RPP-010784-11.1

ETEC Radiological Survey Report for Buildings 4462 and 4463

Revision 0

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Project Manager

11/18/2019
Date

REVISION HISTORY

Revision No.	Effective Date	Sections Affected	Description
0		All	Baseline document.

CONTENTS

Tables

ACRONYMS AND ABBREVIATIONS

D&D	decontamination and decommissioning
DoD	Department of Defense
DOE	Department of Energy
EPA	Environmental Protection Agency
ERPP	Environmental Radiological Protection Program
ETEC	Energy Technology Engineering Center
HWMF	Hazardous Waste Management Facility
LMDL	Liquid Metal Development Laboratory
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	minimum detectable activity
MeV	mega-electron volt
NRC	Nuclear Regulatory Commission
NWP	North Wind Portage
ORISE	Oak Ridge Institute for Science and Energy
RADCON	radiological control
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control technician
SNAP	Systems for Nuclear Auxiliary Power
SPTF	Sodium Pump Test Facility
SSFL	Santa Susana Field Laboratory
SU	survey unit

1. INTRODUCTION

Decontamination and Decommissioning (D&D) activities at the U.S. Department of Energy's (DOE's) Santa Susana Field Laboratory (SSFL) Energy Technology Engineering Center (ETEC) are being conducted for facilities and their contents. These facilities are the property of the DOE and are managed by North Wind Portage (NWP). Confirmation radiological surveys were performed to confirm no radiological contaminates were present within the facilities and to meet the specifications in the NWP contract with DOE.

This survey report includes the summary of results for building 4462 and 4463. These buildings had no known history involving use of radioactive materials. The radiological survey was performed to confirm the radiologically non-impacted status. Sentinel measurements were collected in biased locations to demonstrate that the buildings were not impacted with radioactivity other than naturally-occurring.

This document describes the protocol for planning, conducting, and evaluating radiological surveys. Results of the confirmation surveys are summarized. Section 2 describes the purpose and scope. Section 3 provides information on each building within the project scope. The physical features and past uses are discussed as they relate to the potential for radioactive contamination and the survey approach. Section 4 specifies the potential radiological contaminants of concern. Section 5 discusses the survey design and measurement approach. The technical rationale for the survey design is provided. Section 6 discusses quality assurance for the measurements and Section 7 specifies how records are maintained.

All sentinel and removable measurements taken in buildings 4462 and 4463 were indistinguishable from background. Instrumentation (See Appendix C) used to conduct the surveys were sufficient in determining if the radionuclides of concern from Table 3 were present. Since all sentinel and removable measurements were below the prescribed MDA, no radionuclide of concern was identifiable due to being indistinguishable from background.

2. PURPOSE AND SCOPE

This document reports the results of the standard process for confirming the non-radiological status of buildings 4462 and 4463. These buildings had no known history of containing radioactive material or processes that used radioactive material. Previous information indicated that there was no reason to suspect radioactivity greater than natural background.

The surveys were intended to determine natural background on the differing building construction materials. Differing materials of construction will have different natural background concentrations of radioactivity. These differing materials of construction comprise separate Survey Units as discussed further in Section 3. Once Survey Unit

natural background was determined, measurements were made at locations where radioactivity, if present above natural background, was more likely. These are referred to as sentinel measurements.

Natural background for Survey Units was established. Measurement results are reported considering construction material natural background, as well as location, within the building, e.g., basement versus first or second floor.

3. BUILDING AND SURVEY UNIT DESCRIPTIONS

This section provides a brief description of the physical features of the buildings, lists and describes the Survey Units for each building. A Survey Unit is a specific building material type on the same floor (elevation) within a specific building. Natural background varies depending on the building material type (e.g., concrete, carpet, dry wall, structural steel beams and non-structural steel). Natural background also varies with building floor or elevation because lower building levels have more shielding from cosmic and terrestrial radiation. The Survey Units used are listed in the tables below.

Building contents were not included in the Survey Units. Only the fixed structures were included in the measurements. Note that building wall Survey Units were only surveyed up to a height of six feet. This height may be surveyed by a person standing on the ground and the potential for radioactive contamination at a height greater than a person can reach is low. If contamination is not found at heights up to six feet, then there is no reason to suspect contamination would be present at higher elevations.

3.1 Building 4462

Building 4462 was constructed in 1974. It was the Sodium Pump Test Facility (SPTF) and was used to test electromagnetic sodium pumps. Building 4462 had no past radiological use history and is therefore considered non-impacted. The surveys conducted and discussed within this report confirm no radiation indistinguishable from background is present within building 4462.

Building 4462 has an approximate footprint of 6,530 ft^2 and is one level with grated steel floors above to access the roof and equipment. Survey Units are defined in Table 1.

Table 1. Building 4462 Survey Units.

SU#	Survey Unit	Description	Comments
4462-1	Interior Corrugated Metal	Exterior/Roll-up doors	Metal paneling – non smooth surface
4462-2	Interior Green Sodium Tank	Tank that formerly contained sodium	Approx. 60’ x20’/Smooth metal surface
4462-3	Interior Concrete	Floor/Wall	Throughout interior floor/foundations/bases/posts
4462-4	Wood	Walls	Panels/Boards/Bare
4462-5	Interior Structural Steel	Beams and Columns	Structural support/Smooth Surface
4462-6	Interior Non-Structural Steel	Doors/ Metal Studs/ Electrical Boxes/ Stairs	Accessible metal separate from structural supports
4462-7	Interior Horizontal Tank	Steel Tank	Approx. 50’ x 10’/ Smooth metal surface
4462-8	Exterior Corrugated Metal	Exterior/Roll-up doors	Metal paneling – non smooth surface
4462-9	Exterior Wood	Walls	Panels/Boards/Bare
4462-10	Exterior Non-Structural Steel	Doors/Electrical Panels & Boxes	Attached to Building 4462
4462-11	Exterior Linoleum Tile	Formerly an interior room but exterior walls were demolished	Mostly intact with some tiles broken, 12”-by-12”
4462-12	Exterior Ceramic Tile	Formerly an interior room but exterior walls were demolished	Bathroom floor, 1”-by-1”
4462-13	Exterior Structural Steel	Beams and Columns	Structural support/Smooth surface
4462-14	Exterior Concrete	Paved area around building	Poured concrete adjacent to Building 4462

3.2 Building 4463

Building 4463 was constructed in 1974 and was used to assemble, disassemble and clean pumps tested at the SPTF. Building 4463 is the Component Handling and Cleaning Facility. There are no known past uses of radioactive material. The surveys conducted and discussed within this report confirm no radiation indistinguishable from background is present within building 4463.

Building 4463 has an approximate footprint of 6,635 ft^2 and is one level with grated steel floors above to access the roof and equipment. Survey Units are defined in Table 2.

Table 2. Building 4463 Survey Units.

SU#	Survey Unit	Description	Comments
4463-1	Interior Linoleum Tile	Floor	12” × 12”
4463-2	Interior Ceramic Tile	Floor	1” × 1”
4463-3	Interior Glass	Windows/Doors	Office & exterior doors
4463-4	Interior Non-Structural Steel	Doors/ Metal Studs/ Electrical Boxes/ Stairs	Accessible metal separate from structural supports
4463-5	Interior Wood	Walls	Panels/Boards/Bare
4463-6	Interior Structural Steel	Beams/Columns	Structural support/Smooth surface
4463-7	Interior Corrugated Metal	Interior/Roll-up Doors	Metal Paneling – non smooth surface
4463-8	Interior Sheetrock and Particle Board	Walls	Partition walls
4463-9	Interior Concrete	Floor/Wall	Throughout interior floor/Foundations/Bases/ Posts
4463-10	Interior Tank	Aluminum Insulated Vertical Tank	Approx. 5’ x 8’
4463-11	Exterior Corrugated Metal	Exterior/Roll-up Doors	Metal paneling – non smooth surface
4463-12	Exterior Non-Structural Steel	Doors, Electrical Boxes,	Accessible metal separate from structural supports
4463-13	Exterior Tanks	Vertical Steel	Approx. 15’ x 60’
4463-14	Exterior Concrete	Paved area around building	Poured concrete adjacent to Building 4463
4463-15	Exterior Structural Steel	Beams/Columns	Crane base & structural supports
4463-16	Interior Addition Concrete	Floor	Floor in adjacent addition to 4463

4. POTENTIAL CONTAMINANTS OF CONCERN

There is a listing of radionuclides in the ETEC Radiation Protection Program (RPP) that were known to be used within the Radiological Material Handling Facility (RMHF) at ETEC and may be of concern. Residual quantities of transuranics, uranium, thorium, mixed fission products, and activation products may be present at ETEC. Radionuclides of potential concern are defined as those with a half-life greater than one year and that have a potential to contribute greater than one percent on an activity, pathway-dose, or

risk basis to the site source term as summarized in Table 3[1]. There is no historical evidence that any of the contaminants of concern were ever introduced into buildings 4462 or 4463.

Table 3. Potential radionuclides of concern in Area IV, Santa Susana Field Laboratory.

ROC	T1/2 (y)	Process Relationship	Potential to Contribute >		
			1% of Activity	1% of Pathway Dose	1% of Risk
Th-228	1.90E00	Reactor Fuel Element	Yes	Yes	Yes
Th-232	1.40E10	Reactor Fuel Element	Yes	Yes	Yes
U-234–[a]	2.46E05	Reactor Fuel Element	Yes	Yes	Yes
U-235–[a]	7.04E08	Reactor Fuel Element	Yes	Yes	Yes
U-238–[a]	4.5E09	Reactor Fuel Element	Yes	Yes	Yes
Pu-238–[a]	8.77E01	Reactor Fuel Element	Yes	Yes	Yes
Pu-239–[a]	2.4E04	Reactor Fuel Element	Yes	Yes	Yes
Pu-240–[a]	6.60E03	Reactor Fuel Element	Yes	Yes	Yes
Pu-241–[a]	1.44E01	Reactor Fuel Element	Yes	Yes	Yes
Sr-90	2.91E01	Reactor Fission Product	Yes	Yes	Yes
Cs-137–[a]	3.02E01	Reactor Fission Project	Yes	Yes	Yes
Pm-147–[a]	2.62E00	Reactor Fission Product	Yes	No	No
Eu-155	4.71E00	Reactor Fission Product	Yes	No	No
Be-10	1.53E06	Reactor Activation Product	Yes	Yes	Yes
Co-60–[a]	5.27E00	Reactor Activation Product	Yes	Yes	Yes
Cd-111m	1.41e01	Reactor Activation Product	Yes–[b]	Yes–[b]	Yes–[b]
Np-237	2.14E-6	Research Radionuclide	Yes	Yes	Yes

ROC = Radionuclide of concern
T1/2 (y) = radiological half-life in years.

–[a] These radionuclides may also be associated with research processes and may be found in research laboratories and associated equipment and/or waste materials.

–[b] Characterization data for these radionuclides may not be available for all areas and thus remain of potential concern until eliminated through characterization or historical process assessment determinations.

[1] Data are summarized from Table 20 entitled, "Summary of the SSFL Area IV Historical Operations Related Radionuclides with Half-lives Greater Than One Year," *Radionuclides Related to Historical Operations at the Santa Susana Field Laboratory Area IV,* Thomas L. Rucker, Ph.D., Science Applications International Corporation, March 2009.

5. SURVEY APPROACH AND DESIGN

The survey design and implementation were consistent with concepts and terminology within the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (DoD 2000). The data quality objective (DQO) process and a graded approach are integrated within the MARSSIM process to assure defensible data with cost effectiveness.

Surveys were performed by trained Radiological Control Technicians (RCTs) who followed standard, written procedures, used properly calibrated instruments sensitive to the potential contaminants.

The following requirements were also applied:

- RCTs performing surveys were qualified in accordance with NWP, RPP-10784-010, Rev. 0, "Radiological Technician Training."
- Surveys were performed in accordance with NWP, RPP-10784-003, Rev. 0, "Radiological Surveys."
- Instruments were operated in accordance with NWP, RPP-10784-006, "Radiological Instruments."
- Surveys were documented in accordance with NWP RCM-10784, Rev. 0, *Radiological Control Manual*.

5.1 Data Quality Objectives

The objective of the surveys was to develop data to verify the radiological status of facilities, relative to material-specific natural background. The objectives were to satisfy NWP contractual specifications to perform sentinel measurements in biased locations to demonstrate that the buildings are not impacted with radioactivity other than naturally-occurring.

The data developed (1) allows material-specific natural background to be determined; (2) was used to calculate the minimum detectable activity (MDA) at the 99 percent confidence level for alpha and beta-gamma radiation, (3) assesses whether radiation measurements that exceed the MDA, if any, were statistical fluctuations that would be expected approximately 1 percent of the time; (4) assesses whether measurement results in each Survey Unit are indistinguishable from background; and (5) is reported.

Measurement sensitivities are defined as the MDAs, at the 99 percent confidence level for alpha and beta. The MDAs were calculated using the material-specific measurement results obtained at locations within each building that exhibited gamma radiation signal that was indicative of natural background.

Measurement accuracy and precision were expected to be ± 10 to 20%. Completeness was assured by meeting the minimum data point requirements of MARSSIM, i.e., ≥ 80% useable data. This DQO was met in all cases. In addition to the measures indicated herein, the quality assurance factors described in Section 6 were followed.

5.2 Radiation Detection Instruments

A Ludlum 44-10, 2-inch by 2-inch sodium-iodide detector (referred to as a 2×2 NaI detector) was used to determine appropriate locations of material-specific natural background within each Survey Unit (see Section 5.6 for further discussion on background determination). The 2×2 NaI detector was coupled with a Ludlum 2221 ratemeter/scaler.

A Ludlum 43-93 dual phosphor detector was used to measure alpha and beta-gamma total surface contamination. The detector was coupled with a Ludlum 2360 ratemeter/scaler.

A Ludlum 43-10-1 dual phosphor detector as part of a Ludlum 2929 ratemeter/scaler was used to analyze swipes for removable radioactivity.

The MDA is used to express radiation detection instrument sensitivity. The MDA for this survey is the level at which one can be 99 percent confident that a statistically elevated measurement exceeds building material-specific background. The MDA (sometimes referred to as the lower limit of detection) is a combined parameter that includes the statistical variation in the background count rate when background is determined and the statistical variation in background when a measurement is made at a specific location or on a swipe. The MDA also is determined using the detector efficiency to convert instrument count rate in counts per minute (cpm) to an amount of radioactivity in disintegrations per minute (dpm). The MDA for sentinel measurements for this survey was calculated from the set of background measurements made with the detector held in contact with the building construction material in each Survey Unit. The MDA for removable measurements was calculated from the daily instrument quality check(Appendix C). The MDA considers the naturally-occurring radioactivity within the material itself and the naturally-occurring radon daughters affixed to the surface of the material (notably the relatively long-lived daughters lead-210 and polonium-210).

The condition of the surface being surveyed can result in decreased detection sensitivity. Surfaces that are rough or have small crevasses can cause substantial attenuation of both alpha and beta particles. Correction factors were applied to account for the decreased detection sensitivity. The overall measurement efficiency is comprised of detector response (2 pi efficiency, εi) and a factor for surface condition correction (source efficiency, εs). Values for εs of 0.25 and 0.50 are used for maximum beta energies of 0.150 to 0.400 MeV, respectively. The beta energies of the potential contaminants of concern either exceed 0.400 MeV or approximate 0.400 MeV. Therefore, a surface efficiency of 0.5 was used for beta-gamma radiation. The recommended surface efficiency of 0.25 was used for alpha radiation as specified in *Minimum Detectable*

Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions (NUREG-1507).

The 2-pi detector response efficiency for Tc-99, to which the detectors were calibrated) was 27 percent. The 2-pi detector response efficiency for Pu-239, to which the detectors were calibrated, was 47 percent. Source efficiency factors are not applicable for swipes analyzed on the Ludlum 2929 detector. The 4-pi efficiency was 36 percent for alpha and 25 percent for beta-gamma. These factors were applied to determine the material-specific MDA with 99 percent confidence. Count time for background was ten minutes (average of ten, one-minute measurements) for the 43-93 and 10 minutes for the 2929 (one, ten-minute count). Measurement count times were 1 minute for both the 43-93 and the 2929. Scanning detection efficiencies with the Ludlum 43-93 detector were not calculated because scanning surveys for radioactive contamination was not performed. Scanning for gamma radiation, which is more likely to detect contamination within walls and in cracks and crevasses, was performed as specified is Section 5.6.

Instrumentation was calibrated for the radiations discussed above. Daily performance tests were conducted prior to survey activities. No instruments exhibiting questionable performance were used.

5.3 MARSSIM Class Assignments

For the purposes of guiding the degree and nature of survey coverage, MARSSIM identifies two categories of radiological status: *impacted,* or having a possibility of containing radioactive contamination; and *non-impacted,* or not considered as possibly containing radioactivity in excess of background levels. In addition, for applications to demonstrate compliance with guidelines for purposes of release from radiological control, MARSSIM identifies three classifications of impacted areas based on contamination potential:

- Class 1 Areas: Areas that have, or had prior to remediation, a potential for radioactive contamination (based on site operating history) or known contamination (based on previous radiation surveys) greater than release criteria.
- Class 2 Areas: Areas that have, or had prior to remediation, a potential for radioactive contamination, or known contamination, but are not expected to exceed release criteria.
- Class 3 Areas: Any impacted areas that are not expected to contain any residual radioactivity or are expected to contain levels of residual radioactivity at a small fraction of the release criteria.

MARSSIM recommends the following Survey Unit areas for building surfaces:

- Class 1 Up to 100 m^2

- Class 2 Up to 2000 m^2
- Class 3 Unlimited.

Even though the buildings are considered non-impacted they were surveyed for contamination as MARSSIM Class 3. Survey Unit sizes are unlimited under Class 3 guidelines.

5.4 Number of Measurements per Survey Unit

Based on the recommended MARSSIM approach for calculating the number of measurement data points, a minimum of ten measurement points were obtained in each survey unit. The number of measurements required for each survey unit was determined by the Relative Shift. The Relative Shift is equal to the length of the gray region divided by the expected measurement standard deviation. The upper bound of the gray region is set at three standard deviations greater than mean background (i.e., MDA with 99 percent confidence). The lower bound of the gray region is set at mean net background, ostensibly zero. Thus, the Relative Shift equals three standard deviations divided by one standard deviation, or three. When the probabilities of Type 1 and Type 2 errors are both set to 0.05, then as specified in MARSSIM the minimum number of measurements required for each survey unit is ten.

An equal number of Background Reference Area measurements were required. Thus, a minimum of ten measurements were made in the Background Reference Areas.

5.5 Referencing Survey Location

Measurements taken in the building are referenced to the northwest corner of the Survey Unit. Per MARSSIM, a reference grid is not required for Class 3 Survey Units. Photographs were taken and used as survey maps to properly document the systematic and biased measurement locations.

5.6 Background Determination

This section discusses how natural background and biased measurement locations were determined. A total and removable contamination measurement was made at each of ten background locations identified within Survey Units. These ten measurements per Survey Unit were used to establish the total alpha and beta MDA with 99 percent confidence. The removable measurements were collected as additional evidence that the background locations chosen truly contain no residual radioactivity above natural background.

Background was determined for each Survey Unit. Ten percent of the accessible surface area of each Survey Unit was evaluated using the gamma measurement protocol defined below. MARSSIM recommends scanning up to 10 percent of each Survey Unit.

The buildings have no history of individuals using radioactive material within them. Thus, these buildings should have only naturally-occurring radioactivity. This was evaluated with the gamma radiation sensitive 2×2 NaI detector. Gamma radiation is more penetrating and travels farther than alpha or beta radiation. Gamma radiation is a good measurement to indicate the potential for radioactive material that exceeds natural background.

Gamma radiation was measured by holding the 2×2 NaI detector approximately 6 inches from the building construction material that is part of a Survey Unit. The detector was passed over the specific building surfaces in the Survey Unit by moving the detector in a sinusoidal pattern at a speed less than 0.5 meter/second (m/s). The trained and qualified RCT evaluated the audible detector signal and determined if there were any higher-than-background gamma anomalies throughout the Survey Unit. If the RCT determined that the gamma signal might be increasing or may be elevated above the baseline signal, the RCT slowed the detector movement speed and determined if there could be radioactivity greater than natural background. Such points for evaluation were marked on the Survey Unit surface for later biased measurement with the Ludlum 43-93 detector.

The scans for gamma radiation also allowed a determination of locations within each Survey Unit where there was no reason to suspect that there is radioactivity that exceeds natural background. Ten such background locations were marked. The Ludlum 43-93 detector was used at these ten marked locations to allow a determination of the Survey Unit total alpha and beta-gamma radiation natural background levels. A swipe for removable radioactivity was also performed at these ten locations to provide additional assurance that there is no radioactive contamination at the ten background locations within the specific Survey Unit.

5.7 Total Contamination Measurements

Total contamination measurements for alpha and beta radiation were made by holding the detector at contact with the surface and counting for 1 minute. A total alpha and beta-gamma contamination measurement was made at each of the at least ten sentinel biased measurement locations identified as discussed in Section 5.6. Results were compared to the MDA with 99 percent confidence. Results less than the MDA are considered indistinguishable from background.

Approximately one in 100 measurements may exceed the MDA by statistical chance. If a measurement exceeded the MDA at any single location, then two additional measurements were made at the exact same location. The probability of two sequential measurements at the same location exceeding the MDA is one in 10,000 if the measurement population is properly selected as true material of construction background. The probability of three measurements in a row is one in 1,000,000. This measurement protocol will satisfy one DQO regarding whether a Survey Unit is distinguishable from background. If two of three measurements made at the same location do not exceed the MDA then the measurements are considered indistinguishable from background.

5.8 Removable Contamination Measurements

Removable alpha and beta contamination measurements were made by wiping an area of approximately 100 cm^2 using moderate pressure and an absorbent cloth swipe. One measurement was made at each total contamination measurement location. Detector background for the Ludlum 2929 counter was determined for 10 minutes. Each swipe was analyzed for one minute. If a swipe exceeded the MDA, the swipe was recounted two more times for the reasons specified in Section 5.7.

5.9 Data Evaluation

Total and removable alpha and beta-gamma contamination levels were evaluated against the MDA values as discussed previously. All measurements of total and removable alpha and beta radiation were less than the MDA. All measurements were indistinguishable from background.

There were ten Background Reference Measurements for each Survey Unit. There were ten Biased Sentinel Measurements in each Survey Unit except cases where more than ten Biased Sentinel Measurements were made as shown in Table 6. More measurements were made on some of the larger Survey Units.

Table 6. Survey Units with more than 10 Biased Sentinel Measurements.

Survey Unit Number	Survey Unit	Number of Biased Sentinel Measurements
SU#4462-1	Interior Corrugated Metal	13
SU#4462-3	Interior Concrete	12

5.10 Documentation

Survey data were documented in accordance with NWP radiological procedures. Appendix A provides a separate survey report for each Survey Unit listed in Tables 1 and 2. The survey reports are organized by building. Each survey report includes pictures showing where each measurement was taken. The measurement locations are marked and numbered. Background measurement locations are shown painted white. Biased sentinel measurements are shown painted in orange.

Appendix B provides summary statistical evaluation for each Survey Unit. The statistical evaluations summarized include:

- Measurement range, minimum and maximum
- MDA
- Measurement average
- Measurement standard deviation

6. QUALITY ASSURANCE

Survey instruments and methods specified in applicable RADCON operating and technical procedures have been documented as to their ability to provide a 99% confidence level in detection of surface contamination at levels, which meet the requirements of this plan. Supporting data are provided on each survey form.

Instruments were calibrated with sources traceable to the National Institute for Science and Technology. Instruments were checked daily or when used to demonstrate they were functioning properly. Instruments always passed these Quality Control (QC) checks. Appendix C provides the instrument calibration certificates and QC checks.

A Certified Health Physicist reviewed the data and information from the survey; and assisted, in evaluation of the survey data.

7. RECORDS

Records shall be maintained in accordance with QAP-10784, *"Quality Assurance Program Plan"*

8. REFERENCES

DoD, DOE, EPA, & NRC, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM),* Rev. 1, August 2000.

North Wind, QAP-3171, "Records Management," Rev. 0, August 16, 2019.

North Wind Inc., 2016, *Department of Energy Standard Operating Procedure for Demolition of Facilities in Area IV at the Santa Susana Field Laboratory Revision C,* August 2016.

NUREG 1507, *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*, June 1998.

NWP (North Wind Portage), RPP-10784-010, Rev. 0, "Radiological Technician Training."

NWP, RPP-10784-003, Rev. 0, "Radiological Surveys."

NWP, RPP-10784-006, "Radiological Instruments."

NWP, RCM-10784 Rev. 0, *Radiological Control Manual*.

Appendix A
Survey Reports

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/5/2019

Survey No.:	ETEC-102419-002	**Item Surveyed:**	SU#4462-1 Interior Corrugated Metal
Date:	10/24/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	10/31/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		4.4	188.3	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		5.12	33.49	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		113.64	514.56	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	5100-9600	4	-3	210	160	0	-1	63	-46
2	Background See Drawing	5100-9600	5	5	170	-135	1	2	63	-46
3	Background See Drawing	5100-9600	5	5	163	-186	0	-1	63	-46
4	Background See Drawing	5100-9600	4	-3	177	-83	2	4	80	20
5	Background See Drawing	5100-9600	2	-21	180	-61	0	-1	65	-39
6	Background See Drawing	5100-9600	4	-3	206	130	0	-1	68	-27
7	Background See Drawing	5100-9600	2	-21	232	321	0	-1	76	5
8	Background See Drawing	5100-9600	7	22	196	57	0	-1	61	-54
9	Background See Drawing	5100-9600	5	5	187	-10	1	2	61	-54
10	Background See Drawing	5100-9600	6	14	162	-193	1	2	69	-23
				N						
				A						

North Wind Survey Data Sheet, Rev. 0

Reviewed By: _____ Date: 11/5/2019

Survey No.:	ETEC-102419-002	**Item Surveyed:**	SU#4462-1 Interior Corrugated Metal
Date:	10/24/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	10/31/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm^2

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		4.4	188.3	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		5.12	33.49	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		113.64	514.56	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Biased See Drawing		6	14	205	123	0	-1	71	-15
2	Biased See Drawing		3	-12	153	-260	0	-1	83	32
3	Biased See Drawing		3	-12	155	-245	0	-1	69	-23
4	Biased See Drawing		6	14	169	-142	0	-1	66	-35
5	Biased See Drawing		3	-12	200	86	0	-1	73	-7
6	Biased See Drawing	N	4	-3	189	5	0	-1	82	28
7	Biased See Drawing	A	7	22	213	182	0	-1	64	-43
8	Biased See Drawing		6	14	219	226	0	-1	66	-35
9	Biased See Drawing		4	-3	184	-32	0	-1	64	-43
10	Biased See Drawing		3	-12	183	-39	1	2	69	-23
11	Biased See Drawing		6	14	192	27	0	-1	53	-86
12	Biased See Drawing		5	5	204	115	0	-1	56	-74
13	Biased See Drawing		1	-29	188	-2	0	-1	51	-94
		N								
		A								

ETEC Survey Drawing

Survey No.:	ETEC-102419-002
Date:	10/24/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-1 Interior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ___11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102419-002
Date:	10/24/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-1 Interior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/5/2019

ETEC Survey Drawing

Survey No.:	ETEC-102419-002
Date:	10/24/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-1 Interior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/5/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/5/2019

Survey No.:	ETEC-102419-003	**Item Surveyed:**	SU#4462-2 Interior Green Sodium Tank
Date:	10/24/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	10/31/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		0.8	145.9	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		2.18	29.48	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		63.23	455.58	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	4,000-7,000	1	2	137	-65	0	-1	86	44
2	Background See Drawing	4,000-7,000	0	-7	138	-58	0	-1	65	-39
3	Background See Drawing	4,000-7,000	1	2	139	-51	0	-1	71	-15
4	Background See Drawing	4,000-7,000	1	2	159	96	0	-1	78	13
5	Background See Drawing	4,000-7,000	1	2	152	45	0	-1	52	-90
6	Background See Drawing	4,000-7,000	0	-7	141	-36	0	-1	73	-7
7	Background See Drawing	4,000-7,000	1	2	123	-168	0	-1	63	-46
8	Background See Drawing	4,000-7,000	1	2	163	126	0	-1	64	-43
9	Background See Drawing	4,000-7,000	1	2	140	-43	0	-1	76	5
10	Background See Drawing	4,000-7,000	1	2	167	155	0	-1	89	56
1	Biased See Drawing		1	2	135	-80	0	-1	78	13
2	Biased See Drawing		3	19	153	52	0	-1	74	-3
3	Biased See Drawing		1	2	145	-7	0	-1	74	-3
4	Biased See Drawing	N	0	-7	130	-117	0	-1	71	-15
5	Biased See Drawing		2	10	148	15	0	-1	54	-82
6	Biased See Drawing	A	1	2	142	-29	0	-1	74	-3
7	Biased See Drawing		0	-7	142	-29	0	-1	62	-50
8	Biased See Drawing		1	2	152	45	0	-1	67	-31
9	Biased See Drawing		1	2	135	-80	0	-1	95	80
10	Biased See Drawing		3	19	163	126	0	-1	62	-50

ETEC Survey Drawing

Survey No.:	ETEC-102419-003
Date:	10/24/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-2 Interior Green Sodium Tank
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Reviewer: _____ Date: 11/5/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/5/2019

Survey No.:	ETEC-102419-004
Date:	10/24/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-3 Interior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		3.9	340.5	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		4.82	45.04	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		108.49	684.34	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	6000-11000	2	-16	337	-26	0	-1	65	-39
2	Background See Drawing	6000-11000	5	9	331	-70	0	-1	67	-31
3	Background See Drawing	6000-11000	2	-16	336	-33	0	-1	77	9
4	Background See Drawing	6000-11000	6	18	321	-143	0	-1	81	24
5	Background See Drawing	6000-11000	3	-8	331	-70	0	-1	56	-74
6	Background See Drawing	6000-11000	5	9	374	246	0	-1	76	5
7	Background See Drawing	6000-11000	4	1	320	-151	0	-1	56	-74
8	Background See Drawing	6000-11000	5	9	355	107	0	-1	62	-50
9	Background See Drawing	6000-11000	1	-25	346	40	0	-1	65	-39
10	Background See Drawing	6000-11000	6	18	354	99	0	-1	61	-54

North Wind Survey Data Sheet, Rev. 0

Reviewed By: _____ Date: 11/5/2019

Survey No.:	ETEC-102419-004	**Item Surveyed:**	SU#4462-3 Interior Concrete
Date:	10/24/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Norman Gillen	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	10/31/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm^2

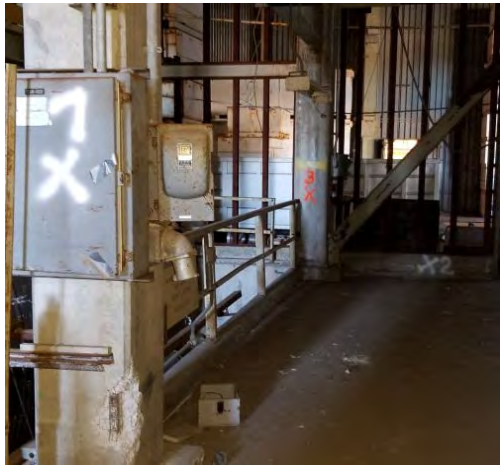
Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		3.9	340.5	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		4.82	45.04	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		108.49	684.34	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Biased See Drawing		1	-25	311	-217	1	2	44	-121
2	Biased See Drawing		5	9	333	-55	2	4	66	-35
3	Biased See Drawing		4	1	262	-577	0	-1	81	24
4	Biased See Drawing		5	9	354	99	0	-1	71	-15
5	Biased See Drawing	N	6	18	358	129	0	-1	71	-15
6	Biased See Drawing	A	4	1	338	-18	0	-1	73	-7
7	Biased See Drawing		7	27	331	-70	0	-1	50	-98
8	Biased See Drawing		4	1	341	4	0	-1	65	-39
9	Biased See Drawing		4	1	359	136	0	-1	69	-23
10	Biased See Drawing		5	9	361	151	0	-1	77	9
11	Biased See Drawing		1	-25	324	-121	0	-1	70	-19
12	Biased See Drawing		5	9	311	-217	1	2	70	-19
		N								
		A								

ETEC Survey Drawing

Survey No.:	ETEC-102419-004
Date:	10/24/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-3 Interior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

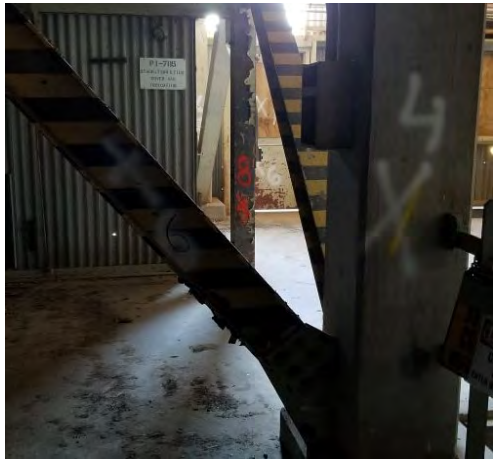


Reviewer: _____ Date: ___ 11/5/2019

ETEC Survey Drawing

Survey No.:	ETEC-102419-004
Date:	10/24/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-3 Interior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ Date: ___ 11/5/2019

ETEC Survey Drawing

Survey No.:	ETEC-102419-004
Date:	10/24/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

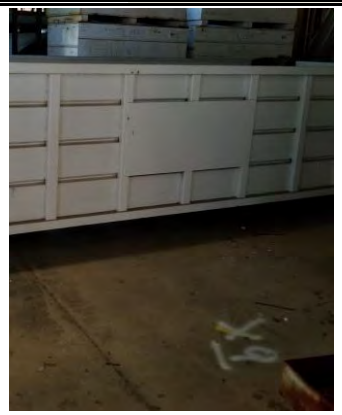
Item Surveyed:	SU#4462-3 Interior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: 11/5/2019

ETEC Survey Drawing

Survey No.:	ETEC-102419-004
Date:	10/24/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-3 Interior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ _____ Date: ___ 11/5/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/5/2019

Survey No.:	ETEC-102519-001
Date:	10/25/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-4 Interior Wood
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		4.1	189.1	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		4.94	33.56	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		110.59	515.61	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	8400-9600	1	-27	188	-8	0	-1	83	32
2	Background See Drawing	8400-9600	4	-1	169	-148	0	-1	65	-39
3	Background See Drawing	8400-9600	2	-18	206	124	0	-1	81	24
4	Background See Drawing	8400-9600	5	8	195	43	0	-1	53	-86
5	Background See Drawing	8400-9600	5	8	171	-133	0	-1	72	-11
6	Background See Drawing	8400-9600	4	-1	176	-96	0	-1	67	-31
7	Background See Drawing	8400-9600	3	-9	188	-8	0	-1	69	-23
8	Background See Drawing	8400-9600	7	25	175	-104	0	-1	58	-66
9	Background See Drawing	8400-9600	3	-9	200	80	0	-1	81	24
10	Background See Drawing	8400-9600	7	25	223	249	0	-1	61	-54
1	Biased See Drawing		3	-9	179	-74	0	-1	61	-54
2	Biased See Drawing		5	8	202	95	0	-1	67	-31
3	Biased See Drawing		2	-18	196	51	0	-1	65	-39
4	Biased See Drawing		2	-18	222	242	0	-1	66	-35
5	Biased See Drawing	N	6	16	198	65	0	-1	60	-58
6	Biased See Drawing	A	2	-18	188	-8	0	-1	66	-35
7	Biased See Drawing		2	-18	191	14	0	-1	78	13
8	Biased See Drawing		5	8	224	257	0	-1	63	-46
9	Biased See Drawing		2	-18	202	95	0	-1	83	32
10	Biased See Drawing		5	8	216	198	0	-1	66	-35

ETEC Survey Drawing

Survey No.:	ETEC-102519-001
Date:	10/25/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-4 Interior Wood
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: 11/5/2019

ETEC Survey Drawing

Survey No.:	ETEC-102519-001
Date:	10/25/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-4 Interior Wood
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/5/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/5/2019

Survey No.:	ETEC-102519-002
Date:	10/25/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-5 Interior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

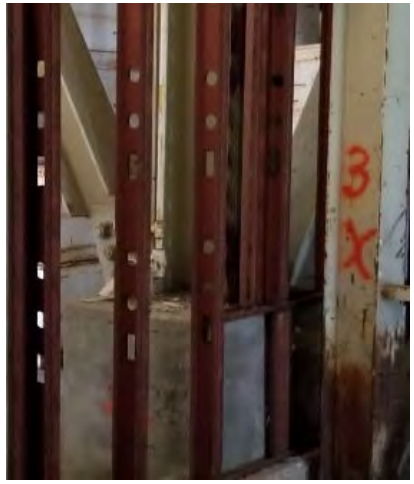
Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2.5	147.7	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.86	29.66	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		92.00	458.25	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	5300-7600	4	13	161	98	0	-1	63	-46
2	Background See Drawing	5300-7600	1	-13	136	-86	0	-1	53	-86
3	Background See Drawing	5300-7600	2	-4	140	-57	0	-1	75	1
4	Background See Drawing	5300-7600	4	13	167	142	0	-1	72	-11
5	Background See Drawing	5300-7600	0	-21	155	54	0	-1	74	-3
6	Background See Drawing	5300-7600	1	-13	143	-35	0	-1	56	-74
7	Background See Drawing	5300-7600	4	13	147	-5	0	-1	75	1
8	Background See Drawing	5300-7600	2	-4	157	68	0	-1	65	-39
9	Background See Drawing	5300-7600	5	21	135	-93	0	-1	70	-19
10	Background See Drawing	5300-7600	2	-4	136	-86	0	-1	71	-15
1	Biased See Drawing		4	13	119	-211	0	-1	71	-15
2	Biased See Drawing		5	21	156	61	0	-1	68	-27
3	Biased See Drawing		4	13	139	-64	0	-1	87	48
4	Biased See Drawing	N	1	-13	153	39	0	-1	73	-7
5	Biased See Drawing	A	3	4	155	54	0	-1	78	13
6	Biased See Drawing		2	-4	164	120	0	-1	71	-15
7	Biased See Drawing		5	21	151	24	0	-1	83	32
8	Biased See Drawing		4	13	156	61	0	-1	66	-35
9	Biased See Drawing		3	4	140	-57	1	2	69	-23
10	Biased See Drawing		2	-4	126	-160	0	-1	75	1

ETEC Survey Drawing

Survey No.:	ETEC-102519-002
Date:	10/25/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-5 Interior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ Date: ____11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102519-002
Date:	10/25/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-5 Interior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/5/2019

ETEC Survey Drawing

Survey No.:	ETEC-102519-002
Date:	10/25/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-5 Interior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ____11/5/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/5/2019

Survey No.:	ETEC-102519-003	**Item Surveyed:**	SU#4462-6 Interior Non-Structural Steel
Date:	10/25/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Chrisopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	10/31/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

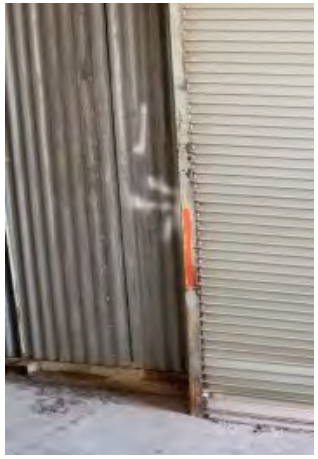
Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		3.8	162.2	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		4.76	31.08	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		107.43	479.16	17.10	178.01

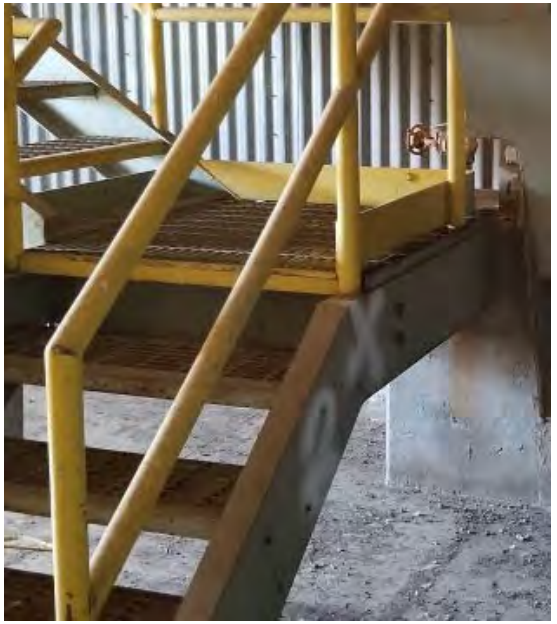
No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	4500-8700	2	-15	142	-149	0	-1	65	-39
2	Background See Drawing	4500-8700	3	-7	167	35	0	-1	70	-19
3	Background See Drawing	4500-8700	5	10	177	109	0	-1	63	-46
4	Background See Drawing	4500-8700	5	10	154	-60	0	-1	70	-19
5	Background See Drawing	4500-8700	5	10	169	50	0	-1	75	1
6	Background See Drawing	4500-8700	2	-15	173	79	0	-1	53	-86
7	Background See Drawing	4500-8700	1	-24	153	-68	0	-1	69	-23
8	Background See Drawing	4500-8700	4	2	163	6	0	-1	56	-74
9	Background See Drawing	4500-8700	4	2	157	-38	0	-1	71	-15
10	Background See Drawing	4500-8700	7	27	167	35	0	-1	65	-39
1	Biased See Drawing		5	10	210	351	0	-1	57	-70
2	Biased See Drawing		5	10	188	190	0	-1	63	-46
3	Biased See Drawing		3	-7	199	271	1	2	74	-3
4	Biased See Drawing		6	19	181	138	0	-1	65	-39
5	Biased See Drawing	N	3	-7	201	285	0	-1	66	-35
6	Biased See Drawing	A	4	2	195	241	0	-1	48	-106
7	Biased See Drawing		4	2	180	131	0	-1	83	32
8	Biased See Drawing		6	19	197	256	0	-1	58	-66
9	Biased See Drawing		5	10	195	241	0	-1	63	-46
10	Biased See Drawing		5	10	156	-46	0	-1	45	-117

ETEC Survey Drawing

Survey No.:	ETEC-102519-003
Date:	10/25/2019
Survey Tech.:	Chrisopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-6 Interior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0





Reviewer: _____ Date: ___11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102519-003
Date:	10/25/2019
Survey Tech.:	Chrisopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-6 Interior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ___11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102519-003
Date:	10/25/2019
Survey Tech.:	Chrisopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

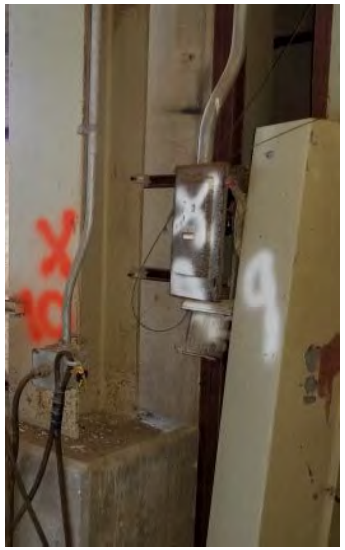
Item Surveyed:	SU#4462-6 Interior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/5/2019

ETEC Survey Drawing

Survey No.:	ETEC-102519-003
Date:	10/25/2019
Survey Tech.:	Chrisopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-6 Interior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ Date: 11/5/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/5/2019

Survey No.:	ETEC-102519-004
Date:	10/25/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-7 Interior Horizontal Tank
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		1.9	125.1	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.36	27.30	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		83.50	423.49	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	4000-6000	2	1	125	-1	0	-1	59	-62
2	Background See Drawing	4000-6000	4	18	126	7	0	-1	65	-39
3	Background See Drawing	4000-6000	3	9	128	21	0	-1	91	64
4	Background See Drawing	4000-6000	4	18	129	29	0	-1	69	-23
5	Background See Drawing	4000-6000	0	-16	131	43	0	-1	80	20
6	Background See Drawing	4000-6000	2	1	123	-15	0	-1	73	-7
7	Background See Drawing	4000-6000	1	-8	132	51	0	-1	71	-15
8	Background See Drawing	4000-6000	1	-8	111	-104	0	-1	65	-39
9	Background See Drawing	4000-6000	1	-8	118	-52	0	-1	78	13
10	Background See Drawing	4000-6000	1	-8	128	21	0	-1	76	5
1	Biased See Drawing		1	-8	117	-60	0	-1	74	-3
2	Biased See Drawing		2	1	93	-236	0	-1	86	44
3	Biased See Drawing		2	1	128	21	0	-1	82	28
4	Biased See Drawing		1	-8	106	-140	0	-1	64	-43
5	Biased See Drawing	N	1	-8	140	110	0	-1	76	5
6	Biased See Drawing	A	0	-16	136	80	0	-1	76	5
7	Biased See Drawing		1	-8	123	-15	1	2	79	17
8	Biased See Drawing		1	-8	150	183	0	-1	61	-54
9	Biased See Drawing		1	-8	116	-67	1	2	77	9
10	Biased See Drawing		3	9	133	58	0	-1	67	-31

ETEC Survey Drawing

Survey No.:	ETEC-102519-004
Date:	10/25/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-7 Interior Horizontal Tank
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/5/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/5/2019

Survey No.:	ETEC-102819-001
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-1 Interior Linoleum Tile
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

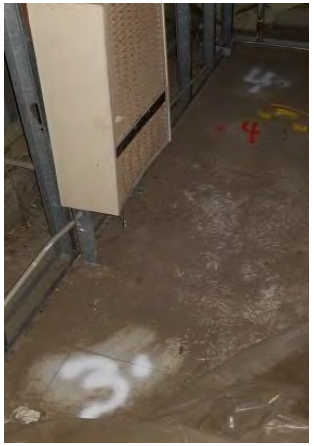
Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2.4	221.2	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.78	36.30	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		90.66	555.86	8.43	171.90

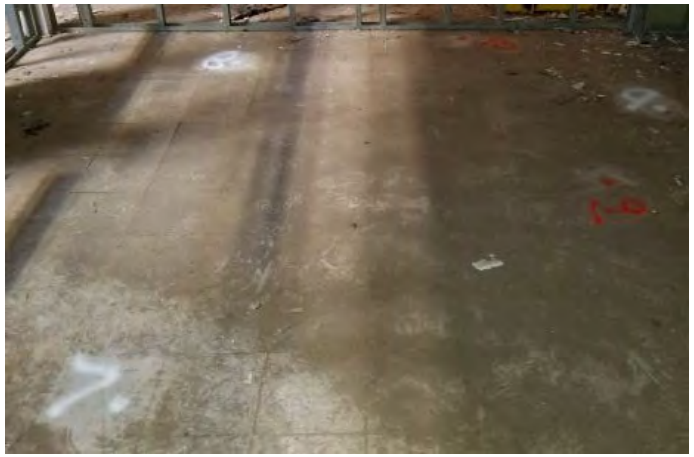
No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	6500-8000	1	-12	256	256	0	0	62	-29
2	Background See Drawing	6500-8000	1	-12	250	212	0	0	70	2
3	Background See Drawing	6500-8000	3	5	238	124	0	0	83	54
4	Background See Drawing	6500-8000	5	22	255	249	1	3	72	10
5	Background See Drawing	6500-8000	3	5	182	-288	0	0	66	-13
6	Background See Drawing	6500-8000	2	-3	186	-259	0	0	67	-9
7	Background See Drawing	6500-8000	2	-3	248	197	0	0	66	-13
8	Background See Drawing	6500-8000	3	5	216	-38	0	0	71	6
9	Background See Drawing	6500-8000	1	-12	191	-222	1	3	70	2
10	Background See Drawing	6500-8000	3	5	190	-229	0	0	69	-2
1	Biased See Drawing		5	22	225	28	0	0	73	14
2	Biased See Drawing		1	-12	271	366	0	0	62	-29
3	Biased See Drawing		2	-3	234	94	0	0	84	57
4	Biased See Drawing	N	2	-3	257	263	0	0	79	38
5	Biased See Drawing		1	-12	210	-82	0	0	71	6
6	Biased See Drawing	A	2	-3	212	-68	0	0	66	-13
7	Biased See Drawing		4	14	217	-31	0	0	73	14
8	Biased See Drawing		4	14	236	109	1	3	84	57
9	Biased See Drawing		5	22	203	-134	0	0	76	26
10	Biased See Drawing		2	-3	212	-68	0	0	72	10

ETEC Survey Drawing

Survey No.:	ETEC-102819-001
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-1 Interior Linoleum Tile
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0





Reviewer: _____ Date: 11/5/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/5/2019

Survey No.:	ETEC-102819-002
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-2 Interior Ceramic Tile
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2.2	392.4	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.62	48.35	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		87.90	733.02	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	8500-10000	0	-19	383	-69	0	0	74	18
2	Background See Drawing	8500-10000	3	7	423	225	0	0	71	6
3	Background See Drawing	8500-10000	1	-10	383	-69	0	0	68	-6
4	Background See Drawing	8500-10000	3	7	417	181	0	0	51	-72
5	Background See Drawing	8500-10000	0	-19	394	12	0	0	67	-9
6	Background See Drawing	8500-10000	4	15	353	-290	0	0	76	26
7	Background See Drawing	8500-10000	4	15	374	-135	0	0	72	10
8	Background See Drawing	8500-10000	1	-10	411	137	1	3	79	38
9	Background See Drawing	8500-10000	3	7	378	-106	0	0	72	10
10	Background See Drawing	8500-10000	3	7	408	115	0	0	77	30
1	Biased See Drawing		2	-2	403	78	0	0	50	-76
2	Biased See Drawing		2	-2	409	122	0	0	64	-21
3	Biased See Drawing		3	7	392	-3	1	3	74	18
4	Biased See Drawing	N	3	7	401	63	0	0	63	-25
5	Biased See Drawing		2	-2	420	203	0	0	65	-17
6	Biased See Drawing	A	2	-2	413	151	0	0	63	-25
7	Biased See Drawing		7	41	392	-3	0	0	59	-41
8	Biased See Drawing		4	15	374	-135	1	3	84	57
9	Biased See Drawing		4	15	425	240	1	3	73	14
10	Biased See Drawing		5	24	388	-32	0	0	56	-53

ETEC Survey Drawing

Survey No.:	ETEC-102819-002
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-2 Interior Ceramic Tile
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ____11/5/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/5/2019

Survey No.:	ETEC-102819-003	**Item Surveyed:**	SU#4463-3 Interior Glass
Date:	10/31/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	11/1/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		1.1	170.8	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		2.56	31.90	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		69.69	491.12	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	5900-7600	2	8	228	421	0	0	50	-76
2	Background See Drawing	5900-7600	2	8	224	391	0	0	55	-57
3	Background See Drawing	5900-7600	2	8	135	-263	0	0	75	22
4	Background See Drawing	5900-7600	0	-9	148	-168	0	0	68	-6
5	Background See Drawing	5900-7600	1	-1	140	-226	0	0	71	6
6	Background See Drawing	5900-7600	2	8	149	-160	0	0	88	73
7	Background See Drawing	5900-7600	1	-1	161	-72	0	0	69	-2
8	Background See Drawing	5900-7600	0	-9	171	1	0	0	72	10
9	Background See Drawing	5900-7600	1	-1	190	141	0	0	71	6
10	Background See Drawing	5900-7600	0	-9	162	-65	0	0	72	10
1	Biased See Drawing		3	16	198	200	0	0	74	18
2	Biased See Drawing		2	8	226	406	0	0	70	2
3	Biased See Drawing		0	-9	173	16	0	0	79	38
4	Biased See Drawing	N	2	8	157	-101	0	0	73	14
5	Biased See Drawing		3	16	158	-94	1	3	64	-21
6	Biased See Drawing	A	1	-1	160	-79	0	0	56	-53
7	Biased See Drawing		1	-1	148	-168	0	0	67	-9
8	Biased See Drawing		2	8	140	-226	0	0	54	-61
9	Biased See Drawing		1	-1	165	-43	0	0	67	-9
10	Biased See Drawing		0	-9	173	16	0	0	62	-29

ETEC Survey Drawing

Survey No.:	ETEC-102819-003
Date:	10/31/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-3 Interior Glass
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ___11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102819-003
Date:	10/31/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-3 Interior Glass
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___11/5/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/5/2019

Survey No.:	ETEC-102819-004
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-4 Interior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

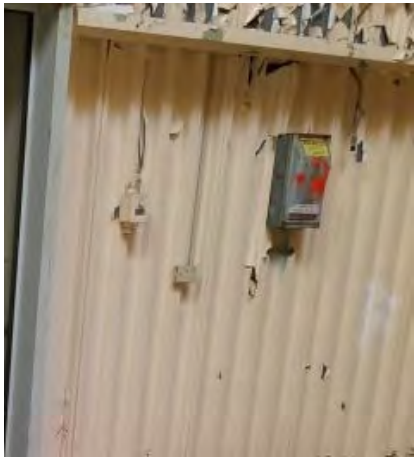
Parameters	***Dose Rate***	***Gamma***	***Other***	***Total***		***Removable***	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2.3	150	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.70	29.89	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		89.29	461.63	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	4400-8600	4	15	142	-59	0	-1	61	-54
2	Background See Drawing	4400-8600	3	6	190	294	0	-1	58	-66
3	Background See Drawing	4400-8600	1	-11	137	-96	0	-1	63	-46
4	Background See Drawing	4400-8600	1	-11	137	-96	0	-1	84	36
5	Background See Drawing	4400-8600	4	15	145	-37	0	-1	72	-11
6	Background See Drawing	4400-8600	0	-20	149	-7	0	-1	54	-82
7	Background See Drawing	4400-8600	4	15	158	59	0	-1	60	-58
8	Background See Drawing	4400-8600	0	-20	185	257	0	-1	70	-19
9	Background See Drawing	4400-8600	3	6	123	-199	0	-1	65	-39
10	Background See Drawing	4400-8600	3	6	134	-118	0	-1	64	-43
1	Biased See Drawing		1	-11	154	29	0	-1	64	-43
2	Biased See Drawing		1	-11	156	44	0	-1	77	9
3	Biased See Drawing		3	6	184	250	0	-1	89	56
4	Biased See Drawing	N	1	-11	142	-59	0	-1	76	5
5	Biased See Drawing		0	-20	143	-51	0	-1	67	-31
6	Biased See Drawing	A	1	-11	186	265	0	-1	75	1
7	Biased See Drawing		2	-3	174	176	0	-1	74	-3
8	Biased See Drawing		2	-3	201	375	0	-1	73	-7
9	Biased See Drawing		1	-11	137	-96	0	-1	68	-27
10	Biased See Drawing		2	-3	169	140	0	-1	62	-50

ETEC Survey Drawing

Survey No.:	ETEC-102819-004
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-4 Interior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

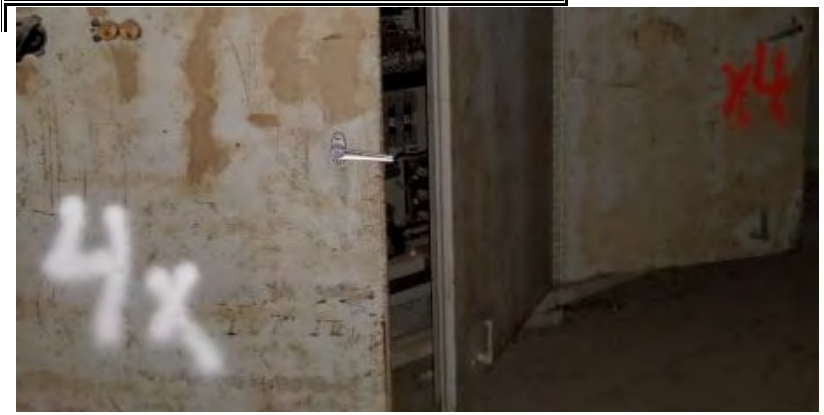


Reviewer: _____ Date: ___11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102819-004
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-4 Interior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ Date: ____11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102819-004
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-4 Interior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ___11/5/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/5/2019

Survey No.:	ETEC-102819-005
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-5 Interior Wood
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		1.7	153.7	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.18	30.26	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		80.38	467.02	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	4800-7300	1	-6	132	-160	0	0	86	65
2	Background See Drawing	4800-7300	2	3	144	-71	0	0	69	-2
3	Background See Drawing	4800-7300	3	11	132	-160	0	0	64	-21
4	Background See Drawing	4800-7300	2	3	170	120	0	0	70	2
5	Background See Drawing	4800-7300	2	3	132	-160	0	0	49	-80
6	Background See Drawing	4800-7300	1	-6	163	68	0	0	61	-33
7	Background See Drawing	4800-7300	0	-15	149	-35	0	0	64	-21
8	Background See Drawing	4800-7300	2	3	159	39	0	0	59	-41
9	Background See Drawing	4800-7300	2	3	171	127	0	0	72	10
10	Background See Drawing	4800-7300	2	3	185	230	0	0	60	-37
1	Biased See Drawing		2	3	149	-35	1	3	67	-9
2	Biased See Drawing		4	20	162	61	0	0	71	6
3	Biased See Drawing		3	11	136	-130	0	0	75	22
4	Biased See Drawing	N	3	11	179	186	0	0	57	-49
5	Biased See Drawing		1	-6	145	-64	0	0	69	-2
6	Biased See Drawing	A	5	28	177	171	0	0	76	26
7	Biased See Drawing		3	11	155	10	0	0	69	-2
8	Biased See Drawing		5	28	138	-115	1	3	71	6
9	Biased See Drawing		2	3	146	-57	0	0	67	-9
10	Biased See Drawing		1	-6	139	-108	0	0	72	10

ETEC Survey Drawing

Survey No.:	ETEC-102819-005
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-5 Interior Wood
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ____11/5/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/5/2019

Survey No.:	ETEC-102819-006
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-6 Interior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		1.6	131.6	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.09	28.00	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		78.75	433.79	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	4400-8600	3	12	123	-63	0	-1	73	-7
2	Background See Drawing	4400-8600	1	-5	135	25	0	-1	69	-23
3	Background See Drawing	4400-8600	4	21	158	194	0	-1	63	-46
4	Background See Drawing	4400-8600	0	-14	153	157	0	-1	77	9
5	Background See Drawing	4400-8600	2	3	119	-93	0	-1	65	-39
6	Background See Drawing	4400-8600	1	-5	144	91	0	-1	66	-35
7	Background See Drawing	4400-8600	0	-14	123	-63	0	-1	64	-43
8	Background See Drawing	4400-8600	2	3	122	-71	0	-1	65	-39
9	Background See Drawing	4400-8600	2	3	148	121	0	-1	79	17
10	Background See Drawing	4400-8600	1	-5	91	-299	0	-1	67	-31
1	Biased See Drawing		0	-14	133	10	0	-1	79	17
2	Biased See Drawing		2	3	132	3	0	-1	65	-39
3	Biased See Drawing		0	-14	133	10	0	-1	52	-90
4	Biased See Drawing	N	3	12	154	165	1	2	65	-39
5	Biased See Drawing		4	21	167	260	0	-1	70	-19
6	Biased See Drawing	A	2	3	145	99	0	-1	78	13
7	Biased See Drawing		0	-14	140	62	0	-1	70	-19
8	Biased See Drawing		0	-14	149	128	0	-1	66	-35
9	Biased See Drawing		0	-14	122	-71	0	-1	72	-11
10	Biased See Drawing		1	-5	109	-166	0	-1	68	-27

ETEC Survey Drawing

Survey No.:	ETEC-102819-006
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-6 Interior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102819-006
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-6 Interior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: 11/5/2019

ETEC Survey Drawing

Survey No.:	ETEC-102819-006
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-6 Interior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___11/5/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/5/2019

Survey No.:	ETEC-102819-007	**Item Surveyed:**	SU#4463-7 Interior Corrugated Metal
Date:	10/28/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	10/31/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		1.5	178.1	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		2.99	32.57	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		77.07	501.04	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	4300-8000	0	-13	150	-207	0	-1	86	44
2	Background See Drawing	4300-8000	3	13	139	-288	0	-1	77	9
3	Background See Drawing	4300-8000	3	13	157	-155	0	-1	70	-19
4	Background See Drawing	4300-8000	2	4	226	352	0	-1	70	-19
5	Background See Drawing	4300-8000	1	-4	205	198	0	-1	57	-70
6	Background See Drawing	4300-8000	2	4	196	132	0	-1	68	-27
7	Background See Drawing	4300-8000	1	-4	155	-170	0	-1	76	5
8	Background See Drawing	4300-8000	0	-13	224	338	0	-1	66	-35
9	Background See Drawing	4300-8000	3	13	171	-52	0	-1	66	-35
10	Background See Drawing	4300-8000	0	-13	158	-148	0	-1	80	20
1	Biased See Drawing		1	-4	157	-155	0	-1	64	-43
2	Biased See Drawing		1	-4	155	-170	1	2	70	-19
3	Biased See Drawing		5	30	206	205	0	-1	73	-7
4	Biased See Drawing	N	1	-4	201	168	0	-1	73	-7
5	Biased See Drawing		0	-13	233	404	1	2	70	-19
6	Biased See Drawing	A	5	30	173	-38	0	-1	75	1
7	Biased See Drawing		1	-4	204	190	0	-1	70	-19
8	Biased See Drawing		2	4	197	139	0	-1	71	-15
9	Biased See Drawing		0	-13	190	88	0	-1	64	-43
10	Biased See Drawing		3	13	137	-302	1	2	84	36

ETEC Survey Drawing

Survey No.:	ETEC-102819-007
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-7 Interior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___11/5/2019

ETEC Survey Drawing

Survey No.:	ETEC-102819-007
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-7 Interior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102819-007
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-7 Interior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ___11/5/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102819-007
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-7 Interior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ____ 11/5/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102819-008	**Item Surveyed:**	SU#4463-8 Interior Sheetrock_Particle Board
Date:	10/28/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	10/31/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

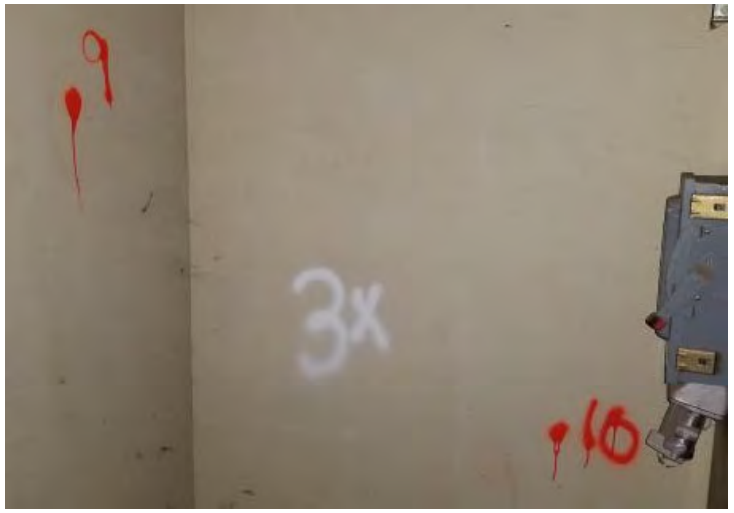
Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2	174.4	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.45	32.23	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		85.00	496.04	17.10	178.01

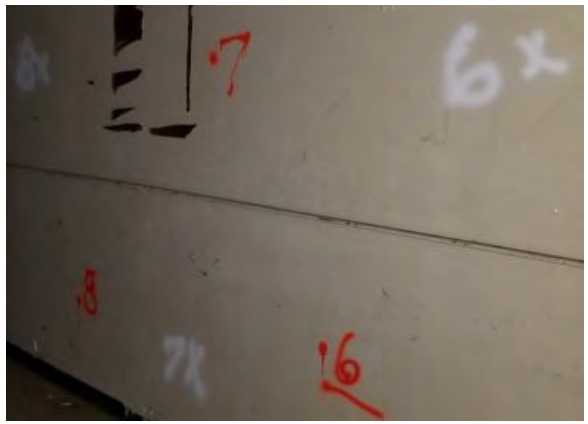
No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	6100-9000	4	17	176	12	0	-1	64	-43
2	Background See Drawing	6100-9000	1	-9	184	71	0	-1	68	-27
3	Background See Drawing	6100-9000	3	9	173	-10	0	-1	71	-15
4	Background See Drawing	6100-9000	2	0	175	4	0	-1	65	-39
5	Background See Drawing	6100-9000	2	0	207	240	0	-1	63	-46
6	Background See Drawing	6100-9000	1	-9	162	-91	0	-1	80	20
7	Background See Drawing	6100-9000	3	9	173	-10	0	-1	64	-43
8	Background See Drawing	6100-9000	1	-9	174	-3	0	-1	75	1
9	Background See Drawing	6100-9000	2	0	184	71	0	-1	60	-58
10	Background See Drawing	6100-9000	1	-9	136	-282	1	2	63	-46
1	Biased See Drawing		2	0	181	49	0	-1	63	-46
2	Biased See Drawing		3	9	200	188	0	-1	60	-58
3	Biased See Drawing		1	-9	187	93	0	-1	77	9
4	Biased See Drawing	N	5	26	158	-121	0	-1	66	-35
5	Biased See Drawing		1	-9	167	-54	0	-1	62	-50
6	Biased See Drawing	A	2	0	181	49	0	-1	78	13
7	Biased See Drawing		0	-17	157	-128	0	-1	77	9
8	Biased See Drawing		3	9	178	26	0	-1	63	-46
9	Biased See Drawing		1	-9	170	-32	0	-1	57	-70
10	Biased See Drawing		3	9	182	56	0	-1	72	-11

ETEC Survey Drawing

Survey No.:	ETEC-102819-008
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-8 Interior Sheetrock_Particle Board
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0





Reviewer: _____ Date: ___11/8/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/8/2019

Survey No.:	ETEC-102819-009
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-9 Interior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2.6	272.7	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.94	40.30	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		93.31	614.75	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	6700-10000	5	21	254	-138	0	0	83	54
2	Background See Drawing	6700-10000	2	-5	284	83	0	0	77	30
3	Background See Drawing	6700-10000	2	-5	282	68	0	0	75	22
4	Background See Drawing	6700-10000	2	-5	269	-27	0	0	61	-33
5	Background See Drawing	6700-10000	1	-14	272	-5	0	0	93	93
6	Background See Drawing	6700-10000	2	-5	331	429	1	3	69	-2
7	Background See Drawing	6700-10000	6	29	361	649	0	0	63	-25
8	Background See Drawing	6700-10000	1	-14	245	-204	1	3	74	18
9	Background See Drawing	6700-10000	3	3	148	-917	0	0	72	10
10	Background See Drawing	6700-10000	2	-5	281	61	0	0	56	-53
1	Biased See Drawing		3	3	275	17	1	3	55	-57
2	Biased See Drawing		3	3	292	142	1	3	56	-53
3	Biased See Drawing		0	-22	281	61	0	0	76	26
4	Biased See Drawing	N	1	-14	262	-79	0	0	74	18
5	Biased See Drawing		3	3	254	-138	0	0	69	-2
6	Biased See Drawing	A	5	21	266	-49	0	0	71	6
7	Biased See Drawing		6	29	287	105	0	0	57	-49
8	Biased See Drawing		0	-22	277	32	1	3	62	-29
9	Biased See Drawing		5	21	263	-71	0	0	75	22
10	Biased See Drawing		4	12	252	-152	0	0	74	18

ETEC Survey Drawing

Survey No.:	ETEC-102819-009
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-9 Interior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102819-009
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

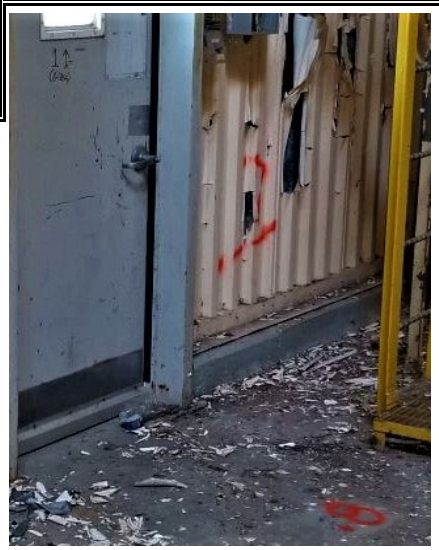
Item Surveyed:	SU#4463-9 Interior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102819-009
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-9 Interior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ Date: 11/8/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/8/2019

Survey No.:	ETEC-102819-010
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-10 Interior Tank
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		1.3	143.4	0.4	74.8
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		2.78	29.23	1.54	21.11
MDA (dpm/100 cm^2)	NA	NA		73.52	451.85	17.10	178.01

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	4300-5700	1	-3	142	-10	0	-1	63	-46
2	Background See Drawing	4300-5700	0	-11	126	-128	0	-1	68	-27
3	Background See Drawing	4300-5700	2	6	138	-40	0	-1	72	-11
4	Background See Drawing	4300-5700	2	6	142	-10	1	2	67	-31
5	Background See Drawing	4300-5700	2	6	140	-25	0	-1	52	-90
6	Background See Drawing	4300-5700	1	-3	142	-10	1	2	77	9
7	Background See Drawing	4300-5700	3	15	165	159	0	-1	67	-31
8	Background See Drawing	4300-5700	2	6	138	-40	0	-1	61	-54
9	Background See Drawing	4300-5700	0	-11	156	93	0	-1	63	-46
10	Background See Drawing	4300-5700	0	-11	145	12	0	-1	66	-35
1	Biased See Drawing		2	6	144	4	0	-1	66	-35
2	Biased See Drawing		1	-3	126	-128	0	-1	71	-15
3	Biased See Drawing		0	-11	120	-172	0	-1	64	-43
4	Biased See Drawing	N	0	-11	122	-157	0	-1	79	17
5	Biased See Drawing		0	-11	134	-69	0	-1	75	1
6	Biased See Drawing	A	0	-11	163	144	0	-1	63	-46
7	Biased See Drawing		0	-11	145	12	0	-1	65	-39
8	Biased See Drawing		1	-3	143	-3	0	-1	68	-27
9	Biased See Drawing		0	-11	126	-128	0	-1	55	-78
10	Biased See Drawing		1	-3	134	-69	0	-1	66	-35

ETEC Survey Drawing

Survey No.:	ETEC-102819-010
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	10/31/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-10 Interior Tank
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___11/8/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-001
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-08 Exterior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2.9	184.6	0.1	72.7
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		4.16	33.16	0.77	20.81
MDA (dpm/100 cm^2)	NA	NA		97.10	509.70	12.76	175.66

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	7000-9000	5	18	187	18	0	0	81	33
2	Background See Drawing	7000-9000	6	27	194	69	0	0	60	-50
3	Background See Drawing	7000-9000	1	-16	192	54	0	0	62	-42
4	Background See Drawing	7000-9000	2	-8	182	-19	0	0	61	-46
5	Background See Drawing	7000-9000	3	1	203	135	0	0	85	48
6	Background See Drawing	7000-9000	1	-16	190	40	0	0	77	17
7	Background See Drawing	7000-9000	4	9	182	-19	0	0	64	-34
8	Background See Drawing	7000-9000	3	1	176	-63	0	0	78	21
9	Background See Drawing	7000-9000	0	-25	163	-159	0	0	76	13
10	Background See Drawing	7000-9000	4	9	177	-56	1	3	60	-50
1	Biased See Drawing		7	35	199	106	1	3	74	5
2	Biased See Drawing		6	27	164	-151	1	3	67	-22
3	Biased See Drawing		2	-8	181	-26	0	0	67	-22
4	Biased See Drawing	N	3	1	205	150	0	0	72	-3
5	Biased See Drawing		6	27	200	113	2	5	47	-101
6	Biased See Drawing	A	2	-8	219	253	0	0	70	-11
7	Biased See Drawing		2	-8	172	-93	1	3	72	-3
8	Biased See Drawing		2	-8	204	143	0	0	85	48
9	Biased See Drawing		6	27	182	-19	0	0	64	-34
10	Biased See Drawing		8	44	183	-12	0	0	64	-34

ETEC Survey Drawing

Survey No.:	ETEC-102919-001
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-08 Exterior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___11/8/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102919-001
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

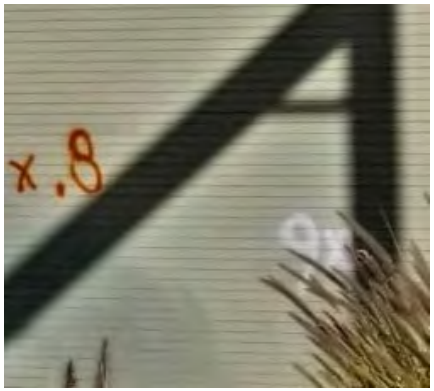
Item Surveyed:	SU#4462-08 Exterior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___11/8/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102919-001
Date:	10/28/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-08 Exterior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ _____ Date: ____11/8/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-002
Date:	10/29/2019
Survey Tech.:	Christopher Gillen
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-09 Exterior Wood
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2.4	194.3	0.1	72.7
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.78	34.02	0.77	20.81
MDA (dpm/100 cm^2)	NA	NA		90.66	522.35	12.76	175.66

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	8000-10000	0	-21	207	93	0	0	76	13
2	Background See Drawing	8000-10000	1	-12	189	-39	0	0	66	-26
3	Background See Drawing	8000-10000	8	48	214	145	0	0	65	-30
4	Background See Drawing	8000-10000	4	14	153	-304	0	0	56	-66
5	Background See Drawing	8000-10000	5	22	179	-113	0	0	77	17
6	Background See Drawing	8000-10000	1	-12	170	-179	0	0	64	-34
7	Background See Drawing	8000-10000	2	-3	204	71	0	0	65	-30
8	Background See Drawing	8000-10000	0	-21	196	12	1	3	77	17
9	Background See Drawing	8000-10000	0	-21	233	285	0	0	66	-26
10	Background See Drawing	8000-10000	3	5	198	27	2	5	67	-22
1	Biased See Drawing		4	14	215	152	0	0	56	-66
2	Biased See Drawing		2	-3	213	138	0	0	60	-50
3	Biased See Drawing		8	48	204	71	0	0	82	37
4	Biased See Drawing	N	4	14	183	-83	0	0	64	-34
5	Biased See Drawing		5	22	217	167	1	3	70	-11
6	Biased See Drawing	A	1	-12	190	-32	1	3	71	-7
7	Biased See Drawing		1	-12	189	-39	0	0	68	-19
8	Biased See Drawing		2	-3	180	-105	0	0	69	-15
9	Biased See Drawing		0	-21	181	-98	0	0	70	-11
10	Biased See Drawing		1	-12	181	-98	0	0	58	-58

ETEC Survey Drawing

Survey No.:	ETEC-102919-002
Date:	10/29/2019
Survey Tech.:	Christopher Gillen
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-09 Exterior Wood
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102919-002
Date:	10/29/2019
Survey Tech.:	Christopher Gillen
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-09 Exterior Wood
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ___11/8/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-003	**Item Surveyed:**	SU#4462-10 Exterior Non-Structural Steel
Date:	10/29/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	11/4/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		4.5	188	0.1	72.7
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		5.18	33.46	0.77	20.81
MDA (dpm/100 cm^2)	NA	NA		114.63	514.17	12.76	175.66

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	8000-10000	4	-4	183	-37	0	0	72	-3
2	Background See Drawing	8000-10000	6	13	187	-7	0	0	76	13
3	Background See Drawing	8000-10000	8	30	212	176	0	0	55	-70
4	Background See Drawing	8000-10000	6	13	203	110	0	0	69	-15
5	Background See Drawing	8000-10000	1	-30	174	-103	0	0	65	-30
6	Background See Drawing	8000-10000	4	-4	166	-162	0	0	75	9
7	Background See Drawing	8000-10000	0	-39	188	0	0	0	60	-50
8	Background See Drawing	8000-10000	7	21	188	0	0	0	76	13
9	Background See Drawing	8000-10000	6	13	215	199	1	3	58	-58
10	Background See Drawing	8000-10000	3	-13	164	-176	0	0	68	-19
1	Biased See Drawing		3	-13	185	-22	1	3	76	13
2	Biased See Drawing		2	-21	148	-294	1	3	75	9
3	Biased See Drawing		3	-13	149	-287	2	5	68	-19
4	Biased See Drawing	N	4	-4	202	103	0	0	50	-89
5	Biased See Drawing		3	-13	184	-29	2	5	82	37
6	Biased See Drawing	A	4	-4	189	7	1	3	69	-15
7	Biased See Drawing		4	-4	186	-15	1	3	75	9
8	Biased See Drawing		1	-30	180	-59	0	0	69	-15
9	Biased See Drawing		5	4	192	29	1	3	72	-3
10	Biased See Drawing		7	21	178	-74	0	0	67	-22

ETEC Survey Drawing

Survey No.:	ETEC-102919-003
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-10 Exterior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102919-003
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-10 Exterior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/8/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-004
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-11 Exterior Linoleum Tile
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2.5	257.6	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.86	39.17	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		92.00	598.10	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	9000-11000	3	4	250	-56	0	0	72	10
2	Background See Drawing	9000-11000	1	-13	260	18	0	0	71	6
3	Background See Drawing	9000-11000	2	-4	252	-41	0	0	72	10
4	Background See Drawing	9000-11000	2	-4	250	-56	0	0	62	-29
5	Background See Drawing	9000-11000	6	30	250	-56	0	0	78	34
6	Background See Drawing	9000-11000	2	-4	251	-49	0	0	78	34
7	Background See Drawing	9000-11000	1	-13	243	-107	0	0	47	-88
8	Background See Drawing	9000-11000	1	-13	271	99	0	0	76	26
9	Background See Drawing	9000-11000	2	-4	274	121	0	0	78	34
10	Background See Drawing	9000-11000	5	21	275	128	0	0	83	54
1	Biased See Drawing		1	-13	258	3	0	0	64	-21
2	Biased See Drawing		4	13	242	-115	0	0	71	6
3	Biased See Drawing		6	30	236	-159	0	0	71	6
4	Biased See Drawing	N	6	30	244	-100	0	0	67	-9
5	Biased See Drawing		4	13	257	-4	0	0	66	-13
6	Biased See Drawing	A	5	21	282	179	0	0	69	-2
7	Biased See Drawing		1	-13	266	62	1	3	55	-57
8	Biased See Drawing		5	21	275	128	0	0	80	42
9	Biased See Drawing		1	-13	294	268	1	3	65	-17
10	Biased See Drawing		7	39	289	231	0	0	58	-45

ETEC Survey Drawing

Survey No.:	ETEC-102919-004
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-11 Exterior Linoleum Tile
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ___11/8/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-005
Date:	10/29/2019
Survey Tech.:	Christopher Gillen
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-12 Exterior Ceramic Tile
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		5.8	501.8	0.1	72.7
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		5.88	54.67	0.77	20.81
MDA (dpm/100 cm^2)	NA	NA		126.66	826.05	12.76	175.66

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	11000-12000	4	-15	516	104	1	3	64	-34
2	Background See Drawing	11000-12000	9	27	537	259	2	5	60	-50
3	Background See Drawing	11000-12000	9	27	561	435	0	0	76	13
4	Background See Drawing	11000-12000	5	-7	436	-484	0	0	68	-19
5	Background See Drawing	11000-12000	5	-7	475	-197	1	3	76	13
6	Background See Drawing	11000-12000	9	27	566	472	0	0	69	-15
7	Background See Drawing	11000-12000	4	-15	521	141	0	0	66	-26
8	Background See Drawing	11000-12000	5	-7	430	-528	0	0	59	-54
9	Background See Drawing	11000-12000	4	-15	510	60	0	0	66	-26
10	Background See Drawing	11000-12000	4	-15	466	-263	0	0	82	37
1	Biased See Drawing		9	27	561	435	0	0	91	72
2	Biased See Drawing		13	62	509	53	0	0	73	1
3	Biased See Drawing		10	36	493	-65	0	0	79	25
4	Biased See Drawing	N	7	10	501	-6	0	0	54	-74
5	Biased See Drawing		6	2	465	-271	0	0	60	-50
6	Biased See Drawing	A	15	79	470	-234	0	0	73	1
7	Biased See Drawing		7	10	467	-256	2	5	66	-26
8	Biased See Drawing		8	19	471	-226	0	0	65	-30
9	Biased See Drawing		10	36	476	-190	0	0	72	-3
10	Biased See Drawing		8	19	477	-182	0	0	67	-22

ETEC Survey Drawing

Survey No.:	ETEC-102919-005
Date:	10/29/2019
Survey Tech.:	Christopher Gillen
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/4/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-12 Exterior Ceramic Tile
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___11/8/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-006	**Item Surveyed:**	SU#4462-13 Exterior Structural Steel
Date:	10/29/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	11/1/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		4.2	161	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		5.00	30.97	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		111.62	477.46	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	6000-9000	6	15	127	-250	0	0	68	-6
2	Background See Drawing	6000-9000	7	24	169	59	1	3	67	-9
3	Background See Drawing	6000-9000	5	7	120	-301	0	0	65	-17
4	Background See Drawing	6000-9000	6	15	165	29	0	0	75	22
5	Background See Drawing	6000-9000	2	-19	173	88	0	0	74	18
6	Background See Drawing	6000-9000	3	-10	193	235	2	6	76	26
7	Background See Drawing	6000-9000	4	-2	171	74	2	6	66	-13
8	Background See Drawing	6000-9000	2	-19	203	309	0	0	57	-49
9	Background See Drawing	6000-9000	2	-19	159	-15	1	3	71	6
10	Background See Drawing	6000-9000	5	7	130	-228	0	0	59	-41
1	Biased See Drawing		3	-10	135	-191	1	3	72	10
2	Biased See Drawing		4	-2	186	184	1	3	66	-13
3	Biased See Drawing		4	-2	167	44	0	0	48	-84
4	Biased See Drawing	N	2	-19	142	-140	0	0	55	-57
5	Biased See Drawing		8	33	194	243	0	0	60	-37
6	Biased See Drawing	A	1	-27	187	191	0	0	63	-25
7	Biased See Drawing		3	-10	135	-191	0	0	67	-9
8	Biased See Drawing		6	15	180	140	0	0	79	38
9	Biased See Drawing		8	33	212	375	0	0	66	-13
10	Biased See Drawing		8	33	199	279	0	0	73	14

ETEC Survey Drawing

Survey No.:	ETEC-102919-006
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-13 Exterior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ____11/8/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102919-006
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-13 Exterior Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/8/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-007	**Item Surveyed:**	SU#4462-14 Exterior Concrete
Date:	10/29/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	11/1/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		12.3	398	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		8.56	48.69	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		172.69	738.08	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	8000-14000	6	-54	410	88	1	3	63	-25
2	Background See Drawing	8000-14000	10	-20	388	-74	1	3	65	-17
3	Background See Drawing	8000-14000	12	-3	400	15	0	0	78	34
4	Background See Drawing	8000-14000	9	-28	378	-147	0	0	72	10
5	Background See Drawing	8000-14000	17	40	431	243	0	0	73	14
6	Background See Drawing	8000-14000	19	58	430	235	0	0	66	-13
7	Background See Drawing	8000-14000	17	40	441	316	0	0	73	14
8	Background See Drawing	8000-14000	11	-11	368	-221	0	0	64	-21
9	Background See Drawing	8000-14000	16	32	384	-103	0	0	64	-21
10	Background See Drawing	8000-14000	6	-54	350	-353	0	0	72	10
1	Biased See Drawing		12	-3	398	0	1	3	62	-29
2	Biased See Drawing		8	-37	381	-125	1	3	69	-2
3	Biased See Drawing		12	-3	420	162	0	0	53	-65
4	Biased See Drawing	N	12	-3	403	37	0	0	67	-9
5	Biased See Drawing		15	23	387	-81	1	3	63	-25
6	Biased See Drawing	A	16	32	384	-103	3	8	61	-33
7	Biased See Drawing		22	83	378	-147	1	3	72	10
8	Biased See Drawing		22	83	357	-301	1	3	62	-29
9	Biased See Drawing		23	92	431	243	3	8	65	-17
10	Biased See Drawing		12	-3	394	-29	0	0	65	-17

ETEC Survey Drawing

Survey No.:	ETEC-102919-007
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-14 Exterior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ___11/8/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102919-007
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-14 Exterior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ___11/8/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102919-007
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4462-14 Exterior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date: ___ 11/8/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-008
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-11 Exterior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		3.3	182.3	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		4.43	32.95	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		101.86	506.65	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	6500-11000	2	-11	194	86	1	3	69	-2
2	Background See Drawing	6500-11000	4	6	211	211	0	0	68	-6
3	Background See Drawing	6500-11000	3	-3	195	93	0	0	56	-53
4	Background See Drawing	6500-11000	3	-3	211	211	0	0	68	-6
5	Background See Drawing	6500-11000	1	-20	195	93	0	0	75	22
6	Background See Drawing	6500-11000	4	6	167	-113	0	0	72	10
7	Background See Drawing	6500-11000	9	49	170	-90	0	0	66	-13
8	Background See Drawing	6500-11000	0	-28	172	-76	0	0	80	42
9	Background See Drawing	6500-11000	2	-11	150	-238	0	0	70	2
10	Background See Drawing	6500-11000	5	15	158	-179	0	0	61	-33
1	Biased See Drawing		2	-11	182	-2	1	3	60	-37
2	Biased See Drawing		5	15	184	12	0	0	71	6
3	Biased See Drawing		8	40	210	204	0	0	64	-21
4	Biased See Drawing	N	4	6	197	108	0	0	60	-37
5	Biased See Drawing		2	-11	182	-2	0	0	67	-9
6	Biased See Drawing	A	2	-11	195	93	1	3	74	18
7	Biased See Drawing		2	-11	201	138	0	0	77	30
8	Biased See Drawing		6	23	151	-230	0	0	61	-33
9	Biased See Drawing		6	23	139	-318	0	0	86	65
10	Biased See Drawing		2	-11	130	-385	1	3	72	10

ETEC Survey Drawing

Survey No.:	ETEC-102919-008
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-11 Exterior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ____11/8/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102919-008
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-11 Exterior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ____11/8/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102919-008
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-11 Exterior Corrugated Metal
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ____11/8/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-009
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-12 Exterior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

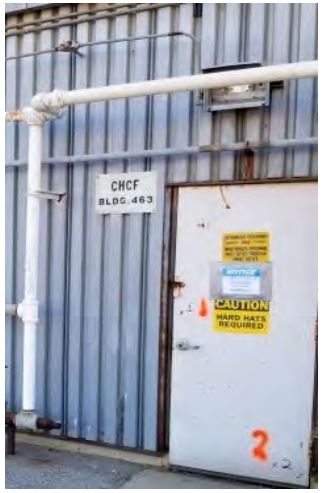
Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		6.9	184.9	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		6.41	33.19	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		135.81	510.10	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	6200-10000	3	-33	235	368	0	0	59	-41
2	Background See Drawing	6200-10000	7	1	219	251	0	0	59	-41
3	Background See Drawing	6200-10000	5	-16	199	104	0	0	67	-9
4	Background See Drawing	6200-10000	3	-33	209	177	1	3	46	-92
5	Background See Drawing	6200-10000	7	1	190	38	1	3	57	-49
6	Background See Drawing	6200-10000	6	-8	154	-227	0	0	69	-2
7	Background See Drawing	6200-10000	11	35	160	-183	1	3	62	-29
8	Background See Drawing	6200-10000	8	9	118	-492	0	0	80	42
9	Background See Drawing	6200-10000	10	27	191	45	2	6	69	-2
10	Background See Drawing	6200-10000	9	18	174	-80	0	0	77	30
1	Biased See Drawing		3	-33	189	30	0	0	79	38
2	Biased See Drawing		4	-25	200	111	0	0	65	-17
3	Biased See Drawing		9	18	186	8	0	0	95	101
4	Biased See Drawing	N	6	-8	194	67	1	3	69	-2
5	Biased See Drawing		6	-8	221	265	0	0	74	18
6	Biased See Drawing	A	10	27	172	-95	0	0	65	-17
7	Biased See Drawing		7	1	165	-146	1	3	76	26
8	Biased See Drawing		11	35	128	-418	1	3	67	-9
9	Biased See Drawing		6	-8	143	-308	0	0	61	-33
10	Biased See Drawing		3	-33	168	-124	2	6	66	-13

ETEC Survey Drawing

Survey No.:	ETEC-102919-009
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-12 Exterior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ Date: ___11/8/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102919-009
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

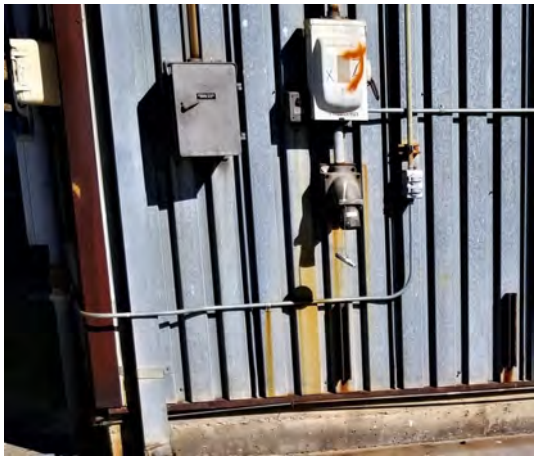
Item Surveyed:	SU#4463-12 Exterior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date: ____11/8/2019__

ETEC Survey Drawing

Survey No.:	ETEC-102919-009
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-12 Exterior Non-Structural Steel
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ Date: ___11/8/2019__

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/8/2019

Survey No.:	ETEC-102919-010
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-13 Exterior Tanks
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		5.3	144.5	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		5.62	29.34	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		122.21	453.50	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	4200-7700	6	6	176	232	0	0	66	-13
2	Background See Drawing	4200-7700	9	32	176	232	0	0	63	-25
3	Background See Drawing	4200-7700	9	32	150	40	0	0	62	-29
4	Background See Drawing	4200-7700	3	-20	127	-129	0	0	69	-2
5	Background See Drawing	4200-7700	2	-28	131	-99	0	0	74	18
6	Background See Drawing	4200-7700	7	15	137	-55	0	0	89	77
7	Background See Drawing	4200-7700	4	-11	137	-55	0	0	69	-2
8	Background See Drawing	4200-7700	2	-28	120	-180	0	0	66	-13
9	Background See Drawing	4200-7700	4	-11	140	-33	1	3	76	26
10	Background See Drawing	4200-7700	7	15	151	48	0	0	79	38
1	Biased See Drawing		4	-11	139	-40	0	0	67	-9
2	Biased See Drawing		5	-3	165	151	0	0	68	-6
3	Biased See Drawing		7	15	170	188	0	0	61	-33
4	Biased See Drawing	N	4	-11	140	-33	0	0	70	2
5	Biased See Drawing		8	23	136	-63	0	0	51	-72
6	Biased See Drawing	A	5	-3	142	-18	0	0	76	26
7	Biased See Drawing		6	6	148	26	0	0	66	-13
8	Biased See Drawing		4	-11	194	364	0	0	62	-29
9	Biased See Drawing		10	40	145	4	0	0	55	-57
10	Biased See Drawing		6	6	160	114	0	0	66	-13

ETEC Survey Drawing

Survey No.:	ETEC-102919-010
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

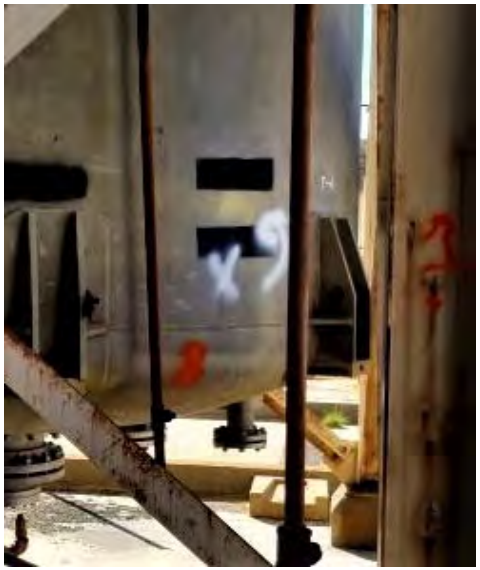
Item Surveyed:	SU#4463-13 Exterior Tanks
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102919-010
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-13 Exterior Tanks
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ Date 11/8/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/8/2019

Survey No.:	ETEC-102919-011
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-14 Exterior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		12.5	378.4	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		8.63	47.48	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		173.88	720.23	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	8500-12000	10	-21	384	41	0	0	57	-49
2	Background See Drawing	8500-12000	11	-13	395	122	0	0	61	-33
3	Background See Drawing	8500-12000	19	56	339	-290	0	0	61	-33
4	Background See Drawing	8500-12000	10	-21	393	107	0	0	53	-65
5	Background See Drawing	8500-12000	12	-4	340	-282	0	0	66	-13
6	Background See Drawing	8500-12000	13	4	393	107	1	3	68	-6
7	Background See Drawing	8500-12000	15	21	405	196	0	0	59	-41
8	Background See Drawing	8500-12000	8	-39	379	4	0	0	82	50
9	Background See Drawing	8500-12000	12	-4	382	26	0	0	62	-29
10	Background See Drawing	8500-12000	15	21	374	-32	1	3	65	-17
1	Biased See Drawing		19	56	419	299	1	3	83	54
2	Biased See Drawing		7	-47	413	254	0	0	75	22
3	Biased See Drawing		11	-13	342	-268	0	0	69	-2
4	Biased See Drawing	N	17	39	395	122	0	0	68	-6
5	Biased See Drawing		12	-4	411	240	0	0	48	-84
6	Biased See Drawing	A	18	47	379	4	0	0	77	30
7	Biased See Drawing		13	4	377	-10	0	0	64	-21
8	Biased See Drawing		15	21	359	-143	0	0	66	-13
9	Biased See Drawing		24	99	385	49	0	0	70	2
10	Biased See Drawing		14	13	383	34	0	0	63	-25

ETEC Survey Drawing

Survey No.:	ETEC-102919-011
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

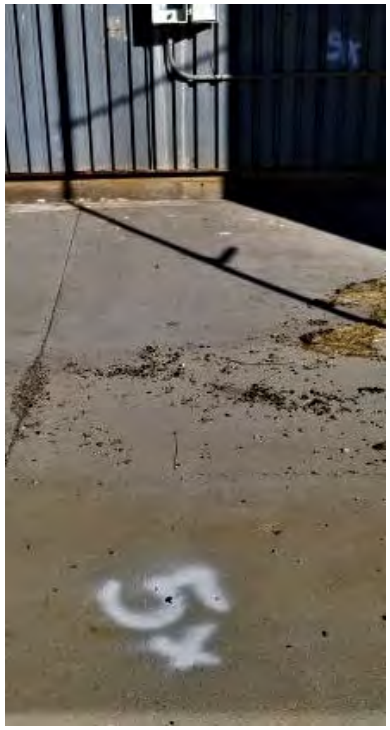
Item Surveyed:	SU#4463-14 Exterior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

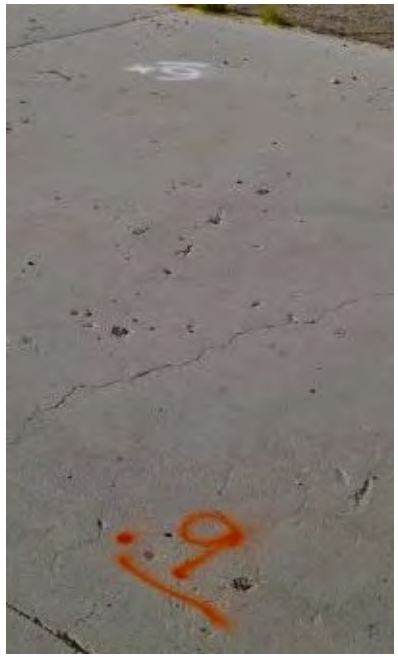
Reviewer: _____ Date 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102919-011
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-14 Exterior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0





Reviewer: _____ Date 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102919-011
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-14 Exterior Concrete
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date 11/8/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By: Date: 11/8/2019

Survey No.:	ETEC-102919-012	**Item Surveyed:**	SU#4463-15 Exterior Structural
Date:	10/29/2019	**Contaminant/Limits:**	1000/200 beta and 100/20 alpha
Survey Tech.:	Christopher Robbins	**Comments:**	
Count Rm. Tech.:	Norman Gillen		
Date Counted:	11/1/2019		
Survey Type:	Job Specific		
Level of Posting:	N/A		

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		3.9	136.3	0	69.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		4.82	28.49	0.00	20.33
MDA (dpm/100 cm^2)	NA	NA		108.49	441.08	8.43	171.90

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	5400-8000	2	-16	134	-17	0	0	68	-6
2	Background See Drawing	5400-8000	4	1	104	-238	1	3	67	-9
3	Background See Drawing	5400-8000	6	18	119	-127	0	0	74	18
4	Background See Drawing	5400-8000	6	18	128	-61	0	0	68	-6
5	Background See Drawing	5400-8000	4	1	118	-135	0	0	67	-9
6	Background See Drawing	5400-8000	3	-8	136	-2	1	3	76	26
7	Background See Drawing	5400-8000	3	-8	150	101	0	0	77	30
8	Background See Drawing	5400-8000	1	-25	161	182	0	0	74	18
9	Background See Drawing	5400-8000	8	35	166	218	0	0	61	-33
10	Background See Drawing	5400-8000	2	-16	147	79	0	0	71	6
1	Biased See Drawing		7	27	127	-68	0	0	71	6
2	Biased See Drawing		10	52	179	314	0	0	72	10
3	Biased See Drawing		7	27	153	123	1	3	77	30
4	Biased See Drawing	N	9	44	143	49	0	0	87	69
5	Biased See Drawing		1	-25	118	-135	1	3	60	-37
6	Biased See Drawing	A	5	9	125	-83	0	0	78	34
7	Biased See Drawing		5	9	136	-2	0	0	87	69
8	Biased See Drawing		1	-25	145	64	2	6	71	6
9	Biased See Drawing		2	-16	131	-39	0	0	79	38
10	Biased See Drawing		8	35	125	-83	0	0	67	-9

ETEC Survey Drawing

Survey No.:	ETEC-102919-012
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-15 Exterior Structural
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102919-012
Date:	10/29/2019
Survey Tech.:	Christopher Robbins
Count Rm. Tech.:	Norman Gillen
Date Counted:	11/1/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-15 Exterior Structural
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ Date 11/8/2019

North Wind Survey Data Sheet, Rev. 0

Reviewed By:  Date: 11/8/2019

Survey No.:	ETEC-102919-012
Date:	11/5/2019
Survey Tech.:	Norman Gillen
Count Rm. Tech.:	Lucas Ray
Date Counted:	11/5/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-15 Exterior Structural
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

Bcpm = Background cpm

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

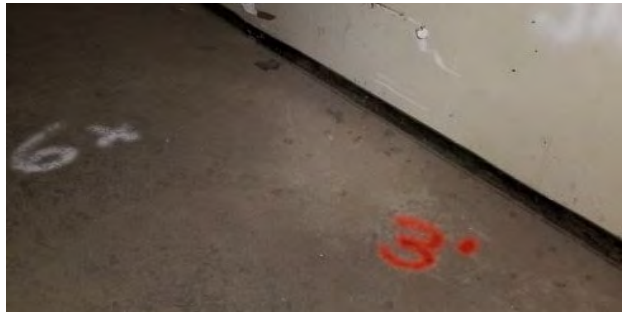
Parameters	*Dose Rate*	*Gamma*	*Other*	*Total*		*Removable*	
				Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:	N/A	L2221 w/ 44-10		L-2360 w/ 43-93	L-2360 w/ 43-93	2929/43-10-1	2929/43-10-1
Instrument SN:	N/A	152193/PR186954		337037/PR374285	337037/PR374285	336334 PR378866	336334 PR378866
Cal. Due Date:	N/A	4/4/2020		10/28/2020	10/28/2020	1/16/2020	1/16/2020
Efficiency:	N/A	NA		0.1165	0.136	0.356	0.254
Background cpm:	NA	NA		2	357.1	0.4	72.4
Area Correction Factor	NA	NA		1	1	1	1
Tb:	NA	NA		10	10	10	10
Ts:	NA	NA		1	1	1	1
Lc (cpm)	NA	NA		3.45	46.12	1.54	20.77
MDA (dpm/100 cm^2)	NA	NA		85.00	700.29	17.10	175.33

No.	*Descriptions*	*Range*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1	Background See Drawing	5400-8000	4	17	411	396	0	-1	74	6
2	Background See Drawing	5400-8000	1	-9	344	-96	0	-1	81	34
3	Background See Drawing	5400-8000	0	-17	366	65	0	-1	77	18
4	Background See Drawing	5400-8000	2	0	337	-148	0	-1	69	-13
5	Background See Drawing	5400-8000	0	-17	345	-89	0	-1	67	-21
6	Background See Drawing	5400-8000	2	0	331	-192	1	2	69	-13
7	Background See Drawing	5400-8000	6	34	361	29	0	-1	63	-37
8	Background See Drawing	5400-8000	3	9	382	183	1	2	76	14
9	Background See Drawing	5400-8000	0	-17	343	-104	0	-1	69	-13
10	Background See Drawing	5400-8000	2	0	351	-45	1	2	77	18
1	Biased See Drawing		3	9	313	-324	0	-1	64	-33
2	Biased See Drawing		6	34	313	-324	0	-1	79	26
3	Biased See Drawing		2	0	369	87	0	-1	63	-37
4	Biased See Drawing	N	0	-17	306	-376	1	2	67	-21
5	Biased See Drawing		2	0	343	-104	0	-1	75	10
6	Biased See Drawing	A	1	-9	387	220	0	-1	61	-45
7	Biased See Drawing		1	-9	346	-82	0	-1	75	10
8	Biased See Drawing		2	0	372	110	0	-1	61	-45
9	Biased See Drawing		0	-17	392	257	0	-1	71	-6
10	Biased See Drawing		3	9	343	-104	0	-1	65	-29

ETEC Survey Drawing

Survey No.:	ETEC-102919-012
Date:	11/5/2019
Survey Tech.:	Norman Gillen
Count Rm. Tech.:	Lucas Ray
Date Counted:	11/5/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-15 Exterior Structural
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0



Reviewer: _____ _____ Date 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102919-012
Date:	11/5/2019
Survey Tech.:	Norman Gillen
Count Rm. Tech.:	Lucas Ray
Date Counted:	11/5/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-15 Exterior Structural
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date 11/8/2019

ETEC Survey Drawing

Survey No.:	ETEC-102919-012
Date:	11/5/2019
Survey Tech.:	Norman Gillen
Count Rm. Tech.:	Lucas Ray
Date Counted:	11/5/2019
Survey Type:	Job Specific
Level of Posting:	N/A

Item Surveyed:	SU#4463-15 Exterior Structural
Contaminant/Limits:	1000/200 beta and 100/20 alpha
Comments:	0

Reviewer: _____ _____ Date 11/8/2019

Appendix B
Summary Statistical Evaluation

SU#4462-1 Interior Corrugated Metal		
Background Measurements	10	
Sentinel Measurements	13	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-29 to 22	-260 to 226
MDA	114	515
Mean	0.00	3.39
Standard Deviation	15.1	150
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1 to 2	-94 to 32
MDA	17.1	178
Mean	-.769	-32.2
Standard Deviation	.832	38.3

SU#4462-2 Interior Green Sodium Tank		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-7 to 19	-117 to 126
MDA	63.2	456
Mean	4.40	-10.4
Standard Deviation	9.11	73.0
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1	-82 to 80
MDA	17.1	178
Mean	-1.00	-14.4
Standard Deviation	0.00	44.0

SU#4462-3 Interior Concrete		
Background Measurements	10	
Sentinel Measurements	12	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-27 to 29	-577 to 151
MDA	117	684
Mean	3.17	-63.0
Standard Deviation	16.4	207
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1 to 4	-121 to 24
MDA	17.1	178
Mean	.083	-29.8
Standard Deviation	1.73	41.3

SU#4462-4 Interior Wood		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-18 to 16	-74 to 257
MDA	111	516
Mean	-5.90	93.5
Standard Deviation	14.15	109
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1	-58 to 32
MDA	17.1	178
Mean	-1.00	-28.8
Standard Deviation	-1.00	28.8

SU#4462-5 Interior Structural Steel		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-13 to 21	211 to 120
MDA	92.0	458
Mean	6.80	-13.3
Standard Deviation	11.4	107
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1 to 2	-35 to 48
MDA	17.1	178
Mean	-.700	-2.80
Standard Deviation	.949	26.67

SU#4462-6 Interior Non-Structural Steel		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-7 to 19	-46 to 351
MDA	107	479
Mean	6.80	206
Standard Deviation	9.22	111
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1 to 2	-117 to 32
MDA	17.1	178
Mean	-.700	-49.6
Standard Deviation	.949	44.2

SU#4462-7 Interior Horizontal Tank		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	93 to 150
MDA	83.5	423
Mean	1.3	124
Standard Deviation	.823	16.9
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1 to 2	-54 to 44
MDA	17.1	178
Mean	-.400	-2.30
Standard Deviation	1.27	31.3

SU#4462-8 Exterior Corrugated Metal		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-8 to 44	-151 to 253
MDA	97.1	510
Mean	12.9	46.4
Standard Deviation	20.9	126
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 5	-101 to 48
MDA	12.76	176
Mean	1.40	-17.7
Standard Deviation	1.90	37.7

SU#4462-9 Exterior Wood		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-21 to 48	-105 to 167
MDA	90.66	522
Mean	3.50	7.30
Standard Deviation	21.00	113
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-66 to 37
MDA	12.76	176
Mean	.600	-23.4
Standard Deviation	1.27	30.1

SU#4462-10 Exterior Non-Structural Steel		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-30 to 21	-294 to 103
MDA	115	514
Mean	-7.70	-64.1
Standard Deviation	14	129
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 5	-89 to 37
MDA	12.76	176
Mean	2.50	-9.50
Standard Deviation	1.90	33.4

SU#4462-11 Exterior Linoleum Tile		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-13 to 39	-159 to 268
MDA	92	598
Mean	12.8	49.3
Standard Deviation	19.46	150
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-57 to 42
MDA	8.43	172
Mean	.600	-11
Standard Deviation	1.27	27.7

SU#4462-12 Exterior Ceramic Tile		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	2 to 79	-271 to 435
MDA	127	826
Mean	30	-94.2
Standard Deviation	24.3	216
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 5	-74 to 72
MDA	12.76	176
Mean	.5	-10.6
Standard Deviation	1.58	40.5

SU#4462-13 Exterior Structural Steel		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-27 to 33	-191 to 375
MDA	112	477
Mean	4.40	93.4
Standard Deviation	22.6	204
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-84 to 38
MDA	8.43	172
Mean	.600	-17.6
Standard Deviation	1.27	35.5

SU#4462-14 Exterior Concrete		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-37 to 92	-301 to 243
MDA	173	738
Mean	26.4	-34.4
Standard Deviation	45.0	157
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 8	-65 to 10
MDA	8.43	172
Mean	3.10	-21.6
Standard Deviation	2.92	20.3

SU#4463-1 Interior Linoleum Tile		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-12 to 22	-134 to 366
MDA	90.7	556
Mean	3.60	47.7
Standard Deviation	13.1	162
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-29 to 57
MDA	8.43	172
Mean	.300	18
Standard Deviation	.949	27.7

SU#4463-2 Interior Ceramic Tile		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-2 to 41	-135 to 240
MDA	87.9	733
Mean	10.1	68.4
Standard Deviation	14.1	115
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-76 to 57
MDA	8.43	172
Mean	.900	-16.9
Standard Deviation	1.45	38.2

SU#4463-3 Interior Glass		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-9 to 16	-226 to 406
MDA	69.7	491
Mean	3.50	-7.30
Standard Deviation	9.11	186
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-61 to 38
MDA	8.43	172
Mean	.3	-11.0
Standard Deviation	.949	31.2

SU#4463-4 Interior Non-Structural Steel		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-20 to 6	-96 to 375
MDA	89.29	462
Mean	-7.80	107
Standard Deviation	7.15	156
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0	-50 to 56
MDA	17.1	178
Mean	0.00	-9.00
Standard Deviation	0.00	30.8

SU#4463-5 Interior Wood		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-6 to 28	-130 to 186
MDA	80.38	467
Mean	10.3	-8.10
Standard Deviation	12.3	114
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-49 to 26
MDA	8.43	172
Mean	.600	-0.10
Standard Deviation	1.27	20.8

SU#4463-6 Interior Structural Steel		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-14 to 21	-166 to 260
MDA	78.75	434
Mean	-3.60	50
Standard Deviation	12.8	121
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1 to 2	-90 to 17
MDA	17.1	178
Mean	-0.70	-24.9
Standard Deviation	.949	30.2

SU#4463-7 Interior Corrugated Metal		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-13 to 30	-302 to 404
MDA	77.1	501
Mean	3.50	52.9
Standard Deviation	15.9	215
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1 to 2	-43 to 36
MDA	17.1	178
Mean	-0.10	-13.5
Standard Deviation	1.45	22.6

SU#4463-8 Interior Sheetrock_Particle Board		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-17 to 26	-128 to 188
MDA	85	496
Mean	0.90	12.6
Standard Deviation	12.7	97.7
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1	-70 to 13
MDA	17.1	178
Mean	-1.00	-28.5
Standard Deviation	0.00	30.8

SU#4463-9 Interior Concrete		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-22 to 29	-152 to 142
MDA	93.3	615
Mean	3.4	-13.2
Standard Deviation	18.1	100
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-57 to 26
MDA	8.43	172
Mean	0.90	-10
Standard Deviation	1.45	33.6

SU#4463-10 Interior Tank		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-11 to 6	-172 to 144
MDA	73.52	452
Mean	-6.90	-56.6
Standard Deviation	5.90	97.4
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1	-78 to 17
MDA	17.1	178
Mean	-1.00	-30.0
Standard Deviation	0.00	26.4

SU#4463-11 Exterior Corrugated Metal		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-11 to 40	-385 to 204
MDA	102	507
Mean	5.20	-38.2
Standard Deviation	19.0	202
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-37 to 65
MDA	8.43	172
Mean	0.90	-0.80
Standard Deviation	1.45	33.2

SU#4463-12 Exterior Non-Stuctural Steel		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
	Sentinel (dpm/100cm2)	
Sentinel Measurements	Alpha	Beta
Range	-33 to 35	-418 to 265
MDA	136	510
Mean	-3.40	-61
Standard Deviation	23.9	202
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 6	-33 to 101
MDA	8.43	172
Mean	1.50	9.20
Standard Deviation	2.12	39.0

SU#4463-13 Exterior Tanks		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
	Sentinel (dpm/100cm2)	
Sentinel Measurements	Alpha	Beta
Range	-11 to 40	-63 to 364
MDA	122	454
Mean	5.10	69.3
Standard Deviation	16.8	135
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0	-72 to 26
MDA	8.43	172
Mean	0.00	-20.4
Standard Deviation	0.00	28.6

SU#4463-14 Exterior Concrete		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
	Sentinel (dpm/100cm2)	
Sentinel Measurements	Alpha	Beta
Range	-47 to 99	-268 to 299
MDA	174	720
Mean	21.5	58.1
Standard Deviation	40.9	179
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 3	-84 to 54
MDA	8.43	172
Mean	0.30	-4.30
Standard Deviation	.949	37.2

SU#4463-15 Exterior Structural Steel		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-25 to 52	-135 to 314
MDA	108	441
Mean	13.7	14
Standard Deviation	28.1	132
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	0 to 6	-37 to 69
MDA	8.43	172
Mean	1.20	21.6
Standard Deviation	2.10	33.3

SU#4463-16 Interior Addition Concrete		
Background Measurements	10	
Sentinel Measurements	10	
Number Sentinel Measurements Exceeded MDA	0	
Sentinel Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-17 to 34	-376 to 257
MDA	85	700
Mean	0	-64
Standard Deviation	15.1	229
Removable Measurements	Sentinel (dpm/100cm2)	
	Alpha	Beta
Range	-1 to 2	-45 to 26
MDA	17.1	175
Mean	-0.70	-17
Standard Deviation	.949	25.4

Appendix C
Daily Instrument QC & Calibration Certificates

Model 2221 SN: 149961 Performance Test Log

Location ETEC Bldg 4044 Rm Lab

Instrument: 149961
Probe : SN: NA
Cal Due Date: 10/18/2020

RC T Lucas Ray / 
Printed Name Signature

Place the source: ID#1003181 15 cm in front of the meter
With the source standing on it's edge

Check Source

Isotope		ID#	Activity uCi	uRem	X.8	X1.2
Beta	Cs-137	1003181	9.62	107669	86135	129202

Source ID#: 1003181
Source Cal Date: 10/3/2018

Date	Back-ground	Check Source	BKG Count Time	Source count time	BKG Pass / Fail	Source Pass/Fail	Comments Bat	HV	Spkr	Condition
10/23/2019	10182	112096	1.0	1.0	PASS	PASS	OK	OK	OK	OK
10/24/2019	9598	103280	1.0	1.0	PASS	PASS	OK	OK	OK	OK
10/28/2019	10202	103012	1.0	1.0	PASS	PASS	OK	OK	OK	OK
10/29/2019	9634	102100	1.0	1.0	PASS	PASS	OK	OK	OK	OK
				N						
					A					

Model 2221 SN: 152193 Performance Test Log

Location ETEC Bldg 4044 Rm Lab

Instrument: 152193
Probe : SN: NA
Cal Due Date: 8/29/2020

RC T Lucas Ray / 
Printed Name Signature

Place the source: ID#1003181 15 cm in front of the meter
With the source standing on it's edge

Check Source

Isotope		ID#	Activity uCi	uRem	X.8	X1.2
Beta	Cs-137	1003181	9.62	104456	83565	125347

Source ID#: 1003181
Source Cal Date: 10/3/2018

Date	Back-ground	Check Source	BKG Count Time	Source count time	BKG Pass / Fail	Source Pass/Fail	Comments Bat	HV	Spkr	Condition
10/23/2019	10351	110193	1.0	1.0	PASS	PASS	OK	OK	OK	OK
10/24/2019	9718	106332	1.0	1.0	PASS	PASS	OK	OK	OK	OK
10/25/2019	10823	103157	1.0	1.0	PASS	PASS	OK	OK	OK	OK
10/28/2019	10472	102154	1.0	1.0	PASS	PASS	OK	OK	OK	OK
10/29/2019	9782	100299	1.0	1.0	PASS	PASS	OK	OK	OK	OK
10/30/2019	10293	102665	1.0	1.0	PASS	PASS	OK	OK	OK	OK
10/31/2019	9542	103389	1.0	1.0	PASS	PASS	OK	OK	OK	OK
				N						
					A					

Ludlum 2360 SN: 337037 Performance Test Log

Location SSFL Bldg RMHF Rm Lab SN: 337037 PR374285 Cal Due Date 10/28/2020

RC T Lucas Ray / 

Printed Name Signature

α Eff 0.24 β Eff 0.17

Check Sources	Isotope	ID#	Activity (DPM)	Activity (CPM)	Activity x 0.8	Activity x 1.2 (± 20% Acceptable Range)	10 min bkg CPM	Measured net CPM
Alpha	Th-230	K7-324	47106	11131	8905	13357	6	11131
Beta	Tc-99	K7-322	51216	8691	6953	10430	84.7	8683

Date	Alpha				Beta				Source Pass / Fail	BKG Pass / Fail	Comments			
	Back-ground counts	Check Source counts	BKG Count Time	Source count time	Back-ground c/m	Check Source counts	BKG count Time	Source count time			Bat	HV	Spkr	Condition
10/29/2019	6	10237	10.0	1.0	2581	7985	10.0	1.0	PASS	PASS	OK	OK	OK	OK
10/30/2019	3	10270	10.0	1.0	2397	8205	10.0	1.0	PASS	PASS	OK	OK	OK	OK
10/31/2019	4	10256	10.0	1.0	2329	7880	10.0	1.0	PASS	PASS	OK	OK	OK	OK
						N								
							A							

Ludlum 2929 SN: 336334 Performance Test Log

Location SSFL Bldg RMHF Rm Lab SN: 336334 PR378866 Cal Due Date 1/16/2020

RC T Lucas Ray / 

Printed Name Signature

α Eff 0.3561 β Eff 0.2541

Check Sources	Isotope	ID#	Emission Rate (DPM)	Activity (CPM)	Activity x 0.8	Activity x 1.2	10 min bkg counts	Measured net CPM
						± 20% Acceptable Range		
Alpha	Th-230	K7-324	47106	16774	13420	20129	1.75	16774
Beta	Tc-99	K7-322	51216	13014	10411	15617	689.95	12945

Date	Alpha				Beta				Source Pass / Fail	BKG Pass / Fail	BAT	HV	Spkr	Condition
	Back-ground counts	Check Source counts	BKG Count Time	Source count time	Back-ground counts	Check Source counts	BKG count Time	Source count time						
10/24/2019	1	17714	10.0	1.0	703	13384	10.0	1.0	PASS	PASS	N/A	OK	OK	OK
10/30/2019	0	17718	10.0	1.0	691	13375	10.0	1.0	PASS	PASS	N/A	OK	OK	OK
10/31/2019	4	17677	10.0	1.0	748	13495	10.0	1.0	PASS	PASS	N/A	OK	OK	OK
							N							
								A						

Ludlum 2360 SN: 337037 Performance Test Log

Location SSFL Bldg RMHF Rm Lab SN: 337037 PR374285 Cal Due Date 10/28/2020

RC T Lucas Ray / 

Printed Name Signature

α Eff 0.24 β Eff 0.17

Check Sources	Isotope	ID#	Activity (DPM)	Activity (CPM)	Activity x 0.8	± 20% Acceptable Range Activity x 1.2	10 min bkg CPM	Measured net CPM
Alpha	Th-230	K7-324	47106	11131	8905	13357	6	11131
Beta	Tc-99	K7-322	51216	8691	6953	10430	84.7	8683

Date	Alpha				Beta				Source Pass / Fail	BKG Pass / Fail	Comments			
	Back-ground counts	Check Source counts	BKG Count Time	Source count time	Back-ground c/m	Check Source counts	BKG count Time	Source count time			Bat	HV	Spkr	Condition
11/1/2019	6	10471	10.0	1.0	2489	8174	10.0	1.0	PASS	PASS	OK	OK	OK	OK
11/4/2019	9	9968	10.0	1.0	2473	8026	10.0	1.0	PASS	PASS	OK	OK	OK	OK
11/5/2019	8	10100	10.0	1.0	2547	7921	10.0	1.0	PASS	PASS	OK	OK	OK	OK
						N								
							A							

Ludlum 2929 SN: 336334 Performance Test Log

Location SSFL Bldg RMHF Rm Lab SN: 336334 PR378866 Cal Due Date 1/16/2020

RC T Lucas Ray / 

Printed Name Signature

α Eff 0.3561 β Eff 0.2541

Check Sources	Isotope	ID#	Emission Rate (DPM)	Activity (CPM)	Activity x 0.8	Activity x 1.2	10 min bkg counts	Measured net CPM
						± 20% Acceptable Range		
Alpha	Th-230	K7-324	47106	16774	13420	20129	1.75	16774
Beta	Tc-99	K7-322	51216	13014	10411	15617	689.95	12945

Date	Alpha				Beta				Source Pass / Fail	BKG Pass / Fail	BAT	HV	Spkr	Condition
	Back-ground counts	Check Source counts	BKG Count Time	Source count time	Back-ground counts	Check Source counts	BKG count Time	Source count time						
11/1/2019	0	17740	10.0	1.0	694	13425	10.0	1.0	PASS	PASS	N/A	OK	OK	OK
11/4/2019	1	17690	10.0	1.0	727	13317	10.0	1.0	PASS	PASS	N/A	OK	OK	OK
11/5/2019	4	17683	10.0	1.0	724	13399	10.0	1.0	PASS	PASS	N/A	OK	OK	OK
							N							
								A						

Calibration Certificate for 2929,Serial # 336334, Bar Code # ,Property # North3

Date: 01/16/19 **Date Last Cal. Expires:** **Technician:** Jacob Galyon

Location: 999999, **Reason For Calibration:** Initial Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 268940 **CAL DUE:** 04/19/19

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):	3.5-53.1	mV	4-50	mV	
Alpha Channel Threshold (175 mV):	71	mV	146	mV	
Alpha Counts w/Pulser @ 10,000 CPM:	9,995	CPM	AF	CPM	% Error: 0.05%
Beta Counts w/Pulser @ 10,000 CPM:	9,995	CPM	AF	CPM	% Error: 0.05%

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:	3.64		3.92	
HV Setpoints:	900	V	975	V
500 V Reading:	510	V	503	V
1000 V Reading:	1016	V	1000	V
1500 V Reading:	1523	V	1500	V
Max HV (1500 V +):				

DIGITAL SCALER

AF 250: 250	% ERR: 0.00%	AL 250: AF		% ERR: 0.00%	
AF 2500: 2504	% ERR: 0.16%	AL 2500: AF		% ERR: 0.16%	
AF 25K: 25.05 K	% ERR: 0.20%	AL 25K: AF	K	% ERR: 0.20%	
AF 250K: 250.5 K	% ERR: 0.20%	AL 250K: AF	K	% ERR: 0.20%	

☑ Is the As Found Data Within 20% of the Set Point?

Comments: Married as a set with: Model: 43-10-1 Serial #: PR378866 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 01/16/20

Performed by: Jacob Galyon Reviewed by: Date: 1/16/19

Printed Name: Jacob Galyon

All instrumentation is calibrated in accordance with the QAP to meet the criteria of ANSI N323AB-2013

Safety and Ecology Corporation

193 Commerce Park Drive, Suite 300 Oak Ridge, TN 37830

Calibration Certificate

1/17/2019

Calibration Certificate for 43-10-1,Serial # PR378866, Bar Code # ,Property # North4

Date: 01/16/19 Date Last Cal. Expires: Technician: Jacob Galyon

Location: 999999, Reason For Calibration: Initial Calibration

EQUIPMENT USED DURING CALIBRATION MODEL: 2929 SERIAL #: 336334 CAL DUE: 01/16/20

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
	4079-02	Pu-239	28994 dpm	14,697 cpm	3/5/2018
	4072-02	Tc-99	28299 dpm	17,700 cpm	3/5/2018
	4071-02	Th-230	40297 dpm	20,499 cpm	3/5/2018
	4076-02	Sr-90	10225 dpm	7,174 cpm	3/5/2018

Efficiencies from last calibration

Pu-239: %
Tc-99: %
Th-230: %
SrY-90: %

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: Calibration Setpoints V Vernier:

Threshold
Beta: 4 - 50 mV
Alpha: 146 mV

	Alpha		Beta		AF Efficiencies
Background:		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 Instrument Condition: SAT

AS LEFT DATA after repair, HV adjust, or Plateau
HV: 975 V Vernier: 3.92

	Alpha		Beta		AL Efficiencies	
Background:	0	CPM	51	CPM		A-B XTLK
Pu-239:	10727	CPM	289	CPM	37.00%	2.2%
Tc-99:	1	CPM	7243	CPM	25.41%	B-A XTLK
Th-230:	14349	CPM	N/A		35.61%	0.0%
SrY-90:	N/A		4150	CPM	40.09%	

"AF" in the AL Efficiency fields means to refer to the AF Efficiencies in the AS FOUND DATA Section

☐ Is the As Found Data Within 20% of the efficiency from the last cal.?

Reproducibility: Isotope: Sr-90 4200 4262 4241 Average: 4234.3 ☑ 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 = 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)			Source 2: Pu-239 Response (CPM)			Background (CPM)		Net A to B Xtalk: <10%	Net B to A Xtalk: <1%
	A ch.	B ch.	Net Eff.	A ch.	B ch.	Net Eff.	A ch.	B ch.		
900/3.64	0	5780	20.34%	10168	262	35.07%	0	25	2.33%	0.00%
925/3.73	3	6393	22.45%	10369	215	35.76%	0	41	1.68%	0.05%
950/3.82	1	6846	24.03%	10347	222	35.69%	0	45	1.71%	0.01%
975/3.92	1	7243	25.41%	10727	289	37.00%	0	51	2.22%	0.01%
1000/4.02	3	7415	25.98%	10681	1107	36.84%	0	63	9.77%	0.04%

2 Pi Efficiencies:	Pu-239	Tc-99	Th-230	SrY-90
	72.99%	40.63%	70.00%	57.14%

Comments: Married as a set with: Model: 2929 Serial #: 336334 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 01/16/20

Performed by: Jacob Galyon Reviewed by: Date: 1/16/19

Printed Name: Jacob Galyon

All instrumentation is calibrated in accordance with the QAP to meet the criteria of ANSI N323AB-2013

Calibration Certificate for 2221,Serial # 152193, Bar Code # ,Property # SEC-5866

Date: 08/29/19 **Date Last Cal. Expires:** 09/13/18 **Technician:** Carl Hall

Location: 999999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 132896 **CAL DUE:** 04/04/20

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:	1000 V	AF V
1500 V:	1495 V	AF V

☐ New Batteries? **Threshold ratio: 100=10mV**

AF THRESHOLD: 10 mV **AL THRESHOLD:** 10 mV

AF Mechanical Zero: 0 **AL Mechanical Zero:** 0

AF HV Reading: 1100 V **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	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?

DIGITAL SCALER

AF 250:	250	**% ERR:**	0.00%	**AL 250:**	AF	**% ERR:**	0.00%
AF 2500:	2498	**% ERR:**	0.08%	**AL 2500:**	AF	**% ERR:**	0.08%
AF 25K:	24.98 K	**% ERR:**	0.08%	**AL 25K:**	AF K	**% ERR:**	0.08%
AF 250K:	249.8 K	**% ERR:**	0.08%	**AL 250K:**	AF K	**% ERR:**	0.08%

☑ 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 #:** PR186954 **Bar Code #:**

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 08/29/20

Performed by: _____ **Reviewed by:** _____ **Date:** 8/29/19

Printed Name: Carl Hall

All instrumentation is calibrated in accordance with the QAP to meet the criteria of ANSI N323AB-2013

Calibration Certificate for 44-10,Serial # PR186954, Bar Code # ,Property # SEC-6706

Date: 08/29/19 **Date Last Cal. Expires:** 02/09/18 **Technician:** Carl Hall

Location: 999999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 **SERIAL #:** 152193 **CAL DUE:** 08/29/20

MODEL: **SERIAL #:** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	5.9048 uCi		3/5/2018

Efficiency from Last Calibration: 0.67 % **HV From Last Calibration:** 1200 V **Calibration Threshold:** 10 mV

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: 1100 V

Center: 89703

Background: 4144

4 π Probe Efficiency: Cs-137 **0.65%**

1 MINUTE COUNTS (CPM)

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: 1100 V

Center: 89703

Background: 4144

4 π Probe Efficiency: Cs-137 **0.65%**

"AF" in the AL Efficiency fields means to refer to the AF Efficiencies in the AS FOUND DATA Section

☑ **Is the As Found Efficiency Within 20% of the efficiency from the last cal.?**

Reproducibility: **Isotope:** Cs-137 89648 89762 89718 **Average:** 89709 ☑ **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	4 π Efficiency
N/A			V			Cs-137

Comments: **Married as a set with:** **Model:** 2221 **Serial #:** 152193 **Bar Code #:**

Lowered high voltage setpoint.

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: 08/29/20

Performed by: **Reviewed by:** Jacob Galyon **Date:** 8/29/19

Printed Name: Carl Hall

All instrumentation is calibrated in accordance with the QAP to meet the criteria of ANSI N323AB-2013

Safety and Ecology Corporation
1093 Commerce Park Drive, Suite 300
Oak Ridge, TN 37830

Calibration Certificate

SEC PROCEDURE # SEC-IS-418 Rev 3

10/28/2019

Calibration Certificate for 2360,Serial # 337037, Bar Code # ,Property # North16

Date: 10/28/19 **Date Last Cal. Expires:** **Technician:** Jacob Galyon

Location: 999999, **Reason For Calibration:** Initial Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 **SERIAL #:** 268940 **CAL DUE:** 05/06/20

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:	500 V	AF V
1000 V:	1000 V	AF V
1500 V:	1500 V	AF V
AF HV Setting:	575 V	AL HV Setting: 600 V

WINDOW SETTINGS	AS FOUND	AS LEFT
BT (4 mV +/- .4 mV):	3.1 mV	4 mV
BW (40 mV +/- 4 mV):	30.9 mV	40 mV
AT (120 mV +/- 10 mV):	122 mV	120 mV

RATE METER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	95	5.00%	AF	5.00%
	250	250	0.00%	AF	0.00%
	400	395	1.25%	AF	1.25%
x1 or x10	1000	950	5.00%	AF	5.00%
	2500	2500	0.00%	AF	0.00%
	4000	3950	1.25%	AF	1.25%
x10 or x100	10K	9.5	5.00%	AF	5.00%
	25K	25	0.00%	AF	0.00%
	40K	39.5	1.25%	AF	1.25%
x100 or x1000	100K	95	5.00%	AF	5.00%
	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?**

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 250K:	249.8 K	**% ERR:** 0.08%	**AL 250K:**	AF K	**% ERR:** 0.08%

☑ **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 #:** PR374285 **Bar Code #:**

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: 10/28/20

Performed by: Jacob Galyon **Reviewed by:** _____ **Date:** 10/28/19

Printed Name: Jacob Galyon

All instrumentation is calibrated in accordance with the QAP to meet the criteria of ANSI N323AB-2013

Calibration Certificate

10/28/2019

Calibration Certificate for 43-93,Serial # PR374285, Bar Code # ,Property # North17

Date: 10/28/19 Date Last Cal. Expires: Technician: Jacob Galyon

Location: 999999, Reason For Calibration: Initial Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2360 SERIAL #: 337037 CAL DUE 10/28/20

NIST TRACEABLE SOURCES USED	SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
Efficiencies from last calibration	4079-02	Pu-239	28994 dpm	14,697 cpm	3/5/2018
Pu: %	4072-02	Tc-99	28299 dpm	17,700 cpm	3/5/2018
Tc: %	4071-02	Th-230	40297 dpm	20,499 cpm	3/5/2018
Th: %	4076-02	Sr-90	10225 dpm	7,174 cpm	3/5/2018
SrY: %					

AS FOUND DATA

AS FOUND Instrument Condition: SAT

Calibration Setpoints HV : V

Threshold Beta: 4 - 40 mV Alpha: 120 mV

	Alpha		Beta	AF 4 π Efficiences	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	

☐ Is the As Found Data within 20% of the efficiency from the last cal.?

AS LEFT DATA after repair, HV adjust or Plateau

AS LEFT Instrument Condition: SAT

HV : 600 V

	Alpha		Beta	AL 4 π Efficiencies		A-B XTLK
Back ground:	0	CPM	141	CPM		
Pu-239:	6851	CPM	384	CPM	23.63%	3.55%
Tc-99:	1	CPM	4943	CPM	16.97%	
Th-230:	8835	CPM	N/A		21.92%	
SrY-90:	N/A		3756	CPM	35.35%	

"AF" in the AL Efficiency fields means to refer to the AF Efficiencies in the AS FOUND DATA Section

Reproducibility : Isotope: Sr-90 3729 3669 3796 Average: 3731.3 ☑ 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: Pu-239

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%
550	0	2967	10.27%	6449	355	22.24%	0	61	4.56%
575	1	4009	13.83%	6798	323	23.45%	0	96	3.34%
600	1	4943	16.97%	6851	384	23.63%	0	141	3.55%
625	2	5888	20.08%	6990	468	24.10%	1	205	3.76%

2 Pi Efficiencies:

Pu-239	Tc-99	Th-230	SrY-90
46.61%	27.13%	43.10%	50.39%

Comments: Married as a set with: Model: 2360 Serial #: 337037 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/28/20

Performed by: Jacob Galyon Reviewed by: Date: 10/28/19

Printed Name: Jacob Galyon

All instrumentation is calibrated in accordance with the QAP to meet the criteria of ANSI N323AB-2013

Calibration Certificate for 2221,Serial # 149961, Bar Code # ,Property # SEC-5094

Date: 10/18/19 Date Last Cal. Expires: 08/23/19 Technician: Carl Hall

Location: 999999, Reason For Calibration: Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 500-2 SERIAL #: 132896 CAL DUE: 04/04/20

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:	497 V	AF V
1000 V:	1004 V	AF V
1500 V:	1509 V	AF V

☐ New Batteries? Threshold ratio: 100=10mV AF THRESHOLD: 10 mV AL THRESHOLD: 10 mV

AF Mechanical Zero: 0 AL Mechanical Zero: 0 AF HV Reading: 800 V AL HV Reading: 800 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 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 #: PR164008 Bar Code #:

☑ Does Instrument Meet Final Acceptance Criteria? ☑ Calibration Sticker Attached?

Date Instrument is Due For Next Calibration: 10/18/20

Performed by: Reviewed by: Date: 10/18/19

Printed Name: Carl Hall

All instrumentation is calibrated in accordance with the QAP to meet the criteria of ANSI N323AB-2013

Calibration Certificate

10/18/2019

Calibration Certificate for 44-10,Serial # PR164008, Bar Code # ,Property # SEC-5039

Date: 10/18/19 **Date Last Cal. Expires:** 08/23/19 **Technician:** Carl Hall

Location: 999999, **Reason For Calibration:** Due for Calibration

EQUIPMENT USED DURING CALIBRATION

MODEL: 2221 **SERIAL #:** 149961 **CAL DUE:** 10/18/20

MODEL: **SERIAL #:** **CAL DUE:**

NIST TRACEABLE SOURCES USED

SOURCE	ISOTOPE	ACTIVITY	2π	ASSAY DATE
99CS250-0288	Cs-137	5.9048 uCi		3/5/2018

Efficiency from Last Calibration: 0.68 % **HV From Last Calibration:** 800 V **Calibration Threshold:** 10 mV

AS FOUND DATA

AS FOUND Instrument Condition: SAT

HV: 800 V

Center: 98457

Background: 3524

4 π Probe Efficiency: Cs-137 **0.72%**

1 MINUTE COUNTS (CPM)

AS LEFT DATA after repair of HV adjust

AS LEFT Instrument Condition: SAT

HV: 800 V

Center: 98457

Background: 3524

4 π Probe Efficiency: Cs-137 **0.72%**

"AF" in the AL Efficiency fields means to refer to the AF Efficiencies in the AS FOUND DATA Section

☑ **Is the As Found Efficiency Within 20% of the efficiency from the last cal.?**

Reproducibility: **Isotope:** Cs-137 98235 99002 98726 **Average:** 98654 ☑ **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	4 π Efficiency
N/A			V			Cs-137

Comments: **Married as a set with:** **Model:** 2221 **Serial #:** 149961 **Bar Code #:**

☑ **Does Instrument Meet Final Acceptance Criteria?** ☑ **Calibration Sticker Attached?**

Date Instrument is Due For Next Calibration: **10/18/20**

Performed by: _____ **Reviewed by:** Jarel Gatson **Date:** 10/18/19

Printed Name: Carl Hall

All instrumentation is calibrated in accordance with the QAP to meet the criteria of ANSI N323AB-2013