FINAL REPORT
FOR THE
PHASE 2 REMEDIAL INVESTIGATION AT THE TONAWANDA LANDFILL FUSRAP VICINITY PROPERTY
IN TONAWANDA, NEW YORK

Contract No. **W912P4-07-D-0009, D.O. 0003**

Prepared for:

U.S. ARMY ENGINEER DISTRICT, BUFFALO

Buffalo, New York

Formerly Utilized Sites Remedial Action Program

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FINAL REPORT FOR THE PHASE 2 REMEDIAL INVESTIGATION AT THE TONAWANDA LANDFILL FUSRAP VICINITY PROPERTY IN THE TOWN OF TONAWANDA, NEW YORK

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DATA REPORT APPROVALS

By their specific signature, the undersigned certify that they reviewed and provided comments on this Data Report for activities at the Tonawanda Landfill Operable Unit FUSRAP Site, Tonawanda, New York.

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ACRONYMS, ABBREVIATIONS, AND SYMBOLS

Am	Americium
APP/SSHP	Accident Prevention Plan/Site Safety and Health Plan
ARS	American Radiation Services
ARSEC	Joint Venture between ARS and Safety and Ecology Corporation (SEC)
bgs	below ground surface
BZ	Breathing Zone
CFR	Code of Federal Regulations
cpm	counts per minute
DOE	U.S. Department of Energy
ENG	Engineering
EPA	U.S. Environmental Protection Agency
FUSRAP	Formerly Utilized Sites Remedial Action Program
ft	foot (feet)
FSP	Field Sampling Plan
g	gram(s)
GM	Geiger-Mueller
GPS	Global Positioning System
GWS	Gamma Walkover Survey
H_2S	Hydrogen Sulfide
IA	Investigative Area
IDW	Investigation Derived Waste
l	liter
MDA	Minimum Detectable Activity
mg	milligram
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NAD	North American Datum
NaI	Sodium Iodide
NGVD	National Geodetic Vertical Datum
NYS	New York State
O_2	Oxygen
ORNL	Oak Ridge National Laboratory
OU	Operable Unit
PCB	Polychlorinated Biphenyl
pCi, pCi/g, pCi/l	picoCurie(s), picoCurie(s) per gram, picoCuries(s) per liter
ppm	parts per million
QA	Quality Assurance
QC	Quality Control
QAPP	Quality Assurance Project Plan
Ra	Radium
RI	Remedial Investigation
RPP	Radiation Protection Plan
SAP	Sampling and Analysis Plan
SOW	Statement of Work
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
Th	Thorium

TWP	Temporary Well Point
U	Uranium
USACE	U.S. Army Corps of Engineers
USACE–Buffalo	U.S. Army Corps of Engineers, Buffalo District
VOC	Volatile Organic Compound

1.0 EXECUTIVE SUMMARY

American Remediation Solutions and Environmental Corporation (ARSEC), a limited liability corporation of American Radiation Services, Inc. (ARS) and Safety and Ecology Corporation, has been contracted by the U.S. Army Corps of Engineers – Buffalo District under Contract No. W912P4-07-D-0009, D.O. 0003 to provide Hazardous, Toxic, and Radioactive Waste environmental services for the Tonawanda Landfill Formerly Utilized Sites Remedial Action Program (FUSRAP) Vicinity Property (hereafter referred to as the “Site") in Tonawanda, NY. Historical field sampling and gamma survey results have indicated the presence of FUSRAP-related material in the landfill Operational Unit (OU). Identified constituents of concern were uranium, thorium, and radium. As a result, the Landfill, comprised of the landfill itself and the adjoining mudflats, was designated as a FUSRAP Vicinity Property to the Linde Site in 1992. There have been several characterization efforts conducted previously at the Site in an effort to make a definitive conclusion regarding future FUSRAP actions at the Site.

The purpose of the ARSEC fieldwork was to collect data of sufficient quality and quantity to assist in the future decision-making process. This document was prepared to present the results of the data collected during this site remedial investigation effort.

All investigative areas (IAs) contained FUSRAP-related materials at activity levels greater than established reference background levels. IA1 contained the highest activity levels at the Site for FUSRAP-related material.

Thorium-230 activity levels for the Site ranged from 0.34 picoCuries per gram to 1,640 picoCuries per gram. Uranium-238 activity levels for the Site ranged from non-detected to 2,048 picoCuries per gram. Radium-226 activity levels for the site ranged from non-detected to 3,485 picoCuries per gram.

Fourteen groundwater wells were installed in and around IA1 and IA2. Three wells produced no water for sampling. Of the 11 producing wells, Temporary Well Point (TWP) Two had the highest radium-226 activity concentration at 11.8 picoCuries per liter. TWP- 7 had the highest detected value of uranium-238 activity at 51.79 picoCuries per liter and TWP-3 had the highest thorium-230 activity value of 0.2 picoCuries per liter. None of the groundwater samples collected from temporary monitoring wells contained FUSRAP-related materials at concentrations greater than the Effluent Concentration Limits listed in 10 Code of Federal Regulations 20, Appendix B, Table 2, Column 2. Effluent concentrations listed in 10 Code of Federal Regulations 20 are equivalent to the radionuclide concentrations which ingested continuously over the course of a year would produce a total effective dose equivalent of 0.05 rem. No concentrations in the Tonawanda temporary monitoring wells exceeded the Effluent Concentration Limits.

The data furnished in this report will aid the U.S. Army Corps of Engineers in their ultimate goals of verifying contaminant levels when compared to previous studies and in re-evaluating the Landfill OU contaminant fate and transport and the risk to human health as discussed in Section 2 of this report.

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2.0 INTRODUCTION

ARSEC conducted a remedial investigation (RI) survey and sampling project at the Tonawanda Landfill OU in October 2009 through April 2010 to collect sufficient information and data to enable an addendum to the previously issued RI Report [U.S. Army Corps of Engineers (USACE 2005)]. The project involved an assessment of the site for FUSRAP-related material. The survey and sampling investigation involved gamma walk-over surveys (GWS) of accessible areas; the boring, surveying, and sampling of 131 soil cores at pre-determined (systematic) locations and 61 biased locations; the installation of 14 temporary groundwater monitoring wells; and the collection of groundwater samples. The surveying and sampling design outlined in the Sampling and Analysis Plan (SAP) Field Sampling Plan (FSP) (USACE 2010a) focused on obtaining data from systematic and biased locations, as stipulated in the Statement of Work (SOW) (USACE 2009), to better delineate the extent of radiological contamination and to update the radiological fate and transport assessment. The ultimate goal of these investigation activities, as stated in the SOW, was to aid the U.S. Army Corps of Engineers, Buffalo District (USACE-Buffalo) in:

- Verifying whether contaminant levels previously detected by the U.S. Department of Energy (DOE) still persist on the site by conducting extensive additional field sampling at the Tonawanda Landfill Operable Unit (OU) and
- Re-evaluating the Landfill OU contaminant fate and transport and the associated risk to human health using only data from the sampling effort that verifies the current nature and extent of the radioactive contamination at the Landfill OU.

Data from this RI effort were collected using the following methods:

- Gamma walkover surveys (GWSs) of accessible site areas;
- Static one minute gamma counts on the soil surface in the location of systematic and biased boring locations;
- Surveying of soil cores for gamma and beta radiation from each of 131 systematic boring locations, collected using a sodium iodide (NaI) scintillator detecting gamma rays and Pancake Geiger-Mueller (GM) detecting beta particles;
- Surface and subsurface soil samples from each of 131 systematic boring locations;
- Surveying of soil cores for gamma and beta radiation from each of 61 biased sampling locations;
- Surface and subsurface soil samples from each of 61 biased boring locations;
- Groundwater samples from 14 temporary monitoring wells; and
- Off-site analyses of soil and groundwater samples for radiological and chemical parameters.

A total of 904 surface and subsurface soil samples were collected from the chosen 192 systematic and biased boring locations. All of the collected samples were sent to an off-site analytical laboratory for radiological analyses. An additional 57 quality control (QC) samples were also collected and analyzed by an off-site laboratory for radiological parameters.

A total of 97 subsurface soil samples were collected from various soil cores and were sent to an off-site laboratory for chemical analysis. An additional 19 subsurface QC soil samples were also collected and analyzed by an off-site laboratory for chemical parameters.

A total of 11 ground water samples were collected from 14 temporary monitoring wells and analyzed by off-site laboratories for both radiological and non-radiological parameters. Three temporary

monitoring wells did not produce a sufficient volume of groundwater for analytical testing. An additional two QC temporary monitoring well samples were also collected and analyzed by off-site laboratories for radiological and chemical parameters.

2.1 Site Description

The Tonawanda Landfill Vicinity Property is located approximately 1.5 miles north of the Linde (Praxair) FUSRAP Site in the Town of Tonawanda, New York. The site is comprised of two OUs: The Town of Tonawanda Landfill (Landfill) and the Mudflats (Mudflats). A no-action Record of Decision for the Mudflats OU was signed September 30, 2008. This RI addressed the 55-acre Landfill OU. The Landfill is located at the northern end of East Park Drive and is bounded by residential developments to the north and northwest, a railroad line to the east, and a right of way owned by National Grid to the south. A 48-inch diameter Erie County Water Authority water transmission line traverses through the National Grid right-of-way. The Erie County Water Authority also has another easement for a second parallel 48-inch line through the National Grid right-of-way, for future use. The property is owned by the Town of Tonawanda, New York, and is zoned as commercial/ industrial.. ***Figure 2-1*** provides an aerial view of the Site and associated investigative areas (IAs).

Figure 2-1 Aerial View of Tonawanda Landfill FUSRAP Site Investigative Areas

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2.2 Site History and Contaminants

A Proposed Plan for the Tonawanda Site in Tonawanda, New York, was originally prepared by DOE in September 1993 under its authority to conduct the FUSRAP. The 1993 Proposed Plan for the DOE Tonawanda Site addressed remediation of radioactive contamination at the four locations in the Town of Tonawanda that comprised the DOE Tonawanda Site as defined at the time: The former Linde Site, currently Praxair; the Ashland 1 Site; the Ashland 2 Site; and the Seaway Site. Due to local concern regarding the DOE's 1993 Proposed Plan, the DOE began to address each site separately.

On October 13, 1997, the Energy and Water Development Appropriations Act was signed into law as Public Law 105-62. Pursuant to this law, FUSRAP was transferred from the DOE to the USACE. As a result of this transfer, the responsibility for this project was transferred to the USACE. The Energy and Water Development Appropriations Act for Fiscal Year 2000, Public Law 106-60, provides authority to USACE to investigate, clean up, or control FUSRAP sites throughout the United States that were part of the Nation's early atomic weapons and energy programs during the 1940s, 1950s, and 1960s subject to the Comprehensive Environmental Response, Compensation, and Liability Act, 42 United States Code 9601 et seq., as amended. At that point, USACE began addressing the four locations of the Tonawanda Site, and the associated Tonawanda Landfill Vicinity Property, as individual projects under the Comprehensive Environmental Response, Compensation, and Liability Act.

USACE study of the Tonawanda Landfill Vicinity Property, including both the Landfill OU and Mudflats OU, began in 2001 with a whole-site field investigation and culminated in a 2005 RI Report. Because the Baseline Risk Assessment portion of the RI Report concluded that the incremental lifetime cancer risk to human receptors was within the criteria established in the National Oil and Hazardous Substances Pollution Contingency Plan, a 'No Further Action' Proposed Plan for both OUs was issued to the public in 2007 (USACE 2007).

2.3 Results of Previous Investigations

2.3.1 Department of Energy (DOE) Investigations (1990-1995)

Radioactive material surveys for the presence of FUSRAP-related materials at the Landfill and Mudflats were conducted by the DOE in 1990 as part of the Linde FUSRAP Site investigation. The intent of the survey was to assess whether any FUSRAP-related materials had been transported and disposed off-site in the general area surrounding the Linde facility. The preliminary survey was completed using a mobile gamma scanning van. An anomaly in the survey detected in the Mudflats during the mobile scanning activities was verified using handheld gamma screening devices. Subsequent soil samples collected from the area around the anomaly indicated elevated levels of Uranium-238 (U-238) and Radium-226 (Ra-226), which are two isotopes consistent with material expected to be in ore processing byproducts generated at the Linde Site [Oak Ridge National Laboratory (ORNL 1990)].

A limited radiological survey was conducted by DOE in September 1991 (ORNL 1992). The survey focused on both the Landfill and Mudflats and consisted of gamma walkover scans, measurement of radiation levels, and the collection and analysis of systematic and biased soil samples. The results of the survey detected soils in the Landfill and Mudflats with elevated concentrations of Ra, Thorium (Th), and U. Laboratory results received indicated some soil samples exhibited characteristics similar

to the FUSRAP-related product formerly produced at the Linde facility and others were consistent with the by-products of the refinery process conducted at the same Linde facility. The Landfill and Mudflats were subsequently designated together as a single Vicinity Property of the Linde FUSRAP Site.

DOE conducted additional soil sampling activities at the Landfill and Mudflats in 1994 to determine the vertical extent of the radiological contamination at the site. Analytical results obtained for subsurface soil, sediment, surface water and groundwater samples indicated that the radiological contamination was mainly limited to the upper 1.5 foot (ft) of soil, but was found in lesser concentrations at 24.5 ft below ground surface (bgs). A summary of results is shown in ***Table 2-1.***

Table 2-1. Results of DOE Investigations

Matrix	# Samples at Landfill OU	Results
Soil	148 samples 92 locations	Th-230: 1.59-4300 picoCuries per gram (pCi/g) U-238: 2.34-1800 pCi/g Ra-226: 2.27-2000pCi/g Lead (2 samples): 740 milligram (mg)/ kilogram; 1,200 mg/ kilogram
Surface Water	1 sample	Th-230: 0.2 picoCuries per liter (pCi/L) Th-232: 0.06 pCi/L U-238: 48.2 pCi/L Ra-226: 521 pCi/L
Sediment	1 sample	Th-228: 2.7 pCi/G Th-230: 121.8 pCi/g Th-232:2 pCi/g U-234: 382.3 pCi/g U-235: 19.5 pCi/g U-238: 393.5 pCi/g Ra-226: 65.7 pCi/g
Groundwater	2 samples	Th-230: 2.4, 693 pCi/L Th-232: 1.1, 6.7 pCi/L U-238: 20.2, 4328 pCi/L

2.3.2 USACE Investigations (1999-2007)

Upon receiving FUSRAP responsibility for the Tonawanda Landfill Vicinity Property in 1997, USACE began a review of data from previous investigations of the Vicinity Property. Based on the data, a Radiological Human Health Assessment was performed for both the Landfill and Mudflats OUs in February 1999 (USACE 1999). Closure scenarios for the Landfill addressed during the assessment included capping the contaminated soil in place and excavation and removal of the impacted soil. Closure alternatives evaluated for the Mudflats area included no action, covering the impacted area with clean soil, and excavation and removal of impacted soil.

Following discussions with the New York State Department of Environmental Conservation and other stakeholders, USACE decided there was not enough data available to make a definitive conclusion on whether action was required at the Tonawanda Landfill Vicinity Property. Therefore, USACE proceeded forward with an RI of the Tonawanda Landfill Vicinity Property. The RI was structured to include both the Landfill OU and the Mudflats OU as separate but related parcels. The

objectives of the *Remedial Investigation Report, Tonawanda Landfill Vicinity Property, Tonawanda, New York* (USACE 2005) were as follows:

- Verify that FUSRAP-related material is present in soil, groundwater, surface water and sediment;
- Confirm concentration of contaminants in areas found to be elevated by DOE;
- Determine whether chemical or non-FUSRAP material is commingled with FUSRAP-related materials; and
- Assess long-term risks posed by leaving FUSRAP-related material in place, including fate and transport profile as a function of time.

Extensive field sampling of surface and subsurface soil, groundwater, surface water and sediment was conducted in 2001. Details of sample acquisition numbers and findings are presented in the RI (USACE 2005)and summarized in ***Table 2-2*** below.

Table 2-2. Results of USACE Investigations

Matrix	# Samples at Landfill OU	Results
Soil	280 samples 114 locations	Th-230: 0.65 - 32.5 pCi/g U-238: 2.0-227 pCi/g Ra-226: 0.83-20.1 pCi/g
Surface Water	4 samples	Total U: 5.16-459 pCi/L Ra-228 + Ra-226: 4.95-37.38 pCi/L
Sediment	9 samples 4 locations	Th-230: 1.02-3.90 pCi/g U-238: 0.77--25.30 pCi/g Ra-226: 0.87-5.80 pCi/g
Groundwater	7 shallow wells, 3 deep wells (filtered/unfiltered analysis)	Well L3: total U: unfiltered: 175.0 pCi/L Filtered: 133.0 pCi/L

Despite the proximity of USACE's samples to the locations that yielded DOE's historical elevated results, USACE was unable to find any elevated concentrations within the same order of magnitude. Based on the RI and the results of the Baseline Risk Assessment, the USACE concluded that soils containing U, Ra and Th could safely remain in place in their current condition. Therefore a No-Action alternative was recommended to the public in an April 25, 2007 presentation of the Proposed Plan for both the Landfill and Mudflats OUs.

Based on public comments received on the Proposed Plan and the fact that USACE did not find levels of contamination of the same order of magnitude as DOE, USACE decided to conduct additional sampling in the Landfill OU. USACE has proceeded forward with a No-Action Record of Decision for the Mudflats OU, which was signed on September 30, 2008.

2.4 Report Organization

This report presents the activities conducted to collect data to assist the USACE in future decision-making for the site. The bullets below identify the sections of the report and the items discussed in each section.

- Section 3 is a brief overview of the project purpose and scope,

- Section 4 presents the project organization and responsibilities,
- Section 5 reports the result of various civil surveys conducted at the site,
- Section 6 outlines the methods used to complete the project activities,
- Section 7 delineates the radiation controls utilized at the site and for the equipment utilized,
- Section 8 discusses the Investigation Derived Waste (IDW) generated during the field investigation and the disposal of the IDW,
- Section 9 describes the analytical methods utilized for the different media investigated for both radiological and chemical analyses,
- Section 10 identifies the field instrumentation and sampling quality activities conducted for the investigation,
- Section 11 details field changes and revisions made to the FSP,
- Section 12 presents the analytical results for each Investigation Area, and
- Section 13 summarizes the results of the investigation.

3.0 PROJECT PURPOSE, SCOPE, AND OBJECTIVES

The following section identifies the project purpose, scope, and specific objectives that were used to satisfy the data quality objectives (DQOs) established in the SAP Quality Assurance Project Plan (QAPP) [USACE 2010b]. This report was designed to ensure that the data collected during the investigation effort was of sufficient quantity and quality to accurately achieve the established data quality objectives.

3.1 Purpose and Scope

The purpose of the Tonawanda Landfill OU RI was to better delineate the extent of radiological contamination to assist the USACE in future decision-making processes regarding the Site and to provide the USACE with current, accurate Site data to update the radiological fate and transport assessment for the site.

The scope of the project included the mobilization of an ARSEC team to the Site for the purpose of performing the tasks identified in the SOW and included the following activities:

- Site clearing and grubbing to prepare the site for field work,
- Site GWSs to characterize the site for worker health and safety and to assist in locating surface soil contamination,
- Collection of surface and subsurface soil samples in six identified IAs from boreholes installed by direct push methodology to determine whether or not the site poses potential risks to human health or the environment,
- Installation of temporary well points (TWPs) in 14 of the subsurface soil boring locations for the collection of groundwater samples to determine the potential for groundwater contamination,
- Data validation and verification of 100% of analytical data and preparation and delivery of electronic deliverable data to the USACE,
- Management of all investigation-derived waste generated during the field work in accordance with the requirements listed in the Task Order SOW, and
- Preparation of a comprehensive Project Report summarizing all work conducted during the project.

3.2 Project Data Quality Objectives

Project data quality objectives for field sampling activities were provided in the SOW and were established based on available site investigation data and potential Applicable or Relevant and Appropriate Requirements pertaining to the Landfill OU. The data quality objectives were established to ensure compliance with applicable Federal, State and local regulations for handling and assessing radiological contaminants present at the site, and to evaluate potential remedial activities associated with the handling and/or removal of radiologically impacted material. The objective of this supplemental RI sampling was to provide the USACE with a comprehensive report which would allow the USACE to:

- Determine the extent and concentration of FUSRAP-related material currently in the Landfill OU;
- Estimate potential risks to human health and the environment associated with exposures to FUSRAP-related contamination which may exist at the site;

- Confirm or update DOE's findings of elevated concentrations of radiological constituents of concern;
- Determine the likelihood and pathways of contaminant migration;
- Evaluate the potential for migration of FUSRAP material into residents' back yards and/or presence of material in yards due to historic disposal operations and haulways;
- Bound the depth of FUSRAP contamination;
- Confirm depth to groundwater, groundwater flow rates and direction of groundwater flow;
- Re-evaluate both persistent and intermittent surface water drainages, both historical and present, considering the recent re-contouring of the landfill;
- Obtain data to support technically defensible contaminated soil volume determination; and
- Evaluate the characteristics of soil and groundwater for waste disposal.

4.0 ORGANIZATION AND RESPONSIBILITIES

Under the direction of USACE, ARSEC was responsible for implementation of work assignments related to RI efforts at the Site. A detailed description of the project organization/responsibilities and organization chart is presented in the SAP (USACE 2010a). To summarize, the USACE-Buffalo Environmental Engineer and/or the USACE-Buffalo Contracting Officer's Representative were the prime interface with the Site property owners and the State of New York. The ARSEC team consisted of a Program/Project Manager, Site Manager, Site Radiation Safety Officer, Site Health and Safety Officer, Contractor Quality Control System Manager, Geologist, field health physics personnel, heavy equipment operator, and subcontract personnel. Site subcontract personnel consisted of drilling crews (Zebra Environmental Corporation), geologists (Ensol, Inc.), and a professional civil surveyor (Ensol, Inc.). Analytical services were provided by ARS (radiochemistry) and Test America (non-radiological analysis).

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5.0 CIVIL SURVEYS

Civil surveys were performed to delineate the elevations and coordinates of the planned and actual boring locations. Ensol, Inc. of Niagara Falls, New York, was subcontracted to provide professional surveying services. Civil surveys for elevations of planned systematic borings were performed on December 17 and 21, 2009 by Ensol, Inc. using a Topcon HyperLite RTK global positioning system (GPS) System with a Topcon FC-200 Data Collector. Surveys for the locations of planned systematic borings were performed by ARSEC personnel using backpack mounted Trimble® ProXRS GPS systems. All 132 systematic survey locations were staked and were marked to indicate the IA and borehole identification number within the IA.

Coordinates for systematic and biased borings and temporary groundwater wells were supplied by USACE-Buffalo. Northing and Easting coordinates were supplied using the x (NAD) New York State (NYS) Plane 3103 (ft) format, with English measurements. Elevation surveys were performed using National Geodetic Vertical Datum (NGVD) 88 Datum, with English measurements.

Table 5-1 provides planned and actual systematic boring location coordinates and elevations, ***Table 5-2*** provides planned and actual biased boring location coordinates and actual elevations, and ***Table 5-3*** provides planned and actual temporary monitoring well location coordinates and actual elevations. Actual borehole coordinates varied slightly from planned coordinates due to borehole refusal at the initial planned location. Actual borehole elevations also varied slightly from initial elevations due to the addition of cover material to the Landfill by the Town of Tonawanda, especially in IAs 4 and 5. ***Table 5-4*** provides IA vertex coordinates.

Table 5-1 Planned and Actual Systematic Borehole Location Coordinates and Elevations

	Planned Systematic Borehole Locations		Actual Systematic Borehole Locations		
Borehole ID	Northing[1]	Easting[1]	Northing[1]	Easting[1]	Elevation[2]
IA1-1	1093062.69	1065749.26	1093061.74	1065749.69	619.02
IA1-2	1093062.69	1065705.49	1093062.69	1065706.74	620.08
IA1-3	1093106.46	1065880.57	1093107.98	1065881.16	621.18
IA1-4	1093106.46	1065836.80	1093107.62	1065835.01	620.44
IA1-5	1093106.46	1065793.03	1093106.16	1065795.04	619.32
IA1-6	1093106.46	1065749.26	1093106.86	1065750.16	618.41
IA1-7	1093106.46	1065705.49	1093104.50	1065705.27	618.04
IA1-8	1093150.24	1065968.11	1093150.92	1065968.89	621.49
IA1-9	1093150.24	1065924.34	1093151.72	1065922.44	620.37
IA1-10	1093150.24	1065880.57	1093148.76	1065879.14	619.23
IA1-11	1093150.24	1065836.80	1093150.99	1065836.52	619.47
IA1-12	1093150.24	1065793.03	1093147.21	1065802.30	619.89
IA1-13	1093150.24	1065749.26	1093151.53	1065747.05	618.09
IA1-14	1093150.24	1065705.49	1093153.60	1065704.19	618.04
IA1-15	1093194.01	1065924.34	1093184.72	1065923.10	620.29
IA1-16	1093194.01	1065880.57	1093189.56	1065880.72	618.56
IA1-17	1093194.01	1065836.80	1093195.61	1065836.32	618.53
IA1-18	1093194.01	1065793.03	1093195.32	1065793.34	619.08
IA1-19	1093194.01	1065749.26	1093193.83	1065749.73	619.26
IA1-20	1093237.78	1065924.34	1093238.55	1065919.88	618.71
IA1-21	1093237.78	1065880.57	1093237.94	1065880.76	618.68

Table 5-1 Planned and Actual Systematic Borehole Location Coordinates and Elevations

	Planned Systematic Borehole Locations		Actual Systematic Borehole Locations		
Borehole ID	Northing[1]	Easting[1]	Northing[1]	Easting[1]	Elevation[2]
IA1-22	1093237.78	1065836.80	1093236.96	1065837.89	619.38
IA2-1	1092861.27	1065219.71	1092861.95	1065218.57	620.06
IA2-2	1092899.03	1065295.23	1092896.36	1065297.06	623.90
IA2-3	1092899.03	1065257.47	1092900.32	1065256.27	620.81
IA2-4	1092899.03	1065219.71	1092897.00	1065218.95	620.52
IA2-5	1092899.03	1065181.95	1092899.50	1065181.83	618.45
IA2-6	1092936.79	1065370.75	1092940.23	1065369.64	622.03
IA2-7	1092936.79	1065332.99	1092940.88	1065331.95	620.11
IA2-8	1092936.79	1065295.23	1092940.44	1065296.91	617.85
IA2-9	1092936.79	1065257.47	1092939.30	1065256.28	615.70
IA2-10	1092936.79	1065219.71	1092937.86	1065220.59	614.38
IA2-11	1092936.79	1065181.95	1092929.29	1065183.68	615.15
IA2-12	1092974.55	1065408.52	1092974.78	1065409.68	619.28
IA2-13	1092974.55	1065370.75	1092973.38	1065371.08	618.39
IA2-14	1092974.55	1065332.99	1092974.78	1065333.72	616.04
IA2-15	1092974.55	1065295.23	1092973.34	1065294.81	615.53
IA2-16	1092974.55	1065257.47	1092968.44	1065258.74	614.11
IA2-17	1092974.55	1065219.71	1092976.06	1065218.62	612.62
IA2-18	1093012.32	1065370.75	1093020.39	1065366.86	615.32
IA2-19	1093012.32	1065332.99	1093012.07	1065334.30	614.33
IA2-20	1093012.32	1065295.23	1093014.18	1065294.71	614.25
IA2-21	1093050.08	1065370.75	1093051.23	1065370.04	615.54
IA2-22	1092970.84	1065181.39	1092970.28	1065182.01	612.62
IA3-1	1092331.10	1063923.95	1092330.58	1063923.85	601.04
IA3-2	1092179.83	1063419.79	1092181.10	1063417.18	588.49
IA3-3	1092433.71	1064112.14	1092438.82	1064131.61	604.00
IA3-4	1092277.03	1063547.45	1092281.34	1063544.11	589.79
IA3-5	1092505.96	1064309.05	1092510.47	1064307.70	606.20
IA3-6	1092397.72	1063774.23	1092395.74	1063774.21	597.85
IA3-7	1092608.88	1064478.05	1092614.06	1064465.88	605.98
IA3-8	1092493.42	1063995.54	1092518.61	1063990.83	601.72
IA3-9	1092721.78	1064703.86	1092722.19	1064703.82	610.08
IA3-10	1092234.31	1063696.22	1092231.54	1063697.14	599.38
IA3-11	1092834.68	1064929.66	1092834.60	1064932.57	611.54
IA3-12	1092831.17	1065033.11	1092831.99	1065034.16	613.26
IA3-13	1092910.72	1065151.65	1092913.79	1065155.42	614.79
IA3-14	1092910.72	1065038.75	1092910.06	1065038.85	613.07
IA3-15	1093023.62	1065264.56	1093021.70	1065263.18	613.96
IA3-16	1093204.02	1065682.19	1093205.12	1065682.13	618.90
IA3-17	1093119.03	1065494.71	1093117.28	1065494.22	616.67
IA3-18	1093276.52	1065837.18	1093277.18	1065837.08	619.09
IA3-19	1093369.83	1066160.28	1093368.55	1066159.97	622.63
IA3-20	1093369.83	1066047.38	1093368.35	1066047.65	620.42
IA3-21	1093502.73	1066428.58	1093498.02	1066429.46	624.86
IA3-22	1093502.73	1066315.68	1093494.54	1066315.47	621.15
IA4-1	1092858.14	1066312.89	1092859.39	1066308.11	644.27
IA4-2	1092858.14	1066210.59	1092858.12	1066210.47	644.38
IA4-3	1092952.13	1066517.48	1092949.68	1066513.27	647.68

Table 5-1 Planned and Actual Systematic Borehole Location Coordinates and Elevations

	Planned Systematic Borehole Locations		Actual Systematic Borehole Locations		
Borehole ID	Northing[1]	Easting[1]	Northing[1]	Easting[1]	Elevation[2]
IA4-4	1092952.13	1066415.19	1092956.53	1066412.31	647.51
IA4-5	1092952.13	1066312.89	1092951.45	1066311.70	645.00
IA4-6	1092952.13	1066210.59	1092952.58	1066208.01	643.08
IA4-7	1093054.43	1066517.48	1093057.93	1066514.90	645.86
IA4-8	1093054.43	1066415.19	1093054.07	1066416.45	646.10
IA4-9	1093054.43	1066312.89	1093052.44	1066311.74	641.89
IA4-10	1093054.43	1066210.59	1093057.01	1066208.65	639.34
IA4-11	1093156.72	1066517.48	1093156.83	1066519.57	641.21
IA4-12	1093156.72	1066415.19	1093159.34	1066409.57	651.59
IA4-13	1093156.72	1066312.89	1093157.01	1066310.12	637.76
IA4-14	1093156.72	1066210.59	1093159.07	1066209.72	635.16
IA4-15	1093259.02	1066517.48	1093260.17	1066515.48	637.36
IA4-16	1093259.02	1066415.19	1093263.19	1066416.96	636.42
IA4-17	1093259.02	1066312.89	1093257.57	1066313.30	635.15
IA4-18	1093259.02	1066210.59	1093264.20	1066231.80	632.27
IA4-19	1093361.31	1066517.48	1093359.78	1066517.64	633.99
IA4-20	1093361.31	1066415.19	1093327.28	1066415.39	634.37
IA4-21	1093361.31	1066312.89	1093375.32	1066304.59	624.14
IA4-22	1093463.61	1066517.48	1093455.08	1066513.85	621.17
IA5-1	1092867.41	1066091.90	1092868.69	1066095.47	643.03
IA5-2	1092867.41	1065989.69	1092868.01	1065987.54	634.26
IA5-3	1092867.41	1065887.47	1092870.04	1065885.71	633.99
IA5-4	1092867.41	1065785.26	1092867.02	1065784.11	636.46
IA5-5	1092867.41	1065683.04	1092871.14	1065680.64	634.51
IA5-6	1092867.41	1065580.83	1092867.42	1065576.24	627.61
IA5-7	1092867.41	1065478.61	1092867.64	1065484.91	621.69
IA5-8	1092867.41	1065376.40	1092877.35	1065387.88	624.20
IA5-9	1092969.63	1066091.90	1092969.71	1066091.00	639.61
IA5-10	1092969.63	1065989.69	1092969.83	1065990.43	636.71
IA5-11	1092969.63	1065887.47	1092977.67	1065885.52	625.01
IA5-12	1092969.63	1065785.26	1092969.89	1065786.83	631.08
IA5-13	1092969.63	1065683.04	1092969.69	1065682.68	623.47
IA5-14	1092969.63	1065580.83	1092968.26	1065579.89	622.18
IA5-15	1092969.63	1065478.61	1092970.34	1065479.16	621.80
IA5-16	1093071.84	1066091.90	1093073.92	1066087.53	635.74
IA5-17	1093071.84	1065989.69	1093065.09	1065994.14	625.47
IA5-18	1093071.84	1065887.47	1093076.39	1065884.40	622.98
IA5-19	1093174.06	1066091.90	1093175.52	1066091.71	621.60
IA5-20	1093174.06	1065989.69	1093174.91	1065989.37	621.20
IA5-21	1093276.27	1066091.90	1093278.39	1066091.20	621.38
IA5-22	1093051.77	1065580.79	1093051.62	1065581.62	619.17
IA6-1	1092583.92	1066413.02	1092584.78	1066410.52	623.08
IA6-2	1092583.92	1066250.59	1092584.36	1066249.69	626.13
IA6-3	1092583.92	1066088.15	1092582.74	1066088.20	624.27
IA6-4	1092583.92	1065925.72	1092576.43	1065928.39	623.73
IA6-5	1092583.92	1065763.28	1092583.09	1065765.18	623.54
IA6-6	1092583.92	1065600.85	1092585.87	1065599.19	620.29

Table 5-1 Planned and Actual Systematic Borehole Location Coordinates and Elevations

	Planned Systematic Borehole Locations		Actual Systematic Borehole Locations		
Borehole ID	Northing[1]	Easting[1]	Northing[1]	Easting[1]	Elevation[2]
IA6-7	1092583.92	1065438.41	1092579.22	1065440.75	620.43
IA6-8	1092583.92	1065275.97	1092584.83	1065276.03	619.80
IA6-9	1092583.92	1065113.54	1092585.66	1065113.07	619.44
IA6-10	1092583.92	1064951.10	1092598.70	1064949.05	618.43
IA6-11	1092583.92	1064788.67	1092584.59	1064788.01	618.42
IA6-12	1092583.92	1064626.23	1092587.28	1064679.71	617.13
IA6-13	1092746.35	1066413.02	1092747.44	1066414.22	637.53
IA6-14	1092746.35	1066250.59	1092755.45	1066247.73	638.86
IA6-15	1092746.35	1066088.15	1092753.28	1066088.36	633.66
IA6-16	1092746.35	1065925.72	1092754.72	1065942.09	627.69
IA6-17	1092746.35	1065763.28	1092749.97	1065763.84	629.23
IA6-18	1092746.35	1065600.85	1092746.25	1065600.54	627.19
IA6-19	1092746.35	1065438.41	1092746.93	1065435.15	622.44
IA6-20	1092746.35	1065275.97	1092745.29	1065274.73	622.18
IA6-21	1092746.35	1065113.54	1092741.91	1065113.63	617.23
IA6-22	1092746.35	1064951.10	1092746.69	1064951.97	615.92

[1] The Northing and Easting values are in feet using the NAD NYS Plane 3103 (ft) format.
[2] Elevation values are in feet using the NGVD 88 Datum.

Table 5-2 Planned and Actual Biased Borehole Location Coordinates and Actual Elevations

	Planned Biased Borehole Locations		Actual Biased Borehole Locations		
Borehole ID	Northing[1]	Easting[1]	Northing[1]	Easting[1]	Elevation[2]
IA1-B1	1093158.01	1065821.931	1093154.21	1065821.52	619.20
IA1-B2	1093084.731	1065727.232	1093085.38	1065732.04	618.54
IA1-B3	1093042.642	1065728.735	1093043.48	1065728.64	620.37
IA1-B4	1093046.024	1065764.059	1093046.04	1065765.39	620.77
IA1-B5	1093084.731	1065815.918	1093085.05	1065817.47	619.88
IA1-B6	1093084.731	1065859.51	1093083.54	1065861.22	621.64
IA1-B7	1093090.095	1065900.095	1093091.39	1065899.65	622.86
IA1-B8	1093175.195	1065944.995	1093177.99	1065943.27	620.59
IA1-B9	1093217.966	1065946.135	1093217.74	1065944.88	619.31
IA1-B10	1093129.826	1065772.702	1093131.02	1065770.00	618.61
IA1-B11	1093085.106	1065770.823	1093082.52	1065769.75	619.13
IA1-B12	1093018.021	1065704.624	1093016.87	1065703.05	620.90
IA1-B13	1093047.903	1065683.64	1093042.40	1065686.53	620.39
IA1-B14	1093036.629	1065660.717	1093035.35	1065661.72	620.13
IA1-B15	1093082.239	1065671.83	1093082.56	1065674.61	619.10
IA1-B16	1093007.841	1065746.454	1093005.01	1065747.23	622.91
IA1-B17	1093035.277	1065815.045	1093026.63	1065812.38	622.73
IA1-DOE-01	1093150.85	1065811.99	1093148.30	1065811.54	620.46
IA1-DOE-02	1093176.59	1065818.4	1093177.39	1065818.63	618.05
IA1-DOE-03	1093160.85	1065833.94	1093160.83	1065835.29	618.62
IA2-DOE-B1	1092936.73	1065207.78	1092936.25	1065207.99	614.36

Table 5-2 Planned and Actual Biased Borehole Location Coordinates and Actual Elevations

	Planned Biased Borehole Locations		Actual Biased Borehole Locations		
Borehole ID	Northing[1]	Easting[1]	Northing[1]	Easting[1]	Elevation[2]
IA2-DOE-B2	1092976.71	1065358.26	1092976.65	1065357.45	616.73
IA2-DOE-B3	1092966.57	1065360.41	1092965.95	1065360.19	617.81
IA3-B01	1093455.78	1066298.57	1093457.04	1066298.88	622.32
IA3-B02	1093448.87	1066263.76	1093448.91	1066263.90	622.25
IA3-B03	1093413.675	1066190.61	1093415.66	1066190.40	622.81
IA3-B04	1093293.81	1066001.25	1093292.03	1066000.05	619.20
IA3-B05	1093126.91	1065621.19	1093127.25	1065622.31	618.24
IA3-DL1	1092228.485	1063540.123	1092244.48	1063540.09	588.75
IA3-DL2	1092350.754	1063732.42	1092351.32	1063732.11	597.28
IA3-DL3	1092436.899	1063921.938	1092447.21	1063923.53	600.64
IA3-DL4	1092497.478	1064149.247	1092498.21	1064151.01	604.83
IA3-DL5	1092537.018	1064370.545	1092528.15	1064375.04	606.69
IA3-DL6	1092661.764	1064592.994	1092672.90	1064597.41	608.32
IA3-DL7	1092753.361	1064812.826	1092751.04	1064813.87	610.50
IA3-DL8	1092915.618	1065084.127	1092909.38	1065092.29	613.01
IA3-DL9	1092995.874	1065291.746	1092997.58	1065291.17	613.46
IA3-DL10	1093090.088	1065481.046	1093091.64	1065481.21	615.29
IA3-DL11	1093076.13	1065525.972	1093077.62	1065526.50	616.72
IA3-DL12	1093128.176	1065698.345	1093128.86	1065696.78	618.39
IA3-FL-0	1093657.27	1066577.74	1093656.15	1066578.96	624.37
IA3-FL-1	1093568.96	1066399.81	1093561.62	1066400.45	623.11
IA3-FL-2	1093482.02	1066220.54	1093478.08	1066219.08	621.65
IA3-FL-3	1093395.09	1066038.03	1093391.55	1066039.62	620.59
IA3-FL-4	1093291.91	1065817.93	1093289.56	1065816.46	619.30
IA3-FL-5	1093246.5	1065724.36	1093241.95	1065728.95	619.14
IA3-FL-6	1093204.46	1065634.6	1093202.03	1065633.47	617.90
IA3-FL-7	1093167.18	1065553.82	1093164.27	1065553.39	617.36
IA3-FL-8	1093050.89	1065307.77	1093048.92	1065303.25	614.80
IA3-FL-9	1092726.74	1064626.62	1092725.93	1064628.49	608.58
IA3-FL-10	1092639.08	1064447.78	1092639.15	1064449.18	607.68
IA3-FL-11	1092556.81	1064267.1	1092555.00	1064271.43	605.80
IA4-B01	1093278.46	1066230.54	1093264.57	1066232.16	632.19
IA4-B02	1093261.86	1066193.7	1093246.45	1066203.02	632.37
IA4-B03	1093211.205	1066144.82	1093213.46	1066152.16	631.72
IA4-B04	1093211.205	1066161.28	1093210.54	1066165.559	632.33
IA4-B05	1092841.77	1066596.21	1092840.62	1066599.07	642.91
IA5-B01	1092873.96	1066043.66	1092872.83	1066046.12	640.08
IA5-B02	1092850.52	1066009.91	1092851.15	1066010.81	633.59
IA5-B03	1092843.18	1066031.87	1092843.78	1066031.62	635.26
IA6-B01	1092817.422	1066003.42	1092817.26	1066003.63	631.76

[1] The Northing and Easting values are in feet using the NAD NYS Plane 3103 (ft) format.
[2] Elevation values are in feet using the NGVD 88 Datum.

Table 5-3 Planned and Actual Temporary Monitoring Well Point (TWP) Location Coordinates and Actual Elevations

	Planned Biased Borehole Locations		Actual Biased Borehole Locations		
Monitoring Well ID	Northing[1]	Easting[1]	Northing[1]	Easting[1]	Elevation[2]
TWP-1	1093323.000	1066069.330	1093321.78	1066069.85	621.91
TWP-2	1093175.530	1066055.207	1093173.69	1066053.79	622.85
TWP-3	1093052.366	1065773.734	1093053.27	1065772.89	620.78
TWP-4	1093091.880	1065871.595	1093093.35	1065872.25	621.97
TWP-5	1093096.615	1065880.414	1093097.00	1065880.75	622.43
TWP-6	1093118.511	1065750.119	1093116.53	1065751.22	619.17
TWP-7	1093113.628	1065741.331	1093111.96	1065744.09	618.87
TWP-8	1093139.993	1065844.185	1093142.17	1065845.62	619.86
TWP-9	1093198.255	1065820.424	1093199.80	1065820.65	620.06
TWP-10	1093193.373	1065811.636	1093193.94	1065810.98	619.65
TWP-11	1093261.562	1065766.729	1093261.18	1065765.64	620.83
TWP-12	1093130.660	1065527.973	1093132.75	1065530.09	619.57
TWP-13	1092999.742	1065624.821	1092999.17	1065623.46	621.52
TWP-14	1093032.323	1065335.272	1093033.73	1065335.79	616.51

[1] The Northing and Easting values are in feet using the NAD NYS Plane 3103 (ft) format.
[2] Elevation values are in feet using the NGVD 88 Datum.

Table 5-4 IA Vertex Location Coordinates

Vertex I.D.	Northing [1]	Easting [1]
Vertex A	1066607.00	1092540.00
Vertex B	1066607.00	1092830.00
Vertex C	1066607.00	1093557.00
Vertex D	1066607.00	1093667.00
Vertex E	1066120.00	1092830.00
Vertex F	1066120.00	1093328.00
Vertex G	1065050.00	1092830.00
Vertex H	1064465.00	1092540.00
Vertex I	1063618.00	1092141.00
Vertex J	1063618.00	1092251.00
Vertex K	1063162.00	1092057.00
Vertex L	1063524.00	1092322.00
Vertex M	1063745.00	1092434.00
Vertex N	1063875.00	1092558.00
Vertex O	1064187.00	1092522.00
Vertex P	1065148.00	1092957.00
Vertex Q	1065208.00	1092848.00
Vertex R	1065434.00	1092955.00
Vertex S	1065372.00	1093066.00
Vertex T	1065654.00	1093157.00
Vertex U	1065718.00	1093030.00
Vertex V	1065980.00	1093155.00
Vertex W	1065910.00	1093285.00

[1] The Northing and Easting values are in feet using the NAD NYS Plane 3103 (ft) format.

6.0 METHODS OF INVESTIGATION / EQUIPMENT EMPLOYED

6.1 Overview

Investigation activities at the Tonawanda Landfill OU site included the following activities:

- Clearing and grubbing activities to prepare the site for the field work,
- GWSs to characterize the site for worker health and safety and to assist in locating surface soil contamination,
- Collection of surface and subsurface soil samples in six identified IAs from boreholes installed by direct push methodology,
- Installation of 14 TWP in subsurface soil boring locations for the collection of groundwater samples to determine the potential for groundwater contamination, and
- 100% data validation and verification of analytical data and the preparation of electronic deliverable data for the USACE.

6.2 Site Clearing

ARSEC performed clearing and grubbing over all accessible areas of IA1 through IA6 to allow for GWS and drill rig access. Site clearing was performed utilizing bush hogs, chain saws, and weed trimmers.

ARSEC personnel cleared lower tree limbs and removed foliage from trees greater than six inches in diameter at shoulder height to ground level. Bushes and undergrowth that may have obscured Professional Surveyor efforts were removed. Trees less than six inches in diameter, larger bushes, brush, and other vegetation were cut within two to four inches of the ground, except for areas where the Contracting Officer's Representative authorized the growth to stand. Removed material was staged in a USACE and Town of Tonawanda authorized area for decomposition. The chosen decomposition area was located in an area of low probability for chemical and radiological contamination and was verified by GWS to contain no elevated surface contamination.

6.3 Gamma Walkover Surveys

The purpose of the GWS was to characterize the site for worker health and safety and to assist in the location of surface soil contamination. GWS was performed using Multi Agency Radiation Survey and Site Investigation Manual methodology [U.S. Environmental Protection Agency (EPA) 2000] and was conducted over 100% of all accessible areas in IAs 1 through 6. A single pass GWS was performed. ARSEC performed the GWS surveys using equipment provided by the ARSEC Instrumentation Facilities located in Knoxville, Tennessee, and Port Allen, Louisiana. ***Figure 6-1*** illustrates IAs 1 through 6 where GWS was performed.

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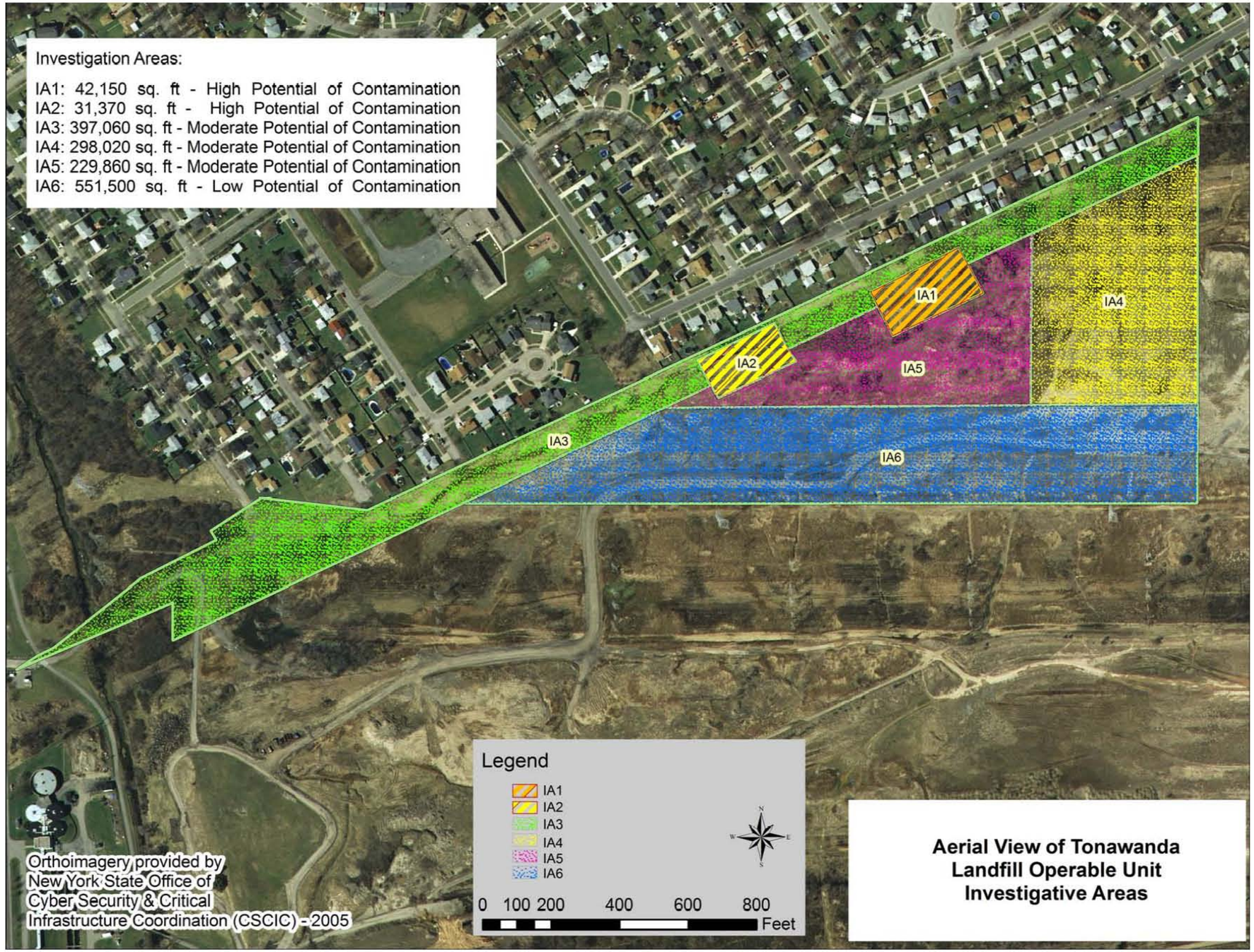

Figure 6-1 Aerial View of Tonawanda Landfill Oprable Unit Investigative Areas Where GWS Was Performed

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GWSs were performed using Ludlum Model 44-10 NaI probes coupled with Ludlum Model 2221 rate meters linked to a Trimble GPS and a data logger in a portable configuration. All detectors and rate meters had current annual calibrations. Daily QC checks of all GWS instrumentation was performed in accordance with the SAP (USACE 2010a).

Prior to the start of the GWS activities, surface specific background measurements were made by averaging 10 1-minute integrated counts, distributed within a 10 meter by 10 meter (32.8 x 32.8 ft) grid. Surface types for background measurements included soil and stone. Surveys of the two background survey units were conducted using Multi Agency Radiation Survey and Site Investigation Manual Class 1 methodology (EPA 2000). Background Reference Areas were established with USACE concurrence.

The counts per minute (cpm) backgrounds were established as follows:

- Stone 7,154 cpm
- Soil/grass 7,816 cpm

Tables 6-1 through ***6-2*** list the corner coordinates for the chosen reference background areas.

Table 6-1 Corner Coordinates and Elevations of Background Area Covered with Crushed Stone

Northing[1]	Easting[1]	Elevation[2]
1091447.29	415592.19	592.56
1091438.26	415560.12	593.16
1091406.35	415570.24	592.20
1091415.68	415602.20	591.65

[1] The Northing and Easting values are in feet using the NAD NYS Plane 3103 (ft) format.
[2] Elevation values are in feet using the NGVD 88 Datum.

Table 6-2 Corner Coordinates and Elevation of Background Area Covered with Soil and Grass

Northing[1]	Easting[1]	Elevation[2]
1091375.38	415444.21	602.53
1091383.24	415463.52	601.90
1091362.69	415471.20	601.61
1091354.36	415450.95	602.16

[1] The Northing and Easting values are in feet using the NAD NYS Plane 3103 (ft) format.
[2] Elevation values are in feet using the NGVD 88 Datum.

Figure 6-2 shows areas where the background surveys were completed.

GWS were performed at a rate not to exceed 0.5 meters (1.6 ft) per second. The NaI detector was maintained approximately 10 centimeters (3.9 in) above the surface being surveyed. Surveyors bound areas with visual markers for reference when elevated activity was identified. In areas where the satellite coverage was limited, the count rate was collected by the data logger while the surveyor walked in a straight line at a constant rate.

A data file with a unique file name was established for each survey area. GPS data underwent differential correction from a continuously operating reference station. Count rate information was recorded simultaneously with geospatial coordinates in one-second intervals.

GWS data, including data collected by conventional means, was entered into the Geographical Information System application ArcView® to generate site maps depicting gamma survey results. Color coded maps were generated of each IA indicating areas with readings greater than background values. Map colors were graduated to reflect increasing count rate values.

GWS were unable to be performed in numerous smaller areas of the Site due to standing water that did not dissipate throughout the duration of the project or due to dense overgrowth that was unable to be cleared. Areas where GWSs were unable to be performed are documented in Appendix A.

6.4 Soil Borings

Soil borings were conducted at 131 pre-determined (systematic) locations and 61 biased locations. Boring locations are listed in ***Tables 5-1*** and ***5-2.*** Proposed and Actual Systematic boring locations are illustrated in ***Figure 6-3***. Biased boring locations are illustrated in ***Figure 6-4***. Boring activities were conducted by Zebra Environmental Corporation of Niagara Falls, New York, and were directed by a representative from ARSEC. Boring activities were performed using direct push methodology with a fully equipped track-mounted Geoprobe.

A track-mounted 6620 Geoprobe unit with a RS-60 sampling system was used for soil boring operations in IA1 and IA2 and a track mounted Geoprobe Dual tube 325 (DT 325) sampling system was used for soil boring operations in IA3, IA4, IA5, and IA6. The RS-60 sampling system utilized a 3.25” drive casing as the sample sheath. The sheath was fitted with an inner acetate liner which collected a sample core approximately 2.5” in diameter. The RS-60 system was driven to depth to collect the soil core. The soil sample was retrieved by pulling the sampler and rod string to the surface. The sampler was fitted with a new acetate liner and deployed back down the borehole to collect the next sample interval.

Two types of data were collected while the soil borings were being drilled: geologic information and radiological scanning data. This data was recorded in the field in waterproof, bound log books. Appendix Q contains copies of both the Geological and Health Physics Technician log books. Appendix I is a transcription of the soil Health Physics data onto a Soil and Core Survey Form. Appendix J is a transcription of the geologists’ data onto the required USACE Engineer (ENG) 5056 Form.

Figure 6-2 Reference Background Area Locations

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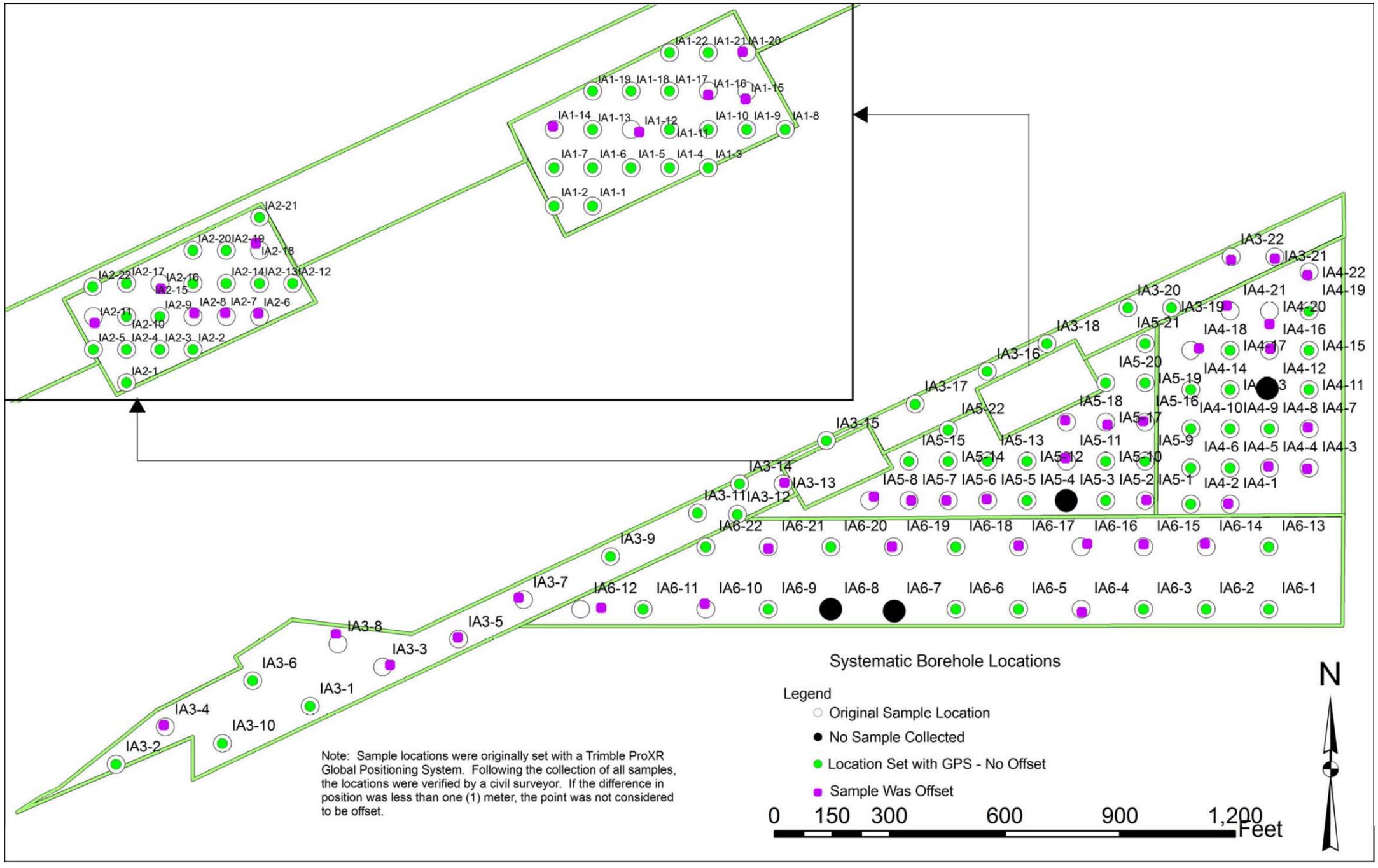

Figure 6-3 Proposed and Actual Systematic Boring Locations

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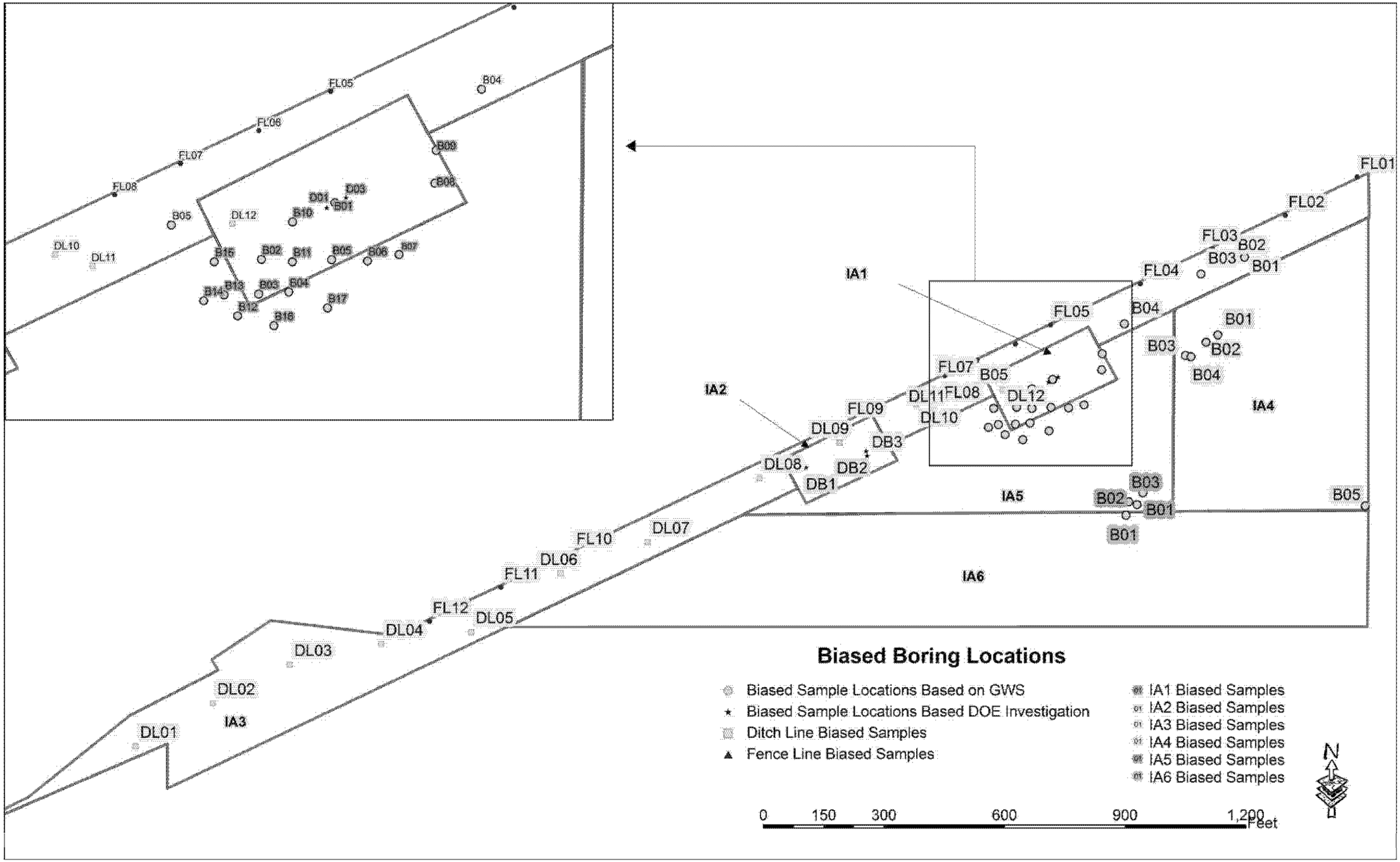

Figure 6-4 Biased Boring Locations

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The DT 325 sampling system also utilized a 3.25” drive casing as the sample sheath. The sheath was fitted with a cutting shoe and inner acetate liner (DT 32) which collected a sample core approximately 1.85” in diameter. The sample sheath was held in place with an inner rod string.

The DT 325 system was driven to depth to collect the soil core. The soil sample was retrieved by pulling the inner rod string and liner to the surface. The 3.25” casing was left in place down hole. A new acetate liner was deployed thru the casing to depth with the inner rods and secured. The system was then advanced to the next sample interval and the process repeated. This system allowed the borehole to remain cased during sampling.

If refusal was encountered at a borehole location prior to reaching native soil, ARSEC made one additional attempt at an offset distance of approximately one meter, and then moved on. The direction from the original boring location to the offset location was determined in the field by ARSEC and the drilling operators. Refusal at both the original borehole location and offset location is discussed further in Section 11.2 of this report.

6.5 Surface and Subsurface Surveying and Sampling

A one minute static gamma count was performed on the boring locations ground surface prior to boring activities. A soil core was collected from each boring location for sampling purposes. RS-60 and DT-325 sampling systems were used to collect soil cores. Soil cores were collected in acetate liners measuring approximately two inches in diameter by five ft long.

A sample table was staged in a low background area at each boring location prior to boring activities. Sample tables were coated with a low volatile organic compound (VOC) content paint and then covered with plastic or paper sheeting to allow for ease of table decontamination. Paper sheeting was used instead of plastic sheeting for cores requiring chemical sampling.

6.5.1 Soil Scan

Soil cores in their acetate liner were verified free of loose radioactive contamination as they were removed from the boreholes. Acetate liners exhibiting loose radioactive contamination were decontaminated by wiping the external surface with a damp cloth, masslin, or paper towel. Soil cores in their acetate liner were then placed on the sample table for scanning and visual inspections.

Acetate liners were then cut away from the soil core to allow for core scanning. Photoionization detector measurements were taken along the length the core when the acetate liner was removed. Soil cores were then scanned for gross gamma count and gross beta count rates and readings recorded at one-ft intervals. Geological characteristics of the core were then determined by a Professional Geologist. One minute static gamma counts and one minute static beta counts were then performed for those areas of the core which were to be sampled. Geological and radiological measurement data was recorded on USACE ENG Form 5056-R or Form 5056A-R. Radiological measurement data was also recorded on ARSEC Soil Core Survey forms. Gamma measurements were performed using Ludlum Model 2221 rate meters coupled with Ludlum Model 44-10 NaI detectors. Beta measurements were performed using Ludlum Model 12 rate meters coupled with 44-9 “pancake” GM detectors.

6.5.2 Surface/Subsurface Sampling Protocol

Sampling protocols were based on whether the IA had a high, medium or low probability of containing radiological contamination. ***Figure 6-1*** illustrates the contamination potential for the different IAs. Soil borings extended through the landfill waste to native soil in IAs that had either a high or medium probability of radiological contamination, e.g., IA1 through IA5. Five samples were collected per soil boring location. In these borings, each sample collected included a one-ft segment of the boring (except for the cores surface, which included approximately the top six inches of the boring) at the following locations:

1. The core surface [i.e., the top six inches of the current landfill surface (0.0 – 0.5 ft bgs)].
2. A soil sample from the first foot just inside the saturated zone.
3. A sample from the first foot of native soil below the landfill waste.
4. A one-ft sample centered on the core area where the gamma instrument registered the highest reading. If the highest gamma instrument reading interval was the same as any of the above three fixed intervals (i.e., the highest scan reading was in either the top six inches, or at the saturated zone interface, or in the first foot of native soil) then the fourth sample interval was selected at the second highest gamma reading, or by other professional judgment.
5. A one-ft sample centered on the core area where the beta survey instrument registered the highest beta reading. If the highest beta reading interval was the same as any of the above four fixed intervals (i.e., the highest scan reading was in either the top six inches, or at the saturated zone interface, or in the first foot of native soil, or in the area of the highest gamma instrument reading) then the fifth sample interval was selected using the following decision tree:
   a. A one-ft sample centered on the core area with the second highest gamma reading,
   b. A one-ft sample centered around the core area with the second highest beta reading, or
   c. A one-ft core sample using other professional judgment.

For areas with a low probability of contamination, e.g., IA6, the borings extended through the structural fill placed by the Town of Tonawanda to a depth of 12 ft beneath the structural fill. The entire length of the soil core, including those in the structural fill, were scanned and considered for potential sample selection. Four samples were collected per soil boring location and consisted of a one-ft segment of the boring (except for the cores surface, which included approximately the top six inches of the boring) at the following locations:

1. The core surface [i.e., the top six inches of the current landfill surface (0.0 – 0.5 ft bgs)]. If the boring location was on the access road, then the sample was collected from the first six inches of soil beneath the road bed material [i.e., below any pavement and gravel base].
2. A soil sample from the first foot just inside the saturated zone. If the saturated zone was not reached in the boring (i.e., it was deeper than the termination depth of the boring), then the sample was collected from the bottom one ft of the boring.
3. A one-ft sample centered on the core area where the gamma instrument registered the highest reading. If the highest gamma instrument reading interval was the same as any of the above two fixed intervals (i.e., the highest scan reading was in either the top six inches, or at the saturated zone interface) then the third sample interval was selected from the core area with the second highest gamma reading, or by other professional judgment.

4. A one-ft sample centered on the core area where the beta instrument registered the highest beta reading. If the highest beta reading interval was the same as any of the above three fixed intervals (i.e., the highest scan reading was in either the top six inches, or at the saturated zone interface, or in the area of the highest gamma instrument reading) then the fourth sample interval was selected using the following decision tree:
   a. A one-ft sample centered on the core area with the second highest gamma reading,
   b. A one-ft sample centered on the core area with the second highest beta reading, or
   c. A one-ft core sample using other professional judgment.

All soil and core samples, including field QC samples, were analyzed for the radiological parameters specified in ***Table 9-1***. In addition, 10% of all soil and core samples were analyzed for the non-radiological parameters specified in ***Table 9-4***.

Radiological investigative samples had top priority for collection from a sample interval. Selection of samples for non-radiological analysis was biased first towards those samples exhibiting the highest gamma radioactivity levels. QC samples were selected from whatever remaining intervals had sufficient sample volume, including the prescribed-depth intervals (i.e., just inside the saturated zone, native soil interval) as well as the scan-based intervals.

6.5.3 Sampling Methods

Soil samples were collected using a stainless steel trowel or sampling spoon and were homogenized in a stainless steel bowl prior to containerization. Field sampling equipment used during soil sampling was free from contamination and was decontaminated after use. Visually identifiable non-soil components such as stones, twigs, and foreign objects were manually separated in the field and excluded from the laboratory samples to avoid biasing results low. A label was affixed to each sample container in accordance the FSP. All protocols for trip blanks, field blanks, etc., were implemented as required by SW 846.

6.5.4 Decontamination

Sampling equipment used during surface/subsurface soil sampling and groundwater sampling was decontaminated after use and verified free of contamination. Decontamination activities were conducted so that all generated solid and liquid wastes were properly contained and collected. Decontamination waste materials were collected daily, stored in either 55-gallon drums or 96 ft^3 B-25 boxes, and managed as IDW.

6.5.5 Sample Quantities

Table 6-3 and ***Table 6-4*** compares the SOW sampling requirements versus actual numbers of samples collected for systematic and biased borings in IA1 through IA6 and for the biased borings installed along the fence line and drainage ditch.

Table 6-3 Proposed Radiochemical Sampling Requirements versus Actual Numbers of Samples Collected per Investigative Area and Other Areas

	IA1	IA2	IA3	IA4	IA5	IA6	Fence Line	Ditch	Total
Systematic Borings -Proposed	22	22	22	22	22	22	0	0	132
Systematic Borings - Actual	22	22	22	21	22	22	0	0	131
Biased Borings - Proposed	14	6	4	4	4	4	12	12	60
Biased Borings - Actual	20	3	5	5	3	1	12	12	61
Routine Samples - Proposed	180	140	130	130	130	104	48	48	910
Routine Samples - Actual	211	121	135	122	113	82	60	60	904
Field Duplicate Samples - Proposed	9	7	7	7	7	5	2	2	46
Field Duplicate Samples - Actual	13	7	8	10	10	5	2	2	57
Total Number of Samples - Proposed	189	147	137	137	137	109	50	50	956
Total Number of Samples - Actual	224	128	143	132	123	87	62	62	961

Table 6-4 Proposed Chemical Sampling Requirements versus Actual Numbers of Samples Collected per Investigative Area and Other Areas

	IA1	IA2	IA3	IA4	IA5	IA6	Fence Line	Ditch	Total
Routine Samples - Proposed	18	14	13	13	13	11	5	5	92
Routine Samples - Actual	22	10	15	14	15	11	5	5	97
Field Duplicate Samples - Proposed	1	1	1	1	1	1	1	1	8
Field Duplicate Samples - Actual	2	1	2	3	1	1	1	1	12
Total Number of Samples - Proposed	19	15	14	14	14	12	6	6	100
Total Number of Samples - Actual	24	11	17	17	16	12	6	6	109

6.5.6 Core Archiving

Upon completion of soil sampling, residual core material was wrapped in plastic sheeting, taped closed, and labeled. The residual core material label contained the boring location, core depth interval bgs, an indication of the top and bottom end of the core, and the date and time of the soil boring. All residual core material was treated as IDW and placed in suitable storage containers on-site while awaiting final disposition.

6.5.7 Laboratories, Sampling Containers, Preservation, and Holding Times

Radiochemical analysis was provided by American Radiation Services, Inc. (doing business as ARS International), of Port Allen, Louisiana, an independent off-site laboratory. TestAmerica of Earth City, Missouri, also an independent off-site laboratory, provided non-radiochemical analyses. The ARS International and TestAmerica laboratories have U.S. Department of Defense Environmental Laboratory Accreditation Program accreditation in the radiochemical and non-radiochemical analytical parameters associated with the project. Sample container, preservation, refrigeration and holding time requirements were maintained in accordance with the QAPP and as a minimum conformed to the guidance provided in EM-200-1-3.

6.6 Temporary Well Point Installation

ARSEC installed 14 TWP in the approximate locations shown on ***Figure 6-5***. Well point locations were selected by the USACE based on preliminary screening of soils data. Additional consideration on the final locations of well points was based on guidance given in EM 1110-1-4000, on observed conditions, and taking into consideration historical groundwater data gaps in the landfill area and adjacent natural (less to undisturbed) areas. The well points were constructed of two-inch polyvinyl chloride with Number 5 sand (or best equivalent) with a 5- to-10-ft section of 0.010-inch slotted screen. Each well point was finished to grade with hydrated bentonite chips with a locking cap on the riser. Well point depth varied depending on location, but averaged approximately 20 ft bgs.

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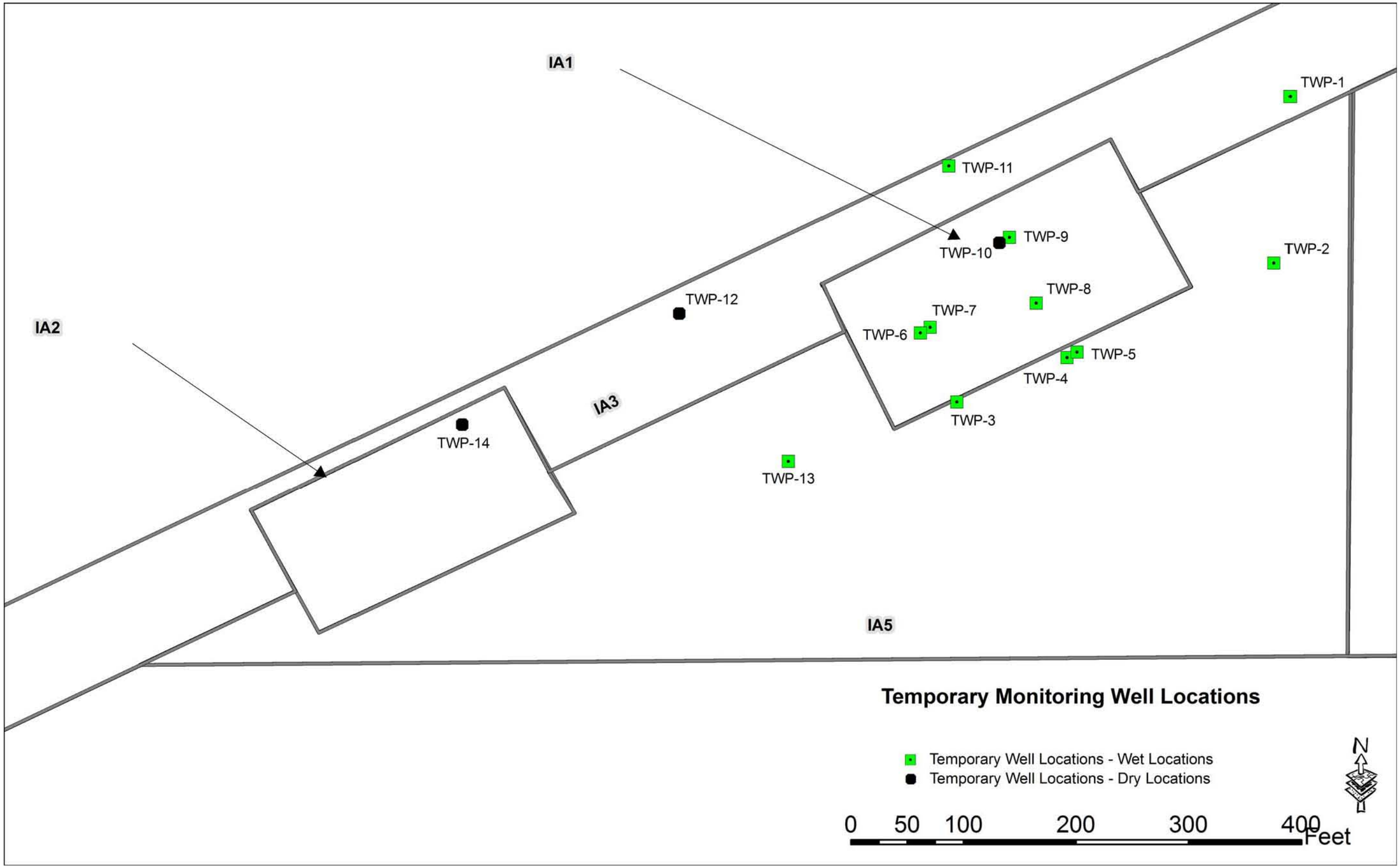

Figure 6-5 Temporary Monitoring Well Locations

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Sampling of the well points was performed after purging was completed, and no earlier than 10 days following installation. Each well point was sampled and analyzed for radiological and chemical parameters as specified in ***Tables 9-2 and 9-4*** to determine whether residual FUSRAP material had impacted site groundwater. Well points were sampled in accordance with standard low-flow technologies delineated in EPA/540/S-95-504 (EPA 1996) using either peristaltic and/or bladder pumps connected to dedicated (by location) high-density polyethylene tubing for radiological testing or Teflon tubing for radiological and organic testing. The wells were purged at a rate of 100 milliliters/ minute or less (6.1 cubic inch/minute) prior to sampling. If a well did not provide enough water volume, and purged dry at a purge rate of 100 milliliters/minute or less (6.1 cubic inch/minute), priority was given to collection of radiological parameters once the well had recovered. Wells were sampled with dedicated sampling equipment (tubing) to avoid cross contamination between sampling locations.

Field parameters including temperature, pH, redox potential, turbidity, dissolved oxygen (O_2), and specific conductivity were measured for each well during sampling activities in accordance with EM 200-1-3 C 2.4.7. All purge water was containerized in U.S. Department of Transportation approved containers and managed as IDW.

Filtering of ground water samples was performed by the laboratory performing the required analysis. ARSEC instructed the laboratories that ground water samples should be divided into two equal segments, and that one of the two groundwater segments should be filtered to remove suspended solids. Required analyses were performed on both the filtered and unfiltered segments of the ground water sample with the exception of Total Dissolved Solids (TDS) analysis. Only the filtered segment of the water sample was analyzed for TDS.

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7.0 RADIOLOGICAL CONTROLS

7.1 Air Sampling

Air monitoring was performed during drilling activities in accordance with the FSP (USACE 2010a), Radiation Protection Plan (RPP) [USACE 2010c] and the Accident Prevention Plan/Site Safety and Health Plan (APP/SSHP) [USACE 2010d]. Air monitoring was performed to ensure exposure to workers, the public, and the environment from radioactivity and/or hazardous substances [VOCs, carbon monoxide, hydrogen sulfide (H_2S)] was maintained as low as reasonably achievable.

Air monitoring was divided into two categories—radiological and non-radiological.

7.1.1 Radiological Air Monitoring

Area and breathing zone (BZ) radiological air monitoring was performed during drilling activities.

Area sampling was performed at the downwind site boundary. Calibrated, low-volume F&J Model LV-1 air samplers were used to collect area air samples. Air samples were collected on a 47-millimeter glass fiber filter paper. Air samples were collected continuously throughout the duration of drilling activities.

BZ air sampling was performed to measure the potential airborne radioactivity exposure to workers. BZ air samples were collected using a calibrated personal air sampler. The personal air sampler was worn by at least one individual within each drilling area and sampling area. BZ air samples were collected on 25-millimeter glass fiber filter papers. The BZ sample was collected continuously while the person was in the drilling and sampling area.

Upon completion of the sampling event, air filters were removed from the sample head and placed in a sample envelope for on-site screening. The location, start time, stop time, and flow rate of the air sampler was noted on the sample envelope. Air filters were screened on-site for gross alpha-beta activity using a Ludlum Model 2929 dual scintillation sample counter. Results of on-site air sample analyses are contained in Appendix B of this report.

7.1.2 Non-Radiological Air Monitoring

Three types of non-radiological air monitoring were performed during site activities—particulate dust monitoring, organic vapor monitoring, and four gas monitoring for Lower Explosive Level, CO, H_2S, O_2.

Particulate dust monitoring was performed during drilling activities using an Environmental Devices Corporation Split II Dust Monitor. The dust monitor produced real-time aerosol readings and computed time-weighted averages. Particulate dust greater than ambient levels was not found during drilling activities.

Four gas monitoring was performed at borehole locations during drilling activities. ***Table 7-1*** lists borehole locations with four gas readings greater than ambient levels.

Table 7-1 Boreholes with Four Gas Monitoring Levels Greater than Ambient Levels

Borehole I.D.	Lower Explosive Level (%)	CO Level (ppm)	H_2S Level (ppm)	O_2 Level (ppm)
IA2-1	>10%	0	0	20.9
IA2-2	>10%	0	0	20.9
IA2-4	>10%	0	0	20.9
IA2-14	>10%	0	0	20.9

Organic vapor monitoring was performed during core sampling activities using a RAE Systems Model DC-Lite Photoionization Detector to monitor for VOCs and hazardous gases. ***Table 7-2*** lists soil cores that exhibited VOC readings greater than zero parts per million (ppm).

Table 7-2 Soil Cores with VOC Readings Greater than 0 ppm

Borehole I.D.	Depth (bgs)	VOC Level (ppm)
IA5-9	12.0-12.3	5.1 *
IA5-12	Not recorded	0.2
IA5-20	25.0-30.0	0.2
IA1-3	20.0-24.0	3.0
IA4-14	7.5-8.5	7.8 **

* Hydrocarbon odor detected. Chemical sample collected.
** Chemical sample collected.

7.2 Radiological Surveys

Radiological contamination surveys were performed to ensure that contamination exceeding the free release criteria stated in the RPP (USACE 2010c) was not released off-site. All contractor and rental equipment was surveyed for fixed and removable contamination in accordance with the RPP prior to release from the Site. No contamination greater than the free release criteria stated in the RPP was found on personnel, equipment, or vehicles leaving the Site. Radiological survey results are contained in Appendix C of this report.

8.0 INVESTIGATION-DERIVED WASTE CHARACTERIZATION AND DESCRIPTION

IDW was generated as a result of investigative activities for this project. IDW consisted of low-level radioactive media in the form of dry active waste and water generated from decontamination activities and temporary well purging. Dry active waste consisted of used plastic sheeting on which soil cores were placed, soil cores, core acetate liners, and used personal protective equipment. Soil cores were labeled and placed into five 96-ft^2 B-25 low specific activity containers along with other forms of dry active waste. Water generated from decontamination activities and temporary well development and purging was placed in six drums (55-gallon). The B-25 containers and 55-gallon drums were stored in an area of the Site adjacent to the temporary administrative trailers. The area was isolated with ropes and signage in accordance with the RPP (USACE 2010c).

Samples of IDW were collected and sent to the ARS International laboratory in Port Allen, Louisiana, for radiochemical analyses and to the TestAmerica Laboratory in Earth City, Missouri, for non-radiochemical analyses. Samples were analyzed for the parameters set forth in the SOW (USACE 2009) and QAPP. IDW analytical parameters are listed in ***Tables 9-2*** and ***9-6*** of this report. Results of IDW sample analyses are contained in Appendix D of this report.

IDW was disposed at the Toxco MMC disposal facility in Oak Ridge, Tennessee. Completed shipping manifests for the IDW are also contained in Appendix D of this report.

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9.0 LABORATORY ANALYSIS

9.1 Radiochemical Analysis

Samples requiring radiochemical analyses were sent to the ARS International laboratory located in Port Allen, Louisiana. All soil and core samples, including field QC samples, were analyzed for the radiochemical parameters specified in ***Table 9-1***. In addition, 10% of all soil and core samples were analyzed for the non-radiological parameters specified in ***Table 9-3.***

Table 9-1 Soil, Core Material, and Solid IDW Sample Radiochemical Testing Parameters for the Phase 2 Tonawanda OU Landfill Site Remedial Investigation

Analytical Parameter	Analytical Method
Ra-226	EPA 901.1 (Gamma Spectroscopy)
Ra-228	EPA 901.1 (Gamma Spectroscopy)
U-234, 235 & 238 (Note 1)	EPA 901.1 (Gamma Spectroscopy)
Isotopic Th-228, 230 and 232	HASL 300 – (Alpha Spectroscopy – Eichrom Modification)
Americium-241 (Am-241)	EPA 901.1 (Gamma Spectroscopy)

Note 1: U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.
U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.

TWP samples, including TWP QC samples, and IDW Liquid Samples were analyzed for the radiochemical parameters specified in ***Table 9-2***. Required analyses were performed on both the filtered and unfiltered segments of the ground water sample.

Table 9-2 Temporary Well Sample and IDW Liquid Radiochemical Testing Parameters for the Phase 2 Tonawanda OU Landfill Site Remedial Investigation

Analytical Parameter	Analytical Method
Ra-226	EPA 903.1
Ra-228	EPA 904
Isotopic U (234, 235, 238)	HASL 300 - Alpha Spectroscopy – Eichrom Modification
Isotopic Th (228, 230, 232)	HASL 300 - Alpha Spectroscopy – Eichrom Modification

9.2 Radiochemical Quality Assurance Split Samples

Per USACE direction, separate quality assurance (QA) split samples were not collected due to a limited amount of sample material available for radiological testing.

9.3 Chemical Analyses

Samples requiring chemical analyses were sent to the TestAmerica laboratory located in Earth City, Missouri. Soil and core samples requiring chemical analyses, including field QC samples, were analyzed for the chemical parameters specified in ***Table 9-3.***

Table 9-3 Soil, Core Material, and Solid IDW Sample Chemical Testing Parameters for the Phase 2 Tonawanda OU Landfill Site Remedial Investigation

Analytical Parameter	Analytical Method
Total VOCs	SW-846 8260
Toxicity Characteristic Leaching Procedure (TCLP) Volatile Organic Compounds (VOCs)	EPA SW-846 1311 (ZHE) followed by SW-846 8260
Total Semi-Volatile Organic Compounds (SVOCs)	SW-846 8270
TCLP SVOCs	EPA SW-846 1311 followed by SW-846 8270
Target Analyte List (TAL) Metals	EPA SW-846 6010/6020/7471
TCLP Metals	EPA SW-846 1311 Followed by SW-846 6010/6020/7471
Pesticides	EPA SW-846 8081
TCLP Pesticides	EPA SW-846 1311 followed by SW-846 8081
Polychlorinated Biphenyls (PCBs)	EPA SW-846 8082

TWP samples, including TWP point QC samples, were analyzed for the chemical parameters specified in ***Table 9-4.*** The SAP required analyses to be performed on both the filtered and unfiltered segments of the ground water sample with the exception of TDS analysis. Only the filtered segment of the ground water sample was analyzed for TDS.

Table 9-4 Temporary Well Sample Chemical Testing Parameters for the Phase 2 Tonawanda OU Landfill Site Remedial Investigation

Analytical Parameter	Analytical Method
TAL Metals	EPA SW-846 6010/6020/7471
Anions (Chlorine, Fluorine, Nitrogen Dioxide/Nitrate Organo-phosphate, Sulfate)	EPA SW-846 9056/EPA 300 Series
TDSs (Filtered Segment Only)	EPA 160.1
Alkalinity (Carbonate/Bicarbonate)	EPA 310.2

IDW solid samples were analyzed for the chemical parameters listed in ***Table 9-3***. IDW liquid samples were analyzed for the parameters specified in ***Table 9-5.***

Table 9-5 IDW Liquid Sample Chemical Testing Parameters for the Phase 2 Tonawanda OU Landfill Site Remedial Investigation

Analytical Parameter	Test Method
Total VOCs	SW-846 8260
Total SVOCs	SW-846 8270
TAL Metals	EPA SW-846 6010/6020/7471
Pesticides	EPA SW-846 8081
PCBs	EPA SW-846 8082
Ignitability	EPA SW-846 1010A/1020A
Corrosivity	EPA SW-846 9040C
Reactivity	No required methods

9.4 Chemical QA Split Samples

Per USACE direction, separate QA split samples were not collected due to a limited amount of sample material available for chemical testing.

10.0 QUALITY CONTROL

10.1 Field Instrumentation Quality Control Results

Radiological survey and stationary instruments used during Phase 2 of the Tonawanda Landfill OU FUSRAP Site RI effort are listed ***Table 10-1***.

All survey instruments used during the project were calibrated in accordance with the American National Standards Institute 323A, 1997 to National Institute of Standards and Technology traceable standards. Copies of instrument calibration certificates can be found in Appendix E of this report.

QC checks were performed daily on all instruments prior to use. A ±20% operability criterion was applied to all QC checks. Daily instrument QC check records can be found in Appendix F of this report.

Table 10-1 Radiological Survey and Stationary Instruments

Instrument Model Serial Number	Detector Model Serial Number Detector Description	Calibration Date	Principle Detectable Emissions	Primary Application
Ludlum 2221 190170	Ludlum 44-10 PR242823 2”x2” NaI Detector	10-19-09	Gamma	GWSs, Core Surveys
Ludlum 2221 187756	Ludlum 44-10 PR242839 2”x2” NaI Detector	2-18-10	Gamma	GWSs Core Surveys
Ludlum 2221 187758	Ludlum 44-10 PR156393 2”x2” NaI Detector	10-19-09	Gamma	GWSs Core Surveys
Ludlum 2221 190191	Ludlum 44-10 PR240366 2”x2” NaI Detector	2-23-10	Gamma	GWSs Core Surveys
Ludlum 2221 172035	Ludlum 44-10 PR242324 2”x2” NaI Detector	10-19-09	Gamma	GWSs Core Surveys
Ludlum 2221 172013	Ludlum 44-10 PR186954 2”x2” NaI Detector	11-9-09	Gamma	GWSs
Ludlum 2221 172017	Ludlum 44-10 PR242851 2”x2” NaI Detector	11-9-09	Gamma	GWSs
Ludlum 2221 132836	Ludlum 44-10 PR150893 2”x2” NaI Detector	11-9-09	Gamma	GWSs
Ludlum 2221 176083	Ludlum 44-9 PR181590 GM Pancake Probe	10-19-09	Beta/Gamma	Personnel, Material and Equipment Frisking
Ludlum 2221 117331	Ludlum 44-9 PR091806 GM Pancake Probe	10-19-09	Beta/Gamma	Personnel, Material and Equipment Frisking

Table 10-1 Radiological Survey and Stationary Instruments

Instrument Model Serial Number	Detector Model Serial Number Detector Description	Calibration Date	Principle Detectable Emissions	Primary Application
Ludlum 2360 138261	Ludlum 43-93 PR244486 100cm^2 Alpha/Beta Scintillator	10-19-09	Alpha/Beta	Personnel, Material and Equipment Frisking
Ludlum 2360 253248	Ludlum 43-93 PR240338 100cm^2 Alpha/Beta Scintillator	12-11-09	Alpha/Beta	Personnel, Material and Equipment Frisking
Ludlum 2360 170556	Ludlum 43-93 PR244535 100cm^2 Alpha/Beta Scintillator	10-19-09	Alpha/Beta	Material and Equipment Frisking
Ludlum 2360 251038	Ludlum 43-93 PR276636 100cm^2 Alpha/Beta Scintillator	11-02-09	Alpha/Beta	Material and Equipment Frisking
Ludlum 2360 187763	Ludlum 43-93 PR244535 100cm^2 Alpha/Beta Scintillator	10-19-09	Alpha/Beta	Material and Equipment Frisking
Ludlum 2360 117331	Ludlum 43-93 PR244486 100cm^2 Alpha/Beta Scintillator	10-19-09	Alpha/Beta	Material and Equipment Frisking
Ludlum 2360 184900	Ludlum 43-93 PR194992 100cm^2 Alpha/Beta Scintillator	10-30-09	Alpha/Beta	Material and Equipment Frisking
Ludlum 12 180431	Ludlum 44-9 PR193567 GM Pancake Probe	10-19-09	Beta/Gamma	Core Surveys, Material and Equipment Frisking
Ludlum 12 229306	Ludlum 44-9 PR191714 GM Pancake Probe	10-28-09	Beta/Gamma	Core Surveys, Material and Equipment Frisking
Ludlum 12 186707	Ludlum 44-9 PR153296 GM Pancake Probe	10-8-09	Beta/Gamma	Core Surveys, Material and Equipment Frisking
Ludlum 12 180411	Ludlum 44-9 PR113654 GM Pancake Probe	2-23-10	Beta/Gamma	Core Surveys, Material and Equipment Frisking
Ludlum 12 186760	Ludlum 44-9 PR193567 GM Pancake Probe	10-19-09	Beta/Gamma	Core Surveys, Material and Equipment Frisking
Ludlum 177 140728	Ludlum 44-9 PR193567 GM Pancake Probe	12-9-09	Beta/Gamma	Core Surveys, Material and Equipment Frisking
Ludlum 19 169641	Internal Scintillator NA 1”x1” NaI Detector	10-24-09	Gamma	Area and Equipment Gamma Surveys

Table 10-1 Radiological Survey and Stationary Instruments

Instrument Model / Serial Number	Detector Model / Serial Number / Detector Description	Calibration Date	Principle Detectable Emissions	Primary Application
Ludlum 2929	Ludlum 43-10-1	10-19-09	Alpha/Beta	Smear and Air Sample Counting
176083	PR181590 20cm^2 ZnS(Ag) & Plastic Scintillator			

10.2 Quality Control Samples

In order to comply with USACE sampling protocols, the number of field duplicates, Matrix Spike (MS)/Matrix Spike Duplicate (MSD) samples, and QC splits were 10%, 5%, and 5%, respectively, of the total number of soil samples collected.

Duplicate samples were collected in the same manner as the original, homogenized and split between two sample containers. Duplicate samples were numbered, logged, and transferred, under ARSEC chain of custody procedures, to off-site laboratories for analyses.

Table 10-2 below lists the number of QC samples required by the SOW and the number of QC samples actually collected.

Table 10-2 SOW QC Sample Requirements versus Actual Numbers of QC Samples Collected per Investigative Area and Other Areas [1]

	IA1	IA2	IA3	IA4	IA5	IA6	Fence Line	Ditch	Total
Field Duplicate Samples - Proposed	9 (2) [3]	7 (2) [3]	7 (2) [3]	7 (2) [3]	7 (2) [3]	5 (2) [3]	2 (2) [3]	2 (2) [3]	46 (16) [3]
Field Duplicate Samples - Actual	13 (2) [4]	7 (1) [4]	8 (2) [4]	10 (3) [4]	10 (1) [4]	5 (1) [4]	2 (1) [4]	2 (1) [4]	57 (12)
MS/MSD Samples [2] - Proposed	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(8)
MS/MSD Samples - Actual [2]	(1)	(1)	(0)	(2)	(0)	(1)	(1)	(1)	(7)

[1] Numbers outside of parentheses are for radiological samples. Numbers in parentheses are for chemical analysis.
[2] MS/MSD samples are not required for the soil radiochemical analyses being performed for this project for the following reasons:
- Ra-226, Am-241, and U-234, 235, and 238 are analyzed by gamma spectroscopy for which a MS is not appropriate.
- Isotopic Th uses a tracer and therefore does not require MS/MSD (Reference MARLAP 18.4.3 and U.S. Department of Defense QSM D 4.1.b.2).

[3] The SOW required one QC duplicate for the off-site laboratory and one QA duplicate for the USACE.
[4] A separate QA duplicate sample for the USACE was not collected due to a limited amount of sample material available for testing.

More field duplicates were taken during field sampling than necessary to ensure that an adequate number of field duplicates were collected.

QC samples requiring radiological analyses were sent to the ARS laboratory in Port Allen, Louisiana, for analysis. QC samples requiring chemical analyses were sent to the TestAmerica laboratory in Earth City, Missouri, for analysis.

MS/MSD samples were not analyzed for radiological parameters, as radiological laboratories use actual field samples to perform MS/MSD analyses for each batch of samples received. MS/MSD samples were analyzed for chemical parameters.

The vast majority of field duplicate sample results were within ± two sigma of the associated field sample. A few field duplicate sample results were not within ± two sigma of the associated field sample result. This could be due to statistical outliers or due to differences in count times of the field sample and associated field duplicate sample yielding a smaller two sigma uncertainty error for one of the samples. This could also be due to imperfect homogenous mixing of sample material prior to splitting the original material into a field sample and field duplicate sample. A summary table of QC sample results is contained in Appendix G of this report.

11.0 REVISION AND FIELD CHANGES TO THE FSP

Revision 1 of the FSP was issued during February 2010 to better enable the safe and efficient collection of samples and data without impacting the goals of the project. Revision 1 of the FSP contained the following changes:

- Removal of the requirement to perform X-Ray Fluorescence analysis on soil cores and samples;
- Updated requirements for soil core sampling locations;
- The addition of a requirement to scan soil cores for beta radiation;
- A provision that if refusal is encountered at a borehole location, ARSEC will make one additional drilling attempt at an offset distance of approximately one meter, and then move on. The direction from the original boring location to the offset location would be determined in the field by ARSEC and the drilling operators;
- The naming of new personnel to fill the positions of Site Manager, Site Safety and Health Officer, Site Radiation Safety Officer, and Contractor Quality Control Systems Manager;
- The listing of IA4 as a Moderate Potential Area for contamination rather than a Low Potential Area for contamination;
- Inclusion of an IA order of importance for conducting drilling operations;
- Inclusion of a requirement for soil core archiving during the project; and
- Inclusion of a requirement for Lower Explosive Level, H_2S, O_2 and CO monitoring when removing soil cores from bore holes.

The following field changes were made to Revision 1 of the FSP:

- Deletion of the requirement to collect QA Split samples. Core sample material had insufficient volume to provide sample material for all required analyses, field duplicates, MS/MSD samples, and QA Split samples. The USACE directed that they would request un-used sample material from laboratories performing analyses for QA Split sample purposes; and
- Provision to use a Ludlum Model 44-9 “pancake” GM probe to perform soil core beta measurements instead of a beta scintillator.

11.1 Soil Core Recoveries

Subsurface voids and subsurface material difficult to capture in the acetate core sampling tube e.g., gravel, concrete, extremely wet soils, etc. resulted in poor core recoveries in some boring locations. Void locations within a core sampling segment were annotated on ENG Forms 5056R and 5056AR and on the ARSEC Soil Core Survey Form. The total depth bgs that the boring reached was recorded on the ENG Forms 5056R/AR. The below ground depths of sample material collected from each boring is included on the ENG Forms 5056R/AR.

11.2 Borehole Refusals Prior to Reaching Native Soil

If refusal was encountered at a borehole location prior to reaching native soil, ARSEC made one additional attempt at an offset distance of approximately one meter. The direction from the original boring location to the offset location was determined in the field by ARSEC and the drilling operators. The direction and distance from the original location was noted in the Geologist’s field log book.

Native soil was not encountered in one borehole in IA1 and several boreholes in IA4 and IA5 during the first and second drilling attempts and, consequently, no native soil samples were collected. When native soil was not encountered, substitute samples were collected. Samples were collected from either the first or second coring attempt based on worker judgment and core scan results. ***Table 11-1*** lists the depths of refusal for boreholes exhibiting refusal at both the original and offset drilling location where native soil was not encountered.

Table 11-1 Boreholes not Encountering Native Soil with Refusals at both Original and Offset Drilling Locations

Borehole ID	Depth of Refusal at Original Location (ft bgs) (1)	Depth of Refusal at Offset Location (ft bgs) (1)
IA1-15	22	22
IA4-1	12	12
IA4-2	17	16
IA4-3	11	12
IA4-4	26	26
IA4-5	22	20
IA4-6	23	18
IA4-7	25	34
IA4-9	22	27
IA4-10	16	21
IA4-13	18	17
IA4-14	34	15
IA4-15	30	16
IA4-B05	19	19
IA5-1	48	10
IA5-8	27	50
IA5-10	8	20
IA5-11	15	15
IA5-17	33	44
IA5-18	8	25

(1) Depths based on Geologists Field Log Book

11.3 Boreholes with No Samples

No samples were collected from boreholes IA5-3, IA6-7 and IA6-8. Borehole IA5-3 met refusal on the first drilling attempt at seven ft bgs and at four ft bgs on the second drilling attempt. Core recovery was poor and did not provide enough soil material for core sampling.

Borehole IA6-7 met refusal on the first drilling attempt at six ft bgs and at 20 ft bgs on the second drilling attempt. Core recovery was poor and did not provide enough soil material for core sampling.

Borehole IA6-8 met refusal on the first drilling attempt at 25-ft bgs and at 20 ft bgs on the second drilling attempt. Core recovery was poor and did not provide enough soil material for core sampling. Small portions of soil were recovered in this boring enabling some static field readings to be collected.

11.4 Boreholes not Drilled

Activities associated with the placement of structural fill and earthen cap being performed by a contactor to the Town of Tonawanda in IA4 during the duration of the project prohibited the drilling of borehole IA4-12.

11.5 Temporary Monitoring Wells

Temporary monitoring wells numbers TWP-10, TWP-12, and TWP-14 did not provide a sufficient quantity of water for analytical testing. Several sampling attempts were performed, using both bladder pumps and bailers. Well re-charge times of greater than 72-hours failed to supply a volume of water sufficient for analytical testing.

The FSP and QAPP required analyses on both filtered (dissolved) and unfiltered (total) portions of each sample.

Filtered Temporary Monitoring Well Sample Segments
Radiochemistry analyses on the filtered sample portions were able to be performed on all temporary monitoring wells with the exception of dry well numbers TWP-10, TWP-12, and TWP-14.

Un-Filtered Temporary Monitoring Well Sample Segments
Radiochemistry analysis of the un-filtered portions of the samples for U and Ra for all temporary monitoring wells failed on the first attempt due to technician error. Due to the low recovery rates of the TWP, a sufficient quantity of sample material was not available to re-run the U and Ra analyses.

The un-filtered sample portions from wells TWP-01, TWP-02, TWP-03, TWP-04, TWP-05, TWP-06, TWP-07, TWP-08, TWP-09, TWP-011and TWP-013 contained suspended solids volumes that prohibited the analysis of the sample for Th isotopes using the HASL 300 - Alpha Spectroscopy – Eichrom Modified Method and the subsequent reporting in units of pCi/l. The laboratory elected to filter the suspended solids and analyze the solids for Th-228, Th-230, and Th-232. Th results were reported in units of pCi/g.

Table 11-2 summarizes the radiochemistry testing parameters which were able to be performed on temporary monitoring well samples.

Table 11-2 Temporary Monitoring Well Radiochemistry Testing Parameter Summary

Temporary Monitoring Well Number	Ra-226 (Filtered Portion) Testing Performed	Ra-226 (Un-Filtered Portion) Testing Performed	Ra-228 (Filtered Portion) Testing Performed	Ra-228 (Un-Filtered Portion) Testing Performed	U-234, U-235, U-238 (Filtered Portion) Testing Performed	U-234, U-235, U-238 (Un-Filtered Portion) Testing Performed	Th-228, Th-230, Th-232 (Filtered Portion) Testing Performed	Th-228, Th-230, Th-232 (Un-Filtered Portion) Testing
TWP-01	√		√		√		√	√ (1)
TWP-02	√		√		√		√	√ (1)
TWP-03	√		√		√		√	√ (1)
TWP-04	√		√		√		√	√ (1)
TWP-05	√		√		√		√	√ (1)
TWP-06	√		√		√		√	√ (1)
TWP-07	√		√		√		√	√ (1)
TWP-08	√		√		√		√	√ (1)
TWP-09	√		√		√		√	√ (1)
TWP-010	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well
TWP-011	√	√	√	√	√	√	√	√ (1)
TWP-012	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well
TWP-013	√		√		√		√	√ (1)
TWP-014	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well	Dry Well

(1) Testing performed on suspended solids only

11.6 QA Split Samples

QA split samples were not collected at the direction of the USACE due to a limited amount of core material available for analytical testing.

12.0 RESULTS

This section provides a summary of GWSs and core survey and sampling results for individual IAs associated with the Phase 2 Tonawanda Landfill OU FUSRAP Site RI. Core survey and sampling results for biased boreholes and a summary of temporary monitoring well sampling results are also included in this section.

12.1 IA1 Results

Figure 12-1 illustrates the GWS results for all the IAs combined.

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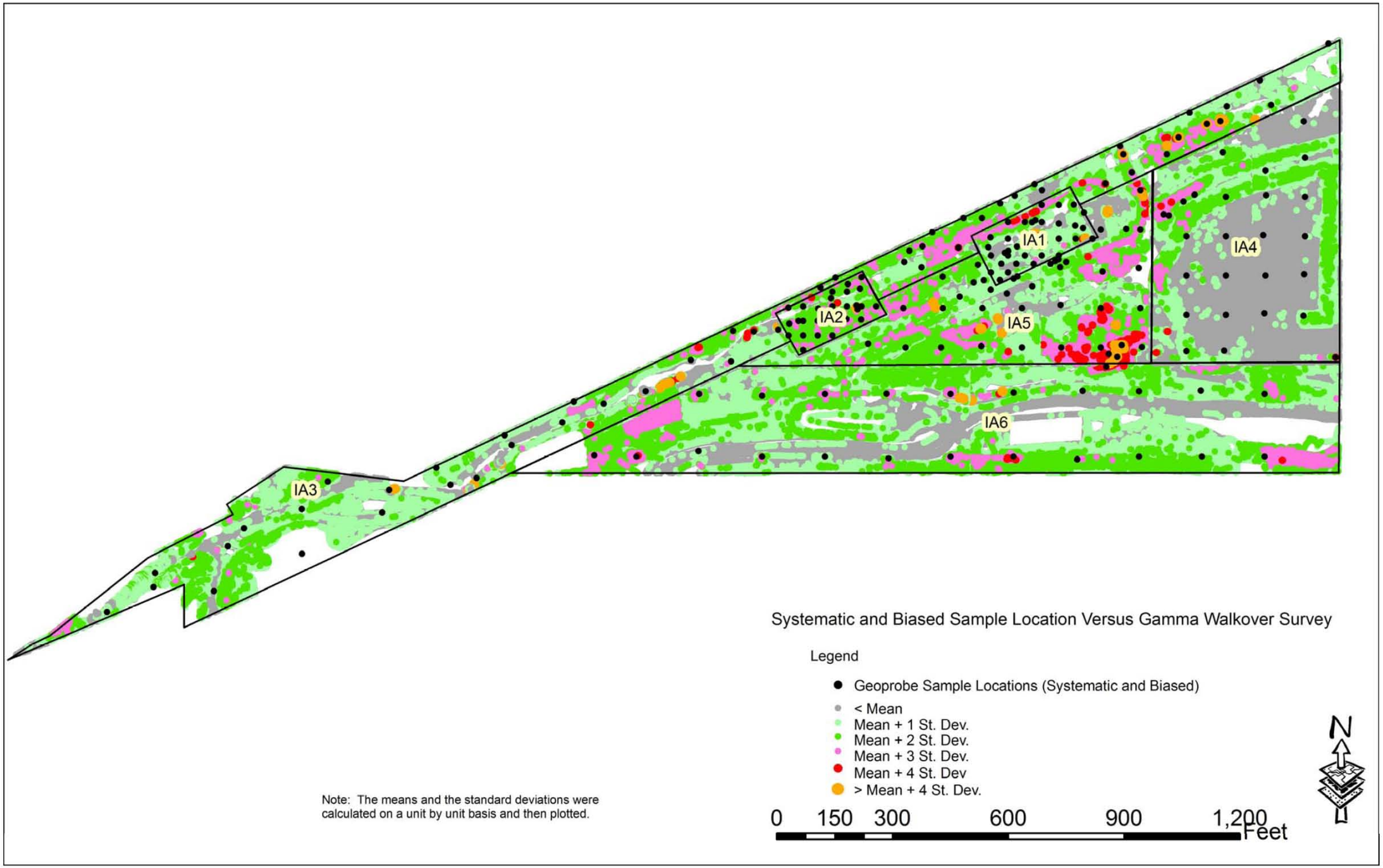

Figure 12-1 Systematic and Biased Sample Location versus Gamma Walkover Survey

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12.1.1 IA1 Gamma Walkover Surveys

GWS count rate results for IA1 are illustrated in ***Figure 12-2***. GWS mean count rate standard deviation results for IA1 are illustrated in ***Figure 12-3.*** The figures incorporate color coding to indicate varying count rates and standard deviations within the IA. Full page IA1 GWS Result Maps are contained in Appendix H.

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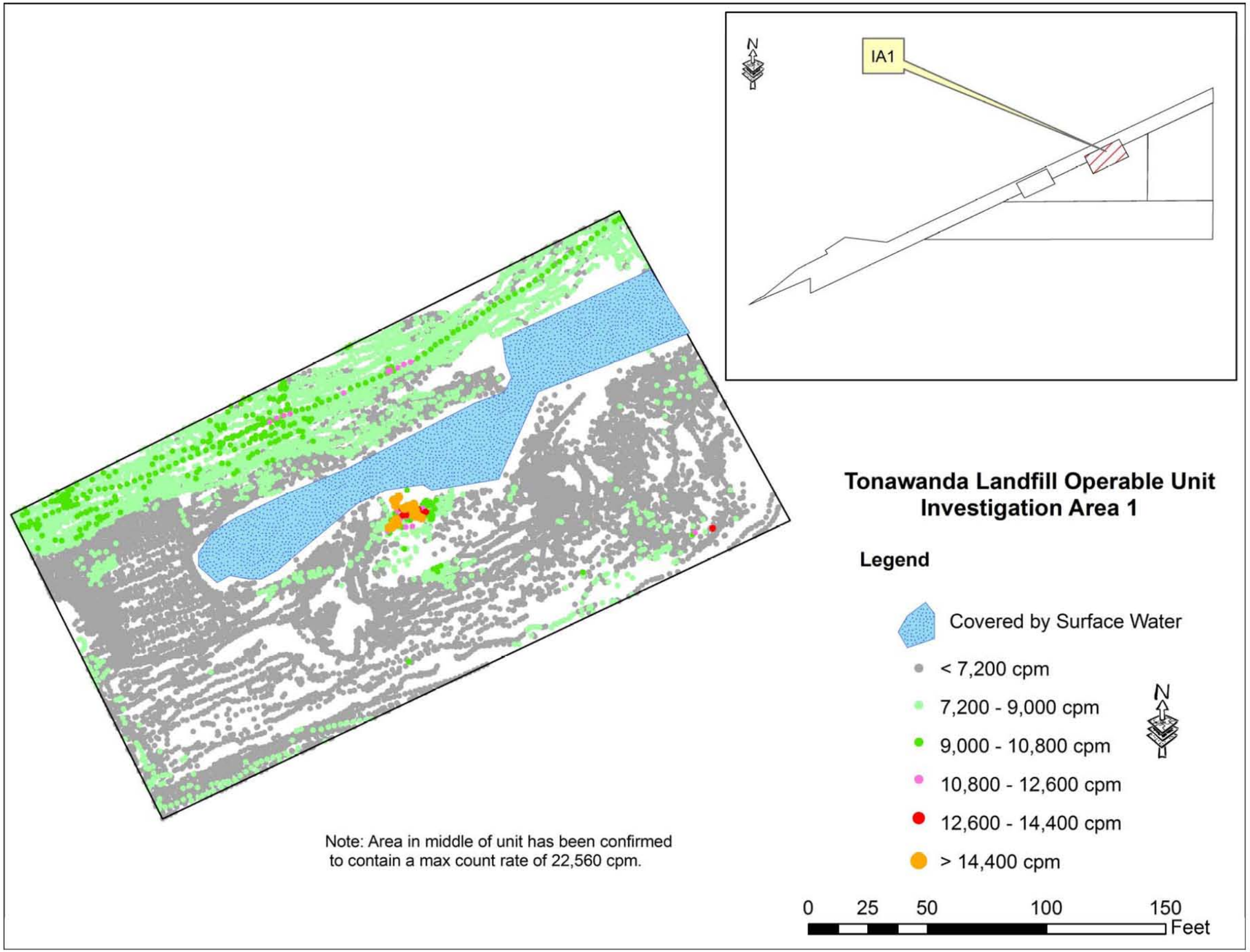

Figure 12-2 IA1 Gamma Walkover Survey Results

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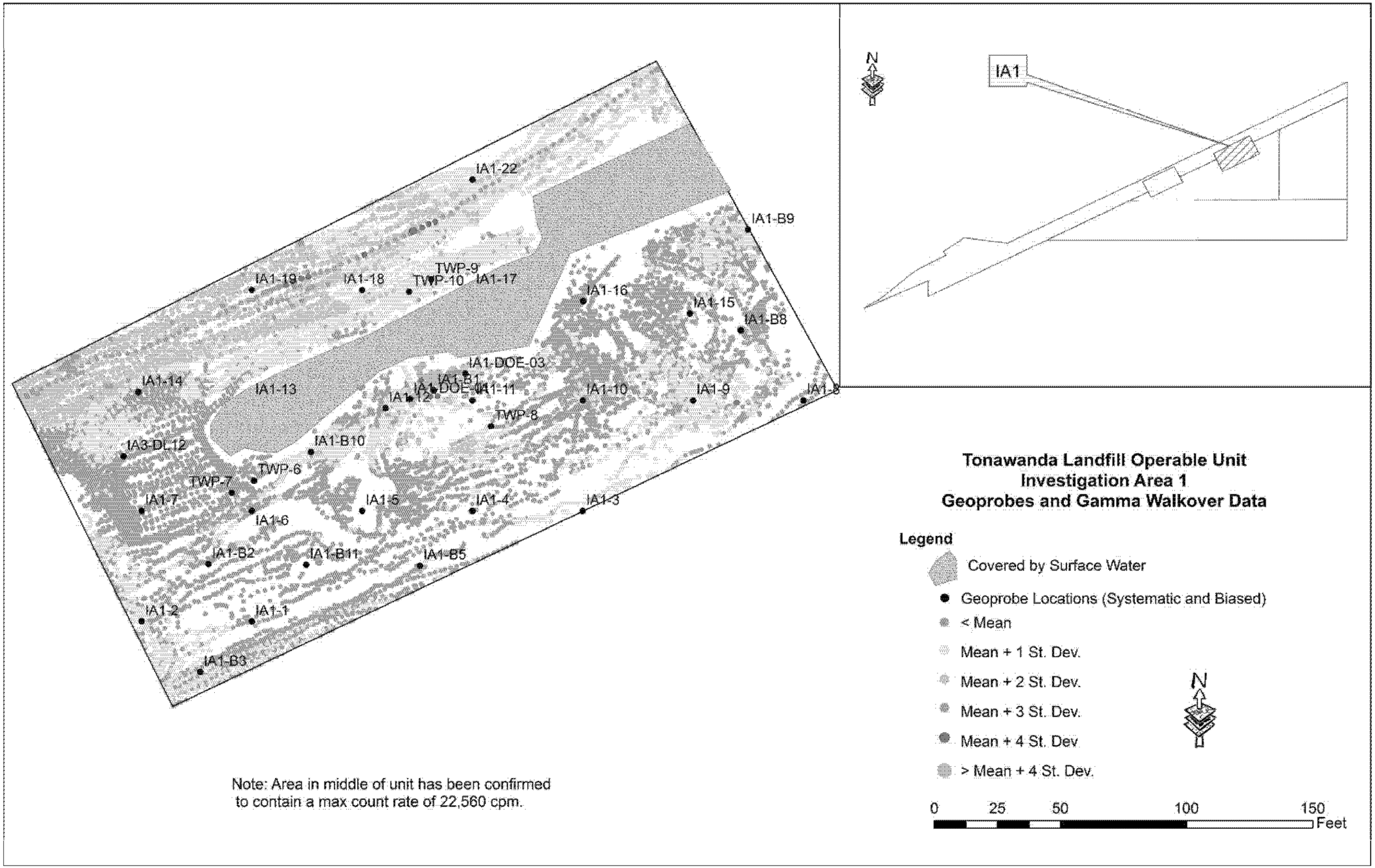

Figure 12-3 IA1 Mean Count Rate Standard Deviation Results

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15,353 GWS count rate data points were collected in IA1. The minimum count rate was 3,154 cpm. The maximum count rate was 22,560 cpm. The mean count rate for IA1 was 6,476 cpm. The standard deviation was 1,434 cpm.

12.1.2 IA1 Gamma and Beta Core Scanning and Static Count Rate Results

Gamma and beta and one minute static count rate data for cores collected from IA1 systematic locations are recorded on ARSEC Soil Core Survey Forms contained in Appendix I and on USACE ENG Form 5056-R or Form 5056A-R contained in Appendix J.

Five samples were collected from each borehole drilled in IA1. Sample locations were chosen in accordance with the SAP and are summarized in ***Table 12-1***. Each sample collected included a one-ft segment of the soil core (except for samples collected from the core's surface, which included the top six inches of the core). Static one minute measurements for gamma and beta radiation were performed on the center of the core segment chosen for sampling. A summary of one minute static gamma and beta counts for cores collected from IA1 systematic locations is contained in ***Table 12-2***. A more detailed summary of one minute static gamma and beta counts for IA1 systematic location cores is contained in Appendix K.

Table 12-1 Soil Core Sample Location Summary for IA1 through IA5

Sample Number	Sample Location Decision Criteria
1	The core surface [i.e., the top six inches of the current landfill surface (0.0 – 0.5 ft bgs)].
2	A soil sample from the first foot just inside the saturated zone.
3	A sample from the first foot of native soil below the landfill waste.
4	A one-ft sample centered on the core area where the gamma instrument registered the highest reading. If the highest gamma instrument reading interval is the same as any of the above three fixed intervals (i.e., the highest scan reading is in either the top six inches, or at the saturated zone interface, or in the first foot of native soil) then the fourth sample interval should be selected at the second highest gamma reading, or by other professional judgment.
5	A one-ft sample centered on the core area where the beta instrument (i.e., beta-gamma GM detector) registered the highest beta reading. If the highest beta reading interval is the same as any of the above four fixed intervals (i.e., the highest scan reading is in either the top six inches, or at the saturated zone interface, or in the first foot of native soil, or in the area of the highest gamma instrument reading) then the fifth sample interval should be selected using the following decision tree: a. A one-ft sample centered around the core area with the second highest gamma reading, b. A one-ft sample centered around the core area with the second highest beta reading, or c. A one-ft core sample using other professional judgment.

Table 12-2 IA1 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Systematic Locations

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	4566 (IA1-1)	8179 (IA1-5)	6444	28 (IA1-7)	80 (IA1-20)	60
			6364			60
2	5393 (IA1-10)	27,250 (IA1-3)	6604	58 (IA1-6)	1179 (IA1-3)	83
			10,010			293
3	5092 (IA1-1)	7345 (IA1-8)	6733	34 (IA1-12)	89 (IA1-5)	66
			6440			66
4	5530 (IA1-10)	284,073 (IA1-5)	7058	50 (IA1-9)	16,334 (IA1-5)	76
			19,979			925
5	5577 (IA1-7)	66,819 (IA1-5)	7002	44 (IA1-13)	1558 (IA1-5)	74
			9014			172

Twenty biased boreholes were drilled in IA1. A summary of one minute **static gamma and beta** counts for cores collected from IA1 biased locations is contained in ***Table 12-3***. A more detailed summary of one minute static counts for IA1 biased location cores is contained in Appendix K.

Table 12-3 IA1 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Biased Locations

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	4771 (IA1-B5)	7379 (IA1-DOE-B3)	6083	35 (IA1-B10)	77 (IA1-B14)	52
			6045			52
2	5034 (IA1-B5)	8372 (IA1-B17)	6378	32 (IA1-B3)	105 (IA1-B10)	55
			6302			57
3	5063 (IA1-B5)	7653 (IA1-B17)	6110	44 (IA1-B4)	84 (IA1-B17)	57
			6183			58
4	5141 (IA1-B6)	23,968 (IA1-B17)	6784	48 (IA1-B4)	3538 (IA1-DOE-B3)	77
			8048			290
5	5096 (IA1-B5)	11,656 (IA1-B17)	6672	43 (IA1-B11)	394 (IA1-B4)	77
			6721			107

12.1.3 IA1 Radiochemistry Analytical Results

A summary of radiochemistry analytical results for samples collected from IA1 systematic locations is contained in ***Table 12-4***. The total number of samples collected for IA1 systematic locations is 117 samples. A summary of radiochemistry analytical results for samples collected from IA1 biased locations is contained in ***Table 12-5***. The total number of samples collected for IA1 biased locations is 107 samples. Complete radiochemistry analytical reports for samples collected from IA1 systematic and biased locations are contained in Appendix L.

Table 12-4 IA1 Radiochemistry Analytical Results Summary – Systematic Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	-4.19U (1) IA1-2 (0.4-1.0)	3485.70 IA1-5 (3.0-4.0)	3.91	73.88
Ra-228	0.31 IA1-2 (25.0-26.0)	4.00 IA1-5 (14.6-15.6)	1.15	1.39
U-234 (2)	0.31U IA1-14 (5.0-6.0)	2048.80 IA1-5 (3.0-4.0)	2.40	54.68
U-235	-0.18U IA1-17 (5.0-6.0)	159.42 IA1-5 (3.0-4.0)	0.17	4.27
U-238 (3)	0.31U IA1-14 (5.0-6.0)	2048.80 IA1-5 (3.0-4.0)	2.40	54.68
Th-228	0.40 IA1-2 (0.4-1.0)	3.55 IA1-15 (10.5-12.0)	0.97	1.27
Th-230	0.52 IA1-10 (20.0-21.0)	1640.88 IA1-5 (3.0-4.0)	1.33	30.84
Th-232	0.26 IA1-11 (16.8-17.8)	3.73 IA1-5 (7.0-8.0)	0.86	1.17
Am-241	-0.35U IA1-5 (3.0-4.0)	0.19U IA1-5 (14.6-15.6)	0.00	0.00

(1) U modifier indicates sample result was less than Minimum Detectable Activity (MDA), e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

Table 12-5 IA1 Radiochemistry Analytical Results Summary – Biased Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	-0.39U (1) IA1-B4 (1.7-2.3)	648.54 IA1-DOE-B3 (5.3-6.3)	4.31	22.72
Ra-228	0.18U IA1-B5 (1.3-1.8)	3.94 IA1-B15 (15.0-16.0)	1.12	1.38
U-234 (2)	0.41U IA1-B13 (0.5-1.0)	502.31 IA1-DOE-B3 (5.3-6.3)	3.21	18.23
U-235	-0.11U IA1-DOE-B2 (0.5-1.0)	40.71 IA1-DOE-B3 (5.3-6.3)	0.20	1.35
U-238 (3)	0.41U IA1-B13 (0.5-1.0)	502.31 IA1-DOE-B3 (5.3-6.3)	3.21	18.23
Th-228	0.32 IA1-B3 (4.4-5.4)	3.96 IA1-B12 (19.0-20.0)	0.92	1.25

Table 12-5 IA1 Radiochemistry Analytical Results Summary – Biased Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Th-230	0.57 IA1-B3 (1.2-1.7)	145.95 IA1-B17(15.0-16.0)	1.80	5.21
Th-232	0.30 IA1-B3 (1.2-1.7)	7.08 IA1-B6 (15.0-16.0)	0.91	1.30
Am-241	-0.12U IA1-DOE-B2 (0.5-1.0)	0.17U IA1-B10 (6.6-7.6)	0.00	0.01

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

In the systematic and biased boreholes in IA1 the highest detections of Ra-226, U-238, and Th-230 were from the same sample. This sample was collected in IA1-5 at a depth of 3.0-4.0 ft depth bgs.

Table 12-6 presents all sample intervals collected from IA1 with analytical values greater than two times established background values for Ra-226, U-238, and Th-230. Those results that exceeded two times background are followed by an asterisk.

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-1	TLS-SB-IA1-1 (19.1-20.1) 030810	19.1	20.1	7330	82	17.61*	13.71*	3.17*
IA1-1	TLS-SB-IA1-1 (21.8-22.8) 030810	21.8	22.8	9285	702	368.59*	305.48*	315.27*
IA1-1	TLS-SB-IA1-1 (22.8-23.8) 030810	22.8	23.8	6232	116	4.68	26.53*	49.89*

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-1	TLS-SB-IA1-1 (23.8-24.8) 030810	23.8	24.8	5092	79	4.26	2.90	3.60*
IA1-2	TLS-SB-IA1-2 (18.3-19.3) 030810	18.3	19.3	6871	154	52.82*	51.72*	0.750
IA1-2	TLS-SB-IA1-2 (22.0-22.7) 030810	22.0	22.7	6375	98	19.02*	20.70*	3.34*
IA1-2	TLS-SB-IA1-2 (22.7-23.7) 030810	22.7	23.7	8244	637	48.93*	44.50*	4.07*
IA1-3	TLS-SS-IA1-3 (1.2-1.7) 031510	1.2	1.7	5449	74	43.32*	36.45*	1.17
IA1-3	TLS-SB-IA1-3 (15.5-16.0/17.6-18.1) MS/MSD	15.5	18.1	5160	60	143.39*	140.12*	22.29*
IA1-3	TLS-SB-IA1-3 (18.1-19.1)031510	18.1	19.1	27250	1179	891.84*	547.57*	59.22*
IA1-3	TLS-SB-IA1-3 (19.1-20.0/24.0-24.1)031510	19.1	24.1	14719	719	276.53*	221.48*	18.28*
IA1-3	TLS-SB-IA1-3 (24.1-25.1)031510	24.1	25.1	6198	89	4.59	6.16*	1.44

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-4	TLS-SB-IA1-4 (10.8-11.8)031210	10.8	11.8	6642	71	9.052*	6.65*	2.12
IA1-4	TLS-SB-IA1-4 (19.0-20.0)031210	19.0	20.0	6642	71	55.33*	49.40*	1.29
IA1-5	TLS-SB-IA1-5 (3.0-4.0)031610	3.0	4.0	284073	16334	3485.70*	2048.80*	1640.88*
IA1-5	TLS-SB-IA1-5 (7.0-8.0)031610	7.0	8.0	1558	66819	457.31*	462.91*	19.06*
IA1-5	TLS-SB-IA1-5 (14.6-15.6)031610	14.6	15.6	16671	384	29.92*	26.86*	9.60*
IA1-6	TLS-SB-IA1-6 (3.0-4.0)031710	3.0	4.0	8112	387	49.16*	44.65*	13.28*
IA1-6	TLS-SB-IA1-6 (5.4-6.4)031710	5.4	6.4	9094	120	118.52*	58.88*	29.13*
IA1-7	TLS-SS-IA1-7 (1.0-1.5)030910	1.0	1.5	5250	28	6.31*	6.08*	1.04
IA1-7	TLS-SB-IA1-7 (5.0-6.0)030910	5.0	6.0	NS	NS	7.42*	5.61*	3.16*

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-7	TLS-SB-IA1-7 (17.6-18.6)030910	7.6	8.6	5625	52	8.58*	6.29*	2.64
IA1-7	TLS-SB-IA1-7 (18.6-19.6)030910	18.6	19.6	5577	70	8.69*	7.17*	1.74
IA1-9	TLS-SB-IA1-9 (5.7-6.7)031110	5.7	6.7	6960	79	8.09*	5.74*	5.22*
IA1-9	TLS-SB-IA1-9 (6.7-7.7)031110	6.7	7.7	7176	50	6.26*	3.80	3.51*
IA1-10	TLS-SB-IA1-10 (10.5-11.5)031510	10.5	11.5	5530	91	6.84*	2.81	2.25
IA1-10	TLS-SB-IA1-10 (11.5-12.0/13.9-14.4)031510	11.5	14.4	5016	57	29.47*	26.11*	4.33*
IA1-10	TLS-SB-IA1-10 (17.8-18.8)031510	17.8	18.8	5393	67	19.59*	18.61*	5.68*
IA1-11	TLS-SB-IA1-11 (11.0-12.0)031210	11.0	12.0	11667	814	331.32*	210.71*	58.42*
IA1-11	TLS-SB-IA1-11 (13.4-14.4)031210	13.4	14.4	9167	249	136.51*	117.21*	2.64

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-11	TLS-SB-IA1-11 (14.4-15.4)031210	14.4	15.4	8129	272	154.25*	116.74*	2.45
IA1-12	TLS-SB-IA1-12 (2.5-3.5)031610	2.5	3.5	8208	141	14.04*	12.24*	2.01
IA1-12	TLS-SB-IA1-12 (6.5-7.5)031610	6.5	7.5	9609	943	383.51*	341.43*	82.92*
IA1-12	TLS-SB-IA1-12 (11.3-12.0)031610	11.3	12.0	7611	74	28.26*	25.00*	4.18*
IA1-13	TLS-SB-IA1-13 (3.0-4.0)031010	3.0	4.0	7496	60	6.29*	3.02	1.63
IA1-15	TLS-SB-IA1-15 (10.5-12.0)031110	10.5	12.0	6840	48	3.84	5.03*	3.25*
IA1-15	TLS-SB-IA1-15 (14.6-15.6)031110	14.6	15.6	7050	144	9.82*	6.34*	3.37*
IA1-15	TLS-SB-IA1-15 (17.5-18.5)031110	17.5	18.5	6760	64	5.96*	7.13*	3.02
IA1-15	TLS-SB-IA1-15 (19.0-20.0)031110	19.0	20.0	10190	687	594.27*	629.27*	705.48*

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-16	TLS-SB-IA1-16 (6.2-7.2)031210	6.2	7.2	9228	111	41.04*	19.38*	16.96*
IA1-16	TLS-SB-IA1-16 (7.2-8.0/9.1-9.3)031210	7.2	9.3	9873	193	70.43*	32.44*	23.67*
IA1-16	TLS-SB-IA1-16 (13.2-14.2)031210	13.2	14.2	10333	302	12.87*	143.70*	73.78*
IA1-16	TLS-SB-IA1-16 (19.0-20.0)031210	19.0	20.0	7292	61	76.92*	71.77*	1.79
IA1-17	TLS-SB-IA1-17 (3.1-4.0)031010	3.1	4.0	6410	70	5.97*	2.98	2.18
IA1-20	TLS-SS-IA1-20 (1.1-1.6)031010	1.1	1.6	7290	80	12.08*	8.39*	4.14*
IA1-20	TLS-SB-IA1-20 (1.6-2.6)031010	1.6	2.6	7291	78	9.92*	9.01*	4.06*
IA1-21	TLS-SB-IA1-21 (1.9-2.9)031010	1.9	2.9	6861	54	4.17	4.77*	1.74
IA1-22	TLS-SB-IA1-22 (2.8-3.8)030910	2.8	3.8	6582	77	6.90*	4.28	2.77

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-B1	TLS-SS-IA1-B1 (0.7-1.2)032610	0.7	1.2	6057	57	8.08*	4.60*	3.69*
IA1-B1	TLS-SB-IA1-B1 (1.2-2.2)032610	1.2	2.2	5660	53	5.64*	3.25	1.53
IA1-B1	TLS-SB-IA1-B1 (7.0-8.0)032610	7.0	8.0	6492	70	23.85*	18.54*	3.88*
IA1-B1	TLS-SB-IA1-B1 (14.0-15.0)032610	14.0	15.0	6994	178	56.38*	52.41*	2.10
IA1-B2	TLS-SB-IA1-B2 (11.0-12.0)032910	11.0	12.0	6957	74	10.77*	6.28*	4.40*
IA1-B2	TLS-SB-IA1-B2 (24.0-25.0)032910	24.0	25.0	6304	115	40.21*	43.63*	1.93
IA1-B3	TLS-SS-IA1-B3 (1.2-1.7)033010	1.2	1.7	6194	64	2.81	5.82*	0.57
IA1-B3	TLS-SB-IA1-B3 (7.0-8.0)033010	7.0	8.0	6677	71	6.26*	3.21	2.32
IA1-B3	TLS-SB-IA1-B3 (13.5-14.5)033010	13.5	14.5	7247	106	31.11*	27.33*	6.69*

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-B4	TLS-SB-IA1-B4 (4.0-5.0)032910	4.0	5.0	5193	50	8.36*	5.78*	2.41
IA1-B4	TLS-SB-IA1-B4 (11.0-12.0)032910	11.0	12.0	6075	394	8.25*	7.07*	4.14*
IA1-B5	TLS-SB-IA1-B5 (15.0-16.0)032610	15.0	16.0	5954	88	12.87*	11.21*	2.89
IA1-B6	TLS-SB-IA1-B6 (15.0-16.0)032610	15.0	16.0	5141	86	9.14*	6.67*	3.84*
IA1-B7	TLS-SB-IA1-B7 (7.0-8.0)032910	7.0	8.0	6914	61	5.82*	3.92	3.22*
IA1-B8	TLS-SB-IA1-B8 (7.0-8.0)032610	7.0	8.0	6432	57	6.16*	4.26	3.79*
IA1-B9	TLS-SB-IA1-B9 (1.7-2.7)032610	1.7	2.7	6372	50	9.72*	6.08*	2.49
IA1-B9	TLS-SB-IA1-B9 (17.6-18.6)032610	17.6	18.6	6543	75	6.06*	5.51*	2.24
IA1-B10	TLS-SB-IA1-B10 (3.0-4.0)032910	3.0	4.0	6434	85	76.97*	68.12*	3.04

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-B10	TLS-SB-IA1-B10 (6.6-7.6)032910	6.6	7.6	6445	105	42.64*	47.68*	11.23*
IA1-B10	TLS-SB-IA1-B10 (15.0-16.0)032910	15.0	16.0	6452	60	13.51*	9.81*	3.93*
IA1-B11	TLS-SB-IA1-B11 (5.5-6.5)032610	5.5	6.5	5798	61	4.42*	4.75*	1.90
IA1-B11	TLS-SB-IA1-B11 (23.0-24.0)032610	23.0	24.0	6675	139	21.21*	18.27*	11.82*
IA1-B12	TLS-SB-IA1-B12 (19.0-20.0)033010	19.0	20.0	7158	80	17.19*	11.31*	3.77*
IA1-B12	TLS-SB-IA1-B12 (25.6-26.6)033010	25.6	26.6	6543	60	2.51	6.86*	1.03
IA1-B13	TLS-SB-IA1-B13 (14.0-15.0)032910	14.0	15.0	6983	182	93.14*	78.04*	5.96*
IA1-B13	TLS-SB-IA1-B13 (18.0-19.0)032910	18.0	19.0	7405	209	52.54*	44.51*	9.76*
IA1-B14	TLS-SB-IA1-B14 (16.0-17.0)033010	16.0	17.0	6339	69	15.49*	11.53*	3.45*

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values[1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-B14	TLS-SB-IA1-B14 (22.6-23.6)033010	22.6	23.6	6633	83	14.78*	10.68*	1.78
IA1-B15	TLS-SB-IA1-B15 (10.0-11.0)032910	10.0	11.0	6718	77	6.64*	5.26*	2.53
IA1-B15	TLS-SB-IA1-B15 (15.0-16.0)032910	15.0	16.0	6893	69	7.99*	7.27*	4.60*
IA1-B16	TLS-SB-IA1-B16 (11.0-12.0)033010	11.0	12.0	6002	62	6.64*	4.60*	3.33*
IA1-B16	TLS-SB-IA1-B16 (24.0-25.0)033010	24.0	25.0	5973	93	30.10*	22.75*	9.89*
IA1-B17	TLS-SB-IA1-B17 (15.0-16.0)033010	15.0	16.0	23968	571	200.29*	95.68*	145.95*
IA1-B17	TLS-SB-IA1-B17 (18.5-19.5)033010	18.5	19.5	11656	125	51.28*	28.37*	41.89*
IA1-DOE-B1	TLS-SS-IA1-DOE-B1 (0.4-0.9)031810	0.4	0.9	6349	42	5.31	4.70*	2.21
IA1-DOE-B1	TLS-SB-IA1-DOE-B1 (6.0-7.0)031810	6.0	7.0	7986	292	68.69*	66.18*	2.81

Table 12-6 IA1 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values [1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA1-DOE-B1	TLS-SB-IA1-DOE-B1 (7.0-8.0)031810	7.0	8.0	7159	110	65.30*	71.94*	4.91*
IA1-DOE-B1	TLS-SB-IA1-DOE-B1 (13.0-14.0)031810	13.0	14.0	6518	73	13.93*	10.82*	2.32
IA1-DOE-B1	TLS-SB-IA1-DOE-B1 (14.2-15.2)031810	14.2	15.2	6660	57	6.28*	3.50	0.95
IA1-DOE-B2	TLS-SB-IA1-DOE-B2 (3.0-4.0)031710	3.0	4.0	7675	59	6.05*	3.21	2.42
IA1-DOE-B3	TLS-SS-IA1-DOE-B3 (1.0-1.5)031810	1.0	1.5	7379	65	6.36*	6.15*	2.53
IA1-DOE-B3	TLS-SB-IA1-DOE-B3 (2.5-3.5)031810	2.5	3.5	7112	258	25.64*	21.94*	3.95*
IA1-DOE-B3	TLS-SB-IA1-DOE-B3 (5.3-6.3)031810	5.3	6.3	17776	3538	648.54*	502.31*	52.20*
IA1-DOE-B3	TLS-SB-IA1-DOE-B3 (7.1-8.1)031810	7.1	8.1	6838	70	13.69*	11.38*	5.84*

1. Background reference activity levels for Ra-226, U-238, and U-238 for the Tonawanda Landfill OU Site were established in 2005 as follows (USACE 2005): Ra-226 2.8pCi/g, U-238 2.2 pCi/g and Th-230 1.58 pCi/g.

***** Asterisk after analytical result indicates that the isotopic value exceeds two times established background

Of the 224 samples collected from IA1, 92 samples had activities that exceeded two times the established background for at least one isotope.

12.1.4 IA1 Chemical Analytical Results

IA1 chemical testing parameters included Total Volatile Organic Compounds (VOCs), TCLP VOCs, Total SVOCs, TCLP SVOCs, TAL Metals, TCLP Metals, Pesticides, TCLP Pesticides, and PCBs. Chemical samples were collected and analyzed only to gather information whether non-FUSRAP material is commingled with FUSRAP material. The focus of this report is on characterization of the FUSRAP-related material. Complete chemical testing analytical reports are contained in Appendix M.

12.2 IA2 Results

12.2.1 IA2 Gamma Walkover Surveys

GWS count rate results for IA2 are illustrated in ***Figure 12-4***. GWS mean count rate standard deviation results for IA2 are illustrated in ***Figure 12-5.*** The figures incorporate color coding to indicate varying count rates and standard deviations within the IA. Full page IA2 GWS Result Maps are contained in Appendix H.

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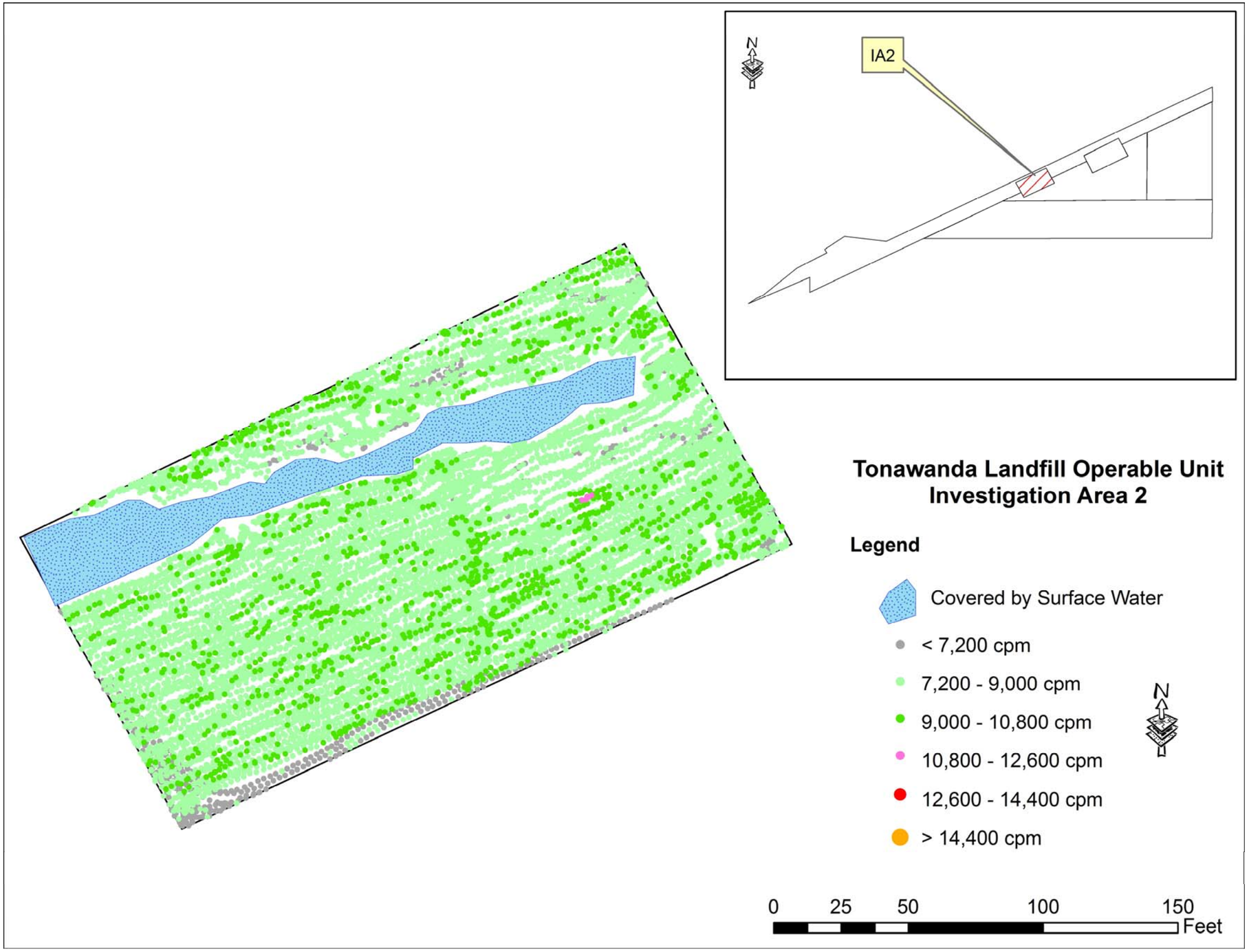

Figure 12-4 IA2 Gamma Walkover Survey Results

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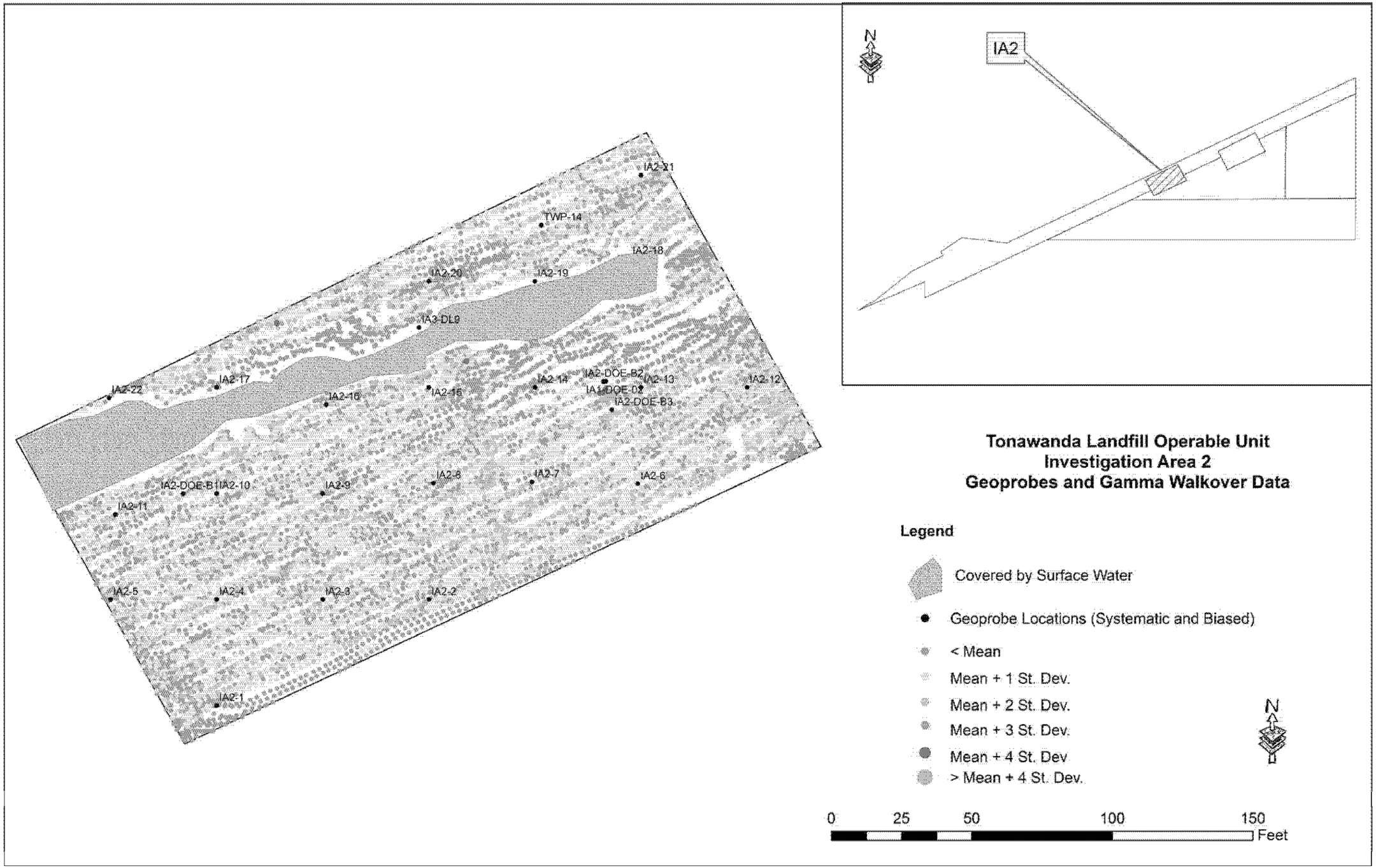

Figure 12-5 IA2 Mean Count Rate Standard Deviation Results

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10,884 GWS count rate data points were collected in IA2. The minimum count rate was 5,298 cpm. The maximum count rate was 12,171 cpm. The mean count rate for IA2 was 8,375 cpm. The standard deviation was 639 cpm.

12.2.2 IA2 Gamma and Beta Core Scanning and Static Count Rate Results

Gamma and beta scanning and one minute static count rate data for cores collected from IA2 systematic locations are recorded on ARSEC Soil Core Survey Forms contained in Appendix I and on USACE ENG Form 5056-R or Form 5056A-R contained in Appendix J.

Five samples were collected from each borehole drilled in IA2. Sample locations were chosen in accordance with the SAP and are summarized in ***Table 12-1***. Each sample collected included a one-ft segment of the soil core (except for samples collected from the core's surface, which included the top six inches of the core). Static one minute measurements for gamma and beta radiation were performed on the center of the core segment chosen for sampling. A summary of one minute static gamma and beta counts for cores collected from IA2 systematic locations is contained in ***Table 12-7***. A more detailed summary of gamma and beta one minute static counts for IA2 systematic location cores is contained in Appendix K.

Table 12-7 IA2 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Systematic Locations

Sample Decision Tree Number (From Table 10.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	6350 (IA2-16)	8287 (IA2-12)	6786	34 (IA2-19)	86 (IA2-12)	62
			7054			61
2	6495 (IA2-14)	8454 (IA2-12)	7619	47 (IA2-14)	122 (IA2-2)	61
			7521			68
3	6445 (IA2-16)	8567 (IA2-12)	6920	54 (IA2-22)	82 (IA2-19)	68
			7211			67
4	6264 (IA2-14)	8952 (IA2-7)	6986	47 (IA2-13)	82 (IA2-19)	62
			7228			64
5	6450 (IA2-18)	8534 (IA2-12)	6873	42 (IA2-2)	96 (IA2-11)	66
			7163			65

Three biased boreholes were drilled in IA2. A summary of one minute static gamma and beta counts for cores collected from IA2 biased locations is contained in ***Table 12-8***. A more detailed summary of one minute static gamma and beta counts for IA2 biased location cores is contained in Appendix K.

Table 12-8 IA2 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Biased Locations

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	7091 (IA2-DOE-B1)	7884 (IA2-DOE-B3)	7590	63 (IA2-DOE-B2)	72 (IA2-DOE-B1)	66
			7522			67
2 (1)	7823 (IA2-DOE-B2	N/A (1)	N/A (1)	53 (IA2-DOE-B2)	N/A (1)	N/A (1)
			N/A (1)			N/A (1)
3	7364 (IA2-DOE-B3)	7677 (IA2-DOE-B2)	7436	48 (IA2-DOE-B2)	58 (IA2-DOE-B1)	55
			7492			54
4	7409 (IA2-DOE-B2)	7766 IA2-DOE-B3)	7670	64 (IA2-DOE-B1)	68 (IA2-DOE-B2)	67
			7615			66
5	7472 (IA2-DOE-B1)	8149 (IA2-DOE-B2)	7624	49 (IA2-DOE-B1)	77 (IA2-DOE-B1)	64
			7680			62

(1) Only one boring encountered the saturated zone.

12.2.3 IA2 Radiochemistry Analytical Results

A summary of radiochemistry analytical results for samples collected from IA2 systematic locations is contained in ***Table 12-9*** below. The total number of samples collected in IA2 systematic locations is 113 samples. A summary of radiochemistry analytical results for samples collected from IA2 biased locations is contained in ***Table 12-10*** below. The total number of samples collected for IA2 biased locations is 15 samples.

Complete radiochemistry analytical reports for samples collected from IA2 systematic and biased locations are contained in Appendix L.

Table 12-9 IA2 Radiochemistry Analytical Results Summary – Systematic Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	-0.66U (1) IA2-1 (0.8-1.3))	62.45 IA2-2 (14.7-15.7)	2.31	3.46
Ra-228	0.09U IA2-1 (9.0-10.0)	4.76 IA2-7 (13.0-14.0)	1.06	1.22
U-234 (2)	-6.05U IA2-11 (0.0-0.6)	69.12 IA2-2 (14.7-15.7)	1.63	2.53
U-235	-0.15U IA2-11 (0.0-0.6)	4.25 IA2-2 (14.7-15.7)	0.09	0.15
U-238 (3)	-6.05U IA2-11 (0.0-0.6)	69.12 IA2-2 (14.7-15.7)	1.63	2.53
Th-228	0.40 IA2-3 (13.5-14.5)	3.40 IA2-7 (13.0-14.0)	0.81	0.93

Table 12-9 IA2 Radiochemistry Analytical Results Summary – Systematic Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Th-230	0.48 IA2-3 (13.5-14.5)	24.87 IA2-2 (14.7-15.7)	1.19	1.74
Th-232	0.34 IA2-3 (13.5-14.5)	3.37 IA2-7 (13.0-14.0)	0.73	0.89
Am-241	-0.08U IA2-8 (6.0-7.0)	0.09U IA2-19 (4.7-5.7)	0.00	0.01

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

Table 12-10 IA2 Radiochemistry Analytical Results Summary – Biased Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	1.76 IA2-DOE-B2 (10.0-11.0)	7.01 IA2-DOE-B3 (0.0-0.5)	2.45	3.25
Ra-228	0.49 IA2-DOE-B3 (12.0-13.0)	2.95 IA2-DOE-B3 (6.0-7.0)	1.16	1.32
U-234 (2)	0.71U (1) IA2-DOE-B3 (14.0-15.0)	5.81 IA2-DOE-B3 (6.0-7.0)	1.54	1.97
U-235	-0.11U IA2-DOE-B3 (6.0-7.0)	0.39U IA2-DOE-B3 (4.0-5.0)	0.14	0.13
U-238 (3)	0.71U IA2-DOE-B3 (14.0-15.0)	5.81 IA2-DOE-B3 (6.0-7.0)	1.54	1.97
Th-228	0.66 IA2-DOE-B1(0.5-1.0)	2.84 IA2-DOE-B3 (6.0-7.0)	0.78	1.01
Th-230	0.67 IA2-DOE-B3 (14.0-15.0)	3.29 IA2-DOE-B3 (6.0-7.0)	1.03	1.38
Th-232	0.57 IA2-DOE-B2 (3.0-4.0)	2.96 IA2-DOE-B3 (6.0-7.0)	0.81	0.99
Am-241	-0.03U IA2-DOE-B1 (5.8-6.8)	0.05U IA2-DOE-B3 (6.0-7.0)	0.01	0.01

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

In the systematic and biased boreholes the greatest detections of Ra-226, U-238 and Th-230 were collected from a depth of 14.7-15.7 ft bgs in borehole IA2-2.

Table 12-11 presents all sample intervals with analytical values greater than two times established background values. Those results that exceed two times background are followed by an asterisk.

Table 12-11 IA2 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values [1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	Ra-228 Results (pCi/g)	Th-230 Results (pCi/g)
IA2-2	TLS-SB-IA2-2 (14.7-15.7)032410	14.7	15.7	7619	122	62.45*	69.12*	24.87*
IA2-2	TLS-SB-IA2-2 (15.7-16.7)032410	15.7	16.7	6943	69	17.92*	16.44*	1.66
IA2-3	TLS-SB-IA2-3 (13.5-14.5)032310	13.5	14.5	7384	51	8.23*	5.45*	0.48
IA2-3	TLS-SB-IA2-3 (28.0-29.0)032310	28.0	29.0	7770	72	2.18	2.17	15.63*
IA2-4	TLS-SB-IA2-4 (13.6-14.6)032410	13.6	14.6	6920	63	5.69*	5.11*	1.01
IA2-6	TLS-SB-IA2-6 (9.8-10.8)031910	9.8	10.8	7758	51	5.96*	4.17	5.42*
IA2-6	TLS-SB-IA2-6 (22.9-23.9)031910	22.9	23.9	7492	60	8.45*	5.71*	2.30
IA2-7	TLS-SB-IA2-7 (10.5-11.5)032210	10.5	11.5	8282	61	8.57*	3.74	4.38*
IA2-7	TLS-SB-IA2-7 (13.0-14.0)032210	13.0	14.0	8952	55	9.62*	9.54*	4.00*
IA2-8	TLS-SB-IA2-8 (6.0-7.0)032210	6.0	7.0	8371	78	8.11*	3.59	3.38*
IA2-12	TLS-SB-IA2-12 (8.3-9.3)031910	8.3	9.3	8458	82	5.58	3.17	12.89*
IA2-12	TLS-SB-IA2-12 (10.3-11.3)031910	10.3	11.3	8534	67	7.29*	3.64	1.67

Table 12-11 IA2 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values [1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	Ra-228 Results (pCi/g)	Th-230 Results (pCi/g)
IA2-DOE-B3	TLS-SS-IA2-DOE-B3 (0.0-0.5)032210	0.0	0.5	7884	66	7.01*	ND	1.37
IA2-DOE-B3	TLS-SB-IA2-DOE-B3 (4.0-5.0)032210	4.0	5.0	7766	67	5.75*	4.09	3.02
IA2-DOE-B3	TLS-SB-IA2-DOE-B3 (6.0-7.0)032210	6.0	7.0	7652	64	4.42	5.81*	3.29*

[1]Background reference activity levels for Ra-226, U-238, and U-238 for the Tonawanda Landfill OU Site were established in 2005 as follows (USACE 2005): Ra-226 2.8pCi/g, U-238 2.2 pCi/g and Th-230 1.58 pCi/g.

* Asterisk after analytical result indicates that the isotopic value exceeds two times established background

Of the 128 samples collected from IA2, 17 samples had activity in at least one isotope that exceeded two times established background.

12.2.4 IA2 Chemical Analytical Results

IA2 chemical testing parameters included Total VOCs, TCLP VOCs, Total SVOCs, TCLP SVOCs, TAL Metals, TCLP Metals, Pesticides, TCLP Pesticides, and PCBs. Chemical samples were collected and analyzed only to gather information whether non-FUSRAP material is commingled with FUSRAP material. The focus of this report is on characterization of the FUSRAP-related material. Complete chemical testing analytical reports are contained in Appendix M.

12.3 IA3 Results

12.3.1 IA3 Gamma Walkover Surveys

GWS count rate results for IA3 are illustrated in ***Figure 12-6***. GWS mean count rate standard deviation results for IA3 are illustrated in ***Figure 12-7.*** The figures incorporate color coding to indicate varying count rates and standard deviations within the IA. Full page IA3 GWS Result Maps are contained in Appendix H.

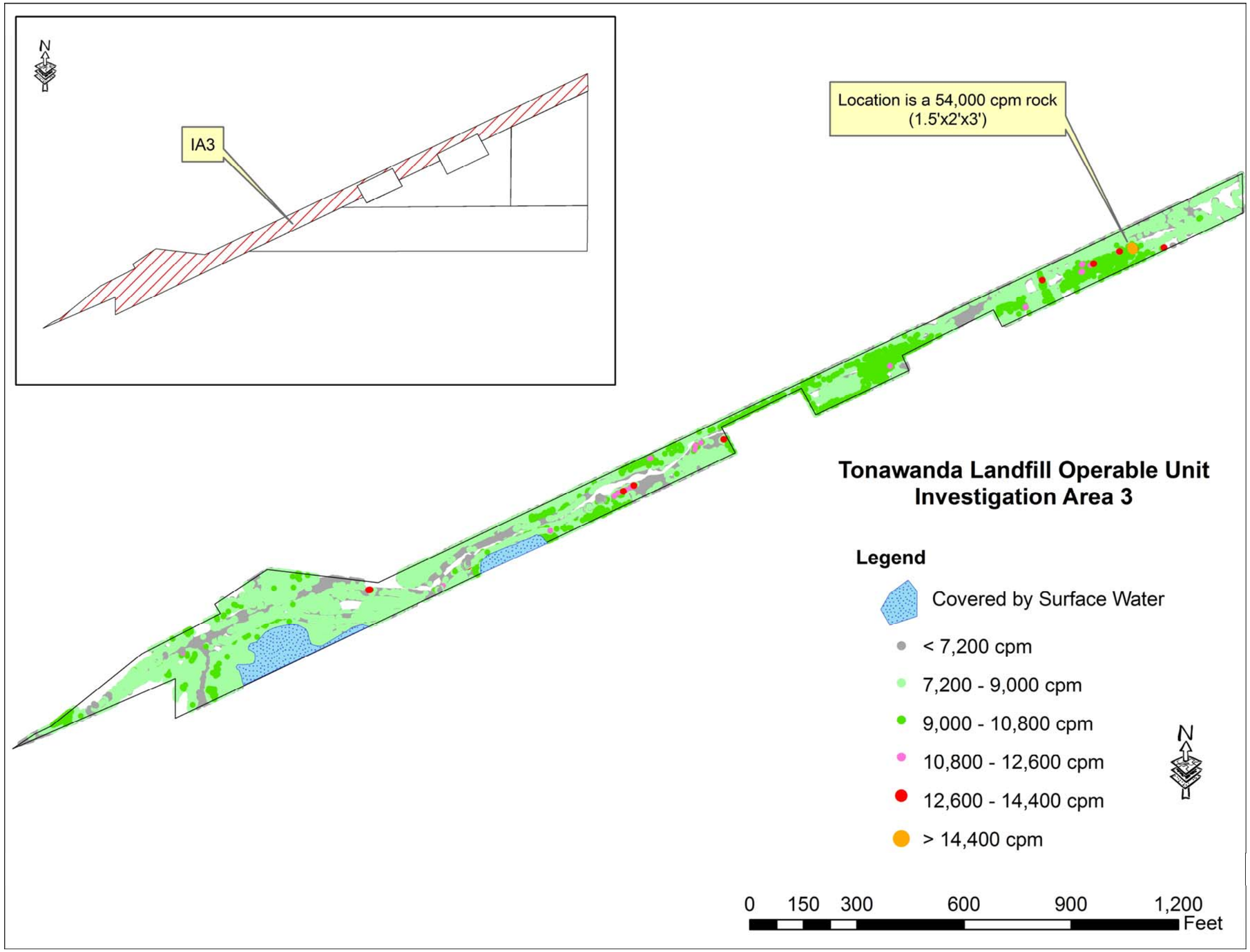

Figure 12-6 IA3 Gamma Walkover Survey Results

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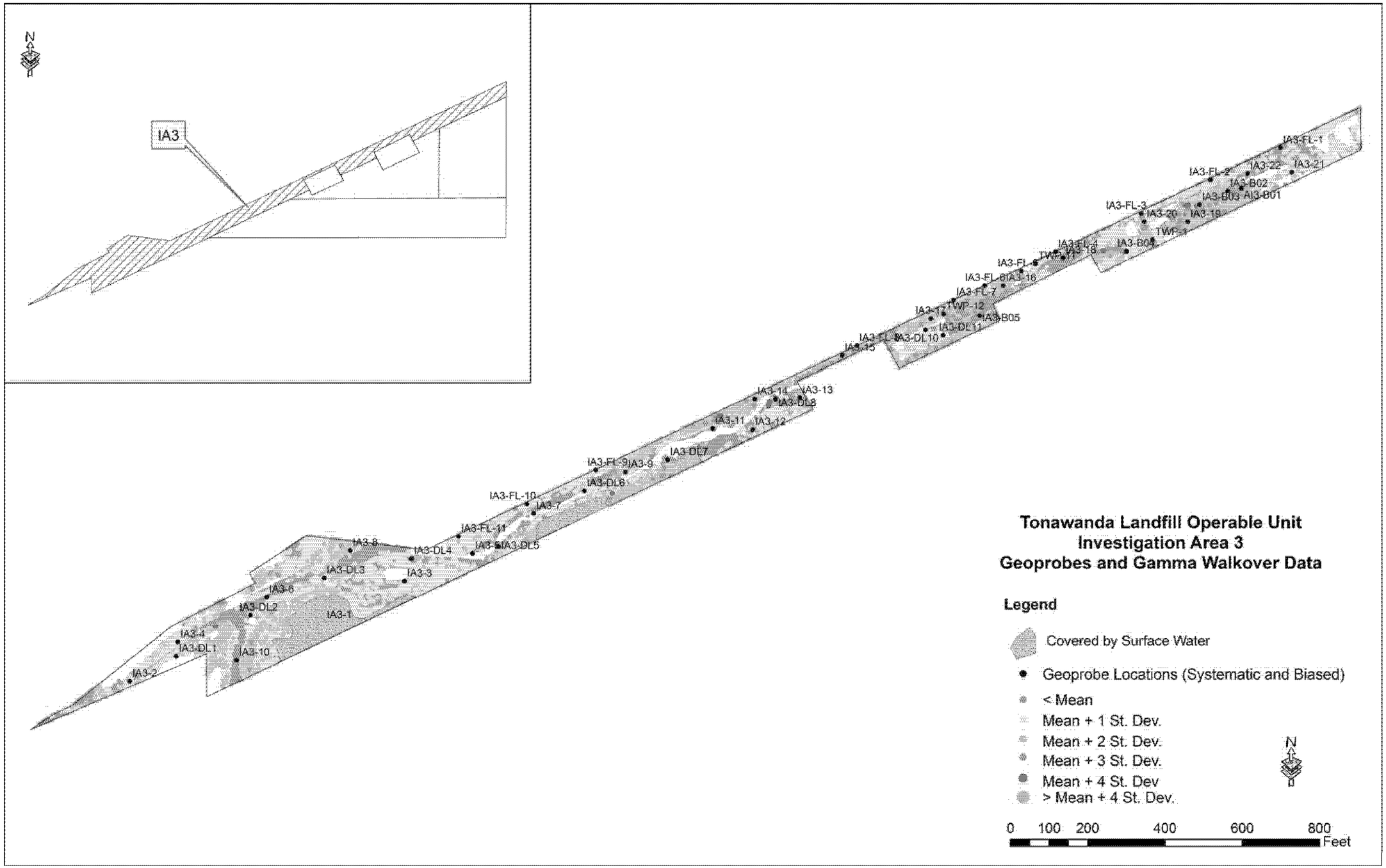

Figure 12-7 IA3 Mean Count Rate Standard Deviation Results

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111,237 GWS count rate data points were collected in IA3. The minimum count rate was 2,977 cpm. The maximum count rate was 53,335 cpm. The mean count rate for IA3 was 7,238 cpm. The standard deviation was 1,141 cpm.

12.3.2 IA3 Gamma and Beta Core Scanning and Static Count Rate Results

Gamma and beta scanning and one minute static count rate data for cores collected from IA3 systematic locations are recorded on ARSEC Soil Core Survey Forms contained in Appendix I and on USACE ENG Form 5056-R or Form 5056A-R contained in Appendix J.

Five samples were collected from each borehole drilled in IA3. Sample locations were chosen in accordance with the SAP and are summarized in ***Table 12-1***. Each sample collected included a one-ft segment of the soil core (except for samples collected from the core's surface, which included the top six inches of the core). Static one minute measurements for gamma and beta radiation were performed on the center of the core segment chosen for sampling. A summary of one minute static gamma and beta counts for cores collected from IA3 systematic locations is contained in ***Table 12-12***. A more detailed summary of one minute static gamma and beta counts for IA3 systematic location cores is contained in Appendix K.

Table 12-12 IA3 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Systematic Locations

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	4923 (IA3-4)	7071 (IA3-9)	5879	17 (IA3-22)	110 (IA3-13)	49
			6026			51
2	5010 (IA3-4)	7230 (IA3-9)	5865	23 (IA3-22)	83 (IA3-13)	50
			6068			53
3	4683 (IA3-4)	7084 (IA3-5)	6203	24 (IA3-22)	110 IA3-13)	59
			6144			58
4	5193 (IA3-4)	7374 (IA3-9)	6078	24 (IA3-22)	73 (IA3-3, 3-10)	60
			6123			57
5	5152 (IA3-12)	7083 (IA3-9)	6050	27 (IA3-22)	140 (IA3-13)	59
			6072			61

Twenty-nine biased boreholes were drilled in IA3, including 12 biased ditch location boreholes and 12 biased fence-line location boreholes. A summary of one minute static gamma and beta counts for cores collected from IA3 biased locations (non ditch and non fence-line locations) is contained in ***Table 12-13***. A summary of one minute static gamma and beta counts for cores collected from IA3 biased ditch locations is contained in ***Table 12-14*** and a summary for IA3 biased fence-line locations is contained in ***Table 12-15***. A more detailed summary of one minute static gamma and beta counts for IA3 biased location cores is contained in Appendix K.

Table 12-13 IA3 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Biased Locations (Non Ditch and Non Fence-Line Locations)

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	6304 (IA3-B05)	6805 (IA3-B04)	6497	45 (IA3-B05)	68 (IA3-B02)	58
			6550			58
2	6592 (IA3-B05)	7096 (IA3-B04)	6844	43 (IA3-B04)	49 (IA3-B05)	46
			6844			46
3	6373 (IA3-B01)	7052 (IA3-B05)	6586	45 (IA3-B05)	67 (IA3-B02)	59
			6645			56
4	6192 (IA3-B05)	6968 (IA3-B04)	6459	53 (IA3-B02, B04)	61 (IA3-B01, B03)	59
			6564			57
5	6280 (IA3-B05)	7235 (IA3-B04)	6581	40 (IA3-B03)	65 (IA3-B01)	52
			6632			52

Table 12-14 IA3 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Biased Ditch Locations

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	5310 (IA3-D01)	7135 (IA3-D10)	6380	48 (IA3-D02)	69 (IA3-D04)	58
			6429			58
2	6987 (IA3-D11)	7174 (IA3-D12)	7081	63 (IA3-D11)	69 (IA3-D12)	66
			7081			66
3	5427 (IA3-D11)	7193 (IA3-D10)	6488	45 (IA3-D08)	72 (IA3-D10)	58
			6457			58
4	5542 (IA3-D01)	7484 (IA3-D10)	6486	42 (IA3-D01)	72 (IA3-D03)	55
			6538			56
5	5079 (IA3-D01)	7417 (IA3-D10)	6424	45 (IA3-D01)	77 (IA3-D05)	59
			6439			59

Table 12-15 IA3 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Biased Fence-Line Locations

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	4568 (IA3FL-4)	5467 (IA3FL-5)	4982	34 (IA3FL-4)	63 (IA3FL-3, FL-10)	45
			5019			50
2	4672 (IA3FL-0)	5801 (IA3FL-5)	4900	46 (IA3FL-6)	62 (IA3FL-3, FL-5)	53
			5036			55
3	4717 (IA3FL-4)	5780 (IA3FL-5)	4939	44 (IA3FL-3)	69 (IA3FL-6)	49
			5036			52
4	4672 (IA3FL-7)	5422 (IA3FL-5)	5090	42 (IA3FL-2)	66 (IA3FL-8)	53
			5040			53
5	4646 (IA3FL-4)	5506 (IA3FL-5)	5047	35 (IA3FL-5)	61 (IA3FL-9)	52
			5017			51

12.3.3 IA3 Radiochemistry Analytical Results

A summary of radiochemistry analytical results for samples collected from IA3 systematic locations is contained in ***Table 12-16*** below. The total number of samples collected for IA3 systematic locations is 118 samples. A summary of radiochemistry analytical results for samples collected from IA3 biased locations (non ditch and non fence-line locations) is contained in ***Table 12-17***. The total number of samples collected in IA3 biased locations is 25 samples. A radiochemistry analytical result summary for IA3 biased ditch locations (62 samples) is contained in ***Table 12-18*** and a radiochemistry analytical result summary for IA3 biased fence-line (62 samples) locations is contained in ***Table 12-19***. Complete radiochemistry analytical reports for samples collected from IA3 systematic and biased locations are contained in Appendix L

Table 12-16 IA3 Radiochemistry Analytical Results Summary – Systematic Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	-0.81U (1) IA3-21 (6.0-7.0)	14.28 IA3-19 (1.0-2.0)	1.69	2.09
Ra-228	0.45 IA3-4 (12.0-13.0)	3.20 IA3-4 (2.0-3.0)	0.82	0.89
U-234 (2)	0.07U IA3-17 (3.0-4.0)	12.37 IA3-19 (1.0-2.0)	0.93	1.30
U-235	-0.12U IA3-16 (7.8-8.8)	0.56U IA3-19 (1.0-2.0)	0.05	0.07
U-238 (3)	0.07U IA3-17 (3.0-4.0)	12.37 IA3-19 (1.0-2.0)	0.93	1.30
Th-228	0.41 IA3-4 (0.0-0.5)	2.73 IA3-2 (2.0-3.0)	0.79	0.84

Table 12-16 IA3 Radiochemistry Analytical Results Summary – Systematic Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Th-230	0.56 IA3-6 (11.0-12.0)	3.74 IA3-19 (1.0-2.0)	0.86	0.97
Th-232	0.39 IA3-22 (7.6-8.6)	2.58 IA3-2 (2.0-3.0)	0.79	0.84
Am-241	-0.09U IA3-8 (8.0-9.0)	0.07U IA3-4 (2.0-3.0)	0.01	0.01

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

Table 12-17 IA3 Radiochemistry Analytical Results Summary – Biased Locations (Non Ditch and Non Fence-Line Locations)

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	0.86 IA3-B04 (7.0-8.0)	4.12 IA3-B04 (2.0-3.0)	1.63	1.85
Ra-228	0.60 IA3-B02 (2.3-2.8)	1.75 IA3-B04 (2.0-3.0)	0.76	0.87
U-234 (2)	0.05U (1) IA3-B01 (9.0-10.0)	3.68 IA3-B04 (2.0-3.0)	0.85	1.19
U-235	-0.05U IA3-B05 (13.0-14.0)	0.26U IA3-B04 (0.8-1.3)	0.03	0.05
U-238 (3)	0.05U IA3-B01 (9.0-10.0)	3.68 IA3-B04 (2.0-3.0)	0.85	1.19
Th-228	0.54 IA3-B02 (9.0-10.0)	1.47 IA3-B04 (2.0-3.0)	0.80	0.86
Th-230	0.60 IA3-B03 (8.0-9.0)	1.77 IA3-B04 (0.8-1.3)	0.92	0.94
Th-232	0.48 IA3-B02 (7.0-8.0)	1.82 IA3-B02 (3.0-4.0)	0.75	0.89
Am-241	-0.03U IA3-B04 (6.0-7.0)	0.08U IA3-B4 (0.8-1.3)	0.01	0.01

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

Table 12-18 IA3 Radiochemistry Analytical Results Summary – Biased Ditch Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	0.74 IA3-D09 (10.0-11.0)	8.23 IA3-D12 (4.0-5.0)	1.87	2.18
Ra-228	0.60 IA3-D11 (9.0-10)	3.20 IA3-D12 (4.0-5.0)	0.94	1.02
U-234 (2)	0.62 IA3-D02 (11.0-12.0)	4.45 IA3-D09 (1.0-2.0)	1.15	1.37
U-235	-0.05U (1) IA3-D12 (6.0-7.0)	0.37U IA3-D01 (4.0-5.0)	0.06	0.08
U-238 (3)	0.62 IA3-D02 (11.0-12.0)	4.45 IA3-D09 (1.0-2.0)	1.15	1.37
Th-228	0.35 IA3-D07 (5.2-6.2)	2.37 IA3-D12 (4.0-5.0)	0.79	0.83
Th-230	0.35 IA3-D07 (5.2-6.2)	2.35 IA3-D12 (4.0-5.0)	0.92	0.99
Th-232	0.28 IA3-D07 (5.2-6.2)	2.11 IA3-D12 (4.0-5.0)	0.70	0.77
Am-241	-0.15U IA3-D09 (1.0-2.0)	0.07U IA3-D08 (1.8-2.8)	0.00	0.00

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

Table 12-19 IA3 Radiochemistry Analytical Results Summary – Biased Fence-Line Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	0.75 IA3FL-6 (6.0-7.0)	3.13 IA3FL-2 (0.5-1.0)	1.62	1.71
Ra-228	0.42 IA3FL-0 (11.6-12.6)	1.34 IA3FL-8 (1.5-2.5)	0.78	0.81
U-234 (2)	0.41 IA3FL-0 (10.6-11.6)	2.25 IA3FL-9 (1.0-1.5)	0.96	1.00
U-235	-0.08U (1) IA3FL-0 (1.3-1.8)	0.16U IA3FL-2 (0.5-1.0)	0.03	0.04
U-238 (3)	0.41 IA3FL-0 (10.6-11.6)	2.25 IA3FL-9 (1.0-1.5)	0.96	1.00
Th-228	0.33 IA3FL-6 (0.6-1.1)	1.05 IA3FL-8 (1.0-1.5)	0.65	0.67
Th-230	0.41 IA3-FL-0 (11.6-12.6)	5.75 IA3FL-1 (12.0-13.0)	0.81	0.89

Table 12-19 IA3 Radiochemistry Analytical Results Summary – Biased Fence-Line Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Th-232	0.33 IA3FL-1 (5.0-6.0)	1.19 IA3FL-11 (1.5-2.5)	0.73	0.73
Am-241	-0.10U IA3FL-4 (1.6-2.6)	0.05U IA3FL-6 (1.4-2.4)	0.00	0.00

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

The highest detections of Ra-226 and U-238 were collected from IA3-19 at a depth of 1.0-2.0 ft bgs. The highest activity of Th-230 was collected from IA3FL-0 at a depth of 12.0-13.0 ft bgs.

Table 12-20 presents all sample intervals with analytical values greater than two times established background values. Those results that exceeded two times background are followed by an asterisk.

Table 12-20 IA3 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values [1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA3-4	TLS-SB-IA3-4(2.0-3.0)021110	2.0	3.0	5225	54	7.33*	3.44	0.79
IA3-6	TLS-SS-IA3-6(0.0-0.5)021210	0.0	0.5	5870	46	6.96*	5.87*	1.06
IA3-19	TLS-SB-IA3-19(1.0-2.0)021810	1.0	2.0	6598	48	14.28*	12.37*	3.74*
IA3-21	TLS-SB-IA3-21(3.0-4.0)021710	3.0	4.0	6256	64	8.81*	1.74	1.82
IA3-D09	TLS-SB-IA3-D09 (1.0-2.0)031210	1.0	2.0	6815	54	2.61	4.45*	0.56
IA3-D12	TLS-SB-IA3-D12 (4.0-5.0)031110	4.0	5.0	7174	69	8.24*	4.12	2.30

Table 12-20 IA3 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values [1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
IA3FL-1	TLS-SB-IA3FL-1 (12.0-13.0)030510	12.0	13.0	4860	57	1.24	0.76	5.75*

1 Background reference activity levels for Ra-226, U-238, and Th-230 for the Tonawanda Landfill OU Site were established in 2005 as follows (USACE 2005): Ra-226 2.8pCi/g, U-238 2.2 pCi/g and Th-230 1.58 pCi/g.`

* Asterisk after analytical result indicates that the isotopic value exceeds 2 times established background.

Of the 267 samples collected from IA3, seven samples had one or more isotopic values that exceeded two times established background.

12.3.4 IA3 Chemical Analytical Results

IA3 chemical testing parameters included Total VOCs, TCLP VOCs, Total SVOCs, TCLP SVOCs, TAL Metals, TCLP Metals, Pesticides, TCLP Pesticides, and PCBs. Chemical samples were collected and analyzed only to gather information whether non-FUSRAP material is commingled with FUSRAP material. The focus of this report is on characterization of the FUSRAP-related material. Complete chemical testing analytical reports are contained in Appendix M.

12.4 IA4 Results

12.4.1 IA4 Gamma Walkover Surveys

GWS count rate results for IA4 are illustrated in ***Figure 12-8***. GWS mean count rate standard deviation results for IA4 are illustrated in ***Figure 12-9.*** The figures incorporate color coding to indicate varying count rates and standard deviations within the IA. Full page IA4 GWS Result Maps are contained in Appendix H.

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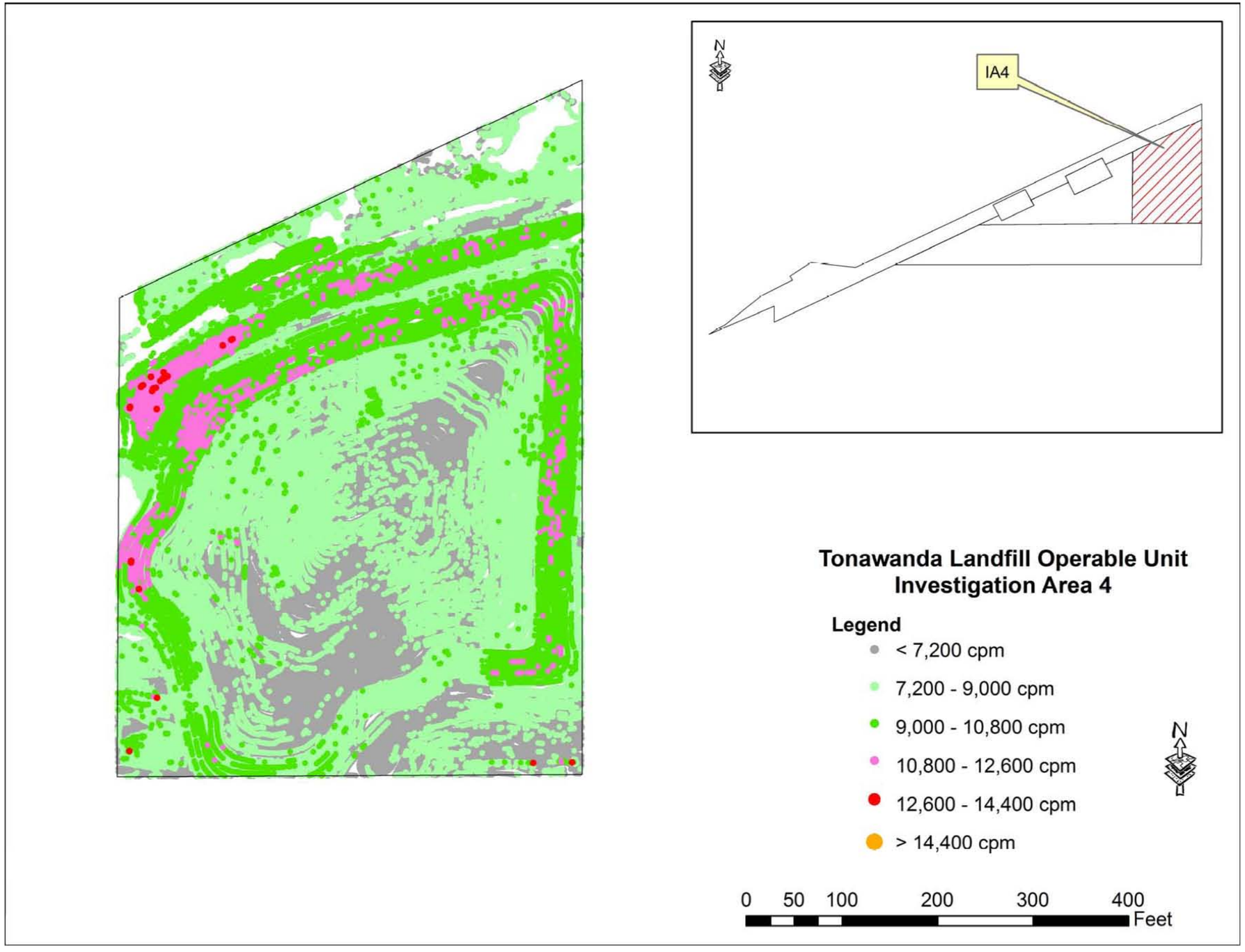

Figure 12-8 IA4 Gamma Walkover Survey Results

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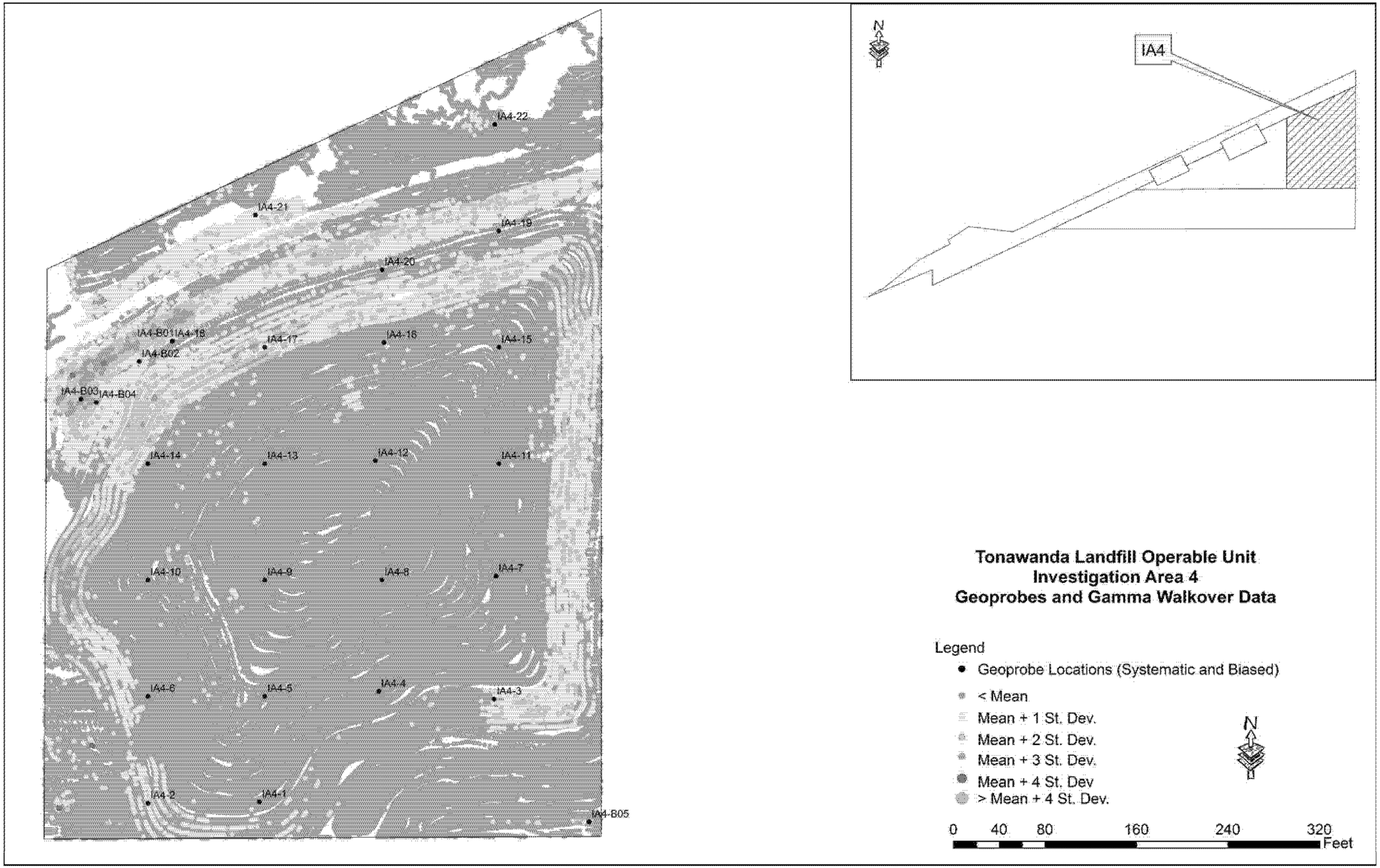

Figure 12-9 IA4 Mean Count Rate Standard Deviation Results

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95,737 GWS count rate data points were collected in IA4. The minimum count rate was 3,676 cpm. The maximum count rate was 13,757 cpm. The mean count rate for IA4 was 7,756 cpm. The standard deviation was 1,379 cpm.

12.4.2 IA4 Gamma and Beta Core Scanning and Static Count Rate Results

Gamma and beta scanning and one minute static count rate data for cores collected from IA4 systematic locations are recorded on ARSEC Soil Core Survey Forms contained in Appendix I and on USACE ENG Form 5056-R or Form 5056A-R contained in Appendix J.

Five samples were collected from each borehole drilled in IA4. Sample locations were chosen in accordance with the SAP and are summarized in ***Table 12-1***. Each sample collected included a one-ft segment of the soil core (except for samples collected from the core's surface, which included the top six inches of the core). Static one minute measurements for gamma and beta radiation were performed on the center of the core segment chosen for sampling. A summary of one minute static gamma and beta counts for cores collected from IA4 systematic locations is contained in ***Table 12-21***. A more detailed summary of one minute static gamma and beta counts for IA4 systematic location cores is contained in Appendix K.

Four biased boreholes were drilled in IA4. A summary of one minute static gamma and beta counts for cores collected from IA4 biased locations is contained in ***Table 12-22***. A more detailed summary of one minute static gamma and beta counts for IA4 biased location cores is contained in Appendix K.

Table 12-21 IA4 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Systematic Locations

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	4909 (IA4-2)	7805 (IA4-13)	5988	31 (IA4-22)	79 (IA4-3)	60
			5983			58
2	5640 (IA4-21)	7141 (IA4-18)	5783	47 (IA4-21)	72 (IA4-8)	60
			6104			58
3	5613 (IA4-8)	7921 (IA4-16)	6314	41 (IA4-19)	73 (IA4-20)	59
			6412			56
4	4842 (IA4-6)	7892 (IA4-13)	6043	40 (IA4-14)	84 (IA4-17)	60
			6143			60
5	4834 (IA4-6)	8229 (IA4-13)	6076	36 (IA4-4)	140 (IA4-17)	62
			6170			64

Table 12-22 IA4 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Biased Locations

Sample Decision Tree Number (From Table 12-1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	6071 (IA4-B05)	8112 (IA4-B04)	7767	25 (IA4-B03)	76 (IA4-B01)	55
			7435			49
2	7512 (IA4-B01)	8496 (IA4-B04)	8063	33 (IA4-B03)	67 (IA4-B04)	55
			8033			54
3	7276 (IA4-B01)	8060 (IA4-B04)	7580	52 (IA4-B03)	72 (IA4-B02)	57
			7624			60
4	5775 (IA4-B05)	8373 (IA4-B04)	7774	49 (IA4-B04)	57 (IA4-B02,B03)	56
			7436			54
5	5922 (IA4-B05)	8461 (IA4-B04)	7544	42 (IA4-B03)	65 (IA4-B01)	55
			7254			53

12.4.3 IA4 Radiochemistry Analytical Results

A summary of radiochemistry analytical results for samples collected from IA4 systematic locations is contained in ***Table 12-23***. The total number of samples collected in IA4 proposed locations is 107 samples. A summary of radiochemistry analytical results for samples collected from IA4 biased locations is contained in ***Table 12-24***. The total number of samples collected for IA4 biased locations is 25 samples. Complete radiochemistry analytical reports for samples collected from IA4 systematic and biased locations are contained in Appendix L.

Table 12-23 IA4 Radiochemistry Analytical Results Summary – Systematic Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	-0.60U (1) IA4-7 (2.3-3.3)	9.99 IA4-21 (5.5-6.5)	1.70	1.97
Ra-228	0.36 IA4-1 (1.2-1.7)	2.38 IA4-21 (5.5-6.5)	0.77	0.83
U-234 (2)	0.41U IA4-15 (2.2-3.2)	8.45 IA4-21 (5.5-6.5)	1.09	1.22
U-235	-0.14U IA4-9 (1.8-2.8)	0.47U IA4-21 (5.5-6.5)	0.05	0.06
U-238 (3)	0.41U IA4-15 (2.2-3.2)	8.45 IA4-21 (5.5-6.5)	1.09	1.22
Th-228	0.29 IA4-2 (2.0-3.0)	1.74 IA4-21 (5.5-6.5)	0.70	0.70
Th-230	0.39 IA4-17 (48.0-49.0)	2.95 IA4-21 (5.5-6.5)	0.85	0.88
Th-232	0.34 IA4-20 (9.0-10.0)	1.92 IA4-21 (5.5-6.5)	0.72	0.73
Am-241	-0.05U IA4-21 (5.5-6.5)	0.61 IA4-16 (13.0-14.0)	0.00	0.02

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

Table 12-24 IA4 Radiochemistry Analytical Results Summary – Biased Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	0.95 IA4-B02 (49.0-50.0)	7.13 IA4-B02 (16.8-17.8)	2.30	2.59
Ra-228	0.50 IA4-B05 (1.0-2.0)	2.49 IA4-B02 (16.8-17.8)	0.98	1.12
U-234 (2)	0.40 IA4-B03 (33.8-34.8)	3.70 IA4-B01 (18.2-19.2)	1.10	1.55
U-235	-0.03U (1) IA4-B03 (28.6-29.6)	0.26U IA4-B04 (17.0-18.0)	0.07	0.09
U-238 (3)	0.40 IA4-B03 (33.8-34.8)	3.70 IA4-B01 (18.2-19.2)	1.10	1.55
Th-228	0.61 IA4-B05 (3.0-4.0)	3.48 IA4-B02 (16.8-17.8)	0.86	1.09
Th-230	0.68 IA4-B02 (49.0-50.0)	3.20 IA4-B02 (16.8-17.8)	1.23	1.29
Th-232	0.47 IA4-B03 (14.0-15.0)	2.73 IA4-B02 (16.8-17.8)	0.78	0.93
Am-241	-0.03U IA4-B05 (1.0-2.0)	0.06U IA4-B02 (16.8-17.8)	0.01	0.01

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected. (2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

The highest activities of Ra-226 and U-238 in IA4 were collected from the same sample interval in borehole IA4-21 at a depth of 5.5-6.5 ft bgs. The highest activity of Th-230 was collected from IA4-B02 at a depth of 16.8-17.8 ft bgs.

Table 12-25 presents all sample intervals with analytical values greater than two times established background values. Those results that exceed two times background are followed by an asterisk.

Table 12-25 IA4 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values [1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static NaI One Minute Count (cpm)	Static Pancake GM One Minute Count (cpm)	Ra-226 Results (pCi/g)	Ra-228 Results (pCi/g)	Th-230 Results (pCi/g)
IA4-21	TLS-SB-IA4-21(5.5-6.5)021810	5.5	6.5	6195	76	9.99*	8.45*	2.95
IA4-B02	TLS-SB-IA4-B02 (16.8-17.8)030910	16.8	17.8	8160	73	7.13*	3.28	3.20*

1 Background reference activity levels for Ra-226, U-238, and U-238 for the Tonawanda Landfill OU Site were established in 2005 as follows (USACE 2005): Ra-226 2.8pCi/g, U-238 2.2 pCi/g and Th-230 1.58 pCi/g.

* Asterisk after analytical result indicates that the isotopic value exceeds two times established background

Of the 132 samples collected in IA4, only two samples had one or more isotopic values greater than two times the established background.

12.4.4 IA4 Chemical Analytical Results

IA4 chemical testing parameters included Total VOCs, TCLP VOCs, Total SVOCs, TCLP SVOCs, TAL Metals, TCLP Metals, Pesticides, TCLP Pesticides, and PCBs. Chemical samples were collected and analyzed only to gather information whether non-FUSRAP material is commingled with FUSRAP material. The focus of this report is on characterization of the FUSRAP-related material. Complete chemical testing analytical reports are contained in Appendix M.

12.5 IA5 Results

12.5.1 IA5 Gamma Walkover Surveys

GWS count rate results for IA5 are illustrated in ***Figure 12-10***. GWS mean count rate standard deviation results for IA5 are illustrated in ***Figure 12-11.*** The figures incorporate color coding to indicate varying count rates and standard deviations within the IA. Full page IA5 GWS Result Maps are contained in Appendix H.

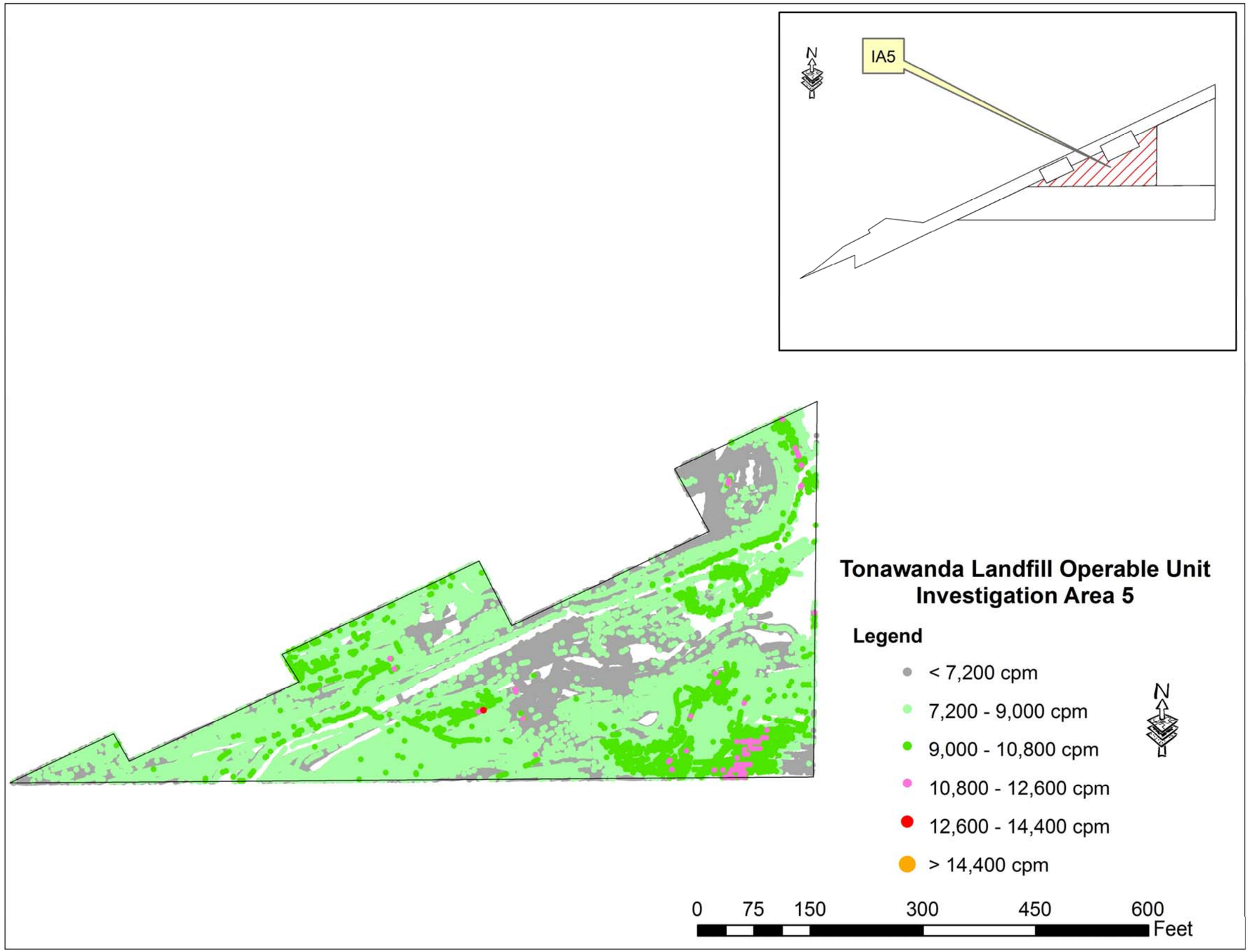

Figure 12-10 IA5 Gamma Walkover Survey Results

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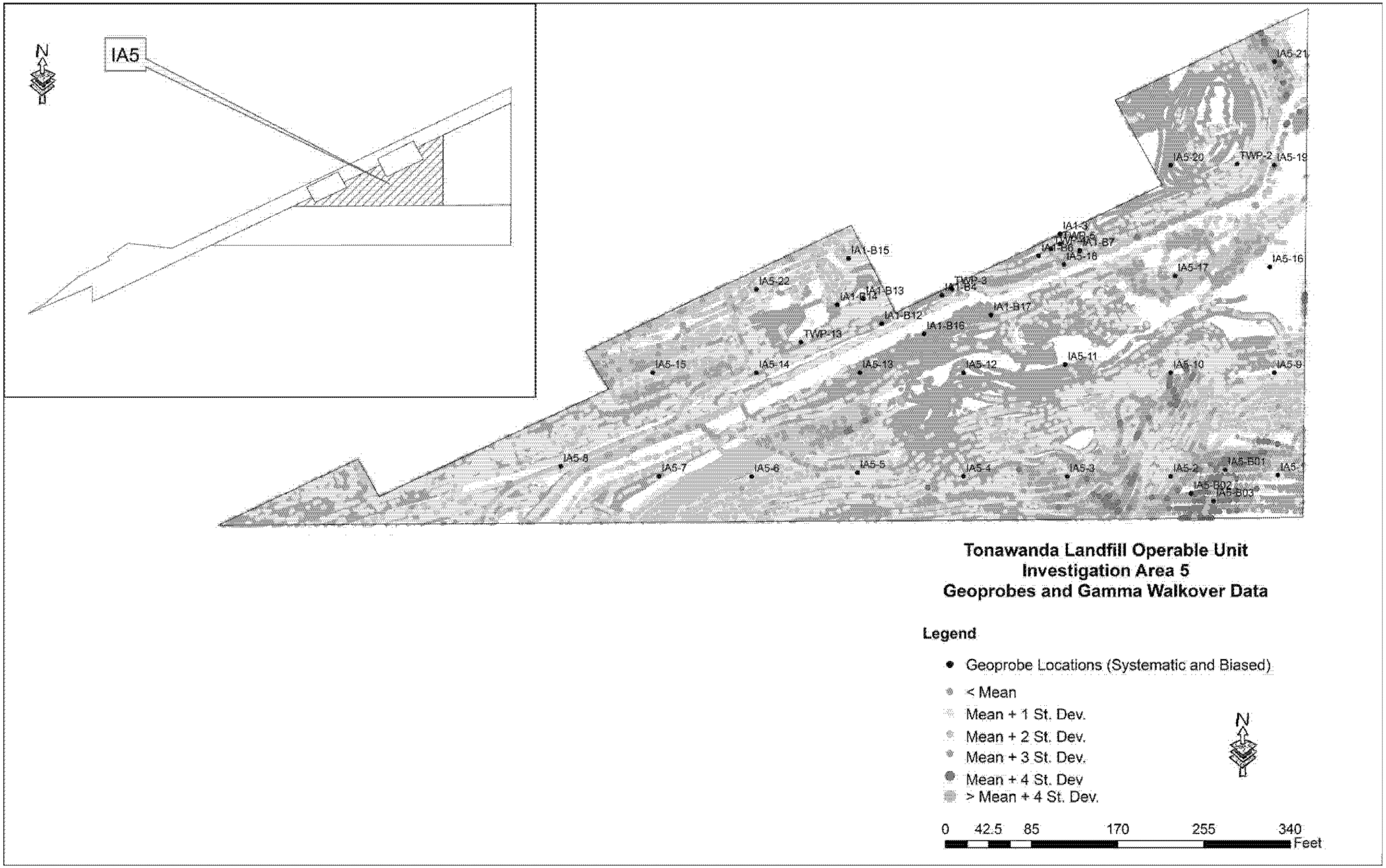

Figure 12.11 IA5 Meant Rate Standard Deviation Results

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78,608 GWS count rate data points were collected in IA5. The minimum count rate was 3,243 cpm. The maximum count rate was 12,771 cpm. The mean count rate for IA5 was 7,152 cpm. The standard deviation was 1,030 cpm.

12.5.2 IA5 Gamma and Beta Core Scanning and Static Count Rate Results

Gamma and beta scanning and one minute static count rate data for cores collected from IA5 systematic locations are recorded on ARSEC Soil Core Survey Forms contained in Appendix I and on USACE ENG Form 5056-R or Form 5056A-R contained in Appendix J.

Five samples were collected from each borehole drilled in IA5. Sample locations were chosen in accordance with the SAP and are summarized in ***Table 12-1***. Each sample collected included a one-ft segment of the soil core (except for samples collected from the core's surface, which included the top six inches of the core). Static one minute measurements for gamma and beta radiation were performed on the center of the core segment chosen for sampling. A summary of one minute static gamma and beta counts for cores collected from IA5 systematic locations is contained in ***Table 12-26***. A more detailed summary of one minute static gamma and beta counts for IA5 systematic location cores is contained in Appendix K.

Table 12-26 IA5 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Systematic Locations

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	4591 (IA5-2)	7574 (IA5-17)	6239	24 (IA5-15)	81 (IA5-9)	53
			6086			51
2	5084 (IA5-2)	7616 (IA5-17)	6045	42 (IA5-2)	87 (IA5-17)	54
			6200			53
3	4843 (IA5-2)	7280 (IA5-21)	5915	42 (IA5-12)	81 (IA5-4)	56
			5996			58
4	4945 (IA5-2)	7525 (IA5-17)	6207	34 (IA5-14)	95 (IA5-17)	59
			6215			59
5	5061 (IA5-2)	7393 (IA5-10)	6138	33 (IA5-11)	129 (IA5-13)	57
			6185			59

Three biased boreholes were drilled in IA5. A summary of one minute static gamma and beta counts for cores collected from IA5 biased locations is contained in ***Table 12-27***. A more detailed summary of one minute static gamma and beta counts for IA5 biased location cores is contained in Appendix K.

Table 12-27 IA5 Soil Core Static One Minute Gamma and Beta Count Rate Summary – Biased Locations

Sample Decision Tree Number (From Table 12.1)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta Pancake GM cpm Value
1	4803 (IA5-B02)	8362 (IA5-B03)	5000	42 (IA5-B01)	65 (IA5-B02)	63
			6064			57
2 (1)	8349 (IA5-B03)	N/A (1)	N/A (1)	66 (IA5-B03)	N/A (1)	N/A (1)
			N/A (1)			N/A (1)
3 (2)	N/A (2)	N/A (2)	N/A (2)	N/A (2)	N/A (2)	N/A (2)
			N/A (2)			N/A (2)
4	4877 (IA5-B01)	8154 (IA5-B03)	5027	43 (IA5-B02)	73 (IA5-B03)	65
			6019			60
5	4895 (IA5-B01)	8368 (IA5-B03)	5116	45 (IA5-B02)	63 (IA5-B02)	51
			5723			54

(1) Only 1 boring encountered the saturated zone.
(2) No native soil encountered.

12.5.3 IA5 Radiochemistry Analytical Results

A summary of radiochemistry analytical results for samples collected from IA5 systematic locations is contained in ***Table 12-28***. The total number of samples collected in IA5 systematic locations is 111 samples. A summary of radiochemistry analytical results for samples collected from IA5 biased locations is contained in ***Table 12-29***. The total number of samples collected from IA5 biased locations is 12 samples. Complete radiochemistry analytical reports for samples collected from IA5 systematic and biased locations are contained in Appendix L.

Table 12-28 IA5 Radiochemistry Analytical Results Summary – Systematic Locations

Analytical Parameter	Lowest Activity (pCi/g)	Highest Activity (pCi/g)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	0.71 IA5-12 (13.0-14.0)	36.71 IA5-13 (23.8-25.0)	1.81	3.10
Ra-228	0.41 IA5-18 (0.8-1.3)	3.29 IA5-15 (0.5-1.0)	0.79	0.96
U-234 (2)	0.46 IA5-16 (49.0-50.0)	33.07 IA5-13 (23.8-25.0)	1.08	2.14
U-235	-0.16U (1) IA5-8 (1.5-2.0)	2.16 IA5-13 (23.8-25.0)	0.05	0.11
U-238 (3)	0.46 IA5-16 (49.0-50.0)	33.07 IA5-13 (23.8-25.0)	1.08	2.14
Th-228	0.29 IA5-12 (13.0-14.0)	2.99 IA5-15 (0.5-1.0)	0.76	0.91
Th-230	0.35 IA5-12 (13.0-14.0)	8.91 IA5-13 (13.2-14.2)	0.80	1.13
Th-232	0.32 IA5-12 (13.0-14.0)	3.46 IA5-19 (4.5-5.5)	0.68	0.86

Table 12-28 IA5 Radiochemistry Analytical Results Summary – Systematic Locations

Analytical Parameter	Lowest Activity (pCi/g)	Highest Activity (pCi/g)	Median Activity (pCi/g)	Average Activity (pCi/g)
Am-241	-0.10U IA5-7 (0.5-1.5)	0.37 IA5-11 (11.7-12.7)	0.00	0.01

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

Table 12-29 IA5 Radiochemistry Analytical Results Summary – Biased Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	1.29 IA5-B01 (0.8-1.3)	3.57 IA5-B02 (3.0-4.0)	1.77	2.05
Ra-228	0.49 IA5-B01 (0.8-1.3)	1.48 IA5-B02 (3.0-4.0)	0.87	0.95
U-234 (2)	0.51 IA5-B01 (4.0-5.0)	1.69 IA5-B03 (13.5-14.5)	1.12	1.16
U-235	-0.08U (1) IA5-B02 (3.0-4.0)	0.20U IA5-B03 (13.5-14.5)	0.06	0.05
U-238 (3)	0.51 IA5-B01 (4.0-5.0)	1.69 IA5-B03 (13.5-14.5)	1.12	1.16
Th-228	0.34 IA5-B03 (13.5-14.5)	1.38 IA5-B03 (0.7-1.2)	0.74	0.78
Th-230	0.43 IA5-B03 (13.5-14.5)	1.22 IA5-B02 (0.5-1.0)	0.79	0.84
Th-232	0.33 IA5-B03 (13.5-14.5)	1.10 IA5-B03 (0.7-1.2)	0.73	0.73
Am-241	-0.02U IA5-B01 (4.0-5.0)	0.04U IA5-B03 (3.0-4.0), (4.0-5.0), (13.5-14.5)	0.01	0.01

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

Of the 123 samples collected in IA5, the highest activities of Ra-226, U-238 and Th-230 were collected from the same borehole, IA5-13. The highest activities of Ra-226 and U-238 were from a depth of 23.8-25.0 ft bgs. The highest activity of Th-230 was from a depth of 13.2-14.2 ft bgs.

Table 12-30 presents all sample intervals with analytical values greater than two times established background values. Those results that exceeded two times background are followed by an asterisk.

Table 12-30 IA5 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values [1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 (pCi/g) Results	U-238 (pCi/g) Results	Th-230 (pCi/g) Results
IA5-13	TLS-SB-IA5-13 (13.2-14.2) 022310	13.2	14.2	5410	73	27.34*	22.01*	6.88*
IA5-13	TLS-SB-IA5-13 (18.8-19.8) 022310	18.8	19.8	5531	57	11.63*	8.87*	2.08
IA5-13	TLS-SB-IA5-13 (23.8-25.0) 022310	23.8	25.0	5272	129	36.71*	33.07*	2.03
IA5-14	TLS-SB-IA5-14 (14.0-15.0) 022410	14.0	15.0	6518	67	5.83*	3.23	1.68
IA5-15	TLS-SS-IA5-15 (0.5-1.0) 022210	0.5	1.0	6973	24	8.17*	5.09*	3.19*
IA5-19	TLS-SB-IA5-19(4.5-5.5)021810	4.5	5.5	6575	53	6.26*	3.02	2.24
IA5-21	TLS-SB-IA5-21(3.8-4.8)021810	3.8	4.8	7205	41	5.78*	2.62	3.37*
IA5-21	TLS-SB-IA5-21(17.2-18.2)021810	17.2	18.2	7145	57	11.72*	8.23*	2.32

1 Background reference activity levels for Ra-226, U-238, and U-238 for the Tonawanda Landfill OU Site were established in 2005 as follows (USACE 2005): Ra-226 2.8pCi/g, U-238 2.2 pCi/g and Th-230 1.58 pCi/g.

* Asterisk after analytical result indicates that the isotopic value exceeds two times established background

Of the 123 samples collected in IA5, eight samples had isotopic values that exceeded two times the established background for one or more isotopes.

12.5.4 IA5 Chemical Analytical Results

IA5 chemical testing parameters included Total VOCs, TCLP VOCs, Total SVOCs, TCLP SVOCs, TAL Metals, TCLP Metals, Pesticides, TCLP Pesticides, and PCBs. Chemical samples were collected and analyzed only to gather information whether non-FUSRAP material is commingled with FUSRAP material. The focus of this report is on characterization of the FUSRAP-related material. Complete chemical testing analytical reports are contained in Appendix M.

12.6 IA6 Results

GWS count rate results for IA6 are illustrated in ***Figure 12-12***. GWS mean count rate standard deviation results for IA6 are illustrated in ***Figure 12-13.*** The figures incorporate color coding to indicate varying count rates and standard deviations within the IA. Full page IA6 GWS Result Maps are contained in Appendix H.

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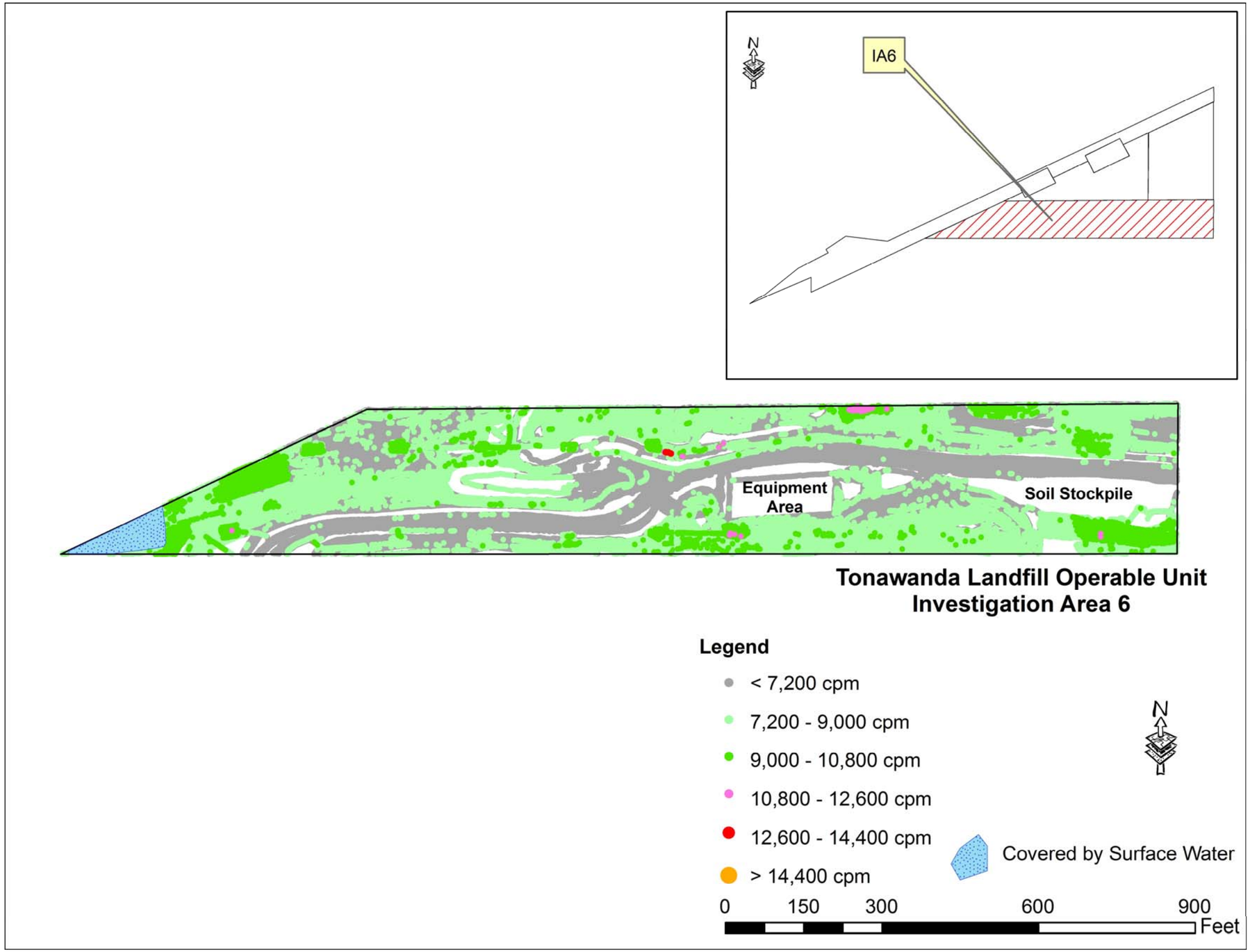

Figure 12-12 IA6 Gamma Walkover Survey Results

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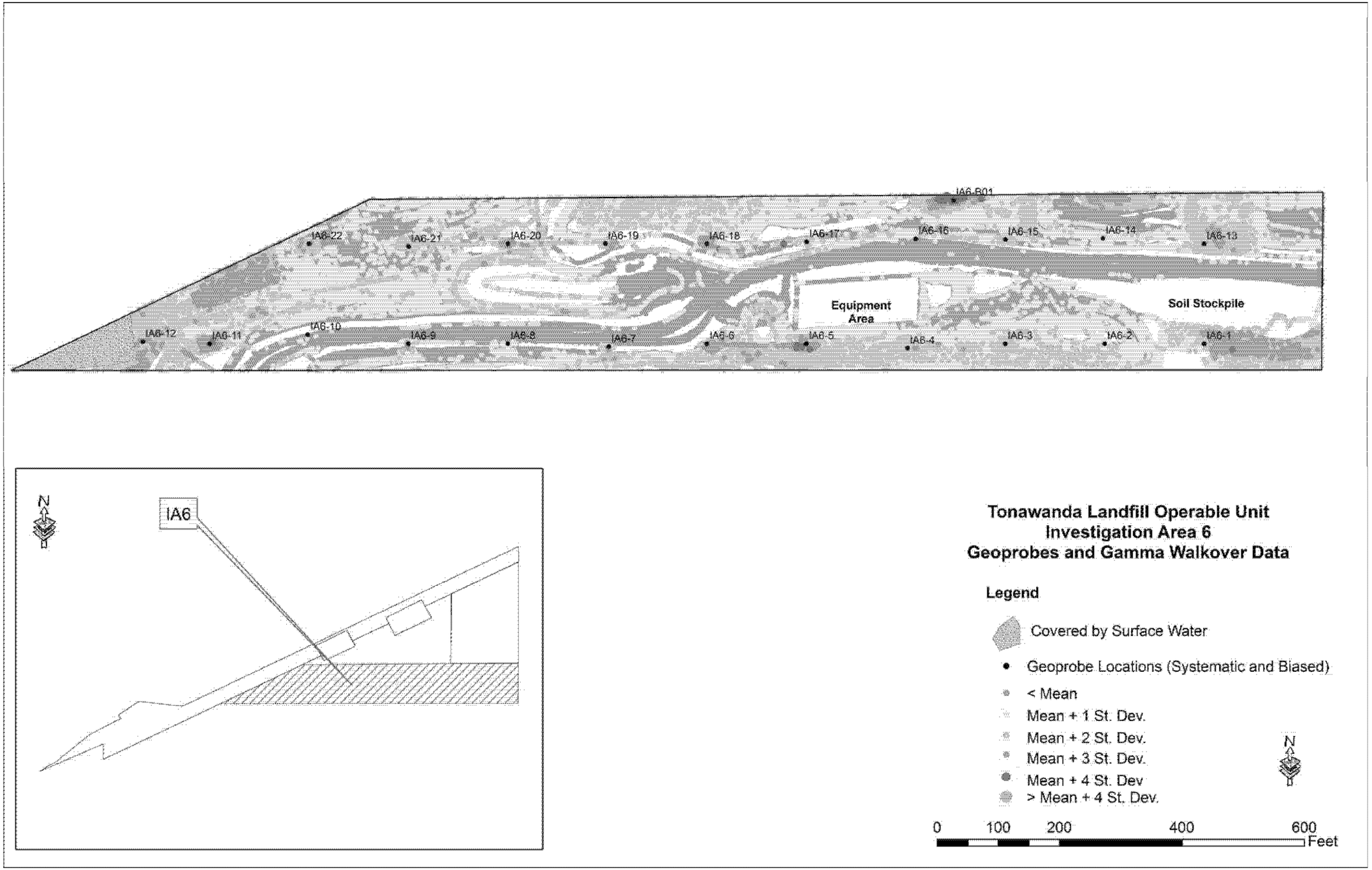

Figure 12-13 IA6 Mean Count Rate Standard Deviation Results

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126,860 GWS count rate data points were collected in IA6. The minimum count rate was 2,498 cpm. The maximum count rate was 13,289 cpm. The mean count rate for IA6 was 6,910 cpm. The standard deviation was 1,301 cpm.

12.6.1 IA6 Gamma and Beta Scanning and Static Count Rate Results

Soil core gamma and beta scanning and one minute static count rate data for IA6 are recorded on ARSEC Soil Core Survey Forms contained in Appendix I and on USACE ENG Form 5056-R or Form 5056A-R contained in Appendix J.

Four samples were collected from each borehole drilled in IA6. Sample locations were chosen in accordance with the SAP and are summarized in ***Table 12-31***. Each sample collected included a one-ft segment of the soil core (except for samples collected from the core's surface, which included the top six inches of the core). Static one minute measurements for gamma and beta radiation were performed on the center of the core segment chosen for sampling. A summary of one minute static gamma and beta counts for cores collected from IA6 systematic locations is contained in ***Table 12-32***. A more detailed summary of one minute static gamma and beta counts for IA6 systematic location cores is contained in Appendix K.

Table 12-31 Soil Core Sample Location Summary for IA6

Sample Number	Sample Location Decision Criteria
1	The core surface [i.e., the top six inches of the current landfill surface (0.0 – 0.5 ft bgs)]. If the boring location was on an access road, then the sample was taken from the first six inches of soil beneath the current road bed material [i.e., below any pavement and gravel base].
2	A soil sample from the first foot just inside the saturated zone. If the saturated zone was not reached in the boring (i.e., it was deeper than the termination depth of the boring), then the sample was taken from the bottom one ft of the boring.
3	A one-ft sample centered on the core area where the gamma instrument registered the highest reading. If the highest gamma instrument reading interval was the same as any of the above two fixed intervals (i.e., the highest scan reading is in either the top six inches, or at the saturated zone interface) then the third sample interval was from the area of the second highest gamma reading, or by other professional judgment.
4	A one-ft sample centered on the core area where the beta instrument (i.e., beta-gamma GM detector) registered the highest beta reading. If the highest beta reading interval is the same as any of the above four fixed intervals (i.e., the highest scan reading is in either the top six inches, or at the saturated zone interface, or in the area of the highest gamma instrument reading) then the fourth sample interval was selected using the following decision tree: a. A one-ft sample centered around the core area with the second highest gamma reading, b. A one-ft sample centered around the core area with the second highest beta reading, or c. A one-ft core sample using other professional judgment.

Table 12-32 IA6 Soil Core Static One Minute Gamma and Beta Count Summary – Systematic Locations

Sample Decision Tree Number (From Table 12-36)	Lowest Gamma cpm Value (Borehole Number)	Highest Gamma cpm Value (Borehole Number)	Median Gamma cpm Value / Average Gamma cpm Value	Lowest Beta cpm Value (Borehole Number)	Highest Beta cpm Value (Borehole Number)	Median Beta cpm Value / Average Beta cpm Value
1	4822 (IA6-9)	9077 (IA6-6)	6809	25 (IA6-11)	72 (IA6-9)	54
			6599			54
2	4490 (IA6-16)	7813 (IA6-5)	6757	41 (IA6-9)	71 (IA6-22)	53
			6317			53
3	4867 (IA6-16)	7811 (IA6-5)	6705	36 (IA6-6)	78 (IA6-20)	60
			6495			59
4	4965 (IA6-16)	8770 (IA6-3)	6591	44 (IA6-14)	67 (IA6-5)	51
			6587			54

One biased borehole was drilled in IA6. A summary of one minute static gamma and beta counts for the core collected from the IA6 biased location is contained in ***Table 12-33***. A more detailed summary of one minute static gamma and beta count for IA6 biased location cores is contained in Appendix K.

Table 12-33 IA6 Soil Core Static One Minute Gamma and Beta Count Summary – Biased Location

Sample Decision Tree Number (From Table 12-36)	Gamma cpm Value (Borehole Number)	Beta cpm Value (Borehole Number)
1	8400 (IA6-B01)	70 (IA6-B01)
2	8568 (IA6-B01)	43 (IA6-B01)
3	8640 (IA6-B01)	50 (IA6-B01)
4	7957 (IA6-B01)	54 (IA6-B01)

12.6.2 IA6 Radiochemistry Analytical Results

A summary of radiochemistry analytical results for samples collected from IA6 systematic locations is contained in ***Table 12-34***. The total number of samples collected from IA6 systematic locations is 82 samples. A summary of radiochemistry analytical results for samples collected from the IA6 biased location is contained in ***Table 12-35***. The total number of samples collected in IA6 biased locations is five samples. Complete radiochemistry analytical reports for samples collected from IA6 systematic and biased locations are contained in Appendix L.

Table 12-34 IA6 Radiochemistry Analytical Results Summary – Systematic Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	-2.14U (1) IA6-15 (6.0-7.0)	3.08 IA6-22 (1.5-2.0)	1.85	1.77
Ra-228	0.40 IA6-17 (9.0-10.0)	1.28 IA6-5 (18.0-19.0)	0.81	0.82
U-234 (2)	0.42 IA6-17 (9.0-10.0)	3.40 IA6-6 (18.0-19.0)	1.11	1.20
U-235	-0.10U IA6-2 (9.2-10.0)	0.30U IA6-9 (4.0-5.0)	0.05	0.06
U-238 (3)	0.42 IA6-17 (9.0-10.0)	3.40 IA6-6 (18.0-19.0)	1.11	1.20
Th-228	0.36 IA6-3 (4.0-5.0)	1.19 IA6-11 (12.5-13.0/13.5-14.0)	0.71	0.70
Th-230	0.50 IA6-3 (3.0-4.0)	2.16 IA6-17 (9.0-10.0)	0.99	1.02
Th-232	0.24 IA6-3 (3.0-4.0)	2.20 IA6-12 (1.0-1.5)	0.65	0.68
Am-241	-0.05U IA6-6 (4.5-5.0)	0.36 IA6-18 (4.0-4.5)	0.01	0.03

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

Table 12-35 IA6 Radiochemistry Analytical Results Summary – Biased Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Ra-226	0.87 IA6-B01 (13.3-14.0)	2.43 IA6-B01 (0.4-0.9)	1.79	1.82
Ra-228	0.28 IA6-B01 (16.9-18.0)	1.33 IA6-B01 (0.4-0.9)	0.87	0.79
U-234 (2)	0.34 IA6-B01 (13.3-14.0)	1.93 IA6-B01 (21.0-22.0)	1.63	1.33
U-235	0.05U (1) IA6-B01 (13.3-14.0)	0.11U IA6-B01 (0.4-0.9)	0.09	0.08
U-238 (3)	0.34 IA6-B01 (13.3-14.0)	1.93 IA6-B01 (21.0-22.0)	1.63	1.33
Th-228	0.39 IA6-B01 (13.3-14.0)	1.14 IA6-B01 (2.0-3.0)	0.59	0.72
Th-230	0.34 IA6-B01 (0.4-0.9)	1.24 IA6-B01 (2.0-3.0)	0.67	0.72

Table 12-35 IA6 Radiochemistry Analytical Results Summary – Biased Locations

Analytical Parameter	Lowest Activity (pCi/g) Borehole(depth ft bgs)	Highest Activity (pCi/g) Borehole(depth ft bgs)	Median Activity (pCi/g)	Average Activity (pCi/g)
Th-232	0.47 IA6-B01 (13.3-14.0)	1.18 IA6-B01 (2.0-3.0)	0.58	0.69
Am-241	-0.03U IA6-B01 (16.9-18.0)	0.01U IA6-B01 (13.3-14.0)	0.10	-0.01

(1) U modifier indicates sample result was less than MDA, e.g. isotope was undetected.
(2) U-234 determined via gamma spectroscopy assuming secular equilibrium with U-238.
(3) U-238 determined via gamma spectroscopy assuming secular equilibrium with Th-234.

The highest activity of Ra-226 was from borehole IA6-22 at a depth of 1.5-2.0 ft bgs. The highest activity of U-238 was from IA6-6 at a depth of 18.0-19.0 ft bgs. The highest activity of Th-230 was from borehole IA6-17 at a depth of 9.0-10.0 ft bgs.

Table 12-36 presents all sample intervals with analytical values greater than two times established background values. Those results that exceeded two times background are followed by an asterisk.

Table 12-36 IA6 Sample Locations with Ra-226, U-238, or Th-230 Activity Levels Greater Than Two Times Established Background Values [1]

Location ID	Sample ID	Top Depth of Sample (ft bgs)	Bottom Depth of Sample (ft bgs)	Static Gamma One Minute Count (cpm)	Static Beta One Minute Count (cpm)	Ra-226 Results (pCi/g)	U-238 Results (pCi/g)	Th-230 Results (pCi/g)
	no samples exceed two times background							

1 Background reference activity levels for Ra-226, U-238, and U-238 for the Tonawanda Landfill OU Site were established in 2005 as follows (USACE 2005): Ra-226 2.8pCi/g, U-238 2.2 pCi/g and Th-230 1.58 pCi/g.

* Asterisk after analytical result indicates that the isotopic value exceeds two times established background

Of the 87 samples collected from IA6, no samples had isotopic values that exceeded two times the established background value.

12.6.3 IA6 Chemical Analytical Results

IA6 chemical testing parameters included Total VOCs, TCLP VOCs, Total SVOCs, TCLP SVOCs, TAL Metals, TCLP Metals, Pesticides, TCLP Pesticides, and PCBs. Chemical samples were collected and analyzed only to gather information whether non-FUSRAP material is commingled with

FUSRAP material. The focus of this report is on characterization of the FUSRAP-related material. Complete chemical testing analytical reports are contained in Appendix M.

12.7 Temporary Monitoring Well Results

Fourteen temporary monitoring wells were constructed in previously-drilled soil borings. Sampling of 14 temporary monitoring wells was performed after purging was completed, and no earlier than 10 days following installation of the well. Temporary monitoring wells numbers 10, 12, and 14 did not provide a sufficient quantity of water for analytical testing. Well points were sampled in accordance with standard low-flow technologies delineated in EPA/540/S-95-504 (EPA 1996) using either peristaltic and/or bladder pumps connected to dedicated (by location) HDPE tubing for radiological testing or Teflon tubing for radiological and organic testing.

Field testing parameters for each well included temperature, pH, redox potential, turbidity, dissolved O_2, and specific conductivity. Field testing parameters were conducted in accordance with EM 200-1-3 C 2.4.7. All purge water was containerized in U.S. Department of Transportation approved containers and managed as IDW. Field testing results are summarized in ***Table 12-37*** below. Field testing results were also recorded on USACE ENG Form 5056-R or Form 5056A-R contained in Appendix J.

Table 12-37 Temporary Monitoring Well Field Testing Summary

Well ID	Sample ID	Temperature (^oF)	pH	Redox Potential (Eh)	Turbidity (NTU)	Dissolved O_2 (mg/L)	Specific Conductivity (µS/cm)
TWP-1	TLSP22-TWP-1	68.34	7.81	225	156	0.18	0.001
TWP-2	TLSP22-TWP-2	65.25	7.85	380	1018	0.01	0.001
TWP-3	TLSP22-TWP-3	58.50	9.21	200	198	3.41	0.001
TWP-4	TLSP22-TWP-4	69.98	9.35	165	332	4.46	0.000
TWP-5	TLSP22-TWP-5	68.18	8.47	220	119	2.69	0.000
TWP-6	TLSP22-TWP-6	74.50	8.14	258	118	0.02	0.000
TWP-7	TLSP22-TWP-7	72.32	7.42	326	122	0.01	0.000
TWP-8	TLSP22-TWP-8	48.54	8.72	260	70	8.21	0.001
TWP-9	TLSP22-TWP-9	42.3	8.92	248	162	7.21	0.000
TWP-10	TLSP22-TWP-10	Insufficient quantity of water from well for analytical testing					
TWP-11	TLSP22-TWP-11	60.98	8.65	230	500	7.21	0.000
TWP-12	TLSP22-TWP-12	Insufficient quantity of water from well for analytical testing					
TWP-13	TLSP22-TWP-13	51.42	8.41	33	75	4.74	0.000
TWP-14	TLSP22-TWP-14	Insufficient quantity of water from well for analytical testing					

Temporary monitoring well samples requiring radiological analyses were sent to the ARS laboratory in Port Allen, Louisiana, for analysis. Temporary monitoring well samples requiring chemical analyses were sent to the TestAmerica laboratory in Earth City, Missouri, for analysis. Filtering of ground water samples was performed by the laboratory performing the required analysis. ARSEC instructed the laboratories that ground water samples should be divided into two equal segments, and that one of the two groundwater segments should be filtered to remove suspended solids. When possible, based on sample volume, required analyses were performed on both the filtered and unfiltered segments of the ground water sample with the exception of TDS analysis. Only the filtered segment of the water sample was analyzed for TDS.

Radiochemistry analyses on the filtered sample portions were able to be performed on all temporary monitoring wells with the exception of dry well numbers TWP-10, TWP-12, and TWP-14.

The un-filtered sample portions from wells TWP-01, TWP-02, TWP-03, TWP-04, TWP-05, TWP-06, TWP-07, TWP-08, TWP-09 TWP-011, and TWP-013 contained suspended solids volumes that prohibited the analysis of the sample for Th isotopes using the HASL 300 - Alpha Spectroscopy – Eichrom Modified Method and the subsequent reporting in units of pCi/l. The laboratory elected to filter the suspended solids and analyze~~d~~ the solids for Th-228, Th-230, and Th-232. Th results were reported in units of pCi/g.

A summary of radiochemistry analytical results for the temporary monitoring wells is contained in ***Table 12-38*** and ***Table 12-39*** below. Complete radiochemistry analytical reports for the temporary monitoring wells are contained in Appendix N. Complete chemical testing analytical reports for the temporary monitoring wells are contained in Appendix O.

Table 12-38 Temporary Monitoring Well Dissolved Radiochemistry Analytical Results (1)

Well ID	Sample ID	Ra-226 pCi/L	Ra-228 pCi/L	U-234 pCi/L	U-235 pCi/L	U-238 pCi/L	Th-228 pCi/L	Th-230 pCi/L	Th-232 pCi/L
		Eff. Conc. Limit 60 pCi/l [3]	Eff. Conc. Limit 60 pCi/l [3]	Eff. Conc. Limit 300 pCi/l [3]	Eff. Conc. Limit 300 pCi/l [3]	Eff. Conc. Limit 300 pCi/l [3]	Eff. Conc. Limit 200 pCi/l [3]	Eff. Conc. Limit 100 pCi/l [3]	Eff. Conc. Limit 300 pCi/l [3]
TWP-1	TLSP22-TWP-1	0.23	1.07	2.87	0.11	2.43	ND(2)	0.08	ND(2)
TWP-2	TLSP22-TWP-2	11.80	0.77	3.25	0.09	3.19	ND(2)	0.12	ND(2)
TWP-3	TLSP22-TWP-3	0.49	ND(2)	13.71	0.43	13.00	ND(2)	0.20	ND(2)
TWP-3	TLSP22-TWP-3 Duplicate	0.17	0.35	13.68	0.51	13.68	ND(2)	0.11	0.03
TWP-4	TLSP22-TWP-4	0.27	4.07	3.20	0.17	3.84	ND(2)	0.11	ND(2)
TWP-5	TLSP22-TWP-5	ND(2)	ND(2)	0.37	ND(2)	0.38	ND(2)	ND(2)	ND(2)
TWP-6	TLSP22-TWP-6	0.28	ND(2)	28.12	0.85	28.24	ND(2)	0.15	ND(2)

Table 12-38 Temporary Monitoring Well Dissolved Radiochemistry Analytical Results (1)

		Ra-226 pCi/L	Ra-228 pCi/L	U-234 pCi/L	U-235 pCi/L	U-238 pCi/L	Th-228 pCi/L	Th-230 pCi/L	Th-232 pCi/L
TWP-7	TLSP22-TWP-7	ND(2)	ND(2)	50.67	1.99	51.79	ND(2)	ND(2)	ND(2)
TWP-8	TLSP22-TWP-8	0.17	ND(2)	4.21	0.24	4.10	0.09	0.07	ND(2)
TWP-9	TLSP22-TWP-9	ND(2)	ND(2)	2.14	0.22	1.95	ND(2)	0.44	ND(2)
TWP-10	N/A	Insufficient quantity of water from well for analytical testing							
TWP-11	TLSP22-TWP-11	0.26	ND(2)	70.24	0.95	20.26	ND(2)	0.08	0.06
TWP-12	N/A	Insufficient quantity of water from well for analytical testing							
TWP-13	TLSP22-TWP-13	0.23	1.32	4.52	0.17	4.19	ND(2)	0.09	ND(2)
TWP-14	N/A	Insufficient quantity of water from well for analytical testing							

(1) Analysis performed on filtered groundwater portion.

(2) Quantity not detected above MDA

(3) Effluent Concentration Limits taken from 10 Code of Federal Regulations (DFR)R20, Appendix B, Table II, Column II

Effluent concentrations listed Table 12-38 are equivalent to the radionuclide concentrations which ingested continuously over the course of a year would produce a total effective dose equivalent of 0.05 rem. No concentrations in the Tonawanda temporary monitoring wells exceeded the Effluent Concentration Limits.

Table 12-39 Temporary Monitoring Well Unfiltered Thorium Isotopic Analytical Results (1)

Well ID	Sample ID	Th-228 pCi/g	Th-230 pCi/g	Th-232 pCi/g
TWP-1	TLSP22-TWP-1	1.47	1.80	1.38
TWP-2	TLSP22-TWP-2	3.99	4.67	3.72
TWP-3	TLSP22-TWP-3	2.69	10.96	3.05
TWP-3	TLSP22-TWP-3 Duplicate	0.60	1.51	0.90
TWP-4	TLSP22-TWP-4	1.98	2.35	1.90
TWP-5	TLSP22-TWP-5	3.29	2.99	4.14
TWP-6	TLSP22-TWP-6	4.63	3.92	2.98
TWP-7	TLSP22-TWP-7	ND	44.54	ND
TWP-8	TLSP22-TWP-8	2.26	5.37	1.97
TWP-9	TLSP22-TWP-9	1.40	2.53	1.65
TWP-10	N/A	Insufficient quantity of water from well for analytical testing		
TWP-11	TLSP22-TWP-11	1.01	1.37	0.89
TWP-12	N/A	Insufficient quantity of water from well for analytical testing		

Table 12-39 Temporary Monitoring Well Unfiltered Thorium Isotopic Analytical Results (1)

Well ID	Sample ID	Th-228 pCi/g	Th-230 pCi/g	Th-232 pCi/g
TWP-13	TLSP22-TWP-13	4.51	3.89	4.36
TWP-14	N/A	Insufficient quantity of water from well for analytical testing		

(1) Sample quantities and quality sufficient only to perform isotopic Th analyses on suspended solids.

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13.0 CONCLUSIONS

Background reference activity levels for Th-230, U-238, and Ra-226 for the Tonawanda Landfill OU Site were established in 2005 as follows (USACE 2005):

- Th-230 1.58 pCi/g;
- U-238 2.2 pCi/g; and
- Ra-226 2.8 pCi/g.

Background reference activity levels for U-234, U-235, Th-232, Th-228, and Ra-228 were not established.

All IAs contained FUSRAP-related materials at activity levels greater than established reference background levels. IA1 contained the highest activity levels at the Site for FUSRAP-related material.

IA1 Th-230 activity levels ranged from 0.52 pCi/g to 1,640 pCi/g with an average Th-230 activity for systematic boreholes of 30.84 pCi/g and 5.21 pCi/g for biased boreholes. U-238 activity levels ranged from non-detection to 2,048 pCi/g with an average U-238 activity for systematic boreholes of 54.86 pCi/g and 18.23 pCi/g for biased boreholes. Ra-226 activity levels ranged from non-detection to 3,485 pCi/g with an average Ra-226 activity for systematic boreholes of 73.88 pCi/g and 22.72 pCi/g for biased boreholes.

IA2 Th-230 activity levels ranged from 0.48 pCi/g to 24.87 pCi/g with an average Th-230 activity for systematic boreholes of 1.74 pCi/g and 1.38 pCi/g for biased boreholes. U-238 activity levels ranged from non-detection to 69.12 pCi/g with an average U-238 activity for systematic boreholes of 2.53 pCi/g and 1.97 pCi/g for biased boreholes. Ra-226 activity levels ranged from non-detection to 62.45 pCi/g with an average Ra-226 activity for systematic boreholes of 3.46 pCi/g and 3.25 pCi/g for biased boreholes.

IA3 Th-230 activity levels ranged from 0.35 pCi/g to 5.75 pCi/g with an average Th-230 activity for systematic boreholes of 0.97 pCi/g and 0.94 pCi/g for biased boreholes (non ditch and non fence-line locations), 0.99 pCi/g for biased ditch locations, and 0.89 for biased fence-line locations. U-238 activity levels ranged from non-detection to 12.37 pCi/g with an average U-238 activity for systematic boreholes of 1.30 pCi/g and 1.19 pCi/g for biased boreholes (non ditch and non fence-line locations), 1.37 pCi/g for biased ditch locations, and 1.00 pCi/g for biased fence-line locations. Ra-226 activity levels ranged from non-detection to 14.28 pCi/g with an average Ra-226 activity for systematic boreholes of 2.09 pCi/g and 1.85 pCi/g for biased boreholes (non ditch and non fence-line locations), 2.18 pCi/g for biased ditch locations, and 1.71 pCi/g for biased fence-line locations.

IA4 Th-230 activity levels ranged from 0.39 pCi/g to 3.20 pCi/g with an average Th-230 activity for systematic boreholes of 0.88 pCi/g and 1.29 pCi/g for biased boreholes. U-238 activity levels ranged from non-detection to 8.45 pCi/g with an average U-238 activity for systematic boreholes of 1.22 pCi/g and 1.55 pCi/g for biased boreholes. Ra-226 activity levels ranged from non-detection to 9.99 pCi/g with an average Ra-226 activity for systematic boreholes of 1.97 pCi/g and 2.59 pCi/g for biased boreholes.

IA5 Th-230 activity levels ranged from 0.35 pCi/g to 8.91 pCi/g with an average Th-230 activity for systematic boreholes of 1.13 pCi/g and 0.84 pCi/g for biased boreholes. U-238 activity levels ranged

from 0.46 pCi/g to 33.07 pCi/g with an average U-238 activity for systematic boreholes of 2.14 pCi/g and 1.16 pCi/g for biased boreholes. Ra-226 activity levels ranged from 0.71 pCi/g to 36.71 pCi/g with an average Ra-226 activity for systematic boreholes of 3.10 pCi/g and 2.05 pCi/g for biased boreholes.

IA6 Th-230 activity levels ranged from 0.34 pCi/g to 2.16 pCi/g with an average Th-230 activity for systematic boreholes of 1.02 pCi/g and 0.72 pCi/g for biased boreholes. U-238 activity levels ranged from 0.34 pCi/g to 3.40 pCi/g with an average U-238 activity for systematic boreholes of 1.20 pCi/g and 1.33 pCi/g for biased boreholes. Ra-226 activity levels ranged from non-detection to 3.08 pCi/g with an average Ra-226 activity for systematic boreholes of 1.77 pCi/g and 1.82 pCi/g for biased boreholes.

IA4, IA5, and IA6 contained Am-241. The highest Am-241 activity value found at the Site was 0.61 pCi/g at a depth of 13.0-14.0 ft bgs in Borehole IA4-16.

Groundwater samples collected from temporary monitoring wells did not contain FUSRAP-related materials at concentrations greater than the Effluent Concentration Limits listed in 10 CFR 20, Appendix B, Table 2, Column 2. Effluent concentrations listed in 10 CFR 20 are equivalent to the radionuclide concentrations which ingested continuously over the course of a year would produce a total effective dose equivalent of 0.05 rem. No concentrations in the Tonawanda temporary monitoring wells exceeded the Effluent Concentration Limits.

14.0 REFERENCES

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USACE 2010d. *Accident Prevenion Plan/Site Safety and Health Plan for the Phase 2 Remedial Investigation at the Tonawanda Landfill Operable Unit in the Town of Tonawanda, New York*, Revision 1, February.

U.S. Department of Transportation; *Class 7 (Radioactive) Materials*; 49 CFR Subpart I; Current.

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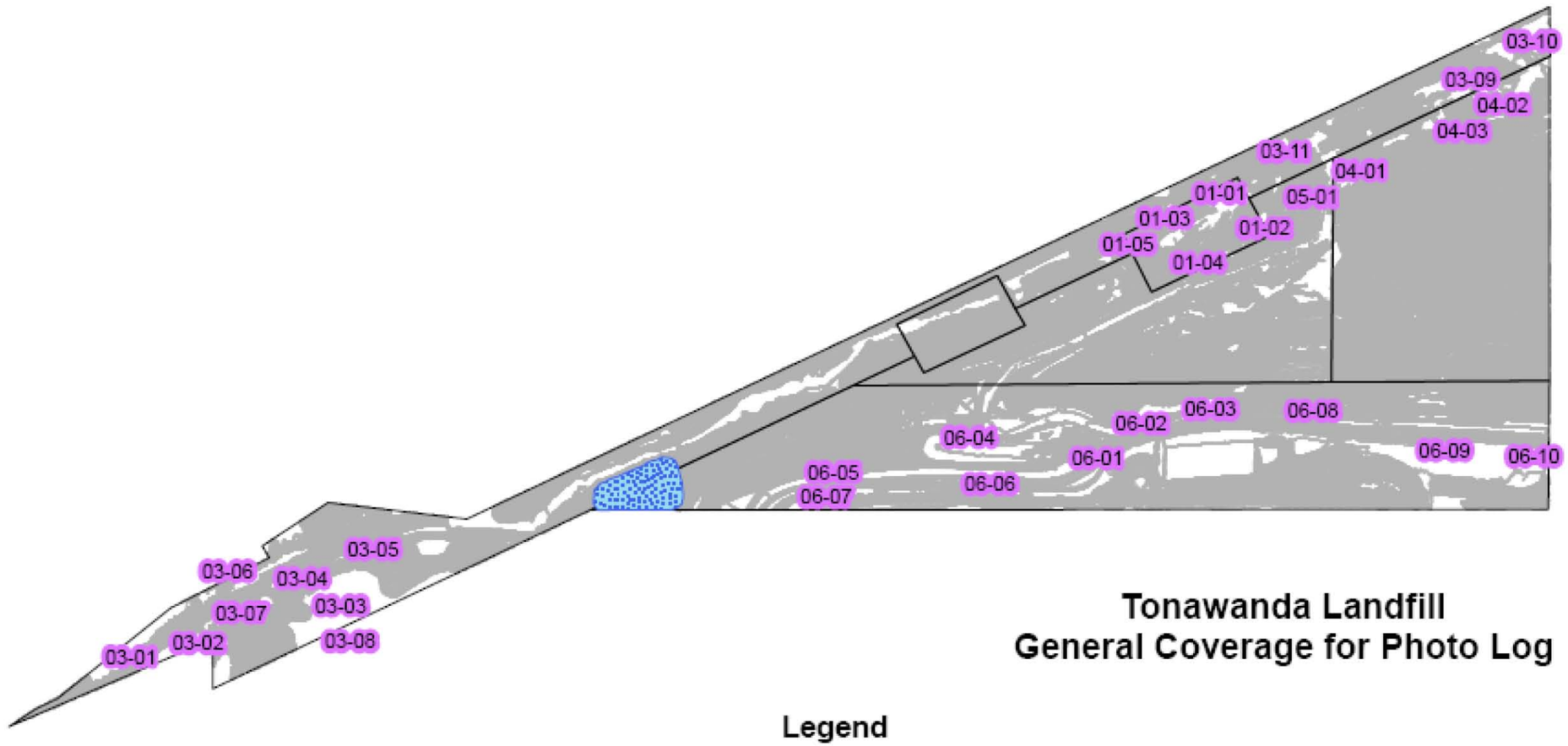
Appendix A. Photo Log of Non-Accessible Areas

Map of Photograph Locations



Tonawanda Landfill
General Coverage for Photo Log

Legend

01-01 Photograph Location

Areas Covered by Gamma Walkover Survey

Surface Water Holding Pond

N

Last Updated 4/18/10

0 200 400 800 1,200 Feet

Photographs of Non-Accessible Areas

IA3-01

IA3-02

IA3-03

IA3-04

IA3-05

IA3-06

IA3-07

IA3-08

IA3-09

IA3-10

IA3-11

IA4-01

IA4-02

IA4-03

IA5-01

IA5-03

IA5-04

IA5-05

IA6-01

IA6-02

IA6-03

IA6-04

IA6-05

IA6-06

IA6-07

IA6-08

IA6-10

IA6_ditch 05

IA 1-01

Appendix B. On-Site Air Sample Results

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-2-09	65	0.0	39.0	< *MDA*	< *MDA*	11-13-09
	13:00	1.59E+07	0.1	42.6	3.84E-14	2.33E-13	9:18
	17:05		-0.1	-3.6			MCS
TLS-Perimeter/downwind	11-2-09	65	0.0	42.0	< *MDA*	< *MDA*	11-13-09
	13:00	1.59E+07	0.1	42.6	3.84E-14	2.33E-13	09:29
	17:05		-0.1	-0.6			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-2-09	4.0	0.0	44.0	< *MDA*	< *MDA*	11-13-09
	08:00	1.92E+06	0.1	42.6	3.18E-13	1.93E-12	09:30
	16:00		-0.1	1.4			MCS
[redacted]	11-2-09	4.0	0.1	47.2	< *MDA*	2.66E-12	11-13-09
	08:00	1.92E+06	0.1	42.6	3.18E-13	1.93E-12	09:19
	16:00		0.0	4.6			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-3-09	65	0.0	38.0	< *MDA*	< *MDA*	11-13-09
	07:00	1.95E+07	0.1	42.6	3.13E-14	1.90E-13	9:43
	12:00		-0.1	-4.6			MCS
TLS-Perimeter/downwind	11-3-09	65	0.1	43.7	< *MDA*	6.27E-14	11-13-09
	07:00	1.95E+07	0.1	42.6	3.13E-14	1.90E-13	09:55
	12:00		0.0	1.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-3-09	4.5	0.0	47.3	< *MDA*	2.15E-12	11-13-09
	08:00	2.43E+06	0.1	42.6	2.51E-13	1.53E-12	10:05
	17:00		-0.1	4.7			MCS
[redacted]	11-3-09	4.5	0	42.0	< *MDA*	< *MDA*	11-13-09
	08:00	2.43E+06	0.1	42.6	2.51E-13	1.53E-12	10:18
	17:00		-0.1	-0.6			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci / mL = \frac{3 + 4.65\ \sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-4-09	65	0.1	21.9	< *MDA*	< *MDA*	11-13-09
	07:00	3.71E+07	0.1	42.6	1.65E-14	1.00E-13	9:52
	16:30		0.0	-20.7			MCS
TLS-Perimeter/downwind	11-4-09	65	0.0	28.9	< *MDA*	< *MDA*	11-13-09
	07:00	3.71E+07	0.1	42.6	1.65E-14	1.00E-13	13:23
	16:30		-0.1	-13.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.34% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-4-09	4.5	0.0	43.2	< *MDA*	< *MDA*	11-13-09
	08:00	2.16E+06	0.1	42.6	2.83E-13	1.72E-12	8:50
	16:00		-0.1	0.6			MCS
[redacted]	11-4-09	4.5	0	39.3	< *MDA*	< *MDA*	11-13-09
	08:00	2.16E+06	0.1	42.6	2.83E-13	1.72E-12	08:54
	16:00		-0.1	-3.3			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-3-09	65	0.1	37.9	< *MDA*	< *MDA*	11-9-09
	07:00	1.95E+07	0.1	43.2	3.13E-14	1.91E-13	9:52
	12:00		0.0	-5.3			JBT
TLS-Perimeter/downwind	11-3-09	65	0.1	41.2	< *MDA*	< *MDA*	11-9-09
	07:00	1.95E+07	0.1	43.2	3.13E-14	1.91E-13	13:23
	12:00		0.0	-2.0			JBT

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.91% **Beta Efficiency:** 40.34% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-5-09	4.0	0.1	41.2	< *MDA*	< *MDA*	11-9-09
	08:00	9.60E+05	0.1	43.2	6.36E-13	3.89E-12	13:15
	12:00		0.0	-2.0			JBT
[redacted]	11-5-09	4.0	0.2	40.5	< *MDA*	< *MDA*	11-9-09
	08:00	1.92E+06	0.1	43.2	3.18E-13	1.94E-12	13:17
	16:00		0.1	-2.7			JBT

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-6-09	65	0.2	43.3	< *MDA*	< *MDA*	11-9-09
	07:30	3.51E+07	0.1	43.2	1.74E-14	1.06E-13	8:22
	16:30		0.1	0.1			JBT
TLS-Perimeter/downwind	11-6-09	65	0.0	43.1	< *MDA*	< *MDA*	11-9-09
	07:40	3.41E+07	0.1	43.2	1.79E-14	1.09E-13	08:42
	16:25		-0.1	-0.1			JBT

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.34% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-6-09	4.0	0.0	44.2	< *MDA*	< *MDA*	11-9-09
	07:30	1.92E+06	0.1	43.2	3.18E-13	1.94E-12	09:37
	15:30		-0.1	1.0			JBT
[redacted]	11-6-09	4.0	0	41.9	< *MDA*	< *MDA*	11-9-09
	07:30	2.16E+06	0.1	43.2	2.83E-13	1.73E-12	09:23
	16:30		-0.1	-1.3			JBT

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-9-09	65	0.1	39.8	< *MDA*	< *MDA*	11-13-09
	08:00	3.22E+07	0.1	42.6	1.90E-14	1.15E-13	9:52
	16:15		0.0	-2.8			MCS
TLS-Perimeter/downwind	11-9-09	65	0.1	41.9	< *MDA*	< *MDA*	11-13-09
	08:00	3.22E+07	0.1	42.6	1.90E-14	1.15E-13	13:23
	16:15		0.0	-0.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.34% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-9-09	4.0	0.1	42.3	< *MDA*	< *MDA*	11-13-09
	08:30	1.90E+06	0.1	42.6	3.21E-13	1.95E-12	13:15
	16:25		0.0	-0.3			MCS
[redacted]	11-9-09	4.0	0.2	40.9	< *MDA*	< *MDA*	11-13-09
	08:00	1.92E+06	0.1	42.6	3.18E-13	1.93E-12	13:17
	16:00		0.1	-1.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-10-09	65	0.1	43.9	< *MDA*	< *MDA*	11-17-09
	08:00	3.28E+07	0.0	44.7	1.25E-14	1.15E-13	9:35
	16:25		0.1	-0.8			MCS
TLS-Perimeter/downwind	11-10-09	65	0.2	46.5	< *MDA*	5.98E-14	11-17-09
	08:05	3.35E+07	0.0	44.7	1.22E-14	1.13E-13	09:47
	16:40		0.2	1.8			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-10-09	4.0	0.0	43.9	< *MDA*	< *MDA*	11-17-09
	08:15	1.94E+06	0.0	44.7	2.11E-13	1.95E-12	10:30
	16:20		0.0	-0.8			MCS
[redacted]	11-10-09	4.0	0.1	41.7	< *MDA*	< *MDA*	11-17-09
	08:10	1.98E+06	0.0	44.7	2.07E-13	1.91E-12	10:44
	16:25		0.1	-3.0			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-12-09	65	0.1	37.4	< *MDA*	< *MDA*	11-18-09
	07:00	1.95E+07	0.0	40.9	2.10E-14	1.87E-13	9:45
	12:00		0.1	-3.5			MCS
TLS-Perimeter/downwind	11-12-09	65	0.2	40.3	< *MDA*	< *MDA*	11-18-09
	07:00	1.95E+07	0	40.9	2.10E-14	1.87E-13	10:00
	12:00		0.2	-0.6			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-12-09	3.5	0.1	42.0	< *MDA*	< *MDA*	11-18-09
	08:00	1.79E+06	0.0	40.9	2.30E-13	2.04E-12	10:50
	16:30		0.1	1.1			MCS
NA	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA		NA	NA			NA

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-13-09	65	0.3	39.6	< *MDA*	< *MDA*	11-18-09
	07:00	1.95E+07	0.1	40.9	3.13E-14	1.87E-13	12:45
	12:00		0.2	-1.3			MCS
TLS-Perimeter/downwind	11-13-09	65	0.1	40.4	< *MDA*	< *MDA*	11-18-09
	07:00	1.95E+07	0.1	40.9	3.13E-14	1.87E-13	13:00
	12:00		0.0	-0.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-13-09	3.5	0.1	40.9	< *MDA*	< *MDA*	11-18-09
	08:30	1.63E+06	0.0	40.9	2.52E-13	2.24E-12	11:20
	16:15		0.1	0.0			MCS
NA	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA		NA	NA			NA

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-16-09	65	0.1	39.6	< *MDA*	< *MDA*	11-23-09
	08:10	3.19E+07	0.0	41.5	1.29E-14	1.15E-13	11:50
	16:20		0.1	-1.9			MCS
TLS-Perimeter/downwind	11-16-09	50	0.2	40.4	< *MDA*	< *MDA*	11-23-09
	08:00	2.45E+07	0.0	41.5	1.67E-14	1.49E-13	12:15
	16:10		0.2	-1.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-16-09	3.5	0.0	41.0	< *MDA*	< *MDA*	11-23-09
	08:00	1.75E+06	0.0	41.5	2.34E-13	2.09E-12	11:45
	16:20		0.0	-0.5			MCS
NA	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA		NA	NA			NA

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-17-09	141.6	0.2	45.1	< *MDA*	5.49E-14	11-23-09
	08:10	7.29E+07	0.0	41.5	5.62E-15	5.02E-14	12:50
	16:45		0.2	3.6			MCS
TLS-Perimeter/downwind	11-17-09	65	0.1	41.3	< *MDA*	< *MDA*	11-23-09
	08:15	3.32E+07	0.0	41.5	1.24E-14	1.10E-13	13:00
	16:45		0.1	-0.2			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-17-09	3.5	0.1	40.9	< *MDA*	< *MDA*	11-23-09
	08:15	1.79E+06	0.0	41.5	2.30E-13	2.05E-12	12:35
	16:45		0.1	-0.6			MCS
NA	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA		NA	NA			NA

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/upwind	11-18-09	141.6	0.3	45.0	6.29E-15	5.97E-14	11-23-09
	07:50	6.51E+07	0.0	41.5	6.29E-15	5.62E-14	13:35
	15:30		0.3	3.5			MCS
TLS-Perimeter/downwind	11-18-09	141.6	0.1	44.3	< *MDA*	4.73E-14	11-23-09
	08:00	6.58E+07	0.0	41.5	6.23E-15	5.56E-14	13:50
	15:45		0.1	2.8			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	11-13-09	3.5	0.1	42.4	< *MDA*	< *MDA*	11-23-09
	08:30	1.63E+06	0.0	41.5	2.52E-13	2.25E-12	11:15
	16:15		0.1	0.9			MCS
NA	NA	NA	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	NA	NA
	NA		NA	NA			NA

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

20-Nov-09

TO: [redacted] Tonawanda, New York FUSRAP Landfill Site Manager
FROM: [redacted] Tonawanda, New York FUSRAP Landfill Site Acting Site RSO

RE: Temporary Air Sampling Suspension

The air sampling requirement of the Tonawanda, New York FUSRAP Landfill Site work plan under Contract Number: W912P4-07-D-0009, D.O. 0003 will be suspended by until further notice by direction of the acting RSO. This action is in response to the recent rain event of 19-Nov-09. Ground saturation mitigates any immediate radiological airborne hazards during intrusive site work for the date 20-Nov-09.

The acting site RSO will review the daily work activities and environmental conditions. When the acting site RSO deems that the potential for creation of radiological airborne conditions exists, the air sampling requirements will be reinstated.

[redacted]

20-Nov-09

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/downwind	2-10-10	227	0.2	42.8	< *MDA*	< *MDA*	2-18-10
	12:50	1.59E+07	0.0	40.1	2.59E-14	2.27E-13	13:40
	14:00		0.2	2.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.91% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-10-10	3.0	0.0	41.5	< *MDA*	< *MDA*	2-18-10
	13:05	1.65E+05	0.0	40.1	2.48E-12	2.19E-11	13:30
	14:00		0.0	1.4			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date / Start Time / Stop Time	Flow Rate (LPM) / Total Volume (mL)	Air Sample α cpm / α BKGD cpm / Net α cpm	Air Sample β cpm / β BKGD cpm / Net β cpm	Alpha Activity (µCi/mL) / Alpha MDA (µCi/mL)	Beta Activity (µCi/mL) / Beta MDA (µCi/mL)	Count Date / Count Time / Tech. Initials
TLS-Perimeter/downwind	2-11-10	198	0.1	44.3	< *MDA*	5.54E-14	2-18-10
	09:20	8.42E+07	0.0	40.1	4.87E-15	4.28E-14	13:50
	16:25		0.1	4.2			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-11-10	3.0	0.0	41.5	< *MDA*	< *MDA*	2-18-10
	09:20	1.28E+06	0.0	40.1	3.22E-13	2.83E-12	13:30
	16:25		0.0	1.4			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
TLS-Perimeter/downwind	2-12-10	198	0.0	45.0	< *MDA*	< *MDA*	2-18-10
	08:55	8.13E+07	0.0	43.0	5.04E-15	4.58E-14	13:50
	15:45		0.0	2.0			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.34% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-12-10	3.0	0.0	38.5	< *MDA*	< *MDA*	2-19-10
	09:45	1.10E+06	0.0	43.0	3.74E-13	3.40E-12	15:15
	15:50		0.0	-4.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	2-15-10	198.1	0.4	46.5	< *MDA*	3.97E-14	2-22-10
	09:00	9.51E+07	0.1	43.1	6.42E-15	3.92E-14	13:10
	17:00		0.3	3.4			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-15-10	3.0	0.0	40.1	< *MDA*	< *MDA*	2-22-10
	09:10	1.40E+06	0.1	43.1	4.38E-13	2.67E-12	13:00
	16:55		-0.1	-3.0			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	2-16-10	198.1	0.0	44.8	< *MDA*	< *MDA*	2-23-10
	08:45	9.51E+07	0.2	42.4	7.30E-15	3.89E-14	16:38
	16:45		-0.2	2.4			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-16-10	3.0	0.0	41.7	< *MDA*	< *MDA*	2-23-10
	08:45	1.46E+06	0.2	42.4	4.77E-13	2.54E-12	16:20
	16:50		-0.2	-0.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	2-17-10	198.1	0.4	41.4	6.27E-15	< *MDA*	2-24-10
	09:00	8.72E+07	0.0	43.4	4.70E-15	4.29E-14	12:40
	16:20		0.4	-2.0			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-17-10	3.0	0.0	41.6	< *MDA*	< *MDA*	2-24-10
	09:35	1.29E+06	0.0	43.4	3.18E-13	2.90E-12	10:40
	16:45		0.0	-1.8			MCS
[redacted] BZ	11-2-09	3.0	0.2	39.4	< *MDA*	< *MDA*	2-24-10
	08:00	1.44E+06	0.0	43.4	2.85E-13	2.60E-12	10:50
	16:00		0.2	-4.0			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	2-18-10	198.1	0.4	40.6	5.81E-15	< *MDA*	2-25-10
	08:50	9.41E+07	0.0	38.7	4.36E-15	3.77E-14	09:20
	16:45		0.4	1.9			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-18-10	3.0	0.0	40.8	< *MDA*	< *MDA*	2-25-10
	08:50	1.35E+06	0.0	38.7	3.04E-13	2.63E-12	08:55
	16:20		0.0	2.1			MCS
[redacted] BZ	2-18-10	3.0	0.1	43.5	< *MDA*	4.13E-12	2-25-10
	09:35	1.29E+06	0.0	38.7	3.18E-13	2.75E-12	09:05
	16:45		0.1	4.8			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	2-19-10	198.1	0.1	45.1	< *MDA*	< *MDA*	2-26-10
	08:45	9.51E+07	0.1	42.2	6.42E-15	3.88E-14	13:30
	16:45		0.0	2.9			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-19-10	3.0	0.0	44.4	< *MDA*	< *MDA*	2-26-10
	08:30	1.26E+06	0.1	42.2	4.85E-13	2.93E-12	13:10
	15:30		-0.1	2.2			MCS
[redacted] BZ	2-19-10	3.0	0.1	34.5	< *MDA*	< *MDA*	2-26-10
	08:30	1.26E+06	0.1	42.2	4.85E-13	2.93E-12	13:20
	15:30		0.0	-7.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	2-22-10	198.1	0.0	43.4	< *MDA*	< *MDA*	3-1-10
	08:20	9.41E+07	0.2	42.5	7.38E-15	3.93E-14	09:00
	16:15		-0.2	0.9			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-22-10	3.0	0.1	41.4	< *MDA*	< *MDA*	3-1-10
	08:10	1.56E+06	0.2	42.5	4.45E-13	2.37E-12	09:10
	16:50		-0.1	-1.1			MCS
[redacted] BZ	2-22-10	3.0	0	43.5	< *MDA*	8.32E-13	3-1-10
	08:35	1.34E+06	0.2	42.5	5.20E-13	2.77E-12	09:20
	16:00		-0.2	1.0			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-23-10	3.0	0.0	37.2	< *MDA*	< *MDA*	3-2-10
	08:00	1.59E+06	0.0	37.0	2.58E-13	2.19E-12	08:40
	16:50		0.0	0.2			MCS
[redacted] BZ	2-23-10	3.0	0	39.1	< *MDA*	1.51E-12	3-2-10
	08:10	1.55E+06	0.0	37	2.65E-13	2.25E-12	08:50
	16:45		0.0	2.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Dat
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Tim
	Stop Time		Net α cpm	Net β cpm			Tech. Initia
GA Downwind	2-23-10	198.1	0.1	40.5	< *MDA*	3.81E-14	3-2-10
	08:15	1.02E+08	0.0	37.0	4.02E-15	3.41E-14	09:40
	16:50		0.1	3.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci / mL = \frac{3 + 4.65\ \sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-24-10	3.0	0.1	38.2	< *MDA*	< *MDA*	3-3-10
	08:00	1.26E+06	0.2	42.2	5.51E-13	2.93E-12	10:05
	15:00		-0.1	-4.0			MCS
[redacted] BZ	2-24-10	3.0	0	40.1	< *MDA*	< *MDA*	3-3-10
	08:15	1.34E+06	0.2	42.2	5.20E-13	2.76E-12	10:20
	15:40		-0.2	-2.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	2-24-10	198.1	0.1	41.0	< *MDA*	< *MDA*	3-3-10
	08:30	8.32E+07	0.2	42.2	8.34E-15	4.44E-14	10:30
	15:30		-0.1	-1.2			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-25-10	3.0	0.0	43.0	< *MDA*	< *MDA*	3-4-10
	08:05	1.56E+06	0.0	43.6	2.63E-13	2.40E-12	10:30
	16:45		0.0	-0.6			MCS
[redacted] BZ	2-25-10	3.0	0.1	42.6	< *MDA*	3.33E-13	3-4-10
	08:15	1.34E+06	0.0	42.2	3.07E-13	2.76E-12	10:40
	15:40		0.1	0.4			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	2-25-10	198.1	0.1	43.7	< *MDA*	< *MDA*	3-4-10
	08:05	1.00E+08	0.0	43.6	4.10E-15	3.74E-14	10:10
	16:30		0.1	0.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	2-26-10	3.0	0.0	42.1	< *MDA*	< *MDA*	3-5-10
	08:30	1.44E+06	0.0	39.4	2.85E-13	2.48E-12	08:40
	16:30		0.0	2.7			MCS
[redacted] BZ	2-26-10	3.0	0	37.3	< *MDA*	< *MDA*	3-5-10
	08:30	5.85E+05	0.0	39.4	7.01E-13	6.11E-12	08:55
	11:45		0.0	-2.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	2-26-10	198.1	0.1	38.4	< *MDA*	< *MDA*	3-5-10
	08:35	8.62E+07	0.0	39.4	4.76E-15	4.15E-14	09:50
	15:50		0.1	-1.0			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted] BZ	3-1-10	3.0	0.0	41.4	< *MDA*	< *MDA*	3-8-10
	08:20	1.52E+06	0.0	43.8	2.71E-13	2.48E-12	11:00
	16:45		0.0	-2.4			MCS
[redacted] BZ	3-1-10	3.0	0	41.6	< *MDA*	< *MDA*	3-8-10
	08:15	6.45E+05	0.0	43.8	6.36E-13	5.82E-12	11:15
	11:50		0.0	-2.2			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-1-10	198.1	0.0	38.4	< *MDA*	< *MDA*	3-8-10
	08:10	9.91E+07	0.0	43.8	4.14E-15	3.79E-14	11:25
	16:30		0.0	-5.4			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-2-10	3.0	0.1	40.2	< *MDA*	< *MDA*	3-9-10
	08:05	1.52E+06	0.0	37.7	2.71E-13	2.31E-12	10:35
	16:30		0.1	2.5			MCS
[redacted]	3-2-10	3.0	0	38.3	< *MDA*	9.66E-13	3-9-10
	12:40	6.90E+05	0.0	37.7	5.94E-13	5.08E-12	10:50
	16:30		0.0	0.6			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-2-10	198.1	0.3	40.0	3.94E-15	< *MDA*	3-3-10
	07:55	1.04E+08	0.0	37.7	3.94E-15	3.37E-14	11:35
	16:40		0.3	2.3			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-3-10	3.0	0.1	39.2	< *MDA*	< *MDA*	3-10-10
	08:10	1.50E+06	0.2	39.7	4.63E-13	2.39E-12	09:10
	16:30		-0.1	-0.5			MCS
[redacted]	3-3-10	3.0	0	43.4	< *MDA*	2.71E-12	3-10-10
	08:15	1.52E+06	0.0	39.7	2.71E-13	2.37E-12	09:30
	16:40		0.0	3.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-3-10	198.1	0.2	43.5	< *MDA*	4.35E-14	3-10-10
	08:15	9.71E+07	0.2	39.7	7.15E-15	3.70E-14	10:15
	16:25		0.0	3.8			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci / mL = \frac{3 + 4.65\ \sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Dat
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Tim
	Stop Time		Net α cpm	Net β cpm			Tech. Initia
[redacted]	3-4-10	3.0	0.2	42.5	< *MDA*	< *MDA*	3-11-10
	09:15	1.22E+06	0.1	41.5	5.03E-13	3.01E-12	09:25
	16:00		0.1	1.0			MCS
[redacted]	3-4-10	3.0	0.1	40	< *MDA*	< *MDA*	3-11-10
	08:20	1.44E+06	0.1	41.5	4.24E-13	2.54E-12	09:40
	16:20		0.0	-1.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-4-10	198.1	0.1	43.4	< *MDA*	< *MDA*	3-11-10
	08:15	9.51E+07	0.1	41.5	6.42E-15	3.85E-14	09:05
	16:15		0.0	1.9			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-5-10	3.0	0.0	46.1	< *MDA*	< *MDA*	3-12-10
	08:00	7.50E+05	0.0	44.7	5.47E-13	5.05E-12	08:30
	12:10		0.0	1.4			MCS
[redacted]	3-5-10	3.0	0	44.2	< *MDA*	< *MDA*	3-12-10
	08:10	7.35E+05	0.0	44.7	5.58E-13	5.15E-12	08:45
	12:15		0.0	-0.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-5-10	198.1	0.1	44.5	< *MDA*	< *MDA*	3-12-10
	08:05	5.25E+07	0.0	44.7	7.81E-15	7.22E-14	09:10
	12:30		0.1	-0.2			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-8-10	3.0	0.2	42.6	< *MDA*	< *MDA*	3-15-10
	08:15	1.34E+06	0.1	44.0	4.58E-13	2.82E-12	08:20
	15:40		0.1	-1.4			MCS
[redacted]	3-8-10	3.0	0.2	41.6	< *MDA*	< *MDA*	3-15-10
	08:30	1.10E+06	0.1	44.0	5.58E-13	3.43E-12	08:35
	14:35		0.1	-2.4			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\ \sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date / Start Time / Stop Time	Flow Rate (LPM) / Total Volume (mL)	Air Sample α cpm / α BKGD cpm / Net α cpm	Air Sample β cpm / β BKGD cpm / Net β cpm	Alpha Activity (µCi/mL) / Alpha MDA (µCi/mL)	Beta Activity (µCi/mL) / Beta MDA (µCi/mL)
GA Downwind	3-8-10	198.1	0.1	45.9	< *MDA*	< *MDA*
	08:10	9.21E+07	0.1	44.0	6.63E-15	4.08E-14
	15:55		0.0	1.9		

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 mi

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-10-10	198.1	0.0	46.3	< *MDA*	< *MDA*	3-17-10
	08:15	1.00E+08	0.0	43.1	4.10E-15	3.72E-14	12:00
	16:40		0.0	3.2			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-10-10	3.0	0.1	44.0	< *MDA*	< *MDA*	3-17-10
	08:30	1.50E+06	0.0	43.1	2.73E-13	2.48E-12	10:30
	16:50		0.1	0.9			MCS
[redacted]	3-10-10	3.0	0.1	43.7	< *MDA*	4.58E-13	3-17-10
	08:25	1.46E+06	0.0	43.1	2.82E-13	2.56E-12	10:50
	16:30		0.1	0.6			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-10-10	3.0	0.0	43.8	< *MDA*	< *MDA*	3-17-10
	08:05	1.40E+06	0.0	43.1	2.94E-13	2.67E-12	11:25
	15:50		0.0	0.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-11-10	3.0	0.1	36.5	< *MDA*	< *MDA*	3-18-10
	08:15	1.47E+06	0.0	42.0	2.79E-13	2.50E-12	09:20
	16:25		0.1	-5.5			MCS
[redacted]	3-11-10	3.0	0.1	43.1	< *MDA*	8.49E-13	3-18-10
	08:20	1.44E+06	0.0	42.0	2.85E-13	2.56E-12	09:35
	16:20		0.1	1.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-11-10	3.0	0.2	42.7	< *MDA*	< *MDA*	3-18-10
	08:00	1.41E+06	0.0	42.0	2.91E-13	2.61E-12	09:55
	15:50		0.2	0.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Cou
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Cou
	Stop Time		Net α cpm	Net β cpm			Tech.
GA Downwind	3-11-10	198.1	0.2	44.6	< *MDA*	< *MDA*	3-1
	08:05	1.00E+08	0.0	42.0	4.10E-15	3.68E-14	1
	16:30		0.2	2.6			M

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-12-10	3.0	0.1	41.7	< *MDA*	< *MDA*	3-19-10
	08:10	1.46E+06	0.0	41.4	2.82E-13	2.51E-12	08:15
	16:15		0.1	0.3			MCS
[redacted]	3-12-10	3.0	0.1	42.3	< *MDA*	7.66E-13	3-19-10
	09:00	1.31E+06	0.0	41.4	3.14E-13	2.80E-12	08:30
	16:15		0.1	0.9			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-12-10	198.1	0.1	44.6	< *MDA*	< *MDA*	3-19-10
	08:25	9.41E+07	0.0	41.4	4.36E-15	3.89E-14	08:45
	16:20		0.1	3.2			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Dat
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Tim
	Stop Time		Net α cpm	Net β cpm			Tech. Initia
[redacted]	3-15-10	3.0	0.0	40.2	< *MDA*	< *MDA*	3-22-10
	08:10	1.40E+06	0.1	43.5	4.38E-13	2.68E-12	08:25
	15:55		-0.1	-3.3			MCS
[redacted]	3-15-10	3.0	0.3	40.9	< *MDA*	< *MDA*	3-22-10
	08:30	1.53E+06	0.1	43.5	3.99E-13	2.45E-12	08:40
	17:00		0.2	-2.6			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-15-10	198.1	0.2	46.8	< *MDA*	< *MDA*	3-22-10
	08:20	9.31E+07	0.1	43.5	6.56E-15	4.02E-14	09:15
	16:10		0.1	3.3			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-16-10	3.0	0.0	39.8	< *MDA*	< *MDA*	3-23-10
	08:30	1.34E+06	0.0	42.2	3.07E-13	2.76E-12	07:40
	15:55		0.0	-2.4			MCS
[redacted]	3-16-10	3.0	0.0	39.2	< *MDA*	< *MDA*	3-23-10
	08:40	1.19E+06	0.0	42.2	3.46E-13	3.11E-12	08:05
	15:15		0.0	-3.0			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-16-10	3.0	0.2	44.4	< *MDA*	< *MDA*	3-23-10
	08:10	1.26E+06	0.0	42.2	3.25E-13	2.93E-12	08:20
	15:10		0.2	2.2			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-16-10	198.1	0.3	41.5	4.31E-15	< *MDA*	3-23-10
	08:00	9.51E+07	0.0	42.2	4.31E-15	3.88E-14	08:35
	16:00		0.3	-0.7			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-17-10	3.0	0.1	44.2	< *MDA*	< *MDA*	3-24-10
	09:00	1.25E+06	0.0	43.7	3.29E-13	3.01E-12	08:10
	15:55		0.1	0.5			MCS
[redacted]	3-17-10	3.0	0.0	38.9	< *MDA*	< *MDA*	3-24-10
	08:20	1.44E+06	0.0	43.7	2.85E-13	2.60E-12	08:25
	16:20		0.0	-4.8			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-17-10	3.0	0.0	41.2	< *MDA*	< *MDA*	3-24-10
	08:20	6.60E+05	0.0	43.7	6.21E-13	5.68E-12	08:40
	12:00		0.0	-2.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-17-10	198.1	0.1	45.8	< *MDA*	< *MDA*	3-24-10
	08:00	8.91E+07	0.0	43.7	4.60E-15	4.21E-14	08:55
	15:30		0.1	2.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-19-10	3.0	0.1	42.6	< *MDA*	< *MDA*	3-26-10
	08:15	1.31E+06	0.2	40.6	5.32E-13	2.78E-12	08:20
	15:30		-0.1	2.0			MCS
[redacted]	3-19-10	3.0	0.0	43.6	< *MDA*	6.73E-12	3-26-10
	08:15	4.95E+05	0.2	40.6	1.40E-12	7.33E-12	08:35
	11:00		-0.2	3.0			

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-19-10	3.0	0.2	41.4	< *MDA*	< *MDA*	3-26-10
	08:00	4.50E+05	0.2	40.6	1.54E-12	8.06E-12	08:45
	10:30		0.0	0.8			MCS
		3.0					

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci / mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-17-10	198.1	0.1	45.8	< *MDA*	< *MDA*	3-24-10
	08:00	8.91E+07	0.0	43.7	4.60E-15	4.21E-14	08:55
	15:30		0.1	2.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Dat
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Tim
	Stop Time		Net α cpm	Net β cpm			Tech. Initia
[redacted]	3-22-10	3.0	0.0	44.5	< *MDA*	< *MDA*	3-29-10
	08:40	4.65E+05	0.0	46.4	8.82E-13	8.29E-12	07:45
	11:15		0.0	-1.9			MCS
[redacted]	3-22-10	3.0	0.1	41.3	< *MDA*	< *MDA*	3-29-10
	08:15	4.95E+05	0.0	46.4	8.28E-13	7.78E-12	08:05
	11:00		0.1	-5.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-22-10	198.1	0.1	42.4	< *MDA*	< *MDA*	3-29-10
	08:05	7.03E+07	0.0	46.0	5.83E-15	5.46E-14	08:35
	14:00		0.1	-3.6			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-23-10	3.0	0.1	41.8	< *MDA*	< *MDA*	3-30-10
	08:40	4.65E+05	0.1	41.1	1.31E-12	7.84E-12	08:10
	11:15		0.0	0.7			MCS
[redacted]	3-23-10	3.0	0.0	42.6	< *MDA*	3.17E-12	3-30-10
	08:45	5.25E+05	0.1	41.1	1.16E-12	6.94E-12	08:35
	11:40		-0.1	1.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Da
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Tir
	Stop Time		Net α cpm	Net β cpm			Tech. Initi
GA Downwind	3-23-10	198.1	0.2	43.4	< *MDA*	< *MDA*	3-30-10
	08:05	7.03E+07	0.1	41.1	8.69E-15	5.18E-14	09:15
	14:00		0.1	2.3			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci / mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci / mL = \frac{3 + 4.65\ \sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-24-10	3.0	0.1	41.8	< *MDA*	< *MDA*	3-31-10
	08:00	1.32E+06	0.1	44.3	4.63E-13	2.86E-12	00:00
	15:20		0.0	-2.5			MCS
[redacted]							

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-24-10	198.1	0.2	45.1	< *MDA*	< *MDA*	3-31-10
	08:05	8.72E+07	0.1	44.3	7.01E-15	4.33E-14	00:00
	15:25		0.1	0.8			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-26-10	3.0	0.2	41.9	< *MDA*	< *MDA*	4-2-10
	09:00	1.16E+06	0.2	41.1	6.01E-13	3.16E-12	07:25
	15:25		0.0	0.8			MCS
[redacted]	3-26-10	3.0	0.1	39	< *MDA*	< *MDA*	4-2-10
	09:20	1.23E+06	0.2	41.1	5.64E-13	2.96E-12	07:40
	16:10		-0.1	-2.1			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-26-10	198.1	0.2	44.1	< *MDA*	< *MDA*	4-2-10
	08:00	9.51E+07	0.2	41.1	7.30E-15	3.83E-14	08:15
	16:00		0.0	3.0			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-29-10	3.0	0.1	40.0	< *MDA*	< *MDA*	4-5-10
	08:40	1.20E+06	0.0	43.6	3.42E-13	3.12E-12	07:30
	15:20		0.1	-3.6			MCS
[redacted]	3-29-10	3.0	0.2	44.1	< *MDA*	4.41E-13	4-5-10
	08:30	1.26E+06	0.0	43.6	3.25E-13	2.97E-12	07:35
	15:30		0.2	0.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3-29-10	198.1	0.1	45.1	< *MDA*	< *MDA*	4-5-10
	08:15	8.42E+07	0.0	43.6	4.87E-15	4.45E-14	08:10
	15:20		0.1	1.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
[redacted]	3-30-10	3.0	0.0	42.4	< *MDA*	< *MDA*	4-5-10
	08:40	1.23E+06	0.0	43.6	3.33E-13	3.05E-12	08:30
	15:30		0.0	-1.2			MCS
[redacted]	3-30-10	3.0	0.0	42.2	< *MDA*	< *MDA*	4-5-10
	08:00	1.35E+06	0.0	43.6	3.04E-13	2.77E-12	08:45
	15:30		0.0	-1.4			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff)\cdot(volume_{mL})\cdot(Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Field Air Sample Count Log
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York, Contract Number: W912P4-07-D-0009, D.O. 0003

Sample I.D.	Date	Flow Rate (LPM)	Air Sample α cpm	Air Sample β cpm	Alpha Activity (µCi/mL)	Beta Activity (µCi/mL)	Count Date
	Start Time	Total Volume (mL)	α BKGD cpm	β BKGD cpm	Alpha MDA (µCi/mL)	Beta MDA (µCi/mL)	Count Time
	Stop Time		Net α cpm	Net β cpm			Tech. Initials
GA Downwind	3/230/2010	198.1	0.2	45.1	< *MDA*	< *MDA*	4-5-10
	15:30	5.94E+06	0.0	43.6	6.90E-14	6.30E-13	09:00
	16:00		0.2	1.5			MCS

Note: *10 minute background and air sample counts performed.*

Counting Instrument Used: Ludlum Model 2929 **Serial Number:** 176083 **Date of Calibration:** 10-19-2009

Alpha Efficiency: 32.97% **Beta Efficiency:** 40.54% **Count Time:** 10 minutes

$$Alpha\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{alpha} \cdot Volume_{mL}}$$

$$Beta\ \mu Ci/mL = \frac{Net\ alpha\ cpm \cdot 4.505E\text{-}07}{eff_{beta} \cdot Volume_{mL}}$$

$$MDA\ \mu Ci/mL = \frac{3 + 4.65\sqrt{BKGD_{cpm}}}{(eff) \cdot (volume_{mL}) \cdot (Count\ Time_{sample})} \cdot 4.505E\text{-}07$$

Appendix C. Radiological Surveys

Equipment and Vehicle Receipt Surveys
Vehicle Survey Logs
Safety and Meeting Conex Weekly Routine Surveys
Conex Weekly Surveys
IDW Storage Area Weekly Surveys
Sample Shipment Surveys
Free Release Surveys
Miscellaneous Surveys

Equipment and Vehicle Receipt Surveys

MATERIAL/VEHICLE RECIEPT SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 10-Feb-10 **TIME:** 9:15

INSTRUMENT MODEL/SERIAL #: 2360/136281 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 188 **ALPHA Eff.:** 0.211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 44 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
1	Zebra drill Rig #1	Right track	<100		<5K		<20		<1K
2	Zebra drill Rig #1	Right track	<100		<5K		<20		<1K
3	Zebra drill Rig #1	Right track	<100		<5K		<20		<1K
4	Zebra drill Rig #1	Left track	<100		<5K		<20		<1K
5	Zebra drill Rig #1	Left track	<100		<5K		<20		<1K
6	Zebra drill Rig #1	Left track	<100		<5K		<20		<1K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
7	Zebra drill Rig #1	Rig body front	<100		<5K		<20		<1K
8	Zebra drill Rig #1	Rig body front	<100		<5K		<20		<1K
9	Zebra drill Rig #1	Rig body rear	<100		<5K		<20		<1K
10	Zebra drill Rig #1	Rig body rear	<100		<5K		<20		<1K
11	Zebra drill Rig #1	Rig mast	<100		<5K		<20		<1K
12	Zebra drill Rig #1	Rig mast	<100		<5K		<20		<1K
13	Zebra drill Rig #1	Rig mast	<100		<5K		<20		<1K
14	Zebra drill Rig #1	Rig core tube tray	<100		<5K		<20		<1K
15	Zebra drill Rig #1	Rig core tube tray	<100		<5K		<20		<1K
16	Zebra drill Rig #1	Rig core tube tray	<100		<5K		<20		<1K
17									
18									
19									
20									
21									

MATERIAL/VEHICLE RECIEPT SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 12-Feb-10 **TIME:** 15:45

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 181 **ALPHA Eff.:** 0.211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 36 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
1	Bob Cat 206-06-6015	Right track	<100	<5K	<20	<1K
2	Bob Cat 206-06-6015	Right track	<100	<5K	<20	<1K
3	Bob Cat 206-06-6015	Right track	<100	<5K	<20	<1K
4	Bob Cat 206-06-6015	Left track	<100	<5K	<20	<1K
5	Bob Cat 206-06-6015	Left track	<100	<5K	<20	<1K
6	Bob Cat 206-06-6015	Left track	<100	<5K	<20	<1K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
7	Bob Cat 206-06-6015	Body front	<100		<5K		<20		<1K
8	Bob Cat 206-06-6015	Body front	<100		<5K		<20		<1K
9	Bob Cat 206-06-6015	Body front	<100		<5K		<20		<1K
10	Bob Cat 206-06-6015	Body front	<100		<5K		<20		<1K
11	Bob Cat 206-06-6015	Forks	<100		<5K		<20		<1K
12	Bob Cat 206-06-6015	Forks	<100		<5K		<20		<1K
13	Bob Cat 206-06-6015	Right lift arm	<100		<5K		<20		<1K
14	Bob Cat 206-06-6015	Right lift arm	<100		<5K		<20		<1K
15	Bob Cat 206-06-6015	Left lift arm	<100		<5K		<20		<1K
16	Bob Cat 206-06-6015	Left lift arm	<100		<5K		<20		<1K
17									
18									
19									
20									
21									

MATERIAL/VEHICLE RECIEPT SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 2/162010 **TIME:** 9:00

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 11-Dec-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 197 **ALPHA Eff.:** 0.211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: .2 **BETA/GAMMA Bkg:** 43.9 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
1	Zebra drill Rig #2	Right track	<100	<5K	<20	<1K
2	Zebra drill Rig #2	Right track	<100	<5K	<20	<1K
3	Zebra drill Rig #2	Right track	<100	<5K	<20	<1K
4	Zebra drill Rig #2	Left track	<100	<5K	<20	<1K
5	Zebra drill Rig #2	Left track	<100	<5K	<20	<1K
6	Zebra drill Rig #2	Left track	<100	<5K	<20	<1K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
7	Zebra drill Rig #2	Rig body front	<100		<5K		<20		<1K
8	Zebra drill Rig #2	Rig body front	<100		<5K		<20		<1K
9	Zebra drill Rig #2	Rig body rear	<100		<5K		<20		<1K
10	Zebra drill Rig #2	Rig body rear	<100		<5K		<20		<1K
11	Zebra drill Rig #2	Rig mast	<100		<5K		<20		<1K
12	Zebra drill Rig #2	Rig mast	<100		<5K		<20		<1K
13	Zebra drill Rig #2	Rig mast	<100		<5K		<20		<1K
14	Zebra drill Rig #2	Rig core tube tray	<100		<5K		<20		<1K
15	Zebra drill Rig #2	Rig core tube tray	<100		<5K		<20		<1K
16	Zebra drill Rig #2	Rig core tube tray	<100		<5K		<20		<1K
17									
18									
19									
20									
21									

MATERIAL/VEHICLE RECIEPT SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 19-Feb-10 **TIME:** 12:45

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 189 **ALPHA Eff.:** 0.211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.0 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
1	Conex AS40SYW0875	Interior Floor	<100	<5K	<20	<1K
2	Conex AS40SYW0875	Interior Floor	<100	<5K	<20	<1K
3	Conex AS40SYW0875	Interior Floor	<100	<5K	<20	<1K
4	Conex AS40SYW0875	Interior Floor	<100	<5K	<20	<1K
5	Conex AS40SYW0875	Interior wall end	<100	<5K	<20	<1K
6	Conex AS40SYW0875	Interior wall side	<100	<5K	<20	<1K
7	Conex AS40SYW0875	Interior wall side	<100	<5K	<20	<1K
8	Conex AS40SYW0875	interior wall end	<100	<5K	<20	<1K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
9	Conex AS40SYW0875	Interior wall side	<100		<5K		<20		<1K
10	Conex AS40SYW0875	Interior wall side	<100		<5K		<20		<1K
11	Conex AS40SYW0875	Exterior wall end	<100		<5K		<20		<1K
12	Conex AS40SYW0875	Exterior wall side	<100		<5K		<20		<1K
13	Bob Cat 206-06-6015	Exterior wall side	<100		<5K		<20		<1K
14	Bob Cat 206-06-6015	Exterior wall end	<100		<5K		<20		<1K
15	Bob Cat 206-06-6015	Exterior wall side	<100		<5K		<20		<1K
16	Bob Cat 206-06-6015	Exterior wall side	<100		<5K		<20		<1K

COMMENTS:

MATERIAL/VEHICLE RECIEPT SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 22-Feb-10 **TIME:** 10:30

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 167 **ALPHA Eff.:** 0.211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: .1 **BETA/GAMMA Bkg:** 43.1 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
1	Kubota #780-11-6037	Right front wheel	<100	<5K	<20	<1K
2	Kubota #780-11-6037	Left front wheel	<100	<5K	<20	<1K
3	Kubota #780-11-6037	Right rear wheel	<100	<5K	<20	<1K
4	Kubota #780-11-6037	Left rear wheel	<100	<5K	<20	<1K
5	Kubota #780-11-6037	Right side i/s cab	<100	<5K	<20	<1K
6	Kubota #780-11-6037	Left side i/s cab	<100	<5K	<20	<1K
7	Kubota #780-11-6037	Right side seat	<100	<5K	<20	<1K
8	Kubota #780-11-6037	Left side seat	<100	<5K	<20	<1K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
9	Kubota #780-11-6037	Right side cab floor	<100		<5K		<20		<1K
10	Kubota #780-11-6037	Left side cab floor	<100		<5K		<20		<1K
11	Kubota #780-11-6037	Transport bed	<100		<5K		<20		<1K
12	Kubota #780-11-6037	Transport bed	<100		<5K		<20		<1K
13	Kubota #780-11-6037	Transport bed	<100		<5K		<20		<1K
14	Kubota #780-11-6037	Transport bed	<100		<5K		<20		<1K

COMMENTS:

MATERIAL/VEHICLE RECIEPT SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 1-Mar-10 **TIME:** 13:50

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 192 **ALPHA Eff.:** 0.211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: .2 **BETA/GAMMA Bkg:** 42.5 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
1	Takeuchi #206-07-7000	Right track	<100	<5K	<20	<1K
2	Takeuchi #206-07-7000	Right track	<100	<5K	<20	<1K
3	Takeuchi #206-07-7000	Right track	<100	<5K	<20	<1K
4	Takeuchi #206-07-7000	Left track	<100	<5K	<20	<1K
5	Takeuchi #206-07-7000	Left track	<100	<5K	<20	<1K
6	Takeuchi #206-07-7000	Left track	<100	<5K	<20	<1K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
7	Takeuchi #206-07-7000	Body front	<100		<5K		<20		<1K
8	Takeuchi #206-07-7000	Body front	<100		<5K		<20		<1K
9	Takeuchi #206-07-7000	Body front	<100		<5K		<20		<1K
10	Takeuchi #206-07-7000	Body front	<100		<5K		<20		<1K
11	Takeuchi #206-07-7000	Forks	<100		<5K		<20		<1K
12	Takeuchi #206-07-7000	Forks	<100		<5K		<20		<1K
13	Takeuchi #206-07-7000	Right lift arm	<100		<5K		<20		<1K
14	Takeuchi #206-07-7000	Right lift arm	<100		<5K		<20		<1K
15	Takeuchi #206-07-7000	Left lift arm	<100		<5K		<20		<1K
16	Takeuchi #206-07-7000	Left lift arm	<100		<5K		<20		<1K

COMMENTS: None

MATERIAL/VEHICLE RECIEPT SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 5-Mar-10 **TIME:** 9:30

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 11-Dec-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 182 **ALPHA Eff.:** 0.211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.6 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
1	Zebra drill Rig #3	Right track	<100		<5K		<20		<1K
2	Zebra drill Rig #3	Right track	<100		<5K		<20		<1K
3	Zebra drill Rig #3	Right track	<100		<5K		<20		<1K
4	Zebra drill Rig #3	Left track	<100		<5K		<20		<1K
5	Zebra drill Rig #3	Left track	<100		<5K		<20		<1K
6	Zebra drill Rig #3	Left track	<100		<5K		<20		<1K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
7	Zebra drill Rig #3	Rig body front	<100		<5K		<20		<1K
8	Zebra drill Rig #3	Rig body front	<100		<5K		<20		<1K
9	Zebra drill Rig #3	Rig body rear	<100		<5K		<20		<1K
10	Zebra drill Rig #3	Rig body rear	<100		<5K		<20		<1K
11	Zebra drill Rig #3	Rig mast	<100		<5K		<20		<1K
12	Zebra drill Rig #3	Rig mast	<100		<5K		<20		<1K
13	Zebra drill Rig #3	Rig mast	<100		<5K		<20		<1K
14	Zebra drill Rig #3	Rig core tube tray	<100		<5K		<20		<1K
15	Zebra drill Rig #3	Rig core tube tray	<100		<5K		<20		<1K
16	Zebra drill Rig #3	Rig core tube tray	<100		<5K		<20		<1K

COMMENTS: none

Vehicle Survey Logs

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup X299151	ARS	11/4/09	1325	40	40	[redacted]
206-05-6128 T-190 Bobcat	ARS [Hertz]	11/4/09	1130	40	40	[redacted]
Drill Rig	Zebra Drilling	11/4/09	1350	40	40	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	11/9/09	1635	40	40	[redacted]
206-05-6128 [T-190 Bobcat]	ARS [Hertz]	11/9/09	1645	40	40	
Drill Rig	Zebra Drilling	11/9/09	1655	40	40	
GMC 2500 Zebra Support Truck NY 21938-JW	Zebra Drilling	NA				
Silver Chevy Silverado LA X299151	ARS	11/9/09	1650	40	60	

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	11/10/09	1640	60	60	[redacted]
206-05-6128 [T-190 Bobcat]	ARS [Hertz]	11/10/09	1635	60	80	
Drill Rig	Zebra Drilling	11/10/09	1645	60	60	
GMC 2500 Zebra Support Truck NY 21938-JW	Zebra Drilling	11/10/09	1645	60	60	
Silver Chevy Silverado LA X299151	ARS	11/10/09	1650	60	80	

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	11/11 /09	1100	60	80	[redacted]
206-05-6128 [T-190 Bobcat]	ARS [Hertz]	11/11/09	1110	60	60	[redacted]
[Drill Rig	Zebra Drilling	11/11/09	1115	60	60	[redacted]
GMC 2500 Zebra Support Truck NY 21938-JW	Zebra Drilling	11/11/09	1050	60	60	[redacted]
Silver Chevy Silverado LA W930834	ARS	11/11/09	1050	60	80	[redacted]
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	11/11/09	1125	60	80	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
LA X299151 [Red Chevy Pickup]	ARS	11/12/09	1625	40	40	[redacted]
206-05-6128 [T-190 Bobcat]	ARS [Hertz]	11/12/09	1640	40	60	[redacted]
[Drill Rig	Zebra Drilling	NA				
GMC 2500 Zebra Support Truck NY 21938-JW	Zebra Drilling	NA				
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	11/12/09	1640	40	40	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 [T-190 Bobcat]	ARS [Hertz]	11/13/09	1635	40	60	[redacted]
[Drill Rig	Zebra Drilling	11/13/09	1640	40	40	[redacted]
GMC 2500 Zebra Support Truck NY 21938-JW	Zebra Drilling	11/13/09	1650	40	40	[redacted]
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	11/13/09	1650	40	60	[redacted]
Polaris	SEC	11/13/09	1650	40	60	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	11/16/09	1640	40	40	[redacted]
206-05-6128 [T-190 Bobcat]	ARS [Hertz]	11/16/09	1640	40	60	[redacted]
[Drill Rig	Zebra Drilling	11/16/09	1645	40	40	[redacted]
GMC 2500 Zebra Support Truck NY 21938-JW	Zebra Drilling	11/16/09	1645	40	40	[redacted]
Silver Chevy Silverado LA W930834	ARS	11/16/09	1655	40	60	[redacted]
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	11/16/09	1650	40	40	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 [T-190 Bobcat]	ARS [Hertz]	11/17/09	1650	40	40	[redacted]
[Drill Rig	Zebra Drilling	11/17/09	1650	40	60	
GMC 2500 Zebra Support Truck NY 68875-JV	Zebra Drilling	11/17/09	1645	40	40	
Silver Chevy Silverado LA W930834	ARS	11/17/09	NA	40	40	
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	11/17/09	1655	40	60	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 T-190 Bobcat	ARS [Hertz]	11/18/09	1600	40	40	[redacted]
Drill Rig	Zebra Drilling	11/18/09	1600	40	40	[redacted]
GMC 2500 Zebra Support Truck NY 68875-JV	Zebra Drilling	11/18/09	1605	40	60	[redacted]
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	11/18/09	1605	40	40	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 T-190 Bobcat	ARS [Hertz]	11/20/09	1605	40	40	[redacted]
Drill Rig	Zebra Drilling	11/20/09	1615	40	60	[redacted]
GMC 2500 Zebra Support Truck NY 68875-JV	Zebra Drilling	11/20/09	1615	40	40	[redacted]
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	11/20/09	1600	40	60	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 T-190 Bobcat	ARS [Hertz]	12/1/09	1630	40	40	[redacted]
Drill Rig	Zebra Drilling	12/1/09	1635	40	60	
GMC 2500 Zebra Support Truck NY 68875-JV	Zebra Drilling	NA				
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	12/1/09	1640	40	60	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 T-190 Bobcat	ARS [Hertz]	12/2/09	1535	40	60	[redacted]
Drill Rig	Zebra Drilling	12/2/09	1540	40	40	[redacted]
GMC 2500 Zebra Support Truck NY 68875-JV	Zebra Drilling	NA				
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	12/2/09	1545	40	40	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 T-190 Bobcat	ARS [Hertz]	12/3/09	1550	40	60	[redacted]
Drill Rig	Zebra Drilling	12/3/09	1555	40	40	
GMC 2500 Zebra Support Truck NY 68875-JV	Zebra Drilling	NA				
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	NA				

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 T-190 Bobcat	ARS [Hertz]	12/4/09	1600	40	60	[redacted]
Drill Rig	Zebra Drilling	NA				
GMC 2500 Zebra Support Truck NY 68875-JV	Zebra Drilling	NA				
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	12/4/09	1605	40	40	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 T-190 Bobcat	ARS [Hertz]	NA				
Drill Rig	Zebra Drilling	NA				
GMC 2500 Zebra Support Truck NY 68875-JV	Zebra Drilling	NA				
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	12/5/09	1555	40	60	[redacted]

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 T-190 Bobcat	ARS [Hertz]	12/08/09	1550	40	60	[redacted]
Polaris	SEC	12/08/09	1600	40	60	[redacted]
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				

VEHICLE SURVEY LOG

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Vehicle License Plate Number	Company	Date	Time	Background (cpm)	Maximum Frisk Reading (cpm)	Surveyor Initials
Red Chevy Pickup LA X299151	ARS	NA				
206-05-6128 T-190 Bobcat	ARS [Hertz]	NA				
Drill Rig	Zebra Drilling	NA				
GMC 2500 Zebra Support Truck NY 68875-JV	Zebra Drilling	NA				
Silver Chevy Silverado LA W930834	ARS	NA				
Grey Chevy Pickup LA X299152	ARS	NA				
Polaris	SEC	12/7/09	1610	40	40	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#:	2929	**SERIAL# / PROBE#:**	176083/PR181590			**CAL DUE:**	19-Oct-10
BKG ALPHA:	.2	**BKG BETA/GAMMA:**	46.5	**ALPHA EFF.:**	0.329	**BETA/GAMMA EFF.:**	0.405
DATE:	11-Dec-09	**TIME:**	1635	**SURVEYED BY:**	[redacted]		

VEHICLE ID	COMPANY	Removable Alpha:		Removable BETA/ GAMMA:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		1635	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 44.9 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 13-Dec-09 **TIME:** 16:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable BETA/ GAMMA:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		1600	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 42.5 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 14-Dec-09 **TIME:** 16:10 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable BETA/ GAMMA:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:10	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 45.1 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 15-Dec-09 **TIME:** 16:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable BETA/ GAMMA:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:00	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 42.9 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 16-Dec-09 **TIME:** 16:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable BETA/ GAMMA:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:15	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 41.9 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 17-Dec-09 **TIME:** 16:20 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable BETA/ GAMMA:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:15	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 36.4 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 5-Jan-10 **TIME:** 14:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable BETA/ GAMMA:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		14:00	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 43.7 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 6-Jan-10 **TIME:** 15:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable BETA/ GAMMA:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)	<20		<1K		15:00	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:00	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 40.5 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 7-Jan-10 **TIME:** 15:45 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable BETA/ GAMMA:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)	<20		<1K		15:45	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:45	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 44.5 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 8-Jan-10 **TIME:** 15:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)	<20		<1K		15:15	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:15	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 40.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 11-Jan-10 **TIME:** 14:25 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)	<20		<1K		14:25	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		14:25	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 42.3 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 13-Jan-10 **TIME:** **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K			

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonowanda New York
Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 42.3 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 13-Jan-10 **TIME:** 14:45 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		14:45	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 38.4 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 14-Jan-10 **TIME:** 16:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)	<20		<1K		16:15	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:15	[redacted]
Komatsu Excavator #450-56194	City of Tonawanda	<20		<1K		16:15	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 42.7 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 16-Jan-10 **TIME:** 12:45 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)	<20		<1K		12:45	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		12:45	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 43.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 18-Jan-10 **TIME:** 14:50 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		14:50	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 43.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 19-Jan-10 **TIME:** 15:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:00	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 42.3 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 20-Jan-10 **TIME:** 14:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS	<20		<1K		14:25	MCS
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		14:15	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 41.8 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 21-Jan-10 **TIME:** 15:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20 dpm		<1K dpm		15:00	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 42.3 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 23-Jan-10 **TIME:** 10:20 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		10:20	[redacted]

[redacted] Site RSO

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 44.2 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 25-Jan-10 **TIME:** 15:45 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:45	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 46.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 26-Jan-10 **TIME:** 16:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
T-160 BOBCAT 206-05-6128	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:15	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 38.6 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 11-Feb-10 **TIME:** 16:45 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS	<20		<1K		16:45	[redacted]
T-160 BOBCAT 206-05-6128	ARS (Hertz)	<20		<1K		16:45	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:45	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:45	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 36.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 12-Feb-10 **TIME:** 16:05 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS						
Bobcat 206-05-6171	ARS (Hertz)	<20		<1K		15:40	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:55	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:05	
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		15:45	
Chevy P/U TN 57201	SEC	<20		<1K		15:50	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 44.1 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 15-Feb-10 **TIME:** 17:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Bobcat 206-05-6171	ARS (Hertz)	<20		<1K		17:10	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:55	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		17:00	
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		16:58	
Chevy P/U TN 57201	SEC	<20		<1K		17:05	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 43.9 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 16-Feb-10 **TIME:** 16:55 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Bobcat 206-05-6171	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:40	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:45	
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		16:55	
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		16:50	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 40.6 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 17-Feb-10 **TIME:** 17:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Bobcat 206-05-6171	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:50	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:57	
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		16:52	
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		16:55	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 41.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 18-Feb-10 **TIME:** 17:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Bobcat 206-05-6171	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		17:05	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		17:00	
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		17:03	
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		17:12	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 43.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 19-Feb-10 **TIME:** 15:50 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Bobcat 206-05-6171	ARS (Hertz)					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		17:05	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		17:00	[redacted]
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		17:03	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		17:12	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 43.1 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 22-Feb-10 **TIME:** 17:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:50	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:40	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:55	[redacted]
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		17:10	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		16:00	[redacted]
Kawasaki Mule 4010	USACE	<20		<1K		15:50	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 42.4 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 23-Feb-10 **TIME:** 17:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:40	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:35	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:30	
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		16:55	
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		16:50	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 43.8 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 24-Feb-10 **TIME:** 15:45 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:45	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:45	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		15:30	[redacted]
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		15:45	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		15:30	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 38.7 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 25-Feb-10 **TIME:** 16:55 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:50	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:50	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:00	[redacted]
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		16:50	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		16:30	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 42.2 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 26-Feb-10 **TIME:** 16:30 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:20	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:50	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:00	
Bobcat 206-05-6015	ARS (Hertz)	<20		<1K		16:15	
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		12:45	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 42.5 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 1-Mar-10 **TIME:** 17:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:50	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:50	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:35	[redacted]
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		17:10	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		12:00	[redacted]
Kawasaki Mule 4010	USACE	<20		<1K		16:15	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 37.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 2-Mar-10 **TIME:** 17:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:45	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:40	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:15	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:50	
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		16:30	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 42.2 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 3-Mar-10 **TIME:** 16:45 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:35	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:35	[redacted]
Zebra Drill Rig #1	Zebra Drilling	<20		<1K		16:20	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:40	
Chevy P/U TN 57201	SEC					NA	
Zebra Drill Rig #2	Zebra Drilling	<20		<1K		16:30	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 43.6 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 4-Mar-10 **TIME:** 16:45 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:35	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:40	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		16:20	[redacted]
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:40	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		16:30	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #3						NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 39.4 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 5-Mar-10 **TIME:** 13:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		12:15	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		12:20	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		12:10	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		13:10	
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		12:00	
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #3						NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 43.8 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 8-Mar-10 **TIME:** 16:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:45	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		14:25	[redacted]
Zebra Geoprobe #1	Zebra Drilling					NA	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:10	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		14:40	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #3	Zebra Drilling	<20		<1K		15:25	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 37.7 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 9-Mar-10 **TIME:** 16:40 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:15	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:15	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		15:50	[redacted]
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:35	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:50	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #3	Zebra Drilling	<20		<1K		15:50	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 39.7 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 10-Mar-10 **TIME:** 17:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:55	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:35	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		16:35	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		17:10	
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:45	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #3	Zebra Drilling	<20		<1K		16:40	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 41.5 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 11-Mar-10 **TIME:** 16:50 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:40	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:30	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		16:20	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:45	
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		16:10	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #3	Zebra Drilling	<20		<1K		16:15	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 44.7 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 12-Mar-10 **TIME:** 16:35 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:25	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		16:20	[redacted]
Zebra Geoprobe #1	Zebra Drilling					NA	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:35	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		16:30	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #3	Zebra Drilling	<20		<1K		16:15	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 44.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 15-Mar-10 **TIME:** 16:55 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		16:25	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:50	[redacted]
Zebra Geoprobe #3	Zebra Drilling	<20		<1K		16:15	[redacted]
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:40	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:40	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #1	Zebra Drilling					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 42.7 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 16-Mar-10 **TIME:** 16:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:25	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:20	[redacted]
Zebra Geoprobe #3	Zebra Drilling	<20		<1K		15:10	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:10	
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:15	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		15:05	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 43.1 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 17-Mar-10 **TIME:** 16:05 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:40	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:40	[redacted]
Zebra Geoprobe #3	Zebra Drilling	<20		<1K		15:00	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:00	
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:25	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		12:30	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 42.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 18-Mar-10 **TIME:** 16:30 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:50	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:45	[redacted]
Zebra Geoprobe #3	Zebra Drilling	<20		<1K		15:35	[redacted]
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		16:25	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:25	[redacted]
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		16:00	[redacted]

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 41.4 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 19-Mar-10 **TIME:** **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K			
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K			
Zebra Geoprobe #3	Zebra Drilling	<20		<1K			
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K			
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K			
Kawasaki Mule 4010	USACE					NA	
Zebra Geoprobe #1	Zebra Drilling					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 43.7 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 22-Mar-10 **TIME:** 16:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:30	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:40	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		15:15	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		15:45	
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:20	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 45.0 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 25-Mar-10 **TIME:** 12:15 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		11:45	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		11:47	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		11:35	[redacted]
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		11:55	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		11:40	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 40.6 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 26-Mar-10 **TIME:** 16:00 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:35	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:30	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		15:20	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		15:55	
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:25	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: 0 **BKG BETA/GAMMA:** 46.4 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 29-Mar-10 **TIME:** 15:35 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:30	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:30	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		15:20	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		15:45	
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:20	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 41.1 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 30-Mar-10 **TIME:** 15:55 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:45	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:40	[redacted]
Zebra Geoprobe #1	Zebra Drilling	<20		<1K		15:25	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		15:50	
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:20	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: **BKG BETA/GAMMA:** **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 31-Mar-10 **TIME:** **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:40	[redacted]
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		15:55	[redacted]
Chevy P/U TN 57201	SEC					NA	
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:35	[redacted]
Kawasaki Mule 4010	USACE					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .1 **BKG BETA/GAMMA:** 41.2 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 1-Apr-10 **TIME:** 15:55 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:10	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:40	[redacted]
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		15:25	
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		15:45	
Chevy P/U TN 57201	SEC					NA	

Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonowanda New York

Contract Number: W912P4-07-D-0009, D.O. 0003

METER MODEL#: 2929 **SERIAL# / PROBE#:** 176083/PR181590 **CAL DUE:** 19-Oct-10

BKG ALPHA: .2 **BKG BETA/GAMMA:** 41.1 **ALPHA EFF.:** 0.329 **BETA/GAMMA EFF.:** 0.405

DATE: 2-Apr-10 **TIME:** 15:10 **SURVEYED BY:** [redacted]

VEHICLE ID	COMPANY	Removable Alpha:		Removable Beta/ Gamma:		TIME	RCT INITIALS
Red Chevy P/U LA X299151	ARS					NA	
Kubota 780-11-6037	ARS (Hertz)	<20		<1K		15:05	[redacted]
Silver Chevy P/U LA W930834	ARS					NA	
Grey Chevy P/U LA X299152	ARS					NA	
Red Polaris 6X6	SEC	<20		<1K		15:00	[redacted]
Zebra Geoprobe #2	Zebra Drilling	<20		<1K		14:50	[redacted]
Takeuchi #206-07-7000	ARS (Hertz)	<20		<1K		15:05	[redacted]
Chevy P/U TN 57201	SEC					NA	

Safety and Meeting Conex Weekly Routine Surveys

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Safety & Break Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	2-24-10	
Time of Activity	12:45	[redacted]
Surveyor Name	[redacted]	

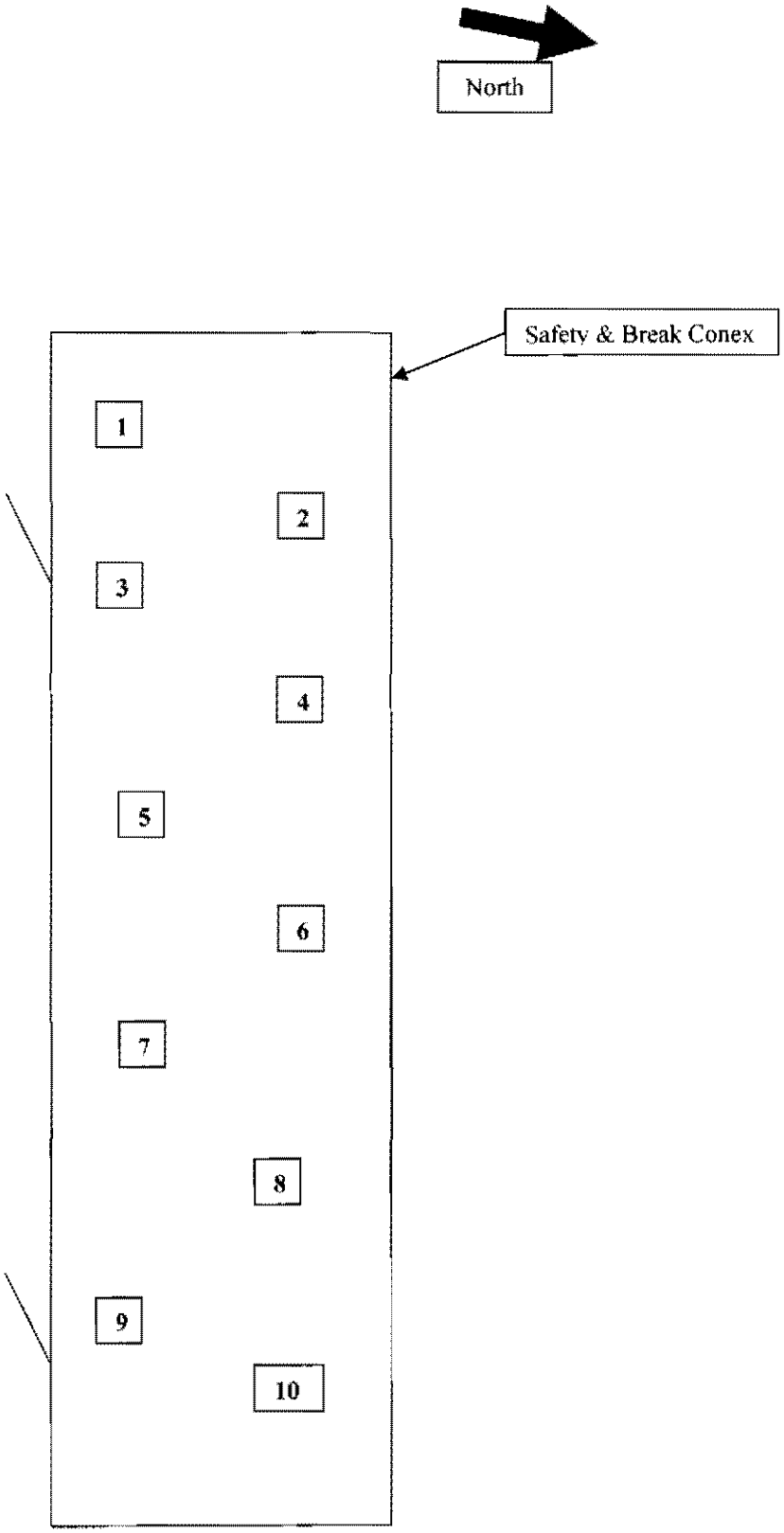
	Survey Equipment [redacted]	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	43.4 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Safety & Break Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	3/3/10	
Time of Activity	11:25	[redacted]
Surveyor Name	[redacted]	

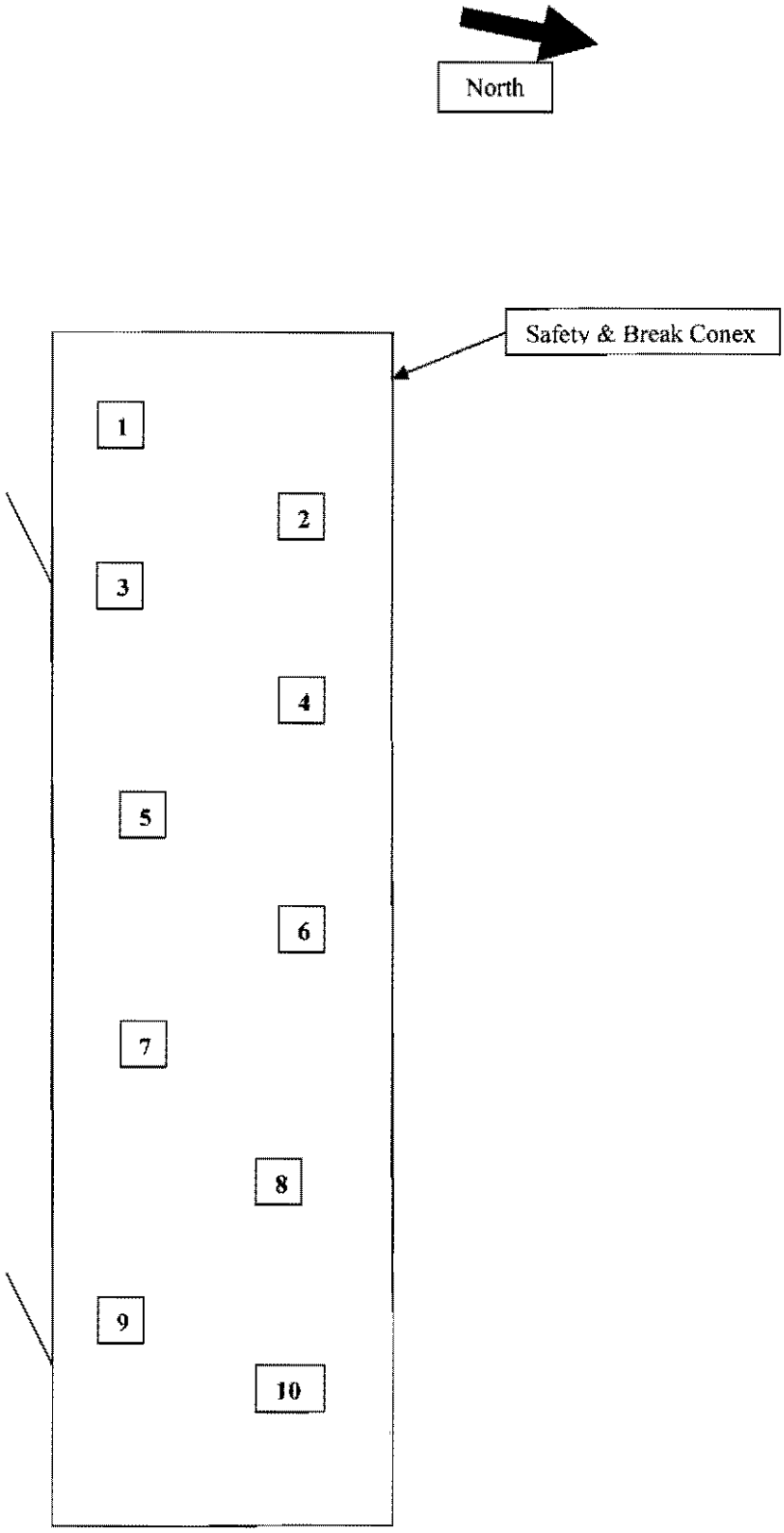
	Survey Equipment [redacted]	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	.2 cpm	
Beta/Gamma Bkg:	42.2 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Safety & Break Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	3/11/10	
Time of Activity	14:40	[redacted]
Surveyor Name	[redacted]	

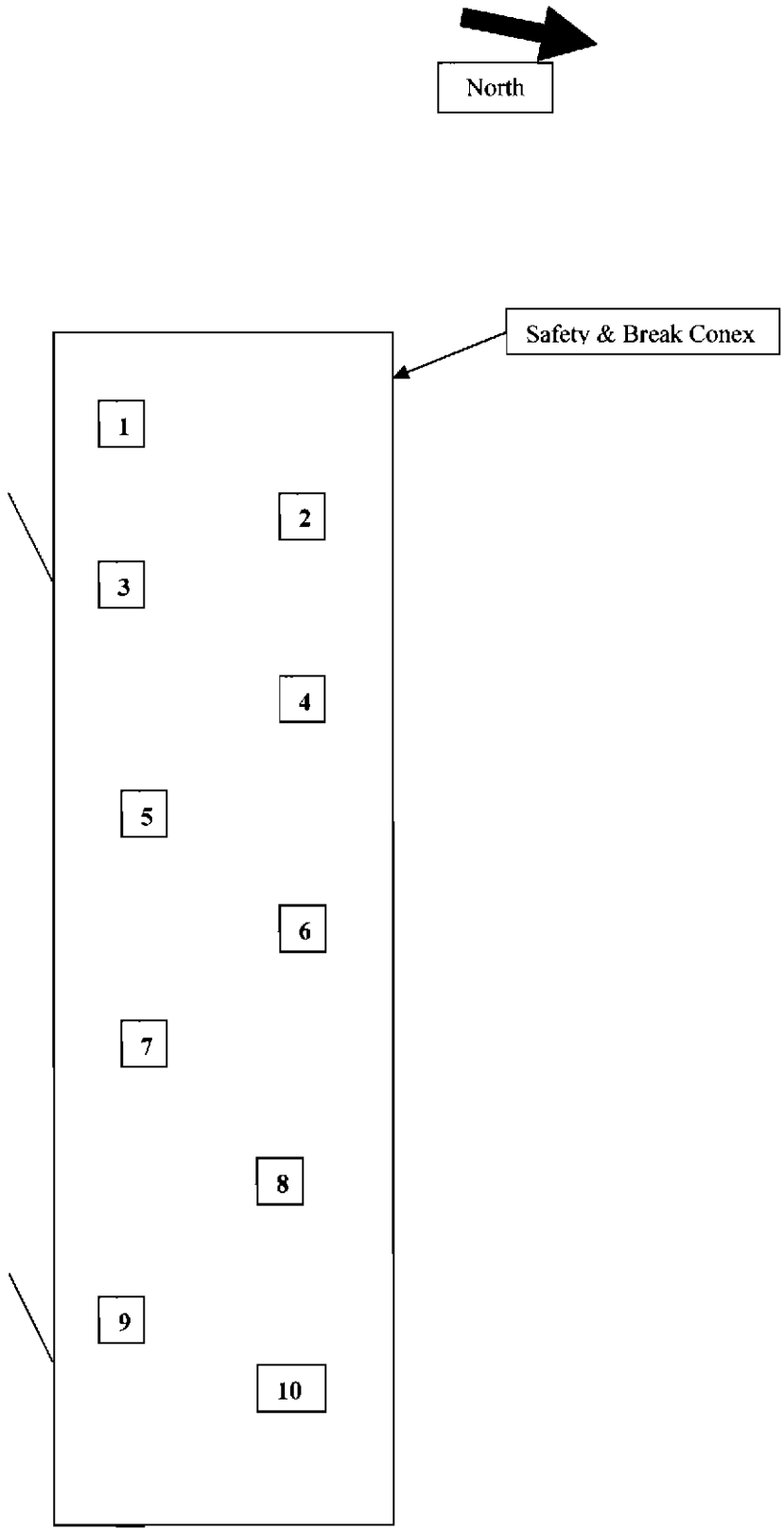
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	.1 cpm	
Beta/Gamma Bkg:	41.5 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	3/17/10	
Time of Activity	07:45	[redacted]
Surveyor Name	[redacted]	

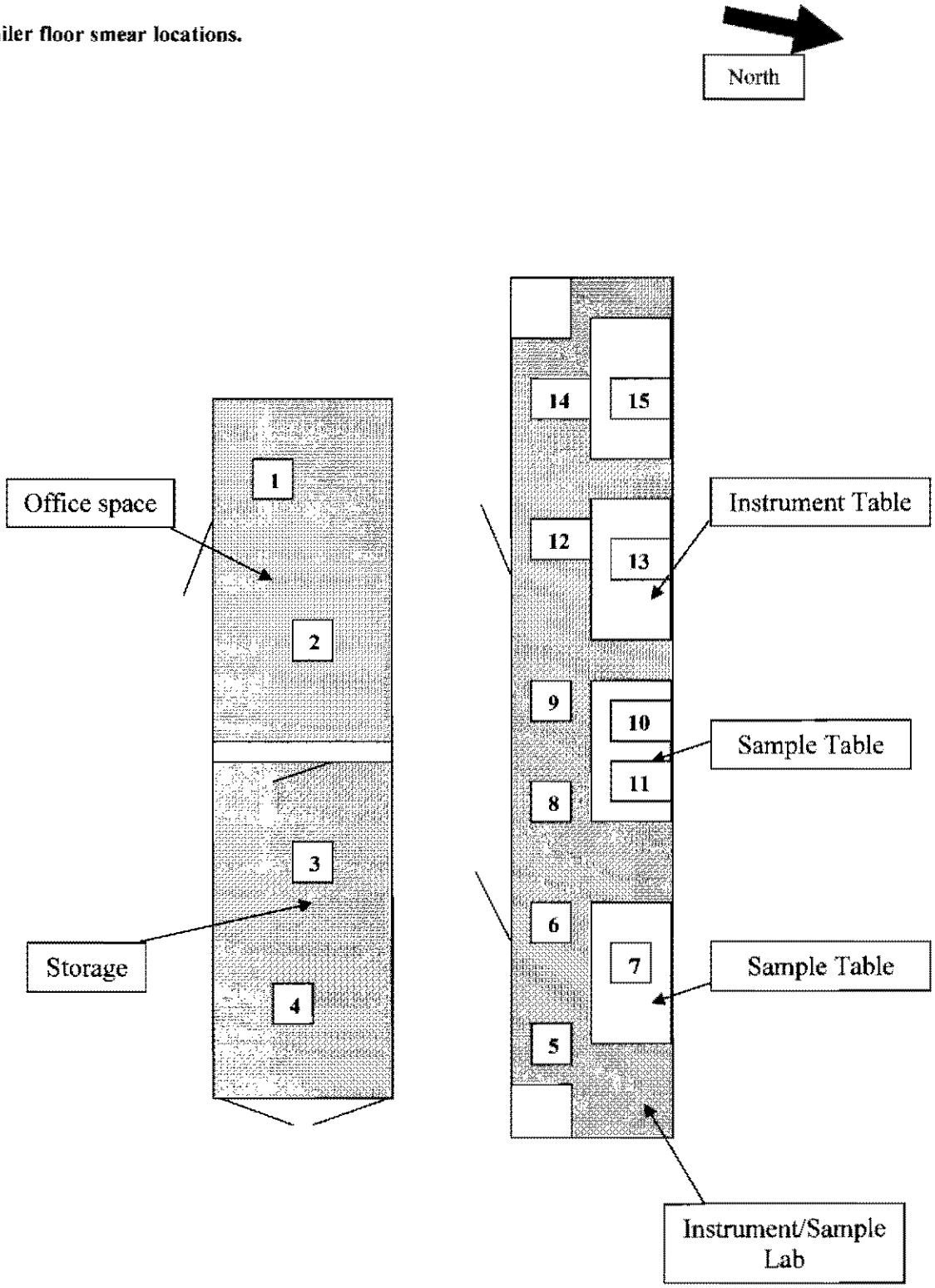
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	43.1 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Safety & Break Conex Weekly Routine**

Site Name:	Tonawanda FUSRAP Landfill Site
Date of Activity:	3/24/10
Time of Activity:	10:30
Surveyor Name:	[redacted]

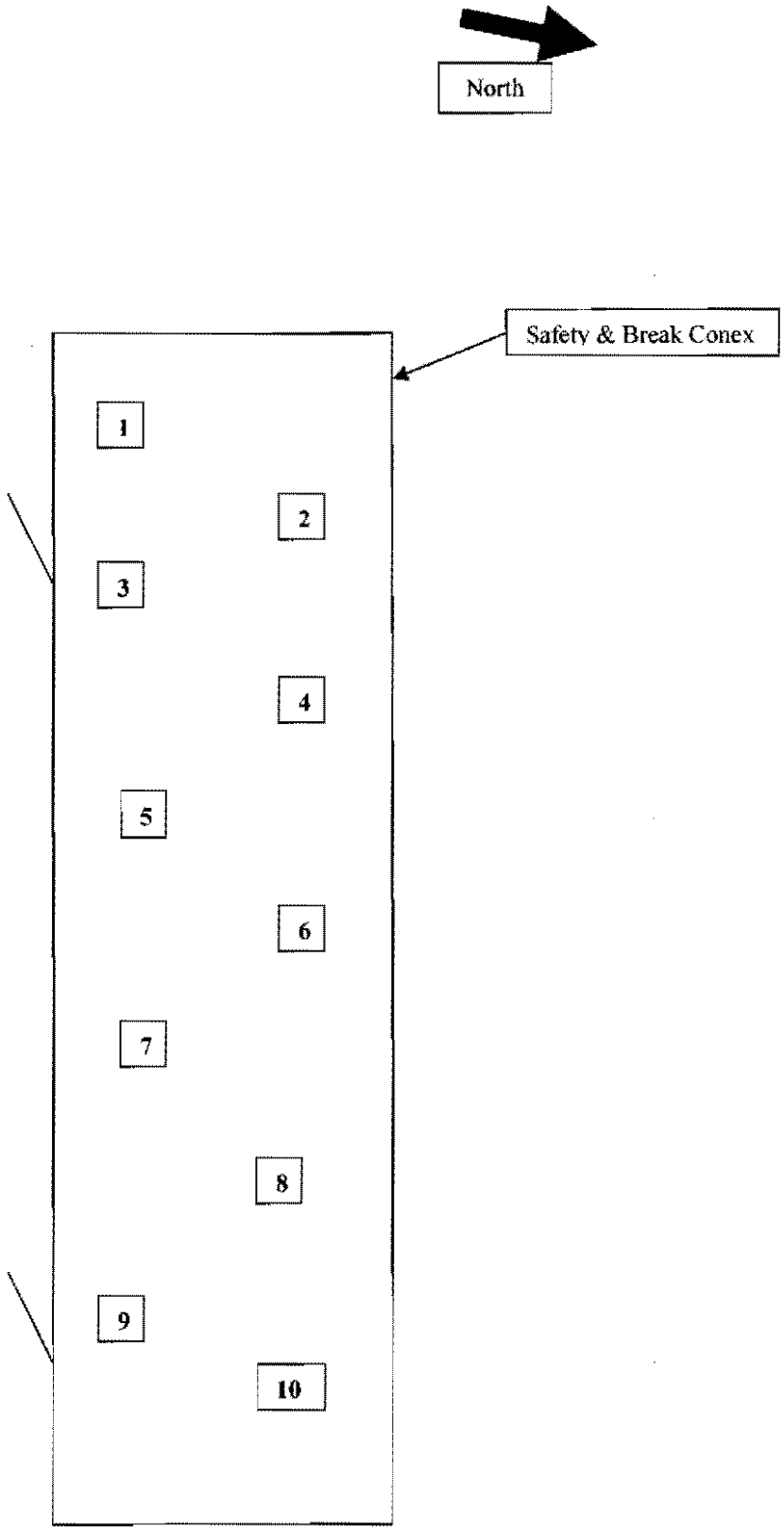
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	43.7 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Safety & Break Conex Weekly Routine**

Site Name:	Tonawanda FUSRAP Landfill Site	
Date of Activity:	3/29/10	
Time of Activity:	11:15	
Surveyor Name:	[redacted]	[redacted]

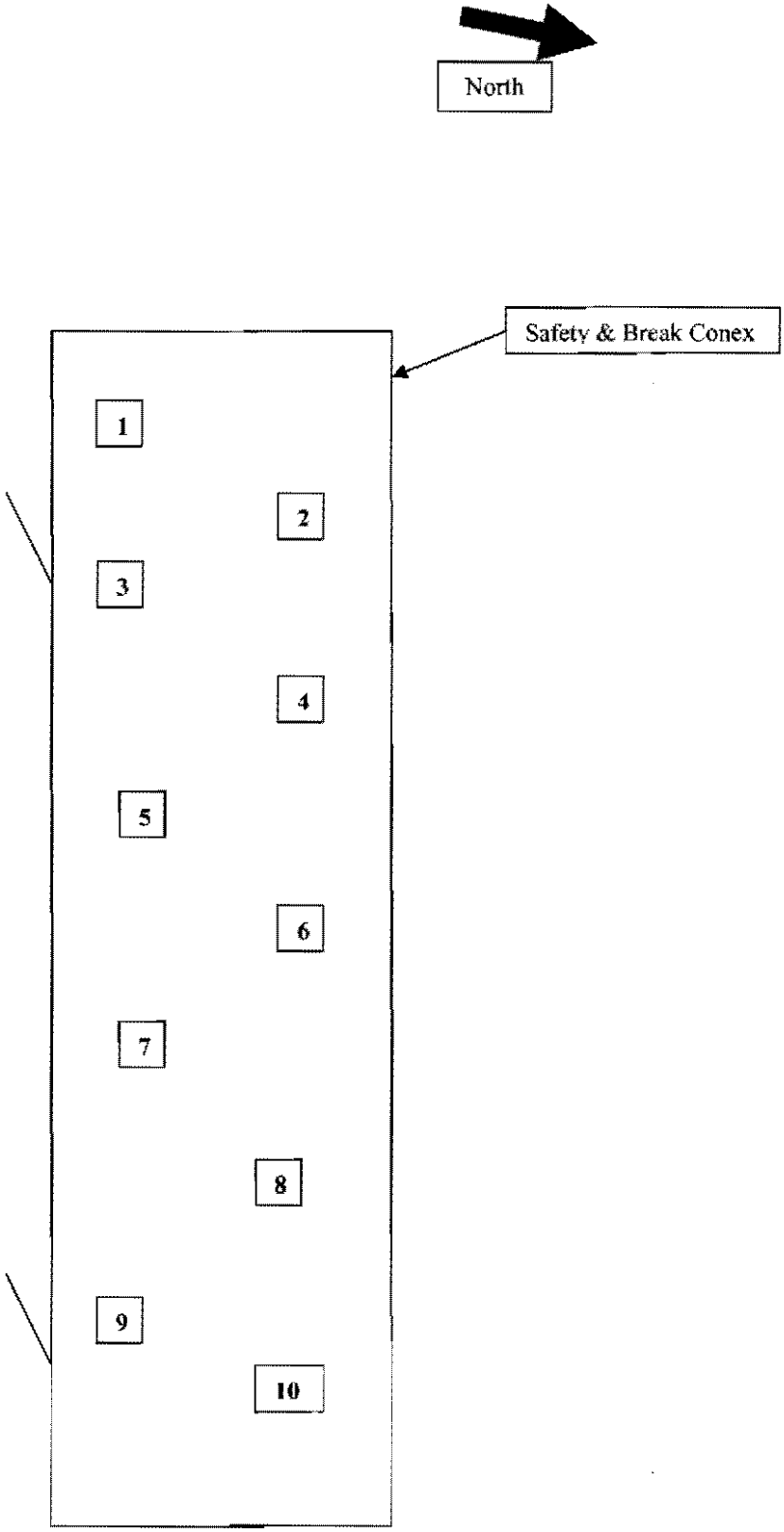
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	46.4 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

Conex Weekly Surveys

Note to file:

All sample and office conex weekly surveys in this file performed prior to 7-Jan-10 utilized a Ludlum 2929, (serial# 176083) and a 43-10-1 probe, (#PR181590).

The efficiencies of this instrument are:

Alpha: 32.97%
Beta/gamma: 40.54%

The calibration due date is 19-Oct-10.

GAMMA SURVEY AND SMEAR LOG

Project Name:	Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation	**Contract No:**	W912P4-07-D-0009
		Delivery Order:	0003
ARSEC Job Number:	Federal 09-055-00003		

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	11/4/09
Time of Activity	1145
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	2929	
Detector Serial No.	4310-1	
Calibration Date	10/19/09	

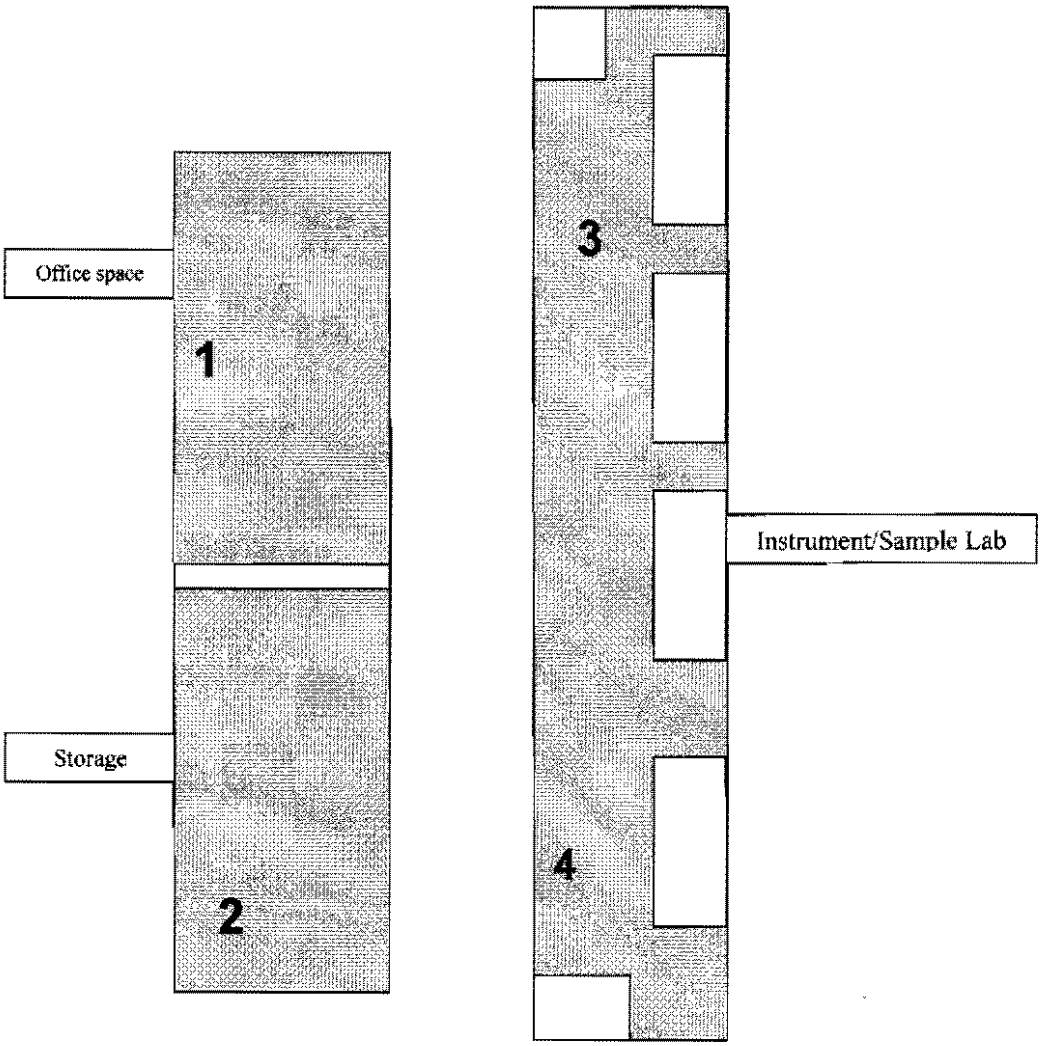
GAMMA SURVEY AND SMEAR LOG

Project Name:	Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation	**Contract No:**	W912P4-07-D-0009
ARSEC Job Number:	Federal 09-055-00003	**Delivery Order:**	0003

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	11/12/09
Time of Activity	1345 [redacted]
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	2929	
Detector Serial No.	4310-1	
Calibration Date	10/19/09	

Conex trailer floor smear locations
[arrow points north]



Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Item Description / Location Conex smears	Survey Result	Measurement Units (i.e., cpm, dpm, µR/hr)	Technician Initials
1 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
2 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
3 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
4 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]

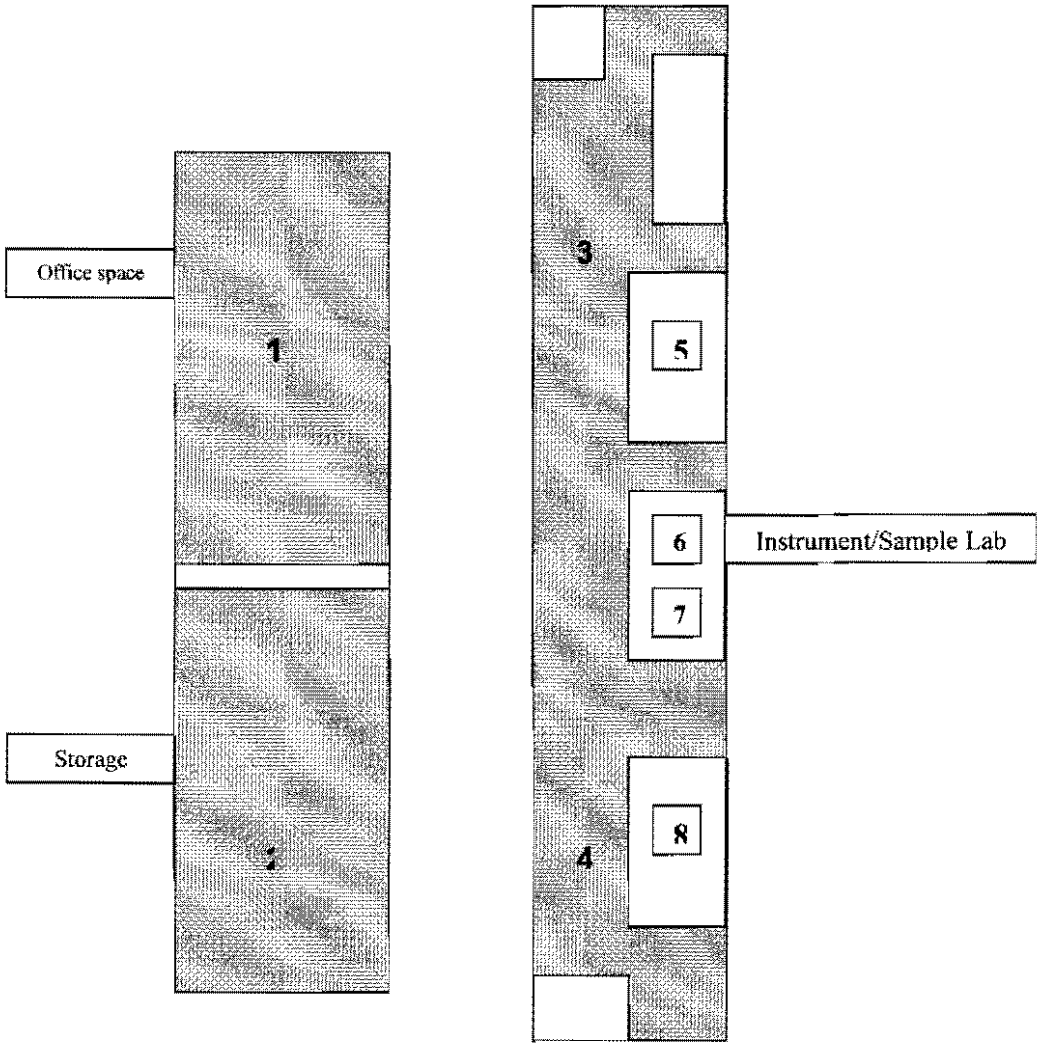
GAMMA SURVEY AND SMEAR LOG

Project Name:	Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation	**Contract No:**	W912P4-07-D-0009
ARSEC Job Number:	Federal 09-055-00003	**Delivery Order:**	0003

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	11/20/09
Time of Activity	1330 [redacted]
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	2929	
Detector Serial No.	43-10-1	
Calibration Date	10/19/09	

Conex trailer floor smear locations
[arrow points north]



Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Item Description / Location **Conex smears**	**Survey Result**	**Measurement Units (i.e., cpm, dpm, µR/hr)**	**Technician Initials**
1 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
2 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
3 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
4 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
5 Instrument table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
6 Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
7 Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
8 Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]

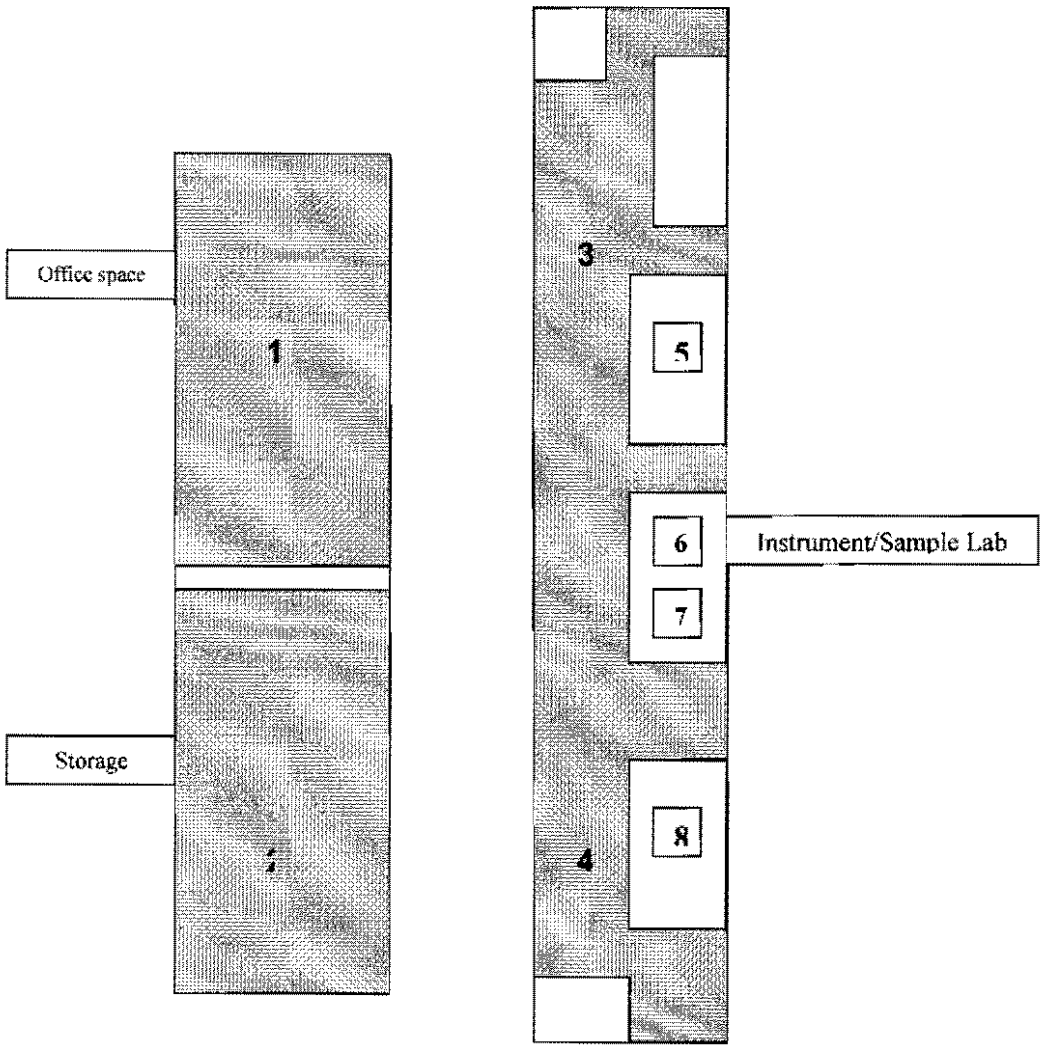
GAMMA SURVEY AND SMEAR LOG

Project Name:	Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation	**Contract No:**	W912P4-07-D-0009
ARSEC Job Number:	Federal 09-055-00003	**Delivery Order:**	0003

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	11/23/09
Time of Activity	1050 [redacted]
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	2929	
Detector Serial No.	43-10-1	
Calibration Date	10/19/09	

Conex trailer floor smear locations
[arrow points north]



Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Item Description / Location **Conex smears**	**Survey Result**	**Measurement Units (i.e., cpm, dpm, µR/hr)**	**Technician Initials**
1 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
2 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
3 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
4 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
5 Instrument table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
6 Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
7 Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
8 Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]

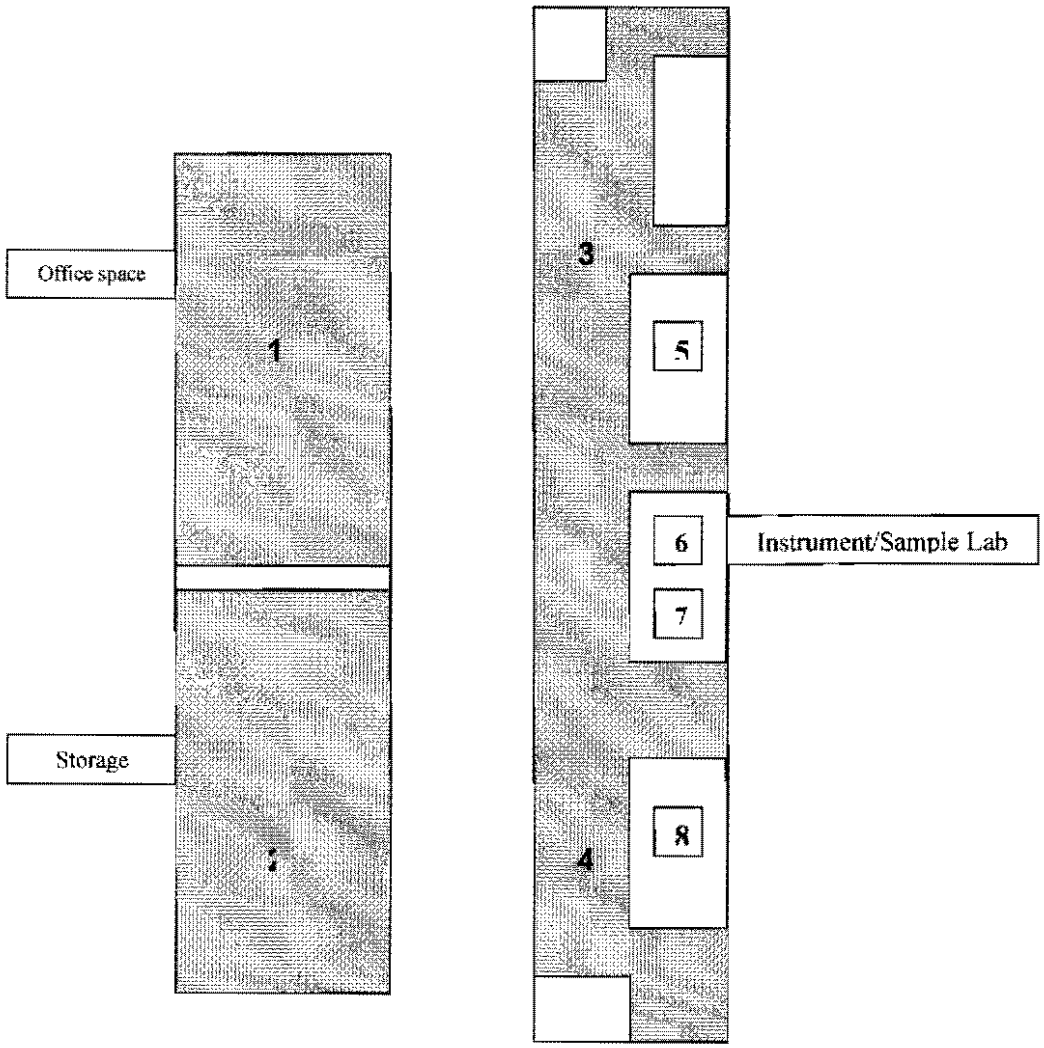
GAMMA SURVEY AND SMEAR LOG

Project Name:	Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation	**Contract No:**	W912P4-07-D-0009
ARSEC Job Number:	Federal 09-055-00003	**Delivery Order:**	0003

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	12/2/09
Time of Activity	0900
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	2929	
Detector Serial No.	43-10-1	
Calibration Date	10/19/09	

[arrow points north]



Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

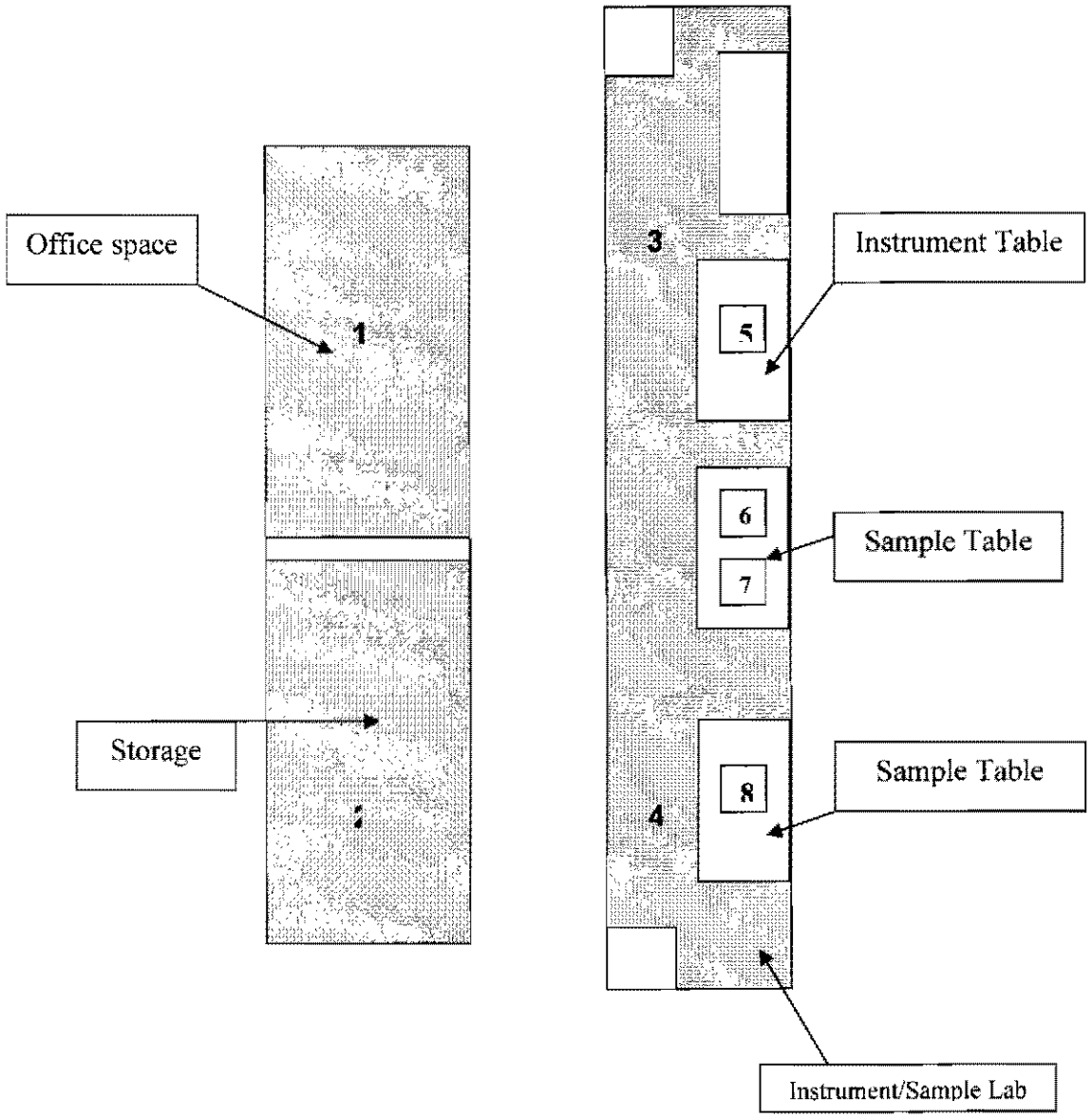
Item Description / Location Conex smears	Survey Result	Measurement Units (i.e., cpm, dpm, µR/hr)	Technician Initials
1 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
2 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
3 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
4 floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
5 Instrument table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
6 Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
7 Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
8 Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:**	**W912P4-07-D-0009**
		Delivery Order:	**0003**
ARSEC Job Number:	**Federal 09-055-00003**		

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	12/11/09
Time of Activity	1015
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	2929	
Detector Serial No.	43-10-1	
Calibration Due Date	10/19/10	


Office space
1
Storage
2
3
Instrument Table
5
6
7
Sample Table
8
Sample Table
4
Instrument/Sample Lab

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Office Floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
2	Conex Floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
3	Conex Floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
4	Conex Floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
5	Instrument table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
6	Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
7	Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
8	Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]

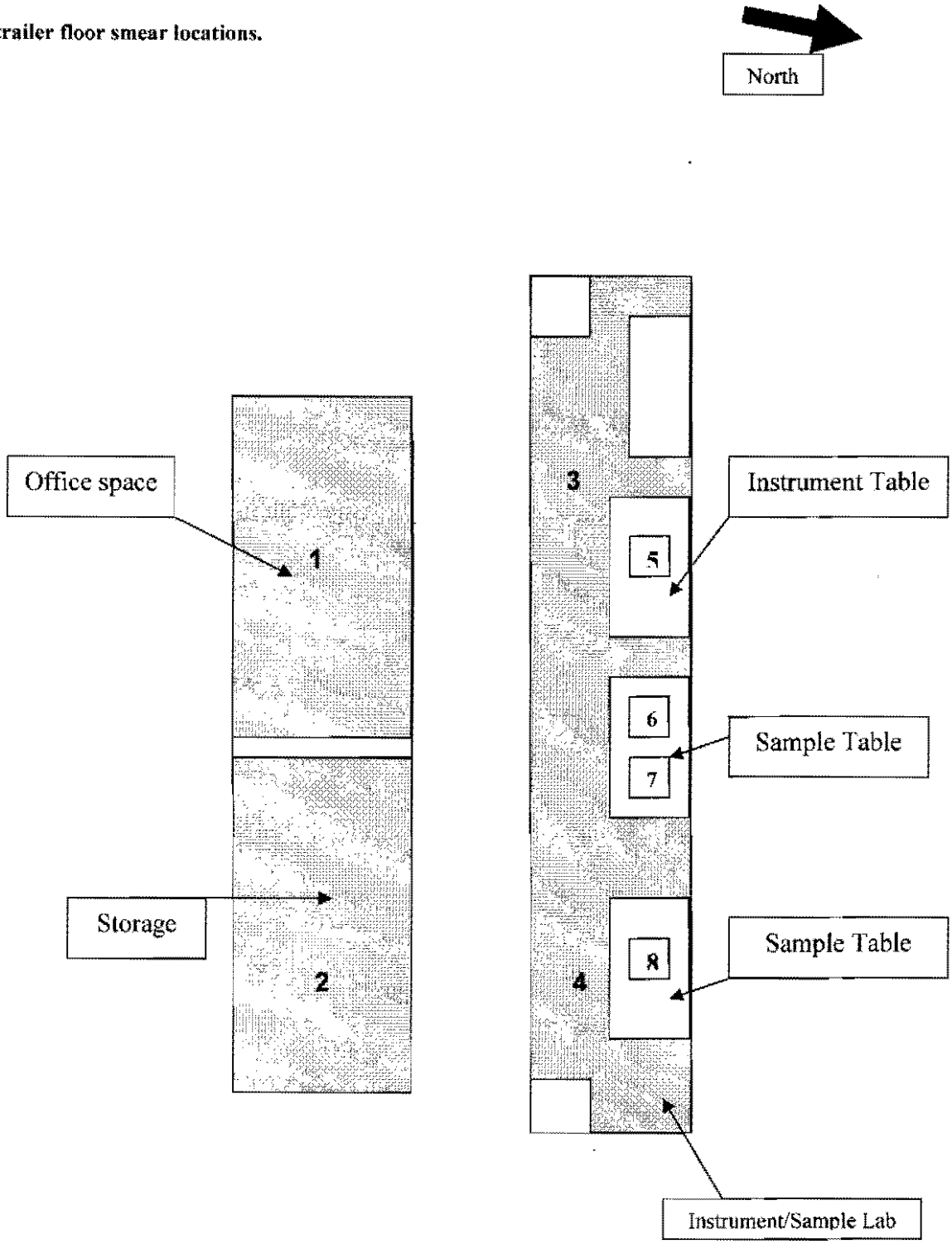
GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:**	**W912P4-07-D-0009**
ARSEC Job Number:	**Federal 09-055-00003**	**Delivery Order:**	**0003**

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	12/15/09
Time of Activity	1405
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	2929	
Detector Serial No.	43-10-1	
Calibration Due Date	10/19/10	

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Office Floor	<20 alpha/<1k beta/gamma	dpm/100cm2	[redacted]
2	Conex Floor	<20 alpha/<1k beta/gamma	dpm/100cm2	
3	Conex Floor	<20 alpha/<1k beta/gamma	dpm/100cm2	
4	Conex Floor	<20 alpha/<1k beta/gamma	dpm/100cm2	
5	Instrument table	<20 alpha/<1k beta/gamma	dpm/100cm2	
6	Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	
7	Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	
8	Sample table	<20 alpha/<1k beta/gamma	dpm/100cm2	

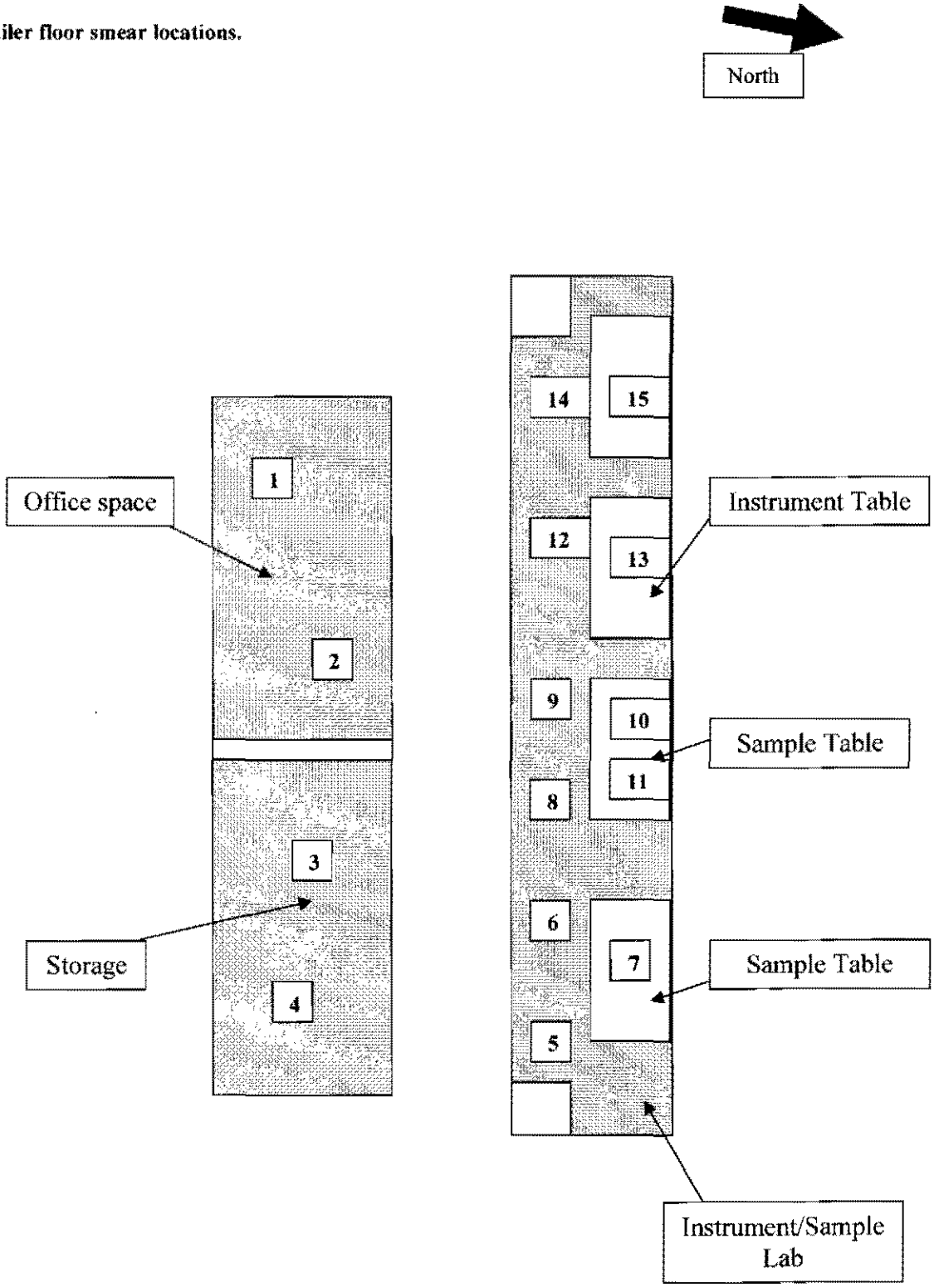
GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:**	**W912P4-07-D-0009**
		Delivery Order:	**0003**
ARSEC Job Number:	**Federal 09-055-00003**		**Sample and Office Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	1/7/10
Time of Activity	1100 [redacted]
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	.NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	40.5 cpm	
Calibration Due:	10-19-10	

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**
ARSEC Job Number:	**Federal 09-055-00003**	

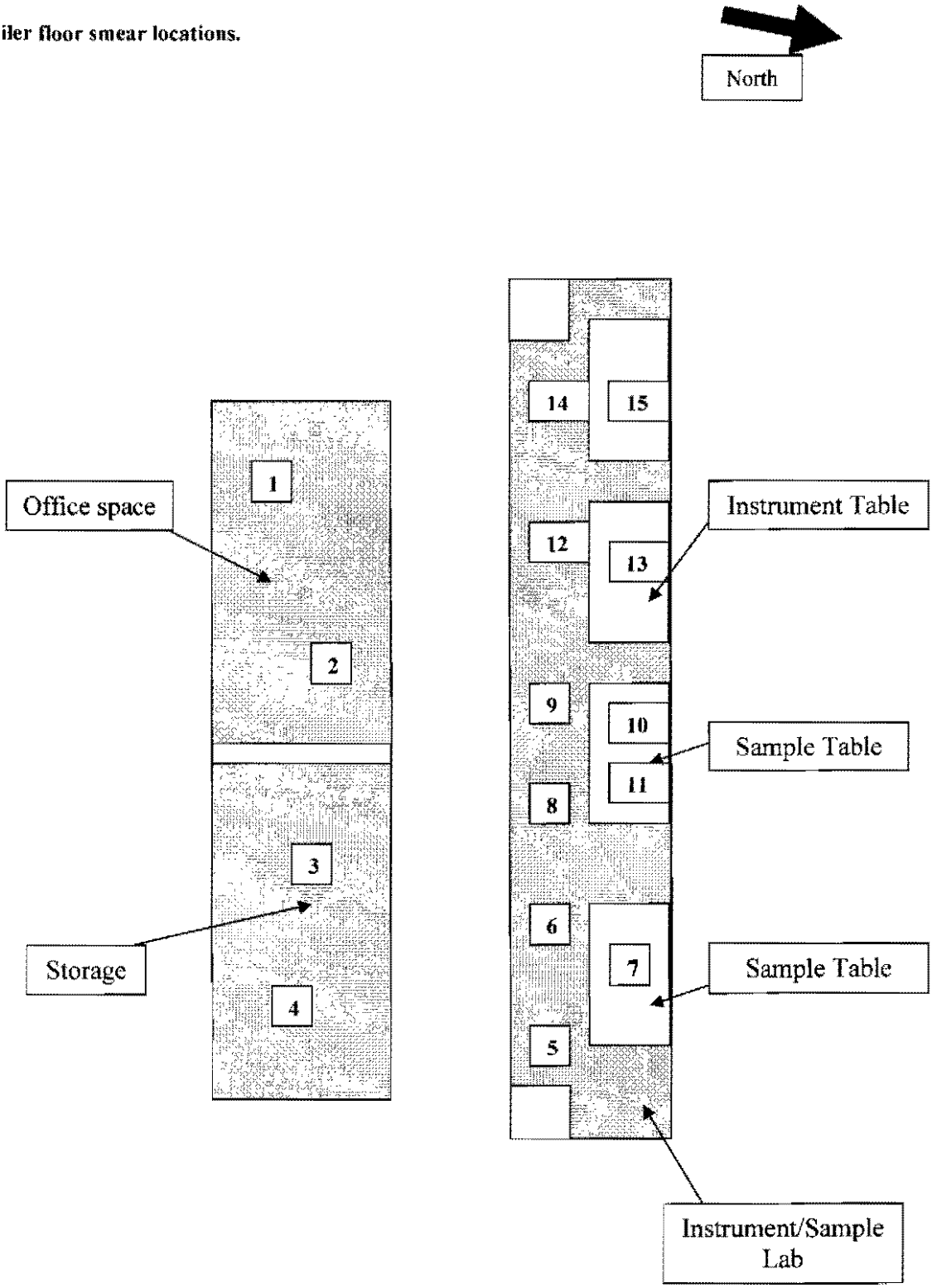
Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	1/13/10
Time of Activity	0925 [redacted]
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	.NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	.1 cpm	
Beta/Gamma Bkg:	42.3 cpm	
Calibration Due:	10-19-10	

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	1/19/10
Time of Activity	1025 [redacted]
Surveyor Name	[redacted]

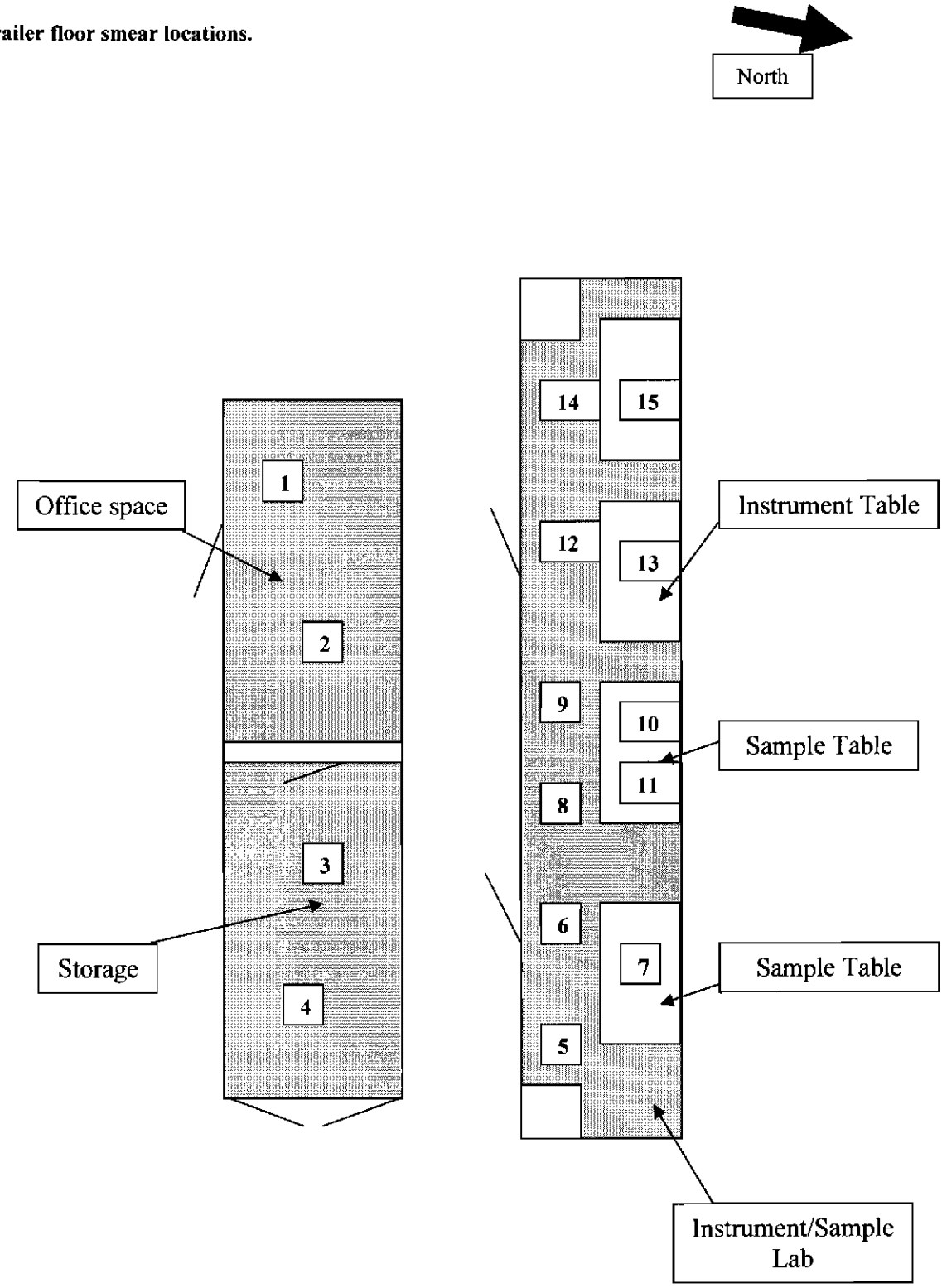
	Survey Equ[redacted]	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	41.4 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	1/25/10	
Time of Activity	0805	
Surveyor Name	[redacted]	

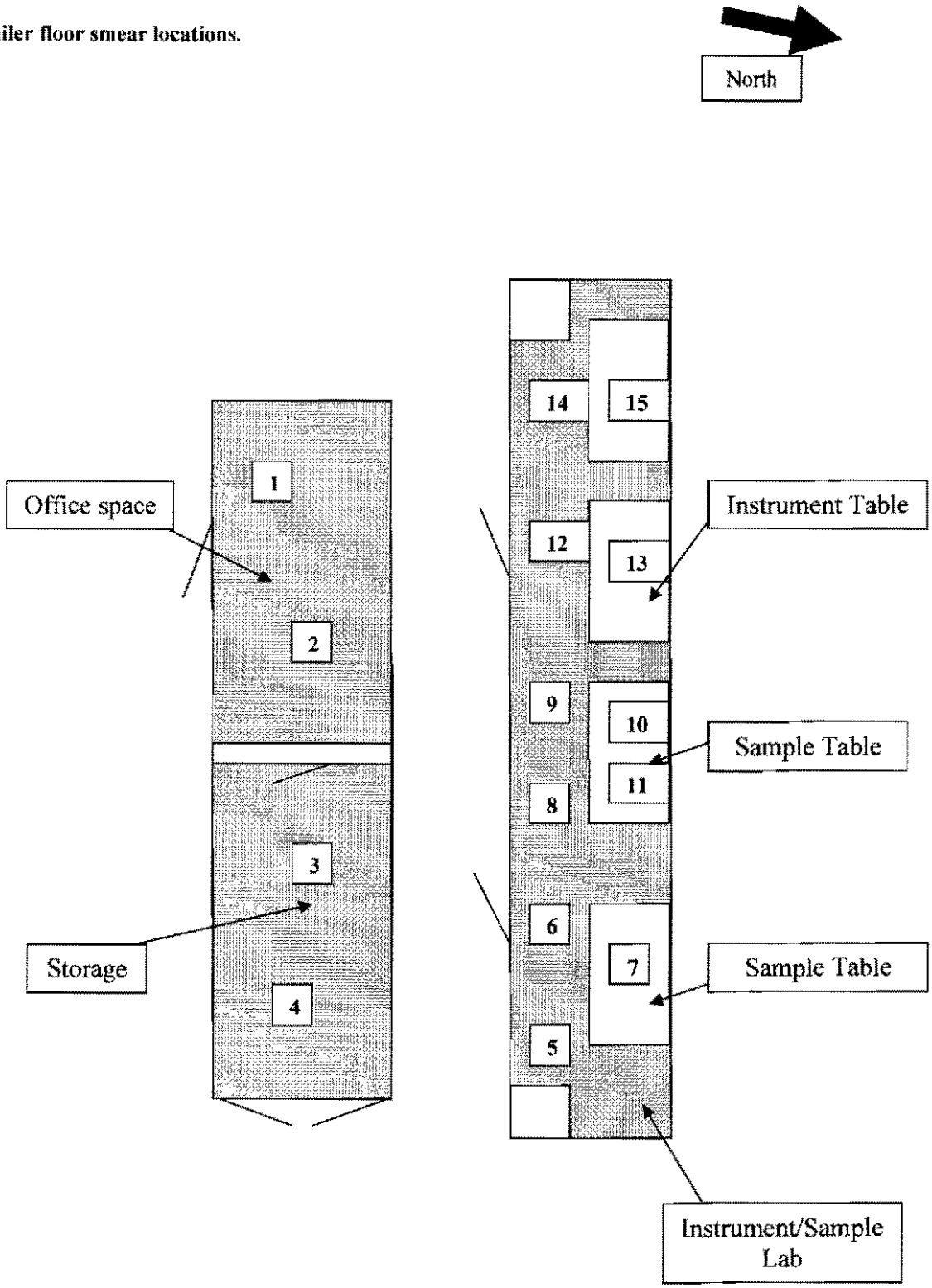
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	41.4 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

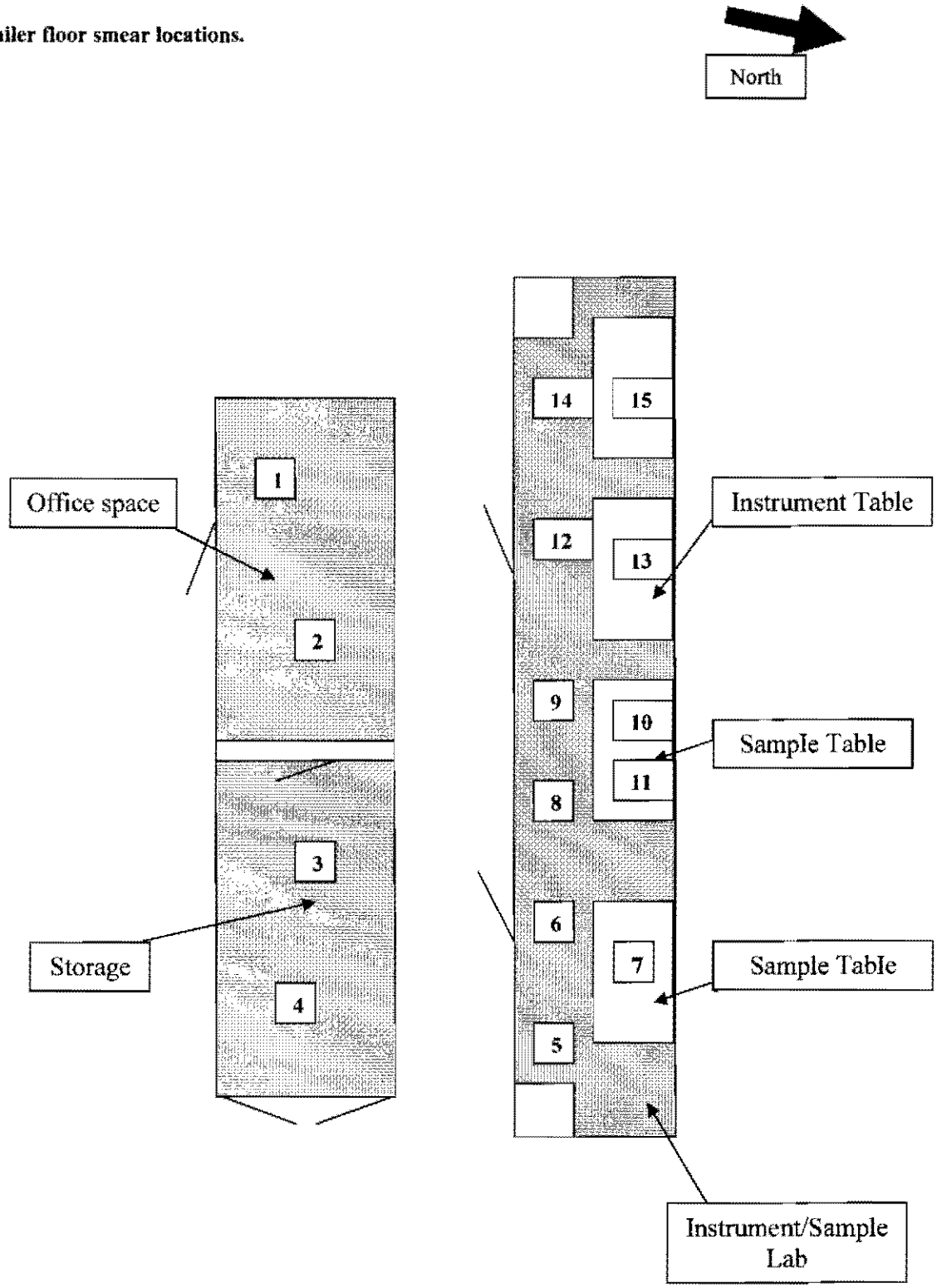
Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	2/12/10	
Time of Activity	0900	[redacted]
Surveyor Name	[redacted]	

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	41.4 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	2/19/10	
Time of Activity	1340	[redacted]
Surveyor Name	[redacted]	

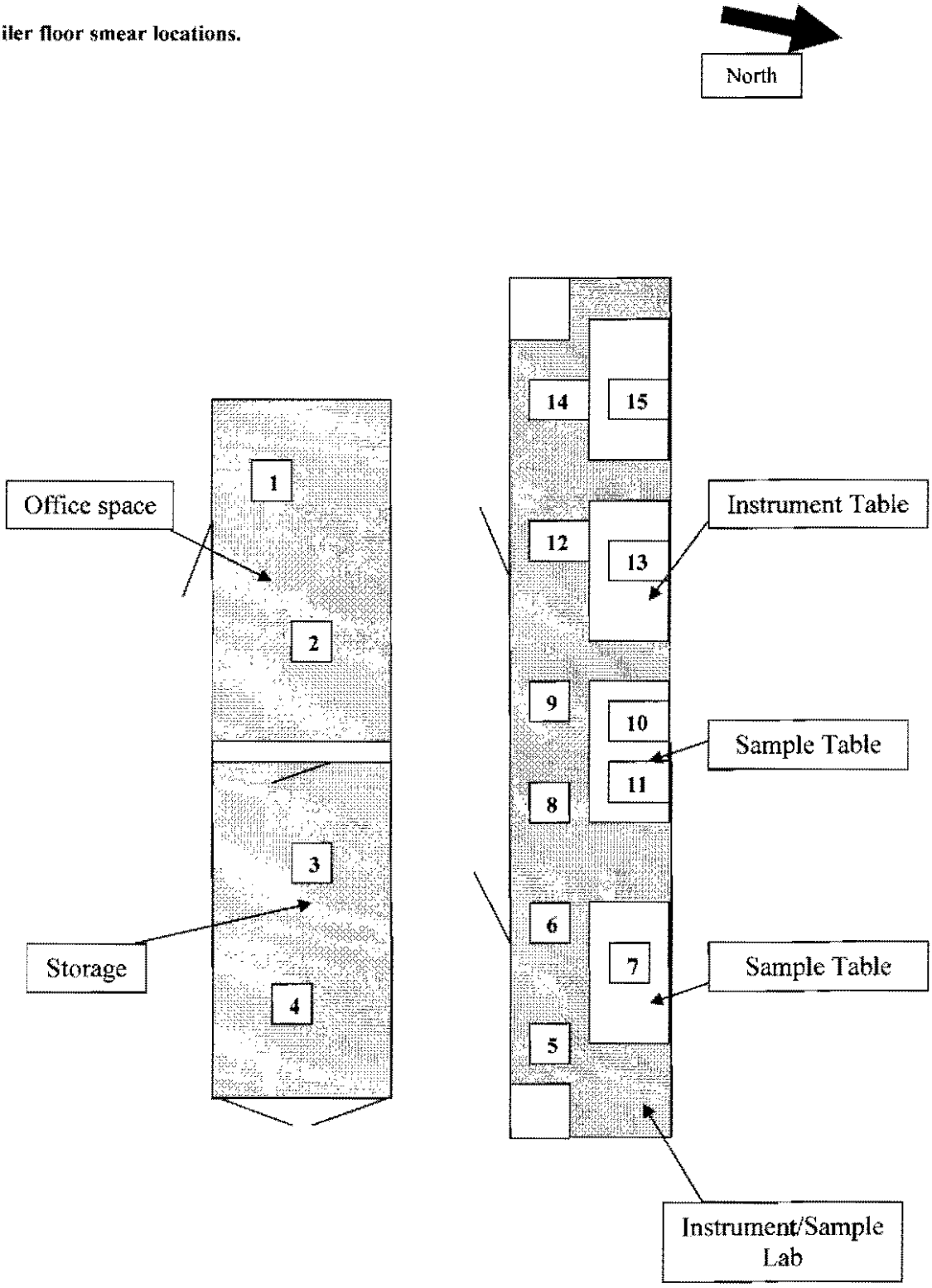
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	43.0 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	2/24/10	
Time of Activity	1405	[redacted]
Surveyor Name	[redacted]	

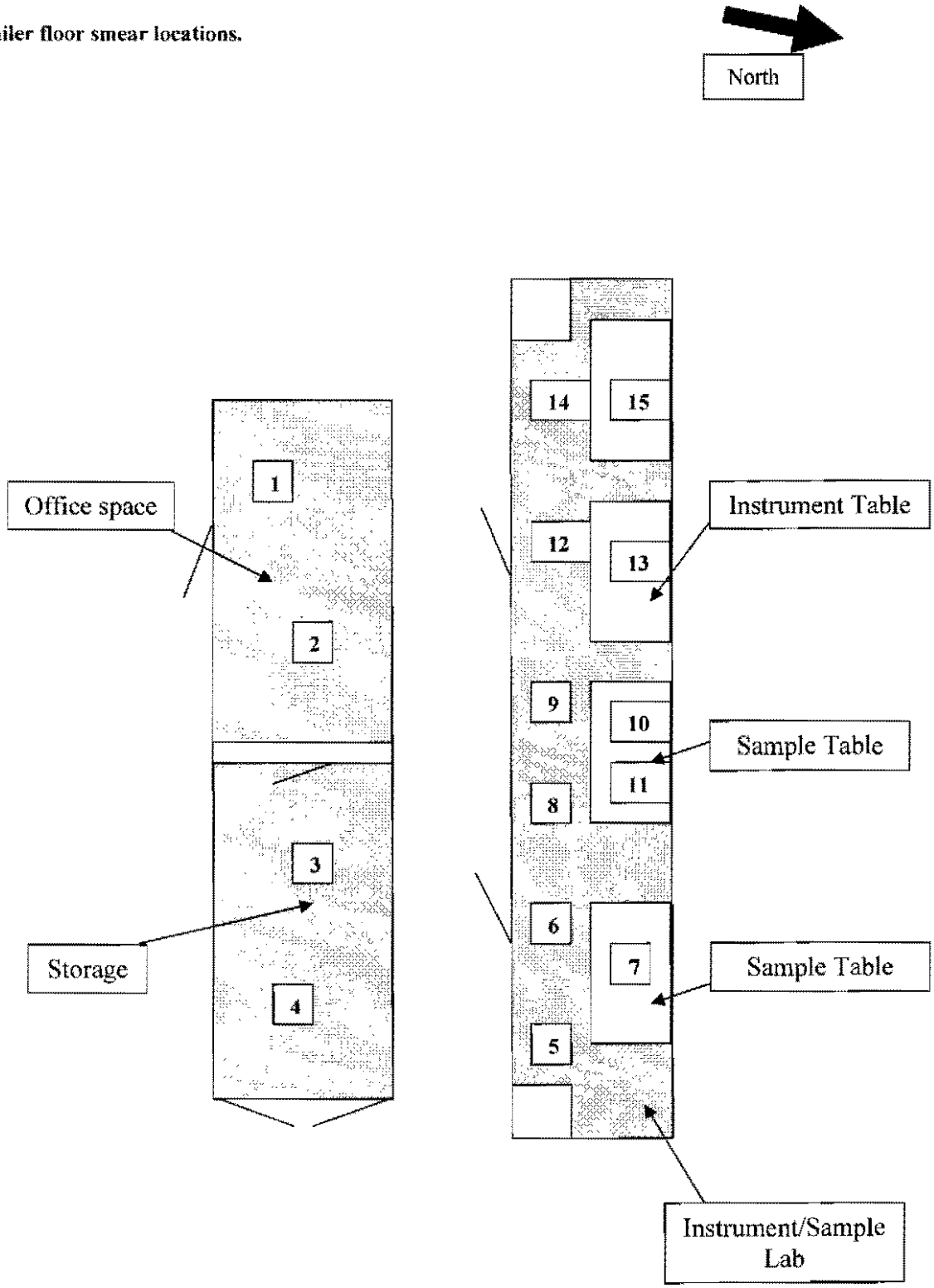
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	43.4 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	3/3/10	
Time of Activity	10:25	[redacted]
Surveyor Name	[redacted]	

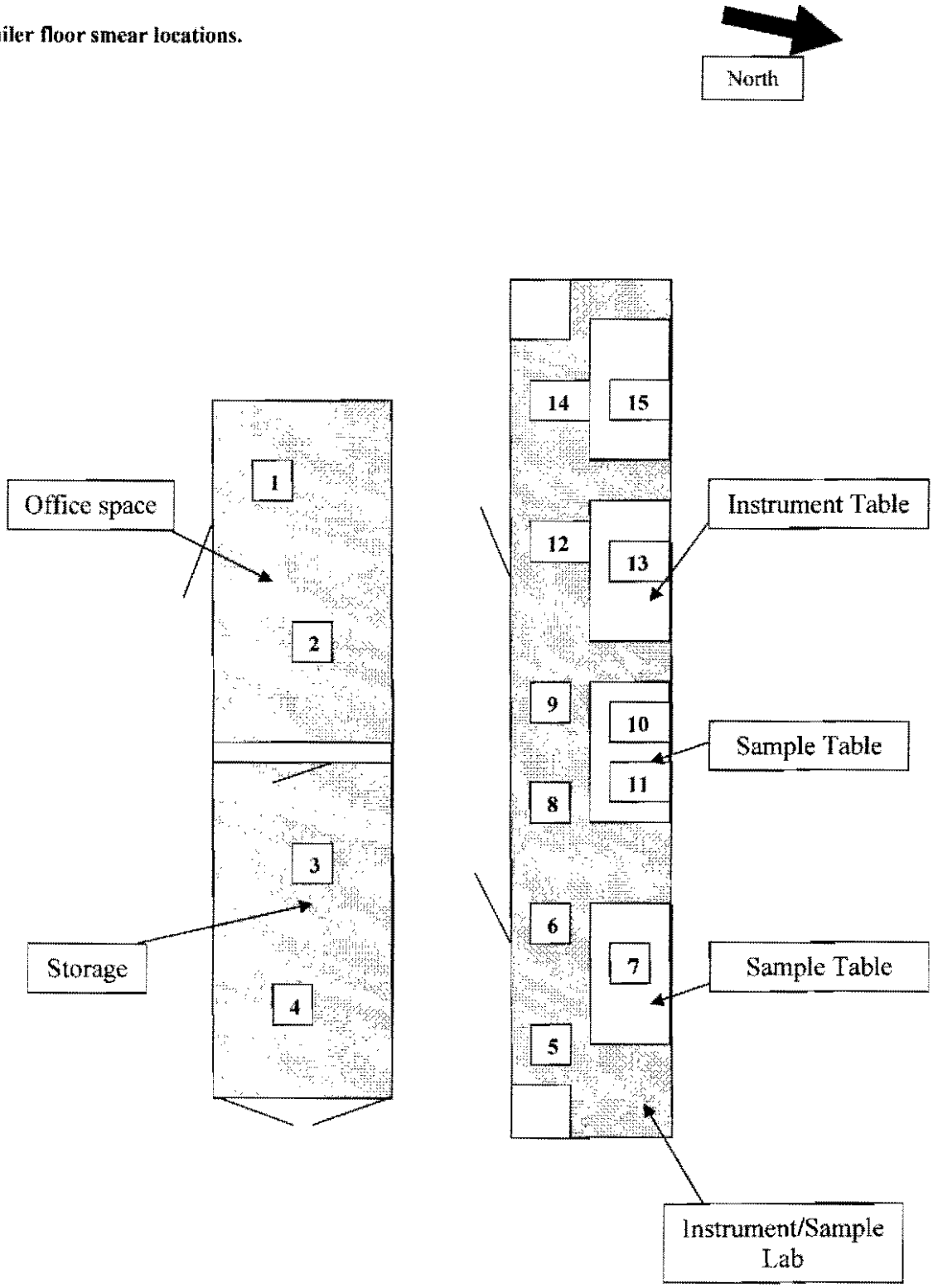
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	.2 cpm	
Beta/Gamma Bkg:	42.2 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	3/10/10	
Time of Activity	13:50	[redacted]
Surveyor Name	[redacted]	

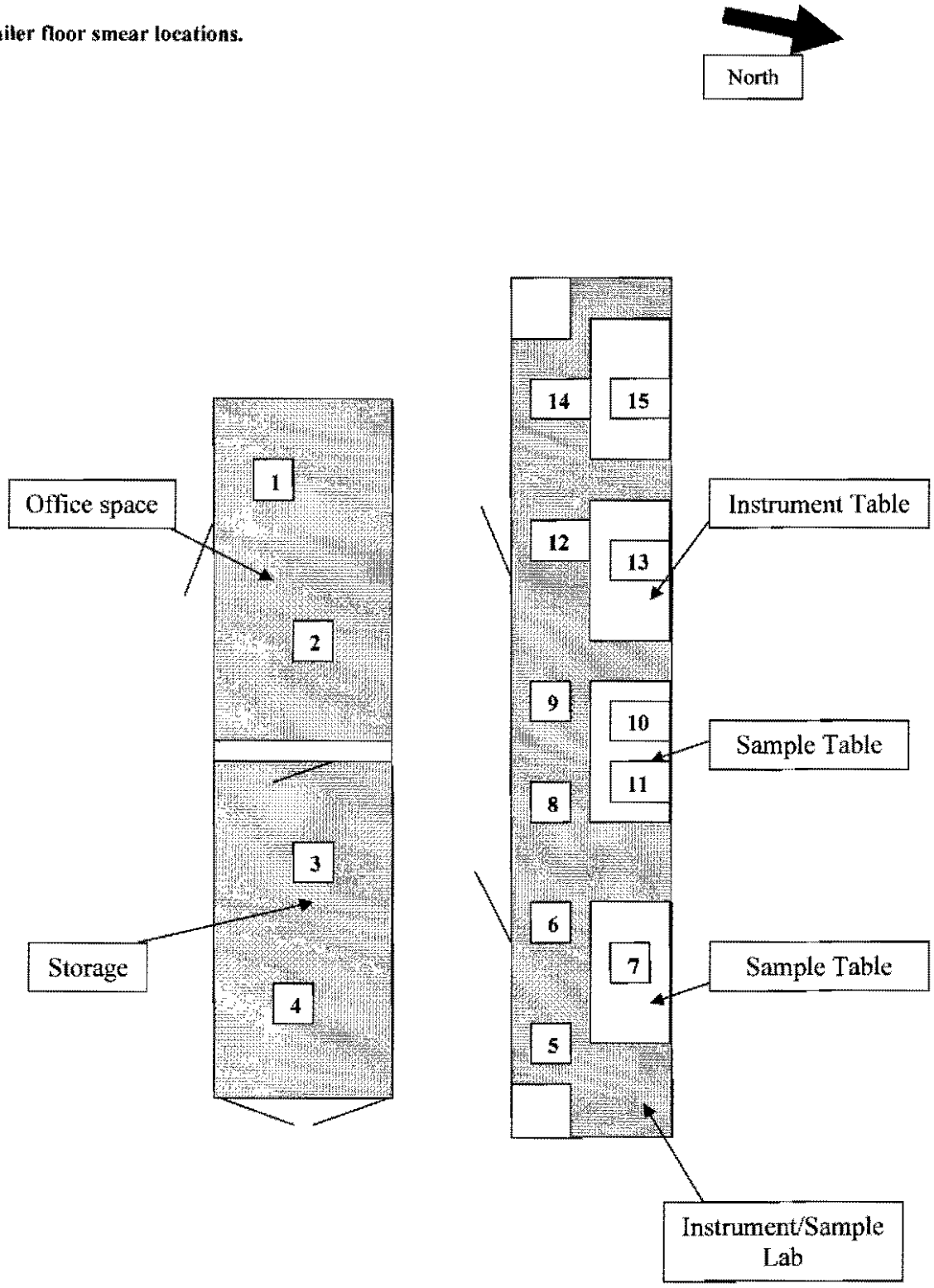
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	.2 cpm	
Beta/Gamma Bkg:	39.7 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

ARSEC Job Number: Federal 09-055-00003

Contract No: W912P4-07-D-0009

Delivery Order: 0003

Sample and Office Conex Weekly Routine

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	3/10/10	
Time of Activity	13:50	[redacted]
Surveyor Name	[redacted]	

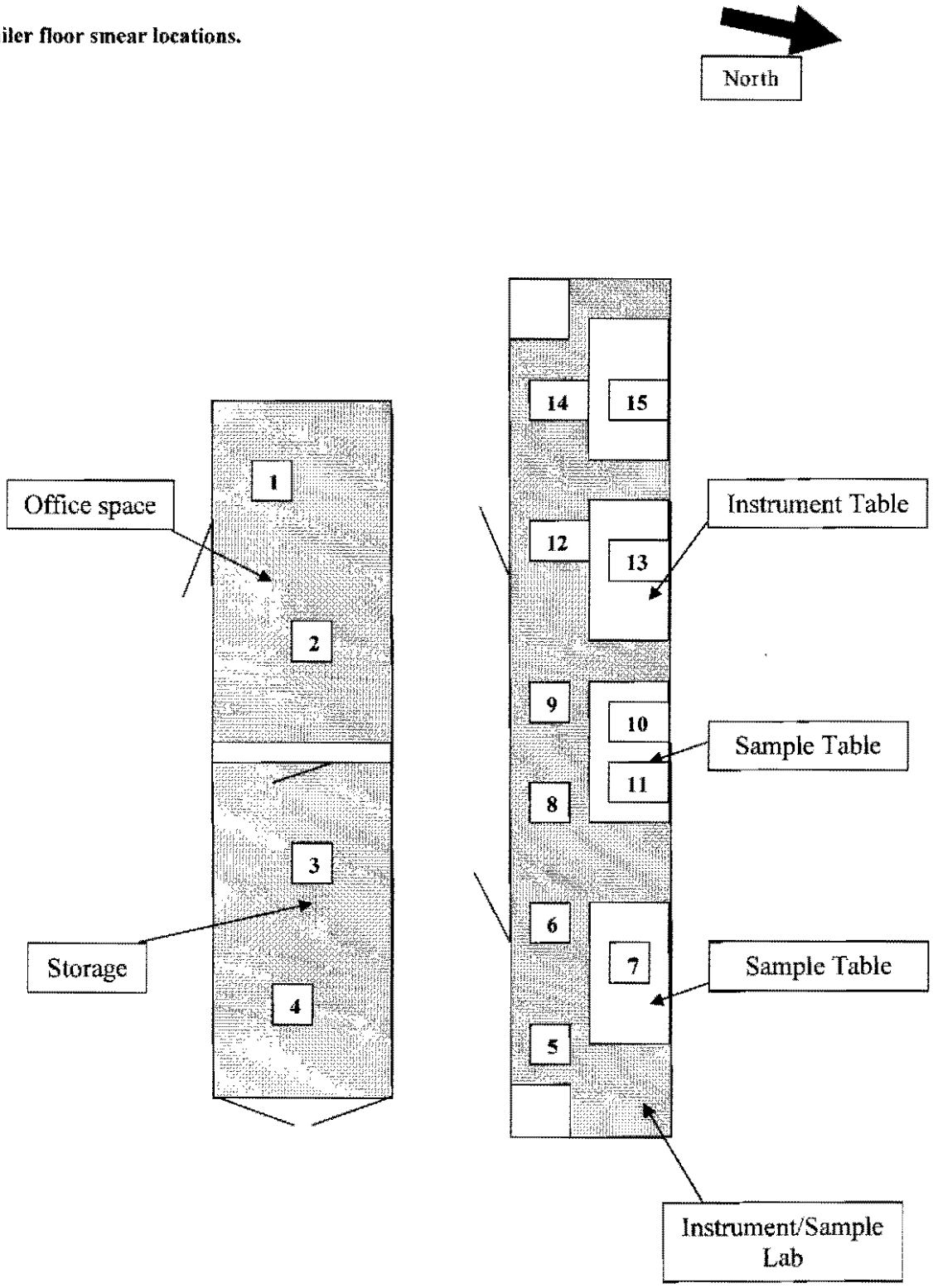
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	.2 cpm	
Beta/Gamma Bkg:	39.7 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Safety & Break Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	3/17/10	
Time of Activity	08:15	[redacted]
Surveyor Name	[redacted]	

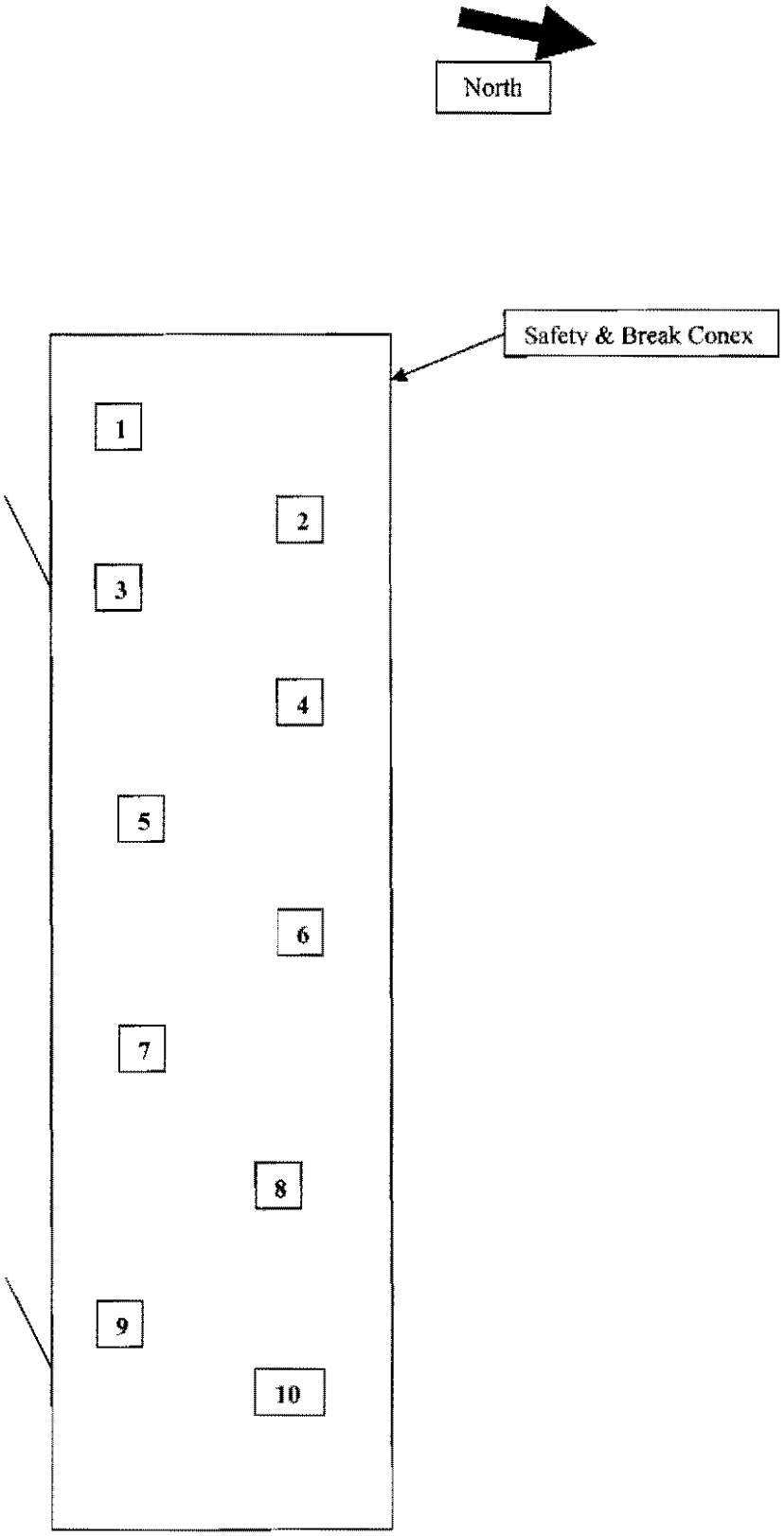
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	43.1 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Safety & Break Conex Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

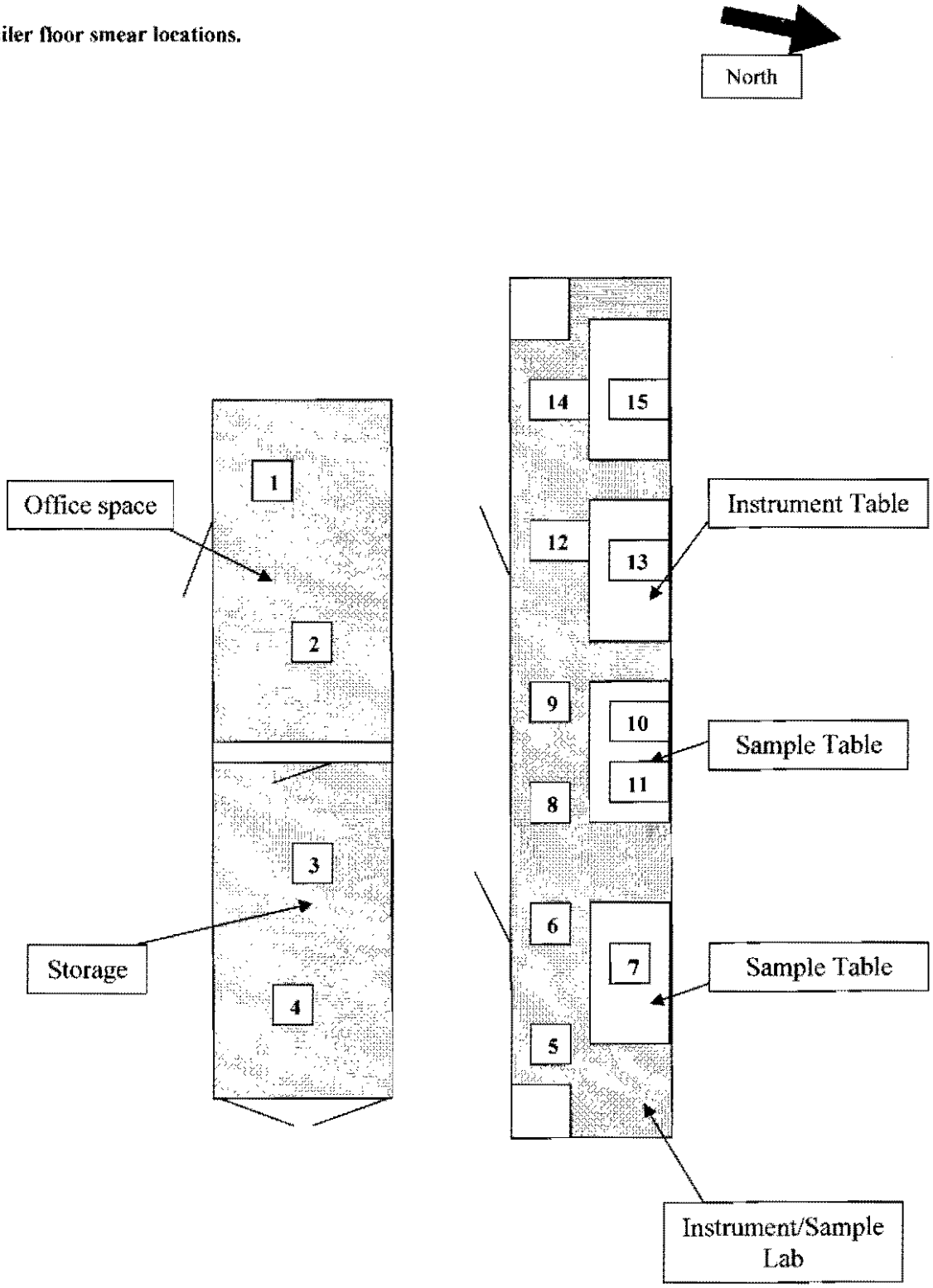
Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	3/23/10
Time of Activity	11:35
Surveyor Name	[redacted]

	Survey Equipment [redacted]	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	42.2 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Sample and Office Conex Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	3/29/10	[redacted]
Time of Activity	10:15	[redacted]
Surveyor Name	[redacted]	

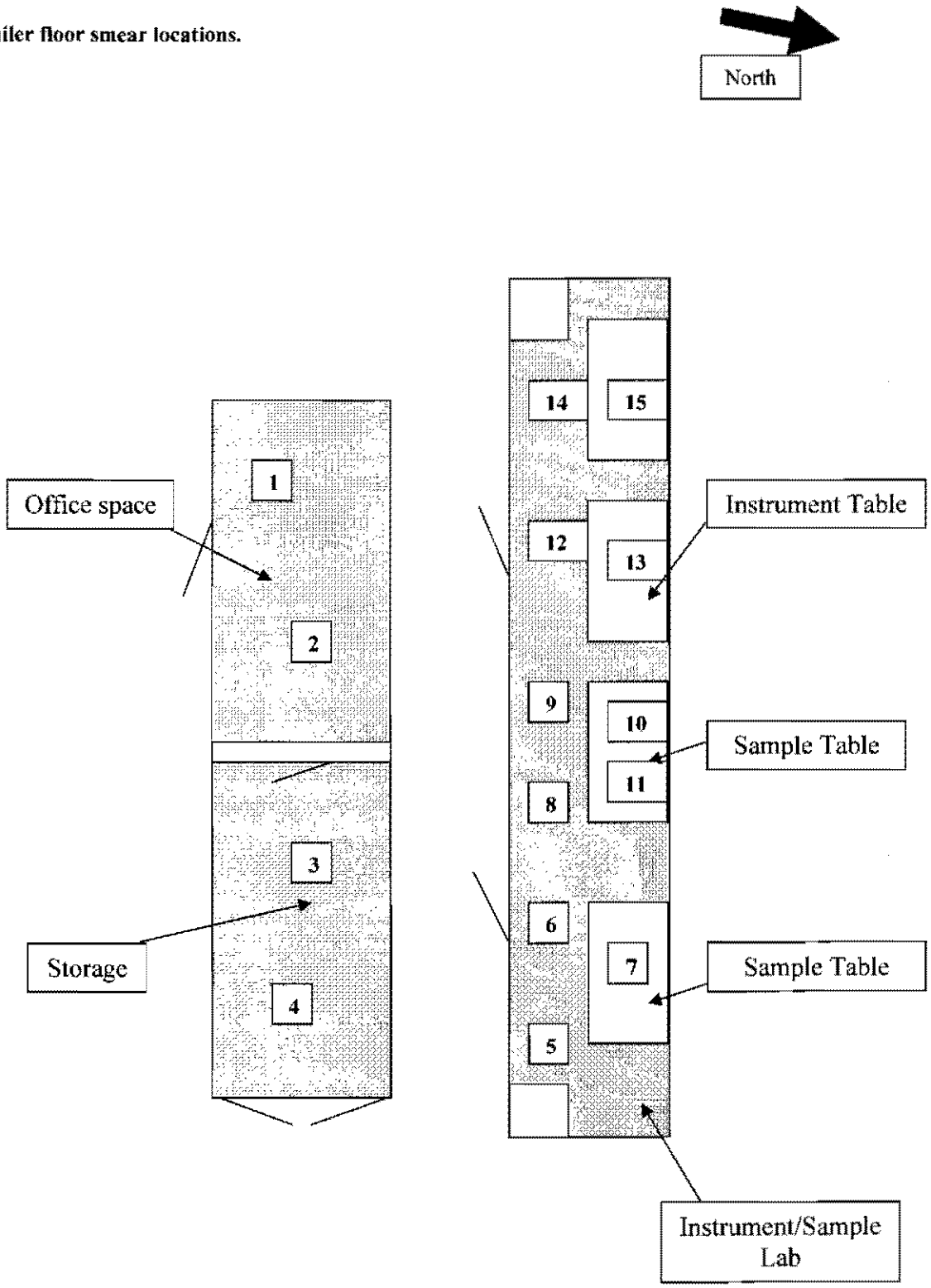
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	NA
Detector Model & Serial No.:	43-10-1/PR181590	
Alpha Eff.:	32.97%	
Beta/Gamma Eff.:	40.54%	
Alpha Bkg:	0 cpm	
Beta/Gamma Bkg:	46.4 cpm	
Calibration Due:	10-19-10	

COMMENTS:

Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Weekly Office Space/Sample Lab/Storage Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]
2	Conex Office Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
3	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
4	Conex Storage Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
5	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
6	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
7	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
8	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
9	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
10	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
11	Sample work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
12	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
13	Sample Conex Instrument table	<20 alpha/<1 K beta/gamma	dpm/100cm2	
14	Sample Conex Floor	<20 alpha/<1 K beta/gamma	dpm/100cm2	
15	Sample Conex work table	<20 alpha/<1 K beta/gamma	dpm/100cm2	[redacted]

IDW Storage Area Weekly Surveys

GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:**	**W912P4-07-D-0009**
		Delivery Order:	**0003**
ARSEC Job Number:	**Federal 09-055-00003**	**IDW Box / Barrier Weekly Routine**	

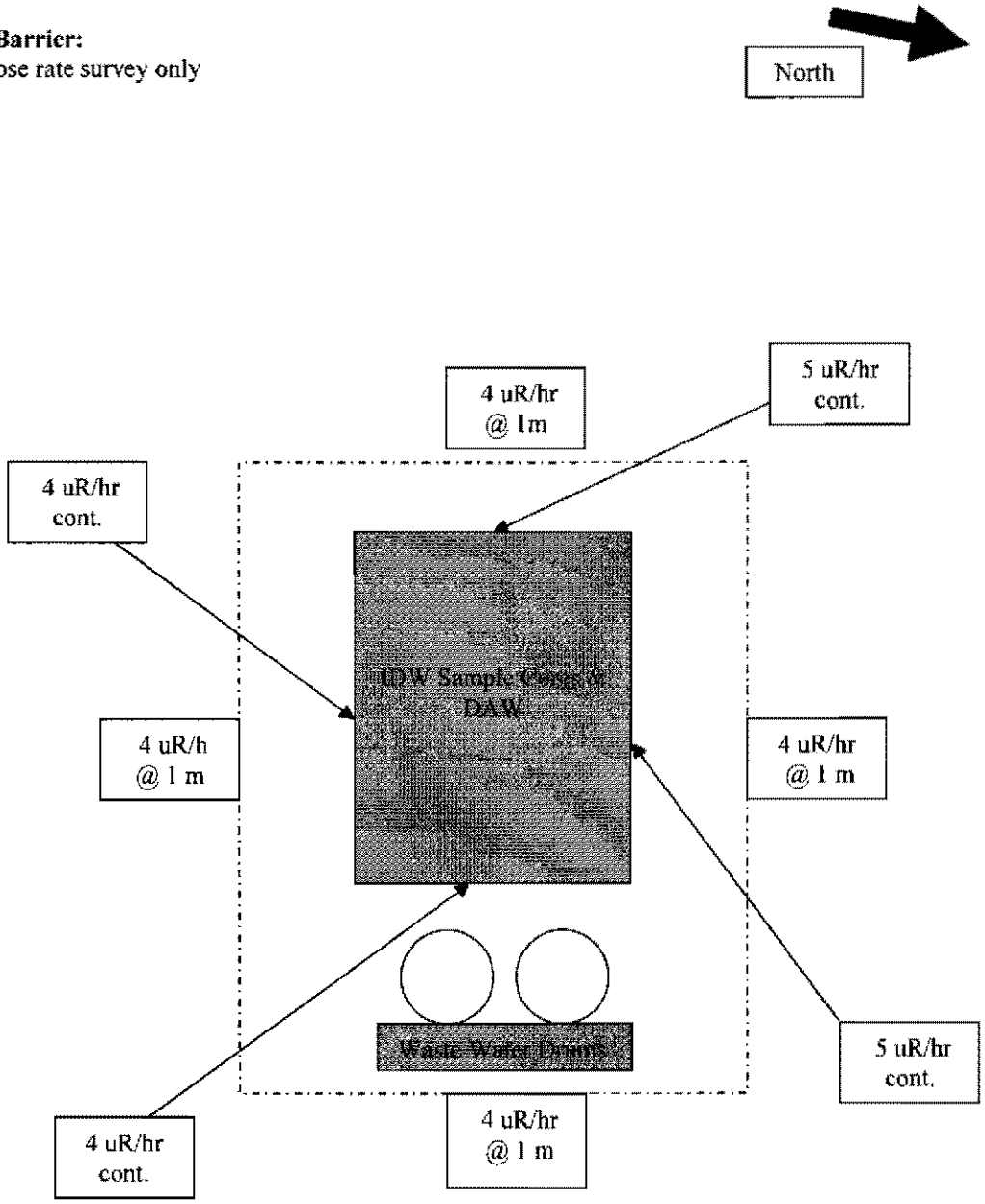
Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	12-13-09
Time of Activity	0955
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4 uR/hr	NA
Detector Serial No.	NA	
Calibration Due Date	10/24/10	

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results **pg 2 of 2**

IDW Box/Barrier:
NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:**	**W912P4-07-D-0009**
		Delivery Order:	**0003**
ARSEC Job Number:	**Federal 09-055-00003**	**IDW Box / Barrier Weekly Routine**	

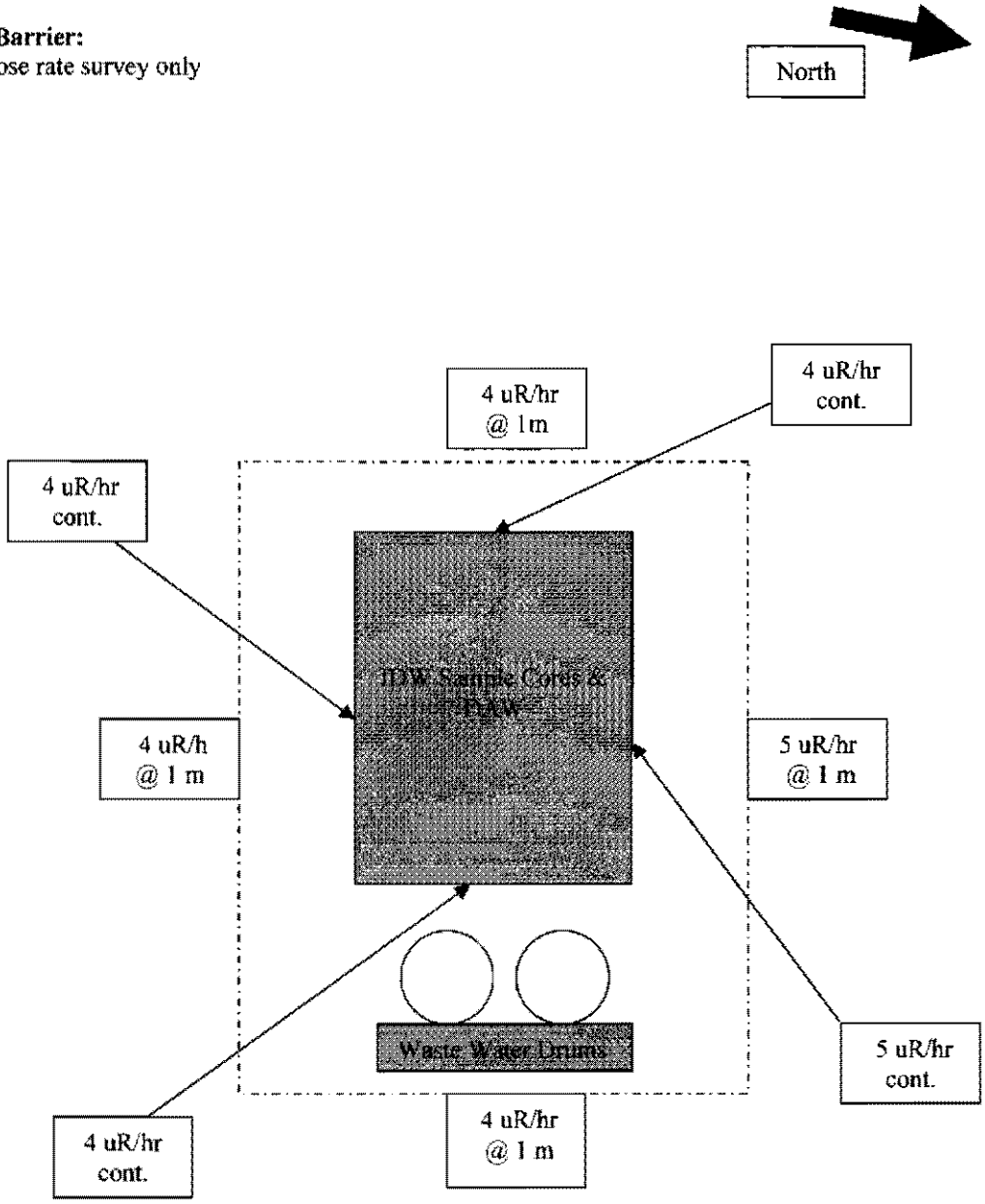
Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	12-16-09
Time of Activity	1345
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4 uR/hr	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results **pg 2 of 2**

IDW Box/Barrier:
NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **IDW Box / Barrier Weekly Routine**
ARSEC Job Number:	**Federal 09-055-00003**	

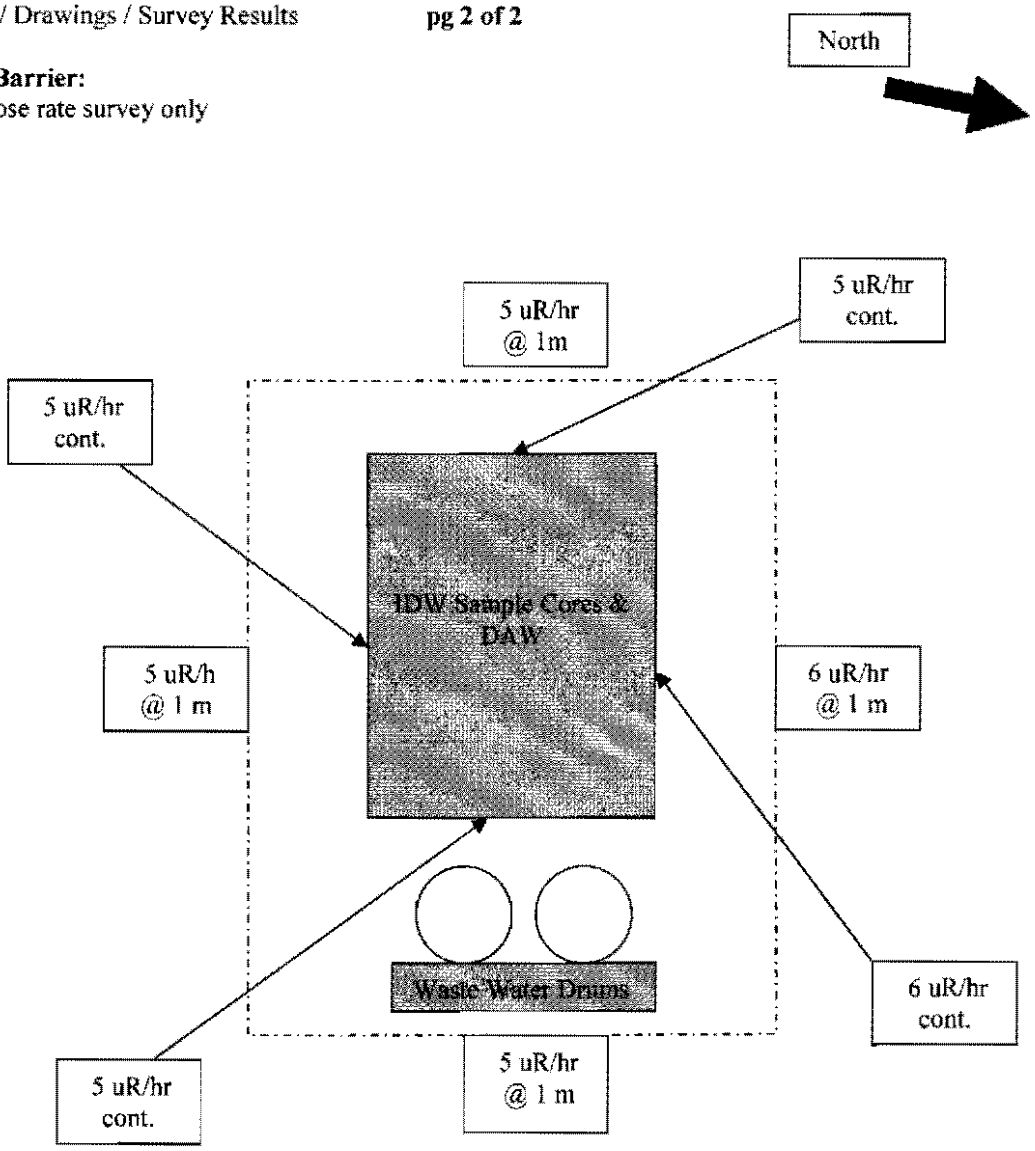
Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	1-7-10	
Time of Activity	1130	[redacted]
Surveyor Name	[redacted]	

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 5uR/hr	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results **pg 2 of 2**

IDW Box/Barrier:
NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **IDW Box / Barrier Weekly Routine**
ARSEC Job Number:	**Federal 09-055-00003**	

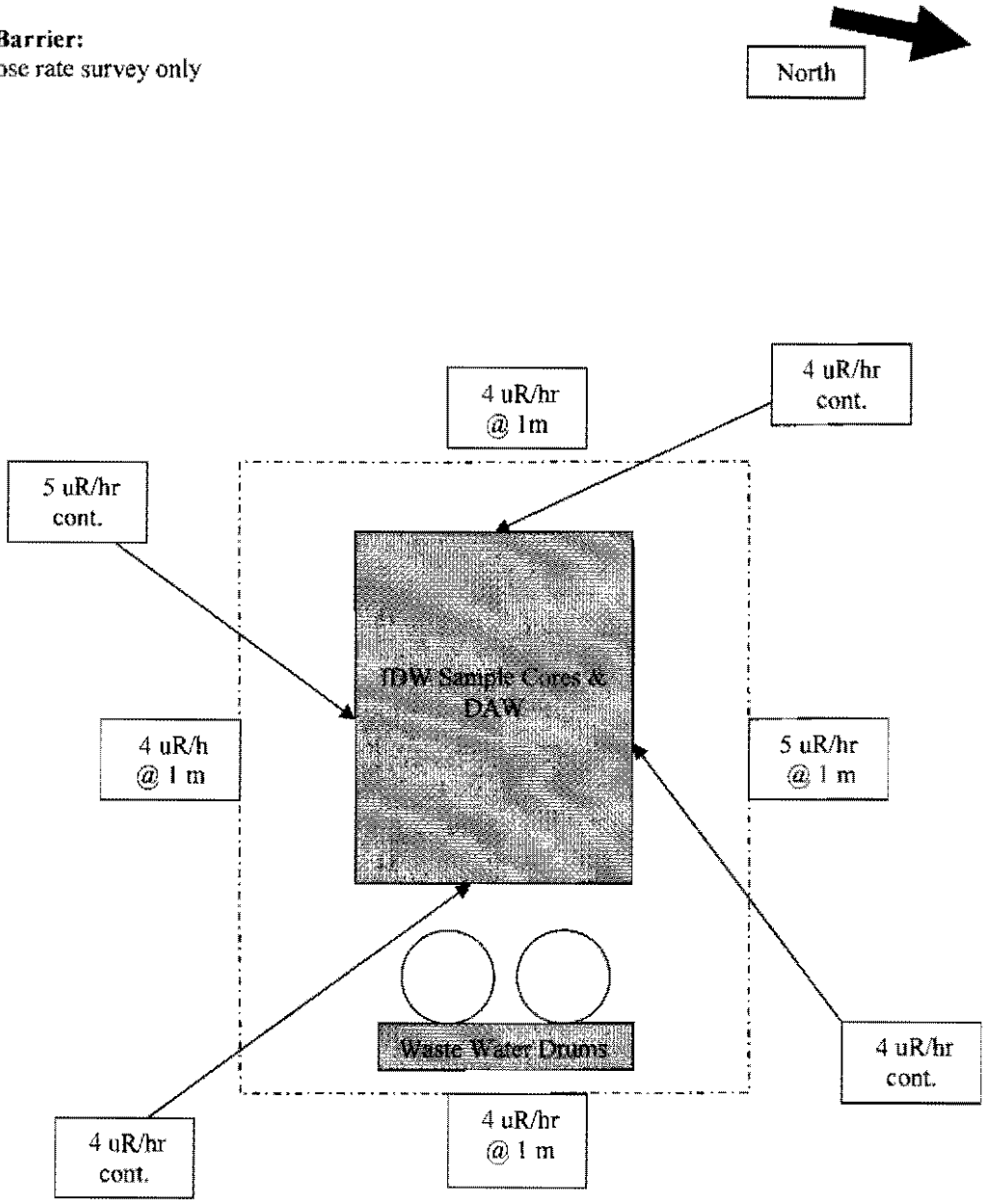
Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	1-13-10	
Time of Activity	0910	
Surveyor Name	[redacted]	

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4 uR/hr	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results **pg 2 of 2**

IDW Box/Barrier:
NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name: **Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:** **W912P4-07-D-0009** **Delivery Order:** **0003**
ARSEC Job Number: **Federal 09-055-00003**	**IDW Box/Barrier Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	1-19-10	
Time of Activity	1305	[redacted]
Surveyor Name	[redacted]	

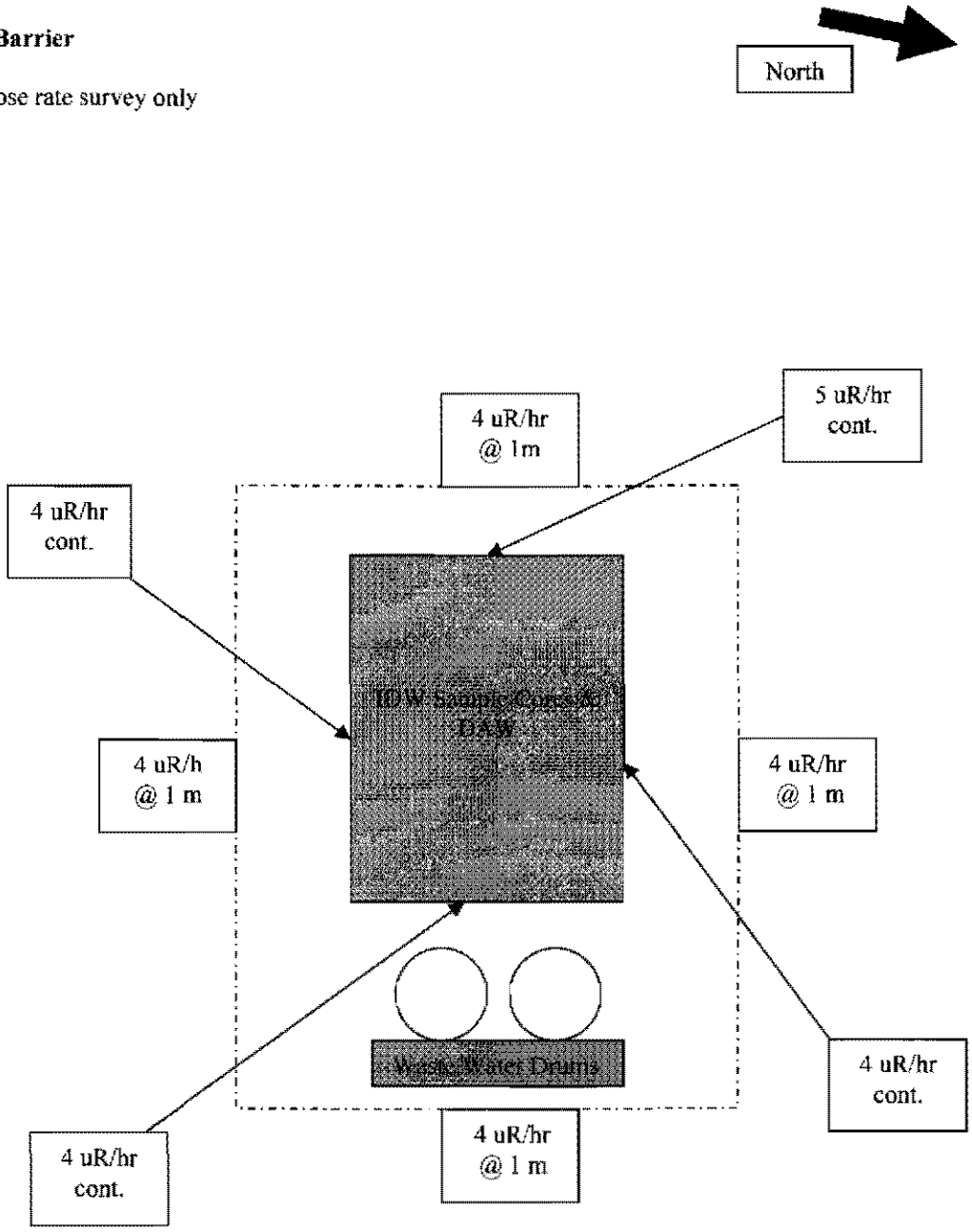
	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4 uR/hr	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	
	COMMENTS:	

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results

IDW Box/Barrier

NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name: **Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:** **W912P4-07-D-0009**
	Delivery Order: **0003**
ARSEC Job Number: **Federal 09-055-00003**	**IDW Box/Barrier Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	1-25-10	
Time of Activity	0825	
Surveyor Name	[redacted]	

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4 uR/hr	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	

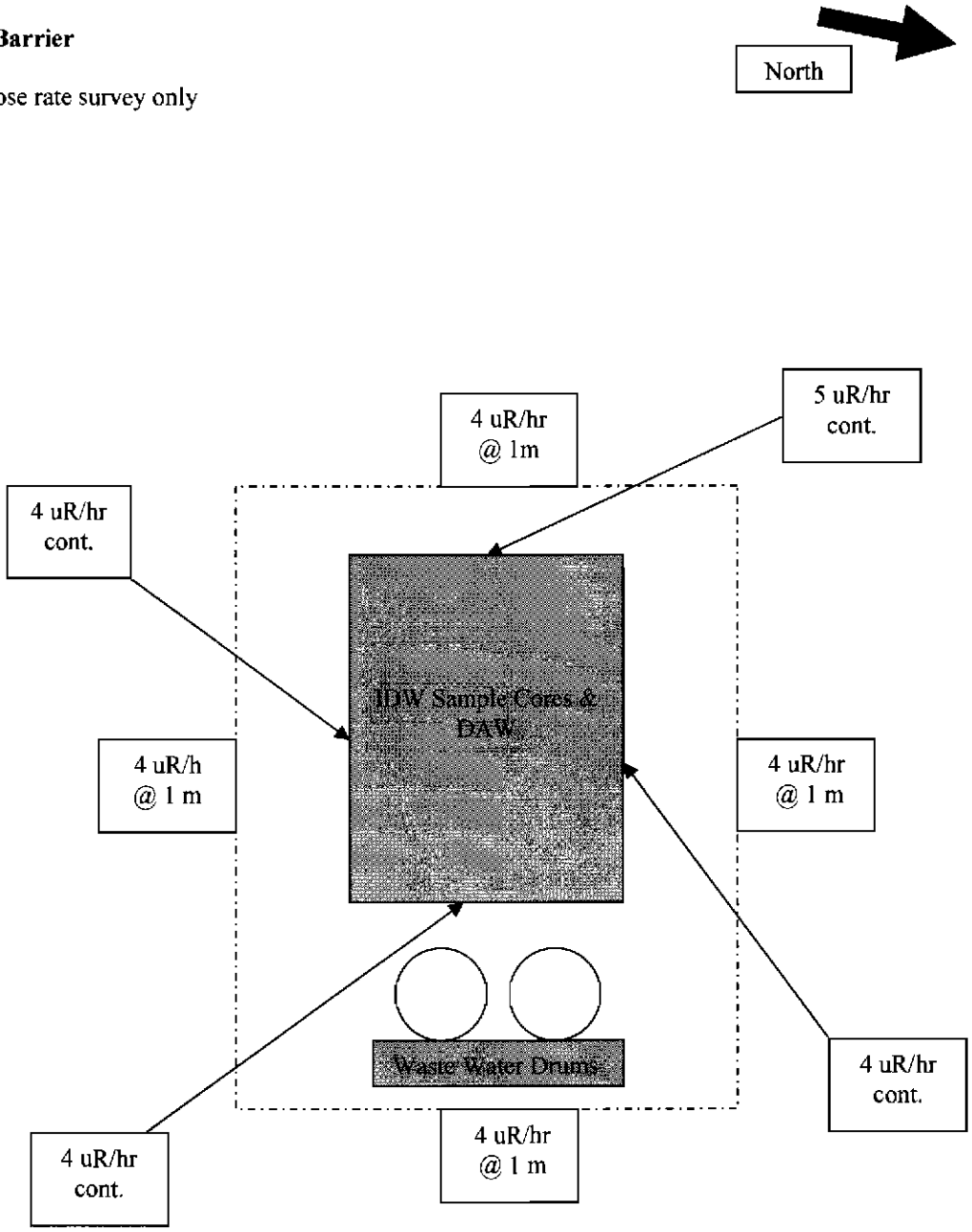
COMMENTS:

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results

IDW Box/Barrier

NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name: **Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:** **W912P4-07-D-0009**
	Delivery Order: **0003**
ARSEC Job Number: **Federal 09-055-00003**	**IDW Box/Barrier Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	2-12-10	
Time of Activity	0930	[redacted]
Surveyor Name	[redacted]	

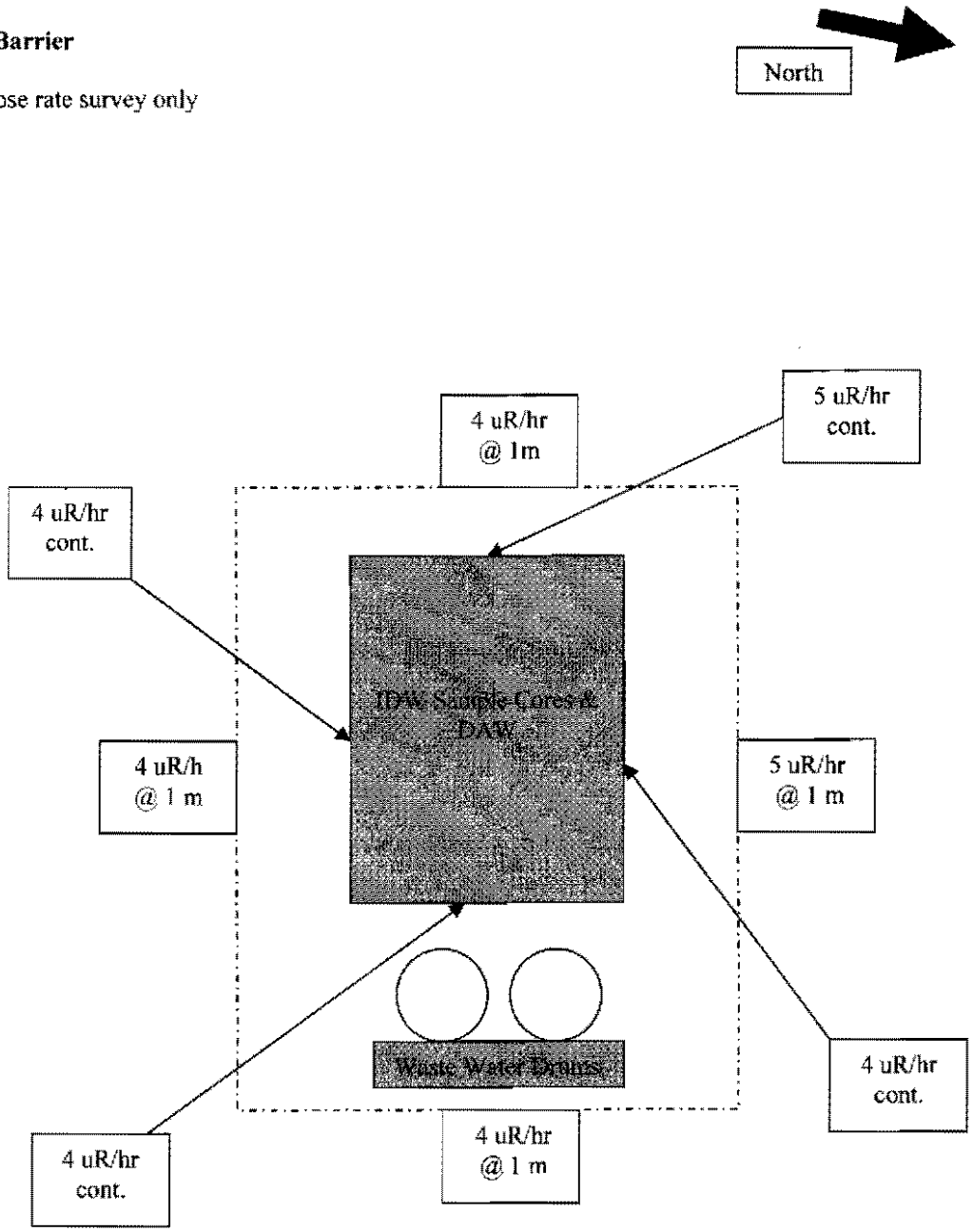
	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4 uR/hr	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	
	COMMENTS:	

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results

IDW Box/Barrier

NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name: **Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:** **W912P4-07-D-0009**
	Delivery Order: **0003**
ARSEC Job Number: **Federal 09-055-00003**	**IDW Box/Barrier Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	2-12-10	
Time of Activity	0930	
Surveyor Name	[redacted]	

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4 uR/hr	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	

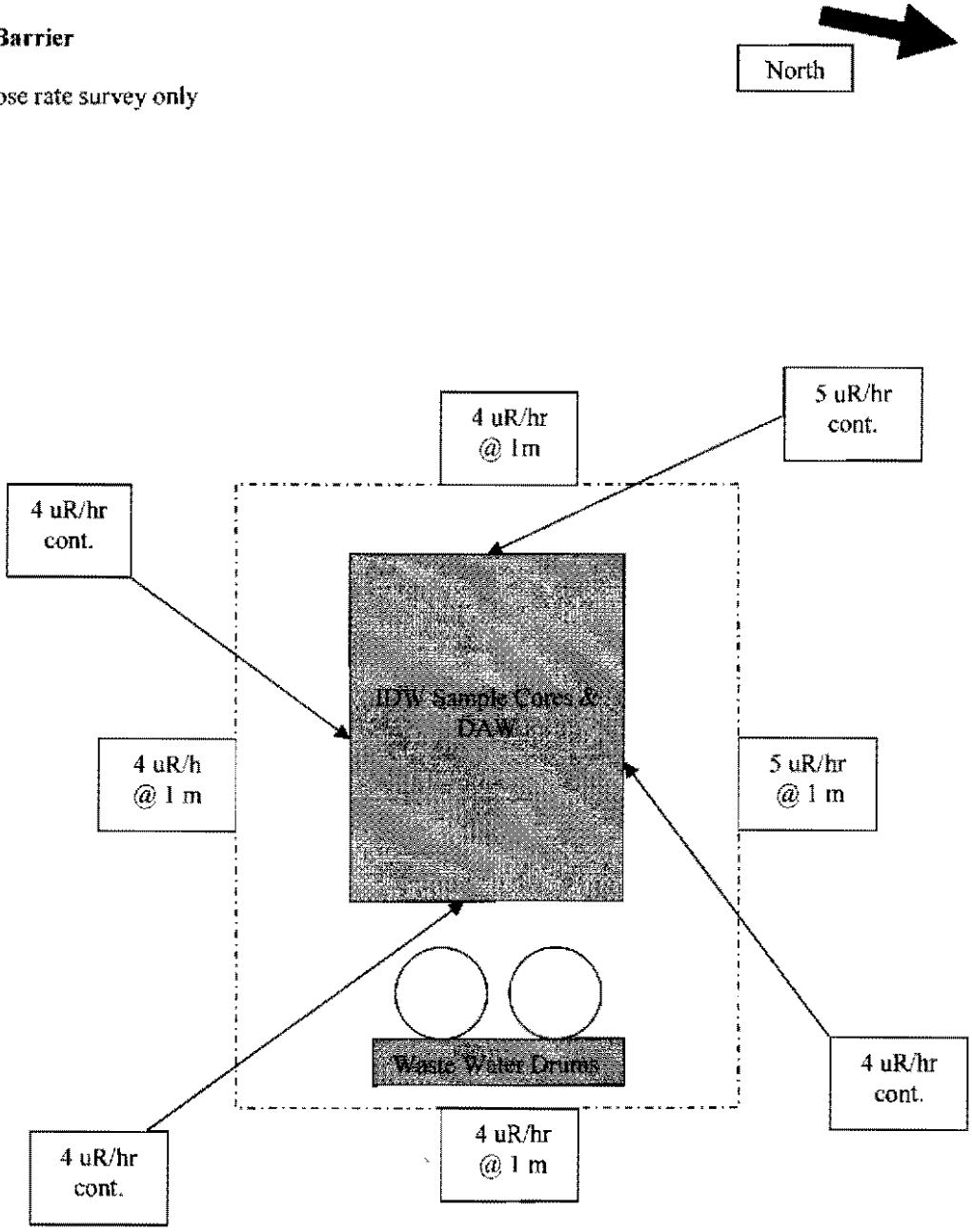
COMMENTS:

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results

IDW Box/Barrier

NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name: **Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:** **W912P4-07-D-0009**
	Delivery Order: **0003**
ARSEC Job Number: Federal 09-055-00003	**IDW box/Barrier Weekly Routine**

Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	2-19-10	
Time of Activity:	1435	[redacted]
Surveyor Name	[redacted]	[redacted]

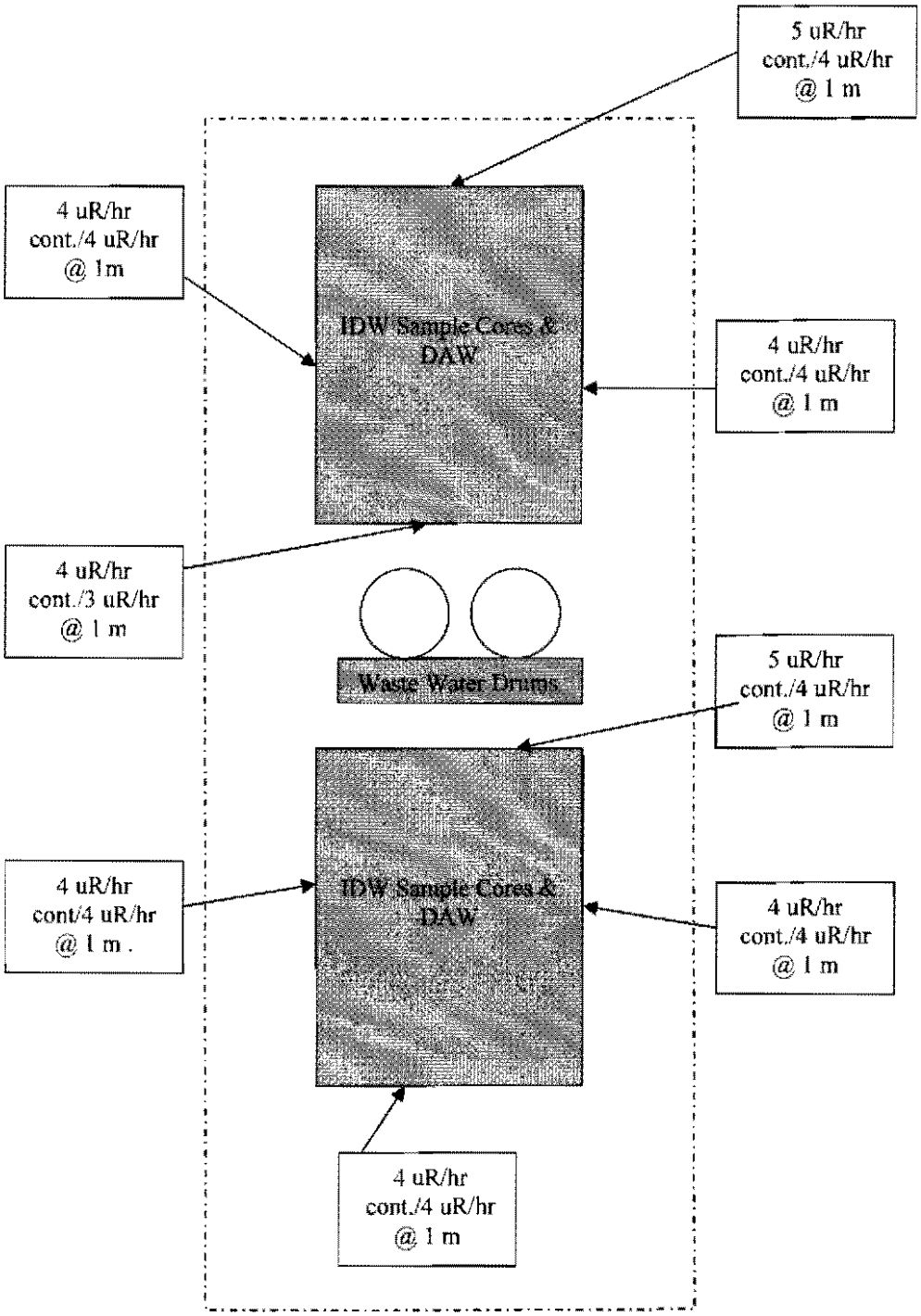
	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	

COMMENTS:

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results

IDW Box/Barrier:
NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name: **Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:** **W912P4-07-D-0009** **Delivery Order:** **0003**
ARSEC Job Number: Federal 09-055-00003	**IDW box/Barrier Weekly Routine**

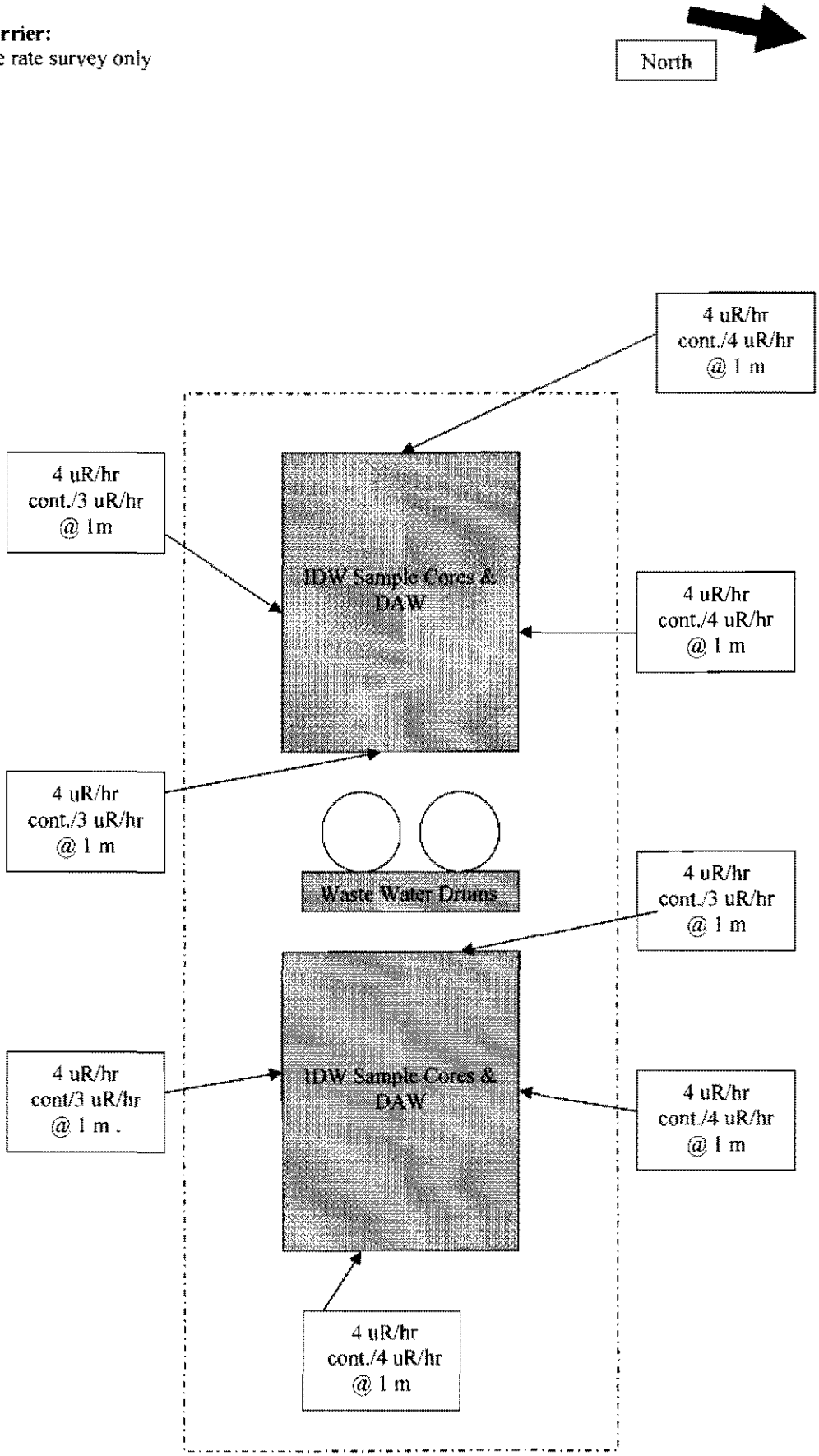
Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	2-24-10	
Time of Activity:	1335	[redacted]
Surveyor Name	[redacted]	

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	
	COMMENTS:	

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results

IDW Box/Barrier:
NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name: **Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:** **W912P4-07-D-0009**
	Delivery Order: **0003**
ARSEC Job Number: Federal 09-055-00003	**IDW box/Barrier Weekly Routine**

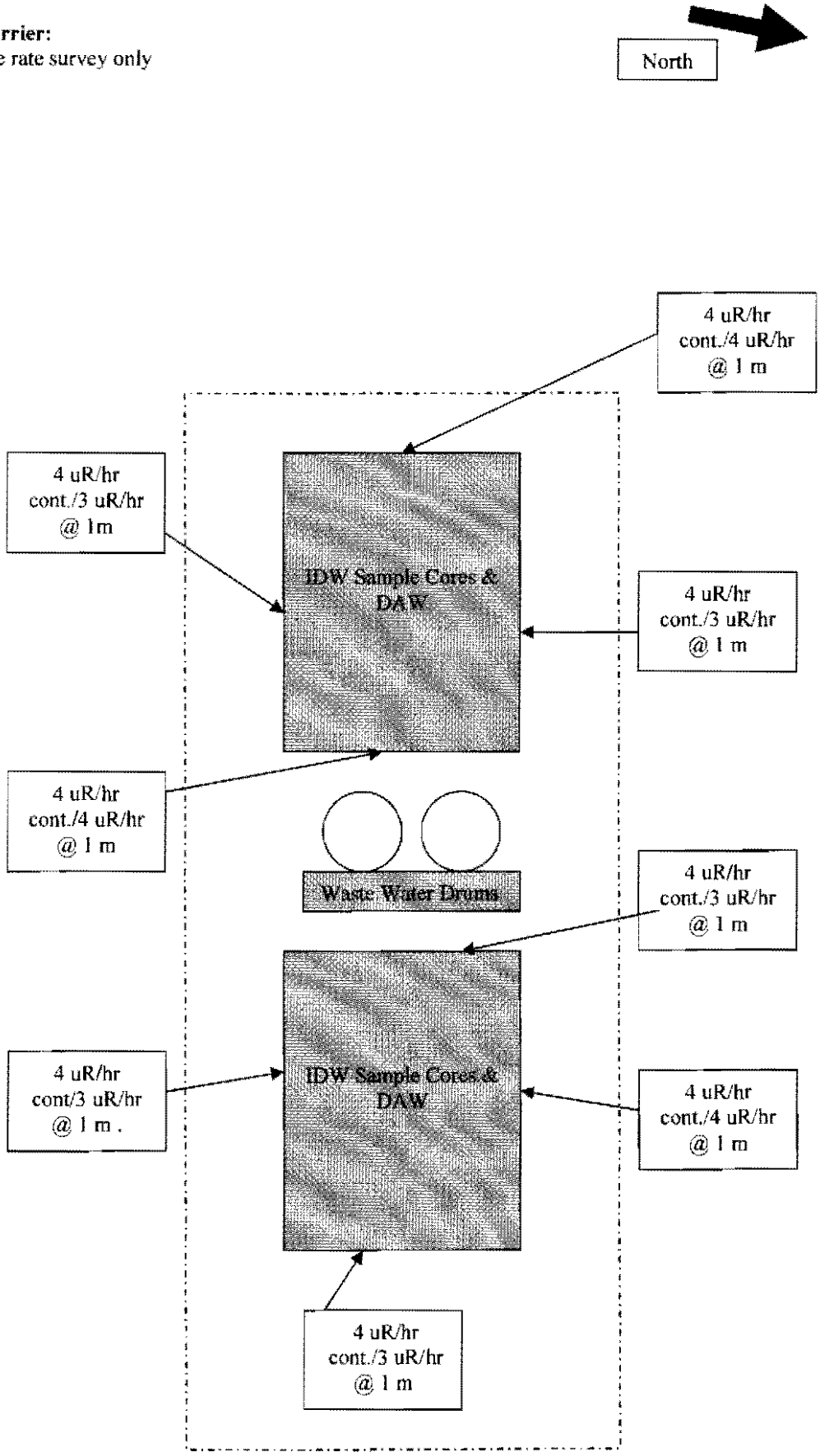
Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	3/3/10	
Time of Activity:	14:15	[redacted]
Surveyor Name	[redacted]	

	Survey Equipment	
	Instrument No. 1	**Instrument No. 2**
Rate Meter Serial No.	M19 #169641 Bkg: 4	
Detector Serial No.	NA	
Calibration Due Date	10/24/10	
	COMMENTS:	

Gamma Survey and Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Comments / Drawings / Survey Results

IDW Box/Barrier:
NOTE: Dose rate survey only



GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:** **W912P4-07-D-0009** **Delivery Order:** **0003** **IDW Waste Storage Area Weekly Routine**
ARSEC Job Number:	**Federal 09-055-00003**	

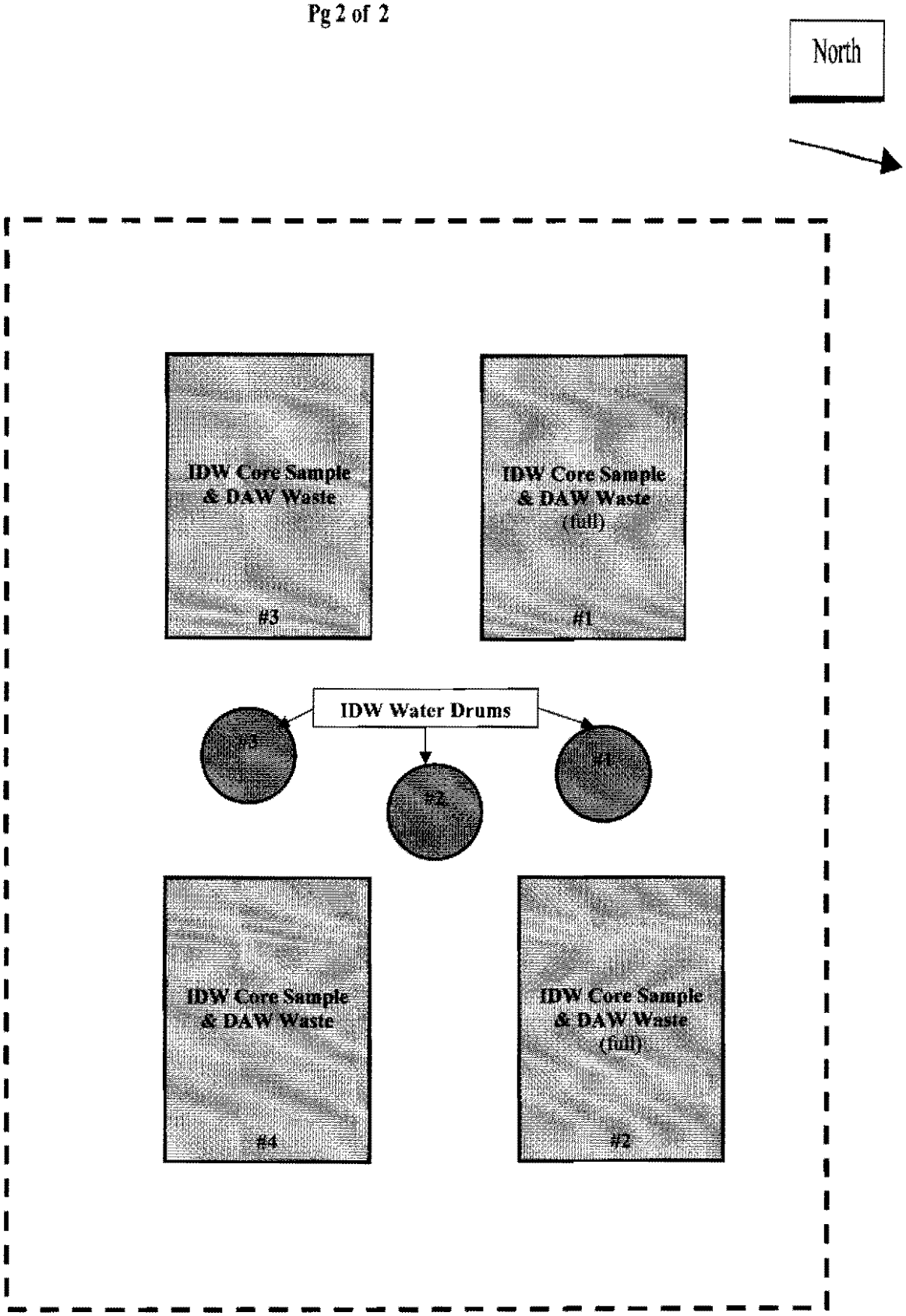
Site Name:	Tonawanda FUSRAP Landfill Site
Date of Activity:	3-11-10
Time of Activity:	10:15
Surveyor Name:	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	MI9 #169641 Bkg: 4	NA
Detector Model & Serial No.:	Internal scintillator (no detector serial #)	
Calibration Due:	10-19-10	

COMMENTS:

All containers less than or equal to background on contact and at 1 meter unless otherwise noted. All boundaries less than or equal to background unless otherwise noted.

IDW Waste Storage Area Weekly Routine
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009



GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003**
ARSEC Job Number:	**Federal 09-055-00003**	**IDW Waste Storage Area Weekly Routine**

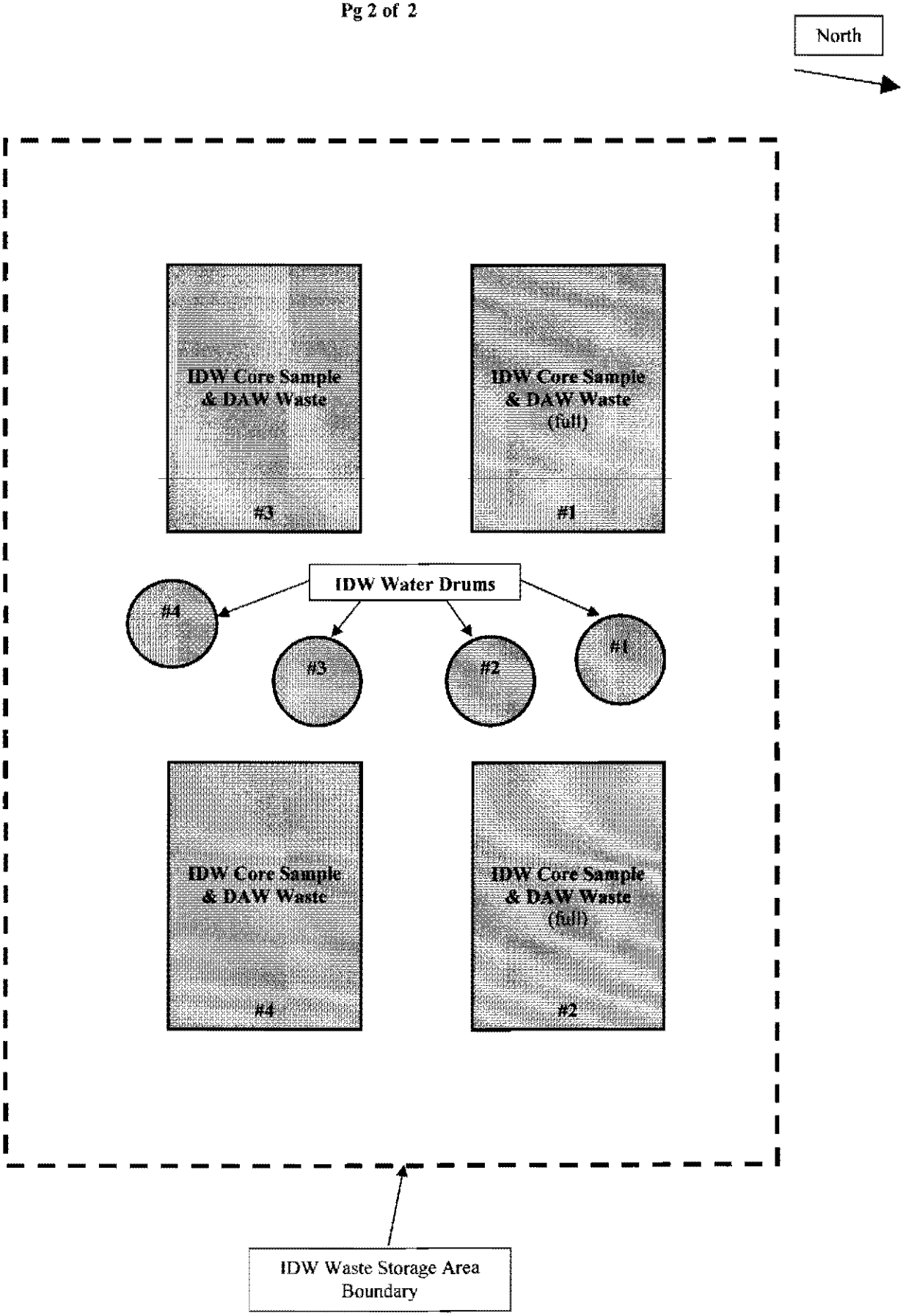
Site Name:	Tonawanda FUSRAP Landfill Site
Date of Activity:	3-18-10
Time of Activity:	15:20 [redacted]
Surveyor Name:	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	M19 #169641 Bkg: 4	NA
Detector Model & Serial No.:	Internal scintillator (no detector serial #)	
Calibration Due:	10-19-10	

COMMENTS:

All containers less than or equal to background on contact and at 1 meter unless otherwise noted. All boundaries less than or equal to background unless otherwise noted.

IDW Waste Storage Area Weekly Routine
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009



GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **IDW Waste Storage Area Weekly Routine**
ARSEC Job Number:	**Federal 09-055-00003**	

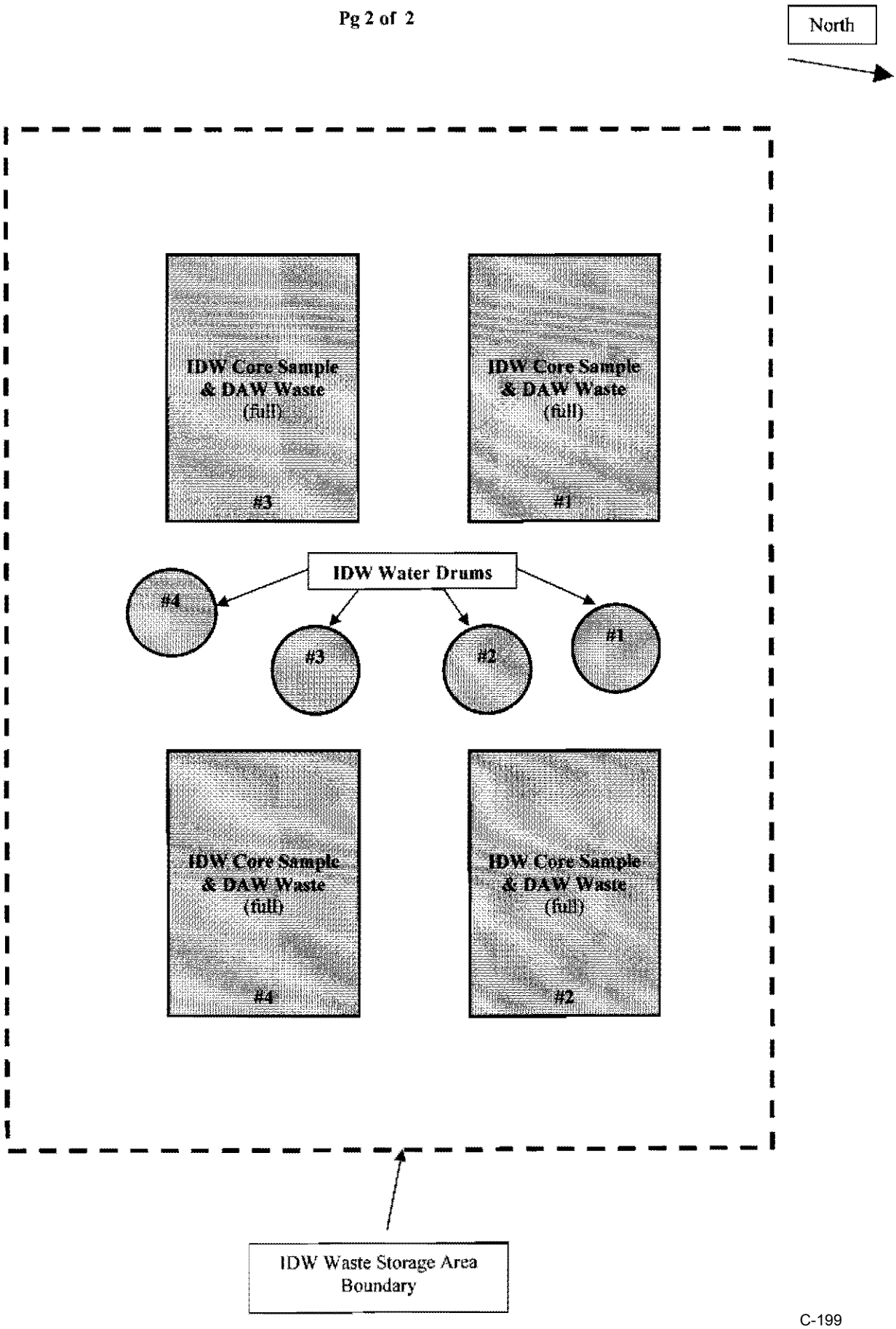
Site Name:	Tonawanda FUSRAP Landfill Site	
Date of Activity:	3-24-10	
Time of Activity:	11:15	[redacted]
Surveyor Name:	[redacted]	

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	M19 #169641	NA
Background:	4 uR/hr	
Detector Model & Serial No.:	Internal scintillator (no detector serial #)	
Calibration Due:	10-19-10	

COMMENTS:

All containers less than or equal to background on contact and at 1 meter unless otherwise noted. All boundaries less than or equal to background unless otherwise noted.

IDW Waste Storage Area Weekly Routine
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009



GAMMA SURVEY AND SMEAR LOG

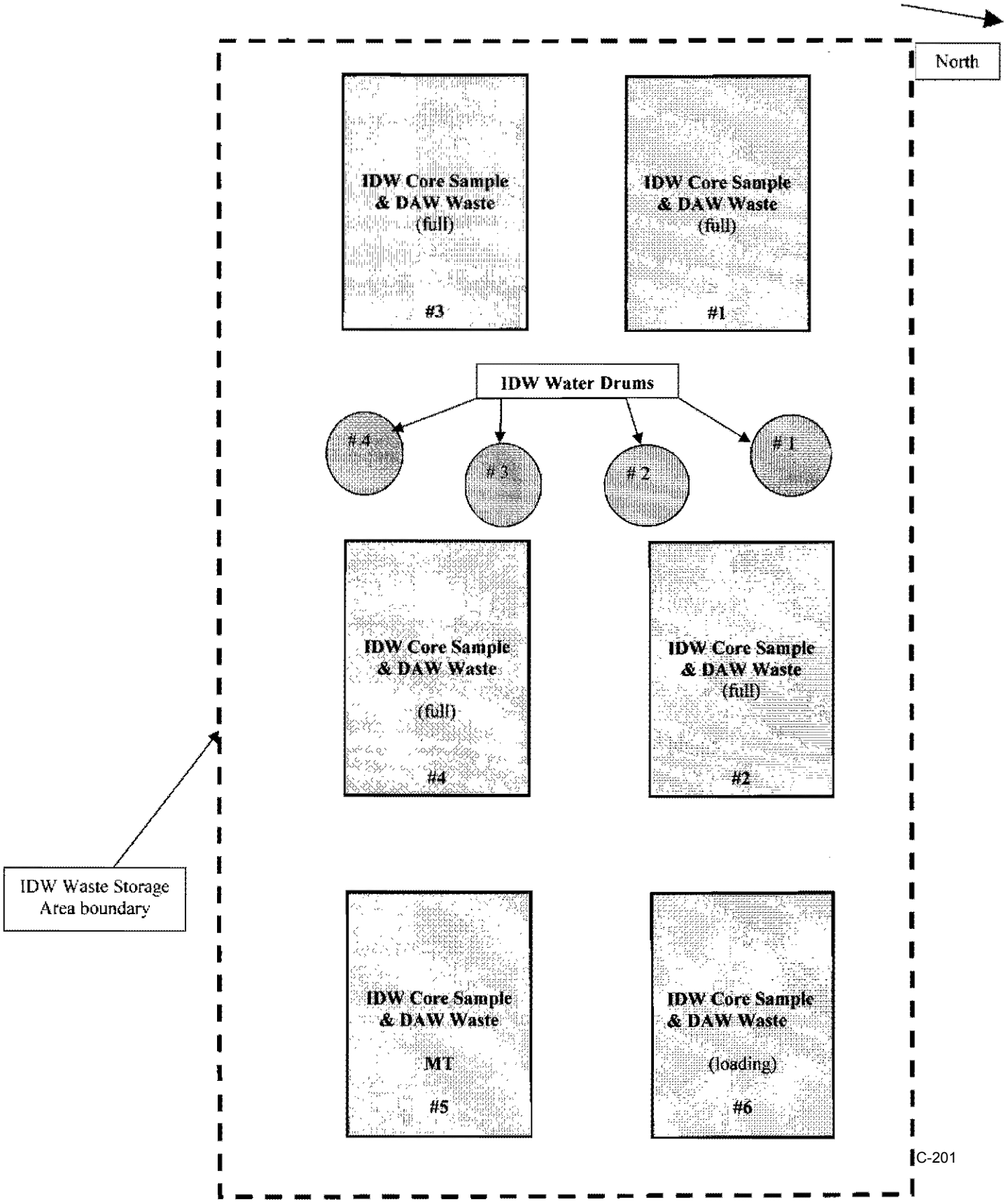
Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003**
ARSEC Job Number:	**Federal 09-055-00003**	**IDW Waste Storage Area Weekly Routine**

Site Name:	Tonawanda FUSRAP Landfill Site
Date of Activity:	3-29-10
Time of Activity:	12:50
Surveyor Name:	[redacted]

	Survey Equipment [redacted]	
	Instrumeut No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	M19 #169641	NA
Background:	4 uR/hr	
Detector Model & Serial No.:	Internal scintillator (no detector serial #)	
Calibration Due:	10-19-10	

COMMENTS:

All containers less than or equal to background on contact and at 1 meter unless otherwise noted. All boundaries less than or equal to background unless otherwise noted.


North
IDW Core Sample & DAW Waste (full) #3
IDW Core Sample & DAW Waste (full) #1
IDW Water Drums
4
3
2
1
IDW Core Sample & DAW Waste (full) #4
IDW Core Sample & DAW Waste (full) #2
IDW Waste Storage Area boundary
IDW Core Sample & DAW Waste MT #5
IDW Core Sample & DAW Waste (loading) #6

Sample Shipment Surveys

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 11/19/2009 **TIME:** 1630 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 176083 **PROBE MODEL/SERIAL #:** PR181590

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 43.6 **CAL DUE:** 10/19/2010
ALPHA Eff: 32.97 **BETA/GAMMA Eff:** 40.54

ITEM:	SHIPMENT ID:	ALPHA Removable:	BETA/ GAMMA Removable:
Cooler Top	Cooler #1	<20	<1K
Cooler Side	Cooler #1	<20	<1K
Cooler Side	Cooler #1	<20	<1K
Cooler Side	Cooler #1	<20	<1K
Cooler Bottom	Cooler #1	<20	<1K
Cooler Top	Cooler #2	<20	<1K
Cooler Side	Cooler #2	<20	<1K
Cooler Side	Cooler #2	<20	<1K
Cooler Side	Cooler #2	<20	<1K

Cooler Side	Cooler #2	<20	<1K
Cooler Bottom	Cooler #2	<20	<1K

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 12/2/2009 **TIME:** 1700 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 176083 **PROBE MODEL/SERIAL #:** PR181590

ALPHA Bk 0.1 **BETA/GAMMA Bkg:** 43.6 **CAL DUE:** 10/19/2010
ALPHA Efl 32.97 **BETA/GAMMA Eff:** 40.54

ITEM:	SHIPMENT ID:	ALPHA Removable:	BETA/ GAMMA Removable:
Cooler Top	Cooler #1	<20	<1K
Cooler Side	Cooler #1	<20	<1K
Cooler Side	Cooler #1	<20	<1K
Cooler Side	Cooler #1	<20	<1K
Cooler Bottom	Cooler #1	<20	<1K
Cooler Top	Cooler #2	<20	<1K
Cooler Side	Cooler #2	<20	<1K
Cooler Side	Cooler #2	<20	<1K
Cooler Side	Cooler #2	<20	<1K

Cooler Side	Cooler #2	<20	<1K
Cooler Bottom	Cooler #2	<20	<1K
Cooler Top	Cooler #3	<20	<1k
Cooler Side	Cooler #3	<20	<1k
Cooler Side	Cooler #3	<20	<1k
Cooler Side	Cooler #3	<20	<1k
Cooler Side	Cooler #3	<20	<1k
Cooler Bottom	Cooler #3	<20	<1k

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 12/7/2009 **TIME:** 1630 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 176083 **PROBE MODEL/SERIAL #:** PR181590

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 43.6 **CAL DUE:** 10/19/2010
ALPHA Eff: 32.97 **BETA/GAMMA Eff:** 40.54

ITEM:	SHIPMENT ID:	ALPHA Removable:	BETA/ GAMMA Removable:
Cooler Top	Cooler #1	<20	<1K
Cooler Side	Cooler #1	<20	<1K
Cooler Side	Cooler #1	<20	<1K
Cooler Side	Cooler #1	<20	<1K
Cooler Bottom	Cooler #1	<20	<1K
Cooler Top	Cooler #2	<20	<1K
Cooler Side	Cooler #2	<20	<1K
Cooler Side	Cooler #2	<20	<1K
Cooler Side	Cooler #2	<20	<1K

Cooler Side	Cooler #2	<20	<1K
Cooler Bottom	Cooler #2	<20	<1K

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 13-Feb-10 **TIME:** 10:15 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 41.4 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7							
8							
9							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 15-Feb-10 **TIME:** 18:00 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 44.1 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7							
8							
9							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 16-Feb-10 **TIME:** 18:00 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.2 **BETA/GAMMA Bkg:** 43.9 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 17-Feb-10 **TIME:** 17:40 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 40.6 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
13							
14							
15							
16							
17							
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21							
22							
23							
24							
25							
26							
27							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 16-Feb-10 **TIME:** 18:00 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.2 **BETA/GAMMA Bkg:** 43.9 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
13							
14							
15							
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24							
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26							
27							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 17-Feb-10 **TIME:** 17:45 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 40.1 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
13							
14							
15							
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27							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 18-Feb-10 **TIME:** 17:30 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 3 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		3 uRem	3 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		3 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		3 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		3 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		3 uRem	3 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		3 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
11	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		3 uRem	3 uRem
13	Cooler Top	Cooler #3	<20	<1K		4 uRem	4 uRem
14	Cooler Side	Cooler #3	<20	<1K		4 uRem	3 uRem
15	Cooler Side	Cooler #3	<20	<1K		3 uRem	3 uRem
16	Cooler Side	Cooler #3	<20	<1K		3 uRem	3 uRem
17	Cooler Side	Cooler #3	<20	<1K		4 uRem	3 uRem
18	Cooler Bottom	Cooler #3	<20	<1K		3 uRem	3 uRem
19							
20							
21							
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23							
24							
25							
26							
27							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 22-Feb-10 **TIME:** 17:20 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 43.1 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 23-Feb-10 **TIME:** 17:35 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.2 **BETA/GAMMA Bkg:** 42.4 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 24-Feb-10 **TIME:** 17:45 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.4 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		3 uRem	3 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		3 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
11	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 25-Feb-10 **TIME:** 17:30 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 38.7 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 26-Feb-10 **TIME:** 17:00 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 42.2 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 1-Mar-10 **TIME:** 17:30 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.2 **BETA/GAMMA Bkg:** 42.5 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 3 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		3 uRem	3 uRem
2	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
4	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		3 uRem	3 uRem
8	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem

10	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
11	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		3 uRem	3 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 2-Mar-10 **TIME:** 17:30 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 37.0 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	3 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 3-Mar-10 **TIME:** 17:00 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.2 **BETA/GAMMA Bkg:** 42.2 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem

10	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	3 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 4-Mar-10 **TIME:** 17:10 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.6 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	3 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	3 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	3 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 5-Mar-10 **TIME:** 13:45 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 39.4 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	3 uRem
7							
8							
9							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 8-Mar-10 **TIME:** 16:40 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-1

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.8 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RA @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	3 uRen
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRen
3	Cooler Side	Cooler #1	<20	<1K		3 uRem	4 uRer
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRer
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRer
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRer
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRe
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRe
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRe

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 9-Mar-10 **TIME:** 17:00 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 37.7 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		3 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
13	Cooler Top	Cooler #3	<20	<1K		4 uRem	3 uRem
14	Cooler Side	Cooler #3	<20	<1K		3 uRem	4 uRem
15	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
16	Cooler Side	Cooler #3	<20	<1K		4 uRem	3 uRem
17	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
18	Cooler Bottom	Cooler #3	<20	<1K		4 uRem	4 uRem
19							
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 10-Mar-10 **TIME:** 17:25 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.2 **BETA/GAMMA Bkg:** 39.7 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	3 uRem
13	Cooler Top	Cooler #3	<20	<1K		4 uRem	3 uRem
14	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
15	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
16	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
17	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
18	Cooler Bottom	Cooler #3	<20	<1K		4 uRem	4 uRem
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 11-Mar-10 **TIME:** 16:35 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 41.5 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
13	Cooler Top	Cooler #3	<20	<1K		4 uRem	4 uRem
14	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
15	Cooler Side	Cooler #3	<20	<1K		4 uRem	3 uRem
16	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
17	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
18	Cooler Bottom	Cooler #3	<20	<1K		4 uRem	3 uRem
19							
20							
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SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 12-Mar-10 **TIME:** 16:50 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 44.7 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 5 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		5 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		5 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		5 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		5 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		5 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		5 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	3 uRem

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 15-Mar-10 **TIME:** 17:25 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 44.0 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 16-Mar-10 **TIME:** 16:30 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 42.7 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 5 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		5 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		5 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		5 uRem	5 uRem
5	Cooler Side	Cooler #1	<20	<1K		5 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		5 uRem	5 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		5 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		5 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
13	Cooler Top	Cooler #3	<20	<1K		5 uRem	5 uRem
14	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
15	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
16	Cooler Side	Cooler #3	<20	<1K		5 uRem	4 uRem
17	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
18	Cooler Bottom	Cooler #3	<20	<1K		5 uRem	4 uRem
19							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 17-Mar-10 **TIME:** 16:30 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.1 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 3 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	3 uRem
2	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
5	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		3 uRem	3 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	3 uRem

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

[redacted]

DATE: 18-Mar-10 **TIME:** 17:00 **SURVEYED BY:**

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 42.0 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	3 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	3 uRem
13	Cooler Top	Cooler #3	<20	<1K		4 uRem	4 uRem
14	Cooler Side	Cooler #3	<20	<1K		4 uRem	3 uRem
15	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
16	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
17	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
18	Cooler Bottom	Cooler #3	<20	<1K		4 uRem	3 uRem
19							
20							
21							
22							
23							
24							
25							
26							
27							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 19-Mar-10 **TIME:** 16:30 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 41.4 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	3 uRem
13	Cooler Top	Cooler #3	<20	<1K		4 uRem	4 uRem
14	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
15	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
16	Cooler Side	Cooler #3	<20	<1K		3 uRem	3 uRem
17	Cooler Side	Cooler #3	<20	<1K		4 uRem	3 uRem
18	Cooler Bottom	Cooler #3	<20	<1K		4 uRem	4 uRem
19							
20							
21							
22							
23							
24							
25							
26							
27							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 22-Mar-10 **TIME:** 16:45 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.7 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	3 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 23-Mar-10 **TIME:** 14:30 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 42.2 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	3 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
5	Cooler Side	Cooler #1	<20	<1K		3 uRem	3 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 24-Mar-10 **TIME:** 16:00 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.7 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		3 uRem	3 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem
13	Cooler Top	Cooler #3	<20	<1K		4 uRem	4 uRem
14	Cooler Side	Cooler #3	<20	<1K		4 uRem	3 uRem
15	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
16	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
17	Cooler Side	Cooler #3	<20	<1K		4 uRem	4 uRem
18	Cooler Bottom	Cooler #3	<20	<1K		4 uRem	3 uRem
19							

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 25-Mar-10 **TIME:** 12:30 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 45.0 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	3 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 26-Mar-10 **TIME:** 14:40 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.2 **BETA/GAMMA Bkg:** 40.6 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 29-Mar-10 **TIME:** 16:00 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 46.4 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	3 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	3 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	3 uRem

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 30-Mar-10 **TIME:** 16:00 **SURVEYED BY:** [redacted]

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 41.1 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	3 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	3 uRem
7	Cooler Top	Cooler #2	<20	<1K		3 uRem	3 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem

SAMPLE SHIPMENT SURVEY
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

[redacted]

DATE: 31-Mar-10 **TIME:** 16:00 **SURVEYED BY:**

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.1 **BETA/GAMMA Bkg:** 44.3 **ALPHA Eff:** 0.405 **BETA/GAMMA Eff:** 0.329

INSTRUMENT MODEL/SERIAL #: Model 19/169641 **Bkg:** 4 uR/hr **CAL DUE:** 24-Oct-10

	LOCATION:	CONTAINER ID:	ALPHA Removable:	BETA/ GAMMA Removable:		DOSE RATE CONTACT:	DOSE RATE @ 1 M
1	Cooler Top	Cooler #1	<20	<1K		4 uRem	4 uRem
2	Cooler Side	Cooler #1	<20	<1K		4 uRem	3 uRem
3	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
4	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
5	Cooler Side	Cooler #1	<20	<1K		4 uRem	4 uRem
6	Cooler Bottom	Cooler #1	<20	<1K		4 uRem	4 uRem
7	Cooler Top	Cooler #2	<20	<1K		4 uRem	4 uRem
8	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
9	Cooler Side	Cooler #2	<20	<1K		4 uRem	3 uRem

10	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
11	Cooler Side	Cooler #2	<20	<1K		4 uRem	4 uRem
12	Cooler Bottom	Cooler #2	<20	<1K		4 uRem	4 uRem

Free Release Surveys

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 8-Dec-09 **TIME:** 9:20

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 187 **ALPHA Eff.:** .211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 45.5 **ALPHA Eff:** .329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Trailer	1 Trailer ramp access	<100		<5K		<20		<1K
Trailer	2 Trailer ramp access	<100		<5K		<20		<1K
Trailer	3 Trailer floor	<100		<5K		<20		<1K
Trailer	4 Trailer floor	<100		<5K		<20		<1K
Drill rig	5 Foot	<100		<5K		<20		<1K
Drill rig	6 Foot	<100		<5K		<20		<1K

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Drill Rig	7 Right track	<100		<5K		<20		<1K
Drill Rig	8 Right track	<100		<5K		<20		<1K
Drill Rig	9 Left track	<100		<5K		<20		<1K
Drill Rig	10 Left track	<100		<5K		<20		<1K
Drill Rig	11 Right track	<100		<5K		<20		<1K
Drill Rig	12 Driver's seat floor board	<100		<5K		<20		<1K
Core tubing	13 Various tubes	<100		<5K		<20		<1K
Core tubing	14 Various tubes	<100		<5K		<20		<1K
Core tubing	15 Various tubes	<100		<5K		<20		<1K
Drill Rig	16 Engine cover/body work	<100		<5K		<20		<1K
Drill Rig	17 Engine cover/body work	<100		<5K		<20		<1K

COMMENTS: Large area wipes also performed on trailer interior, trailer ramp, tracks, core tubing, and drill rig engine cover/body work. No detectable above background. NOTE: Trailer never entered work area. Used for storage of drill rig only.

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 17-Dec-09 **TIME:** 8:45

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 180 **ALPHA Eff.:** 0.215 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 41.9 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
1	Bobcat Mower Deck Admar #46886	Deck top	< 100	< 5 K	< 20	< 1 K
2	Bobcat Mower Deck Admar #46886	Deck top	< 100	< 5 K	< 20	< 1 K
3	Bobcat Mower Deck Admar #46886	Deck top	< 100	< 5 K	< 20	< 1 K
4	Bobcat Mower Deck Admar #46886	Deck bottom	< 100	< 5 K	< 20	< 1 K
5	Bobcat Mower Deck Admar #46886	Deck bottom	< 100	< 5 K	< 20	< 1 K
6	Bobcat Mower Deck Admar #46886	Deck bottom	< 100	< 5 K	< 20	< 1 K

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 19-Feb-10 **TIME:** 10:45

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 184 **ALPHA Eff.:** 0.215 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.0 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
1	Bobcat #206-06-6071	Right track	< 100	< 5 K	< 20	< 1 K
2	Bobcat #206-06-6071	Right track	< 100	< 5 K	< 20	< 1 K
3	Bobcat #206-06-6071	Right drive wheel	< 100	< 5 K	< 20	< 1 K
4	Bobcat #206-06-6071	Left track	< 100	< 5 K	< 20	< 1 K
5	Bobcat #206-06-6071	Left track	< 100	< 5 K	< 20	< 1 K
6	Bobcat #206-06-6071	Left drive wheel	< 100	< 5 K	< 20	< 1 K
7	Bobcat #206-06-6071	Right hydraulic arm	< 100	< 5 K	< 20	< 1 K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
8	Bobcat #206-06-6071	Left hydraulic arm	< 100		< 5 K		< 20		< 1 K
9	Bobcat #206-06-6071	Right fork	< 100		< 5 K		< 20		< 1 K
10	Bobcat #206-06-6071	Left fork	< 100		< 5 K		< 20		< 1 K
11	Bobcat #206-06-6071	Motor cover & body	< 100		< 5 K		< 20		< 1 K
12	Bobcat #206-06-6071	Motor cover & body	< 100		< 5 K		< 20		< 1 K
13	Bobcat #206-06-6071	Interior	< 100		< 5 K		< 20		< 1 K
14	Bobcat #206-06-6071	Interior	< 100		< 5 K		< 20		< 1 K

COMMENTS: Large area wipes performed on various random locations. No detectable counts above background

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 1-Mar-10 **TIME:** 13:30

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 192 **ALPHA Eff.:** 0.215 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0.2 **BETA/GAMMA Bkg:/** 42.5 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
1	Bobcat #206-05-6015	Right track	< 100	< 5 K	< 20	< 1 K
2	Bobcat #206-05-6015	Right track	< 100	< 5 K	< 20	< 1 K
3	Bobcat #206-05-6015	Right drive wheel	< 100	< 5 K	< 20	< 1 K
4	Bobcat #206-05-6015	Left track	< 100	< 5 K	< 20	< 1 K
5	Bobcat #206-05-6015	Left track	< 100	< 5 K	< 20	< 1 K
6	Bobcat #206-05-6015	Left drive wheel	< 100	< 5 K	< 20	< 1 K
7	Bobcat #206-05-6015	Right hydraulic arm	< 100	< 5 K	< 20	< 1 K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
8	Bobcat #206-05-6015	Left hydraulic arm	< 100		< 5 K		< 20		< 1 K
9	Bobcat #206-05-6015	Right fork	< 100		< 5 K		< 20		< 1 K
10	Bobcat #206-05-6015	Left fork	< 100		< 5 K		< 20		< 1 K
11	Bobcat #206-05-6015	Motor cover & body	< 100		< 5 K		< 20		< 1 K
12	Bobcat #206-05-6015	Motor cover & body	< 100		< 5 K		< 20		< 1 K
13	Bobcat #206-05-6015	Interior	< 100		< 5 K		< 20		< 1 K
14	Bobcat #206-05-6015	Interior	< 100		< 5 K		< 20		< 1 K

COMMENTS: Large area wipes performed on various random locations. No detectable counts above background

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 19-Mar-10 **TIME:** 15:30

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 176 **ALPHA Eff.:** .211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 41.4 **ALPHA Eff:** .329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
Zebra Geoprobe #3	1 Geoprobe head	<100	<5K	<20	<1K
Zebra Geoprobe #3	2 Geoprobe head	<100	<5K	<20	<1K
Zebra Geoprobe #3	3 Geoprobe mast	<100	<5K	<20	<1K
Zebra Geoprobe #3	4 Geoprobe mast	<100	<5K	<20	<1K
Zebra Geoprobe #3	5 Geoprobe foot	<100	<5K	<20	<1K
Zebra Geoprobe #3	6 Geoprobe foot	<100	<5K	<20	<1K

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Zebra Geoprobe #3	7 Right track	<100		<5K		<20		<1K
Zebra Geoprobe #3	8 Right track	<100		<5K		<20		<1K
Zebra Geoprobe #3	9 Left track	<100		<5K		<20		<1K
Zebra Geoprobe #3	10 Left track	<100		<5K		<20		<1K
Zebra Geoprobe #3	11 Right track	<100		<5K		<20		<1K
Zebra Geoprobe #3	12 Tube tray	<100		<5K		<20		<1K
Zebra Geoprobe #3	13 Various tubes	<100		<5K		<20		<1K
Zebra Geoprobe #3	14 Various tubes	<100		<5K		<20		<1K
Zebra Geoprobe #3	15 Various tubes	<100		<5K		<20		<1K
Zebra Geoprobe #3	16 Engine cover/body work	<100		<5K		<20		<1K
Zebra Geoprobe #3	17 Engine cover/body work	<100		<5K		<20		<1K

COMMENTS: Large area wipes also performed on trailer interior, trailer ramp, tracks, core tubing, and drill rig engine cover/body work. No detectable above background

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 23-Mar-10 **TIME:** 13:50

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 234 **ALPHA Eff.:** .211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 42.2 **ALPHA Eff:** .329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Zebra Geoprobe #2	1 Geoprobe head	<100		<5K		<20		<1K
Zebra Geoprobe #2	2 Geoprobe head	<100		<5K		<20		<1K
Zebra Geoprobe #2	3 Geoprobe mast	<100		<5K		<20		<1K
Zebra Geoprobe #2	4 Geoprobe mast	<100		<5K		<20		<1K
Zebra Geoprobe #2	5 Geoprobe foot	<100		<5K		<20		<1K
Zebra Geoprobe #2	6 Geoprobe foot	<100		<5K		<20		<1K

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Zebra Geoprobe #2	7 Right track	<100		<5K		<20		<1K
Zebra Geoprobe #2	8 Right track	<100		<5K		<20		<1K
Zebra Geoprobe #2	9 Left track	<100		<5K		<20		<1K
Zebra Geoprobe #2	10 Left track	<100		<5K		<20		<1K
Zebra Geoprobe #2	11 Right track	<100		<5K		<20		<1K
Zebra Geoprobe #2	12 Tube tray	<100		<5K		<20		<1K
Zebra Geoprobe #2	13 Various tubes	<100		<5K		<20		<1K
Zebra Geoprobe #2	14 Various tubes	<100		<5K		<20		<1K
Zebra Geoprobe #2	15 Various tubes	<100		<5K		<20		<1K
Zebra Geoprobe #2	16 Engine cover/body work	<100		<5K		<20		<1K
Zebra Geoprobe #2	17 Engine cover/body work	<100		<5K		<20		<1K

COMMENTS: Large area wipes also performed on tracks, core tubes, and drill rig engine cover/body work. No detectable above background.

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 31-Mar-10 **TIME:** 11:20

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 184 **ALPHA Eff.:** .211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: .1 **BETA/GAMMA Bkg:** 44.3 **ALPHA Eff:** .329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
Drill Rig	1 Geoprobe head	<100	<5K	<20	<1K
Drill Rig	2 Geoprobe head	<100	<5K	<20	<1K
Drill Rig	3 Geoprobe mast	<100	<5K	<20	<1K
Drill Rig	4 Geoprobe mast	<100	<5K	<20	<1K
Drill Rig	5 Geoprobe foot	<100	<5K	<20	<1K
Drill Rig	6 Geoprobe foot	<100	<5K	<20	<1K

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Drill Rig	7 Right track	<100		<5K		<20		<1K
Drill Rig	8 Right track	<100		<5K		<20		<1K
Drill Rig	9 Left track	<100		<5K		<20		<1K
Drill Rig	10 Left track	<100		<5K		<20		<1K
Drill Rig	11 Right track	<100		<5K		<20		<1K
Drill Rig	12 Tube tray	<100		<5K		<20		<1K
Core tubing	13 Various tubes	<100		<5K		<20		<1K
Core tubing	14 Various tubes	<100		<5K		<20		<1K
Core tubing	15 Various tubes	<100		<5K		<20		<1K
Drill Rig	16 Engine cover/body work	<100		<5K		<20		<1K
Drill Rig	17 Engine cover/body work	<100		<5K		<20		<1K

COMMENTS: Large area wipes also performed on trailer interior, trailer ramp, tracks, core tubing, and drill rig engine cover/body work. No detectable above background.

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 2-Apr-10 **TIME:** 9:35

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 181 **ALPHA Eff.:** .211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: .1 **BETA/GAMMA Bkg:** 41.1 **ALPHA Eff:** .329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
USACE Mule	Right front tire	<100		<5K		<20		<1K
USACE Mule	Right front tire	<100		<5K		<20		<1K
USACE Mule	Left front tire	<100		<5K		<20		<1K
USACE Mule	Left front tire	<100		<5K		<20		<1K
USACE Mule	Right rear tire	<100		<5K		<20		<1K
USACE Mule	Right rear tire	<100		<5K		<20		<1K

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
USACE Mule	Left rear tire	<100		<5K		<20		<1K
USACE Mule	Left rear tire	<100		<5K		<20		<1K
USACE Mule	Rear bed	<100		<5K		<20		<1K
USACE Mule	Rear bed	<100		<5K		<20		<1K
USACE Mule	Passenger side front seat	<100		<5K		<20		<1K
USACE Mule	Driver's side front seat	<100		<5K		<20		<1K
USACE Mule	Rear seat	<100		<5K		<20		<1K
USACE Mule	Floor front seat	<100		<5K		<20		<1K
USACE Mule	Floor front seat	<100		<5K		<20		<1K
USACE Mule	Floor front seat	<100		<5K		<20		<1K
USACE Mule	Floor rear seat	<100		<5K		<20		<1K

COMMENTS: Large area wipes also performed on trailer interior, trailer ramp, tracks, core tubing, and drill rig engine cover/body work. No detectable above background.

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 5-Apr-10 **TIME:** 10:20

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 182 **ALPHA Eff.:** .211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.6 **ALPHA Eff:** .329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Zebra Geoprobe #2	1 Geoprobe head	<100		<5K		<20		<1K
Zebra Geoprobe #2	2 Geoprobe head	<100		<5K		<20		<1K
Zebra Geoprobe #2	3 Geoprobe mast	<100		<5K		<20		<1K
Zebra Geoprobe #2	4 Geoprobe mast	<100		<5K		<20		<1K
Zebra Geoprobe #2	5 Geoprobe foot	<100		<5K		<20		<1K
Zebra Geoprobe #2	6 Geoprobe foot	<100		<5K		<20		<1K

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Zebra Geoprobe #2	7 Right track	<100		<5K		<20		<1K
Zebra Geoprobe #2	8 Right track	<100		<5K		<20		<1K
Zebra Geoprobe #2	9 Left track	<100		<5K		<20		<1K
Zebra Geoprobe #2	10 Left track	<100		<5K		<20		<1K
Zebra Geoprobe #2	11 Right track	<100		<5K		<20		<1K
Zebra Geoprobe #2	12 Tube tray	<100		<5K		<20		<1K
Zebra Geoprobe #2	13 Various tubes	<100		<5K		<20		<1K
Zebra Geoprobe #2	14 Various tubes	<100		<5K		<20		<1K
Zebra Geoprobe #2	15 Various tubes	<100		<5K		<20		<1K
Zebra Geoprobe #2	16 Engine cover/body work	<100		<5K		<20		<1K
Zebra Geoprobe #2	17 Engine cover/body work	<100		<5K		<20		<1K

COMMENTS: Large area wipes also performed on tracks, core tubes, and drill rig engine cover/body work. No detectable above background.

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 5-Apr-10 **TIME:** 11:30

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 184 **ALPHA Eff.:** .211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.6 **ALPHA Eff:** .329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Hertz Kubota	Right front tire	<100		<5K		<20		<1K
Hertz Kubota	Right front tire	<100		<5K		<20		<1K
Hertz Kubota	Left front tire	<100		<5K		<20		<1K
Hertz Kubota	Left front tire	<100		<5K		<20		<1K
Hertz Kubota	Right rear tire	<100		<5K		<20		<1K
Hertz Kubota	Right rear tire	<100		<5K		<20		<1K

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
Hertz Kubota	Left rear tire	<100		<5K		<20		<1K
Hertz Kubota	Left rear tire	<100		<5K		<20		<1K
Hertz Kubota	Rear bed	<100		<5K		<20		<1K
Hertz Kubota	Rear bed	<100		<5K		<20		<1K
Hertz Kubota	Passenger side seat	<100		<5K		<20		<1K
Hertz Kubota	Driver's side seat	<100		<5K		<20		<1K
Hertz Kubota	Floor floor passenger side	<100		<5K		<20		<1K
Hertz Kubota	Floor passenger side	<100		<5K		<20		<1K
Hertz Kubota	Floor passenger side	<100		<5K		<20		<1K
Hertz Kubota	Floor driver's side	<100		<5K		<20		<1K
Hertz Kubota	Floor driver's side	<100		<5K		<20		<1K

COMMENTS: Large area wipes also performed on trailer interior, trailer ramp, tracks, core tubing, and drill rig engine cover/body work. No detectable above background.

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 5-Apr-10 **TIME:** 13:00

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 189 **ALPHA Eff.:** .211 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.6 **ALPHA Eff:** .329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
SEC Polaris	Right front tire	<100		<5K		<20		<1K
SEC Polaris	Right front tire	<100		<5K		<20		<1K
SEC Polaris	Left front tire	<100		<5K		<20		<1K
SEC Polaris	Left front tire	<100		<5K		<20		<1K
SEC Polaris	Right rear tire	<100		<5K		<20		<1K
SEC Polaris	Right rear tire	<100		<5K		<20		<1K

ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
SEC Polaris	Left rear tire	<100		<5K		<20		<1K
SEC Polaris	Left rear tire	<100		<5K		<20		<1K
SEC Polaris	Rear bed	<100		<5K		<20		<1K
SEC Polaris	Rear bed	<100		<5K		<20		<1K
SEC Polaris	Passenger side seat	<100		<5K		<20		<1K
SEC Polaris	Driver's side seat	<100		<5K		<20		<1K
SEC Polaris	Floor floor passenger side	<100		<5K		<20		<1K
SEC Polaris	Floor passenger side	<100		<5K		<20		<1K
SEC Polaris	Floor passenger side	<100		<5K		<20		<1K
USACE Mule	Floor driver's side	<100		<5K		<20		<1K
USACE Mule	Floor driver's side	<100		<5K		<20		<1K

COMMENTS: Large area wipes also performed on trailer interior, trailer ramp, tracks, core tubing, and drill rig engine cover/body work. No detectable above background.

FREE RELEASE MATERIAL/VEHICLE SURVEY LOG
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

DATE: 5-Apr-10 **TIME:** 13:30

INSTRUMENT MODEL/SERIAL #: 2360/138261 **PROBE MODEL/SERIAL #:** 43-93/PR244486 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 1 **BETA/GAMMA Bkg:** 184 **ALPHA Eff.:** 0.215 **BETA/GAMMA Eff:** 0.345

INSTRUMENT MODEL/SERIAL #: 2929/176083 **PROBE MODEL/SERIAL #:** 43-10-1/PR181590 **CAL DUE:** 19-Oct-10

ALPHA Bkg: 0 **BETA/GAMMA Bkg:** 43.6 **ALPHA Eff:** 0.329 **BETA/GAMMA Eff:** 0.405

Performed By: [redacted]

	ITEM:	Smear Location:	ALPHA Fixed:	BETA/ GAMMA Fixed:	ALPHA Removable:	BETA/ GAMMA Removable:
1	Takeuchi #208-07-7000	Right track	< 100	< 5 K	< 20	< 1 K
2	Takeuchi #208-07-7000	Right track	< 100	< 5 K	< 20	< 1 K
3	Takeuchi #208-07-7000	Right drive wheel	< 100	< 5 K	< 20	< 1 K
4	Takeuchi #208-07-7000	Left track	< 100	< 5 K	< 20	< 1 K
5	Takeuchi #208-07-7000	Left track	< 100	< 5 K	< 20	< 1 K
6	Takeuchi #208-07-7000	Left drive wheel	< 100	< 5 K	< 20	< 1 K
7	Takeuchi #208-07-7000	Right hydraulic arm	< 100	< 5 K	< 20	< 1 K

	ITEM:	Smear Location:	ALPHA Fixed:		BETA/ GAMMA Fixed:		ALPHA Removable:		BETA/ GAMMA Removable:
8	Takeuchi #208-07-7000	Left hydraulic arm	< 100		< 5 K		< 20		< 1 K
9	Takeuchi #208-07-7000	Right fork	< 100		< 5 K		< 20		< 1 K
10	Takeuchi #208-07-7000	Left fork	< 100		< 5 K		< 20		< 1 K
11	Takeuchi #208-07-7000	Motor cover & body	< 100		< 5 K		< 20		< 1 K
12	Takeuchi #208-07-7000	Motor cover & body	< 100		< 5 K		< 20		< 1 K
13	Takeuchi #208-07-7000	Interior	< 100		< 5 K		< 20		< 1 K
14	Takeuchi #208-07-7000	Interior	< 100		< 5 K		< 20		< 1 K

COMMENTS: Large area wipes performed on various random locations. No detectable counts above background

GAMMA SURVEY AND SMEAR LOG

Project Name: **Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:** **W912P4-07-D-0009**
	Delivery Order: **0003**
ARSEC Job Number: **Federal 09-055-00003**	**Sample and Office Conex Free Release Survey**

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	6-Apr-10
Time of Activity	08:40
Surveyor Name	[redacted]

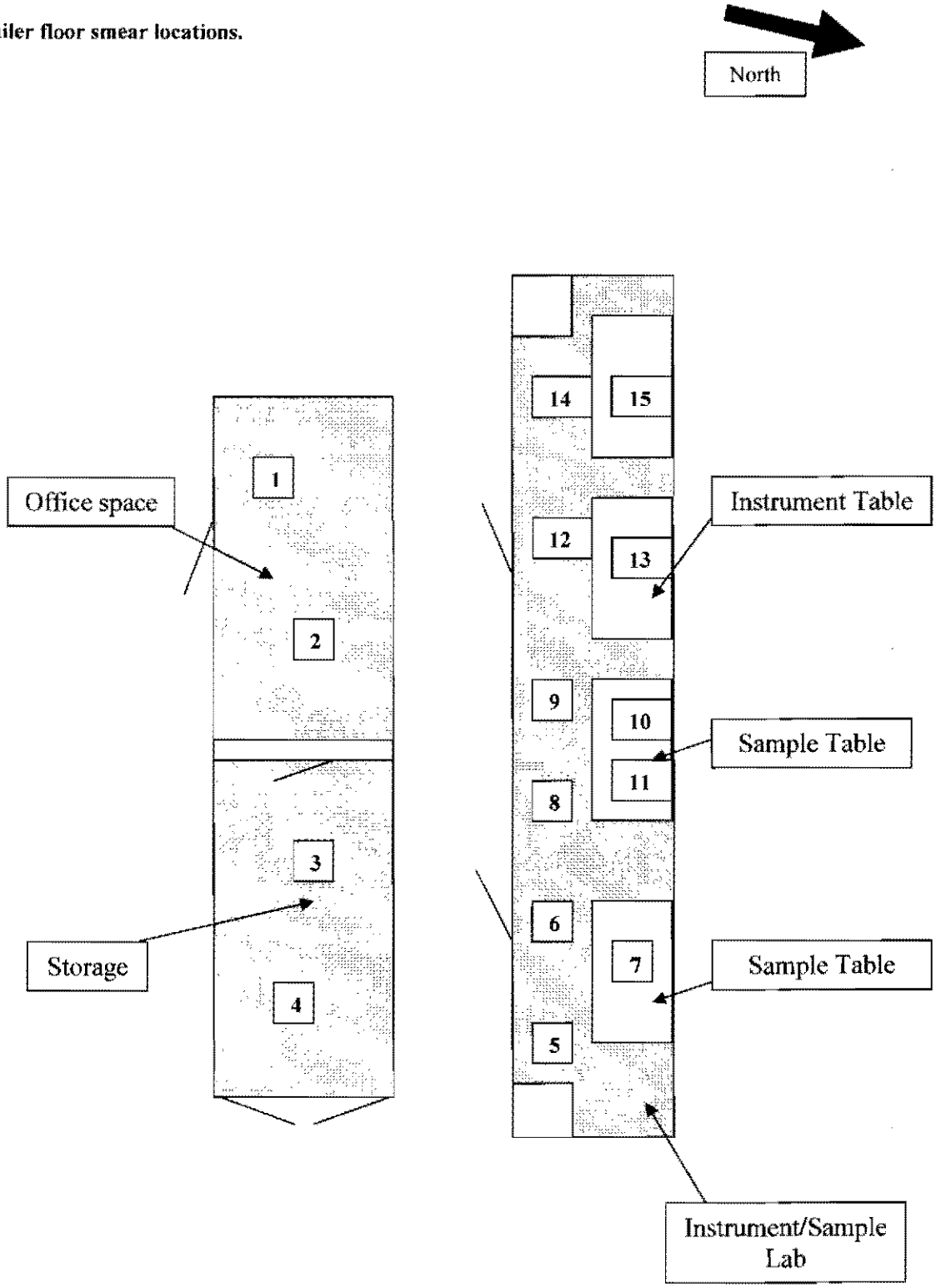
	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929/176083	2360 / 138261
Detector Model & Serial No.:	43-10-1/PR181590	44-93 / PR244486
Alpha Eff.:	32.97%	21.15%
Beta/Gamma Eff.:	40.54%	34.52%
Alpha Bkg:	.1 cpm	1 cpm
Beta/Gamma Bkg:	44.4 cpm	185 cpm
Calibration Due:	10-19-10	10-19-10

COMMENTS: Random LAWs taken in various locations. All ≤ to background.

Office Space/Sample Lab/Storage Free Release Survey
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Office Space/Sample Lab/Storage Free Release Survey
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Alpha Removable in dpm/100cm2	Beta/gamma Removable in dpm/100cm2	Alpha fixed in dpm/100cm2	Beta/gamma fixed in dpm/100cm2	Technician Initials
1	Conex Office Floor	<20	<1 K	<100	<5K	[redacted]
2	Conex Office Floor	<20	<1 K	<100	<5K	[redacted]
3	Conex Storage Floor	<20	<1 K	<100	<5K	[redacted]
4	Conex Storage Floor	<20	<1 K	<100	<5K	[redacted]
5	Sample Conex Floor	<20	<1 K	<100	<5K	[redacted]
6	Sample Conex Floor	<20	<1 K	<100	<5K	[redacted]
7	Sample work table	<20	<1 K	<100	<5K	[redacted]
8	Sample Conex Floor	<20	<1 K	<100	<5K	[redacted]
9	Sample Conex Floor	<20	<1 K	<100	<5K	[redacted]
10	Sample work table	<20	<1 K	<100	<5K	[redacted]
11	Sample work table	<20	<1 K	<100	<5K	[redacted]
12	Sample Conex Floor	<20	<1 K	<100	<5K	[redacted]
13	Sample Conex Instrument table	<20	<1 K	<100	<5K	[redacted]
14	Sample Conex Floor	<20	<1 K	<100	<5K	[redacted]
15	Sample Conex work table	<20	<1 K	<100	<5K	[redacted]
			N			
				A		

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Safety & Break Conex Free Release Survey**

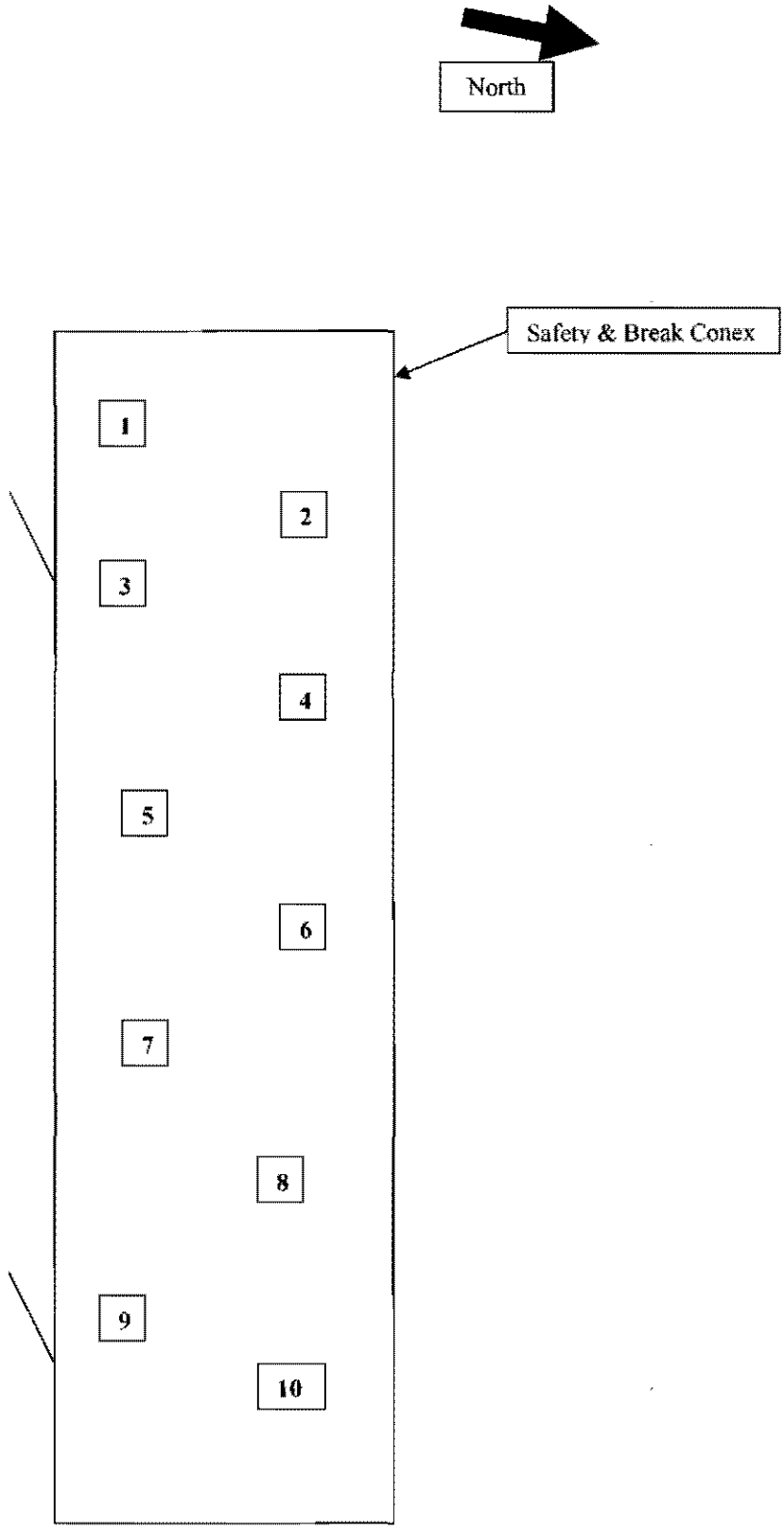
Site Name	Tonawanda FUSRAP Landfill Site	
Date of Activity	6-Apr-10	
Time of Activity	09:25	[redacted]
Surveyor Name	[redacted]	

	Survey Equipmen[redacted]	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2929 / 176083	2360 / 138261
Detector Model & Serial No.:	43-10-1 / PR181590	44-93 / PR 244496
Alpha Eff.:	32.97%	21.15%
Beta/Gamma Eff.:	40.54%	34.52%
Alpha Bkg:	.1 cpm	1 cpm
Beta/Gamma Bkg:	44.4 cpm	191 cpm
Calibration Due:	10-19-10	10-19-10

COMMENTS: Random LAWs taken in various locations. All ≤ to background.

Comments / Drawings / Survey Results

Conex trailer floor smear locations.



Safety & Break Conex Free Release Survey
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Alpha removable indpm/100cm2	Beta/gamma in dpm/100cm2	Alpha fixed in dpm/100cm2	Beta/gamma fixed in dpm/100cm2	Technician Initials
1	Conex Floor	<20	<1K	<100	<5K	[redacted]
2	Conex Floor	<20	<1K	<100	<5K	
3	Conex Floor	<20	<1K	<100	<5K	
4	Conex Floor	<20	<1K	<100	<5K	
5	Conex Floor	<20	<1K	<100	<5K	
6	Conex Floor	<20	<1K	<100	<5K	
7	Conex Floor	<20	<1K	<100	<5K	
8	Conex Floor	<20	<1K	<100	<5K	
9	Conex Floor	<20	<1K	<100	<5K	
10	Conex Floor	<20	<1K	<100	<5K	
		N				
			A			

Miscellaneous Surveys

GAMMA SURVEY AND SMEAR LOG

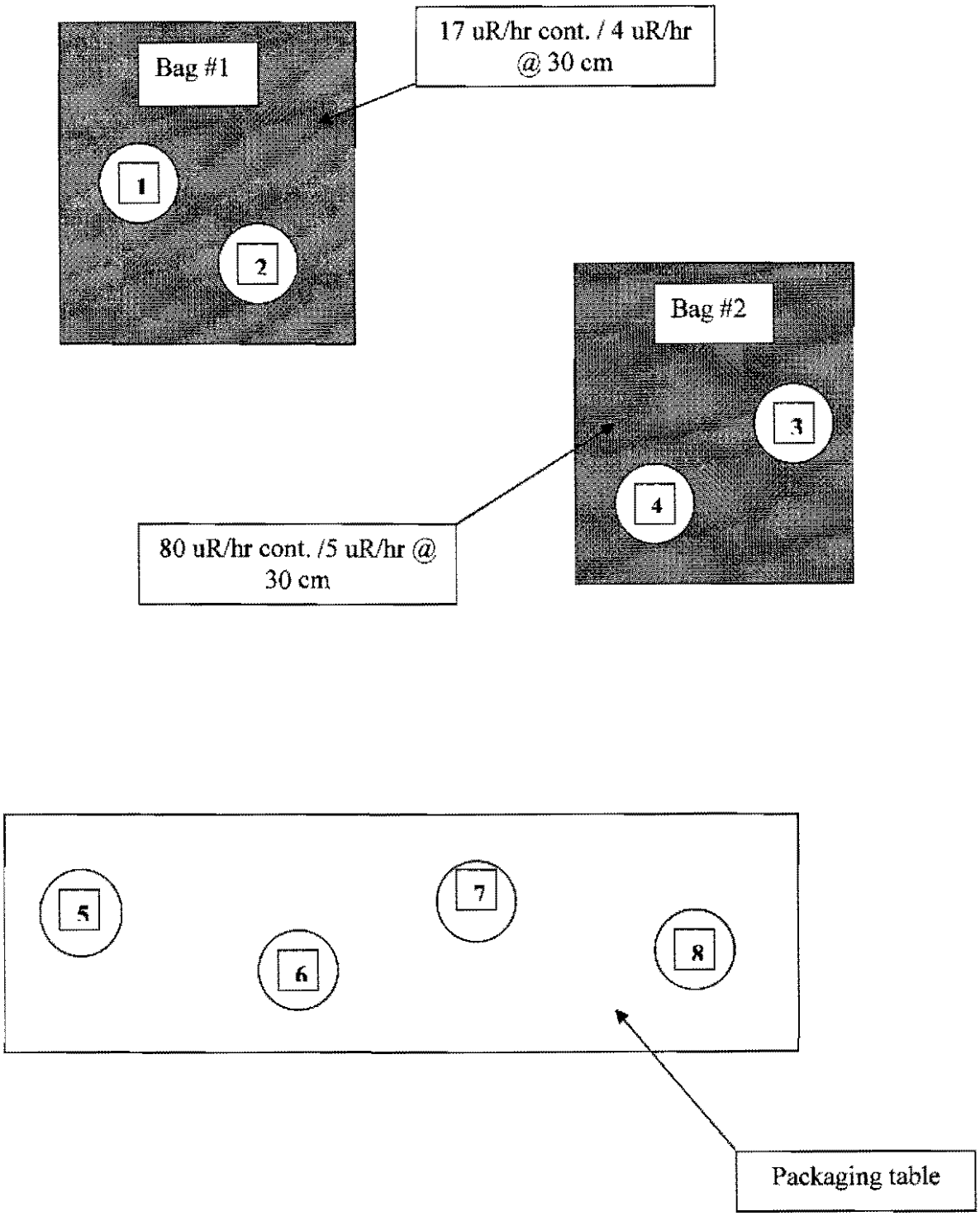
Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:**	**W912P4-07-D-0009**
		Delivery Order:	**0003**
ARSEC Job Number:	**Federal 09-055-00003**	**Radium Dial Clock**	

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	14-Jan-10
Time of Activity	0915
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Instrument Model & Serial No.:	2929/176083	.Model 19/169641
Detector Model & Serial No.:	43-10-1/PR181590	NA
Alpha Eff.:	32.97%	NA
Beta/Gamma Eff.:	40.54%	NA
Alpha Bkg:	0 cpm	NA
Beta/Gamma Bkg:	38.4 cpm	Gamma Bkg: 4uR/hr
Calibration Due:	19-Oct-10	24-Oct-10

Comments / Drawings / Survey Results:

Radium clock dial:



Radium Dial Clock Dose Rate & Smear Log
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Smear #	Item Description / Location	Survey Result	Measurement units:	Technician Initials
1	Bag #1	<20 alpha / < 1K beta/gamma	dpm/100cm2	[redacted]
2	Bag #1	<20 alpha / <1 K beta/gamma	dpm/100cm2	[redacted]
3	Bag #2	<20 alpha / <1K beta/gamma	dpm/100cm2	[redacted]
4	Bag #2	<20 alpha / <1K bet/gamma	dpm/100cm2	[redacted]
5	Packaging table	<20 alpha / <1K bet/gamma	dpm/100cm2	[redacted]
6	Packaging table	<20 alpha / <1K bet/gamma	dpm/100cm2	[redacted]
7	Packaging table	<20 alpha / <1K bet/gamma	dpm/100cm2	[redacted]
8	Packaging table	<20 alpha / <1K bet/gamma	dpm/100cm2	[redacted]

PPE SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No:**	**W912P4-07-D-0009**
		Delivery Order:	**0003**
ARSEC Job Number:	**Federal 09-055-00003**	**PPE Survey for Release**	

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	2-Mar-10
Time of Activity	09:00
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Instrument Model & Serial No.:	2929/176083	2360/138261
Detector Model & Serial No.:	43-10-1/PR181590	43-93/PR244486
Alpha Eff.:	32.97%	21.15%
Beta/Gamma Eff.:	40.54%	34.52%
Alpha Bkg:	0 cpm	1
Beta/Gamma Bkg:	37.0 cpm	178
Calibration Due:	19-Oct-10	19-Oct-10

NOTE: THIS PPE NOT RELEASED. DISPOSED OF AS ~~ID WAST~~ IDW WASTE
[redacted] 18 MAR 10.

PPE Survey for Release
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Comments / Drawings / Survey Results:

PPE for release

Performed surveys of >10% of randomly selected PPE. Highest potential PPE, i.e Zebra Geo-probe crew PPE were selected. All items found to be:

<20 dpm/ 100 cm2 alpha, <1K dpm/ 100 cm2 beta/gamma removable

<100 dpm/ 100 cm2 alpha, <5K dpm/ 100cm2 beta/gamma fixed.

Random large area wipes were performed with massilin. All LAWs < or equal to background.

PPE is bagged and secured awaiting approval for disposal as regular trash.

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Parking / Staging / Gamma Walk-over**

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	3-18-10
Time of Activity	12:00
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2221 / # 187756	NA
Detector Model & Serial No.:	44-10 / PR242839	
Alpha Eff.:	NA	
Beta/Gamma Eff.:	NA	
Alpha Bkg:	NA	
Gamma Bkg:	4,225	
Calibration Due:	2/18-11	

COMMENTS:

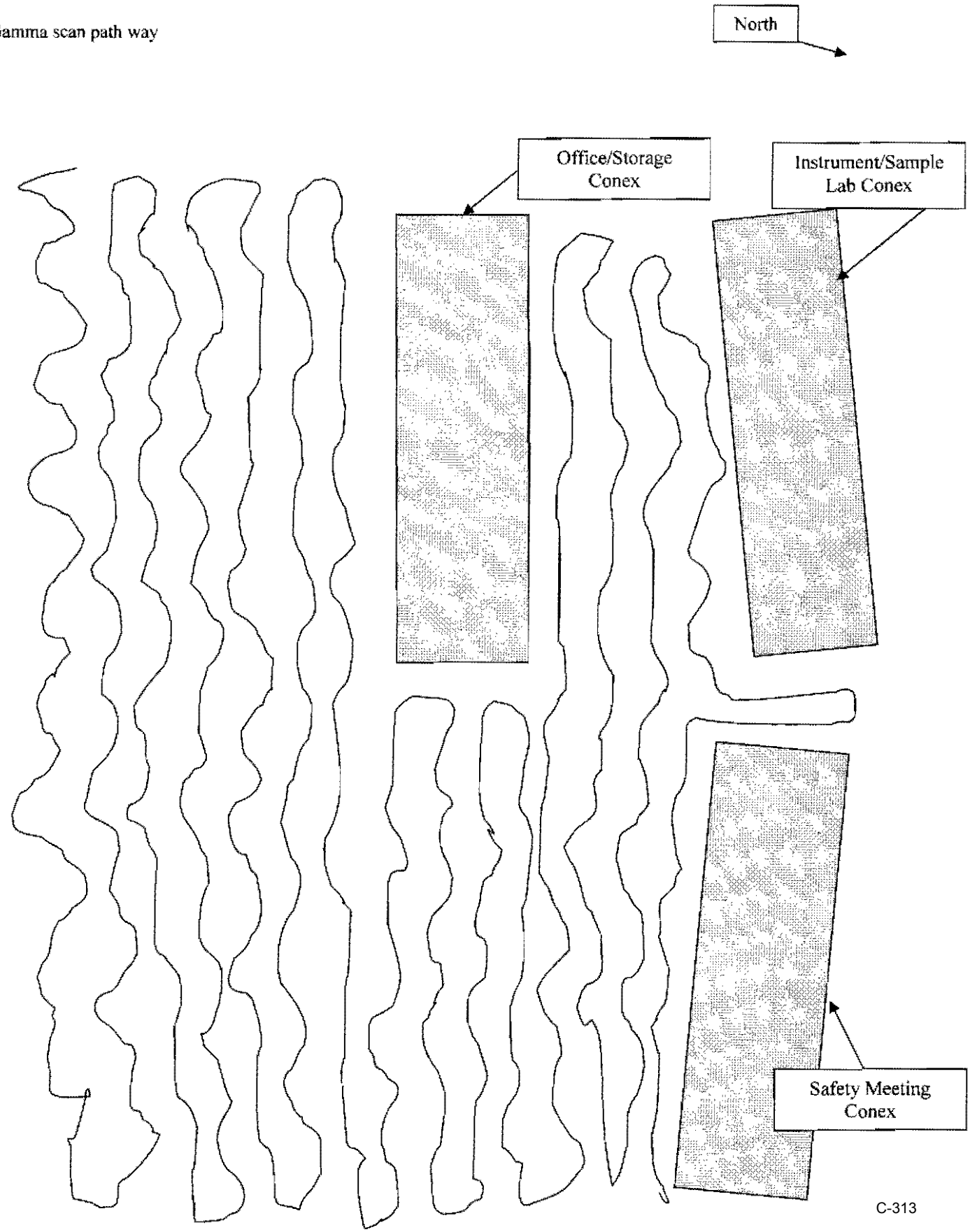
Survey path:

Bkgd: 4,225 cpm

All areas <5,300 gcpm on all surveyed pathways.

Parking / Staging /Gamma Walk-over
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Gamma scan path way



GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **IDW Waste Container Final Survey**
ARSEC Job Number:	**Federal 09-055-00003**	

Site Name:	Tonawanda FUSRAP Landfill Site
Date of Activity:	5 Apr 10
Time of Activity:	11:30
Surveyor Name:	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	M19 / #169641	Model 2929 / #176083
Background:	4 uR/hr	Alpha: 0 Beta/gamma: 43.6
Detector Model & Serial No.:	Internal scintillator (no detector serial #)	Model 43-10-1 / #PR181590
Calibration Due:	10-19-10	10-19-10

COMMENTS:

All containers have been sampled and lid gaskets and closure bolts installed.

IDW Waste Container Final Survey

IDW Core Sample
& DAW Waste

#3 Ser.# 0028

IDW Core Sample
& DAW Waste

#1 Ser.# 0012

IDW Core Sample
& DAW Waste

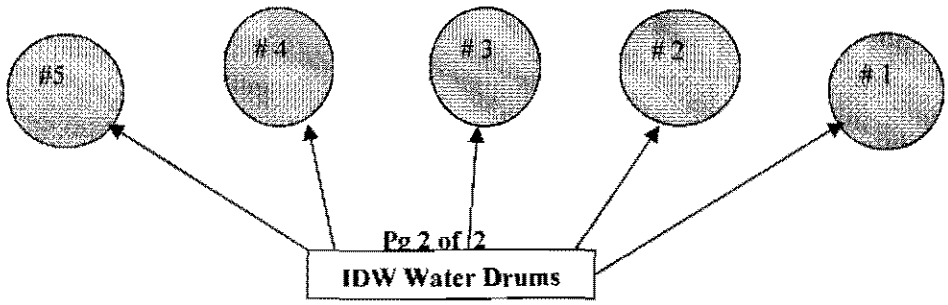
#4 Ser.# 0029

IDW Core Sample
& DAW Waste

#2 Ser.# 0014

IDW Core Sample
& DAW Waste

#5 Ser.# 0031



Smear #	Location	Alpha Removable		Beta/gamma Removable		Dose Rate @ cont.		Dose Rate @ 1 meter	
1	Box #1 0012 top	<20 dpm/100cm2		<1000 dpm/110 cm2		4 uR/hr		4 uR/hr	
2	Box #1 0012 side								
3	Box #1 0012 side								
4	Box #1 0012 side								
5	Box #1 0012 side								
6	Box #1 0012 bottom								
7	Box #2 0014 top								
8	Box #2 0014 side								
9	Box #2 0014 side								
10	Box #2 0014 side								
11	Box #2 0014 side								
12	Box #2 0014 bottom								
13	Box #3 0028 top								
14	Box #3 0028 side								
15	Box #3 0028 side								
16	Box #3 0028 side								
17	Box #3 0028 side								
18	Box #3 0028 bottom								
19	Box #4 0029 top								
20	Box #4 0029 side								
21	Box #4 0029 side								
22	Box #4 0029 side								
23	Box #4 0029 side								
24	Box #4 0029 bottom								
25	Box #5 0031 top								
26	Box #5 0031 side								
27	Box #5 0031 side								
28	Box #5 0031 side								
29	Box #5 0031 side								
30	Box #5 0031 bottom								
31	IDW Water Drum #1 top								
32	IDW Water Drum #1 side								
33	IDW Water Drum #1 bottom								
34	IDW Water Drum #2 top								
35	IDW Water Drum #2 side								
36	IDW Water Drum #2 bottom								
37	IDW Water Drum #3 top								
38	IDW Water Drum #3 side								
39	IDW Water Drum #3 bottom								
40	IDW Water Drum #4 top								
41	IDW Water Drum #4 side								
42	IDW Water Drum #4 bottom								
43	IDW Water Drum #5 top								
44	IDW Water Drum #5 side								
45	IDW Water Drum #5 bottom								
		N							
				A					

GAMMA SURVEY AND SMEAR LOG

Project Name: Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation **ARSEC Job Number: Federal 09-055-00003**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **Parking / Staging / IDW Storage Area Final Gamma Walk-over**

Site Name	Tonawanda FUSRAP Landfill Site
Date of Activity	4-5-10
Time of Activity	11:00
Surveyor Name	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	2221 / # 187756	NA
Detector Model & Serial No.:	44-10 / PR242839	
Alpha Eff.:	NA	
Beta/Gamma Eff.:	NA	
Alpha Bkg:	NA	
Gamma Bkg:	4,153	
Calibration Due:	2/18-11	

COMMENTS:

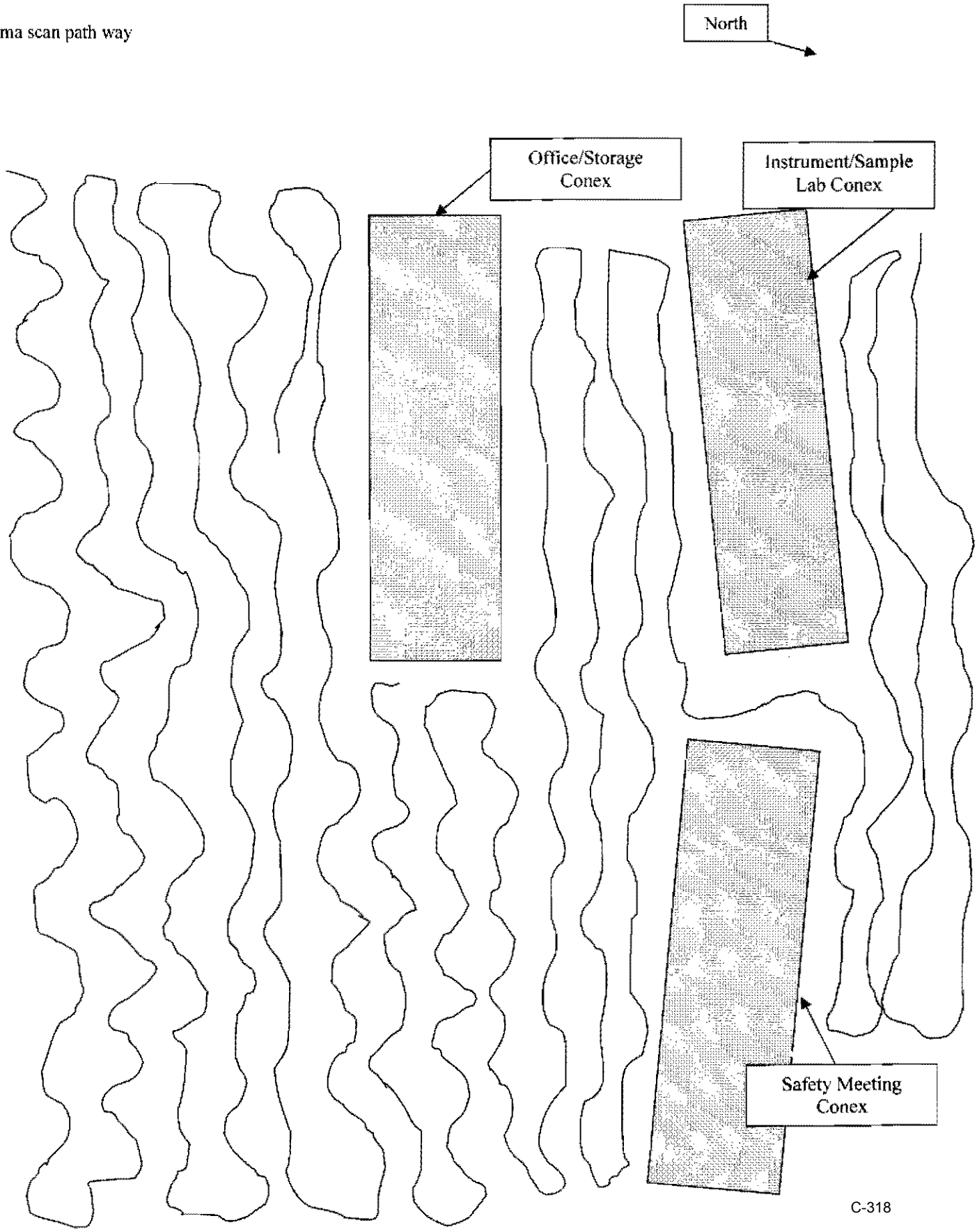
Survey path:

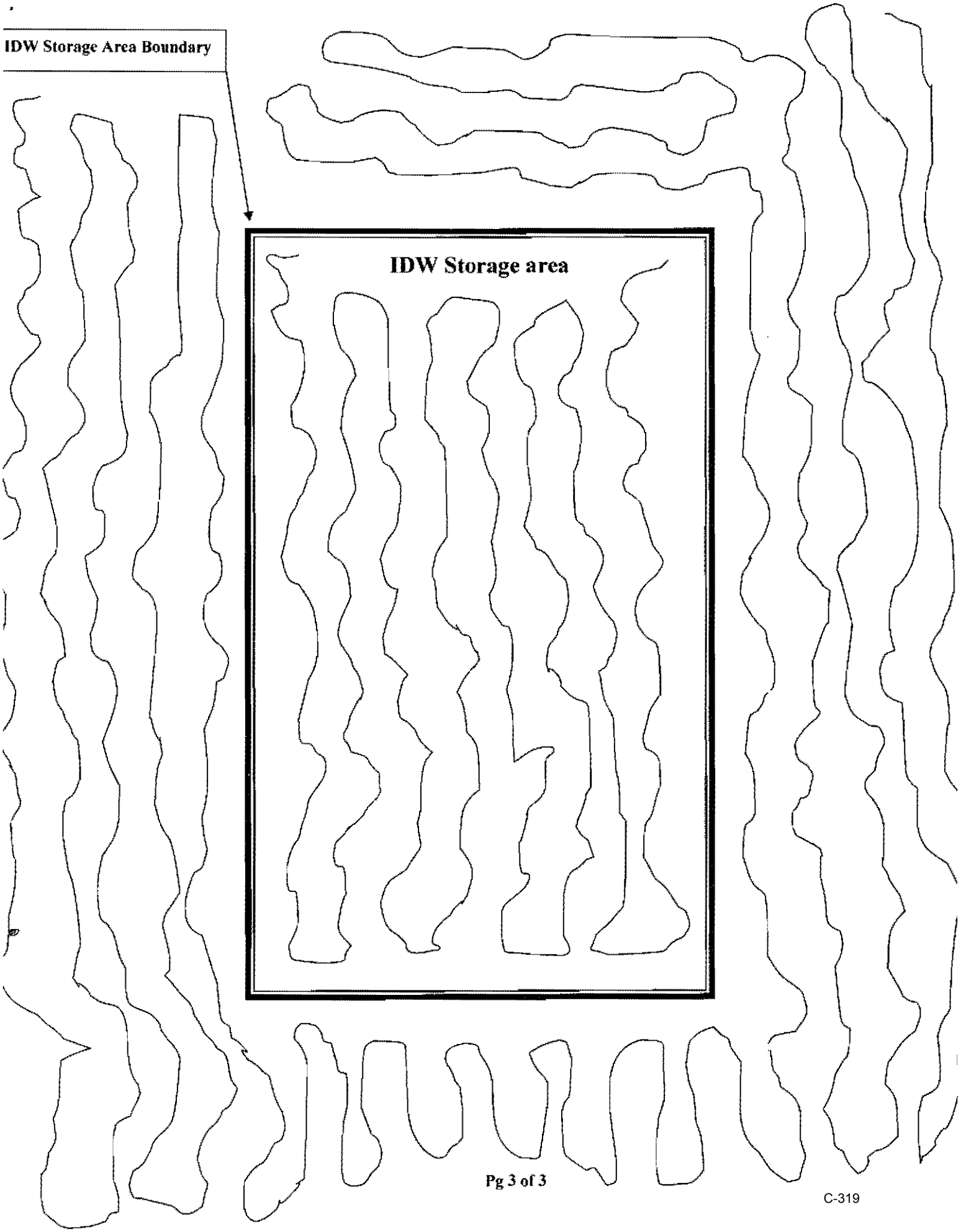
Bkgd: 4,153 cpm

All areas < 7,400 gcpm on all surveyed pathways.

Parking / Staging /IDW Storage Area Final Gamma Walk-over
Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation
Contract No: W912P4-07-D-0009

Gamma scan path way




IDW Storage Area Boundary
IDW Storage area

GAMMA SURVEY AND SMEAR LOG

Project Name:	**Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation**	**Contract No: W912P4-07-D-0009** **Delivery Order: 0003** **IDW Waste Container Final Survey**
ARSEC Job Number:	**Federal 09-055-00003**	

Site Name:	Tonawanda FUSRAP Landfill Site
Date of Activity:	5 Apr 10
Time of Activity:	11:30
Surveyor Name:	[redacted]

	Survey Equipment	
	Instrument No. 1	**No. 2 Instrument**
Scaler Model & Serial No.:	M19 / #169641	Model 2929 / #176083
Background:	4 uR/hr	Alpha: 0 Beta/gamma: 43.6
Detector Model & Serial No.:	Internal scintillator (no detector serial #)	Model 43-10-1 / #PR181590
Calibration Due:	10-19-10	10-19-10

COMMENTS:

All containers have been sampled and lid gaskets and closure bolts installed.

IDW Waste Container Final Survey

-

IDW Core Sample
& DAW Waste

#3 Ser.# 0028

IDW Core Sample
& DAW Waste

#1 Ser.# 0012

IDW Core Sample
& DAW Waste

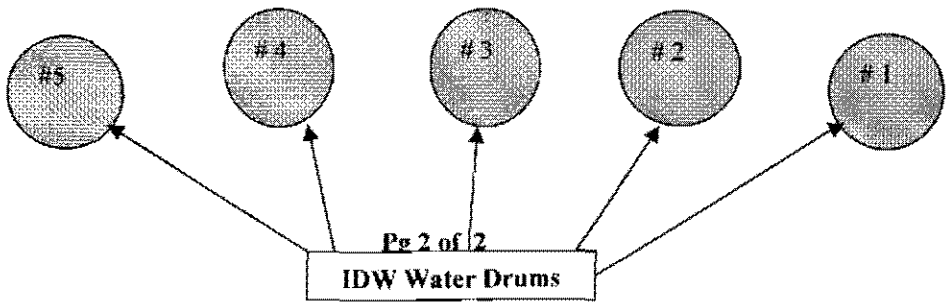
#4 Ser.# 0029

IDW Core Sample
& DAW Waste

#2 Ser.# 0014

IDW Core Sample
& DAW Waste

#5 Ser.# 0031



Smear #	Location	Alpha Removable	Beta/gamma Removable	Dose Rate @ cont.	Dose Rate @ 1 meter
1	Box #1 0012 top	<20 dpm/100cm2	<1000 dpm/110 cm2	4 uR/hr	4 uR/hr
2	Box #1 0012 side				
3	Box #1 0012 side				
4	Box #1 0012 side				
5	Box #1 0012 side				
6	Box #1 0012 bottom				
7	Box #2 0014 top				
8	Box #2 0014 side				
9	Box #2 0014 side				
10	Box #2 0014 side				
11	Box #2 0014 side				
12	Box #2 0014 bottom				
13	Box #3 0028 top				
14	Box #3 0028 side				
15	Box #3 0028 side				
16	Box #3 0028 side				
17	Box #3 0028 side				
18	Box #3 0028 bottom				
19	Box #4 0029 top				
20	Box #4 0029 side				
21	Box #4 0029 side				
22	Box #4 0029 side				
23	Box #4 0029 side				
24	Box #4 0029 bottom				
25	Box #5 0031 top				
26	Box #5 0031 side				
27	Box #5 0031 side				
28	Box #5 0031 side				
29	Box #5 0031 side				
30	Box #5 0031 bottom				
31	IDW Water Drum #1 top				
32	IDW Water Drum #1 side				
33	IDW Water Drum #1 bottom				
34	IDW Water Drum #2 top				
35	IDW Water Drum #2 side				
36	IDW Water Drum #2 bottom				
37	IDW Water Drum #3 top				
38	IDW Water Drum #3 side				
39	IDW Water Drum #3 bottom				
40	IDW Water Drum #4 top				
41	IDW Water Drum #4 side				
42	IDW Water Drum #4 bottom				
43	IDW Water Drum #5 top				
44	IDW Water Drum #5 side				
45	IDW Water Drum #5 bottom				
		N			
			A		

Appendix D. IDW Shipping Manifests and Sample Results

Toxco

Toxco Materials Management Center (TMMC)
109 Flint Road, Oak Ridge, TN 37830
Phone: 865-482-5532 Fax: 865-482-5605

June 25, 2010

Joseph Hanks
Field Technician
2609 North River Rd.
Port Allen, LA 70767

Dear Mr. Hanks:

In compliance with the requirements of 10 CFR 20, Appendix G, Section III, C.1 the attached signed shipping manifest copies are your notice of receipt and acceptance of the radioactive materials specified on the manifests.

Manifest Number	Date Received
A10085 (BOL No Number)	06-25-10

This is acknowledgement of receipt only.

Sincerely,

Rick Low

Digitally signed by Rick Low
DN: cn=Rick Low, o=TOXCO, Inc., ou=Toxco Mat. Man. Ctr., email=rlow@toxcommc.com, c=US
Date: 2010.09.23 10:05:43 -04'00'

Rick Low
Facility General Manager

cc: Manifest File

NRC 540 Signed

TMMC ADVANCE SHIPMENT SUMMARY FORM

Generator: ARSEC TN License for Delivery No: _____

Shipment Weight: 46K Total Activity (mCi): 0.00003696

Highest Contact Dose Rate: 5 microR/Hr SNM Grams: 0 not present

A) Is the waste subject to LLRW Compact Export Approval?: ☐ Yes ■ No

The following states require permits: AR, AZ, CA, CO, KS, LA, NV, NM, ND, OK, and SD

(If yes, list generators and attach permits.) _____

B) Material Properties: ■ WASTE ☐ RECYCLABLE

1. Physical State: ■ Solid ☐ Semi-Solid ☐ Powder/Dust ■ Free Liquid ☐ Other: _____

2. Flash Point (°F): ☐ ≤ 72° ☐ >72° - 100° ☐ >100° - 140° ☐ >140° - 200° ■ > 200° ☐ N/A ☐ N/D

3. Reactivity: ☐ Water Reactive ☐ Acid Reactive ☐ Alkaline Reactive ☐ Oxidizer ☐ Pyrophoric ☐ Explosive ☐ Shock Sensitive ☐ Thermally Sensitive ☐ Autopolymerizable

4. Odor - describe: none ☐ None ☐ Mild ☐ Strong

5. pH: ☐ ≤ 2 ☐ 2.1 - 5.0 ■ 5.1 - 9.0 ☐ 9.1 - 12.4 ☐ ≥ 12.5 ☐ N/A ☐ N/D

6. Contains Asbestos: ☐ Yes ■ No If Yes, is the Asbestos Friable?: ☐ Yes ☐ No

C) Does the material contain, or is it suspected to contain any of the following:

☐ Free Cyanide ☐ Free Sulfide ☐ Organic Compounds ☐ OSHA Substances ☐ Infectious Agents
☐ Virgin Oils ☐ Used Oils ☐ PCBs ☐ Oxidizing Agents ☐ Solvents
☐ Pesticides ☐ Reducing Agents ☐ Volatile Organics ☐ Herbicides ■ None of the Above

FOR WASTE MATERIAL

D) Is this waste a characteristic hazardous waste per 40 CFR 261.21 - 247 ☐ Yes ■ No

Has a TCLP analysis been performed? ■ Yes ☐ No (If yes, provide results.)

E) Is this waste an F, K, P, or U Listed hazardous waste per 40 CFR 261.31-33? ☐ Yes ■ No ☐ N/A

F) Is this waste derived from the treatment, storage or disposal of hazardous waste as described in 40 CFR 261?

☐ Yes ☐ No If yes, explain: _____

G) Is this a "Hazardous Waste" as defined by State, Provincial, or Local Regulations? ☐ Yes ■ No

If yes, enter the waste identification number, if one has been assigned: _____

H) If the waste is a sewer sludge, has analyses been performed in accordance with 40 CFR 503.8 ☐ Yes ■ No
(If yes, please submit a copy of the analyses.)

If no, explain why sampling has not been performed: _____

FINAL DISPOSITION OPTIONS

☐ Energy*Solutions* ■ Conditional Release (e.g., VCFD) ☐ Other (Specify): _____
☐ Unrestricted Release* ☐ Recycle/Reuse* *Surface Contamination only. No activated materials permitted.

CONTAINERS

■ TMMC-Owned Containers or Dispose of Containers ☐ Containers to Be Returned to: _____

*Disposition: ☐ Rad Empty ☐ Return to Service ☐ Unrestricted Release ☐ Other _____

Special Instructions: _____

Customer's certification: I certify that all information submitted on this form is complete and accurate and that waste being offered is in compliance with the TMMC Waste Acceptance Criteria (WAC).

[redacted] Signature Environmental Field Technician Title

Approved By [redacted] Date: 6/23/10 Shipment Number: A10085

Please fax in[redacted] 865-482-5532. To expedite our review, please attach any laboratory analyses results, material safety data sheets and any additional information regarding this material.

Straight Bill of Lading

Original - Not Negotiable **Date:** 6/23/2010

Origin (Facility):
ARSEC- Tonawanda New York

Carrier 1 Company Name:
Southern Pines Trucking

Carrier 2 Company Name:

Destination (Facility/Address):
Toxco
109 Flint Rd.
Oak Ridge, TN 37830

Vehicle / Boat Number:

	X		n/a	n/a	n/a		n/a
5) B-25 Bins		Investigated Derived Waste- non Radioactive				10,000 lbs	
6) 55 Gallon Drums		Investigated Derived Waste- non Radioactive				2,400 lbs	
						total 12,400 lbs	

1. This shipment is within the limitations prescribed for (check applicable): ☐ PASSENGER AND CARGO AIRCRAFT ☐ CARGO AIRCRAFT ONLY
2. Location of package on aircraft:
3. I have confirmed that there are no damaged or leaking packages on the aircraft.

Shipment Type (Check Applicable) ☑ NON-RADIOACTIVE ☐ RADIOACTIVE

For shipments of Radioactive Materials:
1. Name of radioactive material: n/a
2. Physical form: solid/liquid
3. Activity level: n/a Mbq
4. Labels required: n/a
5. Transport index: n/a
6. Package identification marking: n/a
7. Number of packages: 11
8. Location: Tonawanda Landfill

Remarks: See MSDS

Company and Emergency Response Phone Number: Chem-Tec 1-800-424-9300

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Placards Required: ☐ Yes ☑ No

Printed Name: [redacted] Position: RSC Car[redacted] Date: 6/23/10

Placards Suppressed: ☐ Yes ☐ No

Si[redacted] Date: 6-23-10 Carrier 2 Signature Date:

IDW Radiochemistry Laboratory Results

ARS INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767

1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-10-00704
Client Sample ID: TLS-IDW-PPE-COMP-033110
Sample Collection Date: 03/31/10
Sample Matrix: Soil/Solid

Request or PO Number: FED-USCOE-09-055-0008
ARS Sample ID: ARS1-10-00704-002
Date Received: 04/01/10
Report Date: 04/23/10

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
RA-226	-0.099	1.248	2.220	1.110	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 17:23	JLA	N/A
RA-228	0.094	0.260	0.488	0.244	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 17:23	JLA	N/A
U-234	0.989	0.882	1.530	0.765	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 17:23	JLA	N/A
U-235	0.241	0.349	0.598	0.299	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 17:23	JLA	N/A
U-238	0.989	0.882	1.530	0.765	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 17:23	JLA	N/A
AM-241	0.057	0.082	0.137	0.069	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 17:23	JLA	N/A
TH-228	0.149	0.030	0.010	0.004		pCi/g	ARS-031/Eichrom ACW-10	04/16/10 21:07	JR	74%
TH-230	0.128	0.027	0.008	0.003		pCi/g	ARS-031/Eichrom ACW-10	04/16/10 21:07	JR	74%
TH-232	0.130	0.027	0.008	0.003		pCi/g	ARS-031/Eichrom ACW-10	04/16/10 21:07	JR	74%

NOTES: Contract # W912P4-07-D-0009, D.O. 0003. The method blank activity for TH-230 is biased high; however, following technical review results are being reported as valid.

[redacted]Manager Review

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the American Radiation Services, Inc.

LELAP Certificate# 01949 NELAP Certificate # E87558

ARS INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767

1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group:	ARS1-10-00704	**Request or PO Number:**	FED-USCOE-09-055-0008
Client Sample ID:	TLS-IDW-SOIL-COMP-033110	**ARS Sample ID:**	ARS1-10-00704-001
Sample Collection Date:	03/31/10	**Date Received:**	04/01/10
Sample Matrix:	Soil/Solid	**Report Date:**	04/23/10

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
RA-226	1.770	0.738	0.990	0.495		pCi/g	ARS-007/EPA 901.1M	04/05/10 16:03	JLA	N/A
RA-228	0.894	0.164	0.140	0.070		pCi/g	ARS-007/EPA 901.1M	04/05/10 16:03	JLA	N/A
U-234	1.005	0.571	1.170	0.585	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 16:03	JLA	N/A
U-235	0.086	0.211	0.356	0.178	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 16:03	JLA	N/A
U-238	1.005	0.571	1.170	0.585	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 16:03	JLA	N/A
AM-241	-0.041	0.084	0.109	0.055	U	pCi/g	ARS-007/EPA 901.1M	04/05/10 16:03	JLA	N/A
TH-228	0.743	0.146	0.053	0.020		pCi/g	ARS-031/Eichrom ACW-10	04/16/10 21:07	JR	82%
TH-230	0.955	0.172	0.028	0.008		pCi/g	ARS-031/Eichrom ACW-10	04/16/10 21:07	JR	82%
TH-232	0.580	0.122	0.038	0.013		pCi/g	ARS-031/Eichrom ACW-10	04/16/10 21:07	JR	82%

NOTES: Contract # W912P4-07-D-0009, D.O. 0003. The method blank activity for TH-230 is biased high; however, following technical review results are being reported as valid.

[redacted]anager Review

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the American Radiation Services, Inc.

LELAP Certificate# 01949 NELAP Certificate # E87558

ARS INTERNATIONAL
2609 North River Road, Port Allen, Louisiana 70767
1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-10-00705
Client Sample ID: TLS-IDW-WCOMP-033110
Sample Collection Date: 03/31/10
Sample Matrix: Aqueous

Request or PO Number:
ARS Sample ID: ARS1-10-00705-001
Date Received: 04/01/10
Report Date: 05/27/10

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
	4.000	1.166	0.067	0.027		pCi/L	ARS-009/EPA 903.1	05/05/10 14:25	SLU	100%
U-234	45.479	5.646	0.077	0.025		pCi/L	ARS-026/Eichrom ACW-03-15	05/11/10 12:23	JR	80%
U-235	1.497	0.310	0.030	0.000		pCi/L	ARS-026/Eichrom ACW-03-15	05/11/10 12:23	JR	80%
U-238	42.818	5.324	0.054	0.014		pCi/L	ARS-026/Eichrom ACW-03-15	05/11/10 12:23	JR	80%
AM-241	0.219	0.305	0.511	0.188	U	pCi/L	ARS-026/Eichrom ACW-03-15	05/11/10 12:22	JR	15%
TH-228	0.193	0.116	0.147	0.058		pCi/L	ARS-031/Eichrom ACW-10	04/22/10 17:53	JB	70%
TH-230	2.312	0.418	0.070	0.020		pCi/L	ARS-031/Eichrom ACW-10	04/22/10 17:53	JB	70%
TH-232	0.102	0.068	0.058	0.014		pCi/L	ARS-031/Eichrom ACW-10	04/22/10 17:53	JB	70%

NOTES:

VLMulligan

Project Manager Review

Notes: *American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the American Radiation Services, Inc.*

LELAP Certificate# 01949 NELAP Certificate # E87558

ARS INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767

1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group:	ARS1-10-00745	**Request or PO Number:**	N/A
Client Sample ID:	TLS-IDW-WPW-040610	**ARS Sample ID:**	ARS1-10-00745-001
Sample Collection Date:	04/06/10	**Date Received:**	04/07/10
Sample Matrix:	Aqueous	**Report Date:**	05/27/10

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
RA-226	0.233	0.101	0.085	0.036		pCi/L	ARS-009/EPA 903.1	05/05/10 14:25	SLU	100%
RA-228	0.370	0.505	0.848	0.393	U	pCi/L	ARS-010/EPA 904.0	04/27/10 17:38	GJ	69%
U-234	38.302	4.775	0.075	0.025		pCi/L	ARS-026/Eichrom ACW-03-15	05/11/10 12:23	JR	86%
U-235	1.552	0.316	0.058	0.014		pCi/L	ARS-026/Eichrom ACW-03-15	05/11/10 12:23	JR	86%
U-238	36.675	4.578	0.093	0.034		pCi/L	ARS-026/Eichrom ACW-03-15	05/11/10 12:23	JR	86%
AM-241	0.086	0.071	0.095	0.035	U	pCi/L	ARS-026/Eichrom ACW-03-15	05/11/10 12:22	JR	79%
TH-228	0.074	0.083	0.132	0.051	U	pCi/L	ARS-031/Eichrom ACW-10	04/22/10 17:53	JB	68%
TH-230	0.243	0.108	0.071	0.021		pCi/L	ARS-031/Eichrom ACW-10	04/22/10 17:53	JB	68%
TH-232	-0.003	0.037	0.094	0.032	U	pCi/L	ARS-031/Eichrom ACW-10	04/22/10 17:53	JB	68%

NOTES:

VLMulligan

Project Manager Review

Notes: *American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the American Radiation Services, Inc.*

LELAP Certificate# 01949 NELAP Certificate # E87558

Appendix E. Survey Instrument Calibration Records

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-89,Serial # PR276636, Bar Code # ,Property # SEC-6885

Date: 11/02/09 Date Last Cal. Expires: Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 251038 CAL DUE 11/02/10

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4071-02	Th-230	40600 dpm	20,600 cpm	1/10/2008
	4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
	4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008
	4079-02	Pu-239	28700 dpm	14,600 cpm	1/10/2008

AS FOUND DATA AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : V

Threshold Beta: 4 - 40 mV Alpha: 120 mV

Efficiencies from last calibration	
Pu:	%
Tc:	%
Th:	%
SrY:	%

	Alpha	Beta	A-B XTLK
Back ground:	CPM	CPM	
Pu-239:	CPM	CPM	
Tc-99:	CPM	CPM	
Th-230:	CPM	N/A	
SrY-90:	N/A	CPM	

AS FOUND Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

☐ Is the As Found Data Within 20% of the efficiency from the last cal.?

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha	Beta	A-B XTLK
Back ground:	CPM	CPM	
Pu-239:	CPM	CPM	
Tc-99:	CPM	CPM	
Th-230:	CPM	N/A	
SrY-90:	N/A	CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

Reproducibility : Isotope: Sr-90 4198 4111 4089 Average: 4132.7 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified.

PLATEAU DATA Source 1: Sr-90 Source 2: Pu-239

High Voltage	Source 1 Response (CPM) A ch.	B ch.	Net Eff.	Source 2 Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
650	26	1309	9.53%	3703	549	12.90%	0	42	13.69%
675	29	2027	14.79%	4562	453	15.90%	0	60	8.61%
700	31	2800	20.08%	5109	453	17.80%	0	129	6.34%
725	25	3715	26.70%	5556	509	19.36%	0	164	6.21%
750	34	4168	29.94%	5654	673	19.70%	1	186	8.61%
775	37	4402	31.28%	5878	879	20.47%	2	242	10.84%

	Alpha	Beta	HV	Pu-239	Tc-99	Th-230	SrY-90
Background:	0	238	750 V	5642 CPM	3756 CPM	6988 CPM	4099 CPM
AL Efficiencies:				19.66%	12.70%	17.21%	29.03%

Comments: Married as a set with: Model: 2360 Serial #: 251038 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 11/02/10

Performed by [redacted] Reviewed b [redacted] Date: 11-2-09

Printed Name [redacted]

Entered in Computer Inventory By: [redacted] Date: 11.2.09

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-418

11/2/2009

Calibration Certificate for 2360,Serial # 251038, Bar Code # ,Property # SEC-6572

Date: 11/02/09 Date Last Cal. Expires: 04/17/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	504 V	AF V
1000 V:	1000 V	AF V
1500 V:	1494 V	AF V
AF HV Setting:	1600 V	AL HV Setting: 750 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.1 mV	4 mV
BW (40 mV +/- 4 mV):	40 mV	AF mV
AT (120 mV +/- 10 mV):	112 mV	120 mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2501	% ERR: 0.04%	AL 2500:	AF	% ERR: 0.04%
AF 25K:	25.01 K	% ERR: 0.04%	AL 25K:	AF K	% ERR: 0.04%
AF 250K:	250.1 K	% ERR: 0.04%	AL 250K:	AF K	% ERR: 0.04%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT
Overload Light: SAT
Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-89 Serial #: PR276636 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 11/02/10

Performed by: [redacted] Reviewed by: [redacted] Date: 11-2-09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 11-2-09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-89,Serial # PR194992, Bar Code # ,Property # SEC-5578

Date: 10/30/09 Date Last Cal. Expires: 09/23/09 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 184900 CAL DUE 10/30/10

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4071-02	Th-230	40600 dpm	20,600 cpm	1/10/2008
	4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
	4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008
	4079-02	Pu-239	28700 dpm	14,600 cpm	1/10/2008

AS FOUND DATA AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 675 V

Threshold Beta: 4 - 40 mV Alpha: 120 mV

Efficiencies from last calibration	
Pu:	19.26 %
Tc:	10.52 %
Th:	16.00 %
SrY:	25.05 %

	Alpha		Beta		A-B XTLK
Back ground:	2	CPM	211	CPM	
Pu-239:	5413	CPM	736	CPM	9.7%
Tc-99:	1	CPM	3125	CPM	
Th-230:	6467	CPM	N/A		
SrY-90:	N/A		3414	CPM	

AS FOUND Efficiencies: Pu-239: 18.85% Tc-99: 10.52% Th-230: 15.92% SrY-90: 24.08%

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		A-B XTLK
Back ground:		CPM		CPM	
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

Reproducibility : Isotope: Sr-90 3434 3456 3526 Average: 3472.0 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified.

PLATEAU DATA Source 1: Tc-99 Source 2: Th-230

High Voltage	Response (CPM) A ch.	B ch.	Net Eff.	Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	HV	Pu-239	Tc-99	Th-230	SrY-90
Background:			V	CPM	CPM	CPM	CPM
AL Efficiencies:							

Comments: Married as a set with: Model: 2360 Serial #: 184900 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/30/10

Performed by: [redacted] Reviewed by [redacted] Date: 11-2-09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10-30-09

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-418

10/30/2009

Calibration Certificate for 2360,Serial # 184900, Bar Code # ,Property # SEC-5248

Date: 10/30/09 Date Last Cal. Expires: 04/07/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	505 V	AF V
1000 V:	1003 V	AF V
1500 V:	1500 V	AF V
AF HV Setting:	826 V	AL HV Setting: 675 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	4 mV	AF mV
BW (40 mV +/- 4 mV):	40 mV	AF mV
AT (120 mV +/- 10 mV):	120 mV	AF mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2501	% ERR: 0.04%	AL 2500:	AF	% ERR: 0.04%
AF 25K:	25.01 K	% ERR: 0.04%	AL 25K:	AF K	% ERR: 0.04%
AF 250K:	250.1 K	% ERR: 0.04%	AL 250K:	AF K	% ERR: 0.04%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-89 Serial #: PR194992 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/30/10

Performed by: [redacted] Reviewed by [redacted] Date: 11-2-09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10.30.09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-404

10/19/2009

Calibration Certificate for 12,Serial # 180431, Bar Code # ,Property # SEC-5020

Date: 10/19/09 **Date Last Cal. Expires:** 05/22/10 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 190580 **CAL DUE:** 01/23/10

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA

Geotropism: SAT **AS FOUND Instrument Condition:** SAT **AS LEFT Instrument Condition:** SAT

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	504	AF
1000 V:	1001	AF
1500 V:	1506	AF

HV Range 400-1500V: N/A

☐ New Batteries? **Battery Check:** SAT **Alarm:** N/A

AS FOUND Mechanical Zero: 0 **AS LEFT Mechanical Zero:** 0

AS FOUND THRESHOLD: 35 mV **AS LEFT THRESHOLD:** 35 mV

AS FOUND HV Reading: 900 V **AS LEFT HV Reading:** 900 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2501	% ERR:	0.04%	AL 2500:	AF	% ERR:	0.04%
AF 25K:	25.00 K	% ERR:	0.00%	AL 25K:	AF K	% ERR:	0.00%
AF 100K:	100.0 K	% ERR:	0.00%	AL 100K:	AF K	% ERR:	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

☑ Fast / Slow Response Switch Functions Properly?

Audio Response: SAT **Audio Divide:** N/A

Push Buttons: SAT **Lamp:** N/A

Scaler/Digital: SAT

Comments: **Married as a set with:** **Model:** 44-9 **Serial #:** PR193567 **Bar Code #:**

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

[redacted] is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10.19.09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-407

10/19/2009

Calibration Certificate for 44-9,Serial # PR193576, Bar Code # ,Property # SEC-5211

Date: 10/19/09 **Date Last Cal. Expires:** 05/13/10 **Technician:** Thomas Thompson

Location: 106699, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 12 **SERIAL #** 180431 **CAL DUE:** 10/19/10

MODEL: **SERIAL #** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008

Geometry = in contact with surface unless otherwise specified.

PREVIOUS Tc-99 EFFICIENCY: 13.95 % **Calibration Voltage:** 900 V **Calibration Threshold:** 35 mV

AS FOUND Instrument Condition: SAT

AS FOUND DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AF Background:	31			
Tc-99 Count:	3996	3972	3952	3973.3
Sr-90 Count:	3431			

Efficiencies

Tc-99 EFF: 14.23% Sr-90 EFF: 25.56%

AS LEFT Instrument Condition: SAT

AS LEFT DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AL Background:	AF			
Tc-99 Count:	AF	AF	AF	
Sr-90 Count:	AF			

Efficiencies

Tc-99 EFF: Sr-90 EFF:

- [x] Is the AS FOUND efficiency within 20% of efficiency from last calibration?
- [x] Reproducibility: Are the individual counts within 10% of the average?
- [x] Does the probe meet final acceptance criteria?
- [x] Calibration sticker attached?

Comments: Married as a set with: Model: 12 Serial #: 180431 Bar Code #:

[redacted]ment is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10/19.09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-403

10/19/2009

Calibration Certificate for 2221,Serial # 187758, Bar Code # ,Property # SEC-5758

Date: 10/19/09 Date Last Cal. Expires: 10/01/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Repair

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: UNSAT AS LEFT Instrument Condition: SAT

HIGH VOLTAGE (+/- 10% tolerance)		AS FOUND HV	AS LEFT HV				
	500 V:	503 V	AF V	☐ New Batteries?		AF Mechanical Zero:	0
				Threshold ratio: 100=10mV		AL Mechanical Zero:	0
	1000 V:	1003 V	AF V	AF THRESHOLD:	10 mV	AF HV Reading:	948 V
	1500 V:	1500 V	AF V	AL THRESHOLD:	10 mV	AL HV Reading:	950 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2501	% ERR:	0.04%	AL 2500:	AF	% ERR:	0.04%
AF 25K:	25.00 K	% ERR:	0.00%	AL 25K:	AF K	% ERR:	0.00%
AF 250K:	250.0 K	% ERR:	0.00%	AL 250K:	AF K	% ERR:	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

LOG SCALE

AF 200:	200	% ERR:	0.00%	AL 200:	AF	% ERR:	0.00%
AF 2000:	2000	% ERR:	0.00%	AL 2000:	AF	% ERR:	0.00%
AF 20K:	20 K	% ERR:	0.00%	AL 20K:	AF K	% ERR:	0.00%
AF 200K:	200 K	% ERR:	0.00%	AL 200K:	AF K	% ERR:	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT
Audio Divide: SAT
Push Buttons: SAT
Lamp: SAT
Scaler/Digital: SAT

☑ Fast / Slow Response Function Properly?

Comments: Married as a set with: Model: 44-10 Serial #: PR156393 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/19/10

Performed by [redacted] Reviewed b [redacted] Date: 10/20/09

Printed Name [redacted]

Entered In Computer Maintenance By: [redacted] Date: 11.19.09

SEC PROCEDURE # SEC-IS-415

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

10/19/2009

Calibration Certificate for 44-10,Serial # PR156393, Bar Code # ,Property # SEC-5038

Date: 10/19/09 **Date Last Cal. Expires:** 10/01/10 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 **SERIAL #:** 187758 **CAL DUE:** 10/19/10

MODEL: **SERIAL #:** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	7.99 uCi		2/4/2009

Efficiency from Last Calibration: 0.62 % **HV From Last Calibration:** 950 V **Calibration Threshold:** 10 mV

1 MINUTE COUNTS (CPM)

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: 950 V

Center: 113070

Background: 4441

Probe Efficiency: Cs-137 0.61%

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: AF V

Center:

Background:

Probe Efficiency: Cs-137

☑ **Is the As Found Efficiency Within 20% of the efficiency from the last cal.?**

Reproducibility: **Isotope:** Cs-137 113351 113785 113165 **Average:** 113434 ☑ **Are the individual counts within 10% of the average?**

*If AS Found Efficiency (even after repair) is within 10% of the last calibration and uniformity is <10%, the technician may N/A the Plateau Data and proceed to Comments. Geiger-Müller probes use a 137Cs trap source. All other probes are in contact with surface unless otherwise specified.

PLATEAU AND SET POINT DATA (CPM)

High Voltage	Source Response	Background	HV	CENTER	Background	Efficiency
N/A			V			Cs-137

Comments: **Married as a set with:** **Model:** 2221 **Serial #:** 187758 **Bar Code #:**

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Next Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] **Reviewed by:** [redacted] **Date:** 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] **Date:** 10.19.09

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-418

10/19/2009

Calibration Certificate for 2360,Serial # 170556, Bar Code # ,Property # SEC-5377

Date: 10/19/09 Date Last Cal. Expires: 02/12/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	498 V	AF V
1000 V:	996 V	AF V
1500 V:	1501 V	AF V
AF HV Setting:	851 V	AL HV Setting: 800 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.6 mV	4 mV
BW (40 mV +/- 4 mV):	40.6 mV	40 mV
AT (120 mV +/- 10 mV):	118 mV	120 mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2501	% ERR: 0.04%	AL 2500:	AF	% ERR: 0.04%
AF 25K:	25.00 K	% ERR: 0.00%	AL 25K:	AF K	% ERR: 0.00%
AF 250K:	250.0 K	% ERR: 0.00%	AL 250K:	AF K	% ERR: 0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-93 Serial #: PR244535 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

[redacted]ument is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10.19.09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-93,Serial # PR244535, Bar Code # ,Property # SEC-6371

Date: 10/19/09 Date Last Cal. Expires: 02/12/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 170556 CAL DUE 10/19/10

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4071-02	Th-230	40600 dpm	20,600 cpm	1/10/2008
	4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
	4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008
	4079-02	Pu-239	28700 dpm	14,600 cpm	1/10/2008

AS FOUND DATA AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 800 V

Threshold Beta: 4 - 40 mV Alpha: 120 mV

Efficiencies from last calibration	
Pu:	23.69 %
Tc:	17.28 %
Th:	20.74 %
SrY:	36.08 %

	Alpha		Beta		A-B XTLK
Back ground:	2	CPM	168	CPM	
Pu-239:	6617	CPM	795	CPM	9.5%
Tc-99:	2	CPM	4762	CPM	
Th-230:	8227	CPM	N/A		
SrY-90:	N/A		4933	CPM	

AS FOUND Efficiencies: Pu-239: 23.05% Tc-99: 16.58% Th-230: 20.26% SrY-90: 35.83%

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		A-B XTLK
Back ground:		CPM		CPM	
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

Reproducibility : Isotope: Sr-90 4966 4808 4938 Average: 4904.0 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Calibration. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified.

PLATEAU DATA Source 1: Tc-99 Source 2: Th-230

High Voltage	Response (CPM) A ch.	B ch.	Net Eff.	Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	HV	Pu-239	Tc-99	Th-230	SrY-90
Background:			V	CPM	CPM	CPM	CPM
AL Efficiencies:							

Comments: Married as a set with: Model: 2360 Serial #: 170556 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10.19.09

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-418

10/19/2009

Calibration Certificate for 2360,Serial # 138261, Bar Code # ,Property # SEC-5494

Date: 10/19/09 Date Last Cal. Expires: 02/12/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☒ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: >0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	505 V	AF V
1000 V:	997 V	AF V
1500 V:	1490 V	AF V
AF HV Setting:	767 V	AL HV Setting: 710 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.7 mV	4 mV
BW (40 mV +/- 4 mV):	37.0 mV	37.0 mV
AT (120 mV +/- 10 mV):	118 mV	120 mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2500	% ERR: 0.00%	AL 2500:	AF	% ERR: 0.00%
AF 25K:	25.00 K	% ERR: 0.00%	AL 25K:	AF K	% ERR: 0.00%
AF 250K:	250.0 K	% ERR: 0.00%	AL 250K:	AF K	% ERR: 0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT
Overload Light: SAT
Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-93 Serial #: PR244486 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

[redacted] Date Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10/19/09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-93,Serial # PR244486, Bar Code # ,Property # SEC-6465

Date: 10/19/09 **Date Last Cal. Expires:** 02/12/10 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 138261 CAL DUE 10/19/10

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4071-02	Th-230	40600 dpm	20,600 cpm	1/10/2008
	4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
	4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008
	4079-02	Pu-239	28700 dpm	14,600 cpm	1/10/2008

AS FOUND DATA

AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 710 V

Threshold Beta: 4 - 37 mV Alpha: 120 mV

Efficiencies from last calibration	
Pu:	24.50 %
Tc:	17.46 %
Th:	17.32 %
SrY:	36.24 %

	Alpha		Beta		A-B XTLK
Back ground:	1	CPM	206	CPM	
Pu-239:	6972	CPM	538	CPM	4.8%
Tc-99:	3	CPM	4637	CPM	
Th-230:	8586	CPM	N/A		
SrY-90:	N/A		4797	CPM	

AS FOUND Efficiencies: Pu-239: 24.29% Tc-99: 16.00% Th-230: 21.15% SrY-90: 34.52%

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		A-B XTLK
Back ground:		CPM		CPM	
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

Reproducibility : Isotope: Sr-90 4707 4704 4830 Average: 4747.0 ☑ Are the individual counts within 10% of the average?

If the AS FOUND data (given after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and proceed to Calibration. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified.

PLATEAU DATA

High Voltage	Source 1: Tc-99 Response (CPM) A ch.	B ch.	Net Eff.	Source 2: Th-230 Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	HV	Pu-239	Tc-99	Th-230	SrY-90
Background:			V	CPM	CPM	CPM	CPM
AL Efficiencies:							

Comments: Married as a set with: Model: 2360 Serial #: 138261 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10.19.09

Certificate of Calibration

Certificate Number: EDCQP200-4.11.5

Environmental Devices Corporation certifies the Haz-Dust Particulate Monitors are calibrated gravimetrically against the specifications and protocols set forth in NIOSH method 0600 & 0500 and are NIST traceable and conforms to original specifications of +/- 10%.

Calibration Dust Specifications using NIST traceable Coulter Mutisizer II e.
ISO12103 –1 A2 Fine Test Dust.
NIST primary Flow Standard: LFE774300.
Quality system standard to meet the requirements of ANSI/ASQC standard Q9000-1994 (ISO 9001), MIL-STD 45662A, and customer's specification if required.

Particulate Cumulative Volume Numeric Data

Micron Size	% Less Than
1	2.9
2	11.0
3	19.6
4	27.7
5	34.6
7	43.6
10	52.1
20	70.7
40	89.2
80	99.8
120	100.0

Temperature = 22°C
Relative Humidity = 30%
Atmospheric Pressure = 760 mmHg
Measurement Uncertainty Estimated @ 95% Confidence Level (k=2)

Technician	Model	Serial Number	Date
[redacted]	8211 II	07082491	July 24 2009

Checked By [redacted] Next Calibration Due Date July 24 2010

Calibration Span Accessory | K= | Model:

Environmental Devices Corporation
4 Wilder Drive Building #15
Plaistow, NH 03865
ISO-9001 Certified

Safety and Ecology Corporation

SEC PROCEDURE # IH

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for PGM-7300,Serial # 590-000352, Bar Code # ,Property # SEC-6599

Date: 10/20/09 **Date Last Cal. Expires:** 08/29/09 **Technician:** Sabrina Hall

Location: 139186, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: N/A **SERIAL #:** N/A **CAL. DUE:** N/A

MODEL: **SERIAL #:** **CAL DUE:**

Instrument Inspection: Physical and Operational Condition SAT

Reading 1

Gas: Isobutylene

Unit of Measure: PPM

	Gas Applied	Instrument Reading		
Cal Gas (1):	100 /	100	Lot # (1):	604727c27
Cal Gas (2):	/		Lot # (2):	

Reading 2

Gas:

Unit of Measure:

	Gas Applied	Instrument Reading	
Cal Gas (1):	/		Lot # (1):
Cal Gas (2):	/		Lot # (2):

Reading 3

Gas:

Unit of Measure:

	Gas Applied	Instrument Reading	
Cal Gas (1):	/		Lot # (1):
Cal Gas (2):	/		Lot # (2):

Reading 4

Gas:

Unit of Measure:

	Gas Applied	Instrument Reading	
Cal Gas (1):	/		Lot # (1):
Cal Gas (2):	/		Lot # (2):

Comments:

**For calibration frequency please see RAE Systems Technical Note TN-148. Annual calibration is due 7/29/2010.

- [ ] Alkaline Batteries Replaced?
- [x] Rechargeable Instrument - Fully Charged?
- [x] Instrument calibrtated to <= 10% of applied gas?
- [x] Does Instrument Meet Final Acceptance Criteria?
- [x] Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: [redacted] e comments

Performed b [redacted] **Reviewed by:** [redacted] **Date:** 10/20/09

Printed Name: Sabrina Hall

Entered in Computer Inventory B [redacted] **Date:** 10/20/09

Safety and Ecology Corporation

Packing List

Property No.	Serial No.	DOE Bar Code	Cal. Due	Isotope	Activity	Comments	Instrument Description

Shipped To Site/Project: ***139186*** ***ARSEC - Tonawanda Landfill***

Date Shipped: ***10/28/2009***

Model: SOURCE

	602/88	Th-230	
	98SR470-0731	Sr-90	30,300 dpm

Upon receipt of instrumentation, please sign as the accepting technician and fax back to the SEC instrumentation lab at (865) 675-5100. If there are any discrepancies, please call (865) 342-3924.

Transferring Technician Signature [redacted] **Date** 10/28/09

Printed Name [redacted]

Accepting Technician Signature_____ **Date**_____

Printed Name_____

RADIOACTIVE

This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910

Shipment by:

Safety and Ecology Corporation
10512 Lexington Drive Suite 200
Knoxville, Tennessee 37932

Phone: (865) 690-0501

Attn: [redacted]
Lead Instrument Technician

Date: 10/28/09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-414

10/19/2009

Calibration Certificate for 43-10-1,Serial # PR181590, Bar Code # ,Property # SEC-5769

Date: 10/19/09 Date Last Cal. Expires: 05/06/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION MODEL: 2929 SERIAL #: 176083 CAL DUE: 10/19/10

MODEL: SERIAL #: CAL DUE:

NIST TRACEABLE SOURCES USE	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4071-02	Th-230	40600 dpm	20,600 cpm	1/10/2008
	4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
	4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008
	4079-02	Pu-239	28700 dpm	14,600 cpm	1/10/2008

AS FOUND DATA

AS FOUND Instrument Condition: SAT

Calibration Setpoints: HV: 900 V Vernier: 3.58

Threshold: Beta: - mV Alpha: mV

Efficiencies from last calibration	
Pu:	34.76 %
Tc:	20.04 %
Th:	32.37 %
SrY:	40.07 %

	Alpha		Beta		
Back ground:	0	CPM	38	CPM	A-B XTLK
Pu-239:	10063	CPM	339	CPM	3.0%
Tc-99:	0	CPM	5338	CPM	B-A XTLK
Th-230:	13386	CPM	N/A		0.0%
SrY-90:	N/A		5430	CPM	

AS FOUND Efficiencies: Pu-239: 35.06% Tc-99: 19.13% Th-230: 32.97% SrY-90: 40.54%

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV: 900 V Vernier: 3.58

	Alpha		Beta		
Back ground:		CPM		CPM	A-B XTLK
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	B-A XTLK
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

Reproducibility: Isotope: Sr-90 5291 5463 5598 Average: 5450.7 ☑ Are the individual counts within 10% of the average?

When AS FOUND data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry = NaI probes are 4 1/2" from source. All other probes are in contact with surface unless otherwise specified.

PLATEAU DATA

High Voltage	Source 1: Tc-99 Response (CPM) A ch.	B ch.	Net Eff.	Source 2: Th-230 Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%	Net B to A Xtalk: <1%
N/A									N/A	
									N/A	
									N/A	
									N/A	
									N/A	
									N/A	

	Alpha	Beta	HV/Vernier	Pu-239	Tc-99	Th-230	SrY-90
Background:				CPM	CPM	CPM	CPM
AL Efficiencies:							

Comments: Married as a set with: Model: 2929 Serial #: 176083 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10-19-09

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

SEC PROCEDURE # SEC-IS-406

Calibration Certificate

10/19/2009

Calibration Certificate for 2929,Serial # 176083, Bar Code # ,Property # SEC-5768

Date: 10/19/09 Date Last Cal. Expires: 05/06/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA

AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

Scaler Function Check	AS FOUND		AS LEFT		
Beta Channel Window (4-50 mV):	3.8-48.9	mV	4-50	mV	
Alpha Channel Threshold (175 mV):	171	mV	175	mV	
Alpha Counts w/Pulser @ 10,000 CPM:	9,998	CPM	AF	CPM	% Error: 0.02%
Beta Counts w/Pulser @ 10,000 CPM:	10,000	CPM	AF	CPM	% Error: 0.00%

*IF AS FOUND data in Scaler Function Check is within 10%, the technician may place AF in AS LEFT section and proceed to High Voltage power supply section.

HIGH VOLTAGE POWER SUPPLY CALIBRATION	AS FOUND		AS LEFT	
Vernier Setting:	3.58		3.58	
HV Setpoints:	900	V	900	V
500 V Reading:	500	V	AF	V
1000 V Reading:	993	V	AF	V
1500 V Reading:	1497	V	AF	V
Max HV (1500 V +):				

DIGITAL SCALER

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2501	% ERR:	0.04%	AL 2500:	AF	% ERR:	0.04%
AF 25K:	25.01 K	% ERR:	0.04%	AL 25K:	AF K	% ERR:	0.04%
AF 250K:	250.1 K	% ERR:	0.04%	AL 250K:	AF K	% ERR:	0.04%

☑ Is the As Found Data Within 20% of the Set Point?

Comments: Married as a set with: Model: 43-10-1 Serial #: PR181590 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10·19·09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 44-9,Serial # PR193658, Bar Code # ,Property # SEC-5137

Date: 10/19/09 **Date Last Cal. Expires:** 06/30/05 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Repair

EQUIPMENT USED DURING CALIBRATION

MODEL: 12 **SERIAL #** 186760 **CAL DUE:** 10/19/10

MODEL: **SERIAL #** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008

Geometry = in contact with surface unless otherwise specified.

PREVIOUS Tc-99 EFFICIENCY: 15.89 % **Calibration Voltage:** 900 V **Calibration Threshold:** 35 mV

AS FOUND Instrument Condition: SAT

AS FOUND DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AF Background:	0			
Tc-99 Count:	0	0	0	0.0
Sr-90 Count:	0			

Efficiencies

Tc-99 EFF: 0.00% Sr-90 EFF: 0.00%

AS LEFT Instrument Condition: SAT

AS LEFT DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AL Background:	42			
Tc-99 Count:	3852	3828	3663	3781.0
Sr-90 Count:	3321			

Efficiencies

Tc-99 EFF: 13.50% Sr-90 EFF: 24.65%

- [ ] Is the AS FOUND efficiency within 20% of efficiency from last calibration?
- [x] Reproducibility: Are the individual counts within 10% of the average?
- [x] Does the probe meet final acceptance criteria?
- [x] Calibration sticker attached?

Comments: Married as a set with: Model: 12 Serial #: 186760 Bar Code #:

Replaced GMT.

Date Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/21/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10.19.09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 12,Serial # 186760, Bar Code # ,Property # SEC-5653

Date: 10/19/09 **Date Last Cal. Expires:** 02/04/10 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 190580 **CAL DUE:** 01/23/10

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA

Geotropism: SAT **AS FOUND Instrument Condition:** SAT **AS LEFT Instrument Condition:** SAT

☐ **New Batteries?** **Battery Check:** SAT **Alarm:** N/A

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	507	AF
1000 V:	997	AF
1500 V:	1489	AF

HV Range 400-1500V: N/A

AS FOUND Mechanical Zero: 0 **AS LEFT Mechanical Zero:** 0

AS FOUND THRESHOLD: 34.7 mV **AS LEFT THRESHOLD:** 35 mV

AS FOUND HV Reading: 899 V **AS LEFT HV Reading:** 900 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ **Is the As Found Data Within 20% of the Set Point?**

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2501	% ERR: 0.04%	AL 2500:	AF	% ERR: 0.04%
AF 25K:	25.01 K	% ERR: 0.04%	AL 25K:	AF K	% ERR: 0.04%
AF 100K:	100.0 K	% ERR: 0.00%	AL 100K:	AF K	% ERR: 0.00%

☑ **Is the As Found Data Within 20% of the Set Point?**

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ **Are the Individual Counts Within 10% of the Average?**

☑ **Fast / Slow Response Switch Functions Properly?**

Audio Response: SAT **Audio Divide:** N/A

Push Buttons: SAT **Lamp:** N/A

Scaler/Digital: SAT

Comments: **Married as a set with:** **Model:** 44-9 **Serial #:** PR193658 **Bar Code #:**

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] **Reviewed by:** [redacted] **Date:** 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] **Date:** 10-19-09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-407

10/19/2009

Calibration Certificate for 44-9,Serial # PR153302, Bar Code # ,Property # SEC-5326

Date: 10/19/09 **Date Last Cal. Expires:** 05/28/10 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 12 **SERIAL #** 138741 **CAL DUE:** 10/19/10

MODEL: **SERIAL #** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008

Geometry = in contact with surface unless otherwise specified.

PREVIOUS Tc-99 EFFICIENCY: 13.07 % **Calibration Voltage:** 900 V **Calibration Threshold:** 35 mV

AS FOUND Instrument Condition: SAT

AS FOUND DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AF Background:	0			
Tc-99 Count:	0	0	0	0.0
Sr-90 Count:	0			

Efficiencies

Tc-99 EFF: 0.00% Sr-90 EFF: 0.00%

AS LEFT Instrument Condition: SAT

AS LEFT DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AL Background:	39			
Tc-99 Count:	3790	3831	3860	3827.0
Sr-90 Count:	3615			

Efficiencies

Tc-99 EFF: 13.68% Sr-90 EFF: 26.89%

- ☐ Is the AS FOUND efficiency within 20% of efficiency from last calibration?
- ☑ Reproducibility: Are the individual counts within 10% of the average?
- ☑ Does the probe meet final acceptance criteria?
- ☑ Calibration sticker attached?

Comments: Married as a set with: Model: 12 Serial #: 138741 Bar Code #:

Replaced GMT. Replaced resistor.

Date Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10·19·09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 12,Serial # 138741, Bar Code # ,Property # SEC-5652

Date: 10/19/09 Date Last Cal. Expires: 05/28/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	521	517
1000 V:	1016	1000
1500 V:	1509	1490

HV Range 400-1500V: N/A

☐ New Batteries? Battery Check: SAT Alarm: N/A

AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

AS FOUND THRESHOLD: 34.4 mV AS LEFT THRESHOLD: 35 mV

AS FOUND HV Reading: 900 V AS LEFT HV Reading: 900 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2500	% ERR: 0.00%	AL 2500:	AF	% ERR: 0.00%
AF 25K:	25.00 K	% ERR: 0.00%	AL 25K:	AF K	% ERR: 0.00%
AF 100K:	100.0 K	% ERR: 0.00%	AL 100K:	AF K	% ERR: 0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

☑ Fast / Slow Response Switch Functions Properly?

Audio Response: SAT Audio Divide: N/A

Push Buttons: SAT Lamp: N/A

Scaler/Digital: SAT

Comments: Married as a set with: Model: 44-9 Serial #: PR153302 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/19/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10.19.09

SEC PROCEDURE # SEC-IS-415

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

10/19/2009

Calibration Certificate for 44-10,Serial # PR242823, Bar Code # ,Property # SEC-6752

Date: 10/19/09 **Date Last Cal. Expires:** 02/23/10 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 **SERIAL #:** 190170 **CAL DUE:** 10/19/10

MODEL: **SERIAL #:** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	7.99 uCi		2/4/2009

Efficiency from Last Calibration: 0.62 % **HV From Last Calibration:** 950 V **Calibration Threshold:** 10 mV

1 MINUTE COUNTS (CPM)

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: 950 V

Center: 105912

Background: 3208

Probe Efficiency: Cs-137 [redacted]

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: AF V

Center:

Background:

Probe Efficiency: Cs-137 [redacted]

☐ **Is the As Found Efficiency Within 20% of the efficiency from the last cal.?**

Reproducibility: **Isotope:** Cs-137 112997 112875 112934 **Average:** 112935 ☑ **Are the individual counts within 10% of the average?**

[redacted]

PLATEAU AND SET POINT DATA (CPM)

High Voltage	Source Response	Background
950	105972	3276
1000	108820	3415
1050	112456	3628
1075	112922	3669
1100	114018	3714

HV	CENTER	Background	Efficiency
1075 V	112914	3663	Cs-137 [redacted]

Comments: **Married as a set with:** **Model:** 2221 **Serial #:** 190170 **Bar Code #:**

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

[redacted] ument is Due For Next Calibration: [redacted]

Performed by: [redacted] **Reviewed by:** [redacted] **Date:** 10.22.09

Printed Name: Carl Hall

Entered in Computer Inventory By: [redacted] **Date:** 10/20/09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-403

10/19/2009

Calibration Certificate for 2221,Serial # 190170, Bar Code # ,Property # SEC-5298

Date: 10/19/09 Date Last Cal. Expires: 07/09/10 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 132896 CAL DUE: 01/27/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

HIGH VOLTAGE (+/- 10% tolerance)		AS FOUND HV	AS LEFT HV
	500 V:	511 V	503 V
	1000 V:	1013 V	1000 V
	1500 V:	1514 V	1497 V

☑ New Batteries? AF Mechanical Zero: 0

[redacted] AL Mechanical Zero: 0

AF THRESHOLD: 10.0 mV AF HV Reading: 950 V

AL THRESHOLD: 10.0 mV AL HV Reading: 1075 V

[redacted]

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	395	1.25%	AF	1.25%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	3950	1.25%	AF	1.25%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	39.5	1.25%	AF	1.25%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	395	1.25%	AF	1.25%

☑ Is the As Found Data Within 20% of the Set Point?

[redacted]

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2502	% ERR:	0.08%	AL 2500:	AF	% ERR:	0.08%
AF 25K:	25.02 K	% ERR:	0.08%	AL 25K:	AF K	% ERR:	0.08%
AF 250K:	250.2 K	% ERR:	0.08%	AL 250K:	AF K	% ERR:	0.08%

☑ Is the As Found Data Within 20% of the Set Point?

[redacted]

AF 200:	200	% ERR:	0.00%	AL 200:	AF	% ERR:	0.00%
AF 2000:	1900	% ERR:	5.00%	AL 2000:	AF	% ERR:	5.00%
AF 20K:	18.5 K	% ERR:	7.50%	AL 20K:	AF K	% ERR:	7.50%
AF 200K:	180 K	% ERR:	10.00%	AL 200K:	AF K	% ERR:	10.00%

☑ Is the As Found Data Within 20% of the Set Point?

[redacted]

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Audio Divide: SAT

Push Buttons: SAT

Lamp: SAT

Scaler/Digital: SAT

☑ Fast / Slow Response Function Properly?

Comments: Married as a set with: Model: 44-10 Serial #: PR242823 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: [redacted]

Performed by: [redacted] Reviewed by: [redacted] Date: 10-20-09

Printed Name:

Entered in Computer Maintenance By: [redacted] Date: 10/20/09

SEC PROCEDURE # SEC-IS-415

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

10/19/2009

Calibration Certificate for 44-10,Serial # PR242324, Bar Code # ,Property # SEC-6314

Date: 10/19/09 **Date Last Cal. Expires:** 08/19/10 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 **SERIAL #:** 172035 **CAL DUE:** 10/19/10

MODEL: **SERIAL #:** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	7.99 uCi		2/4/2009

Efficiency from Last Calibration: 0.00 % **HV From Last Calibration:** V **Calibration Threshold:** 10 mV

1 MINUTE COUNTS (CPM)

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: V

Center: 0

Background: 0

Probe Efficiency: Cs-137 [redacted]

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: AF V

Center:

Background:

Probe Efficiency: Cs-137 [redacted]

☐ Is the As Found Efficiency Within 20% of the efficiency from the last cal.?

Reproducibility: **Isotope:** Cs-137 113448 113389 113401 **Average:** 113413 ☑ Are the individual counts within 10% of the average?

[redacted]

PLATEAU AND SET POINT DATA (CPM)

High Voltage	Source Response	Background
950	106464	3326
1000	110380	3519
1050	113160	3645
1100	113463	3729
1150	113564	3744
1200	113489	3791

HV	CENTER	Background	Efficiency
1100 V	113419	3715	Cs-137 [redacted]

Comments: Married as a set with: **Model:** 2221 **Serial #:** 172035 **Bar Code #:**

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: [redacted]

Performed by: [redacted] Reviewed by: [redacted] Date: 10·20·09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10/20/09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-403

10/19/2009

Calibration Certificate for 2221,Serial # 172035, Bar Code # ,Property # SEC-5232

Date: 10/19/09 **Date Last Cal. Expires:** 05/22/10 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 132896 **CAL DUE:** 01/27/10

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA **Geotropism:** SAT **AS FOUND Instrument Condition:** SAT **AS LEFT Instrument Condition:** SAT

HIGH VOLTAGE (+/- 10% tolerance)		AS FOUND HV	AS LEFT HV
	500 V:	504 V	AF V
	1000 V:	996 V	AF V
	1500 V:	1488 V	AF V

☑ New Batteries?

[redacted]

AF THRESHOLD: 10.0 mV **AL THRESHOLD:** 10.0 mV

AF Mechanical Zero: 0 **AL Mechanical Zero:** 0 **AF HV Reading:** 900 V **AL HV Reading:** 1100 V

[redacted]

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

[redacted]

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2502	% ERR:	0.08%	AL 2500:	AF	% ERR:	0.08%
AF 25K:	25.02 K	% ERR:	0.08%	AL 25K:	AF K	% ERR:	0.08%
AF 250K:	250.2 K	% ERR:	0.08%	AL 250K:	AF K	% ERR:	0.08%

☑ Is the As Found Data Within 20% of the Set Point?

[redacted]

AF 200:	200	% ERR:	0.00%	AL 200:	AF	% ERR:	0.00%
AF 2000:	2000	% ERR:	0.00%	AL 2000:	AF	% ERR:	0.00%
AF 20K:	20 K	% ERR:	0.00%	AL 20K:	AF K	% ERR:	0.00%
AF 200K:	190 K	% ERR:	5.00%	AL 200K:	AF K	% ERR:	5.00%

☑ Is the As Found Data Within 20% of the Set Point?

[redacted]

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT
Audio Divide: SAT
Push Buttons: SAT
Lamp: SAT
Scaler/Digital: SAT

☑ Fast / Slow Response Function Properly?

Comments: **Married as a set with:** **Model:** 44-10 **Serial #:** PR242324 **Bar Code #:**

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: [redacted]

Performed by: [redacted] **Reviewed by:** [redacted] **Date:** 10-20-09

Printed Name:

Entered in Computer Maintenance By: [redacted] **Date:** 10/20/09

SEC PROCEDURE # SEC-IS-415

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

10/19/2009

Calibration Certificate for 20DT063QA2/5B,Serial # 022006AF1, Bar Code # ,Property # SEC-6955

Date: 10/19/09 **Date Last Cal. Expires:** 07/23/10 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 **SERIAL #:** 187763 **CAL DUE:** 10/19/10

MODEL: **SERIAL #:** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	7.99 uCi		2/4/2009

Efficiency from Last Calibration: 0.00 % **HV From Last Calibration:** V **Calibration Threshold:** 10 mV

1 MINUTE COUNTS (CPM)

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: V

Center: 0

Background: 0

Probe Efficiency: Cs-137 [redacted]

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: AF V

Center:

Background:

Probe Efficiency: Cs-137 [redacted]

☐ Is the As Found Efficiency Within 20% of the efficiency from the last cal.?

Reproducibility: **Isotope:** Cs-137 148415 148039 148343 **Average:** 148266 ☑ Are the individual counts within 10% of the average?

[redacted]

PLATEAU AND SET POINT DATA (CPM)

High Voltage	Source Response	Background
600	24542	1437
650	57259	2084
700	87705	2946
750	103173	3118
800	120718	3340
850	145702	3522
900	148939	3651
950	151523	3699
1000	150913	3742

HV	CENTER	Background	Efficiency
900 V	148386	3644	Cs-137 [redacted]

Comments: **Married as a set with:** **Model:** 2221 **Serial #:** 187763 **Bar Code #:**

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

[redacted] is Due For Next Calibration: [redacted]

Performed by: [redacted] **Reviewed by:** [redacted] **Date:** 10-20-09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] **Date:** 10/20/09

SEC PROCEDURE # SEC-IS-415

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

10/19/2009

Calibration Certificate for 20DT063QA2/5B,Serial # 091806C1, Bar Code # ,Property # SEC-6957

Date: 10/19/09 Date Last Cal. Expires: 07/22/10 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 SERIAL #: 117331 CAL DUE: 10/19/10

MODEL: SERIAL #: CAL DUE:

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	7.99 uCi		2/4/2009

Efficiency from Last Calibration: 0.00 % HV From Last Calibration: V Calibration Threshold: 10 mV

AS FOUND DATA | **1 MINUTE COUNTS (CPM)** | **AS LEFT DATA after repair of HV adjust**

AS FOUND Instrument Condition: SAT

HV: V

Center: 0

Background: 0

Probe Efficiency: Cs-137 [redacted]

AS LEFT Instrument Condition: SAT

HV: AF V

Center:

Background:

Probe Efficiency: Cs-137 [redacted]

☐ Is the As Found Efficiency Within 20% of the efficiency from the last cal.?

Reproducibility: Isotope: Cs-137 150878 151034 151102 Average: 151005 ☑ Are the individual counts within 10% of the average?

[redacted]

PLATEAU AND SET POINT DATA (CPM)

High Voltage	Source Response	Background
800	89837	1755
850	101385	2207
900	107333	2419
950	113103	2846
1000	139904	3027
1050	149380	3211
1100	150695	3258
1150	151981	3304
1200	159112	3596

HV	CENTER	Background	Efficiency
1100 V	151019	3242	Cs-137 [redacted]

Comments: Married as a set with: Model: 2221 Serial #: 117331 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: [redacted]

Performed by: [redacted] Reviewed by: [redacted] Date: 10-20-09

Printed Name:

Entered in Computer Inventory By: [redacted] Date: 10/20/09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-403

10/19/2009

Calibration Certificate for 2221,Serial # 117331, Bar Code # ,Property # SEC-5040

Date: 10/19/09 **Date Last Cal. Expires:** 07/07/10 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 132896 **CAL DUE:** 01/27/10

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA **Geotropism:** SAT **AS FOUND Instrument Condition:** SAT **AS LEFT Instrument Condition:** SAT

HIGH VOLTAGE (+/- 10% tolerance)		AS FOUND HV	AS LEFT HV
	500 V:	507 V	AF V
	1000 V:	1009 V	AF V
	1500 V:	1507 V	AF V

☑ **New Batteries?**

[redacted]

AF THRESHOLD: 10 mV **AL THRESHOLD:** 10 mV

AF Mechanical Zero: 0 **AL Mechanical Zero:** 0

AF HV Reading: 1500 V **AL HV Reading:** 1100 V

[redacted]

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ **Is the As Found Data Within 20% of the Set Point?**

[redacted]

AF 250:	250	**% ERR:**	0.00%	**AL 250:**	AF	**% ERR:**	0.00%
AF 2500:	2501	**% ERR:**	0.04%	**AL 2500:**	AF	**% ERR:**	0.04%
AF 25K:	25.01 K	**% ERR:**	0.04%	**AL 25K:**	AF K	**% ERR:**	0.04%
AF 250K:	250.1 K	**% ERR:**	0.04%	**AL 250K:**	AF K	**% ERR:**	0.04%

☑ **Is the As Found Data Within 20% of the Set Point?**

[redacted]

AF 200:	200	**% ERR:**	0.00%	**AL 200:**	AF	**% ERR:**	0.00%
AF 2000:	1900	**% ERR:**	5.00%	**AL 2000:**	AF	**% ERR:**	5.00%
AF 20K:	18.5 K	**% ERR:**	7.50%	**AL 20K:**	AF K	**% ERR:**	7.50%
AF 200K:	180 K	**% ERR:**	10.00%	**AL 200K:**	AF K	**% ERR:**	10.00%

☑ **Is the As Found Data Within 20% of the Set Point?**

[redacted]

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ **Are the Individual Counts Within 10% of the Average?**

Audio Response: SAT
Audio Divide: SAT
Push Buttons: SAT
Lamp: SAT
Scaler/Digital: SAT

☑ **Fast / Slow Response Function Properly?**

Comments: **Married as a set with:** **Model:** 20DT063QA2/5 **Serial #:** 091806C1 **Bar Code #:**

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: [redacted]

Performed by: [redacted] **Reviewed by:** [redacted] **Date:** 10-20-09

Printed Name:

Entered in Computer Maintenance By: [redacted] **Date:** 10/20/09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-403

10/19/2009

Calibration Certificate for 2221,Serial # 187763, Bar Code # ,Property # SEC-5045

Date: 10/19/09 Date Last Cal. Expires: 05/22/10 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 132896 CAL DUE: 01/27/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

HIGH VOLTAGE (+/- 10% tolerance)		AS FOUND HV	AS LEFT HV
	500 V:	502 V	AF V
	1000 V:	997 V	AF V
	1500 V:	1494 V	AF V

☑ New Batteries? AF Mechanical Zero: 0

[redacted] AL Mechanical Zero: 0

AF THRESHOLD: 10.0 mV AF HV Reading: 1000 V

AL THRESHOLD: 10.0 mV AL HV Reading: 900 V

[redacted]

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

[redacted]

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2502	% ERR:	0.08%	AL 2500:	AF	% ERR:	0.08%
AF 25K:	25.02 K	% ERR:	0.08%	AL 25K:	AF K	% ERR:	0.08%
AF 250K:	250.2 K	% ERR:	0.08%	AL 250K:	AF K	% ERR:	0.08%

☑ Is the As Found Data Within 20% of the Set Point?

[redacted]

AF 200:	200	% ERR:	0.00%	AL 200:	AF	% ERR:	0.00%
AF 2000:	1900	% ERR:	5.00%	AL 2000:	AF	% ERR:	5.00%
AF 20K:	18.5 K	% ERR:	7.50%	AL 20K:	AF K	% ERR:	7.50%
AF 200K:	180 K	% ERR:	10.00%	AL 200K:	AF K	% ERR:	10.00%

☑ Is the As Found Data Within 20% of the Set Point?

[redacted]

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Audio Divide: SAT

Push Buttons: SAT

Lamp: SAT

Scaler/Digital: SAT

☑ Fast / Slow Response Function Properly?

Comments: Married as a set with: Model: 20DT063QA2/5 Serial #: 022006AF1 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: [redacted]

Performed by: [redacted] Reviewed by: [redacted] Date: 10·20·09

Printed Name:

Entered in Computer Maintenance By: [redacted] Date: 10/20/09

WILNER-GREENE ASSOCIATES INC
INSTRUMENTATION AND CALIBRATIONS
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CERTIFICATE OF CALIBRATION

Certificate Number: 338476 - 58089

Issued To:	Equipment:	
SEC INSTRUMENTATION SERVICES 10512 LEXINGTON DRIVE SUITE 200 KNOXVILLE, TN 37932	Manufacturer: BIOS Model Number: DC-1B SerialNumber: 2199 ControlNumber	DateReceived: 7/9/2009 DateCalibrated 7/12/2009 Next Calibration Due: Jul 2010

Test Conditions :

Temperature: 20.4 deg C RelativeHumidity: 42.3 % BarometricPressure: 1012 mBar

Condition Received:
FULLY FUNCTIONAL AND IN TOLERANCE.

Condition Returned:
FULLY FUNCTIONAL AND WITHIN TOLERANCE.

Special Conditions:
NONE

Work Performed:
CALIBRATED PER CALIBRATION PROCEDURE WG-CA-006.

Specification: CALIBRATED TO MANUFACTURERS SPECIFICATIONS

Reference Standards Used
Asset Number, Device, Report Number, Date Next Calibration Due
22, B&K 2818, MULTIMETER, ESSCO77786, 9/24/2009
77, HEWLET-PACKARD 5328A, FREQUENCY COUNTER, ESSCO77790, 9/24/2009

MeasurementUncertainties: FREQUENCY +/-0.1HZ

Calibrated and Reviewed by [redacted] 7/12/2009

Authorized Signature

This report certifies that all calibration equipment used in the test is traceable to the National Institue of Standards (NIST) , and applies only to the unit identified under "Equipment" above. This report must not be reproduced except in it's entirety without the written approval of Wilner-Greene Associates.

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CERTIFICATE OF CALIBRATION

Certificate Number: 338476 - 58090

Issued To:
SEC INSTRUMENTATION SERVICES
10512 LEXINGTON DRIVE
SUITE 200
KNOXVILLE, TN 37932

Equipment:
Manufacturer: BIOS
Model Number: DC-HC-1
SerialNumber: 1139
ControlNumber

DateReceived: 7/9/2009
DateCalibrated 7/12/2009
Next Calibration Due: Jul 2010

Test Conditions :

Temperature: 20.4 deg C RelativeHumidity: 42.3 % BarometricPressure: 1012 mBar

Condition Received:
FULLY FUNCTIONAL AND IN TOLERANCE.

Condition Returned:
FULLY FUNCTIONAL AND WITHIN TOLERANCE.

Special Conditions:
NONE

Work Performed:
CALIBRATED PER CALIBRATION PROCEDURE WG-CA-007.

Specification: CALIBRATED TO +/- 3.0% AS REFERENCED TO PRIMARY BUBBLE FLOW CELL @ 0.3% UNCERTAINTY AT AMBIENT C

Reference Standards Used
Asset Number, Device, Report Number, Date Next Calibration Due
266, DWYER 475-2, DIGITAL MANOMETER, ESSCO77781, 9/24/2009
270, GILIAN GILABRATOR 2, AIRFLOW CALIBRATOR BASE WITH ADAPTOR, 336333-53325, 1/29/2010
283, SKC 311-2000, 2000 mL Lab burette, CALTEC99822, 5/12/2013
84, GILIAN 800265, HIGH FLOW CELL, 336333-53329, 1/29/2010
86, GILIAN IHCP 300HL, MAGNEHELIC GUAGE, ESSCO77784, 9/24/2009

MeasurementUncertainties: AIR FLOW RATE 0-250 CC/MIN 0.3%, 100-6000 CC/MIN 0.3%

Calibrated and Reviewed by [redacted] 7/12/2009
Authorized Signature

This report certifies that all calibration equipment used in the test is traceable to the National Institue of Standards (NIST) , and applies only to the unit identified under "Equipment" above. This report must not be reproduced except in it's entirety without the written approval of Wilner-Greene Associates.

Wilner-Greene Associates
Instrumentation & Calibrations

Calibration Report

Certificate # 338476-58090 Page 2

Model: BIOS DC-HC **Date:** 7/12/2009
Serial # 1139

Test Results As Received

Reference Cell cc/min	Cell Under test cc/min	Relative Difference cc/min	Percent Difference
4538.2	4522.5	-15.7	-0.35%
4537.2	4517.4	-19.8	-0.44%
4543.2	4519.5	-23.7	-0.52%
MEAN	**MEAN**	**PERCENT DIFF. OF AVERAGE**	
4539.5	4519.8	-0.43%	
2991.0	2959.5	-31.4	-1.05%
2989.0	2963.6	-25.4	-0.85%
2991.0	2960.5	-30.4	-1.02%
MEAN	**MEAN**	**PERCENT DIFF. OF AVERAGE**	
2990.3	2961.2	-0.97%	
1511.4	1488.9	-22.5	-1.49%
1513.4	1491.9	-21.5	-1.42%
1510.4	1493.0	-17.5	-1.16%
MEAN	**MEAN**	**PERCENT DIFF. OF AVERAGE**	
1511.7	1491.3	-1.35%	

This report is valid only as an attachment to the Calibration Certificate number indicated above.
WGA-F11 Rev. A 1/5/2000

10 Forest Falls Drive, Unit #1A - Yarmouth Maine 04096
800-634-4327 fax 207-847-9227 www.wilner-greene.com

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WILNER-GREENE ASSOCIATES INC
INSTRUMENTATION AND CALIBRATIONS
an ISO 9001:2000 Company

CERTIFICATE OF CALIBRATION

Certificate Number: 338476 - 58091

Issued To:
SEC INSTRUMENTATION SERVICES
10512 LEXINGTON DRIVE
SUITE 200
KNOXVILLE, TN 37932

Equipment:
Manufacturer: BIOS
Model Number: DC-SC-1
SerialNumber: S-3283
ControlNumber

DateReceived: 7/9/2009
DateCalibrated 7/12/2009
Next Calibration Due: Jul 2010

Test Conditions :

Temperature: 20.4 deg C RelativeHumidity: 42.3 % BarometricPressure: 1012 mBar

Condition Received:
FULLY FUNCTIONAL AND IN TOLERANCE.

Condition Returned:
FULLY FUNCTIONAL AND WITHIN TOLERANCE.

Special Conditions:
NONE

Work Performed:
CALIBRATED PER CALIBRATION PROCEDURE WG-CA-007.

Specification: CALIBRATED TO +/- 3.0% AS REFERENCED TO PRIMARY BUBBLE FLOW CELL @ 0.3% UNCERTAINTY AT AMBIENT C

Reference Standards Used
Asset Number, Device, Report Number, Date Next Calibration Due
275, 3311-500, Lab burrette, caltec96675, 3/14/2013
82, GILIAN 800266, STANDARD FLOW CELL, 336333-53328, 1/29/2010
86, GILIAN IHCP 300HL, MAGNEHELIC GUAGE, ESSCO77784, 9/24/2009
266, DWYER 475-2, DIGITAL MANOMETER, ESSCO77781, 9/24/2009
270, GILIAN GILABRATOR 2, AIRFLOW CALIBRATOR BASE WITH ADAPTOR, 336333-53325, 1/29/2010

MeasurementUncertainties: AIR FLOW RATE 0-250 CC/MIN 0.3%, 100-6000 CC/MIN 0.3%

Calibrated and Reviewed by [redacted] 7/12/2009
Authorized Signature

This report certifies that all calibration equipment used in the test is traceable to the National Institue of Standards (NIST) , and applies only to the unit identified under "Equipment" above. This report must not be reproduced except in it's entirety without the written approval of Wilner-Greene Associates.

Wilner-Greene Associates
instrumentation & Calibrations

Calibration Report

Certificate # 338476-58091 Page 2

Model: BIOS DC-SC **Date:** 7/12/2009
Serial # S-3283

Test Results As Received

Reference Cell cc/min	Cell Under test cc/min	Relative Difference cc/min	Percent Difference
1105.4	1092.1	-13.4	-1.21%
1107.4	1087.0	-20.4	-1.85%
1109.4	1090.0	-19.4	-1.75%
MEAN	**MEAN**	**PERCENT DIFF. OF AVERAGE**	
1107.4	1089.7	-1.60%	
2948.2	2953.4	5.2	0.18%
2949.2	2954.4	5.3	0.18%
2945.2	2953.4	8.2	0.28%
MEAN	**MEAN**	**PERCENT DIFF. OF AVERAGE**	
2947.5	2953.8	0.21%	
2991.0	3038.7	47.7	1.60%
2994.0	3035.6	41.7	1.39%
2993.0	3034.6	41.7	1.39%
MEAN	**MEAN**	**PERCENT DIFF. OF AVERAGE**	
2992.6	3036.3	1.46%	

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WGA-F11 Rev. A 1/5/2000

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Safety and Ecology Corporation

SEC PROCEDURE # SEC-IS-409

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for VS23-0523CV,Serial # 17484, Bar Code # ,Property # SEC-6563

Date: 10/14/09 **Date Last Cal. Expires:** 06/02/10 **Technician:** Jeffrey Knight

Location: 9999, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: D-812 **SERIAL #:** 3317 **CAL. DUE:** 07/16/10

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA **AF Physical Condition** SAT **AS LEFT DATA**

As Found Instrument Flow Indication: 60 LPM **As Left Instrument Flow Indication:** 60 LPM

As Found Calibrator Flow Indication: 60 LPM **As Left Calibrator Flow Indication:** 60 LPM

Unit of Measure: (•) LPM ( ) CFM

Reproducibility 60 LPM 60 LPM 60 LPM **Average:** 60.00 LPM

☑ **Are the Individual Counts Within 10% of the Average?**

CALIBRATION DATA	TARGET VALUE	AIR SAMPLER READING	CALIBRATOR READING	ERROR %
	20.00 LPM	20.00 LPM	20.00 LPM	0.00% LPM
	30.00 LPM	30.00 LPM	30.00 LPM	0.00% LPM
	40.00 LPM	40.00 LPM	40.00 LPM	0.00% LPM

Air Sampler Setting 60.00 ☑ **Is Error Within 10%?**

Reproducibility 60 LPM 60 LPM 60 LPM **Average:** 60.00 LPM

☑ **Are the Individual Counts Within 10% of the Average?**

Air Sampler rotometer reading: ( ) Use Manufacturers Indication (•) Use Corrected Marking ( ) N/A

Comments: **Married as a set with:** **Model:**

Calibrated for new client. Calibrated using F&J model #FP-47 filters.

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: [redacted]

Performed by [redacted] **Reviewed by:** [redacted] **Date:** 10/14/09

Printed Name [redacted]

Entered in Computer Inventory By: [redacted] **Date:** 10-14-09

Safety and Ecology Corporation SEC PROCEDURE # SEC-IS-409

2800 Solway Road

Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for VS23-0523CV,Serial # 17485, Bar Code # ,Property # SEC-6560

Date: 10/14/09 **Date Last Cal. Expires:** 05/27/10 **Technician:** Jeffrey Knight

Location: 9999, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: D-812 **SERIAL #:** 3317 **CAL. DUE:** 07/16/10

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA **AF Physical Condition** SAT **AS LEFT DATA**

As Found Instrument Flow Indication: 60 **LPM** **As Left Instrument Flow Indication:** 60 **LPM**

As Found Calibrator Flow Indication: 60 **LPM** **As Left Calibrator Flow Indication:** 60 **LPM**

Unit of Measure: ◉ **LPM** ○ **CFM**

Reproducibility 60 **LPM** 60 **LPM** 60 **LPM** **Average:** 60.00 **LPM**

☑ **Are the Individual Counts Within 10% of the Average?**

CALIBRATION DATA	**TARGET VALUE**	**AIR SAMPLER READING**	**CALIBRATOR READING**	**ERROR %**
	20.00 **LPM**	20.00 **LPM**	20.00 **LPM**	0.00% **LPM**
	40.00 **LPM**	40.00 **LPM**	40.00 **LPM**	0.00% **LPM**
	70.00 **LPM**	70.00 **LPM**	70.00 **LPM**	0.00% **LPM**

Air Sampler Setting 60.00 ☑ **Is Error Within 10%?**

Reproducibility 60 **LPM** 60 **LPM** 60 **LPM** **Average:** 60.00 **LPM**

☑ **Are the Individual Counts Within 10% of the Average?**

Air Sampler rotometer reading: ○ Use Manufacturers Indication ◉ Use Corrected Marking ○ N/A

Comments: **Married as a set with:** **Model:**

Calibrated for new client. Calibrated using F&J model#FP-47 filters.

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: [redacted]

Performed b [redacted] **Reviewed by:** [redacted] **Date:** 10-26-09

Printed Nam [redacted]

Entered in Computer Inventory By: [redacted] **Date:** 10-14-09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 177-61,Serial # 140728, Bar Code # ,Property # SEC-5803

Date: 12/09/09 **Date Last Cal. Expires:** 06/18/10 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 190580 **CAL DUE:** 01/23/10

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA **Geotropism:** SAT **AS FOUND Instrument Condition:** SAT **AS LEFT Instrument Condition:** SAT

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	507	AF
1000 V:	1000	AF
1500 V:	1492	AF

HV Range 400-1500V: N/A

☐ New Batteries? **Battery Check:** SAT **Alarm:** SAT

AS FOUND Mechanical Zero: 0 **AS LEFT Mechanical Zero:** 0

AS FOUND THRESHOLD: 34.6 mV **AS LEFT THRESHOLD:** 35 mV

AS FOUND HV Reading: 904 V **AS LEFT HV Reading:** 900 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	950	5.00%	1000	0.00%
	2500	2450	2.00%	2500	0.00%
	4000	3900	2.50%	4000	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	95	5.00%	100	0.00%
	250K	245	2.00%	250	0.00%
	400K	390	2.50%	400	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	N/A	% ERR:	0.00%	AL 250:	N/A	% ERR:	0.00%
AF 2500:	N/A	% ERR:	0.00%	AL 2500:	N/A	% ERR:	0.00%
AF 25K:	N/A K	% ERR:	0.00%	AL 25K:	N/A K	% ERR:	0.00%
AF 100K:	N/A K	% ERR:	0.00%	AL 100K:	N/A K	% ERR:	0.00%

☐ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

☑ Fast / Slow Response Switch Functions Properly?

Audio Response: SAT **Audio Divide:** N/A

Push Buttons: SAT **Lamp:** SAT

Scaler/Digital: SAT

Comments: **Married as a set with:** **Model:** 44-9 **Serial #:** PR194682 **Bar Code #:**

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 12/09/10

Performed by: [redacted] Reviewed by: [redacted] Date: 12/10/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 12.9.09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-407

12/9/2009

Calibration Certificate for 44-9, Serial # PR194682, Bar Code # , Property # SEC-5557

Date: 12/09/09 Date Last Cal. Expires: 06/20/09 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 177-61 SERIAL # 140728 CAL DUE: 12/09/10

MODEL: SERIAL # CAL DUE:

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008

Geometry = in contact with surface unless otherwise specified.

PREVIOUS Tc-99 EFFICIENCY: 14.16 % Calibration Voltage: 900 V Calibration Threshold: 35 mV

AS FOUND Instrument Condition: SAT

AS FOUND DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AF Background:	41			
Tc-99 Count:	4000	4000	4000	4000.0
Sr-90 Count:	3200			

Efficiencies

Tc-99 EFF: 14.29% Sr-90 EFF: 23.75%

AS LEFT Instrument Condition: SAT

AS LEFT DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AL Background:	AF			
Tc-99 Count:	AF	AF	AF	
Sr-90 Count:	AF			

Efficiencies

Tc-99 EFF: Sr-90 EFF:

- [x] Is the AS FOUND efficiency within 20% of efficiency from last calibration?
- [x] Reproducibility: Are the individual counts within 10% of the average?
- [x] Does the probe meet final acceptance criteria?
- [x] Calibration sticker attached?

Comments: Married as a set with: Model: 177-61 Serial #: 140728 Bar Code #:

Date Instrument is Due For Next Calibration: 12/09/10

Performed by: [redacted] Reviewed by: [redacted] Date: 12/10/09

Printed Name:

Entered in Computer Inventory By: [redacted] Date: 12.9.09

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-418

10/20/2009

Calibration Certificate for 2360,Serial # 170552, Bar Code # ,Property # SEC-5314

Date: 10/20/09 Date Last Cal. Expires: 02/17/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	499 V	AF V
1000 V:	996 V	AF V
1500 V:	1485 V	AF V
AF HV Setting:	650 V	AL HV Setting: 600 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	4 mV	AF mV
BW (40 mV +/- 4 mV):	40 mV	AF mV
AT (120 mV +/- 10 mV):	117 mV	120 mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2501	% ERR: 0.04%	AL 2500:	AF	% ERR: 0.04%
AF 25K:	25.01 K	% ERR: 0.04%	AL 25K:	AF K	% ERR: 0.04%
AF 250K:	250.1 K	% ERR: 0.04%	AL 250K:	AF K	% ERR: 0.04%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-93 Serial #: PR238114 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/20/10

Performed by: [redacted] Reviewed by [redacted] Date: 10/20/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10-20-09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 43-93,Serial # PR238114, Bar Code # ,Property # SEC-6357

Date: 10/20/09 Date Last Cal. Expires: 02/17/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 170552 CAL DUE 10/20/10

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4071-02	Th-230	40600 dpm	20,600 cpm	1/10/2008
	4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
	4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008
	4079-02	Pu-239	28700 dpm	14,600 cpm	1/10/2008

AS FOUND DATA AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 600 V

Threshold Beta: 4 - 40 mV Alpha: 120 mV

Efficiencies from last calibration	
Pu:	23.97 %
Tc:	12.82 %
Th:	20.57 %
SrY:	32.08 %

	Alpha		Beta		
Back ground:	1	CPM	153	CPM	A-B XTLK
Pu-239:	6639	CPM	578	CPM	6.4%
Tc-99:	1	CPM	4368	CPM	
Th-230:	8205	CPM	N/A		
SrY-90:	N/A		4635	CPM	

AS FOUND Efficiencies: Pu-239: 23.13% Tc-99: 15.22% Th-230: 20.21% SrY-90: 33.70%

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		
Back ground:		CPM		CPM	A-B XTLK
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

Reproducibility : Isotope: Sr-90 4864 4641 4641 Average: 4715.3 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go straight to Comments. Geometry of source = flush to surface, except gas proportional probes < 1/8" from surface unless otherwise specified.

PLATEAU DATA Source 1: Tc-99 Source 2: Th-230

High Voltage	Source 1 Response (CPM) A ch.	B ch.	Net Eff.	Source 2 Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	HV	Pu-239	Tc-99	Th-230	SrY-90
Background:			V	CPM	CPM	CPM	CPM
AL Efficiencies:							

Comments: Married as a set with: Model: 2360 Serial #: 170552 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/20/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/21/09

Printed Name:

Entered in Computer Inventory By: [redacted] Date: 10-20-09

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-418

12/11/2009

Calibration Certificate for 2360,Serial # 253248, Bar Code # ,Property # SEC-6829

Date: 12/11/09 Date Last Cal. Expires: 06/26/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	505 V	AF V
1000 V:	1003 V	AF V
1500 V:	1503 V	AF V
AF HV Setting:	568 V	AL HV Setting: 525 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	4 mV	AF mV
BW (40 mV +/- 4 mV):	40 mV	AF mV
AT (120 mV +/- 10 mV):	120 mV	AF mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2501	% ERR: 0.04%	AL 2500:	AF	% ERR: 0.04%
AF 25K:	25.01 K	% ERR: 0.04%	AL 25K:	AF K	% ERR: 0.04%
AF 250K:	250.1 K	% ERR: 0.04%	AL 250K:	AF K	% ERR: 0.04%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-89 Serial #: PR240338 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 12/11/10

Performed by: [redacted] Reviewed by: [redacted] Date: 12/15/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: R·11·09

SEC PROCEDURE # SEC-IS-420

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

12/11/2009

Calibration Certificate for 43-89,Serial # PR240338, Bar Code # ,Property # SEC-6922

Date: 12/11/09 Date Last Cal. Expires: 06/26/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 253248 CAL DUE 12/11/10

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4071-02	Th-230	40600 dpm	20,600 cpm	1/10/2008
	4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
	4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008
	4079-02	Pu-239	28700 dpm	14,600 cpm	1/10/2008

AS FOUND DATA AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 525 V

Threshold Beta: 4 - 40 mV Alpha: 120 mV

Efficiencies from last calibration	
Pu:	18.69 %
Tc:	10.95 %
Th:	16.39 %
SrY:	26.53 %

	Alpha		Beta		
Back ground:	2	CPM	144	CPM	A-B XTLK
Pu-239:	5469	CPM	677	CPM	9.7%
Tc-99:	1	CPM	3294	CPM	
Th-230:	6725	CPM	N/A		
SrY-90:	N/A		3609	CPM	

AS FOUND Efficiencies: Pu-239: 19.05% Tc-99: 11.37% Th-230: 16.56% SrY-90: 26.05%

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		
Back ground:		CPM		CPM	A-B XTLK
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

Reproducibility : Isotope: Sr-90 3719 3766 3700 Average: 3728.3 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified.

PLATEAU DATA Source 1: Tc-99 Source 2: Th-230

High Voltage	Response (CPM) A ch.	B ch.	Net Eff.	Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	HV	Pu-239	Tc-99	Th-230	SrY-90
Background:			V	CPM	CPM	CPM	CPM
AL Efficiencies:							

Comments: Married as a set with: Model: 2360 Serial #: 253248 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 12/11/10

Performed by: [redacted] Reviewed by: [redacted] Date: 12/15/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 12.11.09

Safety and Ecology Corporation

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-418

12/11/2009

Calibration Certificate for 2360,Serial # 164693, Bar Code # ,Property # SEC-5430

Date: 12/11/09 Date Last Cal. Expires: 12/11/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Other (See Comments)

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

☐ New Batteries? Battery Check: SAT AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	533 V	511 V
1000 V:	1030 V	100 V
1500 V:	1539 V	1490 V
AF HV Setting:	629 V	AL HV Setting: 675 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.3 mV	4 mV
BW (40 mV +/- 4 mV):	40.6 mV	40 mV
AT (120 mV +/- 10 mV):	112 mV	120 mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2510	% ERR: 0.40%	AL 2500:	AF	% ERR: 0.40%
AF 25K:	25.10 K	% ERR: 0.40%	AL 25K:	AF K	% ERR: 0.40%
AF 250K:	250.1 K	% ERR: 0.04%	AL 250K:	AF K	% ERR: 0.04%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Overload Light: SAT

Low Battery (2.2V): SAT

Comments: Married as a set with: Model: 43-89 Serial #: PR171338 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 12/11/10

Performed by: [redacted] Reviewed by: [redacted] Date: 12/14/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 12·11·09

SEC PROCEDURE # SEC-IS-420

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

12/11/2009

Calibration Certificate for 43-89,Serial # PR171338, Bar Code # ,Property # SEC-5426

Date: 12/11/09 Date Last Cal. Expires: 08/30/08 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION MODEL: 2360 SERIAL #: 164693 CAL DUE 12/11/10

MODEL: SERIAL #: CAL DUE

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4071-02	Th-230	40600 dpm	20,600 cpm	1/10/2008
	4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
	4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008
	4079-02	Pu-239	28700 dpm	14,600 cpm	1/10/2008

AS FOUND DATA AS FOUND Instrument Condition: SAT

Calibration Setpoints

HV : 675 V

Threshold Beta: 4 - 40 mV Alpha: 120 mV

Efficiencies from last calibration	
Pu:	18.71 %
Tc:	10.83 %
Th:	15.76 %
SrY:	23.09 %

	Alpha		Beta		
Back ground:	0	CPM	219	CPM	A-B XTLK
Pu-239:	5242	CPM	739	CPM	9.9%
Tc-99:	1	CPM	3065	CPM	
Th-230:	6193	CPM	N/A		
SrY-90:	N/A		3347	CPM	

AS FOUND Efficiencies: Pu-239: 18.26% Tc-99: 10.27% Th-230: 15.25% SrY-90: 23.52%

☑ Is the As Found Data Within 20% of the efficiency from the last cal.?

AS LEFT Instrument Condition: SAT

AS LEFT DATA after repair or HV adjust

HV : V

	Alpha		Beta		
Back ground:		CPM		CPM	A-B XTLK
Pu-239:		CPM		CPM	
Tc-99:		CPM		CPM	
Th-230:		CPM	N/A		
SrY-90:	N/A			CPM	

AS LEFT Efficiencies: Pu-239: Tc-99: Th-230: SrY-90:

Reproducibility : Isotope: Sr-90 3226 3310 3164 Average: 3233.3 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes = 1/8" from surface unless otherwise specified.

PLATEAU DATA Source 1: Tc-99 Source 2: Th-230

High Voltage	Response (CPM) A ch.	B ch.	Net Eff.	Response (CPM) A ch.	B ch.	Net Eff.	Background (CPM) A ch.	B ch.	Net A to B Xtalk: <10%
N/A									N/A
									N/A
									N/A
									N/A
									N/A
									N/A

	Alpha	Beta	HV	Pu-239	Tc-99	Th-230	SrY-90
Background:			V	CPM	CPM	CPM	CPM
AL Efficiencies:							

Comments: Married as a set with: Model: 2360 Serial #: 164693 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 12/11/10

Performed by: [redacted] Reviewed by: [redacted] Date: 12/14/09

Printed Name

Entered in Computer Inventory By: [redacted] Date: 12.11.09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-403

1/15/2010

Calibration Certificate for 2221,Serial # 172018, Bar Code # ,Property # SEC-6644

Date: 01/15/10 Date Last Cal. Expires: 01/15/11 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	496 V	502 V
1000 V:	990 V	1000 V
1500 V:	1480 V	1498 V

☐ New Batteries?

Threshold ratio: 100=10mV

AF THRESHOLD: 15.2 mV

AL THRESHOLD: 10 mV

AF Mechanical Zero: 0

AL Mechanical Zero: 0

AF HV Reading: 1040 V

AL HV Reading: 2000 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2502	% ERR:	0.08%	AL 2500:	AF	% ERR:	0.08%
AF 25K:	25.01 K	% ERR:	0.04%	AL 25K:	AF K	% ERR:	0.04%
AF 250K:	250.1 K	% ERR:	0.04%	AL 250K:	AF K	% ERR:	0.04%

☑ Is the As Found Data Within 20% of the Set Point?

LOG SCALE

AF 200:	200	% ERR:	0.00%	AL 200:	AF	% ERR:	0.00%
AF 2000:	2000	% ERR:	0.00%	AL 2000:	AF	% ERR:	0.00%
AF 20K:	20 K	% ERR:	0.00%	AL 20K:	AF K	% ERR:	0.00%
AF 200K:	200 K	% ERR:	0.00%	AL 200K:	AF K	% ERR:	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Audio Divide: SAT

Push Buttons: SAT

Lamp: SAT

Scaler/Digital: SAT

☑ Fast / Slow Response Function Properly?

Comments: Married as a set with: Model: 44-10 Serial #: PR186960 Bar Code #:

Calibrated using 30' Cable.

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 01/15/11

Performed by: [redacted] Reviewed by [redacted] Date: 1/15/10

Printed Name: [redacted]

Entered in Computer Maintenance By: [redacted] Date: 1.15.10

SEC PROCEDURE # SEC-IS-415

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

1/15/2010

Calibration Certificate for 44-10,Serial # PR186960, Bar Code # ,Property # SEC-5269

Date: 01/15/10 **Date Last Cal. Expires:** 01/15/11 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 **SERIAL #:** 172018 **CAL DUE:** 01/15/11

MODEL: **SERIAL #:** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	7.99 uCi		2/4/2009

Efficiency from Last Calibration: 0.54 % **HV From Last Calibration:** 1050 V **Calibration Threshold:** 10 mV

1 MINUTE COUNTS (CPM)

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: 1050 V

Center: 94254

Background: 4026

Probe Efficiency: Cs-137 0.51%

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: AF V

Center:

Background:

Probe Efficiency: Cs-137

☐ **Is the As Found Efficiency Within 20% of the efficiency from the last cal.?**

Reproducibility: **Isotope:** Cs-137 101185 101171 100843 **Average:** 101066 ☑ **Are the individual counts within 10% of the average?**

* If As Found Efficiency (even after repair) is within 10% of the last calibration and uniformity is <10%, the technician may N/A the Plateau Data and proceed to Comments. Geometry = NaI probes are 4 1/2" from source. All other probes are in contact with surface unless otherwise specified.

PLATEAU AND SET POINT DATA (CPM)

High Voltage	Source Response	Background
1100	98834	3935
1150	100201	3879
1200	100810	4184
1250	100559	4023

HV	CENTER	Background	Efficiency
1200 V	101113	4120	Cs-137 0.55%

Comments: **Married as a set with:** **Model:** 2221 **Serial #:** 172018 **Bar Code #:**

Calibrated using 30' Cable.

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Instrument is Due For Next Calibr [redacted]

Performed by [redacted] **Reviewed by:** [redacted] **Date:** 1/15/10

Printed Name [redacted]

Entered in Computer Inventory By: [redacted] **Date:** 1·15·10

Safety and Ecology Corporation

Packing List

Property No.	Serial No.	DOE Bar Code	Cal. Due	Isotope	Activity	Comments	Instrument Description
Shipped To Site/Project:	***139186***	***ARSEC - Tonawanda Landfill***					
Date Shipped:	***1/15/2010***						
Model: 2221							
SEC-6644	172018		1/15/2011				Scaler/Ratemeter
Model: 44-10							
SEC-5269	PR186960		1/15/2011				NaI Scintillator 2x2 crystal

Upon receipt of instrumentation, please sign as the accepting technician and fax back to the SEC instrumentation lab at (865) 675-5100. If there are any discrepancies, please call (865) 342-3924.

Transferring Technician Signature [redacted] **Date** 1/15/10

Printed Name [redacted]

Accepting Technician Signature_____ **Date**_____

Printed Name_____

Safety and Ecology Corporation

SEC PROCEDURE # Manual

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for PGM-2400P,Serial # 181-000612, Bar Code # ,Property # SEC-6579

Date: 02/04/10 **Date Last Cal. Expires:** 11/09/09 **Technician:** Sabrina Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL:	DC-Lite (M)	**SERIAL #:**	4137	**CAL. DUE:**	09/15/10
MODEL:		**SERIAL #:**		**CAL DUE:**	

Instrument Inspection: Physical and Operational Condition SAT

Reading 1

Gas: CH4

Unit of Measure: % LEL

	Gas Applied		Instrument Reading		
Cal Gas (1):	50	/	49	**Lot # (1):**	670808c31
Cal Gas (2):		/		**Lot # (2):**	

Reading 2

Gas: CO

Unit of Measure: PPM

	Gas Applied		Instrument Reading		
Cal Gas (1):	50	/	50	**Lot # (1):**	670808c31
Cal Gas (2):		/		**Lot # (2):**	

Reading 3

Gas: H2S

Unit of Measure: PPM

	Gas Applied		Instrument Reading		
Cal Gas (1):	25	/	25	**Lot # (1):**	670808c31
Cal Gas (2):		/		**Lot # (2):**	

Reading 4

Gas:

Unit of Measure:

	Gas Applied		Instrument Reading		
Cal Gas (1):		/		**Lot # (1):**	
Cal Gas (2):		/		**Lot # (2):**	

Comments:

O2 sensor calibrated to Air Zero Grade # 101857c55 (20.9% / 20.9%) and to N2 # 682421cy60 (0% / 0%). Annual check is due 7/1/2010. **For calibration frequency please see RAE Systems Technical Note TN-148.

- [ ] **Alkaline Batteries Replaced?**
- [x] **Rechargeable Instrument - Fully Charged?**
- [x] **Instrument calibrtated to <= 10% of applied gas?**
- [x] **Does Instrument Meet Final Acceptance Criteria?**
- [x] **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: 03/04/10

Performed by [redacted] **Reviewed by** [redacted] **Date:** 2/4/10

Printed Name [redacted]

Entered in Computer Inventory By: [redacted] **Date:** 2/4/10

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 12,Serial # 229306, Bar Code # ,Property # SEC-6268

Date: 10/08/09 Date Last Cal. Expires: 09/24/09 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	508	AF
1000 V:	1000	AF
1500 V:	1491	AF

HV Range 400-1500V: N/A

☐ New Batteries? Battery Check: SAT Alarm: N/A

AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

AS FOUND THRESHOLD: 34.1 mV AS LEFT THRESHOLD: 35 mV

AS FOUND HV Reading: 898 V AS LEFT HV Reading: 900 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2500	% ERR: 0.00%	AL 2500:	AF	% ERR: 0.00%
AF 25K:	25.00 K	% ERR: 0.00%	AL 25K:	AF K	% ERR: 0.00%
AF 100K:	100.0 K	% ERR: 0.00%	AL 100K:	AF K	% ERR: 0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

☑ Fast / Slow Response Switch Functions Properly?

Audio Response: SAT Audio Divide: N/A

Push Buttons: SAT Lamp: N/A

Scaler/Digital: SAT

Comments: Married as a set with: Model: 44-9 Serial #: PR191714 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/08/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/8/09

Printed Name:

Entered in Computer Inventory By: [redacted] Date: 10.8.09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-407

10/28/2009

Calibration Certificate for 44-9,Serial # PR153297, Bar Code # ,Property # SEC-5773

Date: 10/28/09 Date Last Cal. Expires: 10/14/09 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 12 SERIAL # 186707 CAL DUE: 10/28/10

MODEL: SERIAL # CAL DUE:

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008

Geometry = in contact with surface unless otherwise specified.

PREVIOUS Tc-99 EFFICIENCY: 13.61 % Calibration Voltage: 900 V Calibration Threshold: 35 mV

AS FOUND Instrument Condition: SAT

AS FOUND DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AF Background:	33			
Tc-99 Count:	3500	3515	3564	3526.3
Sr-90 Count:	3121			

Efficiencies

Tc-99 EFF: 12.61% Sr-90 EFF: 23.22%

AS LEFT Instrument Condition: SAT

AS LEFT DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AL Background:	AF			
Tc-99 Count:	AF	AF	AF	
Sr-90 Count:	AF			

Efficiencies

Tc-99 EFF: Sr-90 EFF:

- ✔ Is the AS FOUND efficiency within 20% of efficiency from last calibration?
- ✔ Reproducibility: Are the individual counts within 10% of the average?
- ✔ Does the probe meet final acceptance criteria?
- ✔ Calibration sticker attached?

Comments: Married as a set with: Model: 12 Serial #: 186707 Bar Code #:

[redacted]ument is Due For Next Calibration: 10/28/10

Performed by [redacted] Reviewed by: [redacted] Date: 10/29/09

Printed Name

Entered in Computer Inventory By: [redacted] Date: 10-28-09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 12,Serial # 186707, Bar Code # ,Property # SEC-5577

Date: 10/28/09 Date Last Cal. Expires: 10/22/06 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due and Repair

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 01/23/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	506	AF
1000 V:	992	AF
1500 V:	1488	AF

HV Range 400-1500V: N/A

☐ New Batteries? Battery Check: SAT Alarm: N/A

AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

AS FOUND THRESHOLD: 34.7 mV AS LEFT THRESHOLD: 35 mV

AS FOUND HV Reading: 1488 V AS LEFT HV Reading: 900 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2501	% ERR: 0.04%	AL 2500:	AF	% ERR: 0.04%
AF 25K:	25.01 K	% ERR: 0.04%	AL 25K:	AF K	% ERR: 0.04%
AF 100K:	100.0 K	% ERR: 0.00%	AL 100K:	AF K	% ERR: 0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

☑ Fast / Slow Response Switch Functions Properly?

Audio Response: SAT Audio Divide: N/A

Push Buttons: SAT Lamp: N/A

Scaler/Digital: SAT

Comments Married as a set with: Model: 44-9 Serial #: PR153297 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/28/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/29/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10.28.09

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-407

10/8/2009

Calibration Certificate for 44-9,Serial # PR191714, Bar Code # ,Property # SEC-5441

Date: 10/08/09 Date Last Cal. Expires: 09/24/09 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 12 SERIAL # 229306 CAL DUE: 10/08/10

MODEL: SERIAL # CAL DUE:

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
4074-02	Tc-99	32500 dpm	20,300 cpm	1/10/2008
4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008

Geometry = in contact with surface unless otherwise specified.

PREVIOUS Tc-99 EFFICIENCY: 13.16 % Calibration Voltage: 900 V Calibration Threshold: 35 mV

AS FOUND Instrument Condition: SAT

AS FOUND DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AF Background:	33			
Tc-99 Count:	3926	3937	4081	3981.3
Sr-90 Count:	3209			

Efficiencies

Tc-99 EFF: 12.15% Sr-90 EFF: 23.88%

AS LEFT Instrument Condition: SAT

AS LEFT DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AL Background:	AF			
Tc-99 Count:	AF	AF	AF	
Sr-90 Count:	AF			

Efficiencies

Tc-99 EFF: Sr-90 EFF:

- [x] Is the AS FOUND efficiency within 20% of efficiency from last calibration?
- [x] Reproducibility: Are the individual counts within 10% of the average?
- [x] Does the probe meet final acceptance criteria?
- [x] Calibration sticker attached?

Comments: Married as a set with: Model: 12 Serial #: 229306 Bar Code #:

Date Instrument is Due For Next Calibration: 10/08/10

Performed by: [redacted] Reviewed by: [redacted] Date: 10/8/09

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 10.8.09

Safety and Ecology Corporation

SEC PROCEDURE # SEC-IH-104

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for PGM50-5P,Serial # 095-526641, Bar Code # ,Property # SEC-6970

Date: 02/18/10 **Date Last Cal. Expires:** **Technician:** Sabrina Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL:	DC-Lite (M)	**SERIAL #:**	4137	**CAL. DUE:**	09/15/10
MODEL:		**SERIAL #:**		**CAL DUE:**	

Instrument Inspection: Physical and Operational Condition SAT

Reading 1

Gas: CH4

Unit of Measure: % LEL

	Gas Applied		Instrument Reading		
Cal Gas (1):	50	/	50	**Lot # (1):**	672753c24
Cal Gas (2):		/		**Lot # (2):**	

Reading 2

Gas: CO

Unit of Measure: PPM

	Gas Applied		Instrument Reading		
Cal Gas (1):	50	/	50	**Lot # (1):**	672753c24
Cal Gas (2):		/		**Lot # (2):**	

Reading 3

Gas: H2S

Unit of Measure: PPM

	Gas Applied		Instrument Reading		
Cal Gas (1):	25	/	25	**Lot # (1):**	672753c24
Cal Gas (2):		/		**Lot # (2):**	

Reading 4

Gas: Isobutylene

Unit of Measure: PPM

	Gas Applied		Instrument Reading		
Cal Gas (1):	100	/	100	**Lot # (1):**	705879c1
Cal Gas (2):		/		**Lot # (2):**	

Comments:

Gas: O2, UOM: % by Volume, 20.9% / 20.9%, Lot # 672753c24. **For calibration frequency please see RAE Systems Technical Note TN-148. Annual check is due 2/18/2011.

- [ ] **Alkaline Batteries Replaced?**
- [x] **Rechargeable Instrument - Fully Charged?**
- [x] **Instrument calibrtated to <= 10% of applied gas?**
- [x] **Does Instrument Meet Final Acceptance Criteria?**
- [x] **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: 03/18/10

Performed b [redacted] **Reviewed by:** [redacted] **Date:** 2/18/10

Printed Name: Sabrina Hall

Entered in Computer Inventory By [redacted] **Date:** 2/18/10

Safety and Ecology Corporation

SEC PROCEDURE # SEC-IH-104

2800 Solway Road
Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for PGM50-5P,Serial # 095-526634, Bar Code # ,Property # SEC-6969

Date: 02/18/10 Date Last Cal. Expires: Technician: Sabrina Hall

Location: 139186, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL:	DC-Lite (M)	SERIAL #:	4137	CAL. DUE:	09/15/10
MODEL:		SERIAL #:		CAL DUE:	

Instrument Inspection: Physical and Operational Condition SAT

Reading 1

Gas: CH4

Unit of Measure: % LEL

	Gas Applied		Instrument Reading		
Cal Gas (1):	50	/	49	Lot # (1):	672753c24
Cal Gas (2):		/		Lot # (2):	

Reading 2

Gas: CO

Unit of Measure: PPM

	Gas Applied		Instrument Reading		
Cal Gas (1):	50	/	50	Lot # (1):	672753c24
Cal Gas (2):		/		Lot # (2):	

Reading 3

Gas: H2S

Unit of Measure: PPM

	Gas Applied		Instrument Reading		
Cal Gas (1):	25	/	25	Lot # (1):	672753c24
Cal Gas (2):		/		Lot # (2):	

Reading 4

Gas: Isobutylene

Unit of Measure: PPM

	Gas Applied		Instrument Reading		
Cal Gas (1):	100	/	100	Lot # (1):	705879c1
Cal Gas (2):		/		Lot # (2):	

Comments:

Gas: O2, UOM: % by Volume, 20.9% / 20.9%, Lot # 672753c24. **For calibration frequency please see RAE Systems Technical Note TN-148. Annual check is due 2/18/2011.

- [ ] Alkaline Batteries Replaced?
- [x] Rechargeable Instrument - Fully Charged?
- [x] Instrument calibrtated to <= 10% of applied gas?
- [x] Does Instrument Meet Final Acceptance Criteria?
- [x] Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 03/18/10

Performed by [redacted] Reviewed by [redacted] Date: 2/18/10

Printed Name: Sabrina Hall

Entered in Computer Inventory B [redacted] Date: 2/18/10

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 44-10,Serial # PR242839, Bar Code # ,Property # SEC-6308

Date: 02/18/10 **Date Last Cal. Expires:** 06/02/10 **Technician:** Carl Hall

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 **SERIAL #:** 187756 **CAL DUE:** 02/18/11

MODEL: **SERIAL #:** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	7.99 uCi		2/4/2009

Efficiency from Last Calibration: 0.64 % **HV From Last Calibration:** 1100 V **Calibration Threshold:** 10 mV

1 MINUTE COUNTS (CPM)

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: 1100 V

Center: 106584

Background: 3343

Probe Efficiency: Cs-137 0.58%

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: AF V

Center:

Background:

Probe Efficiency: Cs-137

☑ **Is the As Found Efficiency Within 20% of the efficiency from the last cal.?**

Reproducibility: **Isotope:** Cs-137 106109 106943 106441 **Average:** 106498 ☑ **Are the individual counts within 10% of the average?**

* If As Found Efficiency (even after repair) is within 10% of the last calibration and uniformity is <10%, the technician may N/A the Plateau Data and proceed to Comments. Geometry = NaI probes are 4-1/2" from source. All other probes are in contact with surface unless otherwise specified.

PLATEAU AND SET POINT DATA (CPM)

High Voltage	Source Response	Background	HV	CENTER	Background	Efficiency
N/A			V			Cs-137

Comments: **Married as a set with:** **Model:** 2221 **Serial #:** 187756 **Bar Code #:**

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

[redacted]nt is Due For Next Calibration: 02/18/11

Performed by: [redacted] **Reviewed by:** [redacted] **Date:** 2-18-10

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] **Date:** 2/18/10

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-403

2/18/2010

Calibration Certificate for 2221,Serial # 187756, Bar Code # ,Property # SEC-5051

Date: 02/18/10 Date Last Cal. Expires: 06/02/10 Technician: Carl Hall

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 132896 CAL DUE: 07/25/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

HIGH VOLTAGE (+/- 10% tolerance)		AS FOUND HV	AS LEFT HV			
				☐ New Batteries?	AF Mechanical Zero:	0
	500 V:	498 V	AF V	Threshold ratio: 100=10mV	AL Mechanical Zero:	0
	1000 V:	999 V	AF V	AF THRESHOLD: 10.0 mV	AF HV Reading:	1100 V
	1500 V:	1501 V	AF V	AL THRESHOLD: 10.0 mV	AL HV Reading:	1100 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2500	% ERR:	0.00%	AL 2500:	AF	% ERR:	0.00%
AF 25K:	25.00 K	% ERR:	0.00%	AL 25K:	AF K	% ERR:	0.00%
AF 250K:	250.0 K	% ERR:	0.00%	AL 250K:	AF K	% ERR:	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

LOG SCALE

AF 200:	200	% ERR:	0.00%	AL 200:	AF	% ERR:	0.00%
AF 2000:	2000	% ERR:	0.00%	AL 2000:	AF	% ERR:	0.00%
AF 20K:	20 K	% ERR:	0.00%	AL 20K:	AF K	% ERR:	0.00%
AF 200K:	200 K	% ERR:	0.00%	AL 200K:	AF K	% ERR:	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Audio Divide: SAT

Push Buttons: SAT

Lamp: SAT

Scaler/Digital: SAT

☑ Fast / Slow Response Function Properly?

Comments: Married as a set with: Model: 44-10 Serial #: PR242839 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 02/18/11

Performed by: [redacted] Reviewed by: [redacted] Date: 2-18-10

Printed Name:

Entered in Computer Maintenance By: [redacted] Date: 2/18/10

Safety and Ecology Corporation

Packing List

Property No.	Serial No.	DOE Bar Code	Cal. Due	Isotope	Activity	Comments	Instrument Description
Shipped To Site/Project:	***139186***	***ARSEC - Tonawanda Landfill***					
Date Shipped:	***2/18/2010***						
Model: 2221							
SEC-5051	187756		2/18/2011				Scaler/Ratemeter
Model: 44-10							
SEC-6308	PR242839		2/18/2011				NaI Scintillator 2x2 crystal
Model: PGM50-5P							
SEC-6969	095-526634		3/18/2010				MultiRAE Plus Multi Gas Moni
SEC-6970	095-526641		3/18/2010				MultiRAE Plus Multi Gas Moni

Upon receipt of instrumentation, please sign as the accepting technician and fax back to the SEC instrumentation lab at (865) 675-5100. If there are any discrepancies, please call (865) 342-3924.

Transferring Technician Signature [redacted] **Date** 2/18/10

Printed Name [redacted]

Accepting Technician Signature_____ **Date**_____

Printed Name_____

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-403

2/23/2010

Calibration Certificate for 2221,Serial # 190191, Bar Code # ,Property # SEC-5293

Date: 02/23/10 Date Last Cal. Expires: 10/14/09 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 190580 CAL DUE: 07/25/10

MODEL: SERIAL #: CAL DUE:

AS FOUND DATA Geotropism: SAT AS FOUND Instrument Condition: SAT AS LEFT Instrument Condition: SAT

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	498 V	502 V
1000 V:	990 V	1000 V
1500 V:	1477 V	1494 V

☐ New Batteries? AF Mechanical Zero: 0

Threshold ratio: 100=10mV AL Mechanical Zero: 0

AF THRESHOLD: 10 mV AF HV Reading: 1034 V

AL THRESHOLD: 10 mV AL HV Reading: 1150 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR:	0.00%	AL 250:	AF	% ERR:	0.00%
AF 2500:	2500	% ERR:	0.00%	AL 2500:	AF	% ERR:	0.00%
AF 25K:	24.99 K	% ERR:	0.04%	AL 25K:	AF K	% ERR:	0.04%
AF 250K:	249.9 K	% ERR:	0.04%	AL 250K:	AF K	% ERR:	0.04%

☑ Is the As Found Data Within 20% of the Set Point?

LOG SCALE

AF 200:	200	% ERR:	0.00%	AL 200:	AF	% ERR:	0.00%
AF 2000:	2000	% ERR:	0.00%	AL 2000:	AF	% ERR:	0.00%
AF 20K:	20 K	% ERR:	0.00%	AL 20K:	AF K	% ERR:	0.00%
AF 200K:	200 K	% ERR:	0.00%	AL 200K:	AF K	% ERR:	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT

Audio Divide: SAT

Push Buttons: SAT

Lamp: SAT

Scaler/Digital: SAT

☑ Fast / Slow Response Function Properly?

Comments: Married as a set with: Model: 44-10 Serial #: PR240366 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 02/23/11

Performed by: [redacted] Reviewed by: [redacted] Date: 2/24/10

Printed Name: [redacted]

Entered in Computer Maintenance By: [redacted] Date: 2·23·10

SEC PROCEDURE # SEC-IS-415

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

2/23/2010

Calibration Certificate for 44-10,Serial # PR240366, Bar Code # ,Property # SEC-6408

Date: 02/23/10 Date Last Cal. Expires: 10/14/09 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 SERIAL #: 190191 CAL DUE: 02/23/11

MODEL: SERIAL #: CAL DUE:

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	7.99 uCi		2/4/2009

Efficiency from Last Calibration: 0.68 % HV From Last Calibration: 1050 V Calibration Threshold: 10 mV

1 MINUTE COUNTS (CPM)

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: 1050 V

Center: 110111

Background: 3796

Probe Efficiency: Cs-137 0.60%

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: AF V

Center:

Background:

Probe Efficiency: Cs-137

☑ Is the As Found Efficiency Within 20% of the efficiency from the last cal.?

Reproducibility: Isotope: Cs-137 110789 111565 110652 Average: 111002 ☐ Are the individual counts within 10% of the average?

* If As Found Efficiency (even after repair) is within 10% of the last calibration and uniformity is <10%, the technician may N/A the Plateau Data and proceed to Comments. Geometry = NaI probes are 4 1/2" from source. All other probes are in contact with surface unless otherwise specified.

PLATEAU AND SET POINT DATA (CPM)

High Voltage	Source Response	Background
1050	110111	3796
1100	111251	4018
1150	112650	4289
1200	112190	4497

HV	CENTER	Background	Efficiency
1150 V	112531	4395	Cs-137 0.61%

Comments: Married as a set with: Model: 2221 Serial #: 190191 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

[redacted]nstrument is Due For Next Calibrat[redacted]

Performed by: [redacted] Reviewed by: [redacted] Date: 2/24/10

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 2·27·10

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 12,Serial # 180411, Bar Code # ,Property # SEC-5666

Date: 02/23/10 **Date Last Cal. Expires:** 12/11/10 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 190580 **CAL DUE:** 07/25/10

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA

Geotropism: SAT **AS FOUND Instrument Condition:** SAT **AS LEFT Instrument Condition:** SAT

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	496	507
1000 V:	990	1000
1500 V:	1493	1496

HV Range 400-1500V: N/A

☐ New Batteries? **Battery Check:** SAT **Alarm:** N/A

AS FOUND Mechanical Zero: >0 **AS LEFT Mechanical Zero:** 0

AS FOUND THRESHOLD: 35.3 mV **AS LEFT THRESHOLD:** 35 mV

AS FOUND HV Reading: 899 V **AS LEFT HV Reading:** 900 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	95	5.00%	100	0.00%
	250	240	4.00%	250	0.00%
	400	390	2.50%	400	0.00%
x1 or x10	1000	950	5.00%	1000	0.00%
	2500	2400	4.00%	2500	0.00%
	4000	3900	2.50%	4000	0.00%
x10 or x100	10K	9.5	5.00%	10	0.00%
	25K	24	4.00%	25	0.00%
	40K	39	2.50%	40	0.00%
x100 or x1000	100K	95	5.00%	100	0.00%
	250K	240	4.00%	250	0.00%
	400K	390	2.50%	400	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2500	% ERR: 0.00%	AL 2500:	AF	% ERR: 0.00%
AF 25K:	25.00 K	% ERR: 0.00%	AL 25K:	AF K	% ERR: 0.00%
AF 100K:	99.99 K	% ERR: 0.01%	AL 100K:	AF K	% ERR: 0.01%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

☑ Fast / Slow Response Switch Functions Properly?

Audio Response: SAT **Audio Divide:** N/A

Push Buttons: SAT **Lamp:** N/A

Scaler/Digital: SAT

Comments: **Married as a set with:** **Model:** 44-9 **Serial #:** PR113654 **Bar Code #:**

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 02/23/11

Performed by: [redacted] Reviewed by: [redacted] Date: 2/24/10

Printed Name:

Entered in Computer Inventory By: [redacted] Date: 2-23-10

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 44-9,Serial # PR113654, Bar Code # ,Property # SEC-5535

Date: 02/23/10 Date Last Cal. Expires: 12/11/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Repair

EQUIPMENT USED DURING CALIBRATION

MODEL: 12 SERIAL # 180411 CAL DUE: 02/23/11

MODEL: SERIAL # CAL DUE:

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008

Geometry = in contact with surface unless otherwise specified.

PREVIOUS Tc-99 EFFICIENCY: 15.88 % Calibration Voltage: 900 V Calibration Threshold: 35 mV

AS FOUND Instrument Condition: SAT

AS FOUND DATA

1 MINUTE COUNTS (CPM)

AF Background: 39

				AVERAGE
Tc-99 Count:	4449	4371	4338	4386.0
Sr-90 Count:	3888			

Efficiencies

Tc-99 EFF: 15.69% Sr-90 EFF: 28.94%

AS LEFT Instrument Condition: SAT

AS LEFT DATA

1 MINUTE COUNTS (CPM)

AL Background: 34

				AVERAGE
Tc-99 Count:	4554	4497	4429	4493.3
Sr-90 Count:	4151			

Efficiencies

Tc-99 EFF: 16.10% Sr-90 EFF: 30.95%

- ☑ Is the AS FOUND efficiency within 20% of efficiency from last calibration?
- ☑ Reproducibility: Are the individual counts within 10% of the average?
- ☑ Does the probe meet final acceptance criteria?
- ☑ Calibration sticker attached?

Comments: Married as a set with: Model: 12 Serial #: 180411 Bar Code #:

Recoated GMT.

[redacted]trument is Due For Next Calibration: 02/23/11

Performed by: [redacted] Reviewed by: [redacted] Date: 2/24/10

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 2.23.10

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

Calibration Certificate for 12,Serial # 145985, Bar Code # ,Property # SEC-5446

Date: 03/19/10 **Date Last Cal. Expires:** 02/14/08 **Technician:** Thomas Thompson

Location: 9999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 190580 **CAL DUE:** 07/25/10

MODEL: **SERIAL #:** **CAL DUE:**

AS FOUND DATA **Geotropism:** SAT **AS FOUND Instrument Condition:** SAT **AS LEFT Instrument Condition:** SAT

HIGH VOLTAGE (+/- 10% tolerance)	AS FOUND HV	AS LEFT HV
500 V:	507	AF
1000 V:	1000	AF
1500 V:	1504	AF

HV Range 400-1500V: N/A

☑ New Batteries? Battery Check: SAT Alarm: N/A

AS FOUND Mechanical Zero: 0 AS LEFT Mechanical Zero: 0

AS FOUND THRESHOLD: 34.6 mV AS LEFT THRESHOLD: 35 mV

AS FOUND HV Reading: 911 V AS LEFT HV Reading: 900 V

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.00%	AF	0.00%
	250	250	0.00%	AF	0.00%
	400	400	0.00%	AF	0.00%
x1 or x10	1000	1000	0.00%	AF	0.00%
	2500	2500	0.00%	AF	0.00%
	4000	4000	0.00%	AF	0.00%
x10 or x100	10K	10	0.00%	AF	0.00%
	25K	25	0.00%	AF	0.00%
	40K	40	0.00%	AF	0.00%
x100 or x1000	100K	100	0.00%	AF	0.00%
	250K	250	0.00%	AF	0.00%
	400K	400	0.00%	AF	0.00%

☑ Is the As Found Data Within 20% of the Set Point?

DIGITAL SCALER

AF 250:	250	% ERR: 0.00%	AL 250:	AF	% ERR: 0.00%
AF 2500:	2499	% ERR: 0.04%	AL 2500:	AF	% ERR: 0.04%
AF 25K:	24.98 K	% ERR: 0.08%	AL 25K:	AF K	% ERR: 0.08%
AF 100K:	99.94 K	% ERR: 0.06%	AL 100K:	AF K	% ERR: 0.06%

☑ Is the As Found Data Within 20% of the Set Point?

REPRODUCIBILITY

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25 K	25 K	25 K
x100 or x1000 Scale:	250 K	250 K	250 K

☑ Are the Individual Counts Within 10% of the Average?

☑ Fast / Slow Response Switch Functions Properly?

Audio Response: SAT Audio Divide: N/A

Push Buttons: SAT Lamp: N/A

Scaler/Digital: SAT

Comments: Married as a set with: **Model:** 44-9 **Serial #:** PR150385 **Bar Code #:**

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 03/19/11

Performed by: [redacted] Reviewed by: [redacted] Date: 3/22/10

Printed Name: [redacted]

Entered in Computer Inventory By: [redacted] Date: 3·19·10

Safety and Ecology Corporation

2800 Solway Road, Knoxville, TN 37931

Calibration Certificate

SEC PROCEDURE # SEC-IS-407

3/19/2010

Calibration Certificate for 44-9,Serial # PR150385, Bar Code # ,Property # SEC-5121

Date: 03/19/10 Date Last Cal. Expires: 02/04/10 Technician: Thomas Thompson

Location: 9999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 12 SERIAL # 145985 CAL DUE: 03/19/11

MODEL: SERIAL # CAL DUE:

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
4072-02	Tc-99	27700 dpm	17,300 cpm	1/10/2008
4076-02	Sr-90	13300 dpm	9,300 cpm	1/10/2008

Geometry = in contact with surface unless otherwise specified.

PREVIOUS Tc-99 EFFICIENCY: 13.24 % Calibration Voltage: 900 V Calibration Threshold: 35 mV

AS FOUND Instrument Condition: SAT

AS FOUND DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AF Background:	26			
Tc-99 Count:	3786	3823	3703	3770.7
Sr-90 Count:	3198			

Efficiencies

Tc-99 EFF: 13.52% Sr-90 EFF: 23.86%

AS LEFT Instrument Condition: SAT

AS LEFT DATA

1 MINUTE COUNTS (CPM)

				AVERAGE
AL Background:	AF			
Tc-99 Count:	AF	AF	AF	
Sr-90 Count:	AF			

Efficiencies

Tc-99 EFF: Sr-90 EFF:

- [x] Is the AS FOUND efficiency within 20% of efficiency from last calibration?
- [x] Reproducibility: Are the individual counts within 10% of the average?
- [x] Does the probe meet final acceptance criteria?
- [x] Calibration sticker attached?

Comments: Married as a set with: Model: 12 Serial #: 145985 Bar Code #:

[redacted]nt is Due For Next Calibration: 03/19/11

Performed by: [redacted] Reviewed by: [redacted] Date: 3/22/10

Printed Name:

Entered in Computer Inventory By: [redacted] Date: 3.17.10

Appendix F. Survey Instrument Daily QA Check Records

Survey Instrument Operational Checks
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
10/29/09	0954	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Yes	184,683 cpm	171,822 – 257,734	MWK
10/29/09	0955	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Yes	177,612 cpm	158,990 – 237,764	MWK
10/29/09	0956	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Yes	189,686 cpm	163,272 – 244,908	MWK
10/29/09	0957	Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10	Yes	64,320 cpm	51,456 – 77,184	MWK
10/29/09	0958	Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10	Yes	591,182 cpm	490,953 – 736,429	MWK
10/29/09	1644	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	Yes	Alpha 1,553 cpm	1,200 – 1,800	MWK
10/29/09	1645	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	Yes	Beta 10,525 cpm	8,476 – 12,714	MWK

Survey Instrument Operational Checks

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11/02/09	0954	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Yes	184,683 cpm	171,822 – 257,734	JVW
11/02/09	0955	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Yes	177,612 cpm	158,990 – 237,764	JVW
11/02/09	0956	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Yes	189,686 cpm	163,272 – 244,908	JVW
11/02/09	0957	Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10	Yes	64,320 cpm	51,456 – 77,184	JVW
11/02/09	0958	Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10	Yes	591,182 cpm	490,953 – 736,429	JVW
11/02/09	1644	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	Yes	Alpha 1,553 cpm	1,200 – 1,800	JVW
11/02/09	1645	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	Yes	Beta 10,525 cpm	8,476 – 12,714	JVW
		Ludlum 2221 #187763	Ludlum 43-93 #PR244535	10/19/10	Yes	Alpha cpm	1,758 – 2,636	
		Ludlum 2221 #187763	Ludlum 43-93 #PR244535	10/19/10	Yes	Beta cpm	2,710 – 4,066	
		Ludlum 2221 #117331	Ludlum 43-93 #PR244486	10/19/10	Yes	Alpha cpm	5,544 – 8,316	
		Ludlum 2221 #117331	Ludlum 43-93 #PR244486	10/19/10	Yes	Beta cpm	4,781 – 7,171	

Survey Instrument Operational Checks

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check OK?? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
110309	0703	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Yes	173958 cpm	171,822 – 257,734	JVW
110309	0702	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Yes	169623 cpm	158,990 – 237,764	JVW
110309	0705	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Yes	174182 cpm	163,272 – 244,908	JVW
		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10	Yes	Cpm not used	51,456 – 77,184	
		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10	Yes	Cpm not used	490,953 – 736,429	
110309	0705	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	n/a	Alpha 1471 cpm	1,200 – 1,800	JVW
110309	0705	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	n/a	Beta 10617 cpm	8,476 – 12,714	JVW
110309	0705	Ludlum 2221 #187763	Ludlum 43-93 #PR244535	10/19/10	Yes	Alpha 1902 cpm	1,758 – 2,636	JVW
110309	0705	Ludlum 2221 #187763	Ludlum 43-93 #PR244535	10/19/10	Yes	Beta 3432 cpm	2,710 – 4,066	JVW
110309	N/A	Ludlum 2221 #117331	Ludlum 43-93 #PR244486	10/19/10	Yes	Alpha Cpm not used	5,544 – 8,316	
110309	N/A	Ludlum 2221 #117331	Ludlum 43-93 #PR244486	10/19/10	Yes	Beta Cpm not used	4,781 – 7,171	

110309	0805	M-12 #180431	44-9 #193567	10/19/10	Yes	6928	5798-7086	JBT
110309	1530	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Yes	Alpha cpm 742	668 – 816	JBT
110309	1545	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Yes	Beta 7817 cpm	7035-8599	JBT
110309	1555	Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/02	Yes	Alpha cpm 665	598 – 732	JBT
110309	1615	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	10/30/02	Yes	Beta cpm 6918	6528-7978	JBT

Survey Instrument Operational Checks

for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
10/29/09	0954	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Yes	173038 cpm	171,822 – 257,734	JVW
10/29/09	0955	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Yes	cpm	158,990 – 237,764	
10/29/09	0956	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Yes	192015 cpm	163,272 – 244,908	JVW
10/29/09	0957	Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10	Yes	cpm	51,456 – 77,184	
10/29/09	0958	Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10	Yes	cpm	490,953 – 736,429	
10/29/09	1644	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	Yes	Alpha 1295 cpm	1,200 – 1,800	
10/29/09	1645	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	Yes	Beta 8945.6 cpm	8,476 – 12,714	
		Ludlum 2221 #187763	Ludlum 43-93 #PR244535	10/19/10	Yes	Alpha cpm	1,758 – 2,636	
		Ludlum 2221 #187763	Ludlum 43-93 #PR244535	10/19/10	Yes	Beta cpm	2,710 – 4,066	
		Ludlum 2221 #117331	Ludlum 43-93 #PR244486	10/19/10	Yes	Alpha cpm	5,544 – 8,316	
		Ludlum 2221 #117331	Ludlum 43-93 #PR244486	10/19/10	Yes	Beta cpm	4,781 – 7,171	

Survey Instrument Operational Checks
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
10/30/09	0815	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Yes	183,566 cpm	171,822 – 257,734	MWK
10/30/09	0816	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Yes	163,796 cpm	158,990 – 237,764	MWK
10/30/09	0817	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Yes	174,198 cpm	163,272 – 244,908	MWK
10/30/09	0818	Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10	Yes	69,206 cpm	51,456 – 77,184	MWK
10/30/09	0819	Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10	Yes	589,710 cpm	490,953 – 736,429	MWK
10/30/09	0820	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	Yes	Alpha 1,452 cpm	1,200 – 1,800	MWK
10/30/09	0821	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	Yes	Beta 10,525 cpm	8,476 – 12,714	MWK

Survey Instrument Operational Checks
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-09-09	0648	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	205220 cpm	171,822 – 257,734	MCS
11-09-09	06639	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	213807 cpm	158,990 – 237,764	MCS
11-09-09	0644	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	218653 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-09-09	0655	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1512 cpm Alpha	1,200 – 1,800	MCS
11-09-09	0650	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	10064 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2221 #187763	Ludlum 43-93 #PR244535	10/19/10		pm Alpha	1,758 – 2,636	
NA		Ludlum 2360 #187763	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	2,710 – 4,066	
NA		Ludlum 2360 #117331	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	5,544 – 8,316	
NA		Ludlum 2360 #117331	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	4,781 – 7,171	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-09-09	0700	M-12 #180431	44-9 #193567	10/19/10	Y	6701 Beta cpm	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
NA		Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/10		cpm Alpha	598 – 732	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	10/30/10		cpm Beta	6528-7978	

Survey Instrument Operational Checks
for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York
Contract Number: W912P4-07-D-0009, D.O. 0003

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-10-09	0640	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	204836 cpm	171,822 – 257,734	MCS
11-10-09	0635	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	211668 cpm	158,990 – 237,764	MCS
11-10-09	0645	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	220614 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-10-09	0640	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	N	1499 Alpha cpm	1,200 – 1,800	MCS
11-10-09	0643	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	N	10179 Beta cpm	8,476 – 12,714	MCS
NA		Ludlum 2360 #187763	Ludlum 43-93 #PR244535	10/19/10		Alpha Cpm	1,758 – 2,636	
NA		Ludlum 2360 #187763	Ludlum 43-93 #PR244535	10/19/10		Beta cpm	2,710 – 4,066	
NA		Ludlum 2360 #117331	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	5,544 – 8,316	
NA		Ludlum 2360 #117331	Ludlum 43-93 #PR244486	10/19/10		cpm Beta	4,781 – 7,171	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-10-09	0650	M-12 #180431	44-9 #193567	10/19/10	Y	6668 cpm Beta	5798-7086	MCS
11-10-09	0712	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y	732 cpm Alpha	668 – 816	MCS
11-10-09	0706	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y	7603 cpm Beta	7035-8599	MCS
NA		Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/10		cpm Alpha	598 – 732	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	10/30/10		cpm Beta	6528-7978	

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11-11-09	0845	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	2218326 cpm	171,822 – 257,734	MCS
11-11-09	0847	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	220981 cpm	158,990 – 237,764	MCS
11-11-09	0850	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	219312 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-11-09	0836	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1547 cpm Alpha	1,200 – 1,800	MCS
11-11-09	0838	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	11017 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #187763	Ludlum 43-93 #PR244535	10/19/10		cpm Alpha	1,758 – 2,636	
NA		Ludlum 2360 #187763	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	2,710 – 4,066	
NA		Ludlum 2360 #117331	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	5,544 – 8,316	
NA		Ludlum 2360 #117331	Ludlum 43-93 #PR244486	10/19/10		Cpm Beta	4,781 – 7,171	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-11-09	0900	M-12 #180431	44-9 #193567	10/19/10	Y	6341 cpm Beta	5798-7086	MS
11-11-09	0903	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y	721 cpm Alpha	668 – 816	MS
11-11-09	0907	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y	7956 cpm Beta	7035-8599	MS
NA		Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/10		cpm Alpha	598 – 732	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	10/30/10		cpm Beta	6528-7978	

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11-12-09	0705	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	209452 cpm	171,822 – 257,734	MCS
11-12-09	0709	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	212684 cpm	158,990 – 237,764	MCS
11-12-09	0703	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	216365 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-12-09	0714	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1593 cpm Alpha	1,200 – 1,800	MCS
11-12-09	0716	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	10861 cpm Beta	8,476 – 12,714	MCS
MA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Alpha	1,758 – 2,636	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	2,710 – 4,066	
11-12-09	0726	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	851 cpm Alpha	774-946	MCS
11-12-09	0728	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	8925 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-12-09	0700	M-12 #180431	44-9 #193567	10/19/10	Y	6483 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
11-12-09	072	Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/10	Y	693 cpm Alpha	598 – 732	MCS
11-12-09	0724	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	10/30/10	Y	7605 cpm Beta	6528-7978	MCS

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11-13-09	0714	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	222271 cpm	171,822 – 257,734	MCS
11-13-09	0709	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	212387 cpm	158,990 – 237,764	MCS
11-13-09	0703	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	226681 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-13-09	0714	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1549 cpm Alpha	1,200 – 1,800	MCS
11-13-09	0716	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	11132 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Alpha	1,758 – 2,636	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	2,710 – 4,066	
11-13-09	0726	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	868 cpm Alpha	774-946	MCS
11-13-09	0728	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	9126 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-13-09	0716	M-12 #180431	44-9 #193567	10/19/10	Y	6615 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
NA		Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/10		cpm Alpha	598 – 732	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	10/30/10		cpm Beta	6528-7978	

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11-14-09	0800	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	197419 cpm	171,822 – 257,734	MCS
NA		Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10		cpm	158,990 – 237,764	
NA		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10		cpm	163,272 – 244,908	
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
NA		Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10		cpm Alpha	1,200 – 1,800	
NA		Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10		cpm Beta	8,476 – 12,714	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Alpha	1,758 – 2,636	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	2,710 – 4,066	
11-14-09	0805	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	862 cpm Alpha	774-946	MCS
11-14-09	0810	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	9059 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
NA		M-12 #180431	44-9 #193567	10/19/10		cpm Beta	5798-7086	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
NA		Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/10		cpm Alpha	598 – 732	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	10/30/10		cpm Beta	6528-7978	

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11-16-09	0710	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	212271 cpm	171,822 – 257,734	MCS
11-16-09	0705	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	228273 cpm	158,990 – 237,764	MCS
11-16-09	0700	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	218226 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-16-09	0700	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1541 cpm Alpha	1,200 – 1,800	MCS
11-16-09	0715	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	11056 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Alpha	1,758 – 2,636	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	2,710 – 4,066	
11-16-09	0725	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	868 cpm Alpha	774-946	MCS
11-16-09	0730	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	9126 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-16-09	0735	M-12 #180431	44-9 #193567	10/19/10	Y	6483 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
NA		Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/10		cpm Alpha	598 – 732	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	10/30/10		cpm Beta	6528-7978	

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OOS	OOS	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	OOS	cpm	171,822 – 257,734	OOS
11-17-09	0700	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	208118 cpm	158,990 – 237,764	MCS
11-17-09	0705	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	211764 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-17-09	0715	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1493 cpm Alpha	1,200 – 1,800	MCS
11-17-09	0728	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	10834 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Alpha	1,758 – 2,636	
NA		Ludlum 2221 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	2,710 – 4,066	
11-17-09	0710	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	821 cpm Alpha	774-946	MCS
11-17-09	0720	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	9165 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-17-09	0731	M-12 #180431	44-9 #193567	10/19/10	Y	6581 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
NA		Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/10		cpm Alpha	598 – 732	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	10/30/10		cpm Beta	6528-7978	

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OOS	OOS	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	OOS	cpm	171,822 – 257,734	OOS
11-18-09	0645	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	216490 cpm	158,990 – 237,764	MCS
11-18-09	0650	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	223979 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-18-09	0705	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1572 cpm Alpha	1,200 – 1,800	MCS
11-18-09	0720	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	10942 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Alpha	761-931	
NA		Ludlum 2221 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	8473 - 10355	
11-18-09	0655	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	854 cpm Alpha	774-946	MCS
11-18-09	0650	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	9101 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-18-09	0725	Ludlum M-12 #180431	44-9 #193567	10/19/10	Y	6757 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
NA		Ludlum 2360 #184900	Ludlum 43-89 #PR194992	10/30/10		cpm Alpha	598 – 732	
11-18-09	0730	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	6389 cpm Beta	6112-7470	MCS

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OOS	OOS	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	OOS	cpm	171,822 – 257,734	MCS
11-19-09	0710	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	213394 cpm	158,990 – 237,764	MCS
11-19-09	0713	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	222995 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-19-09	0705	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1507 cpm Alpha	1,200 – 1,800	MCS
11-19-09	0716	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	10285 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Alpha	761-931	
NA		Ludlum 2221 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	8473 - 10355	
11-19-09	0725	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	859 cpm Alpha	774-946	MCS
11-19-09	0737	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	8888 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-19-09	0740	Ludlum M-12 #180431	44-9 #193567	10/19/10	Y	6605 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
11-19-09	0743	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	6508 cpm Beta	6112-7470	MCS

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11-20-09	0900	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	OOS	cpm	171,822 – 257,734	MCS
11-20-09	0715	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	216609 cpm	158,990 – 237,764	MCS
11-20-09	0718	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	233874 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-20-09	0845	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1555 cpm Alpha	1,200 – 1,800	MCS
11-20-09	0856	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	10983 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Alpha	761-931	
NA		Ludlum 2221 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	8473 - 10355	
11-20-09	0720	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	863 cpm Alpha	774-946	MCS
11-20-09	0724	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	8747 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-20-09	0727	Ludlum M-12 #180431	44-9 #193567	10/19/10	Y	6274 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
11-20-09	0731	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	6417 cpm Beta	6112-7470	MCS

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11-23-09	0725	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	214075 cpm	171,822 – 257,734	MCS
NA		Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10		cpm	158,990 – 237,764	
NA		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10		cpm	163,272 – 244,908	
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
11-23-09	0730	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1526 cpm Alpha	1,200 – 1,800	MCS
11-23-09	0745	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	10980 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm	761-931	
NA		Ludlum 2221 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	8473 - 10355	
11-23-09	0715	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	894 cpm Alpha	774-946	MCS
11-23-09	0720	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	8854 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No)	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
11-23-09		Ludlum M-12 #180431	44-9 #193567	10/19/10	Y	6382 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
11-23-09		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta	6112-7470	MCS

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12-01-09	0720	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y 4562 cpm	214075 cpm	171,822 – 257,734	MCS
12-01-09	0723	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y 4937 cpm	212712 cpm	158,990 – 237,764	MCS
12-01-09	0725	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y 4754 cpm	227699 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
12-01-09	0730	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA .1 cpm	1547 cpm Alpha	1,200 – 1,800	MCS
12-01-09	0745	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 45.5 cpm	11152 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm	761-931	
OOS		Ludlum 2221 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	8473 - 10355	
12-01-09	0719	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 2 cpm	879 cpm Alpha	774-946	MCS
12-01-09	0720	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 223 cpm	9067 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
12-01-09	0710	Ludlum M-12 #180431	44-9 #193567	10/19/10	Y 28 cpm	6247 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
12-01-09	0715	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y 29 cpm	6788 cpm Beta	6112-7470	MCS

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12-02-09	0655	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y 4782 cpm	221242 cpm	171,822 – 257,734	MCS
12-02-09	0658	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y 5011 cpm	220490 cpm	158,990 – 237,764	MCS
12-02-09	0700	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y 5245 cpm	227297 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
12-02-09	0735	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA ..1 cpm	1598 cpm Alpha	1,200 – 1,800	MCS
12-02-09	0725	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 43.6 cpm	10937 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm	761-931	
NA		Ludlum 2221 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	8473 - 10355	
12-02-09	0705	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 1 cpm	861 cpm Alpha	774-946	MCS
12-02-09	0710	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 189 cpm	9016 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
12-02-09	0715	Ludlum M-12 #180431	44-9 #193567	10/19/10	Y 40 cpm	6749 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
12-02-09	0720	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y 36 cpm	6596 cpm Beta	6112-7470	MCS

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12-03-09	0720	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y 4923 cpm	218843 cpm	171,822 – 257,734	MCS
12-03-09	0725	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y 5272 cpm	214475 cpm	158,990 – 237,764	MCS
12-03-09	0730	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y 5219 cpm	230571 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
12-03-09	0745	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA ..1 cpm	1610 cpm Alpha	1,200 – 1,800	MCS
12-03-09	0750	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 46.3 cpm	11090 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm	761-931	
NA		Ludlum 2221 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm Beta	8473 - 10355	
12-03-09	0805	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 0 cpm	870 cpm Alpha	774-946	MCS
12-03-09	0810	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 178 cpm	9101 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
12-03-09	0755	Ludlum M-12 #180431	44-9 #193567	10/19/10	Y 48 cpm	6654 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10		cpm Beta	7035-8599	
12-03-09	0800	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y 37 cpm	6404 cpm Beta	6112-7470	MCS

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12-04-09	0720	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y 4898 cpm	222215 cpm	171,822 – 257,734	N
12-04-09	0723	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y 5064 cpm	215281 cpm	158,990 – 237,764	N
12-04-09	0735	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y 4996 cpm	218795 cpm	163,272 – 244,908	N
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
12-04-09	0745	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA .1 cpm	1581 cpm Alpha	1,200 – 1,800	N
12-04-09	0750	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 46.2 cpm	11075 cpm Beta	8,476 – 12,714	N
12-04-09	0715	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y 0 cpm	182 cpm Alpha	761-931	
12-04-09	0718	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y 182 cpm	9217 cpm Beta	8473 - 10355	
12-04-09	0805	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 0 cpm	852 cpm Alpha	774-946	N
12-04-09	0810	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 223 cpm	8684 cpm Beta	8008 – 9789	N

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
12-04-09	0755	Ludlum M-12 #180431	44-9 #193567	10/19/10	Y 36 cpm	6544 cpm Beta	5798-7086	MCS
12-04-09	0727	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y 0 cpm	701 cpm Alpha	668 – 816	
12-04-09	0729	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y 232 cpm	7809 cpm Beta	7035-8599	
12-04-09	0800	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y 43 cpm	6175 cpm Beta	6112-7470	MCS

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NA		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y cpm	cpm	171,822 – 257,734	
NA		Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y cpm	cpm	158,990 – 237,764	
12-05-09	0745	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y 5143 cpm	228154 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
12-05-09		Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA .2 cpm	1587 cpm Alpha	1,200 – 1,800	
12-05-09		Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 45.1cpm	10849 cpm Beta	8,476 – 12,714	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y cpm	cpm Alpha	761-931	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y cpm	cpm Beta	8473 - 10355	
12-05-09		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 0 cpm	896 cpm Alpha	774-946	MCS
12-05-09		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 182 cpm	8929 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
12-05-09	0750	Ludlum M-12 #180431	44-9 #193567	10/19/10	Y 37 cpm	6855 cpm Beta	5798-7086	MCS
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y cpm	cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y cpm	cpm Beta	7035-8599	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y cpm	cpm Beta	6112-7470	

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12-07-09	0700	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y 4893 cpm	218521 cpm	171,822 – 257,734	MCS
12-07-09	0703	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y 5267 cpm	217887 cpm	158,990 – 237,764	MCS
12-07-09	0705	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y 4817 cpm	215556 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
12-07-09	0720	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA .1 cpm	1536 cpm Alpha	1,200 – 1,800	MCS
12-07-09	0730	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 40.8 cpm	10898 cpm Beta	8,476 – 12,714	MCS
12-07-09	0708	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y 0 cpm	879 cpm Alpha	761-931	MCS
12-07-09	0710	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y 181 cpm	9262 cpm Beta	8473 - 10355	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y cpm	cpm Alpha	774-946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y cpm	cpm Beta	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #180431	44-9 #193567	10/19/10	Y cpm	cpm Beta	5798-7086	
12-07-09	0715	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y 0 cpm	689 cpm Alpha	668 – 816	MCS
12-07-09	0718	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y 220 cpm	7998 cpm Beta	7035-8599	MCS
12-07-09	0713	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y 45 cpm	6551 cpm Beta	6112-7470	MCS

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for the Tonawanda FUSRAP Landfill Site Operable Unit Remedial Investigation

Tonawanda, New York

Contract Number: W912P4-07-D-0009, D.O. 0003

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
12-08-09	0715	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y 4556 cpm	217220 cpm	171,822 – 257,734	MCS
12-08-09	0717	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y 4753cpm	219429 cpm	158,990 – 237,764	MCS
12-08-09	0720	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y 4474 cpm	213502 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
12-08-09	0737	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 0 cpm	1650 cpm Alpha	1,200 – 1,800	MCS
12-08-09	0748	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 45.5 cpm	10999 cpm Beta	8,476 – 12,714	MCS
12-08-09	0750	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y 0 cpm	786 cpm Alpha	761-931	MCS
12-08-09	0752	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y 179 cpm	8778 cpm Beta	8473 - 10355	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y cpm	cpm Alpha	774-946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y cpm	cpm Beta	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range
12-08-09	0727	Ludlum M-12 #180431	44-9 #193567	10/19/10	Y 42 cpm	6323 cpm Beta	5798-7086
12-08-09	0755	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y 1 cpm	cpm Alpha	668 – 816
12-08-09	0758	Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y 195 cpm	cpm Beta	7035-8599
12-08-09	0725	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y 35 cpm	6470 cpm Beta	6112-7470

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Tonawanda, New York

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Te
12-10-09	0835	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y 4425 cpm	240267 cpm	171,822 – 257,734	
NA		Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y cpm	cpm	158,990 – 237,764	
12-09-09	0837	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y 4624 cpm	226179 cpm	163,272 – 244,908	
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
12-10-09	0825	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA .1 cpm	1562 cpm Alpha	1,200 – 1,800	
12-10-09	0815	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 43.9 cpm	11169 cpm Beta	8,476 – 12,714	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y cpm	cpm Alpha	761 - 931	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y cpm	cpm Beta	8473 - 10355	
12-10-09	0827	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 1 cpm	889 cpm Alpha	774 - 946	
NA	0829	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y 192 cpm	8740 cpm Beta	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technicia Initials
NA		Ludlum M-12 #180431	Ludlum 44-9 #193567	10/19/10	Y cpm	cpm Beta	5798-7086	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y cpm	cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y cpm	cpm Beta	7035-8599	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y cpm	cpm Beta	6112-7470	
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10	Y uRem	uRem Gamma	108-160 uRem	

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
12-11-09	0710	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y 4439 cpm	218576 cpm	171,822 – 257,734	MCS
12-11-09	0715	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y 4730 cpm	211549 cpm	158,990 – 237,764	MCS
12-11-09	0712	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y 4582 cpm	228885 cpm	163,272 – 244,908	MCS
NA		Ludlum 2221 #187763	Ludlum 44-9 #PR022006	10/19/10		cpm	51,456 – 77,184	
NA		Ludlum 2221 #1117331	Ludlum 44-9 #PR091806	10/19/10		cpm	490,953 – 736,429	
12-11-09	0725	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA .2 cpm	1541 cpm Alpha	1,200 – 1,800	MCS
12-11-09	0735	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA 46.5 cpm	10855 cpm Beta	8,476 – 12,714	MCS
12-11-09	0737	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y 0 cpm	865 cpm Alpha	761 - 931	MCS
12-11-09	0740	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y 187 cpm	9405 cpm Beta	8473 - 10355	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y cpm	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y cpm	cpm Beta	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? (Yes/No) & Bkg	Response Check Reading (Indicate µR/hr or cpm)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #180431	44-9 #193567	10/19/10	Y cpm	cpm Beta	5798-7086	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y cpm	cpm Alpha	668 – 816	
NA		Ludlum 2360 #251038	Ludlum 43-89 #PR276636	11/02/10	Y cpm	cpm Beta	7035-8599	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y cpm	cpm Beta	6112-7470	
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10	Y uRem	uRem Gamma	108-160 uRem	

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technici Initials
12-13-09	0705	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4366 cpm	217819 cpm	171,822 – 257,734	MCS
12-13-09	0703	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4479 cpm	210085 cpm	158,990 – 237,764	MCS
12-13-09	0701	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4412 cpm	225819 cpm	163,272 – 244,908	MCS
12-13-09	0713	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm	1529 cpm Alpha	1,200 – 1,800	MCS
12-13-09	0723	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.9 cpm	10976 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm	cpm Alpha	761 - 931	
NA		Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10		cpm	cpm Beta	8473 - 10355	
12-13-09	0707	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	cpm	815 cpm Alpha	774 - 946	MCS
12-13-09	0710	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	cpm	8693 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Beta		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR???????	TBD		cpm	cpm Beta		
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm	cpm Beta	6112-7470	
12-13-09	0725	Ludlum M-12 #180431	Ludlum 44-9 #193567	10/19/10	Y	1 cpm	6563 cpm Beta	5798-7086	MCS
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	uRem	uRem Gamma	108 - 160	

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Techn Init
12-14-09	0712	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4412 cpm	205776 cpm	171,822 – 257,734	M
12-14-09	0714	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4688 cpm	218325 cpm	158,990 – 237,764	M
12-14-09	0717	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4870 cpm	216613 cpm	163,272 – 244,908	M
12-14-09	0742	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm	1591 cpm Alpha	1,200 – 1,800	M
12-14-09	0752	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.5 cpm	11319 cpm Beta	8,476 – 12,714	M
12-14-09	0724	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y	0 cpm	844 cpm Alpha	761 - 931	M
12-14-09	0727	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y	167 cpm	9446 cpm Beta	8473 - 10355	M
12-14-09	0720	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm	898 cpm Alpha	774 - 946	M
12-14-09	0722	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	170 cpm	8858 cpm Beta	8008 – 9789	M

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Beta		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR???????	TBD		cpm	cpm Beta		
12-14-09	0729	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	32 cpm	6255 cpm Beta	6112-7470	MCS
12-14-09	0730	Ludlum M-12 #180431	Ludlum 44-9 #193567	10/19/10	Y	36 cpm	6543 cpm Beta	5798-7086	MCS
12-14-09	0732	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	140 uRem Gamma	108 - 160	MCS

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12-15-09	0655	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4532 cpm	234421 cpm	171,822 – 257,734	MCS
12-15-09	0658	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4420 cpm	213683 cpm	158,990 – 237,764	MCS
12-15-09	0700	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4264 cpm	212874 cpm	163,272 – 244,908	MCS
12-15-09	0735	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm	1547 cpm Alpha	1,200 – 1,800	MCS
12-15-09	0725	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	45.1 cpm	11255 cpm Beta	8,476 – 12,714	MCS
12-15-09	0702	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y	1 cpm	829 cpm Alpha	761 - 931	MCS
12-15-09	0704	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y	168 cpm	9248 cpm Beta	8473 - 10355	MCS
12-15-09	0706	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm	883 cpm Alpha	774 - 946	MCS
12-15-09	0708	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	155 cpm	8698 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Beta		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR???????	TBD		cpm	cpm Beta		
12-15-09	0710	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	34 cpm	6963 cpm Beta	6112-7470	MCS
12-15-09	0714	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	38cpm	6381 cpm Beta	5798-7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm	cpm Beta	6135-7499	
12-15-09	0717	Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10	Y	40 cpm	7000 cpm Beta	6498-7942	MCS
12-15-09	0719	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	140 uRem Gamma	108 - 160	MCS

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12-16-09	0703	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4199 cpm	214536 cpm	171,822 – 257,734	MCS
12-16-09	0705	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4017 cpm	213242 cpm	158,990 – 237,764	MCS
12-16-09	0707	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4340 cpm	221066 cpm	163,272 – 244,908	MCS
12-16-09	0720	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm	1526 cpm Alpha	1,200 – 1,800	MCS
12-16-09	0731	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.9 cpm	11028 cpm Beta	8,476 – 12,714	MCS
12-16-09	0708	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y	0 cpm	833 cpm Alpha	761 - 931	MCS
12-16-09	0710	Ludlum 2360 #170556	Ludlum 43-93 #PR244535	10/19/10	Y	164 cpm	8699 cpm Beta	8473 - 10355	MCS
12-16-09	0712	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm	842 cpm Alpha	774 - 946	MCS
12-16-09	0715	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	171 cpm	8847 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Beta		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR???????	TBD		cpm	cpm Beta		
12-16-09	0738	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	31 cpm	6652 cpm Beta	6112-7470	MCS
12-16-09	0741	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	35 cpm	6017 cpm Beta	5798-7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm	cpm Beta	6135-7499	
12-16-09	0742	Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10	Y	20 cpm	6500 cpm Beta	6498-7942	MCS
12-16-09	0745	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	145 uRem Gamma	108 - 160	MCS

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
12-17-09	0704	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4313 cpm	230286 cpm	171,822 – 257,734	MCS
12-17-09	0707	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4067 cpm	210652 cpm	158,990 – 237,764	MCS
12-17-09	0710	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4040 cpm	211388 cpm	163,272 – 244,908	MCS
12-17-09	0730	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm	1539 cpm Alpha	1,200 – 1,800	MCS
12-17-09	0735	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.9 cpm	11054 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #??????	Ludlum 43-93 #PR??????			cpm	cpm Alpha	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-93 #PR??????			cpm	cpm Beta	TBD	
12-17-09	0714	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm	832 cpm Alpha	774 - 946	MCS
12-17-09	0717	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	180 cpm	8822 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Beta		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR???????	TBD		cpm	cpm Beta		
12-17-09	0720	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	32 cpm	6462 cpm Beta	6112-7470	MCS
12-17-09	0722	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	30cpm	6457 cpm Beta	5798-7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm	cpm Beta	6135-7499	
12-17-09	0725	Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10	Y	20 cpm	6500 cpm Beta	6498-7942	MCS
12-17-09	0727	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10		4367 cpm	cpm	171,822 – 257,734	
12-18-09	0709	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4557 cpm	205799 cpm	158,990 – 237,764	MCS
12-18-09	0712	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4367 cpm	227931 cpm	163,272 – 244,908	MCS
12-18-09	0730	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm	1545 cpm Alpha	1,200 – 1,800	MCS
12-18-09	0740	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.4 cpm	10945 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #??????	Ludlum 43-93 #PR??????			cpm	cpm Alpha	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-93 #PR??????			cpm	cpm Beta	TBD	
12-18-09	0715	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm	850 cpm Alpha	774 - 946	MCS
12-18-09	0716	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	181 cpm	9046 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Beta		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????	TBD		cpm	cpm Alpha		
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR???????	TBD		cpm	cpm Beta		
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm	cpm Beta	6112-7470	
12-18-09	0720	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	27 cpm	6325 cpm Beta	5798-7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm	cpm Beta	6135-7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm	cpm Beta	6498-7942	
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10		uRem	uRem Gamma	108 - 160	

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NA		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10		cpm	cpm	171,822 – 257,734	
1-5-10	0800	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4053 cpm	227386 cpm	158,990 – 237,764	MCS
1-5-10	0804	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3890 cpm	239733 cpm	163,272 – 244,908	MCS
1-5-10	0820	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.2 cpm	1527 cpm Alpha	1,200 – 1,800	MCS
1-5-10	0831	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	36.4 cpm	10998 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #??????	Ludlum 43-93 #PR??????			cpm	cpm Alpha	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-93 #PR??????			cpm	cpm Beta	TBD	
1-5-10	0806	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm	843 cpm Alpha	774 - 946	MCS
1-5-10	0809	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	172 cpm	8771 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????			cpm	cpm Alpha	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????			cpm	cpm Beta	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????			cpm	cpm Alpha	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR???????			cpm	cpm Beta	TBD	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm	cpm Beta	6112-7470	
1-5-10	0812	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	35 cpm	6346 cpm Beta	5798-7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm	cpm Beta	6135-7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm	cpm Beta	6498-7942	
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10		uRem	uRem Gamma	108 - 160	

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1-6-10	0710	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3789 cpm	220369 cpm	171,822 – 257,734	MCS
1-6-10	0712	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3902 cpm	2212570 cpm	158,990 – 237,764	MCS
1-6-10	0713	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3884 cpm	218213 cpm	163,272 – 244,908	MCS
1-6-10	0725	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.0 cpm	1520 cpm Alpha	1,200 – 1,800	MCS
1-6-10	0735	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.7 cpm	10972 cpm Beta	8,476 – 12,714	MCS
NA		Ludlum 2360 #??????	Ludlum 43-93 #PR??????			cpm	cpm Alpha	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-93 #PR??????			cpm	cpm Beta	TBD	
1-6-10	0716	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm	899 cpm Alpha	774 - 946	MCS
1-6-10	0718	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	190 cpm	8821 cpm Beta	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????			cpm	cpm Alpha	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????			cpm	cpm Beta	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR??????			cpm	cpm Alpha	TBD	
NA		Ludlum 2360 #??????	Ludlum 43-89 #PR???????			cpm	cpm Beta	TBD	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm	cpm Beta	6112-7470	
1-6-10	0719	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	27 cpm	6522 cpm Beta	5798-7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm	cpm Beta	6135-7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm	cpm Beta	6498-7942	
1-6-10		Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	6 uRem	140 uRem Gamma	108 - 160	MCS

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1-7-10	0713	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4065 cpm	215761 cpm	171,822 – 257,734	MCS
1-7-10	0715	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3897 cpm	214234 cpm	158,990 – 237,764	MCS
1-7-10	0716	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4172 cpm	225246 cpm	163,272 – 244,908	MCS
1-7-10	0735	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1546 cpm Alpha	1,200 - 1800	MCS
1-7-10	0746	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	40.5 cpm Beta/Gamma	10898 cpm Beta/Gamma	8,476 – 12,714	MCS
1-7-10	0718	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	cpm Alpha	719 - 879	MCS
1-7-10	0720	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	cpm Beta/Gamma	cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-7-10	0723	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	27 cpm Beta/Gamma	6577 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-7-10	0725	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	140 uRem Gamma	108 - 160	MCS

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1-7-10	0713	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4065 cpm	215761 cpm	171,822 – 257,734	MCS
1-7-10	0715	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3897 cpm	214234 cpm	158,990 – 237,764	MCS
1-7-10	0716	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4172 cpm	225246 cpm	163,272 – 244,908	MCS
1-7-10	0735	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1546 cpm Alpha	1,200 - 1800	MCS
1-7-10	0746	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	40.5 cpm Beta/Gamma	10898 cpm Beta/Gamma	8,476 – 12,714	MCS
1-7-10	0718	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	801 cpm Alpha	719 - 879	MCS
1-7-10	0720	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	163 cpm Beta/Gamma	8499 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-7-10	0723	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	27 cpm Beta/Gamma	6577 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-7-10	0725	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	140 uRem Gamma	108 - 160	MCS

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1-8-10	0713	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3899 cpm	216882 cpm	171,822 – 257,734	MCS
1-8-10	0715	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4017 cpm	212660 cpm	158,990 – 237,764	MCS
1-8-10	0716	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3972 cpm	226590 cpm	163,272 – 244,908	MCS
1-8-10	0733	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1505 cpm Alpha	1,200 - 1800	MCS
1-8-10	0745	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.5 cpm Beta/Gamma	11104 cpm Beta/Gamma	8,476 – 12,714	MCS
1-8-10	0719	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	816 cpm Alpha	719 - 879	MCS
1-8-10	0721	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	160 cpm Beta/Gamma	8645 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-8-10	0723	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	29 cpm Beta/Gamma	6540 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-8-10	0719	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	140 uRem Gamma	108 - 160	MCS

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
1-11-10	0718	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3682 cpm	219803 cpm	171,822 – 257,734	MCS
1-11-10	0719	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3831 cpm	212660 cpm	158,990 – 237,764	MCS
1-11-10	0721	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3990 cpm	214007 cpm	163,272 – 244,908	MCS
1-11-10	0736	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1608 cpm Alpha	1,200 - 1800	MCS
1-11-10	0746	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	40.0 cpm Beta/Gamma	10919 cpm Beta/Gamma	8,476 – 12,714	MCS
1-11-10	0723	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	1 cpm Alpha	801 cpm Alpha	719 - 879	MCS
1-11-10	0724	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	156 cpm Beta/Gamma	8960 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-11-10	0726	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	37 cpm Beta/Gamma	6767 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10		uRem	Rem Gamma	108 - 160	

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1-12-10	0719	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3943 cpm	218,284 cpm	193,329 – 236,291	MCS
1-12-10	0721	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3931 cpm	207,473 cpm	187,077 – 228,650	MCS
1-12-10	0722	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3896 cpm	228,652 cpm	196,880 – 240,631	MCS
1-12-10	0737	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1556 cpm Alpha	1,200 - 1800	MCS
1-12-10	0747	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.5 cpm Beta/Gamma	10731 cpm Beta/Gamma	8,476 – 12,714	MCS
1-12-10	0724	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	794 cpm Alpha	719 - 879	MCS
1-12-10	0725	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	169 cpm Beta/Gamma	8779 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technic Initial
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-12-10	0727	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	22 cpm Beta/Gamma	6603 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10		uRem	uRem Gamma	108 - 160	

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1-13-10	0726	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3728 cpm	212,779 cpm	193,329 – 236,291	MCS
1-13-10	0728	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3659 cpm	209,040 cpm	187,077 – 228,650	MCS
1-13-10	0729	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3885 cpm	229,342 cpm	196,880 – 240,631	MCS
1-13-10	0755	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	1 cpm Alpha	1517 cpm Alpha	1,200 - 1800	MCS
1-13-10	0745	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.3 cpm Beta/Gamma	11025 cpm Beta/Gamma	8,476 – 12,714	MCS
1-13-10	0731	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	1 cpm Alpha	845 cpm Alpha	719 - 879	MCS
1-13-10	0732	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	175 cpm Beta/Gamma	8640 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-13-10	0733	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	39 cpm Beta/Gamma	6553 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-13-10	0735	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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1-14-10	0656	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4004 cpm	217,515 cpm	193,329 – 236,291	MCS
1-14-10	0657	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3799 cpm	212,851 cpm	187,077 – 228,650	MCS
1-14-10	0659	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3817 cpm	227,924 cpm	196,880 – 240,631	MCS
1-14-10	0715	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1583 cpm Alpha	1,200 - 1800	MCS
1-14-10	0725	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	38.4 cpm Beta/Gamma	10948 cpm Beta/Gamma	8,476 – 12,714	MCS
1-14-10	0701	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	801 cpm Alpha	719 - 879	MCS
1-14-10	0703	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	154 cpm Beta/Gamma	8850 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technici Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-14-10	0705	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	42 cpm Beta/Gamma	6650 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-14-10	0705	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	140 uRem Gamma	108 - 160	MCS

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Tech Ini
1-15-10	0654	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3842 cpm	218,914 cpm	193,329 – 236,291	M
1-15-10	0656	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3923 cpm	204,974 cpm	187,077 – 228,650	M
1-15-10	0657	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4252 cpm	225,970 cpm	196,880 – 240,631	M
1-15-10	0712	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1549 cpm Alpha	1,200 - 1800	M
1-15-10	0723	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.7 cpm Beta/Gamma	10836 cpm Beta/Gamma	8,476 – 12,714	M
1-15-10	0659	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	1 cpm Alpha	857 cpm Alpha	719 - 879	M
1-15-10	0700	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	161 cpm Beta/Gamma	8919 cpm Beta/Gamma	7632 - 9328	M
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-15-10	0702	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	31 cpm Beta/Gamma	6537 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10		uRem	uRem Gamma	108 - 160	

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NA		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10		cpm	cpm	193,329 – 236,291	
NA		Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10		cpm	cpm	187,077 – 228,650	
NA		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10		cpm	cpm	196,880 – 240,631	
1-16-10	0750	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	cpm Alpha	1,200 - 1800	MCS
1-16-10	0800	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.7 cpm Beta/Gamma	cpm Beta/Gamma	8,476 – 12,714	MCS
1-16-10	0735	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	821 cpm Alpha	719 - 879	MCS
1-16-10	0738	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	164 cpm Beta/Gamma	8730 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Tech Ini
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-16-10	0740	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	32 cpm Beta/Gamma	6538 cpm Beta/Gamma	5798 - 7086	M
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10		uRem	uRem Gamma	108 - 160	

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1-18-10	0658	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4063 cpm	219,717 cpm	193,329 – 236,291	MCS
1-18-10	0700	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4072 cpm	213,169 cpm	187,077 – 228,650	MCS
1-18-10	0701	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4159 cpm	228,666 cpm	196,880 – 240,631	MCS
1-18-10	0710	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1578 cpm Alpha	1,200 - 1800	MCS
1-18-10	0721	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.0 cpm Beta/Gamma	10872 cpm Beta/Gamma	8,476 – 12,714	MCS
1-18-10	0704	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	1 cpm Alpha	802 cpm Alpha	719 - 879	MCS
1-18-10	0706	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	178 cpm Beta/Gamma	8733 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technici Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-18-10	0707	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	32 cpm Beta/Gamma	6577 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-18-10	0708	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	130 uRem Gamma	108 - 160	MCS

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
1-19-10	0657	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3980 cpm	216,201 cpm	193,329 – 236,291	MCS
1-19-10	0659	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4029 cpm	204,827 cpm	187,077 – 228,650	MCS
1-19-10	0701	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4117 cpm	227,788 cpm	196,880 – 240,631	MCS
1-19-10	0715	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1563 cpm Alpha	1,200 - 1800	MCS
1-19-10	0725	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.4 cpm Beta/Gamma	11068 cpm Beta/Gamma	8,476 – 12,714	MCS
1-19-10	0703	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	835 cpm Alpha	719 - 879	MCS
1-19-10	0704	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	177 cpm Beta/Gamma	8872 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technici Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-19-10	0705	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	41 cpm Beta/Gamma	6626 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-19-10	0710	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 - 160	MCS
1-19-10	0700	Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 50' cord	1/15/11	Y	4004 cpm	149453 cpm	132317 - 161721	MCS

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1-20-10	0653	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3917 cpm	215,662 cpm	193,329 – 236,291	MCS
1-20-10	0655	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3981 cpm	208,057 cpm	187,077 – 228,650	MCS
1-20-10	0656	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4009 cpm	229,665 cpm	196,880 – 240,631	MCS
1-20-10	0711	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1563 cpm Alpha	1,200 - 1800	MCS
1-20-10	0722	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.4 cpm Beta/Gamma	11068 cpm Beta/Gamma	8,476 – 12,714	MCS
1-20-10	0659	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	798 cpm Alpha	719 - 879	MCS
1-20-10	0701	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	183 cpm Beta/Gamma	9071 cpm Beta/Gamma	7632 - 9328	MCS
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236o #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-20-10	0703	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	37 cpm Beta/Gamma	6349 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
NA		Ludlum M-19 #169641	Scintillator NA	10/24/10		uRem	uRem Gamma	108 - 160	
1-20-10	0700	Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 50' cord	1/15/11	Y	3992 cpm	150,814 cpm	132317 - 161721	MCS

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1-21-10	0701	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3851 cpm	214,214 cpm	193,329 – 236,291	MWK
1-21-10	0702	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3951 cpm	209,581 cpm	187,077 – 228,650	MWK
1-21-10	0705	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4158 cpm	226,335 cpm	196,880 – 240,631	MWK
1-21-10	0707	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0.1 cpm Alpha	1478 cpm Alpha	1,200 - 1800	MWK
1-21-10	0709	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.8 cpm Beta/Gamma	11,061 cpm Beta/Gamma	8,476 – 12,714	MWK
1-21-10	0712	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	726 cpm Alpha	719 - 879	MWK
1-21-10	0714	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	156 cpm Beta/Gamma	8510 cpm Beta/Gamma	7632 - 9328	MWK
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 236D #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-21-10	0716	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	41 cpm Beta/Gamma	6,534 cpm Beta/Gamma	5798 - 7086	MWK
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-21-10	0717	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	3.5 uRem	120 uRem Gamma	108 – 160	MWK
1-21-10	0718	Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 50' cord	1/15/11	Y	3962 cpm	151,319 cpm	132317 - 161721	MWK

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1-22-10	0645	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3808 cpm	214,814 cpm	193,329 – 236,291	M
1-22-10	0647	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3964 cpm	211,244 cpm	187,077 – 228,650	M
1-22-10	0648	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4273 cpm	232,000 cpm	196,880 – 240,631	M
1-22-10	0703	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.2 cpm Alpha	1581 cpm Alpha	1,200 - 1800	M
1-22-10	0713	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	39.9 cpm Beta/Gamma	11,212 cpm Beta/Gamma	8,476 – 12,714	M
1-22-10	0650	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	820 cpm Alpha	719 - 879	M
1-22-10	0652	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	171 cpm Beta/Gamma	8440 cpm Beta/Gamma	7632 - 9328	M
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-22-10	0654	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	41 cpm Beta/Gamma	5954 cpm Beta/Gamma	5798 - 7086	MWK
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
122-10	0650	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	3.5 uRem	120 uRem Gamma	108 – 160	MWK
1-22-10	0652	Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 30' cord	1/15/11	Y	4092 cpm	150,810 cpm	132317 - 161721	MWK

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1-23-10	0718	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3803 cpm	216,030 cpm	193,329 – 236,291	MWK
1-23-10	0721	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3833 cpm	210,738 cpm	187,077 – 228,650	MWK
1-23-10	0724	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4161 cpm	219,044 cpm	196,880 – 240,631	MWK
1-23-10	0730	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0.1 cpm Alpha	1574 cpm Alpha	1,200 - 1800	MWK
1-23-10	0732	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	37.9 cpm Beta/Gamma	11,072 cpm Beta/Gamma	8,476 – 12,714	MWK
1-23-10	0735	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	751 cpm Alpha	719 - 879	MWK
1-23-10	0738	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	177 cpm Beta/Gamma	8,654 cpm Beta/Gamma	7632 – 9328	MWK
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-23-10	0740	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	38 cpm Beta/Gamma	5,923 cpm Beta/Gamma	5798 - 7086	MWK
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-23-10	0742	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	3.5 uRem	125 uRem Gamma	108 – 160	MWK
1-23-10	0745	Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 30' cord	1/15/11	Y	4989 cpm	149,419 cpm	132,317 – 161,721	MWK

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1-25-10	0634	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4627 cpm	220,876 cpm	193,329 – 236,291	MWK
1-25-10	0636	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4578 cpm	209,690 cpm	187,077 – 228,650	MWK
1-25-10	0639	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	5042 cpm	222,878 cpm	196,880 – 240,631	MWK
1-25-10	0650	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1580 cpm Alpha	1,200 - 1800	MWK
1-25-10	0654	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.2 cpm Beta/Gamma	11,177 cpm Beta/Gamma	8,476 – 12,714	MWK
1-25-10	0644	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	0 cpm Alpha	856 cpm Alpha	719 - 879	MWK
1-25-10	0646	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	205 cpm Beta/Gamma	8755 cpm Beta/Gamma	7632 – 9328	MWK
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470
1-25-10	0650	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	38 cpm Beta/Gamma	6254 cpm Beta/Gamma	5798 - 7086
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942
1-25-10	0652	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	3.5 uRem	120 uRem Gamma	108 – 160
1-25-10	0641	Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 30' cord	1/15/11	Y	5088 cpm	151,949 cpm	132,317 – 161,721

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technici Initials
1-26-10	0640	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4524 cpm	217,699 cpm	193,329 – 236,291	MWK
1-26-10	0642	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4487 cpm	209,739 cpm	187,077 – 228,650	MWK
1-26-10	0644	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4621 cpm	229,700 cpm	196,880 – 240,631	MWK
1-26-10	0657	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1599 cpm Alpha	1,200 - 1800	MWK
1-26-10	0700	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	46.0 cpm Beta/Gamma	10,975 cpm Beta/Gamma	8,476 – 12,714	MWK
1-26-10	0650	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	1 cpm Alpha	801 cpm Alpha	719 - 879	MWK
1-26-10	0653	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	169 cpm Beta/Gamma	8814 cpm Beta/Gamma	7632 – 9328	MWK
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Alpha	cpm Alpha	774 - 946	
NA		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	8008 – 9789	

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470	
1-26-10	0702	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	34 cpm Beta/Gamma	6153 cpm Beta/Gamma	5798 - 7086	MWK
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
1-26-10	0704	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	120 uRem Gamma	108 – 160	MWK
1-26-10	0646	Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 30' cord	1/15/11	Y	4486 cpm	150,265 cpm	132,317 – 161,721	MWK

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2-10-10	0730	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4008 cpm	219039 cpm	193,329 – 236,291	MCS
2-10-10	0731	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3998 cpm	210129 cpm	187,077 – 228,650	MCS
2-10-10	0733	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4105 cpm	223631 cpm	196,880 – 240,631	MCS
2-10-10	0757	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1496 cpm Alpha	1,200 - 1800	MCS
2-10-10	0805	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.0 cpm Beta/Gamma	10986 cpm Beta/Gamma	8,476 – 12,714	MCS
2-10-10	0735	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	2 cpm Alpha	812 cpm Alpha	719 - 879	MCS
2-10-10	0737	Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10	Y	176 cpm Beta/Gamma	8776 cpm Beta/Gamma	7632 – 9328	MCS
2-10-10	0738	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	845 cpm Alpha	774 - 946	MCS
2-10-10	0740	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	188 cpm Beta/Gamma	8894 cpm Beta/Gamma	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
2-10-10	0741	Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10	Y	0 cpm Alpha	642 cpm Alpha	610 - 746	MCS
2-10-10	0743	Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10	Y	209 cpm Beta/Gamma	7590 cpm Beta/Gamma	6666 - 8147	MCS
2-10-10	0744	Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10	Y	2 cpm Alpha	619 cpm Alpha	552 - 674	MCS
2-10-10	0745	Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10	Y	214 cpm Beta/Gamma	6134 cpm Beta/Gamma	5228 - 6390	MCS
2-10-10	0746	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	40 cpm Beta/Gamma	6609 cpm Beta/Gamma	6112 - 7470	MCS
2-10-10	0747	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	35 cpm Beta/Gamma	6639 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
2-10-10	0735	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 – 160	MCS
NA		Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 30' cord	1/15/11		cpm	cpm	132,317 – 161,721	

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2-11-10	0702	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3752 cpm	213052 cpm	193,329 – 236,291	MCS
2-11-10	0703	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3802 cpm	214516 cpm	187,077 – 228,650	MCS
2-11-10	0705	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4076 cpm	226185 cpm	196,880 – 240,631	MCS
2-11-10	0728	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1515 cpm Alpha	1,200 - 1800	MCS
2-11-10	0738	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	38.6 cpm Beta/Gamma	10887 cpm Beta/Gamma	8,476 – 12,714	MCS
NA		Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10		cpm Alpha	cpm Alpha	719 - 879	
NA		Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10		cpm Beta/Gamma	cpm Beta/Gamma	7632 – 9328	
2-11-10	0706	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	834 cpm Alpha	774 - 946	MCS
2-11-10	0708	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	176 cpm Beta/Gamma	8964 cpm Beta/Gamma	8008 – 9789	MCS

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2-11-10	0710	Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10	Y	0 cpm Alpha	638 cpm Alpha	610 - 746	MCS
2-11-10	0711	Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10	Y	208 cpm Beta/Gamma	7713 cpm Beta/Gamma	6666 - 8147	MCS
2-11-10	0713	Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10	Y	0 cpm Alpha	619 cpm Alpha	552 - 674	MCS
2-11-10	0714	Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10	Y	197 cpm Beta/Gamma	6067 cpm Beta/Gamma	5228 - 6390	MCS
2-11-10	0716	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	37 cpm Beta/Gamma	6428 cpm Beta/Gamma	6112 - 7470	MCS
2-11-10	0717	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	30 cpm Beta/Gamma	6444 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
2-11-10	0709	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	3 uRem	130 uRem Gamma	108 – 160	MCS
NA		Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 30' cord	1/15/11		cpm	cpm	132,317 – 161,721	

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2-12-10	0708	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4019 cpm	216,219 cpm	193,329 – 236,291	MCS
2-12-10	0710	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3739 cpm	213,038 cpm	187,077 – 228,650	MCS
2-12-10	0711	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3785 cpm	226,485 cpm	196,880 – 240,631	MCS
2-12-10	0728	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1619 cpm Alpha	1,200 - 1800	MCS
2-12-10	0740	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	36.0 cpm Beta/Gamma	10839 cpm Beta/Gamma	8,476 – 12,714	MCS
NA		Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10		cpm Alpha	cpm Alpha	719 - 879	
NA		Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10		cpm Beta/Gamma	cpm Beta/Gamma	7632 – 9328	
2-12-10	0713	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	851 cpm Alpha	774 - 946	MCS
2-12-10	0715	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	181 cpm Beta/Gamma	9005 cpm Beta/Gamma	8008 – 9789	MCS

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NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674	
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390	
2-12-10	0717	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	32 cpm Beta/Gamma	6526 cpm Beta/Gamma	6112 - 7470	MCS
2-12-10	0718	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	38 cpm Beta/Gamma	6381 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942	
2-12-10	0713	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 – 160	MCS
NA		Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 30' cord	1/15/11		cpm	cpm	132,317 – 161,721	

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NA		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10		cpm	cpm	193,329 – 236,291	
NA		Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10		cpm	cpm	187,077 – 228,650	
NA		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10		cpm	cpm	196,880 – 240,631	
2-13-10	0915	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1583 cpm Alpha	1,200 - 1800	MCS
2-13-10	0926	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.4 cpm Beta/Gamma	11185 cpm Beta/Gamma	8,476 – 12,714	MCS
NA		Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10		cpm Alpha	cpm Alpha	719 - 879	
NA		Ludlum 2360 #170552	Ludlum 43-93 #PR238114	10/20/10		cpm Beta/Gamma	cpm Beta/Gamma	7632 – 9328	
2-13-10	0902	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	865 cpm Alpha	774 - 946	MCS
2-13-10	0904	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	177 cpm Beta/Gamma	8976 cpm Beta/Gamma	8008 – 9789	MCS

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NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746
NA		Ludlum 2360 #252248	Ludlum 43-89 #PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Alpha	cpm Alpha	552 - 674
NA		Ludlum 2360 #164693	Ludlum 43-89 #PR171338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	5228 - 6390
NA		Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6112 - 7470
2-13-10	0905	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	35 cpm Beta/Gamma	6403 cpm Beta/Gamma	5798 - 7086
NA		Ludlum M-12 #138741	Ludlum 44-9 #PR153302	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	6135 - 7499
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6498 - 7942
2-13-10	0903	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 – 160
NA		Ludlum 2221 #172018	Ludlum 44-10 PR186960 with 30' cord	1/15/11		cpm	cpm	132,317 – 161,721

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2-15-10	0702	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3912 cpm	211,469 cpm	193,329 – 236,291	MCS
2-15-10	0704	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3899 cpm	207,664 cpm	187,077 – 228,650	MCS
2-15-10	0705	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4211 cpm	226,242 cpm	196,880 – 240,631	MCS
2-15-10	0723	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1584 cpm Alpha	1,200 - 1800	MCS
2-15-10	0734	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.1 cpm Beta/Gamma	11129 cpm Beta/Gamma	8,476 – 12,714	MCS
2-15-10	0706	Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10	Y	1 cpm Alpha	687 cpm Alpha	610 - 746	MCS
2-15-10	0708	Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10	Y	176 cpm Beta/Gamma	6868 cpm Beta/Gamma	6666 - 8147	MCS
2-15-10	0709	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	869 cpm Alpha	774 - 946	MCS
2-15-10	0710	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	185 cpm Beta/Gamma	8842 cpm Beta/Gamma	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technic Initial
2-15-10	0712	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	37 cpm Beta/Gamma	6371 cpm Beta/Gamma	6112 - 7470	MCS
2-15-10	0713	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	31 cpm Beta/Gamma	6560 cpm Beta/Gamma	5798 - 7086	MCS
NA		Ludlum M-12 #229306	Ludlum 44-9 #PR191214	10/28/10		cpm Beta/Gamma	cpm Beta/Gamma	6078 - 7429	
NA		Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10		cpm Beta/Gamma	cpm Beta/Gamma	5792 - 7079	
2-15-10	0745	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7000 cpm Beta/Gamma	6498 - 7942	MCS
2-15-10	0707	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	3 uRem	140 uRem Gamma	108 - 160	MCS

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2-16-10	0704	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4219 cpm	213457 cpm	193,329 – 236,291	MCS
2-16-10	0705	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	3885 cpm	206156 cpm	187,077 – 228,650	MCS
2-16-10	0706	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4131 cpm	223318 cpm	196,880 – 240,631	MCS
2-16-10	0727	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.2 cpm Alpha	1529 cpm Alpha	1,200 - 1800	MCS
2-16-10	0738	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.9 cpm Beta/Gamma	10998 cpm Beta/Gamma	8,476 – 12,714	MCS
2-16-10	0707	Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10	Y	1 cpm Alpha	722 cpm Alpha	610 - 746	MCS
2-16-10	0709	Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10	Y	173 cpm Beta/Gamma	7281 cpm Beta/Gamma	6666 - 8147	MCS
2-16-10	0710	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	829 cpm Alpha	774 - 946	MCS
2-16-10	0711	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	197 cpm Beta/Gamma	8762 cpm Beta/Gamma	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
2-16-10	0713	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	35 cpm Beta/Gamma	6387 cpm Beta/Gamma	6,112 – 7,470	MCS
2-16-10	0714	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	42 cpm Beta/Gamma	6539 cpm Beta/Gamma	6,112 – 7,470	MCS
NA		Ludlum M-12 #229306	Ludlum 44-9 #PR191214	10/28/10		cpm Beta/Gamma	cpm Beta/Gamma	6,093 – 7,447	
NA		Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10		cpm Beta/Gamma	cpm Beta/Gamma	5,454 - 6,667	
2-16-10	0717	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7500 cpm Beta/Gamma	6,498 – 7,942	MCS
2-16-10	0710	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 - 160	MCS

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptab Respons Check Range
2-17-10	0705	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4620 cpm	218,517 cpm	193,329 - 236,291
2-17-10	0706	Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10	Y	4482 cpm	209,422 cpm	187,077 - 228,650
2-17-10	0708	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4463 cpm	224,126 cpm	196,880 - 240,631
2-17-10	0729	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1514 cpm Alpha	1,200 - 18
2-17-10	0740	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	40.6 cpm Beta/Gamma	10878 cpm Beta/Gamma	8,476 – 12,714
2-17-10	0710	Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10	Y	0 cpm Alpha	699 cpm Alpha	610 - 74
2-17-10	0711	Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10	Y	200 cpm Beta/Gamma	7017 cpm Beta/Gamma	6666 - 81
2-17-10	0712	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	837 cpm Alpha	774 - 94
2-17-10	0714	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	202 cpm Beta/Gamma	8941 cpm Beta/Gamma	8008 – 97

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Tech Ini
2-17-10	0715	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	41 cpm Beta/Gamma	6285 cpm Beta/Gamma	6112 - 7470	M
2-17-10	0716	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	36 cpm Beta/Gamma	6774 cpm Beta/Gamma	5798 - 7086	M
NA		Ludlum M-12 #229306	Ludlum 44-9 #PR191214	10/28/10		cpm Beta/Gamma	cpm Beta/Gamma	6078 - 7429	
NA		Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10		cpm Beta/Gamma	cpm Beta/Gamma	5792 - 7079	
2-17-10	0718	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7000 cpm Beta/Gamma	6498 - 7942	M
2-17-10	0710	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	M

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2-18-10	0702	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3696 cpm	216,415cpm	193,329 – 236,291	MCS
NA		Ludlum 2221 #172035	Ludlum 44-10 #PR242324	10/19/10		cpm	cpm	187,077 – 228,650	
2-18-10	0704	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4110 cpm	227,875 cpm	196,880 – 240,631	MCS
2-18-10	0722	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1543 cpm Alpha	1,200 - 1800	MCS
2-18-10	0724	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	40.1 cpm Beta/Gamma	11,008 cpm Beta/Gamma	8,476 – 12,714	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
2-18-10	0705	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	815 cpm Alpha	774 - 946	MCS
2-18-10	0707	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	205 cpm Beta/Gamma	8812 cpm Beta/Gamma	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
2-18-10	0709	Ludlum M-12 #186760	Ludlum 44-9 #PR193567	10/19/10	Y	32 cpm Beta/Gamma	6463 cpm Beta/Gamma	6112 - 7470	MCS
2-18-10	0710	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	38 cpm Beta/Gamma	6382 cpm Beta/Gamma	6,112 – 7,470	MCS
NA		Ludlum M-12 #229306	Ludlum 44-9 #PR191214	10/28/10		cpm Beta/Gamma	cpm Beta/Gamma	6,093 – 7,447	
NA		Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10		cpm Beta/Gamma	cpm Beta/Gamma	5,454 - 6,667	
2-18-10	0712	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7000 cpm Beta/Gamma	6,498 – 7,942	MCS
2-18-10	0705	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	3 uRem	140 uRem Gamma	108 - 160	MCS

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2-19-10	0700	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3694 cpm	215,347 cpm	193,329 – 236,291	MCS
NA		Ludlum 2221 #????	Ludlum 44-10 #PR????	10/19/10		cpm	cpm		
2-19-10	0702	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3860 cpm	235,480 cpm	196,880 – 240,631	MCS
2-19-10	0720	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1550 cpm Alpha	1,200 - 1800	MCS
2-19-10	0731	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.0 cpm Beta/Gamma	10889 cpm Beta/Gamma	8,476 – 12,714	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
2-19-10	0703	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	822 cpm Alpha	774 - 946	MCS
2-19-10	0704	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	160 cpm Beta/Gamma	8823 cpm Beta/Gamma	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #????	Ludlum 44-9 #PR????	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma		
2-19-10	0706	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	38 cpm Beta/Gamma	6563 cpm Beta/Gamma	6,112 – 7,470	MCS
2-19-10	0707	Ludlum M-12 #229306	Ludlum 44-9 #PR191214	10/28/10	Y	31 cpm Beta/Gamma	6878 cpm Beta/Gamma	6,093 – 7,447	MCS
NA		Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10		cpm Beta/Gamma	cpm Beta/Gamma	5,454 - 6,667	
2-19-10	0709	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7500 cpm Beta/Gamma	6,498 - 7,942	MCS
2-19-10	0704	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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2-22-10	0645	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3639 cpm	214,169 cpm	193,329 – 236,291	MCS
NA		Ludlum 2221 #167756	Ludlum 44-10 #PR242839	2/18/11		cpm	cpm	211,111 – 258,025	
2-22-10	0647	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3878 cpm	228,701 cpm	196,880 – 240,631	MCS
2-22-10	0710	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1609 cpm Alpha	1,200 - 1800	MCS
2-22-10	0721	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.1 cpm Beta/Gamma	10983 cpm Beta/Gamma	8,476 – 12,714	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
2-22-10	0648	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	835 cpm Alpha	774 - 946	MCS
2-22-10	0650	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	167 cpm Beta/Gamma	8652 cpm Beta/Gamma	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #????	Ludlum 44-9 #PR????	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma		
2-22-10	0654	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	32 cpm Beta/Gamma	6522 cpm Beta/Gamma	6,112 – 7,470	MCS
2-22-10	0656	Ludlum M-12 #229306	Ludlum 44-9 #PR191214	10/28/10	Y	30 cpm Beta/Gamma	6777 cpm Beta/Gamma	6,093 – 7,447	MCS
2-22-10	0657	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	35 cpm Beta/Gamma	6489 cpm Beta/Gamma	5,454 - 6,667	
2-22-10	0658	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7000 cpm Beta/Gamma	6,498 – 7,942	MCS
2-22-10	0659	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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2-23-10	0653	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3659 cpm	212,036 cpm	193,329 – 236,291	MCS
2-23-10	0655	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3578 cpm	232,554 cpm	211,111 – 258,025	MCS
2-23-10	0656	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3789 cpm	214,229 cpm	196,880 – 240,631	MCS
2-23-10	0717	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.2 cpm Alpha	1553 cpm Alpha	1,200 - 1800	MCS
2-23-10	0727	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.4 cpm Beta/Gamma	10,998 cpm Beta/Gamma	8,476 – 12,714	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
2-23-10	0658	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	817 cpm Alpha	774 - 946	MCS
2-23-10	0659	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	165 cpm Beta/Gamma	8975 cpm Beta/Gamma	8008 – 9789	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #????	Ludlum 44-9 #PR????	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma		
2-23-10	0701	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	34 cpm Beta/Gamma	6593 cpm Beta/Gamma	6,112 – 7,470	MCS
2-23-10	0703	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	39 cpm Beta/Gamma	6982 cpm Beta/Gamma	6,093 – 7,447	MCS
2-23-10	0704	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	33 cpm Beta/Gamma	6301 cpm Beta/Gamma	5,454 - 6,667	MCS
2-23-10	0706	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7000 cpm Beta/Gamma	6,498 – 7,942	MCS
2-23-10	0658	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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2-24-10	0651	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3588 cpm	213,180 cpm	193,329 – 236,291
2-24-10	0653	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3370 cpm	235,775 cpm	211,111 – 258,025
2-24-10	0654	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3719 cpm	215,248 cpm	196,880 – 240,631
2-24-10	0712	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1574 cpm Alpha	1,200 - 1800
2-24-10	0723	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.8 cpm Beta/Gamma	11,1104 cpm Beta/Gamma	8,476 – 12,714
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147
2-24-10	0652	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	828 cpm Alpha	774 - 946
2-24-10	0654	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	158 cpm Beta/Gamma	9040 cpm Beta/Gamma	8008 – 9789

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NA		Ludlum M-12 #????	Ludlum 44-9 #PR????	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma		
2-24-10	0656	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	31 cpm Beta/Gamma	6623 cpm Beta/Gamma	6,112 – 7,470	MCS
2-24-10	0657	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	41 cpm Beta/Gamma	6905 cpm Beta/Gamma	6,093 – 7,447	MCS
2-24-10	0659	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	26 cpm Beta/Gamma	6220 cpm Beta/Gamma	5,454 - 6,667	MCS
2-24-10	0701	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7000 cpm Beta/Gamma	6,498 – 7,942	MCS
2-24-10	0658	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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2-25-10	0647	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3695 cpm	213,717 cpm	193,329 – 236,291	I
2-25-10	0648	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	4104 cpm	227,387 cpm	211,111 – 258,025	I
2-25-10	0650	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3734 cpm	224,836 cpm	196,880 – 240,631	I
2-25-10	0702	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1492 cpm Alpha	1,200 - 1800	I
2-25-10	0709	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	38.7 cpm Beta/Gamma	10,983 cpm Beta/Gamma	8,476 – 12,714	I
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
2-25-10	0651	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	835 cpm Alpha	774 - 946	I
2-25-10	0652	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	182 cpm Beta/Gamma	8690 cpm Beta/Gamma	8008 – 9789	I

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #????	Ludlum 44-9 #PR????	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma		
2-25-10	0654	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	33 cpm Beta/Gamma	6,489 cpm Beta/Gamma	6,112 – 7,470	MCS
2-25-10	0655	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	35 cpm Beta/Gamma	6,764 cpm Beta/Gamma	6,093 – 7,447	MCS
2-25-10	0657	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	27 cpm Beta/Gamma	6,434 cpm Beta/Gamma	5,454 - 6,667	MCS
2-25-10	0659	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
2-25-10	0653	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	150 uRem Gamma	108 - 160	MCS

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2-26-10	0647	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3815 cpm	215,788 cpm	193,329 – 236,291	MCS
2-26-10	0648	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3764 cpm	241,875 cpm	211,111 – 258,025	MCS
2-26-10	0650	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4081 cpm	222,002 cpm	196,880 – 240,631	MCS
NA		Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11		cpm	cpm		
2-26-10	0714	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1540 cpm Alpha	1,200 - 1800	MCS
2-26-10	0724	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.2 cpm Beta/Gamma	10,835 cpm Beta/Gamma	8,476 – 12,714	MCS
2-26-10	0652	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	29 cpm Beta/Gamma	6,397 cpm Beta/Gamma	6,112 – 7,470	MCS
2-26-10	0654	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	38 cpm Beta/Gamma	6,514 cpm Beta/Gamma	6,093 – 7,447	MCS
2-26-10	0655	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	34 cpm Beta/Gamma	5992 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11		cpm Beta/Gamma	cpm Beta/Gamma		
2-26-10	0658	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	878 cpm Alpha	774 - 946	MCS
2-26-10	0701	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	181 cpm Beta/Gamma	8834 cpm Beta/Gamma	8008 – 9789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
2-26-10	0703	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6498 - 7942	MCS
2-26-10	0700	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	150 uRem Gamma	108 - 160	MCS

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3-1-10	0646	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3,986 cpm	210,634 cpm	193,329 – 236,291	MCS
3-1-10	0647	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,711 cpm	231,856 cpm	211,111 – 258,025	MCS
3-1-10	0649	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3,657 cpm	224,540 cpm	196,880 – 240,631	MCS
3-1-10	0650	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	3573 cpm	212,823 cpm	193,321 - 236281	MCS
3-1-10	0708	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.2 cpm Alpha	1,541 cpm Alpha	1,200 - 1800	MCS
3-1-10	0718	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.5 cpm Beta/Gamma	10,929 cpm Beta/Gamma	8,476 – 12,714	MCS
3-1-10	0648	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	32 cpm Beta/Gamma	6,469 cpm Beta/Gamma	6,112 – 7,470	MCS
3-1-10	0650	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	37 cpm Beta/Gamma	6,822 cpm Beta/Gamma	6,093 – 7,447	MCS
3-1-10	0651	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	31 cpm Beta/Gamma	6,256 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
3-1-10	0653	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	42 cpm Beta/Gamma	7,482 cpm Beta/Gamma	6,787 – 8,295	MCS
3-1-10	0649	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	894 cpm Alpha	774 - 946	MCS
3-1-10	0655	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	184 cpm Beta/Gamma	8,860 cpm Beta/Gamma	8008 – 9789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
3-1-10	0658	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6498 - 7942	MCS
3-1-10	0653	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	3 uRem	140 uRem Gamma	108 - 160	MCS

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3-2-10	0637	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3264 cpm	216,328 cpm	193,329 – 236,291
3-2-10	0639	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3386 cpm	228,934 cpm	211,111 – 258,025
3-2-10	0640	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3550 cpm	228,990 cpm	196,880 – 240,631
3-2-10	0642	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	3561 cpm	218,137 cpm	193,321 – 236,281
3-2-10	0644	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,585 cpm Alpha	1,200 - 1800
3-2-10	0658	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	37.0 cpm Beta/Gamma	10,864 cpm Beta/Gamma	8,476 – 12,714
3-2-10	0638	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	31 cpm Beta/Gamma	6,427 cpm Beta/Gamma	6,112 – 7,470
3-2-10	0640	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	33 cpm Beta/Gamma	6,924 cpm Beta/Gamma	6,093 – 7,447
3-2-10	0641	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	39 cpm Beta/Gamma	6,166 cpm Beta/Gamma	5,454 – 6,667

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3-2-10	0643	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	32 cpm Beta/Gamma	7,512 cpm Beta/Gamma	6,787 - 8,295
3-2-10	0632	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	817 cpm Alpha	774 - 94
3-2-10	0645	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	155 cpm Beta/Gamma	8,843 cpm Beta/Gamma	8008 – 97
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 74
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 81
3-2-10	0648	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6498 - 79
3-2-10	0644	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	150 uRem Gamma	108 - 16

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3-3-10	0642	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3,536 cpm	210,066 cpm	193,329 – 236,291	MCS
3-3-10	0644	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,389 cpm	236,445 cpm	211,111 – 258,025	MCS
3-3-10	0645	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3,791 cpm	219,461 cpm	196,880 – 240,631	MCS
3-3-10	0647	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	3,652 cpm	211,444 cpm	193,321 - 236281	MCS
3-3-10	0700	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.2 cpm Alpha	1549 cpm Alpha	1,200 - 1800	MCS
3-3-10	0712	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.2 cpm Beta/Gamma	10,985 cpm Beta/Gamma	8,476 – 12,714	MCS
3-3-10	0640	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	31 cpm Beta/Gamma	6,638 cpm Beta/Gamma	6,112 – 7,470	MCS
3-3-10	0643	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	39 cpm Beta/Gamma	6,813 cpm Beta/Gamma	6,093 – 7,447	MCS
3-3-10	0644	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	37 cpm Beta/Gamma	6,242 cpm Beta/Gamma	5,454 – 6,667	MCS

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3-3-10	0646	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	43 cpm Beta/Gamma	7,301 cpm Beta/Gamma	6,787 – 8,295	MCS
3-3-10	0648	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	809 cpm Alpha	774 - 946	MCS
3-3-10	0649	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	183 cpm Beta/Gamma	8,656 cpm Beta/Gamma	8008 – 9789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
3-3-10	0650	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6498 - 7942	MCS
3-3-10	0650	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	150 uRem Gamma	108 - 160	MCS

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3-4-10	0642	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3,649 cpm	213,631 cpm	193,329 – 236,291	MCS
3-4-10	0644	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,272 cpm	241,064 cpm	211,111 – 258,025	MCS
3-4-10	0645	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3,803 cpm	228,941 cpm	196,880 – 240,631	MCS
3-4-10	0647	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	3,662 cpm	216,676 cpm	193,321 - 236281	MCS
3-4-10	0709	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,601 cpm Alpha	1,200 - 1800	MCS
3-4-10	0720	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.6 cpm Beta/Gamma	11,032 cpm Beta/Gamma	8,476 – 12,714	MCS
3-4-10	0648	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	39 cpm Beta/Gamma	6,354 cpm Beta/Gamma	6,112 – 7,470	MCS
3-4-10	0650	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	40 cpm Beta/Gamma	6,786 cpm Beta/Gamma	6,093 – 7,447	MCS
3-4-10	0653	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	33 cpm Beta/Gamma	6,255 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
3-4-10	0656	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	33 cpm Beta/Gamma	7,655 cpm Beta/Gamma	6,787 – 8,295	MCS
3-4-10	0658	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	852 cpm Alpha	774 - 946	MCS
3-4-10	0700	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	177 cpm Beta/Gamma	8,686 cpm Beta/Gamma	8008 – 9789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
3-4-10	0701	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6498 - 7942	MCS
3-4-10	0650	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	150 uRem Gamma	108 - 160	MCS

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3-5-10	0638	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3,460 cpm	217,017 cpm	193,329 – 236,291	MCS
3-5-10	0640	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,399 cpm	231,999 cpm	211,111 – 258,025	MCS
3-5-10	0641	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3,592 cpm	231,073 cpm	196,880 – 240,631	MCS
3-5-10	0642	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	3,636 cpm	217,882 cpm	193,321 - 236281	MCS
3-5-10	0710	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,551 cpm Alpha	1,200 - 1800	MCS
3-5-10	0721	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	39.4 cpm Beta/Gamma	10,941 cpm Beta/Gamma	8,476 – 12,714	MCS
3-5-10	0639	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	29 cpm Beta/Gamma	6,404 cpm Beta/Gamma	6,112 – 7,470	MCS
3-5-10	0640	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	31 cpm Beta/Gamma	6,261cpm Beta/Gamma	6,093 – 7,447	MCS
3-5-10	0642	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	28 cpm Beta/Gamma	6,272 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range
3-5-10	0644	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	37 cpm Beta/Gamma	7,343 cpm Beta/Gamma	6,787 – 8,295
3-5-10	0645	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	828 cpm Alpha	774 - 946
3-5-10	0647	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	181 cpm Beta/Gamma	8,943 cpm Beta/Gamma	8008 – 9789
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147
3-5-10	0649	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6498 - 7942
3-5-10	0645	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160

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3-8-10	0648	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3,884 cpm	209,940 cpm	193,329 – 236,291	N
3-8-10	0649	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,539 cpm	234,358 cpm	211,111 – 258,025	N
3-8-10	0651	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	3,908 cpm	224,198 cpm	196,880 – 240,631	N
3-8-10	0652	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	3,895 cpm	217, 853 cpm	193,321 - 236281	N
3-8-10	1100	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,541cpm Alpha	1,200 - 1800	N
3-8-10	1049	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.8 cpm Beta/Gamma	10,991 cpm Beta/Gamma	8,476 – 12,714	N
3-8-10	0650	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	31 cpm Beta/Gamma	6,377 cpm Beta/Gamma	6,112 – 7,470	N
3-8-10	0652	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	37 cpm Beta/Gamma	7,212 cpm Beta/Gamma	6,093 – 7,447	N
3-8-10	0654	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	29 cpm Beta/Gamma	6,276 cpm Beta/Gamma	5,454 – 6,667	N

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
3-8-10	0655	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	36 cpm Beta/Gamma	7,606 cpm Beta/Gamma	6,787 – 8,295	MCS
3-8-10	0658	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	849 cpm Alpha	774 - 946	MCS
3-8-10	0650	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	160 cpm Beta/Gamma	8,824 cpm Beta/Gamma	8008 – 9789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6666 - 8147	
3-8-10	0702	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6498 - 7942	MCS
3-8-10	0655	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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3-9-10	0641	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3,826 cpm	214,363 cpm	193,329 – 236,291	MCS
3-9-10	0643	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,515 cpm	236,423 cpm	211,111 – 258,025	MCS
3-9-10	0644	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,050 cpm	232,907 cpm	196,880 – 240,631	MCS
3-9-10	0646	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	3,811 cpm	210,652 cpm	193,321 - 236281	MCS
3-9-10	0712	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,560 cpm Alpha	1,200 - 1800	MCS
3-9-10	0723	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	37.3 cpm Beta/Gamma	11,017 cpm Beta/Gamma	8,476 – 12,714	MCS
3-9-10	0648	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	35 cpm Beta/Gamma	6,341cpm Beta/Gamma	6,112 – 7,470	MCS
3-9-10	0650	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	41 cpm Beta/Gamma	6,844 cpm Beta/Gamma	6,093 – 7,447	MCS
3-9-10	0651	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	31 cpm Beta/Gamma	6,229 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
3-9-10	0653	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	32 cpm Beta/Gamma	7,521cpm Beta/Gamma	6,787 – 8,295	MCS
3-9-10	0655	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	843 cpm Alpha	774 - 946	MCS
3-9-10	0656	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	182 cpm Beta/Gamma	8,882 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-9-10	0700	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-9-10	0649	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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3-10-10	0643	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,078 cpm	209,643 cpm	193,329 – 236,291	MCS
3-10-10	0644	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,711 cpm	227,479 cpm	211,111 – 258,025	MCS
3-10-10	0646	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,038 cpm	225,912 cpm	196,880 – 240,631	MCS
3-10-10	0647	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,014 cpm	217,582 cpm	193,321 - 236281	MCS
3-10-10	0703	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.2 cpm Alpha	1,496 cpm Alpha	1,200 - 1800	MCS
3-10-10	0714	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	39.7 cpm Beta/Gamma	10,832 cpm Beta/Gamma	8,476 – 12,714	MCS
3-10-10	0645	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	43 cpm Beta/Gamma	6,233 cpm Beta/Gamma	6,112 – 7,470	MCS
3-10-10	0647	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	38 cpm Beta/Gamma	6,784 cpm Beta/Gamma	6,093 – 7,447	MCS
3-10-10	0648	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	32 cpm Beta/Gamma	6,170 cpm Beta/Gamma	5,454 – 6,667	MCS

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3-10-10	0650	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	31 cpm Beta/Gamma	7,361 cpm Beta/Gamma	6,787 – 8,295	MCS
3-10-10	0652	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	813 cpm Alpha	774 - 946	MCS
3-10-10	0653	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	169 cpm Beta/Gamma	8,743 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-10-10	0655	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	30 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-10-10	0649	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	150 uRem Gamma	108 - 160	MCS

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3-11-10	0642	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,064 cpm	224,832 cpm	193,329 – 236,291	MCS
3-11-10	0644	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,626 cpm	238,970 cpm	211,111 – 258,025	MCS
3-11-10	0645	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,163 cpm	230,104 cpm	196,880 – 240,631	MCS
3-11-10	0646	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4085 cpm	214,361 cpm	193,321 - 236281	MCS
3-11-10	0655	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1,553 cpm Alpha	1,200 - 1800	MCS
3-11-10	0710	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.5 cpm Beta/Gamma	10,955 cpm Beta/Gamma	8,476 – 12,714	MCS
3-11-10	0641	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	35 cpm Beta/Gamma	6,410 cpm Beta/Gamma	6,112 – 7,470	MCS
3-11-10	0643	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	38 cpm Beta/Gamma	6,944 cpm Beta/Gamma	6,093 – 7,447	MCS
3-11-10	0644	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	33 cpm Beta/Gamma	6,226 cpm Beta/Gamma	5,454 – 6,667	MCS

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3-11-10	0646	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	39 cpm Beta/Gamma	7,464 cpm Beta/Gamma	6,787 – 8,295	MCS
3-11-10	0642	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	831 cpm Alpha	774 - 946	MCS
3-11-10	0648	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	157 cpm Beta/Gamma	9,072 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-11-10	0650	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	50 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-11-10	0648	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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3-12-10	0637	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,578 cpm	211,149 cpm	193,329 – 236,291	MCS
3-12-10	0638	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	4,235 cpm	224,149 cpm	211,111 – 258,025	MCS
3-12-10	0640	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,656 cpm	226,865 cpm	196,880 – 240,631	MCS
3-12-10	0642	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,714 cpm	213,960 cpm	193,321 - 236281	MCS
3-12-10	0656	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,524 cpm Alpha	1,200 - 1800	MCS
3-12-10	0706	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.7 cpm Beta/Gamma	10,977 cpm Beta/Gamma	8,476 – 12,714	MCS
3-12-10	0638	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	31 cpm Beta/Gamma	6,182 cpm Beta/Gamma	6,112 – 7,470	MCS
3-12-10	0640	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	34 cpm Beta/Gamma	7,082 cpm Beta/Gamma	6,093 – 7,447	MCS
3-12-10	0641	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	35 cpm Beta/Gamma	6,215 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range
3-12-10	0643	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	38 cpm Beta/Gamma	7,485 cpm Beta/Gamma	6,787 – 8,295
3-12-10	0645	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1cpm Alpha	816 cpm Alpha	774 - 946
3-12-10	0653	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	192 cpm Beta/Gamma	8,907 cpm Beta/Gamma	8,008 – 9,789
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147
3-12-10	0655	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	50 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942
3-12-10	0643	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	150 uRem Gamma	108 - 160

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3-15-10	0641	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	3,946 cpm	216,806 cpm	193,329 – 236,291	MCS
3-15-10	0643	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,757 cpm	230,507 cpm	211,111 – 258,025	MCS
3-15-10	0644	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,316 cpm	224,975 cpm	196,880 – 240,631	MCS
3-15-10	0646	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,260 cpm	214,778 cpm	193,321 - 236281	MCS
3-15-10	0650	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1,623 cpm Alpha	1,200 - 1800	MCS
3-15-10	0710	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.0 cpm Beta/Gamma	11,036 cpm Beta/Gamma	8,476 – 12,714	MCS
3-15-10	0643	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	30 cpm Beta/Gamma	6,260 cpm Beta/Gamma	6,112 – 7,470	MCS
3-15-10	0645	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	37 cpm Beta/Gamma	7,002 cpm Beta/Gamma	6,093 – 7,447	MCS
3-15-10	0646	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	38 cpm Beta/Gamma	6,262 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Tec I
3-15-10	0648	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	34 cpm Beta/Gamma	7,200 cpm Beta/Gamma	6,787 – 8,295	
3-15-10	0700	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	837 cpm Alpha	774 - 946	
3-15-10	0651	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	197 cpm Beta/Gamma	8,779 cpm Beta/Gamma	8,008 – 9,789	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-15-10	0653	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	50 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	
3-15-10	0658	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	150 uRem Gamma	108 - 160	

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3-16-10	0638	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,189 cpm	212,025 cpm	193,329 – 236,291
3-16-10	0639	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,886 cpm	233,386 cpm	211,111 – 258,025
3-16-10	0641	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,243 cpm	234,944 cpm	196,880 – 240,631
3-16-10	0643	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,329 cpm	214,620 cpm	193,321 - 236281
3-16-10	0654	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1,537 cpm Alpha	1,200 - 180
3-16-10	0702	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.7 cpm Beta/Gamma	10,853 cpm Beta/Gamma	8,476 – 12,714
3-16-10	0637	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	32 cpm Beta/Gamma	6,291 cpm Beta/Gamma	6,112 – 7,470
3-16-10	0639	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	33 cpm Beta/Gamma	6,742 cpm Beta/Gamma	6,093 – 7,447
3-16-10	0640	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	30 cpm Beta/Gamma	6,181 cpm Beta/Gamma	5,454 – 6,667

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptab Respons Check Range
3-16-10	0642	Ludlum M-12 #180411	Ludlum 44-9 #PR113654	2/23/11	Y	36 cpm Beta/Gamma	7,077 cpm Beta/Gamma	6,448 – 7,881
3-16-10	0644	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	839 cpm Alpha	774 - 94
3-16-10	0647	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	192 cpm Beta/Gamma	8,691 cpm Beta/Gamma	8,008 – 9,789
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 74
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147
3-16-10	0713	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942
3-16-10	0645	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	5 uRem	150 uRem Gamma	108 - 16

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3-17-10	0632	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,223 cpm	219,250 cpm	193,329 – 236,291	MCS
3-17-10	0634	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,878 cpm	236,732 cpm	211,111 – 258,025	MCS
3-17-10	0635	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,464 cpm	219,678 cpm	196,880 – 240,631	MCS
3-17-10	0637	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,219 cpm	214,545 cpm	193,321 - 236281	MCS
3-17-10	0634	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,556 cpm Alpha	1,200 - 1800	MCS
3-17-10	0653	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.1 cpm Beta/Gamma	10,964 cpm Beta/Gamma	8,476 – 12,714	MCS
3-17-10	0639	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	36 cpm Beta/Gamma	6,116 cpm Beta/Gamma	6,112 – 7,470	MCS
3-17-10	0640	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	31 cpm Beta/Gamma	6,736 cpm Beta/Gamma	6,093 – 7,447	MCS
3-17-10	0641	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	35 cpm Beta/Gamma	6,120 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
3-17-10		Ludlum M-12 #????	Ludlum 44-9 #PR????	??/??/??		cpm Beta/Gamma	cpm Beta/Gamma	???? – ????	
3-17-10	0645	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	813 cpm Alpha	774 - 946	MCS
3-17-10	0656	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	158 cpm Beta/Gamma	8,850 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-17-10	0700	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	30 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-17-10	0640	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptab Respons Check Range
3-18-10	0631	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,014 cpm	217,851 cpm	193,329 - 236,291
3-18-10	0633	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	4,012 cpm	231,570 cpm	211,111 - 258,025
3-18-10	0634	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,428 cpm	218,564 cpm	196,880 - 240,631
3-18-10	0635	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,117 cpm	212,165 cpm	193,321 - 236281
3-18-10	0639	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,585 cpm Alpha	1,200 - 18
3-18-10	0651	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.0 cpm Beta/Gamma	11,113 cpm Beta/Gamma	8,476 – 12,714
3-18-10	0632	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	37 cpm Beta/Gamma	6,232 cpm Beta/Gamma	6,112 – 7,470
3-18-10	0634	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	38 cpm Beta/Gamma	6,708 cpm Beta/Gamma	6,093 – 7,447
3-18-10	0635	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	34 cpm Beta/Gamma	6,201 cpm Beta/Gamma	5,454 – 6,667

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
3-18-10		Ludlum M-12 #????	Ludlum 44-9 #PR????	??/??/??		cpm Beta/Gamma	cpm Beta/Gamma	???? – ????	
3-18-10	0651	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	878 cpm Alpha	774 - 946	MCS
3-18-10	0638	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	183 cpm Beta/Gamma	8,806 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-18-10	0640	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-18-10	0637	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 - 160	MCS

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3-19-10	0635	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,173 cpm	211,680 cpm	193,329 – 236,291	MCS
3-19-10	0636	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,927 cpm	228,817 cpm	211,111 – 258,025	MCS
3-19-10	0638	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,536 cpm	212,134 cpm	196,880 – 240,631	MCS
3-19-10	0639	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,431 cpm	212,992 cpm	193,321 - 236281	MCS
3-19-10	0705	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,525 cpm Alpha	1,200 - 1800	MCS
3-19-10	0655	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.4 cpm Beta/Gamma	10,922 cpm Beta/Gamma	8,476 – 12,714	MCS
3-19-10	0637	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	42 cpm Beta/Gamma	6,923 cpm Beta/Gamma	6,112 – 7,470	MCS
3-19-10	0639	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	33 cpm Beta/Gamma	7,266 cpm Beta/Gamma	6,093 – 7,447	MCS
3-19-10	0640	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	34 cpm Beta/Gamma	6,772 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #????	Ludlum 44-9 #PR????	??/??/??		cpm Beta/Gamma	cpm Beta/Gamma	???? – ????	
3-19-10	0639	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	841 cpm Alpha	774 - 946	MCS
3-19-10	0642	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	184 cpm Beta/Gamma	8,890 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-19-10	0643	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-19-10	0641	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	135 uRem Gamma	108 - 160	MCS

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3-22-10	0633	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,172 cpm	217,220 cpm	193,329 – 236,291	MCS
3-22-10	0634	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,932 cpm	232,242 cpm	211,111 – 258,025	MCS
3-22-10	0366	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,295 cpm	232,242 cpm	196,880 – 240,631	MCS
3-22-10	0637	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,375 cpm	210,657 cpm	193,321 - 236281	MCS
3-22-10	0705	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,469 cpm Alpha	1,200 - 1800	MCS
3-22-10	0651	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.7 cpm Beta/Gamma	10,861 cpm Beta/Gamma	8,476 – 12,714	MCS
3-22-10	0632	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10	Y	40 cpm Beta/Gamma	6,364 cpm Beta/Gamma	6,112 – 7,470	MCS
3-22-10	0635	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	36 cpm Beta/Gamma	6,525 cpm Beta/Gamma	6,039 – 7,447	MCS
3-22-10	0636	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	33 cpm Beta/Gamma	6,144 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #????	Ludlum 44-9 #PR????	??/??/??		cpm Beta/Gamma	cpm Beta/Gamma	???? – ????	
3-22-10	0642	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	808 cpm Alpha	774 - 946	MCS
3-22-10	0638	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	180 cpm Beta/Gamma	8,866 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-22-10	0640	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-22-10	0640	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 - 160	MCS

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3-23-10		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,000 cpm	209,525 cpm	193,329 – 236,291	MCS
3-23-10		Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,827 cpm	237,081 cpm	211,111 – 258,025	MCS
3-23-10		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,408 cpm	224,334 cpm	196,880 – 240,631	MCS
3-23-10		Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,287 cpm	215,853 cpm	193,321 - 236281	MCS
3-23-10		Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,510 cpm Alpha	1,200 - 1800	MCS
3-23-10		Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	42.2 cpm Beta/Gamma	11,125 cpm Beta/Gamma	8,476 – 12,714	MCS
NA	OOS	Ludlum M-12 #180431	Ludlum 44-9 #PR193567	10/19/10		cpm Beta/Gamma	cpm Beta/Gamma	5,798 – 7,086	
3-23-10		Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	33 cpm Beta/Gamma	6,670cpm Beta/Gamma	6,039 – 7,447	MCS
3-23-10		Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	38cpm Beta/Gamma	5,919cpm Beta/Gamma	5,454 – 6,667	MCS

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NA		Ludlum M-12 #????	Ludlum 44-9 #PR????	??/??/??		cpm Beta/Gamma	cpm Beta/Gamma	???? – ????	
3-23-10		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	840 cpm Alpha	774 - 946	MCS
3-23-10		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	200 cpm Beta/Gamma	8,749 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-23-10		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-23-10		Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 - 160	MCS

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3-24-10	0641	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,135 cpm	210,749 cpm	193,329 – 236,291	MCS
3-24-10	0643	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,912 cpm	232,647 cpm	211,111 – 258,025	MCS
3-24-10	0644	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,390 cpm	234,683 cpm	196,880 – 240,631	MCS
3-24-10	0645	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,404 cpm	218,797 cpm	193,321 - 236281	MCS
3-24-10	0659	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,573 cpm Alpha	1,200 - 1800	MCS
3-24-10	0710	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.7 cpm Beta/Gamma	11,028 cpm Beta/Gamma	8,476 – 12,714	MCS
NA		Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	cpm Beta/Gamma	cpm Beta/Gamma	??? – ???	
3-24-10	0639	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	26 cpm Beta/Gamma	6,598 cpm Beta/Gamma	6,093 – 7,447	MCS
3-24-10	0640	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	34 cpm Beta/Gamma	6,007 cpm Beta/Gamma	5,454 – 6,667	MCS

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NA		Ludlum M-12 #????	Ludlum 44-9 #PR????			cpm Beta/Gamma	cpm Beta/Gamma	???? – ????	
3-24-10	0642	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	828 cpm Alpha	774 - 946	MCS
3-24-10	0644	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	182 cpm Beta/Gamma	8,774 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-24-10	0712	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-24-10	0647	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	120 uRem Gamma	108 - 160	MCS

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3-25-10	0636	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,054 cpm	216,240 cpm	193,329 – 236,291	MCS
3-25-10	0637	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,894 cpm	229,916 cpm	211,111 – 258,025	MCS
3-25-10	0639	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,470 cpm	225,434 cpm	196,880 – 240,631	MCS
3-25-10	0640	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,315 cpm	213,643 cpm	193,321 - 236281	MCS
3-25-10	0647	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,520 cpm Alpha	1,200 - 1800	MCS
3-25-10	0700	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	45.0 cpm Beta/Gamma	10,933 cpm Beta/Gamma	8,476 – 12,714	MCS
3-25-10	0633	Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	37 cpm Beta/Gamma	5,970 cpm Beta/Gamma	5,546 – 6,779	MCS
3-25-10	0635	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	41cpm Beta/Gamma	6,932 cpm Beta/Gamma	6,093 – 7,447	MCS
3-25-10	0636	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	33 cpm Beta/Gamma	6,094 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
3-25-10		Ludlum M-12 #???	Ludlum 44-9 #PR???			cpm Beta/Gamma	cpm Beta/Gamma	??? – ???	
3-25-10	0636	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1cpm Alpha	815 cpm Alpha	774 - 946	MCS
3-25-10	0638	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	184 cpm Beta/Gamma	8,868 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-25-10	0640	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-25-10	0642	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	120 uRem Gamma	108 - 160	MCS

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3-26-10	0641	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,219 cpm	214,944 cpm	193,329 – 236,291	MCS
3-26-10	0643	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,957 cpm	236,636 cpm	211,111 – 258,025	MCS
3-26-10	0644	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,464 cpm	219,598 cpm	196,880 – 240,631	MCS
3-26-10	0647	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,295 cpm	218,147 cpm	193,321 - 236281	MCS
3-26-10	0638	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.2 cpm Alpha	1,509 cpm Alpha	1,200 - 1800	MCS
3-26-10	0700	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	40.6 cpm Beta/Gamma	11,110 cpm Beta/Gamma	8,476 – 12,714	MCS
3-26-10	0639	Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	38 cpm Beta/Gamma	6,264 cpm Beta/Gamma	5,546 – 6,779	MCS
3-26-10	0641	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	36 cpm Beta/Gamma	7,076 cpm Beta/Gamma	6,093 – 7,447	MCS
3-26-10	0643	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	31cpm Beta/Gamma	6,214 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #????	Ludlum 44-9 #PR????			cpm Beta/Gamma	cpm Beta/Gamma	???? – ????	
3-26-10	0650	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	817 cpm Alpha	774 - 946	MCS
3-26-10	0645	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	204 cpm Beta/Gamma	8,842 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-26-10		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-26-10	0650	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	120 uRem Gamma	108 - 160	MCS

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3-29-10	0632	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,415 cpm	211,913 cpm	193,329 – 236,291	MCS
3-29-10	0633	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	4,096 cpm	235,377 cpm	211,111 – 258,025	MCS
3-29-10	0635	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,466 cpm	228,471 cpm	196,880 – 240,631	MCS
3-29-10	0636	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,543 cpm	221,679 cpm	193,321 - 236281	MCS
3-29-10	0705	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,568 cpm Alpha	1,200 - 1800	MCS
3-29-10	0652	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	46.4 cpm Beta/Gamma	11,114 cpm Beta/Gamma	8,476 – 12,714	MCS
3-29-10	0634	Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	31 cpm Beta/Gamma	6,089 cpm Beta/Gamma	5,546 – 6,779	MCS
3-29-10	0635	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	33 cpm Beta/Gamma	6,960 cpm Beta/Gamma	6,093 – 7,447	MCS
3-29-10	0637	Ludlum M-12 #186707	Ludlum 44-9 #PR153296	10/8/10	Y	32 cpm Beta/Gamma	5,931 cpm Beta/Gamma	5,454 – 6,667	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
NA		Ludlum M-12 #????	Ludlum 44-9 #PR????			cpm Beta/Gamma	cpm Beta/Gamma	???? – ????	
3-29-10	0638	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	840 cpm Alpha	774 - 946	MCS
3-29-10	0639	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	191 cpm Beta/Gamma	8,719 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-29-10	0641	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-29-10	0638	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 - 160	MCS

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3-30-10		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,231 cpm	207,867 cpm	193,329 – 236,291	MCS
3-30-10		Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,927 cpm	230,597 cpm	211,111 – 258,025	MCS
3-30-10		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,375 cpm	218,711 cpm	196,880 – 240,631	MCS
3-30-10		Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,192 cpm	219,406 cpm	193,321 - 236281	MCS
3-30-10		Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1,545 cpm Alpha	1,200 - 1800	MCS
3-30-10		Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.1 cpm Beta/Gamma	10,953 cpm Beta/Gamma	8,476 – 12,714	MCS
3-30-10		Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	36 cpm Beta/Gamma	6,163 cpm Beta/Gamma	5,546 – 6,779	MCS
3-30-10		Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	43 cpm Beta/Gamma	6,274 cpm Beta/Gamma	6,093 – 7,447	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
3-30-10		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	829 cpm Alpha	774 - 946	MCS
3-30-10		Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	176 cpm Beta/Gamma	8,688 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-30-10		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	30 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-30-10		Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	120 uRem Gamma	108 - 160	MCS

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3-31-10	0631	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,187 cpm	208,237 cpm	193,329 – 236,291	MCS
3-31-10	0633	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	3,887 cpm	236,734 cpm	211,111 – 258,025	MCS
3-31-10	0634	Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	4,278 cpm	216,599 cpm	196,880 – 240,631	MCS
3-31-10	0636	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,261 cpm	203,885 cpm	193,321 - 236281	MCS
3-31-10	0650	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1,543 cpm Alpha	1,200 - 1800	MCS
3-31-10	0658	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.3 cpm Beta/Gamma	10,996 cpm Beta/Gamma	8,476 – 12,714	MCS
3-31-10	0633	Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	35 cpm Beta/Gamma	6,194 cpm Beta/Gamma	5,546 – 6,779	MCS
3-31-10	0634	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	27 cpm Beta/Gamma	6,429 cpm Beta/Gamma	6,093 – 7,447	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
3-31-10	0632	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	829 cpm Alpha	774 - 946	MCS
3-31-10	0637	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	197 cpm Beta/Gamma	8,768 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
3-31-10	0641	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	20 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
3-31-10	0640	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	120 uRem Gamma	108 - 160	MCS

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4-1-10	0635	Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10	Y	4,220 cpm	218,625 cpm	193,329 – 236,291	MCS
NA		Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	cpm	cpm	211,111 – 258,025	
NA		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10	Y	cpm	cpm	196,880 – 240,631	
4-1-10	0637	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,356 cpm	217,464 cpm	193,321 - 236281	MCS
4-1-10	0705	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1,489 cpm Alpha	1,200 - 1800	MCS
4-1-10	0652	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.2 cpm Beta/Gamma	10,802 cpm Beta/Gamma	8,476 – 12,714	MCS
4-1-10	0632	Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	25 cpm Beta/Gamma	6,241cpm Beta/Gamma	5,546 – 6,779	MCS
4-1-10	0634	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	32 cpm Beta/Gamma	6,695 cpm Beta/Gamma	6,093 – 7,447	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
4-1-10	O639	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	0 cpm Alpha	849 cpm Alpha	774 - 946	MCS
4-1-10	0637	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	183 cpm Beta/Gamma	8,893 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
4-1-10	0640	Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10	Y	40 cpm Beta/Gamma	7,000 cpm Beta/Gamma	6,498 – 7,942	MCS
4-1-10	0642	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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NA		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10		cpm	cpm	193,329 – 236,291	
4-2-10	0636	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	4,095 cpm	234,182 cpm	211,111 – 258,025	MCS
NA		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10		cpm	cpm	196,880 – 240,631	
4-2-10	0637	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,287 cpm	216,972 cpm	193,321 - 236281	MCS
4-2-10	0655	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1,466 cpm Alpha	1,200 - 1800	MCS
4-2-10	0650	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	41.1 cpm Beta/Gamma	11,033 cpm Beta/Gamma	8,476 – 12,714	MCS
4-2-10	0633	Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	31 cpm Beta/Gamma	6,305 cpm Beta/Gamma	5,546 – 6,779	MCS
4-2-10	0635	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	34 cpm Beta/Gamma	6,819 cpm Beta/Gamma	6,093 – 7,447	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
4-2-10	0640	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	861 cpm Alpha	774 - 946	MCS
4-2-10	0638	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	180 cpm Beta/Gamma	8,695 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6,498 – 7,942	
4-2-10	0639	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 - 160	MCS

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NA		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10		cpm	cpm	193,329 – 236,291	
4-5-10	0635	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	4,183 cpm	237,176 cpm	211,111 – 258,025	MCS
NA		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10		cpm	cpm	196,880 – 240,631	
4-5-10	0636	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,299 cpm	217,476 cpm	193,321 - 236281	MCS
4-5-10	0649	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	0 cpm Alpha	1,536 cpm Alpha	1,200 - 1800	MCS
4-5-10	0655	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	43.6 cpm Beta/Gamma	11,054 cpm Beta/Gamma	8,476 – 12,714	MCS
4-5-10	0638	Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	38 cpm Beta/Gamma	6,142 cpm Beta/Gamma	5,546 – 6,779	MCS
4-5-10	0640	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	39 cpm Beta/Gamma	6,226 cpm Beta/Gamma	6,093 – 7,447	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
4-5-10	0639	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	869 cpm Alpha	774 - 946	MCS
4-5-10	0642	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	180 cpm Beta/Gamma	8,766 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6,498 – 7,942	
4-5-10	0638	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	140 uRem Gamma	108 - 160	MCS

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NA		Ludlum 2221 #190170	Ludlum 44-10 #PR242823	10/19/10		cpm	cpm	193,329 – 236,291	
4-6-10	0641	Ludlum 2221 #187756	Ludlum 44-10 #PR242839	2/18/11	Y	4,600 cpm	232,136 cpm	211,111 – 258,025	MCS
NA		Ludlum 2221 #187758	Ludlum 44-10 #PR156393	10/19/10		cpm	cpm	196,880 – 240,631	
4-6-10	0643	Ludlum 2221 #190191	Ludlum 44-10 #PR240366	2/23/11	Y	4,815 cpm	213,100 cpm	193,321 - 236281	MCS
4-6-10	0705	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	.1 cpm Alpha	1,492 cpm Alpha	1,200 - 1800	MCS
4-6-10	0655	Ludlum 2929 #176083	Ludlum 43-10-1 #PR181590	10/19/10	NA	44.4 cpm Beta/Gamma	10,906 cpm Beta/Gamma	8,476 – 12,714	MCS
4-6-10	0639	Ludlum M-12 #145985	Ludlum 44-9 #PR150385	3/19/11	Y	39 cpm Beta/Gamma	6,441 cpm Beta/Gamma	5,546 – 6,779	MCS
4-6-10	0642	Ludlum M-12 #229306	Ludlum 44-9 #PR191714	10/28/10	Y	33 cpm Beta/Gamma	7,083 cpm Beta/Gamma	6,093 – 7,447	MCS

Date	Time	Instrument Type and Serial Number	Probe Type and Serial Number	Calibration Due Date	Battery Check O.K.? Y/N	Background	Response Check Reading (Indicate cpm or uR/hr)	Acceptable Response Check Range	Technician Initials
4-6-10	0638	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	1 cpm Alpha	845 cpm Alpha	774 - 946	MCS
4-6-10	0644	Ludlum 2360 #138261	Ludlum 43-93 #PR244486	10/19/10	Y	189 cpm Beta/Gamma	8,915 cpm Beta/Gamma	8,008 – 9,789	MCS
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Alpha	cpm Alpha	610 - 746	
NA		Ludlum 2360 #253248	Ludlum 43-93 # PR240338	12/11/10		cpm Beta/Gamma	cpm Beta/Gamma	6,666 – 8,147	
NA		Ludlum M177 #140728	Ludlum 44-9 #PR193567	12/9/10		cpm Beta/Gamma	cpm Beta/Gamma	6,498 – 7,942	
4-6-10	0644	Ludlum M-19 #169641	Scintillator NA	10/24/10	Y	4 uRem	130 uRem Gamma	108 - 160	MCS

Appendix G. Summary Table of QC Sample Results

Radiological Duplicates										
Sample ID	Ra-226 (pCi/g)	Ra-226 2σ (pCi/g)	Ra-228 (pCi/g)	Ra-228 2σ (pCi/g)	U-234 (pCi/g)	U-234 2σ (pCi/g)	U-235 (pCi/g)	U-235 2σ (pCi/g)	U-238 (pCi/g)	U-238 2σ (pCi/g)
TLS-SB-IA1-3(26.0-27.0)031510	2.414	0.880	0.731	0.163	1.680	0.552	ND	ND	1.680	0.552
TLS-SB-IA1-3(26.0-27.0)031510D	2.278	1.060	0.786	0.159	1.930	0.740	ND	ND	1.930	0.740
TLS-SB-IA1-9(6.7-7.7)031110	6.263	1.657	2.389	0.415	3.804	1.189	ND	ND	3.804	1.189
TLS-SB-IA1-9(6.7-7.7)031110D	7.761	1.811	2.282	0.352	4.347	1.579	ND	ND	4.347	1.579
TLS-SB-IA1-12(6.5-7.5)031610	383.510	20.626	0.787	0.443	341.430	27.214	25.275	2.396	341.430	27.214
TLS-SB-IA1-12(6.5-7.5)031610D	383.880	21.194	0.911	0.456	322.470	25.493	25.800	2.468	322.470	25.493
TLS-SB-IA1-13(3.0-4.0) 031010	6.292	1.782	2.011	0.347	3.024	0.938	ND	ND	3.024	0.938
TLS-SB-IA1-13(3.0-4.0) 031010D	5.053	1.449	2.222	0.306	2.721	0.819	ND	ND	2.721	0.819
TLS-SB-IA1-16(13.2-14.2)031210	12.865	7.213	2.360	0.552	143.700	12.682	15.188	2.361	143.700	12.682
TLS-SB-IA1-16(13.2-14.2)031210D	4.209	1.950	1.230	0.249	ND(1)	ND	ND	ND	ND	ND
TLS-SB-IA1-20(4.8-5.8)031010	ND(1)	ND	0.928	0.205	ND	ND	ND	ND	ND	ND
TLS-SB-IA1-20(4.8-5.8)031010D	2.757	1.311	0.885	0.193	1.612	0.771	ND	ND	1.612	0.771
TLS-SB-IA1-B9(17.6-18.6)032610	6.061	1.598	1.693	0.258	5.512	1.414	ND	ND	5.512	1.414
TLS-SB-IA1-B9(17.6-18.6)032610D	7.603	1.829	1.863	0.353	6.030	1.291	ND	ND	6.030	1.291
TLS-SB-IA1-B11(23.0-24.0)032610	21.207	2.187	0.972	0.250	18.265	2.015	1.597	0.439	18.265	2.015
TLS-SB-IA1-B11(23.0-24.0)032610D	39.104	3.054	0.922	0.196	39.388	3.584	2.336	0.481	39.388	3.584
TLS-SB-IA1-B15(15.0-16.0)032910	7.991	2.390	3.422	0.466	7.272	1.740	ND	ND	7.272	1.740
TLS-SB-IA1-B15(15.0-16.0)032910D	12.459	2.473	3.935	0.538	8.882	2.274	ND	ND	8.882	2.274
TLS-SB-IA1-B5(15.0-16.0)032610	12.873	2.001	1.596	0.292	11.214	1.914	ND	ND	11.214	1.914
TLS-SB-IA1-B5(15.0-16.0)032610D	15.901	1.028	1.681	0.144	13.054	1.159	0.876	0.159	13.054	1.159
TLS-SB-IA1-DOE-B1(6.0-7.0)031810	68.694	4.511	0.950	0.245	66.175	5.757	4.280	0.687	66.175	5.757
TLS-SB-IA1-DOE-B1(6.0-7.0)031810D	51.641	3.754	1.313	0.258	45.548	3.913	3.471	0.582	45.548	3.913
TLS-SB-IA1-DOE-B2(3.0-4.0)031710	6.051	2.032	2.410	0.372	3.208	0.993	0.433	0.362	3.208	0.993
TLS-SB-IA1-DOE-B2(3.0-4.0)031710D	4.314	1.896	2.329	0.340	3.799	0.979	0.357	0.370	3.799	0.979
TLS-SB-IA1-DOE-B3(5.3-6.3)031810	648.540	32.996	0.943	0.411	502.310	38.727	40.714	3.249	502.310	38.727
TLS-SB-IA1-DOE-B3(5.3-6.3)031810D	399.680	20.762	1.899	0.379	348.040	26.130	26.150	2.244	348.040	26.130
TLS-SB-IA2-1(9.0-10.0)031910	2.304	1.620	0.557	0.242	1.657	1.027	ND	ND	1.657	1.027
TLS-SB-IA2-1(9.0-10.0)031910D	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TLS-SB-IA2-3(10.0-11.0)032310	2.274	1.526	1.337	0.231	1.394	0.740	ND	ND	1.394	0.740
TLS-SB-IA2-3(10.0-11.0)032310D	3.424	1.423	1.094	0.218	1.629	0.769	ND	ND	1.629	0.769
TLS-SB-IA2-7(13.0-14.0)032210	9.624	3.495	4.757	0.571	9.542	2.191	ND	ND	9.542	2.191
TLS-SB-IA2-7(13.0-14.0)032210D	8.018	2.352	3.184	0.516	4.807	1.757	ND	ND	4.807	1.757

Sample ID	Ra-226 (pCi/g)	Ra-226 2σ (pCi/g)	Ra-228 (pCi/g)	Ra-228 2σ (pCi/g)	U-234 (pCi/g)	U-234 2σ (pCi/g)	U-235 (pCi/g)	U-235 2σ (pCi/g)	U-238 (pCi/g)	U-238 2σ (pCi/g)
TLS-SB-IA2-9(6.0-7.0)032210	2.069	1.237	1.253	0.219	1.500	0.721	ND	ND	1.500	0.721
TLS-SB-IA2-9(6.0-7.0)032210D	1.980	1.352	1.431	0.235	ND	ND	ND	ND	ND	ND
TLS-SB-IA2-15(1.0-2.0)032410	2.508	1.123	1.157	0.201	1.524	0.802	ND	ND	1.524	0.802
TLS-SB-IA2-15(1.0-2.0)032410D	2.629	1.648	1.263	0.256	2.246	0.972	ND	ND	2.246	0.972
TLS-SB-IA2-17(6.0-7.0)032510	2.240	1.139	1.030	0.239	1.239	0.739	ND	ND	1.239	0.739
TLS-SB-IA2-17(6.0-7.0)032510D	ND	ND	1.132	0.243	3.076	0.876	ND	ND	3.076	0.876
TLS-SB-IA2-22(5.0-6.0)032510	1.926	1.191	1.051	0.197	1.202	0.743	ND	ND	1.202	0.743
TLS-SB-IA2-22(5.0-6.0)032510D	2.214	1.184	1.059	0.229	1.759	0.739	ND	ND	1.759	0.739
TLS-SB-IA3-7(3.3-4.3)021510	1.711	0.933	1.008	0.188	1.366	0.594	ND	ND	1.366	0.594
TLS-SB-IA3-7(3.3-4.3)021510D	1.543	0.346	0.901	0.108	0.739	0.271	ND	ND	0.739	0.271
TLS-SB-IA3-8(8.0-9.0)021210	1.998	0.910	0.794	0.157	ND[1]	ND	ND	ND	ND	ND
TLS-SB-IA3-8(8.0-9.0)021210D	2.133	0.931	0.866	0.175	2.133	1.123	ND	ND	2.133	1.123
TLS-SB-IA3-11(4.0-5.0)021620	1.733	0.628	0.908	0.100	0.954	0.404	ND	ND	0.954	0.404
TLS-SB-IA3-11(4.0-5.0)021620D	2.466	1.224	0.991	0.221	1.824	0.943	ND	ND	1.824	0.943
TLS-SB-IA3-15(4.0-5.0)021710	1.237	0.308	0.679	0.083	0.551	0.157	ND	ND	0.551	0.157
TLS-SB-IA3-15(4.0-5.0)021710D	1.383	0.410	0.713	0.089	0.824	0.263	ND	ND	0.824	0.263
TLS-SB-IA3-16(7.8-8.8)021710	1.524	0.882	0.810	0.140	1.851	0.566	ND	ND	1.851	0.566
TLS-SB-IA3-16(7.8-8.8)021710D	2.299	0.840	0.817	0.193	ND	ND	ND	ND	ND	ND
TLS-SB-IA3-17(9.0-10.0)021710	0.967	0.309	0.651	0.081	0.612	0.245	ND	ND	0.618	0.245
TLS-SB-IA3-17(9.0-10.0)021710D	1.653	0.829	0.771	0.170	ND	ND	ND	ND	ND	ND
TLS-SB-IA3-19(8.0-9.0) 021810	1.474	0.443	0.808	0.100	0.899	0.243	ND	ND	0.899	0.243
TLS-SB-IA3-19(8.0-9.0) 021810D	1.511	0.405	0.894	0.112	0.863	0.333	ND	ND	0.863	0.333
TLS-SB-IA3-22(4.6-5.6)021710	2.102	1.127	0.669	0.169	1.310	0.496	ND	ND	1.310	0.496
TLS-SB-IA3-22(4.6-5.6)021710D	1.723	0.401	0.611	0.067	0.832	0.271	ND	ND	0.832	0.271
TLS-SB-IA3-D07(9.6-10.6)031510	1.354	0.387	0.752	0.097	0.057	0.024	ND	ND	0.057	0.024
TLS-SB-IA3-D07(9.6-10.6)031510D	2.546	1.237	1.016	0.166	1.236	0.763	ND	ND	1.236	0.763
TLS-SB-IA3-D10(3.3-4.3)031210	1.860	0.963	0.975	0.185	1.269	0.540	ND	ND	1.269	0.540
TLS-SB-IA3-D10(3.3-4.3)031210D	1.103	0.347	0.967	0.117	0.728	0.188	ND	ND	0.728	0.188
TLS-SB-IA3FL-1(5.0-6.0)030510	1.085	0.354	0.613	0.069	0.564	0.212	ND	ND	0.564	0.212
TLS-SB-IA3FL-1(5.0-6.0)030510D	1.521	0.762	0.664	0.148	ND	ND	ND	ND	ND	ND
TLS-SB-IA3FL-6(13.0-14.0) 030410	2.428	1.019	0.782	0.226	1.349	0.535	ND	ND	1.349	0.535
TLS-SB-IA3FL-6(13.0-14.0) 030410D	1.406	0.381	0.747	0.093	0.874	0.227	ND	ND	0.874	0.227
TLS-SB-IA4-3(10.0-11.0)030310	1.973	1.053	0.892	0.165	1.394	0.635	ND	ND	1.394	0.635
TLS-SB-IA4-3(10.0-11.0)030310D	1.461	0.404	0.614	0.065	0.796	0.252	ND	ND	0.796	0.252

Sample ID	Ra-226 (pCi/g)	Ra-226 2σ (pCi/g)	Ra-228 (pCi/g)	Ra-228 2σ (pCi/g)	U-234 (pCi/g)	U-234 2σ (pCi/g)	U-235 (pCi/g)	U-235 2σ (pCi/g)	U-238 (pCi/g)	U-238 2σ (pCi/g)
TLS-SB-IA4-7(24.0-25.0) 030110	2.234	0.979	1.181	0.217	1.425	0.627	ND	ND	1.425	0.627
TLS-SB-IA4-7(24.0-25.0) 030110D	1.240	0.422	0.572	0.094	1.027	0.273	ND	ND	1.027	0.273
TLS-SB-IA4-8(4.0-5.0) 030110	1.706	1.117	0.976	0.237	2.046	0.590	ND	ND	2.046	0.590
TLS-SB-IA4-8(4.0-5.0) 030110D	2.778	1.310	1.274	0.227	1.425	0.728	ND	ND	1.425	0.728
TLS-SB-IA4-9(9.0-10.0) 030310	2.722	1.227	1.134	0.191	1.356	0.879	ND	ND	1.356	0.879
TLS-SB-IA4-9(9.0-10.0) 030310D	2.033	0.912	1.077	0.188	1.749	0.594	ND	ND	1.749	0.594
TLS-SB-IA4-15(2.2-3.2) 030110	2.389	0.869	0.767	0.196	1.659	0.714	ND	ND	1.659	0.714
TLS-SB-IA4-15(2.2-3.2) 030110D	0.954	0.292	0.573	0.100	ND	ND	ND	ND	ND	ND
TLS-SB-IA4-16(13.0-14.0) 022610	1.680	1.018	0.468	0.144	1.136	0.522	ND	ND	1.136	0.522
TLS-SB-IA4-16(13.0-14.0) 022610D	1.051	0.313	0.651	0.095	0.953	0.277	ND	ND	0.953	0.277
TLS-SB-IA4-17(6.9-7.9) 022610	4.295	1.234	0.921	0.178	2.330	0.763	ND	ND	2.330	0.763
TLS-SB-IA4-17(6.9-7.9) 022610 D	4.224	1.559	1.050	0.232	1.651	0.847	ND	ND	1.651	0.847
TLS-SB-IA4-20(9.0-10.0) 030210	1.562	0.359	0.701	0.097	0.991	0.289	ND	ND	0.991	0.289
TLS-SB-IA4-20(9.0-10.0) 030210D	1.247	0.361	0.558	0.074	0.682	0.195	ND	ND	0.682	0.195
TLS-SB-IA4-22(7.0-8.0) 021810	1.643	0.977	0.722	0.152	1.086	0.473	ND	ND	1.086	0.473
TLS-SB-IA4-22(7.0-8.0) 021810D	1.315	0.399	0.729	0.102	0.728	0.230	ND	ND	0.739	0.230
TLS-SB-IA4-B01(4.0-5.0)030910	1.051	0.408	0.897	0.100	1.098	0.292	ND	ND	1.098	0.292
TLS-SB-IA4-B01(4.0-5.0)030910D	2.015	0.466	0.816	0.117	0.621	0.292	ND	ND	0.621	0.292
TLS-SB-IA5-1(4.0-5.0) 022510	1.798	0.501	0.938	0.095	0.774	0.266	ND	ND	0.774	0.266
TLS-SB-IA5-1(4.0-5.0) 022510D	1.778	0.464	0.784	0.089	0.743	0.214	ND	ND	0.743	0.214
TLS-SB-IA5-2(59.0-60.0) 022410	1.768	0.788	0.717	0.137	ND	ND	ND	ND	ND	ND
TLS-SB-IA5-2(59.0-60.0) 022410D	1.734	0.448	0.779	0.106	0.858	0.277	ND	ND	0.858	0.277
TLS-SB-IA5-4(14.0-15.0) 022310	3.262	1.277	0.939	0.249	1.181	0.561	ND	ND	1.181	0.561
TLS-SB-IA5-4(14.0-15.0) 022310D	1.718	0.893	1.101	0.232	1.305	0.509	ND	ND	1.305	0.509
TLS-SB-IA5-5(37.2-38.2) 022310	1.384	0.380	0.712	0.083	0.862	0.234	ND	ND	0.862	0.234
TLS-SB-IA5-5(37.2-38.2) 022310D	1.068	0.314	0.682	0.088	0.729	0.261	ND	ND	0.729	0.261
TLS-SB-IA5-6(9.0-10.0) 022310	1.315	0.486	0.437	0.072	0.464	0.227	ND	ND	0.464	0.227
TLS-SB-IA5-6(9.0-10.0) 022310D	0.945	0.333	0.495	0.075	0.803	0.290	ND	ND	0.803	0.290
TLS-SB-IA5-7(0.5-1.5) 022310	2.482	1.184	0.974	0.204	3.531	1.185	ND	ND	3.531	1.185
TLS-SB-IA5-7(0.5-1.5) 022310D	2.700	1.139	1.139	0.204	1.241	0.613	ND	ND	1.241	0.613
TLS-SB-IA5-12(3.3-4.3) 022410	1.576	0.524	0.675	0.108	1.095	0.327	ND	ND	1.095	0.327
TLS-SB-IA5-12(3.3-4.3) 022410D	1.230	0.362	0.701	0.094	0.612	0.160	ND	ND	0.612	0.160
TLS-SB-IA5-13(13.2-14.2) 022310	27.336	3.057	1.877	0.316	22.009	2.284	1.141	0.481	22.009	2.284
TLS-SB-IA5-13(13.2-14.2) 022310D	27.097	2.864	1.642	0.293	23.144	2.442	1.655	0.469	23.144	2.442

Sample ID	Ra-226 (pCi/g)	Ra-226 2σ (pCi/g)	Ra-228 (pCi/g)	Ra-228 2σ (pCi/g)	U-234 (pCi/g)	U-234 2σ (pCi/g)	U-235 (pCi/g)	U-235 2σ (pCi/g)	U-238 (pCi/g)	U-238 2σ (pCi/g)
TLS-SB-IA5-14(4.0-5.0) 022410	3.489	1.373	1.264	0.259	1.577	1.163	ND	ND	1.577	1.163
TLS-SB-IA5-14(4.0-5.0) 022410D	3.988	1.396	1.554	0.269	2.435	0.796	ND	ND	2.235	0.796
TLS-SB-IA5-15(2.0-3.0) 022210	1.401	0.413	0.840	0.102	0.958	0.264	ND	ND	0.958	0.264
TLS-SB-IA5-15(2.0-3.0) 022210D	1.131	1.370	0.179	0.135	ND	ND	ND	ND	ND	ND
TLS-SB-IA6-5(23.0-24.0)031810	2.617	1.316	0.945	0.236	3.120	0.788	ND	ND	3.120	0.788
TLS-SB-IA6-5(23.0-24.0)031810D	1.146	0.410	1.075	0.153	1.613	0.359	ND	ND	1.613	359.000
TLS-SB-IA6-6(18.0-19.0)031810	2.323	1.413	1.205	0.264	3.396	1.372	ND	ND	3.396	1.372
TLS-SB-IA6-6(18.0-19.0)031810D	2.479	0.652	0.945	0.131	1.928	0.453	ND	ND	1.928	0.453
TLS-SB-IA6-12(17.0-18.0)031610	1.221	0.509	0.980	0.144	0.074	0.027	ND	ND	1.001	0.282
TLS-SB-IA6-12(17.0-18.0)031610D	1.641	0.384	0.898	0.094	1.292	0.276	ND	ND	1.292	0.276
TLS-SB-IA6-13(23.0-24.0)031610	1.926	0.486	0.682	0.081	1.033	0.310	ND	ND	1.033	0.310
TLS-SB-IA6-13(23.0-24.0)031610D	2.878	1.500	0.598	0.248	1.766	0.685	ND	ND	1.766	0.685
TLS-SB-IA6-16(7.0-8.0)030810	1.218	0.391	0.637	0.132	0.704	0.198	ND	ND	0.704	0.198
TLS-SB-IA6-16(7.0-8.0)030810D	1.542	0.372	0.641	0.093	0.778	0.284	ND	ND	0.778	0.284

1. ND means analyte was not detected.

Radiological Duplicates								
Sample ID	Am-241 (pCi/g)	Am-241 2σ (pCi/g)	Th-228 (pCi/g)	Th-228 2σ (pCi/g)	Th-230 (pCi/g)	Th-230 2σ (pCi/g)	Th-232 (pCi/g)	Th-232 2σ (pCi/g)
TLS-SB-IA1-3(26.0-27.0)031510	ND	ND	0.848	0.173	0.725	0.152	0.624	0.138
TLS-SB-IA1-3(26.0-27.0)031510D	ND	ND	0.731	0.154	0.933	0.154	0.639	0.136
TLS-SB-IA1-9(6.7-7.7)031110	ND	ND	2.703	0.453	3.511	0.546	3.030	0.486
TLS-SB-IA1-9(6.7-7.7)031110D	ND	ND	2.995	0.465	3.060	0.467	2.188	0.358
TLS-SB-IA1-12(6.5-7.5)031610	ND	ND	0.995	0.200	82.916	10.116	1.023	0.197
TLS-SB-IA1-12(6.5-7.5)031610D	ND	ND	1.154	0.211	74.006	9.026	1.072	0.196
TLS-SB-IA1-13(3.0-4.0) 031010	ND	ND	1.490	0.256	1.625	0.269	1.472	0.249
TLS-SB-IA1-13(3.0-4.0) 031010D	ND	ND	2.572	0.496	2.457	0.472	2.434	0.469
TLS-SB-IA1-16(13.2-14.2)031210	ND	ND	0.799	0.142	73.779	8.969	0.811	0.141
TLS-SB-IA1-16(13.2-14.2)031210D	ND	ND	1.821	0.328	232.920	28.274	1.465	0.274
TLS-SB-IA1-20(4.8-5.8)031010	ND	ND	0.770	0.166	0.703	0.152	0.706	0.153
TLS-SB-IA1-20(4.8-5.8)031010D	ND	ND	0.730	0.152	0.720	0.147	0.615	0.132
TLS-SB-IA1-B9(17.6-18.6)032610	ND	ND	1.198	0.223	2.239	0.351	0.934	0.184
TLS-SB-IA1-B9(17.6-18.6)032610D	ND	ND	1.482	0.263	2.500	0.389	1.361	0.244
TLS-SB-IA1-B11(23.0-24.0)032610	ND	ND	0.785	0.154	11.819	1.500	0.689	0.139
TLS-SB-IA1-B11(23.0-24.0)032610D	ND	ND	0.806	0.168	11.123	1.427	0.906	0.176
TLS-SB-IA1-B15(15.0-16.0)032910	ND	ND	3.771	0.582	4.601	0.678	3.669	0.563
TLS-SB-IA1-B15(15.0-16.0)032910D	ND	ND	3.443	0.629	4.752	0.781	3.936	0.676
TLS-SB-IA1-B5(15.0-16.0)032610	ND	ND	1.595	0.310	2.887	0.472	1.773	0.329
TLS-SB-IA1-B5(15.0-16.0)032610D	ND	ND	1.983	0.331	2.387	0.377	2.021	0.331
TLS-SB-IA1-DOE-B1(6.0-7.0)031810	ND	ND	1.743	1.188	2.814	1.277	0.945	0.712
TLS-SB-IA1-DOE-B1(6.0-7.0)031810D	ND	ND	1.087	0.193	4.252	0.579	0.968	0.173
TLS-SB-IA1-DOE-B2(3.0-4.0)031710	ND	ND	1.658	0.285	2.421	0.374	1.719	0.286
TLS-SB-IA1-DOE-B2(3.0-4.0)031710D	ND	ND	2.872	0.519	2.805	0.497	2.042	0.398
TLS-SB-IA1-DOE-B3(5.3-6.3)031810	ND	ND	0.690	0.131	52.203	6.363	0.537	0.106
TLS-SB-IA1-DOE-B3(5.3-6.3)031810D	ND	ND	1.091	0.218	58.195	7.133	1.134	0.215
TLS-SB-IA2-1(9.0-10.0)031910	ND	ND	0.689	0.150	0.960	0.183	0.651	0.141
TLS-SB-IA2-1(9.0-10.0)031910D	ND	ND	0.757	0.191	0.900	0.203	0.579	0.155
TLS-SB-IA2-3(10.0-11.0)032310	ND	ND	0.897	0.166	1.246	0.208	0.740	0.143
TLS-SB-IA2-3(10.0-11.0)032310D	ND	ND	1.041	0.203	1.380	0.244	0.912	0.182
TLS-SB-IA2-7(13.0-14.0)032210	ND	ND	3.397	0.567	4.003	0.636	3.367	0.556
TLS-SB-IA2-7(13.0-14.0)032210D	ND	ND	2.889	0.509	3.074	0.526	2.710	0.478

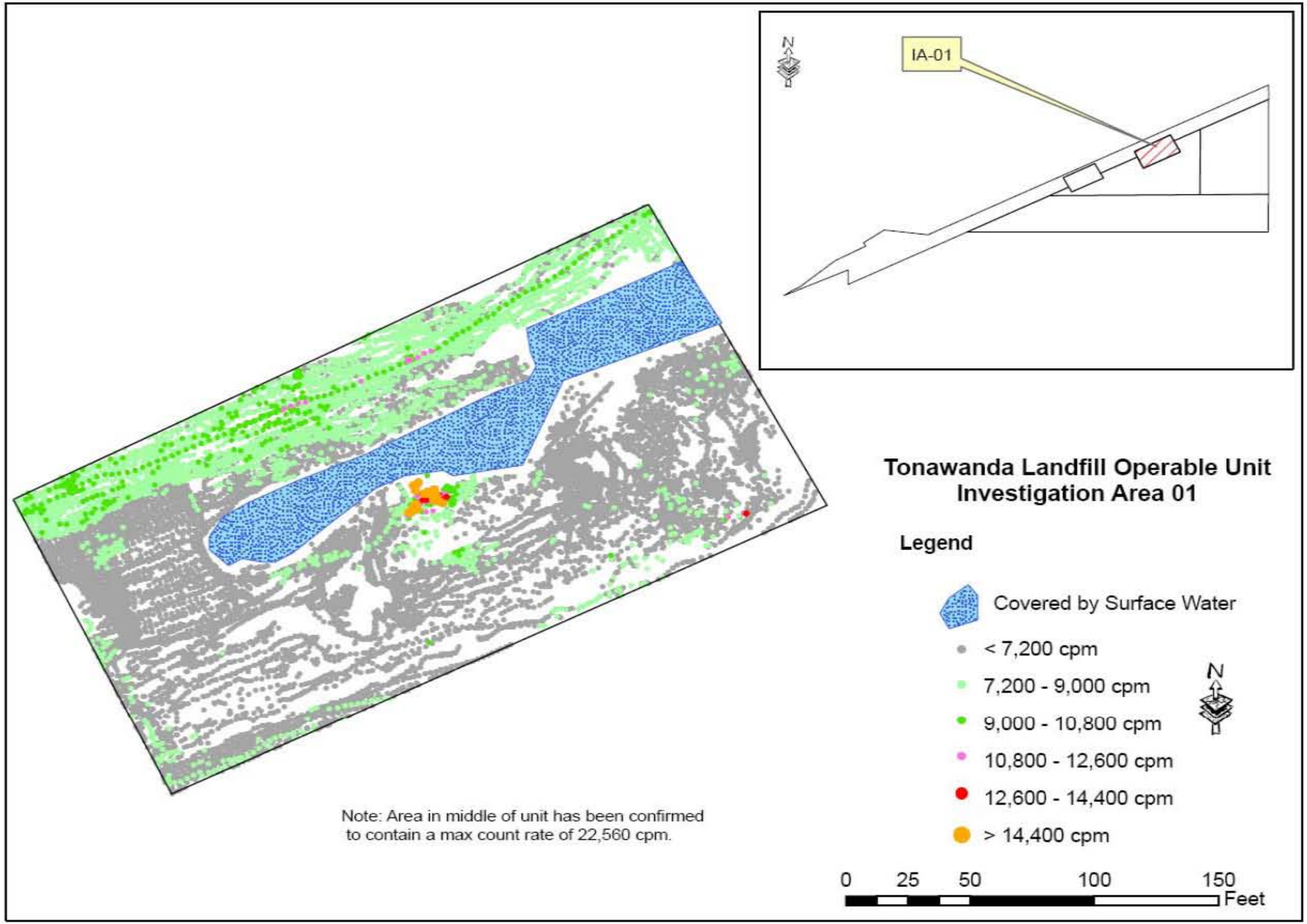
Sample ID	Am-241 (pCi/g)	Am-241 2σ (pCi/g)	Th-228 (pCi/g)	Th-228 2σ (pCi/g)	Th-230 (pCi/g)	Th-230 2σ (pCi/g)	Th-232 (pCi/g)	Th-232 2σ (pCi/g)
TLS-SB-IA2-9(6.0-7.0)032210	ND	ND	1.025	0.191	1.084	0.196	0.961	0.179
TLS-SB-IA2-9(6.0-7.0)032210D	ND	ND	0.931	0.198	1.205	0.228	1.023	0.203
TLS-SB-IA2-15(1.0-2.0)032410	ND	ND	1.119	0.205	1.520	0.253	0.952	0.179
TLS-SB-IA2-15(1.0-2.0)032410D	ND	ND	0.748	0.149	1.261	0.213	0.665	0.135
TLS-SB-IA2-17(6.0-7.0)032510	ND	ND	0.654	0.134	1.229	0.205	0.569	0.118
TLS-SB-IA2-17(6.0-7.0)032510D	ND	ND	0.562	0.110	0.742	0.131	0.480	0.097
TLS-SB-IA2-22(5.0-6.0)032510	ND	ND	0.730	0.152	1.025	0.188	0.810	0.159
TLS-SB-IA2-22(5.0-6.0)032510D	ND	ND	0.647	0.140	1.321	0.226	0.827	0.160
TLS-SB-IA3-7(3.3-4.3)021510	ND	ND	0.770	0.133	0.796	0.134	0.829	0.138
TLS-SB-IA3-7(3.3-4.3)021510D	ND	ND	0.824	0.133	0.823	0.131	0.669	0.111
TLS-SB-IA3-8(8.0-9.0)021210	ND	ND	0.815	0.133	0.867	0.140	0.797	0.131
TLS-SB-IA3-8(8.0-9.0)021210D	ND	ND	0.807	0.126	0.827	0.129	0.900	0.137
TLS-SB-IA3-11(4.0-5.0)021620	ND	ND	0.765	0.149	0.864	0.163	0.900	0.165
TLS-SB-IA3-11(4.0-5.0)021620D	ND	ND	0.942	0.155	0.990	0.160	0.962	0.157
TLS-SB-IA3-15(4.0-5.0)021710	ND	ND	0.769	0.145	0.740	0.138	0.796	0.145
TLS-SB-IA3-15(4.0-5.0)021710D	ND	ND	0.854	0.152	0.757	0.139	0.647	0.124
TLS-SB-IA3-16(7.8-8.8)021710	ND	ND	0.658	0.120	0.742	0.132	0.610	0.113
TLS-SB-IA3-16(7.8-8.8)021710D	ND	ND	0.660	0.111	0.719	0.117	0.733	0.119
TLS-SB-IA3-17(9.0-10.0)021710	ND	ND	0.622	0.108	0.648	0.110	0.685	0.115
TLS-SB-IA3-17(9.0-10.0)021710D	ND	ND	0.720	0.129	0.730	0.128	0.716	0.127
TLS-SB-IA3-19(8.0-9.0) 021810	ND	ND	0.667	0.151	0.877	0.177	0.672	0.148
TLS-SB-IA3-19(8.0-9.0) 021810D	ND	ND	0.844	0.158	0.903	0.163	0.863	0.158
TLS-SB-IA3-22(4.6-5.6)021710	ND	ND	0.585	0.091	0.727	0.107	0.553	0.085
TLS-SB-IA3-22(4.6-5.6)021710D	ND	ND	0.693	0.104	0.772	0.113	0.480	0.077
TLS-SB-IA3-D07(9.6-10.6)031510	ND	ND	0.543	0.141	1.073	0.213	0.697	0.160
TLS-SB-IA3-D07(9.6-10.6)031510D	ND	ND	0.791	0.161	0.832	0.163	0.779	0.155
TLS-SB-IA3-D10(3.3-4.3)031210	ND	ND	0.701	0.147	0.652	0.136	0.747	0.149
TLS-SB-IA3-D10(3.3-4.3)031210D	ND	ND	0.576	0.288	1.133	0.350	1.083	0.339
TLS-SB-IA3FL-1(5.0-6.0)030510	ND	ND	0.581	0.132	0.611	0.132	0.329	0.090
TLS-SB-IA3FL-1(5.0-6.0)030510D	ND	ND	0.641	0.140	0.694	0.143	0.437	0.106
TLS-SB-IA3FL-6(13.0-14.0) 030410	ND	ND	0.682	0.139	0.800	0.160	0.830	0.156
TLS-SB-IA3FL-6(13.0-14.0) 030410D	ND	ND	0.584	0.138	0.753	0.157	0.822	0.166
TLS-SB-IA4-3(10.0-11.0)030310	ND	ND	0.708	0.157	0.828	0.169	0.725	0.155
TLS-SB-IA4-3(10.0-11.0)030310D	ND	ND	0.635	0.135	0.798	0.154	0.664	0.136

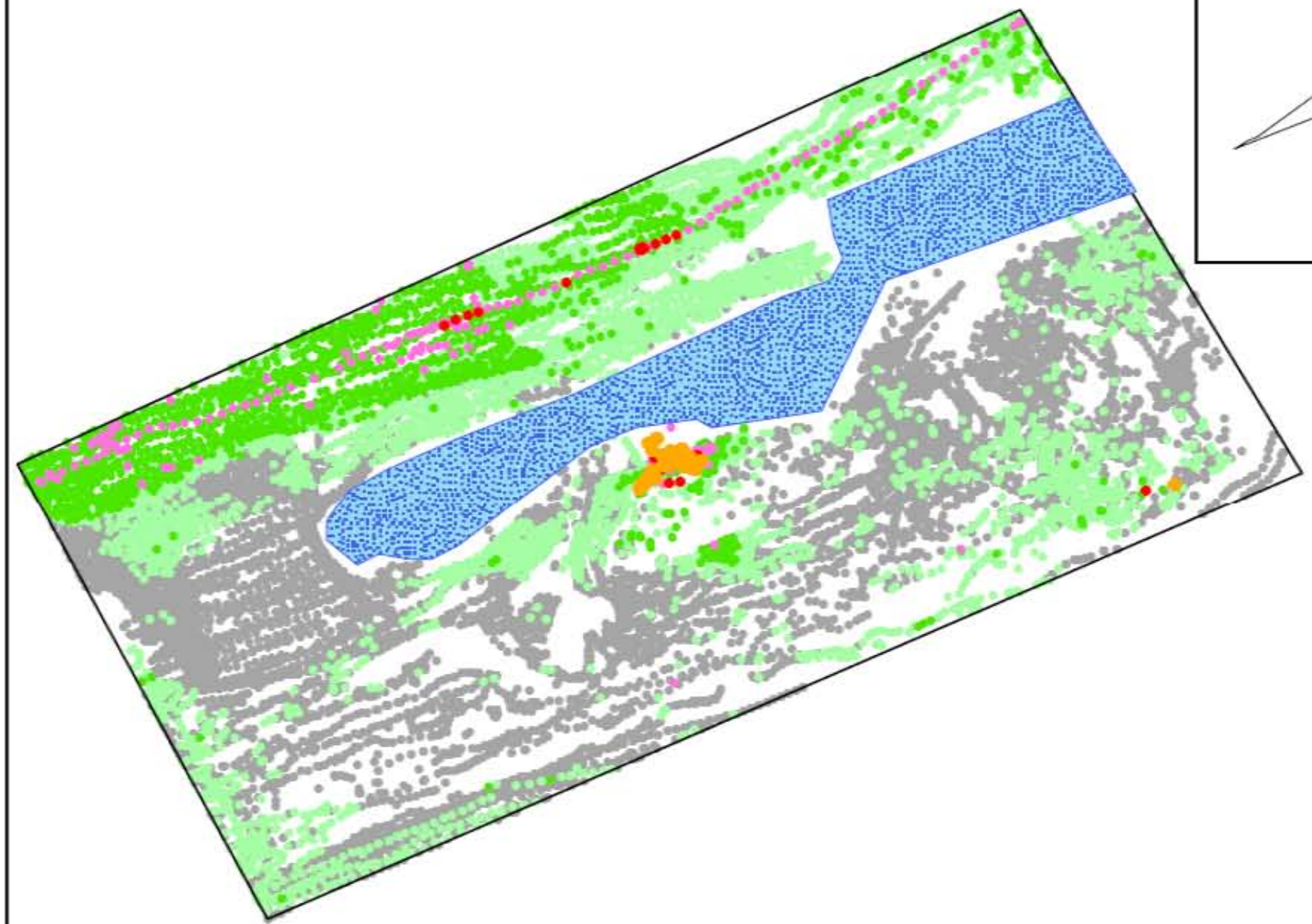
Sample ID	Am-241 (pCi/g)	Am-241 2σ (pCi/g)	Th-228 (pCi/g)	Th-228 2σ (pCi/g)	Th-230 (pCi/g)	Th-230 2σ (pCi/g)	Th-232 (pCi/g)	Th-232 2σ (pCi/g)
TLS-SB-IA4-7(24.0-25.0) 030110	ND	ND	0.727	0.159	0.911	0.180	0.853	0.172
TLS-SB-IA4-7(24.0-25.0) 030110D	ND	ND	0.681	0.115	0.863	0.174	0.920	0.181
TLS-SB-IA4-8(4.0-5.0) 030110	ND	ND	0.579	0.117	0.681	0.128	0.586	0.115
TLS-SB-IA4-8(4.0-5.0) 030110D	ND	ND	0.648	0.133	0.828	0.154	0.834	0.155
TLS-SB-IA4-9(9.0-10.0) 030310	ND	ND	0.696	0.213	1.542	0.333	0.776	0.218
TLS-SB-IA4-9(9.0-10.0) 030310D	ND	ND	0.736	0.142	0.997	0.172	0.904	0.160
TLS-SB-IA4-15(2.2-3.2) 030110	ND	ND	0.641	0.144	0.853	0.171	0.632	0.140
TLS-SB-IA4-15(2.2-3.2) 030110D	ND	ND	0.375	0.097	0.792	0.149	0.574	0.120
TLS-SB-IA4-16(13.0-14.0) 022610	0.525	0.133	0.840	0.172	0.649	0.141	0.632	0.138
TLS-SB-IA4-16(13.0-14.0) 022610D	0.605	0.055	0.565	0.116	0.665	0.127	0.446	0.097
TLS-SB-IA4-17(6.9-7.9) 022610	ND	ND	0.764	0.160	1.628	0.267	0.914	0.175
TLS-SB-IA4-17(6.9-7.9) 022610 D	ND	ND	0.719	0.135	1.761	0.264	0.615	0.118
TLS-SB-IA4-20(9.0-10.0) 030210	ND	ND	0.533	0.122	0.606	0.128	0.336	0.089
TLS-SB-IA4-20(9.0-10.0) 030210D	ND	ND	0.574	0.126	0.815	0.156	0.687	0.138
TLS-SB-IA4-22(7.0-8.0) 021810	ND	ND	0.632	0.120	0.612	0.116	0.611	0.115
TLS-SB-IA4-22(7.0-8.0) 021810D	ND	ND	0.634	0.128	0.543	0.112	0.648	0.126
TLS-SB-IA4-B01(4.0-5.0)030910	ND	ND	0.792	0.184	1.963	0.331	0.691	0.161
TLS-SB-IA4-B01(4.0-5.0)030910D	ND	ND	0.749	0.164	0.938	0.184	0.617	0.139
TLS-SB-IA5-1(4.0-5.0) 022510	ND	ND	0.718	0.156	0.632	0.141	0.940	0.183
TLS-SB-IA5-1(4.0-5.0) 022510D	ND	ND	0.932	0.191	0.859	0.176	0.667	0.149
TLS-SB-IA5-2(59.0-60.0) 022410	ND	ND	0.675	0.131	0.750	0.138	0.574	0.115
TLS-SB-IA5-2(59.0-60.0) 022410D	ND	ND	0.749	0.175	0.757	0.167	0.606	0.146
TLS-SB-IA5-4(14.0-15.0) 022310	ND	ND	0.497	0.111	0.558	0.116	0.416	0.095
TLS-SB-IA5-4(14.0-15.0) 022310D	ND	ND	0.752	0.157	0.767	0.155	0.571	0.128
TLS-SB-IA5-5(37.2-38.2) 022310	ND	ND	0.722	0.145	0.699	0.139	0.618	0.128
TLS-SB-IA5-5(37.2-38.2) 022310D	ND	ND	0.701	0.144	0.704	0.141	0.629	0.130
TLS-SB-IA5-6(9.0-10.0) 022310	ND	ND	0.464	0.111	0.393	0.096	0.330	0.085
TLS-SB-IA5-6(9.0-10.0) 022310D	ND	ND	0.436	0.122	0.514	0.128	0.363	0.105
TLS-SB-IA5-7(0.5-1.5) 022310	ND	ND	0.909	0.203	0.710	0.166	0.791	0.177
TLS-SB-IA5-7(0.5-1.5) 022310D	ND	ND	0.905	0.170	0.684	0.136	0.518	0.114
TLS-SB-IA5-12(3.3-4.3) 022410	ND	ND	0.500	0.109	0.614	0.120	0.598	0.118
TLS-SB-IA5-12(3.3-4.3) 022410D	ND	ND	0.616	0.132	0.736	0.144	0.585	0.123
TLS-SB-IA5-13(13.2-14.2) 022310	ND	ND	1.739	0.342	6.878	0.978	2.140	0.388
TLS-SB-IA5-13(13.2-14.2) 022310D	ND	ND	1.399	0.235	8.911	1.148	1.233	0.210

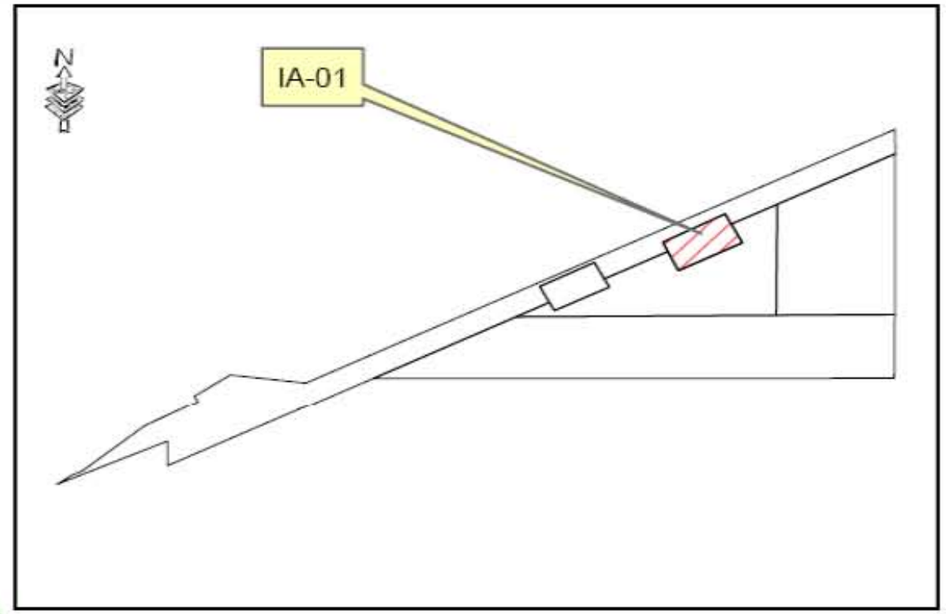
Sample ID	Am-241 (pCi/g)	Am-241 2σ (pCi/g)	Th-228 (pCi/g)	Th-228 2σ (pCi/g)	Th-230 (pCi/g)	Th-230 2σ (pCi/g)	Th-232 (pCi/g)	Th-232 2σ (pCi/g)
TLS-SB-IA5-14(4.0-5.0) 022410	ND	ND	1.416	0.268	1.551	0.279	1.225	0.235
TLS-SB-IA5-14(4.0-5.0) 022410D	ND	ND	1.532	0.286	1.476	0.272	0.933	0.200
TLS-SB-IA5-15(2.0-3.0) 022210	ND	ND	0.790	0.159	0.845	0.162	0.741	0.148
TLS-SB-IA5-15(2.0-3.0) 022210D	ND	ND	0.805	0.152	0.776	0.145	0.745	0.140
TLS-SB-IA6-5(23.0-24.0)031810	ND	ND	0.936	0.186	0.986	0.187	1.277	0.225
TLS-SB-IA6-5(23.0-24.0)031810D	ND	ND	1.044	0.202	0.823	0.167	0.556	0.129
TLS-SB-IA6-6(18.0-19.0)031810	ND	ND	0.748	0.155	1.189	0.209	0.732	0.148
TLS-SB-IA6-6(18.0-19.0)031810D	0.128	0.061	0.833	0.172	1.140	0.207	0.877	0.171
TLS-SB-IA6-12(17.0-18.0)031610	ND	ND	0.777	0.168	0.954	0.188	0.731	0.157
TLS-SB-IA6-12(17.0-18.0)031610D	ND	ND	0.721	0.149	0.734	0.146	0.551	0.120
TLS-SB-IA6-13(23.0-24.0)031610	ND	ND	0.493	0.117	1.380	0.229	0.756	0.148
TLS-SB-IA6-13(23.0-24.0)031610D	ND	ND	0.851	0.169	1.662	0.268	1.703	0.272
TLS-SB-IA6-16(7.0-8.0)030810	ND	ND	0.726	0.142	0.807	0.149	0.737	0.140
TLS-SB-IA6-16(7.0-8.0)030810D	ND	ND	0.682	0.141	0.885	0.165	0.795	0.153

1. ND means analyte was not detected.

Appendix H. Gamma Walkover Survey Maps


N
IA-01
Tonawanda Landfill Operable Unit
Investigation Area 01
Legend
Covered by Surface Water
< 7,200 cpm
7,200 - 9,000 cpm
9,000 - 10,800 cpm
10,800 - 12,600 cpm
12,600 - 14,400 cpm
> 14,400 cpm
N
0
25
50
100
150
Feet
Note: Area in middle of unit has been confirmed
to contain a max count rate of 22,560 cpm.





Tonawanda Landfill Operable Unit
Investigation Area 01

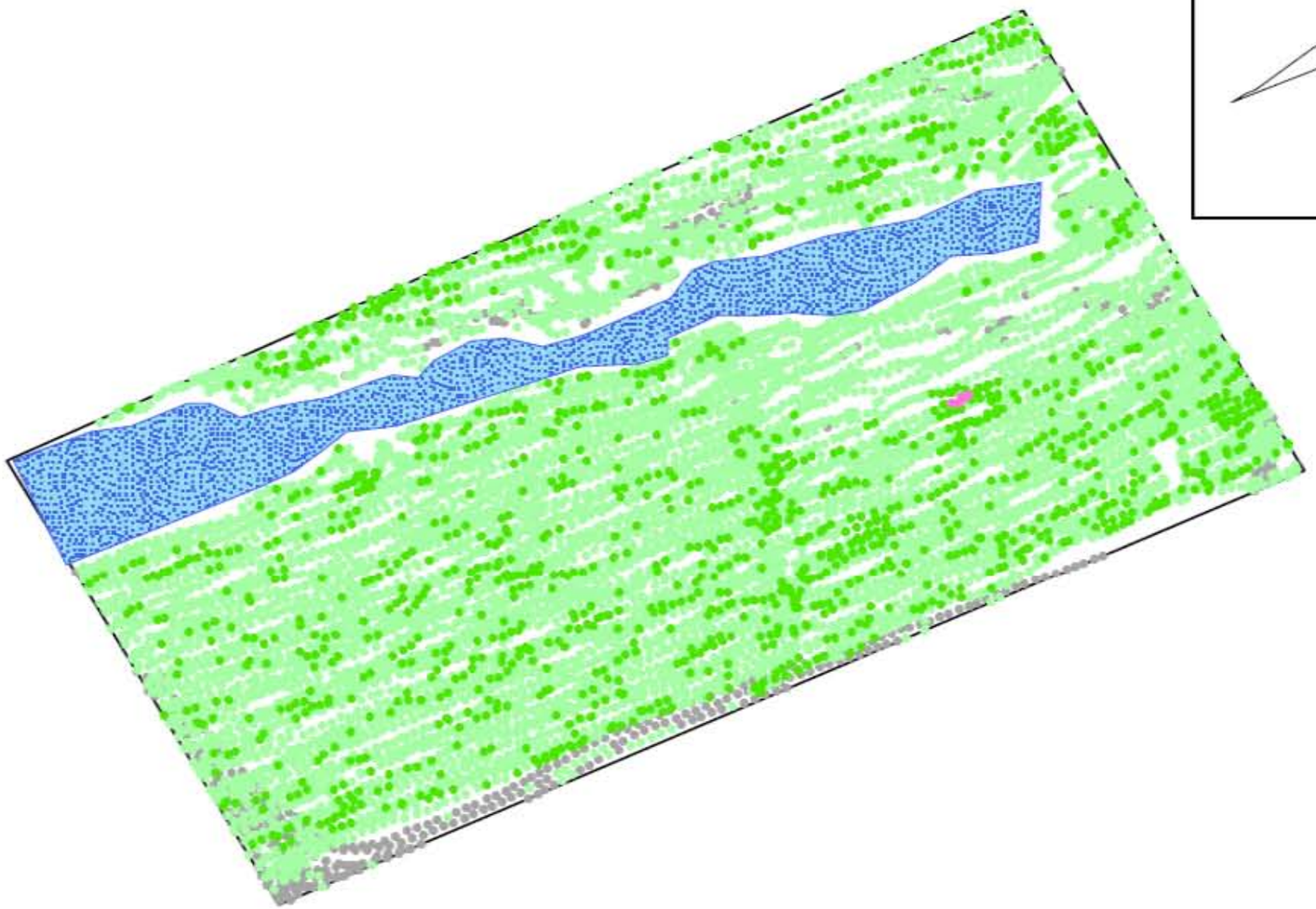
Legend

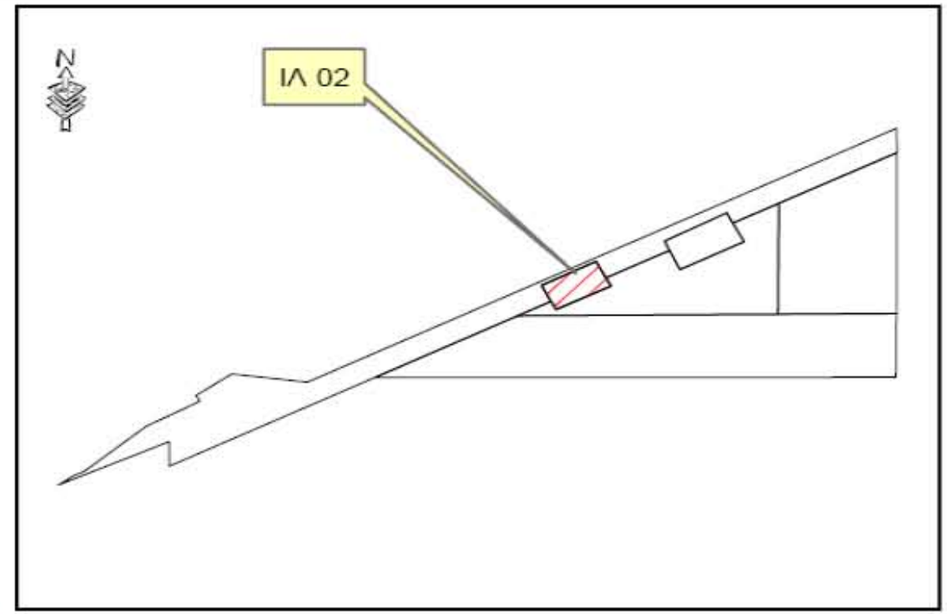
- Covered by Surface Water
- < Mean
- Mean + 1 St. Dev.
- Mean + 2 St. Dev.
- Mean + 3 St. Dev.
- Mean + 4 St. Dev
- > Mean + 4 St. Dev.

N

0 25 50 100 150 Feet

Note: Area in middle of unit has been confirmed to contain a max count rate of 22,560 cpm.





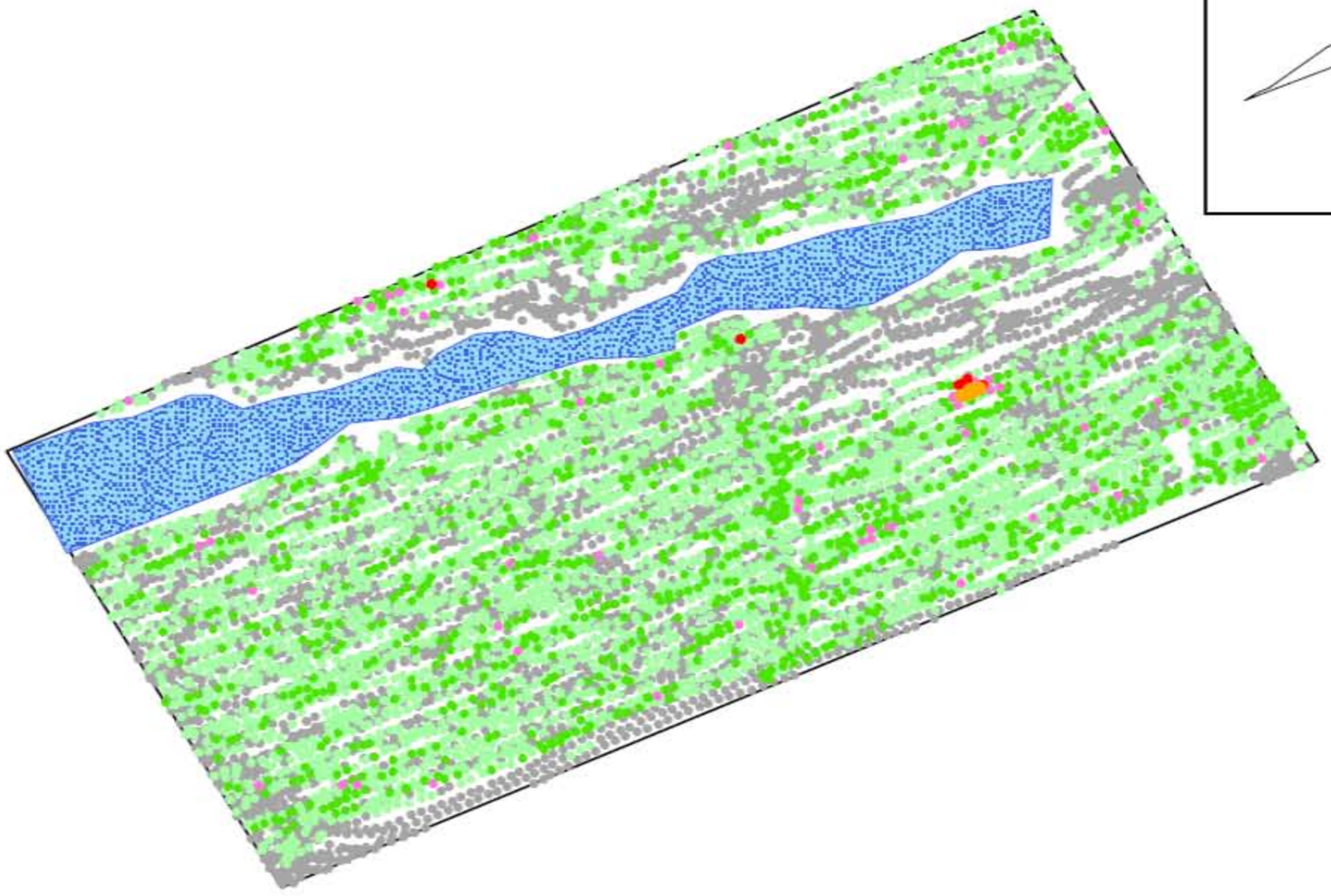
Tonawanda Landfill Operable Unit
Investigation Area 02

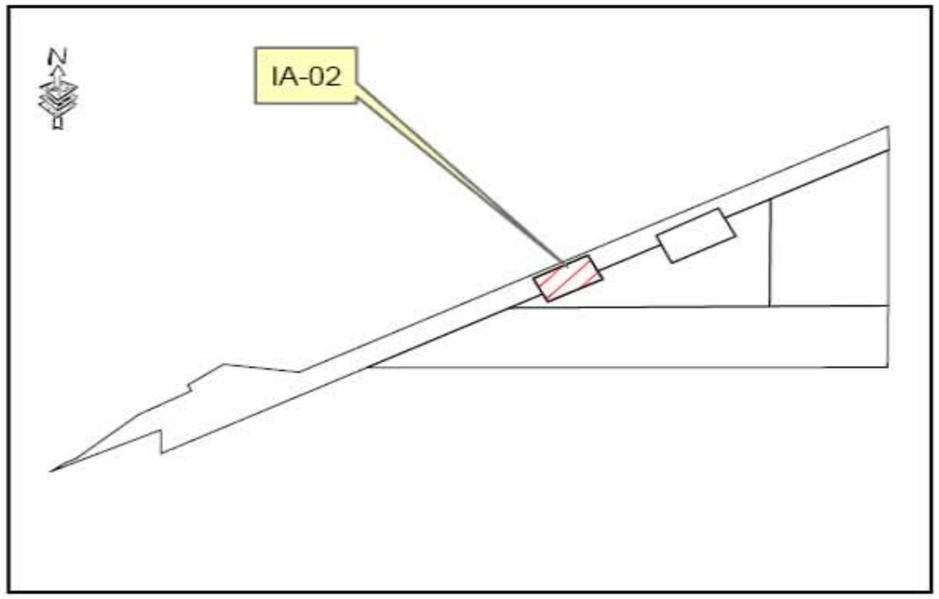
Legend

- Covered by Surface Water
- < 7,200 cpm
- 7,200 - 9,000 cpm
- 9,000 - 10,800 cpm
- 10,800 - 12,600 cpm
- 12,600 - 14,400 cpm
- > 14,400 cpm

N

0 25 50 100 150 Feet





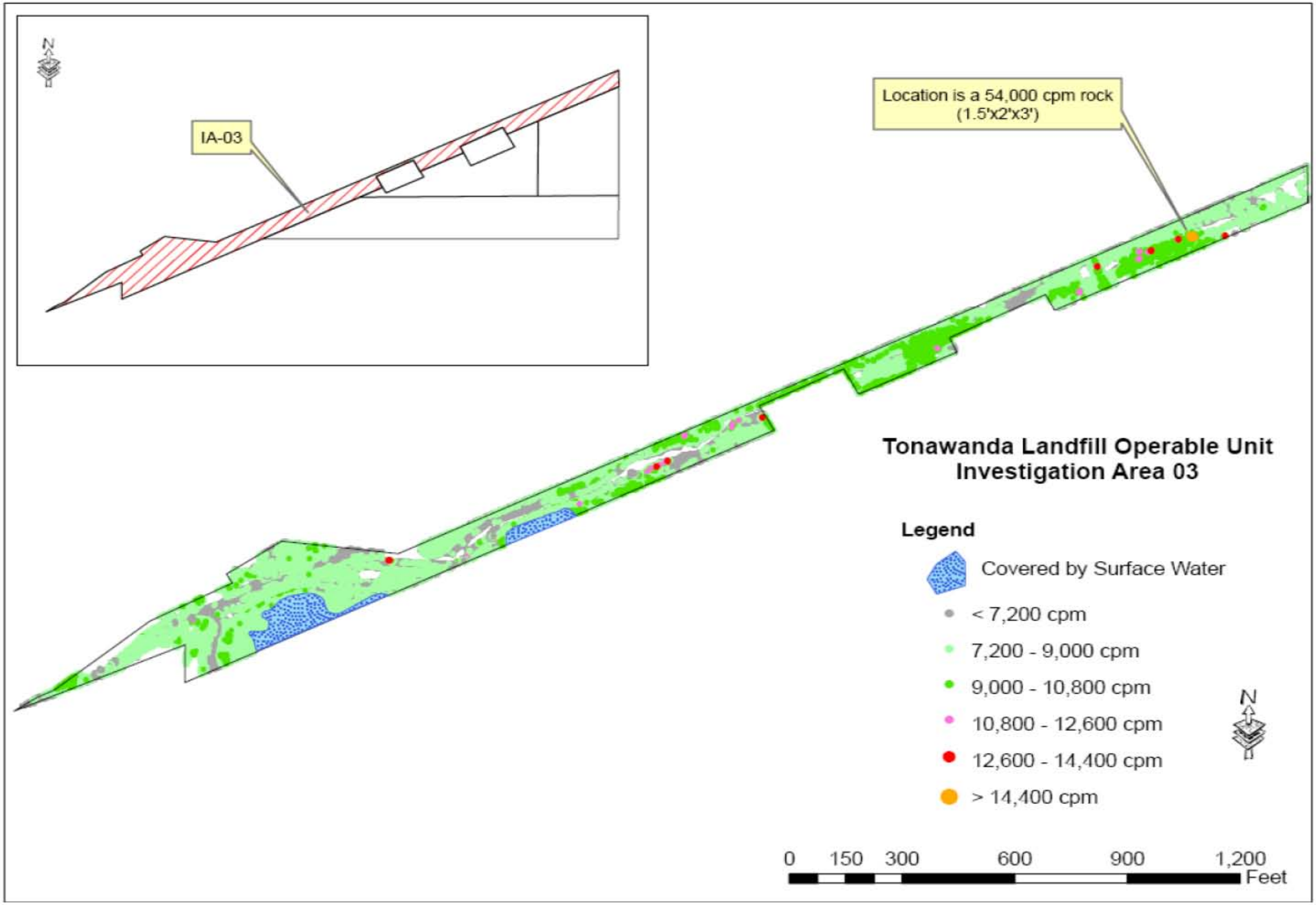
Tonawanda Landfill Operable Unit
Investigation Area 02

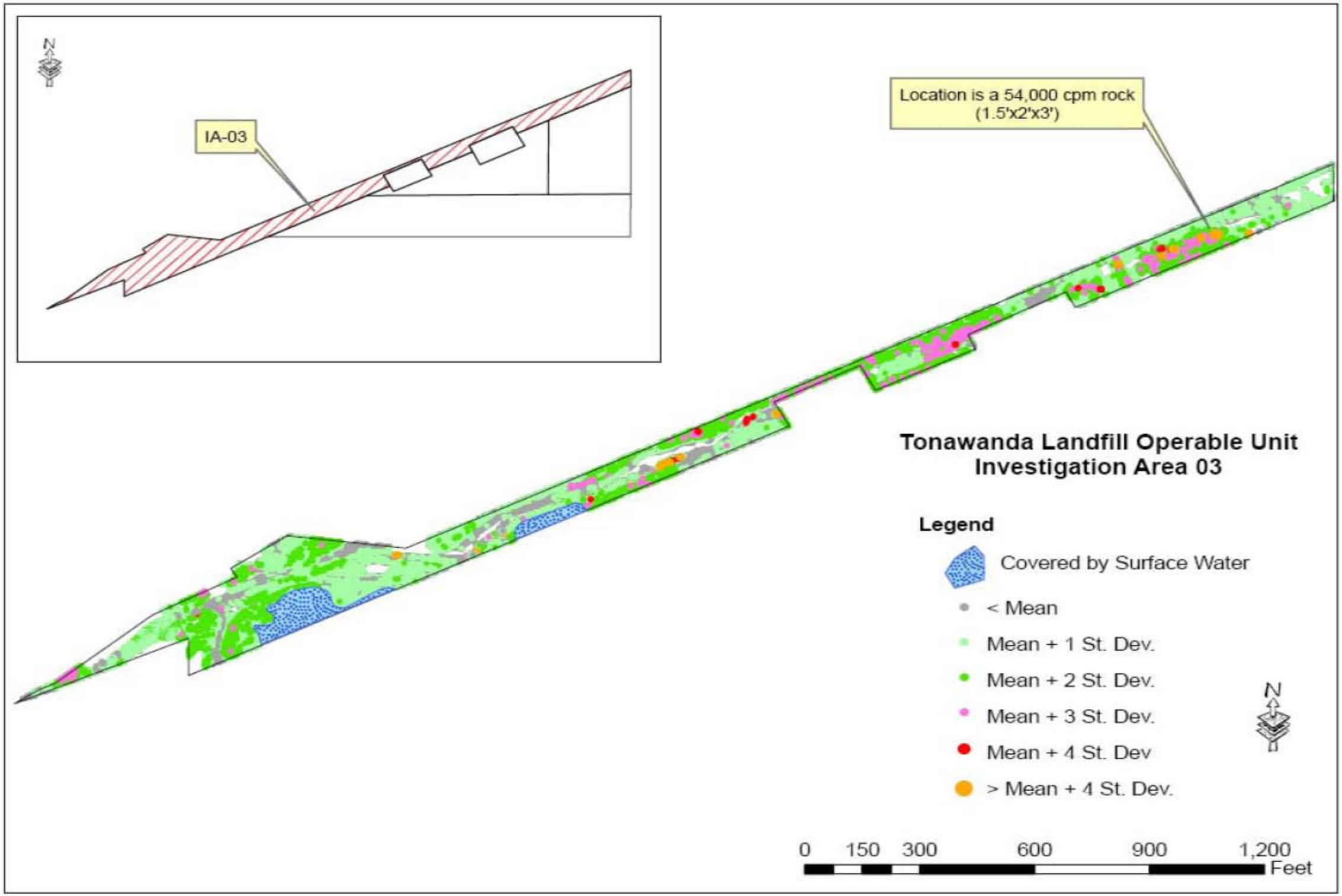
Legend

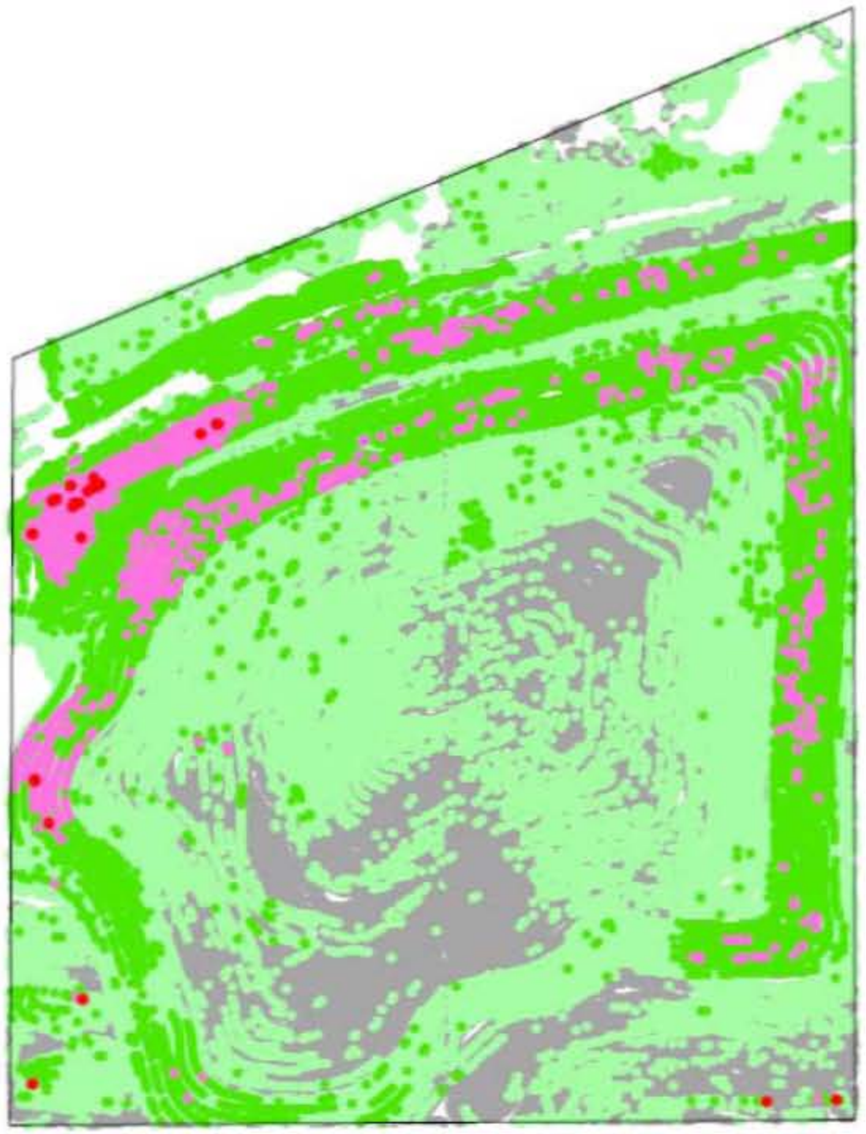
- Covered by Surface Water
- < Mean
- Mean + 1 St. Dev.
- Mean + 2 St. Dev.
- Mean + 3 St. Dev.
- Mean + 4 St. Dev
- > Mean + 4 St. Dev.

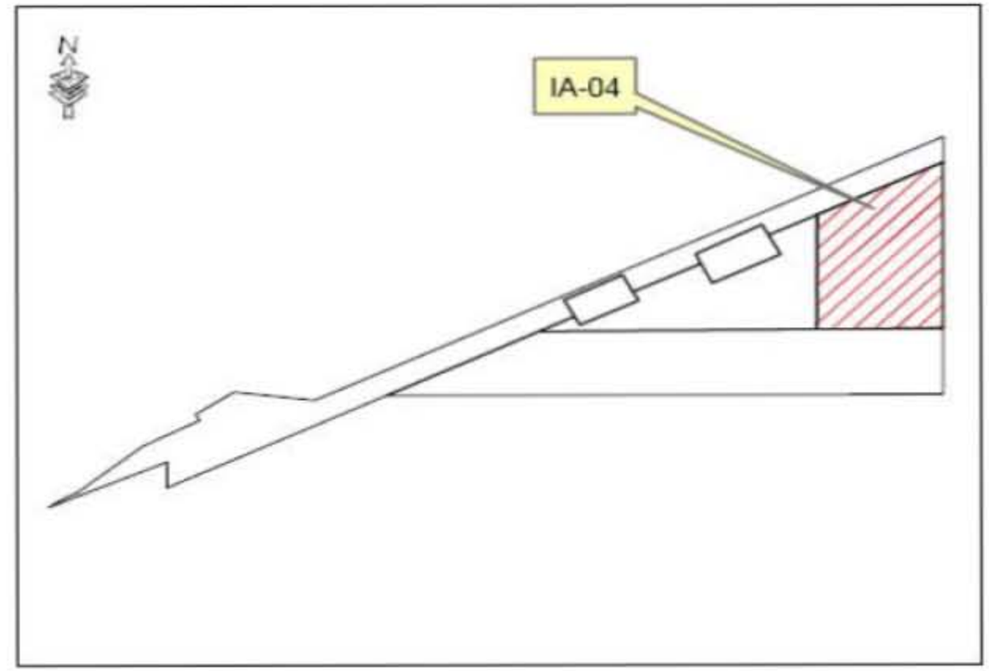
N

0 25 50 100 150 Feet


N
IA-03
Location is a 54,000 cpm rock
(1.5'x2'x3')
Tonawanda Landfill Operable Unit
Investigation Area 03
Legend
Covered by Surface Water
< 7,200 cpm
7,200 - 9,000 cpm
9,000 - 10,800 cpm
10,800 - 12,600 cpm
12,600 - 14,400 cpm
> 14,400 cpm
N
0
150
300
600
900
1,200
Feet


N
IA-03
Location is a 54,000 cpm rock
(1.5'x2'x3')
Tonawanda Landfill Operable Unit
Investigation Area 03
Legend
Covered by Surface Water
< Mean
Mean + 1 St. Dev.
Mean + 2 St. Dev.
Mean + 3 St. Dev.
Mean + 4 St. Dev
> Mean + 4 St. Dev.
N
0
150
300
600
900
1,200
Feet





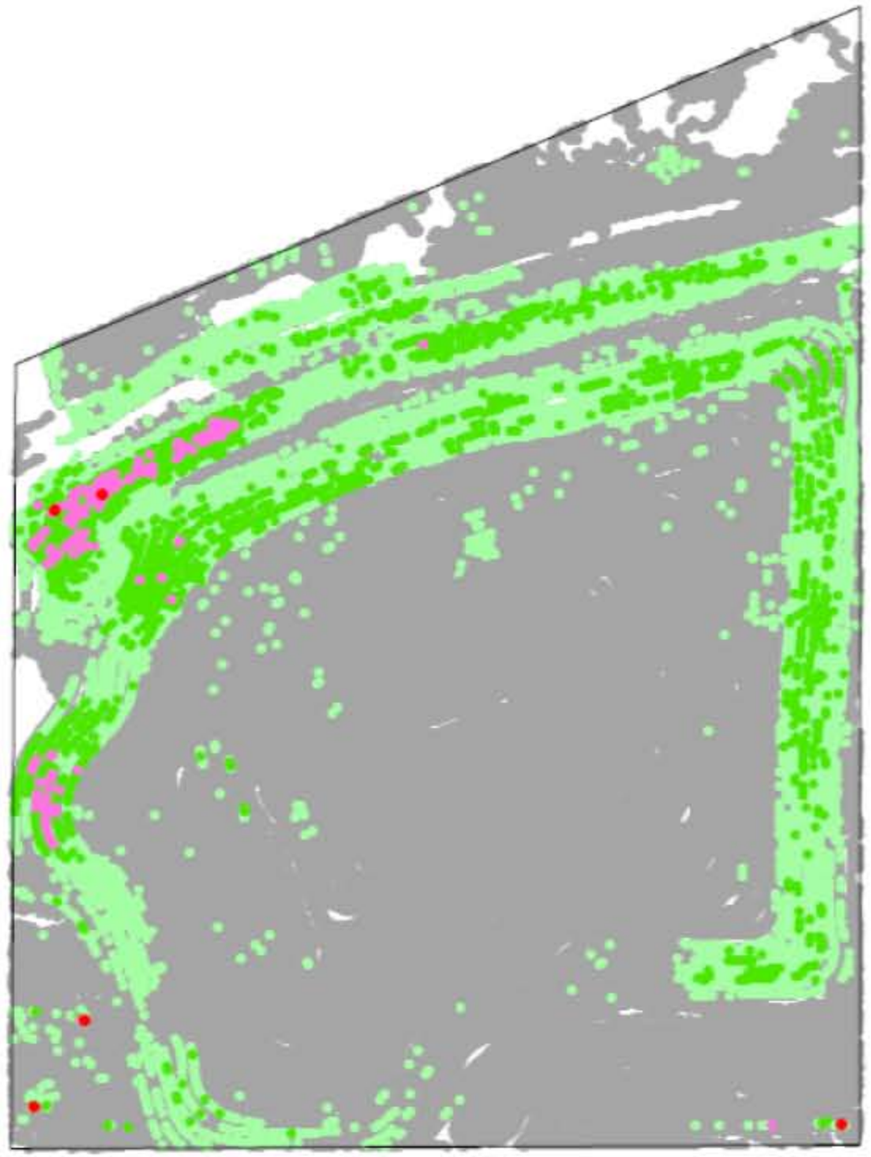
Tonawanda Landfill Operable Unit
Investigation Area 04

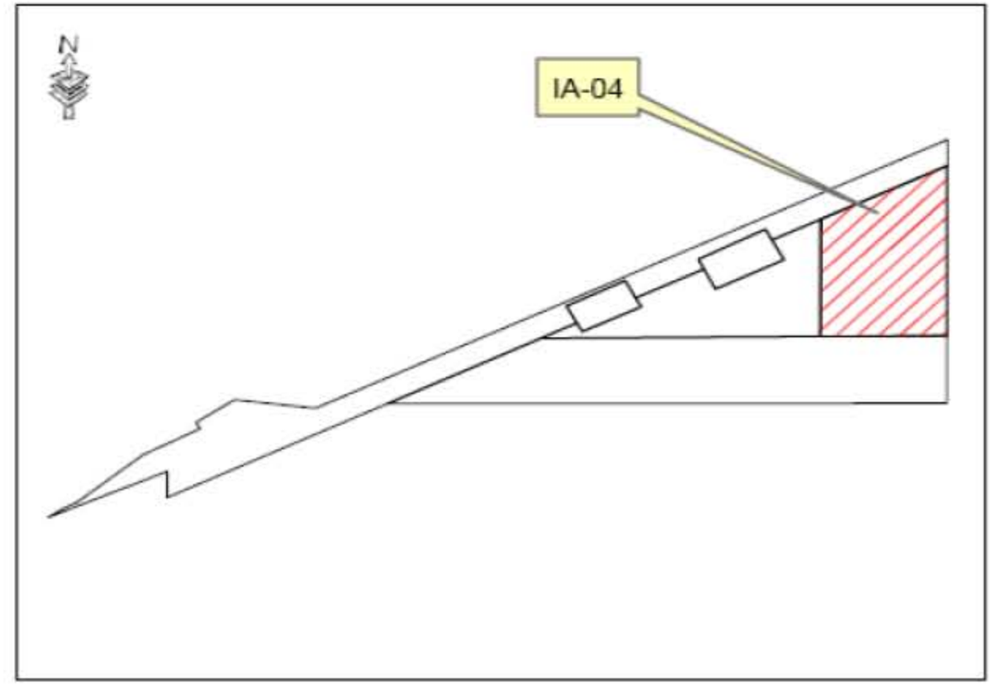
Legend

- < 7,200 cpm
- 7,200 - 9,000 cpm
- 9,000 - 10,800 cpm
- 10,800 - 12,600 cpm
- 12,600 - 14,400 cpm
- > 14,400 cpm

N

0 50 100 200 300 400 Feet





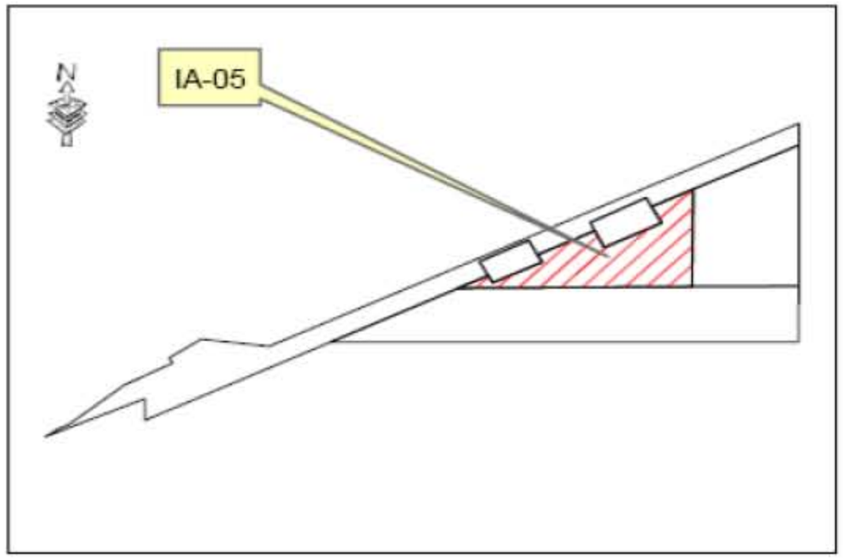
Tonawanda Landfill Operable Unit
Investigation Area 04

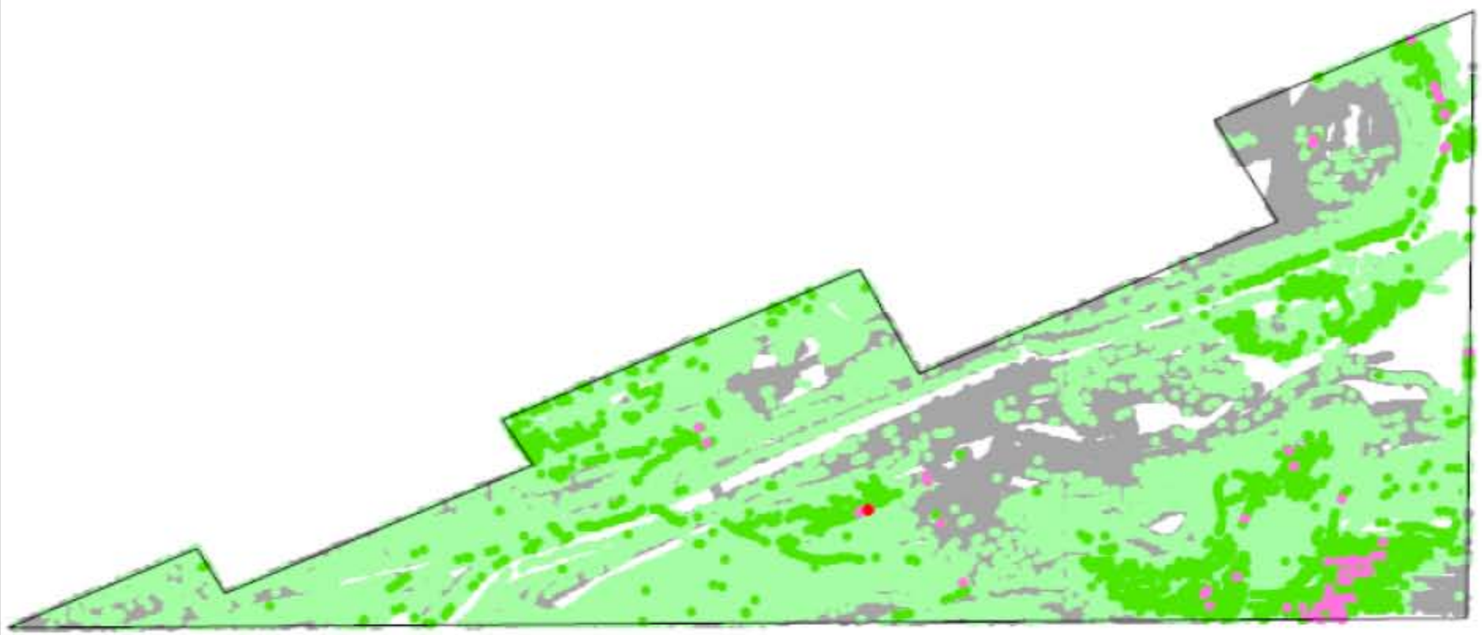
Legend

- < Mean
- Mean + 1 St. Dev.
- Mean + 2 St. Dev.
- Mean + 3 St. Dev.
- Mean + 4 St. Dev
- > Mean + 4 St. Dev.

N

0 50 100 200 300 400 Feet





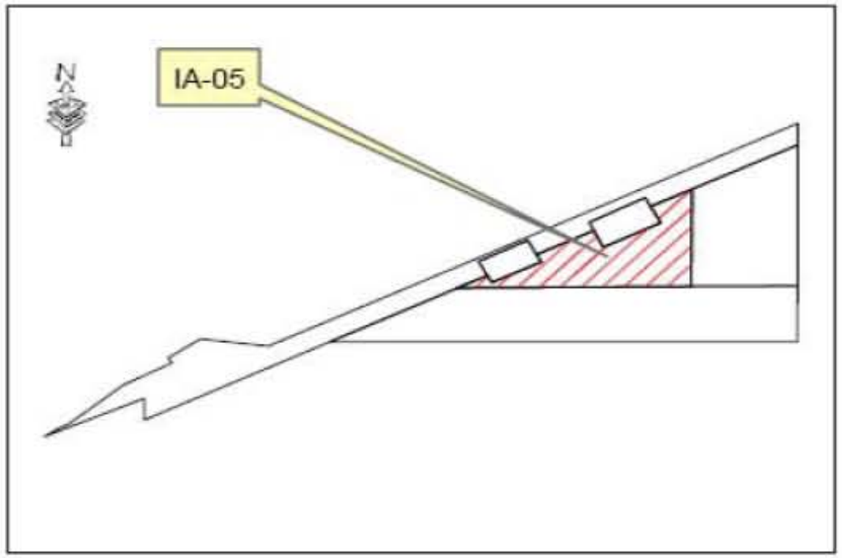
Tonawanda Landfill Operable Unit
Investigation Area 05

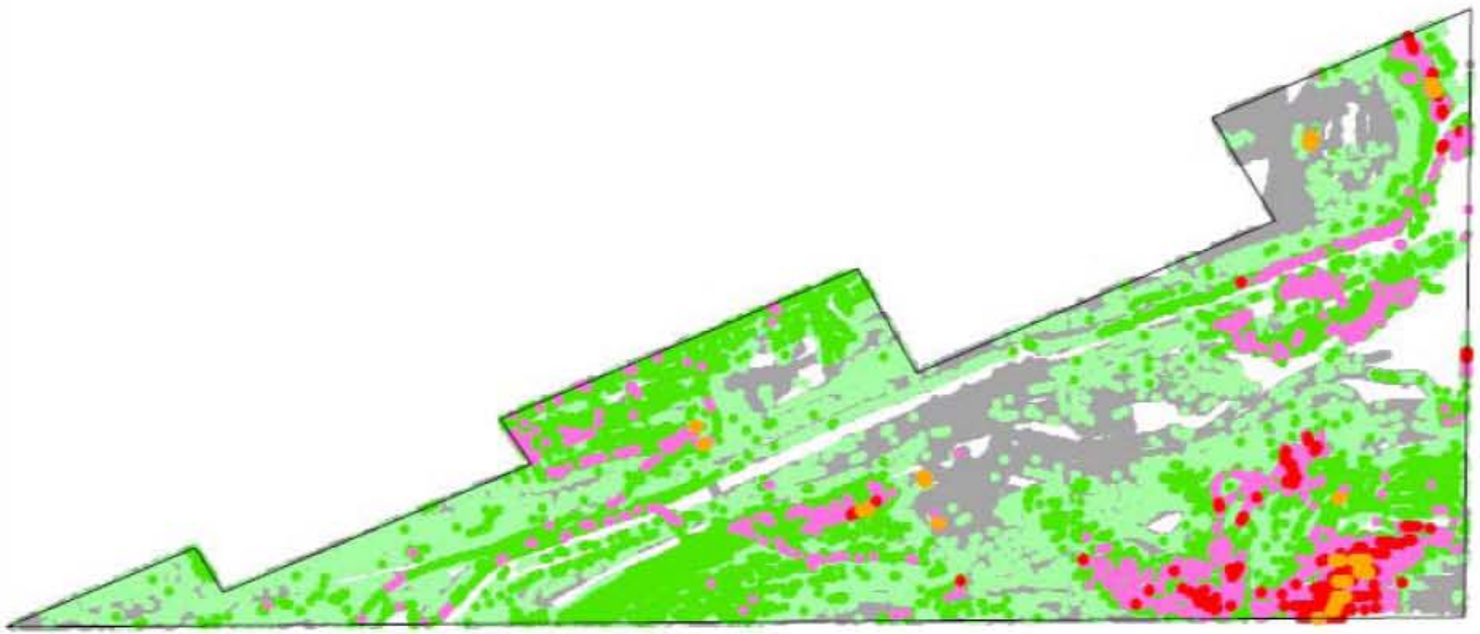
Legend

- < 7,200 cpm
- 7,200 - 9,000 cpm
- 9,000 - 10,800 cpm
- 10,800 - 12,600 cpm
- 12,600 - 14,400 cpm
- > 14,400 cpm

N

0 75 150 300 450 600 Feet





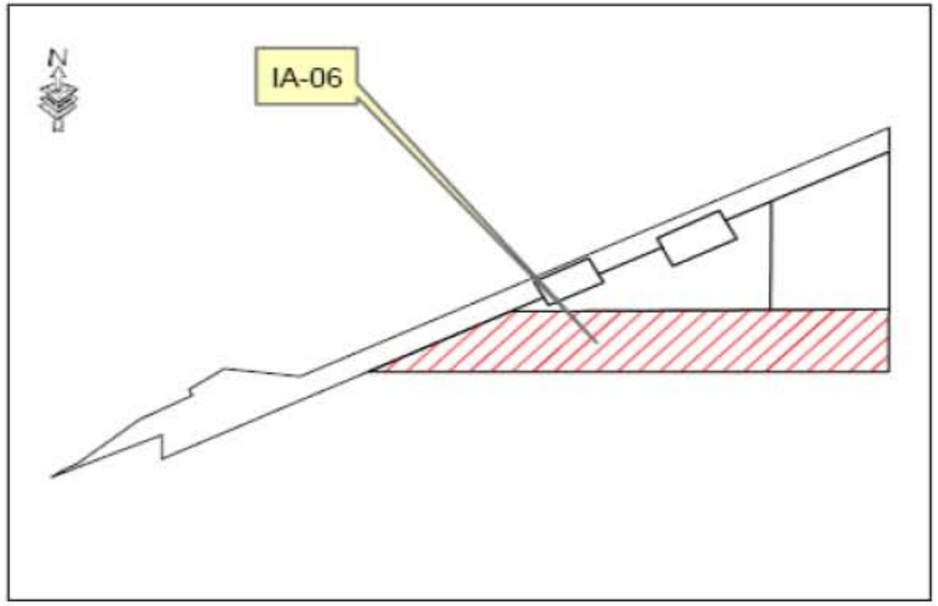
Tonawanda Landfill Operable Unit
Investigation Area 05

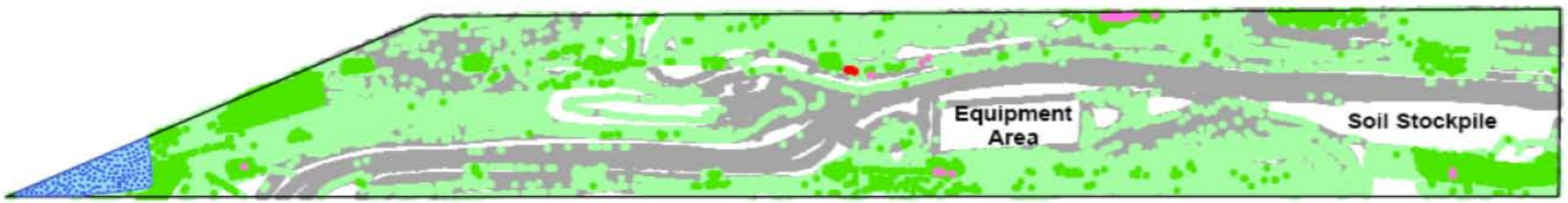
Legend

- < Mean
- Mean + 1 St. Dev.
- Mean + 2 St. Dev.
- Mean + 3 St. Dev.
- Mean + 4 St. Dev
- > Mean + 4 St. Dev.

N

0 75 150 300 450 600 Feet





Tonawanda Landfill Operable Unit
Investigation Area 06

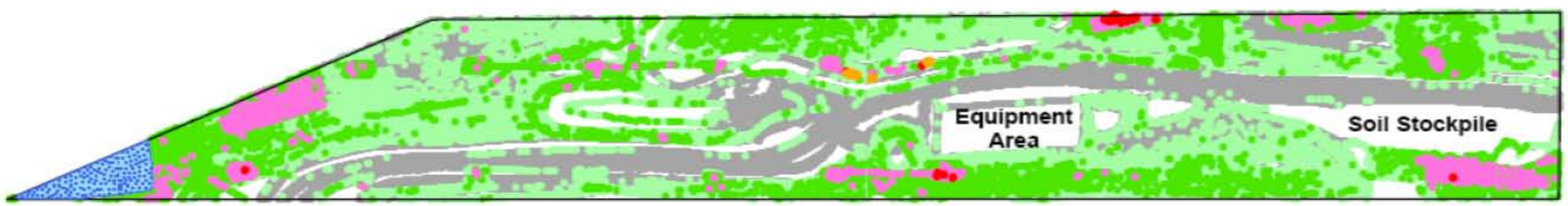
Legend

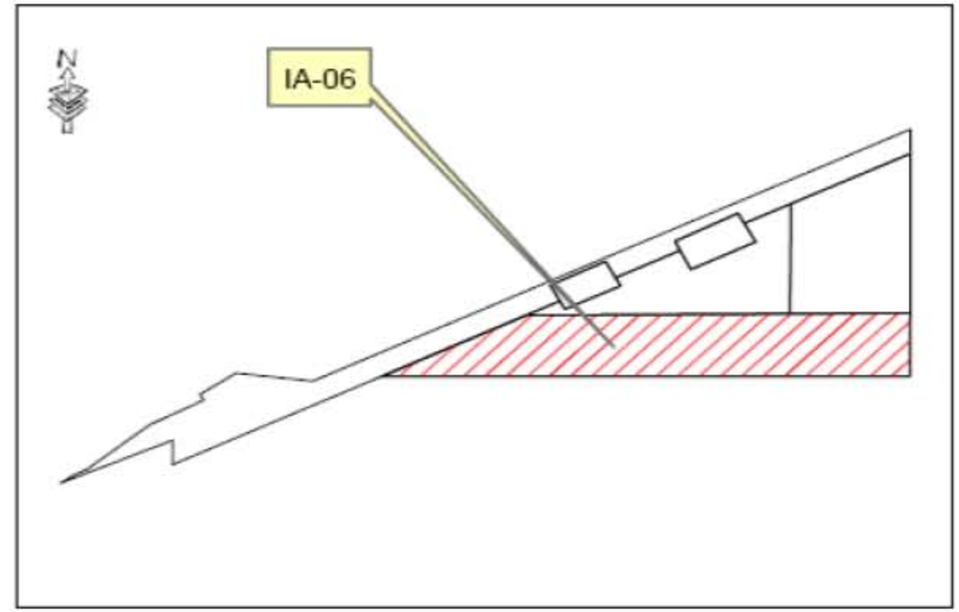
- < 7,200 cpm
- 7,200 - 9,000 cpm
- 9,000 - 10,800 cpm
- 10,800 - 12,600 cpm
- 12,600 - 14,400 cpm
- > 14,400 cpm

Covered by Surface Water

N

0 150 300 600 900 Feet





Tonawanda Landfill Operable Unit
Investigation Area 06

Legend

- < Mean
- Mean + 1 St. Dev.
- Mean + 2 St. Dev.
- Mean + 3 St. Dev.
- Mean + 4 St. Dev
- > Mean + 4 St. Dev.
- Covered by Surface Water

N

0 150 300 600 900 Feet