Addendum
To 2017 Annual Report

For

Radiological Groundwater Impacts

At

Naval Weapons Industrial Reserve Plant
Bethpage, New York

APRIL 2018

The estimated cost of this report or study for the Department of Defense is approximately $66,000 for the 2018 Fiscal Year. This includes $64,000 in expenses and $1,690 in DoD labor.

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ACRONYMS AND ABBREVIATIONS

BWD	Bethpage Water District
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
FWD	Farmingdale Water District
HWD	Hicksville Water District
LWD	Levittown Water District
MCL	maximum contaminant level
mS/cm	Millisiemens per Centimeter
NDAA	National Defense Authorization Act
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
PA/SI	Preliminary Assessment/Site Inspection
pCi/L	Picocurie per Liter
pCi/g	Picocurie per Gram
PWD	Plainview Water District
SU	Standard Unit
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	volatile organic compound
WIIN	Water Infrastructure Improvements for the Nation

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1.0 INTRODUCTION

In June 2017, the Department of the Navy released its first annual report required by the Water Infrastructure Improvements for the Nation (WIIN) Act of 2016, Title VII, Subtitle E, Section 7502. This Addendum to the *2017 Annual Report for Groundwater Impacts at Naval Weapons Industrial Reserve Plant Bethpage, New York* (2017 Annual Report) addresses potential releases by the Department of Defense of radium and radioactive material to groundwater near the former Navy-owned, Northrop Grumman-operated, Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage and the separate former Northrop Grumman-owned and -operated industrial facility adjacent to the former NWIRP Bethpage (Figures 1-1, 1-2, and 1-3), as required by the 2018 National Defense Authorization Act (NDAA), which the President signed on December 12, 2017. This report provides documentation that the concentration of radium and other radioactive materials identified in groundwater in the vicinity of NWIRP Bethpage are consistent with naturally occurring levels and common geochemical factors normally found in the regional aquifer.

The Navy evaluated Department of Defense facilities located within a 75-mile radius of NWIRP Bethpage, where radium or other radioactive materials have been used over the past 80 years; however, none of these other facilities have a hydrogeologic connection to groundwater at the NWIRP Bethpage; and therefore, were eliminated from further consideration. This determination is supported by the location of the groundwater divide (i.e., the boundary that controls groundwater flow direction, [see Figure 3-1]) approximately 2.5 miles to the north of NWIRP Bethpage, with regional groundwater flow to the south from the divide. This Addendum will therefore focus on the available information regarding use, storage, and disposal of radium and related radioactive materials by DoD within the vicinity of the NWIRP Bethpage.

In addition, this Addendum provides information on naturally occurring radium and other radioactive materials, potential factors influencing radium behavior in groundwater, a summary of available radiological data, and additional actions to evaluate the potential for release of radium and other radioactive materials into groundwater within the vicinity of the NWIRP Bethpage.

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2.0 SITE BACKGROUND

This section provides a summary of background information for the NWIRP Bethpage, the adjacent Northrop Grumman facility, and the surrounding area, as well as the radiological history available to the Navy. Additional site background is detailed in Section 2.0 of the 2017 Annual Report.

2.1 FACILITY INFORMATION

The NWIRP Bethpage was approximately 109 acres and was bordered by the Northrop Grumman facility, which was approximately 500 acres. These former facilities are located in Nassau County on Long Island, New York; approximately 30 miles east of New York City (Figure 1-2). In 1942, the Navy established the facility that would later become the NWIRP Bethpage for the research prototyping, testing, design engineering, fabrication, and primary assembly of military aircraft. Northrop Grumman activities in the area date to the 1930s and expanded in the 1940s. Northrop Grumman conducted daily operations at the government-owned NWIRP Bethpage facility until 1996 and at its adjacent Northrop Grumman facility until after 1996. After Northrop Grumman terminated operations at NWIRP Bethpage, the U.S. Congress passed special legislation under Section 2852 of the National Defense Authorization Act of 1998 (P.L.105-85, 111 Stat. 1629), permitting conveyance of the Navy real property at NWIRP Bethpage to Nassau County, New York for economic redevelopment.

When the NWIRP and Northrop Grumman facilities were first established at Bethpage, much of the surrounding land use was agricultural (Rogers, Golden, & Halpern, 1986). According to the Census of Agriculture, Nassau County contained 636 farms spanning 26,543 acres in 1940, representing farm land use of 13.8 percent (U.S. Department of Commerce, 1942). In the late 1950s and early 1960s, residential and commercial development occurred. In 2012, Nassau County reportedly contained 55 farms across 2,682 acres (U.S. Department of Commerce, 2014). Currently, the land surrounding the former NWIRP Bethpage and Northrop Grumman properties remains primarily a mixture of commercial and residential development.

The former NWIRP Bethpage and Northrop Grumman facilities are underlain by four distinct geologic units: Upper Glacial Formation; Magothy Formation; Raritan Clay; and Lloyd Sand Formations (McClymonds and Franke, 1972). The Magothy Formation consists primarily of quartz sands, silt and clay. In addition, iron sulfides such as pyrite and marcasite commonly occur with lignite in scattered nodules or thin solid layers throughout the Magothy Formation (Suter et al., 1949).

The aquifers underlying NWIRP Bethpage are part of the Northern Atlantic Coastal Plain aquifer system, which extends from Long Island to northeastern North Carolina (Masterson et al., 2015). The regional Magothy Aquifer is present on Long Island, New Jersey, Delaware, and Maryland, and is generally confined except on Long Island, where there is limited hydrogeologic distinction between the Upper Glacial Formation and the Magothy Formation (McClymonds and Franke, 1972; Masterson et al., 2015).

Most of Long Island is bisected by an east-west-trending regional groundwater divide (United States Geological Service [USGS], 2006). The former NWIRP Bethpage and Northrop Grumman facilities are located south of the divide where regional groundwater flows southward toward South Oyster Bay and the Atlantic Ocean (Figure 3-1). Based on water level measurements from 2010 to 2016, groundwater across NWIRP Bethpage and Northrop Grumman facilities flows to the south-southeast. The groundwater ultimately discharges to South Oyster Bay, which is at sea level, approximately seven miles south of the NWIRP Bethpage.

2.2 RADIOLOGICAL HISTORY

This section summarizes the radiological history of the former NWIRP Bethpage and the Northrop Grumman facilities based on the currently available information. While there is documentation that radium and radioactive materials were present at the facilities, there is no documentation of a release of radium or other radioactive materials at the facility.

Groundwater investigations into radiological activity in the vicinity of the former NWIRP Bethpage were prompted by the concentration of radium exceeding the Federal and State maximum contaminant level (MCL) of 5 picocuries per liter (pCi/L) in Bethpage Water District (BWD) water supply wells located at Plant 4 (Wells 4-1 and 4-2). In 2006, BWD Wells 4-1 and 4-2 were analyzed for radium during four events (February, May, July, and October). The radium concentration exceeded the MCL once in Well 4-1 (May 2006 at 5.55 pCi/L) and once in Well 4-2 (February 2006 at 5.69 pCi/L). The radium concentrations in these wells did not exceed the MCL in the fourth sampling event. Because the data available to the Navy is incomplete, MCL compliance during the other sampling events and the annual average radium concentration could not be determined. An additional MCL exceedance occurred for BWD Well 4-1 in September 2010 (7.03 pCi/L). MCL exceedances were not reported for radium in the August 2012, September 2012, and November 2012 sampling events for BWD Well 4-1 or 4-2. In 2013, the radium concentration exceeded the MCL in BWD Well 4-1 in two of four sampling events in January to April 2013, with a maximum concentration of 5.87 pCi/L, and an average concentration of 5.04 pCi/L. As a result, BWD Well 4-1 was shut down in 2013.

Because the BWD Plant 4 well is located southeast and side gradient of the former NWIRP Bethpage and potentially downgradient of a portion of the former Northrop Grumman facility, the Navy and Northrop Grumman conducted further examination of historical records and supported testing of groundwater to determine if there was evidence of a release of radium or other radioactive materials from the former NWIRP Bethpage or Northrop Grumman facilities which may be attributable to the MCL exceedance.

In 2013, the Navy conducted a comprehensive records search for materials and documentation regarding use, storage, and disposal of radium and related radioactive materials at NWIRP Bethpage. No records were found indicating a release of radium or other radioactive materials by the Navy or Northrop Grumman at or from the NWIRP Bethpage or the Northrop Grumman facilities. In addition, Northrop Grumman, the contractor that operated the NWIRP Bethpage, maintained the inventory records of all licensable

(regulated) quantities of radioactive materials used on Navy and Northrop Grumman properties (Navy, 2017).

In 2016, in response to a request from New York State Department of Environmental Conservation (NYSDEC), Northrop Grumman prepared a report to "complete and document a comprehensive description of any and all radioactive materials manufactured, handled or installed in any other products manufactured at the site during the period of operation" (Arcadis, 2016; and Sive Paget & Riesel, P.C., 2016). The findings of that report are summarized below.

The report was compiled based on files maintained by the Radiation Safety Officer at the Northrop Grumman Bethpage facility. This type of position existed since at least the 1960s. The Radiation Safety Officer's files reportedly contained all practicably identifiable and unique (non-duplicative) records regarding regulated radionuclides used at the Bethpage facility during its period of operations. However, the report indicates that if documents discussing radioactive materials were present at the facilities in Bethpage in earlier years (pre-1960s), a search of its records could not identify them. In preparing the report, Northrop Grumman also reviewed an index of 34,000 file listings of Northrop Grumman's archived materials to attempt to identify relevant pre-1962 documents, but none of the descriptions of the contents of the archived files in the index referenced the use of radioactive materials at the Bethpage facility.

Although Northrop Grumman's records that were reviewed did not address the period prior to the 1960s, the report concluded that it is reasonable to believe that radium-226-based luminescent dials may have been installed on aircraft manufactured by Northrop Grumman during this earlier time period, as such dials were commonly used in aircraft in the first half of the 20th Century. However, according to the report, there was no evidence that the fabrication of radium-226 dials, including the painting of the dials using radium-based luminescent paint, occurred at the Northrop Grumman-operated facilities, including the NWIRP Bethpage.

According to the Northrop Grumman report, the post-1962 documents indicate that during that period, Northrop Grumman used radioactive materials for testing and research and development purposes and for making quality-assurance and quality-control oriented measurements of manufactured products at the facilities it operated in Bethpage. Radioactive materials were also present in components that were installed in aircraft by Northrop Grumman. The authors of the report opined that the use, handling and disposal of radiological materials during the documented period were consistent with contemporaneous industry standards, and often performed at a level exceeding contemporaneous industry standards. The report also concluded that the Northrop Grumman files provided no reason to believe these operations could be a source of the radium-226 or radium-228 observed in groundwater in the vicinity of the Bethpage facility (Arcadis, 2016).

The Northrop Grumman report identified the following radionuclides as being present during the 1960s to 2015 time period: iron-55, zinc-65, tin-113, yttrium-88, mercury-203, technetium-99, nickel-63, iridium-192, ytterbium-169, europium-152, strontium-90, cobalt-60, tantalum-182, hydrogen-3, carbon-14, americium--

41, promethium-147, barium-133, radium-226, chromium-51, barium-140, thorium-232, calcium-45, cesium-137, polonium-210, polonium-218, bismuth-210, krypton-85, thallium-230, sodium-22, manganese-54, cobalt-57, titanium-204, rhodium-106, lead-210, californium-252, sulfur-35, uranium-238, uranium-235, uranium-234, depleted uranium, enriched uranium (apparent maximum uranium-235 was limited to 5 percent), uranium hexafluoride, plutonium-238, plutonium-239, plutonium-241, plutonium-244 (as a longer-lived decay product from californium-252), thorium nitrate, and 2 percent thorium alloy metal (Arcadis, 2016).

Of the radionuclides identified above, thorium-232 and uranium-238 are of interest because these isotopes decay into radium-228 and -226, respectively (Figure 2-1). While the remaining radionuclides have not been analyzed individually, cumulative concentrations are captured in gross alpha and gross beta activity tests. Available site groundwater data from 2006 to 2017 indicate that thorium, uranium, gross alpha activity, and gross beta activity have not exceeded MCLs.

The Navy has posted the available documents concerning radium and radiological material on the NWIRP Bethpage website homepage at the following location:

http://go.usa.gov/DyXF

In conclusion, although several types of radium or radioactive materials may have been present at the NWIRP Bethpage and Northrop Grumman facilities, there is no current documentation that any of these materials were released from the NWIRP Bethpage and Northrop Grumman facilities to the groundwater. The Navy is in the process of conducting a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment/Site Inspection (PA/SI), which includes employee interviews and on property sampling for radiological releases.

3.0 SOURCE AND ANALYTICAL DATA EVALUATION

This section discusses potential sources of radium and factors potentially controlling radium behavior in soil and groundwater, available groundwater data for radium, an evaluation of radium distribution over time, and data evaluation. Groundwater data supports the conclusion that the radium in groundwater is most likely of natural origin and is not due to a release of radium or other radioactive materials at the NWIRP Bethpage or Northrop Grumman facilities to the groundwater.

3.1 RADIUM SOURCES AND GEOCHEMICAL FACTORS

This section discusses how naturally occurring radium in the groundwater can become mobilized based on the geochemical conditions of the aquifer. Key factors that could influence the concentration of radium (a divalent cation) in groundwater include:

- Presence of naturally occurring radionuclides in the aquifer system, including the concentration, distribution, and solubility of parent compounds (thorium and uranium) and radium
- Rate of release of radium as influenced by residence time of the water and various geochemical factors (the availability of cation exchange sites, pH, dissolved oxygen, and dissolved solids)
- Presence and abundance of competing cations in the aquifer and application of competing cations at the ground surface

The following subsections provide further detail on these key factors as related to documented conditions in the local and regional aquifer system at Bethpage.

Naturally Occurring Radionuclides

Radioactive elements including uranium and thorium occur naturally in rocks, sediments, and groundwater, including that found on Long Island. Uranium and thorium decay slowly to other radioactive isotopes, including radium and radon (Figure 2-1). In groundwater, the most commonly occurring radionuclides are radon-222, radium-226, radium-228, uranium-238, and uranium-234 (Zapecza and Szabo, 1986).

The solubility of radionuclides, which varies with geochemical conditions, affects their mobility in groundwater. Information on the solubility of these chemicals is limited.

The groundwater underlying NWIRP Bethpage are part of the North Atlantic Coastal Plain aquifer system. A nationwide survey comprising 1,270 samples from 15 principal aquifer systems found that the North Atlantic Coastal Plain quartz sand aquifer system produced the maximum radium (radium-226 and radium-228) concentration in groundwater of 20.4 pCi/L (Szabo et al., 2012). More than one-fourth of the samples analyzed from the North Atlantic Coastal Plain surficial aquifer system exceeded the 5 pCi/L MCL for radium. Of the 15 principal aquifer systems evaluated in the nationwide survey, only one aquifer system (Midcontinent and Ozark Plateau Cambro-Ordovician) produced more samples exceeding the MCL than the North Atlantic Coastal Plain aquifer system (Szabo et al., 2012).

Due to the agricultural history at and in the vicinity of the former NWIRP Bethpage, fertilizers may be a contributing source of radium in groundwater. According to the United States Environmental Protection Agency (U.S. EPA), phosphate rock, which is used in the production of phosphate fertilizers, may contain significant quantities of naturally occurring radioactive materials. Phosphate fertilizers contain some of the naturally occurring radium (Radium-226) found in phosphate ores, ranging between 5 to 30 picocuries per gram (pCi/g), depending on the type of fertilizer blend and the origin of the phosphate rock. It was not until 1992, that the U.S. EPA issued a final rule amending 40 Code of Federal Regulations Part 61, Subpart R, because of concerns over elevated radionuclide concentrations in phosphogypsum, which was intended for agricultural use. Due to its relatively low solubility, radium associated with fertilizers can remain in soil for an extended period of time.

Rate of Release of Radium and Related Geochemical Factors

Transport in groundwater of cations such as radium is influenced by the presence and availability of cation exchange sites (e.g., clay minerals in the aquifer or materials coated with charged surfaces). The availability of exchange sites on clay minerals in the aquifer is fixed based on the chemical composition of the mineral. Most of the clay minerals present in the aquifer will often have some coating of iron or manganese oxides ("rust" coatings), which create a charged surface. Cation exchange sites on the surfaces of rust coatings can fluctuate as the surrounding groundwater composition changes. As the availability of cation exchange sites decreases, cations can go into groundwater.

Groundwater parameters that influence the availability of exchange sites on charged surfaces include pH, dissolved oxygen content, and dissolved solids concentration (e.g., calcium chloride). Water quality parameters, such as pH and dissolved oxygen, are influenced by the residence time of the groundwater and therefore also effect concentration of radium. The chlorine associated with chlorinated volatile organic compounds (VOCs) in the area groundwater is tightly bound into the VOC and is present at a relatively low level compared to the chlorides in dissolved salts; and therefore, would not affect the concentration of radium in groundwater.

As the pH in groundwater decreases, the availability of exchange sites associated with the rust coatings will decrease. Radium concentrations are generally higher in acidic (pH less than 7 standard units [SU]) groundwater, and the aquifers of the North Atlantic Coastal Plain are generally acidic due to the limited buffering capacity of the primary minerals, i.e., quartz (Denver et al., 2014). A representative group of groundwater samples collected from wells up to 4 miles of the NWIRP Bethpage exhibit generally acidic pH values ranging from 3.3 to 6.7 SU.

The concentration of dissolved oxygen affects the oxidation-reduction state, or redox state, of the aquifer. Reducing the oxygen content will cause iron and manganese oxide coatings to become more soluble and dissolve into groundwater. The result is fewer cation exchange sites. and increases in dissolved iron, manganese, and other cation concentrations. An increase in dissolved iron and manganese concentrations can affect the radium concentration in the groundwater. In a study conducted of the occurrence and

distribution of radium, gross alpha-particle activity, and gross beta-particle activity in groundwater in the Magothy Formation and Upper Chesapeake Bay Area of Maryland, Bolton concluded that radium-226 and radium-228 may be mobilized when dissolved solids concentrations are high, especially in combination with low pH (Bolton, 2000).

Tricca et al., (2000) conducted a study of uranium and radium behavior in the unconfined Upper Glacial and Magothy aquifer on Long Island within the boundaries of the Department of Energy facility near Brookhaven, New York, 35 miles east of Bethpage. Although most of the groundwater samples were collected from monitoring wells screened in the Upper Glacial, only one sample was collected from the Magothy, and the authors concluded that the transport of radium was strongly associated with the presence of surface coatings on aquifer grains. They further observed that, in the Magothy sample, the slightly lowered oxygen concentration was accompanied by dissolution of these active surface coatings as evidenced by increases in dissolved iron and manganese.

Competing Cations

Transport in groundwater of radium is also influenced by the presence of other ion competitors. Commonly abundant (major) cations in groundwater, such as sodium, potassium, calcium, and magnesium, all compete among themselves and lower concentration (minor) cations, including, radium, for exchange sites. As the concentration of major cations increases, minor cations are replaced on exchange sites, causing them to enter groundwater. In addition to the presence of naturally occurring minerals in the aquifer, cation competitors may be introduced to the aquifer through application of road salt and/or fertilizer at the ground surface. In the 2000 Study, dissolved radium-226 and radium-228 concentrations were most strongly correlated with sodium and chloride concentrations (Bolton, 2000). The chlorine associated with chlorinated VOCs in the area groundwater is tightly bound into the VOC and is present at a relatively low level compared to the chlorides in dissolved salts; and therefore, would not affect the concentration of radium in groundwater.

3.2 SUMMARY OF AVAILABLE RADIUM DATA

All the reported radiological data available to the Navy as of March 6, 2018 is presented in Appendix A. Although there is uncertainty with sample collection techniques, handling, and data validation that may call into question the validity of some of the presented data, these data are nevertheless included in Appendix A for completeness and transparency. Water district data are from Bethpage Water District (2006, 2010, 2012, and 2015), Hempstead Water District (2015), Plainview Water District (2015), South Farmingdale Water District (2015), and Levittown Water District (2015). In addition, NYSDEC organized groundwater sampling events in 2013, 2015, 2016, and 2017 that were implemented by Navy, Northrop Grumman, and/or NYSDEC. Of these investigations, the 2015 sampling event was the most comprehensive, involving 31 water samples collected within approximately 4 miles of the NWIRP Bethpage. The 2015 sample event also included test locations to the north (hydraulically upgradient), east and west (hydraulically side-gradient) and south (hydraulically down-gradient) of the NWIRP Bethpage.

Maximum annual concentrations of radium are presented graphically in Figures 3-1 (0 to 100 Feet below ground surface [bgs]), 3-2 (100 to 300 Feet bgs), and 3-3 (Greater than 300 Feet bgs). The data are organized by depth to help distinguish local sources from remote (upgradient) sources. Concentrations of radium within the 0- to 100-foot bgs depth interval would represent radium that would enter the groundwater in close proximity to the well from either unsaturated soil located above the water table (approximately 50 feet bgs) and/or from saturated soil within the shallow-most groundwater. As groundwater moves to the south, it migrates downward in response to natural precipitation displacement and from deeper pumping activities. Radium in groundwater in the 100- to 300-foot bgs depth interval, and radium in groundwater greater than 300 feet bgs would represent radium from either shallow groundwater further north and/or radium dissolved from soil in that depth interval. The majority of the water supplies in the area are extracted from groundwater greater than 300 feet bgs.

The following sections provide detail on available radium-226 and -228 data in each of the three depth intervals. Radium was detected in most of the groundwater samples and all of the water supplies tested, which illustrates how common it is. Samples with radium concentrations exceeding the MCL (5 pCi/L) are shown with bold text.

3.2.1 Shallow Upper Glacial Aquifer and Upper Magothy Aquifer: 0 to 100 Feet bgs

Shallow wells (less than 100 feet bgs) are screened in the Upper Glacial and Magothy Formations. Groundwater data for radium in these wells are presented in Figure 3-1. Radium concentrations in these wells range from non-detect to 8.59 pCi/L. Of the 24 shallow monitoring wells tested, radium concentrations in groundwater from 2 wells (8.3 percent) exceeded the MCL. A review of the data indicates that there is no clear pattern in the distribution of radium in the shallow groundwater.

As discussed in Section 3.1, pH and specific conductivity affect the solubility of radium. Groundwater from wells screened less than 100 feet bgs have pH values ranging from 4.8 to 6.7 SU and specific conductivities ranging from 0.036 to 1.644 millisiemens per centimeter (mS/cm). These data are evaluated in Section 3.4.

3.2.2 Intermediate Magothy Aquifer: 100 to 300 Feet bgs

Intermediate wells (100 to 300 feet bgs) are screened in the Magothy Formation. Groundwater data for radium in these wells are summarized in Figure 3-2. Radium concentrations in these wells range from non-detect to 5.63 pCi/L. Of the 33 intermediate wells tested, radium concentrations in groundwater from 2 wells (6.1 percent) exceeded the MCL.

A review of the data indicates that there is no clear pattern in the distribution of radium in the intermediate-depth groundwater. There is very limited groundwater monitoring wells and data from east of the NWIRP Bethpage and Northrop Grumman facilities, an area which is hydraulically upgradient of Bethpage Water District Plant 4.

Groundwater from wells screened between 100 and 300 feet bgs in the vicinity of the NWIRP Bethpage have pH values ranging from 4.5 to 6.5 SU and specific conductivities ranging from 0.030 to 0.346 mS/cm. These data are evaluated in Section 3.4.

3.2.3 Deep Magothy Aquifer: Greater than 300 Feet bgs

Deep wells (greater than 300 feet bgs) are screened in the Magothy Formation. Groundwater data for radium in these deep wells are summarized in Figure 3-3. Radium concentrations in these wells range from non-detect to 7.03 pCi/L. Of the 65 deep wells tested, groundwater from 3 wells (4.6 percent) exceeded the MCL. A review of the data indicates that there is no clear pattern in the concentration distribution of radium in the deeper groundwater.

The maximum concentrations of radium in BWD Plant 4, Well 4-1 water ranged from approximately 5.2 to 7.03 pCi/L, which are only slightly higher than the MCL of 5 pCi/L. Two other public water supply wells in the area that are hydraulically side gradient or upgradient of the NWIRP Bethpage have radium concentrations that are only slightly less than the MCL. Radium was detected at a concentration of 4.3 pCi/L in one public water supply well approximately 2.8 miles west of BWD Plant 4 and 2 miles southwest of NWIRP Bethpage (hydraulically side gradient). Radium was detected at a concentration of 4.6 pCi/L in the second public water well approximately 3.5 miles north of BWD Plant 4 and 2 miles north (hydraulically upgradient) of the NWIRP Bethpage.

Groundwater from wells screened greater than 300 feet bgs have pH values ranging from 3.3 to 6.2 SU and specific conductivities ranging from 0.0107 to 0.227 mS/cm. These data are evaluated in Section 3.4.

3.3 RADIUM DISTRIBUTION OVER TIME

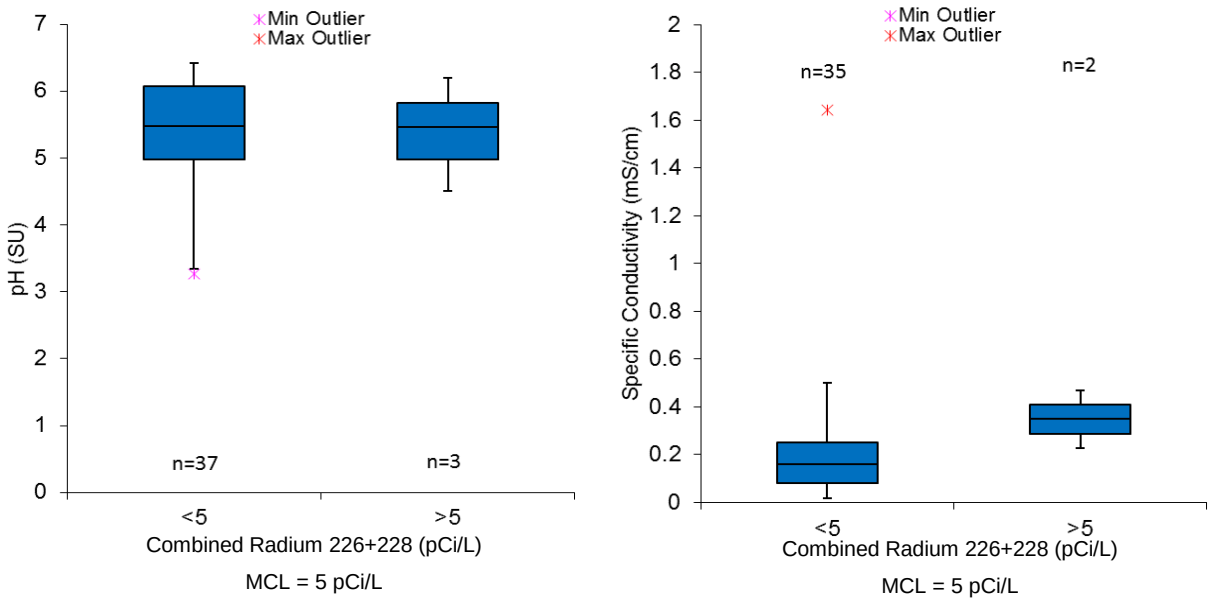
Available radium data in the area is limited to groundwater samples from 2013 to 2017 using the existing VOC monitoring well network collected by the Navy, Northrop Grumman, and NYSDEC, and the water samples from 2006 to 2015 collected by public water supply districts and NYSDEC. This time span is insufficient to develop any trend analysis.

3.4 DATA EVALUATION

As discussed in Section 3.2, there are several natural water quality factors (i.e., pH, dissolved solids [measured as specific conductivity], and dissolved oxygen) that can impact the mobility and transport of radium in groundwater aquifers. Human activities on ground surface, such as the application of road salt or the release of biodegradable organics from common sources including septic systems and gasoline stations, can also alter these water quality parameters.

Figure 3-4 presents box and whisker plots of pH (SU) and specific conductivity for wells sampled for radium-226 and radium-228. There is a limited sample size (n=2; n=3) for samples collected with radium concentrations above the MCL of 5 pCi/L. In addition, not all pH and specific conductivity data are contemporaneous with radium results.

Figure 3-4 – Radium Concentration Versus pH and Specific Conductivity



The box and whisker plots are used to evaluate effects from differences in geochemical conditions. Comparison of data from wells exhibiting radium concentrations less than and greater than the MCL suggests that:

- The measured pH across the wells in the data set is consistently acidic and differences in pH do not appear to predict well locations with increased radium activity
- Monitoring wells with increased dissolved salt content (i.e., higher specific conductivity) appear to exhibit higher radium activity

These comparisons, utilizing a very sparse data set, underscore the importance of understanding the driving forces for the distribution of radium concentrations. The limitations of currently available data include a limited areal distribution of wells to sample from and limited information on coinciding key geochemical parameters. Of particular note, the monitoring wells available for testing are locations used for evaluating VOCs in the area. The wells available for testing do not address the full capture zone of BWD Pant 4, and in particular, groundwater to the north and northeast of BWD Plant 4.

4.0 CURRENT AND FUTURE IMPACTS TO DRINKING WATER FACILITIES

Figures 3-1, 3-2, and 3-3 show the former NWIRP Bethpage and Northrop Grumman facilities, current understanding of the distribution of radium concentrations in groundwater, and the location of nearby public water supply wells that are south and hydraulically downgradient of the former NWIRP Bethpage and Northrop Grumman facilities.

Current impacts to drinking water facilities are based on the available radiological data collected between 2006 and 2017. Radium concentrations exceeding the MCL were documented at BWD Plant 4 wells (Well 4-1), which is located southeast of the NWIRP Bethpage and east of the former Northrop Grumman facilities. As illustrated in Figure 3-3, no other BWD wells show sustained radium levels exceeding the MCL, including BWD Plant 4, Well 4-2 which is located in close proximity to BWD Well 4-1.

The other water districts have radium levels less than the MCL. One water district located 2.5 miles southeast of NWIRP Bethpage and Northrop Grumman facilities is Farmingdale Water District (FWD)-11004, which had a radium concentration of 2.67 pCi/L. This water supply well is too far east to be considered downgradient of the NWIRP Bethpage and Northrop Grumman facilities. Hicksville Water District (HWD) Plant 9 is approximately 0.8 mile northwest of the NWIRP Bethpage and Northrop Grumman facilities. HWD Well 9-2 had a radium concentration of 2.88 pCi/L. HWD Plant 9 is hydraulically upgradient (northwest) of the former NWIRP Bethpage and Northrop Grumman facilities. Radium concentrations in groundwater from the four Plainview Water District (PWD) wells ranged from 2.66 to 4.64 pCi/L; those wells are located approximately 3 miles north (hydraulically upgradient) of Northrop Grumman and NWIRP Bethpage facilities. Levittown Water District (LWD) wells had radium concentrations ranging between 3.73 and 4.31 pCi/L; the LWD wells are located approximately 4 miles southwest (hydraulically side gradient) of NWIRP Bethpage and Northrop Grumman facilities.

Because the levels of radium and other radionuclides in groundwater are consistent with naturally occurring concentrations found in the regional aquifer, definitive future impacts to drinking water facilities, if any, cannot be determined. Further, the locations of radium concentrations appear to be randomly distributed in the Magothy aquifer groundwater.

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5.0 SUMMARY

The concentration of radium and other radioactive materials identified in groundwater in the vicinity of NWIRP Bethpage is consistent with naturally occurring levels normally found in the regional aquifer.

Several radioactive materials, including radium, were reportedly used by Northrop Grumman in product testing, research, and development, and for making product quality assurance and quality control oriented measures at the NWIRP Bethpage and Northrop Grumman facilities. Research to date into the records for these facilities did not find evidence of a radium or other radioactive material release that could have an effect on water quality in the NWIRP Bethpage Area.

Radium is a naturally occurring radioactive material whose solubility in the groundwater can be altered by pH, dissolved oxygen, and/or dissolved salts. Changes in these primary factors can be either natural or influenced by human activities (e.g., road salt, septic systems, gasoline stations, and fertilizers) on or near the surface of the aquifer.

In a nationwide survey, radium was measured at concentrations greater than the MCL in more than 25 percent of samples analyzed from the North American Coastal Plain surficial aquifer system. It can also be found in phosphate rock, which is used in the production of phosphate fertilizers. The Bethpage area has an agricultural history.

Based on available NWIRP Bethpage area data assembled from testing conducted by the local water districts, Navy, Northrop Grumman, and NYSDEC between 2006 and 2017, radium was detected in 97.5 percent of the 122 groundwater and public water supply test locations, with a maximum concentration of 8.6 pCi/L in one well. The MCL for radium is 5 pCi/L. Of these test locations, groundwater from 7 wells (5.7 percent) had a radium concentration exceeding the MCL.

A review of the data indicates that there is no clear pattern in the concentration of the distribution of radium in the groundwater. Of note, there is no groundwater data from east (hydraulically side gradient) of the NWIRP Bethpage and Northrop Grumman facilities, in an area that is hydraulically upgradient of Bethpage Water District Plant 4, which is where the well with the highest concentration of radium is located.

Despite the absence of current report-based or environmental evidence that radium or other radioactive materials were released at the NWIRP Bethpage, the Navy is conducting a PA/SI for the NWIRP Bethpage. The Preliminary Assessment includes employee interviews and enhanced compilation of government records for the former NWIRP Bethpage. The Site Inspection will include on-property groundwater sampling and analysis for radium and other radiological materials. At the conclusion of the PA/SI process, the results will be evaluated to determine if further removal or remedial action is warranted.

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N

Former NWIRP Bethpage Facility

75 miles

Long Island Sound

Massachusetts

Springfield

Kingston

Catskill Park

Minnewaska State Park

Poughkeepsie

Hartford

Willimantic

Windham

New Milford

Waterbury

Meriden

Middletown

Beacon

Newburgh

Middletown

Danbury

New Haven

Bridgeport

Harriman State Park

Sterling Forest

Greenwich

White Plains

Stamford

Yonkers

Paterson

Parsippany

Newark

New York

Elizabeth

Hicksville

Brentwood

West Babylon

Hampton Bays

Edison

Long Branch

Trenton

Hamilton

Toms River

Brendan T. Byrne State Forest

Wharton State Forest

Warren Grove Range

Atlantic City

New York

Connecticut

New Jersey

Legend

- 2016 TCE 5 µg/L
- 1997 Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Property
- 75 Mile Radius

Notes:
µg/L- microgram per liter
TCE- Trichloroethene

0 7.5 15 30 Miles

2013 ESRI Street Map

NAVFAC Naval Facilities Engineering Command

75-MILE RADIUS
NASSAU COUNTY MAP
NASSAU COUNTY, NEW YORK

FILE	112G08005-WE16	SCALE	AS NOTED
FIGURE NO.	1-1	REV	DATE 2/14/2018

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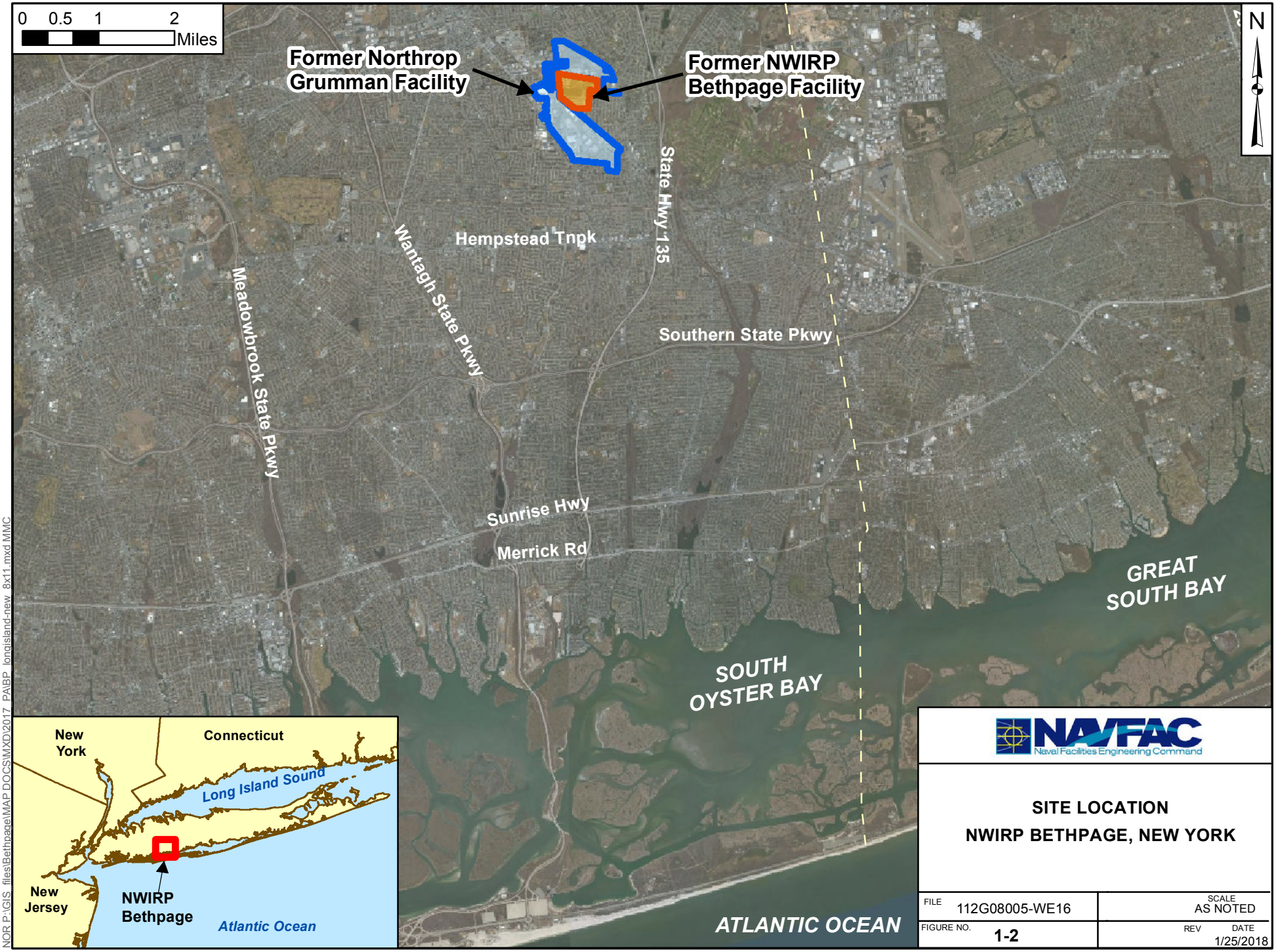

NAVFAC
Naval Facilities Engineering Command

SITE LOCATION
NWIRP BETHPAGE, NEW YORK

FILE	SCALE
112G08005-WE16	AS NOTED
FIGURE NO. 1-2	REV / DATE 1/25/2018

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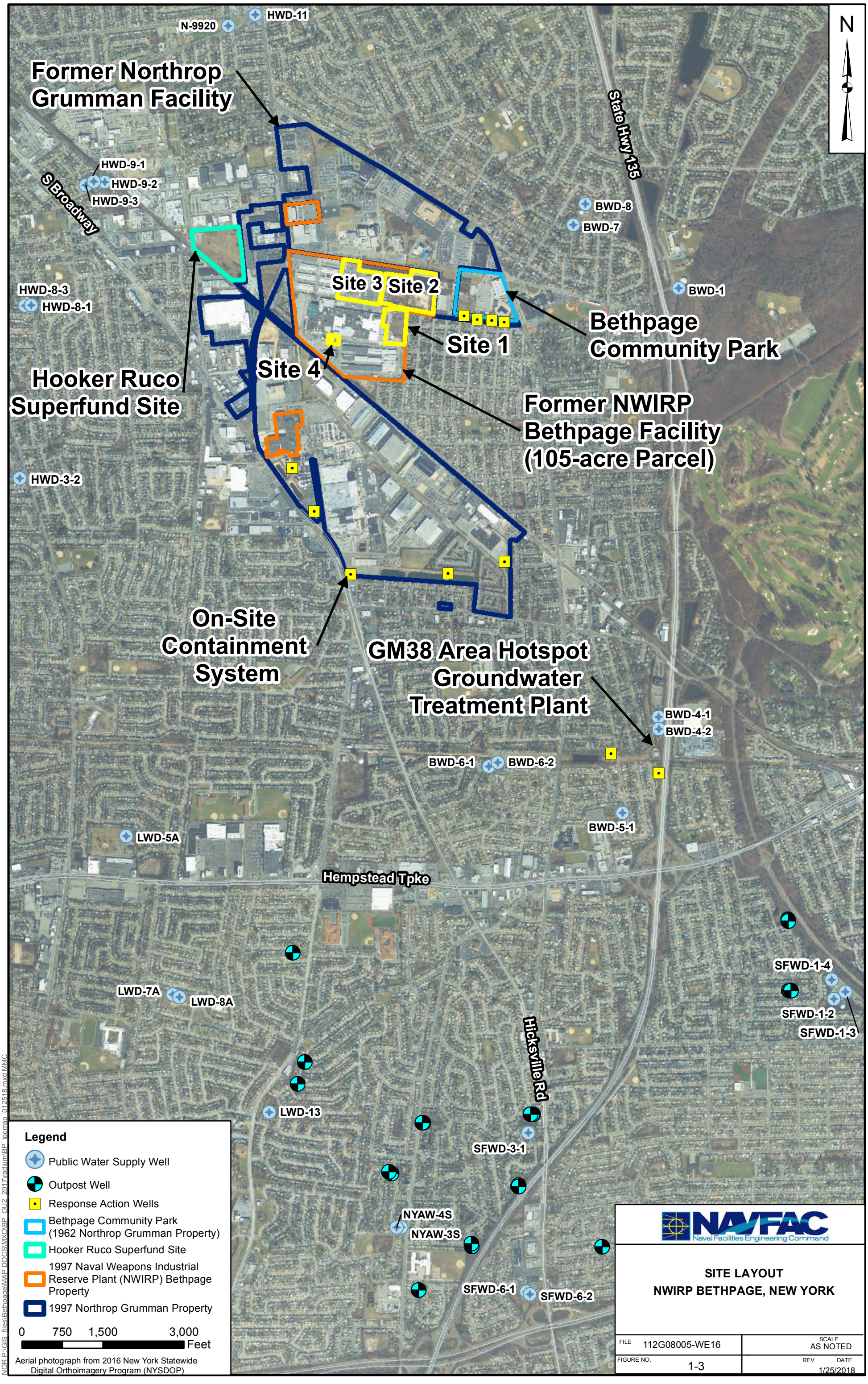
N
Former Northrop Grumman Facility
HWD-11
N-9920
State Hwy 135
S Broadway
HWD-9-1
HWD-9-2
HWD-9-3
BWD-8
BWD-7
HWD-8-3
HWD-8-1
BWD-1
Site 3
Site 2
Site 1
Site 4
Bethpage Community Park
Hooker Ruco Superfund Site
Former NWIRP Bethpage Facility (105-acre Parcel)
HWD-3-2
On-Site Containment System
GM38 Area Hotspot Groundwater Treatment Plant
BWD-4-1
BWD-4-2
BWD-6-1
BWD-6-2
BWD-5-1
LWD-5A
Hempstead Tpke
SFWD-1-4
SFWD-1-2
SFWD-1-3
LWD-7A
LWD-8A
Hicksville Rd
LWD-13
SFWD-3-1
NYAW-4S
NYAW-3S
SFWD-6-1
SFWD-6-2
Legend
Public Water Supply Well
Outpost Well
Response Action Wells
Bethpage Community Park (1962 Northrop Grumman Property)
Hooker Ruco Superfund Site
1997 Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Property
1997 Northrop Grumman Property
0 750 1,500 3,000 Feet
Aerial photograph from 2016 New York Statewide Digital Orthoimagery Program (NYSDOP)
NAVFAC Naval Facilities Engineering Command
SITE LAYOUT
NWIRP BETHPAGE, NEW YORK
FILE 112G08005-WE16
SCALE AS NOTED
FIGURE NO. 1-3
REV
DATE 1/25/2018
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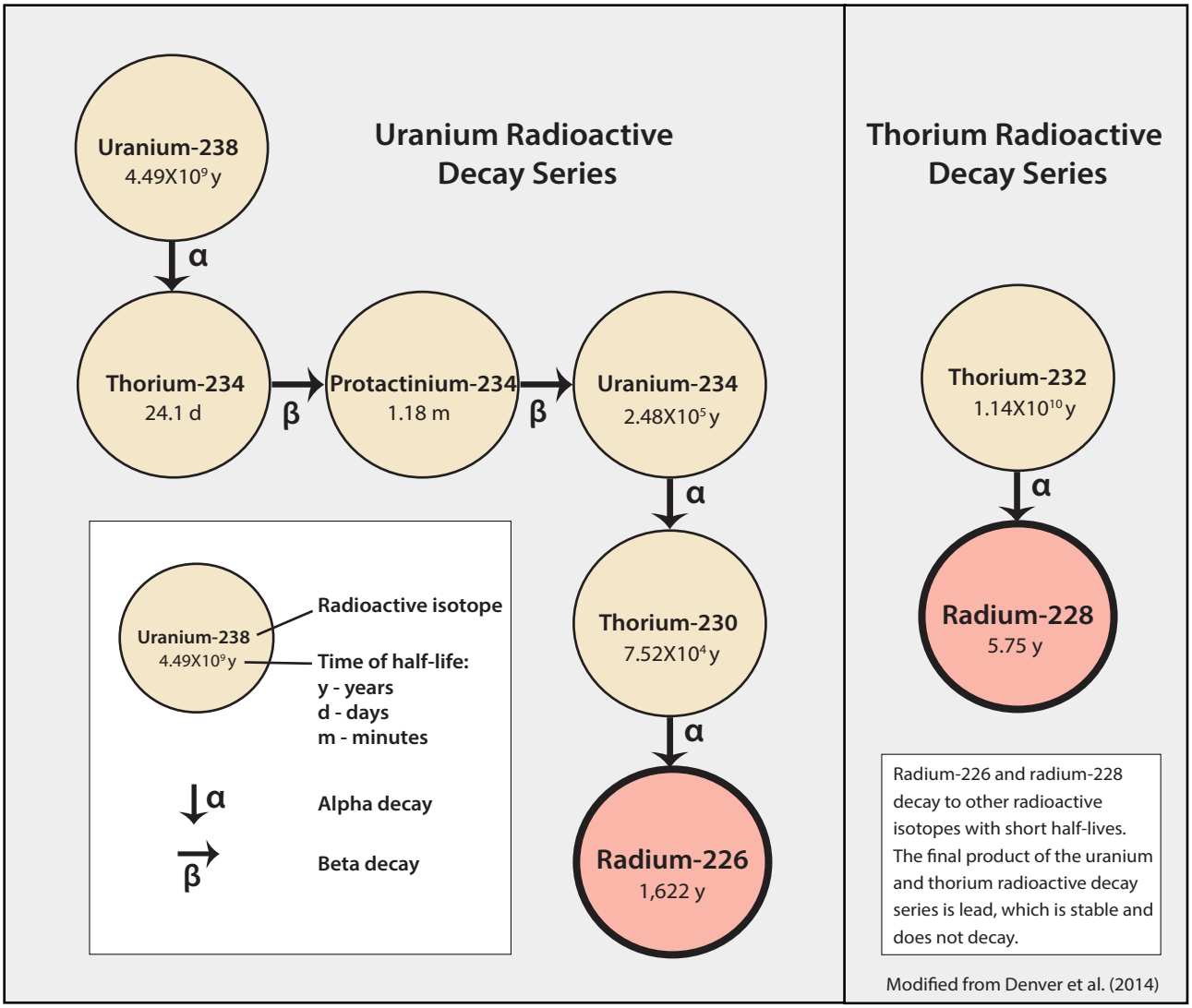

NAVFAC
Naval Facilities Engineering Command

URANIUM AND THORIUM DECAY SERIES

FILE	SCALE
112G08005-WE16	AS NOTED
FIGURE NO. 2-1	REV DATE 1/25/2018

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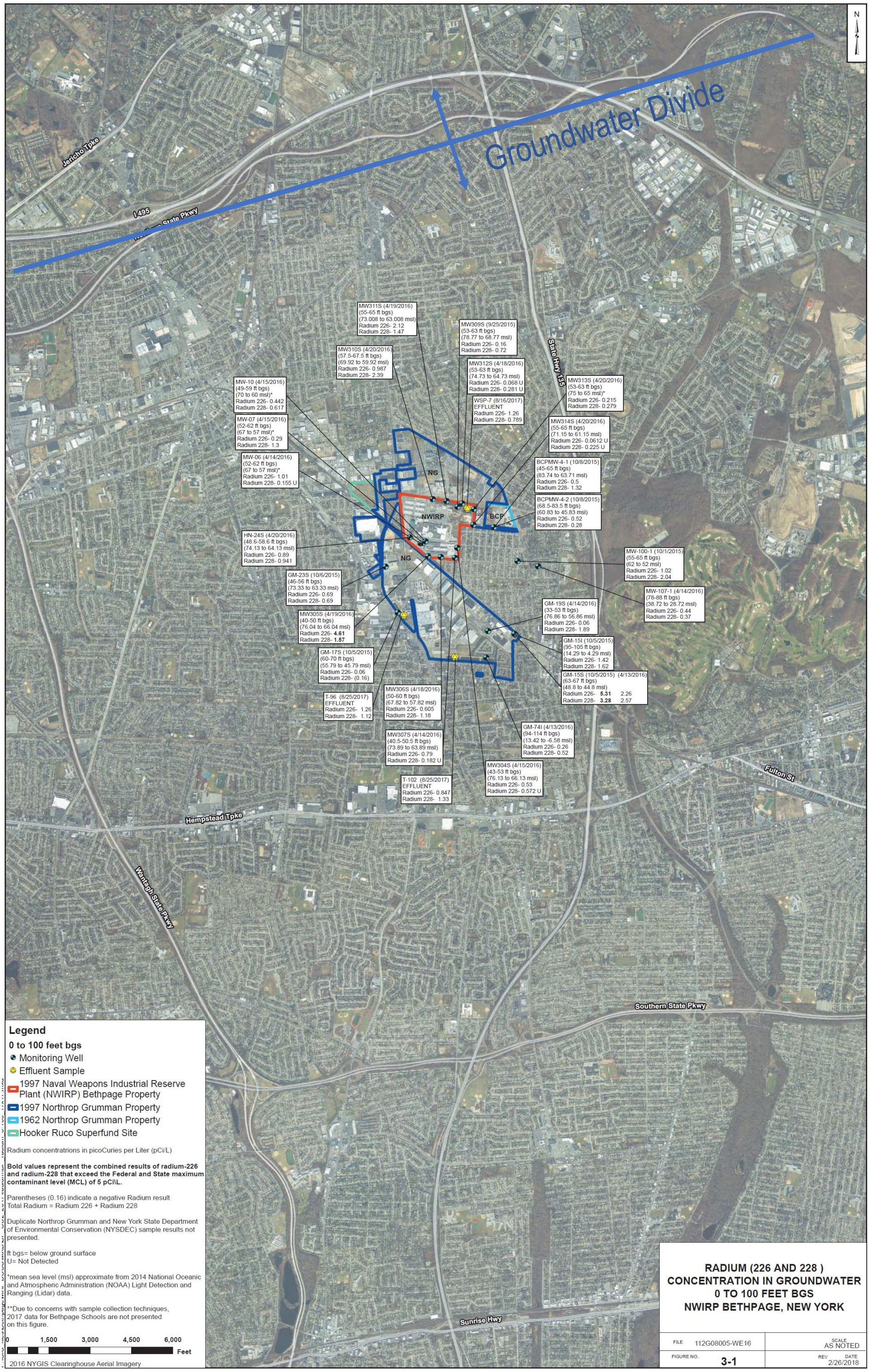

Legend

0 to 100 feet bgs

- Monitoring Well
- Effluent Sample
- 1997 Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Property
- 1997 Northrop Grumman Property
- 1962 Northrop Grumman Property
- Hooker Ruco Superfund Site

Radium concentratrions in picoCuries per Liter (pCi/L)

Bold values represent the combined results of radium-226 and radium-228 that exceed the Federal and State maximum contaminant level (MCL) of 5 pCi\L.

Parentheses (0.16) indicate a negative Radium result
Total Radium = Radium 226 + Radium 228

Duplicate Northrop Grumman and New York State Department of Environmental Conservation (NYSDEC) sample results not presented.

ft bgs= below ground surface
U= Not Detected

*mean sea level (msl) approximate from 2014 National Oceanic and Atmospheric Administration (NOAA) Light Detection and Ranging (Lidar) data.

**Due to concerns with sample collection techniques, 2017 data for Bethpage Schools are not presented on this figure.

0 1,500 3,000 4,500 6,000 Feet

2016 NYGIS Clearinghouse Aerial Imagery

RADIUM (226 AND 228) CONCENTRATION IN GROUNDWATER 0 TO 100 FEET BGS NWIRP BETHPAGE, NEW YORK

FILE 112G08005-WE16	SCALE AS NOTED
FIGURE NO. 3-1	REV DATE 2/26/2018

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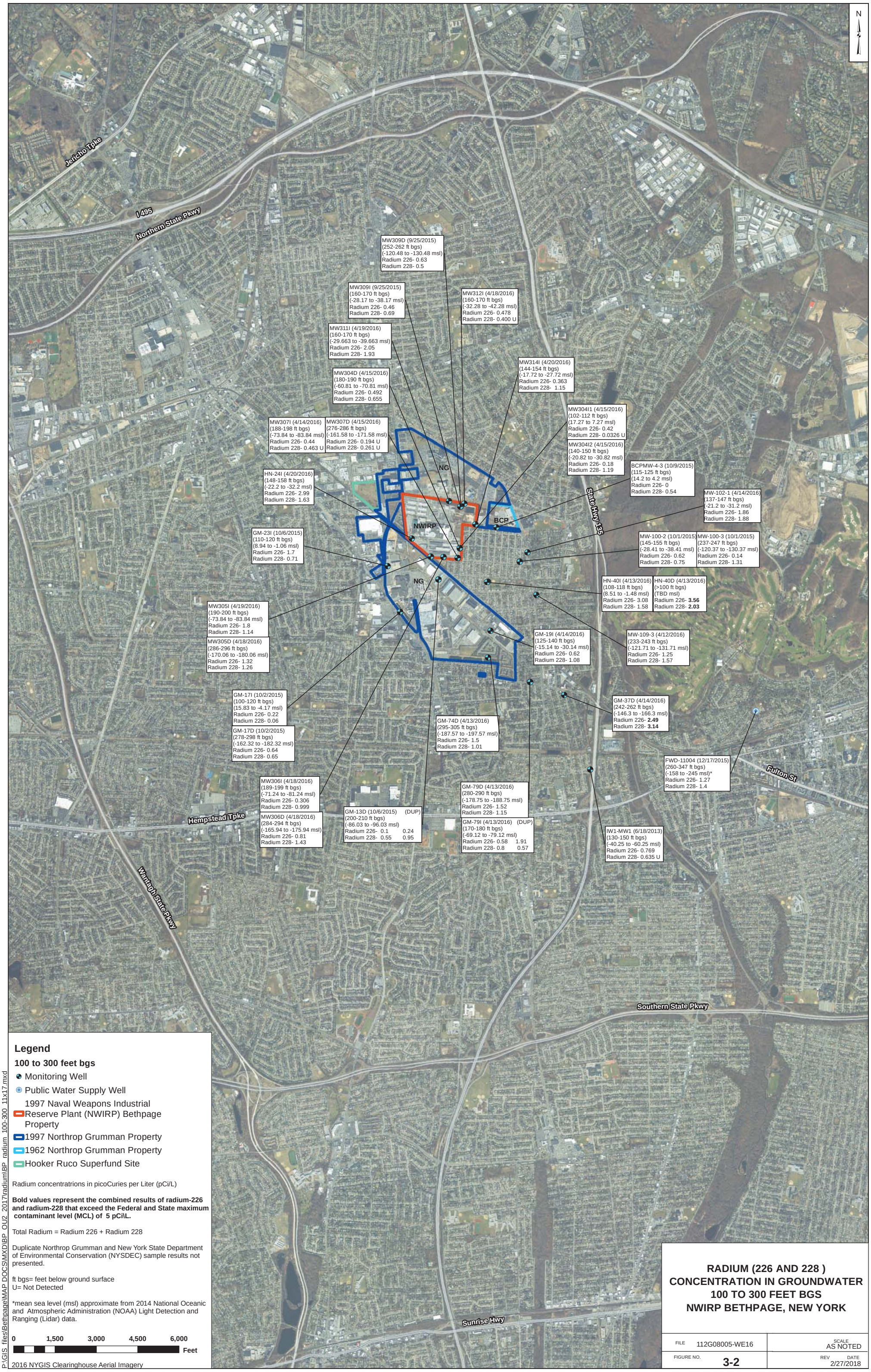

Legend

100 to 300 feet bgs

- Monitoring Well
- Public Water Supply Well
- 1997 Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Property
- 1997 Northrop Grumman Property
- 1962 Northrop Grumman Property
- Hooker Ruco Superfund Site

Radium concentratrions in picoCuries per Liter (pCi/L)

Bold values represent the combined results of radium-226 and radium-228 that exceed the Federal and State maximum contaminant level (MCL) of 5 pCi\L.

Total Radium = Radium 226 + Radium 228

Duplicate Northrop Grumman and New York State Department of Environmental Conservation (NYSDEC) sample results not presented.

ft bgs= feet below ground surface
U= Not Detected

*mean sea level (msl) approximate from 2014 National Oceanic and Atmospheric Administration (NOAA) Light Detection and Ranging (Lidar) data.

0 1,500 3,000 4,500 6,000 Feet

2016 NYGIS Clearinghouse Aerial Imagery

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RADIUM (226 AND 228) CONCENTRATION IN GROUNDWATER 100 TO 300 FEET BGS NWIRP BETHPAGE, NEW YORK

FILE	112G08005-WE16	SCALE	AS NOTED
FIGURE NO.	3-2	REV DATE	2/27/2018

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N

Jericho Tpke

I 495

Northern State Pkwy

PWD-12535 (12/17/2015)
(553-613 ft bgs)
(-390 to -450 msl)*
Radium 226- 0.28
Radium 228- 1.75

PWD-6077 (12/17/2015)
(395-495 ft bgs)
(-236 to -336 msl)*
Radium 226- 1.38
Radium 228- 3.26

HWD-7562 (12/9/2015)
(455-540 ft bgs)
(-292 to -377 msl)*
Radium 226- 0.67
Radium 228- 1.71

PWD-6580 (12/17/2015)
(531-591 ft bgs)
(-380 to -440 msl)*
Radium 226- 0.92
Radium 228- 2.27

HWD-13097 (12/9/2015)
(>300 ft bgs)
(TBD msl)
Radium 226- 0.06
Radium 228- 0.75

HWD-9488 (12/9/2015)
(518-568 ft bgs)
(-356 to -406 msl)*
Radium 226- 0.29
Radium 228- 0.8

HWD-3878 (12/9/2015)
(>300 ft bgs)
(TBD msl)
Radium 226- 1.12
Radium 228- 1.37

N-9920 (10/7/2015) (DUP)
(>300 ft bgs)
(TBD msl)
Radium 226- 0.66 0.50
Radium 228- 0.53 0.54

HWD-11 (12/8/2015)
(608-693 ft bgs)
(-458 to -543 msl)*
Radium 226- 0.06
Radium 228- 0.93

BWD-8 (2006) (2010) (2012)
(605-678 ft bgs)
(-455 to -515 msl)
Radium 226- NA NA 0
Radium 228- 0.831 1.64 0.892

PWD-8595 (12/17/2015)
(>300 ft bgs)
(TBD msl)
Radium 226- 0.75
Radium 228- 1.91

HWD-9-1 (12/8/2015)
(529-590 ft bgs)
(-389 to -450 msl)*
Radium 226- 0.36
Radium 228- 1.32

HWD-9-2 (12/8/2015)
(384-445 ft bgs)
(-244 to -305 msl)*
Radium 226- 1.15
Radium 228- 1.73

BWD-7 (2006) (2010) (2012) (12/7/2015)
(579-640 ft bgs)
(-455 to -515 msl)
Radium 226- NA NA 0.313 1.27
Radium 228- 1.69 1.08 0.61 0.75

BWD-1 (2006) (2010) (2012)
(616-682 ft bgs)
(-496 to -562 msl)
Radium 226- NA NA 0.186
Radium 228- 0.838 1.08 0.637

RW-21_MW-1 (9/1/2017)
(615-625 ft bgs)
(-513.71 to -523.71 msl)
Radium 226- 0.372
Radium 228- 0.563

HWD-9-3 (12/8/2015)
(432-509 ft bgs)
(-292 to -369 msl)*
Radium 226- 0.3
Radium 228- 0.76

NG

NWIRP

BCP

Well 19 (4/12/2016)
(465-617 ft bgs)
(-356.3 to -508.3 msl)
Radium 226- 0.22
Radium 228- 0.79

GM-15D (10/5/2015)
(332-342 ft bgs)
(-222.34 to -232.34 msl)
Radium 226- 0.92
Radium 228- 2.93

GM-15D2 (4/13/2016)
(536-556 ft bgs)
(-426.41 to -446.41 msl)
Radium 226- 0.07
Radium 228- 0.9

State Hwy 135

GM-71D2 (6/5/2013) (4/13/2016)
(444-464 ft bgs)
(-347.08 to -367.08 msl)
Radium 226- 2.28 2.98
Radium 228- 1.14 1.46

RW-21 (8/29/2017)
Radium 226- 0.553
Radium 228- 0.630

HWD-8-1 (12/10/2015)
(545-630 ft bgs)
(-415 to -500 msl)*
Radium 226- 0.98
Radium 228- 1.17

HWD-9212 (12/10/2015)
(>300 ft bgs)
(TBD msl)
Radium 226- 0.77
Radium 228- 1.72

GM-74D2 (4/12/2016)
(542-562 ft bgs)
(-434.64 to -454.64 msl)
Radium 226- 0.7
Radium 228- 1.19

MW-111-4 (4/12/2016)
(448-468 ft bgs)
(-344.62 to -364.62 msl)
Radium 226- 0.32
Radium 228- 1.25

**RW-21_MW-14 (9/1/2017) (DUP)
Radium 226- 0.367 0.502
Radium 228- 0.837 0.463

GM-37D2 (6/5/2013) (4/14/2016)
(370-390 ft bgs)
(-274.34 to -294.34 msl)
Radium 226- 1 0.49
Radium 228- 0.963 0.59

HWD-4-2 (12/10/2015)
(520-601 ft bgs)
(-400 to -481 msl)*
Radium 226- 1.35
Radium 228- 0.57

RW-21_MW-9 (8/31/2017)
(630-640 ft bgs)
(-538.40 to -548.40 msl)
Radium 226- 1.28
Radium 228- 1.20

RW-21_MW-7 (4/13/2016)
(580-590 ft bgs)
(-483.43 to -493.43 msl)
Radium 226- 0.72
Radium 228- 1.27

RE104D1 (9/25/2015)
(350-370 ft bgs)
(-260.2 to -280.2 msl)
Radium 226- 0.27
Radium 228- 0.38

RW-20 (8/28/2017)
Radium 226- 1.51
Radium 228- 0.733

RE104D2 (9/25/2015)
(710-730 ft bgs)
(-619.88 to -639.88 msl)
Radium 226- 1.09
Radium 228- (0.15)

MW-116-5 (6/4/2013) (4/12/2016)
(570-590 ft bgs)
(-477.74 to -497.74 msl)
Radium 226- 1.06 0.77
Radium 228- 0.421 0.8

RE104D3 (9/25/2015)
(760-780 ft bgs)
(-669.8 to -689.8 msl)
Radium 226- 0.52
Radium 228- 0.32

RE108D1 (9/28/2015)
(530-550 ft bgs)
(-434.62 to -454.62 msl)
Radium 226- 1.45
Radium 228- 0.1

BWD-4-1 (2006) (2010) (2012) (2013) (12/7/2015) (DUP)
(540-603 ft bgs)
(-473 to -523 msl)
Radium 226- **3.61** NA 3.1 **4.06** **3.16** **3.69**
Radium 228- **1.94** 2.1 1.62 **1.81** **2.05** **1.86**
Total Radium- **5.55** **7.03**[1] 4.72 **5.87** **5.21** **5.55**

RE108D2 (9/28/2015)
(630-650 ft bgs)
(-534.57 to -554.57 msl)
Radium 226- 0.5
Radium 228- 0.69

LWD-2A (12/15/2015)
(574-674 ft bgs)
(-474 to -574 msl)
Radium 226- 0.92
Radium 228- 2.81

BWD-6-1 (2006) (2010) (2012)
(328-341 ft bgs)
(-283 to -296 msl)
Radium 226- NA NA 0.063
Radium 228- 1.46 0.361 0.824

BWD-4-2 (2006) (2012) (2013) (12/7/2015)
(556-606 ft bgs)
(-478 to -526 msl)
Radium 226- NA 1.76 1.55 2.5
Radium 228- 1.69 1.59 0.985 1.42
Total Radium- **5.69**[1] 3.35 2.5 3.92

BWD-6-2 (2006) (2010) (2012)
(710-770 ft bgs)
(-610 to -680 msl)
Radium 226- NA NA 0.126
Radium 228- 0.947 0.734 0.153

LWD-6B (12/15/2015) (DUP)
(530-630 ft bgs)
(-495 to -565 msl)
Radium 226- 1.48 3.15
Radium 228- 1.39 1.16

RW1-MW3 (6/19/2013)
(395-435 ft bgs)
(-314.66 to -354.66 msl)
Radium 226- 1.07
Radium 228- 1.79

Fulton St

RW3-MW1 (6/20/2013) (DUP)
(475-495 ft bgs)
(-382.78 to -402.78 msl)
Radium 226- 1.11 1.02
Radium 228- 0.957 U 1.35

TP-1 (6/17/2013)
(450-470 ft bgs)
(-363.66 to -383.66 msl)
Radium 226- 0.452
Radium 228- 0.613 U

SFWD-5-2 (12/15/2015)
(493-589 ft bgs)
(-429 to -519 msl)
Radium 226- 0.89
Radium 228- 0.25

Hempstead Tpke

RW3-MW2 (6/20/2013)
(330-350 ft bgs)
(-238.02 to -258.02 msl)
Radium 226- 0.772
Radium 228- 0.539 U

GM38-RW03 (6/17/2013)
(392-504 ft bgs)
(-301.99 to -413.99 msl)
Radium 226- 1.22
Radium 228- 0.488 U

RW1-MW1 (6/19/2013)
(395-435 ft bgs)
(-310.45 to -350.45 msl)
Radium 226- 2.43
Radium 228- 0.0924 U

RW3-MW3 (6/21/2013)
(320-340 ft bgs)
(-227.02 to -247.02 msl)
Radium 226- 1.4
Radium 228- 1.58

RW-22 (8/30/2017)
Radium 226- 1.30
Radium 228- 0.767

RW1-MW2 (6/18/2013)
(395-435 ft bgs)
(-307.34 to -347.34 msl)
Radium 226- 1.74
Radium 228- 0.733 U

Wantagh State Pkwy

RW3-MW4 (6/21/2013)
(475-495 ft bgs)
(-382.08 to -402.08 msl)
Radium 226- 2.17
Radium 228- 2.81

BWD-5-1 (2006) (2010) (2012)
(679-740 ft bgs)
(-599 to -660 msl)
Radium 226- NA NA 0
Radium 228- 0.927 0.598 0.583

RW2-MW1 (6/17/2013)
(470-510 ft bgs)
(-379.25 to -419.25 msl)
Radium 226- **3.99**
Radium 228- **2.81**

GM38-RW01 (6/18/2013) (4/20/2016) (3/1/2017)
(335-430 ft bgs)
(-247.37 to -342.37 msl)
Radium 226- 1.13 0.815 1.19
Radium 228- 1.38 2.19 1.19 U

RW2-MW2 (6/17/2013)
(470-510 ft bgs)
(-379.53 to -419.53 msl)
Radium 226- 0.829
Radium 228- 0.296 U

BPOW 2-1 (9/28/2015)
(356-396 ft bgs)
(-297.36 to 337.36 msl)
Radium 226- 0.51
Radium 228- 0.33

RW2-MW3 (6/18/2013)
(470-510 ft bgs)
(-379.84 to -419.84 msl)
Radium 226- **3.49**
Radium 228- **1.74**

Southern State Pkwy

BPOW 2-2 (9/28/2015)
(455-495 ft bgs)
(-396.5 to -436.5 msl)
Radium 226- 0.21
Radium 228- 0.79

BPOW 2-3 (9/28/2015)
(564-594 ft bgs)
(-506.02 to -536.02 msl)
Radium 226- 0.25
Radium 228- 0.67

TT-102D (6/27/2013) (9/30/2015)
(560-600 ft bgs)
(-510.04 to -550.04 msl)
Radium 226- 0.384 1.2
Radium 228- 0.968 2.38

TT-102D2 (6/27/2013) (9/30/2015)
(740-770 ft bgs)
(-695.88 to -725.88 msl)
Radium 226- 0.930 0.2
Radium 228- 0.759 0.38

Sunrise Hwy

Legend

Greater than 300 feet bgs

- Monitoring Well
- Public Water Supply Well
- Recovery Well
- Production Well
- 1997 Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Property
- 1997 Northrop Grumman Property
- 1962 Northrop Grumman Property
- Hooker Ruco Superfund Site

Radium concentratrions in picoCuries per Liter (pCi/L)

Bold values represent the combined results of radium-226 and radium-228 that exceed the Federal and State maximum contaminant level (MCL) of 5 pCi\L.

Parentheses (0.16) indicate a negative Radium result
Total Radium = Radium 226 + Radium 228

Duplicate Northrop Grumman and New York State Department of Environmental Conservation (NYSDEC) sample results not presented.

ft bgs= feet below ground surface
U= Not Detected

*mean sea level (msl) approximate from 2014 National Oceanic and Atmospheric Administration (NOAA) Light Detection and Ranging (Lidar) data.

**The location of RW-21_MW-14 is unknown

[1] Total Radium value provide in Bethpage Water District v. Northrop Grumman Corporation

0 1,500 3,000 4,500 6,000 Feet

2016 NYGIS Clearinghouse Aerial Imagery

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RADIUM (226 AND 228) CONCENTRATION IN GROUNDWATER GREATER THAN 300 FEET BGS NWIRP BETHPAGE, NEW YORK

FILE 112G08005-WE16	SCALE AS NOTED
FIGURE NO. 3-3	REV DATE 3/16/2018

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APPENDICES

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APPENDIX A
CHEMICAL DATA TABLES

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Appendix A - Chemical Data Tables
Radium Concentrations in the Vicinity of Former Northrop Grumman and NWIRP Bethpage Facilities

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
BWD-4-1	540-603	2/2/2006	NA	1.72	1.72	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-2	556-606	2/2/2006	NA	1.69	1.69	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-2	556-606	February 2006	NA	NA	5.69	Bethpage Water District v. Northrop Grumman Corporation, Northrop Grumman Systems Corporation, U.S. 30 (2017).
BWD-6-1	328-386	2/7/2006	NA	0.652	0.652	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-6-2	710-770	2/7/2006	NA	0.819	0.819	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-7	579-640	2/9/2006	NA	1	1	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-8	605-678	2/9/2006	NA	0.212	0.212	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-5-1	679-740	2/15/2006	NA	0.46	0.46	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-1	616-682	2/23/2006	NA	0.766	0.766	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-5-1	679-740	5/1/2006	NA	0.927	0.927	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-1	540-603	5/9/2006	3.61	1.94	5.55	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-1	540-603	May 2006	NA	NA	5.55	Bethpage Water District v. Northrop Grumman Corporation, Northrop Grumman Systems Corporation, U.S. 30 (2017).
BWD-4-2	556-606	5/9/2006	NA	1.46	1.46	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-6-1	328-386	5/16/2006	NA	1.46	1.46	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-6-2	710-770	5/16/2006	NA	0.947	0.947	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-7	579-640	6/9/2006	NA	1.69	1.69	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-8	605-678	6/9/2006	NA	1.93	1.93	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-1	616-682	6/19/2006	NA	0.828	0.828	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-1	616-682	7/27/2006	NA	0.838	0.838	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-1	540-603	7/27/2006	NA	1.11	1.11	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-2	556-606	7/27/2006	NA	0.839	0.839	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
BWD-5-1	679-740	7/27/2006	NA	0.743	0.743	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-6-1	328-386	7/27/2006	NA	0.677	0.677	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-6-2	710-770	7/27/2006	NA	0.955	0.955	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-7	579-640	7/27/2006	NA	0.869	0.869	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-8	605-678	7/27/2006	NA	0.831	0.831	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-1	616-682	10/30/2006	NA	0.02	0.02	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-1	540-603	10/30/2006	3.61	NA	3.61	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-1	540-603	10/30/2006	NA	1.19	1.19	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-2	556-606	10/30/2006	0.758	NA	0.758	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-2	556-606	10/30/2006	NA	0.855	0.855	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-5-1	679-740	10/30/2006	NA	0.011	0.011	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-6-1	328-331	10/30/2006	NA	0.854	0.854	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-6-2	710-770	10/30/2006	NA	0.36	0.36	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-7	579-640	10/30/2006	NA	1.27	1.27	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-8	605-678	10/30/2006	NA	0.653	0.653	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-1	616-682	9/20/2010	NA	1.08	1.08	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-1	540-603	9/20/2010	NA	2.1	2.1	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-1	540-603	September 2010	NA	NA	7.03	Bethpage Water District v. Northrop Grumman Corporation, Northrop Grumman Systems Corporation, U.S. 30 (2017).
BWD-5-1	679-740	9/20/2010	NA	0.598	0.598	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-6-1	328-386	9/20/2010	NA	0.361	0.361	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-6-2	710-770	9/20/2010	NA	0.734	0.734	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
BWD-7	579-640	9/20/2010	NA	1.08	1.08	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-8	605-678	9/20/2010	NA	1.64	1.64	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-1	616-682	8/14/2012	0.186	0.637	0.823	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-1 Resin Vessel	EFFLUENT	8/14/2012	0.125	0.725	0.85	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-1	540-603	8/14/2012	3.1	1.62	4.72	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-2	556-606	8/14/2012	1.76	1.59	3.35	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-5-1	679-740	8/14/2012	0	0.583	0.583	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-6-1	328-386	8/14/2012	0.063	0.824	0.887	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-6-2	710-770	8/14/2012	0.126	0.153	0.279	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-7	579-640	8/14/2012	0.313	0.61	0.923	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-8	605-678	8/14/2012	0	0.892	0.892	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
Plant 4 Air Stripper and GAC	EFFLUENT	8/14/2012	3.62	2.18	5.8	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
Plant 5 Air Stripper	EFFLUENT	8/14/2012	0	0.64	0.64	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
Plant 6 Air Stripper and GAC	EFFLUENT	8/14/2012	0.061	0.735	0.796	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
WELL 7A/8A GAC	EFFLUENT	8/14/2012	0.217	0.596	0.813	Bethpage Water District (BWD), 2012. 2006-2012 Excel Sample Summary Data Provided by BWD.
BWD-4-1	540-603	9/18/2012	2.25	2.13	4.38	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-2	556-606	9/18/2012	2.41	2.13	4.54	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-1	540-603	11/26/2012	2.38	1.32	3.7	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-2	556-606	11/26/2012	2.09	1.11	3.2	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-1	540-603	1/2/2013	4.06	1.81	5.87	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-1	540-603	January 2013	NA	NA	5.87	Bethpage Water District v. Northrop Grumman Corporation, Northrop Grumman Systems Corporation, U.S. 30 (2017).

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
BWD-4-2	556-606	1/2/2013	1.55	0.985	2.535	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-1	540-603	2/20/2013	1.86	1.8	3.66	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-2	556-606	2/20/2013	1.95	1.1	3.05	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-1	540-603	3/11/2013	2.92	2.89	5.81	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-2	556-606	3/11/2013	2.54	1.39	3.93	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-2	556-606	3/11/2013	3.93	0.89	4.82	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-1	540-603	4/12/2013	3.93	0.89	4.82	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
BWD-4-2	556-606	4/12/2013	2	0.809	2.809	Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September
MW-116-5	570-590	6/4/2013	1.06	0.421	1.481	Northrop Grumman Corporation (NGC), 2013. Email Regarding Preliminary Split Sampling Lab Results for Radiological Parameters in Groundwater Monitoring Well Samples Collected 4 and 5 June 2013, Bethpage, NY, Admin Record N90845.AR.002014. June.
GM-37D2	370-390	6/5/2013	1	0.963	1.963	Northrop Grumman Corporation (NGC), 2013. Email Regarding Preliminary Split Sampling Lab Results for Radiological Parameters in Groundwater Monitoring Well Samples Collected 4 and 5 June 2013, Bethpage, NY, Admin Record N90845.AR.002014. June.
GM-71D2	444-464	6/5/2013	2.28	1.14	3.42	Northrop Grumman Corporation (NGC), 2013. Email Regarding Preliminary Split Sampling Lab Results for Radiological Parameters in Groundwater Monitoring Well Samples Collected 4 and 5 June 2013, Bethpage, NY, Admin Record N90845.AR.002014. June.
GM38-RW03	392-504	6/17/2013	1.22	0.488U	1.22	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW2-MW1	470-510	6/17/2013	3.99	2.81	6.8	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW2-MW1	470-510	6/17/2013	3.99	2.88	6.87	Bethpage Water District (BWD), 2013a. H2M Analytical Results for Radium GM38 Area. July
RW2-MW2	470-510	6/17/2013	0.829	0.296U	0.829	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
TP-1	450-470	6/17/2013	0.452	0.613U	0.452	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
IW1-MW1	130-150	6/18/2013	0.769	0.635U	0.769	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW1-MW2	395-435	6/18/2013	1.74	0.733U	1.74	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW2-MW3	470-510	6/18/2013	3.49	1.74	5.23	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW1-MW1	395-435	6/19/2013	2.43	0.0924U	2.43	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW1-MW1	395-435	6/19/2013	1.43	1.72	3.15	Bethpage Water District (BWD), 2013a. H2M Analytical Results for Radium GM38 Area. July
RW1-MW3	395-435	6/19/2013	1.07	1.79	2.86	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW1-MW3	395-435	6/19/2013	1.52	1.37	2.89	Bethpage Water District (BWD), 2013a. H2M Analytical Results for Radium GM38 Area. July
GM38-RW01	335-430	6/20/2013	1.13	1.38	2.51	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW3-MW1	475-495	6/20/2013	1.11	0.957U	1.11	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW3-MW1	475-495	6/20/2013	0.6	0.969	1.569	Bethpage Water District (BWD), 2013a. H2M Analytical Results for Radium GM38 Area. July
RW3-MW1 (DUP)	475-495	6/20/2013	1.02	1.35	2.37	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW3-MW2	330-350	6/20/2013	0.772	0.539U	0.772	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW3-MW2	330-350	6/20/2013	0.345	0.426	0.771	Bethpage Water District (BWD), 2013a. H2M Analytical Results for Radium GM38 Area. July

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
RW3-MW3	320-340	6/21/2013	1.4	1.58	2.98	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW3-MW3	320-340	6/21/2013	0.87	1.3	2.17	Bethpage Water District (BWD), 2013a. H2M Analytical Results for Radium GM38 Area. July
RW3-MW4	475-495	6/21/2013	2.17	2.81	4.98	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
RW3-MW4	475-495	6/21/2013	2.48	1.08	3.56	Bethpage Water District (BWD), 2013a. H2M Analytical Results for Radium GM38 Area. July
TT-102D	560-600	6/27/2013	0.384	0.968	1.352	Arcadis, 2013. Arcadis Excel Sheet: 2013-MWD Split Radiological Data. June
TT-102D	560-600	6/27/2013	0.52	1.56	2.08	Massapequa Water District (MWD), 2013. H2M Analytical Radium results from 6/27/2013 . July
TT-102D2	740-770	6/27/2013	0.93	0.759	1.689	Arcadis, 2013. Arcadis Excel Sheet: 2013-MWD Split Radiological Data. June
TT-102D2	740-770	6/27/2013	0.181	0.653	0.834	Massapequa Water District (MWD), 2013. H2M Analytical Radium results from 6/27/2013 . July
MW309D	252-262	9/25/2015	0.63	0.5	1.13	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
MW309I	160-170	9/25/2015	0.46	0.69	1.15	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
MW309S	53-63	9/25/2015	0.16	0.72	0.88	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
RE104D1	350-370	9/25/2015	0.27	0.38	0.65	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
RE104D2	710-730	9/25/2015	1.09	-0.15	0.94	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
RE104D3	760-780	9/25/2015	0.52	0.32	0.84	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
BPOW 2-1	356-396	9/28/2015	0.51	0.33	0.84	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
BPOW 2-2	455-495	9/28/2015	0.21	0.79	1	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
BPOW 2-3	564-594	9/28/2015	0.25	0.67	0.92	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
RE108D1	530-550	9/28/2015	1.45	0.1	1.55	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
RE108D2	630-650	9/28/2015	0.5	0.69	1.19	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
TT-102D	560-600	9/30/2015	1.2	2.38	3.58	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
TT-102D2	740-770	9/30/2015	0.2	0.38	0.58	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
MW-100-1	55-65	10/1/2015	1.02	2.04	3.06	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
MW-100-1	55-65	10/1/2015	-0.22	0.56	0.34	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
MW-100-2	145-155	10/1/2015	0.62	0.75	1.37	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
MW-100-2	145-155	10/1/2015	0.82	1.48	2.3	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
MW-100-3	237-247	10/1/2015	0.14	1.31	1.45	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
MW-100-3	237-247	10/1/2015	1.32	2.27	3.59	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-17D	278-298	10/2/2015	0.64	0.65	1.29	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
GM-17D	278-298	10/2/2015	0.68	1.09	1.77	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-17I	100-120	10/2/2015	0.22	0.06	0.28	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
GM-17I	100-120	10/2/2015	0.61	-0.06	0.55	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-15D	332-342	10/5/2015	0.92	2.93	3.85	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
GM-15D	332-342	10/5/2015	1.25	3.07	4.32	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-15I	95-105	10/5/2015	1.42	1.62	3.04	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
GM-15I	95-105	10/5/2015	2.78	0.71	3.49	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-15S	63-67	10/5/2015	5.31	3.28	8.59	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
GM-15S	63-67	10/5/2015	4.71	3.1	7.81	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-17S	60-70	10/5/2015	0.06	-0.16	-0.1	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
GM-17S	60-70	10/5/2015	0.84	0.09	0.93	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-13D	200-210	10/6/2015	0.1	0.55	0.65	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
GM-13D	200-210	10/6/2015	0.44	0.13	0.57	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-13D (DUP)	200-210	10/6/2015	0.24	0.95	1.19	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
GM-13D (DUP)	200-210	10/6/2015	0.29	0.5	0.79	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-23I	110-120	10/6/2015	1.7	0.71	2.41	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
GM-23I	110-120	10/6/2015	2.16	1.13	3.29	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-23S	46-56	10/6/2015	0.69	0.69	1.38	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
GM-23S	46-56	10/6/2015	0.65	0.56	1.21	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
N-9920	>300	10/7/2015	0.66	0.53	1.19	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
N-9920	>300	10/7/2015	0.5	0.17	0.67	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
N-9920 (DUP)	>300	10/7/2015	0.5	0.54	1.04	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
N-9920 (DUP)	>300	10/7/2015	-0.04	0.4	0.36	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
BCPMW-4-1	45-65	10/8/2015	0.5	1.32	1.82	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
BCPMW-4-1	45-65	10/8/2015	-0.24	0.61	0.37	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
BCPMW-4-2	68.5-83.5	10/8/2015	0.52	0.28	0.8	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
BCPMW-4-2	68.5-83.5	10/8/2015	0.06	0.51	0.57	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
BCPMW-4-3	115-125	10/8/2015	0.7	0.45	1.15	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
BCPMW-4-3	115-125	10/9/2015	0	0.54	0.54	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
BWD-4-1	540-603	12/7/2015	3.16	2.05	5.21	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
BWD-4-1	540-603	12/7/2015	4.49	1.43	5.92	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
BWD-4-1 (DUP)	540-603	12/7/2015	3.69	1.86	5.55	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
BWD-4-1 (DUP)	540-603	12/7/2015	3.01	1.6	4.61	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
BWD-4-2	556-606	12/7/2015	2.5	1.42	3.92	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
BWD-4-2	556-606	12/7/2015	0.1	0.96	1.06	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
BWD-7	579-640	12/7/2015	1.27	0.75	2.02	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
BWD-7	579-640	12/7/2015	0.57	0.85	1.42	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-11	608-693	12/8/2015	0.06	0.93	0.99	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
HWD-11	608-693	12/8/2015	0.11	1.08	1.19	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-9-1	529-590	12/8/2015	0.36	1.32	1.68	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
HWD-9-1	529-590	12/8/2015	0.22	0.83	1.05	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-9-2	384-445	12/8/2015	1.15	1.73	2.88	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
HWD-9-2	384-445	12/8/2015	0.47	1.36	1.83	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-9-3	432-509	12/8/2015	0.3	0.76	1.06	Resolution, 2016a. Combined Radium Data from 29 February 2016 for Up Gradient, Down Gradient, and Side Gradient Wells NWIRP Bethpage NY, Admin Record N90845.AR.002004. February.
HWD-9-3	432-509	12/8/2015	0.44	0.8	1.24	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-13097	>300	12/9/2015	0.06	0.75	0.81	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-3878	>300	12/9/2015	1.12	1.37	2.49	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-7562	455-540	12/9/2015	0.67	1.71	2.38	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-9488	518-568	12/9/2015	0.29	0.8	1.09	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
HWD-4-2	520-601	12/10/2015	1.35	0.57	1.92	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-8-1	545-630	12/10/2015	0.98	1.17	2.15	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
HWD-9212	>300	12/10/2015	0.77	1.72	2.49	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
LWD-2A	574-674	12/15/2015	0.92	2.81	3.73	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
LWD-6B	530-630	12/15/2015	1.48	1.39	2.87	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
LWD-6B (DUP)	530-630	12/15/2015	3.15	1.16	4.31	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
SFWD-5-2	493-589	12/15/2015	0.89	0.25	1.14	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
FWD-11004	260-347	12/17/2015	1.27	1.4	2.67	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
PWD-12535	553-613	12/17/2015	0.28	1.75	2.03	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
PWD-6077	395-495	12/17/2015	1.38	3.26	4.64	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
PWD-6580	531-591	12/17/2015	0.92	2.27	3.19	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
PWD-8595	>300	12/17/2015	0.75	1.91	2.66	Resolution, 2016b. Combined Radium Data from October 2015 and December 2015 for Northrop Grumman and NYSDEC Samples from Up Gradient, Side Gradient, and Down Gradient Wells, NWIRP Bethpage NY, Admin Record N90845.AR.002005. February.
GM-74D2	542-562	4/12/2016	0.7	1.19	1.89	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW-109-3	233-243	4/12/2016	1.25	1.57	2.82	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW-111-4	448-468	4/12/2016	0.32	1.25	1.57	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW-116-5	570-590	4/12/2016	0.77	0.8	1.57	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
Well 19	465-617	4/12/2016	0.22	0.79	1.01	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-15D2	536-556	4/13/2016	0.07	0.9	0.97	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-15S	63-67	4/13/2016	2.26	2.57	4.83	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-71D2	444-464	4/13/2016	2.98	1.46	4.44	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-74D	295-305	4/13/2016	1.5	1.01	2.51	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-74I	94-114	4/13/2016	0.26	0.52	0.78	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-79D	280-290	4/13/2016	1.52	1.15	2.67	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-79I	170-180	4/13/2016	0.58	0.8	1.38	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-79I (DUP)	170-180	4/13/2016	1.91	0.57	2.48	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
HN-40D	>100	4/13/2016	3.56	2.03	5.59	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
HN-40I	108-118	4/13/2016	3.08	1.58	4.66	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
RW-21_MW-7	580-590	4/13/2016	0.72	1.27	1.99	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-19I	125-140	4/14/2016	0.62	1.08	1.7	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-19S	33-53	4/14/2016	0.06	1.89	1.95	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-37D	242-262	4/14/2016	2.49	3.14	5.63	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
GM-37D2	370-390	4/14/2016	0.49	0.59	1.08	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
MW-06	52-62	4/14/2016	1.01	0.155U	1.01	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW-102-1	137-147	4/14/2016	1.86	1.88	3.74	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW-107-1	78-88	4/14/2016	0.44	0.37	0.81	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW307I	188-198	4/14/2016	0.44	0.463U	0.44	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW307I	188-198	4/14/2016	0.34	0.46	0.8	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW307S	40.5-50.5	4/14/2016	0.79	0.182U	0.79	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW307S	40.5-50.5	4/14/2016	0.51	2.21	2.72	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW-06	52-62	4/15/2016	1.04	0.66	1.7	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW-07	52-62	4/15/2016	0.29	1.3	1.59	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW-07	52-62	4/15/2016	0.95	2.02	2.97	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW-10	49-59	4/15/2016	0.442	0.617	1.059	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW-10	49-59	4/15/2016	0.56	0.51	1.07	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW304D	180-190	4/15/2016	0.492	0.655	1.147	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW304D	180-190	4/15/2016	0.83	0.21	1.04	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW304I1	102-112	4/15/2016	0.42	0.0326U	0.42	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW304I1	102-112	4/15/2016	0.83	0.2	1.03	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW304I2	140-150	4/15/2016	0.18	1.19	1.37	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW304I2	140-150	4/15/2016	0.13	0.85	0.98	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW304S	43-53	4/15/2016	0.53	0.572U	0.53	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW304S	43-53	4/15/2016	0.1	0.74	0.84	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW307D	276-286	4/15/2016	0.194U	0.261U	ND	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
MW307D	276-286	4/15/2016	0.33	0.31	0.64	NYSDEC, 2016. April 2016 Radium Results Sample Summary. NOT YET PUBLISHED
MW305D	286-296	4/18/2016	1.32	1.26	2.58	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW306D	284-294	4/18/2016	0.81	1.43	2.24	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW306I	189-199	4/18/2016	0.306	0.999	1.305	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW306S	50-60	4/18/2016	0.605	1.18	1.785	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW312I	160-170	4/18/2016	0.478	0.400U	0.478	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW312S	53-63	4/18/2016	0.068U	0.281U	ND	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW305I	190-200	4/19/2016	1.8	1.14	2.94	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW305S	40-50	4/19/2016	4.61	1.57	6.18	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW311I	160-170	4/19/2016	2.05	1.93	3.98	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW311S	55-65	4/19/2016	2.12	1.47	3.59	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
GM38-RW01	335-430	4/20/2016	0.815	2.19	3.005	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
HN-24I	148-158	4/20/2016	2.99	1.63	4.62	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
HN-24S	48.6-58.6	4/20/2016	0.89	0.941	1.831	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW310S	57.5-67.5	4/20/2016	0.987	2.39	3.377	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW313S	53-63	4/20/2016	0.215	0.279	0.494	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
MW314I	144-154	4/20/2016	0.363	1.15	1.513	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
MW314S	55-65	4/20/2016	0.0612U	0.225U	ND	Resolution, 2016c. Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May. NOT YET PUBLISHED
HSMW-1	60-64	2/24/2017	5.29	10.43	15.72	J.C. Broderick & Associates, 2017. Volatile Vapor Intrusion (VVI) and Groundwater Analytical Report with Radon Testing Bethpage High School 10 Cherry Avenue Bethpage, New York. May. Samples were collected via temporary well points adjacent to the monitoring well[1].
HSMW-2	60-64	2/24/2017	7.52	17.22	24.74	J.C. Broderick & Associates, 2017. Volatile Vapor Intrusion (VVI) and Groundwater Analytical Report with Radon Testing Bethpage High School 10 Cherry Avenue Bethpage, New York. May. Samples were collected via temporary well points adjacent to the monitoring well[1].
HSMW-3	60-64	2/24/2017	3.73	6.73	10.46	J.C. Broderick & Associates, 2017. Volatile Vapor Intrusion (VVI) and Groundwater Analytical Report with Radon Testing Bethpage High School 10 Cherry Avenue Bethpage, New York. May. Samples were collected via temporary well points adjacent to the monitoring well[1].
GM38-RW01	335-430	3/1/2017	1.19	1.19 U	1.19	Koman Government Solutions (KGS), 2017. Quarterly Operation Report First Quarter 2017 Groundwater Treatment Plant GM-38 Area Groundwater Remediaton NWIRP Bethpage, New York. August
WSP-7	EFFLUENT	8/16/2017	1.26	0.789	2.049	Arcadis, 2017a. Table 3 Validated Analytical Results from Northrop Grumman Treated Effluent, Northrop Grumman Systems Corporation,Bethpage NY. August.
T-102	EFFLUENT	8/25/2017	0.847	1.33	2.177	Arcadis, 2017a. Table 3 Validated Analytical Results from Northrop Grumman Treated Effluent, Northrop Grumman Systems Corporation,Bethpage NY. August.
T-96	EFFLUENT	8/25/2017	1.26	1.12	2.38	Arcadis, 2017a. Table 3 Validated Analytical Results from Northrop Grumman Treated Effluent, Northrop Grumman Systems Corporation,Bethpage NY. August.
RW-20	TBD	8/28/2017	1.51	0.733	2.243	Arcadis, 2017c. Validated Analytical Results for Radium from Northrop Grumman Remedial Wells, RW-21 Project Area, Northrop Grumman Systems Corporation, Bethpage, NY. November.
RW-20	TBD	8/28/2017	0.968	1.52	2.488	NYSDEC, 2017. RW-21 Area - Northrop Grumman and NYSDEC Recovery Well Split Sampling Radium 226 and Radium 228 NYSDEC Sampling Results. November.
RW-21	TBD	8/29/2017	0.553	0.63	1.183	Arcadis, 2017c. Validated Analytical Results for Radium from Northrop Grumman Remedial Wells, RW-21 Project Area, Northrop Grumman Systems Corporation, Bethpage, NY. November.

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
RW-21	TBD	8/29/2017	0.702	0.474	1.176	NYSDEC, 2017. RW-21 Area - Northrop Grumman and NYSDEC Recovery Well Split Sampling Radium 226 and Radium 228 NYSDEC Sampling Results. November.
RW-22	TBD	8/30/2017	1.3	0.767	2.067	Arcadis, 2017c. Validated Analytical Results for Radium from Northrop Grumman Remedial Wells, RW-21 Project Area, Northrop Grumman Systems Corporation, Bethpage, NY. November.
RW-22	TBD	8/30/2017	1.35	0.669	2.019	NYSDEC, 2017. RW-21 Area - Northrop Grumman and NYSDEC Recovery Well Split Sampling Radium 226 and Radium 228 NYSDEC Sampling Results. November.
RW-21_MW-9	630-640	8/31/2017	1.28	1.2	2.48	Arcadis, 2017b. Table 2 Validated Analytical Results for Radium from Northrop Grumman RW-21 Project Area, Northrop Grumman Systems Corporation, Bethpage NY. November.
RW-21_MW-1	615-625	9/1/2017	0.372	0.563	0.935	Arcadis, 2017b. Table 2 Validated Analytical Results for Radium from Northrop Grumman RW-21 Project Area, Northrop Grumman Systems Corporation, Bethpage NY. November.
RW-21_MW-14	TBD	9/1/2017	0.367	0.837	1.204	Arcadis, 2017b. Table 2 Validated Analytical Results for Radium from Northrop Grumman RW-21 Project Area, Northrop Grumman Systems Corporation, Bethpage NY. November.
RW-21_MW-14	TBD	9/1/2017	0.502	0.463	0.965	Arcadis, 2017b. Table 2 Validated Analytical Results for Radium from Northrop Grumman RW-21 Project Area, Northrop Grumman Systems Corporation, Bethpage NY. November.
CB-MW-1	43-50	8/18/2017	19.4	4.2	23.6	J.C. Broderick & Associates, 2017. Investigation Summary Report Central Boulevard Elementary School 60 Central Boulevard Bethpage, New York 11714. September.
CB-MW-2	43-50	8/18/2017	10.24	1.95	12.19	J.C. Broderick & Associates, 2017. Investigation Summary Report Central Boulevard Elementary School 60 Central Boulevard Bethpage, New York 11714. September.
CB-MW-3	43-50	8/18/2017	25.3	6.85	32.15	J.C. Broderick & Associates, 2017. Investigation Summary Report Central Boulevard Elementary School 60 Central Boulevard Bethpage, New York 11714. September.
CB-MW-1	TBD	TBD	11	7.16	18.16	NYSDEC summary table results for Central Blvd.(CB) Broderick ESML results. Validation, location, and sample collection information is pending[1].
CB-MW-2	TBD	TBD	5.28	4.4	9.68	NYSDEC summary table results for Central Blvd.(CB) Broderick ESML results. Validation, location, and sample collection information is pending[1].
CB-MW-3	TBD	TBD	16.2	9.27	25.47	NYSDEC summary table results for Central Blvd.(CB) Broderick ESML results. Validation, location, and sample collection information is pending[1].

LOCATION	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	RADIUM -226 (pCi/L)	RADIUM -228 (pCi/L)	COMBINED RAD-226 AND RAD-228 (pCi/L)	DATA SOURCE
HS-MW-5	TBD	TBD	9.29	3.27	12.56	NYSDEC summary table results for Bethpage High School (HS) Broderick ESML results. Validation, location, and sample collection information is pending[1].
HS-MW-6	TBD	TBD	17.31	6.64	23.95	NYSDEC summary table results for Bethpage High School (HS) Broderick ESML results. Validation, location, and sample collection information is pending[1].
HS-MW-7	TBD	TBD	15.24	4.08	19.32	NYSDEC summary table results for Bethpage High School (HS) Broderick ESML results. Validation, location, and sample collection information is pending[1].
HS-MW-5	TBD	TBD	1.6	4.88	6.48	NYSDEC summary table results for Bethpage High School (HS), NYSDEC split of Broderick samples. Validation, location, and sample collection information is pending[1].
HS-MW-6	TBD	TBD	10.5	17.2	27.7	NYSDEC summary table results for Bethpage High School (HS), NYSDEC split of Broderick samples. Validation, location, and sample collection information is pending[1].
HS-MW-7	TBD	TBD	2.16	5.68	7.84	NYSDEC summary table results for Bethpage High School (HS), NYSDEC split of Broderick samples. Validation, location, and sample collection information is pending[1].

1. Critical information regarding sample collection technique, sample handling, and data validation are missing. As a result, the reported results are of uncertain quality; and therefore, other than the Appendices, not presented or discussed in this report. In particular, sample turbidity indicative of natural formation material could artifically inflate the reported radium concentration.

FT - BGS	Feet below ground surface.
pCi/L	picaCuries per liter.
TBD	To be determined.
NA	Not available.
NYSDEC	New York State Department of Envionmental Conservation.

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Arcadis, 2013. Arcadis Excel Sheet: 2013- MWD Split Radiological Data. June.

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ARCADIS

Table 1. Validated Concentrations of Radiological Parameters in Groundwater Samples Collected from Monitoring We

Location ID:		TT-102D	TT-102D2
Sample ID:		TT-102D1 (1)	TT-102D2
Sample Date:		6/27/2013	6/27/2013
Constituent Name	Units		
Gross Alpha	pCi/L	**3.03**	**1.14**
Gross Beta	pCi/L	**3.24**	**0.470**
Radium-226	pCi/L	**0.384**	**0.930**
Radium-228	pCi/L	**0.968**	**0.759**
Total Uranium	ug/L	**0.101**	**0.224**

Notes and Abbreviations:

(1) TT-102D was mislabeled during sampling and reported as TT-102D1 in laboratory report.

Radium 226 was analyzed by EPA Method 903.1.

Radium 228 was analyzed by EPA Method 904.0.

Gross Alpha and Gross Beta were analyzed by EPA Method 900.0m.

Total Uranium was analyzed by ASTM D 5174.97.

Data were reviewed in accordance with USEPA National Functional Guidelines of July 2002 and Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual of July 2004.

Bold value indicates a detection.

pCi/L Picocuries per liter

ug/L Micrograms per liter

USEPA United States Environmental Protection Agency

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Bethpage Water District (BWD), 2013a. H2M Analytical Results for Radium GM38 Area. July

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H 2 M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis
Federal ID : 2902817
Collected : 06/21/2013 10:45 AM Point No:
Received : 06/21/2013 10:45 AM Location:
Collected By : PS99

Lab No. : 1306C33-001
Client Sample ID. : R.W.#3M.W.#3

Analytical Method: E900.0 : Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Analyst: Sub Container:
Gross Alpha (See Attached)	1.93		1	pCi/L	15	07/05/2013	Container-01 of 04
Analytical Method: E900.0 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Gross Beta (See Attached)	1.53		1	pCi/L		07/05/2013	Container-01 of 04
Analytical Method: E903.1 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Radium-226 (See Attached)	0.870		1	pCi/L		07/08/2013	Container-01 of 04
Analytical Method: E904.0 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Radium-228 (See Attached)	1.30		1	pCi/L		07/08/2013	Container-01 of 04
Analytical Method: ASTM D5174 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Total Uranium (see attached)	0.111	+	1	µg/L		07/19/2013	Container-01 of 04

Qualifiers: E = Value above quantitation range. Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

Date Reported : 7/25/2013

H 2 M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis
Federal ID : 2902817
Collected : 06/21/2013 9:20 AM Point No:
Received : 06/21/2013 10:23 AM Location:
Collected By : PS99

Lab No. : 1306C05-001
Client Sample ID. : RW#3MW#4

Analytical Method: E900.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Alpha (See Attached)	4.05		1	pCi/L	15	07/05/2013	Container-01 of 04
Analytical Method: E900.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Beta (See Attached)	3.01		1	pCi/L		07/05/2013	Container-01 of 04
Analytical Method: E903.1 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-226 (See Attached)	2.48		1	pCi/L		07/08/2013	Container-01 of 04
Analytical Method: E904.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-228 (See Attached)	1.08		1	pCi/L		07/08/2013	Container-01 of 04
Analytical Method: ASTM D5174 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Total Uranium (see attached)	0.239	+	1	µg/L		07/19/2013	Container-01 of 04

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

H 2 M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1306B36-001
Client Sample ID. : RW#3MW#1

Federal ID : 2902817
Collected : 06/20/2013 11:35 AM Point No:
Received : 06/20/2013 1:13 PM Location:
Collected By : PS99

Analytical Method: E900.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Alpha (See Attached)	1.10		1	pCi/L	15	06/28/2013	Container-01 of 04

Analytical Method: E900.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Beta (See Attached)	1.86		1	pCi/L		06/28/2013	Container-01 of 04

Analytical Method: E903.1 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-226 (See Attached)	0.600		1	pCi/L		07/02/2013	Container-01 of 04

Analytical Method: E904.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-228 (See Attached)	0.969		1	pCi/L		06/28/2013	Container-01 of 04

Analytical Method: ASTM D5174 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Total Uranium (see attached)	0.091	+	1	µg/L		07/16/2013	Container-01 of 04

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

Date Reported : 7/19/2013

H2M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis
Federal ID : 2902817
Collected : 06/20/2013 11:35 AM Point No:
Received : 06/20/2013 1:13 PM Location:
Collected By : PS99

Lab No. : 1306B37-001
Client Sample ID. : RW#3MW#2

Analytical Method: E900.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Alpha (See Attached)	1.27		1	pCi/L	15	06/28/2013	Container-01 of 04

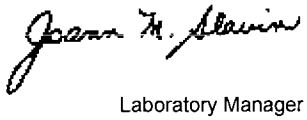
Analytical Method: E900.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Beta (See Attached)	1.18		1	pCi/L		06/28/2013	Container-01 of 04

Analytical Method: E903.1 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-226 (See Attached)	0.345		1	pCi/L		07/02/2013	Container-01 of 04

Analytical Method: E904.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-228 (See Attached)	0.426		1	pCi/L		06/28/2013	Container-01 of 04

Analytical Method: ASTM D5174 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Total Uranium (see attached)	0.093	+	1	µg/L		07/16/2013	Container-01 of 04

Qualifiers:
E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.



Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

H 2 M labs

575 Broad Hollow Rd., Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis
Federal ID : 2902817
Collected : 06/19/2013 5:00 PM Point No:
Received : 06/19/2013 6:20 PM Location:
Collected By : PS99

Lab No. : 1306B19-001
Client Sample ID. : RW#1MW#1

Analytical Method: E900.0 : Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Analyst: Sub Container:
Gross Alpha (See Attached)	1.87		1	pCi/L	15	06/28/2013	Container-01 of 04
Analytical Method: E900.0 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Gross Beta (See Attached)	1.68		1	pCi/L		06/28/2013	Container-01 of 04
Analytical Method: E903.1 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Radium-226 (See Attached)	1.43		1	pCi/L		07/02/2013	Container-01 of 04
Analytical Method: E904.0 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Radium-228 (See Attached)	1.72		1	pCi/L		06/28/2013	Container-01 of 04
Analytical Method: ASTM D5174 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Total Uranium (see attached)	0.115	+	1	µg/L		07/16/2013	Container-01 of 04

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

H 2 M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis
Federal ID : 2902817
Collected : 06/19/2013 11:45 AM Point No:
Received : 06/19/2013 12:56 PM Location:
Collected By : PS99

Lab No. : 1306A55-001
Client Sample ID. : RW#1MW#3

Analytical Method: E900.0 : Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Analyst: Sub Container:
Gross Alpha (See Attached)	2.90		1	pCi/L	15	06/28/2013	Container-01 of 04
Analytical Method: E900.0 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Gross Beta (See Attached)	0.721		1	pCi/L		06/28/2013	Container-01 of 04
Analytical Method: E903.1 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Radium-226 (See Attached)	1.52		1	pCi/L		07/01/2013	Container-01 of 04
Analytical Method: E904.0 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Radium-228 (See Attached)	1.37		1	pCi/L		06/28/2013	Container-01 of 04
Analytical Method: ASTM D5174 : Parameter(s)	**Results**	**Qualifier**	**D.F.**	**Units**	**Limit**	**Analyzed:**	**Analyst: Sub Container:**
Total Uranium (see attached)	0.108	+	1	µg/L		07/15/2013	Container-01 of 04

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

Date Reported : 7/17/2013

H2M labs
575 Broad Hollow Rd., Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Groundwater
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis
Federal ID : 2902817
Collected : 06/17/2013 10:40 AM Point No
Received : 06/17/2013 12:35 PM Location:
Collected By : PS99

Lab No. : 1306841-001
Client Sample ID. : RW 2 MW 1

Analytical Method: E549.2 : SOC | Prep Method: E549.1 | Prep Date: 6/19/2013 9:19:52 AM | Analyst: MJM

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Diquat	<0.40	r	1	µg/L	20	06/22/2013 1:34 PM	Container-01 of 01

Analytical Method: SM2320B : IOC | Analyst: HT

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Alkalinity, Total (As CaCO3)	33.0		1	mg/L		06/20/2013 1:00 PM	Container-01 of 01

Analytical Method: E300.0 : IOC | Analyst: bka

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Chloride	19.1		1	mg/L	250	06/19/2013 10:11 PM	Container-01 of 01
Fluoride	< 0.10		1	mg/L	2.2	06/19/2013 10:11 PM	Container-01 of 01
Sulfate	< 5.00		1	mg/L	250	06/19/2013 10:11 PM	Container-01 of 01

Analytical Method: E200.7 : IOC | Analyst: JA

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Hardness, Calcium (As CaCO3)	22.1		1	mg/L		06/18/2013 3:14 PM	Container-01 of 01

Analytical Method: SM4500-CN E : IO | Analyst: HT

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Free Cyanide	< 10.0		1	µg/L	200	06/20/2013 12:50 PM	Container-01 of 01

Analytical Method: SM2120B : IOC | Analyst: EM

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Color	* 25	*	1	units	15	06/18/2013 8:17 AM	Container-01 of 01

Analytical Method: E1613 : SOC | Analyst: Sub

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Dioxin (See Attached)	< 5.0		1	Pg/L	30	07/03/2013	Container-01 of 02

Analytical Method: E900.0 : | Analyst: Sub

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Alpha (See Attached)	5.79		1	pCi/L	15	06/28/2013	Container-01 of 04

Analytical Method: E900.0 : | Analyst: Sub

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Beta (See Attached)	3.47		1	pCi/L		06/28/2013	Container-01 of 04

Analytical Method: M2340 B : IOC | Analyst: JA

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Total Hardness (As CaCO3)	36.9		1	mg/L		06/18/2013 3:14 PM	Container-01 of 01

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

H 2 M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Groundwater
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis
Federal ID : 2902817
Collected : 06/17/2013 10:40 AM Point No
Received : 06/17/2013 12:35 PM Location:
Collected By : PS99

Lab No. : 1306841-001
Client Sample ID. : RW 2 MW 1

Analytical Method: SM2330 LSI : IOC							Analyst: Calc
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
LSI	-3.01		1	SI		06/24/2013	Container-01 of 01
Analytical Method: SM5540C : IOC							**Analyst: EM**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
MBAS	< 0.08		1	mg/L		06/18/2013 8:02 AM	Container-01 of 01
Analytical Method: SM4500-NH3 H : I							**Analyst: bka**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Nitrogen, Ammonia (As N)	0.32	+	1	mg/L		06/20/2013 1:36 PM	Container-01 of 01
Analytical Method: E353.2 : IOC							**Analyst: EM**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Nitrite as N	* 1.09	*	1	mg/L	1	06/18/2013 6:46 AM	Container-01 of 01
Analytical Method: E353.2 : IOC							**Analyst: EM**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Nitrate as N	* 9.00	*D	20	mg/L	10	06/18/2013 12:39 PM	Container-01 of 01
Analytical Method: SM2150B : IOC							**Analyst: EM**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Odor at 60°C	2		1	units	3	06/18/2013 8:25 AM	Container-01 of 01
Analytical Method: E314.0 : IOC							**Analyst: bka**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Perchlorate	< 1.0		1	µg/L	18	06/20/2013 3:00 PM	Container-01 of 01
Analytical Method: SM4500-H B : IOC							**Analyst: Client**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
PH (FIELD)	6.0	+	1	pH Units		06/17/2013 10:40 AM	Container-01 of 01
Analytical Method: E903.1 :							**Analyst: Sub**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-226 (See Attached)	3.99		1	pCi/L		07/02/2013	Container-01 of 04
Analytical Method: E904.0 :							**Analyst: Sub**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-228 (See Attached)	2.88		1	pCi/L		06/28/2013	Container-01 of 04

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

H2M labs
575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Groundwater
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis
Federal ID : 2902817
Collected : 06/17/2013 10:40 AM Point No
Received : 06/17/2013 12:35 PM Location:
Collected By : PS99

Lab No. : 1306841-001
Client Sample ID. : RW 2 MW 1

Analytical Method: SM2540C : IOC							Analyst: EM
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Total Dissolved Solids	150		1	mg/L		06/18/2013 1:06 PM	Container-01 of 01

Analytical Method: E180.1 : IOC							Analyst: EM
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Turbidity *	13	*D	2	NTU	5	06/18/2013 8:47 AM	Container-01 of 01

Analytical Method: ASTM D5174 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Total Uranium (see attached)	0.130	+	1	µg/L		07/16/2013	Container-01 of 04

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

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Bethpage Water District (BWD), 2013b. H2M Analytical Results for Radium BWD wells. September

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H 2 M labs
575 Broad Hollow Road , Melville, NY
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

Sample Information...
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1208683-001

Client Sample ID. : N-08004

Federal ID 2902817
Collected :8/14/2012 9:45:00 AM Point No: N-08004
Received :8/14/2012 12:20:00 PM Location: Well 5-1
Collected By PS99

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Method Number	Analyzed
Gross Alpha (See Attached)	1.17		1	pCi/L	15	E900.0	08/27/2012
Gross Beta (See Attached)	0.0470		1	pCi/L		E900.0	08/27/2012
Radium-226 (See Attached)	0.000		1	pCi/L		E903.1	08/30/2012
Radium-228 (See Attached)	0.583		1	pCi/L		E904.0	08/29/2012
Total Uranium (see attached)	0.122		1	µg/L		ASTM D5174	09/06/2012

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit below calibration range
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Date Reported : 9/12/2012

H 2 M labs
575 Broad Hollow Road , Melville, NY
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

Sample Information...
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1208683-011

Client Sample ID. : N-03876

Federal ID 2902817
Collected : 8/14/2012 10:00:00 AM Point No: N-03876
Received : 8/14/2012 12:20:00 PM Location: Well 6-1
Collected By PS99

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Method Number	Analyzed
Gross Alpha (See Attached)	0.373		1	pCi/L	15	E900.0	08/27/2012
Gross Beta (See Attached)	1.23		1	pCi/L		E900.0	08/27/2012
Radium-226 (See Attached)	0.0628		1	pCi/L		E903.1	08/30/2012
Radium-228 (See Attached)	0.824		1	pCi/L		E904.0	08/29/2012
Total Uranium (see attached)	0.119		1	µg/L		ASTM D5174	09/06/2012

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit below calibration range
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

H 2 M labs
575 Broad Hollow Road , Melville, NY
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

Sample Information...
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1208683-012

Client Sample ID. : N-08941

Federal ID 2902817
Collected :8/14/2012 10:00:00 AM Point No: N-08941
Received :8/14/2012 12:20:00 PM Location: Well 6-2
Collected By PS99

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Method Number	Analyzed
Gross Alpha (See Attached)	-1.449		1	pCi/L	15	E900.0	08/28/2012
Gross Beta (See Attached)	0.619		1	pCi/L		E900.0	08/28/2012
Radium-226 (See Attached)	0.126		1	pCi/L		E903.1	08/30/2012
Radium-228 (See Attached)	0.153		1	pCi/L		E904.0	09/04/2012
Total Uranium (see attached)	0.101		1	µg/L		ASTM D5174	09/07/2012

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit below calibration range
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Date Reported : 9/12/2012

H 2 M labs
575 Broad Hollow Road , Melville, NY
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

Sample Information...
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1208683-008

Client Sample ID. : N-08767

Federal ID 2902817
Collected :8/14/2012 10:20:00 AM Point No: N-08767
Received :8/14/2012 12:20:00 PM Location: Well 7-A
Collected By PS99

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Method Number	Analyzed
Gross Alpha (See Attached)	1.02		1	pCi/L	15	E900.0	08/27/2012
Gross Beta (See Attached)	0.364		1	pCi/L		E900.0	08/27/2012
Radium-226 (See Attached)	0.313		1	pCi/L		E903.1	08/30/2012
Radium-228 (See Attached)	0.610		1	pCi/L		E904.0	08/29/2012
Total Uranium (see attached)	0.070		1	µg/L		ASTM D5174	09/06/2012

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit below calibration range
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Date Reported : 9/12/2012

H 2 M labs
575 Broad Hollow Road , Melville, NY
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

Sample Information...
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1208683-009

Client Sample ID. : N-08768

Federal ID 2902817
Collected :8/14/2012 10:20:00 AM Point No: N-08768
Received :8/14/2012 12:20:00 PM Location: Well 8-A
Collected By PS99

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Method Number	Analyzed
Gross Alpha (See Attached)	1.43		1	pCi/L	15	E900.0	08/29/2012
Gross Beta (See Attached)	0.143		1	pCi/L		E900.0	08/29/2012
Radium-226 (See Attached)	0.000		1	pCi/L		E903.1	08/30/2012
Radium-228 (See Attached)	0.892		1	pCi/L		E904.0	08/29/2012
Total Uranium (see attached)	0.095		1	µg/L		ASTM D5174	09/06/2012

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit below calibration range
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

H 2 M labs
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TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

Sample Information...
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1208683-006

Client Sample ID. : N-09591

Federal ID 2902817
Collected :8/14/2012 9:10:00 AM Point No: N-09591
Received :8/14/2012 12:20:00 PM Location: Well BGD-1
Collected By PS99

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Method Number	Analyzed
Gross Alpha (See Attached)	-0.752		1	pCi/L	15	E900.0	08/29/2012
Gross Beta (See Attached)	1.33		1	pCi/L		E900.0	08/29/2012
Radium-226 (See Attached)	0.186		1	pCi/L		E903.1	08/30/2012
Radium-228 (See Attached)	0.637		1	pCi/L		E904.0	09/04/2012
Total Uranium (see attached)	-0.013		1	µg/L		ASTM D5174	09/06/2012

Qualifiers: E = Value above quantitation range
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+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit below calibration range
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Date Reported : 9/12/2012

H 2 M labs
575 Broad Hollow Road , Melville, NY
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

Sample Information...
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1208683-003

Client Sample ID. : N-06915

Federal ID 2902817
Collected :8/14/2012 9:25:00 AM Point No: N-06915
Received :8/14/2012 12:20:00 PM Location: Well 4-1
Collected By PS99

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Method Number	Analyzed
Gross Alpha (See Attached)	3.73		1	pCi/L	15	E900.0	08/29/2012
Gross Beta (See Attached)	2.36		1	pCi/L		E900.0	08/29/2012
Radium-226 (See Attached)	3.10		1	pCi/L		E903.1	08/30/2012
Radium-228 (See Attached)	1.62		1	pCi/L		E904.0	09/04/2012
Total Uranium (see attached)	0.231		1	µg/L		ASTM D5174	09/06/2012

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
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+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit below calibration range
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

H 2 M labs
575 Broad Hollow Road , Melville, NY
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

Sample Information...
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1208683-004

Client Sample ID. : N-06916

Federal ID 2902817
Collected :8/14/2012 9:25:00 AM Point No: N-06916
Received :8/14/2012 12:20:00 PM Location: Well 4-2
Collected By PS99

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Method Number	Analyzed
Gross Alpha (See Attached)	3.09		1	pCi/L	15	E900.0	08/27/2012
Gross Beta (See Attached)	2.35		1	pCi/L		E900.0	08/27/2012
Radium-226 (See Attached)	1.76		1	pCi/L		E903.1	08/30/2012
Radium-228 (See Attached)	1.59		1	pCi/L		E904.0	09/04/2012
Total Uranium (see attached)	0.151		1	µg/L		ASTM D5174	09/06/2012

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit below calibration range
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Date Reported : 9/12/2012

H 2 M labs
575 Broad Hollow Road , Melville, NY
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

Sample Information...
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1209865-001

Client Sample ID. : N-06915

Federal ID : 2902817
Collected :9/18/2012 10:35:00 AM Point No: N-06915
Received :9/18/2012 12:28:00 PM Location: Well 4-1
Collected By PS99

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Method Number	Analyzed
Radium-226 (See Attached)	2.25		1	pCi/L		E903.1	09/28/2012
Radium-228 (See Attached)	2.13		1	pCi/L		E904.0	09/26/2012

Qualifiers: E = Value above quantitation range
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit below calibration range
J = Estimated value - below calibration range
s = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Nicole R. Crespi
QA Manager

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J.C. Broderick & Associates, 2017. *Volatile Vapor Intrusion (VVI) and Groundwater Analytical Report with Radon Testing Bethpage High School 10 Cherry Avenue Bethpage, New York.* May.

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EMSL Analytical Inc. (EMSL) of Cinnaminson, New Jersey provided laboratory analytical services. Copies of EMSL's NYSDOH certifications are available upon request.

The laboratory analytical results for the Radon in Air samples were reviewed and compared to the United States Environmental Protection Agency (EPA) *Radon Measurement in Schools Revised Edition* (EPA 402-R-92-014), dated July 1993.

The following table summarizes the Groundwater Analytical Results:

Table No. 7:
Summary of Radon Samples Analysis Results

Sample ID#	Box Number	Sample Device Number	Radon Activity pCi/L	Blank Device Number	Radon Activity pCi/L
Rm 001	165553	283724	1.9	283758	0.1
Rm 002	165563	283834	3.8	283928	0
Rm 004	165552	283801	1.2	283861	0
Rm 006	165562	283802	2.6	283819	0.04
Rm 007	165565	283772	2.4	283770	0.1
Rm 008	165556	283822	1.9	283759	0
Hall 013	165569	283876	1.1	283757	0.04
Rm 013A/B	165571	283667	1	283723	0.04
Rm 013D	165570	283885	1	283771	0.04
Rm 013E	165548	283803	0.9	283767	0.04
Hall 014	165554	283804	1.1	283848	0.04
HS Hall 0006	165540	283930	2.4	283812	0.04
HS Hall 0010A	165541	283926	1	283867	0.04
HS Rm 013	165543	283876	3.9	283827	0.2
HS Rm 013A	165542	283845	0.5	283749	0.4
HS Rm 013B	165544	283823	0.7	283811	0.4
HS Rm 013C	165545	283915	0.6	283830	0.1
HS Rm 013D	165546	283806	1.7	283727	0.1

Notes:
Rm = Room
HS = High School

The laboratory analysis results from the Radon samples submitted did not reveal any elevated concentrations of Radon exceeding 4.0 pCi/L, the referenced guidance value established by the EPA.

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-0327
http://www.EMSL.com cinnaminsonradonlab@emsl.com

EMSL Order:	381703842
CustomerID:	JCBR50
CustomerPO:	16-35984
ProjectID:	

Attn: **Ed McGuire**
J.C. Broderick & Associates
1775 Expressway Drive North
Hauppauge, NY 11788

Phone:	(631) 584-5492
Fax:	
Received:	04/18/17 6:55 PM
Analysis Date:	4/19/2017
Collected:	4/12/2017

Project: **16-35984 / Bethpage Admin & HS**

Test Site: **Bethpage Admin & HS**
10 Cherry Avenue
Bethpage, NY 11714

Test Report: Radon in Air Test Results

Samples for EMSL Kit 165563

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283928	Rm 002	0	4/12/2017	4/17/2017	72	30	Blank
381703842-0001			3:44:00 PM	8:05:00 AM			
Sample Notes: Radon device exposed >96 hours							
283834	Rm 002	3.8	4/12/2017	4/17/2017	72	30	Customer
381703842-0002			3:44:00 PM	8:05:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165553

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283758	Rm 001	0.1	4/12/2017	4/17/2017	72	40	Blank
381703842-0003			3:45:00 PM	8:06:00 AM			
Sample Notes: Radon device exposed >96 hours							
283724	Rm 001	1.9	4/12/2017	4/17/2017	72	40	Customer
381703842-0004			3:45:00 PM	8:06:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165552

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283861	Rm 004	0	4/12/2017	4/17/2017	72	30	Blank
381703842-0005			3:47:00 PM	8:07:00 AM			
Sample Notes: Radon device exposed >96 hours							
283801	Rm 004	1.2	4/12/2017	4/17/2017	72	30	Customer
381703842-0006			3:47:00 PM	8:07:00 AM			
Sample Notes: Radon device exposed >96 hours							

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Phone:	(631) 584-5492
Fax:	
Received:	04/18/17 6:55 PM
Analysis Date:	4/19/2017
Collected:	4/12/2017

Project: **16-35984 / Bethpage Admin & HS**

Test Site: **Bethpage Admin & HS**
10 Cherry Avenue
Bethpage, NY 11714

Test Report: Radon in Air Test Results

Samples for EMSL Kit 165554

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283848	Hall 014	0.04	4/12/2017	4/17/2017	74	30	Blank
381703842-0007			3:48:00 PM	8:03:00 AM			
Sample Notes: Radon device exposed >96 hours							
283804	Hall 014	1.1	4/12/2017	4/17/2017	74	30	Customer
381703842-0008			3:48:00 PM	8:03:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165562

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283819	Rm 006	0.04	4/12/2017	4/17/2017	72	40	Blank
381703842-0009			3:49:00 PM	8:02:00 AM			
Sample Notes: Radon device exposed >96 hours							
283802	Rm 006	2.6	4/12/2017	4/17/2017	72	40	Customer
381703842-0010			3:49:00 PM	8:02:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165565

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283770	Rm 007	0.1	4/12/2017	4/17/2017	74	20	Blank
381703842-0011			3:50:00 PM	8:01:00 AM			
Sample Notes: Radon device exposed >96 hours							
283772	Rm 007	2.4	4/12/2017	4/17/2017	74	20	Customer
381703842-0012			3:50:00 PM	8:01:00 AM			
Sample Notes: Radon device exposed >96 hours							

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EMSL Order:	381703842
CustomerID:	JCBR50
CustomerPO:	16-35984
ProjectID:	

Attn: **Ed McGuire**
J.C. Broderick & Associates
1775 Expressway Drive North
Hauppauge, NY 11788

Phone:	(631) 584-5492
Fax:	
Received:	04/18/17 6:55 PM
Analysis Date:	4/19/2017
Collected:	4/12/2017

Project: **16-35984 / Bethpage Admin & HS**

Test Site: **Bethpage Admin & HS**
10 Cherry Avenue
Bethpage, NY 11714

Test Report: Radon in Air Test Results

Samples for EMSL Kit 165556

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283759	Rm 008	0	4/12/2017	4/17/2017	74	30	Blank
381703842-0013			3:50:00 PM	8:04:00 AM			
Sample Notes:	Radon device exposed >96 hours						
283822	Rm 008	1.9	4/12/2017	4/17/2017	74	30	Customer
381703842-0014			3:50:00 PM	8:04:00 AM			
Sample Notes:	Radon device exposed >96 hours						

Samples for EMSL Kit 165571

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283723	Rm 013A / B	0.04	4/12/2017	4/17/2017	72	30	Blank
381703842-0015			3:51:00 PM	7:59:00 AM			
Sample Notes:	Radon device exposed >96 hours						
283667	Rm 013A / B	1	4/12/2017	4/17/2017	72	30	Customer
381703842-0016			3:51:00 PM	7:59:00 AM			
Sample Notes:	Radon device exposed >96 hours						

Samples for EMSL Kit 165569

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283757	Hall 013	0.04	4/12/2017	4/17/2017	72	30	Blank
381703842-0017			3:52:00 PM	7:58:00 AM			
Sample Notes:	Radon device exposed >96 hours						
283876	Hall 013	1.1	4/12/2017	4/17/2017	72	30	Customer
381703842-0018			3:52:00 PM	7:58:00 AM			
Sample Notes:	Radon device exposed >96 hours						

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EMSL Order:	381703842
CustomerID:	JCBR50
CustomerPO:	16-35984
ProjectID:	

Attn: **Ed McGuire**
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Hauppauge, NY 11788

Phone:	(631) 584-5492
Fax:	
Received:	04/18/17 6:55 PM
Analysis Date:	4/19/2017
Collected:	4/12/2017

Project: **16-35984 / Bethpage Admin & HS**

Test Site: **Bethpage Admin & HS**
10 Cherry Avenue
Bethpage, NY 11714

Test Report: Radon in Air Test Results

Samples for EMSL Kit 165570

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283771	Rm 013D	0.04	4/12/2017	4/17/2017	70	40	Blank
381703842-0019			3:54:00 PM	7:59:00 AM			
Sample Notes: Radon device exposed >96 hours							
283885	Rm 013D	1	4/12/2017	4/17/2017	70	40	Customer
381703842-0020			3:54:00 PM	7:59:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165548

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283767	Rm 013E	0.04	4/12/2017	4/17/2017	74	30	Blank
381703842-0021			3:55:00 PM	8:00:00 AM			
Sample Notes: Radon device exposed >96 hours							
283803	Rm 013E	0.9	4/12/2017	4/17/2017	74	30	Customer
381703842-0022			3:55:00 PM	8:00:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165543

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283827	HS Rm 013	0.2	4/12/2017	4/17/2017	70	70	Blank
381703842-0023			4:08:00 PM	7:50:00 AM			
Sample Notes: Radon device exposed >96 hours							
283873	HS Rm 013	3.9	4/12/2017	4/17/2017	70	70	Customer
381703842-0024			4:08:00 PM	7:50:00 AM			
Sample Notes: Radon device exposed >96 hours							

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EMSL Order:	381703842
CustomerID:	JCBR50
CustomerPO:	16-35984
ProjectID:	

Attn: **Ed McGuire**
J.C. Broderick & Associates
1775 Expressway Drive North
Hauppauge, NY 11788

Phone:	(631) 584-5492
Fax:	
Received:	04/18/17 6:55 PM
Analysis Date:	4/19/2017
Collected:	4/12/2017

Project: **16-35984 / Bethpage Admin & HS**

Test Site: **Bethpage Admin & HS**
10 Cherry Avenue
Bethpage, NY 11714

Test Report: Radon in Air Test Results

Samples for EMSL Kit 165542

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283749	HS Rm 013A	0.4	4/12/2017	4/17/2017	72	70	Blank
381703842-0025			4:08:00 PM	7:42:00 AM			
Sample Notes: Radon device exposed >96 hours							
283845	HS Rm 013A	0.5	4/12/2017	4/17/2017	72	70	Customer
381703842-0026			4:08:00 PM	7:42:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165544

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283811	HS Rm 013B	0.4	4/12/2017	4/17/2017	70	70	Blank
381703842-0027			4:10:00 PM	7:43:00 AM			
Sample Notes: Radon device exposed >96 hours							
283823	HS Rm 013B	0.7	4/12/2017	4/17/2017	70	70	Customer
381703842-0028			4:10:00 PM	7:43:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165545

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283830	HS Rm 013C	0.1	4/12/2017	4/17/2017	72	60	Blank
381703842-0029			4:12:00 PM	7:52:00 AM			
Sample Notes: Radon device exposed >96 hours							
283915	HS Rm 013C	0.6	4/12/2017	4/17/2017	72	60	Customer
381703842-0030			4:12:00 PM	7:52:00 AM			
Sample Notes: Radon device exposed >96 hours							

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-0327
http://www.EMSL.com cinnaminsonradonlab@emsl.com

EMSL Order:	381703842
CustomerID:	JCBR50
CustomerPO:	16-35984
ProjectID:	

Attn: **Ed McGuire**
J.C. Broderick & Associates
1775 Expressway Drive North
Hauppauge, NY 11788

Phone:	(631) 584-5492
Fax:	
Received:	04/18/17 6:55 PM
Analysis Date:	4/19/2017
Collected:	4/12/2017

Project: **16-35984 / Bethpage Admin & HS**

Test Site: **Bethpage Admin & HS**
10 Cherry Avenue
Bethpage, NY 11714

Test Report: Radon in Air Test Results

Samples for EMSL Kit 165546

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283727	HS Rm 013D	0.1	4/12/2017	4/17/2017	72	60	Blank
381703842-0031			4:14:00 PM	7:53:00 AM			
Sample Notes: Radon device exposed >96 hours							
283806	HS Rm 013D	1.7	4/12/2017	4/17/2017	72	60	Customer
381703842-0032			4:14:00 PM	7:53:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165540

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283812	HS Hall 0006	0.04	4/12/2017	4/17/2017	74	30	Blank
381703842-0033			4:17:00 PM	7:47:00 AM			
Sample Notes: Radon device exposed >96 hours							
283930	HS Hall 0006	2.4	4/12/2017	4/17/2017	74	30	Customer
381703842-0034			4:17:00 PM	7:47:00 AM			
Sample Notes: Radon device exposed >96 hours							

Samples for EMSL Kit 165541

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
283867	HS Hall 0010A	0.04	4/12/2017	4/17/2017	72	30	Blank
381703842-0035			4:19:00 PM	7:41:00 AM			
Sample Notes: Radon device exposed >96 hours							
283926	HS Hall 0010A	1	4/12/2017	4/17/2017	72	30	Customer
381703842-0036			4:19:00 PM	7:41:00 AM			
Sample Notes: Radon device exposed >96 hours							

The radon test was performed using a liquid scintillation radon detector/s and counted on a liquid scintillation counter using approved EPA testing protocols for Radon in Air testing. The EPA recommends fixing your home if the average of two short-term tests taken in the lowest lived-in level of the home show radon levels that are equal to or greater than 4.0pCi/L.
The EPA recommends retesting your home every two years.

Please contact EMSL Analytical, Inc. or your State Health Department for further information.
All procedures used for generating this report are in complete accordance with the current EPA protocols for the analysis of Radon in Air.

Report Note

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-0327
http://www.EMSL.com cinnaminsonradonlab@emsl.com

EMSL Order:	381703842
CustomerID:	JCBR50
CustomerPO:	16-35984
ProjectID:	

Attn: **Ed McGuire**
J.C. Broderick & Associates
1775 Expressway Drive North
Hauppauge, NY 11788

Phone:	(631) 584-5492
Fax:	
Received:	04/18/17 6:55 PM
Analysis Date:	4/19/2017
Collected:	4/12/2017

Project: **16-35984 / Bethpage Admin & HS**

Test Site: **Bethpage Admin & HS**
10 Cherry Avenue
Bethpage, NY 11714

Test Report: Radon in Air Test Results

Analyst(s)

Racquel Hafiz (36)

Laura Freeman, Radon Laboratory Manager &
Peixue Ma, Ph.D, NJ Radon Measurement Specialist NJ MES 13502

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ Accreditations: NRSB ARL6006, NJ DEP 03036, MEB 92525, PA 2573, IN 00455, IA L00032, RI RAS-024, ME 20200C, NE RMB-1083, NY ELAP 10872, NM 885-10L, FL RB2034, OH RL-39, NRPP #106178AL, KS-LB-0005, IL RNL2008202.

Initial report from 04/25/2017 16:12:27

Please visit www.radontestinglab.com

Massapequa Water District (MWD), 2013. H2M Analytical Radium results from 6/27/2013. July

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H 2 M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Groundwater
Origin: Raw Well
Special

MASSAPEQUA W.D.
84 GRAND AVE.
MASSAPEQUA, NY 11758
Attn To : Stan Carey
Federal ID : 2902837
Collected : 06/27/2013 3:00 PM Point No:
Received : 06/28/2013 10:30 AM Location:
Collected By : AC99

Lab No. : 1306G69-001
Client Sample ID. : Monitoring Well 102T2D2

Monitoring Well 102T2D2

Analytical Method: E900.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Alpha (See Attached)	-0.810		1	pCi/L	15	07/12/2013	Container-01 of 03
Analytical Method: E903.1 :							**Analyst: Sub**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-226 (See Attached)	0.181		1	pCi/L		07/18/2013	Container-01 of 03
Analytical Method: E904.0 :							**Analyst: Sub**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-228 (See Attached)	0.653		1	pCi/L		07/17/2013	Container-01 of 03

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

H 2 M labs

575 Broad Hollow Rd. , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478

LABORATORY RESULTS

Results for the samples and analytes requested

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the certified tests requested.

Sample Information:
Type : Groundwater
Origin: Raw Well
Special

MASSAPEQUA W.D.
84 GRAND AVE.
MASSAPEQUA, NY 11758
Attn To : Stan Carey
Federal ID : 2902837
Collected : 06/27/2013 6:21 PM Point No:
Received : 06/28/2013 10:30 AM Location:
Collected By : AC99

Lab No. : 1306G69-002

Client Sample ID. : Monitoring Well TT-102D1

Monitoring Well TT-102D1

Analytical Method: E900.0 :							Analyst: Sub
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Gross Alpha (See Attached)	0.252		1	pCi/L	15	07/12/2013	Container-01 of 03
Analytical Method: E903.1 :							**Analyst: Sub**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-226 (See Attached)	0.520		1	pCi/L		07/18/2013	Container-01 of 03
Analytical Method: E904.0 :							**Analyst: Sub**
Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Radium-228 (See Attached)	1.56		1	pCi/L		07/12/2013	Container-01 of 03

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
H = Received/analyzed outside of analytical holding time
+ = ELAP / NELAC does not offer certification for this analyte
c = Calibration acceptability criteria exceeded for this analyte
r = Reporting limit > MDL and < LOQ, Value estimated.
J = Estimated value - below calibration range
S = Recovery exceeded control limits for this analyte
N = Indicates presumptive evidence of compound
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.

Joann M. Slavin
Laboratory Manager

Test results meet the requirements of NELAC unless otherwise noted.

Northrop Grumman Corporation (NGC), 2013. Email Regarding Preliminary Split Sampling Lab Results for Radiological Parameters in Groundwater Monitoring Well Samples Collected 4 and 5 June 2013, Bethpage, NY, Admin Record N90845.AR.002014. June.

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Steven Scharf - Preliminary Ground Water Results Split with BWD

From: "Hannon, ED (AS)" <Edward.Hannon@ngc.com>
To: "Steven Scharf <sxscharf@gw.dec.state.ny.us>(sxscharf@gw.dec.state.ny.us...
Date: 6/20/2013 4:32 PM
Subject: Preliminary Ground Water Results Split with BWD
CC: "Hannon, ED (AS)" <Edward.Hannon@ngc.com>, "Weber, Fred (AS)" <fred.webe...

Gentlemen

Below please find ***preliminary*** lab results for groundwater monitoring well samples collected by Northrop Grumman and split with the Bethpage Water District on June 4 and 5, 2013. The final quality control report is expected to be available late next week. We will submit the report, when it becomes available. Also, quality control is being performed on samples that were analyzed for a broader range of constituents (including Nassau County Department of Health Water Quality Monitoring parameters, 1,4 – dioxane, chromium's). We expect to have those results ready for submission next week, as well.

Let me know if you have any questions or require any additional information.

Thank You
Ed Hannon

"Preliminary Split Sampling Lab Results"

Well ID	Parameter	Method	Act ± Unc (MDC)[1]	Units[2]
MW-116-5	Gross Alpha	EPA 900.0m	3.12 ± 1.56 (2.10)	pCi/L
	Gross Beta	EPA 900.0m	2.54 ± 1.33 (2.24)	pCi/L
	Radium-226	EPA 903.1	1.06 ± 0.709 (0.879)	pCi/L
	Radium-228	EPA 904.0	0.421 ± 0.394 (0.805)	pCi/L
	Total Uranium	ASTM D5174.97	0.0447 ± 0.0011 (0.197)	ug/L
GM-37D2	Gross Alpha	EPA 900.0m	3.04 ± 1.48 (1.58)	pCi/L
	Gross Beta	EPA 900.0m	2.37 ± 1.30 (2.22)	pCi/L
	Radium-226	EPA 903.1	1.00 ± 0.634 (0.716)	pCi/L
	Radium-228	EPA 904.0	0.963 ± 0.412 (0.662)	pCi/L
	Total Uranium	ASTM D5174.97	0.0452 ± 0.0009 (0.197)	ug/L
GM-71D2	Gross Alpha	EPA 900.0m	5.43 ± 2.15 (1.89)	pCi/L
	Gross Beta	EPA 900.0m	2.89 ± 1.44 (2.34)	pCi/L
	Radium-226	EPA 903.1	2.28 ± 1.01 (0.729)	pCi/L
	Radium-228	EPA 904.0	1.14 ± 0.511 (0.897)	pCi/L
	Total Uranium	ASTM D5174.97	0.134 ± 0.0023 (0.197)	ug/L

Note 1:
Act = Activity
Unc = Uncertainty
(MDC) = Minimum Detectable Concentration

Note 2:
pCi/L = picocuries/Liter
ug/L = micrograms/Liter

Resolution, 2016c. *Lab Results for April 14 through 20, 2016 Sample Event, Project #60266589 Phase FI.WS. SDG: 395851 and 395751. May*. NOT YET PUBLISHED

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GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074 Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT305D-GW-041816
Sample ID: 395751001
Matrix: Ground Water
Collect Date: 18-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0874	+/-0.173	0.293	+/-0.174	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	0.143	+/-0.196	0.298	+/-0.199	0.500	pCi/L						
Thorium-232	U	0.100	+/-0.147	0.183	+/-0.149	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.566	+/-0.313	0.242	+/-0.323	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.135	+/-0.195	0.235	+/-0.196	0.500	pCi/L						
Uranium-238		0.228	+/-0.207	0.190	+/-0.210	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.26	+/-0.449	0.554	+/-0.493	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		1.32	+/-0.315	0.264	+/-0.367	1.00	pCi/L		LXP1	04/29/16	1000	1561456	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	91.3	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	92.4	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	96.5	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	81.7	(30%-110%)

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT305D-GW-041816
Sample ID: 395751001
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT312S-GW-041816
Sample ID: 395751002
Matrix: Ground Water
Collect Date: 18-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0182	+/-0.124	0.303	+/-0.125	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	-0.0128	+/-0.113	0.273	+/-0.114	0.500	pCi/L						
Thorium-232	U	-0.00198	+/-0.0809	0.150	+/-0.0813	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.215	+/-0.182	0.201	+/-0.184	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.104	+/-0.150	0.181	+/-0.151	0.500	pCi/L						
Uranium-238		0.244	+/-0.180	0.0915	+/-0.183	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.281	+/-0.420	0.721	+/-0.422	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226	U	0.068	+/-0.149	0.275	+/-0.149	1.00	pCi/L		LXP1	04/29/16	1000	1561456	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	71.3	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	91.3	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	98.8	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	93.5	(30%-110%)

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2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT312S-GW-041816
Sample ID: 395751002
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT312I-GW-041816
Sample ID: 395751003
Matrix: Ground Water
Collect Date: 18-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0244	+/-0.109	0.276	+/-0.109	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	0.0631	+/-0.174	0.323	+/-0.176	0.500	pCi/L						
Thorium-232	U	-0.000588	+/-0.103	0.233	+/-0.104	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.321	+/-0.226	0.230	+/-0.230	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.152	+/-0.180	0.194	+/-0.181	0.500	pCi/L						
Uranium-238	U	0.190	+/-0.186	0.230	+/-0.187	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.400	+/-0.381	0.628	+/-0.387	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.478	+/-0.217	0.266	+/-0.234	1.00	pCi/L		LXP1	04/29/16	1000	1561456	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	82.6	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	87.4	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	97.4	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	94.2	(30%-110%)

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT312I-GW-041816
Sample ID: 395751003
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT307D-GW-041516
Sample ID: 395751004
Matrix: Ground Water
Collect Date: 15-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.101	+/-0.146	0.177	+/-0.147	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	0.146	+/-0.189	0.279	+/-0.193	0.500	pCi/L						
Thorium-232	U	0.0972	+/-0.143	0.178	+/-0.144	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.359	+/-0.216	0.179	+/-0.221	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.0911	+/-0.145	0.200	+/-0.145	0.500	pCi/L						
Uranium-238	U	0.0596	+/-0.119	0.193	+/-0.119	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.261	+/-0.260	0.422	+/-0.263	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226	U	0.194	+/-0.180	0.285	+/-0.183	1.00	pCi/L		LXP1	04/29/16	1000	1561456	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	81.7	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	93.8	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	99.4	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	86.3	(30%-110%)

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT307D-GW-041516
Sample ID: 395751004
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

GEL LABORATORIES LLC

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT306D-GW-041816
Sample ID: 395751005
Matrix: Ground Water
Collect Date: 18-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0376	+/-0.106	0.123	+/-0.107	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	-0.0248	+/-0.106	0.273	+/-0.106	0.500	pCi/L						
Thorium-232	U	-0.0287	+/-0.0807	0.230	+/-0.0811	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.352	+/-0.233	0.229	+/-0.238	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.0516	+/-0.142	0.246	+/-0.142	0.500	pCi/L						
Uranium-238	U	0.156	+/-0.173	0.229	+/-0.174	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.43	+/-0.585	0.840	+/-0.630	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.810	+/-0.297	0.327	+/-0.324	1.00	pCi/L		LXP1	04/29/16	1000	1561456	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	74.4	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	95.7	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	95.6	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	85.1	(30%-110%)

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT306D-GW-041816
Sample ID: 395751005
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: EB01-041516
Sample ID: 395751006
Matrix: Ground Water
Collect Date: 15-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0113	+/-0.120	0.252	+/-0.121	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	0.0195	+/-0.165	0.343	+/-0.166	0.500	pCi/L						
Thorium-232	U	-0.00198	+/-0.0811	0.150	+/-0.0815	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.0211	+/-0.156	0.320	+/-0.156	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.143	+/-0.181	0.225	+/-0.182	0.500	pCi/L						
Uranium-238	U	0.0921	+/-0.149	0.231	+/-0.150	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	-0.119	+/-0.269	0.555	+/-0.269	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226	U	-0.0341	+/-0.0819	0.210	+/-0.0819	1.00	pCi/L		LXP1	04/29/16	1000	1561456	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	67.5	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	90.9	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	105	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	81	(30%-110%)

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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: EB01-041516
Sample ID: 395751006
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
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Company : Katahdin Analytical Services
Address : 600 Technology Way
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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT306S-GW-041816
Sample ID: 395751007
Matrix: Ground Water
Collect Date: 18-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.00115	+/-0.100	0.223	+/-0.100	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	0.064	+/-0.148	0.262	+/-0.150	0.500	pCi/L						
Thorium-232	U	-0.00994	+/-0.0687	0.165	+/-0.0689	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.109	+/-0.149	0.203	+/-0.150	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.186	+/-0.200	0.228	+/-0.202	0.500	pCi/L						
Uranium-238	U	0.101	+/-0.150	0.219	+/-0.151	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.18	+/-0.432	0.546	+/-0.473	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.605	+/-0.224	0.236	+/-0.241	1.00	pCi/L		LXP1	04/29/16	1115	1561456	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	80.1	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	96.7	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	93.3	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	91.2	(30%-110%)

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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT306S-GW-041816
Sample ID: 395751007
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
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Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT306I-GW-041816
Sample ID: 395751008
Matrix: Ground Water
Collect Date: 18-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.115	+/-0.160	0.239	+/-0.162	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	0.0741	+/-0.140	0.231	+/-0.142	0.500	pCi/L						
Thorium-232	U	0.0221	+/-0.0904	0.158	+/-0.0906	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.308	+/-0.255	0.219	+/-0.259	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.268	+/-0.273	0.270	+/-0.276	0.500	pCi/L						
Uranium-238	U	0.217	+/-0.221	0.219	+/-0.223	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		0.999	+/-0.433	0.597	+/-0.462	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.306	+/-0.170	0.209	+/-0.181	1.00	pCi/L		LXP1	04/29/16	1040	1561456	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	82.3	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	59	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	87.8	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	95.7	(30%-110%)

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Address : 600 Technology Way
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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT306I-GW-041816
Sample ID: 395751008
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Scarborough, Maine 04074

Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT304I1-GW-041516
Sample ID: 395751009
Matrix: Ground Water
Collect Date: 15-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.143	+/-0.174	0.234	+/-0.176	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	0.104	+/-0.169	0.271	+/-0.172	0.500	pCi/L						
Thorium-232	U	0.000793	+/-0.128	0.282	+/-0.128	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.323	+/-0.227	0.231	+/-0.231	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236		0.276	+/-0.228	0.196	+/-0.231	0.500	pCi/L						
Uranium-238	U	0.141	+/-0.161	0.202	+/-0.163	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	-0.0326	+/-0.411	0.753	+/-0.411	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.420	+/-0.181	0.168	+/-0.193	1.00	pCi/L		LXP1	04/29/16	1040	1561456	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	81.8	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	86.1	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	106	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	92.7	(30%-110%)

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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT304I1-GW-041516
Sample ID: 395751009
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT307I-GW-041416
Sample ID: 395751010
Matrix: Ground Water
Collect Date: 14-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0417	+/-0.067	0.214	+/-0.0672	0.500	pCi/L		KXB2	05/05/16	2214	1562055	1
Thorium-230	U	0.025	+/-0.112	0.222	+/-0.113	0.500	pCi/L						
Thorium-232	U	0.0195	+/-0.0804	0.141	+/-0.0805	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.311	+/-0.207	0.185	+/-0.211	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.160	+/-0.183	0.228	+/-0.184	0.500	pCi/L						
Uranium-238	U	-0.00725	+/-0.0626	0.145	+/-0.0627	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.463	+/-0.441	0.728	+/-0.448	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.440	+/-0.140	0.128	+/-0.154	1.00	pCi/L		LXP1	05/03/16	1125	1561457	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	106	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	93.6	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	103	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	82.5	(30%-110%)

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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT307I-GW-041416
Sample ID: 395751010
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Address : 600 Technology Way

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Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT307S-GW-041416
Sample ID: 395751011
Matrix: Ground Water
Collect Date: 14-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.128	+/-0.169	0.138	+/-0.171	0.500	pCi/L		KXB2	05/05/16	2213	1562055	1
Thorium-230	U	0.0224	+/-0.171	0.355	+/-0.172	0.500	pCi/L						
Thorium-232	U	-0.00198	+/-0.0843	0.155	+/-0.0847	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.259	+/-0.213	0.259	+/-0.216	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.179	+/-0.193	0.220	+/-0.195	0.500	pCi/L						
Uranium-238	U	0.0411	+/-0.113	0.196	+/-0.113	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.182	+/-0.237	0.404	+/-0.239	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.790	+/-0.183	0.123	+/-0.218	1.00	pCi/L		LXP1	05/03/16	1125	1561457	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	86.2	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	87	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	104	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	92.7	(30%-110%)

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT307S-GW-041416
Sample ID: 395751011
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: MW10-GW-041416
Sample ID: 395751012
Matrix: Ground Water
Collect Date: 14-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0236	+/-0.104	0.271	+/-0.104	0.500	pCi/L		KXB2	05/05/16	2213	1562055	1
Thorium-230	U	-0.0167	+/-0.137	0.331	+/-0.137	0.500	pCi/L						
Thorium-232	U	-0.0134	+/-0.0989	0.235	+/-0.0994	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.156	+/-0.179	0.223	+/-0.180	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236	U	0.0578	+/-0.159	0.276	+/-0.159	0.500	pCi/L						
Uranium-238	U	0.0278	+/-0.104	0.175	+/-0.104	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		0.617	+/-0.340	0.489	+/-0.354	1.00	pCi/L		AXM6	05/10/16	1317	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.442	+/-0.147	0.138	+/-0.162	1.00	pCi/L		LXP1	05/03/16	1125	1561457	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	74.5	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	86.8	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	97.4	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	90.4	(30%-110%)

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Company : Katahdin Analytical Services
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Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: MW10-GW-041416 Project: KATA00116
Sample ID: 395751012 Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:

The MDC is a sample specific MDC.
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Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: FD01-GW-041516
Sample ID: 395751013
Matrix: Ground Water
Collect Date: 15-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.130	+/-0.188	0.227	+/-0.190	0.500	pCi/L		KXB2	05/05/16	2213	1562055	1
Thorium-230	U	0.00622	+/-0.163	0.357	+/-0.164	0.500	pCi/L						
Thorium-232	U	0.011	+/-0.135	0.286	+/-0.136	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.162	+/-0.162	0.188	+/-0.164	0.500	pCi/L		KXB2	05/05/16	0917	1562056	2
Uranium-235/236		0.219	+/-0.199	0.182	+/-0.201	0.500	pCi/L						
Uranium-238	U	0.117	+/-0.152	0.216	+/-0.153	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		0.609	+/-0.374	0.564	+/-0.387	1.00	pCi/L		AXM6	05/10/16	1318	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.383	+/-0.135	0.138	+/-0.152	1.00	pCi/L		LXP1	05/03/16	1125	1561457	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	81.3	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	96.3	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	96.5	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	90.8	(30%-110%)

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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: FD01-GW-041516
Sample ID: 395751013
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
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Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT304D-GW-041516
Sample ID: 395751014
Matrix: Ground Water
Collect Date: 15-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.011	+/-0.0933	0.217	+/-0.0937	0.500	pCi/L		KXB2	05/05/16	2213	1562055	1
Thorium-230	U	-0.00888	+/-0.124	0.292	+/-0.125	0.500	pCi/L						
Thorium-232	U	-0.00198	+/-0.0889	0.163	+/-0.0894	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.219	+/-0.250	0.312	+/-0.252	0.500	pCi/L		KXB2	05/05/16	0946	1562056	2
Uranium-235/236	U	-0.0152	+/-0.131	0.303	+/-0.131	0.500	pCi/L						
Uranium-238	U	0.257	+/-0.270	0.337	+/-0.273	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		0.655	+/-0.401	0.608	+/-0.415	1.00	pCi/L		AXM6	05/10/16	1318	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.492	+/-0.154	0.145	+/-0.168	1.00	pCi/L		LXP1	05/03/16	1125	1561457	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	80.9	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	71.6	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	92.2	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	93.1	(30%-110%)

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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT304D-GW-041516
Sample ID: 395751014
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
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Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT304S-GW-041516
Sample ID: 395751015
Matrix: Ground Water
Collect Date: 15-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0668	+/-0.185	0.320	+/-0.185	0.500	pCi/L		KXB2	05/05/16	2213	1562055	1
Thorium-230	U	0.0127	+/-0.181	0.389	+/-0.182	0.500	pCi/L						
Thorium-232	U	0.0493	+/-0.144	0.187	+/-0.145	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.139	+/-0.177	0.219	+/-0.178	0.500	pCi/L		KXB2	05/05/16	0946	1562056	2
Uranium-235/236	U	0.135	+/-0.195	0.235	+/-0.196	0.500	pCi/L						
Uranium-238	U	0.139	+/-0.177	0.219	+/-0.178	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.572	+/-0.377	0.581	+/-0.388	1.00	pCi/L		AXM6	05/10/16	1318	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.530	+/-0.145	0.0923	+/-0.164	1.00	pCi/L		LXP1	05/03/16	1155	1561457	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	68.4	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	89.9	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	98.1	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	91.6	(30%-110%)

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Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT304S-GW-041516
Sample ID: 395751015
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
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Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: MW07-GW-041416
Sample ID: 395751016
Matrix: Ground Water
Collect Date: 14-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.146	+/-0.162	0.191	+/-0.164	0.500	pCi/L		KXB2	05/07/16	1345	1562055	1
Thorium-230	U	0.0419	+/-0.149	0.282	+/-0.150	0.500	pCi/L						
Thorium-232	U	-0.018	+/-0.0763	0.190	+/-0.0765	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.258	+/-0.205	0.110	+/-0.208	0.500	pCi/L		KXB2	05/05/16	0946	1562056	2
Uranium-235/236	U	0.0346	+/-0.130	0.218	+/-0.130	0.500	pCi/L						
Uranium-238		0.249	+/-0.206	0.177	+/-0.208	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.30	+/-0.384	0.422	+/-0.437	1.00	pCi/L		AXM6	05/10/16	1318	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.290	+/-0.119	0.123	+/-0.133	1.00	pCi/L		LXP1	05/03/16	1155	1561457	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	53.5	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	108	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	101	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	94.2	(30%-110%)

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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: MW07-GW-041416
Sample ID: 395751016
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
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Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: MW06-GW-041416
Sample ID: 395751017
Matrix: Ground Water
Collect Date: 14-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0119	+/-0.101	0.235	+/-0.102	0.500	pCi/L		KXB2	05/05/16	2213	1562055	1
Thorium-230	U	-0.0761	+/-0.102	0.349	+/-0.102	0.500	pCi/L						
Thorium-232	U	0.0343	+/-0.136	0.235	+/-0.137	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.245	+/-0.210	0.208	+/-0.213	0.500	pCi/L		KXB2	05/05/16	0946	1562056	2
Uranium-235/236		0.186	+/-0.205	0.139	+/-0.206	0.500	pCi/L						
Uranium-238		0.320	+/-0.235	0.208	+/-0.239	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.155	+/-0.263	0.464	+/-0.264	1.00	pCi/L		AXM6	05/10/16	1318	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		1.01	+/-0.202	0.079	+/-0.257	1.00	pCi/L		LXP1	05/03/16	1155	1561457	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	72.2	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	97.7	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	104	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	87.4	(30%-110%)

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Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: MW06-GW-041416
Sample ID: 395751017
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 10, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT304I2-GW-041516
Sample ID: 395751018
Matrix: Ground Water
Collect Date: 15-APR-16
Receive Date: 20-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.126	+/-0.166	0.136	+/-0.168	0.500	pCi/L		KXB2	05/05/16	2213	1562055	1
Thorium-230	U	0.0511	+/-0.166	0.311	+/-0.167	0.500	pCi/L						
Thorium-232	U	0.0195	+/-0.119	0.232	+/-0.119	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.334	+/-0.233	0.251	+/-0.237	0.500	pCi/L		KXB2	05/07/16	1352	1562056	2
Uranium-235/236		0.160	+/-0.176	0.120	+/-0.177	0.500	pCi/L						
Uranium-238	U	0.178	+/-0.170	0.179	+/-0.171	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.19	+/-0.430	0.553	+/-0.471	1.00	pCi/L		AXM6	05/10/16	1318	1562314	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.180	+/-0.119	0.171	+/-0.125	1.00	pCi/L		LXP1	05/03/16	1155	1561457	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	87.5	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	89.5	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	100	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562314	90.4	(30%-110%)

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 10, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT304I2-GW-041516
Sample ID: 395751018
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

QC Summary

Client : **Katahdin Analytical Services**
600 Technology Way
Scarborough, Maine
Contact: **Ms. Jennifer Obrin**
Workorder: **395751**

Report Date: May 10, 2016

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1562055										
QC1203534366 395751018 DUP										
Thorium-228	U	0.126	U	-0.000204	pCi/L	0		N/A	KXB2	05/05/1622:13
	Uncert:	+/-0.166		+/-0.103						
	TPU:	+/-0.168		+/-0.104						
Thorium-230	U	0.0511	U	0.0112	pCi/L	0		N/A		
	Uncert:	+/-0.166		+/-0.177						
	TPU:	+/-0.167		+/-0.178						
Thorium-232	U	0.0195	U	-0.00198	pCi/L	0		N/A		
	Uncert:	+/-0.119		+/-0.101						
	TPU:	+/-0.119		+/-0.102						
QC1203534367 LCS										
Thorium-228			U	0.0407	pCi/L				KXB2	05/05/1622:13
	Uncert:			+/-0.115						
	TPU:			+/-0.115						
Thorium-230	10.5			9.57	pCi/L		91.4	(75%-125%)		
	Uncert:			+/-1.23						
	TPU:			+/-2.26						
Thorium-232			U	-0.00198	pCi/L			(75%-125%)		
	Uncert:			+/-0.0821						
	TPU:			+/-0.0825						
QC1203534365 MB										
Thorium-228			U	-0.0252	pCi/L				KXB2	05/05/1622:13
	Uncert:			+/-0.110						
	TPU:			+/-0.111						
Thorium-230			U	0.0155	pCi/L					
	Uncert:			+/-0.215						
	TPU:			+/-0.216						
Thorium-232			U	0.0374	pCi/L					
	Uncert:			+/-0.148						
	TPU:			+/-0.148						
Batch 1562056										
QC1203534372 395751018 DUP										
Uranium-233/234		0.334	U	0.0777	pCi/L	44.7		(0% - 100%)	KXB2	05/05/1609:46
	Uncert:	+/-0.233		+/-0.153						
	TPU:	+/-0.237		+/-0.153						
Uranium-235/236		0.160		0.218	pCi/L	30.9		(0% - 100%)		
	Uncert:	+/-0.176		+/-0.241						
	TPU:	+/-0.177		+/-0.243						
Uranium-238	U	0.178	U	0.223	pCi/L	0		N/A		
	Uncert:	+/-0.170		+/-0.234						
	TPU:	+/-0.171		+/-0.236						
QC1203534373 LCS										

QC Summary

Workorder: 395751

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1562056										
Uranium-233/234				13.8	pCi/L				KXB2	05/05/1609:46
	Uncert:			+/-1.48						
	TPU:			+/-2.46						
Uranium-235/236				0.910	pCi/L					
	Uncert:			+/-0.432						
	TPU:			+/-0.452						
Uranium-238	13.5			13.9	pCi/L		103	(75%-125%)		
	Uncert:			+/-1.48						
	TPU:			+/-2.48						
QC1203534371 MB										
Uranium-233/234			U	0.185	pCi/L				KXB2	05/05/1609:17
	Uncert:			+/-0.173						
	TPU:			+/-0.175						
Uranium-235/236				0.257	pCi/L					
	Uncert:			+/-0.212						
	TPU:			+/-0.215						
Uranium-238				0.200	pCi/L					
	Uncert:			+/-0.172						
	TPU:			+/-0.174						
Rad Gas Flow										
Batch 1562314										
QC1203535059 LCS										
Radium-228	13.9			13.0	pCi/L		93.9	(80%-120%)	AXM6	05/10/1613:18
	Uncert:			+/-1.07						
	TPU:			+/-2.44						
QC1203535056 MB										
Radium-228			U	-0.377	pCi/L				AXM6	05/10/1613:18
	Uncert:			+/-0.297						
	TPU:			+/-0.297						
QC1203535057 395751018 MS										
Radium-228	140	1.19		114	pCi/L		81.1	(70%-130%)	AXM6	05/10/1613:18
	Uncert:	+/-0.430		+/-10.6						
	TPU:	+/-0.471		+/-21.6						
QC1203535058 395751018 MSD										
Radium-228	140	1.19		134	pCi/L	15.8	95.2	(0%-20%)	AXM6	05/10/1613:18
	Uncert:	+/-0.430		+/-11.4						
	TPU:	+/-0.471		+/-24.4						
Rad Ra-226										
Batch 1561456										
QC1203532738 LCS										
Radium-226	12.2			12.8	pCi/L		105	(90%-110%)	LXP1	04/29/1613:10
	Uncert:			+/-0.926						
	TPU:			+/-2.48						
QC1203532735 MB										
Radium-226			U	0.0163	pCi/L				LXP1	04/29/1610:40

QC Summary

Workorder: **395751**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Ra-226										
Batch 1561456										
	Uncert:			+/-0.132						
	TPU:			+/-0.132						
QC1203532736 395997001 MS										
Radium-226	12.2 U	0.135		12.0	pCi/L		98.7	(80%-120%)	LXP1	04/29/1610:40
	Uncert:	+/-0.115		+/-0.906						
	TPU:	+/-0.117		+/-1.89						
QC1203532737 395997001 MSD										
Radium-226	12.2 U	0.135		10.9	pCi/L	9.87	89.4	(0%-20%)	LXP1	04/29/1613:10
	Uncert:	+/-0.115		+/-0.827						
	TPU:	+/-0.117		+/-1.85						
Batch 1561457										
QC1203532742 LCS										
Radium-226	12.2			12.5	pCi/L		102	(90%-110%)	LXP1	05/03/1612:30
	Uncert:			+/-0.711						
	TPU:			+/-1.88						
QC1203532739 MB										
Radium-226			U	-0.0458	pCi/L				LXP1	05/03/1611:55
	Uncert:			+/-0.0777						
	TPU:			+/-0.0777						
QC1203532740 395751018 MS										
Radium-226	24.4	0.180		27.4	pCi/L		112	(80%-120%)	LXP1	05/03/1612:30
	Uncert:	+/-0.119		+/-1.44						
	TPU:	+/-0.125		+/-4.37						
QC1203532741 395751018 MSD										
Radium-226	24.4	0.180		27.8	pCi/L	1.25	113	(0%-20%)	LXP1	05/03/1612:30
	Uncert:	+/-0.119		+/-1.46						
	TPU:	+/-0.125		+/-5.21						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative

QC Summary

Workorder: **395751**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074 Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: HN24S-GW-042016 Project: KATA00116
Sample ID: 395851001 Client ID: KATA003
Matrix: Ground Water
Collect Date: 20-APR-16
Receive Date: 21-APR-16
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0201	+/-0.0879	0.230	+/-0.0883	0.500	pCi/L		KXB2	05/05/16	2213	1562055	1
Thorium-230	U	0.0498	+/-0.164	0.308	+/-0.165	0.500	pCi/L						
Thorium-232	U	-0.00198	+/-0.0821	0.152	+/-0.0825	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.593	+/-0.357	0.295	+/-0.369	0.500	pCi/L		KXB2	05/05/16	0946	1562056	2
Uranium-235/236		0.418	+/-0.332	0.179	+/-0.338	0.500	pCi/L						
Uranium-238		0.145	+/-0.191	0.145	+/-0.192	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		0.941	+/-0.367	0.469	+/-0.397	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.890	+/-0.164	0.0827	+/-0.212	1.00	pCi/L		LXP1	05/08/16	0915	1561849	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	87.9	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	75.9	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	98.3	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	87.4	(30%-110%)

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: HN24S-GW-042016
Sample ID: 395851001

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: FD03-GW-042016
Sample ID: 395851002
Matrix: Ground Water
Collect Date: 20-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0638	+/-0.147	0.234	+/-0.147	0.500	pCi/L		KXB2	05/05/16	2213	1562055	1
Thorium-230	U	-0.0315	+/-0.120	0.312	+/-0.120	0.500	pCi/L						
Thorium-232	U	0.0295	+/-0.118	0.204	+/-0.118	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.00211	+/-0.156	0.347	+/-0.156	0.500	pCi/L		KXB2	05/05/16	0946	1562056	2
Uranium-235/236	U	0.115	+/-0.225	0.312	+/-0.226	0.500	pCi/L						
Uranium-238	U	0.145	+/-0.210	0.253	+/-0.211	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.39	+/-0.884	1.38	+/-0.912	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.656	+/-0.146	0.0874	+/-0.179	1.00	pCi/L		LXP1	05/08/16	0915	1561849	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562055	86.1	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562056	71.5	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	47.5	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	93.5	(30%-110%)

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: FD03-GW-042016
Sample ID: 395851002
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: RW1-GW-042016
Sample ID: 395851003
Matrix: Ground Water
Collect Date: 20-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		2.19	+/-0.859	1.18	+/-0.929	1.00	pCi/L		AXM6	05/10/16	1739	1562339	1
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.815	+/-0.154	0.0703	+/-0.213	1.00	pCi/L		LXP1	05/08/16	0915	1561849	2

The following Analytical Methods were performed

Method	Description
1	EPA 904.0/ EPA 9320
2	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	46.3	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	96.9	(30%-110%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT305S-GW-041916
Sample ID: 395851004
Matrix: Ground Water
Collect Date: 19-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0878	+/-0.142	0.221	+/-0.143	0.500	pCi/L		MXS2	05/09/16	1001	1562057	1
Thorium-230		0.366	+/-0.245	0.283	+/-0.256	0.500	pCi/L						
Thorium-232	U	0.0214	+/-0.0878	0.153	+/-0.0879	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234		0.533	+/-0.337	0.289	+/-0.346	0.500	pCi/L		MXS2	05/04/16	0846	1562058	2
Uranium-235/236	U	0.117	+/-0.200	0.175	+/-0.201	0.500	pCi/L						
Uranium-238		0.614	+/-0.347	0.142	+/-0.359	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.57	+/-0.373	0.334	+/-0.452	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		4.61	+/-0.372	0.0948	+/-0.741	1.00	pCi/L		LXP1	05/08/16	0915	1561849	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	88.2	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	77.7	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	99.2	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	101	(30%-110%)

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074 Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT305S-GW-041916 Project: KATA00116
Sample ID: 395851004 Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT305I-GW-041916
Sample ID: 395851005
Matrix: Ground Water
Collect Date: 19-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0196	+/-0.0876	0.221	+/-0.0877	0.500	pCi/L		MXS2	05/09/16	1001	1562057	1
Thorium-230	U	0.0957	+/-0.160	0.268	+/-0.162	0.500	pCi/L						
Thorium-232	U	0.0192	+/-0.0795	0.139	+/-0.0797	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.0969	+/-0.208	0.367	+/-0.209	0.500	pCi/L		MXS2	05/09/16	1356	1562058	2
Uranium-235/236	U	0.128	+/-0.203	0.281	+/-0.204	0.500	pCi/L						
Uranium-238	U	0.166	+/-0.202	0.270	+/-0.203	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.14	+/-0.447	0.635	+/-0.484	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		1.80	+/-0.233	0.120	+/-0.346	1.00	pCi/L		LXP1	05/08/16	0950	1561849	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	118 *	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	89	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	98.6	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	101	(30%-110%)

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT305I-GW-041916
Sample ID: 395851005

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074 Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT311S-GW-041916 Project: KATA00116
Sample ID: 395851006 Client ID: KATA003
Matrix: Ground Water
Collect Date: 19-APR-16
Receive Date: 21-APR-16
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.104	+/-0.154	0.225	+/-0.155	0.500	pCi/L		MXS2	05/09/16	1001	1562057	1
Thorium-230	U	-0.0424	+/-0.122	0.312	+/-0.122	0.500	pCi/L						
Thorium-232	U	0.0154	+/-0.0966	0.189	+/-0.0968	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.068	+/-0.163	0.260	+/-0.163	0.500	pCi/L		MXS2	05/09/16	1354	1562058	2
Uranium-235/236	U	-0.042	+/-0.143	0.322	+/-0.143	0.500	pCi/L						
Uranium-238	U	0.00	+/-0.188	0.376	+/-0.189	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.47	+/-0.433	0.497	+/-0.497	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		2.12	+/-0.261	0.128	+/-0.419	1.00	pCi/L		LXP1	05/08/16	0950	1561849	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	91.2	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	27 *	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	96.5	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	90.8	(30%-110%)

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Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT311S-GW-041916
Sample ID: 395851006
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin

Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT311I-GW-041916
Sample ID: 395851007
Matrix: Ground Water
Collect Date: 19-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0823	+/-0.146	0.221	+/-0.147	0.500	pCi/L		MXS2	05/09/16	1002	1562057	1
Thorium-230	U	-0.00763	+/-0.125	0.287	+/-0.125	0.500	pCi/L						
Thorium-232	U	-0.019	+/-0.0752	0.200	+/-0.0755	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.227	+/-0.231	0.228	+/-0.233	0.500	pCi/L		MXS2	05/04/16	0846	1562058	2
Uranium-235/236	U	0.00	+/-0.119	0.176	+/-0.119	0.500	pCi/L						
Uranium-238	U	0.192	+/-0.234	0.314	+/-0.236	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.93	+/-0.430	0.426	+/-0.531	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		2.05	+/-0.265	0.122	+/-0.459	1.00	pCi/L		LXP1	05/08/16	0950	1561849	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	81.3	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	75.9	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	101	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	99.9	(30%-110%)

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Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT311I-GW-041916
Sample ID: 395851007
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074 Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: FD02-GW-041916 Project: KATA00116
Sample ID: 395851008 Client ID: KATA003
Matrix: Ground Water
Collect Date: 19-APR-16
Receive Date: 21-APR-16
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228		0.279	+/-0.228	0.234	+/-0.234	0.500	pCi/L		MXS2	05/10/16	0929	1565953	1
Thorium-230	U	0.172	+/-0.196	0.260	+/-0.200	0.500	pCi/L						
Thorium-232	U	0.139	+/-0.166	0.185	+/-0.168	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.143	+/-0.195	0.266	+/-0.196	0.500	pCi/L		MXS2	05/09/16	1356	1562058	2
Uranium-235/236	U	0.0819	+/-0.188	0.298	+/-0.188	0.500	pCi/L						
Uranium-238	U	0.143	+/-0.195	0.266	+/-0.196	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.72	+/-0.420	0.461	+/-0.503	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.831	+/-0.155	0.0866	+/-0.199	1.00	pCi/L		LXP1	05/11/16	0905	1561850	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1565953	76	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	93.2	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	101	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	99.5	(30%-110%)

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Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: FD02-GW-041916
Sample ID: 395851008
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT310S-GW-042016
Sample ID: 395851009
Matrix: Ground Water
Collect Date: 20-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0386	+/-0.122	0.228	+/-0.122	0.500	pCi/L		MXS2	05/09/16	1002	1562057	1
Thorium-230	U	0.128	+/-0.162	0.244	+/-0.166	0.500	pCi/L						
Thorium-232		0.193	+/-0.161	0.144	+/-0.164	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.0979	+/-0.173	0.262	+/-0.174	0.500	pCi/L		MXS2	05/04/16	0846	1562058	2
Uranium-235/236	U	0.106	+/-0.182	0.159	+/-0.183	0.500	pCi/L						
Uranium-238	U	0.0979	+/-0.173	0.262	+/-0.174	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		2.39	+/-0.575	0.723	+/-0.692	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.987	+/-0.169	0.088	+/-0.246	1.00	pCi/L		LXP1	05/11/16	0905	1561850	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	102	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	95	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	98.1	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	96.5	(30%-110%)

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Company : Katahdin Analytical Services
Address : 600 Technology Way
Scarborough, Maine 04074
Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS
Client Sample ID: TT310S-GW-042016
Sample ID: 395851009
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Company : Katahdin Analytical Services
Address : 600 Technology Way

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Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: HN24I-GW-042016
Sample ID: 395851010
Matrix: Ground Water
Collect Date: 20-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0261	+/-0.131	0.263	+/-0.132	0.500	pCi/L		MXS2	05/09/16	1002	1562057	1
Thorium-230	U	0.080	+/-0.165	0.290	+/-0.167	0.500	pCi/L						
Thorium-232	U	0.00662	+/-0.090	0.191	+/-0.0901	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.285	+/-0.266	0.310	+/-0.269	0.500	pCi/L		MXS2	05/09/16	1356	1562058	2
Uranium-235/236	U	-0.028	+/-0.124	0.322	+/-0.124	0.500	pCi/L						
Uranium-238	U	0.166	+/-0.210	0.261	+/-0.211	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.63	+/-0.457	0.578	+/-0.527	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		2.99	+/-0.299	0.121	+/-0.514	1.00	pCi/L		LXP1	05/11/16	0905	1561850	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	82.8	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	81.2	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	105	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	94.6	(30%-110%)

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Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: HN24I-GW-042016
Sample ID: 395851010
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074 Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT314S-GW-042016 Project: KATA00116
Sample ID: 395851011 Client ID: KATA003
Matrix: Ground Water
Collect Date: 20-APR-16
Receive Date: 21-APR-16
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0206	+/-0.0922	0.233	+/-0.0924	0.500	pCi/L		MXS2	05/09/16	1002	1562057	1
Thorium-230	U	0.0436	+/-0.132	0.248	+/-0.133	0.500	pCi/L						
Thorium-232	U	0.0427	+/-0.103	0.167	+/-0.103	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.145	+/-0.184	0.229	+/-0.185	0.500	pCi/L		MXS2	05/04/16	0846	1562058	2
Uranium-235/236	U	0.0898	+/-0.177	0.245	+/-0.177	0.500	pCi/L						
Uranium-238	U	0.0529	+/-0.145	0.252	+/-0.146	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.225	+/-0.230	0.377	+/-0.232	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226	U	0.0612	+/-0.0735	0.124	+/-0.0745	1.00	pCi/L		LXP1	05/11/16	0905	1561850	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	88.9	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	89	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	93.7	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	101	(30%-110%)

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
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Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT314S-GW-042016
Sample ID: 395851011
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way

Scarborough, Maine 04074

Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT314I-GW-042016
Sample ID: 395851012
Matrix: Ground Water
Collect Date: 20-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	0.0757	+/-0.134	0.204	+/-0.135	0.500	pCi/L		MXS2	05/09/16	1002	1562057	1
Thorium-230	U	0.169	+/-0.196	0.288	+/-0.200	0.500	pCi/L						
Thorium-232	U	0.0476	+/-0.114	0.185	+/-0.114	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.234	+/-0.245	0.305	+/-0.248	0.500	pCi/L		MXS2	05/04/16	0846	1562058	2
Uranium-235/236	U	0.0298	+/-0.165	0.317	+/-0.166	0.500	pCi/L						
Uranium-238	U	0.0816	+/-0.160	0.222	+/-0.161	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228		1.15	+/-0.374	0.443	+/-0.417	1.00	pCi/L		AXM6	05/10/16	1739	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.363	+/-0.117	0.102	+/-0.137	1.00	pCi/L		LXP1	05/11/16	0905	1561850	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	88	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	78.4	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	94.7	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	94.6	(30%-110%)

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Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT314I-GW-042016
Sample ID: 395851012
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Company : Katahdin Analytical Services
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Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT313S-GW-042016
Sample ID: 395851013
Matrix: Ground Water
Collect Date: 20-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0482	+/-0.0774	0.247	+/-0.0777	0.500	pCi/L		MXS2	05/09/16	1002	1562057	1
Thorium-230	U	0.161	+/-0.184	0.259	+/-0.188	0.500	pCi/L						
Thorium-232	U	0.00717	+/-0.0957	0.203	+/-0.0959	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.0749	+/-0.128	0.112	+/-0.129	0.500	pCi/L		MXS2	05/04/16	0846	1562058	2
Uranium-235/236	U	0.0463	+/-0.130	0.139	+/-0.130	0.500	pCi/L						
Uranium-238	U	0.0659	+/-0.130	0.180	+/-0.130	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.279	+/-0.313	0.525	+/-0.317	1.00	pCi/L		AXM6	05/10/16	1740	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226		0.215	+/-0.0849	0.0854	+/-0.0903	1.00	pCi/L		LXP1	05/11/16	0935	1561850	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	83.9	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	102	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	99.7	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	87	(30%-110%)

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Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: TT313S-GW-042016
Sample ID: 395851013
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
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Report Date: May 11, 2016

Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: EB02-042016
Sample ID: 395851014
Matrix: Ground Water
Collect Date: 20-APR-16
Receive Date: 21-APR-16
Collector: Client

Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
Alphaspec Th, Liquid "As Received"													
Thorium-228	U	-0.0061	+/-0.137	0.309	+/-0.137	0.500	pCi/L		MXS2	05/09/16	1002	1562057	1
Thorium-230	U	-0.0154	+/-0.129	0.303	+/-0.129	0.500	pCi/L						
Thorium-232	U	0.0891	+/-0.145	0.204	+/-0.146	0.500	pCi/L						
Alphaspec U, Liquid "As Received"													
Uranium-233/234	U	0.183	+/-0.216	0.234	+/-0.218	0.500	pCi/L		MXS2	05/04/16	0846	1562058	2
Uranium-235/236	U	0.0603	+/-0.169	0.181	+/-0.170	0.500	pCi/L						
Uranium-238	U	0.135	+/-0.194	0.234	+/-0.195	0.500	pCi/L						
Rad Gas Flow Proportional Counting													
Radium-228 in Drinking Water EPA 904.0 "As Received"													
Radium-228	U	0.216	+/-0.283	0.483	+/-0.286	1.00	pCi/L		AXM6	05/10/16	1740	1562339	3
Rad Radium-226													
Radium-226 in Drinking Water EPA 903.1 (De-emanati "As Received"													
Radium-226	U	0.0217	+/-0.0471	0.0892	+/-0.0472	1.00	pCi/L		LXP1	05/11/16	0935	1561850	4

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Th-01-RC Modified
2	DOE EML HASL-300, U-02-RC Modified
3	EPA 904.0/ EPA 9320
4	EPA 903.1

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Thorium-229 Tracer	Alphaspec Th, Liquid "As Received"	1562057	76.9	(30%-110%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"	1562058	77.1	(30%-110%)
Barium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	102	(30%-110%)
Yttrium Carrier	Radium-228 in Drinking Water EPA 904.0 "As Received"	1562339	97.2	(30%-110%)

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Certificate of Analysis

Company : Katahdin Analytical Services
Address : 600 Technology Way
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Report Date: May 11, 2016
Contact: Ms. Jennifer Obrin
Project: NWIRP Bethpage Project # 60266589 Phase FI.WS

Client Sample ID: EB02-042016
Sample ID: 395851014
Project: KATA00116
Client ID: KATA003

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	**Test**						**Batch ID**		**Recovery%**	**Acceptable Limits**			

Notes:
The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

QC Summary

Client : **Katahdin Analytical Services**
600 Technology Way
Scarborough, Maine
Contact: **Ms. Jennifer Obrin**
Workorder: **395851**

Report Date: May 11, 2016

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1562055										
QC1203534366 395751018 DUP										
Thorium-228	U	0.126	U	-0.000204	pCi/L	0		N/A	KXB2	05/05/1622:13
	Uncert:	+/-0.166		+/-0.103						
	TPU:	+/-0.168		+/-0.104						
Thorium-230	U	0.0511	U	0.0112	pCi/L	0		N/A		
	Uncert:	+/-0.166		+/-0.177						
	TPU:	+/-0.167		+/-0.178						
Thorium-232	U	0.0195	U	-0.00198	pCi/L	0		N/A		
	Uncert:	+/-0.119		+/-0.101						
	TPU:	+/-0.119		+/-0.102						
QC1203534367 LCS										
Thorium-228			U	0.0407	pCi/L				KXB2	05/05/1622:13
	Uncert:			+/-0.115						
	TPU:			+/-0.115						
Thorium-230	10.5			9.57	pCi/L		91.4	(75%-125%)		
	Uncert:			+/-1.23						
	TPU:			+/-2.26						
Thorium-232			U	-0.00198	pCi/L			(75%-125%)		
	Uncert:			+/-0.0821						
	TPU:			+/-0.0825						
QC1203534365 MB										
Thorium-228			U	-0.0252	pCi/L				KXB2	05/05/1622:13
	Uncert:			+/-0.110						
	TPU:			+/-0.111						
Thorium-230			U	0.0155	pCi/L					
	Uncert:			+/-0.215						
	TPU:			+/-0.216						
Thorium-232			U	0.0374	pCi/L					
	Uncert:			+/-0.148						
	TPU:			+/-0.148						
Batch 1562056										
QC1203534372 395751018 DUP										
Uranium-233/234		0.334	U	0.0777	pCi/L	44.7		(0% - 100%)	KXB2	05/05/1609:46
	Uncert:	+/-0.233		+/-0.153						
	TPU:	+/-0.237		+/-0.153						
Uranium-235/236		0.160		0.218	pCi/L	30.9		(0% - 100%)		
	Uncert:	+/-0.176		+/-0.241						
	TPU:	+/-0.177		+/-0.243						
Uranium-238	U	0.178	U	0.223	pCi/L	0		N/A		
	Uncert:	+/-0.170		+/-0.234						
	TPU:	+/-0.171		+/-0.236						
QC1203534373 LCS										

QC Summary

Workorder: 395851

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1562056										
Uranium-233/234				13.8	pCi/L				KXB2	05/05/1609:46
	Uncert:			+/-1.48						
	TPU:			+/-2.46						
Uranium-235/236				0.910	pCi/L					
	Uncert:			+/-0.432						
	TPU:			+/-0.452						
Uranium-238	13.5			13.9	pCi/L		103	(75%-125%)		
	Uncert:			+/-1.48						
	TPU:			+/-2.48						
QC1203534371 MB										
Uranium-233/234			U	0.185	pCi/L				KXB2	05/05/1609:17
	Uncert:			+/-0.173						
	TPU:			+/-0.175						
Uranium-235/236				0.257	pCi/L					
	Uncert:			+/-0.212						
	TPU:			+/-0.215						
Uranium-238				0.200	pCi/L					
	Uncert:			+/-0.172						
	TPU:			+/-0.174						
Batch 1562057										
QC1203534375 395851013 DUP										
Thorium-228	U	-0.0482	U	0.0406	pCi/L	0		N/A	MXS2	05/09/1610:02
	Uncert:	+/-0.0774		+/-0.140						
	TPU:	+/-0.0777		+/-0.140						
Thorium-230	U	0.161	U	0.121	pCi/L	0		N/A		
	Uncert:	+/-0.184		+/-0.188						
	TPU:	+/-0.188		+/-0.191						
Thorium-232	U	0.00717	U	0.0273	pCi/L	0		N/A		
	Uncert:	+/-0.0957		+/-0.110						
	TPU:	+/-0.0959		+/-0.110						
QC1203534376 LCS										
Thorium-228				10.9	pCi/L				MXS2	05/09/1610:02
	Uncert:			+/-1.20						
	TPU:			+/-2.33						
Thorium-230				1.63	pCi/L			(75%-125%)		
	Uncert:			+/-0.476						
	TPU:			+/-0.569						
Thorium-232	9.93			9.65	pCi/L		97.2	(75%-125%)		
	Uncert:			+/-1.12						
	TPU:			+/-2.11						
QC1203534374 MB										
Thorium-228			U	-0.00652	pCi/L				MXS2	05/09/1610:02
	Uncert:			+/-0.0948						
	TPU:			+/-0.095						
Thorium-230			U	0.215	pCi/L					
	Uncert:			+/-0.197						

QC Summary

Workorder: **395851**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1562057										
	TPU:			+/-0.202						
Thorium-232			U	0.0532	pCi/L					
	Uncert:			+/-0.109						
	TPU:			+/-0.109						
Batch 1562058										
QC1203534378 395851013 DUP										
Uranium-233/234	U	0.0749	U	0.186	pCi/L	0		N/A	MXS2	05/04/1608:46
	Uncert:	+/-0.128		+/-0.226						
	TPU:	+/-0.129		+/-0.228						
Uranium-235/236	U	0.0463	U	0.00	pCi/L	0		N/A		
	Uncert:	+/-0.130		+/-0.115						
	TPU:	+/-0.130		+/-0.115						
Uranium-238	U	0.0659	U	0.116	pCi/L	0		N/A		
	Uncert:	+/-0.130		+/-0.184						
	TPU:	+/-0.130		+/-0.185						
QC1203534379 LCS										
Uranium-233/234				13.9	pCi/L				MXS2	05/04/1608:47
	Uncert:			+/-1.77						
	TPU:			+/-2.88						
Uranium-235/236				0.795	pCi/L					
	Uncert:			+/-0.503						
	TPU:			+/-0.519						
Uranium-238	13.5			14.7	pCi/L		109	(75%-125%)		
	Uncert:			+/-1.83						
	TPU:			+/-3.01						
QC1203534377 MB										
Uranium-233/234			U	0.182	pCi/L				MXS2	05/04/1608:46
	Uncert:			+/-0.221						
	TPU:			+/-0.223						
Uranium-235/236			U	0.0979	pCi/L					
	Uncert:			+/-0.192						
	TPU:			+/-0.193						
Uranium-238			U	0.169	pCi/L					
	Uncert:			+/-0.199						
	TPU:			+/-0.201						
Batch 1565953										
QC1203545100 395851008 DUP										
Thorium-228		0.279	U	0.0746	pCi/L	10.8		(0% - 100%)	MXS2	05/10/1609:29
	Uncert:	+/-0.228		+/-0.148						
	TPU:	+/-0.234		+/-0.148						
Thorium-230	U	0.172	U	0.147	pCi/L	0		N/A		
	Uncert:	+/-0.196		+/-0.191						
	TPU:	+/-0.200		+/-0.194						
Thorium-232	U	0.139	U	0.117	pCi/L	0		N/A		
	Uncert:	+/-0.166		+/-0.140						
	TPU:	+/-0.168		+/-0.141						

QC Summary

Workorder: 395851

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 1565953										
QC1203545101 LCS										
Thorium-228				9.39	pCi/L				MXS2	05/10/1609:29
	Uncert:			+/-1.03						
	TPU:			+/-1.93						
Thorium-230				1.30	pCi/L			(75%-125%)		
	Uncert:			+/-0.397						
	TPU:			+/-0.461						
Thorium-232	9.93			9.83	pCi/L		99	(75%-125%)		
	Uncert:			+/-1.05						
	TPU:			+/-2.01						
QC1203545099 MB										
Thorium-228			U	0.0597	pCi/L				MXS2	05/10/1609:29
	Uncert:			+/-0.136						
	TPU:			+/-0.136						
Thorium-230			U	0.165	pCi/L					
	Uncert:			+/-0.200						
	TPU:			+/-0.204						
Thorium-232			U	0.0897	pCi/L					
	Uncert:			+/-0.132						
	TPU:			+/-0.133						
Rad Gas Flow										
Batch 1562339										
QC1203535152 LCS										
Radium-228	13.9			11.5	pCi/L		82.6	(80%-120%)	AXM6	05/10/1617:40
	Uncert:			+/-0.963						
	TPU:			+/-2.09						
QC1203535149 MB										
Radium-228			U	0.056	pCi/L				AXM6	05/10/1617:40
	Uncert:			+/-0.263						
	TPU:			+/-0.263						
QC1203535150 395851013 MS										
Radium-228	139	U 0.279		134	pCi/L		96.3	(70%-130%)	AXM6	05/10/1617:40
	Uncert:	+/-0.313		+/-10.7						
	TPU:	+/-0.317		+/-24.1						
QC1203535151 395851013 MSD										
Radium-228	139	U 0.279		118	pCi/L	12.5	84.9	(0%-20%)	AXM6	05/10/1617:40
	Uncert:	+/-0.313		+/-9.49						
	TPU:	+/-0.317		+/-21.3						
Rad Ra-226										
Batch 1561849										
QC1203533793 LCS										
Radium-226	12.2			12.2	pCi/L		100	(90%-110%)	LXP1	05/08/1610:20
	Uncert:			+/-0.618						
	TPU:			+/-1.77						
QC1203533790 MB										
Radium-226			U	0.0439	pCi/L				LXP1	05/08/1609:50

QC Summary

Workorder: **395851**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Ra-226										
Batch 1561849										
	Uncert:			+/-0.0621						
	TPU:			+/-0.0627						
QC1203533791 396162001 MS										
Radium-226	12.2	0.152		11.9	pCi/L		96.6	(80%-120%)	LXP1	05/08/1610:20
	Uncert:	+/-0.0736		+/-0.600						
	TPU:	+/-0.0771		+/-1.88						
QC1203533792 396162001 MSD										
Radium-226	12.2	0.152		13.1	pCi/L	9.54	106	(0%-20%)	LXP1	05/08/1610:20
	Uncert:	+/-0.0736		+/-0.638						
	TPU:	+/-0.0771		+/-2.49						
Batch 1561850										
QC1203533797 LCS										
Radium-226	12.2			11.0	pCi/L		90.4	(90%-110%)	LXP1	05/11/1610:10
	Uncert:			+/-0.540						
	TPU:			+/-1.76						
QC1203533794 MB										
Radium-226			U	0.00	pCi/L				LXP1	05/11/1609:35
	Uncert:			+/-0.0407						
	TPU:			+/-0.0407						
QC1203533795 395851013 MS										
Radium-226	24.4	0.215		24.3	pCi/L		98.8	(80%-120%)	LXP1	05/11/1609:35
	Uncert:	+/-0.0849		+/-1.19						
	TPU:	+/-0.0903		+/-4.61						
QC1203533796 395851013 MSD										
Radium-226	24.4	0.215		21.4	pCi/L	12.7	87	(0%-20%)	LXP1	05/11/1609:35
	Uncert:	+/-0.0849		+/-1.10						
	TPU:	+/-0.0903		+/-3.18						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
H	Analytical holding time was exceeded
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative

QC Summary

Workorder: **395851**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.