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Remedial Investigation Report (RIR) Addendum
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Appendix 12-F	2009 Topographical Survey Report NFSS
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Niagara Falls Storage Site
Historical Photographic Analysis
Lewiston, Township, New York

NIAGARA FALLS STORAGE SITE
HISTORICAL PHOTOGRAPHIC ANALYSIS

LEWISTON TOWNSHIP, NEW YORK

FINAL

September 2009

US Army Geospatial Center
Operations Division
Hydrologic & Environmental Analysis Branch
7701 Telegraph Road
Alexandria, Virginia 22315-3864

Prepared for the US Army Corps Of Engineers,
Buffalo District, Buffalo, New York

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NOTICE AND INTRODUCTION

NOTICE

The views, opinions, and conclusions in this report are those of the author and should not be construed as official Department of Army positions or policy unless so designated by other documentation.

Photographic items contained in this report may be restricted for use other than research. It is the responsibility of the party using photographs from this study to contact the U.S. Army Geospatial Center, Operations Division in order to ascertain clearance for use.

INTRODUCTION

This report presents the results of a GIS-based Historical Photographic Analysis of the Niagara Falls Storage Site and a section of the Lewiston-Porter Central School, Lewiston, NY property.

The Hydrologic and Environmental Analysis Branch, Operations Division of the U.S. Army Corps of Engineers, Army Geospatial Center (AGC) was tasked to analyze historical photographic records relative to the Niagara Falls Storage Site (NFSS) area to identify potential areas of concern related to activities around the site since its development. Areas of potential concern (such as ground scars, disturbed ground, trenches, ditches) were identified and mapped based on the analysis of historical aerial photographs.

This task expands the area of research from the Lake Ontario Ordnance Works, NY, (LOOW) completed in September 2002 by the U.S. Army Topographic Engineering Center (the predecessor agency to the U.S. Army Geospatial Center).

Significant features, derived through photo analysis, are displayed on selected photos in this study. The accompanying GIS, supplied on DVD, has additional information useful in locating identified features and defining their extent.

Some of the identified features can be "benign" as it is not always possible to determine the activity that altered the surface. Future field work and additional ancillary information will further determine the relevance of these features.

This analysis was completed for the U.S. Army Corps of Engineers, Buffalo District, Buffalo, NY.

METHODOLOGY

Photographic analysis of historical aerial photography, both vertical and oblique, was the primary method of identifying man-made and natural occurring features in the Niagara Falls Storage Site and a section of the Lewiston-Porter Central School campus.

The analysis in this report is primarily based upon interpretation of black and white and color aerial photography over the project area for the period 1938 to 2005. Stereo viewing was employed where overlapping photographs permitted its use. A list of aerial photography used by AGC appears on the Photographic Source slide.

Both single-optical and stereoscopic viewing, at various magnifications, were performed on AGC collection of historical aerial photographs. Visible signatures such as size, scale, shape, shadow, tone, texture, and pattern allow features to be recognized on the aerial photography.

Stereo-paired images viewed through a stereoscopic microscope allows for a three-dimensional view of the terrain.

Sample of aerial photographs examined.

GEOREFERENCED DATA

Geodetic Control was applied to the 1938, 1942, 1944,1951, 1956, 1958, 1978, 1985, 1990, and 1995 aerial photography using 2005 New York State GIS data (http://www.nysgis.state.ny.us/gateway/mg/). This georeferenced image file is placed on DVD for quick and easy access. A “world file”, or .tfw file, is associated with each .tif image file. The .tfw file contains the coordinate information of the upper left (x,y) pixel and the pixel size (in feet). This .tfw file must be placed in the same directory as the .tif image file before viewing in any Geographic Information System (GIS) software.

The 2005 orthophoto was used for the horizontal control for the historical photos. Also, selected rectified images were created to support mapping and analysis for various years. ERDAS 9.2 software was used to geo-reference these selected historical photos to the 2005 photomap of the site. ESRI’s ArcGIS 9.3 software was used to digitize and create vector layers for the historical years. The data can be shown in a Geographic Information System (GIS) such as ArcMAP. Digital analysis is presented using ArcGIS shape files. Shape files, digital orthophotos and the report are on a DVD. Microsoft PowerPoint 2003 was used to create this report.

Significant features, derived through photo analysis, are displayed on selected photos in this study. All GIS image and vector data are projected in a State Plane coordinate system, New York West, FIPS Zone 3103 ; Spheroid: GRS 1980; Datum: NAD83, Units: feet.

GLOSSARY

BERM: Man-made ridge or embankment, constructed of natural or man-made materials.

BUILDING/STRUCTURES: Relatively permanent, usually box-like and roofed, man-made structure.

CLEARED AREA: An area from which man has removed trees, shrubs or other natural vegetation cover.

CIRCLE FEATURE: A circular shaped ground scar, varying in size and shape that does not appear to be natural. No depth is apparent for these features; however, they may be associated with areas used to dispose of unwanted material.

DEBRIS: The scattered remains of anything broken or destroyed.

DEPRESSION: An area sunken below the surrounding surface.

DISTURBED GROUND: Rough ground surface that has been cleared, overturned, dug up, filled and/or changed from the surrounding area.

DITCH: A long narrow trench or furrow dug in the ground, as for drainage or irrigation.

EXCAVATION: A cavity in the earth formed by digging or scooping out material (e.g. to facilitate construction).

FENCE: A structure serving as an enclosure, a barrier, or a boundary, usually made of posts or stakes joined together by boards, wire, or rails.

GRADED AREA: Area where the ground surface has been shaped, usually leveled to a smooth horizontal or sloping surface.

GROUND SCAR(S): Ground surface, vegetated or not, where marks from a previous activity or feature, or from a subterranean feature, are visible. Ground scars can result from many things and therefore vary greatly in appearance (e.g. septic drain fields, archaeological features, buried waste disposal pits, filled trenches, etc)

LINEAR FEATURE: General classification based on tonal quality of feature, caused by man-made or natural occurrences, such as buried (filled in or closed) trenches, vehicle/tank tracks, or geologic conditions.

MOUNDED MATERIALS: Material that has been placed in piles or mounds.

ORTHOPHOTO: Continuous-tone image created from aerial photographs with geometric distortions and relief displacements removed. Depicts terrain features in their true geographic position. This image can also be referred to as a photomap.

OTHER: Descriptions are noted in the remarks section of the GIS file.

OUTSIDE STORAGE AREA: An open-air, outdoor area for storage of materials, supplies, vehicles and/or equipment; may or may not be enclosed by a fence.

PIT: Relatively deep, steep sided hole in the ground surface.

POND/LAGOON: A containment area, man-made or naturally occurring, that appears to be used for waste and/or water storage, disposal, or treatment.

TOWER: Elevated structure, such as a water tank, storage tank, guard tower, or observation tower.

TRENCH: An excavation, often elongated and linear, having steep-sided walls.

ACRONYMS

AGC	ARMY GEOSPATIAL CENTER
AOI	AREA OF INTEREST
BLDG	BUILDING
BNI	BRUNSWICK NUCLEAR, INC OR BECHTEL NATIONAL, INC
CWM	CHEMICAL WASTE MANAGEMENT
DEC	NY STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DEIS	DRAFT ENVIRONMENTAL IMPACT STATEMENT
DOE	DEPARTMENT OF ENERGY
DOQ	DIGITAL ORTHO QUADRANGLE
DRG	DIGITAL RASTER GRAPHIC
DVD	DIGITAL VERSATILE DISC OR DIGITAL VIDEO DISC
GIS	GEOGRAPHIC INFORMATION SYSTEM
IWCS	INTERIM WASTE CONTAINMENT STRUCTURE
LOOW	LAKE ONTARIO ORDNANCE WORKS
MED	MANHATTAN ENGINEER DISTRICT
NAD	NORTH AMERICAN DATUM
NARA	NATIONAL ARCHIVES & RECORDS ADMINISTRATION
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
NFSS	NIAGARA FALLS STORAGE SITE
TEC	TOPOGRAPHIC ENGINEERING CENTER
UTM	UNIVERSAL TRANSVERSE MERCATOR
WGS	WORLD GEODETIC SYSTEM

PROJECT AREA LOCATION

FINAL

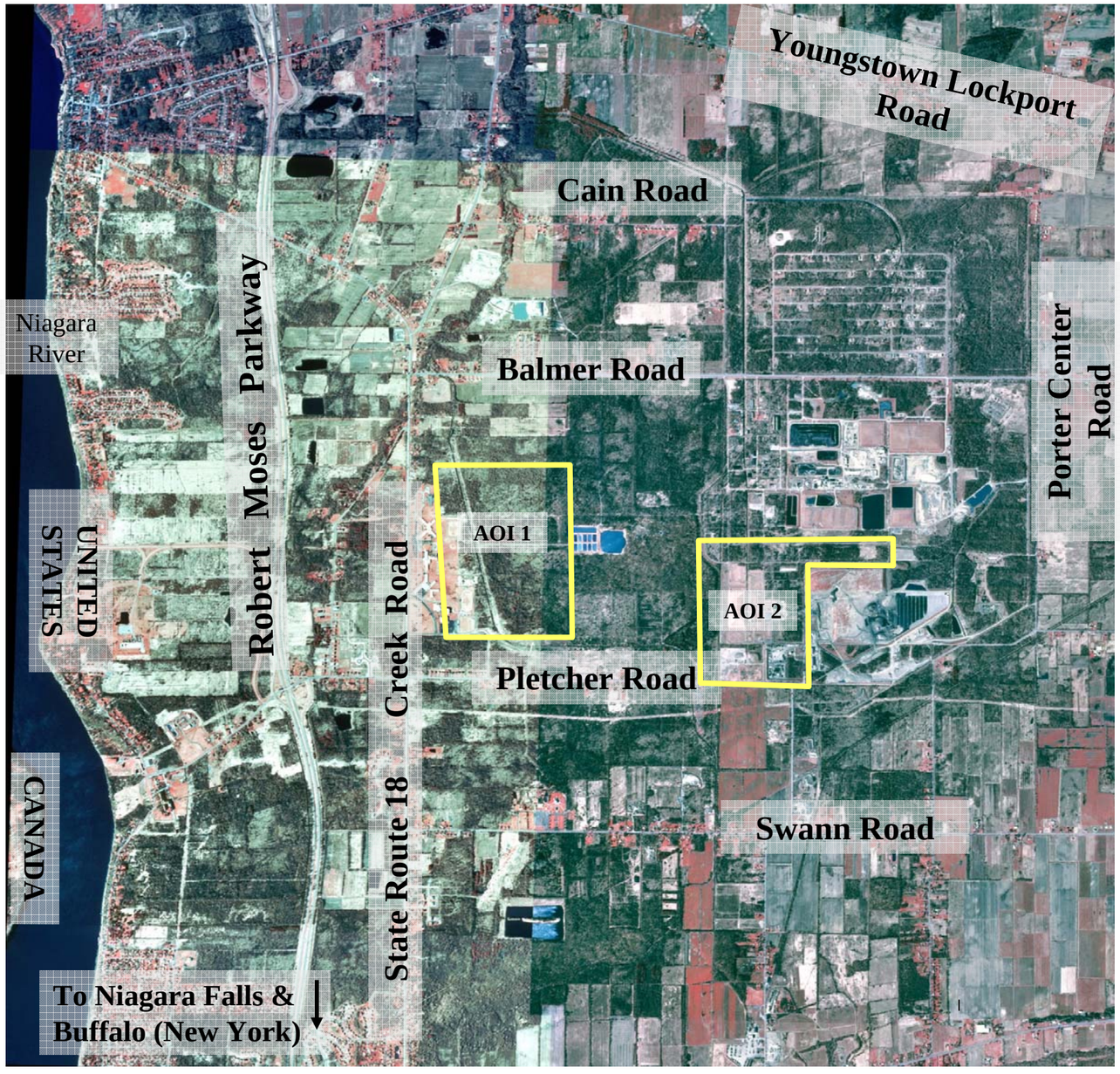
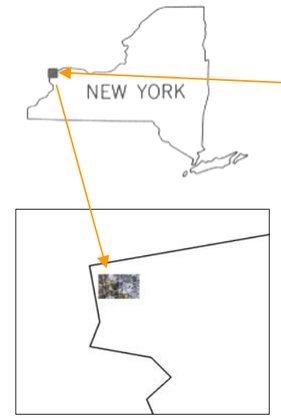
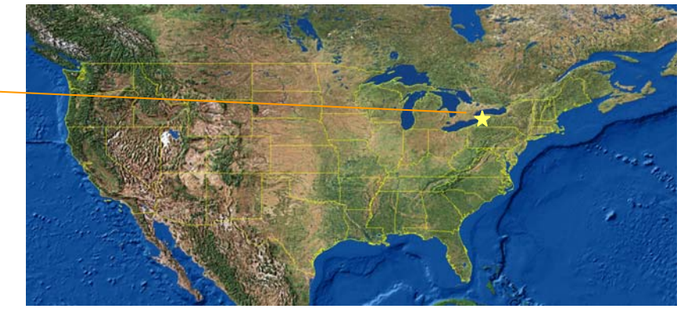


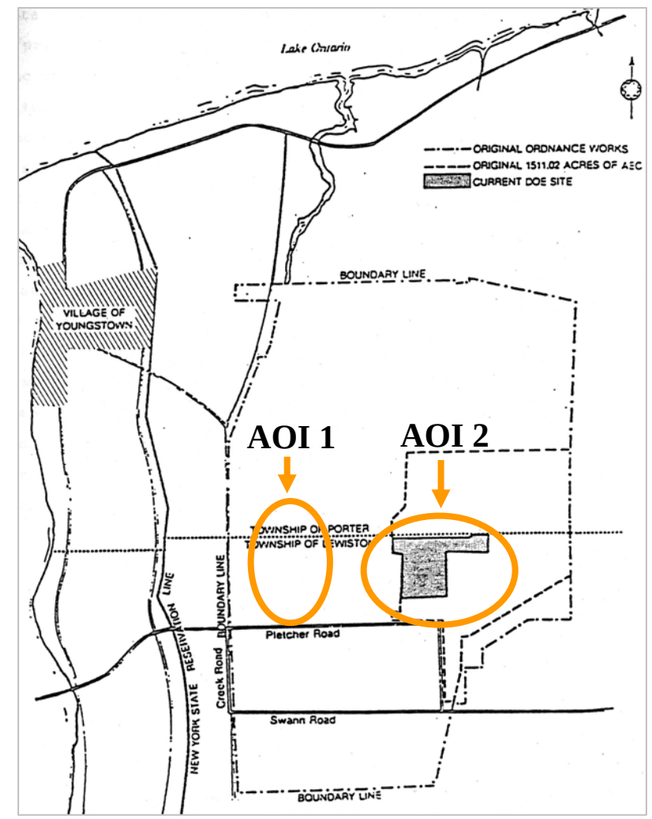
Image Source: Digital Orthoquad (DOQ) data, US Geological Survey, 28 March 1995.





Niagara Falls Storage Site project is divided into two areas of interest (AOI 1 and AOI 2).

Area maps shows positions of current study in relation to previous study (LOOW), completed in September 2002 by the U.S. Army Topographic Engineering Center (the predecessor agency to the U.S. Army Geospatial Center).



Map Source: Department Of Energy, 1979.

PHOTOGRAPHIC SOURCES

YEAR	MONTH	DAY	SCALE	AGENCY & MISSION ID
1938	September	25	1:20,000	ASCS
1942	April	23	1:20,000	DOD
1944	March	19	1:20,000	DOD
1944	March	19	oblique	DOD
1951	October	14	1:20,000	ASCS
1956	September	27	1:6,000	DOD
1958	August	9	1:20,000	ASCS
1978	May	22	1:36,000	USDA
1985	May	3	1:58,000	USGS/HAP
1990	June	20	1:40,000	USDA
1995	March	28	1:40,000	USGS/NAP
1995	March	28	N/A	USGS/DOQ (color)
2005	April		N/A	NYS CSCIC

ASCS - Agricultural Stabilization and Conservation Service

DOD - Department Of Defense

DOQ - Digital Ortho Quadrangle

HAP - High Altitude Photography

NAP - National Aerial Photography

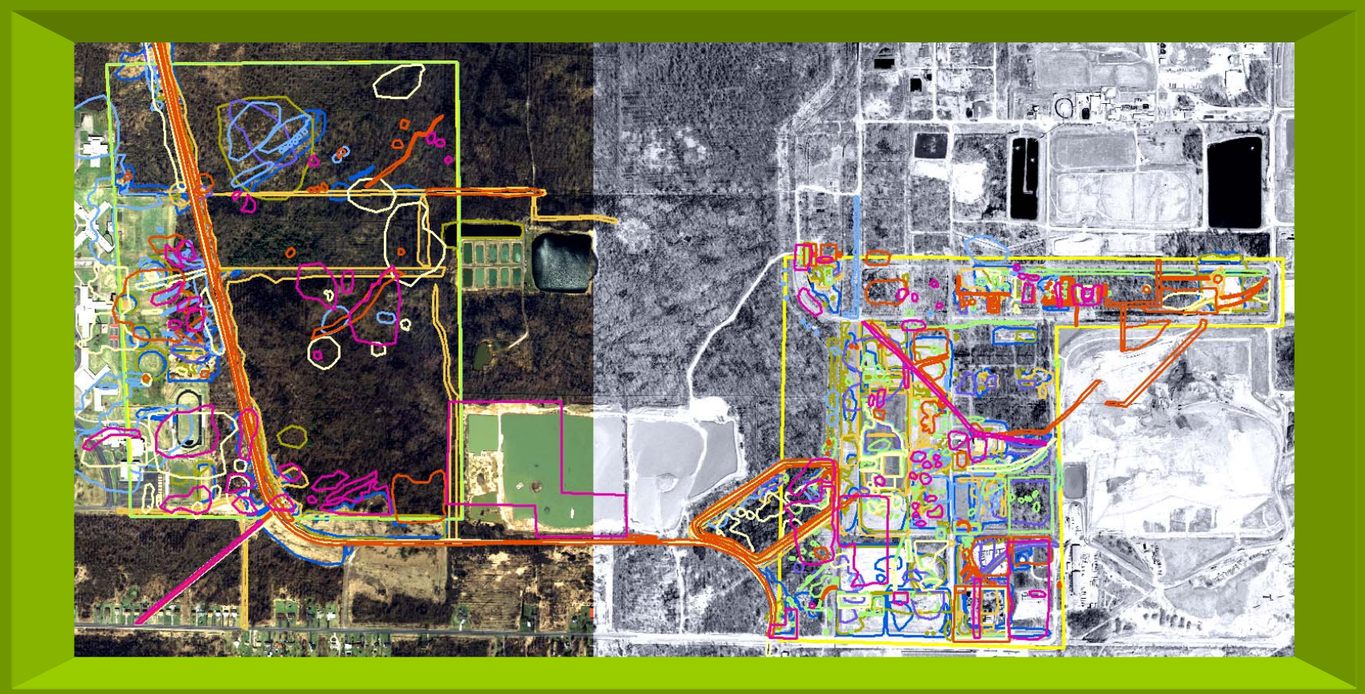
NYS CSCIC – New York State Cyber Security & Critical Infrastructure Coordination

USDA - United States Department Of Agriculture

USGS - United States Geological Survey

Source information from: Former Lake Ontario Ordnance Works, NY Final Report

FEATURE ANALYSIS



ALL FEATURES FOUND IN EACH YEAR ANALYZED, SHOWN ON 2005 BASE MAP

CAVEATS AND EXPLANATIONS

1 Only the building layer and a drainage layer (giving natural above ground drainage, fracture traces, and man-made ditches) are provided for the predevelopment time frame (1938).

2 The labels "Pit(s)" and "Ground Scar(s)" are applied to features that may have one or more pits or ground scars.

3 Features outside the AOI are not displayed unless their boundaries cross to the inside of the AOI boundaries.

4 A 2005 digital orthophoto (or photomap) by the New York State Geographic Information Systems Clearinghouse was obtained (from web site http://www.nysgis.state.ny.us/gateway/mg/) and used as the current image map of the area. This orthophoto has a horizontal accuracy of about forty feet (per National Map Accuracy Standards) and was used for the horizontal control for the historical photos. Historical aerial photos rectified to the 2005 orthophoto were used as placement guides for the Features shape file. Towers and storage tanks may appear in both the Building Location shape file and the Features shape file.

5 Buildings locations may appear to shift positions from one year's analysis to the next. As objects appear farther from true nadir (the shortest distance from the plane's camera to the ground) the more they appear to lean. The 10 to 20 foot difference in building location is within the National Map Accuracy Standards.

6 Building numbers and Drainage Ditch names are from: Design Report for the Interim Waste Containment Facility at the Niagara Falls Storage Site, May 1986, Prepared for US Department of Energy, Oak Ridge Operations Office Under Contract No. DE-AC05-81OR20722 By Bechtel National, Inc. Advanced Technology Division, Oak Ridge, Tennessee, Bechtel Job No. 14501 (DOE/OR/20722-21 (DE86012601)

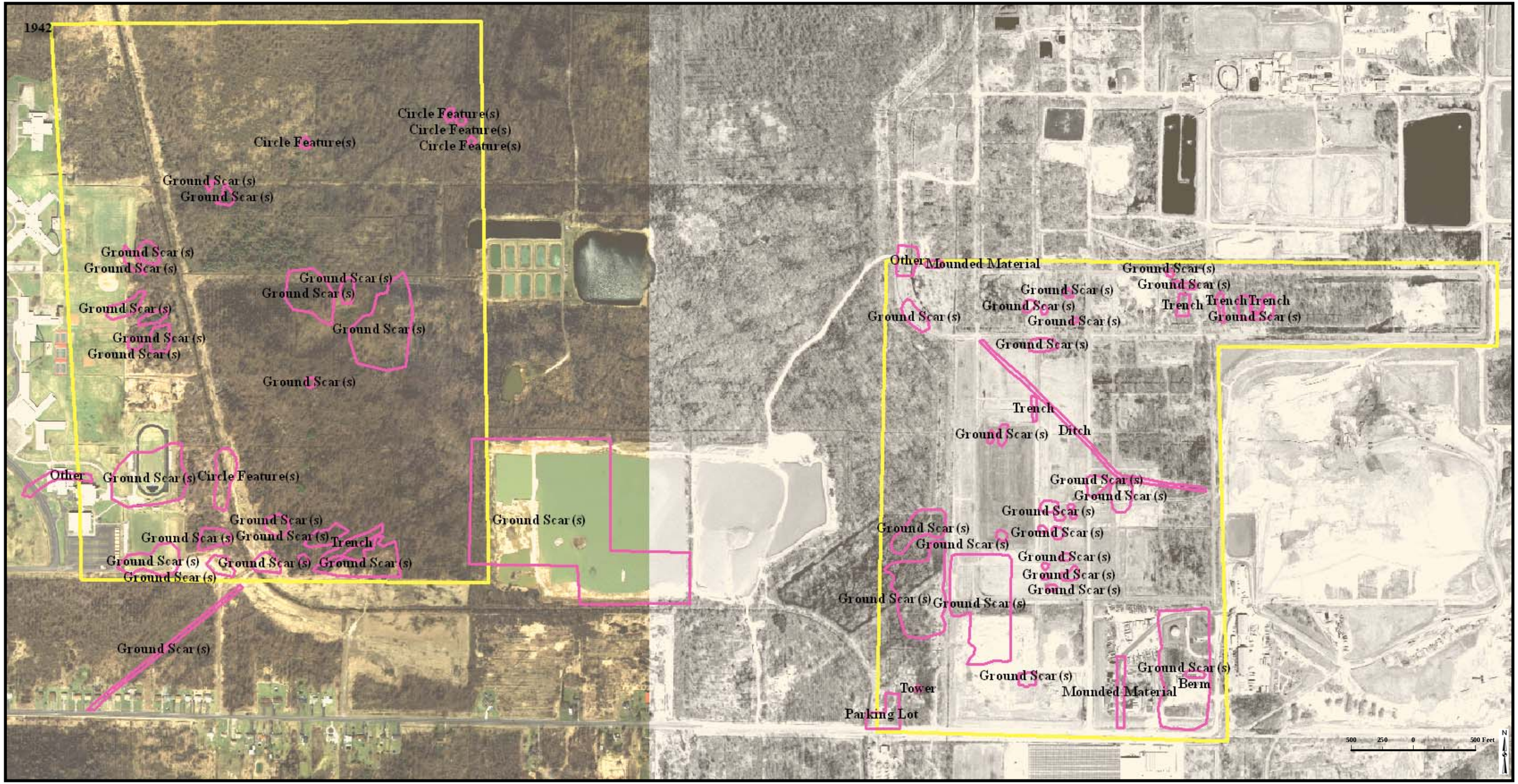
7 One drainage file has been created named Drainage1938to2005.shp. It is composed of all of the drainage areas that were analyzed. It includes the fracture traces and the natural drainage paths that were detected, and the man-made ditches created in the years analyzed.

8 The line files, created by tracking the Rail Roads, fences/steam pipes (not including agricultural fences), and utility lines for the years analyzed, have been combined into one file called Lines1938to2005.shp.

9 Drainage and Line features were not redrawn each year after they first appeared. For example the Southwestern Drainage Ditch was displayed in the Features files the first two analysis years it appeared, 1944 and 1951. After that it only appears in the Drainage files and the Drainage1938to2005 file.

10 The best resolution available at the time was chosen for this study area. The result is the West side (AOI 1) is in "Natural Color" and is at a higher resolution than the East side (AOI 2). This accounts for the abrupt change from color to black and white (gray tones) in the base maps.

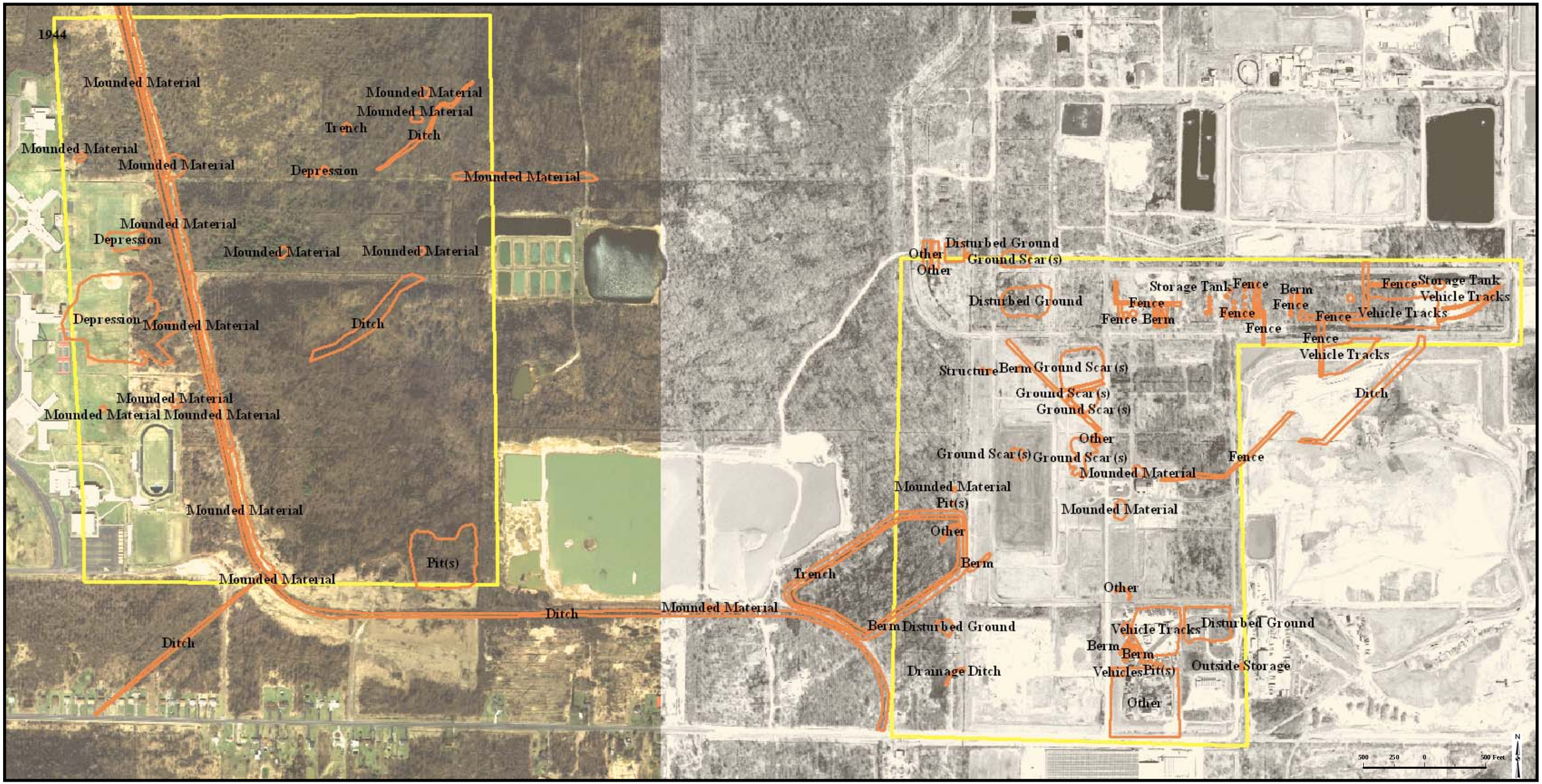
1942 ANALYSIS DISPLAYED ON 2005 BASE MAP



FEATURES IDENTIFIED FROM 1942 AERIAL PHOTOGRAPHS DISPLAYED ON 2005 BASE MAP

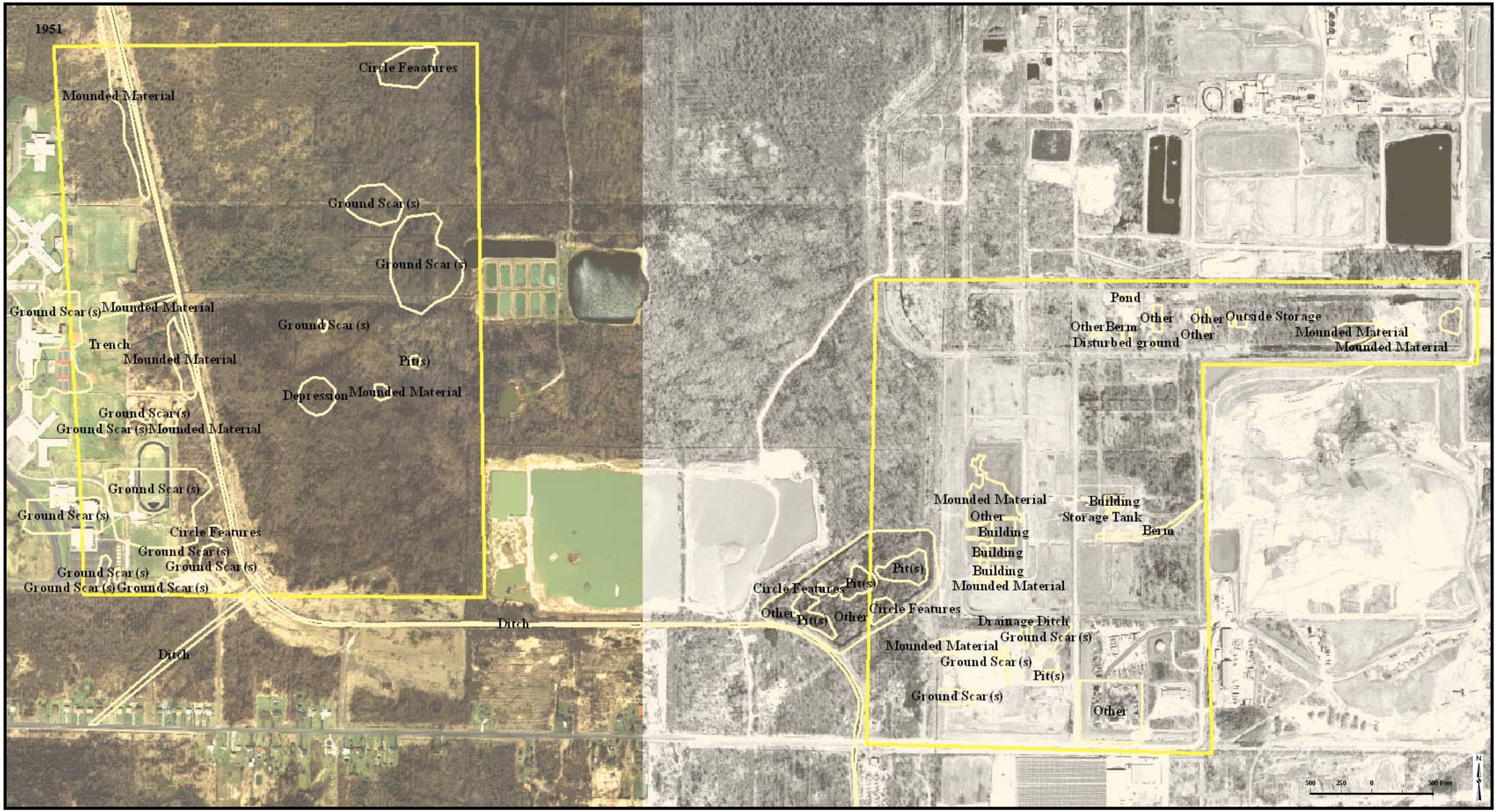
FINAL

1944 ANALYSIS DISPLAYED ON 2005 BASE MAP



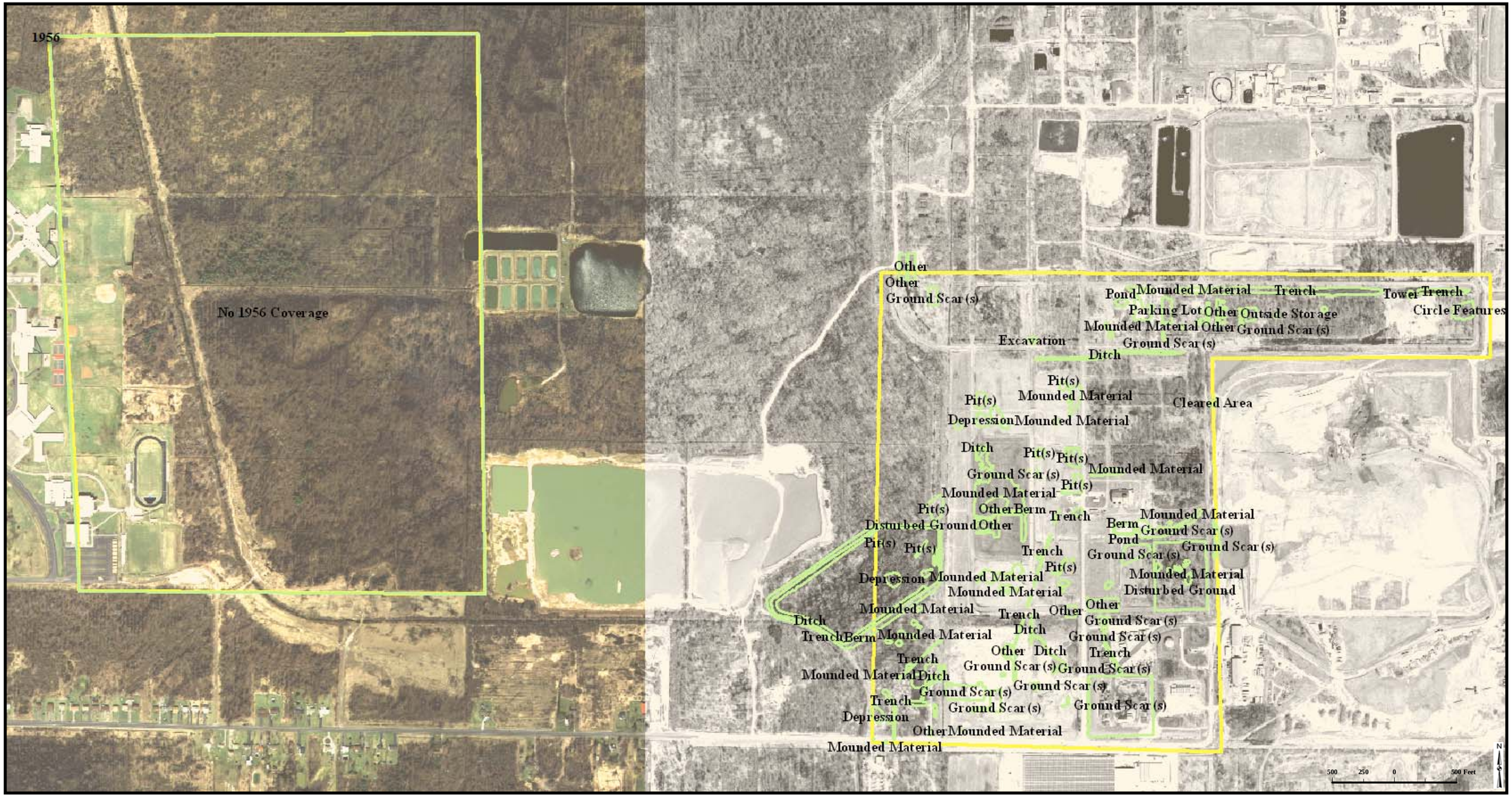
FEATURES IDENTIFIED FROM 1944 AERIAL PHOTOGRAPHS DISPLAYED ON 2005 BASE MAP

1951 FEATURES DISPLAYED ON 2005 BASE MAP



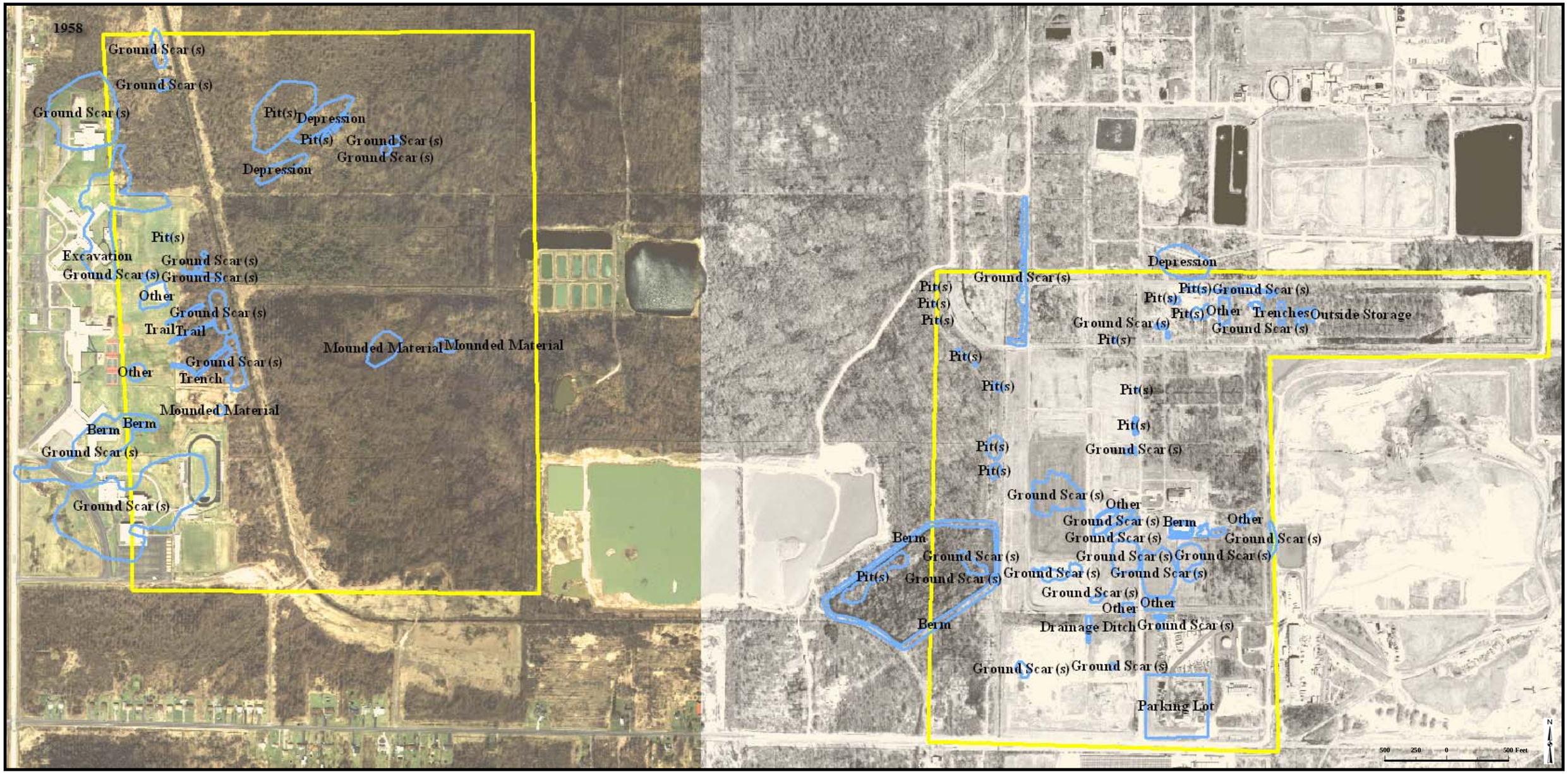
FEATURES IDENTIFIED FROM 1951 AERIAL PHOTOGRAPHS DISPLAYED ON 2005 BASE MAP

1956 FEATURES DISPLAYED ON 2005 BASE MAP



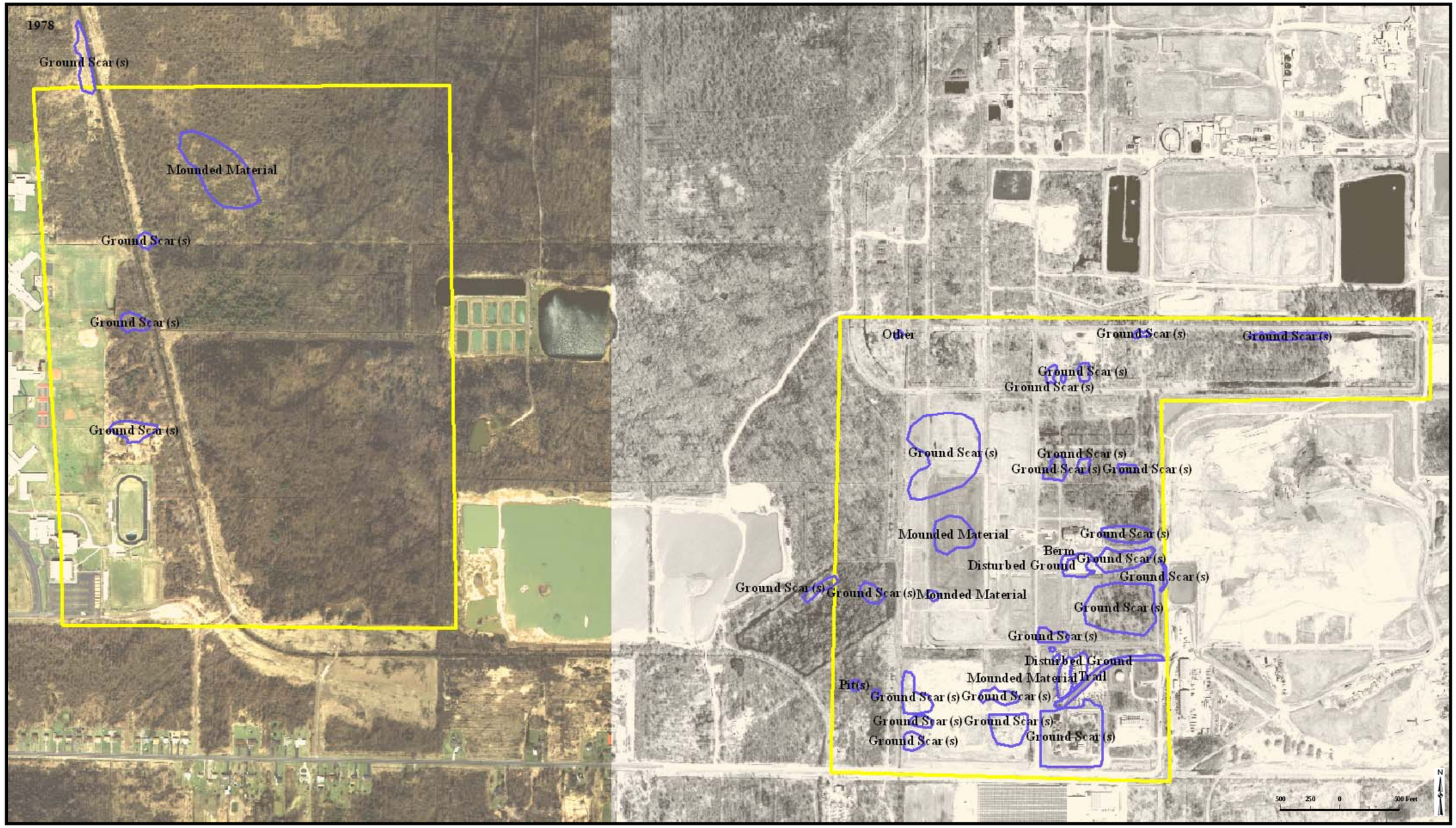
FEATURES IDENTIFIED FROM 1956 AERIAL PHOTOGRAPHS DISPLAYED ON 2005 BASE MAP

1958 FEATURES DISPLAYED ON 2005 BASE MAP



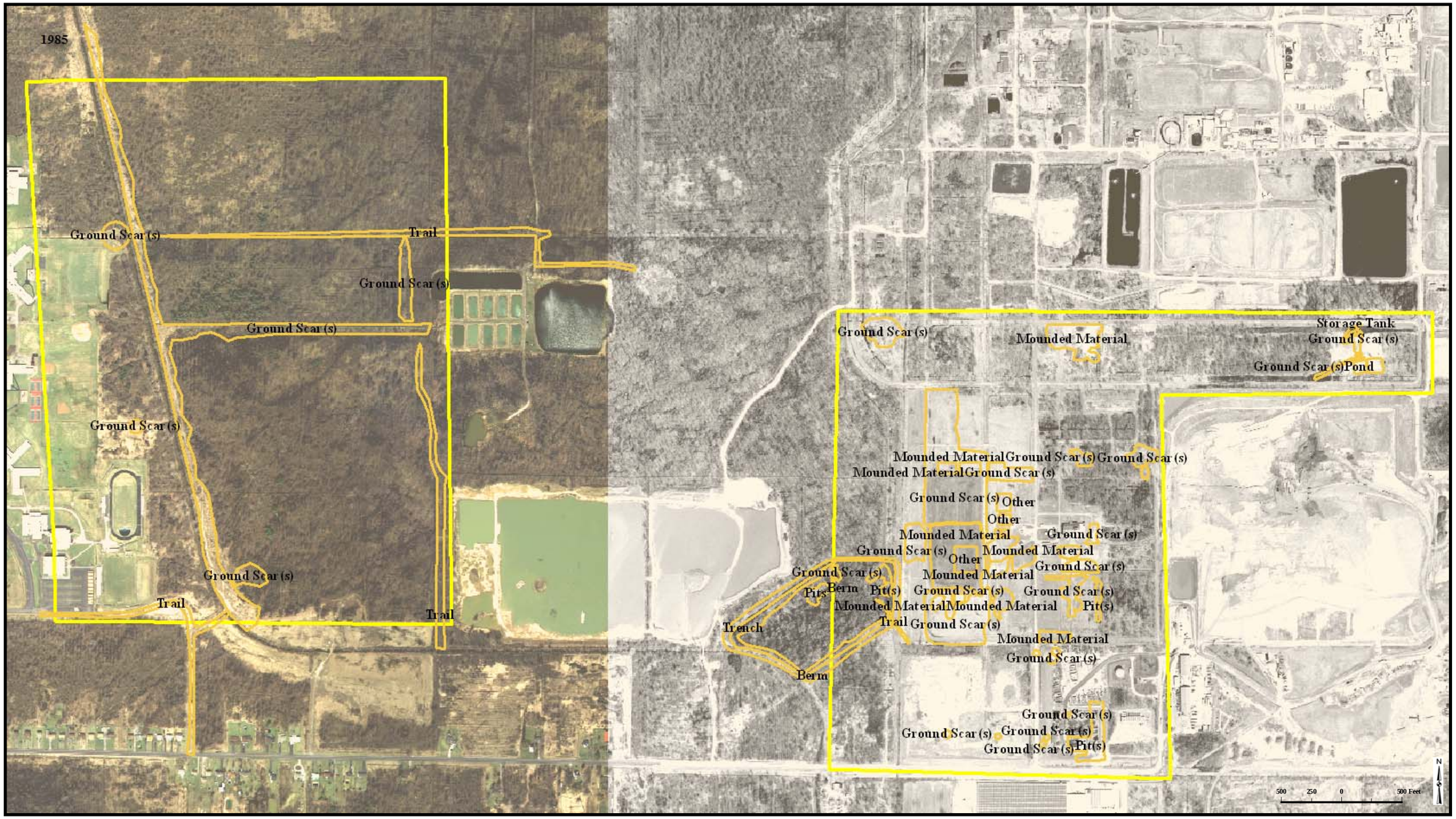
FEATURES IDENTIFIED FROM 1958 AERIAL PHOTOGRAPHS DISPLAYED ON 2005 BASE MAP

1978 FEATURES DISPLAYED ON 2005 BASE MAP



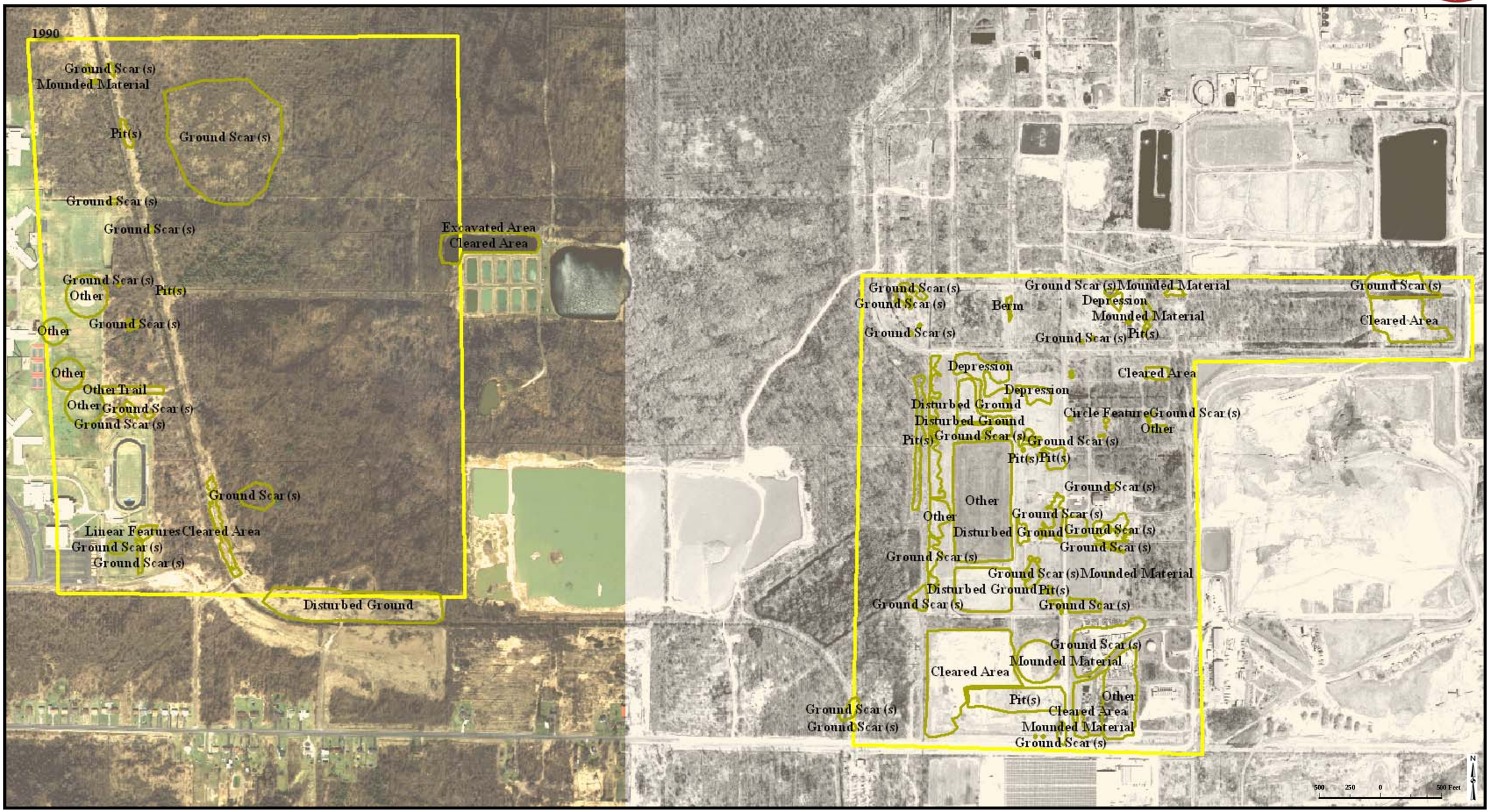
FEATURES IDENTIFIED FROM 1978 AERIAL PHOTOGRAPHS DISPLAYED ON 2005 BASE MAP

1985 FEATURES DISPLAYED ON 2005 BASE MAP



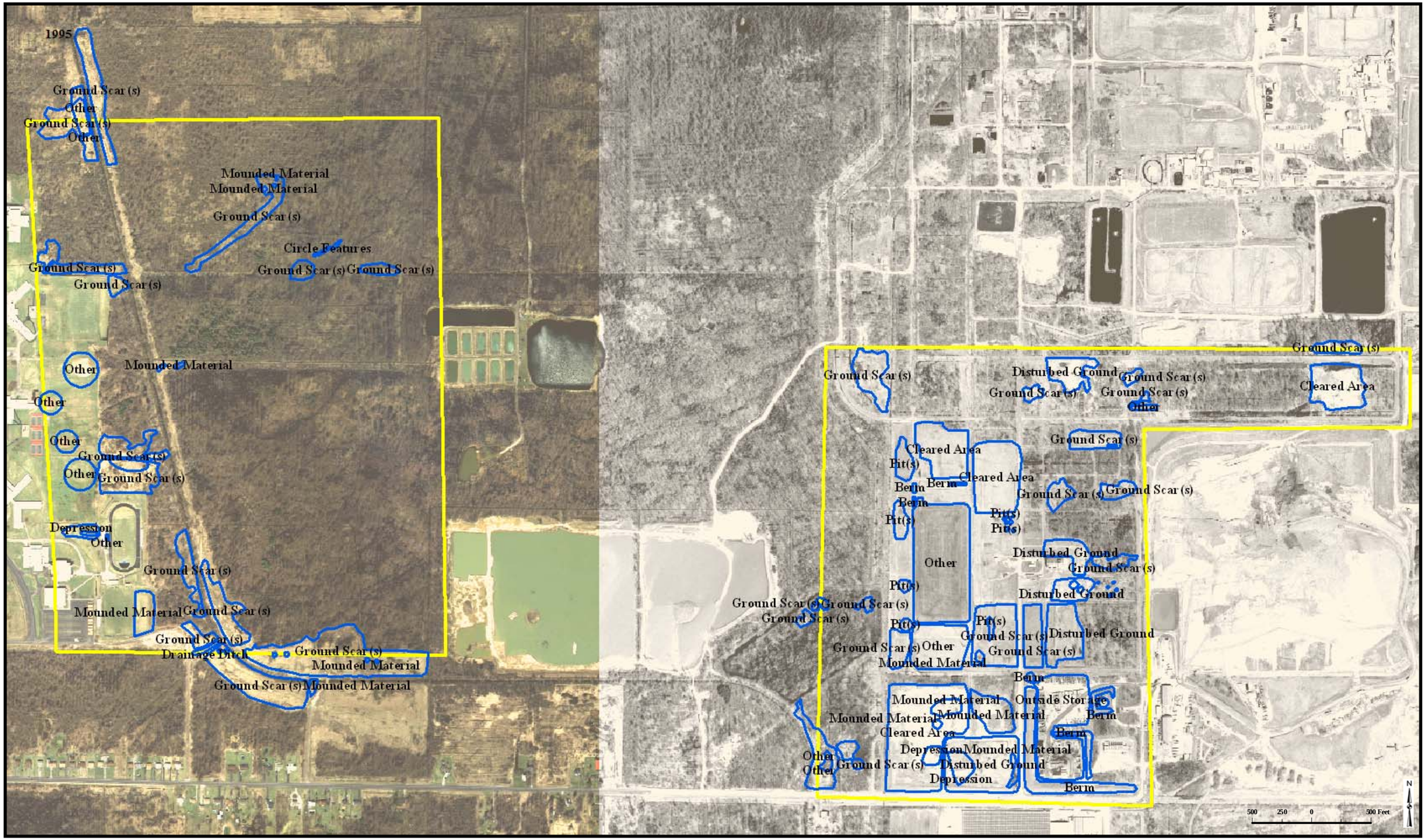
FEATURES IDENTIFIED FROM 1985 AERIAL PHOTOGRAPHS DISPLAYED ON 2005 BASE MAP

1990 FEATURES DISPLAYED ON 2005 BASE MAP



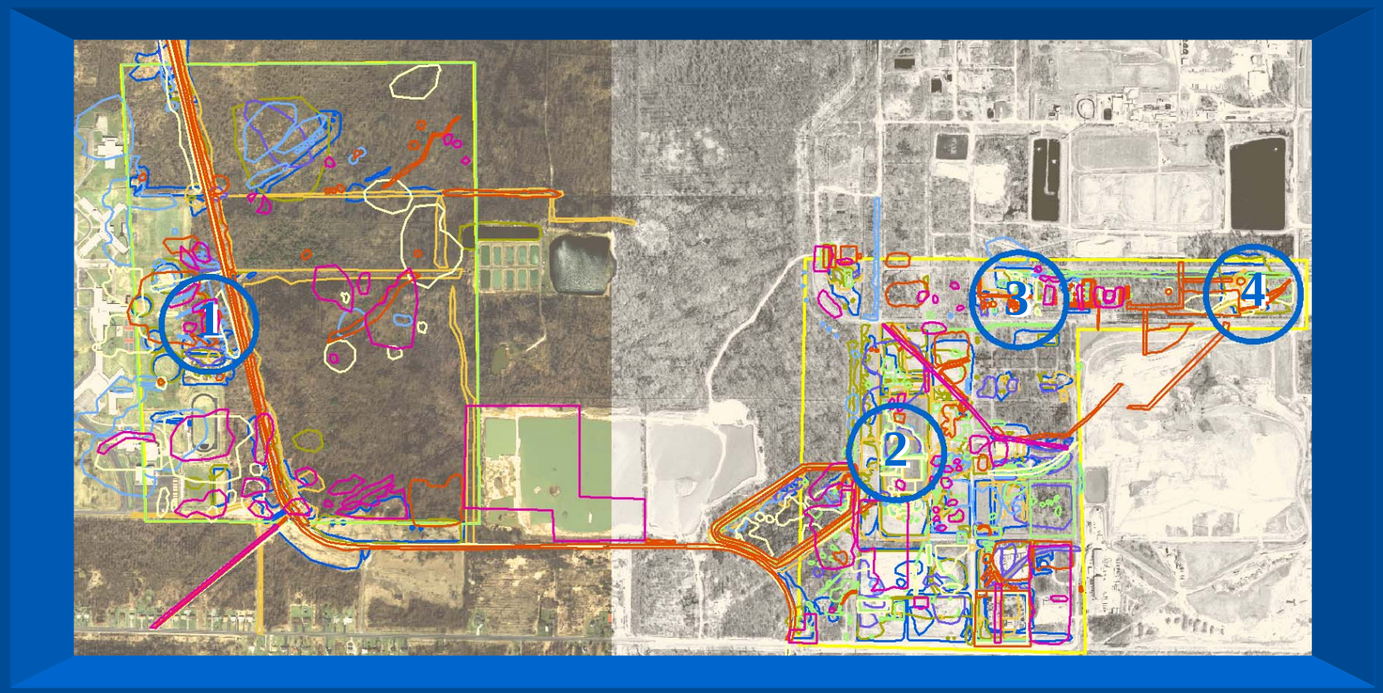
FEATURES IDENTIFIED FROM 1990 AERIAL PHOTOGRAPHS DISPLAYED ON 2005 BASE MAP

1995 FEATURES DISPLAYED ON 2005 BASE MAP



FEATURES IDENTIFIED FROM 1995 AERIAL PHOTOGRAPHS DISPLAYED ON 2005 BASE MAP

DETAIL LOOK AT SELECTED AREAS

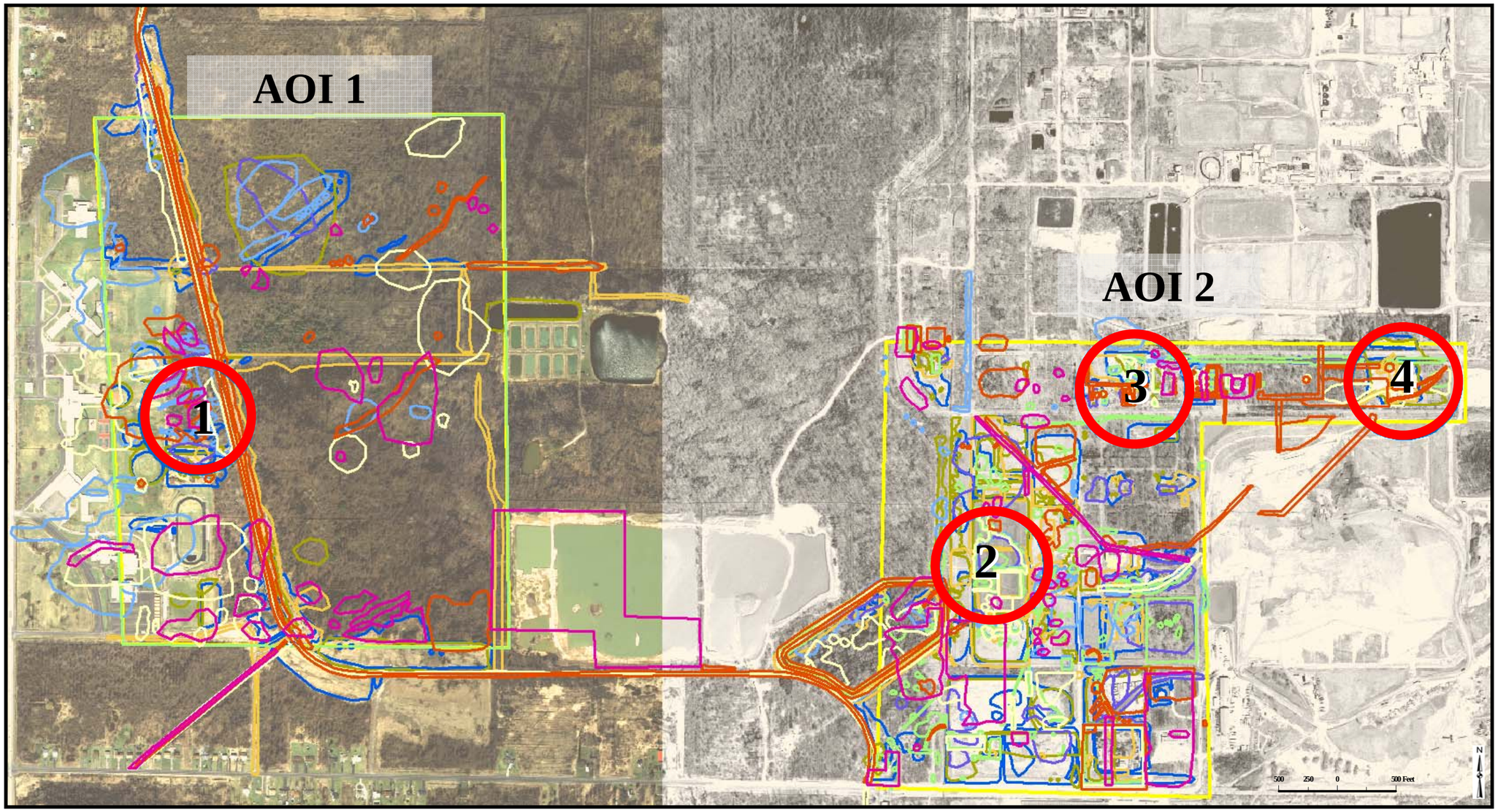


ALL FEATURES FOUND IN EACH YEAR ANALYZED, SHOWN ON 2005 BASE MAP

FINAL

AREA OF INTEREST 1 (AOI 1)

SELECTED AREA 1

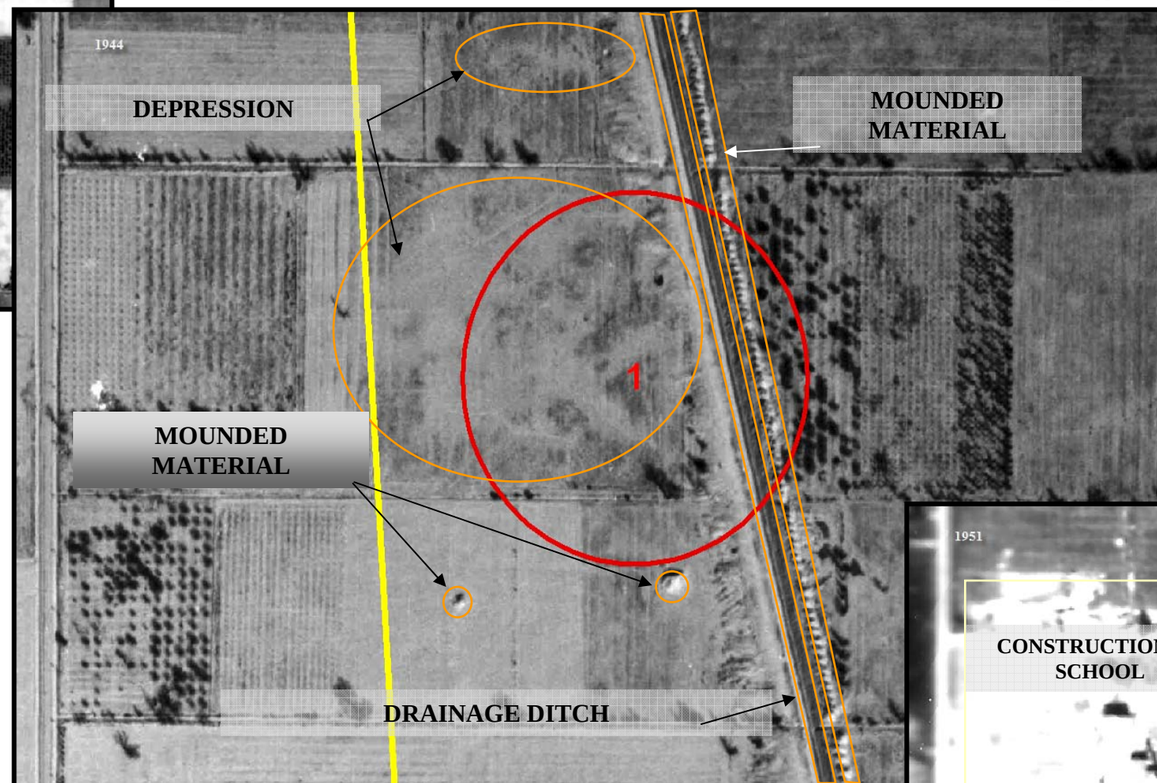


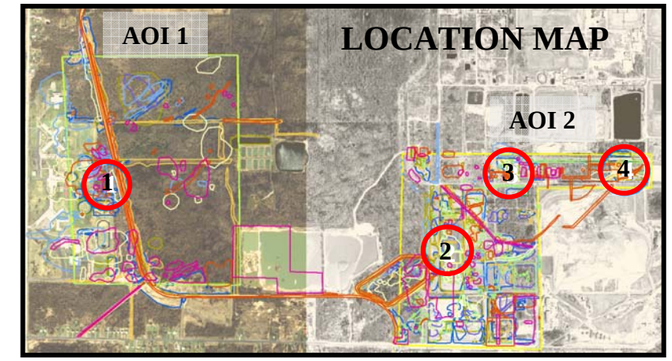
FINAL

1938, 1944, & 1951 IMAGES DEMONSTRATING CHANGES IN SELECTED AREA 1

PREDEVELOPMENT

1944

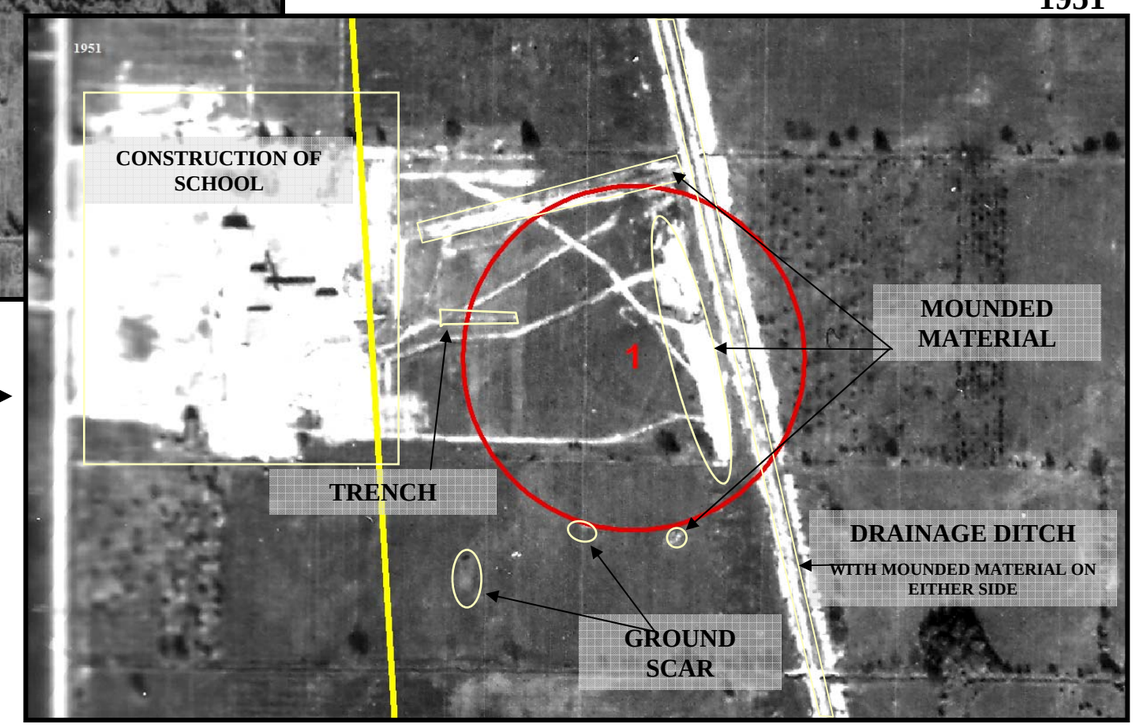




N

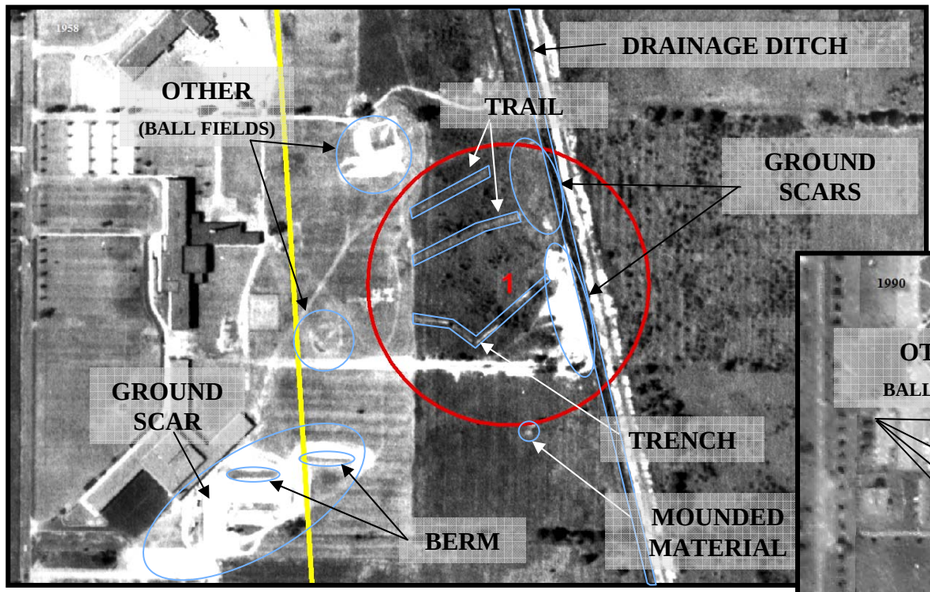
The Mounded Material seen in the 1944 photos are not seen in the predevelopment photos. Ground Scars seen in the 1942 photos (illustrated in the GIS) are possibly the result of agricultural activities.

1951



Lewiston-Porter School District was established in the late 1940s, possibly 1947. Construction of the school building is evident in the 1951 photos. Activity along the Drainage Ditch is also evident.

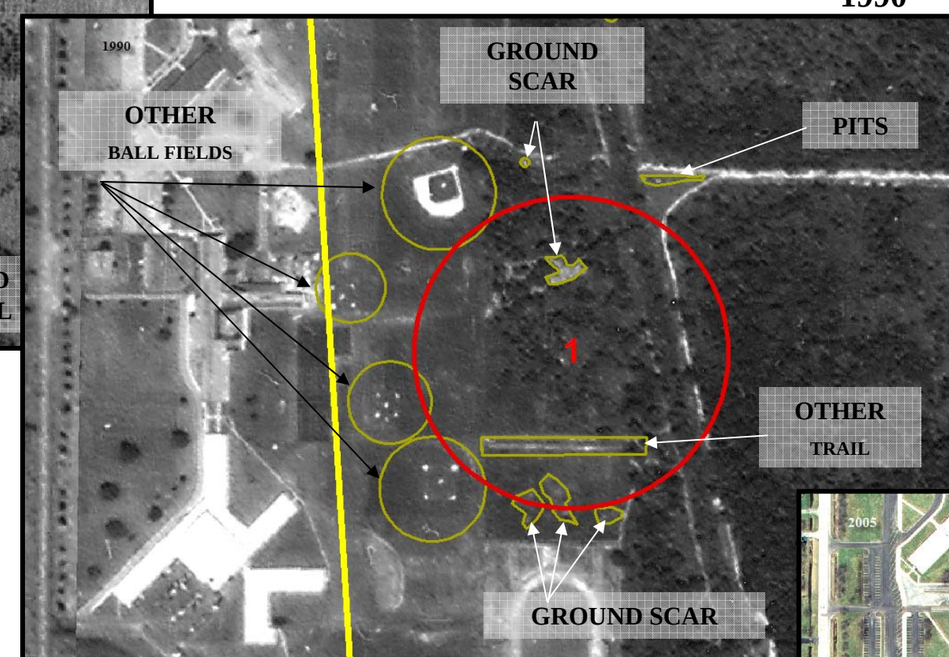
1958, 1990, & 2005 IMAGES DEMONSTRATING CHANGES IN SELECTED AREA 1 (AOI #1)



1958

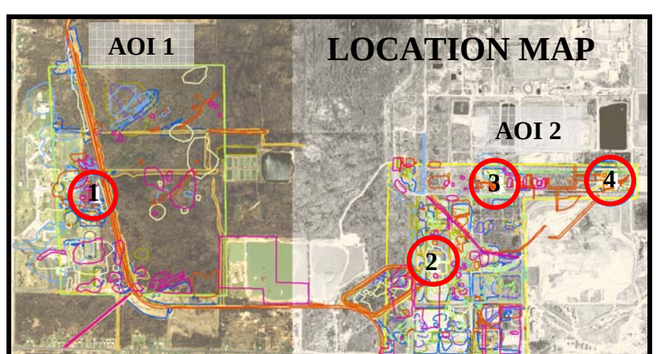
Activity on either side of the Drainage Ditch is evident in the 1958 photos.

1990



School sports activities are evident in the photos from 1958 to 2005. Only a few ground scars, pits, and/or mounded material appear in photos for these years.

2005

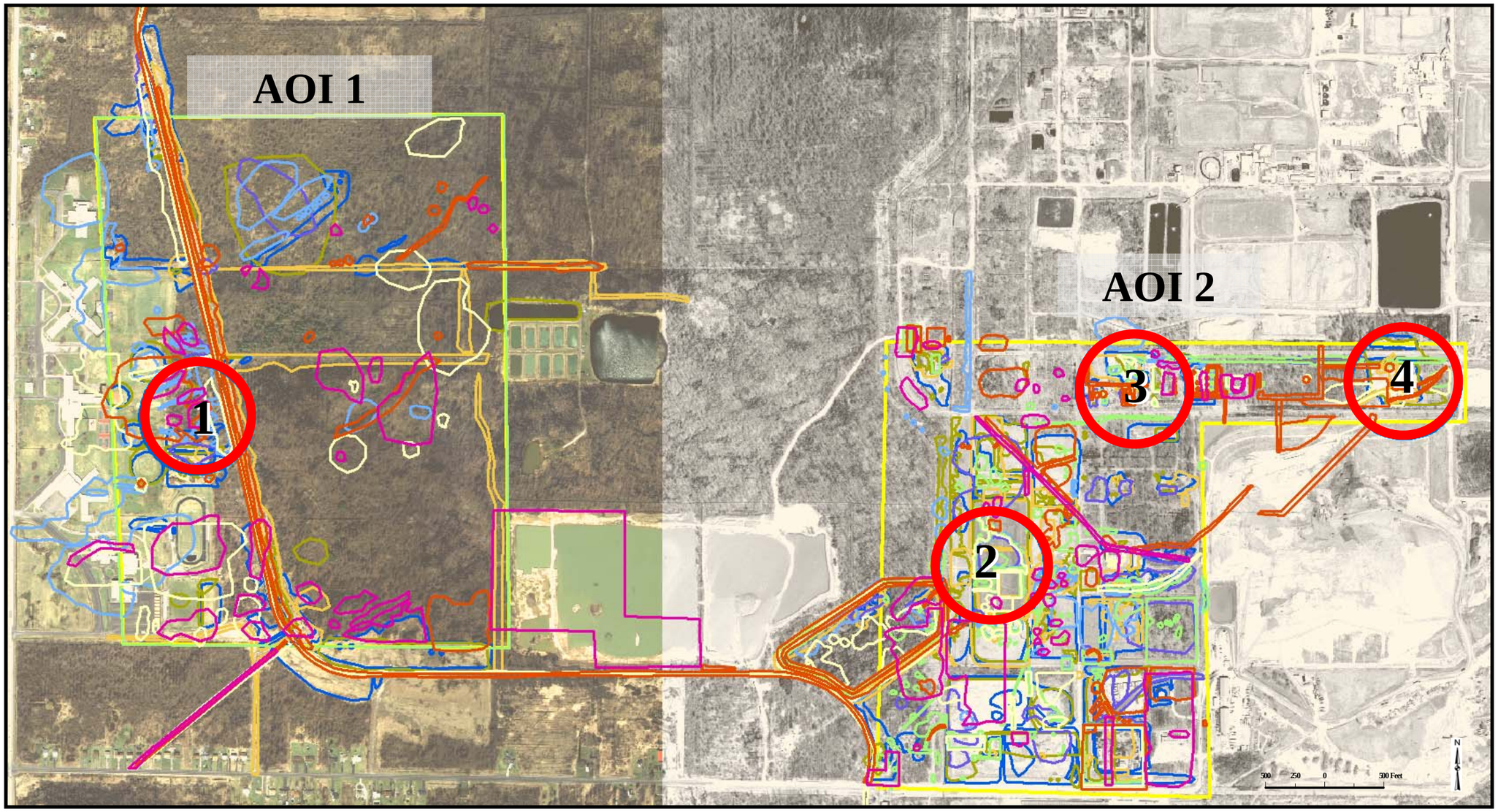


Activity around the Drainage Ditch and south of the AOI 1 is evident on the photos from 1944 to 1995. See the GIS for more detailed coverage of AOI 1.

FINAL

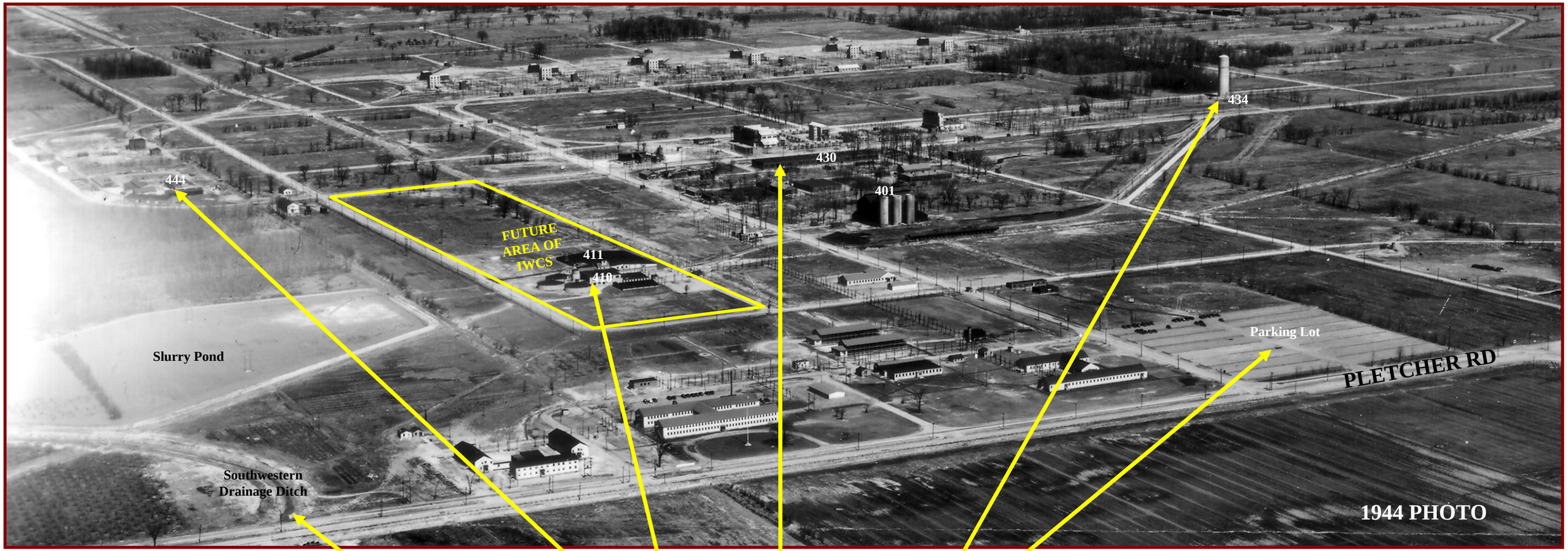
AREA OF INTEREST 2 (AOI 2)

SELECTED AREAS 2, 3, AND 4

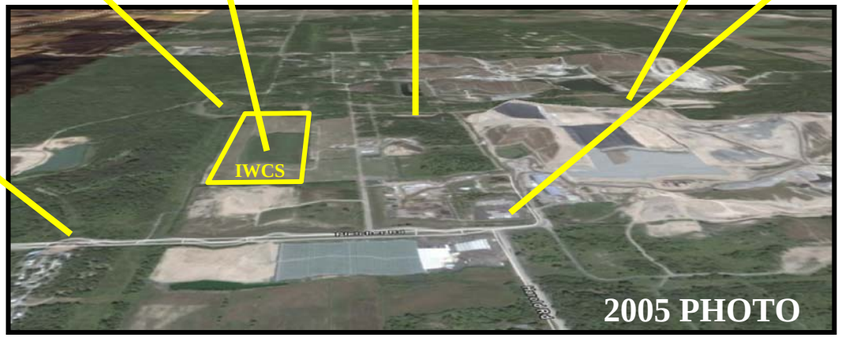


1944 AND 2005 POSITIONING MAPS FOR AOI #2

FINAL



NUMBERS INDICATE 1944 BUILDING NUMBERS



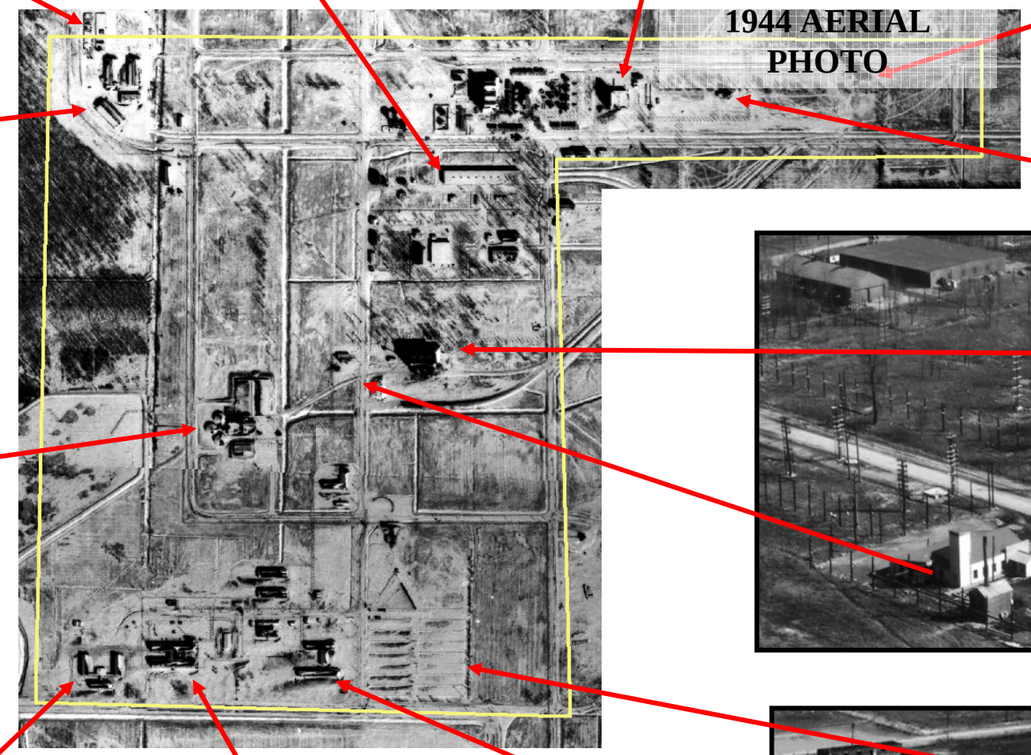
ABOVE PHOTO SHOWS 1944 MILITARY DEVELOPMENT IN THE AREA AROUND THE AREA THAT HAS BECOME THE PRESENT DAY INTERIM WASTE CONTAINMENT STRUCTURE (IWCS)

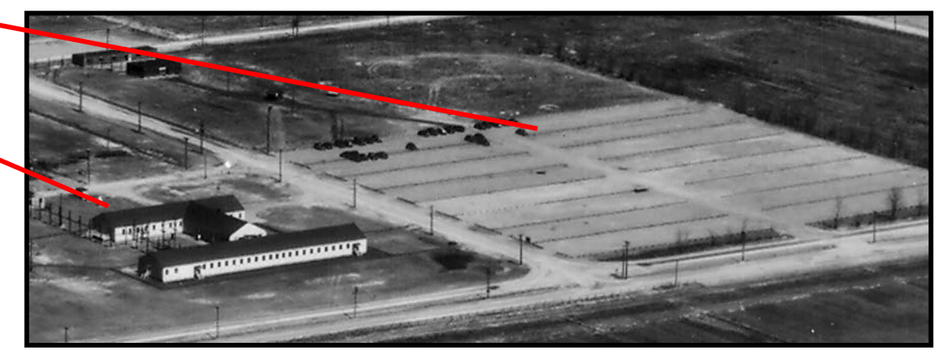
TO LEFT, THE 2005 AERIAL PHOTO SHOWS MORE CURRENT CONDITIONS AROUND THE INTERIM WASTE CONTAINMENT STRUCTURE (IWCS)

Building numbers are from Bechtel National, Inc; see REFERENCES page.

1944 OBLIQUE VIEWS OF AOI #2

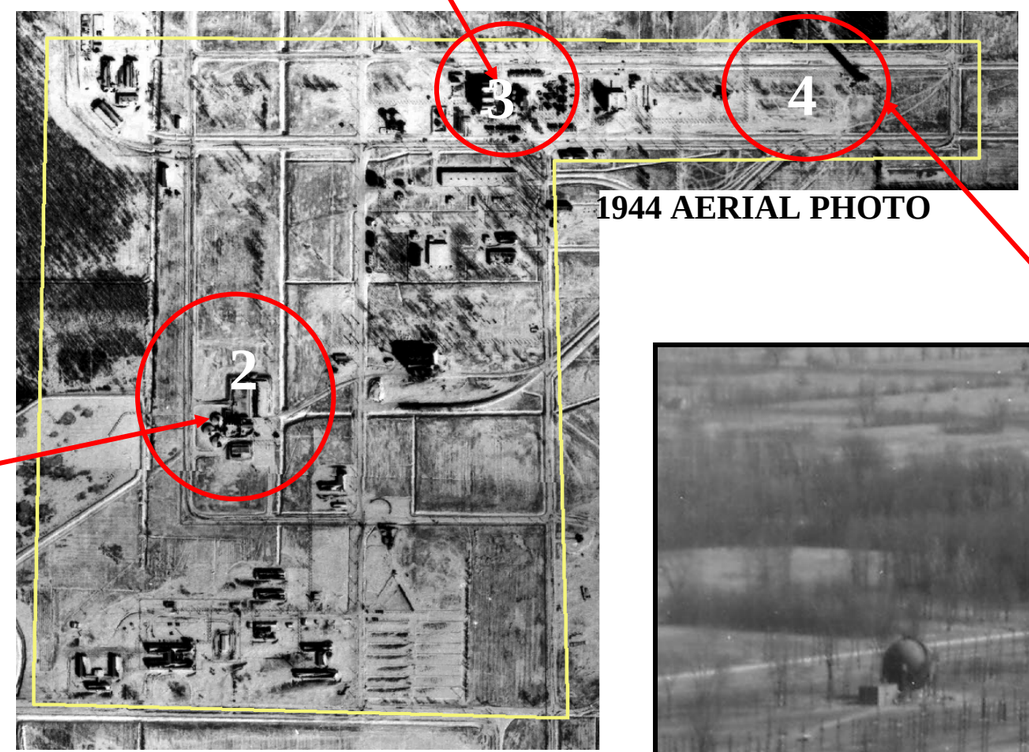
FINAL



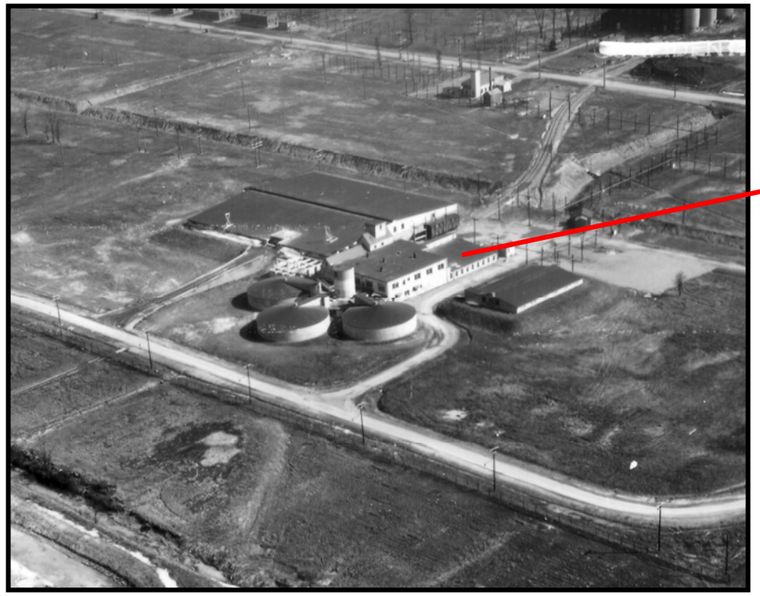


FINAL

1944 OBLIQUE VIEWS OF SELECTED AREAS 2, 3, AND 4



1944 AERIAL PHOTO



AOI 2

FINAL

2ND - 1944 OBLIQUE VIEW OF SELECTED AREA 2 IN AOI #2

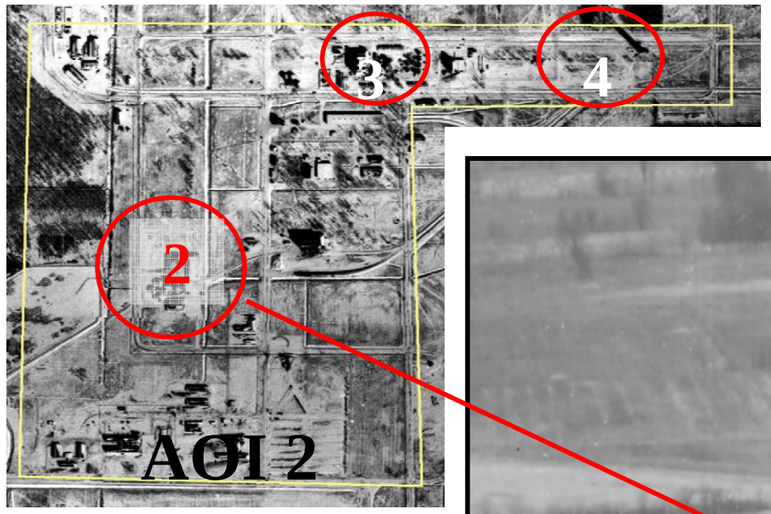
1944 AERIAL PHOTO

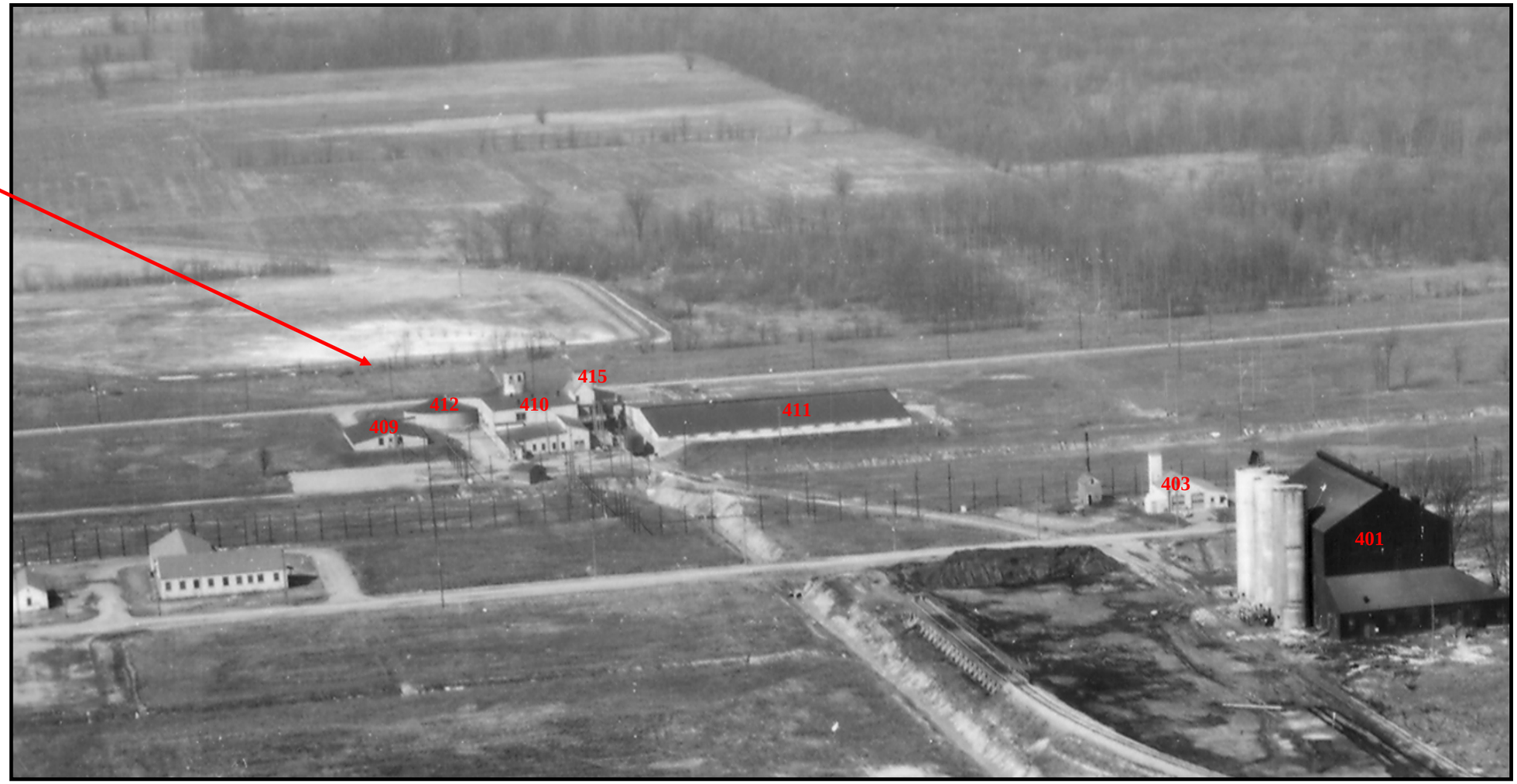
Area seen in 1944 aerial photo and 1944 oblique photo. Oblique photo is taken from the Southwest looking Northeast. Note the single ramp leading to building 411.

Building numbers are from Bechtel National, Inc; see REFERENCES page.

3RD - 1944 OBLIQUE VIEW OF SELECTED AREA 2 IN AOI #2

1944 AERIAL PHOTO



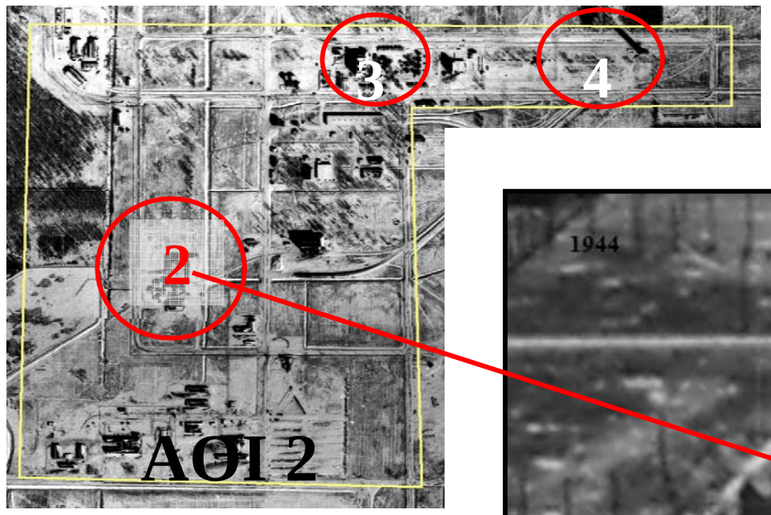


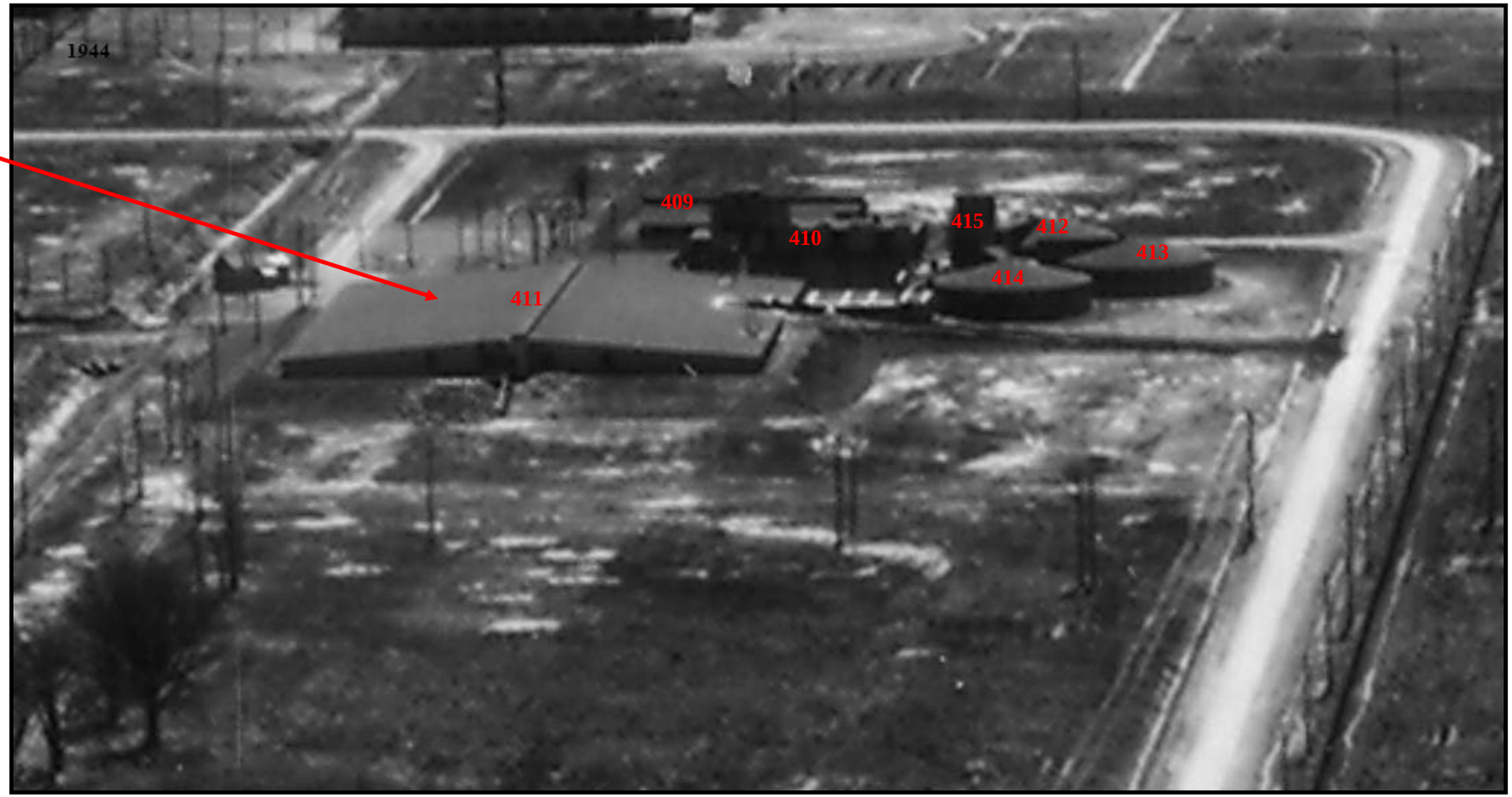
Area seen in 1944 aerial photo and 1944 oblique photo. Oblique photo is taken from the East looking West

Building numbers are from Bechtel National, Inc; see REFERENCES page.

4TH - 1944 OBLIQUE VIEW OF SELECTED AREA 2 IN AOI #2

1944 AERIAL PHOTO





Area seen in 1944 aerial photo and 1944 oblique photo. Oblique photo is taken from the North looking South

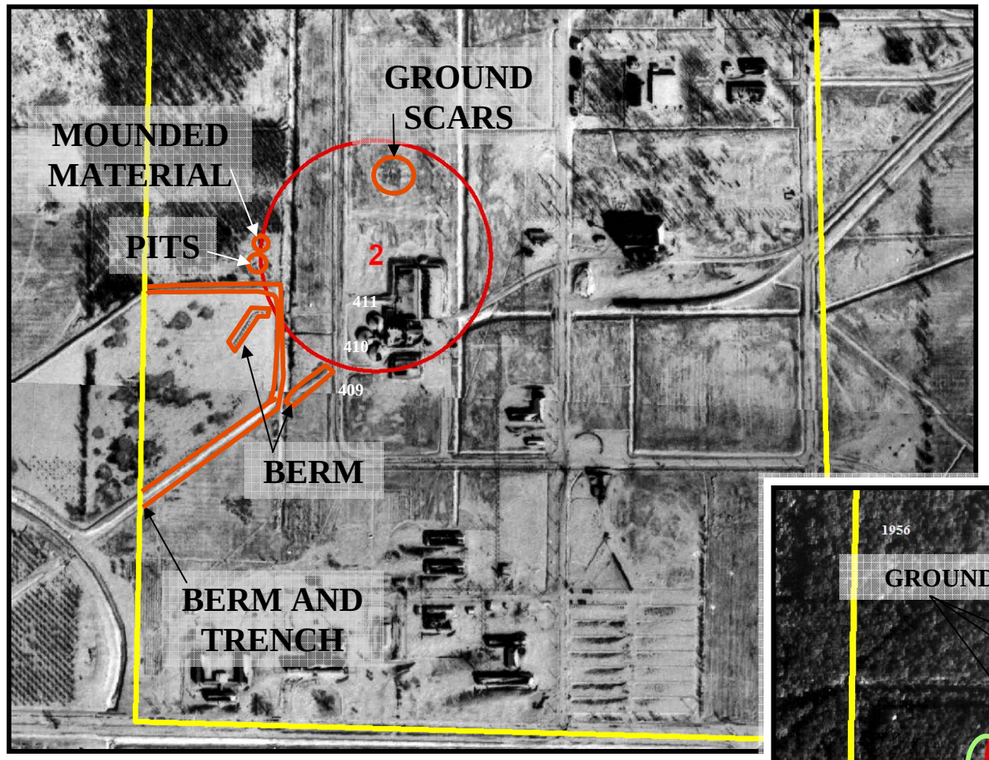
Building numbers are from Bechtel National, Inc; see REFERENCES page.

FINAL

1938, 1942, 1944 & 1956 IMAGES DEMONSTRATING CHANGES IN SELECTED AREA 2 (AOI 2)

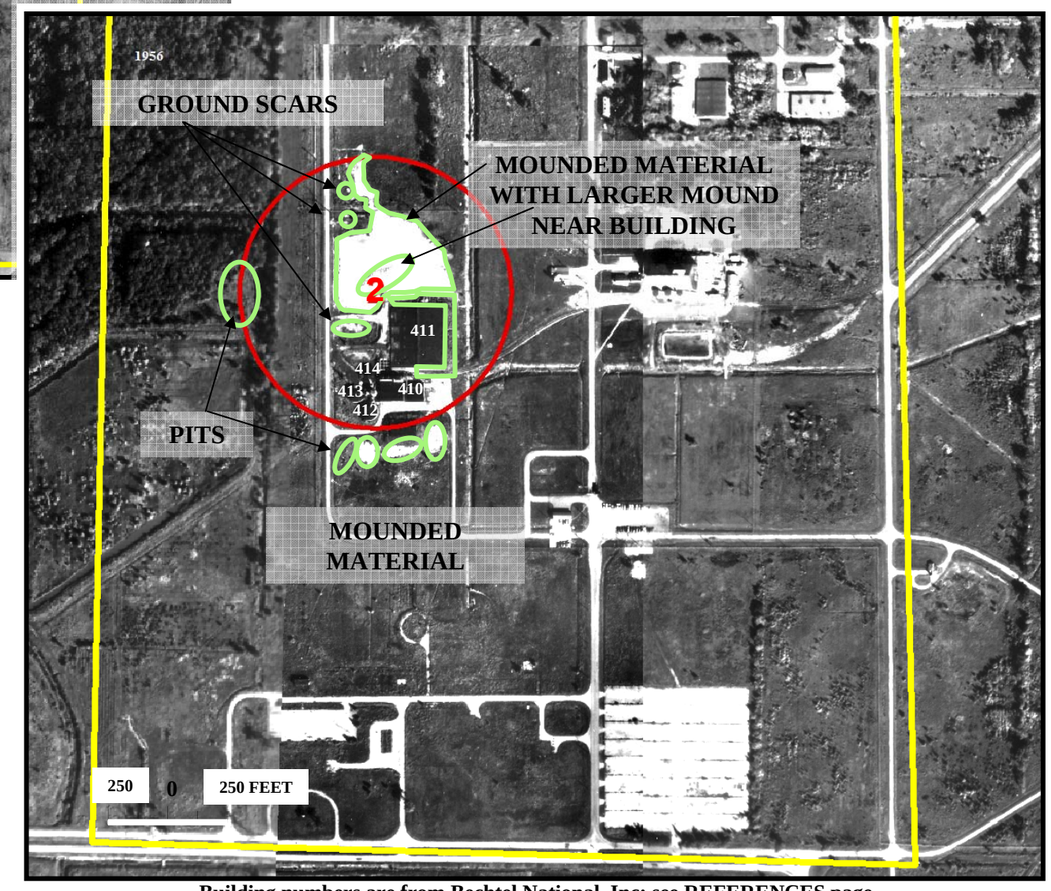
1938
PREDEVELOPMENT

1942 NO DEVELOPMENT IN SELECTED AREA 2



1944

1956



Building numbers are from Bechtel National, Inc; see REFERENCES page.

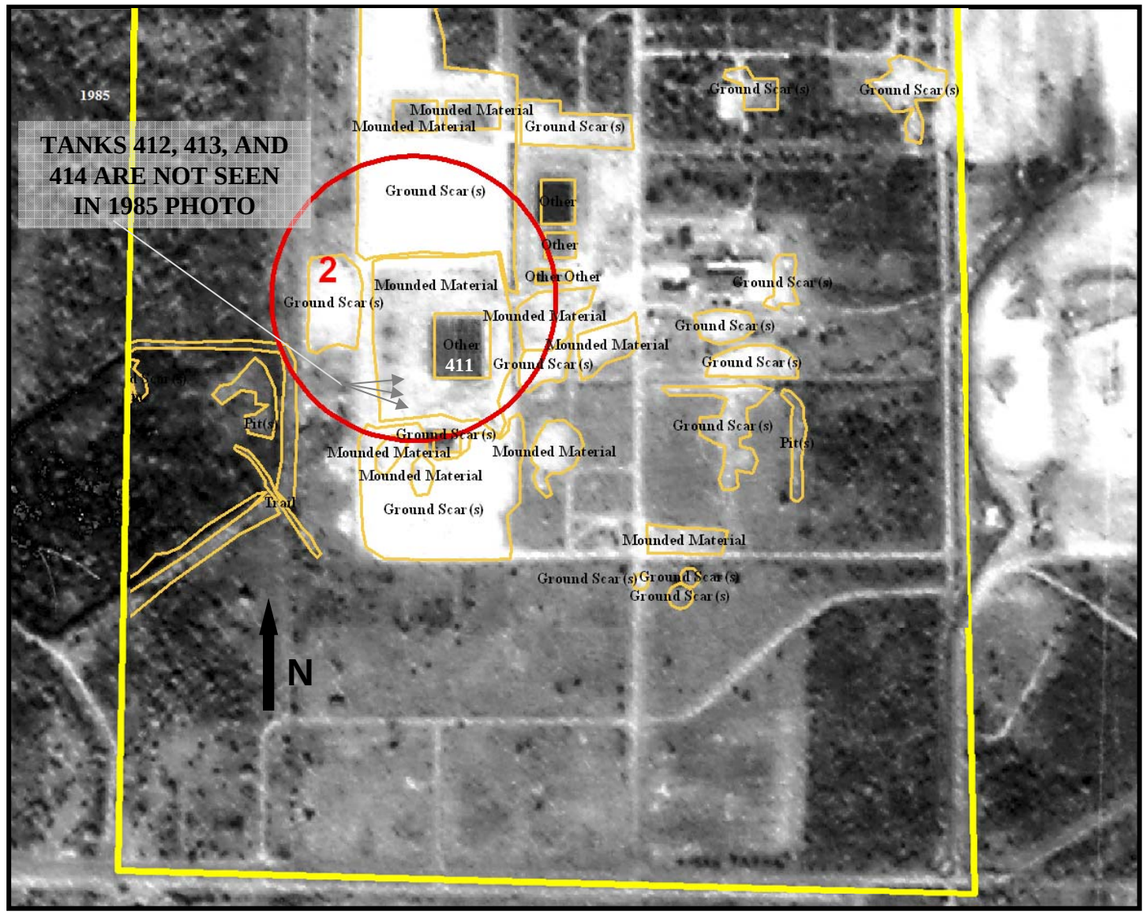
Buildings are not seen in this Selected Area 2 of AOI 2 in the predevelopment nor the 1942 photos. The buildings in Selected Area 2 appear first in the 1944 photos. The Storage Tanks (buildings 412 to 415) are seen in each year analyzed from 1944 to 1978. They do not appear in 1985 photos but building 411 does. Building 411 is not seen in the 1990 photos.

See the GIS for detailed coverage of AOI 2.

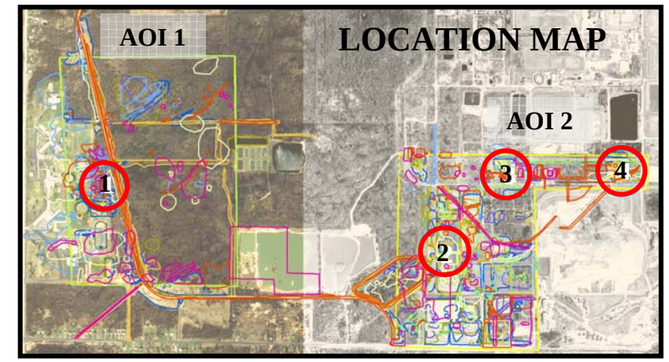
FINAL

1985 & 1990 IMAGES DEMONSTRATING CHANGES IN SELECTED AREA 2 (AOI 2)

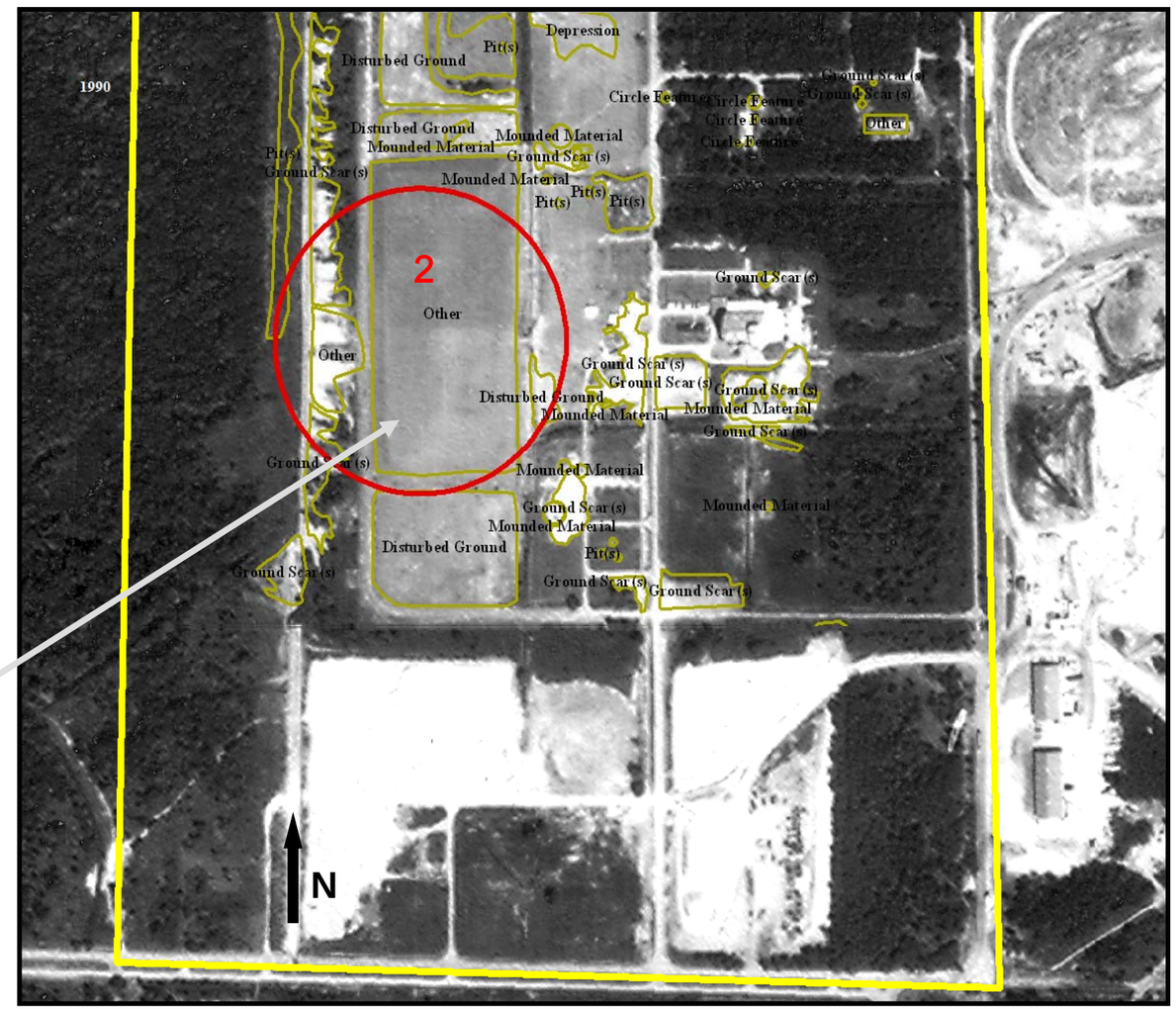
Storage Tanks (412 to 415) and building 410 are not seen in the 1985 photos.



1985



1990



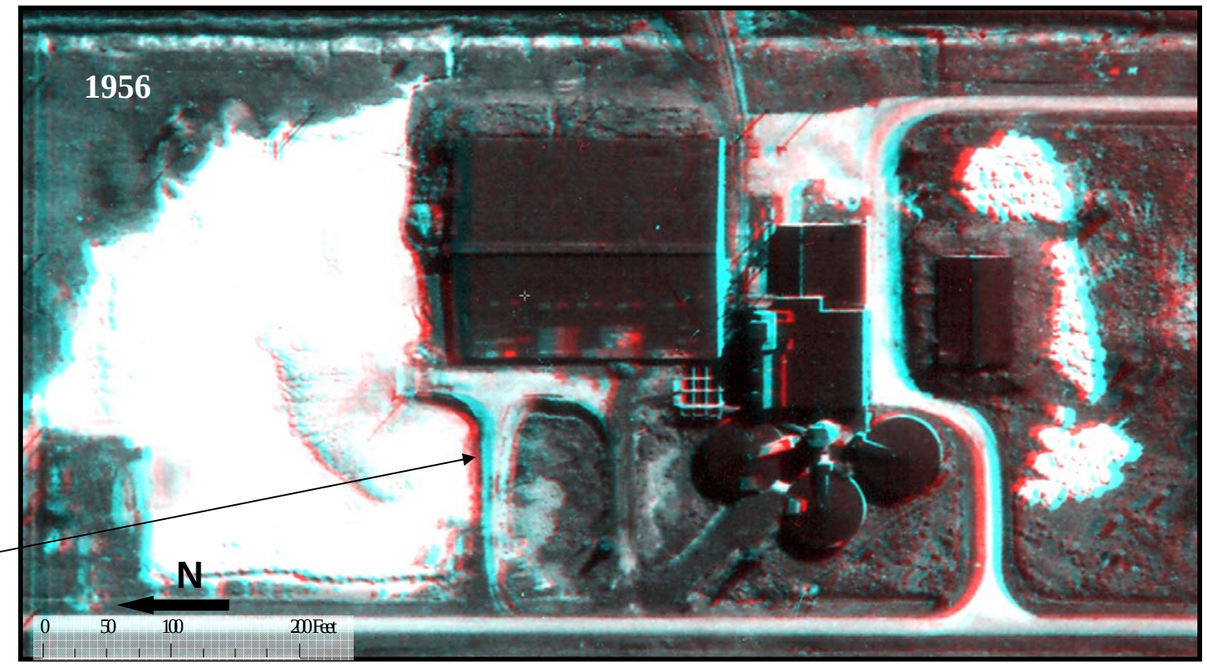
Buildings and Storage Tanks are gone by 1990, with the appearance of the IWCS, an engineered earthen drainage cover (cap).

The cap is designed to minimize water infiltration, radon emanation, gamma radiation, erosion, and frost heave damage. A vegetative cover of shallow-rooted grasses minimizes erosion. The upper layer is compacted and contoured to promote runoff, the same as the underlying layers are.

See the GIS for detailed coverage of AOI 2.

STEREO IMAGES OF CHANGES IN SELECTED AREA 2 OF AOI 2

1944

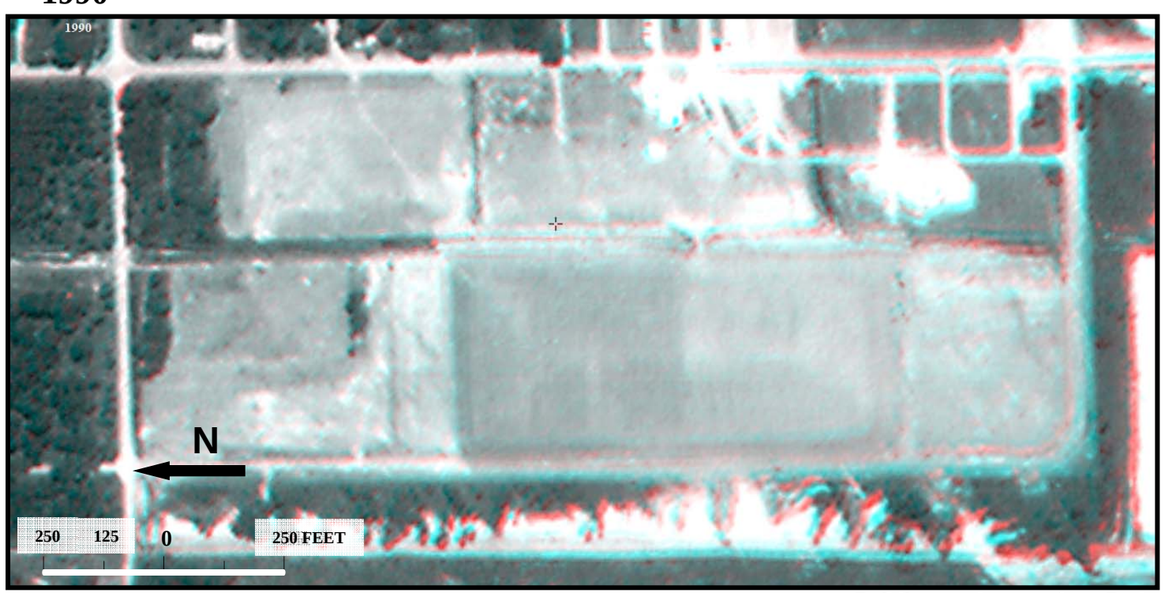


1956

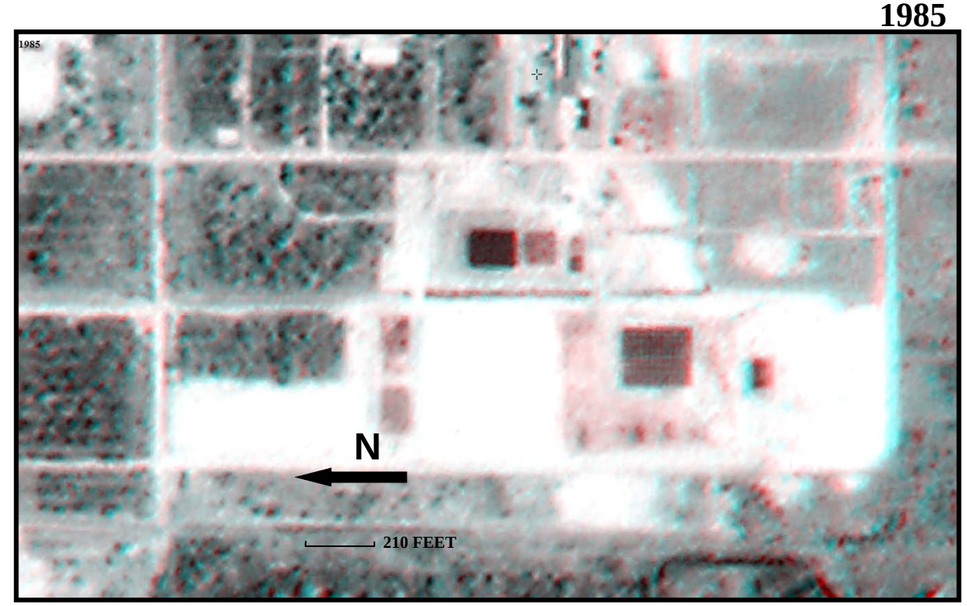
Note one ramp to building 411 in 1944 oblique. In 1951 photo two ramps are evident, as in this 1956 photo. Building 411 is gone in 1990 stereo.

L-30 residue was delivered to building 411 by the truck load in the forties.*

1990



1985



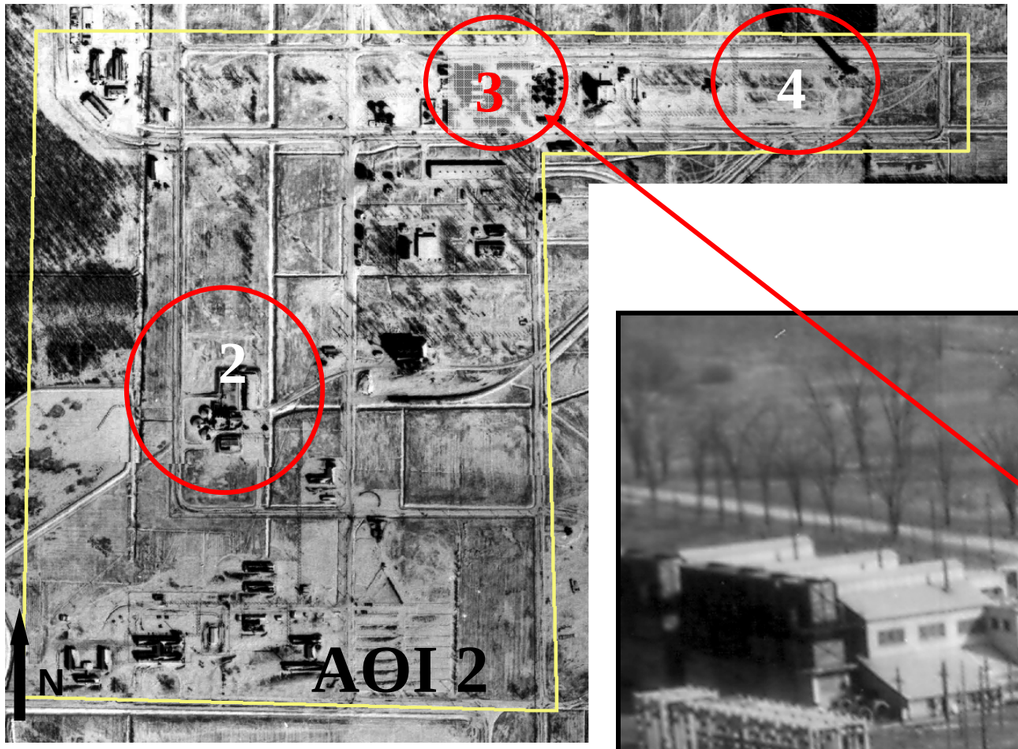
To obtain the 3-D effect, images must be viewed with red/blue lens stereo glasses.

Building numbers are from Bechtel National, Inc. see page 56

*Aerospace Corporation, 1982

1944 OBLIQUE VIEW OF SELECTED AREA 3 IN AOI #2

1944 AERIAL PHOTO

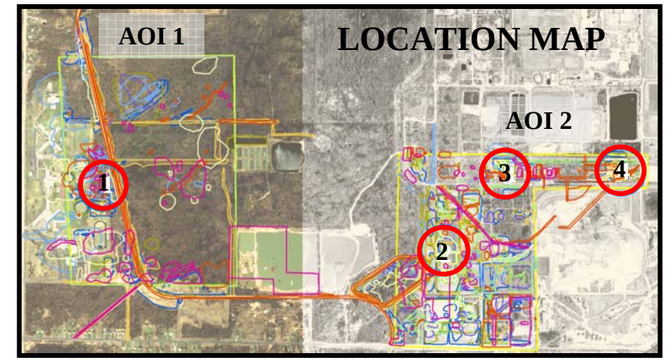


Area seen in 1944 aerial photo and 1944 oblique photo. Oblique photo is taken from the Southwest looking Northeast.

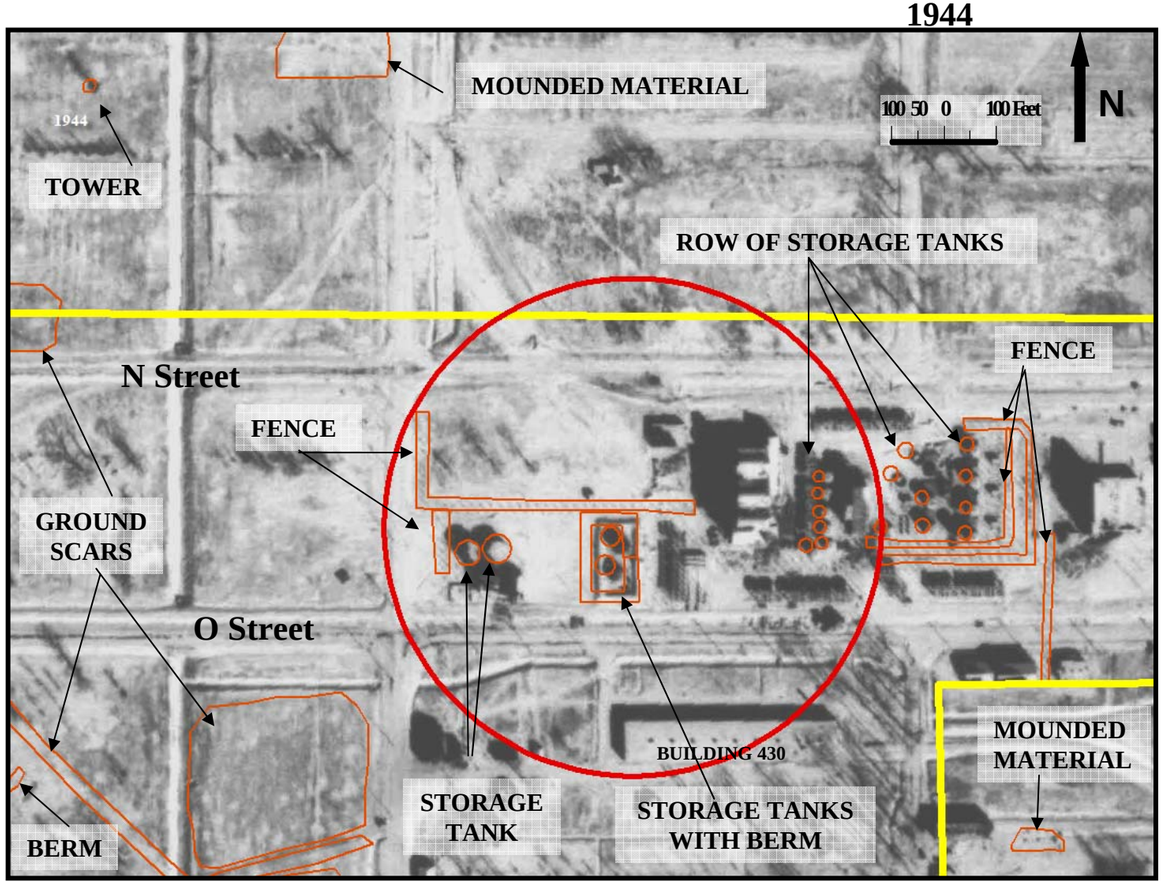
1938, 1944 & 1956 IMAGES DEMONSTRATING CHANGES IN SELECTED AREA 3 (AOI2)

1938 PREDEVELOPMENT

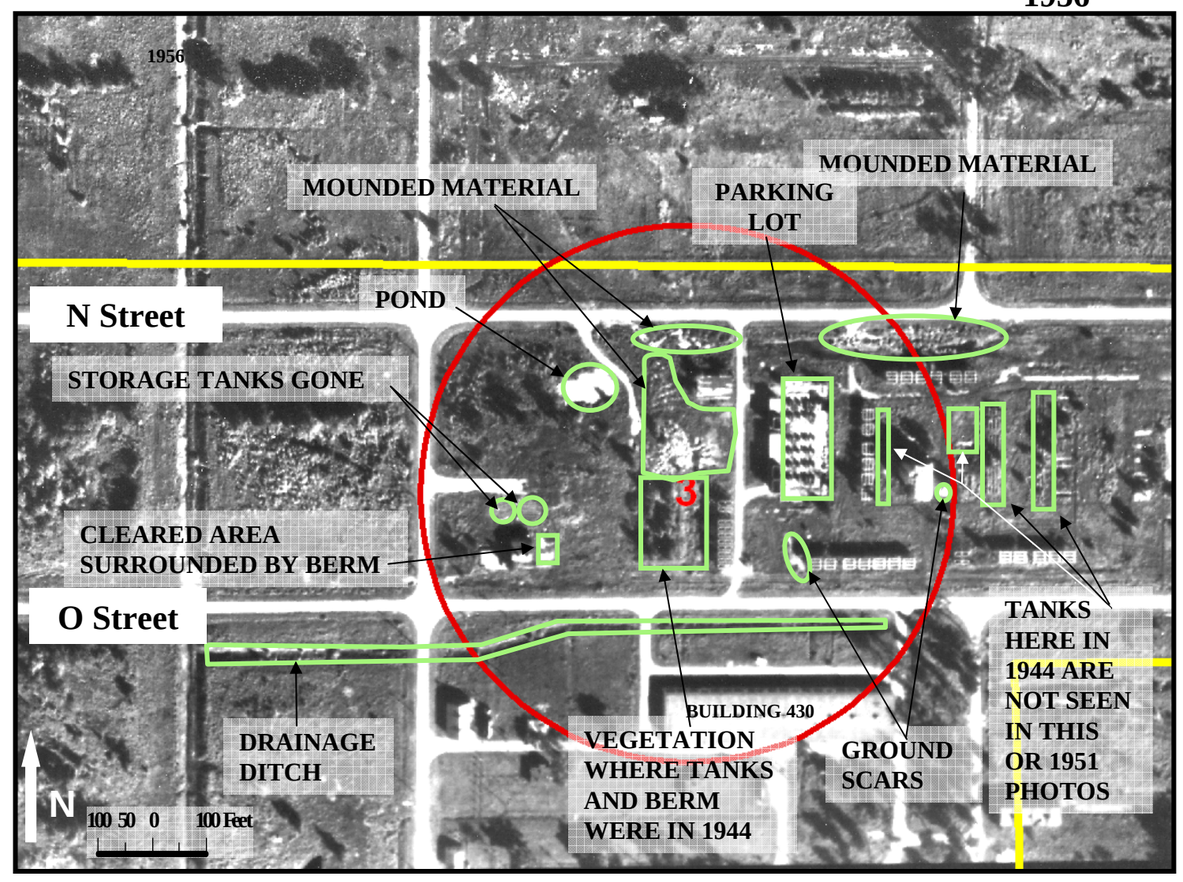
IN 1944 PHOTOS, STORAGE TANKS ARE EVIDENT AMONG THE BUILDINGS BETWEEN "N" AND "O" STREETS. THE TANKS ARE NOT SEEN IN THE 1951 PHOTOS OR AFTER. THE LOCATION WHERE THE 1944 TANKS WERE LOCATED IS MARKED ON THE 1956 PHOTO.



1944



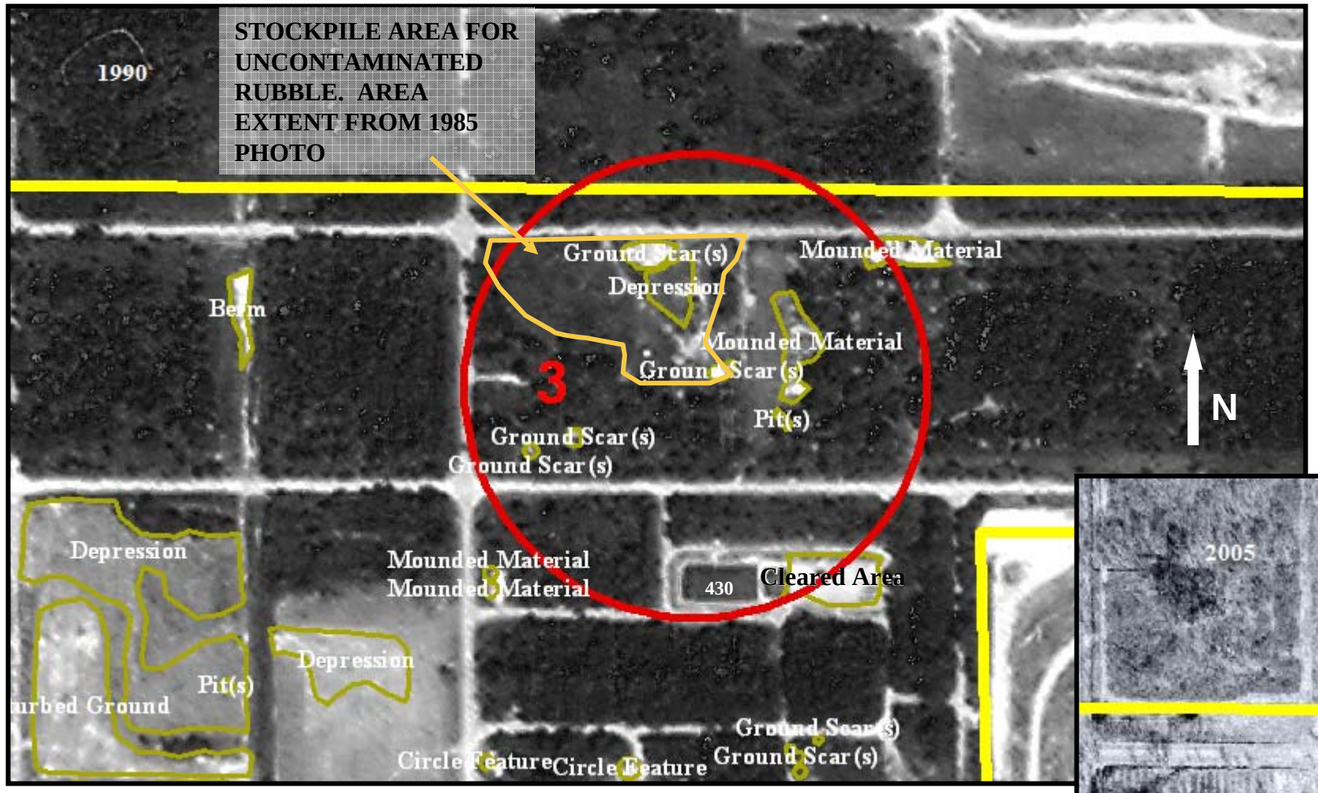
1956



See the GIS for detailed coverage of AOI 2.

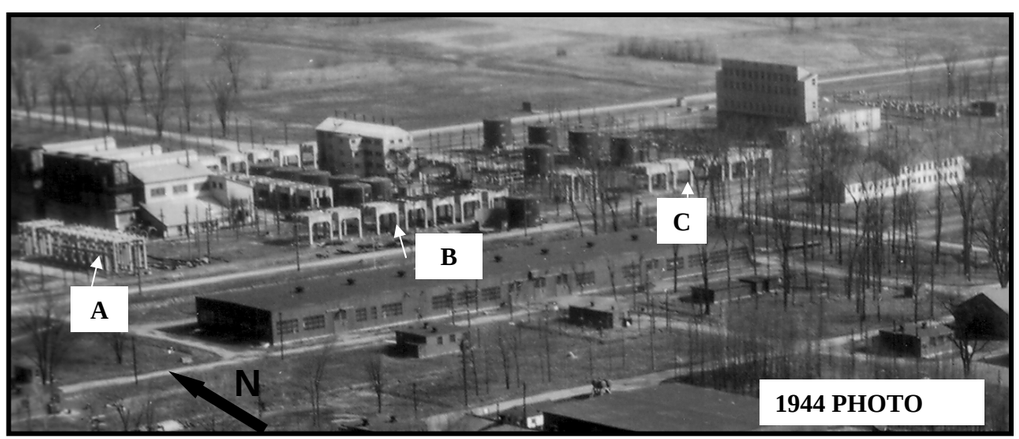
1990 & 2005 IMAGES DEMONSTRATING CHANGES IN SELECTED AREA 3 (AOI2)

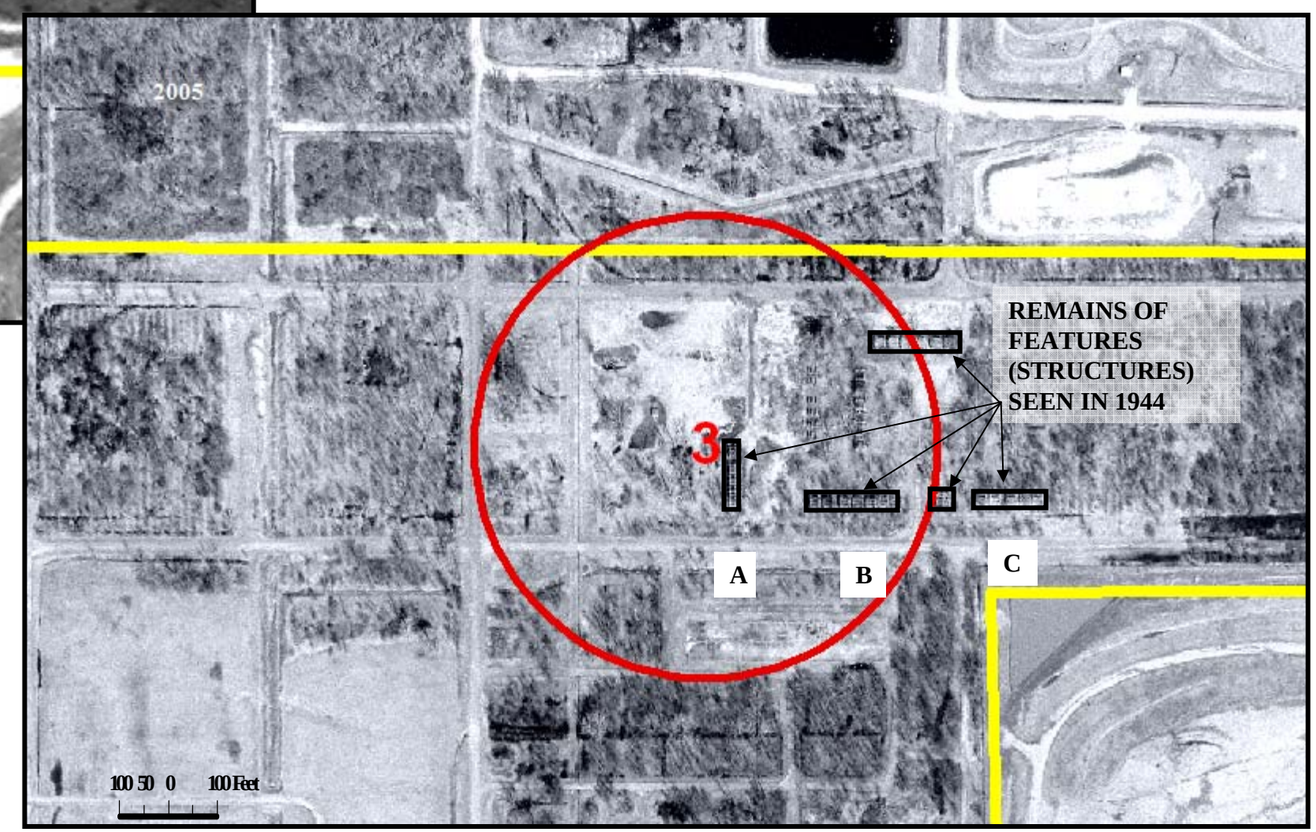
FINAL



1985 PHOTOS INDICATE MOUNDED MATERIAL IN AN AREA THAT BECHTEL NATIONAL, INC. CALLED "STOCKPILE AREA FOR UNCONTAMINATED RUBBLE" IN THEIR MAY 1986 REPORT. THIS AREA IS OUTLINED ON THE 1990 PHOTO IN LIGHT ORANGE.

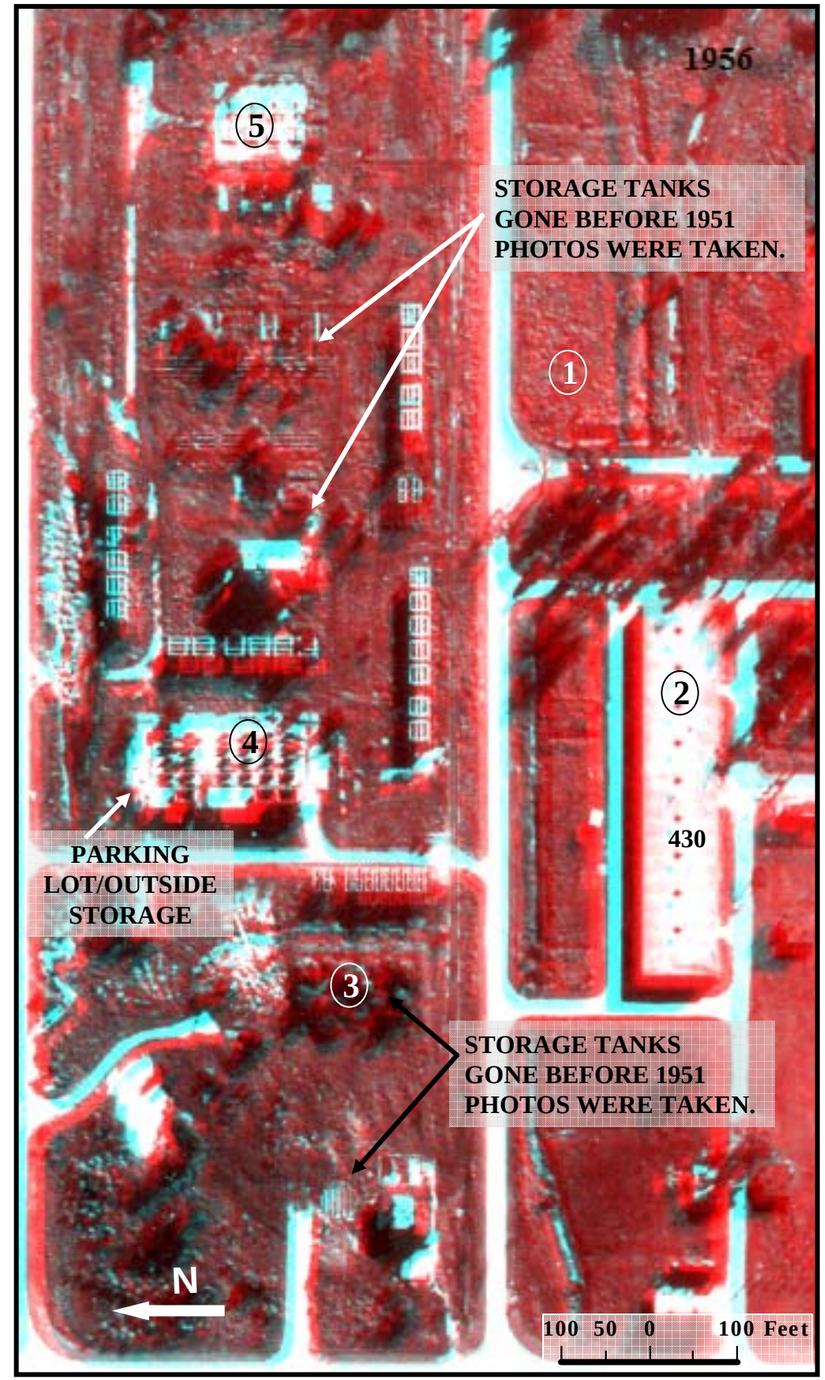
THE 1990 PHOTO IS USED BECAUSE IT SHOWS THE SIZE CHANGE OF BUILDING 430. THIS BUILDING DOES NOT CHANGE SIZE FROM 1944 PHOTOS TO 1985 PHOTOS. IT IS LESS THAN HALF ITS FORMER SIZE IN THE 1990 PHOTOS.





See the GIS for detailed coverage of AOI 2.

1944 & 1956 - STEREO IMAGES OF CHANGES OF SELECTED AREA 3 (AOI2)



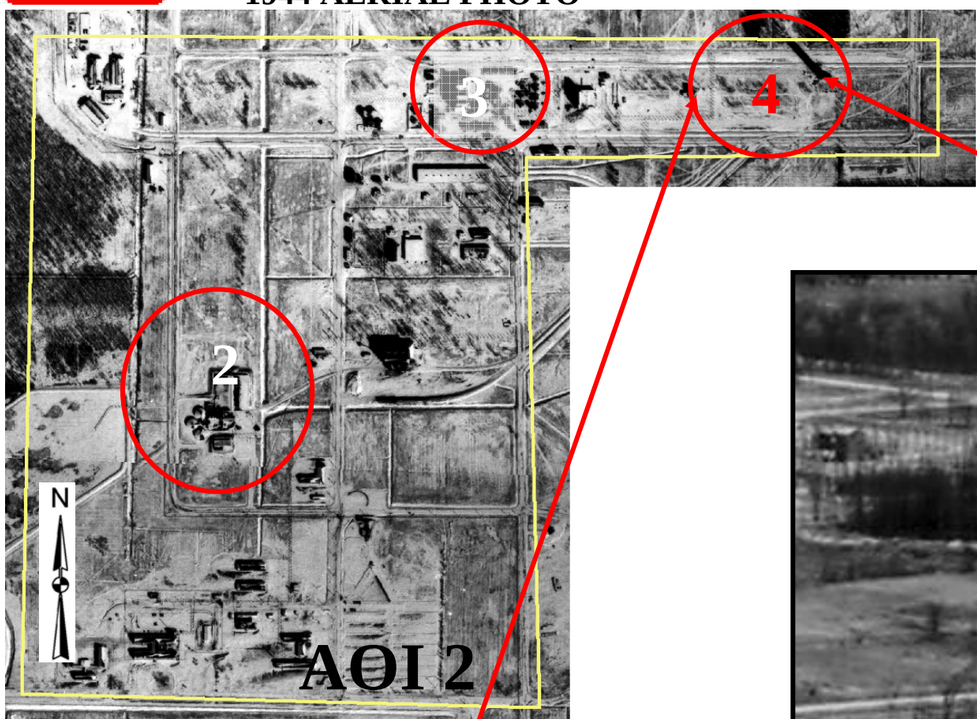
CIRCLED NUMBERS INDICATE A MATCHING LOCATION IN THE ADJACENT PHOTO.

To obtain the 3-D effect, images must be viewed with red/blue lens stereo glasses.

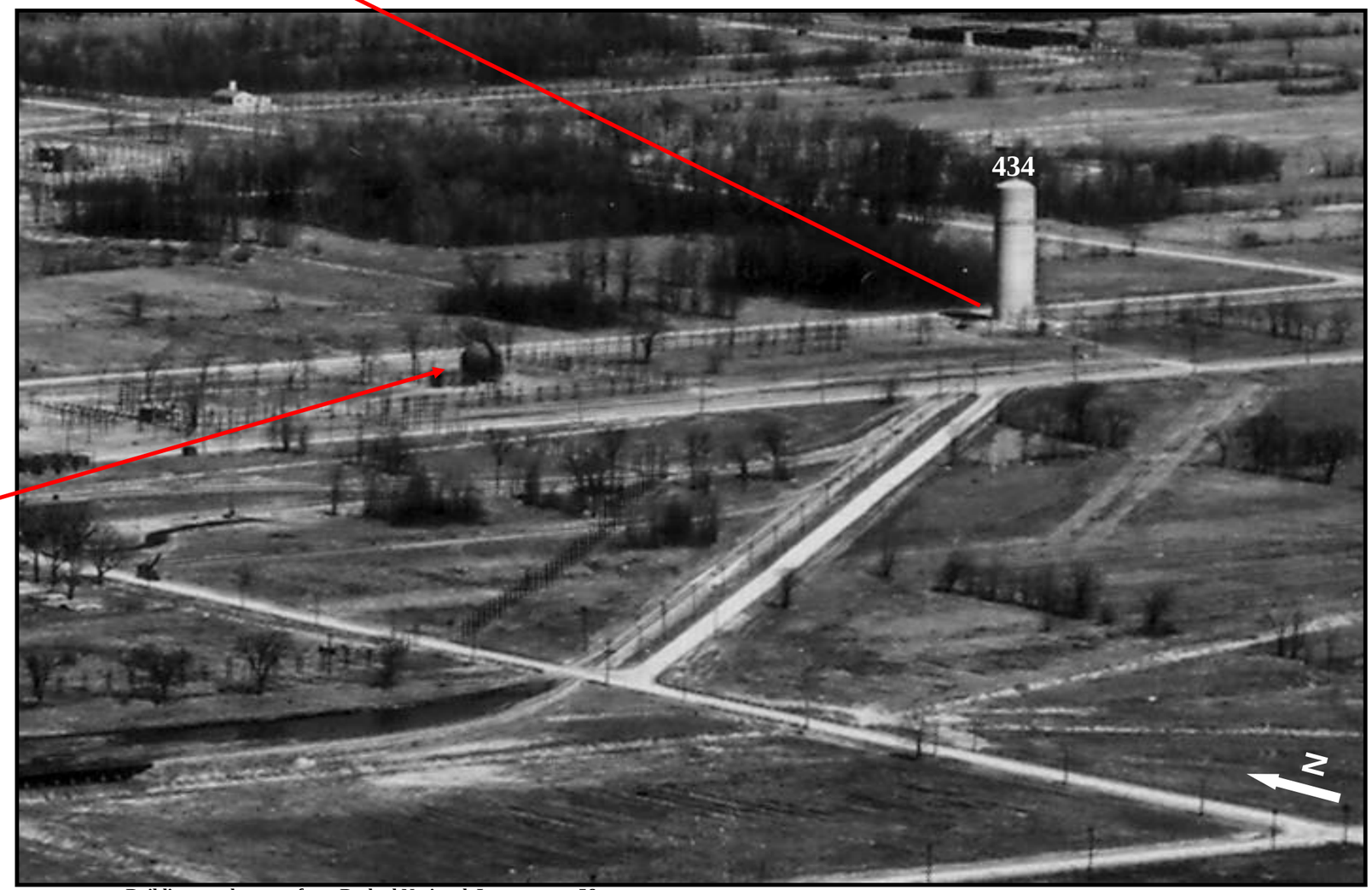
See the GIS for detailed coverage of AOI 2.

1944 OBLIQUE VIEW OF SELECTED AREA 4 IN AOI #2

1944 AERIAL PHOTO



Area seen in 1944 aerial photo and 1944 oblique photo. Oblique photo is taken from the Southwest looking Northeast

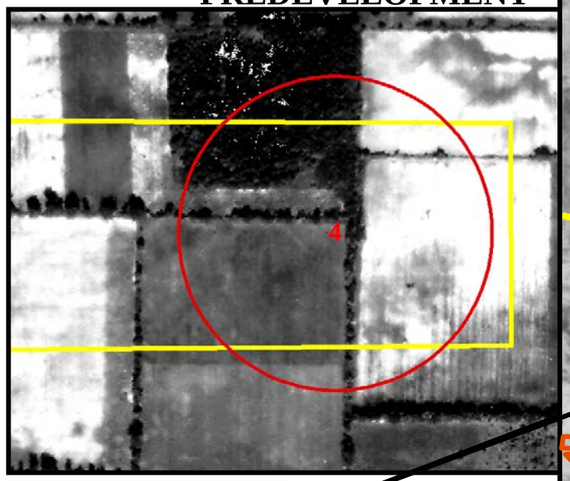


Building numbers are from Bechtel National, Inc. see page 56

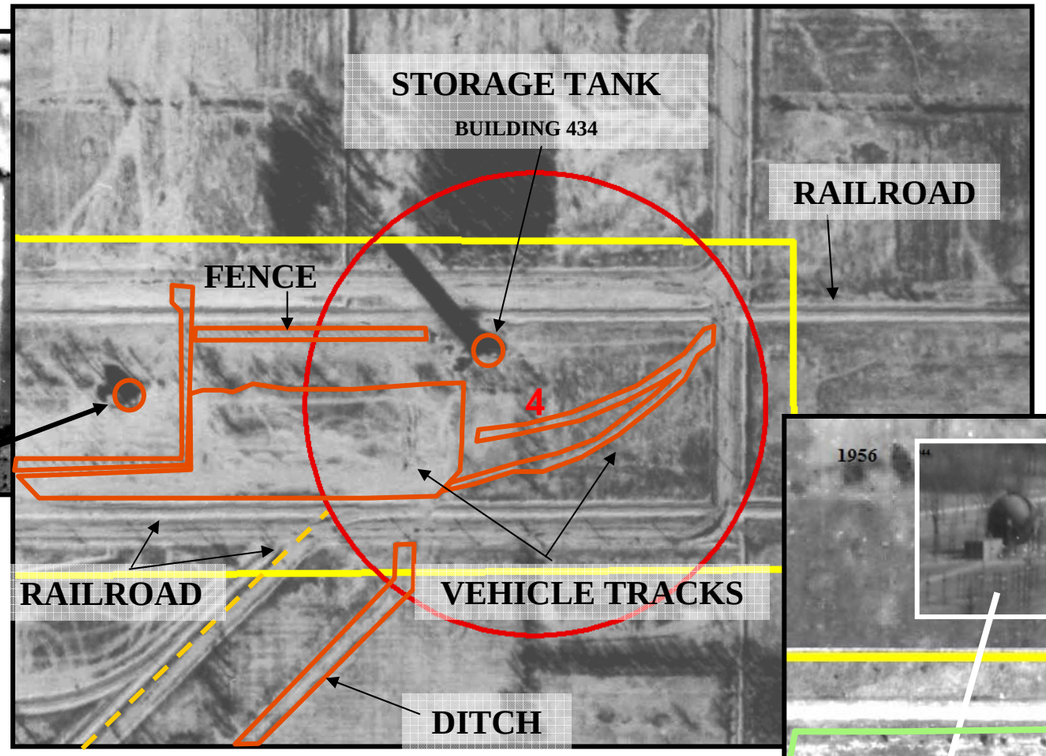
1938, 1944 & 1956 IMAGES DEMONSTRATING CHANGES IN SELECTED AREA 4 (AOI2)

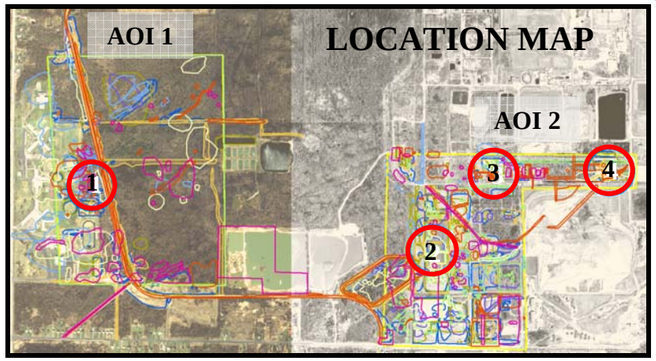
FINAL

1938
PREDEVELOPMENT

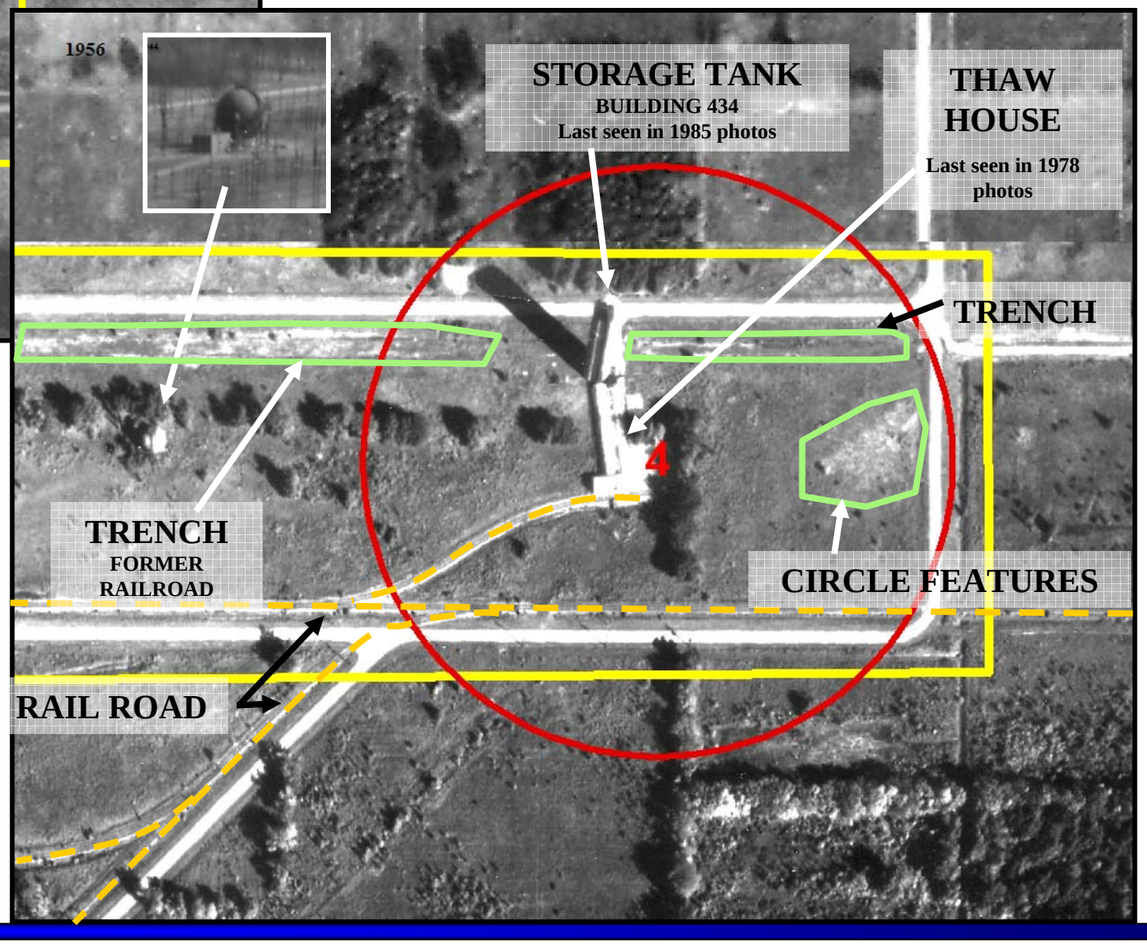


1944





1956



THE MAY 1986 REPORT BY BECHTEL NATIONAL, INC. INDICATES A BUILDING CALLED "THAW HOUSE" ADJACENT TO BUILDING 434. THE BUILDING SEEN IN THE 1956 PHOTO IS LABELED "THAW HOUSE" BASED ON THIS REPORT. A BUILDING, OR EVIDENCE OF ONE, IS SEEN IN PHOTOS FROM 1951 THROUGH 1978. IT IS NOT SEEN IN 1985 PHOTOS.

BUILDING 434, THE STORAGE TANK/TOWER, IS SEEN IN PHOTOS FROM 1944 TO 1985.

NEITHER BUILDING NOR STORAGE TANK/TOWER (BUILDING 434) IS SEEN IN THE 1990 PHOTOS

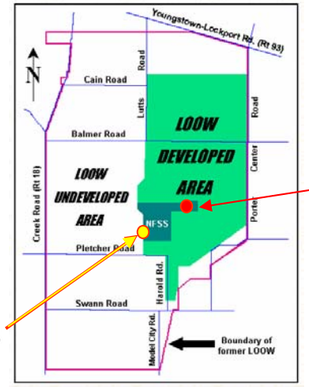
See the GIS for detailed coverage of AOI 2.

ADDITIONAL INFORMATION REGARDING SELECTED AREA 4 (AOI2)

TNT production, support, and storage were constructed within the 2,500 acres commonly referred to as the "Developed Area" of the LOOW (shown in green in map below). *

In the 1950's, drums of high-activity radioactive residues from around the Developed Area were emptied into a vented silo* (the one seen in the photo at right).

In the early 1980's, the Department of Energy transferred this waste from the vented silo to the area now called The Interim Waste Containment Structure, or "IWCS" (pages 29 to 34 of this report).



LOCATION OF IMAGE

IWCS

The "Developed Area" is analyzed in the 2002 report produced by TEC and entitled "Former Lake Ontario Ordnance Works, NY".

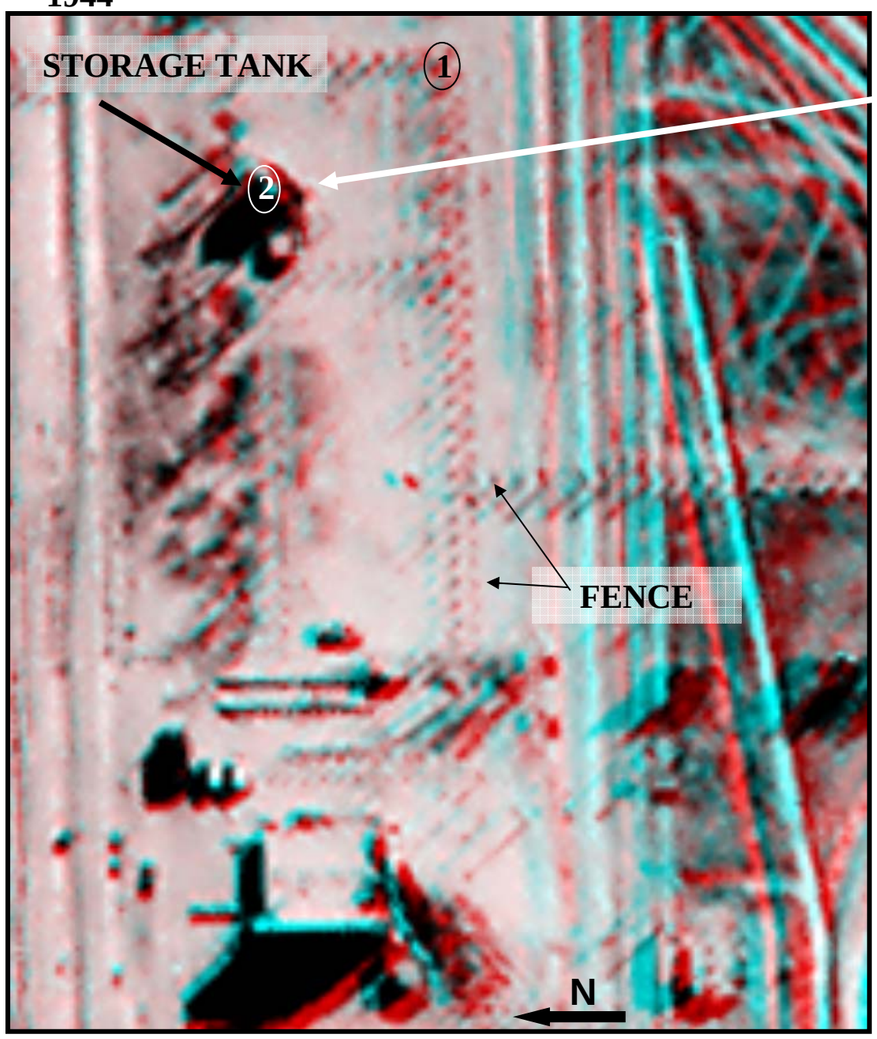
***Information taken from the Restoration Advisory Board, Lake Ontario Ordnance Works web site. LOOW-RAB, P.O.Box, Youngstown, NY 14174**

N

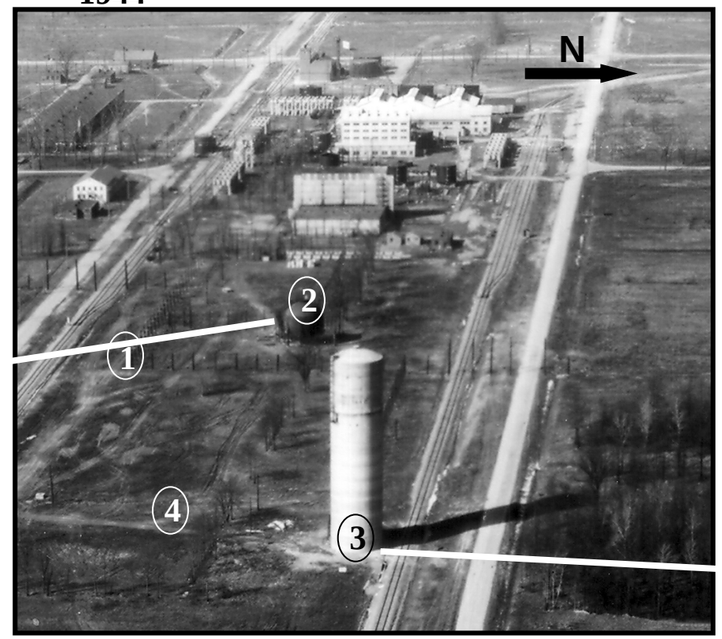
FINAL

1944 STEREO IMAGES OF CHANGES IN SELECTED AREA 4 (AOI 2)

1944



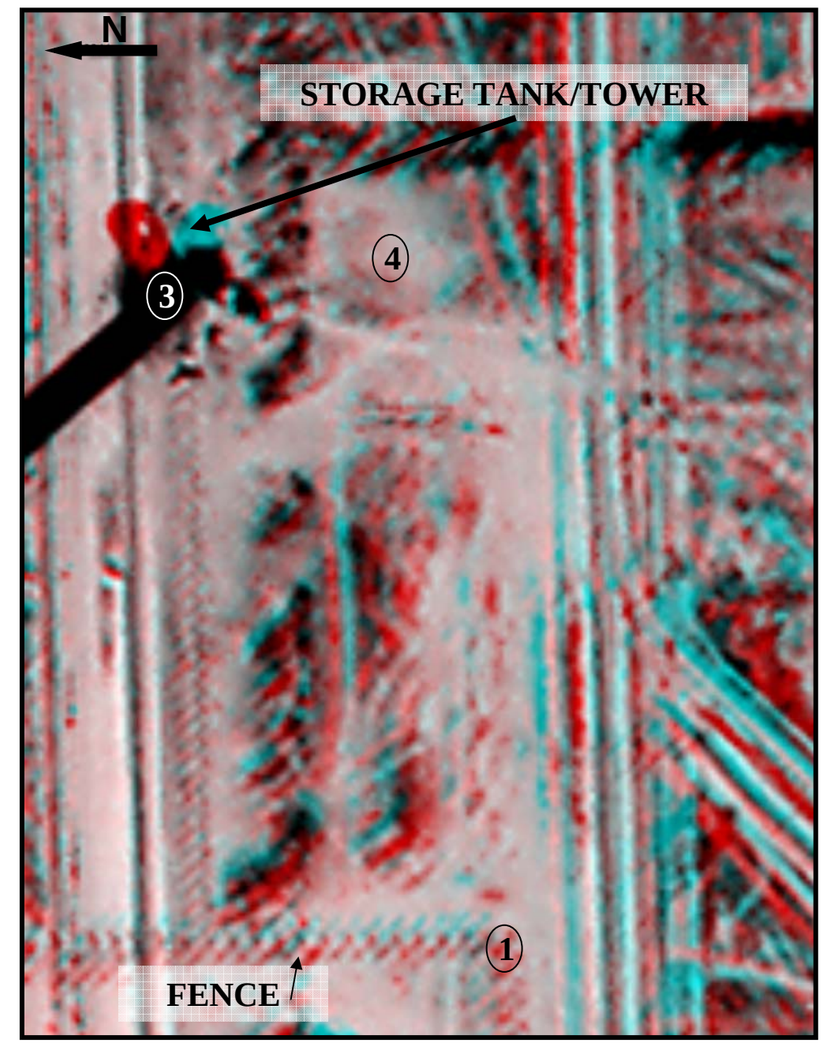
1944



CIRCLED NUMBERS INDICATE A MATCHING LOCATION IN THE ADJACENT PHOTOS.

To obtain the 3-D effect, images must be viewed with red/blue lens stereo glasses.

1944

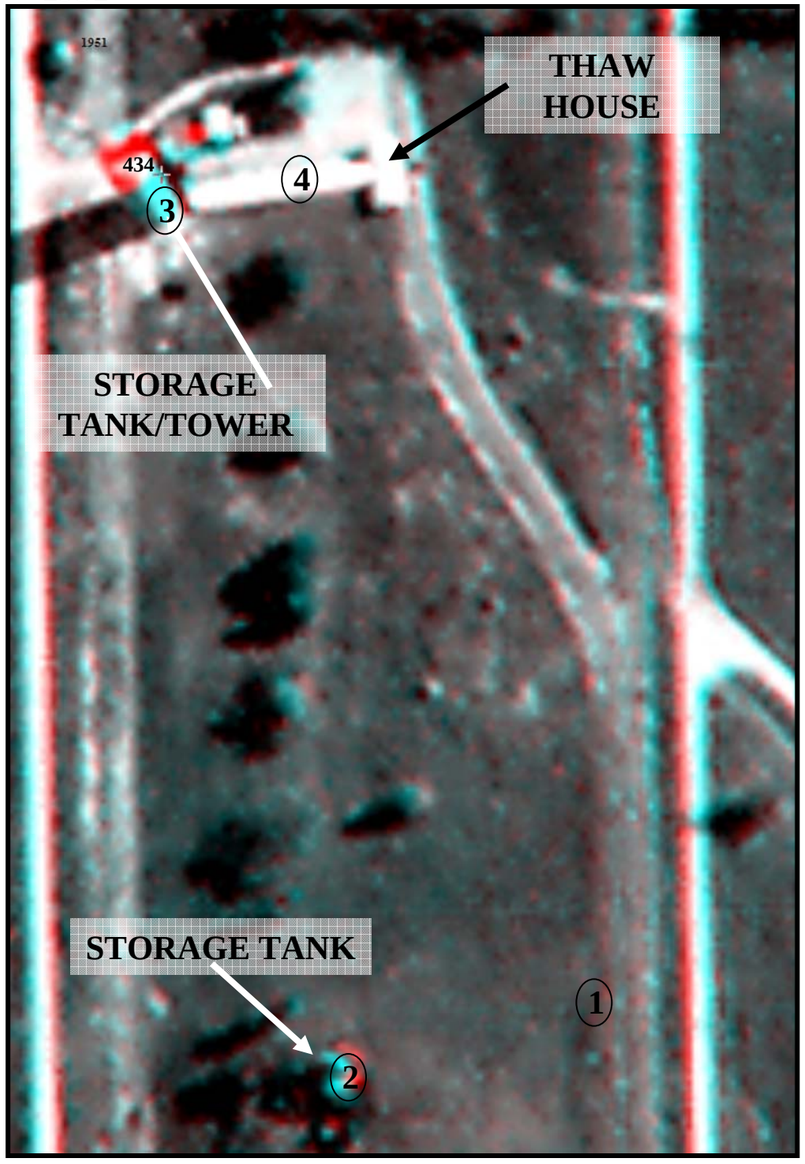


See the GIS for detailed coverage of AOI 2.

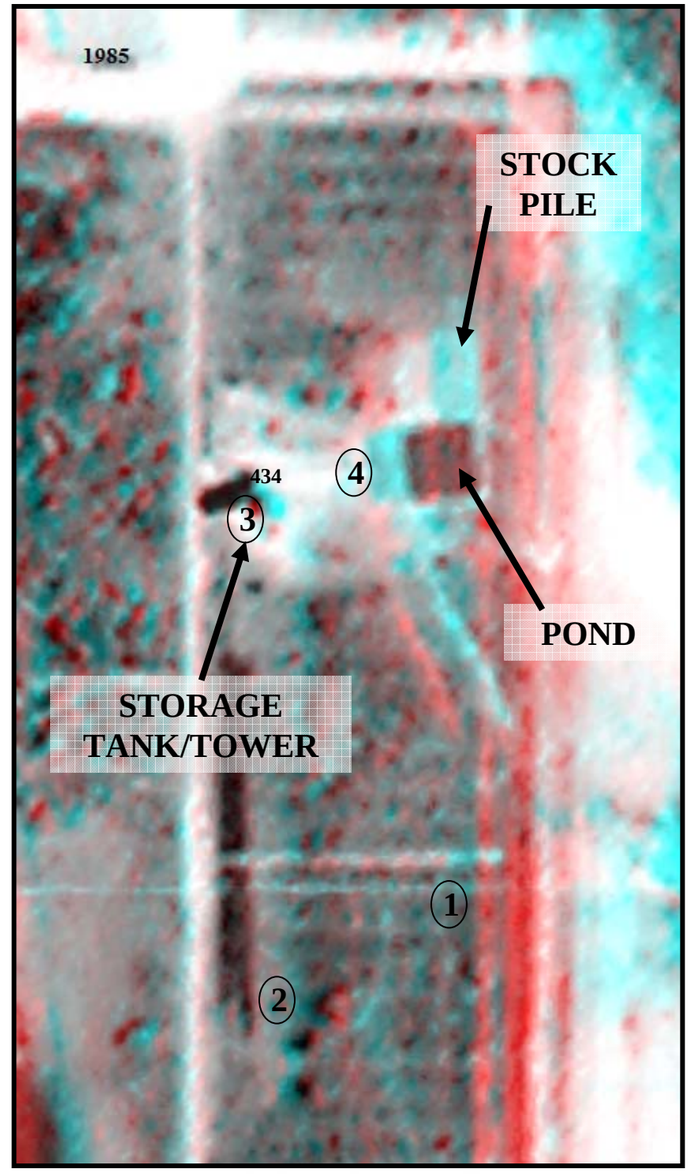
1951, 1985 & 1995 - STEREO IMAGES OF CHANGES IN SELECTED AREA 4 (AOI 2)

FINAL

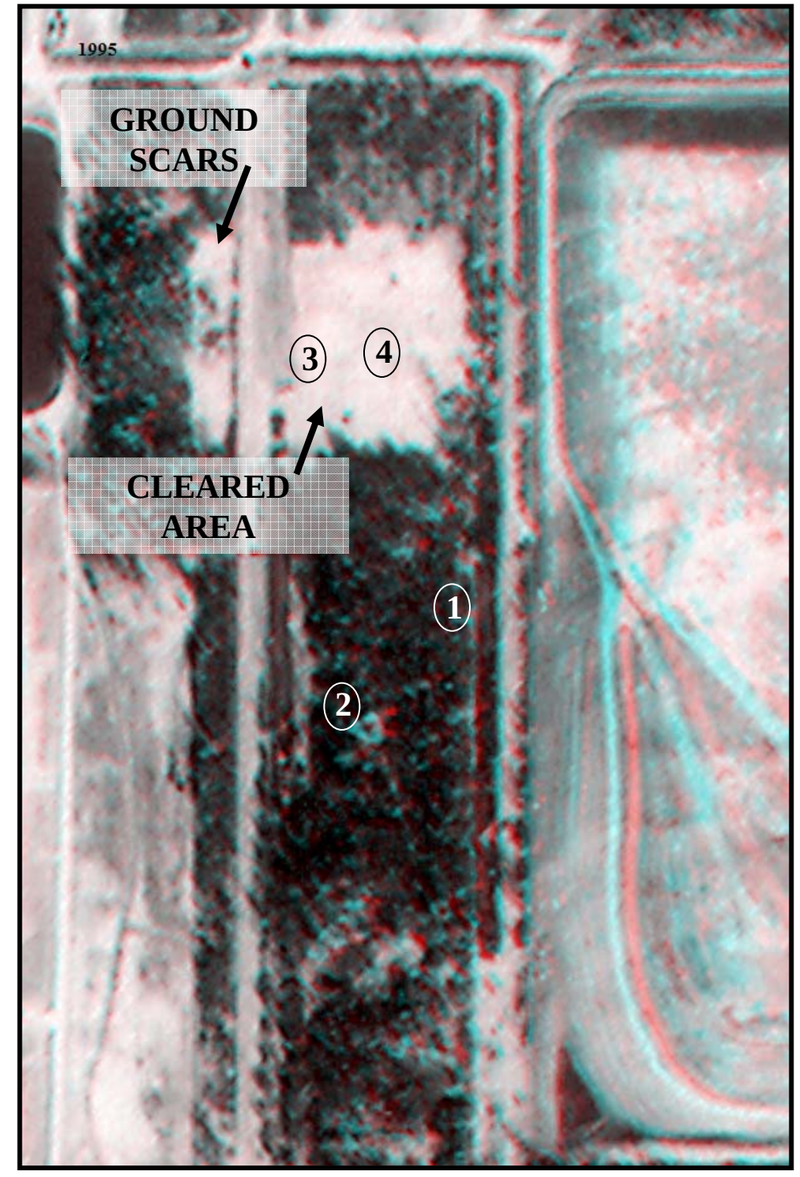
1951



1985



1995



CIRCLED NUMBERS INDICATE A MATCHING LOCATION IN THE ADJACENT PHOTO.

N

Building numbers are from Bechtel National, Inc; see REFERENCES page.

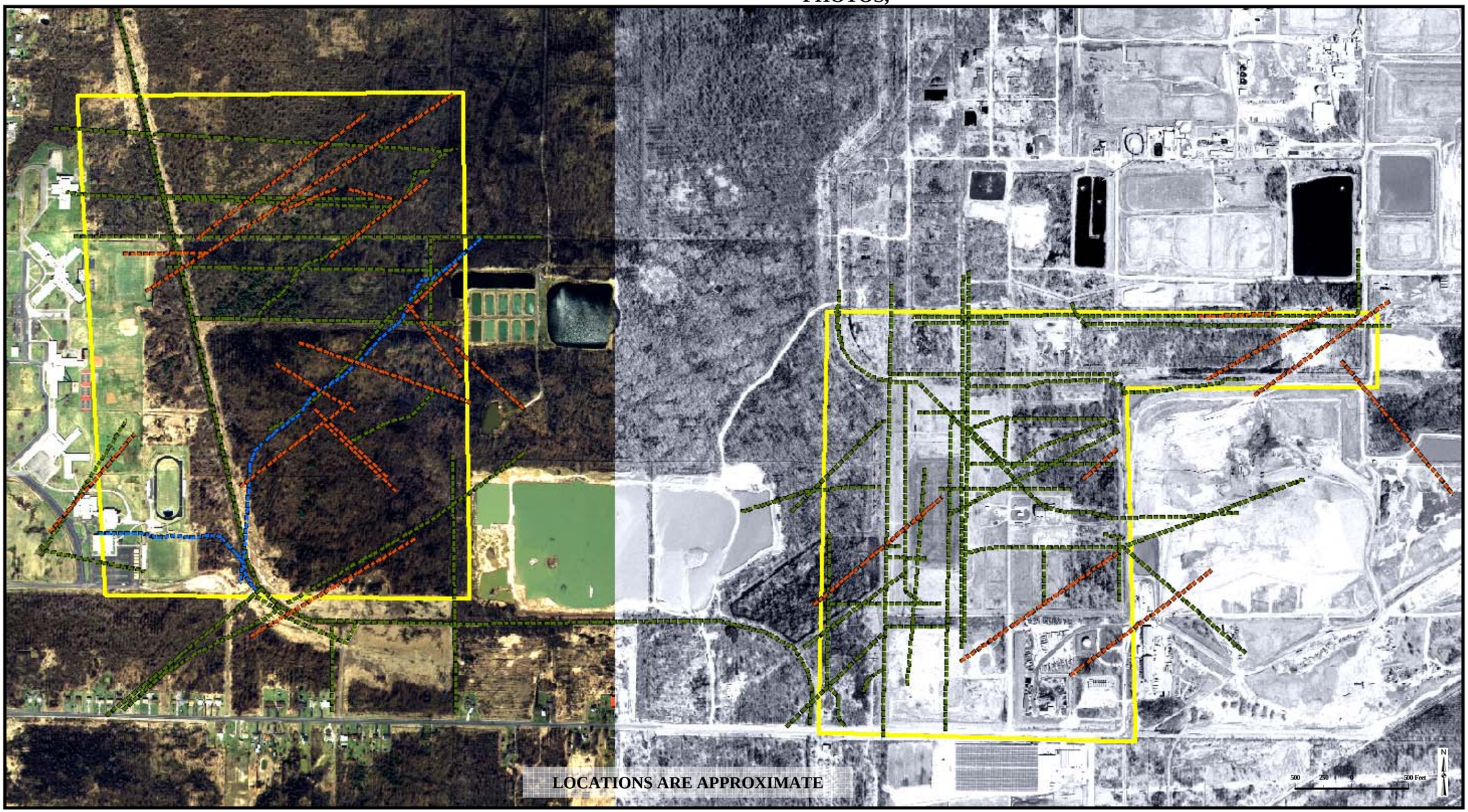
To obtain the 3-D effect, images must be viewed with red/blue lens stereo glasses.

FINAL

DRAINAGE

DRAINAGE INCLUDES FRACTURE TRACES (RED LINES), NATURAL STREAMS (BLUE LINES), AND MAN-MADE DITCHES (GREEN LINES). ANALYSIS INCLUDES CONDUITS OR PATHWAYS AVAILABLE FOR SURFACE WATER TO REACH GROUND WATER. ANALYSIS INCLUDES IMAGERY FROM 1938 (PREDEVELOPMENT) TO 2005.

NOTE: FRACTURE TRACES (RED) WERE GATHERED FROM PREDEVELOPMENT PHOTOS. MANY OF THE MAN-MADE DITCHES (GREEN) ARE SEEN ON THE 1938 PHOTOS AND HAVE BEEN ALTERED IN SIZE OR DIRECTION IN LATER PHOTOS,

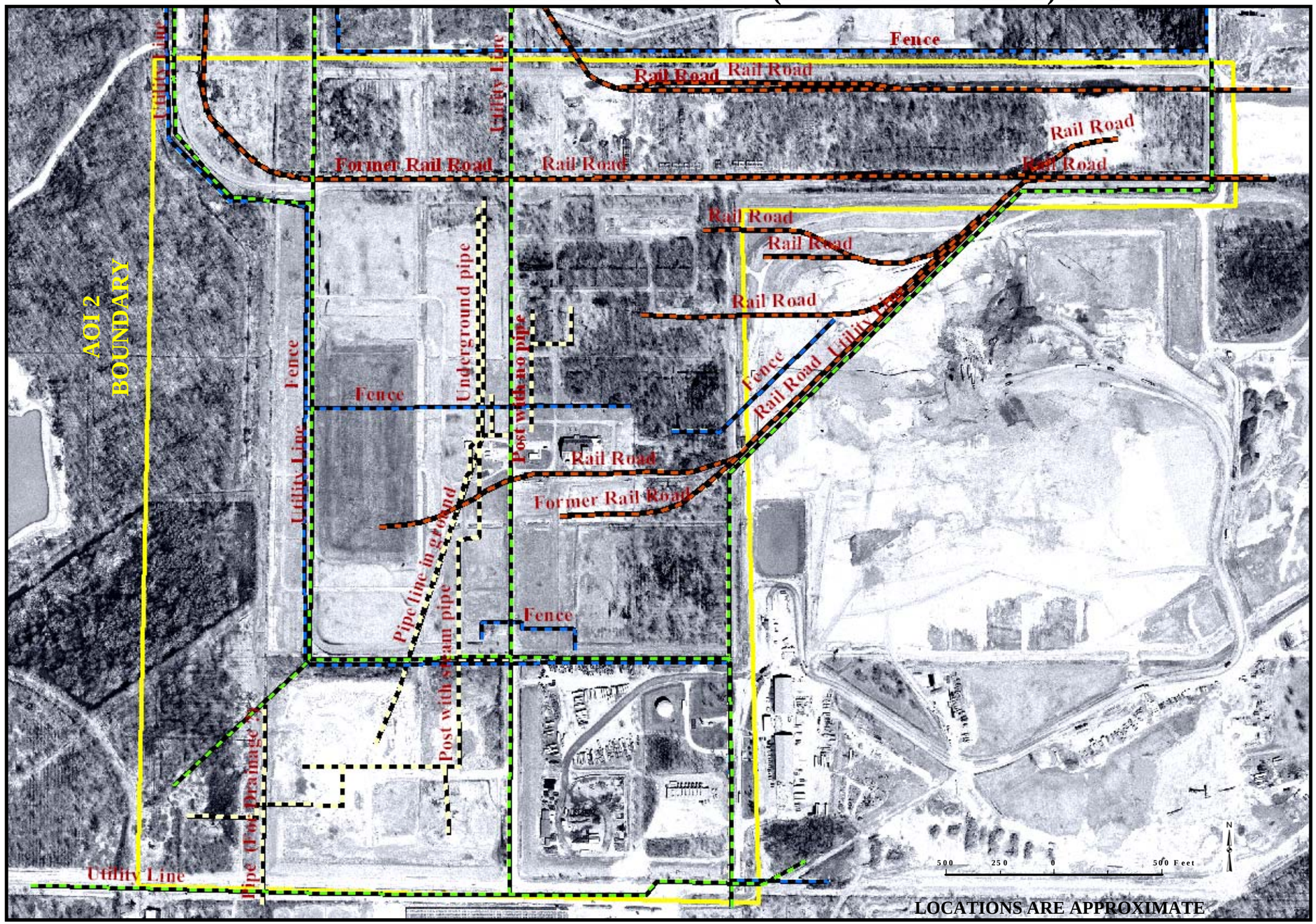


DRAINAGE IDENTIFIED FROM AERIAL PHOTOGRAPHS IS DISPLAYED ON 2005 BASE MAP

MAJOR UTILITY LINES (RAILROAD, PIPES, ELECTRICITY)

FINAL

ANALYSIS INCLUDES IMAGERY FROM 1938 (PREDEVELOPMENT) TO 2005

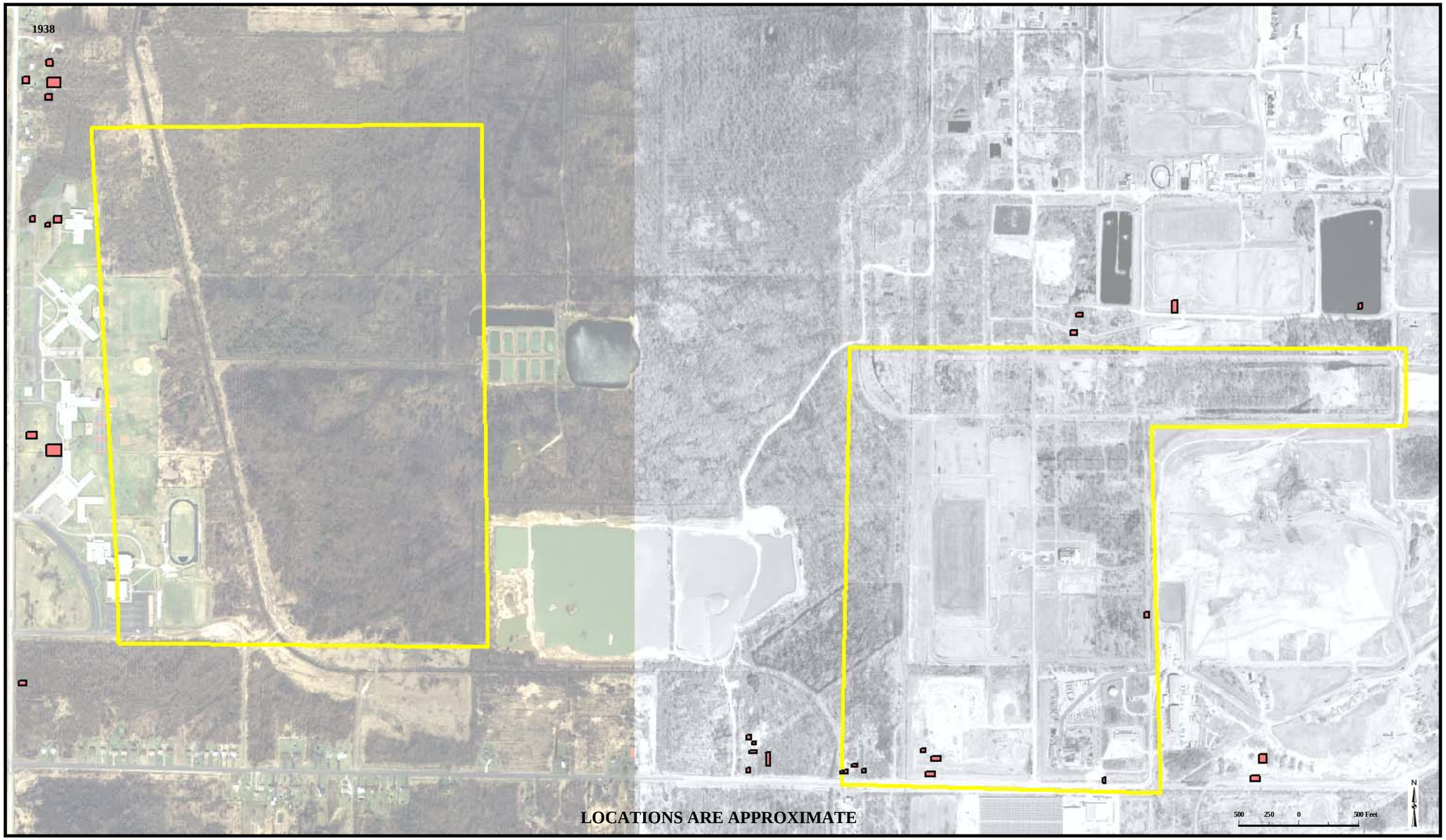


LINES IDENTIFIED FROM AERIAL PHOTOGRAPHS IN AOI 2 ARE DISPLAYED ON 2005 BASE MAP.
RAIL ROADS ARE IN RED; PIPES, YELLOW; FENCE, BLUE; UTILITY LINE, GREEN.

NO MAJOR UTILITY LINES ARE SEEN IN AOI 1. NO BASE MAP WAS COMPOSED

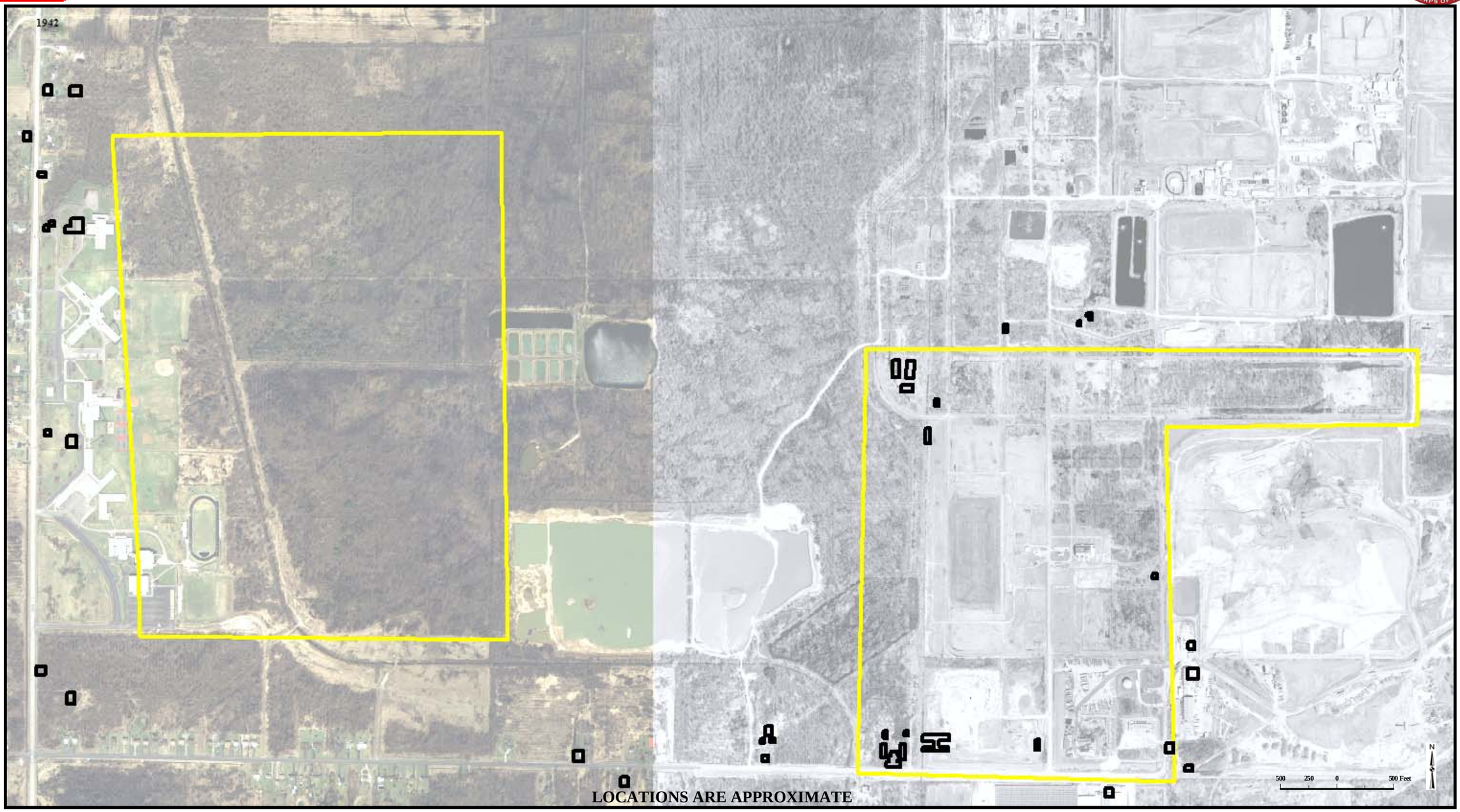
FINAL

PREDEVELOPMENT BUILDING LOCATIONS



BUILDINGS IDENTIFIED FROM 1938 PHOTOS ARE LOCATED ON 2005 BASE MAP. **FARM HOUSES AND FARM STRUCTURES.**

1942 BUILDING LOCATIONS



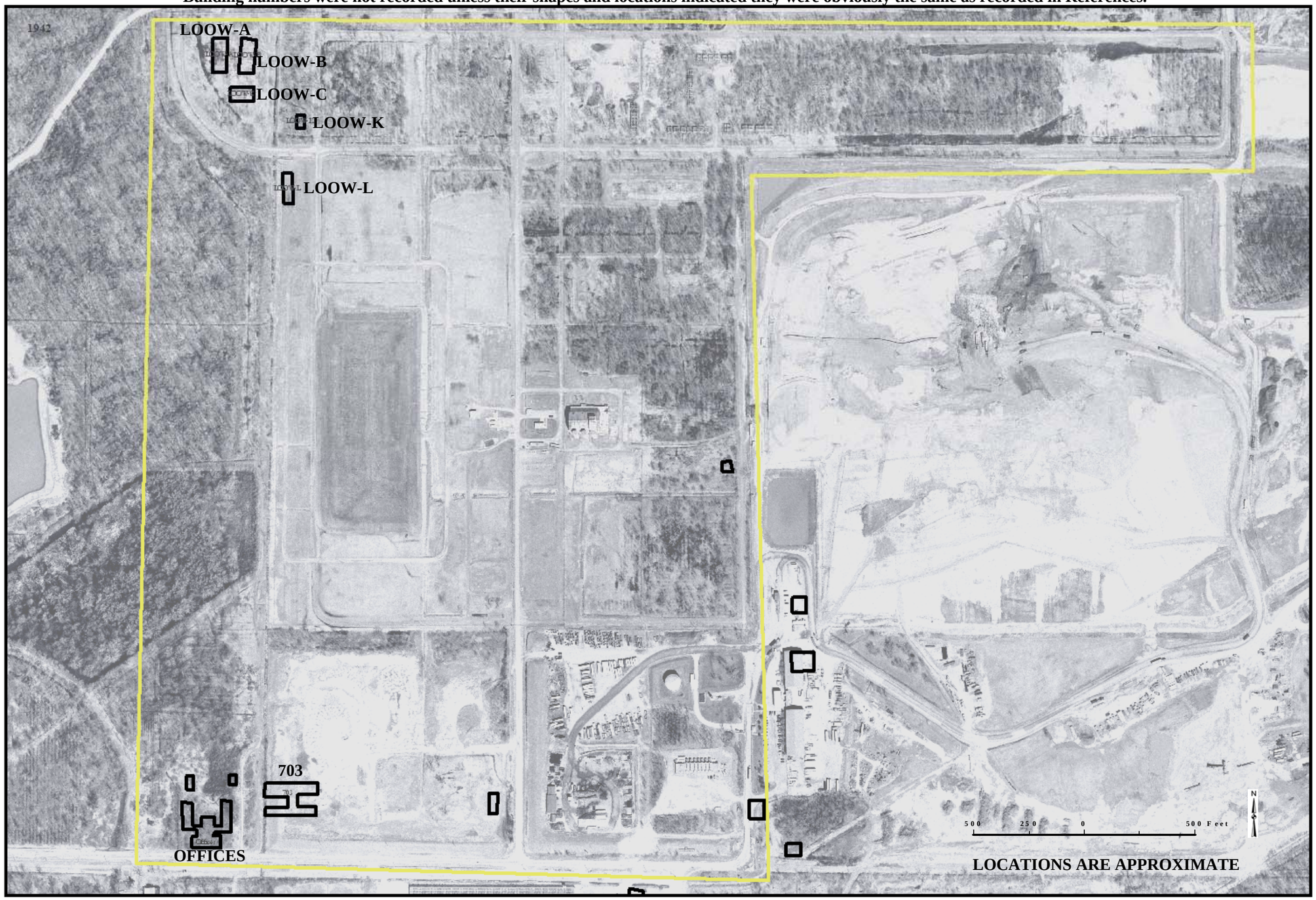
LOCATIONS ARE APPROXIMATE

BUILDINGS IDENTIFIED FROM 1942 PHOTOS ARE LOCATED ON 2005 BASE MAP. FARM HOUSES AND MILITARY STRUCTURES.

FINAL

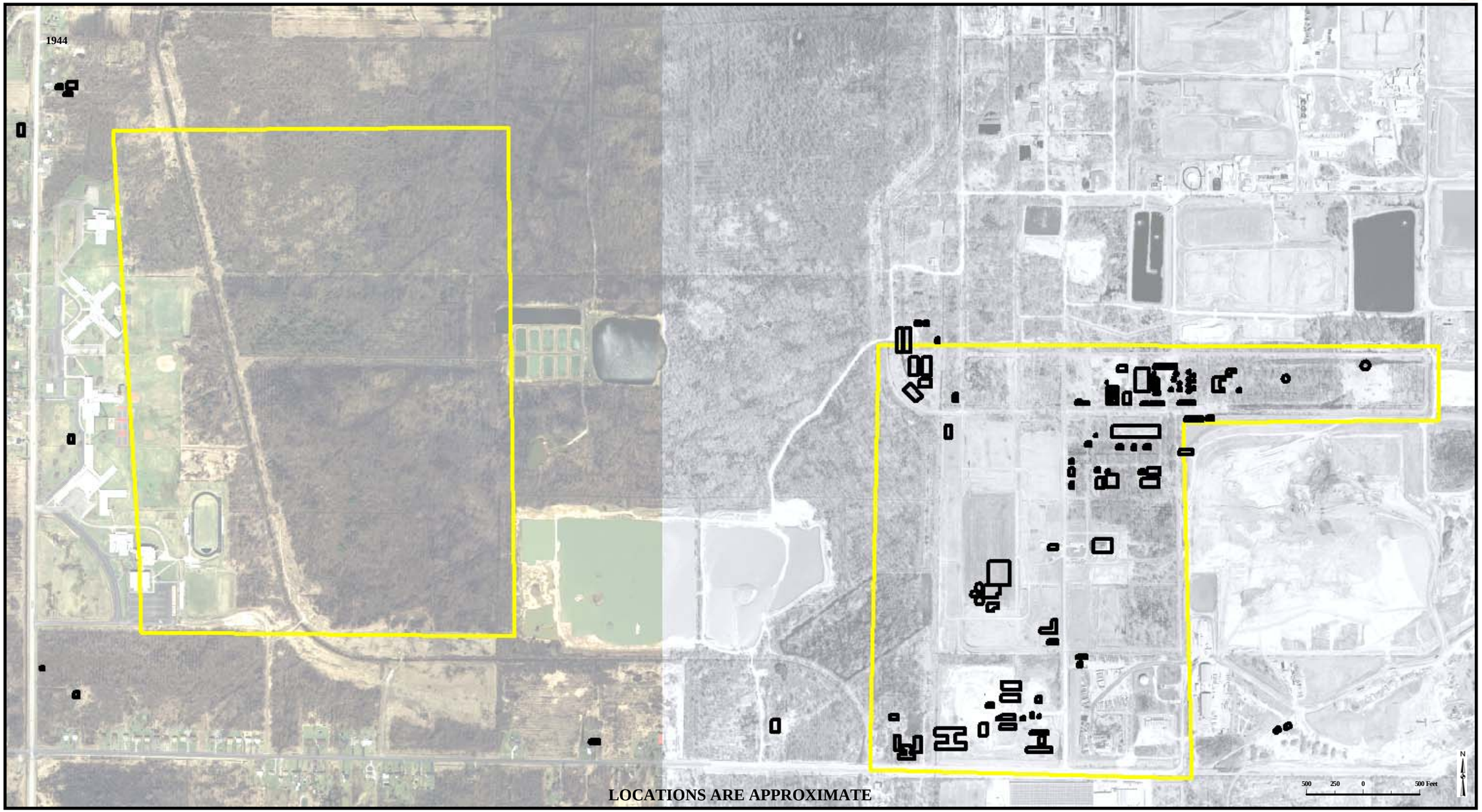
1942 BUILDING LOCATIONS AND NUMBERS IN AOI 2

Building numbers were not recorded unless their shapes and locations indicated they were obviously the same as recorded in References.



Building numbers are from Bechtel National, Inc, and EA Engineering. Science, and Technology; see REFERENCES page.

1944 BUILDING LOCATIONS



LOCATIONS ARE APPROXIMATE

BUILDINGS IDENTIFIED FROM 1944 PHOTOS ARE LOCATED ON 2005 BASE MAP. **MOSTLY MILITARY STRUCTURES.**

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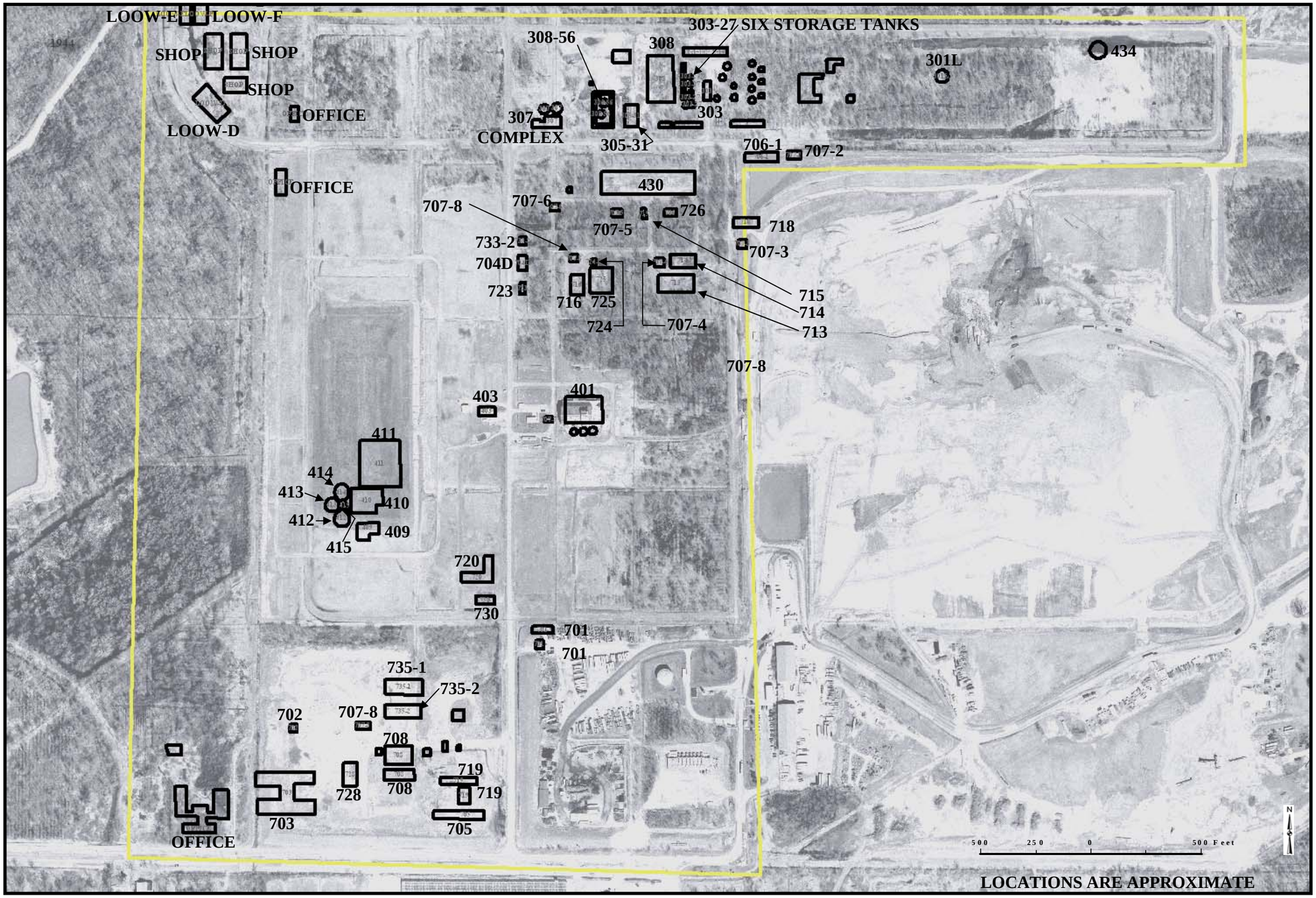
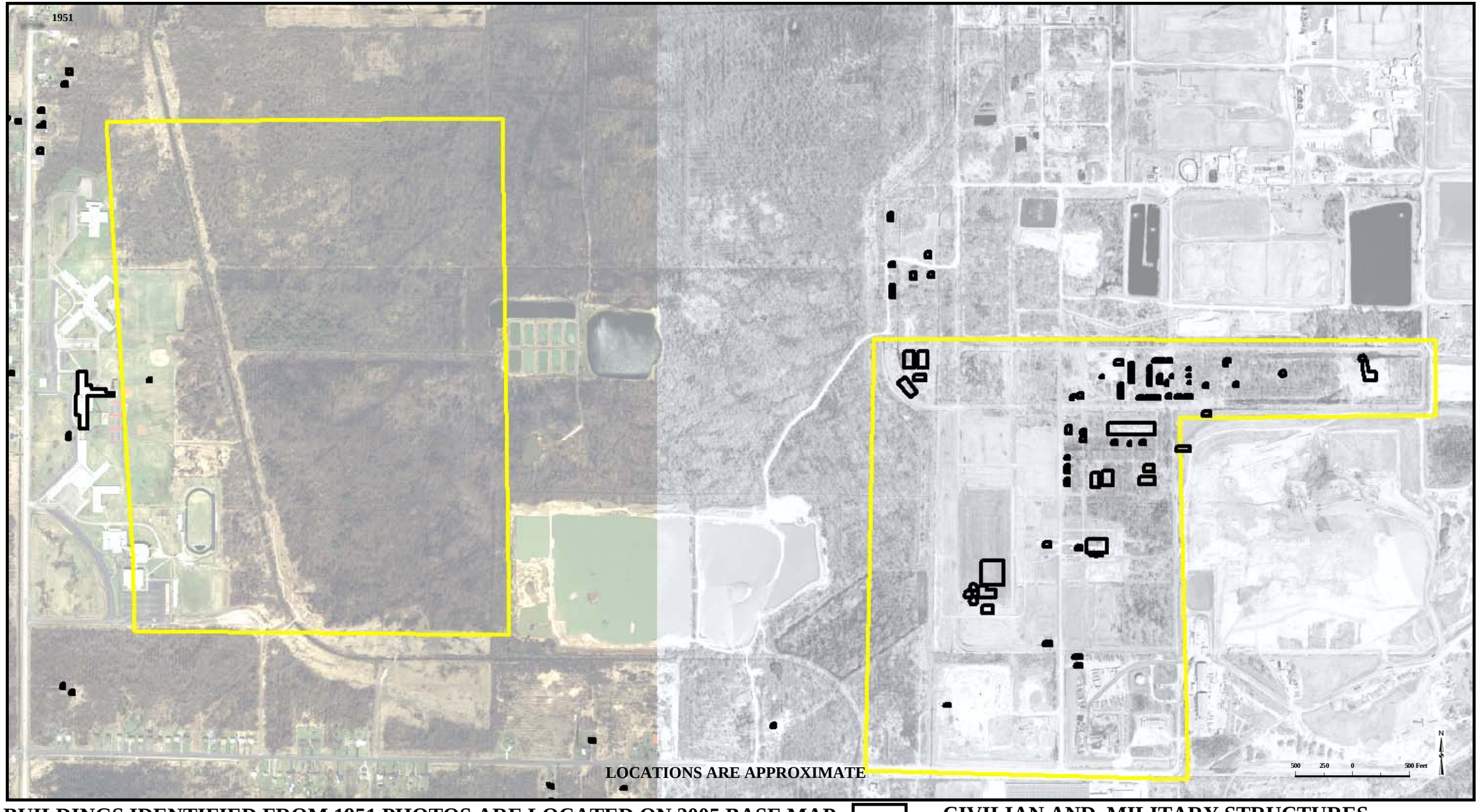


Building numbers are from Bechtel National, Inc, and EA Engineering, Science, and Technology; see REFERENCES page.

FINAL

1951 BUILDING LOCATIONS



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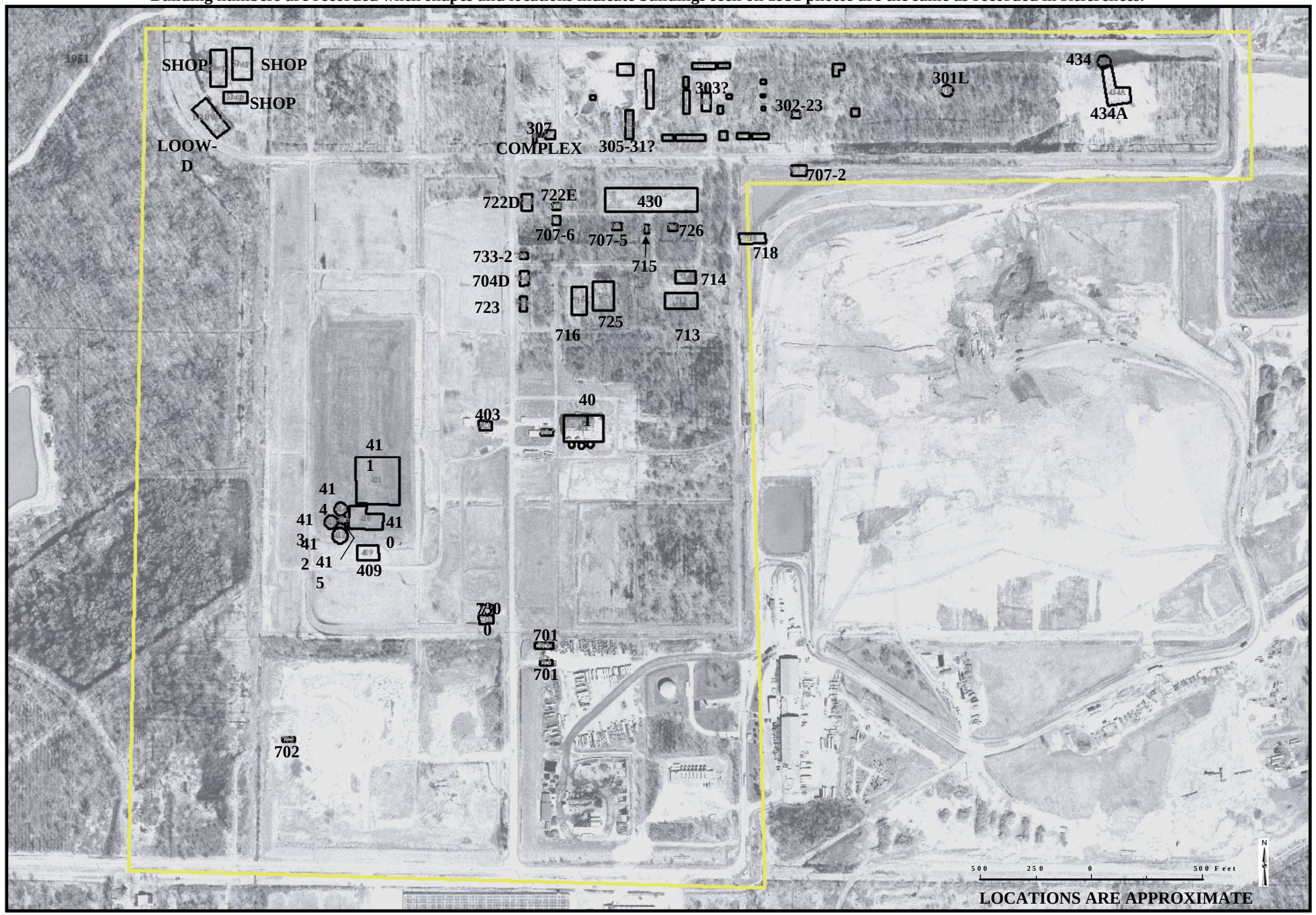
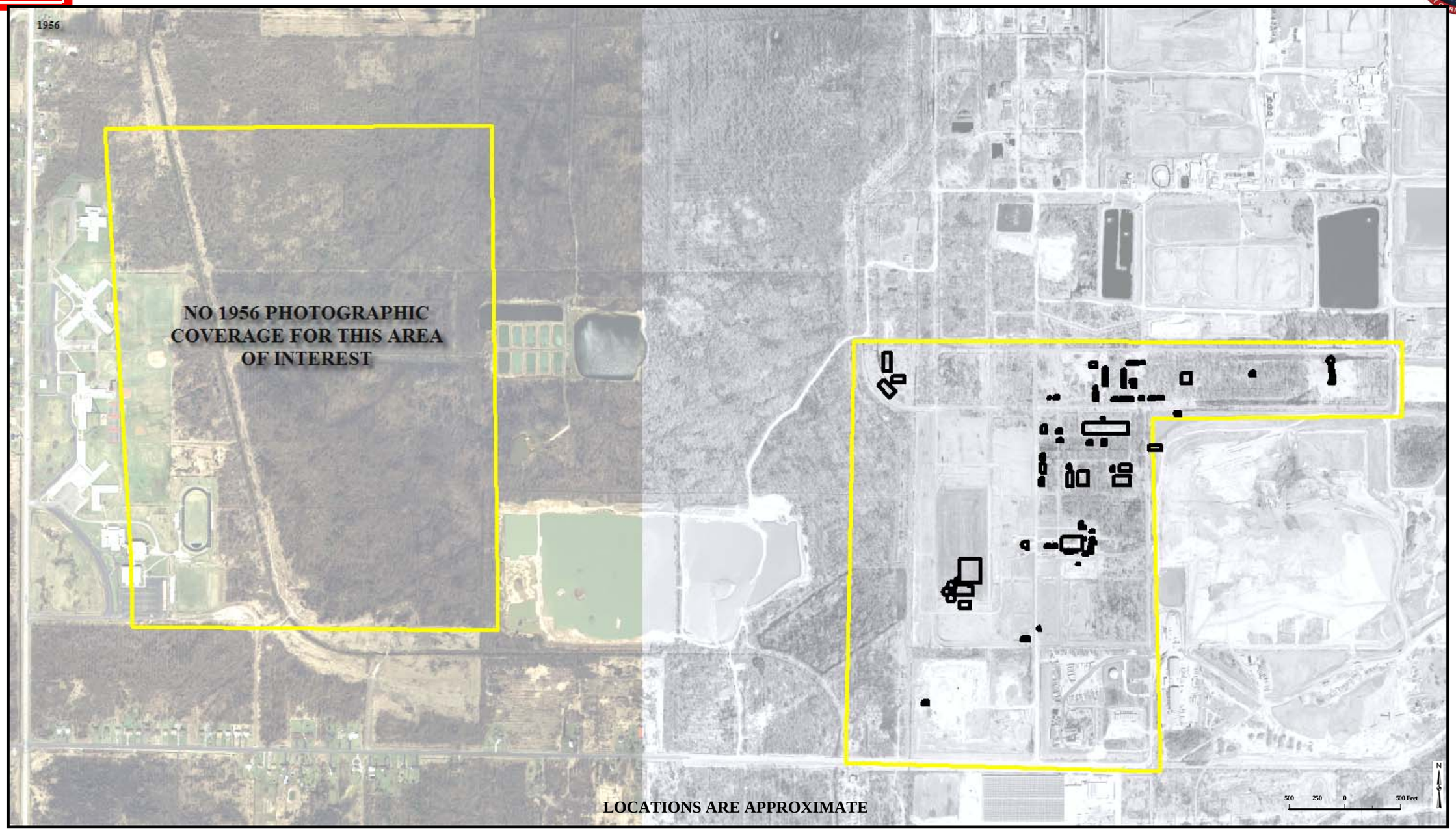


Building numbers are from Bechtel National, Inc, and EA Engineering, Science, and Technology; see REFERENCES page.

1956 BUILDING LOCATIONS



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FINAL

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Building numbers are recorded when shapes and locations indicate buildings seen on 1956 photos are the same as recorded in References.

Building numbers are from Bechtel National, Inc, and EA Engineering, Science, and Technology; see REFERENCES page.

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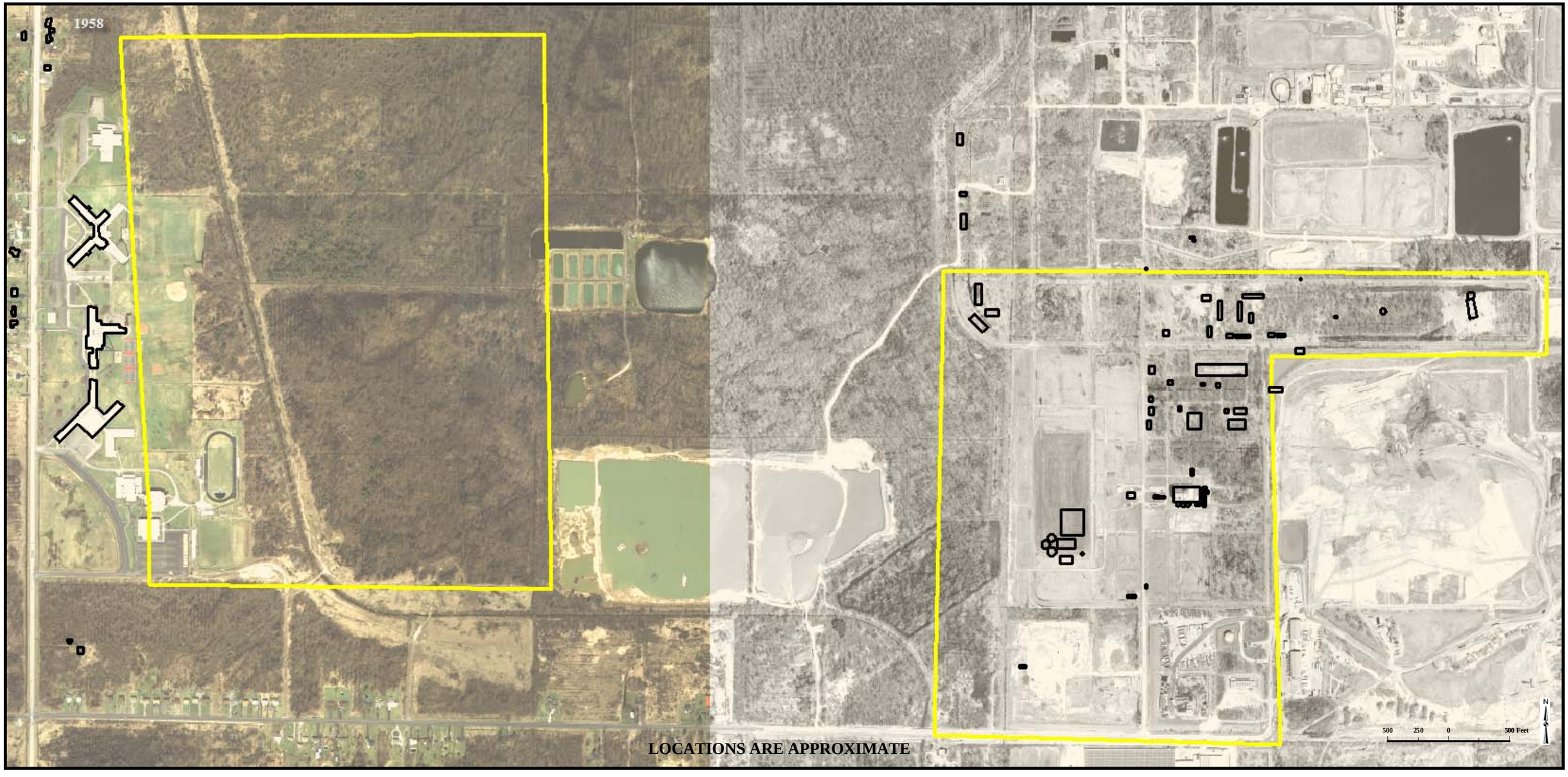

BUILDINGS IDENTIFIED FROM 1958 PHOTOS ARE LOCATED ON 2005 BASE MAP. **CIVILIAN AND MILITARY STRUCTURES.**

1958 BUILDING LOCATIONS AND NUMBERS IN AOI 2

FINAL

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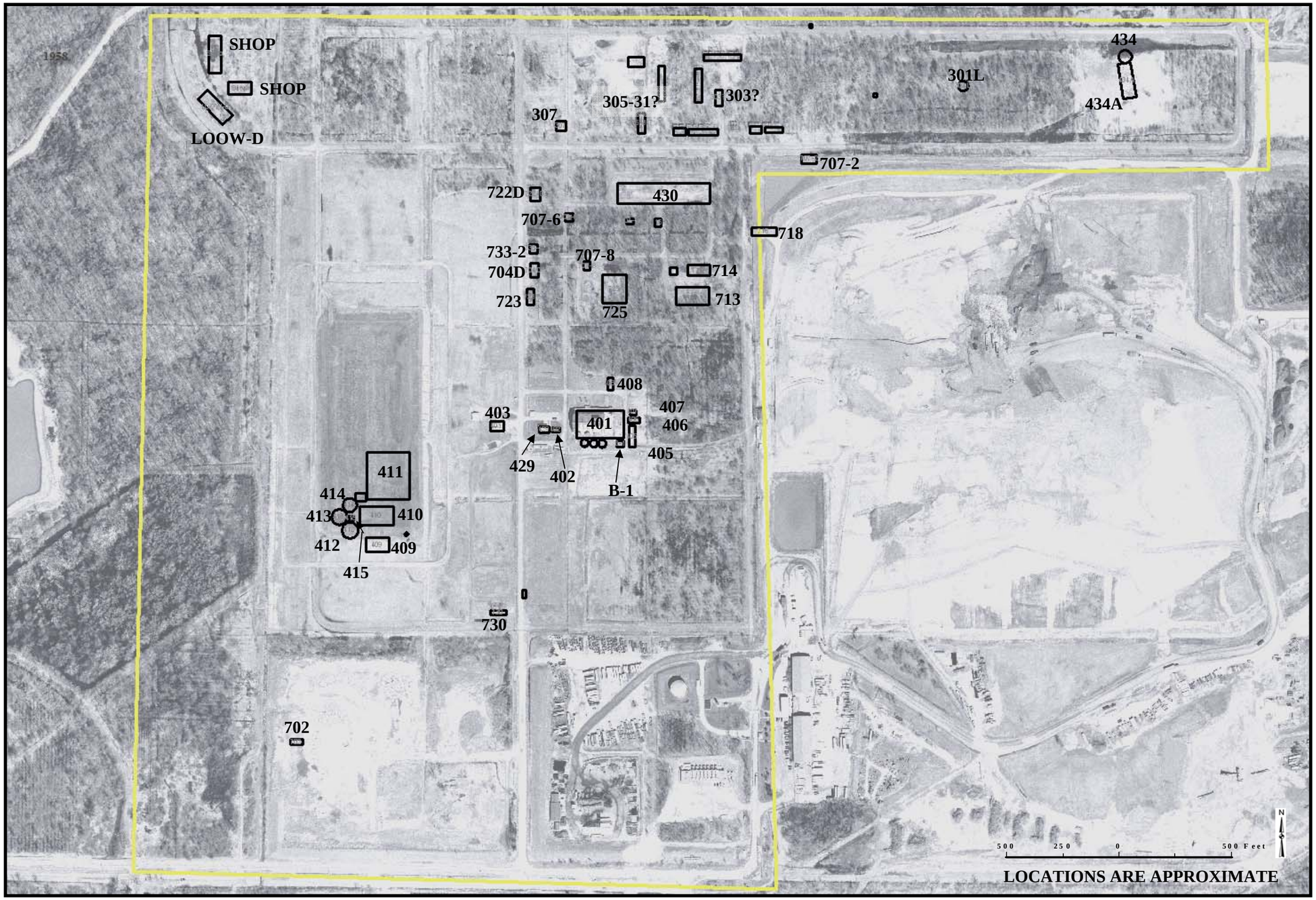
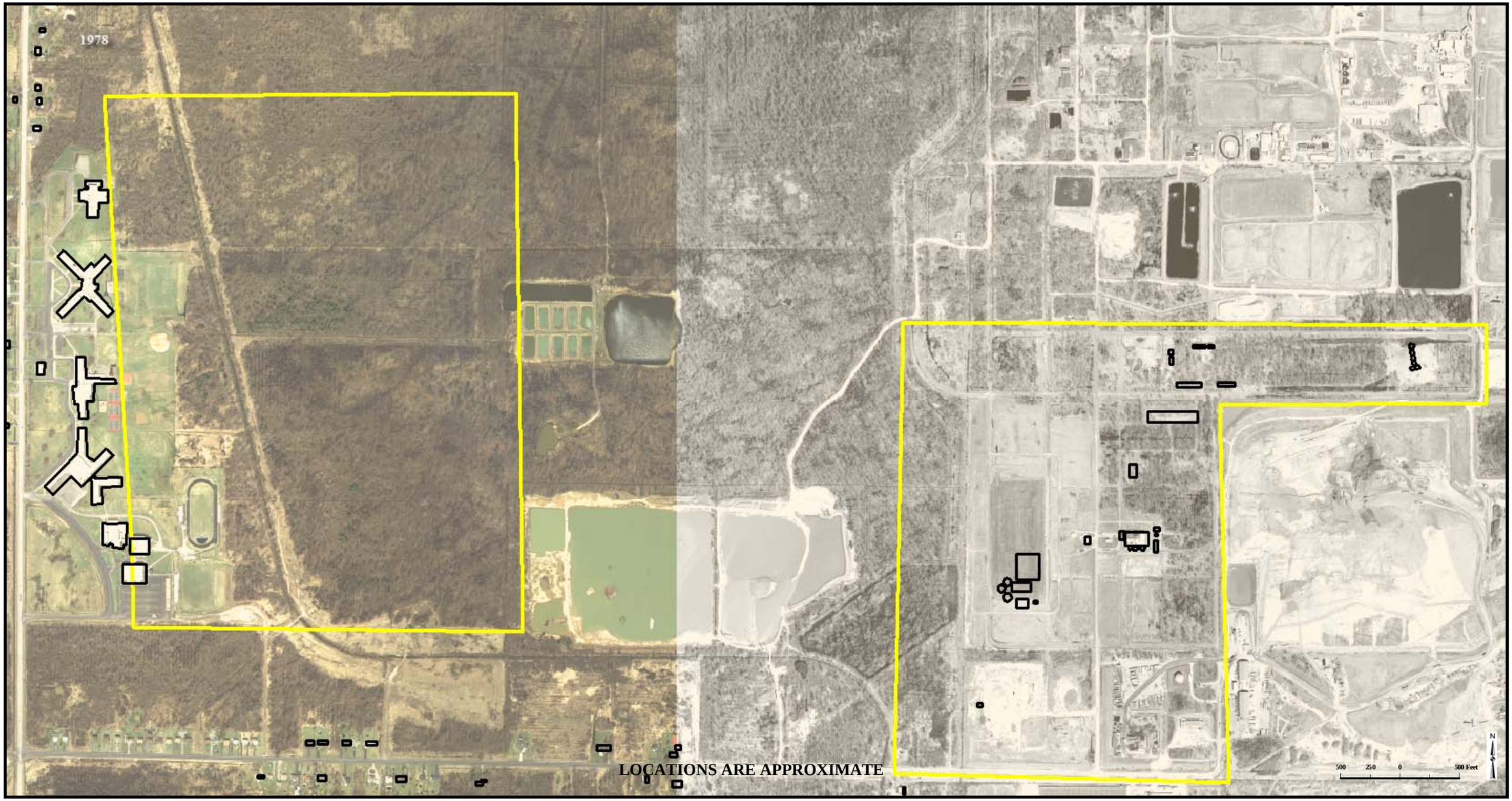


Building numbers are from Bechtel National, Inc, and EA Engineering, Science, and Technology; see REFERENCES page.

FINAL

1978 BUILDING LOCATIONS



BUILDINGS IDENTIFIED FROM 1978 PHOTOS ARE LOCATED ON 2005 BASE MAP. ▭ CIVILIAN AND POSSIBLE MILITARY STRUCTURES.

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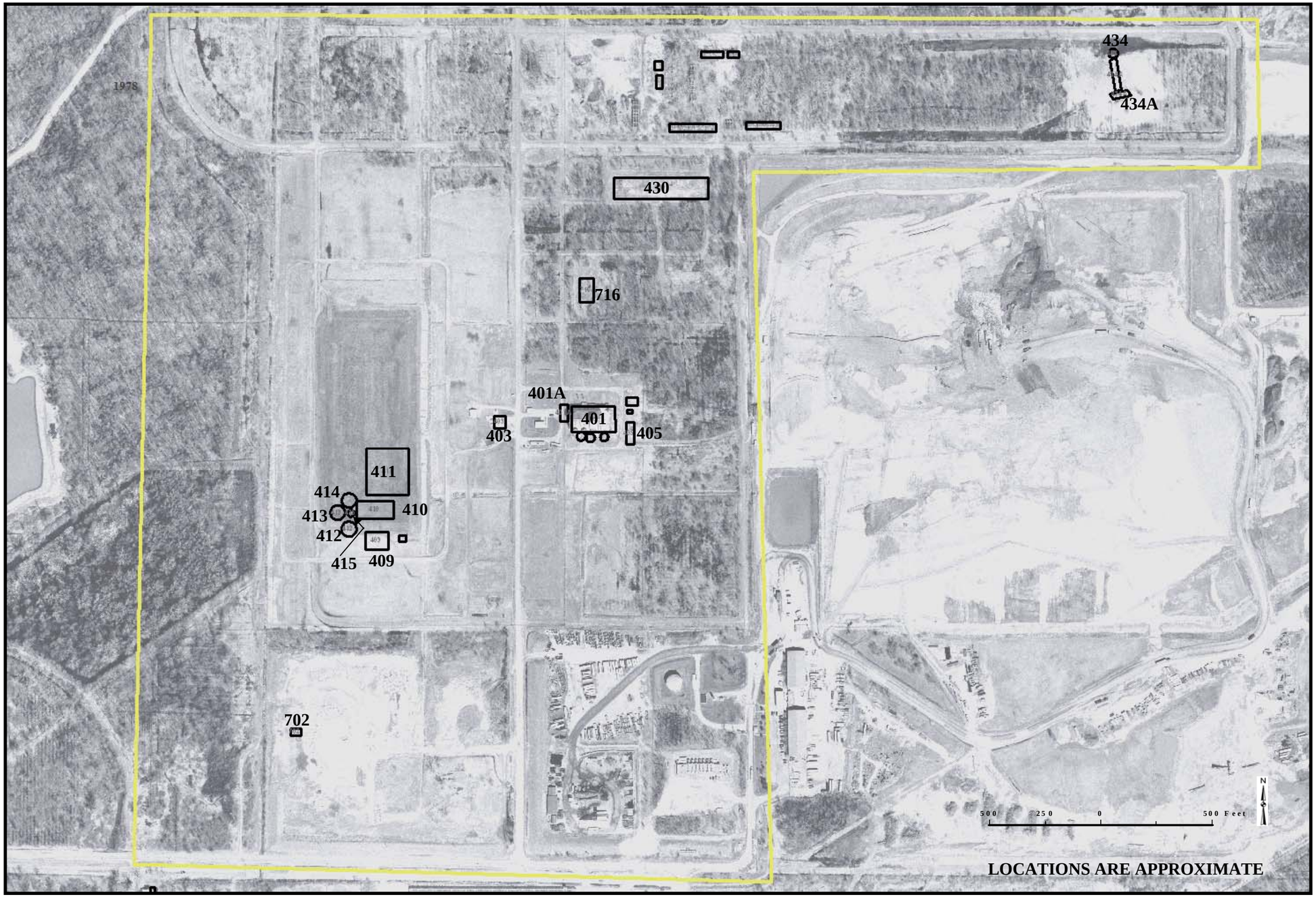
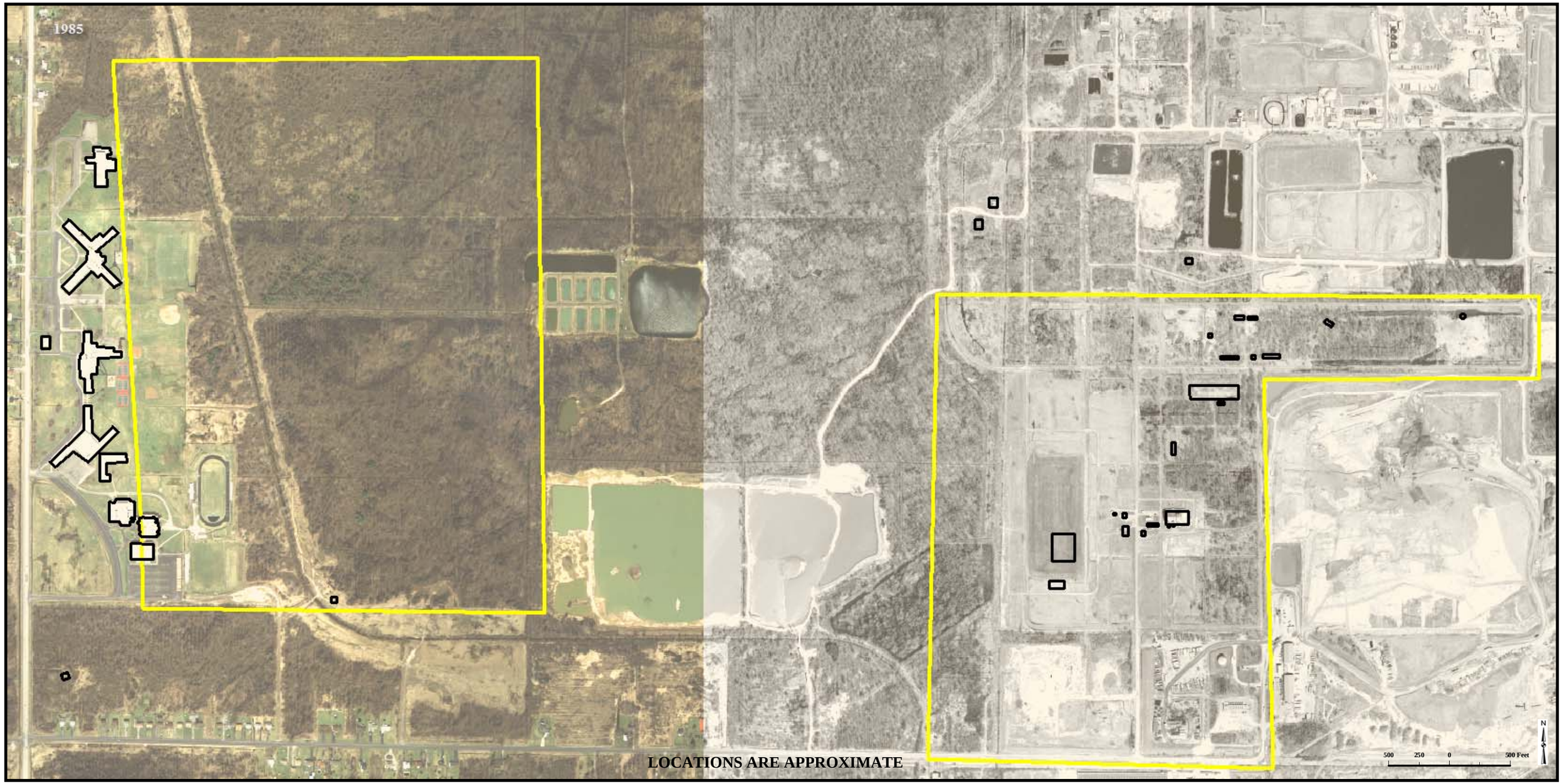


Building numbers are from Bechtel National, Inc, and EA Engineering, Science, and Technology; see REFERENCES page.

FINAL

1985 BUILDING LOCATIONS



BUILDINGS IDENTIFIED FROM 1985 PHOTOS ARE LOCATED ON 2005 BASE MAP. ▭ **CIVILIAN AND POSSIBLE MILITARY STRUCTURES.**

FINAL

1985 BUILDING LOCATIONS AND NUMBERS IN AOI 2

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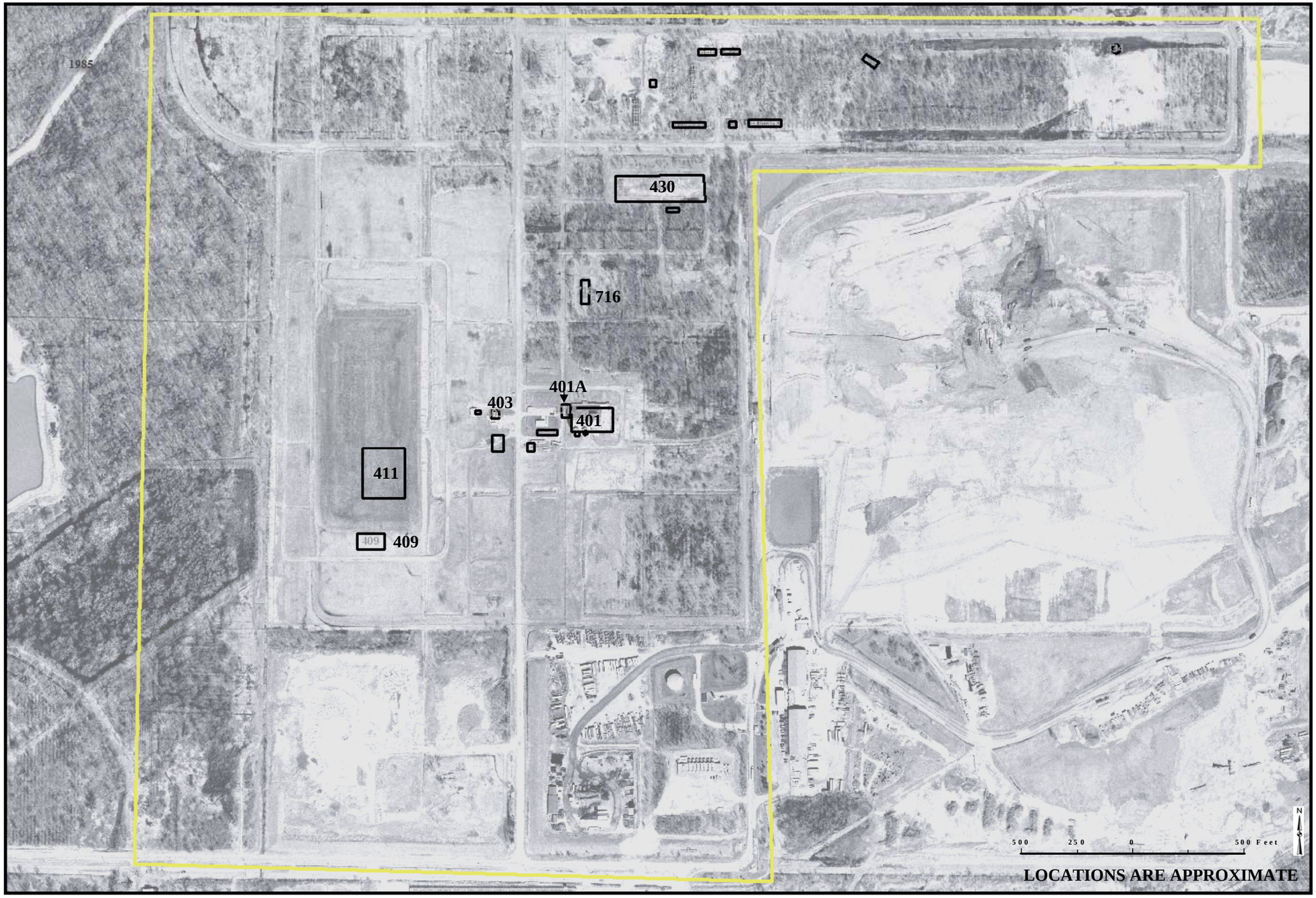

Building numbers are from Bechtel National, Inc, and EA Engineering, Science, and Technology; see REFERENCES page.

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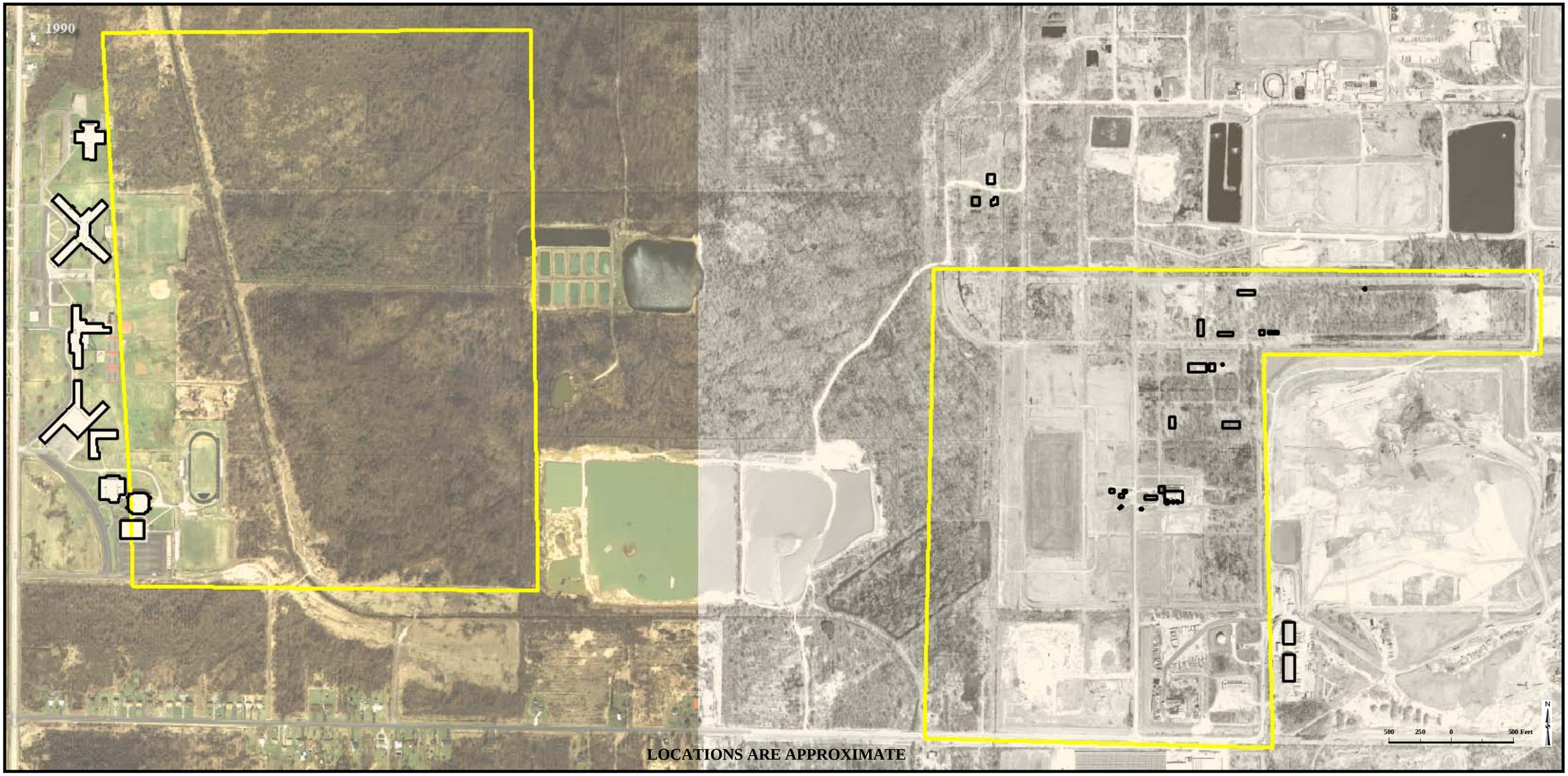
1990 BUILDING LOCATIONS



BUILDINGS IDENTIFIED FROM 1990 PHOTOS ARE LOCATED ON 2005 BASE MAP. ▭ CIVILIAN AND POSSIBLE MILITARY STRUCTURES.

FINAL

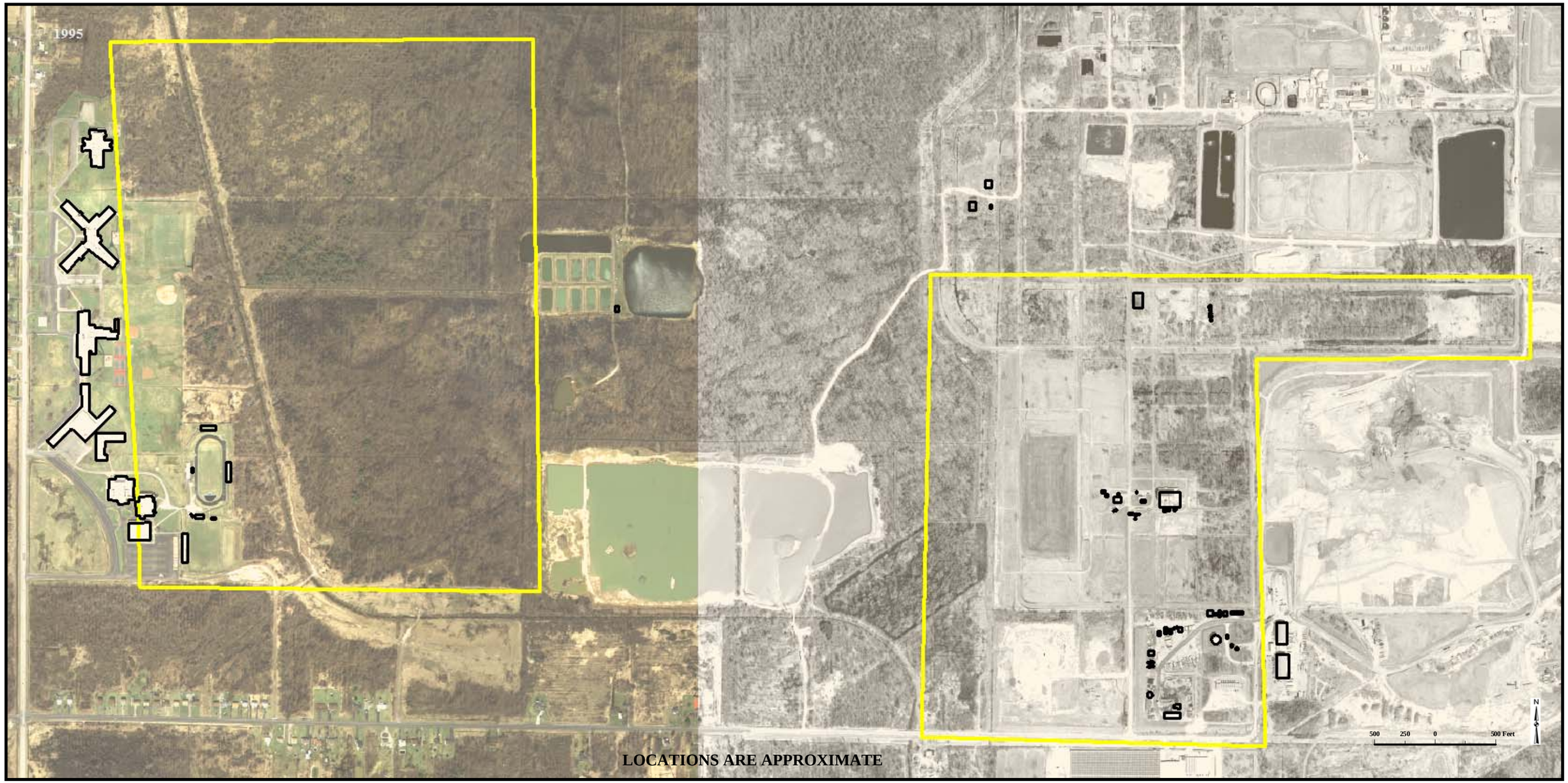
1990 BUILDING LOCATIONS AND NUMBERS IN AOI 2

Building numbers are recorded when shapes and locations indicate buildings seen on 1990 photos are the same as recorded in References.

Building numbers are from Bechtel National, Inc, and EA Engineering, Science, and Technology; see REFERENCES page.

FINAL

1995 BUILDING LOCATIONS



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FINAL

1995 BUILDING LOCATIONS AND NUMBERS IN AOI 2

Building numbers are recorded when shapes and locations indicate buildings seen on 1995 photos are the same as recorded in References.

Building numbers are from Bechtel National, Inc, and EA Engineering, Science, and Technology; see REFERENCES page.

REFERENCES

Aerospace Corporation. Background and Resurvey Recommendations for the Atomic Energy Commission Portion of the Lake Ontario Ordnance Works. Washington, D.C. November 1982.

Bechtel National, Inc. Design Report of the Interim Waste Containment Facility at the Niagara Falls Storage Site, May 1986, Prepared for United States Department of Energy, Oak Ridge Operations Office, Under Contract No. DE AC05-81OR20722 by Bechtel National, Inc. Advanced Technology Division, Oak Ridge, Tennessee PDF #5778790 DOE/OR/20722-21 (DE86012601)
http://www.osti.gov/bridge/servlets/purl/5778790-K1eqmK/5778790.pdf

EA Engineering, Science, and Technology. FINAL - History Search Report, Lake Ontario Ordnance Works (LOOW), Niagara County, New York, Project No. 60957.46, Sparks, Maryland, August 1998

US Army Topographic Engineering Center. Former Lake Ontario Ordnance Works, NY, Examination of Historical Aerial Photography – Selected Sites, Final Report, Alexandria, Virginia September 2002

WEB SITES
http://www.nap.edu/openbook.php?record_id=9161&page=23

http://images.google.com/imgres?imgurl=http://www.loowrab.org/history_files/image002.jpg&imgrefurl=http://www.loowrab.org/history.htm&usg=__tway4A8odXoDfDPNqMG9z7TXX68=&h=577&w=882&sz=48&hl=en&start=6&um=1&tbnid=C8m_KyO83w1JUM:&tbnh=96&tbnw=146&prev=/images%3Fq%3Dtnt%2Bplant%26hl%3Den%26sa%3DN%26um%3D1

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http://www.nysgis.state.ny.us/

APPENDIX 12-D

Utilizing Isotopic Uranium Ratios in Groundwater Evaluations at NFSS

Utilizing Isotopic Uranium Ratios in Groundwater Evaluations at NFSS

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ABSTRACT

The U.S. Army Corps of Engineers (USACE) Buffalo District is currently evaluating environmental contamination at the Niagara Falls Storage Site (NFSS) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as part of its Formerly Utilized Sites Remedial Action Program (FUSRAP). The NFSS is located in the Town of Lewiston in western New York and has been used to store uranium-contaminated materials since 1944. Most of the radioactive materials are currently contained in an on-site structure, but past contamination remains in soil and groundwater. As a naturally occurring radionuclide, uranium is present in all groundwater. Because contamination levels at the site are quite low, it can be difficult to distinguish zones that have been impacted by the past releases from those at the high end of the natural background range. The differences in the isotopic ratio of uranium-234 (U-234) to uranium-238 (U-238) between natural groundwater systems and affected areas are being used in an innovative way to better define the nature and extent of groundwater contamination at NFSS. In natural groundwater, the ratio of U-234 to U-238 exceeds 1 due to the alpha particle recoil effect, in which U-234 is preferentially mobilized to groundwater from adjacent rock or soil. This process is very slow, and it can be hundreds to thousands of years before a measurable impact is seen in the isotopic ratio. Thus, as a result of the recoil effect, the ratio of U-234 to U-238 will be higher in natural groundwater than in contaminated groundwater. This means that if site releases were the source of the uranium being measured in groundwater at NFSS, the ratio of U-234 to U-238 would be expected to be very close to 1 (the same ratio that exists in wastes and soil at the site), because not enough time has elapsed for the alpha particle recoil effect to have significantly altered that ratio. From an evaluation of site and regional groundwater data, an isotopic ratio of 1.2 has been identified as a site-specific signature to help distinguish natural groundwater (e.g., at the high end of the background range) from zones impacted by past releases. This information is crucial for focusing the ongoing CERCLA evaluation and decision making process. This signature value is not applied as a bright line, e.g., to define samples with ratios of U-234 to U-238 above 1.2 as representing background and those with ratios below 1.2 as being affected by site releases. Rather, this ratio serves as a weight of evidence for use in conjunction with other site information, including historical activities, to form science-based decisions regarding contaminated groundwater. This novel approach for developing a groundwater signature from the isotopic uranium ratio has proven to be a very useful tool for NFSS, and it is now being considered for broader application.

INTRODUCTION

All soils and rock exhibit differing levels of radioactivity, largely associated with the varying levels of naturally-occurring potassium, uranium, thorium, and radium. Oftentimes the radioactive properties of soils and rock, along with the ratios at which they exist, are used for geologic mapping purposes. For example, the ratio of potassium to thorium may provide an indication of igneous and metamorphic mineralization. In soil and radioactive wastes containing natural uranium, the ratio of uranium-234 (U-234) to uranium-238 (U-238) is essentially 1. As a naturally occurring radionuclide, uranium is present in all groundwater. However, in groundwater, the ratio increases with time because of the alpha particle recoil effect. When a U-238 atom undergoes radioactive decay by emitting an alpha particle to form thorium-234 (Th-234), its nucleus recoils in the opposite direction to conserve momentum. If this U-238 atom is within rock or soil that is in contact with groundwater, the relatively short-lived daughter product Th-234 can have sufficient recoil energy to shortly enter the aqueous phase and then precipitate from solution. This Th-234 atom transforms fairly quickly to U-234 through two successive beta-particle decays (see Figure 1 and Table I); this atom is generally soluble. Thus, the alpha particle recoil effect could preferentially mobilize U-234 into adjacent groundwater when it would otherwise have sorbed to solid material [1].

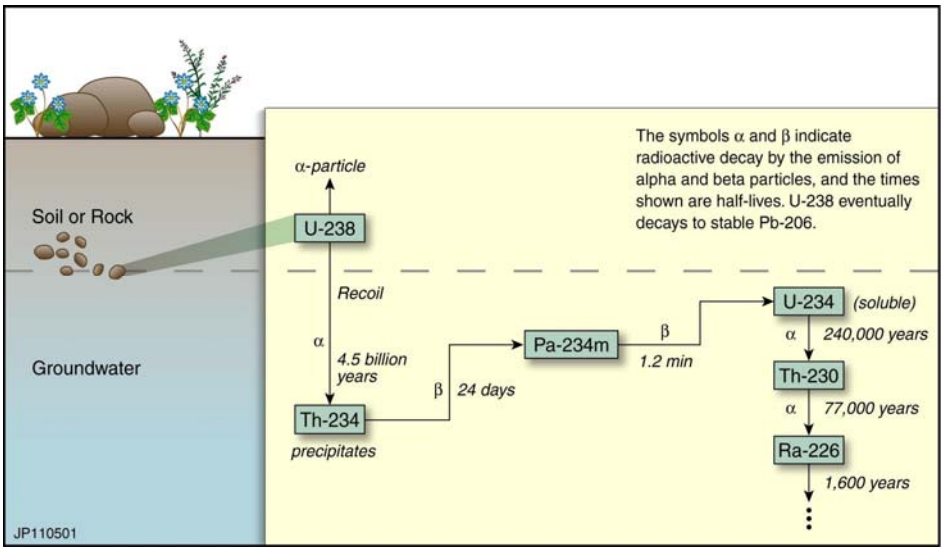

Fig. 1. Radioactive Decay of U-238 and U-234 [2].

Although only a very small fraction of U-238 decays produce this effect because it is limited by the presence of a phase interface and recoil geometry, over considerable time, groundwater concentrations of U-234 can become much higher than those of U-238. Since uranium is a contaminant at many milling, processing, storage, and disposal sites, this phenomenon makes the isotopic uranium ratio a good candidate for a signature to indicate contaminated versus uncontaminated groundwater when the distinction is unclear.

The ratio of U-234 to U-238 in natural groundwater typically ranges from 1 to 3 but can reach 10 or more (a value of 28 has been reported [3]). High ratios usually reflect very old groundwater in deep formations. In evaluating groundwater data at sites contaminated with natural uranium, the U-234 to U-238 ratio would be expected to be near 1 if site materials were the source of the uranium being measured (additional evaluations are warranted if depleted or enriched uranium is present). This ratio of near unity occurs because not enough residence time would have elapsed to allow the alpha particle recoil effect to increase the ratio. In contrast, background groundwater would be expected to exhibit a higher ratio, especially for deeper hydrogeologic units. Determining site-specific U-234 to U-238 ratios and applying them as signature indicators of contaminated versus uncontaminated areas can provide a very practical, scientific basis for framing the boundaries of contaminant plumes for cleanup decisions.

Naturally occurring uranium in soil typically ranges from about 1 to 5 picocuries per gram (pCi/g) [4], although values can be much higher depending on local geological conditions. This natural radioactive element exists primarily as three isotopes: U-234, uranium-235 (U-235), and U-238. The relative activity concentrations of these isotopes in soil and rock (i.e., U-234:U-235:U-238) are in the approximate ratio of 1.0:0.046:1.0. The main interest for this analysis is the ratio of the two most prominent isotopes, U-234 and U-238, since they occur in the same radioactive decay series. Basic properties of the first four radionuclides in that series are summarized in Table I (including primary decay modes). The two short-lived decay products of U-238 are italicized in this table.

Table I. Properties of Naturally Occurring Uranium Isotopes

Radionuclide	Half Life	Specific Activity (Ci/g)	Decay Mode	Natural Abundance
Uranium-238	4.5 billion yr	0.00000034	α	>99%
Thorium-234	*24 days*	*23,000*	*β*	
Protactinium-234m	*1.2 min*	*690,000,000*	*β*	
Uranium-234	240,000 yr	0.0063	α	0.0055%

Concentrations of naturally occurring uranium vary more in groundwater than in soil, due to location-specific geological, hydrological, and geochemical factors. Those factors include the uranium concentration in the host rock,

the nature of the contact between the uranium minerals and groundwater, the presence of oxygen and complexing agents, and chemical reactions with dissolved ions [3]. Naturally occurring uranium concentrations in groundwater have been reported to range from <1 to 650 pCi/L [5], with values generally falling between 1 and 10 pCi/L. Recent data indicate that natural concentrations could be much higher, with a value above 6,000 pCi/L reported for a well in South Carolina [6]. While the activity concentrations of U-234 and U-238 in soil and rock are essentially equal, in groundwater this ratio usually exceeds 1 and is often near 2 [7].

The U-234 to U-238 ratio is affected by site-specific hydrogeological and geochemical characteristics, and different ratios would be expected in different water-bearing zones, with a higher ratio in deeper zones hydraulically separated from recent recharge. This phenomenon makes the isotopic uranium ratio a good candidate for defining a groundwater signature at sites contaminated with anthropogenically-derived uranium, i.e., to indicate contaminated versus uncontaminated areas when the distinction is otherwise unclear. This approach can be particularly useful to distinguish between results at or only slightly above the high end of a background range, and indicative of those site contributions or natural variability. While the utility of this concept is most apparent for sites that processed and stored natural uranium, it may be useful for sites that handled enriched or depleted uranium, although some modifications would be needed to assess expected uranium ratios associated with site-related contamination.

CASE STUDY – NIAGARA FALLS STORAGE SITE, LEWISTON, NY

The U.S. Army Corps of Engineers (USACE) Buffalo District is evaluating conditions at the Niagara Falls Storage Site (NFSS) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as part of its Formerly Utilized Sites Remedial Action Program (FUSRAP). The NFSS is located in the Town of Lewiston in western New York and has been used for the storage of uranium-contaminated materials since 1944. In the 1980s, the U.S. Department of Energy (USDOE) conducted a number of interim remedial actions under FUSRAP to stabilize radioactive materials at the site, most of which are enclosed in the on-site interim waste containment structure (IWCS). The Energy and Water Appropriations Act for Fiscal Year 1998 transferred responsibility for administering and executing FUSRAP from the USDOE to the USACE in October 1997; the USACE has maintained control of the site since then. However, responsibility for long-term stewardship of the site will revert back to the USDOE two years after remedial actions are completed, in accordance with a memorandum of understanding between these two agencies.

Groundwater at NFSS contains elevated (i.e., above background) levels of a number of radioactive and chemical contaminants (including uranium) in several isolated plumes. It is challenging to determine the full aerial extent of uranium contamination in these plumes because of its natural presence in host soils. Developing a site-specific signature for uranium contamination versus naturally occurring uranium will help to better define the nature and extent of contamination at the site, which in turn will provide useful information for the development and evaluation of remedial action alternatives under the ongoing CERCLA process. Because the site will eventually be transferred back to the USDOE, a clear definition of the extent of groundwater contamination is of interest to both federal agencies, i.e., to the USACE for framing remedial actions and to the USDOE for framing long-term surveillance and maintenance actions.

Evaluation of Background Groundwater Data and the Development of a Site-Specific Ratio

The NFSS has been used to store uranium-contaminated materials in their natural isotopic ratios for over a half of a century; the contaminated soils and residues at the site (contained within the IWCS) have a U-234 to U-238 ratio of essentially 1. If these materials were the source of the uranium measured in groundwater at the site, the U-234 to U-238 ratio from groundwater data would be expected to be close to 1 because too little time has elapsed for alpha particle recoil to have measurably affected the U-234 to U-238 ratio. In contrast, background groundwater would be expected to exhibit a somewhat higher ratio, especially for deeper units storing older groundwater.

Evaluating the background concentration of uranium in groundwater at NFSS is central to both determining the nature and extent of site contamination and supporting assessments of human health and ecological risks. Groundwater samples were collected from nearby areas not expected to have been impacted by site releases, and the measured concentrations were then used to identify local background conditions. In evaluating these data, a variety of information was reviewed to provide a weight-of-evidence indication for this background determination. This information included historical activities, physical and geochemical properties of the soil and rock, the nature of the

measurement (including its depth, the screened lithologic unit, and data validation/verification context), and an understanding of what levels are clearly considered reference background concentrations for the region.

Uranium isotopic concentrations sampled from nearby wells were tentatively identified as representing background groundwater. Isotopic uranium concentrations resulting from radiochemical analysis using alpha spectroscopy with a four hour count time are reported in Table II below. Two values are generally reported for each isotope in each well, one for the total concentration and one for the dissolved concentration. The dissolved value represents the concentration of the sample after it was passed through a 0.45 micron filter to remove entrained solids, while the value for total uranium reflects the unfiltered sample. These values are very similar, meaning that most of the uranium in these samples is in solution. Table II lists the uranium concentration data and associated isotopic ratios for background groundwater wells in the order of increased well depth (in meters above mean sea level (meters AMSL).

Table II. Background Uranium Groundwater Concentrations and Isotopic Ratios by Lithology[a]

Well Location	**Well Depth (meters AMSL)**	**Screened Lithology**	**Uranium Concentration (pCi/L)**				**Total U-234:238**	**Dissolved U-234:238**
			Total		**Dissolved**			
			U-234	**U-238**	**U-234**	**U-238**		
GW-PZ23S	95.75	UCT	4.65	3.65	-	-	1.27	-
GW-PZ18S	94.49	UCT	7.32	5.79	7.23	5.93	1.26	1.22
GW-PZ21S	***94.45***	**UCT**	**13.7**	**11.9**	**10.9**	**9.04**	**1.15**	**1.21**
GW-PZ25S	***94.30***	**UCT**	**20.8**	**19.7**	**20.9**	**19.8**	**1.06**	**1.06**
GW-GW2A	*93.25*	*GLC*	*8.19*	*4.36*	*7.06*	*4.54*	*1.88*	*1.56*
GW-SP2M	93.23	ASG	4	3.13	8.28	6.32	1.28	1.31
GW-SP5M	93.06	ASG	5.29	4.27	6.5	4.8	1.24	1.35
GW-PZ21M	*92.52*	*GLC*	*8.73*	*3.4*	*8.94*	*3.35*	*2.57*	*2.67*
GW-MW17	92.44	ASG	4.1	3.15	4.44	3.12	1.3	1.42
GW-W12	92.11	ASG	5.62	3.92	5.86	4.15	1.43	1.41
GW-SP1M	90.96	ASG	1.83	1.43	2.21	1.67	1.28	1.32
GW-GW2B	89.86	BRT	1.41	1.15	1.42	1.04	1.23	1.37
GW-PZ18M	*89.29*	*GLC*	*1.56*	*0.616*	*1.05*	*0.55*	*2.53*	*1.91*
GW-SP9M	89.25	ASG/BRT	1.54	1.1	1.63	1.07	1.4	1.52
GW-W11	88.64	QFM	0.674	0.322	0.687	0.42	2.09	1.64
GW-W12D	88.03	QFM	1.14	0.604	1.23	0.695	1.89	1.77
GW-W3R	87.24	QFM	0.539	0.247	0.628	0.295	2.18	2.13
GW-W13D	86.63	QFM	0.608	-	0.409	0.229	-	1.79
GW-SP14D	86.51	QFM	0.324	0.116	0.279	0.17	2.79	1.64
GW-W14D	85.74	QFM	-	-	0.557	0.195	-	2.86
GW-PZ21D	85.52	QFM	0.39	-	0.196	0.109	-	1.80
GW-SP9D	84.88	QFM	1.29	0.954	1.09	0.729	1.35	1.50
GW-PZ7M	84.85	QFM	0.452	0.3	0.68	0.469	1.51	1.45
GW-PZ8D	84.62	QFM	0.605	0.425	0.964	0.245	1.42	3.93

[a] Shown are total and dissolved concentrations of U-234 and U-238 from wells initially identified as background for site groundwater. Also shown are U-234 to U-238 ratios; the site-specific cutoff for background was identified as 1.2. A hyphen indicates the concentration was either not detected or available. Two wells potentially impacted by the site in this data set are bolded (PZ-21S and PZ-25S). Lithology acronyms used in this table are defined in Figure 2.

The data sorted by well depth show that the ratios of the U-234 to U-238 concentrations are typically higher in the bedrock unit (shaded cells in Table II) than the overburden, as would be expected from the alpha particle recoil effect for naturally occurring uranium in older (deeper) groundwater.

Although initially considered as part of the background data set, the ratios from piezometers PZ-21S and PZ-25S (bolded in Table II) screened in the upper zone were significantly lower than other locations, and thus may not represent background, but be impacted by site releases. These two piezometers are located along an old rail line in an area where the soil was heavily disturbed in the past. Two factors suggest that these measurements might reflect site-related contamination: (1) the rail line could have been used to transport radioactive materials for the site, and (2) the higher porosity of disturbed soils compared to undisturbed soils could enhance leaching of potential soil contamination to groundwater, such that the impact might be seen within several decades.

In addition, the U-234 and U-238 measurements for all other locations are less than 9 pCi/L, whereas the concentrations from PZ-21S and PZ-25S are noticeably higher than the others. In addition, most wells show U-234 to U-238 ratios ranging from 1.23 to 2.79 for total concentrations, and from 1.22 to 3.93 for dissolved concentrations. The ratio of U-234 to U-238 in PZ-25S is 1.06 for both total and dissolved uranium. These results show a clear distinction between the U-234 and U-238 concentrations reported for PZ-25S and those for the other wells identified as background. The much higher uranium concentrations coupled with the low ratio of U-234 to U-238 strongly suggest that the uranium reported for PZ-25S is largely attributable to past site releases.

The evidence for PZ-21S also supports a similar conclusion but is somewhat less compelling. The uranium concentrations in this piezometer are about 50% higher than the next highest value, and the concentration ratios of U-234 to U-238 are 1.15 for total uranium and 1.21 for dissolved uranium. While these ratios are smaller than those for the other wells, they do not provide conclusive evidence that the uranium from this piezometer largely reflects site releases. It appears that PZ-21S might have been impacted to a small extent by site releases, but not like PZ-25S. That is, uranium in groundwater at that location could represent a combination of naturally occurring levels with a relatively small contribution from NFSS releases.

The concentration ratios in PZ-18S are only slightly higher than those in PZ-21S, which might indicate that these data also reflect a combination of naturally occurring uranium with a small contribution from NFSS materials. However, the uranium concentrations themselves are much lower and are comparable to the concentrations reported for several other background wells, such as GW-2A and PZ-21M. The isotopic ratios for GW-2A and PZ-21M exceed 1.5 for both total and dissolved concentrations, which would indicate that these wells are measuring naturally occurring rather than site-related uranium. These data together indicate that PZ-18S may be slightly impacted by site releases (similar to but less than PZ-21S), but are not sufficient to support deleting this well from the background data set.

The evidence that PZ-25S has been impacted by site releases is strong, considering the historical context and physical observations, and the higher-than-expected uranium concentrations and lower U-234 to U-238 ratios compared with wells considered representative of local background. This conclusion also applies for PZ-21S, although the evidence is not as compelling.

Although uranium concentrations in PZ-21S are higher than those in other wells, the U-234 to U-238 ratios are not so much lower than the ratios for other wells to make a definitive conclusion about background. This piezometer likely reflects naturally occurring uranium with a relatively small contribution from the site. While the isotopic ratios for PZ-18S are somewhat similar to those for PZ21S, the measured concentrations are much lower, which indicates that this piezometer could reflect the higher end of natural uranium in groundwater.

On the basis of these data and physical considerations, a decision was made to remove the PZ-21S and PZ-25S data from the data set being used to calculate background uranium concentrations in groundwater. The resulting values for U-234 and U-238 better represent background conditions for the upper water-bearing zone at this site. These findings are being summarized for inclusion in the CERCLA Remedial Investigation Report (RIR) being prepared for this site, and they are also being incorporated in the ongoing human health and ecological risk assessments to support site cleanup decisions.

Once groundwater locations PZ-21S and PZ-25S were eliminated from the background dataset for this evaluation, a closer look at the geochemical impacts of various lithologic strata on the isotopic uranium ratio was conducted. Figure 2 illustrates the lithology at NFSS, which consists of a thin Fill, an Upper Clay Till (UCT), a Glacio-Lacustrine Clay (GLC), an Alluvial Sand and Gravel (ASG), and a Basal Red Till (BRT). The bedrock at NFSS is a reddish-brown zone of the Queenston shale formation (QFM).

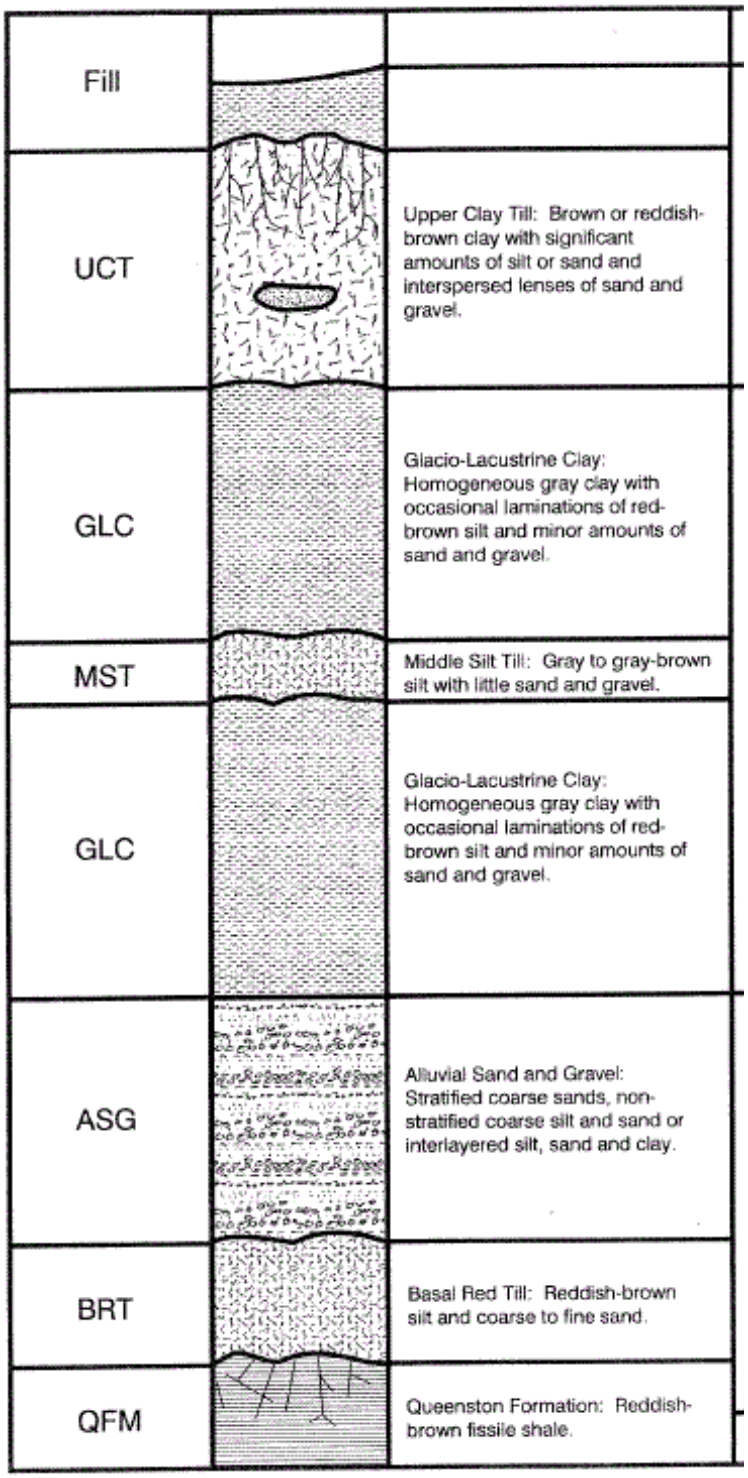

Fig. 2. NFSS Lithology [8].

It is apparent from Table II that the uranium ratio signature for groundwater wells screened in the overburden is typically less than those from wells screened in bedrock (shaded in Table II), with the exception of those screened in the GLC unit (italicized in Table II). Since the bedrock wells will exhibit a higher uranium ratio due to the older groundwater in this deeper geologic formation, it is not readily apparent why the uranium ratio is also elevated for wells in the GLC unit. A likely two-fold explanation is that there is an increased probability for the recoil effect to

occur since a greater number of cations (U-238 atoms) will sorb onto the charged clay particles due to a higher partition coefficient (Kd) driven by greater electrostatic potentials (i.e., negative charge) on the clay. In addition, the slow movement of groundwater through this clay unit provides enough residence time for the alpha recoil effect to enrich groundwater in U-234. These two conditions increase the probability that the Th-234 atom generated by the U-238 decay will reach the groundwater in the clay unit. Because of this, the alpha particle recoil effect in the GLC is more pronounced than in the rock units, resulting in the observed higher U-234:U-238 ratio.

Use of Isotopic Ratio to Evaluate Groundwater Plumes at NFSS

Cleanup decisions for groundwater can have substantial cost implications, so the ability to distinguish between ambient levels and those reflecting site contamination is crucial. Groundwater zones that are obviously contaminated are easy to define, but for areas where measurements fall at or slightly above the high end of the background range, it can be difficult to determine whether the data for a given analyte reflect site contributions or natural variability. Thus, a scientific approach for defining practical thresholds to determine plume boundaries would be useful to guide cleanup decisions.

The isotopic uranium ratio signature at NFSS proved to be a useful tool in evaluating groundwater contamination at the site and in the preparation of groundwater contaminant plume maps, which provide a pictorial representation of current groundwater conditions at the site. Typically, background screening values or maximum contaminant levels developed by the U.S. Environmental Protection Agency for drinking water sources are used to define boundaries of uranium plumes. Background screening values were used to define plumes at the NFSS. However, some of the plume boundaries were modified based upon consideration of other factors, such as the uranium ratio signature, as discussed below.

Groundwater plume maps for dissolved concentrations of U-234, U-238, and U-235 were initially developed by comparing the measured concentrations of these three uranium isotopes against the screening values of 8.94, 6.32, and 0.51 pCi/L for dissolved U-234, U-238, and U-235, respectively. These screening values represent the 95% UTL of the background data for these three radionuclides in groundwater at the site. Background data for U-234 and U-238 are shown in Table II; similar information was developed for U-235, but it is not included in the table.

In evaluating these initial plumes, it was noted that for some locations a plume would be indicated for one or two of these isotopes (based on comparison to the screening values noted above), but not all three. In these situations, the data were re-evaluated to determine if indeed a plume should be indicated in this area of the site. For example, at one location in the northernmost bounds of the site a plume was indicated for U-235, but no similar plumes were identified for U-234 and U-238. Since enriched uranium is not expected in natural groundwater at this site, U-235 should be collocated with U-234 and U-238. In addition, documentation indicated that there was no storage or burial of contaminated waste in this area. The question therefore arose as to whether the dissolved U-235 plume was indeed in excess of background conditions or simply an artifact of the background statistics, since the concentrations of the other two uranium isotopes were not elevated at this location.

To clarify this condition, the dissolved U-234:U-238 ratio signature at this location was calculated to be 1.44. Since the well producing this U-235 "plume" was screened in the UCT unit, the isotopic uranium ratio signature of 1.44 would indicate that the dissolved uranium detected in groundwater at this location was likely due to natural background sources, i.e., 1.44 is above the background uranium ratio signature of 1.2. Since uncertainty in the reported result can influence this ratio, it was determined that the isotopic uranium ratio would be 1.2 (indicative of background), even if half of the uncertainty associated with the dissolved U-234 result was subtracted and half of the uncertainty associated with the dissolved U-238 result was added to the measured concentrations. The influence of the data uncertainty can be greatly reduced, thereby increasing the confidence in the isotopic uranium ratio signature, by increasing the alpha count time during analysis.

Current and historical information on site operations, scientific knowledge on the migration of uranium isotopes to groundwater, and the application of the background isotopic uranium ratio signature would indicate that the dissolved U-235 "plume" at this location is a result of the background statistics and not site contamination. This is further supported by the background concentrations of U-234 and U-238. This weight of evidence indicates a very low level of conference associated with this U-235 "plume", which will be articulated in the RIR.

A similar condition was applied to a preliminary dissolved U-235 groundwater plume located to the east of the IWCS, where a groundwater plume was identified for U-235, but no collocated plumes were evident for the other two uranium isotopes. The isotopic uranium plumes indicate locations where the concentrations of U-234, U-238, and U-235 exceed the background screening values of 8.94, 6.32, and 0.51 pCi/L. As noted above, a groundwater plume for U-235 would be expected to be collocated with plumes for the other two uranium isotopes. This condition flagged the area as a location requiring more detailed analysis.

The U-235 groundwater "plume", east of the IWCS, was the result of elevated concentrations in two wells, although the concentrations of U-234 and U-238 in both wells were below their respective background screening values. The isotopic uranium ratios in these two wells were calculated to be 1.07 and 1.33; both wells were screened in the UCT unit. The well having the lower ratio (1.07) would be indicative of having been impacted by releases from wastes formerly stored at this site since the value is less than the background signature of 1.2. Conversely, the well having the higher ratio (1.33) was likely not impacted by site releases, in that this ratio is above 1.2. In addition, the dissolved U-235 concentration of 0.684 pCi/L in this second well was only slightly greater than the background screening value of 0.51 pCi/L. This supports the contention that the uranium being measured in the second well is likely associated with natural sources and is not related to site releases.

In contrast, the U-235 concentration in the well having the lower ratio of 1.07 was close to three times the background screening value of 0.51 pCi/L. The isotopic uranium ratio and the measured concentration of U-235 at this location both suggest that this well has been impacted by uranium releases from the site. However, since uncertainty in the reported concentrations of U-234 and U-238 can influence the isotopic ratio, it was determined that the ratio of U-234 to U-238 for this well would be 1.18, if 25% of the uncertainty from the dissolved U-234 concentration was added to and 25% of the uncertainty from the dissolved U-238 concentration subtracted from the measured values. As previously noted, the influence of the data uncertainty can be greatly reduced by increasing the alpha count time during analysis.

Based on these analyses, it was concluded that the U-235 concentration of 0.684 pCi/L in the first well was elevated based solely on the manner in which the data were obtained and analyzed. That is, this well does not likely represent site-related contamination. In contrast, the second well, with a U-235 concentration of 1.33 pCi/L, could have been impacted by site releases. However, the confidence associated with this conclusion is low, as reflected in the uncertainty evaluations associated with the isotopic uranium ratio at this location and the lack of elevated concentrations of U-234 and U-238. This information is also being incorporated into the RIR being prepared for the site.

CONCLUSIONS AND RECOMMENDATIONS

The development of a site-specific isotopic uranium ratio to signify background conditions for the NFSS proved to be a valuable resource in evaluating the measured concentrations of uranium in groundwater. This signature ratio helps differentiate between natural uranium in groundwater at the high end of background and areas impacted by site releases. This site-specific ratio of 1.2 for U-234 to U-238 has provided the technical team with an additional tool to better define the nature and extent of uranium contamination in groundwater. This ratio, when used in conjunction with other site-related information such as previous site activities, hydrogeochemistry, and collocation of contaminants, allowed the technical team to more accurately assess the measured data in a timely manner, and should reduce the likelihood of identifying uncontaminated areas as possibly requiring remediation. This will help ensure remediation resources are properly applied to address site-related releases.

In considering the use of this concept at other sites, it must be remembered that the isotopic uranium ratio signature is site specific. The value of 1.2 given here is only relevant to NFSS and the use of this approach may not be applicable at other sites. It is possible that for some sites the data may yield a large enough uncertainty that renders this application useless, because there is not an obvious distinction between the ratio associated with site-related contamination and background. The data must be of sufficient quality and quantity for use in this application. It is recommended that the alpha count time for the detection of uranium isotopes be sufficient to yield low uncertainty and count be of sufficient quantity to be statistically significant. The higher the quality of the data, the greater the probability that there will be a clear distinction between naturally occurring uranium ratios and those associated with site releases. Finally, the uranium ratio signature is a tool that can support site evaluations, but should not be the sole source for making technically sound decisions.

REFERENCES

1. Arndt, M.F., and L. West, 2005, "A Study of the Factors Affecting the Gross Alpha Measurement, and a Radiochemical Analysis of some Groundwater Samples from the State of Wisconsin Exhibiting an Elevated Gross Alpha Activity," http://www.slh.wisc.edu/ehd/radiochem/dnr_reports/dnrfinal.pdf, accessed January.
2. MacDonell, et al., 2005. "Using Isotopic Uranium Ratios as a Signature for Contaminated versus Uncontaminated Groundwater," 2005 International Conference of Environmental Remediation and Radioactive Waste Management. Glasgow, Scotland, September.
3. Hess, C.T., et al., 1985, "The Occurrence of Radioactivity in Public Water Supplies in the United States," Health Physics, 48:553-586.
4. Myrick, T.E., B.A. Berven, and F.F. Haywood, 1983, "Determination of Concentrations of Selected Radionuclides in Surface Soil in the U.S.," Health Physics, 45:631-642.
5. Cothern, C.R., and W.L. Lappenbusch, 1983, "Occurrence of Uranium in Drinking Water in the U.S.," Health Physics, 45:89-99.
6. Hughes, L.D., et al., 2005, "Anomalously High Levels of Uranium and Other Naturally Occurring Radionuclides in Private Wells in the Piedmont Region of South Carolina," Health Physics, 88:248-252.
7. Kitto, M.E., and M.S. Kim, 2005, "Naturally Occurring Radionuclides in Community Water Supplies of New York State," Health Physics, 88:253-260.
8. HydroGeoLogic, Inc., 2002, "Draft NFSS Groundwater Flow Model and Calibration Technical Memo", April.

APPENDIX 12-E

Lake Ontario Ordnance Works Underground Utilities Remedial Investigation Fact Sheet

US Army Corps of Engineers
Buffalo District

FUSRAP Fact Sheet

Niagara Falls Storage Site (NFSS)

Radiological Investigation of Underground Utility (UU) Lines

on the former Lake Ontario Ordnance Works (LOOW) property

U.S. Army Corps of Engineers • Buffalo District • October 2007

History of "Underground Utilities"

In 1942, the War Department acquired the 7500-acre Lake Ontario Ordnance Works (LOOW) site in the towns of Lewiston and Porter, NY for the purpose of manufacturing trinitrotoluene (TNT) in support of World War II. Underground utility (UU) lines were installed to support this process, although in July 1943 the War Department stopped production at LOOW due to an oversupply of TNT. The UU lines include, but are not limited to, acid waste, sanitary sewer, storm sewer, TNT waste, chemical waste, 30-inch wastewater discharge line, water, fire suppression, and associated drains, pits, and sumps.

Beginning in 1944, the Manhattan Engineer District (MED) and its successor the Atomic Energy Commission (AEC) used portions of the former LOOW, including the 191-acre, federally-owned Niagara Falls Storage Site (NFSS), for the storage of radioactive residues that resulted from the processing of uranium ores during the development of the atomic bomb.

A multi-phase Remedial Investigation (RI) was conducted at Niagara Falls Storage Site (NFSS) in Lewiston, NY under the Formerly Utilized Sites Remedial Action Program (FUSRAP) to identify the nature and extent of radiological contamination resulting from past government activity. FUSRAP was initiated in 1974 to identify, investigate and clean up or control sites that were part of the Nation's early atomic energy and weapons program.

Background

During the Remedial Investigation (RI) of the NFSS, samples from within the underground utility (UU) lines, which supported the 1940's TNT manufacturing effort, indicated radiological contamination exists within sediment and water in the sanitary sewer and acid waste UU lines on-site. Since the UU lines on the NFSS property extend north to the former LOOW wastewater treatment plant and subsequently to the 30-inch outfall to the Niagara River, the UU lines on the northern site boundary were grouted to avoid potential transport of radiological contamination off-site. Sampling was then initiated on the northern extent of the UU lines to determine if radiological contaminants had already transported off-site.

Between August and October of 2006, the U.S. Army Corps of Engineers (USACE) collected a total of 60 samples for radiological analysis from within or adjacent to UU lines on the former LOOW site. Twelve additional samples were collected for waste disposal and quality assurance purposes. Fifty-five (55) samples consisted of were sludge and wastewater within, and soil below, UU lines on the former LOOW, including the 30-inch outfall. In addition, one collocated surface water and sediment sample and surface soil and subsurface soil sample was collected beneath the 30-inch outfall line at a single point where it traverses the Southwest (SW) Drainage Ditch on the Lewiston-Porter Central School District property. Lastly, one sediment (SD) sample was collected within the sludge bed of the former LOOW wastewater treatment plant. All samples were analyzed for radiological constituents including, but not limited to, isotopic uranium, isotopic thorium, radium-226, and radium-228.

FUSRAP Sampling Objectives:

The Corps conducted radiological sampling of former LOOW UU lines under FUSRAP to:

- Confirm the presence or absence of radiological contamination in wastewater and sludge within, and soil below and adjacent to, UU lines.

Since radiological contamination of sediment within UU lines exists on the NFSS property and the UU lines could act as a preferential pathway for contaminants to move off site (i.e. north toward the former LOOW wastewater treatment plant), radiological sampling was conducted and UU lines on the northern boundary of the site were grouted in place to prevent future migration off-site.

Figure 1: Exterior View of the 12-inch Terracotta Sanitary Sewer (lower) and 4-inch Steel Chemical Waste (upper) UU lines

Figure 2: Interior View of a 6-inch Terracotta Sanitary Sewer UU line

UU Line Sampling

Radiological sampling (under FUSRAP) was conducted in conjunction with the Fall 2006 LOOW chemical sampling (under the Defense Environmental Restoration Program (DERP) for formerly used defense sites (FUDS)) of former LOOW UU lines. During the LOOW investigation, a total of 202 trenches were dug and 359 samples collected for chemical analysis. For more information, refer to the August 2007 DERP LOOW UU Investigation Fact Sheet. In addition, sampling locations, such as the sanitary sewer and acid waste UU lines extending north off of the NFSS property, were targeted for radiological analysis since these were the UU lines that contained radiologically contaminated sediment and water on the NFSS property. Radiological sampling was conducted on UU lines that extended from these lines to the former LOOW wastewater treatment plant and subsequent outfall line.

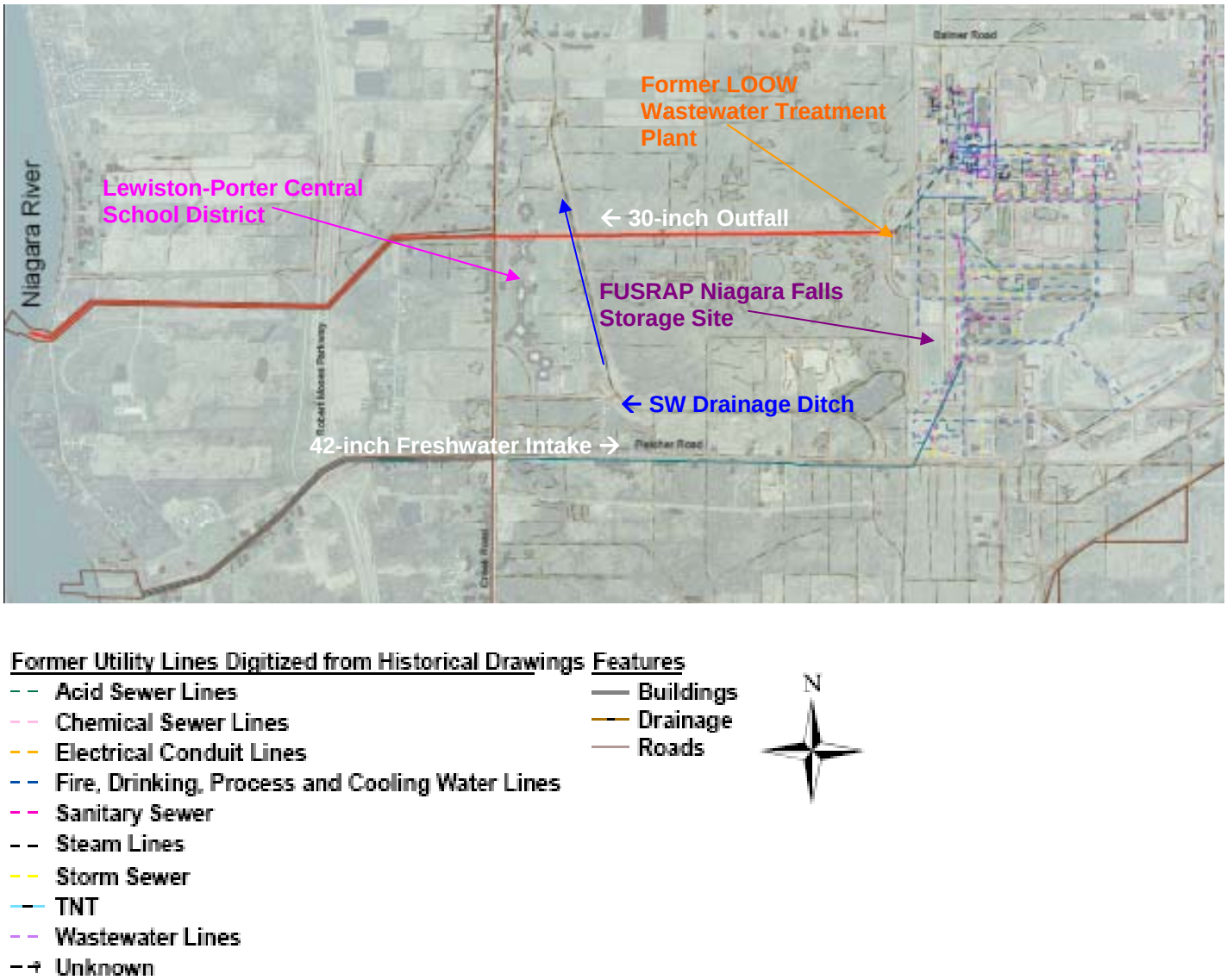

Figure 3: Aerial View of former LOOW UULs[1]

References:

[1] Aerial Source: McIntosh & McIntosh, P.C. for EA Engineering, Science, and Technology Inc., 29 April 1997.

USACE Buffalo District
FUSRAP Niagara Falls Storage Site
Split Samples of LOOW UU Lines for Radiological Analysis
Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Bismuth 214	pCi/g	0.65			0.22	0.24
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Lead 212	pCi/g	0.72			0.21	0.22
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Lead 214	pCi/g	0.75			0.18	0.17
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Potassium 40	pCi/g	15.1			3.1	0.3
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Radium (226)	pCi/g	0.75			0.18	0.17
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Radium 228	pCi/g	0.89			0.46	0.88
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Thallium 208	pCi/g	0.19			0.11	0.11
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Thorium 228	pCi/g	0.83			0.19	0.05
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Thorium 230	pCi/g	1.02			0.22	0.04
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Thorium 232	pCi/g	0.76			0.17	0.03
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Thorium 234	pCi/g	3.3			1	1.7
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Uranium 234	pCi/g	4.65			0.7	0.02
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Uranium 235	pCi/g	0.258	J	J	0.079	0.021
PIPES-C7-0CC-SL-X26-UN01-6	Sediment	30-inch Outfall (OCC-X26)	8/14/2006	Uranium 238	pCi/g	4.5			0.68	0.01
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Actinium 228	pCi/g	0.457			0.077	0.1
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Bismuth 214	pCi/g	0.484			0.07	0.052
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Cesium 137	pCi/g	0.107			0.023	0.025
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Lead 210	pCi/g	0.61			0.27	0.51
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Lead 212	pCi/g	0.544			0.076	0.033
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Lead 214	pCi/g	0.566			0.07	0.04
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Potassium 40	pCi/g	12.9			1.7	0.2
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Radium (226)	pCi/g	0.484	J	J	0.07	0.052
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Radium 228	pCi/g	0.457	J	J	0.077	0.1
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Thallium 208	pCi/g	0.179			0.033	0.026
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Thorium 228	pCi/g	0.65			0.16	0.05
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Thorium 230	pCi/g	0.81			0.19	0.03
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Thorium 232	pCi/g	0.72			0.17	0.03
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Thorium 234	pCi/g	0.78			0.14	0.23
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Uranium 234	pCi/g	1.14			0.23	0.03
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Uranium 235	pCi/g	0.071	J	J	0.046	0.017
SD-C7-OCC-SD-X00-SN01-0.5	Sediment	Southwest Drainage Ditch	9/1/2006	Uranium 238	pCi/g	1.2			0.24	0.02
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Actinium 228	pCi/g	0.55			0.13	0.32
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Bismuth 214	pCi/g	0.56			0.12	0.11
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Cesium 137	pCi/g	0.172			0.05	0.064
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Lead 212	pCi/g	0.58			0.1	0.09
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Lead 214	pCi/g	0.581			0.096	0.1
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Potassium 40	pCi/g	12.9			2.1	0.6
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Radium (226)	pCi/g	0.56			0.12	0.11
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Radium 228	pCi/g	0.55			0.13	0.32
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Thallium 208	pCi/g	0.24			0.058	0.054
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Thorium 228	pCi/g	0.71			0.17	0.04
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Thorium 230	pCi/g	0.7			0.17	0.02
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Thorium 232	pCi/g	0.73			0.17	0.02
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Uranium 234	pCi/g	1			0.21	0.03
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Uranium 235	pCi/g	0.065	J	J	0.045	0.018
SB-C7-OCC-SD-X00-SN01-2	Soil	Southwest Drainage Ditch	8/16/2006	Uranium 238	pCi/g	1.22			0.24	0.03
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Actinium 228	pCi/g	0.9			0.23	0.28
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Lead 212	pCi/g	0.66			0.14	0.11
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Lead 214	pCi/g	0.63			0.15	0.2
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Potassium 40	pCi/g	11.6			2.5	0.9
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Radium (226)	pCi/g	0.63			0.15	0.2
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Radium 228	pCi/g	0.9			0.23	0.28
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Thallium 208	pCi/g	0.161			0.096	0.097
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Thorium 228	pCi/g	0.45	J	J	0.11	0.04
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Thorium 230	pCi/g	0.85			0.17	0.03
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Thorium 232	pCi/g	0.57			0.13	0.02
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Thorium 234	pCi/g	1.86			0.61	1.5
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Uranium 234	pCi/g	2.42			0.38	0.02
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Uranium 235	pCi/g	0.135	J	J	0.053	0.021
SS-C7-OCC-SS-X00-SN01-0.5	Soil	Southwest Drainage Ditch	8/7/2006	Uranium 238	pCi/g	2.56			0.4	0.02
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Lead 212	pCi/g	0.8			0.15	0.11
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Lead 214	pCi/g	0.94			0.17	0.12
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Potassium 40	pCi/g	19.2			3.2	0.7
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Radium (226)	pCi/g	0.94			0.17	0.12
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Radium 228	pCi/g	0.94			0.37	0.66
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Thallium 208	pCi/g	0.256			0.095	0.093
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Thorium 228	pCi/g	0.8			0.17	0.04
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Thorium 230	pCi/g	0.79			0.17	0.04
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Thorium 232	pCi/g	0.9			0.18	0.02
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Uranium 234	pCi/g	0.87			0.17	0.02

USACE Buffalo District
FUSRAP Niagara Falls Storage Site
Split Samples of LOOW UU Lines for Radiological Analysis
Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Uranium 235	pCi/g	0.048	J	J	0.032	0.022
TSB-C7-0CC-SO-X03-SN01-7	Soil	30-inch Outfall (OCC-X03)	8/8/2006	Uranium 238	pCi/g	0.77			0.15	0.02
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Actinium 228	pCi/g	0.98			0.32	0.51
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Bismuth 212	pCi/g	0.83			0.47	0.82
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Lead 212	pCi/g	1			0.24	0.23
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Lead 214	pCi/g	0.69			0.19	0.17
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Potassium 40	pCi/g	16			3.3	1.6
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Radium (226)	pCi/g	0.69			0.19	0.17
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Radium 228	pCi/g	0.98			0.32	0.51
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Thallium 208	pCi/g	0.43			0.13	0.11
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Thorium 228	pCi/g	1			0.21	0.04
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Thorium 230	pCi/g	0.97			0.2	0.01
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Thorium 232	pCi/g	0.9			0.19	0.03
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Uranium 234	pCi/g	0.9			0.18	0.03
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Uranium 235	pCi/g	0.02	J	J	0.023	0.014
TSB-C7-0CC-SO-X13-SN01-6	Soil	30-inch Outfall (OCC-X13)	8/10/2006	Uranium 238	pCi/g	0.94			0.18	0.03
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Lead 212	pCi/g	0.79			0.19	0.16
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Lead 214	pCi/g	0.93			0.19	0.13
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Potassium 40	pCi/g	17.3			3.4	1
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Radium (226)	pCi/g	0.93			0.19	0.13
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Radium 228	pCi/g	0.94			0.4	0.72
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Thallium 208	pCi/g	0.26			0.1	0.1
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Thorium 228	pCi/g	0.88			0.18	0.04
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Thorium 230	pCi/g	0.85			0.17	0.01
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Thorium 232	pCi/g	0.73			0.15	0.02
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Uranium 234	pCi/g	2.94			0.48	0.02
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Uranium 235	pCi/g	0.161	J	J	0.065	0.025
TSB-C7-0CC-SO-X26-UN01-6	Soil	30-inch Outfall (OCC-X26)	8/14/2006	Uranium 238	pCi/g	2.65			0.44	0.02
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Actinium 228	pCi/g	0.95			0.18	0.3
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Bismuth 214	pCi/g	0.69			0.15	0.14
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Lead 212	pCi/g	0.9			0.15	0.1
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Lead 214	pCi/g	0.77			0.13	0.13
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Potassium 40	pCi/g	16.7			2.7	0.5
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Radium (226)	pCi/g	0.69			0.15	0.14
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Radium 228	pCi/g	0.95			0.18	0.3
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Thallium 208	pCi/g	0.247			0.067	0.069
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Thorium 228	pCi/g	0.91	J	J	0.18	0.03
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Thorium 230	pCi/g	0.85	J	J	0.17	0.03
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Thorium 232	pCi/g	0.87	J	J	0.17	0.01
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Uranium 234	pCi/g	0.7	J	J	0.15	0.03
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Uranium 235	pCi/g	0.048	J	J	0.037	0.037
TSB-C7-0CC-SO-X11-SN07	Soil	30-inch Outfall (OCC-X11)	8/9/2006	Uranium 238	pCi/g	0.74	J	J	0.15	0.03
SW-C7-OCC-SW-X00-SN01-1	Water	Southwest Drainage Ditch	8/7/2006	Radium (226)	pCi/L	0.014	U	U	0.096	0.18
SW-C7-OCC-SW-X00-SN01-1	Water	Southwest Drainage Ditch	8/7/2006	Radium 228	pCi/L	-0.03	U	U	0.5	0.86
SW-C7-OCC-SW-X00-SN01-1	Water	Southwest Drainage Ditch	8/7/2006	Thorium 228	pCi/L	0	U	UJ	0	0.2
SW-C7-OCC-SW-X00-SN01-1	Water	Southwest Drainage Ditch	8/7/2006	Thorium 230	pCi/L	0.24	J	UJ	0.16	0.15
SW-C7-OCC-SW-X00-SN01-1	Water	Southwest Drainage Ditch	8/7/2006	Thorium 232	pCi/L	0.015	U	UJ	0.044	0.09
SW-C7-OCC-SW-X00-SN01-1	Water	Southwest Drainage Ditch	8/7/2006	Uranium 234	pCi/L	0.22	J	J	0.1	0.05
SW-C7-OCC-SW-X00-SN01-1	Water	Southwest Drainage Ditch	8/7/2006	Uranium 235	pCi/L	0.027	U	U	0.047	0.037
SW-C7-OCC-SW-X00-SN01-1	Water	Southwest Drainage Ditch	8/7/2006	Uranium 238	pCi/L	0.29	J	J	0.12	0.05
PIPEW-C7-OCC-WW-X13-SN01-5	Water	30-inch Outfall (OCC-X13)	8/10/2006	Radium (226)	pCi/L	0.21	J	J	0.15	0.21
PIPEW-C7-OCC-WW-X13-SN01-5	Water	30-inch Outfall (OCC-X13)	8/10/2006	Radium 228	pCi/L	0.78	U	U	0.57	0.9
PIPEW-C7-OCC-WW-X13-SN01-5	Water	30-inch Outfall (OCC-X13)	8/10/2006	Thorium 228	pCi/L	0.19	J	J	0.12	0.11
PIPEW-C7-OCC-WW-X13-SN01-5	Water	30-inch Outfall (OCC-X13)	8/10/2006	Thorium 230	pCi/L	0.178	J	UJ	0.098	0.055
PIPEW-C7-OCC-WW-X13-SN01-5	Water	30-inch Outfall (OCC-X13)	8/10/2006	Thorium 232	pCi/L	0.135	J	J	0.088	0.071
PIPEW-C7-OCC-WW-X13-SN01-5	Water	30-inch Outfall (OCC-X13)	8/10/2006	Uranium 234	pCi/L	5.3			1	0.04
PIPEW-C7-OCC-WW-X13-SN01-5	Water	30-inch Outfall (OCC-X13)	8/10/2006	Uranium 235	pCi/L	0.16	J	J	0.12	0.05
PIPEW-C7-OCC-WW-X13-SN01-5	Water	30-inch Outfall (OCC-X13)	8/10/2006	Uranium 238	pCi/L	4.4			0.88	0.07
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Lead 210	pCi/g	3.7			2.3	2.4
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Lead 212	pCi/g	1.19			0.3	0.21
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Lead 214	pCi/g	1.33			0.25	0.2
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Potassium 40	pCi/g	28.7			4.7	1.4
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Radium (226)	pCi/g	1.33			0.25	0.2
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Radium 228	pCi/g	1.24			0.74	1.1
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Thallium 208	pCi/g	0.5			0.14	0.12
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Thorium 228	pCi/g	1.3			0.26	0.06
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Thorium 230	pCi/g	1.36			0.27	0.03
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Thorium 232	pCi/g	1.24			0.25	0.02
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Uranium 234	pCi/g	1.27			0.24	0.03
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Uranium 235	pCi/g	0.108	J	J	0.054	0.037

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Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
PIPES-C7-LEW-SL-X03-SN01-5.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Uranium 238	pCi/g	1.34			0.25	0.03
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Bismuth 214	pCi/g	3.85			0.77	0.37
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Cesium 137	pCi/g	0.57			0.23	0.25
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Lead 212	pCi/g	1.86			0.35	0.26
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Lead 214	pCi/g	5			0.69	0.33
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Potassium 40	pCi/g	11.9			2.9	1.5
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Radium (226)	pCi/g	5			0.69	0.33
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Radium 228	pCi/g	2.49			0.96	1.5
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Thallium 208	pCi/g	0.38			0.27	0.21
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Thorium 228	pCi/g	1.61			0.31	0.06
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Thorium 230	pCi/g	1.82			0.34	0.04
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Thorium 232	pCi/g	0.5			0.13	0.03
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Uranium 234	pCi/g	2.13			0.35	0.02
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Uranium 235	pCi/g	0.114	J	J	0.051	0.013
PIPES-C7-LEW-SL-X07-AW01-4	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X07)	8/17/2006	Uranium 238	pCi/g	2.14			0.35	0.02
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Actinium 228	pCi/g	1.73			0.41	0.46
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Bismuth 214	pCi/g	1.4			0.34	0.26
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Lead 212	pCi/g	1.11			0.24	0.22
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Lead 214	pCi/g	1.51			0.3	0.28
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Potassium 40	pCi/g	13.5			3.1	0.4
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Radium (226)	pCi/g	1.51			0.3	0.28
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Radium 228	pCi/g	1.73			0.41	0.46
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Thallium 208	pCi/g	0.46			0.18	0.16
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Thorium 228	pCi/g	1.25			0.26	0.06
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Thorium 230	pCi/g	1.61			0.31	0.04
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Thorium 232	pCi/g	1.05			0.22	0.02
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Thorium 234	pCi/g	3.2			1.2	2.3
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Uranium 234	pCi/g	5.74			0.89	0.03
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Uranium 235	pCi/g	0.289	J	J	0.091	0.025
PIPES-C7-LEW-SL-X11-AW01-4.5	Sediment	Former LOOW Wastewater Treatment Plant (LEW-X11)	8/17/2006	Uranium 238	pCi/g	4.98			0.78	0.02
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Actinium 228	pCi/g	0.327			0.057	0.1
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Bismuth 214	pCi/g	0.339			0.054	0.05
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Lead 212	pCi/g	0.372			0.056	0.034
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Lead 214	pCi/g	0.345			0.048	0.042
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Potassium 40	pCi/g	8.6			1.2	0.2
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Radium (226)	pCi/g	0.339	J	J	0.054	0.05
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Radium 228	pCi/g	0.327	J	J	0.057	0.1
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Thallium 208	pCi/g	0.158			0.03	0.026
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Thorium 228	pCi/g	0.46	J	J	0.12	0.04
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Thorium 230	pCi/g	0.44	J	J	0.12	0.01
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Thorium 232	pCi/g	0.47	J	J	0.12	0.02
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Uranium 234	pCi/g	0.52			0.13	0.02
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Uranium 235	pCi/g	0.026	J	J	0.029	0.017
SD-C7-LEW-SL-X00-DW04-1	Sediment	Former LOOW Wastewater Treatment Plant (Sludge Bed)	8/22/2006	Uranium 238	pCi/g	0.44	J	J	0.12	0.01
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Actinium 228	pCi/g	0.46			0.13	0.32
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Bismuth 214	pCi/g	1.67			0.24	0.13
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Lead 210	pCi/g	2.22			0.58	0.96
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Lead 212	pCi/g	0.393			0.085	0.11
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Lead 214	pCi/g	1.73			0.22	0.12
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Potassium 40	pCi/g	8.8			1.6	0.8
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Radium (226)	pCi/g	1.67			0.24	0.13
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Radium 228	pCi/g	0.46	J	J	0.13	0.32
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thallium 208	pCi/g	0.174			0.05	0.065
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 228	pCi/g	0.59			0.15	0.04
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 230	pCi/g	2.38			0.44	0.03
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 232	pCi/g	0.65			0.16	0.02
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 234	pCi/g	5.36			0.81	0.8
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 234	pCi/g	13			2.2	0.03
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 235	pCi/g	0.63			0.18	0.02
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 235	pCi/g	0.47			0.14	0.29
SUMPS-C7-LEW-SL-X00-DW03-16	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 238	pCi/g	13			2.2	0.03
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Actinium 228	pCi/g	1.18			0.31	0.45
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Bismuth 214	pCi/g	1.8			0.32	0.2
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Cesium 137	pCi/g	1.2			0.23	0.15
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Lead 210	pCi/g	4.8			1.1	1.5
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Lead 212	pCi/g	1.05			0.19	0.17
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Lead 214	pCi/g	1.77			0.25	0.23
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Potassium 40	pCi/g	7.8			1.8	1.3
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Protactinium 234M	pCi/g	38			12	15
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Radium (226)	pCi/g	1.8			0.32	0.2

USACE Buffalo District
FUSRAP Niagara Falls Storage Site
Split Samples of LOOW UU Lines for Radiological Analysis
Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Radium 228	pCi/g	1.18			0.31	0.45
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Thallium 208	pCi/g	0.26			0.087	0.12
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Thorium 228	pCi/g	0.95			0.24	0.07
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Thorium 230	pCi/g	2.69			0.52	0.04
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Thorium 232	pCi/g	0.97			0.24	0.05
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Thorium 234	pCi/g	30.2			4.1	1.1
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Uranium 234	pCi/g	30			4.8	0.05
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Uranium 235	pCi/g	1.56			0.37	0.05
SUMPS-C7-LEW-SL-X00-DW05-15	Sediment	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Uranium 238	pCi/g	29.4			4.7	0.04
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Lead 212	pCi/g	0.8			0.22	0.18
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Lead 214	pCi/g	0.7			0.16	0.14
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Potassium 40	pCi/g	17.7			3.2	0.9
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Radium (226)	pCi/g	0.7			0.16	0.14
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Radium 228	pCi/g	0.93			0.38	0.75
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Thallium 208	pCi/g	0.37			0.13	0.11
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Thorium 228	pCi/g	0.86			0.18	0.04
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Thorium 230	pCi/g	0.8			0.17	0.03
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Thorium 232	pCi/g	0.74			0.16	0.02
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Uranium 234	pCi/g	0.69			0.15	0.03
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Uranium 235	pCi/g	0.022	U	U	0.025	0.031
TSB-C7-LEW-S0-X03-SN01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X03)	8/15/2006	Uranium 238	pCi/g	0.73			0.15	0.02
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Lead 212	pCi/g	0.87			0.2	0.16
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Lead 214	pCi/g	0.95			0.19	0.16
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Potassium 40	pCi/g	22.1			3.6	0.6
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Radium (226)	pCi/g	0.95			0.19	0.16
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Radium 228	pCi/g	1.2			0.45	0.76
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Thallium 208	pCi/g	0.293			0.098	0.095
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Thorium 228	pCi/g	1.08			0.22	0.05
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Thorium 230	pCi/g	0.96			0.2	0.04
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Thorium 232	pCi/g	0.87			0.19	0.03
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Uranium 234	pCi/g	0.9			0.2	0.03
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Uranium 235	pCi/g	0.034	J	J	0.034	0.018
TSB-C7-LEW-S0-X06-AW01-5	Soil	Former LOOW Wastewater Treatment Plant (LEW-X06)	8/16/2006	Uranium 238	pCi/g	1.01			0.21	0.03
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Actinium 228	pCi/g	1.13			0.32	0.4
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Lead 212	pCi/g	0.91			0.25	0.21
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Lead 214	pCi/g	0.84			0.21	0.18
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Potassium 40	pCi/g	16.3			3.4	1.3
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Radium (226)	pCi/g	0.84			0.21	0.18
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Radium 228	pCi/g	1.13			0.32	0.4
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Thorium 228	pCi/g	0.86			0.18	0.06
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Thorium 230	pCi/g	0.83			0.17	0.03
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Thorium 232	pCi/g	0.89			0.18	0.03
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Uranium 234	pCi/g	0.89			0.19	0.04
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Uranium 235	pCi/g	0.055	J	J	0.04	0.035
TSB-C7-LEW-S0-X10-AW01-6	Soil	Former LOOW Wastewater Treatment Plant (LEW-X10)	8/17/2006	Uranium 238	pCi/g	0.95			0.19	0.03
SUMPW-C7-LEW-WW-X00-AN-12	Water	Former LOOW Wastewater Treatment Plant (Acid Neutralization Bldg)	9/1/2006	Radium (226)	pCi/L	0.16	U	U	0.13	0.2
SUMPW-C7-LEW-WW-X00-AN-12	Water	Former LOOW Wastewater Treatment Plant (Acid Neutralization Bldg)	9/1/2006	Radium 228	pCi/L	0.66	U	U	0.57	0.92
SUMPW-C7-LEW-WW-X00-AN-12	Water	Former LOOW Wastewater Treatment Plant (Acid Neutralization Bldg)	9/1/2006	Thorium 228	pCi/L	0.09	U	U	0.15	0.22
SUMPW-C7-LEW-WW-X00-AN-12	Water	Former LOOW Wastewater Treatment Plant (Acid Neutralization Bldg)	9/1/2006	Thorium 230	pCi/L	0.3	J	J	0.17	0.11
SUMPW-C7-LEW-WW-X00-AN-12	Water	Former LOOW Wastewater Treatment Plant (Acid Neutralization Bldg)	9/1/2006	Thorium 232	pCi/L	-0.017	U	U	0.061	0.14
SUMPW-C7-LEW-WW-X00-AN-12	Water	Former LOOW Wastewater Treatment Plant (Acid Neutralization Bldg)	9/1/2006	Uranium 234	pCi/L	1.44			0.3	0.04
SUMPW-C7-LEW-WW-X00-AN-12	Water	Former LOOW Wastewater Treatment Plant (Acid Neutralization Bldg)	9/1/2006	Uranium 235	pCi/L	0.075	J	J	0.062	0.029
SUMPW-C7-LEW-WW-X00-AN-12	Water	Former LOOW Wastewater Treatment Plant (Acid Neutralization Bldg)	9/1/2006	Uranium 238	pCi/L	1.13			0.26	0.02
SUMPW-C7-LEW-WW-X00-DW01-4	Water	Former LOOW Wastewater Treatment Plant (Collection Tank)	8/16/2006	Radium (226)	pCi/L	0.34	J	J	0.17	0.18
SUMPW-C7-LEW-WW-X00-DW01-4	Water	Former LOOW Wastewater Treatment Plant (Collection Tank)	8/16/2006	Radium 228	pCi/L	0.66	U	U	0.55	0.88
SUMPW-C7-LEW-WW-X00-DW01-4	Water	Former LOOW Wastewater Treatment Plant (Collection Tank)	8/16/2006	Thorium 228	pCi/L	0.14	J	J	0.11	0.12
SUMPW-C7-LEW-WW-X00-DW01-4	Water	Former LOOW Wastewater Treatment Plant (Collection Tank)	8/16/2006	Thorium 230	pCi/L	0.18	J	UJ	0.11	0.1
SUMPW-C7-LEW-WW-X00-DW01-4	Water	Former LOOW Wastewater Treatment Plant (Collection Tank)	8/16/2006	Thorium 232	pCi/L	0.034	U	U	0.051	0.072
SUMPW-C7-LEW-WW-X00-DW01-4	Water	Former LOOW Wastewater Treatment Plant (Collection Tank)	8/16/2006	Uranium 234	pCi/L	4.77			0.85	0.05
SUMPW-C7-LEW-WW-X00-DW01-4	Water	Former LOOW Wastewater Treatment Plant (Collection Tank)	8/16/2006	Uranium 235	pCi/L	0.28	J	J	0.13	0.06
SUMPW-C7-LEW-WW-X00-DW01-4	Water	Former LOOW Wastewater Treatment Plant (Collection Tank)	8/16/2006	Uranium 238	pCi/L	4.33			0.78	0.05
SUMPW-C7-LEW-WW-X00-DW03-7	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Radium (226)	pCi/L	0.13	U	U	0.14	0.21
SUMPW-C7-LEW-WW-X00-DW03-7	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Radium 228	pCi/L	0.3	U	U	0.57	0.95
SUMPW-C7-LEW-WW-X00-DW03-7	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 228	pCi/L	0.02	U	U	0.12	0.2
SUMPW-C7-LEW-WW-X00-DW03-7	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 230	pCi/L	0.14	U	U	0.14	0.17
SUMPW-C7-LEW-WW-X00-DW03-7	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 232	pCi/L	0.017	U	U	0.05	0.1
SUMPW-C7-LEW-WW-X00-DW03-7	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 234	pCi/L	0.125	J	J	0.08	0.053
SUMPW-C7-LEW-WW-X00-DW03-7	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 235	pCi/L	0.014	U	U	0.041	0.039
SUMPW-C7-LEW-WW-X00-DW03-7	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 238	pCi/L	0.168	J	J	0.095	0.062
SUMPW-C7-LEW-WW-X00-DW05-10	Water	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Radium (226)	pCi/L	0.07	U	U	0.15	0.26

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FUSRAP Niagara Falls Storage Site
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Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
SUMPW-C7-LEW-WW-X00-DW05-10	Water	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Radium 228	pCi/L	0.22	U	U	0.56	0.95
SUMPW-C7-LEW-WW-X00-DW05-10	Water	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Thorium 228	pCi/L	0.05	U	UJ	0.11	0.18
SUMPW-C7-LEW-WW-X00-DW05-10	Water	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Thorium 230	pCi/L	0.099	J	UJ	0.098	0.095
SUMPW-C7-LEW-WW-X00-DW05-10	Water	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Thorium 232	pCi/L	-0.005	U	UJ	0.047	0.095
SUMPW-C7-LEW-WW-X00-DW05-10	Water	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Uranium 234	pCi/L	0.73			0.19	0.04
SUMPW-C7-LEW-WW-X00-DW05-10	Water	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Uranium 235	pCi/L	0.018	U	U	0.031	0.046
SUMPW-C7-LEW-WW-X00-DW05-10	Water	Former LOOW Wastewater Treatment Plant (Imhoff Tank)	8/31/2006	Uranium 238	pCi/L	0.68			0.18	0.04
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Actinium 228	pCi/g	0.58			0.18	0.26
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Bismuth 214	pCi/g	0.65			0.15	0.1
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Cesium 137	pCi/g	0.144			0.054	0.058
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Lead 212	pCi/g	0.53			0.1	0.13
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Lead 214	pCi/g	0.68			0.12	0.11
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Potassium 40	pCi/g	12.5			2.1	0.5
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Radium (226)	pCi/g	0.65			0.15	0.1
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Radium 228	pCi/g	0.58			0.18	0.26
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Thallium 208	pCi/g	0.182			0.059	0.07
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Thorium 228	pCi/g	0.54	J	J	0.12	0.04
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Thorium 230	pCi/g	0.66	J	J	0.14	0.03
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Thorium 232	pCi/g	0.63	J	J	0.13	0.02
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Uranium 234	pCi/g	0.79	J	J	0.16	0.03
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Uranium 235	pCi/g	0.034	J	J	0.031	0.016
MHS-C7-CWM-SL-X83-SN01-6	Sediment	Nitration House Area (CWM-X83)	9/21/2006	Uranium 238	pCi/g	0.76	J	J	0.15	0.01
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Actinium 228	pCi/g	0.54			0.16	0.18
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Bismuth 214	pCi/g	0.39			0.11	0.11
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Lead 212	pCi/g	0.368			0.087	0.12
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Lead 214	pCi/g	0.51			0.097	0.11
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Potassium 40	pCi/g	11			1.9	0.4
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Radium (226)	pCi/g	0.39	J	J	0.11	0.11
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Radium 228	pCi/g	0.54			0.16	0.18
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Thallium 208	pCi/g	0.121			0.046	0.065
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Thorium 228	pCi/g	0.47	J	J	0.12	0.04
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Thorium 230	pCi/g	0.45	J	J	0.11	0.03
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Thorium 232	pCi/g	0.4	J	J	0.1	0.04
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Thorium 234	pCi/g	0.5	U	U	0.23	0.6
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Uranium 234	pCi/g	0.362	J	J	0.094	0.029
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Uranium 235	pCi/g	0.015	U	U	0.021	0.03
TSB-C7-CWM-SO-X83-SN01-7	Soil	Nitration House Area (CWM-X83)	9/21/2006	Uranium 238	pCi/g	0.363	J	J	0.094	0.024
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Actinium 228	pCi/g	0.48			0.14	0.23
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Bismuth 214	pCi/g	0.57			0.11	0.08
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Lead 212	pCi/g	0.61			0.11	0.07
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Lead 214	pCi/g	0.66			0.1	0.1
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Potassium 40	pCi/g	11.2			1.8	0.5
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Radium (226)	pCi/g	0.57			0.11	0.08
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Radium 228	pCi/g	0.48	J	J	0.14	0.23
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Thallium 208	pCi/g	0.156			0.048	0.052
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Thorium 228	pCi/g	0.54	J	J	0.13	0.07
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Thorium 230	pCi/g	0.52	J	J	0.12	0.04
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Thorium 232	pCi/g	0.55	J	J	0.13	0.04
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Uranium 234	pCi/g	0.54	J	J	0.12	0.03
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Uranium 235	pCi/g	0.007	U	U	0.02	0.036
TSB-C7-CWM-SO-X86-SN01-6.5	Soil	Nitration House Area (CWM-X86)	9/22/2006	Uranium 238	pCi/g	0.55	J	J	0.12	0.03
PIPEW-C7-CWM-WW-X86-SN01-6	Water	Nitration House Area (CWM-X86)	9/22/2006	Radium (226)	pCi/L	0.23	U	U	0.18	0.26
PIPEW-C7-CWM-WW-X86-SN01-6	Water	Nitration House Area (CWM-X86)	9/22/2006	Radium 228	pCi/L	-0.005	U	UJ	0.69	1.2
PIPEW-C7-CWM-WW-X86-SN01-6	Water	Nitration House Area (CWM-X86)	9/22/2006	Thorium 228	pCi/L	0.25	J	J	0.13	0.09
PIPEW-C7-CWM-WW-X86-SN01-6	Water	Nitration House Area (CWM-X86)	9/22/2006	Thorium 230	pCi/L	0.32	J	J	0.14	0.03
PIPEW-C7-CWM-WW-X86-SN01-6	Water	Nitration House Area (CWM-X86)	9/22/2006	Thorium 232	pCi/L	0.149	J	J	0.093	0.067
PIPEW-C7-CWM-WW-X86-SN01-6	Water	Nitration House Area (CWM-X86)	9/22/2006	Uranium 234	pCi/L	1.39			0.29	0.08
PIPEW-C7-CWM-WW-X86-SN01-6	Water	Nitration House Area (CWM-X86)	9/22/2006	Uranium 235	pCi/L	0.087	J	J	0.071	0.034
PIPEW-C7-CWM-WW-X86-SN01-6	Water	Nitration House Area (CWM-X86)	9/22/2006	Uranium 238	pCi/L	1.41			0.29	0.05
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Actinium 228	pCi/g	0.72			0.2	0.37
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Bismuth 214	pCi/g	1.12			0.21	0.16
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Cesium 137	pCi/g	0.276			0.084	0.085
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Lead 210	pCi/g	2.5			1	1.9
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Lead 212	pCi/g	0.8			0.15	0.13
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Lead 214	pCi/g	1.08			0.17	0.17
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Potassium 40	pCi/g	16.2			2.7	0.5
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Radium (226)	pCi/g	1.12			0.21	0.16
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Radium 228	pCi/g	0.72			0.2	0.37
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Thallium 208	pCi/g	0.291			0.08	0.075
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 228	pCi/g	0.71	J	J	0.16	0.06

USACE Buffalo District
FUSRAP Niagara Falls Storage Site
Split Samples of LOOW UU Lines for Radiological Analysis
Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 230	pCi/g	1.17			0.22	0.03
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 232	pCi/g	0.81	J	J	0.17	0.03
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 234	pCi/g	7.9			1.2	1
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Uranium 234	pCi/g	9.6			1.3	0.03
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Uranium 235	pCi/g	0.38	J	J	0.11	0.02
MHS-C7-CWM-SL-X97-SN01-14	Sediment	Area South of "M" Street (CWM-X97)	10/2/2006	Uranium 238	pCi/g	8.9			1.2	0.02
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Actinium 228	pCi/g	0.61			0.2	0.31
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Bismuth 214	pCi/g	1.09			0.19	0.14
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Cesium 137	pCi/g	0.228			0.07	0.098
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Lead 210	pCi/g	2.13			0.93	1.6
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Lead 212	pCi/g	0.7			0.13	0.12
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Lead 214	pCi/g	1.2			0.17	0.15
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Potassium 40	pCi/g	12.2			2.2	0.6
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Radium (226)	pCi/g	1.09			0.19	0.14
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Radium 228	pCi/g	0.61			0.2	0.31
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Thallium 208	pCi/g	0.231			0.069	0.086
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Thorium 228	pCi/g	0.67	J	J	0.14	0.03
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Thorium 230	pCi/g	1.04			0.19	0.03
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Thorium 232	pCi/g	0.61	J	J	0.13	0.03
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Thorium 234	pCi/g	3.92			0.66	0.75
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Uranium 234	pCi/g	6.62			0.91	0.03
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Uranium 235	pCi/g	0.44	J	J	0.12	0.03
PIPES-C7-CWM-SL-X94-AW01-10	Sediment	Area South of "M" Street (CWM-X94)	9/29/2006	Uranium 238	pCi/g	6.87			0.94	0.01
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Actinium 228	pCi/g	0.77			0.18	0.26
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Bismuth 214	pCi/g	0.76			0.15	0.11
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Lead 212	pCi/g	0.75			0.13	0.09
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Lead 214	pCi/g	0.92			0.13	0.11
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Potassium 40	pCi/g	10.1			1.7	0.7
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Radium (226)	pCi/g	0.76			0.15	0.11
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Radium 228	pCi/g	0.77			0.18	0.26
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Thallium 208	pCi/g	0.225			0.058	0.068
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 228	pCi/g	0.57			0.17	0.16
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 230	pCi/g	1.2			0.22	0.05
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 232	pCi/g	0.55			0.13	0.04
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 234	pCi/g	2.66			0.47	0.65
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Uranium 234	pCi/g	5.02			0.71	0.04
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Uranium 235	pCi/g	0.225	J	J	0.084	0.057
PIPES-C7-CWM-SL-X96-AW01-10	Sediment	Area South of "M" Street (CWM-X96)	9/29/2006	Uranium 238	pCi/g	4.92			0.7	0.04
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Actinium 228	pCi/g	1.05			0.28	0.59
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Bismuth 212	pCi/g	1.02			0.45	1
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Bismuth 214	pCi/g	1.02			0.21	0.24
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Lead 212	pCi/g	1.17			0.21	0.21
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Lead 214	pCi/g	1.04			0.17	0.16
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Potassium 40	pCi/g	26.6			4.2	0.9
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Radium (226)	pCi/g	1.02			0.21	0.24
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Radium 228	pCi/g	1.05			0.28	0.59
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Thallium 208	pCi/g	0.45			0.11	0.1
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Thorium 228	pCi/g	1.04			0.2	0.06
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Thorium 230	pCi/g	1.03			0.19	0.01
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Thorium 232	pCi/g	1.11			0.2	0.02
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Uranium 234	pCi/g	0.85	J	J	0.16	0.03
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Uranium 235	pCi/g	0.052	J	J	0.038	0.035
TSB-C7-CWM-SO-X100-SN01-14	Soil	Area South of "M" Street (CWM-X100)	10/2/2006	Uranium 238	pCi/g	0.83	J	J	0.16	0.01
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Actinium 228	pCi/g	0.88			0.17	0.29
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Bismuth 214	pCi/g	0.57			0.12	0.1
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Lead 212	pCi/g	0.82			0.13	0.08
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Lead 214	pCi/g	0.69			0.11	0.11
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Potassium 40	pCi/g	18			2.7	0.4
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Radium (226)	pCi/g	0.57			0.12	0.1
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Radium 228	pCi/g	0.88			0.17	0.29
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Thallium 208	pCi/g	0.235			0.061	0.063
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Thorium 228	pCi/g	0.67	J	J	0.14	0.04
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Thorium 230	pCi/g	0.81	J	J	0.16	0.02
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Thorium 232	pCi/g	0.69	J	J	0.14	0.02
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Uranium 234	pCi/g	0.75	J	J	0.15	0.06
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Uranium 235	pCi/g	0.032	J	J	0.029	0.03
TSB-C7-CWM-SO-X101-SN01-14	Soil	Area South of "M" Street (CWM-X101)	10/5/2006	Uranium 238	pCi/g	0.76	J	J	0.15	0.03
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Actinium 228	pCi/g	0.98			0.22	0.31
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Bismuth 214	pCi/g	0.56			0.14	0.16
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Lead 212	pCi/g	0.68			0.14	0.13

USACE Buffalo District
FUSRAP Niagara Falls Storage Site
Split Samples of LOOW UU Lines for Radiological Analysis
Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Lead 214	pCi/g	0.78			0.14	0.14
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Potassium 40	pCi/g	15.4			2.6	0.7
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Radium (226)	pCi/g	0.56			0.14	0.16
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Radium 228	pCi/g	0.98			0.22	0.31
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Thallium 208	pCi/g	0.338			0.088	0.069
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Thorium 228	pCi/g	0.67	J	J	0.14	0.03
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Thorium 230	pCi/g	0.7	J	J	0.14	0.02
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Thorium 232	pCi/g	0.69	J	J	0.14	0.02
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Uranium 234	pCi/g	0.93	J	J	0.19	0.03
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Uranium 235	pCi/g	0.091	J	J	0.054	0.019
TSB-C7-CWM-SO-X103-SN01-13	Soil	Area South of "M" Street (CWM-X103)	10/6/2006	Uranium 238	pCi/g	0.81	J	J	0.17	0.03
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Actinium 228	pCi/g	0.74			0.23	0.33
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Bismuth 214	pCi/g	0.75			0.15	0.14
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Lead 212	pCi/g	0.84			0.15	0.11
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Lead 214	pCi/g	0.78			0.13	0.12
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Potassium 40	pCi/g	18.1			2.9	0.6
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Radium (226)	pCi/g	0.75			0.15	0.14
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Radium 228	pCi/g	0.74			0.23	0.33
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Thallium 208	pCi/g	0.201			0.062	0.077
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Thorium 228	pCi/g	0.75	J	J	0.15	0.03
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Thorium 230	pCi/g	0.68	J	J	0.14	0.03
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Thorium 232	pCi/g	0.72	J	J	0.15	0.04
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Uranium 234	pCi/g	0.64	J	J	0.14	0.03
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Uranium 235	pCi/g	0.062	J	J	0.042	0.038
TSB-C7-CWM-SO-X104-SN01-13	Soil	Area South of "M" Street (CWM-X104)	10/6/2006	Uranium 238	pCi/g	0.83	J	J	0.17	0.01
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Bismuth 214	pCi/g	0.57			0.16	0.16
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Lead 212	pCi/g	0.7			0.14	0.16
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Lead 214	pCi/g	0.61			0.13	0.16
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Potassium 40	pCi/g	16.8			2.8	0.6
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Radium (226)	pCi/g	0.57			0.16	0.16
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Radium 228	pCi/g	0.69			0.32	0.61
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Thallium 208	pCi/g	0.27			0.082	0.098
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Thorium 228	pCi/g	0.73	J	J	0.16	0.05
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Thorium 230	pCi/g	0.67	J	J	0.15	0.04
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Thorium 232	pCi/g	0.69	J	J	0.15	0.03
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Uranium 234	pCi/g	0.68	J	J	0.14	0.03
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Uranium 235	pCi/g	0.046	J	J	0.035	0.032
TSB-C7-CWM-SO-X105-SN01-12	Soil	Area South of "M" Street (CWM-X105)	10/3/2006	Uranium 238	pCi/g	0.65	J	J	0.14	0.03
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Actinium 228	pCi/g	1.16			0.2	0.3
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Bismuth 214	pCi/g	0.89			0.17	0.15
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Lead 212	pCi/g	1.02			0.16	0.1
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Lead 214	pCi/g	0.94			0.14	0.13
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Potassium 40	pCi/g	23.8			3.4	0.7
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Radium (226)	pCi/g	0.89			0.17	0.15
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Radium 228	pCi/g	1.16			0.2	0.3
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Thallium 208	pCi/g	0.271			0.069	0.078
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 228	pCi/g	1.03			0.2	0.06
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 230	pCi/g	1			0.19	0.05
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 232	pCi/g	1.01			0.19	0.03
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 234	pCi/g	0.82	J	J	0.16	0.03
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 235	pCi/g	0.08	J	J	0.047	0.017
TSB-C7-CWM-SO-X106-SN01-14	Soil	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 238	pCi/g	0.82	J	J	0.17	0.01
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Actinium 228	pCi/g	0.7			0.17	0.23
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Bismuth 214	pCi/g	0.52			0.11	0.12
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Lead 212	pCi/g	0.57			0.11	0.11
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Lead 214	pCi/g	0.496			0.09	0.11
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Potassium 40	pCi/g	12.7			2	0.5
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Radium (226)	pCi/g	0.52			0.11	0.12
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Radium 228	pCi/g	0.7			0.17	0.23
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Thallium 208	pCi/g	0.198			0.054	0.054
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Thorium 228	pCi/g	0.58			0.13	0.07
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Thorium 230	pCi/g	0.56			0.13	0.04
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Thorium 232	pCi/g	0.46	J	J	0.11	0.03
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Uranium 234	pCi/g	0.53	J	J	0.13	0.03
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Uranium 235	pCi/g	0.029	U	U	0.03	0.033
TSB-C7-CWM-SO-X87-AW01-16	Soil	Area South of "M" Street (CWM-X87)	9/25/2006	Uranium 238	pCi/g	0.56	J	J	0.13	0.04
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Actinium 228	pCi/g	1			0.27	0.44
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Bismuth 214	pCi/g	0.72			0.18	0.18
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Lead 212	pCi/g	1.02			0.18	0.2
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Lead 214	pCi/g	0.91			0.16	0.16

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Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Potassium 40	pCi/g	26.6			4.1	0.8
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Radium (226)	pCi/g	0.72			0.18	0.18
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Radium 228	pCi/g	1			0.27	0.44
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Thallium 208	pCi/g	0.372			0.094	0.095
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Thorium 228	pCi/g	1.07			0.19	0.03
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Thorium 230	pCi/g	1.1			0.2	0.03
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Thorium 232	pCi/g	1.04			0.19	0.03
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Uranium 234	pCi/g	0.9	J	J	0.17	0.02
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Uranium 235	pCi/g	0.021	J	J	0.023	0.014
TSB-C7-CWM-SO-X90-AW01-17	Soil	Area South of "M" Street (CWM-X90)	9/26/2006	Uranium 238	pCi/g	0.92	J	J	0.17	0.03
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Bismuth 214	pCi/g	0.57			0.13	0.11
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Lead 212	pCi/g	0.52			0.11	0.11
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Lead 214	pCi/g	0.525			0.0996	0.12
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Potassium 40	pCi/g	9.8			1.8	0.9
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Radium (226)	pCi/g	0.57			0.13	0.11
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Radium 228	pCi/g	0.44	U	U	0.2	0.46
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Thallium 208	pCi/g	0.188			0.056	0.06
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Thorium 228	pCi/g	0.72	J	J	0.15	0.05
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Thorium 230	pCi/g	0.62	J	J	0.14	0.04
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Thorium 232	pCi/g	0.82	J	J	0.16	0.01
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Uranium 234	pCi/g	0.53	J	J	0.12	0.03
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Uranium 235	pCi/g	0.033	J	J	0.03	0.015
TSB-C7-CWM-SO-X92-AW01-14	Soil	Area South of "M" Street (CWM-X92)	10/5/2006	Uranium 238	pCi/g	0.54	J	J	0.12	0.02
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Actinium 228	pCi/g	0.96			0.18	0.28
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Bismuth 212	pCi/g	0.76			0.32	0.45
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Bismuth 214	pCi/g	0.68			0.14	0.12
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Lead 212	pCi/g	0.8			0.14	0.16
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Lead 214	pCi/g	0.71			0.12	0.13
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Potassium 40	pCi/g	19.2			3	0.6
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Radium (226)	pCi/g	0.68			0.14	0.12
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Radium 228	pCi/g	0.96			0.18	0.28
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Thallium 208	pCi/g	0.28			0.071	0.078
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Thorium 228	pCi/g	0.76	J	J	0.16	0.04
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Thorium 230	pCi/g	0.87	J	J	0.17	0.03
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Thorium 232	pCi/g	0.81	J	J	0.16	0.01
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Uranium 234	pCi/g	0.73	J	J	0.15	0.03
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Uranium 235	pCi/g	0.051	J	J	0.037	0.031
TSB-C7-CWM-SO-X94-AW01-10	Soil	Area South of "M" Street (CWM-X94)	9/29/2006	Uranium 238	pCi/g	0.78	J	J	0.16	0.03
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Actinium 228	pCi/g	0.87			0.18	0.34
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Bismuth 214	pCi/g	0.82			0.16	0.15
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Lead 212	pCi/g	0.79			0.14	0.18
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Lead 214	pCi/g	0.73			0.13	0.14
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Potassium 40	pCi/g	18.5			2.9	0.7
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Radium (226)	pCi/g	0.82			0.16	0.15
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Radium 228	pCi/g	0.87			0.18	0.34
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Thallium 208	pCi/g	0.297			0.077	0.079
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Thorium 228	pCi/g	1	J	J	0.19	0.04
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Thorium 230	pCi/g	0.89	J	J	0.18	0.01
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Thorium 232	pCi/g	0.93	J	J	0.18	0.03
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Uranium 234	pCi/g	0.63	J	J	0.14	0.03
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Uranium 235	pCi/g	0.042	J	J	0.034	0.016
TSB-C7-CWM-SO-X95-AW01-10	Soil	Area South of "M" Street (CWM-X95)	9/29/2006	Uranium 238	pCi/g	0.72	J	J	0.15	0.01
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Actinium 228	pCi/g	0.95			0.18	0.27
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Bismuth 214	pCi/g	0.78			0.16	0.14
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Lead 212	pCi/g	0.83			0.15	0.12
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Lead 214	pCi/g	0.83			0.13	0.11
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Potassium 40	pCi/g	19.8			2.9	0.6
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Radium (226)	pCi/g	0.78			0.16	0.14
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Radium 228	pCi/g	0.95			0.18	0.27
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Thallium 208	pCi/g	0.271			0.071	0.07
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 228	pCi/g	0.91			0.19	0.08
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 230	pCi/g	0.89			0.19	0.04
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 232	pCi/g	0.89			0.18	0.04
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Uranium 234	pCi/g	0.74	J	J	0.16	0.04
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Uranium 235	pCi/g	0.064	J	J	0.043	0.017
TSB-C7-CWM-SO-X96-AW01-10	Soil	Area South of "M" Street (CWM-X96)	9/29/2006	Uranium 238	pCi/g	0.73	J	J	0.15	0.03
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Actinium 228	pCi/g	0.83			0.19	0.29
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Bismuth 212	pCi/g	0.88			0.33	0.54
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Bismuth 214	pCi/g	0.57			0.14	0.13
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Lead 212	pCi/g	0.78			0.14	0.15

USACE Buffalo District
FUSRAP Niagara Falls Storage Site
Split Samples of LOOW UU Lines for Radiological Analysis
Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Lead 214	pCi/g	0.82			0.13	0.12
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Potassium 40	pCi/g	20.4			3.1	0.7
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Radium (226)	pCi/g	0.57			0.14	0.13
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Radium 228	pCi/g	0.83			0.19	0.29
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Thallium 208	pCi/g	0.347			0.082	0.061
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 228	pCi/g	0.87	J	J	0.17	0.05
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 230	pCi/g	0.72	J	J	0.15	0.05
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 232	pCi/g	0.83	J	J	0.16	0.03
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Uranium 234	pCi/g	0.71	J	J	0.14	0.03
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Uranium 235	pCi/g	0.053	J	J	0.036	0.029
TSB-C7-CWM-SO-X97-SN01-14	Soil	Area South of "M" Street (CWM-X97)	10/2/2006	Uranium 238	pCi/g	0.85	J	J	0.16	0.03
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Actinium 228	pCi/g	0.7			0.16	0.23
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Bismuth 214	pCi/g	0.54			0.12	0.13
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Lead 212	pCi/g	0.8			0.13	0.12
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Lead 214	pCi/g	0.75			0.12	0.11
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Potassium 40	pCi/g	16.3			2.5	0.8
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Radium (226)	pCi/g	0.54			0.12	0.13
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Radium 228	pCi/g	0.7			0.16	0.23
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Thallium 208	pCi/g	0.272			0.067	0.06
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Thorium 228	pCi/g	0.62	J	J	0.14	0.04
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Thorium 230	pCi/g	0.74	J	J	0.15	0.03
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Thorium 232	pCi/g	0.77	J	J	0.16	0.03
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Uranium 234	pCi/g	0.54	J	J	0.12	0.04
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Uranium 235	pCi/g	0.012	U	U	0.02	0.016
TSB-C7-CWM-SO-X98-SN01-15	Soil	Area South of "M" Street (CWM-X98)	10/2/2006	Uranium 238	pCi/g	0.61	J	J	0.13	0.02
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Actinium 228	pCi/g	0.7			0.15	0.21
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Bismuth 212	pCi/g	0.43			0.23	0.42
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Bismuth 214	pCi/g	0.7			0.13	0.11
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Lead 212	pCi/g	0.7			0.12	0.08
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Lead 214	pCi/g	0.606			0.096	0.099
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Potassium 40	pCi/g	11.8			1.9	0.3
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Radium (226)	pCi/g	0.7			0.13	0.11
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Radium 228	pCi/g	0.7			0.15	0.21
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Thallium 208	pCi/g	0.244			0.057	0.055
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Thorium 228	pCi/g	0.64	J	J	0.14	0.05
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Thorium 230	pCi/g	0.68	J	J	0.14	0.01
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Thorium 232	pCi/g	0.68	J	J	0.14	0.01
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Uranium 234	pCi/g	0.58	J	J	0.13	0.04
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Uranium 235	pCi/g	0.032	U	U	0.033	0.039
TSB-C7-CWM-SO-X99-SN01-15	Soil	Area South of "M" Street (CWM-X99)	10/2/2006	Uranium 238	pCi/g	0.61	J	J	0.14	0.03
MHW-C7-CWM-WW-X100-SN01-14	Water	Area South of "M" Street (CWM-X100)	10/2/2006	Radium (226)	pCi/L	0.104	U	U	0.094	0.14
MHW-C7-CWM-WW-X100-SN01-14	Water	Area South of "M" Street (CWM-X100)	10/2/2006	Radium 228	pCi/L	-0.28	U	U	0.35	0.63
MHW-C7-CWM-WW-X100-SN01-14	Water	Area South of "M" Street (CWM-X100)	10/2/2006	Thorium 228	pCi/L	0.067	U	U	0.09	0.13
MHW-C7-CWM-WW-X100-SN01-14	Water	Area South of "M" Street (CWM-X100)	10/2/2006	Thorium 230	pCi/L	0.19	J	UJ	0.13	0.13
MHW-C7-CWM-WW-X100-SN01-14	Water	Area South of "M" Street (CWM-X100)	10/2/2006	Thorium 232	pCi/L	0.018	U	U	0.051	0.048
MHW-C7-CWM-WW-X100-SN01-14	Water	Area South of "M" Street (CWM-X100)	10/2/2006	Uranium 234	pCi/L	0.52		J	0.16	0.09
MHW-C7-CWM-WW-X100-SN01-14	Water	Area South of "M" Street (CWM-X100)	10/2/2006	Uranium 235	pCi/L	0.05	U	U	0.078	0.12
MHW-C7-CWM-WW-X100-SN01-14	Water	Area South of "M" Street (CWM-X100)	10/2/2006	Uranium 238	pCi/L	0.55			0.17	0.09
MHW-C7-CWM-WW-X103-SN01-12	Water	Area South of "M" Street (CWM-X103)	10/5/2006	Radium (226)	pCi/L	0.14	U	U	0.11	0.16
MHW-C7-CWM-WW-X103-SN01-12	Water	Area South of "M" Street (CWM-X103)	10/5/2006	Radium 228	pCi/L	0.13	U	U	0.34	0.58
MHW-C7-CWM-WW-X103-SN01-12	Water	Area South of "M" Street (CWM-X103)	10/5/2006	Thorium 228	pCi/L	-0.06	U	U	0.14	0.3
MHW-C7-CWM-WW-X103-SN01-12	Water	Area South of "M" Street (CWM-X103)	10/5/2006	Thorium 230	pCi/L	0.1	U	UJ	0.12	0.15
MHW-C7-CWM-WW-X103-SN01-12	Water	Area South of "M" Street (CWM-X103)	10/5/2006	Thorium 232	pCi/L	-0.012	U	U	0.067	0.15
MHW-C7-CWM-WW-X103-SN01-12	Water	Area South of "M" Street (CWM-X103)	10/5/2006	Uranium 234	pCi/L	0.2	J	UJ	0.11	0.09
MHW-C7-CWM-WW-X103-SN01-12	Water	Area South of "M" Street (CWM-X103)	10/5/2006	Uranium 235	pCi/L	0.014	U	U	0.04	0.038
MHW-C7-CWM-WW-X103-SN01-12	Water	Area South of "M" Street (CWM-X103)	10/5/2006	Uranium 238	pCi/L	0.11	J	J	0.08	0.08
MHW-C7-CWM-WW-X106-SN01-10	Water	Area South of "M" Street (CWM-X106)	9/29/2006	Radium (226)	pCi/L	0.31	J	J	0.16	0.2
MHW-C7-CWM-WW-X106-SN01-10	Water	Area South of "M" Street (CWM-X106)	9/29/2006	Radium 228	pCi/L	-0.17	U	U	0.3	0.54
MHW-C7-CWM-WW-X106-SN01-10	Water	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 228	pCi/L	0.044	U	U	0.095	0.15
MHW-C7-CWM-WW-X106-SN01-10	Water	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 230	pCi/L	0.082	U	UJ	0.074	0.087
MHW-C7-CWM-WW-X106-SN01-10	Water	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 232	pCi/L	0.013	U	U	0.038	0.07
MHW-C7-CWM-WW-X106-SN01-10	Water	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 234	pCi/L	9.9			1.3	0.08
MHW-C7-CWM-WW-X106-SN01-10	Water	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 235	pCi/L	0.37	J	J	0.15	0.07
MHW-C7-CWM-WW-X106-SN01-10	Water	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 238	pCi/L	9			1.2	0.03
MHW-C7-CWM-WW-X87-AW01-15	Water	Area South of "M" Street (CWM-X87)	9/25/2006	Radium (226)	pCi/L	0.32	J	J	0.17	0.19
MHW-C7-CWM-WW-X87-AW01-15	Water	Area South of "M" Street (CWM-X87)	9/25/2006	Radium 228	pCi/L	-0.08	U	UJ	0.45	0.8
MHW-C7-CWM-WW-X87-AW01-15	Water	Area South of "M" Street (CWM-X87)	9/25/2006	Thorium 228	pCi/L	-0.009	U	U	0.1	0.18
MHW-C7-CWM-WW-X87-AW01-15	Water	Area South of "M" Street (CWM-X87)	9/25/2006	Thorium 230	pCi/L	0.19	J	UJ	0.11	0.1
MHW-C7-CWM-WW-X87-AW01-15	Water	Area South of "M" Street (CWM-X87)	9/25/2006	Thorium 232	pCi/L	-0.019	U	U	0.047	0.11
MHW-C7-CWM-WW-X87-AW01-15	Water	Area South of "M" Street (CWM-X87)	9/25/2006	Uranium 234	pCi/L	3.83			0.61	0.09

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FUSRAP Niagara Falls Storage Site
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Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
MHW-C7-CWM-WW-X87-AW01-15	Water	Area South of "M" Street (CWM-X87)	9/25/2006	Uranium 235	pCi/L	0.078	U	U	0.079	0.097
MHW-C7-CWM-WW-X87-AW01-15	Water	Area South of "M" Street (CWM-X87)	9/25/2006	Uranium 238	pCi/L	3.81			0.61	0.09
MHW-C7-CWM-WW-X95-AW01-10	Water	Area South of "M" Street (CWM-X95)	9/29/2006	Radium (226)	pCi/L	0.003	U	U	0.13	0.25
MHW-C7-CWM-WW-X95-AW01-10	Water	Area South of "M" Street (CWM-X95)	9/29/2006	Radium 228	pCi/L	0.13	U	U	0.39	0.66
MHW-C7-CWM-WW-X95-AW01-10	Water	Area South of "M" Street (CWM-X95)	9/29/2006	Thorium 228	pCi/L	0.01	U	U	0.1	0.18
MHW-C7-CWM-WW-X95-AW01-10	Water	Area South of "M" Street (CWM-X95)	9/29/2006	Thorium 230	pCi/L	0.28	J	UJ	0.15	0.12
MHW-C7-CWM-WW-X95-AW01-10	Water	Area South of "M" Street (CWM-X95)	9/29/2006	Thorium 232	pCi/L	0.016	U	U	0.047	0.045
MHW-C7-CWM-WW-X95-AW01-10	Water	Area South of "M" Street (CWM-X95)	9/29/2006	Uranium 234	pCi/L	17.3			2.2	0.1
MHW-C7-CWM-WW-X95-AW01-10	Water	Area South of "M" Street (CWM-X95)	9/29/2006	Uranium 235	pCi/L	0.87			0.23	0.03
MHW-C7-CWM-WW-X95-AW01-10	Water	Area South of "M" Street (CWM-X95)	9/29/2006	Uranium 238	pCi/L	17			2.1	0.08
MHW-C7-CWM-WW-X96-AW01-10	Water	Area South of "M" Street (CWM-X96)	9/29/2006	Radium (226)	pCi/L	0.25	J	J	0.16	0.21
MHW-C7-CWM-WW-X96-AW01-10	Water	Area South of "M" Street (CWM-X96)	9/29/2006	Radium 228	pCi/L	0.17	U	U	0.42	0.7
MHW-C7-CWM-WW-X96-AW01-10	Water	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 228	pCi/L	0.03	U	U	0.16	0.26
MHW-C7-CWM-WW-X96-AW01-10	Water	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 230	pCi/L	0.1	U	U	0.11	0.14
MHW-C7-CWM-WW-X96-AW01-10	Water	Area South of "M" Street (CWM-X96)	9/29/2006	Thorium 232	pCi/L	-0.021	U	U	0.05	0.12
MHW-C7-CWM-WW-X96-AW01-10	Water	Area South of "M" Street (CWM-X96)	9/29/2006	Uranium 234	pCi/L	7.8			1.1	0.06
MHW-C7-CWM-WW-X96-AW01-10	Water	Area South of "M" Street (CWM-X96)	9/29/2006	Uranium 235	pCi/L	0.58			0.19	0.04
MHW-C7-CWM-WW-X96-AW01-10	Water	Area South of "M" Street (CWM-X96)	9/29/2006	Uranium 238	pCi/L	7.6			1.1	0.03
MHW-C7-CWM-WW-X97-SN01-14	Water	Area South of "M" Street (CWM-X97)	10/2/2006	Radium (226)	pCi/L	0.06	U	U	0.17	0.29
MHW-C7-CWM-WW-X97-SN01-14	Water	Area South of "M" Street (CWM-X97)	10/2/2006	Radium 228	pCi/L	-0.78	U	U	0.33	0.62
MHW-C7-CWM-WW-X97-SN01-14	Water	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 228	pCi/L	-0.02	U	U	0.1	0.19
MHW-C7-CWM-WW-X97-SN01-14	Water	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 230	pCi/L	0.092	U	UJ	0.089	0.11
MHW-C7-CWM-WW-X97-SN01-14	Water	Area South of "M" Street (CWM-X97)	10/2/2006	Thorium 232	pCi/L	0.001	U	U	0.064	0.12
MHW-C7-CWM-WW-X97-SN01-14	Water	Area South of "M" Street (CWM-X97)	10/2/2006	Uranium 234	pCi/L	3.76			0.58	0.06
MHW-C7-CWM-WW-X97-SN01-14	Water	Area South of "M" Street (CWM-X97)	10/2/2006	Uranium 235	pCi/L	0.18	J	J	0.1	0.07
MHW-C7-CWM-WW-X97-SN01-14	Water	Area South of "M" Street (CWM-X97)	10/2/2006	Uranium 238	pCi/L	3.07			0.5	0.06
PIPEW-C7-CWM-WW-X104-SN01-12	Water	Area South of "M" Street (CWM-X104)	10/6/2006	Radium (226)	pCi/L	0.49	J	J	0.24	0.28
PIPEW-C7-CWM-WW-X104-SN01-12	Water	Area South of "M" Street (CWM-X104)	10/6/2006	Radium 228	pCi/L	0.42	U	UJ	0.78	1.3
PIPEW-C7-CWM-WW-X104-SN01-12	Water	Area South of "M" Street (CWM-X104)	10/6/2006	Thorium 228	pCi/L	0.166	J	J	0.0997	0.09
PIPEW-C7-CWM-WW-X104-SN01-12	Water	Area South of "M" Street (CWM-X104)	10/6/2006	Thorium 230	pCi/L	0.29	J	J	0.13	0.09
PIPEW-C7-CWM-WW-X104-SN01-12	Water	Area South of "M" Street (CWM-X104)	10/6/2006	Thorium 232	pCi/L	0.126	J	J	0.091	0.096
PIPEW-C7-CWM-WW-X104-SN01-12	Water	Area South of "M" Street (CWM-X104)	10/6/2006	Uranium 234	pCi/L	0.19	J	UJ	0.11	0.1
PIPEW-C7-CWM-WW-X104-SN01-12	Water	Area South of "M" Street (CWM-X104)	10/6/2006	Uranium 235	pCi/L	-0.025	U	U	0.052	0.12
PIPEW-C7-CWM-WW-X104-SN01-12	Water	Area South of "M" Street (CWM-X104)	10/6/2006	Uranium 238	pCi/L	0.101	J	J	0.069	0.055
PIPEW-C7-CWM-WW-X105-SN01-12	Water	Area South of "M" Street (CWM-X105)	10/3/2006	Radium (226)	pCi/L	0.44	J	J	0.17	0.17
PIPEW-C7-CWM-WW-X105-SN01-12	Water	Area South of "M" Street (CWM-X105)	10/3/2006	Radium 228	pCi/L	1.1			0.54	0.82
PIPEW-C7-CWM-WW-X105-SN01-12	Water	Area South of "M" Street (CWM-X105)	10/3/2006	Thorium 228	pCi/L	0.29	J	J	0.17	0.16
PIPEW-C7-CWM-WW-X105-SN01-12	Water	Area South of "M" Street (CWM-X105)	10/3/2006	Thorium 230	pCi/L	0.51		J	0.21	0.1
PIPEW-C7-CWM-WW-X105-SN01-12	Water	Area South of "M" Street (CWM-X105)	10/3/2006	Thorium 232	pCi/L	0.24	J	J	0.14	0.1
PIPEW-C7-CWM-WW-X105-SN01-12	Water	Area South of "M" Street (CWM-X105)	10/3/2006	Uranium 234	pCi/L	12.5			1.6	0.1
PIPEW-C7-CWM-WW-X105-SN01-12	Water	Area South of "M" Street (CWM-X105)	10/3/2006	Uranium 235	pCi/L	0.62			0.2	0.07
PIPEW-C7-CWM-WW-X105-SN01-12	Water	Area South of "M" Street (CWM-X105)	10/3/2006	Uranium 238	pCi/L	11			1.5	0.09
PIPEW-C7-CWM-WW-X90-AW01-17	Water	Area South of "M" Street (CWM-X90)	9/26/2006	Radium (226)	pCi/L	0.18	U	U	0.2	0.32
PIPEW-C7-CWM-WW-X90-AW01-17	Water	Area South of "M" Street (CWM-X90)	9/26/2006	Radium 228	pCi/L	-0.28	U	U	0.26	0.49
PIPEW-C7-CWM-WW-X90-AW01-17	Water	Area South of "M" Street (CWM-X90)	9/26/2006	Thorium 228	pCi/L	0.17	U	U	0.21	0.29
PIPEW-C7-CWM-WW-X90-AW01-17	Water	Area South of "M" Street (CWM-X90)	9/26/2006	Thorium 230	pCi/L	0.37	J	J	0.2	0.16
PIPEW-C7-CWM-WW-X90-AW01-17	Water	Area South of "M" Street (CWM-X90)	9/26/2006	Thorium 232	pCi/L	0.15	J	J	0.13	0.13
PIPEW-C7-CWM-WW-X90-AW01-17	Water	Area South of "M" Street (CWM-X90)	9/26/2006	Uranium 234	pCi/L	13.2			1.7	0.07
PIPEW-C7-CWM-WW-X90-AW01-17	Water	Area South of "M" Street (CWM-X90)	9/26/2006	Uranium 235	pCi/L	0.77			0.22	0.07
PIPEW-C7-CWM-WW-X90-AW01-17	Water	Area South of "M" Street (CWM-X90)	9/26/2006	Uranium 238	pCi/L	12.3			1.6	0.08
PIPEW-C7-CWM-WW-X92-AW01-12	Water	Area South of "M" Street (CWM-X92)	10/5/2006	Radium (226)	pCi/L	0.26	J	J	0.12	0.12
PIPEW-C7-CWM-WW-X92-AW01-12	Water	Area South of "M" Street (CWM-X92)	10/5/2006	Radium 228	pCi/L	0.12	U	U	0.34	0.58
PIPEW-C7-CWM-WW-X92-AW01-12	Water	Area South of "M" Street (CWM-X92)	10/5/2006	Thorium 228	pCi/L	0.052	U	U	0.079	0.12
PIPEW-C7-CWM-WW-X92-AW01-12	Water	Area South of "M" Street (CWM-X92)	10/5/2006	Thorium 230	pCi/L	0.29	J	UJ	0.12	0.08
PIPEW-C7-CWM-WW-X92-AW01-12	Water	Area South of "M" Street (CWM-X92)	10/5/2006	Thorium 232	pCi/L	-0.003	U	U	0.032	0.076
PIPEW-C7-CWM-WW-X92-AW01-12	Water	Area South of "M" Street (CWM-X92)	10/5/2006	Uranium 234	pCi/L	0.37	J	J	0.13	0.07
PIPEW-C7-CWM-WW-X92-AW01-12	Water	Area South of "M" Street (CWM-X92)	10/5/2006	Uranium 235	pCi/L	0.032	U	U	0.053	0.082
PIPEW-C7-CWM-WW-X92-AW01-12	Water	Area South of "M" Street (CWM-X92)	10/5/2006	Uranium 238	pCi/L	0.27	J	J	0.11	0.06
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Bismuth 214	pCi/g	0.33			0.17	0.23
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Lead 210	pCi/g	8.1			2.2	2.5
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Lead 212	pCi/g	0.5			0.15	0.21
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Lead 214	pCi/g	0.56			0.14	0.24
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Potassium 40	pCi/g	10.7			2.4	1.3
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Radium (226)	pCi/g	0.33	J	J	0.17	0.23
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Radium 228	pCi/g	0.62	U	U	0.39	0.77
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Thallium 208	pCi/g	0.15			0.079	0.13
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Thorium 228	pCi/g	0.196	J	J	0.071	0.044
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Thorium 230	pCi/g	0.246	J	J	0.077	0.026
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Thorium 232	pCi/g	0.192	J	J	0.067	0.013
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Thorium 234	pCi/g	2.52			0.67	1.2

USACE Buffalo District
FUSRAP Niagara Falls Storage Site
Split Samples of LOOW UU Lines for Radiological Analysis
Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Uranium 234	pCi/g	3.43			0.5	0.01
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Uranium 235	pCi/g	0.121	J	J	0.056	0.016
MHS-C7-CWM-SL-X103-SN01-12	Sediment	Area South of "M" Street (CWM-X103)	10/5/2006	Uranium 238	pCi/g	2.78			0.42	0.03
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Actinium 228	pCi/g	0.89			0.25	0.5
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Bismuth 214	pCi/g	0.99			0.21	0.2
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Cesium 137	pCi/g	0.28			0.089	0.12
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Lead 210	pCi/g	3.29			0.88	1.3
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Lead 212	pCi/g	0.95			0.18	0.12
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Lead 214	pCi/g	0.97			0.16	0.17
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Potassium 40	pCi/g	18.6			3.1	0.8
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Protactinium 234M	pCi/g	14.9			8.6	12
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Radium (226)	pCi/g	0.99			0.21	0.2
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Radium 228	pCi/g	0.89			0.25	0.5
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Thallium 208	pCi/g	0.228			0.074	0.11
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 228	pCi/g	0.6			0.14	0.06
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 230	pCi/g	0.62			0.14	0.03
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 232	pCi/g	0.45	J	J	0.12	0.03
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Thorium 234	pCi/g	10.3			1.5	1
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 234	pCi/g	12.9			1.7	0.05
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 235	pCi/g	0.73			0.21	0.37
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 235	pCi/g	0.65	J	J	0.15	0.03
MHS-C7-CWM-SL-X106-SN01-16	Sediment	Area South of "M" Street (CWM-X106)	9/29/2006	Uranium 238	pCi/g	11.4			1.5	0.04
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Actinium 228	pCi/g	0.57			0.15	0.27
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Bismuth 214	pCi/g	0.35			0.11	0.12
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Cesium 137	pCi/g	0.343			0.081	0.073
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Lead 210	pCi/g	2.19			0.86	1.4
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Lead 212	pCi/g	0.54			0.1	0.08
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Lead 214	pCi/g	0.456			0.087	0.11
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Potassium 40	pCi/g	10.7			1.9	0.7
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Radium (226)	pCi/g	0.35	J	J	0.11	0.12
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Radium 228	pCi/g	0.57			0.15	0.27
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Thallium 208	pCi/g	0.18			0.056	0.077
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Thorium 228	pCi/g	0.48	J	J	0.14	0.08
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Thorium 230	pCi/g	0.69			0.16	0.04
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Thorium 232	pCi/g	0.51			0.14	0.04
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Thorium 234	pCi/g	2.75			0.5	0.69
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Uranium 234	pCi/g	3.36			0.5	0.05
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Uranium 235	pCi/g	0.135	J	J	0.061	0.031
MHS-C7-CWM-SL-X87-AW01-16	Sediment	Area South of "M" Street (CWM-X87)	9/26/2006	Uranium 238	pCi/g	3.25			0.48	0.03
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Actinium 228	pCi/g	0.74			0.16	0.28
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Bismuth 212	pCi/g	1.1			0.32	0.45
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Bismuth 214	pCi/g	3.94			0.5	0.13
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Lead 212	pCi/g	0.95			0.15	0.12
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Lead 214	pCi/g	3.86			0.45	0.13
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Potassium 40	pCi/g	10.8			1.7	0.8
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Radium (226)	pCi/g	3.94			0.5	0.13
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Radium 228	pCi/g	0.74			0.16	0.28
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Thallium 208	pCi/g	0.256			0.063	0.08
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Thorium 228	pCi/g	0.66			0.14	0.03
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Thorium 230	pCi/g	1.18			0.21	0.01
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Thorium 232	pCi/g	0.72			0.15	0.03
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Thorium 234	pCi/g	3.19			0.54	0.74
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Uranium 234	pCi/g	1.01			0.19	0.04
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Uranium 235	pCi/g	0.082	J	J	0.046	0.016
TSB-C7-CWM-SO-X21-WW01-4	Soil	Elevated Radiological Survey Sample (CWM-X21)	8/28/2006	Uranium 238	pCi/g	0.94	J	J	0.18	0.03
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Actinium 228	pCi/g	0.96			0.21	0.33
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Bismuth 212	pCi/g	0.71			0.34	0.6
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Lead 212	pCi/g	0.81			0.14	0.11
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Lead 214	pCi/g	1.22			0.17	0.13
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Potassium 40	pCi/g	12.8			2.2	0.4
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Radium (226)	pCi/g	1.09			0.2	0.15
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Radium 228	pCi/g	0.96			0.21	0.33
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thallium 208	pCi/g	0.264			0.068	0.068
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 228	pCi/g	0.68			0.15	0.07
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 230	pCi/g	1.25			0.22	0.04
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 232	pCi/g	0.58			0.13	0.04
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 234	pCi/g	3.02			0.56	0.88
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Uranium 234	pCi/g	5.05			0.7	0.03
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Uranium 235	pCi/g	0.187	J	J	0.07	0.03
PIPES-C7-CWM-SL-X96-AW01-10-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Uranium 238	pCi/g	5.23			0.73	0.03

USACE Buffalo District
FUSRAP Niagara Falls Storage Site
Split Samples of LOOW UU Lines for Radiological Analysis
Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Actinium 228	pCi/g	0.85			0.17	0.29
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Bismuth 214	pCi/g	0.62			0.14	0.13
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Lead 212	pCi/g	0.87			0.15	0.09
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Lead 214	pCi/g	0.75			0.12	0.13
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Potassium 40	pCi/g	18.8			2.8	0.7
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Radium (226)	pCi/g	0.62			0.14	0.13
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Radium 228	pCi/g	0.85			0.17	0.29
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thallium 208	pCi/g	0.249			0.066	0.064
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 228	pCi/g	1.02			0.2	0.06
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 230	pCi/g	0.9			0.18	0.04
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 232	pCi/g	1.13			0.22	0.04
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Uranium 234	pCi/g	0.74	J	J	0.16	0.04
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Uranium 235	pCi/g	0.047	J	J	0.036	0.032
TSB-C7-CWM-SL-X96-AW01-10-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Uranium 238	pCi/g	0.78	J	J	0.16	0.04
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Actinium 228	pCi/g	0.9			0.21	0.33
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Bismuth 214	pCi/g	0.72			0.16	0.14
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Lead 212	pCi/g	0.91			0.16	0.1
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Lead 214	pCi/g	0.72			0.13	0.15
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Potassium 40	pCi/g	16.2			2.7	0.8
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Radium (226)	pCi/g	0.72			0.16	0.14
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Radium 228	pCi/g	0.9			0.21	0.33
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Thallium 208	pCi/g	0.273			0.076	0.065
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Thorium 228	pCi/g	0.93	J	J	0.18	0.04
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Thorium 230	pCi/g	0.91	J	J	0.17	0.03
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Thorium 232	pCi/g	0.82	J	J	0.16	0.01
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Uranium 234	pCi/g	0.79	J	J	0.16	0.04
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Uranium 235	pCi/g	0.024	U	U	0.038	0.056
TSB-C7-CWM-SO-X106-SN01-14-D	Soil	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Uranium 238	pCi/g	0.68	J	J	0.14	0.04
MHW-C7-CWM-WW-X106-SN01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Radium (226)	pCi/L	0.24	J	J	0.12	0.13
MHW-C7-CWM-WW-X106-SN01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Radium 228	pCi/L	0.21	U	U	0.31	0.51
MHW-C7-CWM-WW-X106-SN01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Thorium 228	pCi/L	-0.29	U	U	0.21	0.35
MHW-C7-CWM-WW-X106-SN01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Thorium 230	pCi/L	0.04	U	UJ	0.07	0.11
MHW-C7-CWM-WW-X106-SN01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Thorium 232	pCi/L	-0.0009	U	U	0.043	0.09
MHW-C7-CWM-WW-X106-SN01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Uranium 234	pCi/L	10.1			1.3	0.09
MHW-C7-CWM-WW-X106-SN01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Uranium 235	pCi/L	0.43	J	J	0.16	0.07
MHW-C7-CWM-WW-X106-SN01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X106)	9/29/2006	Uranium 238	pCi/L	9.6			1.3	0.06
MHW-C7-CWM-WW-X96-AW01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Radium (226)	pCi/L	-0.07	U	U	0.2	0.38
MHW-C7-CWM-WW-X96-AW01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Radium 228	pCi/L	-0.01	U	U	0.4	0.69
MHW-C7-CWM-WW-X96-AW01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 228	pCi/L	0.02	U	U	0.13	0.21
MHW-C7-CWM-WW-X96-AW01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 230	pCi/L	0.23	J	UJ	0.14	0.11
MHW-C7-CWM-WW-X96-AW01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Thorium 232	pCi/L	-0.015	U	U	0.048	0.11
MHW-C7-CWM-WW-X96-AW01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Uranium 234	pCi/L	9.5			1.3	0.1
MHW-C7-CWM-WW-X96-AW01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Uranium 235	pCi/L	0.47	J	J	0.17	0.07
MHW-C7-CWM-WW-X96-AW01-10-D	Water	Duplicate for Laboratory Quality Control Purposes (CWM-X96)	9/29/2006	Uranium 238	pCi/L	8.5			1.1	0.08
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Actinium 228	pCi/g	0.54			0.13	0.26
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Bismuth 214	pCi/g	0.54			0.11	0.1
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Cesium 137	pCi/g	0.324			0.072	0.06
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Lead 210	pCi/g	3.13			0.84	1.3
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Lead 212	pCi/g	0.62			0.1	0.07
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Lead 214	pCi/g	0.615			0.094	0.1
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Potassium 40	pCi/g	12.7			2	0.5
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Radium (226)	pCi/g	0.54			0.11	0.1
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Radium 228	pCi/g	0.54			0.13	0.26
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Thallium 208	pCi/g	0.193			0.049	0.053
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Thorium 228	pCi/g	0.58			0.14	0.07
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Thorium 230	pCi/g	0.5			0.12	0.04
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Thorium 232	pCi/g	0.46	J	J	0.11	0.03
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Thorium 234	pCi/g	2.82			0.47	0.49
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Uranium 234	pCi/g	3.16			0.48	0.04
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Uranium 235	pCi/g	0.125	J	J	0.06	0.043
MHS-C7-CWM-SL-X87-AW01-16-D	Sediment	Duplicate for Laboratory Quality Control Purposes (CWM-X87)	9/26/2006	Uranium 238	pCi/g	2.88			0.44	0.04
RB-C7-CWM-WW-RINSATE	Water	Rinsate Blank for Field Quality Control Purposes	10/11/2006	Radium (226)	pCi/L	0.066	U	U	0.074	0.11
RB-C7-CWM-WW-RINSATE	Water	Rinsate Blank for Field Quality Control Purposes	10/11/2006	Radium 228	pCi/L	0.04	U	U	0.35	0.59
RB-C7-CWM-WW-RINSATE	Water	Rinsate Blank for Field Quality Control Purposes	10/11/2006	Thorium 228	pCi/L	0.031	U	U	0.065	0.1
RB-C7-CWM-WW-RINSATE	Water	Rinsate Blank for Field Quality Control Purposes	10/11/2006	Thorium 230	pCi/L	0.1	J	UJ	0.064	0.025
RB-C7-CWM-WW-RINSATE	Water	Rinsate Blank for Field Quality Control Purposes	10/11/2006	Thorium 232	pCi/L	0.009	U	U	0.026	0.025
RB-C7-CWM-WW-RINSATE	Water	Rinsate Blank for Field Quality Control Purposes	10/11/2006	Uranium 234	pCi/L	-0.075	U	UJ	0.061	0.14
RB-C7-CWM-WW-RINSATE	Water	Rinsate Blank for Field Quality Control Purposes	10/11/2006	Uranium 235	pCi/L	0.008	U	U	0.031	0.069
RB-C7-CWM-WW-RINSATE	Water	Rinsate Blank for Field Quality Control Purposes	10/11/2006	Uranium 238	pCi/L	0.065	U	U	0.06	0.067
TSB-C7-CWM-SO-X105-SN01-12-QA	Soil	Quality Assurance Sample (CWM-X105)	10/3/2006	Radium (226)	pCi/g	0.811			0.163	0.117

USACE Buffalo District
FUSRAP Niagara Falls Storage Site
Split Samples of LOOW UU Lines for Radiological Analysis
Collected: August-October 2006
Submitted: October 2007

Sample Number	Matrix	Sample Location	Date	Compound Name	Units	Result	Laboratory Qualifier	Validated Qualifier	Total Uncertainty	Minimum Detectable Concentration
TSB-C7-CWM-SO-X105-SN01-12-QA	Soil	Quality Assurance Sample (CWM-X105)	10/3/2006	Radium 228	pCi/g	0.828			0.273	0.209
TSB-C7-CWM-SO-X105-SN01-12-QA	Soil	Quality Assurance Sample (CWM-X105)	10/3/2006	Thorium 228	pCi/g	0.680			0.334	0.331
TSB-C7-CWM-SO-X105-SN01-12-QA	Soil	Quality Assurance Sample (CWM-X105)	10/3/2006	Thorium 230	pCi/g	0.427			0.270	0.318
TSB-C7-CWM-SO-X105-SN01-12-QA	Soil	Quality Assurance Sample (CWM-X105)	10/3/2006	Thorium 232	pCi/g	0.570			0.280	0.191
TSB-C7-CWM-SO-X105-SN01-12-QA	Soil	Quality Assurance Sample (CWM-X105)	10/3/2006	Uranium 234	pCi/g	0.559			0.288	0.573
TSB-C7-CWM-SO-X105-SN01-12-QA	Soil	Quality Assurance Sample (CWM-X105)	10/3/2006	Uranium 235	pCi/g	-0.058	U		0.045	0.201
TSB-C7-CWM-SO-X105-SN01-12-QA	Soil	Quality Assurance Sample (CWM-X105)	10/3/2006	Uranium 238	pCi/g	0.481			0.262	0.416
SUMPS-C7-LEW-SL-XOO-DW03-16-QA	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Radium (226)	pCi/g	3.970			0.415	0.231
SUMPS-C7-LEW-SL-XOO-DW03-16-QA	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Radium 228	pCi/g	0.000	UI		0.428	0.640
SUMPS-C7-LEW-SL-XOO-DW03-16-QA	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 228	pCi/g	0.640			0.209	0.065
SUMPS-C7-LEW-SL-XOO-DW03-16-QA	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 230	pCi/g	4.240			0.961	0.058
SUMPS-C7-LEW-SL-XOO-DW03-16-QA	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 232	pCi/g	0.623			0.203	0.031
SUMPS-C7-LEW-SL-XOO-DW03-16-QA	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 234	pCi/g	20.900			2.960	0.046
SUMPS-C7-LEW-SL-XOO-DW03-16-QA	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 235	pCi/g	1.910			0.377	0.031
SUMPS-C7-LEW-SL-XOO-DW03-16-QA	Sediment	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 238	pCi/g	22.100			3.110	0.069
SUMPW-C7-LEW-WW-XOO-DW03-7-QA	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Radium (226)	pCi/L	0.207	U		0.226	0.373
SUMPW-C7-LEW-WW-XOO-DW03-7-QA	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Radium 228	pCi/L	0.305	U		0.433	0.747
SUMPW-C7-LEW-WW-XOO-DW03-7-QA	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 228	pCi/L	0.168	U		0.268	0.418
SUMPW-C7-LEW-WW-XOO-DW03-7-QA	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 230	pCi/L	0.411			0.348	0.230
SUMPW-C7-LEW-WW-XOO-DW03-7-QA	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Thorium 232	pCi/L	-0.018	U		0.155	0.368
SUMPW-C7-LEW-WW-XOO-DW03-7-QA	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 234	pCi/L	0.759			5.090	0.253
SUMPW-C7-LEW-WW-XOO-DW03-7-QA	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 235	pCi/L	0.104	U		0.205	0.313
SUMPW-C7-LEW-WW-XOO-DW03-7-QA	Water	Former LOOW Wastewater Treatment Plant (Chlorination Tank)	8/31/2006	Uranium 238	pCi/L	0.000	U		0.165	0.253
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Actinium 228	pCi/g	0.71			0.18	0.33
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Bismuth 214	pCi/g	0.6			0.14	0.16
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Lead 212	pCi/g	0.63			0.13	0.14
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Lead 214	pCi/g	0.61			0.12	0.16
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Potassium 40	pCi/g	4.9			1.3	0.7
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Radium (226)	pCi/g	0.6			0.14	0.16
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Radium 228	pCi/g	0.71			0.18	0.33
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Thallium 208	pCi/g	0.18			0.066	0.085
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Thorium 228	pCi/g	0.68			0.15	0.07
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Thorium 230	pCi/g	1.37			0.24	0.04
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Thorium 232	pCi/g	0.74			0.15	0.03
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Thorium 234	pCi/g	1.03			0.3	0.69
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Uranium 234	pCi/g	1.54			0.27	0.03
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Uranium 235	pCi/g	0.077	J	J	0.05	0.043
IDWS-C7-NFS-SL-IDW-1	Sediment	Investigative Derived Waste Samples for Disposal Purposes	10/27/2006	Uranium 238	pCi/g	1.65			0.29	0.01
IDWW-C7-NFS-WW-IDW-1	Water	Investigative Derived Waste Samples for Disposal Purposes	10/26/2006	Radium (226)	pCi/L	0.28	J	J	0.13	0.14
IDWW-C7-NFS-WW-IDW-1	Water	Investigative Derived Waste Samples for Disposal Purposes	10/26/2006	Radium 228	pCi/L	0.21	U	U	0.28	0.46
IDWW-C7-NFS-WW-IDW-1	Water	Investigative Derived Waste Samples for Disposal Purposes	10/26/2006	Thorium 228	pCi/L	-0.007	U	U	0.073	0.13
IDWW-C7-NFS-WW-IDW-1	Water	Investigative Derived Waste Samples for Disposal Purposes	10/26/2006	Thorium 230	pCi/L	0.172	J	UJ	0.093	0.073
IDWW-C7-NFS-WW-IDW-1	Water	Investigative Derived Waste Samples for Disposal Purposes	10/26/2006	Thorium 232	pCi/L	0.003	U	U	0.039	0.079
IDWW-C7-NFS-WW-IDW-1	Water	Investigative Derived Waste Samples for Disposal Purposes	10/26/2006	Uranium 234	pCi/L	0.035	U	UJ	0.058	0.088
IDWW-C7-NFS-WW-IDW-1	Water	Investigative Derived Waste Samples for Disposal Purposes	10/26/2006	Uranium 235	pCi/L	-0.005	U	U	0.029	0.065
IDWW-C7-NFS-WW-IDW-1	Water	Investigative Derived Waste Samples for Disposal Purposes	10/26/2006	Uranium 238	pCi/L	0.003	U	U	0.038	0.077

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
ENVIRONMENTAL HEALTH SECTION
BUFFALO, NEW YORK 14207

Subject: Chemical Data Quality Assessment Report
Project: NFSS/LOOW Radiological Pipeline Sampling for Radiochemistry
Intended Use: Evaluation Purposes
Date Submitted: 18OCT2007
Submitted by: Mat Masset, CELRB-TD-EH
Date Sampled: AUG-OCT 2006

Background

Between August and October of 2006, the U.S. Army Corps of Engineers (USACE) collected a total of 60 samples for radiological analysis from within or adjacent to UU lines on the former LOOW site in addition to twelve samples for waste disposal and quality assurance purposes. Fifty-five (55) samples were sludge and wastewater within, and soil below, UU lines on the former LOOW, including the 30-inch outfall. In addition, one collocated surface water and sediment sample and surface and subsurface soil sample was collected beneath the 30-inch outfall line at the point where it traverses the Southwest (SW) Drainage Ditch on the Lewiston-Porter Central School District property. Lastly, one sediment (SD) sample was collected within the sludge bed of the former LOOW wastewater treatment plant imhoff tank. All primary samples were analyzed by Severn Trent Laboratories (STL) of St. Louis for radiological constituents including, but not limited to, isotopic uranium, isotopic thorium, radium-226, and radium-228.

Data Verification and Validation

USACE conducted a data verification on 100% of the data that evaluated the completeness and accuracy of the data. Additionally, USACE validated the complete analytical dataset to substantiate its usability for risk assessment purposes. Radiological data validation procedures include the evaluation of all batch quality control including method blanks, laboratory control samples and laboratory control sample duplicates and laboratory duplicates. Evaluation of basic and continuing calibration checks and instrument background counts . See attached data validation reports for those SDGs.

F6H180238
F6I070225_rev1
F6J310237
F6J310264

NFSS/LOOW 2006 Radiological Pipeline Sampling Chemical Quality Assurance Report (CQAR)

The USACE CQAR is an evaluation of primary sample findings and those findings of the same sample prepared in the field at a secondary laboratory. This comparison is done using USACE EM200-1-6 Table 4-1 (Criteria for Comparing Field QA and QA Sample Data) and the Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP) section 18.4.2 Laboratory Replicates. This

comparison is conducted to verify primary sample findings accuracy and that of the sample handling from the point of obtaining the sample to reporting of the result. The primary and QA laboratory PARCCS parameters (precision, accuracy, representativeness, comparability, completeness, and sensitivity) are evaluated for each associated batch.
In addition field duplicates, blind to the laboratory, are compared to those of the primary and laboratory duplicate using MARLAP section 18.4.2 Laboratory Replicates and relative percent difference (RPD).

Data Assessment

The sample data verification/validation and the chemical quality assurance report (CQAR), attached, support the acceptability of the NFSS/LOOW 2006 radiological pipeline sampling data.

NFSS/LOOW 2006 Radiological Pipeline Sampling
Chemical Quality Assurance Report (CQAR)

1. SUMMARY: The data package submitted by the contractor Cabrera Services Inc. of East Hartford, CT met the minimum USACE HTRW chemistry data reporting requirements as per EM 200-1-6.

   The primary laboratory (Severn Trent Laboratory (STL), St. Louis MO) results were reviewed for the laboratory batches which contained samples that matched the quality assurance splits. The evaluation used the QC acceptance limits that were set by the laboratory. There were a total of two soil/sediment samples and one water sample reviewed. All were analyzed for radiological parameters the listed below. See Table 1 for a list of the sample IDs and the associated analyses. The method quality control (QC) review indicated that the information provided supports the acceptability of the project data.

   Minor data discrepancies were noted in the comparison of the quality assurance (QA) laboratory and primary laboratory sample results (Table 2). However, these data comparisons and those of the field duplicate and primary sample comparison (Table 3) of those data in sample delivery groups (SDGs) below (attached) support the acceptability of the project data.
   SDGs:
   F6H180238
   F6J310237
   F6J310264

   Table 1: Sample List

Primary Lab ID	QA Lab ID	Sampled Date	Analyses
TSB-C7-CWM-SO-X105-SN01-12	TSB-C7-CWM-SO-X105-SN01-12-QA	10/03/2006	Iso-Uranium Iso-Thorium Ra-226&228
SUMPS-C7-LEW-SL-XOO-DW03-16	SUMPS-C7-LEW-SL-XOO-DW03-16-QA	08/31/2006	Iso-Uranium Iso-Thorium Ra-226&228
SUMPW-C7-LEW-WW-XOO-DW03-7	SUMPW-C7-LEW-WW-XOO-DW03-7-QA	08/31/2006	Iso-Uranium Iso-Thorium Ra-226&228

2. PRIMARY LAB DATA EVALUATION: The contract laboratory performed the analyses using DOE and EPA methods. Results were reviewed for the batches that contained samples that matched the quality assurance splits. Proper quality control procedures were followed and documented. The contract laboratory provided radiological analytical results for samples that were analyzed for:

   Isotopic Uranium (234, 235, 238) by DOE EML A-01-R modified, (alpha spectroscopy)
   Isotopic Thorium (228, 230, 232) by DOE EML A-01-R modified, (alpha spectroscopy)
   Radium-226 by EPA 903.0 modified, (gas flow proportional counting)
   Radium-228 by EPA 904 modified, (gas flow proportional counting)
   Radium -226&228 by DOE EML GA-01-R modified, (gamma spectroscopy)

   2.1 ACCURACY: Factors indicating the accuracy of the laboratory's data include:
   2.1.1 Tracer recoveries:

2.1.1.1 Iso-U – all recoveries were within acceptable limits

2.1.1.2 Iso-Th -all recoveries were within acceptable limits

2.1.1.3 Radium -226 - all recoveries were within acceptable limits except were noted below:

SDG F6J310237 batch # 6304444

-tracer recovery for barium was less than %50 for the below sample, results were qualified with a 'J' or 'UJ'

PIPEW-C7-CWM-WW-X104-SN01-12

2.1.1.4 Radium -228 - all recoveries were within acceptable limits except were noted below:

SDG F6J310237 batch # 6304445

-tracer recovery for barium was less than %50 for the below sample, results were qualified with a 'J' or 'UJ'

PIPEW-C7-CWM-WW-X104-SN01-12

MHW-C7-CWM-WW-X87-AW01-15

PIPEW-C7-CWM-WW-X86-SN01-6

2.1.2 Laboratory Control Sample (LCS) recoveries:

2.1.2.1 Iso-U – all recoveries were within acceptable limits

2.1.2.2 Iso-Th – all recoveries were within acceptable limits

2.1.2.3 Radium -226 – all recoveries were within acceptable limits

2.1.2.4 Radium -228 – all recoveries were within acceptable limits

2.1.3 Matrix Spiked and Matrix Spiked Duplicate recoveries:

2.1.3.1 Iso-U – No MS/MSDs run.

2.1.3.2 Iso-Th – No MS/MSDs run.

2.1.3.3 Radium -226 – No MS/MSDs run.

2.1.3.4 Radium -228 – No MS/MSDs run.

2.2 PRECISION: Factors indicating the precision of the laboratory's data include 2.2.1 Relative Percent Difference (RPD) for laboratory duplicates:

2.2.1.1 Iso-U – all were within acceptable limits

2.2.1.2 Iso-Th – all were within acceptable limits

2.2.1.3 Radium -226 – all were within acceptance limits

2.2.1.4 Radium -228 – all were within acceptable limits

2.3 Method blank results for:

2.2.1.1 Iso-U – all were within acceptable limits

2.2.1.2 Iso-Th – all were within acceptable limits except were noted, see attached data validation report for those samples that had qualifiers changed to 'J' or 'UJ'

2.2.1.3 Radium -226 – all were within acceptance limits

2.2.1.4 Radium -228 – all were within acceptable limits

2.4 HOLDING TIMES: Holding times were met for all samples and for all parameters.

3. OBSERVATIONS FOR PRIMARY LAB:

3.1 Several chain of custody of forms (COC) were not signed off by the laboratory for samples in SDGs F6J310237 and F6J310264. Samples were received by the laboratory the day following shipment as can be verified by FedEx proof of delivery letters for each cooler and COC with associated air bill number. Cooler receipt forms were completed by the laboratory and all samples logged.

MDCs exceeded, other than Ra-226&228, for gamma spectroscopy were reported as requested by USACE. Only QC for Ra-226&228 was conducted by the laboratory for gamma spectroscopy, aside from laboratory duplicate evaluation.

3.2 All sample findings have been reported.

4 Primary/QA COMPARISON: QA split samples were submitted to General Engineering Laboratories, LLC (Charleston, SC) for radiological analysis. A comparison of the quality assurance (QA) and primary test results is presented in Table 2. Minor data discrepancies were noted in the comparison of the quality assurance (QA) and contractor test results. There were a total of two discrepancies noted. Both samples had findings for uranium and radium. This particular sample was of sediment in make up. Lack of homogeneity at the time of the sample split in the field may have contributed to this or differences in the QA laboratory preparation to that of the primary laboratory. The data comparisons support the acceptability of the project data.

5. QUALITY ASSURANCE LAB DATA EVALUATION: The quality assurance laboratory performed the analyses using DOE/EPA/ASTM methods. Results were reviewed for the batches that contained the quality assurance splits. Proper quality control procedures were followed and documented. The laboratory provided chemical and radiological analytical results for samples that were analyzed for:

Isotopic Uranium (234, 235, 238) by DOE EML HASL-300, U-02-RC modified, (alpha spectroscopy)
Isotopic Thorium (228, 230, 232) by DOE EML HASL-300, Th-01-RC modified, (alpha spectroscopy)
Ra-226 by EPA 903.1 modified (Lucas Cell)
Ra-228 by EPA 904.0 modified (gas flow proportional counting)
Ra -226&228 by EML HASL 300, 4.5.2.3 (gamma spectroscopy)

5.1 ACCURACY: Factors indicating the accuracy of the laboratory's data include:

5.1.1 Tracer recoveries

5.1.1.1 Iso-U – all recoveries were within acceptable limits
5.1.1.2 Iso-Th – all recoveries were within acceptable limits
5.1.1.3 Ra -226 – all recoveries were within acceptable limits
5.1.1.4 Ra -228 – all recoveries were within acceptable limits

5.1.2 MS recoveries

5.1.2.1 Iso-U – all recoveries were within acceptable limits. Except for sample SUMPS-C7-LEW-SL-XOO-DW03-16-QA were the activity was five time greater than the spiked nominal concentration.
5.1.2.2 Iso-Th – all recoveries were within acceptable limits.
5.1.2.3 Ra -226 – all water sample recoveries were within

acceptable limits. No MS samples were run for soils/sediment.

5.1.1.4 Ra -228 – all water sample recoveries were within acceptable limits. No MS samples were run for soils/sediment.

5.1.3 LCS recoveries

5.1.3.1 Iso-U – all recoveries were within acceptable limits

5.1.3.2 Iso-Th – all recoveries were within acceptable limits

5.1.3.3 Ra -226 – all recoveries were within acceptable limits

5.1.3.4 Ra -228 – all recoveries were within acceptable limits

5.2 PRECISION: Factors indicating the precision of the laboratory's data include:

5.2.1 RPD for MS/MSD

5.2.3.1 Iso-U – no MSD run.

5.2.3.2 Iso-Th – no MSD run.

5.2.3.3 Ra -226 – no MSD run.

5.2.3.4 Ra -228 – no MSD run.

5.2.2 RPD for Lab duplicates

5.1.3.1 Iso-U – all RPDs are within acceptable limits. Except for sample SUMPW-C7-LEW-WW-XOO-DW03-7-QA were the RPD was out of range. Both samples were non-detect.

5.1.3.2 Iso-Th – all RPDs are within acceptable limits. Except for sample SUMPW-C7-LEW-WW-XOO-DW03-7-QA were the RPD was out of range. Both sample findings were below requested RL/MDC.

5.1.3.3 Ra -226 – all RPDs are within acceptable limits

5.1.3.4 Ra -228 – all RPDs are within acceptable limits

5.3 Method blank results

5.3.1 Iso-U – all were within acceptable limits

5.3.2 Iso-Th – all were within acceptable limits

5.3.3 Ra -226 – all were within acceptable limits

5.3.4 Ra -228 – all were within acceptable limits

5.4 Holding Times

5.4.1 Holding times were met for all samples and all analyses.

6. OBSERVATIONS for QA Lab

6.1 MDCs exceeded, other than Ra-226&228, for gamma spectroscopy were reported as requested by USACE.

6.2 All sample findings have been reported.

Submitted by:

Mat Masset
Chemist
Environmental Health Section
USACE –Buffalo District

TABLE 2 - NFSS/LOOW Pipeline Primary Lab and QA Split (Independent Lab) Comparison

Project: NFSS

QA Sample ID: TSB-C7-CWM-SO-X105-SN01-12-QA
Lab: GEL
Material Description: Solid
Analysis

Primary ID: TSB-C7-CWM-SO-X105-SN01-12
Lab: STL-St.Louis
Date Sampled: 10/3/2006

Radiological	QA Result	Qualifier	Total Uncertainty	MDA	Primary Result	Qualifier	Total Uncertainty	MDA	Units	Difference Ratio Table 4-1 EM200-1-6	Z Score MARLAP	Discrepancy/Comment
Alpha Spec												
Th-228	**0.680**		0.334	0.331	**0.730**	J	0.160	0.050	pCi/g	1.1	0.1	
Th-230	**0.427**		0.270	0.318	**0.670**	J	0.150	0.040	pCi/g	1.6	0.8	
Th-232	**0.570**		0.280	0.191	**0.690**	J	0.150	0.030	pCi/g	1.2	0.4	
Alpha Spec												
U-234	**0.559**		0.288	0.573	**0.680**	J	0.140	0.030	pCi/g	1.2	0.4	
U-235	**-0.058**	U	0.045	0.201	**0.046**	J	0.035	0.032	pCi/g	-0.8	1.8	
U-238	**0.481**		0.262	0.416	**0.650**	J	0.140	0.030	pCi/g	1.4	0.6	
Gamma Spec.												
Ra-226	**0.811**		0.163	0.117	**0.570**		0.160	0.160	pCi/g	1.4	1.1	
Ra-228	**0.828**		0.273	0.209	**0.690**		0.320	0.610	pCi/g	1.2	0.3	

Project: NFSS

QA Sample ID: SUMPS-C7-LEW-SL-XOO-DW03-16-QA
Lab: GEL
Material Description: Sediment
Analysis

Primary ID: SUMPS-C7-LEW-SL-XOO-DW03-16
Lab: STL-St.Louis
Date Sampled: 8/31/2006

Radiological	QA Result	Qualifier	Total Uncertainty	MDA	Primary Result	Qualifier	Total Uncertainty	MDA	Units	Difference Ratio Table 4-1 EM200-1-6	Z Score MARLAP	Discrepancy/Comment
Alpha Spec												
Th-228	**0.640**		0.209	0.065	**0.590**		0.150	0.040	pCi/g	1.1	0.2	
Th-230	**4.240**		0.961	0.058	**2.380**		0.440	0.030	pCi/g	1.8	1.8	
Th-232	**0.623**		0.203	0.031	**0.650**		0.160	0.020	pCi/g	1.0	0.1	
Alpha Spec												
U-234	**20.900**		2.960	0.046	**13.000**		2.200	0.030	pCi/g	1.6	2.1	
U-235	**1.910**		0.377	0.031	**0.630**		0.180	0.020	pCi/g	3.0	3.1	Minor Disagreeemnt
U-238	**22.100**		3.110	0.069	**13.000**		2.200	0.030	pCi/g	1.7	2.4	
Gamma Spec.												
Ra-226	**3.970**		0.415	0.231	**1.670**		0.240	0.130	pCi/g	2.4	4.8	Minor Disagreeemnt
Ra-228	**0.000**	U	0.428	0.640	**0.460**	J	0.130	0.320	pCi/g	1.4	1.0	

Project: NFSS

QA Sample ID: SUMPW-C7-LEW-WW-XOO-DW03-7-QA
Lab: GEL
Material Description: Water
Analysis

Primary ID: SUMPW-C7-LEW-WW-XOO-DW03-7
Lab: STL-St.Louis
Date Sampled: 8/31/2006

Radiological	QA Result	Qualifier	Total Uncertainty	MDA	Primary Result	Qualifier	Total Uncertainty	MDA	Units	Difference Ratio Table 4-1 EM200-1-6	Z Score MARLAP	Discrepancy/Comment
Alpha Spec												
Th-228	**0.168**	U	0.268	0.418	**0.020**	U	0.120	0.200	pCi/L	8.4	0.5	Both non-detects. Exceptable Z Score.
Th-230	**0.411**		0.348	0.230	**0.140**	U	0.140	0.170	pCi/L	2.9	0.7	Acceptable Z Score
Th-232	**-0.018**	U	0.155	0.368	**0.017**	U	0.050	0.100	pCi/L	-0.9	0.2	
Alpha Spec												
U-234	**0.759**		5.090	0.253	**0.125**	J	0.080	0.053	pCi/L	6.1	0.1	Acceptable Z Score
U-235	**0.104**	U	0.205	0.313	**0.014**	U	0.041	0.039	pCi/L	7.4	0.4	Both non-detects. Exceptable Z Score.
U-238	**0.000**	U	0.165	0.253	**0.168**	J	0.095	0.062	pCi/L	1.5	0.9	
Gamma Spec.												
Ra-226	**0.207**	U	0.226	0.373	**0.130**	U	0.140	0.210	pCi/L	1.6	0.3	
Ra-228	**0.305**	U	0.433	0.747	**0.300**	U	0.570	0.950	pCi/L	1.0	0.0	

Table 3 - NFSS/LOOW Pipeline Primary, Field Duplicate and Laboratory Duplicate Comparisons

CLIENT SAMPLE DESCRIPTION	DATE SAMP	COMPOUND NAME	UNITS	RESULT	QUALIFIERS	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	Z Score Primary or Lab Dup and Field	Z Score Lab Dup and Field Dup	RPD Chk or % Rec
MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	Thorium 230	pCi/L	0.1	U	U	0.11	0.14			
MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	Thorium 228	pCi/L	0.03	U	U	0.16	0.26			
MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	Thorium 232	pCi/L	-0.021	U	U	0.05	0.12			
MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	Thorium 230	pCi/L	0.23	J	UJ	0.14	0.11	0.7		78.8
MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	Thorium 228	pCi/L	0.02	U	U	0.13	0.21	0.0		40.0
MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	Thorium 232	pCi/L	-0.015	U	U	0.048	0.11	0.1		-33.3
MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	Thorium 230	pCi/L	0.082	U	UJ	0.074	0.087			
MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	Thorium 228	pCi/L	0.044	U	U	0.095	0.15			
MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	Thorium 232	pCi/L	0.013	U	U	0.038	0.07			
MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	Thorium 230	pCi/L	0.04	U	UJ	0.07	0.11	0.4		68.9
MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	Thorium 228	pCi/L	-0.29	U	U	0.21	0.35	1.4		-271.5
MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	Thorium 232	pCi/L	-0.0009	U	U	0.043	0.09	0.2		229.8
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Thorium 228	pCi/g	1.03			0.2	0.06			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Thorium 230	pCi/g	1			0.19	0.05			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Thorium 232	pCi/g	1.01			0.19	0.03			
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Thorium 228	pCi/g	0.93	J	J	0.18	0.04	0.4		10.2
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Thorium 230	pCi/g	0.91	J	J	0.17	0.03	0.4		9.4
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Thorium 232	pCi/g	0.82	J	J	0.16	0.01	0.8		20.8
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Uranium 234	pCi/g	0.82	**J**	**J**	0.16	0.03			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Uranium 235	pCi/g	0.08	**J**	**J**	0.047	0.017			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Uranium 238	pCi/g	0.82	**J**	**J**	0.17	0.01			
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Uranium 234	pCi/g	0.79	J	J	0.16	0.04	0.1		22.9
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Uranium 235	pCi/g	0.024	U	U	0.038	0.056	0.9		151.4
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Uranium 238	pCi/g	0.68	J	J	0.14	0.04	0.6		41.3
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Thorium 228	pCi/g	0.48	J	J	0.14	0.08			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Thorium 230	pCi/g	0.69			0.16	0.04			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Thorium 232	pCi/g	0.51			0.14	0.04			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Thorium 228	pCi/g	0.48	J	J	0.12	0.05	0.0		0.0
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Thorium 230	pCi/g	0.6			0.13	0.03	0.4		14.0
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Thorium 232	pCi/g	0.42	J	J	0.11	0.01	0.5		19.4
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Thorium 228	pCi/g	0.58			0.14	0.07	0.5		18.9
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Thorium 230	pCi/g	0.5			0.12	0.04	1.0		31.9
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Thorium 232	pCi/g	0.46	J	J	0.11	0.03	0.3		10.3
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Thorium 228	pCi/g	0.91			0.19	0.08			
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Thorium 230	pCi/g	0.89			0.19	0.04			
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Thorium 232	pCi/g	0.89			0.18	0.04			
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Thorium 228	pCi/g	1.02			0.2	0.06	0.4		11.4
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Thorium 230	pCi/g	0.9			0.18	0.04	0.0		1.1
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Thorium 232	pCi/g	1.13			0.22	0.04	0.8		23.8
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Thorium 228	pCi/g	0.57			0.17	0.16			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Thorium 230	pCi/g	1.2			0.22	0.05			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Thorium 232	pCi/g	0.55			0.13	0.04			
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Thorium 228	pCi/g	0.68			0.15	0.07	0.5		17.6
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Thorium 230	pCi/g	1.25			0.22	0.04	0.2		4.1
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Thorium 232	pCi/g	0.58			0.13	0.04	0.2		5.3
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Uranium 234	pCi/g	3.36			0.5	0.05			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Uranium 235	pCi/g	0.135	J	J	0.061	0.031			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Uranium 238	pCi/g	3.25			0.48	0.03			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Uranium 234	pCi/g	3.29			0.49	0.04	0.1		2.1
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Uranium 235	pCi/g	0.138	J	J	0.063	0.043	0.0		2.2
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Uranium 238	pCi/g	3.21			0.48	0.03	0.1		1.2
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Uranium 234	pCi/g	3.16			0.48	0.04	0.3	0.2	6.1
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Uranium 235	pCi/g	0.125	J	J	0.06	0.043	0.1	0.1	7.7
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Uranium 238	pCi/g	2.88			0.44	0.04	0.6	0.5	12.1
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Uranium 234	pCi/g	5.02			0.71	0.04			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Uranium 235	pCi/g	0.225	J	J	0.084	0.057			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Uranium 238	pCi/g	4.92			0.7	0.04			
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Uranium 234	pCi/g	5.05			0.7	0.03	0.0		0.6
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Uranium 235	pCi/g	0.187	J	J	0.07	0.03	0.3		18.4
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Uranium 238	pCi/g	5.23			0.73	0.03	0.3		6.1

Table 3 - NFSS/LOOW Pipeline Primary, Field Duplicate and Laboratory Duplicate Comparisons											
CLIENT SAMPLE DESCRIPTION	DATE SAMP	COMPOUND NAME	UNITS	RESULT	QUALIFIERS	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	Z Score Primary or Lab Dup and Field	Z Score Lab Dup and Field Dup	RPD Chk or % Rec
MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	Uranium 234	pCi/L	7.8			1.1	0.06			
MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	Uranium 235	pCi/L	0.58			0.19	0.04			
MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	Uranium 238	pCi/L	7.6			1.1	0.03			
MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	Uranium 234	pCi/L	9.5			1.3	0.1	1.0		19.7
MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	Uranium 235	pCi/L	0.47	J	J	0.17	0.07	0.4		21.0
MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	Uranium 238	pCi/L	8.5			1.1	0.08	0.6		11.2
MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	Uranium 234	pCi/L	9.9			1.3	0.08			
MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	Uranium 235	pCi/L	0.37	J	J	0.15	0.07			
MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	Uranium 238	pCi/L	9			1.2	0.03			
MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	Uranium 234	pCi/L	10.1			1.3	0.09	0.1		2.0
MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	Uranium 235	pCi/L	0.43	J	J	0.16	0.07	0.3		15.0
MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	Uranium 238	pCi/L	9.6			1.3	0.06	0.3		6.5
MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	Radium (226)	pCi/L	0.25	J	J	0.16	0.21			
MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	Radium (226)	pCi/L	-0.07	U	U	0.2	0.38	1.2		355.6
MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	Radium (226)	pCi/L	0.31	J	J	0.16	0.2			
MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	Radium (226)	pCi/L	0.24	J	J	0.12	0.13	0.4		25.5
MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	Radium 228	pCi/L	0.17	U	U	0.42	0.7			
MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	Radium 228	pCi/L	-0.01	U	U	0.4	0.69	0.3		225.0
MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	Radium 228	pCi/L	-0.17	U	U	0.3	0.54			
MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	Radium 228	pCi/L	0.21	U	U	0.31	0.51	0.9		1900.0
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Actinium 228	pCi/g	1.16			0.2	0.3			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Bismuth 214	pCi/g	0.89			0.17	0.15			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Lead 212	pCi/g	1.02			0.16	0.1			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Lead 214	pCi/g	0.94			0.14	0.13			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Potassium 40	pCi/g	23.8			3.4	0.7			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Radium (226)	pCi/g	0.89			0.17	0.15			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Radium 228	pCi/g	1.16			0.2	0.3			
TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	Thallium 208	pCi/g	0.271			0.069	0.078			
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Actinium 228	pCi/g	0.9			0.21	0.33	0.9		25.2
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Bismuth 214	pCi/g	0.72			0.16	0.14	0.7		21.1
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Lead 212	pCi/g	0.91			0.16	0.1	0.5		11.4
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Lead 214	pCi/g	0.72			0.13	0.15	1.2		26.5
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Potassium 40	pCi/g	16.2			2.7	0.8	1.8		38.0
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Radium (226)	pCi/g	0.72			0.16	0.14	0.7		21.1
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Radium 228	pCi/g	0.9			0.21	0.33	0.9		25.2
TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	Thallium 208	pCi/g	0.273			0.076	0.065	0.0		0.7

Table 3 - NFSS/LOOW Pipeline Primary, Field Duplicate and Laboratory Duplicate Comparisons

CLIENT SAMPLE DESCRIPTION	DATE SAMP	COMPOUND NAME	UNITS	RESULT	QUALIFIERS	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	Z Score Primary or Lab Dup and Field	Z Score Lab Dup and Field Dup	RPD Chk or % Rec
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Actinium 228	pCi/g	0.57			0.15	0.27			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Bismuth 214	pCi/g	0.35			0.11	0.12			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Cesium 137	pCi/g	0.343			0.081	0.073			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Lead 210	pCi/g	2.19			0.86	1.4			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Lead 212	pCi/g	0.54			0.1	0.08			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Lead 214	pCi/g	0.456			0.087	0.11			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Potassium 40	pCi/g	10.7			1.9	0.7			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Radium (226)	pCi/g	0.35	J	J	0.11	0.12			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Radium 228	pCi/g	0.57			0.15	0.27			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Thallium 208	pCi/g	0.18			0.056	0.077			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Thorium 234	pCi/g	2.75			0.5	0.69			
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Actinium 228	pCi/g	0.34			0.1	0.3	1.3		50.5
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Bismuth 214	pCi/g	0.46			0.13	0.14	0.6		27.2
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Cesium 137	pCi/g	0.215			0.069	0.096	1.2		45.9
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Lead 212	pCi/g	0.52			0.11	0.14	0.1		3.8
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Lead 214	pCi/g	0.394			0.092	0.15	0.5		14.6
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Potassium 40	pCi/g	12.1			2.2	0.7	0.5		12.3
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Radium (226)	pCi/g	0.46	J	J	0.13	0.14	0.6		27.2
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Radium 228	pCi/g	0.34	J	J	0.1	0.3	1.3		50.5
MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	Thorium 234	pCi/g	2.88			0.53	0.72	0.2		4.6
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Actinium 228	pCi/g	0.54			0.13	0.26	0.2	1.2	5.4
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Bismuth 214	pCi/g	0.54			0.11	0.1	1.2	0.5	42.7
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Cesium 137	pCi/g	0.324			0.072	0.06	0.2	1.1	5.7
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Lead 210	pCi/g	3.13			0.84	1.3	0.8		35.3
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Lead 212	pCi/g	0.62			0.1	0.07	0.6	0.7	13.8
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Lead 214	pCi/g	0.615			0.094	0.1	1.2	1.7	29.7
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Potassium 40	pCi/g	12.7			2	0.5	0.7	0.2	17.1
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Radium (226)	pCi/g	0.54			0.11	0.1	1.2	0.5	42.7
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Radium 228	pCi/g	0.54			0.13	0.26	0.2	1.2	5.4
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Thallium 208	pCi/g	0.193			0.049	0.053	0.2		7.0
MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	Thorium 234	pCi/g	2.82			0.47	0.49	0.1	0.1	2.5
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Actinium 228	pCi/g	0.95			0.18	0.27			
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Bismuth 214	pCi/g	0.78			0.16	0.14			
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Lead 212	pCi/g	0.83			0.15	0.12			
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Lead 214	pCi/g	0.83			0.13	0.11			
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Potassium 40	pCi/g	19.8			2.9	0.6			
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Radium (226)	pCi/g	0.78			0.16	0.14			
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Radium 228	pCi/g	0.95			0.18	0.27			
TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	Thallium 208	pCi/g	0.271			0.071	0.07			
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Actinium 228	pCi/g	0.85			0.17	0.29	0.4		11.1
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Bismuth 214	pCi/g	0.62			0.14	0.13	0.8		22.9
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Lead 212	pCi/g	0.87			0.15	0.09	0.2		4.7
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Lead 214	pCi/g	0.75			0.12	0.13	0.5		10.1
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Potassium 40	pCi/g	18.8			2.8	0.7	0.2		5.2
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Radium (226)	pCi/g	0.62			0.14	0.13	0.8		22.9
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Radium 228	pCi/g	0.85			0.17	0.29	0.4		11.1
TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Thallium 208	pCi/g	0.249			0.066	0.064	0.2		8.5
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Actinium 228	pCi/g	0.77			0.18	0.26			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Bismuth 214	pCi/g	0.76			0.15	0.11			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Lead 212	pCi/g	0.75			0.13	0.09			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Lead 214	pCi/g	0.92			0.13	0.11			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Potassium 40	pCi/g	10.1			1.7	0.7			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Radium (226)	pCi/g	0.76			0.15	0.11			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Radium 228	pCi/g	0.77			0.18	0.26			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Thallium 208	pCi/g	0.225			0.058	0.068			
PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	Thorium 234	pCi/g	2.66			0.47	0.65			
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Actinium 228	pCi/g	0.96			0.21	0.33	0.7		22.0
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Bismuth 212	pCi/g	0.71			0.34	0.6	0.1		6.8
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Lead 212	pCi/g	0.81			0.14	0.11	0.3		7.7
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Lead 214	pCi/g	1.22			0.17	0.13	1.4		28.0
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Potassium 40	pCi/g	12.8			2.2	0.4	1.0		23.6
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Radium (226)	pCi/g	1.09			0.2	0.15	1.3		35.7
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Radium 228	pCi/g	0.96			0.21	0.33	0.7		22.0
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Thallium 208	pCi/g	0.264			0.068	0.068	0.4		16.0
PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	Thorium 234	pCi/g	3.02			0.56	0.88	0.5		12.7

USACE - Buffalo District
Data Verification and Validation Report

Niagara Falls Storage Site
Pipeline Sampling
SDG #F6H180238

Data Package Summary

- The samples listed below were in the sample delivery group (work order). The samples were analyzed by Severn Trent Laboratories –St. Louis, MO for radiological analysis of:
  Isotopic uranium
  Isotopic thorium
  Radium (226 and 228)

Sample Cross Reference

	LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION
1	F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6
2	F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5
3	F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4
4	F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5
5	F6H180238001	PIPEW-C7-OCC-WW-X13-SN01-5
6	F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5
7	F6H180238008	SUMPW-C7-LEW-WW-X00-DW01-4
8	F6H180238002	SW-C7-OCC-SW-X00-SN01-1
9	F6H180238004	TSB-C7-0CC-SO-X03-SN01-7
10	F6H180238005	TSB-C7-0CC-SO-X13-SN01-6
11	F6H180238006	TSB-C7-0CC-SO-X26-UN01-6
12	F6H180238011	TSB-C7-LEW-S0-X03-SN01-6
13	F6H180238009	TSB-C7-LEW-S0-X06-AW01-5
14	F6H180238010	TSB-C7-LEW-S0-X10-AW01-6

Data Deliverables Completeness

- All required information was provided

Analytical Completeness

- Data completeness was 100%.

Analytical Deviations

Instrumentation

- All required information was provided

Batch QC Deviations

- Findings in the method blank were elevated for Th-230 for batch number: 6305381 and 6234131. Use of MARLAP (Chpt .18) numerical performance indicator value (Z Score) indicated a warning. Further evaluation using the normalized absolute difference between the MB and the samples showed no impact on the samples.

  Findings in the method blank were elevated for Th-230 for batch number: 6305382. Use of MARLAP (Chpt .18) numerical performance indicator value (Z Score) indicated a warning. Further evaluation using the normalized absolute difference between the MB and the samples justified the change of the laboratory qualifier from “J “ to “UJ”.
  Affected samples:
  PIPEW-C7-OCC-WW-X13-SN01-5
  SW-C7-OCC-SW-X00-SN01-1
  SUMPW-C7-LEW-WW-X00-DW01-4

Method blank and associated sample results:
The normalized absolute difference between the method blank and associated sample results, given by the below equation, is used in testing the null hypothesis that the sample and the method blank do not differ significantly when compared to their respective TPU. If the normalized absolute difference is greater than 2.58, one can conclude that the method blank and associated sample results differ significantly. No qualification of the data is necessary. If the normalized absolute difference is between 1.96 and 2.58 sample results are qualified "J" due to the possibility of activity in the method blank biasing sample results. If the normalized absolute difference is between 0 and 1.96, the conclusion is reached that the method blank and sample results do not differ significantly and reported results are qualified "UJ". The data was determined to be usable for its intended purpose because the blank contamination is negligible when compared to the derived concentration guideline levels (DCGLs).
Equation:
Sample-Method Blank Bias = |(S - B) / (TPU2S + TPU2B)1/2|
S = Sample result
B = Method blank result
TPUS = Total Propagated Uncertainty of the parent sample
TPUB = Total Propagated Uncertainty of the method blank

Sample Deviations

- Ra-228 samples associated with batch number: 6231036 had three samples that did not meet the required MDC. All samples were non-detect at acceptable MDCs, impact is insignificant.

- Thorium tracer yield for sample: SW-C7-OCC-SW-X00-SN01-1 was less than 50%.. Those thorium laboratory qualifiers with a “U” were changed to “UJ”.

- Soil samples in batch #6235420 analyzed for Ra 226&228 using gamma spectroscopy (GA-01-R MOD) reported all findings that recorded a value above the instruments MDC for those isotopes available in the instruments library, as was requested.

Data Usability

Based on the results of the data validation conducted by USACE-Buffalo District the data is usable for it’s intended purpose as qualified.

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6H180238001	PIPEW-C7-OCC-WW-X13-SN01-5	8/10/2006	903.0 MOD	Radium (226)	pCi/L	0.21	J	J	0.15	0.21
F6H180238001	PIPEW-C7-OCC-WW-X13-SN01-5	8/10/2006	904 MOD	Radium 228	pCi/L	0.78	U	U	0.57	0.9
F6H180238001	PIPEW-C7-OCC-WW-X13-SN01-5	8/10/2006	A-01-R MOD	Thorium 228	pCi/L	0.19	J	J	0.12	0.11
F6H180238001	PIPEW-C7-OCC-WW-X13-SN01-5	8/10/2006	A-01-R MOD	Thorium 230	pCi/L	0.178	J	U	0.098	0.055
F6H180238001	PIPEW-C7-OCC-WW-X13-SN01-5	8/10/2006	A-01-R MOD	Thorium 232	pCi/L	0.135	J	J	0.088	0.071
F6H180238001	PIPEW-C7-OCC-WW-X13-SN01-5	8/10/2006	A-01-R MOD	Uranium 234	pCi/L	5.3			1	0.04
F6H180238001	PIPEW-C7-OCC-WW-X13-SN01-5	8/10/2006	A-01-R MOD	Uranium 235	pCi/L	0.16	J	J	0.12	0.05
F6H180238001	PIPEW-C7-OCC-WW-X13-SN01-5	8/10/2006	A-01-R MOD	Uranium 238	pCi/L	4.4			0.88	0.07
F6H180238002	SW-C7-OCC-SW-X00-SN01-1	8/7/2006	903.0 MOD	Radium (226)	pCi/L	0.014	U	U	0.096	0.18
F6H180238002	SW-C7-OCC-SW-X00-SN01-1	8/7/2006	904 MOD	Radium 228	pCi/L	-0.03	U	U	0.5	0.86
F6H180238002	SW-C7-OCC-SW-X00-SN01-1	8/7/2006	A-01-R MOD	Thorium 228	pCi/L	0	U	UJ	0	0.2
F6H180238002	SW-C7-OCC-SW-X00-SN01-1	8/7/2006	A-01-R MOD	Thorium 230	pCi/L	0.24	J	J	0.16	0.15
F6H180238002	SW-C7-OCC-SW-X00-SN01-1	8/7/2006	A-01-R MOD	Thorium 232	pCi/L	0.015	U	UJ	0.044	0.09
F6H180238002	SW-C7-OCC-SW-X00-SN01-1	8/7/2006	A-01-R MOD	Uranium 234	pCi/L	0.22	J	J	0.1	0.05
F6H180238002	SW-C7-OCC-SW-X00-SN01-1	8/7/2006	A-01-R MOD	Uranium 235	pCi/L	0.027	U	U	0.047	0.037
F6H180238002	SW-C7-OCC-SW-X00-SN01-1	8/7/2006	A-01-R MOD	Uranium 238	pCi/L	0.29	J	J	0.12	0.05
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	GA-01-R MOD	Actinium 228	pCi/g	0.9			0.23	0.28
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	GA-01-R MOD	Lead 212	pCi/g	0.66			0.14	0.11
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	GA-01-R MOD	Lead 214	pCi/g	0.63			0.15	0.2
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	GA-01-R MOD	Potassium 40	pCi/g	11.6			2.5	0.9
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	GA-01-R MOD	Radium (226)	pCi/g	0.63			0.15	0.2
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	GA-01-R MOD	Radium 228	pCi/g	0.9			0.23	0.28
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	GA-01-R MOD	Thallium 208	pCi/g	0.161			0.096	0.097
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	A-01-R MOD	Thorium 228	pCi/g	0.45	J	J	0.11	0.04
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	A-01-R MOD	Thorium 230	pCi/g	0.85			0.17	0.03
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	A-01-R MOD	Thorium 232	pCi/g	0.57			0.13	0.02

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	GA-01-R MOD	Thorium 234	pCi/g	1.86			0.61	1.5
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	A-01-R MOD	Uranium 234	pCi/g	2.42			0.38	0.02
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	A-01-R MOD	Uranium 235	pCi/g	0.135	J	J	0.053	0.021
F6H180238003	SS-C7-OCC-SS-X00-SN01-0.5	8/7/2006	A-01-R MOD	Uranium 238	pCi/g	2.56			0.4	0.02
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	GA-01-R MOD	Lead 212	pCi/g	0.8			0.15	0.11
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	GA-01-R MOD	Lead 214	pCi/g	0.94			0.17	0.12
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	GA-01-R MOD	Potassium 40	pCi/g	19.2			3.2	0.7
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	GA-01-R MOD	Radium (226)	pCi/g	0.94			0.17	0.12
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	GA-01-R MOD	Radium 228	pCi/g	0.94			0.37	0.66
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	GA-01-R MOD	Thallium 208	pCi/g	0.256			0.095	0.093
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	A-01-R MOD	Thorium 228	pCi/g	0.8			0.17	0.04
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	A-01-R MOD	Thorium 230	pCi/g	0.79			0.17	0.04
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	A-01-R MOD	Thorium 232	pCi/g	0.9			0.18	0.02
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	A-01-R MOD	Uranium 234	pCi/g	0.87			0.17	0.02
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	A-01-R MOD	Uranium 235	pCi/g	0.048	J	J	0.032	0.022
F6H180238004	TSB-C7-0CC-SO-X03-SN01-7	8/8/2006	A-01-R MOD	Uranium 238	pCi/g	0.77			0.15	0.02
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	GA-01-R MOD	Actinium 228	pCi/g	0.98			0.32	0.51
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	GA-01-R MOD	Bismuth 212	pCi/g	0.83			0.47	0.82
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	GA-01-R MOD	Lead 212	pCi/g	1			0.24	0.23
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	GA-01-R MOD	Lead 214	pCi/g	0.69			0.19	0.17
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	GA-01-R MOD	Potassium 40	pCi/g	16			3.3	1.6
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	GA-01-R MOD	Radium (226)	pCi/g	0.69			0.19	0.17
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	GA-01-R MOD	Radium 228	pCi/g	0.98			0.32	0.51
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	GA-01-R MOD	Thallium 208	pCi/g	0.43			0.13	0.11
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	A-01-R MOD	Thorium 228	pCi/g	1			0.21	0.04
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	A-01-R MOD	Thorium 230	pCi/g	0.97			0.2	0.01
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	A-01-R MOD	Thorium 232	pCi/g	0.9			0.19	0.03

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	A-01-R MOD	Uranium 234	pCi/g	0.9			0.18	0.03
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	A-01-R MOD	Uranium 235	pCi/g	0.02	J	J	0.023	0.014
F6H180238005	TSB-C7-0CC-SO-X13-SN01-6	8/10/2006	A-01-R MOD	Uranium 238	pCi/g	0.94			0.18	0.03
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	GA-01-R MOD	Lead 212	pCi/g	0.79			0.19	0.16
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	GA-01-R MOD	Lead 214	pCi/g	0.93			0.19	0.13
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	GA-01-R MOD	Potassium 40	pCi/g	17.3			3.4	1
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	GA-01-R MOD	Radium (226)	pCi/g	0.93			0.19	0.13
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	GA-01-R MOD	Radium 228	pCi/g	0.94			0.4	0.72
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	GA-01-R MOD	Thallium 208	pCi/g	0.26			0.1	0.1
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	A-01-R MOD	Thorium 228	pCi/g	0.88			0.18	0.04
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	A-01-R MOD	Thorium 230	pCi/g	0.85			0.17	0.01
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	A-01-R MOD	Thorium 232	pCi/g	0.73			0.15	0.02
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	A-01-R MOD	Uranium 234	pCi/g	2.94			0.48	0.02
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	A-01-R MOD	Uranium 235	pCi/g	0.161	J	J	0.065	0.025
F6H180238006	TSB-C7-0CC-SO-X26-UN01-6	8/14/2006	A-01-R MOD	Uranium 238	pCi/g	2.65			0.44	0.02
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.65			0.22	0.24
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	GA-01-R MOD	Lead 212	pCi/g	0.72			0.21	0.22
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	GA-01-R MOD	Lead 214	pCi/g	0.75			0.18	0.17
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	GA-01-R MOD	Potassium 40	pCi/g	15.1			3.1	0.3
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	GA-01-R MOD	Radium (226)	pCi/g	0.75			0.18	0.17
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	GA-01-R MOD	Radium 228	pCi/g	0.89			0.46	0.88
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	GA-01-R MOD	Thallium 208	pCi/g	0.19			0.11	0.11
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	A-01-R MOD	Thorium 228	pCi/g	0.83			0.19	0.05
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	A-01-R MOD	Thorium 230	pCi/g	1.02			0.22	0.04
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	A-01-R MOD	Thorium 232	pCi/g	0.76			0.17	0.03
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	GA-01-R MOD	Thorium 234	pCi/g	3.3			1	1.7
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	A-01-R MOD	Uranium 234	pCi/g	4.65			0.7	0.02

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	A-01-R MOD	Uranium 235	pCi/g	0.258	J	J	0.079	0.021
F6H180238007	PIPES-C7-0CC-SL-X26-UN01-6	8/14/2006	A-01-R MOD	Uranium 238	pCi/g	4.5			0.68	0.01
F6H180238008	SUMPW-C7-LEW-WW-X00-DW01-4	8/16/2006	903.0 MOD	Radium (226)	pCi/L	0.34	J	J	0.17	0.18
F6H180238008	SUMPW-C7-LEW-WW-X00-DW01-4	8/16/2006	904 MOD	Radium 228	pCi/L	0.66	U	U	0.55	0.88
F6H180238008	SUMPW-C7-LEW-WW-X00-DW01-4	8/16/2006	A-01-R MOD	Thorium 228	pCi/L	0.14	J	J	0.11	0.12
F6H180238008	SUMPW-C7-LEW-WW-X00-DW01-4	8/16/2006	A-01-R MOD	Thorium 230	pCi/L	0.18	J	U	0.11	0.1
F6H180238008	SUMPW-C7-LEW-WW-X00-DW01-4	8/16/2006	A-01-R MOD	Thorium 232	pCi/L	0.034	U	J	0.051	0.072
F6H180238008	SUMPW-C7-LEW-WW-X00-DW01-4	8/16/2006	A-01-R MOD	Uranium 234	pCi/L	4.77			0.85	0.05
F6H180238008	SUMPW-C7-LEW-WW-X00-DW01-4	8/16/2006	A-01-R MOD	Uranium 235	pCi/L	0.28	J	J	0.13	0.06
F6H180238008	SUMPW-C7-LEW-WW-X00-DW01-4	8/16/2006	A-01-R MOD	Uranium 238	pCi/L	4.33			0.78	0.05
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	GA-01-R MOD	Lead 212	pCi/g	0.87			0.2	0.16
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	GA-01-R MOD	Lead 214	pCi/g	0.95			0.19	0.16
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	GA-01-R MOD	Potassium 40	pCi/g	22.1			3.6	0.6
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	GA-01-R MOD	Radium (226)	pCi/g	0.95			0.19	0.16
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	GA-01-R MOD	Radium 228	pCi/g	1.2			0.45	0.76
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	GA-01-R MOD	Thallium 208	pCi/g	0.293			0.098	0.095
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	A-01-R MOD	Thorium 228	pCi/g	1.08			0.22	0.05
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	A-01-R MOD	Thorium 230	pCi/g	0.96			0.2	0.04
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	A-01-R MOD	Thorium 232	pCi/g	0.87			0.19	0.03
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	A-01-R MOD	Uranium 234	pCi/g	0.9			0.2	0.03
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	A-01-R MOD	Uranium 235	pCi/g	0.034	J	J	0.034	0.018
F6H180238009	TSB-C7-LEW-S0-X06-AW01-5	8/16/2006	A-01-R MOD	Uranium 238	pCi/g	1.01			0.21	0.03
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	GA-01-R MOD	Actinium 228	pCi/g	1.13			0.32	0.4
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	GA-01-R MOD	Lead 212	pCi/g	0.91			0.25	0.21
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	GA-01-R MOD	Lead 214	pCi/g	0.84			0.21	0.18
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	GA-01-R MOD	Potassium 40	pCi/g	16.3			3.4	1.3
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	GA-01-R MOD	Radium (226)	pCi/g	0.84			0.21	0.18

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	GA-01-R MOD	Radium 228	pCi/g	1.13			0.32	0.4
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	A-01-R MOD	Thorium 228	pCi/g	0.86			0.18	0.06
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	A-01-R MOD	Thorium 230	pCi/g	0.83			0.17	0.03
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	A-01-R MOD	Thorium 232	pCi/g	0.89			0.18	0.03
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	A-01-R MOD	Uranium 234	pCi/g	0.89			0.19	0.04
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	A-01-R MOD	Uranium 235	pCi/g	0.055	J	J	0.04	0.035
F6H180238010	TSB-C7-LEW-S0-X10-AW01-6	8/17/2006	A-01-R MOD	Uranium 238	pCi/g	0.95			0.19	0.03
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	GA-01-R MOD	Lead 212	pCi/g	0.8			0.22	0.18
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	GA-01-R MOD	Lead 214	pCi/g	0.7			0.16	0.14
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	GA-01-R MOD	Potassium 40	pCi/g	17.7			3.2	0.9
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	GA-01-R MOD	Radium (226)	pCi/g	0.7			0.16	0.14
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	GA-01-R MOD	Radium 228	pCi/g	0.93			0.38	0.75
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	GA-01-R MOD	Thallium 208	pCi/g	0.37			0.13	0.11
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	A-01-R MOD	Thorium 228	pCi/g	0.86			0.18	0.04
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	A-01-R MOD	Thorium 230	pCi/g	0.8			0.17	0.03
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	A-01-R MOD	Thorium 232	pCi/g	0.74			0.16	0.02
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	A-01-R MOD	Uranium 234	pCi/g	0.69			0.15	0.03
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	A-01-R MOD	Uranium 235	pCi/g	0.022	U	U	0.025	0.031
F6H180238011	TSB-C7-LEW-S0-X03-SN01-6	8/15/2006	A-01-R MOD	Uranium 238	pCi/g	0.73			0.15	0.02
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	GA-01-R MOD	Lead 210	pCi/g	3.7			2.3	2.4
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	GA-01-R MOD	Lead 212	pCi/g	1.19			0.3	0.21
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	GA-01-R MOD	Lead 214	pCi/g	1.33			0.25	0.2
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	GA-01-R MOD	Potassium 40	pCi/g	28.7			4.7	1.4
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	GA-01-R MOD	Radium (226)	pCi/g	1.33			0.25	0.2
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	GA-01-R MOD	Radium 228	pCi/g	1.24			0.74	1.1
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	GA-01-R MOD	Thallium 208	pCi/g	0.5			0.14	0.12
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	A-01-R MOD	Thorium 228	pCi/g	1.3			0.26	0.06

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	A-01-R MOD	Thorium 230	pCi/g	1.36			0.27	0.03
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	A-01-R MOD	Thorium 232	pCi/g	1.24			0.25	0.02
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	A-01-R MOD	Uranium 234	pCi/g	1.27			0.24	0.03
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	A-01-R MOD	Uranium 235	pCi/g	0.108	J	J	0.054	0.037
F6H180238012	PIPES-C7-LEW-SL-X03-SN01-5.5	8/15/2006	A-01-R MOD	Uranium 238	pCi/g	1.34			0.25	0.03
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	GA-01-R MOD	Actinium 228	pCi/g	1.73			0.41	0.46
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	GA-01-R MOD	Bismuth 214	pCi/g	1.4			0.34	0.26
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	GA-01-R MOD	Lead 212	pCi/g	1.11			0.24	0.22
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	GA-01-R MOD	Lead 214	pCi/g	1.51			0.3	0.28
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	GA-01-R MOD	Potassium 40	pCi/g	13.5			3.1	0.4
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	GA-01-R MOD	Radium (226)	pCi/g	1.51			0.3	0.28
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	GA-01-R MOD	Radium 228	pCi/g	1.73			0.41	0.46
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	GA-01-R MOD	Thallium 208	pCi/g	0.46			0.18	0.16
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	A-01-R MOD	Thorium 228	pCi/g	1.25			0.26	0.06
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	A-01-R MOD	Thorium 230	pCi/g	1.61			0.31	0.04
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	A-01-R MOD	Thorium 232	pCi/g	1.05			0.22	0.02
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	GA-01-R MOD	Thorium 234	pCi/g	3.2			1.2	2.3
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	A-01-R MOD	Uranium 234	pCi/g	5.74			0.89	0.03
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	A-01-R MOD	Uranium 235	pCi/g	0.289	J	J	0.091	0.025
F6H180238013	PIPES-C7-LEW-SL-X11-AW01-4.5	8/17/2006	A-01-R MOD	Uranium 238	pCi/g	4.98			0.78	0.02
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	GA-01-R MOD	Bismuth 214	pCi/g	3.85			0.77	0.37
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	GA-01-R MOD	Cesium 137	pCi/g	0.57			0.23	0.25
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	GA-01-R MOD	Lead 212	pCi/g	1.86			0.35	0.26
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	GA-01-R MOD	Lead 214	pCi/g	5			0.69	0.33
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	GA-01-R MOD	Potassium 40	pCi/g	11.9			2.9	1.5
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	GA-01-R MOD	Radium (226)	pCi/g	5			0.69	0.33
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	GA-01-R MOD	Radium 228	pCi/g	2.49			0.96	1.5

USACE - Buffalo District
Data Verification and Validation Report

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	GA-01-R MOD	Thallium 208	pCi/g	0.38			0.27	0.21
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	A-01-R MOD	Thorium 228	pCi/g	1.61			0.31	0.06
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	A-01-R MOD	Thorium 230	pCi/g	1.82			0.34	0.04
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	A-01-R MOD	Thorium 232	pCi/g	0.5			0.13	0.03
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	A-01-R MOD	Uranium 234	pCi/g	2.13			0.35	0.02
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	A-01-R MOD	Uranium 235	pCi/g	0.114	J	J	0.051	0.013
F6H180238014	PIPES-C7-LEW-SL-X07-AW01-4	8/17/2006	A-01-R MOD	Uranium 238	pCi/g	2.14			0.35	0.02

Laboratory Analytical Method	Analysis by:
903.0 MOD	Gas Flow Proportional Counting (GFPC)
A-01-R MOD	Alpha Spectronomy
904 MOD	Gas Flow Proportional Counting (GFPC)
GA-01-R MOD	Gamma Spectronomy

USACE - Buffalo District
Data Verification and Validation Form

Verification and Validation Cover Sheet

Project: Niagara Falls Storage Site/LOOW Pipe Line Sampling
Job/Contract/P.O.#: DACW49-03-D-0003 (Cabrera)

SDG No.: F6H180238

Laboratory Identification: STL - St.Louis
Address (City/State): St.Louis, MO

Contractor Identification: Cabrera
Address (City/State): East Hartford , CT

Validation Requirements Based On: QAPP RI at NFSS (Sept.1999)

Date of Sample Reciept: 18-Aug-06
Date of Data Package: 7-Sep-06
Completeness: 100 (Must be > 90%)

Verification by: Mat Masset Date: 3-Oct-07
Validation by: Mat Masset Date: 3-Oct-07

Parameters	Instrumentation
Th-228	Alpha Spec -Th
Th-230	
Th-232	
U-234	Alpha Spec -U
U-235	
U-238	
Ra-226	Gas Flow Proportional Counting -Ra
Ra-228	
Ra-226	Gamma Spec -Ra
Ra-228	

USACE - Buffalo District
Data Verification and Validation Form

Data Package Checklist

Required Data Package Components

Chain of Custody?:	Y
COC No.:	320237, 320247
Cooler Reciept Checklist?:	Y
Sample Preservation OK?:	Y
Cover Sheet listing samples?:	Y
Case narrative including analysis problems?:	Y
Laboratory Project Manager signed narrative?:	Y
Tabulated Results?:	Y
Analytical Results for QC Samples?:	Y
Lab. Duplicates run at least once per 20 samples?:	Y
Matrix Spike/LCS Dup. run at least once per 20 samples?:	Y
Tabulation of MDLs in water?:	N
Run logs included?:	Y
10% of calculations checked by Verifier?:	Y

USACE - Buffalo District
Data Verification and Validation Form

Instrument Checklist

	Alpha Spec -Th	Alpha Spec -U	Gas Flow Proportional Counting -Ra	Gamma Spec -Ra						
Basic calibration:										
Calibration file/files identified for all detectors or listing of efficiency determination present?	Y	Y	Y	Y						
Continuing calibration:										
Efficiency control check given as percent difference from calibration?	Y	Y	Y	Y						
Control charts or other documentation of instrument background provided?	Y	Y	Y	Y						

Compliance Listing	Non-compliance details or comments
Alpha Spec -Th instrument is in compliance with requirements.	
Alpha Spec -U instrument is in compliance with requirements.	
Gas Flow Proportional Counting -Ra instrument is in compliance with requirements.	
Gamma Spec -Ra instrument is in compliance with requirements.	

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	MATRIX	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Lab QUALIFIERS	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score / Norm.Abs.Diff.	Detected	Certainty > than Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment:
F6H180238001	SO	PIPEW-C7-OCC-WW-X13-SN01-5	LI	8/10/2006	903.0 MOD -GFPC	Radium (226)	pCi/L	0.21	J	J	0.15	0.21	6231034				Y	N						
F6H180238002	SO	SW-C7-OCC-SW-X00-SN01-1	LI	8/7/2006		Radium (226)	pCi/L	0.014	U	U	0.096	0.18	6231034				N	Y						
F6H180238008	SO	SUMPW-C7-LEW-WW-X00-DW01-4	LI	8/16/2006		Radium (226)	pCi/L	0.34	J	J	0.17	0.18	6231034				Y	N						
F6H190000034B	BM	LABQC	LI	8/10/2006		Radium (226)	pCi/L	0.086	U		0.091	0.14	6231034		0.9		N	Y						
F6H190000034C	LCS	LABQC	LI	8/10/2006		Radium (226)	pCi/L	10.2			1.2	0.1	6231034	11	0.8		Y	N	91	54-134	**8.2**		91.1	
F6H190000034L	LCSD	LABQC	LI	8/10/2006		Radium (226)	pCi/L	9.4			1.1	0.2	6231034	11	1.6	0.49	Y	N	84	54-134	8	40	83.9	
F6H180238001	SO	PIPEW-C7-OCC-WW-X13-SN01-5	LI	8/10/2006	904 MOD -GFPC	Radium 228	pCi/L	0.78	U	U	0.57	0.9	6231036				N	N						
F6H180238002	SO	SW-C7-OCC-SW-X00-SN01-1	LI	8/7/2006		Radium 228	pCi/L	-0.03	U	U	0.5	0.86	6231036				N	Y						
F6H180238008	SO	SUMPW-C7-LEW-WW-X00-DW01-4	LI	8/16/2006		Radium 228	pCi/L	0.66	U	U	0.55	0.88	6231036				N	N						
F6H190000036B	BM	LABQC	LI	8/10/2006		Radium 228	pCi/L	0.47	U		0.39	0.62	6231036		1.2		N	N		N				
F6H190000036C	LCS	LABQC	LI	8/10/2006		Radium 228	pCi/L	4.09			0.74	0.82	6231036	4.7	0.8		Y	N	87	61-138	**30**		87.0	
F6H190000036L	LCSD	LABQC	LI	8/10/2006		Radium 228	pCi/L	5.53			0.83	0.68	6231036	4.7	1.0	1.29	Y	N	118	61-138	30	40	117.7	
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006	A-01-R MOD - Alpha Spec.	Thorium 228	pCi/g	0.45	J	J	0.11	0.04	6234131				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Thorium 230	pCi/g	0.85			0.17	0.03	6234131			4.50	Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Thorium 232	pCi/g	0.57			0.13	0.02	6234131				Y	N						
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Thorium 228	pCi/g	0.54			0.13	0.04	6234131		0.53		Y	N			17	**40**	**18.2**	
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Thorium 230	pCi/g	0.74			0.16	0.02	6234131		0.47	4.10	Y	N			13	**40**	**13.8**	
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Thorium 232	pCi/g	0.58			0.13	0.03	6234131		0.05		Y	N			3	**40**	**1.7**	
F6H180238004	SO	TSB-C7-OCC-SO-X03-SN01-7	SO	8/8/2006		Thorium 228	pCi/g	0.8			0.17	0.04	6234131				Y	N						
F6H180238004	SO	TSB-C7-OCC-SO-X03-SN01-7	SO	8/8/2006		Thorium 230	pCi/g	0.79			0.17	0.04	6234131			4.16	Y	N						
F6H180238004	SO	TSB-C7-OCC-SO-X03-SN01-7	SO	8/8/2006		Thorium 232	pCi/g	0.9			0.18	0.02	6234131				Y	N						
F6H180238005	SO	TSB-C7-OCC-SO-X13-SN01-6	SO	8/10/2006		Thorium 228	pCi/g	1			0.21	0.04	6234131				Y	N						
F6H180238005	SO	TSB-C7-OCC-SO-X13-SN01-6	SO	8/10/2006		Thorium 230	pCi/g	0.97			0.2	0.01	6234131			4.44	Y	N						
F6H180238005	SO	TSB-C7-OCC-SO-X13-SN01-6	SO	8/10/2006		Thorium 232	pCi/g	0.9			0.19	0.03	6234131				Y	N						
F6H180238006	SO	TSB-C7-OCC-SO-X26-UN01-6	SO	8/14/2006		Thorium 228	pCi/g	0.88			0.18	0.04	6234131				Y	N						
F6H180238006	SO	TSB-C7-OCC-SO-X26-UN01-6	SO	8/14/2006		Thorium 230	pCi/g	0.85			0.17	0.01	6234131			4.50	Y	N						
F6H180238006	SO	TSB-C7-OCC-SO-X26-UN01-6	SO	8/14/2006		Thorium 232	pCi/g	0.73			0.15	0.02	6234131				Y	N						
F6H180238007	SO	PIPES-C7-OCC-SL-X26-UN01-6	SO	8/14/2006		Thorium 228	pCi/g	0.83			0.19	0.05	6234131				Y	N						
F6H180238007	SO	PIPES-C7-OCC-SL-X26-UN01-6	SO	8/14/2006		Thorium 230	pCi/g	1.02			0.22	0.04	6234131			4.27	Y	N						
F6H180238007	SO	PIPES-C7-OCC-SL-X26-UN01-6	SO	8/14/2006		Thorium 232	pCi/g	0.76			0.17	0.03	6234131				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Thorium 228	pCi/g	1.08			0.22	0.05	6234131				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Thorium 230	pCi/g	0.96			0.2	0.04	6234131			4.39	Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Thorium 232	pCi/g	0.87			0.19	0.03	6234131				Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Thorium 228	pCi/g	0.86			0.18	0.06	6234131				Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Thorium 230	pCi/g	0.83			0.17	0.03	6234131			4.39	Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Thorium 232	pCi/g	0.89			0.18	0.03	6234131				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Thorium 228	pCi/g	0.86			0.18	0.04	6234131				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Thorium 230	pCi/g	0.8			0.17	0.03	6234131			4.22	Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Thorium 232	pCi/g	0.74			0.16	0.02	6234131				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Thorium 228	pCi/g	1.3			0.26	0.06	6234131				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Thorium 230	pCi/g	1.36			0.27	0.03	6234131			4.74	Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Thorium 232	pCi/g	1.24			0.25	0.02	6234131				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Thorium 228	pCi/g	1.25			0.26	0.06	6234131				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Thorium 230	pCi/g	1.61			0.31	0.04	6234131			4.94	Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Thorium 232	pCi/g	1.05			0.22	0.02	6234131				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Thorium 228	pCi/g	1.61			0.31	0.06	6234131				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Thorium 230	pCi/g	1.82			0.34	0.04	6234131			5.12	Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Thorium 232	pCi/g	0.5			0.13	0.03	6234131				Y	N						
F6H220000131B	BM	LABQC	SO	8/7/2006		Thorium 228	pCi/g	0.029	U		0.028	0.03	6234131		1.0		N	N						
F6H220000131B	BM	LABQC	SO	8/7/2006		Thorium 230	pCi/g	**0.069**	J		0.034	0.02	6234131		**2.0**		Y	N						
F6H220000131B	BM	LABQC	SO	8/7/2006		Thorium 232	pCi/g	-0.001	U		0.0086	0.02	6234131		-0.1		N	Y						
F6H220000131C	LCS	LABQC	SO	8/7/2006		Thorium 230	pCi/g	60.7			9.1	0.3	6234131	59	0.2		Y	N	104	68-128			103.8	
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006	A-01-R MOD - Alpha Spec.	Uranium 234	pCi/g	2.42			0.38	0.02	6234132				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Uranium 235	pCi/g	0.135	J	J	0.053	0.02	6234132				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Uranium 238	pCi/g	2.56			0.4	0.02	6234132				Y	N						
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Uranium 234	pCi/g	2.44			0.41	0.01	6234132				Y	N			0.9	**40**	**0.8**	
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Uranium 235	pCi/g	0.081	J	J	0.045	0.02	6234132				Y	N			**50**	**40**	**50.0**	
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Uranium 238	pCi/g	2.79			0.46	0.02	6234132				Y	N			9	**40**	**8.6**	
F6H180238004	SO	TSB-C7-OCC-SO-X03-SN01-7	SO	8/8/2006		Uranium 234	pCi/g	0.87			0.17	0.02	6234132				Y	N						
F6H180238004	SO	TSB-C7-OCC-SO-X03-SN01-7	SO	8/8/2006		Uranium 235	pCi/g	0.048	J	J	0.032	0.02	6234132				Y	N						
F6H180238004	SO	TSB-C7-OCC-SO-X03-SN01-7	SO	8/8/2006		Uranium 238	pCi/g	0.77			0.15	0.02	6234132				Y	N						
F6H180238005	SO	TSB-C7-OCC-SO-X13-SN01-6	SO	8/10/2006		Uranium 234	pCi/g	0.9			0.18	0.03	6234132				Y	N						
F6H180238005	SO	TSB-C7-OCC-SO-X13-SN01-6	SO	8/10/2006		Uranium 235	pCi/g	0.02	J	J	0.023	0.01	6234132				Y	Y						
F6H180238005	SO	TSB-C7-OCC-SO-X13-SN01-6	SO	8/10/2006		Uranium 238	pCi/g	0.94			0.18	0.03	6234132				Y	N						
F6H180238006	SO	TSB-C7-OCC-SO-X26-UN01-6	SO	8/14/2006		Uranium 234	pCi/g	2.94			0.48	0.02	6234132				Y	N						
F6H180238006	SO	TSB-C7-OCC-SO-X26-UN01-6	SO	8/14/2006		Uranium 235	pCi/g	0.161	J	J	0.065	0.03	6234132				Y	N						
F6H180238006	SO	TSB-C7-OCC-SO-X26-UN01-6	SO	8/14/2006		Uranium 238	pCi/g	2.65			0.44	0.02	6234132				Y	N						
F6H180238007	SO	PIPES-C7-OCC-SL-X26-UN01-6	SO	8/14/2006		Uranium 234	pCi/g	4.65			0.7	0.02	6234132				Y	N						
F6H180238007	SO	PIPES-C7-OCC-SL-X26-UN01-6	SO	8/14/2006		Uranium 235	pCi/g	0.258	J	J	0.079	0.02	6234132				Y	N						
F6H180238007	SO	PIPES-C7-OCC-SL-X26-UN01-6	SO	8/14/2006		Uranium 238	pCi/g	4.5			0.68	0.01	6234132				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Uranium 234	pCi/g	0.9			0.2	0.03	6234132				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Uranium 235	pCi/g	0.034	J	J	0.034	0.02	6234132				Y	Y						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Uranium 238	pCi/g	1.01			0.21	0.03	6234132				Y	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	MATRIX	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Lab QUALIFIERS	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score / Norm Abs.Diff.	Detected	Certainty > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment:
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006	A-01-R MOD -Alpha Spec.	Uranium 234	pCi/g	0.89			0.19	0.04	6234132				Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Uranium 235	pCi/g	0.055	J	J	0.04	0.04	6234132				Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Uranium 238	pCi/g	0.95			0.19	0.03	6234132				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Uranium 234	pCi/g	0.69			0.15	0.03	6234132				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Uranium 235	pCi/g	0.022	U	U	0.025	0.03	6234132				N	Y						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Uranium 238	pCi/g	0.73			0.15	0.02	6234132				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Uranium 234	pCi/g	1.27			0.24	0.03	6234132				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Uranium 235	pCi/g	0.108	J	J	0.054	0.04	6234132				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Uranium 238	pCi/g	1.34			0.25	0.03	6234132				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Uranium 234	pCi/g	5.74			0.89	0.03	6234132				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Uranium 235	pCi/g	0.289	J	J	0.091	0.03	6234132				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Uranium 238	pCi/g	4.98			0.78	0.02	6234132				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Uranium 234	pCi/g	2.13			0.35	0.02	6234132				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Uranium 235	pCi/g	0.114	J	J	0.051	0.01	6234132				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Uranium 238	pCi/g	2.14			0.35	0.02	6234132				Y	N						
F6H220000132B	**BM**	LABQC	SO	8/7/2006		Uranium 234	pCi/g	0.019	U		0.019	0.02	6234132		1.0		N	Y		**N**				
F6H220000132B	**BM**	LABQC	SO	8/7/2006		Uranium 235	pCi/g	-0.005	U		0.013	0.03	6234132		-0.4		N	Y		**N**				
F6H220000132B	**BM**	LABQC	SO	8/7/2006		Uranium 238	pCi/g	0.0009	U		0.014	0.03	6234132		0.1		N	Y		**N**				
F6H220000132C	**LCS**	LABQC	SO	8/7/2006		Uranium 234	pCi/g	17.7			3.1	0.2	6234132	20	0.6		Y	N	90	75-125	90		90.3	
F6H220000132C	**LCS**	LABQC	SO	8/7/2006		Uranium 238	pCi/g	16.8			2.9	0.3	6234132	20	1.0		Y	N	86	75-122	86		85.7	
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006	GA-01-R MOD -Gamma Spec	Actinium 228	pCi/g	0.9			0.23	0.28	6235420				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Lead 212	pCi/g	0.66			0.14	0.11	6235420				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Lead 214	pCi/g	0.63			0.15	0.2	6235420				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Potassium 40	pCi/g	11.6			2.5	0.9	6235420				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Radium (226)	pCi/g	0.63			0.15	0.2	6235420				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Radium 228	pCi/g	0.9			0.23	0.28	6235420				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Thallium 208	pCi/g	0.161			0.096	0.1	6235420				Y	N						
F6H180238003	SO	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Thorium 234	pCi/g	1.86			0.61	1.5	6235420				Y	N						
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Lead 212	pCi/g	0.57			0.13	0.12	6235420		0.47		Y	N			13		**14.6**	
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Lead 214	pCi/g	0.48			0.12	0.14	6235420		0.78		Y	N			27		**27.0**	
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Potassium 40	pCi/g	13.5			2.7	1	6235420		0.52		Y	N			15		**15.1**	
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Radium (226)	pCi/g	0.48	J	J	0.12	0.14	6235420		0.78		Y	N			27		**27.0**	
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Radium 228	pCi/g	0.94			0.37	0.69	6235420		0.09		Y	N			4		**4.3**	
F6H180238003X	DUP	SS-C7-OCC-SS-X00-SN01-0.5	SO	8/7/2006		Thallium 208	pCi/g	0.239			0.092	0.08	6235420		0.59		Y	N			39		**39.0**	
F6H180238004	SO	TSB-C7-0CC-SO-X03-SN01-7	SO	8/8/2006		Lead 212	pCi/g	0.8			0.15	0.11	6235420				Y	N						
F6H180238004	SO	TSB-C7-0CC-SO-X03-SN01-7	SO	8/8/2006		Lead 214	pCi/g	0.94			0.17	0.12	6235420				Y	N						
F6H180238004	SO	TSB-C7-0CC-SO-X03-SN01-7	SO	8/8/2006		Potassium 40	pCi/g	19.2			3.2	0.7	6235420				Y	N						
F6H180238004	SO	TSB-C7-0CC-SO-X03-SN01-7	SO	8/8/2006		Radium (226)	pCi/g	0.94			0.17	0.12	6235420				Y	N						
F6H180238004	SO	TSB-C7-0CC-SO-X03-SN01-7	SO	8/8/2006		Radium 228	pCi/g	0.94			0.37	0.66	6235420				Y	N						
F6H180238004	SO	TSB-C7-0CC-SO-X03-SN01-7	SO	8/8/2006		Thallium 208	pCi/g	0.256			0.095	0.09	6235420				Y	N						
F6H180238005	SO	TSB-C7-0CC-SO-X13-SN01-6	SO	8/10/2006		Actinium 228	pCi/g	0.98			0.32	0.51	6235420				Y	N						
F6H180238005	SO	TSB-C7-0CC-SO-X13-SN01-6	SO	8/10/2006		Bismuth 212	pCi/g	0.83			0.47	0.82	6235420				Y	N						
F6H180238005	SO	TSB-C7-0CC-SO-X13-SN01-6	SO	8/10/2006		Lead 212	pCi/g	1			0.24	0.23	6235420				Y	N						
F6H180238005	SO	TSB-C7-0CC-SO-X13-SN01-6	SO	8/10/2006		Lead 214	pCi/g	0.69			0.19	0.17	6235420				Y	N						
F6H180238005	SO	TSB-C7-0CC-SO-X13-SN01-6	SO	8/10/2006		Potassium 40	pCi/g	16			3.3	1.6	6235420				Y	N						
F6H180238005	SO	TSB-C7-0CC-SO-X13-SN01-6	SO	8/10/2006		Radium (226)	pCi/g	0.69			0.19	0.17	6235420				Y	N						
F6H180238005	SO	TSB-C7-0CC-SO-X13-SN01-6	SO	8/10/2006		Radium 228	pCi/g	0.98			0.32	0.51	6235420				Y	N						
F6H180238005	SO	TSB-C7-0CC-SO-X13-SN01-6	SO	8/10/2006		Thallium 208	pCi/g	0.43			0.13	0.11	6235420				Y	N						
F6H180238006	SO	TSB-C7-0CC-SO-X26-UN01-6	SO	8/14/2006	GA-01-R MOD -Gamma Spec	Lead 212	pCi/g	0.79			0.19	0.16	6235420				Y	N						
F6H180238006	SO	TSB-C7-0CC-SO-X26-UN01-6	SO	8/14/2006		Lead 214	pCi/g	0.93			0.19	0.13	6235420				Y	N						
F6H180238006	SO	TSB-C7-0CC-SO-X26-UN01-6	SO	8/14/2006		Potassium 40	pCi/g	17.3			3.4	1	6235420				Y	N						
F6H180238006	SO	TSB-C7-0CC-SO-X26-UN01-6	SO	8/14/2006		Radium (226)	pCi/g	0.93			0.19	0.13	6235420				Y	N						
F6H180238006	SO	TSB-C7-0CC-SO-X26-UN01-6	SO	8/14/2006		Radium 228	pCi/g	0.94			0.4	0.72	6235420				Y	N						
F6H180238006	SO	TSB-C7-0CC-SO-X26-UN01-6	SO	8/14/2006		Thallium 208	pCi/g	0.26			0.1	0.1	6235420				Y	N						
F6H180238007	SO	PIPES-C7-0CC-SL-X26-UN01-6	SO	8/14/2006		Bismuth 214	pCi/g	0.65			0.22	0.24	6235420				Y	N						
F6H180238007	SO	PIPES-C7-0CC-SL-X26-UN01-6	SO	8/14/2006		Lead 212	pCi/g	0.72			0.21	0.22	6235420				Y	N						
F6H180238007	SO	PIPES-C7-0CC-SL-X26-UN01-6	SO	8/14/2006		Lead 214	pCi/g	0.75			0.18	0.17	6235420				Y	N						
F6H180238007	SO	PIPES-C7-0CC-SL-X26-UN01-6	SO	8/14/2006		Potassium 40	pCi/g	15.1			3.1	0.3	6235420				Y	N						
F6H180238007	SO	PIPES-C7-0CC-SL-X26-UN01-6	SO	8/14/2006		Radium (226)	pCi/g	0.75			0.18	0.17	6235420				Y	N						
F6H180238007	SO	PIPES-C7-0CC-SL-X26-UN01-6	SO	8/14/2006		Radium 228	pCi/g	0.89			0.46	0.88	6235420				Y	N						
F6H180238007	SO	PIPES-C7-0CC-SL-X26-UN01-6	SO	8/14/2006		Thallium 208	pCi/g	0.19			0.11	0.11	6235420				Y	N						
F6H180238007	SO	PIPES-C7-0CC-SL-X26-UN01-6	SO	8/14/2006		Thorium 234	pCi/g	3.3			1	1.7	6235420				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Lead 212	pCi/g	0.87			0.2	0.16	6235420				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Lead 214	pCi/g	0.95			0.19	0.16	6235420				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Potassium 40	pCi/g	22.1			3.6	0.6	6235420				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Radium (226)	pCi/g	0.95			0.19	0.16	6235420				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Radium 228	pCi/g	1.2			0.45	0.76	6235420				Y	N						
F6H180238009	SO	TSB-C7-LEW-S0-X06-AW01-5	SO	8/16/2006		Thallium 208	pCi/g	0.293			0.098	0.1	6235420				Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Actinium 228	pCi/g	1.13			0.32	0.4	6235420				Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Lead 212	pCi/g	0.91			0.25	0.21	6235420				Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Lead 214	pCi/g	0.84			0.21	0.18	6235420				Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Potassium 40	pCi/g	16.3			3.4	1.3	6235420				Y	N						
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006		Radium (226)	pCi/g	0.84			0.21	0.18	6235420				Y	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	MATRIX	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Lab QUALIFIERS	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score / Norm.Abs.Diff.	Detected	Certainty > than Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment:
F6H180238010	SO	TSB-C7-LEW-S0-X10-AW01-6	SO	8/17/2006	GA-01-R MOD -Gamma Spec	Radium 228	pCi/g	1.13			0.32	0.4	6235420				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Lead 212	pCi/g	0.8			0.22	0.18	6235420				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Lead 214	pCi/g	0.7			0.16	0.14	6235420				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Potassium 40	pCi/g	17.7			3.2	0.9	6235420				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Radium (226)	pCi/g	0.7			0.16	0.14	6235420				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Radium 228	pCi/g	0.93			0.38	0.75	6235420				Y	N						
F6H180238011	SO	TSB-C7-LEW-S0-X03-SN01-6	SO	8/15/2006		Thallium 208	pCi/g	0.37			0.13	0.11	6235420				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Lead 210	pCi/g	3.7			2.3	2.4	6235420				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Lead 212	pCi/g	1.19			0.3	0.21	6235420				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Lead 214	pCi/g	1.33			0.25	0.2	6235420				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Potassium 40	pCi/g	28.7			4.7	1.4	6235420				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Radium (226)	pCi/g	1.33			0.25	0.2	6235420				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Radium 228	pCi/g	1.24			0.74	1.1	6235420				Y	N						
F6H180238012	SO	PIPES-C7-LEW-SL-X03-SN01-5.5	SO	8/15/2006		Thallium 208	pCi/g	0.5			0.14	0.12	6235420				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Actinium 228	pCi/g	1.73			0.41	0.46	6235420				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Bismuth 214	pCi/g	1.4			0.34	0.26	6235420				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Lead 212	pCi/g	1.11			0.24	0.22	6235420				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Lead 214	pCi/g	1.51			0.3	0.28	6235420				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Potassium 40	pCi/g	13.5			3.1	0.4	6235420				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Radium (226)	pCi/g	1.51			0.3	0.28	6235420				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Radium 228	pCi/g	1.73			0.41	0.46	6235420				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Thallium 208	pCi/g	0.46			0.18	0.16	6235420				Y	N						
F6H180238013	SO	PIPES-C7-LEW-SL-X11-AW01-4.5	SO	8/17/2006		Thorium 234	pCi/g	3.2			1.2	2.3	6235420				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006	GA-01-R MOD -Gamma Spec	Bismuth 214	pCi/g	3.85			0.77	0.37	6235420				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Cesium 137	pCi/g	0.57			0.23	0.25	6235420				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Lead 212	pCi/g	1.86			0.35	0.26	6235420				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Lead 214	pCi/g	5			0.69	0.33	6235420				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Potassium 40	pCi/g	11.9			2.9	1.5	6235420				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Radium (226)	pCi/g	5			0.69	0.33	6235420				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Radium 228	pCi/g	2.49			0.96	1.5	6235420				Y	N						
F6H180238014	SO	PIPES-C7-LEW-SL-X07-AW01-4	SO	8/17/2006		Thallium 208	pCi/g	0.38			0.27	0.21	6235420				Y	N						
F6H230000420B	BM	LABQC	SO	8/7/2006		Radium (226)	pCi/g	0.068	U		0.052	0.12	6235420		1.3		N	N						
F6H230000420B	BM	LABQC	SO	8/7/2006		Radium 228	pCi/g	0.13	U		0.17	0.36	6235420		0.8		N	Y						
F6H230000420C	LCS	LABQC	SO	8/7/2006		Radium (226)	pCi/g	12.6			1.5	0.5	6235420	12	0.3		Y	N	103	75-108			103.3	
F6H230000420C	LCS	LABQC	SO	8/7/2006		Thorium 232	pCi/g	10.7			1.4	0.9	6235420	9.5	0.9		Y	N	113	77-125			112.6	
F6H180238001	SO	PIPEW-C7-OCC-WW-X13-SN01-5	LI	8/10/2006	A-01-R MOD -Alpha Spec.	Uranium 234	pCi/L	5.3			1	0.04	6236381				Y	N						
F6H180238001	SO	PIPEW-C7-OCC-WW-X13-SN01-5	LI	8/10/2006		Uranium 235	pCi/L	0.16	J	**J**	0.12	0.05	6236381				Y	N						
F6H180238001	SO	PIPEW-C7-OCC-WW-X13-SN01-5	LI	8/10/2006		Uranium 238	pCi/L	4.4			0.88	0.07	6236381				Y	N						
F6H180238002	SO	SW-C7-OCC-SW-X00-SN01-1	LI	8/7/2006		Uranium 234	pCi/L	0.22	J	**J**	0.1	0.05	6236381				Y	N						
F6H180238002	SO	SW-C7-OCC-SW-X00-SN01-1	LI	8/7/2006		Uranium 235	pCi/L	0.027	U	**U**	0.047	0.04	6236381				N	Y						
F6H180238002	SO	SW-C7-OCC-SW-X00-SN01-1	LI	8/7/2006		Uranium 238	pCi/L	0.29	J	**J**	0.12	0.05	6236381				Y	N						
F6H180238008	SO	SUMPW-C7-LEW-WW-X00-DW01-4	LI	8/16/2006		Uranium 234	pCi/L	4.77			0.85	0.05	6236381				Y	N						
F6H180238008	SO	SUMPW-C7-LEW-WW-X00-DW01-4	LI	8/16/2006		Uranium 235	pCi/L	0.28	J	**J**	0.13	0.06	6236381				Y	N						
F6H180238008	SO	SUMPW-C7-LEW-WW-X00-DW01-4	LI	8/16/2006		Uranium 238	pCi/L	4.33			0.78	0.05	6236381				Y	N						
F6H240000381B	BM	LABQC	LI	8/10/2006		Uranium 234	pCi/L	0.028	U		0.039	0.05	6236381		0.7		N	Y						
F6H240000381B	BM	LABQC	LI	8/10/2006		Uranium 235	pCi/L	0	U		0	0.04	6236381		0.0		N	Y						
F6H240000381B	BM	LABQC	LI	8/10/2006		Uranium 238	pCi/L	-0.004	U		0.025	0.05	6236381		-0.2		N	Y						
F6H240000381C	LCS	LABQC	LI	8/10/2006		Uranium 234	pCi/L	2.77			0.5	0.05	6236381	3.3			Y	N	84	82-122			84.5	
F6H240000381C	LCS	LABQC	LI	8/10/2006		Uranium 238	pCi/L	3.23			0.57	0.04	6236381	3.4			Y	N	95	82-121			94.7	
F6H240000381L	LCSD	LABQC	LI	8/10/2006		Uranium 234	pCi/L	3.71			0.69	0.05	6236381	3.3			Y	N	113	82-122	29	40	113.1	
F6H240000381L	LCSD	LABQC	LI	8/10/2006		Uranium 238	pCi/L	3.7			0.69	0.03	6236381	3.4			Y	N	108	82-121	14	40	108.5	
F6H180238001	SO	PIPEW-C7-OCC-WW-X13-SN01-5	LI	8/10/2006	A-01-R MOD -Alpha Spec.	Thorium 228	pCi/L	0.19	J	**J**	0.12	0.11	6236382				Y	N						
F6H180238001	SO	PIPEW-C7-OCC-WW-X13-SN01-5	LI	8/10/2006		Thorium 230	pCi/L	0.178	J	**UJ**	0.098	0.06	6236382			**0.10**	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6H180238001	SO	PIPEW-C7-OCC-WW-X13-SN01-5	LI	8/10/2006		Thorium 232	pCi/L	0.135	J	**J**	0.088	0.07	6236382				Y	N						
F6H180238002	SO	SW-C7-OCC-SW-X00-SN01-1	LI	8/7/2006		Thorium 228	pCi/L	0	U	**UJ**	0	0.2	6236382				N	Y						Low tracer recovery
F6H180238002	SO	SW-C7-OCC-SW-X00-SN01-1	LI	8/7/2006		Thorium 230	pCi/L	0.24	J	**UJ**	0.16	0.15	6236382			**0.27**	Y	N						Low tracer recovery and Possible bias from isotope in MB (Normaized Absoulte Difference <1.96)
F6H180238002	SO	SW-C7-OCC-SW-X00-SN01-1	LI	8/7/2006		Thorium 232	pCi/L	0.015	U	**UJ**	0.044	0.09	6236382				N	Y						Low tracer recovery
F6H180238008	SO	SUMPW-C7-LEW-WW-X00-DW01-4	LI	8/16/2006		Thorium 228	pCi/L	0.14	J	**J**	0.11	0.12	6236382				Y	N						
F6H180238008	SO	SUMPW-C7-LEW-WW-X00-DW01-4	LI	8/16/2006		Thorium 230	pCi/L	0.18	J	**UJ**	0.11	0.1	6236382			**0.08**	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6H180238008	SO	SUMPW-C7-LEW-WW-X00-DW01-4	LI	8/16/2006		Thorium 232	pCi/L	0.034	U	**U**	0.051	0.07	6236382				N	Y						
F6H240000382B	BM	LABQC	LI	8/10/2006		Thorium 228	pCi/L	0.002	U		0.063	0.1	6236382		0.0		N	Y						
F6H240000382B	BM	LABQC	LI	8/10/2006		Thorium 230	pCi/L	**0.191**	J		0.086	0.05	6236382		**2.2**		Y	N						
F6H240000382B	BM	LABQC	LI	8/10/2006		Thorium 232	pCi/L	0.004	U		0.021	0.05	6236382		0.2		N	Y						
F6H240000382C	LCS	LABQC	LI	8/10/2006		Thorium 230	pCi/L	2.72			0.48	0.07	6236382	2.1	1.4		Y	N	132	62-137	8.8		132.0	
F6H240000382L	LCSD	LABQC	LI	8/10/2006		Thorium 230	pCi/L	2.49			0.46	0.05	6236382	2.1	0.9	0.35	Y	N	121	62-137	9	40	120.9	

USACE - Buffalo District
Data Verification and Validation Report

Niagara Falls Storage Site
Pipeline Sampling
SDG #F6I070255

Data Package Summary

- The samples listed below were in the sample delivery group (work order). The samples were analyzed by Severn Trent Laboratories –St. Louis, MO for radiological analysis of:
  Isotopic uranium
  Isotopic thorium
  Radium (226 and 228)

Sample Cross Reference

	LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION
1	F6I070225001	SUMPW-C7-LEW-WW-X00-AN-12
2	F6I070225002	SUMPW-C7-LEW-WW-X00-DW05-10
3	F6I070225003	SUMPW-C7-LEW-WW-X00-DW03-7
4	F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16
5	F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15
6	F6I070225006	SD-C7-LEW-SL-X00-DW04-1
7	F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5
8	F6I070225008	SB-C7-OCC-SD-X00-SN01-2

Data Deliverables Completeness

- All required information was provided

Analytical Completeness

- Data completeness was 100%.

Analytical Deviations

Instrumentation

- All required information was provided

Batch QC Deviations

- Findings in the method blank were slightly elevated over their respective MDC for Th-230 &232 for batch number: 6254557. Use of MARLAP (Chpt .18) numerical performance indicator value (Z Score)

had a score less than 2 (no action). Findings for Th-230&232 using the normalized absolute difference between the MB and the sample justified the change of the laboratory qualifier from “J “ to “UJ”.
Affected sample:
SUMPW-C7-LEW-WW-X00-DW05-10

- Findings in the method blank were slightly elevated over MDC for Th-230 for batch number: 6257376. Use of MARLAP (Chpt .18) numerical performance indicator value (Z Score) had a score less than 2 (no action). Findings for Th-230 using the normalized absolute difference between the MB and the sample were greater than 2.58 (no action), impact is minimal.

Method blank and associated sample results:
The normalized absolute difference between the method blank and associated sample results, given by the below equation, is used in testing the null hypothesis that the sample and the method blank do not differ significantly when compared to their respective TPU. If the normalized absolute difference is greater than 2.58, one can conclude that the method blank and associated sample results differ significantly. No qualification of the data is necessary. If the normalized absolute difference is between 1.96 and 2.58 sample results are qualified "J" due to the possibility of activity in the method blank biasing sample results. If the normalized absolute difference is between 0 and 1.96, the conclusion is reached that the method blank and sample results do not differ significantly and reported results are qualified "UJ". The data was determined to be usable for its intended purpose because the blank contamination is negligible when compared to the derived concentration guideline levels (DCGLs).
Equation:
Sample-Method Blank Bias = |(S - B) / (TPU2S + TPU2B)1/2|
S = Sample result
B = Method blank result
TPUS = Total Propagated Uncertainty of the parent sample
TPUB = Total Propagated Uncertainty of the method blank

Sample Deviations

- Thorium tracer yield for sample: SUMPW-C7-LEW-WW-X00-DW05-10 was less than 50%. Those thorium laboratory qualifiers with a “U” were changed to “UJ” for possible biased low result.

- Soil samples in batches #6251184, 6257376 and 6257378 were analyzed for Ra 226&228 using gamma spectroscopy (GA-01-R MOD) reported all findings that recorded a value above the instruments MDC for those isotopes available in the instruments library, as was requested.

Data Usability

Based on the results of the data validation conducted by USACE-Buffalo District the data is usable for it's intended purpose as qualified.

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY
F6I070225001	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	903.0 MOD	Radium (226)	pCi/L	0.16	U	U	0.13
F6I070225001	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	904 MOD	Radium 228	pCi/L	0.66	U	U	0.57
F6I070225001	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	A-01-R MOD	Uranium 234	pCi/L	1.44			0.3
F6I070225001	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	A-01-R MOD	Uranium 235	pCi/L	0.075	J	J	0.062
F6I070225001	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	A-01-R MOD	Uranium 238	pCi/L	1.13			0.26
F6I070225001REA	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	A-01-R MOD	Thorium 228	pCi/L	0.09	U	U	0.15
F6I070225001REA	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	A-01-R MOD	Thorium 230	pCi/L	0.3	J	J	0.17
F6I070225001REA	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	A-01-R MOD	Thorium 232	pCi/L	-0.02	U	U	0.061
F6I070225002	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006	903.0 MOD	Radium (226)	pCi/L	0.07	U	U	0.15
F6I070225002	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006	904 MOD	Radium 228	pCi/L	0.22	U	U	0.56
F6I070225002	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006	A-01-R MOD	Thorium 228	pCi/L	0.05	U	UJ	0.11
F6I070225002	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006	A-01-R MOD	Thorium 230	pCi/L	0.099	J	UJ	0.098
F6I070225002	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006	A-01-R MOD	Thorium 232	pCi/L	-0.01	U	UJ	0.047
F6I070225002	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006	A-01-R MOD	Uranium 234	pCi/L	0.73			0.19
F6I070225002	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006	A-01-R MOD	Uranium 235	pCi/L	0.018	U	U	0.031
F6I070225002	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006	A-01-R MOD	Uranium 238	pCi/L	0.68			0.18
F6I070225003	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006	903.0 MOD	Radium (226)	pCi/L	0.13	U	U	0.14
F6I070225003	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006	904 MOD	Radium 228	pCi/L	0.3	U	U	0.57
F6I070225003	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006	A-01-R MOD	Uranium 234	pCi/L	0.125	J	J	0.08
F6I070225003	SUMPW-C7-LEW-WW-X00-DW03-	8/31/2006	A-01-R MOD	Uranium 235	pCi/L	0.014	U	U	0.041

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY
	7								
F6I070225003	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006	A-01-R MOD	Uranium 238	pCi/L	0.168	J	J	0.095
F6I070225003REA	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006	A-01-R MOD	Thorium 228	pCi/L	0.02	U	U	0.12
F6I070225003REA	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006	A-01-R MOD	Thorium 230	pCi/L	0.14	U	U	0.14
F6I070225003REA	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006	A-01-R MOD	Thorium 232	pCi/L	0.017	U	U	0.05
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Actinium 228	pCi/g	0.46			0.13
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Bismuth 214	pCi/g	1.67			0.24
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Lead 210	pCi/g	2.22			0.58
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Lead 212	pCi/g	0.393			0.085
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Lead 214	pCi/g	1.73			0.22
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Potassium 40	pCi/g	8.8			1.6
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Radium (226)	pCi/g	1.67			0.24
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Radium 228	pCi/g	0.46	J	J	0.13
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Thallium 208	pCi/g	0.174			0.05
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	A-01-R MOD	Thorium 228	pCi/g	0.59			0.15
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	A-01-R MOD	Thorium 230	pCi/g	2.38			0.44
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	A-01-R MOD	Thorium 232	pCi/g	0.65			0.16
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Thorium 234	pCi/g	5.36			0.81
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	A-01-R MOD	Uranium 234	pCi/g	13			2.2
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD	Uranium 235	pCi/g	0.47			0.14
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	A-01-R MOD	Uranium 235	pCi/g	0.63			0.18
F6I070225004	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	A-01-R MOD	Uranium 238	pCi/g	13			2.2
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Actinium 228	pCi/g	1.18			0.31
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Bismuth 214	pCi/g	1.8			0.32
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Cesium 137	pCi/g	1.2			0.23

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Lead 210	pCi/g	4.8			1.1
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Lead 212	pCi/g	1.05			0.19
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Lead 214	pCi/g	1.77			0.25
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Potassium 40	pCi/g	7.8			1.8
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Protactinium 234M	pCi/g	38			12
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Radium (226)	pCi/g	1.8			0.32
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Radium 228	pCi/g	1.18			0.31
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Thallium 208	pCi/g	0.26			0.087
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	A-01-R MOD	Thorium 228	pCi/g	0.95			0.24
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	A-01-R MOD	Thorium 230	pCi/g	2.69			0.52
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	A-01-R MOD	Thorium 232	pCi/g	0.97			0.24
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	GA-01-R MOD	Thorium 234	pCi/g	30.2			4.1
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	A-01-R MOD	Uranium 234	pCi/g	30			4.8
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	A-01-R MOD	Uranium 235	pCi/g	1.56			0.37
F6I070225005	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006	A-01-R MOD	Uranium 238	pCi/g	29.4			4.7
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	GA-01-R MOD	Actinium 228	pCi/g	0.327			0.057
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.339			0.054
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	GA-01-R MOD	Lead 212	pCi/g	0.372			0.056
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	GA-01-R MOD	Lead 214	pCi/g	0.345			0.048
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	GA-01-R MOD	Potassium 40	pCi/g	8.6			1.2
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	GA-01-R MOD	Radium (226)	pCi/g	0.339	J	J	0.054
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	GA-01-R MOD	Radium 228	pCi/g	0.327	J	J	0.057
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	GA-01-R MOD	Thallium 208	pCi/g	0.158			0.03
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	A-01-R MOD	Thorium 228	pCi/g	0.46	J	J	0.12
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	A-01-R MOD	Thorium 230	pCi/g	0.44	J	J	0.12
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	A-01-R MOD	Thorium 232	pCi/g	0.47	J	J	0.12
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	A-01-R MOD	Uranium 234	pCi/g	0.52			0.13
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	A-01-R MOD	Uranium 235	pCi/g	0.026	J	J	0.029

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY
F6I070225006	SD-C7-LEW-SL-X00-DW04-1	8/22/2006	A-01-R MOD	Uranium 238	pCi/g	0.44	J	J	0.12
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Actinium 228	pCi/g	0.457			0.077
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.484			0.07
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Cesium 137	pCi/g	0.107			0.023
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Lead 210	pCi/g	0.61			0.27
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Lead 212	pCi/g	0.544			0.076
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Lead 214	pCi/g	0.566			0.07
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Potassium 40	pCi/g	12.9			1.7
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Radium (226)	pCi/g	0.484	J	J	0.07
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Radium 228	pCi/g	0.457	J	J	0.077
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Thallium 208	pCi/g	0.179			0.033
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	A-01-R MOD	Thorium 228	pCi/g	0.65			0.16
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	A-01-R MOD	Thorium 230	pCi/g	0.81			0.19
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	A-01-R MOD	Thorium 232	pCi/g	0.72			0.17
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	GA-01-R MOD	Thorium 234	pCi/g	0.78			0.14
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	A-01-R MOD	Uranium 234	pCi/g	1.14			0.23
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	A-01-R MOD	Uranium 235	pCi/g	0.071	J	J	0.046
F6I070225007	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006	A-01-R MOD	Uranium 238	pCi/g	1.2			0.24
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	GA-01-R MOD	Actinium 228	pCi/g	0.55			0.13
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.56			0.12
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	GA-01-R MOD	Cesium 137	pCi/g	0.172			0.05
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	GA-01-R MOD	Lead 212	pCi/g	0.58			0.1
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	GA-01-R MOD	Lead 214	pCi/g	0.581			0.096
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	GA-01-R MOD	Potassium 40	pCi/g	12.9			2.1
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	GA-01-R MOD	Radium (226)	pCi/g	0.56			0.12
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	GA-01-R MOD	Radium 228	pCi/g	0.55			0.13
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	GA-01-R MOD	Thallium 208	pCi/g	0.24			0.058
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	A-01-R MOD	Thorium 228	pCi/g	0.71			0.17

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	A-01-R MOD	Thorium 230	pCi/g	0.7			0.17
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	A-01-R MOD	Thorium 232	pCi/g	0.73			0.17
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	A-01-R MOD	Uranium 234	pCi/g	1			0.21
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	A-01-R MOD	Uranium 235	pCi/g	0.065	J	J	0.045
F6I070225008	SB-C7-OCC-SD-X00-SN01-2	8/16/2006	A-01-R MOD	Uranium 238	pCi/g	1.22			0.24

Laboratory Analytical Method	Analysis by:
903.0 MOD	Gas Flow Proportional Counting (GFPC)
A-01-R MOD	Alpha Spectronomy
904 MOD	Gas Flow Proportional Counting (GFPC)
GA-01-R MOD	Gamma Spectronomy

USACE - Buffalo District
Data Verification and Validation Form

Verification and Validation Cover Sheet

Project: Niagara Falls Storage Site/LOOW Pipe Line Sampling
Job/Contract/P.O.#: DACW49-03-D-0003 (Cabrera)

SDG No.: F6I070225_rev1

Laboratory Identification: STL - St.Louis
Address (City/State): St.Louis., MO

Contractor Identification: Cabrera
Address (City/State): East Hartford , CT

Validation Requirements Based On: QAPP RI at NFSS (Sept.1999)
MARLAP

Date of Sample Reciept: 6-Sep-06
Date of Data Package: 6-Oct-06
Completeness: 100 (Must be > 90%)

Verification by: Mat Masset Date: 5-Oct-07
Validation by: Mat Masset Date: 5-Oct-07

Parameters	Instrumentation
Th-228	Alpha Spec -Th
Th-230	
Th-232	
U-234	
U-235	Alpha Spec -U
U-238	
Ra-226	Gas Flow Proportional Counting -Ra
Ra-228	
Ra-226	Gamma Spec -Ra
Ra-228	

USACE - Buffalo District
Data Verification and Validation Form

Data Package Checklist

Required Data Package Components

Chain of Custody?:	Y
COC No.:	320248
Cooler Reciept Checklist?:	Y
Sample Preservation OK?:	Y
Cover Sheet listing samples?:	Y
Case narrative including analysis problems?:	Y
Laboratory Project Manager signed narrative?:	Y
Tabulated Results?:	Y
Analytical Results for QC Samples?:	Y
Lab. Duplicates run at least once per 20 samples?:	Y
Matrix Spike/LCS Dup. run at least once per 20 samples?:	Y
Tabulation of MDLs in water?:	N
Run logs included?:	Y
10% of calculations checked by Verifier?:	Y

USACE - Buffalo District
Data Verification and Validation Form

Instrument Checklist

	Alpha Spec -Th	Alpha Spec -U	Gas Flow Proportional Counting -Ra	Gamma Spec -Ra						
Basic calibration:										
Calibration file/files identified for all detectors or listing of efficiency determination present?	Y	Y	Y	Y						
Continuing calibration:										
Efficiency control check given as percent difference from calibration?	Y	Y	Y	Y						
Control charts or other documentation of instrument background provided?	Y	Y	Y	Y						

Compliance Listing	Non-compliance details or comments
Alpha Spec -Th instrument is in compliance with requirements.	
Alpha Spec -U instrument is in compliance with requirements.	
Gas Flow Proportional Counting -Ra instrument is in compliance with requirements.	
Gamma Spec -Ra instrument is in compliance with requirements.	

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radio Isotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score / Norm.Abs.Diff.	Detected	Cetainty > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6I070000401B	BM	LABQC	9/5/2006	903.0 MOD -GFPC	Radium (226)	pCi/L	-0.007	U		0.083	0.17	6250401		**-0.1**		N	Y						
F6I070000401C	LCS	LABQC	9/5/2006		Radium (226)	pCi/L	10.6			1.3	0.2	6250401	11	**0.5**		Y	N	94	54-134			94.6	
F6I070000401L	LCSD	LABQC	9/5/2006		Radium (226)	pCi/L	10			1.2	0.2	6250401	11	**1.0**	**0.3**	Y	N	89	54-134	5.0	40	**5.8**	
F6I070225001	SO	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006		Radium (226)	pCi/L	0.16	U	**U**	0.13	0.2	6250401				N	N						
F6I070225002	SO	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006		Radium (226)	pCi/L	0.07	U	**U**	0.15	0.26	6250401				N	Y						
F6I070225003	SO	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006		Radium (226)	pCi/L	0.13	U	**U**	0.14	0.21	6250401				N	Y						
F6I070000405B	BM	LABQC	9/5/2006	903.0 MOD -GFPC	Radium 228	pCi/L	0.14	U		0.39	0.66	6250405		**0.4**		N	Y						
F6I070000405C	LCS	LABQC	9/5/2006		Radium 228	pCi/L	9.5			1.2	0.6	6250405	9.7	**0.2**		Y	N	98	61-138				
F6I070000405L	LCSD	LABQC	9/5/2006		Radium 228	pCi/L	9.8			1.2	0.6	6250405	9.7	**0.1**	**0.2**	Y	N	100	61-138	2.0	40	100.9	
F6I070225001	SO	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006		Radium 228	pCi/L	0.66	U	**U**	0.57	0.92	6250405				N	N						
F6I070225002	SO	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006		Radium 228	pCi/L	0.22	U	**U**	0.56	0.95	6250405				N	Y						
F6I070225003	SO	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006		Radium 228	pCi/L	0.3	U	**U**	0.57	0.95	6250405				N	Y						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	GA-01-R MOD -Gamma Spec	Actinium 228	pCi/g	0.46			0.13	0.32	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Bismuth 214	pCi/g	1.67			0.24	0.13	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Lead 210	pCi/g	2.22			0.58	0.96	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Lead 212	pCi/g	0.393			0.085	0.11	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Lead 214	pCi/g	1.73			0.22	0.12	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Potassium 40	pCi/g	8.8			1.6	0.8	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Radium (226)	pCi/g	1.67			0.24	0.13	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Radium 228	pCi/g	0.46	J	**J**	0.13	0.32	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Thallium 208	pCi/g	0.174			0.05	0.065	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Thorium 234	pCi/g	5.36			0.81	0.8	6251184				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Uranium 235	pCi/g	0.47			0.14	0.29	6251184				Y	N						
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Actinium 228	pCi/g	0.47			0.13	0.29	6251184		**0.1**		Y	N			1.0		**2.2**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Bismuth 214	pCi/g	1.7			0.24	0.12	6251184		**0.1**		Y	N			2.0		**1.8**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Cesium 137	pCi/g	0.078			0.039	0.076	6251184				Y	N						
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Lead 210	pCi/g	2.51			0.58	0.78	6251184		**0.4**		Y	N			12.0		**12.3**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Lead 212	pCi/g	0.47			0.088	0.082	6251184		**0.6**		Y	N			18.0		**17.8**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Lead 214	pCi/g	1.95			0.24	0.11	6251184		**0.7**		Y	N			12.0		**12.0**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Potassium 40	pCi/g	8.2			1.5	0.9	6251184		**0.3**		Y	N			8.0		**7.1**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Protactinium 234M	pCi/g	11.4			5	9.4	6251184				Y	N						
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Radium (226)	pCi/g	1.7			0.24	0.12	6251184		**0.1**		Y	N			2.0		**1.8**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Radium 228	pCi/g	0.47	J	**J**	0.13	0.29	6251184		**0.1**		Y	N			1.0		**2.2**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Thallium 208	pCi/g	0.173			0.046	0.058	6251184		**0.0**		Y	N			0.4		**0.6**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Thorium 234	pCi/g	5.49			0.8	0.52	6251184		**0.1**		Y	N			2.0		**2.4**	
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Actinium 228	pCi/g	1.18			0.31	0.45	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Bismuth 214	pCi/g	1.8			0.32	0.2	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Cesium 137	pCi/g	1.2			0.23	0.15	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Lead 210	pCi/g	4.8			1.1	1.5	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Lead 212	pCi/g	1.05			0.19	0.17	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Lead 214	pCi/g	1.77			0.25	0.23	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Potassium 40	pCi/g	7.8			1.8	1.3	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Protactinium 234M	pCi/g	38			12	15	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Radium (226)	pCi/g	1.8			0.32	0.2	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Radium 228	pCi/g	1.18			0.31	0.45	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Thallium 208	pCi/g	0.26			0.087	0.12	6251184				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Thorium 234	pCi/g	30.2			4.1	1.1	6251184				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Actinium 228	pCi/g	0.327			0.057	0.1	6251184				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Bismuth 214	pCi/g	0.339			0.054	0.05	6251184				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Lead 212	pCi/g	0.372			0.056	0.034	6251184				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Lead 214	pCi/g	0.345			0.048	0.042	6251184				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Potassium 40	pCi/g	8.6			1.2	0.2	6251184				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Radium (226)	pCi/g	0.339	J	**J**	0.054	0.05	6251184				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Radium 228	pCi/g	0.327	J	**J**	0.057	0.1	6251184				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Thallium 208	pCi/g	0.158			0.03	0.026	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Actinium 228	pCi/g	0.457			0.077	0.1	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Bismuth 214	pCi/g	0.484			0.07	0.052	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Cesium 137	pCi/g	0.107			0.023	0.025	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Lead 210	pCi/g	0.61			0.27	0.51	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Lead 212	pCi/g	0.544			0.076	0.033	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Lead 214	pCi/g	0.566			0.07	0.04	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Potassium 40	pCi/g	12.9			1.7	0.2	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Radium (226)	pCi/g	0.484	J	**J**	0.07	0.052	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Radium 228	pCi/g	0.457	J	**J**	0.077	0.1	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Thallium 208	pCi/g	0.179			0.033	0.026	6251184				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Thorium 234	pCi/g	0.78			0.14	0.23	6251184				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Actinium 228	pCi/g	0.55			0.13	0.32	6251184				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Bismuth 214	pCi/g	0.56			0.12	0.11	6251184				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Cesium 137	pCi/g	0.172			0.05	0.064	6251184				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Lead 212	pCi/g	0.58			0.1	0.09	6251184				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Lead 214	pCi/g	0.581			0.096	0.1	6251184				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Potassium 40	pCi/g	12.9			2.1	0.6	6251184				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Radium (226)	pCi/g	0.56			0.12	0.11	6251184				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Radium 228	pCi/g	0.55			0.13	0.32	6251184				Y	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radio Isotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score / Norm.Abs.Diff.	Detected	Cetainty > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Thallium 208	pCi/g	0.24			0.058	0.054	6251184				Y	N						
F6I080000184B	BM	LABQC	8/31/2006		Radium (226)	pCi/g	0.062	U		0.056	0.12	6251184		**1.1**		N	N						
F6I080000184B	BM	LABQC	8/31/2006		Radium 228	pCi/g	0.1	U		0.11	0.24	6251184		**0.9**		N	Y						
F6I080000184C	LCS	LABQC	8/31/2006		Radium (226)	pCi/g	11.7			1.4	0.4	6251184	12	**0.4**		Y	N	96	75-108			95.9	
F6I080000184C	LCS	LABQC	8/31/2006		Thorium 232	pCi/g	10.4			1.2	0.7	6251184	9.5	**0.8**		Y	N	109	77-125			109.5	
F6I070225002	SO	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006	A-01-R MOD -Alpha Spec	Thorium 228	pCi/L	0.05	U	**UJ**	0.11	0.18	6254557				N	Y						Tracer recovery less than 50%
F6I070225002	SO	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006		Thorium 230	pCi/L	0.099	J	**UJ**	0.098	0.095	6254557			**0.27**	Y	N						Tracer recovery less than 50%/Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6I070225002	SO	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006		Thorium 232	pCi/L	-0.005	U	**UJ**	0.047	0.095	6254557			**0.53**	N	Y						Tracer recovery less than 50%/Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6I111000557B	BM	LABQC	9/1/2006		Thorium 228	pCi/L	0.028	U		0.045	0.065	6254557		**0.6**		N	Y						
F6I111000557B	BM	LABQC	9/1/2006		Thorium 230	pCi/L	0.069	J		0.053	0.023	6254557		**1.3**		Y	N						
F6I111000557B	BM	LABQC	9/1/2006		Thorium 232	pCi/L	0.026	J		0.035	0.023	6254557		**0.7**		Y	Y						
F6I111000557C	LCS	LABQC	9/1/2006		Thorium 230	pCi/L	1.93			0.36	0.04	6254557	2.1	**0.4**		Y	N	94	62-137			93.7	
F6I111000557L	LCSD	LABQC	9/1/2006		Thorium 230	pCi/L	2.66			0.48	0.04	6254557	2.1	**1.3**	**1.2**	Y	N	129	62-137	32.0	40	**31.8**	
F6I070225001	SO	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	A-01-R MOD -Alpha Spec	Uranium 234	pCi/L	1.44			0.3	0.04	6254558				Y	N						
F6I070225001	SO	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006		Uranium 235	pCi/L	0.075	J	**J**	0.062	0.029	6254558				Y	N						
F6I070225001	SO	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006		Uranium 238	pCi/L	1.13			0.26	0.02	6254558				Y	N						
F6I070225002	SO	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006		Uranium 234	pCi/L	0.73			0.19	0.04	6254558				Y	N						
F6I070225002	SO	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006		Uranium 235	pCi/L	0.018	U	**U**	0.031	0.046	6254558				N	Y						
F6I070225002	SO	SUMPW-C7-LEW-WW-X00-DW05-10	8/31/2006		Uranium 238	pCi/L	0.68			0.18	0.04	6254558				Y	N						
F6I070225003	SO	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006		Uranium 234	pCi/L	0.125	J	**J**	0.08	0.053	6254558				Y	N						
F6I070225003	SO	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006		Uranium 235	pCi/L	0.014	U	**U**	0.041	0.039	6254558				N	Y						
F6I070225003	SO	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006		Uranium 238	pCi/L	0.168	J	**J**	0.095	0.062	6254558				Y	N						
F6I111000558B	BM	LABQC	9/1/2006		Uranium 234	pCi/L	0.005	U	**U**	0.016	0.033	6254558		**0.3**		N	Y						
F6I111000558B	BM	LABQC	9/1/2006		Uranium 235	pCi/L	0.018	U	**U**	0.031	0.024	6254558		**0.6**		N	Y						
F6I111000558B	BM	LABQC	9/1/2006		Uranium 238	pCi/L	0.004	U	**U**	0.018	0.038	6254558		**0.2**		N	Y						
F6I111000558C	LCS	LABQC	9/1/2006		Uranium 234	pCi/L	3.42			0.58	0.04	6254558	3.3	**0.2**		Y	N	104	82-122			104.3	
F6I111000558C	LCS	LABQC	9/1/2006		Uranium 238	pCi/L	3.74			0.62	0.02	6254558	3.4	**0.5**		Y	N	110	82-121			109.7	
F6I111000558L	LCSD	LABQC	9/1/2006		Uranium 234	pCi/L	3.85			0.64	0.04	6254558	3.3	**0.9**	**0.5**	Y	N	117	82-122	12.0	40	**11.8**	
F6I111000558L	LCSD	LABQC	9/1/2006		Uranium 238	pCi/L	3.78			0.63	0.04	6254558	3.4	**0.6**	**0.0**	Y	N	111	82-121	1.0	40	**1.1**	
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	A-01-R MOD -Alpha Spec	Thorium 228	pCi/g	0.59			0.15	0.04	6257376				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Thorium 230	pCi/g	2.38			0.44	0.03	6257376			**5.33**	Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Thorium 232	pCi/g	0.65			0.16	0.02	6257376				Y	N						
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Thorium 228	pCi/g	0.67			0.18	0.04	6257376		**0.3**		Y	N			13.0	40	**12.7**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Thorium 230	pCi/g	2.52			0.5	0.05	6257376		**0.2**	**4.97**	Y	N			6.0	40	**5.7**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Thorium 232	pCi/g	0.77			0.2	0.05	6257376		**0.5**		Y	N			17.0	40	**16.9**	
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Thorium 228	pCi/g	0.95			0.24	0.07	6257376				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Thorium 230	pCi/g	2.69			0.52	0.04	6257376			**5.11**	Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Thorium 232	pCi/g	0.97			0.24	0.05	6257376				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Thorium 228	pCi/g	0.46	J	**J**	0.12	0.04	6257376				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Thorium 230	pCi/g	0.44	J	**J**	0.12	0.01	6257376			**3.34**	Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Thorium 232	pCi/g	0.47	J	**J**	0.12	0.02	6257376				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Thorium 228	pCi/g	0.65			0.16	0.05	6257376				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Thorium 230	pCi/g	0.81			0.19	0.03	6257376			**4.07**	Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Thorium 232	pCi/g	0.72			0.17	0.03	6257376				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Thorium 228	pCi/g	0.71			0.17	0.04	6257376				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Thorium 230	pCi/g	0.7			0.17	0.02	6257376			**3.89**	Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Thorium 232	pCi/g	0.73			0.17	0.02	6257376				Y	N						
F6I140000376B	BM	LABQC	8/31/2006		Thorium 228	pCi/g	0.013	U		0.024	0.038	6257376		**0.5**		N	Y						
F6I140000376B	BM	LABQC	8/31/2006		Thorium 230	pCi/g	0.029	J		0.028	0.026	6257376		**1.0**		Y	N						
F6I140000376B	BM	LABQC	8/31/2006		Thorium 232	pCi/g	0.005	U		0.013	0.026	6257376		**0.4**		N	Y						
F6I140000376C	LCS	LABQC	8/31/2006		Thorium 230	pCi/g	56.9			9.3	0.2	6257376	59	**0.2**		Y	N	97	68-128			97.3	
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006	A-01-R MOD -Alpha Spec	Uranium 234	pCi/g	13			2.2	0.03	6257378				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Uranium 235	pCi/g	0.63			0.18	0.02	6257378				Y	N						
F6I070225004	SO	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Uranium 238	pCi/g	13			2.2	0.03	6257378				Y	N						
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Uranium 234	pCi/g	12.6			2.1	0.03	6257378		**0.1**		Y	N			3.0	40	**3.1**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Uranium 235	pCi/g	0.47	J	**J**	0.14	0.02	6257378		**0.7**		Y	N			29.0		**29.1**	
F6I070225004X	DUP	SUMPS-C7-LEW-SL-X00-DW03-16	8/31/2006		Uranium 238	pCi/g	12.6			2.1	0.03	6257378		**0.1**		Y	N			2.0	40	**3.1**	
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Uranium 234	pCi/g	30			4.8	0.05	6257378				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Uranium 235	pCi/g	1.56			0.37	0.05	6257378				Y	N						
F6I070225005	SO	SUMPS-C7-LEW-SL-X00-DW05-15	8/31/2006		Uranium 238	pCi/g	29.4			4.7	0.04	6257378				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Uranium 234	pCi/g	0.52			0.13	0.02	6257378				Y	N						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Uranium 235	pCi/g	0.026	J	**J**	0.029	0.017	6257378				Y	Y						
F6I070225006	SO	SD-C7-LEW-SL-X00-DW04-1	8/22/2006		Uranium 238	pCi/g	0.44	J	**J**	0.12	0.01	6257378				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Uranium 234	pCi/g	1.14			0.23	0.03	6257378				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Uranium 235	pCi/g	0.071	J	**J**	0.046	0.017	6257378				Y	N						
F6I070225007	SO	SD-C7-OCC-SD-X00-SN01-0.5	9/1/2006		Uranium 238	pCi/g	1.2			0.24	0.02	6257378				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Uranium 234	pCi/g	1			0.21	0.03	6257378				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Uranium 235	pCi/g	0.065	J	**J**	0.045	0.018	6257378				Y	N						
F6I070225008	SO	SB-C7-OCC-SD-X00-SN01-2	8/16/2006		Uranium 238	pCi/g	1.22			0.24	0.03	6257378				Y	N						
F6I140000378B	BM	LABQC	8/31/2006		Uranium 234	pCi/g	0.024	U		0.026	0.027	6257378		**0.9**		N	Y						
F6I140000378B	BM	LABQC	8/31/2006		Uranium 235	pCi/g	-0.001	U		0.017	0.034	6257378		**-0.1**		N	Y						
F6I140000378B	BM	LABQC	8/31/2006		Uranium 238	pCi/g	0.004	U		0.015	0.031	6257378		**0.3**		N	Y						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radio Isotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score / Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6I140000378C	LCS	LABQC	8/31/2006		Uranium 234	pCi/g	22.7			4.5	0.4	6257378	20	**5.0**		Y	N	116	75-125			115.8	
F6I140000378C	LCS	LABQC	8/31/2006		Uranium 238	pCi/g	22.2			4.4	0.4	6257378	20	**0.6**		Y	N	113	75-122			113.3	
F6I070225001REA	SO	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006	A-01-R MOD -Alpha Spec	Thorium 228	pCi/L	0.09	U	**U**	0.15	0.22	6258308				N	Y						
F6I070225001REA	SO	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006		Thorium 230	pCi/L	0.3	J	**J**	0.17	0.11	6258308				Y	N						
F6I070225001REA	SO	SUMPW-C7-LEW-WW-X00-AN-12	9/1/2006		Thorium 232	pCi/L	-0.017	U	**U**	0.061	0.14	6258308				N	Y						
F6I070225003REA	SO	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006		Thorium 228	pCi/L	0.02	U	**U**	0.12	0.2	6258308				N	Y						
F6I070225003REA	SO	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006		Thorium 230	pCi/L	0.14	U	**U**	0.14	0.17	6258308				N	Y						
F6I070225003REA	SO	SUMPW-C7-LEW-WW-X00-DW03-7	8/31/2006		Thorium 232	pCi/L	0.017	U	**U**	0.05	0.1	6258308				N	Y						
F6I150000308B	BM	LABQC	9/1/2006		Thorium 228	pCi/L	0.023	U		0.046	0.07	6258308		**0.5**		N	Y						
F6I150000308B	BM	LABQC	9/1/2006		Thorium 230	pCi/L	0.052	U		0.047	0.052	6258308		**1.1**		**Y**	N						
F6I150000308B	BM	LABQC	9/1/2006		Thorium 232	pCi/L	0.004	U		0.019	0.041	6258308		**0.2**		N	Y						
F6I150000308C	LCS	LABQC	9/1/2006		Thorium 230	pCi/L	2.25			0.41	0.04	6258308	2.1	**0.5**		Y	N	109	62-137			109.2	
F6I150000308L	LCSD	LABQC	9/1/2006		Thorium 230	pCi/L	2.43			0.44	0.07	6258308	2.1	**0.8**	**0.3**	Y	N	118	62-137	8.0	40	**7.7**	

USACE - Buffalo District
Data Verification and Validation Report

Niagara Falls Storage Site
Pipeline Sampling
SDG #F6J310237

Data Package Summary

- The samples listed below were in the sample delivery group (work order). The samples were analyzed by Severn Trent Laboratories –St. Louis, MO for radiological analysis of:
  Isotopic uranium
  Isotopic thorium
  Radium (226 and 228)

Sample Cross Reference

	LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION
1	F6J310237001	MHW-C7-CWM-WW-X96-AW01-10
2	F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D
3	F6J310237003	MHW-C7-CWM-WW-X95-AW01-10
4	F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17
5	F6J310237005	MHW-C7-CWM-WW-X106-SN01-10
6	F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D
7	F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12
8	F6J310237008	MHW-C7-CWM-WW-X87-AW01-15
9	F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6
10	F6J310237010	MHW-C7-CWM-WW-X100-SN01-14
11	F6J310237011	IDWW-C7-NFS-WW-IDW-1
12	F6J310237012	MHW-C7-CWM-WW-X97-SN01-14
13	F6J310237013	MHW-C7-CWM-WW-X103-SN01-12
14	F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12
15	F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12
16	F6J310237016	RB-C7-CWM-WW-RINSATE

Data Deliverables Completeness

- All required information was provided.

Analytical Completeness

- Data completeness was 100%.

Analytical Deviations

Instrumentation

- All required information was provided

Batch QC Deviations

- Findings in the method blank were slightly elevated over their respective MDCs for U-234 for batch number: 6305139 Use of MARLAP (Chpt .18) numerical performance indicator value (Z Score) had a score less than 2. Findings (between 0-1.96) using the normalized absolute difference between the MB and the sample justified the change of the laboratory qualifier from “J “ to “UJ” for several samples.

- Findings in the method blank were slightly elevated over MDC for Th-230 for batch number: 6313023. Use of MARLAP (Chpt .18) numerical performance indicator value (Z Score) had a score lgreater than 2. Findings (between 0-1.96) using the normalized absolute difference between the MB and the sample justified the change of the laboratory qualifier from “J “ to “UJ” for several samples.

Method blank and associated sample results:
The normalized absolute difference between the method blank and associated sample results, given by the below equation, is used in testing the null hypothesis that the sample and the method blank do not differ significantly when compared to their respective TPU. If the normalized absolute difference is greater than 2.58, one can conclude that the method blank and associated sample results differ significantly. No qualification of the data is necessary. If the normalized absolute difference is between 1.96 and 2.58 sample results are qualified "J" due to the possibility of activity in the method blank biasing sample results. If the normalized absolute difference is between 0 and 1.96, the conclusion is reached that the method blank and sample results do not differ significantly and reported results are qualified "UJ". The data was determined to be usable for its intended purpose because the blank contamination is negligible when compared to the derived concentration guideline levels (DCGLs).
Equation:
Sample-Method Blank Bias = |(S - B) / (TPU2S + TPU2B)1/2|
S = Sample result
B = Method blank result
TPUS = Total Propagated Uncertainty of the parent sample
TPUB = Total Propagated Uncertainty of the method blank

Sample Deviations

- Ra-226 tracer yield for sample: PIPEW-C7-CWM-WW-X104-SN01-12 was less than 50%, qualified with a “J”.
- Ra-228 tracer yield for samples:
  MHW-C7-CWM-WW-X87-AW01-15
  PIPEW-C7-CWM-WW-X86-SN01-6
  PIPEW-C7-CWM-WW-X104-SN01-12
  was less than 50%. Laboratory qualifiers with a “U” were changed to “UJ”.

Data Usability

Based on the results of the data validation conducted by USACE-Buffalo District the data is usable for it’s intended purpose as qualified.

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	MDC
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	A-01-R MOD	Uranium 234	pCi/L	7.8			1.1	0.06
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	903.0 MOD	Radium (226)	pCi/L	0.25	J	**J**	0.16	0.21
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	A-01-R MOD	Uranium 235	pCi/L	0.58			0.19	0.04
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	904 MOD	Radium 228	pCi/L	0.17	U	**U**	0.42	0.7
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	A-01-R MOD	Uranium 238	pCi/L	7.6			1.1	0.03
F6J310237001REA	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	A-01-R MOD	Thorium 230	pCi/L	0.1	U	**U**	0.11	0.14
F6J310237001REA	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	A-01-R MOD	Thorium 228	pCi/L	0.03	U	**U**	0.16	0.26
F6J310237001REA	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	A-01-R MOD	Thorium 232	pCi/L	-0	U	**U**	0.05	0.12
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	A-01-R MOD	Uranium 234	pCi/L	9.5			1.3	0.1
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	903.0 MOD	Radium (226)	pCi/L	-0.1	U	**U**	0.2	0.38
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	A-01-R MOD	Uranium 235	pCi/L	0.47	J	**J**	0.17	0.07
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	904 MOD	Radium 228	pCi/L	-0	U	**U**	0.4	0.69
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	A-01-R MOD	Uranium 238	pCi/L	8.5			1.1	0.08
F6J310237002REA	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	A-01-R MOD	Thorium 230	pCi/L	0.23	J	**UJ**	0.14	0.11
F6J310237002REA	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	A-01-R MOD	Thorium 228	pCi/L	0.02	U	**U**	0.13	0.21
F6J310237002REA	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	A-01-R MOD	Thorium 232	pCi/L	-0	U	**U**	0.048	0.11
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	A-01-R MOD	Uranium 234	pCi/L	17.3			2.2	0.1
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	903.0 MOD	Radium (226)	pCi/L	0	U	**U**	0.13	0.25
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	A-01-R MOD	Uranium 235	pCi/L	0.87			0.23	0.03
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	904 MOD	Radium 228	pCi/L	0.13	U	**U**	0.39	0.66
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	A-01-R MOD	Uranium 238	pCi/L	17			2.1	0.08
F6J310237003REA	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	A-01-R MOD	Thorium 230	pCi/L	0.28	J	**UJ**	0.15	0.12
F6J310237003REA	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	A-01-R MOD	Thorium 228	pCi/L	0.01	U	**U**	0.1	0.18
F6J310237003REA	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	A-01-R MOD	Thorium 232	pCi/L	0.02	U	**U**	0.047	0.05
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	A-01-R MOD	Uranium 234	pCi/L	13.2			1.7	0.07
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	903.0 MOD	Radium (226)	pCi/L	0.18	U	**U**	0.2	0.32
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	A-01-R MOD	Uranium 235	pCi/L	0.77			0.22	0.07
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	904 MOD	Radium 228	pCi/L	-0.3	U	**U**	0.26	0.49

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	MDC
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	A-01-R MOD	Uranium 238	pCi/L	12.3			1.6	0.08
F6J310237004REA	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	A-01-R MOD	Thorium 230	pCi/L	0.37	J	**J**	0.2	0.16
F6J310237004REA	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	A-01-R MOD	Thorium 228	pCi/L	0.17	U	**U**	0.21	0.29
F6J310237004REA	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	A-01-R MOD	Thorium 232	pCi/L	0.15	J	**J**	0.13	0.13
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	A-01-R MOD	Uranium 234	pCi/L	9.9			1.3	0.08
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	903.0 MOD	Radium (226)	pCi/L	0.31	J	**J**	0.16	0.2
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	A-01-R MOD	Uranium 235	pCi/L	0.37	J	**J**	0.15	0.07
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	904 MOD	Radium 228	pCi/L	-0.2	U	**U**	0.3	0.54
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	A-01-R MOD	Uranium 238	pCi/L	9			1.2	0.03
F6J310237005REA	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	A-01-R MOD	Thorium 230	pCi/L	0.08	U	**UJ**	0.074	0.09
F6J310237005REA	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	A-01-R MOD	Thorium 228	pCi/L	0.04	U	**U**	0.095	0.15
F6J310237005REA	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	A-01-R MOD	Thorium 232	pCi/L	0.01	U	**U**	0.038	0.07
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	A-01-R MOD	Uranium 234	pCi/L	10.1			1.3	0.09
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	903.0 MOD	Radium (226)	pCi/L	0.24	J	**J**	0.12	0.13
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	A-01-R MOD	Uranium 235	pCi/L	0.43	J	**J**	0.16	0.07
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	904 MOD	Radium 228	pCi/L	0.21	U	**U**	0.31	0.51
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	A-01-R MOD	Uranium 238	pCi/L	9.6			1.3	0.06
F6J310237006REA	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	A-01-R MOD	Thorium 230	pCi/L	0.04	U	**UJ**	0.07	0.11
F6J310237006REA	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	A-01-R MOD	Thorium 228	pCi/L	-0.3	U	**U**	0.21	0.35
F6J310237006REA	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	A-01-R MOD	Thorium 232	pCi/L	-0	U	**U**	0.043	0.09
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	A-01-R MOD	Uranium 234	pCi/L	0.37	J	**J**	0.13	0.07
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	903.0 MOD	Radium (226)	pCi/L	0.26	J	**J**	0.12	0.12
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	A-01-R MOD	Uranium 235	pCi/L	0.03	U	**U**	0.053	0.08
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	904 MOD	Radium 228	pCi/L	0.12	U	**U**	0.34	0.58
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	A-01-R MOD	Uranium 238	pCi/L	0.27	J	**J**	0.11	0.06
F6J310237007REA	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	A-01-R MOD	Thorium 230	pCi/L	0.29	J	**UJ**	0.12	0.08
F6J310237007REA	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	A-01-R MOD	Thorium 228	pCi/L	0.05	U	**U**	0.079	0.12
F6J310237007REA	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	A-01-R MOD	Thorium 232	pCi/L	-0	U	**U**	0.032	0.08
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	A-01-R MOD	Uranium 234	pCi/L	3.83			0.61	0.09

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	MDC
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	903.0 MOD	Radium (226)	pCi/L	0.32	J	**J**	0.17	0.19
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	A-01-R MOD	Uranium 235	pCi/L	0.08	U	**U**	0.079	0.1
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	904 MOD	Radium 228	pCi/L	-0.1	U	**UJ**	0.45	0.8
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	A-01-R MOD	Uranium 238	pCi/L	3.81			0.61	0.09
F6J310237008REA	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	A-01-R MOD	Thorium 230	pCi/L	0.19	J	**UJ**	0.11	0.1
F6J310237008REA	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	A-01-R MOD	Thorium 228	pCi/L	-0	U	**U**	0.1	0.18
F6J310237008REA	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	A-01-R MOD	Thorium 232	pCi/L	-0	U	**U**	0.047	0.11
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	A-01-R MOD	Uranium 234	pCi/L	1.39			0.29	0.08
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	903.0 MOD	Radium (226)	pCi/L	0.23	U	**U**	0.18	0.26
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	A-01-R MOD	Uranium 235	pCi/L	0.09	J	**J**	0.071	0.03
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	904 MOD	Radium 228	pCi/L	-0	U	**UJ**	0.69	1.2
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	A-01-R MOD	Uranium 238	pCi/L	1.41			0.29	0.05
F6J310237009REA	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	A-01-R MOD	Thorium 230	pCi/L	0.32	J	**J**	0.14	0.03
F6J310237009REA	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	A-01-R MOD	Thorium 228	pCi/L	0.25	J	**J**	0.13	0.09
F6J310237009REA	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	A-01-R MOD	Thorium 232	pCi/L	0.15	J	**J**	0.093	0.07
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	A-01-R MOD	Uranium 234	pCi/L	0.52		**J**	0.16	0.09
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	903.0 MOD	Radium (226)	pCi/L	0.1	U	**U**	0.094	0.14
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	A-01-R MOD	Uranium 235	pCi/L	0.05	U	**U**	0.078	0.12
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	904 MOD	Radium 228	pCi/L	-0.3	U	**U**	0.35	0.63
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	A-01-R MOD	Uranium 238	pCi/L	0.55			0.17	0.09
F6J310237010REA	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	A-01-R MOD	Thorium 230	pCi/L	0.19	J	**UJ**	0.13	0.13
F6J310237010REA	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	A-01-R MOD	Thorium 228	pCi/L	0.07	U	**U**	0.09	0.13
F6J310237010REA	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	A-01-R MOD	Thorium 232	pCi/L	0.02	U	**U**	0.051	0.05
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	A-01-R MOD	Uranium 234	pCi/L	0.04	U	**UJ**	0.058	0.09
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	903.0 MOD	Radium (226)	pCi/L	0.28	J	**J**	0.13	0.14
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	A-01-R MOD	Uranium 235	pCi/L	-0	U	**U**	0.029	0.07
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	904 MOD	Radium 228	pCi/L	0.21	U	**U**	0.28	0.46
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	A-01-R MOD	Uranium 238	pCi/L	0	U	**U**	0.038	0.08
F6J310237011REA	IDWW-C7-NFS-WW-IDW-1	10/26/2006	A-01-R MOD	Thorium 230	pCi/L	0.17	J	**UJ**	0.093	0.07

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	MDC
F6J310237011REA	IDWW-C7-NFS-WW-IDW-1	10/26/2006	A-01-R MOD	Thorium 228	pCi/L	-0	U	**U**	0.073	0.13
F6J310237011REA	IDWW-C7-NFS-WW-IDW-1	10/26/2006	A-01-R MOD	Thorium 232	pCi/L	0	U	**U**	0.039	0.08
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	A-01-R MOD	Uranium 234	pCi/L	3.76			0.58	0.06
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	903.0 MOD	Radium (226)	pCi/L	0.06	U	**U**	0.17	0.29
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	A-01-R MOD	Uranium 235	pCi/L	0.18	J	**J**	0.1	0.07
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	904 MOD	Radium 228	pCi/L	-0.8	U	**U**	0.33	0.62
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	A-01-R MOD	Uranium 238	pCi/L	3.07			0.5	0.06
F6J310237012REA	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	A-01-R MOD	Thorium 230	pCi/L	0.09	U	**UJ**	0.089	0.11
F6J310237012REA	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	A-01-R MOD	Thorium 228	pCi/L	-0	U	**U**	0.1	0.19
F6J310237012REA	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	A-01-R MOD	Thorium 232	pCi/L	0	U	**U**	0.064	0.12
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	A-01-R MOD	Uranium 234	pCi/L	0.2	J	**UJ**	0.11	0.09
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	903.0 MOD	Radium (226)	pCi/L	0.14	U	**U**	0.11	0.16
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	A-01-R MOD	Uranium 235	pCi/L	0.01	U	**U**	0.04	0.04
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	904 MOD	Radium 228	pCi/L	0.13	U	**U**	0.34	0.58
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	A-01-R MOD	Uranium 238	pCi/L	0.11	J	**J**	0.08	0.08
F6J310237013REA	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	A-01-R MOD	Thorium 230	pCi/L	0.1	U	**UJ**	0.12	0.15
F6J310237013REA	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	A-01-R MOD	Thorium 228	pCi/L	-0.1	U	**U**	0.14	0.3
F6J310237013REA	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	A-01-R MOD	Thorium 232	pCi/L	-0	U	**U**	0.067	0.15
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	A-01-R MOD	Uranium 234	pCi/L	12.5			1.6	0.1
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	903.0 MOD	Radium (226)	pCi/L	0.44	J	**J**	0.17	0.17
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	A-01-R MOD	Uranium 235	pCi/L	0.62			0.2	0.07
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	904 MOD	Radium 228	pCi/L	1.1			0.54	0.82
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	A-01-R MOD	Uranium 238	pCi/L	11			1.5	0.09
F6J310237014REA	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	A-01-R MOD	Thorium 230	pCi/L	0.51		**J**	0.21	0.1
F6J310237014REA	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	A-01-R MOD	Thorium 228	pCi/L	0.29	J	**J**	0.17	0.16
F6J310237014REA	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	A-01-R MOD	Thorium 232	pCi/L	0.24	J	**J**	0.14	0.1
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	A-01-R MOD	Uranium 234	pCi/L	0.19	J	**UJ**	0.11	0.1
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	903.0 MOD	Radium (226)	pCi/L	0.49	J	**J**	0.24	0.28
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	A-01-R MOD	Uranium 235	pCi/L	-0	U	**U**	0.052	0.12

USACE - Buffalo District
Data Verification and Validation Report

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	MDC
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	904 MOD	Radium 228	pCi/L	0.42	U	**UJ**	0.78	1.3
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	A-01-R MOD	Uranium 238	pCi/L	0.1	J	**J**	0.069	0.06
F6J310237015REA	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	A-01-R MOD	Thorium 230	pCi/L	0.29	J	**J**	0.13	0.09
F6J310237015REA	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	A-01-R MOD	Thorium 228	pCi/L	0.17	J	**J**	0.1	0.09
F6J310237015REA	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	A-01-R MOD	Thorium 232	pCi/L	0.13	J	**J**	0.091	0.1
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	A-01-R MOD	Uranium 234	pCi/L	-0.1	U	**UJ**	0.061	0.14
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	903.0 MOD	Radium (226)	pCi/L	0.07	U	**U**	0.074	0.11
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	A-01-R MOD	Uranium 235	pCi/L	0.01	U	**U**	0.031	0.07
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	904 MOD	Radium 228	pCi/L	0.04	U	**U**	0.35	0.59
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	A-01-R MOD	Uranium 238	pCi/L	0.07	U	**U**	0.06	0.07
F6J310237016REA	RB-C7-CWM-WW-RINSATE	10/11/2006	A-01-R MOD	Thorium 230	pCi/L	0.1	J	**UJ**	0.064	0.03
F6J310237016REA	RB-C7-CWM-WW-RINSATE	10/11/2006	A-01-R MOD	Thorium 228	pCi/L	0.03	U	**U**	0.065	0.1
F6J310237016REA	RB-C7-CWM-WW-RINSATE	10/11/2006	A-01-R MOD	Thorium 232	pCi/L	0.01	U	**U**	0.026	0.03

Laboratory Analytical Method	Analysis by:
903.0 MOD	Gas Flow Proportional Counting (GFPC)
A-01-R MOD	Alpha Spectronomy
904 MOD	Gas Flow Proportional Counting (GFPC)

USACE - Buffalo District
Data Verification and Validation Form

Verification and Validation Cover Sheet

Project: Niagara Falls Storage Site/LOOW Pipe Line Sampling
Job/Contract/P.O.#: DACW49-03-D-0003 (Cabrera)

SDG No.: F6J310237

Laboratory Identification: STL - St.Louis
Address (City/State): St.Louis., MO

Contractor Identification: Cabrera
Address (City/State): East Hartford , CT

Validation Requirements Based On: QAPP RI at NFSS (Sept.1999)
MARLAP

Date of Sample Reciept: 31-Oct-06
Date of Data Package: 20-Nov-06
Completeness: 100 (Must be > 90%)

Verification by: Mat Masset Date: 11-Oct-07
Validation by: Mat Masset Date: 11-Oct-07

Parameters	Instrumentation
Th-228	Alpha Spec -Th
Th-230	
Th-232	
U-234	Alpha Spec -U
U-235	
U-238	
Ra-226	Gas Flow Proportional Counting -Ra
Ra-228	
Ra-226	Gamma Spec -Ra
Ra-228	

USACE - Buffalo District
Data Verification and Validation Form

Data Package Checklist

Required Data Package Components

Chain of Custody?:	Y
COC No.:	236870, 236871, 320240
Cooler Reciept Checklist?:	Y
Sample Preservation OK?:	Y
Cover Sheet listing samples?:	Y
Case narrative including analysis problems?:	Y
Laboratory Project Manager signed narrative?:	Y
Tabulated Results?:	Y
Analytical Results for QC Samples?:	Y
Lab. Duplicates run at least once per 20 samples?:	Y
Matrix Spike/LCS Dup. run at least once per 20 samples?:	Y
Tabulation of MDLs in water?:	N
Run logs included?:	Y
10% of calculations checked by Verifier?:	Y

USACE - Buffalo District
Data Verification and Validation Form

Instrument Checklist

	Alpha Spec -Th	Alpha Spec -U	Gas Flow Proportional Counting -Ra	Gamma Spec -Ra						
Basic calibration:										
Calibration file/files identified for all detectors or listing of efficiency determination present?	Y	Y	Y	Y						
Continuing calibration:										
Efficiency control check given as percent difference from calibration?	Y	Y	Y	Y						
Control charts or other documentation of instrument background provided?	Y	Y	Y	Y						

Compliance Listing	Non-compliance details or comments
Alpha Spec -Th instrument is in compliance with requirements.	
Alpha Spec -U instrument is in compliance with requirements.	
Gas Flow Proportional Counting -Ra instrument is in compliance with requirements.	
Gamma Spec -Ra instrument is in compliance with requirements.	

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	STYPE	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310000444B	LABQC	9/25/2006	BM	903.0 MOD - GFPC	Radium (226)	pCi/L	0.02	U	U	0.11	0	6304444		0.2		N	Y						
F6J310000444C	LABQC	9/25/2006	LCS		Radium (226)	pCi/L	11.4			1.4	0	6304444	11.2	0.1		Y	N	102	54-134			101.8	
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	SO		Radium (226)	pCi/L	0.25	J	J	0.16	0	6304444				Y	N						
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	SO		Radium (226)	pCi/L	-0.07	U	U	0.2	0	6304444				N	Y						
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	SO		Radium (226)	pCi/L	0.003	U	U	0.13	0	6304444				N	Y						
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	SO		Radium (226)	pCi/L	0.18	U	U	0.2	0	6304444				N	Y						
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	SO		Radium (226)	pCi/L	0.31	J	J	0.16	0	6304444				Y	N						
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	SO		Radium (226)	pCi/L	0.24	J	J	0.12	0	6304444				Y	N						
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	SO		Radium (226)	pCi/L	0.26	J	J	0.12	0	6304444				Y	N						
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	SO		Radium (226)	pCi/L	0.32	J	J	0.17	0	6304444				Y	N						
F6J310237008X	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	DUP		Radium (226)	pCi/L	0.47	J	J	0.19	0	6304444		0.6		Y	N			36	40	38.0	
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	SO		Radium (226)	pCi/L	0.23	U	U	0.18	0	6304444				N	N						
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	SO		Radium (226)	pCi/L	0.104	U	U	0.09	0	6304444				N	N						
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	SO		Radium (226)	pCi/L	0.28	J	J	0.13	0	6304444				Y	N						
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	SO		Radium (226)	pCi/L	0.06	U	U	0.17	0	6304444				N	Y						
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	SO		Radium (226)	pCi/L	0.14	U	U	0.11	0	6304444				N	N						
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	SO		Radium (226)	pCi/L	0.44	J	J	0.17	0	6304444				Y	N						
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	SO		Radium (226)	pCi/L	0.49	J	J	0.24	0	6304444				Y	N						Tracer recovery less than 50%
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	SO		Radium (226)	pCi/L	0.066	U	U	0.07	0	6304444				N	Y						
F6J310000445B	LABQC	9/25/2006	BM	904 MOD -GFPC	Radium 228	pCi/L	-0.39	U	U	0.32	1	6304445		-1.2		N	Y						
F6J310000445C	LABQC	9/25/2006	LCS		Radium 228	pCi/L	9			1.1	1	6304445	9.53	0.5		Y	N	94	61-138			94.4	
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	SO		Radium 228	pCi/L	0.17	U	U	0.42	1	6304445				N	Y						
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	SO		Radium 228	pCi/L	-0.01	U	U	0.4	1	6304445				N	Y						
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	SO		Radium 228	pCi/L	0.13	U	U	0.39	1	6304445				N	Y						
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	SO		Radium 228	pCi/L	-0.28	U	U	0.26	0	6304445				N	Y						
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	SO		Radium 228	pCi/L	-0.17	U	U	0.3	1	6304445				N	Y						
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	SO		Radium 228	pCi/L	0.21	U	U	0.31	1	6304445				N	Y						
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	SO		Radium 228	pCi/L	0.12	U	U	0.34	1	6304445				N	Y						
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	SO		Radium 228	pCi/L	-0.08	U	UJ	0.45	1	6304445				N	Y						Tracer recovery less than 50%
F6J310237008X	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	DUP		Radium 228	pCi/L	-1.35	U	U	0.57	1	6304445		1.7		N	Y			179	40	-177.6	Both primary and laboratory samples were non-detect.
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	SO		Radium 228	pCi/L	-0.005	U	UJ	0.69	1	6304445				N	Y						Tracer recovery less than 50%
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	SO		Radium 228	pCi/L	-0.28	U	U	0.35	1	6304445				N	Y						
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	SO		Radium 228	pCi/L	0.21	U	U	0.28	0	6304445				N	Y						
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	SO		Radium 228	pCi/L	-0.78	U	U	0.33	1	6304445				N	Y						
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	SO		Radium 228	pCi/L	0.13	U	U	0.34	1	6304445				N	Y						
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	SO		Radium 228	pCi/L	1.1			0.54	1	6304445				Y	N						
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	SO		Radium 228	pCi/L	0.42	U	UJ	0.78	1	6304445				N	Y						Tracer recovery less than 50%
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	SO		Radium 228	pCi/L	0.04	U	U	0.35	1	6304445				N	Y						
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	SO	A-01-R MOD -Alpha Spec	Uranium 234	pCi/L	7.8			1.1	0	6305139			7.0	Y	N						
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	SO		Uranium 235	pCi/L	0.58			0.19	0	6305139				Y	N						
F6J310237001	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	SO		Uranium 238	pCi/L	7.6			1.1	0	6305139				Y	N						
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	SO		Uranium 234	pCi/L	9.5			1.3	0	6305139			7.2	Y	N						
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	SO		Uranium 235	pCi/L	0.47	J	J	0.17	0	6305139				Y	N						
F6J310237002	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	SO		Uranium 238	pCi/L	8.5			1.1	0	6305139				Y	N						
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	SO		Uranium 234	pCi/L	17.3			2.2	0	6305139			7.8	Y	N						
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	SO		Uranium 235	pCi/L	0.87			0.23	0	6305139				Y	N						
F6J310237003	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	SO		Uranium 238	pCi/L	17			2.1	0	6305139				Y	N						
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	SO		Uranium 234	pCi/L	13.2			1.7	0	6305139			7.7	Y	N						
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	SO		Uranium 235	pCi/L	0.77			0.22	0	6305139				Y	N						
F6J310237004	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	SO		Uranium 238	pCi/L	12.3			1.6	0	6305139				Y	N						
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	SO		Uranium 234	pCi/L	9.9			1.3	0	6305139			7.5	Y	N						
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	SO		Uranium 235	pCi/L	0.37	J	J	0.15	0	6305139				Y	N						
F6J310237005	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	SO		Uranium 238	pCi/L	9			1.2	0	6305139				Y	N						
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	SO		Uranium 234	pCi/L	10.1			1.3	0	6305139			7.7	Y	N						
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	SO		Uranium 235	pCi/L	0.43	J	J	0.16	0	6305139				Y	N						
F6J310237006	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	SO		Uranium 238	pCi/L	9.6			1.3	0	6305139				Y	N						
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	SO		Uranium 234	pCi/L	0.37	J	J	0.13	0	6305139			1.8	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	SO		Uranium 235	pCi/L	0.032	U	U	0.05	0	6305139				N	Y						
F6J310237007	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	SO		Uranium 238	pCi/L	0.27	J	J	0.11	0	6305139				Y	N						
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	SO		Uranium 234	pCi/L	3.83			0.61	0	6305139			6.1	Y	N						
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	SO		Uranium 235	pCi/L	0.078	U	U	0.08	0	6305139				N	Y						

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	STYPE	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310237008	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	SO	A-01-R MOD -Alpha Spec	Uranium 238	pCi/L	3.81			0.61	0	6305139				Y	N						
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	SO		Uranium 234	pCi/L	1.39			0.29	0	6305139			4.3	Y	N						
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	SO		Uranium 235	pCi/L	0.087	J	J	0.07	0	6305139				Y	N						
F6J310237009	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	SO		Uranium 238	pCi/L	1.41			0.29	0	6305139				Y	N						
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	SO		Uranium 234	pCi/L	0.52		J	0.16	0	6305139			2.4	Y	N						
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	SO		Uranium 235	pCi/L	0.05	U	U	0.08	0	6305139				N	Y						
F6J310237010	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	SO		Uranium 238	pCi/L	0.55			0.17	0	6305139				Y	N						
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	SO		Uranium 234	pCi/L	0.035	U	UJ	0.06	0	6305139			0.7	N	Y						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	SO		Uranium 235	pCi/L	-0.005	U	U	0.03	0	6305139				N	Y						
F6J310237011	IDWW-C7-NFS-WW-IDW-1	10/26/2006	SO		Uranium 238	pCi/L	0.003	U	U	0.04	0	6305139				N	Y						
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	SO		Uranium 234	pCi/L	3.76			0.58	0	6305139			6.3	Y	N						
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	SO		Uranium 235	pCi/L	0.18	J	J	0.1	0	6305139				Y	N						
F6J310237012	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	SO		Uranium 238	pCi/L	3.07			0.5	0	6305139				Y	N						
F6J310237012X	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	DUP		Uranium 234	pCi/L	3.39			0.56	0	6305139		0.5	5.8	Y	N			10	40	10.3	
F6J310237012X	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	DUP		Uranium 235	pCi/L	0.17	J	J	0.11	0	6305139		0.1		Y	N			8		5.7	
F6J310237012X	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	DUP		Uranium 238	pCi/L	3.22			0.53	0	6305139		0.2		Y	N			5	40	4.8	
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	SO		Uranium 234	pCi/L	0.2	J	UJ	0.11	0	6305139			0.7	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	SO		Uranium 235	pCi/L	0.014	U	U	0.04	0	6305139				N	Y						
F6J310237013	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	SO		Uranium 238	pCi/L	0.11	J	J	0.08	0	6305139				Y	N						
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	SO		Uranium 234	pCi/L	12.5			1.6	0	6305139			7.7	Y	N						
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	SO		Uranium 235	pCi/L	0.62			0.2	0	6305139				Y	N						
F6J310237014	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	SO		Uranium 238	pCi/L	11			1.5	0	6305139				Y	N						
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	SO		Uranium 234	pCi/L	0.19	J	UJ	0.11	0	6305139			0.7	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	SO		Uranium 235	pCi/L	-0.025	U	U	0.05	0	6305139				N	Y						
F6J310237015	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	SO		Uranium 238	pCi/L	0.101	J	J	0.07	0	6305139				Y	N						
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	SO		Uranium 234	pCi/L	-0.075	U	UJ	0.06	0	6305139			1.8	N	Y						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96) and MB exceeds sample result.
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	SO		Uranium 235	pCi/L	0.008	U	U	0.03	0	6305139				N	Y						
F6J310237016	RB-C7-CWM-WW-RINSATE	10/11/2006	SO		Uranium 238	pCi/L	0.065	U	U	0.06	0	6305139				N	N						
F6K010000139B	LABQC	9/25/2006	BM		Uranium 234	pCi/L	0.103	J		0.08	0	6305139		1.4		Y	N						
F6K010000139B	LABQC	9/25/2006	BM		Uranium 235	pCi/L	0	U		0	0	6305139		0.0		N	Y						
F6K010000139B	LABQC	9/25/2006	BM		Uranium 238	pCi/L	0.016	U		0.03	0	6305139		0.5		N	Y						
F6K010000139C	LABQC	9/25/2006	LCS		Uranium 234	pCi/L	13.7			1.8	0	6305139	13.1	0.3		Y	N	104	82-122			104.6	
F6K010000139C	LABQC	9/25/2006	LCS		Uranium 238	pCi/L	14			1.8	0	6305139	13.6	0.2		Y	N	103	82-121			102.9	
F6J310237001REA	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	SO	A-01-R MOD -Alpha Spec	Thorium 230	pCi/L	0.1	U	U	0.11	0	6316023			0.7	N	Y						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237001REA	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	SO		Thorium 228	pCi/L	0.03	U	U	0.16	0	6316023				N	Y						
F6J310237001REA	MHW-C7-CWM-WW-X96-AW01-10	9/29/2006	SO		Thorium 232	pCi/L	-0.021	U	U	0.05	0	6316023				N	Y						
F6J310237002REA	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	SO		Thorium 230	pCi/L	0.23	J	UJ	0.14	0	6316023			0.1	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237002REA	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	SO		Thorium 228	pCi/L	0.02	U	U	0.13	0	6316023				N	Y						
F6J310237002REA	MHW-C7-CWM-WW-X96-AW01-10-D	9/29/2006	SO		Thorium 232	pCi/L	-0.015	U	U	0.05	0	6316023				N	Y						
F6J310237003REA	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	SO		Thorium 230	pCi/L	0.28	J	UJ	0.15	0	6316023			0.4	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237003REA	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	SO		Thorium 228	pCi/L	0.01	U	U	0.1	0	6316023				N	Y						
F6J310237003REA	MHW-C7-CWM-WW-X95-AW01-10	9/29/2006	SO		Thorium 232	pCi/L	0.016	U	U	0.05	0	6316023				N	Y						
F6J310237004REA	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	SO		Thorium 230	pCi/L	0.37	J	J	0.2	0	6316023			0.7	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237004REA	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	SO		Thorium 228	pCi/L	0.17	U	U	0.21	0	6316023				N	Y						
F6J310237004REA	PIPEW-C7-CWM-WW-X90-AW01-17	9/26/2006	SO		Thorium 232	pCi/L	0.15	J	J	0.13	0	6316023				Y	N						
F6J310237005REA	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	SO		Thorium 230	pCi/L	0.082	U	UJ	0.07	0	6316023			1.0	N	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237005REA	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	SO		Thorium 228	pCi/L	0.044	U	U	0.1	0	6316023				N	Y						
F6J310237005REA	MHW-C7-CWM-WW-X106-SN01-10	9/29/2006	SO		Thorium 232	pCi/L	0.013	U	U	0.04	0	6316023				N	Y						
F6J310237006REA	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	SO		Thorium 230	pCi/L	0.04	U	UJ	0.07	0	6316023			1.4	N	Y						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237006REA	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	SO		Thorium 228	pCi/L	-0.29	U	U	0.21	0	6316023				N	Y						
F6J310237006REA	MHW-C7-CWM-WW-X106-SN01-10-D	9/29/2006	SO		Thorium 232	pCi/L	-0.0009	U	U	0.04	0	6316023				N	Y						
F6J310237007REA	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	SO		Thorium 230	pCi/L	0.29	J	UJ	0.12	0	6316023			0.5	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	STYPE	ANALYSIS METHOD	COMPOUND NAME	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310237007REA	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	SO	A-01-R MOD -Alpha Spec	Thorium 228	pCi/L	0.052	U	U	0.08	0	6316023				N	Y						
F6J310237007REA	PIPEW-C7-CWM-WW-X92-AW01-12	10/5/2006	SO		Thorium 232	pCi/L	-0.003	U	U	0.03	0	6316023				N	Y						
F6J310237008REA	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	SO		Thorium 230	pCi/L	0.19	J	UJ	0.11	0	6316023			0.1	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237008REA	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	SO		Thorium 228	pCi/L	-0.009	U	U	0.1	0	6316023				N	Y						
F6J310237008REA	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	SO		Thorium 232	pCi/L	-0.019	U	U	0.05	0	6316023				N	Y						
F6J310237008X	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	DUP		Thorium 230	pCi/L	0.022	U	UJ	0.05	0	6316023		1.4	1.6	N	Y			200	40	158.5	Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237008X	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	DUP		Thorium 228	pCi/L	0.04	U	U	0.12	0	6316023		0.3		N	Y			200	40	316.1	Primary and Lab Dup Non-detect. Acceptable Z-Score
F6J310237008X	MHW-C7-CWM-WW-X87-AW01-15	9/25/2006	DUP		Thorium 232	pCi/L	-0.016	U	U	0.04	0	6316023		0.1		N	Y			200	40	-17.1	Primary and Lab Dup Non-detect. Acceptable Z-Score
F6J310237009REA	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	SO		Thorium 230	pCi/L	0.32	J	J	0.14	0	6316023			0.7	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237009REA	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	SO		Thorium 228	pCi/L	0.25	J	J	0.13	0	6316023				Y	N						
F6J310237009REA	PIPEW-C7-CWM-WW-X86-SN01-6	9/22/2006	SO		Thorium 232	pCi/L	0.149	J	J	0.09	0	6316023				Y	N						
F6J310237010REA	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	SO		Thorium 230	pCi/L	0.19	J	UJ	0.13	0	6316023			0.1	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96) and MB exceeds sample result.
F6J310237010REA	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	SO		Thorium 228	pCi/L	0.067	U	U	0.09	0	6316023				N	Y						
F6J310237010REA	MHW-C7-CWM-WW-X100-SN01-14	10/2/2006	SO		Thorium 232	pCi/L	0.018	U	U	0.05	0	6316023				N	Y						
F6J310237011REA	IDWW-C7-NFS-WW-IDW-1	10/26/2006	SO		Thorium 230	pCi/L	0.172	J	UJ	0.09	0	6316023			0.2	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96) and MB exceeds sample result.
F6J310237011REA	IDWW-C7-NFS-WW-IDW-1	10/26/2006	SO		Thorium 228	pCi/L	-0.007	U	U	0.07	0	6316023				N	Y						
F6J310237011REA	IDWW-C7-NFS-WW-IDW-1	10/26/2006	SO		Thorium 232	pCi/L	0.003	U	U	0.04	0	6316023				N	Y						
F6J310237012REA	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	SO		Thorium 230	pCi/L	0.092	U	UJ	0.09	0	6316023			0.8	N	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96) and MB exceeds sample result.
F6J310237012REA	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	SO		Thorium 228	pCi/L	-0.02	U	U	0.1	0	6316023				N	Y						
F6J310237012REA	MHW-C7-CWM-WW-X97-SN01-14	10/2/2006	SO		Thorium 232	pCi/L	0.001	U	U	0.06	0	6316023				N	Y						
F6J310237013REA	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	SO	A-01-R MOD -Alpha Spec	Thorium 230	pCi/L	0.1	U	UJ	0.12	0	6316023			0.7	N	Y						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96) and MB exceeds sample result.
F6J310237013REA	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	SO		Thorium 228	pCi/L	-0.06	U	U	0.14	0	6316023				N	Y						
F6J310237013REA	MHW-C7-CWM-WW-X103-SN01-12	10/5/2006	SO		Thorium 232	pCi/L	-0.012	U	U	0.07	0	6316023				N	Y						
F6J310237014REA	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	SO		Thorium 230	pCi/L	0.51		J	0.21	0	6316023			1.3	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237014REA	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	SO		Thorium 228	pCi/L	0.29	J	J	0.17	0	6316023				Y	N						
F6J310237014REA	PIPEW-C7-CWM-WW-X105-SN01-12	10/3/2006	SO		Thorium 232	pCi/L	0.24	J	J	0.14	0	6316023				Y	N						
F6J310237015REA	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	SO		Thorium 230	pCi/L	0.29	J	J	0.13	0	6316023			0.5	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96)
F6J310237015REA	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	SO		Thorium 228	pCi/L	0.166	J	J	0.1	0	6316023				Y	N						
F6J310237015REA	PIPEW-C7-CWM-WW-X104-SN01-12	10/6/2006	SO		Thorium 232	pCi/L	0.126	J	J	0.09	0	6316023				Y	N						
F6J310237016REA	RB-C7-CWM-WW-RINSATE	10/11/2006	SO		Thorium 230	pCi/L	0.1	J	UJ	0.06	0	6316023			0.9	Y	N						Possible bias from isotope in MB (Normaized Absoulte Difference less than1.96) and MB exceeds sample result.
F6J310237016REA	RB-C7-CWM-WW-RINSATE	10/11/2006	SO		Thorium 228	pCi/L	0.031	U	U	0.07	0	6316023				N	Y						
F6J310237016REA	RB-C7-CWM-WW-RINSATE	10/11/2006	SO		Thorium 232	pCi/L	0.009	U	U	0.03	0	6316023				N	Y						
F6K120000023B	LABQC	9/29/2006	BM		Thorium 230	pCi/L	0.205	J		0.1	0	6316023		2.1		Y	N						
F6K120000023B	LABQC	9/29/2006	BM		Thorium 228	pCi/L	0.029	U		0.06	0	6316023		0.5		N	Y						
F6K120000023B	LABQC	9/29/2006	BM		Thorium 232	pCi/L	0.028	J		0.04	0	6316023		0.8		Y	Y						
F6K120000023C	LABQC	9/29/2006	LCS		Thorium 230	pCi/L	4.6			0.72	0	6316023	4.12	0.7		Y	N	112	62-137				

USACE - Buffalo District
Data Verification and Validation Report

Niagara Falls Storage Site
Pipeline Sampling
SDG #F6J31064

Data Package Summary

- The samples listed below were in the sample delivery group (work order). The samples were analyzed by Severn Trent Laboratories –St. Louis, MO for radiological analysis of:
  Isotopic uranium
  Isotopic thorium
  Radium (226 and 228)

Sample Cross Reference

#	LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION
1	F6J310264001	TSB-C7-0CC-SO-X11-SN07
2	F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5
3	F6J310264003	TSB-C7-CWM-SO-X90-AW01-17
4	F6J310264004	TSB-C7-CWM-SO-X101-SN01-14
5	F6J310264005	TSB-C7-CWM-SO-X104-SN01-13
6	F6J310264006	TSB-C7-CWM-SO-X99-SN01-15
7	F6J310264007	TSB-C7-CWM-SO-X92-AW01-14
8	F6J310264008	TSB-C7-CWM-SO-X97-SN01-14
9	F6J310264009	MHS-C7-CWM-SL-X97-SN01-14
10	F6J310264010	TSB-C7-CWM-SO-X105-SN01-12
11	F6J310264011	TSB-C7-CWM-SO-X94-AW01-10
12	F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10
13	F6J310264013	TSB-C7-CWM-SO-X103-SN01-13
14	F6J310264014	MHS-C7-CWM-SL-X103-SN01-12
15	F6J310264015	TSB-C7-CWM-SO-X95-AW01-10
16	F6J310264016	MHS-C7-CWM-SL-X83-SN01-6
17	F6J310264017	TSB-C7-CWM-SO-X83-SN01-7
18	F6J310264018	TSB-C7-CWM-SO-X100-SN01-14
19	F6J310264019	TSB-C7-CWM-SO-X98-SN01-15
20	F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D
21	F6J310264021	TSB-C7-CWM-SO-X106-SN01-14
22	F6J310264022	MHS-C7-CWM-SL-X106-SN01-16
23	F6J310264023	TSB-C7-CWM-SO-X87-AW01-16
24	F6J310264024	MHS-C7-CWM-SL-X87-AW01-16
25	F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D
26	F6J310264026	TSB-C7-CWM-SO-X96-AW01-10
27	F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10
28	F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D

#	LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION
29	F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D
30	F6J310264030	IDWS-C7-NFS-SL-IDW-1
31	F6J310264031	TSB-C7-CWM-SO-X21-WW01-4

Data Deliverables Completeness

- All required information was provided

Analytical Completeness

- Data completeness was 100%.

Analytical Deviations

Instrumentation

- All required information was provided

Batch QC Deviations

- Findings in the method blank were slightly elevated over their respective MDC for Th-230 for batch numbers: 6305381 and 6305382. Use of MARLAP (Chpt .18) numerical performance indicator value (Z Score) had a score greater than 2. Findings for Th-230 using the normalized absolute difference between the MB and the sample were greater than 2.58 (no action), impact is minimal.

Method blank and associated sample results:
The normalized absolute difference between the method blank and associated sample results, given by the below equation, is used in testing the null hypothesis that the sample and the method blank do not differ significantly when compared to their respective TPU. If the normalized absolute difference is greater than 2.58, one can conclude that the method blank and associated sample results differ significantly. No qualification of the data is necessary. If the normalized absolute difference is between 1.96 and 2.58 sample results are qualified "J" due to the possibility of activity in the method blank biasing sample results. If the normalized absolute difference is between 0 and 1.96, the conclusion is reached that the method blank and sample results do not differ significantly and reported results are qualified "UJ". The data was determined to be usable for its intended purpose because the blank contamination is negligible when compared to the derived concentration guideline levels (DCGLs).
Equation:
Sample-Method Blank Bias = |(S - B) / (TPU2S + TPU2B)1/2|
S = Sample result

B = Method blank result
TPUS = Total Propagated Uncertainty of the parent sample
TPUB = Total Propagated Uncertainty of the method blank

Sample Deviations

- Soil samples in batches # 6307129 and 6307135 were analyzed for Ra 226&228 using gamma spectroscopy reported all findings that recorded a value above the instruments MDC for those isotopes available in the instruments library, as was requested.

Data Usability

Based on the results of the data validation conducted by USACE-Buffalo District the data is usable for it's intended purpose as qualified.

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	GA-01-R MOD	Actinium 228	pCi/g	0.95			0.18	0.3
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.69			0.15	0.14
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	GA-01-R MOD	Lead 212	pCi/g	0.9			0.15	0.1
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	GA-01-R MOD	Lead 214	pCi/g	0.77			0.13	0.13
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	GA-01-R MOD	Potassium 40	pCi/g	16.7			2.7	0.5
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	GA-01-R MOD	Radium (226)	pCi/g	0.69			0.15	0.14
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	GA-01-R MOD	Radium 228	pCi/g	0.95			0.18	0.3
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	GA-01-R MOD	Thallium 208	pCi/g	0.247			0.067	0.069
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	A-01-R MOD	Thorium 228	pCi/g	0.91	J	J	0.18	0.03
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	A-01-R MOD	Thorium 230	pCi/g	0.85	J	J	0.17	0.03
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	A-01-R MOD	Thorium 232	pCi/g	0.87	J	J	0.17	0.01
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	A-01-R MOD	Uranium 234	pCi/g	0.7	J	J	0.15	0.03
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	A-01-R MOD	Uranium 235	pCi/g	0.048	J	J	0.037	0.037
F6J310264001	TSB-C7-0CC-SO-X11-SN07	8/9/2006	A-01-R MOD	Uranium 238	pCi/g	0.74	J	J	0.15	0.03
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	GA-01-R MOD	Actinium 228	pCi/g	0.48			0.14	0.23
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.57			0.11	0.08
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	GA-01-R MOD	Lead 212	pCi/g	0.61			0.11	0.07
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	GA-01-R MOD	Lead 214	pCi/g	0.66			0.1	0.1
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	GA-01-R MOD	Potassium 40	pCi/g	11.2			1.8	0.5
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	GA-01-R MOD	Radium (226)	pCi/g	0.57			0.11	0.08
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	GA-01-R MOD	Radium 228	pCi/g	0.48	J	J	0.14	0.23
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	GA-01-R MOD	Thallium 208	pCi/g	0.156			0.048	0.052
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	A-01-R MOD	Thorium 228	pCi/g	0.54	J	J	0.13	0.07
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	A-01-R MOD	Thorium 230	pCi/g	0.52	J	J	0.12	0.04
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	A-01-R MOD	Thorium 232	pCi/g	0.55	J	J	0.13	0.04
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	A-01-R MOD	Uranium 234	pCi/g	0.54	J	J	0.12	0.03

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	A-01-R MOD	Uranium 235	pCi/g	0.007	U	U	0.02	0.036
F6J310264002	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006	A-01-R MOD	Uranium 238	pCi/g	0.55	J	J	0.12	0.03
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	GA-01-R MOD	Actinium 228	pCi/g	1			0.27	0.44
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.72			0.18	0.18
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	GA-01-R MOD	Lead 212	pCi/g	1.02			0.18	0.2
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	GA-01-R MOD	Lead 214	pCi/g	0.91			0.16	0.16
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	GA-01-R MOD	Potassium 40	pCi/g	26.6			4.1	0.8
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	GA-01-R MOD	Radium (226)	pCi/g	0.72			0.18	0.18
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	GA-01-R MOD	Radium 228	pCi/g	1			0.27	0.44
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	GA-01-R MOD	Thallium 208	pCi/g	0.372			0.094	0.095
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	A-01-R MOD	Thorium 228	pCi/g	1.07			0.19	0.03
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	A-01-R MOD	Thorium 230	pCi/g	1.1			0.2	0.03
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	A-01-R MOD	Thorium 232	pCi/g	1.04			0.19	0.03
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	A-01-R MOD	Uranium 234	pCi/g	0.9	J	J	0.17	0.02
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	A-01-R MOD	Uranium 235	pCi/g	0.021	J	J	0.023	0.014
F6J310264003	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006	A-01-R MOD	Uranium 238	pCi/g	0.92	J	J	0.17	0.03
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	GA-01-R MOD	Actinium 228	pCi/g	0.88			0.17	0.29
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.57			0.12	0.1
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	GA-01-R MOD	Lead 212	pCi/g	0.82			0.13	0.08
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	GA-01-R MOD	Lead 214	pCi/g	0.69			0.11	0.11
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	GA-01-R MOD	Potassium 40	pCi/g	18			2.7	0.4
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	GA-01-R MOD	Radium (226)	pCi/g	0.57			0.12	0.1
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	GA-01-R MOD	Radium 228	pCi/g	0.88			0.17	0.29
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	GA-01-R MOD	Thallium 208	pCi/g	0.235			0.061	0.063
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	A-01-R MOD	Thorium 228	pCi/g	0.67	J	J	0.14	0.04
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	A-01-R MOD	Thorium 230	pCi/g	0.81	J	J	0.16	0.02
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	A-01-R MOD	Thorium 232	pCi/g	0.69	J	J	0.14	0.02

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	A-01-R MOD	Uranium 234	pCi/g	0.75	J	J	0.15	0.06
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	A-01-R MOD	Uranium 235	pCi/g	0.032	J	J	0.029	0.03
F6J310264004	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	A-01-R MOD	Uranium 238	pCi/g	0.76	J	J	0.15	0.03
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	GA-01-R MOD	Actinium 228	pCi/g	0.74			0.23	0.33
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.75			0.15	0.14
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	GA-01-R MOD	Lead 212	pCi/g	0.84			0.15	0.11
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	GA-01-R MOD	Lead 214	pCi/g	0.78			0.13	0.12
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	GA-01-R MOD	Potassium 40	pCi/g	18.1			2.9	0.6
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	GA-01-R MOD	Radium (226)	pCi/g	0.75			0.15	0.14
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	GA-01-R MOD	Radium 228	pCi/g	0.74			0.23	0.33
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	GA-01-R MOD	Thallium 208	pCi/g	0.201			0.062	0.077
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	A-01-R MOD	Thorium 228	pCi/g	0.75	J	J	0.15	0.03
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	A-01-R MOD	Thorium 230	pCi/g	0.68	J	J	0.14	0.03
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	A-01-R MOD	Thorium 232	pCi/g	0.72	J	J	0.15	0.04
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	A-01-R MOD	Uranium 234	pCi/g	0.64	J	J	0.14	0.03
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	A-01-R MOD	Uranium 235	pCi/g	0.062	J	J	0.042	0.038
F6J310264005	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006	A-01-R MOD	Uranium 238	pCi/g	0.83	J	J	0.17	0.01
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	GA-01-R MOD	Actinium 228	pCi/g	0.7			0.15	0.21
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	GA-01-R MOD	Bismuth 212	pCi/g	0.43			0.23	0.42
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.7			0.13	0.11
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	GA-01-R MOD	Lead 212	pCi/g	0.7			0.12	0.08
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	GA-01-R MOD	Lead 214	pCi/g	0.606			0.096	0.099
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	GA-01-R MOD	Potassium 40	pCi/g	11.8			1.9	0.3
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	GA-01-R MOD	Radium (226)	pCi/g	0.7			0.13	0.11
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	GA-01-R MOD	Radium 228	pCi/g	0.7			0.15	0.21
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	GA-01-R MOD	Thallium 208	pCi/g	0.244			0.057	0.055
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	A-01-R MOD	Thorium 228	pCi/g	0.64	J	J	0.14	0.05

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	A-01-R MOD	Thorium 230	pCi/g	0.68	J	J	0.14	0.01
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	A-01-R MOD	Thorium 232	pCi/g	0.68	J	J	0.14	0.01
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	A-01-R MOD	Uranium 234	pCi/g	0.58	J	J	0.13	0.04
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	A-01-R MOD	Uranium 235	pCi/g	0.032	U	U	0.033	0.039
F6J310264006	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	A-01-R MOD	Uranium 238	pCi/g	0.61	J	J	0.14	0.03
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.57			0.13	0.11
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	GA-01-R MOD	Lead 212	pCi/g	0.52			0.11	0.11
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	GA-01-R MOD	Lead 214	pCi/g	0.525			0.1	0.12
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	GA-01-R MOD	Potassium 40	pCi/g	9.8			1.8	0.9
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	GA-01-R MOD	Radium (226)	pCi/g	0.57			0.13	0.11
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	GA-01-R MOD	Radium 228	pCi/g	0.44	U	U	0.2	0.46
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	GA-01-R MOD	Thallium 208	pCi/g	0.188			0.056	0.06
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	A-01-R MOD	Thorium 228	pCi/g	0.72	J	J	0.15	0.05
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	A-01-R MOD	Thorium 230	pCi/g	0.62	J	J	0.14	0.04
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	A-01-R MOD	Thorium 232	pCi/g	0.82	J	J	0.16	0.01
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	A-01-R MOD	Uranium 234	pCi/g	0.53	J	J	0.12	0.03
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	A-01-R MOD	Uranium 235	pCi/g	0.033	J	J	0.03	0.015
F6J310264007	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	A-01-R MOD	Uranium 238	pCi/g	0.54	J	J	0.12	0.02
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	GA-01-R MOD	Actinium 228	pCi/g	0.83			0.19	0.29
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	GA-01-R MOD	Bismuth 212	pCi/g	0.88			0.33	0.54
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.57			0.14	0.13
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	GA-01-R MOD	Lead 212	pCi/g	0.78			0.14	0.15
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	GA-01-R MOD	Lead 214	pCi/g	0.82			0.13	0.12
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	GA-01-R MOD	Potassium 40	pCi/g	20.4			3.1	0.7
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	GA-01-R MOD	Radium (226)	pCi/g	0.57			0.14	0.13
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	GA-01-R MOD	Radium 228	pCi/g	0.83			0.19	0.29
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	GA-01-R MOD	Thallium 208	pCi/g	0.347			0.082	0.061

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	A-01-R MOD	Thorium 228	pCi/g	0.87	J	J	0.17	0.05
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	A-01-R MOD	Thorium 230	pCi/g	0.72	J	J	0.15	0.05
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	A-01-R MOD	Thorium 232	pCi/g	0.83	J	J	0.16	0.03
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	A-01-R MOD	Uranium 234	pCi/g	0.71	J	J	0.14	0.03
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	A-01-R MOD	Uranium 235	pCi/g	0.053	J	J	0.036	0.029
F6J310264008	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006	A-01-R MOD	Uranium 238	pCi/g	0.85	J	J	0.16	0.03
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Actinium 228	pCi/g	0.72			0.2	0.37
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Bismuth 214	pCi/g	1.12			0.21	0.16
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Cesium 137	pCi/g	0.276			0.084	0.085
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Lead 210	pCi/g	2.5			1	1.9
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Lead 212	pCi/g	0.8			0.15	0.13
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Lead 214	pCi/g	1.08			0.17	0.17
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Potassium 40	pCi/g	16.2			2.7	0.5
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Radium (226)	pCi/g	1.12			0.21	0.16
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Radium 228	pCi/g	0.72			0.2	0.37
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Thallium 208	pCi/g	0.291			0.08	0.075
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	A-01-R MOD	Thorium 228	pCi/g	0.71	J	J	0.16	0.06
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	A-01-R MOD	Thorium 230	pCi/g	1.17			0.22	0.03
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	A-01-R MOD	Thorium 232	pCi/g	0.81	J	J	0.17	0.03
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD	Thorium 234	pCi/g	7.9			1.2	1
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	A-01-R MOD	Uranium 234	pCi/g	9.6			1.3	0.03
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	A-01-R MOD	Uranium 235	pCi/g	0.38	J	J	0.11	0.02
F6J310264009	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	A-01-R MOD	Uranium 238	pCi/g	8.9			1.2	0.02
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.57			0.16	0.16
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	GA-01-R MOD	Lead 212	pCi/g	0.7			0.14	0.16
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	GA-01-R MOD	Lead 214	pCi/g	0.61			0.13	0.16
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	GA-01-R MOD	Potassium 40	pCi/g	16.8			2.8	0.6

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	GA-01-R MOD	Radium (226)	pCi/g	0.57			0.16	0.16
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	GA-01-R MOD	Radium 228	pCi/g	0.69			0.32	0.61
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	GA-01-R MOD	Thallium 208	pCi/g	0.27			0.082	0.098
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	A-01-R MOD	Thorium 228	pCi/g	0.73	J	J	0.16	0.05
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	A-01-R MOD	Thorium 230	pCi/g	0.67	J	J	0.15	0.04
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	A-01-R MOD	Thorium 232	pCi/g	0.69	J	J	0.15	0.03
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	A-01-R MOD	Uranium 234	pCi/g	0.68	J	J	0.14	0.03
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	A-01-R MOD	Uranium 235	pCi/g	0.046	J	J	0.035	0.032
F6J310264010	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	A-01-R MOD	Uranium 238	pCi/g	0.65	J	J	0.14	0.03
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	0.96			0.18	0.28
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	GA-01-R MOD	Bismuth 212	pCi/g	0.76			0.32	0.45
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.68			0.14	0.12
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	0.8			0.14	0.16
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	0.71			0.12	0.13
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	19.2			3	0.6
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	0.68			0.14	0.12
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	0.96			0.18	0.28
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.28			0.071	0.078
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	0.76	J	J	0.16	0.04
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	0.87	J	J	0.17	0.03
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	0.81	J	J	0.16	0.01
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	0.73	J	J	0.15	0.03
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.051	J	J	0.037	0.031
F6J310264011	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	0.78	J	J	0.16	0.03
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	0.61			0.2	0.31
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Bismuth 214	pCi/g	1.09			0.19	0.14
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Cesium 137	pCi/g	0.228			0.07	0.098

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Lead 210	pCi/g	2.13			0.93	1.6
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	0.7			0.13	0.12
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	1.2			0.17	0.15
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	12.2			2.2	0.6
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	1.09			0.19	0.14
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	0.61			0.2	0.31
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.231			0.069	0.086
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	0.67	J	J	0.14	0.03
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	1.04			0.19	0.03
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	0.61	J	J	0.13	0.03
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD	Thorium 234	pCi/g	3.92			0.66	0.75
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	6.62			0.91	0.03
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.44	J	J	0.12	0.03
F6J310264012	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	6.87			0.94	0.01
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	GA-01-R MOD	Actinium 228	pCi/g	0.98			0.22	0.31
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.56			0.14	0.16
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	GA-01-R MOD	Lead 212	pCi/g	0.68			0.14	0.13
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	GA-01-R MOD	Lead 214	pCi/g	0.78			0.14	0.14
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	GA-01-R MOD	Potassium 40	pCi/g	15.4			2.6	0.7
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	GA-01-R MOD	Radium (226)	pCi/g	0.56			0.14	0.16
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	GA-01-R MOD	Radium 228	pCi/g	0.98			0.22	0.31
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	GA-01-R MOD	Thallium 208	pCi/g	0.338			0.088	0.069
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	A-01-R MOD	Thorium 228	pCi/g	0.67	J	J	0.14	0.03
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	A-01-R MOD	Thorium 230	pCi/g	0.7	J	J	0.14	0.02
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	A-01-R MOD	Thorium 232	pCi/g	0.69	J	J	0.14	0.02
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	A-01-R MOD	Uranium 234	pCi/g	0.93	J	J	0.19	0.03
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	A-01-R MOD	Uranium 235	pCi/g	0.091	J	J	0.054	0.019

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264013	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006	A-01-R MOD	Uranium 238	pCi/g	0.81	J	J	0.17	0.03
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.33			0.17	0.23
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD	Lead 210	pCi/g	8.1			2.2	2.5
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD	Lead 212	pCi/g	0.5			0.15	0.21
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD	Lead 214	pCi/g	0.56			0.14	0.24
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD	Potassium 40	pCi/g	10.7			2.4	1.3
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD	Radium (226)	pCi/g	0.33	J	J	0.17	0.23
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD	Radium 228	pCi/g	0.62	U	U	0.39	0.77
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD	Thallium 208	pCi/g	0.15			0.079	0.13
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	A-01-R MOD	Thorium 228	pCi/g	0.196	J	J	0.071	0.044
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	A-01-R MOD	Thorium 230	pCi/g	0.246	J	J	0.077	0.026
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	A-01-R MOD	Thorium 232	pCi/g	0.192	J	J	0.067	0.013
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD	Thorium 234	pCi/g	2.52			0.67	1.2
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	A-01-R MOD	Uranium 234	pCi/g	3.43			0.5	0.01
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	A-01-R MOD	Uranium 235	pCi/g	0.121	J	J	0.056	0.016
F6J310264014	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	A-01-R MOD	Uranium 238	pCi/g	2.78			0.42	0.03
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	0.87			0.18	0.34
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.82			0.16	0.15
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	0.79			0.14	0.18
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	0.73			0.13	0.14
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	18.5			2.9	0.7
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	0.82			0.16	0.15
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	0.87			0.18	0.34
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.297			0.077	0.079
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	1	J	J	0.19	0.04
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	0.89	J	J	0.18	0.01
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	0.93	J	J	0.18	0.03

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	0.63	J	J	0.14	0.03
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.042	J	J	0.034	0.016
F6J310264015	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	0.72	J	J	0.15	0.01
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	GA-01-R MOD	Actinium 228	pCi/g	0.58			0.18	0.26
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.65			0.15	0.1
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	GA-01-R MOD	Cesium 137	pCi/g	0.144			0.054	0.058
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	GA-01-R MOD	Lead 212	pCi/g	0.53			0.1	0.13
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	GA-01-R MOD	Lead 214	pCi/g	0.68			0.12	0.11
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	GA-01-R MOD	Potassium 40	pCi/g	12.5			2.1	0.5
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	GA-01-R MOD	Radium (226)	pCi/g	0.65			0.15	0.1
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	GA-01-R MOD	Radium 228	pCi/g	0.58			0.18	0.26
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	GA-01-R MOD	Thallium 208	pCi/g	0.182			0.059	0.07
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	A-01-R MOD	Thorium 228	pCi/g	0.54	J	J	0.12	0.04
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	A-01-R MOD	Thorium 230	pCi/g	0.66	J	J	0.14	0.03
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	A-01-R MOD	Thorium 232	pCi/g	0.63	J	J	0.13	0.02
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	A-01-R MOD	Uranium 234	pCi/g	0.79	J	J	0.16	0.03
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	A-01-R MOD	Uranium 235	pCi/g	0.034	J	J	0.031	0.016
F6J310264016	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006	A-01-R MOD	Uranium 238	pCi/g	0.76	J	J	0.15	0.01
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	GA-01-R MOD	Actinium 228	pCi/g	0.54			0.16	0.18
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.39			0.11	0.11
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	GA-01-R MOD	Lead 212	pCi/g	0.368			0.087	0.12
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	GA-01-R MOD	Lead 214	pCi/g	0.51			0.097	0.11
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	GA-01-R MOD	Potassium 40	pCi/g	11			1.9	0.4
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	GA-01-R MOD	Radium (226)	pCi/g	0.39	J	J	0.11	0.11
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	GA-01-R MOD	Radium 228	pCi/g	0.54			0.16	0.18
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	GA-01-R MOD	Thallium 208	pCi/g	0.121			0.046	0.065
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	A-01-R MOD	Thorium 228	pCi/g	0.47	J	J	0.12	0.04

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	A-01-R MOD	Thorium 230	pCi/g	0.45	J	J	0.11	0.03
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	A-01-R MOD	Thorium 232	pCi/g	0.4	J	J	0.1	0.04
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	GA-01-R MOD	Thorium 234	pCi/g	0.5	U	U	0.23	0.6
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	A-01-R MOD	Uranium 234	pCi/g	0.362	J	J	0.094	0.029
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	A-01-R MOD	Uranium 235	pCi/g	0.015	U	U	0.021	0.03
F6J310264017	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006	A-01-R MOD	Uranium 238	pCi/g	0.363	J	J	0.094	0.024
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD	Actinium 228	pCi/g	1.05			0.28	0.59
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD	Bismuth 212	pCi/g	1.02			0.45	1
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD	Bismuth 214	pCi/g	1.02			0.21	0.24
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD	Lead 212	pCi/g	1.17			0.21	0.21
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD	Lead 214	pCi/g	1.04			0.17	0.16
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD	Potassium 40	pCi/g	26.6			4.2	0.9
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD	Radium (226)	pCi/g	1.02			0.21	0.24
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD	Radium 228	pCi/g	1.05			0.28	0.59
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD	Thallium 208	pCi/g	0.45			0.11	0.1
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	A-01-R MOD	Thorium 228	pCi/g	1.04			0.2	0.06
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	A-01-R MOD	Thorium 230	pCi/g	1.03			0.19	0.01
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	A-01-R MOD	Thorium 232	pCi/g	1.11			0.2	0.02
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	A-01-R MOD	Uranium 234	pCi/g	0.85	J	J	0.16	0.03
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	A-01-R MOD	Uranium 235	pCi/g	0.052	J	J	0.038	0.035
F6J310264018	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	A-01-R MOD	Uranium 238	pCi/g	0.83	J	J	0.16	0.01
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	GA-01-R MOD	Actinium 228	pCi/g	0.7			0.16	0.23
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.54			0.12	0.13
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	GA-01-R MOD	Lead 212	pCi/g	0.8			0.13	0.12
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	GA-01-R MOD	Lead 214	pCi/g	0.75			0.12	0.11
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	GA-01-R MOD	Potassium 40	pCi/g	16.3			2.5	0.8
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	GA-01-R MOD	Radium (226)	pCi/g	0.54			0.12	0.13

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F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	GA-01-R MOD	Radium 228	pCi/g	0.7			0.16	0.23
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	GA-01-R MOD	Thallium 208	pCi/g	0.272			0.067	0.06
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	A-01-R MOD	Thorium 228	pCi/g	0.62	J	J	0.14	0.04
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	A-01-R MOD	Thorium 230	pCi/g	0.74	J	J	0.15	0.03
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	A-01-R MOD	Thorium 232	pCi/g	0.77	J	J	0.16	0.03
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	A-01-R MOD	Uranium 234	pCi/g	0.54	J	J	0.12	0.04
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	A-01-R MOD	Uranium 235	pCi/g	0.012	U	U	0.02	0.016
F6J310264019	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	A-01-R MOD	Uranium 238	pCi/g	0.61	J	J	0.13	0.02
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	0.9			0.21	0.33
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.72			0.16	0.14
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	0.91			0.16	0.1
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	0.72			0.13	0.15
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	16.2			2.7	0.8
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	0.72			0.16	0.14
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	0.9			0.21	0.33
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.273			0.076	0.065
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	0.93	J	J	0.18	0.04
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	0.91	J	J	0.17	0.03
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	0.82	J	J	0.16	0.01
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	0.79	J	J	0.16	0.04
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.024	U	U	0.038	0.056
F6J310264020	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	0.68	J	J	0.14	0.04
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	1.16			0.2	0.3
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.89			0.17	0.15
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	1.02			0.16	0.1
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	0.94			0.14	0.13
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	23.8			3.4	0.7

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F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	0.89			0.17	0.15
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	1.16			0.2	0.3
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.271			0.069	0.078
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	1.03			0.2	0.06
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	1			0.19	0.05
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	1.01			0.19	0.03
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	0.82	J	J	0.16	0.03
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.08	J	J	0.047	0.017
F6J310264021	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	0.82	J	J	0.17	0.01
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	0.89			0.25	0.5
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.99			0.21	0.2
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Cesium 137	pCi/g	0.28			0.089	0.12
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Lead 210	pCi/g	3.29			0.88	1.3
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	0.95			0.18	0.12
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	0.97			0.16	0.17
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	18.6			3.1	0.8
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Protactinium 234M	pCi/g	14.9			8.6	12
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	0.99			0.21	0.2
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	0.89			0.25	0.5
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.228			0.074	0.11
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	0.6			0.14	0.06
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	0.62			0.14	0.03
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	0.45	J	J	0.12	0.03
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Thorium 234	pCi/g	10.3			1.5	1
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	12.9			1.7	0.05
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.65	J	J	0.15	0.03
F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	GA-01-R MOD	Uranium 235	pCi/g	0.73			0.21	0.37

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F6J310264022	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	11.4			1.5	0.04
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	GA-01-R MOD	Actinium 228	pCi/g	0.7			0.17	0.23
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.52			0.11	0.12
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	GA-01-R MOD	Lead 212	pCi/g	0.57			0.11	0.11
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	GA-01-R MOD	Lead 214	pCi/g	0.496			0.09	0.11
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	GA-01-R MOD	Potassium 40	pCi/g	12.7			2	0.5
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	GA-01-R MOD	Radium (226)	pCi/g	0.52			0.11	0.12
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	GA-01-R MOD	Radium 228	pCi/g	0.7			0.17	0.23
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	GA-01-R MOD	Thallium 208	pCi/g	0.198			0.054	0.054
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	A-01-R MOD	Thorium 228	pCi/g	0.58			0.13	0.07
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	A-01-R MOD	Thorium 230	pCi/g	0.56			0.13	0.04
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	A-01-R MOD	Thorium 232	pCi/g	0.46	J	J	0.11	0.03
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	A-01-R MOD	Uranium 234	pCi/g	0.53	J	J	0.13	0.03
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	A-01-R MOD	Uranium 235	pCi/g	0.029	U	U	0.03	0.033
F6J310264023	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	A-01-R MOD	Uranium 238	pCi/g	0.56	J	J	0.13	0.04
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Actinium 228	pCi/g	0.57			0.15	0.27
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.35			0.11	0.12
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Cesium 137	pCi/g	0.343			0.081	0.073
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Lead 210	pCi/g	2.19			0.86	1.4
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Lead 212	pCi/g	0.54			0.1	0.08
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Lead 214	pCi/g	0.456			0.087	0.11
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Potassium 40	pCi/g	10.7			1.9	0.7
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Radium (226)	pCi/g	0.35	J	J	0.11	0.12
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Radium 228	pCi/g	0.57			0.15	0.27
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Thallium 208	pCi/g	0.18			0.056	0.077
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	A-01-R MOD	Thorium 228	pCi/g	0.48	J	J	0.14	0.08
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	A-01-R MOD	Thorium 230	pCi/g	0.69			0.16	0.04

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	A-01-R MOD	Thorium 232	pCi/g	0.51			0.14	0.04
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	GA-01-R MOD	Thorium 234	pCi/g	2.75			0.5	0.69
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	A-01-R MOD	Uranium 234	pCi/g	3.36			0.5	0.05
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	A-01-R MOD	Uranium 235	pCi/g	0.135	J	J	0.061	0.031
F6J310264024	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006	A-01-R MOD	Uranium 238	pCi/g	3.25			0.48	0.03
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Actinium 228	pCi/g	0.54			0.13	0.26
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.54			0.11	0.1
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Cesium 137	pCi/g	0.324			0.072	0.06
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Lead 210	pCi/g	3.13			0.84	1.3
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Lead 212	pCi/g	0.62			0.1	0.07
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Lead 214	pCi/g	0.615			0.094	0.1
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Potassium 40	pCi/g	12.7			2	0.5
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Radium (226)	pCi/g	0.54			0.11	0.1
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Radium 228	pCi/g	0.54			0.13	0.26
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Thallium 208	pCi/g	0.193			0.049	0.053
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	A-01-R MOD	Thorium 228	pCi/g	0.58			0.14	0.07
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	A-01-R MOD	Thorium 230	pCi/g	0.5			0.12	0.04
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	A-01-R MOD	Thorium 232	pCi/g	0.46	J	J	0.11	0.03
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	GA-01-R MOD	Thorium 234	pCi/g	2.82			0.47	0.49
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	A-01-R MOD	Uranium 234	pCi/g	3.16			0.48	0.04
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	A-01-R MOD	Uranium 235	pCi/g	0.125	J	J	0.06	0.043
F6J310264025	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	A-01-R MOD	Uranium 238	pCi/g	2.88			0.44	0.04
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	0.95			0.18	0.27
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.78			0.16	0.14
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	0.83			0.15	0.12
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	0.83			0.13	0.11
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	19.8			2.9	0.6

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F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	0.78			0.16	0.14
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	0.95			0.18	0.27
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.271			0.071	0.07
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	0.91			0.19	0.08
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	0.89			0.19	0.04
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	0.89			0.18	0.04
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	0.74	J	J	0.16	0.04
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.064	J	J	0.043	0.017
F6J310264026	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	0.73	J	J	0.15	0.03
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	0.77			0.18	0.26
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.76			0.15	0.11
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	0.75			0.13	0.09
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	0.92			0.13	0.11
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	10.1			1.7	0.7
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	0.76			0.15	0.11
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	0.77			0.18	0.26
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.225			0.058	0.068
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	0.57			0.17	0.16
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	1.2			0.22	0.05
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	0.55			0.13	0.04
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	GA-01-R MOD	Thorium 234	pCi/g	2.66			0.47	0.65
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	5.02			0.71	0.04
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.225	J	J	0.084	0.057
F6J310264027	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	4.92			0.7	0.04
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	0.85			0.17	0.29
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.62			0.14	0.13
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	0.87			0.15	0.09

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F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	0.75			0.12	0.13
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	18.8			2.8	0.7
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	0.62			0.14	0.13
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	0.85			0.17	0.29
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.249			0.066	0.064
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	1.02			0.2	0.06
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	0.9			0.18	0.04
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	1.13			0.22	0.04
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	0.74	J	J	0.16	0.04
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.047	J	J	0.036	0.032
F6J310264028	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	0.78	J	J	0.16	0.04
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Actinium 228	pCi/g	0.96			0.21	0.33
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Bismuth 212	pCi/g	0.71			0.34	0.6
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Lead 212	pCi/g	0.81			0.14	0.11
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Lead 214	pCi/g	1.22			0.17	0.13
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Potassium 40	pCi/g	12.8			2.2	0.4
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Radium (226)	pCi/g	1.09			0.2	0.15
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Radium 228	pCi/g	0.96			0.21	0.33
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Thallium 208	pCi/g	0.264			0.068	0.068
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Thorium 228	pCi/g	0.68			0.15	0.07
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Thorium 230	pCi/g	1.25			0.22	0.04
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Thorium 232	pCi/g	0.58			0.13	0.04
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	GA-01-R MOD	Thorium 234	pCi/g	3.02			0.56	0.88
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Uranium 234	pCi/g	5.05			0.7	0.03
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Uranium 235	pCi/g	0.187	J	J	0.07	0.03
F6J310264029	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006	A-01-R MOD	Uranium 238	pCi/g	5.23			0.73	0.03
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	GA-01-R MOD	Actinium 228	pCi/g	0.71			0.18	0.33

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F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	GA-01-R MOD	Bismuth 214	pCi/g	0.6			0.14	0.16
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	GA-01-R MOD	Lead 212	pCi/g	0.63			0.13	0.14
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	GA-01-R MOD	Lead 214	pCi/g	0.61			0.12	0.16
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	GA-01-R MOD	Potassium 40	pCi/g	4.9			1.3	0.7
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	GA-01-R MOD	Radium (226)	pCi/g	0.6			0.14	0.16
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	GA-01-R MOD	Radium 228	pCi/g	0.71			0.18	0.33
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	GA-01-R MOD	Thallium 208	pCi/g	0.18			0.066	0.085
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	A-01-R MOD	Thorium 228	pCi/g	0.68			0.15	0.07
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	A-01-R MOD	Thorium 230	pCi/g	1.37			0.24	0.04
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	A-01-R MOD	Thorium 232	pCi/g	0.74			0.15	0.03
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	GA-01-R MOD	Thorium 234	pCi/g	1.03			0.3	0.69
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	A-01-R MOD	Uranium 234	pCi/g	1.54			0.27	0.03
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	A-01-R MOD	Uranium 235	pCi/g	0.077	J	J	0.05	0.043
F6J310264030	IDWS-C7-NFS-SL-IDW-1	10/27/2006	A-01-R MOD	Uranium 238	pCi/g	1.65			0.29	0.01
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Actinium 228	pCi/g	0.74			0.16	0.28
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Bismuth 212	pCi/g	1.1			0.32	0.45
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Bismuth 214	pCi/g	3.94			0.5	0.13
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Lead 212	pCi/g	0.95			0.15	0.12
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Lead 214	pCi/g	3.86			0.45	0.13
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Potassium 40	pCi/g	10.8			1.7	0.8
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Radium (226)	pCi/g	3.94			0.5	0.13
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Radium 228	pCi/g	0.74			0.16	0.28
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Thallium 208	pCi/g	0.256			0.063	0.08
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	A-01-R MOD	Thorium 228	pCi/g	0.66			0.14	0.03
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	A-01-R MOD	Thorium 230	pCi/g	1.18			0.21	0.01
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	A-01-R MOD	Thorium 232	pCi/g	0.72			0.15	0.03
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD	Thorium 234	pCi/g	3.19			0.54	0.74

USACE - Buffalo District
Data Verification and Validation Report

LAB SAMPLE ID	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	Validated Qualifier	TOTAL UNCERTAINTY	MDC
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	A-01-R MOD	Uranium 234	pCi/g	1.01			0.19	0.04
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	A-01-R MOD	Uranium 235	pCi/g	0.082	J	J	0.046	0.016
F6J310264031	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	A-01-R MOD	Uranium 238	pCi/g	0.94	J	J	0.18	0.03

Laboratory Analytical Method	Analysis by:
903.0 MOD	Gas Flow Proportional Counting (GFPC)
A-01-R MOD	Alpha Spectronomy
904 MOD	Gas Flow Proportional Counting (GFPC)
GA-01-R MOD	Gamma Spectronomy

USACE - Buffalo District
Data Verification and Validation Form

Verification and Validation Cover Sheet

Project: Niagara Falls Storage Site/LOOW Pipe Line Sampling
Job/Contract/P.O.#: DACW49-03-D-0003 (Cabrera)

SDG No.: F6J310264

Laboratory Identification: STL - St.Louis
Address (City/State): St.Louis., MO

Contractor Identification: Cabrera
Address (City/State): East Hartford , CT

Validation Requirements Based On: QAPP RI at NFSS (Sept.1999)
MARLAP

Date of Sample Reciept: 30-Oct-06
Date of Data Package: 22-Nov-06
Completeness: 100 (Must be > 90%)

Verification by: Mat Masset Date: 15-Oct-07
Validation by: Mat Masset Date: 15-Oct-07

Parameters	Instrumentation
Th-228	Alpha Spec -Th
Th-230	
Th-232	
U-234	Alpha Spec -U
U-235	
U-238	
Ra-226	Gas Flow Proportional Counting -Ra
Ra-228	
Ra-226	Gamma Spec -Ra
Ra-228	

USACE - Buffalo District
Data Verification and Validation Form

Data Package Checklist

Required Data Package Components

Chain of Custody?:	Y
COC No.:	320241, 320242, 320243
Cooler Reciept Checklist?:	Y
Sample Preservation OK?:	Y
Cover Sheet listing samples?:	Y
Case narrative including analysis problems?:	Y
Laboratory Project Manager signed narrative?:	Y
Tabulated Results?:	Y
Analytical Results for QC Samples?:	Y
Lab. Duplicates run at least once per 20 samples?:	Y
Matrix Spike/LCS Dup. run at least once per 20 samples?:	Y
Tabulation of MDLs in water?:	N
Run logs included?:	Y
10% of calculations checked by Verifier?:	Y

USACE - Buffalo District
Data Verification and Validation Form

Instrument Checklist

	Alpha Spec -Th	Alpha Spec -U	Gas Flow Proportional Counting -Ra	Gamma Spec -Ra						
Basic calibration:										
Calibration file/files identified for all detectors or listing of efficiency determination present?	Y	Y	Y	Y						
Continuing calibration:										
Efficiency control check given as percent difference from calibration?	Y	Y	Y	Y						
Control charts or other documentation of instrument background provided?	Y	Y	Y	Y						

Compliance Listing	Non-compliance details or comments
Alpha Spec -Th instrument is in compliance with requirements.	
Alpha Spec -U instrument is in compliance with requirements.	
Gas Flow Proportional Counting -Ra instrument is in compliance with requirements.	
Gamma Spec -Ra instrument is in compliance with requirements.	

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006	A-01-R MOD - Alpha Spec.	Thorium 228	pCi/g	0.91	J	**J**	0.18	0.03	6305381				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Thorium 230	pCi/g	0.85	J	**J**	0.17	0.03	6305381			4.6	Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Thorium 232	pCi/g	0.87	J	**J**	0.17	0.01	6305381				Y	N						
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Thorium 228	pCi/g	0.77	J	**J**	0.18	0.08	6305381		0.5		Y	N			17	40	16.7	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Thorium 230	pCi/g	0.74	J	**J**	0.17	0.04	6305381		0.5	4.0	Y	N			14	40	13.8	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Thorium 232	pCi/g	0.85	J	**J**	0.19	0.05	6305381		0.1		Y	N			3	40	2.3	
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Thorium 228	pCi/g	0.54	J	**J**	0.13	0.07	6305381				Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Thorium 230	pCi/g	0.52	J	**J**	0.12	0.04	6305381			3.8	Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Thorium 232	pCi/g	0.55	J	**J**	0.13	0.04	6305381				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Thorium 228	pCi/g	1.07			0.19	0.03	6305381				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Thorium 230	pCi/g	1.1			0.2	0.03	6305381			5.2	Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Thorium 232	pCi/g	1.04			0.19	0.03	6305381				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Thorium 228	pCi/g	0.67	J	**J**	0.14	0.04	6305381				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Thorium 230	pCi/g	0.81	J	**J**	0.16	0.02	6305381			4.7	Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Thorium 232	pCi/g	0.69	J	**J**	0.14	0.02	6305381				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Thorium 228	pCi/g	0.75	J	**J**	0.15	0.03	6305381				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Thorium 230	pCi/g	0.68	J	**J**	0.14	0.03	6305381			4.4	Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Thorium 232	pCi/g	0.72	J	**J**	0.15	0.04	6305381				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Thorium 228	pCi/g	0.64	J	**J**	0.14	0.05	6305381				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Thorium 230	pCi/g	0.68	J	**J**	0.14	0.01	6305381			4.4	Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Thorium 232	pCi/g	0.68	J	**J**	0.14	0.01	6305381				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Thorium 228	pCi/g	0.72	J	**J**	0.15	0.05	6305381				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Thorium 230	pCi/g	0.62	J	**J**	0.14	0.04	6305381			4.0	Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Thorium 232	pCi/g	0.82	J	**J**	0.16	0.01	6305381				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Thorium 228	pCi/g	0.87	J	**J**	0.17	0.05	6305381				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Thorium 230	pCi/g	0.72	J	**J**	0.15	0.05	6305381			4.4	Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Thorium 232	pCi/g	0.83	J	**J**	0.16	0.03	6305381				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Thorium 228	pCi/g	0.71	J	**J**	0.16	0.06	6305381				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Thorium 230	pCi/g	1.17			0.22	0.03	6305381			5.0	Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Thorium 232	pCi/g	0.81	J	**J**	0.17	0.03	6305381				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006	A-01-R MOD - Alpha Spec.	Thorium 228	pCi/g	0.73	J	**J**	0.16	0.05	6305381				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Thorium 230	pCi/g	0.67	J	**J**	0.15	0.04	6305381			4.0	Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Thorium 232	pCi/g	0.69	J	**J**	0.15	0.03	6305381				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Thorium 228	pCi/g	0.76	J	**J**	0.16	0.04	6305381				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Thorium 230	pCi/g	0.87	J	**J**	0.17	0.03	6305381			4.7	Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Thorium 232	pCi/g	0.81	J	**J**	0.16	0.01	6305381				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Thorium 228	pCi/g	0.67	J	**J**	0.14	0.03	6305381				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Thorium 230	pCi/g	1.04			0.19	0.03	6305381			5.1	Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Thorium 232	pCi/g	0.61	J	**J**	0.13	0.03	6305381				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Thorium 228	pCi/g	0.67	J	**J**	0.14	0.03	6305381				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Thorium 230	pCi/g	0.7	J	**J**	0.14	0.02	6305381			4.5	Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Thorium 232	pCi/g	0.69	J	**J**	0.14	0.02	6305381				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Thorium 228	pCi/g	0.196	J	**J**	0.071	0.044	6305381				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Thorium 230	pCi/g	0.246	J	**J**	0.077	0.026	6305381			2.4	Y	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	A-01-R MOD - Alpha Spec.	Thorium 232	pCi/g	0.192	J	**J**	0.067	0.013	6305381				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Thorium 228	pCi/g	1	J	**J**	0.19	0.04	6305381				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Thorium 230	pCi/g	0.89	J	**J**	0.18	0.01	6305381			4.6	Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Thorium 232	pCi/g	0.93	J	**J**	0.18	0.03	6305381				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Thorium 228	pCi/g	0.54	J	**J**	0.12	0.04	6305381				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Thorium 230	pCi/g	0.66	J	**J**	0.14	0.03	6305381			4.3	Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Thorium 232	pCi/g	0.63	J	**J**	0.13	0.02	6305381				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Thorium 228	pCi/g	0.47	J	**J**	0.12	0.04	6305381				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Thorium 230	pCi/g	0.45	J	**J**	0.11	0.03	6305381			3.5	Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Thorium 232	pCi/g	0.4	J	**J**	0.1	0.04	6305381				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Thorium 228	pCi/g	1.04			0.2	0.06	6305381				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Thorium 230	pCi/g	1.03			0.19	0.01	6305381			5.1	Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Thorium 232	pCi/g	1.11			0.2	0.02	6305381				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Thorium 228	pCi/g	0.62	J	**J**	0.14	0.04	6305381				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Thorium 230	pCi/g	0.74	J	**J**	0.15	0.03	6305381			4.5	Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Thorium 232	pCi/g	0.77	J	**J**	0.16	0.03	6305381				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Thorium 228	pCi/g	0.93	J	**J**	0.18	0.04	6305381				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Thorium 230	pCi/g	0.91	J	**J**	0.17	0.03	6305381				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Thorium 232	pCi/g	0.82	J	**J**	0.16	0.01	6305381				Y	N						
F6K010000381B	BM	LABQC	8/9/2006		Thorium 228	pCi/g	-0.0002	U		0.0086	0.018	6305381		0.0		N	Y						
F6K010000381B	BM	LABQC	8/9/2006		Thorium 230	pCi/g	0.056	J		0.024	0.013	6305381		2.3		Y	N						
F6K010000381B	BM	LABQC	8/9/2006		Thorium 232	pCi/g	0.0025	U		0.0072	0.013	6305381		0.3		N	Y						
F6K010000381C	LCS	LABQC	8/9/2006		Thorium 228	pCi/g	1.33			0.5	0.35	6305381	0	*****		Y	N	*****	85-120				
F6K010000381C	LCS	LABQC	8/9/2006		Thorium 230	pCi/g	60.3			8.2	0.2	6305381	58.5	0.2		Y	N	103	68-128			103.1	
F6K010000381C	LCS	LABQC	8/9/2006		Thorium 232	pCi/g	1.04			0.41	0.18	6305381	0	*****		Y	N	*****	84-120				
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	A-01-R MOD - Alpha Spec.	Thorium 228	pCi/g	1.03			0.2	0.06	6305382				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Thorium 230	pCi/g	1			0.19	0.05	6305382			5.0	Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Thorium 232	pCi/g	1.01			0.19	0.03	6305382				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Thorium 228	pCi/g	0.6			0.14	0.06	6305382				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Thorium 230	pCi/g	0.62			0.14	0.03	6305382			4.1	Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Thorium 232	pCi/g	0.45	J	**J**	0.12	0.03	6305382				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Thorium 228	pCi/g	0.58			0.13	0.07	6305382				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Thorium 230	pCi/g	0.56			0.13	0.04	6305382			3.9	Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Thorium 232	pCi/g	0.46	J	**J**	0.11	0.03	6305382				Y	N						
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Thorium 228	pCi/g	0.59			0.13	0.05	6305382		0.1		Y	N			2	40	1.7	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Thorium 230	pCi/g	0.58			0.13	0.04	6305382		0.1	4.1	Y	N			3	40	3.5	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Thorium 232	pCi/g	0.57			0.13	0.03	6305382		0.6		Y	N			21	40	21.4	
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Thorium 228	pCi/g	0.48	J	**J**	0.14	0.08	6305382				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Thorium 230	pCi/g	0.69			0.16	0.04	6305382			4.0	Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Thorium 232	pCi/g	0.51			0.14	0.04	6305382				Y	N						
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Thorium 228	pCi/g	0.48	J	**J**	0.12	0.05	6305382		0.0		Y	N			1	40	0.0	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Thorium 230	pCi/g	0.6			0.13	0.03	6305382		0.4	4.2	Y	N			14	40	14.0	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Thorium 232	pCi/g	0.42	J	**J**	0.11	0.01	6305382		0.5		Y	N			19	40	19.4	
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Thorium 228	pCi/g	0.58			0.14	0.07	6305382				Y	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006	A-01-R MOD - Alpha Spec.	Thorium 230	pCi/g	0.5			0.12	0.04	6305382			3.8	Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Thorium 232	pCi/g	0.46	J	**J**	0.11	0.03	6305382				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Thorium 228	pCi/g	0.91			0.19	0.08	6305382				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Thorium 230	pCi/g	0.89			0.19	0.04	6305382			4.4	Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Thorium 232	pCi/g	0.89			0.18	0.04	6305382				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Thorium 228	pCi/g	0.57			0.17	0.16	6305382				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Thorium 230	pCi/g	1.2			0.22	0.05	6305382			5.2	Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Thorium 232	pCi/g	0.55			0.13	0.04	6305382				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Thorium 228	pCi/g	1.02			0.2	0.06	6305382				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Thorium 230	pCi/g	0.9			0.18	0.04	6305382			4.7	Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Thorium 232	pCi/g	1.13			0.22	0.04	6305382				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Thorium 228	pCi/g	0.68			0.15	0.07	6305382				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Thorium 230	pCi/g	1.25			0.22	0.04	6305382			5.5	Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Thorium 232	pCi/g	0.58			0.13	0.04	6305382				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Thorium 228	pCi/g	0.68			0.15	0.07	6305382				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Thorium 230	pCi/g	1.37			0.24	0.04	6305382			5.5	Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Thorium 232	pCi/g	0.74			0.15	0.03	6305382				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Thorium 228	pCi/g	0.66			0.14	0.03	6305382				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Thorium 230	pCi/g	1.18			0.21	0.01	6305382			5.4	Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Thorium 232	pCi/g	0.72			0.15	0.03	6305382				Y	N						
F6K010000382B	BM	LABQC	9/25/2006		Thorium 228	pCi/g	0.0017	U		0.0083	0.016	6305382		0.2		N	Y						
F6K010000382B	BM	LABQC	9/25/2006		Thorium 230	pCi/g	0.041	J		0.021	0.016	6305382		2.0		Y	N						
F6K010000382B	BM	LABQC	9/25/2006		Thorium 232	pCi/g	0	U		0	0.006	6305382		0.0		N	Y						
F6K010000382C	LCS	LABQC	9/25/2006		Thorium 228	pCi/g	1.36			0.5	0.4	6305382	0	*****		Y	N	*****	85-120				
F6K010000382C	LCS	LABQC	9/25/2006		Thorium 230	pCi/g	51.9			7	0.2	6305382	58.5	0.9		Y	N	89	68-128			88.7	
F6K010000382C	LCS	LABQC	9/25/2006		Thorium 232	pCi/g	1.07			0.41	0.24	6305382	0	*****		Y	N	*****	84-120				
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006	A-01-R MOD - Alpha Spec.	Uranium 234	pCi/g	0.7	J	**J**	0.15	0.03	6305383				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Uranium 235	pCi/g	0.048	J	**J**	0.037	0.037	6305383				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Uranium 238	pCi/g	0.74	J	**J**	0.15	0.03	6305383				Y	N						
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Uranium 234	pCi/g	0.74	J	**J**	0.15	0.03	6305383		0.2		Y	N			6	40	5.6	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Uranium 235	pCi/g	0.012	U	**U**	0.021	0.016	6305383		0.8		N	Y			120		120.0	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Uranium 238	pCi/g	0.7	J	**J**	0.15	0.03	6305383		0.2		Y	N			6	40	5.6	
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Uranium 234	pCi/g	0.54	J	**J**	0.12	0.03	6305383				Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Uranium 235	pCi/g	0.007	U	**U**	0.02	0.036	6305383				N	Y						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Uranium 238	pCi/g	0.55	J	**J**	0.12	0.03	6305383				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Uranium 234	pCi/g	0.9	J	**J**	0.17	0.02	6305383				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Uranium 235	pCi/g	0.021	J	**J**	0.023	0.014	6305383				Y	Y						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Uranium 238	pCi/g	0.92	J	**J**	0.17	0.03	6305383				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Uranium 234	pCi/g	0.75	J	**J**	0.15	0.06	6305383				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Uranium 235	pCi/g	0.032	J	**J**	0.029	0.03	6305383				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Uranium 238	pCi/g	0.76	J	**J**	0.15	0.03	6305383				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Uranium 234	pCi/g	0.64	J	**J**	0.14	0.03	6305383				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Uranium 235	pCi/g	0.062	J	**J**	0.042	0.038	6305383				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Uranium 238	pCi/g	0.83	J	**J**	0.17	0.01	6305383				Y	N						

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F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006	A-01-R MOD - Alpha Spec.	Uranium 234	pCi/g	0.58	J	**J**	0.13	0.04	6305383				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Uranium 235	pCi/g	0.032	U	**U**	0.033	0.039	6305383				N	Y						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Uranium 238	pCi/g	0.61	J	**J**	0.14	0.03	6305383				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Uranium 234	pCi/g	0.53	J	**J**	0.12	0.03	6305383				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Uranium 235	pCi/g	0.033	J	**J**	0.03	0.015	6305383				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Uranium 238	pCi/g	0.54	J	**J**	0.12	0.02	6305383				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Uranium 234	pCi/g	0.71	J	**J**	0.14	0.03	6305383				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Uranium 235	pCi/g	0.053	J	**J**	0.036	0.029	6305383				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Uranium 238	pCi/g	0.85	J	**J**	0.16	0.03	6305383				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Uranium 234	pCi/g	9.6			1.3	0.03	6305383				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Uranium 235	pCi/g	0.38	J	**J**	0.11	0.02	6305383				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Uranium 238	pCi/g	8.9			1.2	0.02	6305383				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Uranium 234	pCi/g	0.68	J	**J**	0.14	0.03	6305383				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Uranium 235	pCi/g	0.046	J	**J**	0.035	0.032	6305383				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Uranium 238	pCi/g	0.65	J	**J**	0.14	0.03	6305383				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Uranium 234	pCi/g	0.73	J	**J**	0.15	0.03	6305383				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Uranium 235	pCi/g	0.051	J	**J**	0.037	0.031	6305383				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Uranium 238	pCi/g	0.78	J	**J**	0.16	0.03	6305383				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Uranium 234	pCi/g	6.62			0.91	0.03	6305383				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Uranium 235	pCi/g	0.44	J	**J**	0.12	0.03	6305383				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Uranium 238	pCi/g	6.87			0.94	0.01	6305383				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Uranium 234	pCi/g	0.93	J	**J**	0.19	0.03	6305383				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Uranium 235	pCi/g	0.091	J	**J**	0.054	0.019	6305383				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Uranium 238	pCi/g	0.81	J	**J**	0.17	0.03	6305383				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Uranium 234	pCi/g	3.43			0.5	0.01	6305383				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Uranium 235	pCi/g	0.121	J	**J**	0.056	0.016	6305383				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Uranium 238	pCi/g	2.78			0.42	0.03	6305383				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Uranium 234	pCi/g	0.63	J	**J**	0.14	0.03	6305383				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Uranium 235	pCi/g	0.042	J	**J**	0.034	0.016	6305383				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Uranium 238	pCi/g	0.72	J	**J**	0.15	0.01	6305383				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Uranium 234	pCi/g	0.79	J	**J**	0.16	0.03	6305383				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Uranium 235	pCi/g	0.034	J	**J**	0.031	0.016	6305383				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Uranium 238	pCi/g	0.76	J	**J**	0.15	0.01	6305383				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Uranium 234	pCi/g	0.362	J	**J**	0.094	0.029	6305383				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Uranium 235	pCi/g	0.015	U	**U**	0.021	0.03	6305383				N	Y						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Uranium 238	pCi/g	0.363	J	**J**	0.094	0.024	6305383				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Uranium 234	pCi/g	0.85	J	**J**	0.16	0.03	6305383				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Uranium 235	pCi/g	0.052	J	**J**	0.038	0.035	6305383				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Uranium 238	pCi/g	0.83	J	**J**	0.16	0.01	6305383				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Uranium 234	pCi/g	0.54	J	**J**	0.12	0.04	6305383				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Uranium 235	pCi/g	0.012	U	**U**	0.02	0.016	6305383				N	Y						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Uranium 238	pCi/g	0.61	J	**J**	0.13	0.02	6305383				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Uranium 234	pCi/g	0.79	J	**J**	0.16	0.04	6305383				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Uranium 235	pCi/g	0.024	U	**U**	0.038	0.056	6305383				N	Y						

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F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Uranium 238	pCi/g	0.68	J	**J**	0.14	0.04	6305383				Y	N						
F6K010000383B	BM	LABQC	8/9/2006		Uranium 234	pCi/g	0.01	U		0.014	0.02	6305383		0.7		N	Y						
F6K010000383B	BM	LABQC	8/9/2006		Uranium 235	pCi/g	-0.001	U		0.0065	0.014	6305383		-0.2		N	Y						
F6K010000383B	BM	LABQC	8/9/2006		Uranium 238	pCi/g	0.01	U		0.012	0.017	6305383		0.8		N	Y						
F6K010000383C	LCS	LABQC	8/9/2006		Uranium 234	pCi/g	20.4			3.1	0.2	6305383	19.6	0.3		Y	N	104	75-125			104.1	
F6K010000383C	LCS	LABQC	8/9/2006		Uranium 238	pCi/g	19.4			3	0.2	6305383	19.6	0.1		Y	N	99	75-122			99.0	
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	A-01-R MOD - Alpha Spec.	Uranium 234	pCi/g	0.82	J	**J**	0.16	0.03	6305384				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Uranium 235	pCi/g	0.08	J	**J**	0.047	0.017	6305384				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Uranium 238	pCi/g	0.82	J	**J**	0.17	0.01	6305384				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Uranium 234	pCi/g	12.9			1.7	0.05	6305384				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Uranium 235	pCi/g	0.65	J	**J**	0.15	0.03	6305384				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Uranium 238	pCi/g	11.4			1.5	0.04	6305384				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Uranium 234	pCi/g	0.53	J	**J**	0.13	0.03	6305384				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Uranium 235	pCi/g	0.029	U	**U**	0.03	0.033	6305384				N	Y						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Uranium 238	pCi/g	0.56	J	**J**	0.13	0.04	6305384				Y	N						
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Uranium 234	pCi/g	0.49	J	**J**	0.12	0.04	6305384		0.2		Y	N			9	40	7.8	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Uranium 235	pCi/g	0.01	U	**U**	0.019	0.033	6305384		0.5		N	Y			99		97.4	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Uranium 238	pCi/g	0.53	J	**J**	0.12	0.01	6305384		0.2		Y	N			6	40	5.5	
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Uranium 234	pCi/g	3.36			0.5	0.05	6305384				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Uranium 235	pCi/g	0.135	J	**J**	0.061	0.031	6305384				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Uranium 238	pCi/g	3.25			0.48	0.03	6305384				Y	N						
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Uranium 234	pCi/g	3.29			0.49	0.04	6305384		0.1		Y	N			2	40	2.1	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Uranium 235	pCi/g	0.138	J	**J**	0.063	0.043	6305384		0.0		Y	N			2		2.2	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Uranium 238	pCi/g	3.21			0.48	0.03	6305384		0.1		Y	N			1	40	1.2	
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Uranium 234	pCi/g	3.16			0.48	0.04	6305384				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Uranium 235	pCi/g	0.125	J	**J**	0.06	0.043	6305384				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Uranium 238	pCi/g	2.88			0.44	0.04	6305384				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Uranium 234	pCi/g	0.74	J	**J**	0.16	0.04	6305384				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Uranium 235	pCi/g	0.064	J	**J**	0.043	0.017	6305384				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Uranium 238	pCi/g	0.73	J	**J**	0.15	0.03	6305384				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Uranium 234	pCi/g	5.02			0.71	0.04	6305384				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Uranium 235	pCi/g	0.225	J	**J**	0.084	0.057	6305384				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Uranium 238	pCi/g	4.92			0.7	0.04	6305384				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Uranium 234	pCi/g	0.74	J	**J**	0.16	0.04	6305384				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Uranium 235	pCi/g	0.047	J	**J**	0.036	0.032	6305384				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Uranium 238	pCi/g	0.78	J	**J**	0.16	0.04	6305384				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Uranium 234	pCi/g	5.05			0.7	0.03	6305384				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Uranium 235	pCi/g	0.187	J	**J**	0.07	0.03	6305384				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Uranium 238	pCi/g	5.23			0.73	0.03	6305384				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Uranium 234	pCi/g	1.54			0.27	0.03	6305384				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Uranium 235	pCi/g	0.077	J	**J**	0.05	0.043	6305384				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Uranium 238	pCi/g	1.65			0.29	0.01	6305384				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Uranium 234	pCi/g	1.01			0.19	0.04	6305384				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Uranium 235	pCi/g	0.082	J	**J**	0.046	0.016	6305384				Y	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Uranium 238	pCi/g	0.94	J	**J**	0.18	0.03	6305384				Y	N						
F6K010000384B	BM	LABQC	9/25/2006		Uranium 234	pCi/g	0.01	U		0.014	0.021	6305384		0.7		N	Y						
F6K010000384B	BM	LABQC	9/25/2006		Uranium 235	pCi/g	0.0017	U		0.0069	0.015	6305384		0.2		N	Y						
F6K010000384B	BM	LABQC	9/25/2006		Uranium 238	pCi/g	0.003	U		0.01	0.018	6305384		0.3		N	Y						
F6K010000384C	LCS	LABQC	9/25/2006		Uranium 234	pCi/g	17.3			2.7	0.3	6305384	19.6	0.9		Y	N	88	75-125			88.3	
F6K010000384C	LCS	LABQC	9/25/2006		Uranium 238	pCi/g	16.2			2.5	0.2	6305384	19.6	1.4		Y	N	83	75-122			82.7	
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006	GA-01-R MOD -Gamma Spec	Actinium 228	pCi/g	0.95			0.18	0.3	6307129				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Bismuth 214	pCi/g	0.69			0.15	0.14	6307129				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Lead 212	pCi/g	0.9			0.15	0.1	6307129				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Lead 214	pCi/g	0.77			0.13	0.13	6307129				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Potassium 40	pCi/g	16.7			2.7	0.5	6307129				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Radium (226)	pCi/g	0.69			0.15	0.14	6307129				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Radium 228	pCi/g	0.95			0.18	0.3	6307129				Y	N						
F6J310264001	SO	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Thallium 208	pCi/g	0.247			0.067	0.069	6307129				Y	N						
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Actinium 228	pCi/g	0.96			0.22	0.38	6307129		0.0		Y	N			1		1.0	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Bismuth 214	pCi/g	0.65			0.15	0.13	6307129		0.2		Y	N			5		6.0	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Lead 212	pCi/g	0.84			0.15	0.11	6307129		0.3		Y	N			7		6.9	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Lead 214	pCi/g	0.77			0.13	0.14	6307129		0.0		Y	N			0.3		0.0	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Potassium 40	pCi/g	19.3			3	0.8	6307129		0.6		Y	N			14		14.4	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Radium (226)	pCi/g	0.65			0.15	0.13	6307129		0.2		Y	N			5		6.0	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Radium 228	pCi/g	0.96			0.22	0.38	6307129		0.0		Y	N			1		1.0	
F6J310264001X	DUP	TSB-C7-0CC-SO-X11-SN07	8/9/2006		Thallium 208	pCi/g	0.239			0.072	0.077	6307129		0.1		Y	N			3		3.3	
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Actinium 228	pCi/g	0.48			0.14	0.23	6307129				Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Bismuth 214	pCi/g	0.57			0.11	0.08	6307129				Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Lead 212	pCi/g	0.61			0.11	0.07	6307129				Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Lead 214	pCi/g	0.66			0.1	0.1	6307129				Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Potassium 40	pCi/g	11.2			1.8	0.5	6307129				Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Radium (226)	pCi/g	0.57			0.11	0.08	6307129				Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Radium 228	pCi/g	0.48	J	**J**	0.14	0.23	6307129				Y	N						
F6J310264002	SO	TSB-C7-CWM-SO-X86-SN01-6.5	9/22/2006		Thallium 208	pCi/g	0.156			0.048	0.052	6307129				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Actinium 228	pCi/g	1			0.27	0.44	6307129				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Bismuth 214	pCi/g	0.72			0.18	0.18	6307129				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Lead 212	pCi/g	1.02			0.18	0.2	6307129				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Lead 214	pCi/g	0.91			0.16	0.16	6307129				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Potassium 40	pCi/g	26.6			4.1	0.8	6307129				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Radium (226)	pCi/g	0.72			0.18	0.18	6307129				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Radium 228	pCi/g	1			0.27	0.44	6307129				Y	N						
F6J310264003	SO	TSB-C7-CWM-SO-X90-AW01-17	9/26/2006		Thallium 208	pCi/g	0.372			0.094	0.095	6307129				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	MOD -Gamma Spec	Actinium 228	pCi/g	0.88			0.17	0.29	6307129				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Bismuth 214	pCi/g	0.57			0.12	0.1	6307129				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Lead 212	pCi/g	0.82			0.13	0.08	6307129				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Lead 214	pCi/g	0.69			0.11	0.11	6307129				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Potassium 40	pCi/g	18			2.7	0.4	6307129				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Radium (226)	pCi/g	0.57			0.12	0.1	6307129				Y	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006	GA-01-R M	Radium 228	pCi/g	0.88			0.17	0.29	6307129				Y	N						
F6J310264004	SO	TSB-C7-CWM-SO-X101-SN01-14	10/5/2006		Thallium 208	pCi/g	0.235			0.061	0.063	6307129				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Actinium 228	pCi/g	0.74			0.23	0.33	6307129				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Bismuth 214	pCi/g	0.75			0.15	0.14	6307129				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Lead 212	pCi/g	0.84			0.15	0.11	6307129				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Lead 214	pCi/g	0.78			0.13	0.12	6307129				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Potassium 40	pCi/g	18.1			2.9	0.6	6307129				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Radium (226)	pCi/g	0.75			0.15	0.14	6307129				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Radium 228	pCi/g	0.74			0.23	0.33	6307129				Y	N						
F6J310264005	SO	TSB-C7-CWM-SO-X104-SN01-13	10/6/2006		Thallium 208	pCi/g	0.201			0.062	0.077	6307129				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Actinium 228	pCi/g	0.7			0.15	0.21	6307129				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Bismuth 212	pCi/g	0.43			0.23	0.42	6307129				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Bismuth 214	pCi/g	0.7			0.13	0.11	6307129				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Lead 212	pCi/g	0.7			0.12	0.08	6307129				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Lead 214	pCi/g	0.606			0.096	0.099	6307129				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Potassium 40	pCi/g	11.8			1.9	0.3	6307129				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Radium (226)	pCi/g	0.7			0.13	0.11	6307129				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Radium 228	pCi/g	0.7			0.15	0.21	6307129				Y	N						
F6J310264006	SO	TSB-C7-CWM-SO-X99-SN01-15	10/2/2006		Thallium 208	pCi/g	0.244			0.057	0.055	6307129				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006	GA-01-R MOD -Gamma Spec	Bismuth 214	pCi/g	0.57			0.13	0.11	6307129				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Lead 212	pCi/g	0.52			0.11	0.11	6307129				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Lead 214	pCi/g	0.525			0.0996	0.12	6307129				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Potassium 40	pCi/g	9.8			1.8	0.9	6307129				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Radium (226)	pCi/g	0.57			0.13	0.11	6307129				Y	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Radium 228	pCi/g	0.44	U	**U**	0.2	0.46	6307129				N	N						
F6J310264007	SO	TSB-C7-CWM-SO-X92-AW01-14	10/5/2006		Thallium 208	pCi/g	0.188			0.056	0.06	6307129				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Actinium 228	pCi/g	0.83			0.19	0.29	6307129				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Bismuth 212	pCi/g	0.88			0.33	0.54	6307129				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Bismuth 214	pCi/g	0.57			0.14	0.13	6307129				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Lead 212	pCi/g	0.78			0.14	0.15	6307129				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Lead 214	pCi/g	0.82			0.13	0.12	6307129				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Potassium 40	pCi/g	20.4			3.1	0.7	6307129				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Radium (226)	pCi/g	0.57			0.14	0.13	6307129				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Radium 228	pCi/g	0.83			0.19	0.29	6307129				Y	N						
F6J310264008	SO	TSB-C7-CWM-SO-X97-SN01-14	10/2/2006		Thallium 208	pCi/g	0.347			0.082	0.061	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Actinium 228	pCi/g	0.72			0.2	0.37	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Bismuth 214	pCi/g	1.12			0.21	0.16	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Cesium 137	pCi/g	0.276			0.084	0.085	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Lead 210	pCi/g	2.5			1	1.9	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Lead 212	pCi/g	0.8			0.15	0.13	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Lead 214	pCi/g	1.08			0.17	0.17	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Potassium 40	pCi/g	16.2			2.7	0.5	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	Spec	Radium (226)	pCi/g	1.12			0.21	0.16	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Radium 228	pCi/g	0.72			0.2	0.37	6307129				Y	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006	GA-01-R MOD -Gamma	Thallium 208	pCi/g	0.291			0.08	0.075	6307129				Y	N						
F6J310264009	SO	MHS-C7-CWM-SL-X97-SN01-14	10/2/2006		Thorium 234	pCi/g	7.9			1.2	1	6307129				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Bismuth 214	pCi/g	0.57			0.16	0.16	6307129				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Lead 212	pCi/g	0.7			0.14	0.16	6307129				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Lead 214	pCi/g	0.61			0.13	0.16	6307129				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Potassium 40	pCi/g	16.8			2.8	0.6	6307129				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Radium (226)	pCi/g	0.57			0.16	0.16	6307129				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Radium 228	pCi/g	0.69			0.32	0.61	6307129				Y	N						
F6J310264010	SO	TSB-C7-CWM-SO-X105-SN01-12	10/3/2006		Thallium 208	pCi/g	0.27			0.082	0.098	6307129				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Actinium 228	pCi/g	0.96			0.18	0.28	6307129				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Bismuth 212	pCi/g	0.76			0.32	0.45	6307129				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Bismuth 214	pCi/g	0.68			0.14	0.12	6307129				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Lead 212	pCi/g	0.8			0.14	0.16	6307129				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Lead 214	pCi/g	0.71			0.12	0.13	6307129				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Potassium 40	pCi/g	19.2			3	0.6	6307129				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Radium (226)	pCi/g	0.68			0.14	0.12	6307129				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Radium 228	pCi/g	0.96			0.18	0.28	6307129				Y	N						
F6J310264011	SO	TSB-C7-CWM-SO-X94-AW01-10	9/29/2006		Thallium 208	pCi/g	0.28			0.071	0.078	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006	GA-01-R MOD -Gamma Spec	Actinium 228	pCi/g	0.61			0.2	0.31	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Bismuth 214	pCi/g	1.09			0.19	0.14	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Cesium 137	pCi/g	0.228			0.07	0.098	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Lead 210	pCi/g	2.13			0.93	1.6	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Lead 212	pCi/g	0.7			0.13	0.12	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Lead 214	pCi/g	1.2			0.17	0.15	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Potassium 40	pCi/g	12.2			2.2	0.6	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Radium (226)	pCi/g	1.09			0.19	0.14	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Radium 228	pCi/g	0.61			0.2	0.31	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Thallium 208	pCi/g	0.231			0.069	0.086	6307129				Y	N						
F6J310264012	SO	PIPES-C7-CWM-SL-X94-AW01-10	9/29/2006		Thorium 234	pCi/g	3.92			0.66	0.75	6307129				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Actinium 228	pCi/g	0.98			0.22	0.31	6307129				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Bismuth 214	pCi/g	0.56			0.14	0.16	6307129				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Lead 212	pCi/g	0.68			0.14	0.13	6307129				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Lead 214	pCi/g	0.78			0.14	0.14	6307129				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Potassium 40	pCi/g	15.4			2.6	0.7	6307129				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Radium (226)	pCi/g	0.56			0.14	0.16	6307129				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Radium 228	pCi/g	0.98			0.22	0.31	6307129				Y	N						
F6J310264013	SO	TSB-C7-CWM-SO-X103-SN01-13	10/6/2006		Thallium 208	pCi/g	0.338			0.088	0.069	6307129				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Bismuth 214	pCi/g	0.33			0.17	0.23	6307129				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Lead 210	pCi/g	8.1			2.2	2.5	6307129				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Lead 212	pCi/g	0.5			0.15	0.21	6307129				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Lead 214	pCi/g	0.56			0.14	0.24	6307129				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Potassium 40	pCi/g	10.7			2.4	1.3	6307129				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Radium (226)	pCi/g	0.33	J	**J**	0.17	0.23	6307129				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Radium 228	pCi/g	0.62	U	**U**	0.39	0.77	6307129				N	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006	GA-01-R MOD -Gamma Spec	Thallium 208	pCi/g	0.15			0.079	0.13	6307129				Y	N						
F6J310264014	SO	MHS-C7-CWM-SL-X103-SN01-12	10/5/2006		Thorium 234	pCi/g	2.52			0.67	1.2	6307129				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Actinium 228	pCi/g	0.87			0.18	0.34	6307129				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Bismuth 214	pCi/g	0.82			0.16	0.15	6307129				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Lead 212	pCi/g	0.79			0.14	0.18	6307129				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Lead 214	pCi/g	0.73			0.13	0.14	6307129				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Potassium 40	pCi/g	18.5			2.9	0.7	6307129				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Radium (226)	pCi/g	0.82			0.16	0.15	6307129				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Radium 228	pCi/g	0.87			0.18	0.34	6307129				Y	N						
F6J310264015	SO	TSB-C7-CWM-SO-X95-AW01-10	9/29/2006		Thallium 208	pCi/g	0.297			0.077	0.079	6307129				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Actinium 228	pCi/g	0.58			0.18	0.26	6307129				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Bismuth 214	pCi/g	0.65			0.15	0.1	6307129				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Cesium 137	pCi/g	0.144			0.054	0.058	6307129				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Lead 212	pCi/g	0.53			0.1	0.13	6307129				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Lead 214	pCi/g	0.68			0.12	0.11	6307129				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Potassium 40	pCi/g	12.5			2.1	0.5	6307129				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Radium (226)	pCi/g	0.65			0.15	0.1	6307129				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Radium 228	pCi/g	0.58			0.18	0.26	6307129				Y	N						
F6J310264016	SO	MHS-C7-CWM-SL-X83-SN01-6	9/21/2006		Thallium 208	pCi/g	0.182			0.059	0.07	6307129				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Actinium 228	pCi/g	0.54			0.16	0.18	6307129				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Bismuth 214	pCi/g	0.39			0.11	0.11	6307129				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Lead 212	pCi/g	0.368			0.087	0.12	6307129				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Lead 214	pCi/g	0.51			0.097	0.11	6307129				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Potassium 40	pCi/g	11			1.9	0.4	6307129				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Radium (226)	pCi/g	0.39	J	**J**	0.11	0.11	6307129				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Radium 228	pCi/g	0.54			0.16	0.18	6307129				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Thallium 208	pCi/g	0.121			0.046	0.065	6307129				Y	N						
F6J310264017	SO	TSB-C7-CWM-SO-X83-SN01-7	9/21/2006		Thorium 234	pCi/g	0.5	U	**U**	0.23	0.6	6307129				N	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006	GA-01-R MOD -Gamma Spec	Actinium 228	pCi/g	1.05			0.28	0.59	6307129				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Bismuth 212	pCi/g	1.02			0.45	1	6307129				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Bismuth 214	pCi/g	1.02			0.21	0.24	6307129				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Lead 212	pCi/g	1.17			0.21	0.21	6307129				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Lead 214	pCi/g	1.04			0.17	0.16	6307129				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Potassium 40	pCi/g	26.6			4.2	0.9	6307129				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Radium (226)	pCi/g	1.02			0.21	0.24	6307129				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Radium 228	pCi/g	1.05			0.28	0.59	6307129				Y	N						
F6J310264018	SO	TSB-C7-CWM-SO-X100-SN01-14	10/2/2006		Thallium 208	pCi/g	0.45			0.11	0.1	6307129				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Actinium 228	pCi/g	0.7			0.16	0.23	6307129				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Bismuth 214	pCi/g	0.54			0.12	0.13	6307129				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Lead 212	pCi/g	0.8			0.13	0.12	6307129				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Lead 214	pCi/g	0.75			0.12	0.11	6307129				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Potassium 40	pCi/g	16.3			2.5	0.8	6307129				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Radium (226)	pCi/g	0.54			0.12	0.13	6307129				Y	N						
F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006		Radium 228	pCi/g	0.7			0.16	0.23	6307129				Y	N						

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F6J310264019	SO	TSB-C7-CWM-SO-X98-SN01-15	10/2/2006	GA-01-R MOD -Gamma Spec	Thallium 208	pCi/g	0.272			0.067	0.06	6307129				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Actinium 228	pCi/g	0.9			0.21	0.33	6307129				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Bismuth 214	pCi/g	0.72			0.16	0.14	6307129				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Lead 212	pCi/g	0.91			0.16	0.1	6307129				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Lead 214	pCi/g	0.72			0.13	0.15	6307129				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Potassium 40	pCi/g	16.2			2.7	0.8	6307129				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Radium (226)	pCi/g	0.72			0.16	0.14	6307129				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Radium 228	pCi/g	0.9			0.21	0.33	6307129				Y	N						
F6J310264020	SO	TSB-C7-CWM-SO-X106-SN01-14-D	9/29/2006		Thallium 208	pCi/g	0.273			0.076	0.065	6307129				Y	N						
F6K030000129B	BM	LABQC	8/9/2006		Radium (226)	pCi/g	0.075	U		0.062	0.13	6307129		1.2		N	N						
F6K030000129B	BM	LABQC	8/9/2006		Radium 228	pCi/g	0.18	U		0.11	0.23	6307129		1.6		N	N						
F6K030000129C	LCS	LABQC	8/9/2006		Radium (226)	pCi/g	10.8			1.4	0.5	6307129	12.2	1.0		Y	N	88	75-108			88.5	
F6K030000129C	LCS	LABQC	8/9/2006		Thorium 232	pCi/g	10.5			1.4	0.9	6307129	9.5	0.7		Y	N	110	77-125			110.5	
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006	GA-01-R MOD -Gamma	Actinium 228	pCi/g	1.16			0.2	0.3	6307135				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Bismuth 214	pCi/g	0.89			0.17	0.15	6307135				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Lead 212	pCi/g	1.02			0.16	0.1	6307135				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Lead 214	pCi/g	0.94			0.14	0.13	6307135				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Potassium 40	pCi/g	23.8			3.4	0.7	6307135				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Radium (226)	pCi/g	0.89			0.17	0.15	6307135				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Radium 228	pCi/g	1.16			0.2	0.3	6307135				Y	N						
F6J310264021	SO	TSB-C7-CWM-SO-X106-SN01-14	9/29/2006		Thallium 208	pCi/g	0.271			0.069	0.078	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Actinium 228	pCi/g	0.89			0.25	0.5	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Bismuth 214	pCi/g	0.99			0.21	0.2	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Cesium 137	pCi/g	0.28			0.089	0.12	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Lead 210	pCi/g	3.29			0.88	1.3	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Lead 212	pCi/g	0.95			0.18	0.12	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Lead 214	pCi/g	0.97			0.16	0.17	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Potassium 40	pCi/g	18.6			3.1	0.8	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Protactinium 234M	pCi/g	14.9			8.6	12	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Radium (226)	pCi/g	0.99			0.21	0.2	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Radium 228	pCi/g	0.89			0.25	0.5	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Thallium 208	pCi/g	0.228			0.074	0.11	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Thorium 234	pCi/g	10.3			1.5	1	6307135				Y	N						
F6J310264022	SO	MHS-C7-CWM-SL-X106-SN01-16	9/29/2006		Uranium 235	pCi/g	0.73			0.21	0.37	6307135				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	01-R MOD -Gamma Spec	Actinium 228	pCi/g	0.7			0.17	0.23	6307135				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Bismuth 214	pCi/g	0.52			0.11	0.12	6307135				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Lead 212	pCi/g	0.57			0.11	0.11	6307135				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Lead 214	pCi/g	0.496			0.09	0.11	6307135				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Potassium 40	pCi/g	12.7			2	0.5	6307135				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Radium (226)	pCi/g	0.52			0.11	0.12	6307135				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Radium 228	pCi/g	0.7			0.17	0.23	6307135				Y	N						
F6J310264023	SO	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Thallium 208	pCi/g	0.198			0.054	0.054	6307135				Y	N						
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Actinium 228	pCi/g	0.56			0.12	0.24	6307135		0.7		Y	N			22		22.2	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Bismuth 214	pCi/g	0.56			0.1	0.1	6307135		0.3		Y	N			7		7.4	

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006	GA-0	Lead 212	pCi/g	0.73			0.12	0.06	6307135		1.0		Y	N			24		24.6	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Lead 214	pCi/g	0.615			0.091	0.086	6307135		0.9		Y	N			21		21.4	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Potassium 40	pCi/g	13.3			2	0.5	6307135		0.2		Y	N			5		4.6	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Radium (226)	pCi/g	0.56			0.1	0.1	6307135		0.3		Y	N			7		7.4	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Radium 228	pCi/g	0.56			0.12	0.24	6307135		0.7		Y	N			22		22.2	
F6J310264023X	DUP	TSB-C7-CWM-SO-X87-AW01-16	9/25/2006		Thallium 208	pCi/g	0.197			0.047	0.048	6307135		0.0		Y	N			0.5		0.5	
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Actinium 228	pCi/g	0.57			0.15	0.27	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Bismuth 214	pCi/g	0.35			0.11	0.12	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Cesium 137	pCi/g	0.343			0.081	0.073	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Lead 210	pCi/g	2.19			0.86	1.4	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Lead 212	pCi/g	0.54			0.1	0.08	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Lead 214	pCi/g	0.456			0.087	0.11	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Potassium 40	pCi/g	10.7			1.9	0.7	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Radium (226)	pCi/g	0.35	J	**J**	0.11	0.12	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Radium 228	pCi/g	0.57			0.15	0.27	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Thallium 208	pCi/g	0.18			0.056	0.077	6307135				Y	N						
F6J310264024	SO	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Thorium 234	pCi/g	2.75			0.5	0.69	6307135				Y	N						
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Actinium 228	pCi/g	0.34			0.1	0.3	6307135		1.3		Y	N			51		50.5	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Bismuth 214	pCi/g	0.46			0.13	0.14	6307135		0.6		Y	N			27		27.2	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Cesium 137	pCi/g	0.215			0.069	0.096	6307135		1.2		Y	N			46		45.9	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Lead 212	pCi/g	0.52			0.11	0.14	6307135		0.1		Y	N			4		3.8	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Lead 214	pCi/g	0.394			0.092	0.15	6307135		0.5		Y	N			15		14.6	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Potassium 40	pCi/g	12.1			2.2	0.7	6307135		0.5		Y	N			12		12.3	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Radium (226)	pCi/g	0.46	J	**J**	0.13	0.14	6307135		0.6		Y	N			27		27.2	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Radium 228	pCi/g	0.34	J	**J**	0.1	0.3	6307135		1.3		Y	N			51		50.5	
F6J310264024X	DUP	MHS-C7-CWM-SL-X87-AW01-16	9/26/2006		Thorium 234	pCi/g	2.88			0.53	0.72	6307135		0.2		Y	N			5		4.6	
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Actinium 228	pCi/g	0.54			0.13	0.26	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Bismuth 214	pCi/g	0.54			0.11	0.1	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Cesium 137	pCi/g	0.324			0.072	0.06	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Lead 210	pCi/g	3.13			0.84	1.3	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Lead 212	pCi/g	0.62			0.1	0.07	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Lead 214	pCi/g	0.615			0.094	0.1	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Potassium 40	pCi/g	12.7			2	0.5	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Radium (226)	pCi/g	0.54			0.11	0.1	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Radium 228	pCi/g	0.54			0.13	0.26	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Thallium 208	pCi/g	0.193			0.049	0.053	6307135				Y	N						
F6J310264025	SO	MHS-C7-CWM-SL-X87-AW01-16-D	9/26/2006		Thorium 234	pCi/g	2.82			0.47	0.49	6307135				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Actinium 228	pCi/g	0.95			0.18	0.27	6307135				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Bismuth 214	pCi/g	0.78			0.16	0.14	6307135				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Lead 212	pCi/g	0.83			0.15	0.12	6307135				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Lead 214	pCi/g	0.83			0.13	0.11	6307135				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Potassium 40	pCi/g	19.8			2.9	0.6	6307135				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Radium (226)	pCi/g	0.78			0.16	0.14	6307135				Y	N						
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006		Radium 228	pCi/g	0.95			0.18	0.27	6307135				Y	N						

GA-01-R MOD -Gamma Spec

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LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264026	SO	TSB-C7-CWM-SO-X96-AW01-10	9/29/2006	GA-01-R MOD -Gamma Spec	Thallium 208	pCi/g	0.271			0.071	0.07	6307135				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Actinium 228	pCi/g	0.77			0.18	0.26	6307135				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Bismuth 214	pCi/g	0.76			0.15	0.11	6307135				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Lead 212	pCi/g	0.75			0.13	0.09	6307135				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Lead 214	pCi/g	0.92			0.13	0.11	6307135				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Potassium 40	pCi/g	10.1			1.7	0.7	6307135				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Radium (226)	pCi/g	0.76			0.15	0.11	6307135				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Radium 228	pCi/g	0.77			0.18	0.26	6307135				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Thallium 208	pCi/g	0.225			0.058	0.068	6307135				Y	N						
F6J310264027	SO	PIPES-C7-CWM-SL-X96-AW01-10	9/29/2006		Thorium 234	pCi/g	2.66			0.47	0.65	6307135				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Actinium 228	pCi/g	0.85			0.17	0.29	6307135				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Bismuth 214	pCi/g	0.62			0.14	0.13	6307135				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Lead 212	pCi/g	0.87			0.15	0.09	6307135				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Lead 214	pCi/g	0.75			0.12	0.13	6307135				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Potassium 40	pCi/g	18.8			2.8	0.7	6307135				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Radium (226)	pCi/g	0.62			0.14	0.13	6307135				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Radium 228	pCi/g	0.85			0.17	0.29	6307135				Y	N						
F6J310264028	SO	TSB-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Thallium 208	pCi/g	0.249			0.066	0.064	6307135				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Actinium 228	pCi/g	0.96			0.21	0.33	6307135				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Bismuth 212	pCi/g	0.71			0.34	0.6	6307135				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Lead 212	pCi/g	0.81			0.14	0.11	6307135				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Lead 214	pCi/g	1.22			0.17	0.13	6307135				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Potassium 40	pCi/g	12.8			2.2	0.4	6307135				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Radium (226)	pCi/g	1.09			0.2	0.15	6307135				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Radium 228	pCi/g	0.96			0.21	0.33	6307135				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Thallium 208	pCi/g	0.264			0.068	0.068	6307135				Y	N						
F6J310264029	SO	PIPES-C7-CWM-SL-X96-AW01-10-D	9/29/2006		Thorium 234	pCi/g	3.02			0.56	0.88	6307135				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Actinium 228	pCi/g	0.71			0.18	0.33	6307135				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Bismuth 214	pCi/g	0.6			0.14	0.16	6307135				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Lead 212	pCi/g	0.63			0.13	0.14	6307135				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Lead 214	pCi/g	0.61			0.12	0.16	6307135				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Potassium 40	pCi/g	4.9			1.3	0.7	6307135				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Radium (226)	pCi/g	0.6			0.14	0.16	6307135				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Radium 228	pCi/g	0.71			0.18	0.33	6307135				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Thallium 208	pCi/g	0.18			0.066	0.085	6307135				Y	N						
F6J310264030	SO	IDWS-C7-NFS-SL-IDW-1	10/27/2006		Thorium 234	pCi/g	1.03			0.3	0.69	6307135				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	Gamma Spec	Actinium 228	pCi/g	0.74			0.16	0.28	6307135				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Bismuth 212	pCi/g	1.1			0.32	0.45	6307135				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Bismuth 214	pCi/g	3.94			0.5	0.13	6307135				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Lead 212	pCi/g	0.95			0.15	0.12	6307135				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Lead 214	pCi/g	3.86			0.45	0.13	6307135				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Potassium 40	pCi/g	10.8			1.7	0.8	6307135				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Radium (226)	pCi/g	3.94			0.5	0.13	6307135				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Radium 228	pCi/g	0.74			0.16	0.28	6307135				Y	N						

LAB SAMPLE ID	STYPE	CLIENT SAMPLE DESCRIPTION	DATE SAMP	ANALYSIS METHOD	Radioisotope	UNITS	RESULT	Laboratory Qualifier	**Validated Qualifier**	TOTAL UNCERTAINTY	RPT LIMIT/MDC	BATCH ID	SPIKE AMOUNT	Z Score	Z Score/Norm.Abs.Diff.	Detected	Cetainity > then Result	PERCENT RECOVERY	CONTROL LIMITS	RPD	RPD LIMIT	RPD Chk or % Rec	Comment
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006	GA-01-R MOD -0	Thallium 208	pCi/g	0.256			0.063	0.08	6307135				Y	N						
F6J310264031	SO	TSB-C7-CWM-SO-X21-WW01-4	8/28/2006		Thorium 234	pCi/g	3.19			0.54	0.74	6307135				Y	N						
F6K030000135B	BM	LABQC	9/25/2006		Radium (226)	pCi/g	0.067	U		0.051	0.12	6307135		1.3		N	N						
F6K030000135B	BM	LABQC	9/25/2006		Radium 228	pCi/g	0.081	U		0.091	0.2	6307135		0.9		N	Y						
F6K030000135C	LCS	LABQC	9/25/2006		Radium (226)	pCi/g	12			1.4	0.3	6307135	12.2	0.1		Y	N	98	75-108			98.4	
F6K030000135C	LCS	LABQC	9/25/2006		Thorium 232	pCi/g	9.6			1.1	0.6	6307135	9.5	0.1		Y	N	101	77-125			101.1	

APPENDIX 12-F

2009 Survey
Niagara Falls Storage Site
Lewiston, New York

Report

SURVEY
NIAGARA FALLS STORAGE SITE
LEWISTON NY

US Army Corps of Engineers®

Gourdie-Fraser

W911XK-07-D-0003 D.O. 9902
GFA:09177

7/14/2009

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SECTION 1

GOURDIE-FRASER / JULY, 2009
CONTRACT NO. W911XK-07-D-0003
D.O. NO. 9902
SURVEY NIAGARA FALLS STORAGE SITE, LEWISTON, NY

SURVEYOR'S PROJECT REPORT
FIELD SURVEY

The purpose of this work is to perform a detailed survey of the Niagara Falls Storage Site and to obtain all survey data needed for the preparation of plans and specifications for work to be conducted on the site. The survey included performing a boundary survey of the Niagara Falls Storage Site, a detailed topographic survey of the waste containment area, a detailed survey of the fence lines surrounding the project site, and the installation of 2 permanent monuments to be used as benchmarks for future survey work.

HORIZONTAL CONTROL

The Horizontal Control for this project consisted of setting six primary control points. Control Point Number 18 is a ½"x18" rebar, CP19 is a ½"x18" rebar, CP21 is a ½"x18" rebar, CP22 is a ½"x18" rebar, BM1A is a 8' rod with brass disk, and BM2A is a 8' rod with brass disk, and are described in the attached Survey Control Data Sheets. Existing Site Benchmarks were recovered and tied into the project coordinate system, and are described in the attached Survey Control Data Sheets. BM7 was a found disk in concrete, B-5 is a found R.R. spike, BM-1 is a found disk in concrete, B-6 is a found pin with cap, B-7 is a found pin with cap, BM-FH is a fire hydrant bolt, and "AA8259" is a NGS monument. The Horizontal control points were established by GPS RTK methods using the State of New York CORS Network. CORS_ID NYLP, PID DI0596 was the reference station used in the RTK survey. Leica system 1200 GPS receivers were utilized to perform the horizontal control survey. The GPS survey was performed on June 08, 2009 through June 13, 2009.

The horizontal control for this project was based on the NAD83 datum. The state plane coordinates shown in this project are reference to U.S. State plane coordinate system zone 3103, the units of measurement are expressed as U.S. Survey feet.

A local coordinate system exists at the site and was required for this project. A 2 Dimensional transformation was used to compute the local system. Points 18, 19, 21, 22, 25 and 27 were measured in both systems and held fixed in the transformation. The residuals at these points varied from 0.0 to 0.08 of a foot. Leica Geo Office software was utilized to compute and generate the local system coordinates. A Microstation design file was created from the State plane coordinates and the local system coordinates, as required for the project scope.

VERTICAL CONTROL

The vertical control component for this project was based upon the National Geodetic Vertical Datum of 1929 (NGVD29) Primary vertical control was established by holding fixed the published NAVD88 elevation at NGS PID "AA8259" elevation = 307.89(NAVD88) = 308.45(NGVD29). A First order Class 2 elevation circuit was performed beginning at an existing site benchmark (BM-1) a found disk in concrete with stamping "BM-1 321.089" and returning to BM-1. BM2, CP18, BM7, CP19, CP20, BM2A, CP21, BM1A, and CP22 were observed in the loop. A second elevation circuit was performed beginning at CP21, and returning to CP21. Existing benchmark BM-FH "West bonnet bolt of the fire hydrant located at the South West corner of building #429 was observed in this loop. A third loop beginning at temporary benchmark TP1 (observed in loop 1) and closing to NGS PID "AA8259" was performed. The elevation circuits were combined into Star*Net (least squares adjustment program) for analysis. The published elevation at BM-1

321.089 (NGVD29) was found to be 0.035' higher than the elevation at NGS PID "AA8259" The level circuits were adjusted down by 0.035 feet by holding fixed the elevation at Existing benchmark BM-FH "West bonnet bolt of the fire hydrant located at the South West corner of building #429 Elevation= 321.50(NGVD29). The level circuit agreed to within 0.001 feet at NGS PID "AA8259".

A Leica DNA03 digital level with invar rods were utilized to perform the elevation circuits. The level loops were performed on June 10, 2009. The NGVD29 elevations were attached to the local system horizontal coordinates to produce the Local system Microstation design files. The NAVD88 elevations obtained by RTK connections were attached to the State Plane Zone 3103 coordinates to produce the State Plane Microstation design files. Survey control data sheets were prepared for new and existing control points with values in both systems.

Gary Wilson, P.S. 25881

SECTION 2

SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: BM7 (1) **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: DISK IN CONC **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°12'57.36972" N **LONGITUDE:** 78°59'08.92473" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1172033.61 **us feet** **EAST (X):** 1041003.99 **us feet**

DATUM: LOCAL

NORTH (Y): -600.16 **(feet)** **EAST (X):** 375.03 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 316.83 **NGVD29** **(feet)** **ELEVATION (Z):** 316.28 **NAVD88** **(feet)**

GPS ELEVATION 316.06 **NAVD88** **(feet)**

ACCESS NOTES:

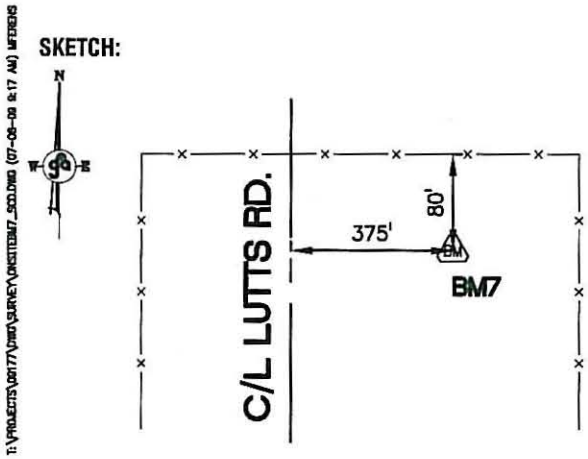
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE NORTH ON MAIN ACCESS RD 0.4 MILES TO "O" STREET TURN WEST AND GO 900' TO LUTTS RD THEN TURN SOUTH AND GO 600' SOUTH YOU WILL FIND BM7 INSIDE OF THE CONTAINMENT AREA FENCE 375' EAST OF LUTTS RD.

DESCRIPTION:

DISK IN CONC STAMPING "EL. 316.80 N 1171997.38 E 392 646.28"

PHOTO:

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: B-5 (3) **QUAD:** -

COUNTY: NIAGARA **STATE:** NEW YORK **T.** - **N** **R.** - **E**

MARKER TYPE: RR SPIKE **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°13'03.27924" N **LONGITUDE:** 78°59'14.02868" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1172633.71 **us feet** **EAST (X):** 1040628.95 **us feet**

DATUM: LOCAL

NORTH (Y): -0.03 (0.0 R) **(feet)** **EAST (X):** -0.05 (0.0 R) **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 319.39 **NGVD29** **(feet)** **ELEVATION (Z):** 318.84 **NAVD88** **(feet)**

GPS ELEVATION 318.76 **NAVD88** **(feet)**

ACCESS NOTES:

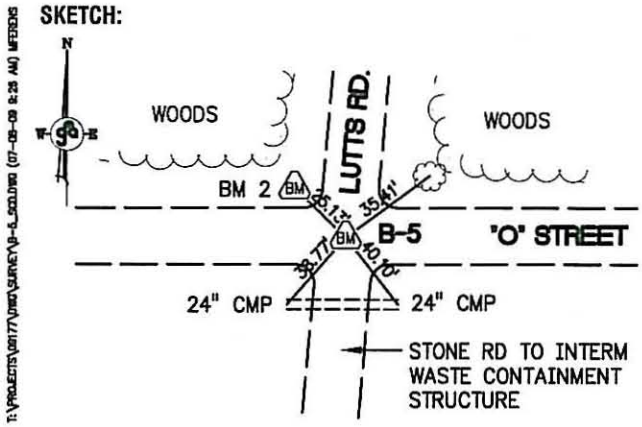
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE NORTH 0.4 MILES TO "O" STREET GO WEST ON "O" STREET 900'± TO LUTSS RD YOU WILL FIND B-5 IN THE INTERSECTION OF "O" STREET AND LUTTS RD.

DESCRIPTION:

EX. RAILROAD SPIKE

PHOTO:

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: BM-1 (4) **QUAD:** -

COUNTY: NIAGARA **STATE:** NEW YORK **T.** - **N** **R.** - **E**

MARKER TYPE: DISK IN CONC **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°13'03.46920" N **LONGITUDE:** 78°59'01.40175" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1172648.45 **us feet** **EAST (X):** 1041564.00 **us feet**

DATUM: LOCAL

NORTH (Y): 14.74 **(feet)** **EAST (X):** 935.05 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 321.06 **NGVD29** **(feet)** **ELEVATION (Z):** 320.51 **NAVD88** **(feet)**

GPS ELEVATION 320.28 **NAVD88** **(feet)**

ACCESS NOTES:

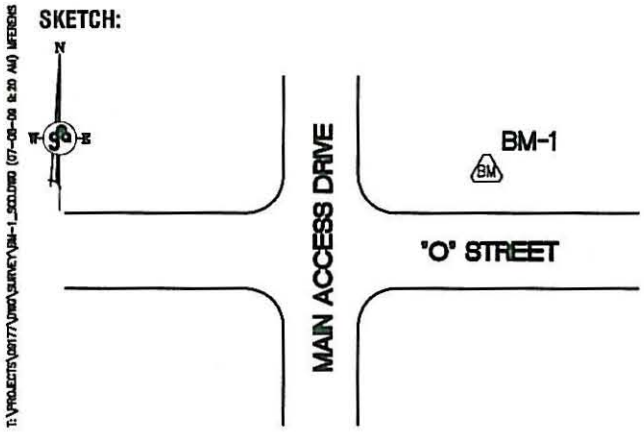
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE NORTH 0.4 MILES TO "O" STREET YOU WILL FIND BM-1 AT THE NE CORNER OF THE INTERSECTION OF THE MAIN ACCESS DRIVE AND "O" STREET.

DESCRIPTION:

DISK IN CONC STAMPING "BM-1 321.089"

PHOTO:

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: B-6 (7) **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: PIN W/CAP **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°13'03.47165" N **LONGITUDE:** 78°58'19.15237" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1172633.95 **us feet** **EAST (X):** 1044692.33 **us feet**

DATUM: LOCAL

NORTH (Y): 0.32 **(feet)** **EAST (X):** 4063.58 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): _____ **NGVD29** **(feet)** **ELEVATION (Z):** _____ **NAVD88** **(feet)**

GPS ELEVATION 320.91 **NAVD88** **(feet)**

ACCESS NOTES:

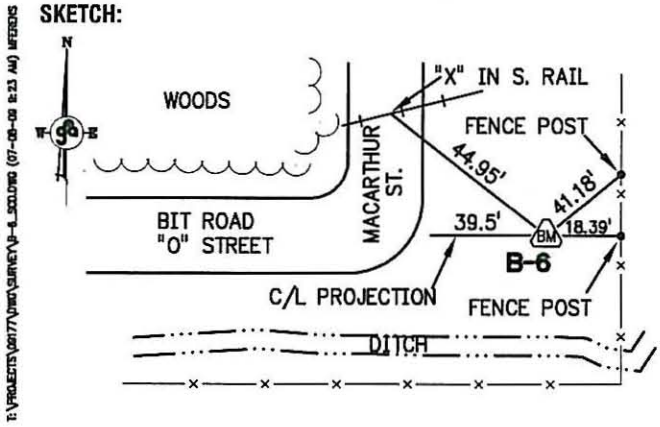
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE NORTH 0.4 MILES TO "O" STREET TURN RIGHT AND GO EAST 0.6 MILES TO MACARTHER ST. YOU WILL FIND B-6 ON THE EXTENSION OF "O" STREET 39.5' EAST OF THE EDGE OF PAVEMENT.

DESCRIPTION:

PIN WITH CAP "B-6"

PHOTO:

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: CP18 **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: 1/2"x18" REBAR **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°13'01.69616" N **LONGITUDE:** 78°59'15.09345" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1172473.82 **us feet** **EAST (X):** 1040549.34 **us feet**

DATUM: LOCAL

NORTH (Y): -159.93 **(feet)** **EAST (X):** -79.67 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 318.85 **NGVD29** **(feet)** **ELEVATION (Z):** 318.30 **NAVD88** **(feet)**

GPS ELEVATION 318.15 **NAVD88** **(feet)**

ACCESS NOTES:

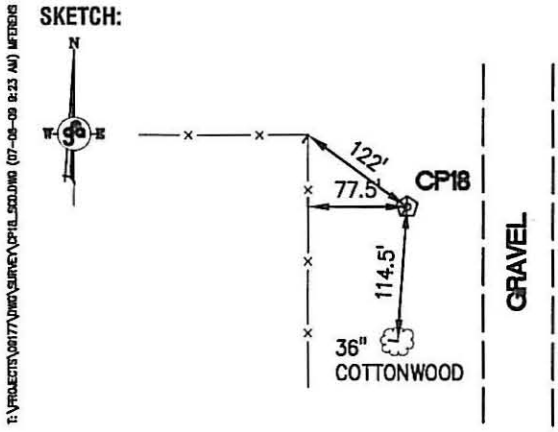
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE NORTH ALONG MAIN ACCESS DRIVE 0.4 MILES TO "O" STREET TURN LEFT AND GO WEST 900'± TO LUTTS RD TURN LEFT AND GO SOUTH 150'± YOU WILL FIND CP18 122' SE OF A FENCE CORNER NEAR THE PROPERTY BOUNDARY.

PHOTO:

DESCRIPTION:

SET 1/2" X 18" REBAR WITH CONTROL POINT CAP

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: CP19 **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: 1/2"x18" REBAR **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°12'42.38433" N **LONGITUDE:** 78°59'16.23940" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1170519.08 **us feet** **EAST (X):** 1040455.03 **us feet**

DATUM: LOCAL

NORTH (Y): -2114.80 **(feet)** **EAST (X):** -173.92 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 318.18 **NGVD29** **(feet)** **ELEVATION (Z):** 317.63 **NAVD88** **(feet)**

GPS ELEVATION 317.54 **NAVD88** **(feet)**

ACCESS NOTES:

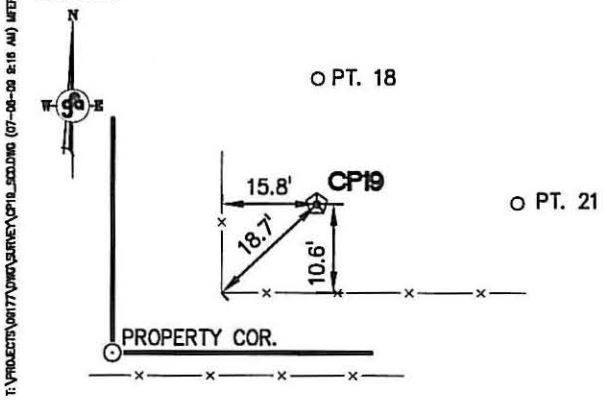
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE THROUGH FENCE BUT TURN IMMEDIATELY LEFT AND GO WEST 1050'± YOU WILL FIND CP19 19' NE OF THE SW COR OF THE PERIMETER FENCE.

PHOTO:

DESCRIPTION:

SET 1/2" X 18" REBAR WITH CONTROL POINT CAP

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: B-7 (20) **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: PIN W/CAP **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°12'42.37630" N **LONGITUDE:** 78°59'13.88920" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1170517.43 **us feet** **EAST (X):** 1040629.06 **us feet**

DATUM: LOCAL

NORTH (Y): -2116.45 **(feet)** **EAST (X):** 0.12 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 319.16 **NGVD29** **(feet)** **ELEVATION (Z):** 318.61 **NAVD88** **(feet)**

GPS ELEVATION 318.49 **NAVD88** **(feet)**

ACCESS NOTES:

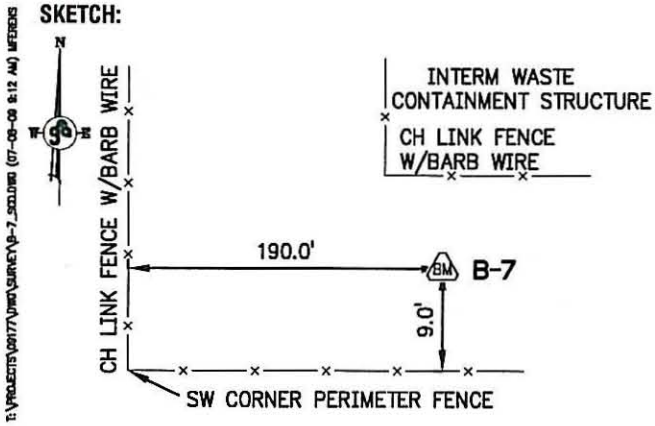
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. TURN LEFT AND GO WEST 900' YOU WILL FIND B-7 190' EAST AND 9' NORTH OF THE PERIMETER FENCE.

DESCRIPTION:

PIN WITH CAP "B-7"

PHOTO:

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: CP21 **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: 1/2"x18" REBAR **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°12'44.80077" N **LONGITUDE:** 78°59'01.58471" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1170758.50 **us feet** **EAST (X):** 1041541.40 **us feet**

DATUM: LOCAL

NORTH (Y): -1875.33 **(feet)** **EAST (X):** 912.51 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 319.87 **NGVD29** **(feet)** **ELEVATION (Z):** 319.32 **NAVD88** **(feet)**

GPS ELEVATION 319.17 **NAVD88** **(feet)**

ACCESS NOTES:

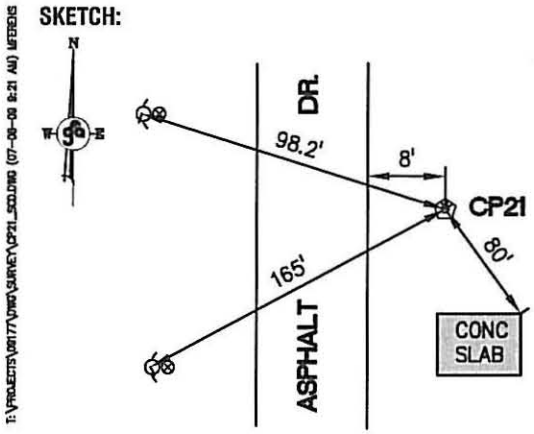
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE NORTH ON THE MAIN ACCESS DRIVE 250' ± YOU WILL FIND CP21 8' EAST OF THE EAST ESDGE OF PAVEMENT.

PHOTO:

DESCRIPTION:

SET 1/2" X 18" REBAR WITH CONTROL POINT CAP

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: CP22 **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: 1/2"x18" REBAR **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°12'58.07661" N **LONGITUDE:** 78°59'02.09158 W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1172102.74 **us feet** **EAST (X):** 1041510.31 **us feet**

DATUM: LOCAL

NORTH (Y): -531.01 **(feet)** **EAST (X):** 881.37 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 319.77 **NGVD29** **(feet)** **ELEVATION (Z):** 319.22 **NAVD88** **(feet)**

GPS ELEVATION 319.01 **NAVD88** **(feet)**

ACCESS NOTES:

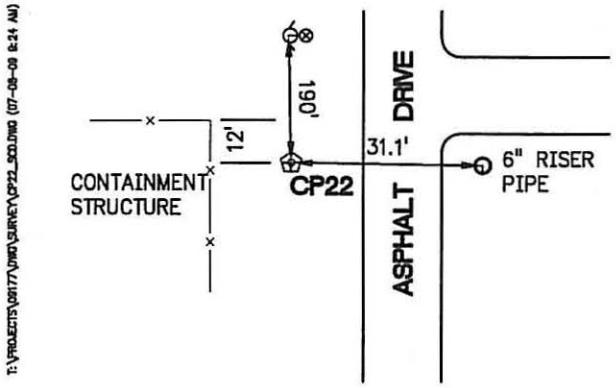
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE NORTH ON MAIN ACCESS DRIVE 1600' ± YOU WILL FIND CP22 JUST OFF THE WEST EDGE OF PAVEMENT 12' SOUTH OF THE EXTENSION OF THE N. FENCE OF THE CONTAINMENT AREA.

PHOTO:

DESCRIPTION:

SET 1/2" X 18" REBAR WITH CONTROL POINT CAP

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: BM1A (25) **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: 8' ROD W/BRASS DISK **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°12'50.44455" N **LONGITUDE:** 78°59'06.46600" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1171331.62 **us feet** **EAST (X):** 1041182.69 **us feet**

DATUM: LOCAL

NORTH (Y): -1302.19 **(feet)** **EAST (X):** 553.75 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 317.56 **NGVD29** **(feet)** **ELEVATION (Z):** 317.01 **NAVD88** **(feet)**

GPS ELEVATION 316.83 **NAVD88** **(feet)**

ACCESS NOTES:

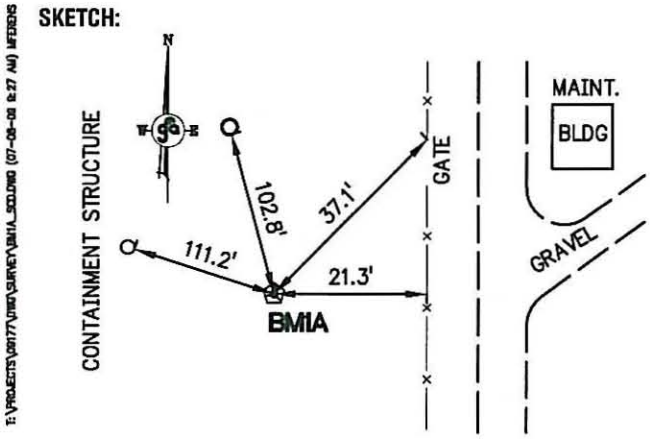
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE NORTH 800'± ALONG MAIN ACCESS ROAD YOU WILL FIND BM1A 300'± WEST OF MAIN ACCESS ROAD 37' SW OF A MAN GATE TO THE NIAGARA FALLS STORAGE SITE CONTAINMENT AREA.

DESCRIPTION:

SET 8' ROD WITH BRASS CAP

PHOTO:

SKETCH:



SURVEY CONTROL DATA

PROJECT: **SURVEY NIAGARA FALLS STORAGE SITE**

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: BM-FH (26) **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: W. BONNET BOLT HYDRANT **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°12'50.70050" N **LONGITUDE:** 78°59'00.97834" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1171355.58 **us feet** **EAST (X):** 1041589.16 **us feet**

DATUM: LOCAL

NORTH (Y): -1278.21 **(feet)** **EAST (X):** 960.26 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 321.50 **NGVD29** **(feet)** **ELEVATION (Z):** 320.95 **NAVD88** **(feet)**

GPS ELEVATION 320.82 **NAVD88** **(feet)**

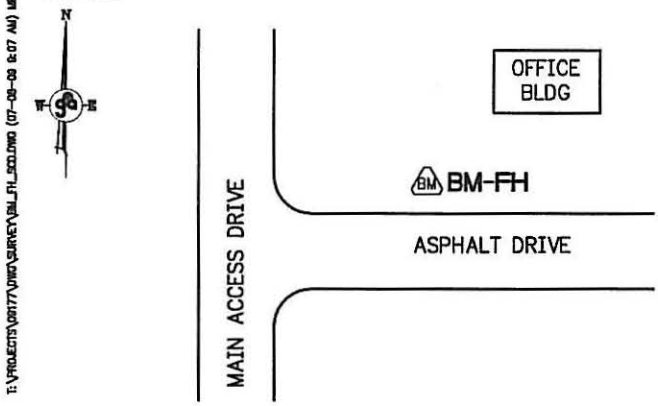
ACCESS NOTES:

FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE NORTH 800' YOU WILL FIND BENCHMARK EAST OF THE MAIN ACCESS ROAD AND SW OF THE OFFICE BLDG AT THE NIAGARA STORAGE SITE.

DESCRIPTION:

WEST BONNET BOLT ON HYDRANT

SKETCH:



SURVEY CONTROL DATA

PROJECT: SURVEY NIAGARA FALLS STORAGE SITE

CONTRACT # W911XK-07-D-0003 D.O. 9902

STATION DESIGNATION: BM2A (27) **QUAD:** –

COUNTY: NIAGARA **STATE:** NEW YORK **T.** – **N** **R.** – **E**

MARKER TYPE: 8' ROD W/BRASS DISK **SET BY:** GOURDIE-FRASER **DATE:** 06-13-09

ORIGIN OF CONTROL VERTICAL: NGS PID: "AA8259"

HORIZONTAL

DATUM: NAD83 **LATITUDE:** 43°12'44.36555" N **LONGITUDE:** 78°59'13.17621" W

STATE PLANE ZONE: ZONE 3103 NY WEST

NORTH (Y): 1170718.57 **us feet** **EAST (X):** 1040682.83 **us feet**

DATUM: LOCAL

NORTH (Y): -1915.29 **(feet)** **EAST (X):** 53.89 **(feet)**

VERTICAL

CONVENTIONAL LEVEL

ELEVATION (Z): 319.25 **NGVD29** **(feet)** **ELEVATION (Z):** 318.70 **NAVD88** **(feet)**

GPS ELEVATION 318.51 **NAVD88** **(feet)**

ACCESS NOTES:

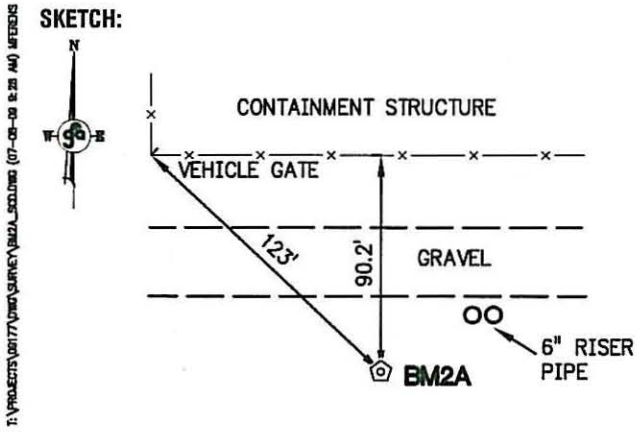
FROM THE INTERSECTION OF ROBERT MOSES PARKWAY AND 18F ON THE EAST SIDE OF THE VILLAGE OF LEWISTON GO EAST ON 18F FOR 1.1 MILES TO CREEK ROAD FOLLOW CREEK ROAD NORTH 2.5 MILES TO PLETCHER ROAD FOLLOW PLETCHER RD EAST 1.7 MILES TO CAMPBELL STREET ON LEFT (1397 PLETCHER RD) GO NORTH 0.2 MILES TO GATE AT NIAGARA FALLS STORAGE SITE. CONTINUE THROUGH GATE BUT TURN LEFT IMMEDIATLY GO 900'± WEST THEN GO NORTH 200'± YOU WILL FIND BM2A 123' SE OF THE SW COR OF THE NIAGARA FALLS STORAGE SITE CONTAINMENT AREA FENCE.

DESCRIPTION:

SET 8' ROD WITH BRASS CAP

PHOTO:

SKETCH:



SECTION 3

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

BM7 (1)

1/1

Latitude: 43 12 57.36972	**Latitude:** 43 12 57.36972
Longitude: 78 59 08.92473	**Longitude:** 78 59 08.92473
Elevation/Z: 316.83	**Elevation/Z:** 316.279

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

B-5 (3)

1/1

Latitude: 43 13 03.27924	**Latitude:** 43 13 03.27924
Longitude: 78 59 14.02868	**Longitude:** 78 59 14.02868
Elevation/Z: 319.39	**Elevation/Z:** 318.839

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

BM-1 (4)

1/1

Latitude: 43 13 03.46920	**Latitude:** 43 13 03.46920
Longitude: 78 59 01.40175	**Longitude:** 78 59 01.40175
Elevation/Z: 321.06	**Elevation/Z:** 320.509

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

CP18

1/1

Latitude: 43 13 01.69616	**Latitude:** 43 13 01.69616
Longitude: 78 59 15.09345	**Longitude:** 78 59 15.09345
Elevation/Z: 318.85	**Elevation/Z:** 318.299

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

CP19

1/1

Latitude: 43 12 42.38433	**Latitude:** 43 12 42.38433
Longitude: 78 59 16.23940	**Longitude:** 78 59 16.23940
Elevation/Z: 318.18	**Elevation/Z:** 317.632

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

B-7 (20)

1/1

Latitude: 43 12 42.37630	**Latitude:** 43 12 42.37630
Longitude: 78 59 13.88920	**Longitude:** 78 59 13.88920
Elevation/Z: 319.16	**Elevation/Z:** 318.612

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

CP21

1/1

Latitude: 43 12 44.80077	**Latitude:** 43 12 44.80077
Longitude: 78 59 01.58471	**Longitude:** 78 59 01.58471
Elevation/Z: 319.87	**Elevation/Z:** 319.319

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

CP22

1/1

Latitude: 43 12 58.07661	**Latitude:** 43 12 58.07661
Longitude: 78 59 02.09158	**Longitude:** 78 59 02.09158
Elevation/Z: 319.77	**Elevation/Z:** 319.219

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

BM1A (25)

1/1

Latitude: 43 12 50.44455	**Latitude:** 43 12 50.44455
Longitude: 78 59 06.46600	**Longitude:** 78 59 06.46600
Elevation/Z: 317.56	**Elevation/Z:** 317.009

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

BM-FH (26)

1/1

Latitude: 43 12 50.70050	**Latitude:** 43 12 50.70050
Longitude: 78 59 00.97834	**Longitude:** 78 59 00.97834
Elevation/Z: 321.50	**Elevation/Z:** 320.949

Remark:

Office

Project

8 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NGVD29 (Vertcon94), Int. Feet	Vertical - NAVD88, Int. Feet

BM2A (27)

1/1

Latitude: 43 12 44.36555	**Latitude:** 43 12 44.36555
Longitude: 78 59 13.17621	**Longitude:** 78 59 13.17621
Elevation/Z: 319.25	**Elevation/Z:** 318.699

Remark:

Office

Project

14 July 2009

INPUT	OUTPUT
Geographic, NAD83	Geographic, NAD83
Vertical - NAVD88, Int. Feet	Vertical - NGVD29 (Vertcon94), Int. Feet

AA8259

1/1

Latitude: 43 13 52.36785	**Latitude:** 43 13 52.36785
Longitude: 78 58 58.42693	**Longitude:** 78 58 58.42693
Elevation/Z: 307.89	**Elevation/Z:** 308.451

Remark:

SECTION 4

Classical 2D - Transformation Report

Processed: 07/08/2009 10:09:07

Project Information

	System A	System B
Project name:	09177_TPS	09177_TPS_LOCAL

Coordinate System Information System B

Coordinate system name:	WGS 1984
Created:	-
Transformation name:	-
Transformation type:	-
Height mode:	-
Residuals:	-
Local Ellipsoid:	WGS 1984
Projection:	-
Geoid model:	-
CSCS model:	-

Transformation details

2D-Helmert transformation

Number of common points:	6	
Sigma a priori:	1.0000	
Sigma a posteriori:	0.0101	
Rotation origin:	X0:	1040986.9294 fts
	Y0:	1171317.4092 fts

No.	Parameter	Value	rms
1	dE	-1040628.9411 fts	0.0135 fts
2	dN	-1172633.8342 fts	0.0135 fts
3	Rotation	-0° 00' 07.53316"	0° 00' 03.22780"
4	Scale	77.0534 ppm	15.6476 ppm

System A	System B	Easting	Northing	Height	Position	Position+Height
18	18	-0.0115	-0.0086	-	0.0144	0.0144
19	19	-0.0008	-0.0349	-	0.0349	0.0349
21	21	0.0170	-0.0228	-	0.0284	0.0284
22	22	0.0059	0.0001	-	0.0059	0.0059
25	25	-0.0091	-0.0126	-	0.0155	0.0155
27	27	-0.0015	0.0788	-	0.0788	0.0788

SECTION 5

STAR*NET-PLUS Version 6.0.36
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Run Date: Wed Jul 08 2009 15:52:37

Summary of Files Used and Option Settings

Project Folder and Data Files

Project Name LINE3
Project Folder T:\PROJECTS\09177\STARNET\LINE3
Data File List 1. LINE3.dat

Project Option Settings

STAR*NET Run Mode	: Adjust with Error Propagation
Type of Adjustment	: Lev
Project Units	: FeetUS
Input/Output Coordinate Order	: North-East
Create Coordinate File	: Yes

Instrument Standard Error Settings

Project Default Instrument
Differential Levels : 0.010000 FeetUS / Mile

Summary of Unadjusted Input Observations

Number of Entered Stations (FeetUS) = 1

Fixed Stations	Elev	Description
TP1	318.9604	TP1'

Number of Differential Level Observations (FeetUS) = 1

From	To	Elev Diff	StdErr	Length
TP1	AA8259	-10.5025	0.0103	5570

Adjustment Statistical Summary

Number of Stations = 2

Number of Observations = 1
Number of Unknowns = 1
Number of Redundant Obs = 0

Observation	Count	Sum Squares of StdRes	Error Factor
Level Data	1	0.000	0.000
Total	1	0.000	0.000

No Redundant Observations - No Chi Square Test

Adjusted Elevations and Error Propagation (FeetUS)

Station	Elev	StdDev	95%	Description
TP1	318.9604	0.000000	0.000000	TP1'
AA8259	308.4579	0.010271	0.020131	

Adjusted Observations and Residuals

Adjusted Differential Level Observations (FeetUS)

From	To	Elev Diff	Residual	StdErr	StdRes
TP1	AA8259	-10.5025	0.0000	0.0103	0.0

Elapsed Time = 00:00:00

```
410102+?......1
110103+00000TP1 83..17+0318996
.P TP1 318.961 'TP1'
110104+00000TP1 32...7+01804231 331.27+00045095 390...+00000003
391.27+00000005
110105+00001020 32...7+01850456 332.27+00057527 390...+00000003
391.27+00000003
110106+00001020 573..7-00046225 574..7+03654686 83..27+03174908
110107+00001020 32...7+02088519 331.27+00042457 390...+00000003
391.27+00000004
110108+00001021 32...7+02156843 332.27+00060501 390...+00000003
391.27+00000004
110109+00001021 573..7-00114549 574..7+07900048 83..27+03156864
110110+00001021 32...7+01874109 331.27+00045672 390...+00000003
391.27+00000002
110111+00001022 32...7+01659331 332.27+00056829 390...+00000003
391.27+00000003
110112+00001022 573..7+00100229 574..7+11433487 83..27+03145707
110113+00001022 32...7+02017292 331.27+00057639 390...+00000003
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110116+00001023 32...7+02071909 331.27+00039580 390...+00000003
391.27+00000001
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391.27+00000007
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110119+00001024 32...7+01930277 331.27+00047458 390...+00000003
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110123+00001026 32...7+01850162 332.27+00054011 390...+00000003
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391.27+00000004
110126+00001027 32...7+01861510 332.27+00053156 390...+00000003
391.27+00000002
110127+00001027 573..7+00014609 574..7+31131494 83..27+03103825
110128+00001027 32...7+01892677 331.27+00047965 390...+00000003
391.27+00000006
110129+00001028 32...7+01905216 332.27+00052000 390...+00000003
391.27+00000003
110130+00001028 573..7+00002070 574..7+34929387 83..27+03099791
110131+00001028 32...7+01916254 331.27+00048998 390...+00000003
391.27+00000003
110132+00001029 32...7+02017269 332.27+00050291 390...+00000003
391.27+00000005
110133+00001029 573..7-00098944 574..7+38862909 83..27+03098498
110134+00001029 32...7+01961126 331.27+00052790 390...+00000003
391.27+00000005
110135+00001030 32...7+01944901 332.27+00043864 390...+00000003
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391.27+00000001
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```

```
110143+00001032 32...7+01965562 331.27+00038179 390...+00000003
391.27+00000004
110144+00001033 32...7+01950870 332.27+00042620 390...+00000003
391.27+00000003
110145+00001033 573..7-00122852 574..7+55164863 83..27+03098980
110146+00001033 32...7+00326315 331.27+00044667 390...+00000003
391.27+00000001
110147+00AA8259 32...7+00209094 332.27+00061330 390...+00000003
391.27+00000000
110148+00AA8259 573..7-00005631 574..7+55700272 83..27+03082317
```

STAR*NET-PLUS Version 6.0.36
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Run Date: Wed Jul 08 2009 15:48:51

Summary of Files Used and Option Settings

Project Folder and Data Files

Project Name LINE2
Project Folder T:\PROJECTS\09177\STARNET\LINE2
Data File List 1. LINE2.dat

Project Option Settings

STAR*NET Run Mode	: Adjust with Error Propagation
Type of Adjustment	: Lev
Project Units	: FeetUS
Input/Output Coordinate Order	: North-East
Create Coordinate File	: Yes

Instrument Standard Error Settings

Project Default Instrument
Differential Levels : 0.010000 FeetUS / Mile

Summary of Unadjusted Input Observations

Number of Entered Stations (FeetUS) = 1

Fixed Stations	Elev	Description
BM2	319.8094	BM2'

Number of Differential Level Observations (FeetUS) = 2

From	To	Elev Diff	StdErr	Length
BM2	CP3	-0.4239	0.0011	61
CP3	BM2	0.4241	0.0011	61

Adjustment Statistical Summary

Number of Stations = 2

Number of Observations = 2
Number of Unknowns = 1
Number of Redundant Obs = 1

Observation	Count	Sum Squares of StdRes	Error Factor
Level Data	2	0.017	0.132
Total	2	0.017	0.132

The Chi-Square Test at 5.00% Level Passed
Lower/Upper Bounds (0.031/2.241)

Adjusted Elevations and Error Propagation (FeetUS)

Station	Elev	StdDev	95%	Description
BM2	319.8094	0.000000	0.000000	BM2'
CP3	319.3854	0.000760	0.001490	

Adjusted Observations and Residuals

Adjusted Differential Level Observations (FeetUS)

From	To	Elev Diff	Residual	StdErr	StdRes
BM2	CP3	-0.4240	-0.0001	0.0011	0.1
CP3	BM2	0.4240	-0.0001	0.0011	0.1

Elapsed Time = 00:00:00

```
410094+?......1
110095+00000BM2 83..17+03198427
.P BM2 319.81 'BM2'
110096+00000BM2 32...7+00347985 331.07+00046351 390...+00000003
391.07+00000001
110097+00000CP3 32...7+00265073 332.07+00050590 390...+00000003
391.07+00000000 71....+0000CP-3
110098+00000CP3 573..7+00082912 574..7+00613058 83..07+03194189
110099+00000CP3 32...7+00262641 331.07+00051885 390...+00000003
391.07+00000000
110100+00000BM2 32...7+00348486 332.07+00047644 390...+00000003
391.07+00000002
.P BM2 319.81 'BM2'
110101+00000BM2 573..7-00002933 574..7+01224185 83..07+03198429
```

STAR*NET-PLUS Version 6.0.36
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Run Date: Wed Jul 08 2009 15:42:13

Summary of Files Used and Option Settings

Project Folder and Data Files

Project Name LINE1
Project Folder T:\PROJECTS\09177\STARNET\LINE1
Data File List 1. LINE1.dat

Project Option Settings

STAR*NET Run Mode	: Adjust with Error Propagation
Type of Adjustment	: Lev
Project Units	: FeetUS
Input/Output Coordinate Order	: North-East
Create Coordinate File	: Yes

Instrument Standard Error Settings

Project Default Instrument
Differential Levels : 0.010000 FeetUS / Mile

Summary of Unadjusted Input Observations

Number of Entered Stations (FeetUS) = 1

Fixed Stations	Elev	Description
BM1	321.0594	BM1'

Number of Differential Level Observations (FeetUS) = 10

From	To	Elev Diff	StdErr	Length
BM1	BM2	-1.2462	0.0043	956
BM2	CP18	-0.9584	0.0019	187
CP18	BM7	-2.0204	0.0040	849
BM7	CP19	1.3436	0.0064	2193
CP19	CP20	0.9840	0.0018	175
CP20	BM2A	0.0855	0.0020	208
BM2A	CP21	0.6256	0.0046	1114
CP21	BM1A	-2.3117	0.0045	1061
BM1A	CP22	2.2094	0.0043	973
CP22	BM1	1.2949	0.0032	554

Adjustment Statistical Summary

Number of Stations = 10

Number of Observations = 10
Number of Unknowns = 9
Number of Redundant Obs = 1

Observation	Count	Sum Squares of StdRes	Error Factor
Level Data	10	0.253	0.503
Total	10	0.253	0.503

The Chi-Square Test at 5.00% Level Passed
Lower/Upper Bounds (0.031/2.241)

Adjusted Elevations and Error Propagation (FeetUS)

Station	Elev	StdDev	95%	Description
BM1	321.0594	0.000000	0.000000	BM1'
BM2	319.8124	0.004002	0.007843	
CP18	318.8539	0.004319	0.008466	
BM7	316.8328	0.005352	0.010489	
CP19	318.1748	0.006257	0.012264	
CP20	319.1586	0.006248	0.012246	
BM2A	319.2440	0.006223	0.012197	
CP21	319.8687	0.005803	0.011374	
BM1A	317.5562	0.004856	0.009518	
CP22	319.7649	0.003129	0.006132	

Adjusted Observations and Residuals

Adjusted Differential Level Observations (FeetUS)

From	To	Elev Diff	Residual	StdErr	StdRes
BM1	BM2	-1.2469	-0.0007	0.0043	0.2
BM2	CP18	-0.9585	-0.0001	0.0019	0.1
CP18	BM7	-2.0210	-0.0006	0.0040	0.2
BM7	CP19	1.3419	-0.0017	0.0064	0.3
CP19	CP20	0.9839	-0.0001	0.0018	0.1
CP20	BM2A	0.0853	-0.0002	0.0020	0.1
BM2A	CP21	0.6248	-0.0008	0.0046	0.2
CP21	BM1A	-2.3125	-0.0008	0.0045	0.2
BM1A	CP22	2.2087	-0.0007	0.0043	0.2
CP22	BM1	1.2945	-0.0004	0.0032	0.1

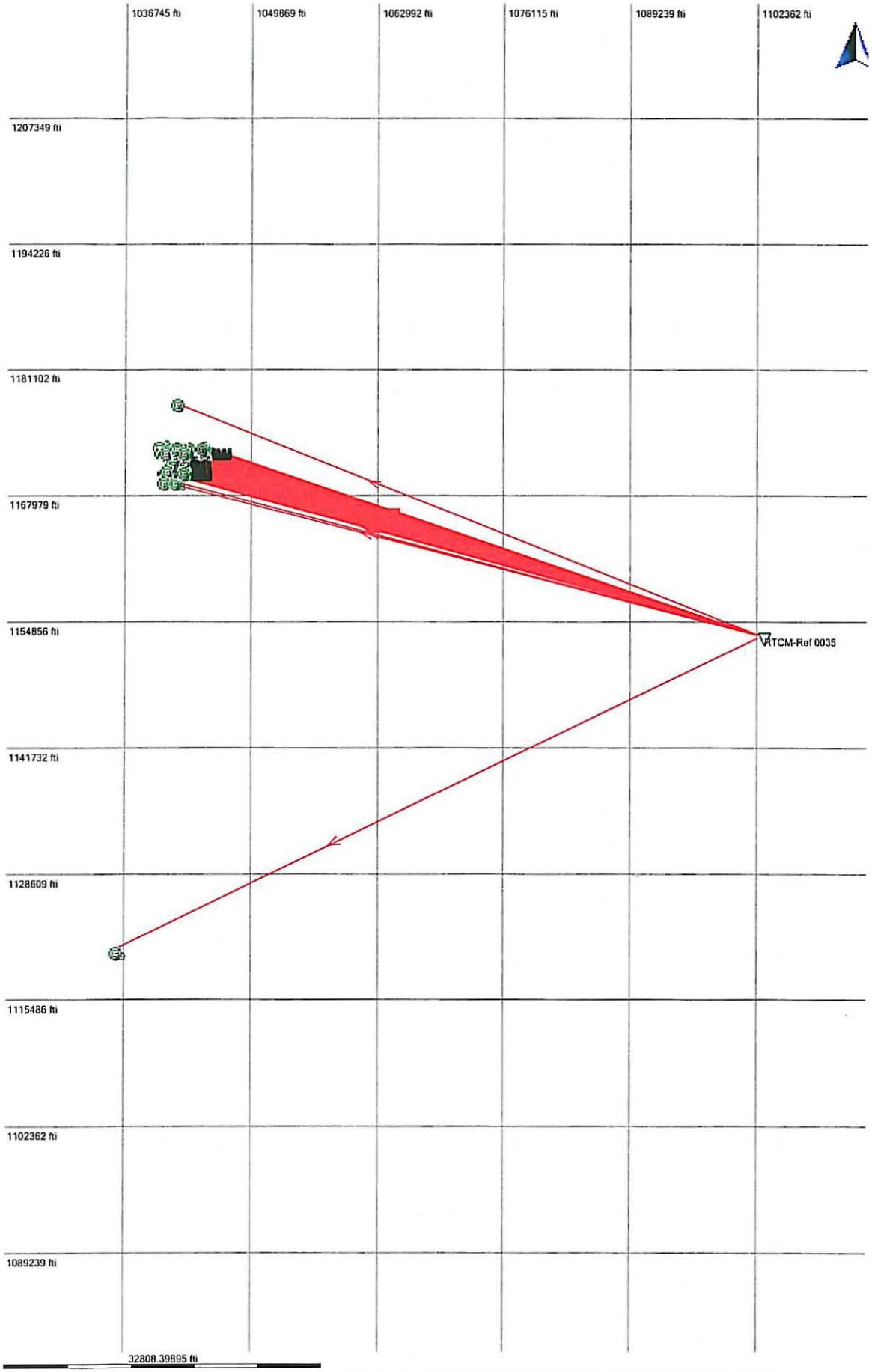
Elapsed Time = 00:00:01

```
410005+?......1
110006+00000BM1 83..57+03210890
.P BM1 321.06 'BM1'
110007+00000BM1 32...7+01893759 331.07+00041059 390...+00000003
391.07+00000005
110008+00001001 32...7+01803109 332.07+00051875 390...+00000003
391.07+00000009
110009+00001001 573..7+00090650 574..7+03696868 83..07+03200074
110010+00001001 32...7+01941577 331.07+00049133 390...+00000003
391.07+00000003
110011+00001002 32...7+01907160 332.07+00053463 390...+00000003
391.07+00000004
110012+00001002 573..7+00125067 574..7+07545605 83..07+03195744
110013+00001002 32...7+00958264 331.07+00051123 390...+00000003
391.07+00000001
110014+00000BM2 32...7+01052246 332.07+00048439 390...+00000003
391.07+00000004 71....+0000BM-2
110015+00000BM2 573..7+00031085 574..7+09556116 83..07+03198427
110016+00000BM2 32...7+00901403 331.07+00040602 390...+00000003
391.07+00000002
110017+0000CP18 32...7+00965874 332.07+00050186 390...+00000003
391.07+00000001 71....+000CP-18
110018+0000CP18 573..7-00033385 574..7+11423393 83..07+03188843
110019+0000CP18 32...7+01741358 331.07+00051266 390...+00000003
391.07+00000003
110020+00001003 32...7+01810597 332.07+00051549 390...+00000003
391.07+00000005
110021+00001003 573..7-00102624 574..7+14975348 83..07+03188560
110022+00001003 32...7+01967954 331.07+00036852 390...+00000003
391.07+00000006
110023+00001004 32...7+01922118 332.07+00064198 390...+00000003
391.07+00000006
110024+00001004 573..7-00056789 574..7+18865420 83..07+03161214
110025+00001004 32...7+00521720 331.07+00061069 390...+00000003
391.07+00000002
110026+00000BM7 32...7+00521477 332.07+00053644 390...+00000003
391.07+00000001
110027+00000BM7 573..7-00056546 574..7+19908616 83..07+03168639
110028+00000BM7 32...7+01857463 331.07+00048728 390...+00000003
391.07+00000003
110029+00001005 32...7+01918899 332.07+00027536 390...+00000003
391.07+00000000
110030+00001005 573..7-00117981 574..7+23684978 83..07+03189831
110031+00001005 32...7+01489905 331.07+00045597 390...+00000003
391.07+00000003
110032+00001006 32...7+01471391 332.07+00043827 390...+00000003
391.07+00000005
110033+00001006 573..7-00099468 574..7+26646274 83..07+03191601
110034+00001006 32...7+01897494 331.07+00051603 390...+00000003
391.07+00000005
110035+00001007 32...7+01833543 332.07+00046153 390...+00000003
391.07+00000004
110036+00001007 573..7-00035517 574..7+30377312 83..07+03197051
110037+00001007 32...7+01622792 331.07+00045143 390...+00000003
391.07+00000007
110038+00001008 32...7+01568957 332.07+00042677 390...+00000003
391.07+00000008
110039+00001008 573..7+00018318 574..7+33569061 83..07+03199518
110040+00001008 32...7+01839660 331.07+00041151 390...+00000003
391.07+00000005
110041+00001009 32...7+01903715 332.07+00044693 390...+00000003
391.07+00000006
110042+00001009 573..7-00045736 574..7+37312436 83..07+03195976
110043+00001009 32...7+01674359 331.07+00047822 390...+00000003
391.07+00000003
110044+00001010 32...7+01542616 332.07+00059237 390...+00000003
391.07+00000006
110045+00001010 573..7+00086006 574..7+40529411 83..07+03184562
```

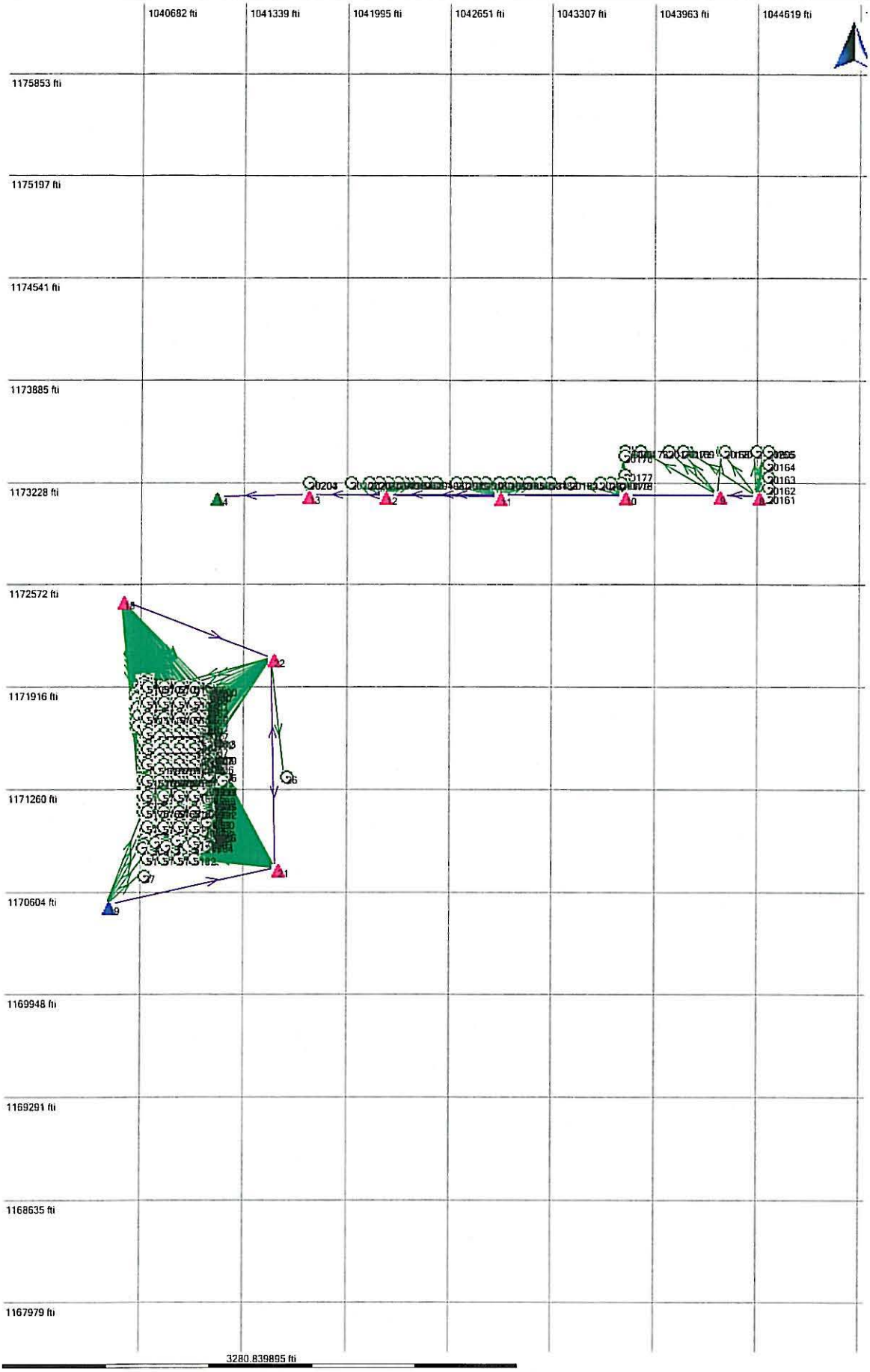
```
110046+00001010 32...7+00610761 331.07+00050150 390...+00000003
391.07+00000002
110047+0000CP19 32...7+00694143 332.07+00052635 390...+00000003
391.07+00000003 71....+000CP-19
110048+0000CP19 573..7+00002624 574..7+41834315 83..07+03182077
110049+0000CP19 32...7+00837968 331.07+00058969 390...+00000003
391.07+00000003
110050+0000CP20 32...7+00912552 332.07+00049129 390...+00000003
391.07+00000001 71....+000CP-20
110051+0000CP20 573..7-00071960 574..7+43584835 83..07+03191917
110052+0000CP20 32...7+01035431 331.07+00053658 390...+00000003
391.07+00000004
110053+0000BM2A 32...7+01047525 332.07+00052803 390...+00000003
391.07+00000007 71....+000BM-1A
110054+0000BM2A 573..7-00084053 574..7+45667791 83..07+03192772
110055+0000BM2A 32...7+01800974 331.07+00056028 390...+00000003
391.07+00000004
110056+00001011 32...7+01817231 332.07+00053445 390...+00000003
391.07+00000002
110057+00001011 573..7-00100310 574..7+49285996 83..07+03195355
110058+00001011 32...7+01842177 331.07+00048512 390...+00000003
391.07+00000003
110059+00001012 32...7+01771020 332.07+00046165 390...+00000003
391.07+00000003
110060+00001012 573..7-00029153 574..7+52899193 83..07+03197701
110061+00001012 32...7+01606209 331.07+00059351 390...+00000003
391.07+00000003
110062+00001013 32...7+01490201 332.07+00045758 390...+00000003
391.07+00000006
110063+00001013 573..7+00086855 574..7+55995603 83..07+03211295
110064+00001013 32...7+00404272 331.07+00043157 390...+00000003
391.07+00000001
110065+0000CP21 32...7+00409718 332.07+00055424 390...+00000003
391.07+00000002 71....+000CP-21
110066+0000CP21 573..7+00081408 574..7+56809593 83..07+03199028
110067+0000CP21 32...7+01894543 331.07+00052954 390...+00000003
391.07+00000013
110068+00001014 32...7+01966887 332.07+00052253 390...+00000003
391.07+00000007
110069+00001014 573..7+00009064 574..7+60671023 83..07+03199729
110070+00001014 32...7+01951521 331.07+00057544 390...+00000003
391.07+00000007
110071+00001015 32...7+01842886 332.07+00066107 390...+00000003
391.07+00000007
110072+00001015 573..7+00117700 574..7+64465431 83..07+03191166
110073+00001015 32...7+01026814 331.07+00067129 390...+00000003
391.07+00000003
110074+00001016 32...7+01158584 332.07+00087187 390...+00000003
391.07+00000002
110075+00001016 573..7-00014070 574..7+66650829 83..07+03171108
110076+00001016 32...7+00406174 331.07+00066142 390...+00000003
391.07+00000001
110077+0000BM1A 32...7+00358032 332.07+00061339 390...+00000003
391.07+00000000 71....+000BM-2A
110078+0000BM1A 573..7+00034071 574..7+67415035 83..07+03175911
110079+0000BM1A 32...7+01789783 331.07+00059139 390...+00000003
391.07+00000004
110080+00001017 32...7+01585270 332.07+00036637 390...+00000003
391.07+00000002
110081+00001017 573..7+00238584 574..7+70790089 83..07+03198412
110082+00001017 32...7+01725725 331.07+00037097 390...+00000003
391.07+00000006
110083+00001018 32...7+01810517 332.07+00044122 390...+00000003
391.07+00000003
110084+00001018 573..7+00153793 574..7+74326331 83..07+03191386
110085+00001018 32...7+01305249 331.07+00056673 390...+00000003
391.07+00000004
110086+0000CP22 32...7+01510857 332.07+00050056 390...+00000003
```

```
391.07+00000002 71....+000CP-22
110087+0000CP22 573..7-00051815 574..7+77142437 83..07+03198004
110088+0000CP22 32...7+01909204 331.07+00048752 390...+00000003
391.07+00000011
110089+00001019 32...7+01863103 332.07+00049404 390...+00000003
391.07+00000007
110090+00001019 573..7-00005713 574..7+80914744 83..07+03197352
110091+00001019 32...7+00895340 331.07+00052929 390...+00000003
391.07+00000004
110092+00000BM1 32...7+00871982 332.07+00039328 390...+00000003
391.07+00000002
.P BM1 321.06 'BM1'
110093+00000BM1 573..7+00017645 574..7+82682067 83..07+03210953
```

SECTION 6



Estimated
Navigated
SPP
Measured
Average
Reference
Adjusted
Control - 1D
Control - 2D
Control - 3D



Estimated
Navigated
SPP
Measured
Average
Reference
Adjusted
Control - 1D
Control - 2D
Control - 3D

SECTION 7

The NGS Data Sheet

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.67
1         National Geodetic Survey,   Retrieval Date = JUNE 25, 2009
 DI0596 ***********************************************************************
 DI0596  CORS         -  This is a GPS Continuously Operating Reference Station.
 DI0596  DESIGNATION -  LOCKPORT CORS ARP
 DI0596  CORS_ID      -  NYLP
 DI0596  PID          -  DI0596
 DI0596  STATE/COUNTY-  NY/NIAGARA
 DI0596  USGS QUAD    -
 DI0596
 DI0596                          *CURRENT SURVEY CONTROL
 DI0596  ______________________________________________________________________
 DI0596* NAD 83(CORS)-  43 09 54.85489(N)    078 45 13.35735(W)     ADJUSTED
 DI0596* NAVD 88      -              **(meters)            **(feet)
 DI0596  ______________________________________________________________________
 DI0596  EPOCH DATE   -        2002.00
 DI0596  X            -     908,734.404 (meters)                    COMP
 DI0596  Y            -  -4,570,063.041 (meters)                    COMP
 DI0596  Z            -   4,341,022.879 (meters)                    COMP
 DI0596  ELLIP HEIGHT-         166.303 (meters)          (07/??/06) ADJUSTED
 DI0596  GEOID HEIGHT-         -35.66  (meters)                    GEOID03
 DI0596  HORZ ORDER   -  SPECIAL (CORS)
 DI0596  ELLP ORDER   -  SPECIAL (CORS)
 DI0596
 DI0596.ITRF positions are available for this station.
 DI0596.The coordinates were established by GPS observations
 DI0596.and adjusted by the National Geodetic Survey in July 2006.
 DI0596.The coordinates are valid at the epoch date displayed above.
 DI0596.The epoch date for horizontal control is a decimal equivalence
 DI0596.of Year/Month/Day.
 DI0596
 DI0596
 DI0596.The PID for the CORS L1 Phase Center is DI0597.
 DI0596
 DI0596.The XYZ, and position/ellipsoidal ht. are equivalent.
 DI0596
 DI0596.The ellipsoidal height was determined by GPS observations
 DI0596.and is referenced to NAD 83.
 DI0596
 DI0596.The geoid height was determined by GEOID03.
 DI0596
 DI0596;                    North         East     Units Scale Factor Converg.
 DI0596;SPC NY W      -   351,539.923   336,145.441   MT  0.99993986   -0 06 59.6
 DI0596;SPC NY W      - 1,153,343.90  1,102,837.17   sFT  0.99993986   -0 06 59.6
 DI0596
 DI0596!              -  Elev Factor  x  Scale Factor =   Combined Factor
 DI0596!SPC NY W      -   0.99997392  x   0.99993986  =   0.99991378
 DI0596
 DI0596                          SUPERSEDED SURVEY CONTROL
 DI0596
 DI0596.No superseded survey control is available for this station.
 DI0596
 DI0596_U.S. NATIONAL GRID SPATIAL ADDRESS: 17TPH8260381614(NAD 83)
 DI0596_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
 DI0596
 DI0596                          STATION DESCRIPTION
 DI0596
 DI0596'DESCRIBED BY NATIONAL GEODETIC SURVEY 2006
 DI0596'STATION IS A GPS CORS.  LATEST INFORMATION INCLUDING POSITIONS AND
```

```
DI0596'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DI0596'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DI0596'   FTP CORS.NGS.NOAA.GOV: CORS/COORD  AND  CORS/STATION_LOG
DI0596'   HTTP://WWW.NGS.NOAA.GOV  UNDER PRODUCTS AND SERVICES.

*** retrieval complete.
Elapsed Time = 00:00:00
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.67
1         National Geodetic Survey,   Retrieval Date = JULY 14, 2009
 AA8259 ***********************************************************************
 AA8259  FBN          -  This is a Federal Base Network Control Station.
 AA8259  DESIGNATION -  YOUN USCG B
 AA8259  PID          -  AA8259
 AA8259  STATE/COUNTY-  NY/NIAGARA
 AA8259  USGS QUAD    -
 AA8259
 AA8259                         *CURRENT SURVEY CONTROL
 AA8259  ___________________________________________________________________
 AA8259* NAD 83(2007)-  43 13 52.36785(N)    078 58 58.42693(W)     ADJUSTED
 AA8259* NAVD 88      -        93.844  (meters)     307.89   (feet)  ADJUSTED
 AA8259  ___________________________________________________________________
 AA8259  EPOCH DATE   -        2002.00
 AA8259  X            -     889,472.744 (meters)                     COMP
 AA8259  Y            -  -4,568,658.852 (meters)                     COMP
 AA8259  Z            -   4,346,291.977 (meters)                     COMP
 AA8259  LAPLACE CORR-           1.61  (seconds)                    DEFLEC99
 AA8259  ELLIP HEIGHT-          57.812 (meters)          (02/10/07) ADJUSTED
 AA8259  GEOID HEIGHT-         -36.00  (meters)                     GEOID03
 AA8259  DYNAMIC HT   -          93.823 (meters)     307.82   (feet)  COMP
 AA8259
 AA8259  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 AA8259  Type     PID    Designation                       North   East  Ellip
 AA8259  ---------------------------------------------------------------------
 AA8259  NETWORK AA8259 YOUN USCG B                         0.14   0.10   0.24
 AA8259  ---------------------------------------------------------------------
 AA8259  MODELED GRAV-     980,398.7   (mgal)                       NAVD 88
 AA8259
 AA8259  VERT ORDER   -  FIRST     CLASS II
 AA8259
 AA8259.This is a reference station for the YOUNGSTOWN 1
 AA8259.National Continuously Operating Reference Station (YOU1).
 AA8259
 AA8259.The horizontal coordinates were established by GPS observations
 AA8259.and adjusted by the National Geodetic Survey in February 2007.
 AA8259
 AA8259.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 AA8259.See National Readjustment for more information.
 AA8259.The horizontal coordinates are valid at the epoch date displayed above.
 AA8259.The epoch date for horizontal control is a decimal equivalence
 AA8259.of Year/Month/Day.
 AA8259
 AA8259.The orthometric height was determined by differential leveling
 AA8259.and adjusted in July 2002.
 AA8259.WARNING-GPS observations at this control monument resulted in a GPS
 AA8259.derived orthometric height which differed from the leveled height by
 AA8259.more than one decimeter (0.1 meter).
 AA8259
 AA8259.Photographs are available for this station.
 AA8259
 AA8259.The X, Y, and Z were computed from the position and the ellipsoidal ht.
```

```
AA8259
AA8259.The Laplace correction was computed from DEFLEC99 derived deflections.
AA8259
AA8259.The ellipsoidal height was determined by GPS observations
AA8259.and is referenced to NAD 83.
AA8259
AA8259.The geoid height was determined by GEOID03.
AA8259
AA8259.The dynamic height is computed by dividing the NAVD 88
AA8259.geopotential number by the normal gravity value computed on the
AA8259.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AA8259.degrees latitude (g = 980.6199 gals.).
AA8259
AA8259.The modeled gravity was interpolated from observed gravity values.
AA8259
AA8259;                    North         East     Units Scale Factor Converg.
AA8259;SPC NY W     -   358,932.578   317,543.686   MT  0.99995045   -0 16 25.3
AA8259;SPC NY W     - 1,177,597.97  1,041,807.91   sFT  0.99995045   -0 16 25.3
AA8259;UTM  17      - 4,788,466.422   663,795.120   MT  0.99993004   +1 22 54.9
AA8259
AA8259!             -  Elev Factor  x  Scale Factor =   Combined Factor
AA8259!SPC NY W     -   0.99999093  x   0.99995045  =   0.99994138
AA8259!UTM  17      -   0.99999093  x   0.99993004  =   0.99992097
AA8259
AA8259:                Primary Azimuth Mark                     Grid Az
AA8259:SPC NY W     -  YOUN USCG A                              080 19 31.7
AA8259:UTM  17      -  YOUN USCG A                              078 40 11.5
AA8259
AA8259|---------------------------------------------------------------------|
AA8259| PID    Reference Object                     Distance      Geod. Az  |
AA8259|                                                           dddmmss.s |
AA8259| AA8258 YOUN USCG A                         APPROX. 1.0 KM 0800306.4 |
AA8259|---------------------------------------------------------------------|
AA8259
AA8259                          SUPERSEDED SURVEY CONTROL
AA8259
AA8259  ELLIP H (09/18/02)   57.849  (m)                        GP(       ) 4 2
AA8259  ELLIP H (07/24/97)   57.861  (m)                        GP(       ) 2 1
AA8259  NAD 83(1992)-  43 13 52.36774(N)    078 58 58.42778(W) AD(1995.00) A
AA8259  ELLIP H (10/06/95)   57.798  (m)                        GP(1995.00) 1 1
AA8259  NAVD 88 (11/18/96)   93.84   (m)          307.9    (f) LEVELING    3
AA8259
AA8259.Superseded values are not recommended for survey control.
AA8259.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AA8259.See file dsdata.txt to determine how the superseded data were derived.
AA8259
AA8259_U.S. NATIONAL GRID SPATIAL ADDRESS: 17TPH6379588466(NAD 83)
AA8259_MARKER: I = METAL ROD
AA8259_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
AA8259_STAMPING: YOUN USCG B
AA8259_MARK LOGO: NGS
AA8259_PROJECTION: FLUSH
AA8259_MAGNETIC: N = NO MAGNETIC MATERIAL
AA8259_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AA8259_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AA8259+SATELLITE: SATELLITE OBSERVATIONS - October 03, 2003
AA8259_ROD/PIPE-DEPTH: 6.50 meters
AA8259_SLEEVE-DEPTH  : 0.90 meters
AA8259
AA8259  HISTORY     - Date     Condition        Report By
```

```
AA8259  HISTORY     - 1995     MONUMENTED       NGS
AA8259  HISTORY     - 19960311 GOOD             NGS
AA8259  HISTORY     - 19960511 GOOD             NGS
AA8259  HISTORY     - 20010725 GOOD             NGS
AA8259  HISTORY     - 20031003 GOOD             NGS
AA8259
AA8259                          STATION DESCRIPTION
AA8259
AA8259'DESCRIBED BY NATIONAL GEODETIC SURVEY 1995 (RWD)
AA8259'THE STATION IS LOCATED IN THE TOWN OF PORTER, NY, AT THE ENTRANCE GATE
AA8259'OF THE RANSOMVILLE NATIONAL GUARD TRAINING AREA.  TO REACH THE STATION
AA8259'FROM THE INTERSECTION OF MAIN AND CHURCH STREETS IN YOUNGSTOWN, NY,
AA8259'PROCEED EAST AND SOUTH ON CHURCH ST FOR 2.1 MI (3.4 KM) TO BALMER ST
AA8259'ON THE LEFT.  TURN LEFT AND PROCEED EAST FOR 1.75 MI (2.82 KM) TO THE
AA8259'STATION ON THE LEFT, JUST EAST OF A ROAD WITH A GATE AND A GUARD
AA8259'HOUSE.  THE STATION IS 18.5 M (60.7 FT) NORTH OF THE CENTERLINE OF
AA8259'BALMER ST, 7.8 M (25.6 FT) EAST OF A WOODEN POST WITH A WITNESS
AA8259'STICKER ON IT, AND 1.78 M (5.84 FT) SOUTH OF A BARBED WIRE FENCE.
AA8259
AA8259                          STATION RECOVERY (1996)
AA8259
AA8259'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1996 (GAS)
AA8259'0.1 KM (0.05 MI) WESTERLY ALONG LOCKPORT STREET FROM THE POST OFFICE
AA8259'IN YOUNGSTOWN, THENCE 0.4 KM (0.25 MI) SOUTHERLY ALONG MAIN STREET,
AA8259'THENCE 3.1 M (10.2 FT) EASTERLY ALONG CHURCH STREET AND BLAIRVILLE
AA8259'ROAD, THENCE 0.3 KM (0.20 MI) SOUTHERLY ALONG CREEK ROAD, THENCE 2.8
AA8259'KM (1.75 MI) EASTERLY ALONG BALMER ROAD, 18.5 M (60.7 FT) NORTH OF THE
AA8259'ROAD CENTERLINE, 11.0 M (36.1 FT) EAST OF THE CENTER OF A ROAD LEADING
AA8259'TO THE NATIONAL GUARD COMPLEX, 7.8 M (25.6 FT) EAST OF A WOODEN POST
AA8259'WITH A WITNESS SIGN ATTACHED, 1.7 M (5.6 FT) SOUTH OF A FENCE, AND 0.5
AA8259'M (1.6 FT) BELOW THE LEVEL OF THE ROAD.  NOTE--ACCESS TO THE DATUM
AA8259'POINT IS THROUGH A 5-INCH LOGO CAP.  THE SLEEVE DEPTH DOES NOT MEET
AA8259'THE SPECIFICATIONS FOR A CLASS A MARK.
AA8259
AA8259                          STATION RECOVERY (1996)
AA8259
AA8259'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1996 (RPB)
AA8259'RECOVERED AS DESCRIBED.
AA8259
AA8259                          STATION RECOVERY (2001)
AA8259
AA8259'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2001 (CSM)
AA8259'RECOVERED AS DESCRIBED EXCEPT THERE IS NO STAMPING.
AA8259'
AA8259'
AA8259
AA8259                          STATION RECOVERY (2003)
AA8259
AA8259'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2003 (AJL)
AA8259'RECOVERED AS DESCRIBED IN THE 1996 RECOVERY DESCRIPTION WITH THE
AA8259'FOLLOWING CHANGES.
AA8259'CHANGE 3.1 METERS TO 1.9 MILES EASTERLY ALONG CHURCH STREET AND
AA8259'BLAIRVILLE ROAD.  A NEW
AA8259'LOGO CAP WITH STAMPING WAS INSTALLED.
AA8259'

*** retrieval complete.
Elapsed Time = 00:00:00
```

SECTION 8

CONTROL SURVEY RECORD

P.I.N: 4832-99
ORDER OF SURVEY:
UTM ZONE:
HORIZONTAL DATUM: 1983
VERTICAL DATUM: 1929

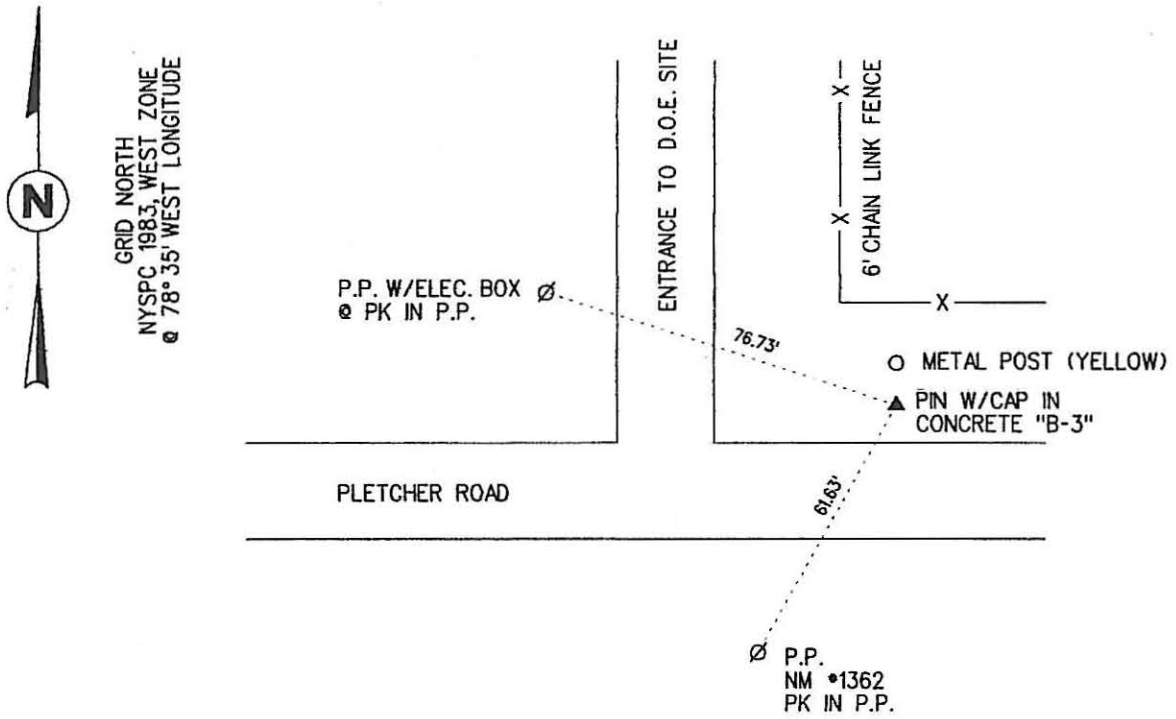
PROJECT: N.F.S.S.
PROJECTION SYSTEM: TRAVERSE MERCATOR
STATE: NY ZONE: WEST
STATE PLANE COORDINATE SYSTEM

Party Chief: MR
Draftsman: MC
Checked By: KLS
Sheet No.:

COUNTY	NAME OF STATION	MONUMENT TYPE
NIAGARA	B-3	PIN WITH ALUMINUM CAP

LATITUDE: 43° 12'32.20154"N
LONGITUDE: 078° 59'01.12788"W
NAD83(96) NORTHING (Y): 1169482.77'
NAD83(96) EASTING (X): 1041569.12'
UTM NORTHING (Y):
UTM EASTING (X):
GROUND NORTHING (Y):
GROUND EASTING (X):
GPS ELEVATION:
COMBINED FACTOR: .999941096
GEOID HT.:
CONVENTIONAL LEVEL ELEV.:

TO STATION	AZIMUTH	BEARING	DISTANCE



STATION DESCRIPTION:

TO REACH DESCRIPTION:

SURVEYING METHOD	ALL TIES
GPS [X] CONVENTIONAL [ ]	DIRECT [X] LEVELED [ ]

CONTROL SURVEY RECORD

P.I.N: 4832-99
ORDER OF SURVEY:
UTM ZONE:
HORIZONTAL DATUM: 1983
VERTICAL DATUM: 1929

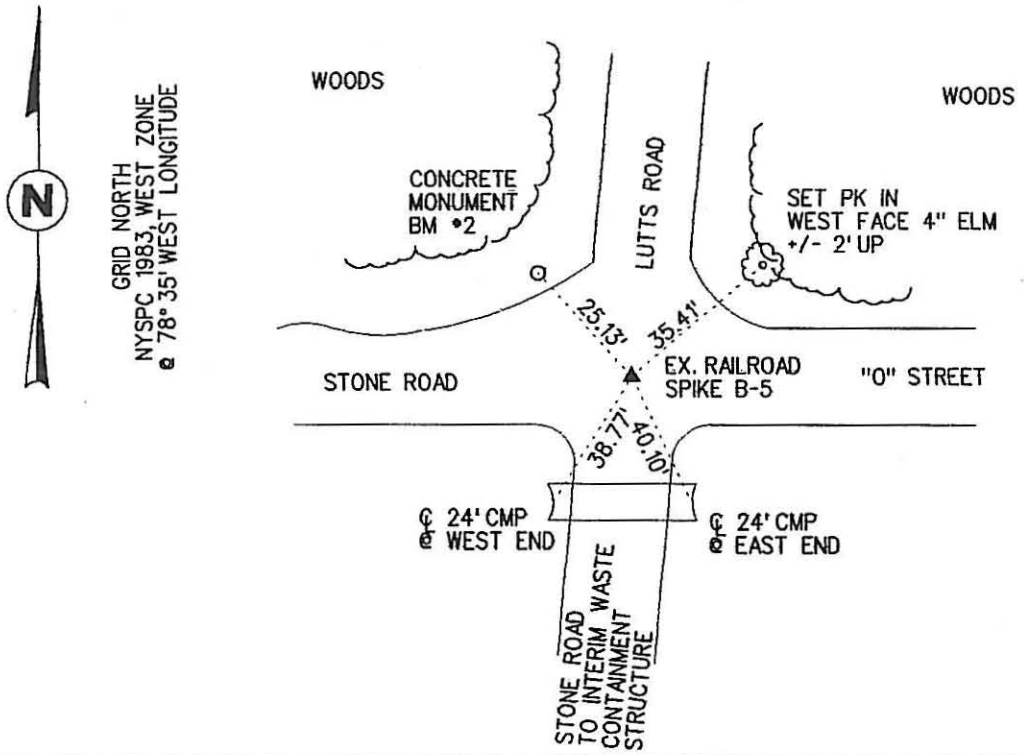
PROJECT: N.F.S.S.
PROJECTION SYSTEM: TRAVERSE MERCATOR
STATE: NY ZONE: WEST
STATE PLANE COORDINATE SYSTEM

Party Chief: MR
Draftsman: MC
Checked By: KLS
Sheet No.:

COUNTY	NAME OF STATION	MONUMENT TYPE
NIAGARA	B-5	RAILROAD SPIKE

LATITUDE: 43° 13'03.27913"N
LONGITUDE: 078° 59'14.02971"W
NAD83(96) NORTHING (Y): 1172633.69'
NAD83(96) EASTING (X): 1040628.86'
UTM NORTHING (Y):
UTM EASTING (X):
GROUND NORTHING (Y):
GROUND EASTING (X):
GPS ELEVATION:
COMBINED FACTOR: .999941096
GEOID HT.:
CONVENTIONAL LEVEL ELEV.: 319.35'

TO STATION	AZIMUTH	BEARING	DISTANCE
B-6	89° 59'49"	S 89° 59'49" W	4063.43'
B-7	179° 59'48"	S 0° 00'12" E	2116.34'



STATION DESCRIPTION:

TO REACH DESCRIPTION:

SURVEYING METHOD	ALL TIES
GPS [X] CONVENTIONAL [ ]	DIRECT [X] LEVELED [ ]

CONTROL SURVEY RECORD

P.I.N: 4832-99
ORDER OF SURVEY:
UTM ZONE:
HORIZONTAL DATUM: 1983
VERTICAL DATUM: 1929

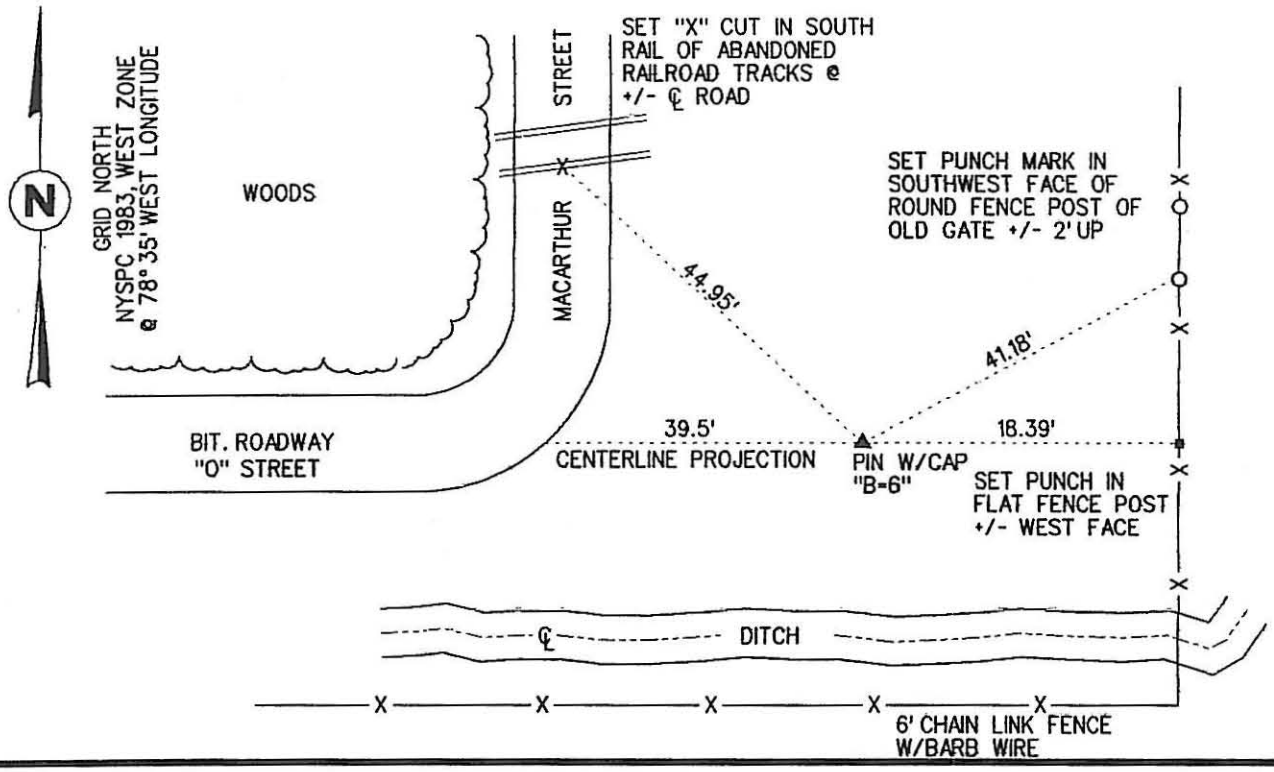
PROJECT: N.F.S.S.
PROJECTION SYSTEM: TRAVERSE MERCATOR
STATE: NY ZONE: WEST
STATE PLANE COORDINATE SYSTEM

Party Chief: MR
Draftsman: MC
Checked By: KLS
Sheet No.:

COUNTY	NAME OF STATION	MONUMENT TYPE
NIAGARA	B-6	PIN WITH ALUMINUM CAP

LATITUDE: 43° 13'03.47129"N
LONGITUDE: 078° 58'19.15271"W
NAD83(96) NORTHING (Y): 1172633.90'
NAD83(96) EASTING (X): 1044692.29'
UTM NORTHING (Y):
UTM EASTING (X):
GROUND NORTHING (Y):
GROUND EASTING (X):
GPS ELEVATION:
COMBINED FACTOR: .999941096
GEOID HT.:
CONVENTIONAL LEVEL ELEV.: 320.62'

TO STATION	AZIMUTH	BEARING	DISTANCE
B-5	269° 59'49"	S 89° 59'49" W	4063.43'



STATION DESCRIPTION:

TO REACH DESCRIPTION:

SURVEYING METHOD	ALL TIES
GPS [X] CONVENTIONAL [ ]	DIRECT [X] LEVELED [ ]

CONTROL SURVEY RECORD

P.I.N: 4832-99
ORDER OF SURVEY:
UTM ZONE:
HORIZONTAL DATUM: 1983
VERTICAL DATUM: 1929

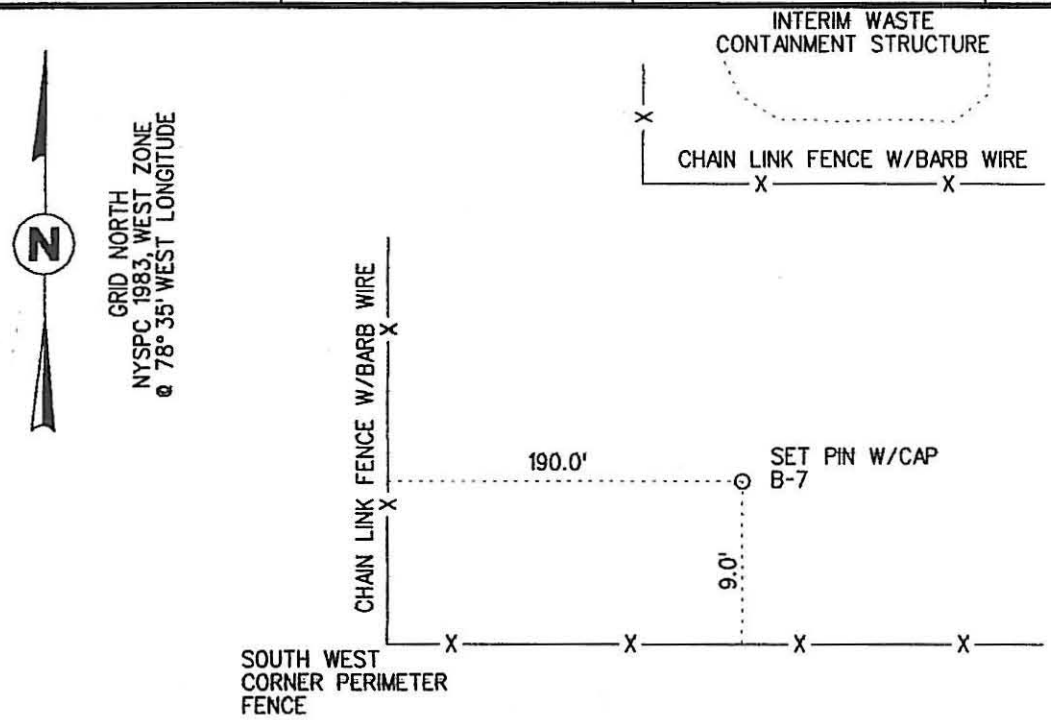
PROJECT: N.F.S.S.
PROJECTION SYSTEM: TRAVERSE MERCATOR
STATE: NY ZONE: WEST
STATE PLANE COORDINATE SYSTEM

Party Chief: MR
Draftsman: MC
Checked By: KLS
Sheet No.:

COUNTY	NAME OF STATION	MONUMENT TYPE
NIAGARA	B-7	PIN WITH PLASTIC CAP

LATITUDE: 43° 12'42.37577"N
LONGITUDE: 078° 59'13.89004"W
NAD83(96) NORTHING (Y): 1170517.36'
NAD83(96) EASTING (X): 1040628.99'
UTM NORTHING (Y):
UTM EASTING (X):
GROUND NORTHING (Y):
GROUND EASTING (X):
GPS ELEVATION:
COMBINED FACTOR: .999941096
GEOID HT.:
CONVENTIONAL LEVEL ELEV.: 319.12'

TO STATION	AZIMUTH	BEARING	DISTANCE
B-5	0° 00'12"	N 0° 00'12" E	2116.34'



STATION DESCRIPTION:

TO REACH DESCRIPTION:

SURVEYING METHOD	ALL TIES
GPS [ ] CONVENTIONAL [X]	DIRECT [X] LEVELED [ ]

SECTION 9

Property of

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Telephone

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815255

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PG 5-6 6-9-09 RTK SURVEY & SET BM 2A

PG 7-12 6-10-09 RTK SURVEY & DIGI

PG 13-15 6-11-09 RTK SURVEY & GRID SURVEY

PG 16-20 6-12-09 RTK SURVEY & SITE SKETCH

PG 21- 6-13-09 SET BOUNDARY POINTS, CONTROL PT SKETCHS
LEVELS TO NGS BM, STATIC GPS ON BM 2A

(1)

(2)

SURVEY OF

NIAGARA FALLS STORAGE SITE

TOWN OF LEWISTON

TOWNSHIP 14, RANGE 9

1397 FLETCHER ROAD

CREW CHIEF - TIM MITCHELL

INSTRUMENTMAN - JON WILSON

INSTRUMENTS

LEICA TCRP 1205 ROBOT

LEICA DNA 03 DIGILEVEL

LEICA 1200 GPS RTK

LEICA NA 728

(3)

6-8-09 T. MITCHELL / J. WILSON

RTK GPS

RTCM REF. 0035

DATA SOURCE NYS DOT

IMAX NETWORK

MOUNT PT: NET CELL_IMAX_RTCM V3

#	CODE	REMARKS
1	106	ON SITE BM FOUND (PHOTOS 1-5)
		STAMPING
		EL. 316.80
BELIEVED TO BE NYSP EAST		N 171997.385
		E 392646.28
2	106	BM-2 (PHOTOS 6-10)
		STAMPING
		BM 2
		319.693
3	101	FD R.R. SPIKE LOCAL 0'S/0'E
		"B-5" (PHOTOS 26-30)

(4)

#	CODE	REMARKS
4	106	BM-1 (PHOTOS # 11-15)
		STAMPING
		BM 1
		321.089
5	106	NGS BM "AA 3259"
		STAMPING
		YOUN USCG B
6	103	NAIL FOUND

NOTE; INITIAL SAFETY MEETING CONDUCTED BY DENNIS RIMER CONSISTING OF SLIDE PRESENTATION & TOUR OF SITE

STARTED TO SET BM 1A BUT COULD NOT FINISH DUE TO RAIN IN THE PM

6-9-09 T. MITCHELL / J. WILSON

#	CODE	REMARKS
7	101	"B-6" FOUND PIN W/CAP
		(PHOTO # 16-20)
8	103	FD PK NAIL
9-17	113	SET NAIL
18-19	111	IRON SET W/CONTROL PT CAP
20	101	FD PIN & CAP "B-7"
		PHOTOS # 21-25
21-22	111	IRON SET W/CONTROL PT CAP
23	103	FD PK NAIL
24	101	FD R.R. SPIKE

SAFETY MEETING: TALKED ABOUT TRIPPING HAZARDS DISCUSSED AT SAFETY MEETING ON 6-8-09 AND IMPORTANCE OF WEARING GLOVES WHILE INSTALLING MONUMENTS

SET MONUMENT BM 1A
DROVE ROD TO 12 FEET

SET MONUMENT BM 2A
DROVE ROD TO 8 FEET

(7)

6-10-09 T. MITCHELL / J. WILSON

PEG TEST DNA 03 DIGITAL LEVEL

STA	BS	HI	FS	ELEV	DIST.
	5.0929	105.0929		100.00	65.94
			5.8832	99.2097	134.38
	5.6988	104.8925			67.24
			4.8975	100.6010	133.15

OLD COLL. ERR. = 4.8"

NEW COLL. ERR = 3.2"

DIFF = -1.6"

ACCEPTED NEW COLL.

SAFETY MEETING - REVIEWED LOCATION OF ST. MARY'S HOSPITAL IN LEWISTON & LOCATION OF PHONE # IN TRUCK ENTERED LOCATION IN THE GPS IN THE TRUCK

(DNA 03 DIGITAL LEVEL)

STA	BS	HI	FS	ELEV (NGVD 1929)	REMARKS
1	4.1059	325.1949		321.089	BM 1
TP 1001			5.1875	320.0074 ✓	
	4.9133	324.9207			
TP 1002			5.3463	319.5744 ✓	
	5.1123	324.6867			
2			4.8439	319.8427 / 319.69 ✓	BM 2
	4.0602	323.9029			
3			5.0136	318.8843 ✓	CP #18
	5.1266	324.0109			
TP 1003			5.1549	318.8560 ✓	
	3.6852	322.5412			
TP 1004			6.4198	316.1214 ✓	
	6.1069	322.2283			
4			5.3644	316.8639 ✓	BM 7
	4.8728	321.7367			
TP			2.7536	318.9831 ✓	
	4.5597	323.5428			
TP 1005			4.3827	319.1601 ✓	

(9)

STA	BS	HI	FS	ELEV	REMARKS
	5.1603	324.3204			
TP 1006			4.6153	319.7051	✓
	4.5143	324.2195			
TP 1007			4.2677	319.9518	✓
	4.1151	324.0669			
TP 1008			4.4693	319.5976	✓
	4.7822	324.3798			
TP 1009			5.9237	318.4562	✓
	5.0150	323.4712			
5			5.2655	318.2077	✓ CP 19
	5.8969	324.1046			
6			5.9129	319.1917	✓ CP 20 (B-7)
	5.5658	324.5574			
7			5.2803	319.2772	✓ BM 2A
	5.6023	324.8800			
TP 1010			5.3445	319.5355	✓
	4.3512	324.3367			
TP 1011			4.6165	319.7201	✓

(10)

STA	BS	HI	FS	ELEV	REMARKS
	5.9351	325.7052			
TP 1012			4.5758	321.1295	✓
	4.3157	325.4452			
8			5.5424	319.9028	✓ CP 21
	5.2954	325.1982			
TP 1013			5.2253	319.9729	✓
	5.7544	325.7274			
TP 1014			6.6107	319.1166	✓
	6.7129	325.8295			
TP 1015			8.7187	317.1108	✓
	6.6142	323.7250			
9			6.1339	317.5911	✓ BM 1A
	5.9139	323.5049			
TP 1016			3.6637	319.8412	✓
	3.7097	323.5509			
TP 1017			4.4122	319.1386	✓
	5.6673	324.8060			
10			5.0056	319.8004	✓ CP 22

(11)

STA	BS	HI	FS	ELEV	REMARKS
	4.8755	324.6755			
TP 1018			4.9404	319.7352	
	5.2929	325.0281			
1			3.9328	321.0953 321.089	BM 1
	(DNA 03 DIGITAL LEVEL)				
2	4.6351	324.4778		319.8427	BM 2
11			5.0590	~~319.1489~~ 319.419	CP #3
	5.1885	324.6074			
2			4.7644	319.8429 319.8427	BM 2

(12)

#	CODE	RTK GPS REMARKS		LOCAL
2	106	BM-2		
3	101	FD R.R. SPIKE		OS/CE
5	106	NGS	BM "	AA8259 "

(B-5)

6-11-09 T. MITCHELL / J. WILSON

SAFETY MEETING: TALKED ABOUT BEE STINGS AND HOW JON HAS AN ALERGY TO THEM, LOCATION AND HOW TO USE HIS EPI-PEN

INTERIM WASTE CONTAINMENT STRUCTURE GRID SURVEY

$\overline{\wedge}$ SET UPS FOR GRID SURVEY

$\overline{\wedge}$ @ 21 BS 22 HI = 6.00

$\overline{\wedge}$ @ 22 BS 21 HI = 5.79

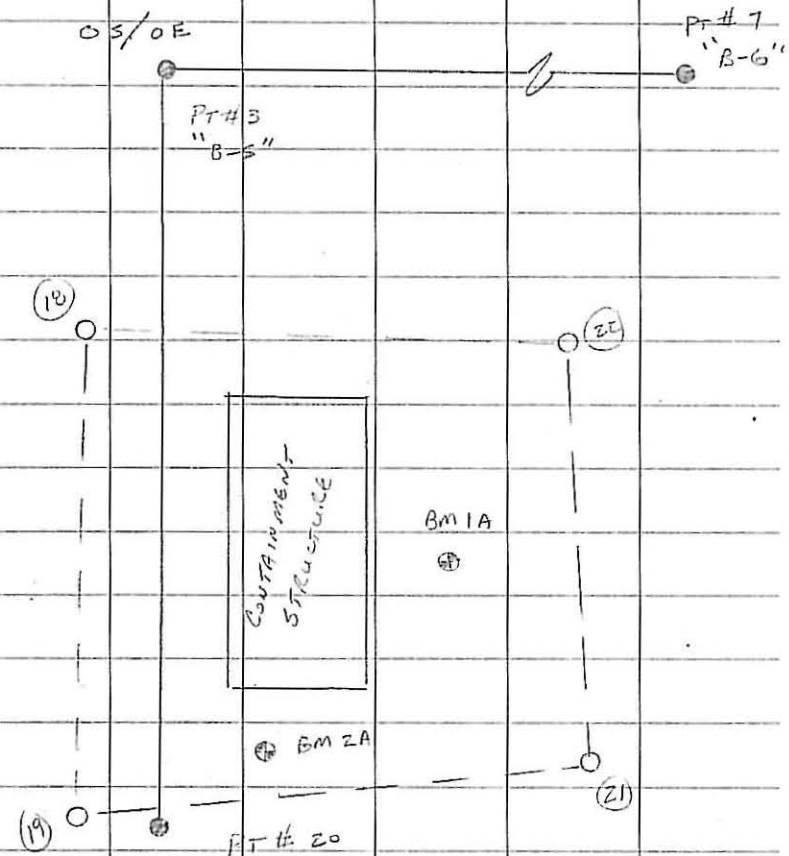
$\overline{\wedge}$ @ 19 BS 21 HI = 5.745

$\overline{\wedge}$ @ 18 BS 22 HI = 5.74

RTK GPS

H	CODE	REMARKS
25	116	BM 1A
26	106	BM
27	116	BM 2A
28	102	"B-3" PIN W/CAP IN CONC

BASE LINES FOR GRID SURVEY



NOTE: SET POINTS 18, 19, 20, 21 W/ RTK GPS INCLUDED THEM IN OUR LEVEL LOOP, USED THEM FOR GRID SURVEY STORED POINTS AS SHOWN (STAKEOUT PT 1101 ROBOT PT 5101 RTK PT 6101)

(15)

#	CODE	REMARKS			
29	102	NGS	BM "AA3859" YOUN USCGB		

(16)

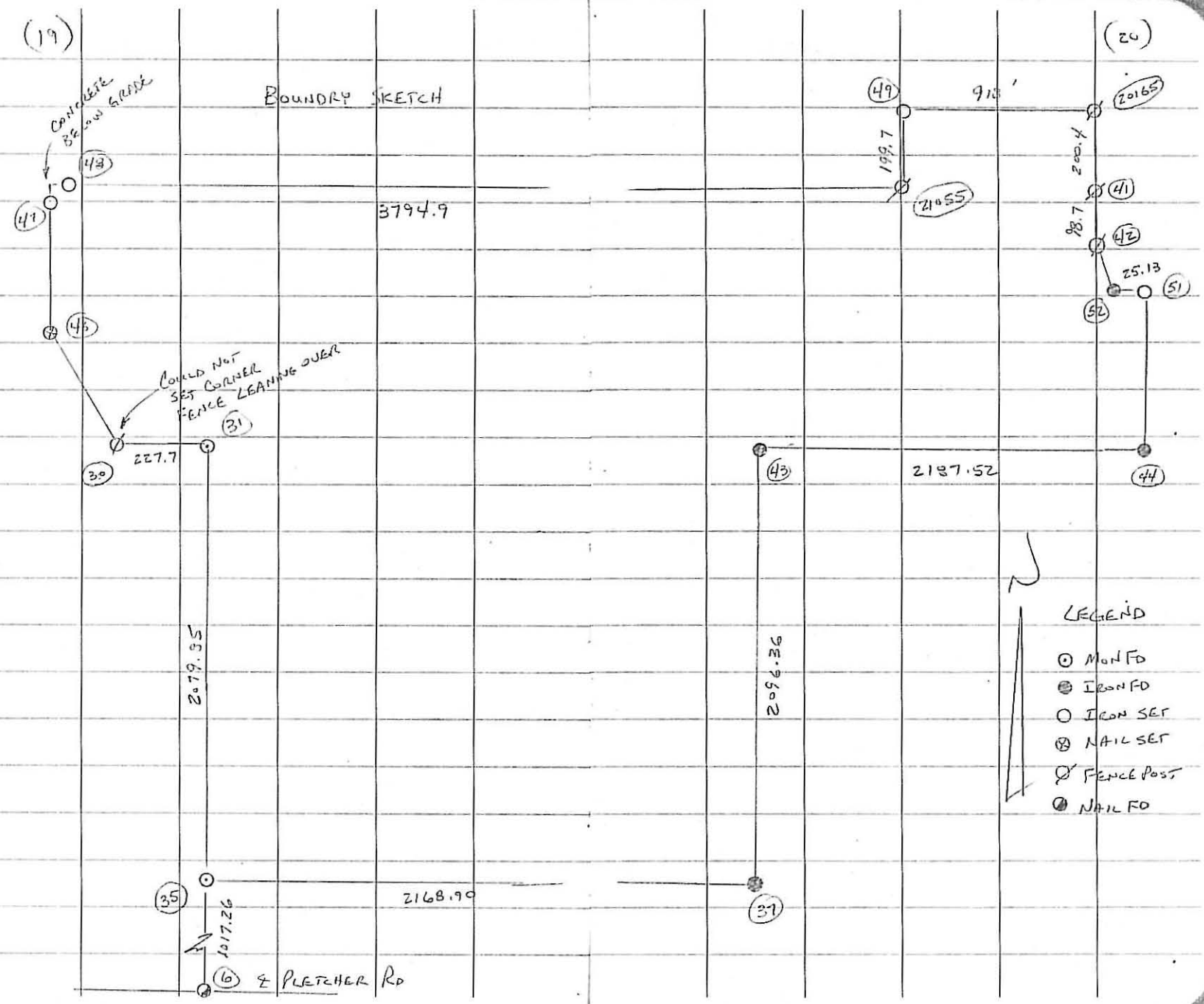
6-12-09 T. MITCHELL / T. WILSON / G. WILSON

SAFETY MEETING: USE REFLECTORS
SETTING ON ROBOT TO AVOID POISONED
IVY CONTACT AS MUCH AS POSSIBLE
WATCH CLOSELY FOR BEES & OTHER HAZARDS
WE MAY ENCOUNTER BECAUSE WE ARE GOING
TO ACCESS WASTE MANAGEMENT PROPERTY
TODAY

RTK GPS

#	CODE	REMARKS
30	310	FENCE POST
31	101	3/4" PIPE IN CONC
32	310	FENCE POST
1000	901	2.89 } TEMP PTS
1001	901	2.11 }
33	102	CONC MON FD (HIDDEN PT)
34	101	FD 1/2" REBOD
35	102	FD ALUM DISK IN CONC
36	101	FD 1 1/2" IP
37	101	FD 5/8" BAR
38	102	FD CONC MON
39	101	RR SPK IN CONC
41	310	CUT OFF FENCE POST
42	310	FENCE COR
20165	310	FENCE COR
43	101	FD 5/8" BAR & CAP

#	CODE	REMARKS
44	101	FD 5/8" BAR
45	101	FD 5/8" BAR


(19)
(20)
BOUNDRY SKETCH
CONCRETE BELOW GRADE
(48)
(47)
(46)
3794.9
(49)
913'
(20165)
199.7
(21055)
200.4
(41)
98.7
(42)
25.13
(51)
(52)
COULD NOT SET CORNER FENCE LEANING OVER
(31)
(30)
227.7
(43)
2187.52
(44)
2079.35
2096.36
LEGEND
MON FD
IRON FD
IRON SET
NAIL SET
FENCE POST
NAIL FD
(35)
2168.90
(37)
1017.26
(6)
℄ FLETCHER RD

(21)

6-13-09 T. MITCHELL / J. WILSON

SAFETY MEETING: REVIEWED TRIPPING HAZARDS, CHECKED CELL PHONE CHARGE TO INSURE COMMUNICATIONS

TC 17 BS 16

A	CODE	REMARKS
4/6	113	NAILSET
4/7	111	½" REROD SET
4/8	111	½" REROD SET

TC 10 BS 11

4/9	111	SET ½"X 30" ROD W/ BRASS DISC
50	101	FD 3/4" IP BENT

STATIC GPS ON BM1A

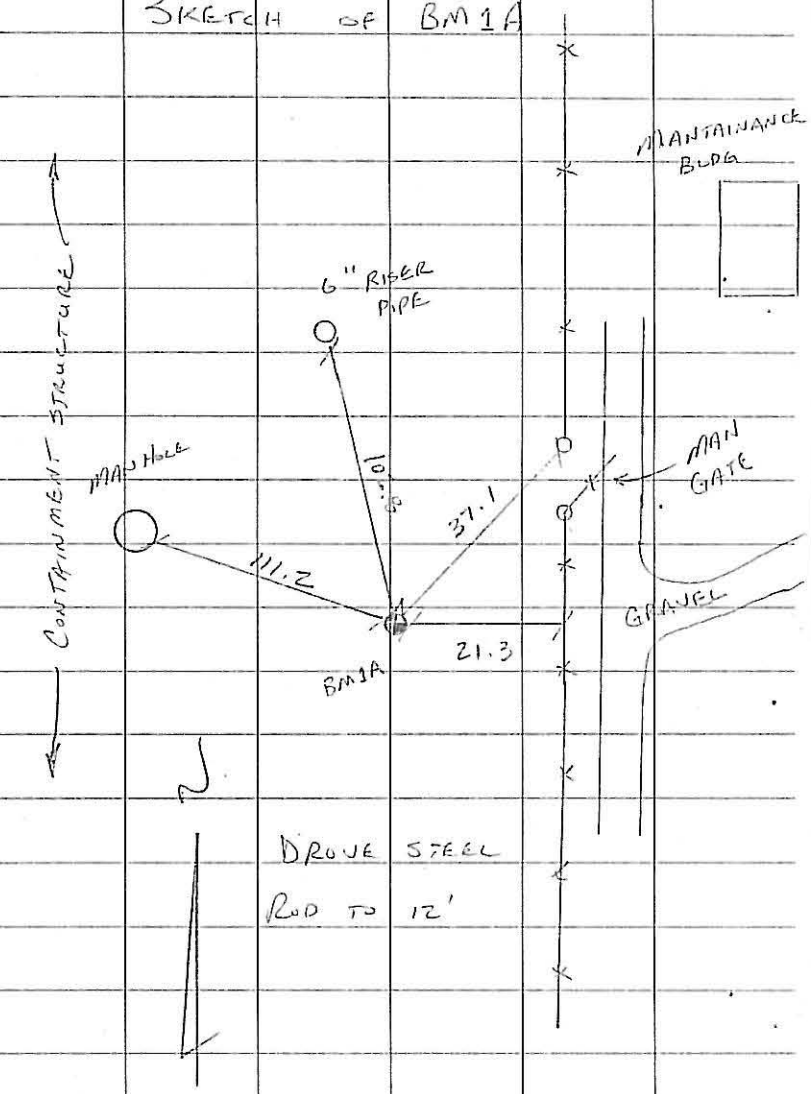
START = 1023

END = 1250

HI = 2m = 6.562 FT

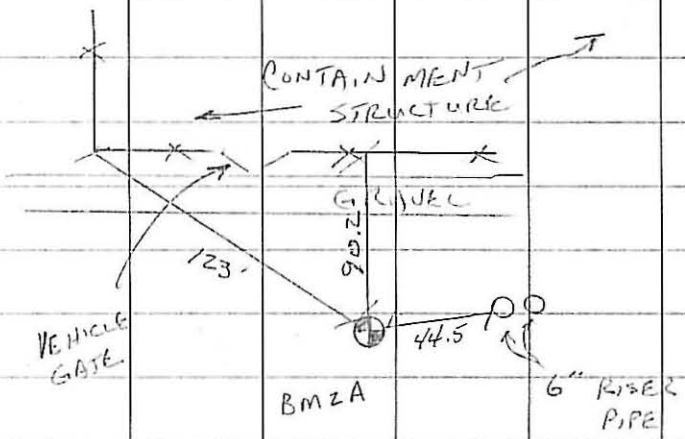
(22)

SKETCH OF BM1A



(23)

SKETCH OF BM2A

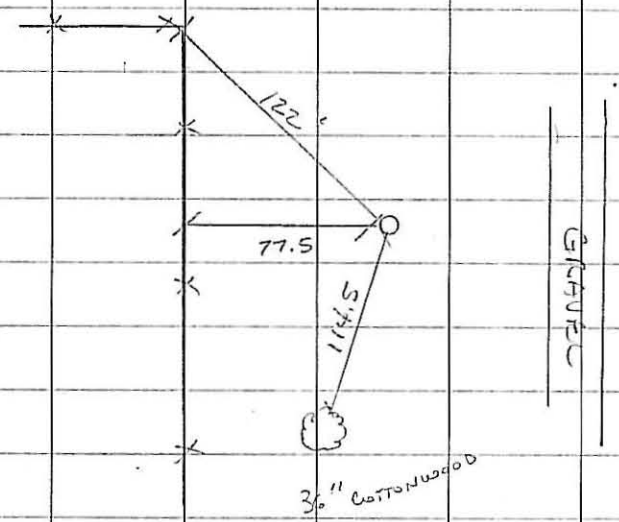


N

DRIVE STEEL ROD TO 8'

(24)

SKETCH OF CONTROL POINT # 18



N

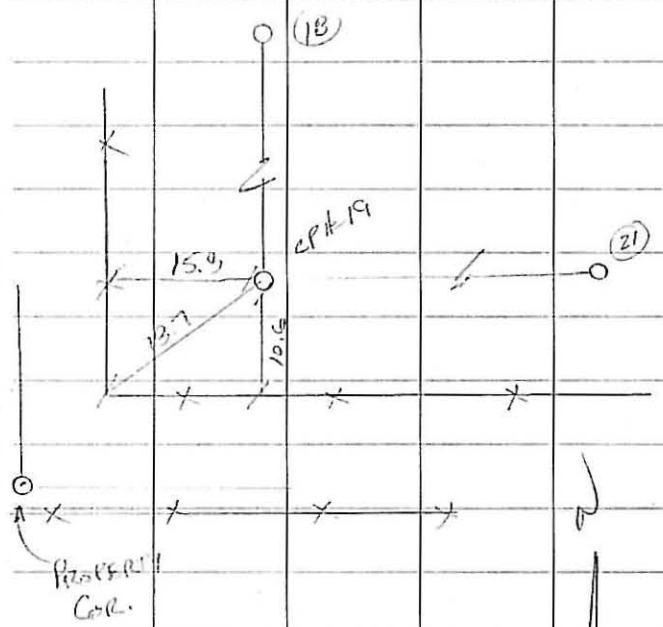
SET ½" x 1.5' REBAR W/ CONTROL PT CAP

(92)

(52)

(27)

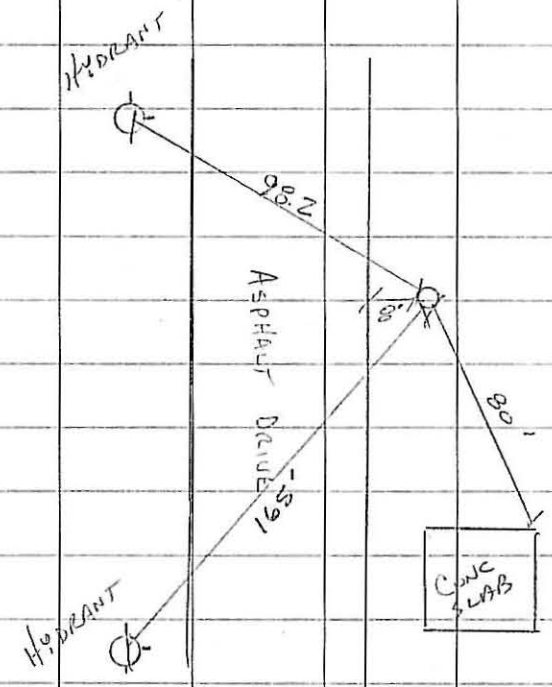
SKETCH OF
CONTROL PT # 19



SET 1/2" X 18" REBAR
W/ CONTROL PT CAP

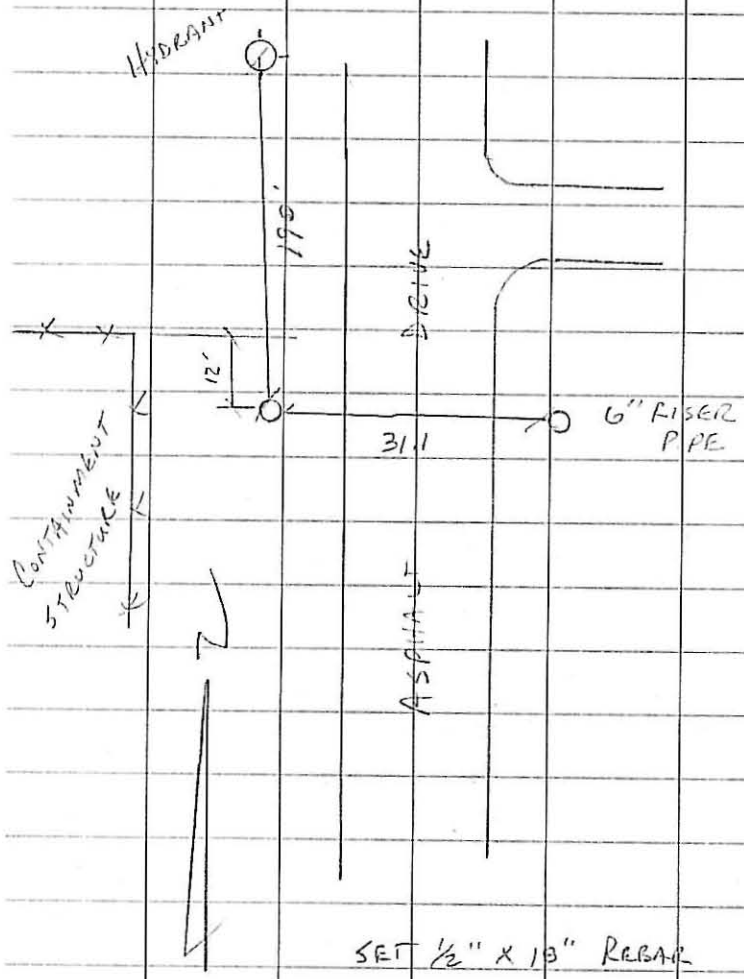
(28)

SKETCH OF
CONTROL POINT # 21



SET 1/2" X 12" REBAR
W/ CONTROL PT CAP

SKETCH OF
CONTROL POINT # 22



SET 1/2" X 18" REBAR
W/ CONTROL P- CAP

(NA 728 CONVENTIONAL LEVEL)

STA	BS	HI	FS	ELEV	REMARKS
BM	5.555	325.458		319.903	CP#21
TP			5.412	320.046	
	5.395	325.441			
BM			3.910	321.531 / 321.50	W. BONNET BOLT FND.
	4.370	325.901			
BM			8.31	317.591 / 317.591	BM1A
/	/ /	/	/	/ /	/

(NA 723 CONVENTIONAL LEVEL)

STA	BS	HI	FS	ELEV	REMARKS
BM	4.17	323.319		~~319.149~~ 319.416	CP#3
TP 1			4.59	318.729 ~~319.416~~	
	4.88	323.609			
BM			4.47	319.139 / 319.149 ~~319.416~~	CP#3
/	/ /	/	/	/	/

(DNA 03 DIGITAL LEVEL)

STA	BS	HI	FS	ELEV	REMARKS
TP 1	4.5095	323.2435		318.9746 ~~318.7340~~	(ADJ.)
TP 1020			5.7527	~~314.490~~	317.53
	4.2457	321.7365			
TP 1021			6.0501	~~315.6864~~	315.492

STA	BS	HI	FS	ELEV	REMARKS
	4.5672	320.2535			
TP 1022			5.6829	~~314.5707~~	314.233
	5.7639	320.3346			
TP 1023			5.6127	~~314.7129~~	314.984
	3.9530	318.6800			
TP 1024			6.6439	~~312.0631~~	312.398
	4.7458	316.7819			
TP 1025			5.3557	~~311.4262~~	311.482
	4.6776	316.1038			
TP 1026			5.4011	~~310.7027~~	310.965
	4.9955	315.6781			
TP 1027			5.3156	~~310.3625~~	311.645
	4.7965	315.1791			
TP 1028			5.2000	~~309.9991~~	310.241
	4.8998	314.8789			
TP 1029			5.0291	~~309.8498~~	310.112
	5.2790	315.1288			
TP 1030			4.3864	~~310.7421~~	311.034

STA	BS	HI	FS	ELEV	REMARKS
	4.4118	315.1543			
TP 1031			5.0440	~~310.4103~~	310.372
	3.5159	313.6962			
TP 1032			3.3441	~~310.3420~~	310.109
	3.5179	314.1600			
TP 1033			4.2620	~~309.8980~~	310.159
	4.4669	314.3647		~~308.4981~~	
AA8259 BM Youll USCG B			6.1330	~~308.2317~~ ~~307.890~~ 307.932	NGVD 29 NAVD 88
/	/	/	/	/	/
TRIG	LEVEL	BACK	TO	TP 1	
BM	+6.5325	314.764		~~308.2317~~	AA 8259 308.414
			+0.6621	~~315.426~~	315.689
	+1.1165	316.543			
			+4.1673	~~320.770~~	320.972
	+2.9413	323.650		318.983	
TP 1			-4.9303	~~318.720~~ ~~313.734~~ 318.996	SEE PG 31

(SEE LEICA FIELD BOOK REPORT FOR SUPPORT.)

NOTE: THE VERTICAL DATUM FOR THIS SURVEY IS NGVD29. THE SOURCE BENCHMARK IS TOP OF WEST BONNET BOLT OF FIRE HYDRANT LOCATED AT THE SOUTH WEST CORNER OF BUILDING #429 ELEVATION = 321.50 NGVD29. SEE PG. 31 ALL ELEVATIONS SHOWN ON LEVEL NOTES SHOULD BE ADJUSTED BY -0.035

SECTION 10

	SPC NY WEST		NAVD88	NGVD29	LOCAL		NGVD29	
PT ID	NORTH	EAST	ELEV	JUNE, 2009	SOUTH	EAST	APRIL, 1996	DELTA
5100	1171933.68	1041003.84	315.62	316.17	700	375	316.09	0.08
5101	1171933.61	1040903.83	316.38	316.93	700	275	316.71	0.22
5102	1171933.68	1040803.89	316.60	317.15	700	175	317.13	0.02
5103	1171933.74	1040704.00	318.48	319.03	700	75	NM	#VALUE!
5104	1171833.64	1040703.91	332.86	333.41	800	75	333.37	0.04
5105	1171833.73	1040803.85	334.11	334.66	800	175	334.63	0.03
5106	1171833.63	1040903.82	333.87	334.42	800	275	334.37	0.05
5107	1171833.61	1041003.89	332.97	333.52	800	375	333.53	-0.01
5108	1171733.71	1041003.85	334.10	334.65	900	375	334.59	0.06
5109	1171733.74	1040903.86	341.07	341.62	900	275	341.57	0.05
5110	1171733.72	1040803.84	340.64	341.19	900	175	341.15	0.04
5111	1171733.73	1040703.84	333.37	333.92	900	75	333.85	0.07
5112	1171658.70	1040978.84	337.83	338.38	975	350	338.34	0.04
5113	1171658.72	1040928.80	342.53	343.08	975	300	343.07	0.01
5114	1171658.69	1040878.85	346.43	346.98	975	250	347.04	-0.06
5115	1171658.68	1040828.84	345.59	346.14	975	200	346.18	-0.04
5116	1171658.67	1040778.80	341.74	342.29	975	150	342.32	-0.03
5117	1171633.72	1040703.85	333.11	333.66	1000	75	333.61	0.05
5118	1171633.71	1040803.86	344.40	344.95	1000	175	345.01	-0.06
5119	1171633.73	1040903.84	345.34	345.89	1000	275	345.95	-0.06
5120	1171633.70	1041003.84	333.86	334.41	1000	375	334.24	0.17
5121	1171608.75	1040978.84	337.82	338.37	1025	350	338.31	0.06
5122	1171608.75	1040928.94	343.21	343.76	1025	300	343.84	-0.08
5123	1171608.64	1040878.84	347.46	348.01	1025	250	348.11	-0.10
5124	1171608.64	1040828.90	346.14	346.69	1025	200	346.76	-0.07
5125	1171608.75	1040778.79	341.83	342.38	1025	150	342.41	-0.03
5126	1171558.73	1040778.81	341.35	341.90	1075	150	341.96	-0.06
5127	1171558.68	1040828.95	346.46	347.01	1075	200	347.14	-0.13
5128	1171558.71	1040878.83	347.94	348.49	1075	250	348.60	-0.11
5129	1171558.62	1040928.84	344.09	344.64	1075	300	344.65	-0.01
5130	1171558.69	1040978.86	337.87	338.42	1075	350	338.43	-0.01
5131	1171533.67	1041003.87	334.25	334.80	1100	375	334.70	0.10
5132	1171533.72	1040903.90	346.38	346.93	1100	275	347.01	-0.08
5133	1171533.74	1040803.82	344.32	344.87	1100	175	344.90	-0.03
5134	1171533.72	1040703.88	332.62	333.17	1100	75	333.08	0.09
5135	1171508.67	1040978.85	338.10	338.65	1125	350	338.63	0.02
5136	1171508.75	1040928.86	344.37	344.92	1125	300	345.00	-0.08
5137	1171508.66	1040878.89	348.11	348.66	1125	250	348.77	-0.11
5138	1171508.66	1040828.88	346.50	347.05	1125	200	347.13	-0.08
5139	1171508.72	1040778.89	341.75	342.30	1125	150	342.35	-0.05
5140	1171458.75	1040978.80	337.95	338.50	1175	350	338.46	0.04
5141	1171458.72	1040928.89	344.64	345.19	1175	300	345.24	-0.05
5142	1171458.59	1040878.83	348.24	348.79	1175	250	348.88	-0.09
5143	1171458.63	1040828.94	346.92	347.47	1175	200	347.55	-0.08
5144	1171458.72	1040778.94	341.52	342.07	1175	150	342.11	-0.04
5145	1171433.64	1040703.96	332.47	333.02	1200	75	333.00	0.02
5146	1171433.68	1040803.93	344.51	345.06	1200	175	345.08	-0.02
5147	1171433.67	1040903.88	346.66	347.21	1200	275	347.21	0.00
5148	1171433.64	1041003.85	334.48	335.03	1200	375	334.92	0.11

5149	1171408.69	1040978.90	338.07	338.62	1225	350	338.55	0.07
5150	1171408.72	1040928.89	344.90	345.45	1225	300	345.47	-0.02
5151	1171408.72	1040878.80	348.74	349.29	1225	250	349.34	-0.05
5152	1171408.70	1040828.86	347.01	347.56	1225	200	347.61	-0.05
5153	1171408.62	1040778.88	341.73	342.28	1225	150	342.29	-0.01
5154	1171333.71	1041003.88	336.87	337.42	1300	375	337.42	0.00
5155	1171333.73	1040978.89	340.18	340.73	1300	350	340.70	0.03
5156	1171333.71	1040928.86	345.42	345.97	1300	300	345.98	-0.01
5157	1171333.70	1040903.91	347.27	347.82	1300	275	347.78	0.04
5158	1171333.68	1040878.88	349.10	349.65	1300	250	349.71	-0.06
5159	1171333.65	1040828.86	346.96	347.51	1300	200	347.56	-0.05
5160	1171333.66	1040803.88	344.71	345.26	1300	175	345.28	-0.02
5161	1171333.61	1040778.88	342.08	342.63	1300	150	342.70	-0.07
5162	1171333.69	1040703.82	333.05	333.60	1300	75	333.58	0.02
5163	1171233.74	1040703.82	333.15	333.70	1400	75	333.72	-0.02
5164	1171233.75	1040803.91	342.48	343.03	1400	175	342.89	0.14
5165	1171233.68	1040903.89	346.35	346.90	1400	275	346.90	0.00
5166	1171233.70	1041003.92	338.86	339.41	1400	375	339.37	0.04
5167	1171133.67	1041003.78	342.53	343.08	1500	375	343.06	0.02
5168	1171133.66	1040903.75	346.00	346.55	1500	275	346.59	-0.04
5169	1171133.62	1040803.92	342.55	343.10	1500	175	343.05	0.05
5170	1171133.77	1040703.79	333.87	334.42	1500	75	334.39	0.03
5171	1171033.77	1040703.86	338.17	338.72	1600	75	338.69	0.03
5172	1171033.71	1040803.84	339.15	339.70	1600	175	339.64	0.06
5173	1171033.70	1040903.83	336.89	337.44	1600	275	337.37	0.07
5174	1171033.71	1041003.86	337.11	337.66	1600	375	337.65	0.01
5175	1170933.72	1041003.84	319.93	320.48	1700	375	320.32	0.16
5176	1170933.72	1040903.88	319.35	319.90	1700	275	319.84	0.06
5177	1170933.67	1040803.82	320.63	321.18	1700	175	321.07	0.11
5178	1170933.68	1040703.91	322.49	323.04	1700	75	322.97	0.07
5179	1170833.72	1040703.84	319.52	320.07	1800	75	320.08	-0.01
5180	1170833.66	1040803.87	320.07	320.62	1800	175	320.65	-0.03
5181	1170833.69	1040903.92	319.87	320.42	1800	275	320.52	-0.10
5182	1170833.64	1041003.88	317.04	317.59	1800	375	317.70	-0.11

	BECHTEL GRID SURVEY		NGVD29	LOCAL		NGVD29	
PT ID	NORTH	EAST	JUNE, 2009	SOUTH	EAST	APRIL, 1996	DELTA
5100	-700.11	374.88	316.17	700	375	316.09	0.08
5101	-700.18	274.86	316.93	700	275	316.71	0.22
5102	-700.11	174.91	317.15	700	175	317.13	0.02
5103	-700.06	75.01	319.03	700	75	NM	#VALUE!
5104	-800.16	74.93	333.41	800	75	333.37	0.04
5105	-800.07	174.88	334.66	800	175	334.63	0.03
5106	-800.17	274.85	334.42	800	275	334.37	0.05
5107	-800.18	374.93	333.52	800	375	333.53	-0.01
5108	-900.09	374.89	334.65	900	375	334.59	0.06
5109	-900.07	274.90	341.62	900	275	341.57	0.05
5110	-900.09	174.87	341.19	900	175	341.15	0.04
5111	-900.08	74.86	333.92	900	75	333.85	0.07
5112	-975.11	349.89	338.38	975	350	338.34	0.04
5113	-975.09	299.84	343.08	975	300	343.07	0.01
5114	-975.12	249.89	346.98	975	250	347.04	-0.06
5115	-975.13	199.87	346.14	975	200	346.18	-0.04
5116	-975.15	149.83	342.29	975	150	342.32	-0.03
5117	-1000.10	74.88	333.66	1000	75	333.61	0.05
5118	-1000.11	174.89	344.95	1000	175	345.01	-0.06
5119	-1000.08	274.88	345.89	1000	275	345.95	-0.06
5120	-1000.11	374.89	334.41	1000	375	334.24	0.17
5121	-1025.06	349.89	338.37	1025	350	338.31	0.06
5122	-1025.06	299.98	343.76	1025	300	343.84	-0.08
5123	-1025.18	249.88	348.01	1025	250	348.11	-0.10
5124	-1025.18	199.94	346.69	1025	200	346.76	-0.07
5125	-1025.07	149.82	342.38	1025	150	342.41	-0.03
5126	-1075.09	149.84	341.90	1075	150	341.96	-0.06
5127	-1075.14	199.99	347.01	1075	200	347.14	-0.13
5128	-1075.11	249.87	348.49	1075	250	348.60	-0.11
5129	-1075.20	299.89	344.64	1075	300	344.65	-0.01
5130	-1075.13	349.91	338.42	1075	350	338.43	-0.01
5131	-1100.15	374.92	334.80	1100	375	334.70	0.10
5132	-1100.10	274.94	346.93	1100	275	347.01	-0.08
5133	-1100.08	174.86	344.87	1100	175	344.90	-0.03
5134	-1100.11	74.91	333.17	1100	75	333.08	0.09
5135	-1125.15	349.90	338.65	1125	350	338.63	0.02
5136	-1125.07	299.91	344.92	1125	300	345.00	-0.08
5137	-1125.16	249.93	348.66	1125	250	348.77	-0.11
5138	-1125.17	199.92	347.05	1125	200	347.13	-0.08
5139	-1125.11	149.93	342.30	1125	150	342.35	-0.05
5140	-1175.07	349.85	338.50	1175	350	338.46	0.04
5141	-1175.11	299.94	345.19	1175	300	345.24	-0.05
5142	-1175.24	249.88	348.79	1175	250	348.88	-0.09
5143	-1175.20	199.98	347.47	1175	200	347.55	-0.08
5144	-1175.11	149.98	342.07	1175	150	342.11	-0.04
5145	-1200.20	74.99	333.02	1200	75	333.00	0.02
5146	-1200.15	174.97	345.06	1200	175	345.08	-0.02
5147	-1200.16	274.93	347.21	1200	275	347.21	0.00
5148	-1200.18	374.91	335.03	1200	375	334.92	0.11

5149	-1225.14	349.95	338.62	1225	350	338.55	0.07
5150	-1225.11	299.94	345.45	1225	300	345.47	-0.02
5151	-1225.11	249.85	349.29	1225	250	349.34	-0.05
5152	-1225.13	199.90	347.56	1225	200	347.61	-0.05
5153	-1225.21	149.92	342.28	1225	150	342.29	-0.01
5154	-1300.12	374.94	337.42	1300	375	337.42	0.00
5155	-1300.10	349.95	340.73	1300	350	340.70	0.03
5156	-1300.13	299.91	345.97	1300	300	345.98	-0.01
5157	-1300.14	274.96	347.82	1300	275	347.78	0.04
5158	-1300.16	249.93	349.65	1300	250	349.71	-0.06
5159	-1300.19	199.91	347.51	1300	200	347.56	-0.05
5160	-1300.18	174.92	345.26	1300	175	345.28	-0.02
5161	-1300.23	149.92	342.63	1300	150	342.70	-0.07
5162	-1300.15	74.86	333.60	1300	75	333.58	0.02
5163	-1400.11	74.86	333.70	1400	75	333.72	-0.02
5164	-1400.10	174.96	343.03	1400	175	342.89	0.14
5165	-1400.16	274.95	346.90	1400	275	346.90	0.00
5166	-1400.14	374.98	339.41	1400	375	339.37	0.04
5167	-1500.18	374.85	343.08	1500	375	343.06	0.02
5168	-1500.19	274.81	346.55	1500	275	346.59	-0.04
5169	-1500.23	174.97	343.10	1500	175	343.05	0.05
5170	-1500.09	74.83	334.42	1500	75	334.39	0.03
5171	-1600.10	74.91	338.72	1600	75	338.69	0.03
5172	-1600.15	174.90	339.70	1600	175	339.64	0.06
5173	-1600.16	274.89	337.44	1600	275	337.37	0.07
5174	-1600.15	374.93	337.66	1600	375	337.65	0.01
5175	-1700.14	374.91	320.48	1700	375	320.32	0.16
5176	-1700.15	274.95	319.90	1700	275	319.84	0.06
5177	-1700.20	174.88	321.18	1700	175	321.07	0.11
5178	-1700.19	74.96	323.04	1700	75	322.97	0.07
5179	-1800.16	74.89	320.07	1800	75	320.08	-0.01
5180	-1800.22	174.93	320.62	1800	175	320.65	-0.03
5181	-1800.18	274.99	320.42	1800	275	320.52	-0.10
5182	-1800.23	374.96	317.59	1800	375	317.70	-0.11

SECTION 11

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1,1172033.61,1041003.99,316.28,FNDBM
2,1172648.98,1040608.83,319.36,BM2
3,1172633.71,1040628.95,318.84,FNDBM
4,1172648.45,1041564,320.51,BM1
5,1177597.98,1041807.91,308.01,YOUNUSCGB
6,1169472.5,1040401.31,321.51,FNDNAIL
7,1172633.95,1044692.33,320.11,FNDBM
8,1173142.85,1044611.42,321.05,FNDIRON
9,1173148.52,1044364.13,320.89,SETNAIL
10,1173142.64,1043759.06,320.78,SETNAIL
11,1173137.48,1042958.93,319.83,SETNAIL
12,1173140.08,1042225.36,320.39,SETNAIL
13,1173148.33,1041729,319.76,SETNAIL
14,1173136.85,1041145.66,319,SETNAIL
15,1173228.83,1040626.34,318.26,SETNAIL
16,1173225.68,1039967.91,315.55,SETNAIL
17,1172670.95,1040150.91,316.82,SETNAIL,
18,1172473.82,1040549.34,318.3,SETIRON,
19,1170519.08,1040455.03,317.63,SETIRON,
20,1170517.43,1040629.06,318.61,FNDBM,
21,1170758.5,1041541.41,319.32,SETIRON,
22,1172102.75,1041510.31,319.22,SETIRON,
23,1170524.49,1042536.87,319.27,FNDNAIL,
24,1172633.56,1042498.94,320.13,FNDIRON,
25,1171331.62,1041182.69,317.01,SETBM,BM1A BM1A116
26,1171355.59,1041589.16,320.95,FNDBM,
27,1170718.57,1040682.83,318.7,SETBM,BM2A BM1A116
28,1169482.87,1041569.19,320.5,FNDMON,
29,1120661.58,1035517.63,583.46,FNDMON,
30,1172577.28,1040226.25,317.35,CH LK FENCE,
31,1172569.18,1040453.88,318.42,FNDIRON,
32,1172864.94,1039968.5,317.42,CH LK FENCE,
33,1173242.77,1040669.24,0,FNDMON
34,1173241.06,1039959.98,315.45,FNDIRON
35,1170489.63,1040418.88,0,FNDMON
36,1170487.96,1042537.5,319.41,FNDIRON
37,1170487.9,1042587.78,321.87,FNDIRON
38,1173065.77,1044711.29,0,FNDMON
39,1173141.51,1044670.38,320.89,FNDIRON
41,1173241.24,1044672.01,319.86,CH LK FENCE
42,1173142.47,1044671.97,0,CH LK FENCE
43,1172583.91,1042549.63,322.31,FNDIRON
44,1172583.98,1044737.15,319.1,FNDIRON
45,1173065.14,1044737.02,318.57,FNDIRON
46,1172865.51,1039968.45,311.51,SETNAIL
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9,514.95,3735.38,321.44,SETNAIL
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22,-531.01,881.37,319.77,SETIRON,
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24,-0.12,1870.07,320.68,FNDIRON,
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27,-1915.29,53.89,319.25,SETBM,BM1A116
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20311,-695.85,194.05,316.99,GROUND
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20314,-727.32,90.97,318.59,BREAKLINE
20315,-684.36,74.72,318.16,BREAKLINE
20316,-684.42,65.9,319.19,BREAKLINE
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20319,-662.95,38.38,318.11,GROUND
20320,-656.46,73.17,317.68,GROUND
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20322,-716.63,27.45,319.34,GROUND
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20329,-1499.8,50.16,332,BREAKLINE
20331,-1500.09,100.18,336.44,GROUND
20332,-1499.66,151.83,341.03,GROUND
20333,-1497.92,200.66,345.28,GROUND
20334,-1585.07,131.31,342.4,BREAKLINE
20335,-1549.45,169.25,343.17,BREAKLINE
20336,-1520.54,196.78,344.79,BREAKLINE
20337,-1490.96,226.55,347.41,BREAKLINE
20338,-1474.78,245.87,348.89,BREAKLINE
20339,-1414.43,244.3,349.13,BREAKLINE
20340,-1449.91,201.31,345.65,GROUND
20341,-1450.06,150.87,340.51,GROUND
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20349,-1347.9,242.55,348.52,BREAKLINE
20350,-1321.52,241.61,348.83,BREAKLINE
20351,-1306.47,241.85,349.72,BREAKLINE
20352,-1306.41,242.04,349.66,BREAKLINE
20353,-1307.14,217.66,348.82,BREAKLINE
20354,-1305.94,180.32,345.71,BREAKLINE
20355,-1303.07,152.82,343,BREAKLINE
20356,-1350.34,200.94,345.79,GROUND
20357,-1358.27,150.08,340.67,GROUND
20358,-1351.23,101.62,336.27,GROUND
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20359,-1351.15,48.54,330.87,BREAKLINE
20360,-1350.6,60.39,332.55,GROUND
20361,-1299.08,49.04,330.94,BREAKLINE
20362,-1299.63,100.67,335.88,GROUND
20363,-1300.09,131.32,339.23,GROUND
20364,-1251.89,129.54,338.61,GROUND
20365,-1252.13,147.56,342.05,BREAKLINE
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20367,-1250.63,240.79,349.51,BREAKLINE
20368,-1199.32,240.29,349.4,BREAKLINE
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20372,-1199.93,100.2,335.3,GROUND
20373,-1199.43,50.34,331.01,BREAKLINE
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20392,-973.93,242.07,347.3,BREAKLINE
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20419,-925.4,240.81,343.24,BREAKLINE
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20422,-853.36,139.66,338,BREAKLINE
20423,-824.13,109.5,335.76,BREAKLINE
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20446,-768.72,251.02,331.25,BREAKLINE
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20448,-851.38,301.75,338.4,GROUND
20449,-801.28,300.63,334.6,GROUND
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20452,-754.35,351.08,326.62,GROUND
20453,-768.54,353.89,330.81,BREAKLINE
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20457,-816.49,365.03,334.83,BREAKLINE
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20459,-771.98,415.47,329.86,BREAKLINE
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20462,-851.13,415.48,331.06,BREAKLINE
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20465,-898.92,350.68,336.09,GROUND
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20467,-951.95,414.38,331.49,BREAKLINE
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20474,-998.57,304.48,343.35,GROUND
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20477,-1003.55,415.11,331.43,BREAKLINE
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20483,-1100.58,302.45,344.34,GROUND
20484,-1101.89,324.89,342.22,BREAKLINE
20485,-1101.98,353.61,337.88,GROUND
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20533,-1550.15,351.24,342.24,GROUND
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20535,-1598.13,349.73,337.5,GROUND
20536,-1598.51,299.68,337.32,GROUND
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20539,-1647.14,150.47,337.07,GROUND
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20542,-1649.99,301.07,332.74,GROUND
20543,-1650.88,349.9,332.98,GROUND
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20546,-1662.18,411.06,331.78,BREAKLINE
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20559,-1670.23,63.35,331.34,GROUND
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20575,-1712.74,330.46,319.55,WELL
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20577,-1727.39,374.49,319.21,GROUND
20578,-1700.86,373.8,320.33,WELL
20579,-1704.23,375.34,319.66,BREAKLINE
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20581,-1683.23,420.66,325.7,GROUND
20582,-1675.36,428.77,326.53,GROUND
20583,-1696.11,447.62,319.36,BREAKLINE
20584,-1720.08,449.86,318.17,GROUND
20585,-1652.59,463.87,318.11,HYDRANT
20586,-1654.12,465.52,317.95,GROUND
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20588,-1622.43,439.16,324.99,GROUND
20589,-1572.52,435.97,327,GROUND
20590,-1571.97,458.58,320.18,BREAKLINE
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20592,-1507.03,466.65,318.46,GROUND
20593,-1504.37,434.63,327.52,GROUND
20594,-1456.11,428.85,327.23,GROUND
20595,-1452.74,456.13,318.93,BREAKLINE
20596,-1452.34,467.76,317.46,GROUND
20597,-1433.92,462.76,317.98,WELL
20598,-1419.95,462.6,317.84,WELL
20599,-1361.58,465.91,317.65,GROUND
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20601,-1356.26,431.36,326.46,GROUND
20602,-1260.57,432.78,326.02,GROUND
20603,-1263.33,449.56,320.73,BREAKLINE
20604,-1258.4,450.38,321.47,SAN MH
20605,-1268.57,467.93,318.54,GROUND
20606,-1215.7,450.49,320.25,WELL
20607,-1159.93,446.91,321.03,WELL
20608,-1158.73,451.35,319.94,BREAKLINE
20609,-1159.13,465.97,318.5,GROUND
20610,-1155.71,433.14,326.04,GROUND
20611,-1064.43,436.21,324.97,GROUND
20612,-1055.97,452.49,319.38,BREAKLINE
20613,-1053.86,463.84,318.05,GROUND
21000,-1302.15,553.7,317.51,CLOSEPT
21001,-972.33,464.34,318.44,WELL
21002,-966.57,464.64,318,WELL
21003,-956.02,462.8,318.03,GROUND
21004,-955.72,454.4,319.04,BREAKLINE
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21009,-812.81,466.72,317.15,GROUND
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21012,-754.15,438.41,323.39,GROUND
21013,-733.07,451.73,318.57,BREAKLINE
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21015,-735.37,300.72,320.69,WELL
21016,-721.82,176.8,317.62,WELL

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21021,-923.64,2.29,319.24,WELL
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21026,-1048.85,12.82,320.27,WELL
21027,-1050.42,27.41,324.34,GROUND
21028,-1126.75,26.05,323.87,GROUND
21029,-1126.68,13.61,320.28,BREAKLINE
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21032,-1201.43,-3.96,318.52,GROUND
21033,-1200.86,9.37,319.67,BREAKLINE
21034,-1199.5,19.2,321.96,WELL
21035,-1286.97,26.27,323.91,GROUND
21036,-1291.28,10.29,319.51,BREAKLINE
21037,-1291.28,-4.31,317.92,GROUND
21038,-1384.6,-5.27,318.23,GROUND
21039,-1385.6,8.95,319.36,BREAKLINE
21040,-1385.89,25.05,323.79,GROUND
21041,-1397.84,11.61,320.13,WELL
21042,-1494.48,24.72,324.11,GROUND
21043,-1497.29,9.02,319.62,BREAKLINE
21044,-1496.39,-5.5,318.91,GROUND
21045,-1581.25,-6.46,318.27,GROUND
21046,-1582.89,6.09,319.5,BREAKLINE
21047,-1579.89,9.92,320.39,WELL
21048,-1583.56,25.91,325.39,GROUND
21049,-1668.73,44.72,327.13,GROUND
21050,-1696.68,30.27,318.59,BREAKLINE
21051,-1723.09,13.36,318.39,GROUND
21052,-1739.94,45.58,319.33,GROUND
21053,-1711.82,60.94,319.13,BREAKLINE
21054,-56.31,-402.63,313.86,CH LK FENCE
21055,608.17,3123.89,312.87,CH LK FENCE
30000,-2135.99,-213.55,317.6,GROUND
30001,-2139.43,-202.5,318.71,GROUND
30003,-2146.79,-210.07,0.55,CH LK FENCE
30004,-2133.65,-101.92,318.77,GROUND
30005,-2146.54,-101.98,0.55,CH LK FENCE
30006,-2146.2,-38.07,321.27,CH LK FENCE
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APPENDIX 12-G

NFSS Remedial Investigation
Phase 3 Soil Boring Logs

This PDF is a compilation of the following boring logs:

3a017; 3a020; 3b015; 3c014; 3c015; 3d001; 3d002; 3d006; 5a010; 5a013; 5a016; 5a018; 5a020; 8d016; 8e003; 414; bd003; bd006; bd009; bh218; bh219; bh220; bh221; bh222; bh223; bh224; bh225; bh226; bh227; mh6; mh7; mh7/8; mh8; mh41; mh43; mh45;mw228; mw229; mw313; mw314; mw422; mw423; mw424; mw860; mw861; mw862; mw863; otfl11; otfl12; ow1a; Pipe74; sb864; twp830; twp831; twp832; twp833; twp834; twp835; twp836; twp837; twp838; twp839; twp840; twp841; twp842; twp843; twp844; twp845; twp846/847; twp848; twp849; twp850; twp851; twp852; twp853; twp854; twp855; twp856; twp857; twp858; twp859.

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: 3A017
1. COMPANY NAME: Maxim	2. DRILLING SUBCONTRACTOR: C+W Environmental	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston, NY	
5. NAME OF DRILLER: Ron Huntingdon	6. MANUFACTURER'S DESIGNATION OF DRILL: Trailer Mount	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' EME Sampler; 2"x3" Split Spoon; 4.25" HSA	8. HOLE LOCATION: Shops Area	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/17/03	11. DATE COMPLETED: 9/17/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
SB-3A017-SO-3635			RAD			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	3A017

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 3A017

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	ROOT COE SAMPLE RECOVERY FOR NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
	1	Dark brn loam w/large ang. gravel	OVM 0.00	Rad Bkgd +10cpm			CME Sampler 1.0/1.0
	2	Brn silty clay w/ Fe staining stiff dry (CL)	0.00	Bkgd			2.0/1.6
	3						
	4	Brn-gray mottled silty clay w/Fe staining stiff dry	0.00	Bkgd			2.0/1.7
			0.00				SB-3A017-5.0-3635 1520
	5						

PROJECT: NFSS

HOLE NO: 3A017

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: 3A020
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Shops Area	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 9/22/03	11. DATE COMPLETED: 9/22/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 5.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATU[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	3A020

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 3A020

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 2 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	SAMPLE PACKING NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (ft)
		Drk brn loam	ovm	Rad			
			0.00	Bkgd			5.0/1.8
	1						
							had to auger to 3'
	2		0.00				concrete rubble, slag
	3	Brn-gray-clay (CL)	0.00				
	4	Brn silt, sand well sorted med fine wet	(SP) 0.00				SB 3A020-5.0-3636
	5	TD 5.0					4.5-5.0 (1000)

PROJECT: NFSS

HOLE NO: 3A020

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT	Buffalo
HOLE NUMBER	3B015
1. COMPANY NAME	Maxim
2. DRILLING SUBCONTRACTOR	C+W Environmental
SHEET	1 OF 2 SHEETS
3. PROJECT	NFSS
4. LOCATION	Lewiston NY
5. NAME OF DRILLER	Ron Huntingdon
6. MANUFACTURER'S DESIGNATION OF DRILL	Trailer mount
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	5' CME Sampler; 2" x 3" split spoon; 4.25" HSA
8. HOLE LOCATION	Shops Area
9. SURFACE ELEVATION	
10. DATE STARTED	9/17/03
11. DATE COMPLETED	9/17/03
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	NA
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14. TOTAL DEPTH OF HOLE	5'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA
18. GEOTECHNICAL SAMPLES	NA; DISTURBED; UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS	SB-3B015-5.0-3637
VOC	
METALS	
OTHER (SPECIFY)	Rad
OTHER (SPECIFY)	
OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY	%
22. DISPOSITION OF HOLE	
BACKFILLED	
MONITORING WELL	
OTHER (SPECIFY)	Grouted
23. SI[redacted]	

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT	NFSS
HOLE NO.	3B015

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 3B015

PROJECT: NFSS

INSPECTOR: M. Severs

SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	REPRESENTATIVE SAMPLE OR VIAL FOR ID. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Loam	OVM	Rad			CME sampler
	1	Brn-gray mottled silty clay w/fe staining stiff Dry	0.00	Bkgd			3.0/2.0
	2	(CL)	0.00	Bkgd			
	3		0.00	Bkgd			2' split spoon
	4		0.00	Bkgd			2.0/1.8 SB-3B015-5.0-3637 1415
	5						

PROJECT: NFSS

HOLE NO.: 3B015

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: 3C014
1. COMPANY NAME: Maxim	2. DRILLING SUBCONTRACTOR: C+W Environmental	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Ron Huntington	6. MANUFACTURER'S DESIGNATION OF DRILL: Trailer mount	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5" CME Sampler; 2'x3" split spoon; 4.25" HSA	8. HOLE LOCATION: Shops Area	
	9. SURFACE ELEVATION: /	
	10. DATE STARTED: 9/17/03	11. DATE COMPLETED: 9/17/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 5.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
SB3C014-5.0-3638			Rad			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23.
			Grouted	[redacted]

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	3C014

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 3C014

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 2 OF 2 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	REM CORE SAMPLE OR CORE RUN NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Loam	OVM	Rad			Auger
	1	Lg ang gravel					1.0/0.0 no recovery auger to 2' then spoon
	2	Brn silty clay w/Fe staining stiff dry (CL)	0.0	Bkgd			2.0/1.5
	4		0.0	Bkgd			1.0/1.0
	5	TD 5.0'					SB-3C014-5.0-3638 9/17/03 1115

PROJECT NFSS | HOLE NO. 3C014

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT Buffalo		HOLE NUMBER 3C015
1. COMPANY NAME Maxim	2. DRILLING SUBCONTRACTOR C+W Environmental	SHEET 1 OF 2 SHEETS
3. PROJECT NFSS	4. LOCATION Lewiston NY	
5. NAME OF DRILLER Ron Huntingdon	6. MANUFACTURER'S DESIGNATION OF DRILL Trailer mount	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3.5' CME sampler; 2'x3" split spoon; 4.25" HSA	8. HOLE LOCATION Shops Area	
	9. SURFACE ELEVATION	
	10. DATE STARTED 9/17/03	11. DATE COMPLETED 9/17/03
12. OVERBURDEN THICKNESS NA	15. DEPTH GROUNDWATER ENCOUNTERED NA	
13. DEPTH DRILLED INTO ROCK NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
14. TOTAL DEPTH OF HOLE 5.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA	

18. GEOTECHNICAL SAMPLES	DISTURBED NA	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES NA			
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
SB-3C015-5.0-3679				Rad		
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. [redacted]		
			Grouted			

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT NFSS	HOLE NO. 3C015

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 3C015

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 2 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	MONITOR SAMPLE RECOVERY FOR ANL. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Loam	OVM	Rad			CME To 3'
	1	Large ang gravel	0.0	Bkgd			1.2' recover, lg ang gravel
	2	Brn-gray mottled silty clay w/Fe staining sl. moist med stiff (CL)	0.0				
	3		0.0	Bkgd			3" split spoon 2.0/1.6
	4						SB-3C015-5.0-3639 9/17/03 945
	5	Gray gravelly sandy clay v. moist	0.0				

PROJECT NFSS | HOLE NO. 3C015

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: 3D001
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler, 2' split spoon, 4.25" ID HSA	8. HOLE LOCATION: NE of Debris Pile	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 10/1/03	11. DATE COMPLETED: 10/1/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			grouted	

LOCATION SKETCH/COMMENTS **SCALE:**

PROJECT	HOLE NO.
NFSS	3D001

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 3D001

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 2 OF 3 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	REPOSITORY SAMPLE OR CORE BOX NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Drk brn-blk loam w/ large (3") gravel dry	OVM	Rad			Auger to 1' L
	1		0.00	Bkgd			
		Drk brn clayey silt w/ large gravel loose dry	0.00				
	2						5.0/4.2
	3	(CL)	0.00				
	4	Red brn silty sand w/some 1" gravel loose dry (GW)	0.00				SB-3D001-5.0-3637 4.5-5.0 (1415)
	5						
	6		0.00	Bkgd			Sampler refusal 5.5-7.0 Augered
	7		0.00				
	8	Red-brn silty clay w/some large (3") gravel moist Fe staining (CL)	0.00				5.0/3.8
	9	Gray-brn mottled silty clay w/Fe staining and some small gravel stiff moist	0.00				

PROJECT NFSS | HOLE NO. 3D001

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: 3D001 | SHEET 3 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SEQUENCE SAMPLE RECOVERY (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		cont	OVM	Bkgd			
		gray-brn mottled					
	11	silty clay w/Fe	0.00				
		staining and some					
		small gravel					
	12	med soft moist	0.00				
		(CL)					
	13	Gray clay soft	0.00				5.0/5.0
		wet plastic					
	14						
			0.00				
	15						
		TD 15.0'					
	16						
	17						
	18						
	19						

PROJECT: NFSS | HOLE NO.: 3D001

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT	Buffalo
HOLE NUMBER	30002
1. COMPANY NAME	Maxim Technologies
2. DRILLING SUBCONTRACTOR	Subsurface Drilling Solutions
SHEET	1 OF 3 SHEETS
3. PROJECT	NFSS
4. LOCATION	Lewiston NY
5. NAME OF DRILLER	Jeff Grant
6. MANUFACTURER'S DESIGNATION OF DRILL	Mobile 59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	5' CMT Sampler 2' split spoon 4.25" ID HSA
8. HOLE LOCATION	Shops Area
9. SURFACE ELEVATION	
10. DATE STARTED	9/22/03
11. DATE COMPLETED	9/22/03
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	NA
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14. TOTAL DEPTH OF HOLE	20.0'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			Grouted	

LOCATION SKETCH/COMMENTS **SCALE:**

PROJECT	HOLE NO.
NFSS	30002

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 3D002

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ppm)	SENTRY SAMPLE INTERVAL FOR VOA (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		Dark Brn loam	0 ppm	Rad			
	1	Brn silty clay w/Fe staining loose dry	0.00	Bkgd			
	2		0.00				5.0/3.0
	3	Brn-gray silty clay w/Fe staining and some small gravel stiff dry (CL)	0.00				
	4						SB-3D002-5.0 3633 4.5-5.0 (1600)
	5		0.00				
	6		0.00	Bkgd			5.0/5.0
	7		0.00				
	8		0.00				
	9	more gravel soft	0.00				

PROJECT: NFSS

HOLE NO.: 3D002

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 3D002

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (8)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SOIL/CORE SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		cont Gray-brn mottled silty clay w/Fe staining and some small gravel med soft moist (CL)	ovm	Rad Bkgd			
	11		0.00				5.0/5.0
	12		0.00				
	13		0.00				
	14						
	15	more gray soft	0.00				
			0.00	Bkgd			
	16						5.0/5.0
			0.00				
	17	gray clay soft wet	0.00				
	18						
			0.00				
		TD 20.0					

PROJECT NFSS | HOLE NO. 3D002

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT	Buffalo
HOLE NUMBER	3D006
COMPANY NAME	Maxim Technologies
2. DRILLING SUBCONTRACTOR	Subsurface Drilling Solutions
SHEET	1 OF 4 SHEETS
3. PROJECT	NFSS
4. LOCATION	Lewiston NY
5. NAME OF DRILLER	Jeff Grant
6. MANUFACTURER'S DESIGNATION OF DRILL	Mobile 59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	5' CME Sampler 2' split spoon 4.25" ID HSA
8. HOLE LOCATION	Shops Area
9. SURFACE ELEVATION	
10. DATE STARTED	9/22/03
11. DATE COMPLETED	9/22/03
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	NA
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14. TOTAL DEPTH OF HOLE	22.0'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA
18. GEOTECHNICAL SAMPLES	NA
DISTURBED	
UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES	NA
20. SAMPLES FOR CHEMICAL ANALYSIS	
VOC	
METALS	
OTHER (SPECIFY)	
OTHER (SPECIFY)	
OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY	%
22. DISPOSITION OF HOLE	
BACKFILLED	
MONITORING WELL	
OTHER (SPECIFY)	Grouted
23. SIGNATU	[redacted]

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT	NFSS
HOLE NO.	3D006

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 3D006

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET: 2 OF 4 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SCOOP OR SAMPLE NO. OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
			0VM	Rad			
	1		0.00	Bkgd			Augered to 3' large gravel 2"+
	2		0.00				
	3		0.00				2.0/2.0
	4	Brn silty clay loose dry					
	5	Brn-gray silty clay w/Festaining and some small gravel stiff dry (CL)	0.00				SB-3D006-5.0 -3630 and Q (1430) 4.5-5.0'
	6		0.00	Bkgd			
	7		0.00				5.0/5.0
	8		0.00				
	9	more brn	0.00				

PROJECT: NFSS

HOLE NO.: 3D006

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 3D006

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 3 OF 4 SHEETS

ELEV. (4)	DEPTH (8)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REMOVED SAMPLE OR CORE FOR ISL (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		cont brn-gray silty clay	ppm	Red			
	11	stiff almost	0.00	Bkgd			5.0/5.0
	12	silt lens more gray	0.00				
	13	(CL)	0.00				
	14	[illegible]					
	15		0.00				
	16		0.00				5.0/0.4
	17	gray clay soft wet					poor recovery will pound 2' SS to confirm gray clay
	18						
	19						

PROJECT NFSS | HOLE NO. 3D006

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 3D006

PROJECT NFSS

INSPECTOR M. Sievers

SHEET 4 OF 4 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	PROTOCOL SAMPLE OR CORE SOR NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		gray clay soft wet (CL)	OVM 0.00	Rad			2.0/2.0
	21			Bkgd			
	22	TD 22.0					

PROJECT NFSS

HOLE NO. 3D006

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: 414
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Acid Area	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 10/1/03	11. DATE COMPLETED: 10/1/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 20.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATU[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	414

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 414

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REPOSITORY SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (4)	BLOW COUNT (4)	REMARKS (5)
		Drk brn loam loose dry	OVM	Rad			
	1	Lt brn clayey silt loose dry	0.00	Bkgd			
	2	Brn silty clay w/Fe staining and some small gravel	0.00				5.0/5.0
	3	dry stiff (CL)	0.00				
	4		0.00				SB-414-5.0-3631 4.5-5.0 (1530)
	5	Lt brn silt loose dry and some very fine sand		Bkgd			
	6	Brn-gray silty clay w/Fe staining and some small gravel	0.00				
	7	stiff sl moist	0.00				5.0/5.0
	8	more gray less brn	0.00				
	9	Red-brn silty sand poorly sorted moist (SW)	0.00				

PROJECT NFSS | HOLE NO. 414

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 414

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (8)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REPTOX SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Red-brn silty sand poorly sorted moist	OVM	Rad			
				Bkgd			
	11	Gray-brn silty clay w/some small gravel med soft moist	0.00				
	12		0.00				5.0/5.0
	13	(CL)					
	14		0.00				
	15	Softer more gray	0.00				
			0.00				2-foot spoon
	16						2.0/2.0
	17	Gray clay very soft wet plastic	0.00	Bkgd			5' spoon
	18		0.00				3.0/3.0
	19	med soft	0.00				
		TD 20.0'					

PROJECT NFSS | HOLE NO. 414

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo	HOLE NUMBER: 5A010	
1. COMPANY NAME: Maxim	2. DRILLING SUBCONTRACTOR: CGW Environmental	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston, NY	
5. NAME OF DRILLER: Ron Huntington	6. MANUFACTURER'S DESIGNATION OF DRILL: Trailer Mount	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2" x 3" Split Spoon; 4.25" HSA	8. HOLE LOCATION: Baker Smith Area	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 9/18/03	11. DATE COMPLETED: 9/18/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
SB-5A010-S0-3011			RAD			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPEC[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	5A010

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 5A010

PROJECT: NFSS

INSPECTOR: M. Severs

SHEET 2 OF 2 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ppm)	HEADSPACE SAMPLE RECOVERY (ppm)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		Large Ang slag Gravel	0UM 0.00	Rad Bkgd			CME 1.0/0.5
	1						
	2	Brn-gray mottled silty clay w/Fe staining and some small gravel dry stiff (CL)	6.00 0.00	Bkgd			split spoon 2.0/1.6
	3						
	4		0.00 0.00	Bkgd			2.0/1.4
	5	TD 5.0'					~~SB~~ 5A010-5.0-3L-11 @1100

PROJECT: NFSS

HOLE NO.: 5A010

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: 5A013
1. COMPANY NAME: Maxim	2. DRILLING SUBCONTRACTOR: CHW Environmental	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston, NY	
5. NAME OF DRILLER: Ron Huntingdon	6. MANUFACTURER'S DESIGNATION OF DRILL: Trailer Mount	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2" x 3" Split Spoon; 4.25" HSA	8. HOLE LOCATION: Baker Smith Area	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 9/18/03	11. DATE COMPLETED: 9/18/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
SB-5A013-5.0-3640			RAD			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSP[redacted]
			Grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	5A013

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 5A013

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 2 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	DEPTH OF SAMPLE OR CORE RUN (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Drk brn-blk loam w/ large Ang Slag	OVM	Rad			CME
	1	Brn-gray mottled silty clay w/Fe staining stiff sl. moist	0.0	Bkgd			2.0/2.0
	2	(CL)	0.00	Bkgd			
	3		0.00				2.0/1.6
	4	more gray Some small gravel more moist	0.00	Bkgd			SB-5A013-5.0-3640 9/18 0900 and QC
	5	TD 5.0'					

PROJECT NFSS | HOLE NO. 5A013

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: 5A016
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Baker Smith Area	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/22/03	11. DATE COMPLETED: 9/22/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 5.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE
			grouted	[redacted]

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT	HOLE NO.
NFSS	5A016

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 5A016

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 2 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	MONITOR SAMPLE VALUE FOR NA (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (ft)
		Drk brn loam	0.00	Rad			
	1	Brn silty clay w/Fe staining and some 1" gravel loose dry (CL)	0.00	Rad			5.0/4.8
	2		0.00				
	3	Brn-gray silty clay w/Fe staining and some small gravel stiff dry	0.00				
	4		0.00				SB-5A016-3642
	5						4.5-5.0 (0930)
		TD 5.0'					

PROJECT: NFSS

HOLE NO.: 5A016

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo	HOLE NUMBER: 5A018	
1. COMPANY NAME: Maxim	2. DRILLING SUBCONTRACTOR: GW Environmental	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston, NY	
5. NAME OF DRILLER: Ron Huntington	6. MANUFACTURER'S DESIGNATION OF DRILL: Trailer Mount	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' GMB Sampler; 2" x 3" Split Spoon; 4.25" HSA	8. HOLE LOCATION: Baker Smith Area	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 9/18/03	11. DATE COMPLETED: 9/18/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 5.01	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
SB-5A018-5.0-3643			RAD			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF [redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	5A018

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 5A018

PROJECT: NPSS

INSPECTOR: M. Sievers

SHEET: 2 OF 2 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	REPRESENTATIVE SAMPLE NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Large Ang Slag/Gravel	OVM	Rad			CME
		Brn-gray mottled silty clay w/Fe staining + some small gravel stiff Dry	0.00	Bkgd			1.0/1.0
	1						
	2		0.00	Bkgd			split spoon 2.0/1.5
	3	(CL)	0.00	Bkgd			
	4		0.00	Bkgd			2.0/1.4
	5		0.00	Bkgd			
		TD 5.01					SB-5A018-5.0-364B 1230

PROJECT: NPSS

HOLE NO: 5A018

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: 5A020
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Baker Smith Area	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/22/03	11. DATE COMPLETED: 9/22/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 5.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGN[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	5A020

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: 5A020 | SHEET 2 OF 2 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	SCOPE OF SAMPLE RECOVERY (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Dk brn loam	OVM	Rad			
	1	Brn-silty clay w/Fe staining and some 1" gravel loose dry	0.00	Bkgd			
	2	(CL)	0.00				5.0/5.0
	3	Brn-gray silty clay w/Fe staining	0.00				
	4	and some small gravel stiff dry					SB-5A020-5.0-3644
			0.00				0830 4.5'-5.0'
	5	TD 5.0					

PROJECT: NFSS | HOLE NO.: 5A020

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Boring

9-22-03 1 of 2

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 8D016

PROJECT: NFSS | INSPECTOR: CAW/TL | SHEET 1 OF 2 SHEETS

BLOW (4)	DEPTH (ft)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REPRESENTATIVE SAMPLE OR CORE FOR DESC. (4)	ANALYTICAL SAMPLE NO. (4)	BLOW COUNT (4)	REMARKS (4)
0.0		Silty clay from Topsoil organics, brown, moist stiff	RAD ≤ BKG PID =	$H_2S = 0$ $O_2 = 21.8$ $CO = 0$ $LEL = 0$			No RAD readings above Background on 4x4 w/ 10' of stake for borehole location
	1	Silty clay w/sand & gr Brown, to dk brown w/ wood pieces, ceramic chip @ 2.0' firm moist (CL)	RAD ≤ BKG PID =	IN BZ BKG = 20.0			
2.0	2		RAD PID = 5.0				50" recovery
	3	Silt w/clay, s. sand & tr gravel, dk gray w/ dark gray olive & red brown medium to soft moist	RAD ≤ BKG PID =	Sample @ 3.5' SB-8D016 3.5-3634			Lab Sample @ 3.5 @ 0945
	4						
5.0	5		RAD ≤ BKG PID = 0.0				
5.0		Sand w/silt, fine grained brown, loose to med dense moist (SP)					
	6		RAD ≤ BKG PID = 0.0				52" recovery 52"
		Clay w/silt, sand & gravel Brown, Red brown & gray stiff moist (CL)					
	7		RAD ≤ BKG PID = 0.0				
	8		RAD ≤ BKG PID = 0.0				
	9		RAD ≤ BKG PID = 0.0				
	10	No sample	PID = 0.0 RAD ≤ BKG				

PROJECT: NFSS | HOLE NO. 8D016

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-8D016-3.5-3634

9-22-03 #202

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BD016

PROJECT: NFSS

INSPECTOR: CAW/TL

SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SCOPE OF SAMPLE OR CORE RUN NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		SAME ↓					
	11	Clay, Gray to Graybrown Tr Gravel, soft moist	PID=0.0 RAD=bkg				
	12	EOB @ 12.0'					
	13						

PROJECT:

HOLE NO.:

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: 8E003
COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: N of IWCS	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 10/2/03	11. DATE COMPLETED: 10/2/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 5.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	8E003

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER 8E003

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SAMPLE NO. OR CORE RUN NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Drk brn loam med stiff sl. moist	OVM	Rad Bkgd			
	1	Brn clayey silt loose dry	0.00				
	2	Large Ls cobble	0.00				
		(CL)	0.00				5.0/4.3
	3	Brn-gray mottled silty clay w/Fe staining and some small gravel stiff sl. moist					
	4		0.00				SB-8E003-5.0 -3649
	5	TD 5.0					4.5-5.0 (0800)

PROJECT NFSS | HOLE NO. 8E003

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Burney

9-22-03 13:30

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 8D003

PROJECT: NFSS | INSPECTOR: CAW / MATL | SHEET 1 of 1 SHEETS

ELEV. (3)	DEPTH (2)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (5)	REMARKS OR SAMPLE OR CORE DRILL (6)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (8)	REMARKS (9)
		Silty Clay/loam Topsoil brown/dk brown medium to stiff moist	RAD ≤ Bkg PID=0	RAD Bkg=200			52" recovery
	1	Silty Clay w/ sand & gravel Brown, yellow brown & gray, stiff moist (CL)	RAD ≤ Bkg PID=0	PID=0 H_2S=0 O_2=22.1 CO=0 LEL=0.0			S.
	2		RAD ≤ Bkg PID=0				
	3						
74		Silty Clay w/s sand & s. gravel Brown-red brown w/ gray, stiff, moist (CL)	RAD ≤ Bkg PID=0				
	4		RAD ≤ Bkg PID=0				Sample @ 4.5'
	5	EOB @ 5.0 Sample @ 4.5 @ 1400					SB-8D003-4.5-3645 @ 1400

PROJECT: NFSS | HOLE NO. 8D003

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-8D003-

9-22-03 @ 11[10]

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 8D006

PROJECT: NFSS | INSPECTOR: CW/TL | SHEET 1 OF 1 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SEPTICS SAMPLE OR CORE FOR DEL (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
0.8		Silty Clay loam Topsoil, soft, moist	RAD ≤ Bkg PID=0.0	H_2S=0 O_2=21.0 CO=0 LEL=2			Sample @ 2.5 @ 11[20]
1.9	1	Silty ~~SAND~~ w/ ~~CLAY~~ clay gravel Brown, brown red loose medium density moist (CL) ~~Rocks~~ gravel to 1'/2" (SM-GM)	PID=0.0 RAD=360	RAD Bkg=200			
	2	Silty Clay w/SSAND & gravel, brown - red brown w/gray - red iron inclusions Stiff moist (CL)					SB-8D006-2.5
	3		PID=0.0 RAD ≤ Bkg				
4.0	4	Silty SAND w/s. clay ~~medium~~ brown, med dense, moist (SC-SM)	PID=0.0 RAD ≤ Bkg				
	5		PID=0.0 RAD ≤ Bkg				
		EOB @ 5.0'					
	6	Grouted @ 11[35]					
	7						
	8						
	9						
	10						

PROJECT: NFSS | HOLE NO. 8D006

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-HD006-25-3646

9-22-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: 8D009

PROJECT: NFSS | INSPECTOR: CAW/TL | SHEET 1 OF 1 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	GEOTECH SAMPLE NO. CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Silty Clay loam w/organics roots etc soft moist	~~H2S~~ PID=0.0 RAD=1000 @1.0'	RAD BKG= 200			50" recovery surface 70,000 CPM 4/2x2
1.0	1	Silty SAND w/ Clay, fine grained, brown to yellow brown w/gray med. dense, moist (ML)	PID=0.0 RAD=400 @2.0'	H_2S=0 O_2=22.1 CO=0 LEL=-1			
	2	Fine grained Silty SAND layer 2.5-2.7'	~~RAD=0.0~~				Sample @ ~~2.0'~~ 2.5' @ 0920 SB-8D009-2.5
2.8			@3.0'				
	3	Clay w/silt, s sand & gravel Brown, Gray brown & gray Stiff, moist (CL)	PID=0.0 RAD=300				Hole grouted @ 0925
	4		PID=0.0 RAD=BKG				
	5		PID= RAD				
		EOB @ 5.0'					
							Boring off set 6 ft to ~~SW~~ due to elevated readings not in marked borehole location

PROJECT: | HOLE NO.: 8D009

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Instrument 43-93 SB-8D009-2.0-3647

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: BH218
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Bldg 401	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/30/03	11. DATE COMPLETED: 9/30/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 14.5'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE
			grouted	[redacted]

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	BH218

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH 218

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	BOX OR SAMPLE NO. OR CORE RUN NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Dk brn foam sl moist	OVM	Rad			
	1	Brn silty clay loose dry	0.00	Bkgd			
	2	Brn-gray mottled silty clay w/ee staining and some small gravel sl moist (CL)	0.00				5.0/5.0
	3		0.00				
	4		0.00				
	5		0.00	Bkgd			
	6		0.00				5.0/5.0
	7	more gray					
	8		0.00				
	9	med soft more plastic	0.00				

PROJECT: NFSS

HOLE NO: BH 218

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH218

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF SHEETS

ELEV. (-)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (-)	RECOVERY SAMPLE OR CORE BOX NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (ft)
		Cont Gray-brn mottled silt, clay w/some small gravel med soft moist	ovm 0.00	Red Black			5.0/5.0
	12	(CL)	0.00				
	13		0.00				
	14	Gray clay soft wet plastic					SB-BH218-15.0-3660 14.5-15.0' (915)
	15	sand lens	0.00				
		TD 15.0'					
	16						
	17						
	18						
	19						
	20						

PROJECT: NFSS

HOLE NO.: BH218

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: BH219
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/3/03	11. DATE COMPLETED: 10/3/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 17.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNA[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	BH219

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH219

PROJECT: NF 55

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SAMPLE NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Brn loam loose moist	OVM	Red			
			0.00	Bkgd			
	1	Dark brn-black silty gravel loose dry					
			0.00				5.0/3,4
	2	Brn-gray mottled silty clay w/Fe staining and some 1" gravel stiff slm moist					
			0.00				
	3						
			0.00				
	4	(CL)					
	5	med soft moist					
		Dark brn-gray-black silty clay	0.00	Bkgd			(staining?) SB-BH219-60-3661 5.0-6.0 (0830) 5.0/5.0
	6						
		Brn-gray silty clay w/Fe staining and some small rocks med st, SS moist					
	7		0.00				
	8		0.00				
	9		0.00				
		more gray					

PROJECT: NF55

HOLE NO. BH219

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH219

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SAMPLE NO. OR CORE RUN NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		cont gray-brn silty clay w/Fe staining and some small gravel	ovM	Rad			
	11						
	12	med soft moist					5.0/0.4 Poor recovery gray clay in shoe
	13	Gray clay soft wet plastic					
	14	(CL)	0.00	Bkgd			
	15		0.0	Bkgd			pushed 2" split spoon to confirm Gray clay 2.0/2.0
	16		0.00				
	17	TD 17.0					
	18						
	19						

PROJECT: NFSS

HOLE NO. BH219

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: BH 220
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Bldg 401	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 9/30/03	11. DATE COMPLETED: 9/30/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATU[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	BH 220

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH220

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (3)	DEPTH (m)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SAMPLE NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (6)	REMARKS (8)
		Dk brn loose slmoist	ovm	Rad			
	1	Brn silty clay w/fe staining and some large sand gravel loose slmoist	0.00	Bkgd			
			0.00				
	2						5.0/3.7
		Dk brn silty clay w/some small gravel stiff slmoist (CL)					
	3						
	4						
	5	Brn-gray silty clay w/ staining and some small gravel stiff moist					
	6		0.00				
	7	Gray-brn mottled silty clay w/fe staining and some small gravel stiff	0.00				6.0/4.0 (goes more gray at 8.5')
	8		0.00				
	9						

PROJECT: NFSS

HOLE NO.: BH220

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH220

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	PROTOCOL SAMPLE OR CORE BOX NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
			0.00	Rad			
	11	Gray-brn silt [illegible] with [illegible] [illegible] stiff moist CL	0.00	pkgd			
	12		0.00				5.0/2.9
	13	Gray clayey silt very moist med stiff	0.00				
	14						
	15		0.00				
	16		0.00	pkgd			
	17	Gray clay [illegible] soft wet	0.00				5.0/3.8
	18		0.00				
	19		0.00				
		TD 20.0'					SB-BH220-20.0-3662 19.5-20.0' (1115)

PROJECT: NFSS

HOLE NO.: BH220

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT	Buffalo
HOLE NUMBER	BH221
COMPANY NAME	Maxim Technologies
2. DRILLING SUBCONTRACTOR	Subsurface Drilling Solutions
SHEET	1 OF 3 SHEETS
3. PROJECT	NFSS
4. LOCATION	Lewiston NY
5. NAME OF DRILLER	Jeff Grant
6. MANUFACTURER'S DESIGNATION OF DRILL	Mobile 59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	5' CME Sampler; 2' split sp'son; 4.25" ID HSA
8. HOLE LOCATION	Bldg 401
9. SURFACE ELEVATION	
10. DATE STARTED	9/30/03
11. DATE COMPLETED	9/30/03
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	~7'
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14. TOTAL DEPTH OF HOLE	15.0'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA
18. GEOTECHNICAL SAMPLES	NA; DISTURBED; UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES	NA
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC; METALS; OTHER (SPECIFY); OTHER (SPECIFY); OTHER (SPECIFY)
21. TOTAL CORE RECOVERY	%
22. DISPOSITION OF HOLE	BACKFILLED; MONITORING WELL; OTHER (SPECIFY): grouted
23. SIGNATU[redacted]	

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT	NFSS
HOLE NO.	BH 221

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH221

PROJECT: NFSS | INSPECTOR: M. Sievers | SHEET 2 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REC'D OR SAMPLE OR CORE RUN NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Drk brn loam slmoist	OVM	Rad			
	1	Brn silty clay w/Fe staining and scattered large gravel loose slmoist (CL)	0.00	Bkgd			5.0/4.0
	2		0.00				
	3		0.00				
	4	Drk brn silty clay w/Fe staining and some small gravel stiff slmoist	0.00				
	5		0.00	Bkgd			
	6	Brn-gray mottled silty clay w/Fe staining and some small gravel stiff slmoist	0.00				
	7	Sand lens saturated (SP)					5.0/5.0
	8	Gray-brn mottled silty clay w/Fe staining and some small gravel stiff moist (CL)	0.00				
	9		0.00				

PROJECT: NFSS | HOLE NO.: BH221

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: DH-221

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	REC OF SAMPLE OR CORE BOX NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		cont gray-brn silty clay w/ little stringers and small small gravel (CL)	OVM 0.00	Rad Bkgd			
	12		0.00				
	13	Gray clay soft wet plastic	0.00				SB-DH221-15.0 3663
	15	very soft very wet	0.00				
		TD 15.0'					
	16						
	17						
	18						
	19						

PROJECT: NFSS

HOLE NO. DH-221

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: BH222
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/3/03	11. DATE COMPLETED: 10/3/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ~8.5'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	BH222

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH 222

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF - SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SAMPLE NUMBER AND RECOVERY (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	1	Dark gray silty Gravel well rounded dry	OVM	Rad			Auger to 31
	2						
	3						
	4	Brn-gray silty clay w/ staining and some 1" gravel stiff slmoist (CL)	0.00	Bkgd		2.0/2.0	sampler refusal at 4' try to auger through refusal concrete in augers
	5		0.00				
	6	Dark gray stained silty clay	0.00	Bkgd			will move South of silo footer SB-BH222-6.0-3664 5.5-6.0' (9.45) 5.0/5.0
	7	more gray soft moist	0.00				
	8		0.0				
	9	Gray sand fine med grain wet	(SP)				
		Gray-brn silty clay w/ staining and some small gravel soft wet	0.0				

PROJECT: NFSS

HOLE NO. BH 222

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH222

PROJECT: NFSS

INSPECTOR: Mr. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (1)	DEPTH (2)	DESCRIPTION OF MATERIALS (3)	FIELD SCREENING RESULTS (4)	SAMPLE NUMBER AND TYPE (5)	ANALYTICAL SAMPLE (6)	BLOW COUNT (7)	REMARKS (8)
	11	cont Gray-Brn mottled silty clay w/Fe staining and some small gravel soft wet	OVM 0.00	Rad Bkgd			5.0/5.0
	12		0.00				
	13	Gray clay soft wet plastic (CL)	0.00				
	14						
			0.00				
	15	15.0'					
	16						
	17						
	18						
	19						

PROJECT: NFSS

HOLE NO.: BH222

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: BH223
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/3/03	11. DATE COMPLETED: 10/3/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	BH223

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH223

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 2 SHEETS

BLOW (1)	DEPTH (2)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (5)	SAMPLE ID OR OTHER TEST (6)	ANALYTICAL SAMPLE (7)	BLOW COUNT (8)	REMARKS (9)
		Brn silty gravelly clay loose sl moist	OVM 0.00	Rad Btgd			
	1	Brn silty clay w/Fe staining and some 1" gravel med stiff sl moist	0.00				
	2	Drk gray-black silty clay "old musty" odor stiff sl moist	0.00				SB-BH223-3.0 3665 2.5-3.0 (1125)
	3	Brn-gray mottled silty clay w/Fe staining and some small gravel stiff moist	0.00				5.0/5.0
	4	(CL)	0.00	Btgd			
	5	more gray softer more moist	0.00				
	6		0.00				5.0/5.0
	7	Gray clay soft wet plastic	0.00				
	8	TD 10.0'					
	9						

PROJECT: NFSS

HOLE NO.: BH223

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: BH224
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Bldg 401	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 10/4/03	11. DATE COMPLETED: 10/4/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ~8.5'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNA[redacted]
			Grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	BH224

SB-BH224 3666

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH224

PROJECT: NFSS | INSPECTOR: M. Sievers | SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SAMPLE NO. OR CORE RUN NO. (e)	PENETRATION RESISTANCE (f)	BLOW COUNT (g)	REMARKS (h)
		Brn loam loose moist	amy	Rad			
	1		0.00	Bkgd			
		Drk brn clayey silt loose dry					
	2		0.00				
							5.0/4.8
	3	Brn-gray silty clay w/Fe staining and some small gravel slightly moist (CL)	0.00				
	4		0.00				
	5						
				Bkgd			
	6	Brn-gray silty sand fine moist (SP)	0.00				
	7	Gray-brn silty clay (CL)	0.00				5.0/3.0
	8		0.00				
		Gray gravel lens saturated		(GW)			
	9	Gray clay silt wet plastic (CL)	0.00				SB-BH224-10.0 - 3666 9.0-10.0 (GSD)
		TD-10.0					

PROJECT: NFSS | HOLE NO.: BH224

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: BH225
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/3/03	11. DATE COMPLETED: 10/3/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	BH225

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER BH225

PROJECT NFSS | INSPECTOR M. Sievers | SHEET 2 OF SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (3)	SELECTED SAMPLE OR CORE RUN NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		Dk brn clayey silt with pieces of coal	DUM	Rad Bkgd			
			0.00				
	1						water pouring into hole from this interval
		Brn silty gravel loose saturated					
	2		0.00				
		Brn-gray mottled silty clay w/Fe staining and some small gravel					
	3		0.00				
							5.0/3.1
	4						
			0.00				
	5						
			0.00	Bkgd			
	6						
			0.00				
	7	more gray softer moist					
							5.0/5.0
	8		0.00				
	9	Gray clay soft wet plastic	0.00				SB-BH225-10.0 -3667 0.5-10 1230

PROJECT TD 10.0' NFSS | HOLE NO. BH225

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: B4226
COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Bldg 401	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/3/03	11. DATE COMPLETED: 10/3/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ~11.5'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			Grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	B4226

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH226

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

BLOW (4)	DEPTH (ft)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SOIL SAMPLE RECOVERY (4)	ANALYTICAL SAMPLE NO. (4)	BLOW COUNT (4)	REMARKS (4)
	1	Large Gravel RR Ballast					original location Hit metal object at 1.0' moved 3' south
	2						Augered Through RR ballast
	3	Poor recovery 1/4" - chips in shoe	0.00	Bkgd			2' spoon 2.0/0.3
	4						
	5	Brn-gray mottled silty clay w/Fe staining and some small gravel stiff moist (CL)	0.00	Bkgd			2nd attempt hit metal at 5' will move to middle of RR Tracks
	6		0.00				3rd attempt Augered to 5' then sampled
	7	more gray softer	0.00				
	8						
	9	gray clay	0.00				

PROJECT: NF SS

HOLE NO. BH226

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH226

PROJECT: NFSS | INSPECTOR: M. Sievers | SHEET 3 OF 3 SHEETS

BLOW (c)	DEPTH (b)	DESCRIPTION OF MATERIALS (a)	FIELD SCREENING RESULTS (d)	REMOVED SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Crat gray clay soft wet plastic	OVM 0.00	Rad Bkgd			SB-BH226-12.0-3368 11.5-12.6 (1546) 5.0/5.0
	11						
		very wet	0.00				
	12						
	13	(CL)	0.00				
	14						
			0.00				
	15	TD 15.0					

PROJECT: NFSS | HOLE NO. BH226

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo	HOLE NUMBER: DH227	
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler, 2' split spoon, 4.25" ID HSA	8. HOLE LOCATION: Bldg 401	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/4/03	11. DATE COMPLETED: 10/4/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATU[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	DH227

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH227

PROJECT: NFSS | INSPECTOR: M. Sievers | SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REPRESENTATIVE SAMPLE OR CORE RUN NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		Brn silty clay w/Fe staining and some 1" gravel loose wet	0.0M	Red			
	1		0.00	Bled			
	2	Brn-gray silty clay w/Fe staining and some small gravel stiff moist	0.00				
	3						5.0/5.0
			0.00				
	4	(CL)					
			0.00				
	5						
			0.00	Bled			
	6						
			0.00				5.0/3.8
	7	wet gray med soft moist					
	8		0.00				
	9						
			0.00				
		Gray clay					

PROJECT: NFSS | HOLE NO. BH227

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: BH 227

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SAMPLE NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		cont gray clay soft wet plastic	0 ppm	Rad			
	11		0.00	Bkgd			
	12		0.00				5.0/5.0
	13		0.00				
	14						SB-BH227-15.0-3669 14.0-15.0 (815)
			0.00				
	15	TD 15.0					

PROJECT: NFSS

HOLE NO. BH227

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

N↑ MH ↑ 3'
0'

Borehole off set 8' N of ℄ of MH

Difficult to get rig by MH
Chainsawed trees for access etc

10-1-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER MH-41

PROJECT NFSS | INSPECTOR CAW/JS | SHEET 1 OF 1 SHEETS

BLOW (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (7)	REPRESENTATIVE SAMPLE OR CORE RUN NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		Silty Clay from Topsoil	PID=0.0	RAD BKG			
		organics, roots leaves	RAD≈BKG	=150			
0.8		dk brown soft moist					50" Recovery
	1	Clayey silt w/SAND & gravel	PID=0.0	PID=0.0			
		brown, brown gray (ML)	RAD≈BKG				
		medium moist (CL)		in BZ			
	2	& dry to moist		H_2S=0			
			PID=0.0	O_2=22.0			
			RAD≈BKG	CO=.2			
	3			LEL=0			
			PID=0.0				
			RAD≈BKG				
	4	Silty Clay w/SAND &					
		gravel, gray to Lt gray					
		med, dry to moist w/brown	PID=0.0				
	5	(CH)	RAD≈BKG				
		Cobbles &	PID=0.0				
	6	gravel	RAD≈BKG				
							56" recovery
			PID=0.0				
	7		RAD≈BKG				
							Bottom of MH 27½
			PID=0		SB-MH 41		Sample @ 9.0'
0	8	Clay w/silt & SAND & gr	RAD≈BKG		-9.0-		1045
		Brown to Brown gray w/ gray			3656		
		red inclusions	PID=0				
	9	stiff moist (CH)	RAD≈BKG				
			PID=0.0				
			RAD≈BKG				
	10						

PROJECT NFSS | EOB @ 10.0 @ 1055 | HOLE NO. MH-41

ENG FORM 5056A-R, AUG 94 | Grouted by 11[10] | (Proponent: CECW-EG)

SB-MH41- -3656

MH-43 N↑ 4' MH 10-1-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MH-43

PROJECT: NFSS | INSPECTOR: CAW / DS | SHEET 1 OF 1 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REMOTE SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Silty Clay loam w/SAND & gravel, dk brown, soft moist	RAD ≤ Bkg PID = 0	RAD Bkg = 200			42" Recovery
0.8	1	Clayey Silt w/ SAND & gravel, fine grained, gray brown yellow brown, soft, dry to moist (ML)	PID = 0 RAD ≤ Bkg	PID = 0 In BZ			
	2			H_2S = 0 O_2 = 21.9 CO = 2 LEL = 2			
2.7			PID = 0 RAD ≤ Bkg				
	3	Clay w/ Silt, S. SAND & gravel Brown, gray brown, gray w/red inclusions, med to stiff, moist (CL)	RAD ≤ Bkg PID = 0.0				
	4	Softer w/ depth					
	5		PID = 0 RAD ≤ Bkg				
	6		PID = 0.0 RAD ≤ Bkg				
	7		PID = 0.0 RAD ≤ Bkg				
8.3	8						Bottom of MH - 8.1
	9	Clay, tr sand, s gravel, brown gray, soft, moist (CH)	PID = 0 RAD ≤ Bkg		SP-MH 43-9.0-3655		Sample @ 1325
	10	Eob @ 10'	PID = 0 RAD ≤ Bkg				

PROJECT: NFSS | HOLE NO.: MH-43

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-MH 43- -3655

N↑ MH-45 6' → Boring

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MH-45

PROJECT: NFSS | INSPECTOR: PAW-JS | SHEET 1 OF 1 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REMOTE SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
0.2		Silty Clay w/organics, dk brn, s. gravel, soft Moist	PID=0.0 RAD≤BKG	RAD BKG = 175			
1.6	1	Gravel w/SAND, ~~dk~~ Lt gray Angular, loose to med dense Moist (Fill) (OP)	PID=0.0 RAD≤BKG	1			48" recovery
2.5	2	Silty Clay w/SAND & gr Brown, gray brown & red brown medium, moist (CL)	PID=0.0 RAD≤BKG	H_2= O_2= CO= LEL=			
	3	Black organic layer @ 2.5 to 3.0					
	4	Clay w/silt, s. sand & gr, gray brown, brown w/red brown, med to stiff moist (CL) (Fill)	PID=0.0 RAD≤BKG				~~Sampled~~
	5	Silty Clay w/SAND, gravel & cobbles, brown, gray brown, red brown	X PID=0 RAD≤BKG				52" recovery
	6						
	7	Cobbles, gravel & SAND layers in pebble (Fill)	PID=0 RAD≤BKG				
	8		PID=0 RAD≤BKG				Bottom of MH @ 8.0'
	9	SAND w/silt & gravel, fine to coarse grained, brown to brown red, med dense Moist to Wet (SM) (Fill)	PID=0 RAD≤BKG		SB-MH45-9.0-3654		Sample @ 9.0' @ 0845
	10	Possibly fine bedding mat'l	PID=0 RAD≤BKG				

PROJECT: NFSS EOB @ 10.0' | HOLE NO. MH-45

ENG FORM 5056A-R, AUG 94 Grouted @ 9.00 (Proponent: CECW-EG)

MH45 SB-MH45- -3654

HTRW DRILLING LOG

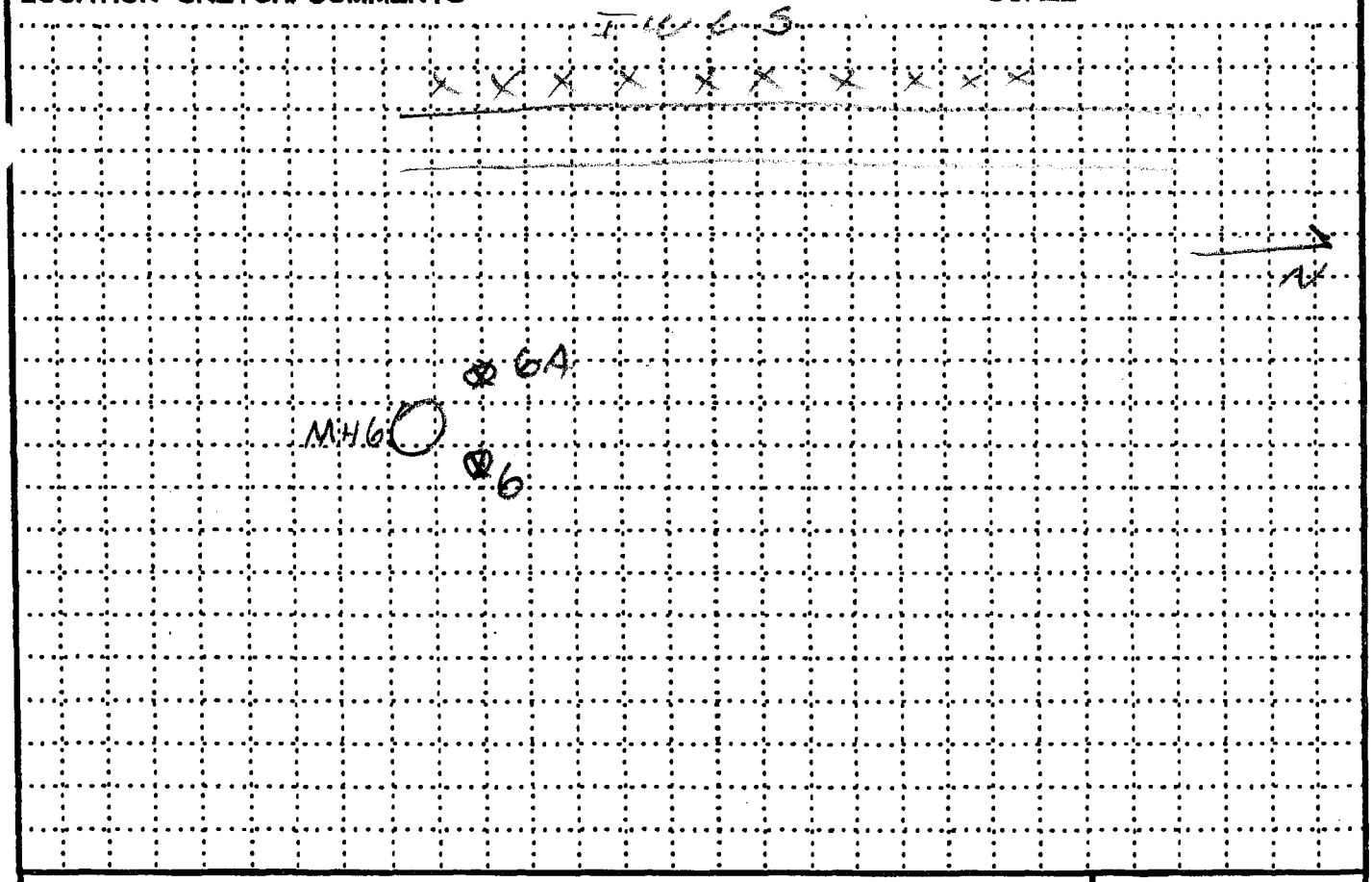
DISTRICT: Buffalo		HOLE NUMBER: MH6
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Manhole East of Lwes	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/1/03	11. DATE COMPLETED: 10/1/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			Grouted	

LOCATION SKETCH/COMMENTS **SCALE:**



PROJECT	HOLE NO.
NFSS	MH6

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: MH6 | SHEET 2 OF 3 SHEETS

ELEV. (3)	DEPTH (8)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SCOOP SAMPLE SEQUENCE (5)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		Drk brn loam sl moist	OVM	Rad			
		Drk brn clayey silt loose dry	0.0	Bkgd			
	1						
	2						
		Drk brn silty clay w/Fe staining and some small gravel stiff sl moist					5.0/3.9
	3						
	4	(CL)					
	5		0.4				
	6						5.0 sampler refusal at 6' (large gravel in shoe)
	7			well rounded 1" gravel poss pipeline bed			
	8						Auger to 7' and try again refusal again sampler comes up with concrete move boring 10' west
	9						

PROJECT: NFSS | HOLE NO.: MH6

EMC FORM 5058A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER MH-6 (a)

PROJECT NESS | INSPECTOR M. Sievers | SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	REPORT OF SAMPLE RECOVERY (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Drk brn loam slimoist	BUM	Rad Bkgd			
	1	Drk brn clayey silt loose dry	0.00				
	2	Brn silty clay w/Fe staining and small gravel stiff dry (CL)	0.00				5.0/3.2
	3		0.00				
	4						
	5		0.00				
	6	softer moist	0.00	Bkgd			5.0/0.0
	7		0.00				no recovery except shoe
	8	more gray less brn	0.00				log from cuttings sample collected at 8.0-8.5 from auger SB-MH6-8.5-3650 1145
	9		0.00				
		no TD 10.0'					

PROJECT NESS | HOLE NO. MH 6

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: MH 7
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: S of IWCS	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/30/03	11. DATE COMPLETED: 9/30/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ≈13.5	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATU[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	MH 7

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: MH 7 | SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (ft)	DESCRIPTION OF MAT'L (4)	FIELD SCREENING RESULTS (4)	REPT'DR SAMPLE NO. OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (4)	BLOW COUNT (4)	REMARKS (4)
		Brn lean sl mois.	0.00	Red			
	1	Drk brn silty clay loose dry	0.00	Rkgd			
	2		0.00				5.0/4.1
	3	Brn-gray mottled silty clay w/fe staining and some small gravel stiff slmoist	0.00				
	4		0.00				
	5	(CL)					
	6	more moist	0.00	Rkgd			5.0/5.0
	7		0.00				
	8	more gray less stiff	0.00				
	9		0.00				

PROJECT: NFSS | HOLE NO.: MH 7

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MH7

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	DEPTH OF SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Cont	OVM	Rad			
		Gray/brn silty clay w/ Fe staining and some small gravel med stiff	0.0	Bkgd			SR-MH7-11.0-3651
	11						10.5-11.0 1630
	12		0.00				
		(CL)					
	13		0.00				5.0/4.6
	14	Gray sand GMS wet	(SP)				
		Gray clay soft wet plastic	0.00				
		(CL)					
	15	TD 15.0					

PROJECT: NFSS

HOLE NO.: MH7

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: MH 7/8
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Manhole South of IWCS	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/1/03	11. DATE COMPLETED: 10/1/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			Grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	MH 7/8

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MH 7/8

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SAMPLE NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		Drk Brn loam	0.00	Rad Bkgd			
	1	Drk Brn clayey silt loose dry	0.00				
	2	Brn silty clay w/some small gravel and fe staining stiff sl. moist	0.00				5.0/4.2
	3	(CL)	0.00				
	4						
	5	Brn-gray mottled silty clay w/fe staining and some small gravel stiff sl. moist	0.00				
	6		0.00	Bkgd			
	7	more gray less Brn	0.00				5.0/5.0
	8		0.00				
	9	med soft	0.00				

PROJECT: NFSS

HOLE NO.: MH 7/8

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MH 7/8

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	TEXT OF SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		cont gray-brn silt clay, w/Fe staining and some small grav	OVM	Rad			
	11	med soft moist	0.00	Bkgd			SB-MH7/8-11.0-3652
							10.5-11.0
	12	gray clay soft wet plastic	0.00				
	13	(CL)	0.00				
	14		0.00				
	15	TD 15.0					

PROJECT: NFSS

HOLE NO.: MH 7/8

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: MH 8
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Manhole South of IWC2	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 10/1/03	11. DATE COMPLETED: 10/1/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ~6.5'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	MH 8

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MH8

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	BOTTOM SAMPLE RECOVERY PER INT. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Dark brn loam slmsis	0.00	Red			
	1	Dark brn silty clay w/ some fine grained sand clay	0.00	Red			5.0/5.0
	2	Brn - gray silty clay w/ Fe staining and some sand	0.00				
	3		0.00				
		(CL)					
	4		0.00				
	5	wet					
	6		0.00	Red			
		(GW)					
		From this point down saturated	0.00				5.0/5.0
	7	Brn - gray silty sand, wet					
	8	(CL)					
	9	Gray-brn mottled silty clay w/ Fe staining and some fine grained sand stiff wet					

PROJECT: NFSS

HOLE NO.: MH8

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MH8

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MAT'L SAMPLE (ft)	FIELD SCREENING RESULTS (ft)	SCOPE OF SAMPLE OR CORE BOX NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		cont brn silty [illegible]	0.00	Rad			
	11	[illegible]	0.00	Bkgd			SB-MH8-11.0-3653 10.5-11.0 0830
	12	[illegible]	0.00				5.0/4.7
	13	(CL)	0.00				
	14						
	15		0.00				
		TD 15.0					

PROJECT: NFSS

HOLE NO.: MH8

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

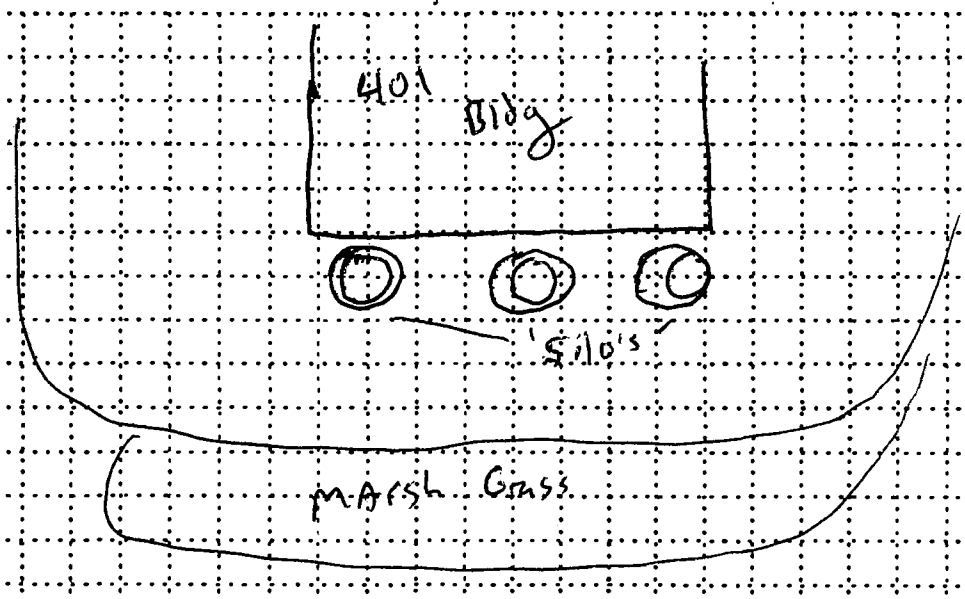
DISTRICT: Buffalo		HOLE NUMBER: MW 228
1. COMPANY NAME: Maxim Tech	2. DRILLING SUBCONTRACTOR: C&W ENV	SHEET 1 OF 4 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: C&W ENV. Phil Beck / Todd	6. MANUFACTURER'S DESIGNATION OF DRILL: CME	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME Truck Drill Rig; 3" x 5' SS Sampler; SS Bowls - Spoons; DI / Liquinox D-Con	8. HOLE LOCATION: S of 401 Bldg	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9-18-03	11. DATE COMPLETED: 9-18-03 @ 1525
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED: ~ 30'	
13. DEPTH DRILLED INTO ROCK: No	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE: 41	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		

LOCATION SKETCH/COMMENTS N↑ **SCALE:** NTS



PROJECT	HOLE NO.
NFSS	MW-229

See figure w/ MW-229

8/19-03 No Surface (SS MW228-3614) Sample as Per Dave G
SB MW 228- -3615

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-228

PROJECT: NFSS | INSPECTOR: CAW/MAG | SHEET 2 OF 4 SHEETS

BLOW (4)	DEPTH (ft)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REPRESENTATIVE SAMPLE OR CORE FOR DESC. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		Clay Silt w/ SAND & gravel Brown to dk brown, medium moist Fill	PID=0.0 RAD≤Bkg	PID=0.0 Bkg RAD=150 Bkg			No Analytical Sample as per Dave G
1.2	1						
	2	Clay with S.Silt, S.SAND & gravel gray to dk gray w/black, decomposed organic streaks, med to soft moist (CL)	PID=0.0 RAD≤Bkg	H_2S=0.0 O_2=21.9 CO=0.0 LEL=0.0			slight odor - decomp organics 60" recovery
			PID=0.0 RAD≤Bkg				
	3		RAD≤Bkg PID=0.0				
4.0	4	Clay w/ Silty SAND & Grav gray to med gray with red Iron Inclusions/streaking med to soft, moist (CL)	RAD≤Bkg PID=0.0				
	5		PID=0.0 RAD≤Bkg				
5.8	6	Silty Clay w/s.SAND & grav. Brown to Red brown, with gray med to soft, moist (CL)	PID=0.0 RAD≤Bkg				
	7	Softer w/Depth	PID=0.0 RAD≤Bkg				
	8		PID=0.0 RAD≤Bkg				60" Recovery
	9	SAME but Brown to Gray Brown w/Red iron streaks (CH)	PID=0.0 RAD≤Bkg				
	10						

PROJECT: NFSS | HOLE NO.: MW-228

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW 228

PROJECT: NFSS

INSPECTOR: CAW - MAC

SHEET 3 OF 4 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REPTOR SAMPLE OR CORE RUN NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Clay w/ S. sand & gravel	PID=0.0	H_2S=0.0			60" recovery
		Gray with red iron streaks to Gray Brown	RAD= Bkg	O_2=22.2			
		Soft, wet (CH)		LEL=0			
	11		PID=0.0	Co=0			
			RAD= Bkg				
	12		PID=0.0				
			RAD= Bkg				
	13		PID=0.0				
			RAD= Bkg				
	14		PID=0.0				Sampled to 15.0'
			RAD= Bkg				
	15						
		Blind Drill w/ HSA & Center Plug					No Sample
	16						
	17						Advanced to 18' BLS
		EOB @ 18.0		H_2S=0			
				O_2=21.9			
	18			LEL=0.0			
		Set well @ 18' @ 09:30		Co=0 @ 09:10			
	19	Finished Grout by 10:00					
		on 9-19-03					
	20						

PROJECT: NFSS

HOLE NO. MW 228

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

MW-228 4 of 4
Sheet ~~MW~~

Facility/Project Name: NFSS	Local Grid Location of Well: ____ m. ☐ N. ☐ S. ____ m. ☐ E. ☐ W.	Well Number: MW-229
Facility License, Permit or Monitoring Number	Grid Origin Location: Lat. ____ Long. ____ or	Date Well Installed (Start): 9-19-03 0920
Type of Protective Cover: Above-Ground ☑ Flush-To-Ground ☐	St. Plane ____ m. N. ____ m. E.	Date Well Installed (Completed): 9-19-03
Well Distance From Waste/Source Boundary	Section Location of Waste/Source: ___ ¼ of ___ ¼ of Sec. ___ T. ___ N.R. ___ ☐ E. ☐ W.	Well Installed By: (Person's Name & Firm) C & E ENV. Ph. I B/Todd
Maximum Depth of Frost Penetration (estimated): 4'6"	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation ____ m. MSL
B. Well casing, top elevation ____ m. MSL
C. Land surface elevation ____ m. MSL
D. Surface seal, bottom ____ m. TOC or ____ m. MSL

16. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☑
Bedrock ☐

17. Sieve analysis attached? ☐ Yes ☑ No

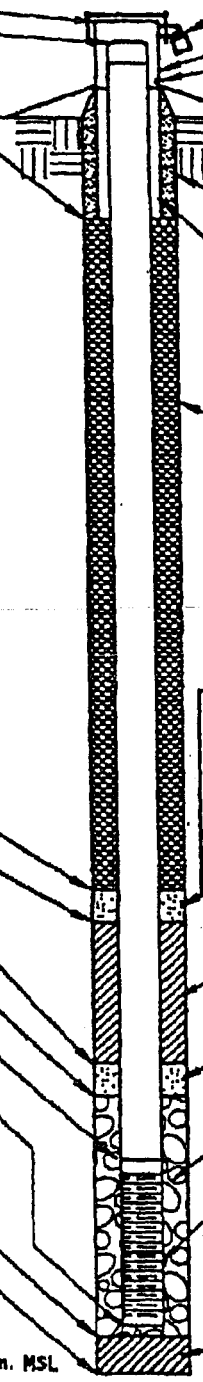
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☑ ____ Other ☐

19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☑

20. Drilling additives used? ☐ Yes ☑ No
Describe ____

21. Source of water (attach analysis):
None
DI water for hydrating Bent Chips

E. Secondary filter, top — m. TOC or ____ m. MSL
F. Bentonite seal, top 4.0 m. TOC or ____ m. MSL
G. Secondary filter, top — m. TOC or ____ m. MSL
H. Primary filter, top 6.0' m. TOC or ____ m. MSL
I. Screen joint, top 8.0' m. TOC or ____ m. MSL
J. Well bottom 18.0' m. TOC or ____ m. MSL
K. Filter pack, bottom 18.0' m. TOC or ____ m. MSL
L. Borehole, bottom 18.0' m. TOC or ____ m. MSL
M. Borehole, diameter 8.0" mm.
N. O.D. well casing 2.37" mm.
O. I.D. well casing 2.00" mm.
P. 24-hr water level after completion ____ m. TOC or ____ m. MSL



1. Cap and lock? ☑ Yes ☐ No
2. Protective posts? ☑ Yes ☐ No
3. Protective casing:
a. Inside diameter: 4.0" mm.
b. Length: 5.0' m.
4. Drainage port(s) ☑ Yes ☐ No
5. Surface seal:
a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☐ ____ Other ☐
b. Annular space seal: Bentonite ☐ Cement ☐ ____ Other ☐
6. Material between well casing and protective casing: Bentonite ☐ Cement ☐ Bent/Bent Grout Other ☐
7. Annular space seal: a. Granular Bentonite ☐
b. ____ Lbs/gal mud weight... Bentonite-sand slurry ☐
c. ____ Lbs/gal mud weight ..... Bentonite slurry ☐
d. ____ x Bentonite ..... Bentonite-cement grout ☑
e. ____ m.³ volume added for any of the above
f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☑
8. Centralizers ☐ Yes ☑ No
9. Secondary Filter ☐ Yes ☐ No
a. Volume added ____ m³ ____ Bags/Size
10. Bentonite seal: a. Bentonite granules ☐
b. ☐ ¼in. ☑ ⅜in. ☐ ½in. Bentonite pellets ☐
c. BENT. Chips Other ☐
11. Secondary Filter ☐ Yes ☑ No
a. Volume added ____ m³ ____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
a. ____
b. Volume added ____ m³ 3 Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☑ Flush threaded PVC schedule 80 ☐ ____ Other ☐
14. Screen material: Buffalo Well Products
a. Screen type: Factory cut ☑ Continuous slot ☐ PVC Other ☐
b. Manufacturer ____
c. Slot size: 0.010 in.
d. Slotted length: 10.0' m.
15. Backfill material (below filter pack): None ☐ ____ Other ☑

Figure 5-3. Schematic construction diagram of monitoring well

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: MW-229
1. COMPANY NAME: MAXIM TECH	2. DRILLING SUBCONTRACTOR: C&W ENV	SHEET 1 OF 7 SHEETS
3. PROJECT: NFSS	4. LOCATION	
5. NAME OF DRILLER: C&W Phil BENCE	6. MANUFACTURER'S DESIGNATION OF DRILL: CME	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME - 4¼ HSA; 3" x 5' SS Sample; SS Bowls - Spoons; Liquinox & DI water D-con	8. HOLE LOCATION: S of 401 Bldg	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9-18-03	11. DATE COMPLETED: 9-18-03
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED	
13. DEPTH DRILLED INTO ROCK: to weathered bedrock @ 40.0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE: 40' - Sampled to 42'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

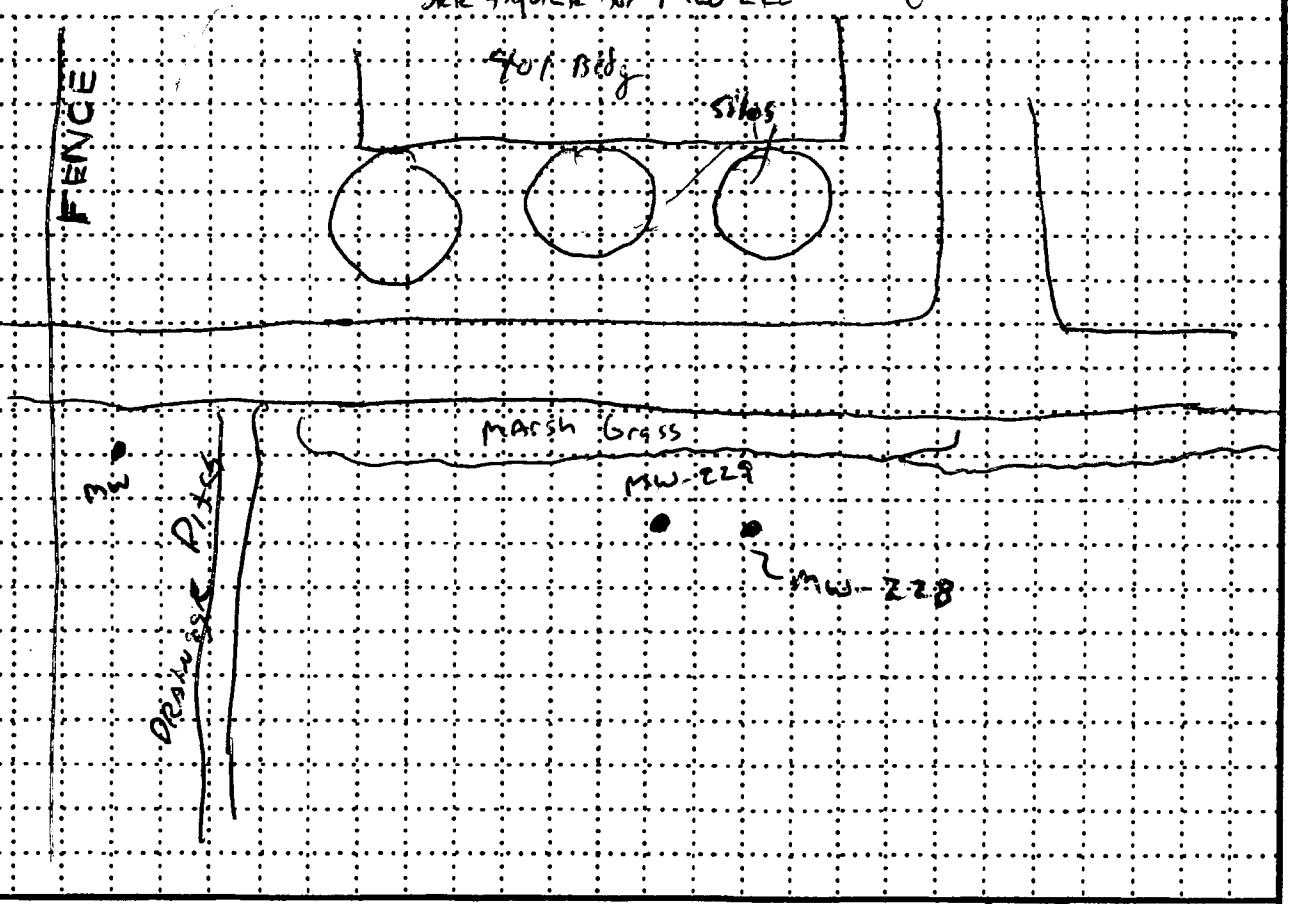
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None	—		None

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGN[redacted]
		X		

LOCATION SKETCH/COMMENTS

See Figure for MW 228 SCALE:



PROJECT	HOLE NO.
NFSS	MW-229

SAND NSF Produced by:
Ricci Bros SAND Co.
2099 Dragston Rd P.O Box 664
Port Norris NJ 08349
[illegible]-785-[illegible]

Chipped Bentonite - Pure gold
~~Powdered Bentonite~~ - Saylors - Type I
Portland Cement
Powdered Bentonite -

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-229

PROJECT: NFSS | INSPECTOR: CAW/MAG | SHEET 2 OF 4 SHEETS

ELEV. (1)	DEPTH (2)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (5)	REPRESENTATIVE SAMPLE OR CORE BOX NO. (6)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (8)	REMARKS (9)
		Silt w/ SAND & gravel, organics Dk graybrown, soft, dry (ML)	RAD ≤ Bkg H_2S = 0.0 O_2 = 21.8 CO = 0.0 LEL = 0	RAD: Bkg = 150 PID = 0.0	Sample SS-MW 229-3617		Sample @ 0-6"
	1	~~Silty Clay, dk gray to black, Septic odor~~ Clay with Silt, S. SAND & gravel, Brown, Gray brown w/ Gray with red/redbrown iron staining, med to stiff, moist (CL)		PID = 0.0 RAD ≤ Bkg			
	2			PID = 0.0 RAD ≤ Bkg			54" Recovery
	3			PID = 0.0 RAD ≤ Bkg			
	4			PID = 0.0 RAD ≤ Bkg			
	5			RAD ≤ Bkg PID = 0.0			
	6	Silty Clay w/ S. SAND & gravel Brown w/ Red brown w/ gray med to Soft, moist (CL)		PID = 0.0 RAD ≤ Bkg			
	7	Less Silt w/depth — Softer w/depth		PID = 0.0 RAD ≤ Bkg			
	8			PID = 0.0 RAD ≤ Bkg			
	9	(CH)		PID = 0.0 RAD ≤ Bkg			
	10			PID = 0.0 RAD ≤ Bkg			

PROJECT: NFSS | HOLE NO.: MW-229

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS - MW229 - 3617

SB - MW229 - - 3618

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-229

PROJECT: NFSS | INSPECTOR: CAW/MAG | SHEET 3 OF 7 SHEETS

ELEV. (4)	DEPTH (B)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REMOTE SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (B)
		Silty clay w/ Tr SAND & gravel Brown to red brown, soft moist (CH)	PID = 0.1 RAD ≤ Bkg				60" Recovery
	11	CLAY, Tr SAND & Tr gravel Gray to brown gray, soft Moist to wet (CH)	RAD ≤ Bkg PID = 17.5	SB-MW229 -11.0-361E 2103 H_2S = 0.0 O_2 = 21.4 CO = 0.0 LEL = 0.0			PID readings 11-12' - V. Slight odor 11.0-12.0
	12	Red Iron Streaks (Common)	RAD ≤ Bkg PID = 0.3				
	13		PID = 0.0 RAD ≤ Bkg	IN BZ			
	14		PID = 0.0 RAD ≤ Bkg				
	15		PID = 0.0 RAD ≤ Bkg				
	16	(SAME)					
	16	Red Iron Streaks (few)	PID = 0.0 RAD ≤ Bkg				
	17		PID = 0.0 RAD ≤ Bkg				60" recovery
	18		PID = 0.0 RAD ≤ Bkg				
	19		RAD ≤ Bkg PID = 0.0				
	20						

PROJECT: NFSS | HOLE NO.: ~~NFSS~~ MW-229

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-229

PROJECT: NFSS

INSPECTOR: GW/MAC

SHEET 4 OF 7 SHEETS

ELEV. (3)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	SELECTED SAMPLE OR CORE BOX NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Clay, Trace SAND & S. gravel Gray to Gray brown, soft moist to wet (CH)	PID=0.0 RAD≤ BKG	H_2S=0.0 O_2=21.9			
	21	Red Iron Streaks (Few)	PID=0.0 RAD≤ BKG	CO=0.0 LEL=0 in BZ			60" recovery
	22		PID=0.0 RAD≤ BKG				
	23		PID=0.0 RAD≤ BKG				
	24		RAD≤ BKG PID=0.0				
	25		PID= RAD≤ BKG				
	26	SAME to 28.5	PID= RAD≤ BKG				60" recovery
	27		PID= RAD≤ BKG				
	28		PID= RAD≤ BKG	H_2S=0.0 O_2=22.1			
	29	Gravel w/SAND, Silt & Clay Brown to red brown dense wet (GM-GC)	PID= RAD≤ BKG RAD≤ BKG PID=	CO=0 LEL=0 in BZ	SB-MW 229-28.5 3618		Lab Sample @ 28.5 @ 1120

PROJECT: NFSS

HOLE NO. MW-229

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

RAD Bkg = 165

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-229

PROJECT: NFSS | INSPECTOR: CAW/MAG | SHEET 5 OF 6 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SAMPLE NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		SAME to ~~32.5~~ 29.5	PID=0.0 RAD≤ Bkg	H_2S=0.0 O_2=22.0			
	31		PID=0.0 RAD≤ Bkg	CO=0.0 LEL=0			
	32		PID=0.0 RAD≤ Bkg				
	29.5	29.5					40" recovery
	30	~~Silty Clay~~, w/ Gravel & SAND					~~No Recov~~
	33	Clayey Silt, brown red to brown					No advancement to 35'
	31	Soft moist to wet (CL-ML)	PID=0.0 RAD≤ Bkg				refusal @ 33'
	32	32'					
	34	Silt w/ SAND, fine grained, trace gravel, brown to red brown	PID=0.0 RAD≤ Bkg				
	33	33' soft, wet (ML)					
	35	No Samples					Drilled to 34' attempted sampling w/ 5' sampler No Recovery
	34	Silt w/ SAND, fine grained w/ s. gravel, brown to red brown, dense, wet	PID=0.0 RAD≤ Bkg			Blows 11-17-19-24	
2' split spoon	35	(ML)					
			PID=0.0 RAD≤ Bkg				
	36	SAME to 37.0	PID=0.0 RAD≤ Bkg			11-20 23-17	
SS	37	Gravel, w Silt & SAND, red brown, dense wet (GM)	PID=0.0				
	38	Gravel w/ SAND Coarse to med brown - red brown, dense wet (GM)	PID=0.0 RAD≤ Bkg			12-21 25-20	
SS	39						
	40		PID=0.0 RAD≤ Bkg				

PROJECT: NFSS | HOLE NO. MW-229

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER MW-229

PROJECT NFSS | INSPECTOR UAW/MAC | SHEET OF SHEETS

ELEV. (c)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SAMPLE NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h) 6 7
2' SS Sample	41	Same ↓ wet Weathered bedrock Brown to Red brown (moist)	H_2S - 0.0 O_2 = 22.1 CO = 0.0 LEL = 0.0 @ BZ	RAD ≤ Bkg PID = 0.0 RAD ≤ Bkg PID = 0.0	24-50/.3		8" recovery
	42	EOB					
	43	Set well @ 41.0' @ 1525 on 9-18-03 Well Screen 30'-40'					advance HSA to 41.0' w/ Center Plug to Complete Well
	44	Coarse sand to 28.0 Chipped bentonite to 26' & Hydrated w/ DI					
	45	Neat Cement grout to Land Surface by 1700					
	46	Drilled guard post Holes Set-up on MW-228					

PROJECT NFSS | HOLE NO. MW-229

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Facility/Project Name: NFSS	Local Grid Location of Well: ☐ N. ☐ S. _____ m. ☐ E. ☐ W. _____ m.	Well Number: MW-229
Facility License, Permit or Monitoring Number	Grid Origin Location: Lat. ___ ___ ___ Long. ___ ___ ___ or St. Plane _____ m. N. _____ m. E.	Date Well Installed (Start): 9-18-03
Type of Protective Cover: Above-Ground ☒ Flush-To-Ground ☐	Section Location of Waste/Source: ___ ¼ of ___ ¼ of Sec. ___ T. ___ N.R. ___ ☐ E. ☐ W.	Date Well Installed (Completed): 9-19-03
Well Distance From Waste/Source Boundary	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known	Well Installed By: (Person's Name & Firm) C&E ENV; Phil Bence
Maximum Depth of Frost Penetration (estimated)		

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation _____ m. MSL
B. Well casing, top elevation _____ m. MSL
C. Land surface elevation _____ m. MSL
D. Surface seal, bottom _____ m. TOC or _____ m. MSL

16. USCS classification of soil near screen:
GP ☐ GM ☒ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☒ MH ☐ CL ☒ CH ☐
Bedrock ☐

17. Sieve analysis attached? ☐ Yes ☒ No

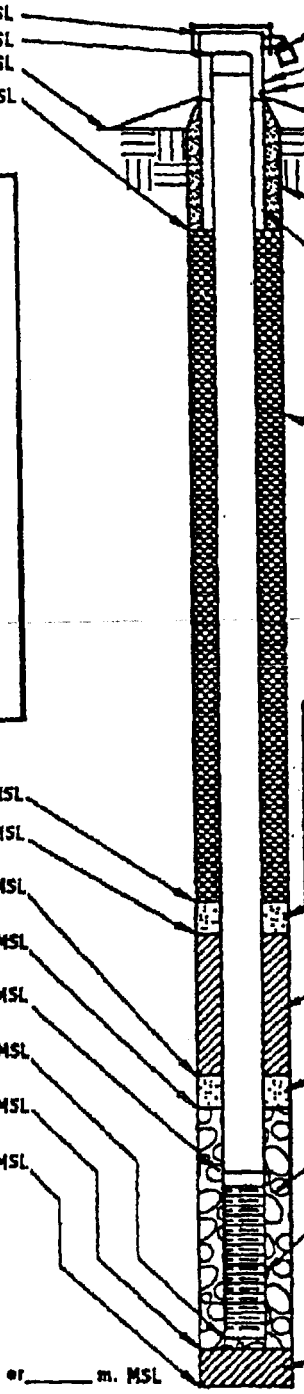
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☒ _____ Other ☐

19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☒

20. Drilling additives used? ☐ Yes ☒ No
Describe _____

21. Source of water (attach analysis): N/A

E. Secondary filter, top — m. TOC or _____ m. MSL
F. Bentonite seal, top 27.0 m. TOC or _____ m. MSL
G. Secondary filter, top — m. TOC or _____ m. MSL
H. Primary filter, top 29.0 m. TOC or _____ m. MSL
I. Screen joint, top 31.0 m. TOC or _____ m. MSL
J. Well bottom 41.0 m. TOC or _____ m. MSL
K. Filter pack, bottom 41.0 m. TOC or _____ m. MSL
L. Borehole, bottom 41.0 m. TOC or _____ m. MSL
M. Borehole, diameter 8" mm.
N. O.D. well casing 2.37" mm.
O. I.D. well casing 2.00" mm.
P. 24-hr water level after completion _____ m. TOC or _____ m. MSL



1. Cap and lock? ☒ Yes ☐ No
2. Protective posts? ☒ Yes ☐ No
3. Protective casing:
a. Inside diameter: 4" mm.
b. Length: 5.0' m.
4. Drainage port(s) ☒ Yes ☐ No
5. Surface seal:
a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☒ _____ Other ☐
b. Annular space seal: Bentonite ☐ Cement ☐ Cement Bentonite Slurry Other ☐
6. Material between well casing and protective casing: Bentonite ☒ Cement ☐ _____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
b. ___ Lbs/gal mud weight... Bentonite-sand slurry ☐
c. ___ Lbs/gal mud weight..... Bentonite slurry ☐
d. ___ x Bentonite ..... Bentonite-cement grout ☒
e. 37 gal m.³ volume added for any of the above
f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
8. Centralizers ☐ Yes ☒ No
9. Secondary Filter ☐ Yes ☐ No
a. Volume added ___ m³ _____ Bags/Size
10. Bentonite seal: a. Bentonite ~~granular~~ Chips ☒
b. ☐ ¼in. ☒ ⅜in. ☐ ½in. Bentonite pellets ☐
c. _____ Other ☐
11. Secondary Filter ☐ Yes ☒ No
a. Volume added ___ m³ _____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
a. Morie 00N
b. Volume added ___ m³ 3 Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ _____ Other ☐
14. Screen material: PVC
a. Screen type: Factory cut ☒ Continuous slot ☐ _____ Other ☐
b. Manufacturer _____
c. Slot size: 0.010 in.
d. Slotted length: 10' m.
15. Backfill material (below filter pack): None ☒ _____ Other ☐

Figure 5-3. Schematic construction diagram of monitoring well

Well grouted on 9-18-03 in PM

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: MW-313
1. COMPANY NAME: MAXIM Tech	2. DRILLING SUBCONTRACTOR: C&W ENV	SHEET 1 OF 4 SHEETS
3. PROJECT: NFSS	4. LOCATION	
5. NAME OF DRILLER: C&W ENV Phil Bence	6. MANUFACTURER'S DESIGNATION OF DRILL: CME	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME Truck Mt Drill Rig; 4¼" HSA 3"x5' Sampler; SS Bowls - Spoons; Liquinox Wash - DI rinse Decon	8. HOLE LOCATION: See Map	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9-17-03 1610	11. DATE COMPLETED: 9-18-03 in AM
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED	
13. DEPTH DRILLED INTO ROCK	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE: 20.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

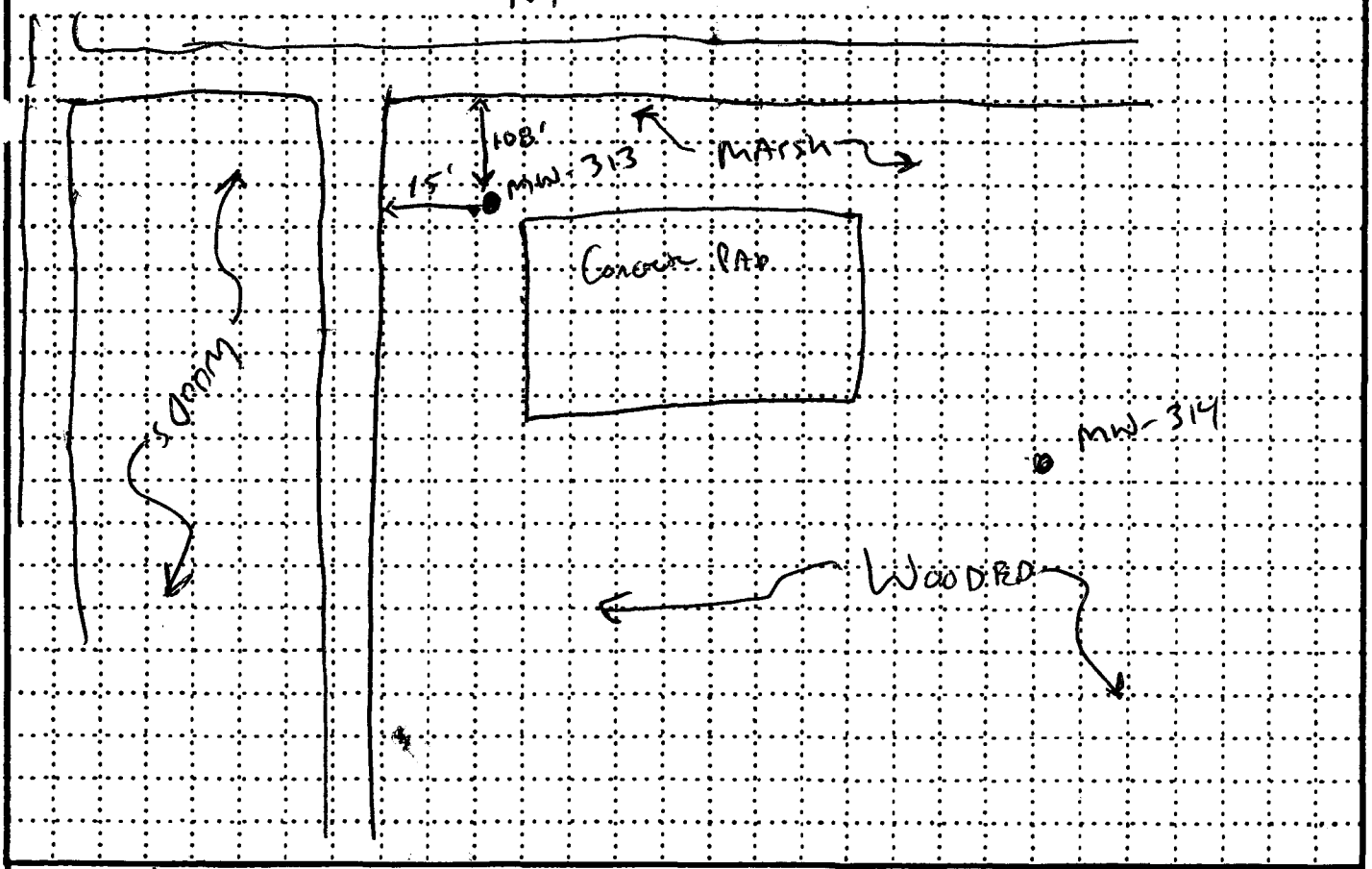
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
N						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		

LOCATION SKETCH/COMMENTS

N ↑ SCALE:



PROJECT	HOLE NO.
NFSS	MW-313

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-313

PROJECT: NFSS

INSPECTOR: CWseman / MAX G

SHEET 2 OF 4 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	SCOOP OR SAMPLE OR CORE BOX NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Clayey Silt w/SAND & gravel w/organics, brown to dk gray brown - 1-3" Cylinders & Rock to 1.5'	RAD Background 65	PID 0.0 RAD ≤ BKg	SS-MW313-359 Inc MS/MSD 0-6"		40" recovery
	1		PID: 0.0				
		Clayey Silt w/SAND & gravel Brown, red brown, gray brown Stiff, moist (ML-CL)	H_2S = 0.0 O_2 = 21.9 CO = 0.0 LEL = 0	PID = 0.0 RAD ≤ BKg			
	2						
	3			PID = 0.0 RAD ≤ BKg			
	4			PID = 0.0 RAD ≤ BKg			
	5	Silty CLAY w/ S. SAND & gravel Brown to Red brown w/ Gray Lt gray mottles to 7' Stiff, moist (CL)		PID = 0.0 RAD ≤ BKg			
	6			PID = 0.0 RAD ≤ BKg			
		Red iron staining thru Profile (Few to Common) to 8.5'		PID = 0.0 RAD ≤ BKg			60" Recovery
	7	softer w/ Depth					
	8			PID = 0.1 RAD ≤ BKg			
	9			PID = 0.1 RAD ≤ BKg			
	10			PID = 0.2 RAD			

PROJECT: NFSS

HOLE NO.: MW-313

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-MW 313-11-3592

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-313

PROJECT: NFSS

INSPECTOR: CWiemann / MAX G

SHEET 3 OF 4 SHEETS

ELEV. (4)	DEPTH (8)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SENSITIVE SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (4)	BLOW COUNT (10)	REMARKS (8)
		Silty Clay w/Tr SAND & S gravel Brown to dk red brown, stiff moist (CL)	PID=0.0 H_2S-0.0 O_2-21.9 CO=0.0 LEL=0 in BZ	PID=0.0 RAD≤BKg			
11	11	~~SAND, fn to m~~ Silty SAND, fn to med gr brown, moist (SM) dense		PID=0.0 RAD≤BKg	SB-MW313-11-3591 Incl QC	@11.0	Sample @11.0' Incl QC
11.8	12	Silty Clay w/ S. SAND & gravel Brown to dk red brown, moist ~~st~~ medium to Soft, (CL)		PID=0.0 RAD≤BKg			
	13	Softer w/Depth		PID=0.0 RAD≤BKg			
	14	Silty Clay w/Tr SAND & ~~tr~~ gravel Red to Red brown Soft to medium, moist (CL)		PID=0.0 RAD≤BKg			
	15	Clay, w/Tr SAND & S. gravel Gray to Red gray, soft moist to wet (CH)					
	16			PID=0.0 RAD≤BKg			
	17	med to Fine SAND layer @ 17.5 to 17.6		PID=0.0 RAD≤BKg			
	18		PID=0.0 H_2S=0.0 O_2=21.9 CO=0.0 LEL=0.0 in BZ	PID=0.0 RAD≤BKg			
	19	Fine SAND layer @ 19 to 19.2'		PID=0.0 RAD≤BKg			
	20			PID=0.0 RAD≤BKg			

PROJECT: NFSS EOB @ 20.0'

HOLE NO. MW-313

ENG FORM 5056A-R, AUG 94 Set well @ 20.0 (Proponent: CECW-EG)

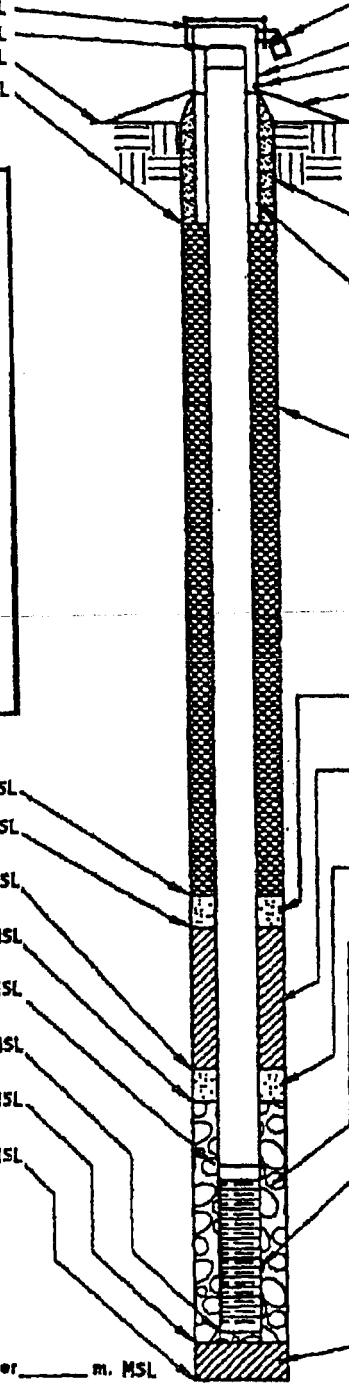
on 9-18-03

Protop Set on —
Grouted on 9-18-03 in PM
Sheet 4 of 4

Facility/Project Name: NFSS	Local Grid Location of Well: ☐ N. ____ m. ☐ S. ____ m. ☐ E. ☐ W.	Well Number: MW-313
Facility License, Permit or Monitoring Number	Grid Origin Location: Lat. ___ ___ ___ Long. ___ ___ ___ or	Date Well Installed (Start): 9-17-03 14:30
Type of Protective Cover: Above-Ground ☒ Flush-To-Ground ☐	St. Plane ____ m. N. ____ m. E.	Date Well Installed (Completed)
Well Distance From Waste/Source Boundary	Section Location of Waste/Source: ___ ¼ of ___ ¼ of Sec. ___ T. ___ N. R. ___ ☐ E. ☐ W.	Well Installed By: (Person's Name & Firm): C&W ENV Phil Benge
Maximum Depth of Frost Penetration (estimated)	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known	

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation ____ m. MSL
B. Well casing, top elevation ____ m. MSL
C. Land surface elevation ____ m. MSL
D. Surface seal, bottom ____ m. TOC or ____ m. MSL



1. Cap and lock? ☒ Yes ☐ No
2. Protective posts? ☒ Yes ☐ No
3. Protective casing:
   a. Inside diameter: 4.0" mm.
   b. Length: 5.0' m.
4. Drainage port(s) ☐ Yes ☐ No
5. Surface seal:
   a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☐ ____ Other ☐
   b. Annular space seal: Bentonite ☐ Cement ☐ ____ Other ☐
6. Material between well casing and protective casing: Bentonite ☐ Cement ☐ ____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
   b. ____ Lbs/gal mud weight ... Bentonite-sand slurry ☐
   c. ____ Lbs/gal mud weight ... Bentonite slurry ☐
   d. ____ x Bentonite ... Bentonite-cement grout ☒
   e. ____ m³ volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☐
8. Centralizers ☐ Yes ☒ No
9. Secondary Filter ☐ Yes ☒ No
   a. Volume added ____ m³ ____ Bags/Size
10. Bentonite seal: a. Bentonite granules ☐
    b. ☐ ¼in. ☒ ⅜in. ☐ ½in. Bentonite pellets ☐
    c. ____ Other ☐
11. Secondary Filter ☐ Yes ☒ No
    a. Volume added ____ m³ ____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
    a. Morie 00N
    b. Volume added ____ m³ 3 Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ ~~Morie 00N~~ Other ☐
14. Screen material: PVC
    a. Screen type: Factory cut ☒ Continuous slot ☐ Buffalo Well Products Other ☐
    b. Manufacturer ____
    c. Slot size: 0.010 in.
    d. Slotted length: 10.0' m.
15. Backfill material (below filter pack): None ☒ ____ Other ☐

16. USCS classification of soil near screen:
    GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
    SM ☐ SC ☐ ML ☐ MH ☐ CL ☒ CH ☒
    Bedrock ☐
17. Sieve analysis attached? ☐ Yes ☒ No
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☒ ____ Other ☐
19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☒
20. Drilling additives used? ☐ Yes ☒ No
    Describe ____
21. Source of water (attach analysis): None

E. Secondary filter, top ____ m. TOC or ____ m. MSL
F. Bentonite seal, top 4.5 m. TOC or ____ m. MSL
G. Secondary filter, top — m. TOC or ____ m. MSL
H. Primary filter, top 8.0' m. TOC or ____ m. MSL
I. Screen joint, top 10.0' m. TOC or ____ m. MSL
J. Well bottom 20.0' m. TOC or ____ m. MSL
K. Filter pack, bottom 20.0' m. TOC or ____ m. MSL
L. Borehole, bottom 20.0 m. TOC or ____ m. MSL
M. Borehole, diameter 8.0" mm.
N. O.D. well casing 2.00" mm.
O. I.D. well casing 2.37" mm.
P. 24-hr water level after completion ____ m. TOC or ____ m. MSL

Figure 5-3. Schematic construction diagram of monitoring well

HTRW DRILLING LOG

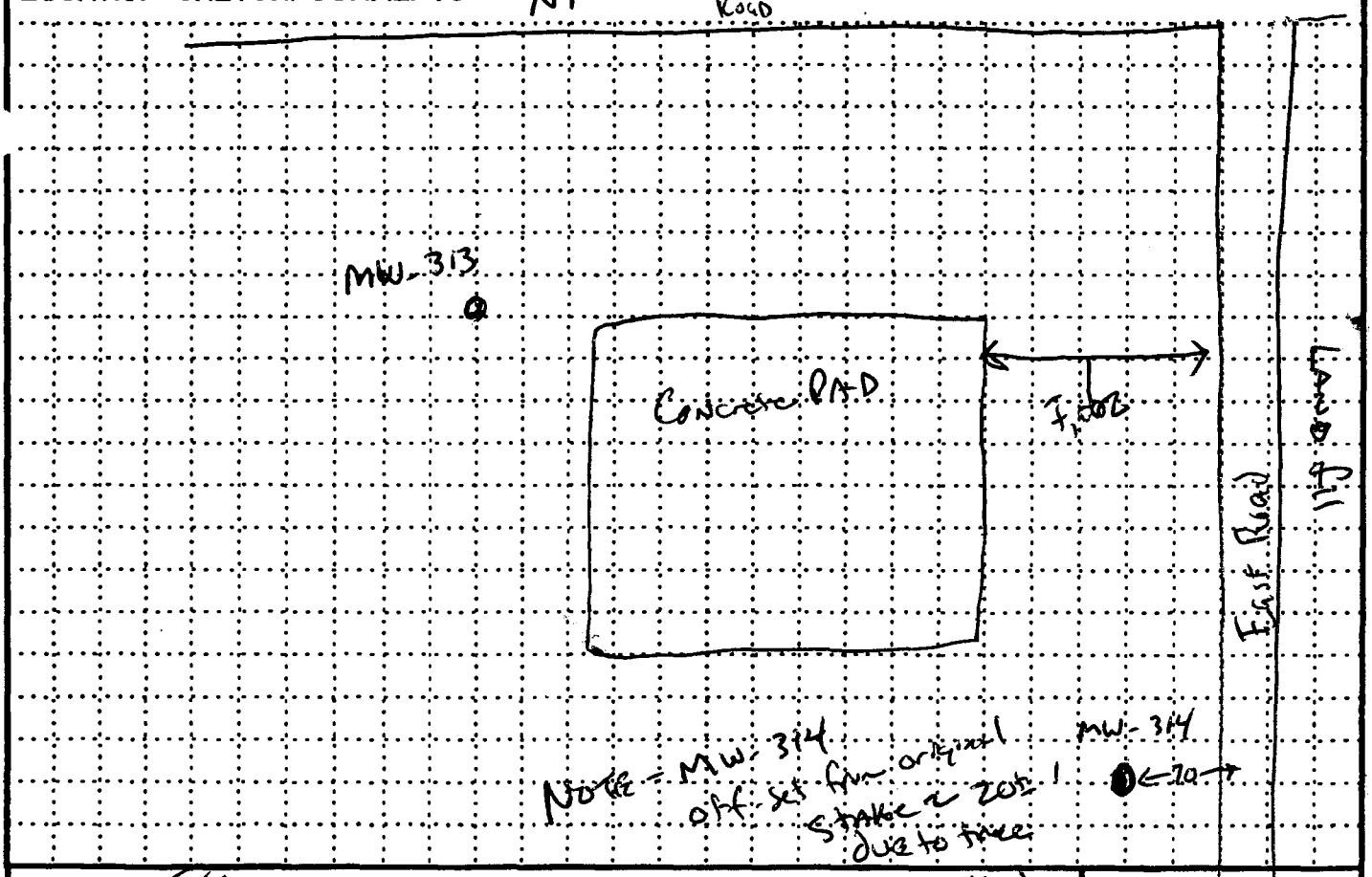
DISTRICT Buffalo		HOLE NUMBER MW 314
1. COMPANY NAME Maxim Tech.	2. DRILLING SUBCONTRACTOR	SHEET 1 OF 4 SHEETS
3. PROJECT NFSS	4. LOCATION	
5. NAME OF DRILLER Phil Bence / Todd Brown	6. MANUFACTURER'S DESIGNATION OF DRILL CME	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME 44 HSA; 3" x 5' SAMPLER; DI/Liquinox D-Con; SS Bowls	8. HOLE LOCATION W of Landfill	
	9. SURFACE ELEVATION	
	10. DATE STARTED 9-17-03	11. DATE COMPLETED 9-17-03
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED	
13. DEPTH DRILLED INTO ROCK 0	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIG[redacted]
		X		

LOCATION SKETCH/COMMENTS SCALE:



PROJECT NFSS	HOLE NO. MW-314

Needs new survey

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-314

PROJECT: NFSS

INSPECTOR: Wieman / MAX G

SHEET 2 OF 4 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	SAMPLE NO. OR CORE RUN NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Clay with Silt, SAND & S gravel w/organics (roots etc) Dk gray to dk gray brown, Soft moist (CL)	PID = 0.0 BKgrnd BZ RAD = 65	RAD ≤ Bkg PID = 0.0	SS-MW314 3593 @ 1340		Lab Sample @ 0-6"
	1		H_2S = 0.0 O_2 = 21.9 CO = 0.0 LEL = 0.0				60" Recovery
	2	Clay with Silt, SAND & S gravel Gray to Dk gray brown w/ red & Red Brown Incl. Stiff, dry (CL)		RAD ≤ Bkg PID = 0.0			
	3			RAD ≤ Bkg PID = 0.0			
	4	white/Lt gray gleying @ 4.5'		RAD ≤ BKG PID = 0.0			
	5	Clay with Silt, S. SAND & gravel Dk brown to dk gray brown w/ red/redbrown iron staining, stiff dry to moist (CL) moister w/depth		RAD ≤ Bkg PID = 0.0			
	6			PID = 0.0 RAD ≤ Bkg			
	7			PID = 0.0 RAD ≤ Bkg			60" Recovery
	8			PID = 0.0 RAD ≤ Bkg			
	9			PID = 0.0 RAD ≤ Bkg			
	10			PID = 0.0 RAD ≤ Bkg			

PROJECT: NFSS

HOLE NO.: MW 314

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS-MW314-3593

[illegible] 314 - [illegible] - 3594

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-314

PROJECT: NFSS

INSPECTOR: C Wiseman / MAX G

SHEET 3 OF 4 SHEETS

ELEV. (4)	DEPTH (b)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (d)	SCOTCH SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (e)	REMARKS (h)
		Clay w/silt, s. SAND + gravel Brown to Gray Brown, stiff dry to moist (CL)	PID=0.0 H_2S=0.0 O_2=22.0 CO=0.0 LEL=0				60" Recovery
	11			PID=0.0 RAD≤Bkg			
		Lt redbrown silt layers from 12 to 14.5					
		moister w/depth					
	12			PID=0.0 RAD≤Bkg			
	13			PID=0.0 RAD≤Bkg			
	14			PID=0.0 RAD≤Bkg			
		Silty SAND, fine to med, Lt brown loose, dry (SM)					
	15			PID=0.0 RAD≤Bkg	SB-MW 314-15.0 3594 @ 1435		
		CLAY, Brown to Gray brown Soft moist (CH)					
	16			RAD≤Bkg PID=0.0			
		less silt w/depth					60" Recovery
		Softer w/depth		RAD≤Bkg PID=0.0			
	17						
	18			RAD≤Bkg PID=0.0			
		CLAY Gray to Gray brown Soft, moist to wet (CH)					
	19			RAD≤Bkg PID=0.0			
	20			RAD≤Bkg PID=0.0			

PROJECT: NFSS EOB @ 20.0

HOLE NO. MW-314

ENG FORM 5056A-R, AUG 94 Set Well @ 20.0 w/10' screen (Proponent: CECW-EG)

Protop Installed on _____

Facility/Project Name: NFSS	Local Grid Location of Well: ☐ N. _____ m. ☐ S. _____ m. ☐ E. ☐ W.	Well Number: MW-314
Facility License, Permit or Monitoring Number:	Grid Origin Location: Lat. ___ ___ ___ Long. ___ ___ ___ or	Date Well Installed (Start): 9-17-03
Type of Protective Cover: Above-Ground ☑ Flush-To-Ground ☐	St. Plane _____ m. N. _____ m. E.	Date Well Installed (Completed): 9-18-03 Grouted
Well Distance From Waste/Source Boundary	Section Location of Waste/Source: ___ ¼ of ___ ¼ of Sec. ___ T. ___ N.R. ___ ☐ E. ☐ W.	Well Installed By: (Person's Name & Firm) C&W ENV
Maximum Depth of Frost Penetration (estimated)	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known	Phil Bruce

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation _____ m. MSL
B. Well casing, top elevation _____ m. MSL
C. Land surface elevation _____ m. MSL
D. Surface seal, bottom _____ m. TOC or _____ m. MSL

16. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☑ CH ☑
Bedrock ☐

17. Sieve analysis attached? ☐ Yes ☑ No

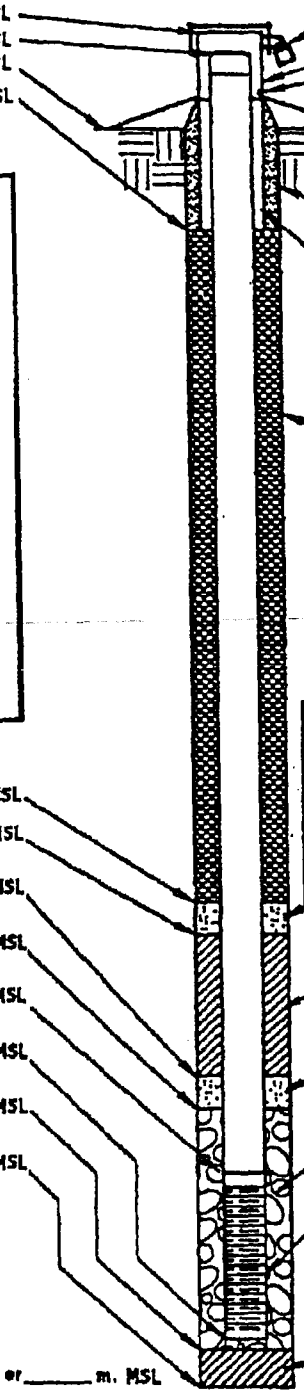
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☑ _____ Other ☐

19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☑

20. Drilling additives used? ☐ Yes ☑ No
Describe _____

21. Source of water (attach analysis):
None

E. Secondary filter, top — m. TOC or _____ m. MSL
F. Bentonite seal, top 5.0' m. TOC or _____ m. MSL
G. Secondary filter, top — m. TOC or _____ m. MSL
H. Primary filter, top 8.0' m. TOC or _____ m. MSL
I. Screen joint, top 10.0' m. TOC or _____ m. MSL
J. Well bottom 20.0' m. TOC or _____ m. MSL
K. Filter pack, bottom 20.0' m. TOC or _____ m. MSL
L. Borehole, bottom 20.0' m. TOC or _____ m. MSL
M. Borehole, diameter 8.0' mm.
N. O.D. well casing 2.37" mm.
O. I.D. well casing 2.00" mm.
P. 24-hr water level after completion _____ m. TOC or _____ m. MSL



1. Cap and lock? ☑ Yes ☐ No
2. Protective posts? ☑ Yes ☐ No
3. Protective casing:
a. Inside diameter: 4.0" mm.
b. Length: 5.0' m.
4. Drainage port(s) ☑ Yes ☐ No
5. Surface seal:
a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☑ _____ Other ☐
b. Annular space seal: Bentonite ☐ Cement ☐ _____ Other ☐
6. Material between well casing and protective casing: Bentonite ☑ Cement ☐ _____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
b. ___ Lbs/gal mud weight ... Bentonite-sand slurry ☐
c. ___ Lbs/gal mud weight ... Bentonite slurry ☐
d. ___ x Bentonite ... Bentonite-cement grout ☑
e. _____ m³ volume added for any of the above
f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☐
8. Centralizers ☐ Yes ☑ No
9. Secondary Filter ☐ Yes ☐ No
a. Volume added _____ m³ _____ Bags/Size
10. Bentonite seal: a. Bentonite ~~granules~~ Chips ☑
b. ☐ ¼in. ☑ ⅜in. ☐ ½in. Bentonite pellets ☐
c. _____ Other ☐
11. Secondary Filter ☐ Yes ☑ No
a. Volume added _____ m³ _____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
a. Morie 00 N
b. Volume added _____ m³ 3 Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☑ Flush threaded PVC schedule 80 ☐ _____ Other ☐
14. Screen material: PVC
a. Screen type: Factory cut ☑ Continuous slot ☐ _____ Other ☐
b. Manufacturer Buffalo Well Supply
c. Slot size: 0.010 in.
d. Slotted length: 10.0' m.
15. Backfill material (below filter pack): None ☑ _____ Other ☐

Figure 5-3. Schematic construction diagram of monitoring well

Well grouted on 9-18-03 in PM
Pro Tap Set on ——

HTRW DRILLING LOG

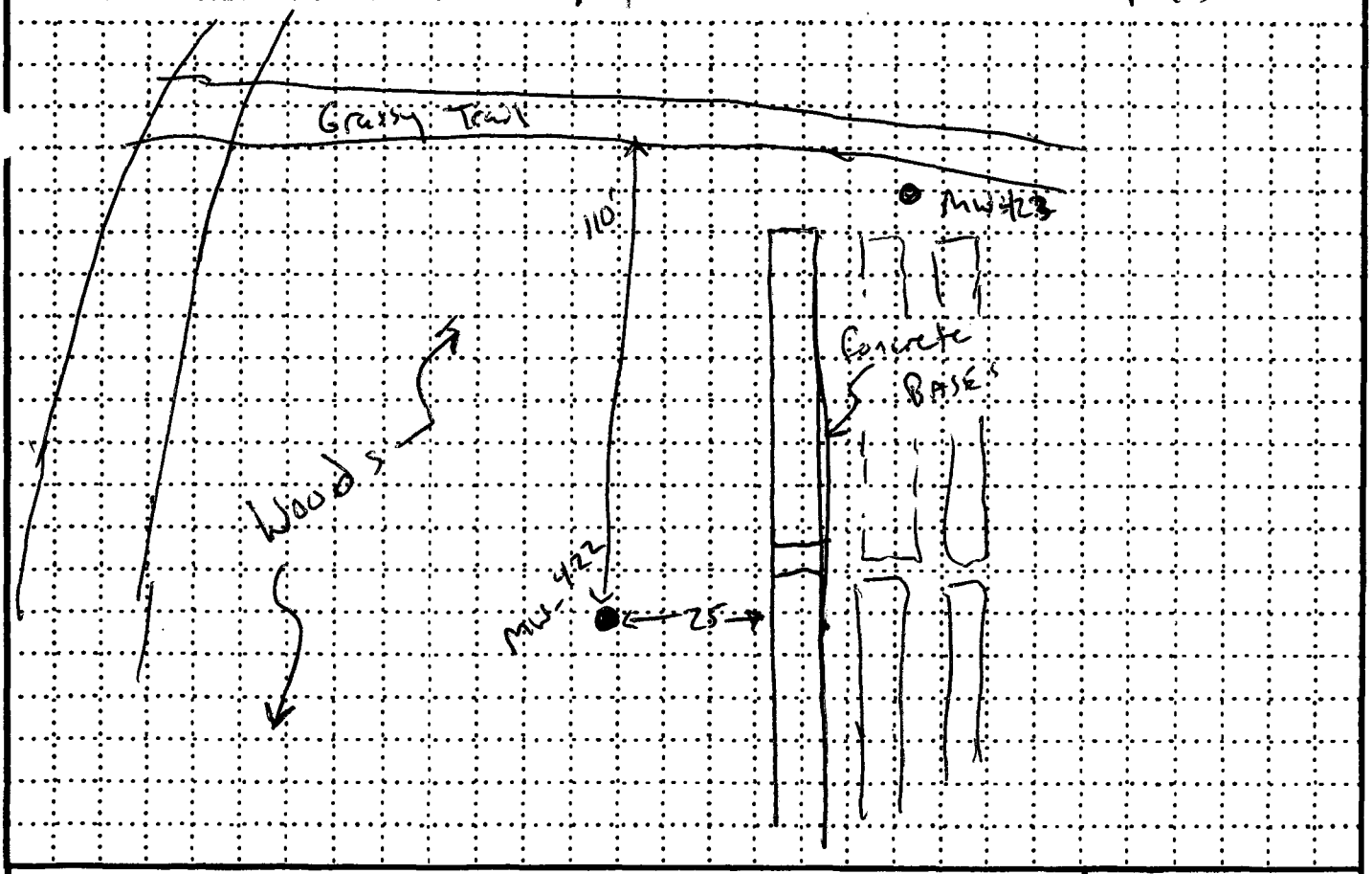
1. COMPANY NAME: MAXIM	DISTRICT: Buffalo	HOLE NUMBER: MW-422
	2. DRILLING SUBCONTRACTOR: C&W ENV.	SHEET 1 OF 4 SHEETS
3. PROJECT: NFSS	4. LOCATION	
5. NAME OF DRILLER: Phil Bench / Todd Bown	6. MANUFACTURER'S DESIGNATION OF DRILL	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME 4¼; 3" x 5' SAMPLER; SS Split Spoon; SS Bowls - Spoons; Liquinox Wash - PPE level D	8. HOLE LOCATION: SW of MW423	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9-17-03	11. DATE COMPLETED: 9-17-03
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED	
13. DEPTH DRILLED INTO ROCK: Ø	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Ø			Ø

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		

LOCATION SKETCH/COMMENTS N↑ SCALE: NTS



PROJECT: NFSS | HOLE NO.: MW-422

NOTE: Borehole MW-422 moved S due to obstruction

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-422

PROJECT: NFSS

INSPECTOR: C Wieman / MAX G

SHEET 2 OF 4 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REMOTE SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (9)
		Clayey Silt w/s. SAND & Gravel ~~Dk~~ Organics, roots, leaves DK brown, soft, moist (ML-CL)	RAD Bkg = 90 PID = 0.0 H_2S = 0.0 O_2 = 21.7 CO = 0.0	PID = 0.0 RAD ≤ Bkg	SS-MW 422-3608 0-6" 09:15		
	11						
	12	Silty Clay w/s. SAND & Gravel, Red Brown w/gray & white incl., stiff Dry (CL)		PID = 0.0 RAD ≤ Bkg			~24" Recovery
	13						
	14	Silty Clay w/s. SAND & gravel Gray w/ Red & Red brown Incl. Stiff - dry - moist (CL)		PID = 0.0 RAD ≤ Bkg			
	15			PID = 0.0 RAD ≤ Bkg			
	16			PID = 0.0 RAD ≤ Bkg			60" Recovery
	17	Silty w/gravel ~~Fine~~ SAND, fine grained, brown loose, (SM) 7-7.2'		PID = 0.0 RAD ≤ Bkg			
	18	Silty Clay w/s. SAND & Gravel Gray w/ Red brown & Red Incl Stiff, moist (CL)		PID = 0.0 RAD ≤ Bkg			
9.2	19	9.2					
	20	Silty SAND w/gravel, fine to med grained, brown dry (SM)		PID = 0.0 Rad ≤ Bkg			

PROJECT: NFSS

HOLE NO. MW-422

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS-MW422-3608-0-6"
SB-MW 422-~~36~~ 3609

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-422

PROJECT: NFSS | INSPECTOR: CAW/MAG | SHEET 3 OF 4 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	REMOTE SAMPLE OR CORE BOX NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Clay with Silt, s SAND & gravel, brown to dk red brown stiff - dry to moist (CL)	H_2S=0.0 O_2=21.9 CO=0.0 LEL=0.0	PID=0.0 RAD≤BK			
	11			PID=0.0 RAD≤Bkg			60" Recovery
	12	Light gray ~~reddish~~ glaying 12.5 to 14.5'		PID=0.0 RAD≤Bkg			
	13	softer/moister w/depth		PID=0.0 RAD≤Bkg			
	14			PID=0.0 RAD≤Bkg			
	15				SB MW-422 15-0 @ 3609	LAB @ 15.0'	
	16				10⁴⁰		
	17	Clay w/ Silt, s SAND & gravel, brown to dk red brown, stiff, moist (CL)					Cobble Layer @ 17-19½'
	18		H_2S=0.0 O_2=21.9 CO=0.0 LEL=0.0				
	19	to 19.5					
19.5		Clay, gray to red gray Soft moist-wet (CH)		PID=0.0 RAD≤Bkg			split spoon 19-21
	20						

PROJECT: NFSS | EOB @ 20.0 | HOLE NO. MW-422

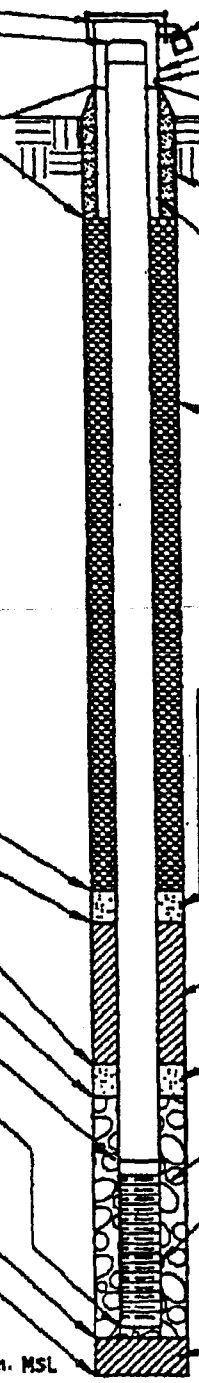
ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Sheet 4 of 4

Facility/Project Name: NFSS	Local Grid Location of Well: ☐ N. ☐ S. ____ m. ☐ E. ☐ W. ____ m.	Well Number: MW422
Facility License, Permit or Monitoring Number	Grid Origin Location: Lat. ____ Long. ____ or St. Plane ____ m. N. ____ m. E.	Date Well Installed (Start): 9-17-03 1050
Type of Protective Cover: Above-Ground ☑ Flush-To-Ground ☐	Section Location of Waste/Source: ____ ¼ of ____ ¼ of Sec. ____ T. ____ N. R. ____ ☐ E. ☐ W.	Date Well Installed (Completed): 1
Well Distance From Waste/Source Boundary	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known	Well Installed By: (Person's Name & Firm) Phil Bence C&W
Maximum Depth of Frost Penetration (estimated)		

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation ____ m. MSL
B. Well casing, top elevation ____ m. MSL
C. Land surface elevation ____ m. MSL
D. Surface seal, bottom ____ m. TOC or ____ m. MSL



1. Cap and lock? ☑ Yes ☐ No
2. Protective posts? ☑ Yes ☐ No
3. Protective casing:
   a. Inside diameter: 4.0 mm.
   b. Length: 5.0 m.
4. Drainage port(s) ☑ Yes ☐ No
5. Surface seal:
   a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☐ ____ Other ☐
   b. Annular space seal: Bentonite ☑ Cement ☐ ____ Other ☐
6. Material between well casing and protective casing: Bentonite ☑ Cement ☐ ____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
   b. ____ Lbs/gal mud weight ... Bentonite-sand slurry ☐
   c. ____ Lbs/gal mud weight ... Bentonite slurry ☐
   d. ____ x Bentonite ... Bentonite-cement grout ☑
   e. ____ m³ volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☑
8. Centralizers ☐ Yes ☑ No
9. Secondary Filter ☐ Yes ☑ No
   a. Volume added ____ m³ ____ Bags/Size
10. Bentonite seal: a. Bentonite ~~granular~~ Chips ☑
    b. ☐ ¼in. ☑ ⅜in. ☐ ½in. Bentonite pellets ☐
    c. ____ Other ☐
11. Secondary Filter ☐ Yes ☐ No
    a. Volume added ____ m³ ____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
    a. Morie #00N
    b. Volume added ____ m³ 3 Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☑ Flush threaded PVC schedule 80 ☐ ____ Other ☐
14. Screen material: PVC
    a. Screen type: Factory cut ☑ Continuous slot ☐ ____ Other ☐
    b. Manufacturer Buffalo Well Products
    c. Slot size: 0.010 in.
    d. Slotted length: 10 m.
15. Backfill material (below filter pack): None ☑ ____ Other ☐

16. USCS classification of soil near screen:
    GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
    SM ☐ SC ☐ ML ☐ MH ☐ CL ☑ CH ☑
    Bedrock ☐
17. Sieve analysis attached? ☐ Yes ☑ No
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☑ ____ Other ☐
19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☑
20. Drilling additives used? ☐ Yes ☑ No
    Describe ____
21. Source of water (attach analysis): N/A

E. Secondary filter, top — m. TOC or ____ m. MSL
F. Bentonite seal, top 5.0 m. TOC or ____ m. MSL
G. Secondary filter, top — m. TOC or ____ m. MSL
H. Primary filter, top 8.0 m. TOC or ____ m. MSL
I. Screen joint, top 10.0 m. TOC or ____ m. MSL
J. Well bottom 20.0' m. TOC or ____ m. MSL
K. Filter pack, bottom 20.0' m. TOC or ____ m. MSL
L. Borehole, bottom 20.0' m. TOC or ____ m. MSL
M. Borehole, diameter 8" mm.
N. O.D. well casing 2.37 mm.
O. I.D. well casing 2.00 mm.
P. 24-hr water level after completion ____ m. TOC or ____ m. MSL

Figure 5-3. Schematic construction diagram of monitoring well

HTRW DRILLING LOG

1. COMPANY NAME: Maxim Tech	2. DRILLING SUBCONTRACTOR: E&W ENV	DISTRICT: Buffalo
		HOLE NUMBER: MW 423
		SHEET 1 OF 4 SHEETS

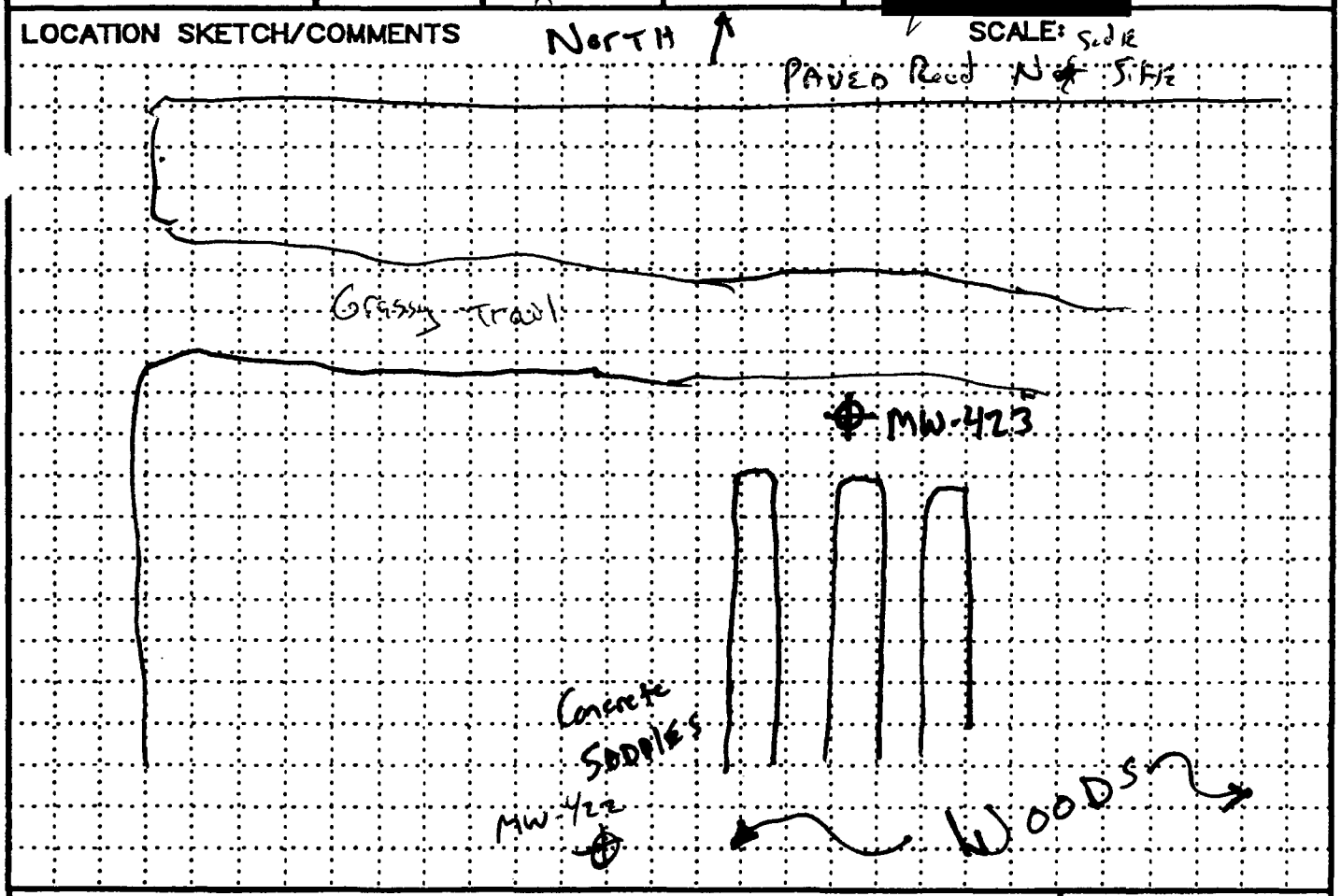
3. PROJECT: NFSS	4. LOCATION
5. NAME OF DRILLER: Phil Bence / Todd Bown	6. MANUFACTURER'S DESIGNATION OF DRILL: CME
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME 4¼ HSA; 3" SAMPLER; SS. Split Spoon; DI Water / Liquinox Decon; SS. Bowls	8. HOLE LOCATION: Lewiston NY
	9. SURFACE ELEVATION
	10. DATE STARTED: 9-16-03 1550 / 11. DATE COMPLETED: 9-16-03
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED: ~15'
13. DEPTH DRILLED INTO ROCK: X	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			0

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. [redacted]
		X		

LOCATION SKETCH/COMMENTS



PROJECT: NFSS	HOLE NO.: MW-23

Note: Bore hole moved 10' S from original staked location due to tree obstruction for drill Rig

HTRW DRILLING LOG ~~(CONTINUATION SHEET)~~

HOLE NUMBER: MW-423

PROJECT: NFSS | INSPECTOR: C Wieman / Max G | SHEET 2 OF 4 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SOIL OR ROCK SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Clayey Silt w/ tr SAND (roots etc) Gravel, organics - dk brown medium moist (ML-CL)	PID Bkgr - 0.0 BZ H_2S = 0.0 O_2 = 21.7 CO = 0.0 LEL = 0.0	PID 0.0 RAD Bkg - 134	SS-MW 423 3611 0-6"		
	1	Clay Silty w/ SAND, S. gravel Brown w/ Red Brown mod to Stiff, dry (ML→CL)		PID = 0.0 RAD ≤ Bkg			
	2	↓ to 3.5					
	3			PID = 0.0 RAD ≤ Bkg			
	4	Silty Clay w/ S. SAND & gravel Gray w/ Red to Red brown w/ red Inclusions Stiff, dry (CL)	PID = 0.0 H_2S = 0.0 O_2 = 21.7 CO = 0.0 LEL = 0.0	PID = 0.0 RAD ≤ Bkg			
	5	Silty Clay w/ TRACE SAND S. gravel - Red to Red Brown w/ gray, Stiff w/ Red Incl. dry to moist (CL)		PID = 0.0 RAD ≤ Bkg			
	6	↓		PID = 0.0 RAD ≤ Bkg			
	7	(SAME)		PID = 0.0 RAD ≤ Bkg			
	8	↓	PID = 0.0 H_2S = 0.0 O_2 = 21.8 CO = 0.0 LEL = 0.0	PID = 0.0 RAD ≤ Bkg			
	9	more moist w/ depth Silty CLAY w/ TRACE SAND S Gravel, Red Brown to Red w/ Red Incl. w/ Gray, medium moist (CL)		PID = 0.0 RAD ≤ Bkg			
	10			PID = 0.0 RAD ≤ Bkg			

PROJECT: NFSS | HOLE NO.: MW-423

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-423

PROJECT: NFSS -

INSPECTOR:

SHEET 3 OF 4 SHEETS

ELEV. (4)	DEPTH (b)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REMOVED SAMPLE OR CORE FOR ID. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (h)
		Silty Clay w/ Some SAND, grav=1 Red brown to Red w/gray Incl. Med to Soft moist (CL) Softer w/ Depth	PID = 0.0 H_2S = 0.0 O_2 = 21.8 CO = 0.0 LEL = 0.0	RAD ≤ Bkg PID = 0.0			
	12			RAD ≤ Bkg PID = 0.0			
	14			RAD ≤ Bkg PID = 0.0	SB-MW 423 9612 1635		LAB SAMPLE @ 15.0
14.5							
	16	Clay, Gray to red gray Soft, moist - wet (CH) Softer w/ Depth		PID = 0.0 RAD ≤ Bkg			Down Rock 18" Recovery Gobble Layer @ 16.5-17'
	18						
20	20	EOB @ 20.0 Set Well @ 20.0 @ 1650 ON 9-16-03		H_2S = 0.0 CO_2 = 22.1 CO = 0.0 LEL = 0.0 RAD ≤ Bkg			

PROJECT: NFSS

HOLE NO.: MW-423

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Well grouted on 9-18-03 in PM

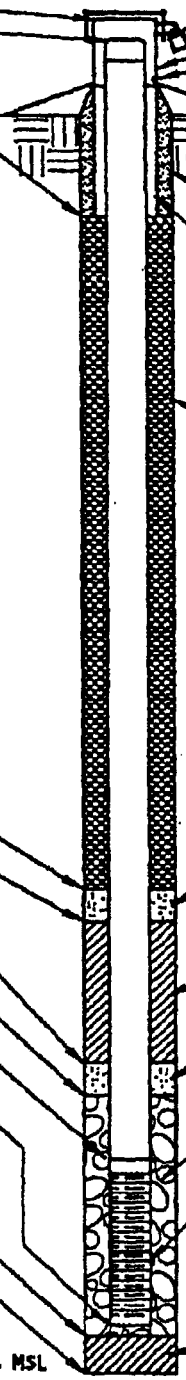
Protop set on _____

Sheet 4 of 4

Facility/Project Name: NFSS	Local Grid Location of Well: ☐ N. _____ m. ☐ S. _____ m. ☐ E. ☐ W.	Well Number: MW-423
Facility License, Permit or Monitoring Number	Grid Origin Location: Lat. ___ ___ ___ Long. ___ ___ ___ or St. Plane ___ m. N. ___ m. E.	Date Well Installed (Start): 9-16-03 13:30
Type of Protective Cover: Above-Ground ☑ Flush-To-Ground ☐	Section Location of Waste/Source: ___ ¼ of ___ ¼ of Sec. ___ T. ___ N.R. ___ ☐ E. ☐ W.	Date Well Installed (Completed): 9-16-03 17:00
Well Distance From Waste/Source Boundary	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known	Well Installed By: (Person's Name & Firm) C&W ENV
Maximum Depth of Frost Penetration (estimated): N/A		

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation _____ m. MSL
B. Well casing, top elevation _____ m. MSL
C. Land surface elevation _____ m. MSL
D. Surface seal, bottom 8.0 m. TOC or _____ m. MSL



1. Cap and lock? ☑ Yes ☐ No
2. Protective posts? ☑ Yes ☐ No
3. Protective casing:
   a. Inside diameter: 4.0" mm.
   b. Length: 5.0 m.
4. Drainage port(s) ☐ Yes ☐ No
5. Surface seal:
   a. Cap: Gravel blanket ☐, Bentonite ☐, Concrete ☐, _____ Other ☐
   b. Annular space seal: Bentonite ☑, Cement ☐, _____ Other ☐
6. Material between well casing and protective casing: Bentonite ☑, Cement ☐, _____ Other ☐
7. Annular space seal: 3/8 Chipped a. Granular Bentonite ☑
   b. ___ Lbs/gal mud weight... Bentonite-sand slurry ☐
   c. ___ Lbs/gal mud weight ..... Bentonite slurry ☐
   d. ___ x Bentonite ..... Bentonite-cement grout ☐
   e. _____ m³ volume added for any of the above
   f. How installed: Tremie ☐, Tremie pumped ☐, Gravity ☐
8. Centralizers ☐ Yes ☐ No
9. Secondary Filter ☐ Yes ☐ No
   a. Volume added ___ m³ _____ Bags/Size
10. Bentonite seal: a. Bentonite granules ☐
    b. ☐ ¼in. ☐ ⅜in. ☐ ½in. Bentonite pellets ☐
    c. _____ Other ☐
11. Secondary Filter ☐ Yes ☐ No
    a. Volume added ___ m³ 1/2 ft Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
    a. Morie # 00N
    b. Volume added ___ m³ 3 Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☑, Flush threaded PVC schedule 80 ☐, _____ Other ☐
14. Screen material: PVC
    a. Screen type: Factory cut ☑, Continuous slot ☐, _____ Other ☐
    b. Manufacturer Buffalo Well Products
    c. Slot size: 0.010 in.
    d. Slotted length: 10 ft m.
15. Backfill material (below filter pack): None ☑, _____ Other ☐

16. USCS classification of soil near screen:
    GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
    SM ☐ SC ☐ ML ☐ MH ☐ CL ☑ CH ☑
    Bedrock ☐
17. Sieve analysis attached? ☐ Yes ☑ No
18. Drilling method used: Rotary ☐, Hollow Stem Auger ☑, _____ Other ☐
19. Drilling fluid used: Water ☐, Air ☐, Drilling Mud ☐, None ☑
20. Drilling additives used? ☐ Yes ☑ No
    Describe _____
21. Source of water (attach analysis): N/A

E. Secondary filter, top — m. TOC or _____ m. MSL
F. Bentonite seal, top 5.0 m. TOC or _____ m. MSL
G. Secondary filter, top 6.0 m. TOC or _____ m. MSL
H. Primary filter, top 8.0' m. TOC or _____ m. MSL
I. Screen joint, top 10.0 m. TOC or _____ m. MSL
J. Well bottom 20.0 m. TOC or _____ m. MSL
K. Filter pack, bottom 20.0 m. TOC or _____ m. MSL
L. Borehole, bottom 20.0 m. TOC or _____ m. MSL
M. Borehole, diameter 8" mm.
N. O.D. well casing 2.37" mm.
O. I.D. well casing 2.00" mm.
P. 24-hr water level after completion _____ m. TOC or _____ m. MSL

6' bentonite above Filter SAND
Chipped

Figure 5-3. Schematic construction diagram of monitoring well

N road

9-22-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-424

PROJECT: NFSS

INSPECTOR: CAW/TL

SHEET 1 OF 1 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GRAPHIC SAMPLE NO. OR CORE RUN NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		S.ity Clay loam topsoil roots organics etc	PID= RAD≤0.0	RAD Bkg=200 in BZ PID=0.0			Sample SS-MW 424-3620 @ 1.5 BGS
0.3	1	Clay w/ s.ilt, s. sand & gravel Brown w/ brown grey stiff, dry (CL)	PID= RAD≤0.0				
	2		PID=0.0 RAD≤0.0				60" recovery
	3		PID=0.0 RAD≤Bkg				
	4	Clay w/silt, s. sand & Gravel Brown, red brown w/grey stiff, dry to moist (CL)	PID=0.0 RAD≤Bkg				
	5						
	6		PID=0.0 RAD≤Bk				58" recovery
	7		PID=0.0 RAD≤Bkg				
	8		PID=0.0 RAD≤Bkg				
8.5	9	Silty sand, fine grained brown, dry-moist (SM)	PID=0.0 RAD≤Bkg				
9.5	10	Clay, s. sand & gravel ~~Brown, Red Br w/ grey~~ soft/moist (CL)	PID=0.0 RAD≤Bkg				

PROJECT: NFSS

HOLE NO.: MW-424

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-MW424- 3620

SB MW 424- -3621

9-22-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-424

PROJECT: NFSS | INSPECTOR: CAW/TL | SHEET 2 OF 2 SHEETS

BLOW (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REMOTE SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Clay w/s. sand & gravel brown - red brown, medium moist (CL)	RAD ≤ Bkg PID = 0.0	$A_2S = 0$ $O_2 = 22.1$ CO = 0 LEL = 0 IN BZ			
11.0	11	Clay - ~~Gr~~ / Trace sand & gravel, soft moist (CH)	RAD ≤ Bkg PID = 0.0				
	12	Fine SAND with silt & gravel brown - to ~~brown red~~ gray brown, dense moist (SM)	RAD ≤ Bkg PID = 0.0				49% recovery
	13		RAD ≤ Bkg PID = 0.0				
	14						Auger Refusal @ 14.5 Proceed w/Split Spoons
55		~~No sample~~	RAD < Bkg PID = 0.0		SB-MW-424-14.0-3621		Sample @ 14.0 @ 1532
	15	SAND w/silt, fn grained w/s Gravel brown to gray brown Dense moist to wet (SM)	PID = 0.0 RAD ≤ BK				
	16		PID = 0.0 RAD ≤ Bkg				
55	17		PID = 0.0 RAD ≤ Bkg				
	18		PID = 0.0 RAD ≤ Bkg				
55	19		RAD ≤ Bkg PID = 0.0				
	20		PID = 0.0 RAD ≤ Bkg				

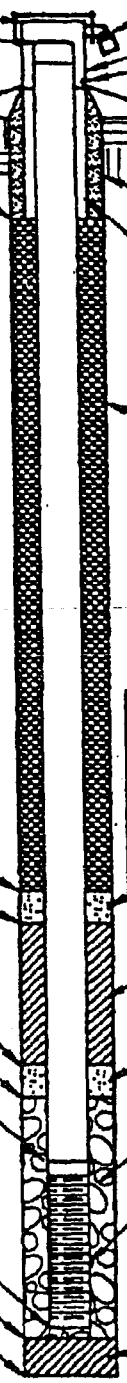
PROJECT: NFSS | HOLE NO. MW 424

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Facility/Project Name: NFGS	Local Grid Location of Well: ☐ N. ☐ S. _____ m. ☐ E. ☐ W. _____ m.	Well Number: MW 424
Facility License, Permit or Monitoring Number	Grid Origin Location: Lat. ___ ___ ___ Long. ___ ___ ___ or	Date Well Installed (Start): 9-22-03
Type of Protective Cover: Above-Ground ☑ Flush-To-Ground ☐	St. Plane _____ m. N. _____ m. E.	Date Well Installed (Completed): 9-22-03
Well Distance From Waste/Source Boundary	Section Location of Waste/Source: ___ ¼ of ___ ¼ of Sec. ___ T. ___ N.R. ___ ☐ E. ☐ W.	Well Installed By: (Person's Name & Firm): C&E ENV.
Maximum Depth of Frost Penetration (estimated): 48"	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known	Ph. I B / TOND

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation _____ m. MSL
B. Well casing, top elevation _____ m. MSL
C. Land surface elevation _____ m. MSL
D. Surface seal, bottom _____ m. TOC or _____ m. MSL



1. Cap and lock? ☑ Yes ☐ No
2. Protective posts? ☑ Yes ☐ No
3. Protective casing:
   a. Inside diameter: 4" mm.
   b. Length: 5 m.
4. Drainage port(s) ☐ Yes ☐ No
5. Surface seal:
   a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☐ _____ Other ☐
   b. Annular space seal: Bentonite ☐ Cement ☐ Cement/Bent Grout Other ☐
6. Material between well casing and protective casing: Bentonite ☐ Cement ☐ _____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
   b. ___ Lbs/gal mud weight ... Bentonite-sand slurry ☐
   c. ___ Lbs/gal mud weight ... Bentonite slurry ☐
   d. ___ x Bentonite ... Bentonite-cement grout ☑
   e. _____ m³ volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☐
8. Centralizers ☐ Yes ☐ No
9. Secondary Filter ☐ Yes ☐ No
   a. Volume added ___ m³ _____ Bags/Size
10. Bentonite seal: a. Bentonite granules ☐
    b. ☐ ¼in. ☑ ⅜in. ☐ ½in. Bentonite pellets ☐
    c. BENT Chips Other ☐
11. Secondary Filter ☐ Yes ☑ No
    a. Volume added ___ m³ _____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
    a. MORIE OON
    b. Volume added ___ m³ 3 Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☐ Flush threaded PVC schedule 80 ☐ _____ Other ☐
14. Screen material: PVC
    a. Screen type: Factory cut ☐ Continuous slot ☐ Buffalo Well Pack Other ☐
    b. Manufacturer _____
    c. Slot size: 0.010 in.
    d. Slotted length: 10' m.
15. Backfill material (below filter pack): None ☐ _____ Other ☐

16. USCS classification of soil near screen:
    GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
    SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☑
    Bedrock ☐
17. Sieve analysis attached? ☐ Yes ☑ No
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☑ _____ Other ☐
19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☑
20. Drilling additives used? ☐ Yes ☐ No
    Describe _____
21. Source of water (attach analysis):
    None
    DI for chips

E. Secondary filter, top — m. TOC or _____ m. MSL
F. Bentonite seal, top 4.0 m. TOC or _____ m. MSL
G. Secondary filter, top — m. TOC or _____ m. MSL
H. Primary filter, top 6.0 m. TOC or _____ m. MSL
I. Screen joint, top 10.0 m. TOC or _____ m. MSL
J. Well bottom 20.0 m. TOC or _____ m. MSL
K. Filter pack, bottom 20.0 m. TOC or _____ m. MSL
L. Borehole, bottom 20.0 m. TOC or _____ m. MSL
M. Borehole, diameter 8" mm.
N. O.D. well casing 2.37" mm.
O. I.D. well casing 2.0 mm.
P. 24-hr water level after completion _____ m. TOC or _____ m. MSL

Figure 5-3. Schematic construction diagram of monitoring well

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: MW-860
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 4 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: E of IWCS	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/21/03	11. DATE COMPLETED: 9/21/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ≈14.0'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 23.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
		✓		

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: MW-860 | SHEET 2 OF 4 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	SAMPLE NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Drk brn loam w/roots	0VM	Rad			
	1	Brn silty clay w/Fe staining and some 1" gravel	0.00	Bkgd			
		dry stiff	0.00				
	2						
	3	Brn-gray mottled silty clay w/Fe staining and some small gravel stiff dry	0.00				5.0/5.0
	4		0.00				
	5	(CL)					
			0.00	Bkgd			
	6						
	7		0.00				5.0/4.6
	8		0.00				
	9						
		moist med stiff	0.00				

PROJECT: NFSS | HOLE NO.: MW-860

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-860

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 4 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REPRESENTATIVE SAMPLE NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		cont	OVM	Rad			
		gray-brn mottled silty clay		Bkgd			
	11	med stiff moist	0.00				
			0.00				
	12						5.0/5.0
			0.00				
	13	more gray more moist					
			0.00				
	14						
		Brn gravelly sand coarse, poorly sorted saturated					SB-MW860-15.0-3597 14.5-15.0
	15						(0800)
			0.00	Rad			
	16			Bkgd			
			0.00				5.0/5.0
	17						
		Gray clay soft very moist plastic					
	18		0.00				
	19		0.00				

PROJECT: NFSS

HOLE NO.: MW-860

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW 860

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 4 OF 4 SHEETS

ELEV. (4)	DEPTH (8)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	GEOTECH SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
	21						3.0/0.0
	22						no recovery assume due to soft clay
	23	TD 23.0					set well at 23.0
	24						
	25						

PROJECT: NFSS

HOLE NO.: MW 860

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

Facility/Project Name: NFSS	Local Grid Location of Well: ☐ N. ____ m. ☐ S. ____ m. ☐ E. ☐ W.	Well Number: MW 860
Facility License, Permit or Monitoring Number	Grid Origin Location: Lat. ___ ___ ___ Long. ___ ___ ___ or St. Plane ___ m. N. ___ m. E.	Date Well Installed (Start): 9/21/03
Type of Protective Cover: Above-Ground ☒ Flush-To-Ground ☐	Section Location of Waste/Source: ___ ¼ of ___ ¼ of Sec. ___ T. ___ N. R. ___ ☐ E. ☐ W.	Date Well Installed (Completed): 9/21/03
Well Distance From Waste/Source Boundary	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Well Installed By: (Person's Name & Firm) Jeff Grant, Subsurface Drilling Solutions
Maximum Depth of Frost Penetration (estimated)		

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation ____ m. MSL
B. Well casing, top elevation ____ m. MSL
C. Land surface elevation ____ m. MSL
D. Surface seal, bottom ____ m. TOC or ____ m. MSL

16. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☒
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

17. Sieve analysis attached? ☐ Yes ☒ No

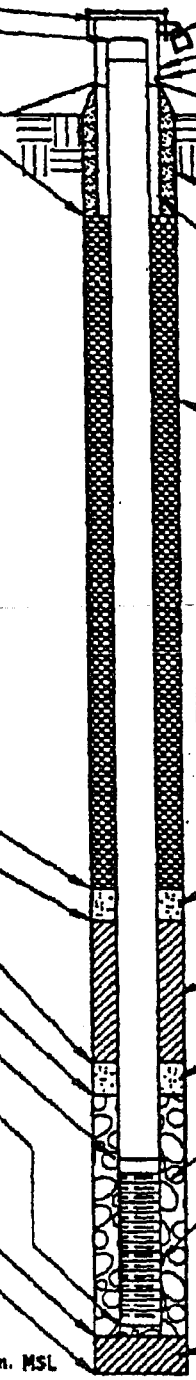
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☒ ____ Other ☐

19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☒

20. Drilling additives used? ☐ Yes ☒ No
Describe ____

21. Source of water (attach analysis):
none

E. Secondary filter, top — m. TOC or ____ m. MSL
F. Bentonite seal, top 2.0 m. TOC or ____ m. MSL
G. Secondary filter, top — m. TOC or ____ m. MSL
H. Primary filter, top 10.0 m. TOC or ____ m. MSL
I. Screen joint, top 12.75 m. TOC or ____ m. MSL
J. Well bottom 23.0 m. TOC or ____ m. MSL
K. Filter pack, bottom 23.00 m. TOC or ____ m. MSL
L. Borehole, bottom 23.0 m. TOC or ____ m. MSL
M. Borehole, diameter 6.0" mm.
N. O.D. well casing 2.37" mm.
O. I.D. well casing 2.0" mm.
P. 24-hr water level after completion 16.48 m. TOC or ____ m. MSL



1. Cap and lock? ☒ Yes ☐ No
2. Protective posts? ☐ Yes ☒ No
3. Protective casing:
a. Inside diameter: 4" mm.
b. Length: 5' m.
4. Drainage port(s) ☒ Yes ☐ No
5. Surface seal:
a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☒ ____ Other ☐
b. Annular space seal: Bentonite ☐ Cement ☒ ____ Other ☐
6. Material between well casing and protective casing: Bentonite ☐ Cement ☒ ____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
b. ____ Lbs/gal mud weight ... Bentonite-sand slurry ☐
c. ____ Lbs/gal mud weight ... Bentonite slurry ☐
d. ____ x Bentonite ... Bentonite-cement grout ☒
e. ____ m^3 volume added for any of the above
f. How installed: Tremie ☒ Tremie pumped ☐ Gravity ☐
8. Centralizers ☐ Yes ☒ No
9. Secondary Filter ☐ Yes ☒ No
a. Volume added ____ m^3 ____ Bags/Size
10. Bentonite seal: a. Bentonite granules ☐
b. ☐ ¼in. ☒ ⅜in. ☐ ½in. Bentonite pellets ☒
c. ____ Other ☐
11. Secondary Filter ☐ Yes ☒ No
a. Volume added ____ m^3 ____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
a. Morie OON
b. Volume added ____ m^3 6x50# Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ ____ Other ☐
14. Screen material: PVC
a. Screen type: Factory cut ☒ Continuous slot ☐ ____ Other ☐
b. Manufacturer Buffalo Well Supplies
c. Slot size: 0.010 in.
d. Slotted length: 10 m.
15. Backfill material (below filter pack): None ☒ ____ Other ☐

Figure 5-3. Schematic construction diagram of monitoring well

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: MW 861
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 6 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: E side IWCS	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 9/20/03	11. DATE COMPLETED: 9/20/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 34'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 42'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	MW 861

9/20/03

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: MW 861 | SHEET 2 OF 6 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	BOX OR SAMPLE NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Drk brn loam w/roots	OVM	Rad			SS-MW861-3599
	1	Brn silty clay w/Fe staining and some 1" gravel dry stiff (CL)	0.00	Bkgd			0-0.5' (945)
	2		0.00				
	3	Brn-gray mottled silty clay w/Fe staining and some small gravel dry stiff	0.00				
	4						
			0.00				
	5						
			0.00	Bkgd			
	6						
	7	softer more silt more moist	0.00				
	8		0.00				
	9	Brn Gray gravelly sand course sand gravel to 1" saturated (GL)	0.00				

PROJECT: NFSS | HOLE NO.: MW 861

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW 861

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 6 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (2)	MONITOR SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Cont Brn-gray coarse gravelly Sand	OVM	Rad Bkgd			
	11	Brn-gray mottled silty clay meds. moist (CL)	0.00				5.0/5.0
	12		0.00				
	13	more gray	0.00				
		Gray gravelly sand (GC)					
	14	Gray clay soft wet plastic	0.00				
	15						
	16	(CL)		Bkgd			5.0/0.5
	17		0.00				Poor recovery probably due to soft gray clay
	18						
	19						

PROJECT: NFSS

HOLE NO.: MW 861

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW 861

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 4 OF 6 SHEETS

ELEV. (1)	DEPTH (2)	DESCRIPTION OF MATERIALS (3)	FIELD SCREENING RESULTS (4)	SOIL/CORE SAMPLE OR CORE BOX NO. (5)	ANALYTICAL SAMPLE NO. (6)	BLOW COUNT (7)	REMARKS (8)
		cont Gray clay soft wet plastic	ovm	Red			
	21		0.00	Bkgd			5.0/5.0
		less soft (CL)					
	22		0.00				
	23		0.00				
		silt lens					
	24	Gray clay soft wet plastic	0.00				
	25						
			0.00	Bkgd			
	26						5.0/3.1
	27		0.00				
	28		0.00				
	29		0.00				

PROJECT: NFSS

HOLE NO: MW861

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-861

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 5 OF 6 SHEETS

ELEV. (1)	DEPTH (2)	DESCRIPTION OF MATERIALS (3)	FIELD SCREENING RESULTS (4)	REMOVED SAMPLE OR CORE BOX NO. (5)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (8)	REMARKS (9)
		Cont Gray clay soft wet plastic	OVM	Rad			
	31		0.00	Bkgd			5.0/5.0
	32		0.00				
	33		0.00				SB-MW861- 34.5-3596 34'-34.5' 1015
	34	Saturated soft silt, Red-brn silty clay w/ some poorly sorted gravel and sand 1" to 4"	0.00				
	35		0.00	Bkgd			
	36	very soft saturated (CL-GC)	0.00				5.0/4.2
	37		0.00				
	38		0.00				SB-MW-861- 38.0-3600 (1100) 37.5-38.0'
	39	med stiff moist	0.00				

PROJECT: NFSS

HOLE NO.: MW 861

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-861

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 6 OF 6 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	REC/TCR SAMPLE OR CORE BOX NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		cont Red-brn silty clay w/some poorly sorted gravel and sand stiff moist	0.00	Bt gd			2' split spoon
	41	Gray weathered siltstone claystone	0.00				2.0/1.6
	42	TD 42.0'					Auger to 42' set well screen 32'-42'
	43						
	44						
	45						

PROJECT: NFSS

HOLE NO. MW-861

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

Facility/Project Name: NFSS

Local Grid Location of Well: ☐ N. ____ m. ☐ S. ____ m. ☐ E. ☐ W.

Well Number: MW-861

Facility License, Permit or Monitoring Number:

Grid Origin Location: Lat. ____ Long. ____ or St. Plane ____ m. N. ____ m. E.

Date Well Installed (Start): 9/20/03

Type of Protective Cover: Above-Ground ☒ Flush-To-Ground ☐

Date Well Installed (Completed): 9/20/03

Well Distance From Waste/Source Boundary:

Section Location of Waste/Source: ____ ¼ of ____ ¼ of Sec. ____ T. ____ N.R. ____ ☐ E. ☐ W.

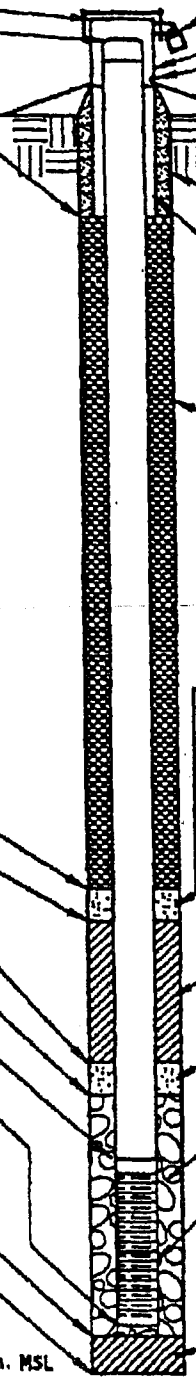
Well Installed By: (Person's Name & Firm) Jeff Grant, Subsurface Drilling Solutions

Maximum Depth of Frost Penetration (estimated):

Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation ____ m. MSL
B. Well casing, top elevation ____ m. MSL
C. Land surface elevation ____ m. MSL
D. Surface seal, bottom ____ m. TOC or ____ m. MSL



1. Cap and lock? ☒ Yes ☐ No
2. Protective posts? ☐ Yes ☒ No
3. Protective casing:
   a. Inside diameter: 4" ~~mm.~~
   b. Length: 5' m.
4. Drainage port(s) ☒ Yes ☐ No
5. Surface seal:
   a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☒ ____ Other ☐
   b. Annular space seal: Bentonite ☐ Cement ☐ ____ Other ☐
6. Material between well casing and protective casing: Bentonite ☐ Cement ☐ ____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
   b. ____ Lbs/gal mud weight... Bentonite-sand slurry ☐
   c. ____ Lbs/gal mud weight..... Bentonite slurry ☐
   d. ____ x Bentonite ..... Bentonite-cement grout ☒
   e. ____ m.³ volume added for any of the above
   f. How installed: Tremie ☒ Tremie pumped ☐ Gravity ☐
8. Centralizers ☐ Yes ☒ No
9. Secondary Filter ☐ Yes ☒ No
   a. Volume added ____ m³ ____ Bags/Size
10. Bentonite seal: a. Bentonite granules ☐
    b. ☐ ¼in. ☒ ⅜in. ☐ ½in. Bentonite pellets ☒
    c. ____ Other ☐
11. Secondary Filter ☐ Yes ☒ No
    a. Volume added ____ m³ ____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
    a. Morie 00N
    b. Volume added ____ m³ 6.5 x 50# Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ ____ Other ☐
14. Screen material: PVC
    a. Screen type: Factory cut ☒ Continuous slot ☐ ____ Other ☐
    b. Manufacturer: Buffalo Well Supplies
    c. Slot size: 0.010 in.
    d. Slotted length: 10' m.
15. Backfill material (below filter pack): None ☒ ____ Other ☐

16. USCS classification of soil near screen:
    GP ☐ GM ☐ GC ☒ GW ☐ SW ☐ SP ☐
    SM ☐ SC ☐ ML ☐ MH ☐ CL ☒ CH ☐
    Bedrock ☐
17. Sieve analysis attached? ☐ Yes ☒ No
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☒ ____ Other ☐
19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☒
20. Drilling additives used? ☐ Yes ☒ No
    Describe ____
21. Source of water (attach analysis): none

E. Secondary filter, top — m. TOC or ____ m. MSL
F. Bentonite seal, top 26.0' m. TOC or ____ m. MSL
G. Secondary filter, top — m. TOC or ____ m. MSL
H. Primary filter, top 29.0' m. TOC or ____ m. MSL
I. Screen joint, top 32.25 m. TOC or ____ m. MSL
J. Well bottom 42.25 m. TOC or ____ m. MSL
K. Filter pack, bottom 42.0' m. TOC or ____ m. MSL
L. Borehole, bottom 42.0' m. TOC or ____ m. MSL
M. Borehole, diameter 8.0" mm.
N. O.D. well casing 2.37" mm.
O. I.D. well casing 2.00" mm.
P. 24-hr water level after completion 8.0' m. TOC or ____ m. MSL

Figure 5-3. Schematic construction diagram of monitoring well

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW 862

PROJECT: NFSS | INSPECTOR: CAW/TL | SHEET 1 OF 2 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	CONTROL SAMPLE PID CORR FOR HE (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		Silty Clay loam Topsoil organic, black soft moist	PID=0 RAD≤BKG	RAD BKG=150 PID=0.0	Soil Sample SS-MW 862-3602 @ 13:30		Lab Sample @ 13:30
.7		~~Silt with Clay~~					
	1	Clay w/silt, sand, gr Gray, grey brown, brown w/red brown streaks ~~Flow~~ Stiff, moist (CL)	PID=0 RAD≤BKG	H_2S=0 O_2=22.0 CO=0 LEL=0 in BZ			
	2		PID=0 RAD≤BKG				60" recovery
	3		PID=0 RAD≤BKG				
	4	less gravel	PID=0 RAD≤BKG				
	5		PID RAD≤				
	6		PID RAD≤				60" recovery
	7		PID RAD≤				
	8	Thin fine sand layer @ 8.1' < .1' thick	PID RAD≤				
9.2	9		PID RAD≤				
	10	Silty sand, fine grained brown, dense, moist (SM)	PID RAD≤				

PROJECT: NFSS | HOLE NO. MW-862

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS-MW 862-3602 Surface

SB-MW 862- -3603 Subsurface

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-86Z

PROJECT: NFSS | INSPECTOR: CHW/TL | SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REMARKS (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Silty SAND, fine grained brown, dense wet (SM)	PID=0 RAD=BKG				36" recovery
	11						
11.5		Clay w/silt, tr gravel, brown to gray brown, soft moist-wet (CH)	PID=0 RAD≤BKG	SB-MW86Z-11.5-3103			Lab sample @ 11.5 @ 1435
	12						
		less silt with depth	PID=0 RAD≤BKG				
	13						
		Clay, tr gravel, gray to gray brown, soft, moist-wet, (CH)	PID RAD≤BKG				
	14						
	15	softer w/depth	PID=0.0 RAD=BKG				
	16		PID=0.0 RAD≤BKG				42" Recovery
	17		PID=0.0 RAD=BKG				
	18		PID=0.0 RAD=BKG				
	19		PID=0.0 RAD=BKG	H_2S=0.0 O_2=22.0 CO=0 LEL=0 IN BZ			
	20	EOB@20.0					

PROJECT: NFSS Set well @ 20.0 by 1530 | HOLE NO. MW 86Z

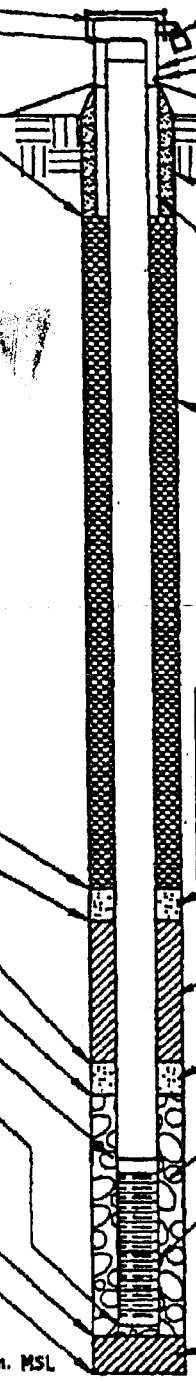
Finished Grouting @ 16:00

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Facility/Project Name: NFSS	Local Grid Location of Well: ☐ N. ☐ S. _____ m. ☐ E. ☐ W. _____ m.	Well Number: MW 062
Facility License, Permit or Monitoring Number	Grid Origin Location: Lat. ___ ___ ___ Long. ___ ___ ___ or	Date Well Installed (Start): 9-20-03 13:00
Type of Protective Cover: Above-Ground ☐ Flush-To-Ground ☐	St. Plane _____ m. N. _____ m. E.	Date Well Installed (Completed): 9-20-03 16:00
Well Distance From Waste/Source Boundary	Section Location of Waste/Source: ___ ¼ of ___ ¼ of Sec. ___ T. ___ N.R. ___ ☐ E. ☐ W.	Well Installed By: (Person's Name & Firm) C & W ENV
Maximum Depth of Frost Penetration (estimated)	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known	

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation _____ m. MSL
B. Well casing, top elevation _____ m. MSL
C. Land surface elevation _____ m. MSL
D. Surface seal, bottom _____ m. TOC or _____ m. MSL



1. Cap and lock? ☑ Yes ☐ No
2. Protective posts? ☐ Yes ☑ No
3. Protective casing:
   a. Inside diameter: 4.0" ~~mm~~
   b. Length: 5.0' m.
4. Drainage port(s) ☑ Yes ☐ No
5. Surface seal:
   a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☑ _____ Other ☐
   b. Annular space seal: Bentonite ☑ Cement ☐ _____ Other ☐
6. Material between well casing and protective casing: Bentonite ☑ Cement ☐ _____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
   b. ____ Lbs/gal mud weight...Bentonite-sand slurry ☐
   c. ____ Lbs/gal mud weight ..... Bentonite slurry ☐
   d. ____ x Bentonite ..... Bentonite-cement grout ☑
   e. _____ m.³ volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☑
8. Centralizers ☐ Yes ☑ No
9. Secondary Filter ☐ Yes ☑ No
   a. Volume added ____ m³ _____ Bags/Size
10. Bentonite seal: a. Bentonite granules ☐
    b. ☐ ¼in. ☑ ⅜in. ☐ ½in. Bentonite ~~pellets~~ chips ☑
    c. _____ Other ☐
11. Secondary Filter ☐ Yes ☑ No
    a. Volume added ____ m³ _____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
    a. Morie OON
    b. Volume added ____ m³ 3 Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☑ Flush threaded PVC schedule 80 ☐ _____ Other ☐
14. Screen material: PVC
    a. Screen type: Factory cut ☑ Continuous slot ☐ _____ Other ☐
    b. Manufacturer: Buffalo Well Supply
    c. Slot size: 0.010 in.
    d. Slotted length: 10' ~~m.~~
15. Backfill material (below filter pack): None ☑ _____ Other ☐

16. USCS classification of soil near screen:
    GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
    SM ☑ SC ☐ ML ☐ MH ☐ CL ☐ CH ☑
    Bedrock ☐
17. Sieve analysis attached? ☐ Yes ☑ No
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☑ _____ Other ☐
19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☑
20. Drilling additives used? ☐ Yes ☑ No
    Describe: NONE
21. Source of water (attach analysis):
    NA

E. ~~Secondary filter, top~~ _____ m. TOC or _____ m. MSL
F. Bentonite seal, top 0.0 m. TOC or _____ m. MSL
G. Secondary filter, top 6.0 m. TOC or _____ m. MSL
H. Primary filter, top 8.0 m. TOC or _____ m. MSL
I. Screen joint, top 10.0' m. TOC or _____ m. MSL
J. Well bottom 20.0' m. TOC or _____ m. MSL
K. Filter pack, bottom 20.0' m. TOC or _____ m. MSL
L. Borehole, bottom 20.0' m. TOC or _____ m. MSL
M. Borehole, diameter 8" mm.
N. O.D. well casing 2.37" mm.
O. I.D. well casing 2.00" mm.
P. 24-hr water level after completion _____ m. TOC or _____ m. MSL

Figure 5-3. Schematic construction diagram of monitoring well

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW 863

PROJECT: NFSS

INSPECTOR: PAW/TL

SHEET 1 OF 4 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	REPTOR SAMPLE OR CORE BOX NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
0.5		Silty Clay loam Top soil w/organics, black moist	RAD BKG=150 PID=0.0	PID RAD ≤ BKG	Sample SS-MW863-3605 w/Q		
	1	Silty Clay w/SAND & gravel stiff to med, brown to red brown, moist (CL)	H_2S=0 O_2=22.0 CO=0 LEL=0	PID=0.0 RAD ≤	0800		52" recovery
	2			PID 0.0 RAD ≤ BKG			
	3			PID=0.0 RAD ≤ BKG			
		Fine SAND lense @ 4.2 ↓					
	4			PID=0.0 RAD ≤ BKG			55" recovery
	5	Silty Clay w/s. SAND & gravel, brown w/few gray mottles medium to soft (CL)		RAD ≤ BKG PID=0.0			
	6			RAD ≤ BKG PID=0.0			
	7	Softer w/depth ↓		RAD ≤ BKG PID=0.0			
	8			RAD ≤ BKG PID=0.0			
	9			RAD ≤ BKG PID=0.0			
	10			RAD ≤ BKG PID=0.0			

PROJECT: NFSS

HOLE NO.: MW-863

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

MW-862 - SHALLOW
MW-863 - Deep

SS-MW863-3605 QC Sample
SB MW-863 - 3606

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW P63

PROJECT: NFSS | INSPECTOR: CAW/TL | SHEET 2 OF 4 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REMOTE SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Clay, brown to gray brown, tr gravel Soft, moist (CH)	PID = 0.0 RAD ≤ 0	H_2S = 0 O_2 = 22.0 CO = 0.2			
	11		PID = 0.0 RAD ≤ 0	LEL = 0			60" recovery
	12		PID = 0.0 RAD ≤ 0				
		SAND ↑ with depth ↓					
13.2	13		PID = 0.0 RAD ≤ 0				
		SAND w/Silt, ~~med to~~ Coarse to med grained w/gravel, loose to med dense brown, wet (SM-GM)					
14.1	14		PID = 0.0 RAD ≤ 0				
		Clay, s SAND, brown, ~~loose to med dense~~ Soft, wet (CH)					
	15		PID = 0 RAD ≤ BKG				
16	16	Clay w/tr SAND, gray to gray brown, soft wet (CH)					
16.2		Coarse SAND/fine gravel ~~Gray~~ Layer @ 16-16.2	PID = 0 RAD ≤ BKG				60" Recovery
	17						
		Clay w/SAND & gravel, gray to brown gray Soft wet (CH)	PID = 0 RAD ≤ BKG	H_2S = 0 O_2 = 22.1			
	18	less coarse w/depth	PID = 0 RAD ≤ BKG	CO = 0 LEL = 0			
	19		PID = 0 RAD ≤ BKG				
19.5	20	Clay, gray to brown gray Soft wet (CH)					

PROJECT: NFSS | HOLE NO. MW-E63

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-863

PROJECT: NFSS | INSPECTOR: CAW/TL | SHEET 3 OF 4 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REMARKS FOR SAMPLE OR CORE RUN NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Clay w/s sand + s gravel	PID=0.0	H_2S=0			
		Gray to brown gray, soft red iron streaks	RAD≤ Bkg	O_2=22.1			
	21	Wet (CH)		CO=0			
				LEL=0			
							60" recovery
			PID=0.0				
	22		RAD≤ Bkg				
			PID=0.0				
	23		RAD≤ Bkg				
			PID=0.0				
	24		RAD≤ Bkg				
			PID=0.0				
	25		RAD≤ Bkg				
	26		PID				
			RAD≤ Bkg				
			PID				
	27		RAD≤ Bkg				refusal w/ 4" x 5' sampler
		Cobbles + gravel					
			PID				Switch to 2' samples
			RAD≤ Bkg				
	28						@ 29'
			PID				
			RAD≤ Bkg				
		Auger refusal					
28.9			PID				56" recovery
	29	SAND w/ silt, fine grained, ~5% gravel					
		brown, dense, moist to wet	RAD≤ Bkg				
		(SP)	PID				
	30						

PROJECT: NFSS | HOLE NO. MW 863

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-MW863- - 3606 - Sample ID

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-863

PROJECT: NFSS | INSPECTOR: CHW/TL | SHEET 4 OF 4 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE FOR DR. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Silt w/ SAND & gravel, s. clay brown/red brown, medium wet (ML)	RAD ≤ BKG PID=	$H_2S = 0$ $O_2 = 22.1$ $CO = 0$ $LEL = 0$			4" recovery
2' SAMPLER split spoon	31	C					
	32	Clayey silt w/ SAND & gravel brown/red brown, soft wet (GM-ML)	RAD ≤ BKG PID=		SB-MW863 32.0-3606 @ 10:30		16" recovery LAB SAMPLE @ 32.0 @ 10:30
2' SS	33						
	34						
34.6		Silt w/ SAND fine grained stiff low stiff brown/red brown, ~~dense~~ moist (ML)	RAD ≤ BKG PID = 0.0				
2' SS	35	Silt w/ SAND & Gravel, brown to red brown, ~~med~~ to dense wet (GM-ML)	PID = 0.0 RAD ≤ BKG				Sample refusal @ 35.5
		Weathered Shale bedrock dense, dry	PID = 0.0 RAD ≤ BKG				
2' SS	39						No more samples after 35.5 HSA to 40.0 then set well
	40	NO MORE SAMPLES	RAD ≤ BKG				

EOB @ 40.0'

PROJECT: NFSS | HOLE NO. MW 863

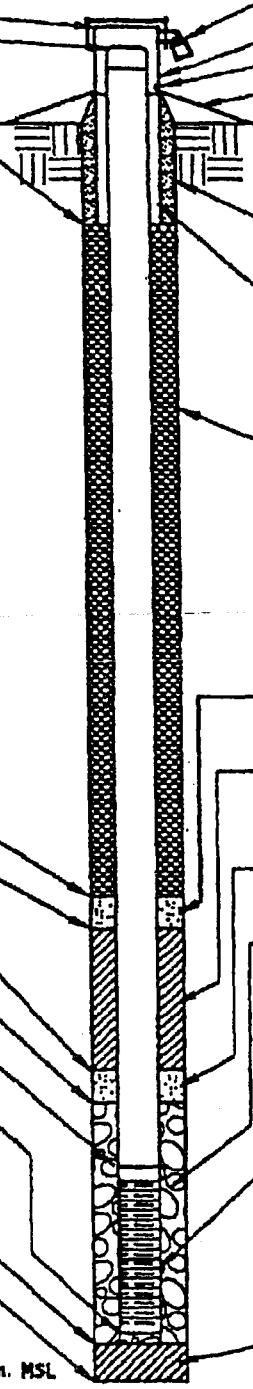
ENG FORM 5056A-R, AUG 94 @ 11:00 (Proponent: CECW-EG)

Set Well @ 40.0 @ 11:20

Facility/Project Name: NFSS	Local Grid Location of Well: ☐ N. ____ m. ☐ S. ____ m. ☐ E. ☐ W.	Well Number: MW-863
Facility License, Permit or Monitoring Number:	Grid Origin Location: Lat. ___ Long. ___ or St. Plane ___ m. N. ___ m. E.	Date Well Installed (Start): 9-20-03 08:00
Type of Protective Cover: Above-Ground ☑ Flush-To-Ground ☐	Section Location of Waste/Source: ___ ¼ of ___ ¼ of Sec. ___ T. ___ N. R. ___ ☐ E. ☐ W.	Date Well Installed (Completed): 9-20-03 14:00
Well Distance From Waste/Source Boundary:	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known	Well Installed By: (Person's Name & Firm) C&W Env. Phil Bence
Maximum Depth of Frost Penetration (estimated):		

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation ____ m. MSL
B. Well casing, top elevation ____ m. MSL
C. Land surface elevation ____ m. MSL
D. Surface seal, bottom ____ m. TOC or ____ m. MSL



1. Cap and lock? ☑ Yes ☐ No
2. Protective posts? ☐ Yes ☑ No
3. Protective casing:
   a. Inside diameter: 4.0" mm.
   b. Length: 5.0' m.
4. Drainage port(s) ☑ Yes ☐ No
5. Surface seal:
   a. Cap: Gravel blanket ☐ Bentonite ☐ Concrete ☑ Other ☐
   b. Annular space seal: Bentonite ☐ Cement ☐ Other ☐
6. Material between well casing and protective casing: Bentonite ☐ Cement ☐ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
   b. ____ Lbs/gal mud weight ... Bentonite-sand slurry ☐
   c. ____ Lbs/gal mud weight ... Bentonite slurry ☐
   d. ____ x Bentonite ... Bentonite-cement grout ☑
   e. ____ m³ volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☑
8. Centralizers ☐ Yes ☑ No
9. Secondary Filter ☐ Yes ☑ No
   a. Volume added ____ m³ ____ Bags/Size
10. Bentonite seal: a. Bentonite granules ☐
    b. ☐ ¼in. ☑ ⅜in. ☐ ½in. Bentonite pellets ☑
    c. ____ Other ☐
11. Secondary Filter ☐ Yes ☑ No
    a. Volume added ____ m³ ____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
    a. Morie 00N
    b. Volume added ____ m³ 3 Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☑ Flush threaded PVC schedule 80 ☐ Other ☐
14. Screen material: PVC
    a. Screen type: Factory cut ☑ Continuous slot ☐ Other ☐
    b. Manufacturer Buffalo Well Supplies
    c. Slot size: 0.010 in.
    d. Slotted length: 10' m.
15. Backfill material (below filter pack): None ☑ Other ☐

16. USCS classification of soil near screen:
    GP ☐ GM ☑ GC ☐ GW ☐ SW ☐ SP ☐
    SM ☐ SC ☐ ML ☑ MH ☐ CL ☐ CH ☐
    Bedrock ☐
17. Sieve analysis attached? ☐ Yes ☑ No
18. Drilling method used: Rotary ☐ Hollow Stem Auger ☑ Other ☐
19. Drilling fluid used: Water ☐ Air ☐ Drilling Mud ☐ None ☑
20. Drilling additives used? ☐ Yes ☑ No
    Describe ____
21. Source of water (attach analysis): ____

E. Secondary filter, top — m. TOC or ____ m. MSL
F. Bentonite seal, top 25.0 m. TOC or ____ m. MSL
G. Secondary filter, top — m. TOC or ____ m. MSL
H. Primary filter, top 28.0 m. TOC or ____ m. MSL
I. Screen joint, top 30.0 m. TOC or ____ m. MSL
J. Well bottom 40.0 m. TOC or ____ m. MSL
K. Filter pack, bottom 40.0 m. TOC or ____ m. MSL
L. Borehole, bottom 40.0 m. TOC or ____ m. MSL
M. Borehole, diameter 8.0 mm.
N. O.D. well casing 2.37" mm.
O. I.D. well casing 2.00' mm.
P. 24-hr water level after completion ____ m. TOC or ____ m. MSL

Figure 5-3. Schematic construction diagram of monitoring well

10-1-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: OTFL-11

PROJECT: NFSS | INSPECTOR: CAW/DS | SHEET 1 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (d)	FIELD SCREENING RESULTS (e)	SEMI-VOC SAMPLE OR CORE BAR NO. (c)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Silty Clay Loam Topsoil w/ gravel		RAD Bkg			
0.8			PID=0 RAD≤Bkg	=150			
	1	Clay w/ silt, SAND & gravel Brown, ~~Yellow~~ red brown & gray w/ red inclusions (few)		PID: 0 INBZ			56" recovery
	2	moist, stiff (CL)	PID=0.0 RAD≤Bkg	H_2S=0.0 O_2=21.9 CO=0 LEL=2			
		Yellow brown					
	3		PID=0.0 RAD≤Bkg				
	4		PID=0.0 RAD≤Bkg				
	5	Clay w/ TR SAND & gravel Brown - Red brown w/ gray	RAD≤Bkg PID=0.0				
	6	med to stiff, moist (CH)	RAD≤Bkg PID=0.0				
7.0	7	SAND, fine gravel, w/ little fine gravel, lt. brown loose, dry (SP)	RAD≤Bkg PID=0.0				60" recovery
7.3		w tr SAND & gravel Clay, Brown, Red brown w/ gray, med to soft, moist (CH)					
	8		RAD≤Bkg PID=0.0				
	9	Softer w/depth	RAD≤Bkg PID=0				
	10		RAD≤Bkg PID=0.0				

PROJECT: NFSS | HOLE NO.: OTFL-11

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-OTFL-11-13.0-3658

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: OTFL-11

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SEMI-VOL SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Clay w/Tr. SAND & gravel	PID = 0.0				
		Brown - Red Brown w/gray medium to soft, moist (CH)	RAD = Bkg	H_2S =			
	11		PID = 0.0	O_2 =			
			RAD = Bkg	CO =			
				LEL =			
	12						
12.5			PID = 0.0				
			RAD = Bkg				
	13	Clay, w/s. Gravel, gray to gray brown, soft moist to wet (CH)			Sample SB-OTFL-13.0-3658 & 3658D		Sample @ 15^50 @ 13.0'
			PID = 0.0				
			RAD = Bkg				
	14						
			PID = 0.0				
			RAD = Bkg				
	15						
		EOB @ 15.0' @ 16^10					
		Grout borehole by 16^25					

PROJECT: NFSS | HOLE NO. OTFL-11

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

10-1-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: OTFL-12

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 1 OF 2 SHEETS

BLOW (4)	DEPTH (ft)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SAMPLE NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		silty clay loam, organics black soft moist	PID=0 RAD≤Bkg	RAD Bkg = 150			
	1	Silty Clay w/sand & gravel brown, red brown, gray	PID=0 RAD≤Bkg	PID = 0.0 in BZ			
	2	Brown, yellow brown		H_2S=0 O_2=22.0 CO=0 LEL=3			42"
	3		PID=0 RAD≤Bkg				
	4	Gray, gray brown	PID=0 RAD≤Bkg				
	5	Clay w/s SAND & gravel, brown medium to soft w/red inclusions (few) (CL)	PID=0 RAD≤Bkg X				
	6	Softer w/depth	PID=0 RAD≤Bkg				60" recovery
	7		PID=0 RAD≤Bkg				
	8		PID=0 RAD≤Bkg				
	9		PID=0 RAD≤Bkg				
	10		PID=0 RAD≤Bkg				

PROJECT: NFSS | HOLE NO.: OTFL-12

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-OTFL12- -3659

OTFL-12 START ● 5' ↓ ⊗ Boring

N↑

10-1-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: OTFL-12

PROJECT: NFSS

INSPECTOR: CAW/JS

SHEET 2 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SEMI-VOL SAMPLE NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		Clay, ~~SE~~ sand & S. gravel Brown Soft, moist (CH)	PID RAD	H_2S=0			
	11			O_2=21.9			
			PID RAD	CO=0 LEL=3			
	12						60" Recovery
		Clay, Tr gravel, gray to gray brown Soft Moist-wet (CH)	PID RAD				Sample @ 14^45 @ 13.5'
	13				SB-OTFL12 3659		
			PID RAD				
	14		RAD PID				
	15	EOB @ 15.0' @ 14^55 Grouted @ 15^10					

PROJECT: NFSS

HOLE NO.: OTFL-12

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Well Abandonment

HTRW ~~DRILLING~~ LOG

DISTRICT	Buffalo
HOLE NUMBER	OW1A
1. COMPANY NAME	MAXIM Technologies
2. DRILLING SUBCONTRACTOR	C&W Env.
SHEET	1 OF 1 SHEETS
3. PROJECT	NFSS
4. LOCATION	Lewiston NY
5. NAME OF DRILLER	Phill Bence
6. MANUFACTURER'S DESIGNATION OF DRILL	CME
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	CME Drill Rig; Pump on Drill Rig; Neat Cement, Bentonite
8. HOLE LOCATION	W Side of Cap @ Toe of Slope
9. SURFACE ELEVATION	
10. DATE STARTED	10-4-03 1320
11. DATE COMPLETED	10-4-03
12. OVERBURDEN THICKNESS	
15. DEPTH GROUNDWATER ENCOUNTERED	
13. DEPTH DRILLED INTO ROCK	0 -
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE	~45'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
None			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
None						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. [redacted]
—	Grouted			

LOCATION SKETCH/COMMENTS

SCALE:

Pulled out Casing - Double CASED to 20' w/ Steel inside & PVC on out side
- Approx 50' of Screen & riser removed
- S.S. Well Riser & Screen Removed from Borehole
- All materials removed from well drummed for disposal (Stored in drum Storage Area) Cut up @ drum storage area -
- Borehole grouted w/ Cement - Bentonite Grout using pump & Tremie hose
- ~100 gallons of material - Slurry added to borehole for abandonment.

PROJECT	HOLE NO.
NFSS	OW1A

Concrete PAD

NT

10-3-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: PIPE 74

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 1 OF 1 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REMOVED SAMPLE OR CORE FOR DESC. (4)	ANALYTICAL SAMPLE ID NO. (7)	BLOW COUNT (10)	REMARKS (8)
0.5		Concrete PAD	PID= RAD≤BKg	RAD BKg= 100			
	1	SAND, fine grained, black (stained) w/ ~5% lt brown loose, dry	PID= RAD≤BKg	PID=0.0 BZ			40" recovery
1.4		Silt w/ tr sand & trace gravel Black, soft moist					
	2	↓ dk gray Dark gray	PID= RAD≤BKg	H_2S=0.0 O_2=22.1 CO=0			
	3	↓ silt w/ clay gray w/ brown gray	PID= RAD≤BKg	LEL=2			
		No Recovery					
	4						
	5	Clay w/ tr sand & gravel brown to brown red w/ gray stiff moist (CH)					
	6						30" recovery
	7						sample @ 7.0' @ 1635
	8						
	9						
	10						

PROJECT: NFSS | HOLE NO.: PIPE 74

ENG FORM 5056A-R, AUG 94 | SB-Pipe74-3657-~~1635~~ 7.0' | (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: SB864
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 2 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: west of IWCS	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 10/2/03	11. DATE COMPLETED: 10/2/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNA[redacted]
			grouted	

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	SB864

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SB 864

PROJECT: NFSS

INSPECTOR: M. Sieve

SHEET 2 OF ___ SHEETS

ELEV. (4)	DEPTH (8)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SOVEREIGN SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		Dark brn loamy loose sl. moist	OVM	Rad			
			0.00	Bkgd			
	1	Brn clayey silt loose dry					
	2	Brn-gray mottled silty clay w/Fe staining and some small gravel stiff sl moist	0.00				5.0/3.6
	3		0.00				
	4	(CL)					
	5		0.00				
			0.00	Bkgd			
	6						
			0.00				
	7	more gray					5.0/5.0
			0.00				
	8	soft moist					
	9		0.00				
		TD 10.0'					SB-SB864-10.0-3648 9.5-10.0 0900

PROJECT: NFSS

HOLE NO: SB 864

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

SW Corner of Cap 10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 930

PROJECT: NFSS | INSPECTOR: JAW/JS | SHEET 1 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REMOVED SAMPLE OR CORE DIA. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		Silty Clay loam Topsoil w/organics, dk. brown moist	PID	RAD Bkg	SS-TWP-930-0350		Sample @ 0930
0.8				=50			20" recovery
	1	Silty Clay. w/s SAND & gr. brown, Lt brown w/gray medium to stiff, moist (CL)	PID	PID=0 BZ			
	2						
	3						
	4						
	5	Clay w/s SAND & gravel Brown red brown gray w/red inclusions (Hew) medium, moist (CH)	PID RAD=Bkg				
	6						
	7		PID RAD=Bkg				42" Recovery
	8		PID RAD=Bkg				
	9						
	10						

PROJECT: NFSS | HOLE NO.: TWP 930

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-830

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SOIL/GAS SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Clay w/s, sand & gravel Brown - red brown w/gray moist, medium to soft (CH)	PID RAD ≤ Bkg	H_2S = 0 O_2 = 21.9 CO = 0 LEL = 0			
	11		RAD ≤ Bkg PID = 0				56" recovery
12.0	12	Sand w/silt, fine grained, Lt brown, med dense, moist (SM)	RAD ≤ Bkg PID = 0				
	13		RAD ≤ Bkg PID = 0				
13.8			RAD ≤ Bkg PID = 0				
	14	Clay w/s sand & gravel Brown - red brown, w/gray moist, soft (CH)	RAD ≤ Bkg				
14.8					SB-TWP @30-15.0 -3501		Sample @ 0915 @ 15.0'
	15	Sand w/silt, fine, brown - Lt. brown, medium, moist (SM) to wet	PID = 0				
	16		RAD ≤ Bkg PID = 0				
16.5							
	17	Clay w/gravel Gray to Gray brown soft wet (CH)	RAD ≤ Bkg PID = 0				60" Recovery
	18		RAD ≤ Bkg PID = 0				
	19		RAD ≤ Bkg PID = 0 PID = 0				
	20	EOB @ 20.0	RAD ≤ Bkg				

PROJECT: NFSS Set Temp Well @ 0920 | HOLE NO. TWP-830

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS-TWP 0930-3500 + MS/MSD - 0930

SB-TWP 0930-3501-15.0-3501 @ 0915

S of Cap ~ ℄

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-831

PROJECT: NFSS

INSPECTOR: CAW/DS

SHEET 1 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SAMPLE NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Silty Clay loam Topsoil	PID=	RAD Bkg			SAMPLE @ 10:00
		Organics, dk brown, soft	RAD	=50			
0.0		moist		PID=0.0			
	1	Clay w/sand & gravel	PID=	BZ			50" recovery
		Brown, red brown w/	RAD				
		red inclusions (few)					
	2	stiff moist					
			PID=				
		SAND with Silt, fine to	RAD				
	3	med grained, brown, yellow					
		gray brown, med dense					
		moist (SM)					
		Cementitious Sand	PID=				
	4	(Possibly old concrete)	RAD				
		Clay Pipe Fragments	PID=				
	5		RAD				
5.8			PID=				
	6	Clay w/s sand & gravel	RAD=				
		Brown - red brown w/ gray					
		med to stiff moist					
		(CH)	PID=				
	7		RAD=				
	8		PID=				
		Silt & Fine grained	RAD=				
		SAND lenses					
		in Pattie	PID=				
	9		RAD=				
		Softer	PID=				
	10	w/depth	RAD=				

PROJECT: NFSS

HOLE NO. TWP-831

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS - TWP 831 3503

- 3504

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-831

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 2 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SCREENED SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		Clay w/ SAND & gravel	PID= RAD≤Bkg	H_2S = 0.0			
		Brown to red brown w/gray mottling, soft, moist (CH)		O_2 = 21.[illegible] CO = 0			60" recovery
	11		PID= RAD≤Bkg	LEL=			
	12		PID= RAD≤Bkg				
13.2	13						
13.7		SAND fine grained, Lt brown medium dense, moist (SM)	PID=0.0 RAD≤Bkg				
	14	Clay w/s. gravel, brown-gray brown w/silt soft, moist-wet (CL)	RAD≤Bkg PID=0.0				
	15						Sample @ 10:30 @ 15.0
	16	Silt & fine SAND layers w/silt @ 15.2 16.9 & 17.5'	RAD≤Bkg PID=0.0				
	17		RAD≤Bkg PID=0.0				
18.0	18	Clay w/tr SAND & gravel - Gray brown-gray soft wet (CH)	RAD≤Bkg PID=0.0				
	19		RAD≤Bkg PID=0.0				
	20	EOB @ 20.0'	RAD≤Bkg PID=0.0				

PROJECT: NFSS Set Temp Well | HOLE NO.: TWP-831

ENG FORM 5056A-R, AUG 94 @ 10:50 (Proponent: CECW-EG)

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-832

PROJECT: NFSS | INSPECTOR: LAW/JS | SHEET 1 OF 2 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	BORING/WELL SAMPLE OR CORE RUN NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		Silty Clay loam Topsoil	PID	PID = 0.0	SS-TWP 832-3506		SAMPLE @ 11:15
		Organics, dk brown, soft Moist	RAD ≈ Bkg	RAD Bkg = 50			
0.8							
	1	Silty Clay w/ silt & sand & gr Brown, Red brown & grey Medium to stiff, moist (CL)	PID RAD ≈ Bkg				57" recovery
	2						
			RAD ≈ Bkg PID = 0.0				
	3						
	4		RAD ≈ Bkg PID = 0.0				
	5	Clay w/ sand & gravel Brown, red brown w/ grey Stiff to medium moist (CH)	RAD ≈ Bkg PID = 0.0				
	6		RAD ≈ Bkg PID = 0.0				58" recovery
	7		RAD ≈ Bkg PID = 0.0				
		Grey Streaking					
	8		RAD ≈ Bkg PID = 0.0				
	9		RAD ≈ Bkg PID = 0.0				
	10		RAD ≈ Bkg PID = 0				

PROJECT: NFSS | HOLE NO.: TWP-832

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS- TWP 832 - 3506 11:15

SB TWP 832 - - 3507

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 832

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	BORING/SAMPLE OR CORE RUN NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		SAND w/silt w/gravel, medium to	PID=0	H_2S=0			
		Course gr, brown moist (SM-SW)	RAD≤Bkg	O_2=22.0			
11.1	11			CO=0			
		Clay w/s gravel, brown-red brown, medium moist (CH)	PID=0 RAD≤Bkg	LEL=3			
11.7							
12.2	12	Silt w/ fine gr SAND, brown moist (ML)	PID=0 RAD≤Bkg				
		Clay, tr gravel, gray to gray brown, soft moist-wet					
	13		PID=0 RAD≤Bkg		SB-TWP 832-12.5-3507		LAB SAMPLE @ 12.5' @ 1145
		Softer w/depth ↓					
	14		PID=0.0 RAD≤Bkg				
	15	Clay, w/tr gravel Gray to gray brown, moist-wet soft (CH)	PID=0 RAD≤Bkg				
	16		PID=0 RAD≤Bkg				
		Softer/wetter w/depth					
	17		PID=0 RAD≤Bkg				
	18	Silt layer @ 18.7 to 18.9 brown.	PID=0 RAD≤Bkg				
	19		PID=0 RAD≤Bkg				
	20	EOB @ 20.0					

PROJECT: NFSS Set Temp Well | HOLE NO. TWP 832

ENG FORM 5056A-R, AUG 94 @ 1420 (Proponent: CECW-EG)

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-833

PROJECT: NFSS

INSPECTOR: CAW/JS

SHEET 1 OF 2 SHEETS

BLOW (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SELECTED SAMPLE INTERVAL (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Silty Clay loam w/organics	PID: 0.0	RAD	SS-TWP		Sample ID
0.8		Top soil, ~~DK~~ Brown, soft moist	RAD ≤ BKG	BKG = 50	833-3509		1410
	1	CLAY w/silt, s. SAND & gravel Brown, some grey, medium to stiff, moist (CL)	PID = 0.0 RAD ≤ BKG	PID = 0.0			50" Recovery
	2		PID = 0.0 RAD ≤ BKG				
	3	Wood pieces ~ 3.4'	PID = 0.0 RAD ≤ BKG				
	4						
	5	CLAY w/silt, s. SAND & gravel Brown w/ grey & red inclusions (few) medium to soft moist to wet (CL)	PID = 0.0 RAD ≤ BKG				
	6		RAD ≤ BKG PID: 0.0				60" Recovery
	7		RAD ≤ BKG PID: 0.0				
	8		RAD ≤ BKG PID: 0.0				
8.5		SAND w/silt, fine grained brown, med dense, wet to Lt. brown (SP-SM)					
	9		PID = 0.0 RAD ≤ BKG				
	10		PID: 0.0 RAD ≤ BKG				

PROJECT: NFSS

HOLE NO. TWP-833

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS - TWP 833 - 3509

SB - TWP 833 - 3510

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-833

PROJECT: NFSS

INSPECTOR: CAW/JS

SHEET 2 OF 2 SHEETS

ELEV. (2)	DEPTH (3)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (5)	SELECTED SAMPLE OR CORE RUN NO. (6)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (8)	REMARKS (9)
		SAND w/silt, fine grained brown to lt. brown, med dense wet (SP-SM)	PID= RAD=Bkg	H_2S=0 O_2=21.9 CO=0 LEL=0	SB-TWP 833-10.0-3510		
	11		PID=0.0 RAD=Bkg				
11.3		Clay, trace gravel, gray to gray brown, soft wet (CH)					
	12		PID=0.0 RAD=Bkg				60" recovery
	13	Softer w/depth	PID=0.0 RAD=Bkg				
	14		PID=0.0 RAD=Bkg				
	15	EOB @15.0' Set temp Well @1445					Sampled @ 1435 @10.0'
	16						
	17						
	18						
	19						
	20						

PROJECT: NFSS

HOLE NO. TWP-833

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

N ↑ 2nd @ 1st 3' | 6' — BLD Corner STAKE NE

NE Corner of "building" on S Side of Cap

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-834

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 1 OF 3 SHEETS

BLOW (3)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SOIL/GAS SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Silty Clay loam (Topsoil) w/ organics, DK-brown Soft moist	PID=0.0 RAD=BKG	RAD BKG=50	SS-TWP 834-3512		Samples @ 15:10 Surface only
	1			PID=0 in BZ			
	2	Refusal @ 2.0'		H_2S=0 O_2=22.0 CO=0 LEL=3			
		Off set 3.0' toward Cap (to N) attempted to drill again - Refusal (Concrete) Called DAVE G. He said to abandon hole but collect surface sample					
		Completed @ 15:35					
		Grouted two borehole Attempts prior to relocating to TWP 858					
		Re Attempted Borehole on 10-3-03 @ 08:10					

PROJECT: NFSS | HOLE NO.: TWP-834

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS - TWP 834 - 3512

No Subsurface Sample

NE Corner of "building" location - S of CAP Area - 10-3-03 (continued)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP E34

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 2 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REMARKS OF SAMPLE OR CORE FOR ANL (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
0.7		Silty Clay loam w/organics dk brown, soft, moist	PID=0.0 RAD≤BKG	RAD BKG=100	* SS-TWP E34-3512		* Sampled on 10-2-03 @ 15"
	1	Clay w/silt & sand & gravel Concrete pieces @ 2.0' Brown - dk redbrown w/ red inclusions, stiff to medium moist (CL)	PID=0.0 RAD≤BKG	PID= IN BZ			Recovery 50"
	2		PID=0.0 RAD≤BKG	H_2S=0 O_2=22.2 CO=0 LEL=3			
	3		PID=0.0 RAD≤BKG				
	4	dk gray @ 3.6'	X				
	5	Clay w/silt, sand & gravel Brown, Browngray w/red incl soft moist (CL)					50" Recovery
	6		PID=0.0 RAD≤BKG				
		Softer w/depth					
	7		PID=0.0 RAD≤BKG				
	8		PID=0.0 RAD≤BKG				
	9	Wood pieces @ 9.5' dk gray to black	PID=0.0 RAD≤BKG				
	10						

PROJECT: NFSS | HOLE NO: TWP-934

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

10-3-03 (Continued from 10-2-03)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 834

PROJECT: NFSS

INSPECTOR: VAW/JS

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	GROUND SAMPLE OR CORE PIECE NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Clay w/s. Gravel, brown gray to gray, soft moist-wet (CH)	PID = 0.0 RAD ≤ BKG	H_2S = 0 O_2 = 21.9 CO = 0 LEL = 2			
	11		PID = 0.0 RAD ≤ BKG				60" Recovery
	12		PID = 0.0 RAD ≤ BKG				
	13	med to fine grained SAND layers from 13.5 to 15'	PID = 0.0 RAD ≤ BKG				
	14		PID = 0.0 RAD ≤ BKG		Sample @ 14.0'		SB-TWP834-14.0 3513 @ 0915
	15	EOB @ 15.0' Set Temp Well @ 0920					
	16						
	17						
	18						
	19						
	20						

PROJECT: NFSS

HOLE NO.: TWP 834

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT	Buffalo
HOLE NUMBER	TWP 835
COMPANY NAME	Maxim Technologies
2. DRILLING SUBCONTRACTOR	Subsurface Drilling Solutions
SHEET	1 OF 3 SHEETS
3. PROJECT	NFSS
4. LOCATION	Lewiston NY
5. NAME OF DRILLER	Jeff Grant
6. MANUFACTURER'S DESIGNATION OF DRILL	Mobile 59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	5' CME sampler 2' split spoon 4.25 ID HSA
8. HOLE LOCATION	Former Disposal Area
9. SURFACE ELEVATION	
10. DATE STARTED	9/20/03
11. DATE COMPLETED	9/20/03
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	NA
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14. TOTAL DEPTH OF HOLE	17'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA
18. GEOTECHNICAL SAMPLES	NA
DISTURBED	
UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES	NA
20. SAMPLES FOR CHEMICAL ANALYSIS	
VOC	
METALS	
OTHER (SPECIFY)	
OTHER (SPECIFY)	
OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY %	
22. DISPOSITION OF HOLE	
BACKFILLED	
MONITORING WELL	Temp
OTHER (SPECIFY)	
23. SIGNATURE	[redacted]

LOCATION SKETCH/COMMENTS **SCALE:**

PROJECT	NFSS
HOLE NO.	TWP 835

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: TWP835 | SHEET 2 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SAMPLE RECOVERY (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Drk Brn loam w/ roots	OVM	Rad			SS-TWP835-3515
		Brn silty clay w/ 1" gravel dry	0.00	Bkgd			0-0.5' (815)
	1	Brn-gray mottled silty clay w/Fe staining and some small gravel stiff sl. moist					5.0/5.0
	2		0.00				
	3	(CL)	0.00				
	4		0.00				
	5						
	6		0.00	Bkgd			5.0/5.0
	7		0.00				
	8		0.00				
	9	sand lens	0.00				

PROJECT: NFSS | HOLE NO.: TWP 835

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 835

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (2)	DEPTH (3)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (5)	SOIL/ROCK SAMPLE OR CORE BOX NO. (6)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (8)	REMARKS (9)
		cont Brn-gray mottled silty clay w/Fe staining and some small gravel	OVM	Red			
	11		0.00	Bkgd			5.0/3.5
		sl. moist stiff	0.00				
	12						
		(CL)	0.00				
	13						
	14		0.00				
		Gray clay soft wet					SB-TWP835-15.0-3516 14.5-15.0 (0845)
	15						
			0.00	Bkgd			2.0/1.8
	16		0.00				
	17						
		TD 17'					TWP set at 17.0'
	18						
	19						

PROJECT: NFSS

HOLE NO.: TWP 835

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: TWP 836
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Former Organic Burial Area	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/21/03	11. DATE COMPLETED: 9/21/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
		Temp		

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	TWP 836

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 836

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	REMOTE SAMPLE NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Drk brn loam w/roots	OVA	Kod			SS-TWP836-3518 0-0.5' (1245) 5.0/4.7
	1	Brn silty clay w/Fe staining and some 2" gravel	0.00	Bkgd			
	2						
	3	Brn-gray mottled silty clay w/Fe staining and some small gravel	0.00				
	4	stiff dry	0.00				
	5		0.00				
	6	more gray more moist less stiff	0.00	Bkgd			5.0/5.0
	7		0.00				
	8		0.00				
	9		0.00				

PROJECT: NFSS

HOLE NO.: TWP 836

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 836

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (8)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REVISED SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		cont gray-brn mottled silt, clay w/ fe staining and small gravel moist med soft	OVM	Rad			
	11		0.00	Bkgd			5.0/5.0
	12		0.00				
		Gray clay soft very moist plastic (CL)					
	13		0.00				
	14		0.00				SB-TWP 836-15.0 - 3519, 14.5-15.0 1315
	15	TD 15.0'					Set TWP at 15.0

PROJECT: NFSS

HOLE NO.: TWP 836

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: TWP-837
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Former Pond 3	
	9. SURFACE ELEVATION:	
	10. DATE STARTED: 9/21/03	11. DATE COMPLETED: 9/21/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ≈19'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 20.0'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNA[redacted]
		Temp		

LOCATION SKETCH/COMMENTS **SCALE:**

PROJECT	HOLE NO.
NFSS	TWP 837

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: TWP-837 | SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (B)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	PORTION SAMPLE OR CORE FOR DESC. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (B)
		Dk brn loam w/roots	OVM	Rad			SS-TWP 837-3521 (0-0.5)
	1	Brn silty clay w/Fe staining and some 1" gravel stiff dry	0.00	Bkgd			5.0/5.0 1330
			0.00				
	2	(CL)					
			0.00				
	3	lt brn silt lens					
		Brn-gray mottled silty clay w/Fe staining and some small gravel stiff dry					
	4		0.00				
	5						
			0.00	Bkgd			5.0/2.8
	6						
			0.00				
	7	more gray sl moist					
			0.00				
	8						
			0.00				
	9						

PROJECT: NFSS | HOLE NO.: TWP 837

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 837

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	MONITOR SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		cont gray-brn silty clay w/Fe staining and some small gravel	[illegible]	Rad			5.0/5.0
	11		0.00	PKgd			
		moist med stiff	0.00				
	12						
		GL	[illegible]				
	13						
			[illegible]				
	14						
	15	gray clay med soft moist					
			0.00	[illegible]			5.0/5.0
	16						
		very soft wet	0.00				
	17						
			0.00				
	18						
							SB-TWP 837-19.0-3522
	19	gray sand lens saturated (SM)	0.00				19.5-19.0 1400
		[illegible] clay					TWP set at 20

PROJECT: NFSS

HOLE NO.: TWP 837

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

9-30-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-838

PROJECT: NFSS

INSPECTOR: MW/JS

SHEET 1 OF 2 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	REPRESENTATIVE SAMPLE OR CORE FOR NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Silty Clay loam Topsoil w/organics roots etc Dark brown, soft moist	PID= RAD ≤ Bkg	RAD: Bkg = 200 PID = 0	SS-TWP 838-3524		Sample @ 0830
	1	~~Silty Clay~~ Clay w/ SAND & gr dk brown w/ gray brown soft moist (CL)	PID= RAD ≤ Bkg	H_2S = 0 O_2 = 22.2 CO = 0 LEL = 0			Recovery 48"
2.3	2						
	3	Silty SAND, Fine grained red - red brown, medium dense, moist (SM)	PID= RAD ≤ Bkg				
3.5							
	4	Silty Clay, w/ Tr SAND & gravel brown, brown red, ~~dark~~ gray w/ red inclusions (few) Stiff moist (CCL)	PID= RAD ≤ Bkg				
	5	to medium Softer w/depth	PID = 0.0 RAD ≤ Bkg				
	6	Less silt w/depth	PID = 0.0 RAD ≤ Bkg				60" recovery
	7		PID = 0.0 RAD ≤ Bkg				
	8		PID = 0.0 RAD ≤ Bkg				
	9		PID = 0.0 RAD ≤ Bkg				
	10	(CH)	PID = 0 RAD ≤ Bkg				

PROJECT: NFSS

HOLE NO.: TWP 838

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-838

PROJECT: NFSS

INSPECTOR: CAW / JS

SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SOIL GAS SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Clay, tr gravel, brown, medium to soft, ~~soft~~ moist (CH)	PID = 0.0 RAD = BKG	H_2S = 0.0 O_2 = 21.9 CO = 0.0 LEL = 0.0			54" recovery
	11	Silter w/depth	PID = 0.0 RAD = BKG				
	12		PID = 0.0 RAD = BKG				
	13		PID = 0.0 RAD = BKG				
13.7							
	14	Clay w/ some SAND, brown soft moist to wet (CH)	PID = 0.0 RAD = BKG			SS TWP 838-14.0-3525	Sample @ 14.0'
	15	SAND with silt, fn gr brown, medium dense wet (SM)	PID = 0.0 RAD = BKG				
15.6							
	16	Clay w/ SAND fine grained brown, soft moist to wet (CH)	PID = 0.0 RAD = BKG				60" recovery
17.2	17						
	18	Clay, gray to brown gray w/ tr SAND & gravel soft ~~moist~~ wet (CH)	PID = 0.0 RAD = BKG				
	19		PID = 0.0 RAD = BKG				
19.3		fine SAND layer @ 19.3 - 19.5'	PID = 0.0 RAD = BKG				
	20						

PROJECT: NFSS EOBA 200

HOLE NO. TWP-838

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Set Temp well @ 0915

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: IWP-839

PROJECT: NFSS

INSPECTOR: LAW / JS

SHEET 1 OF 2 SHEETS

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	REPORT OF SAMPLE OR CORE FOR INT. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		Silty Clay loam w/organics roots, soft dk brown	PID 0.0 RAD ≤ BKG	H_2S = -1 O_2 = 22.0 CO = 0 LEL - 2	SS-TWP 839-3527		Sample @ 0940
	1	SAND w/silt & clay, ~~brown~~ fine gr brown	PID 0.0 RAD ≤ BKG				
1.6							
	2	Clay w/ Silt, s sand & gr Brown red brown & gray w red inclusions (few) stiff, moist (CL)	PID 0.0 RAD ≤ BKG				54" recovery
	3		PID 0.0 RAD ≤ BKG				
	4		PID 0.0 RAD ≤ BKG				
	5	Clay w/s sand & gravel Brown, red brown w/gray medium, moist (CH) to soft	RAD ≤ BKG PID 0.0				
	6		PID = 0.0 RAD ≤ BKG				60" recovery
	7		PID = 0.0 RAD ≤ BKG				
8.3	8	Silty sand w/tr gravel med to coarse gr, brown dense moist to wet (SM)	PID = 0.0 RAD ≤ BKG				
8.9	9	Clay w/ sand & gravel Brown, red brown to gray brown medium ~~to stiff~~, moist to soft (CH)	PID = 0.0 RAD ≤ BKG				
	10						

PROJECT: NFSS

HOLE NO.: IWP-839

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER TWP 939

PROJECT NFSS | INSPECTOR DAVIS | SHEET 2 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	SAMPLE NO. (4)	ANALYTICAL SAMPLE NO. (4)	BLOW COUNT (4)	REMARKS (5)
		Clay w/ sand & gravel brown, medium to soft moist (CH)	PID 0.0 RAD ≤ BKG	H_2S = 0.0 O_2 = 22.0 CO = 0.0 LEL = 0.0			60" recovery
	11						
		Softer w/depth	PID 0.0 RAD ≤ BKG				
	12						
			PID 0.0 RAD ≤ BKG				
	13						
			PID 0.0 RAD ≤ BKG			SB-TWP 939-14.0 3528	Lab sample @ 14.0 @ 1005
	14		PID 0.0 RAD ≤ BKG				
	15						
		Clay w/ Tr gravel, brown to gray brown soft wet (CH)	RAD ≤ BKG PID = 0.0				
	16						
			RAD ≤ BKG PID 0.0				
	17						
			RAD ≤ BKG PID = 0.0				40" recovery
	18						
			RAD ≤ BKG PID 0.0				
	19						
	20		RAD PID X				

PROJECT NFSS EOBO 20.0 | HOLE NO. TWP 939

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Set Temp Well @ 1020

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: TWP 84
1. COMPANY NAME: MAXIM	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston, NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5" CME Sampler; 2"x24" SP - Spoon; 4.25" HSA	8. HOLE LOCATION: Former Pond 4	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/18/03	11. DATE COMPLETED: 9/22/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 11.5'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 12' (15' on 9/22/03)	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	X	X	PCB, Pesticides, Rad			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGN[redacted]
		temp		

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT	HOLE NO.
NFSS	TWP84

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP840

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	RECOVERY SAMPLE OR CORE BOX NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
	1	Drk brn loam w/roots and small gravel	OVM 0.0 0	Rad Bkgd			SS-TWP-840-3 530 1540 0-0.5
	2	Brn-gray mottled silty clay w/Fe staining and some 1" ang gravel Dry stiff (CL)	0.00				5.0/4.8
	3		0.00				
	4						
	5		0.00				
	6						5.0/6.0
	7	gray clay interface?					no recovery will try 2' SS from 10-12
	8						
	9						

PROJECT: NFSS

HOLE NO.: TWP840

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: TWP840 | SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	SCREEN SAMPLE OR TIME PER INT. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Gray clay soft wet	OVM	Rad			2.0/1.6
			0.00	Bkgd			2' SS
	11						SB-TWP840-12.0 3531 1600 (11'-12')
		Gray Clayey sand wet (GC)	0.00	Bkgd			
	12	Gray clay soft wet					
		(CL)	0.00	Bkgd			9/22/03 added 3' to boring to get more water
	13						
	14		0.00	Bkgd			
	15	TD 15.0'					TWP set at 14.9'

PROJECT: NFSS | HOLE NO.: TWP340

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo	HOLE NUMBER: TWP 841	
COMPANY NAME: Maxim	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2'x2" split spoon; 4.25" HSA	8. HOLE LOCATION: Former Pond 5	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/18/03	11. DATE COMPLETED: 9/22/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 10' (15' on 9/22)	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	X	✓	PCB, Pesticide, Rad			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. [redacted]
		Temp		

LOCATION SKETCH/COMMENTS **SCALE:**

PROJECT	HOLE NO.
NFSS	TWP 841

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: TWP841 | SHEET 2 OF 2 SHEETS

ELEV. (1)	DEPTH (2)	DESCRIPTION OF MATERIALS (3)	FIELD SCREENING RESULTS (4)	SCOPE OF SAMPLE OR CORE BOX NO. (5)	ANALYTICAL SAMPLE NO. (6)	BLOW COUNT (7)	REMARKS (8)
		Loam w/ roots + small gravel dry	ppm	Rad			CME
	1	Brn-gray mottled silty clay w/Fe staining and some small gravel.	0.00	Bkgd			5.0/5.0 SS-TWP841-3533
	2	Dry stiff	0.00	Bkgd			0-1' (large volume of sample) 1430
	3						
	4	(CL)	0.00	Bkgd			
	5	more moist					
			0.00	Bkgd			
	6	Gray clay very plastic soft (PP 0.5)					
	7		0.00	Bkgd			5.0/5.0
		very moist					
	8						
			0.00	Bkgd			
	9						SB-TWP-841-10.0-3534 9.0-10.0 1445
		TD 10.0'	0.00	Bkgd			

PROJECT: NFSS | HOLE NO.: TWP841

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TCP-841

PROJECT:

INSPECTOR:

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (2)	SOIL/GAS SAMPLE NO. CORE PUSH NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		Cont	OVM	Reel			9/20/03 add 5' to original boring to clay and get well
	11	Gray clay soft wet plastic	0.00	Bkgd			
	12		0.00				
	13	(CL)	0.00				
	14		0.00				
	15	TD 15.0'					

PROJECT:

HOLE NO.:

HTRW DRILLING LOG

1. COMPANY NAME: [illegible]	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	DISTRICT: Buffalo
		HOLE NUMBER: TWP 842
		SHEET 1 OF 2 SHEETS

3. PROJECT: NFSS	4. LOCATION: Lewiston, NY
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME sampler; 2" x 2" split spoon; 4.25" HSA	8. HOLE LOCATION: E of IWCS
	9. SURFACE ELEVATION:
	10. DATE STARTED: 9/18/03 — 11. DATE COMPLETED: 9/18/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: 7.5'
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA
14. TOTAL DEPTH OF HOLE: 10'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	X	X	PCB, Pesticides, Rad			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. [redacted]
		temp		

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT: NFSS	HOLE NO.: TWP 842

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: TWP 842 | SHEET 2 OF 2 SHEETS

ELEV. (3)	DEPTH (ft)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (7)	REPRESENTATIVE SAMPLE INTERVAL FOR TA (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		Loam w/ roots grass	0.0	Rad			SS-TWP842-3536 MS/MSD 0-1½ (0800) 5.0/4.2
	1	Brn silty clay w/Fe staining and small gravel dry stiff	0.00	Bkgd			
	2						
	3						
	4	moist (CL)					
	5						
	6	soft plastic	0.00	Bkgd			
	7						
	8	gray clay very soft wet					TWP set at 10.0
		(GC) gray sand wet					SB-TWP-842-10.0 3537: 9-10' 0830
	9	(CL) gray clay very soft wet					
		(GC) gray sand					

PROJECT: NFSS TD 10.0' | HOLE NO.: TWP842

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: TWP 843
1. COMPANY NAME: Maxim	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME sampler; 2' x 2" split spoon; 4.25' HSA	8. HOLE LOCATION: Former North Pond	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/19/03	11. DATE COMPLETED: 9/22/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: NA	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 12' (15' on 9/22)	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	X	X	PCB, Pesticides, Rad			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGN[redacted]
		temp		

LOCATION SKETCH/COMMENTS **SCALE:**

PROJECT	HOLE NO.
NFSS	TWP 843

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 843

PROJECT: NPSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (3)	DEPTH (8)	DESCRIPTION OF MATERIALS (14)	FIELD SCREENING RESULTS (4)	SOIL/GAS SAMPLE PID/OVM, ppm (14)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Drk brn loam w/ roots and small gravel dry	OVM	Rad			SS-TWP843-3539
	1	Brn clay w/ some large gravel dry stiff	0.00	Bkgd			0-0.5' 9.15
	2		0.00				5.0/5.0
	3	Brn-gray mottled silty clay w/ Fe staining and small gravel dry stiff	0.00				
	4	(CL)					
	5	sand lens sli moist	0.00				
	6		0.00	Bkgd			5.0/5.0
	7	softer more moist	0.00				
	8		0.00				
	9	Gray clay w/ some pockets of Fe staining very soft wet	0.00				SB-TWP843-10.0-3540 9.5-10' C0930

PROJECT: NPSS

HOLE NO.: TWP 843

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 843

PROJECT: NPSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	SENSITIVE SAMPLE OR CORE FOR DIS. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		gray clay very soft wet	OVM	Rad			Dropped 2' split spoon; drove itself under weight of rod 2.0/2.0
	11		0.00	Bkgd			
	12						
			0.00	Bkgd			set 7 wp at 10.0 9/22/03 take boring to 15' to try and get water
	13	(CL)	0.00				
	14		0.00				
	15	TD 15.0'					

PROJECT: NPSS

HOLE NO: TWP 843

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT	Buffalo
HOLE NUMBER	TWP844
1. COMPANY NAME	Maxim
2. DRILLING SUBCONTRACTOR	Subsurface Drilling Solutions
SHEET	1 OF 3 SHEETS
3. PROJECT	NFSS
4. LOCATION	Lewiston, NY
5. NAME OF DRILLER	Jeff Grant
6. MANUFACTURER'S DESIGNATION OF DRILL	Mobile 59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	5' CME sampler 2"x2" split spoon 4.25" HSA
8. HOLE LOCATION	Former South Pond
9. SURFACE ELEVATION	
10. DATE STARTED	9/19/03
11. DATE COMPLETED	9/19/03
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	≈ 10.5
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14. TOTAL DEPTH OF HOLE	12'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA
18. GEOTECHNICAL SAMPLES	NA
DISTURBED	
UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES	NA
20. SAMPLES FOR CHEMICAL ANALYSIS	
VOC	X
METALS	X
OTHER (SPECIFY)	PCB, Pesticides, Rad
OTHER (SPECIFY)	
OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY	%
22. DISPOSITION OF HOLE	
BACKFILLED	
MONITORING WELL	Temp
OTHER (SPECIFY)	
23. SIGN	[redacted]

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT	NFSS
HOLE NO.	TWP844

HTRW DRILLING LOG (CONTINUATION SHEET)

PROJECT: NFSS | INSPECTOR: M. Sievers | HOLE NUMBER: TWP 844 | SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	SAMPLE RECOVERY (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Brn loam w/roots	OVM	Rad			SS-TWP844. 3542 (0'-0.5') 1100 5.0/5.0
	1	Brn silty clay w/fe staining and some 1" gravel stiff dry	0.00	Bkgd			
	2		0.00				
	3	(CL)	0.00				
	4	Brn-gray mottled silty clay w/fe staining and some small gravel stiff sl moist	0.00				
	5		0.00	Bkgd			5.0/5.0
	6						
	7		0.00				
	8	less stiff more moist	0.00				
	9	Gray clay med soft moist	0.00				

PROJECT: NFSS | HOLE NO.: TWP 844

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 844

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (8)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	DEPTH OF SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		cont Gray clay	0 ppm	Rad			2.0/2.0
		Gray coarse sand w/some 1" gravel (GC)	0.00	Bhgd			SB-TWP844-11.0-3543 (10.5-11.0) 1115
		Free water					
	11	Gray clay soft wet	0.00				
	12						TWP set at 12.0'

PROJECT: NFSS

HOLE NO.: TWP 844

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo	HOLE NUMBER: TWP 845	
1. COMPANY NAME: Maxim	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston, NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME SAMPLER; 2' x 2" SPLIT SPOON; 4.75" HSA	8. HOLE LOCATION: Former West Pond	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/19/03	11. DATE COMPLETED: 9/19/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 10.5'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
	X	X	PCB, Pesticides, Rad			

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF IN[redacted]
		TEMP		

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT	HOLE NO.
NFSS	TWP845

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 845

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	SCHEDULE SAMPLE INTERVAL SAMPLE NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Drk brn loam	OVM	Rad			SS-TWP845-
		Brn silty clay w/Fe staining and some 1" gravel.	0.00	Bkgd			3545 + QC
	1	stiff Dry					(0-0.5)
							1200
			0.00				
	2	(CL)					
	3						5.0/4.7
			0.00				
	4						
		Brn-gray silty clay w/Fe staining and some small gravel stiff sl moist					
	5		0.00				
			0.00	Bkgd			
	6						
			0.0				
	7						5.0/5.0
			0.00				
	8						
	9		0.00				
		Brn-gray sandy silty clay moist					

PROJECT: NFSS

HOLE NO.: TWP845

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 845

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REPRESENTATIVE SAMPLE NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Brn-gray silty clay silt w/ist	0 ppm	Bkgd			3.0/3.0
	11	Brn silty clay w/ 1" gravel	0.00	Bkgd			
		Free water					SB-TWP845-13.0 -3536
	12	(CL)	0.00				12.5-13.0 1230
	13						
		Gray clay soft wet	0.00	Bkgd			2' split spoon
	14		0.00				2.0/2.0
	15						
							TWP set at 13.0'

PROJECT: NFSS

HOLE NO.: TWP845

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo	HOLE NUMBER: TWP. 846/847	
COMPANY NAME: MAXIM Tech	2. DRILLING SUBCONTRACTOR: C&W ENV. Drilling	SHEET 1 OF 5 SHEETS

3. PROJECT: NFSS	4. LOCATION: Lewiston NY
5. NAME OF DRILLER: Phil Bence	6. MANUFACTURER'S DESIGNATION OF DRILL: CME
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: CME Drill Rig; 3" x 5' SAMPLER; SS Bowls - Spoons; DI/Liquinox Clean	8. HOLE LOCATION: SE of Cap Area
	9. SURFACE ELEVATION:
	10. DATE STARTED: 9-19-03 / 11. DATE COMPLETED: 9-19-03
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED:
13. DEPTH DRILLED INTO ROCK:	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: TWP 846 - 17.0' TWP. 847 = 12.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

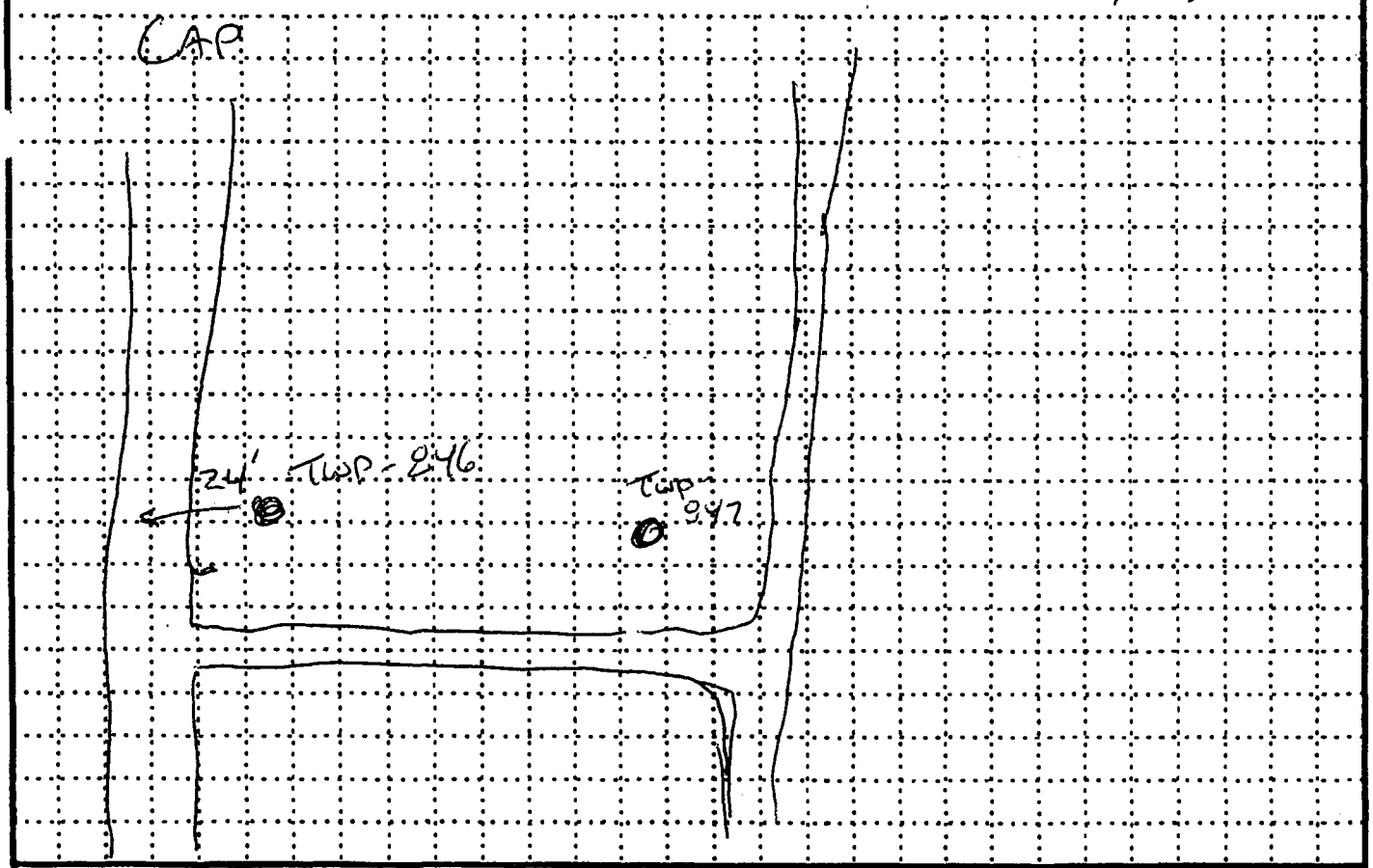
18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	~~19. TOTAL NUMBER OF CORE BOXES~~
None			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR

LOCATION SKETCH/COMMENTS

SCALE: NTS



PROJECT: NFSS	HOLE NO.: TWP. 846/847

TWP 846 SS - TWP 946 - 3549

SB - TWP 846 - - 3549

9-19-03 11:15 Start

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-846

PROJECT: NFSS | INSPECTOR: CAW/MAG | SHEET 1 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (2)	SCOPED SAMPLE NO. CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
	1	Clayey Silt w/SAND & gravel, organics (roots etc) brown to dark brown, soft moist (ML)	RAD= PID=0.0	RAD Bkg 320 PID=0.0 H_2S=0 O_2=21.9 LEL=0 CO=0			48" recovery
1.6'			RAD≤ Bkg PID=0.0				
	2	Silt w/ fine gr SAND, & gravel Red brown to red w/ gray med dense, moist (ML)					
	3		RAD≤ Bkg PID=0.0				
	4		RAD≤ Bkg PID=0.0				
	5		RAD≤ Bkg PID=0.0				
		Cobbles @ 5.5					Cobble prevented sampler from advancing
	6	to 9.5'					
	7	No sample w/ 3" sampler					Cobbles/gravel
	8	Hard drilling w/ sampler					
	9						
	10						

PROJECT: NFSS | HOLE NO.: TWP - 846

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 846

PROJECT: NFSS | INSPECTOR: CAW - MAG | SHEET 2 OF 2 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	SOIL SAMPLE OR CORE FOR DR. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
2' Split Spoon	11	SAND w/silt & gravel, Cobbles med to coarse grained, brown to red brown, dense, moist (SM-GM)	H_2S - 0.0 O_2 - 22.9 CO = 0.0 LEL - 0.0	PID = 0 RAD ≤ Bkg			
				PID = 0.0 RAD ≤ Bkg			2' Recovery
	12	Moist to 13'		PID = RAD ≤ Bkg			
2' SS		SAND w/silt & Gravel, Fine grained brown, dense, moist (SM)					
	13	WET 13-14'		PID = 0.0 RAD ≤ Bkg			2' Recovery
	14	Clay, w/tr sand & gr gray to gray brown, soft, wet (CH)		PID = 0. RAD ≤ Bkg			
2' SS	15	@ 14.5'		RAD ≥ Bkg PID = 0.			16" recovery
	16			SB-TWP 846-16.0-3549			Pushed 3" sample LAB SAMPLE @ 16.0
	17	EOB @ 17.0 Set Temp Well @ 14.5 ON 9-19-03					
	18						
	19						

PROJECT: NFSS | HOLE NO. TWP 846

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-TWP 846 - 16.0 - 3549

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-847

PROJECT: NFSS | INSPECTOR: CAW/MAG | SHEET 1 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (7)	SCOOP OR SAMPLE BY CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (6)	REMARKS (8)
		Clayey Silt w/SAND & gr Gray to dk gray brown w/orgnics medium, moist (ML)	H_2S - 0 O_2 - 21.9 CO = 0 LEL 0	PID 0.0 RAD ≤ BKG	SS-TWP-847 3551 0-6"		LAB SAMPLE 0-6"
	1			PID = 0.0 RAD ≤ BKG			
1.8'							60" recovery
	2	Clayey Silt w/ SAND & gravel brown w/ red brown, red iron inclusions & Light gray mottles/gleying medium Moist (ML)		PID = 0.0 RAD ≤ BKG			
	3			PID = 0.0 RAD ≤ BKG			
	4	SAND w/silt, fine grained brown - dk red browns dense moist (SP-SM)		PID 0.0 RAD ≤ BKG			
	5	Silty Clay w/SAND & Gravel Brown to Lt brown w/ grey Red Iron inclusions, med to Stiff, moist (ML-CL)		PID 0.0 RAD ≤ BKG			
	6			PID 0.0 RAD ≤ BKG			
	7			PID = 0.0 RAD ≤ BKG			60" Recovery
	8			PID = 0.0 RAD ≤ BKG			
	9	9.7' Clay, ~~w/silt~~, gray to grey brown, w/ red streaks Soft moist (CH)	Tr SAND & Tr gravel	RAD ≤ BKG PID = 0.0			
	10						

PROJECT: NFSS | HOLE NO.: TWP-847

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS-TWP847-3551

SB-TWP847- -3552

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-847

PROJECT: NFSS

INSPECTOR: CAW/MAG

SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SENTRY SAMPLE OR CORE FOR INS. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	11	Clay ~~[illegible]~~, Tr SAND & Tr gravel gray to gray brown w/red streaks, Soft moist-wet (CH)	H_2S - 0.0 O_2 = 21.9 CO = 0.0 LEL = 0		SB-TWP 847-10-3552		Sample @ 10' @ 15:15
	12						
		EOB @ 12.5					
	13	Set Temp Well @ 16:00					
	14						

PROJECT: NFSS

HOLE NO. TWP-847

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

TWP MCS

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER ~~MW~~-848

PROJECT NFSS | INSPECTOR DAW / TL | SHEET 1 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SCREENING SAMPLE NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
.7		Silty Clay Loam Topsoil organics, roots, dk brown soft moist	PID=0 RAD= Bkg	PID=0.0 RAD Bkg =200	Sample SS-TWP 848-3554		Sample @ 0815 54" Recovery
	1	Silty Clay w/SAND & gravel, brown, gray brown & gray stiff, moist (CL)	PID=0 RAD= Bkg	H_2S=0 O_2=22.1 CO=0 LEL=0			
	2	Cinders to 3" in from .7 to 1.5	PID= RAD= Bkg				
	3						
	4		PID=0.0 RAD= Bkg				
	5	w/ Red/brown red Inclusions	PID=0.0 RAD= Bkg				
	6	Silty clay w/SAND & gravel Brown, gray brown w/gray w/few red incl, med to soft, moist (CL)	PID=0.0 RAD= Bkg				
	7		PID=0.0 RAD= Bkg				
	8	Softer w/depth & less silt	PID=0.0 RAD= Bkg				
	9		PID=0.0 RAD= Bkg				
	10		PID=0.0 RAD= Bkg				

PROJECT NFSS | HOLE NO. MW-848

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SB-TWP848 _____ -3555

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 848

PROJECT: NFSS

INSPECTOR: CAW/TL

SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	SEMI-CO SAMPLE OR CORE PER NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Clay, ~~[illegible]~~ silt, ~~[illegible]~~ tr sand, tr gravel, brown gray brown, w/few red incl.	PID= RAD≤ BKG	H_2S: 0 O_2: 21.9 CO: 0 LEL: 0			
	11	Soft moist (CL) to 11.5	PID=0.0 RAD≤ BKG		Lab sample SB-TWP 848-11.0-3555		Sample @ 0.50
		thin fine sand layer 2.1' @11.6					60" recovery
	12	Clay: gray to gray brown soft moist to wet (CH)	PID=0.0 RAD≤ BKG				
	13		PID=0.0 RAD≤ BKG				
		Softer w/depth					
	14		PID=0.0 RAD≤ BKG				
	15						
			PID=0.0 RAD≤ BKG				
	16	Wet @ 16.0'					
			PID=0.0 RAD≤ BKG				60" recovery
	17						
		Fine sand silt layer @ 17.5 2.1'	PID=0.0 RAD≤ BKG				
	18						
	19		RAD≤ BKG PID=0.0				
	20		RAD≤ BKG PID=0.0				

PROJECT: NFSS

EOB @ 20' @ 0905

HOLE NO. TWP 848

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

Set Temp Well

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-849

PROJECT: NFSS | INSPECTOR: CAW / TL | SHEET 1 OF 2 SHEETS

BLOW (#)	DEPTH (ft)	DESCRIPTION OF MATERIALS (#)	FIELD SCREENING RESULTS (#)	DEPTH OF SAMPLE OR CORE RUN DIA. (#)	ANALYTICAL SAMPLE NO. (#)	BLOW COUNT (#)	REMARKS (#)
.7		Silty Clay loam Topsoil, organics dk brown, stiff, moist to 0.7 C	PID=0.0 RAD≤Bkg	RAD Bkg = 150	Sample SS-TWP 849-3557		LAb sample @ 950 60" recovery
	1	Silty Clay w/sand & gravel Brown, brown gray & gray w/few red inclusions med to stiff moist (CL)	PID=0.0 RAD≤Bkg	PID=0.0 FN BE			
	2	gravel/cobbles @ 0.7 to 1.5	PID=0.0 RAD≤Bkg	H_2S-0 O_2=22.1 CO=0 LEL=0			
	3	Gravel/Cobbles	PID=0.0 RAD≤Bkg				
	4		PID=0.0 RAD≤Bkg				
	5						56" recovery
	6	Gravel/Cobbles	RAD≤Bkg PID=				
	7		RAD≤Bkg PID=				
	8	Silty Clay with silt, sand & S. Gravel, brown to ~~brown to~~ red brown, stiff moist. (CL)	RAD≤Bkg PID=				
	9		RAD≤Bkg PID=				
	10	Getter w/ depth less silty	RAD≤Bkg PID=				

PROJECT: NFSS | HOLE NO: TWP-849

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS-TWP849-3557

SB-TWP849-3559

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 849

PROJECT: NFSS

INSPECTOR: CAW/TL

SHEET 2 OF 21 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	REMOTE SAMPLE OR CORE BOX NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		SAME	RAD ≤ BKG PID	H_2S = 6.0 O_2 = 22.6 CO = -1 LEL = -3	Sample SB-TWP 849-11.0-3558		Lab Sample @ 11.0' 1040
	11	Tr. gravel Clay, gray to graybrown w/red streaking, soft moist to wet (CH)	RAD ≤ BKG PID = 0.0				
	12		RAD ≤ BKG PID 0.0				
	13		RAD ≤ BKG PID ≥ 0.0				
	14		RAD ≤ BKG PID 0.0				
	15	silt layer ~0.2' @ 15.2 (ML)	RAD ≤ BKG PID = 0.0				
		SAME					
	16		RAD ≤ BKG PID 0.0				
	17	Softer & wetter w/ Depth	RAD ≤ BKG PID = 0.0				
		fine grained sand layer @ 17.5 (SP) < 0.1'					
	18		RAD ≤ BKG PID = 0.0	H_2S = 0 O_2 = 22.0 CO = 1 LEL = 2			
	19	(CH)	RAD ≤ BKG PID = 0.0				
	20						

PROJECT: NFSI EOB @ 20.0

HOLE NO. TWP-849

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Set Temp Well @ 20.0

@ 11[00]

9-21-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-850

PROJECT: NFSS

INSPECTOR: CAW/TL

SHEET 1 OF 2 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	DEPTH OF SAMPLE OR CORE RUN (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		Silty Clay loam topsoil w/organics, dk brown, soft dry to moist	PID=0 RAD≤Bkg	RAD Bkg=175	SS-TWP 850-3560		Sampled @ 1300
	1	Silty Clay w/sand: gr Brown, Brown gray. Stiff moist (CL)	RAD≤BG PID=0	PID in BZ=0 H_2S=0 O_2=22.1 CO=0 LEL=-1			SS-TWP850-3560 w/MS/MSD 57" recovery 0-5
	2						
	3		RAD≤BG PID=0.0				
	4		RAD≤Bk PID=0.0				
	5	Silty Clay w/SAND: gravel, brown, brown gray w/light brown: gray ~~soft to~~ medium to stiff moist (CL)	RAD≤Bkg PID=0.0				
	6		PID= RAD≤Bkg				
	7	Fine silty SAND layer 0.2' @ 7.5	PID RAD≤Bkg				60" recovery 5'-10'
	8		PID= RAD≤Bkg				
	9	Silty FINE SAND layer <0.1' @ 9.0	PID= RAD≤Bkg				
	10		PID=0.6 RAD≤Bkg				

PROJECT: NFSI

HOLE NO.: TWP-850

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS-TWP850-3560 MS/MSD 3 cuts

CA-TWP850 - -3561 QC

9-21-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: ~~Des~~ Twp 850

PROJECT: NFSS

INSPECTOR: CAW / TL

SHEET 2 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	REMOTE SAMPLE OR CORE BOX NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Clay w/trace SAND · gravel	PID=	H_2S= O_2= CO= LEL= in BZ			
	11		PID=				
	12		PID=				
	13	Clay, w/trace gravel gray to gray brown soft, moist to wet (CH)	PID=				
	14		PID= RAD				
	15	Red Iron streaking (few) through Profile	PID= RAD ≤ Bkg				
	16	Wetter = softer w/depth	PID= RAD ≤ Bkg				
	17		PID= RAD ≤ Bkg				
	18		PID= RAD ≤ Bkg				
	19		PID= RAD ≤ Bkg				
	20						

PROJECT: NFSS TD @ 20.0'

HOLE NO.: Twp-850

ENG FORM 5056A-R, AUG 94 ≈ 1410

(Proponent: CECW-EG)

9-21-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-851

PROJECT: NFSS

INSPECTOR: GW/TL

SHEET 1 OF 2 SHEETS

ELEV. (+)	DEPTH (ft)	DESCRIPTION OF MATERIALS (+)	FIELD SCREENING RESULTS (+)	REPRESENTATIVE SAMPLE OR CORE RUN NO. (+)	ANALYTICAL SAMPLE NO. (+)	BLOW COUNT (+)	REMARKS (+)
		Silty Clay Lean Topsoil w/organics	PID=0.0 RAD≤BK	H_2S=0.0 O_2=22.1 CO=0 LEL-1 @ BZ	Sample ID SS-TWP 851 3563		Sampling @ 15:00
	1	Clay w/silt, s. SAND & gravel Brown, Graybrown & gray stiff moist (CL)	PID=0.0 RAD≤Bkg				60" recovery
	2		PID=0.0 RAD≤Bkg	RAD Bkg = 175			
	3		PID=0.0 RAD≤Bkg				
	4		PID=0 RAD≤Bkg				
	5	Silty Clay w/SAND & gravel Brown, Browngray & gray w/red iron inclusions	PID=0 RAD≤Bkg				
	6	stiff moist (CL)	PID=0 RAD≤Bkg				60" recovery
	7		PID=0 RAD≤Bkg				
	8	Silty fine SAND layer ~~[illegible]~~ moist brown (SM) @ 8.2' to 9.2	PID=0 RAD≤Bkg				
	8	↓	PID=0.0 RAD≤Bkg	H_2S=-1 O_2=22.0 CO=-1 LEL-2			
	9	Fine Silty SAND layer ~0.1' @ 9.2'	PID=0 RAD≤Bkg				
	10						

PROJECT: NFSS

HOLE NO. TWP-851

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS-TWP851 - 3563

SBTWP-851- -3564

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 851

PROJECT: NFSS | INSPECTOR: CAW/TL | SHEET 2 OF 2 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (5)	HEADSPACE SAMPLE PID CONC. (6)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (8)	REMARKS (9)
		Clay w/ Silt, S. SAND & gr Brown, ~~to~~ medium, moist (CL)	PID = 0.0 RAD ≤ Bkg	H_2S = O_2 = 21.8			
11	11			CO = 0			
		Silty SAND w/s clay trace fine gravel, brown medium dense, moist (SM)	PID = 0.0 RAD ≤ Bkg	LEL = 0			
12.1	12						
		Clay, w/ TR. SAND & gravel, gray to gray brown, soft moist (CH)	PID = 0.0 RAD ≤ Bkg				
	13						
		Softer w/ depth & wetter	PID = 0.0 RAD ≤ Bkg				
	14		RAD ≤ Bkg PID = 0.0				
	15		PID = 0.0 RAD ≤ Bkg				
	16		PID = 0.0 RAD ≤ Bkg				
	17		PID = 0.0 RAD ≤ Bkg				
18	18	~~Silty~~ Silt w/ fine gr SAND & Clay, soft, wet ML	PID = 0.0 RAD ≤ Bkg		SAMPLE SB-TWP 851-18.0 3564		SAMPLE @ 15:20
18.9	19	Clay w/ S SAND & TR Gravel gray to gray brown Soft, moist (CH)	PID = 0.0 RAD ≤ Bkg	H_2S = 0.0 O_2 = 22.2 CO = 0 LEL = 1			
	20						

PROJECT: NFSS EOBW 201.0 | HOLE NO.: TWP 851

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Set Temp Well @ 15:30

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: TWP 852
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CMT Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION: Blk 409	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 9/30/03	11. DATE COMPLETED: 9/30/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 13.5'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 20'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
		Temp		

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	TWP 852

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 852

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	SCOT CORE SAMPLE OR CORE FOR DIS. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Brn loam dry	OVM	Rad			SS-TWP852-3566 0.0-0.5 1330
	1	Brn silty clay w/fe staining and some small gravel loose dry (CL)	0.00	Rad			5.0/4.2
	2		0.00				
	3	Brn gray mottled silty clay w/fe staining and some small gravel stiff sl moist	0.00				
	4						
	5		0.00				
	6	Brown silty sand saturated soft very fine (SM)	0.00	Rad			5.0/5.0
	7	Dark brn silty clay w/fe staining and some small gravel stiff moist (CL)	0.00				
	8		0.00				
	9	Dark brn clayey silt w/fe staining and some small gravel stiff moist					

PROJECT: NFSS

HOLE NO.: TWP 852

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 852

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (2)	DEPTH (3)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (5)	REC'D OR SAMPLE RECOVERY NO. (6)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (8)	REMARKS (9)
		cont					
		Drk brn clayey silt w/some 1" gravel wet	OVM 0.0	Rad Bkgd			
	11						
		(CL)	0.0				
	12						5.0/5.0
		Some Sand					
	13		0.0				
		Brn silty sand w/some 1" gravel very wet					
	14	(SM)	0.0				SB-TWP852-15.0-3567 14.5'-15.0 (1400)
	15	Brn clayey silt wet	0.0	Bkgd			
	16	grading to gray more clay	0.0				5.0/5.0
	17						
	18	Gray clay soft wet (CL)	0.0				
	19		0.0				
		TD 20.0'					

PROJECT: NFSS

HOLE NO: TWP 852

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-853

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 1 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	GEOTECH SAMPLE RECOVERY DIR. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
0.0		Silty Clay loam	PID=0 RAD≤BKG	RAD BKG=200 PIP=0.0	SS-TWP 853-3569		Sample @ 1345
	1	Silty Clay w/s. sand·gravel Brown w/some red·gray inclusions stiff to medium moist (CL)	PID=0 RAD≤BKG	H_2S=0.0 O_2=21.0 CO=0 LEL=0			
	2		PID=0 RAD≤BKG				
	3		PID=0 RAD≤BKG				
	4		PID=0 RAD≤BKG				
	5	Silty Clay w/s. sand & gravel, Red brown, w/ gray, red inclusions (few) Stiff, moist (CL)	PID= RAD≤				
	6		PID= RAD≤				
	7		PID= RAD≤				
	8		PID= RAD≤				
	9		PID= RAD≤				
	10		PID= RAD≤				

PROJECT: NFSS | HOLE NO. TWP 853

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 853

PROJECT: NFSS

INSPECTOR: CAW/JS

SHEET 2 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	HEADSPACE SAMPLE OR CORE (MM DIA. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Layer refusal @10'12	PID = 0.0 RAD ≤ Bkg	H_2S = 0.0 O_2 = 21.9 CO = 0 LEL = 0			20" recovery
		Cobbles					
	11	Silty Clay w/ SAND & gravel Red brown, brown, gray stiff moist (CH)					
			PID = 0.0 RAD ≤ Bkg				
	12						
	13						
	14	Clay with S. SAND & Gravel Gray - Gray brown, w red streaks Soft, moist (CL) to wet					
	15		PID = 0.0 RAD ≤ Bkg	SB			60" recovery
	16	Softer w/ depth	PID = 0.0 RAD ≤ Bkg				
	17		PID = 0.0 RAD ≤ Bkg	SB-TWP 853-10.5 3570			Sampled 1410
	18		PID = 0.0 RAD ≤ Bkg				
19.0 / 19.2	19	Silt Layer, brown, red brown, dense wet (ML)	PID = 0.0 RAD ≤ Bkg				
	20						

PROJECT: NFSS EOBD 20.0'

HOLE NO.: TWP - 853

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Set Well @ Temp 1430

1 of 2

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-E54

PROJECT: NFSS

INSPECTOR: CAW/RS

SHEET 1 OF 2 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	HEADSPACE SAMPLE OR CORE FOR DIL (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
0.7		Silty clay brown Topsoil	PID = RAD ≤ Bkg	RAD Bkg = 200 PID = 0.0	SS-TWP E54-3572		Sample @ 1115
	1	Silty Clay w/sand & gravel, brown - red brown w/gray, stiff moist (CL)	PID = RAD ≤ Bkg				
	2		PID = RAD ≤ Bkg				
	3		PID = RAD ≤ Bkg				
	4		PID = RAD ≤ Bkg				
	5	Clay w/s. sand & gravel red brown, brown, gray w/red inclusions (few) medium to soft, moist (CL)					
	6		PID = RAD ≤ Bkg				
	7		PID = RAD ≤ Bkg				
	8	Sitter w/depth	PID = RAD ≤ Bkg				
	9		PID = RAD ≤ Bkg				
	10		PID = RAD ≤ Bkg				

PROJECT: NFSS

HOLE NO.: TWP E54

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-854

PROJECT: NFSS | INSPECTOR: DAW/JS | SHEET 2 OF 2 SHEETS

BLOW (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (6)	FIELD SCREENING RESULTS (7)	REPRESENTATIVE SAMPLE OR CORE FOR NO. (8)	ANALYTICAL SAMPLE NO. (9)	BLOW COUNT (10)	REMARKS (11)
		Clay w/SAND & gravel Brown, red brown w/gray Soft moist (CH)	PID=0.0 RAD≤ BKg	H_2S = 0 O_2 = 22.0 CO = 0 LEL = 0			
	11		PID=0.0 RAD≤ BKg				
		Softer w/depth					
	12	SAND w/silt & clay, gray to gray brown, moist to wet	PID=0.2 RAD≤ BKg				
	13						
		Silty SAND layer.	PID=0.1 RAD≤ BKg		SB-TWP 854-13.0 3573		LAB Sample @ 13.0 @ 1146
	14						
		Silt & silt w/ SAND layer red brown - brown dense wet	PID=0.1 RAD≤ BKg				
	15						
		Clay, Gray to gray brown w/s. SAND & gravel Soft, wet (CH)	PID=0.0 RAD≤ BKg				
	16						
			PID=0.0 RAD≤ BKg				
	17						
			PID=0.0 RAD≤ BKg				
	18						
			PID=0.0 RAD≤ BKg				
	19						
			PID=0.0 RAD≤ BKg				
	20						

PROJECT: NFSS EOB @ 20.0 | HOLE NO. TWP 854

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

Set Temp Well @ 1150

S End of Cap ~ Center 9-30-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-855

PROJECT: NFSS | INSPECTOR: DAW / JS | SHEET 1 OF 2 SHEETS

BLOW (4)	DEPTH (B)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	REPRESENTATIVE SAMPLE NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (H)	REMARKS (8)
0.0		Silty Clay loam Topsoil	PID=0 RAD≤BKg	H_2S=0 O_2=21.9	SS-TWP 855-3575 @1505		Sample @ 1505
	1	Clay w/silt, sand & gravel Brown, gray w/ Red Inclusions stiff moist (CH)	PID=0 RAD≤BKg	CO=0 LEL=-1 RAD BKg=200			52" recovery
	2		PID=0 RAD≤BKg				
	3		PID=0 RAD≤BKg				
	4		RAD≤BKg PID~0				
	5						
6.5	6	Clay	PID=0.0 RAD≤BKg				60" recovery
	7	Clay, Red brown - brow with s. sand & gravel stiff to medium, moist (CH)	PID 0.0 RAD≤BKg				
8.0 8.2	8	SAND Fine grained w/silt, brown dense moist (SM)	PID 0.0 RAD≤BKg				
9.6	9	Clay (same)	PID 0.0 RAD BKg≤				
	10	SAND with silt, fine grained, brown dense moist-wet (SM)	PID=0.0 RAD BKg≤				

PROJECT: NFSS | HOLE NO.: TWP 855

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

9-30-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-855

PROJECT: NFSS

INSPECTOR: CAW/DS

SHEET 2 OF 2 SHEETS

ELEV. (3)	DEPTH (B)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	GEOTECH SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (9)
		SAND w/silt, fine gr. brown dense moist-wet (SM)	PID=0 RAD≤Bkg	H_2S=0 O_2=21.9 CO=0.0 LEL=0			
10.8							
	11	Clay w/s. SAND & gravel brown, red brown & gray med to stiff, moist (CH)	PID=0.0 RAD≤Bkg				
	12		PID=0.0 RAD≤Bkg				
	13		PID=0.0 RAD≤Bkg				
	14		PID=0.0 RAD≤Bkg				
14.7	14	Silty SAND w/clay brown, gray brown, moist			TWP-855-15.0 3576		SAMPLE @ 1535 @ 15.0'
	15						
	15		PID=0.0 RAD≤Bkg				
16.3	16						
	16	Clay w/fr SAND & gravel Gray to Gray Brown Soft, wet (CH)	PID=0.0 RAD≤Bkg				
	17						
	18	½ fine gr sand silt lenses throughout	PID=0.0 RAD≤Bkg				
	18			H_2S=0 O_2=22.0 CO=-1 LEL=2			
	19		PID=0 RAD≤Bkg				
	20	EOB @ 20.0'	PID=0 RAD≤Bkg				

PROJECT: NFSS Set Temp Well

HOLE NO. TWP-855

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

@ 16.00

HTRW DRILLING LOG

DISTRICT	Buffalo
HOLE NUMBER	TWP 856
1. COMPANY NAME	Maxim Technologies
2. DRILLING SUBCONTRACTOR	Subsurface Drilling Solutions
SHEET	1 OF 3 SHEETS
3. PROJECT	NFSS
4. LOCATION	Lewiston NY
5. NAME OF DRILLER	Jeff Grant
6. MANUFACTURER'S DESIGNATION OF DRILL	Mobile 59
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	5' CME Sampler 2' split spoon 4.25" ID HSA
8. HOLE LOCATION	
9. SURFACE ELEVATION	
10. DATE STARTED	10/2/03
11. DATE COMPLETED	10/2/03
12. OVERBURDEN THICKNESS	NA
15. DEPTH GROUNDWATER ENCOUNTERED	~ 9'
13. DEPTH DRILLED INTO ROCK	NA
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	NA
14. TOTAL DEPTH OF HOLE	20.0'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	NA

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNA[redacted]
		Temp		

LOCATION SKETCH/COMMENTS **SCALE:**

PROJECT	HOLE NO.
NFSS	TWP 856

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 856

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 2 OF 3 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (4)	GEOTOP SAMPLE OR CORE PIC NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (4)	REMARKS (8)
		Drk brn loam loose sl moist	0.00	Red			SS-TWP856-3578
	1	Brn clayey silt loose dry	0.00	Bkgr			0.0-0.5 (1.00)
	2	Brn-gray silty clay w/Fe staining and some small gravel	0.00				
	3	stiff slmoist	0.00				5.0/5.0
	4	(CL)					
	5		0.00				
	6	more gray soft moist	0.00	Bkgd			
	7		0.00				5.0/5.0
	8		0.00				
	9	Gray-brn clayey silty sand very fine soft wet (SM)	0.00				

PROJECT: NFSS

HOLE NO.: TWP 856

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: Twp 856

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

BLOW (3)	DEPTH (b)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (5)	REMOTE SAMPLE OR CORE FOR OC (6)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (8)	REMARKS (9)
		cont gray-brn clayey silty sand very fine	ppm	Red			
		soft wet	0.00	Bkgd			SB-Twp 856-11.0 - 3529
	11						10.0-11.0
		gray-brn silty clay w/Fe staining and	0.00				1120
	12	some small gravel					
		soft moist	0.00				5.0/5.0
	13	(CL)					
	14		0.00				
		Gray clay soft wet plastic					
	15		0.00	Bkgd			
	16						
	17		0.00				5.0/4.3
	18		0.00				
	19		0.00				
		TD 20.0					Twp Set at 20'

PROJECT: NFSS

HOLE NO.: Twp 856

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: TWP857
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/2/03	11. DATE COMPLETED: 10/2/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ≈ 11'	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 20.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
		Temp		

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	TWP 857

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 857

PROJECT: NESS | INSPECTOR: M. Sievers | SHEET 2 OF 3 SHEETS

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	SAMPLE NO. OR CORE RUN NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		Dark brn loam damoist loose	OVM	Rad Bkgd			SS-TWP857-3581 0.0-0.5 (0930)
	1	Dark brn clayey silt loose dry	0.00				
	2		0.00				
		(CL)					
	3		0.00				5.0/4.6
	4	Brn-gray silty clay w/Fe staining and some small gravel stiff dry	0.00				
	5		0.00	Bkgd			
	6		0.00				
	7						
	8	Brn silt w/some large gravel stiff dry	0.00				5.0/3.7
	9		0.00				

PROJECT: NESS | HOLE NO. TWP 857

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 857

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

BLOW (d)	DEPTH (e)	DESCRIPTION OF MATERIALS (f)	FIELD SCREENING RESULTS (g)	REPRESENTATIVE SAMPLE RECOVERY PER INT. (h)	ANALYTICAL SAMPLE NO. (i)	BLOW COUNT (j)	REMARKS (k)
		Brn-gray silty clay w/Fe staining and some small gravel wet very soft Free water (CL)	0.014	Rad			
			0.00	Bkgd			
	11						SB-TWP857-11.0-3582 10.5-11.0 (1000)
			0.00				
	12						
	13		0.00				5.0/4.7
	14	Gray clay soft wet plastic					
			0.00				
	15						
				Bkgd			
			0.00				
	16						
			0.00				5.0/5.0
	17						
	18		0.00				
	19		0.00				TWP set at 20.0'
		TD 20.0'					

PROJECT: NFSS

HOLE NO. TWP 857

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

NW Corner of "building" - S of CAP

Boring off Set 3x - moving N & W of original stake for NW Corner of building

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-858

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 1 OF 2 SHEETS

ELEV. (ft)	DEPTH (ft)	DESCRIPTION OF MATERIALS (ft)	FIELD SCREENING RESULTS (ft)	SAMPLE NO. (ft)	ANALYTICAL SAMPLE NO. (ft)	BLOW COUNT (ft)	REMARKS (ft)
		Silty Clay loam w/organics dk brown, moist	PID=0.0 RAD=Bkg	RAD Bkg=50		SS-TWP 858-	Sample @ 15 YS
0.7				PID=0 BZ			
	1	Clay w/sand & gravel brown, w/grey streak inclusions medium stiff moist (CH)	RAD≤Bkg PID=0.0				36" recovery
	2	Concrete — @ 2.0' Edge of auger hit Concrete					
			RAD≤Bkg PID=0				
	3						
	4						
	5	Clay w/s. sand & gravel Brown, Brown red	PID=0 RAD≤Bkg				
	6	[Large wood pieces & organics undecomposed @ 5-5.5' (Black)]	PID=0 RAD≤Bkg				60" Recovery
		Soft, moist-wet (CH)					
	7	Fill	PID=0 RAD≤Bkg				
	8	Coarse gravel @ 8.5 feet					
		Softer w/depth	PID=0 RAD≤Bkg				
	9						
	10		PID=0 RAD≤Bkg				

PROJECT: NFSS | HOLE NO.: TWP 858

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

SS-TWP 858-3584
SB-TWP 858- -3585

10-2-03

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-850

PROJECT: NFSS | INSPECTOR: CAW/JS | SHEET 2 OF 2 SHEETS

ELEV. (4)	DEPTH (5)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (2)	RESPECT SAMPLE OR CORE BOX NO. (4)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (10)	REMARKS (8)
		Clay, tr gravel Brown to brownred, Soft moist (CH)	RAD ≤ Bkg PID = 0.0	BAD Bkg = 50 PID = 0.0 in BZ			
	11		RAD ≤ Bkg PID = 0.0				50" Recovery
	12	Moist to Wet	RAD ≤ Bkg PID = 0.0				
	13	Softer w/depth	RAD ≤ Bkg PID = 0.0				
	14	Coarse Gravel @ 14.0-14.2					
	15		PID = 0.0 RAD ≤ Bkg				
16.0	16	Silt w/fine gr SAND, brown, med dense Wet (ML)	PID = 0.0 RAD ≤ Bkg		SB-TWP 850-16.0 3585		Sample @ 16.0 @ 15:10
17.2	17		PID = 0.0 RAD ≤ Bkg				60" Recovery
		Clay w/tr gravel, gray to Browngray, soft Wet (CH)					
	18		PID = 0.0 RAD ≤ Bkg				
	19						
	20	EOB @ 20.0	PID = 0.0 RAD ≤ Bkg				

PROJECT: Set Temp Well @ NFSS | HOLE NO.: TWP 850

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: Buffalo		HOLE NUMBER: TWP 859
1. COMPANY NAME: Maxim Technologies	2. DRILLING SUBCONTRACTOR: Subsurface Drilling Solutions	SHEET 1 OF 3 SHEETS
3. PROJECT: NFSS	4. LOCATION: Lewiston NY	
5. NAME OF DRILLER: Jeff Grant	6. MANUFACTURER'S DESIGNATION OF DRILL: Mobile 59	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 5' CME Sampler; 2' split spoon; 4.25" ID HSA	8. HOLE LOCATION	
	9. SURFACE ELEVATION	
	10. DATE STARTED: 10/2/03	11. DATE COMPLETED: 10/2/03
12. OVERBURDEN THICKNESS: NA	15. DEPTH GROUNDWATER ENCOUNTERED: ~17.5	
13. DEPTH DRILLED INTO ROCK: NA	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: NA	
14. TOTAL DEPTH OF HOLE: 20.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): NA	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NA			NA

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNAT[redacted]
		Temp		

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
NFSS	TWP 859

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP-859

PROJECT: NFSS | INSPECTOR: M. Sievers | SHEET 2 OF SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REMOTE SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		Brn loam loose sl. moist	0 ppm	Rad			SS-TWP 859-3587 0.0-0.5' (1545)
	1		0.00	Bkgd			
		Brn clayey silt w/Fe staining loose dry					
	2		0.00				5.0/3.3
		Brn-gray mottled silty clay w/Fe staining and some 1" gravel					
	3		0.00				
	4	stiff sl moist	0.00				
	5	(CL)					
			0.00	Bkgd			
	6						
		more moist med stiff	0.00				5.0/5.0
	7						
			0.00				
	8	Gray-brn mottled silty clay w/some small gravel med stiff moist					
	9		0.00				

PROJECT: NFSS | HOLE NO. TWP 859

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: TWP 859

PROJECT: NFSS

INSPECTOR: M. Sievers

SHEET 3 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	REPRESENTATIVE SAMPLE OR PENETRATION (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		cont gray-brn mottled silt/clay w/Fe staining and	OVM	Rad			
	11	some small grad	0.00	Bkgd			
		med soft moist					
	12		0.00				
	13	Gray clay soft wet plastic	0.00				5.0/5.0
	14		0.00				
	15	(CL)					
			0.00	Bkgd			
	16						
			0.00				
	17	med soft					
			0.00				SB-TWP859-18.0-3588
	18	Gray clayey silt saturated					
		Gray clay soft					
	19		0.00				
		TD - 20.0					

PROJECT: NFSS

HOLE NO.: TWP 859

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

APPENDIX 12-H

Water Level Measurement Data Used in the NFSS Groundwater Flow Model

NFSS Groundwater Levels, May 16 and 17, 2000, September 19, 2000 and October 17, 2000

May 16, 2000							
Location ID	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**
B-34A	315.03	PZ-17M	317.36	R104D	313.38	SP-5D	321.21
BW01D	313.79	PZ-18D	317.40	R105D	313.25	SP-5M	322.43
BW02D	314.94	PZ-18M	317.24	R106D	313.10	SP-6D	319.57
BW03D	315.13	PZ-18S	321.00	R107D	314.10	SP-6M	321.87
BW04D	314.37	PZ-1M	316.41	R108D	315.74	SP-7D	320.32
BW05D	315.05	PZ-20M	318.14	R109D	316.05	SP-7M	321.55
EB-1D	319.07	PZ-21D	319.08	R110D	316.08	SP-8D	320.59
F102D	314.16	PZ-21M	318.99	R111D	315.91	SP-9D	318.11
F302D	314.83	PZ-21S	319.77	R114D	316.25	SP-9M	318.09
F5801D	313.93	PZ-22D	317.10	R116D	315.17	TW03D	314.92
F802LD	315.13	PZ-22M	317.07	R117LD	315.11	TW15D	312.60
F802UD	315.24	PZ-22S	320.36	R117UD	315.36	TW30D	313.71
FP01D	314.76	PZ-23D	319.86	R118D	315.10	W-10	316.34
GW-1A	321.88	PZ-23M	321.08	R119D	315.24	W1001D	314.91
GW-1B	322.42	PZ-23S	321.25	R120D	314.88	W101D	314.56
GW-2A	322.98	PZ-24M	317.51	R121D	314.75	W-11	320.01
GW-2B	322.54	PZ-25M	316.89	R122D	314.84	W-12	314.41
GW-3A	321.31	PZ-25S	315.59	R123D	314.80	W-1R	314.93
GW-3B	321.15	PZ-2M	316.76	R124D	314.81	W-1R2	316.96
GW-4A	322.83	PZ-3M	316.96	SP-10D	319.35	W201D	314.49
GW-4B	322.76	PZ-4D	316.99	SP-10M	318.41	W202LD	314.57
LMS01D	313.37	PZ-4M	317.01	SP-11D	318.79	W202UD	314.45
LMS02D	313.34	PZ-4S	321.62	SP-12D	320.64	W-2R	316.67
LMS03D	311.70	PZ-5M	317.01	SP-12M	317.41	W301D	314.63
MW-12D	320.61	PZ-6D	317.43	SP-13D	320.26	W-3R	316.89
MW-13D	322.21	PZ-6M	317.19	SP-13M	320.65	W401D	314.69
MW-13S	322.69	PZ-6S	319.88	SP-14D	317.25	W-4D	315.19
MW-14D	320.13	PZ-7M	318.53	SP-1D	319.63	W-4S	320.02
MW-14S	320.20	PZ-7S	317.44	SP-1M	318.76	W-5	316.91
MW-16	321.49	PZ-8D	317.00	SP-2D	319.88	W501D	314.82
MW-17	318.15	PZ-8M	317.23	SP-2M	319.27	W601D	316.80
MW-6R	317.18	PZ-8S	318.17	SP-3D	319.36	W-7	321.04
PZ-15D	316.46	R101D	314.04	SP-3M	323.68	W-8R	310.30
PZ-15M	316.79	R102D	313.70	SP-4D	320.35	W-9	320.95
PZ-15S	321.84	R103D	313.39	SP-4M	318.46	WDA01D	313.44
May 17, 2000							
Location ID	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**
A23A	313.10	BH49	312.59	OW03B	316.86	OW12A	314.27
A42	314.09	BH49A	318.15	OW04A	313.36	OW12B	315.06
A43	314.60	BH5	313.16	OW04B	316.53	OW13A	314.24
A45	311.59	BH50	312.86	OW05A	313.39	OW13B	314.47
A50	310.73	BH51	313.94	OW05B	315.37	OW14A	313.21
A51	313.89	BH57	313.95	OW06A	314.16	OW14B	317.82
A52	313.94	BH59	314.31	OW06B	315.95	OW15A	313.05
A54	314.04	BH60	314.90	OW07A	314.02	OW15B	317.59
A55	314.13	BH61	311.34	OW07B	311.89	OW16A	313.48
A56	312.29	BH62	310.72	OW08A	313.65	OW16B	317.23
A57	310.73	BH63	314.62	OW08B	315.74	OW17A	313.82

NFSS Groundwater Levels, May 16 and 17, 2000, September 19, 2000 and October 17, 2000

May 17, 2000 (continued)							
Location ID	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**
B02W19D	314.82	BH64	314.55	OW09A	313.90	OW17B	317.47
B02W20D	314.78	BH70	313.55	OW09B	315.60	OW18A	314.58
B02W20S	319.08	OW01A	313.23	OW10A	314.09	OW18B	316.98
BH12	314.20	OW01B	317.86	OW10B	316.83	--	--
BH15	314.71	OW02A	313.32	OW11A	314.22	--	--
BH48	314.67	OW02B	317.96	OW11B	316.29	--	--
September 19, 2000							
Location ID	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**
A23A	313.89	BH49	313.04	OW03A	313.88	OW11B	312.28
A42	311.59	BH49A	314.61	OW03B	314.17	OW12A	315.11
A43	313.29	BH5	313.69	OW04A	313.89	OW12B	309.94
A45	309.50	BH50	312.00	OW04B	312.76	OW13A	314.90
A50	308.75	BH51	315.03	OW05A	313.84	OW13B	313.67
A51	309.93	BH57	315.04	OW05B	311.61	OW14A	313.10
A52	311.47	BH59	315.08	OW06A	312.89	OW14B	313.98
A54	314.67	BH60	316.19	OW06B	313.57	OW15A	313.64
A55	314.77	BH61	310.64	OW07A	314.76	OW15B	313.33
A56	312.98	BH62	310.94	OW07B	308.51	OW16A	314.07
A57	311.52	BH63	315.53	OW08A	314.29	OW16B	313.74
B02W19D	315.95	BH64	310.35	OW08B	310.28	OW17A	314.46
B02W20D	315.99	BH70	314.29	OW09A	314.60	OW17B	314.57
B02W20S	316.30	OW01A	314.04	OW09B	310.61	OW18A	315.25
BH12	315.00	OW01B	314.14	OW10A	314.69	OW18B	314.25
BH15	314.94	OW02A	313.88	OW10B	313.24	--	--
BH48	315.53	OW02B	315.00	OW11A	315.02	--	--
October 17, 2000							
Location ID	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**
AQ01	307.20	BWP01S	317.30	DS22	307.04	F5801D	313.82
AQ02	306.69	BWP02S	316.31	DS23	306.66	F5801S	312.56
AQ03	307.05	BWP03S	316.42	DS26	312.17	F5802S	314.49
AQ04	308.30	BWP04S	316.67	DS27	306.79	F801S	318.52
AQ05	309.15	DS01	307.58	DS28	304.79	F802LD	315.25
AQ06	309.49	DS02	307.35	DS29	303.50	F802S	319.18
AQ07	308.11	DS03	307.10	EB-1D	318.54	F802UD	315.22
AQ08	308.64	DS04	306.90	EW06	308.38	FP01D	314.39
AQ09	306.63	DS05	306.74	EW07	308.50	FP01S	314.89
AQ10	306.53	DS06	306.82	EW08	308.83	GW-1A	318.24
AQ11	312.38	DS07	306.96	EW09	309.36	GW-1B	319.20
AQ12	312.08	DS08	306.99	EW10	315.61	GW-2A	319.57
AQ13W	304.64	DS09	306.99	EW11	311.85	GW-2B	319.72
AQ14E	305.11	DS10	307.50	EW12	310.08	GW-3A	319.09
B-34A	309.92	DS11	308.45	EW13	300.82	GW-3B	319.13
BW01D	312.51	DS12	309.21	EW14	309.09	GW-4A	320.10
BW01S	315.04	DS13	309.60	EW15	300.93	GW-4B	320.05
BW02D	315.76	DS14	309.76	EW16	300.95	GZR01S	312.31
BW02S	312.34	DS15	309.93	F101S	312.07	GZR02S	314.92
BW03D	315.45	DS16	310.44	F102D	313.70	GZR03S	311.75

NFSS Groundwater Levels, May 16 and 17, 2000, September 19, 2000 and October 17, 2000

October 17, 2000 (continued)							
Location ID	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**
BW03S	312.11	DS17	309.45	F102S	308.78	GZR04S	307.99
BW04D	315.24	DS18	308.70	F103S	312.35	LMS01D	313.31
BW04S	309.00	DS19	308.49	F301S	313.60	LMS01S	314.36
BW05D	315.76	DS20	308.63	F302D	315.11	LMS02D	313.27
BW05S	306.17	DS21	307.73	F302S	313.33	LMS02S	309.96
LMS03D	310.77	P703S	315.95	PCS03	312.46	PZ-21D	318.86
LMS03S	308.92	PA	307.04	PDN01	315.71	PZ-21M	319.24
LMS04S	308.82	PAN01	306.98	PDN02	316.09	PZ-21S	319.96
MW-12D	319.28	PAN02	307.67	PDN03	316.71	PZ-22D	317.80
MW-13D	319.45	PAN03	307.99	PE01S	317.08	PZ-22M	317.86
MW-13S	319.04	PAN04	309.11	PE02S	316.37	PZ-22S	317.88
MW-14D	317.35	PAS01	307.19	PE03S	316.08	PZ-23D	317.21
MW-14S	319.15	PAS02	307.59	PEW204	319.62	PZ-23M	318.32
MW-16	318.36	PAS03	308.26	PEW701	311.42	PZ-23S	318.44
MW-17	315.16	PAS04	310.86	PEW702	312.72	PZ-24M	315.63
MW-6R	317.90	PB	308.05	PEW703	314.18	PZ-25M	317.52
P1001S	315.72	PBN01	308.04	PEW704	314.68	PZ-25S	317.04
P1002S	315.86	PBN02	308.49	PLM101	312.18	PZ-2M	317.66
P1102S	316.92	PBN03	308.48	PLM201	308.85	PZ-3M	317.95
P1103S	316.63	PBN04	309.49	PLM202	305.56	PZ-4D	318.01
P1104S	316.76	PBS01	308.02	PLM301	308.92	PZ-4M	318.04
P1105S	316.50	PBS02	310.34	PZ-15D	317.30	PZ-4S	319.69
P1201S	307.98	PBS03	311.61	PZ-15M	317.62	PZ-5M	317.91
P1202S	290.62	PBS04	313.06	PZ-15S	318.38	PZ-6D	317.73
P1203S	312.35	PC	307.85	PZ-17M	318.34	PZ-6M	317.83
P1204S	312.04	PCN01	310.55	PZ-18D	318.27	PZ-6S	318.32
P1205S	312.09	PCN02	311.46	PZ-18M	317.99	PZ-7M	317.69
P1206S	312.07	PCN03	314.94	PZ-18S	320.90	PZ-7S	321.44
P701S	316.03	PCS01	308.68	PZ-1M	317.14	PZ-8D	317.34
P702S	314.31	PCS02	310.86	PZ-20M	318.98	PZ-8M	317.39
PZ-8S	321.08	R113S	309.08	R1P08S	314.42	SP-8D	325.28
R101D	314.13	R114D	310.89	R1P09S	319.90	SP-9D	318.73
R101S	316.40	R114S	311.35	R1P10S	319.01	SP-9M	318.67
R102D	313.45	R115S	320.67	SP-10D	314.29	TP04S	316.44
R102S	314.78	R116D	315.41	SP-10M	322.19	TW01S	314.66
R102SR	315.97	R116S	320.78	SP-11D	317.49	TW02S	319.60
R103D	312.57	R117LD	315.19	SP-12D	317.13	TW03D	314.86
R103S	315.68	R117UD	315.17	SP-12M	318.16	TW03S	316.68
R104D	312.75	R118D	315.21	SP-13D	318.88	TW11S	315.21
R104S	313.88	R118S	317.11	SP-13M	319.02	TW12S	310.56
R105D	312.48	R119D	315.24	SP-14D	318.05	TW13S	313.79
R105S	316.66	R120D	315.60	SP-1D	319.83	TW14S	311.22
R106D	312.02	R121D	315.68	SP-1M	318.00	TW15D	312.42
R106S	316.71	R122D	315.77	SP-2D	321.52	TW15S	310.87
R107D	313.30	R123D	315.73	SP-2M	319.20	TW16S	312.33
R107S	317.22	R124D	315.73	SP-3D	318.28	TW17S	313.07
R108D	315.44	R1N08S	317.55	SP-3M	320.77	TW18S	313.36
R108S	317.20	R1N10S	317.19	SP-4D	318.86	TW19S	306.17
R109D	315.87	R1P01S	317.00	SP-4M	316.50	TW20S	308.85

NFSS Groundwater Levels, May 16 and 17, 2000, September 19, 2000 and October 17, 2000

October 17, 2000 (continued)							
Location ID	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**	**Location ID**	**Water Level**
R109S	316.99	R1P02S	317.02	SP-5D	318.24	TW21S	316.58
R110D	315.91	R1P03S	318.83	SP-5M	319.90	TW24S	316.68
R110S	317.13	R1P04S	317.75	SP-6D	314.71	TW25S	305.42
R111D	315.58	R1P05S	318.67	SP-6M	318.93	TW26S	309.88
R111S	317.46	R1P06S	314.09	SP-7D	317.94	W701S	309.22
R112S	316.09	R1P07S	313.84	SP-7M	320.79	W702D	302.92
TW30D	313.64	W1109D	310.14	W201S	314.55	W702S	310.06
W-10	318.44	W1109S	312.09	W202LD	314.27	W703D	303.06
W1001D	315.38	W-12	318.63	W202S	319.02	W703S	311.35
W1001S	317.71	W1201S	310.96	W202UD	314.27	W704D	302.55
W1002S	317.50	W1202S	311.52	W-2R	317.62	W704S	312.20
W101D	314.25	W1203S	312.35	W301D	316.01	W705D	303.74
W101S	314.83	W1204D	302.24	W301S	320.86	W705S	313.06
W102S	314.56	W1204S	303.77	W302S	315.50	W-8R	317.99
W-11	318.19	W1205D	302.51	W303S	315.27	W-9	316.85
W1101D	309.14	W1205S	309.85	W-3R	317.45	WDA01D	313.19
W1101S	312.67	W1206D	302.35	W401D	314.61	WDA01S	309.24
W1102D	307.03	W1206S	308.43	W401S	320.41	WS01S	313.89
W1102S	312.59	W1207D	302.34	W402S	315.62	--	--
W1103D	305.38	W1207S	306.84	W-4D	316.13	--	--
W1103S	312.56	W1208S	302.68	W-4S	318.76	--	--
W1104D	306.55	W121LD	302.20	W-5	317.93	--	--
W1104S	313.92	W121UD	302.14	W501D	314.84	--	--
W1105D	308.53	W122LD	302.12	W501S	320.82	--	--
W1105S	313.49	W122UD	302.11	W502S	315.09	--	--
W1106D	308.93	W123LD	302.08	W601D	314.95	--	--
W1106S	313.36	W123UD	302.12	W601S	317.30	--	--
W1107D	309.44	W128LD	302.44	W602S	315.14	--	--
W1107S	314.05	W128UD	302.45	W603S	317.24	--	--
W1108D	309.78	W-1R2	319.54	W-7	318.12	--	--
W1108S	312.93	W201D	314.11	W701D	307.37	--	--

APPENDIX 12-I

Evaluation of Groundwater and Surface Water in the West Drainage Ditch and Central Drainage Ditch

Email from Don DeMarco to Michelle Rhodes – March 31, 2009

For your information and records, the attached tables summarize the model-predicted flow and mass discharge into the drainage ditches on the NFSS. Results are presented for U-238 in the Baseline U-238 Case for the Central; Western; South 16; and South 31 drainage ditches. A few of the key results are:

1. The highest average flow rate was predicted for the Central drainage ditch at 3.9e-5 cfs (95 L/day). This flow rate seems reasonable, although I don't have any manual measurements taken in the Central Drainage Ditch for comparison.

2. The lowest flow rate was predicted for the South 16 drainage ditch at 8.6e-6 cfs (21 L/day);

3. The diluted concentration of U-238 along each ditch length, within the NFSS property boundary, increases with time from t=0 to 1,000 years. These results reflect the increasing concentrations in groundwater near the ditches from various sources.

4. Of the four drainage ditches analyzed, the lowest diluted concentrations are predicted to occur in the Western drainage ditch. The Western drainage ditch primarily receives U-238 from the IWCS-based sources which only impact a portion of its length.

5. Of the four drainage ditches analyzed, the highest diluted concentrations are predicted to occur in the South 16 drainage ditch. The South 16 drainage ditch receives U-238 primarily from SESOIL-based sources in EU's 8, 11 and 12. The plume assigned in EU11, in particular, significantly impacts the water quality in the South 16 ditch.

6. U-238 screening level exceedances are predicted to occur in the South 16 and South 31 drainage ditches after t=350 years. Screening level exceedances are not predicted to occur in the Central or Western Drainage ditches. These are diluted concentrations along the entire ditch length and localized exceedances may occur earlier.

Table 1

Summary of Model-Predicted Water Flow and U-238 Discharge
in the Central Drainage Ditch on the NFSS property
from t=0 to 1000 years

Time Interval		Average Flow Rate	Volume of Water Discharged	Mass Discharged	Diluted Concentration over Ditch Length	
years		cfs	ft^3	g	g/ft^3	pCi/L
0	50	-2.9E-05	-45,284	-0.2	5.0E-06	0.06
50	100	-3.7E-05	-58,343	-0.7	1.2E-05	0.14
100	150	-3.6E-05	-57,551	-1.1	1.9E-05	0.23
150	200	-3.7E-05	-58,908	-1.6	2.7E-05	0.33
200	250	-3.7E-05	-57,974	-2.1	3.5E-05	0.43
250	300	-3.8E-05	-59,669	-2.6	4.4E-05	0.53
300	350	-3.7E-05	-58,820	-3.0	5.2E-05	0.62
350	400	-3.8E-05	-60,181	-3.6	6.0E-05	0.72
400	450	-3.8E-05	-60,047	-4.1	6.8E-05	0.82
450	500	-3.8E-05	-60,463	-4.6	7.7E-05	0.92
500	550	-3.8E-05	-60,373	-5.1	8.5E-05	1.02
550	600	-3.8E-05	-60,640	-5.7	9.3E-05	1.12
600	650	-3.8E-05	-60,574	-6.2	1.0E-04	1.22
650	700	-3.9E-05	-60,792	-6.7	1.1E-04	1.32
700	750	-3.8E-05	-60,701	-7.2	1.2E-04	1.43
750	800	-3.9E-05	-60,920	-7.8	1.3E-04	1.53
800	850	-3.9E-05	-60,808	-8.3	1.4E-04	1.64
850	900	-3.9E-05	-61,083	-8.9	1.5E-04	1.75
900	950	-3.9E-05	-60,962	-9.5	1.6E-04	1.86
950	1000	-3.9E-05	-61,113	-10.1	1.6E-04	1.98

Notes:
- Although extending both upgradient and downgradient of the NFSS property, the analysis here considers only the portion of the Central Drainage Ditch upgradient and within the NFSS property boundary. In the numerical model, this portion of the Central Drainage Ditch is represented by 143 cells.
- The applicable screening level for U-238 in surface water is 5.23 pCi/L (4.36E-04 g/ft^3) (pers. comm. George Butterworth).
- Overland runoff, precipitation directly into ditches, and upgradient flow contributions from offsite are not accounted for calculations herein.

Table 2

Summary of Model-Predicted Water Flow and U-238 Discharge
in the Western Drainage Ditch on the NFSS property
from t=0 to 1000 years

Time Interval		Average Flow Rate	Volume of Water Discharged	Mass Discharged	Diluted Concentration over Ditch Length	
years		cfs	ft^3	g	g/ft^3	pCi/L
0	50	-9.0E-06	-14,246	-0.02	1.4E-06	0.02
50	100	-1.6E-05	-24,618	-0.1	4.2E-06	0.05
100	150	-1.5E-05	-23,974	-0.2	7.0E-06	0.08
150	200	-1.6E-05	-25,062	-0.2	9.9E-06	0.12
200	250	-1.5E-05	-24,302	-0.3	1.3E-05	0.15
250	300	-1.6E-05	-25,645	-0.4	1.5E-05	0.18
300	350	-1.6E-05	-24,946	-0.4	1.8E-05	0.22
350	400	-1.7E-05	-26,035	-0.5	2.0E-05	0.25
400	450	-1.6E-05	-25,932	-0.6	2.3E-05	0.27
450	500	-1.7E-05	-26,253	-0.7	2.5E-05	0.30
500	550	-1.7E-05	-26,184	-0.7	2.7E-05	0.32
550	600	-1.7E-05	-26,389	-0.8	2.9E-05	0.35
600	650	-1.7E-05	-26,340	-0.8	3.1E-05	0.37
650	700	-1.7E-05	-26,507	-0.9	3.2E-05	0.39
700	750	-1.7E-05	-26,438	-0.9	3.4E-05	0.41
750	800	-1.7E-05	-26,606	-0.9	3.5E-05	0.42
800	850	-1.7E-05	-26,521	-1.0	3.7E-05	0.44
850	900	-1.7E-05	-26,733	-1.0	3.8E-05	0.46
900	950	-1.7E-05	-26,642	-1.1	3.9E-05	0.47
950	1000	-1.7E-05	-26,755	-1.1	4.1E-05	0.49

Notes:
- Although extending both upgradient and downgradient of the NFSS property, the analysis here considers only the portion of the Western Drainage Ditch upgradient and within the NFSS property boundary. In the numerical model, this portion of the Western Drainage Ditch is represented by 139 cells.
- The applicable screening level for U-238 in surface water is 5.23 pCi/L (4.36E-04 g/ft^3) (pers. comm. George Butterworth).
- Overland runoff, precipitation directly into ditches, and upgradient flow contributions from offsite are not accounted for calculations herein.

Table 3

Summary of Model-Predicted Water Flow and U-238 Discharge
in the South 16 Drainage Ditch on the NFSS property
from t=0 to 1000 years

Time Interval		Average Flow Rate	Volume of Water Discharged	Mass Discharged	Diluted Concentration over Ditch Length	
years		cfs	ft^3	g	g/ft^3	pCi/L
0	50	-8.6E-06	-13,489	-0.1	9.5E-06	0.11
50	100	-1.2E-05	-18,672	-0.6	3.3E-05	0.40
100	150	-1.2E-05	-18,349	-1.4	7.4E-05	0.88
150	200	-1.2E-05	-18,893	-2.4	1.3E-04	1.54
200	250	-1.2E-05	-18,514	-3.6	2.0E-04	2.35
250	300	-1.2E-05	-19,189	-5.2	2.7E-04	3.29
300	350	-1.2E-05	-18,841	-6.8	3.6E-04	4.34
350	400	-1.2E-05	-19,387	-8.9	4.6E-04	5.50
400	450	-1.2E-05	-19,343	-10.9	5.6E-04	6.73
450	500	-1.2E-05	-19,496	-13.1	6.7E-04	8.06
500	550	-1.2E-05	-19,468	-15.3	7.9E-04	9.45
550	600	-1.2E-05	-19,565	-17.8	9.1E-04	10.90
600	650	-1.2E-05	-19,546	-20.2	1.0E-03	12.40
650	700	-1.2E-05	-19,624	-22.8	1.2E-03	13.95
700	750	-1.2E-05	-19,596	-25.3	1.3E-03	15.51
750	800	-1.2E-05	-19,674	-28.1	1.4E-03	17.13
800	850	-1.2E-05	-19,639	-30.7	1.6E-03	18.77
850	900	-1.3E-05	-19,738	-33.6	1.7E-03	20.45
900	950	-1.2E-05	-19,700	-36.3	1.8E-03	22.12
950	1000	-1.3E-05	-19,749	-39.2	2.0E-03	23.83

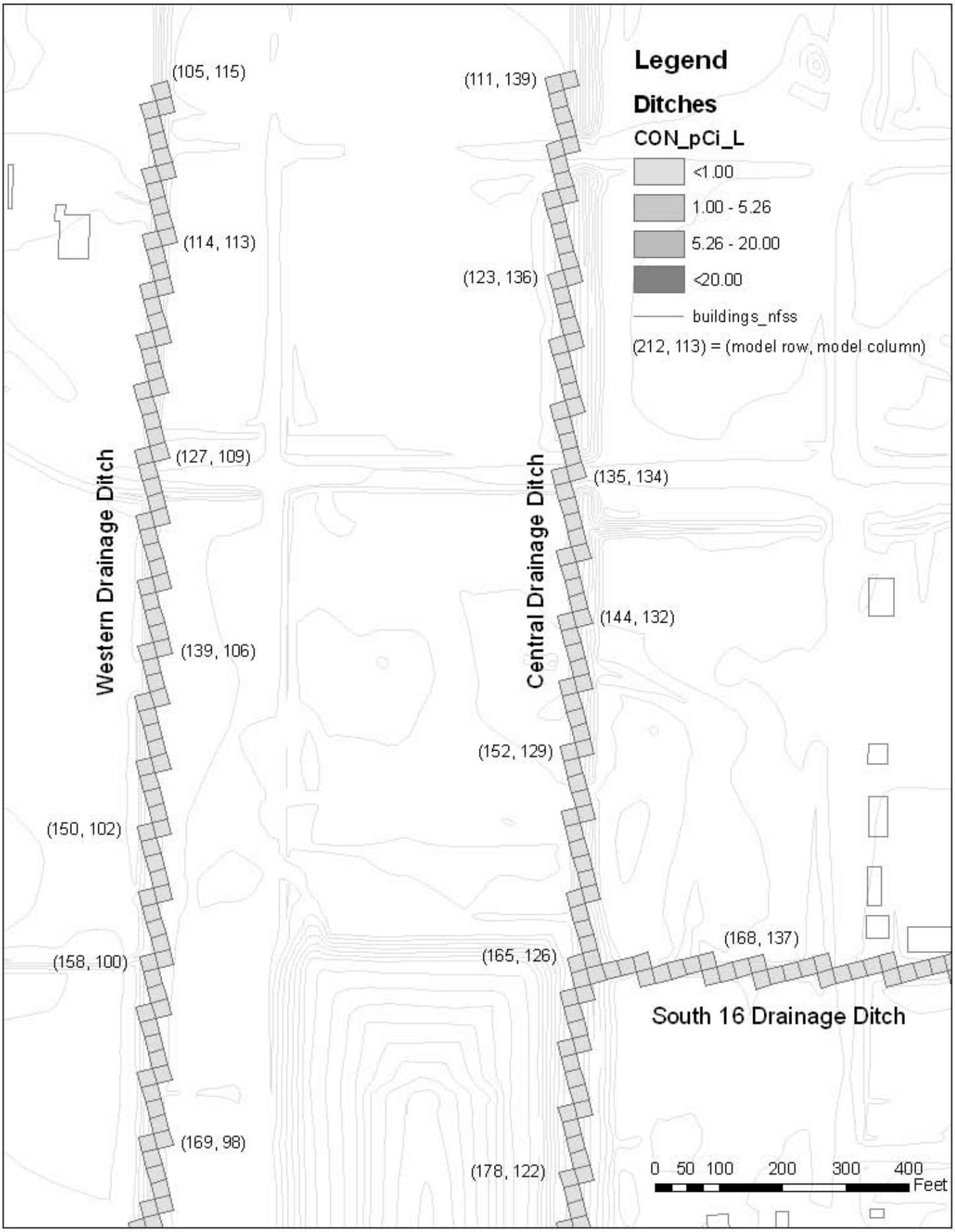
Notes:
- The South 16 Drainage Ditch is located within the NFSS property boundary and drains into the Central Drainage Ditch. In the numerical model, the South 16 Drainage Ditch is represented by 69 model cells.
- The applicable screening level for U-238 in surface water is 5.23 pCi/L (4.36E-04 g/ft^3) (pers. comm. George Butterworth).
- Overland runoff, precipitation directly into ditches, and upgradient flow contributions from offsite are not accounted for calculations herein.

Table 4

Summary of Model-Predicted Water Flow and U-238 Discharge
in the South 31 Drainage Ditch on the NFSS property
from t=0 to 1000 years

Time Interval		Average Flow Rate	Volume of Water Discharged	Mass Discharged	Diluted Concentration over Ditch Length	
years		cfs	ft^3	g	g/ft^3	pCi/L
0	50	-1.4E-05	-22,241	-0.9	4.2E-05	0.51
50	100	-1.7E-05	-26,782	-2.3	8.6E-05	1.03
100	150	-1.7E-05	-26,514	-3.4	1.3E-04	1.56
150	200	-1.7E-05	-26,988	-4.8	1.8E-04	2.14
200	250	-1.7E-05	-26,670	-6.1	2.3E-04	2.75
250	300	-1.7E-05	-27,273	-7.8	2.9E-04	3.43
300	350	-1.7E-05	-26,989	-9.3	3.4E-04	4.12
350	400	-1.7E-05	-27,466	-11.2	4.1E-04	4.88
400	450	-1.7E-05	-27,434	-12.9	4.7E-04	5.64
450	500	-1.7E-05	-27,570	-14.8	5.4E-04	6.46
500	550	-1.7E-05	-27,549	-16.8	6.1E-04	7.30
550	600	-1.8E-05	-27,636	-18.9	6.8E-04	8.19
600	650	-1.8E-05	-27,621	-20.9	7.6E-04	9.10
650	700	-1.8E-05	-27,693	-23.2	8.4E-04	10.05
700	750	-1.8E-05	-27,671	-25.4	9.2E-04	11.02
750	800	-1.8E-05	-27,741	-27.8	1.0E-03	12.03
800	850	-1.8E-05	-27,713	-30.1	1.1E-03	13.05
850	900	-1.8E-05	-27,800	-32.7	1.2E-03	14.13
900	950	-1.8E-05	-27,770	-35.1	1.3E-03	15.19
950	1000	-1.8E-05	-27,812	-37.8	1.4E-03	16.32

Notes:
- The South 31 Drainage Ditch is located within the NFSS property boundary and drains into the Central Drainage Ditch. In the numerical model, the South 31 Drainage Ditch is represented by 69 model cells.
- The applicable screening level for U-238 in surface water is 5.23 pCi/L (4.36E-04 g/ft^3) (pers. comm. George Butterworth).
- Overland runoff, precipitation directly into ditches, and upgradient flow contributions from offsite are not accounted for calculations herein.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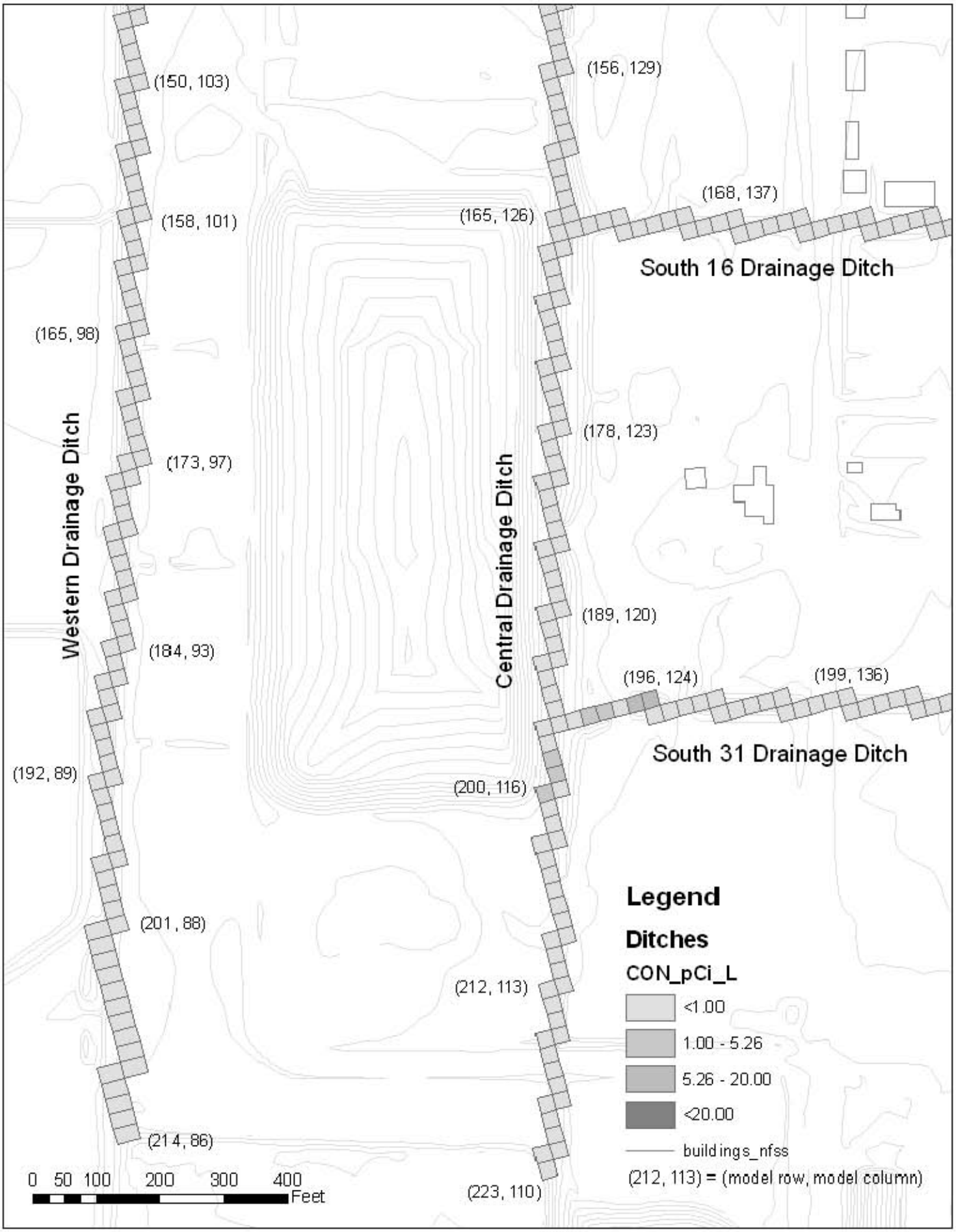
Feet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(214, 86)
Western Drainage Ditch
(156, 129)
(165, 126)
(168, 137)
South 16 Drainage Ditch
(178, 123)
Central Drainage Ditch
(189, 120)
(196, 124)
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South 31 Drainage Ditch
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Ditches
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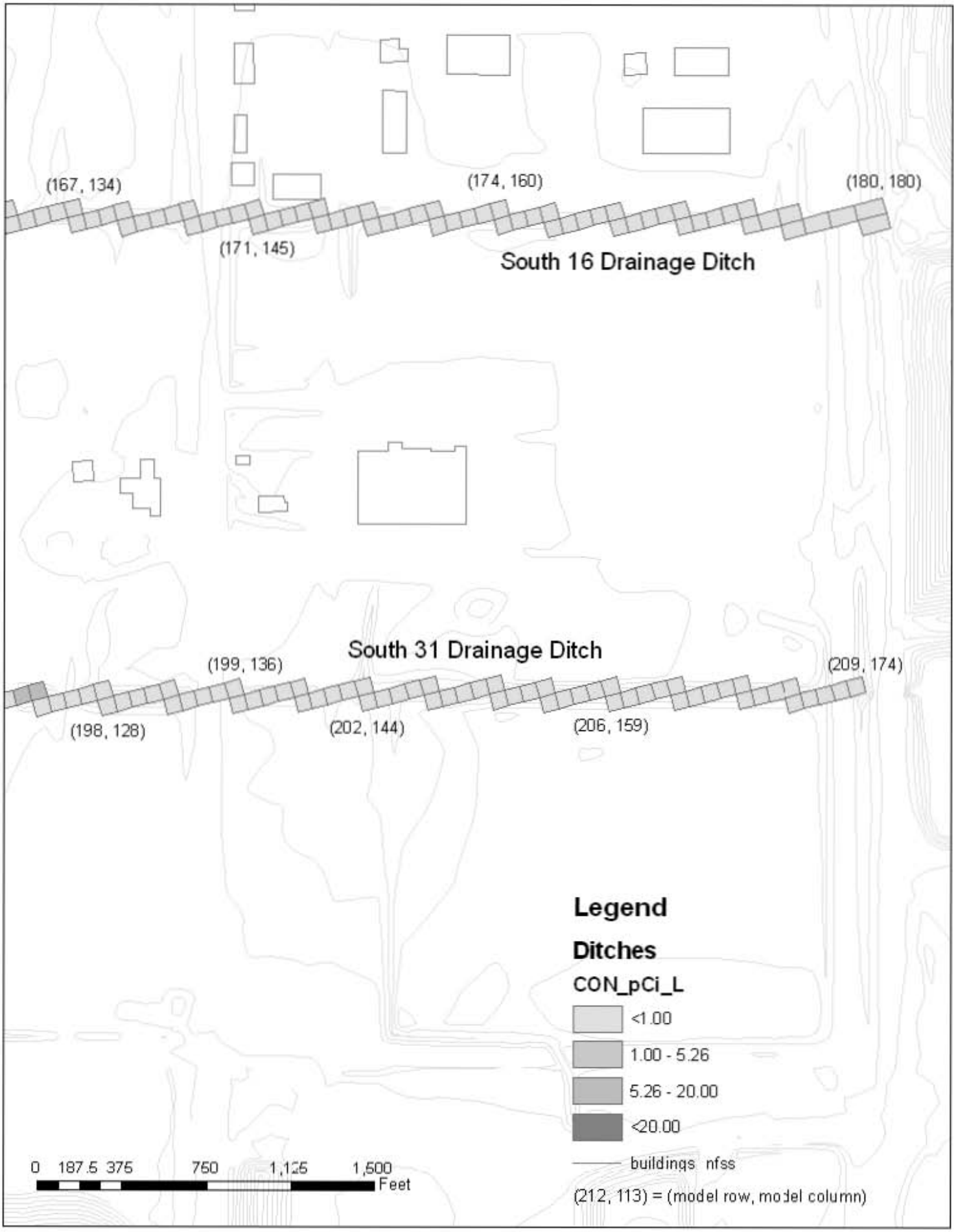
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(180, 180)
(171, 145)
South 16 Drainage Ditch
South 31 Drainage Ditch
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(209, 174)
(198, 128)
(202, 144)
(206, 159)
Legend
Ditches
CON_pCi_L
<1.00
1.00 - 5.26
5.26 - 20.00
<20.00
buildings nfss
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Feet

APPENDIX 12-J

Preparation and Review of Cross-sections to Evaluate the Presence of Sand Lenses in the Vicinity of the IWCS

TECHNICAL MEMORANDUM

EVALUATION OF THE OCCURRENCE AND EXTENT OF SAND LENSES IN UNCONSOLIDATED SUBSURFACE SEDIMENTS AT THE NIAGARA FALLS STORAGE SITE, LEWISTON, NEW YORK

November 15, 2010

1.0 INTRODUCTION

The depositional origin, nature, and extent of unconsolidated deposits observed at the Niagara Falls Storage Site (NFSS) are discussed in the report entitled *Revised Draft Groundwater Flow and Contaminant Transport Modeling*, prepared for the U.S. Army Corps of Engineers (USACE) by HydroGeoLogic, Inc. (HGL) in 2007. The purpose of this technical memorandum is to supplement the 2007 report by providing additional analysis of sand lenses at the NFSS. The additional analysis herein considers the additional borehole data collected (1) in 2003 during Phase 3 of the Remedial Investigation (RI) and (2) in 2009 and 2010 as part of field work associated with the RI Report (RIR) Addendum. In addition, the interim waste containment structure (IWCS) cut-off wall excavation profiles were reviewed and compared against the cross-sections to verify accuracy and confirm subsurface details.

1.1 OVERVIEW OF SITE GEOLOGY AND HYDROGEOLOGY

There are five generally recognized and distinct stratigraphic units at NFSS. These include the uppermost Brown Clay Till (BCT), which is underlain by successively deeper units including the Glacio-Lacustrine Clay (GLC); Middle Silt Till; Basal Red Till; and Alluvial Sand and Gravel. The characteristically low permeability of the BCT and GLC units act to inhibit the flow of water or dissolved constituents from near surface sources. These units are believed to provide a natural safeguard against solute transport in the event of unforeseen releases from the IWCS.

The effectiveness of the BCT as a barrier to flow and transport, however, depends on the lateral discontinuity of sand lenses observed in some boreholes. These sand lenses are found within the clay matrix that comprises the bulk of the BCT. If the sand lenses are isolated and discontinuous features, solute transport through the BCT will be governed by the low permeability of the clay matrix. If the sand lenses are continuous features, however, they may act as discrete pathways for preferential solute movement. Accordingly, investigations have been performed to evaluate the occurrence and continuity, or discontinuity, of sand lenses within the BCT at the NFSS.

1.2 GEOSTATISTICAL ANALYSIS

Sand lens connectivity at the NFSS was initially assessed as reported in HGL (2007) using a geostatistical approach based on observed occurrences of sand lenses from available borehole data. The locations of boreholes on the NFSS are presented in Figure 1. The geostatistical analysis included a semi-variogram analysis to characterize the spatial correlation, length, and thickness of known sand lenses. Semi-variogram analysis is a statistical technique used to evaluate the continuity of spatially distributed data.

The key findings of the geostatistical analysis were as follows:

- The sand lenses are limited in their continuity and are not statistically correlated beyond 4-5 feet (ft) in thickness and 15-20 ft in length;
- There is a low probability that sand lenses exist at lengths significantly beyond 15-20 ft.

2.0 CROSS-SECTIONS

Further evaluation of sand lenses was performed to consider the affect of additional Phase 3 and RIR Addendum borehole data, as well as IWCS cut-off wall excavation profiles. Seven cross-sections that illustrate subsurface profiles adjacent to the IWCS and elsewhere on the NFSS were prepared. The cross-section locations are presented in Figure 1. Individual cross-sections are presented in Figures 3 through 8, labeled as Cross-Sections A-A' through G-G', respectively.

The objectives of the cross-section analyses were multi-fold and included:

- Comparison of data presented in the cross-sections against the conclusions of the geostatistical analysis;
- Assessment of whether the conceptual understanding of the subsurface has changed in any material way since the conceptual model of hydrogeologic conditions was formulated and presented in HGL (2002); and
- Evaluation of the subsurface lithology for evidence that uranium (U), tetrachloroethene (PCE) or trichloroethene (TCE) plumes may pose a greater transport risk than previously believed.

2.1 REVIEW OF PHASE THREE REMEDIAL INVESTIGATION DATA

The key findings of the review of Phase Three RI data are as follows:

- The cross-sections A-A', B-B', F-F', and G-G' depict sand lenses at similar elevations in adjacent boreholes. In some cases, these boreholes are more than 100 ft apart. Connectivity between these sand lenses has not been substantiated in the field and was not assumed for the purposes of the cross sections.
- On cross-section D-D', a sand lens that is 17 ft thick is reported at location OW10A. No correlating sand lenses of comparable thickness are in BH70, which is adjacent to OW10A, 75 ft west of location OW10A.
- As evident on cross-section E-E' there are fewer sand lenses in the northwest corner of the NFSS than near the IWCS. This observation is supported by a review of individual boreholes in this area as summarized in Table 1. With the exception of a 7 ft sand lens in location 810, all other sand lenses have a thickness of 2.5 ft or less.
- As shown in cross-section G-G', which transects the region near the chlorinated solvents plume, there is a greater occurrence of sand lenses in this area. The correlation of the plume and the sand lens suggests that the bulk-permeability of the subsurface in this area may be locally higher than that in the subsurface near the northwest corner of the NFSS. A summary of boreholes near G-G' is summarized in Table 2.

- There are localized sand lenses that exceed the 15-20 ft correlation length determined through the geostatistical analysis.

2.2 REVIEW OF RIR ADDENDUM DATA

The scope of this update included:

- Review of logs from the 23 boreholes;
- Extraction of pertinent stratigraphic information from borehole records to be summarized and entered into the NFSS database;
- Comparison of the supplementary stratigraphic and sand lens information provided by these additional boreholes against the seven cross-sections and against the conceptual understanding of the site;
- Comparison of RIR Addendum borehole data to site historical information to test the validity of the previous key findings.

The key findings of the review of RIR Addendum data are as follows:

- The locations of the 23 additional borehole logs are plotted in Figure 1, and sand lens details for these locations are summarized in Table 3. The new boreholes are clustered in three regions of the NFSS: The northwest corner of the property (six boreholes); the mid-northern portion of the property (eight boreholes); and in the vicinity of the IWCS (nine boreholes).
- In the three general regions where boreholes installed for the RIR Addendum were located, there are boreholes with sand lenses and boreholes without sand lenses. This observation is consistent with previous evidence that sand lenses are not widespread contiguous features, but are disconnected.
- Sand lenses were reported in 14 of the 23 boreholes, or 61 percent (%) of the boreholes installed for the RIR Addendum. This rate of sand lens occurrence is nominally higher than the overall NFSS average of 59% (218/365). This observation is generally consistent with previous data.
- The geospatial distribution of sand lenses is not homogenous or consistent across the site. Localized regions that exhibit higher-than-site-average sand lens occurrences are noted in cross sections A-A', C-C', and G-G'. Consistent with historical data, the data obtained from RIR Addendum boreholes confirmed evidence of higher sand lens occurrence near cross-section G-G' than other regions where cross-sections were developed.
- The cross-sections illustrate sand lenses at comparable vertical elevations in adjacent boreholes that are 100 ft or more apart, for example OW17A-BH69-A28 in cross-section B-B'. Sand lens connectivity over such distance is not substantiated, however, and cross-sections were drawn to depict such sand lens as isolated features. In electing to maintain separation between such sand lenses, consideration was given to other results, including the sand lens horizontal correlation length of 15 ft determined from the geostatistical analysis, and the maximum observed horizontal sand lens length observed in the cut-off profiles, which is 30 ft.

2.3 REVIEW OF CUT-OFF WALL EXCAVATION PROFILES

Cut-off wall excavation profiles from the 1986 Bechtel geotechnical post-construction report were reviewed and compared against the cross-sections to verify accuracy and confirm subsurface details. The cut-off wall excavation profiles provide the most detailed means of assessing sand lens continuity. Whereas single boreholes provide insight into vertical sand lens thickness, lateral sand lens connectivity must be inferred by comparing against adjacent borehole data, and the continuity of the sand lenses is subject to some expert judgment. The cut-off wall profiles permit evaluation of the lateral extent of sand lenses through direct observations.

The key findings of the review of IWCS cut-off wall excavation profiles are as follows:

- On average, the dimensions of sand lenses observed in the cut-off wall excavation profile are consistent with the results of the geostatistical analysis. Both indicate that sand lenses are discrete, disconnected features with average dimensions on the order of 5 ft thick and 15 ft long.
- Some exceptions to the statistical average sand lens dimensions previously determined by the geostatistical analysis are noted on the West Side of IWCS:
    - The cut-off wall excavation profile indicates a sand lens ~ 20 ft thick and up to 30 ft in length ~ 25 ft south of location A-15 on cut-off wall excavation cross-section A-A'.
    - An 11 ft thick sand lens is present at location A42, which is approximately 15 ft west of the sand lens occurrence on A-A' cross-section.
    - Other surrounding boreholes at distances up to 200 ft from location A-15 were also investigated and shown to report sand lenses up to a maximum of 7 ft in thickness. These sand lenses occur at various elevations.
    - The connectivity between the sand lens observed at location A-15 and the larger sand lens on the cut-off wall excavation profile is uncertain. Likewise, the connectivity between these and other sand lenses observed in the vicinity has not been established. The variability in the elevation of sand lens occurrences suggest these are not continuous features and are independent and isolated. For further evaluation, analysis of plume trends and the distribution of contaminant concentrations may be used as a guide to infer sand lens connectivity.
- A borehole drilled between locations OW15A and A19 would help resolve sand lens connectivity westward of the IWCS.

3.0 SUMMARY

The results of the geostatistical analysis suggested an average sand lens thickness of 4-5 ft and length of 15-20 ft across the NFSS. Information gained through Phase 3 and RIR Addendum borehole data and IWCS cut-off wall excavation profiles has not changed the conceptual understanding of the subsurface in any material way with respect to stratigraphy, permeability, hydrogeology, groundwater flow or solute transport. Evidence presented in this subsequent analysis indicates that there are localized exceptions to this NFSS-wide statistical average;

however, these sand lenses do not appear to extend beyond 30 ft in length based on cut-off wall profiles.

Based on an evaluation of the subsurface lithology as determined from the cross-section analysis, there is no evidence that existing groundwater plumes pose a greater transport risk than previously believed. A higher occurrence of sand lenses near existing PCE and TCE plumes suggests the bulk-permeability of the subsurface in this area may be locally higher than that in the subsurface near the northwest corner of the NFSS.

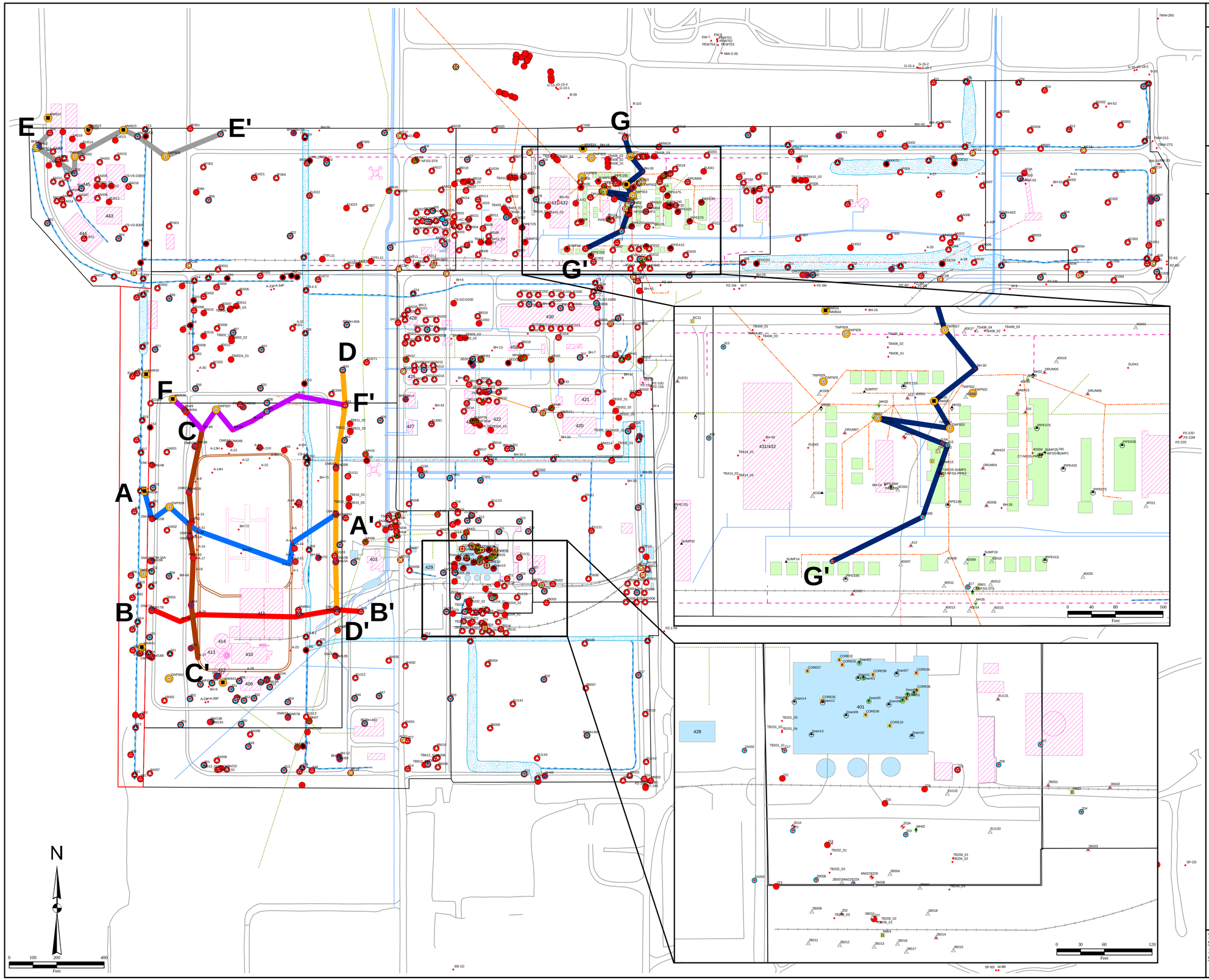
In cases where the distance between boreholes is large (e.g., >100 ft), sand lens connectivity cannot be substantiated. To address this uncertainty, it is recommended that monitoring results from wells with sand lenses be subject to a higher degree of scrutiny to discern or identify concentration trends that may imply hydraulic connectivity via sand lenses.

4.0 REFERENCES

HGL, 2002. *Draft Groundwater Flow Model Calibration Technical Memorandum, Niagara Falls Storage Site , Lewiston, New York*. Prepared for the U.S. Army Corps of Engineers, Buffalo District.

HGL, 2007. *Revised Draft Groundwater Flow and Contaminant Transport Modeling, Niagara Falls Storage Site, Lewiston, New York*. Prepared for the U.S. Army Corps of Engineers, Buffalo District.

FIGURES



HGL—Header

Figure 1
Borehole and Well Locations
Niagara Falls Storage Site
Lewiston, New York

Army Corps of Engineers
Buffalo District

Legend

- Drum residue
- UWBZ TWP
- LWBZ well
- UWBZ well
- Manhole sediment
- Manhole water
- Pipe sediment
- Pipe water
- Railroad ballast
- Core
- Soil boring
- Sediment
- Surface soil
- Sump sediment
- Sump water
- Surface water
- RIR Addendum Monitoring Wells
- RIR Addendum Temporary Well Points
- 2009 Borehole
- Phase III Borehole
- Cross Section A-A'
- Cross Section B-B'
- Cross Section C-C'
- Cross Section D-D'
- Cross Section E-E'
- Cross Section F-F'
- Cross Section G-G'
- National Grid Boundary
- EU boundary
- Structure abandoned above grade
- Existing structure
- Former structure
- Former K-65 Transfer Pipeline
- Acid sewer
- Water lines
- Fuel line
- Sanitary sewer
- Storm sewer
- WCS Cutoff Wall
- Roads
- Surface Water (inundated 50% of year)
- Ephemeral Ditch
- West_Ditch
- Excavation 91
- Former Railroad

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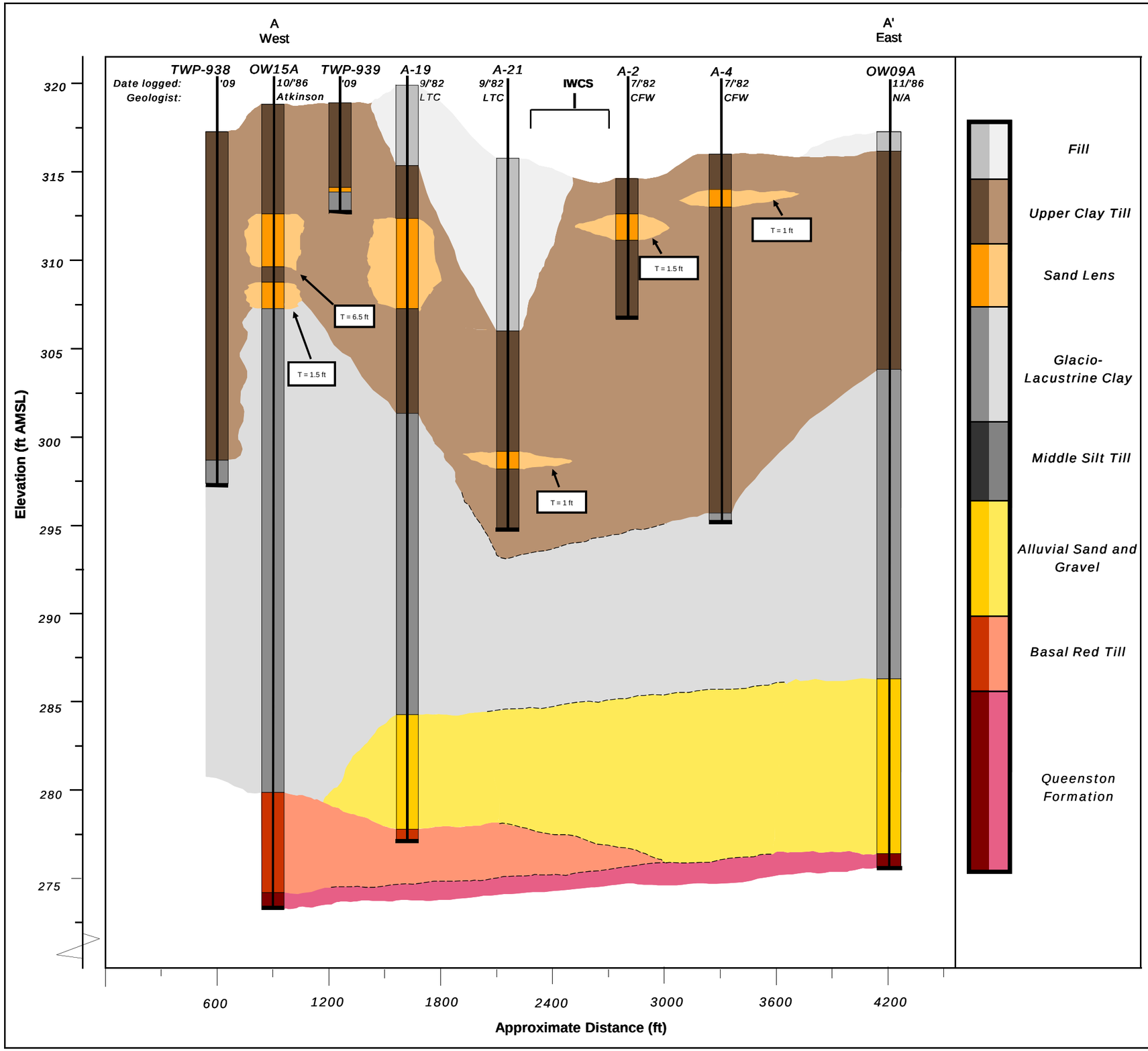
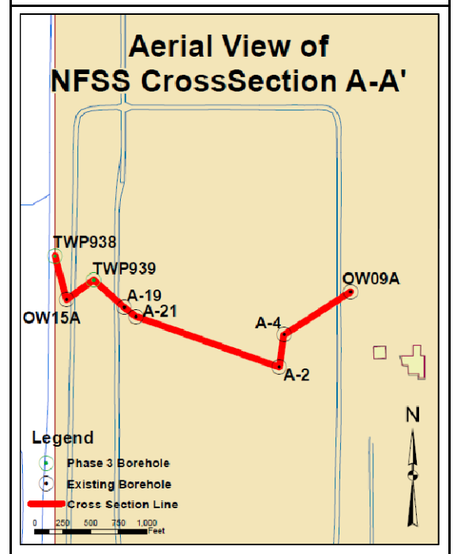


Figure 2

Generalized Geologic Cross Section A-A'
Niagara Falls Storage Site



T = thickness (average if more than 1)

HGL HydroGeoLogic, Inc Exceeding Expectations

US Army Corps of Engineers

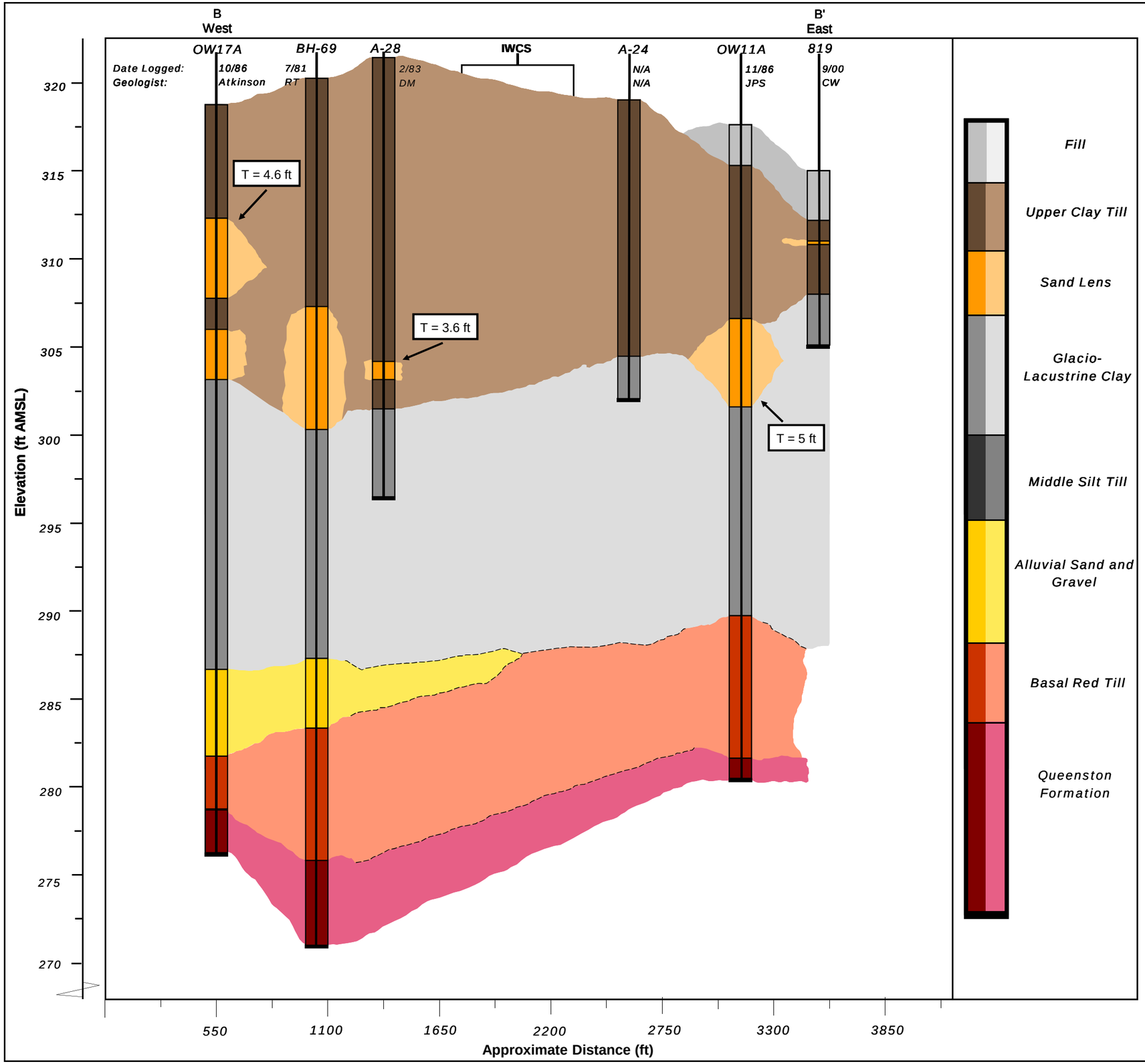
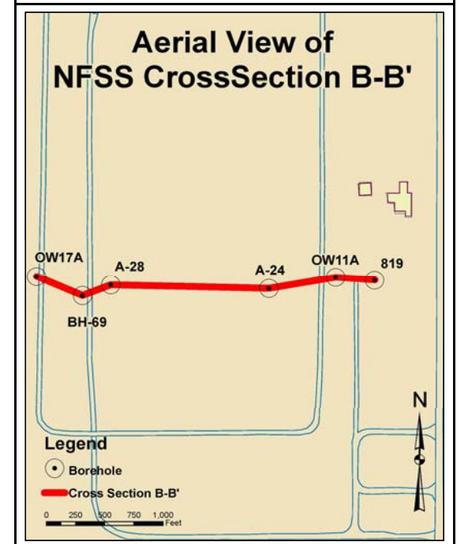


Figure 3

Generalized Geologic Cross Section B-B'
Niagara Falls Storage Site



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HGL HydroGeoLogic, Inc Exceeding Expectations

US Army Corps of Engineers

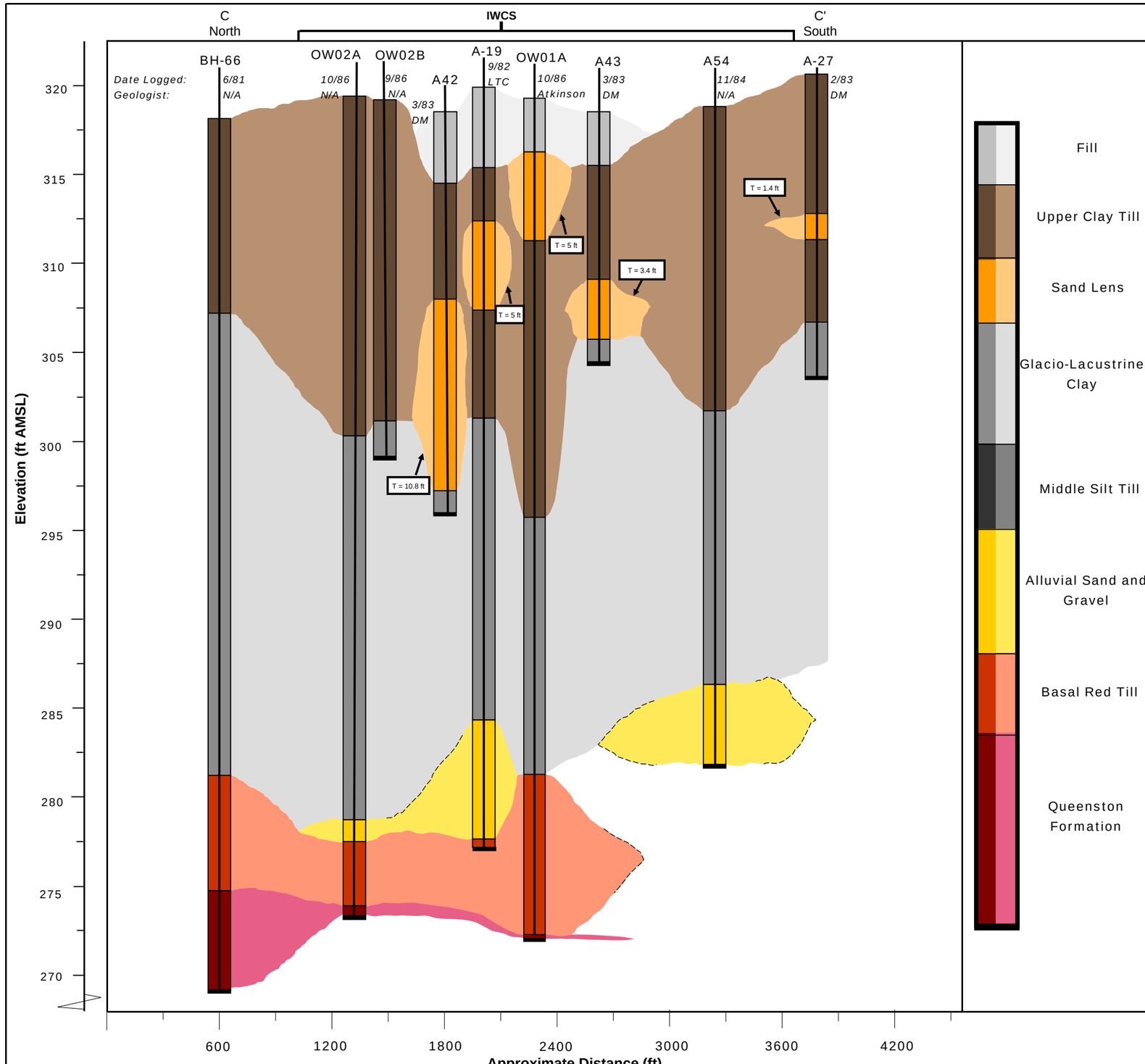
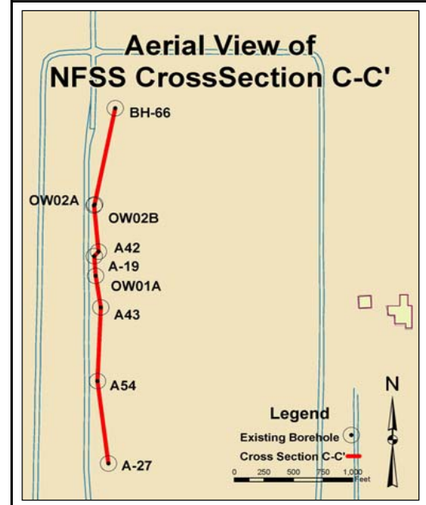


Figure 4

Generalized Geologic Cross Section C-C'
Niagara Falls Storage Site



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US Army Corps of Engineers

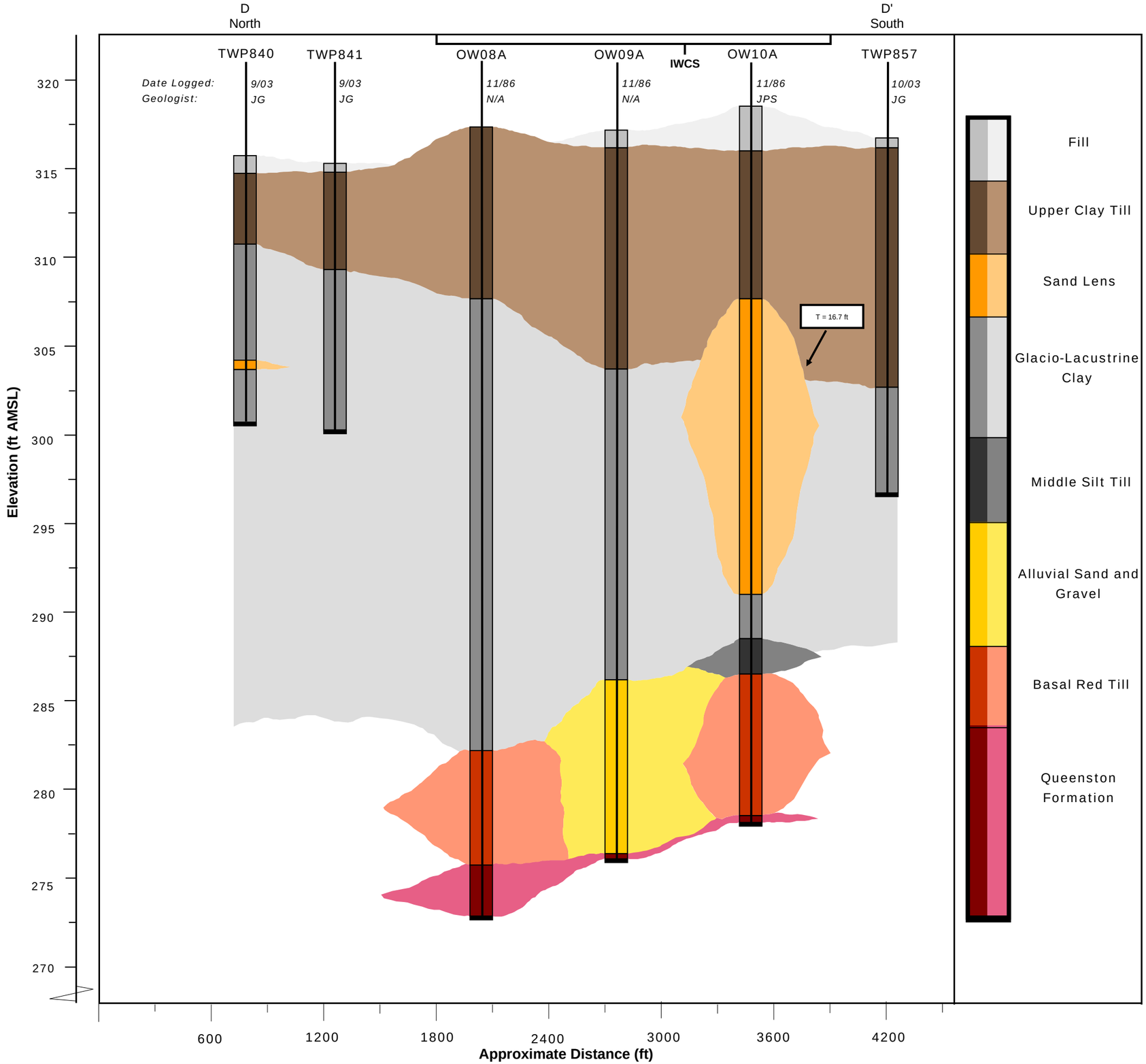
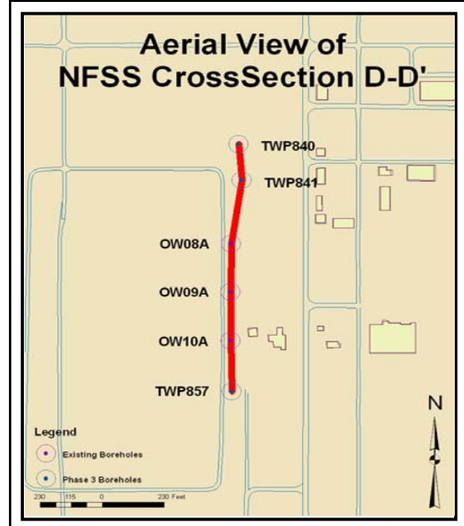


Figure 5

Generalized Geologic Cross Section D-D'
Niagara Falls Storage Site



T = thickness (average if more than 1)

HGL HydroGeoLogic, Inc Exceeding Expectations

US Army Corps of Engineers

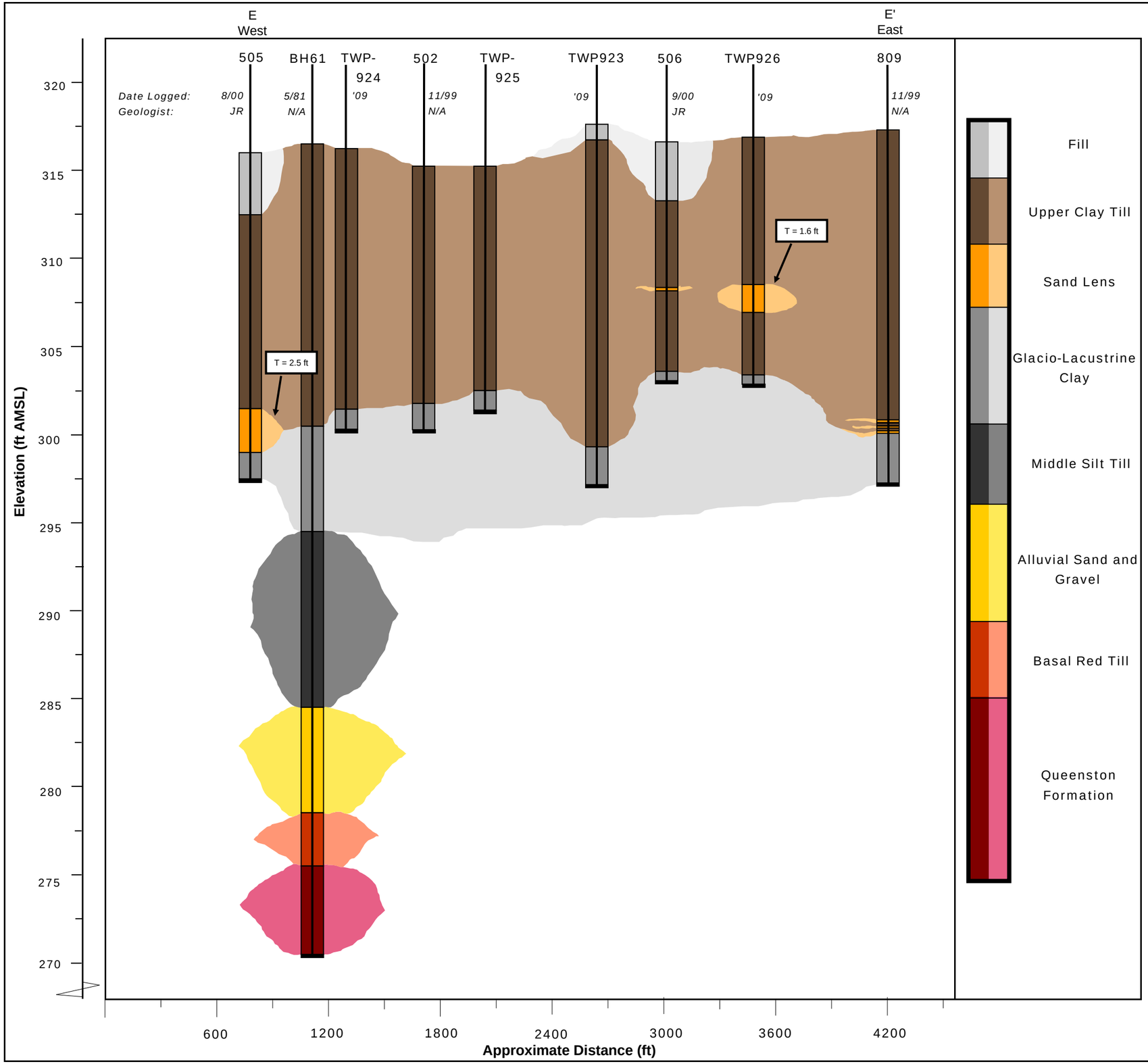
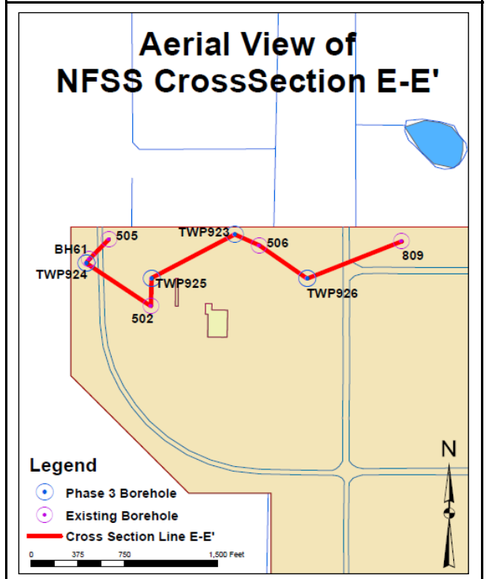


Figure 6

Generalized Geologic Cross Section E-E'
Niagara Falls Storage Site



T = thickness (average if more than 1)

HGL HydroGeoLogic, Inc Exceeding Expectations

US Army Corps of Engineers

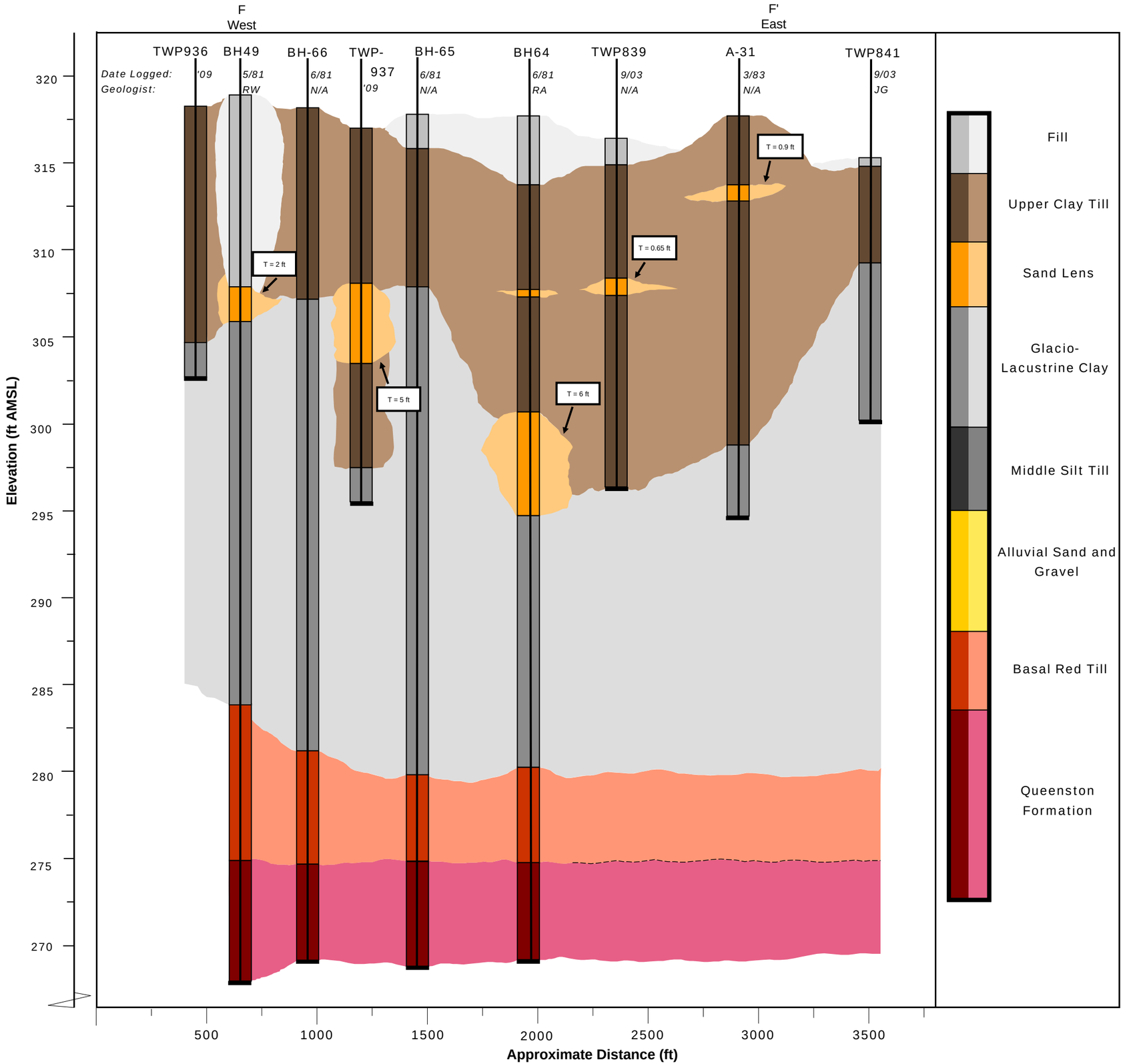
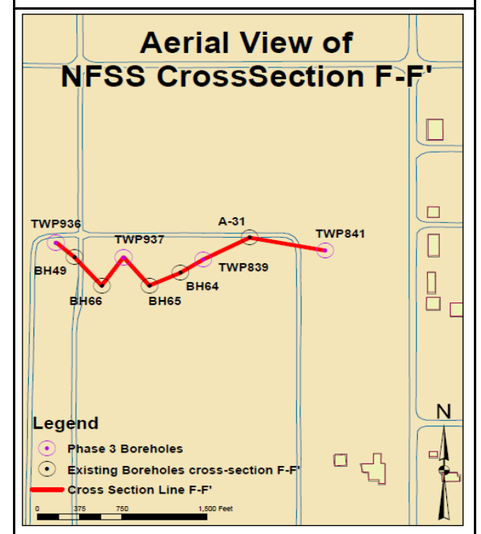


Figure 7

Generalized Geologic Cross Section F-F'
Niagara Falls Storage Site



T = thickness (average if more than 1)

HGL HydroGeoLogic, Inc Exceeding Expectations

US Army Corps of Engineers

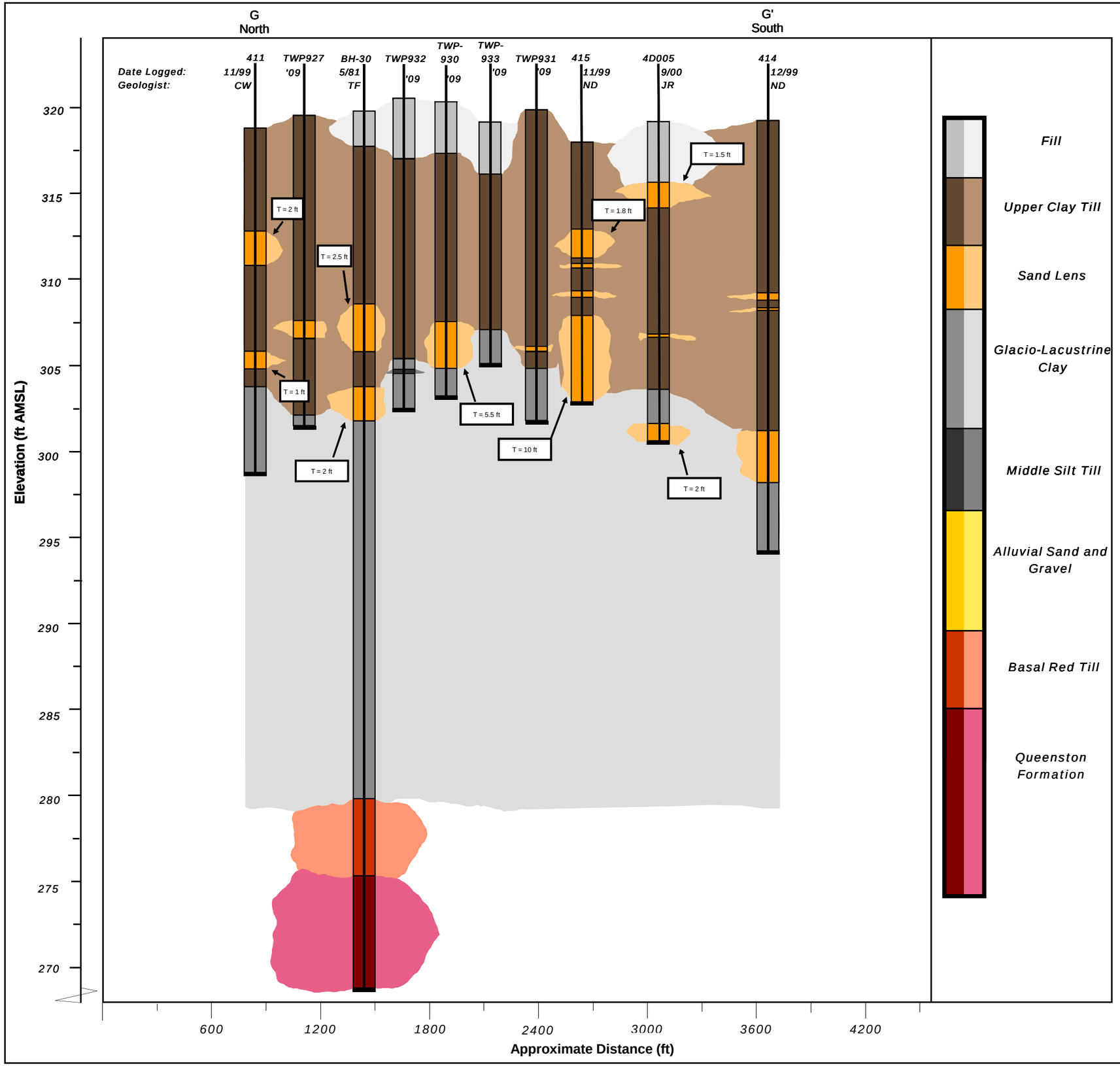
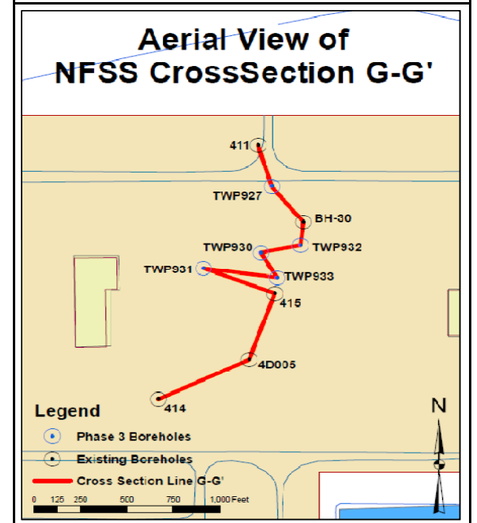


Figure 8

Generalized Geologic Cross Section G-G'
Niagara Falls Storage Site



T = thickness (average if more than 1)

HGL HydroGeoLogic, Inc Exceeding Expectations

US Army Corps of Engineers

TABLES

Table 1
Sand Lens Locations in the Vicinity of E-E'

Sand Lens Location	Begin Elevation (ft amsl)	End Elevation (ft amsl)	Thickness (ft)
Sand Lens Locations in the Vicinity of E-E'			
501	No sand lens		
502	No sand lens		
503	No sand lens		
504	No sand lens		
505	301.500	299.000	**2.5**
506	308.400	308.350	0.05
808	303.431	303.181	0.25
	302.681	301.681	**1**
809	300.759	300.659	0.1
	300.159	300.009	0.15
	299.659	299.359	0.3
810	310.596	303.596	**7**
BH50	No sand lens		

amsl = above mean sea level
ft = feet
0.00 = sand lens thickness 1 foot or greater

Table 2
Sand Lens Locations in the Vicinity of G-G'

Sand Lens Location	Begin Elevation (ft amsl)	End Elevation (ft amsl)	Thickness (ft)
Sand Lens Locations in the Vicinity of G-G'			
411	313.236	311.236	**2**
	306.236	305.236	**1**
BH-16	314.900	312.900	**2**
410	314.854	314.354	0.5
	309.854	309.354	0.5
4D003	307.310	306.810	0.5
	302.310	301.810	0.5
4D001	314.960	314.460	0.5
	313.210	312.760	0.45
	309.960	308.960	**1**
413	310.245	309.545	0.7
414	309.684	309.384	0.3
	308.784	308.684	0.1
	301.684	298.584	**3.1**
4D006	311.030	310.530	0.5
	308.280	308.030	0.25
	307.280	307.030	0.25
415	313.474	311.674	**1.8**
	311.374	311.074	0.3
	309.774	309.474	0.3
	308.474	303.470	**5.004**
416	312.233	312.033	0.2
	311.633	311.433	0.2
	311.133	311.083	0.05
	310.433	310.333	0.1
	303.833	303.633	0.2
	303.033	302.833	0.2
4D002	314.180	314.080	0.1
BH-30	309.020	306.270	**2.75**
	304.270	302.270	**2**
412	310.183	310.180	0.003
BH-24	320.300	318.300	**2**
	316.300	303.300	**13**
419	311.198	310.198	**1**
	307.398	306.698	0.7
	305.598	304.898	0.7
418	314.628	311.828	**2.8**
	310.628	310.128	0.5
	307.328	307.228	0.1
	305.128	303.828	**1.3**
425	315.300	314.800	0.5
	313.300	313.200	0.1

amsl = above mean sea level
ft = feet
0.0 = sand lens thickness 1 foot or greater

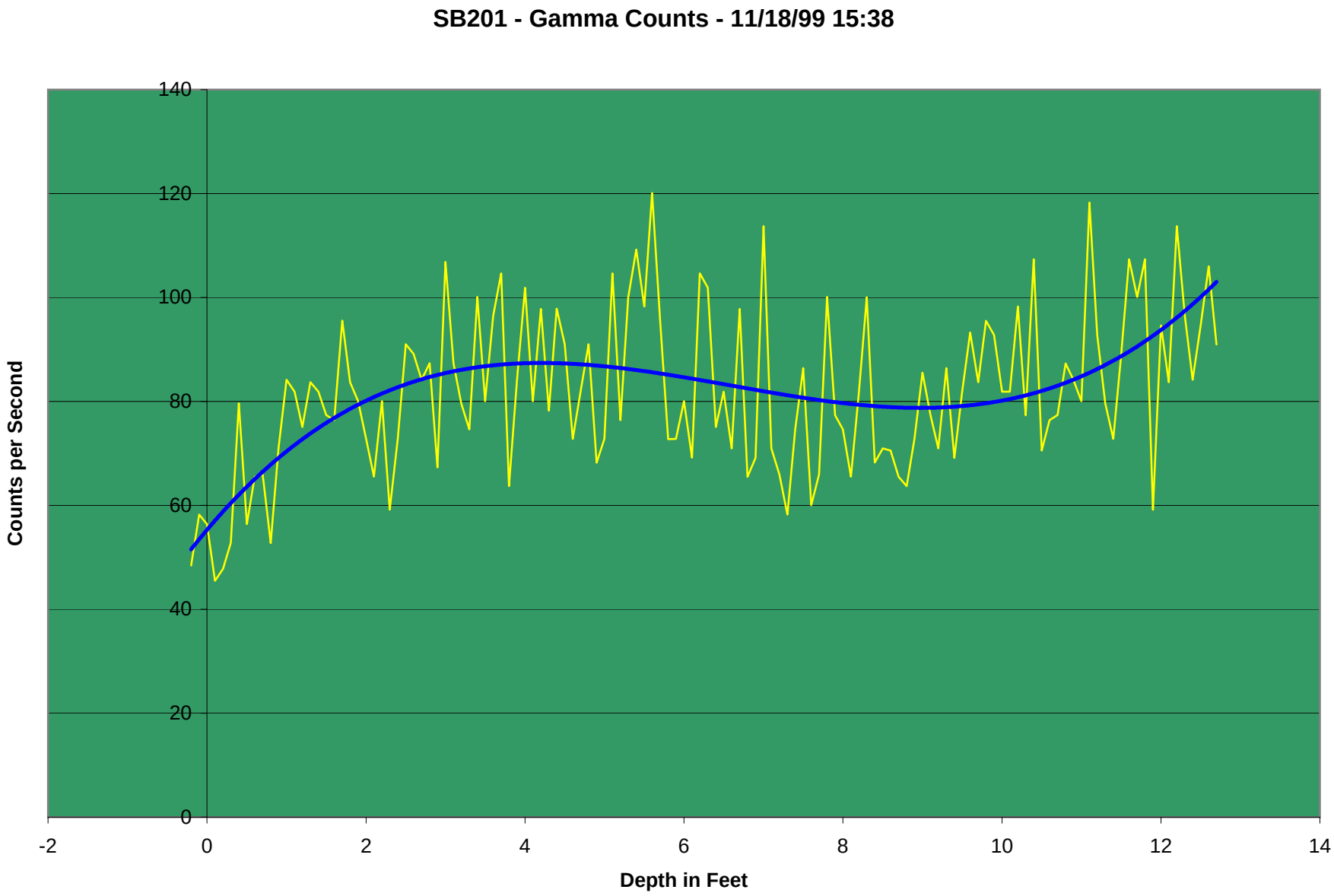
Table 3
Sand Lens Details for RIR Addendum Boreholes

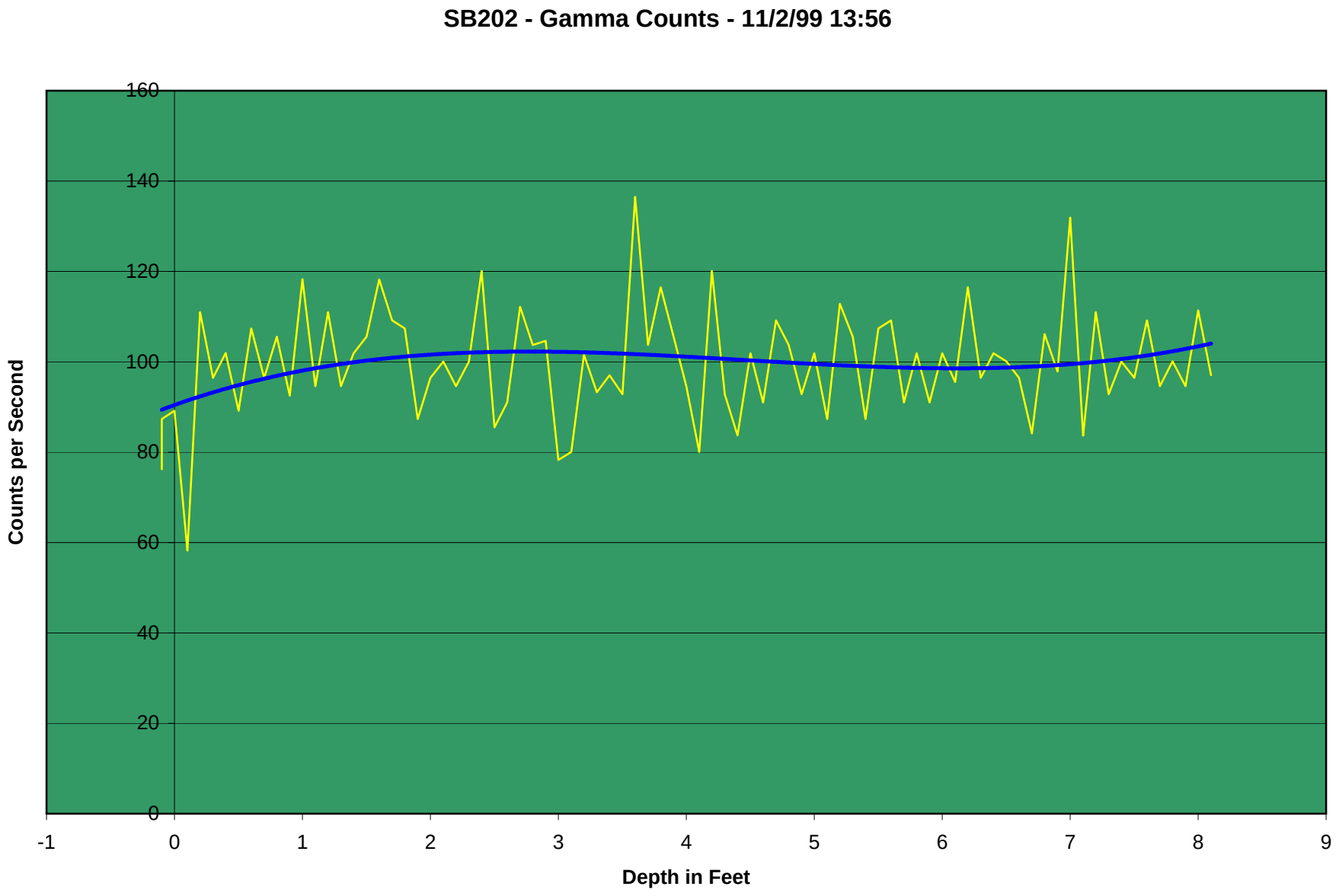
Loc_ID	Begin Elevation (ft amsl)	End Elevation (ft amsl)	Thickness (ft)
Northwest Corner of NFSS			
TWP921	316.71	315.01	1.7
TWP922	315.04	314.79	0.25
TWP923	No Sand Lens		
TWP924	No Sand Lens		
TWP925	No Sand Lens		
TWP926	308.51	306.91	1.6
Northern, Mid-Property Boundary			
TWP927	308.04	307.04	1
TWP928	No Sand Lens		
TWP929	320.62	320.22	0.4
TWP929	312.92	311.92	1
TWP930	308.00	305.30	2.7
TWP931	306.63	306.33	0.3
TWP932	No Sand Lens		
TWP933	No Sand Lens		
TWP934	304.83	303.83	1
In Vicinity of IWCS			
TWP935	No Sand Lens		
TWP936	No Sand Lens		
TWP937	308.09	302.99	5.1
TWP938	No Sand Lens		
TWP939	309.39	308.89	0.5
TWP940	311.52	308.52	3
TWP941	No Sand Lens		
TWP942	316.21	314.41	1.8
TWP943	311.48	310.98	0.5

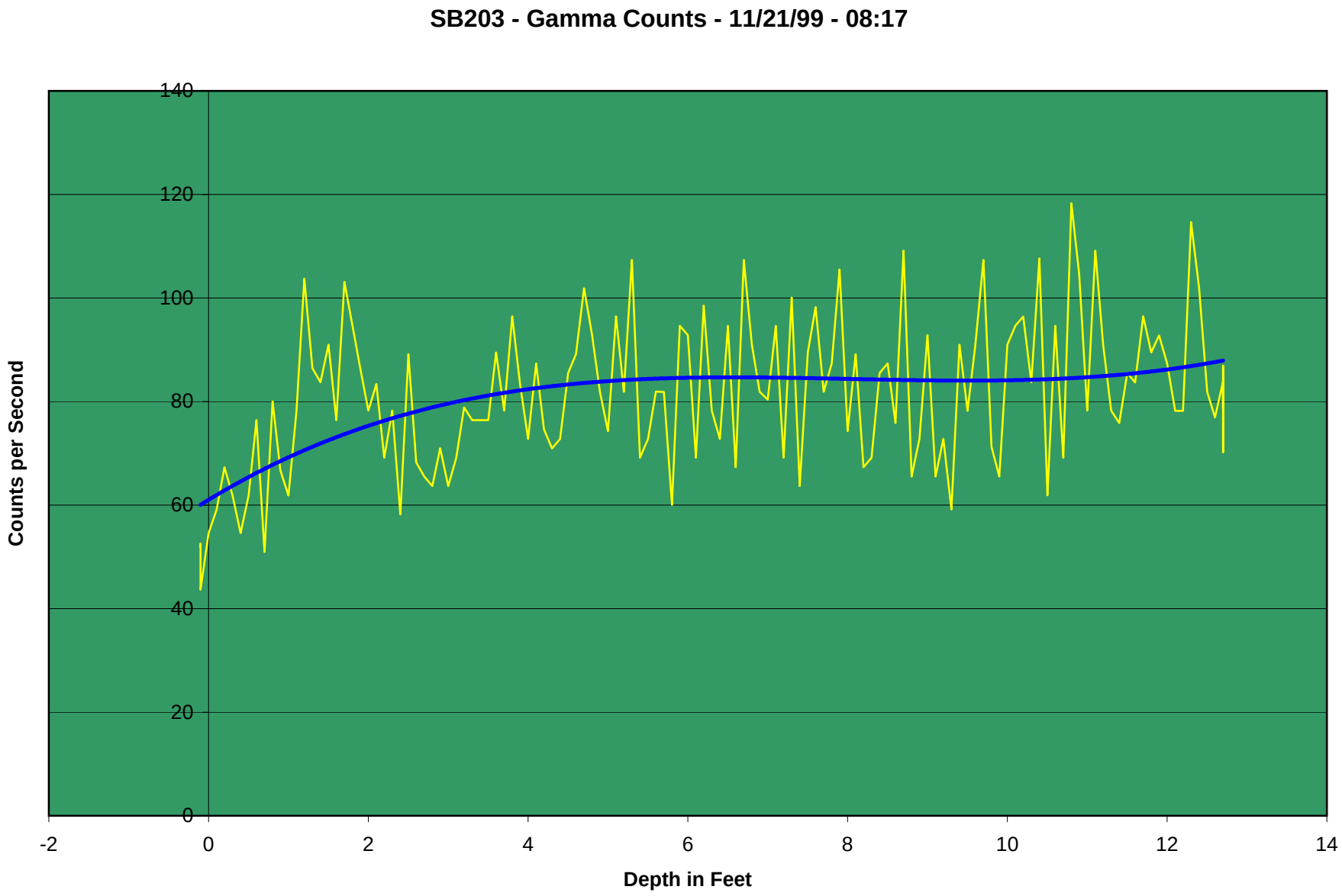
amsl = above mean sea level
ft = feet

APPENDIX 13-A

RI Downhole Gamma Logging Results


SB201 - Gamma Counts - 11/18/99 15:38
Counts per Second
Depth in Feet
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14


SB202 - Gamma Counts - 11/2/99 13:56
Counts per Second
160
140
120
100
80
60
40
20
0
-1
0
1
2
3
4
5
6
7
8
9
Depth in Feet


SB203 - Gamma Counts - 11/21/99 - 08:17
Counts per Second
Depth in Feet
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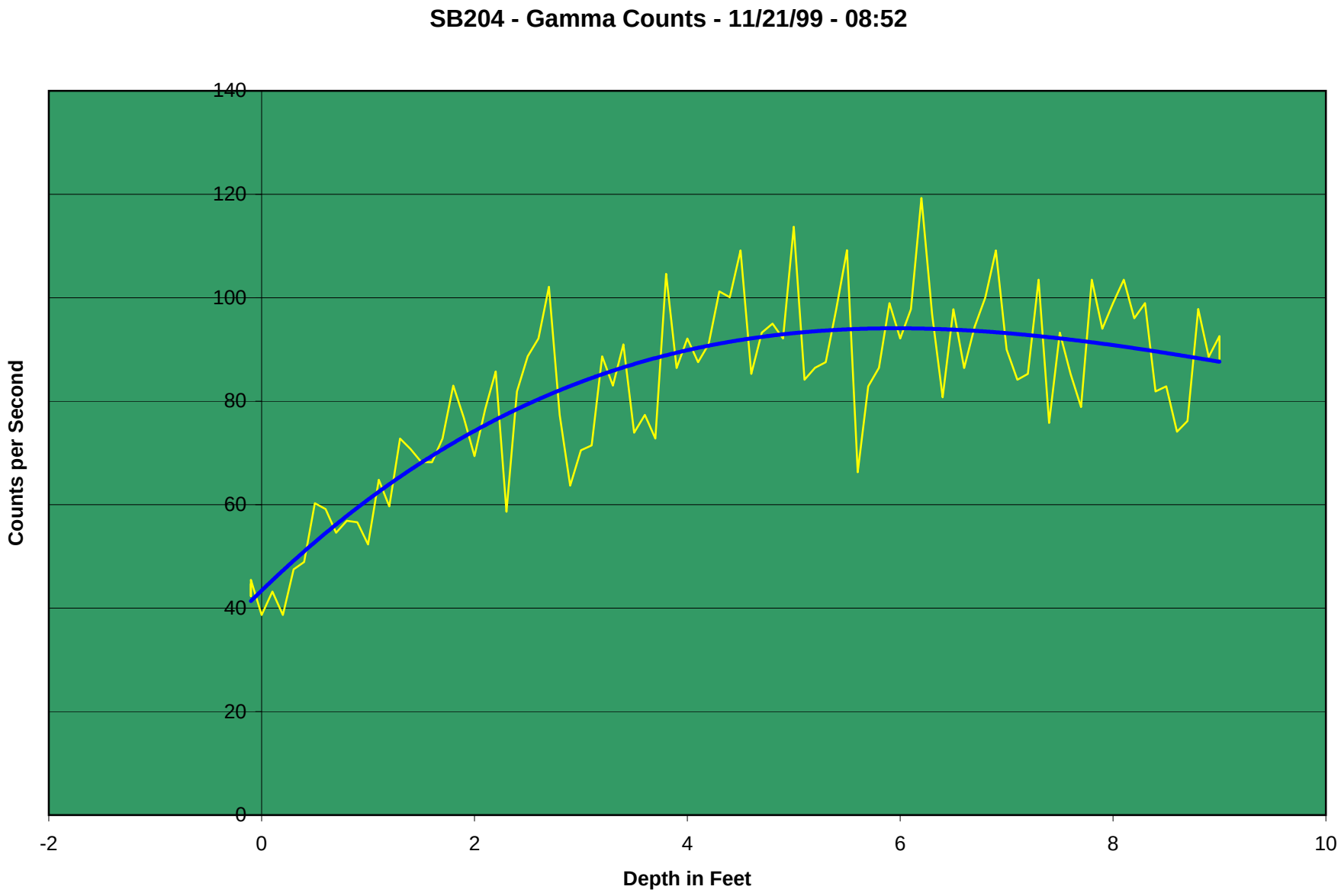
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14


SB204 - Gamma Counts - 11/21/99 - 08:52
Counts per Second
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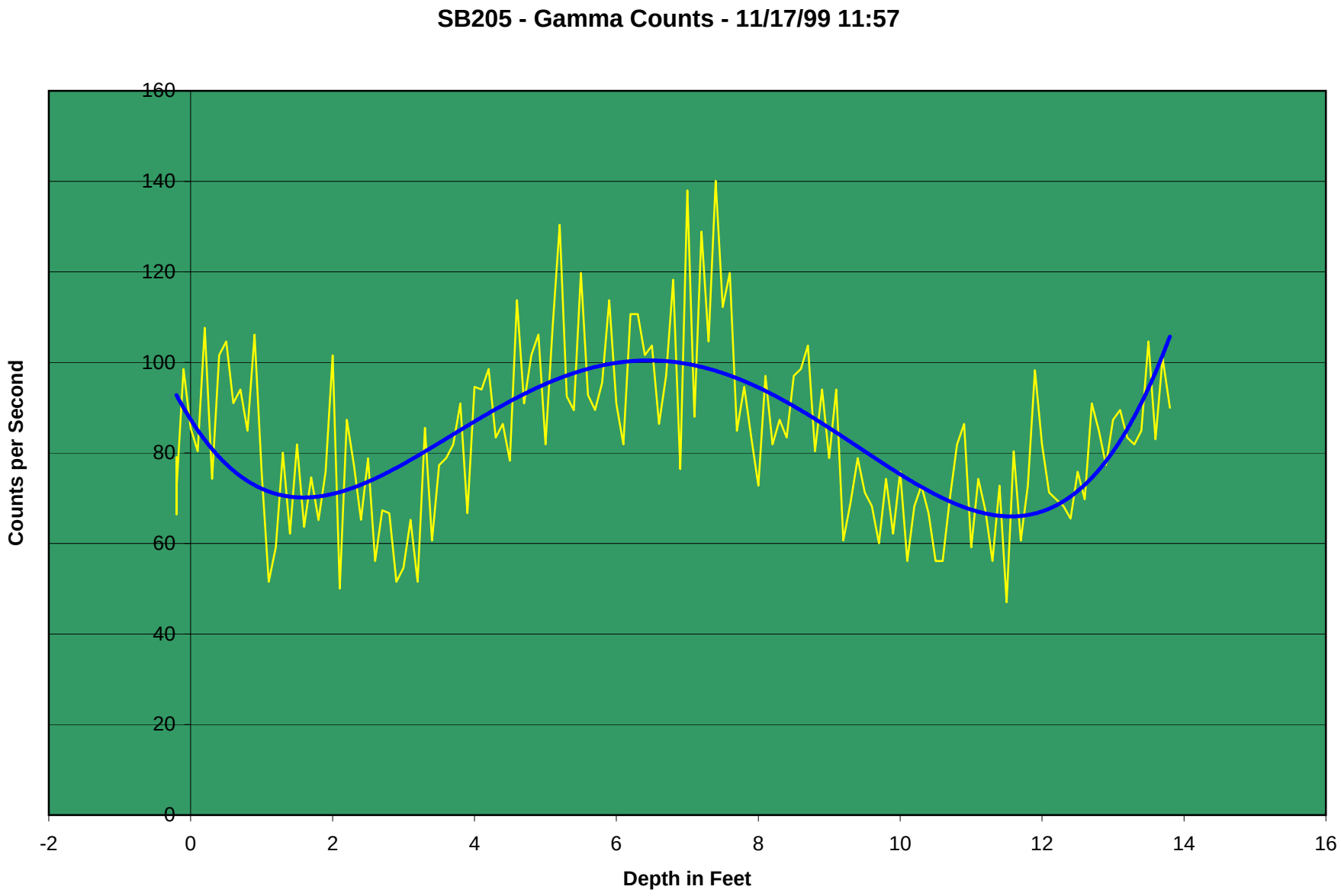
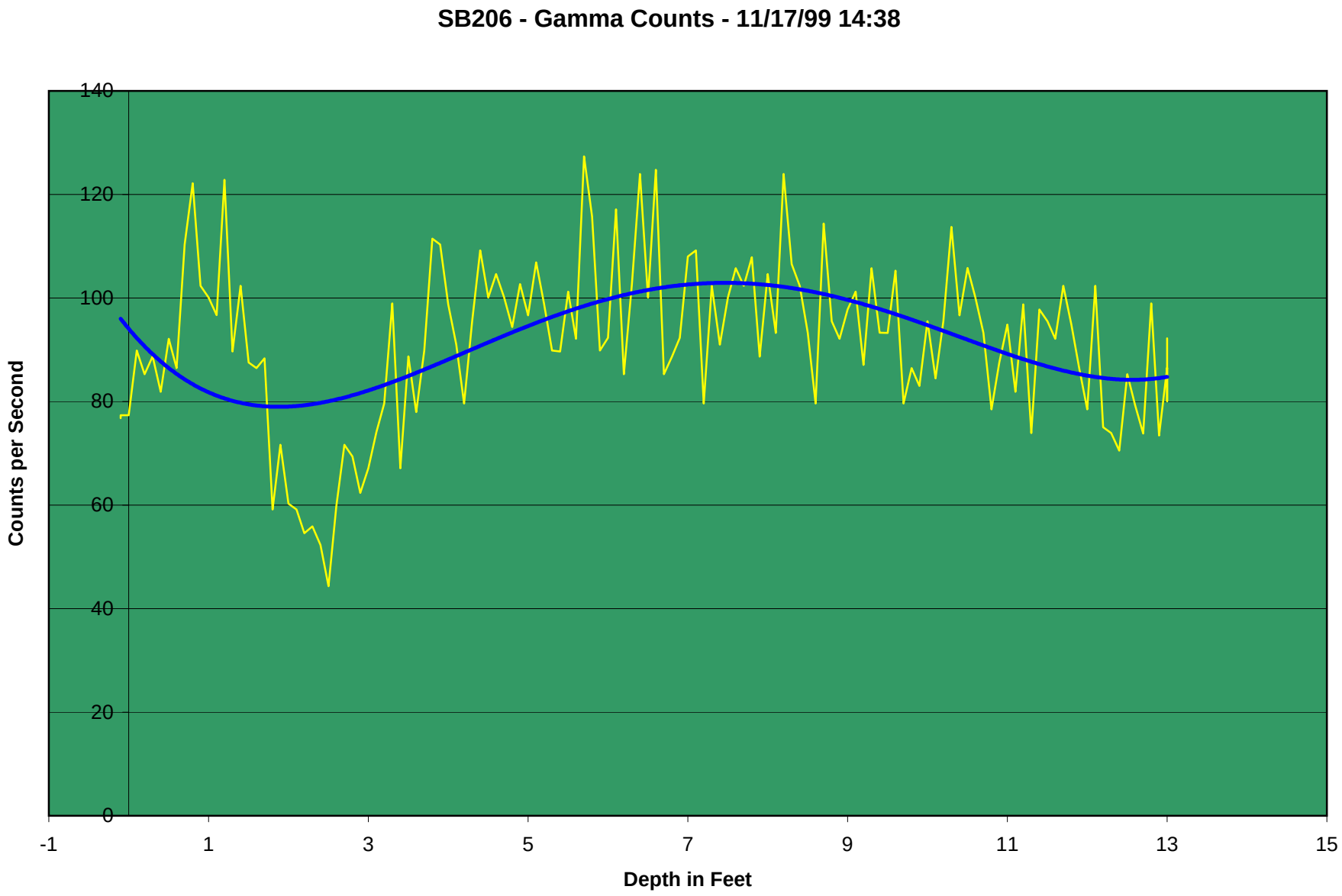
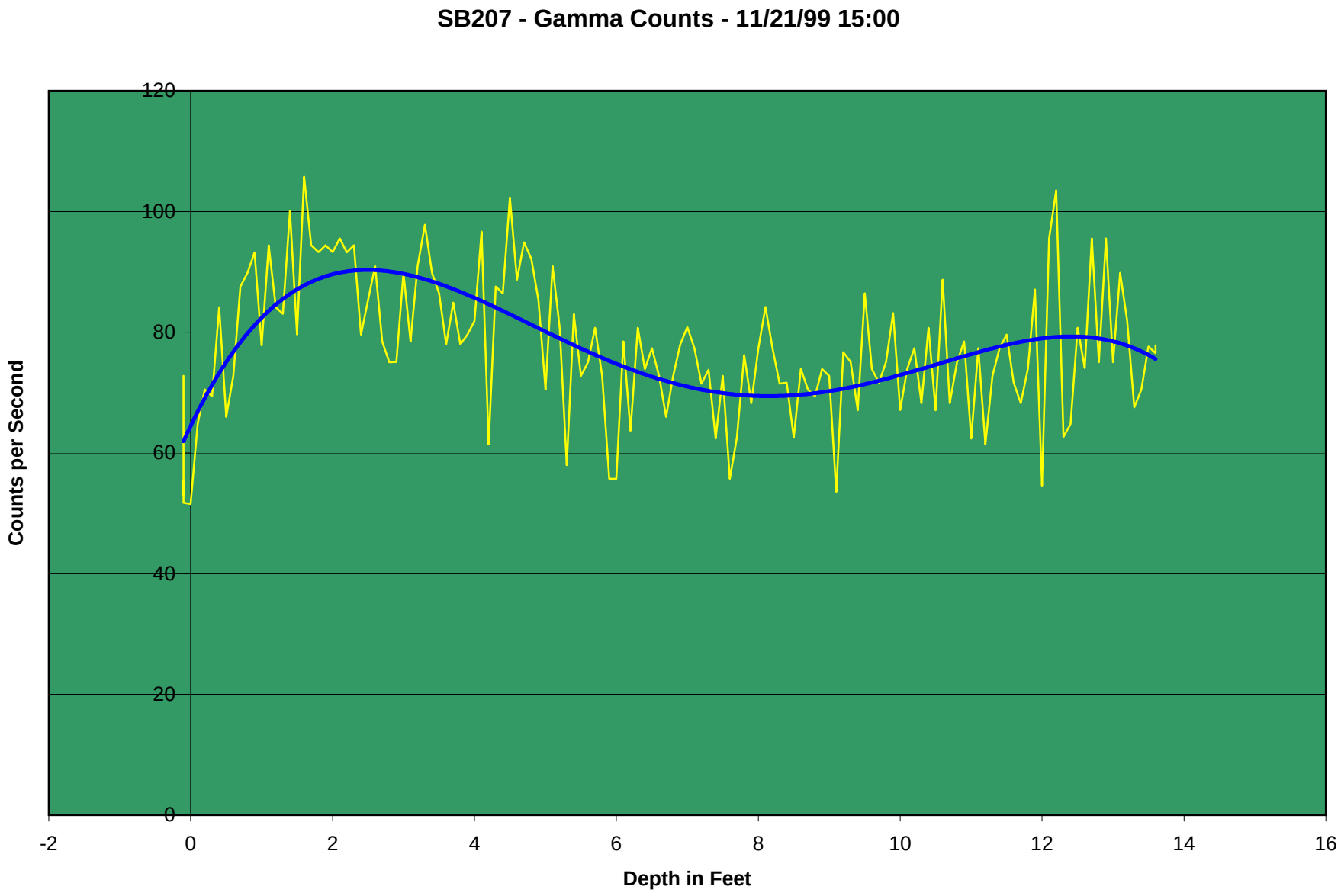
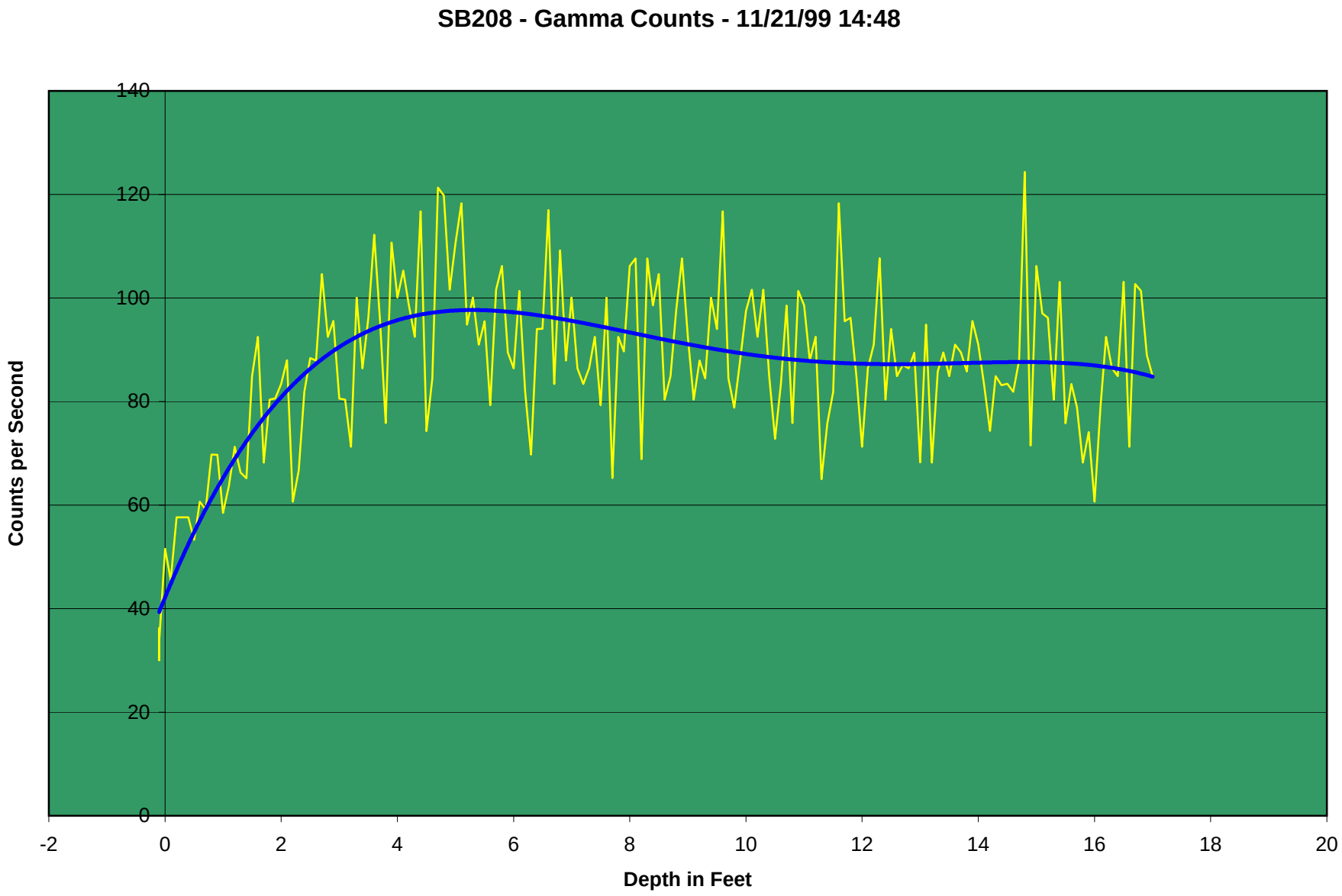
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
Depth in Feet


SB205 - Gamma Counts - 11/17/99 11:57
Counts per Second
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet


SB206 - Gamma Counts - 11/17/99 14:38
Counts per Second
140
120
100
80
60
40
20
0
-1
1
3
5
7
9
11
13
15
Depth in Feet


SB207 - Gamma Counts - 11/21/99 15:00
Counts per Second
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet


SB208 - Gamma Counts - 11/21/99 14:48
Counts per Second
Depth in Feet
140
120
100
80
60
40
20
0
-2
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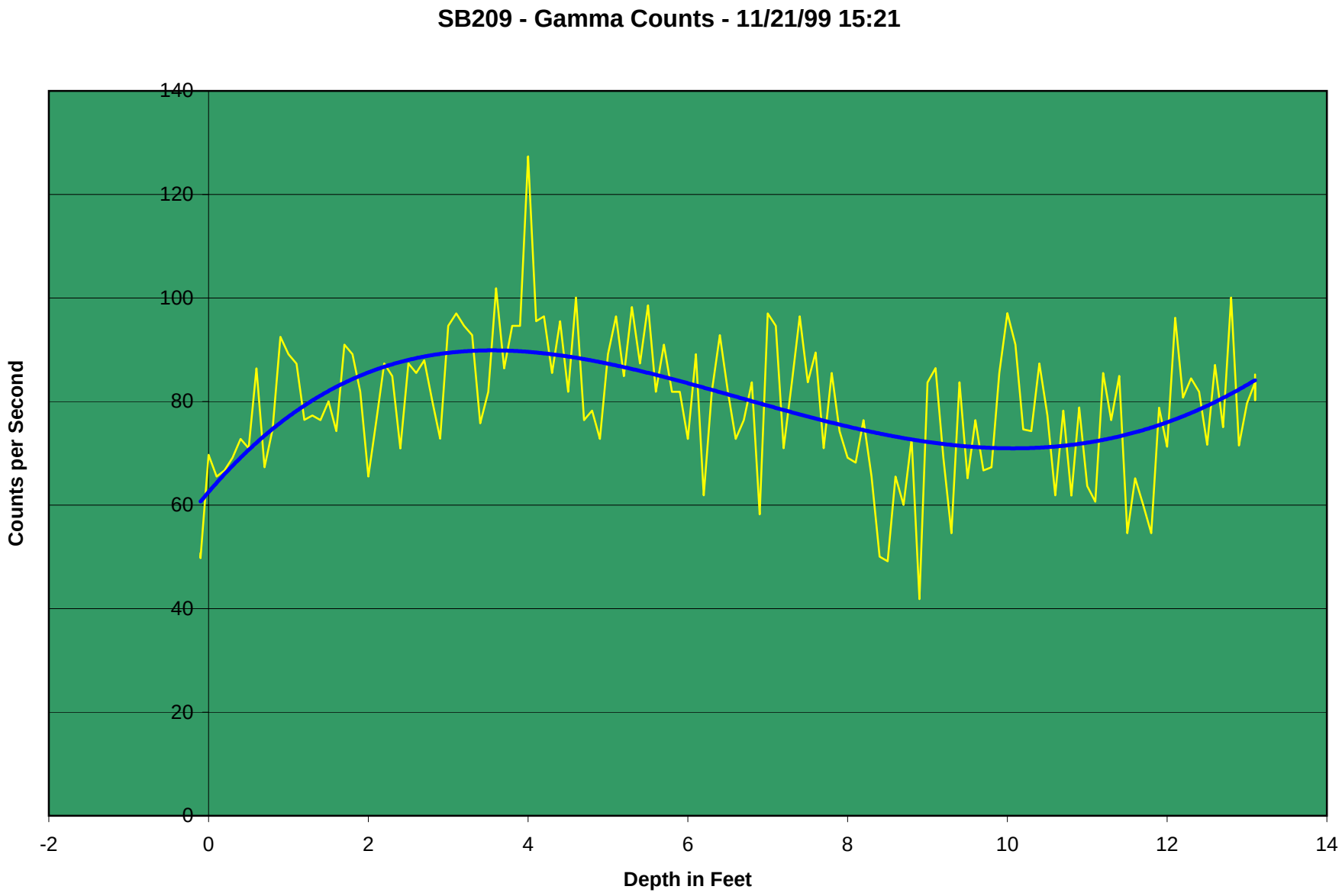
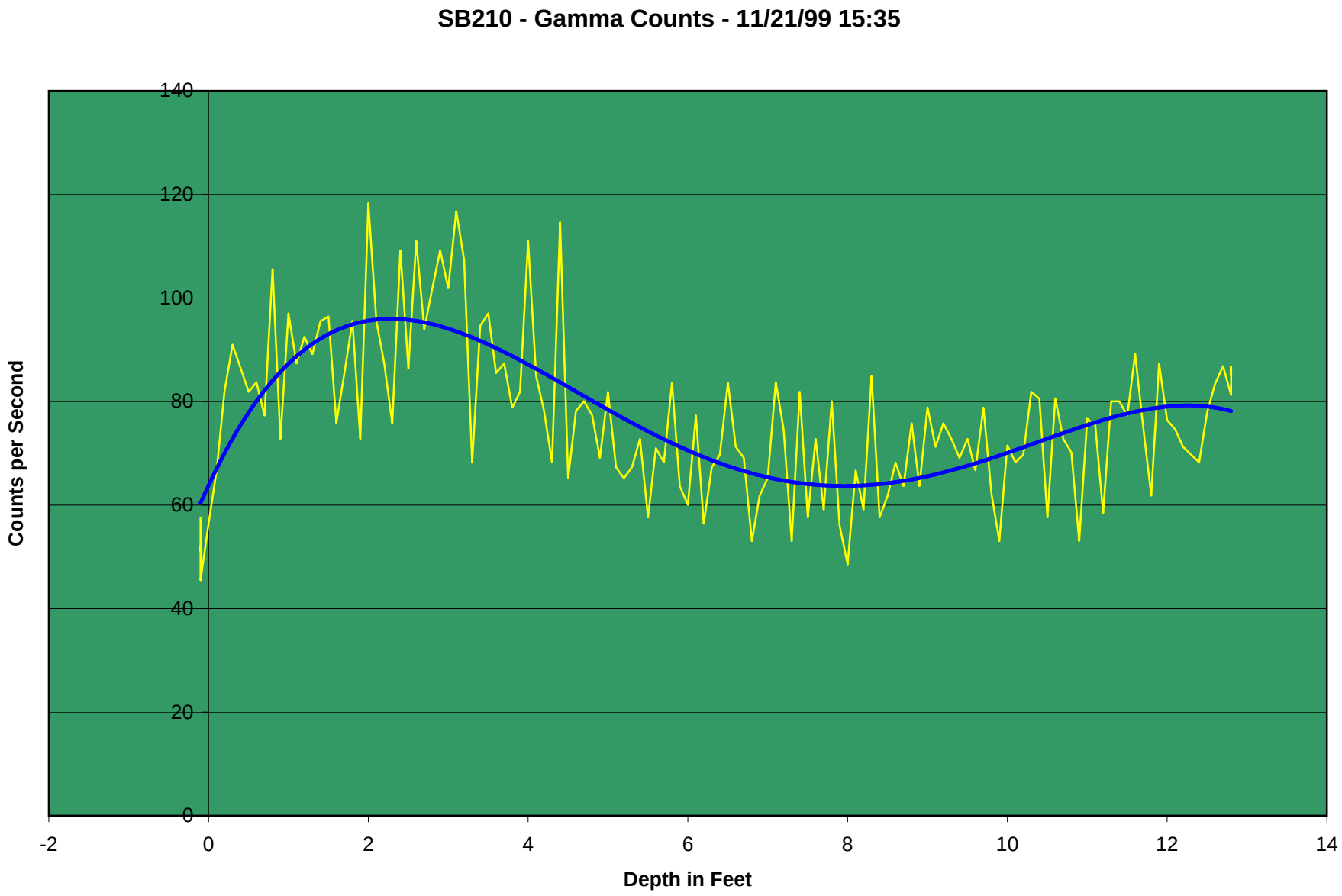
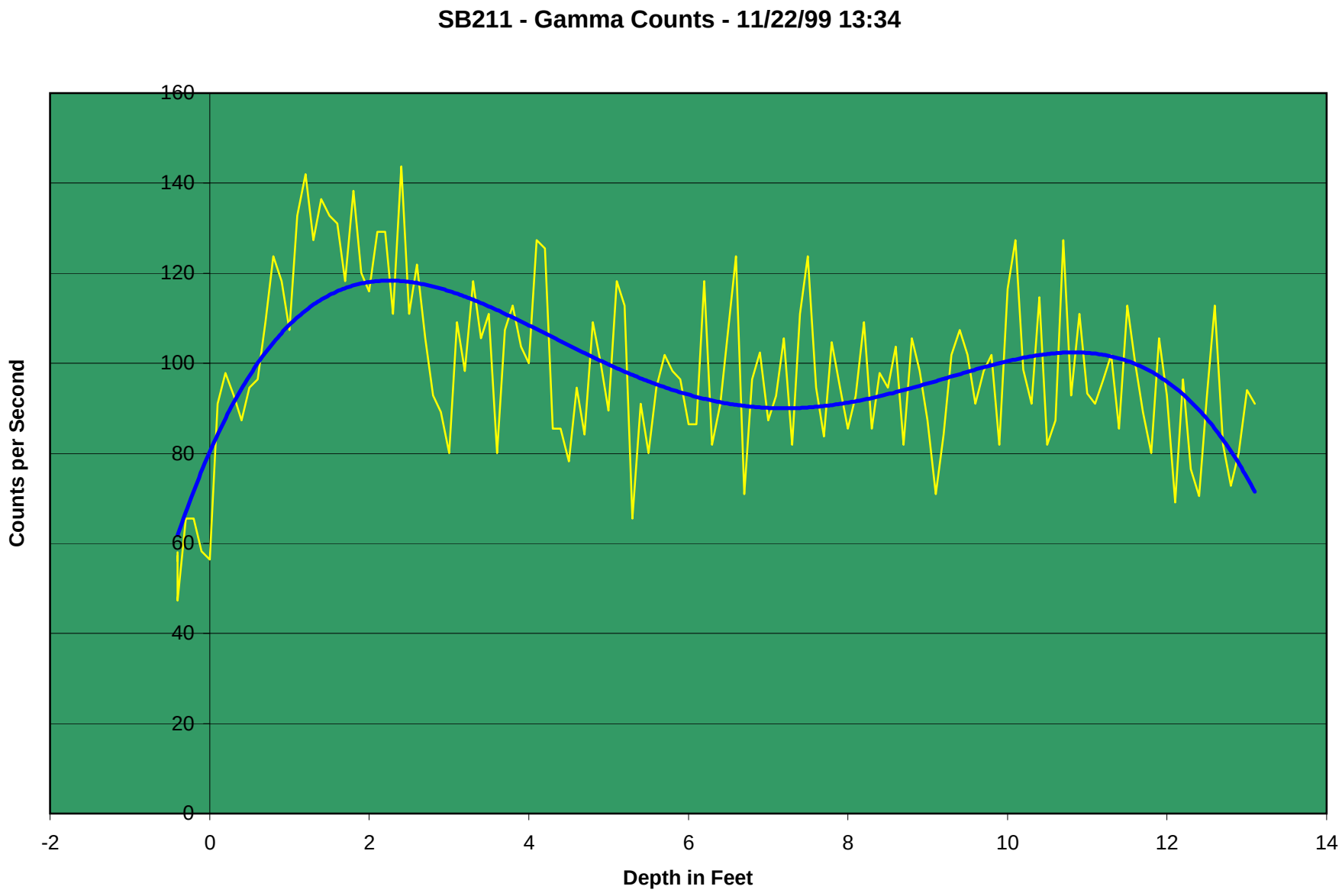
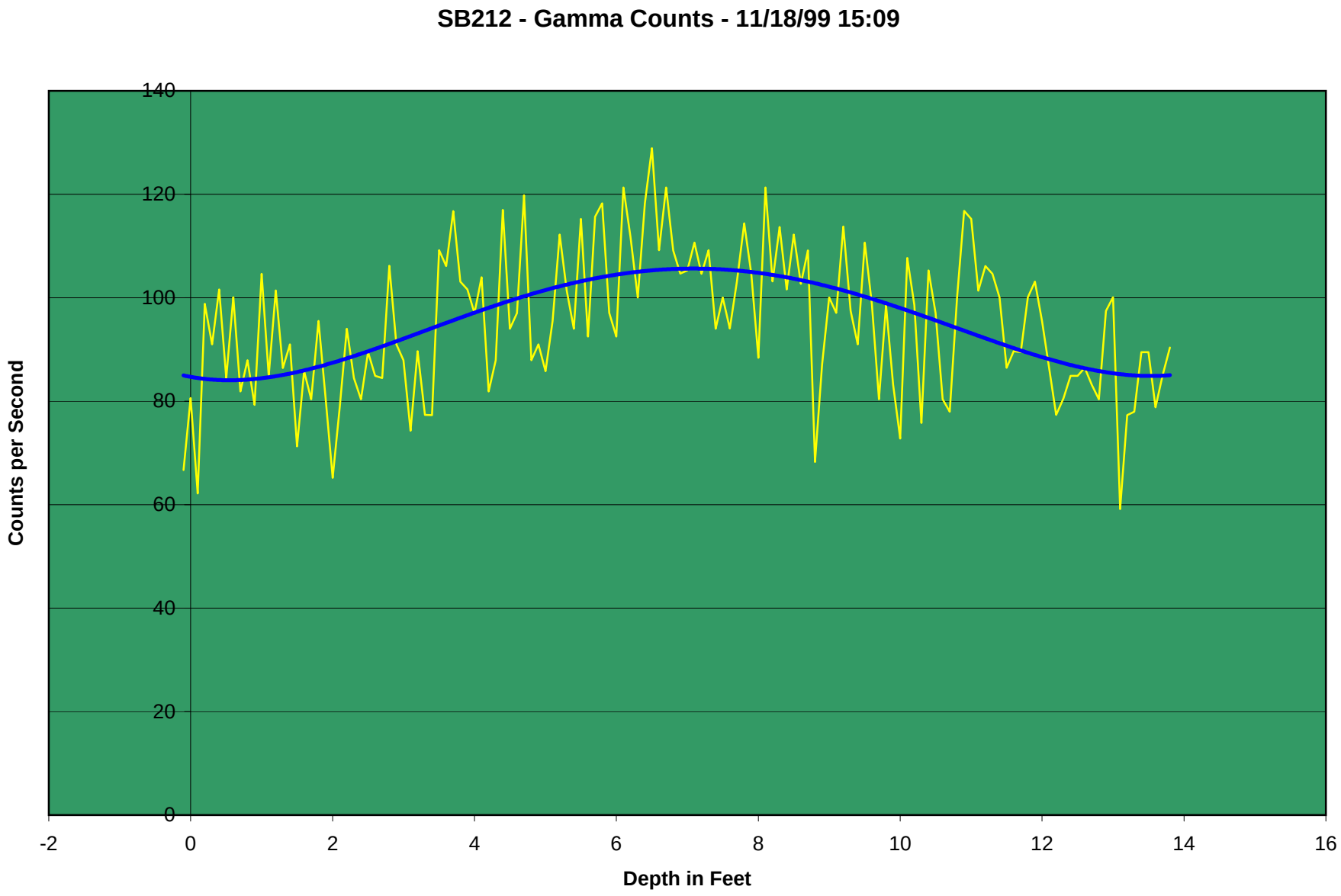
4
6
8
10
12
14
16
18
20


SB209 - Gamma Counts - 11/21/99 15:21
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet


SB210 - Gamma Counts - 11/21/99 15:35
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet


SB211 - Gamma Counts - 11/22/99 13:34
Counts per Second
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet


SB212 - Gamma Counts - 11/18/99 15:09
Counts per Second
140
120
100
80
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40
20
0
-2
0
2
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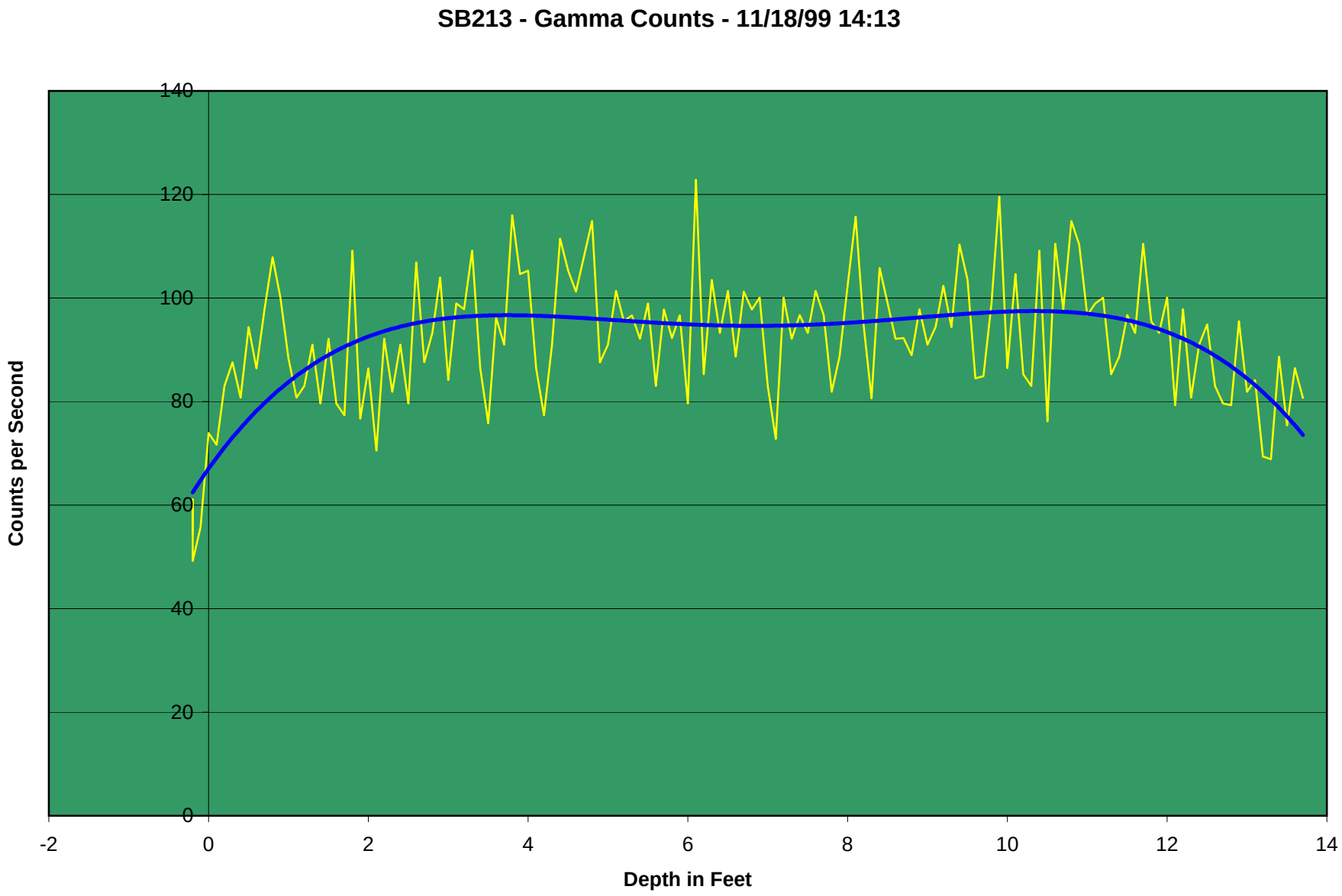
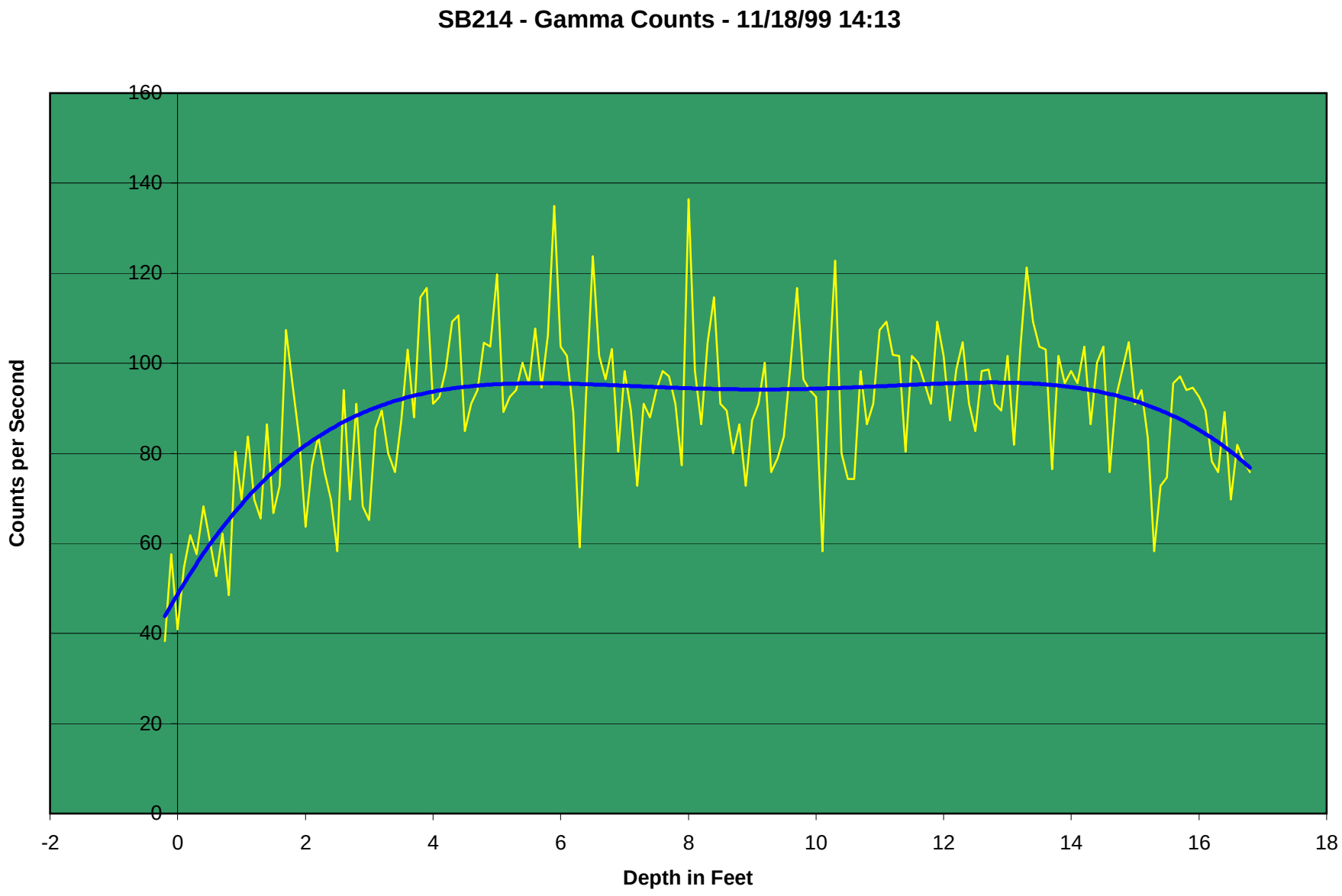
8
10
12
14
16
Depth in Feet


SB213 - Gamma Counts - 11/18/99 14:13
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet


SB214 - Gamma Counts - 11/18/99 14:13
Counts per Second
160
140
120
100
80
60
40
20
0
-2
0
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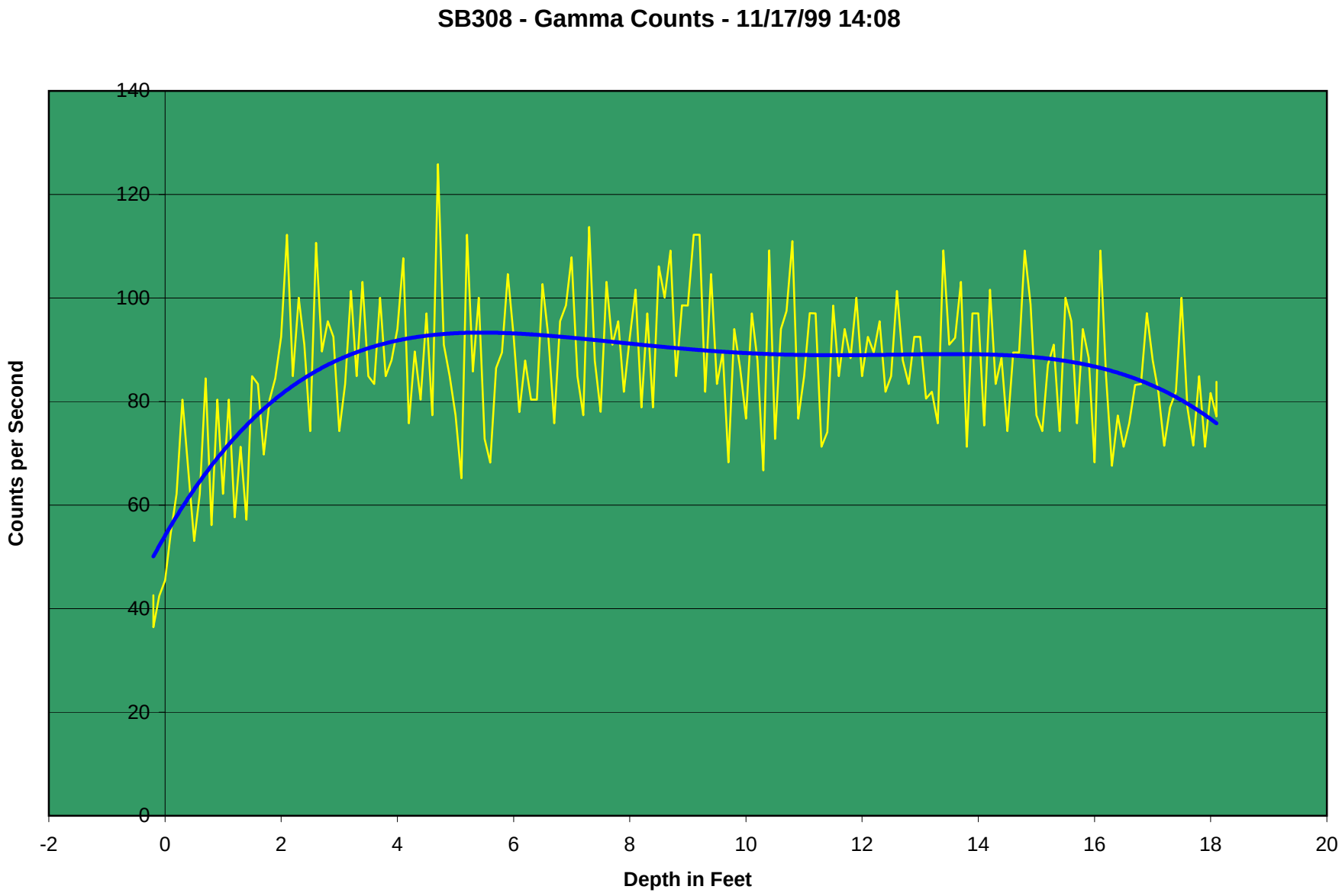
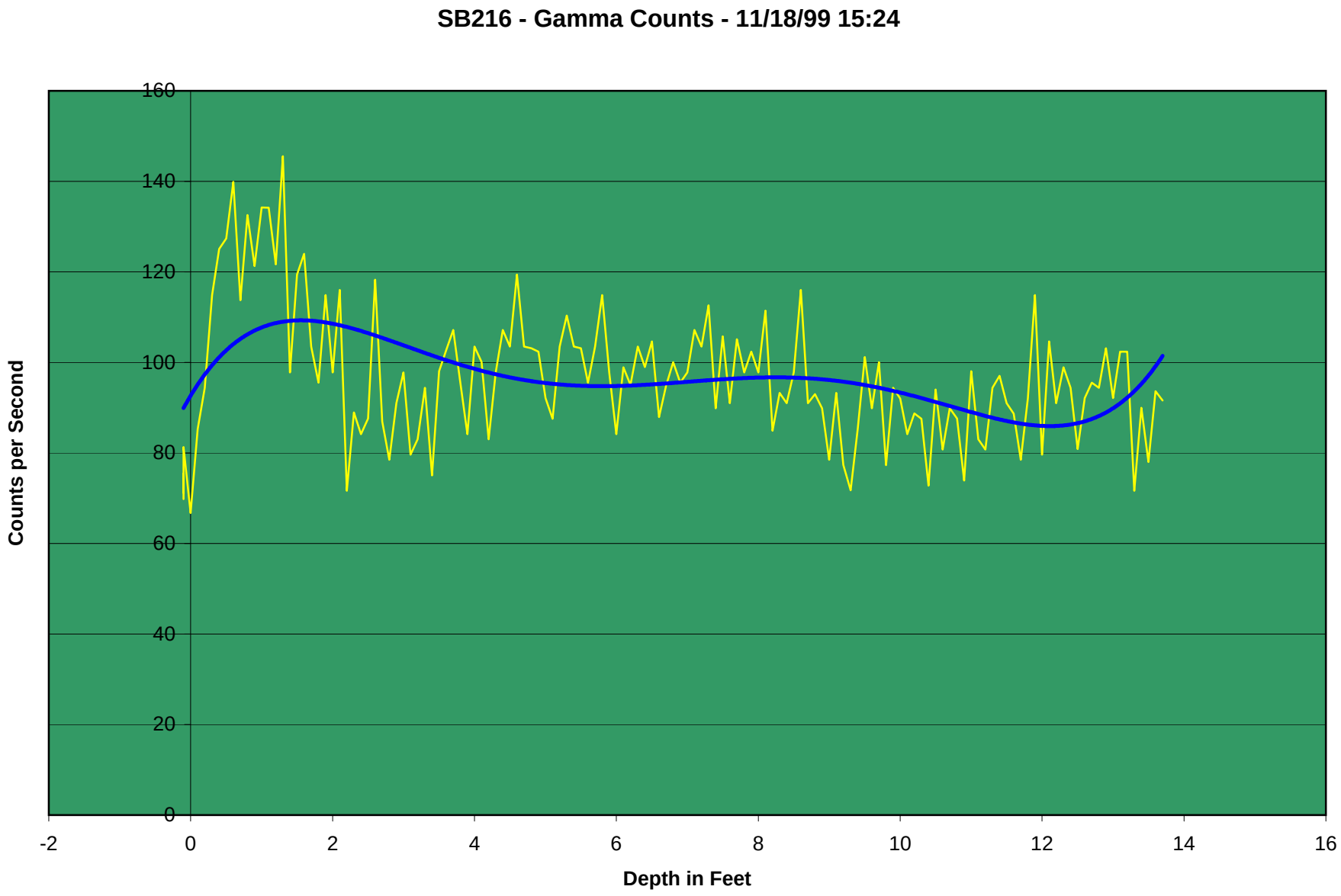
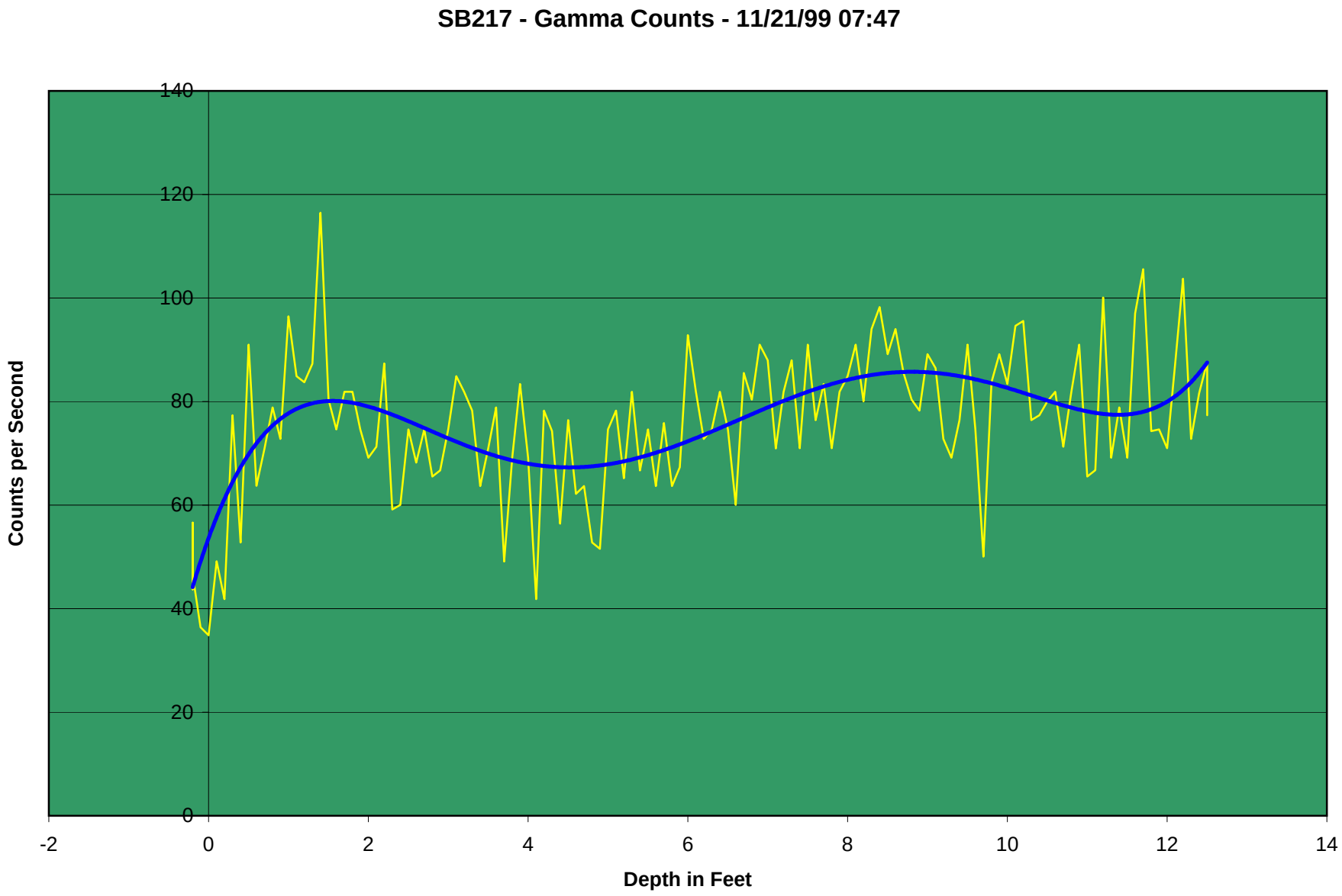
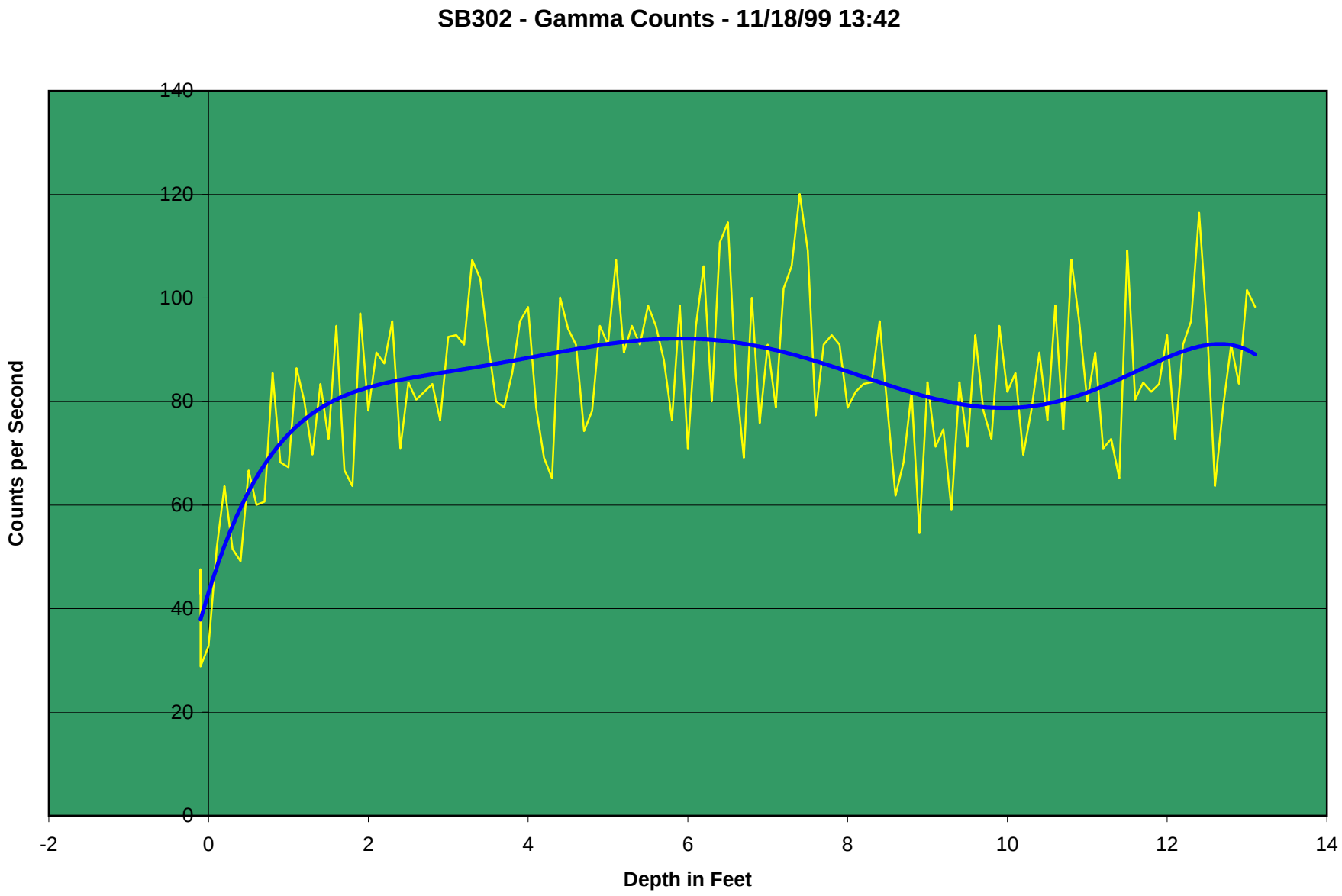
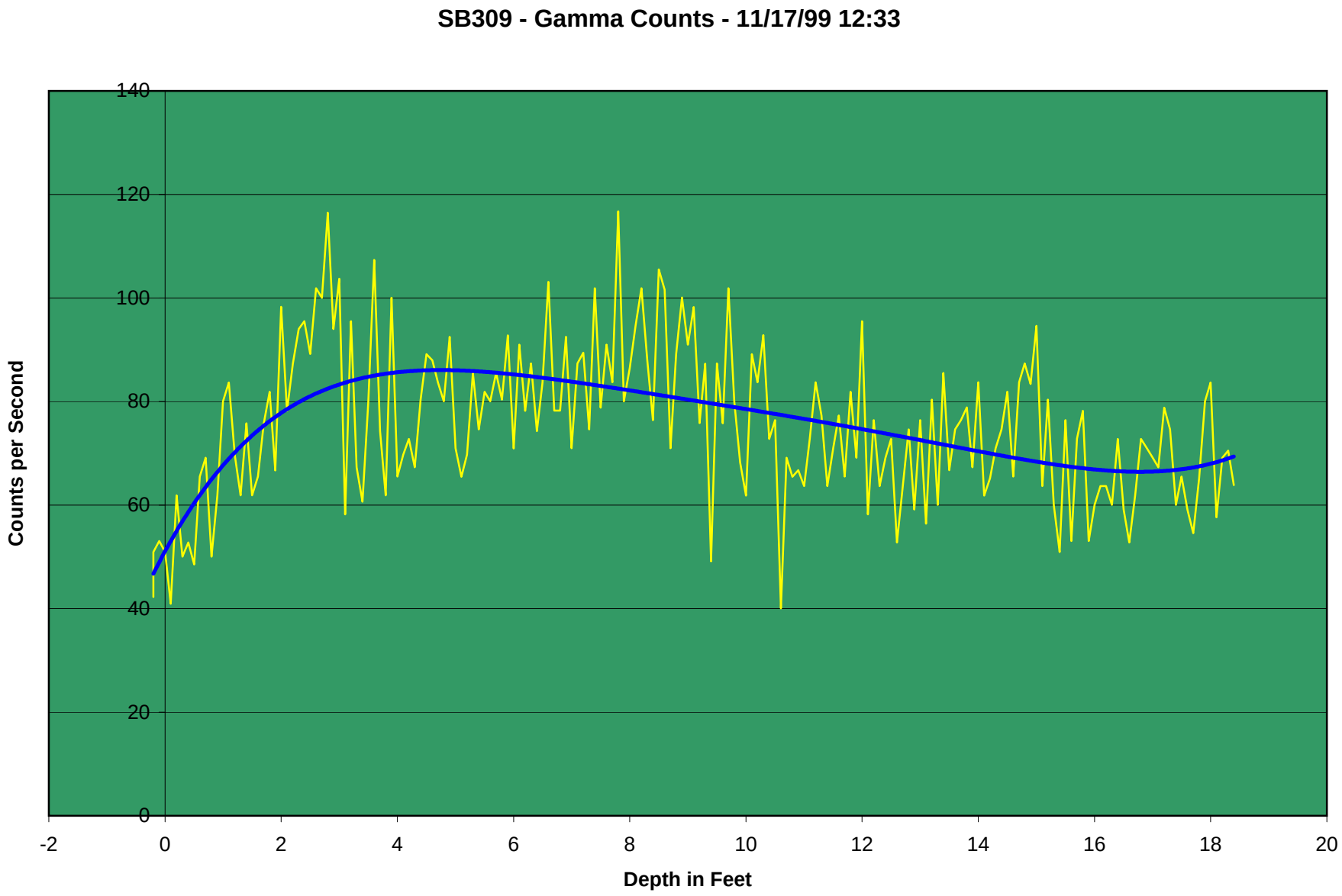
4
6
8
10
12
14
16
18
Depth in Feet

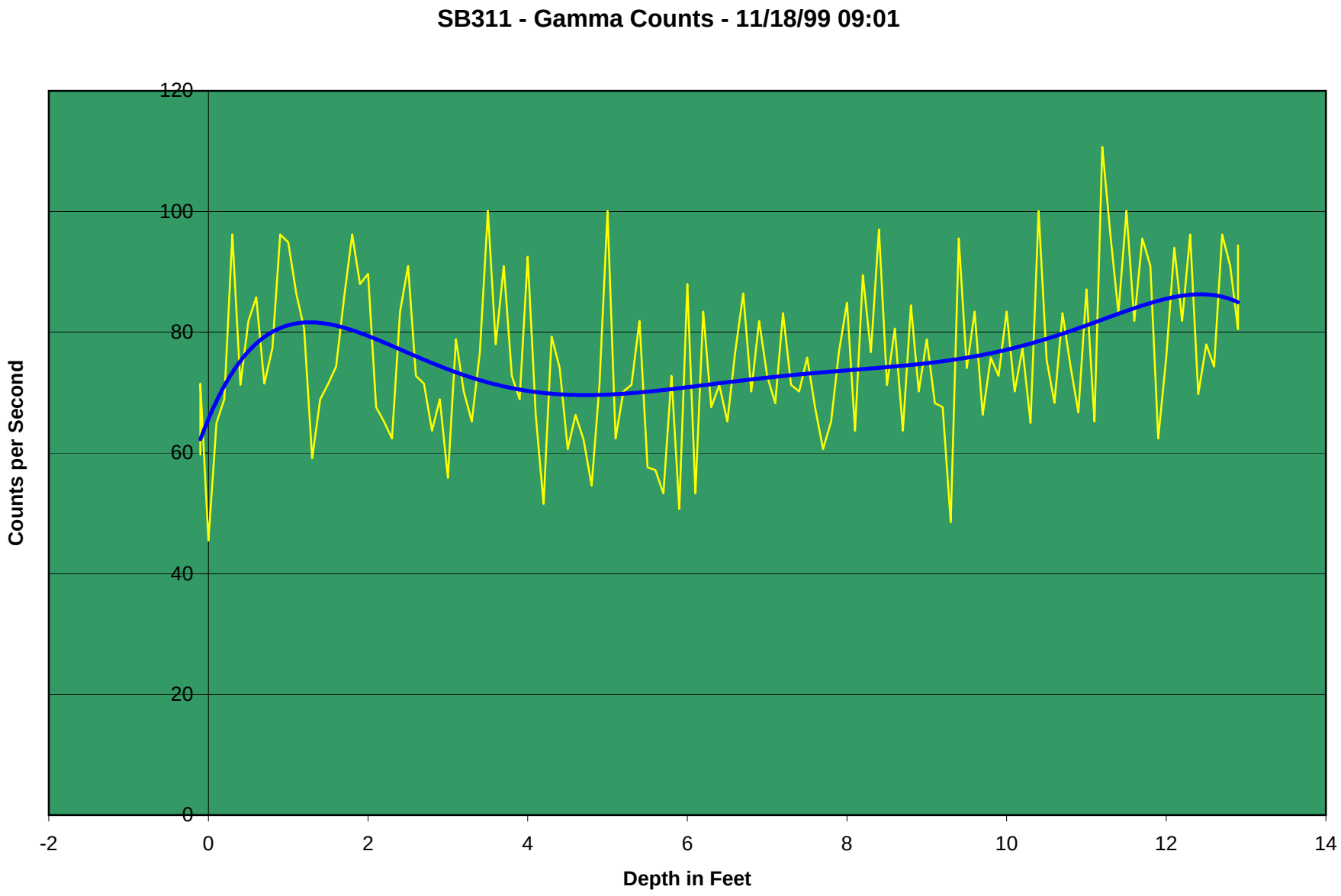

SB308 - Gamma Counts - 11/17/99 14:08
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
18
20
Depth in Feet

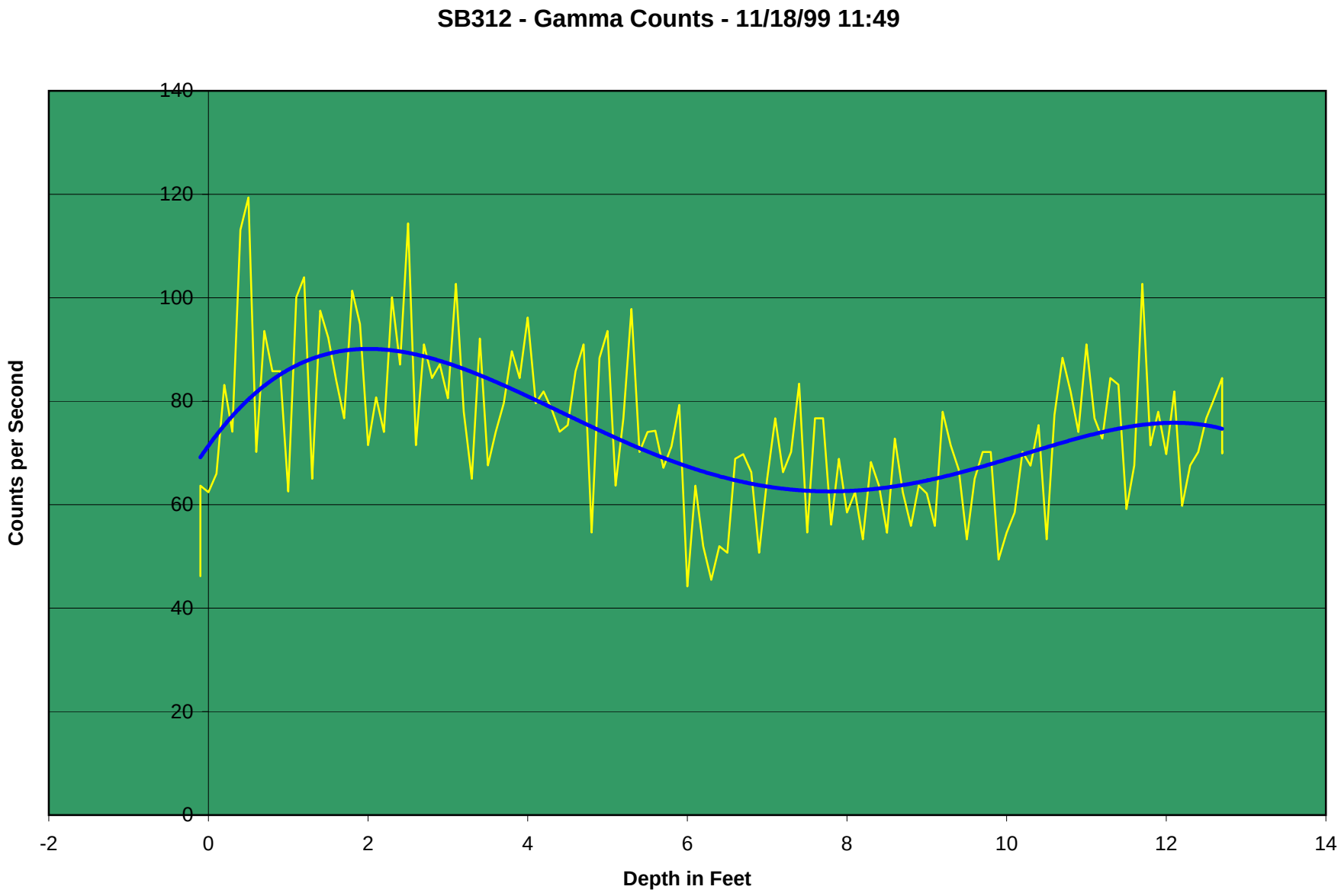

SB216 - Gamma Counts - 11/18/99 15:24
Counts per Second
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet

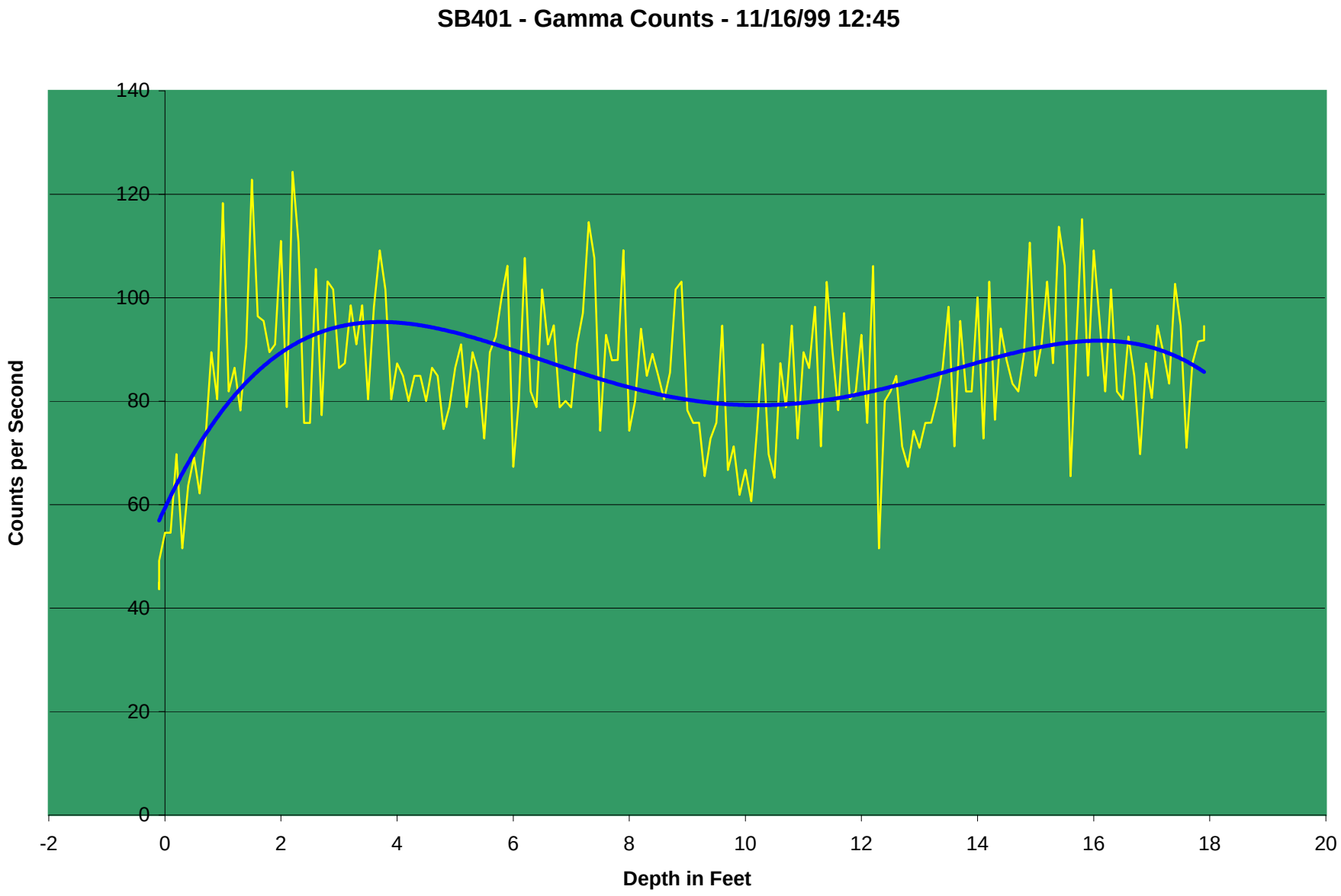

SB217 - Gamma Counts - 11/21/99 07:47
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet


SB302 - Gamma Counts - 11/18/99 13:42
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet


SB309 - Gamma Counts - 11/17/99 12:33
Counts per Second
Depth in Feet
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
18
20


SB311 - Gamma Counts - 11/18/99 09:01
Counts per Second
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet


SB312 - Gamma Counts - 11/18/99 11:49
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet


SB401 - Gamma Counts - 11/16/99 12:45
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
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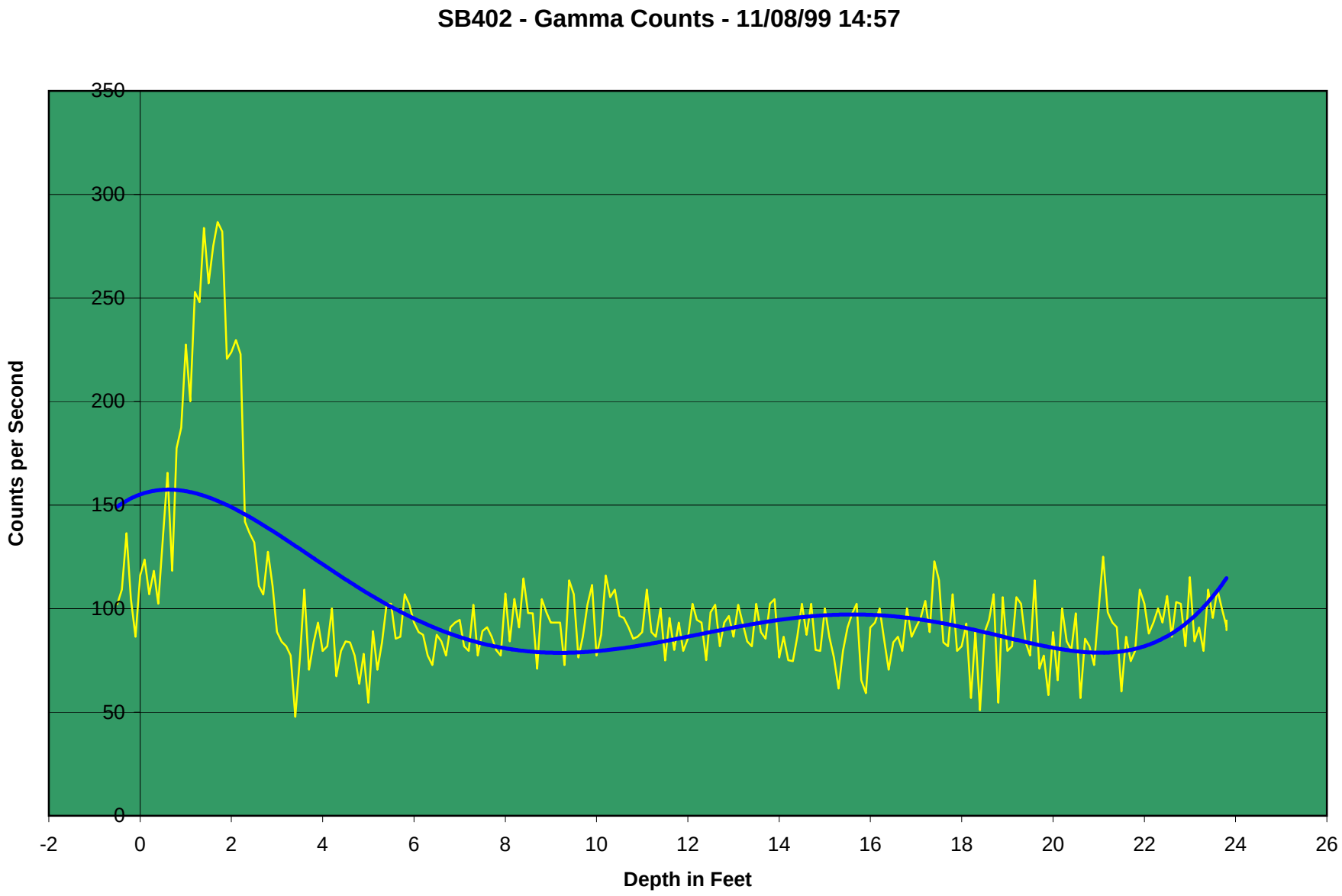
12
14
16
18
20
Depth in Feet


SB402 - Gamma Counts - 11/08/99 14:57
Counts per Second
350
300
250
200
150
100
50
0
-2
0
2
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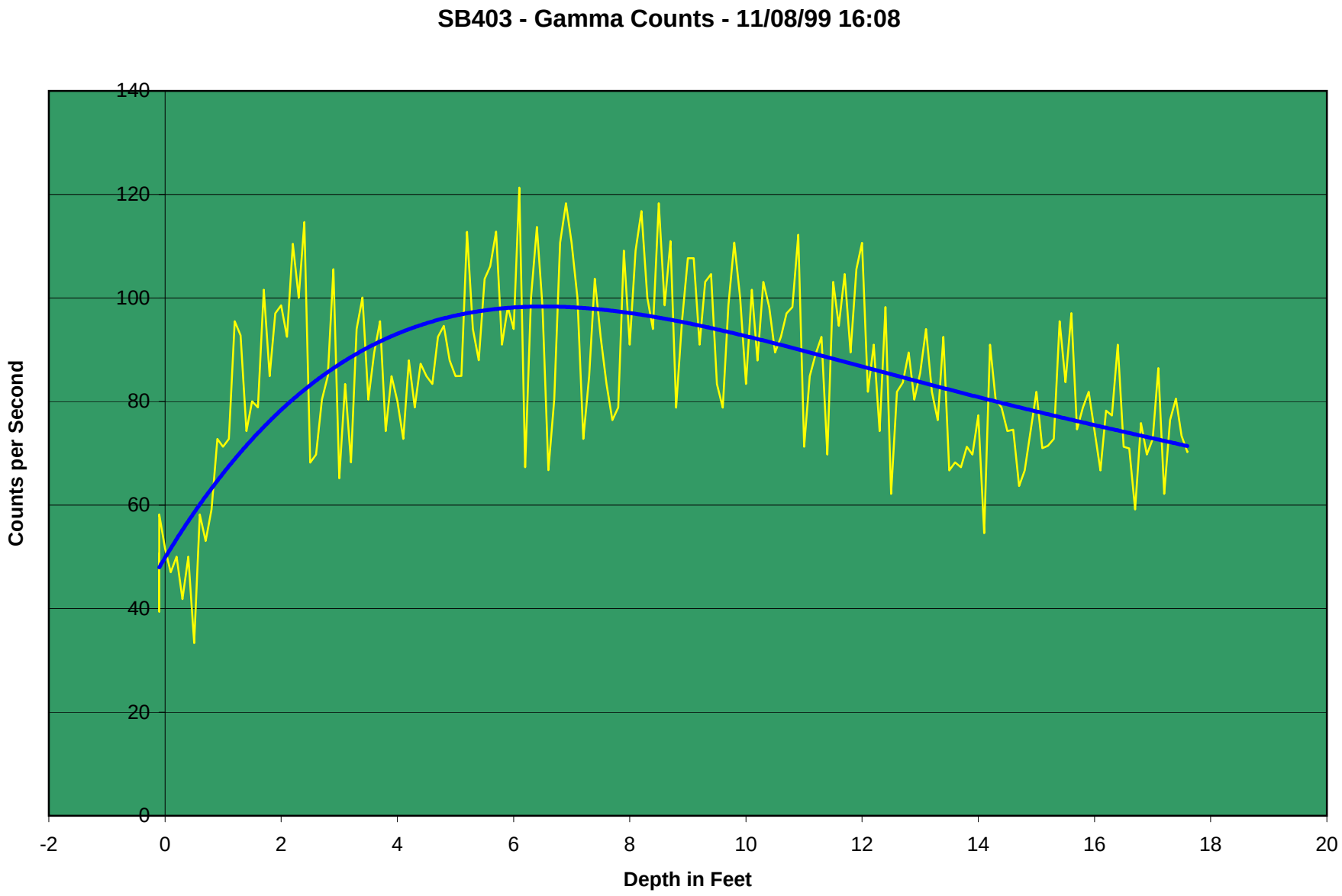
6
8
10
12
14
16
18
20
22
24
26
Depth in Feet


SB403 - Gamma Counts - 11/08/99 16:08
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
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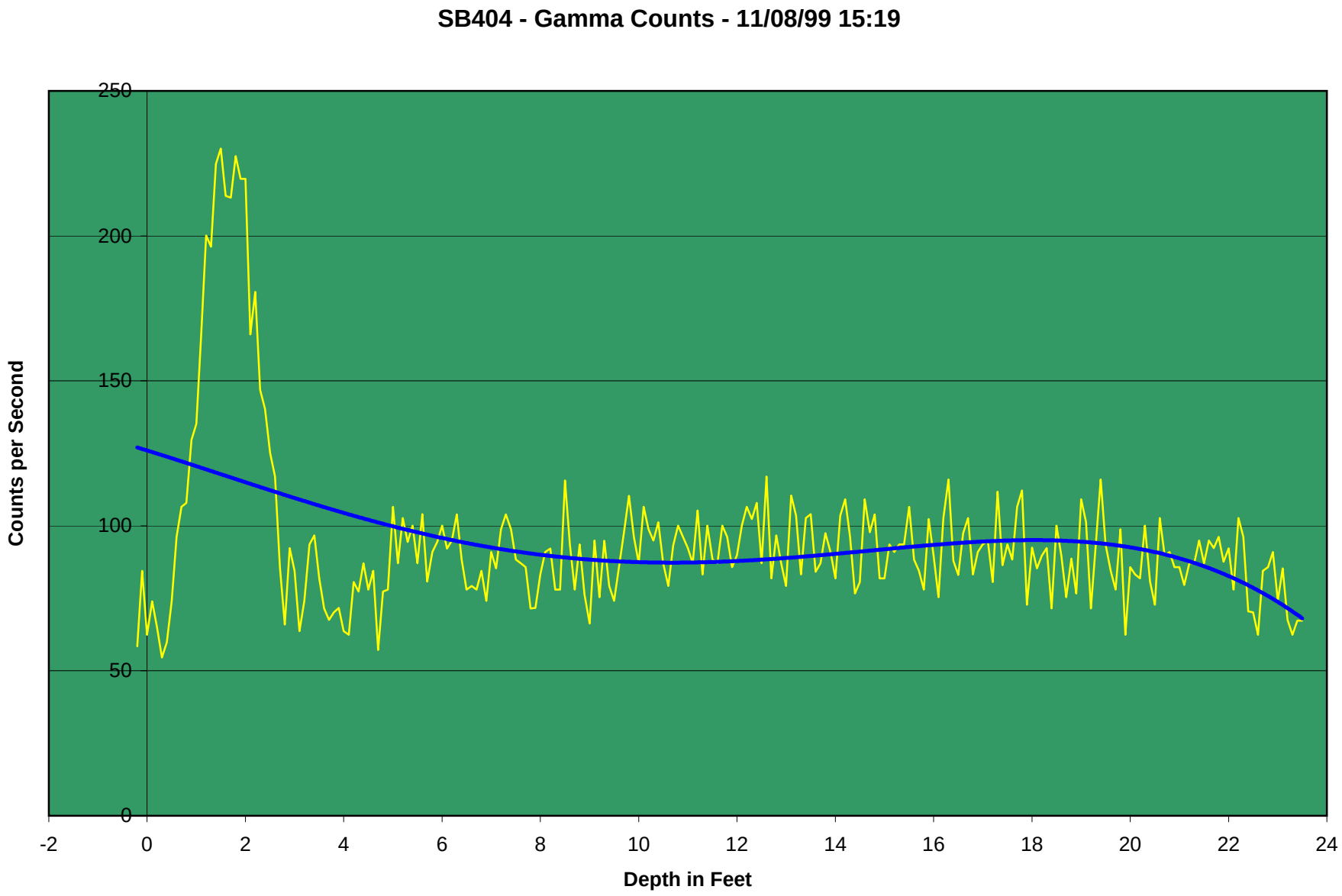
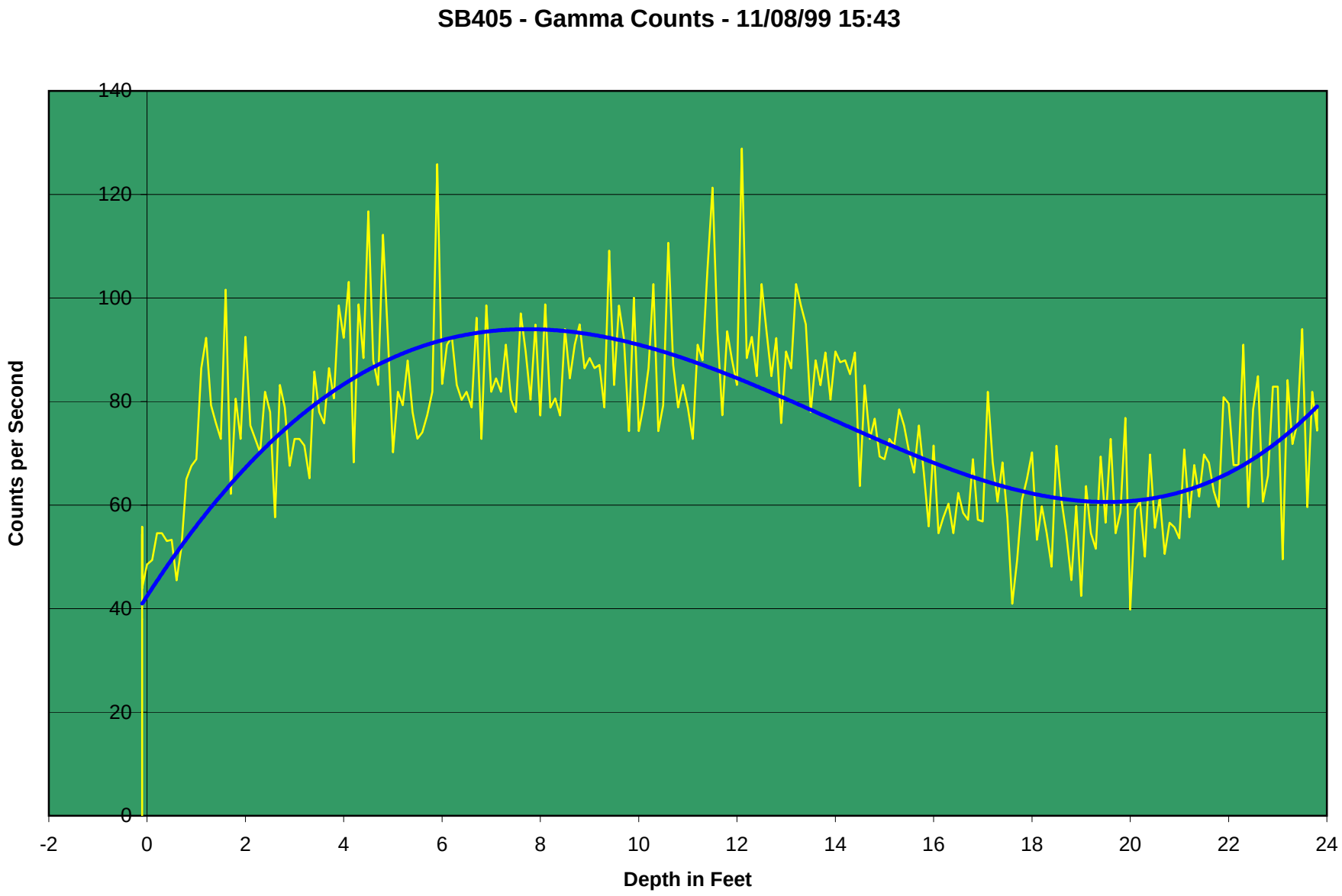
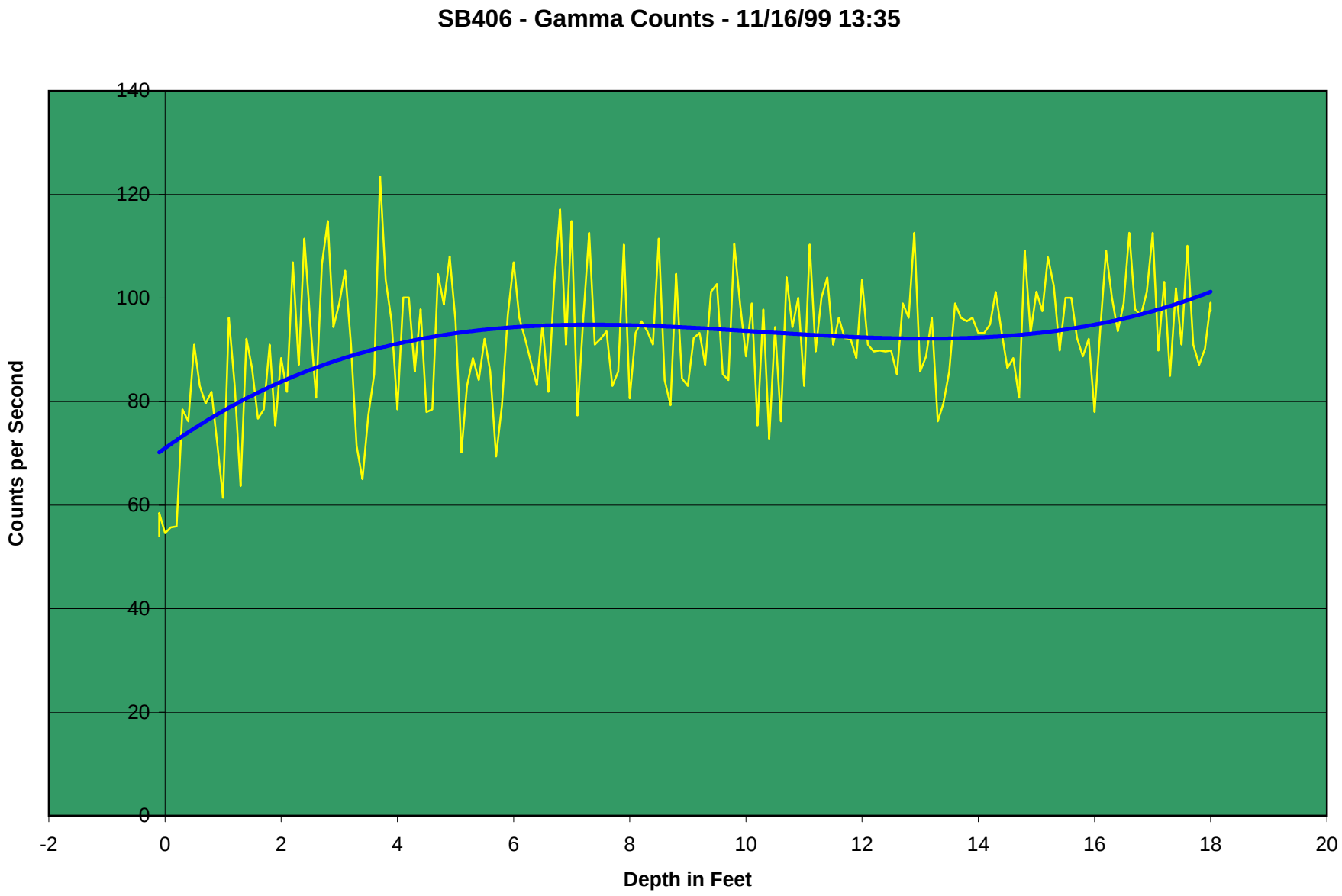
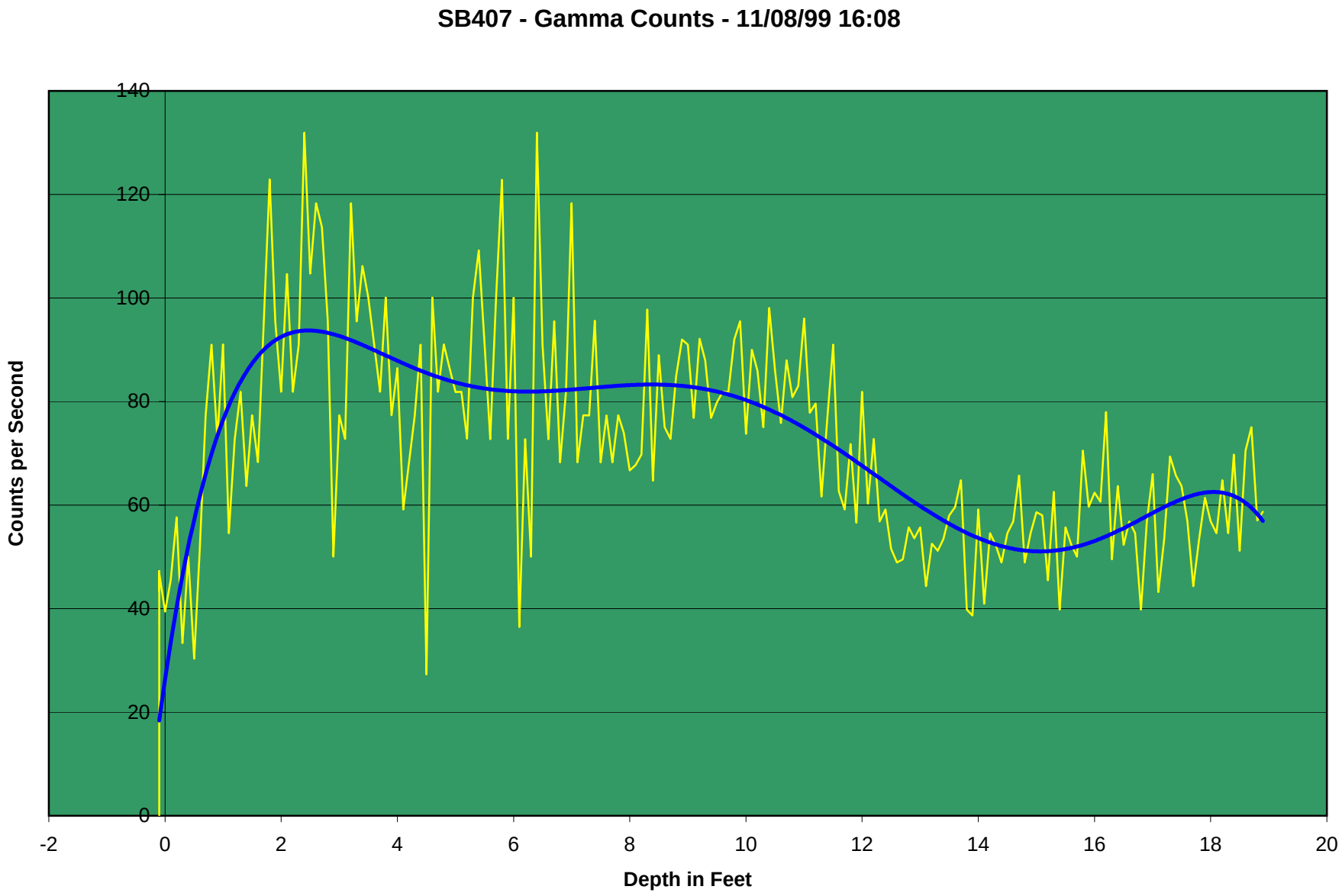
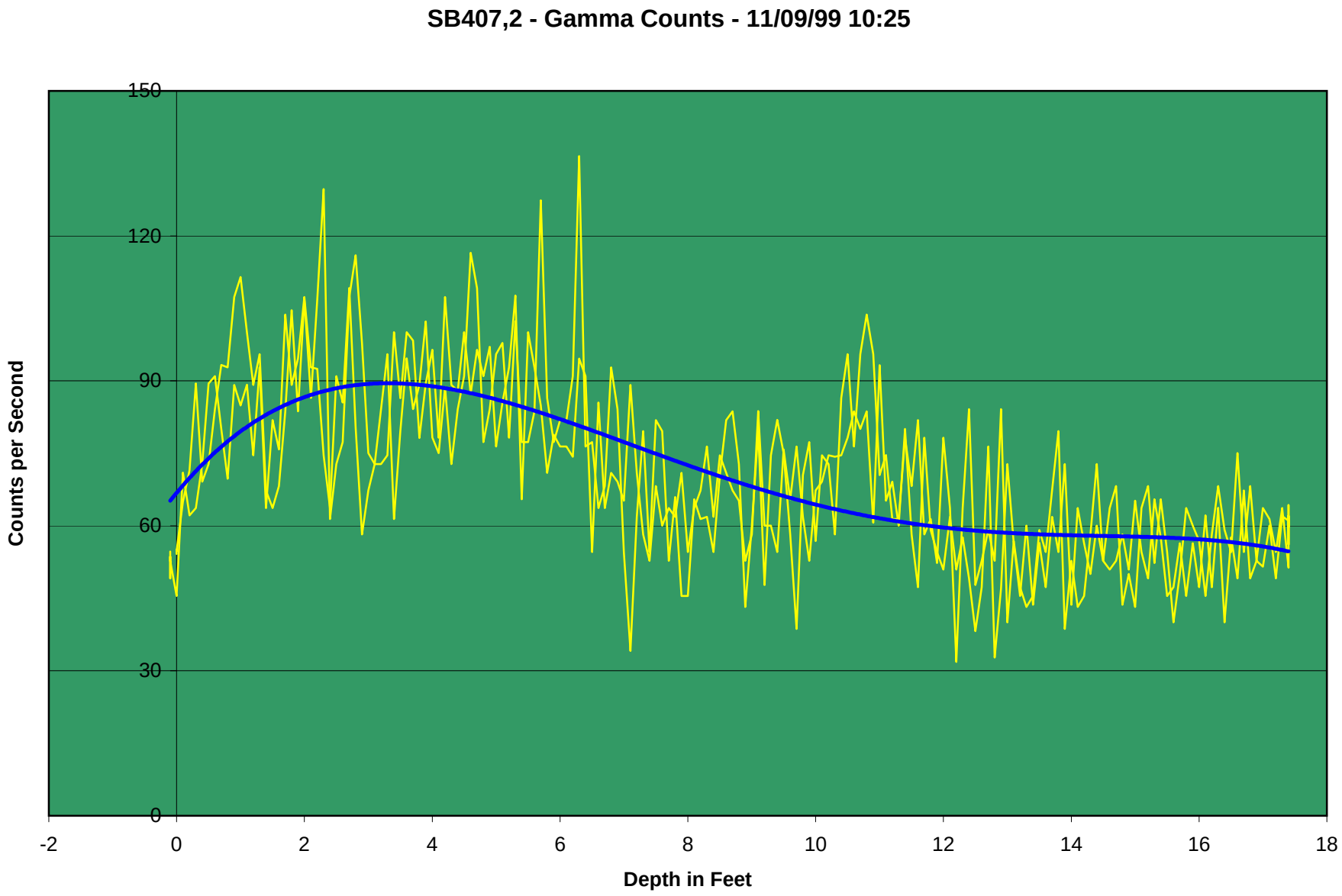
12
14
16
18
20
Depth in Feet

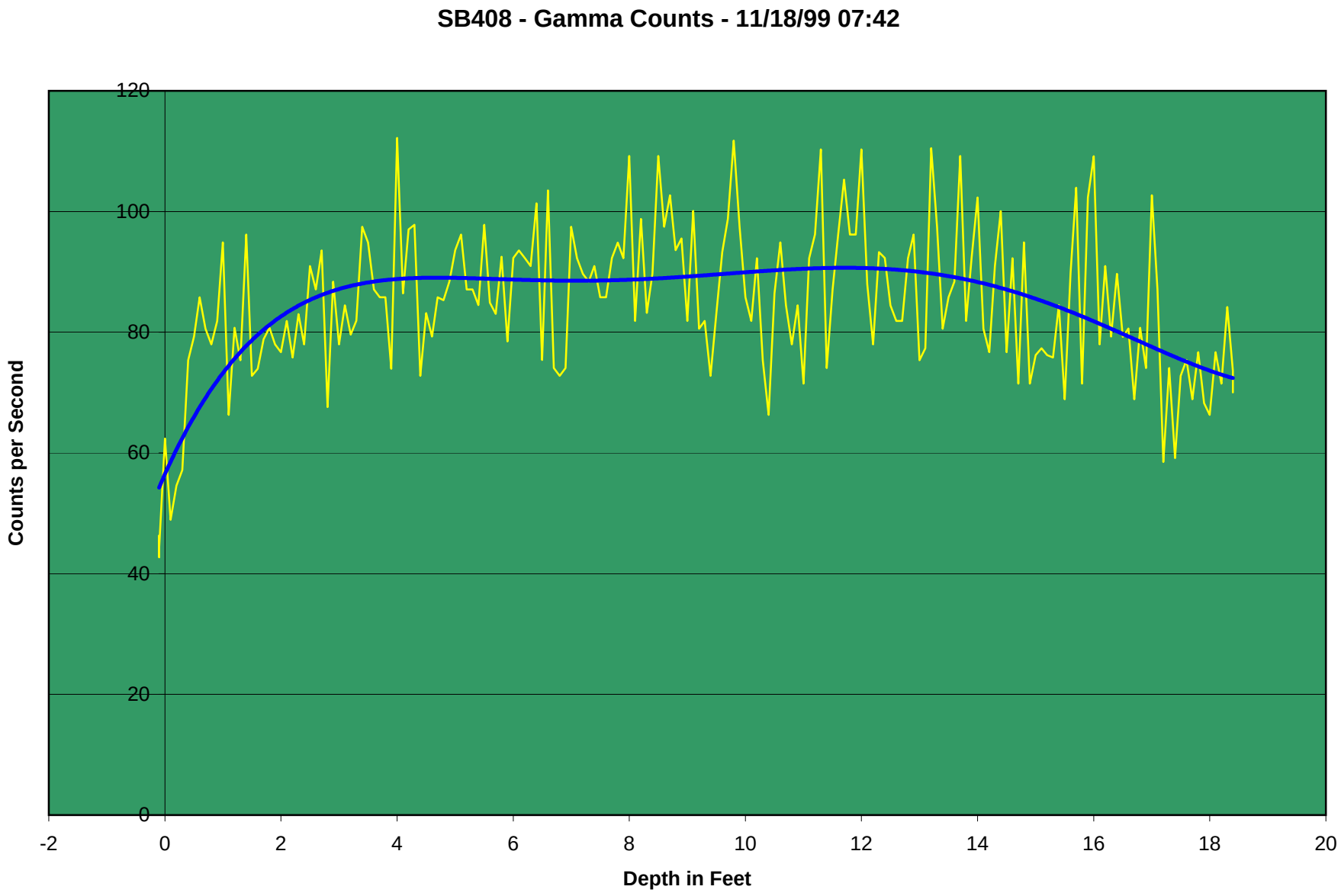

SB404 - Gamma Counts - 11/08/99 15:19
Counts per Second
250
200
150
100
50
0
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
Depth in Feet

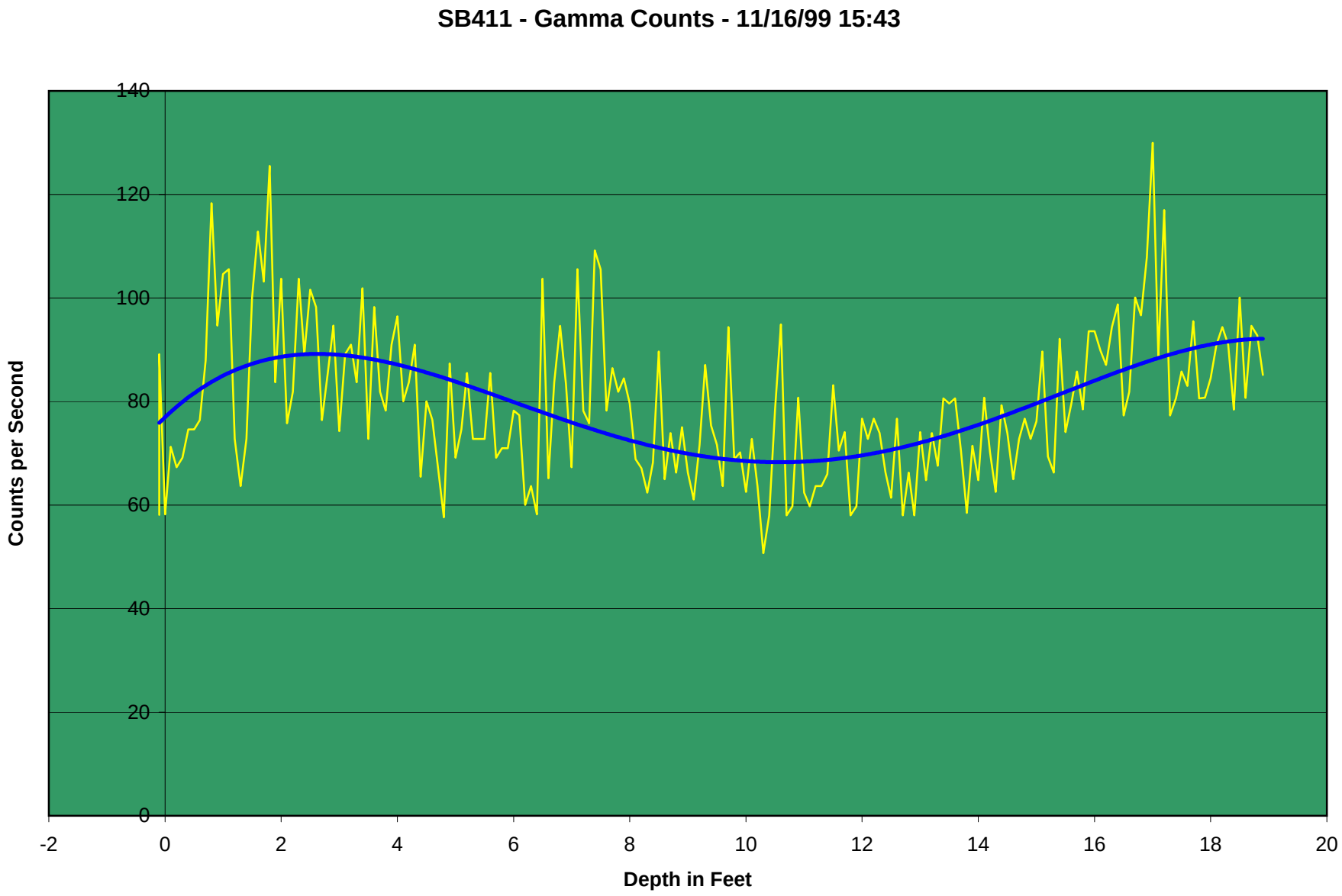

SB405 - Gamma Counts - 11/08/99 15:43
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
Depth in Feet

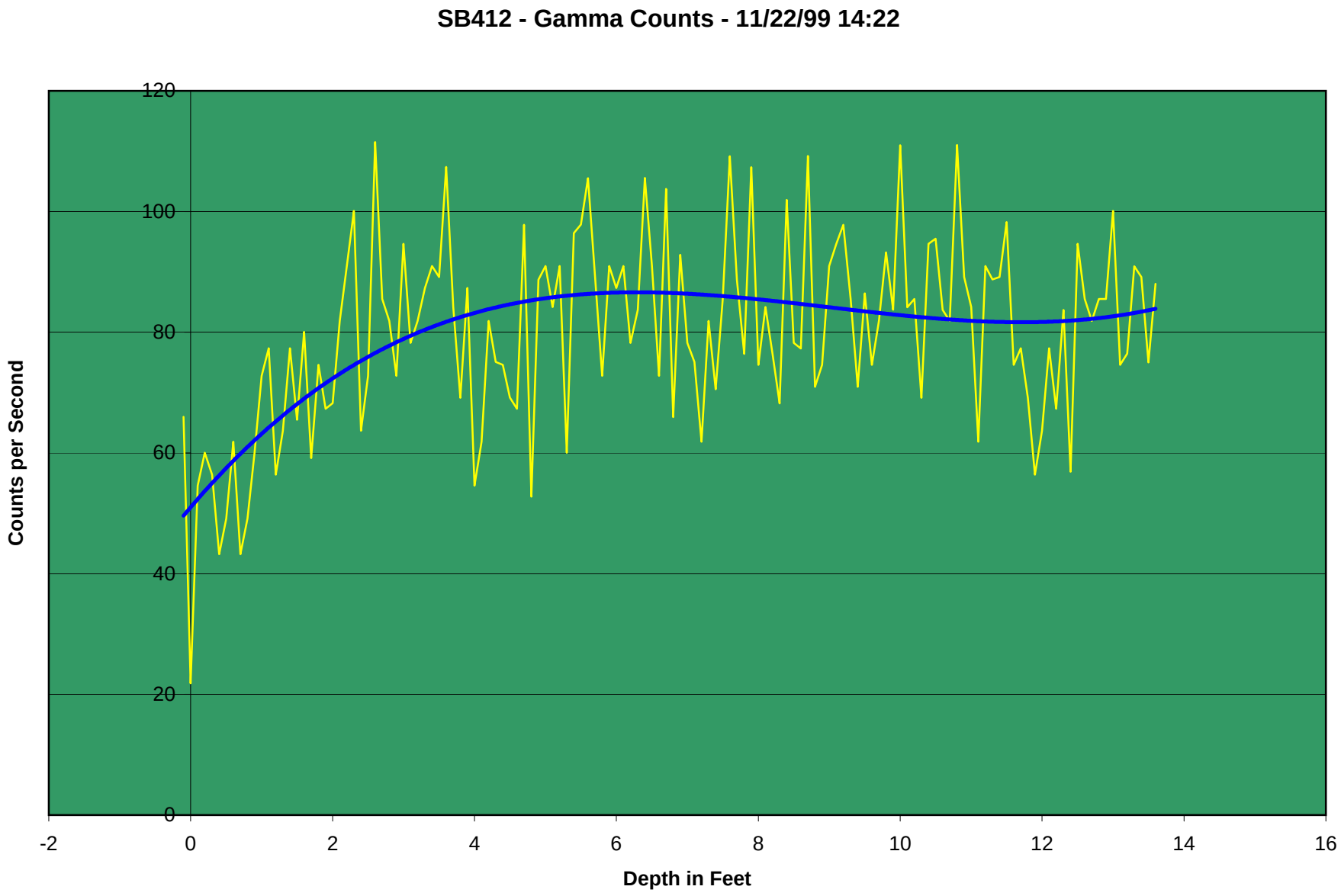

SB406 - Gamma Counts - 11/16/99 13:35
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
18
20
Depth in Feet

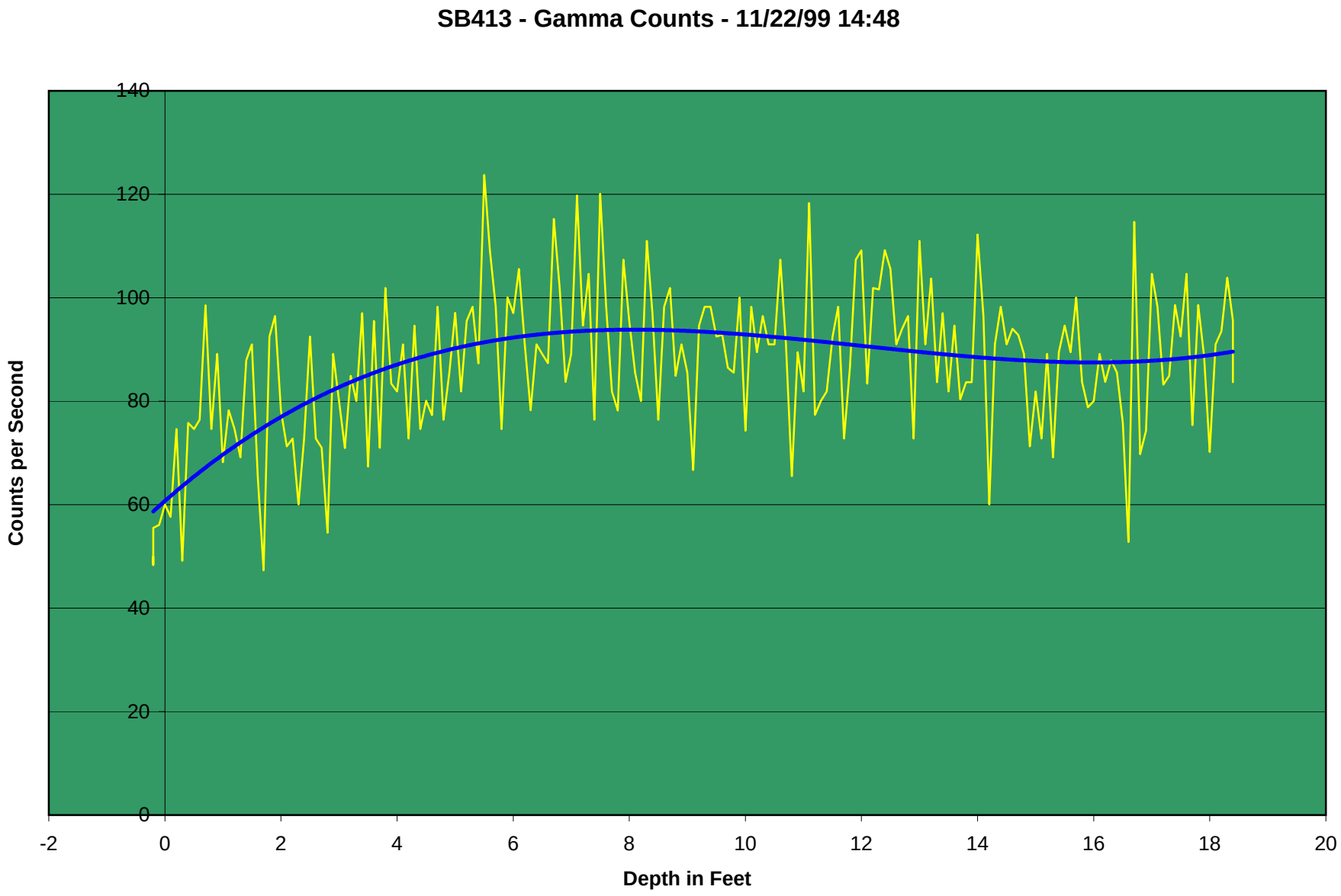

SB407 - Gamma Counts - 11/08/99 16:08
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
18
20
Depth in Feet

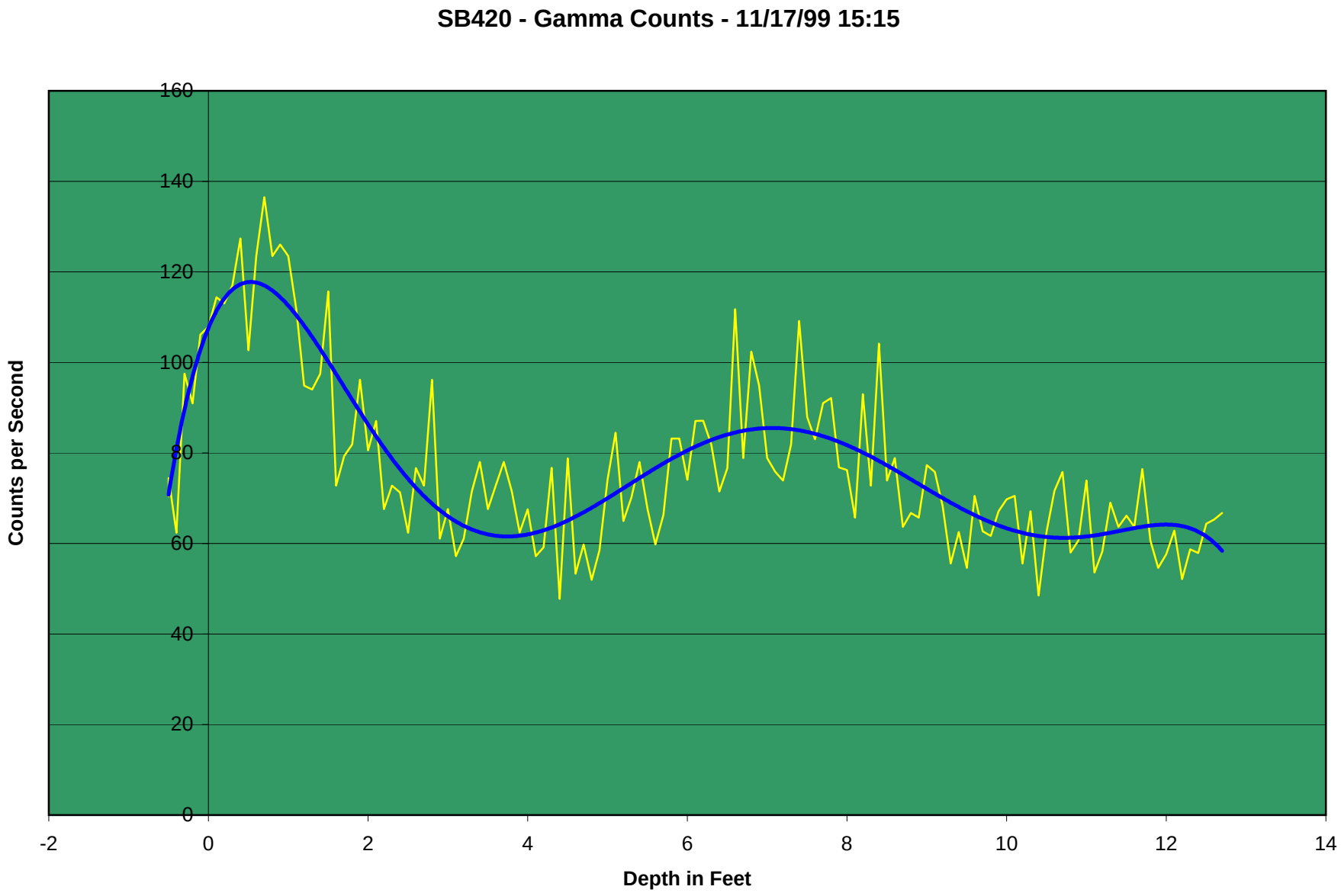

SB407,2 - Gamma Counts - 11/09/99 10:25
Counts per Second
150
120
90
60
30
0
-2
0
2
4
6
8
10
12
14
16
18
Depth in Feet

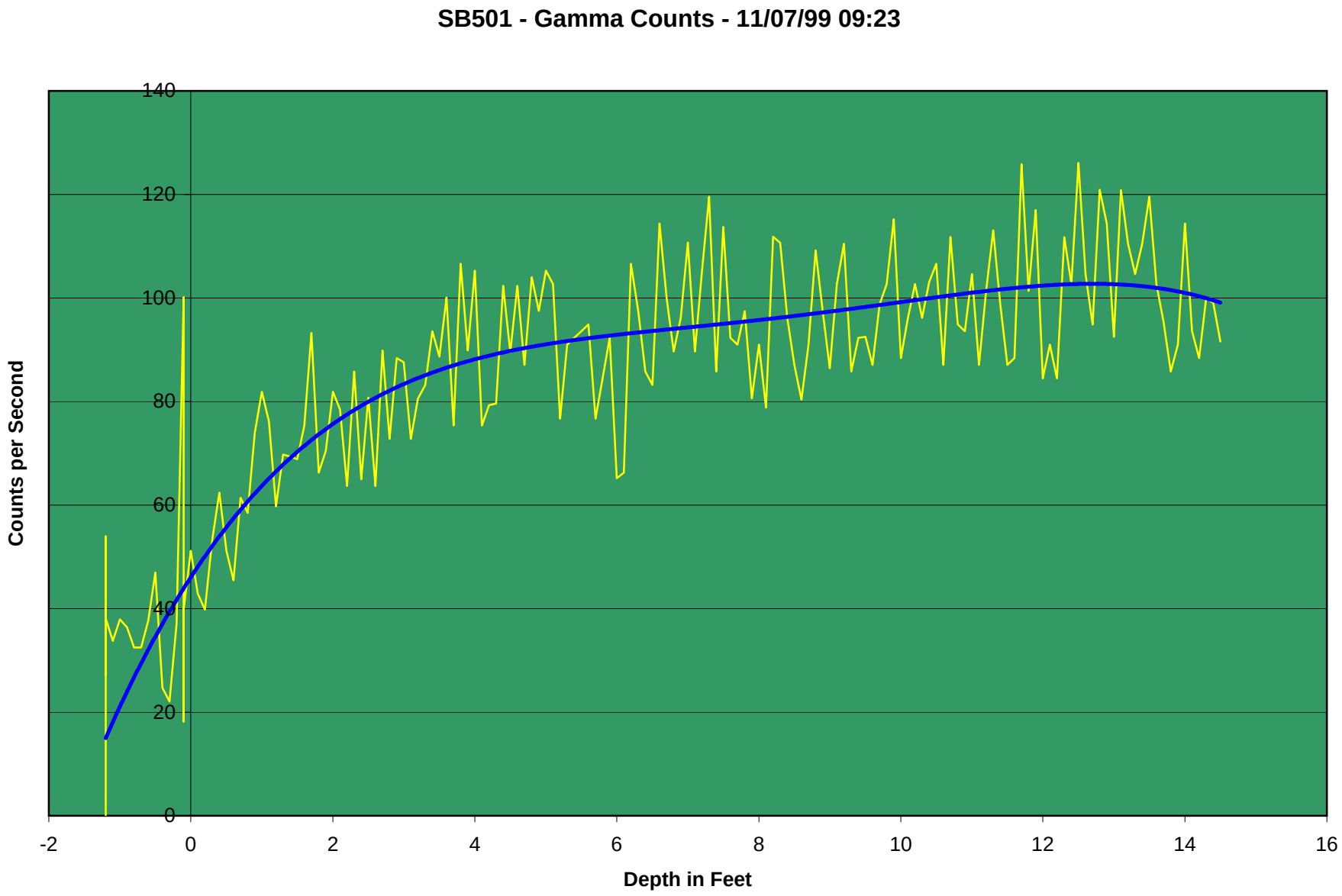

SB408 - Gamma Counts - 11/18/99 07:42
Counts per Second
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
18
20
Depth in Feet

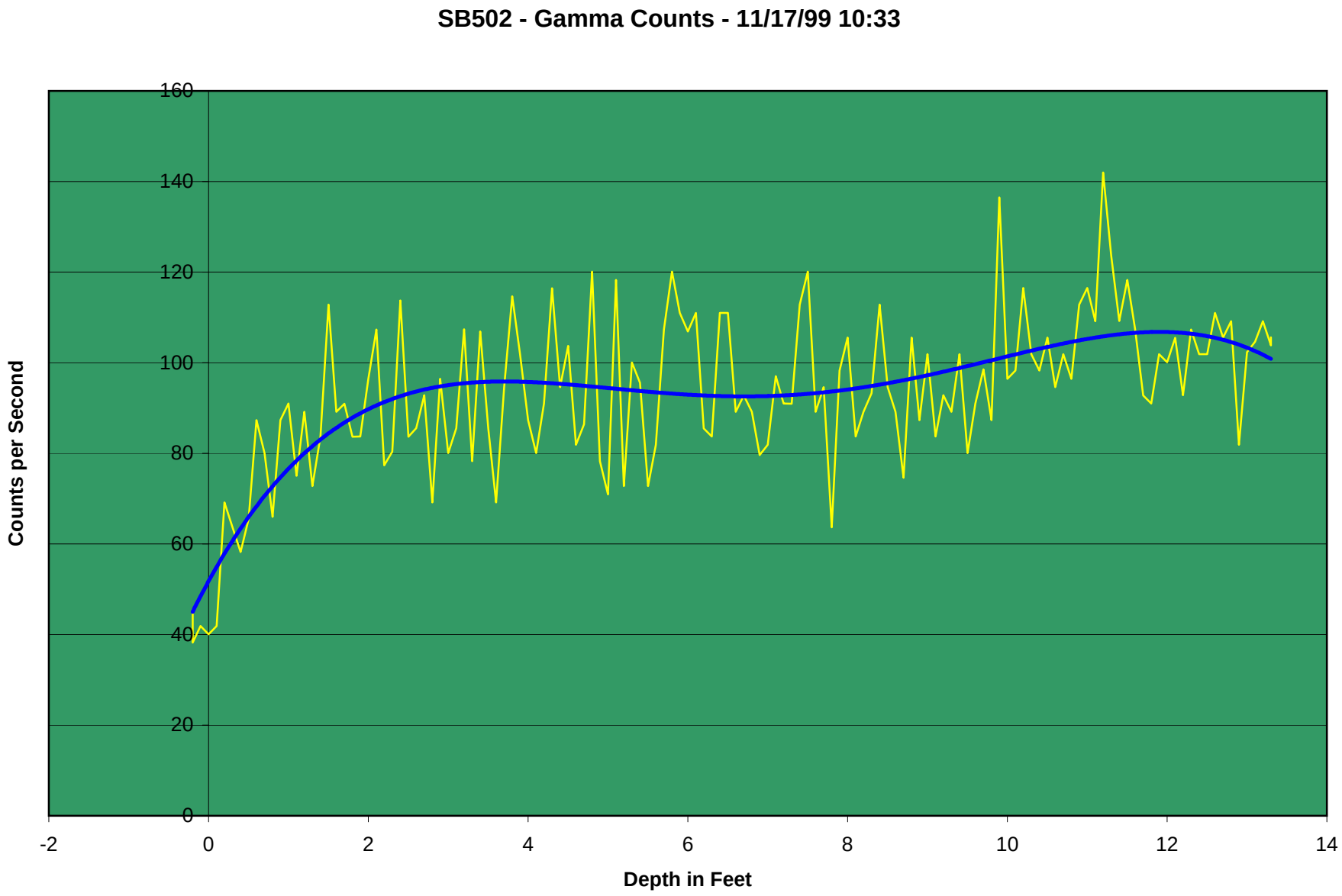

SB411 - Gamma Counts - 11/16/99 15:43
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
18
20
Depth in Feet

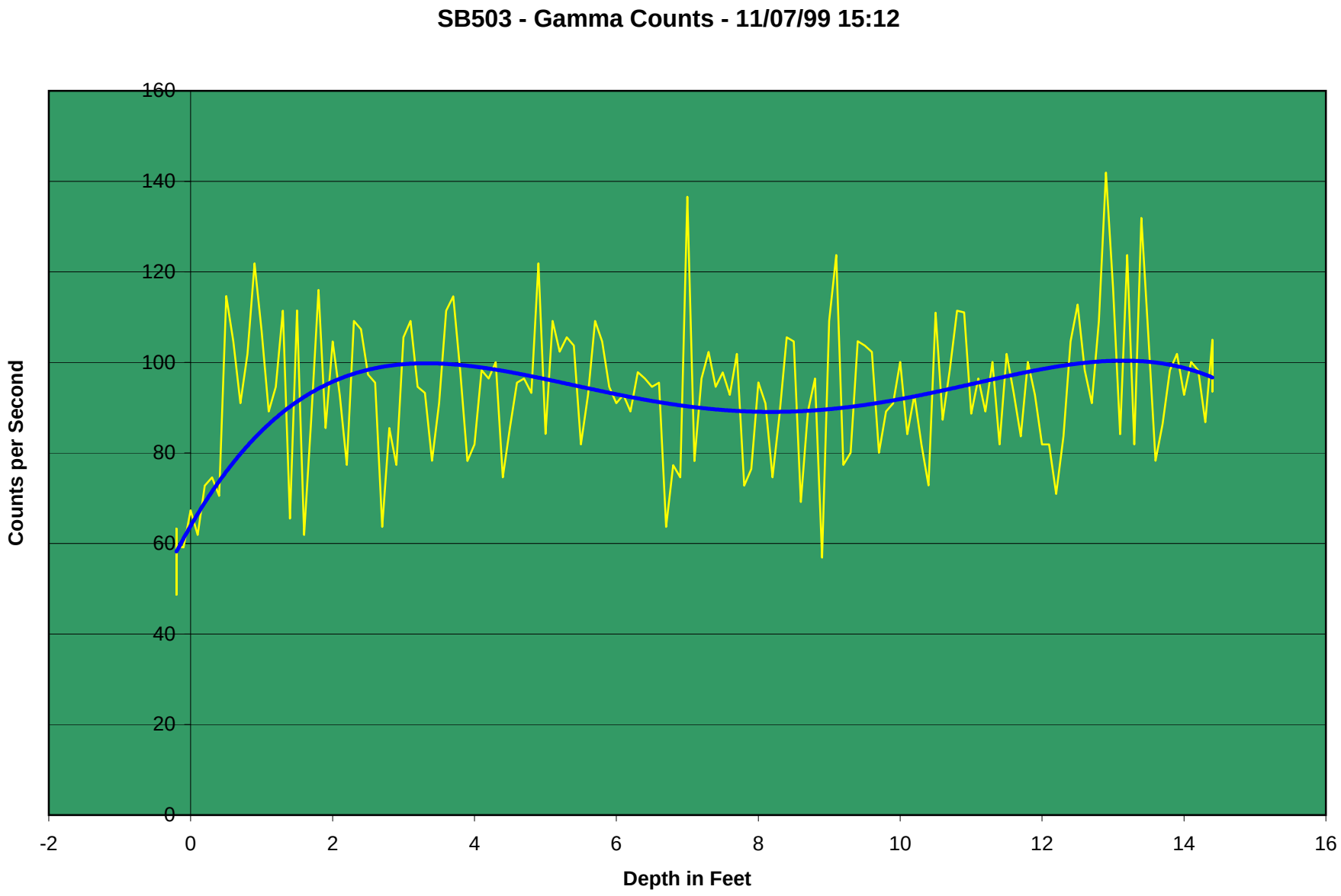

SB412 - Gamma Counts - 11/22/99 14:22
Counts per Second
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet

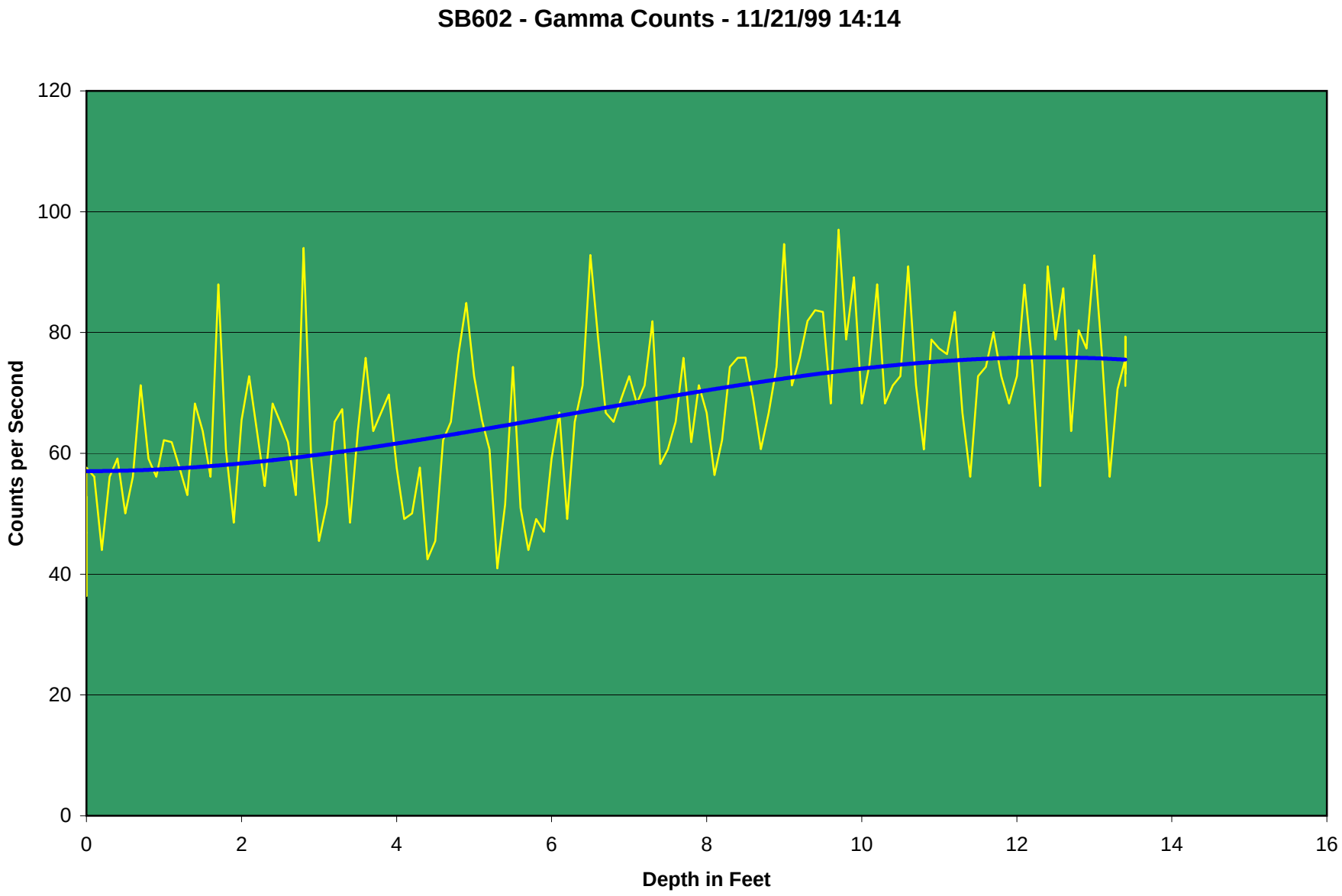

SB413 - Gamma Counts - 11/22/99 14:48
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
18
20
Depth in Feet

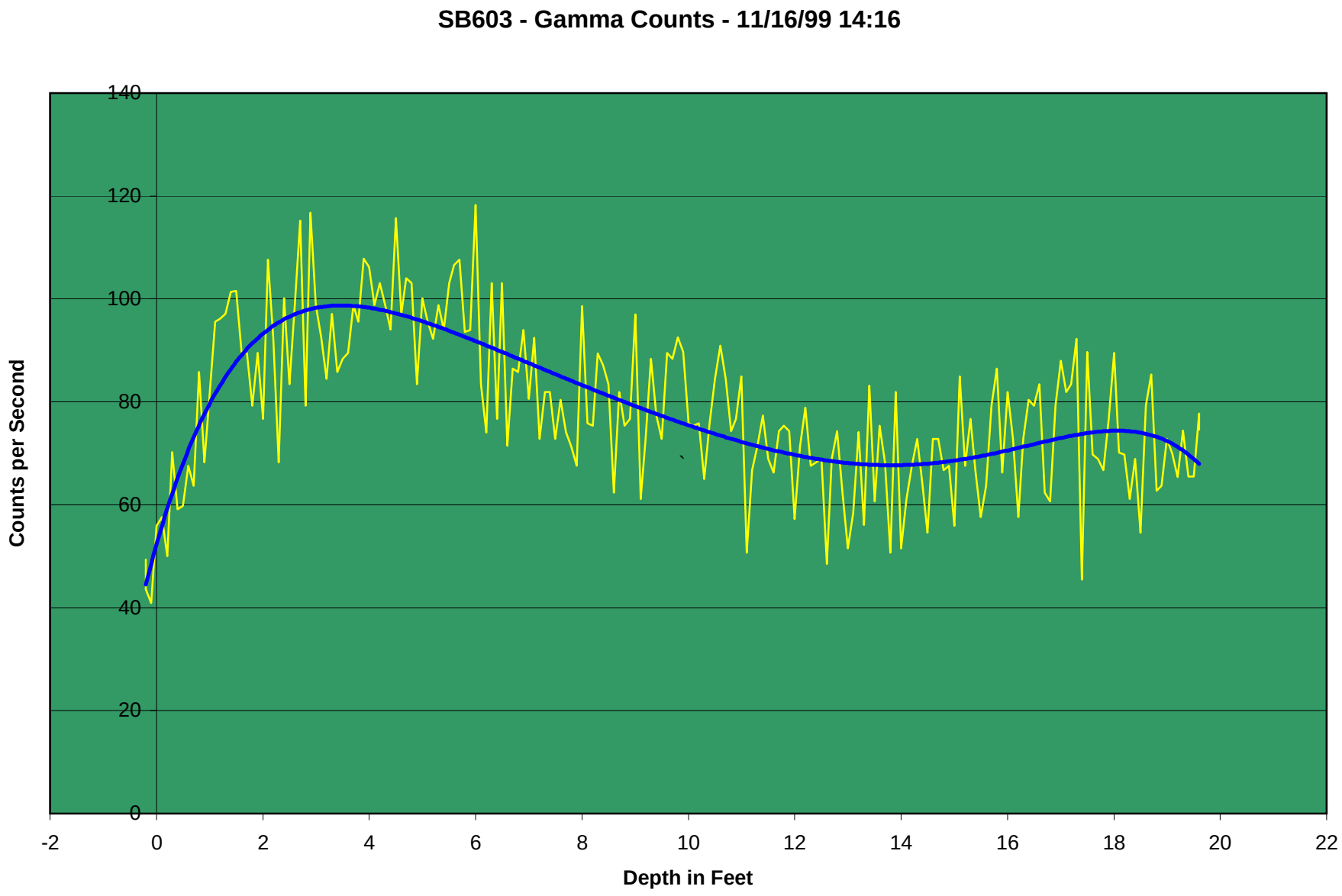

SB420 - Gamma Counts - 11/17/99 15:15
Counts per Second
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet

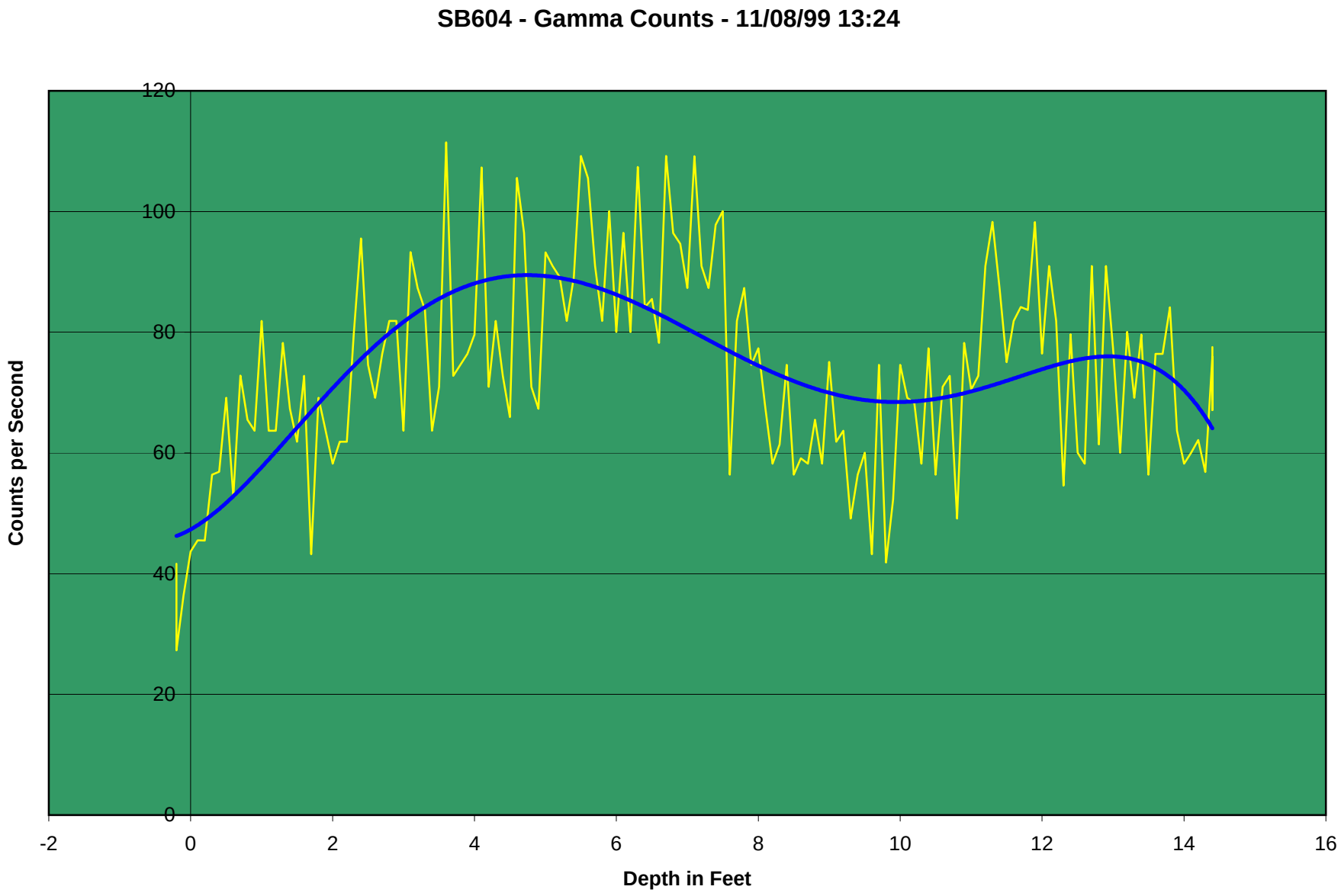

SB501 - Gamma Counts - 11/07/99 09:23
Counts per Second
Depth in Feet
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16

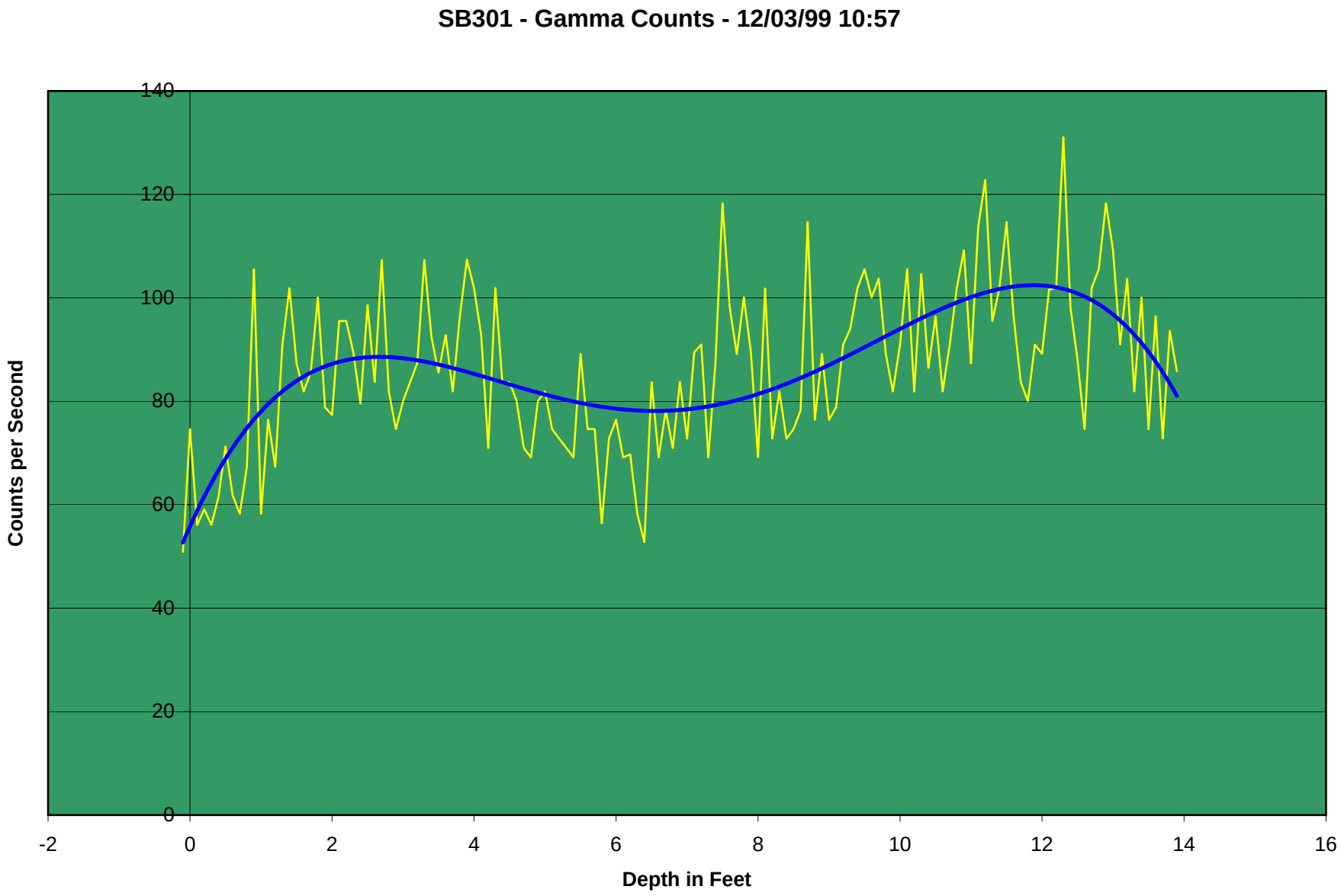

SB502 - Gamma Counts - 11/17/99 10:33
Counts per Second
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet

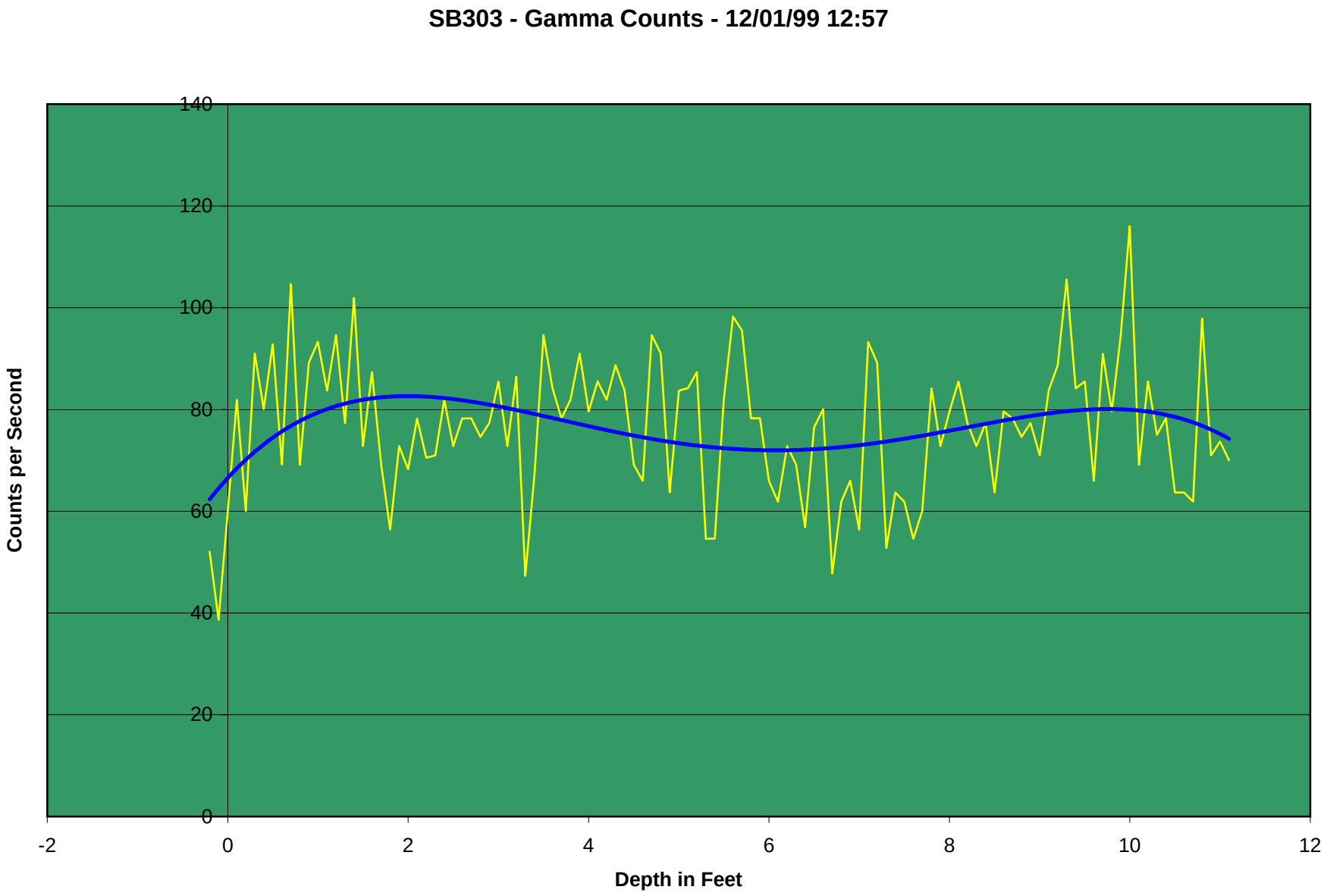

SB503 - Gamma Counts - 11/07/99 15:12
Counts per Second
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet

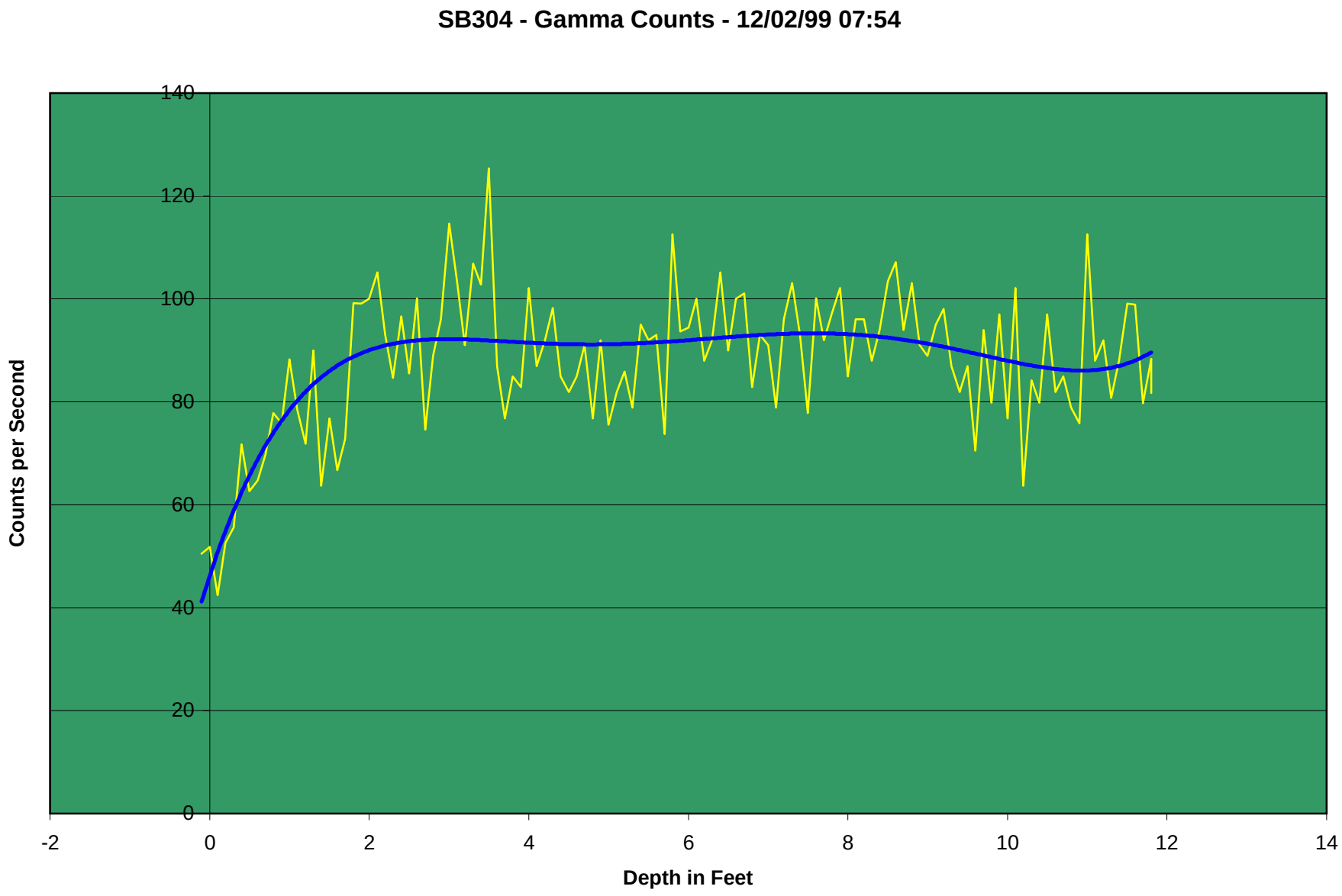

SB602 - Gamma Counts - 11/21/99 14:14
Counts per Second
120
100
80
60
40
20
0
0
2
4
6
8
10
12
14
16
Depth in Feet

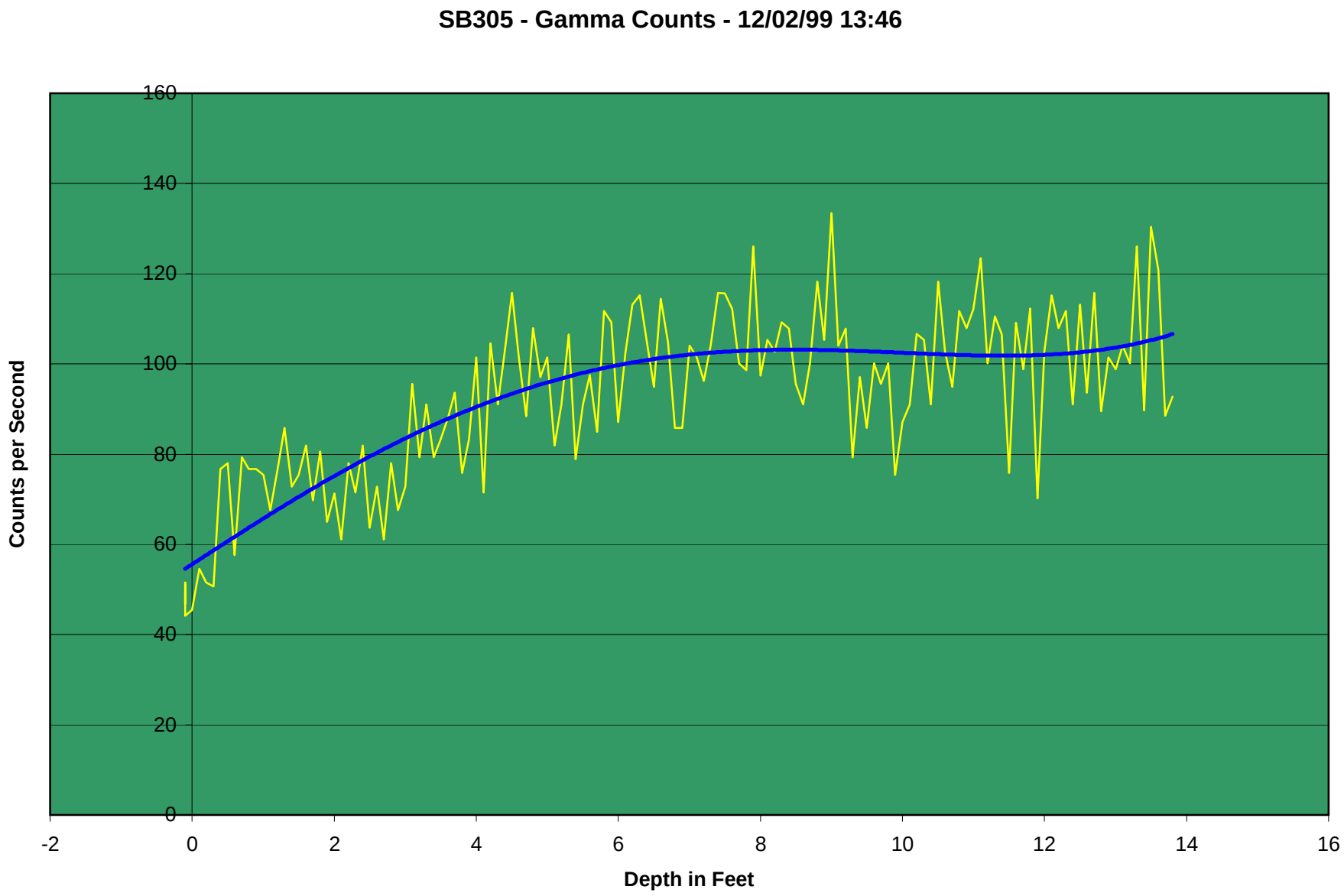

SB603 - Gamma Counts - 11/16/99 14:16
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
18
20
22
Depth in Feet

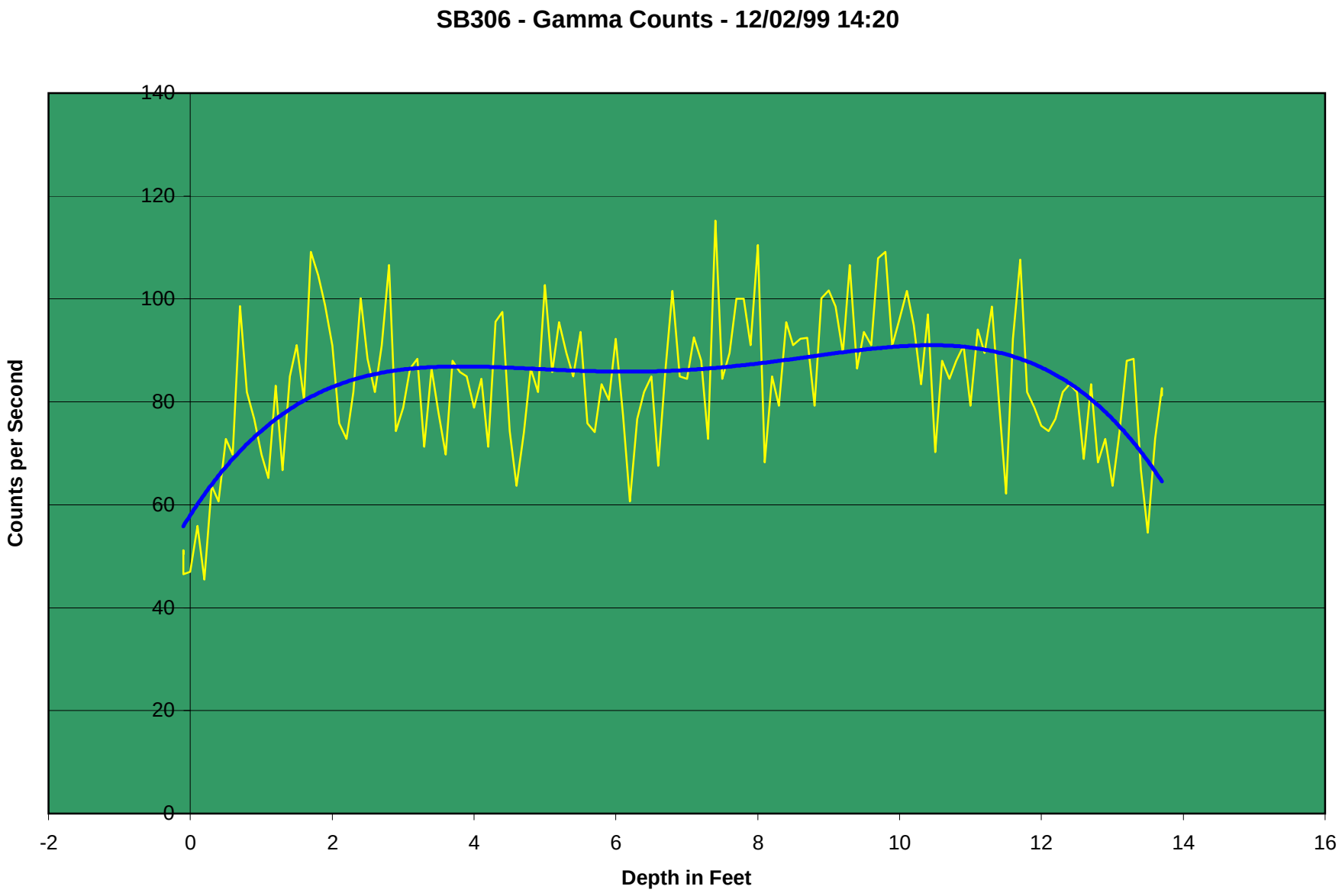

SB604 - Gamma Counts - 11/08/99 13:24
Counts per Second
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet

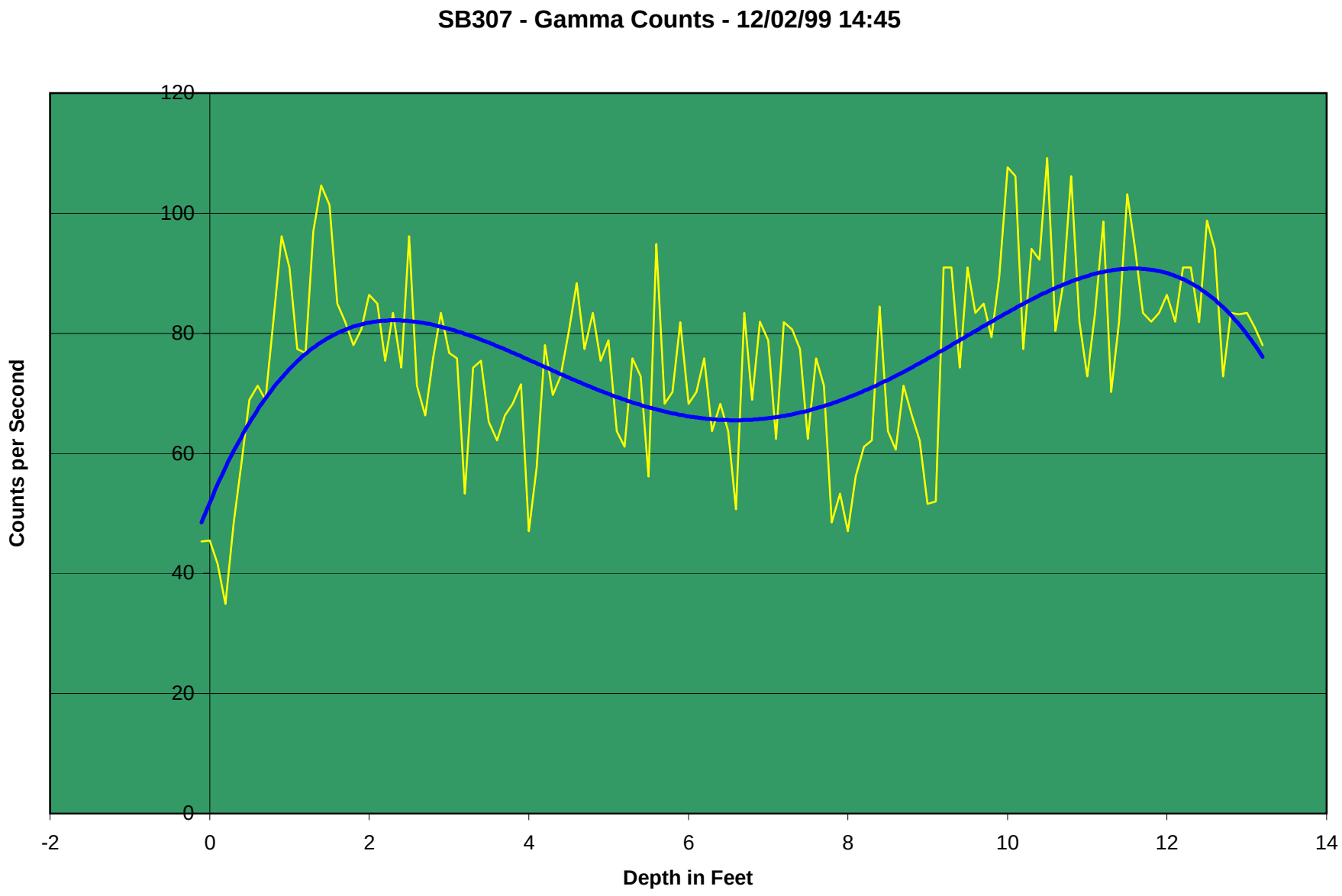

SB301 - Gamma Counts - 12/03/99 10:57
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet

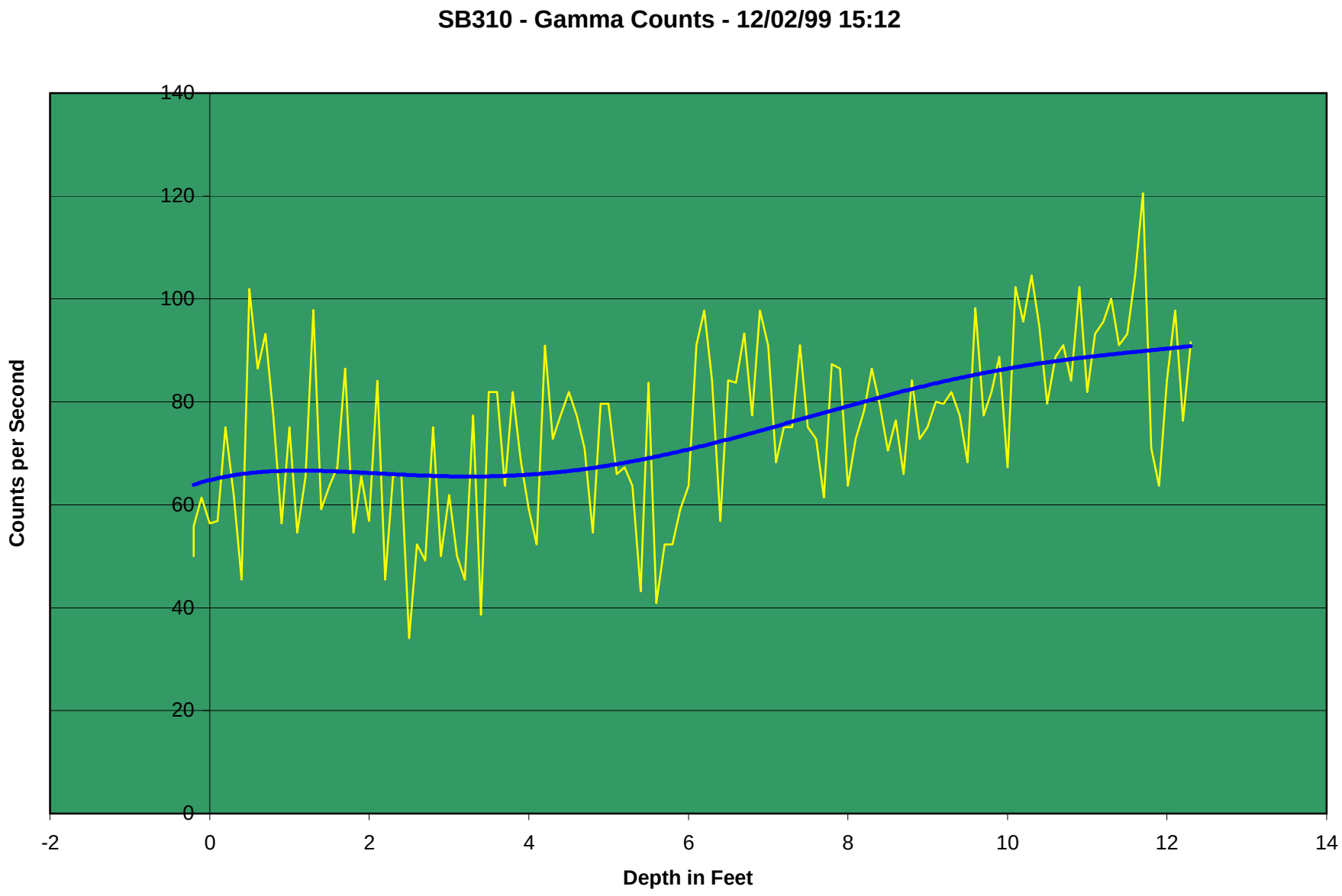

SB303 - Gamma Counts - 12/01/99 12:57
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
Depth in Feet

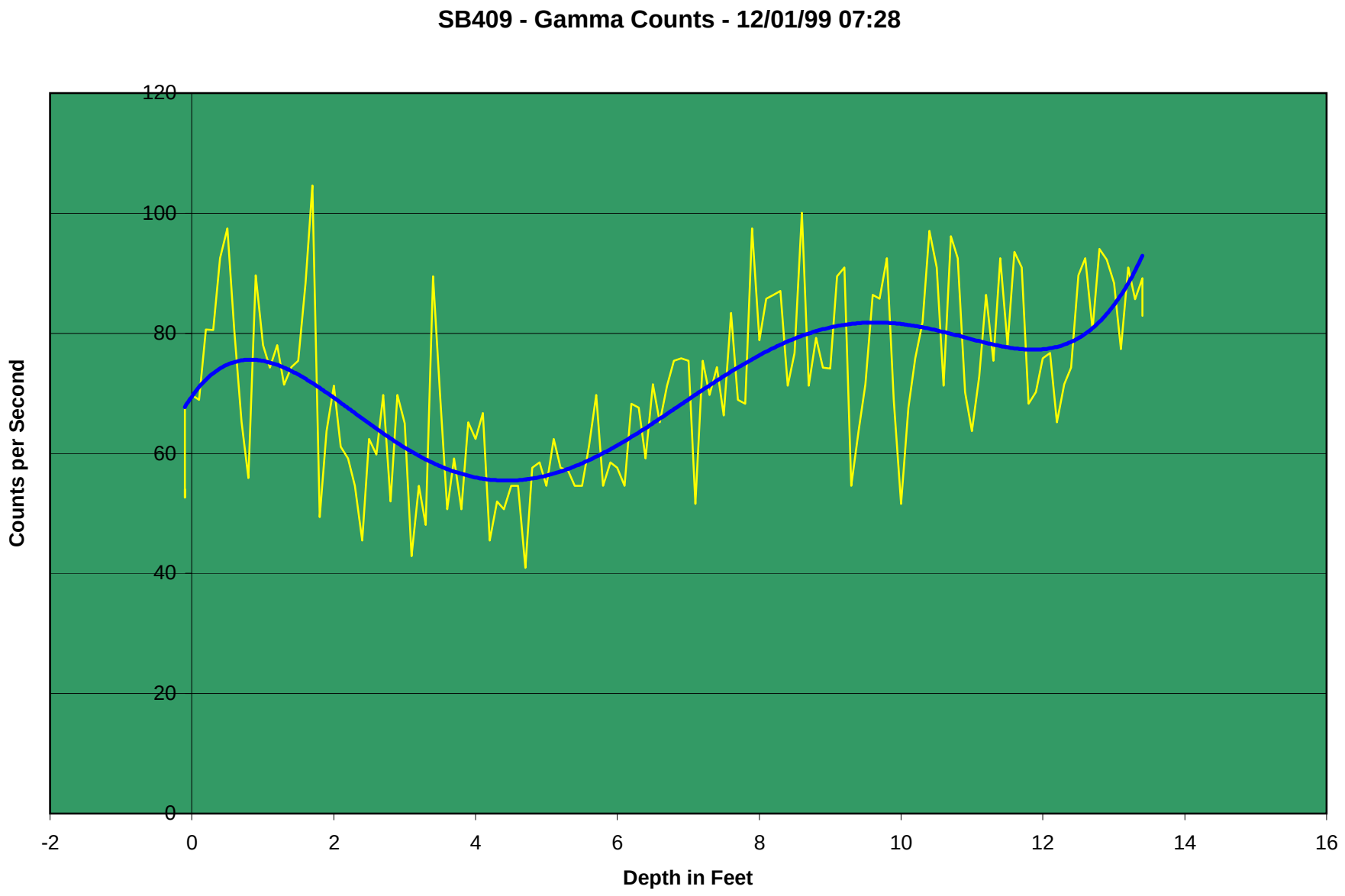

SB304 - Gamma Counts - 12/02/99 07:54
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet

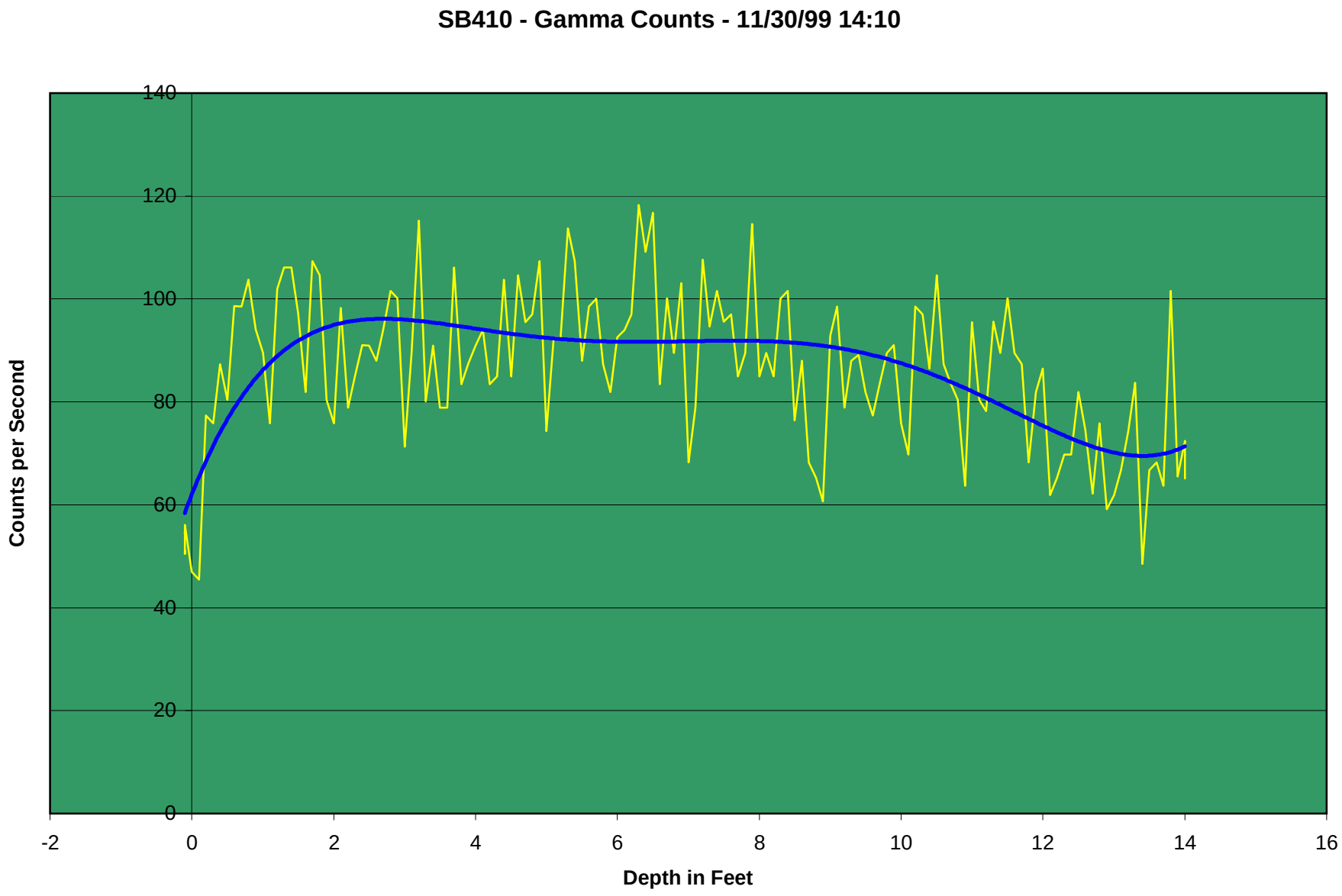

SB305 - Gamma Counts - 12/02/99 13:46
Counts per Second
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet

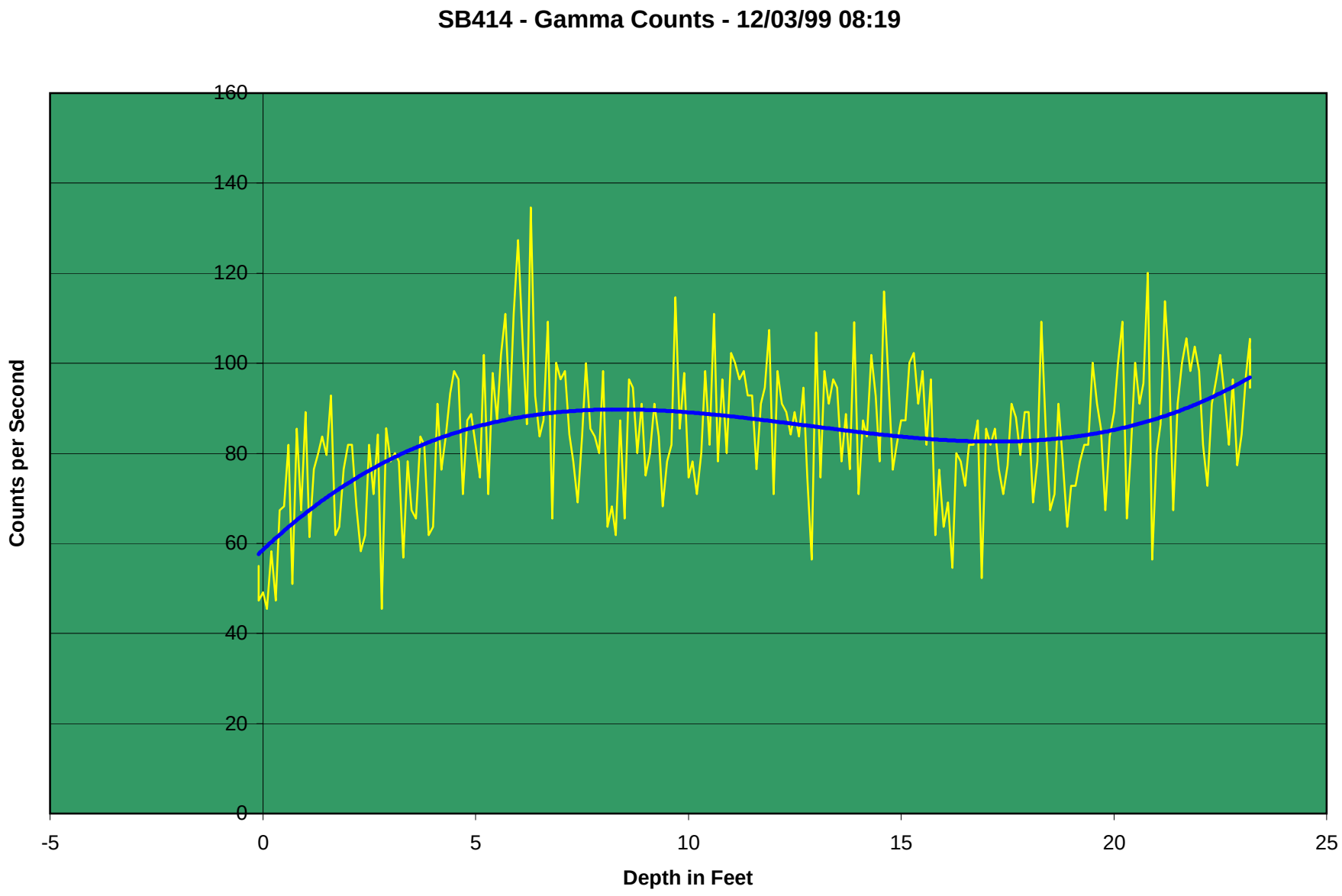

SB306 - Gamma Counts - 12/02/99 14:20
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet

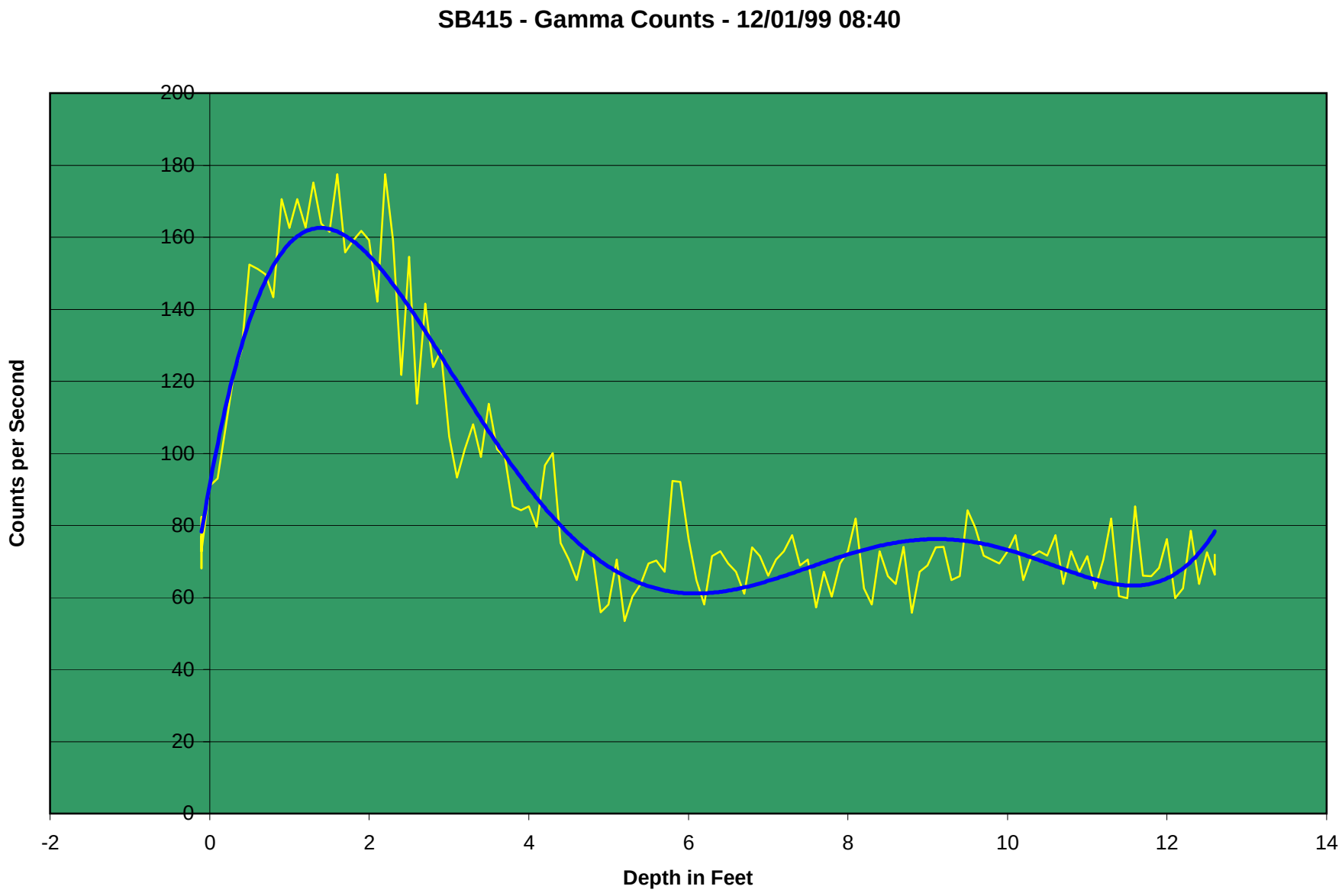

SB307 - Gamma Counts - 12/02/99 14:45
Counts per Second
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet

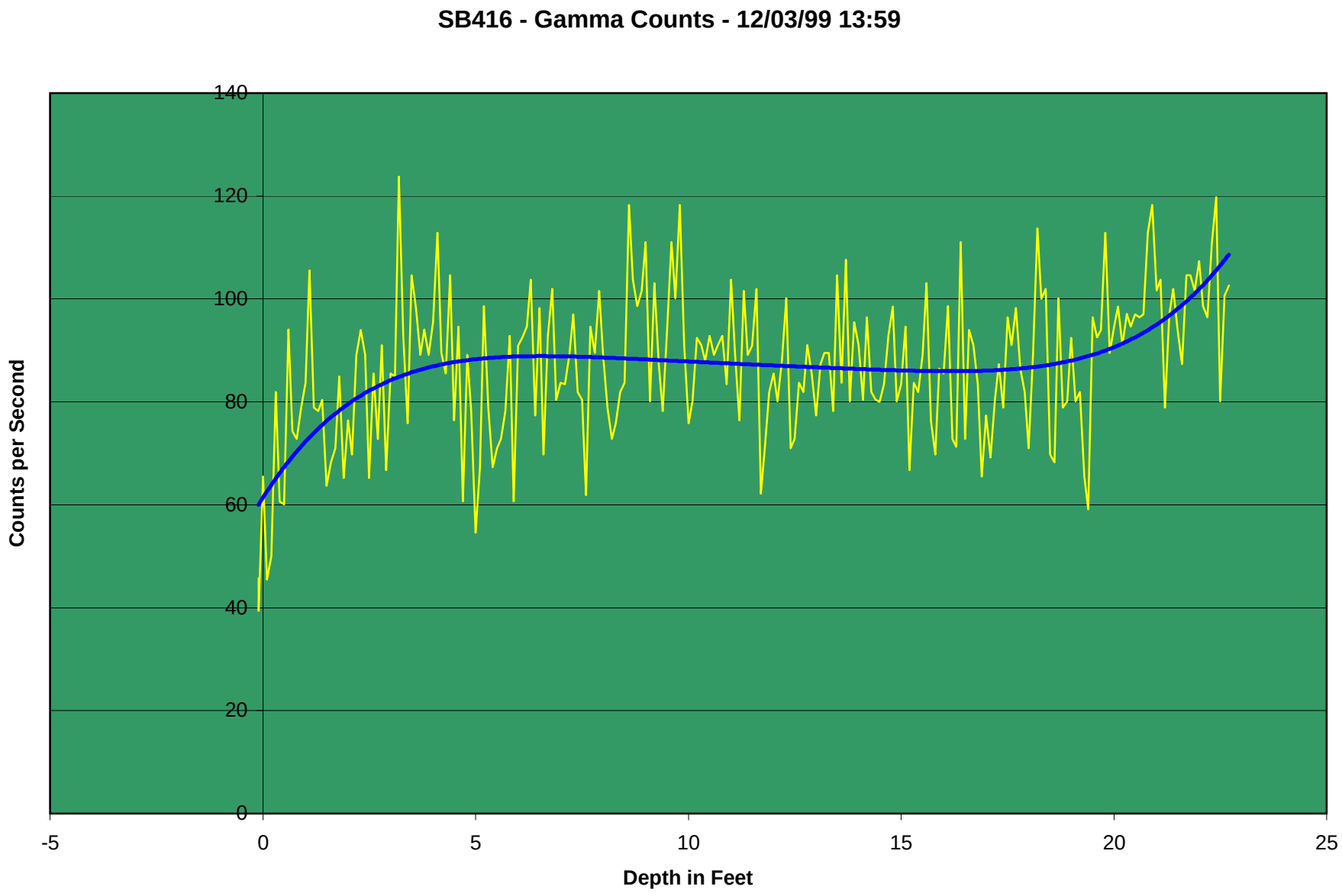

SB310 - Gamma Counts - 12/02/99 15:12
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet

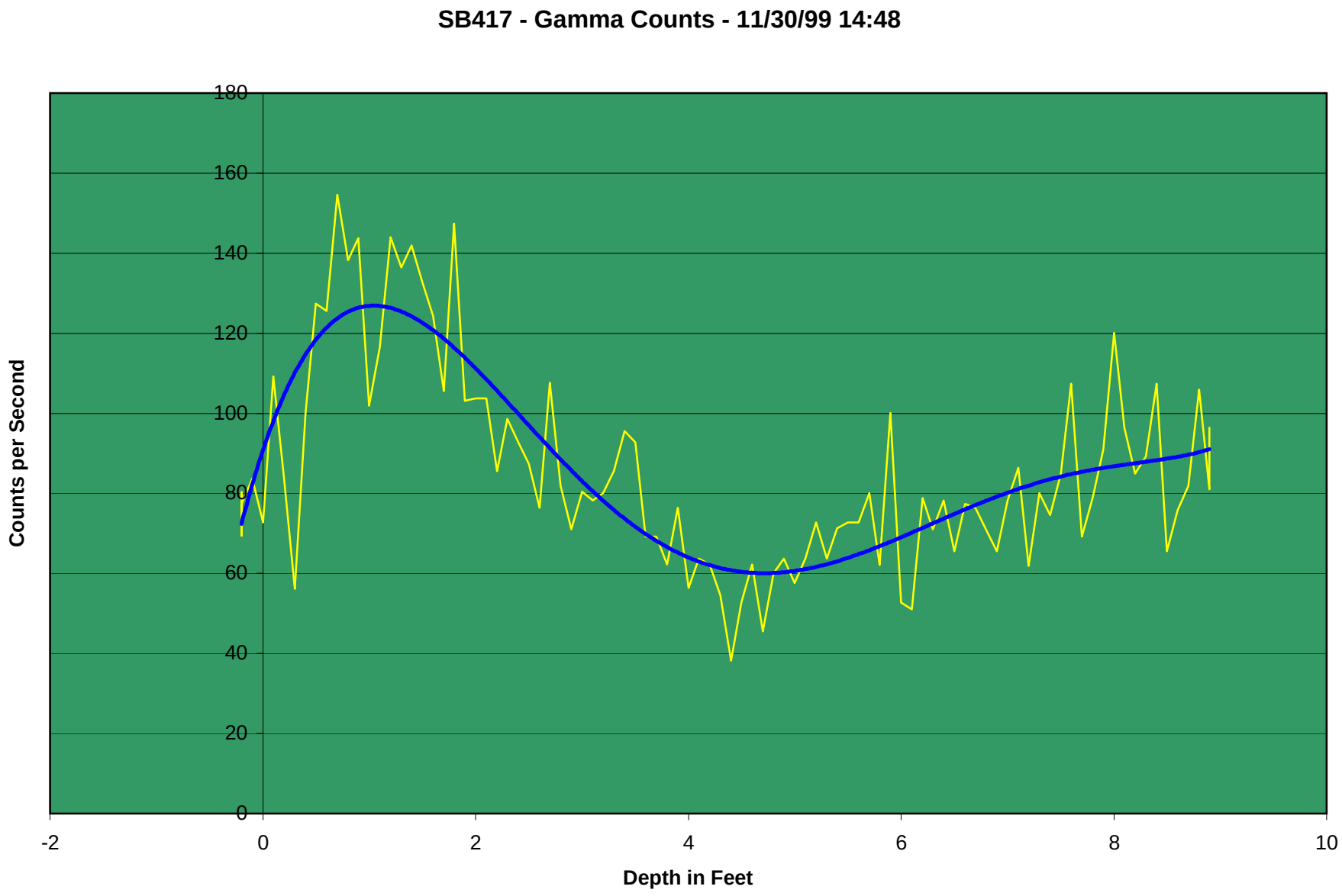

SB409 - Gamma Counts - 12/01/99 07:28
Counts per Second
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet

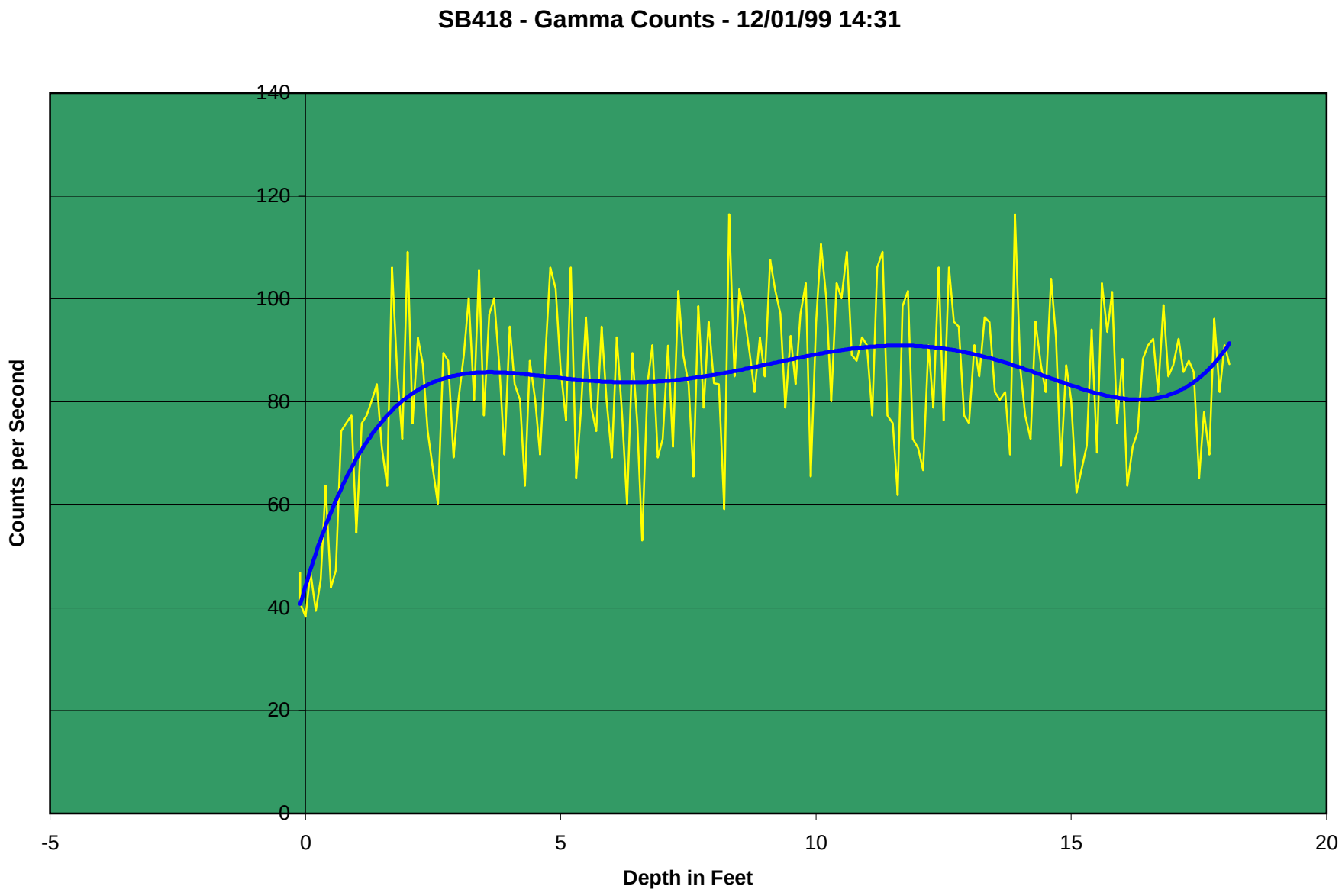

SB410 - Gamma Counts - 11/30/99 14:10
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet

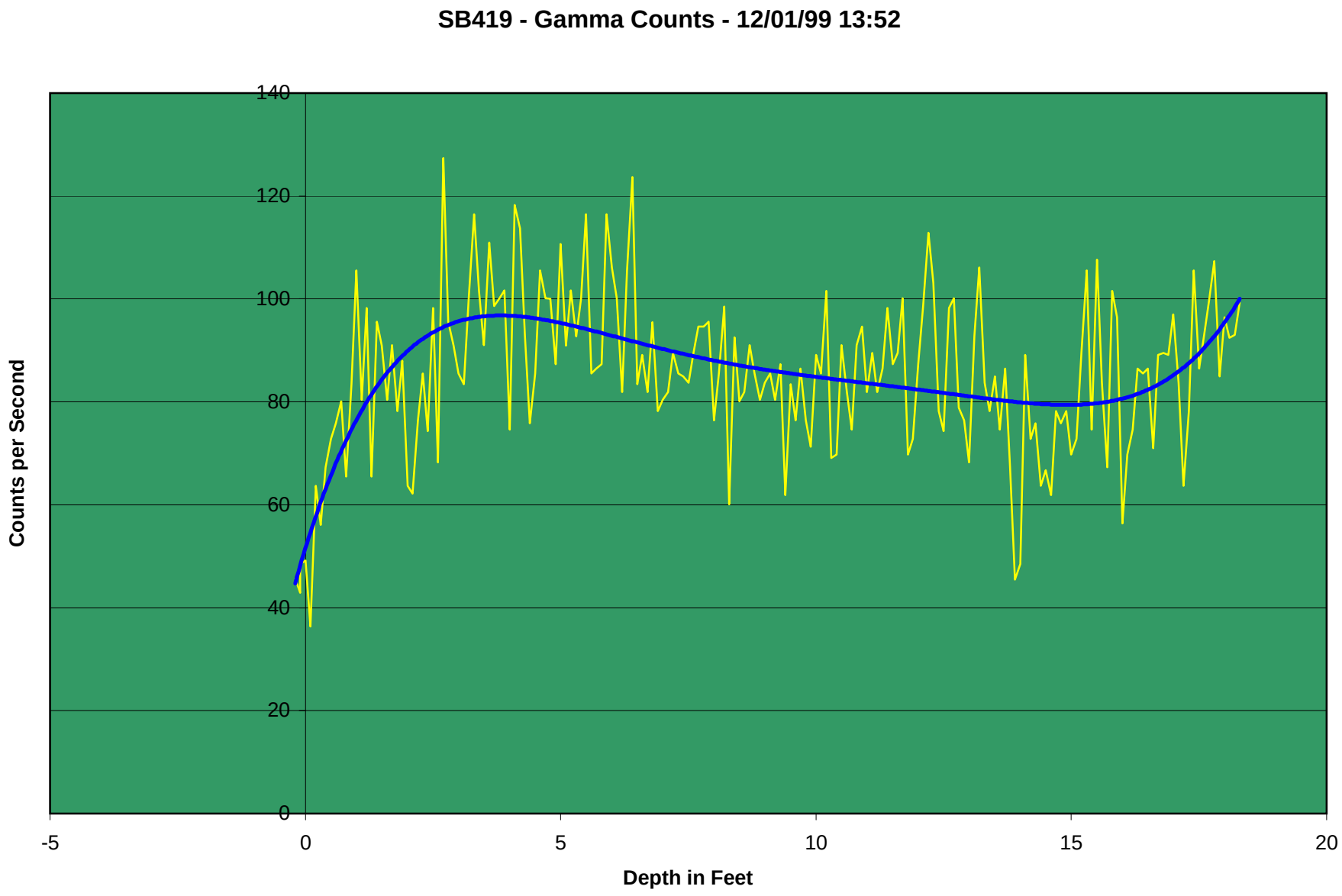

SB414 - Gamma Counts - 12/03/99 08:19
Counts per Second
160
140
120
100
80
60
40
20
0
-5
0
5
10
15
20
25
Depth in Feet

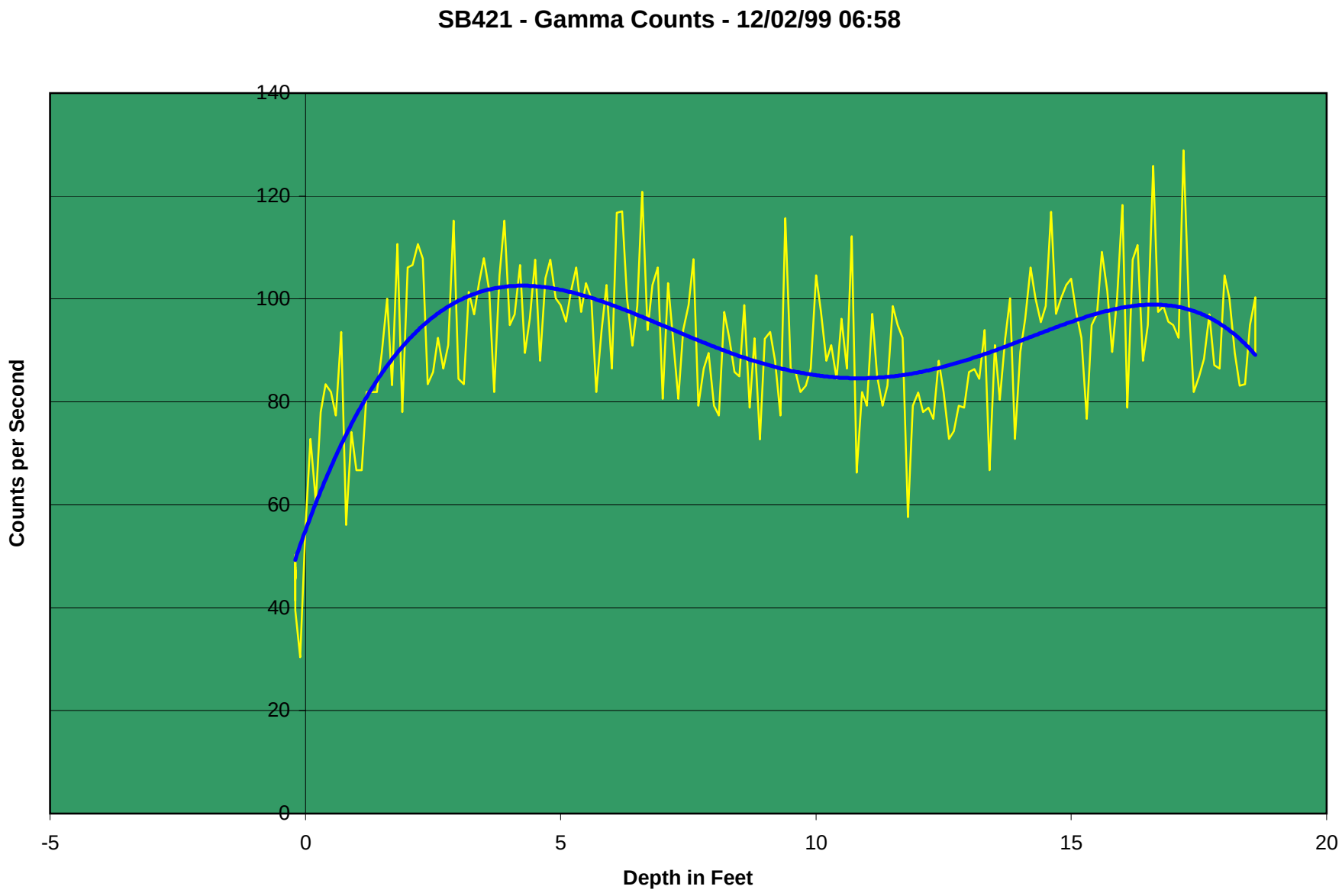

SB415 - Gamma Counts - 12/01/99 08:40
Counts per Second
200
180
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet

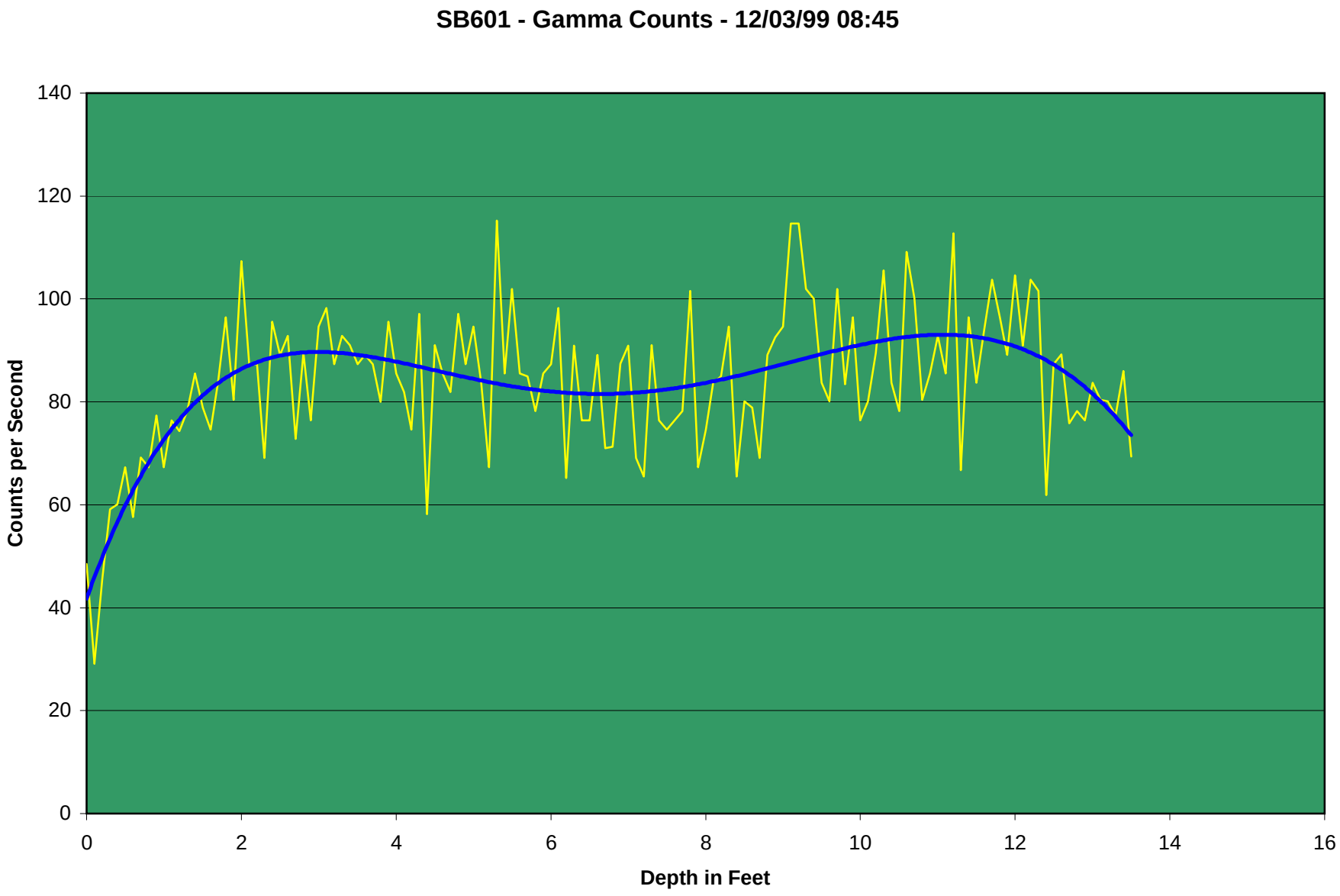

SB416 - Gamma Counts - 12/03/99 13:59
Counts per Second
140
120
100
80
60
40
20
0
-5
0
5
10
15
20
25
Depth in Feet

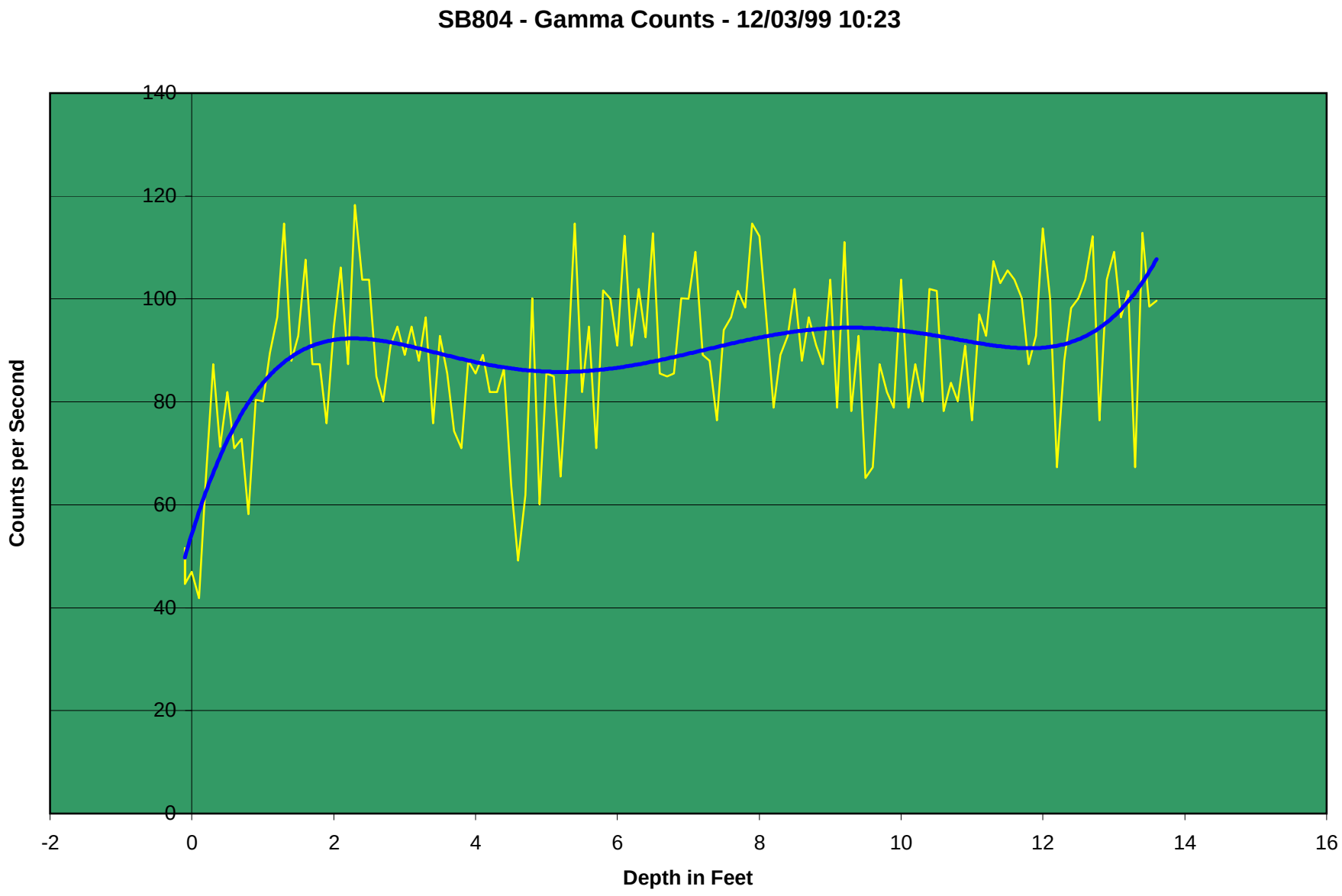

SB417 - Gamma Counts - 11/30/99 14:48
Counts per Second
180
160
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
Depth in Feet

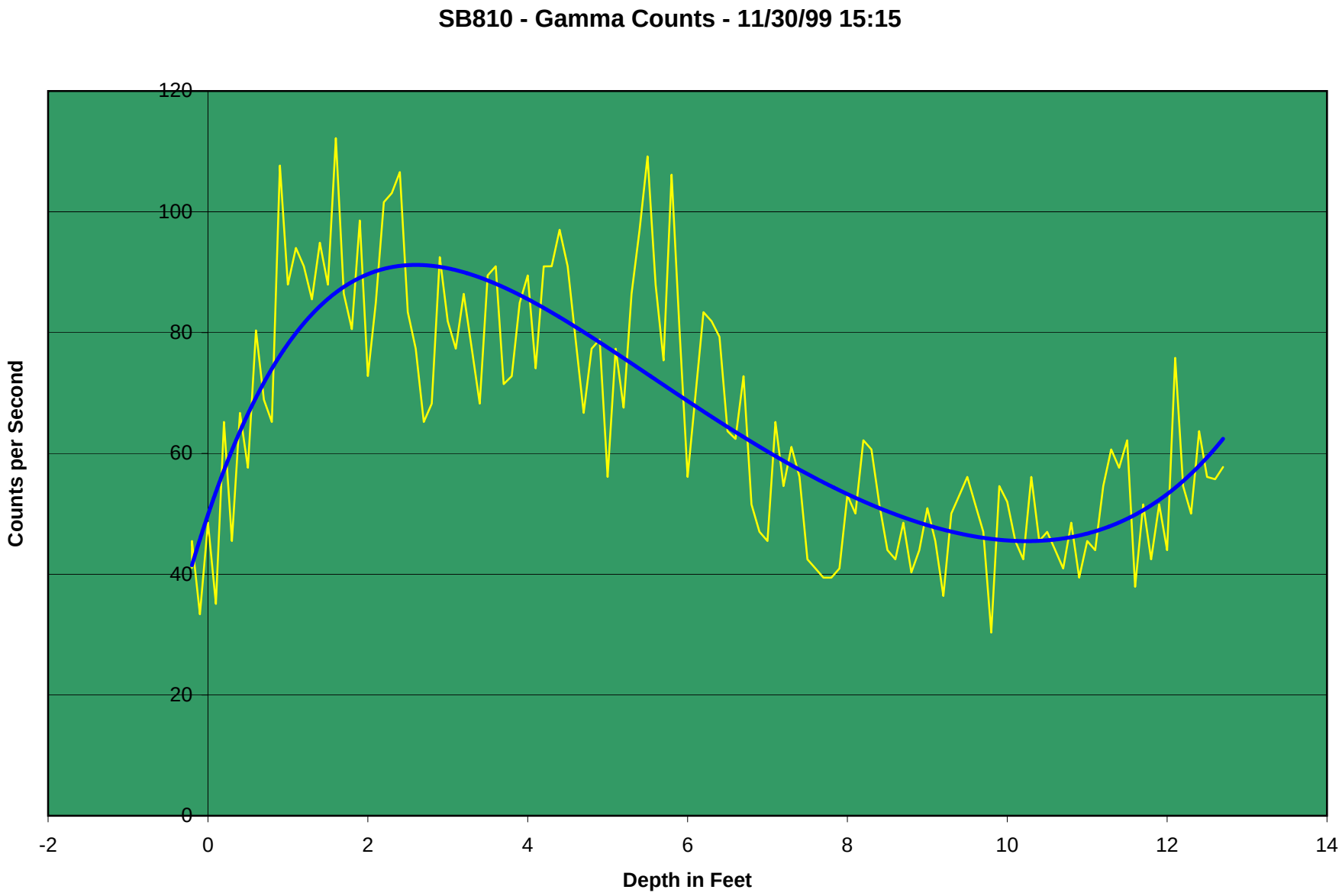

SB418 - Gamma Counts - 12/01/99 14:31
Counts per Second
140
120
100
80
60
40
20
0
-5
0
5
10
15
20
Depth in Feet

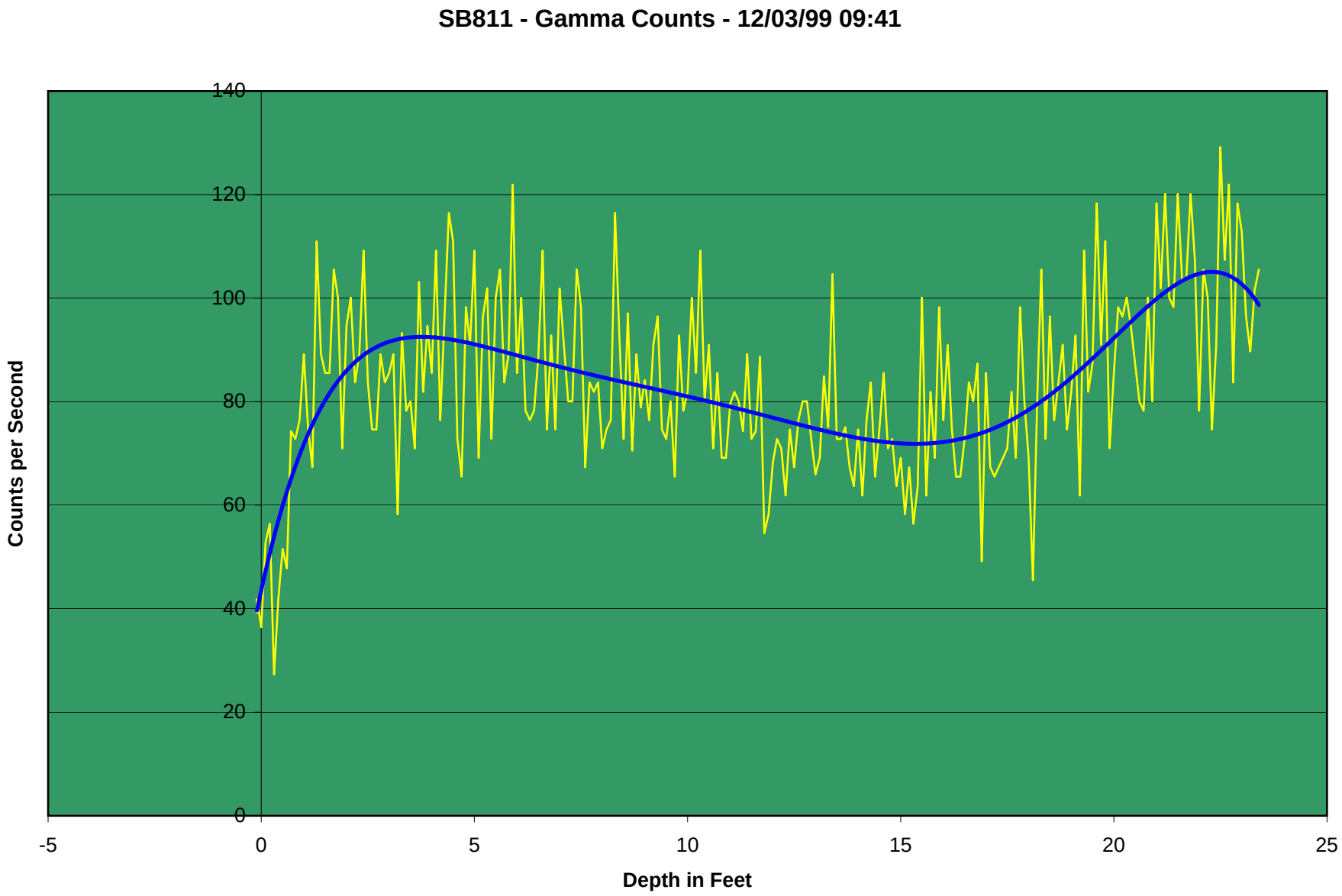

SB419 - Gamma Counts - 12/01/99 13:52
Counts per Second
140
120
100
80
60
40
20
0
-5
0
5
10
15
20
Depth in Feet


SB421 - Gamma Counts - 12/02/99 06:58
Counts per Second
140
120
100
80
60
40
20
0
-5
0
5
10
15
20
Depth in Feet


SB601 - Gamma Counts - 12/03/99 08:45
Counts per Second
Depth in Feet
0
20
40
60
80
100
120
140
0
2
4
6
8
10
12
14
16


SB804 - Gamma Counts - 12/03/99 10:23
Counts per Second
140
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
16
Depth in Feet


SB810 - Gamma Counts - 11/30/99 15:15
Counts per Second
120
100
80
60
40
20
0
-2
0
2
4
6
8
10
12
14
Depth in Feet


SB811 - Gamma Counts - 12/03/99 09:41
Counts per Second
140
120
100
80
60
40
20
0
-5
0
5
10
15
20
25
Depth in Feet