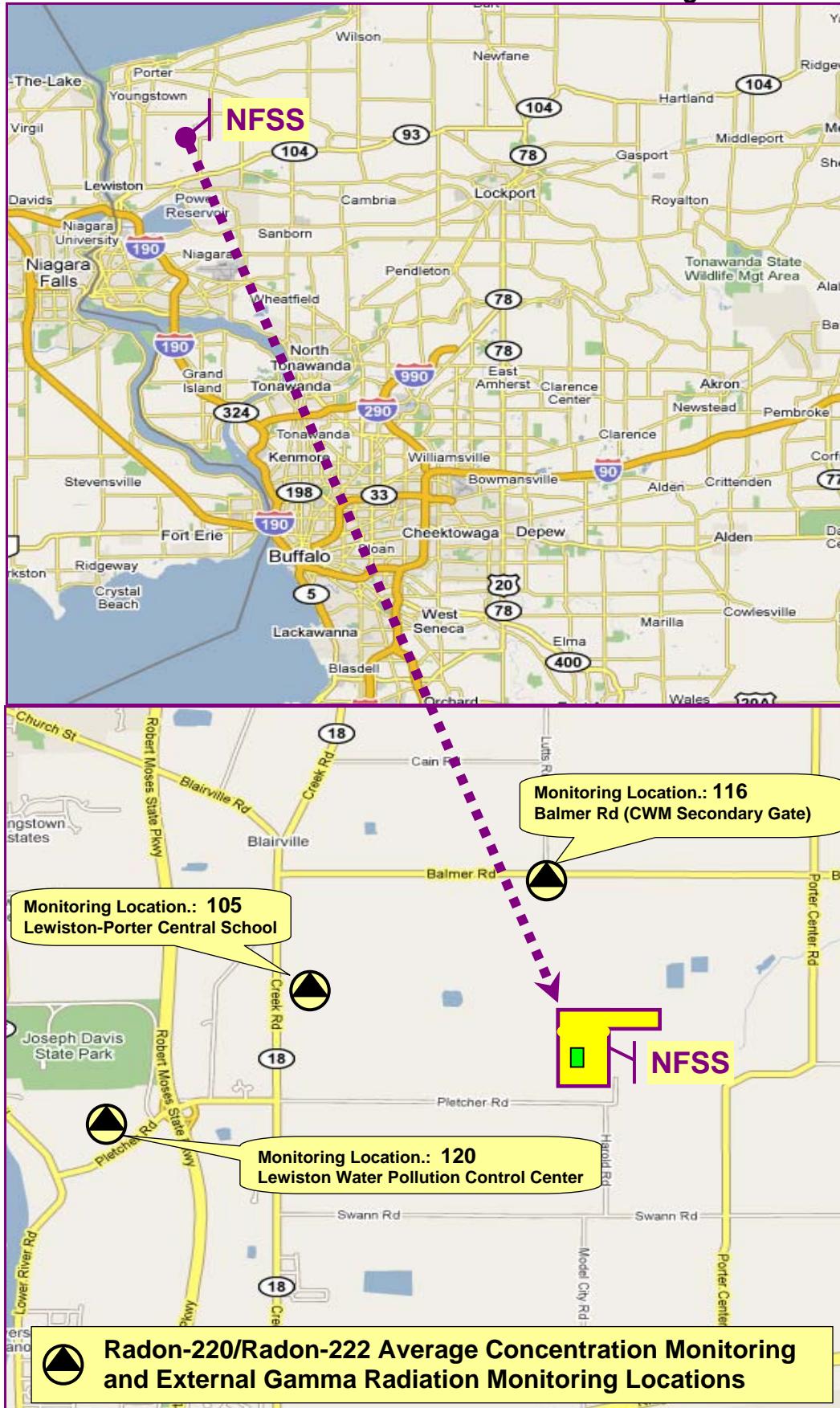


Figure 2a: NFSS Environmental Surveillance Groundwater Wells

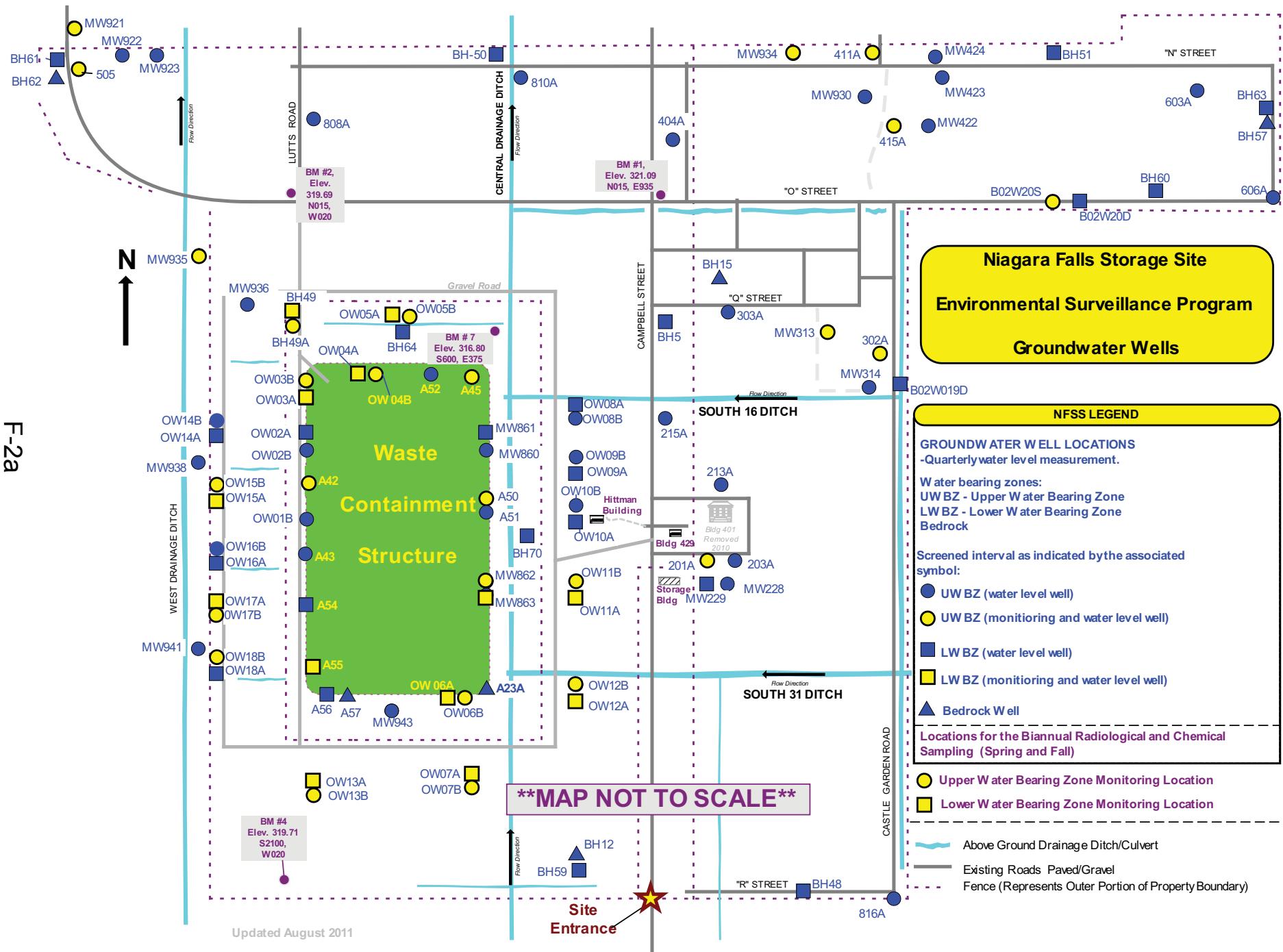


Figure 2b: Surface Water and Sediment Sampling Locations at the NFSS

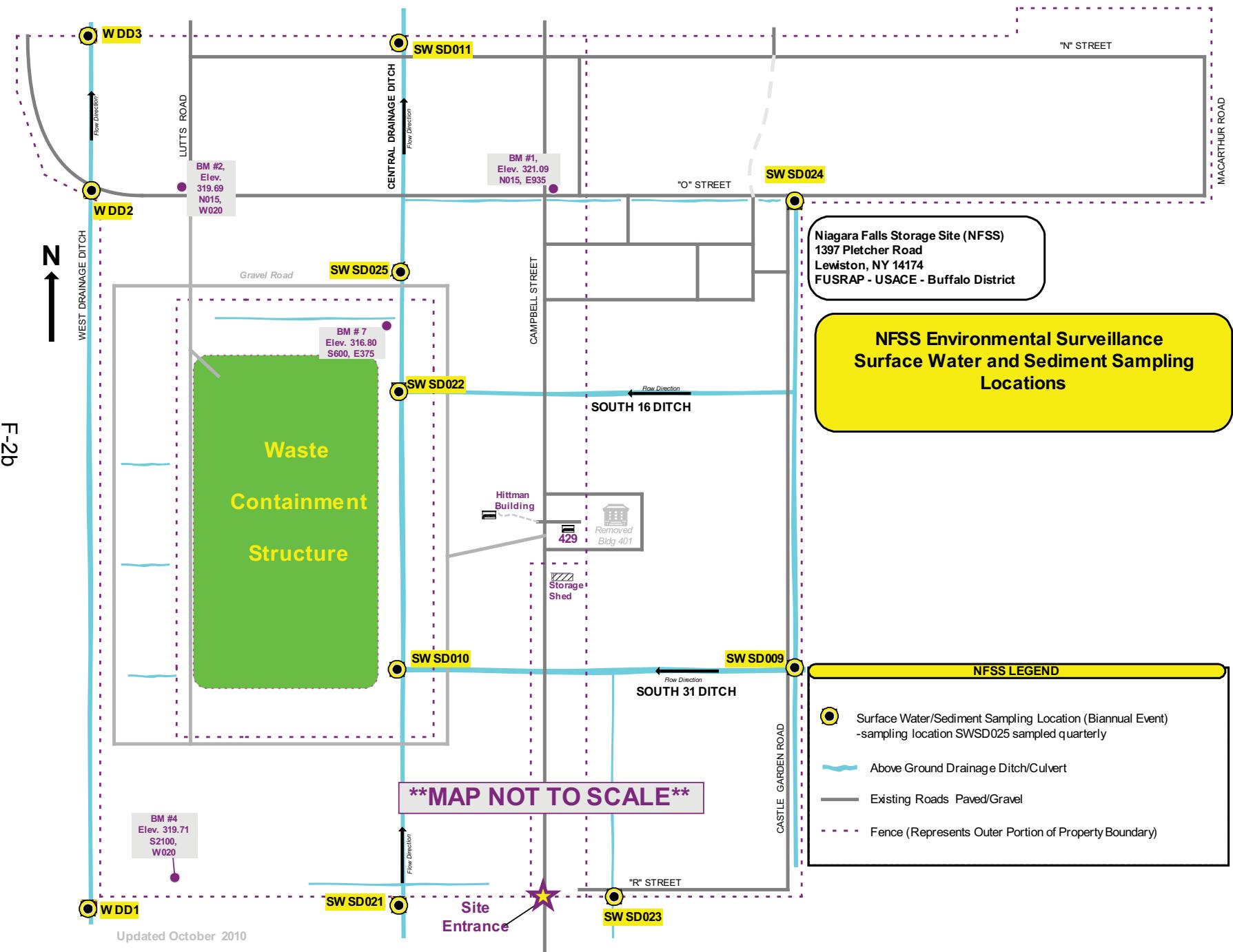
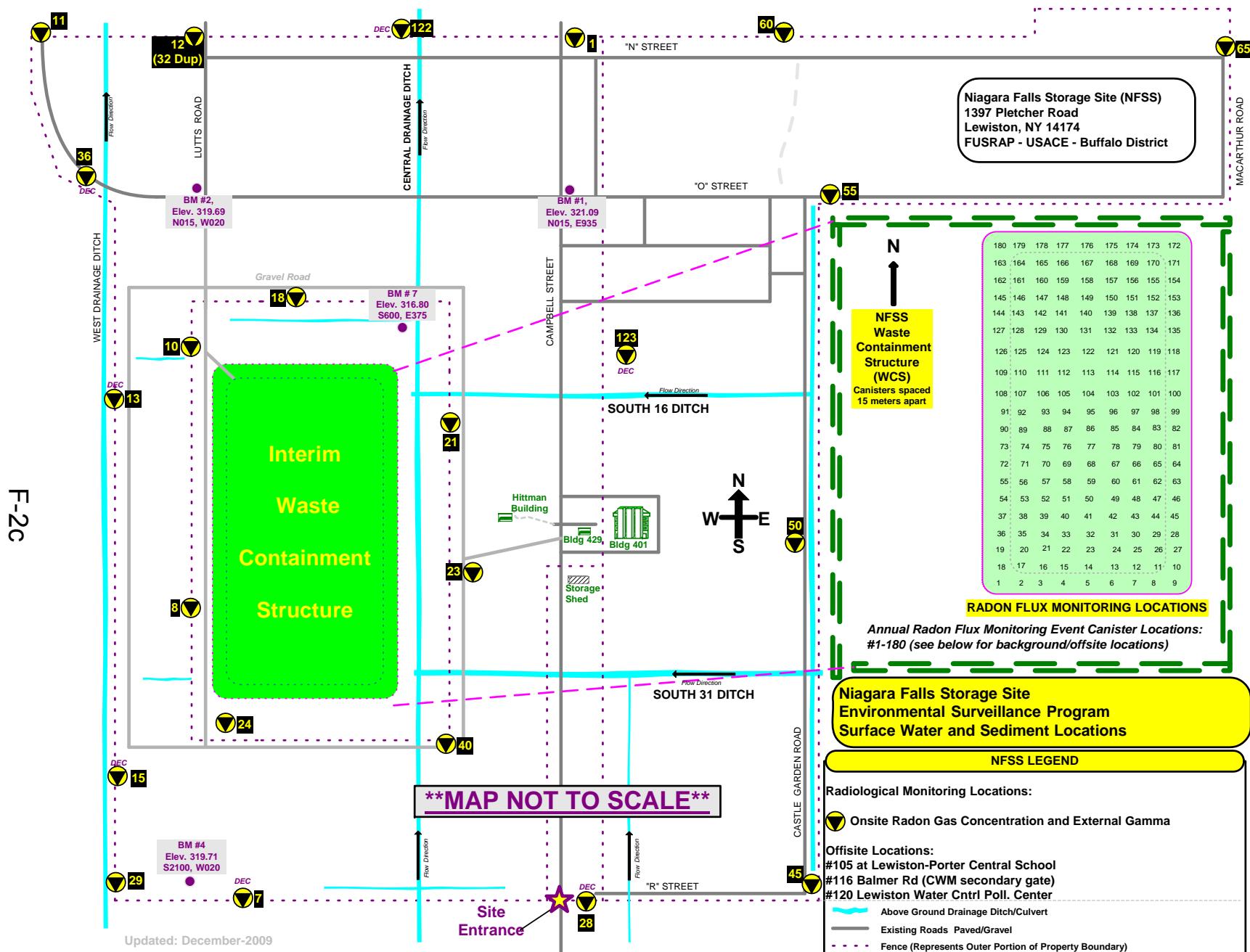
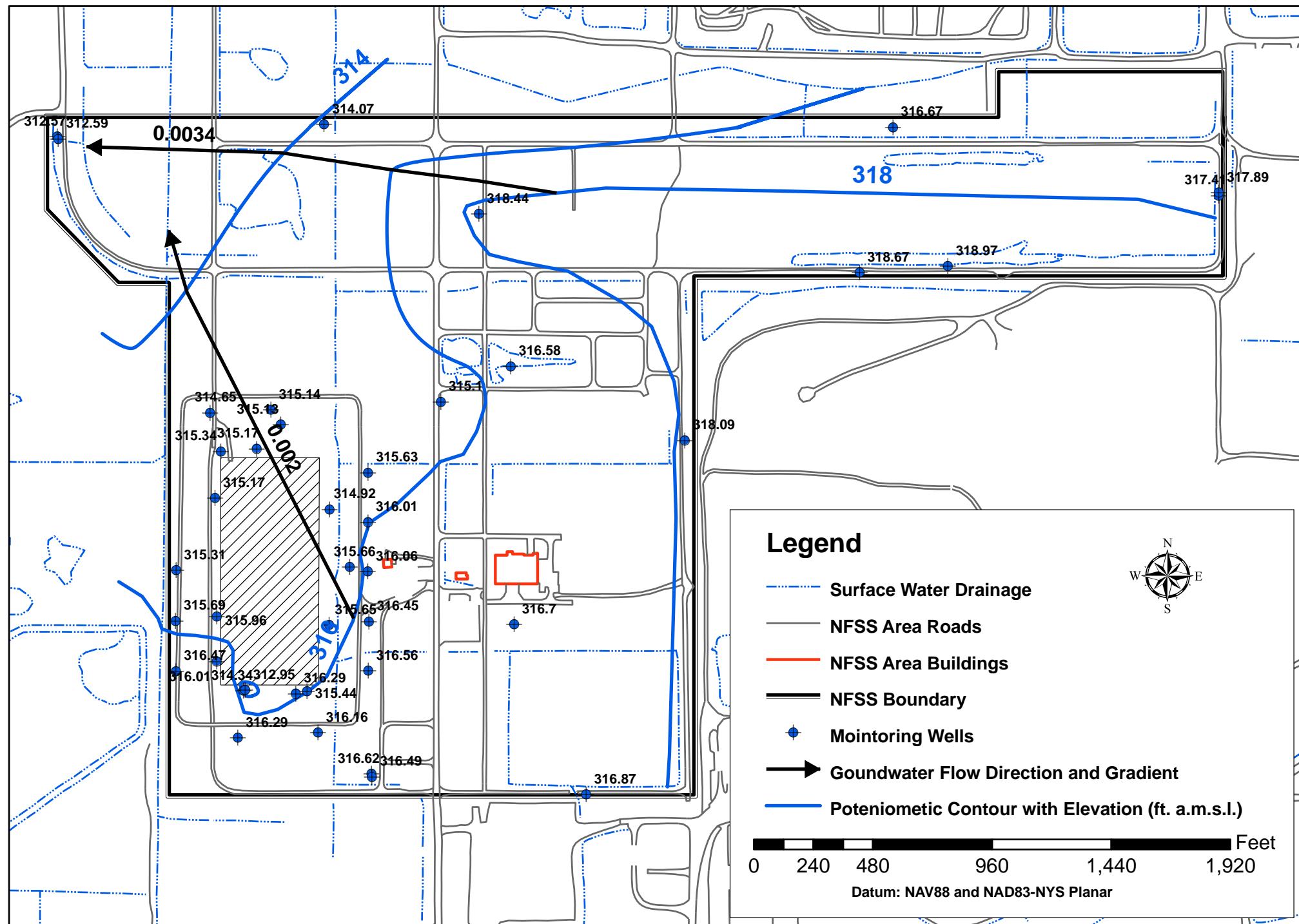


Figure 2c : Radiological Monitoring Locations at the NFSS





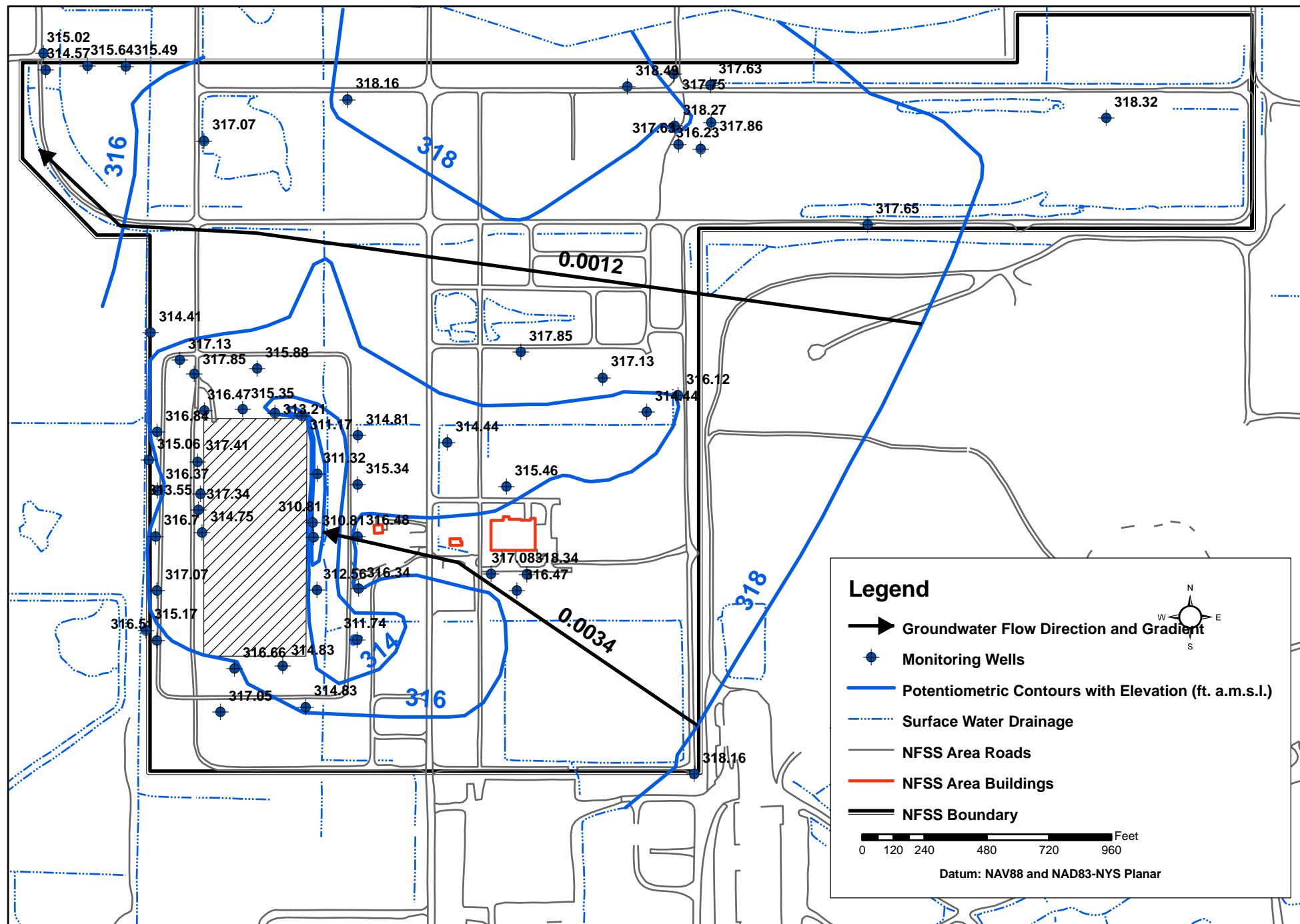
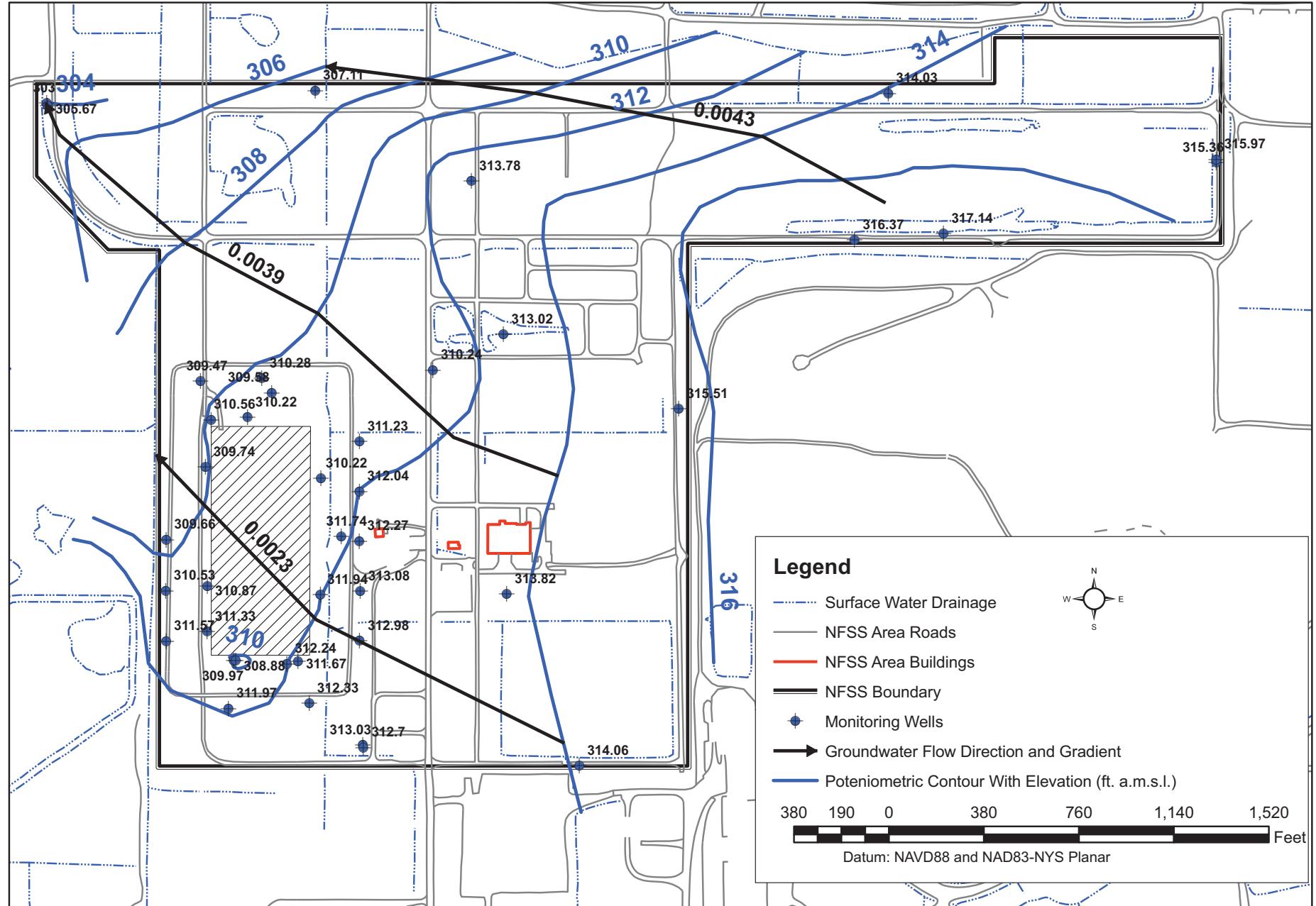
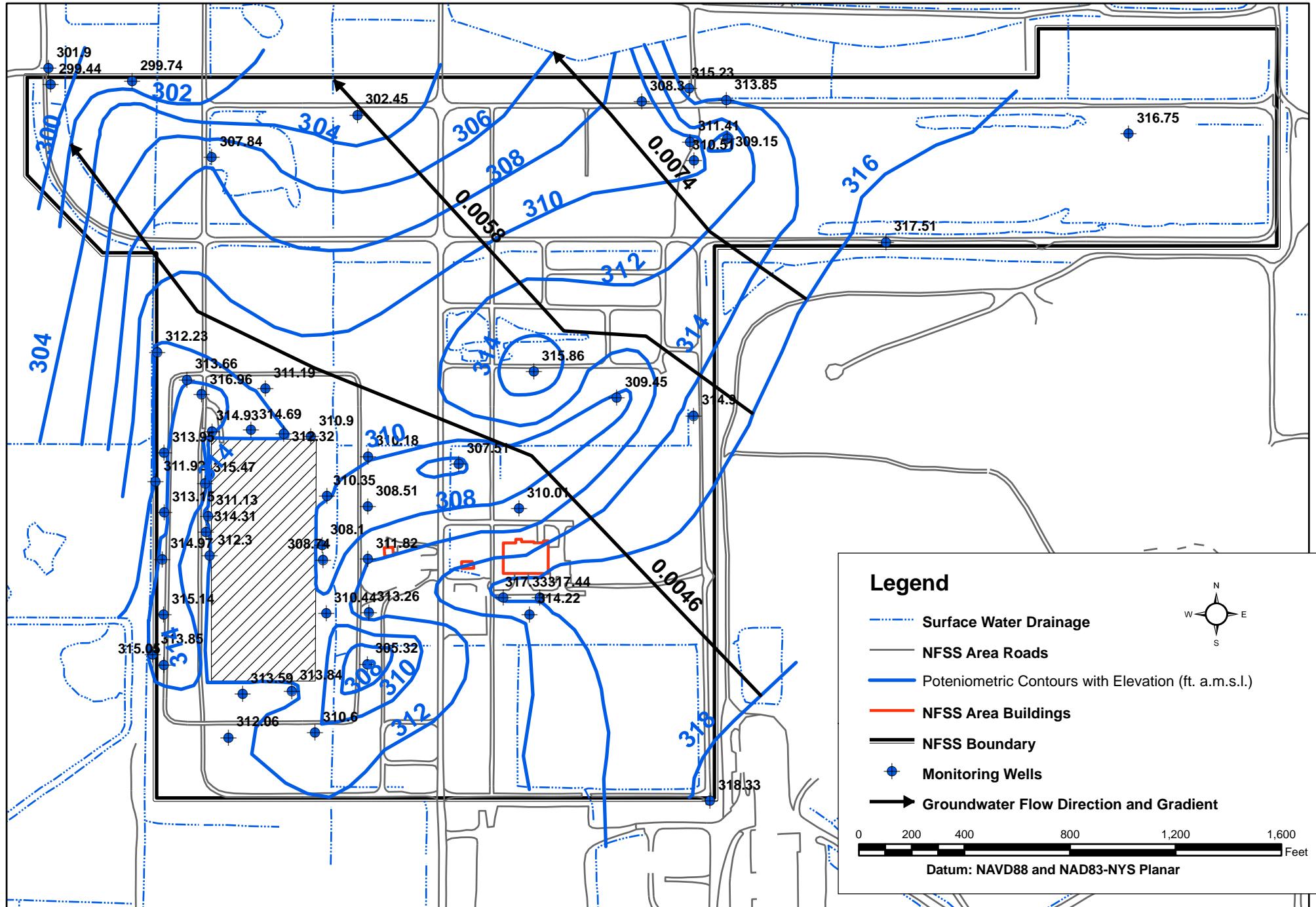


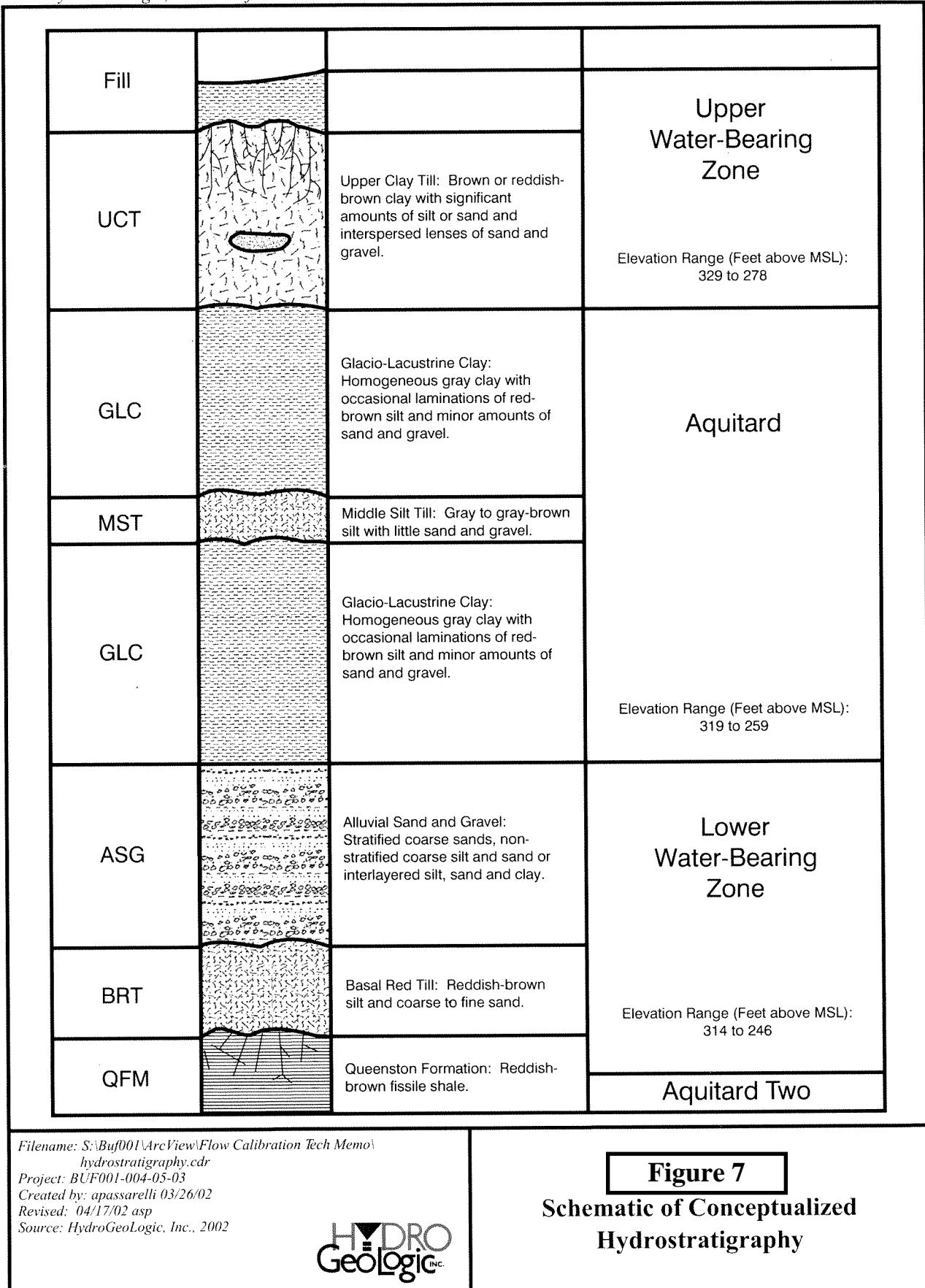
Figure 4  
Seasonal High Potentiometric Surface Map (May 18, 2010)  
Upper Groundwater System



**Figure 5**  
**Seasonal Low Potentiometric Surface Map (October 18, 2010)**  
**Lower Groundwater System**



**Figure 6**  
Seasonal Low Potentiometric Surface Map (October 18, 2008)  
Upper Groundwater System



Filename: S:\Buf001\ArcView\Flow Calibration Tech Memo\

hydrostratigraphy.cdr

Project: BUF001-004-05-03

Created by: apassarelli 03/26/02

Revised: 04/17/02.asp

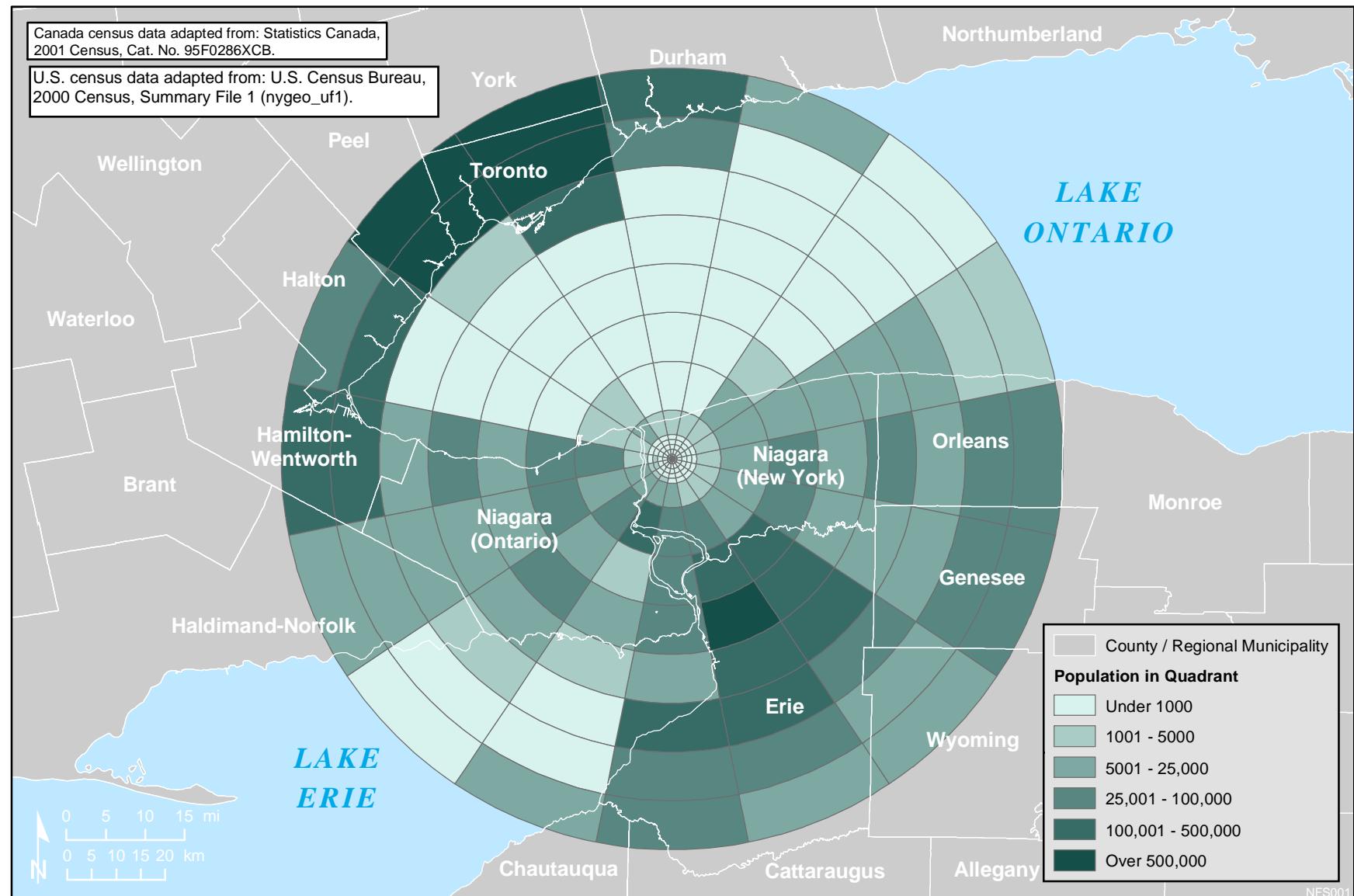
Source: HydroGeoLogic, Inc., 2002



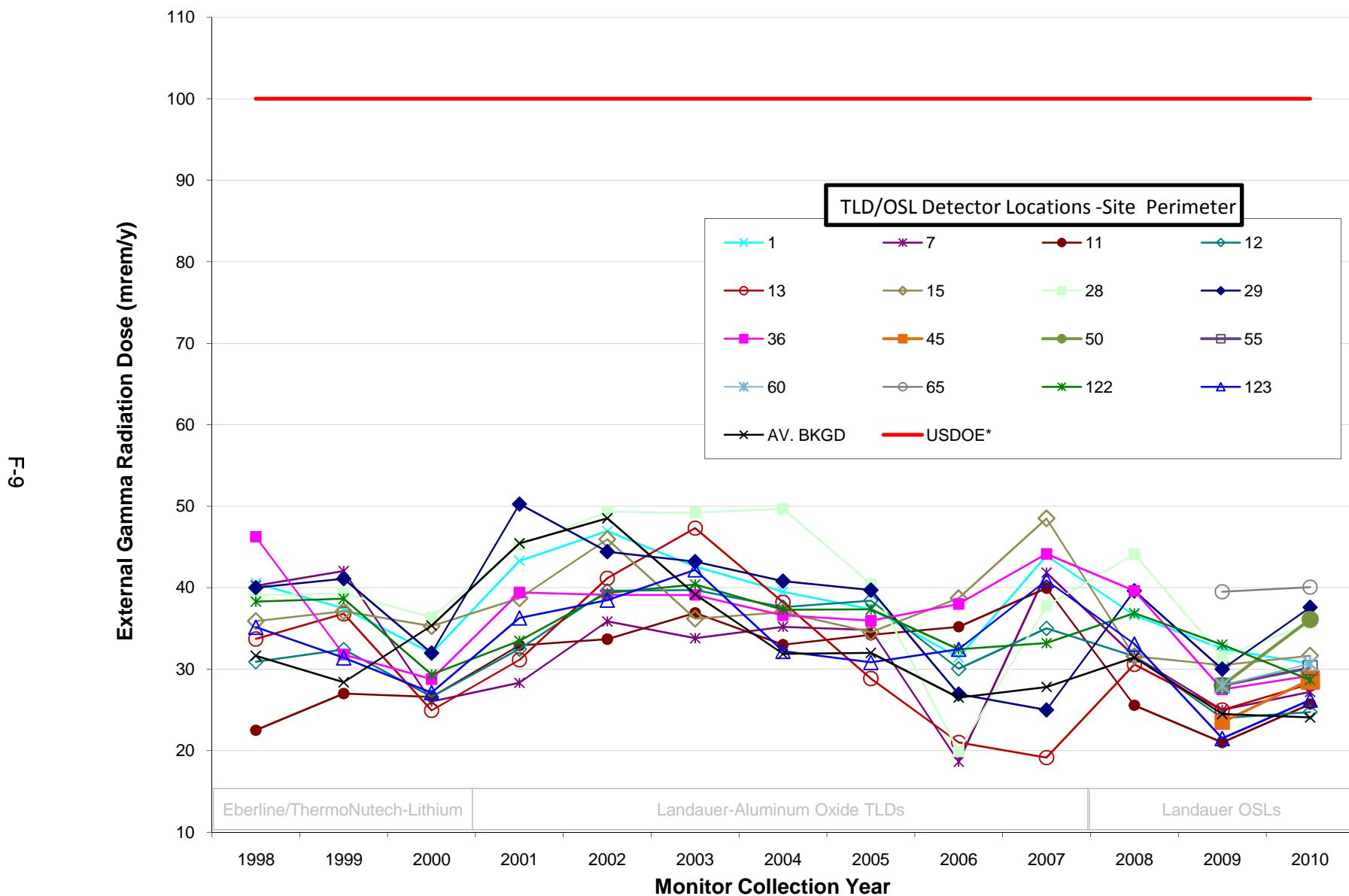
**Figure 7**

**Schematic of Conceptualized  
Hydrostratigraphy**

Figure 8: Census Data



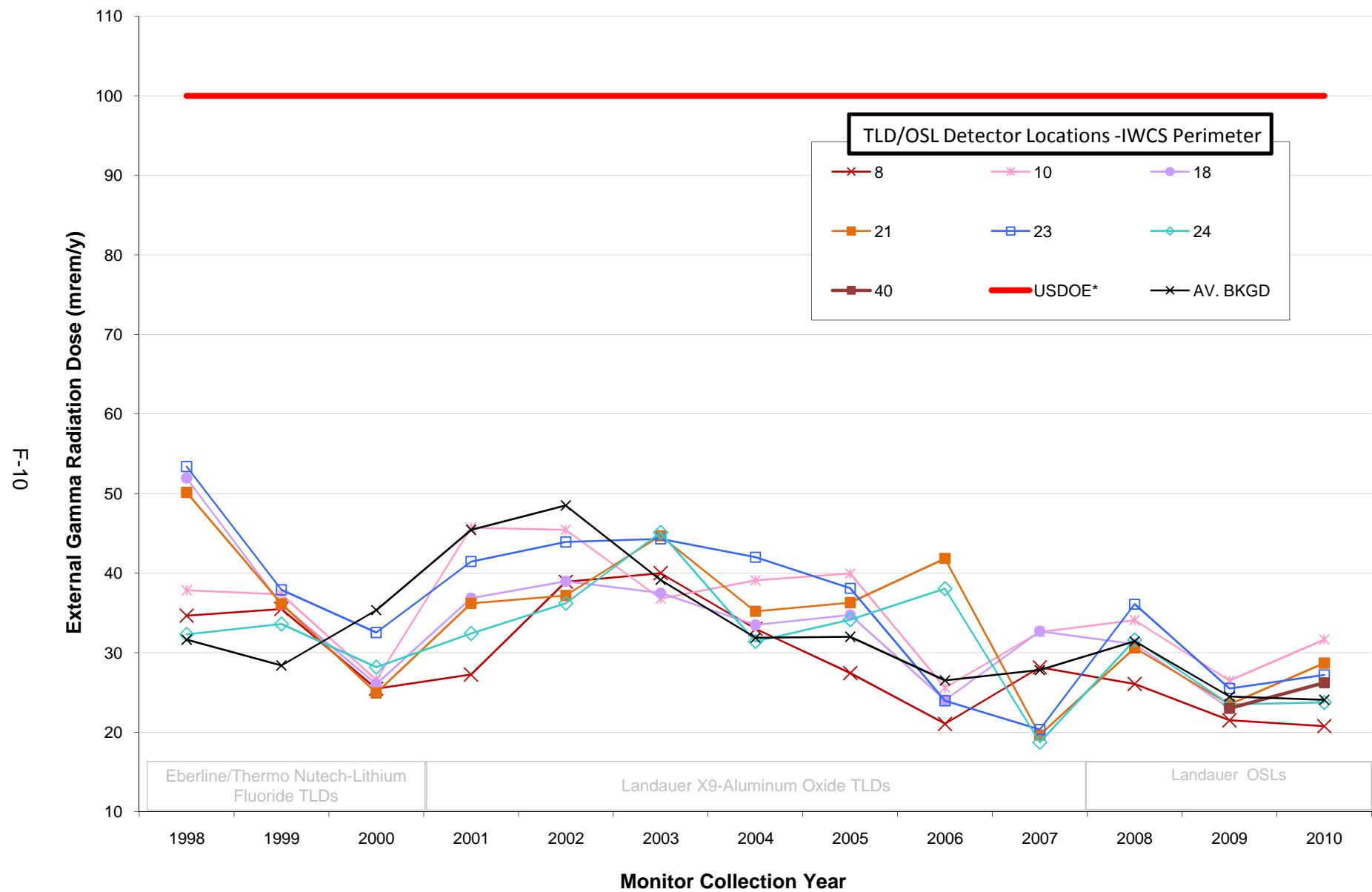
**FIGURE 9: EXTERNAL GAMMA RADIATION DOSE RATES AT NFSS PERIMETER**



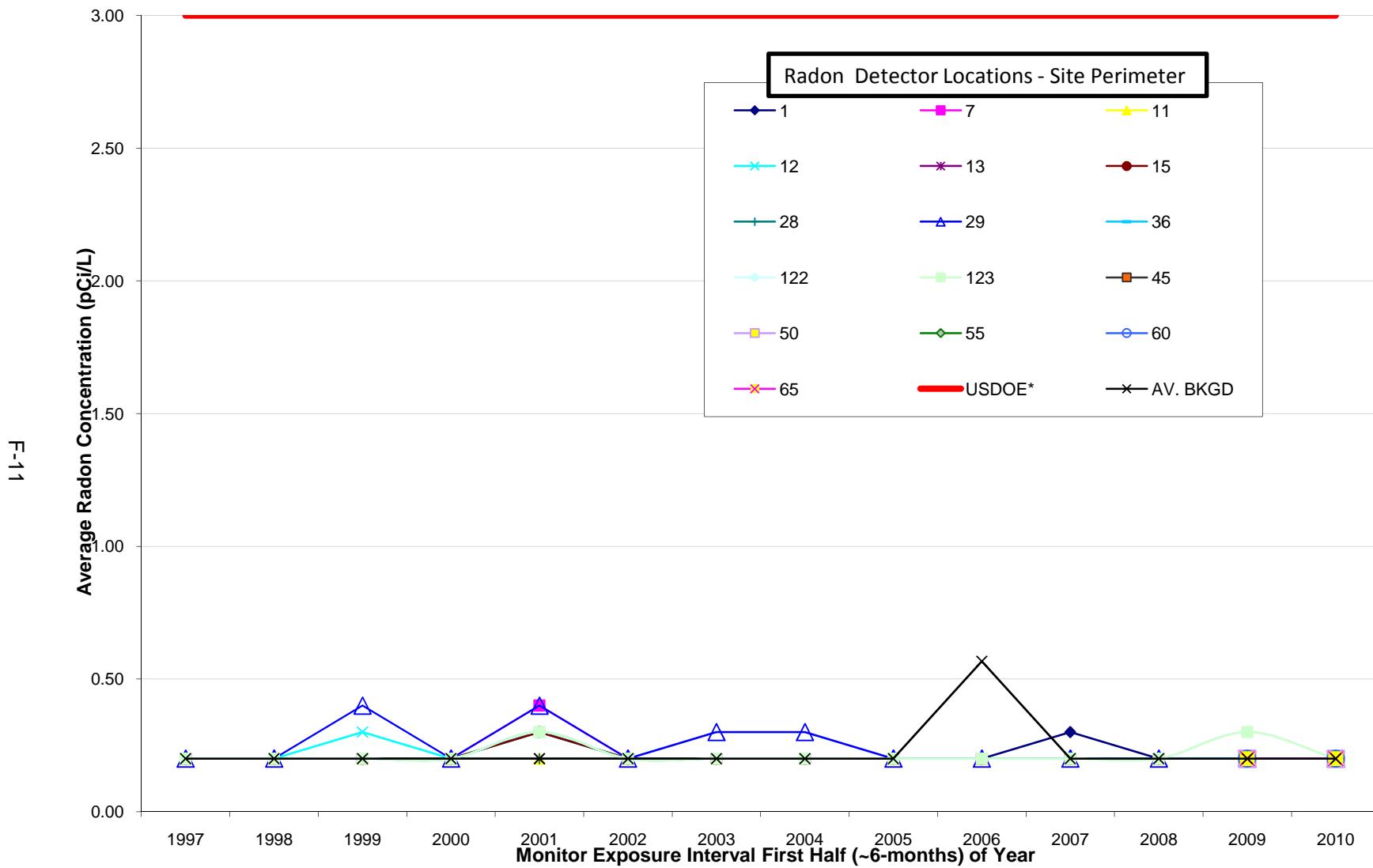
\*The United States Department of Energy (USDOE) limit for external gamma radiation is 100 mrem/year above background.

\*\*Locations added in 2009: 45, 50, 55, 60 and 65

**FIGURE 10: EXTERNAL GAMMA RADIATION DOSE RATES AT IWCS PERIMETER**



**FIGURE 11: RADON GAS CONCENTRATION AT NFSS PERIMETER (JAN-JULY INTERVAL)**

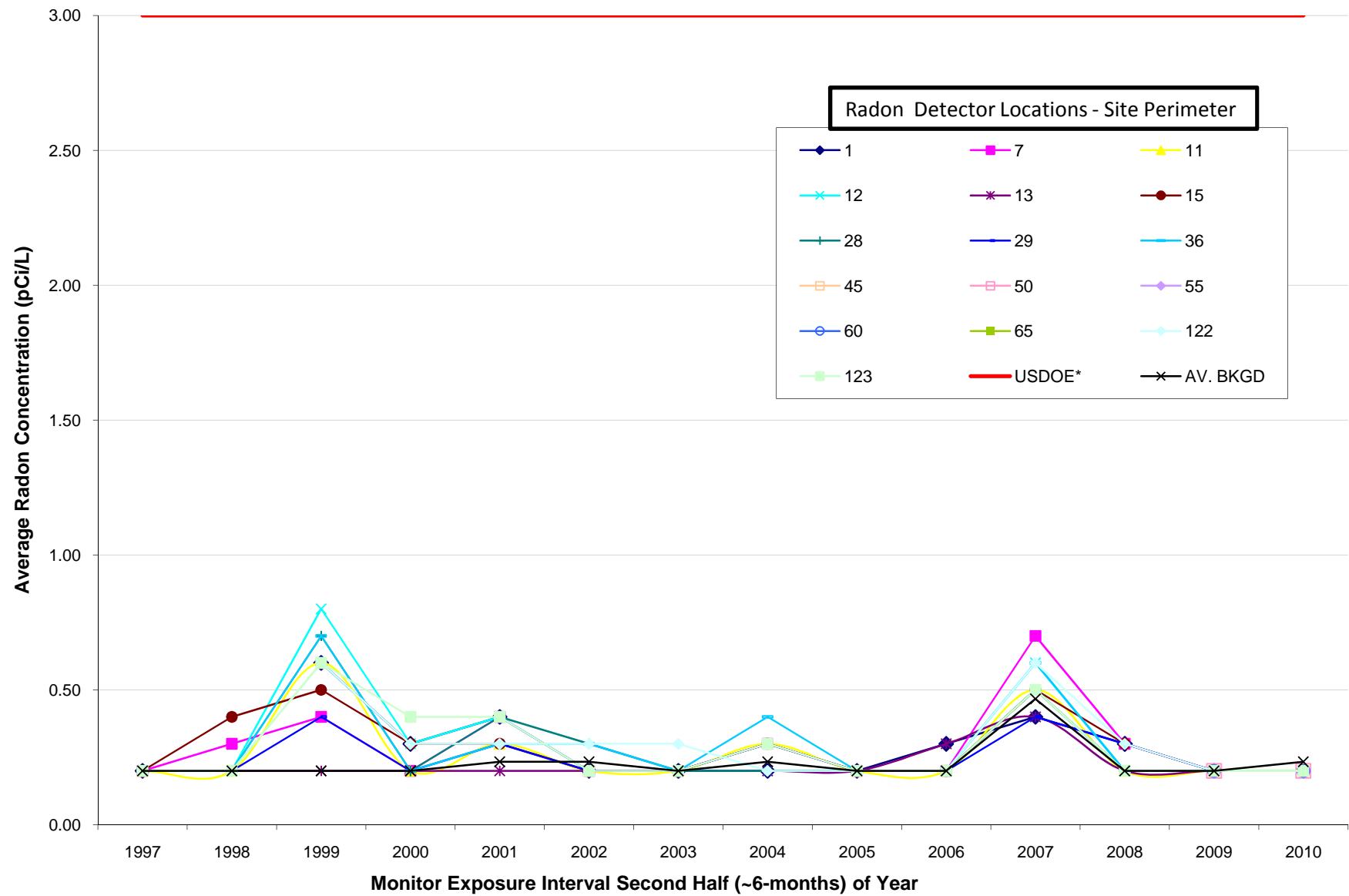


\*The United States Department of Energy (USDOE) off-site limit for radon gas is 3.0 pCi/L above background.

\*\*Locations added in 2009: 45, 50, 55, 60 and 65

Note: Above values contain detects and non-detects (detection limit is 0.2 pCi/L).

**FIGURE 12: RADON GAS CONCENTRATION AT NFSS PERIMETER (JUL-JAN INTERVAL)**

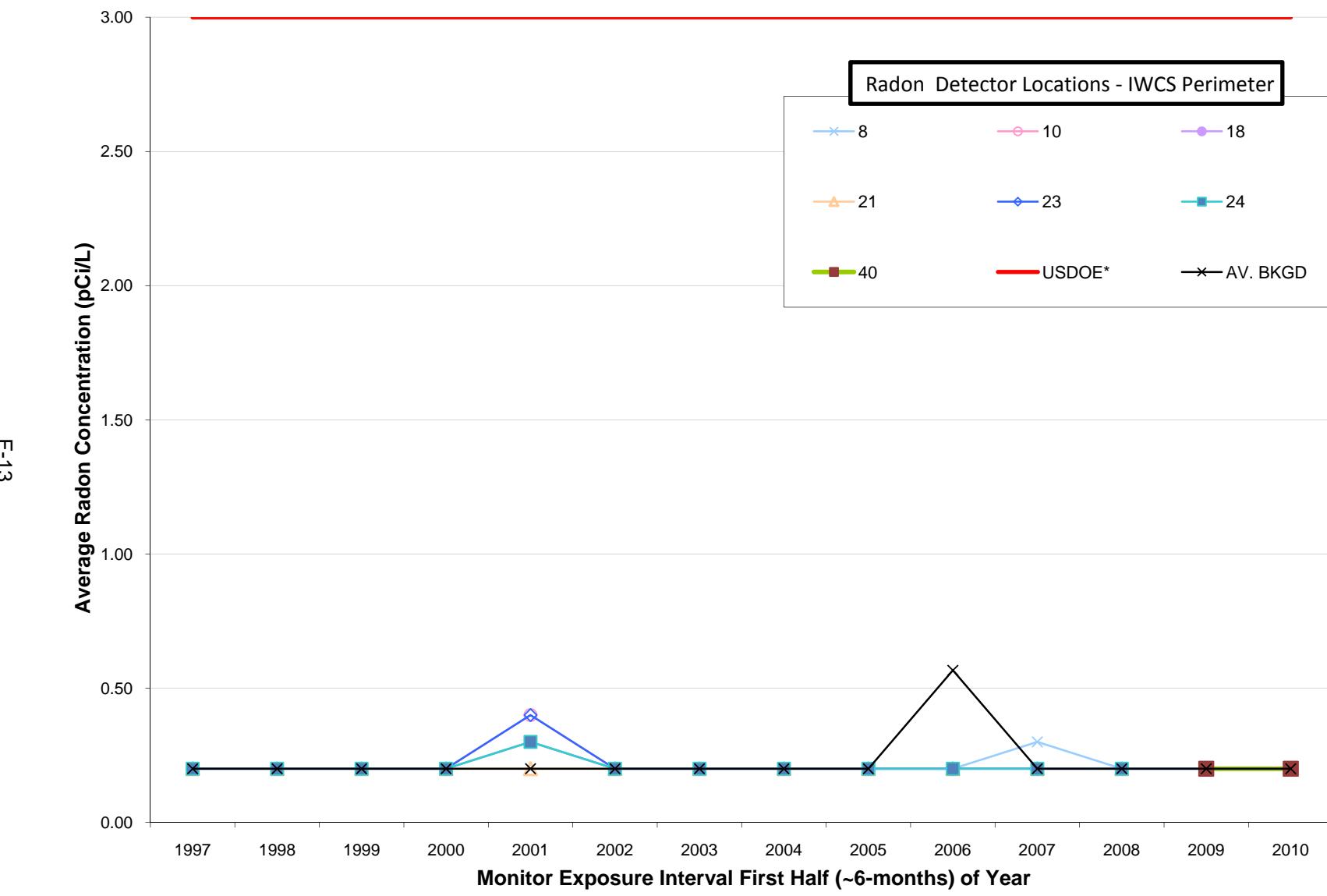


\*The United States Department of Energy (USDOE) off-site limit for radon gas is 3.0 pCi/L above background.

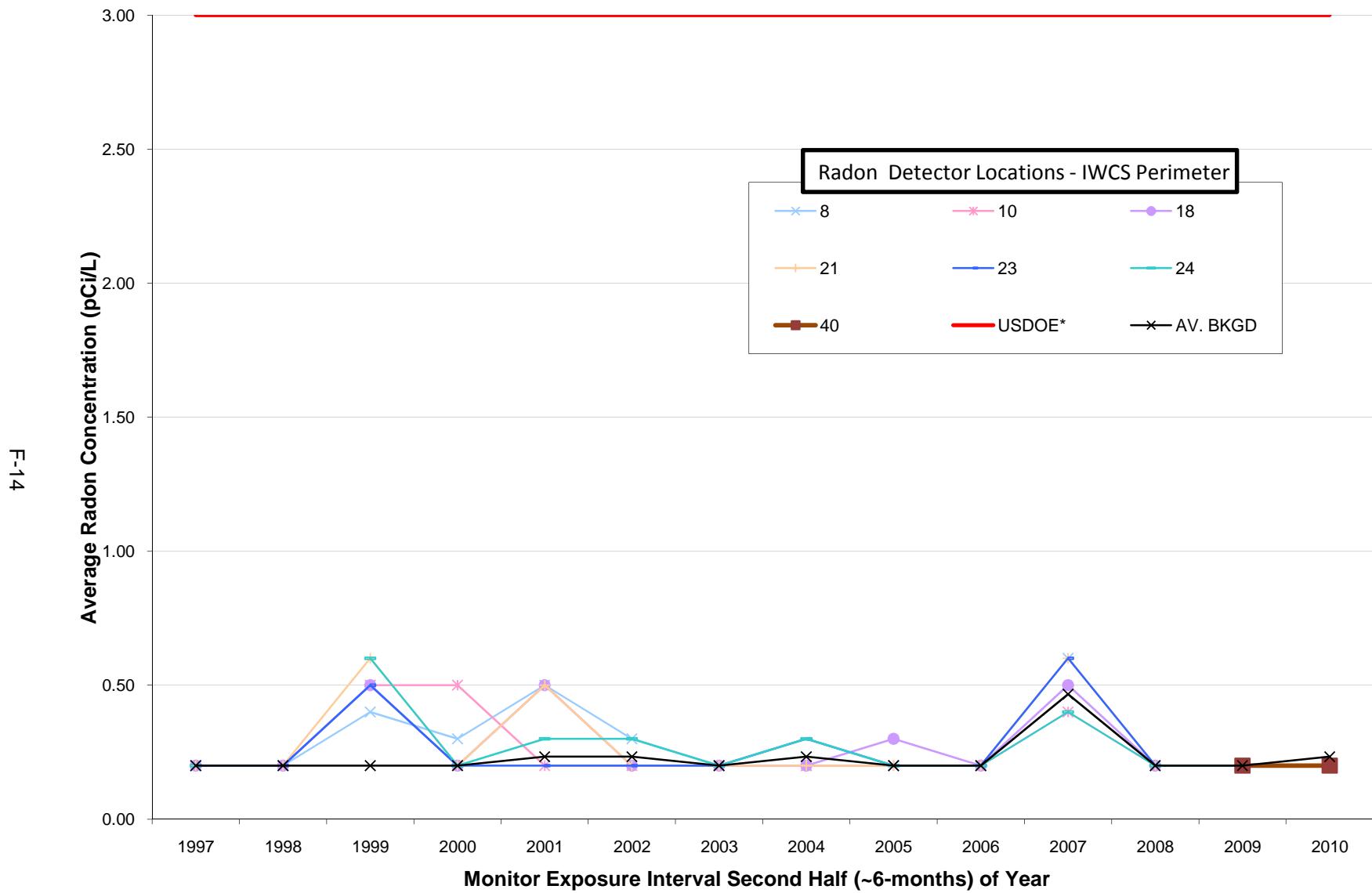
\*\*Locations added in 2009: 45, 50, 55, 60 and 65

Note: Above values contain detects and non-detects (detection limit is 0.2 pCi/L).

**FIGURE 13: RADON GAS CONCENTRATION AT IWCS PERIMETER (JAN-JULY INTERVAL)**



**FIGURE 14: RADON GAS CONCENTRATION AT IWCS PERIMETER (JULY-JAN INTERVAL)**

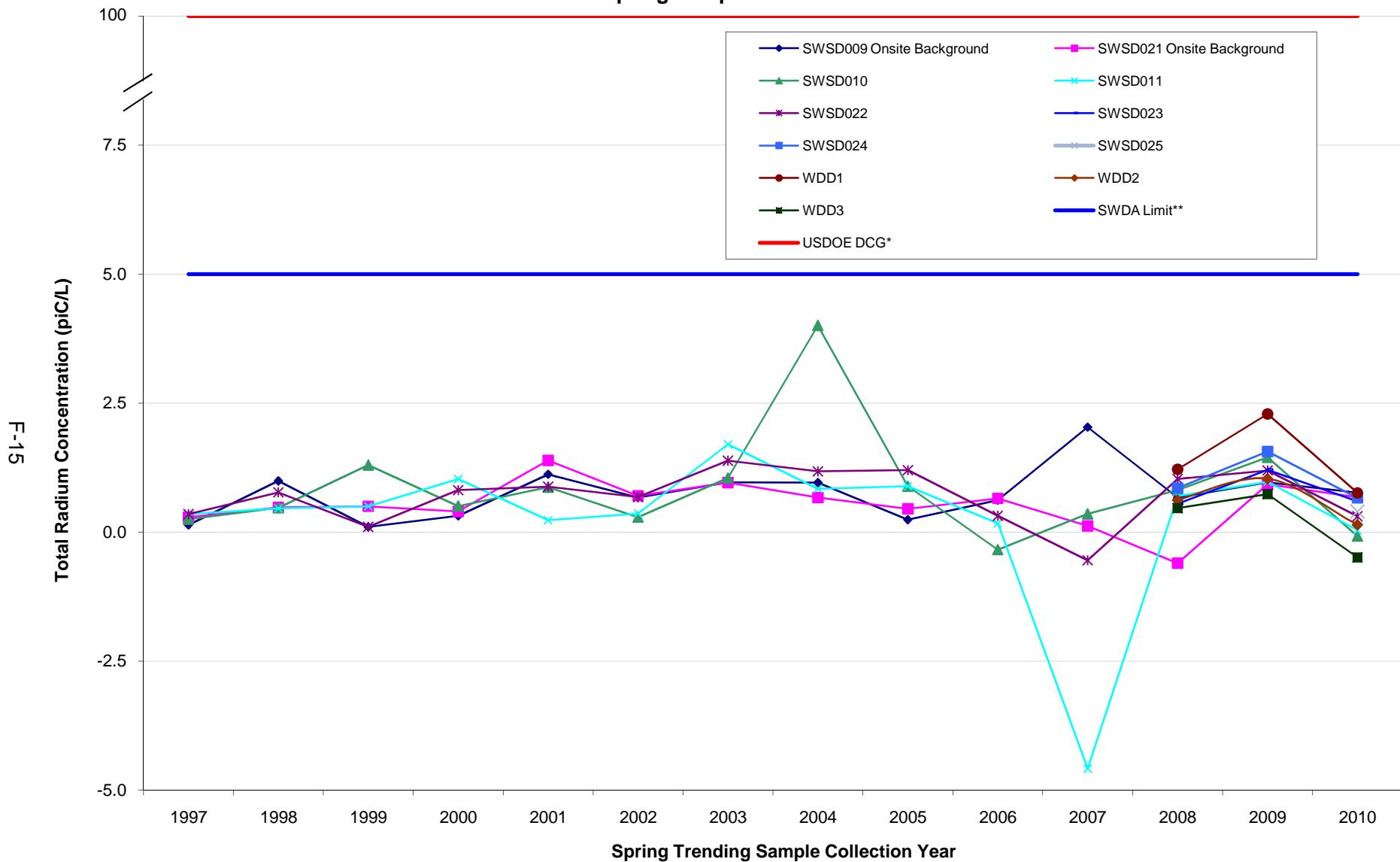


\*The United States Department of Energy (USDOE) off-site limit for radon gas is 3.0 pCi/L above background.

\*\*Location added in 2009: 40

Note: Above values contain detects and non-detects (detection limit is 0.2 pCi/L).

**FIGURE 15: TOTAL RADIUM (RADIUM-226 AND RADIUM-228) CONCENTRATION IN SURFACE WATER**  
**Spring Sample Collection**



\* The United States Department of Energy Derived Concentration Guide (USDOE DCG) for Total Radium is 100 pCi/L.

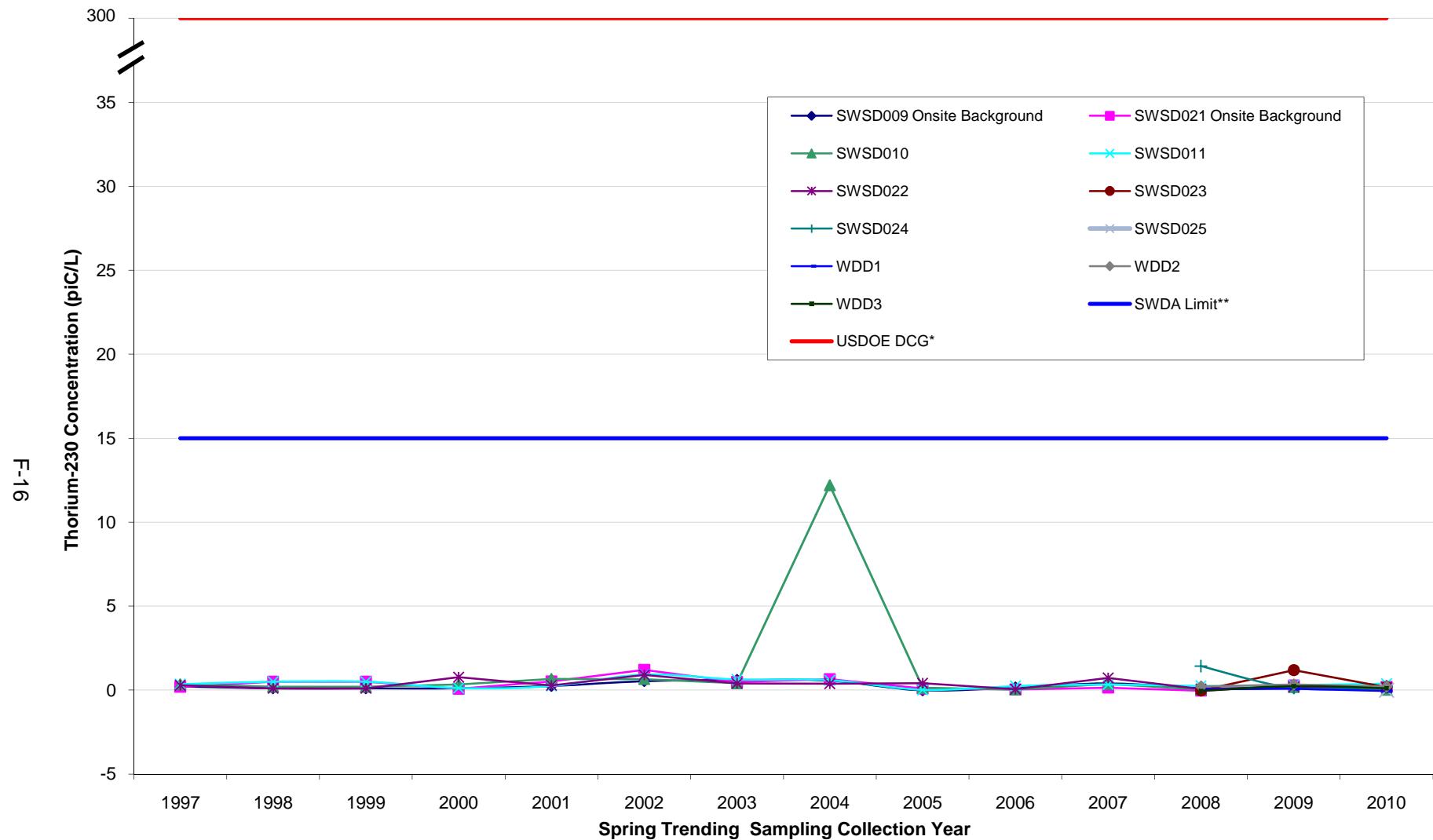
\*\*The Safe Drinking Water Act Maximum Containment Level (SDWA MCL) for Total Radium is 5 pCi/L. Surface water at NFSS is not a drinking water source. The above concentrations are for comparative purposes only.

Note 1: 2004 findings for sample SWSD010 was attributed to excess turbidity of the sample.

Note 2: Above combined radium values include both detect and non-detect values.

Note 3: New sampling locations began in the year 2008: SWSD023, SWSD024, WDD1, WDD2 and WDD3

**FIGURE 16: THORIUM-230 CONCENTRATION IN SURFACE WATER**  
**Spring Sample Collection**



\* The United States Department of Energy Derived Concentration Guide (USDOE DCG) for Thorium-230 is 300 pCi/L.

\*\*The Safe Drinking Water Act Maximum Containment Level (SDWA MCL) for Thorium is 15 pCi/L ( Gross alpha limit including radium-226, excluding radon and uranium). Surface water at NFSS is not a drinking water source. The above concentrations are for comparative purposes only.

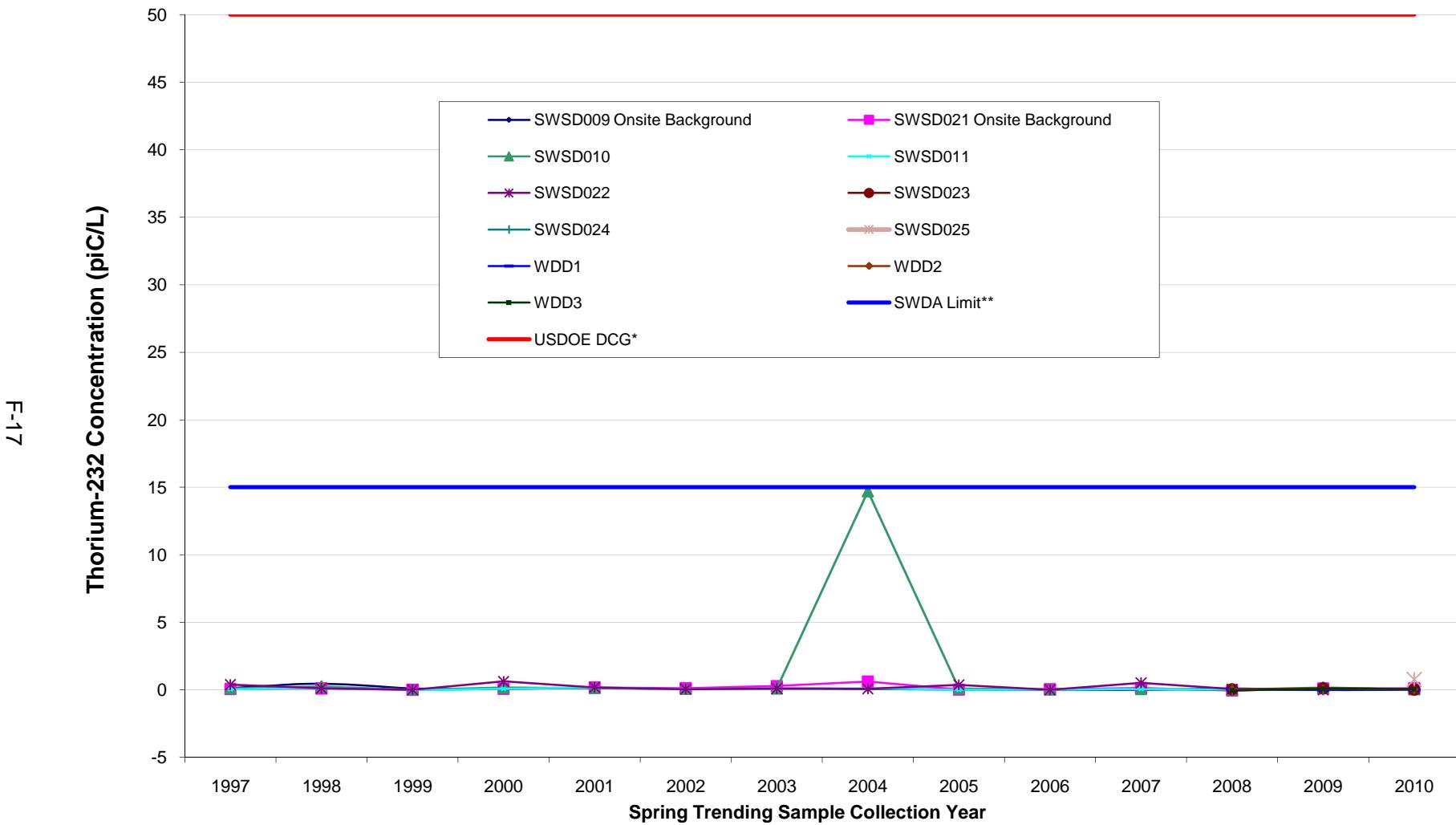
Note 1: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

Note 2: 2004 findings for sample SWSD010 was attributed to excess turbidity of the sample.

Note 3: Above thorium-230 values contain detect and non-detect results.

Note 4: New sampling locations began in the year 2008: SWSD023, SWSD024, WDD1, WDD2 and WDD3

**FIGURE 17: THORIUM-232 CONCENTRATION IN SURFACE WATER  
Spring Sample Collection**



\* The United States Department of Energy Derived Concentration Guide (USDOE DCG) for Thorium-232 is 50 pCi/L.

\*\*The Safe Drinking Water Act Maximum Containment Level (SDWA MCL) for Thorium is 15 pCi/L ( Gross alpha limit including radium-226, excluding radon and uranium).

Surface water at NFSS is not a drinking water source. The above concentrations are for comparative purposes only.

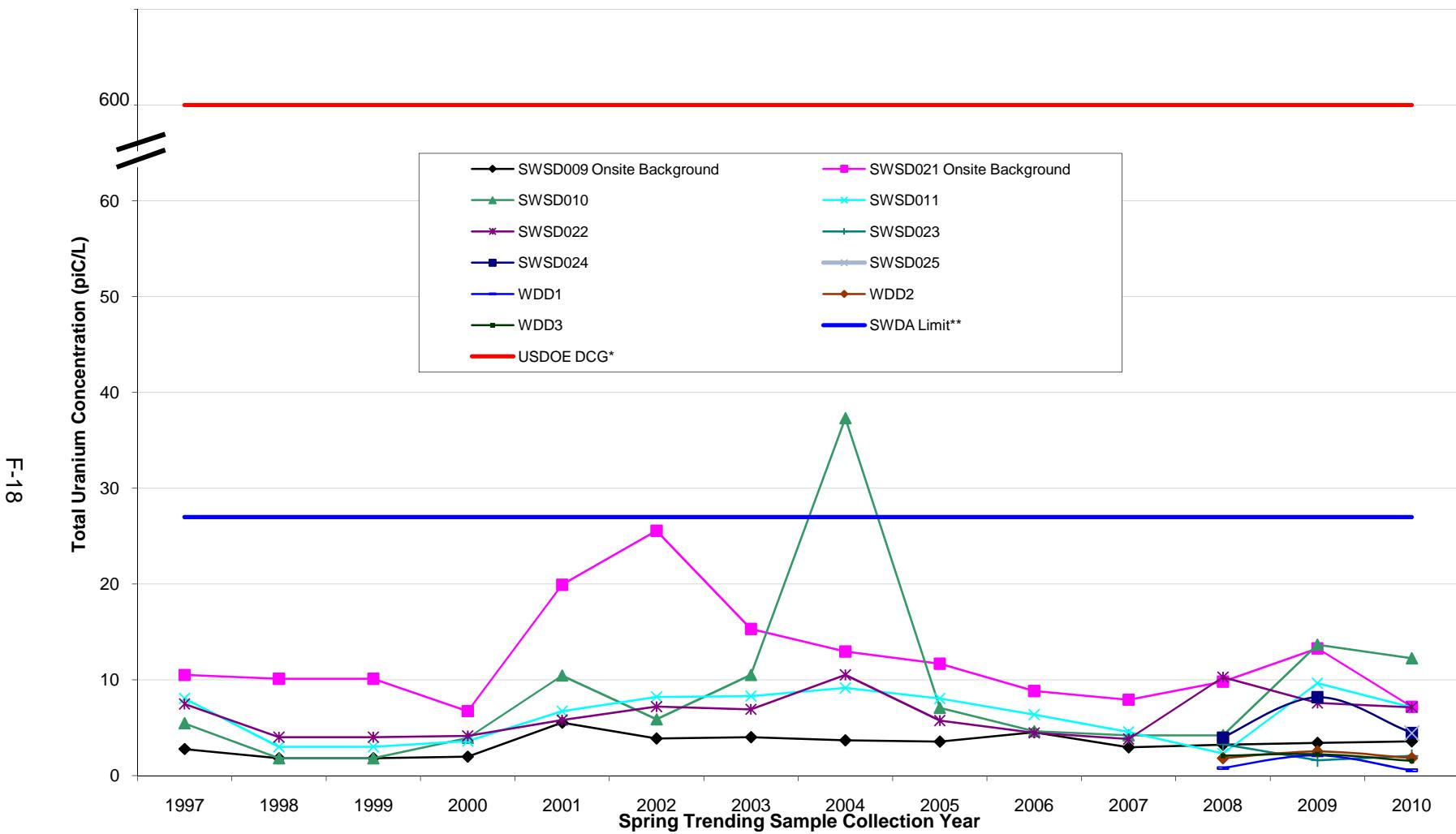
Note 1: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

Note 2: 2004 findings for sample SWSD010 was attributed to excess turbidity of the sample.

Note 3: Above thorium-232 values contain detect and non-detect results.

Note 4: New sampling locations began in the year 2008: SWSD023, SWSD024, WDD1, WDD2 and WDD3

**FIGURE 18: TOTAL URANIUM CONCENTRATION IN SURFACE WATER**  
**Spring Sample Collection**



\* The United States Department of Energy Derived Concentration Guide (USDOE DCG) for Total Uranium is 600 pCi/L over background.

\*\*The Safe Drinking Water Act Maximum Containment Level (SDWA MCL) for Total Uranium is 27 pCi/L. Surface water at NFSS is not a drinking water source. The above concentrations are for comparative purposes only.

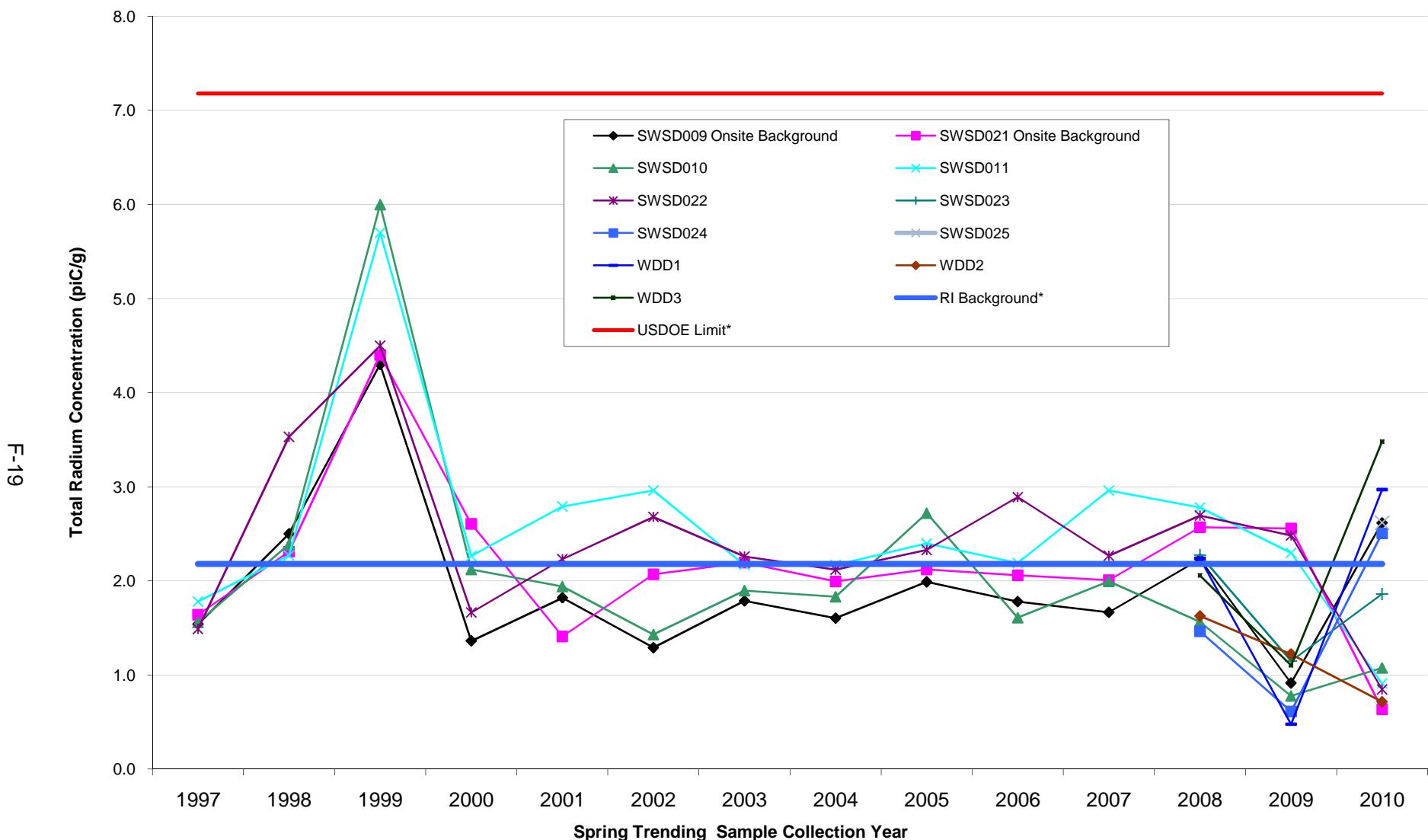
Note 1: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

Note 2: 2004 findings for sample SWSD010 was attributed to excess turbidity of the sample.

Note 3: Note: Above combined total uranium (sum of isotopic uranium) values include both detect and non-detect values.

Note 4: New sampling locations began in the year 2008: SWSD023, SWSD024, WDD1, WDD2 and WDD3

**FIGURE 19: TOTAL RADIUM (RADIUM-226 AND RADIUM-228) CONCENTRATION IN SEDIMENT**  
**Spring Sample Collection**



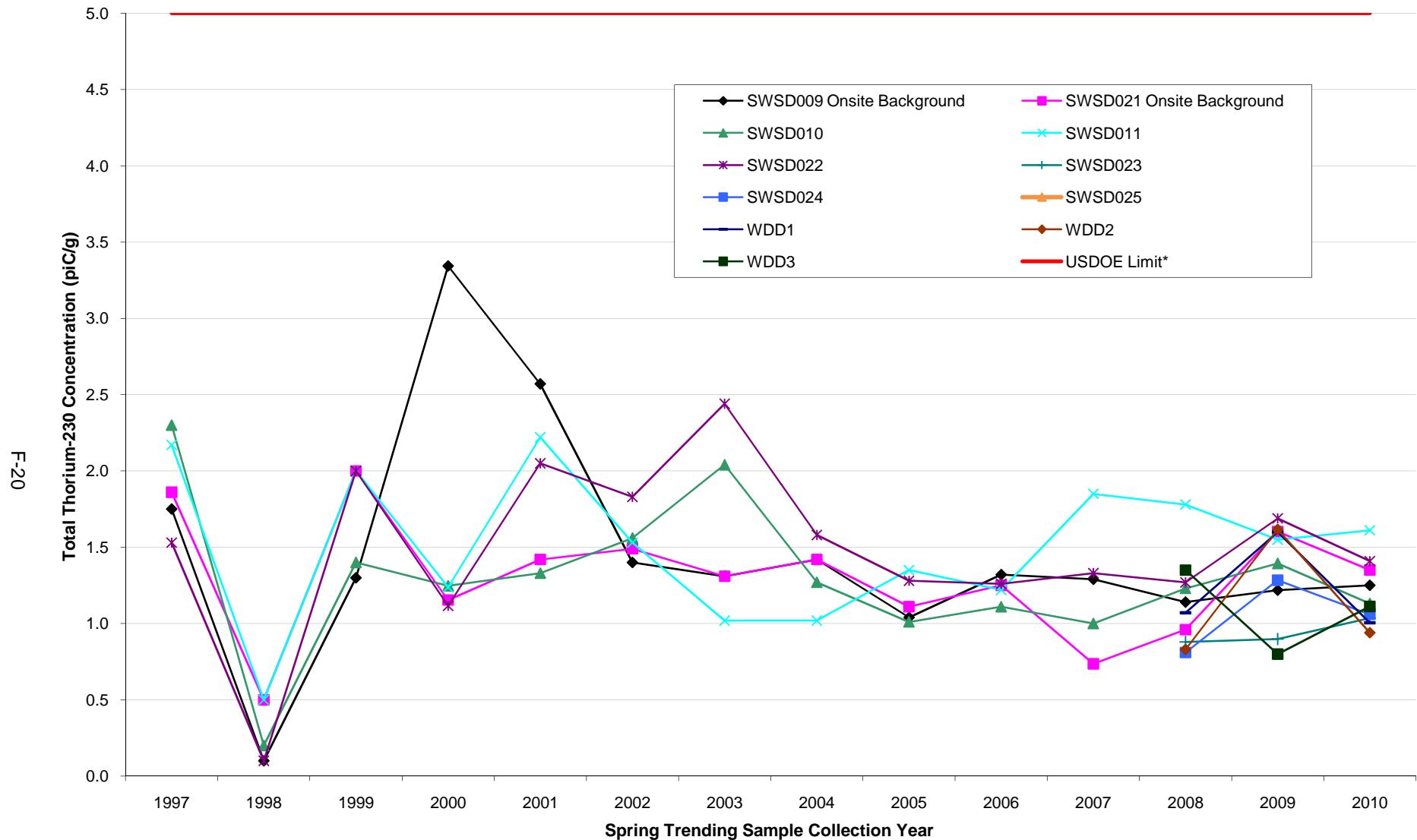
\*The United States Department of Energy (USDOE) surface soil cleanup criterion for total radium is 5 pCi/g above background. Above Background value of 7.18 pCi/g is obtained when 5 pCi/g is added to the NFSS surface soil RI background value of 2.18 pCi/g taken from the NFSS Remedial Investigation Report (December, 2007).

Note 1: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

Note 2: Above combined radium values include both detect and non-detect values.

Note 3: New sampling locations began in the year 2008: SWSD023, SWSD024, WDD1, WDD2 and WDD3

**FIGURE 20: THORIUM-230 CONCENTRATION IN SEDIMENT**  
**Spring Sample Collection**



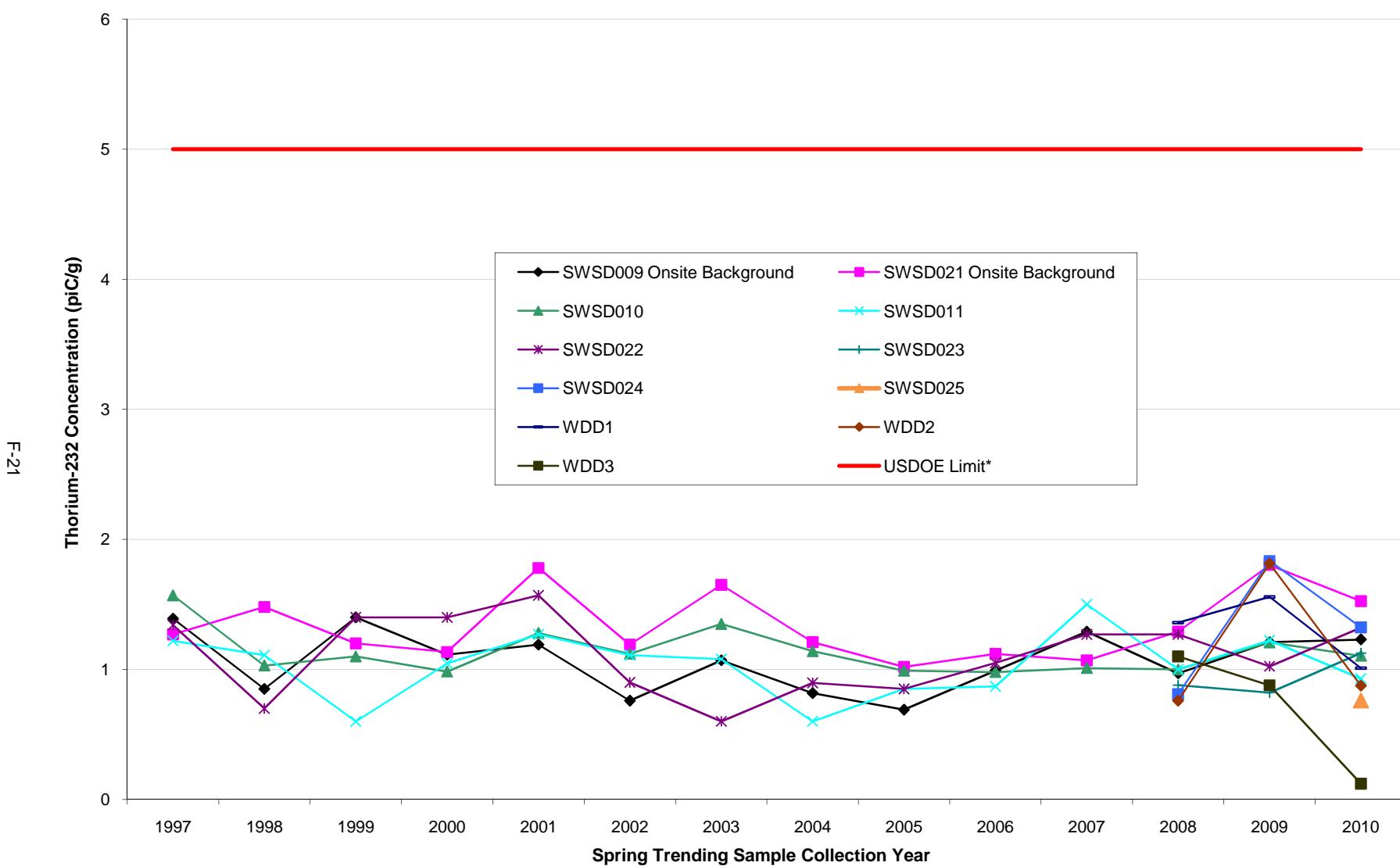
\*The United States Department of Energy (USDOE) surface soil cleanup criterion for total thorium is 5 pCi/g above background.

Note 1: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

Note 2: Above values include both detect and non-detect values.

Note 3: New sampling locations began in the year 2008: SWSD023, SWSD024, WDD1, WDD2 and WDD3

**FIGURE 21: THORIUM-232 CONCENTRATION IN SEDIMENT**  
**- Spring Sample Collection**



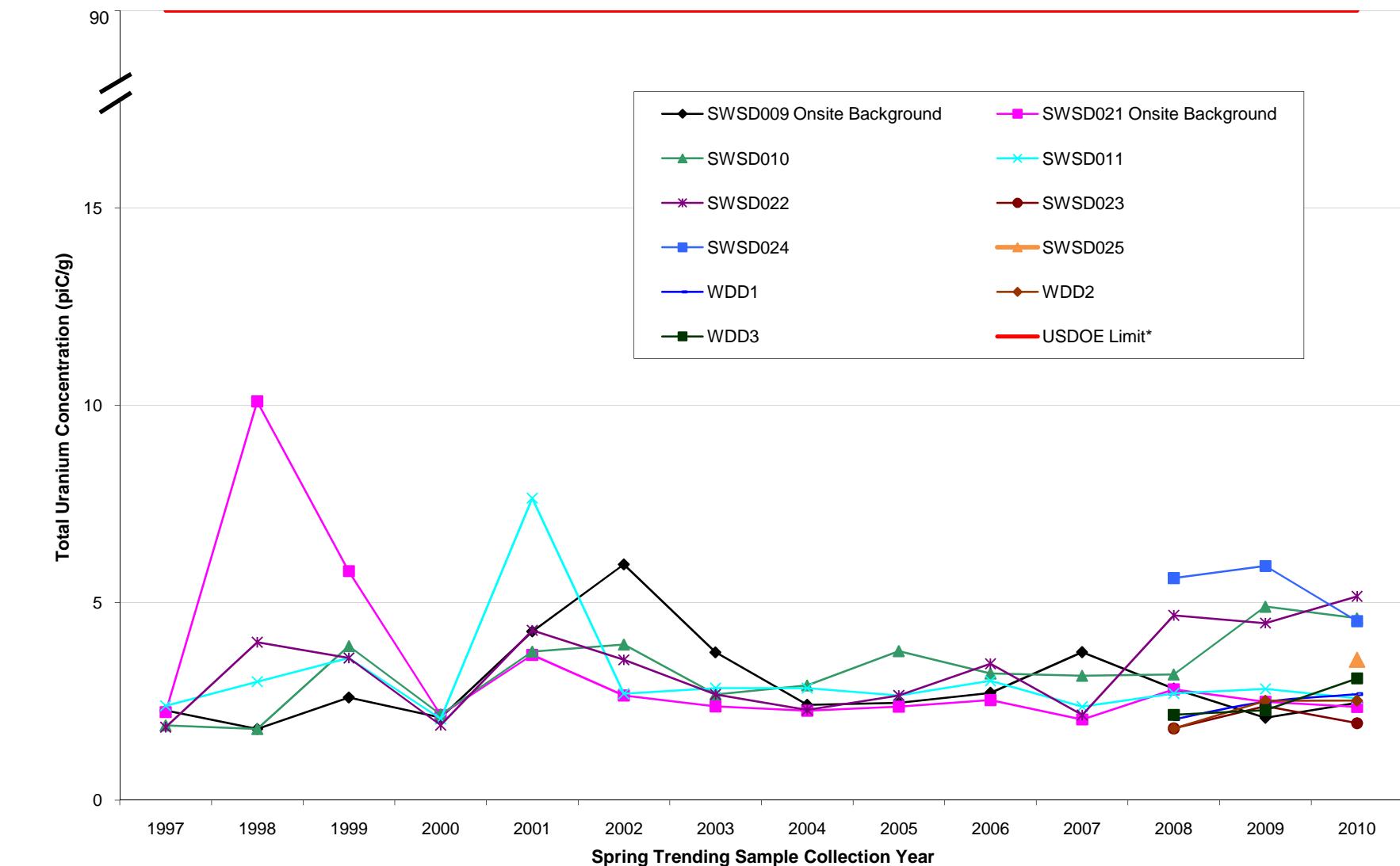
\*The United States Department of Energy (USDOE) surface soil cleanup criterion for total thorium is 5 pCi/g above background.

Note 1: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

Note 2: Above values include both detect and non-detect values

Note 3 : New sampling locations began in the year 2008: SWSD023, SWSD024, WDD1, WDD2 and WDD3

**FIGURE 22: TOTAL URANIUM CONCENTRATION IN SEDIMENT**  
**Spring Sample Collection**

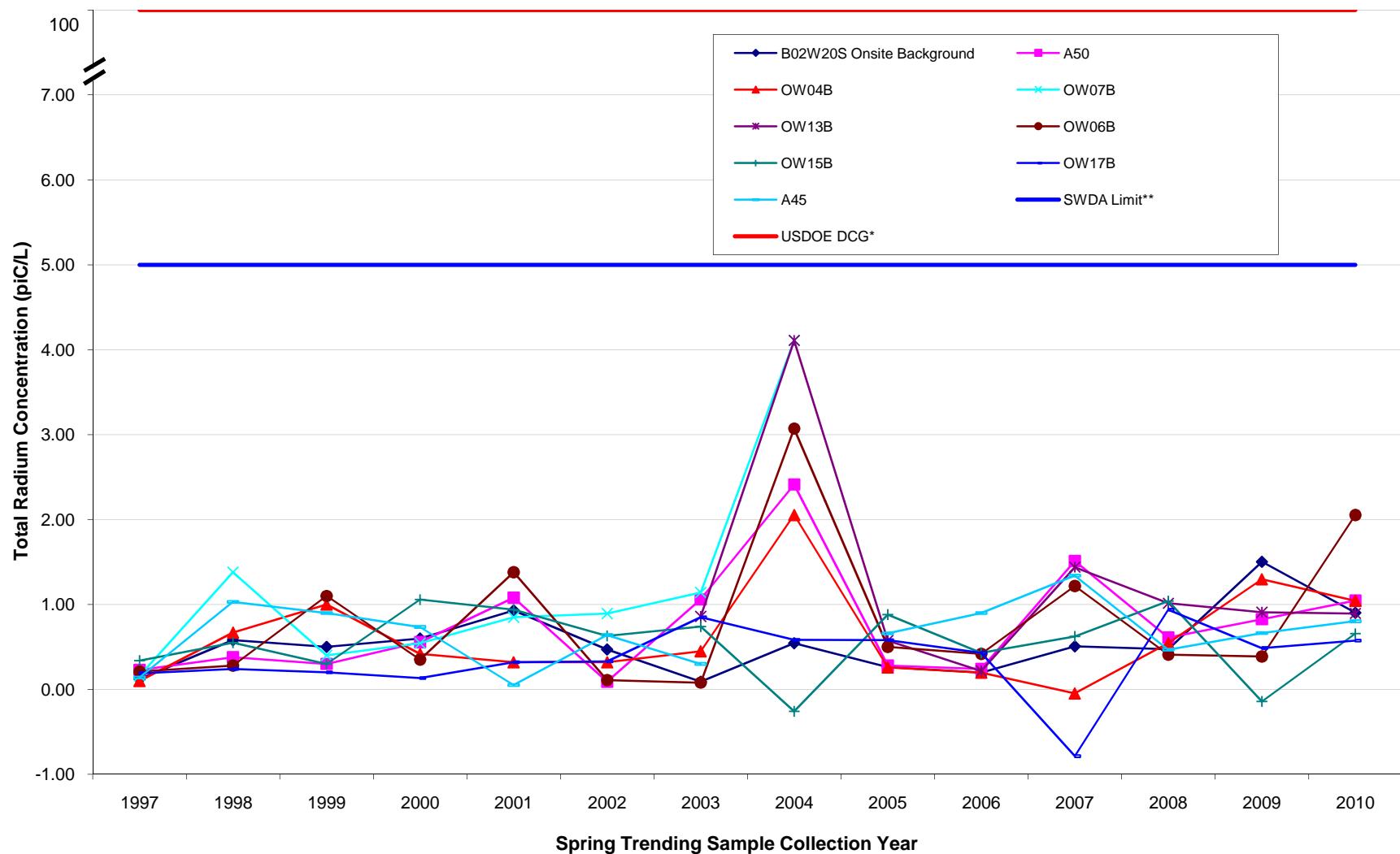


\*The United States Department of Energy (USDOE) surface soil cleanup criterion for total uranium is 90 pCi/g above background.

Note 1: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

Note 2: New sampling locations began in the year 2008: SWSD023, SWSD024, WDD1, WDD2 and WDD3

**FIGURE 23: TOTAL RADIUM (RADIUM-226 AND RADIUM-228) CONCENTRATION IN GROUNDWATER AT NFSS Spring Sample Collection**



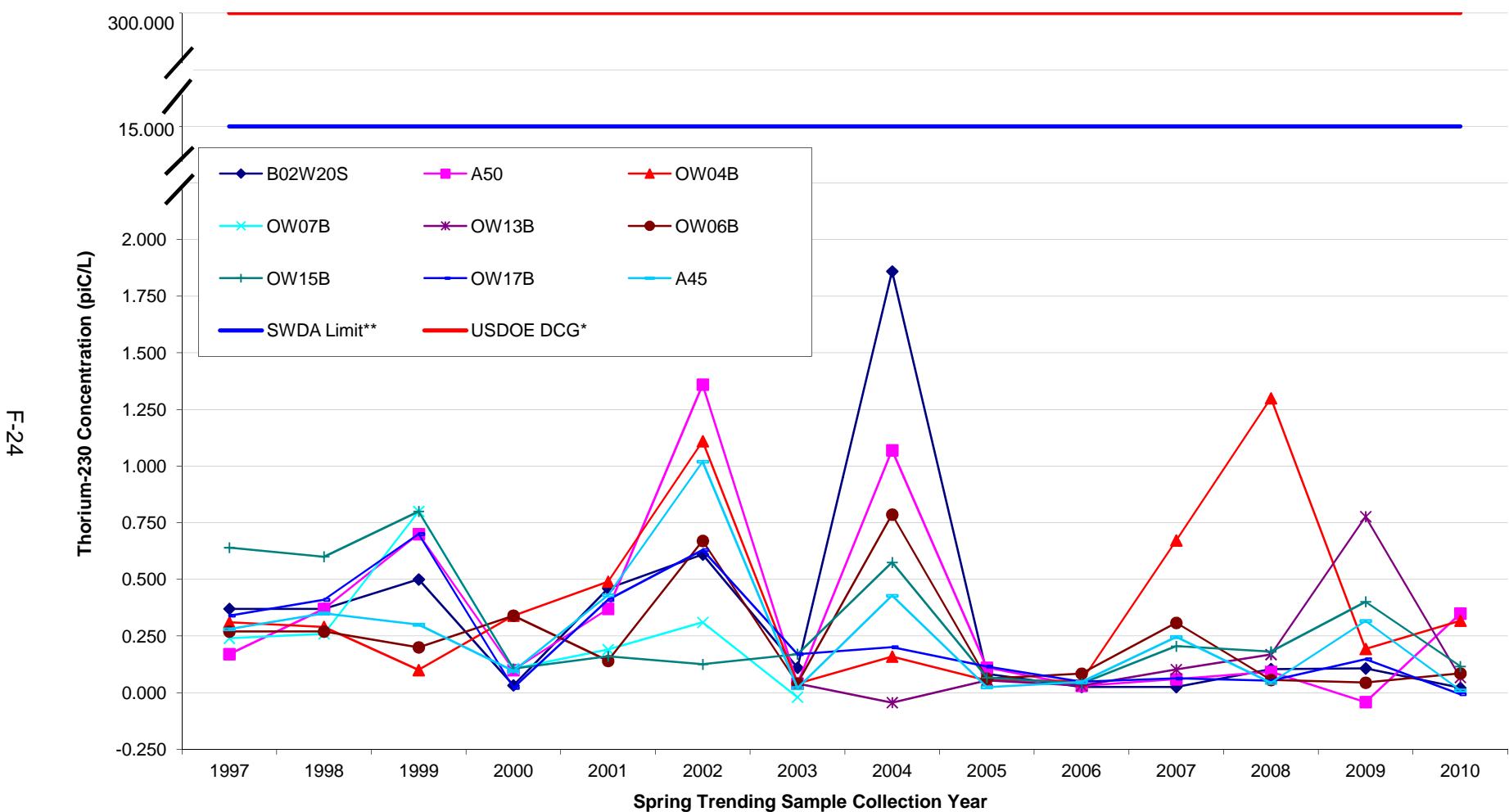
\* The United States Department of Energy Derived Concentration Guide (USDOE DCG) for combined Radium-226 & 228 is 100 pCi/L.

**\*\***The Safe Drinking Water Act Maximum Containment Level (SDWA MCL) for Total Radium is 5 pCi/L. Groundwater at NFSS is not a drinking water source. The above concentrations are for comparative purposes only.

Note 1: Above combined radium values include both detect and non-detect values.

Note 2: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

**FIGURE 24: THORIUM-230 CONCENTRATION IN GROUNDWATER AT NFSS**  
**Spring Sample Collection**



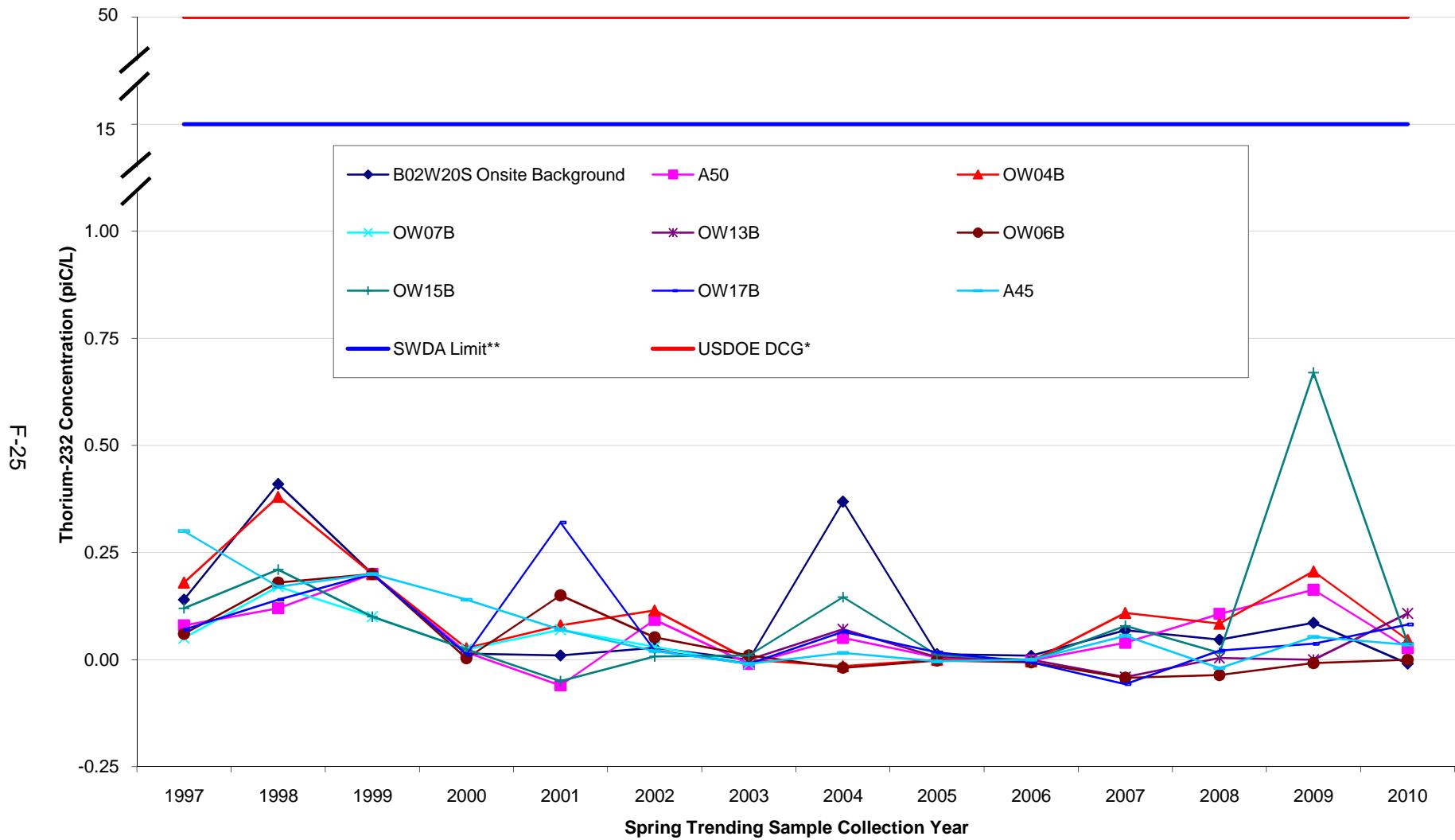
\* The United States Department of Energy Derived Concentration Guide (USDOE DCG) for Thorium-230 is 300 pCi/L.

\*\*The Safe Drinking Water Act Maximum Containment Level (SDWA MCL) for Thorium-230 is 15 pCi/L. Groundwater at NFSS is not a drinking water source. The above concentrations are for comparative purposes only.

Note 1: Above values contain detect and non-detect results.

Note 2: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

**FIGURE 25: THORIUM-232 CONCENTRATION IN GROUNDWATER AT NFSS - Spring Sample Collection**



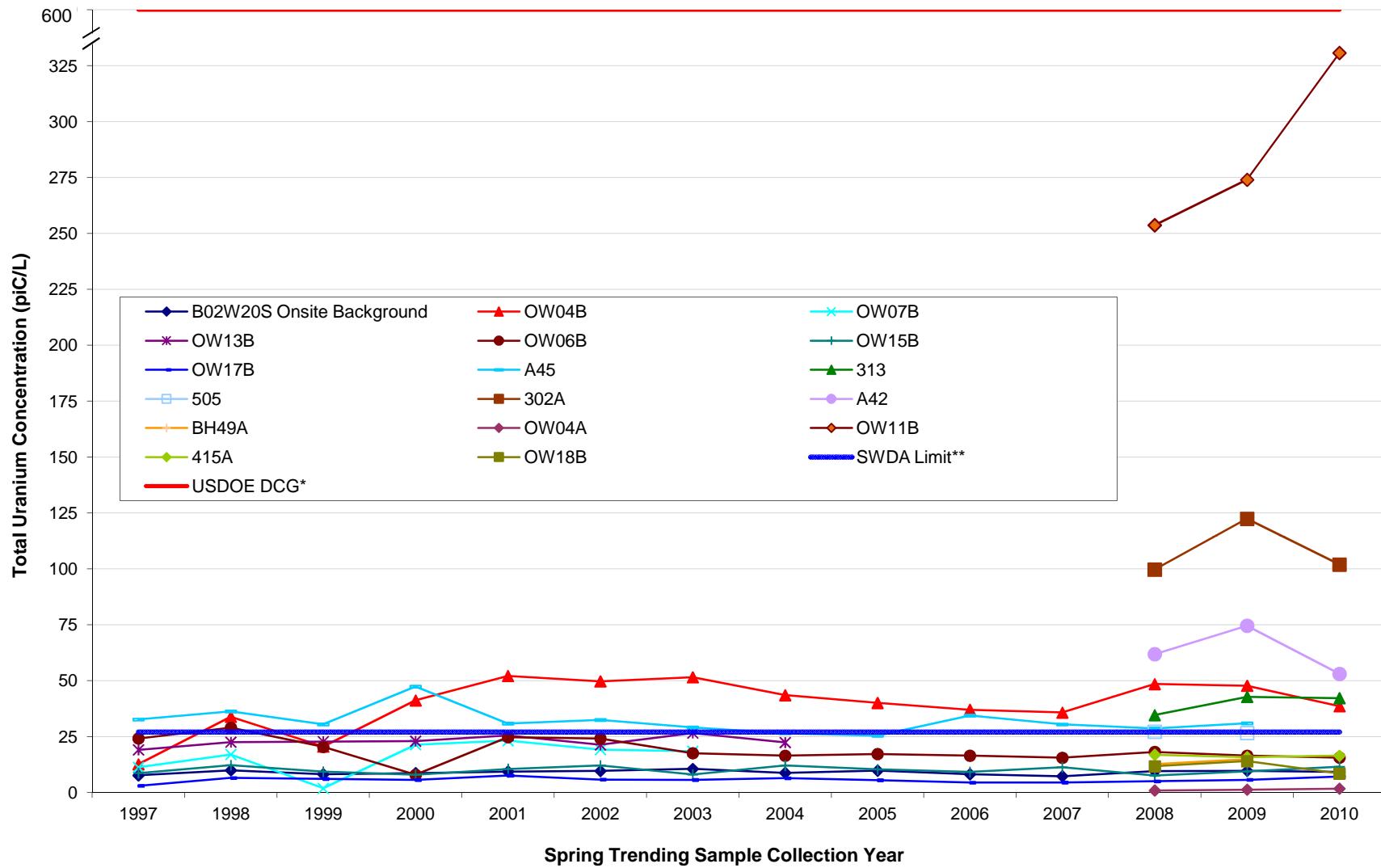
\* The United States Department of Energy Derived Concentration Guide (USDOE DCG) for Thorium-232 is 50 pCi/L.

\*\*The Safe Drinking Water Act Maximum Containment Level (SDWA MCL) for Thorium-232 is 15 pCi/L. Groundwater at NFSS is not a drinking water source. The above concentrations are for comparative purposes only.

Note 1: Above values contain detect and non-detect results.

Note 2: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

**FIGURE 26: TOTAL URANIUM CONCENTRATION IN GROUNDWATER AT NFSS - Spring Sample Collection**



\* The United States Department of Energy Derived Concentration Guide (USDOE DCG) for Total Uranium is 600 pCi/L.

**\*\*The Safe Drinking Water Act Maximum Containment Level (SDWA MCL) for Total Uranium is 27 pCi/L. Groundwater at NFSS is not a drinking water source. The above concentrations are for comparative purposes only.**

Note 1: It should be noted that the above trending data is taken from the spring (April-June) sampling events at NFSS.

Note 2 : New sampling locations are represented by two plotting oints starting in 2008.

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## **APPENDIX B: NFSS CY2010 ENVIRONMENTAL SURVEILLANCE TECHNICAL MEMORANDUM**

### **CY2010 CALCULATION OF EXTERNAL GAMMA RADIATION DOSE RATES FOR NIAGARA FALLS STORAGE SITE (NFSS)**

**LEWISTON, NEW YORK**

August 2010

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## **1.0 PURPOSE**

This calculation estimates the external gamma radiation dose from the Niagara Falls Storage Site (NFSS), Lewiston, New York (see Figure 1, Appendix A), during calendar year 2010 (CY2010). Hypothetical doses from external gamma radiation to members of the public are calculated from dose measurements using Landauer “Luxel” Optically Stimulated Luminescence dosimeters (OSLs) located at the perimeters of the NFSS and the Interim Waste Containment Structure (IWCS) (see Figure 2, Appendix A). OSLs replaced thermoluminescent dosimeters (TLDs) in the environmental program beginning in 2008. In addition OSL location 32 was added for CY2010.

## **2.0 ASSUMPTIONS**

Doses were calculated for off-site receptors based on these locations for off-site receptors based on the canvas of receptors in CY2006. The hypothetical doses for the nearest resident and off-site worker are reported. The modeling approach described below is considered to be protective of human health (conservative) in calculating hypothetical dose to receptors. The shielding effect of the air has not been included in the calculations. Calculations for the hypothetical annual external gamma radiation doses to the nearest resident and nearest off-site worker used the following assumptions:

Distance from each OSL above the source (the ground) is 3 feet (ft),  
Distance from the OSLs to the nearest resident is 500 ft (perpendicular to the western OSL line),  
Distance from the OSLs to the nearest off-site worker is 1,020 ft (perpendicular to the eastern OSL line),  
Length of the western OSL monitoring line (western perimeter fence) is 2,766 ft,  
Length of the eastern OSL monitoring line (east of Campbell Street) is 2,700 ft.

## **3.0 OSL DATA**

At NFSS, OSLs are used to measure gamma radiation from the site and from sources of background radiation. Natural sources of background radiation include cosmic radiation and terrestrial radiation sources. In the United States, the annual average (per capita) cosmic and terrestrial radiation doses are 34 millirem per year (mrem/yr) and 22 mrem/yr, respectively (NCRP Report 160). Annual doses due to background at NFSS are measured at background locations using OSLs. Background dose for the same period of exposure is subtracted from site dose values to estimate the net dose from NFSS. OSLs are located at the facility perimeter and at the perimeter of the IWCS. The OSLs are placed at approximately 3 ft [1.6 meters (m)] above the ground surface. The OSLs measure approximately six-month intervals and are analyzed at an off-site vendor.

Seventeen locations around the perimeter of the site and seven locations around the IWCS were monitored in CY2010 (see Figure 2, Appendix A). In addition to these locations, there were three background locations (Figure 1, Appendix A). Two environmental OSLs were placed at each monitoring location. The environmental program utilizes two OSLs at each monitoring location for each monitoring period as a quality control check. In addition, if a measurement result is rejected or a OSL is lost, the duplicate reading is assumed for that monitoring period. For CY2010 two OSL co-located badge results were used for each location.

OSL monitoring data for CY2010 are presented in Table 2 in the Tables section. A time-weighted or normalized annual dose is calculated that accounts for exposure periods having different integration times (a different number of measurement days). Negative net values, when they occur, are retained for calculational purposes.

## **4.0 ASSESSMENT METHODOLOGY AND RESULTS**

Gamma radiation measured at the perimeter fence line represents the dose for full-time occupancy i.e. 24 hours/day and 365 days/year (366 days for a leap year). Dose to an off-site receptor is significantly affected by proximity to the source and the amount of time spent at the receptor location. The estimate of dose to an off-site worker therefore uses a correction factor for occupancy assuming 2000 hours worked per year. The estimate of dose to an off-site resident assumes a full-time occupancy at home. The average net dose rate for CY 2010 at the site perimeter by direction is calculated to be:

Direction	OSL Locations	Calculated Average Net Dose Rate (mrem/year)
North Perimeter	1, 11, 12, 60, 65, 122	6.02
East Perimeter	1,28,123	6.76
South Perimeter	7, 28, 29, 45	8.20
West Perimeter	8, 10, 11,13,15,29,36	5.18

### **4.1 NEAREST RESIDENT**

The dose calculation for the nearest resident uses the line of OSLs along the western perimeter fence. The OSLs along this side of the facility include NFSS perimeter fence monitoring locations 11, 13, 15, 29, and 36, and WCS perimeter fence monitoring locations 8 and 10. The two WCS locations are located close to the western NFSS perimeter fence. These OSL locations are shown in Appendix A, Figure 2. Net dose rates (corrected for background) for these OSLs are summed and divided by the total number of observations (14 for CY2010). This average value represents the annual dose at the site perimeter ( $D_1 = 5.18$  mrem for CY2010). The dose contribution to this resident from the southern exposure is insignificant compared to the exposure from the western line source. The western site perimeter dose is then used in the following equation for a line source:

$$D_2 = D_1 * h_1/h_2 * (\text{Arc Tan}(L/h_2) / \text{Arc Tan}(L/h_1))$$

Where:

$D_2$  = dose calculated at the receptor location from the line source

$D_1$  = dose at the site perimeter as described above

$h_1$  = the distance of the OSLs from the source (3 ft)

$h_2$  = the distance of the resident from the fence line (500 ft)

$L$  = half the length of line of OSLs measuring the line source (1,383 ft)

Nearest Resident Dose Calculation (Resident southwest of NFSS)

NFSS Perimeter Monitoring Locations 11, 13, 15, 29, and 36 and IWCS Perimeter Monitoring Locations 8 and 10

Where:

$h_1$  = 3 feet distance of OSL from the source

$h_2$  = 500 feet distance of resident from the OSLs

$L$  = 1,383 feet half the length of the western line source

$D_1$  = 5.18 mrem average annual dose at the OSL monitoring locations

$D_2$  = 0.024 mrem resident annual dose at 500 feet from the OSL

The hypothetical dose to the nearest resident is 2.4 E-02 (or 0.024) mrem for calendar year 2010.

## **4.2 NEAREST OFF-SITE WORKER**

The dose to the nearest off-site worker uses, the line of OSLs, closest to the eastern perimeter fence (Castle Garden Road). The OSLs used include monitoring locations 1, 28, and 123. These OSLs are located along an interior fence east of Campbell Street. Their locations are shown in Figure 2, Appendix A. There are no WCS perimeter fence monitoring locations close to those along the line east of Campbell Street; therefore, none are included in the dose calculations. Net dose rates (corrected for background) for OSL monitoring locations 1, 28, and 123 are summed and divided by the total number observations (6 for CY2010). This average represents the annual dose at the site perimeter ( $D_1 = 6.76$  mrem for CY2010).

### Nearest Off-Site Worker Dose Calculations (Worker east of NFSS)

#### NFSS Perimeter Monitoring Locations 1, 28, 123

$h_1 = 3$  feet distance of OSL from the source

$h_2 = 1,020$  feet distance of off-site worker from the OSLs

$L = 1,350$  feet half the length of the eastern line source

$D_1 = 6.76$  mrem average annual dose at the OSL monitoring locations

$D_2 = 0.0027$  mrem off-site worker annual dose at 1,020 feet from the OSL location

Using the equation above and a correction factor for off-site worker occupancy of 2000/8760 hours the hypothetical dose to the nearest off-site worker is 2.7 E-03 (or 0.0027) mrem for calendar year 2010.

## **5.0 REFERENCES**

Bechtel National, Inc. (BNI), 1997. "1996 Public External Gamma Dose," 14501-158-CV-031, Rev. 0, Oak Ridge, TN.

National Council on Radiation Protection and Measurements (NCRP), 2009. "NCRP Report No. 160, Ionizing Radiation Exposure of the Population of the United States," ISBN-13: 978-0-929600-98-7, Bethesda, MD.

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## **APPENDIX C: NFSS CY2010 ENVIRONMENTAL SURVEILLANCE TECHNICAL MEMORANDUM**

## **FUSRAP CY2010 NESHAP ANNUAL REPORT FOR NIAGARA FALLS STORAGE SITE (NFSS)**

**LEWISTON, NEW YORK**

**JUNE 2011**

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## ACRONYMS AND ABBREVIATIONS

BNI	Bechtel National, Inc.
CAP88-PC Ver 3	Clean Air Act Assessment Package-1988, Version 3.0
CFR	Code of Federal Regulations
E <sub>w</sub>	annual wind erosion emission
FUSRAP	Formerly Utilized Sites Remedial Action Program
ICRP	International Commission on Radiological Protection
IWCS	Interim Waste Containment Structure
m <sup>2</sup>	square meter(s)
MEI	maximally exposed individual
ML	Modern Landfill
mph	miles per hour
NOAA	National Oceanic and Atmospheric Administration
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFIA	Niagara Falls International Airport
NFSS	Niagara Falls Storage Site
USAEC	United States Atomic Energy Commission
USACE	United States Army Corps of Engineers
UCL	upper confidence limit
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency

## **1.0 INTRODUCTION**

In 1974, the United States Atomic Energy Commission (USAEC), a predecessor to the United States Department of Energy (USDOE), instituted the Formerly Utilized Sites Remedial Action Program (FUSRAP). This program is now managed by United States Army Corps of Engineers (USACE) to identify and clean up, or otherwise control sites where residual radioactivity remains from the early years of the nation's atomic energy program or from commercial operations causing conditions that Congress has authorized USACE to remedy under FUSRAP. The Niagara Falls Storage Site (NFSS) is a federally-owned storage site managed under FUSRAP. In October 1997, Congress transferred the responsibility for FUSRAP to USACE.

### **1.1 SITE DESCRIPTION**

The Niagara Falls Storage Site (NFSS) is located in the Town of Lewiston in northwestern New York State, northeast of Niagara Falls and south of Lake Ontario (Figure 1 (Appendix A, pg. F-1)). NFSS is approximately 77 hectare (~191 acre) site which includes: one former process building (Building 401), one office building (Building 429), an equipment shed, and a 4 hectare (9.9 acre) interim waste containment structure (IWCS). The property is fenced, and public access is restricted.

Land use in the region is primarily rural; however, the site is bordered by a chemical waste disposal facility on the north, a solid waste disposal facility 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 southwest of the site; the residences are primarily single-family dwellings.

### **1.2 SOURCE DESCRIPTION**

Beginning in 1944, NFSS was used as a storage facility for radioactive residues and wastes. The residues and wastes are the process by-products of uranium extraction from pitchblende (uranium ore). Waste was also generated from remediation of buildings and process equipment used in the uranium extraction process. The residues originated at other sites and were transferred to NFSS for storage in buildings, on-site pits, and surface piles. Table 1 includes a brief history and description of the major radioactive residues and wastes transferred to NFSS. From 1953 to 1959 and 1965 to 1971, Building 401 was used as a boron-10 isotope separation plant.

**Table 1. History and Description of Wastes Transferred to NFSS**

Material	Description	Transferred to NFSS
<b>L-50</b>	Low-activity radioactive residues from the processing of low-grade uranium ores at Linde Air Products, Tonawanda, New York.	1944
<b>R-10</b>	Low-activity radioactive residues from the processing of low-grade uranium ores at Linde Air Products, Tonawanda, New York.	1944
<b>F-32</b>	Low-activity radioactive residues from the processing of high-grade uranium ores at Middlesex, New Jersey.	1944 to early 1950
<b>L-30</b>	Low-activity radioactive residues from the processing of low-grade uranium ores at Linde Air Products, Tonawanda, New York.	1945
<b>K-65</b>	High-activity radioactive residues from the processing of high-grade uranium ores at Mallinckrodt Chemical Works, St. Louis, Missouri.	1949
<b>Middlesex Sands</b>	Sand and abraded material from the sandblasting of buildings and process equipment where the F-32 residue was generated at Middlesex Metal Refinement Plant, Middlesex, New Jersey.	1950

Since 1971, activities at NFSS have been confined to residue and waste storage and remediation. On-site and off-site areas with residual radioactivity exceeding USDOE guidelines were remediated between 1981 and 1992. The materials generated during remedial actions (approximately 195,000 m<sup>3</sup>) are encapsulated in the IWCS (See Appendix A, Figure 2), which is specifically designed to provide interim storage of the materials. Remedial investigation began at the end of 1999 to determine if any areas of the site contained radioactive or chemical contaminants at levels that could pose an unacceptable risk to human health and the environment. Initial results show that isolated areas of elevated activity do exist.

## **2.0 REGULATORY STANDARDS**

The United States Environmental Protection Agency's (USEPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) are compliance standards that require annual reporting of emissions of radionuclides and radon gas from operations at nuclear facilities.

### **2.1 40 CFR 61, SUBPART H**

40 CFR 61, Subpart H provides standards for reporting emissions of radionuclides (excluding radon-222 and radon-220) into the air from USDOE facilities. Although control and maintenance of the site currently rests with USACE, responsibility for NFSS will return to USDOE following completion of remedial actions. This regulation therefore provides an appropriate standard for NFSS. Compliance with Subpart H is verified by applying the USEPA approved code, CAP88-PC. CAP88-PC Version 3.0 (USEPA 2006)] was used for this year's calculation. The applicable regulation, 40 CFR 61.92 limits exposure of the public to an annual effective dose equivalent of 10 mrem from radioactive emissions.

### **2.2 40 CFR 61, SUBPART Q**

40 CFR 61, Subpart Q applies to storage and disposal facilities for radium-containing material that emits radon-222 into air. NFSS is specifically identified as one such facility in this subpart (in 40 CFR 61.190). Compliance with Subpart Q is verified by annual monitoring of the IWCS for radon-222 flux. The Subpart Q radon-222 emission limit is 20 pCi/m<sup>2</sup>/s.

## **3.0 AIR EMISSION DATA**

Table 2 summarizes the sources of air emissions. Attachment A contains the annual wind erosion emission ( $E_w$ ) calculation. Attachment B contains the radioactive source term calculations and annual air releases.

These calculations use the USEPA air pollution emission factor methodology (AP-42) to estimate the radioactive release from wind erosion, which is then used as the source term in the Clean Air Act Assessment Package (CAP88-PC) model to estimate airborne doses to hypothetically exposed individuals. The annual wind erosion emission estimate uses the most current soil data from the NFSS RI sampling Phases I, II, and III. A 95% upper confidence limit (UCL) without the subtraction of background radioactivity was calculated for each soil nuclide of concern and used for the source term estimate. The area of the entire NFSS was assumed to be uniformly contaminated and to contribute to the source term.

**Table 2. Air Emission Data - NFSS**

<b>Point Sources</b>	<b>Type Control</b>	<b>Efficiency</b>	<b>Distance to Hypothetical Exposed Individual</b>
none	not applicable	not applicable	not applicable
<b>Non-Point Sources</b>	<b>Type Control</b>	<b>Efficiency</b>	<b>Distance and Direction from Center of Site to Hypothetical Exposed Individual</b>
<i>in situ</i> soil –area source	vegetative cover	90 percent <sup>a</sup>	533 m SE Modern Scale-house Worker 783 m S Greenhouse Worker 914 m SSW Resident 1105 m S Resident (farm) 1250 m WSW Resident 1486 m ESE Resident 2499 m W School 2629 m WNW School
<b>Group Sources</b>	<b>Type Control</b>	<b>Efficiency</b>	<b>Distance to Hypothetical Exposed Individual</b>
none	not applicable	not applicable	not applicable

<sup>a</sup> This is the fraction of vegetative cover used to correct emissions (Attachments A,B).

## 4.0 DOSE ASSESSMENTS

### 4.1 MODEL SOURCE DESCRIPTION

To determine the dose from airborne particulates potentially released from NFSS during CY2010, the annual wind erosion emission,  $E_w$  (Attachment A) is calculated using local climatological data (Attachment E) from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center for the Niagara Falls International Airport (NFIA) in Niagara Falls, NY.  $E_w$  is calculated using the USEPA AP-42 methodology for “fugitive emissions” from an “area source” that uses the “fastest mile” wind speed data from local climatological data reports.  $E_w$ , in grams emitted, is then applied to the soil nuclide concentration to estimate the source term or annual emissions for each radionuclide. The soil concentration was developed from sample data compiled during Phases I, II, and III of the Remedial Investigation for soil contamination (Attachment B). Contributions from radon gas, in accordance with regulatory guidance, are not considered in this calculation. Annual estimated emissions for each radionuclide were input into the USEPA’s CAP88-PC, Version 3.0 code to calculate hypothetical receptor doses. The model estimates resultant doses from airborne particulates to hypothetical individuals at the distances to the nearest residence, commercial/industrial facility, school, and farm as measured from a central location on-site. Hypothetical doses are then corrected for occupancy. Commercial/industrial facility and school occupancy is assumed to be 40 hr/week for 50 weeks/yr). Residential and farm occupancy is assumed to be full-time for 24 hr/day for 365 days/yr. The hypothetical individual receiving the higher of these calculated doses is then identified as the maximally exposed individual (MEI) for airborne particulate dose.

## **4.2 DESCRIPTION OF DOSE MODEL**

### **4.2.1 CAP88-PC Computer Program**

The CAP88-PC model is a set of computer programs, databases, and associated utility programs that estimate the dose and risk from airborne radioactivity emissions. The USEPA NESHAP compliance procedures for airborne radioactivity emissions at USDOE facilities (40 CFR 61.93(a)) require the use of the CAP88-PC model, or other approved procedures to calculate effective dose equivalents to members of the public.

CAP88-PC uses a modified Gaussian plume equation to estimate the average dispersion of radionuclides released from a site. Assessments are performed for a circular grid of distances and directions for a radius of 80 km (50 miles) around the facility. Agricultural arrays of milk cattle, beef cattle and agricultural crop area are generated automatically, requiring the user to supply only the State name or agricultural productivity values. Dose and risk factors for CAP88-PC, Version 3.0 are from Federal Guidance Report 13 and are based on the methods detailed in International Commission on Radiological Protection (ICRP) 72 (ICRP72). The dose calculations presented in this document used the default values for nuclide lung clearance type. These defaults correspond to the recommended values from FGR 13. Deposition velocity and scavenging coefficient are calculated by the code in accordance with USEPA policy. In the CAP88 model nuclides are depleted from the plume by precipitation scavenging, dry deposition and radioactive decay. The default scavenging coefficient is calculated as a function of annual precipitation. The program calculates the effective dose equivalents received by receptors by combining the inhalation and ingestion intake rates and the air and ground surface concentrations using the appropriate dose conversion factors.

### **4.2.2 CAP88-PC Input**

Input parameters for CAP88 include:

Radionuclide emissions (Attachment B),  
Weather data (average annual temperature, total annual precipitation) (Attachment E),  
Emission source height and area (Section 4.3), and  
Distance to nearest resident, off-site worker, school, and farm (Section 4.3).

### **4.2.3 CAP88-PC Output**

The "Dose and Risk Equivalent Summaries" from CAP88-PC contains the resulting effective dose equivalents for each modeled scenario. The effective dose equivalent summary contains results for 16 compass directions around the facility for the nearest resident, off-site worker, school, and farm. CAP88-PC individual receptor and population output summaries are located in Attachment C and D, respectively.

## **4.3 COMPLIANCE ASSESSMENT**

The released activity data from Attachment B is entered into the CAP88-PC modeling program to derive the hypothetical dose to the defined receptors. To derive the dose to the MEI, the CAP88-PC model must have weather data for the appropriate year, information on the emission source, and the distances and directions to the nearest residence, off-site worker, school, and farm. The following CY2010 meteorological data were entered into CAP88-PC (see Attachment E):

Average temperature	9.56 °C (49.2 °F) NFIA
Precipitation,	87.7 cm (34.5 inches) ML
Mixing height	1,000 m

The following emission source and nearest receptor distances and direction information were also entered into the program:

Source height	0 m
Source area	780,000 m <sup>2</sup>
Resident	914 m SSW
Resident (farm)	1105 m S
Resident	1250 m WSW
Resident	1486 m ESE
Off-site worker	533 m SE
Off-site worker	783 m S
School (building)	2499 m W
School (building)	2629 m WNW

The CAP88-PC annual hypothetical dose to the nearest resident, off-site worker, school, and farm at the corresponding directions and distances taken from page six of the "Dose and Risk Equivalent Summaries" document for individual modeling (Attachment C) are:

Resident	1.4 E-03 mrem, SSW @ 914 m
Off-site worker	6.0 E-03 mrem, SE @ 533 m
School	5.9 E-04 mrem, W @ 2499 m
Farm	1.1 E-03 mrem, S @ 1105 m

The hypothetical doses to the nearest off-site worker and school corrected for an assumed 2,000 hr of exposure per year are:

Off-site worker	1.4 E-03 mrem
School	1.3 E-04 mrem

## 5.0 SUPPLEMENTAL INFORMATION

### 5.1 POPULATION DOSE

The CAP88-PC model was also used to estimate the hypothetical airborne particulate dose to the population within 80 km of the site. Population data taken from year 2000 census data for New York State and 2001 census data for Ontario, Canada was used to create a population file for CAP88-PC. The effective dose equivalent for the collective population in person-rem/yr is from the CAP88-PC "Dose and Risk Equivalent Summaries" report.

The CAP88-PC annual effective dose for the population within 80 km of the facility (Attachment D) is:

Population:	4.2 E-02 person-rem
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### 5.2 RADON-222 FLUX

Measurement of radon-222 flux provides an indication of the rate of radon-222 emission from a surface. Radon-222 flux is measured with activated charcoal canisters placed at 15-m intervals across the surface of the IWCS for a 24-hr exposure period. Measurements for

CY2010 are presented in the radon flux results with measurement locations (site map) in Figure 2c, Appendix A.

Measured results for 2010 ranged from non-detect to 0.09301 pCi/m<sup>2</sup>/s, with an average result including detects and non-detects of 0.04606 pCi/m<sup>2</sup>/s. As in previous years, these results are well below the 20 pCi/m<sup>2</sup>/s standard specified in 40 CFR Part 61, Subpart Q, and demonstrate the effectiveness of the containment cell design and construction in mitigating radon-222 migration.

### **5.3 NON-APPLICABILITY**

Requirements from section 61.93(b) of 40 CFR for continuous monitoring from point sources (stacks or vents) are not applicable to NFSS.

## **6.0 REFERENCES**

ANL 2003. CAP88-PC Population Files for NFSS, Argonne National Laboratory, Chicago, Illinois.

Bechtel National, Inc. (BNI), 1997. "1996 Public Inhalation Dose" 14501-158-CV-030, Rev. 0, Oak Ridge, TN.

Environmental Protection Agency (EPA), 1995. *Compilation of Air Pollutant Emission Factors, Fifth Edition*, AP-42, Office of Air Quality Planning and Standards, Research Triangle Park, NC (January).

Environmental Protection Agency (EPA), 2006. CAP88-PC Version 3.0 Computer Code, U.S. Environmental Protection Agency.

Environmental Protection Agency (EPA), 1999. *Federal Guidance Report 13, Cancer Risk Coefficients for Environmental Exposure to Radionuclides*, EPA99 EPA 402-R-99\_001, USEPA Office of Radiation and Indoor Air, Washington, DC.

International Commission on Radiological Protection (ICRP72), 1996. *Age Dependent Doses to Members of the Public from Intake of Radionuclides, Part 5, Compilation of Ingestion and Inhalation Dose Coefficients*," ICRP 72, Pergamon Press, Oxford.

40 CFR 61, Subpart H. *National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities*.

40 CFR 61, Subpart Q. *National Emission Standards for Radon Emissions from Department of Energy Facilities*.

**ATTACHMENT A**  
**ANNUAL WIND EROSION EMISSION CALCULATION**

## A.1 ANNUAL WIND EROSION

In 2010, the potential source of airborne emissions from NFSS is assumed to be from wind erosion of in-situ soil from the entire NFSS. The AP-42 model for industrial wind erosion for limited flat sources is used. In this model the potential airborne emissions are a function of the number of disturbances of contaminated soil. The following assumptions and calculations are made:

The air release source is wind erosion of in-situ soil from an area (A) of 780,000 m<sup>2</sup> of vegetation covered soil.

$$A = 780,000 \text{ m}^2$$

The calculation assumes that 90% of this area is covered by grass or vegetation (V).

$$V = 0.90$$

Weekly grass cutting is assumed for half the year, occurring May through October and in an April spring thaw. The number of estimated disturbances (N) is therefore:

$$N = 27$$

The threshold velocity ( $U_t$ ) for overburden (USEPA 1995 Table 13.2.5-2) is:

$$U_t = 1.02 \text{ m/s}$$

Anemometer height adjustment is not necessary.

$$Z_r = \text{reference anemometer height} = 10 \text{ m}$$

$$Z_a = \text{actual anemometer height} = 10 \text{ m}$$

The roughness height for overburden is 0.3 cm (USEPA 1995 Table 13.2.5-2).

$$Z_o = 0.3 \text{ cm}$$

The corrected wind speed ( $U_{rN}$ ) for each period (N) between disturbances (USEPA 1995 Equation 5) is:

$$U_{rN} = U_{aN} [\ln(Z_r / Z_o) / \ln(Z_a / Z_o)], \text{ therefore } U_{rN} = U_{aN}$$

The equivalent friction velocity ( $U_N$ ) for each period between disturbances (USEPA 1995 Equation 4) is:

$$U_N = 0.053 U_{rN}$$

The fastest mile speeds (maximum 2-minute wind speeds<sup>a</sup>) from Local Climatological Data reports from NOAA for Niagara Falls International Airport (NFIA) in mph for the period between each disturbance are:

$U_{a1} = 37$	$U_{a2} = 32$	$U_{a3} = 45$	$U_{a4} = 23$	$U_{a5} = 18$	$U_{a6} = 25$
$U_{a7} = 29$	$U_{a8} = 32$	$U_{a9} = 28$	$U_{a10} = 26$	$U_{a11} = 23$	$U_{a12} = 22$
$U_{a13} = 31$	$U_{a14} = 28$	$U_{a15} = 25$	$U_{a16} = 25$	$U_{a17} = 30$	$U_{a18} = 25$
$U_{a19} = 35$	$U_{a20} = 40$	$U_{a21} = 24$	$U_{a22} = 37$	$U_{a23} = 31$	$U_{a24} = 28$
$U_{a25} = 28$	$U_{a26} = 33$	$U_{a27} = 39$			

<sup>a</sup>Maximum 2-minute wind speeds can be used to approximate fastest mile wind speeds (USEPA 2004 Table 7-4), however, this calculation applies an uncertainty correction factor, protective of human health, of 1.3 in order to approximate the fastest mile wind speeds.

The equivalent friction velocity in m/s for each period is:

$U_1 = 1.14 \text{ E+00}$	$U_2 = 9.86 \text{ E-01}$	$U_3 = 1.39 \text{ E+00}$	$U_4 = 7.08 \text{ E-01}$	$U_5 = 5.54 \text{ E-01}$	$U_6 = 7.70 \text{ E-01}$
$U_7 = 8.93 \text{ E-01}$	$U_8 = 9.86 \text{ E-01}$	$U_9 = 8.62 \text{ E-01}$	$U_{10} = 8.01 \text{ E-01}$	$U_{11} = 7.08 \text{ E-01}$	$U_{12} = 6.78 \text{ E-01}$
$U_{13} = 9.55 \text{ E-01}$	$U_{14} = 8.62 \text{ E-01}$	$U_{15} = 7.70 \text{ E-01}$	$U_{16} = 7.70 \text{ E-01}$	$U_{17} = 9.24 \text{ E-01}$	$U_{18} = 7.70 \text{ E-01}$
$U_{19} = 1.08 \text{ E+00}$	$U_{20} = 1.23 \text{ E+00}$	$U_{21} = 7.39 \text{ E-01}$	$U_{22} = 1.14 \text{ E+00}$	$U_{23} = 9.55 \text{ E-01}$	$U_{24} = 8.62 \text{ E-01}$
$U_{25} = 8.62 \text{ E-01}$	$U_{26} = 1.02 \text{ E+00}$	$U_{27} = 1.20 \text{ E+00}$			

The erosion potential ( $P_N$ ) for a dry exposed surface (USEPA 1985 Figure 4-2) is:

$$P_N = 58 (U^* - U_t)^2 + 25(U^* - U_t) = 40.56 \text{ g/m}^2$$

The erosion potentials ( $P_N$ ) for each period between disturbances are all less than or equal to the threshold friction velocity except for  $U_1$ ,  $U_3$ ,  $U_6$ , and  $U_{23}$ .

The particle size multiplier ( $k$ ) for 10  $\mu$  particles (USEPA 1995 Equation 2) is:

$$k = 0.5$$

The emission factor ( $P$ ) for dry bare soil for 10  $\mu$  particles (USEPA 1995 Equation 2) is:

$$P = k \sum P_N = 20.28 \text{ g/m}^2$$

Thornthwaite's Precipitation Evaporation Index (PE), used as a measure of average soil moisture, is:

$$PE = 110$$

The corrected emission factor ( $PM_{10}$ ) for 10  $\mu$  particles (USEPA 1985 Equation 4-1) is:

$$PM_{10} = P(1-V) / (PE/50)^2 = 0.42 \text{ g/m}^2/\text{yr}$$

The annual wind erosion emission ( $E$ ) is calculated to be:

$$E = A (PM_{10}) = 326,797 \text{ g soil}$$

## A.2 REFERENCES

EPA 2004. *Methods for Estimating Fugitive Air Emissions of Radionuclides from Diffuse Sources at USDOE Facilities*, Final Report, September 3, 2004.

EPA 1995. *AP 42 Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources*, Fifth Edition, 1995.

M. J. Changery, *National Wind Data Index Final Report*, HCO/T1041-01 UC-60, National Climatic Center, Asheville, NC, December 1978.

EPA 1985. *Rapid Assessment of Exposure to Particulate Emissions from Surface Contaminated Sites*, EPA/600/8-85/002, Office of Health and Environmental Assessment, Washington, DC (February).

EPA 1985. *AP 42 Compilation of Air Pollution Emission Factors*, Third Edition (including supplements 1-7), August 1977.

**ATTACHMENT B**

**SOURCE TERM DEVELOPMENT AND ANNUAL AIR EMISSIONS**

## B.1 SOURCE TERM DEVELOPMENT

The source term for NFSS NESHAPS calculations was developed considering the radionuclides in the uranium, thorium, and actinium decay series as shown in Table B-1. Concentration data for these radioisotopes were taken from Phases I, II, and III of the Remedial Investigation and are listed in Table B-2. The Phase I sampling was performed from November 1999 through January 2000. The Phase II was performed from August 2000 through October 2000. The Phase III sampling was performed from May 2001 through October 2003. The dataset has been verified to ensure data quality and includes the analysis of soils from biased high locations (i.e., locations that had elevated gamma survey readings). The dataset used for CY 2009 uses higher soil concentrations than in years before CY2004 and more conservatively estimates (biased high) the site concentration values.

The IWCS, completed in 1986 and added to in 1991, is surrounded by sufficient topsoil and compacted clay to consider radionuclide emissions negligible. In 1986, the entire IWCS was covered with 0.9 meters (3 feet) of low-permeability, compacted clay, a 0.3 meter (12 inch)-thick layer of loosely compacted soil, 0.15 meter (6 inches) of topsoil and covered with shallow-rooted grass. A clay cutoff wall and dike measuring 3.35 to 8.84 meters (11 to 29 feet) in thickness formed the perimeter. In 1991 additional soil with residual radioactivity from a vicinity property, along with 60 drums containing radioactive material, were placed over the existing IWCS. Six inches of clay was placed over the waste material and two feet of compacted clay was added on top along with 0.46 meter (1.5 feet) of topsoil material. However, the area of the cap was included in the site area estimate.

Radium-226 was detected at an elevated concentration of 1,140 pCi/g in one area during the Phase I remedial investigation. This was analyzed and determined to come from a stone in the sample. Although release rates are based on dust erosion and not buried stones, this detection was used in the source term calculation.

Soil concentration data, listed in Table B-3, are not available for all the radionuclides in Table B-1. If explicit results for a radionuclide were not available, it was assumed that the radionuclide was present in equilibrium with (i.e., at the same concentration as) the nearest long-lived parent. Branching ratios were used to estimate source term concentrations. Table B-3 lists the source term values used in the CAP-88 modeled scenarios.

**Table B-1. Radionuclides Considered in NESHAPS Evaluation**

Uranium Series	Thorium Series	Actinium Series
U-238	Th-232	U-235
Th-234	Ra-228	Th-231
Pa-234m	Ac-228	Pa-231
Pa-234 (0.13%)	Th-228	Ac-227
U-234	Ra-224	Th-227 (98.62%)
Th-230	*Rn-220 (thoron)	Fr-223 (1.38%)
Ra-226	Po-216	Ra-223
*Rn-222 (radon)	Pb-212	*Rn-219 (actinon)
Po-218	Bi-212	Po-215
Pb-214 (99.98%)	Po-212 (64.07%)	Pb-211 ( $\approx$ 100%)
At-218 (0.02%)	Tl-208 (35.93%)	At-215 (0.00023%)
Bi-214	*Pb-208 (stable)	Bi-211
Po-214 (99.979%)		Po-211 (0.273%)
Tl-210 (0.021%)		Tl-207 (99.73%)
Pb-210		*Pb-207 (stable)
Bi-210		
Po-210 ( $\approx$ 100%)		
Tl-206 (0.00013%)		
*Pb-206 (stable)		
Nuclides with asterisks (*) were excluded from dose calculations for the following reasons: 1) Radon isotopes including thoron and actinon are specifically excluded per the regulation or 2) nuclides of low abundance and stable nuclides do not contribute significantly to radiological dose.		
Nuclides are presented from top to bottom in order of decay starting from the parent radionuclides. Branching fractions are shown, as appropriate, for consideration in source term development. Fractions taken from Shleien, 1992.		

**Table B-2. Summary of Phases I, II, and III Characterization Data Used in NESHPAP Dose Calculations**

Analyte	Units	Results	Minimum Detect	Maximum Detect	Average Result	95% UCL of the Mean	Input Exposure Concentration
Radium-226 <sup>a</sup> (pCi/g)	552	0.0607	1140	10.23	26.09	26.09	
Thorium-228 (pCi/g)	552	0.0481	2.38	1.06	1.08	1.08	
Thorium-230 (pCi/g)	552	0.0906	978	8.68	22.74	22.74	
Thorium-232 (pCi/g)	551	0.0149	2.07	0.88	0.89	0.89	
Uranium-234 (pCi/g)	552	0.0416	8340	20.57	87.4	87.4	
Uranium-235 (pCi/g)	553	-0.16	886	1.94	8.97	8.97	
Uranium-238 (pCi/g)	551	0.049	8830	21.59	92.38	92.38	

<sup>a</sup> Includes previous outlier 1,140 pCi/g (NiagAir1 on 25JUL00 at 15:36 using dataset allradnq)

**Table B-3. Soil Concentration and Estimated Emission of Radionuclides from NFSS for CY 2009**

Soil Concentration and CAPP88 Input Source Term								
Uranium Series			Thorium Series			Actinium Series		
Nuclide	pCi/g	Ci/y	Nuclide	pCi/g	Ci/y	Nuclide	pCi/g	Ci/y
U-238	92.38	3.02E-05	Th-232	0.89	2.91E-07	U-235	8.97	2.93E-06
Th-234	92.38	3.02E-05	Ra-228	0.89	2.91E-07	Th-231	8.97	2.93E-06
Pa-234m	92.38	3.02E-05	Ac-228	0.89	2.91E-07	Pa-231	8.97	2.93E-06
Pa-234	92.38	3.92E-08	Th-228	1.08	3.53E-07	Ac-227	8.97	2.93E-06
U-234	87.4	2.86E-05	Ra-224	1.08	3.53E-07	Th-227	8.97	2.89E-06
Th-230	22.74	7.43E-06	Rn-220	1.08	0.00E-00	Fr-223	8.97	4.05E-08
Ra-226	26.09	8.53E-06	Po-216	1.08	3.53E-07	Ra-223	8.97	2.93E-06
Rn-222	26.09	0.00E-00	Pb-212	1.08	3.53E-07	Rn-219	8.97	0.00E-00
Po-218	26.09	8.53E-06	Bi-212	1.08	3.53E-07	Po-215	8.97	2.93E-06
Pb-214	26.09	8.52E-06	Po-212	1.08	2.26E-07	Pb-211	8.97	2.93E-06
At-218	26.09	1.71E-09	Tl-208	1.08	1.27E-07	At-215	8.97	6.74E-12
Bi-214	26.09	8.53E-06	Pb-208 (stable)	1.08	0.00E-00	Bi-211	8.97	2.93E-06
Po-214	26.09	8.52E-06				Po-211	8.97	8.00E-09
Tl-210	26.09	1.79E-09				Tl-207	8.97	2.92E-06
Pb-210	26.09	8.53E-06				Pb-207 (stable)	8.97	0.00E-00
Bi-210	26.09	8.53E-06						
Po-210	26.09	8.53E-06						
Tl-206	26.09	1.11E-11						
Pb-206 (stable)	26.09	0.00E-00						

## B.2 REFERENCES

Shleien, 1992. *The Health Physics and Radiological Health Handbook*, Scinta, Inc., Silver Spring, MD.

**ATTACHMENT C**

**CAPP88-PC REPORTS – INDIVIDUAL**

C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

D O S E    A N D    R I S K    E Q U I V A L E N T    S U M M A R I E S

Non-Radon Individual Assessment  
Jun 7, 2011 09:34 amm

Facility: Niagara Falls Storage Site  
Address: 1397 Pletcher Road  
City: Lewiston  
State: NY               Zip: 14174

Source Category: Area Source  
Source Type: Area  
Emission Year: 2010

Comments: NFSS Tech Memo 2010  
Individual Dose

Dataset Name: NFSS 2010 Ind  
Dataset Date: 6/7/2011 9:07:00 AM  
Wind File: . C:\Program Files\CAP88-  
PC30\WindLib\IAG0905.WND

Jun 7, 2011 09:34 am

SUMMARY  
Page 1

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	2.26E-04
INHALATION	7.54E-03
AIR IMMERSION	2.76E-08
GROUND SURFACE	8.93E-06
INTERNAL	7.77E-03
EXTERNAL	8.96E-06
TOTAL	7.78E-03

## NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	7.15E-04
Th-234	2.46E-06
Pa-234m	1.49E-06
Pa-234	2.33E-10
U-234	8.23E-04
Th-230	8.58E-04
Ra-226	3.01E-04
Rn-222	5.41E-15
Po-218	3.27E-11
Pb-214	1.75E-06
Bi-214	6.46E-06
Po-214	3.00E-10
Pb-210	1.43E-04
Bi-210	6.64E-06
Po-210	2.49E-04
At-218	0.00E+00
Th-232	5.86E-05
Ra-228	6.23E-06
Ac-228	2.85E-08
Th-228	1.14E-04
Ra-224	8.52E-06
Rn-220	2.06E-13
Po-216	8.69E-15
Pb-212	4.92E-07
Bi-212	8.85E-08
Po-212	0.00E+00
Tl-208	6.83E-10
U-235	7.51E-05
Th-231	2.89E-08
Pa-231	2.24E-03
Ac-227	1.74E-03
Th-227	2.44E-04
Ra-223	1.80E-04
Rn-219	2.45E-10
Po-215	2.22E-10
Pb-211	3.89E-07
Bi-211	5.83E-08
Tl-207	7.32E-08
Po-211	9.28E-14
Fr-223	3.42E-09
TOTAL	7.78E-03

Jun 7, 2011 09:34 amm

SUMMARY  
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
Esophagus	4.34E-12
Stomach	1.06E-11
Colon	3.60E-11
Liver	1.55E-10
LUNG	3.01E-09
Bone	1.05E-10
Skin	4.83E-13
Breast	6.17E-12
Ovary	1.84E-11
Bladder	1.03E-11
Kidneys	1.92E-11
Thyroid	8.51E-13
Leukemia	2.01E-11
Residual	4.26E-11
Total	3.44E-09
TOTAL	6.89E-09

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	6.90E-11
INHALATION	3.37E-09
AIR IMMERSION	1.47E-14
GROUND SURFACE	4.08E-12
INTERNAL	3.44E-09
EXTERNAL	4.10E-12
TOTAL	3.44E-09

## NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
U-238	5.89E-10
Th-234	2.49E-12
Pa-234m	2.39E-13
Pa-234	1.49E-16
U-234	6.79E-10
Th-230	4.38E-10
Ra-226	2.24E-10
Rn-222	2.94E-21
Po-218	1.79E-17
Pb-214	1.06E-12
Bi-214	3.41E-12
Po-214	1.65E-16
Pb-210	6.95E-11
Bi-210	5.72E-12
Po-210	2.00E-10
At-218	0.00E+00
Th-232	2.60E-11
Ra-228	2.98E-12
Ac-228	1.82E-14
Th-228	9.75E-11
Ra-224	7.34E-12
Rn-220	1.13E-19
Po-216	4.76E-21
Pb-212	4.24E-13
Bi-212	5.71E-14
Po-212	0.00E+00
Tl-208	3.77E-16
U-235	6.18E-11
Th-231	1.71E-14
Pa-231	2.12E-10
Ac-227	4.58E-10
Th-227	2.11E-10
Ra-223	1.54E-10
Rn-219	1.32E-16
Po-215	1.22E-16
Pb-211	2.68E-13
Bi-211	3.19E-14
Tl-207	9.35E-15
Po-211	5.09E-20
Fr-223	2.90E-15
TOTAL	3.44E-09

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)  
(All Radionuclides and Pathways)

Direction	Distance (m)						
	533	783	914	1105	1250	1486	2499
N	5.6E-03	2.3E-03	1.8E-03	1.3E-03	1.1E-03	9.1E-04	5.0E-04
NNW	4.5E-03	1.8E-03	1.3E-03	9.2E-04	7.4E-04	5.5E-04	2.7E-04
NW	4.5E-03	1.6E-03	1.2E-03	9.1E-04	7.7E-04	6.1E-04	3.5E-04
WNW	4.8E-03	2.4E-03	1.8E-03	1.3E-03	1.1E-03	8.1E-04	4.1E-04
W	5.2E-03	2.6E-03	2.0E-03	1.5E-03	1.3E-03	1.1E-03	5.9E-04
WSW	5.2E-03	2.6E-03	1.9E-03	1.4E-03	1.1E-03	8.5E-04	4.2E-04
SW	4.8E-03	1.9E-03	1.5E-03	1.1E-03	9.2E-04	7.4E-04	4.2E-04
SSW	4.3E-03	1.9E-03	1.4E-03	1.0E-03	8.4E-04	6.4E-04	3.3E-04
S	4.6E-03	1.9E-03	1.5E-03	1.1E-03	9.5E-04	7.6E-04	4.3E-04
SSE	5.2E-03	2.5E-03	1.8E-03	1.3E-03	1.1E-03	8.1E-04	4.0E-04
SE	6.0E-03	2.7E-03	2.0E-03	1.5E-03	1.3E-03	1.0E-03	5.4E-04
ESE	6.6E-03	3.1E-03	2.3E-03	1.7E-03	1.4E-03	1.0E-03	5.1E-04
E	7.4E-03	3.2E-03	2.4E-03	1.7E-03	1.4E-03	1.1E-03	5.8E-04
ENE	7.8E-03	3.7E-03	2.8E-03	2.0E-03	1.6E-03	1.2E-03	5.5E-04
NE	7.7E-03	3.7E-03	2.8E-03	2.1E-03	1.8E-03	1.4E-03	7.4E-04
NNE	6.9E-03	3.5E-03	2.6E-03	1.9E-03	1.5E-03	1.1E-03	5.4E-04

Direction	Distance (m)						
	2629						
N	4.8E-04						
NNW	2.6E-04						
NW	3.4E-04						
WNW	3.9E-04						
W	5.6E-04						
WSW	4.0E-04						
SW	4.0E-04						
SSW	3.2E-04						
S	4.1E-04						
SSE	3.8E-04						
SE	5.1E-04						
ESE	4.8E-04						
E	5.4E-04						
ENE	5.2E-04						
NE	6.9E-04						
NNE	5.1E-04						

INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

Direction	533	783	914	1105	1250	1486	2499
N	2.5E-09	1.0E-09	7.7E-10	5.7E-10	4.8E-10	3.8E-10	2.0E-10
NNW	2.0E-09	7.8E-10	5.7E-10	3.9E-10	3.1E-10	2.2E-10	9.8E-11
NW	2.0E-09	6.8E-10	5.2E-10	3.8E-10	3.2E-10	2.5E-10	1.3E-10
WNW	2.1E-09	1.1E-09	7.8E-10	5.5E-10	4.5E-10	3.4E-10	1.6E-10
W	2.3E-09	1.1E-09	8.8E-10	6.6E-10	5.6E-10	4.5E-10	2.4E-10
WSW	2.3E-09	1.1E-09	8.3E-10	5.8E-10	4.7E-10	3.5E-10	1.6E-10
SW	2.1E-09	8.3E-10	6.3E-10	4.6E-10	3.9E-10	3.1E-10	1.6E-10
SSW	1.9E-09	8.4E-10	6.2E-10	4.4E-10	3.5E-10	2.6E-10	1.2E-10
S	2.0E-09	8.4E-10	6.4E-10	4.8E-10	4.0E-10	3.2E-10	1.7E-10
SSE	2.3E-09	1.1E-09	7.9E-10	5.6E-10	4.5E-10	3.4E-10	1.6E-10
SE	2.6E-09	1.2E-09	8.9E-10	6.5E-10	5.5E-10	4.3E-10	2.2E-10
ESE	2.9E-09	1.4E-09	1.0E-09	7.2E-10	5.9E-10	4.4E-10	2.0E-10
E	3.3E-09	1.4E-09	1.0E-09	7.5E-10	6.2E-10	4.8E-10	2.3E-10
ENE	3.4E-09	1.6E-09	1.2E-09	8.5E-10	6.8E-10	5.1E-10	2.2E-10
NE	3.4E-09	1.6E-09	1.2E-09	9.1E-10	7.6E-10	6.0E-10	3.1E-10
NNE	3.0E-09	1.5E-09	1.1E-09	8.0E-10	6.5E-10	4.9E-10	2.2E-10

Direction	2629	Distance (m)
N	1.9E-10	
NNW	9.4E-11	
NW	1.3E-10	
WNW	1.5E-10	
W	2.2E-10	
WSW	1.5E-10	
SW	1.5E-10	
SSW	1.2E-10	
S	1.6E-10	
SSE	1.5E-10	
SE	2.0E-10	
ESE	1.9E-10	
E	2.2E-10	
ENE	2.1E-10	
NE	2.8E-10	
NNE	2.0E-10	

**ATTACHMENT D**  
**CAPP88-PC REPORTS – POPULATION**

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

D O S E      A N D      R I S K      E Q U I V A L E N T      S U M M A R I E S

Non-Radon Population Assessment  
Jun 6, 2011 11:21 amm

Facility: Niagara Falls Storage Site  
Address: 1397 Pletcher Road  
City: Lewiston  
State: NY                Zip:        14174

Source Category: Area Source  
Source Type: Area  
Emission Year: 2010

Comments: Population Dose  
Population Dose

Dataset Name: NFSS 2010 Pop  
Dataset Date: 6/6/2011 11:19:00 AM  
Wind File: . C:\Program Files\CAP88-  
PC30\WindLib\IAG0905.WND  
Population File: C:\Program Files\CAP88-  
PC30\Poplib\NFSS2003.POP

Jun 6, 2011 11:21 am

SUMMARY  
Page 1

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	2.55E-05	1.08E-03
INHALATION	3.01E-02	4.08E-02
AIR IMMERSION	1.10E-07	1.50E-07
GROUND SURFACE	3.35E-05	7.99E-05
INTERNAL	3.01E-02	4.18E-02
EXTERNAL	3.36E-05	8.01E-05
TOTAL	3.01E-02	4.19E-02

## NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	2.79E-03	3.87E-03
Th-234	7.98E-06	1.37E-05
Pa-234m	5.58E-06	1.33E-05
Pa-234	9.29E-10	1.26E-09
U-234	3.22E-03	4.45E-03
Th-230	3.36E-03	4.64E-03
Ra-226	9.59E-04	1.49E-03
Rn-222	2.12E-14	4.65E-14
Po-218	1.23E-10	2.93E-10
Pb-214	6.74E-06	1.26E-05
Bi-214	2.45E-05	5.42E-05
Po-214	1.12E-09	2.68E-09
Pb-210	3.14E-04	7.76E-04
Bi-210	2.62E-05	3.61E-05
Po-210	9.05E-04	1.34E-03
At-218	0.00E+00	0.00E+00
Th-232	2.33E-04	3.16E-04
Ra-228	2.48E-05	3.37E-05
Ac-228	1.14E-07	1.54E-07
Th-228	4.53E-04	6.15E-04
Ra-224	3.40E-05	4.60E-05
Rn-220	8.08E-13	1.77E-12
Po-216	3.46E-14	4.70E-14
Pb-212	1.96E-06	2.66E-06
Bi-212	3.53E-07	4.78E-07
Po-212	0.00E+00	0.00E+00
Tl-208	2.72E-09	3.69E-09
U-235	2.93E-04	4.07E-04
Th-231	1.10E-07	2.30E-07
Pa-231	8.86E-03	1.21E-02
Ac-227	6.91E-03	9.41E-03
Th-227	9.71E-04	1.32E-03
Ra-223	7.06E-04	9.62E-04
Rn-219	9.61E-10	2.10E-09
Po-215	8.34E-10	1.99E-09
Pb-211	1.52E-06	2.54E-06
Bi-211	2.19E-07	5.21E-07
Tl-207	2.75E-07	6.55E-07
Po-211	3.70E-13	5.02E-13
Fr-223	1.36E-08	1.85E-08
TOTAL	3.01E-02	4.19E-02

## CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (Deaths/y)
Esophagus	1.51E-11	3.03E-10
Stomach	3.38E-11	7.38E-10
Colon	8.68E-11	2.43E-09
Liver	5.77E-10	1.08E-08
LUNG	1.20E-08	2.11E-07
Bone	3.81E-10	7.22E-09
Skin	1.68E-12	4.24E-11
Breast	1.98E-11	4.40E-10
Ovary	7.04E-11	1.29E-09
Bladder	3.59E-11	7.18E-10
Kidneys	5.21E-11	1.34E-09
Thyroid	2.75E-12	5.96E-11
Leukemia	6.81E-11	1.39E-09
Residual	1.19E-10	2.83E-09
Total	1.35E-08	2.41E-07

## PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (Deaths/y)
INGESTION	7.52E-12	4.22E-09
INHALATION	1.34E-08	2.36E-07
AIR IMMERSION	5.87E-14	1.04E-12
GROUND SURFACE	1.53E-11	4.73E-10
INTERNAL	1.34E-08	2.40E-07
EXTERNAL	1.54E-11	4.74E-10
TOTAL	1.35E-08	2.41E-07

## NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (Deaths/y)
U-238	2.33E-09	4.12E-08
Th-234	7.26E-12	1.78E-10
Pa-234m	8.95E-13	2.77E-11
Pa-234	5.92E-16	1.04E-14
U-234	2.68E-09	4.75E-08
Th-230	1.74E-09	3.06E-08
Ra-226	8.10E-10	1.51E-08
Rn-222	1.15E-20	3.27E-19
Po-218	6.73E-17	2.08E-15
Pb-214	4.11E-12	9.63E-11
Bi-214	1.29E-11	3.72E-10
Po-214	6.17E-16	1.91E-14
Pb-210	1.92E-10	4.87E-09
Bi-210	2.24E-11	3.95E-10
Po-210	7.63E-10	1.40E-08
At-218	0.00E+00	0.00E+00
Th-232	1.04E-10	1.82E-09
Ra-228	1.19E-11	2.08E-10
Ac-228	7.25E-14	1.27E-12
Th-228	3.88E-10	6.82E-09
Ra-224	2.92E-11	5.14E-10
Rn-220	4.42E-19	1.25E-17
Po-216	1.90E-20	3.33E-19
Pb-212	1.69E-12	2.97E-11
Bi-212	2.28E-13	4.00E-12
Po-212	0.00E+00	0.00E+00
Tl-208	1.50E-15	2.64E-14
U-235	2.44E-10	4.33E-09
Th-231	6.61E-14	1.63E-12
Pa-231	8.37E-10	1.48E-08
Ac-227	1.82E-09	3.21E-08
Th-227	8.42E-10	1.48E-08
Ra-223	6.09E-10	1.07E-08
Rn-219	5.20E-16	1.47E-14
Po-215	4.57E-16	1.41E-14
Pb-211	1.06E-12	2.06E-11
Bi-211	1.20E-13	3.69E-12
Tl-207	3.51E-14	1.08E-12
Po-211	2.03E-19	3.56E-18
Fr-223	1.15E-14	2.03E-13
TOTAL	1.35E-08	2.41E-07

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)  
(All Radionuclides and Pathways)

		Distance (m)						
Direction		250	750	1500	2500	3500	4500	7500
N	3.0E-02	2.3E-03	7.2E-04	3.3E-04	1.9E-04	1.3E-04	5.9E-05	
NNW	3.0E-02	1.8E-03	3.7E-04	1.0E-04	5.9E-05	4.0E-05	1.8E-05	
NW	3.0E-02	1.5E-03	4.3E-04	1.8E-04	1.1E-04	7.1E-05	3.2E-05	
WNW	3.0E-02	2.5E-03	6.3E-04	2.4E-04	1.4E-04	9.2E-05	4.1E-05	
W	3.0E-02	2.6E-03	8.7E-04	4.2E-04	2.4E-04	1.6E-04	7.3E-05	
WSW	3.0E-02	2.6E-03	6.6E-04	2.4E-04	1.4E-04	9.6E-05	4.3E-05	
SW	3.0E-02	1.9E-03	5.6E-04	2.4E-04	1.4E-04	9.6E-05	4.3E-05	
SSW	3.0E-02	1.9E-03	4.6E-04	1.6E-04	9.2E-05	6.2E-05	2.8E-05	
S	3.0E-02	1.9E-03	5.8E-04	2.6E-04	1.5E-04	1.0E-04	4.6E-05	
SSE	3.0E-02	2.5E-03	6.3E-04	2.3E-04	1.3E-04	9.0E-05	4.1E-05	
SE	3.0E-02	2.7E-03	8.2E-04	3.7E-04	2.1E-04	1.4E-04	6.5E-05	
ESE	3.0E-02	3.2E-03	8.5E-04	3.4E-04	1.9E-04	1.3E-04	6.0E-05	
E	3.0E-02	3.2E-03	9.4E-04	4.0E-04	2.3E-04	1.6E-04	7.2E-05	
ENE	3.0E-02	3.9E-03	1.0E-03	3.8E-04	2.2E-04	1.5E-04	6.8E-05	
NE	3.0E-02	3.8E-03	1.2E-03	5.6E-04	3.3E-04	2.2E-04	1.0E-04	
NNE	3.0E-02	3.6E-03	9.5E-04	3.7E-04	2.1E-04	1.5E-04	6.6E-05	

		Distance (m)						
Direction		15000	25000	35000	45000	55000	65000	75000
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.9E-06	1.5E-06	
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.9E-07	6.4E-07	5.2E-07	
NW	1.1E-05	0.0E+00	0.0E+00	0.0E+00	1.4E-06	9.7E-07	7.7E-07	
WNW	1.5E-05	0.0E+00	0.0E+00	0.0E+00	1.8E-06	1.2E-06	9.0E-07	
W	2.7E-05	1.2E-05	7.2E-06	4.7E-06	3.2E-06	2.1E-06	1.6E-06	
WSW	1.6E-05	7.1E-06	4.3E-06	2.9E-06	2.0E-06	1.4E-06	1.1E-06	
SW	1.6E-05	7.0E-06	4.3E-06	2.9E-06	2.0E-06	1.4E-06	0.0E+00	
SSW	1.0E-05	4.5E-06	2.8E-06	1.9E-06	0.0E+00	9.4E-07	7.5E-07	
S	1.7E-05	7.4E-06	4.5E-06	3.1E-06	2.1E-06	1.5E-06	1.1E-06	
SSE	1.5E-05	6.6E-06	4.1E-06	2.8E-06	1.9E-06	1.4E-06	1.1E-06	
SE	2.3E-05	1.1E-05	6.4E-06	4.3E-06	3.0E-06	2.1E-06	1.6E-06	
ESE	2.2E-05	9.8E-06	6.0E-06	4.0E-06	2.8E-06	2.0E-06	1.5E-06	
E	2.6E-05	1.2E-05	7.3E-06	4.9E-06	3.4E-06	2.4E-06	1.9E-06	
ENE	2.5E-05	1.1E-05	7.0E-06	4.8E-06	3.4E-06	2.4E-06	1.9E-06	
NE	3.7E-05	1.7E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
NNE	2.4E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-06	

Jun 6, 2011 11:21 am

## SUMMARY

**COLLECTIVE EFFECTIVE DOSE EQUIVALENT (person rem/y)**  
**(All Radionuclides and Pathways)**

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	2.7E-04	6.5E-05	6.9E-05	4.5E-05	3.6E-05	3.1E-05	8.0E-05
NNW	2.7E-04	5.0E-05	3.8E-05	1.4E-05	1.1E-05	8.9E-06	2.8E-05
NW	2.7E-04	4.3E-05	4.8E-05	2.8E-05	2.0E-05	1.8E-05	2.6E-04
WNW	2.7E-04	6.9E-05	6.9E-05	4.4E-05	3.3E-05	5.3E-05	1.6E-04
W	2.7E-04	7.3E-05	9.6E-05	7.7E-05	3.9E-04	5.4E-05	8.3E-05
WSW	2.7E-04	7.4E-05	7.3E-05	4.5E-05	2.2E-04	1.9E-04	2.9E-04
SW	2.7E-04	5.3E-05	6.2E-05	4.5E-05	4.5E-05	2.0E-04	5.2E-04
SSW	2.7E-04	5.4E-05	5.1E-05	2.9E-05	2.7E-05	9.6E-05	3.1E-04
S	2.7E-04	5.3E-05	6.5E-05	4.8E-05	3.4E-05	3.0E-05	4.8E-04
SSE	2.7E-04	7.0E-05	7.0E-05	4.3E-05	3.0E-05	2.6E-05	1.9E-04
SE	2.7E-04	7.6E-05	9.2E-05	6.8E-05	5.1E-05	4.1E-05	2.0E-04
ESE	2.7E-04	9.0E-05	9.5E-05	6.2E-05	5.0E-05	4.3E-05	1.5E-04
E	2.7E-04	9.0E-05	1.0E-04	7.5E-05	6.0E-05	5.3E-05	1.7E-04
ENE	2.7E-04	1.1E-04	1.1E-04	6.9E-05	4.3E-05	3.1E-05	2.2E-04
NE	2.7E-04	1.1E-04	1.3E-04	6.9E-05	3.7E-05	3.2E-05	2.7E-04
NNE	2.7E-04	1.0E-04	9.3E-05	4.9E-05	3.9E-05	3.0E-05	9.9E-05

Jun 6, 2011 11:21 amm

SUMMARY  
Page 7INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

		Distance (m)						
Direction		250	750	1500	2500	3500	4500	7500
N	1.3E-08	1.0E-09	3.2E-10	1.5E-10	8.6E-11	5.8E-11	2.6E-11	
NNW	1.3E-08	8.0E-10	1.7E-10	4.6E-11	2.6E-11	1.8E-11	8.0E-12	
NW	1.3E-08	6.8E-10	1.9E-10	8.2E-11	4.7E-11	3.2E-11	1.4E-11	
WNW	1.3E-08	1.1E-09	2.8E-10	1.1E-10	6.1E-11	4.1E-11	1.8E-11	
W	1.3E-08	1.2E-09	3.9E-10	1.9E-10	1.1E-10	7.3E-11	3.3E-11	
WSW	1.3E-08	1.2E-09	2.9E-10	1.1E-10	6.3E-11	4.3E-11	1.9E-11	
SW	1.3E-08	8.4E-10	2.5E-10	1.1E-10	6.3E-11	4.3E-11	1.9E-11	
SSW	1.3E-08	8.7E-10	2.1E-10	7.1E-11	4.1E-11	2.8E-11	1.2E-11	
S	1.3E-08	8.5E-10	2.6E-10	1.2E-10	6.7E-11	4.6E-11	2.0E-11	
SSE	1.3E-08	1.1E-09	2.8E-10	1.0E-10	6.0E-11	4.0E-11	1.8E-11	
SE	1.3E-08	1.2E-09	3.7E-10	1.6E-10	9.5E-11	6.4E-11	2.9E-11	
ESE	1.3E-08	1.4E-09	3.8E-10	1.5E-10	8.7E-11	5.9E-11	2.7E-11	
E	1.3E-08	1.4E-09	4.2E-10	1.8E-10	1.0E-10	7.1E-11	3.2E-11	
ENE	1.3E-08	1.7E-09	4.5E-10	1.7E-10	9.9E-11	6.7E-11	3.0E-11	
NE	1.3E-08	1.7E-09	5.4E-10	2.5E-10	1.5E-10	9.9E-11	4.5E-11	
NNE	1.3E-08	1.6E-09	4.2E-10	1.6E-10	9.5E-11	6.5E-11	2.9E-11	

		Distance (m)						
Direction		15000	25000	35000	45000	55000	65000	75000
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.3E-13	6.5E-13	
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.8E-13	2.7E-13	2.1E-13	
NW	5.1E-12	0.0E+00	0.0E+00	0.0E+00	6.1E-13	4.2E-13	3.3E-13	
WNW	6.6E-12	0.0E+00	0.0E+00	0.0E+00	7.6E-13	5.0E-13	3.9E-13	
W	1.2E-11	5.2E-12	3.2E-12	2.1E-12	1.4E-12	9.3E-13	7.1E-13	
WSW	7.0E-12	3.1E-12	1.9E-12	1.3E-12	8.8E-13	6.0E-13	4.7E-13	
SW	6.9E-12	3.1E-12	1.9E-12	1.3E-12	8.8E-13	6.0E-13	0.0E+00	
SSW	4.5E-12	2.0E-12	1.2E-12	8.3E-13	0.0E+00	4.0E-13	3.2E-13	
S	7.4E-12	3.3E-12	2.0E-12	1.3E-12	9.2E-13	6.3E-13	4.9E-13	
SSE	6.5E-12	3.0E-12	1.8E-12	1.2E-12	8.4E-13	5.9E-13	4.6E-13	
SE	1.0E-11	4.7E-12	2.9E-12	1.9E-12	1.3E-12	9.2E-13	7.1E-13	
ESE	9.6E-12	4.3E-12	2.7E-12	1.8E-12	1.2E-12	8.6E-13	6.7E-13	
E	1.2E-11	5.3E-12	3.2E-12	2.2E-12	1.5E-12	1.0E-12	8.2E-13	
ENE	1.1E-11	5.1E-12	3.1E-12	2.1E-12	1.5E-12	1.1E-12	8.3E-13	
NE	1.6E-11	7.5E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
NNE	1.1E-11	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.8E-13	

Jun 6, 2011 11:21 am

## SUMMARY

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COLLECTIVE FATAL CANCER RATE (deaths/y)  
(All Radionuclides and Pathways)

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	1.6E-09	3.8E-10	4.0E-10	2.6E-10	2.1E-10	1.8E-10	4.6E-10
NNW	1.6E-09	2.9E-10	2.2E-10	7.9E-11	6.4E-11	5.1E-11	1.6E-10
NW	1.6E-09	2.5E-10	2.8E-10	1.6E-10	1.1E-10	1.1E-10	1.5E-09
WNW	1.6E-09	4.0E-10	4.0E-10	2.5E-10	1.9E-10	3.1E-10	9.0E-10
W	1.6E-09	4.2E-10	5.6E-10	4.5E-10	2.2E-09	3.1E-10	4.8E-10
WSW	1.6E-09	4.3E-10	4.2E-10	2.6E-10	1.2E-09	1.1E-09	1.7E-09
SW	1.6E-09	3.0E-10	3.6E-10	2.6E-10	2.6E-10	1.2E-09	3.0E-09
SSW	1.6E-09	3.1E-10	3.0E-10	1.7E-10	1.5E-10	5.5E-10	1.8E-09
S	1.6E-09	3.1E-10	3.7E-10	2.8E-10	1.9E-10	1.7E-10	2.7E-09
SSE	1.6E-09	4.1E-10	4.0E-10	2.5E-10	1.7E-10	1.5E-10	1.1E-09
SE	1.6E-09	4.4E-10	5.3E-10	3.9E-10	3.0E-10	2.4E-10	1.2E-09
ESE	1.6E-09	5.2E-10	5.5E-10	3.6E-10	2.9E-10	2.5E-10	8.7E-10
E	1.6E-09	5.2E-10	6.0E-10	4.3E-10	3.5E-10	3.1E-10	1.0E-09
ENE	1.6E-09	6.3E-10	6.4E-10	4.0E-10	2.5E-10	1.8E-10	1.3E-09
NE	1.6E-09	6.1E-10	7.6E-10	4.0E-10	2.2E-10	1.8E-10	1.6E-09
NNE	1.6E-09	5.9E-10	5.4E-10	2.9E-10	2.2E-10	1.7E-10	5.7E-10

**ATTACHMENT E**

**NATIONAL CLIMATIC DATA CENTER, NIAGARA FALLS, NEW YORK**

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level															
Date	Temperature (Fahrenheit)						Degree Days Base 65 Degrees			Sun		Significant Weather	Snow/Ice on Ground(In)			Precipitation (In)	Pressure(inches of Hg)			Wind: Speed=mph Dir=tens of degrees						Date	
	Max.	Min.	Avg.	Dep From Normal	Avg. Dew pt.	Avg. Wet Bulb	Heating	Cooling	Sunrise LST	Sunset LST	Depth	Water Equiv	Snow Fall	Water Equiv	Avg. Station	Resultant Speed	Res Dir	Avg. Speed	max 5-second Speed	Dir	max 2-minute Speed	Dir	Speed	Dir			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
01	34	20	27	M	24	27	38	0	-	-	SN BR	T	M	2.4	0.10	29.27	29.95	12.3	27	13.5	32	270	24	280	01		
02	20	9	15	M	8	12	50	0	-	-	SN FZFG BR BLSN	8	M	9.9	0.27	29.34	30.05	13.9	31	14.7	29	290	22	290	02		
03	17	12	15	M	10	13	50	0	-	-	SN FZFG BR BLSN	10	M	15.9	0.54	29.26	29.96	15.2	32	15.9	33	320	26	330	03		
04	19	14	17	M	12	15	48	0	-	-	SN BR	18	M	12.5	0.22	29.26	29.95	8.5	30	9.4	22	310	18	310	04		
05	27	16	22	M	16	19	43	0	-	-	FZRA FZDZ SN BR UP	18	M	4.4	0.16	29.23	29.92	10.0	29	11.0	22	310	20	310	05		
06	25	20	23	M	18	21	42	0	-	-	FZDZ SN BR	14	M	0.2s	T	29.27	29.98	11.0	29	12.8	25	320	21	320	06		
07	28	25	27	M	24	26	38	0	-	-	SN BR	13	M	T	T	29.32	29.99	6.8	26	8.0	17	260	14	260	07		
08	26	16	21	M	15	18	44	0	-	-	SN BR	12	M	2.7	0.12	29.27	29.99	8.2	35	9.5	22	320	18	330	08		
09	16	0	8	M	6	10	57	0	-	-	SN BR	14	M	3.2	0.09	29.62	30.35	4.4	33	4.8	16	350	13	350	09		
10	26	0	13	M	9	14	52	0	-	-	FG+ FZFG BR	14	M	0.0	0.00	29.63	30.32	12.8	24	13.0	38	220	30	230	10		
11	25	17	21	M	18	22	44	0	-	-	SN BR	10	M	1.1s	T	29.44	30.14	13.0	22	13.3	40	240	30	230	11		
12	23	15	19	M	14	19	46	0	-	-	SN BR	10	M	0.6	0.04	29.57	30.28	6.0	30	7.6	20	300	16	300	12		
13	30	19	25	M	22	25	40	0	-	-	BR BLSN	9	M	0.0	0.00	29.51	30.18	15.3	23	16.0	41	230	33	230	13		
14	41	22	32	M	25	30	33	0	-	-	BR	8	M	0.0	0.00	29.43	30.10	13.8	22	14.0	32	250	28	240	14		
15	40	34	37	M	30	34	28	0	-	-	DZ BR HZ	5	M	0.0	T	29.47	30.17	11.7	24	11.8	33	240	28	250	15		
16	35	32	34	M	29	32	31	0	-	-	BR	4	M	0.0	0.00	29.52	30.19	14.5	23	14.7	37	230	29	230	16		
17	36	32	34	M	32	33	31	0	-	-	FG+ FG BR	3	M	0.0	0.00	29.26	29.89	1.8	08	3.3	13	230	10	230	17		
18	35	29	32	M	30	31	33	0	-	-	FZDZ FG+ FG BR	2	M	0.0	T	29.21	29.90	9.8	25	10.2	25	240	21	240	18		
19	34	25	30	M	26	29	35	0	-	-	SN BR	2	M	0.2	0.02	29.26	29.94	6.9	24	7.2	17	240	14	230	19		
20	31	22	27	M	21	25	38	0	-	-	SN BR	2	M	0.6	0.04	29.38	30.09	4.7	32	5.0	15	330	12	290	20		
21	33	12	23	M	19	23	42	0	-	-	BR	2	M	T	T	29.50	30.18	M	M	8.1	20	070	17	070	21		
22	36	23	30	M	22	26	35	0	-	-	BR	2	M	0.0	0.00	29.37	30.07	9.2	07	9.4	22	080	18	070	22		
23	39	20	30	M	22	27	35	0	-	-	RA FG BR	1	M	0.0	0.00	29.50	30.17	6.9	08	7.3	16	080	13	070	23		
24	45	29	37	M	32	36	28	0	-	-	RA DZ FG+ FG BR	1	M	0.0	0.65	29.13	29.74	M	M	7.0	21	160	16	170	24		
25	45*	32	39*	M	35	37	26	0	-	-	RA DZ FG+ FG BR	T	M	0.0s	0.98	28.66	29.30	12.0	23	13.4	44	240	35	240	25		
26	34	29	32	M	24	29	33	0	-	-	SN BR UP	T	M	T	T	28.94	29.65	19.9	24	19.9	37	240	29	240	26		
27	30	24	27	M	21	25	38	0	-	-	SN BR BLSN	T	M	1.1	0.07	29.31	30.02	M	M	18.6	40	230	31	240	27		
28	29	12	21	M	13	18	44	0	-	-	SN BR BLSN	2	M	3.1	0.18	29.37	30.10	19.0	27	19.5	44	280	37	270	28		
29	15	8	12	M	4	10	53	0	-	-	SN FZFG BR	3	M	7.6	0.20	29.70	30.43	10.8	29	12.3	30	280	23	280	29		
30	14	-1*	7*	M	0	5	58	0	-	-	SN BR	3	M	0.4s	T	29.64	30.34	1.8	07	2.6	13	350	10	360	30		
31	24	0	12	M	10	16	53	0	-	-	SN BLSN	2	M	0.2s	T	29.43	30.14	15.4	24	15.7	37	230	29	240	31		
29.4	18.3	23.9			19.1	22.8	40.8	0.0	<----Monthly Averages   Totals----->										M	M	1.79s	29.36	30.03	7.4	26	11.3	<Monthly Average
Degree Days Monthly Season to Date												Greatest 24-hr Precipitation: 1.63s Date: 24-25 Greatest 24-hr Snowfall: M Date: M Greatest Snow Depth: M Date: M												Sea Level Pressure Date Time (LST)			
Total Departure Total Departure												Heating: 1266 M M M Cooling: 0 M												Maximum 30.48 29 2345 Minimum 29.10 25 1016			
												Number of Days with ----->												Max Temp >=90: 0 Max Temp <=32: 30 Min Temp <=0 : 4 Thunderstorms : 18 Heavy Fog : 4 0			
																								Precipitation >=.01 inch: 9s Precipitation >=.10 inch: Snowfall >=1.0 inch : M			
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																								Data Version: VER2			

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level														
Date	Temperature (Fahrenheit)					Degree Days Base 65 Degrees		Sun		Significant Weather	Snow/Ice on Ground(In)		Precipitation (In)		Pressure(inches of Hg)		Wind: Speed=mph Dir=tens of degrees						Date			
	Max	Min.	Avg.	Dep From Normal	Avg. Dew pt	Avg Wet Bulb	Heating	Cooling	Sunrise LST		Sunset LST	1200 UTC	1800 UTC	2400 LST	2400 LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	max 5-second	max 2-minute				
												Depth	Water Equiv	Snow Fall	Water Equiv			Speed	Dir	Speed	Dir	Speed		Dir		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
01	24	13	19	M	12	18	46	0	-	-	SN	2	M	0.2s	T	29.57	30.28	12.2	26	12.5	29	260	24	260	01	
02	29	10	20	M	16	20	45	0	-	-	SN BR UP	2	M	0.2	0.01	29.51	30.18	2.1	10	3.2	10	050	9	070	02	
03	31	16	24	M	21	25	41	0	-	-	SN FG+ FZFG BR	2	M	1.4	0.07	29.44	30.16	8.6	27	9.2	28	290	23	270	03	
04	30	10	20	M	16	21	45	0	-	-	BR	2	M	0.0	0.00	29.71	30.41	6.4	25	7.0	20	210	16	210	04	
05	32	16	24	M	20	24	41	0	-	-	BR HZ	2	M	0.0	0.00	29.58	30.24	7.0	07	7.7	31	080	24	070	05	
06	23	8*	16*	M	10	15	49	0	-	-	SN	1	M	0.1s	T	29.36	30.05	12.4	05	13.1	35	050	28	060	06	
07	26	9	18	M	11	17	47	0	-	-	SN	1	M	0.6	0.02	29.43	30.13	9.0	32	9.3	23	330	18	330	07	
08	30	10	20	M	14	20	45	0	-	-	SN UP	1	M	0.0	0.00	29.47	30.18	8.0	28	8.8	21	280	17	280	08	
09	27	24	26	M	19	23	39	0	-	-	SN BR	1	M	0.2	0.01	29.38	30.01	7.5	06	8.0	23	070	20	070	09	
10	29	16	23	M	22	25	42	0	-	-	SN BR	1	M	0.2	0.01	28.93	29.62	8.0	02	12.2	24	330	20	330	10	
11	54s	9	M	M	13	18	M	M	-	-	SN BR	1	M	0.0	0.00	29.18	29.89	10.7	26	10.9	24	260	20	260	11	
12	29	16	23	M	17	23	42	0	-	-	SN BR	1	M	T	T	29.26	29.94	9.2	26	9.7	21	250	18	260	12	
13	28	10	19	M	18	21	46	0	-	-	SN BR	1	M	1.3	0.05	29.11	29.77	7.3	29	8.3	24	280	18	290	13	
14	30	25	28	M	23	26	37	0	-	-	SN BR	3	M	2.2	0.12	29.03	29.71	13.1	26	13.2	29	270	24	260	14	
15	31	17	24	M	20	24	41	0	-	-	SN BR	2	M	T	T	29.05	29.72	7.9	24	8.5	23	240	18	220	15	
16	30	23	27	M	20	25	38	0	-	-	SN	1	M	T	T	28.97	29.66	8.5	26	8.8	18	270	16	270	16	
17	32	26	29	M	25	27	36	0	-	-	SN FG FZFG BR	1	M	3.8	0.33	28.98	29.65	M	M	13.8	26	280	21	300	17	
18	33	29	31	M	25	29	34	0	-	-	FZRA SN BR	5	M	0.8	0.08	29.08	29.77	M	M	13.5	24	270	20	260	18	
19	35	29	32	M	26	30	33	0	-	-	SN BR	5	M	0.0	0.00	29.26	29.96	15.5	26	15.6	28	260	22	260	19	
20	34	21	28	M	24	27	37	0	-	-	BR	4	M	0.0	0.00	29.43	30.12	10.3	25	10.6	20	260	16	260	20	
21	39	16	28	M	21	24	37	0	-	-	BR	4	M	0.0	0.00	29.42	30.10	4.3	26	5.5	14	320	13	320	21	
22	33	16	25	M	23	26	40	0	-	-	RA FZRA SN FZFG BR UP	4	M	1.4	0.16	29.21	29.85	8.8	08	9.0	24	080	21	070	22	
23	35	31	33	M	30	31	32	0	-	-	RA SN PL BR	5	M	T	0.01	29.10	29.80	10.1	22	10.5	26	220	21	220	23	
24	36	19	28	M	23	27	37	0	-	-	SN BR	4	M	T	T	29.24	29.91	2.8	30	3.1	12	350	9	310	24	
25	30	21	26	M	22	24	39	0	-	-	SN BR BLSN	4	M	1.6	0.07	29.07	29.72	12.8	31	13.0	24	290	21	320	25	
26	30	22	26	M	24	25	39	0	-	-	SN GS FZFG BR BLSN	6	M	2.7	0.16	28.82	29.51	10.2	30	12.2	30	310	23	310	26	
27	35	27	31	M	31	32	34	0	-	-	SN FG BR UP	10	M	5.4	0.43	28.90	29.57	7.6	31	8.4	21	310	17	290	27	
28	39*	32	36*	M	30	33	29	0	-	-	SN BR	11	M	0.7	0.07	29.08	29.77	7.8	34	8.8	17	010	14	340	28	
					<-----Monthly Averages   Totals----->					M	M	0.72s		29.23	29.91	M	M	9.8	<Monthly Average							
M M M					<-----Departure From Normal----->					M																
Degree Days      Monthly      Season to Date Total Departure Total Departure Heating: M      M      M Cooling: M      M      M      M												Greatest 24-hr Precipitation: 0.26s Date: 27-28 Greatest 24-hr Snowfall: M      Date: M Greatest Snow Depth: M      Date: M						Sea Level Pressure Date Time (LST) Maximum 30.47 04 1034 Minimum 29.43 26 0639								
												Max Temp >=90: 0 Number of Days with -----> 18						Min Temp <=32: 28 Min Temp <=0 : 0 Thunderstorms : 0						Precipitation >=.01 inch: 11s Precipitation >=.10 inch: Snowfall >=1.0 inch : M		
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																		Data Version: VER2								

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level																						
NOAA, National Climatic Data Center Month: 03/2010																																		
Date	Temperature (Fahrenheit)					Degree Days Base 65 Degrees		Sun		Significant Weather	Snow/Ice on Ground(In)		Precipitation (In)		Pressure(inches of Hg)		Wind: Speed=mph Dir=tens of degrees						Date											
	Max.	Min.	Avg.	Dep From Normal	Avg. Dew pt.	Avg. Wet Bulb	Heating	Cooling	Sunrise LST		Sunset LST	1200 UTC	1800 UTC	2400 LST	2400 LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	max 5-second Speed	max 2-minute Speed												
	1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	18	19	20	21		22	23	24	25	26						
01	36	31	34	M	27	31	31	0	-	-	SN BR	9	M	0.3	0.03	29.32	30.01	8.6	31	8.9	16	300	14	300	01									
02	37	29	33	M	25	30	32	0	-	-		5	M	0.0	0.00	29.34	29.99	3.5	34	3.9	10	010	8	350	02									
03	38	29	34	M	24	30	31	0	-	-		5	M	0.0	0.00	29.20	29.86	5.5	35	6.0	14	040	10	330	03									
04	37	26	32	M	19	27	33	0	-	-		4	M	0.0	0.00	29.29	30.00	9.0	35	9.4	18	360	16	010	04									
05	36	22	29	M	19	26	36	0	-	-		4	M	0.0	0.00	29.54	30.25	6.3	33	6.8	18	320	15	330	05									
06	37	15*	26*	M	21	26	39	0	-	-	BR	M	M	M	0.00	29.64	30.32	8.6	22	8.9	18	210	18	210	06									
07	38	26	32	M	26	30	33	0	-	-	BR HZ	3	M	0.0	0.00	29.48	30.14	M	12.9	28	220	24	220	07										
08	44	28	36	M	28	32	29	0	-	-	BR HZ	0	M	0.0	0.00	29.35	30.02	10.1	22	10.2	22	230	18	240	08									
09	49	29	39	M	30	34	26	0	-	-	BR HZ	2	M	0.0	0.00	29.34	30.00	5.8	21	6.0	15	230	13	220	09									
10	50	27	39	M	30	36	26	0	-	-	BR HZ	1	M	0.0	0.00	29.27	29.93	4.1	07	4.2	13	080	10	080	10									
11	56	34	45	M	34	40	20	0	-	-	BR	T	M	0.0	T	29.26	29.91	5.9	07	6.6	18	070	16	070	11									
12	53	40	47	M	43	45	18	0	-	-	RA BR HZ	T	M	0.0	0.36	29.25	29.89	8.5	09	8.6	21	100	14	100	12									
13	47	37	42	M	36	38	23	0	-	-	RA SN PL BR	0	M	T	0.54	29.13	29.76	21.3	07	21.5	45	070	36	070	13									
14	41	34	38	M	34	36	27	0	-	-	RA DZ SN BR	0	M	T	0.31	29.07	29.75	19.3	06	19.5	45	070	35	070	14									
15	49	36	43	M	31	37	22	0	-	-	DZ BR	0	M	0.0	T	29.27	29.96	11.1	03	11.5	33	020	23	030	15									
16	59	30	45	M	21	36	20	0	-	-		0	M	0.0	0.00	29.45	30.12	1.2	01	3.0	13	330	9	020	16									
17	61*	29	45	M	30	37	20	0	-	-		0	M	0.0	0.00	29.41	30.05	5.5	22	6.1	18	210	15	210	17									
18	59	33	46	M	29	38	19	0	-	-		0	M	0.0	0.00	29.20	29.83	10.3	21	10.5	31	220	25	240	18									
19	59	34	47*	M	37	42	18	0	-	-		0	M	0.0	0.00	29.18	29.84	11.8	22	12.2	35	240	29	240	19									
20	46	32	39	M	30	36	26	0	-	-		0	M	0.0	0.00	29.39	30.09	6.6	36	6.8	17	310	14	010	20									
21	46	34	40	M	33	36	25	0	-	-	RA SN	0	M	T	0.01	29.47	30.13	8.2	04	8.4	18	040	14	040	21									
22	39	35	37	M	34	36	28	0	-	-	RA BR	0	M	0.0	0.68	29.30	29.94	16.7	06	16.8	43	060	32	060	22									
23	39	35	37	M	36	37	28	0	-	-	RA DZ PL BR	0	M	T	0.19	29.07	29.74	9.3	01	12.3	32	050	25	050	23									
24	51	29	40	M	29	36	25	0	-	-		0	M	0.0	0.00	29.31	29.99	7.3	23	8.8	23	220	18	210	24									
25	50	32	41	M	27	34	24	0	-	-	RA	0	M	0.0	0.06	29.26	29.91	4.4	30	9.0	24	010	18	340	25									
26	32	24	28	M	9	22	37	0	-	-		0	M	0.0	0.00	29.44	30.16	9.0	03	9.4	24	040	20	030	26									
27	48	20	34	M	15	28	31	0	-	-		0	M	0.0	0.00	29.60	30.26	3.0	09	4.6	14	110	10	040	27									
28	51	38	45	M	32	39	20	0	-	-	RA BR	0	M	0.0	0.17	29.28	29.90	7.0	16	8.1	25	190	18	180	28									
29	47	37	42	M	37	40	23	0	-	-	RA FG+ BR	0	M	0.0	0.09	29.20	29.88	6.4	01	6.7	21	010	17	360	29									
30	49	31	40	M	30	36	25	0	-	-	BR	0	M	0.0	0.00	29.32	29.98	5.8	36	8.0	24	040	20	030	30									
31	59	27	43	M	29	37	22	0	-	-	FG+ FZFG BR	0	M	0.0	0.00	29.32	30.00	4.6	20	4.9	15	240	13	240	31									
	46.5	30.4	38.5		28.5	34.5	26.4	0.0	<----Monthly Averages   Totals----->												M	M	2.41s	29.32	29.99	2.2	03	9.0	<Monthly Average					
	M	M	M		<-----Departure From Normal----->												M																	
Degree Days      Monthly      Season to Date Total Departure Total Departure Heating: 817      M      M      M Cooling: 0      M												Greatest 24-hr Precipitation: 0.83s Date: 13-14 Greatest 24-hr Snowfall: M Date: M Greatest Snow Depth: M Date: M						Sea Level Pressure Date Time (LST) Maximum 30.39 27 0806 Minimum 29.66 23 0606						Data Version: VER2										
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.												Number of Days with -----> Max Temp >=90: 0 Max Temp <=32: 19 1 Thunderstorms : 0						Min Temp <=32: 19 Min Temp <=0 : 0 Heavy Fog : 2						Precipitation >=.01 inch: 9s Precipitation >=.10 inch: Snowfall >=1.0 inch : M										

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level																
Date	Temperature (Fahrenheit)					Degree Days Base 65 Degrees			Sun			Significant Weather	Snow/Ice on Ground(In)		Precipitation (In)		Pressure(inches of Hg)				Wind: Speed=mph Dir=tens of degrees						Data	
	Max.	Min.	Avg.	Dep. From Normal	Avg. Dew pt	Avg. Wet Bulb	Heating	Cooling	Sunrise LST	Sunset LST	1200 UTC		1800 UTC	2400 LST	2400 LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	max 5-second	max 2-minute	Speed	Dir	Speed	Dir		
	Depth	Water Equiv	Snow Fall	Water Equiv																								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26			
01	77	37	57	M	39	49	8	0	-	-	0	M	0.0	0.00	29.32	29.96	3.0	20	4.7	18	200	15	210	01				
02	80	48	64	M	43	52	1	0	-	-	0	M	0.0	0.00	29.32	29.95	5.3	22	5.6	28	220	23	220	02				
03	85*	47	66*	M	44	54	0	1	-	-	0	M	0.0	T	29.21	29.85	10.0	22	11.9	48	250	37	250	03				
04	64	40	52	M	34	44	13	0	-	-	0	M	0.0	0.00	29.49	30.13	6.1	21	6.7	20	220	16	220	04				
05	70	48	59	M	42	51	6	0	-	-	0	M	0.0	T	29.31	29.94	12.1	21	12.8	31	210	25	220	05				
06	60	48	54	M	49	51	11	0	-	-	RA	0	M	0.0	0.59	29.16	29.76	3.9	09	5.6	98	040	7s	030	06			
07	66	49	58	M	51	54	7	0	-	-	RA FG+ BR	0	M	0.0	0.66	29.02	29.66	8.1	22	9.1	31	240	24	250	07			
08	68	42	55	M	48	50	10	0	-	-	RA BR	0	M	0.0	0.68	28.98	29.60	9.1	22	12.0	32	230	25	230	08			
09	42	34	38*	M	28	34	27	0	-	-	RA BR	0	M	T	0.02	29.19	29.89	14.0	26	14.3	30	250	24	270	09			
10	53	33	43	M	31	38	22	0	-	-	SN	0	M	0.0	0.00	29.53	30.20	12.3	24	13.3	36	230	28	230	10			
11	61	42	52	M	35	44	13	0	-	-	RA	0	M	0.0	0.00	29.59	30.27	5.2	27	7.4	21	320	16	320	11			
12	56	35	46	M	29	39	19	0	-	-	RA	0	M	0.0	0.00	29.77	30.44	3.7	35	5.0	21	320	15	350	12			
13	59	38	49	M	28	41	16	0	-	-	RA	0	M	0.0	0.00	29.83	30.50	3.5	03	4.4	23	040	16	030	13			
14	64	32*	48	M	27	40	17	0	-	-	RA	0	M	M	0.00	29.85	30.50	1.0	10	2.3	14	250	10	250	14			
15	72	40	56	M	39	48	9	0	-	-	RA BR HZ	0	M	M	0.00	29.56	30.20	5.3	20	5.6	21	180	15	200	15			
16	66	43	55	M	45	50	10	0	-	-	RA BR HZ	0	M	0.0	0.07	29.16	29.78	8.7	24	11.4	36	300	29	310	16			
17	45	37	41	M	30	37	24	0	-	-	RA	0	M	T	T	29.19	29.86	16.2	28	16.6	31	270	24	290	17			
18	57	37	47	M	34	40	18	0	-	-	RA	0	M	0.0	0.03	29.34	30.02	9.2	30	10.2	23	300	17	300	18			
19	60	38	49	M	31	41	16	0	-	-	RA	0	M	0.0	0.00	29.44	30.11	7.5	30	8.8	22	330	15	320	19			
20	66	36	51	M	35	44	14	0	-	-	BR	0	M	0.0	0.00	29.36	29.99	3.0	20	3.8	15	290	9	280	20			
21	66	39	53	M	35	44	12	0	-	-	BR	0	M	0.0	0.00	29.15	29.79	5.3	23	8.2	23	220	18	210	21			
22	54	37	46	M	31	39	19	0	-	-	RA	0	M	0.0	0.00	29.20	29.86	6.9	30	8.0	18	310	15	310	22			
23	60	34	47	M	29	40	18	0	-	-	RA	0	M	0.0	0.00	29.34	30.01	1.8	01	3.0	16	040	12	060	23			
24	70	36	53	M	32	45	12	0	-	-	RA	0	M	0.0	T	29.33	29.94	5.0	11	6.1	21	140	16	150	24			
25	55	49	52	M	46	48	13	0	-	-	RA BR	0	M	0.0	0.24	28.94	29.54	11.1	08	11.4	28	070	22	070	25			
26	62	46	54	M	38	46	11	0	-	-	RA	0	M	0.0	T	28.75	29.38	7.7	04	10.2	32	360	25	350	26			
27	51	37	44	M	24	36	21	0	-	-	RA	0	M	0.0	0.00	28.95	29.63	13.8	34	14.7	33	320	24	360	27			
28	57	37	47	M	23	38	18	0	-	-	RA	0	M	0.0	0.00	29.13	29.80	14.5	31	15.0	35	320	28	310	28			
29	65	34	50	M	29	41	15	0	-	-	RA	0	M	0.0	0.00	29.24	29.89	8.5	24	10.2	28	250	22	230	29			
30	78	50	64	M	45	54	1	0	-	-	RA	0	M	0.0	0.00	29.15	29.77	6.1	22	7.2	26	240	21	240	30			
										<-----Monthly Averages   Totals----->					M	M	M	2.29s	29.29	29.94	3.8	26	8.8	<Monthly Average>				
Degree Days Monthly Season to Date												Greatest 24-hr Precipitation: 1.12s Date: 07-08 Greatest 24-hr Snowfall: M Date: M Greatest Snow Depth: M Date: M					Sea Level Pressure Date (LST) Maximum 30.62 14 0719 Minimum 29.33 26 1614											
Total Departure Total Departure Heating: 401 M M M Cooling: 1 M												Number of Days with -----> Max Temp >=90: 0 Max Temp <=32: 1 Max Temp <=32: 0 Thunderstorms : 0					Min Temp <=32: 1 Min Temp <=0 : 0 Heavy Fog : 1					Precipitation >=.01 inch: 7 Precipitation >=.10 inch: Snowfall >=1.0 inch : M						
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																								Data Version: VER2				

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level																			
D a t e	Temperature (Fahrenheit)					Degree Days Base 65 Degrees			Sun		Significant Weather	Snow/Ice on Ground(In)		Precipitation (In)		Pressure(inches of Hg)		Wind: Speed=mph Dir=tens of degrees								D a t e					
	Max.	Min.	Avg.	Dep From Normal	Avg. Dew pt.	Avg Wet Bulb	Heating	Cooling	Sunrise LST	Sunset LST		1200 UTC	1800 UTC	2400 LST	2400 LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	max 5-second Speed	Dir	max 2-minute Speed	Dir							
												Depth	Water Equiv	Snow Fall	Water Equiv																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26						
01	77	59	68	M	55	60	0	3	-	-	HZ	0	M	0.0	0.03	29.11	29.73	7.2	22	7.7	35	230	26	240	01						
02	80	60	70	M	59	63	0	5	-	-	RA	M	M	T	29.06	29.68	9.4	21	9.9	30	240	22	230	02							
03	75	52	64	M	53	58	1	0	-	-	RA	0	M	0.0	0.10	29.05	29.69	8.6	24	11.3	37	290	28	300	03						
04	71	51	61	M	45	52	4	0	-	-	TSRA RA BR VCTS	0	M	0.0	0.01	29.18	29.82	11.4	23	12.7	37	240	25	240	04						
05	81	51	66	M	46	55	0	1	-	-	TSRA RA BR VCTS	0	M	0.0	0.75	29.15	29.77	12.4	22	12.9	38	220	31	230	05						
06	62	42	52	M	42	48	13	0	-	-	TSRA RA BR VCTS	0	M	0.0	T	29.20	29.87	11.7	28	14.1	32	290	26	300	06						
07	55	40	48	M	40	44	17	0	-	-	RA BR	0	M	0.0	0.61	29.30	29.90	7.8	07	8.8	43	080	32	070	07						
08	54	38	46	M	37	42	19	0	-	-	RA BR	0	M	0.0	0.04	28.94	29.62	18.1	26	21.4	62	230	45	230	08						
09	51	35	43	M	27	35	22	0	-	-	SN	0	M	T	T	29.44	30.15	15.5	30	15.8	33	280	26	290	09						
10	56	28*	42*	M	27	37	23	0	-	-	TSRA RA BR VCTS	0	M	0.0	0.00	29.68	30.37	5.8	28	7.5	23	280	16	310	10						
11	53	34	44	M	32	39	21	0	-	-	RA BR	0	M	0.0	0.16	29.63	30.26	10.5	11	11.0	31	100	21	100	11						
12	54	38	46	M	41	43	19	0	-	-	RA DZ BR	0	M	0.0	0.02	29.48	30.17	9.5	06	9.9	25	060	22	060	12						
13	58	33	46	M	43	46	19	0	-	-	RA BR	0	M	0.0	0.73	29.54	30.19	5.4	09	6.4	22	130	15	120	13						
14	69	51	60	M	51	55	5	0	-	-	RA BR	0	M	0.0	T	29.38	30.02	11.4	25	12.2	37	240	30	220	14						
15	59	47	53	M	43	48	12	0	-	-	FG+ BR	0	M	0.0	0.00	29.52	30.19	8.8	30	9.4	24	300	20	320	15						
16	69	46	58	M	42	49	7	0	-	-	TSRA RA BR VCTS	0	M	0.0	0.00	29.58	30.23	2.1	04	4.4	18	060	15	060	16						
17	69	43	56	M	40	49	9	0	-	-	TSRA RA BR VCTS	0	M	0.0	0.00	29.51	30.14	6.7	08	6.8	24	070	17	070	17						
18	62	52	57	M	46	51	8	0	-	-	RA	0	M	0.0	T	29.39	30.01	5.2	11	6.6	30	110	23	110	18						
19	75	50	63	M	45	53	2	0	-	-	TSRA RA BR VCTS	0	M	0.0	T	29.31	29.95	1.6	34	6.3	18	220	15	230	19						
20	77	49	63	M	50	56	2	0	-	-	TSRA RA BR VCTS	0	M	0.0	0.00	29.36	30.01	7.4	20	7.6	18	220	15	220	20						
21	81	51	66	M	53	59	0	1	-	-	RA BR HZ	0	M	0.0	T	29.44	30.08	2.3	08	4.1	21	060	17	060	21						
22	73	62	68	M	56	60	0	3	-	-	RA	0	M	0.0	0.08	29.41	30.03	5.4	15	6.9	23	210	18	220	22						
23	79	59	69	M	60	64	0	4	-	-	BR	0	M	0.0	0.00	29.49	30.13	1.4	06	3.9	18	310	14	330	23						
24	84	59	72	M	61	65	0	7	-	-	BR	0	M	0.0	0.00	29.57	30.20	2.8	04	4.6	17	350	14	360	24						
25	85	59	72	M	60	65	0	7	-	-	TSRA RA BR VCTS	0	M	0.0	0.00	29.55	30.16	0.5	36	2.7	17	350	14	350	25						
26	87	60	74	M	61	66	0	9	-	-	TSRA RA BR VCTS	0	M	0.0	0.00	29.37	29.97	2.4	25	4.5	16	290	14	220	26						
27	87	61	74*	M	61	65	0	9	-	-	TSRA RA BR VCTS	0	M	0.0	0.00	29.23	29.85	1.9	24	4.5	15	230	13	230	27						
28	79	59	69	M	56	62	0	4	-	-	TSRA RA BR VCTS	0	M	0.0	0.03	29.28	29.90	4.6	03	5.0	16	030	13	030	28						
29	79	56	68	M	53	60	0	3	-	-	TSRA RA BR VCTS	0	M	0.0	0.00	29.29	29.92	5.9	33	6.5	21	350	16	360	29						
30	83	56	70	M	51	60	0	5	-	-	TSRA RA BR VCTS	0	M	0.0	0.00	29.31	29.94	4.1	22	4.7	16	230	13	210	30						
31	88*	58	73	M	60	65	0	8	-	-	TSRA RA BR VCTS	0	M	0.0	0.03	29.26	29.87	5.9	21	6.9	30	230	25	210	31						
	71.4	49.6	60.5		48.3	54.0	6.5	2.2	<-----Monthly Averages   Totals----->										M	M	2.59s	29.36	29.99	2.2	24	8.3	<Monthly Average				
	M	M	M		<-----Departure From Normal----->										M																
Degree Days      Monthly      Season to Date												Greatest 24-hr Precipitation: 0.75 Date: 05-06 Greatest 24-hr Snowfall: M Date: M Greatest Snow Depth: M Date: M								Sea Level Pressure Date Time (LST)											
Total Departure Total Departure												Number of Days with ----->								Maximum 30.42 11 0358				Minimum 29.44 08 0152							
Heating: 203 M M M												Max Temp >=90: 0 Max Temp <=32: 0 Thunderstorms : 1								Min Temp <=32: 1 Min Temp <=0 : 0 Heavy Fog : 1				Precipitation >=.01 inch: 12 Precipitation >=.10 inch: M Snowfall >=1.0 inch : M							
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																								Data Version: VER2							

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level																					
Date	Temperature (Fahrenheit)					Degree Days Base 65 Degrees			Sun			Significant Weather	Snow/Ice on Ground(In) (In)		Precipitation		Pressure(inches of Hg)		Wind: Speed=mph Dir=tens of degrees								Date						
	Max.	Min.	Avg.	Dep From Normal	Avg. Dew pt.	Avg. Heating Bulb	Cooling	Sunrise LST	Sunset LST	1200 UTC	1800 UTC		2400 LST	2400 LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	max 5-second Speed	Dir	max 2-minute Speed	Dir										
	Max.	Min.	Avg.	Dep From Normal	Avg. Dew pt.	Avg. Heating Bulb	Cooling	Sunrise LST	Sunset LST	Depth	Water Equiv		Snow Fall	Water Equiv	13	14	15	16	17	18	19	20	21	22	23	24		25					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26								
01	81	61	71	M	57	63	0	6	-	-	RA BR	0	M	0.0	0.94	29.18	29.80	6.6	27	8.4	21	310	17	310	01								
02	81	59	70	M	60	64	0	5	-	-	RA BR	0	M	0.0	0.33	29.13	29.72	8.9	21	9.5	26	210	22	360	02								
03	72	62	67	M	61	63	0	2	-	-	TSRA DZ BR	0	M	0.0	0.22	29.08	29.72	3.9	28	5.6	21	330	15	330	03								
04	76	61	69	M	61	63	0	4	-	-	TSRA RA BR VCTS	0	M	0.0	0.29	29.19	29.79	0.7	05	4.7	20	270	15	260	04								
05	82	63	73	M	61	65	0	8	-	-	RA BR HZ	0	M	0.0	0.01	29.05	29.66	6.4	26	11.0	30	280	24	270	05								
06	64	54	59	M	52	55	6	0	-	-	RA DZ BR	0	M	0.0	1.03	28.95	29.61	7.6	02	10.4	35	010	29	010	06								
07	68	50	59	M	46	53	6	0	-	-		0	M	0.0	0.00	29.28	29.94	9.5	32	9.9	25	300	22	300	07								
08	69	46*	58*	M	44	51	7	0	-	-		0	M	0.0	0.00	29.49	30.13	4.2	30	5.7	21	320	14	310	08								
09	64	54	59	M	54	56	6	0	-	-	RA DZ FG+ FG BR VCTS	0	M	0.0	0.37	29.26	29.87	3.4	15	6.9	18	140	15	130	09								
10	71	56	64	M	53	58	1	0	-	-	BR	0	M	0.0	0.01	29.24	29.90	7.6	30	8.7	29	310	22	320	10								
11	75	53	64	M	55	59	1	0	-	-		0	M	0.0	0.00	29.45	30.09	1.7	14	3.0	18	200	10	170	11								
12	85*	63	74	M	64	67	0	9	-	-	RA BR	0	M	0.0	0.02	29.31	29.92	1.8	22	9.0	23	240	20	230	12								
13	70	62	66	M	61	63	0	1	-	-	RA DZ BR	0	M	0.0	0.03	29.29	29.91	3.0	03	4.6	13	360	10	360	13								
14	78	62	70	M	61	64	0	5	-	-	RA BR	0	M	0.0	T	29.28	29.91	1.6	35	5.5	17	050	14	060	14								
15	78	58	68	M	51	58	0	3	-	-		0	M	0.0	0.00	29.45	30.08	6.1	07	6.6	21	040	15	070	15								
16	79	60	70	M	59	62	0	5	-	-	RA BR VCTS	0	M	0.0	0.37	29.25	29.86	10.3	25	15.7	40	240	32	240	16								
17	76	58	67	M	53	58	0	2	-	-		0	M	0.0	0.00	29.39	30.03	6.2	32	9.2	26	290	21	290	17								
18	81	57	69	M	58	63	0	4	-	-		0	M	0.0	0.00	29.43	30.05	5.8	20	6.3	21	210	17	210	18								
19	83	70	77*	M	63	68	0	12	-	-		0	M	0.0	0.00	29.27	29.87	12.4	22	13.8	37	240	28	230	19								
20	82	66	74	M	60	65	0	9	-	-		0	M	0.0	0.00	29.31	29.94	6.0	30	7.0	25	270	18	280	20								
21	81	60	71	M	58	63	0	6	-	-		0	M	0.0	0.00	29.46	30.08	1.6	29	3.6	17	200	12	220	21								
22	80	63	72	M	64	67	0	7	-	-	RA BR	0	M	0.0	0.16	29.36	29.96	5.5	24	7.9	32	270	24	280	22								
23	84	65	75	M	67	70	0	10	-	-	BR VCTS	0	M	0.0	T	29.30	29.90	9.3	22	9.6	28	230	22	240	23								
24	82	66	74	M	64	67	0	9	-	-	TSRA RA BR	0	M	0.0	0.10	29.18	29.81	10.7	27	14.6	36	240	28	230	24								
25	77	59	68	M	58	62	0	3	-	-		0	M	0.0	0.00	29.39	30.02	5.4	27	7.8	23	270	18	270	25								
26	75	62	69	M	61	64	0	4	-	-	RA BR HZ	0	M	0.0	0.03	29.27	29.87	3.8	19	4.6	15	200	12	230	26								
27	82	63	73	M	67	69	0	8	-	-	TSRA RA BR HZ	0	M	0.0	0.80	29.07	29.65	2.9	24	5.1	24	220	18	230	27								
28	82	64	73	M	67	69	0	8	-	-	RA BR	0	M	0.0	0.54	28.93	29.57	10.6	25	11.8	33	320	26	320	28								
29	70	53	62	M	47	54	3	0	-	-		0	M	0.0	0.00	29.28	29.95	12.6	29	13.1	31	280	25	290	29								
30	70	48	59	M	44	52	6	0	-	-		0	M	0.0	0.00	29.49	30.14	12.2	29	12.3	28	290	23	300	30								
										<----Monthly Averages   Totals---->					M	M	5.33s	29.26	29.89	4.0	27	8.4	<Monthly Average										
										<-----Departure From Normal----->					M																		
Degree Days      Monthly      Season to Date  Total Departure Total Departure  Heating: 36      M      M      M Cooling: 130      M												Greatest 24-hr Precipitation: 1.34s Date: 27-28 Greatest 24-hr Snowfall: M Date: M Greatest Snow Depth: M Date: M					Sea Level Pressure Date Time (LST) Maximum 30.21 30 2359 Minimum 29.32 06 0541																
												Number of Days with ----->					Max Temp >=90: 0 Max Temp <=32: 0 Thunderstorms : 4					Min Temp <=32: 0 Min Temp <=0 : 0 Heavy Fog : 1					Precipitation >=.01 inch: 18s Precipitation >=.10 inch: Snowfall >=1.0 inch : M						
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																								Data Version: VER2									

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level																									
Date	Temperature (Fahrenheit)				Degree Days Base 65 Degrees				Sun		Significant Weather	Snow/Ice on Ground (In) (In)		Precipitation		Pressure(inches of Hg)		Wind: Speed=mph Dir=tens of degrees						Date													
	Max	Min	Avg	From Normal	Avg. Dew pt.	Avg Wet Bulb	Heating	Cooling	Sunrise LST	Sunset LST		1200 UTC	1800 UTC	2400 LST	LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg Speed	5-second Speed	max Dir	max Speed														
	Max	Min	Avg	From Normal	Avg. Dew pt.	Avg Wet Bulb	Heating	Cooling	Sunrise LST	Sunset LST		Depth	Water Equiv	Snow Fall	Water Equiv																						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26												
01	73	49*	61*	M	45	53	4	0	-	-		0	M	0.0	0.00	29.60	30.26	6.4	32	7.0	22	300	17	300	01												
02	76	50	63	M	49	56	2	0	-	-		0	M	0.0	0.00	29.64	30.26	3.2	24	4.6	16	230	14	230	02												
03	83	58	71	M	56	62	0	6	-	-		0	M	0.0	0.00	29.49	30.10	9.7	22	10.0	24	240	20	240	03												
04	86	63	75	M	62	67	0	10	-	-	HZ	0	M	0.0	0.00	29.37	29.98	10.9	22	11.1	30	210	23	220	04												
05	90	71	81	M	69	73	0	16	-	-	HZ	0	M	0.0	0.00	29.96	10.0	22	10.2	25	200	21	210	05													
06	90	72	81	M	67	72	0	16	-	-	HZ	0	M	0.0	0.00	29.41	30.03	7.5	22	7.6	21	230	16	210	06												
07	91	70	81	M	69	73	0	16	-	-	BR HZ	0	M	0.0	0.00	29.44	30.04	6.0	21	6.4	18	240	15	230	07												
08	92*	73	83*	M	67	72	0	18	-	-	BR HZ	0	M	0.0	0.00	29.37	29.97	5.8	23	6.2	20	260	14	240	08												
09	77	65	71	M	69	70	0	6	-	-	RA FG BR HZ VCTS	0	M	0.0	0.47	29.26	29.87	2.6	30	4.0	15	350	13	340	09												
10	83	60	72	M	56	63	0	7	-	-	BR	0	M	0.0	0.00	29.29	29.91	5.1	32	5.3	17	310	14	320	10												
11	84	59	72	M	61	66	0	7	-	-	FG+	0	M	0.0	0.00	29.26	29.87	4.1	22	4.8	21	210	15	220	11												
12	85	66	76	M	64	68	0	11	-	-	HZ	0	M	0.0	T	29.16	29.77	2.8	20	4.6	17	260	15	240	12												
13	83	71	77	M	69	72	0	12	-	-	BR HZ	0	M	0.00s	0.00s	29.21	29.83	3.4	21	5.3	16	210	13	210	13												
14	84	68	76	M	67	70	0	11	-	-	BR HZ	0	M	0.0	0.00	29.37	30.00	4.7	03	5.2	16	030	13	040	14												
15	87	65	76	M	65	70	0	11	-	-	FG+ FG BR	0	M	0.0	T	29.38	29.98	5.5	21	6.2	22	230	16	240	15												
16	86	73	80	M	67	71	0	15	-	-	HZ	0	M	0.0	T	29.24	29.85	11.0	24	12.1	28	240	22	230	16												
17	87	72	80	M	66	70	0	15	-	-	RA	0	M	0.0	T	29.20	29.80	13.8	25	14.7	41	240	31	240	17												
18	85	61	73	M	59	65	0	8	-	-	RA DZ BR	0	M	0.0	0.02	29.24	29.86	6.2	24	8.1	29	220	20	220	18												
19	82	69	76	M	65	69	0	11	-	-	RA DZ BR	0	M	0.0	0.03	29.18	29.81	5.7	29	8.5	24	210	17	220	19												
20	83	66	75	M	61	66	0	10	-	-	RA	0	M	0.0	0.00	29.33	29.94	2.7	23	3.1	13	210	10	210	20												
21	87	65	76	M	64	68	0	11	-	-	RA	0	M	0.0	T	29.28	29.89	8.2	27	9.7	33	260	25	300	21												
22	85	63	74	M	61	66	0	9	-	-	RA BR HZ	0	M	M	0.00	29.38	30.00	6.3	27	8.1	21	330	15	320	22												
23	88	66	77	M	72	74	0	12	-	-	RA BR	0	M	0.0	0.79	29.21	29.81	10.3	22	12.6	31	250	24	240	23												
24	83	68	76	M	72	73	0	11	-	-	RA BR	0	M	0.0	0.63	29.21	29.83	7.3	24	8.8	30	350	21	350	24												
25	80	60	70	M	61	65	0	5	-	-	RA BR	0	M	0.0	0.18	29.28	29.93	5.7	34	6.4	22	320	18	330	25												
26	83	59	71	M	61	65	0	6	-	-	RA	0	M	0.0	0.00	29.44	30.07	5.3	27	6.3	20	290	15	250	26												
27	84	61	73	M	61	66	0	8	-	-	BR	0	M	0.0	0.00	29.44	30.05	4.9	22	5.2	25	220	13	210	27												
28	85	64	75	M	68	70	0	10	-	-	TSRA BR	0	M	0.0	0.46	29.28	29.88	11.1	23	11.7	36	240	28	230	28												
29	76	61	69	M	57	62	0	4	-	-	RA	0	M	0.0	0.00	29.34	29.97	6.5	33	7.0	20	320	14	320	29												
30	78	58	68	M	57	62	0	3	-	-	RA	0	M	0.0	0.00	29.36	29.98	2.2	01	4.0	14	020	12	360	30												
31	76	58	67	M	58	62	0	2	-	-	RA	0	M	0.0	0.00	29.31	29.93	2.4	34	2.8	15	330	13	330	31												
	83.6	64.0	73.8		62.7	67.1	0.2	9.3	<----Monthly Averages   Totals----->												M	M	2.63s	29.34	29.95	4.8	25	7.3	<Monthly Average								
	M	M	M		<-----Departure From Normal----->												M																				
Degree Days      Monthly      Season to Date Total Departure Total Departure Heating: 6      M      M      M Cooling: 287      M												Greatest 24-hr Precipitation: 0.82s Date: 24-25 Greatest 24-hr Snowfall: M Date: M Greatest Snow Depth: M Date: M Number of Days with -----> Max Temp >=90: 4 Max Temp <=32: 0 Thunderstorms : 1												Sea Level	Pressure	Date	Time (LST)										
												Maximum 30.35 02 0821 Minimum 29.72 19 0517 Min Temp <=32: 0 Min Temp <=0 : 0 Heavy Fog : 2												Precipitation >=.01 inch: 8s Precipitation >=.10 inch: Snowfall >=1.0 inch : M													
												<b>Data Version:</b> <b>VER2</b>																									
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																																					

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**  
**(final)**

NOAA, National Climatic Data Center  
Month: 08/2010

Station Location: NIAGARA FALLS INTL AIRPORT (04724)  
NIAGARA FALLS, NY

Lat. 43.107 Lon. -78.945

Elevation(Ground): 585 ft. above sea level

D a t e	Temperature (Fahrenheit)						Degree Days Base 65 Degrees		Sun		Significant Weather	Snow/Ice on Ground (In)		Precipitation (In)		Pressure (inches of Hg)		Wind: Speed=mph Dir=tens of degrees								D a t e	
	Max.	Min.	Avg.	Dep. From Normal	Avg. Dew pt.	Avg. Wet Bulb	Heating	Cooling	Sunrise LST	Sunset LST		1200 UTC	1800 UTC	2400 LST	2400 LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	Dir	max 5-second Speed	Dir	max 2-minute Speed	Dir		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
01	83	65	74	M	63	67	0	9	-	-		0	M	0.0	0.00	29.34	29.96	4.6	06	5.3	20	050	14	040	01		
02	83	67	75	M	66	69	0	10	-	-		0	M	0.0	0.00	29.38	30.00	6.3	21	6.6	17	220	13	220	02		
03	87	71	79	M	69	72	0	14	-	-	BR HZ	0	M	0.0	0.00	29.32	29.92	12.2	22	12.6	30	250	24	230	03		
04	87	73	80	M	71	74	0	15	-	-	BR HZ	0	M	0.0	0.00	29.20	29.79	9.9	22	10.2	25	220	18	230	04		
05	88	69	79	M	68	71	0	14	-	-	RA BR HZ	0	M	0.0	0.02	29.05	29.66	9.2	24	10.1	31	230	24	230	05		
06	78	57	68	M	54	60	0	3	-	-	RA	0	M	0.0	0.06	29.17	29.81	7.1	30	8.9	30	260	25	270	06		
07	75	52	64	M	51	57	1	0	-	-	RA	0	M	0.0	0.00	29.33	29.97	3.8	24	6.1	20	240	16	200	07		
08	82	66	74	M	62	66	0	9	-	-	RA	0	M	0.0	T	29.29	29.91	11.4	22	11.8	31	240	25	230	08		
09	81	71	76	M	68	71	0	11	-	-	RA BR	0	M	0.0	0.47	29.31	29.93	7.3	22	8.1	26	240	20	240	09		
10	87	69	78	M	71	73	0	13	-	-	BR HZ	0	M	0.0	0.00	29.30	29.92	2.5	28	4.3	16	300	12	210	10		
11	86	67	77	M	70	72	0	12	-	-	BR	0	M	0.0	0.00	29.28	29.89	2.9	05	3.8	13	080	12	010	11		
12	84	67	76	M	66	69	0	11	-	-	RA	0	M	0.0	0.01	29.21	29.84	7.5	09	7.9	23	070	18	080	12		
13	85	64	75	M	64	67	0	10	-	-	BR	0	M	0.0	0.00	29.32	29.94	4.7	16	5.8	20	160	15	150	13		
14	88	63	76	M	65	69	0	11	-	-	TSRA BR HZ VCTS	0	M	0.0	0.00	29.29	29.90	8.0	18	8.8	23	190	17	190	14		
15	87	72	80	M	70	72	0	15	-	-	TSRA BR HZ VCTS	0	M	0.0	0.04	29.21	29.82	11.0	20	11.8	36	240	28	250	15		
16	83	67	75	M	60	66	0	10	-	-		0	M	0.0	0.06	29.24	29.87	12.7	24	13.0	39	200	30	190	16		
17	82	58	70	M	57	63	0	5	-	-		0	M	0.0	0.00	29.36	30.00	10.3	24	11.2	31	250	24	240	17		
18	77	62	70	M	58	62	0	5	-	-	RA	0	M	0.0	T	29.41	30.03	1.0	11	3.0	12	250	9	250	18		
19	85	58	72	M	63	66	0	7	-	-	TSRA BR VCTS	0	M	0.0	0.42	29.28	29.90	5.1	25	7.7	33	240	25	230	19		
20	76	57	67	M	56	61	0	2	-	-		0	M	0.0	0.00	29.38	30.01	5.0	06	5.8	16	120	12	120	20		
21	82	61	72	M	64	67	0	7	-	-	RA BR	0	M	0.0	0.44	29.27	29.88	2.4	15	5.2	30	220	25	220	21		
22	75	67	71	M	66	68	0	6	-	-	RA BR	0	M	0.0	0.46	29.24	29.88	6.5	05	6.9	18	030	16	030	22		
23	68	61	65	M	62	64	0	0	-	-	RA DZ BR	0	M	0.0	0.16	29.38	30.01	11.0	04	11.9	28	060	21	050	23		
24	77	59	68	M	59	62	0	3	-	-		0	M	0.0	0.00	29.42	30.05	5.7	09	6.0	20	080	15	050	24		
25	79	59	69	M	61	64	0	4	-	-	RA BR	0	M	0.0	0.28	29.30	29.92	2.4	30	4.2	22	260	17	260	25		
26	72	56	64	M	53	58	1	0	-	-		0	M	0.0	0.00	29.41	30.06	8.1	31	8.9	25	290	18	300	26		
27	75	50*	63*	M	53	57	2	0	-	-		M	M	Ts	29.52	30.15	4.0	23	5.2	20	210	16	200	27			
28	81	59	70	M	59	63	0	5	-	-	BR	0	M	0.0	0.00	29.54	30.17	6.6	21	6.8	21	230	17	230	28		
29	85	54	70	M	59	64	0	5	-	-	BR	0	M	0.0	0.00	29.57	30.20	5.3	22	5.5	20	190	14	210	29		
30	88	62	75	M	66	70	0	10	-	-	BR HZ	0	M	0.0	0.00	29.59	30.21	5.9	20	5.9	16	220	13	190	30		
31	90*	69	80*	M	66	70	0	15	-	-	BR HZ	0	M	0.0	0.00	29.51	30.11	6.5	22	6.8	20	240	16	240	31		
	81.8	63.0	72.4		62.6	66.3	0.1	7.8	<----Monthly Averages   Totals----->										M	0.0	2.42s	29.34	29.96	3.1	22	7.6	<Monthly Average
	M	M	M		<-----Departure From Normal----->										M												
Degree Days      Monthly      Season to Date										Greatest 24-hr Precipitation: 0.90s Date: 21-22 Greatest 24-hr Snowfall: M Date: M Greatest Snow Depth: M Date: M								Sea Level	Pressure	Date	Time (LST)						
Total Departure      Total Departure										Max Temp >=90: 1 Max Temp <=32: 0 Number of Days with -----> 0 Thunderstorms : 2								Maximum	30.28	30	0739						
Heating: 4      M      M      M Cooling: 241      M										Min Temp <=32: 0 Min Temp <=0 : 0 Heavy Fog : 0								Precipitation >=.01 inch: 11 Precipitation >=.10 inch: Snowfall >=1.0 inch : M									
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.										Data Version: VER2																	

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY													
NOAA, National Climatic Data Center Month: 09/2010												Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level													
Date	Temperature (Fahrenheit)						Degree Days Base 65 Degrees			Sun		Significant Weather	Snow/Ice on Ground(In)		Precipitation (In)		Pressure(inches of Hg)		Wind: Speed=mph Dir=tens of degrees						Date
	Max	Min	Avg	Dep From Normal	Avg. Dew pt.	Avg. Wet Bulb	Heating	Cooling	Sunrise LST	Sunset LST	1200 UTC		1800 UTC	2400 LST	2400 LST	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	max 5-second Speed	max 2-minute Speed	max Dir			
											Depth		Water Equiv	Snow Fall	Water Equiv										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
01	88	71	80*	M	66	70	0	15	-	-	BR HZ	0	M	0.0	0.00	29.36	29.96	8.5	22	8.8	29	230	24	230	01
02	84	70	77	M	69	72	0	12	-	-	RA BR	0	M	0.0	0.36	29.28	29.88	7.8	23	8.3	26	240	21	240	02
03	83	63	73	M	63	67	0	8	-	-	RA	0	M	0.0	0.03	29.04	29.63	11.6	23	12.7	41	280	35	270	03
04	64	54	59	M	48	53	6	0	-	-	RA	0	M	0.0	0.03	29.01	29.66	19.4	26	19.6	44	240	35	260	04
05	67	50	59	M	47	52	6	0	-	-	RA	0	M	0.0	0.00s	29.28	29.94	12.4	26	12.9	30	230	23	250	05
06	75	50	63	M	53	59	2	0	-	-	RA	0	M	0.0	T	29.41	30.05	11.2	20	11.5	31	230	26	220	06
07	88	65	77	M	58	65	0	12	-	-	TSRA	0	M	0.0	0.19	29.29	29.87	15.1	21	15.8	53	210	40	210	07
08	68	56	62	M	51	56	3	0	-	-	RA	0	M	0.0	T	29.21	29.84	17.0	27	17.3	35	280	26	280	08
09	63	53	58	M	51	54	7	0	-	-	RA DZ	0	M	0.0	T	29.28	29.93	11.6	29	11.9	29	290	22	280	09
10	70	50	60	M	50	54	5	0	-	-	RA	0	M	0.0	0.00	29.37	30.02	5.1	34	5.6	16	330	14	360	10
11	75	45	60	M	50	55	5	0	-	-	RA FG+ FG BR	0	M	0.0	0.11	29.36	29.97	4.1	12	4.9	20	100	15	110	11
12	70	57	64	M	57	60	1	0	-	-	BR	0	M	0.0	0.04	29.28	29.93	6.0	25	7.5	25	210	17	270	12
13	76	55	66	M	51	57	0	1	-	-	RA VCTS	M	M	M	0.03	29.27	29.89	4.8	28	9.3	31	300	24	300	13
14	68	47	58	M	46	52	7	0	-	-	RA	0	M	0.0	0.00	29.35	30.00	9.4	28	10.0	26	300	21	290	14
15	65	44	55	M	44	50	10	0	-	-	RA	0	M	0.0	0.00	29.49	30.15	4.5	29	6.5	20	300	15	300	15
16	66	48	57	M	52	53	8	0	-	-	RA DZ BR	0	M	0.0	0.51	29.21	29.83	2.2	08	9.1	23	200	17	200	16
17	62	46	54	M	46	50	11	0	-	-	BR	0	M	0.0	0.00	29.42	30.10	3.3	01	4.5	20	030	15	030	17
18	72	46	59	M	52	56	6	0	-	-	RA	0	M	0.0	T	29.51	30.14	5.7	23	7.6	28	200	23	220	18
19	65	48	57	M	47	52	8	0	-	-	RA BR	0	M	0.0	0.08	29.52	30.17	2.9	35	3.5	14	320	10	310	19
20	66	42	54	M	43	49	11	0	-	-	RA	0	M	0.0	0.00	29.53	30.17	2.2	36	2.8	13	010	10	360	20
21	82	42*	62	M	52	58	3	0	-	-	RA FG+ BR	0	M	0.0	0.00	29.38	29.98	11.3	21	11.7	32	220	25	210	21
22	75	55	65	M	61	63	0	0	-	-	RA BR	0	M	0.0	0.25	29.33	29.99	3.4	25	6.4	32	320	25	320	22
23	79	50	65	M	59	62	0	0	-	-	RA	M	M	M	0.00	29.47	30.08	3.7	18	5.0	18	200	14	200	23
24	88*	61	75	M	62	67	0	10	-	-	RA	0	M	0.0	T	29.20	29.80	16.3	23	18.0	52	230	37	220	24
25	67	48	58	M	46	52	7	0	-	-	RA	0	M	0.0	0.00	29.25	29.90	15.5	26	16.0	33	250	26	280	25
26	64	44	54*	M	45	49	11	0	-	-	RA DZ BR	M	M	M	0.00	29.43	30.09	0.2	34	3.7	16	210	10	060	26
27	62	47	55	M	53	55	10	0	-	-	RA DZ BR	0	M	0.0	0.15	29.31	29.91	7.7	07	7.7	21	080	17	080	27
28	72	57	65	M	58	59	0	0	-	-	RA FG+ BR	0	M	0.0	0.42	28.95	29.59	7.6	24	11.5	40	210	31	210	28
29	68	52	60	M	53	56	5	0	-	-	RA BR	0	M	0.0	0.00	29.24	29.89	6.0	23	7.1	22	260	17	200	29
30	62	53	58	M	54	56	7	0	-	-	RA BR	0	M	0.0	0.10	29.16	29.79	1.1	01	2.7	16	340	13	330	30
71.8 52.3 62.1						<----Monthly Averages   Totals----->						M	0.0	2.30s	29.31	29.94	5.6	25	9.3	<Monthly Average					
M M M						<-----Departure From Normal----->						M													
Degree Days      Monthly      Season to Date  Total Departure Total Departure Heating: 139    M    M    M Cooling: 58    M												Greatest 24-h Precipitation: 0.54s Date: 27-28 Greatest 24-h Snowfall: M Date: M Greatest Snow Depth: M Date: M						Sea Level Pressure Date Time (LST) Maximum 30.21 20 1032 Minimum 29.44 28 0936							
												Number of Days with ----->						Max Temp >=90: 0 Max Temp <=32: 0 0 Thunderstorms : 1			Min Temp <=32: 0 Min Temp <=0 : 0 Heavy Fog : 2			Precipitation >=.01 inch: 13 Precipitation >=.10 inch: Snowfall >=1.0 inch : M	
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																				Data Version: VER2					

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY													
NOAA, National Climatic Data Center Month: 10/2010												Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level													
D a t e	Temperature (Fahrenheit)					Degree Days Base 65 Degrees		Sun		Significant Weather	Snow/Ice on Ground(in)		Precipitation (in)		Pressure(inches of Hg)		Wind: Speed=mph Dir=tens of degrees						D a t e		
	Max.	Min.	Avg.	Dep. From Normal	Avg. Dew pt.	Avg. Wet Bulb	Heating	Cooling	Sunrise LST		1200 UTC	1800 UTC	2400 LST	2400 LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	5-second Speed	max 2-minute Speed	max 2-minute Speed			
	Depth	Water Equiv	Water Equiv	Water Equiv	Water Equiv	Water Equiv	Water Equiv	Water Equiv	Sunset LST		1200 UTC	1800 UTC	2400 LST	2400 LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	5-second Speed	max 2-minute Speed	max 2-minute Speed			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
01	62	43	53	M	45	50	12	0	-	-	0	M	0.0	0.00	29.27	29.93	9.2	33	9.5	28	330	22	330	01	
02	58	39	49	M	43	46	16	0	-	-	0	M	0.0	0.14	29.40	30.06	3.3	04	3.5	16	040	14	030	02	
03	52	45	49	M	43	45	16	0	-	-	0	M	0.0	0.32	29.57	30.25	10.2	05	10.3	25	050	20	060	03	
04	52	43	48	M	43	46	17	0	-	-	0	M	0.0	0.27	29.64	30.28	6.7	01	7.5	17	030	14	030	04	
05	52	48	50	M	46	48	15	0	-	-	0	M	0.0	0.45	29.52	30.16	7.0	35	7.8	26	360	17	330	05	
06	61	51	56	M	51	53	9	0	-	-	0	M	0.0	0.06	29.28	29.89	4.6	35	7.0	17	360	14	360	06	
07	68	46	57	M	45	51	8	0	-	-	0	M	0.0	0.00	29.16	29.83	11.8	29	12.2	36	300	28	290	07	
08	70	45	58	M	47	52	7	0	-	-	0	M	0.0	0.00	29.30	29.93	13.1	24	13.2	31	230	25	240	08	
09	63	37	50	M	38	47	15	0	-	-	0	M	0.0	0.00	29.38	30.04	5.4	03	6.4	20	050	15	070	09	
10	72	33	53	M	44	48	12	0	-	-	0	M	0.0	0.00	29.26	29.88	4.0	23	4.6	16	280	13	220	10	
11	64	47	56	M	51	52	9	0	-	-	0	M	0.0	0.39	29.18	29.82	1.4	34	1.6	10	360	8	010	11	
12	55	38	47	M	40	45	18	0	-	-	0	M	0.0	0.00	29.28	29.94	5.4	34	5.6	17	010	13	010	12	
13	61	32	47	M	37	43	18	0	-	-	0	M	0.0	0.04	29.38	30.03	1.7	17	2.9	12	110	9	200	13	
14	52	38	45	M	45	47	20	0	-	-	0	M	0.0	0.28	29.21	29.83	4.3	33	5.8	29	310	23	320	14	
15	55	37	46	M	38	43	19	0	-	-	0	M	0.0	T	29.13	29.79	12.6	33	13.2	35	320	28	320	15	
16	59	40	50	M	39	46	15	0	-	-	0	M	0.0	0.00	29.34	29.99	8.7	30	10.4	23	290	17	300	16	
17	63	42	53	M	42	48	12	0	-	-	0	M	M	0.00	29.28	29.93	10.2	29	11.5	28	300	22	280	17	
18	54	40	47	M	34	41	18	0	-	-	0	M	0.0	0.00	29.34	29.98	5.2	31	5.5	20	330	15	310	18	
19	58	42	50	M	35	43	15	0	-	-	0	M	0.0	0.00	29.24	29.89	7.9	25	8.5	24	260	18	280	19	
20	61	39	50	M	38	46	15	0	-	-	0	M	0.0	0.19	29.11	29.72	14.0	23	15.0	45	220	33	230	20	
21	51	39	45	M	37	41	20	0	-	-	0	M	0.0	0.35	29.02	29.70	10.1	28	11.4	28	300	22	320	21	
22	50	35	43	M	33	39	22	0	-	-	0	M	0.0	T	29.38	30.06	10.7	27	11.3	29	290	22	300	22	
23	63	46	55	M	46	50	10	0	-	-	0	M	0.0	0.33	29.43	30.08	4.6	21	5.0	20	220	15	230	23	
24	68	51	60	M	50	54	5	0	-	-	0	M	0.0	0.12	29.33	29.94	3.3	21	4.7	21	290	17	280	24	
25	68	55	62	M	55	58	3	0	-	-	0	M	0.0	0.05	29.09	29.70	9.3	19	9.6	32	190	25	200	25	
26	76*	56	66*	M	56	59	0	1	-	-	0	M	0.0	0.33	28.98	29.61	10.6	18	11.9	49s	240	39	240	26	
27	68	51	60	M	43	51	5	0	-	-	0	M	0.0	0.04	29.09	29.72	15.3	21	15.7	37	210	29	210	27	
28	60	46	53	M	37	45	12	0	-	-	0	M	0.0	T	29.17	29.84	18.0	26	18.9	44	240	35	250	28	
29	49	36	43	M	33	39	22	0	-	-	0	M	M	0.00	29.44	30.10	13.7	28	14.2	29	280	23	280	29	
30	54	42	48	M	35	43	17	0	-	-	0	M	0.0	0.00	29.21	29.83	15.0	25	17.2	46	230	32	230	30	
31	47	31*	39*	M	30	36	26	0	-	-	0	M	0.0	T	29.33	30.04	9.0	33	9.9	26	330	20	360	31	
59.5 42.4 51.0												<-----Monthly Averages   Totals----->		M	M	3.36s	29.28	29.93	4.9	28	9.4	<Monthly Average			
M M M												<-----Departure From Normal----->		M											
Degree Days      Monthly      Season to Date												Greatest 24-hr Precipitation: 0.63s Date: 04-05		Sea Level	Pressure	Date	Time								
Total Departure      Total Departure												Greatest 24-hr Snowfall: M Date: M		Maximum	30.33	31	2345								
Heating: 428      M      M      M												Greatest Snow Depth: M Date: M		Minimum	29.42	26	1640								
Cooling: 1      M												Max Temp >=90: 0		Min Temp <=32: 2											
												Max Temp <=32: 0		Min Temp <=0 : 0											
												Thunderstorms : 0		Heavy Fog : 0											
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																								<b>Data Version: VER2</b>	

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)												Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY																	
NOAA, National Climatic Data Center Month: 10/2010												Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level																	
D a t e	Temperature (Fahrenheit)					Degree Days Base 65 Degrees		Sun		Significant Weather	Snow/Ice on Ground(in)		Precipitation (in)		Pressure(inches of Hg)		Wind: Speed=mph Dir=tens of degrees						D a t e						
	Max.	Min.	Avg.	Dep. From Normal	Avg. Dew pt.	Avg. Wet Bulb	Heating	Cooling	Sunrise LST		1200 UTC	1800 UTC	2400 LST	2400 LST	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	5-second Speed	max 2-minute Speed	max 2-minute Speed							
	Depth	Water Equiv	Water Equiv	Water Equiv	Water Equiv	Water Equiv	Water Equiv	Water Equiv	Sunset LST		1200 Depth	1800 Depth	2400 Depth	2400 Depth	Avg. Station	Avg. Sea Level	Resultant Speed	Res Dir	Avg. Speed	5-second Speed	max 2-minute Speed	max 2-minute Speed							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25					
01	62	43	53	M	45	50	12	0	-	-	0	M	0.0	0.00	29.27	29.93	9.2	33	9.5	28	330	22	330	01					
02	58	39	49	M	43	46	16	0	-	-	0	M	0.0	0.14	29.40	30.06	3.3	04	3.5	16	040	14	030	02					
03	52	45	49	M	43	45	16	0	-	-	0	M	0.0	0.32	29.57	30.25	10.2	05	10.3	25	050	20	060	03					
04	52	43	48	M	43	46	17	0	-	-	0	M	0.0	0.27	29.64	30.28	6.7	01	7.5	17	030	14	030	04					
05	52	48	50	M	46	48	15	0	-	-	0	M	0.0	0.45	29.52	30.16	7.0	35	7.8	26	360	17	330	05					
06	61	51	56	M	51	53	9	0	-	-	0	M	0.0	0.06	29.28	29.89	4.6	35	7.0	17	360	14	360	06					
07	68	46	57	M	45	51	8	0	-	-	0	M	0.0	0.00	29.16	29.83	11.8	29	12.2	36	300	28	290	07					
08	70	45	58	M	47	52	7	0	-	-	0	M	0.0	0.00	29.30	29.93	13.1	24	13.2	31	230	25	240	08					
09	63	37	50	M	38	47	15	0	-	-	0	M	0.0	0.00	29.38	30.04	5.4	03	6.4	20	050	15	070	09					
10	72	33	53	M	44	48	12	0	-	-	0	M	0.0	0.00	29.26	29.88	4.0	23	4.6	16	280	13	220	10					
11	64	47	56	M	51	52	9	0	-	-	0	M	0.0	0.39	29.18	29.82	1.4	34	1.6	10	360	8	010	11					
12	55	38	47	M	40	45	18	0	-	-	0	M	0.0	0.00	29.28	29.94	5.4	34	5.6	17	010	13	010	12					
13	61	32	47	M	37	43	18	0	-	-	0	M	0.0	0.04	29.38	30.03	1.7	17	2.9	12	110	9	200	13					
14	52	38	45	M	45	47	20	0	-	-	0	M	0.0	0.28	29.21	29.83	4.3	33	5.8	29	310	23	320	14					
15	55	37	46	M	38	43	19	0	-	-	0	M	0.0	T	29.13	29.79	12.6	33	13.2	35	320	28	320	15					
16	59	40	50	M	39	46	15	0	-	-	0	M	0.0	0.00	29.34	29.99	8.7	30	10.4	23	290	17	300	16					
17	63	42	53	M	42	48	12	0	-	-	0	M	M	0.00	29.28	29.93	10.2	29	11.5	28	300	22	280	17					
18	54	40	47	M	34	41	18	0	-	-	0	M	0.0	0.00	29.34	29.98	5.2	31	5.5	20	330	15	310	18					
19	58	42	50	M	35	43	15	0	-	-	0	M	0.0	0.00	29.24	29.89	7.9	25	8.5	24	260	18	280	19					
20	61	39	50	M	38	46	15	0	-	-	0	M	0.0	0.19	29.11	29.72	14.0	23	15.0	45	220	33	230	20					
21	51	39	45	M	37	41	20	0	-	-	0	M	0.0	0.35	29.02	29.70	10.1	28	11.4	28	300	22	320	21					
22	50	35	43	M	33	39	22	0	-	-	0	M	0.0	T	29.38	30.06	10.7	27	11.3	29	290	22	300	22					
23	63	46	55	M	46	50	10	0	-	-	0	M	0.0	0.33	29.43	30.08	4.6	21	5.0	20	220	15	230	23					
24	68	51	60	M	50	54	5	0	-	-	0	M	0.0	0.12	29.33	29.94	3.3	21	4.7	21	290	17	280	24					
25	68	55	62	M	55	58	3	0	-	-	0	M	0.0	0.05	29.09	29.70	9.3	19	9.6	32	190	25	200	25					
26	76*	56	66*	M	56	59	0	1	-	-	0	M	0.0	0.33	28.98	29.61	10.6	18	11.9	49s	240	39	240	26					
27	68	51	60	M	43	51	5	0	-	-	0	M	0.0	0.04	29.09	29.72	15.3	21	15.7	37	210	29	210	27					
28	60	46	53	M	37	45	12	0	-	-	0	M	0.0	T	29.17	29.84	18.0	26	18.9	44	240	35	250	28					
29	49	36	43	M	33	39	22	0	-	-	0	M	M	0.00	29.44	30.10	13.7	28	14.2	29	280	23	280	29					
30	54	42	48	M	35	43	17	0	-	-	0	M	0.0	0.00	29.21	29.83	15.0	25	17.2	46	230	32	230	30					
31	47	31*	39*	M	30	36	26	0	-	-	0	M	0.0	T	29.33	30.04	9.0	33	9.9	26	330	20	360	31					
59.5 42.4 51.0												<-----Monthly Averages   Totals----->		M	M	3.36s	29.28	29.93	4.9	28	9.4	<Monthly Average							
M M M												<-----Departure From Normal----->		M															
Degree Days      Monthly      Season to Date												Greatest 24-hr Precipitation: 0.63s Date: 04-05 Greatest 24-hr Snowfall: M Date: M Greatest Snow Depth: M Date: M												Sea Level	Pressure	Date	Time		
																								(LST)	Maximum	30.33	31	2345	
Total Departure Total Departure																								Minimum	29.42	26	1640		
Heating: 428      M      M      M												Max Temp >=90: 0 Max Temp <=32: 0 Number of Days with -----> Thunderstorms : 0												Min Temp <=32: 2 Min Temp <=0 : 0 Heavy Fog : 0			Precipitation >=.01 inch: 15 Precipitation >=.10 inch: Snowfall >=1.0 inch : M		
Cooling: 1      M																													
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																								Data Version:	VER2				

<b>QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)</b> <b>NOAA, National Climatic Data Center</b> <b>Month: 11/2010</b>												<b>Station Location: NIAGARA FALLS INTL AIRPORT (04724) NIAGARA FALLS , NY</b> Lat. 43.107 Lon. -78.945 Elevation(Ground): 585 ft. above sea level																					
												Temperature (Fahrenheit)			Degree Days Base 65 Degrees			Sun		Significant Weather		Snow/Ice on Ground(In)		Precipitation (In)		Pressure(inches of Hg)		Wind: Speed=mph Dir=tens of degrees				D a t e	
D	a	t	e	Max.	Min.	Avg.	Dep.	From	Avg.	Avg.	Heating	Cooling	Sunrise	Sunset	LST	Depth	Water	Snow	Water			Equiv.	Equiv.	Avg.	Sea	Resultant	Res.	Avg.	max	5-second	max		2-minute
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			21	22	23	24	25	26						
01	42	28	35	M	24	31	30	0	-	-		0	M	0.0	0.00	29.75	30.46	3.4	35	4.1	16	310	13	320	01								
02	48	24	36	M	28	33	29	0	-	-	BR	0	M	0.0	0.00	29.81	30.47	3.1	05	3.8	16	040	14	030	02								
03	51	27	39	M	30	36	26	0	-	-		0	M	0.0	0.00	29.42	30.04	2.9	21	4.6	16	220	12	200	03								
04	45	42	44	M	40	42	21	0	-	-	RA BR	0	M	0.0	0.32	29.05	29.68	1.7	15	3.4	10	010	8	360	04								
05	43	37	40	M	36	38	25	0	-	-	RA DZ SN BR	0	M	T	0.32	29.00	29.71	8.4	34	9.1	22	330	16	340	05								
06	44	28	36	M	29	33	29	0	-	-	RA UP	0	M	T	T	29.55	30.27	2.7	02	3.4	14	010	12	010	06								
07	48	26	37	M	31	35	28	0	-	-	BR	0	M	0.0	0.00	29.65	30.30	5.2	23	5.5	23	250	18	260	07								
08	49	25	37	M	31	35	28	0	-	-	BR	0	M	0.0	0.00	29.39	30.04	3.7	35	4.4	20	360	13	340	08								
09	44	27	36	M	34	36	29	0	-	-	FZFG BR	0	M	0.0	0.00	29.44	30.13	1.8	05	2.6	12	130	9	110	09								
10	54	32	43	M	37	40	22	0	-	-	FG+ BR	0	M	0.0	0.00	29.61	30.31	4.2	04	4.7	16	050	14	010	10								
11	60	27	44	M	35	39	21	0	-	-	BR	0	M	0.0	0.00	29.75	30.43	3.2	06	3.9	14	080	10	060	11								
12	58	28	43	M	36	38	22	0	-	-	FG+ FZFG BR	0	M	0.0	0.00	29.75	30.41	1.7	34	1.9	10	330	8	320	12								
13	57	29	43	M	36	38	22	0	-	-	FG+ FZFG BR	0	M	0.0	0.00	29.53	30.17	1.0	01	1.5	12	320	8	330	13								
14	58	38	48	M	37	43	17	0	-	-	RA BR	0	M	0.0	0.02	29.26	29.92	7.8	23	9.3	28	260	22	240	14								
15	52	31	42	M	32	38	23	0	-	-		0	M	0.0	Ts	29.34	30.01	6.4	20	7.4	24	230	21	210	15								
16	53	33	43	M	37	42	22	0	-	-	RA BR	0	M	0.0	0.65	29.21	29.81	8.0	09	8.1	26	080	20	080	16								
17	54	41	48	M	40	44	17	0	-	-	RA DZ BR	0	M	0.0	0.11	28.90	29.61	14.8	26	17.7	53	290	41	280	17								
18	45	34	40	M	35	37	25	0	-	-	RA BR	0	M	0.0	0.04	29.41	30.10	6.8	29	8.3	25	300	22	300	18								
19	46	28	37	M	28	34	28	0	-	-		0	M	0.0	0.00	29.54	30.19	6.7	24	9.3	39	220	28	240	19								
20	47	28	38	M	30	37	27	0	-	-		0	M	0.0	0.00	29.49	30.20	12.0	28	13.6	36	250	26	250	20								
21	54	28	41	M	30	35	24	0	-	-		0	M	0.0	0.00	29.67	30.31	7.9	11	9.8	26	200	21	190	21								
22	62	54	58*	M	50	53	7	0	-	-	RA BR	0	M	0.0	0.62	29.36	29.98	12.6	20	13.0	29	200	21	210	22								
23	62*	34	48	M	40	45	17	0	-	-	RA BR	0	M	0.0	0.31	29.21	29.88	15.9	25	19.4	40	270	31	260	23								
24	39	30	35	M	23	30	30	0	-	-		M	M	M	0.00	29.63	30.32	4.5	34	8.1	29	250	22	270	24								
25	45	30	38	M	31	36	27	0	-	-	RA BR	0	M	0.0	0.33	29.31	29.89	8.5	12	9.8	23	100	16	090	25								
26	50	28	39	M	23	30	26	0	-	-	RA SN BR	0	M	T	0.22	28.95	29.64	19.8	26	21.1	46	290	35	290	26								
27	38	30	34	M	23	30	31	0	-	-	SN UP	0	M	T	T	29.10	29.83	17.8	27	18.7	45	250	33	280	27								
28	38	26	32*	M	27	31	33	0	-	-	BR	0	M	T	T	29.60	30.31	7.5	26	8.4	26	290	21	290	28								
29	48	24*	36	M	24	31	29	0	-	-		0	M	0.0	0.00	29.66	30.33	5.7	15	6.5	17	180	15	180	29								
30	57	35	46	M	43	46	19	0	-	-	RA BR	0	M	0.0	0.53	29.29	29.89	12.4	17	13.2	36	190	25	160	30								
												M	M	M	<-----Departure From Normal----->																		
<b>Degree Days</b> <b>Monthly</b> <b>Season to Date</b> Total Departure    Total Departure Heating: 734      M      M      M Cooling: 0      M												Greatest 24-hr Precipitation: 0.93s Date: 22-23 Greatest 24-hr Snowfall: M Date: M Greatest Snow Depth: M Date: M						Sea Level Pressure Date Time (LST) Maximum 30.56 02 0838 Minimum 29.25 17 0342															
												Max Temp >=90: 0 Max Temp <=32: 21 Number of Days with -----> 0						Min Temp <=32: 21 Min Temp <=0 : 0 Thunderstorms : 0						Precipitation >=.01 inch: 11 Precipitation >=.10 inch: Snowfall >=1.0 inch : M									
* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.																		<b>Data Version:</b> <b>VER2</b>															

**QUALITY CONTROLLED LOCAL  
CLIMATOLOGICAL DATA**

(final)

NOAA, National Climatic Data Center

Month: 12/2010

**Station Location: NIAGARA FALLS INTL AIRPORT (04724)  
NIAGARA FALLS , NY**

Lat. 43.107 Lon. -78.945

Elevation(Ground): 585 ft. above sea level

Date	Temperature (Fahrenheit)					Degree Days Base 65 Degrees		Sun		Significant Weather	Snow/Ice on Ground(In)				Precipitation (In)		Pressure(inches of Hg)				Wind: Speed=mph Dir=tens of degrees				Data	
	Max	Min	Avg	Dep From Normal	Avg Dew pt.	Avg Wet Bulb	Heating	Cooling	Sunrise LST	Sunset LST	1200 UTC	1800 UTC	2400 LST	2400 LST	Avg. Station Depth	Avg. Sea Level	Resultant Speed	Res. Dir	Avg. Speed	max 5-second Speed	max 2-minute Speed	Dir				
	1	2	3	4	5	6	7	8	9	10	11	13	14	15	16	17	18	19	20	21	22	23	24	25		
01	55*	31	43	M	32	35	22	0	-	-	RA SN FG BR	M	M	M	0.75	29.05	29.74	13.9	25	14.3	29	250	22	260	01	
02	34	30	32	M	23	28	33	0	-	-	SN	T	M	T	T	29.36	30.06	10.5	26	10.7	24	260	20	260	02	
03	36	28	32	M	25	29	33	0	-	-	SN BR	0	M	0.5	0.05	29.42	30.10	6.3	27	6.8	16	320	13	320	03	
04	32	24	28	M	21	26	37	0	-	-	SN	T	M	T	T	29.34	30.00	M	10.4	22	330	18	330	04		
05	33	24	29	M	19	25	36	0	-	-	SN	T	M	0.1	0.01	29.18	29.85	18.8	30	19.4	43	300	32	300	05	
06	28	24	26	M	21	24	39	0	-	-	SN FZFG BR	1	M	6.7	0.50	29.04	29.70	13.5	31	14.0	30	290	23	300	06	
07	29	22	26	M	18	23	39	0	-	-	SN UP	5	M	1.5	0.09	29.05	29.75	17.9	29	18.4	33	300	26	290	07	
08	25	18	22	M	13	19	43	0	-	-	SN	4	M	0.1s	T	29.29	30.02	13.1	27	13.4	28	250	22	290	08	
09	24	7*	16	M	9	15	49	0	-	-	SN BR	4	M	T	T	29.59	30.30	2.5	28	5.6	21	290	10	310	09	
10	39	22	31	M	22	27	34	0	-	-	SN	3	M	T	T	29.44	30.10	10.1	19	11.8	30	200	23	200	10	
11	39	32	36	M	30	33	29	0	-	-	BR HZ	2	M	0.0	0.00	29.43	30.09	1.7	14	6.7	21	250	15	240	11	
12	38	32	35	M	33	34	30	0	-	-	RA SN BR	T	M	T	0.79	28.84	29.44	2.8	17	9.7	33	240	25	240	12	
13	33	11	22	M	11	15	43	0	-	-	SN FZFG BR UP HZ BLSN	T	M	4.2	0.15	28.79	29.52	15.6	32	16.7	29	330	24	310	13	
14	20	12	16*	M	10	15	49	0	-	-	SN BR HZ BLSN	7	M	6.8	0.27	29.05	29.77	17.6	32	18.0	32	320	25	330	14	
15	25	16	21	M	12	18	44	0	-	-	SN	6	M	0.3	0.01	29.18	29.87	15.1	28	15.8	32	300	28	290	15	
16	27	21	24	M	15	21	41	0	-	-	SN	4	M	0.1s	T	29.08	29.77	14.6	25	14.9	29	250	23	260	16	
17	32	25	29	M	20	25	36	0	-	-	SN BR UP	4	M	0.1s	T	29.24	29.95	12.8	25	13.0	28	240	21	250	17	
18	28	23	26	M	20	24	39	0	-	-	SN BR UP	5	M	3.0	0.18	29.35	30.04	13.5	22	13.8	31	230	25	210	18	
19	26	22	24	M	20	23	41	0	-	-	SN BR	M	M	M	T	29.38	30.06	6.9	20	7.5	17	200	15	200	19	
20	30	22	26	M	22	25	39	0	-	-	SN BR HZ	M	M	M	0.02	29.42	30.10	4.5	28	6.1	13	330	10	340	20	
21	27	17	22	M	18	22	43	0	-	-	SN	M	M	M	T	29.47	30.15	4.0	33	4.6	16	330	13	340	21	
22	27	23	25	M	20	24	40	0	-	-	SN	M	M	M	T	29.40	30.08	M	10.0	26	330	23	330	22		
23	28	26	27	M	20	25	38	0	-	-	SN UP	M	M	M	T	29.54	30.22	13.7	33	13.8	28	330	23	320	23	
24	27	19	23	M	17	22	42	0	-	-	SN BR UP	M	M	M	T	29.59	30.27	6.7	31	7.3	18	310	15	310	24	
25	27	17	22	M	20	23	43	0	-	-	SN BR	3	M	0.4	0.02	29.46	30.14	5.8	03	6.4	17	050	14	050	25	
26	24	19	22	M	14	20	43	0	-	-	SN UP	3	M	T	T	29.39	30.06	12.1	02	12.4	26	030	20	010	26	
27	29	16	23	M	15	20	42	0	-	-	SN UP	3	M	0.1s	T	29.28	29.98	15.6	33	16.8	39	320	31	320	27	
28	29	25	27	M	21	25	38	0	-	-	SN	3	M	T	T	29.29	29.99	17.9	25	18.0	37	240	31	240	28	
29	31	17	24	M	23	26	41	0	-	-	SN MIFG BR HZ	3	M	T	T	29.39	30.09	8.4	25	9.2	3s	130	3s	130	29	
30	42	14	28	M	25	28	37	0	-	-	MIFG BR	3	M	T	T	29.42	30.09	5.1	18	5.5	16	190	14	180	30	
31	51	40	46*	M	40	43	19	0	-	-	RA	2	M	0.0	0.05	29.33	29.98	8.9	19	9.1	21	200	17	200	31	
					31.5	21.9	26.7		20.3	24.6	38.1	0.0	<----Monthly Averages   Totals----->					M	M	1.78s	29.29	29.97	7.2	28	11.6	<Monthly Average
					M	M	M		<-----Departure From Normal----->					M												

U.S. Department of Commerce  
National Oceanic & Atmospheric Administration

# ANNUAL CLIMATOLOGICAL SUMMARY (2010)

National Climatic Data Center  
Federal Building  
151 Patton Avenue  
Asheville, North Carolina 28801

Station: 305840/99999, NIAGARA FALLS INTL AP, New York

Elev. 519 ft. above sea level

Lat. 43°06'N, Lon. 78°57'W

Date	Temperature (° F)												Precipitation (inches)												
	Elem->	MMXT	MMNT	MNTM	DPNT	HTDD	CLDD	EMXT	EMNP	DT90	DX32	DT32	DT00	TPCP	DPNP	EMXP		TSNW	MXSD	DP01	DP05	DP10			
2010 Month		Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Max >=90°	Max <=32°	Min <=32°	Min <=0°	Total	Depart. from Normal	Greatest Observed Day	Snow, Sleet Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0
1	29.9	18.5	24.2	0.0	1257	0	45	26	-1	30	0	17	29	3	3.63	1.08	1.50	25	65.3	18	5	8	2	1	
2	30.7	17.9	24.3	-1.0	1131	0	39	22	8	7	0	19	28	0	1.16	-1.16	0.40	18	18.9	10	27	5	0	0	
3	45.9	29.3	37.6	3.8	840	0	61	18	15	6	0	1	22	0	2.45	-0.18	0.83	14	0.4	9	1	5	2	0	
4	62.5	38.5	50.5	5.4	428	0	85	4	27	1	0	0	3	0	2.29	-0.17	0.86	8	0.0T	0T	28	5	1	0	
5	71.0	49.2	60.1	3.0	208	64	87	28	28	10	0	0	1	0	2.56	-0.38	0.75	6	0.0T	0T	9	4	3	0	
6	77.2	59.5	68.4	2.6	34	143	88	1	46	8	0	0	0	0	5.28	2.02	0.97	1	0.0	0	11	4	0	0	
7	83.5	64.2	73.9	2.5	8	289	92	9	49	1	4	0	0	0	2.58	-0.11	0.81	25	0.0	0	5	2	0	0	
8	81.4	61.8	71.6	2.0	6	217	88	31	50	27	0	0	0	0	2.42	-0.61	0.88	22	0.0	0	6	1	0	0	
9	72.7	52.2	62.5	0.8	137	69	90	1	42	21	1	0	0	0	2.20	-1.32	0.51	17	0.0	0	7	1	0	0	
10	60.1	42.6	51.4	1.3	414	0	76	27	32	14	0	0	2	0	3.42	0.75	0.45	6	0.0	0	12	0	0	0	
11	49.2	30.4	39.8	-0.1	749	0	62	24	24	29	0	0	23	0	2.97	-0.01	0.93	23	0.0T	0T	28	5	3	0	
12	30.5	21.0	25.8	-3.9	1209	0	57	1	7	10	0	22	30	0	3.58	0.70	1.14	1	30.4	7	14	9	2	1	
Annual	57.9	40.4	49.2	1.4	6421	782	92	Jul	-1	Jan	5	59	138	3	34.54	0.61	1.50	Jan	115.0	18	Jan	82	21	2	

## Notes

(blank) Not reported.

+ Occurred on one or more previous dates during the month. The date in the Date field is the last day of occurrence. Used through December 1983 only.

A Accumulated amount. This value is a total that may include data from a previous month or months or year (for annual value).

B Adjusted Total. Monthly value totals based on proportional available data across the entire month.

E An estimated monthly or annual total.

X Monthly means or totals based on incomplete time series. 1 to 9 days are missing. Annual means or totals include one or more months which had 1 to 9 days that were missing.

M Used to indicate data element missing.

T Trace of precipitation, snowfall, or snowdepth. The precipitation data value will = zero.

Elem- Element Types are included to provide cross-reference for users of the NCDC > CDO System.

Station Station is identified by: CoopID/WBAN, Station Name, State.

S Precipitation amount is continuing to be accumulated. Total will be included in a subsequent monthly or yearly value. Example: Days 1-20 had 1.35 inches of precipitation, then a period of accumulation began. The element TPCP would then be 00135S and the total accumulated amount value appears in a subsequent monthly value. If TPCP = "M" there was no precipitation measured during the month. Flag is set to "S" and the total accumulated amount appears in a subsequent monthly value.

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## **APPENDIX D: NFSS CY2010 ENVIRONMENTAL SURVEILLANCE TECHNICAL MEMORANDUM**

### **TOTAL URANIUM AND RADIUM-226 TREND EVALUATIONS**

**LEWISTON, NEW YORK**

**FEBRUARY 2011**

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**US Army Corps  
of Engineers®**

Buffalo District

**BUILDING STRONG®**

## Niagara Falls Storage Site FUSRAP Project

### Total Uranium Trend Evaluations

Remarks: The data sets were imported into Minitab (commercial statistical software) from the Excel file “Graphs 1997 to 2009\_uranium.xlsx” to do temporal trend analyses for a set of groundwater monitoring wells. Temporal trend were evaluated from **1997 – 2010**.

### Descriptive Statistics

Variable	Total Count	N	Mean	StDev	Minimum	Median	Maximum
B02W20S	23	16	9.091	0.900	7.320	9.286	10.600
A45	23	18	31.01	5.89	21.14	30.69	47.41
A50	23	18	13.523	2.128	10.703	13.200	19.840
OW04B	23	21	38.07	9.24	18.41	38.60	52.15
OW06B	23	19	18.75	5.91	7.79	17.23	29.60
OW07A	23	<b>2</b>	1.9695	0.0983	1.9000	1.9695	2.0390
OW07B	23	7	21.77	9.56	11.30	19.23	41.68
OW13B	23	11	21.14	6.75	1.59	22.82	26.63
OW15B	23	18	10.101	1.569	7.609	10.064	12.240
OW17B	23	17	5.662	1.057	3.030	5.660	7.610
A42	23	16	63.50	13.00	37.50	60.68	85.60
BH49A	23	8	13.53	3.68	9.24	13.29	21.32
OW04A	23	8	1.712	0.469	0.875	1.750	2.448
OW11B	23	15	242.2	60.5	133.3	247.4	326.0
OW18B	23	7	12.279	2.304	8.510	12.552	15.354

There sample size ( $n = 2$ ) for Well OW07A is too small to do trend evaluations.

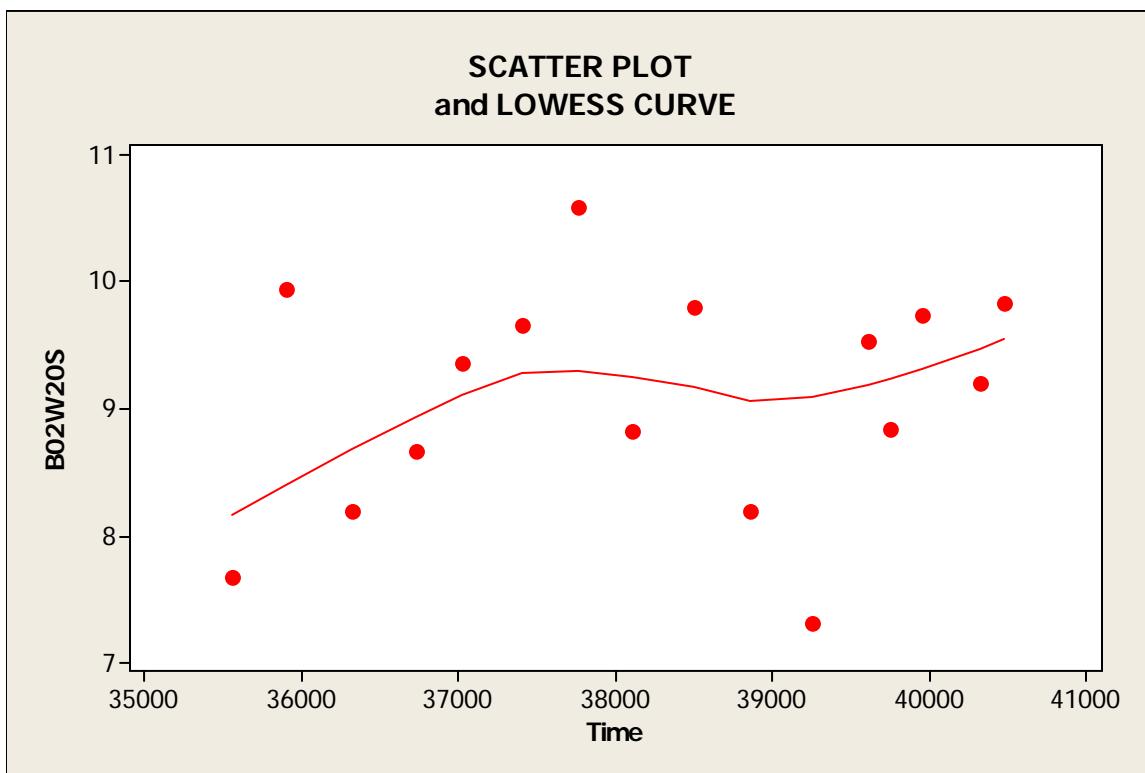
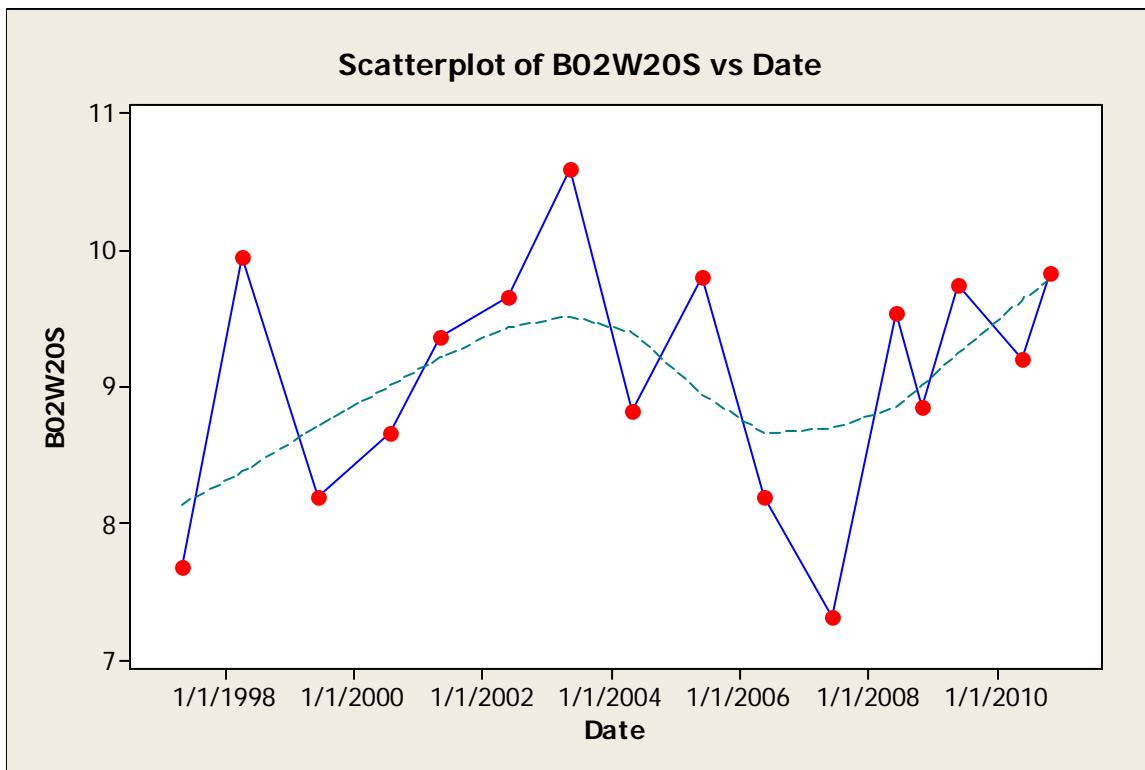
All units are in pCi/L.

## Summary of Total U Temporal Trend Evaluations

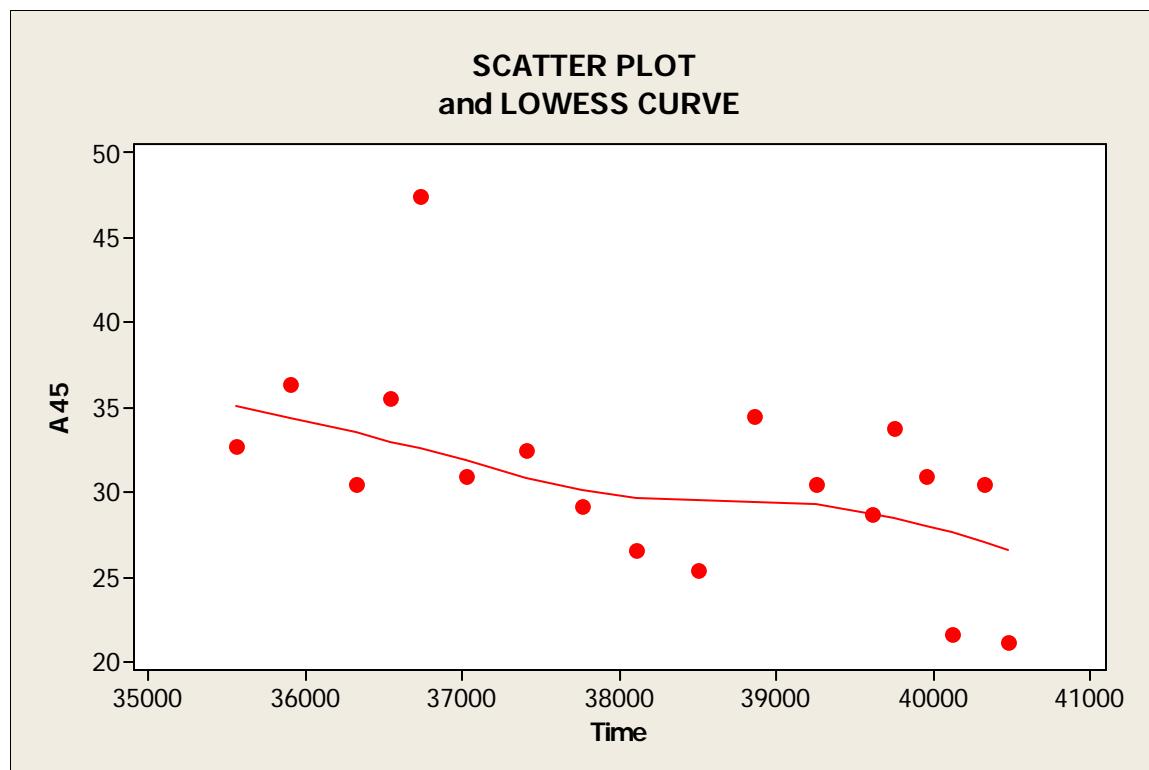
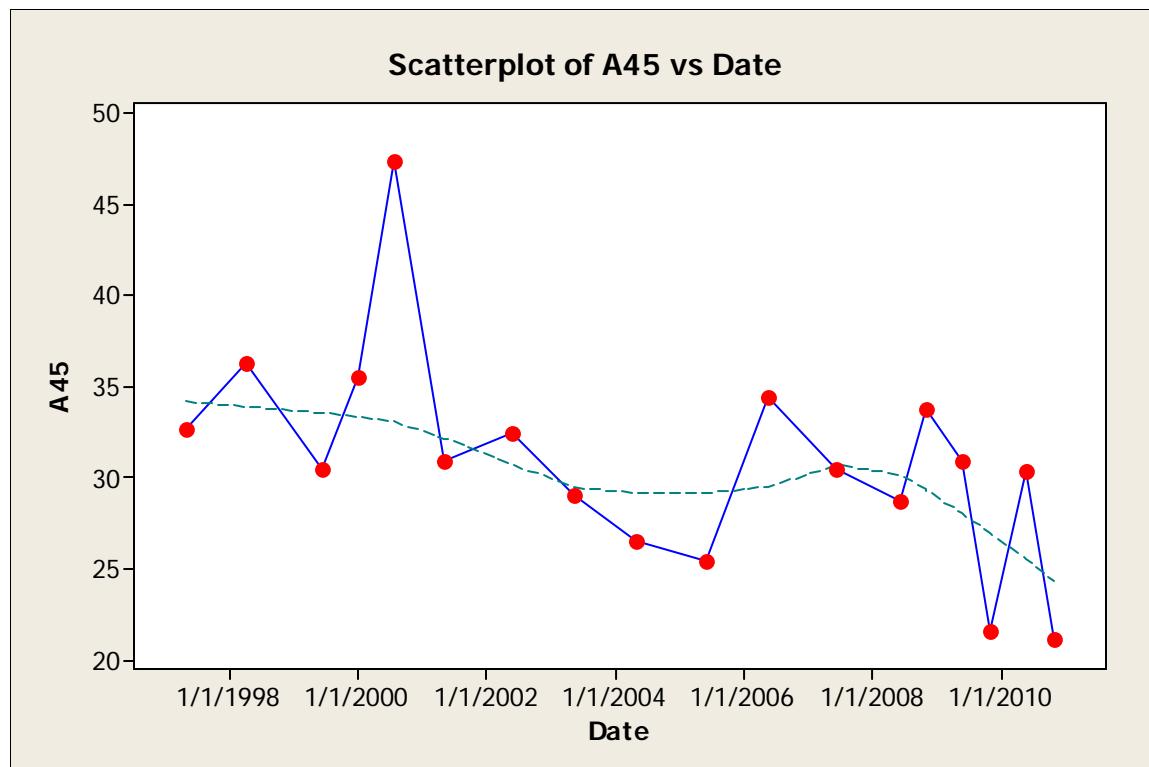
Well	<i>n</i>	Kendall's $\tau$	p-value	Remarks*
B02W20S	16	0.18	0.37	No trend.
<b>A45</b>	18	<b>-0.44</b>	<b>0.012</b>	<b>Downward trend.</b>
A50	18	-0.22	0.23	No trend. (Possible weak downward trend.)
OW04B	21	-0.095	0.57	No trend.
<b>OW06B</b>	19	<b>-0.42</b>	<b>0.013</b>	<b>Downward trend.</b>
<b>OW7B</b>	7	<b>0.52</b>	<b>0.13</b>	No trend. (Possible upward trend; <i>n</i> is small)
OW13B	11	0.24	0.35	No trend.
OW15B	18	-0.0065	1.0	No trend.
OW17B	17	-0.10	0.59	No trend.
A42	16	0.15	0.44	No trend.
BH49A	8	-0.14	0.71	No trend.
OW04A	8	0.0	1.0	No trend.
<b>OW11B</b>	15	<b>0.54</b>	<b>0.0056</b>	<b>Upward trend.</b>
OW18B	7	-0.52	0.13	No trend. (Possible downward trend; <i>n</i> is small)

\* 95% level of confidence used for all trend evaluations.

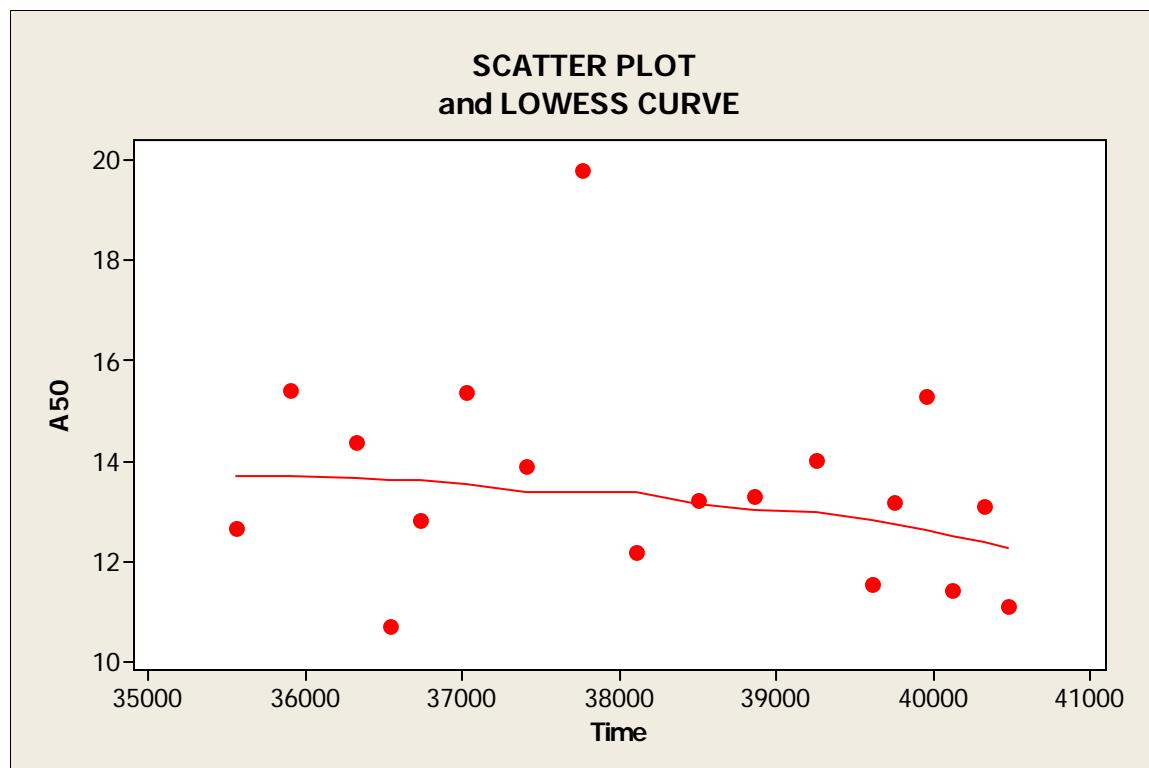
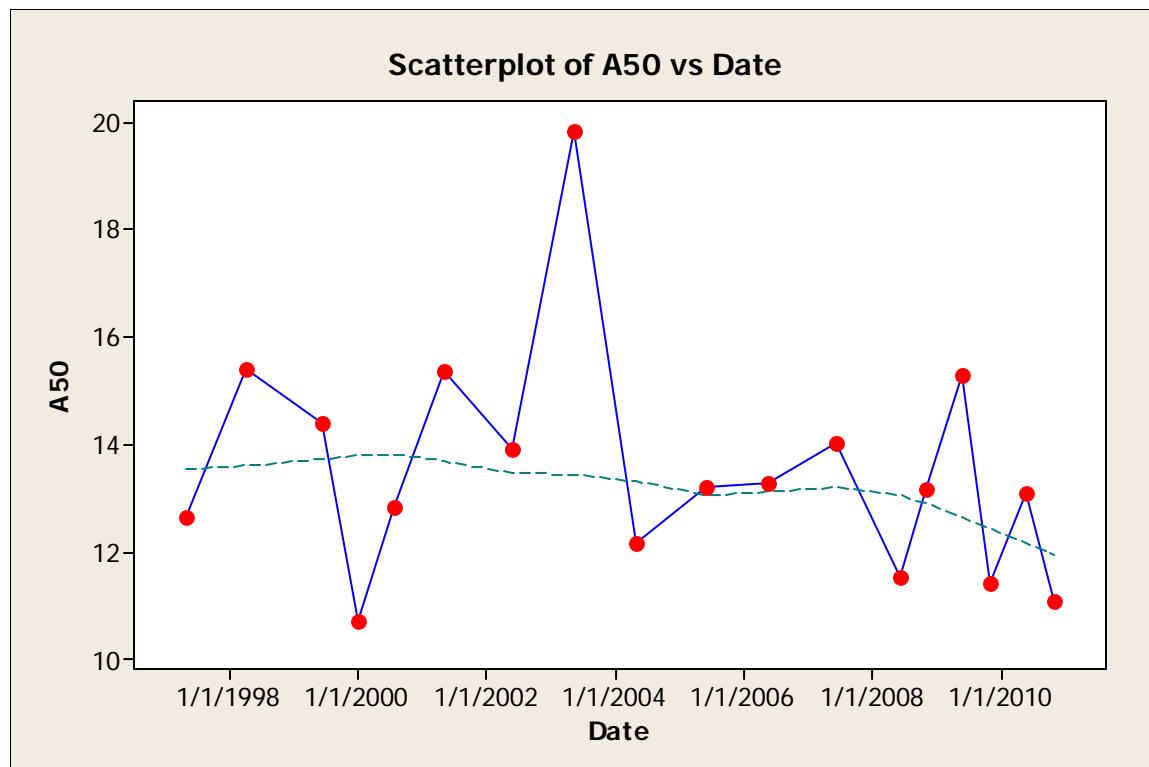
## Time Series Plots and Results of Mann-Kendall Test by Well for Total U



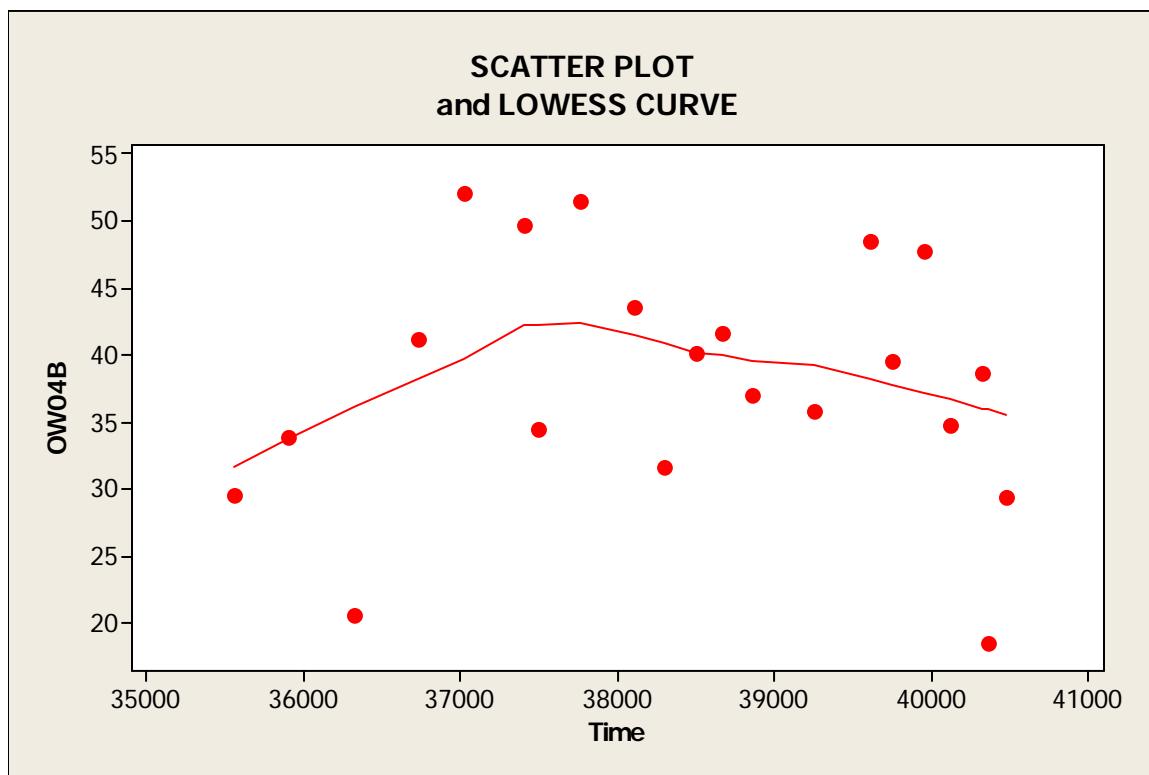
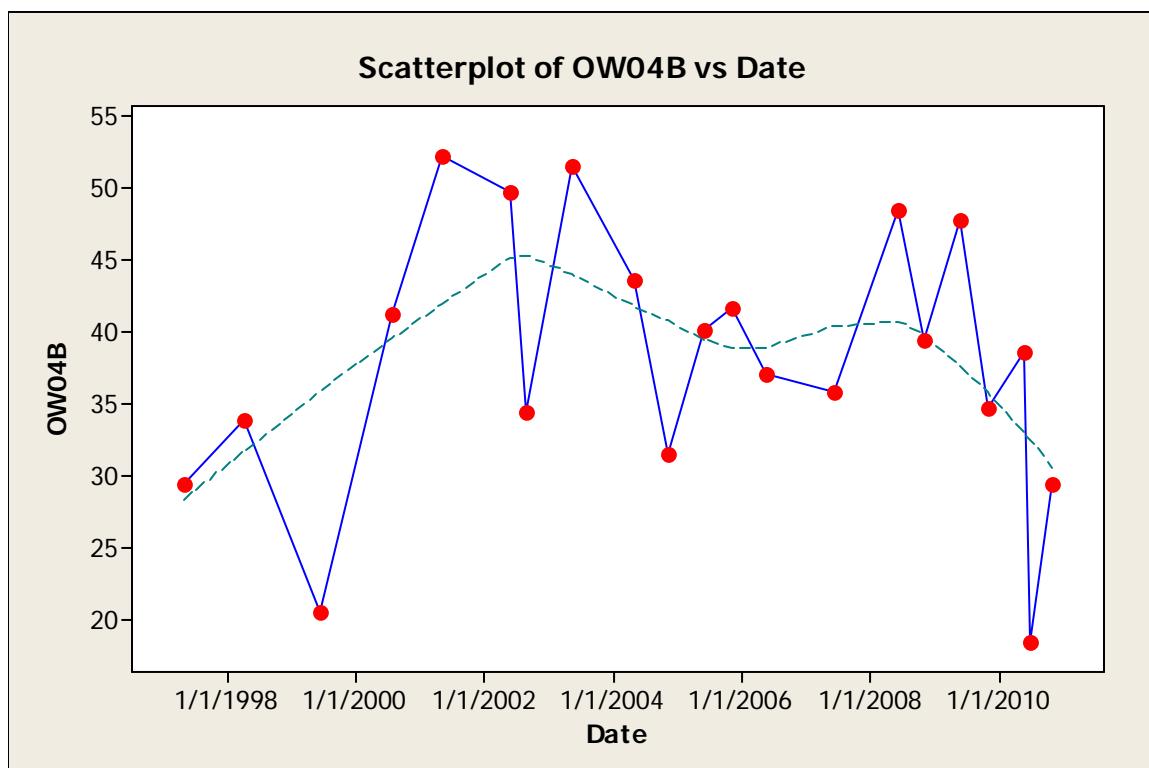
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.171247	0.525992
SPEARMAN'S RHO	0.186902	0.488240
KENDALL'S TAU_A	0.175000	0.367395
KENDALL'S TAU_B	0.175734	0.367395



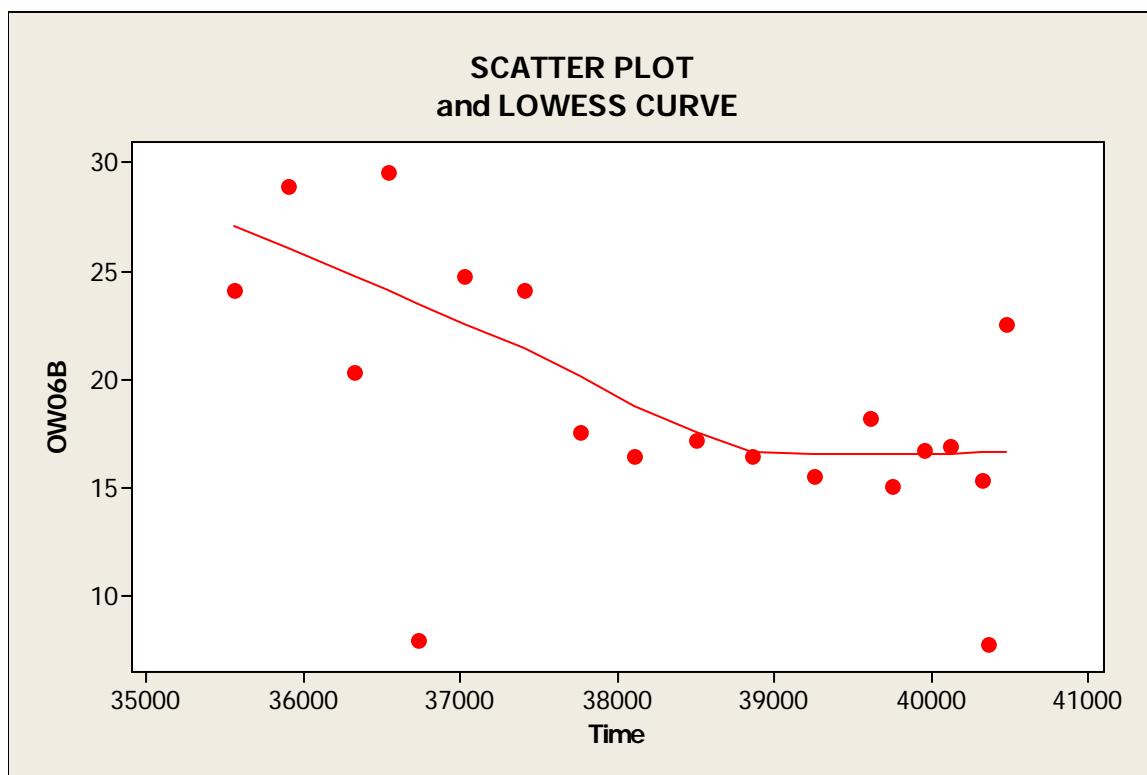
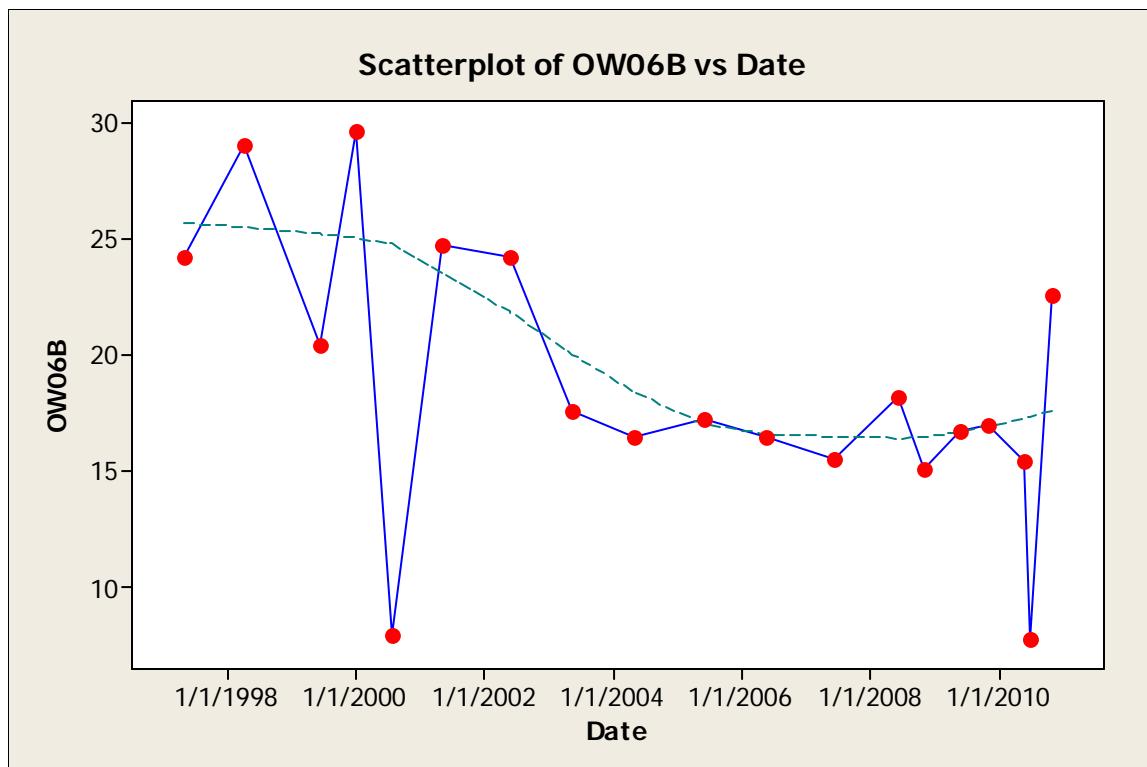
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.538478	0.0211388
SPEARMAN'S RHO	-0.583075	0.0110924
KENDALL'S TAU_A	-0.437908	0.0124218
KENDALL'S TAU_B	-0.437908	0.0124218



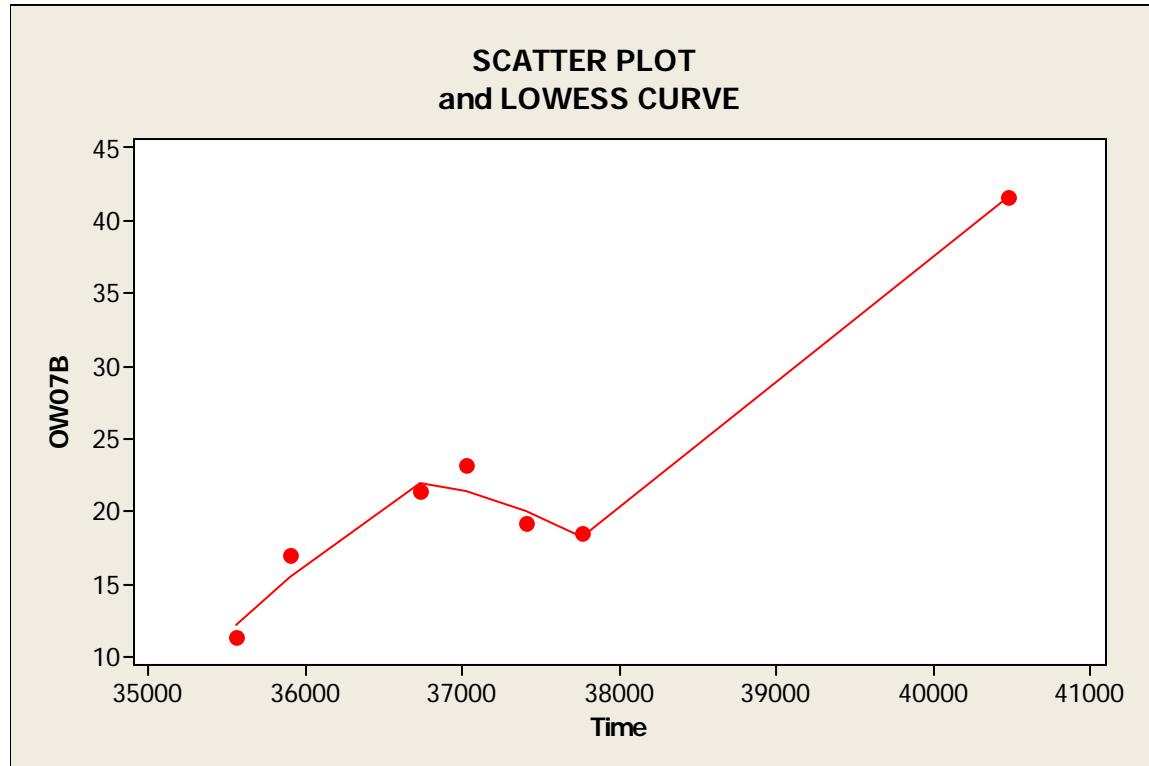
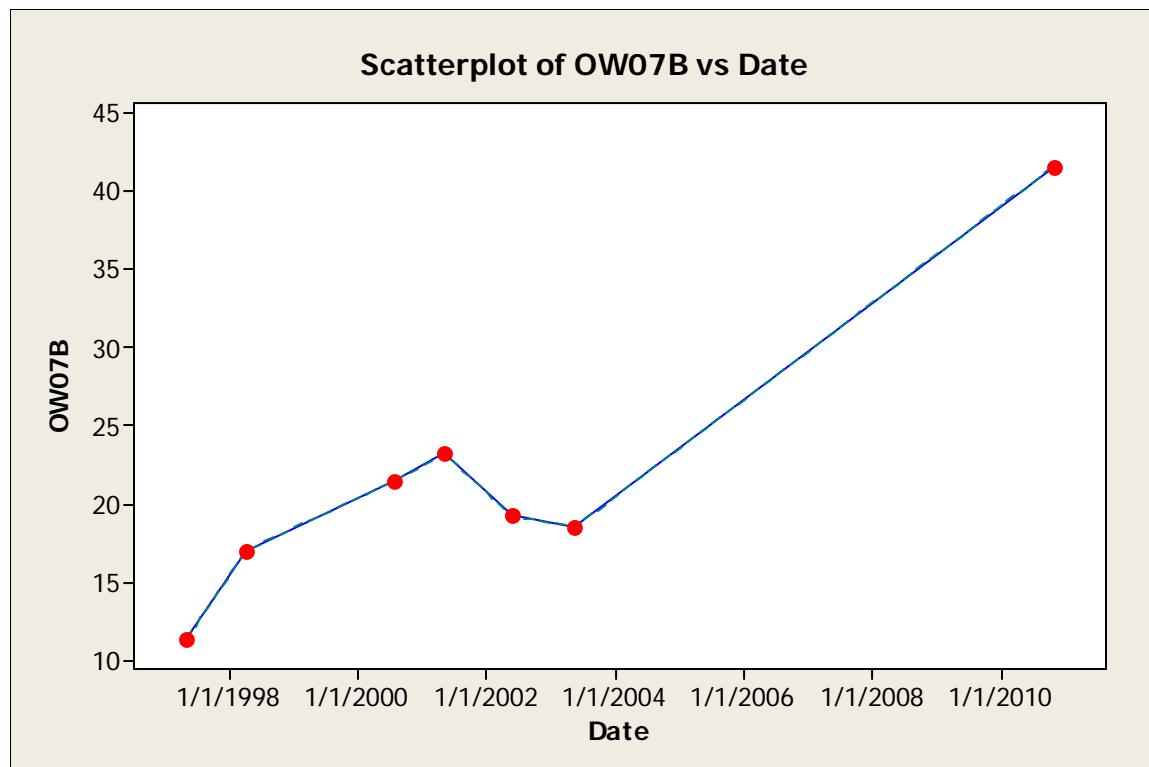
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.229070	0.360543
SPEARMAN'S RHO	-0.277606	0.264710
KENDALL'S TAU_A	-0.215686	0.225479
KENDALL'S TAU_B	-0.215686	0.225479



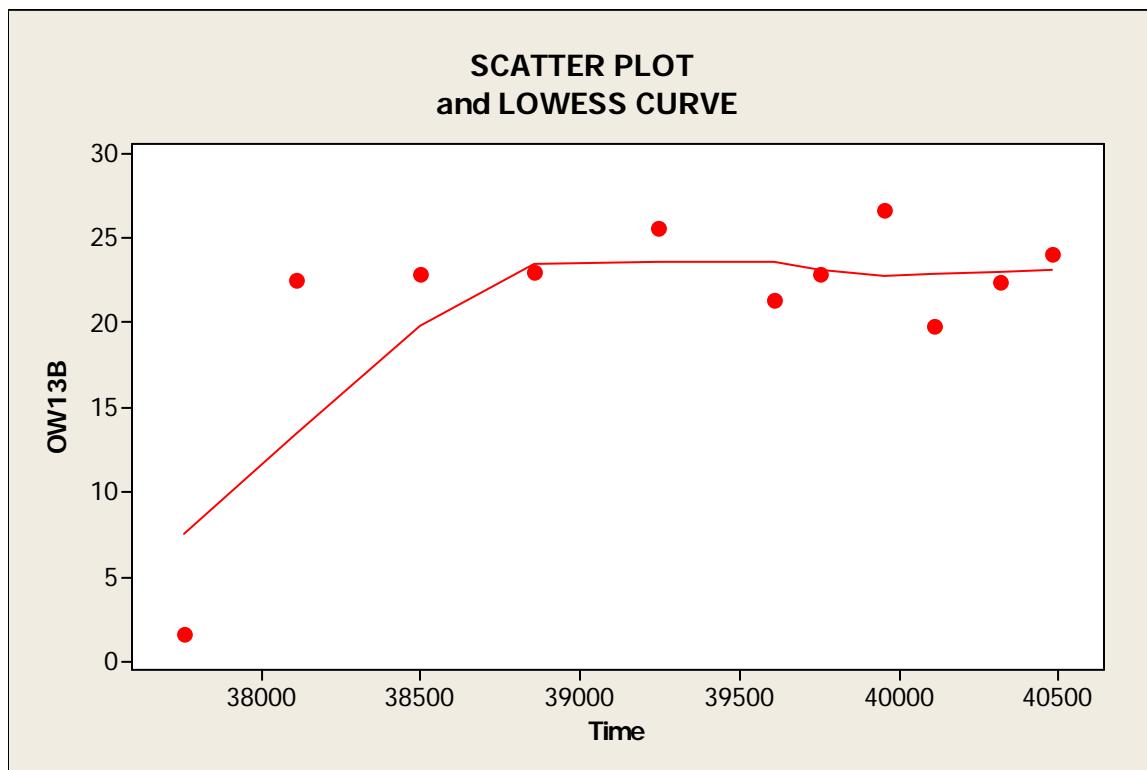
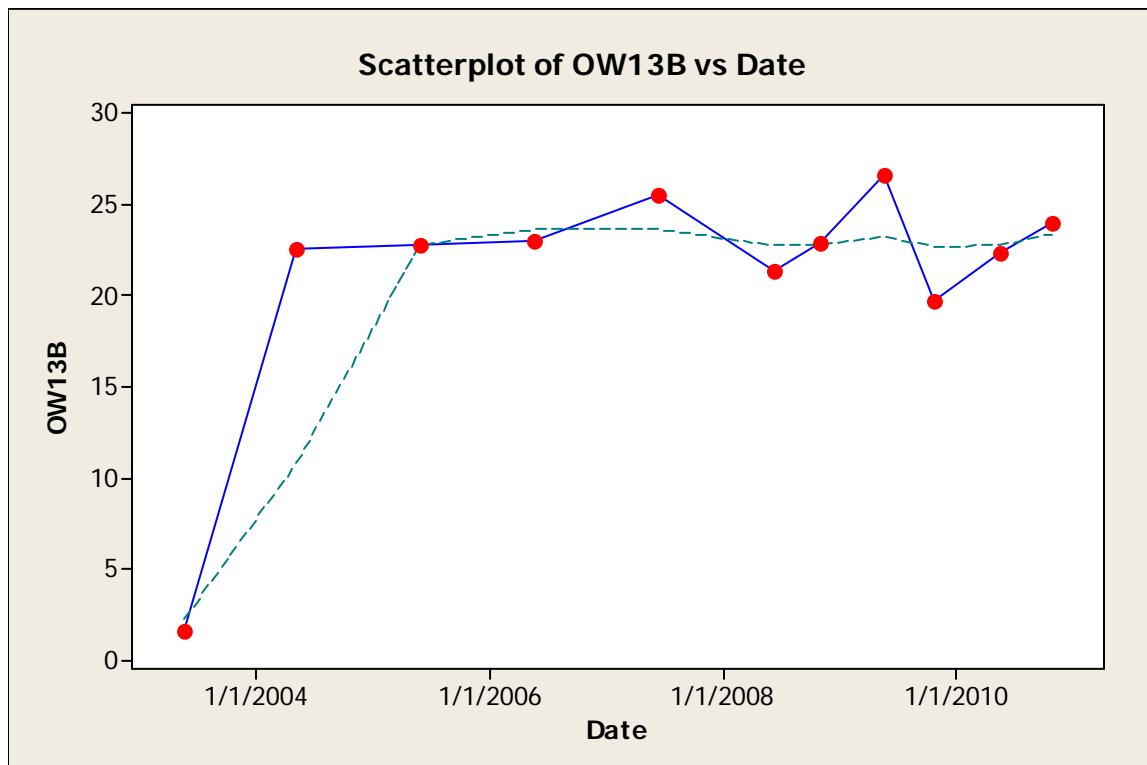
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.0153989	0.947179
SPEARMAN'S RHO	-0.0974026	0.674468
KENDALL'S TAU_A	-0.0952381	0.566143
KENDALL'S TAU_B	-0.0952381	0.566143



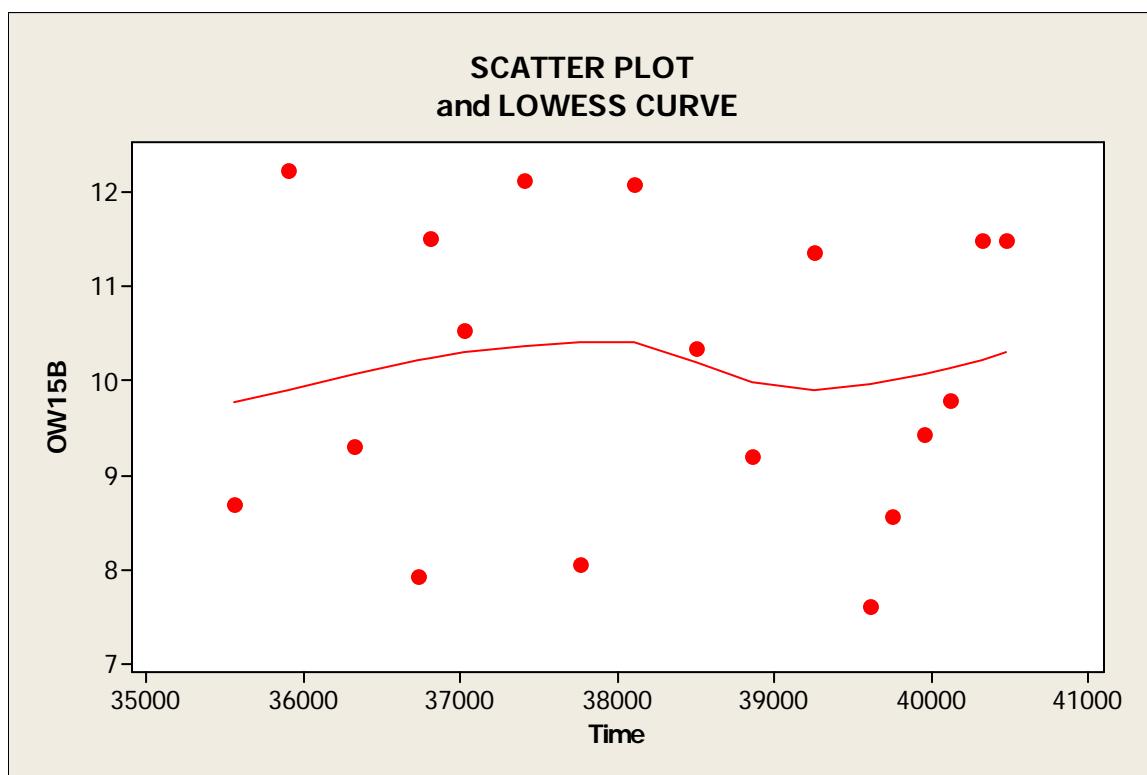
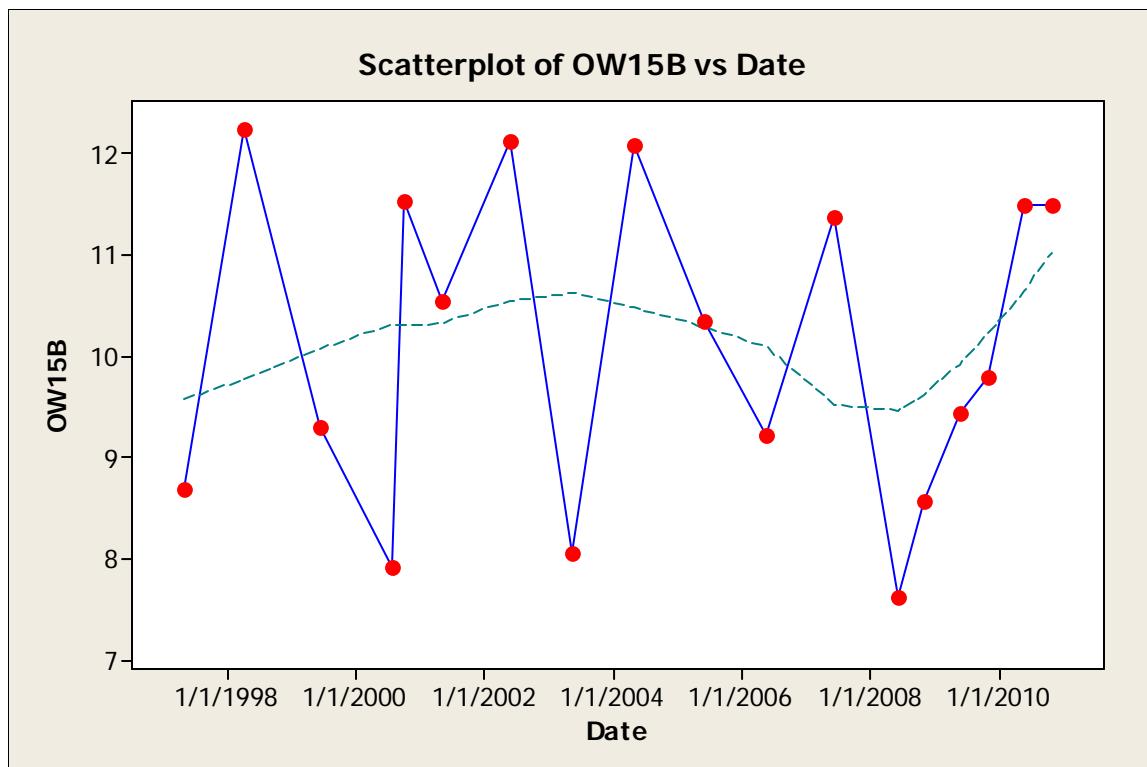
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.535735	0.0180726
SPEARMAN'S RHO	-0.561650	0.0123339
KENDALL'S TAU_A	-0.421053	0.0129371
KENDALL'S TAU_B	-0.422289	0.0129371



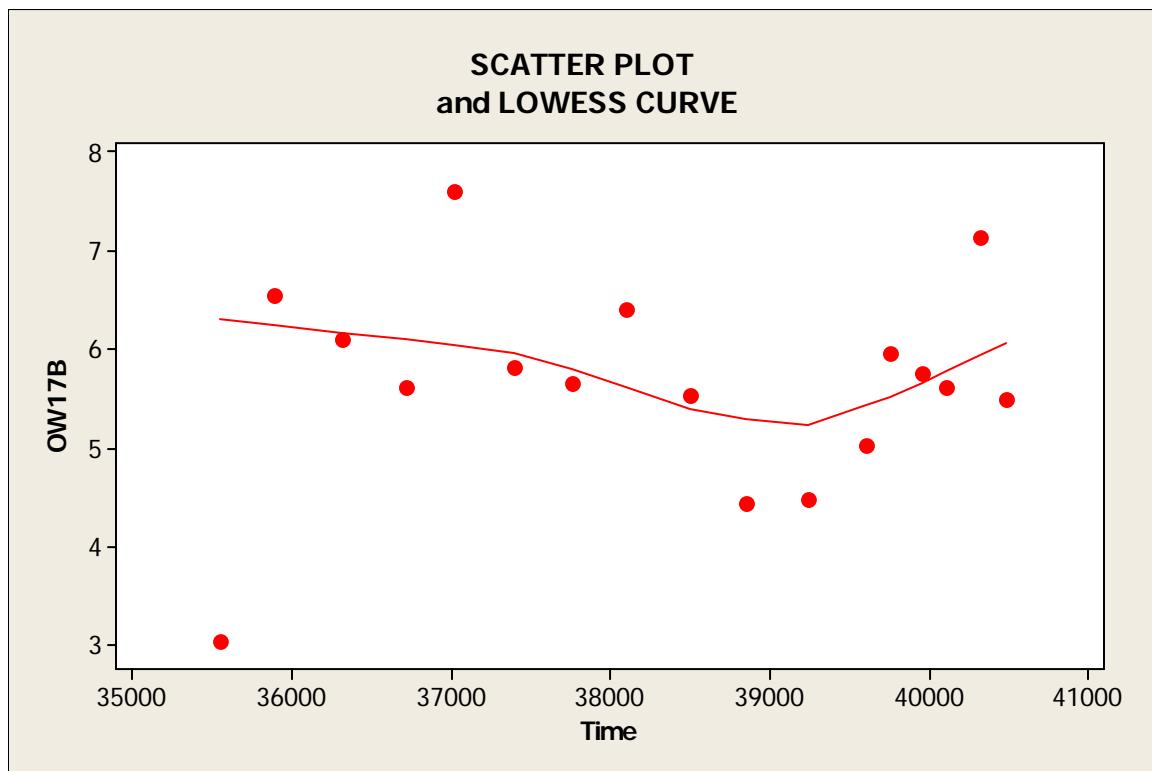
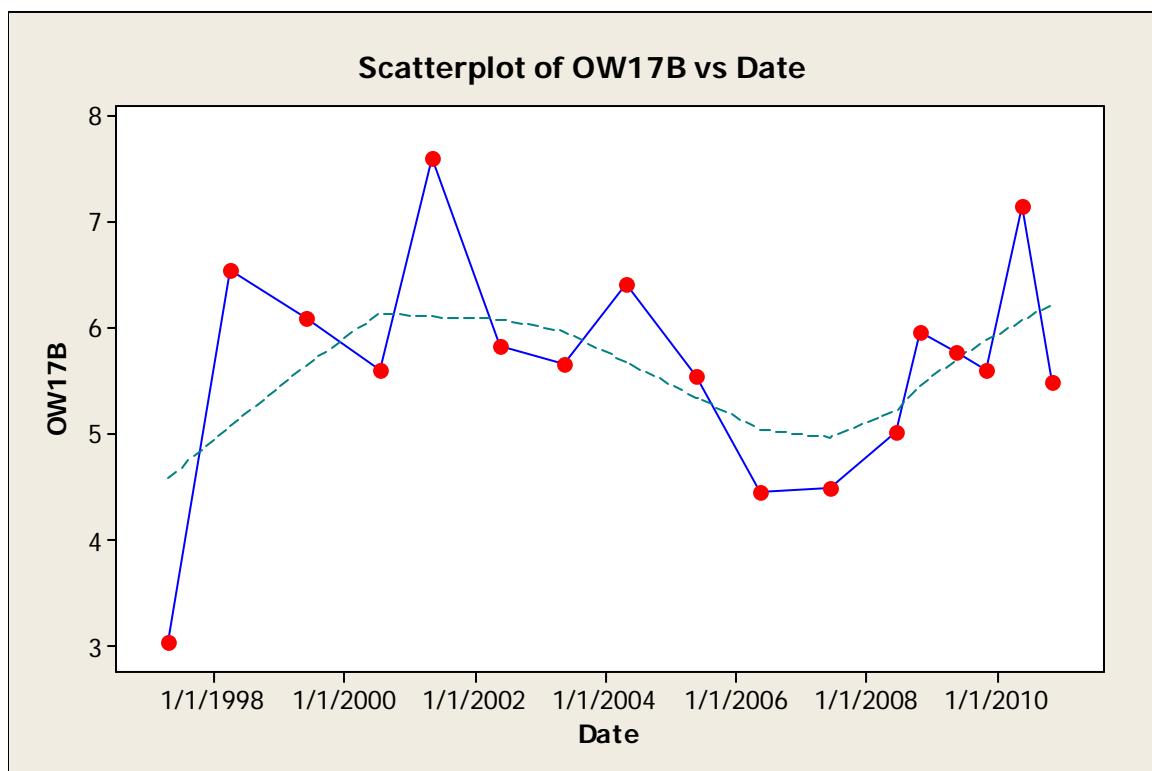
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.929084	0.002475
SPEARMAN'S RHO	0.678571	0.093750
KENDALL'S TAU_A	0.523810	0.133128
KENDALL'S TAU_B	0.523810	0.133128



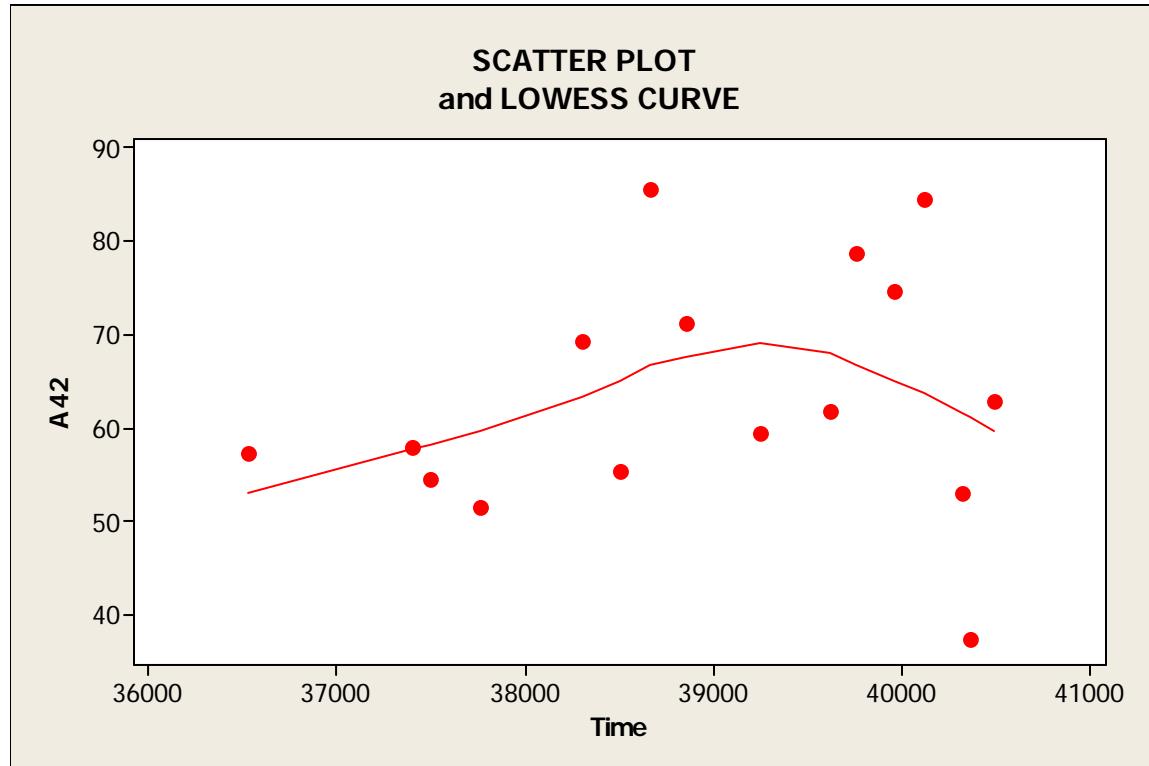
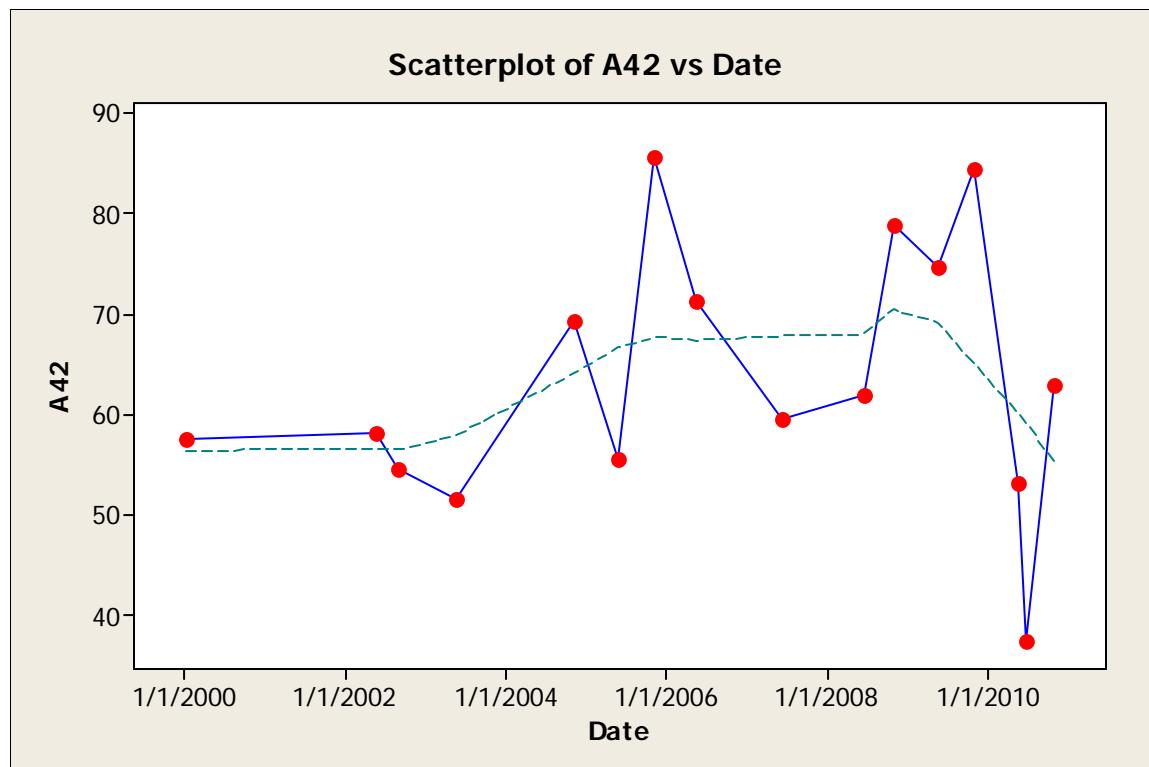
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.549288	0.080085
SPEARMAN'S RHO	0.245455	0.466922
KENDALL'S TAU_A	0.236364	0.350201
KENDALL'S TAU_B	0.236364	0.350201



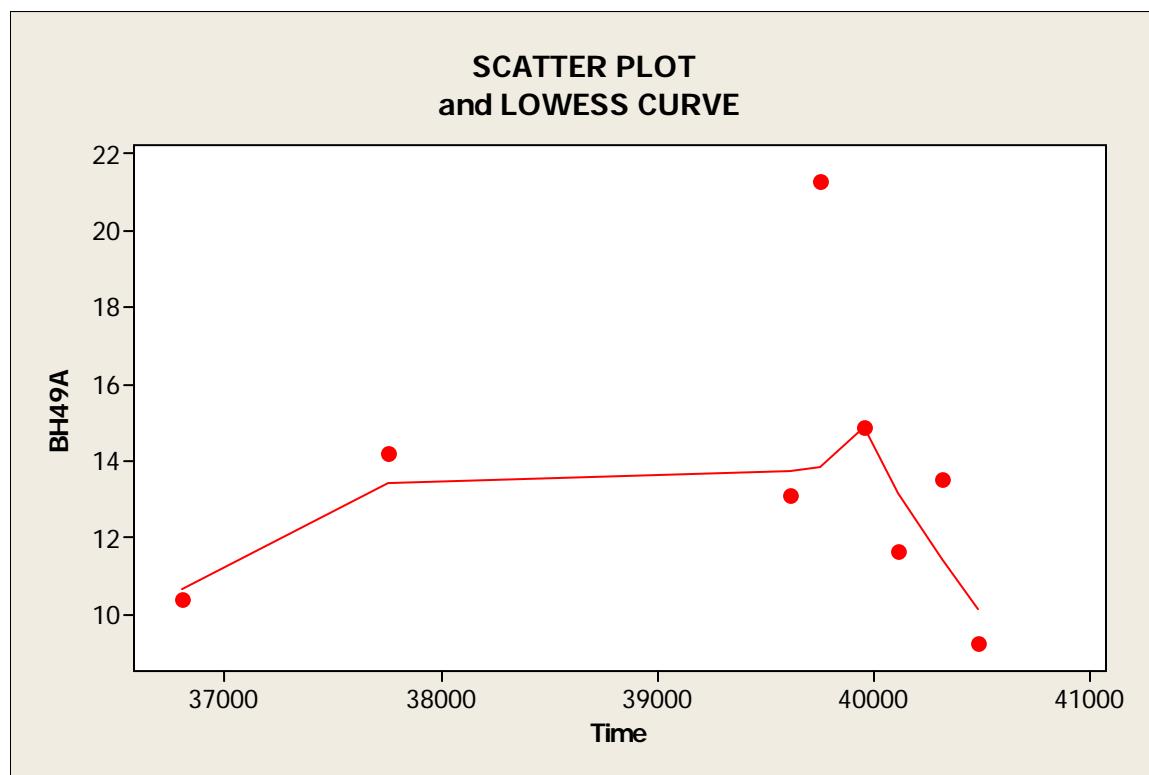
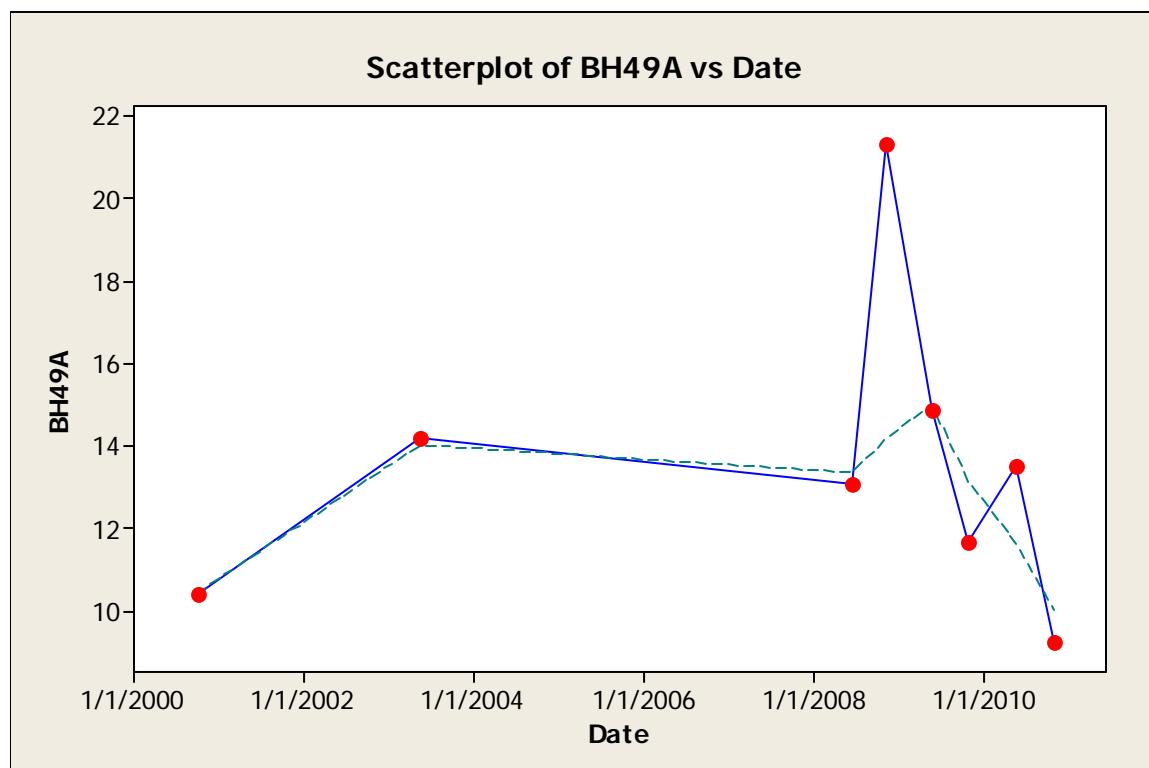
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.0138572	0.95648
SPEARMAN'S RHO	-0.0237358	0.92552
KENDALL'S TAU_A	-0.0065359	1.00000
KENDALL'S TAU_B	-0.0065359	1.00000



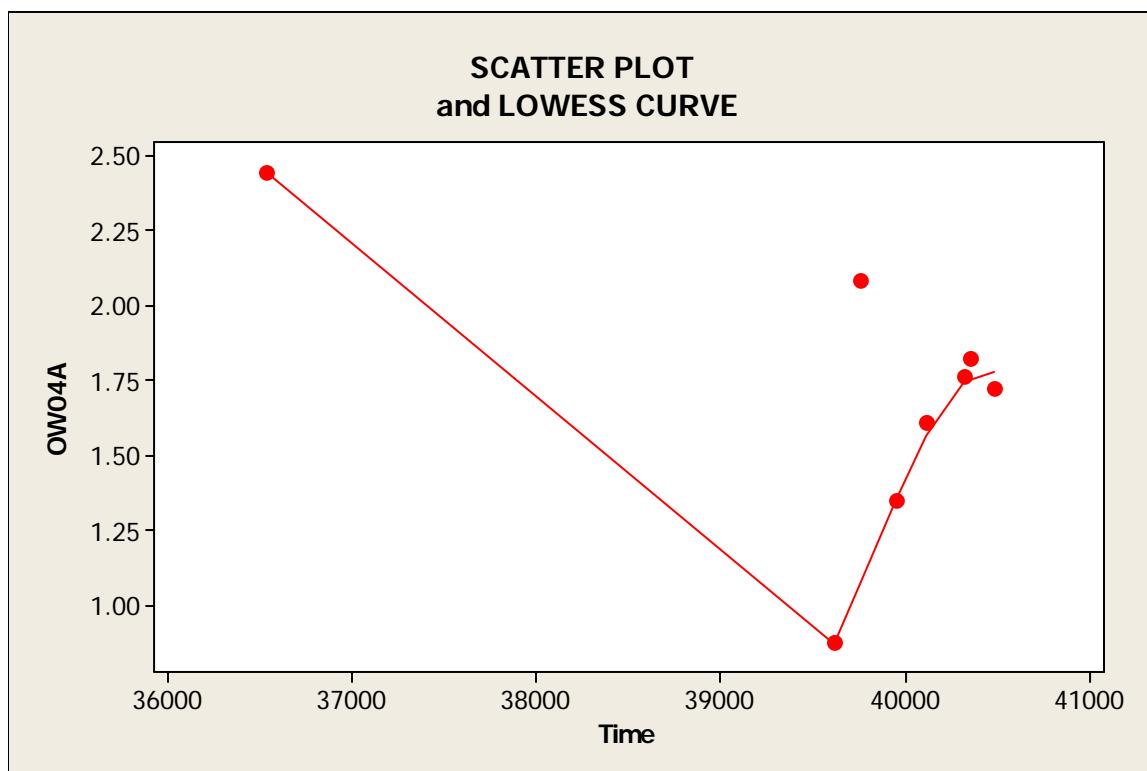
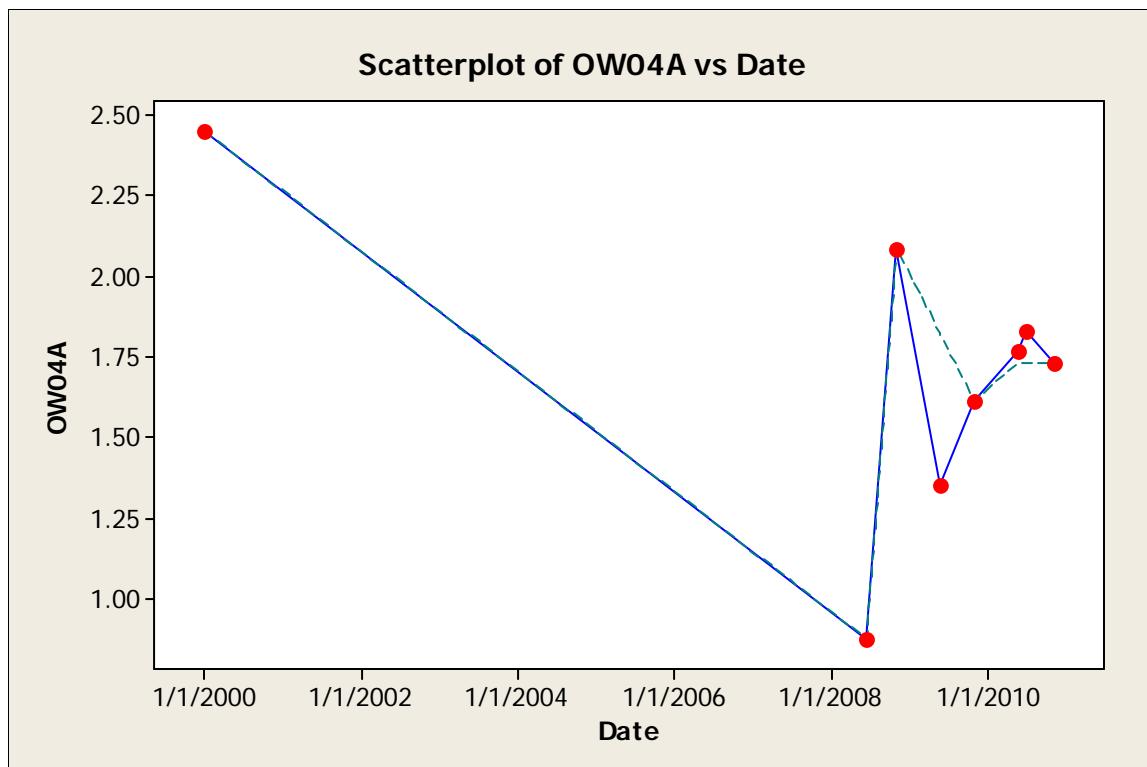
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.073984	0.777793
SPEARMAN'S RHO	-0.127451	0.625930
KENDALL'S TAU_A	-0.102941	0.592301
KENDALL'S TAU_B	-0.102941	0.592301



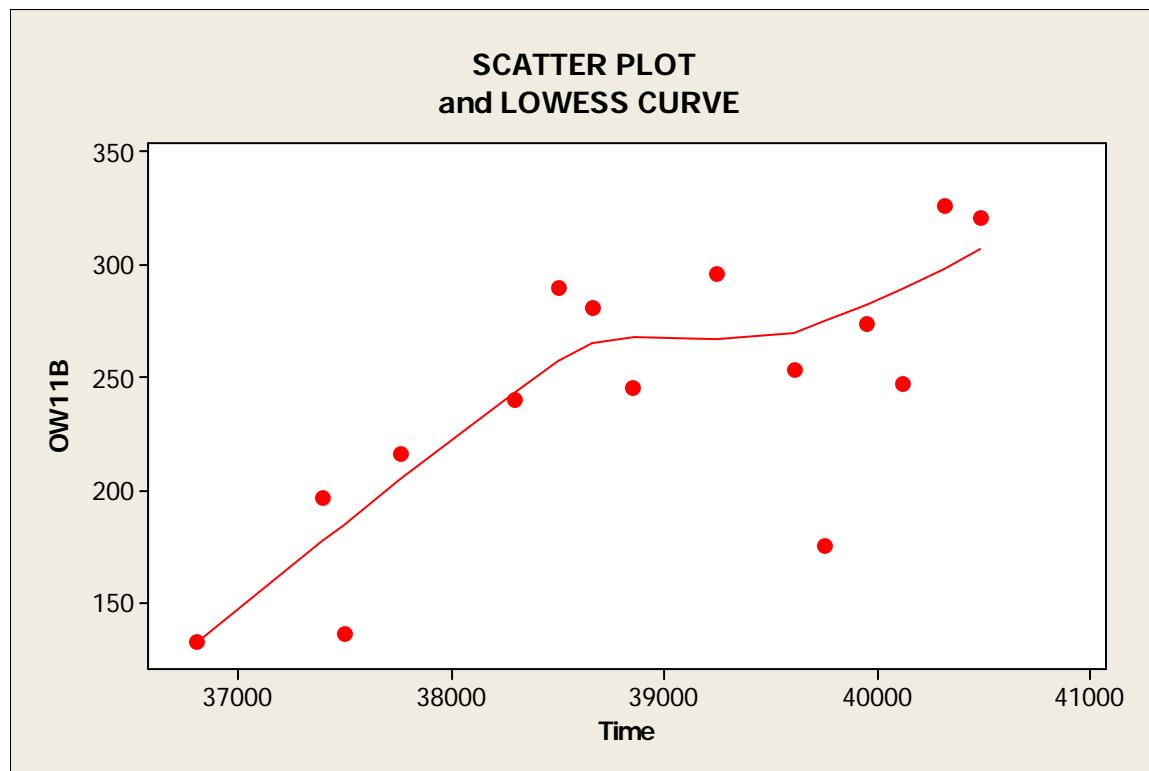
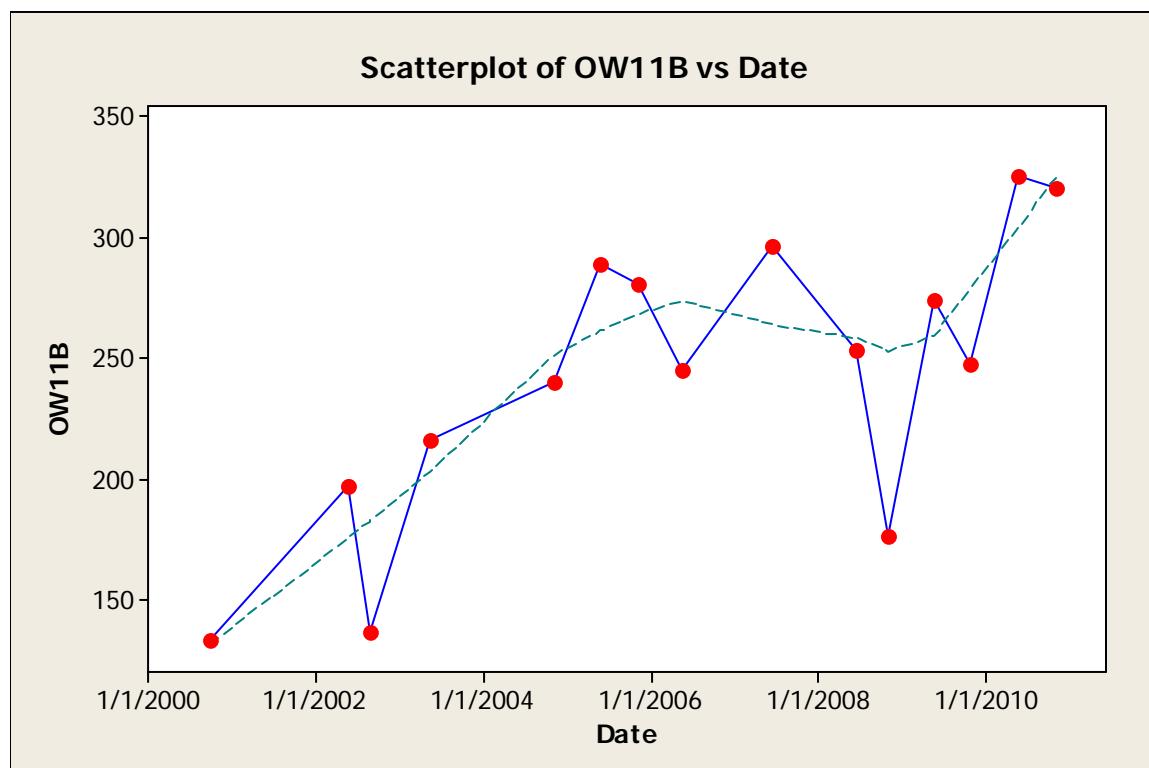
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.155268	0.565838
SPEARMAN'S RHO	0.179412	0.506140
KENDALL'S TAU_A	0.150000	0.444044
KENDALL'S TAU_B	0.150000	0.444044



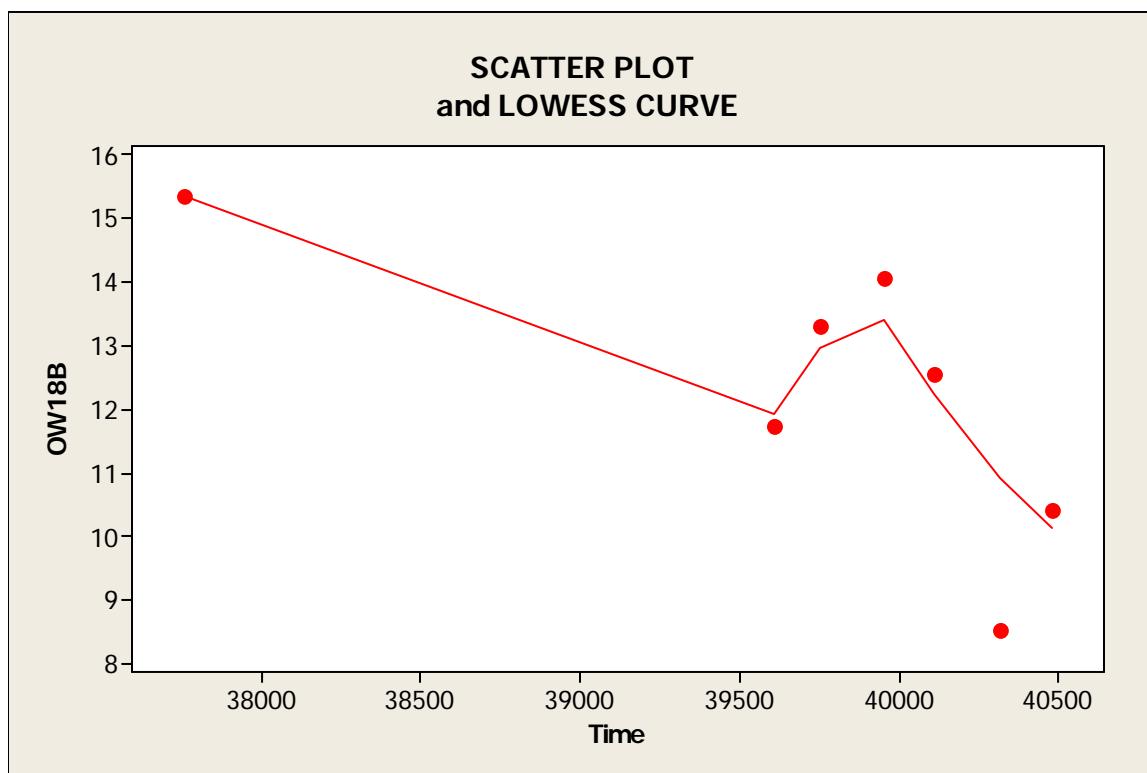
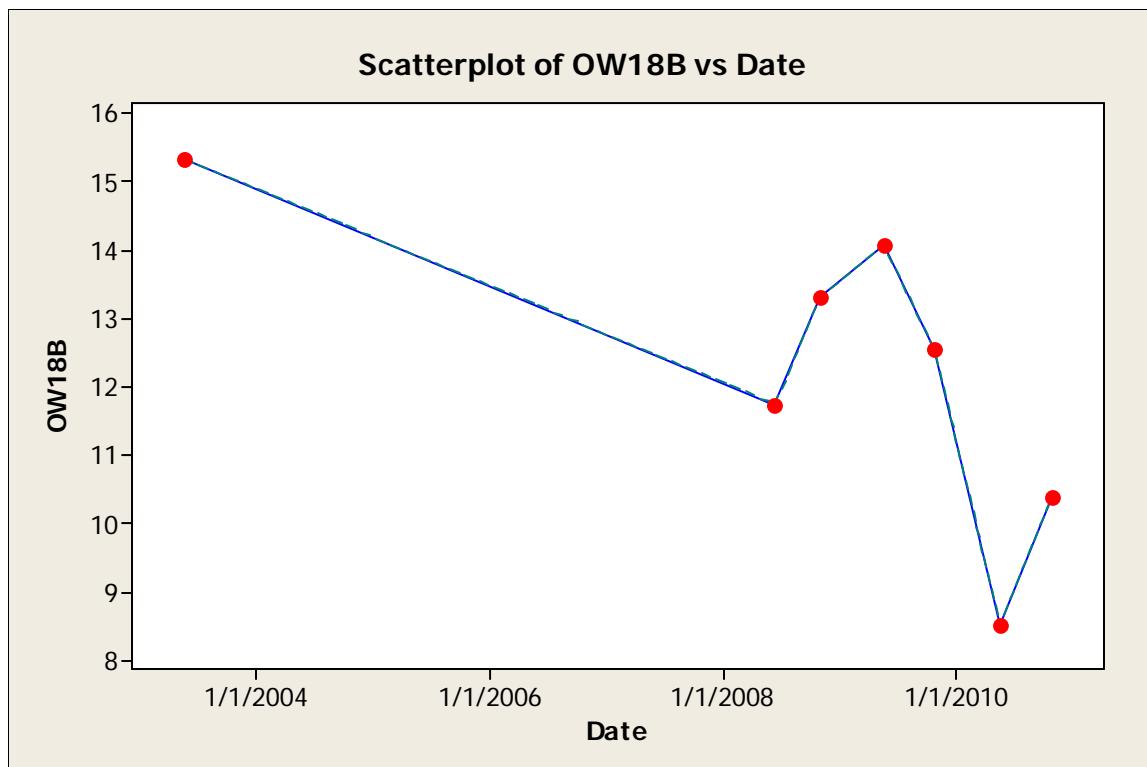
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.129213	0.760409
SPEARMAN'S RHO	-0.190476	0.651401
KENDALL'S TAU_A	-0.142857	0.710523
KENDALL'S TAU_B	-0.142857	0.710523



CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.529994	0.17667
SPEARMAN'S RHO	-0.095238	0.82251
KENDALL'S TAU_A	0.000000	1.00000
KENDALL'S TAU_B	0.000000	1.00000



CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.711058	0.0029588
SPEARMAN'S RHO	0.692857	0.0041902
KENDALL'S TAU_A	0.542857	0.0055836
KENDALL'S TAU_B	0.542857	0.0055836



CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.720634	0.067701
SPEARMAN'S RHO	-0.714286	0.071344
KENDALL'S TAU_A	-0.523810	0.133128
KENDALL'S TAU_B	-0.523810	0.133128

## Ra-226 Trend Evaluations (Unfiltered Groundwater)

Remarks: The data sets were imported into Minitab (commercial statistical software) from the Excel file “Graphs 1997 to 2009 Radium 226.xlsx” to do temporal trend analyses for a set of groundwater monitoring wells. Temporal trend were evaluated from **1997 – 2010**. All units are in pCi/L.

### Descriptive Statistics

Variable	Total Count	N	Mean	StDev	Minimum	Median	Maximum
B02W20S	22	17	0.2131	0.1759	0.0300	0.1790	0.7650
A45	22	18	0.4223	0.3498	-0.0720	0.3590	1.1200
A50	22	18	0.2859	0.1787	0.000000000	0.3160	0.6330
OW04B	22	18	0.3133	0.3182	-0.0100	0.2525	1.2900
OW06B	22	18	0.2756	0.2730	-0.0400	0.1655	0.9710
OW07A	22	1	0.40000	*	0.40000	0.40000	0.40000
OW07B	22	6	0.433	0.492	0.0330	0.244	1.290
OW13B	22	11	0.430	0.354	0.0560	0.359	1.050
OW15B	22	18	0.2691	0.1741	0.0800	0.2190	0.7290
OW17B	22	16	0.2261	0.2600	-0.0850	0.1230	0.9810
A42	22	9	0.440	0.665	-0.866	0.341	1.610
BH49A	22	3	0.351	0.349	0.146	0.153	0.754
OW04A	22	3	0.0697	0.342	-0.325	0.253	0.281
OW11B	22	8	0.589	0.760	-0.160	0.348	2.250
OW6A	22	2	0.1395	0.0686	0.0910	0.1395	0.1880
OW15A	22	2	0.3025	0.0643	0.2570	0.3025	0.3480
OW14B	22	1	-0.037000	*	-0.037000	-0.037000	-0.037000

Samples sizes for the following wells were too small to do statistical trend evaluations:

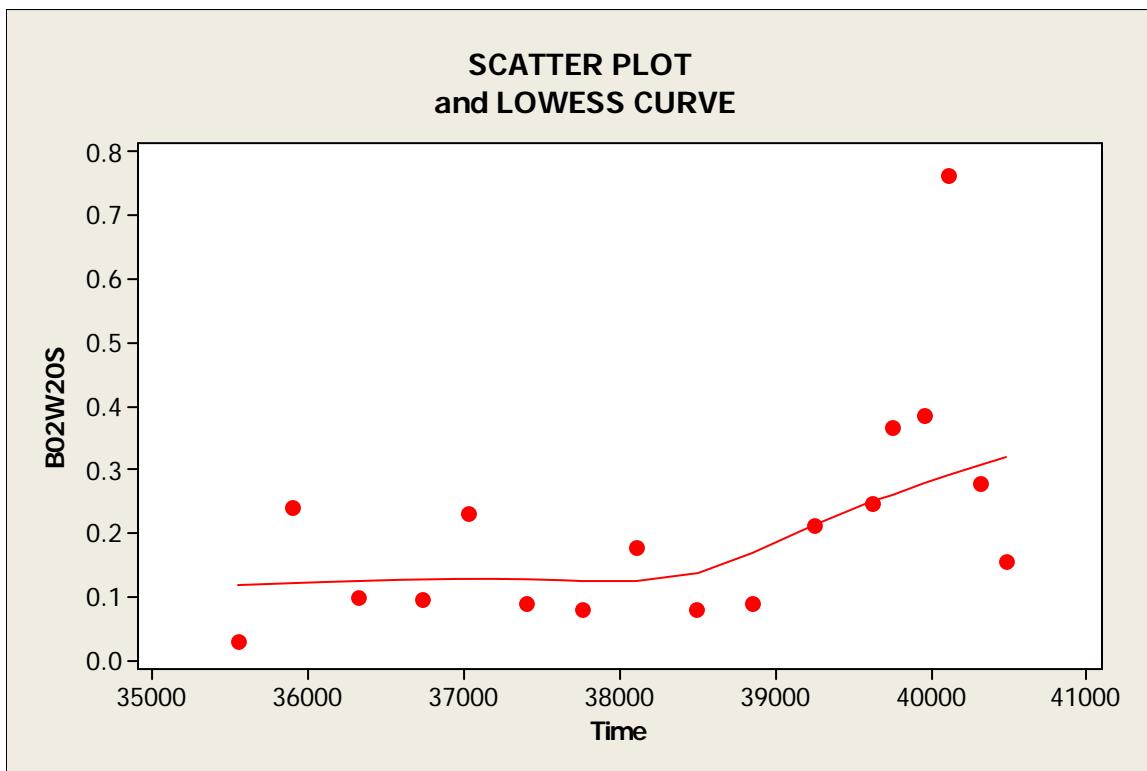
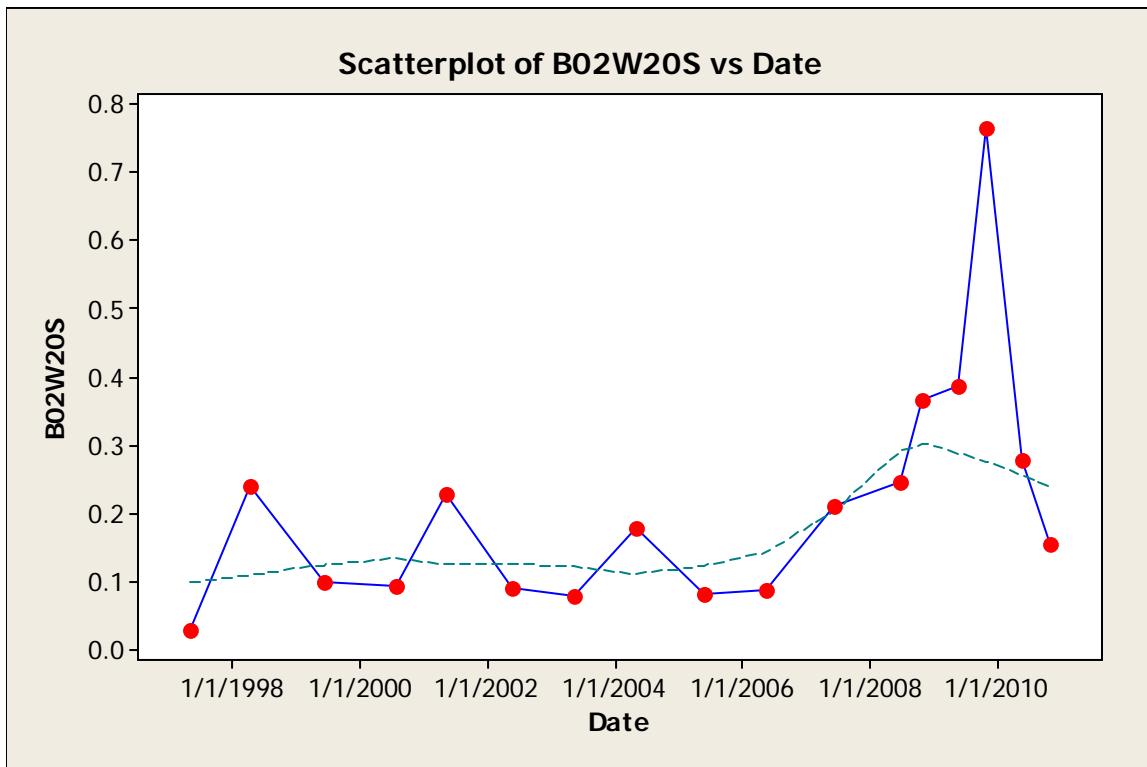
- OW07A
- BH49A
- OW04A
- OW6A
- OW15A
- OW14B

## Summary of Ra-226 Trend Evaluations

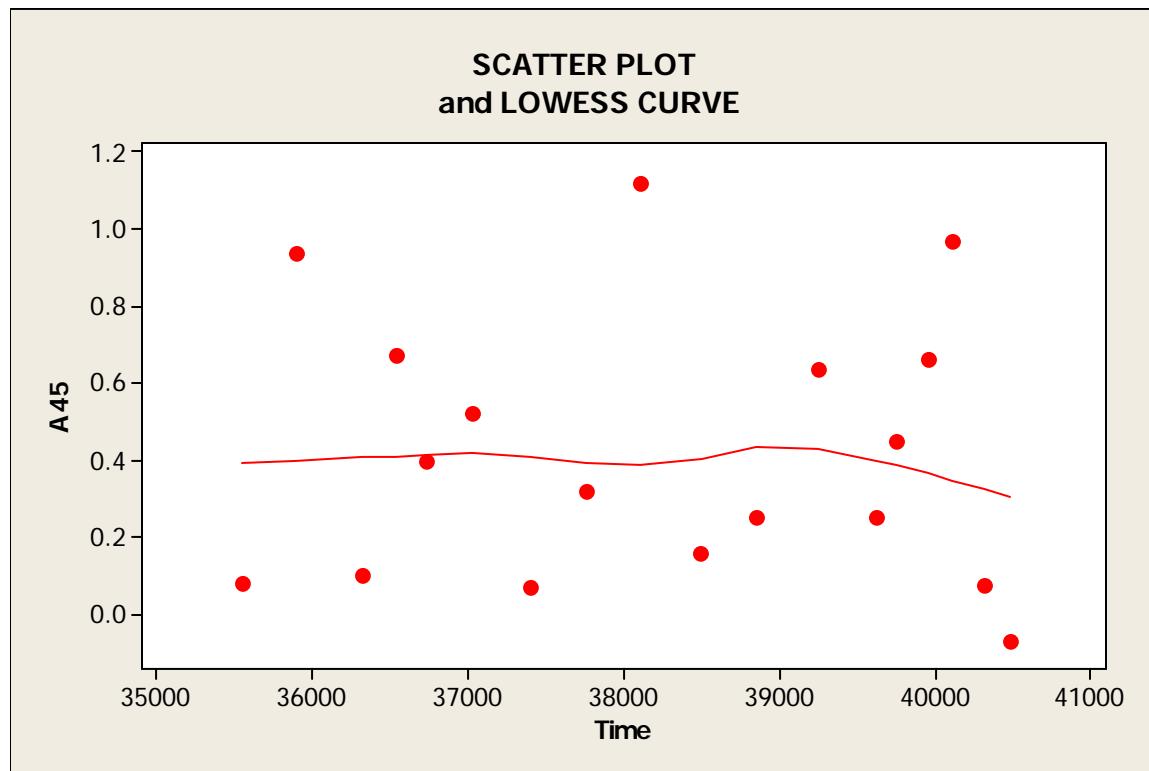
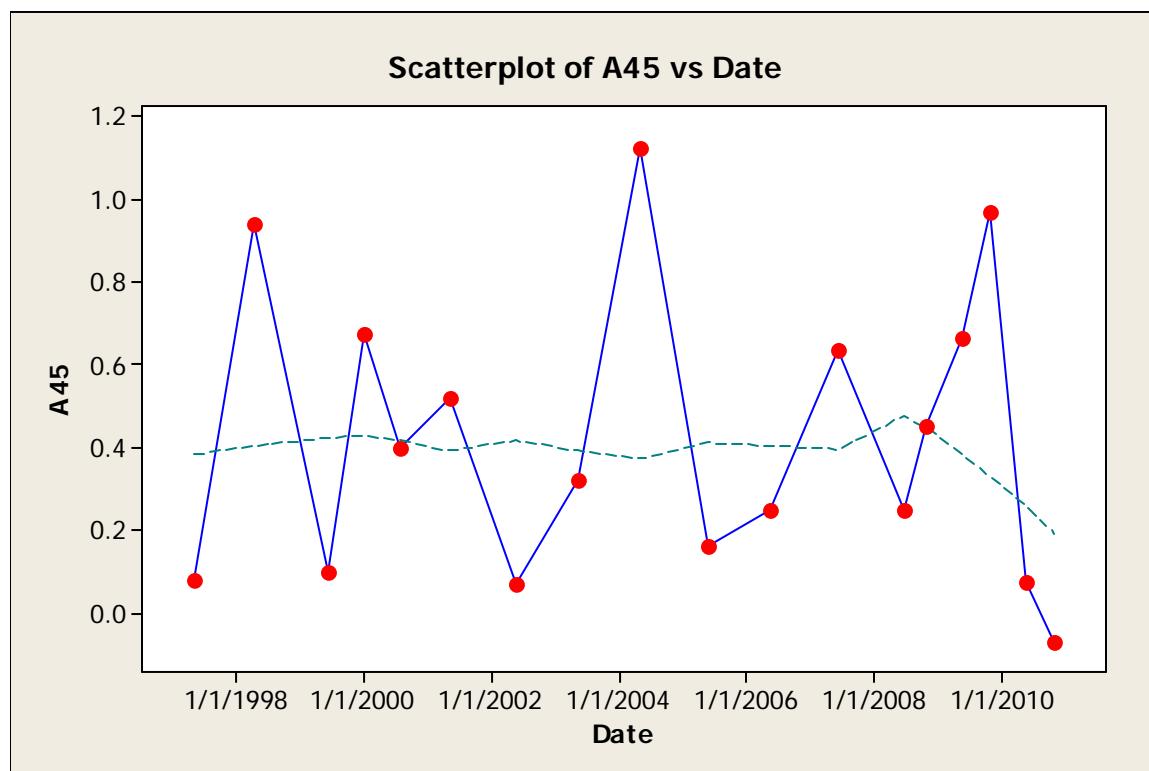
Well	<i>n</i>	Kendall's $\tau$	p-value	Remarks*
<b>B02W20S</b>	17	<b>0.40</b>	<b>0.029</b>	<b>Upward trend.</b>
A45	18	-0.039	0.85	No trend.
<b>A50</b>	<b>18</b>	<b>0.24</b>	<b>0.17</b>	No trend. (Possible upward trend.)
OW04B	18	0.18	0.52	No trend.
<b>OW06B</b>	<b>18</b>	<b>0.26</b>	<b>0.13</b>	No trend. (Possible upward trend.)
OW07B	6	-0.20	0.71	No trend.
OW13B	11	0.31	0.21	No trend.
<b>OW15B</b>	<b>18</b>	<b>0.31</b>	<b>0.081</b>	No trend. (Upward trend at 90% CL.)
<b>OW17B</b>	<b>16</b>	<b>0.28</b>	<b>0.14</b>	No trend. (Possible upward trend.)
A42	9	-0.28	0.35	No trend.
OW11B	8	0.14	0.71	No trend.

\* 95% level of confidence used for all trend evaluations.

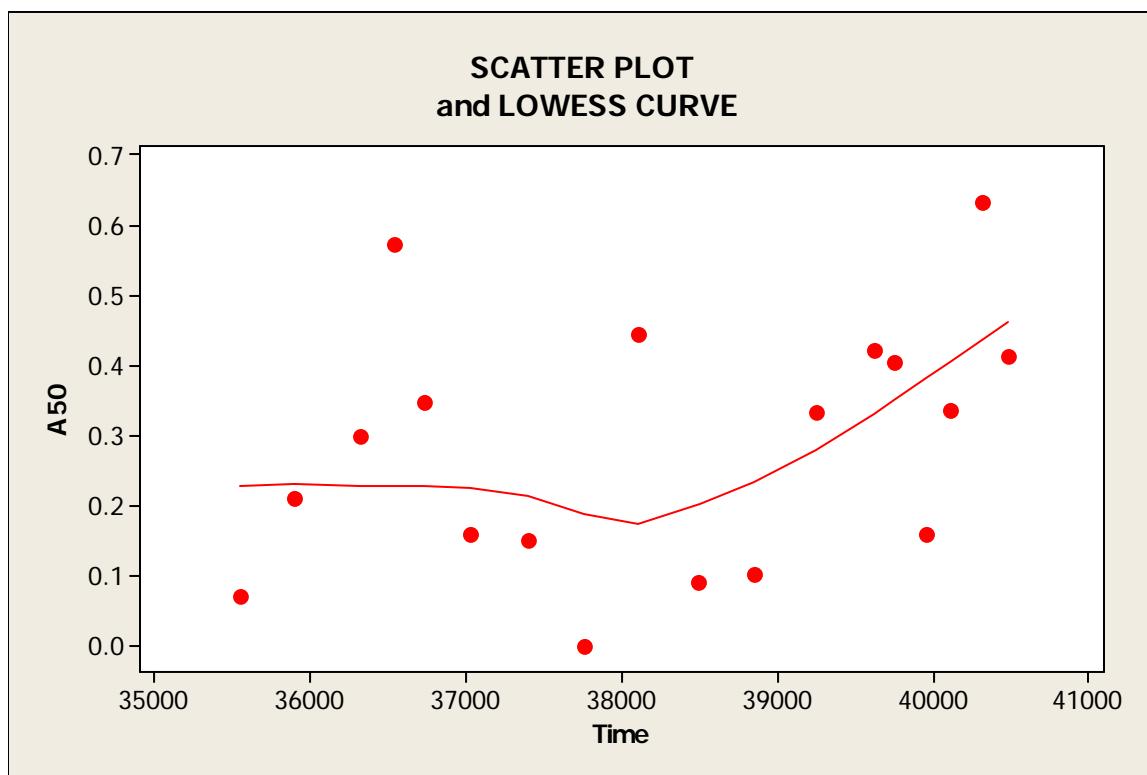
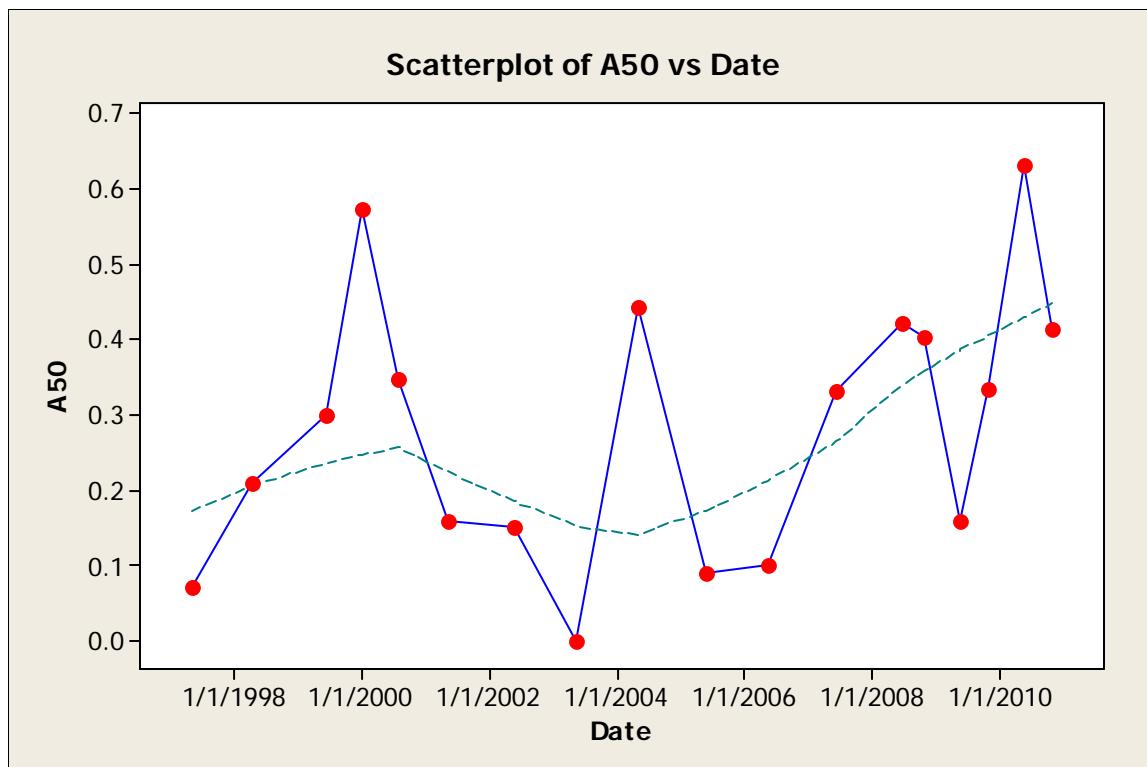
### Times Series Plots and Results of Mann-Kendall Tests for Ra-226 by Well



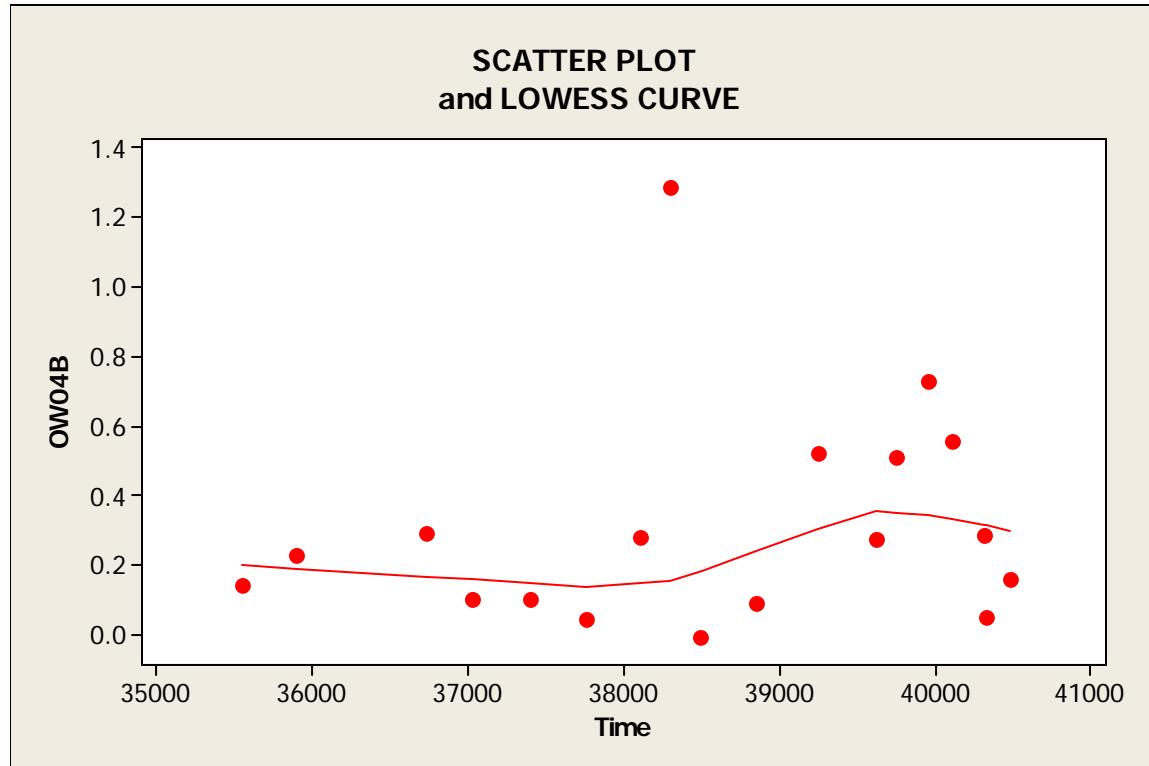
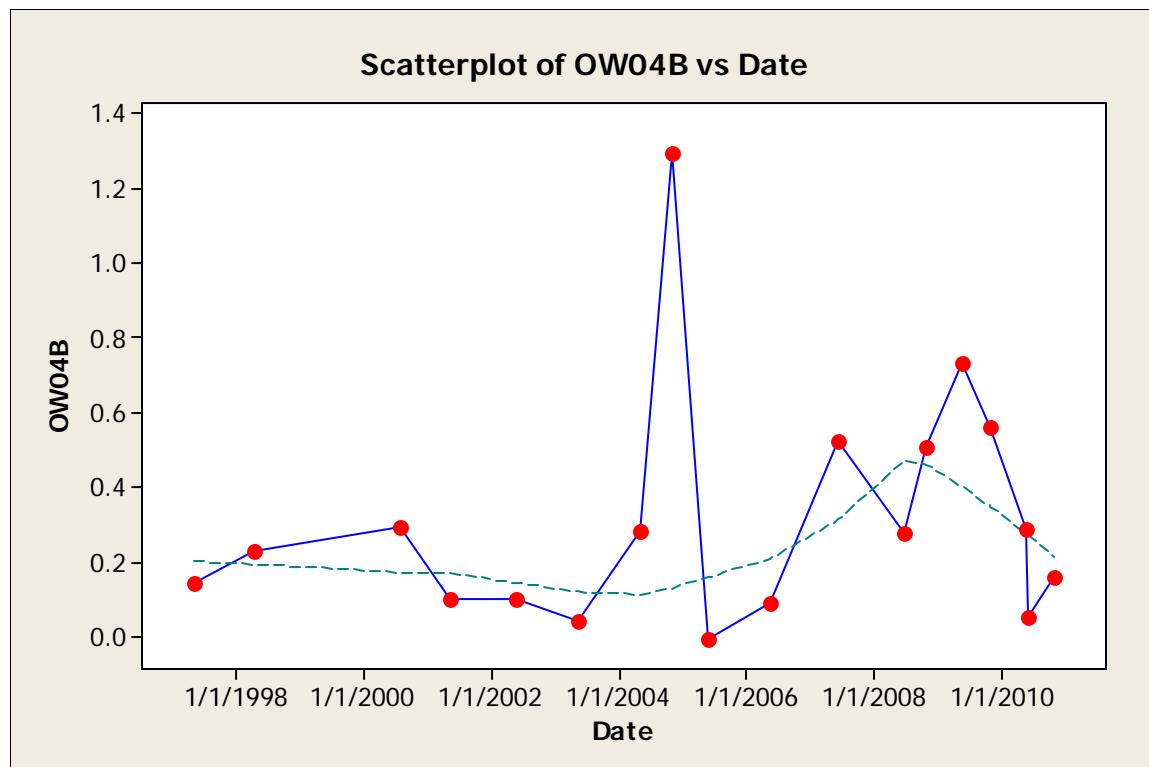
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.540892	0.0249621
SPEARMAN'S RHO	0.566176	0.0178228
KENDALL'S TAU_A	0.397059	0.0290204
KENDALL'S TAU_B	0.397059	0.0290204



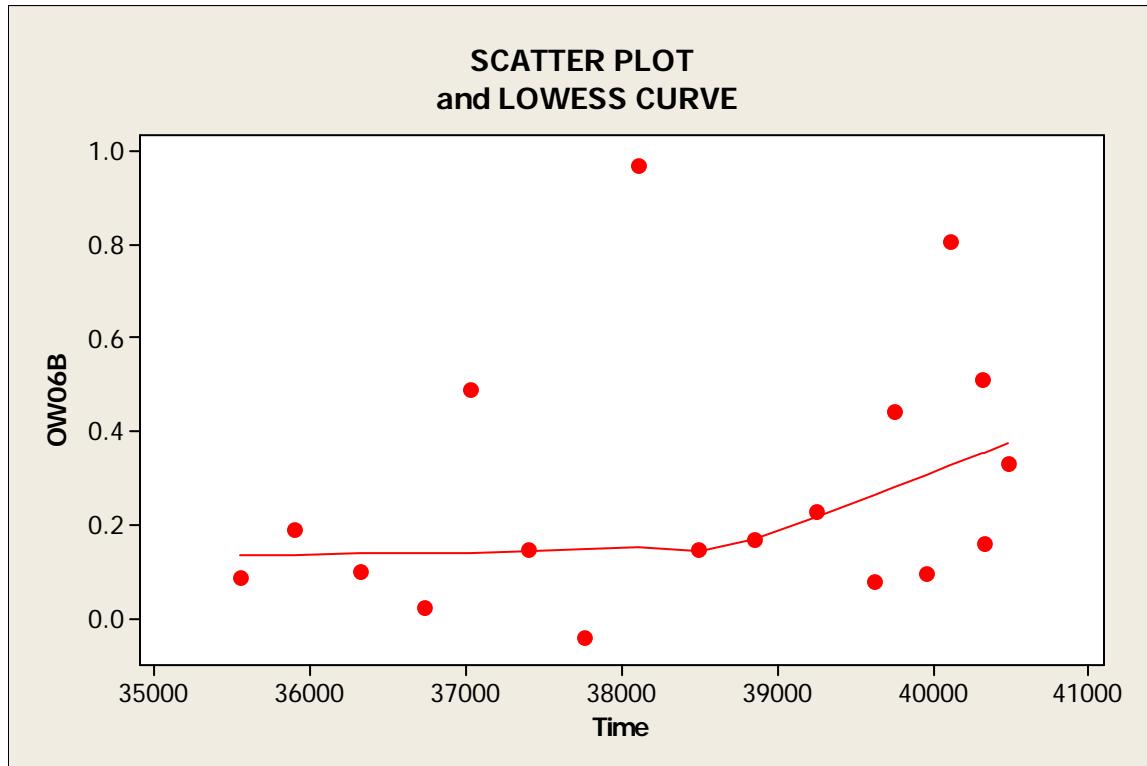
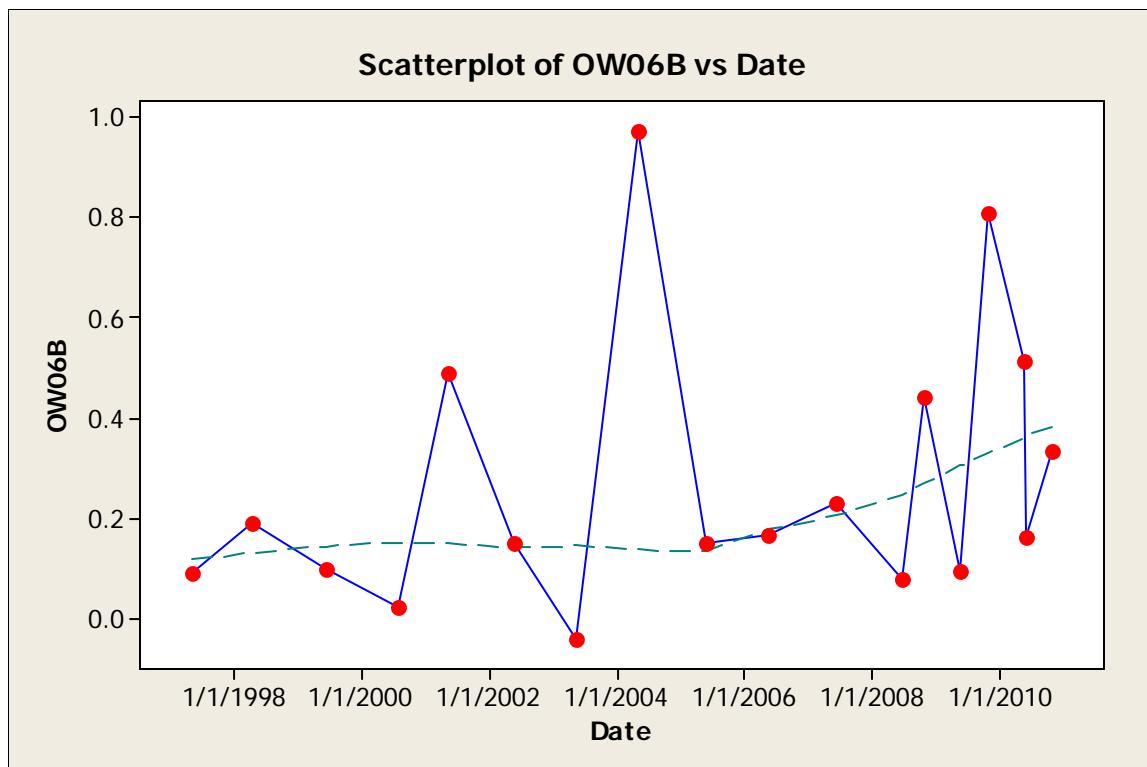
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.0486944	0.847841
SPEARMAN'S RHO	-0.0877646	0.729124
KENDALL'S TAU_A	-0.0392157	0.849682
KENDALL'S TAU_B	-0.0393445	0.849682



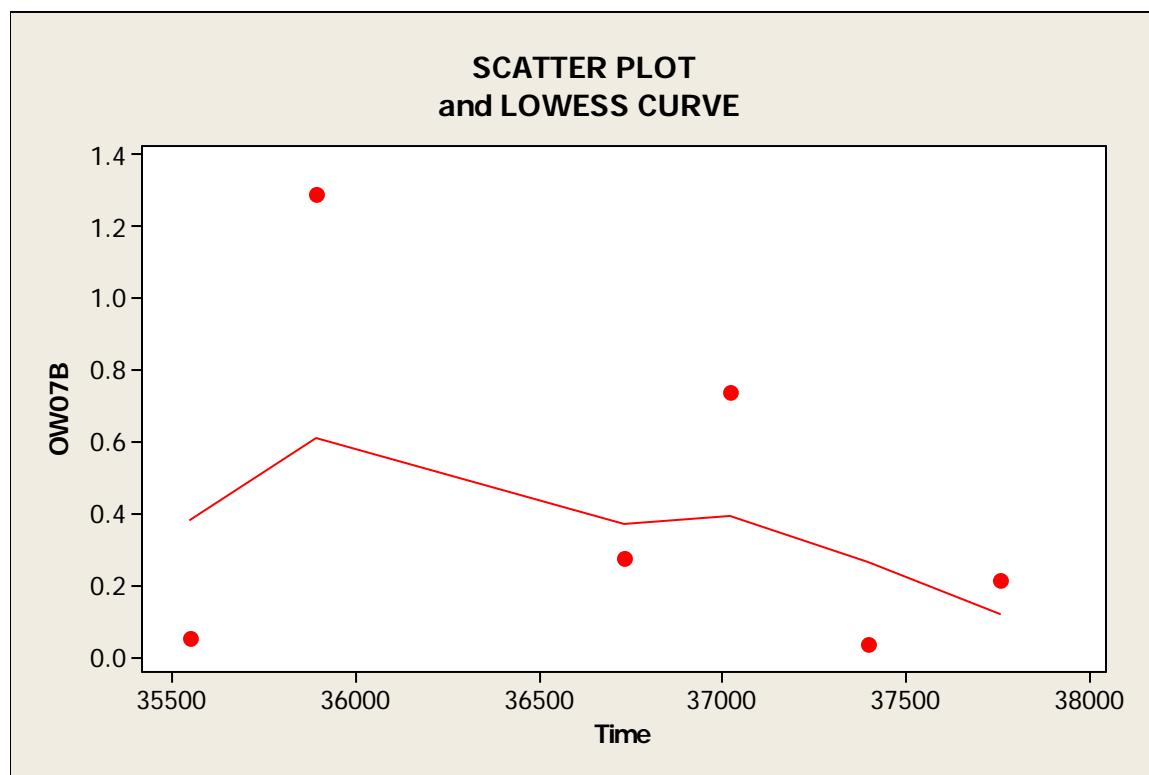
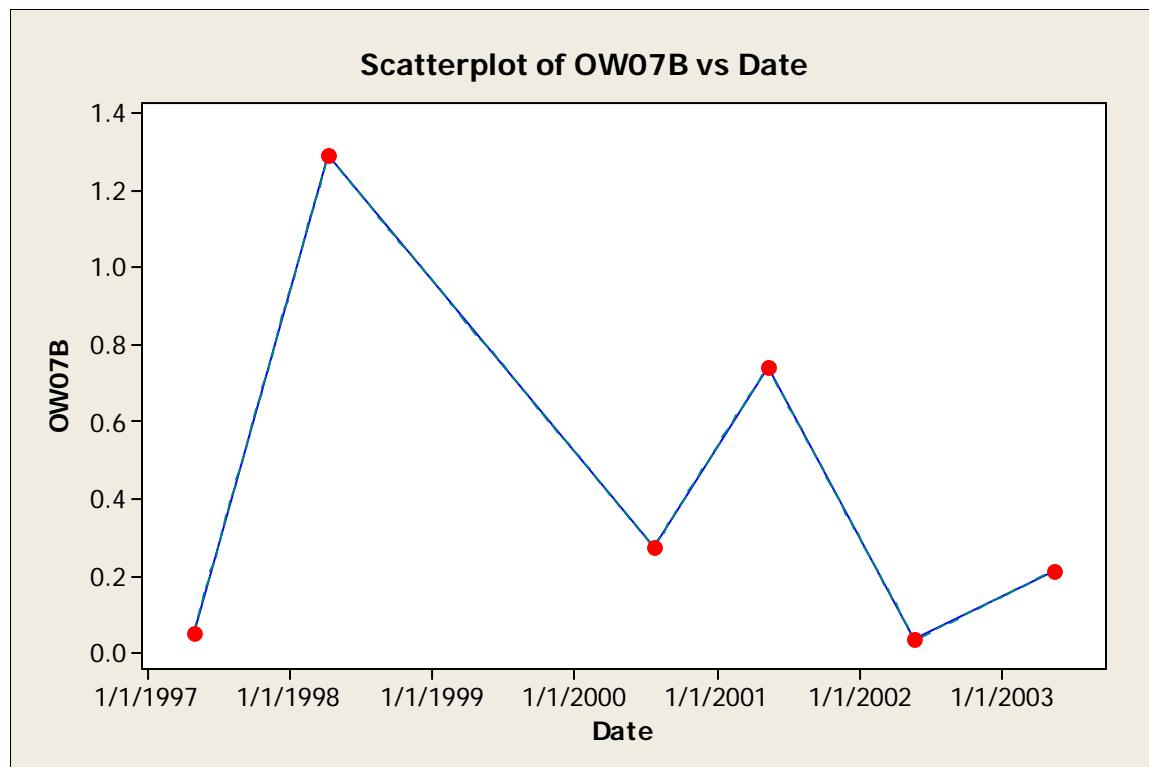
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.334673	0.174624
SPEARMAN'S RHO	0.356037	0.147026
KENDALL'S TAU_A	0.241830	0.172694
KENDALL'S TAU_B	0.241830	0.172694



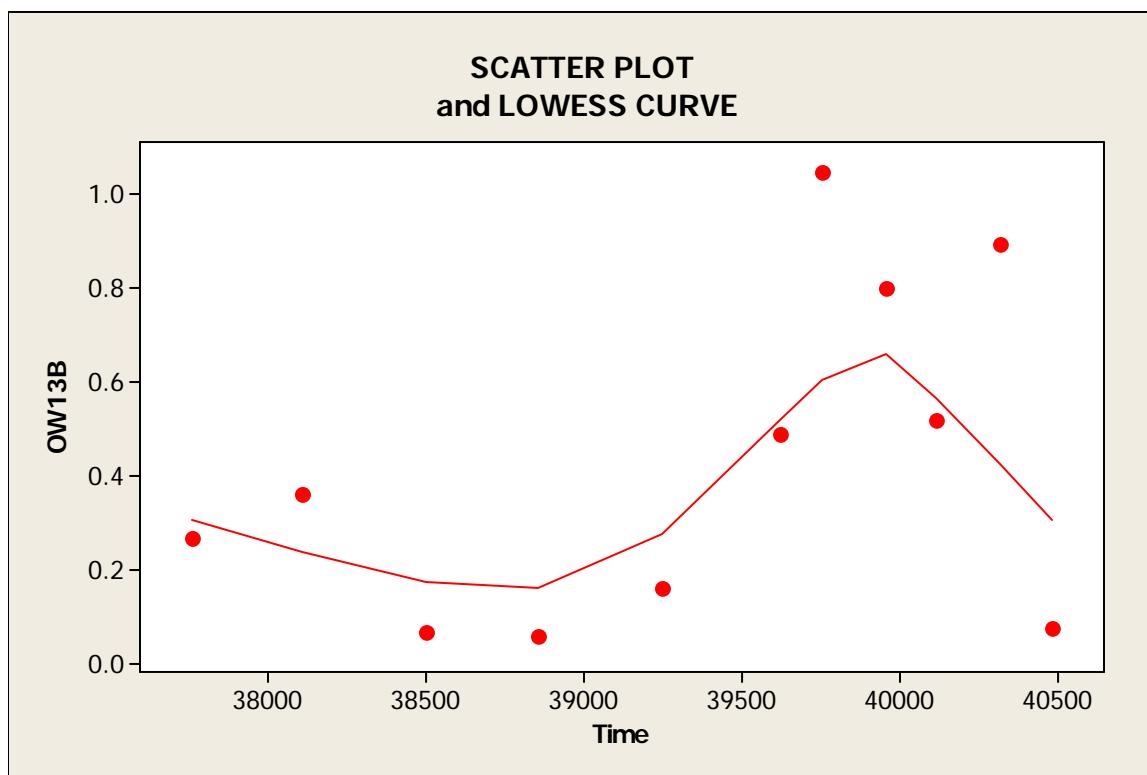
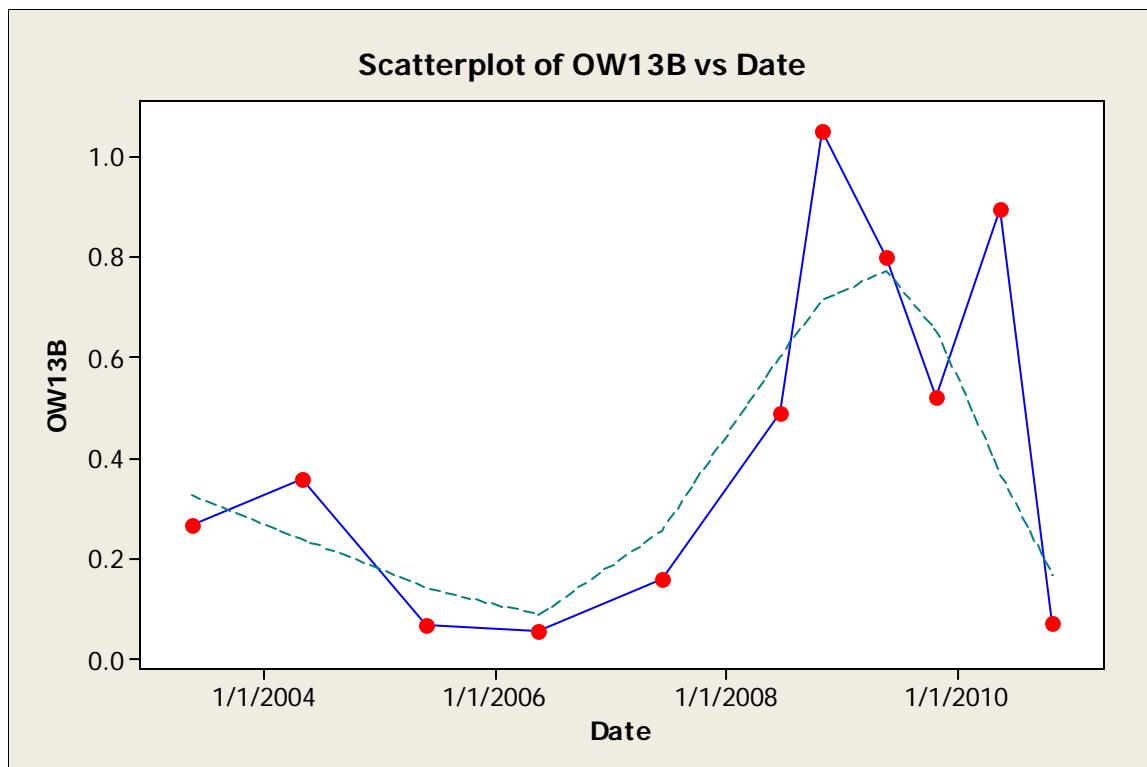
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.209808	0.403382
SPEARMAN'S RHO	0.212700	0.396781
KENDALL'S TAU_A	0.117647	0.519327
KENDALL'S TAU_B	0.118033	0.519327



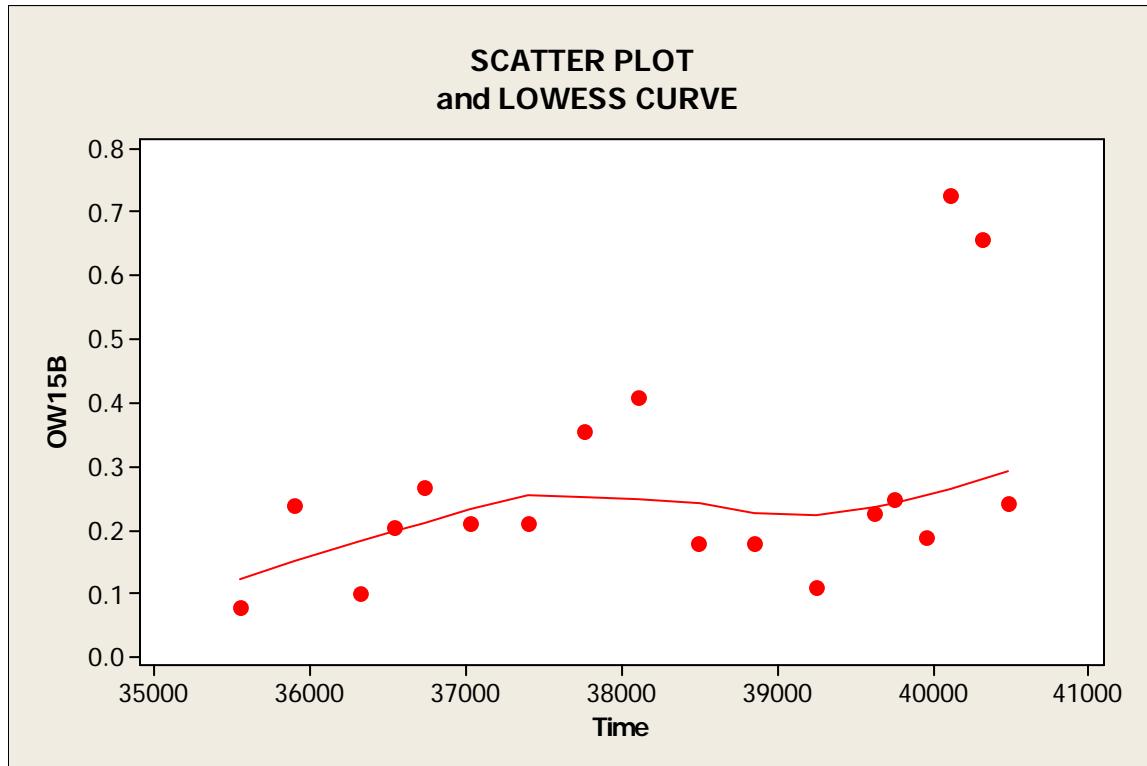
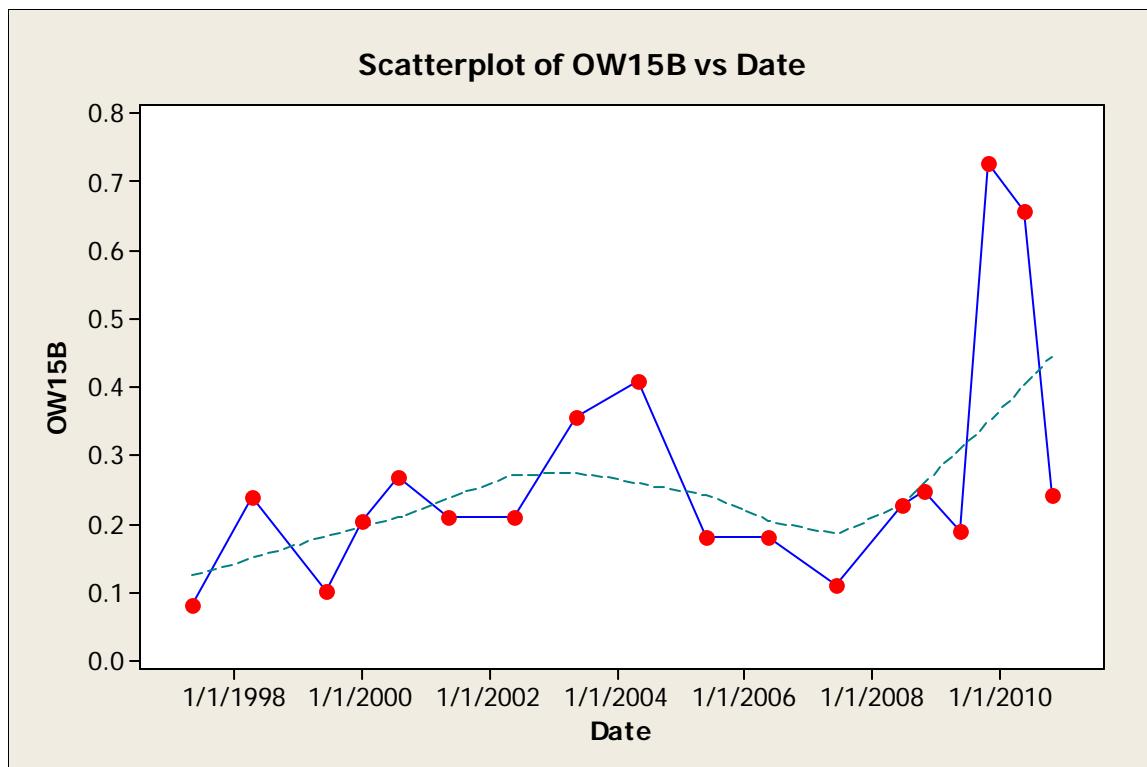
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.292467	0.238906
SPEARMAN'S RHO	0.379969	0.119864
KENDALL'S TAU_A	0.261438	0.139330
KENDALL'S TAU_B	0.262296	0.139330



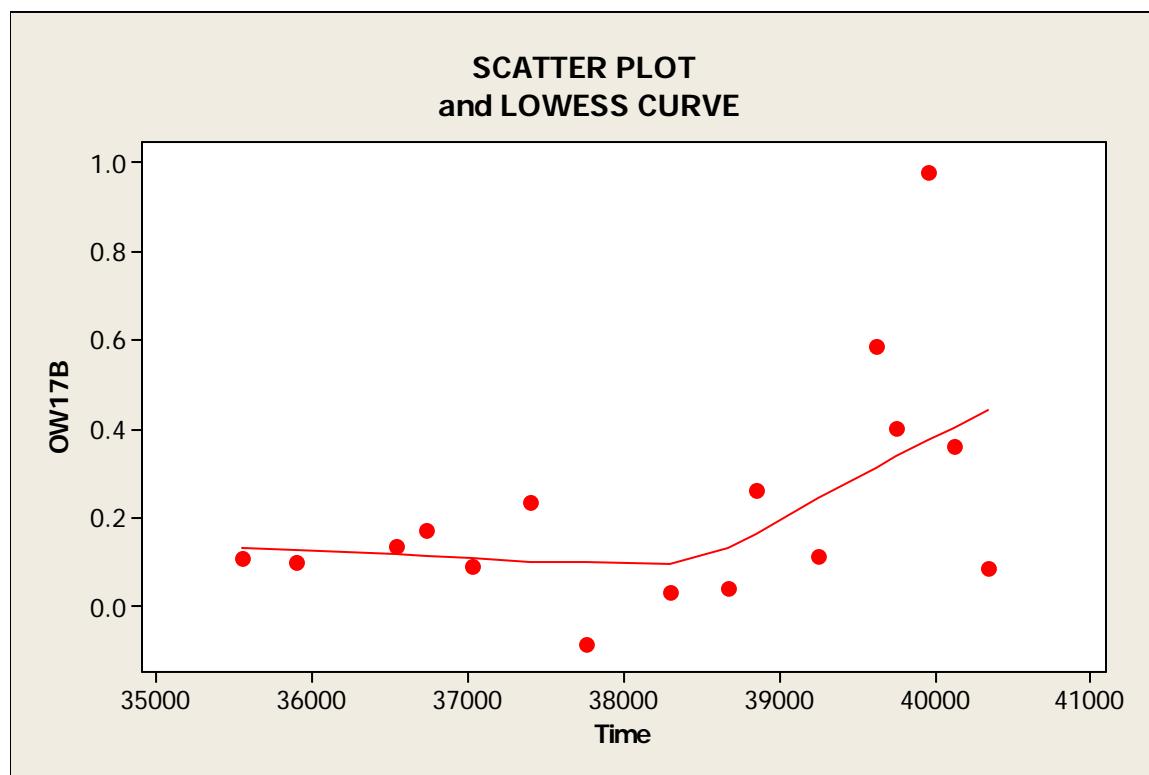
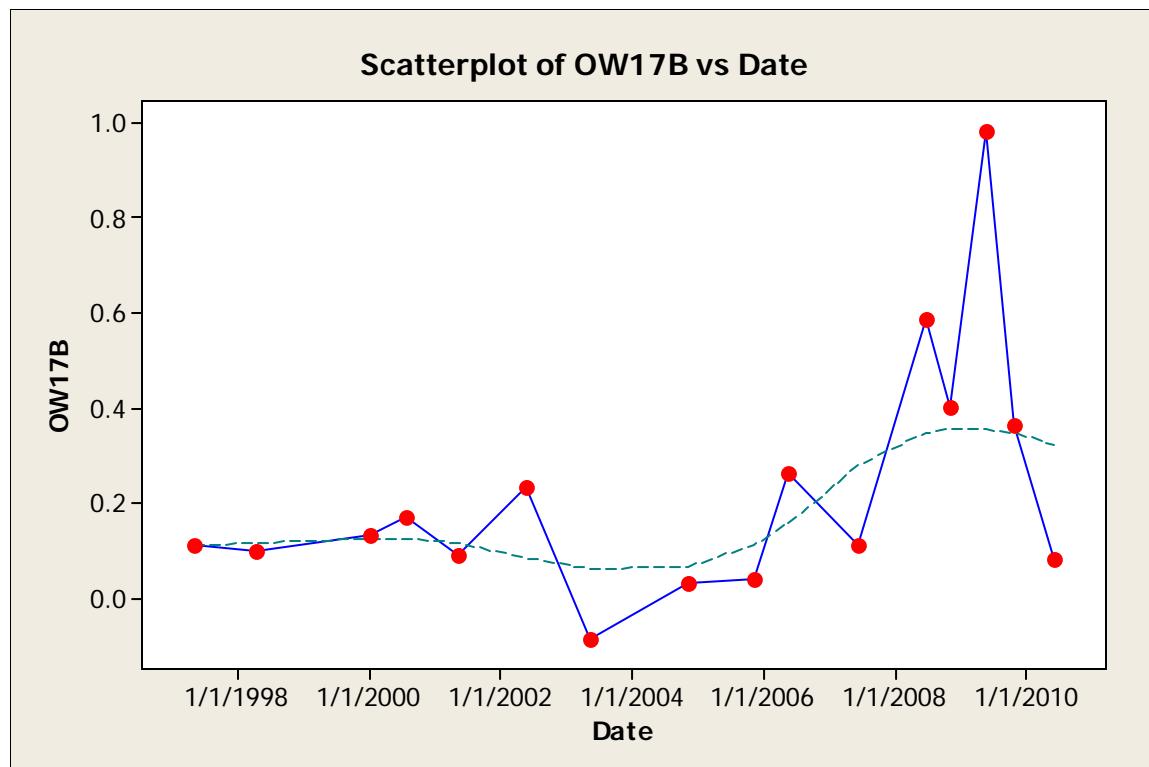
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.317048	0.540362
SPEARMAN'S RHO	-0.257143	0.622787
KENDALL'S TAU_A	-0.200000	0.707114
KENDALL'S TAU_B	-0.200000	0.707114



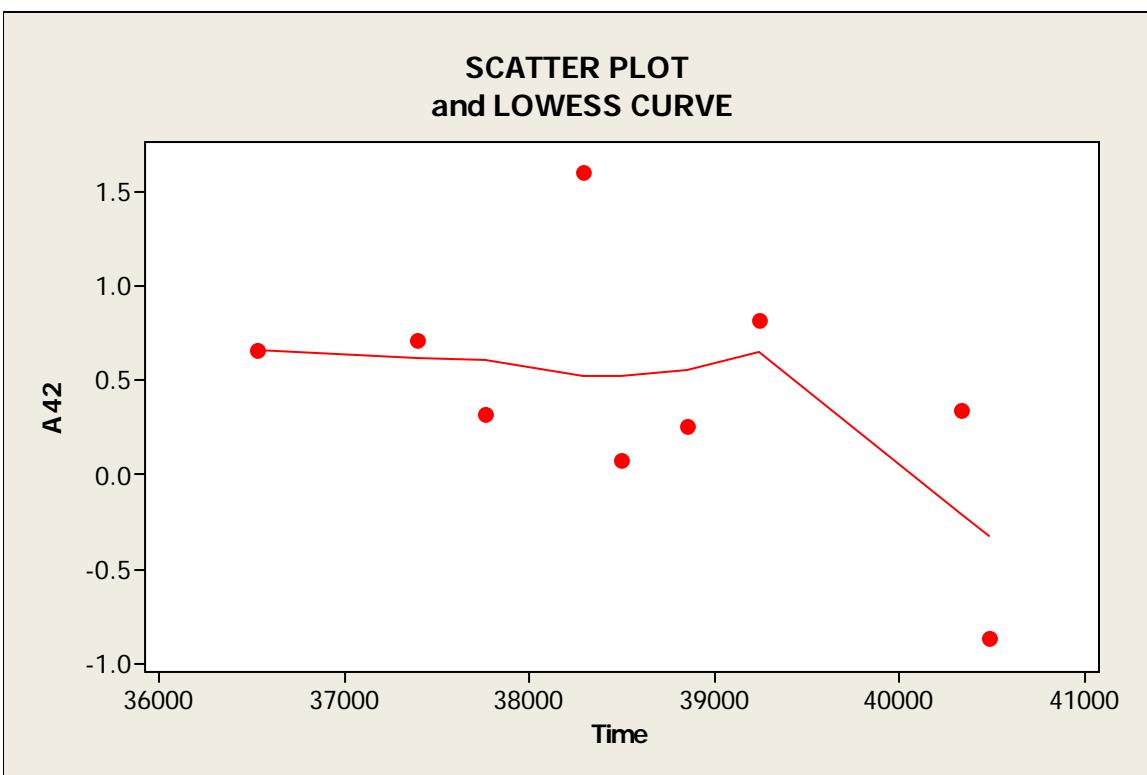
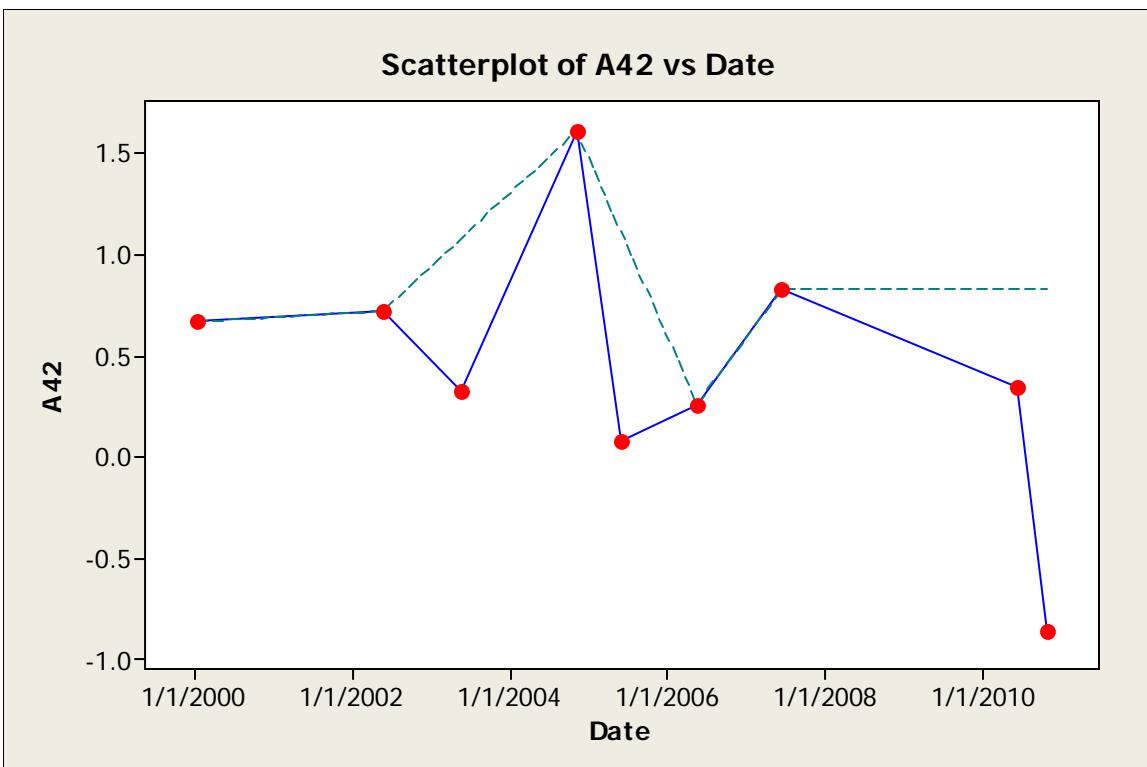
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.452119	0.162671
SPEARMAN'S RHO	0.427273	0.189944
KENDALL'S TAU_A	0.309091	0.212912
KENDALL'S TAU_B	0.309091	0.212912



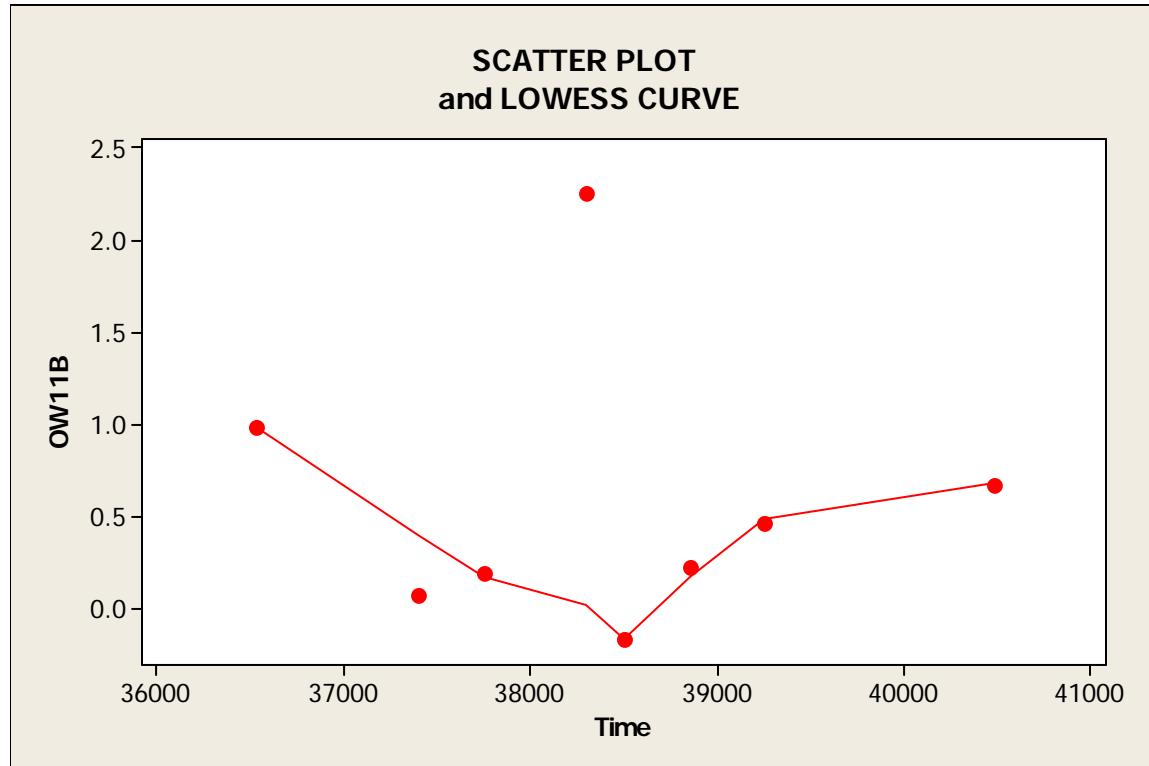
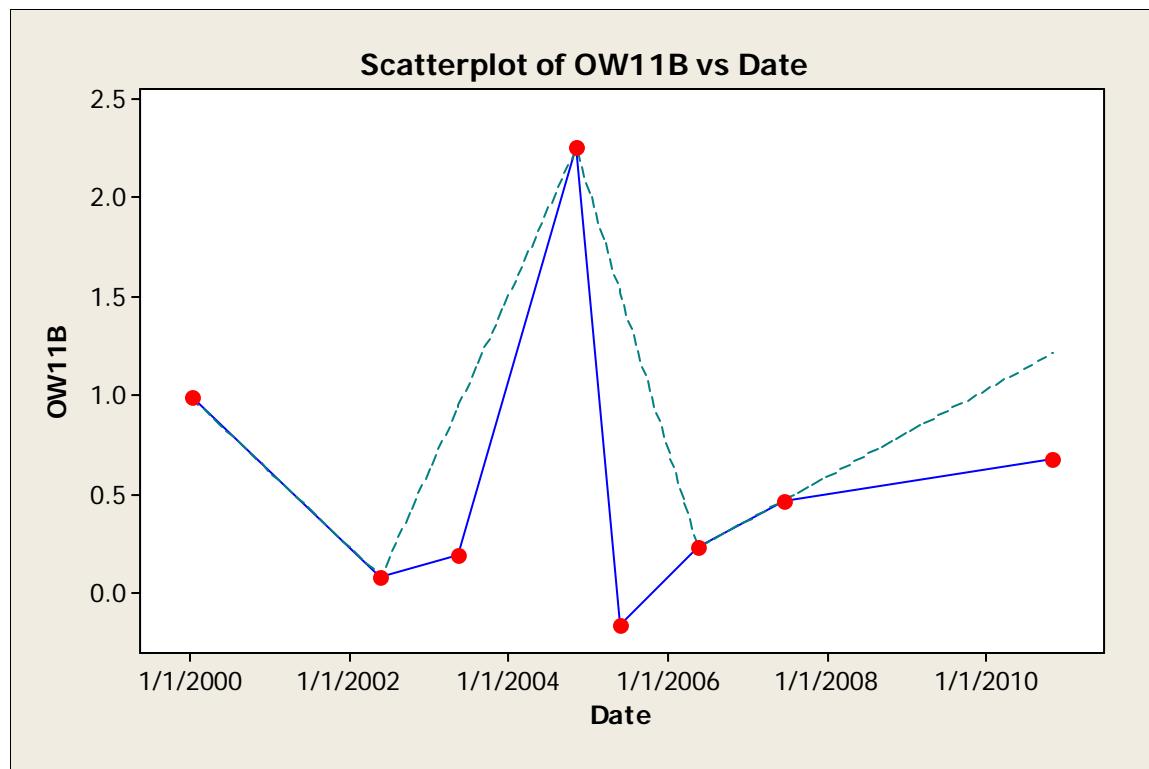
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.458179	0.0558514
SPEARMAN'S RHO	0.418389	0.0839992
KENDALL'S TAU_A	0.307190	0.0810059
KENDALL'S TAU_B	0.309217	0.0810059



CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.488908	0.054631
SPEARMAN'S RHO	0.364706	0.164868
KENDALL'S TAU_A	0.283333	0.137347
KENDALL'S TAU_B	0.283333	0.137347

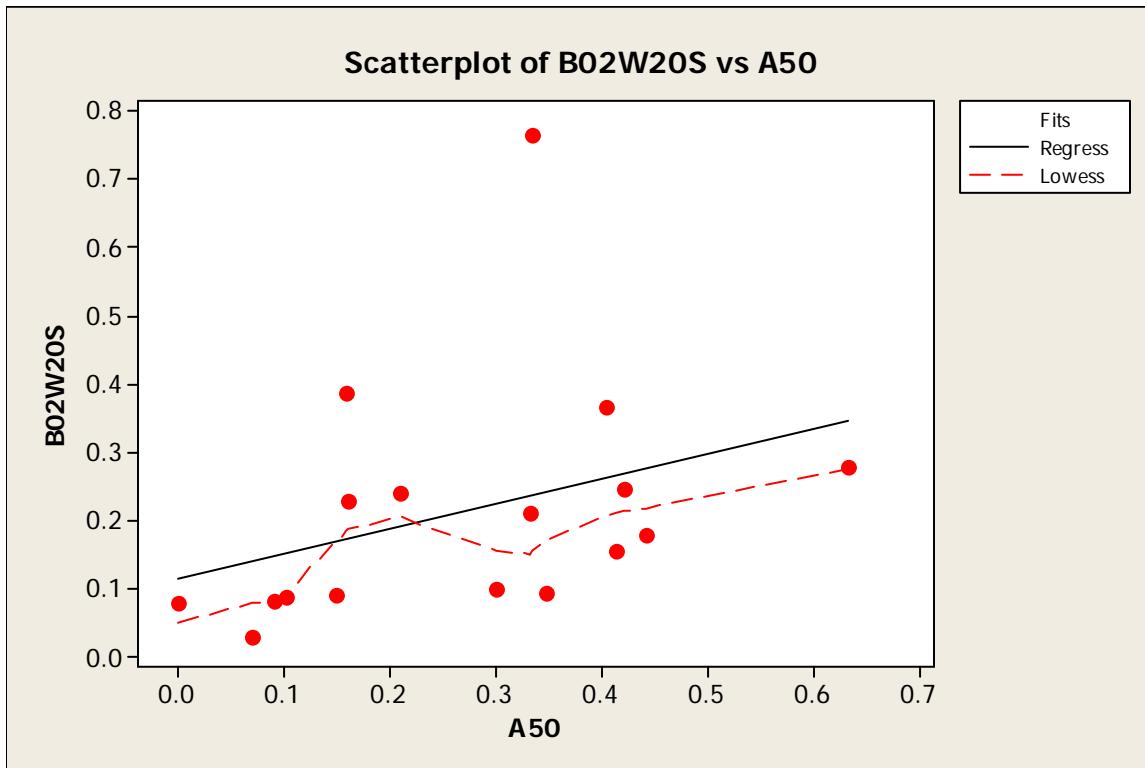


CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.498685	0.171779
SPEARMAN'S RHO	-0.400000	0.286105
KENDALL'S TAU_A	-0.277778	0.348083
KENDALL'S TAU_B	-0.277778	0.348083

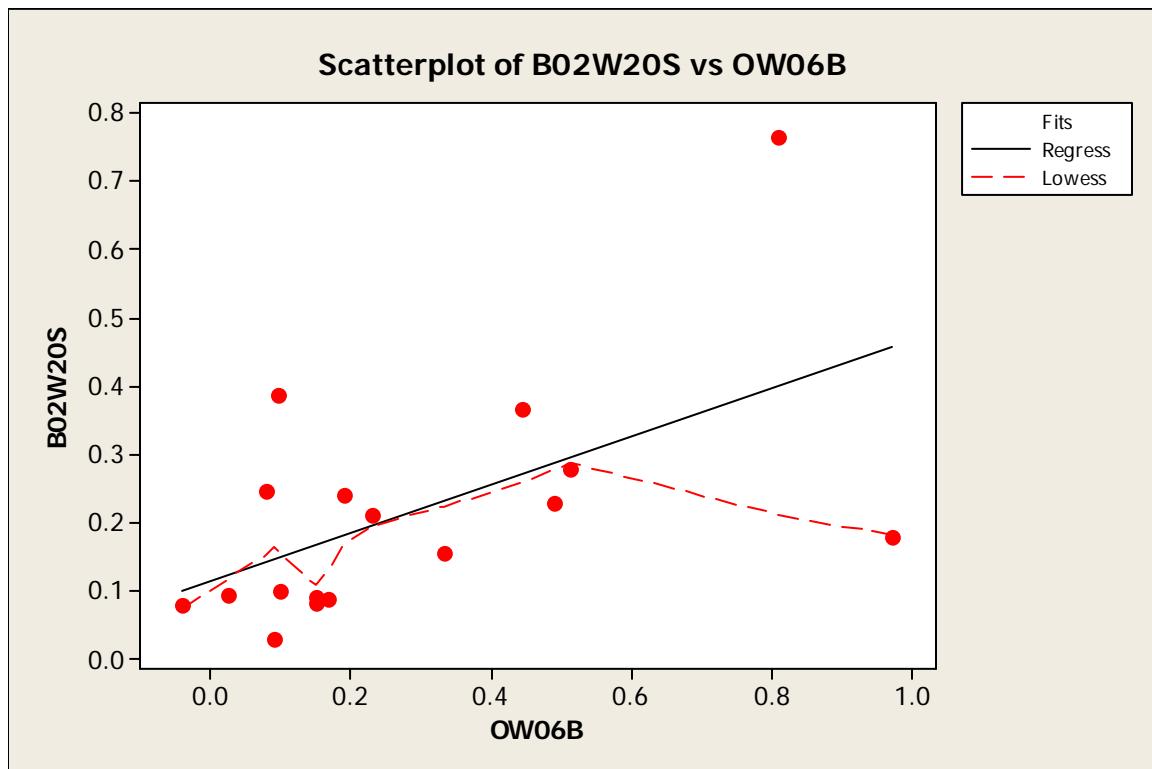


CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	-0.048813	0.908622
SPEARMAN'S RHO	0.047619	0.910849
KENDALL'S TAU_A	0.142857	0.710523
KENDALL'S TAU_B	0.142857	0.710523

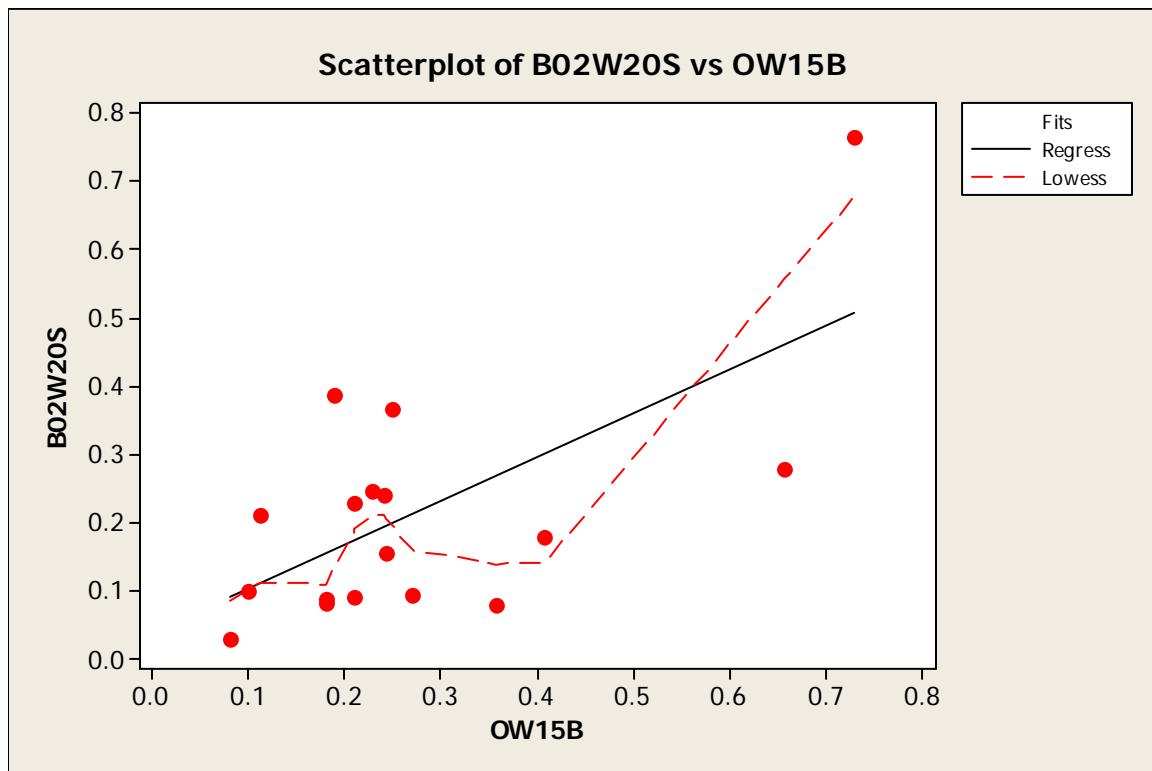
## Supplementary Evaluation of Correlations Between Select Wells



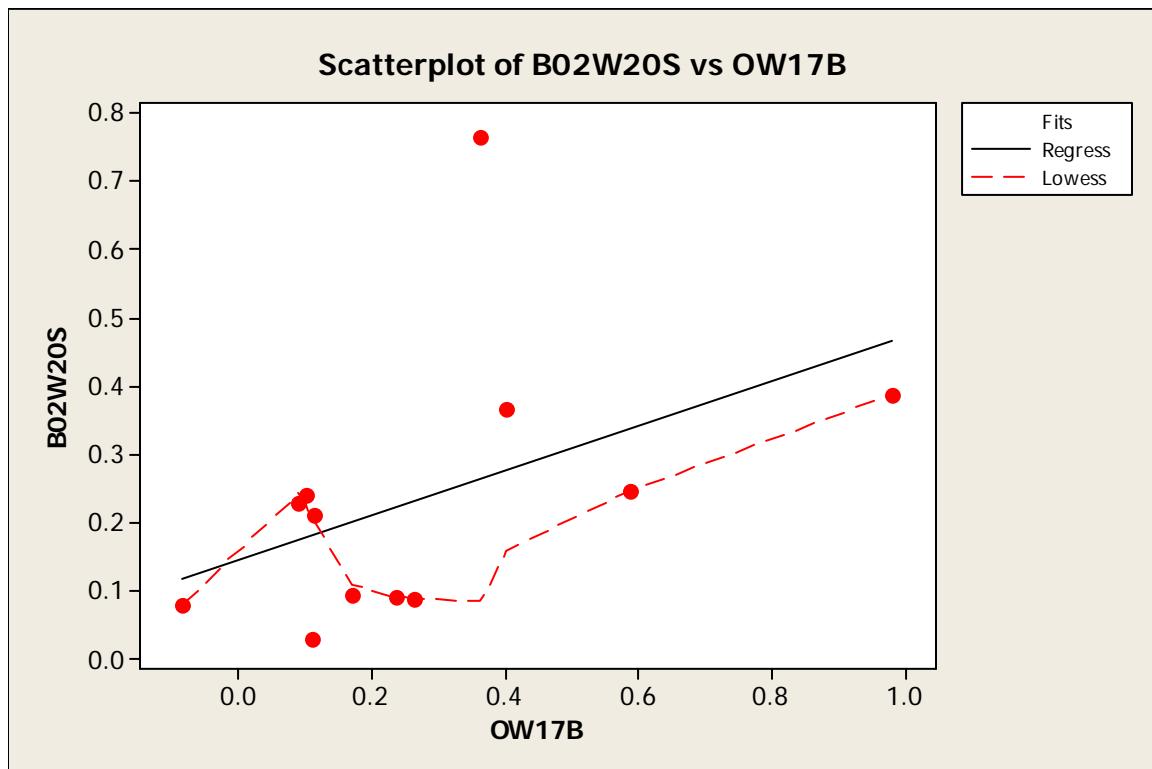
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.352773	0.164873
SPEARMAN'S RHO	0.617647	0.008242
KENDALL'S TAU_A	<b>0.470588</b>	<b>0.009455</b>
KENDALL'S TAU_B	0.470588	0.009455



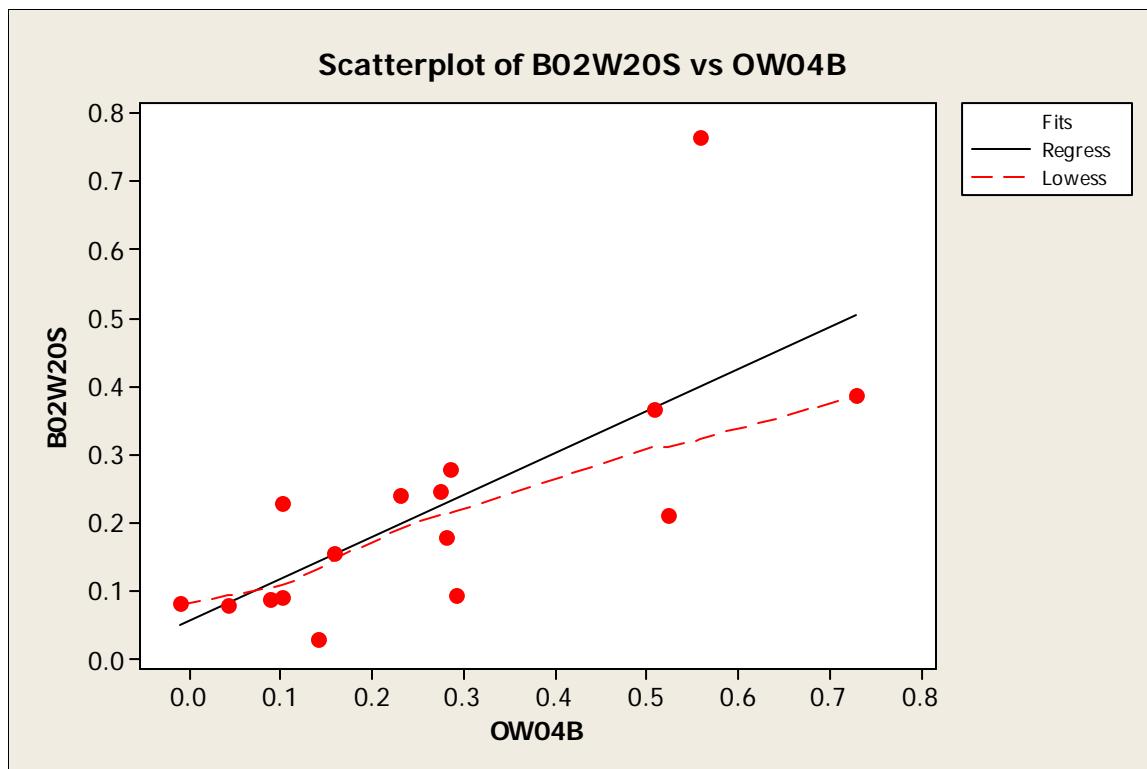
CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.562917	0.0186404
SPEARMAN'S RHO	0.510117	0.0364340
KENDALL'S TAU_A	<b>0.375000</b>	<b>0.0392667</b>
KENDALL'S TAU_B	0.376386	0.0392667



CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.651642	0.0045949
SPEARMAN'S RHO	0.428221	0.0863701
KENDALL'S TAU_A	<b>0.323529</b>	<b>0.0760142</b>
KENDALL'S TAU_B	0.325935	0.0760142



CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.460017	0.132390
SPEARMAN'S RHO	0.615385	0.033170
KENDALL'S TAU_A	0.363636	0.114757
KENDALL'S TAU_B	0.363636	0.114757



CORRTYPE	CORR_VAL	P_VALUE
PEARSON'S R	0.724395	0.00015050
SPEARMAN'S RHO	0.778514	0.0003814
KENDALL'S TAU_A	<b>0.625000</b>	<b>0.0008528</b>
KENDALL'S TAU_B	0.627621	0.0008528

	<b>B02W20S</b>	<b>A50</b>	<b>OW04B</b>	<b>OW06B</b>	<b>OW13B</b>	<b>OW15B</b>
A50	0.353 0.165					
<b>OW04B</b>	<b>0.724</b> <b>0.002</b>	0.399 0.126				
<b>OW06B</b>	<b>0.563</b> <b>0.019</b>	<b>0.522</b> <b>0.032</b>	0.282 0.273			
<b>OW13B</b>	<b>0.539</b> <b>0.087</b>	0.470 0.145	<b>0.625</b> <b>0.040</b>	0.233 0.490		
<b>OW15B</b>	<b>0.652</b> <b>0.005</b>	<b>0.410</b> <b>0.091</b>	0.226 0.399	<b>0.642</b> <b>0.005</b>	0.376 0.254	
<b>OW17B</b>	<b>0.460</b> <b>0.132</b>	0.178 0.562	0.255 0.379	0.069 0.823	0.602 0.152	0.037 0.904

Cell Contents: Pearson correlation  
P-Value

Wells B02W20S, A50, OW06, OW15B, OW17B, OW04B, OW13B and exhibit positive correlations with one another at the 90% level of confidence. It is noted that wells B02W20S, A50, OW06, OW15B, OW17B exhibit either increasing trends or possible increasing trends; wells OW04B and OW13B have positive correlation coefficients. This suggests that the concentration of Ra-226 is increasing with time overall.