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NIAGARA FALLS STORAGE SITE
Formerly Utilized Sites Remedial Action Program

2015
ENVIRONMENTAL SURVEILLANCE TECHNICAL MEMORANDUM

PREPARED BY:
U.S. ARMY CORPS OF ENGINEERS
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Acronyms and Abbreviations

AEC	Atomic Energy Commission
ASTM	American Society for Testing and Materials
CAP88-PC	Clean Air Act Assessment Package – 1988 (U.S. EPA)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Corps of Engineers	United States Army Corps of Engineers
DOD	Department of Defense
DOE	United States Department of Energy
DOH	Department of Health
EPA	United States Environmental Protection Agency
ESP	environmental surveillance program
FUSRAP	Formerly Utilized Sites Remedial Action Program
IWCS	interim waste containment structure
KAPL	Knolls Atomic Power Laboratory
LOOW	Lake Ontario Ordnance Works
MCL	maximum contaminant level
MDA	minimum detectable activity
MED	Manhattan Engineer District
MEI	maximally exposed off-site individual
m	meters
m^3	cubic meter(s)
µg/g	micrograms per gram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
NCRP	National Council on Radiation Protection and Measurements
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NFSS	Niagara Falls Storage Site
NTUs	nephelometric turbidity units
NRC	Nuclear Regulatory Commission
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
OSL	optically stimulated luminescence
OSLD	optically stimulated luminescence dosimeter
PAH	polycyclic aromatic hydrocarbon
pCi/g	picocuries per gram
pCi/L	picocuries per liter
Ra	radium
RCRA	Resource Conservation and Recovery Act
RSL	regional screening level
SCO	soil cleanup objective
SDWA	Safe Drinking Water Act
TDS	total dissolved solids
TED	total effective dose
U	lab qualifier–nondetect
U_3O_8	triuranium octoxide
USACE	United States Army Corps of Engineers
VOC	volatile organic compound

Units of Measurement and Conversion Factors–Radioactivity

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

Units of Measurement and Conversion Factors–Mass, Length, Area, and Volume

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

EXECUTIVE SUMMARY

Purpose: This technical memorandum documents the scientific methods, criteria, data, and findings of the Environmental Surveillance Program (ESP) at the Niagara Falls Storage Site (NFSS). The U.S. Army Corps of Engineers (Corps of Engineers) Buffalo District is executing this program in support of its mission under the Formerly Utilized Sites Remedial Action Program (FUSRAP) to protect human health and the environment at the NFSS. The Buffalo District publishes this technical memorandum annually and posts it to the Corps website in the "Environmental Monitoring" section: http://www.lrb.usace.army.mil/Missions/HTRW/FUSRAP/NiagaraFallsStorageSite.aspx.

Site Description and Background: The NFSS is located at 1397 Pletcher Road in the town of Lewiston, New York, 19 miles (30.6 km) north of Buffalo, New York. The NFSS is federally owned property that covers an area of 191 acres. 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) (a predecessor to the U.S. Department of Energy [DOE]) brought radioactive wastes and residues to a small portion of the LOOW. Throughout the 1970s, the AEC gradually consolidated its operations and sold excess property to the public. In the 1980s, the DOE constructed a ten-acre interim waste containment structure (IWCS) on the NFSS to contain the radioactive wastes and residues.

In October 1997, Congress transferred management of FUSRAP (which had been initiated in 1974) from the DOE to the Corps of Engineers. In addition to investigating and remediating site contaminants at the NFSS, the Corps of Engineers is responsible for maintaining the site and conducting the ESP. The environmental surveillance activities the DOE initiated in 1979 have since evolved; today the Corps of Engineers Buffalo District ensures that wastes buried within the IWCS and contaminated on-site soil and groundwater do not pose a risk to human health and the environment. The program includes monitoring air, water, and sediments for radiological and chemical parameters.

In December 2007 and April 2011, the Corps of Engineers completed the *Remedial Investigation Report for the NFSS* and *NFSS Remedial Investigation Report Addendum*, respectively (USACE 2007, USACE 2011). These defined the nature and extent of contaminants on the NFSS and assessed their potential long-term risks. Based on findings from these investigations and public input, the Corps of Engineers further enhanced the ESP.

Between 2012 and 2014, the Corps of Engineers investigated further to describe the soil contamination in detail and locate the source of elevated uranium in groundwater south and east of the IWCS. As part of these investigations, the Corps of Engineers worked to prevent possible off-site migration of contaminants through site utilities. The work included installing monitoring wells, collecting and analyzing soil and groundwater samples, sealing manholes and pipelines near the property boundary, excavating investigative trenches, and completing a geophysical survey. The Corps of Engineers presented results of these investigations in reports issued in August 2013 (U.S. Army Corps of Engineers [USACE], 2013a) and February 2015 (USACE 2015a).

In 2013, the Corps of Engineers implemented the following modifications to the ESP:

- The number of wells monitored semiannually increased from 39 to 54 (to include several wells installed in 2012); the analytical parameters were refined to include total uranium, radium-226, and volatile organic compounds (for a limited number of wells)
- The number of surface water and sediment locations sampled semiannually decreased from 11 to 9; the analytical parameters were refined to include total uranium, radium-226, polycyclic

aromatic hydrocarbons, and metals.

In 2014, the Corps of Engineers added well MW943 to the ESP, increasing the total number of wells monitored semiannually to 55. Well MW943 monitors the upper water-bearing zone south of the IWCS.

The Corps of Engineers made no changes to air monitoring and continues to measure radon-222 flux on the IWCS cap annually and radon-222 concentrations and gamma emissions at the IWCS perimeter and NFSS property boundary semiannually.

To evaluate environmental surveillance data, the Corps of Engineers uses the criteria, standards, and guidelines of the DOE, U.S. Environmental Protection Agency (EPA), Nuclear Regulatory Commission (NRC), and New York State Department of Environmental Conservation (NYSDEC) for comparison purposes.

Additional information about the site and the ESP is available on the Corps of Engineers Buffalo District website:
http://www.lrb.usace.army.mil/Missions/HTRW/FUSRAP/NiagaraFallsStorageSite.aspx.

Key Findings: The 2015 environmental surveillance analytical results confirm that site controls continue to perform as designed; they are fully protective of human health and the environment.

Results of the 2015 surveillance program are consistent with previous years and show:

- Site radon-222 concentrations are below the DOE off-site limit of 3.0 picocuries/liter (pCi/L); radon-222 flux measurements taken on the IWCS are less than the DOE flux standard of 20 $pCi/m^2/s$.
- The calculated dose to a receptor due to airborne particulates is below the EPA guideline of 10 millirem/year (excluding radon); the cumulative dose, which is calculated by adding the maximum external gamma dose to the maximum airborne particulate dose, is significantly less than the DOE limit of 100 millirem/year.
- Several metals in all sediment samples and several polycyclic aromatic hydrocarbons, predominantly in upstream sediment samples, exceed criteria.
- Trace levels of chlorinated solvents were detected in several groundwater monitoring wells in the former acidification area, and chloroform was above criteria in one groundwater monitoring well, also located in the former acidification area.
- Total uranium concentrations in all groundwater monitoring wells were consistent with historical data.

The 2015 groundwater analytical data show that total uranium concentrations in 24 groundwater monitoring wells exceed the drinking water criterion for uranium (30 µg/L). The most elevated total uranium concentrations were detected in wells installed east and south of the IWCS in late 2012 as part of the Balance of Plant field investigation: MW953 (4,523 µg/L), located east and across the Central Drainage Ditch from the IWCS and immediately east of well OW11B; MW951 (3,280 µg/L), located south of the IWCS and east of former Building 409, and MW957 (3,290 µg/L) located south of the IWCS.

The former storage piles and residual contamination in and around former Building 409 are the likely source of uranium in wells south of the IWCS. The Corps of Engineers believes the source of uranium in wells east of the IWCS is the residual soil contamination from former operations in this area; they include a railroad bed, storage piles, and a decontamination pad used during construction of the IWCS. In addition, residual contamination in the sanitary sewer near manhole 6, which was removed in 2013 as part

of field investigative activities, may have contributed to groundwater contamination in this area (USACE 2015a).

A trend analysis of total uranium in groundwater shows:

- No increasing or decreasing trends in 44 wells
- A decreasing trend in wells A42, A45, OW04B, OW06B, OW13B, OW18B, 302A, and MW935
- A possible increasing trend in well MW934; the available data for well MW934 is marginal for definitively determining a trend and as additional data are collected, the test's statistical power will increase

It's important to note that ESP groundwater sampling results are compared to federal and state drinking water standards as a conservative basis for evaluation. Groundwater resources underlying the NFSS reflect the U.S. Environmental Protection Agency (EPA) Class IIIB criteria for nonpotable and limited beneficial use water (EPA 1986). To be a potable water source, groundwater at the NFSS would require expensive and energy intensive treatment by reverse osmosis (desalination). Since there's a replaceable surface water source via the Niagara River/Lake Ontario and groundwater south of the site (Lockport Formation), it's reasonable to assume that no municipality or service would find NFSS groundwater economically viable.

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (Corps of Engineers) is addressing the Niagara Falls Storage Site (NFSS) as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP); this effort is subject to the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan. The site is located in the town of Lewiston, New York, north of Buffalo (Figure 1).

Figure 1: Location of Niagara Falls Storage Site

The Corps of Engineers Buffalo District conducts the Environmental Surveillance Program (ESP); it performs site operations, maintenance, and monitoring to ensure protection of human health and the environment. These activities are ongoing across the site, including at the interim waste containment structure (IWCS). The IWCS contains radiologically contaminated materials from cleanup actions the U.S. Department of Energy (DOE) conducted more than 20 years ago. The ESP is the focus of this report.

1.1 Brief History of the Niagara Falls Storage Site

The NFSS represents a portion of the former Lake Ontario Ordnance Works (LOOW). The LOOW was used by the Corps of Engineers Manhattan Engineer District (MED) and U.S. Atomic Energy Commission (AEC) to store radioactive residues and other materials beginning in 1944. Nearly all the radioactive residues in the IWCS originated from uranium (U) processing activities conducted for MED and AEC at two locations: the Linde Air Products facility in Tonawanda, New York, and the Mallinckrodt Chemical Works refinery in St. Louis, Missouri. Other residues were generated from past processing activities at the Middlesex Sampling Plant in New Jersey.

The first materials sent to NFSS for storage were low-grade radioactive residues from processing pitchblende ore at the Linde Air Products facility. These residues came about as a result of processing ores with different uranium (U_3O_8) contents; they are categorized as follows:

- R-10 residues: from processing ore with 3.5 percent U_3O_8
- L-30 residues: from processing ore with 10 percent U_3O_8
- L-50 residues: from processing ore with 7 percent U_3O_8
- F-32 residues: from processing ore (unknown percent U_3O_8)

Beginning in 1949, highly radioactive residues from uranium processing at the Mallinckrodt Chemical Works—referred to as the K-65 residues—were shipped to NFSS in 208-liter (L) (55-gallon [gal]) drums for storage. The residues were generated from uranium ore containing 35 to 65 percent U_3O_8. Between 1950 and 1952, the K-65 residues were transferred from the 208-L (55-gal) drums to a large concrete tower on site, referred to as Building 434. The residues remained there until the DOE transferred them to

the IWCS in the 1980s.

The K-65 residues represent the main hazard in the IWCS. Uncontained, the high levels of radium-226 (Ra-226) in these residues would emit substantial external gamma radiation and release radon-222 (Rn-222) gas to air. Without controls, the doses from external gamma irradiation and inhalation of Rn-222 progeny could harm anyone nearby.

In addition to these residues, radioactive wastes from a number of other Federal Government programs were sent to NFSS decades ago for storage or disposal. These included radioactive wastes from the Knolls Atomic Power Laboratory (KAPL) and the University of Rochester. The KAPL processing wastes contained some residual plutonium and fission product radioactivity (cesium-137 and strontium-90). These materials were transferred to the Oak Ridge Burial Grounds during the late 1950s; most of the buildings where they were stored were later destroyed (EA 1998).

Based on an investigation of the former storage sites, the DOE concluded that all suspect areas had been remediated for unrestricted use, and that "although minor KAPL residuals remain, particularly cesium-137, they are less than a risk-based screening benchmark. Therefore, they do not pose an unacceptable risk and do not require further remediation" (DOE 2012).

From 1981 to 1991, the DOE performed a number of cleanup activities at the site and nearby areas known as vicinity properties. The DOE placed the radioactive materials generated by these activities in an engineered structure on the west side of the NFSS property, the IWCS (Figure 2).

Within the IWCS, the DOE placed the more highly contaminated residues (K-65, L-30, L-50, and F-32) in existing concrete structures that had been part of the freshwater treatment plant for the LOOW during the 1940s. It placed L-50 residues in Buildings 413 and 414, cylindrical structures made of reinforced concrete. They had been used as clarifier tanks at the treatment plant. The DOE placed the remaining residues in several bays of Building 411, which was also made of reinforced concrete. It had originally been designed to securely hold liquids.

The DOE placed contaminated soil and debris from its cleanup of the site and vicinity properties together with the R-10 residues within the IWCS and then compacted them to increase stability. Soils contaminated by the K-65 residues during interim storage, referred to as tower soils, were placed in the north end of Building 411. The DOE addressed the R-10 residues in the same manner as contaminated soil due to their similar radionuclide concentrations. It put additional contaminated soil and debris in the remaining areas of the IWCS so as to ensure the stability of the structure.

The IWCS was constructed by installing a clay dike and cutoff wall around the areas containing all the consolidated wastes. The wall was tied into the underlying clay formation. A multi-layered cap was placed over the contents after the cleanup actions were completed. These DOE actions are described in further detail in the Remedial Investigation Report (U.S. Army Corps of Engineers [USACE] 2007) and the references cited therein.

In September 1986, the DOE issued a Record of Decision under the National Environmental Policy Act to store the consolidated residues and other contaminated materials in the IWCS. The Record of Decision identified the IWCS as an acceptable long-term management solution for the residues once the existing interim cap was replaced with a long-term, multi-layered, engineered cap. The design service life of the clay dike and cutoff walls surrounding the IWCS and the natural glaciolacustrine clay beneath the IWCS is 200 to 1,000 years. (BNI 1986); the design service life of the interim IWCS cap is 25 to 50 years (Bechtel National, Inc. [BNI] 1986).

In October 1997, Congress transferred overall responsibility for implementing FUSRAP from DOE to the Corps of Engineers and directed that FUSRAP remediation be done according to CERCLA. With this transfer, the Corps of Engineers assumed responsibility for the remedial action process at NFSS.

Since that time, the Corps of Engineers completed a number of studies of the NFSS, including the *Remedial Investigation Report for the Niagara Falls Storage Site* (USACE 2007), *NFSS Remedial Investigation Report Addendum* (USACE 2011), *Feasibility Study Report for the IWCS at the NFSS* (USACE 2015b), and the *Proposed Plan IWCS Operable Unit* (USACE 2015c).

1.2 Overview of Environmental Surveillance Program

The DOE initiated the ESP at the NFSS in 1979 before the construction of the IWCS, monitoring air, water, and external gamma radiation (and later streambed sediments) to ensure human health and environmental protection from radioactive residues and wastes later buried in the IWCS. In 1997, when responsibility for FUSRAP transferred to the Corps of Engineers, the Corps of Engineers Buffalo District continued to follow the DOE ESP, with some revisions over the years. The Corps of Engineers reports its findings annually in the form of this technical memorandum, which is posted to the NFSS website at http://www.lrb.usace.army.mil/Missions/HTRW/FUSRAP/NiagaraFallsStorageSite.aspx.

The surveillance program is designed to achieve the following objectives:

- Ensure protection of human health and the environment
- Verify compliance with environmental regulatory standards
- Verify the IWCS is performing as designed

To meet these objectives, the Corps of Engineers monitors environmental media and regularly reassesses the adequacy of the program. If warranted, the Corps of Engineers makes necessary adjustments to the program. It has made several modifications to the surveillance program over time. These changes are identified on Table 1. Tables 2 and 3 show the ESP sampling schedule for groundwater and surface water/sediment, respectively, implemented in 2013. Sample locations and analytical parameters and methods are detailed in Section 2.0.

In addition to collecting and analyzing environmental samples, the ESP calculates the dose to off-site receptors from airborne emissions of site soils. To do this, the Corps of Engineers uses annual weather data collected at the Niagara Falls International Airport by the National Weather Service. The dose to off-site receptors based on gamma radiation measurements is also calculated and added to the airborne emissions dose to determine the cumulative dose to the public from the NFSS.

1.3 Regional Hydrogeology

1.3.1 Groundwater

Within 50 feet of the ground surface, the NFSS and surrounding vicinity are underlain by two water-bearing zones; these are separated by an aquitard, or confining unit. The two water-bearing zones, the upper water-bearing zone and the lower water-bearing zone, are detailed below.

The upper water-bearing zone is present in the surficial Brown Clay Unit. This is situated above the Gray Clay Unit (Figure 3). The Brown Clay Unit consists of a clayey silt and silty clay groundmass. It has occasional sand and gravel lenses. Coarse-grained deposits appear in places along the undulating contact between the Brown Clay Unit and the Gray Clay Unit.

The Corps of Engineers conducted a geostatistical analysis of these coarse-grained lenses to assess their continuity or whether they act as preferential migration pathways for contamination. Lithologic information from boring logs was spatially analyzed using semivariogram calculations and models.

The results suggest the sand lenses in the upper water-bearing zone are intermittent and vertically and horizontally discontinuous, vary considerably in thickness, color, texture, extent, and saturation, and are not horizontally continuous over distances greater than 4.57 to 6.1 meters (15 to 20 feet) and vertical distances of 1.22 to 1.83 meters (4 to 6 feet). As a result, the occurrence of groundwater varies across the site (i.e., proximate wells may have noticeably different water levels depending on the presence or absence of sand lenses). Regional groundwater flow in the upper water-bearing zone is to the northwest towards Lake Ontario.

Underlying the Brown Clay Unit is the Gray Clay Unit, which consists of glacio-lacustrine clay and acts as an aquitard that separates the upper water-bearing zone from the lower water-bearing zone and minimizes transport between the two zones (Figure 3). For purposes of classification, wells that terminate in the Gray Clay Unit are considered representative of the upper water-bearing zone.

The lower water-bearing zone consists of unconsolidated glacial sediments (Alluvial Sand and Gravel that overlie the upper, fractured portion of the Queenston Formation (Figure 3). It extends from the bottom of the Gray Clay Unit to the bottom of the weathered zone of the Queenston Formation. A regional groundwater divide (the Lockport Escarpment) is approximately two miles south of the NFSS. Regional groundwater flow north of the divide is toward the northwest, whereas groundwater flow south of the divide is toward the southwest.

The entire zone varies from 3.05 to 11.73 meters (10 feet to 38.5 feet) in thickness; it consists of the stratified sands and gravels of the Alluvial Sand and Gravel Unit, the dense silt and sands of the Red Silt Unit, and the weathered and fractured upper portions of the Queenston Formation in the upper 3.05 meters (10 feet) of the bedrock. The lower water-bearing zone has higher permeability and more lateral continuity than the upper water-bearing zone. The lower water-bearing zone generally shows a westerly to northwesterly flow.

1.3.2 Surface Water Drainage

Before site development, surface drainage from the NFSS entered Four Mile, Six Mile, and Twelve Mile Creeks. All of these flow northward to Lake Ontario. During the 1940s, drainage modifications routed surface water to a series of linear ditches that eventually coalesce into the Central Drainage Ditch north of the site.

The Central Drainage Ditch enters into Four Mile Creek approximately 3 miles northwest of the NFSS. The vegetation that grows in the on-site ditches during the summer months dewaters the ditches via evapotranspiration between rainfall events.

Groundwater elevations in wells near the ditches are notably lower throughout the summer and early fall; this is due to higher localized evapotranspiration. In other words, wetland vegetation in and along the ditches creates a significant moisture deficit in the surrounding soils. Low baseflow conditions in the site ditches between rainfall events also indicate that groundwater doesn’t significantly discharge into the ditches (i.e., surface drainage is the main contributor to flow).

2.0 SAMPLE COLLECTION AND ANALYSIS

2.1 Sampling Locations and Rationale

The purpose of the ESP is to ensure the protection of human health and the environment by monitoring the IWCS and other site media for release of hazardous constituents.

To monitor the integrity of the IWCS, the Corps of Engineers collects:

- Annual radon-222 flux data via 180 radon flux canisters placed on the IWCS protective cap at discrete grid intersections and at three off-site (background) locations, as shown on Figure 4
- Semiannual groundwater samples from 45 monitoring wells, 14 wells screened in the lower water-bearing zone and 31 wells screened in the upper water-bearing zone, near the IWCS (two wells are sampled on a quarterly basis), as shown on Figure 5
- Semiannual radon and external gamma radiation samples by placing Radtrak® detectors and optically stimulated luminescence dosimeters (OSLDs), respectively, at seven locations around the perimeter of the IWCS, as shown on Figure 6

In addition, the Corps of Engineers collects:

- Semiannual groundwater samples from 11 monitoring wells, one well screened in the lower water-bearing zone and ten wells screened in the upper water-bearing zone, as shown on Figure 5 (note that well MW922 is sampled only if well MW921 is dry)
- Semiannual radon and external gamma radiation samples by placing Radtrak® detectors and OSLDs, respectively, at 16 locations within and around the perimeter of the site and at three off-site (background) locations, as shown on Figure 6
- Semiannual surface water and sediment sampling from a total of nine locations shown on Figure 7 along the West Drainage Ditch, Central Drainage Ditch, and east (upstream) of the Central Drainage Ditch (one location is sampled on a quarterly basis)
    - SWSD009, SWSD021, and SWSD023 were selected as “upstream” locations because they are located at the site boundary where surface water flows on to NFSS from off site.
    - SWSD010, SWSD011, SWSD022, and SWSD025 are situated along the Central Drainage Ditch.
    - WDD2 and WDD3 are located along the West Drainage Ditch.
- Quarterly water level measurements in over 100 monitoring wells throughout the site to monitor the groundwater flow directions in the upper and lower water-bearing zones

2.2 Sampling Parameters and Laboratory Analytical Methods

Environmental surveillance monitoring of air, water, and sediment includes the following analytes:

- The IWCS cap and off-site locations are monitored for radon-222 flux.
- The perimeter of the IWCS and the NFSS and off-site locations are monitored for radon concentrations and gamma emissions.
- Sediment is monitored for total uranium, radium-226, metals, and polycyclic aromatic hydrocarbons (PAHs).
- Surface water is monitored for total uranium, radium-226, metals, and PAHs; field measurements are recorded for dissolved oxygen, turbidity, pH, temperature, specific conductivity, and oxidation-reduction potential.
- Groundwater is monitored for total uranium, radium-226, volatile organic compounds (VOCs)

(limited to five wells), anions, and water quality parameters; field measurements are recorded for dissolved oxygen, turbidity, pH, temperature, specific conductivity, and oxidation-reduction potential.

The Corps of Engineers uses standard analytical methods approved and published by EPA and the American Society for Testing and Materials (ASTM) for chemical (i.e., all nonradiological) analyses. The laboratories conducting the radiological analyses adhere to EPA, National Urban Security Technology (formerly the Environmental Measurements Laboratory) and ASTM standard methods. Radiological and chemical laboratories are accredited through the Department of Defense (DOD) Environmental Laboratory Accredited Program. That accreditation is based on conformance to the DOD Quality Systems Manual for Environmental Laboratories. The laboratory analytical methods associated with sediment, surface water, and groundwater monitoring are presented in the following table:

Parameter	**Analytical Method**		
	Groundwater	**Surface Water**	**Sediment**
Volatile Organic Compounds	SW 846 8260 (select wells only)	---	---
Polycyclic Aromatic Hydrocarbons	---	SW 846 8270	SW 846 8270
Metals	---	SW 846 6020, 7470	SW 846 6020, 7470
Total Uranium	ASTM D5174.97, Trace Uranium by Pulsed Laser Phosphorimetry	ASTM D5174.97 Trace Uranium by Pulsed Laser Phosphorimetry	HASL-300m, Iso-uranium
Radium-226	EPA 903.1	EPA 903.1	EPA 901.1m
Anions •Chloride •Fluoride •Nitrate/Nitrite •Ortho-phosphate •Sulfate	EPA 300.0	EPA 300.0	---
Water Quality •Alkalinity •Total Dissolved Solids	SM-2320B SM-2540C	SM-2320B SM-2540C	---

--- Indicates that media is not analyzed for that parameter(s)

2.3 Sample Collection Techniques

All environmental surveillance activities at the NFSS are conducted in accordance with DOD Environmental Field Sampling Handbook (2013) and the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP). The UFP-QAPP provides procedures and guidance on implementing the national consensus standard (ANSI/ASQ E-4, *Quality Systems for Environmental Data and Technology Programs*) for the collection and use of environmental data at federal facilities.

2.3.1 Groundwater and Surface Water

The Corps of Engineers collects groundwater samples using low-flow sampling techniques in accordance with EPA's Ground Water Issue Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures (EPA/540/S-95/504). Existing polyethylene tubing is used for each well during each sampling event and is replaced when necessary. The Corps of Engineers also measures groundwater levels and uses sample collection techniques in accordance with the Corps of Engineers' Manual 1110-2-1421, *Groundwater Hydrology*.

The Corps of Engineers collects surface water samples by using a peristaltic pump. This type of pump is needed because of the shallowness of the designated ditch locations. New polyethylene tubing is carefully placed below the water line to minimize disturbance of organic materials and sediments in the ditch.

If turbidity measurements for any groundwater or surface water sample exceed 50 nephelometric turbidity units (NTUs), the Corps of Engineers field filters the sample via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold.

2.3.2 Sediment

The Corps of Engineers collects sediment using a stainless steel posthole digger. This digger works well in areas where there are excess fibrous materials and roots from phragmites. A sample consists of several grab samples (5 to 10 centimeters [2 to 4 inches] in depth) near the center of the ditch below the water line. The cores are placed in a stainless steel pan and are composited into sample containers.

2.3.3 Radon Flux

The Corps of Engineers measures radon flux at the NFSS once a year toward the end of summer. An effective means of trapping radon gas is activated charcoal. Metal canisters filled with activated charcoal and filter pads are placed on the ground in the morning and collected 24 hours later.

The activated charcoal in the canister adsorbs the radon gas emanating from the surface over which the canister is placed. The charcoal holds the radon, which subsequently decays until equilibrium between radon and its short-lived daughters is established (a minimum of 3 hours). The radon flux is calculated in the laboratory through gamma spectroscopy using the area of canister exposed to the radon flux and the time that exposure took place.

2.3.4 Radon Gas

The Corps of Engineers monitors radon gas concentrations using Landauer Radtrak® detectors placed around the IWCS and the NFSS. The Radtrak® detectors are placed on the fence at breathing height (1.7 meters [5.6 feet] above the ground) and replaced every six months.

The Radtrak® detector consists of a small piece of special plastic or film inside a small container. The film is a radiosensitive element that records alpha particle emissions (alpha tracks) from the natural radioactive decay of radon. Air diffuses through a filter covering a hole in the container; alpha particles from radon and its decay products strike the detector, causing alpha tracks on the film inside. At the end of the test, the container is sealed and returned to a laboratory for reading, i.e., the alpha tracks are counted using computer-assisted image analysis equipment. The number of alpha tracks along with the deployment time period provides the basis for calculating the average radon concentration.

2.3.5 Gamma Emissions

External gamma radiation is monitored at the NFSS by Landauer optically stimulated luminescent detectors (OSLDs) placed around the IWCS and the NFSS at the same locations as the Radtrak® detectors, at breathing height (1.7 meters [5.6 feet] above the ground). Two OSLDs are placed at each location for quality control. The OSLDs are also replaced every six months.

Optically-stimulated luminescence technology is the newest advancement in passive radiation protection dosimetry; it improves on the best features of traditional film and thermo-luminescent dosimeter (TLD) technologies. The specific OSLDs used at NFSS consist of specially formulated aluminum oxide crystalline detector material; this is configured into a thin strip sandwiched within a multi-element filter pack. The filter pack is heat sealed with a laminated, light-tight paper wrapper, creating an integrated, self-contained packet that is radio-frequency sealed inside a tamper-proof plastic blister pack to eliminate possible mishandling, light leaking, or lost detection elements.

Radiation exposure is measured at the laboratory by stimulating the aluminum oxide crystalline detector material with selected frequencies of laser light; this causes it to luminesce in proportion to the amount of radiation exposure.

3.0 REGULATORY GUIDELINES

The criteria in federal statutes and federal and state regulations and guidelines relevant to activities at NFSS are compared to ESP analytical data. However, the standards and criteria provided herein are for comparative purposes only; applicable or relevant and appropriate requirements and media-specific cleanup goals will be evaluated independently and presented in future CERCLA decision documents that will be available for public comment. Details are provided in the following sections.

3.1 Dose to the Public

The annual public dose limit from sources of radiation (excluding radon) is 100 millirem (mrem) above background. This standard is used by the U.S. Army, the DOE, and the Nuclear Regulatory Commission (NRC). This limit is stated in Army Pamphlet 385-24 entitled "The Army Radiation Safety Program," DOE Order 458.1 entitled "Radiation Protection of the Public and the Environment" (DOE 2011), and NRC 10 CFR Part 20 entitled "Standards for Protection Against Radiation."

Doses from sampled media and external gamma can be combined and compared to the public annual dose limit of 100 mrem. For purposes of this document, the maximum off-site dose to a receptor is calculated from the total of the external gamma dose and the internal dose from airborne materials.

3.2 Radioactive Constituents in Air

3.2.1 U.S. Department of Energy Order 458.1

The DOE limits for radon concentrations in air from operations at DOE-owned and -operated facilities are presented in DOE Order 458.1. Based on the radioactive constituents in the wastes contained in the IWCS, it's unlikely that radon-220 would be emitted from the IWCS. This is because the radon-220 half-life is approximately 55.6 seconds; this isotope would decay before it permeated the IWCS cap. It is possible, however, that radon-222 with a half-life of 3.8 days could be emitted. The DOE limit for an annual average radon-222 concentration at the site boundary, not including background, is 3.0 picocuries/liter (pCi/L). To provide a conservative basis for comparison, on-site radon concentrations are evaluated against the site boundary limit of 3.0 pCi/L.

3.2.2 U.S. Environmental Protection Agency Clean Air Act

The EPA guidance action level for radon concentrations in indoor air (homes and buildings) is 4.0 pCi/L. Although this limit is specific to indoor air, it is a conservative basis for comparing the outdoor air results of the environmental surveillance. To compare further, the average radon level in U.S. homes is about 1.25 pCi/L, and the average outdoor value is 0.4 pCi/L (National Council on Radiation Protection and Measurements [NCRP] 2009).

Section 112 of the Clean Air Act authorized the EPA to promulgate the National Emission Standards for Hazardous Air Pollutants (NESHAPs), which are provided in 40 Code of Federal Regulations (CFR) Part 61. The 40 CFR Part 61, Subparts H and Q, apply to the NFSS; they are summarized below:

- 40 CFR 61.92, Subpart H, National Emission Standards for Emissions of Radionuclides Other Than Radon from DOE Facilities: emissions of radionuclides to the ambient air from DOE facilities shall not exceed amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem.

- 40 CFR 61.192, Subpart Q, National Emission Standards for Radon Emissions from DOE

> Facilities: no source at a DOE facility shall emit into the air more than 20 picocuries per square meter per second (pCi/(meter^2-sec)) (1.9 pCi/(feet^2-sec)) of radon-222 as an average for the entire source.

At the NFSS, the Corps of Engineers complies with 40 CFR 61.92, Subpart H, by running the EPA-approved CAP88-PC air dispersion model with site-specific input values, such as average radionuclide concentrations in soil and average annual wind speed data. Compliance with 40 CFR 61.192, Subpart Q, is verified by annual monitoring of the IWCS cap for radon-222 flux.

3.3 Radioactive and Chemical Constituents in Groundwater

3.3.1 General Groundwater Quality

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

In 1988, the DOE conducted a well survey; it found eight wells within three miles (4.8 km) of the site. They are used mainly for irrigation; none are drinking water wells (DOE 1994).

In 2007, the Niagara County Department of Health (DOH) updated its well inventory to include nine potable wells (two were a sole source for drinking water), eight nonpotable wells, 20 abandoned wells, and 77 idle wells within the survey area. Based on the DOE report and the recent Niagara County DOH inventory, groundwater isn't the main source of drinking water; however, the New York State Department of Environmental Conservation (NYSDEC) Class GA groundwater standards are conservatively used to compare to ESP groundwater analytical results. Groundwater at the NFSS and surrounding area, in both the upper and lower water-bearing zones, consistently (and naturally) exceeds sodium and sulfate Class GA standards; it exhibits over 1,000 milligrams/Liter (mg/L) total dissolved solids and commonly over 250 mg/L of chloride. By definition, these levels indicate that the natural condition of groundwater in the NFSS area is saline and qualifies for the GSA groundwater classification (Title 6 New York Codes, Rules and Regulations (6 NYCRR) Part 701.16).

3.3.2 Federal Safe Drinking Water Act for Chemicals and Radionuclides

The Safe Drinking Water Act (SDWA) is the primary federal law that applies to operating a public water system and developing drinking water quality standards [*EPA Drinking Water Regulations and Health Advisories* (*EPA* 1996)]. The regulations in 40 CFR Part 141 (National Primary Drinking Water Regulations) set maximum permissible levels, known as maximum contaminant levels (MCLs), for organic, inorganic, radionuclide (including uranium and combined radium), and microbial contaminants in drinking water.

The established (promulgated) MCL for combined concentrations of radium-226 and radium-228 is 5 pCi/L. The MCL for total uranium is 30 micrograms per liter (µg/L).

3.3.3 New York State Department of Environmental Conservation Groundwater Criteria for Chemicals and Radionuclides

Aside from adopting the federal SDWA standards, the NYSDEC has promulgated its own standards; they are presented in 6 NYCRR Parts 700–705, "Water Quality Regulations for Surface and Groundwater" (NYSDEC 1996). The New York State (NYS) limit for radium-226 in groundwater is 3 pCi/L.

Also, the New York State DOH, per 10 NYCRR Part 5, Subpart 5-1, established an MCL of 30 µg/L for uranium in drinking water that applies to community water systems but doesn't apply to groundwater at the site. Since this limit is identical to the federal criteria, the analytical results discussed in Section 4.0 only reference NYS criteria.

3.4 Radioactive and Chemical Constituents in Sediment

Results of the ESP sediment analyses are compared to federal and state guidelines and standards and site-specific background screening levels. Details are provided in the following sections.

3.4.1 Nuclear Regulatory Commission Dose-Based Screening Levels for Radionuclides

Sediment analytical results for uranium-234, uranium-235, and uranium-238 are compared to surface soil screening levels (or dose-based screening levels) presented in NRC document NUREG-1757 (NRC 2006). This document provides guidance on compliance with radiological criteria for NRC license termination in accordance with 10 CFR 20, Subpart E. Based on these surface soil screening values, the radiological dose to a member of the public using the site for any purpose, including farming, is limited to 25 mrem/year. The use of these dose-based screening levels is more than protective to human health because actual exposures to sediment would be much lower than the conservative and chronic exposure assumed in developing these screening values. These screening values do not include background concentrations.

Sediment analytical results for radium-226 are compared to 5 pCi/g above background. The 5 pCi/g above background value is presented in 10 Code of Federal Regulations (CFR) Part 40, Appendix A, Criterion 6(6), which stipulates that:

> "The design requirements in this criterion for longevity and control of radon releases apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land, averaged over areas of 100 square meters (100 meters squared is equivalent to 1,076 feet squared), which, as a result of byproduct material, does not exceed the background level by more than: (i) 5 picocuries per gram (pCi/g) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15 centimeters (cm) below the surface…"

3.4.2 New York State Department of Environmental Conservation Unrestricted Use Recommended Soil Clean-up Objectives for Chemicals

New York State regulatory criteria found in 6 NYCRR Part 375, Unrestricted Use Soil Cleanup Objectives (SCOs), are compared to sediment analytical data for PAHs. When appropriate, Restricted Use (Residential or Industrial) SCOs are also cited for comparison to results. Unrestricted Use SCOs from 6NYCRR 375 for certain PAH constituents are based on a survey of soil background concentrations performed in New York State. It should be noted that sediment background concentrations would differ from soil background in many instances.

3.4.3 U.S. Environmental Protection Agency Regional Screening Levels and Niagara Falls Storage Site Background Criteria for Metals

For some of the more common metals, such as aluminum, calcium, and sodium, among others, there are no NYSDEC SCOs. Therefore, the analytical data for these metals are compared to EPA Regional Screening Levels (RSLs) for soil (June 2016) (residential receptor). In the event that an NFSS background screening level found in Table 13-1 of the *NFSS Remedial Investigation Report Addendum* (USACE 2011) is greater than its corresponding RSL, the background screening level is selected for comparison. As noted in Section 3.4.2, sediment background concentrations presented in the *NFSS Remedial Investigation Report* (USACE 2007) would differ from soil background in many instances.

3.5 Radioactive and Chemical Constituents in Surface Water

The results from surface water samples collected from site drainage ditches are compared to NYSDEC standards presented in 6 NYCRR Part 703, Surface Water and Groundwater Quality Standards for Class B water aquatic life. The NYSDEC Class B water classification is conservatively used because the on-site Central Drainage and West Drainage Ditches discharge into Four Mile Creek, which New York State classifies as a Class B or C water source, depending on its location. If a standard for Class B water isn't available in 6 NYCRR Part 703 for a specific parameter, the corresponding standard for groundwater or Class A water is used, as appropriate.

The NYSDEC standard (both groundwater and Class A drinking water) for radium-226 is 3 pCi/L. The NYSDOH drinking water standard for uranium is 30 µg/L.

Surface water collected in the drainage ditches at the site isn't a source of drinking water, so the ESP analytical results are conservatively compared to the NYS standards for radionuclides; they apply to public water systems that provide drinking water to communities and to standards for Class A surface water, which is also considered a source of drinking water.

4.0 ANALYTICAL DATA AND INTERPRETATION OF RESULTS

This section presents the 2015 ESP analytical results for groundwater, surface water, sediment, airborne particulate, radon, and gamma radiation. It's important to note that results for radioactive constituents may be expressed as negative numbers. Negative numbers can occur when the average background activity of the laboratory counting instrument exceeds the measured sample activity; background activity is subtracted from the measured sample activity to calculate the result. Also, when results fall below the laboratory's minimum detectable activity (MDA), they are interpreted as having unknown values between zero and the MDA; these are referred to herein as nondetects.

4.1 Air

To establish the annual dose to the public from radiological sources in air, the Corps of Engineers determines doses at specific off-site receptors by combining (1) the calculated external gamma radiation doses based on gamma radiation dose measurements taken at the NFSS perimeter and (2) modeled doses from airborne particulate releases using soil data from the Remedial Investigation and later field investigations and annual average wind speed.

4.1.1 External Gamma Radiation

OSLDs measure gamma radiation doses at the NFSS but these measurements also include natural sources of background radiation, such as cosmic radiation and terrestrial radiation.[1] To measure background gamma radiation near the NFSS, OSLDs are placed at several background locations including Lewiston Porter High School, Balmer Road, and the Lewiston Water Pollution Control Center. At the NFSS, the OSLDs are placed along the property boundary and perimeter of the IWCS. Two OSLDs are placed at each monitoring location as a quality control check and to provide data if an OSLD is lost or a result is rejected. The OSLDs are replaced semi-annually. During the second half of 2015, one badge from location 21 was damaged during analysis.

Following receipt of the laboratory analytical data, the Corps of Engineers calculates a time-weighted or normalized annual dose that accounts for exposure periods having different integration times (a different number of measurement days). Negative net values, when they occur, are retained for calculation purposes. The 2015 results, including both raw data and net data corrected for background, are presented in Table 4.

Net gamma radiation doses from the NFSS are used to estimate dose rates to the nearest residential and commercial/industrial worker receptors. The locations of these receptors are based on the results of a 2005 canvas of the site vicinity that remains valid today.

Calculating gamma radiation dose to an off-site receptor is a multi-step process. First, the average net dose at the nearest perimeter fence is determined. Using the net OSLD values in Table 4, the average gamma radiation dose at each perimeter fence is calculated. The results are shown in the following table.

[1] In the United States, the annual average per capita cosmic and terrestrial radiation doses are 34 millirem per year and 22 34 millirem per year, respectively (NCRP Report 160)

Direction	OSLD Locations	Calculated Average Net Dose Rate (mrem/year)[1]
Eastern Perimeter[2]	1,28,123	4.76
Western Perimeter[3]	8, 10, 11,13,15,29,36	3.30
Northern Perimeter	1, 11, 12, 60, 65, 122	0.42
Southern Perimeter	7, 28, 29, 45	4.12

[1]Net dose rates (corrected for background) for each perimeter are summed and divided by the total number of observations (e.g., 14 for the western perimeter). These values represent D_1 in the equation below.
[2]Perimeter closest to worker receptor
[3]Perimeter closest to residential receptor

Since the nearest resident is located to the west, the nearest perimeter fence is the western fence. Similarly, the nearest worker is located to the east, so the nearest perimeter fence is the eastern fence. The dose at each receptor location is calculated using 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
h_1 = the distance of the OSLDs from the source
h_2 = the distance of the resident from the fence line
L = half the length of line of OSLDs measuring the line source (western OSLD monitoring line, 843 meters (2,766 feet) long

Input parameters for each receptor are as follows:

Receptor	D_1 (mrem/year)	h_1 (feet)	h_2 (feet)	L (feet)
resident	3.30	3	500	1,383
worker	4.76	3	1,020	1,350

The results of the calculated annual dose for each receptor are:

- 0.015 mrem/year for the resident at 500 feet from the western fence
- 0.002 mrem for the off-site worker at 1,020 feet from the eastern fence

Trend graphs depicting external gamma dose rates at the NFSS and IWCS perimeters from 1998 thru 2015 are presented on Figures 8 and 9, respectively.

4.1.2 Airborne Particulate Dose

To determine the dose from airborne particulates potentially released from NFSS during 2015, the Corps of Engineers calculates airborne particulate release rates using site soil data (from the Remedial Investigation initiated in 1999 through field investigations conducted in 2014) and weather data collected at the Niagara Falls International Airport in 2015.

Contributions from radon gas, which isn't a particulate, aren't considered in this calculation. The total airborne particulate release rate is input into the EPA's CAP88-PC (Version 4.0) computer model to calculate:

- Doses from airborne particulates to individuals of several population age groups in the nearest residence, school, farm, and commercial/industrial facility, as measured from a central location on site; doses are then corrected for occupancy at an assumed rate, and the individual receiving the higher of these calculated doses is identified as the maximally exposed off-site individual (MEI) for airborne particulate dose
- Airborne particulate collective dose to the population within 50 miles (80 km) of the site using population data for the United States and Canada from Landscan 2013 Global Population Data from Oak Ridge National Laboratory (Figure 10)

The first calculation indicates that the annual airborne particulate dose to the MEI, a resident, 914 meters (2,999 feet) south-southwest of the site, in 2015, was 0.00014 mrem. Consistent with results from previous years, this value is well below the 10 mrem per year standard, individual dose, specified in 40 CFR, Part 61.92, Subpart H.

The second calculation indicates that the annual airborne particulate collective dose to the population within 80 km (50 miles) of the site in 2015 was 0.00302 person-rem. This compares to an annual background dose to the same population of 5,425,000 person-rem. Details of the calculations, including methodology, are presented in the Corps of Engineers' "FUSRAP CY2015 NESHAP Annual Report for Niagara Falls Storage Site (NFSS), Lewiston, New York" (USACE 2016).

4.1.3 Calculated Cumulative Dose

As a conservative measure, the cumulative dose to the MEI, which is calculated by adding the maximum airborne particulate dose to the maximum external gamma dose, is compared to the 100 mrem per year dose limit (excluding radon). Based on 2015 data, the cumulative dose is 0.01514 mrem (0.00014 mrem + 0.0150 mrem), which is significantly less than the DOE limit of 100 mrem per year (excluding radon) and the U.S. average per capita background dose of approximately 620 mrem per year (NCRP 2009). (Please note that the U.S. per capita dose from background radiation has been increased to 620 mrem/person due mainly to increased use of nuclear medical imaging.)

4.1.4 Radon Gas

Radon monitoring at NFSS is performed at a height that represents the human breathing zone (1.7 meters or 5.6 feet 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's unlikely that the IWCS would emit radon-220; however, it's possible that it would emit radon-222. The Corps of Engineers uses Radtrak® detectors to conduct air surveillance to determine the concentration of radon gas at NFSS. These Radtrak® detectors measure alpha particle emissions from both isotopes of radon (radon-220 and radon-222) and collect passive, integrated data throughout the period of exposure. Because radon-220 isn't 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 2015 are presented in Table 5. The corresponding surveillance locations are shown on Figure 6.

Consistent with results from previous years, all site radon-222 results from the 2015 ESP were well below the DOE off-site limit of 3.0 pCi/L above background. Results presented are without background subtracted and ranged from nondetect (less than 0.2 pCi/L) to 0.2 pCi/L. The results from the background locations were all nondetect (less than 0.2 pCi/L). Including nondetects, the site average and the background average are both 0.20 pCi/L, which is less than the average outdoor value of 0.4 pCi/L (EPA 1993).

4.1.5 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 15 meters (49.2 feet) on center across the surface of the IWCS for a 24-hour exposure period. Sample locations are shown on Figure 4.

Measured results in 2015 for radon flux, presented on Table 6, ranged from nondetect to 0.1226 pCi/m^2/s, with an average result (of detects and nondetects) of 0.0180 pCi/m^2/s. Average background flux rate was 0.0321 pCi/m^2/s. As in previous years, these results are well below the 20 pCi/m^2/s standard specified in 40 CFR Part 61, Subpart Q, comparable to background, and demonstrate the effectiveness of the IWCS containment to mitigate the release of radon-222.

4.2 Surface Water

In 2015, all surface water samples were collected semiannually (2nd and 4th quarters) from nine designated locations. Location SWSD025 also is sampled during 1st and 3rd quarters and during significant rain events. Sample locations are presented in Figure 7.

A summary of the surface water sample collection effort is as follows:

- 2nd quarter samples were collected on April 13 and April 15, 2015
- 4th quarter samples were collected on October 26 and October 28, 2015
- 1st and 3rd quarter samples were also collected from SWSD025 on February 11 and August 18, 2015, respectively; six additional sampling events occurred at SWSD025 between June and October 2015 during significant rain events
- Analytical parameters included radium-226, total uranium, PAHs, and metals (samples collected during significant rain events were analyzed for radium-226 and total uranium only)

All surface water samples are measured for turbidity prior to submission to the laboratory for analysis. If turbidity measurements are greater than 50 nephelometric turbidity units (NTUs), the sample is filtered, and both the filtered and unfiltered samples are submitted to the laboratory for analysis (applies to radionuclides and metals only). Otherwise, only an unfiltered sample is collected and analyzed.

Details of the findings are presented in the following sections.

4.2.1 Surface Water Field Measurements

Before sampling, the Corps of Engineers measures field parameters at each surface water sampling location using a calibrated water quality meter. Field parameters include temperature, pH, specific conductance, oxidation-reduction potential, turbidity, and dissolved oxygen. The results are summarized on Table 7.

4.2.2 Surface Water Radiological Findings

In general, the 2015 analytical results for radionuclides in surface water, which are presented on Table 8, were:

- Below NYS Class B surface water criteria (or if not available, Class A or drinking water criteria)
- Comparable to past results

Details are presented in the following sections.

Radium-226

Radium-226 was not detected in 18 of 30 surface water samples collected in 2015. Among the 12 detections, the concentrations were well below the state drinking water limit of 3 pCi/L, with concentrations ranging from 0.214 pCi/L to 1.57 pCi/L, collected at WDD3 and SWSD025, respectively.

Total Uranium

Uranium was detected in all 30 surface water samples collected in 2015. Concentrations ranged from 0.812 µg/L at WDD3 to 15.5 µg/L at SWSD025. No samples exhibited concentrations greater than the state drinking water limit of 30 µg/L.

4.2.3 Surface Water Chemical Findings

The 2015 analytical results for chemicals in surface water are presented on Tables 9 and 10 and are summarized below.

PAHs

No PAHs were detected in the surface water samples collected in 2015.

Metals

Several metals exceeded NYSDEC surface water criteria for aluminum, antimony, iron, magnesium, manganese, and sodium; however, the data was comparable to past results.

4.3 Sediment

In accordance with the 2015 analytical schedule, the Corps of Engineers collected sediment samples from eight locations in the 2nd and 4th quarters (i.e., semiannually) and one location (SWSD025) in all four quarters (i.e., quarterly). Sampling locations are presented on Figure 7.

A summary of the sediment sample collection effort for 2015 is as follows:

- 2nd quarter samples were collected on April 13, April 14, and April 15, 2015
- 4th quarter samples were collected on October 27, 2015
- Location SWSD025 was also sampled on February 11 and August 18, 2015 (1st and 3rd quarters)
- Analytical parameters include radionuclides (radium-226, uranium-234, uranium-235, and uranium-238), metals, and PAHs (1st and 3rd quarter samples from SWSD025 are analyzed for radionuclides only)

Details of the findings are presented in the following sections.

4.3.1 Sediment Radiological Findings

The 2015 analytical results for radionuclides in sediment are presented on Table 11. In general, the results were:

- Below criteria
- Comparable to past results

Radium-226

The 2015 analytical results for the 20 sediment samples collected and analyzed for radium-226 were below 5 pCi/g. They exhibited activity levels ranging from 0.83 pCi/g (SWSD023) to 2.59 pCi/g (SWSD025). These results are fairly consistent with historical data, as shown on the graph on Figure 11, which presents radium-226 concentrations in sediment between 1997 and 2015.

Uranium

The 2015 analytical results for uranium isotopes, uranium-234, uranium-235 and uranium-238, in sediment showed detections in the majority of samples collected. Among the detections, the isotopic activity levels ranged from 0.08 pCi/g to 3.48 pCi/g. All of the isotopic uranium data are well below their respective criteria and most are consistent with historical data. A graphical representation of the analytical data is shown on Figure 12.

4.3.2 Sediment Chemical Findings

The 2015 analytical results for chemicals in sediment are presented on Tables 12 and 13 and are summarized below.

Metals

Several metals, including copper, lead, manganese, mercury, nickel, selenium, and zinc, were detected in sediment at concentrations that exceed their respective NYS Unrestricted Use SCOs; however, all but manganese were below their respective NYS Residential Restricted Use SCOs. In addition, calcium, total chromium, magnesium, potassium, sodium, and thallium exceeded the greater value between the EPA RSL or NFSS Remedial Investigation background screening level. These values are used for comparison in the absence of NYS SCOs. The analytical data are shown on Table 12.

PAHs

Several PAHs were detected in the sediment samples collected in 2015; the highest concentrations were found at sampling point SWSD023, along the southern property boundary near a parking area owned by Modern Landfill, Inc. The analytical results for most of the detected PAHs are below their respective NYS Unrestricted Use SCOs, except for those in samples collected at SWSD023. The analytical findings for PAHs in sediment are shown on Table 13.

4.4 Groundwater

There are 55 monitoring wells in the groundwater monitoring program; they are sampled semiannually.

Two of these wells, OW04A and OW04B, are also sampled quarterly. Occasionally, additional wells are sampled if a well that is typically dry is found to have water. Sampling locations are presented on Figure 5. Water levels are measured on a quarterly basis in over 100 wells.

Highlights of the groundwater sample collection effort in 2015 are as follows:

- The semiannual sampling took place between April 13 and 16 (2nd quarter) and October 26 and November 4 (4th quarter); wells OW04A and OW04B were also sampled on February 11 and August 17, 2015;
- Groundwater samples were collected from 55 monitoring wells in the 2nd quarter event; well MW947 was dry; well MW921 replaced MW922, which was dry; and well MW423, which isn't part of the ESP, was sampled;
- Groundwater samples were collected from 54 monitoring wells in the 4th quarter event; wells MW946 and MW947 were dry and replaced by wells 808A and MW423, respectively, and wells MW944 and MW945 were dry and replaced by well MW922;
- Water level measurements were recorded from over 100 wells; and,
- Groundwater samples were analyzed for radium-226, total uranium, VOCs (six wells only), and water quality parameters (such as alkalinity and total dissolved solids).

For comparative purposes, the NYSDEC Class GA (groundwater, which is considered potable) water quality standards (hereafter referred to as NYSDEC drinking water standards) were used. It's noted that groundwater at the NFSS isn't a source of drinking water and is naturally a Class GSA saline water.

Details of the findings are presented in the following sections.

4.4.1 Groundwater Level Measurements

In 2015, the Corps of Engineers measured groundwater levels in 117 wells using an electronic depth-to-water meter. Potentiometric data were recorded from 75 wells in the upper water-bearing zone and 42 wells in the lower water-bearing zone (including six bedrock wells). Water level measurements are presented on Table 14. Figures 13 through 16 show the piezometric surfaces in the upper and lower units during seasonally high and low groundwater conditions.

The UWBZ exists in a fine-grained glacial till that was derived from ice advancement through a pro-glacial lake, where beach ridges were modified into discontinuous sand lenses within the clayey ground mass. The clayey sediments exhibit capillary characteristics that cause non-uniform saturation and desaturation of the UWBZ during seasonal periods. This variability (texture and saturation) can produce groundwater levels that are significantly different in proximal wells. Consequently, the UWBZ potentiometric surface maps represent generalized trends in groundwater elevations, especially in areas where well levels show local variability. The potentiometric contours heavily weigh elevation data that are hydraulically similar to proximal wells, whereas localized anomalous data are omitted in the contouring. For example, water levels in MW947 can be nearly 15 feet lower than nine nearby wells, so MW947 levels are omitted in the contouring. These omissions are not seasonally consistent and thus professional judgment, coupled with site knowledge, is used in the water-level contouring of the UWBZ. Site knowledge (or soft data) includes trends in ponded water, the presence of burial areas and utilities, vegetation coverage, and drainage characteristics that can affect the UWBZ hydrology.

The screened intervals for wells completed in the upper water-bearing zone range from 0.92 to 8.4 meters (3.02 to 27.6 feet) below ground surface; the screened intervals for wells completed in the lower water-bearing zone range from 6.8 to 31.9 meters (22.4 to 104.5 feet) below ground surface.

In the upper water-bearing zone, the depth to water ranged from 0.63 to 6.51 meters (2.06 to 21.35 feet) below ground surface during 2015. The quarterly water level fluctuations in the upper water-bearing zone averaged 0.65 meters (2.16 feet) and showed high and low elevations on April 13, 2015, and February 11, 2015, respectively.

In the lower groundwater system, the depth to water ranged from 0.33 to 3.99 meters (1.09 to 13.10 feet) below ground surface during 2015. Quarterly water level fluctuations in the lower groundwater system averaged 0.30 meters (0.99 feet) and showed high and low elevations also on February 11, 2015 and October 26, 2015, respectively. The lower groundwater system exhibits artesian conditions due to the overlying clay aquitard that confines the zone.

The high-water elevations in the upper system ranged from 91.84 to 97.16 meters (301.24 to 318.77 feet) above mean sea level, whereas the low-water condition ranged from 91.01 to 97.09 meters (298.88 to 318.53 feet). The high-water elevation in the lower system ranged from 93.86 to 96.58 meters (307.85 to 316.77 feet) above mean sea level, whereas the low-water condition ranged from 93.09 to 95.69 meters (305.40 to 313.86 feet).

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 glacio-lacustrine clay aquitard. The two water-bearing zones demonstrate hydraulic separation through independent water level responses seen in the data (i.e., the range and timing of fluctuations).

The high-stress (dry) summer conditions significantly lower water levels throughout the upper water-bearing zone, whereas the lower water-bearing zone is much less reactive to seasonal variations due to the aquitard. Vertical gradients calculated using water levels obtained from monitoring well pairs indicate vertical groundwater flow normally occurs from the upper zone to the lower zone (or downward) in the midwinter through early summer period, when evapotranspiration is less robust. From midsummer to late fall, when evapotranspiration is more robust, vertical gradients in 26 percent of the well pairs become upward due to water level declines in the upper water-bearing zone. This is most pronounced near the Central Drainage Ditch east of the IWCS; in other areas of the site, the downward gradient becomes weaker for that period. This seasonal saturation of the soils and vertical flow variation mitigates the potential transport of contaminants from the upper zone into the lower zone.

4.4.2 Groundwater Field Parameters

Before sampling, the Corps of Engineers measures field parameters at each well using a calibrated water quality meter. Field parameters include temperature, pH, specific conductance, oxidation-reduction potential, turbidity, and dissolved oxygen. The results are summarized on Table 15.

4.4.3 Groundwater Quality Parameters

At the NFSS, water quality in the upper water-bearing zone is indicative of low recharge to a hydraulically slow flow system; this produces poor-quality (near-saline) groundwater with 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’s likely that the lower groundwater system receives recharge along the base of the Niagara Escarpment, situated approximately 3.2 kilometers (2 miles) south of the site (DOE 1994) and, to a lesser extent, via downward flow from the upper unit during spring recharge. Table 16 presents water quality parameter data for 2015.

Analytical results for sulfate were consistently above the NYS Class GA groundwater quality standards, while chloride and fluoride exceeded the NYS standards in only a few samples.

Sampling of wells during the Remedial Investigation confirms 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 isn't used as a public drinking water supply; it's definable as a Class GSA water, although the comparison to the drinking water standards continues to be used as a conservative basis for evaluating the results of groundwater analysis.

4.4.4 Groundwater Radiological Findings

The 2015 analytical results for radium-226 and total uranium in groundwater are presented on Table 17 and discussed in detail below.

Radium

Radium-226 was not detected in 73 of the 113 samples collected in 2015. Among the 40 detections, radium-226 concentrations were below the NYS drinking water standard of 3 pCi/L; they ranged from 0.124 pCi/L to 0.788 pCi/L. The highest activity level was detected in well MW959, which is screened in the upper water-bearing zone and is situated south of the IWCS.

The range of radium-226 concentrations differentiated by upper and lower water-bearing zones over the last two years is presented in the following table:

Radium-226 Findings
2014 and 2015

Groundwater Zone Monitored	Concentration Range	
	2014	2015
Upper water-bearing zone	Nondetect—1.07 pCi/L	Nondetect—0.788 pCi/L
Lower water-bearing zone	Nondetect—1.73 pCi/L	Nondetect—0.705 pCi/L

Total Uranium

The 2015 groundwater analytical data showed that total uranium concentrations in 24 groundwater monitoring wells exceeded the uranium drinking water criterion (30 µg/L). The most elevated total uranium concentrations were detected in wells installed east and south of the IWCS in late 2012 as part of the Balance of Plant field investigation. The two wells with the highest total uranium concentrations are MW953 (4,523 µg/L), located east and across the Central Drainage Ditch from the IWCS and immediately east of well OW11B, and MW957 (3,290 µg/L), located south of the IWCS. As shown in the table below, analytical data from 2014 and 2015 are comparable.

Total Uranium Findings
2014 and 2015

Groundwater Zone Monitored	Concentration Range	
	2014	2015
Upper water-bearing zone	5.57—3,601 µg/L	5.69—4,523 µg/L
Lower water-bearing zone	0.076—9.58 µg/L	0.13—10.4 µg/L

The Corps of Engineers believes the source of uranium in wells east of and across the Central Drainage Ditch from the IWCS is residual soil contamination from former operations in this area; these included a railroad bed, storage piles, and a decontamination pad used during construction of the IWCS. In addition, residual contamination in the sanitary sewer near manhole 6, which was removed in 2013 as part of the field investigation, may have contributed to groundwater contamination in this area. The Corps of Engineers believes the source of the uranium in wells south of the IWCS is the former storage piles and possibly residual contamination in and around former Building 409. The latest analytical data, as well as historical data, for the wells in these areas are depicted on Figures 17 and 18. Figures 19 and 20 include analytical data for all wells in the upper water- and lower water-bearing zones, respectively.

As previously reported, declining to dynamic steady-state (i.e., annually fluctuating about a mean) uranium trends in wells surrounding the IWCS indicate attenuating legacy sources (i.e., surface stored wastes) that impacted soil and groundwater before and during IWCS construction. Analysis of trends for total uranium in groundwater is discussed in more detail in Section 4.6.6.

4.4.5 Groundwater Chemical Findings

Analysis of VOCs in groundwater is limited to the former Acidification Area in the north-central portion of the site; they're monitored by wells 411A, MW934, MW947, MW948, and MW949. These wells were selected to monitor potential migration of the chlorinated solvent (i.e., tetrachloroethylene (PCE) and its degradation products) plume. Although not part of the ESP, well MW423 was sampled as a substitute for well MW947, which had an insufficient volume of water to sample. Among the wells sampled, only MW949 monitors the lower water-bearing zone; all of the other wells monitor the upper water-bearing zone.

Results from the 2015 analysis were similar to previous years and showed trace levels of PCE and cis-1,2-dichloroethene in wells 411A and MW423. Additionally, several VOCs, primarily laboratory contaminants (e.g., acetone, methylene chloride, and chloroform), were detected in several wells at concentrations below state drinking water standards, with one exception: chloroform was found in well MW934 at a concentration of 9.6 µg/L, which exceeds the NYS drinking water standard of 7 µg/L. The analytical results are presented in Table 18.

Chloroform concentrations in well MW934 have fluctuated over the years (i.e., since 2009 when the well was installed), ranging from 3.61 µg/L (2009) to 1,400 µg/L (2012). Although chloroform can be a laboratory contaminant, laboratory contamination isn't likely the source of chloroform detected in well MW934 due to its persistence and sometimes elevated level. Chloroform can be a degradation product of carbon tetrachloride, a highly volatile solvent that doesn't easily bind to soil and may leach into groundwater; there it can hydrolyze into chloroform. However, carbon tetrachloride has not been detected in any soil or water samples collected at the site. Therefore, the source of chloroform in well MW934 remains unknown.

4.6.6 Groundwater Trend Analysis

Total uranium groundwater concentrations over the course of the Corps of Engineers ESP (1997 through 2015) were subjected to the Mann-Kendall test to determine if any surveillance well showed a statistically significant upward trend in concentration. The groundwater analytical data are presented in Tables 19 and 20.

The Mann-Kendall test, described in the Corps of Engineers' Manual *Environmental Quality–Environmental Statistics* (USACE 2013b), is an accepted method for identifying the presence of a significant upward trend at surveillance wells. This method assumes that no discernible linear trend exists in concentration data over time (null hypothesis).

To test this hypothesis, the Mann-Kendall "test statistic" is determined. The test statistic is a function of the sample data which quantifies the probability associated with the relative magnitudes of the sample data for a given sample size (n). The significance of this probability is determined by comparison to the critical value, a threshold value of statistical significance. The critical value was determined based on a 95 percent level of confidence associated with the standard normal distribution. If the test statistic exceeds the critical value, the null hypothesis is rejected, and the alternative hypothesis that concentrations are trending is accepted. For small sample sizes less than or equal to 10, a slightly different procedure was used in which the probability was calculated directly and compared to the selected level of significance (0.05 for a 95 percent level of confidence); in this case, the null hypothesis is rejected if the probability is less than the level of significance. Rejection of the null hypothesis is considered to be strong evidence of an upward trend; if the null hypothesis isn't rejected, there's insufficient evidence for identifying a significant, nonzero trend.

The results of the total uranium groundwater concentration trend evaluation (spring and fall data from 1997 to 2015) are presented in Attachment A and summarized in the following two tables: the first table presents wells with sample sizes greater than 10, and the second table presents wells with sample sizes less than or equal to 10.

As shown by the results in the tables, no increasing or decreasing trends in total uranium concentrations were identified in 44 of 53 wells analyzed for trending. A decreasing trend in total uranium concentrations was identified at wells A42, A45, OW04B, OW06B, OW13B, OW18B, 302A, and MW935; a possible increasing trend was identified at well MW934. The available sample size for wells MW934 and MW935 is marginal (n = 12) for definitively determining a 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.

WELLS WITH SAMPLE SIZES GREATER THAN 10

Well	Sample Size (n)	Test Statistic	Critical Value	Resulting Trend
OW03B	12	0.21	1.64	No trend
OW04B	***41***	***-1.98***	***-1.64***	***Decreasing***
OW05B	12	0.07	1.64	No trend
OW06B	***29***	***-4.22***	***-1.64***	***Decreasing***
OW07B	18	-0.30	-1.64	No trend
OW11B	25	0.07	1.64	No trend
OW12B	11	0.78	1.64	No trend
OW13B	***21***	***-2.02***	***-1.64***	***Decreasing***
OW15B	28	-1.30	-1.64	No trend
OW17B	27	-1.61	-1.64	No trend
OW18B	***17***	***-2.23***	***-1.64***	***Decreasing***
BH49	12	0.82	1.64	No trend
BH49A	17	0.45	1.64	No trend
A42	***27***	***-2.23***	***-1.64***	***Decreasing***
A45	***28***	***-2.55***	***-1.64***	***Decreasing***
A50	28	-0.30	-1.64	No trend
A55	12	0.89	1.64	No trend
505	16	0.86	1.64	No trend
302A	***26***	***-2.03***	***-1.64***	***Decreasing***
411A	13	0.55	1.64	No trend
OW03A	12	-1.30	-1.64	No trend
OW04A	28	0.24	1.64	No trend
OW05A	13	0.18	1.64	No trend
OW06A	13	-0.37	-1.64	No trend
OW07A	13	0.92	1.64	No trend
OW11A	12	0.41	1.64	No trend
OW12A	11	-0.62	-1.64	No trend
OW13A	13	1.17	1.64	No trend
OW15A	12	-0.21	-1.64	No trend
OW17A	12	0.21	1.64	No trend
MW862	13	1.16	1.64	No trend
MW863	13	-0.24	-1.64	No trend
MW934	***12***	***1.99***	***1.64***	***Possibly Increasing***
MW935	***12***	***-2.54***	***-1.64***	***Possibly Decreasing***

NOTE: If the absolute value of the Test Statistic exceeds that of the Critical Value, there is evidence of trending.

WELLS WITH SAMPLE SIZES LESS THAN OR EQUAL TO 10

Well	Sample Size (n)	Test Probability	Level of Significance	Resulting Trend
808A	5	0.592	0.05	No trend
A43	8	0.548	0.05	No trend
MW921	7	0.500	0.05	No trend
MW922	7	0.136	0.05	No trend
MW938	7	0.281	0.05	No trend
MW945	5	0.242	0.05	No trend
MW948	6	0.500	0.05	No trend

MW949	7	0.068	0.05	No trend
MW950	8	0.274	0.05	No trend
MW951	8	0.548	0.05	No trend
MW952	7	0.281	0.05	No trend
MW953	7	0.386	0.05	No trend
MW954	6	0.360	0.05	No trend
MW955	7	0.500	0.05	No trend
MW956	7	0.386	0.05	No trend
MW957	7	0.500	0.05	No trend
MW958	7	0.386	0.05	No trend
MW959	7	0.191	0.05	No trend
MW960	7	0.199	0.05	No trend

NOTE: If the Test Probability is less than the Level of Significance, there is evidence of trending.

Radium-226 concentrations (pCi/L) in groundwater were not evaluated for trending in this memorandum. Radium-226 groundwater concentrations over the course of the Corps of Engineers ESP (1997 through 2015) are predominantly less than the laboratory detection limit, precluding the accurate assessment of trends. The test loses significant statistical power if most of the data are censored.

5.0 CONCLUSION

The objective of the ESP is to monitor the air, groundwater, surface water, and sediment for the release of contaminants to ensure the protection of human health and the environment. To achieve this objective, the Corps of Engineers:

- Calculates the annual cumulative dose to the nearest receptor from NFSS sources based on (1) measured total external gamma radiation and (2) modeled airborne particulate dose using Remedial Investigation soil data and annual meteorological data
- Measures radon gas concentrations at several locations around the property boundary and radon flux on top of the IWCS
- Analyzes surface water and sediment samples for radionuclides, metals, and PAHs
- Analyzes groundwater samples for radionuclides (and VOCs in a limited area of the site)

The results of the 2015 ESP show that the IWCS is continuing to perform as designed and is fully protective of human health and the environment. The data indicate that most contaminant concentrations are below regulatory standards and criteria. Based on 2015 data, contaminants that exceed criteria (used for comparison purposes only) include:

- Metals at multiple locations and PAHs at one location in sediment
- Total uranium at multiple locations in groundwater
- VOCs at a few locations in groundwater

The 2015 groundwater analytical data show that total uranium concentrations in 24 groundwater monitoring wells exceed the drinking water standard. All 24 wells are screened in the upper water-bearing zone. Some of these wells are located along the northeastern, northern, and eastern boundaries of the NFSS, but the majority of the wells are located east and south of the IWCS. The two wells with the highest total uranium concentrations are MW953 (4,523 µg/L), located east and across the Central Drainage Ditch from the IWCS and immediately east of well OW11B, and MW957 (3,290 µg/L), located south of the IWCS.

The Corps of Engineers believes the source of uranium in wells east of the IWCS is residual soil contamination from former operations in this area, which included a railroad bed, storage piles, and a decontamination pad used during construction of the IWCS. In addition, residual contamination in the sanitary sewer near manhole 6, which has been removed and the sewer line plugged, may have contributed to groundwater contamination in this area. The Corps of Engineers believes the former storage piles and residual contamination from former Building 409 are the source of the uranium in wells south of the IWCS (USACE 2015a).

The results of the trend analysis for total uranium in groundwater showed no increasing or decreasing trends in total uranium concentrations in 44 of 53 wells analyzed for trending. A decreasing trend in total uranium concentrations was identified at wells A42, A45, OW04B, OW06B, OW13B, OW18B, 302A, and MW935; a possible increasing trend was identified at well MW934. The available sample size for wells MW934 and MW935 is marginal (n = 12) for definitively determining a 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.

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TABLES

Acronyms and Abbreviations (in Tables)

BKGD	background
CY	calendar year
DO	dissolved oxygen
DOE	Department of Energy
°F	degrees Fahrenheit.
IWCS	Interim Waste Containment Structure
J	data estimated
LWBZ	lower water bearing zone
MDA	method detection activity
MDL	method detection limit
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mrem	millirem
mrem/yr	millirem per year
mS/cm	milliSiemens per centimeter
mV	millivolts
NA	not applicable
NFSS	Niagara Falls Storage Site
NTU	nephelometric turbidity units
NYCRR	New York Codes, Rules, and Regulations
NYS	New York State
NYSDOH	New York State Department of Health
ORP	oxidation-reduction potential
OSL	optically stimulated luminescence
OSLD	optically stimulated luminescence dosimeter
pCi	picocurie
pCi/g	picocuries per gram
pCi/L	picocuries per liter
$pCi/m^2/s$	picocuries per meters-squared per second
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
R	data rejected
RI	remedial investigation
RSL	regional screening level
SDWA	Safe Drinking Water Act
Spec. Cond.	Specific conductance
TDS	total dissolved solids
TLD	thermo luminescent dosimeter
U	not detected
µg/kg	microgram per kilogram
UWBZ	upper water bearing zone
VOC	volatile organic compound
µg/L	micrograms per liter

Table 1: Evolution of NFSS Environmental Surveillance Plan

White background: annual sampling frequency
Blue background: quarterly measurement frequency
Yellow background: semi-annual sampling frequency

Parameter	1997	2000	2003	2008	2009	2010 (fall) (spring 2010 same as 2009)	2013 (fall) (spring same as 2010)
Radon Flux (Radon-222 emissions)	-----	180 monitoring locations	183 monitoring locations	183 monitoring locations	183 monitoring locations	183 monitoring locations	183 monitoring locations
OSLs (external gamma dose)	18 locations 1 duplicate location	20 locations 1 duplicate location	20 locations 1 duplicate location	20 locations 1 duplicate location	26 locations 1 duplicate location	26 locations 1 duplicate location	26 locations 1 duplicate location
Radon-222, -220	18 locations 1 duplicate location	20 locations 1 duplicate location	20 locations 1 duplicate location	20 locations 1 duplicate location	26 locations 1 duplicate location	26 locations 1 duplicate location	26 locations 1 duplicate location
Groundwater level measurements	66 wells	66 wells	91 wells	91 wells	91 wells	101 wells	101 wells
Groundwater Sampling	8 wells: BO2W20S, A45, A50, OW04B, OW06B, OW07B, OW15B, OW17B	8 wells (same)	8 wells (same)	18 wells: The 10 groundwater wells added to the ESP include: OW18B, 313, 505, 302A, A42, BH49A, OW04A, OW11B, 415A, and 201A NOTE: OW13B replaced OW07B in 2004	18 wells (same)	Spring 2010 - Same as 2009 Fall 2010 – 39 wells (wells OW04A/4B are sampled quarterly; all others are sampled semi-annually)	54 wells: (wells listed on Table 2)
	Field Parameters: Dissolved oxygen, redox potential, turbidity, temperature, specific conductivity, pH	Field Parameters: Same	Field Parameters: Same	Field Parameters: Same	Field Parameters: Same	Field Parameters: Same	Field Parameters: Same
	Water quality analytes: calcium, magnesium, potassium, sodium alkalinity, bicarbonate, carbonate, chloride, nitrate-nitrogen, nitrite-nitrogen, phosphate, sulfate, Total Dissolved Solids, sulfate	Water quality analytes: Same	Water quality analytes: Same	Water quality analytes: alkalinity(calcium carbonate) and total dissolved solids Anions: chloride, fluoride, nitrate, nitrite, ortho-phosphate, sulfate	Water quality analytes: Same Anions: Same	Water quality analytes: Same Anions: Same	Water quality analytes: Same Anions: Same
	Radionuclides: Total uranium, radium, thorium	Radionuclides: Same	Radionuclides: Same	Radionuclides: Same (except analysis for Iso Uranium only for wells OW18B, 313, 505, 302A, A42, BH49A, OW04A, OW11B, and 415A and no radionuclide analysis for well 201A) Also added thorium-228	Radionuclides: Same	Radionuclides: Iso-uranium, Iso-thorium, Radium-226, -228 Strontium-90, Technetium-99, Cesium-137, Iso-plutonium, Tritium	Radionuclides: Total Uranium Radium-226
	Metals: Copper, lead, vanadium	Metals: Same	Metals: Same	Metals: Target analyte list, boron, and lithium Volatile Organic Compounds (VOCs): Only wells 415A and 201A	Metals: Same VOCs: same	Metals: Same VOCs: Only wells 415A, 411A, 201A, MW934, MW948, MW949, MW950	Metals: Same VOCs: Same

Table 1 Continued: Evolution of NFSS Environmental Surveillance Plan

Parameter	1997	2000	2003	2008	2009	2010	2013
Surface water:	SWSD009, SWSD010, SWSD011, SWSD021, SWSD022	Same 5 locations	Same 5 locations	Same 5 locations plus 5 additional locations: SWSD023, SWSD024, WDD1, WDD2, WDD3,	Same 10 locations	Spring 2010 - Same 10 locations as 2009 Fall 2010: 11 locations (Added location SWSD025)	9 locations (removed SWSD024 and WDD1)
	Field Parameters: Dissolved oxygen, redox potential, turbidity, temperature, specific conductivity, pH	Field Parameters: Same	Field Parameters: Same	Field Parameters: Same	Field Parameters: Same	Field Parameters: Same	Field Parameters: Same
	Radionuclides: total uranium radium-226, -228 thorium-230, -232	Radionuclides: Uranium-234, -235, -238 radium-226, -228 thorium-230, -232	Radionuclides: Same	Radionuclides: Uranium-234, -235, -238 radium-226, -228 thorium-228 (new), -230, -232 Metals: TAL metals, lithium, boron Organics: Polychlorinated Biphenyls (PCBs), pesticides, VOCs, Polycyclic Aromatic Hydrocarbons (PAHs)	Radionuclides: Same Metals: same Organics: same	Radionuclides: Iso-uranium, Iso-thorium, Radium-226, -228 Strontium-90, Technetium-99, Cesium-137, Iso-plutonium, Tritium Metals: same Organics: same	Radionuclides: Total Uranium Radium-226 Metals: same Organics: PAHs only
Sediment:	SWSD011, SWSD021, SWSD010, SWSD022, SWSD009	Same 5 locations	Same 5 locations	Same 5 locations plus 5 additional locations: WDD1, WDD2, WDD3, SWSD023, SWSD024	Same 10 locations	Spring 2010 - Same as 2009 Fall 2010:	9 locations (removed SWSD024 and WDD1)
	Radionuclides: total uranium radium-226, -228 thorium-230, -232	Radionuclides: Uranium-234, -235, -238 radium-226, -228 thorium-230, -232	Radionuclides: Same	Radionuclides: Uranium-234, -235, -238 radium-226, -228 thorium-228 (new), -230, -232 Metals: TAL metals, lithium, boron Organics: PCBs, pesticides, VOCs, PAHs	Radionuclides: Same Metals: same Organics: same	Radionuclides: Iso-uranium, Iso-thorium, Radium-226, -228 Strontium-90, Technetium-99, Cesium-137, Iso-plutonium, Tritium Metals: same Organics: same	Radionuclides: Total Uranium Radium-226 Metals: same Organics: PAHs only

Table 2
2015 ESP
Groundwater Sampling
Niagara Falls Storage Site

Well Location	UWBZ or LWBZ Well	Purpose	*Laboratory Analytical Parameters						**Field Parameters
			Total Uranium	Radium -226	VOCs	Alkalinity	TDS	Anions	
A45	UWBZ	N (IWCS)	X	X		X	X	X	X
OW04A[1]	LWBZ	N (IWCS)	X	X		X	X	X	X
OW04B[1]	UWBZ	N (IWCS)	X	X		X	X	X	X
BH49A	UWBZ	N (IWCS)	X	X		X	X	X	X
BH49	LWBZ	N (IWCS)	X	X		X	X	X	X
OW05A	LWBZ	N (IWCS)	X	X		X	X	X	X
OW05B	UWBZ	N (IWCS)	X	X		X	X	X	X
A50	UWBZ	E (IWCS)	X	X		X	X	X	X
MW862	UWBZ	E (IWCS)	X	X		X	X	X	X
MW863	LWBZ	E (IWCS)	X	X		X	X	X	X
OW11A	LWBZ	E (IWCS)	X	X		X	X	X	X
OW11B	UWBZ	E (IWCS)	X	X		X	X	X	X
OW12A	LWBZ	E (IWCS)	X	X		X	X	X	X
OW12B	UWBZ	E (IWCS)	X	X		X	X	X	X
OW06A	LWBZ	S (IWCS)	X	X		X	X	X	X
OW06B	UWBZ	S (IWCS)	X	X		X	X	X	X
OW13A	LWBZ	S (IWCS)	X	X		X	X	X	X
OW13B	UWBZ	S (IWCS)	X	X		X	X	X	X
OW07A	LWBZ	S (IWCS)	X	X		X	X	X	X
OW07B	UWBZ	S (IWCS)	X	X		X	X	X	X
OW03A	LWBZ	W (IWCS)	X	X		X	X	X	X
OW03B	UWBZ	W (IWCS)	X	X		X	X	X	X
OW15A	LWBZ	W (IWCS)	X	X		X	X	X	X
OW15B	UWBZ	W (IWCS)	X	X		X	X	X	X
A42	UWBZ	W (IWCS)	X	X		X	X	X	X
OW17A	LWBZ	W (IWCS)	X	X		X	X	X	X
OW17B	UWBZ	W (IWCS)	X	X		X	X	X	X
OW18B	UWBZ	W (IWCS)	X	X		X	X	X	X
A55	LWBZ	W (IWCS)	X	X		X	X	X	X
A43	UWBZ	W (IWCS)	X	X		X	X	X	X
505	UWBZ	EU 1	X	X		X	X	X	X
MW934	UWBZ	EU 4	X	X	X	X	X	X	X
411A	UWBZ	EU 4	X	X	X	X	X	X	X
302A	UWBZ	EU 8	X	X		X	X	X	X
MW921 or MW922[2]	UWBZ	NW (off-site)	X	X		X	X	X	X
MW 935	UWBZ	NW (IWCS)	X	X		X	X	X	X
MW938	UWBZ	NW (IWCS)	X	X		X	X	X	X
MW-943	UWBZ	S (IWCS)	X	X		X	X	X	X
MW-944	UWBZ	EU 1	X	X		X	X	X	X
MW-945	UWBZ	EU 1	X	X		X	X	X	X
MW-946	UWBZ	EU 1	X	X		X	X	X	X
MW-947	UWBZ	EU 4	X	X	X	X	X	X	X
MW-948	UWBZ	EU 4	X	X	X	X	X	X	X
MW-949	LWBZ	EU 4	X	X	X	X	X	X	X
MW-950	UWBZ	S (IWCS)	X	X		X	X	X	X
MW-951	UWBZ	S (IWCS)	X	X		X	X	X	X
MW-952	UWBZ	E (IWCS)	X	X		X	X	X	X
MW-953	UWBZ	E (IWCS)	X	X		X	X	X	X
MW-954	UWBZ	E (IWCS)	X	X		X	X	X	X
MW-955	UWBZ	E (IWCS)	X	X		X	X	X	X
MW-956	UWBZ	S (IWCS)	X	X		X	X	X	X
MW-957	UWBZ	S (IWCS)	X	X		X	X	X	X
MW-958	UWBZ	S (IWCS)	X	X		X	X	X	X
MW-959	UWBZ	S (IWCS)	X	X		X	X	X	X
MW-960	UWBZ	S (IWCS)	X	X		X	X	X	X
Field Duplicate	-	-	X	X		X	X	X	X

***Laboratory Analytical Parameters**

VOC - Volatile Organic Compounds
TDS - Total Dissolved Solids
Anions: Chloride, Fluoride, Nitrate, Nitrite, Phosphate, 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 well (Spring 2013)
indicates not sampled

[1] These wells are sampled quarterly

[2] MW921 or MW922 is sampled based on availability of water within these wells

Table 3

2015 ESP
Surface Water and Sediment Sampling
Niagara Falls Storage Site

*Laboratory Analytical Parameters					**Field Parameters
Sample Location	**Total Uranium**	**Radium -226**	**Metals**	**PAHs**	
SWSD009	X	X	X	X	X
SWSD010	X	X	X	X	X
SWSD011	X	X	X	X	X
SWSD021	X	X	X	X	X
SWSD022	X	X	X	X	X
SWSD023	X	X	X	X	X
SWSD025[1]	X	X	X	X	X
WDD2	X	X	X	X	X
WDD3	X	X	X	X	X
Field Duplicate	X	X	X	X	X

***Laboratory Analytical Parameters:**
PAH - Polyaromatic Hydrocarbons
[1] Sampled quarterly

****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 4
2015 External Gamma Radiation Dose Rates
Niagara Falls Storage Site

Monitoring Location	Monitoring Station	Gross OSL[a] Data[b] (mrem) 12/23/2014 - 06/24/15[c]	Gross OSL[a] Data[b] (mrem) 06/24/2015 - 12/16/15[c]	Normalized Gross OSL Data[d] (mrem/yr)	CY2015 Net OSL[e] Data (mrem/yr)
NFSS Perimeter	1	11.0	15.0	26.5	1.2
	1	10.0	15.0	25.5	0.2
	7	12.0	17.0	29.6	4.2
	7	12.0	15.0	27.5	2.2
	11	6.0	10.0	16.3	-9.0
	11	6.0	9.0	15.3	-10.0
	12	12.0	16.0	28.5	3.2
	12	12.0	13.0	25.5	0.2
	13	10.0	19.0	29.6	4.2
	13	12.0	19.0	31.6	6.3
	15	13.0	19.0	32.6	7.3
	15	17.0	18.0	35.7	10.4
	28	13.0	18.0	31.6	6.3
	28	18.0	21.0	39.8	14.4
	29	14.0	15.0	29.6	4.2
	29	12.0	16.0	28.5	3.2
	32	10.0	15.0	25.5	0.2
	32	11.0	16.0	27.5	2.2
	36	16.0	20.0	36.7	11.4
	36	13.0	19.0	32.6	7.3
	45	11.0	13.0	24.5	-0.8
	45	12.0	12.0	24.5	-0.8
	50	14.0	20.0	34.7	9.3
	50	16.0	19.0	35.7	10.4
	55	11.0	16.0	27.5	2.2
	55	9.0	14.0	14.0	-11.3
	60	12.0	13.0	13.0	-12.3
	60	11.0	18.0	18.0	-7.3
	65	12.0	14.0	26.5	1.2
	65	13.0	16.0	29.6	4.2
	122	14.0	15.0	29.6	4.2
	122	14.0	16.0	30.6	5.3
	123	13.0	13.0	26.5	1.2
	123	13.0	17.0	30.6	5.3
IWCS Perimeter	8	10.0	16.0	26.5	1.2
	8	7.0	15.0	22.4	-2.9
	10	15.0	16.0	31.6	6.3
	10	13.0	18.0	31.6	6.3
	18	10.0	14.0	24.5	-0.8
	18	9.0	15.0	24.5	-0.8
	21	9.0	12.0	21.4	-3.9
	21*	10.0		10.2	-15.1
	23	10.0	13.0	23.4	-1.9
	23	11.0	12.0	23.4	-1.9
	24	13.0	15.0	28.5	3.2
	24	11.0	16.0	27.5	2.2
	40	10.0	14.0	24.5	-0.8
	40	9.0	10.0	19.4	-5.9
Background[f]	105	9.0	12.0	21.4	
	105	11.0	13.0	24.5	
	116	10.0	14.0	24.5	
	116	9.0	12.0	21.4	
	120	13.0	17.0	30.6	
	120	14.0	15.0	29.6	
Average Background		11.0	13.8	25.3	

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

* Dosimeter damaged during second half of 2015 monitoring period.

Table 5
2015 Radon Gas Concentrations[a]

Monitoring Location[b]	Station	Average Daily Concentration (pCi/L) 12/23/2014 - 06/24/15[c]			Average Daily Concentration (pCi/L) 6/24/15 - 12/16/15[c]		
NFSS Perimeter	1	< 0.2	±	0.03	0.2	±	0.02
	7	< 0.2	±	0.03	0.2	±	0.02
	11	< 0.2	±	0.03	0.2	±	0.02
	12	< 0.2	±	0.03	0.2	±	0.02
	12 (dup[d])	< 0.2	±	0.03	0.2	±	0.02
	13	< 0.2	±	0.03	0.2	±	0.02
	15	< 0.2	±	0.03	< 0.2	±	0.02
	28	< 0.2	±	0.03	< 0.2	±	0.02
	29	< 0.2	±	0.03	0.2	±	0.02
	36	< 0.2	±	0.03	< 0.2	±	0.02
	45	< 0.2	±	0.03	< 0.2	±	0.02
	50	< 0.2	±	0.03	< 0.2	±	0.02
	55	< 0.2	±	0.03	< 0.2	±	0.02
	60	< 0.2	±	0.03	< 0.2	±	0.02
	65	< 0.2	±	0.03	< 0.2	±	0.02
	122	< 0.2	±	0.03	< 0.2	±	0.02
	123	< 0.2	±	0.03	< 0.2	±	0.02
IWCS Perimeter	8	< 0.2	±	0.03	< 0.2	±	0.02
	10	< 0.2	±	0.03	< 0.2	±	0.02
	18	< 0.2	±	0.03	0.2	±	0.02
	21	< 0.2	±	0.03	< 0.2	±	0.02
	23	< 0.2	±	0.03	< 0.2	±	0.02
	24	< 0.2	±	0.03	< 0.2	±	0.02
	40	< 0.2	±	0.03	< 0.2	±	0.02
Background	105	< 0.2	±	0.03	< 0.2	±	0.02
	116	< 0.2	±	0.03	< 0.2	±	0.02
	120	< 0.2	±	0.03	< 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. Monitoring locations are shown on Figure 6.
c. Detectors were installed (start date) and removed (end date) on the dates listed.
d. 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.

Note: DOE off-site limit for radon-222 concentration is 3 pCi/L above background.
(<0.2) Indicates detection limit is reported. Actual result is less than this value.
1 pCi = 0.037 becquerel

Table 6
2015 Radon Flux Monitoring Results[a]
Niagara Falls Storage Site

NFSS Sample ID	Qualifier[d]	Radon-222 Flux (pCi/m²/s)			MDA	NFSS Sample ID	Qualifier[d]	Radon-222 Flux (pCi/m²/s)			MDA
1	U	0.0173	±	0.0056	0.0200	51	U	0.0337	±	0.0278	0.0423
2	U	0.0169	±	0.0129	0.0452	52	U	0.0029	±	0.0288	0.0765
3	U	-0.0185	±	0.0437	0.0790	53	U	0.0309	±	0.0296	0.0340
4		0.0317	±	0.0067	0.0096	54	U	0.0088	±	0.0205	0.0647
5		0.0642	±	0.0109	0.0261	55	U	0.0082	±	0.0178	0.0449
6		0.0322	±	0.0079	0.0110	56	U	0.0128	±	0.0171	0.0427
7	U	0.0197	±	0.0520	0.0981	57	U	0.0352	±	0.0409	0.0768
8		0.0393	±	0.0076	0.0181	58	U	0.0116	±	0.0178	0.0400
9	U	0.0132	±	0.0153	0.0396	59	U	0.0169	±	0.0079	0.0266
10	J	0.0324	±	0.0077	0.0108	60	U	0.0000	±	0.0489	0.0428
10-DUP[b]	U	0.0153	±	0.0279	0.0504	60-DUP[b]	U	-0.0165	±	0.0352	0.0875
11	U	0.0425	±	0.0420	0.0851	61	U	-0.0021	±	0.0101	0.0310
12		0.0605	±	0.0114	0.0359	62		0.0410	±	0.0082	0.0160
13		0.0436	±	0.0270	0.0319	63		0.0507	±	0.0341	0.0370
14	U	0.0062	±	0.0440	0.0846	64	U	0.0193	±	0.0456	0.0877
15		0.0262	±	0.0072	0.0156	65	U	0.0102	±	0.0137	0.0366
16	U	0.0262	±	0.0107	0.0456	66	U	-0.0063	±	0.0139	0.0391
17	U	0.0182	±	0.0230	0.0459	67	U	0.0000	±	0.0351	0.0698
18	U	0.0184	±	0.0270	0.0329	68	U	0.0136	±	0.0159	0.0395
19	U	0.0186	±	0.0845	0.0390	69	U	0.0017	±	0.0158	0.0398
20	U	0.0169	±	0.0215	0.0331	70	U	0.0144	±	0.0311	0.0493
20-DUP[b]	U	0.0041	±	0.0090	0.0304	70-DUP[b]	U	0.0140	±	0.0220	0.0425
21		0.0341	±	0.0088	0.0157	71	U	0.0312	±	0.0499	0.0927
22	U	0.0152	±	0.0236	0.0439	72		0.0454	±	0.0105	0.0100
23	U	0.0200	±	0.0190	0.0469	73	U	0.0176	±	0.0067	0.0236
24	U	0.0069	±	0.0167	0.0323	74	U	0.0000	±	0.0360	0.0237
25		0.0270	±	0.0080	0.0205	75	U	0.0062	±	0.0178	0.0448
26	U	0.0228	±	0.0290	0.0391	76	U	0.0278	±	0.0286	0.0506
27		0.0250	±	0.0064	0.0158	77	U	0.0136	±	0.0220	0.0472
28	U	0.0207	±	0.0255	0.0503	78	U	0.0000	±	0.0503	0.0771
29		0.0329	±	0.0074	0.0158	79	U	-0.0043	±	0.0160	0.0413
30	U	0.0166	±	0.0193	0.0364	80	J	0.0484	±	0.0097	0.0210
30-DUP[b]	U	0.0296	±	0.0290	0.0417	80-DUP[b]	U	0.0086	±	0.0160	0.0412
31	U	0.0261	±	0.0280	0.0296	81	U	0.0029	±	0.0579	0.1143
32		0.0221	±	0.0054	0.0108	82	U	0.0312	±	0.0242	0.0383
33	U	0.0104	±	0.0194	0.0501	83		0.0344	±	0.0083	0.0124
34	U	0.0277	±	0.0472	0.0325	84	U	0.0445	±	0.0460	0.0890
35	U	0.0126	±	0.0169	0.0394	85		0.0231	±	0.0058	0.0097
36	U	0.0115	±	0.0260	0.0415	86	U	0.0172	±	0.0240	0.0358
37	U	0.0133	±	0.0217	0.0335	87	U	0.0171	±	0.0199	0.0475
38	U	0.0302	±	0.0235	0.0372	88	U	0.0111	±	0.0412	0.0936
39	U	0.0125	±	0.0168	0.0393	89	U	-0.0069	±	0.0196	0.0434
40	U	0.0178	±	0.0067	0.0229	90	U	0.0124	±	0.0179	0.0423
40-DUP[b]	U	0.0161	±	0.0207	0.0373	90-DUP[b]	U	0.0000	±	0.0227	0.0511
41	U	-0.0021	±	0.0169	0.0395	91	U	0.0385	±	0.0299	0.0477
42	U	0.0151	±	0.0191	0.0393	92	U	0.0177	±	0.0291	0.0822
43		0.0284	±	0.0081	0.0113	93	U	0.0172	±	0.0179	0.0452
44	U	0.0286	±	0.0271	0.0413	94	U	0.0107	±	0.0244	0.0498
45	U	0.0188	±	0.0276	0.0444	95	U	0.0000	±	0.0358	0.0889
46	U	0.0043	±	0.0284	0.0619	96		0.0282	±	0.0066	0.0189
47	U	0.0111	±	0.0175	0.0373	97	U	0.0104	±	0.0139	0.0334
48	U	-0.0063	±	0.0098	0.0308	98	U	-0.0129	±	0.0100	0.0316
49	U	0.0087	±	0.0404	0.0817	99	U	0.0453	±	0.0587	0.0640
50	U	-0.0017	±	0.0081	0.0232	100	U	-0.0009	±	0.0160	0.0417
50-DUP[b]	U	0.0051	±	0.0176	0.0299	100-DUP[b]	U	0.0145	±	0.0198	0.0437

Table 6 (cont.)

2015 Radon Flux Monitoring Results[a]

Niagara Falls Storage Site

NFSS Sample ID	Qualifier[d]	Radon-222 Flux (pCi/m²/s)			MDA
101	U	0.0064	±	0.0141	0.0398
102	U	-0.0030	±	0.0207	0.0655
103	U	0.0052	±	0.0180	0.0453
104	U	0.0138	±	0.0224	0.0431
105	U	0.0223	±	0.0414	0.0837
106		0.0327	±	0.0075	0.0190
107	U	-0.0035	±	0.0181	0.0385
108	U	-0.0119	±	0.0142	0.0402
109	U	-0.0084	±	0.0467	0.0719
110	U	0.0061	±	0.0162	0.0342
110-DUP[b]	U	0.0057	±	0.0162	0.0419
111	U	0.0052	±	0.0195	0.0407
112	U	0.0050	±	0.0174	0.0346
113	U	-0.0119	±	0.0360	0.0839
114		0.0400	±	0.0314	0.0337
115	U	0.0087	±	0.0143	0.0402
116	U	0.0010	±	0.0362	0.0949
117	U	0.0262	±	0.0270	0.0364
118	U	0.0173	±	0.0202	0.0348
119	U	0.0045	±	0.0295	0.0833
120	U	0.0139	±	0.0162	0.0225
120-DUP[b]	U	0.0194	±	0.0215	0.0384
121	U	0.0275	±	0.0466	0.0783
122	U	0.0152	±	0.0267	0.0482
123	U	0.0000	±	0.0368	0.0243
124	U	0.0115	±	0.0182	0.0457
125	U	0.0174	±	0.0202	0.0409
126	U	0.0360	±	0.0553	0.0900
127	U	0.0053	±	0.0182	0.0406
128	U	0.0230	±	0.0267	0.0410
129		0.0222	±	0.0057	0.0098
130	U	0.0348	±	0.0286	0.0436
130-DUP[b]	U	0.0131	±	0.0175	0.0437
131	U	0.0146	±	0.0146	0.0388
132	U	0.0212	±	0.0201	0.0498
133	U	0.0220	±	0.0228	0.0441
134		0.0265	±	0.0068	0.0099
135	U	0.0022	±	0.0205	0.0119
136	U	0.0190	±	0.0259	0.0344
137	U	0.0131	±	0.0176	0.0469
138		0.0351	±	0.0078	0.0103
139	U	0.0022	±	0.0203	0.0383
140		0.0180	±	0.0055	0.0098
140-DUP[b]	U	0.0211	±	0.0200	0.0443
141	U	0.0184	±	0.0061	0.0233
142		0.0218	±	0.0074	0.0194
143	U	-0.0077	±	0.0142	0.0380
144	U	0.0054	±	0.0187	0.0362
145	U	0.0271	±	0.0090	0.0297
146	U	0.0158	±	0.0243	0.0461
147	U	0.0110	±	0.0227	0.0461
148	U	0.0081	±	0.0526	0.0809
149	U	0.0178	±	0.0261	0.0479
150	U	0.0048	±	0.0242	0.0410
150-DUP[b]		0.0245	±	0.0075	0.0186

NFSS Sample ID	Qualifier[d]	Radon-222 Flux (pCi/m²/s)			MDA
151	U	0.0277	±	0.0102	0.0364
152	U	0.0535	±	0.0623	0.0727
153	U	0.0197	±	0.0205	0.0329
154	U	0.0147	±	0.0255	0.0519
155	U	0.0295	±	0.0471	0.1216
156		0.0414	±	0.0110	0.0216
157	U	0.0184	±	0.0225	0.0438
158	U	0.0395	±	0.0325	0.0575
159	U	-0.0034	±	0.0474	0.1020
160	U	0.0280	±	0.0261	0.0517
160-DUP[b]	U	0.0205	±	0.0073	0.0217
161	U	-0.0025	±	0.0198	0.0528
162	U	0.0621	±	0.0254	0.1035
163	U	0.0338	±	0.0320	0.0465
164	U	0.0000	±	0.0230	0.0432
165	U	-0.0238	±	0.0238	0.0752
166	U	0.0222	±	0.0082	0.0275
167		0.0452	±	0.0108	0.0129
168	U	0.0147	±	0.0197	0.0393
169	U	0.0000	±	0.0236	0.0747
170	U	0.0307	±	0.0089	0.0356
170-DUP[b]		0.0331	±	0.0098	0.0217
171	U	0.0172	±	0.0226	0.0463
172	U	-0.0049	±	0.0280	0.0573
173	U	-0.0014	±	0.0531	0.1185
174		0.0283	±	0.0086	0.0187
175	U	0.0080	±	0.0324	0.0641
176	U	0.0102	±	0.0592	0.1181
177		0.0437	±	0.0097	0.0117
178		0.0403	±	0.0107	0.0107
179	U	0.0409	±	0.0362	0.0574
180	U	0.0611	±	0.0581	0.1407
180-DUP[b]		0.1226	±	0.0258	0.0184
181[c]	U	0.0386	±	0.0306	0.0531
182[c]	U	0.0157	±	0.0255	0.0393
183[c]		0.0420	±	0.0100	0.0255
Average background		0.03210		(pCi/m²/s)	

IWCS	Value	Units
Average[e]	0.0180	(pCi/m²/s)
High[f]	0.1226	(pCi/m²/s)
Low	-0.0238	(pCi/m²/s)

NOTE: The EPA Standard for Radon-222 Flux is 20 pCi/m2/sec

a. Radon-222 flux was performed on July 6-7, 2015

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-Lewiston Water Pollution Control Center
183-Balmer Rd. (CWM Secondary Gate)

d. Data Qualifier: U - no analyte was detected (Non-Detect).
J - indicates a estimated value when relative percent difference > 30% and Z-score > 1.96 between the primary finding and duplicate (-DUP).

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

f. Highest detectable finding.

Table 7
2015 Surface water Field Parameter Measurements
Niagara Falls Storage Site

SURFACE WATER

Surface Water	Date	Temperature (°F[a])	pH	ORP[f] (mV[g])	Spec. Cond.[b] (mS/cm[c])	Turbidity (NTU[h])	DO[d] (mg/L[e])
SWSD025[1]	2/11/2015	35.7	6.44	129	1.79	21.0	10.07
SWSD009	4/15/2015	55.9	8.11	211	1.86	34.8	13.18
SWSD010	4/14/2015	51.2	7.02	196	1.25	15.3	6.30
SWSD011	4/14/2015	47.5	6.99	187	0.91	10.5	7.52
SWSD021	4/14/2015	50.4	7.00	214	0.75	36.0	7.04
SWSD022	4/14/2015	50.4	7.16	196	1.16	10.1	7.46
SWSD023	4/15/2015	55.1	7.25	88	1.18	0.3	5.69
SWSD025[1]	4/14/2015	48.7	7.15	210	1.05	6.7	7.70
WDD2	4/13/2015	67.4	7.23	211	0.93	12.4	8.21
WDD3	4/13/2015	63.2	6.74	200	0.69	14.5	8.21
SWSD025[2,3]	5/11/2015	67.0	7.50	176.0	1.29	36.4	6.62
SWSD025[2,3,4]	6/8/2015	68.6	8.41	185.0	0.91	186.0	7.87
SWSD025[2,3,4]	6/12/2015	67.7	8.07	151.0	0.65	233.0	6.90
SWSD025[2,3,4]	6/27/2015	65.4	7.14	183.0	0.76	318.0	6.97
SWSD025[2,3,4]	8/4/2015	72.7	7.19	173.0	1.33	71.2	6.51
SWSD025[2,3]	8/10/2015	72.3	7.51	180.0	1.42	15.5	5.52
SWSD025[2,3,4]	8/14/2015	74.1	7.53	17.0	0.97	55.2	5.17
SWSD025[2,3]	9/12/2015	57.0	7.02	288.0	1.21	7.1	5.40
SWSD025[2,3,4]	10/28/2015	51.1	7.58	216.0	1.08	341.0	6.86
SWSD025[1]	8/18/15	73.0	7.49	227.0	0.66	45.3	3.47
SWSD009	10/26/2015	54.7	8.23	266.0	1.20	43.2	6.75
SWSD010	10/26/2015	47.1	7.26	146.0	1.31	10.2	6.78
SWSD011	10/26/2015	44.0	6.93	164.0	1.35	29.2	8.40
SWSD021	10/26/2015	53.9	7.41	229.0	0.85	17.4	5.65
SWSD022	10/26/2015	44.3	7.01	154.0	1.31	25.5	8.71
SWSD023	10/26/2015	57.0	7.35	286.0	1.43	26.0	5.01
SWSD025[1]	10/26/2015	43.7	6.85	176.0	1.30	32.7	7.47
WDD2	10/26/2015	51.0	7.64	277.0	1.79	5.2	6.44
WDD3	10/26/2015	50.7	7.72	226.0	1.80	7.8	7.27

a. °F - Degrees Fahrenheit.
b. Spec. Cond. - Specific conductance.
c. uS/cm - micro Siemens/centimeter.
d. DO - Dissolved oxygen.
e. mg/L - milligrams per liter.
f. ORP - Oxidation-Reduction potential.
g. mV - milliVolts.
h. NTU - Nephelometric turbidity units.

NA - Not Applicable
*Parameter not taken/meter malfunction
[1] NYSDOH requested sampling location for quarterly sampling.
[2] Rain Event -sample taken by autosampler.
[3]Water quality parameters taken after the sample has been retrieved.
[4]Primary sample will have an accompanying filtered sample (-F).

TABLE 8
SURFACE WATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD009	SWSD009	SWSD009	SWSD010	SWSD010
Field Sample Identifier :			SWSD009	SWSD009-D	SWSD009	SWSD010	SWSD010
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	04/15/15	10/26/15	04/14/15	10/26/15
Parameter	Units	Criteria[1]		Field Duplicate			
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	1.01	0.35 J	0.335 U	0.277	0.0818 U
TOTAL URANIUM	*UG/L*	30	6.3	6.91	3.08	10.1	3.19
RADIONUCLIDES (FILTERED)							
RADIUM-226	*PCI/L*	3	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed
TOTAL URANIUM	*UG/L*	30	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 8
SURFACE WATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD010	SWSD011	SWSD011	SWSD011	SWSD021
Field Sample Identifier :			SWSD010	SWSD011	SWSD011	SWSD011	SWSD021
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/14/15	10/26/15	10/26/15	04/14/15
Parameter	Units	Criteria[1]	Field Duplicate			Field Duplicate	
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.236 U	0.557	-0.183 U	0.0796 U	0.247
TOTAL URANIUM	*UG/L*	30	3.28	15.5	3.43	3.34	14.2
RADIONUCLIDES (FILTERED)							
RADIUM-226	*PCI/L*	3	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed
TOTAL URANIUM	*UG/L*	30	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 8
SURFACE WATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD021	SWSD022	SWSD022	SWSD023	SWSD023
Field Sample Identifier :			SWSD021	SWSD022	SWSD022	SWSD023	SWSD023
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/14/15	10/26/15	04/15/15	10/26/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.358 U	0.193 U	0.607 U	0.0619 U	-0.484 U
TOTAL URANIUM	*UG/L*	30	4.08	15	3.26	6.58	2.37
RADIONUCLIDES (FILTERED)							
RADIUM-226	*PCI/L*	3	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed
TOTAL URANIUM	*UG/L*	30	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 8
SURFACE WATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD025	SWSD025	SWSD025	SWSD025	SWSD025
Field Sample Identifier :			SWSD025	SWSD025	SWSD025-R	SWSD025-R	SWSD025-R
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			02/11/15	04/14/15	06/08/15	08/04/15	08/10/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.329 J	0.119 U	0.368 J	0.326 U	0.533 J
TOTAL URANIUM	*UG/L*	30	10.8	15.5	5.06	8.99	3.62
RADIONUCLIDES (FILTERED)							
RADIUM-226	*PCI/L*	3	Not Anaylzed	Not Anaylzed	0.319 J	0.369 U	Not Anaylzed
TOTAL URANIUM	*UG/L*	30	Not Anaylzed	Not Anaylzed	3.74	8.91	Not Anaylzed

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 8
SURFACE WATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD025	SWSD025	SWSD025	SWSD025	SWSD025
Field Sample Identifier :			SWSD025-R	SWSD025	SWSD025-R	SWSD025	SWSD025-R
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			08/14/15	08/18/15	09/12/15	10/26/15	10/28/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	-0.141 U	1.57	0.315 U	-0.159 U	0.266 U
TOTAL URANIUM	*UG/L*	30	2.24	0.898	6.04	2.9	2.85
RADIONUCLIDES (FILTERED)							
RADIUM-226	*PCI/L*	3	0.205 U	Not Anaylzed	Not Anaylzed	Not Anaylzed	0.201 U
TOTAL URANIUM	*UG/L*	30	2.15	Not Anaylzed	Not Anaylzed	Not Anaylzed	2.41

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 8
SURFACE WATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			WDD2	WDD2	WDD3	WDD3
Field Sample Identifier :			WDD2	WDD2	WDD3	WDD3
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-
Date of Sample :			04/13/15	10/26/15	04/13/15	10/26/15
Parameter	Units	Criteria[1]				
RADIONUCLIDES						
RADIUM-226	*PCI/L*	3	0.247 J	0.397 U	0.214 J	0.561
TOTAL URANIUM	*UG/L*	30	2.71	0.831	2.65	0.812
RADIONUCLIDES (FILTERED)						
RADIUM-226	*PCI/L*	3	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed
TOTAL URANIUM	*UG/L*	30	Not Anaylzed	Not Anaylzed	Not Anaylzed	Not Anaylzed

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 9
SURFACE WATER ANALYTICAL RESULTS - PAHs
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Field Sample Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/26/15	04/14/15	10/26/15	04/14/15
Parameter	Units	Criteria[1]					
SEMI-VOLATILE ORGANIC ANALYSES							
2-METHYLNAPHTHALENE	UG/L	4.7	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
ACENAPHTHENE	UG/L	5.3	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
ACENAPHTHYLENE	UG/L	50	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
ANTHRACENE	UG/L	3.8	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
BENZO(A)ANTHRACENE	UG/L	0.03	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
BENZO(A)PYRENE	UG/L	0.0012	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
BENZO(B)FLUORANTHENE	UG/L	0.002	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
BENZO(G,H,I)PERYLENE	UG/L	50	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
BENZO(K)FLUORANTHENE	UG/L	0.002	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
CHRYSENE	UG/L	0.002	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
DIBENZ(A,H)ANTHRACENE	UG/L	50	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
FLUORANTHENE	UG/L	50	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
FLUORENE	UG/L	0.54	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
INDENO(1,2,3-C,D)PYRENE	UG/L	0.002	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
NAPHTHALENE	UG/L	13	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
PHENANTHRENE	UG/L	5	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U
PYRENE	UG/L	4.6	0.5 U	0.47 U	0.5 U	0.47 U	0.5 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 9
SURFACE WATER ANALYTICAL RESULTS - PAHs
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Field Sample Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/14/15	10/26/15	04/14/15	10/26/15
Parameter	Units	Criteria[1]					
SEMI-VOLATILE ORGANIC ANALYSES							
2-METHYLNAPHTHALENE	UG/L	4.7	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
ACENAPHTHENE	UG/L	5.3	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
ACENAPHTHYLENE	UG/L	50	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
ANTHRACENE	UG/L	3.8	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(A)ANTHRACENE	UG/L	0.03	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(A)PYRENE	UG/L	0.0012	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(B)FLUORANTHENE	UG/L	0.002	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(G,H,I)PERYLENE	UG/L	50	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(K)FLUORANTHENE	UG/L	0.002	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
CHRYSENE	UG/L	0.002	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
DIBENZ(A,H)ANTHRACENE	UG/L	50	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
FLUORANTHENE	UG/L	50	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
FLUORENE	UG/L	0.54	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
INDENO(1,2,3-C,D)PYRENE	UG/L	0.002	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
NAPHTHALENE	UG/L	13	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
PHENANTHRENE	UG/L	5	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
PYRENE	UG/L	4.6	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 9
SURFACE WATER ANALYTICAL RESULTS - PAHs
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Field Sample Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/26/15	02/11/15	04/14/15	08/18/15
Parameter	Units	Criteria[1]					
SEMI-VOLATILE ORGANIC ANALYSES							
2-METHYLNAPHTHALENE	UG/L	4.7	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
ACENAPHTHENE	UG/L	5.3	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
ACENAPHTHYLENE	UG/L	50	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
ANTHRACENE	UG/L	3.8	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
BENZO(A)ANTHRACENE	UG/L	0.03	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
BENZO(A)PYRENE	UG/L	0.0012	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
BENZO(B)FLUORANTHENE	UG/L	0.002	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
BENZO(G,H,I)PERYLENE	UG/L	50	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
BENZO(K)FLUORANTHENE	UG/L	0.002	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
CHRYSENE	UG/L	0.002	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
DIBENZ(A,H)ANTHRACENE	UG/L	50	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
FLUORANTHENE	UG/L	50	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
FLUORENE	UG/L	0.54	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
INDENO(1,2,3-C,D)PYRENE	UG/L	0.002	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
NAPHTHALENE	UG/L	13	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
PHENANTHRENE	UG/L	5	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U
PYRENE	UG/L	4.6	0.5 U	0.47 U	0.5 U	0.5 U	0.51 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 9
SURFACE WATER ANALYTICAL RESULTS - PAHs
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Field Sample Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/13/15	10/26/15	04/13/15	10/26/15
Parameter	Units	Criteria[1]					
SEMI-VOLATILE ORGANIC ANALYSES							
2-METHYLNAPHTHALENE	UG/L	4.7	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
ACENAPHTHENE	UG/L	5.3	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
ACENAPHTHYLENE	UG/L	50	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
ANTHRACENE	UG/L	3.8	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(A)ANTHRACENE	UG/L	0.03	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(A)PYRENE	UG/L	0.0012	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(B)FLUORANTHENE	UG/L	0.002	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(G,H,I)PERYLENE	UG/L	50	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
BENZO(K)FLUORANTHENE	UG/L	0.002	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
CHRYSENE	UG/L	0.002	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
DIBENZ(A,H)ANTHRACENE	UG/L	50	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
FLUORANTHENE	UG/L	50	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
FLUORENE	UG/L	0.54	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
INDENO(1,2,3-C,D)PYRENE	UG/L	0.002	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
NAPHTHALENE	UG/L	13	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
PHENANTHRENE	UG/L	5	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U
PYRENE	UG/L	4.6	0.47 U	0.5 U	0.47 U	0.5 U	0.47 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 10
SURFACE WATER ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Field Sample Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/26/15	04/14/15	10/26/15	04/14/15
Parameter	Units	Criteria[1]					
METALS							
ALUMINUM	UG/L	100	210	700	180	170	180
ANTIMONY	UG/L	3	9	4.6	3.5 J	1.1 J	1.7 J
ARSENIC	UG/L	150	3.9	2.2	2.3	2.1	0.93 J
BARIUM	UG/L	1000	57	150	79	98	64
BERYLLIUM	UG/L	1100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BORON	UG/L	10000	280 J	320 J	630	1,100	360 J
CADMIUM	UG/L	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CALCIUM	UG/L	-	120,000	100,000	130,000	120,000	110,000
CHROMIUM, TOTAL	UG/L	50	2.4 J	2.5 J	7.4 J	1.5 J	4.6 J
COBALT	UG/L	5	0.93 J	1.2 J	0.51 J	0.44 J	0.43 J
COPPER	UG/L	200	15	5.4	9.3	2.8 J	5.5
IRON	UG/L	300	440	1,500	400	560	410
LEAD	UG/L	25	3.1	3.2	0.86 J	0.6 J	0.43 J
LITHIUM	UG/L	-	25 J	33 J	17 J	27 J	12 J
MAGNESIUM	UG/L	35000	41,000	32,000	37,000	33,000	31,000
MANGANESE	UG/L	300	100	200	110	120	62
MERCURY	UG/L	0.7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
MOLYBDENUM	UG/L	-	14	11	6.5	4.5 J	4.1 J
NICKEL	UG/L	100	11	9.6 J	8.7 J	6.5 J	5.9 J

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 10
SURFACE WATER ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Field Sample Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/26/15	04/14/15	10/26/15	04/14/15
Parameter	Units	Criteria[1]					
METALS							
POTASSIUM	UG/L	-	12,000	13,000	7,700	11,000	5,500
SELENIUM	UG/L	10	7	4.4 J	3.8 J	2.5 J	1.7 J
SILVER	UG/L	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SODIUM	UG/L	20000	190,000	81,000	110,000	94,000	49,000
THALLIUM	UG/L	8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VANADIUM	UG/L	14	1.3 J	2.6 J	1.1 J	0.88 J	0.81 J
ZINC	UG/L	2000	39 J	22 J	25 J	7 J	17 J

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 10
SURFACE WATER ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Field Sample Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/14/15	10/26/15	04/14/15	10/26/15
Parameter	Units	Criteria[1]					
METALS							
ALUMINUM	UG/L	100	190	780	400	200	70
ANTIMONY	UG/L	3	0.78 J	1 U	1 U	2.9 J	0.72 J
ARSENIC	UG/L	150	1.3 J	1.7	1.1 J	1.9	1.7
BARIUM	UG/L	1000	95	72	85	72	96
BERYLLIUM	UG/L	1100	0.41 J	0.5 U	0.5 U	0.5 U	0.5 U
BORON	UG/L	10000	1,300	64 J	56 J	780	1,100
CADMIUM	UG/L	5	0.43 J	0.5 U	0.5 U	0.5 U	0.5 U
CALCIUM	UG/L	-	120,000	100,000	120,000	130,000	120,000
CHROMIUM, TOTAL	UG/L	50	1.6 J	14	9.8 J	4.6 J	1.2 J
COBALT	UG/L	5	0.6 J	0.92 J	0.5 J	0.45 J	0.33 J
COPPER	UG/L	200	2.9 J	6.5	5.5	8	2.3 J
IRON	UG/L	300	780	1,500	620	430	270
LEAD	UG/L	25	0.85 J	0.58 J	0.38 J	0.58 J	0.34 J
LITHIUM	UG/L	-	23 J	9.3 J	12 J	15 J	23 J
MAGNESIUM	UG/L	35000	34,000	31,000	25,000	34,000	34,000
MANGANESE	UG/L	300	140	110	19	73	60
MERCURY	UG/L	0.7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
MOLYBDENUM	UG/L	-	3.4 J	3 J	1.7 J	6.3	3.4 J
NICKEL	UG/L	100	5.3 J	5.9 J	4.2 J	8 J	5.7 J

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 10
SURFACE WATER ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Field Sample Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/14/15	10/26/15	04/14/15	10/26/15
Parameter	Units	Criteria[1]					
METALS							
POTASSIUM	UG/L	-	9,600	3,800	9,300	6,900	11,000
SELENIUM	UG/L	10	3.7 J	2.5 U	1.9 J	2.1 J	3 J
SILVER	UG/L	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SODIUM	UG/L	20000	94,000	27,000	8,800	92,000	97,000
THALLIUM	UG/L	8	0.25 J	0.81 J	0.5 U	0.5 U	0.5 U
VANADIUM	UG/L	14	0.82 J	2 J	0.99 J	1.1 J	0.52 J
ZINC	UG/L	2000	8.9 J	6 J	5.6 J	34 J	5.9 J

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 10
SURFACE WATER ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Field Sample Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/26/15	02/11/15	04/14/15	08/18/15
Parameter	Units	Criteria[1]					
METALS							
ALUMINUM	UG/L	100	49 J	220	100	200	490
ANTIMONY	UG/L	3	1.4 J	0.92 J	2.5	2.4 J	0.76 J
ARSENIC	UG/L	150	2.5	1.7	2	1.2 J	4.2
BARIUM	UG/L	1000	67	67	66	66	74
BERYLLIUM	UG/L	1100	0.5 U	0.35 J	0.32 J	0.5 U	0.5 U
BORON	UG/L	10000	160 J	180 J	Not Anaylzed	630	300 J
CADMIUM	UG/L	5	0.5 U	0.45 J	0.34 J	0.5 U	0.5 U
CALCIUM	UG/L	-	140,000	140,000	140,000	120,000	79,000
CHROMIUM, TOTAL	UG/L	50	1.3 J	1.8 J	6.9 J	3.9 J	2.7 J
COBALT	UG/L	5	0.52 J	0.92 J	0.8 J	0.42 J	0.76 J
COPPER	UG/L	200	6.1	6.2	4.9 J	6.7	6.2
IRON	UG/L	300	1,000	710	420	370	2,000
LEAD	UG/L	25	0.76 J	3.2	0.66 J	0.43 J	1
LITHIUM	UG/L	-	13 J	19 J	21 J	14 J	13 J
MAGNESIUM	UG/L	35000	36,000	33,000	35,000	31,000	22,000
MANGANESE	UG/L	300	160	160	310 J	63	800
MERCURY	UG/L	0.7	0.1 U	0.1 U	0.1 U	0.1 U	0.18 J
MOLYBDENUM	UG/L	-	5 J	3.8 J	7.6	4.8 J	2.9 J
NICKEL	UG/L	100	8.6 J	6.5 J	8.7 J	6.8 J	4.3 J

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 10
SURFACE WATER ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Field Sample Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/26/15	02/11/15	04/14/15	08/18/15
Parameter	Units	Criteria[1]					
METALS							
POTASSIUM	UG/L	-	5,600	6,700	7,700	6,400	15,000
SELENIUM	UG/L	10	1.7 J	1.9 J	7.5	1.9 J	2 J
SILVER	UG/L	50	0.5 U	0.5 U	0.5 U	0.5 U	0.27 J
SODIUM	UG/L	20000	98,000	96,000	120,000	68,000	38,000
THALLIUM	UG/L	8	0.5 U	0.64 J	0.3 J	0.5 U	0.5 U
VANADIUM	UG/L	14	0.77 J	2 J	1.1 J	1.1 J	2.3 J
ZINC	UG/L	2000	18 J	34 J	26 J	11 J	14 J

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 10
SURFACE WATER ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Field Sample Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/13/15	10/26/15	04/13/15	10/26/15
Parameter	Units	Criteria[1]					
METALS							
ALUMINUM	UG/L	100	71	470	140	480	150
ANTIMONY	UG/L	3	1.1 J	1.5 J	1 U	2.1 J	1 U
ARSENIC	UG/L	150	1.6	1.2 J	2.7	2	2.9
BARIUM	UG/L	1000	93	45	30	40	32
BERYLLIUM	UG/L	1100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BORON	UG/L	10000	1,100	110 J	320 J	100 J	350 J
CADMIUM	UG/L	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CALCIUM	UG/L	-	110,000	97,000	170,000	84,000	170,000
CHROMIUM, TOTAL	UG/L	50	1.4 J	2.5 J	1.2 J	2.7 J	1.2 J
COBALT	UG/L	5	0.46 J	0.7 J	1.7 J	0.68 J	1.8 J
COPPER	UG/L	200	2.4 J	6.8	14	6.7	15
IRON	UG/L	300	470	760	300	790	300
LEAD	UG/L	25	0.41 J	0.92 J	0.69 J	1.1	0.72 J
LITHIUM	UG/L	-	23 J	11 J	32 J	9.6 J	31 J
MAGNESIUM	UG/L	35000	33,000	34,000	55,000	29,000	56,000
MANGANESE	UG/L	300	150	47	52	39	40
MERCURY	UG/L	0.7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
MOLYBDENUM	UG/L	-	2.7 J	2.6 J	8.4	2.2 J	8.9
NICKEL	UG/L	100	6.1 J	6.1 J	9.3 J	5.5 J	9.1 J

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 10
SURFACE WATER ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Field Sample Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Sample Type :			Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/13/15	10/26/15	04/13/15	10/26/15
Parameter	Units	Criteria[1]					
METALS							
POTASSIUM	UG/L	-	10,000	10,000	97,000	9,900	100,000
SELENIUM	UG/L	10	3.9 J	2.5 U	2.7 J	2.5 U	3.3 J
SILVER	UG/L	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
SODIUM	UG/L	20000	93,000	63,000	45,000	59,000	45,000
THALLIUM	UG/L	8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
VANADIUM	UG/L	14	0.82 J	1.6 J	1.2 J	1.4 J	1.1 J
ZINC	UG/L	2000	4.7 J	35 J	120	33 J	130

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) Class B surface water criteria (default to Groundwater or Class A standard if Class B is not provided). Sum of Radium-226 and Radium-228 (sum total of 5 pCi/l); Thorium (15 pCi/l for alpha emitters) . 10 NYCRR Part 5, Subpart 5-1 (NYSDOH); Total Uranium (30 ug/L or 27 pCi/L) total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, and H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 11
SEDIMENT ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Field Sample Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/14/15	10/27/15	04/14/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/G*	5	1.099	1.606	1.195	2.226	1.782
URANIUM-234	*PCI/G*	13	1.39	1.37	2.44	2.11	3.24
URANIUM-235	*PCI/G*	8	0.105 J	0.065 U	0.131 J	0.087 J	0.154
URANIUM-238	*PCI/G*	14	1.3	1.22	2.31	2.15	2.63
TOTAL URANIUM	*PCI/G*	-	2.795	2.59	4.881	4.347	6.024

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives for VOCs, Pesticides, PCBs, PAHs and Metals. USDOE Order 458.1 (June 2011) - Ra-226 and Ra-228 (sum total of 5 pCi/g),Thorium isotopes (sum total of 5 pCi/g) total dose not to exceed 25 mrem/yr for remaining radionuclides (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3, and U).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 11
SEDIMENT ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Field Sample Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	10/27/15	04/14/15	10/27/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/G*	5	1.671	1.172	1.158	2.162	2.384
URANIUM-234	*PCI/G*	13	2.37	1.22	0.957	2.44	3.05
URANIUM-235	*PCI/G*	8	0.181	0.104 J	0.115 J	0.119 J	0.191
URANIUM-238	*PCI/G*	14	2.25	0.679 B	0.93	2.05	2.16
TOTAL URANIUM	*PCI/G*	-	4.801	2.003	2.002	4.609	5.401

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives for VOCs, Pesticides, PCBs, PAHs and Metals. USDOE Order 458.1 (June 2011) - Ra-226 and Ra-228 (sum total of 5 pCi/g),Thorium isotopes (sum total of 5 pCi/g) total dose not to exceed 25 mrem/yr for remaining radionuclides (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3, and U).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 11
SEDIMENT ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Field Sample Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	02/11/15	04/14/15	08/18/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/G*	5	0.828	0.957	1.511	2.591	1.419
URANIUM-234	*PCI/G*	13	0.915	0.823	3.48 J	2.16	1.72
URANIUM-235	*PCI/G*	8	0.093 J	0.035 U	0.421 J	0.125 J	0.143
URANIUM-238	*PCI/G*	14	0.838	0.687	3.04 J	2.08	1.83
TOTAL URANIUM	*PCI/G*	-	1.846	1.51	6.941	4.365	3.693

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives for VOCs, Pesticides, PCBs, PAHs and Metals. USDOE Order 458.1 (June 2011) - Ra-226 and Ra-228 (sum total of 5 pCi/g),Thorium isotopes (sum total of 5 pCi/g) total dose not to exceed 25 mrem/yr for remaining radionuclides (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3, and U).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 11
SEDIMENT ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Field Sample Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/13/15	10/27/15	04/13/15	10/27/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/G*	5	1.854	1.395	1.411	2.07	0.933
URANIUM-234	*PCI/G*	13	2.28	1.51	1.12	1.58	0.992
URANIUM-235	*PCI/G*	8	0.277	0.13 J	0.033 U	0.096	0.082 J
URANIUM-238	*PCI/G*	14	2.24	1.19	0.986	1.44	0.86
TOTAL URANIUM	*PCI/G*	-	4.797	2.83	2.106	3.116	1.934

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives for VOCs, Pesticides, PCBs, PAHs and Metals. USDOE Order 458.1 (June 2011) - Ra-226 and Ra-228 (sum total of 5 pCi/g),Thorium isotopes (sum total of 5 pCi/g) total dose not to exceed 25 mrem/yr for remaining radionuclides (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3, and U).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 12
SEDIMENT ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Field Sample Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/14/15	10/27/15	04/14/15
Parameter	Units	Criteria[1]					
METALS							
ALUMINUM	MG/KG	77000	26,000	14,000	27,000	27,000	35,000
ANTIMONY	MG/KG	NS	2.5	8.3	4.2	7.3	2.5
ARSENIC	MG/KG	13	3.4 J	5.5	8.8	10	3.4 J
BARIUM	MG/KG	350	130	90	140	140	180
BERYLLIUM	MG/KG	7.2	0.089 U	0.58	0.17 U	0.95	0.11 U
BORON	MG/KG	16000	36	21	46	32	45
CADMIUM	MG/KG	2.5	0.87	1.1	1	1.3	0.5 J
CALCIUM	MG/KG	58900	61,000	54,000	48,000	54,000	62,000
CHROMIUM, TOTAL	MG/KG	25.8	51	43	94	81	78
COBALT	MG/KG	36.7	11	8.3	13	14	14
COPPER	MG/KG	50	64	67	100	110	70
IRON	MG/KG	55000	33,000	25,000	39,000	41,000	43,000
LEAD	MG/KG	63	41	40	67	71	38
LITHIUM	MG/KG	160	34	26	38	42	48
MAGNESIUM	MG/KG	14800	18,000	13,000	15,000	20,000	19,000
MANGANESE	MG/KG	1600	690	710	850	1,100	1,100
MERCURY	MG/KG	0.18	0.22	0.17	0.29	0.27	0.14
MOLYBDENUM	MG/KG	390	1.3	Not Anaylzed	6.3	Not Anaylzed	2.7
NICKEL	MG/KG	30	36	27	41	47	46

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives, Resident Soil RSL (6/2016) and RI Background Screening Levels (12/2007).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 12
SEDIMENT ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Field Sample Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/14/15	10/27/15	04/14/15
Parameter	Units	Criteria[1]					
METALS							
POTASSIUM	*MG/KG*	2860	6,900	2,700	7,000	6,800	8,200
SELENIUM	*MG/KG*	3.9	2.7 U	1.1 J	5.2 U	2.4 U	3.3 U
SILVER	*MG/KG*	2	0.45 U	0.15 J	0.87 U	0.26 J	0.55 U
SODIUM	*MG/KG*	331	570	320	840	540	470
THALLIUM	*MG/KG*	0.78	1.8 U	0.79 U	3.5 U	0.73 J	2.2 U
VANADIUM	*MG/KG*	390	46	29	55	47	59
ZINC	*MG/KG*	109	260	250	420	350	290

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives, Resident Soil RSL (6/2016) and RI Background Screening Levels (12/2007).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 12
SEDIMENT ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Field Sample Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	10/27/15	04/14/15	10/27/15
Parameter	Units	Criteria[1]					
METALS							
ALUMINUM	MG/KG	77000	20,000 J	29,000	31,000	30,000	23,000
ANTIMONY	MG/KG	NS	4	0.75 U	0.89 J	1.4 J	1.9
ARSENIC	MG/KG	13	9.3	4.7	6.7	5.2	6.7
BARIUM	MG/KG	350	140	140	180	210	160
BERYLLIUM	MG/KG	7.2	0.76 J	0.075 U	1.2	0.1 U	0.94
BORON	MG/KG	16000	34	28	20	40	28
CADMIUM	MG/KG	2.5	0.6 J	0.075 U	0.079 J	0.27 J	0.38
CALCIUM	MG/KG	58900	40,000 J	52,000	73,000	51,000	47,000
CHROMIUM, TOTAL	MG/KG	25.8	57	48	94	50	42
COBALT	MG/KG	36.7	11 J	12	16	14	14
COPPER	MG/KG	50	59	37	47	51	53
IRON	MG/KG	55000	33,000 J	36,000	51,000	39,000	39,000
LEAD	MG/KG	63	30	12	11	27	27
LITHIUM	MG/KG	160	33 J	40	54	41	40
MAGNESIUM	MG/KG	14800	12,000 J	17,000	21,000	15,000	15,000
MANGANESE	MG/KG	1600	1,500 J	810	1,100	1,600	1,600
MERCURY	MG/KG	0.18	0.22 J	0.032	0.031	0.15	0.13
MOLYBDENUM	MG/KG	390	Not Anaylzed	0.38 U	Not Anaylzed	0.68 J	Not Anaylzed
NICKEL	MG/KG	30	37 J	39	52	41	40

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives, Resident Soil RSL (6/2016) and RI Background Screening Levels (12/2007).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 12
SEDIMENT ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Field Sample Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	10/27/15	04/14/15	10/27/15
Parameter	Units	Criteria[1]					
METALS							
POTASSIUM	MG/KG	2860	4,600	7,300	6,700	6,600	4,800
SELENIUM	MG/KG	3.9	3.9 J	2.3 U	1.8 U	3 U	2 U
SILVER	MG/KG	2	0.4 J	0.38 U	0.29 U	0.5 U	0.34 U
SODIUM	MG/KG	331	640	330	290	410	420
THALLIUM	MG/KG	0.78	1.4 U	1.5 U	1.2 U	2 U	1.4 U
VANADIUM	MG/KG	390	37 J	50	49	52	39
ZINC	MG/KG	109	260	66	83	190	170

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives, Resident Soil RSL (6/2016) and RI Background Screening Levels (12/2007).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 12
SEDIMENT ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Field Sample Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	02/11/15	04/14/15	08/18/15
Parameter	Units	Criteria[1]					
METALS							
ALUMINUM	MG/KG	77000	11,000	9,000	110	39,000	30,000
ANTIMONY	MG/KG	NS	4.2	3.6	0.81 J	4.3	4.4
ARSENIC	MG/KG	13	9.6	11	2.1 U	5.8	13
BARIUM	MG/KG	350	89	83	9.9 J	220	200
BERYLLIUM	MG/KG	7.2	0.09 U	0.41	0.11 U	0.13 U	0.092 U
BORON	MG/KG	16000	20 J	12	12 J	51	47
CADMIUM	MG/KG	2.5	0.98	1.2	0.076 J	0.68	0.94
CALCIUM	MG/KG	58900	120,000	130,000	1,500	41,000	49,000
CHROMIUM, TOTAL	MG/KG	25.8	26	21	0.28 J	78	69
COBALT	MG/KG	36.7	14	17	0.53 U	15	16
COPPER	MG/KG	50	110	110	5.1 J	82	82
IRON	MG/KG	55000	22,000	22,000	1,000	47,000	48,000
LEAD	MG/KG	63	94	83	1.7 J	55	48
LITHIUM	MG/KG	160	17	17	0.53 U	48	48
MAGNESIUM	MG/KG	14800	50,000	57,000	450	20,000	18,000
MANGANESE	MG/KG	1600	690	820	9.5	1,300	1,700
MERCURY	MG/KG	0.18	0.27	0.21	0.14	0.16	0.19
MOLYBDENUM	MG/KG	390	4.2	Not Anaylzed	0.53 U	2.4	3.2
NICKEL	MG/KG	30	25	26	1.1 J	49	49

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives, Resident Soil RSL (6/2016) and RI Background Screening Levels (12/2007).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 12
SEDIMENT ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Field Sample Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	02/11/15	04/14/15	08/18/15
Parameter	Units	Criteria[1]					
METALS							
POTASSIUM	MG/KG	2860	2,700	1,600	2,600	8,600	7,800
SELENIUM	MG/KG	3.9	2.7 U	1.1 U	3.2 U	3.8 U	3.1 J
SILVER	MG/KG	2	0.45 U	0.62 J	0.53 U	0.63 U	0.46 U
SODIUM	MG/KG	331	440	440	1,100	580	730
THALLIUM	MG/KG	0.78	1.8 U	0.42 J	2.1 U	1.3 J	1.8 U
VANADIUM	MG/KG	390	26	21	2.1 U	65	53
ZINC	MG/KG	109	790	1,200	29	320	290

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives, Resident Soil RSL (6/2016) and RI Background Screening Levels (12/2007).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 12
SEDIMENT ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Field Sample Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/13/15	10/27/15	04/13/15	10/27/15
Parameter	Units	Criteria[1]					
METALS							
ALUMINUM	MG/KG	77000	32,000	35,000	14,000	33,000	17,000
ANTIMONY	MG/KG	NS	8.7	1.6 U	0.85 J	1.4 U	0.73 U
ARSENIC	MG/KG	13	12	3.1 U	3.5	3.9 J	3.9
BARIUM	MG/KG	350	220	200	140	230	180
BERYLLIUM	MG/KG	7.2	1.2	0.16 U	0.58	0.14 U	0.58
BORON	MG/KG	16000	35	43	18	47	23
CADMIUM	MG/KG	2.5	0.94	0.16 U	0.13 J	0.14 U	0.12 J
CALCIUM	MG/KG	58900	55,000	29,000	38,000	38,000	87,000
CHROMIUM, TOTAL	MG/KG	25.8	75	40	18	39	20
COBALT	MG/KG	36.7	20	12	8.7	12	8.2
COPPER	MG/KG	50	84	43	31	55	31
IRON	MG/KG	55000	55,000	43,000	27,000	40,000	30,000
LEAD	MG/KG	63	51	19	9	19	19
LITHIUM	MG/KG	160	57	47	27	46	29
MAGNESIUM	MG/KG	14800	21,000	14,000 J	8,900	14,000 J	10,000
MANGANESE	MG/KG	1600	2,500	1,700	1,900	2,500	2,600
MERCURY	MG/KG	0.18	0.26	0.094	0.054	0.099	0.069
MOLYBDENUM	MG/KG	390	Not Anaylzed	2.7	Not Anaylzed	2.6	Not Anaylzed
NICKEL	MG/KG	30	59	34	23	31	23

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives, Resident Soil RSL (6/2016) and RI Background Screening Levels (12/2007).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 12
SEDIMENT ANALYTICAL RESULTS - METALS
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Field Sample Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/13/15	10/27/15	04/13/15	10/27/15
Parameter	Units	Criteria[1]					
METALS							
POTASSIUM	*MG/KG*	2860	7,100	8,200	3,600	7,800	3,600
SELENIUM	*MG/KG*	3.9	4.9	4.7 U	2.2	4.2 U	2.3 U
SILVER	*MG/KG*	2	0.23 J	0.78 U	0.15 J	0.69 U	0.15 J
SODIUM	*MG/KG*	331	670	450	210	560	510
THALLIUM	*MG/KG*	0.78	1.8 U	1.6 J	0.92 U	1.2 J	1.5 U
VANADIUM	*MG/KG*	390	58	50	22	51	25
ZINC	*MG/KG*	109	310	170	130	210	130

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives, Resident Soil RSL (6/2016) and RI Background Screening Levels (12/2007).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 13
SEDIMENT ANALYTICAL RESULTS - PAHs
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Field Sample Identifier :			SWSD009	SWSD009	SWSD010	SWSD010	SWSD011
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/14/15	10/27/15	04/14/15
Parameter	Units	Criteria[1]					
SEMI-VOLATILE ORGANIC ANALYSES							
2-METHYLNAPHTHALENE	UG/KG	-	32 J	16 J	67 U	58 U	38 U
ACENAPHTHENE	UG/KG	20000	58 J	16 J	67 U	58 U	38 U
ACENAPHTHYLENE	UG/KG	100000	39 J	29 U	55 J	58 U	31 J
ANTHRACENE	UG/KG	100000	120 J	38 J	87 J	58 U	48 J
BENZO(A)ANTHRACENE	UG/KG	1000	370	120 J	300 J	45 J	150 J
BENZO(A)PYRENE	UG/KG	1000	370	140 J	380 J	62 J	190 J
BENZO(B)FLUORANTHENE	UG/KG	1000	600	230 J	660	100 J	330 J
BENZO(G,H,I)PERYLENE	UG/KG	100000	190 J	51 J	280 J	58 U	130 J
BENZO(K)FLUORANTHENE	UG/KG	800	200 J	75 J	240 J	120 U	92 J
CHRYSENE	UG/KG	1000	460	140 J	410 J	58 J	210 J
DIBENZ(A,H)ANTHRACENE	UG/KG	330	63 U	59 U	130 U	120 U	77 U
FLUORANTHENE	UG/KG	100000	730 J	270 J	630 J	84 J	270 J
FLUORENE	UG/KG	30000	84 J	22 J	67 U	58 U	38 U
INDENO(1,2,3-C,D)PYRENE	UG/KG	500	170 J	49 J	200 J	36 J	95 J
NAPHTHALENE	UG/KG	12000	36 J	18 J	67 U	58 U	38 U
PHENANTHRENE	UG/KG	100000	370 J	110 J	170 J	58 U	110 J
PYRENE	UG/KG	100000	810 J	250 J	740	95 J	290 J

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives for VOCs, Pesticides, PCBs, PAHs and Metals. USDOE Order 458.1 (June 2011) - Ra-226 and Ra-228 (sum total of 5 pCi/g),Thorium isotopes (sum total of 5 pCi/g) total dose not to exceed 25 mrem/yr for remaining radionuclides (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3, and U).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 13
SEDIMENT ANALYTICAL RESULTS - PAHs
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Field Sample Identifier :			SWSD011	SWSD021	SWSD021	SWSD022	SWSD022
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	10/27/15	04/14/15	10/27/15
Parameter	Units	Criteria[1]					
SEMI-VOLATILE ORGANIC ANALYSES							
2-METHYLNAPHTHALENE	UG/KG	-	60 U	27 U	38 U	52 U	46 U
ACENAPHTHENE	UG/KG	20000	60 U	27 U	38 U	52 U	46 U
ACENAPHTHYLENE	UG/KG	100000	60 U	27 U	38 U	52 U	46 U
ANTHRACENE	UG/KG	100000	60 U	15 J	38 U	30 J	46 U
BENZO(A)ANTHRACENE	UG/KG	1000	60 U	37 J	38 U	110 J	62 J
BENZO(A)PYRENE	UG/KG	1000	60 U	41 J	38 U	120 J	71 J
BENZO(B)FLUORANTHENE	UG/KG	1000	60 U	63 J	26 J	260 J	120 J
BENZO(G,H,I)PERYLENE	UG/KG	100000	60 U	39 J	38 U	120 J	46 U
BENZO(K)FLUORANTHENE	UG/KG	800	120 U	55 U	76 U	78 J	92 U
CHRYSENE	UG/KG	1000	60 U	64 J	38 U	180 J	72 J
DIBENZ(A,H)ANTHRACENE	UG/KG	330	120 U	55 U	76 U	100 U	92 U
FLUORANTHENE	UG/KG	100000	60 U	86 J	38 U	220 J	110 J
FLUORENE	UG/KG	30000	60 U	27 U	38 U	52 U	46 U
INDENO(1,2,3-C,D)PYRENE	UG/KG	500	120 U	25 J	76 U	69 J	92 U
NAPHTHALENE	UG/KG	12000	60 U	27 U	38 U	52 U	46 U
PHENANTHRENE	UG/KG	100000	60 U	45 J	38 U	96 J	43 J
PYRENE	UG/KG	100000	60 U	76 J	38 U	220 J	110 J

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives for VOCs, Pesticides, PCBs, PAHs and Metals. USDOE Order 458.1 (June 2011) - Ra-226 and Ra-228 (sum total of 5 pCi/g),Thorium isotopes (sum total of 5 pCi/g) total dose not to exceed 25 mrem/yr for remaining radionuclides (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3, and U).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 13
SEDIMENT ANALYTICAL RESULTS - PAHs
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Field Sample Identifier :			SWSD023	SWSD023	SWSD025	SWSD025	SWSD025
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	02/11/15	04/14/15	08/18/15
Parameter	Units	Criteria[1]					
SEMI-VOLATILE ORGANIC ANALYSES							
2-METHYLNAPHTHALENE	UG/KG	-	90 J	120 J	42 U	60 U	68 U
ACENAPHTHENE	UG/KG	20000	170 J	110 J	42 U	60 U	68 U
ACENAPHTHYLENE	UG/KG	100000	140 J	120 J	24 J	44 J	68 U
ANTHRACENE	UG/KG	100000	500 J	280 J	28 J	75 J	46 J
BENZO(A)ANTHRACENE	UG/KG	1000	1,200 J	700 J	120 J	240 J	180 J
BENZO(A)PYRENE	UG/KG	1000	1,200 J	760 J	180 J	320 J	210 J
BENZO(B)FLUORANTHENE	UG/KG	1000	2,000	1,100 J	260 J	490 J	370 J
BENZO(G,H,I)PERYLENE	UG/KG	100000	720 J	870 J	160 J	240 J	130 J
BENZO(K)FLUORANTHENE	UG/KG	800	870 J	280 J	78 J	180 J	90 J
CHRYSENE	UG/KG	1000	1,900	830 J	150 J	330 J	200 J
DIBENZ(A,H)ANTHRACENE	UG/KG	330	350 U	320 U	83 U	120 U	140 U
FLUORANTHENE	UG/KG	100000	2,700	1,400 J	220 J	500 J	300 J
FLUORENE	UG/KG	30000	250 J	150 J	42 U	60 U	68 U
INDENO(1,2,3-C,D)PYRENE	UG/KG	500	540 J	480 J	120 J	180 J	110 J
NAPHTHALENE	UG/KG	12000	69 J	110 J	42 U	60 U	68 U
PHENANTHRENE	UG/KG	100000	1,100 J	700 J	63 J	170 J	110 J
PYRENE	UG/KG	100000	3,400	1,500 J	200 J	520 J	290 J

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives for VOCs, Pesticides, PCBs, PAHs and Metals. USDOE Order 458.1 (June 2011) - Ra-226 and Ra-228 (sum total of 5 pCi/g),Thorium isotopes (sum total of 5 pCi/g) total dose not to exceed 25 mrem/yr for remaining radionuclides (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3, and U).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 13
SEDIMENT ANALYTICAL RESULTS - PAHs
NIAGARA FALLS STORAGE SITE

Location Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Field Sample Identifier :			SWSD025	WDD2	WDD2	WDD3	WDD3
Sample Type :			Sediment	Sediment	Sediment	Sediment	Sediment
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/13/15	10/27/15	04/13/15	10/27/15
Parameter	Units	Criteria[1]					
SEMI-VOLATILE ORGANIC ANALYSES							
2-METHYLNAPHTHALENE	UG/KG	-	67 U	65 U	39 U	73 U	52 U
ACENAPHTHENE	UG/KG	20000	67 U	65 U	39 U	73 U	52 U
ACENAPHTHYLENE	UG/KG	100000	67 U	65 U	39 U	73 U	52 U
ANTHRACENE	UG/KG	100000	67 U	65 U	39 U	73 U	52 U
BENZO(A)ANTHRACENE	UG/KG	1000	67 U	65 U	39 U	73 U	52 U
BENZO(A)PYRENE	UG/KG	1000	48 J	49 J	39 U	73 U	52 U
BENZO(B)FLUORANTHENE	UG/KG	1000	71 J	71 J	25 J	48 J	52 U
BENZO(G,H,I)PERYLENE	UG/KG	100000	67 U	51 J	39 U	73 U	52 U
BENZO(K)FLUORANTHENE	UG/KG	800	130 U	130 U	77 U	150 U	100 U
CHRYSENE	UG/KG	1000	41 J	70 J	39 U	73 U	52 U
DIBENZ(A,H)ANTHRACENE	UG/KG	330	130 U	130 U	77 U	150 U	100 U
FLUORANTHENE	UG/KG	100000	67 U	100 J	39 U	73 U	52 U
FLUORENE	UG/KG	30000	67 U	65 U	39 U	73 U	52 U
INDENO(1,2,3-C,D)PYRENE	UG/KG	500	130 U	38 J	77 U	150 U	100 U
NAPHTHALENE	UG/KG	12000	67 U	65 U	39 U	73 U	52 U
PHENANTHRENE	UG/KG	100000	67 U	38 J	39 U	73 U	52 U
PYRENE	UG/KG	100000	61 J	90 J	39 U	50 J	52 U

Concentration Exceeds Criteria

(1) - 6 NYCRR Part 375, NYS Unrestricted Use Soil Cleanup Objectives for VOCs, Pesticides, PCBs, PAHs and Metals. USDOE Order 458.1 (June 2011) - Ra-226 and Ra-228 (sum total of 5 pCi/g),Thorium isotopes (sum total of 5 pCi/g) total dose not to exceed 25 mrem/yr for remaining radionuclides (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3, and U).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

Table 14
2015 Water Level Measurements

Well ID	Reference Elevation ft	1st Quarter 02/11/15		2nd Quarter 4/13/15		3rd Quarter 8/18/15		4th Quarter 10/26/15	
		Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
LOWER WATER BEARING ZONE WELLS									
A23A	321.90	10.46	311.44	10.29	311.61	5.13	316.77	10.88	311.02
A54	320.70	8.75	311.95	8.50	312.20	7.69	313.01	9.19	311.51
A55	320.60	9.80	310.80	8.24	312.36	7.58	313.02	8.94	311.66
A56	322.30	11.85	310.45	11.63	310.67	9.90	312.40	12.42	309.88
A57	321.40	12.41	308.99	12.12	309.28	11.50	309.90	12.96	308.44
BH5	321.32	10.81	310.51	10.40	310.92	9.65	311.67	11.29	310.03
BH12	320.85	8.28	312.57	8.10	312.75	7.29	313.56	8.54	312.31
BH15	320.16	7.95	312.21	7.70	312.46	6.87	313.29	8.18	311.98
BH48	322.04	9.48	312.56	9.28	312.76	8.50	313.54	9.75	312.29
BH49	320.23	10.34	309.89	9.95	310.28	9.20	311.03	11.05	309.18
BH50	319.25	10.47	308.78	9.11	310.14	9.35	309.90	11.81	307.44
BH51	321.24	9.26	311.98	8.80	312.44	7.78	313.46	9.42	311.82
BH57	322.84	9.71	313.13	9.46	313.38	8.56	314.28	9.96	312.88
BH59	321.45	9.13	312.32	8.95	312.50	8.20	313.25	9.59	311.86
BH60	322.32	8.24	314.08	7.99	314.33	7.13	315.19	8.46	313.86
BH61	318.50	12.18	306.32	10.78	307.72	10.65	307.85	13.10	305.40
BH62	318.60	11.40	307.20	10.63	307.97	9.72	308.88	11.80	306.80
BH64	319.32	5.03	314.29	3.02	316.30	7.60	311.72	8.39	310.93
BH70	321.29	9.61	311.68	9.43	311.86	8.55	312.74	10.01	311.28
B02W19D	319.90	6.45	313.45	6.29	313.61	3.52	316.38	6.69	313.21
B02W20D	322.00	8.17	313.83	2.85	319.15	7.03	314.97	8.45	313.55
OW02A	321.50	1.09	320.41	10.53	310.97	9.60	311.90	11.35	310.15
OW03A	321.67	10.53	311.14	10.26	311.41	9.45	312.22	11.20	310.47
OW04A	320.52	9.72	310.80	9.35	311.17	9.91	310.61	10.19	310.33
OW05A	319.59	8.85	310.74	8.43	311.16	7.60	311.99	9.44	310.15
OW06A	322.34	10.07	312.27	9.24	313.10	9.10	313.24	10.63	311.71
OW07A	319.77	7.51	312.26	7.33	312.44	6.58	313.19	8.02	311.75
OW08A	318.91	7.50	311.41	7.25	311.66	6.32	312.59	7.97	310.94
OW09A	318.66	6.68	311.98	6.52	312.14	5.60	313.06	7.09	311.57
OW10A	320.01	7.79	312.22	9.61	310.40	6.80	313.21	8.21	311.80
OW11A	319.05	6.42	312.63	6.30	312.75	5.25	313.80	7.76	311.29
OW12A	320.42	7.86	312.56	7.68	312.74	6.88	313.54	8.29	312.13
OW13A	321.54	9.31	312.23	9.05	312.49	8.31	313.23	9.91	311.63
OW14A	320.52	10.12	310.40	9.72	310.80	8.80	311.72	10.58	309.94
OW15A	320.30	10.28	310.02	9.89	310.41	8.62	311.68	10.68	309.62
OW16A	320.63	9.66	310.97	9.40	311.23	8.48	312.15	10.09	310.54
OW17A	320.31	8.59	311.72	8.40	311.91	7.56	312.75	9.06	311.25
OW18A	321.09	8.51	312.58	8.30	312.79	7.51	313.58	9.01	312.08
MW229	320.61	8.12	312.49	7.98	312.63	7.21	313.40	8.39	312.22
MW861	319.92	9.37	310.55	9.05	310.87	8.11	311.81	9.80	310.12
MW863	319.61	7.75	311.86	7.63	311.98	6.80	312.81	8.14	311.47
MW949	320.96	10.32	310.64	9.68	311.28	8.97	311.99	10.59	310.37
UPPER WATER BEARING ZONE WELLS									
A42	319.70	6.21	313.49	4.95	314.75	7.39	312.31	8.93	310.77
A43	320.50	6.35	314.15	5.06	315.44	6.24	314.26	8.11	312.39
A45	321.70	9.88	311.82	8.38	313.32	10.40	311.30	11.24	310.46
A50	321.30	10.98	310.32	9.09	312.21	10.97	310.33	12.26	309.04
A51	321.20	9.64	311.56	6.62	314.58	8.55	312.65	11.14	310.06
A52	321.10	7.28	313.82	5.70	315.40	7.82	313.28	9.02	312.08
BH49A	320.65	4.10	316.55	2.30	318.35	6.40	314.25	7.67	312.98
B02W20S	322.00	3.68	318.32	7.92	314.08	5.02	316.98	6.69	315.31
OW01B	321.49	4.56	316.93	2.99	318.50	6.15	315.34	7.12	314.37
OW02B	321.55	3.98	317.57	3.08	318.47	4.52	317.03	7.11	314.44
OW03B	321.38	4.95	316.43	4.00	317.38	5.25	316.13	6.16	315.22
OW04B	320.17	5.00	315.17	3.26	316.91	5.20	314.97	6.97	313.20
OW05B	319.68	5.09	314.59	3.15	316.53	7.49	312.19	9.29	310.39
OW06B	322.28	6.41	315.87	4.33	317.95	5.09	317.19	7.91	314.37
OW07B	319.69	6.38	313.31	3.75	315.94	8.04	311.65	9.44	310.25
OW08B	318.97	6.34	312.63	3.51	315.46	7.48	311.49	9.99	308.98
OW09B	318.82	4.94	313.88	2.61	316.21	7.80	311.02	11.30	307.52

Table 14
2015 Water Level Measurements

Well ID	Reference Elevation	1st Quarter 02/11/15		2nd Quarter 4/13/15		3rd Quarter 8/18/15		4th Quarter 10/26/15	
		Depth to	Groundwater	Depth to	Groundwater	Depth to	Groundwater	Depth to	Groundwater
OW10B	320.13	5.02	315.11	2.52	317.61	6.50	313.63	8.19	311.94
OW11B	319.09	5.13	313.96	2.45	316.64	5.65	313.44	5.87	313.22
OW12B	319.09	7.86	311.23	3.90	315.19	9.79	309.30	12.03	307.06
OW13B	321.09	5.33	315.76	2.36	318.73	6.89	314.20	9.04	312.05
OW14B	320.73	4.93	315.80	2.80	317.93	6.90	313.83	7.34	313.39
OW15B	320.12	4.58	315.54	2.80	317.32	7.03	313.09	7.88	312.24
OW16B	320.06	4.97	315.09	2.81	317.25	6.04	314.02	6.61	313.45
OW17B	320.29	4.89	315.40	2.10	318.19	5.25	315.04	5.88	314.41
OW18B	320.76	4.60	316.16	3.13	317.63	4.99	315.77	6.28	314.48
201A	321.47	5.56	315.91	4.02	317.45	5.99	315.48	9.22	312.25
203A	321.87	5.10	316.77	4.32	317.55	5.68	316.19	6.04	315.83
213A	321.37	8.20	313.17	5.69	315.68	9.36	312.01	12.06	309.31
215A	320.26	10.20	310.06	4.21	316.05	12.76	307.50	12.61	307.65
302A	320.53	5.66	314.87	4.17	316.36	8.44	312.09	9.76	310.77
303A	321.83	6.57	315.26	3.25	318.58	7.59	314.24	8.38	313.45
404A	323.73	8.21	315.52	5.52	318.21	10.71	313.02	12.34	311.39
411A	322.05	6.20	315.85	3.99	318.06	11.87	310.18	12.43	309.62
415A	321.27	7.80	313.47	3.28	317.99	9.84	311.43	11.60	309.67
505	317.80	16.15	301.65	5.79	312.01	14.89	302.91	18.32	299.48
603A	320.57	2.48	318.09	2.09	318.48	4.94	315.63	7.13	313.44
606A	321.49	4.10	317.39	3.29	318.20	6.62	314.87	7.70	313.79
808A	319.27	7.38	311.89	2.51	316.76	8.56	310.71	12.51	306.76
810A	318.44	5.72	312.72	3.89	314.55	17.97	300.47	16.36	302.08
816	320.62	2.36	318.26	2.06	318.56	2.27	318.35	2.09	318.53
MW228	320.85	6.14	314.71	4.38	316.47	6.72	314.13	8.01	312.84
MW313	320.88	6.43	314.45	3.89	316.99	9.32	311.56	11.30	309.58
MW314	318.94	19.02	299.92	17.70	301.24	17.21	301.73	20.06	298.88
MW422	321.36	21.35	300.01	dry	na	dry	na	dry	na
MW423	322.39	12.69	309.70	5.10	317.29	11.47	310.92	13.82	308.57
MW424	320.93	5.70	315.23	2.94	317.99	9.68	311.25	9.76	311.17
MW860	320.06	8.39	311.67	6.22	313.84	8.00	312.06	9.76	310.30
MW862	319.62	5.81	313.81	4.70	314.92	5.45	314.17	7.89	311.73
MW921	319.88	12.02	307.86	5.52	314.36	13.14	306.74	18.14	301.74
MW922	318.56	6.35	312.21	2.84	315.72	9.71	308.85	12.34	306.22
MW923	319.53	19.45	300.08	8.12	311.41	15.76	303.77	20.26	299.27
MW930	323.16	9.50	313.66	4.56	318.60	11.42	311.74	12.16	311.00
MW934	322.20	7.95	314.25	3.76	318.44	11.46	310.74	14.10	308.10
MW935	319.33	5.23	314.10	3.95	315.38	7.73	311.60	6.15	313.18
MW936	320.64	3.78	316.86	2.50	318.14	5.72	314.92	6.97	313.67
MW938	319.54	4.73	314.81	3.83	315.71	8.37	311.17	9.26	310.28
MW941	318.98	3.75	315.23	3.71	315.27	5.89	313.09	5.45	313.53
MW943	321.60	4.28	317.32	2.83	318.77	4.90	316.70	7.81	313.79
MW944	318.64	8.42	310.22	4.31	314.33	12.60	306.04	15.37	303.27
MW945	320.24	13.55	306.69	5.31	314.93	13.81	306.43	17.52	302.72
MW946	319.65	15.05	304.60	5.45	314.20	8.98	310.67	14.22	305.43
MW947	322.53	21.08	301.45	21.12	301.41	20.00	302.53	21.13	301.40
MW948	321.04	10.00	311.04	3.10	317.94	8.66	312.38	11.53	309.51
MW950	322.03	5.62	316.41	3.50	318.53	6.25	315.78	8.67	313.36
MW951	320.84	6.98	313.86	4.23	316.61	4.90	315.94	7.29	313.55
MW952	320.16	6.52	313.64	3.81	316.35	6.89	313.27	6.86	313.30
MW953	319.94	6.87	313.07	3.65	316.29	8.11	311.83	9.32	310.62
MW954	319.85	6.50	313.35	3.60	316.25	6.45	313.40	8.18	311.67
MW955	320.09	6.64	313.45	3.80	316.29	6.79	313.30	8.95	311.14
MW956	323.13	8.43	314.70	7.00	316.13	8.30	314.83	9.91	313.22
MW957	324.48	9.77	314.71	6.45	318.03	10.58	313.90	11.40	313.08
MW958	319.77	6.20	313.57	3.60	316.17	8.41	311.36	8.78	310.99
MW959	320.56	6.58	313.98	3.80	316.76	6.91	313.65	8.18	312.38
MW960	321.02	7.20	313.82	4.21	316.81	5.13	315.89	7.56	313.46

NOTES:
OW01A has been decommissioned
BH63 has a frozen well cap

Table 15
2015 Groundwater Field Parameter Measurements
Niagara Falls Storage Site

Well ID	Date	Temperature (°F[a])	pH	ORP[f] (mV[g])	Spec. Cond.[b] (mS/cm[c])	Turbidity (NTU[h])	DO[d] (mg/L[e])	Volume Purged (Liters[i])	Discharge milliter PM[j]
OW04A	2/11/15	48.8	8.51	154	1.47	5.9	5.73	5.7	172
OW04B	2/11/15	44.3	7.09	169	1.85	0.8	9.34	5.0	250
505	4/14/15	51.2	7.46	-57	5.60	7.1	0.93	3.8	120
302A	4/15/15	50.1	6.96	5	7.80	3.1	1.00	3.1	103
411A	4/15/15	52.7	7.03	2	2.42	5.8	0.83	1.6	54
A42	4/14/15	53.4	6.85	180	1.27	0.0	1.31	3.8	159
A43	4/13/15	67.10	6.95	89	1.95	0.00	2.01	6.3	210
A45	4/13/15	51.7	7.48	24	1.89	0.0	0.80	9.1	259
A50	4/15/15	52.6	7.24	70	1.98	5.50	1.95	3.3	110
A55	4/12/15	63.8	12.31	-291	5.20	0.0	3.66	4.1	110
BH49	4/14/15	58.9	8.16	-223	0.79	4.4	1.67	2.1	101
BH49A	4/14/15	56.9	7.45	225	1.64	2.7	2.71	2.0	97
MW862	4/15/15	62.0	7.03	190	1.90	8.0	0.32	3.0	100
MW863	4/15/15	56.0	7.79	54	2.23	20.0	2.85	3.6	120
MW921	4/15/15	65.9	6.96	314	3.55	1.4	2.45	3.6	120
MW934	4/15/15	53.0	7.10	186	4.01	1.1	3.40	4.4	146
MW935	4/13/15	53.8	7.33	56	2.18	0.0	8.61	5.6	182
MW938	4/13/15	59.6	7.17	-50	3.64	7.8	1.30	3.9	130
MW943	4/16/15	52.1	6.99	146	2.10	3.3	0.70	3.9	131
MW944	4/14/15	62.6	7.01	306	1.19	0.2	2.22	3.6	120
MW945	4/14/15	50.7	7.47	120	2.60	9.0	3.90	3.1	122
MW946	4/13/15	55.2	7.13	211	6.41	0.0	4.76	3.6	118
MW947[2]	4/15/15	***-Insufficient volume see substitute well MW423***							
MW423[(Sub for MW947)]	4/15/15	47.6	7.36	-86	1.68	7.0	1.50	3.0	100
MW948	4/15/15	46.7	7.05	181	4.88	1.0	4.68	3.4	113
MW949	4/15/15	49.0	7.60	160	3.32	0.8	7.01	4.3	142
MW950	4/16/15	52.8	7.19	37	3.45	0.4	0.95	3.4	113
MW951	4/16/15	50.0	7.03	16	1.96	0.8	0.40	3.0	100
MW952	4/15/15	47.1	7.83	224	2.07	3.4	4.74	3.7	122
MW953	4/14/15	51.1	7.13	266	1.84	2.4	2.29	3.0	100
MW954	4/14/15	48.9	7.85	209	2.52	3.9	3.00	3.6	121
MW955	4/14/15	48.5	7.88	199	1.68	7.0	1.84	3.6	120
MW956	4/15/15	54.0	7.77	146	2.30	2.6	1.63	3.3	110
MW957	4/14/15	57.0	7.06	155	2.16	0.0	3.42	3.3	110
MW958	4/16/15	52.8	7.83	191	1.29	0.0	4.09	4.1	135
MW959	4/16/15	50.0	7.15	162	2.43	0.0	1.85	3.3	110
MW960	4/16/15	51.0	6.93	94	1.86	2.4	0.42	3.5	100
OW03A	4/14/15	64.7	7.29	180	1.91	1.8	2.18	3.3	109
OW03B	4/14/15	53.5	7.54	204	1.97	4.5	3.26	3.7	105
OW04A	4/15/15	54.7	8.80	213	1.42	0.0	5.00	4.5	150
OW04B	4/16/15	45.8	7.08	167	2.13	1.5	0.35	7.5	250
OW05A	4/15/15	53.3	8.40	-70	1.32	2.1	0.54	4.8	120
OW05B	4/15/15	54.8	7.87	124	1.54	0.0	0.87	3.3	110
OW06A	4/16/15	52.6	8.06	-30	2.07	1.7	2.98	4.5	150
OW06B	4/16/15	48.5	7.39	117	1.93	2.5	0.99	4.8	161
OW07A	4/14/15	54.3	7.59	-63	2.10	0.0	0.84	10.5	149
OW07B	4/15/15	51.9	7.29	127	1.96	11.7	2.69	4.0	132
OW11A	4/15/15	52.0	8.31	120	1.46	2.3	1.30	3.0	100
OW11B	4/14/15	48.5	7.43	97	1.53	1.4	2.41	3.5	115
OW12A	4/15/15	51.2	7.45	-57	1.79	0.0	0.78	12.0	200
OW12B	4/15/15	43.5	7.74	153	0.39	0.0	8.65	5.0	124
OW13A	4/15/15	52.3	7.46	-111	2.08	0.0	0.41	8.5	213
OW13B	4/13/15	70.2	7.35	-4	2.28	7.0	7.76	8.5	189
OW15A	4/14/15	57.1	7.48	-58	2.42	31.8	0.91	3.9	129
OW15B	4/15/15	49.3	7.36	104	0.82	0.0	1.27	7.0	155
OW17A	4/14/15	57.2	7.60	-43	2.30	0.0	0.67	3.7	123
OW17B	4/13/15	54.6	7.71	197	1.57	1.2	0.77	3.6	121
OW18B	4/13/15	62.4	7.72	170	1.89	0.0	0.57	3.9	130
OW04A	8/17/15	70.9	6.88	-51	1.73	0.0	0.67	7.3	260
OW04B	8/17/15	63.2	8.49	-71	1.33	0.0	0.73	6.5	261

Table 15
2015 Groundwater Field Parameter Measurements
Niagara Falls Storage Site

Well ID	Date	Temperature (°F[a])	pH	ORP[f] (mV[g])	Spec. Cond.[b] (mS/cm[c])	Turbidity (NTU[h])	DO[d] (mg/L[e])	Volume Purged (Liters[i])	Discharge milliter PM[j]
505[3]	10/27/15	52.5	6.77	-108	8.11	5.4	2.50	2.4	120
302A	10/30/15	54.1	6.93	1	6.35	4.6	6.37	3.9	130
411A	10/27/15	54.8	6.98	-89	3.70	21.0	0.95	6.0	200
A42	10/29/15	52.8	7.44	19	1.50	0.0	0.53	4.9	141
A43	10/29/15	57.8	6.41	20	2.48	4.4	0.48	5.1	169
A45	10/30/15	55.4	6.67	-24	2.42	11.9	0.46	8.9	221
A50	10/27/15	53.0	7.15	-62	1.87	9.3	0.96	3.6	91
A55	10/29/15	53.5	12.37	-271	5.89	6.0	1.07	3.9	140
BH49	10/27/15	55.8	7.30	-69	1.67	0.9	1.61	6.6	147
BH49A	10/27/15	54.9	8.61	-255	0.97	7.2	0.60	3.0	100
MW862	10/27/15	52.7	6.99	6	2.03	3.9	0.56	3.0	100
MW863	10/27/15	55.0	7.70	-98	2.10	0.9	0.42	3.3	108
MW921[2]	10/29/15	***-Insufficient volume see substitute well MW922***							
MW922 (Sub for MW921)	10/29/15	54.7	7.01	44	4.92	3.4	3.75	3.8	101
MW934	10/27/15	53.9	6.97	-4	3.79	96.6	1.20	4.6	153
MW935	10/27/15	53.9	7.03	4	2.80	5.5	1.28	5.5	165
MW938	10/26/15	54.6	6.85	-131	3.84	6.1	1.05	3.2	107
MW943	10/30/15	58.5	6.84	57	2.05	0.7	1.52	4.5	150
MW944[2]	10/29/15	***-Insufficient volume see substitute well MW922.***							
MW945[2]	10/29/15	***-Insufficient volume see substitute well MW922.***							
MW922 (Sub for MW944,945)	10/29/15	54.7	7.01	44	4.92	3.4	3.75	3.8	120
MW946[2,3]	10/26/15	***-Insufficient well volume, grab sample taken. See substitute well 808A***							
808A (Sub for MW946)	10/26/15	56.5	6.93	-34	5.93	3.7	1.44	4.2	139
MW947[2]	10/27/15	***-Insufficient volume see substitute well MW423***							
MW423 (Sub for MW947)	10/29/15	51.8	7.77	-233	1.64	0.0	0.44	3.7	123
MW948	10/27/15	52.5	6.97	-31	4.60	0.1	6.22	2.9	97
MW949	10/27/15	50.2	7.70	-190	3.10	2.0	0.88	2.9	95
MW950	10/30/15	55.2	6.64	0	4.68	2.0	5.91	3.0	100
MW951	10/30/15	54.7	6.65	-55	2.30	15.8	1.79	3.0	100
MW952	10/29/15	53.5	7.20	278	2.31	0.4	3.72	3.5	100
MW953	10/29/15	56.1	7.43	307	0.59	5.2	7.69	3.3	110
MW954	10/29/15	7.1	7.11	182	2.62	4.8	0.76	4.3	143
MW955[4]	10/29/15	52.3	7.28	107	1.83	1.9	2.13	4.6	114
MW956	10/29/15	58.3	6.68	-87	2.56	0.2	3.63	5.0	165
MW957	10/29/15	57.4	6.84	84	2.50	4.5	3.40	4.4	120
MW958	10/30/15	56.5	7.20	221	1.30	0.6	2.65	2.8	93
MW959	10/30/15	54.8	6.92	19	2.35	0.0	0.98	2.9	95
MW960	10/27/15	58.7	7.04	-35	1.56	0.0	0.36	3.0	100
OW03A	10/29/15	55.6	7.01	-52	2.22	2.1	1.10	6.0	200
OW03B	10/29/15	56.4	7.39	10	2.09	2.1	3.22	4.7	155
OW04A	10/29/15	51.8	7.81	-155	1.53	4.3	0.70	3.0	98
OW04B	10/29/15	55.1	7.10	-25	1.96	68.6	0.62	5.0	167
OW05A	10/27/15	54.4	7.79	-157	1.42	5.7	0.88	3.4	100
OW05B	10/27/15	56.0	7.22	-12	1.66	4.5	0.69	3.2	105
OW06A	10/29/15	52.8	7.44	-125	2.23	6.3	1.33	4.8	160
OW06B	10/29/15	52.9	7.15	-9	1.96	14.2	1.90	2.5	60
OW07A	10/30/15	53.3	7.42	-109	2.40	0.0	0.56	3.0	98
OW07B	10/30/15	54.7	6.93	38	2.19	0.5	3.92	2.9	97
OW11A	10/29/15	52.1	7.58	187	1.68	10.0	1.13	3.0	100
OW11B	10/29/15	52.1	7.12	179	1.76	0.0	1.57	4.0	100
OW12A	10/27/15	55.5	7.49	-115	1.67	6.2	0.54	3.0	100
OW12B[5]	10/27/15	59.0	7.21	40	1.20	0.0	1.16	3.5	100
OW13A	10/27/15	56.2	7.41	-113	2.08	6.2	0.93	3.9	130
OW13B	10/27/15	58.8	7.08	-24	2.52	7.0	1.42	4.5	140
OW15A	10/27/15	55.9	7.57	-86	2.27	4.2	1.25	3.6	120
OW15B	10/27/15	58.0	7.14	80	1.10	5.6	1.65	4.9	140
OW17A	10/27/15	56.4	7.81	-179	2.51	0.0	0.70	3.0	67
OW17B	10/27/15	57.8	7.41	13	1.42	0.0	0.83	5.3	156
OW18B	10/29/15	60.2	6.99	157	2.15	0.0	1.30	6.3	210

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

NA - Not Applicable
*Parameter not taken/meter malfunction
[1] Quarterly sampling.
[2] Insufficient well volume and/or dry.
[3] Grab sample.
[4] Chemical sample broken during shipment to laboratory resampled 11/2/2015
[5] Radiological sample collected on 10/29 well purged dry and chemical collected 10/30

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			302A	302A	411A	411A	505
Field Sample Identifier :			302A	302A	411A	411A	505
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/15/15	10/27/15	04/14/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	560	550	830	640	890
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	0 U	1 U	0 U	1 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	0 U	1 U	0 U	1 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	560	550	830	640	890
BROMIDE	MG/L	2	1.5	1.2	0.24 J	0.36	2.9
CHLORIDE (AS CL)	MG/L	250	520 J	330 J	14 J	37	210
DISSOLVED SOLIDS, TOTAL	MG/L	1000	7,300	6,400	1,600	3,000	5,400
FLUORIDE	MG/L	1.5	0.2 U	0.22 J	0.55	0.55	0.99
NITROGEN, NITRATE (AS N)	MG/L	10	0.39	0.12 U	0.12 U	0.12 U	0.11 J
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.2 U	0.084 J	0.2 U	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
SULFATE	MG/L	250	7,200	3,200	680	1,500	3,400

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			505	808A	A42	A42	A43
Field Sample Identifier :			505	808A	A42	A42	A43
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	10/26/15	04/14/15	10/29/15	04/13/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	1,200	640	440	420	590
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	1 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	1 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	1,200	640	440	420	590
BROMIDE	MG/L	2	4	2.6	0.43	0.33 J	0.62
CHLORIDE (AS CL)	MG/L	250	330 J	260 J	21 J	26	28
DISSOLVED SOLIDS, TOTAL	MG/L	1000	9,000	5,500	950	990	1,700
FLUORIDE	MG/L	1.5	1.6	0.3 J	0.2 U	0.094 J	0.32 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.14 J	0.12 U	0.12 J	0.025 U	0.12 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.2 U	0.084 J	0.021 J	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.2 U	0.2 U	0.04 U	0.2 U
SULFATE	MG/L	250	4,600	2,900 J	370	360	800

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			A43	A45	A45	A50	A50
Field Sample Identifier :			A43	A45	A45	A50	A50
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/29/15	04/13/15	10/30/15	04/15/15	10/27/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	600	470	470	460	450
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	4.534 U	4.534 U	4.534 U	0 U	1 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	4.534 U	4.534 U	4.534 U	0 U	1 U
ALKALINITY, TOTAL	MG/L	500	600	470	470	460	450
BROMIDE	MG/L	2	0.61 J	0.31	0.27	0.42	0.44
CHLORIDE (AS CL)	MG/L	250	23	60	53	23	22
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,700	1,700	1,700	1,300	1,400
FLUORIDE	MG/L	1.5	0.04 U	0.18 J	0.33	0.2 U	0.29 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.025 U	0.16 J	0.031 J	0.41	0.12 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.02 J	0.2 U	0.025 J	0.1 J	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.04 U	0.2 U	0.04 U	0.2 U	0.2 U
SULFATE	MG/L	250	770	1,000	790	670	580

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			A55	A55	BH49	BH49	BH49A
Field Sample Identifier :			A55	A55	BH49	BH49	BH49A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/13/15	10/29/15	04/14/15	10/27/15	04/14/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	4.534 U	4.534 U	110	66	400
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	76	79	4.534 U	1 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	560	670	4.534 U	1 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	640	750	110	66	400
BROMIDE	MG/L	2	0.6	0.57 J	0.25	0.31	0.31
CHLORIDE (AS CL)	MG/L	250	110	61	21 J	27	45 J
DISSOLVED SOLIDS, TOTAL	MG/L	1000	2,400	2,400	600	680	1,200
FLUORIDE	MG/L	1.5	0.2 U	0.26 J	0.2 U	0.22 J	0.25 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.11 J	0.025 U	0.39	0.31	0.14 J
NITROGEN, NITRITE (AS N)	MG/L	1	0.74	0.04 U	0.088 J	0.2 U	0.12 J
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.12 J	0.04 U	0.2 U	0.2 U	0.2 U
SULFATE	MG/L	250	1,300	1,100	360	330	580

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			BH49A	MW423	MW423	MW862	MW862
Field Sample Identifier :			BH49A	MW423	MW423	MW862	MW862
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/15/15	10/29/15	04/15/15	10/27/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	400	680	700	620	620
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	1 U	0 U	4.534 U	0 U	1 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	1 U	0 U	4.534 U	0 U	1 U
ALKALINITY, TOTAL	MG/L	500	400	680	700	620	620
BROMIDE	MG/L	2	0.3	0.29	0.25	0.54	0.5
CHLORIDE (AS CL)	MG/L	250	44	11	9	85 J	83 J
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,300	960	940	1,300	1,400
FLUORIDE	MG/L	1.5	0.26 J	0.25 J	0.55	0.2 U	0.3 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.16 J	0.49	0.061	0.37	0.12 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.12 J	0.04 U	0.2 U	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.35 J	0.2 U	0.54	0.2 U	2.1
SULFATE	MG/L	250	500	260	200	500	460

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW863	MW863	MW921	MW922	MW934
Field Sample Identifier :			MW863	MW863	MW921	MW922	MW934
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/14/15	10/29/15	04/15/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	230	240	770	410	690
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	0 U	1 U	4.534 U	4.534 U	0 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	0 U	1 U	4.534 U	4.534 U	0 U
ALKALINITY, TOTAL	MG/L	500	230	240	770	410	690
BROMIDE	MG/L	2	0.48	0.48	2.6	0.39	0.63
CHLORIDE (AS CL)	MG/L	250	33	32	220	27	85 J
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,600	1,700	3,700	4,500	3,400
FLUORIDE	MG/L	1.5	0.2 U	0.19 J	0.2 U	0.13	0.2 U
NITROGEN, NITRATE (AS N)	MG/L	10	0.86	0.12 U	0.12 J	0.17	0.12 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.12 J	0.2 U	0.2 U	0.04 U	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.2 U	0.2 U	0.04 U	0.2 U
SULFATE	MG/L	250	1,300	870	2,000	2,900	2,100

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW934	MW935	MW935	MW938	MW938
Field Sample Identifier :			MW934	MW935	MW935	MW938	MW938
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/13/15	10/27/15	04/13/15	10/26/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	710	550	590	720	700
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	1 U	4.534 U	1 U	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	1 U	4.534 U	1 U	4.534 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	710	550	590	720	700
BROMIDE	MG/L	2	0.58	0.22 J	0.34	0.46	0.43
CHLORIDE (AS CL)	MG/L	250	47 J	12	28	40	38
DISSOLVED SOLIDS, TOTAL	MG/L	1000	3,300	1,700	2,300	3,300	3,400
FLUORIDE	MG/L	1.5	0.51	0.45 J	0.4 J	0.2 U	0.34 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.12 U	0.16 J	0.15 J	0.11 J	0.12 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.098 J	0.2 U	0.087 J	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.2 U	0.71	0.2 U	0.2 U
SULFATE	MG/L	250	1,700	1,100	1,100	2,100	1,700

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW943	MW943	MW944	MW945	MW946
Field Sample Identifier :			MW943	MW943	MW944	MW945	MW946
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/16/15	10/30/15	04/14/15	04/14/15	04/13/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	450	440	540	560	560
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	0 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	0 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	450	440	540	560	560
BROMIDE	MG/L	2	0.35	0.28	0.25	1.5	2.6
CHLORIDE (AS CL)	MG/L	250	65	68	10 J	110	290
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,400	1,300	990	1,900	7,200
FLUORIDE	MG/L	1.5	0.47 J	0.46	0.2 U	0.37 J	0.28 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.12 U	0.069 J	0.57	0.19 J	0.33
NITROGEN, NITRITE (AS N)	MG/L	1	0.11 J	0.04 U	0.081 J	0.085 J	0.082 J
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.04 U	0.2 U	0.2 U	0.2 U
SULFATE	MG/L	250	610	560	340	1,100	5,000

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW946	MW948	MW948	MW949	MW949
Field Sample Identifier :			MW946	MW948	MW948	MW949	MW949
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/15/15	10/27/15	04/15/15	10/27/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	560	550	590	70	63
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	4.534 U	0 U	1 U	0 U	1 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	4.534 U	0 U	1 U	0 U	1 U
ALKALINITY, TOTAL	MG/L	500	560	550	590	70	63
BROMIDE	MG/L	2	2.6	0.82	0.78	0.9	0.83
CHLORIDE (AS CL)	MG/L	250	340	74 J	89 J	140 J	96 J
DISSOLVED SOLIDS, TOTAL	MG/L	1000	7,600	4,200	4,200	2,400	2,600
FLUORIDE	MG/L	1.5	1.5	0.2 U	0.48 J	0.2 U	0.2 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.16 J	0.14 J	0.12 U	0.15 J	0.21 J
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.2 U	0.2 U	0.11 J	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.2 U	0.2 U	0.14 J	0.2 U
SULFATE	MG/L	250	4,300	2,400	2,300	1,500	1,700

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW950	MW950	MW951	MW951	MW952
Field Sample Identifier :			MW950	MW950	MW951	MW951	MW952
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/16/15	10/30/15	04/16/15	10/30/15	04/14/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	520	540	540	560	360
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	0 U	4.534 U	0 U	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	0 U	4.534 U	0 U	4.534 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	520	540	540	560	360
BROMIDE	MG/L	2	0.62	0.54	0.28	0.28 J	0.29
CHLORIDE (AS CL)	MG/L	250	58	51	65	67	50
DISSOLVED SOLIDS, TOTAL	MG/L	1000	2,900	3,100	1,300	1,400	1,800
FLUORIDE	MG/L	1.5	0.2 U	0.14	0.35 J	0.54 J	0.34 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.3	0.092 J	0.12 U	0.1 J	0.11 J
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.021 J	0.11 J	0.02 J	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.04 U	0.2 U	0.04 U	0.2 U
SULFATE	MG/L	250	1,600	2,000	470 J	570	1,300

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW952	MW953	MW953	MW954	MW954
Field Sample Identifier :			MW952	MW953	MW953	MW954	MW954
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/29/15	04/14/15	10/29/15	04/14/15	10/29/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	390	410	210	460	480
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	4.534 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	4.534 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	390	410	210	460	480
BROMIDE	MG/L	2	0.24 J	0.15 J	0.04 U	0.22 J	0.18
CHLORIDE (AS CL)	MG/L	250	40	24 J	3.9	41 J	30
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,800	1,600	410	2,200	2,200
FLUORIDE	MG/L	1.5	0.45 J	0.41 J	1.3	0.3 J	0.21
NITROGEN, NITRATE (AS N)	MG/L	10	0.032 J	0.14 J	0.61	0.14 J	0.025 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.04 U	0.2 U	0.04 U	0.087 J	0.04 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.04 U	0.2 U	0.083 J	0.2 U	0.04 U
SULFATE	MG/L	250	940	920	130	1,500	1,200

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW955	MW956	MW956	MW957	MW957
Field Sample Identifier :			MW955	MW956	MW956	MW957	MW957
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/14/15	04/15/15	10/29/15	04/14/15	10/29/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	430	550	540	560	590
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	4.534 U	0 U	4.534 U	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	4.534 U	0 U	4.534 U	4.534 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	430	550	540	560	590
BROMIDE	MG/L	2	0.25 J	0.48	0.44	0.4	0.45
CHLORIDE (AS CL)	MG/L	250	23 J	41	30	19	20
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,300	1,700	1,800	1,900	2,000
FLUORIDE	MG/L	1.5	0.35 J	0.2 U	0.23	0.42 J	0.33
NITROGEN, NITRATE (AS N)	MG/L	10	0.12 U	0.21 J	0.28	0.15 J	0.071
NITROGEN, NITRITE (AS N)	MG/L	1	0.12 J	0.2 U	0.04 U	0.2 U	0.04 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.2 U	0.04 U	0.2 U	0.04 U
SULFATE	MG/L	250	670	1,200	840	960	930

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW958	MW958	MW959	MW959	MW960
Field Sample Identifier :			MW958	MW958	MW959	MW959	MW960
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/16/15	10/30/15	04/16/15	10/30/15	04/16/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	440	480	510	500	520
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	0 U	4.534 U	0 U	4.534 U	0 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	0 U	4.534 U	0 U	4.534 U	0 U
ALKALINITY, TOTAL	MG/L	500	440	480	510	500	520
BROMIDE	MG/L	2	0.19 J	0.17	0.39	0.38 J	0.14 J
CHLORIDE (AS CL)	MG/L	250	38	30	67	36	51
DISSOLVED SOLIDS, TOTAL	MG/L	1000	770	860	1,500	1,500	1,100
FLUORIDE	MG/L	1.5	0.2 U	0.24	0.46 J	0.44 J	0.29 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.24 J	0.022 J	0.12 U	0.027 J	0.12 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.04 U	0.2 U	0.022 J	0.11 J
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.04 U	0.2 U	0.04 U	0.2 U
SULFATE	MG/L	250	220	250	690	720	350

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW960	OW03A	OW03A	OW03B	OW03B
Field Sample Identifier :			MW960	OW03A	OW03A	OW03B	OW03B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	10/29/15	04/14/15	10/29/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	510	500	500	500	500
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	1 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	1 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	510	500	500	500	500
BROMIDE	MG/L	2	0.2 U	0.42	0.37	0.3	0.23
CHLORIDE (AS CL)	MG/L	250	46 J	32 J	25	29 J	26
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,100	1,500	1,600	1,500	1,300
FLUORIDE	MG/L	1.5	0.28 J	0.32 J	0.32	0.3 J	0.6
NITROGEN, NITRATE (AS N)	MG/L	10	0.12 U	0.33	0.067	0.3	0.052
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.2 U	0.04 U	0.11 J	0.04 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.38 J	0.2 U	0.04 U	0.2 U	0.04 U
SULFATE	MG/L	250	290	810	730	3,700	580

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW04A	OW04A	OW04A	OW04A	OW04B
Field Sample Identifier :			OW04A	OW04A	OW04A	OW04A	OW04B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			02/11/15	04/15/15	08/17/15	10/29/15	02/11/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	180	120	150	170	340
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	4.534 U	28	0 U	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	4.534 U	0 U	0 U	4.534 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	180	150	160	170	340
BROMIDE	MG/L	2	0.44	0.45	0.46	0.45	0.088
CHLORIDE (AS CL)	MG/L	250	99	33	32	28	96
DISSOLVED SOLIDS, TOTAL	MG/L	1000	960	920	960	1,000	1,300
FLUORIDE	MG/L	1.5	0.32	0.2 U	0.2 J	0.25	0.38
NITROGEN, NITRATE (AS N)	MG/L	10	0.2 J	0.26	0.12 U	0.037 J	0.025 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.04 U	0.2 U	0.2 U	0.04 U	0.04 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.01	0.2 U	0.37 J	0.04 U	0.01 U
SULFATE	MG/L	250	54	560	490	530	550

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW04B	OW04B	OW04B	OW05A	OW05A
Field Sample Identifier :			OW04B	OW04B	OW04B	OW05A	OW05A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/16/15	08/17/15	10/29/15	04/15/15	10/27/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	340	340	350	260	270
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	0 U	0 U	4.534 U	0 U	1 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	0 U	0 U	4.534 U	0 U	1 U
ALKALINITY, TOTAL	MG/L	500	340	340	350	260	270
BROMIDE	MG/L	2	0.12 J	0.2 U	0.091	0.55	0.49
CHLORIDE (AS CL)	MG/L	250	100 J	88	85 J	43	42
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,300	1,300	1,300	970	1,000
FLUORIDE	MG/L	1.5	0.33 J	0.48 J	0.69	0.2 U	0.31 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.14 J	0.18 J	0.025 U	0.19 J	0.12 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.12 J	0.2 U	0.04 U	0.09 J	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.2 U	0.04 U	0.2 U	0.74
SULFATE	MG/L	250	570	530	580	510	400

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW05B	OW05B	OW06A	OW06A	OW06B
Field Sample Identifier :			OW05B	OW05B	OW06A	OW06A	OW06B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/16/15	10/29/15	04/16/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	400	390	220	240	530
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	0 U	1 U	0 U	4.534 U	0 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	0 U	1 U	0 U	4.534 U	0 U
ALKALINITY, TOTAL	MG/L	500	400	390	220	240	530
BROMIDE	MG/L	2	0.18 J	0.2 U	0.5	0.46	0.35
CHLORIDE (AS CL)	MG/L	250	16	16	35	28	56
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,200	1,200	1,500	1,600	1,200
FLUORIDE	MG/L	1.5	0.2 U	0.28 J	0.2 U	0.52	0.2 U
NITROGEN, NITRATE (AS N)	MG/L	10	0.46	0.12 U	0.24 J	0.66	0.12 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.12 J	0.2 U	0.12 J	0.04 U	0.11 J
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.2 U	0.2 U	0.04 U	0.2 U
SULFATE	MG/L	250	600	530	930	880	460

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW06B	OW07A	OW07A	OW07B	OW07B
Field Sample Identifier :			OW06B	OW07A	OW07A	OW07B	OW07B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/29/15	04/14/15	10/30/15	04/14/15	10/30/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	520	200	170	430	440
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	4.534 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	4.534 U	4.534 U	4.534 U	4.534 U	4.534 U
ALKALINITY, TOTAL	MG/L	500	520	200	170	430	440
BROMIDE	MG/L	2	0.3	0.69	0.68	0.28	0.29
CHLORIDE (AS CL)	MG/L	250	58	45	38	20 J	16
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,200	1,700	1,700	1,600	1,500
FLUORIDE	MG/L	1.5	0.4	0.2 U	0.5	0.38 J	0.46
NITROGEN, NITRATE (AS N)	MG/L	10	0.28	0.12 U	0.14 J	0.12 U	0.097 J
NITROGEN, NITRITE (AS N)	MG/L	1	0.04 U	0.11 J	0.023 J	0.2 U	0.027 J
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.04 U	0.2 U	0.04 U	0.2 U	0.04 U
SULFATE	MG/L	250	460	990	1,000	840	720

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW11A	OW11A	OW11B	OW11B	OW12A
Field Sample Identifier :			OW11A	OW11A	OW11B	OW11B	OW12A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/14/15	10/30/15	04/14/15	10/29/15	04/15/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	230	260	360	380	200
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	4.534 U	4.534 U	4.534 U	4.534 U	0 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	4.534 U	4.534 U	4.534 U	4.534 U	0 U
ALKALINITY, TOTAL	MG/L	500	230	260	360	380	200
BROMIDE	MG/L	2	0.42	0.38	0.16 J	0.14	0.39
CHLORIDE (AS CL)	MG/L	250	26 J	24 J	20 J	22	24
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,100	1,200	1,200	1,300	1,400
FLUORIDE	MG/L	1.5	0.19 J	0.16	0.2 U	0.5	0.2 U
NITROGEN, NITRATE (AS N)	MG/L	10	0.33	0.066 J	0.12 U	0.025 U	0.12 U
NITROGEN, NITRITE (AS N)	MG/L	1	0.088 J	0.02 J	0.13 J	0.04 U	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.04 U	0.2 U	0.04 U	0.2 U
SULFATE	MG/L	250	540	610	600	570	790

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW12A	OW12B	OW12B	OW13A	OW13A
Field Sample Identifier :			OW12A	OW12B	OW12B	OW13A	OW13A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/15/15	10/30/15	04/14/15	10/27/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	220	180	410	200	210
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	1 U	0 U	4.534 U	4.534 U	1 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	1 U	0 U	4.534 U	4.534 U	1 U
ALKALINITY, TOTAL	MG/L	500	220	180	410	200	210
BROMIDE	MG/L	2	0.39	0.2 U	0.089	0.57	0.58
CHLORIDE (AS CL)	MG/L	250	22 J	4.5	7.3	43 J	41 J
DISSOLVED SOLIDS, TOTAL	MG/L	1000	1,400	270	1,000	1,600	1,700
FLUORIDE	MG/L	1.5	0.32 J	0.47 J	0.22	0.2 U	0.32 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.14 J	0.42 J	0.052 J	0.16 J	0.11 J
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.2 U	0.02 J	0.12 J	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	1.8	0.2 U	0.19 J	0.2 U	0.79
SULFATE	MG/L	250	560	49	Not Anaylzed	1,300	1,000

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW13B	OW13B	OW15A	OW15A	OW15B
Field Sample Identifier :			OW13B	OW13B	OW15A	OW15A	OW15B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/13/15	10/27/15	04/14/15	10/27/15	04/15/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	510	480	95	94	310
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	4.534 U	1 U	4.534 U	1 U	0 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	4.534 U	1 U	4.534 U	1 U	0 U
ALKALINITY, TOTAL	MG/L	500	510	480	95	94	310
BROMIDE	MG/L	2	0.38	0.38	0.82	0.77	0.2 U
CHLORIDE (AS CL)	MG/L	250	47	41 J	110 J	74 J	4.6 J
DISSOLVED SOLIDS, TOTAL	MG/L	1000	2,300	2,300	1,900	1,800	520
FLUORIDE	MG/L	1.5	0.19 J	0.39 J	0.28 J	0.32 J	0.2 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.12 U	0.12 U	0.12 U	0.12 U	0.44 J
NITROGEN, NITRITE (AS N)	MG/L	1	0.088 J	0.2 U	0.087 J	0.2 U	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.2 U	0.2 U	0.2 U	0.2 U	0.73 J
SULFATE	MG/L	250	1,500	1,300	1,600	1,100	160

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW15B	OW17A	OW17A	OW17B	OW17B
Field Sample Identifier :			OW15B	OW17A	OW17A	OW17B	OW17B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	10/27/15	04/14/15	10/27/15
Parameter	Units	Criteria[1]					
MISCELLANEOUS							
ALKALINITY, BICARBONATE (As CaCO3)	MG/L	-	380	62	120	440	420
ALKALINITY, CARBONATE (As CaCO3)	MG/L	-	1 U	4.534 U	1 U	4.534 U	1 U
ALKALINITY, HYDROXIDE (AS CACO3)	MG/L	-	1 U	4.534 U	1 U	4.534 U	1 U
ALKALINITY, TOTAL	MG/L	500	380	62	120	440	420
BROMIDE	MG/L	2	0.2 U	0.58	0.44	0.16 J	0.2 U
CHLORIDE (AS CL)	MG/L	250	4.8	98	38	11 J	7.9
DISSOLVED SOLIDS, TOTAL	MG/L	1000	860	3,000	2,200	1,000	1,000
FLUORIDE	MG/L	1.5	0.48 J	0.35 J	0.2 J	0.33 J	0.32 J
NITROGEN, NITRATE (AS N)	MG/L	10	0.13 J	0.12 U	0.12 U	0.15 J	0.23 J
NITROGEN, NITRITE (AS N)	MG/L	1	0.2 U	0.088 J	0.2 U	0.086 J	0.2 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	MG/L	-	0.61	0.2 U	1.6	0.2 U	0.2 U
SULFATE	MG/L	250	300	2,400	1,200	460	410

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 16
GROUNDWATER ANALYTICAL RESULTS - WATER QUALITY PARAMETERS
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW18B	OW18B
Field Sample Identifier :			OW18B	OW18B
Sample Type :			Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-
Date of Sample :			04/13/15	10/29/15
Parameter	**Units**	**Criteria[1]**		
MISCELLANEOUS				
ALKALINITY, BICARBONATE (As CaCO3)	*MG/L*	-	550	580
ALKALINITY, CARBONATE (As CaCO3)	*MG/L*	-	4.534 U	4.534 U
ALKALINITY, HYDROXIDE (AS CACO3)	*MG/L*	-	4.534 U	4.534 U
ALKALINITY, TOTAL	*MG/L*	500	550	580
BROMIDE	*MG/L*	2	0.25	0.16
CHLORIDE (AS CL)	*MG/L*	250	17	10
DISSOLVED SOLIDS, TOTAL	*MG/L*	1000	1,400	1,300
FLUORIDE	*MG/L*	1.5	0.4 J	0.66
NITROGEN, NITRATE (AS N)	*MG/L*	10	0.17 J	0.23
NITROGEN, NITRITE (AS N)	*MG/L*	1	0.13 J	0.04 U
PHOSPHORUS, TOTAL ORTHOPHOSPHATE (AS PO4)	*MG/L*	-	0.2 U	0.04 U
SULFATE	*MG/L*	250	720	590

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			302A	302A	411A	411A	505
Field Sample Identifier :			302A	302A	411A	411A	505
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/15/15	10/27/15	04/14/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.0701 U	0.163 U	0.0691 U	0.375 U	0.181 J
TOTAL URANIUM	*UG/L*	30	112	87.5	18.7	23.2	40.4

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			505	808A	A42	A42	A43
Field Sample Identifier :			505	808A	A42	A42	A43
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	10/26/15	04/14/15	10/29/15	04/13/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	-0.089 U	0.305 U	0.124 J	-0.031 U	0 U
TOTAL URANIUM	*UG/L*	30	21.9	43.5	43	46.8	40

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			A43	A45	A45	A50	A50
Field Sample Identifier :			A43	A45	A45	A50	A50
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/29/15	04/13/15	10/30/15	04/15/15	10/27/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.265 U	0.128 J	0.347 U	0.325	-0.182 U
TOTAL URANIUM	*UG/L*	30	39.8	34.8	35	16.5	16.6

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			A55	A55	BH49	BH49	BH49A
Field Sample Identifier :			A55	A55	BH49	BH49	BH49A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/13/15	10/29/15	04/14/15	10/27/15	04/14/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.259 U	0.392 U	0 U	0.679 J	0.118 U
TOTAL URANIUM	*UG/L*	30	0.13 J	0.141 J	6.59	1.62	19.9

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			BH49A	MW423	MW423	MW862	MW862
Field Sample Identifier :			BH49A	MW423	MW423	MW862	MW862
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/15/15	10/29/15	04/15/15	10/27/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.4 U	0.0743 U	0.734 J	0 U	0.494 U
TOTAL URANIUM	*UG/L*	30	18.4	11.2	10.2	26.6	23

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW863	MW863	MW921	MW922	MW934
Field Sample Identifier :			MW863	MW863	MW921	MW922	MW934
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/14/15	10/29/15	04/15/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.705	0.426 U	0.237	0.282 U	0.331 J
TOTAL URANIUM	*UG/L*	30	4.64	3.75	34	32.8	36.7

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW934	MW935	MW935	MW938	MW938
Field Sample Identifier :			MW934	MW935	MW935	MW938	MW938
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/13/15	10/27/15	04/13/15	10/26/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.191 U	0.137 J	0.259 U	0.174	0.264 U
TOTAL URANIUM	*UG/L*	30	34.4	21.6	22.9	25.3	19.7

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW943	MW943	MW944	MW945	MW946
Field Sample Identifier :			MW943	MW943	MW944	MW945	MW946
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/16/15	10/30/15	04/14/15	04/14/15	04/13/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.539 J	0.0929 U	0.19 U	0.536 J	0.351
TOTAL URANIUM	*UG/L*	30	20.4	20.8	7.08	11.9	31.2

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW946	MW948	MW948	MW949	MW949
Field Sample Identifier :			MW946	MW948	MW948	MW949	MW949
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/26/15	04/15/15	10/27/15	04/15/15	10/27/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.314 U	0.134 J	-0.082 U	0.263 J	0.286 U
TOTAL URANIUM	*UG/L*	30	33.7	32.7	29.7	4.44	2.1

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW950	MW950	MW951	MW951	MW952
Field Sample Identifier :			MW950	MW950	MW951	MW951	MW952
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/16/15	10/30/15	04/16/15	10/30/15	04/14/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.201 U	0.184 U	0.74 J	0.0945 U	0.257
TOTAL URANIUM	*UG/L*	30	32.9	35.4	2,917	3,280	247

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW952	MW953	MW953	MW954	MW954
Field Sample Identifier :			MW952	MW953	MW953	MW954	MW954
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/29/15	04/14/15	10/29/15	04/14/15	10/29/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.689 J	0.274 U	0.315 U	0.489	0.461 U
TOTAL URANIUM	*UG/L*	30	215	4,523	2,106	682	548

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW955	MW955	MW956	MW956	MW957
Field Sample Identifier :			MW955	MW955	MW956	MW956	MW957
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/14/15	11/04/15	04/15/15	10/29/15	04/14/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.157 U	0.0794 U	0.067 U	0.28 U	0.5
TOTAL URANIUM	*UG/L*	30	24.9	23.3	61.2	50.5	3,290

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW957	MW958	MW958	MW959	MW959
Field Sample Identifier :			MW957	MW958	MW958	MW959	MW959
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/29/15	04/16/15	10/30/15	04/16/15	10/30/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.308 U	0.236 J	0.493 U	0.788	0.18 U
TOTAL URANIUM	*UG/L*	30	1,967	216	123	193	76.8

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW960	MW960	OW03A	OW03A	OW03B
Field Sample Identifier :			MW960	MW960	OW03A	OW03A	OW03B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/16/15	10/27/15	04/14/15	10/29/15	04/14/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.732 J	0.179 U	0.618	0.506 U	0.298 J
TOTAL URANIUM	*UG/L*	30	1,165	1,063	10.4	9.82	19.2

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW03B	OW04A	OW04A	OW04A	OW04A
Field Sample Identifier :			OW03B	OW04A	OW04A	OW04A	OW04A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/29/15	02/11/15	04/15/15	08/17/15	10/29/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.229 U	0.131 U	0.133 U	0.244 U	0.165 U
TOTAL URANIUM	*UG/L*	30	17.3	1.99 B	2.1	2.11	1.93

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW04B	OW04B	OW04B	OW04B	OW05A
Field Sample Identifier :			OW04B	OW04B	OW04B	OW04B	OW05A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			02/11/15	04/16/15	08/17/15	10/29/15	04/15/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.771	0.22 J	0.0669 U	-0.236 U	0.443 J
TOTAL URANIUM	*UG/L*	30	46.5	49.6	46.5	45.1	2

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW05A	OW05B	OW05B	OW06A	OW06A
Field Sample Identifier :			OW05A	OW05B	OW05B	OW06A	OW06A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/15/15	10/27/15	04/16/15	10/29/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	-0.088 U	-0.067 U	0.174 U	0.344	0.91 U
TOTAL URANIUM	*UG/L*	30	1.78	15.5	13.7	1.45	1.71

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW06B	OW06B	OW07A	OW07A	OW07B
Field Sample Identifier :			OW06B	OW06B	OW07A	OW07A	OW07B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/16/15	10/29/15	04/14/15	10/30/15	04/14/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0 U	-0.039 U	0.119 U	0.167 U	0.202 J
TOTAL URANIUM	*UG/L*	30	19.1	15.4	1.79	1.62	20.4

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW07B	OW11A	OW11A	OW11B	OW11B
Field Sample Identifier :			OW07B	OW11A	OW11A	OW11B	OW11B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/30/15	04/14/15	10/30/15	04/14/15	10/29/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.487 U	0.551 J	0.455 U	0.261 J	0.19 U
TOTAL URANIUM	*UG/L*	30	22.7	1.25	2.08	370	246

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW12A	OW12A	OW12B	OW12B	OW13A
Field Sample Identifier :			OW12A	OW12A	OW12B	OW12B	OW13A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/15/15	10/30/15	04/14/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.523 J	0.34 U	0.135 J	0.587 J	0.304 J
TOTAL URANIUM	*UG/L*	30	4.41	3.73	26.5	28.1	2.5

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW13A	OW13B	OW13B	OW15A	OW15A
Field Sample Identifier :			OW13A	OW13B	OW13B	OW15A	OW15A
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/13/15	10/27/15	04/14/15	10/27/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.174 U	0.0616 U	0.0314 U	0.266 J	0.463 U
TOTAL URANIUM	*UG/L*	30	2.87	14.2	30.3	0.41	0.402

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW15B	OW15B	OW17A	OW17A	OW17B
Field Sample Identifier :			OW15B	OW15B	OW17A	OW17A	OW17B
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/14/15	10/27/15	04/14/15
Parameter	Units	Criteria[1]					
RADIONUCLIDES							
RADIUM-226	*PCI/L*	3	0.0688 U	0.2 U	0.127 U	0.333 U	0.254 J
TOTAL URANIUM	*UG/L*	30	9.55	8.83	1.13	1.15	5.69

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 17
GROUNDWATER ANALYTICAL RESULTS - RADIONUCLIDES
NIAGARA FALLS STORAGE SITE

Location Identifier :			OW17B	OW18B	OW18B
Field Sample Identifier :			OW17B	OW18B	OW18B
Sample Type :			Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-
Date of Sample :			10/27/15	04/13/15	10/29/15
Parameter	Units	Criteria[1]			
RADIONUCLIDES					
RADIUM-226	*PCI/L*	3	-0.213 U	0.31 J	-0.094 U
TOTAL URANIUM	*UG/L*	30	6.53	13.2	14.1

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

If turbidity measurements exceed 50 nephelometric turbidity units (NTUs) for any groundwater or surface water sample, the sample is field filtered via a disposable 0.45 micron in-line filter to remove solids and reduce the turbidity readings to below the 50 NTU threshold and then the filtered and unfiltered samples are analyzed.
U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			411A	411A	MW423	MW423	MW934
Field Sample Identifier :			411A	411A	MW423	MW423	MW934
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/15/15	10/29/15	04/15/15
Parameter	Units	Criteria[1]					
VOLATILE ORGANIC ANALYSES							
1,1,1,2-TETRACHLOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1,2,2-TETRACHLOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1,2-TRICHLOROETHANE	UG/L	1	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1-DICHLOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1-DICHLOROETHENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1-DICHLOROPROPENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2,3-TRICHLOROBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2,3-TRICHLOROPROPANE	UG/L	0.04	1 U	1 U	1 U	1 U	1 U
1,2,4-TRICHLOROBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2,4-TRIMETHYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2-DIBROMO-3-CHLOROPROPANE	UG/L	0.04	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	UG/L	0.006	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2-DICHLOROBENZENE	UG/L	3	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2-DICHLOROETHANE	UG/L	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2-DICHLOROPROPANE	UG/L	1	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,3-DICHLOROBENZENE	UG/L	3	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,3-DICHLOROPROPANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			411A	411A	MW423	MW423	MW934
Field Sample Identifier :			411A	411A	MW423	MW423	MW934
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/15/15	10/29/15	04/15/15
Parameter	Units	Criteria[1]					
VOLATILE ORGANIC ANALYSES							
1,4-DICHLOROBENZENE	UG/L	3	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
2,2-DICHLOROPROPANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
2-CHLOROTOLUENE	UG/L	-	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
2-HEXANONE	UG/L	50	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
4-CHLOROTOLUENE	UG/L	-	1 U	1 U	1 U	1 U	1 U
ACETONE	UG/L	50	5.1 J	2.6 J	3.5 J	3.7 J	3.4 J
BENZENE	UG/L	1	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMOBENZENE	UG/L	-	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMOCHLOROMETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMODICHLOROMETHANE	UG/L	50	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMOFORM	UG/L	50	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMOMETHANE	UG/L	5	4 U	4 U	4 U	4 U	4 U
CARBON DISULFIDE	UG/L	60	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
CARBON TETRACHLORIDE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
CHLOROBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
CHLOROETHANE	UG/L	5	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	UG/L	7	0.6 U	0.6 U	0.6 U	0.6 U	9.6
CHLOROMETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
CIS-1,2-DICHLOROETHYLENE	UG/L	5	0.6 U	0.2 J	0.6 U	0.6 U	0.6 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			411A	411A	MW423	MW423	MW934
Field Sample Identifier :			411A	411A	MW423	MW423	MW934
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/15/15	10/29/15	04/15/15
Parameter	Units	Criteria[1]					
VOLATILE ORGANIC ANALYSES							
CIS-1,3-DICHLOROPROPENE	UG/L	0.4	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
DIBROMOCHLOROMETHANE	UG/L	50	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
DIBROMOMETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
DICHLORODIFLUOROMETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
ETHYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
HEXACHLOROBUTADIENE	UG/L	0.5	1 U	1 U	1 U	1 U	1 U
ISOPROPYLBENZENE (CUMENE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
M+P-XYLENE	UG/L	5	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
METHYL ETHYL KETONE (2-BUTANONE)	UG/L	50	5 U	5 U	5 U	5 U	5 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L	-	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
METHYLENE CHLORIDE	UG/L	5	0.6 U	0.6 U	0.6 U	R	0.6 U
NAPHTHALENE	UG/L	10	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
N-BUTYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
N-PROPYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
O-XYLENE (1,2-DIMETHYLBENZENE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
P-CYMENE (P-ISOPROPYLTOLUENE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
SEC-BUTYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
STYRENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
T-BUTYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			411A	411A	MW423	MW423	MW934
Field Sample Identifier :			411A	411A	MW423	MW423	MW934
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			04/15/15	10/27/15	04/15/15	10/29/15	04/15/15
Parameter	Units	Criteria[1]					
VOLATILE ORGANIC ANALYSES							
TERT-BUTYL METHYL ETHER	UG/L	10	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TETRACHLOROETHYLENE(PCE)	UG/L	5	0.6 U	0.6 U	0.6 U	1.5	0.6 U
TOLUENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TOTAL 1,2-DICHLOROETHENE	UG/L	5	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
TRANS-1,2-DICHLOROETHENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TRANS-1,3-DICHLOROPROPENE	UG/L	0.4	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TRICHLOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TRICHLOROETHYLENE (TCE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TRICHLOROFLUOROMETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
VINYL CHLORIDE	UG/L	2	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
XYLENES, TOTAL	UG/L	-	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW934	MW944	MW948	MW948	MW949
Field Sample Identifier :			MW934	MW944	MW948	MW948	MW949
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	04/15/15	10/27/15	04/15/15
Parameter	Units	Criteria[1]					
VOLATILE ORGANIC ANALYSES							
1,1,1,2-TETRACHLOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1,2,2-TETRACHLOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1,2-TRICHLOROETHANE	UG/L	1	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1-DICHLOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1-DICHLOROETHENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,1-DICHLOROPROPENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2,3-TRICHLOROBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2,3-TRICHLOROPROPANE	UG/L	0.04	1 U	1 U	1 U	1 U	1 U
1,2,4-TRICHLOROBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2,4-TRIMETHYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2-DIBROMO-3-CHLOROPROPANE	UG/L	0.04	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	UG/L	0.006	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2-DICHLOROBENZENE	UG/L	3	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2-DICHLOROETHANE	UG/L	0.6	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2-DICHLOROPROPANE	UG/L	1	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,3-DICHLOROBENZENE	UG/L	3	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,3-DICHLOROPROPANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW934	MW944	MW948	MW948	MW949
Field Sample Identifier :			MW934	MW944	MW948	MW948	MW949
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	04/15/15	10/27/15	04/15/15
Parameter	Units	Criteria[1]					
VOLATILE ORGANIC ANALYSES							
1,4-DICHLOROBENZENE	UG/L	3	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
2,2-DICHLOROPROPANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
2-CHLOROTOLUENE	UG/L	-	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
2-HEXANONE	UG/L	50	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
4-CHLOROTOLUENE	UG/L	-	1 U	1 U	1 U	1 U	1 U
ACETONE	UG/L	50	3.4 J	2.4 J	3.8 J	R	5.7 J
BENZENE	UG/L	1	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMOBENZENE	UG/L	-	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMOCHLOROMETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMODICHLOROMETHANE	UG/L	50	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMOFORM	UG/L	50	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
BROMOMETHANE	UG/L	5	4 U	4 U	4 U	4 U	4 U
CARBON DISULFIDE	UG/L	60	0.6 U	0.6 U	0.6 U	0.6 U	0.43 J
CARBON TETRACHLORIDE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
CHLOROBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
CHLOROETHANE	UG/L	5	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	UG/L	7	0.85 J	0.6 U	0.6 U	0.6 U	0.6 U
CHLOROMETHANE	UG/L	5	0.34 J	0.6 U	0.6 U	0.6 U	0.6 U
CIS-1,2-DICHLOROETHYLENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW934	MW944	MW948	MW948	MW949
Field Sample Identifier :			MW934	MW944	MW948	MW948	MW949
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	04/15/15	10/27/15	04/15/15
Parameter	Units	Criteria[1]					
VOLATILE ORGANIC ANALYSES							
CIS-1,3-DICHLOROPROPENE	UG/L	0.4	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
DIBROMOCHLOROMETHANE	UG/L	50	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
DIBROMOMETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
DICHLORODIFLUOROMETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
ETHYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
HEXACHLOROBUTADIENE	UG/L	0.5	1 U	1 U	1 U	1 U	1 U
ISOPROPYLBENZENE (CUMENE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
M+P-XYLENE	UG/L	5	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
METHYL ETHYL KETONE (2-BUTANONE)	UG/L	50	5 U	5 U	5 U	5 U	5 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	UG/L	-	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
METHYLENE CHLORIDE	UG/L	5	0.6 U	0.6 U	R	R	0.6 U
NAPHTHALENE	UG/L	10	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
N-BUTYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
N-PROPYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
O-XYLENE (1,2-DIMETHYLBENZENE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
P-CYMENE (P-ISOPROPYLTOLUENE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
SEC-BUTYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
STYRENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
T-BUTYLBENZENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

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NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW934	MW944	MW948	MW948	MW949
Field Sample Identifier :			MW934	MW944	MW948	MW948	MW949
Sample Type :			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample Depth Interval (ft) :			-	-	-	-	-
Date of Sample :			10/27/15	04/14/15	04/15/15	10/27/15	04/15/15
Parameter	Units	Criteria[1]					
VOLATILE ORGANIC ANALYSES							
TERT-BUTYL METHYL ETHER	UG/L	10	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TETRACHLOROETHYLENE(PCE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TOLUENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TOTAL 1,2-DICHLOROETHENE	UG/L	5	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
TRANS-1,2-DICHLOROETHENE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TRANS-1,3-DICHLOROPROPENE	UG/L	0.4	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TRICHLOROETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TRICHLOROETHYLENE (TCE)	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
TRICHLOROFLUOROMETHANE	UG/L	5	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
VINYL CHLORIDE	UG/L	2	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
XYLENES, TOTAL	UG/L	-	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW949
Field Sample Identifier :			MW949
Sample Type :			Groundwater
Sample Depth Interval (ft) :			-
Date of Sample :			10/27/15
Parameter	**Units**	**Criteria[1]**	
VOLATILE ORGANIC ANALYSES			
1,1,1,2-TETRACHLOROETHANE	*UG/L*	5	0.6 U
1,1,2,2-TETRACHLOROETHANE	*UG/L*	5	0.6 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	*UG/L*	5	0.6 U
1,1,2-TRICHLOROETHANE	*UG/L*	1	0.6 U
1,1-DICHLOROETHANE	*UG/L*	5	0.6 U
1,1-DICHLOROETHENE	*UG/L*	5	0.6 U
1,1-DICHLOROPROPENE	*UG/L*	5	0.6 U
1,2,3-TRICHLOROBENZENE	*UG/L*	5	0.6 U
1,2,3-TRICHLOROPROPANE	*UG/L*	0.04	1 U
1,2,4-TRICHLOROBENZENE	*UG/L*	5	0.6 U
1,2,4-TRIMETHYLBENZENE	*UG/L*	5	0.6 U
1,2-DIBROMO-3-CHLOROPROPANE	*UG/L*	0.04	1 U
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	*UG/L*	0.006	0.6 U
1,2-DICHLOROBENZENE	*UG/L*	3	0.6 U
1,2-DICHLOROETHANE	*UG/L*	0.6	0.6 U
1,2-DICHLOROPROPANE	*UG/L*	1	0.6 U
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	*UG/L*	5	0.6 U
1,3-DICHLOROBENZENE	*UG/L*	3	0.6 U
1,3-DICHLOROPROPANE	*UG/L*	5	0.6 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW949
Field Sample Identifier :			MW949
Sample Type :			Groundwater
Sample Depth Interval (ft) :			-
Date of Sample :			10/27/15
Parameter	**Units**	**Criteria[1]**	
VOLATILE ORGANIC ANALYSES			
1,4-DICHLOROBENZENE	*UG/L*	3	0.6 U
2,2-DICHLOROPROPANE	*UG/L*	5	0.6 U
2-CHLOROTOLUENE	*UG/L*	-	0.6 U
2-HEXANONE	*UG/L*	50	0.6 U
4-CHLOROTOLUENE	*UG/L*	-	1 U
ACETONE	*UG/L*	50	7.3 J
BENZENE	*UG/L*	1	0.6 U
BROMOBENZENE	*UG/L*	-	0.6 U
BROMOCHLOROMETHANE	*UG/L*	5	0.6 U
BROMODICHLOROMETHANE	*UG/L*	50	0.6 U
BROMOFORM	*UG/L*	50	0.6 U
BROMOMETHANE	*UG/L*	5	4 U
CARBON DISULFIDE	*UG/L*	60	1.9
CARBON TETRACHLORIDE	*UG/L*	5	0.6 U
CHLOROBENZENE	*UG/L*	5	0.6 U
CHLOROETHANE	*UG/L*	5	1 U
CHLOROFORM	*UG/L*	7	0.6 U
CHLOROMETHANE	*UG/L*	5	0.6 U
CIS-1,2-DICHLOROETHYLENE	*UG/L*	5	0.6 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

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NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW949
Field Sample Identifier :			MW949
Sample Type :			Groundwater
Sample Depth Interval (ft) :			-
Date of Sample :			10/27/15
Parameter	**Units**	**Criteria[1]**	
VOLATILE ORGANIC ANALYSES			
CIS-1,3-DICHLOROPROPENE	*UG/L*	0.4	0.6 U
DIBROMOCHLOROMETHANE	*UG/L*	50	0.6 U
DIBROMOMETHANE	*UG/L*	5	0.6 U
DICHLORODIFLUOROMETHANE	*UG/L*	5	0.6 U
ETHYLBENZENE	*UG/L*	5	0.6 U
HEXACHLOROBUTADIENE	*UG/L*	0.5	1 U
ISOPROPYLBENZENE (CUMENE)	*UG/L*	5	0.6 U
M+P-XYLENE	*UG/L*	5	1.2 U
METHYL ETHYL KETONE (2-BUTANONE)	*UG/L*	50	5 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	*UG/L*	-	0.6 U
METHYLENE CHLORIDE	*UG/L*	5	0.72 J
NAPHTHALENE	*UG/L*	10	0.6 U
N-BUTYLBENZENE	*UG/L*	5	0.6 U
N-PROPYLBENZENE	*UG/L*	5	0.6 U
O-XYLENE (1,2-DIMETHYLBENZENE)	*UG/L*	5	0.6 U
P-CYMENE (P-ISOPROPYLTOLUENE)	*UG/L*	5	0.6 U
SEC-BUTYLBENZENE	*UG/L*	5	0.6 U
STYRENE	*UG/L*	5	0.6 U
T-BUTYLBENZENE	*UG/L*	5	0.6 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 18
GROUNDWATER ANALYTICAL RESULTS - VOLATILES
NIAGARA FALLS STORAGE SITE

Location Identifier :			MW949
Field Sample Identifier :			MW949
Sample Type :			Groundwater
Sample Depth Interval (ft) :			-
Date of Sample :			10/27/15
Parameter	**Units**	**Criteria[1]**	
VOLATILE ORGANIC ANALYSES			
TERT-BUTYL METHYL ETHER	*UG/L*	10	0.6 U
TETRACHLOROETHYLENE(PCE)	*UG/L*	5	0.6 U
TOLUENE	*UG/L*	5	0.6 U
TOTAL 1,2-DICHLOROETHENE	*UG/L*	5	1.2 U
TRANS-1,2-DICHLOROETHENE	*UG/L*	5	0.6 U
TRANS-1,3-DICHLOROPROPENE	*UG/L*	0.4	0.6 U
TRICHLOROETHANE	*UG/L*	5	0.6 U
TRICHLOROETHYLENE (TCE)	*UG/L*	5	0.6 U
TRICHLOROFLUOROMETHANE	*UG/L*	5	0.6 U
VINYL CHLORIDE	*UG/L*	2	0.6 U
XYLENES, TOTAL	*UG/L*	-	1.8 U

Concentration Exceeds Criteria

(1) - TOGS 1.1.1 (June 1998) for chemicals (VOCs, metals), Ra-226 and Ra-228 (5 pCi/l), Thorium (sum total of 15 pCi/l). 10 NYCRR Part 5, Subpart 5-1 (NYSDOH) for Arsenic, Total Uranium (30 ug/L or 27 pCi/L) beta emitters total dose not to exceed 4 mrem/yr (Sr-90, Tc-99, Cs-137, Pu-238, Pu-239/240, H-3).

U - Not detected above the reported quantitation limit.; R - The data is rejected.; J - The reported concentration is an estimated value.

NOTE: The detection limits shown are MDL.

TABLE 19

Total Uranium in Upper Water Bearing Zone Groundwater Wells (ug/L)

LOGDATE	302A	411A	505	808A	A42	A43	A45	A50	BH49A	MW313	MW423	MW862
April 1997							32.67	12.66				
April 1998							46.16	21.33				
June 1999							30.53	18.36				
January 2000					80.3	36.6	44.1	17.6				
July 2000							62.46	16.75				
September 2000	125	13.6	24.4	46.3					14			
October 2000												
May 2001							40.09	23.09				
May 2002	116				85.6		29.3	15.7				
August 2002	112				83.9							
May 2003	125	13	25.8	37.4	56	47.4	42.8	15.2	16.3			
October 2003										31.7		17.4
April 2004							33.42	16.04				
November 2004	115				99.7							
May 2005	133.72				76.9		33.02	6.77				
November 2005	125.86				121.22							
May 2006	123.23				103.03		43.66	17.25				
June 2007	115.18				84.67		39.62	18.98				
November 2007	121.6				89.95							
June 2008	125.82		34.6		89.95		39.27	16.67	17.62	44.02		
October 2008	130.42		29.53		112.26		40.78	17.67	30.14	51.16		
May 2009	150.47		33.59		106.88		36.73	20.93	20.23	53.13		
October 2009	127.53		40.32		120.21		27.99	15.65	15.07	61.89		
December 2009												
January 2010												
May 2010	135.23		33.82		71.91		40.14	18.06	16.72	54.44		
June 2010					57.39							7.73
October 2010	131.3	19.46	28.82		81.07		31.2	15.94	11.23	43.06		25.94
November 2010												
February 2011												
April 2011	118.54	17.07	36.4		68.11		35.1	16.55	12.35	65.63		26.21
August 2011												
October 2011	108.48	11.94			87.88		23.92	15.94		46.95		21.56

TABLE 19

Total Uranium in Upper Water Bearing Zone Groundwater Wells (ug/L)

LOGDATE	302A	411A	505	808A	A42	A43	A45	A50	BH49A	MW313	MW423	MW862
February 2012												
April 2012	63.1	16.1	22.1		45.4		27.6	19.8	17.6	23.7		25.3
August 2012												
October 2012	61.3	14.2			109		13.7	16.6	16	35.1		21.3
November 2012												
December 2012												
February 2013												
April 2013	84.5	11.4	42.4		45.6	36.3	33.6	16.3	19			23.2
August 2013												
October 2013	82.2	18.1	34.7	34.4	67.8	32.9	26.4	16.7	11		12	22.4
April 2014	104	11.1	37.8		41.8	36	32.6	16.2	22.7		10.2	24.5
August 2014												
October 2014	84.6	13.9	27.4	43.1	62.3	40.5	29.2	17.8	14.3		11.9	24.1
February 2015												
April 2015	112	18.7	40.4		43	40	34.8	16.5	19.9		11.2	26.6
August 2015												
October 2015	87.5	23.2	21.9	43.5	46.8	39.8	35	16.6	18.4		10.2	23
November 2015												
February 2016												
April 2016	64	21.9	41.3		49.5	43.9	37	16.7	17.3	58.8	11.9	24.7

TABLE 19

Total Uranium in Upper Water Bearing Zone Groundwater Wells (ug/L)

LOGDATE	MW921	MW922	MW934	MW935	MW938	MW943	MW944	MW945	MW946	MW948	MW950	MW951
April 1997												
April 1998												
June 1999												
January 2000												
July 2000												
September 2000												
October 2000												
May 2001												
May 2002												
August 2002												
May 2003												
October 2003												
April 2004												
November 2004												
May 2005												
November 2005												
May 2006												
June 2007												
November 2007												
June 2008												
October 2008												
May 2009												
October 2009												
December 2009		31.1	28.67			19.48						
January 2010	35.34			32.43	23.42							
May 2010												
June 2010												
October 2010			26.19	34.55								
November 2010		27.71										
February 2011												
April 2011	38.54		32.37	29.2								
August 2011												
October 2011		32.6	26.3	45.89								

TABLE 19

Total Uranium in Upper Water Bearing Zone Groundwater Wells (ug/L)

LOGDATE	MW921	MW922	MW934	MW935	MW938	MW943	MW944	MW945	MW946	MW948	MW950	MW951
February 2012												
April 2012	26		24.5	25.9								
August 2012												
October 2012		28	19.6	27.4								
November 2012											35	2400
December 2012											29.4	2090
February 2013												
April 2013	31.2		31	25.4	28.7		10.1	5.25	37.6	33.1	31.8	4631
August 2013												
October 2013	38.6		30.6	29.3	25.9		6.37	15.3		24.6	26.3	4502
April 2014	36.2		35	28.8	29.2	22.3	9.32	10.7	17.6	32.4	33.1	3601
August 2014												
October 2014		33.2	34.1	25.8	28.3			25.2	33.7	33.9	30.1	3231
February 2015												
April 2015	34		36.7	21.6	25.3	20.4	7.08	11.9	31.2	32.7	32.9	2917
August 2015												
October 2015		32.8	34.4	22.9	19.7	20.8			33.7	29.7	35.4	3280
November 2015												
February 2016												
April 2016	30.3		33	21.6	28.1	24.3	5.1	11.6	37.2	26.6	34.9	3069

TABLE 19

Total Uranium in Upper Water Bearing Zone Groundwater Wells (ug/L)

LOGDATE	MW952	MW953	MW954	MW955	MW956	MW957	MW958	MW959	MW960	OW03B	OW04B	OW05B
April 1997											29.5	
April 1998											49.83	
June 1999											30.58	
January 2000										18.1		
July 2000											59.87	
September 2000												
October 2000												
May 2001											76.15	
May 2002											62.3	
August 2002											47.7	
May 2003											61.1	13.4
October 2003												
April 2004											62.53	
November 2004											48.5	
May 2005											58.34	
November 2005											59.9	
May 2006											51.98	
June 2007											55.01	
November 2007											33.17	
June 2008											71.16	
October 2008											54.91	
May 2009											72.4	
October 2009											49.88	
December 2009												
January 2010												
May 2010											59.12	
June 2010											27.05	
October 2010										19.79	43.04	20.74
November 2010												
February 2011											64.64	
April 2011										16.92	59.58	14.74
August 2011											38.74	
October 2011										17.39	49.22	13.45

TABLE 19

Total Uranium in Upper Water Bearing Zone Groundwater Wells (ug/L)

LOGDATE	MW952	MW953	MW954	MW955	MW956	MW957	MW958	MW959	MW960	OW03B	OW04B	OW05B
February 2012											52.85	
April 2012										15.6	42.5	14.4
August 2012											37.4	
October 2012										17	40.3	9.79
November 2012												
December 2012	286	1970	218	24.7	27	2100	33.2	41.7	1010			
February 2013											46.7	
April 2013	216	4843	687	25.2	70.8	2846	235	137	1097	17.1	55.8	14.9
August 2013											49.3	
October 2013	175	3929	322	22	46.8	1944	113	50.3	1049	8.91	45.5	12.1
April 2014	200	3351	620	22.5	64.3	2310	210	160	1109	17.6	47.5	15.1
August 2014											46.8	
October 2014	165	3221	523	23.7	49.1	1600	84.8	78.6	1201	18.5	49.7	13.2
February 2015											46.5	
April 2015	247	4523	682	24.9	61.2	3290	216	193	1165	19.2	49.6	15.5
August 2015											46.5	
October 2015	215	2106	548		50.5	1967	123	76.8	1063	17.3	45.1	13.7
November 2015				23.3								
February 2016											50.6	
April 2016	204	6547	724	26.1	65.5	3410	198	180	1204	16.1	50.2	15.5

TABLE 19

Total Uranium in Upper Water Bearing Zone Groundwater Wells (ug/L)

LOGDATE	OW06B	OW07B	OW11B	OW12B	OW13B	OW15B	OW17B	OW18B
April 1997	24.2	11.3				8.69	3.03	
April 1998	37.3	26.12				15.14	9.52	
June 1999	30.49	2.47				12.26	6.11	
January 2000	37.2							
July 2000	9.43	27.44				9.43	7.17	
September 2000						10.3		
October 2000			172	17.9				
May 2001	30.28	30.27				13.64	8.62	
May 2002	28.3	20.6	270			11.6	7.52	
August 2002			170					
May 2003	29.2	19.1	250		23.5	9.82	7.79	20.5
October 2003								
April 2004	21.39				28.5	15.42	7.07	
November 2004			365					
May 2005	22.85		424.69		31.4	12.62	6.21	
November 2005			413.16					
May 2006	20.48		363.13		30.22	10.42	5.93	
June 2007	21.37		435.46		34.2	13.77	5.74	
November 2007								
June 2008	23.93		366.69		28.13	9.83	6.08	16.17
October 2008	20.53		256.8		30.16	11.13	9.06	17.45
May 2009	21.49		380.51		36.35	10.83	7.65	19.03
October 2009	21.04		362.06		26.95	12.23	7.07	17.19
December 2009								
January 2010								
May 2010	21.28		493.76		28.75	13.98	8.47	12.5
June 2010	10.64							
October 2010	28.59	53.75	478.8		33.01	13.93	7.66	12.68
November 2010								
February 2011								
April 2011	18.31	21.05	555.94	28.25	23.41	13.75	7.57	13.43
August 2011								
October 2011	19.85	20.45	244.04	24.74	31.19	6.5	7.44	14.3

TABLE 19

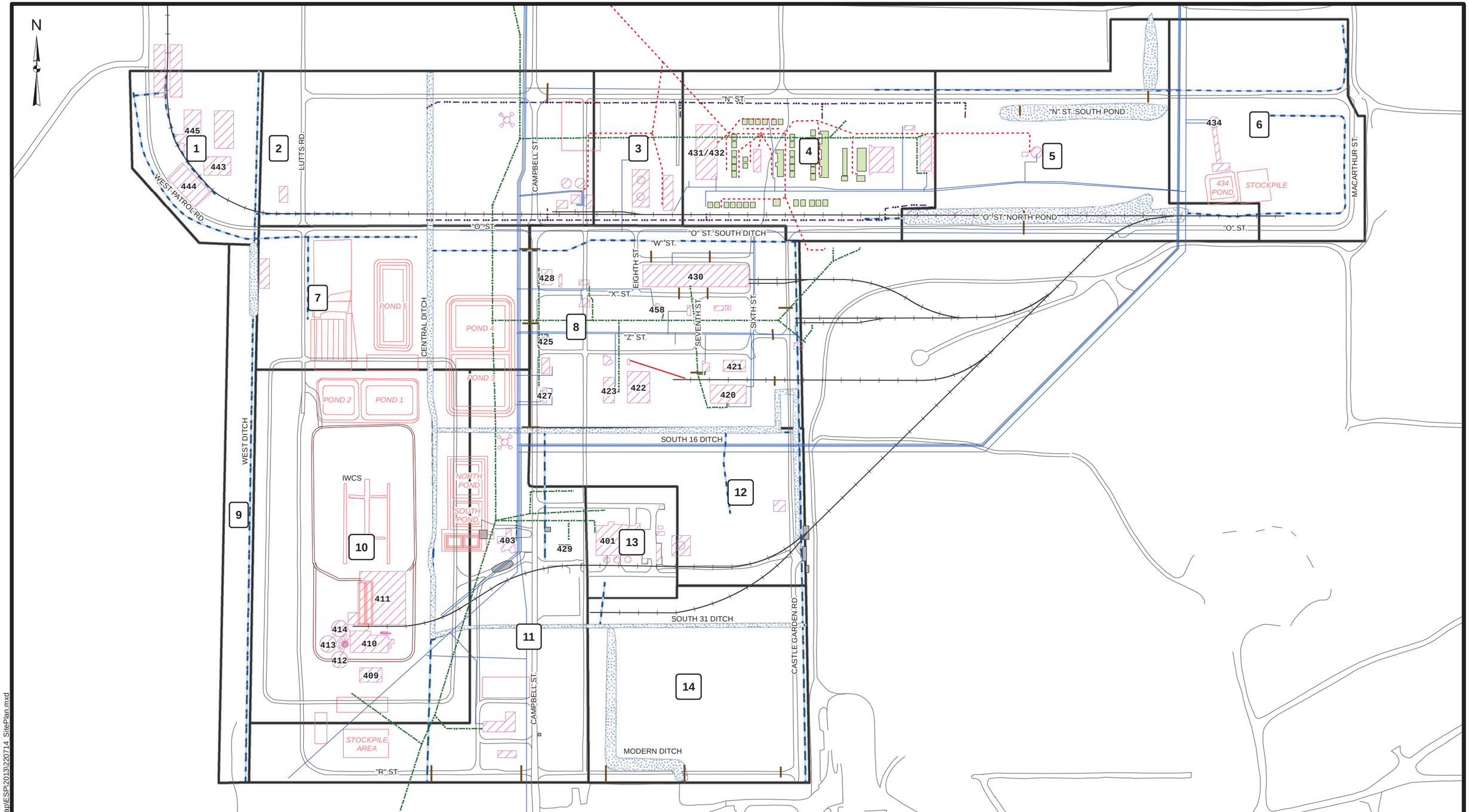
Total Uranium in Upper Water Bearing Zone Groundwater Wells (ug/L)

LOGDATE	OW06B	OW07B	OW11B	OW12B	OW13B	OW15B	OW17B	OW18B
February 2012								
April 2012	22.8	17.7	353	36.6	25	11.5	6.69	11.8
August 2012								
October 2012	19.4	19.2	210	28.4	25.2	10.8	6.8	13.9
November 2012								
December 2012								
February 2013								
April 2013	18.9	18.7	355	42.8	22.9	9.59	5.25	11.6
August 2013								
October 2013	15.2	17.1	175	30.8	25.3	8.84	6.4	13.9
April 2014	17.2	17.6	385	34.3	12.7	10.4	5.57	10.4
August 2014								
October 2014	15.8	20.9	221	34.8	24.3	11.6	6.64	12.7
February 2015								
April 2015	19.1	20.4	370	26.5	14.2	9.55	5.69	13.2
August 2015								
October 2015	15.4	22.7	246	28.1	30.3	8.83	6.53	14.1
November 2015								
February 2016								
April 2016	20.7	21.6	382	62.8	27.8	12.6	5.48	11.2

TABLE 20
Total Uranium in Lower Water Bearing Zone Groundwater Wells (ug/L)

	A55	BH49	MW863	MW949	OW03A	OW04A	OW05A	OW06A	OW07A	OW11A	OW12A	OW13A	OW15A	OW17A
January 2000		0			10.8	2.84	1.53	1.93						0.794
October 2000									1.44			2.04		
May 2002							1.98							
May 2003	0								1.25	1.47		2.4		
October 2003			8.39											
June 2008						1.33								
October 2008						2.47								
May 2009						1.76								
October 2009						1.32								
May 2010						2.38								
June 2010			2.5			1.63		0.38					0.82	
October 2010	0.99	14.25	3.3		13.11	2.17	1.27	3.11	2.34	1.47	4.72	2.62	1.27	2.52
February 2011						5.27								
April 2011	0.01	0	4.52		13.04	1.93	2.5	0.91	1.71	1.21	3.75	3.31	0.32	1.08
August 2011						1.79								
October 2011	0.23	11.84	3.74		11.2	1.4	2.98	1.37	1.28	1.32	3.06	3.37	0.33	1.37
February 2012						3.15								
April 2012	0.129	1.23	4.16		12.7	2.11	1.82	2.64	1.77	3.6	6.34	2.39	0.426	1.5
August 2012						2.54								
October 2012	0.03	0.904	4.37		11.3	1.82	2.03	2.14	1.66	2.67	5.36	2.28	0.56	1.34
December 2012				0.363										
February 2013						2.01								
April 2013	0.111	1.47	4.16	0.803	9.95	2.38	2.3	2.07	1.9	2.45	4.83	2.47	0.481	1.45
August 2013						2.6								
October 2013	0.107	0.701	2.44	0.469	18.4	2.44	2.08	2.07	1.51	1.73	4.95	2.4	0.372	1.1
February 2014						2.41								
April 2014	0.076	0.723	3.93	0.289	8.61	2.03	2.31	1.99	1.68	1.55	4.36	2.47	0.497	1.36
August 2014						2.05								
October 2014	0.103	1.98	3.04	1.12	9.58	1.92	1.96	1.78	1.94	1.96	4.4	2.47	0.535	4.12
February 2015						1.99								
April 2015	0.13	6.59	4.64	4.44	10.4	2.1	2	1.45	1.79	1.25	4.41	2.5	0.41	1.13
August 2015						2.11								
October 2015	0.141	1.62	3.75	2.1	9.82	1.93	1.78	1.71	1.62	2.08	3.73	2.87	0.402	1.15
February 2016						2.26								
April 2016	0.121	0.443	3.77	2.25	11.7	2.24	1.91	1.77	1.66	1.9	3.88	2.41	0.412	0.867

FIGURES



Legend

- Ephemeral Ditchs
- IWCS Cutoff Wall
- Former Remedial Structures
- Surface Water Features
- NFSS Site Roads
- Railroads
- EU Boundaries
- Structure (Active)
- Structure (Abandoned Above Grade)
- Former Structure
- Acid Sewer
- Water Line
- Culvert
- Fuel Line
- Sanitary Sewer
- Storm Sewer

0 175 350 700 Feet

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SITE PLAN

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NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 2

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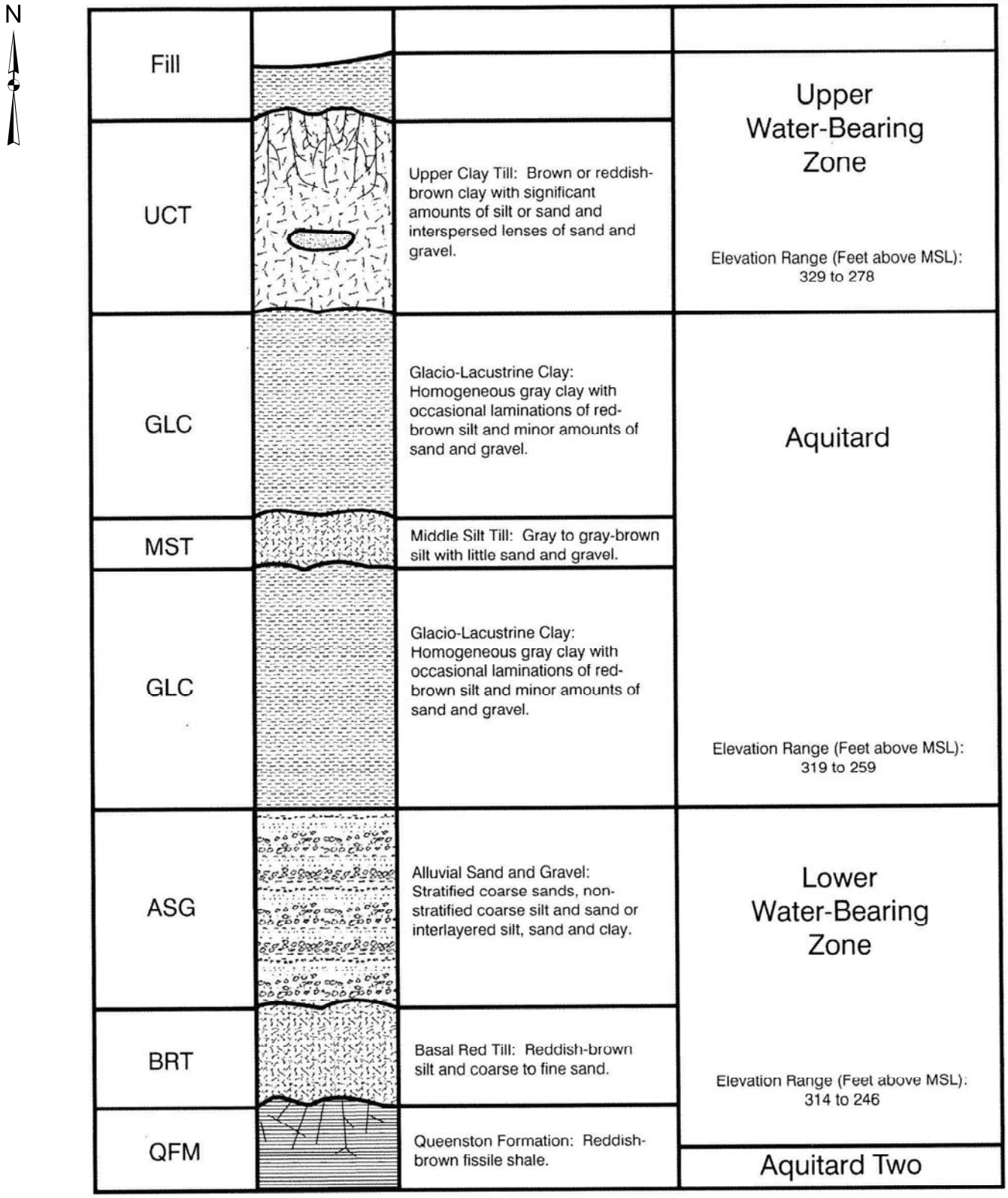

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SCHEMATIC OF CONCEPTUALIZED HYDROSTRATIGRAPHY

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NIAGARA FALLS STORAGE SITE
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FIGURE 3

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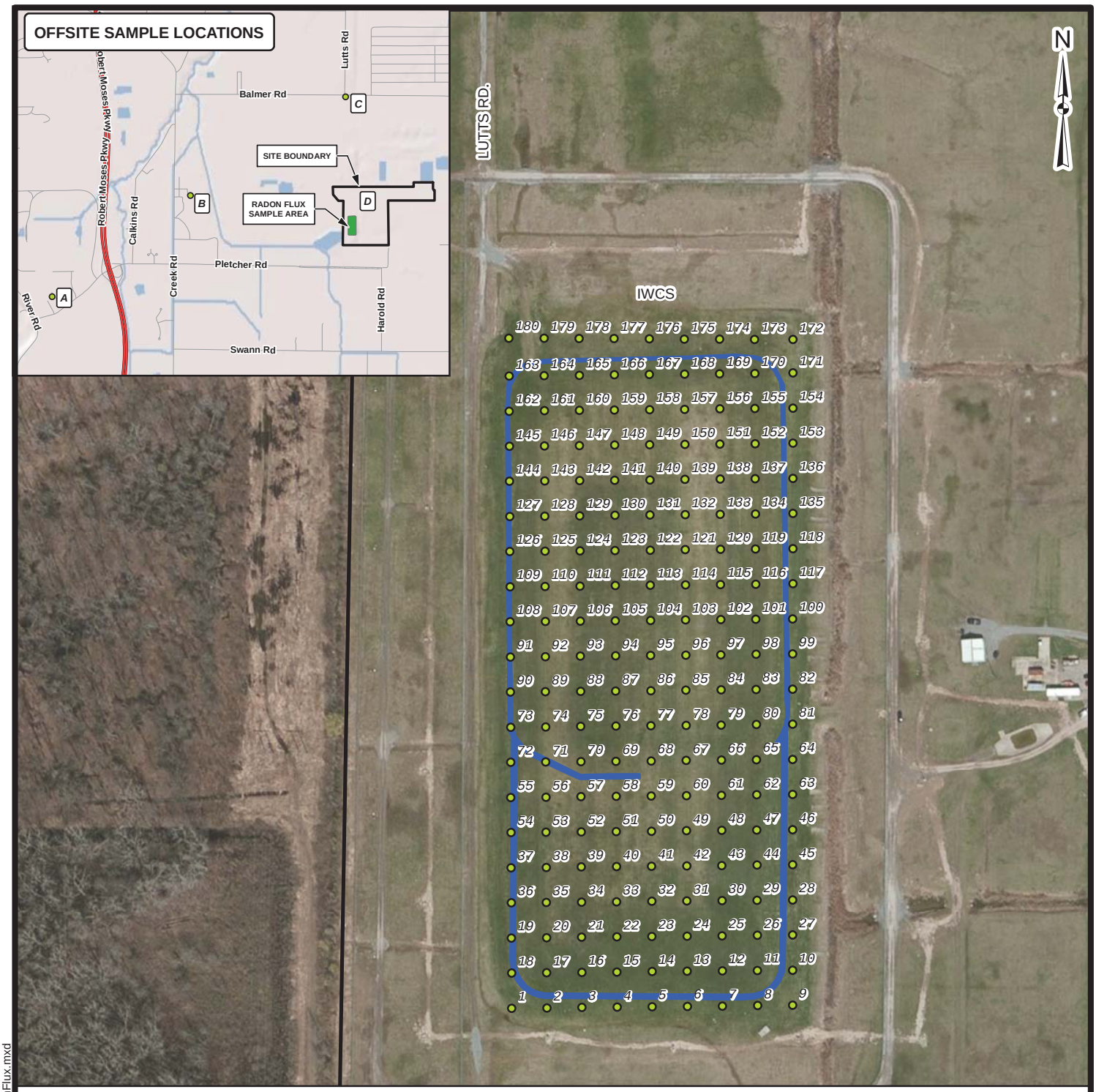

Legend

- Radon Flux Location
- IWCS Cutoff Wall
- NFSS Site Boundary

A - Lewiston Water Pollution Control Center
B - Lewiston Porter School Campus
C - Balmer Road Location
D - Niagara Falls Storage Site

Locations A, B, and C are background locations for Radon Flux Sampling.

0 100 200 400 Feet

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LOCATIONS OF RADON FLUX MEASUREMENTS ON THE IWCS

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NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 4

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Legend

- Monitoring Well (Sampled Bi-Annually)
- Monitoring Well (Sampled Quarterly)
- Secondary Monitoring Well
- Tertiary Monitoring Well
- NFSS Site Boundary

Notes:
1) If MW921 is dry, MW922 shall be sampled.
2) If MW946 is dry, 808A shall be sampled.
3) If MW947 is dry, MW422 shall be sampled, but if both MW947 and MW422 are dry, MW423 shall be sampled.

0 175 350 700 Feet

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MONITORING WELL LOCATION MAP

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NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 5

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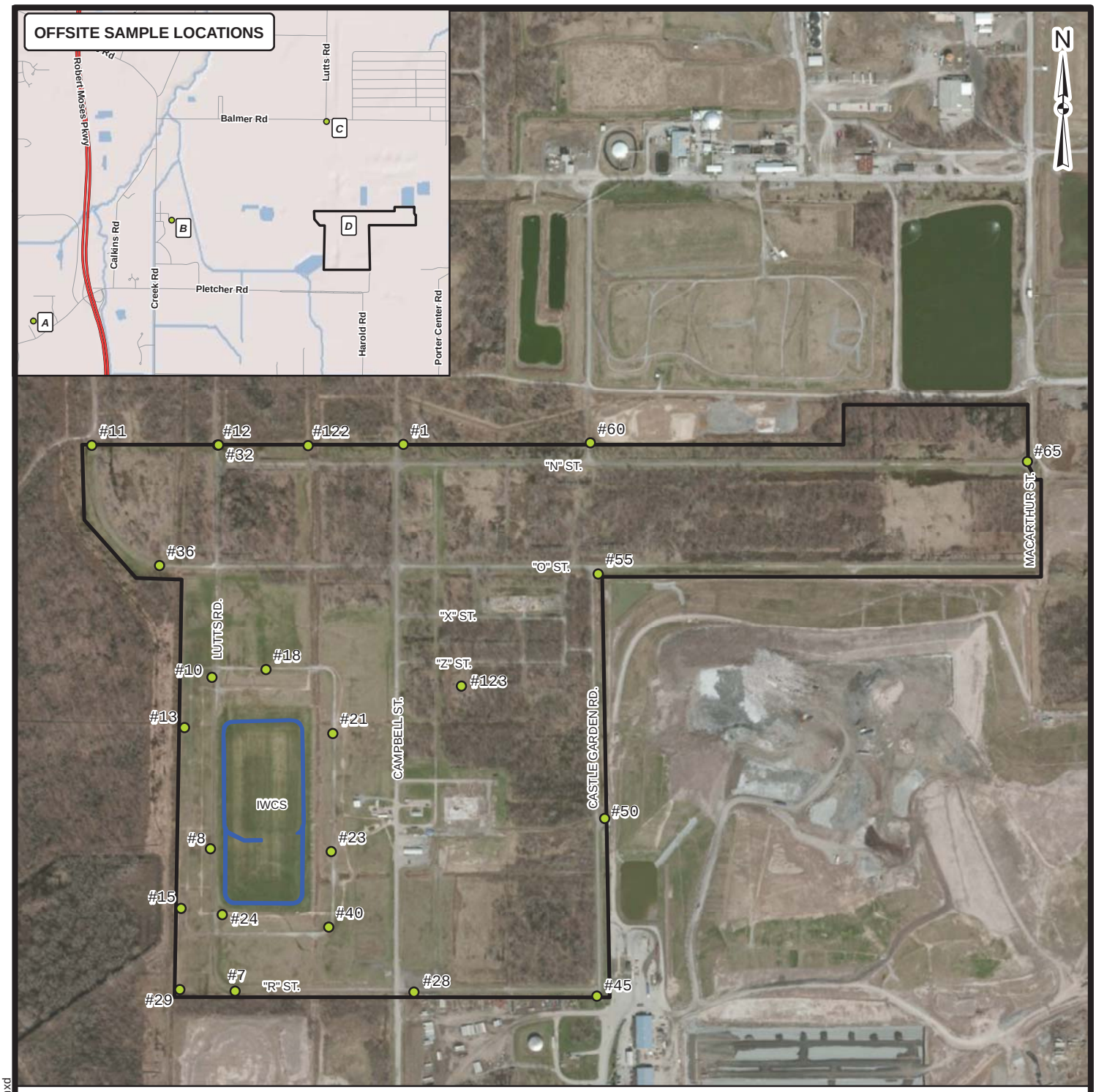

Legend

- OSL's / RadTrack Detectors
- IWCS Cutoff Wall
- NFSS Site Boundary

A - Lewiston Water Pollution Control Center
B - Lewiston Porter School Campus
C - Balmer Road Location
D - Niagara Falls Storage Site

Locations A, B, and C are background locations for OSL and RadTrack Sampling.

0 350 700 1,400 Feet

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LOCATION OF RADTRACK DETECTORS AND OSL'S

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NIAGARA FALLS STORAGE SITE
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FIGURE 6

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Legend

- Surface Water/Sediment Sample Location
- NFSS Site Boundary

0 175 350 700 Feet

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SURFACE WATER/SEDIMENT SAMPLING
LOCATION MAP

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NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 7

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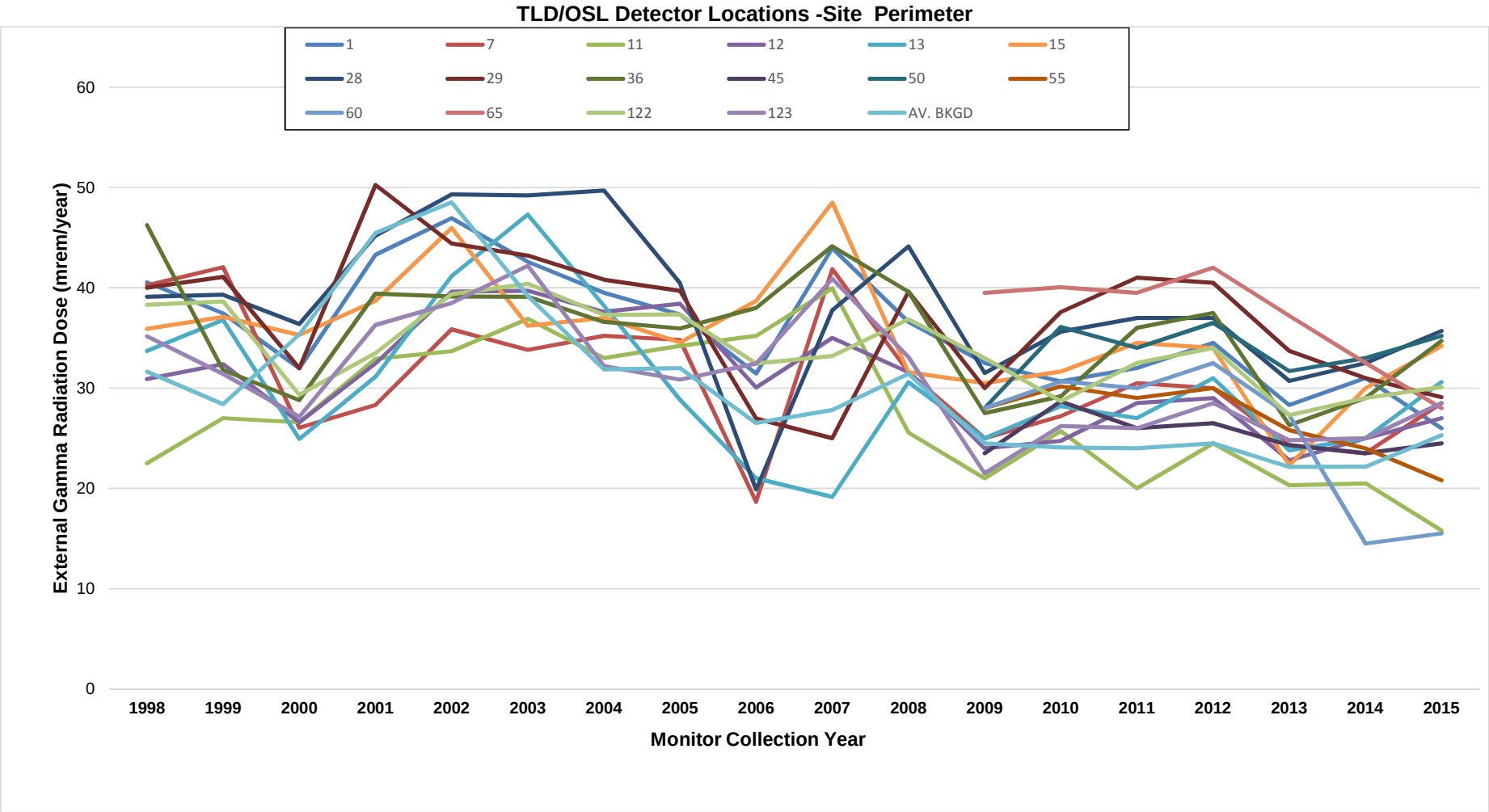
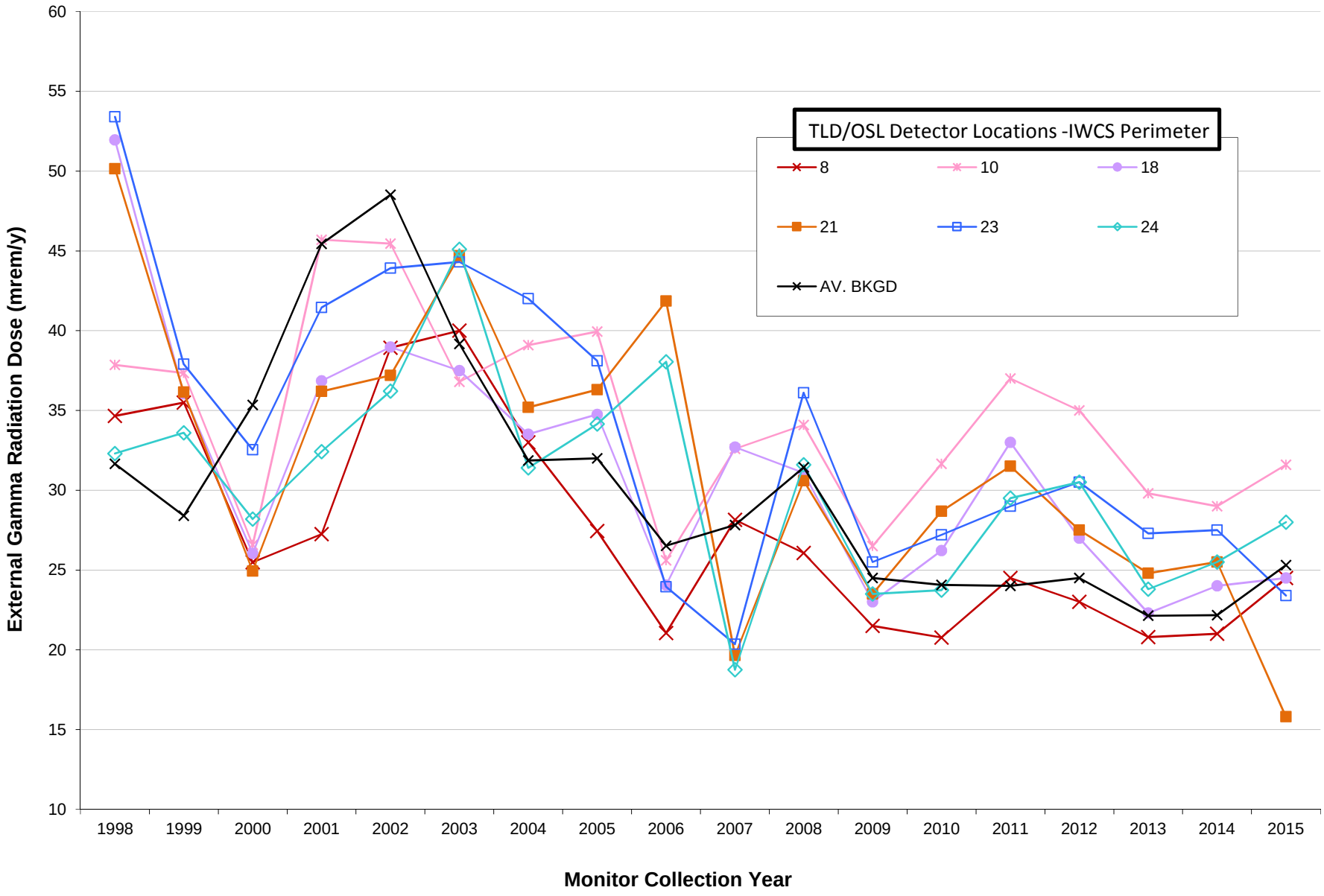
FIGURE 8
EXTERNAL GAMMA RADIATION DOSE RATES AT NFSS PERIMETER



*USDOE limit for external gamma radiation is 100 mrem/year above background but the value for each detector location includes background.

FIGURE 9
EXTERNAL GAMMA RADIATION DOSE RATES AT IWCS PERIMETER



*The United States Department of Energy (USDOE) limit for external gamma radiation is 100 mrem/year above background but the value shown for each detector location includes background.

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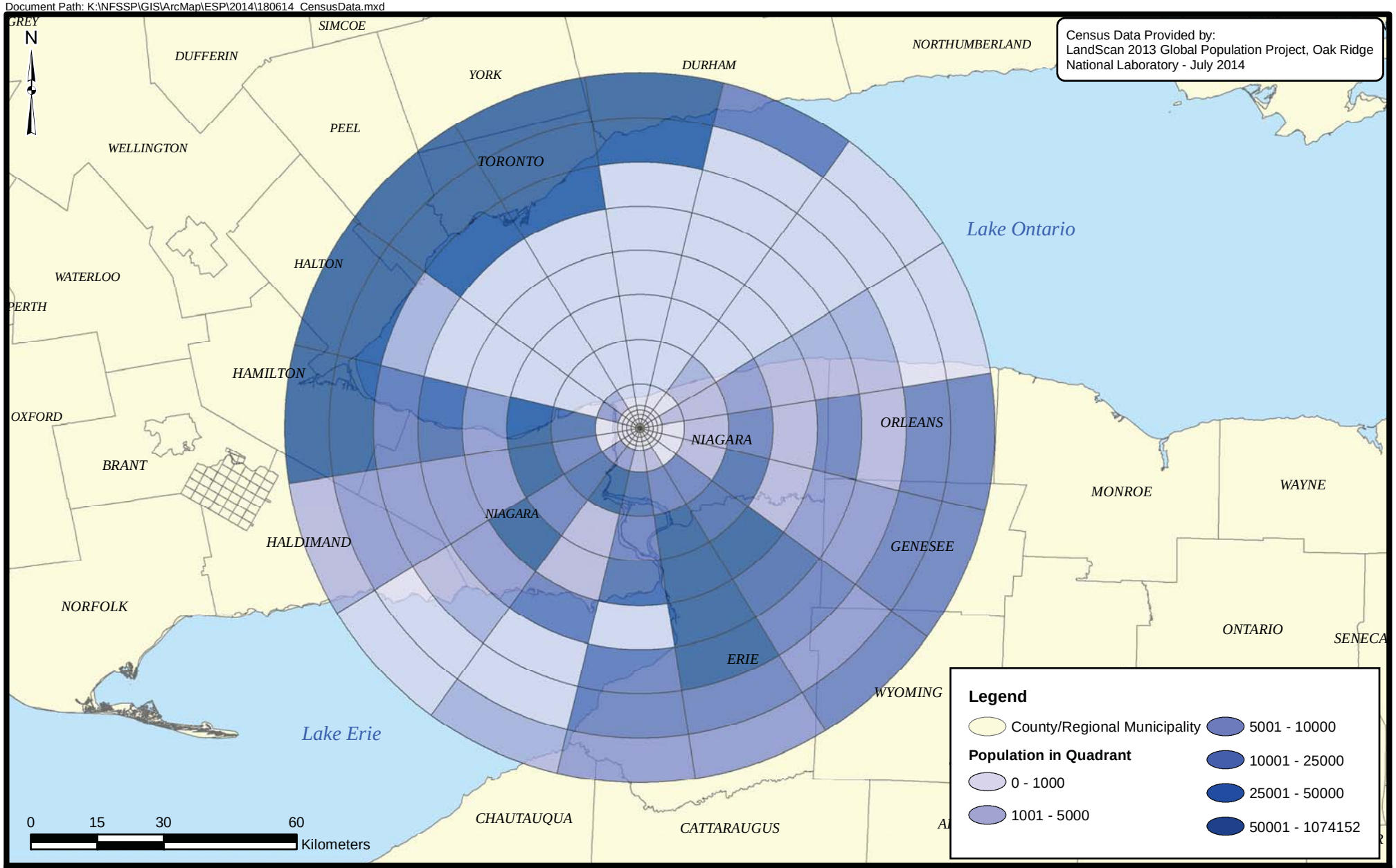

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CENSUS DATA

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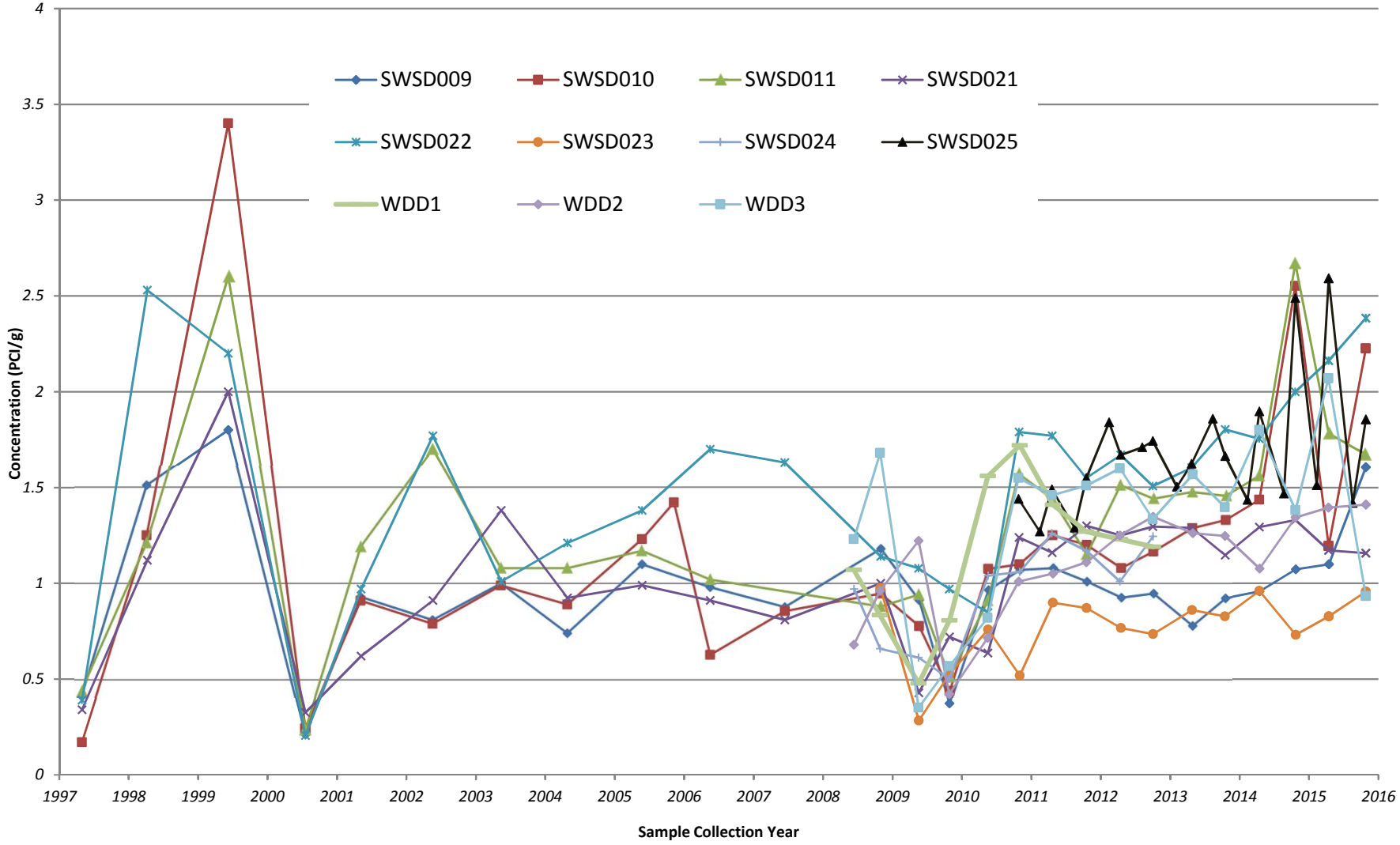
NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 10

FIGURE 11
RADIUM-226 CONCENTRATIONS IN SEDIMENT
1997 - 2015



DOE limit + background is 6.06 pCi/g

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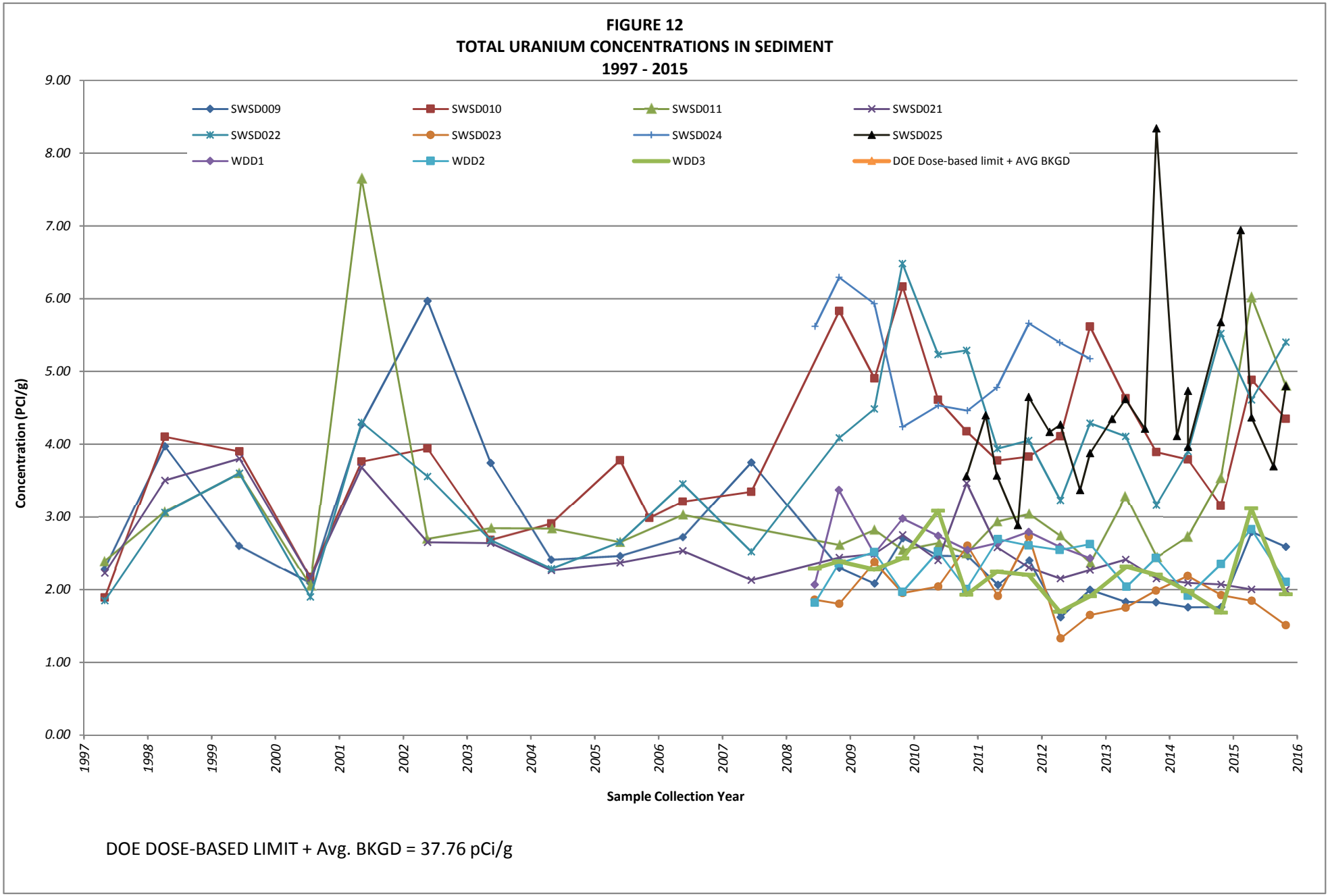

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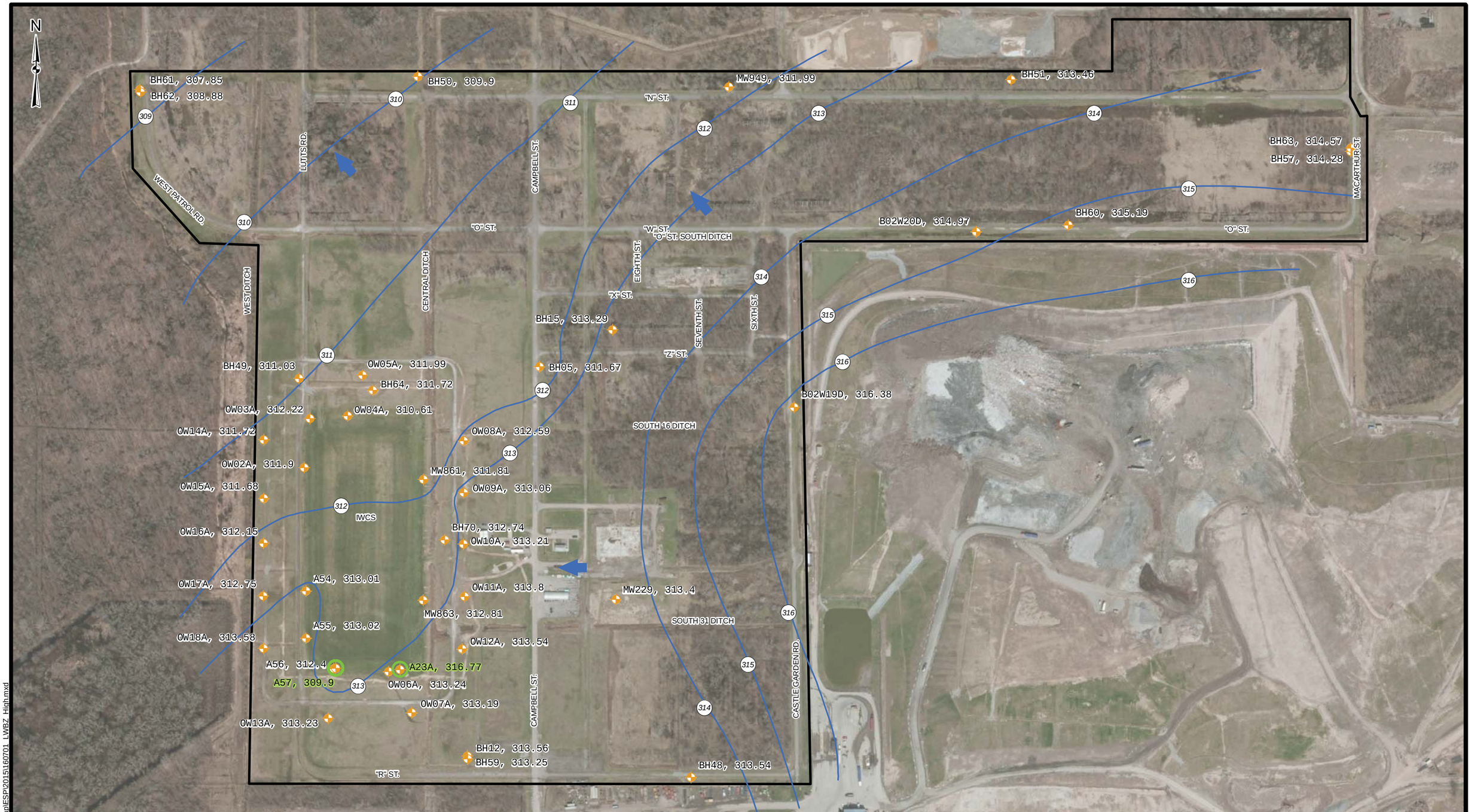
Copy of Fig_11_and_12_ESP_Graphs_sed_only.xlsx, Total Uranium (Sediment), 6/30/2016



Legend

- Monitoring Well (Lower Water Bearing Zone)
- Well Data not used for Contouring
- Groundwater Potentiometric Surface (ft amsl)
- Groundwater Flow Direction
- NFSS Site Boundary

NOTES:
1) All elevations are represented in NGVD 88.

0 175 350 700 Feet

US Army Corps of Engineers. Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

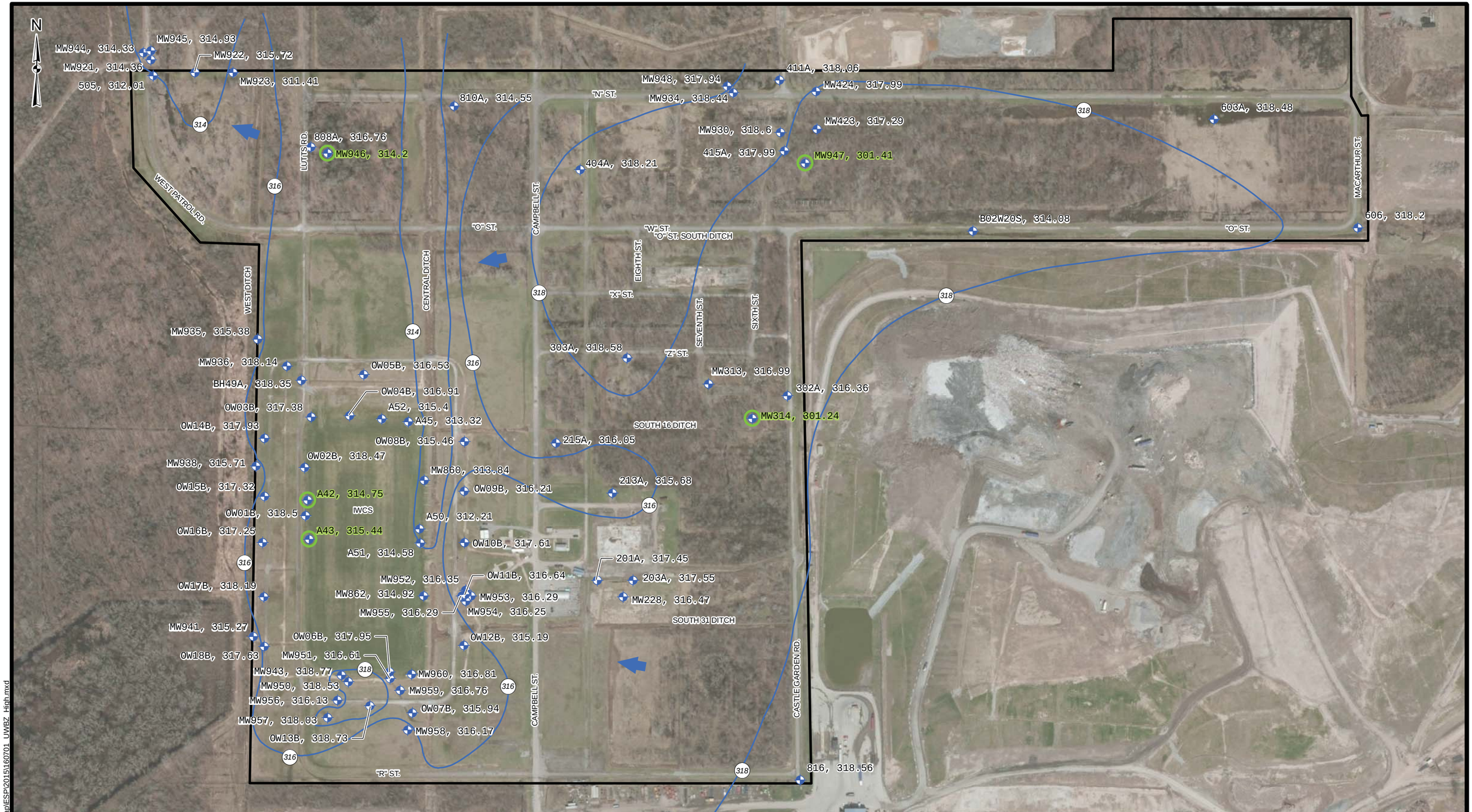
GROUNDWATER POTENTIOMETRIC SURFACE MAP FOR THE LOWER WATER BEARING ZONE (AUGUST 18, 2015 - SEASONAL HIGH)

Name: 160701_LWBZ_High.mxd
Drawn By: H5TDESPM
Date Saved: 03 Aug 2016
Time Saved: 8:03:03 AM

NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 13

Document Path: K:\NFSSP\GIS\ArcMap\ESP\2015\160701_LWBZ_High.mxd



Legend

- Well Data not used for Contouring
- Monitoring Well (Upper Water Bearing Zone)
- Groundwater Potentiometric Surface (ft amsl)
- Groundwater Flow Direction
- NFSS Site Boundary

NOTES:
1) All elevations are represented in NGVD 88.

0 175 350 700 Feet

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

US Army Corps of Engineers. Buffalo District

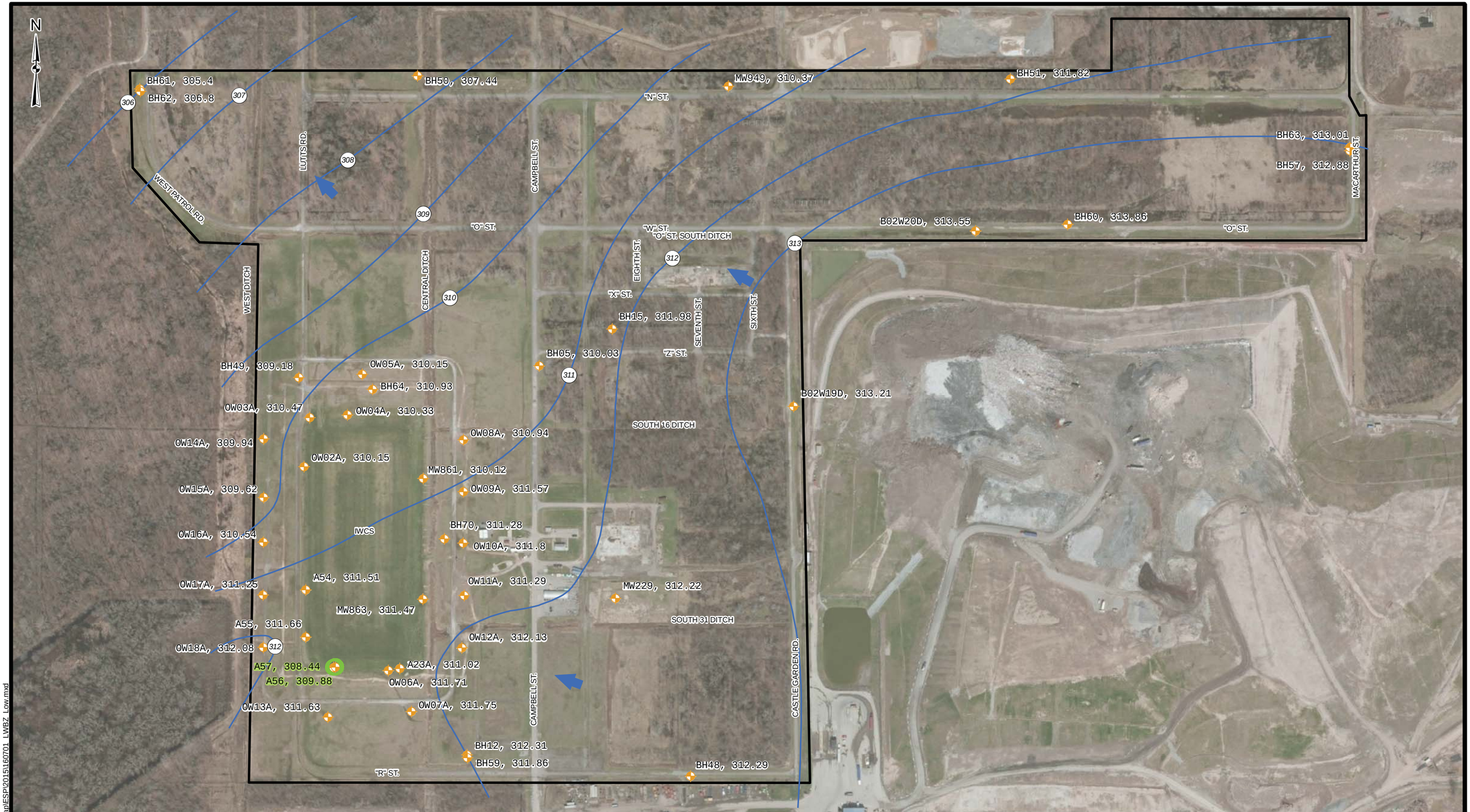
GENERALIZED GROUNDWATER POTENTIOMETRIC SURFACE MAP FOR THE UPPER WATER BEARING ZONE (APRIL 13, 2015 - SEASONAL HIGH)

Name: 160701_UWBZ_High.mxd
Drawn By: H5TDESPM
Date Saved: 03 Aug 2016
Time Saved: 7:41:26 AM

NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 14

Document Path: K:\NFSSP\GIS\ArcMap\ESP\2015\160701_UWBZ_High.mxd



Legend

- Well Data not used for Contouring
- Monitoring Well (Lower Water Bearing Zone)
- Groundwater Potentiometric Surface (ft amsl)
- Groundwater Flow Direction
- NFSS Site Boundary

NOTES:
1) All elevations are represented in NGVD 88.

0 175 350 700 Feet

US Army Corps of Engineers
Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

GROUNDWATER POTENTIOMETRIC SURFACE MAP FOR
THE LOWER WATER BEARING ZONE
(OCTOBER 26, 2015 - SEASONAL LOW)

Name: 160701_LWBZ_Low.mxd
Drawn By: H5TDESPM
Date Saved: 09 Aug 2016
Time Saved: 2:24:18 PM

NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 15

Document Path: K:\NFSSP\GIS\ArcMap\ESP\2015\160701_LWBZ_Low.mxd

Legend

- Well Data not used for Contouring
- Monitoring Well (Upper Water Bearing Zone)
- Groundwater Potentiometric Surface (ft amsl)
- Groundwater Flow Direction
- NFSS Site Boundary

NOTES:
1) All elevations are represented in NGVD 88.

0 175 350 700 Feet

U.S. ARMY ENGINEER DISTRICT
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BUFFALO, NY

US Army Corps of Engineers
Buffalo District

GROUNDWATER POTENTIOMETRIC SURFACE MAP FOR THE UPPER WATER BEARING ZONE (OCTOBER 26, 2015 - SEASONAL LOW)

Name: 160701_UWBZ_Low.mxd
Drawn By: H5TDESPM
Date Saved: 09 Aug 2016
Time Saved: 2:38:28 PM

NIAGARA FALLS STORAGE SITE
LEWISTON, NEW YORK

FIGURE 16

Document Path: K:\NFSSP\GIS\ArcMap\ESP\2015\160701_UWBZ_Low.mxd

FIGURE 17

Total Uranium Concentrations in Upper Water Bearing Zone Monitoring Wells in the Vicinity of the IWCS (1997-2015)

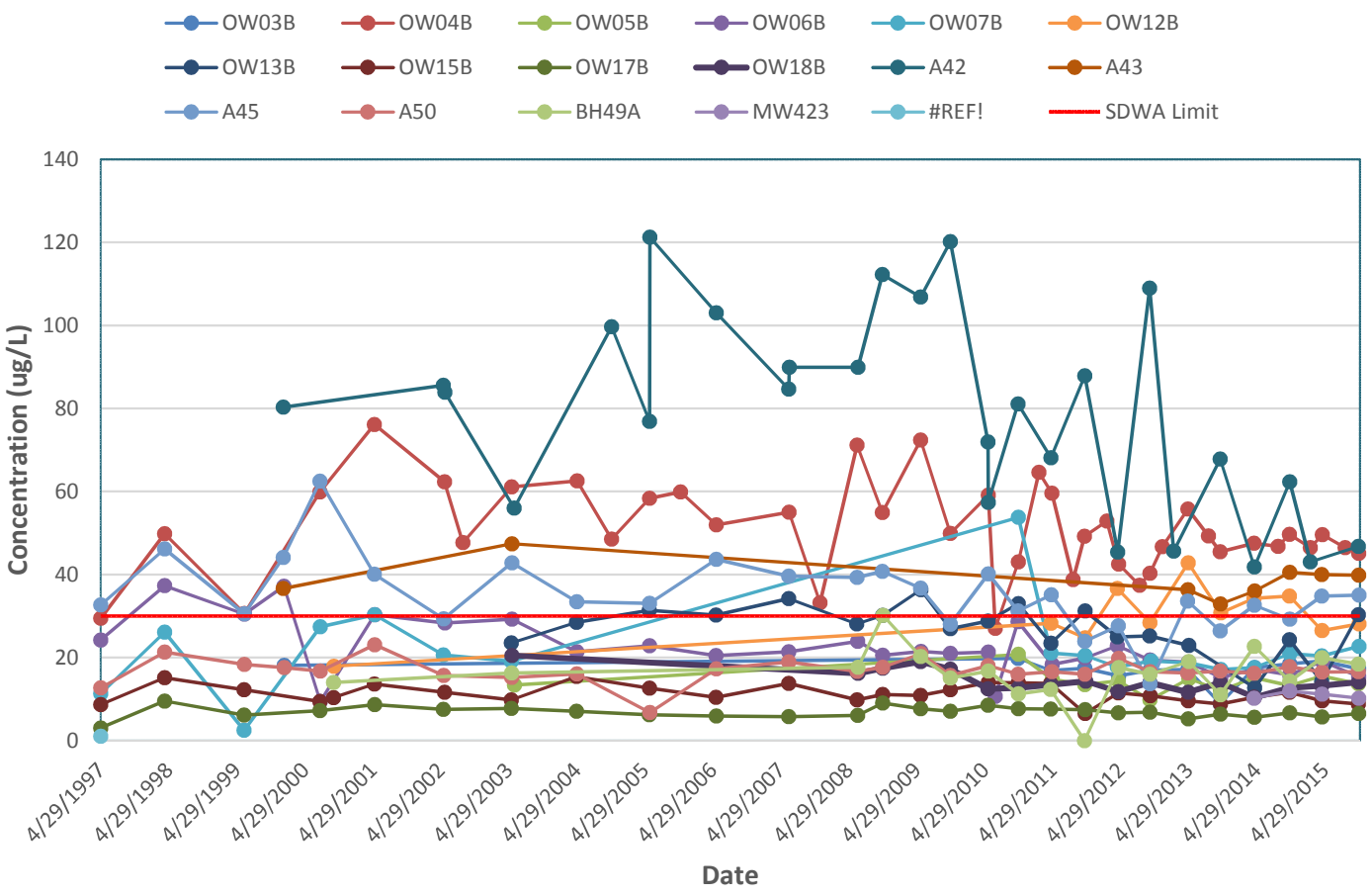


Figure 18

Total Uranium Concentrations in Groundwater in well OW11B and Newly Installed Balance of Plant Wells (1997–2015)

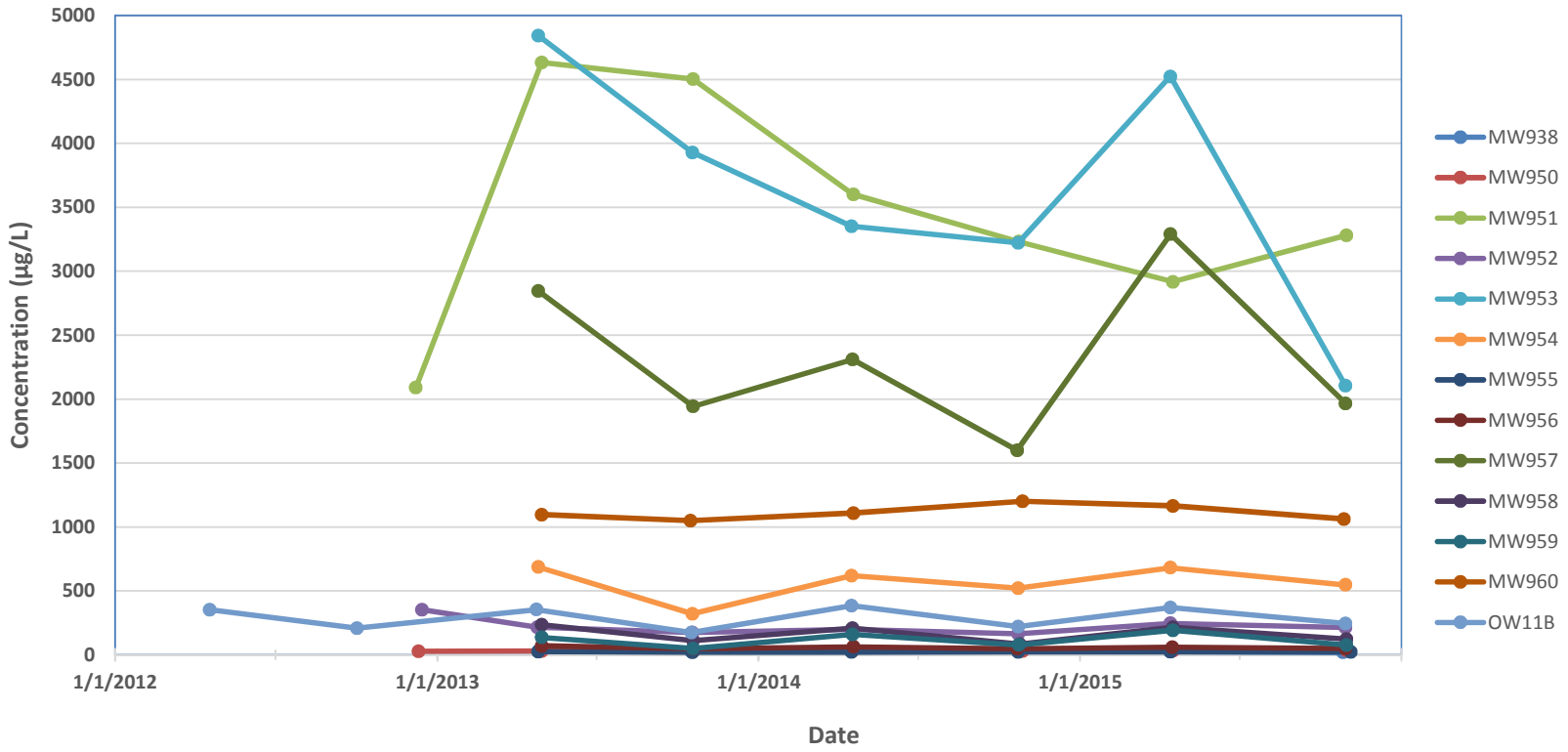


Figure 19
Total Uranium Concentrations in Upper Water Bearing Zone Monitoring Wells (1997–2015)

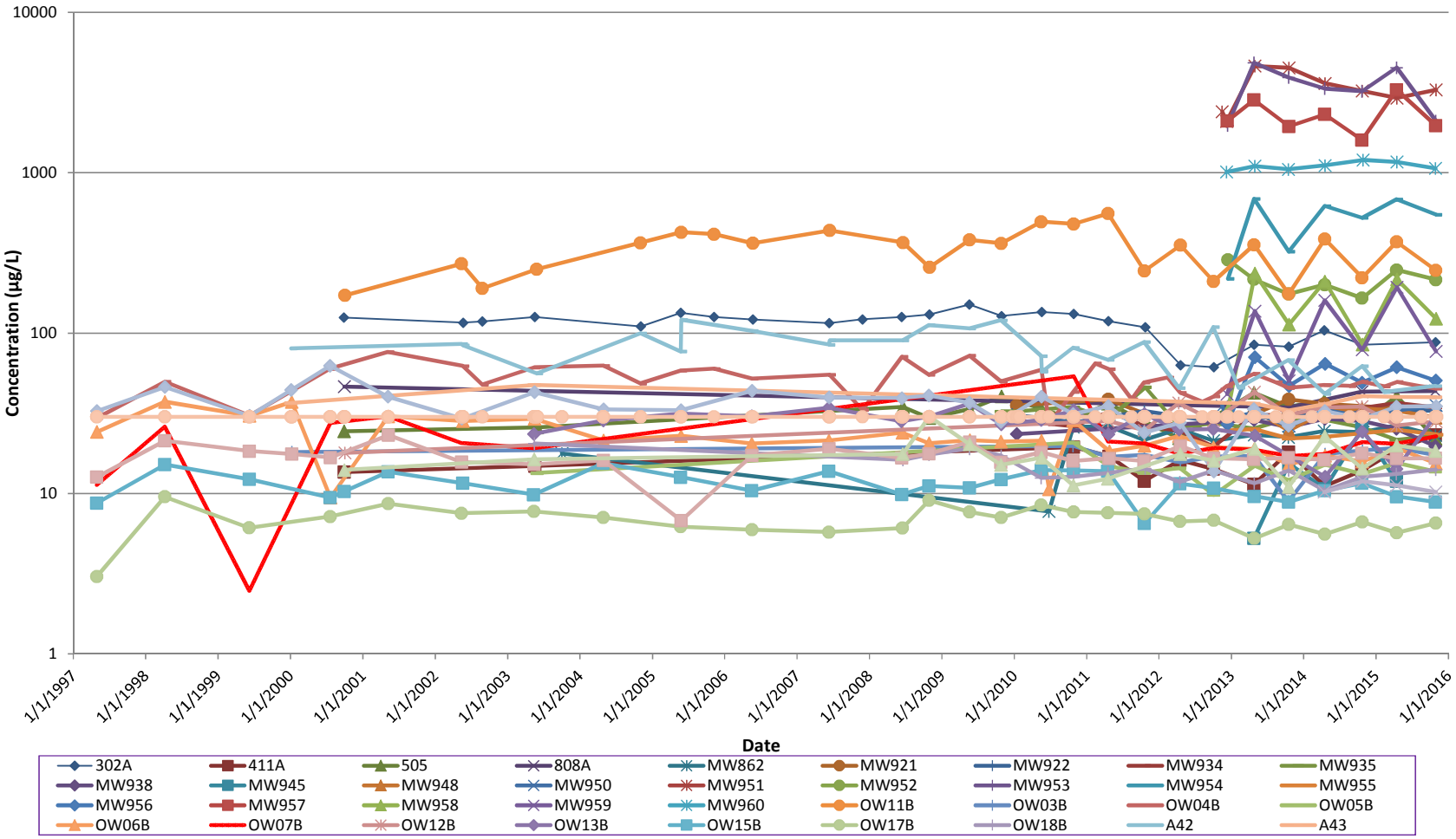
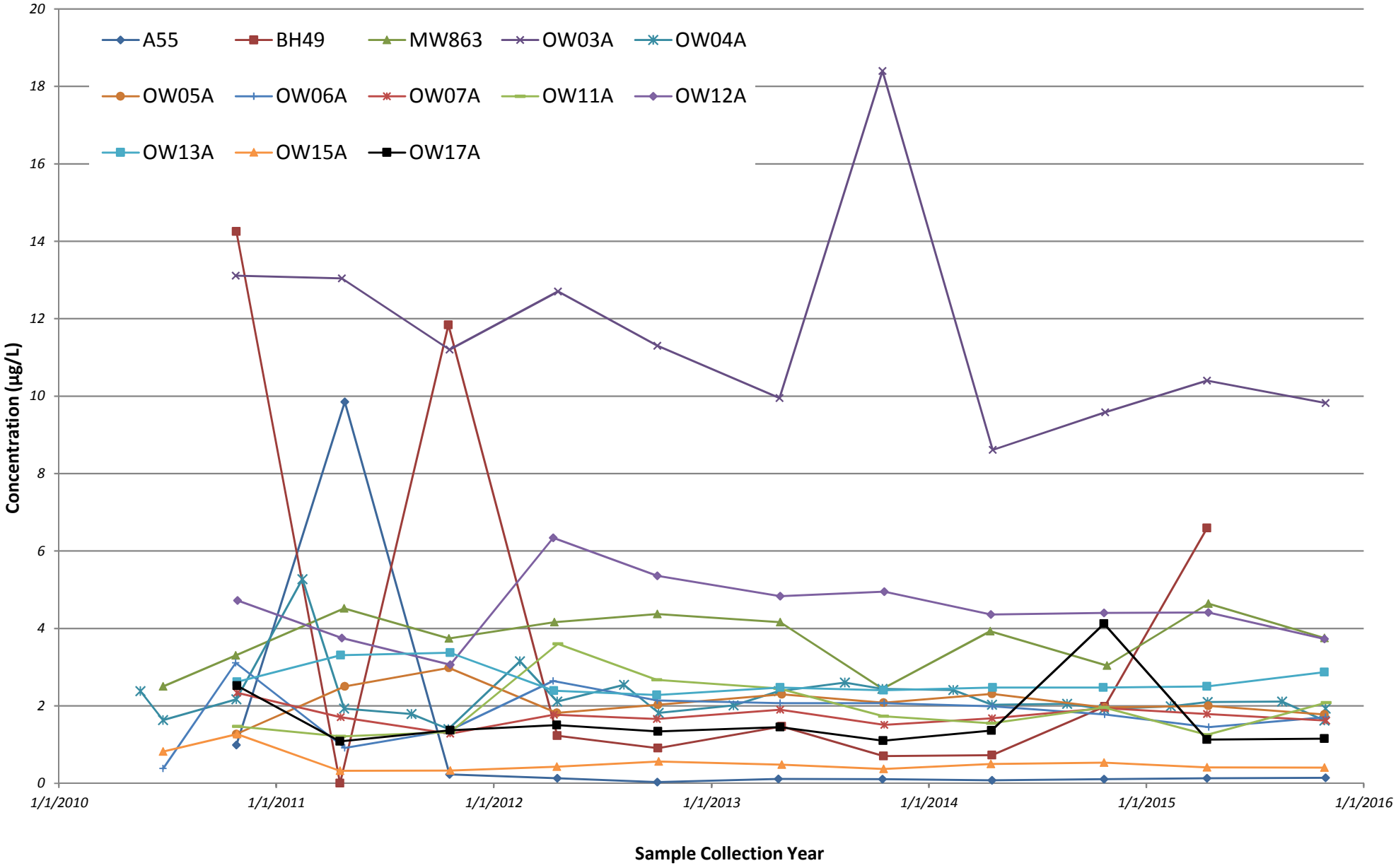


FIGURE 20
TOTAL URANIUM CONCENTRATIONS IN LOWER WATER BEARING ZONE MONITORING WELLS (2010 - 2015)



The Safe Drinking Water Act Maximum Containment Level (SDWA MCL) for Total Uranium 30 µg/L. Groundwater at NFSS is not a drinking water source so use of the MCL is for comparative purposes only.

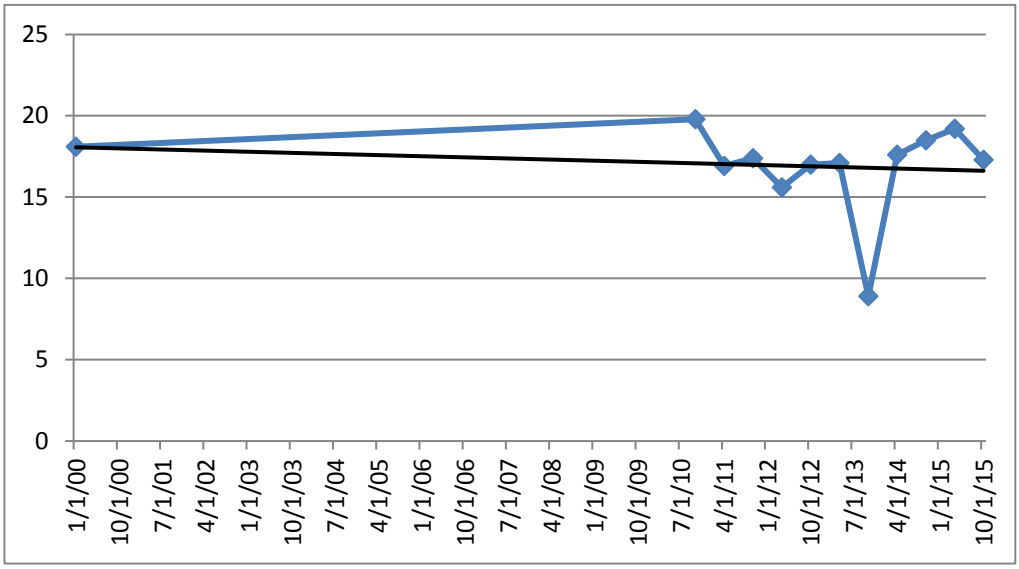
K:\EDMS\Program\NFSS\Printing\EDMS.mdb
ESP_Figures_17_18_19_20.xlsx, fig 20 Total U (LWBZ Wells), 10/11/2016

ATTACHMENT A

MANN-KENDALL TEST RESULTS

Total U

OW03B	**µg/L**
1/9/00	18.1
10/25/10	19.79
4/21/11	16.92
10/19/11	17.39
4/18/12	15.6
10/2/12	17
4/25/13	17.1
10/15/13	8.91
4/18/14	17.6
10/24/14	18.5
4/14/15	19.2
10/29/15	17.3



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	4		
V(S)	212.67	n	12
z	**0.21**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

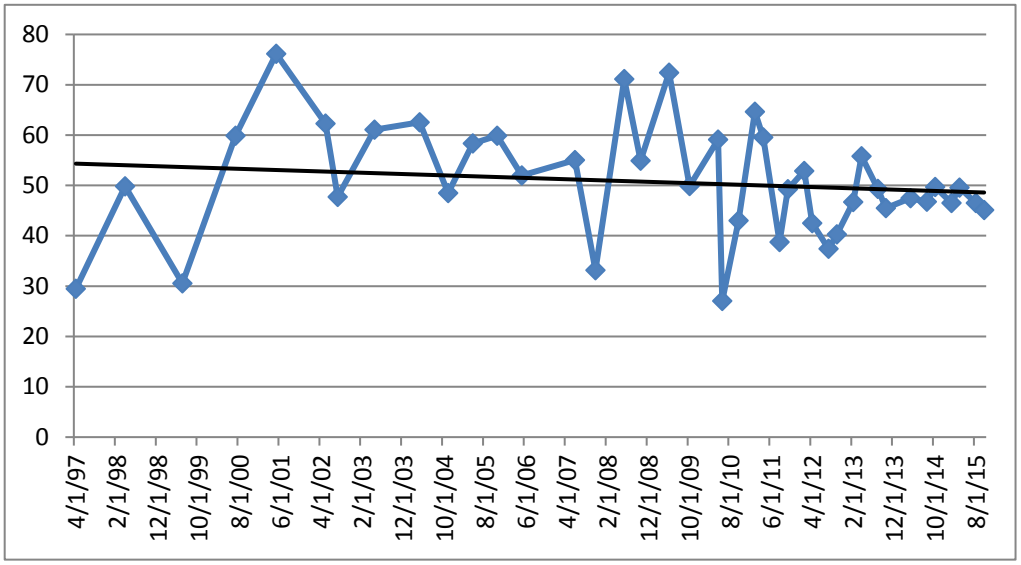
Ha: Upward Trend

Reject Ho if z > Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

OW04B	**µg/L**
4/29/97	29.5
4/8/98	49.83
6/9/99	30.58
7/19/00	59.87
5/7/01	76.15
5/20/02	62.3
8/26/02	47.7
5/15/03	61.1
4/30/04	62.53
11/2/04	48.5
5/24/05	58.34
11/8/05	59.9
5/18/06	51.98
6/13/07	55.01
11/27/07	33.17
6/13/08	71.16
10/27/08	54.91
5/20/09	72.4
10/26/09	49.88
5/18/10	59.12
6/25/10	27.05
10/26/10	43.04
2/14/11	64.64
4/25/11	59.58
8/16/11	38.74
10/17/11	49.22
2/14/12	52.85
4/17/12	42.5
8/7/12	37.4
10/3/12	40.3
2/7/13	46.7
4/24/13	55.8
8/13/13	49.3
10/15/13	45.5
4/14/14	47.5
8/21/14	46.8
10/22/14	49.7
2/11/15	46.5
4/16/15	49.6
8/17/15	46.5
10/29/15	45.1



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-177		
V(S)	7925.67	n	41
z	**-1.98**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

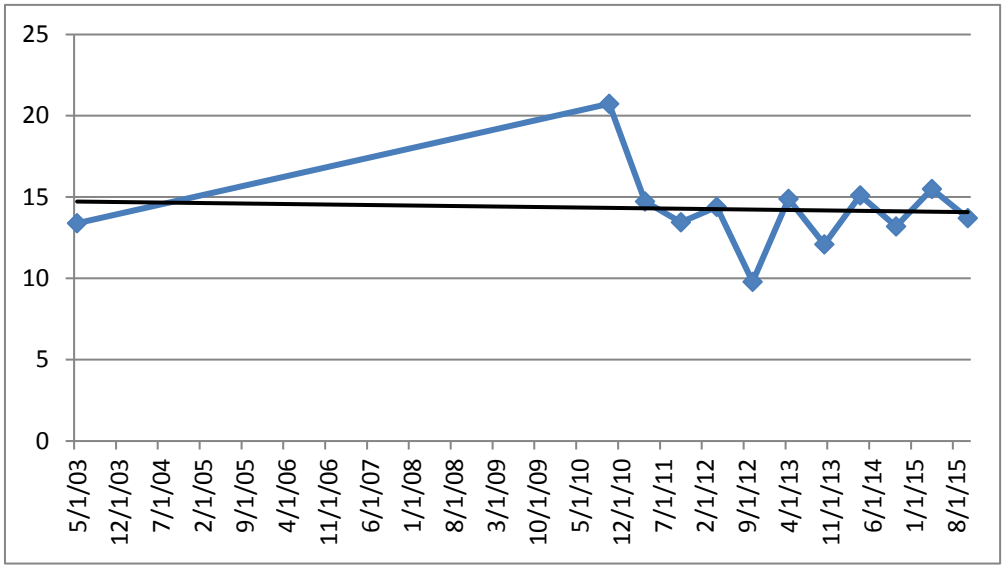
Ha: Downward Trend

Reject Ho if z< - Z(0.95)

Ho is rejected, there is evidence of a downward trend

Total U

OW05B	**µg/L**
5/30/03	13.4
10/26/10	20.74
4/26/11	14.74
10/18/11	13.45
4/16/12	14.4
10/3/12	9.79
4/29/13	14.9
10/17/13	12.1
4/17/14	15.1
10/23/14	13.2
4/15/15	15.5
10/27/15	13.7



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	2		
V(S)	212.67	n	12
z	**0.07**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

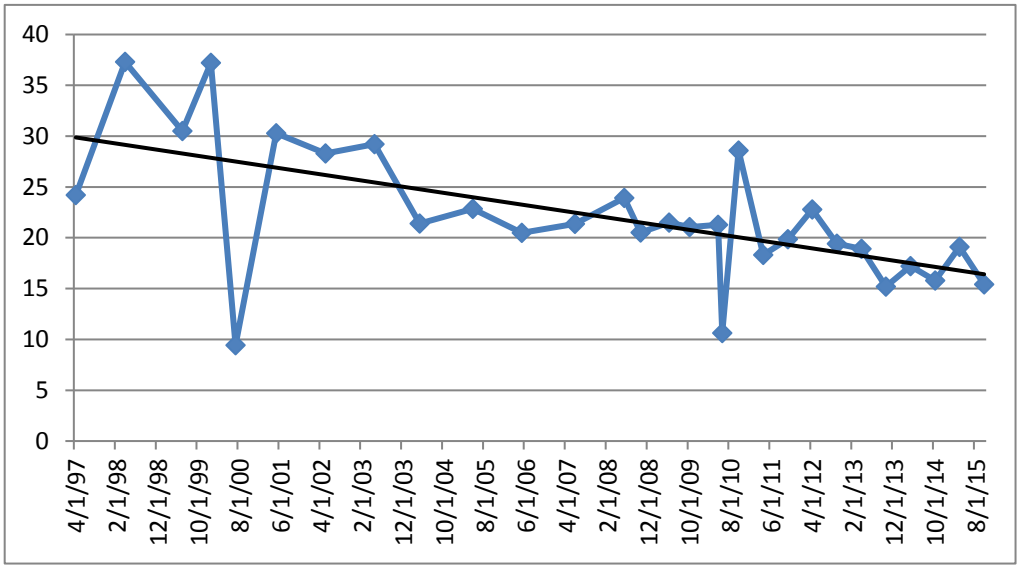
Ha: Upward Trend

Reject Ho if z > Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

OW06B	**µg/L**
4/29/97	24.2
4/7/98	37.3
6/9/99	30.49
1/8/00	37.2
7/21/00	9.43
5/9/01	30.28
5/21/02	28.3
5/16/03	29.2
4/29/04	21.39
5/25/05	22.85
5/17/06	20.48
6/11/07	21.37
6/16/08	23.93
10/28/08	20.53
5/21/09	21.49
10/26/09	21.04
5/18/10	21.28
6/25/10	10.64
10/25/10	28.59
4/26/11	18.31
10/19/11	19.85
4/10/12	22.8
10/2/12	19.4
4/26/13	18.9
10/18/13	15.2
4/18/14	17.2
10/23/14	15.8
4/16/15	19.1
10/29/15	15.4



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-226		
V(S)	2842.00	n	29
z	**-4.22**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

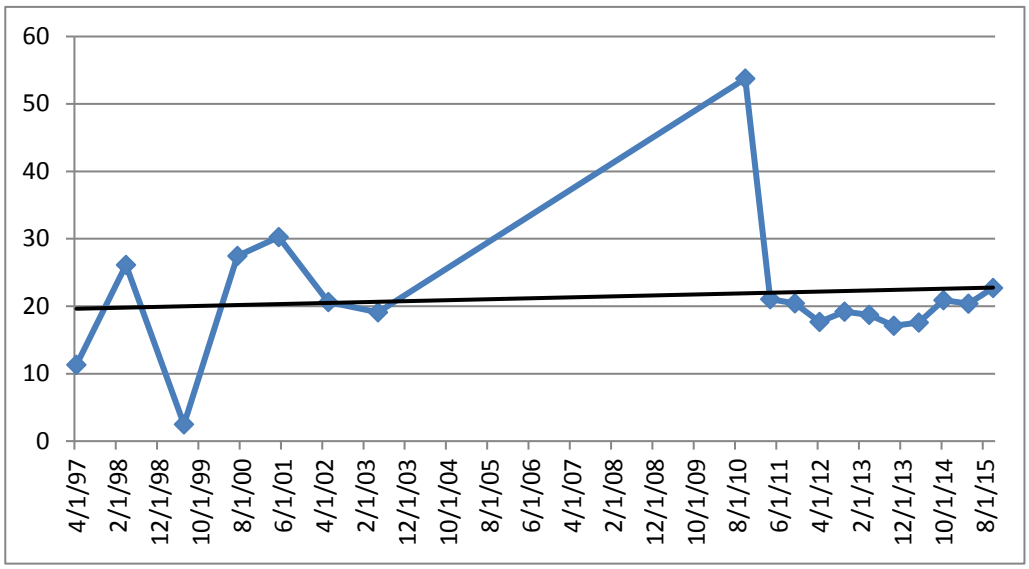
Ha: Downward Trend

Reject Ho if z< -Z(0.95)

Ho is rejected, there is evidence of a downward trend

Total U

OW07B	**µg/L**
4/29/97	11.3
4/7/98	26.12
6/8/99	2.47
7/21/00	27.44
5/9/01	30.27
5/13/02	20.6
5/13/03	19.1
10/27/10	53.75
4/19/11	21.05
10/20/11	20.45
4/11/12	17.7
10/10/12	19.2
4/29/13	18.7
10/18/13	17.1
4/17/14	17.6
10/24/14	20.9
4/14/15	20.4
10/30/15	22.7



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-9		
V(S)	697.00	n	18
z	**-0.30**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

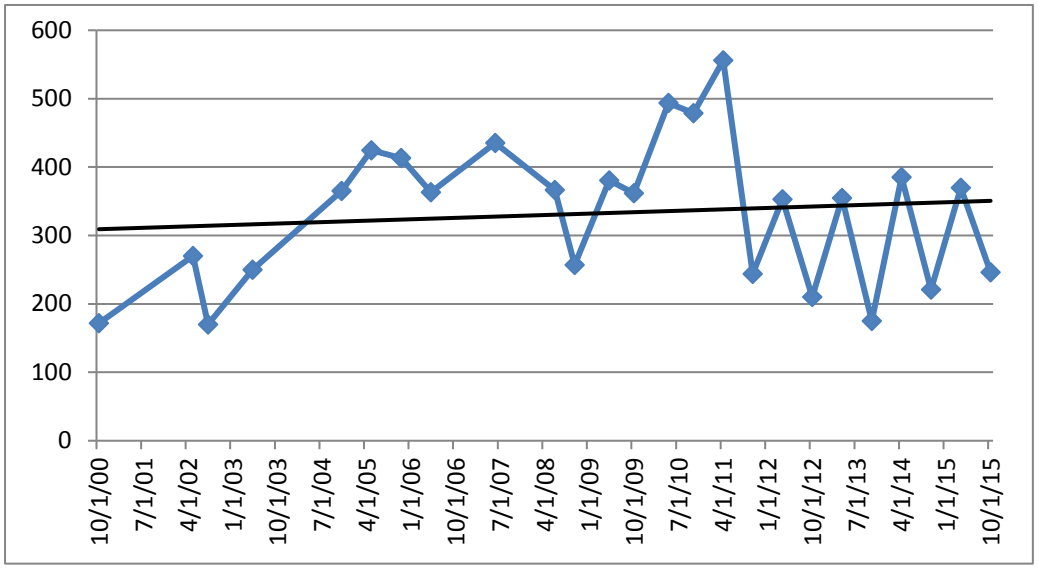
Ha: Downward Trend

Reject Ho if z < -Z(0.95)

Ho is not rejected, there is no evidence of a downward trend

Total U

OW11B	**µg/L**
10/2/00	172
5/14/02	270
8/27/02	170
5/28/03	250
11/2/04	365
5/26/05	424.69
11/8/05	413.16
5/22/06	363.13
6/14/07	435.46
6/18/08	366.69
10/30/08	256.8
5/20/09	380.51
10/27/09	362.06
5/17/10	493.76
10/28/10	478.8
4/19/11	555.94
10/20/11	244.04
4/18/12	353
10/2/12	210
4/24/13	355
10/17/13	175
4/16/14	385
10/22/14	221
4/14/15	370
10/29/15	246



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	4		
V(S)	1833	n	25
z	**0.07**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

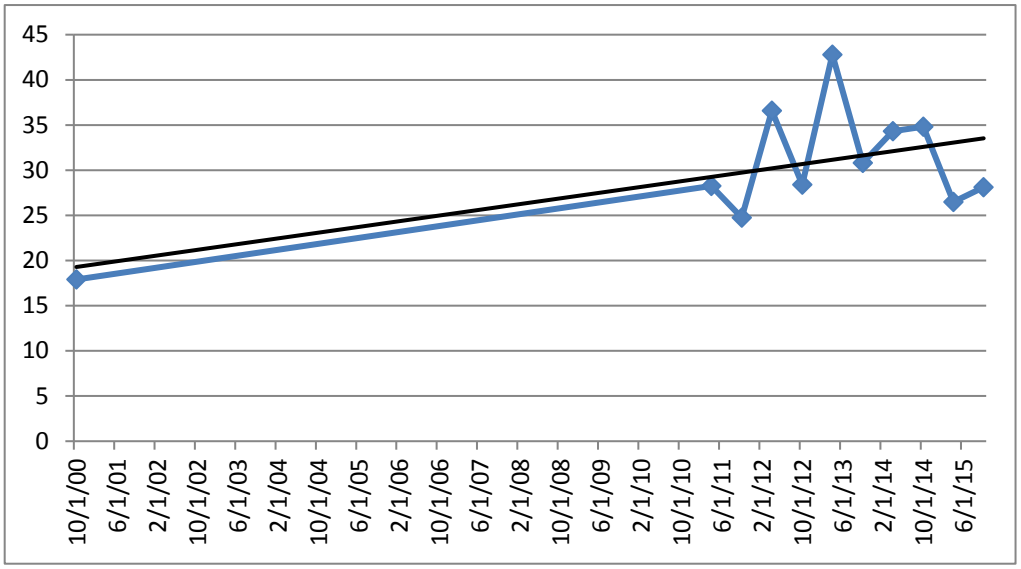
Ha: upward trend

Reject Ho if z> Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

OW12B	**µg/L**
10/2/00	17.9
4/19/11	28.25
10/20/11	24.74
4/10/12	36.6
10/2/12	28.4
4/26/13	42.8
10/18/13	30.8
4/15/14	34.3
10/22/14	34.8
4/15/15	26.5
10/30/15	28.1



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	11		
V(S)	165	n	11
z	**0.78**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

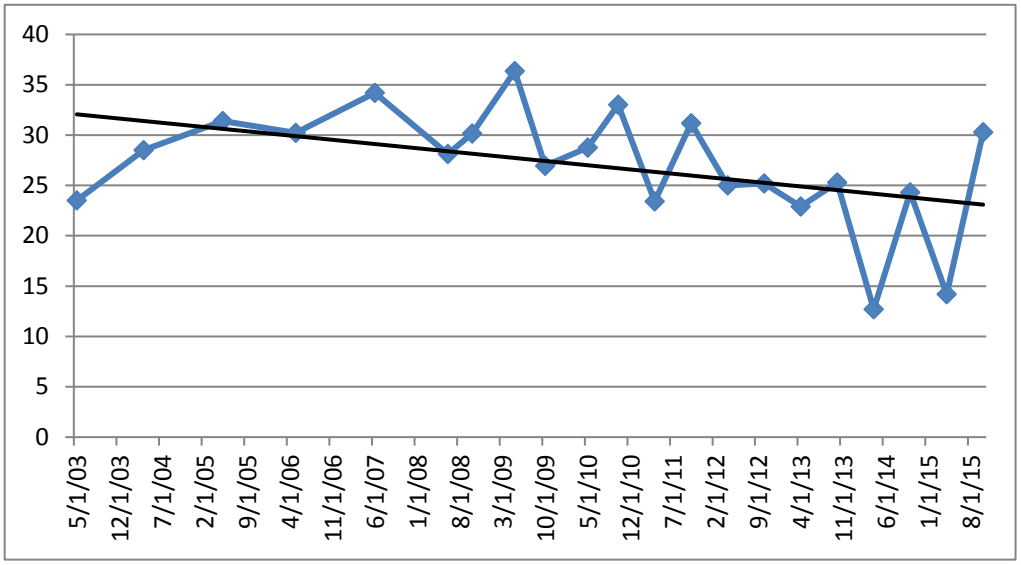
Ha: Upward trend

Reject Ho if z> Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

OW13B	**µg/L**
5/14/03	23.5
4/28/04	28.5
5/23/05	31.4
5/17/06	30.22
6/11/07	34.2
6/10/08	28.13
10/28/08	30.16
5/21/09	36.35
10/27/09	26.95
5/17/10	28.75
10/27/10	33.01
4/20/11	23.41
10/20/11	31.19
4/11/12	25
10/1/12	25.2
4/29/13	22.9
10/17/13	25.3
4/18/14	12.7
10/21/14	24.3
4/13/15	14.2
10/27/15	30.3



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-68		
V(S)	1096.67	n	21
z	**-2.02**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No Trend

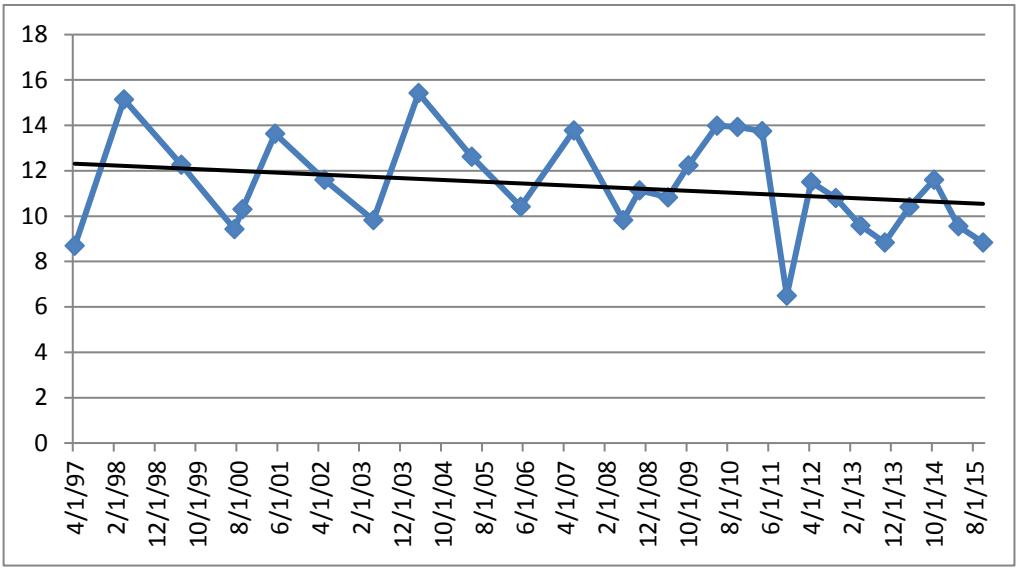
Ha: Downward Trend

Reject Ho if z< -Z(0.95)

Ho is rejected, there is evidence of a downward trend

Total U

OW15B	**µg/L**
4/29/97	8.69
4/8/98	15.14
6/8/99	12.26
7/20/00	9.43
9/30/00	10.3
5/8/01	13.64
5/20/02	11.6
5/14/03	9.82
4/27/04	15.42
5/24/05	12.62
5/17/06	10.42
6/11/07	13.77
6/13/08	9.83
10/28/08	11.13
5/20/09	10.83
10/27/09	12.23
5/18/10	13.98
10/27/10	13.93
4/18/11	13.75
10/20/11	6.5
4/16/12	11.5
10/4/12	10.8
4/26/13	9.59
10/17/13	8.84
4/15/14	10.4
10/22/14	11.6
4/15/15	9.55
10/27/15	8.83



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-67		
V(S)	2561.00	n	28
z	**-1.30**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

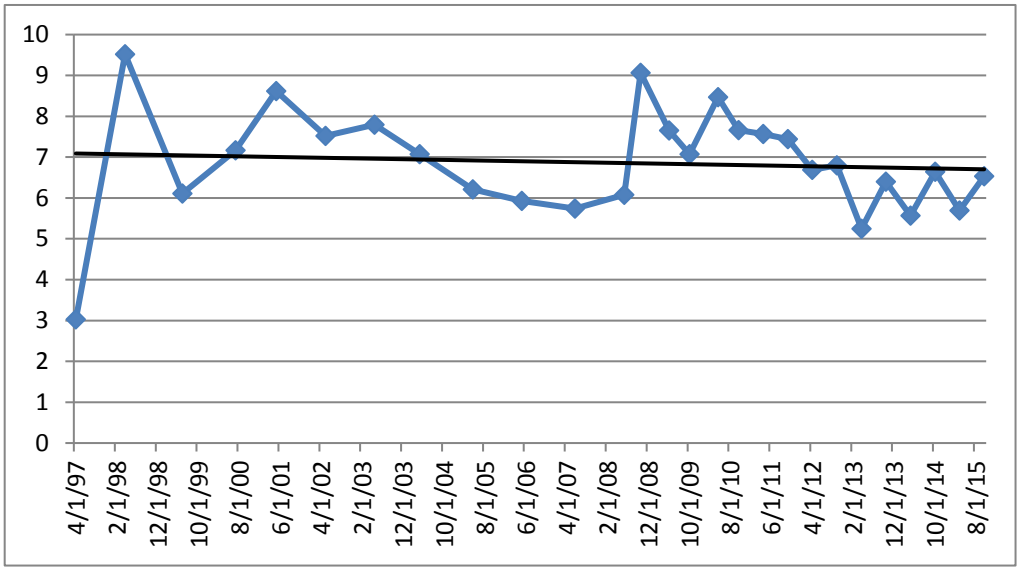
Ha: Downward Trend

Reject Ho if z < -Z(0.95)

Ho is not rejected, there is no evidence of a downward trend

Total U

OW17B	**µg/L**
4/29/97	3.03
4/7/98	9.52
6/7/99	6.11
7/20/00	7.17
5/9/01	8.62
5/13/02	7.52
5/14/03	7.79
4/28/04	7.07
5/23/05	6.21
5/18/06	5.93
6/11/07	5.74
6/16/08	6.08
10/28/08	9.06
5/20/09	7.65
10/27/09	7.07
5/17/10	8.47
10/27/10	7.66
4/18/11	7.57
10/20/11	7.44
4/16/12	6.69
10/3/12	6.8
4/26/13	5.25
10/16/13	6.4
4/16/14	5.57
10/22/14	6.64
4/14/15	5.69
10/27/15	6.53



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-78		
V(S)	2300.00	n	27
z	**-1.61**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

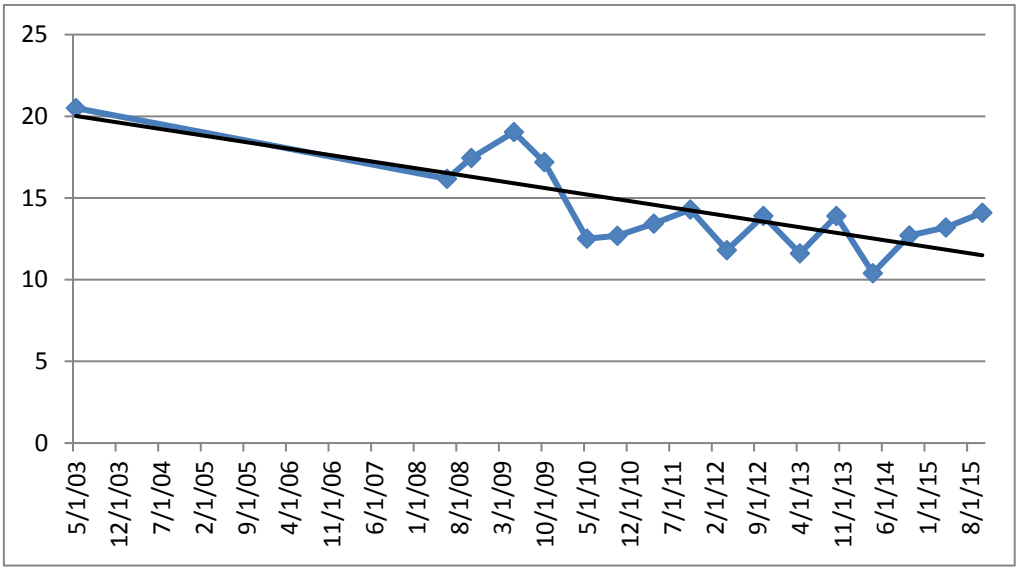
Ha: Downward Trend

Reject Ho if z< -Z(0.95)

Ho is not rejected, there is no evidence of a downwardward trend

Total U

OW18B	**µg/L**
5/18/03	20.5
6/18/08	16.17
10/28/08	17.45
5/20/09	19.03
10/27/09	17.19
5/17/10	12.5
10/27/10	12.68
4/19/11	13.43
10/24/11	14.3
4/16/12	11.8
10/3/12	13.9
4/26/13	11.6
10/17/13	13.9
4/17/14	10.4
10/22/14	12.7
4/13/15	13.2
10/29/15	14.1



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-55		
V(S)	588	n	17
z	**-2.23**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

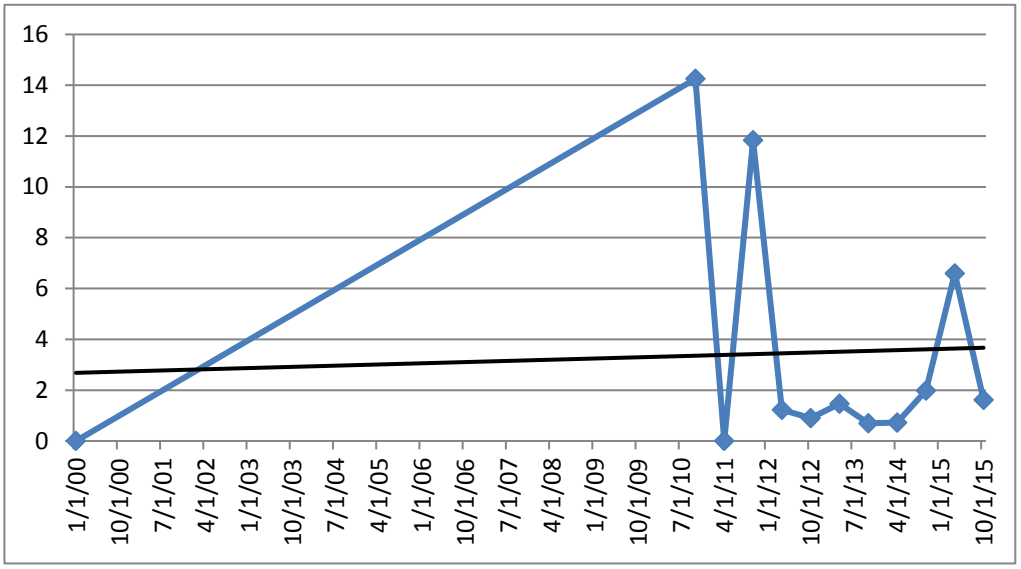
Ha: Downward Trend

Reject Ho if z< -Z(0.95)

Ho is rejected, there is evidence of a downward trend

Total U

BH49	**µg/L**
1/9/00	0
10/26/10	14.25
4/18/11	0
10/17/11	11.84
4/17/12	1.23
10/3/12	0.904
4/29/13	1.47
10/17/13	0.701
4/17/14	0.723
10/23/14	1.98
4/14/15	6.59
10/27/15	1.62



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	13		
V(S)	211.67	n	12
z	**0.82**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

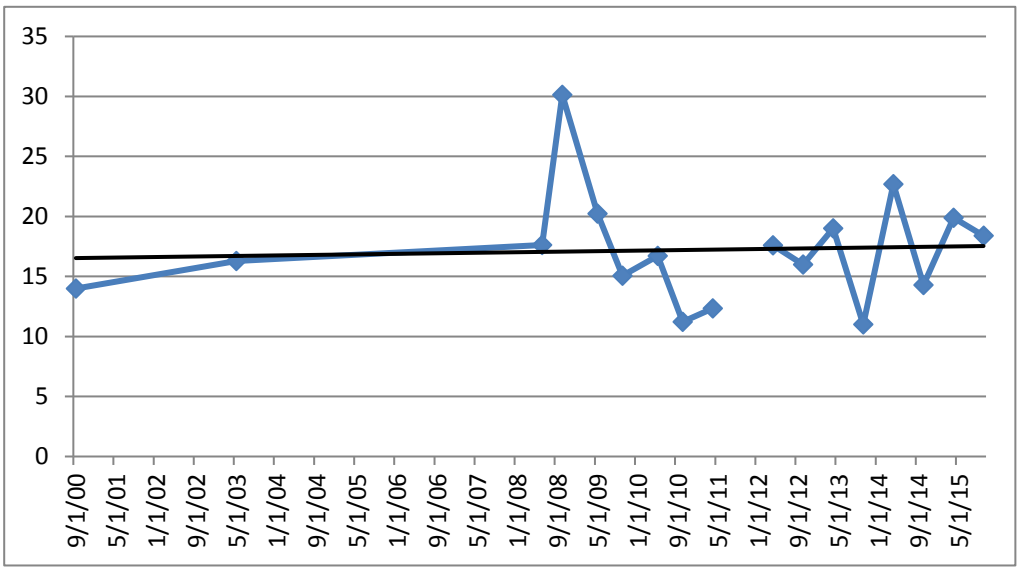
Ha: Upward Trend

Reject Ho if z > Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

BH49A	**µg/L**
9/30/00	14
5/15/03	16.3
6/17/08	17.62
10/30/08	30.14
5/20/09	20.23
10/26/09	15.07
5/18/10	16.72
10/26/10	11.23
4/18/11	12.35
10/17/11	
4/17/12	17.6
10/3/12	16
4/29/13	19
10/17/13	11
4/17/14	22.7
10/23/14	14.3
4/14/15	19.9
10/27/15	18.4



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	12		
V(S)	589	n	17
z	**0.45**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

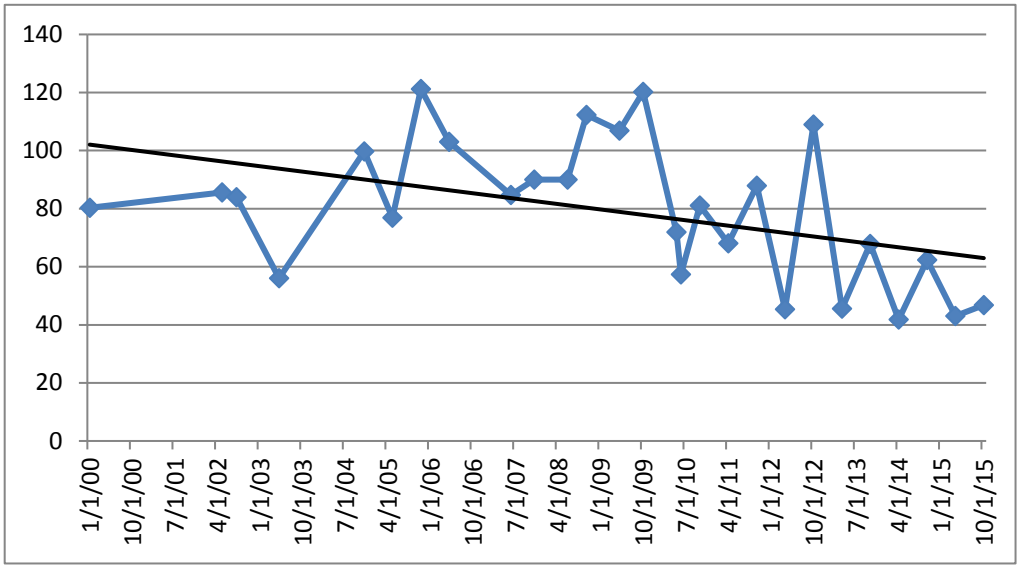
Ha: Upward Trend

Reject Ho if z > Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

A42	µg/L
1/6/00	80.3
5/14/02	85.6
8/26/02	83.9
5/29/03	56
11/3/04	99.7
5/25/05	76.9
11/8/05	121.22
5/22/06	103.03
6/12/07	84.67
11/27/07	89.95
6/18/08	89.95
10/28/08	112.26
5/21/09	106.88
10/27/09	120.21
5/18/10	71.91
6/25/10	57.39
10/26/10	81.07
4/20/11	68.11
10/19/11	87.88
4/16/12	45.4
10/2/12	109
4/23/13	45.6
10/16/13	67.8
4/17/14	41.8
10/24/14	62.3
4/14/15	43
10/29/15	46.8



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-108.00		
V(S)	2300.00	n	27
z	**-2.23**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

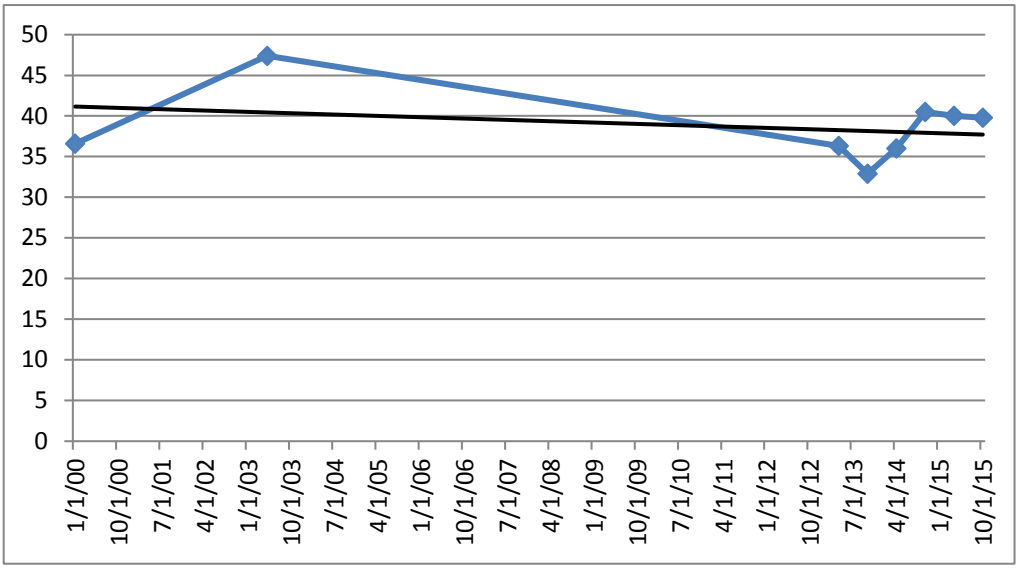
Ha: Downward Trend

Reject Ho if z < -Z(0.95)

Ho is rejected, there is evidence of a downward trend

Total U

A43	**µg/L**
1/5/00	36.6
5/17/03	47.4
4/25/13	36.3
10/16/13	32.9
4/18/14	36
10/24/14	40.5
4/13/15	40
10/29/15	39.8



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	0	
p	**0.548**	From Table B-10
n	8	

Ho: No trend

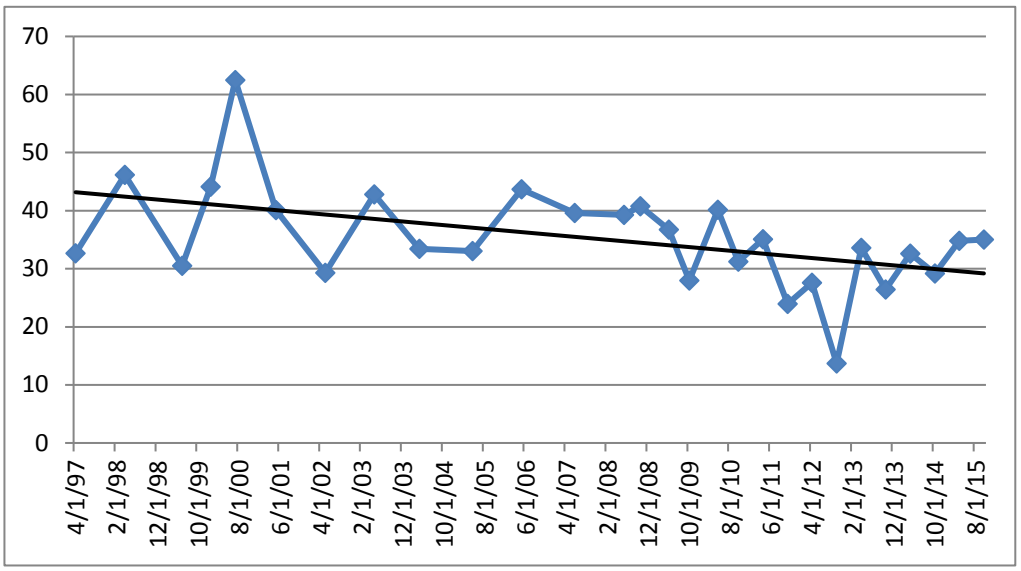
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

A45	µg/L
4/29/97	32.67
4/8/98	46.16
6/9/99	30.53
1/5/00	44.1
7/19/00	62.46
5/7/01	40.09
5/15/02	29.3
5/16/03	42.8
4/29/04	33.42
5/25/05	33.02
5/18/06	43.66
6/12/07	39.62
6/12/08	39.27
10/27/08	40.78
5/19/09	36.73
10/26/09	27.99
5/18/10	40.14
10/25/10	31.2
4/21/11	35.1
10/18/11	23.92
4/16/12	27.6
10/3/12	13.7
4/23/13	33.6
10/15/13	26.4
4/17/14	32.6
10/24/14	29.2
4/13/15	34.8
10/30/15	35



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-130		
V(S)	2562.00	n	28
z	**-2.55**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

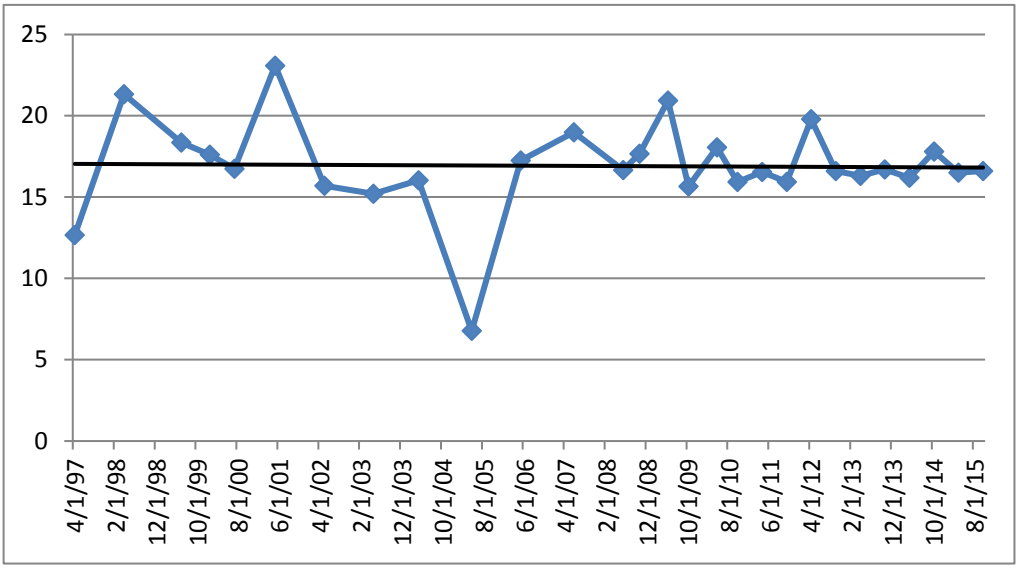
Ha: Downward Trend

Reject Ho if z< -Z(0.95)

Ho is rejected, there is evidence of a downward trend

Total U

A50	µg/L
4/29/97	12.66
4/7/98	21.33
6/9/99	18.36
1/9/00	17.6
7/21/00	16.75
5/10/01	23.09
5/15/02	15.7
5/15/03	15.2
4/29/04	16.04
5/26/05	6.77
5/18/06	17.25
6/12/07	18.98
6/12/08	16.67
10/28/08	17.67
5/21/09	20.93
10/26/09	15.65
5/17/10	18.06
10/25/10	15.94
4/25/11	16.55
10/18/11	15.94
4/18/12	19.8
10/3/12	16.6
4/23/13	16.3
10/15/13	16.7
4/14/14	16.2
10/22/14	17.8
4/15/15	16.5
10/27/15	16.6



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-16		
V(S)	2560.00	n	28
z	**-0.30**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No Trend

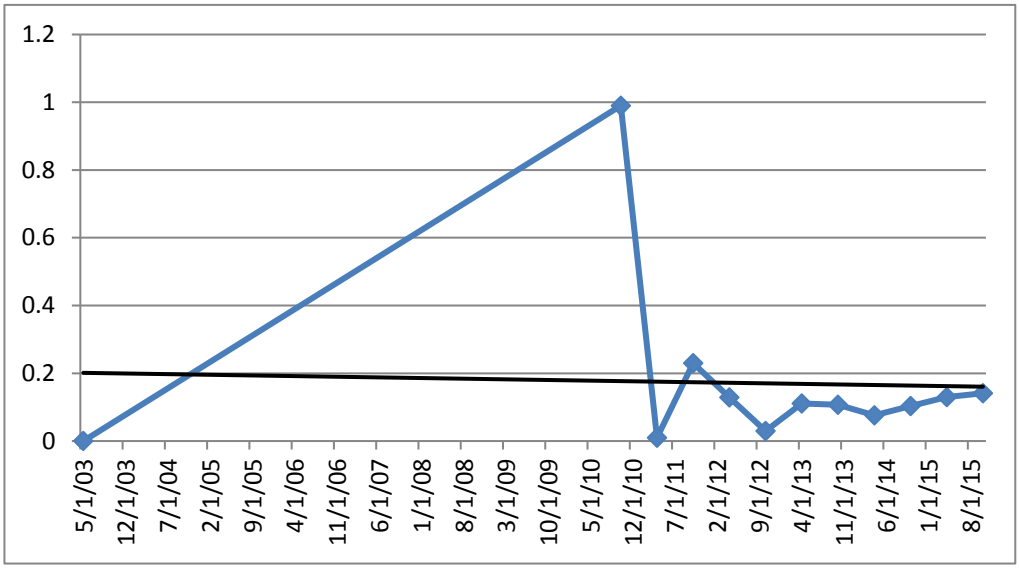
Ha: Downward Trend

Reject Ho if z < -Z(0.95)

Ho is not rejected, there is no evidence of a downward trend

Total U

A55	**µg/L**
5/17/03	0
10/26/10	0.99
4/26/11	0.01
10/19/11	0.23
4/17/12	0.129
10/2/12	0.03
4/23/13	0.111
10/15/13	0.107
4/17/14	0.076
10/22/14	0.103
4/13/15	0.13
10/29/15	0.141



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	14		
V(S)	212.67	n	12
z	**0.89**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No Trend

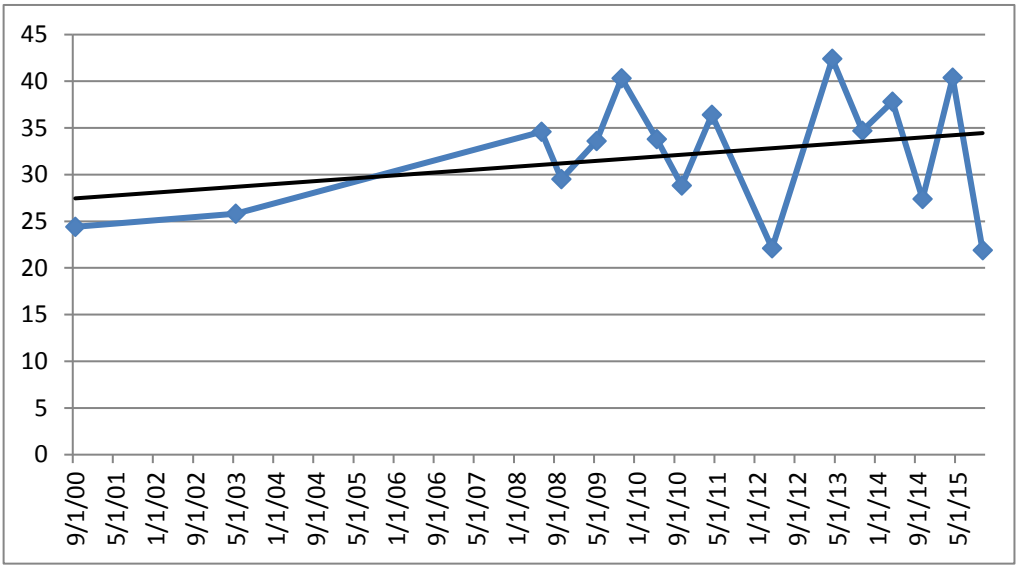
Ha: Upward Trend

Reject Ho if z > Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

505	**µg/L**
9/28/00	24.4
5/29/03	25.8
6/18/08	34.6
10/29/08	29.53
5/19/09	33.59
10/29/09	40.32
5/17/10	33.82
10/26/10	28.82
4/18/11	36.4
4/11/12	22.1
4/25/13	42.4
10/17/13	34.7
4/14/14	37.8
10/21/14	27.4
4/14/15	40.4
10/27/15	21.9



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	20		
V(S)	493.33	n	16
z	**0.86**		
Z(0.9)	1.28	Z(.95)	**1.64**

Ho: No Trend

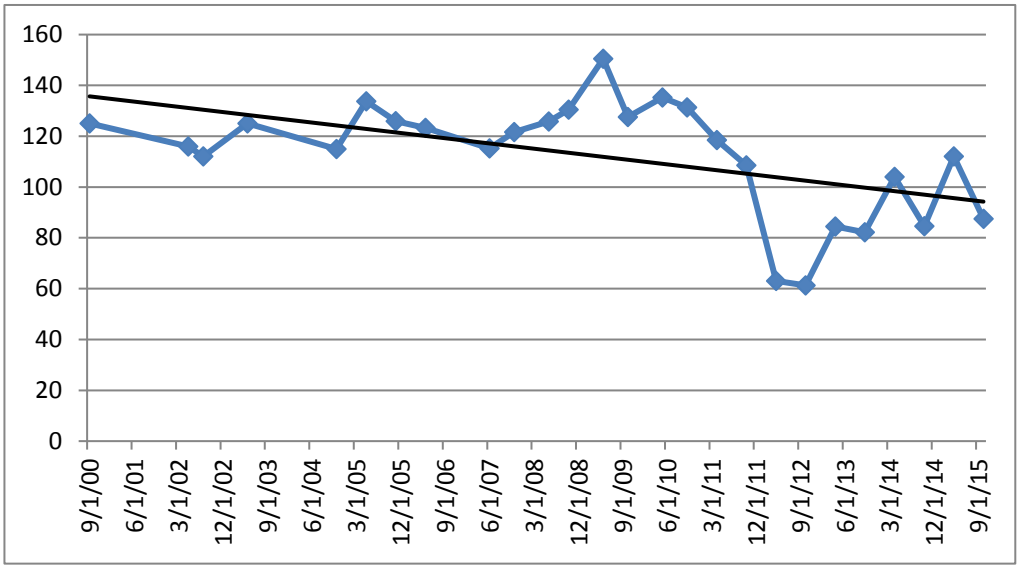
Ha: Upward Trend

Reject Ho if z > Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

302A	**µg/L**
9/27/00	125
5/22/02	116
8/27/02	112
5/18/03	125
11/3/04	115
5/24/05	133.72
11/8/05	125.86
5/22/06	123.23
6/12/07	115.18
11/27/07	121.6
6/11/08	125.82
10/29/08	130.42
5/19/09	150.47
10/28/09	127.53
5/19/10	135.23
10/28/10	131.3
4/20/11	118.54
10/24/11	108.48
4/18/12	63.1
10/4/12	61.3
4/25/13	84.5
10/16/13	82.2
4/14/14	104
10/22/14	84.6
4/15/15	112
10/27/15	87.5



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-93		
V(S)	2056.33	n	26
z	**-2.03**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

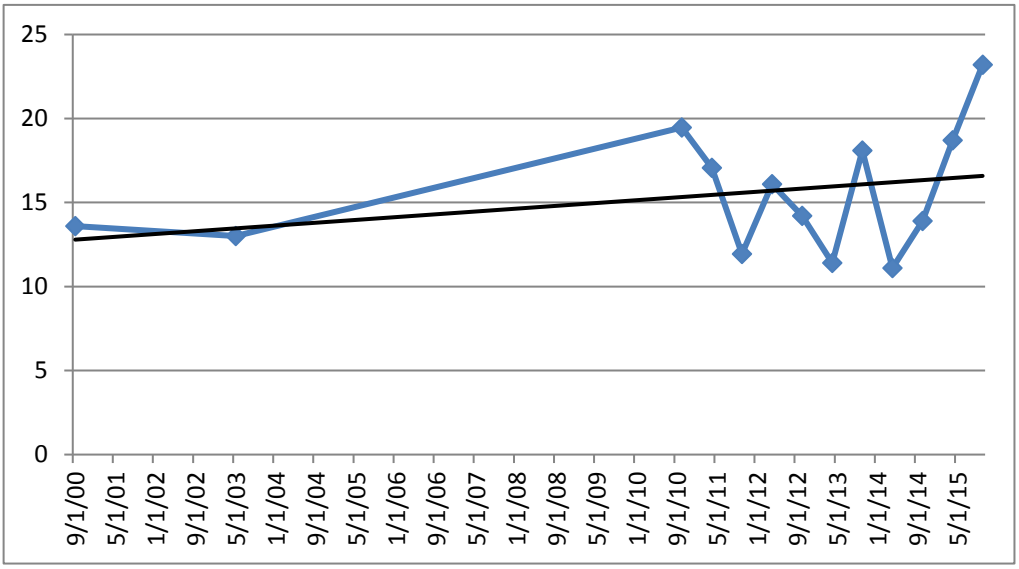
Ha: Downward Trend

Reject Ho if z < -Z(0.95)

Ho is rejected, there is evidence of a downward trend

Total U

411A	**µg/L**
9/29/00	13.6
5/19/03	13
10/28/10	19.46
4/25/11	17.07
10/20/11	11.94
4/17/12	16.1
10/2/12	14.2
4/25/13	11.4
10/16/13	18.1
4/17/14	11.1
10/21/14	13.9
4/15/15	18.7
10/27/15	23.2



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	10		
V(S)	268.67	n	13
z	**0.55**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

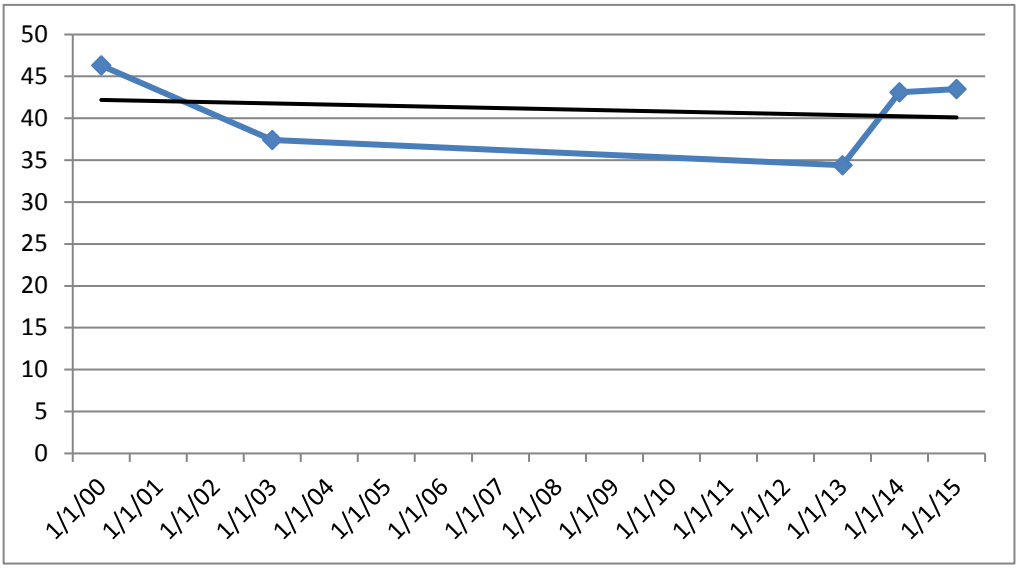
Ha: Upward Trend

Reject Ho if z > Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

808A	**µg/L**
9/29/00	46.3
5/28/03	37.4
10/18/13	34.4
10/22/14	43.1
10/26/15	43.5



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	0	
p	**0.592**	From Table B-10
n	5	

Ho: No trend

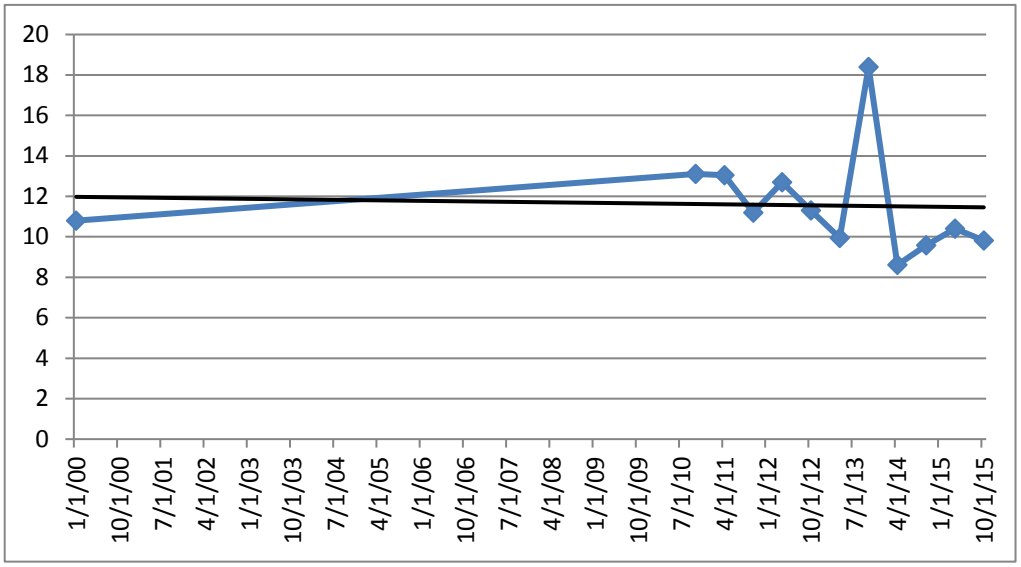
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

OW03A	**µg/L**
1/8/00	10.8
10/25/10	13.11
4/21/11	13.04
10/19/11	11.2
4/18/12	12.7
10/2/12	11.3
4/25/13	9.95
10/15/13	18.4
4/18/14	8.61
10/24/14	9.58
4/14/15	10.4
10/29/15	9.82



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-20		
V(S)	212.67	n	12
z	**-1.30**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

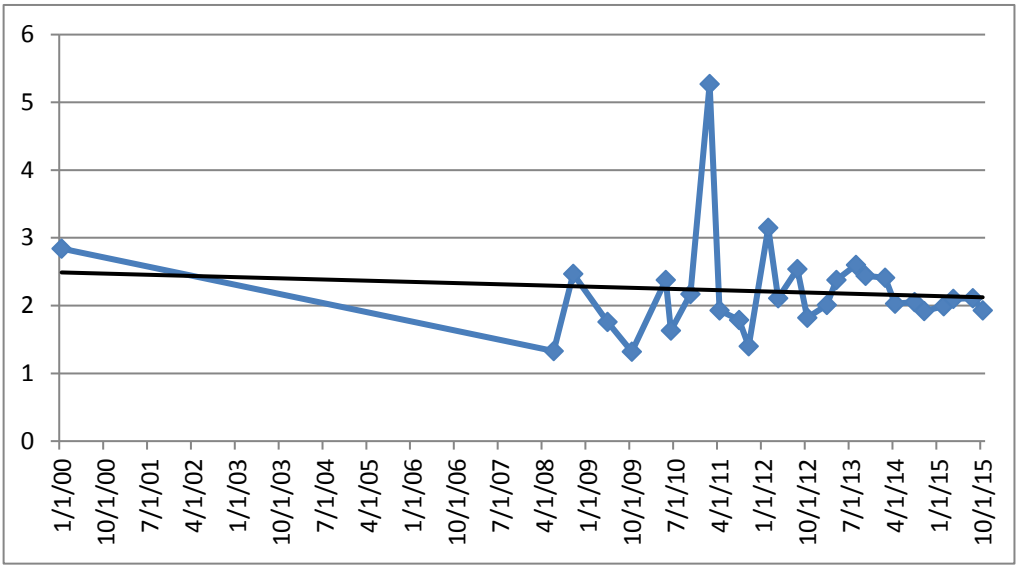
Ha:Downward Trend

Reject Ho if z < - Z(0.95)

Ho is not rejected, there is no evidence of a downward trend

Total U

OW04A	**µg/L**
1/9/00	2.84
6/17/08	1.33
10/29/08	2.47
5/20/09	1.76
10/26/09	1.32
5/18/10	2.38
6/25/10	1.63
10/26/10	2.17
2/14/11	5.27
4/25/11	1.93
8/16/11	1.79
10/17/11	1.4
2/14/12	3.15
4/17/12	2.11
8/7/12	2.54
10/4/12	1.82
2/7/13	2.01
4/24/13	2.38
8/13/13	2.6
10/15/13	2.44
2/11/14	2.41
4/17/14	2.03
8/21/14	2.05
10/22/14	1.92
2/11/15	1.99
4/15/15	2.1
8/17/15	2.11
10/29/15	1.93



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	13		
V(S)	2559.00	n	28
z	**0.24**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

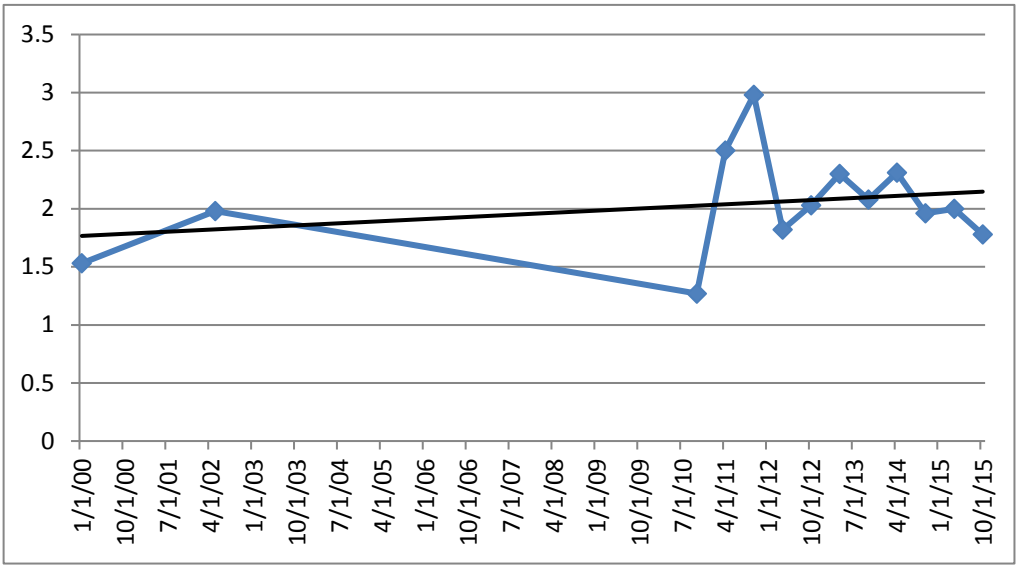
Ha: Upward Trend

Reject Ho if z> Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

OW05A	**µg/L**
1/9/00	1.53
5/16/02	1.98
10/26/10	1.27
4/26/11	2.5
10/18/11	2.98
4/16/12	1.82
10/3/12	2.03
4/29/13	2.3
10/17/13	2.08
4/17/14	2.31
10/23/14	1.96
4/15/15	2
10/27/15	1.78



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	4		
V(S)	268.67	n	13
z	**0.18**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

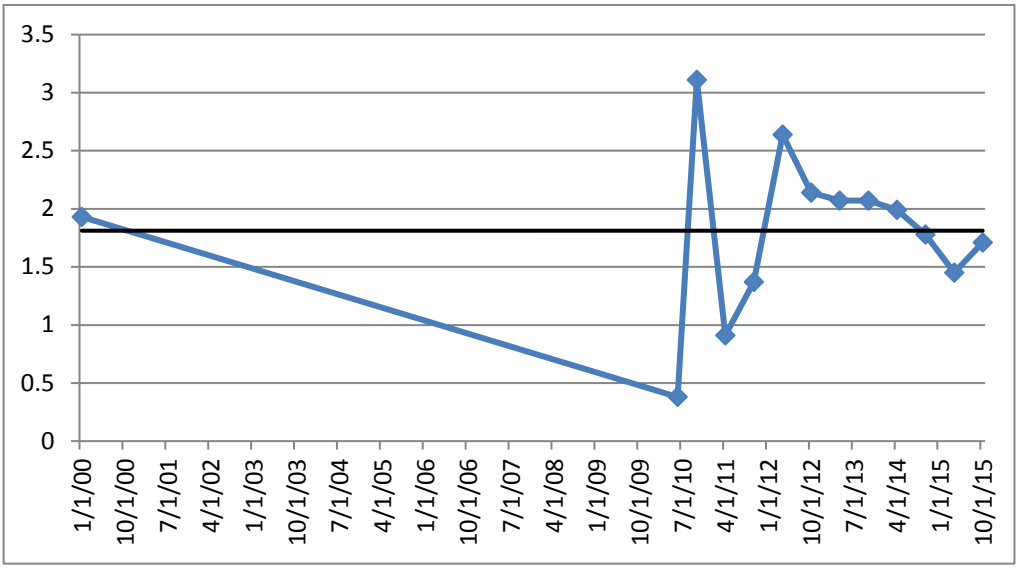
Ha: Upward Trend

Reject Ho if z> Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

OW06A	**µg/L**
1/8/00	1.93
6/25/10	0.38
10/25/10	3.11
4/26/11	0.91
10/19/11	1.37
4/10/12	2.64
10/2/12	2.14
4/26/13	2.07
10/18/13	2.07
4/18/14	1.99
10/23/14	1.78
4/16/15	1.45
10/29/15	1.71



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-7		
V(S)	267.67	n	13
z	**-0.37**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

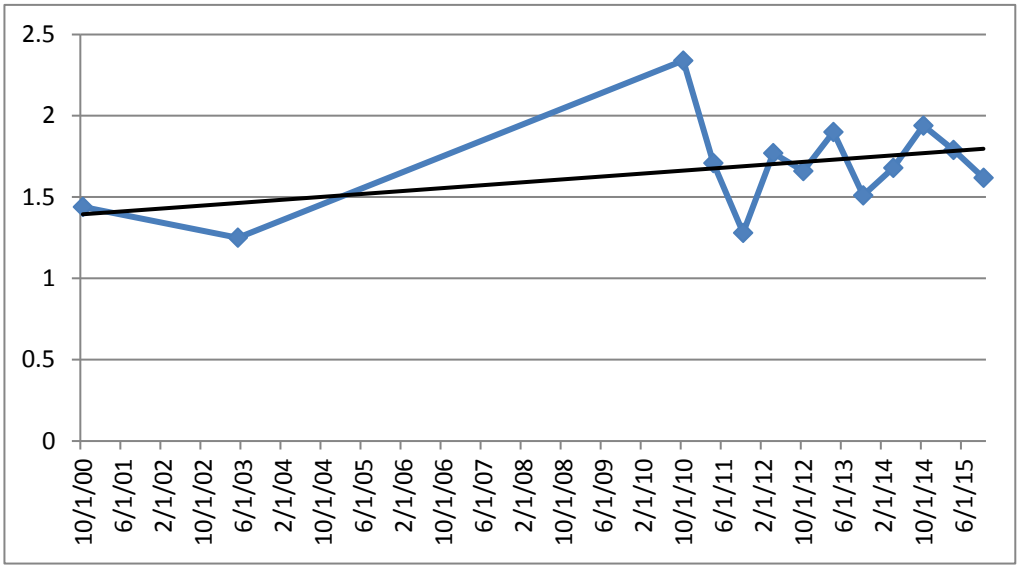
Ha: Downward Trend

Reject Ho if z < -Z(0.95)

Ho is not rejected, there is no evidence of an downward trend

Total U

OW07A	**µg/L**
10/2/00	1.44
5/31/03	1.25
10/27/10	2.34
4/19/11	1.71
10/20/11	1.28
4/11/12	1.77
10/1/12	1.66
4/26/13	1.9
10/18/13	1.51
4/17/14	1.68
10/24/14	1.94
4/14/15	1.79
10/30/15	1.62



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	16		
V(S)	268.67	n	13
z	**0.92**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

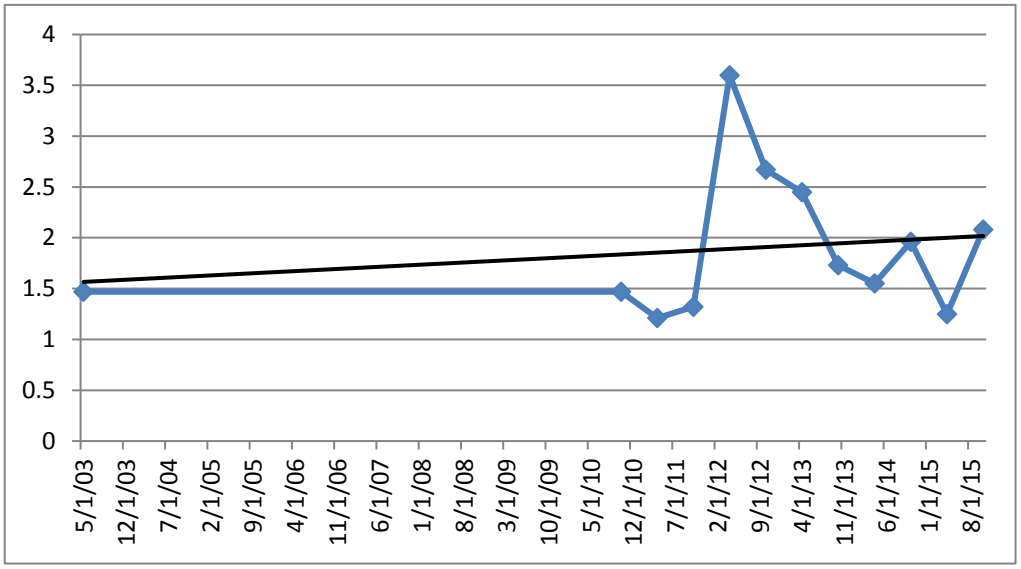
Ha: Upward Trend

Reject Ho if z> Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

OW11A	**µg/L**
5/31/03	1.47
10/28/10	1.47
4/19/11	1.21
10/20/11	1.32
4/18/12	3.6
10/1/12	2.67
4/24/13	2.45
10/17/13	1.73
4/16/14	1.55
10/22/14	1.96
4/14/15	1.25
10/30/15	2.08



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	7		
V(S)	211.67	n	12
z	**0.41**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

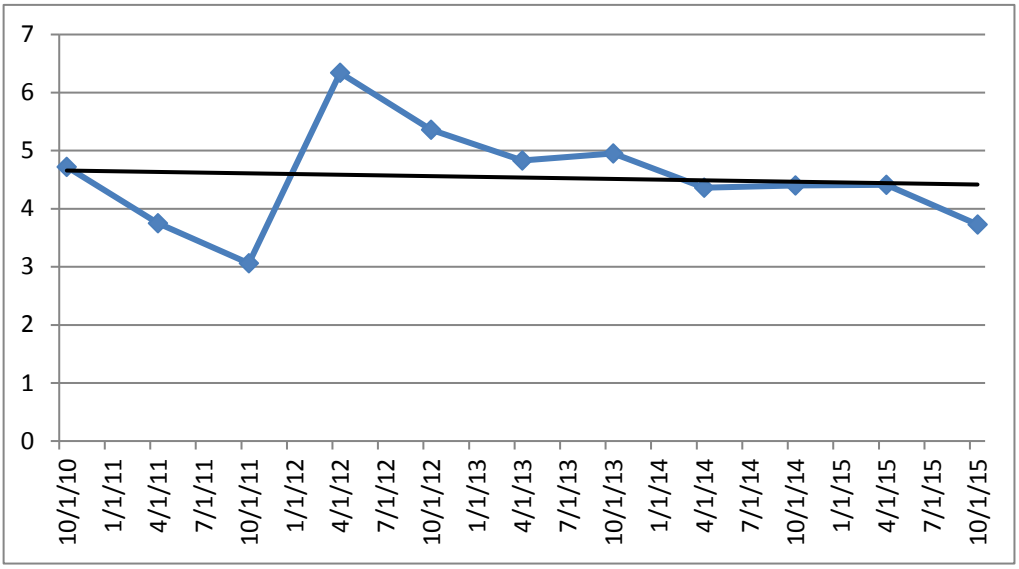
Ha: Upward Trend

Reject Ho if z> Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

OW12A	**µg/L**
10/28/10	4.72
4/21/11	3.75
10/20/11	3.06
4/10/12	6.34
10/2/12	5.36
4/26/13	4.83
10/18/13	4.95
4/15/14	4.36
10/22/14	4.4
4/15/15	4.41
10/27/15	3.73



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-9		
V(S)	165.00	n	11
z	**-0.62**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

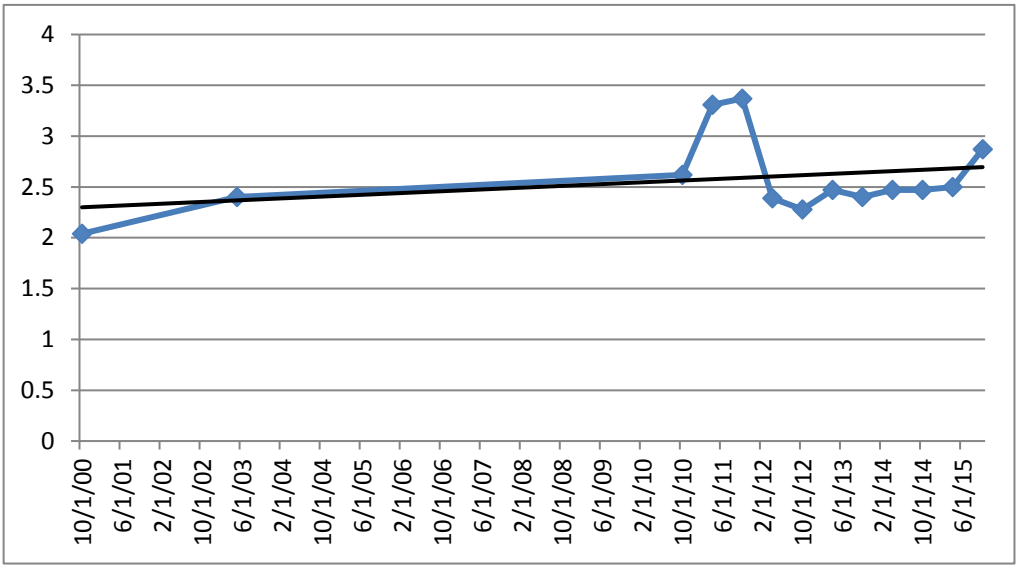
Ha: Downward Trend

Reject Ho if z< - Z(0.95)

Ho is not rejected, there is no evidence of a downward trend

Total U

OW13A	**µg/L**
10/1/00	2.04
5/31/03	2.4
10/27/10	2.62
4/19/11	3.31
10/20/11	3.37
4/11/12	2.39
10/1/12	2.28
4/26/13	2.47
10/17/13	2.4
4/18/14	2.47
10/21/14	2.47
4/14/15	2.5
10/27/15	2.87



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	20		
V(S)	264.00	n	13
z	**1.17**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

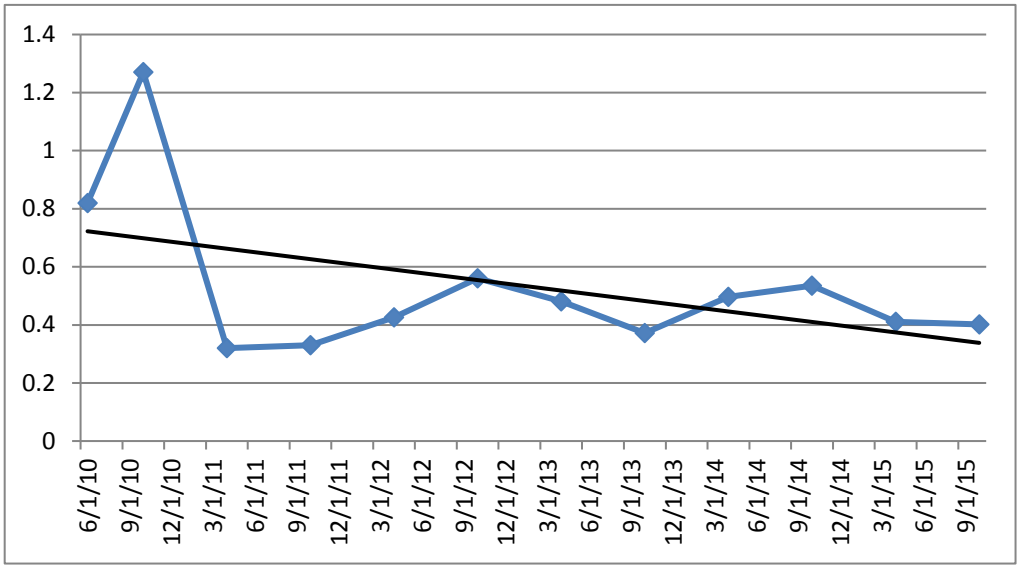
Ha: Upward Trend

Reject Ho if z> Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

OW15A	**µg/L**
6/25/10	0.82
10/27/10	1.27
4/18/11	0.32
10/20/11	0.33
4/16/12	0.426
10/4/12	0.56
4/29/13	0.481
10/17/13	0.372
4/15/14	0.497
10/22/14	0.535
4/14/15	0.41
10/27/15	0.402



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-4		
V(S)	212.67	n	12
z	**-0.21**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

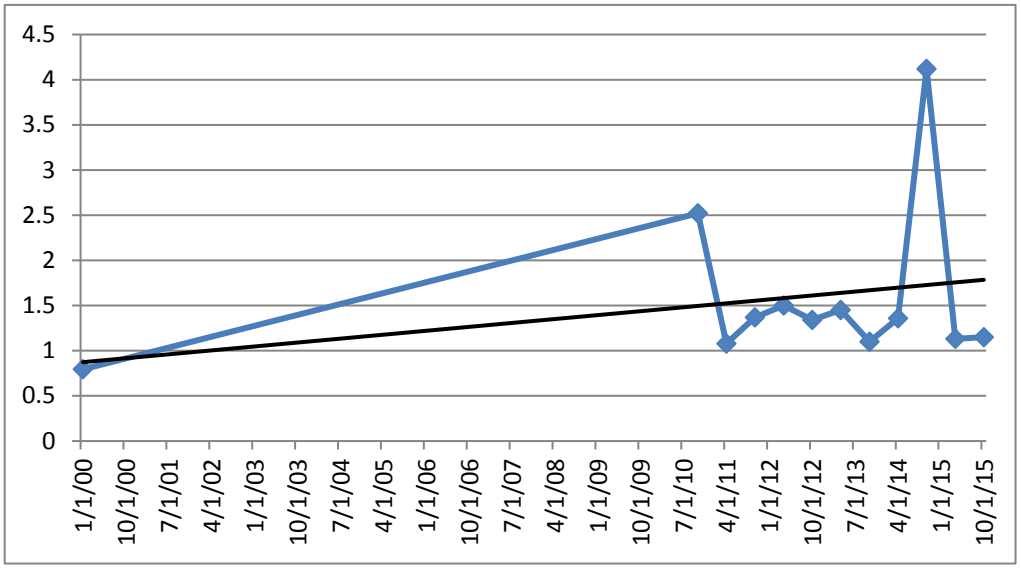
Ha: Downward Trend

Reject Ho if z< -Z(0.95)

Ho is not rejected, there is no evidence of a downward trend

Total U

OW17A	**µg/L**
1/10/00	0.794
10/27/10	2.52
4/18/11	1.08
10/20/11	1.37
4/16/12	1.5
10/3/12	1.34
4/26/13	1.45
10/16/13	1.1
4/16/14	1.36
10/22/14	4.12
4/14/15	1.13
10/27/15	1.15



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	4		
V(S)	212.67	n	12
z	**0.21**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

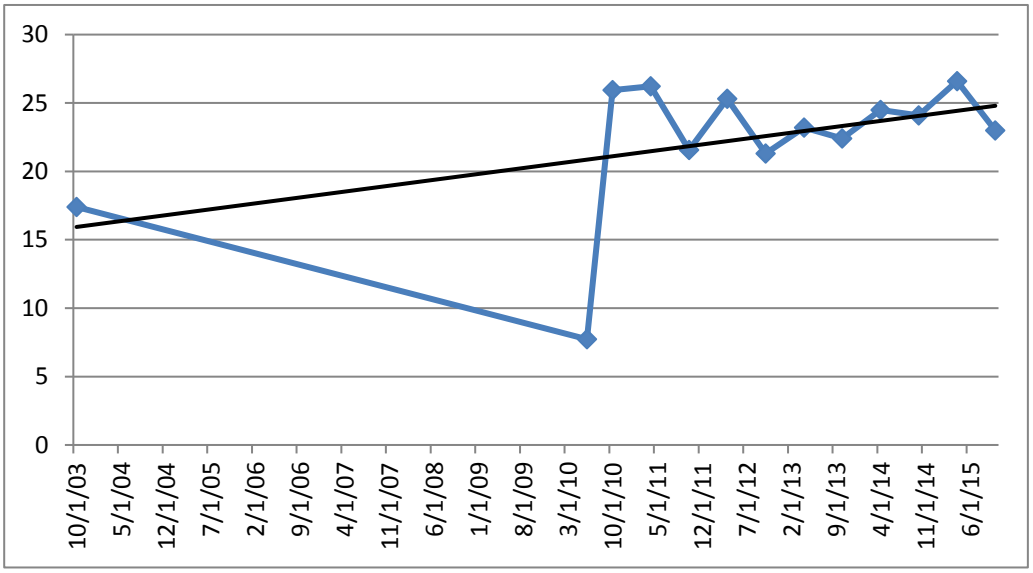
Ha: Upward Trend

Reject Ho if z> Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

MW862	**µg/L**
10/2/03	17.4
6/25/10	7.73
10/25/10	25.94
4/25/11	26.21
10/18/11	21.56
4/12/12	25.3
10/2/12	21.3
4/26/13	23.2
10/15/13	22.4
4/14/14	24.5
10/27/14	24.1
4/15/15	26.6
10/27/15	23



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	20		
V(S)	268.67	n	13
z	**1.16**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

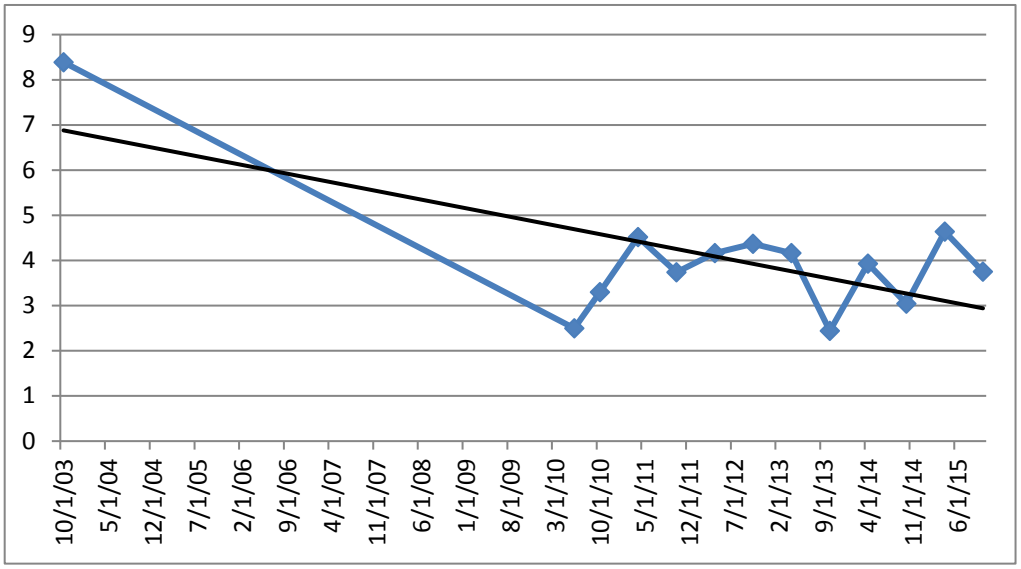
Ha: Upward Trend

Reject Ho if z> Z(0.95)

Ho is not rejected, there is no evidence of an upward trend

Total U

MW863	**µg/L**
10/2/03	8.39
6/25/10	2.5
10/25/10	3.3
4/25/11	4.52
10/18/11	3.74
4/12/12	4.16
10/2/12	4.37
4/26/13	4.16
10/15/13	2.44
4/14/14	3.93
10/27/14	3.04
4/15/15	4.64
10/27/15	3.75



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-5		
V(S)	267.67	n	13
z	**-0.24**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

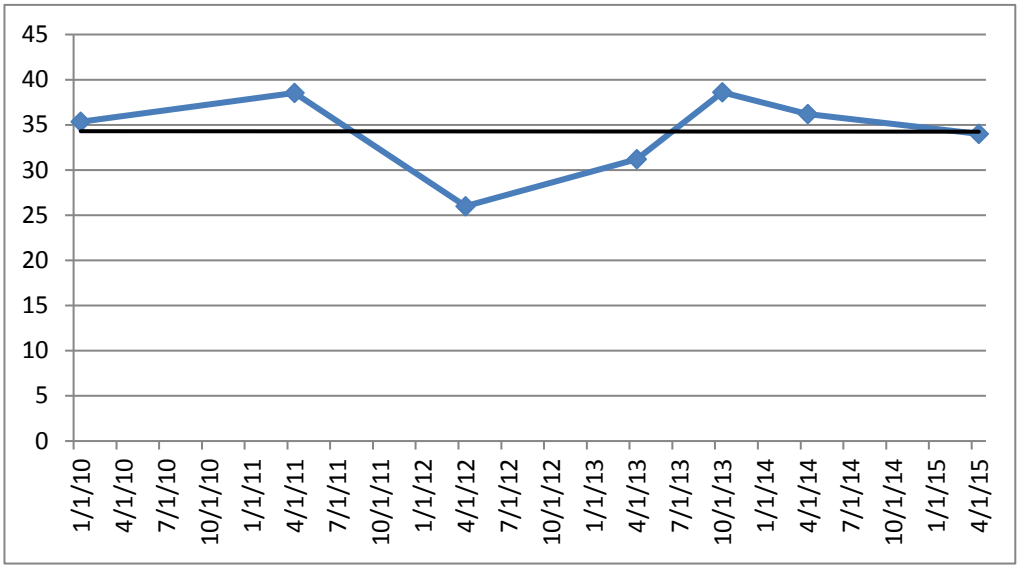
Ha: Downward Trend

Reject Ho if z< -Z(0.95)

Ho is not rejected, there is no evidence of a downward trend

Total U

MW921	**µg/L**
1/13/10	35.34
4/20/11	38.54
4/10/12	26
4/24/13	31.2
10/17/13	38.6
4/14/14	36.2
4/14/15	34



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	1	
p	**0.500**	From Table B-10
n	7	

Ho: No trend

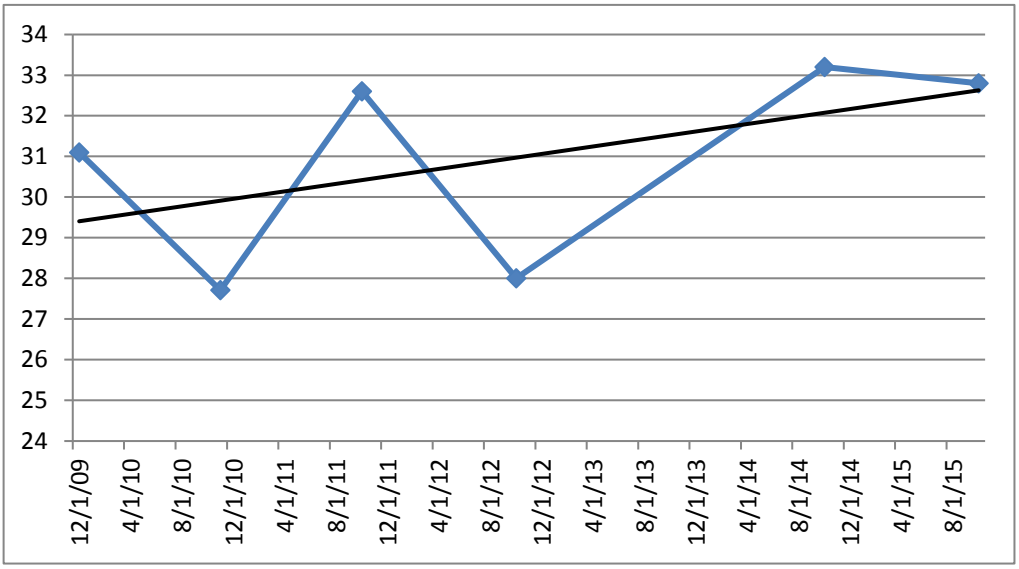
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW922	**µg/L**
12/22/09	31.1
11/1/10	27.71
10/20/11	32.6
10/3/12	28
10/21/14	33.2
10/29/15	32.8



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	7	
p	**0.136**	From Table B-10
n	6	

Ho: No trend

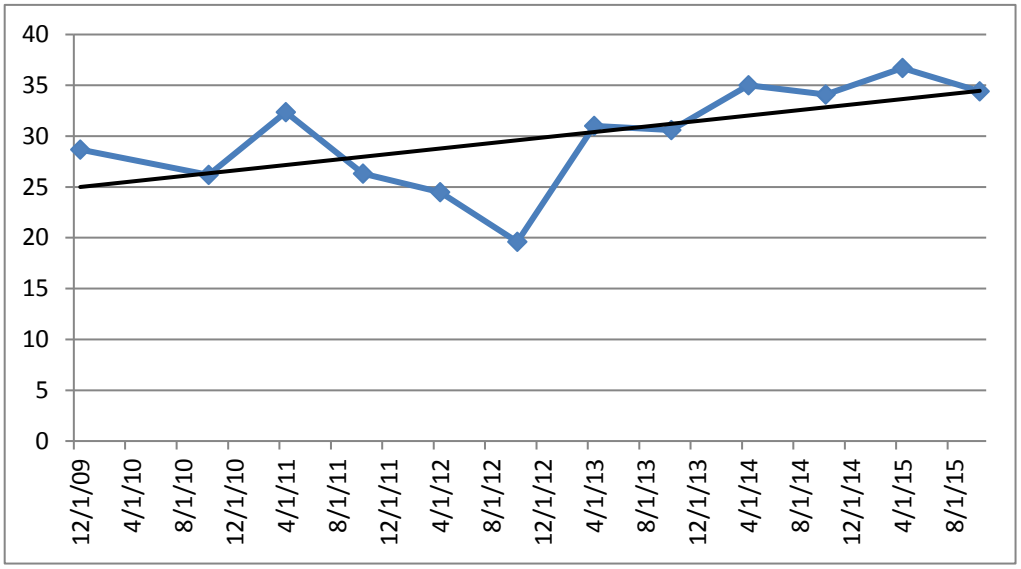
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW934	**µg/L**
12/22/09	28.67
10/28/10	26.19
4/25/11	32.37
10/24/11	26.3
4/18/12	24.5
10/2/12	19.6
4/25/13	31
10/16/13	30.6
4/15/14	35
10/21/14	34.1
4/15/15	36.7
10/27/15	34.4



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	30		
V(S)	212.67	n	12
z	**1.99**		
Z(0.9)	1.28	Z(0.95)	**1.64**

Ho: No trend

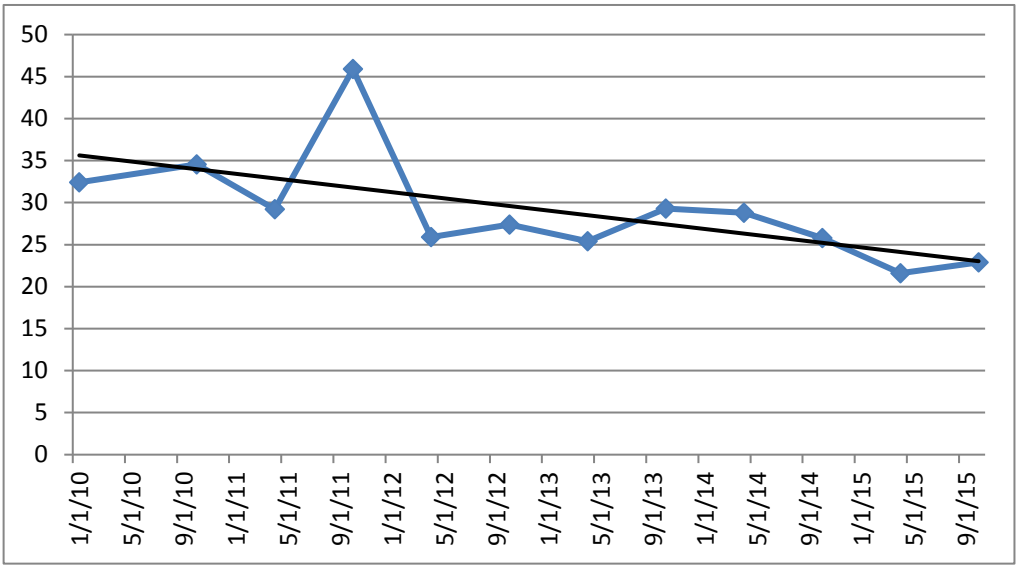
Ha: Upward Trend

Reject Ho if z > Z(0.95)

Ho is rejected, there is evidence of an upward trend

Total U

MW935	**µg/L**
1/16/10	32.43
10/27/10	34.55
4/21/11	29.2
10/24/11	45.89
4/16/12	25.9
10/4/12	27.4
4/23/13	25.4
10/15/13	29.3
4/15/14	28.8
10/22/14	25.8
4/13/15	21.6
10/27/15	22.9



Mann-Kendall Test Using Normal Approximation for Larger Samples

S	-38		
V(S)	212.67	n	12
z	**-2.54**		
Z(0.9)	-1.28	Z(0.95)	**-1.64**

Ho: No trend

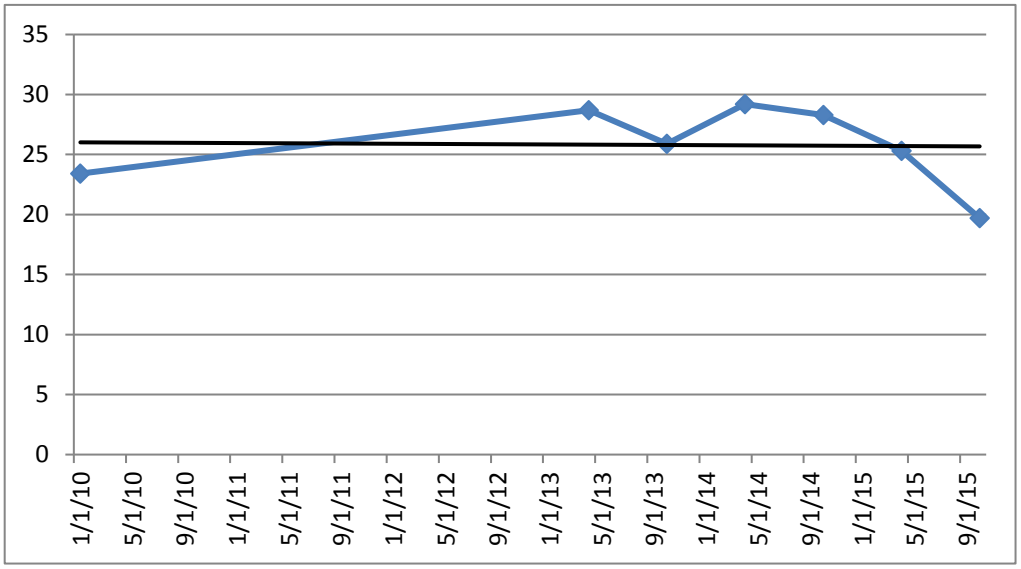
Ha: Downward Trend

Reject Ho if z< -Z(0.95)

Ho is rejected, there is evidence of a downward trend

Total U

MW938	**µg/L**
1/14/10	23.42
4/25/13	28.7
10/16/13	25.9
4/16/14	29.2
10/23/14	28.3
4/13/15	25.3
10/26/15	19.7



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	-5	
p	**0.281**	From Table B-10
n	7	

Ho: No trend

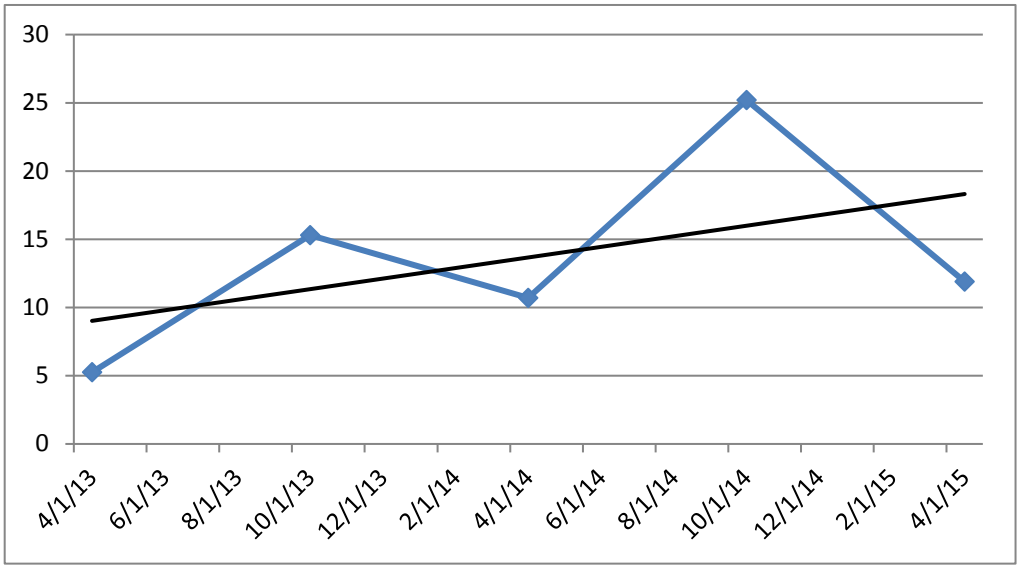
Ha: Downward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of a downward trend

Total U

MW945	**µg/L**
4/24/13	5.25
10/18/13	15.3
4/15/14	10.7
10/21/14	25.2
4/14/15	11.9



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	4	
p	**0.242**	From Table B-10
n	5	

Ho: No trend

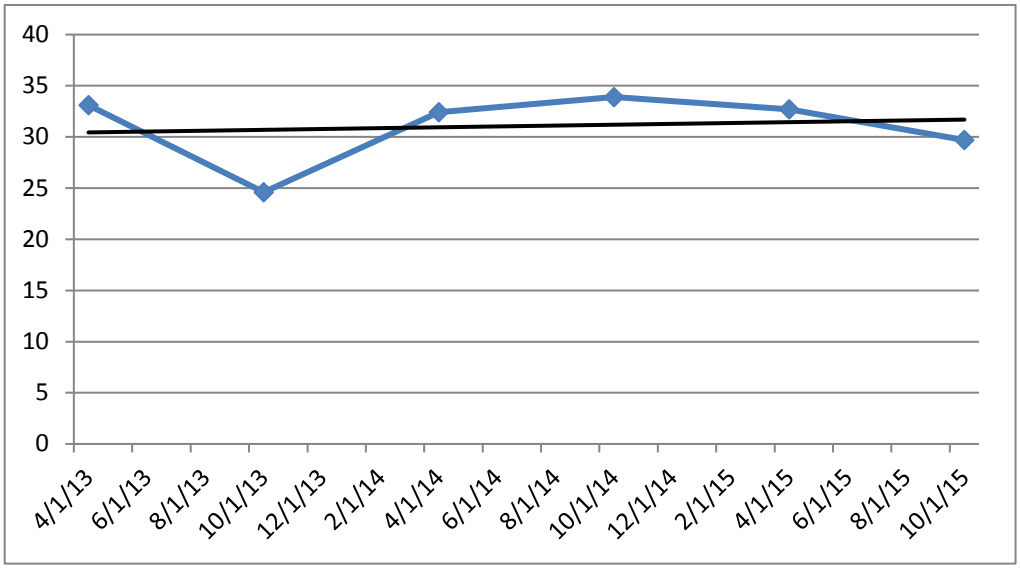
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW948	**µg/L**
4/24/13	33.1
10/16/13	24.6
4/16/14	32.4
10/21/14	33.9
4/15/15	32.7
10/27/15	29.7



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	-1	
p	**0.500**	From Table B-10
n	6	

Ho: No trend

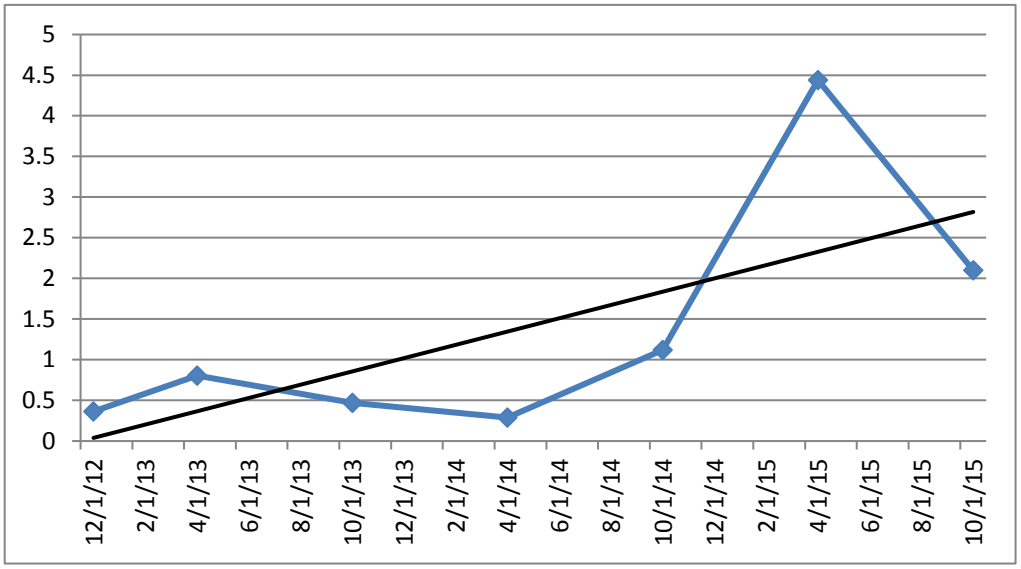
Ha: Downward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of a downward trend

Total U

MW949	**µg/L**
12/6/12	0.363
4/24/13	0.803
10/17/13	0.469
4/16/14	0.289
10/21/14	1.12
4/15/15	4.44
10/27/15	2.1



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	11	
p	**0.068**	From Table B-10
n	7	

Ho: No trend

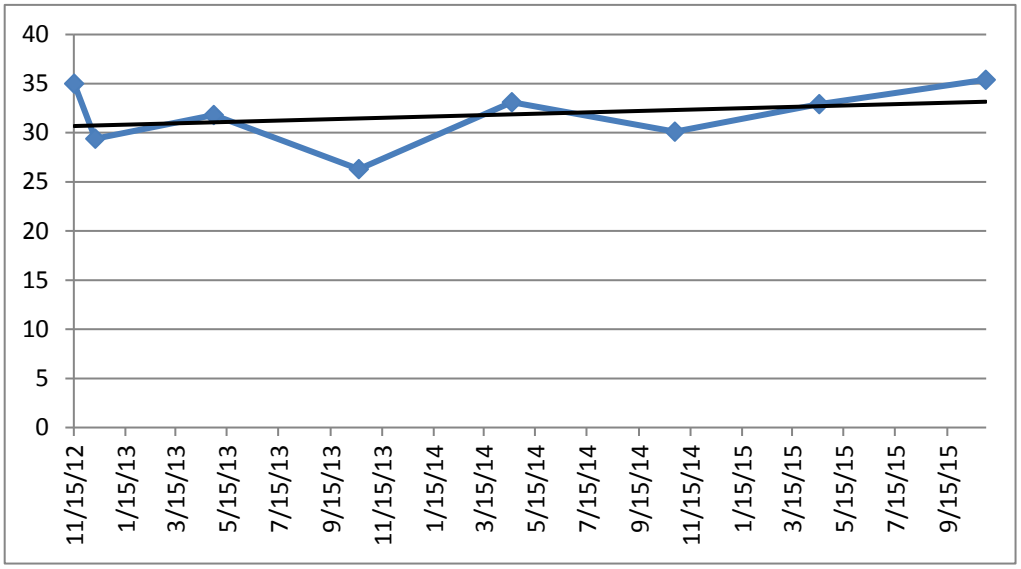
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW950	**µg/L**
11/15/12	35
12/10/12	29.4
4/29/13	31.8
10/18/13	26.3
4/17/14	33.1
10/27/14	30.1
4/16/15	32.9
10/30/15	35.4



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	6	
p	**0.274**	From Table B-10
n	8	

Ho: No trend

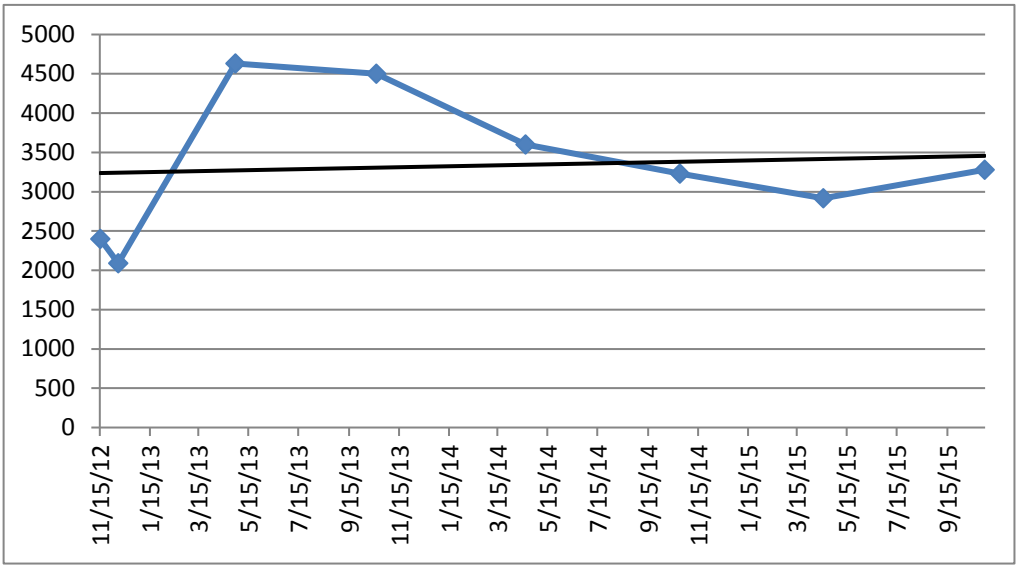
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW951	**µg/L**
11/15/12	2400
12/7/12	2090
4/29/13	4631
10/18/13	4502
4/18/14	3601
10/23/14	3231
4/16/15	2917
10/30/15	3280



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	0	
p	**0.548**	From Table B-10
n	8	

Ho: No trend

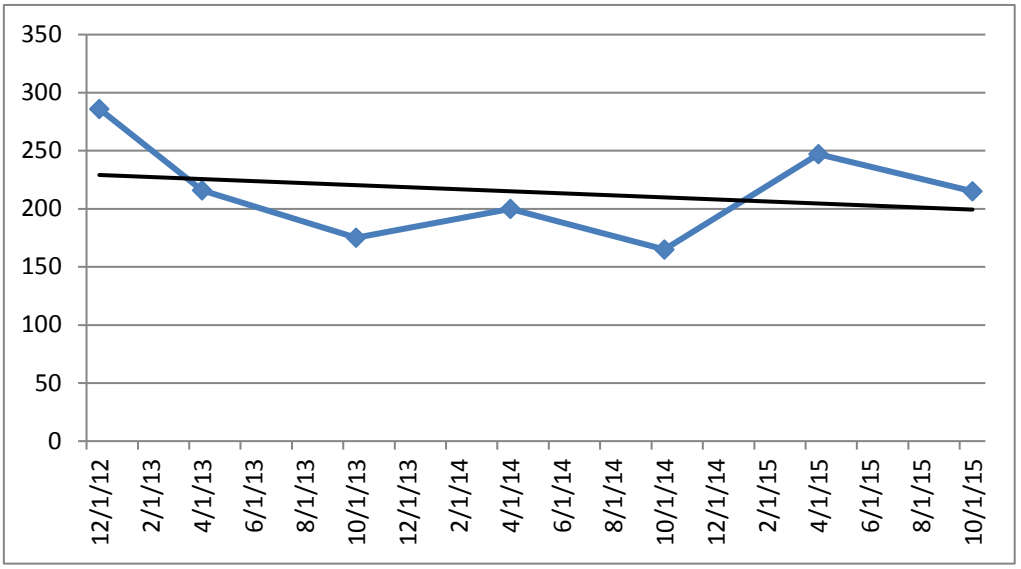
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW952	**µg/L**
12/12/12	286
4/24/13	216
10/17/13	175
4/16/14	200
10/22/14	165
4/14/15	247
10/29/15	215



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	-5	
p	**0.281**	From Table B-10
n	7	

Ho: No trend

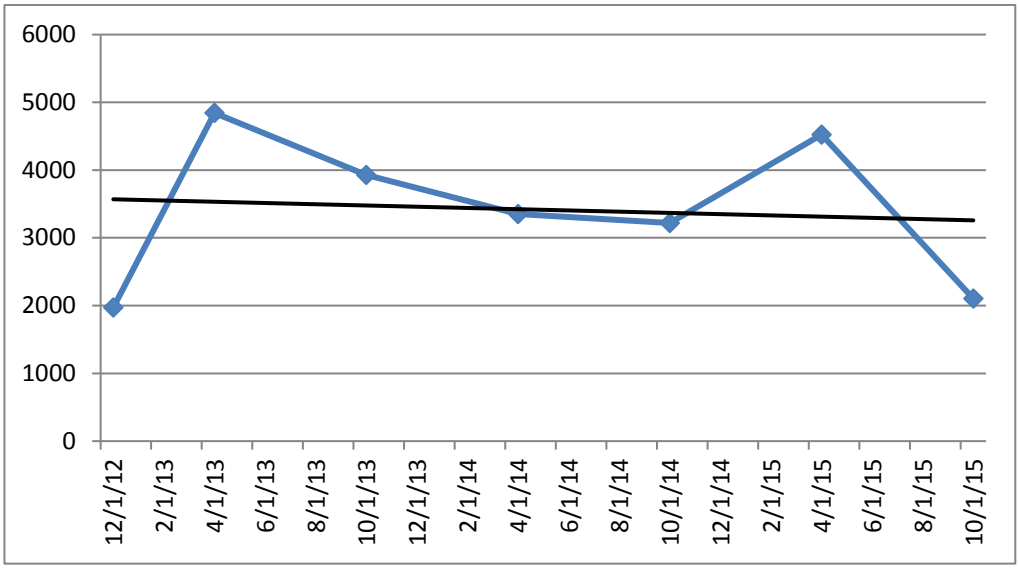
Ha: Downward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of a downward trend

Total U

MW953	**µg/L**
12/12/12	1970
4/25/13	4843
10/17/13	3929
4/16/14	3351
10/22/14	3221
4/14/15	4523
10/29/15	2106



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	-3	
p	**0.386**	From Table B-10
n	7	

Ho: No trend

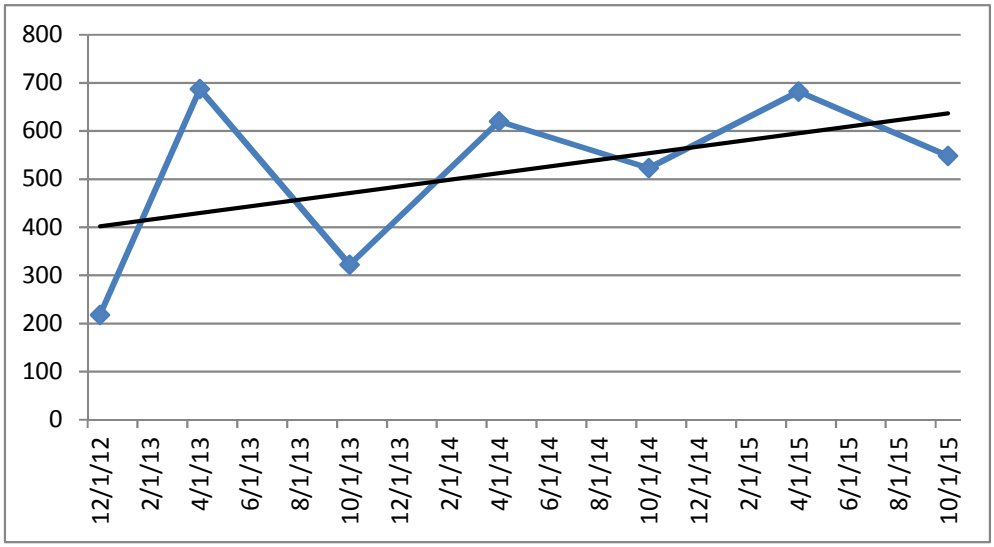
Ha: Downward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of a downward trend

Total U

MW954	**µg/L**
12/14/12	218
4/25/13	687
10/17/13	322
4/16/14	620
10/22/14	523
4/14/15	682
10/29/15	548



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	5	
p	**0.281**	From Table B-10
n	7	

Ho: No trend

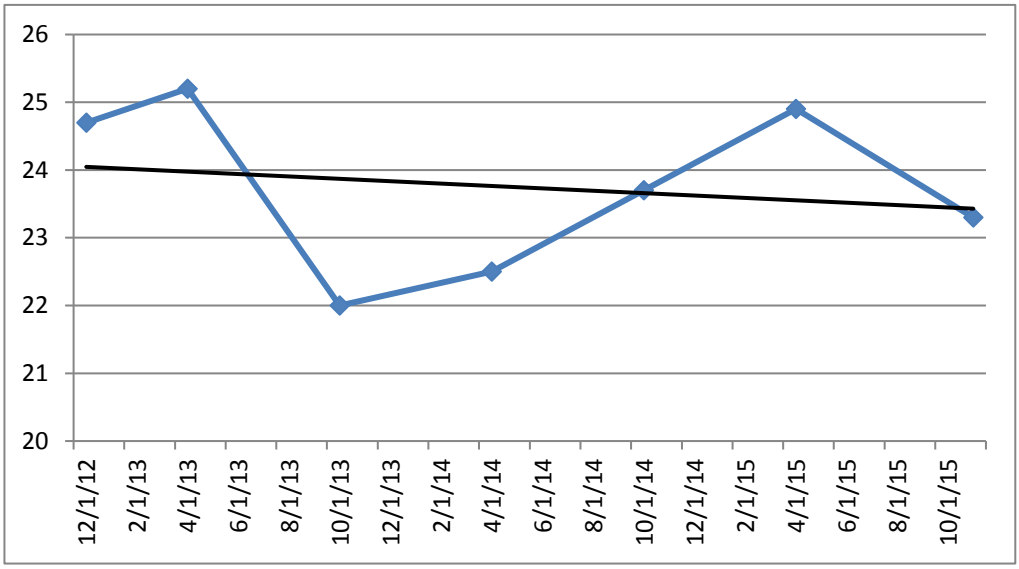
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW955	**µg/L**
12/13/12	24.7
4/25/13	25.2
10/17/13	22
4/16/14	22.5
10/22/14	23.7
4/14/15	24.9
11/4/15	23.3



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	-1	
p	**0.500**	From Table B-10
n	7	

Ho: No trend

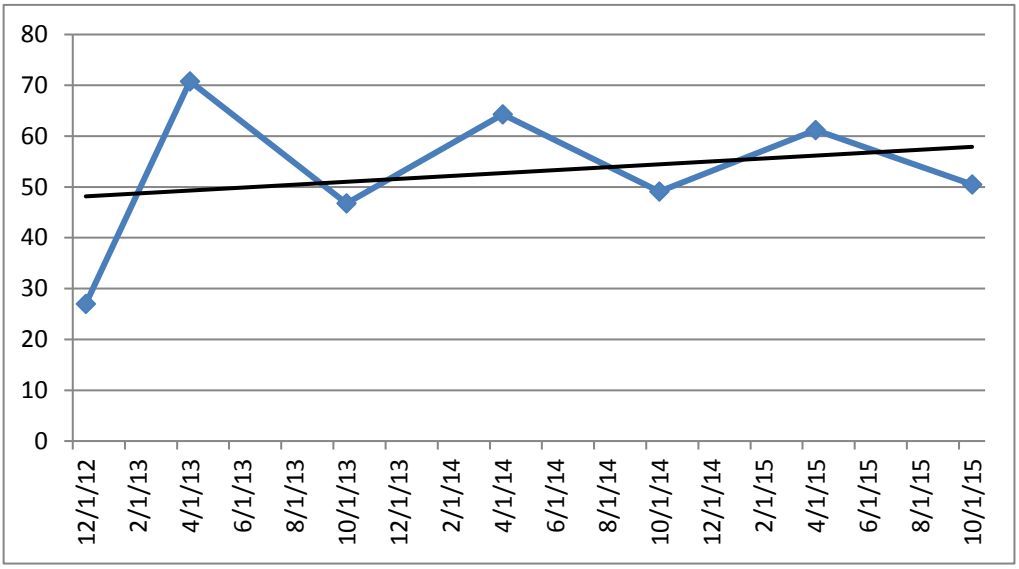
Ha: Downward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of a downward trend

Total U

MW956	**µg/L**
12/11/12	27
4/29/13	70.8
10/18/13	46.8
4/18/14	64.3
10/21/14	49.1
4/15/15	61.2
10/29/15	50.5



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	3	
p	**0.386**	From Table B-10
n	7	

Ho: No trend

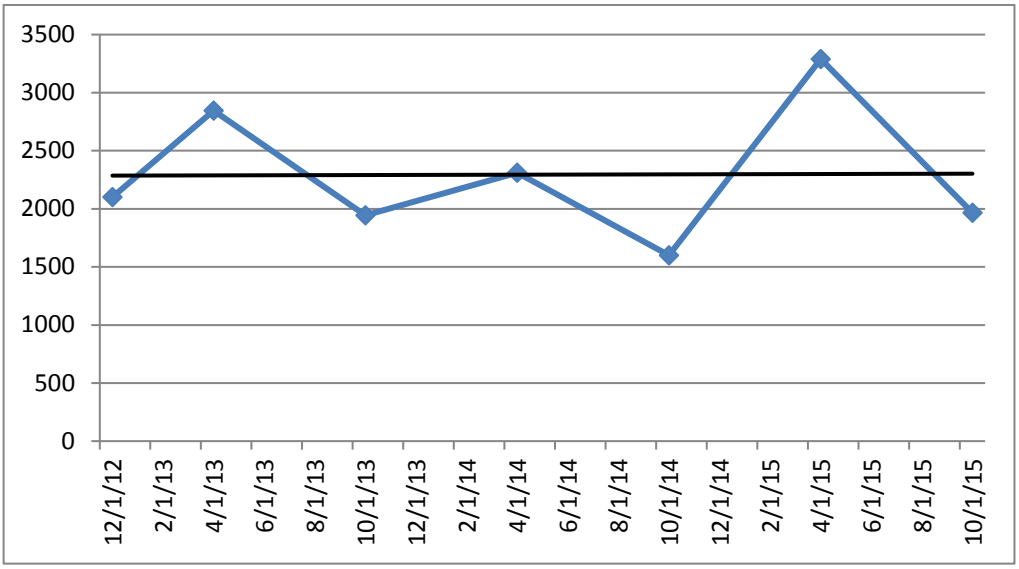
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW957	**µg/L**
12/11/12	2100
4/25/13	2846
10/18/13	1944
4/17/14	2310
10/21/14	1600
4/14/15	3290
10/29/15	1967



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	-1	
p	**0.500**	From Table B-10
n	7	

Ho: No trend

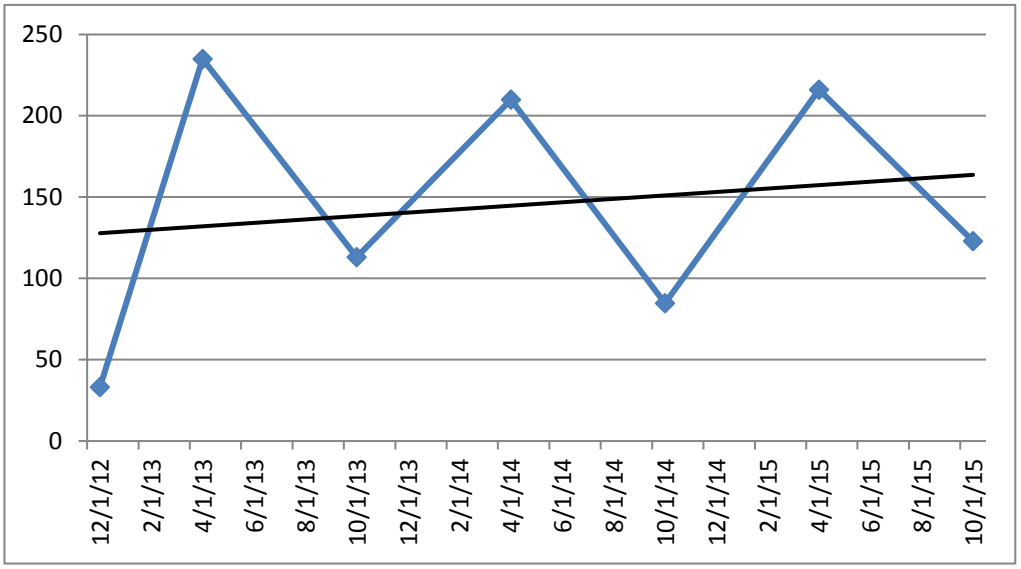
Ha: Downward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of a downward trend

Total U

MW958	**µg/L**
12/14/12	33.2
4/29/13	235
10/18/13	113
4/17/14	210
10/24/14	84.8
4/16/15	216
10/30/15	123



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	3	
p	**0.386**	From Table B-10
n	7	

Ho: No trend

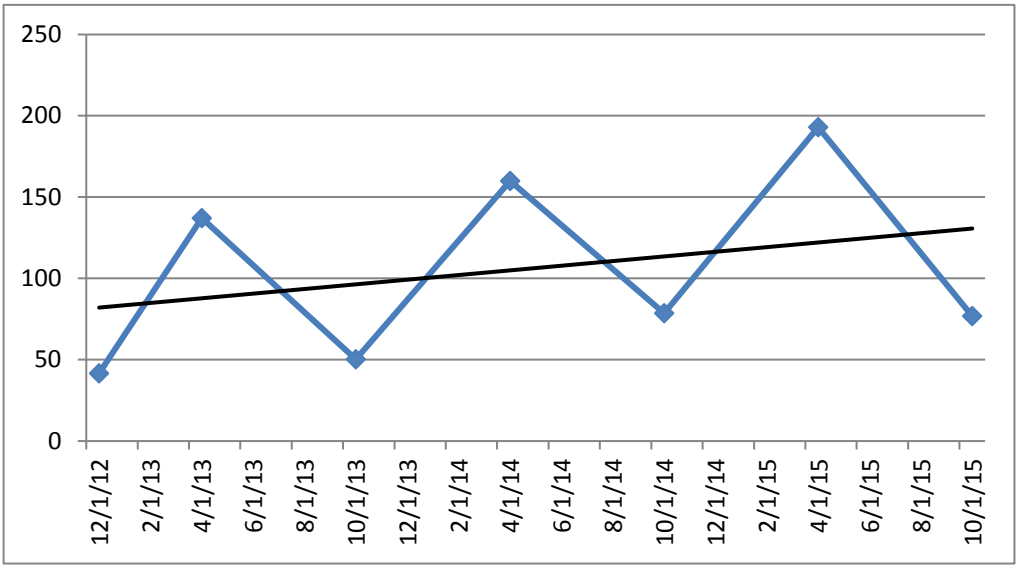
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW959	**µg/L**
12/10/12	41.7
4/29/13	137
10/18/13	50.3
4/17/14	160
10/23/14	78.6
4/16/15	193
10/30/15	76.8



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	7	
p	**0.191**	From Table B-10
n	7	

Ho: No trend

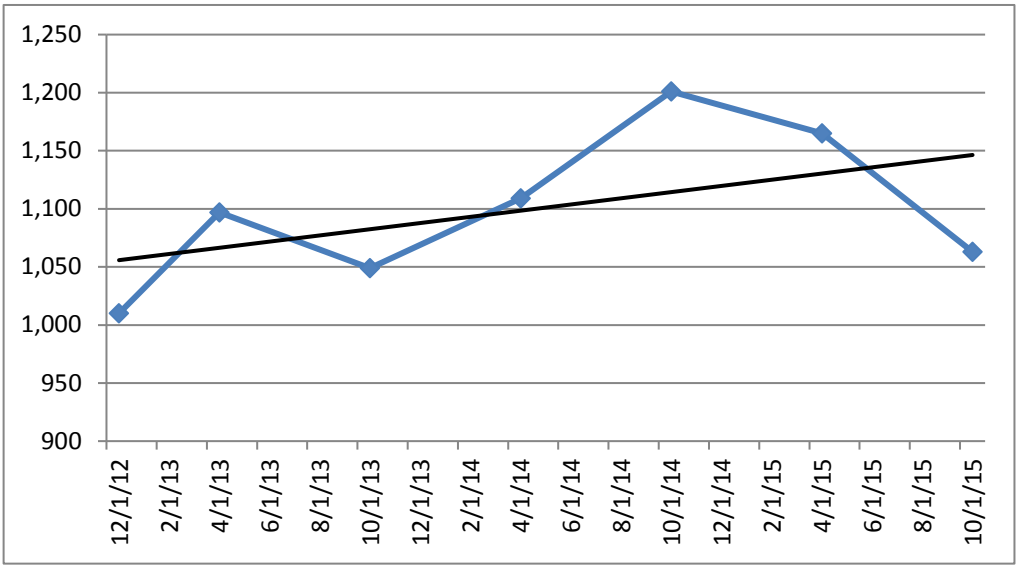
Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend

Total U

MW960	**µg/L**
12/7/12	1,010
4/29/13	1,097
10/15/13	1,049
4/18/14	1,109
10/27/14	1,201
4/16/15	1,165
10/27/15	1,063



Mann-Kendall Trend Test for Small Sample Sizes (n≤10)

S	9	
p	**0.199**	From Table B-10
n	7	

Ho: No trend

Ha: Upward Trend

Reject Ho if p< 0.05

Ho is not rejected, there is no evidence of an upward trend