Attachment L

Final Status Survey Report #12 Documentation

(UNDER SEPARATE COVER)

FINAL

COLUMBUS CLOSURE PROJECT CHARACTERIZATION AND FINAL STATUS SURVEY REPORT FOR ACTIVE NORTH FILTER BED – NORTH SUBSURFACE SAND FILTER

Revision 2
June 16, 2006

Prepared by

ECC & E2 Closure Services
1425 State Route 142 East
West Jefferson, OH 43162

Contract Number: DE-AC24-04OH20171

Final Characterization and Final Status Report for ANFB-NSSF

Revision Data Compiled By:

Randy Parsons, Characterization Lead — Date: 6/16/06

FSS Report Written By:

Keith Anderson, Associate Radiation Safety Officer — Date: June 16, 2006

Glenn Henderson, Project Manager — Date: June 16, 2006

Dave Garber, Quality Assurance Manager — Date: 6/16/06

Signatory page represents only revisions to this document that may reflect comments received by the U.S. Department of Energy, Battelle Memorial Institute, and the Oak Ridge Institute for Science and Education (ORISE). As such, original data compilation and drafting may have been by other Employees, Representatives, or Subcontractors of ECC&E2 Closure Services, LLC, not specifically represented by said Signatory Page.

Contract Number: DE-AC24-04OH20171

Table of Contents

Figures

Tables

Attachments

1.0 Introduction

This report contains the final status surveys (FSS) of the Active North Filter Bed (ANFB) North Subsurface Sand Filter (NSSF) located at the Columbus Closure Project (CCP), 1425 State Route 142 East, West Jefferson, OH 43162. Final status surveys were conducted according to the guidance presented the *Manual for Conducting Surveys in Support of License Termination*, NUREG/CR-5849 (ORAU, 1992) and the *Radiological Characterization and Final Status Plan for Battelle Columbus Laboratories Decommissioning Project, West Jefferson Site*, DD-97-02 (Final Status Plan) (Battelle, 2000). The final status surveys were conducted in January and February of 2005. The ANFB-NSSF final status also includes the excavation of a dosing chamber and a trench from the ANFB to manhole (MH) number 2.

The intent of this final status survey report is to provide a complete and unambiguous record of the radiological status of ANFB-NSSF. Sufficient information and data is provided to enable an independent re-creation and evaluation at some future date of both the survey activities and the reported results for ANFB-NSSF. Information in this report is also available in referenced technical basis documents, final status survey plans and procedures, and the *Battelle Memorial Institute Columbus Operations, Decommissioning Plan*, DD-93-19 (BMI Decommissioning Plan), and reporting and quality assurance procedures.

To the extent practicable, this final status survey report is presented with minimal information incorporated by reference. The report has been generated following the comprehensive, annotated outline presented in Chapter 9 of NUREG/CR-5849.

1.1 Background

On April 16, 1943, BMI, acting through what is now its Battelle Columbus Operations (BCO), entered into Contract No. W-7405-ENG-92 with the Manhattan Engineering District to perform atomic energy research and development (R&D) activities. BCO performed nuclear materials research and development at privately-owned facilities for the Manhattan Engineering District and its successor agencies – the Atomic Energy Commission (AEC), the Energy Research and Development Agency (ERDA), and the Department of Energy (DOE). Research and development continued until 1988 (Battelle, 2003).

The BCO facilities at the King Avenue Site, Columbus, Ohio, and the West Jefferson North (WJN) and South (WJS) Sites, West Jefferson, Ohio, became partially radiologically contaminated as a result of the R&D activities. Decontamination of the King Avenue Sites and WJS sites has been completed and activities continue at the WJN site. The DOE, as the successor to the AEC and the Government's earlier work, is the agreed party with predominant liability and responsibility for decontamination and decommissioning (D&D) of the BCO facilities (Battelle, 2003). The Assistant Secretary

for Nuclear Energy of the DOE accepted the decontamination and decommissioning (D&D) of the WJN into the DOE's Surplus Facilities Management Program as a major project (DOE, 1986). The DOE is the agency funding and managing the cleanup of the WJN (Battelle, 2003). However, the site is not a DOE-owned facility.

BMI holds U.S. Nuclear Regulatory Commission (NRC) license number SNM-7. BMI has continually operated and conducted D&D activities in full compliance with this NRC license. The BMI Decommissioning Plan for the WJN site does not serve as a declaration to terminate SNM-7, but establish the criteria for performing D&D activities. The end goal of the BMI Decommissioning Plan is to reach unrestricted use conditions for the site (Battelle, 2003).

The DOE has contracted ECC&E2 Closure Services, LLC (Closure Services) to safely remove DOE radioactive materials and contamination from the WJN site. Removal of radioactive material will be to levels allowing future use of the site without radiological restrictions as described in the BMI Decommissioning Plan. Closure Services has conducted characterization and final status surveys of the ANFB-NSSF to demonstrate that the structure and excavations are available for unrestricted release.

2.0 Site Description

Created in 1984, the Battelle Columbus Decommissioning Project (BCLDP) is a remediation project that includes nine buildings at the King Avenue site and five at the WJN site. The CCP is the successor of the BCLDP. The WJN site has one permanent structure (Well House). Three former research facilities, JN-1, JN-2, and JN-3 have been demolished as well as JN-6, the guard house. Several outfalls, filter beds, and wells are also located at the site. The ANFB-NSSF is one of the filter beds and is shown on Figure 1 in relation to the CCP site.

2.1 Facility Description

Constructed in 1979, the ANFB-NSSF was constructed to replace the previous filter bed serving the West Jefferson North Site. The previous filter bed was constructed in the flood plain and periodically flooded out. The ANFB-NSSF was constructed out of the flood plain. The ANFB-NSSF served the West Jefferson North Site, including buildings JN-1, JN-2, JN-3 and JN-4. The ANFB-NSSF is used to treat the sanitary waste generated from these buildings.

The ANFB is constructed of two subsurface sand filters each measuring 30 feet by 36 feet and are approximately 4 feet deep. The ANFB is constructed of reinforced concrete walls and bottom.

The dosing chamber fed the ANFB. The chamber was excavated and disposed of off-site. The ANFB to MH-2 sanitary sewer pipe runs east from the ANFB. The ANFB to MH-2 sanitary sewer line is constructed of eight inch diameter vitrified clay pipe. In-situ surveys performed by Science & Engineering Associates, Incorporated in August of 2000 indicated internal contamination of the pipe. Internal contamination exceeded the surface contamination limits for unrestricted release presented in DD-93-02, *Surface Release Criteria Technical Basis Document for Battelle Columbus Laboratories Decommissioning Project*. For this reason, the pipe was removed and disposed of as low level waste.

Two classifications of areas are used in NUREG-5849 and are termed **affected** or **unaffected.** These classifications are defined as:

> **Affected Areas:** Areas that have potential radioactive contamination (based on plant operating history) or known radioactive contamination (based on past or preliminary radiological surveillance). This would normally include areas where radioactive materials were used and stored, where records indicate spills or other unusual occurrences that could have resulted in spread of contamination, and where radioactive materials were buried. Areas immediately surrounding or adjacent to locations where radioactive materials were used, stored, or buried are included in this classification because of the potential for inadvertent spread of contamination.

Unaffected Areas: All areas not classified as affected. These areas are not expected to contain residual radioactivity, based on knowledge of site history and previous information.

ANFB-NSSF is considered an affected area due to the documented inlet and outlet pipe surveys. The in-situ survey performed by Science & Engineering Associates, Incorporated in August of 2000 indicated internal contamination of the pipe exceeding those levels presented in DD-93-02, Rev 0, *Surface Release Criteria Technical Basis Document for Battelle Columbus Laboratories Decommissioning Project*. The excavations were conducted in both affected and unaffected areas. The base, or floor, of the excavations was considered affected, and the sidewalls were considered unaffected.

3.0 Decommissioning Activities

3.1 Decommissioning Objective

ANFB-NSSF is considered to be an affected, baseline area. The objective of the final status survey performed in ANFB-NSSF was to statistically demonstrate that the structure is available for unrestricted release. **Table 1** presents the surface release criteria as detailed in DD-93-02, Rev. 0, "Surface Release Criteria Technical Basis Document." (Battelle, 1993A). The excavations are determined to be free of residual radioactive contamination when remaining soil contamination levels are below those presented DD-93-03, Rev. 0, "Volumetric Release Criteria Technical Basis Document for Battelle Columbus Laboratory Decommissioning Project" (Battelle, 1993B). **Table 2** presents the volumetric release criteria as presented in DD-93-03, Rev. 0.

4.0 Final Status Survey Procedures

The CS Characterization Team conducted the final status survey of ANFB-NSSF and the excavations according to the Final Status Plan (Battelle, 2000). CS Characterization Teams performed final status surveys under Work Instruction 2806 (Closure Services, 2004).

The planning and implementation of the final status survey of the structure surface and affected areas adhered to the requirements of the Final Status Plan (Battelle, 2000).

4.1 Sampling Parameters

The Final Status Plan requires that grid systems be established for structure affected areas (Battelle, 2000). The ANFB-NSSF characterization and final status survey grid system comprised of one square meter (1m x 1m) grids in the structure. **Figure 3** presents the ANFB-NSSF grids and the alpha numeric identifier for each.

Direct and indirect surveys were performed within each grid as required by the Final Status Plan, §5.1.3 (Battelle, 2000). The Characterization Team scanned 100 percent of the floor and walls. Scanning surveys included alpha and beta measurements of all accessible surfaces. Static one-minute readings were performed in a grid if scan survey readings indicated a net activity above the Decision Level Value (DLV). Section 4.2 of this report discusses the DLV in further detail.

A large population statistical survey was conducted for the floors and the wall surfaces within the ANFB-NSSF as required by §5.3.3 and §5.4.5 of the Final Status Plan (Battelle, 2000). Population surveys are those grouped surface activity measurements that are performed at randomly and systematically selected locations. Surface activity measurements are performed for a 1-minute, static count, using a large area (180 cm^2) gas proportional detector. This method provides detection efficiencies well above the guideline level.

The ANFB-NSSF was grouped into "blocks" or "units". The ANFB-NSSF was divided into two units: the walls being one unit, and the floor the other. From each block, 30 grids were selected for the population statistical survey. Population statistical surveys consisted of static alpha + beta integrated measurement, of the thirty grids from the floor and the walls of the structure.

Final status soil samples were taken in the affected base of the trench excavations at a frequency of one sample per linear meter. Final status samples of the unaffected sidewalls were taken by dividing the sidewalls into equal sections and sampling each section per Work Instruction 2806 (CS, 2004). Analyses of samples by gamma spectroscopy were performed by the RAL.

4.2 Background/Baseline Levels Identified

The Characterization Team performed a background survey in support of the characterization and final status survey for the ANFB-NSSF. The background survey was conducted within Building JN-6 for alpha + beta and alpha integrated measurements for each building material type. Additionally, the final status survey performed for Building JN-6 supported the unrestricted release of the facility (Closure Services, 2004). Building material types selected for the background survey included:

- Concrete block wall,
- Concrete forms & Concrete floor.
- LONAM (steel, window frames. building components). and
- Brick

Background surveys were performed in the same manner and with the same instrumentation used during the characterization and final status survey of the ANFB-NSSF. **Table 3 through Table 5** lists the results of the background survey.

A decision level value (DLV) was calculated to permit the field identification of surfaces requiring additional radiological measurements. Decision level values were calculated using the following equation (Battelle. 2000).

$$DLV = \bar{x}_{bkg} + MDA$$

where:

$\bar{x}_{bkg}$ = mean background value (cpm)
MDA = minimum detectable activity (cpm).

MDA values were calculated using the following equation:

$$MDA = 3 + 4.65(\sigma_{bkg})$$

where:

σ_{bkg} = standard deviation of background value.

4.3 Major Contaminants Identified

The characterization of the ANFB-NSSF excavation identified Cesium-137 (Cs-137) as the primary radiological contaminant of concern (RCOC). Other RCOCs included Cobalt-60 (Co-60), Europium-152 (Eu-152), Eu-154. Americium-241 (Am-241). Strontium-90 (SR-90). Plutonium-238 (Pu-238), Pu-239, and Pu-241. Cs-137 is used as a surrogate for the other RCOC present in the soils as it typically accounts for 64 percent of the total isotopic activity. Further, the release criteria set for Cs-137 is considered conservative for the decommissioning activities. The surrogate relationship of Cs-137 to

other RCOCs was calculated using data presented in **Table 6**. **Table 6** presents the isotopic quantity and activity concentrations of samples collected from the filter bed area by BMI from March through September 2000. These data are not associated with the excavation of the ANFB-NSSF area. Average activities for the multiple samples were calculated for each RCOC prior to setting the ratios against Cs-137.[1] For each RCOC, the average activity concentration was set as a ratio against the average Cs-137 activity concentration as obtained from previous actions at the filter beds. Cs-137 activity ratios for each RCOC utilized to calculate the RCOCs for the ANBF-NSSF are presented at the lower portion of **Table 6**.

4.3.1 Guidelines Established

Surface Contamination

Table 1 presents the surface contamination guidelines applied for ANFB-NSSF. These criteria are provided by DOE Order 5400.5 "Radiation Protection of the Public and Environment." which reference Regulatory Guide 1.86. DOE Order 5400.5 does not define the release levels for nuclides such as transuranics. Ra-226 and Th-230, therefore the CCP adopted the guidance of Regulatory Guide 1.86.

As previously stated, the more restrictive surface contamination limits associated with strontium-90 were applied to the characterization and final status survey for total fixed plus removable and removal contamination for alpha + beta measurements.

Exposure rates were compared to the 5 μR/hr above mean background limit listed in DD-97-02, Rev. 0. The calculated mean background exposure rate and the 95 percent confidence intervals used for the CCP grounds are 8 ± 2 μR/hr. Data collected from trench-like water drainage areas located on Battelle property unassociated with site operations indicate a geometry effect, increasing the exposure rates inside the trenches by 3 to 5 μR/hr.

Soil Contamination

Table 2 presents the guidelines for residual radioactivity concentrations for soil and solid volumes as applied to the excavation. Criteria for residual radioactivity concentrations in soil are defined in a number of references. DOE Order 5400.5. Section IV.a.2 provides generic guidelines for residual concentrations of Ra-226, Ra-228, Th-230, and Th-232. NRC Guidance has been received by the CCP which contains soil radioactivity concentration guidelines for Co-60, Sr-90, Cs-137, Ra-226, and Ra-228. NRC guidance for soil radioactivity concentration guidelines for natural, enriched and depleted uranium are also utilized. **Table 2** compiles soil residual radioactivity concentration guidelines to

[1] Battelle. *Radiological Status of Abandoned Filter Bed Presentation*, http://www.ohio.doe.gov/ccp_seb/, Posted 7/15/2003. Presentation provided by DOE to the CCP website. Page titled "Radioactive Inventory of the Abandoned North Filter Beds & Limit Fractions" contains sampling data obtained from March through September 2000 from the filter beds. Average Cs-137 ratios were utilized to calculate the activity concentrations of the isotopes of concern.

be utilized by the CCP. **Table 2** values have been generated primarily from the various reference technical documents and from soil guidelines generated from computer pathway analyses. Pu-241 is calculated by applying a ratio to sum of Pu-238 and Pu-239 (obtained from ORIGEN 2.1 derived values, Battelle, 2003c), resulting in a Cs-137 to Pu-241 ratio of 2.8. Using the ratios from **Table 6** and the Cs-137 to Pu-241 ratio of 2.8, the sum of ratios of radionuclides will meet unity at Cs-137 concentrations of 11 pCi/g. **Table 6** details the unity calculation for the RCOCs.

5.0 Equipment and Procedures

5.1 Equipment

Direct reading gas proportional survey instruments sensitive to alpha and beta radiation are used to monitor facility surfaces for residual radioactive materials. Ludlum Model 43-20 gas proportional detectors (180 square centimeters (cm^2) detection areas) with Eberline ESP-2 meters were used to scan all building surfaces. The 180 cm^2 detector was used for all static measurements for the determination of residual radioactivity levels. P-10 gas was supplied via a continuous feed to the detectors. Thin, flat plate thorium-230 and technicium-99 (Tc-99) sources traceable to the National Institute of Standards and Technology (NIST) per requirements of ANSI-N323a, "Radiation Protection Instrumentation Test and Calibration" were used to calibrate the gas proportional instruments for alpha and beta detection, respectively (ANSI, 1997). Tc-99 was used as the calibration source in accordance with Section 4.2.2 of ANSI-N323A which states "the detector shall be calibrated with an energy that is less than or similar to beta energies in the field." (ANSI, 1997) The average beta energy of Tc-99 is 85 KeV, with the average energies of Co-60, Cs-137, and Sr-90 being 95, 156, and 196 KeV, respectively.

Other instrumentation used in the support of the final status survey includes:

- A Ludlum Model 19 Exposure Rate Meter to perform gamma radiation measurements.
- Ludlum Model 44-10 two-inch by two-inch sodium iodide detectors with Eberline ESP-2 meters were used to scan the excavation.
- A VMS based Canberra Procount data acquisition system in conjunction with high purity germanium detectors for gamma spectroscopy of soil samples.
- A Tennelec Model LB5100 Simultaneous Alpha and Beta Gas Proportional Counter to count smear samples.

5.2 Minimum Detectable Activities

5.2.1 Structure Surface Scanning

Minimum detectable activities (MDAs) are determined utilizing the data collected for each surface material. The following equation is used to calculate the MDA:

$$MDA = \frac{3 + (4.65 * \sigma_{bkg})}{Eff * T * G}$$

where:

σ_{bkg} = standard deviation of background value = $\sqrt{counts_{bkg}}$
Eff = efficiency of detector
T = time in minutes

$$G = \text{geometry} = \frac{\text{active probe area in cm}^2}{100}$$

The MDA for large, wide area sources was calculated assuming the radioactive source remained under the detector approximately one minute, allowing the MDA for wide-area source scan surveys to approach the MDA reported for a static survey. The MDA for a wide-area beta source was calculated at 260 disintegrations per minute per 100 square centimeters (dpm/100 cm^2). The MDA for scans involving point sources were calculated by evaluating the time a point source remained under the detection area, given a worst-case brick background. A beta MDA of 1600 dpm/100 cm^2 was calculated for a point source configuration during a scan survey. The calculated MDAs for alpha scans for wide-area and point sources are 18.5 and 281 dpm/100 cm^2. Attachment A details the method for calculating the MDA.

5.2.2 Excavation Scanning Minimum Detectable Concentrations

Scanning minimum detectable concentrations (MDC_{scan}) is determined to demonstrate that the MDC_{scan} is less than the modified Cs-137 screening criteria. The MDC_{scan} is calculated utilizing the methodology described in NUREG-1507 and the background count rate and a default detector response to Cs-137 (NRC. 1998). The equation during the walkover surveys of the CCP incorporates a d' of 1.38 and a surveyor efficiency of 0.5. The ambient background in the ANFB to MH-2 area was 12,400 counts per minute (cpm). The following is the calculation of the MDC_{scan}:

b_i	=	(12,400 cpm) x (1 sec) x (1 min/60 sec)	=	207 counts
MDCR	=	(1.38) x ($\sqrt{207 counts}$) x (60 sec/1min)	=	1191 cpm
$MDCR_{surveyor}$	=	1191 cpm/$\sqrt{0.5}$	=	1684 cpm
MDER	=	1684 cpm/(900 cpm/μR/hr)	=	1.87 μR/hr
MDC_{scan}	=	$(5 pCi/g) * \frac{1.87 \mu R/hr}{1.307 \mu R/hr} = 7.15 pCi/g$		

The ambient background in the dosing chamber area was 15,400 counts per minute cpm. Using the same methodology as above, the MDC_{scan} is calculated to be 7.97 pCi/g for the dosing chamber surveys.

5.3 Procedures

The Characterization Team was formally trained and qualified to applicable procedures prior to the initiation of the characterization and final status surveys. Documentation of training is maintained by CCP Project Records.

The following plans and procedures were utilized for the surveys:

DD-93-19, Rev. 5	Decommissioning Plan, Battelle Memorial Institute Columbus Operations
DD-97-02, Rev. 0	Radiological Characterization and Final Status Plan for BCLDP West Jefferson Site
SC-OP-004, Rev. 0	Radioactive Contamination Monitoring Requirements for Facility Surface Characterization
SC-OP-007, Rev. 0	Baseline Reference Values for Facility Radiological Characterization Surveys
SC-OP-010, Rev. 0	Establishing a Surface Reference Grid for Walls, Floors, and Ceilings for a Detailed Characterization Survey
SC-SP-004.2, Rev. 3	Manual and Mechanical Collection of Surface and Subsurface Soil Samples in Support of Site Characterization
WI-2806, Rev 2	Excavation and Trench Sampling and Surveys

6.0 Survey Findings

6.1 Exposure Rate Surveys

The calculated mean background exposure rate and the 95 percent confidence intervals used for the CCP grounds are 8 ± 2 μR/hr. The exposure rate readings for each appropriate area are presented in **Tables 7 and 8**. The exposure rate readings were individually compared to the mean background value of 8 ± 2 μR/hr in order to show compliance with the 5 μR /hr above background release criterion (grounds exposure rate surveys must be less than or equal to 13 μR/hr to be compliant, trenches, less than or equal to 18 μR/hr). The average one meter measurement was 11 μR/hr, the minimum measurement was 10 μR/hr and the maximum measurement was 12 μR/hr.

6.2 Scanning and Fixed Measurements

Final status surveys for total (fixed and removable) radiological contamination were less than the release criteria defined in **Table 1**.

Table 9 presents the static survey results and **Table 10** presents scanning survey results from the ANFB-NSSF surveys. Numerical values in the tables represent residual activities and were computed as follows:

$$\frac{dpm}{100cm^2} = \frac{C_g - C_b}{(T)(Eff)(\frac{180}{100})}$$

Where:

C_g = Gross counts (counts/180 cm^2)
C_b = Mean value of background counts (counts/180 cm^2)
T = count time (min) [one minute count time is standard]
Eff = average instrument efficiency

Count rates for both wide area (greater than the probe area of 180 cm^2) and point (less than the probe area of 180 cm^2) sources were normalized to 100 cm^2 through this equation. Utilizing the equation confirms that all wide-area sources met the 1.000 dpm/100 cm^2 release criteria. Point sources, if identified, were also subject to the normalizing equation. Therefore, activities for point sources was limited to 1800 dpm/100 cm^2, which is well below the 3.000 dpm/100 cm^2 release criteria for "hot spots."

Areas where measurements exceed the decision level value (DLV), precise identification of the area and additional data collection is required. Further data collection includes: (a) a static alpha-plus-beta measurement, (b) a static alpha-only measurement, and (c) a smear sample. In these areas, it is Closure Services current policy to decontaminate the area to below 1000 dpm/100 cm^2, or the appropriate radiological cleanup criteria. If

decontamination is not feasible in the area, additional information such as the exact area of contamination and contamination levels using a 100 cm^2 probe are obtained.

The following summarizes the alpha + beta scanning and integrated measurement surveys obtained for ANFB-NSSF. A total of 178 Survey grids were scanned, static measurements and smears were collected in 60 survey grids. The results of these surveys are summarized below.

Location	Total Alpha + Beta Activity in dpm/100cm^2		
	Average	Minimum	Maximum
Scanning Survey	-82.1	-352	169
FSS Static - Walls	-189	-258	-134
FSS Static – Floor	-35.6	-109	25.3

Scanning of the excavations was performed with a two inch by two inch sodium iodide detector. Results of the survey indicate a uniform distribution of residual radioactivity and no exposure rates were above the DLV. Survey results are presented **Tables 11 and 12.**

6.3 Excavation Sampling

Samples of the trench excavation bases were taken at a rate of one per linear meter in accordance with Section 6.3.3 of DD-97-02, Rev. 0. Summary tables of the Cs-137 results in relation to the sample locations are presented as **Tables 13 and 14**. Sample results for the excavations are presented as **Tables 15, 16 and 17**. **Tables 15, 16, and 17** present all radionuclides activities and minimum detectable activities of the analyses.

Cesium-137 is utilized as a surrogate for determining compliance to the cleanup criteria presented in **Table 1**. The CCP has consistently utilized Cs-137 as a surrogate for other radionuclides of concern as it is the predominate radionuclide present throughout the site and the buildings. Additionally, Cs-137 exhibits the lowest cleanup criteria of 15 pCi/g. The calculation of the Cs-137 surrogate value is performed utilizing sample results obtained prior to remediation of the area in question. Pu-241 is calculated by applying a ratio to sum of Pu-238 and Pu-239 (obtained from ORIGEN 2.1 derived values, Battelle, 2003c), resulting in a Cs-137 to Pu-241 ratio of 2.8. **Table 6** presents the results of the pre-remediation samples of the filter bed and are not associated with the ANFB-NSSF.

Compliance to the cleanup criteria presented in **Table 1** is demonstrated through a "fraction of limit." The total quantity and activity concentrations are calculated using the average isotopic ratios of radionuclides to Cs-137 as obtained for the filter beds, with the exception of Pu-241 (Battelle, 2003b). See **Table 6**. Results for Co-60, Cs-137, Sr-90, Eu152 and 154, Pu-239, 240 and 241, and Am-241 are compared to the respective release criteria and a "fraction of limit" calculated. The "fraction of limit" is determined by summing the ratios of each isotopic concentration to the respective release limit. The sum of ratios must be less than one to meet sample release criteria. Utilizing the average ratios from the filter beds, Cs-137 is the predominate radionuclide and is used to quickly

evaluate radioanalytical results. with a modified screening criteria of 11 pCi/g. This ratio has been used in past technical basis documents which have been reviewed and approved by the NRC and licensee. The "fraction of limit" for the ANFB-NSSF samples was not calculated due to the low concentrations of Cs-137 in respect to the modified screening criteria. The following table summarizes the Cs-137 analytical results.

Location	Number of Samples	Average (pCi/g)	Standard Deviation (pCi/g)	Range (pCi/g)	Comparison Value (pCi/g)	Modified Screening Criteria (pCi/g)
ANFB to MH-2 Sidewalls	10	0.02	0.01	0.02–0.04	0.03	11
ANFB to MH-2 Excavation Base	10	0.04	0.01	0.03–0.05	NA	11
Dosing Chamber Excavation Base	7	0.02	0.01	0.01–0.02	NA	11

Statistical analyses were performed on the sidewall sample data in accordance with Section 6.4.3 of DD-97-02. Rev. 0. Statistical analysis was performed according to NUREG/CR-5849, §8.5. As stated in §8.5, the EPA has recommended applying the calculated value of μ_a, relative to a guideline value, at a desired level of confidence. The value of μ_a is compared to the guideline value: if the μ_a is less than the guideline, the area meets the guideline at a 95% confidence level. This in turn means that the probability is less than 5% that the μ_a, will pass the test, when the true mean activity level exceeds the guideline value. The calculated the μ_a, for Cs-137 of 0.03 pCi/g, was less than the modified screening criteria of 11 pCi/g. **Table 18** presents the calculation.

6.4 Overburden Sampling

Twenty samples were taken from the excavation overburden in accordance with Section 6.3 of this document. The overburden soil from ground surface to three feet above the contaminated pipe is designated as overburden "A". The next two feet of soil (from three feet to one foot above the pipe) is designated as overburden "B". A summary table of the Cs-137 results in relation to the sample location is presented as **Table 19**. Sample results for the overburden sampling are presented in **Table 20**. No man-made radionuclides were detected. The following is a summary Table of the Cs-137 results.

Location	Number of Samples	Average (pCi/g)	Standard Deviation (pCi/g)	Range (pCi/g)	Comparison Value (pCi/g)	Modified Screening Criteria (pCi/g)
ANFB to MH-2 Overburden A	10	0.03	0.02	0.02–0.06	0.04	11
ANFB to MH-2 Overburden B	10	0.05	0.05	0.02–0.20	0.08	11

Statistical analyses were performed on the overburden sample data in accordance with Section in the same manner as Section 6.2 of this document. The calculation of the Cs-137 comparison values, 0.04 and 0.08 pCi/g, was less than the modified screening criteria of 11 pCi/g. The calculation is presented as **Tables 21 and 22**.

7.0 Conclusions

The characterization and final status survey results demonstrate that the radiological endpoint criteria objectives of the NRC-approved Decommissioning Plan have been met for the areas addressed by this effort. (Battelle, 2003) The scanning and the integrated measurements for alpha + beta, smear survey results, and static alpha measurements obtained from the ANFB-NSSF are reported as concentrations less than those listed in **Table 1.** Reported analytical results for media samples obtained from the excavation are below the residual radioactivity concentrations for soil and solid volumes as presented in **Table 2**.

The final status survey performed on the ANFB-NSSF area, statistically demonstrates that the remediation of the area was successful and that the area is free from residual radioactive contamination making it suitable for unrestricted release.

8.0 References

American National Standards Institute (ANSI), 1997. ANSI-N323a, "Radiation Protection Instrumentation Test and Calibration".

Battelle, 1993A. "Surface Release Criteria Technical Basis Document", DD-93-02.

Battelle, 1993. "Volumetric Release Criteria Technical Basis Document for Battelle Columbus Laboratories Decommissioning Project". DD-93-03.

Battelle. 2000. "Radiological Characterization and Final Status Survey Plan for Battelle Columbus Laboratory Decommissioning Project West Jefferson Site". DD-97-02.

Battelle. 2003a. "Decommissioning Plan for the Battelle Memorial Institute Columbus Operations", DD-93-19.

Battelle. 2003b. Radiological Status of Abandoned Filter Bed Presentation. http://www.ohio.doe.gov/ccp_seb/, Posted 7/15/2003. Presentation provided by DOE to the CCP website. Page titled "Radioactive Inventory of the Abandoned North Filter Beds & Limit Fractions" contains sampling data obtained from March through September 2000 from the filter beds. Average Cs-137 ratios were utilized to calculate the activity concentrations of the isotopes of concern.

Battelle. 2003c. Waste Characterization, Classification, and Shipping Support Technical Basis Document, Rev. 5 for BCLDP West Jefferson Facility, November 2003. Isotopic mixture for Pu-241 is calculated using the values obtained from the ORIGEN2.1-derived data values presented in the technical basis document.

ECC&E2 Closure Services, LLC (Closure Services. 2004A). Work Instruction 2500, Rev. 0, CS CCP Filter Bed Remediation Project.

ECC&E2 Closure Services, LLC (Closure Services. 2004B). Characterization and Final Status Report for JN-6, Revision 1, July 2004.

ECC&E2 Closure Services. LLC (Closure Services, 2004C). Work Instruction 2806, Rev. 1, Excavation and Trench Sampling and Survey.

U.S. Department of Energy (DOE), 1986. May 29, 1986 memorandum, Voight to Vaughan, approved by Vaughan, June 10, 1986.

U.S. Department of Energy (DOE). 1990. Finding of No Significant Impact, Decontamination and Decommissioning of the Battelle Columbus Laboratories in Columbus and West Jefferson, Ohio.

Oak Ridge Associated Universities (ORAU). 1992. "Manual for Conducting Radiological Surveys in Support of License Termination. Draft Report for Comment" NUREG/CR-5849, ORAU-92/C57, prepared for the Nuclear Regulatory Commission by the Environmental Survey and Assessment Program, Energy/Environmental Systems Division. ORAU, 1992.

FIGURES

FIGURE 1, SITE MAP

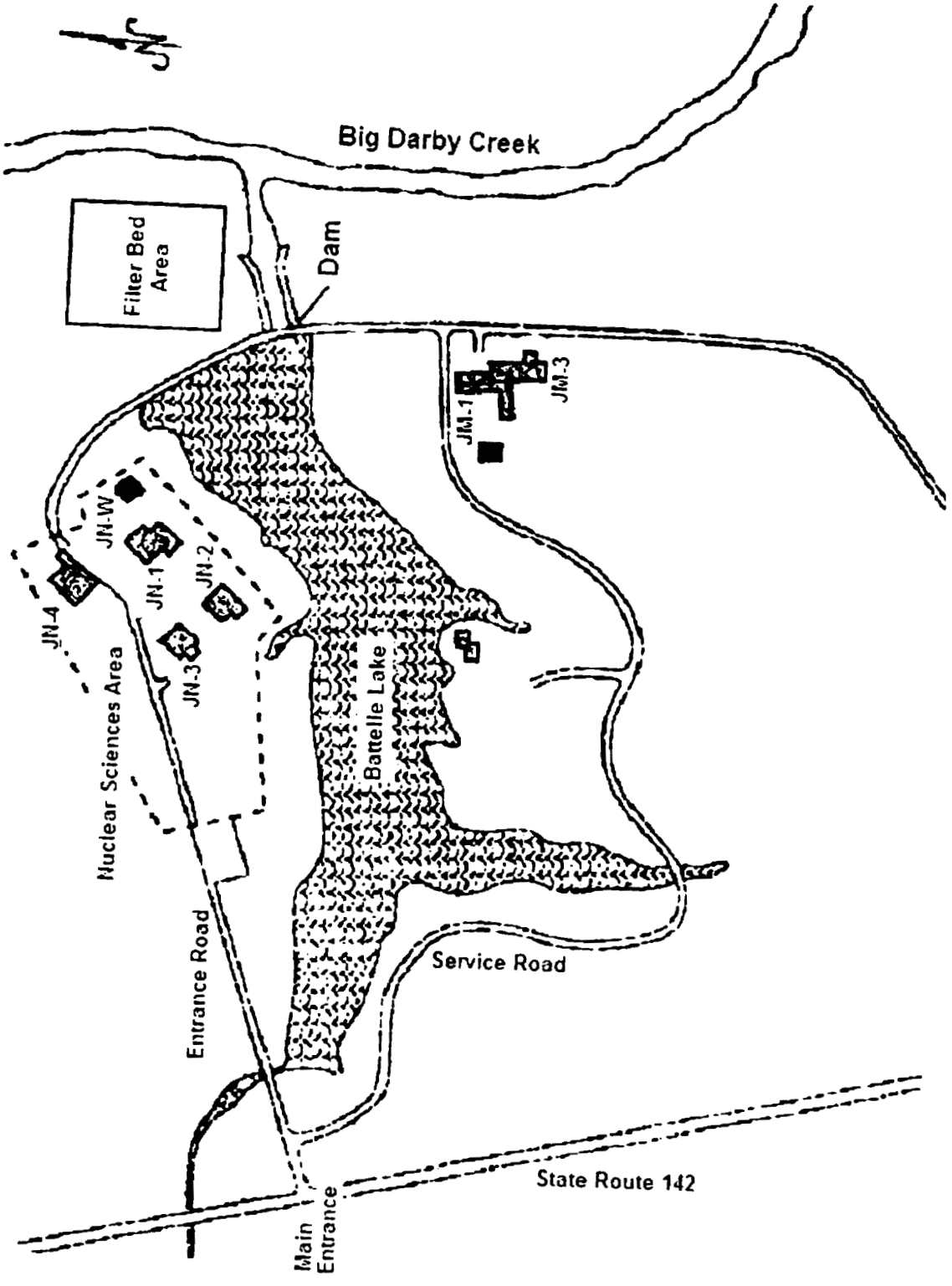
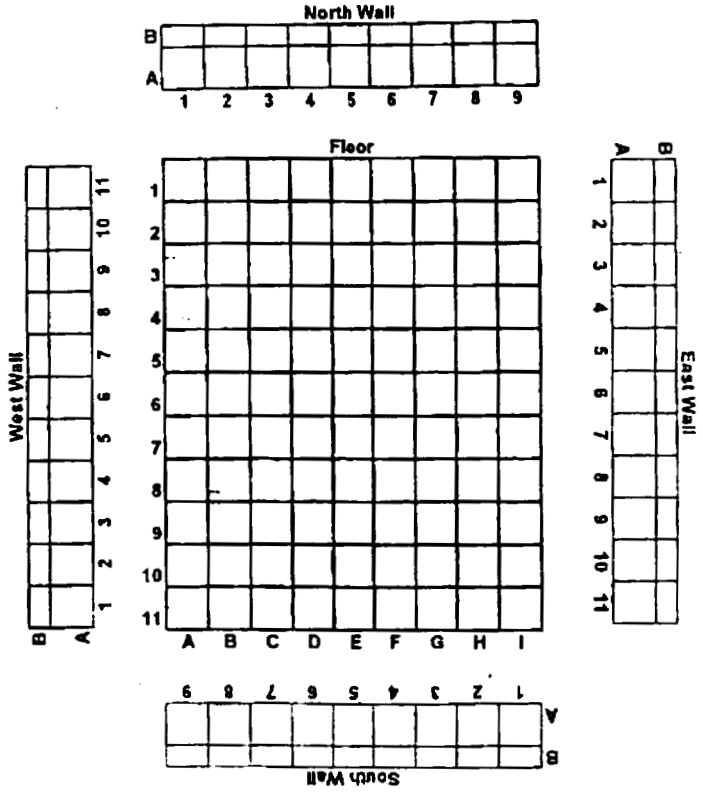


FIGURE 2, ACTIVE NORTH FILTER BED – NORTH SUBSURFACE SAND FILTER

FIGURE 3
Grid Map – North Subsurface Sand Filter



TABLES

Table 1
Surface Contamination Guidelines for BCLDP

Radionuclides [2]	Allowable Total Residual Surface Contamination (dpm/100 cm^2)[1]		
	Average [3,4]	Maximum [4,5]	Removable [4,6]
Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231	Reserved (100)*	Reserved (300)*	Reserved (20)*
Th-Natural, Sr-90, I-126, I-131, I-133, , Ra-223, Ra-224, U-232, Th-232	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay product, alpha emitters	5,000	15,000	1,000
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others notes above. [7]	5,000	15,000	1,000

(1) As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

(2) Where surface contamination by both alpha-and beta-gamma-emitting radionuclides exists, the limits established for alpha-and beta-gamma-emitting radionuclides should apply independently.

(3) Measurements of average contamination should not be averaged over an area of more than 1m^2. For objects of less surface area, the average should be derived for each such object.

(4) The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr and 1.0 mrad/hr., respectively, at 1 cm.

(5) The maximum contamination level applies to an area of not more than 100 cm^2.

(6) The amount of removable material per 100 cm^2 of surface area should be determined by wiping and area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

(7) This category of radionuclides includes mixed fission products, including the Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

* Regulatory Guide 1.86

TABLE 2
BCLDP GUIDELINES FOR RESIDUAL
RADIOACTIVITY CONCENTRATIONS FOR SOIL AND SOLID VOLUMES

Radionuclide[a]	King Avenue Concentration (pCi/g)[b]	West Jefferson Concentration (pCi/g)[b]
Natural Uranium	10[1]	na[c]
Enriched Uranium	30[1]	30[1]
Depleted Uranium	35[1]	35[1]
Ac-227	19	19
Am-241	na[c]	30
Am-243	na	30
Ce-144	na	2,100
Cm-243	na	0.79
Cm-244	na	1.0
Co-60	8[2]	8[2]
Cs-134	na	33
Cs-137	15[2]	15[2]
C-14	940	940
Eu-152	na	36
Eu-154	na	32
Eu-155	na	1,800
Fe-55	na	2.7E+07
H-3[d]	41,000	38,000
I-129	na	13
Mn-54	na	61
Ni-59	na	1.3E+07
Ni-63	na	4.9E+06
Np-237	na	0.58
Pa-231	18	18
Pb-210	140	na
Pu-238	na	25
Pu-239	na	25
Pu-240	na	25
Pu-241	na	25
Pu-242	na	25
Ra-226 (0-15 cm of soil)	5[2,3]	na

Radionuclide[a]	King Avenue Concentration (pCi/g)[b]	West Jefferson Concentration (pCi/g)[b]
Ra-226 (>15 cm of soil)	15[2,3]	na
Ra-228	5[2,3]	na
Ru-106	na	180
Sb-125	na	118
Sm-151	na	6,700
Sr-90	5[2]	5[2]
Th-228	29	na
Th-230	5[3]	na
Th-232	5[3]	na

Table 2 Notes and References

Notes:

a. Activity concentrations above natural background concentrations. Where more than one radionuclide is present, the sum of the ratios of the individual radionuclide concentrations to their respective concentration limits shall not exceed 1.

b. Concentrations for which no specific reference is cited have been derived from RESRAD calculations and are the more restrictive values calculated for soil deposition at a depth of 5 meters.

c. Indicates that this radionuclide is not expected to be found at the indicated site.

d. Difference in tritium activity concentrations are due to the difference in depths of the water tables at two sites. The water table depth at King Avenue is deeper than that at West Jefferson.

References:

1. Options 1 and 2 of the Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (46 FR 52061, October 23, 1981).

2. NRC Memorandum, "Acceptable Cleanup Criteria and Practices for Decontamination and Decommissioning (License No. SNM-7)" dated April 17, 1992, to Harley L. Toy, License Coordinator and Manager, Nuclear Sciences, Battelle Memorial Institute from J.W.N. Hickey, Chief, Fuel Cycle Safety Branch, Division of Industrial and Medical Nuclear Safety, Office of Nuclear Material Safety and Safeguards.

3. DOE Order 5400.5, "Radiation Protection of the Public and the Environment".

4. NRC Policy and Guidance Directive FC83-23, "Termination of Byproduct, Source, and Special Nuclear Material Licenses".

Table 3
Chauvenet's Criterion - Pop DLV Alpha-Concrete

Building:	JN-6	Room:	Various	Surface Material:	Concrete Floor
Meter ID:	92374	Probe ID:	149047	Probe Area:	180
Survey Date:	7/7/2004	Chauvenet's Criterion:	2.488	Survey Type:	POP DLV Alpha

Grid ID	Other ID	cpm	Comparison CC
A1	Stairwell	2	0.649
A1	Utility	3	0.016
A2	Utility	3	0.016
A4	Utility	1	1.281
A5	Utility	1	1.281
B1	Utility	2	0.649
B2	Utility	6	1.881
B3	Utility	2	0.649
B4	Utility	2	0.649
B5	Utility	5	1.249
A1	Stairwell	1	1.281
A1	Utility	6	1.881
A2	Utility	4	0.616
A3	Utility	3	0.016
A4	Utility	2	0.649
A5	Utility	5	1.249
B1	Utility	5	1.249
B2	Utility	2	0.649
B3	Utility	4	0.616
B4	Utility	0	1.914
B5	Utility	1	1.281
A1	Stairwell	2	0.649
A2	Utility	3	0.016
A3	Utility	3	0.016
A4	Utility	2	0.649
A5	Utility	5	1.249
B1	Utility	2	0.649
B2	Utility	3	0.016
B3	Utility	6	1.881
B4	Utility	3	0.016
B5	Utility	3	0.016
A1	Stairwell	4	0.616
A1	Utility	6	1.881
A2	Utility	4	0.616
A3	Utility	2	0.649
A4	Utility	4	0.616
A5	Utility	2	0.649
B1	Utility	2	0.649
B2	Utility	2	0.649

Mean	3
Std Dev	2
Data Points	39

MDA	8
DLV	11

Mean + 2 Sigma	6
Mean + 3 Sigma	8

Survey BKG 1 cpm

Table 4
Chauvenet's Criterion - Pop DLV Beta-Concrete

Building	JN-6	Room:	Utility	Surface Material	Concrete
Meter ID:	92374	Probe ID:	149047	Probe Area	180
Survey Date:	7/8/2004	Chauvenet's Criterion	2.496	Survey Type:	POP DLV Beta

Grid ID	Other ID	cpm	Comparison CC
A1	Floor	361	0.595
A2	Floor	426	0.616
A3	Floor	498	1.958
A4	Floor	374	0.353
A5	Floor	426	0.616
B1	Floor	302	1.695
B2	Floor	396	0.057
B3	Floor	375	0.335
B4	Floor	411	0.336
B5	Floor	400	0.131
A1	Floor	496	1.920
A2	Floor	483	1.678
A3	Floor	385	0.148
A4	Floor	409	0.299
A5	Floor	422	0.541
B1	Floor	325	1.266
B2	Floor	388	0.092
B3	Floor	343	0.931
B4	Floor	368	0.465
B5	Floor	372	0.390
A1	Floor	462	1.287
A2	Floor	488	1.771
A3	Floor	379	0.260
A4	Floor	486	1.734
A5	Floor	417	0.448
B1	Floor	342	0.950
B2	Floor	302	1.695
B3	Floor	379	0.260
B4	Floor	334	1.099
B5	Floor	408	0.280
A1	Floor	472	1.473
A2	Floor	398	0.094
A3	Floor	344	0.912
A4	Floor	362	0.577
A5	Floor	429	0.672
B1	Floor	383	0.185
B2	Floor	317	1.415
B3	Floor	335	1.080
B4	Floor	374	0.353
B5	Floor	347	0.856

Mean	393
Std Dev	54
Data Points	40

MDA	80
DLV	473

Mean + 2 Sigma	500
Mean + 3 Sigma	554

Survey BKG 277 cpm

Table 5
Chauvenet's Criterion - Scan DLV Beta-Concrete

Building	JN-6	Room:	Various	Surface Material	Concrete Floor
Meter ID	92374	Probe ID:	149047	Probe Area	180
Survey Date:	7/7/2004	Chauvenet's Criterion	2.488	Survey Type	Scan DLV Beta

Grid ID	Other ID	cpm	Comparison CC
A1	Stairwell	413	0.419
A1	Utility	345	1.073
A2	Utility	557	0.964
A3	Utility	587	1.253
A4	Utility	371	0.823
A5	Utility	548	0.878
B1	Utility	522	0.628
B2	Utility	439	0.170
B3	Utility	514	0.551
B4	Utility	510	0.513
B5	Utility	512	0.532
A1	Stairwell	587	1.253
A1	Utility	605	1.426
A2	Utility	584	1.224
A3	Utility	565	1.041
A4	Utility	543	0.830
A5	Utility	401	0.535
B1	Utility	674	2.089
B2	Utility	584	1.224
B3	Utility	551	0.907
B4	Utility	550	0.897
B5	Utility	521	0.618
A1	Stairwell	562	1.012
A2	Utility	444	0.121
A3	Utility	409	0.458
A4	Utility	404	0.506
A5	Utility	382	0.717
B1	Utility	354	0.986
B2	Utility	366	0.871
A2	Utility	328	1.236
A3	Utility	312	1.390
A4	Utility	347	1.054
A5	Utility	334	1.178
B2	Utility	356	0.967
B3	Utility	346	1.063
B5	Utility	358	0.948
A2	Utility	359	0.938
A3	Utility	345	1.073
A4	Utility	320	1.313

Mean	457
Std Dev	104
Data Points	39

MDA	88
DLV	545

Mean + 2 Sigma	665
Mean + 3 Sigma	769

Survey BKG 332 cpm

Table 6
Cesium-137 Surrogate Analysis Data & Modified Cs-137 Screening Criteria

Sample ID (a,b)	Cs-137 Activity (pCi/g)	Co-60 Activity (pCi/g)	Eu-152 Activity (pCi/g)	Eu-154 Activity (pCi/g)	Am-241 Activity (b) (pCi/g)	Sr-90 Activity (pCi/g)	Pu-238 Activity (pCi/g)	Pu-239 Activity (pCi/g)
16741	40 1	0 05	<0 096	<0.053	1 36 g	<0 172	<0.009	0.053
16746	21.8	0 04	<0.079	<0.051	1.20 g	<0.184	0.026	0.9
16747	26 1	0 06	<0.077	<0 046	0.89 g	<0 175	<0.011	0 116
16751	8	<0 024	<0 068	<0.047	0.93g	<0.151	0.021	0.496
16752	39 1	0 06	<0 086	<0.046	10 74 a	<0 167	0.131	5.822
16607	74 2	0 28	7 26	0 65	1 18 a	0.59	0.0213	0 629
16608	18 7	0 07	4.03	0.26	0.47 a	<0.180	0 016	0.287
16668	41 6	0 08	<0.098	<0 061	2.59 a	NA	0 036	1 846
16686	38 1	0.07	<0 050	<0 031	4.71 a	NA	0.135	3.84
19079	11 7	0 17	8 02	0 64	0 018	4 39	<0 016	0 034
19080	32 4	<0 016	0 562	<0 053	<0 016	0.21	<0.019	<0.017
Average	*31 99*	*0 084*	*1.857*	*0.176*	*2.2*	*0.691*	*0.04*	*1.276*

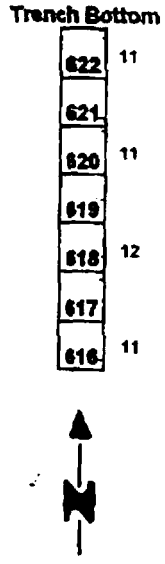
Calculated Cs-137 Surrogate Ratio (c)	
Cs-137/Co-60	381
Cs-137/Eu-152	17
Cs-137/Eu-154	182
Cs-137Am-241	15
Cs-137/Sr-90	46
Cs-137/Pu-238	800
Cs-137/Pu-239	25
Cs-137/Pu-241 (d)	2 8

Modified Cs-137 Screening Criteria			
Cleanup Criteria (pCi/g)		*Surrogate Activity (pCi/g)*	*Summed Ratio*
Cs-137	15	11	0.73
Co-60	8	0.028884028	0.00
Eu-152	36	0 638543295	0.02
Eu-154	32	0.060518912	0.00
Am-241	30	0 758486402	0 03
Sr-90	5	0 237605502	0.05
Pu-238	25	0.013754298	0.00
Pu-239	25	0 438762113	0 02
Pu-241	25	3.928571429	0.16
		Unity Rule (e)	*1.00*

Notes:
(a) Battelle reported analytical results of samples obtained from the filter bed area between March and September 2000.
(b) Reported data obtained from gamma spectroscopy analysis
(c) Surrogate ratio calculated by dividing average Cs-137 activity by average activity of isotope of concern
(d) Pu-241 is calculated by applying a ratio to sum of Pu-238 and Pu-239 (obtained from ORIGEN 2.1 derived values, Battelle, 2003c), resulting in a Cs-137 to Pu-241 ratio of 2 8.
(e) Unity Rule applied to surrogate calculated activity resulting in modified Cs-137 screening level of 11 pCi/g

Table 7
ANFB Dosing Chamber Dose Rate Survey

ANFB Dosing Chamber
Dose Rate Survey (Results in µR/hr)

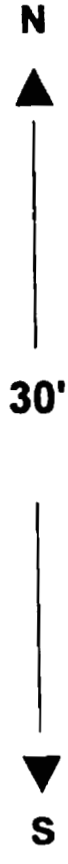


Instrument: Model-19/Sn # 89491
Cal. Due: 2/17/05
Background: 10µR/hr

Table 8
ANFB to MH-2 DOSE RATE SURVEY

Area/Location: Active North Filter Bed to Manhole 2

Trench Bottom



1	
2	11
3	
4	11
5	
6	10
7	
8	11
9	
10	

Results in µR/hr

Bkgd = 11µR/hr
Instrument: #89499

Table 9
ANFB-NSSF - FSS Surveys - Static Survey Results
STATIC SURVEY RESULTS

Area/Building: Filter Bed
Room: Active North Filter Bed
Date:01/26/05

North Side

			Results In CPM					Instrument		Results In DPM/100cm²	Results In CPM					Instrument		Results In DPM/100cm²	Smear Results In DPM/100cm²		Results In µR/hr Gamma	
	Surface	Material	Alpha + Beta BKG			Static Measurements					Alpha BKG			Static Measurements								
Grid	Medium	Type	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	Alpha	Beta	Contact	1 Meter
A3	Floor	C	473	302	393	367	-26	0.286	1.8	-50.51	11	1	3	3	0	0.233	1.8	0.00	-0.25	1.21	N/A	N/A
A6	Floor	C	473	302	393	381	-12	0.286	1.8	-23.31	11	1	3	5	2	0.233	1.8	4.77	-0.25	-2.1	N/A	N/A
A8	Floor	C	473	302	393	353	-40	0.286	1.8	-77.70	11	1	3	7	4	0.233	1.8	9.54	-0.25	-2.1	N/A	N/A
B1	Floor	C	473	302	393	358	-35	0.286	1.8	-67.99	11	1	3	4	1	0.233	1.8	2.38	-0.25	0.11	N/A	N/A
B3	Floor	C	473	302	393	362	-31	0.286	1.8	-60.22	11	1	3	3	0	0.233	1.8	0.00	-0.25	-0.99	N/A	N/A
B6	Floor	C	473	302	393	363	-30	0.286	1.8	-58.28	11	1	3	4	1	0.233	1.8	2.38	-0.25	-0.99	N/A	N/A
B9	Floor	C	473	302	393	398	5	0.286	1.8	9.71	11	1	3	5	2	0.233	1.8	4.77	-0.25	0.11	N/A	N/A
C2	Floor	C	473	302	393	353	-40	0.286	1.8	-77.70	11	1	3	3	0	0.233	1.8	0.00	-0.25	1.21	N/A	N/A
C5	Floor	C	473	302	393	375	-18	0.286	1.8	-34.97	11	1	3	6	3	0.233	1.8	7.16	-0.25	-0.99	N/A	N/A
C8	Floor	C	473	302	393	382	-11	0.286	1.8	-21.37	11	1	3	0	-3	0.233	1.8	-7.15	-0.25	1.21	N/A	N/A
C9	Floor	C	473	302	393	337	-56	0.286	1.8	-108.78	11	1	3	9	6	0.233	1.8	14.31	-0.25	0.11	N/A	N/A
D3	Floor	C	473	302	393	374	-19	0.286	1.8	-36.91	11	1	3	0	-3	0.233	1.8	-7.15	-0.25	-3.2	N/A	N/A
D6	Floor	C	473	302	393	373	-20	0.286	1.8	-38.86	11	1	3	2	-1	0.233	1.8	-2.38	-0.25	1.21	N/A	N/A
D9	Floor	C	473	302	393	347	-46	0.286	1.8	-89.36	11	1	3	6	3	0.233	1.8	7.16	-0.25	5.64	N/A	N/A
E1	Floor	C	473	302	393	394	1	0.286	1.8	1.94	11	1	3	3	0	0.233	1.8	0.00	-0.25	4.53	N/A	N/A
E5	Floor	C	473	302	393	371	-22	0.286	1.8	-42.74	11	1	3	3	0	0.233	1.8	0.00	-0.25	-0.99	N/A	N/A
E7	Floor	C	473	302	393	399	6	0.286	1.8	11.66	11	1	3	1	-2	0.233	1.8	-4.77	3.44	1.21	N/A	N/A
E9	Floor	C	473	302	393	401	8	0.286	1.8	15.54	11	1	3	4	1	0.233	1.8	2.38	-0.25	0.11	N/A	N/A
F2	Floor	C	473	302	393	376	-18	0.286	1.8	-34.97	11	1	3	3	0	0.233	1.8	0.00	-0.25	-2.1	N/A	N/A
F5	Floor	C	473	302	393	361	-32	0.286	1.8	-62.16	11	1	3	4	1	0.233	1.8	2.38	-0.25	-2.1	N/A	N/A
F8	Floor	C	473	302	393	343	-50	0.286	1.8	-97.13	11	1	3	3	0	0.233	1.8	0.00	-0.25	1.21	N/A	N/A
G1	Floor	C	473	302	393	367	-26	0.286	1.8	-50.51	11	1	3	2	-1	0.233	1.8	-2.38	-0.25	0.11	N/A	N/A
G5	Floor	C	473	302	393	382	-11	0.286	1.8	-21.37	11	1	3	1	-2	0.233	1.8	-4.77	-0.25	0.11	N/A	N/A
G8	Floor	C	473	302	393	399	6	0.286	1.8	11.66	11	1	3	3	0	0.233	1.8	0.00	-0.25	2.32	N/A	N/A
H2	Floor	C	473	302	393	398	5	0.286	1.8	9.71	11	1	3	5	2	0.233	1.8	4.77	-0.25	3.43	N/A	N/A
H4	Floor	C	473	302	393	373	-20	0.286	1.8	-38.86	11	1	3	6	3	0.233	1.8	14.31	-0.25	1.21	N/A	N/A
H7	Floor	C	473	302	393	406	13	0.286	1.8	26.26	11	1	3	9	6	0.233	1.8	14.31	1.59	2.32	N/A	N/A
I1	Floor	C	473	302	393	353	-40	0.286	1.8	-77.70	11	1	3	8	5	0.233	1.8	11.92	-0.25	1.21	N/A	N/A
I5	Floor	C	473	302	393	404	11	0.286	1.8	21.37	11	1	3	4	1	0.233	1.8	2.38	-0.25	0.11	N/A	N/A
I9	Floor	C	473	302	393	391	-2	0.286	1.8	-3.89	11	1	3	10	7	0.233	1.8	16.69	-0.25	-2.1	N/A	N/A
A1	W.Wall	C	473	302	393	291	-102	0.286	1.8	-198.14	11	1	3	2	-1	0.233	1.8	-2.38	-0.25	-2.1	N/A	N/A
A3	W.Wall	C	473	302	393	279	-114	0.286	1.8	-221.48	11	1	3	3	0	0.233	1.8	0.00	1.59	1.21	N/A	N/A
A5	W.Wall	C	473	302	393	274	-119	0.286	1.8	-231.16	11	1	3	4	1	0.233	1.8	2.38	-0.25	2.32	N/A	N/A
A7	W.Wall	C	473	302	393	316	-78	0.286	1.8	-151.52	11	1	3	5	2	0.233	1.8	4.77	-0.25	0.11	N/A	N/A
A9	W.Wall	C	473	302	393	260	-133	0.286	1.8	-258.36	11	1	3	1	-2	0.233	1.8	-4.77	-0.25	-0.99	N/A	N/A
A11	W.Wall	C	473	302	393	271	-122	0.286	1.8	-236.99	11	1	3	0	-3	0.233	1.8	-7.15	-0.25	2.32	N/A	N/A
B3	W.Wall	C	473	302	393	272	-121	0.286	1.8	-235.04	11	1	3	3	0	0.233	1.8	0.00	1.59	-0.99	N/A	N/A
B5	S.Wall	C	473	302	393	321	-72	0.286	1.8	-139.86	11	1	3	3	0	0.233	1.8	0.00	1.59	1.21	N/A	N/A
A2	S.Wall	C	473	302	393	294	-99	0.286	1.8	-192.31	11	1	3	4	1	0.233	1.8	2.38	1.59	0.11	N/A	N/A
A3	S.Wall	C	473	302	393	291	-102	0.286	1.8	-198.14	11	1	3	5	2	0.233	1.8	4.77	-0.25	-0.99	N/A	N/A
A5	S.Wall	C	473	302	393	307	-86	0.286	1.8	-167.06	11	1	3	6	3	0.233	1.8	7.16	-0.25	-2.1	N/A	N/A
A7	S.Wall	C	473	302	393	310	-83	0.286	1.8	-161.23	11	1	3	5	2	0.233	1.8	4.77	-0.25	-2.1	N/A	N/A
A8	S.Wall	C	473	302	393	306	-87	0.286	1.8	-169.00	11	1	3	2	-1	0.233	1.8	-2.38	-0.25	2.32	N/A	N/A
B1	S.Wall	C	473	302	393	287	-106	0.286	1.8	-205.91	11	1	3	5	2	0.233	1.8	4.77	1.59	0.11	N/A	N/A
B5	S.Wall	C	473	302	393	302	-91	0.286	1.8	-176.77	11	1	3	2	-1	0.233	1.8	-2.38	-0.25	-2.1	N/A	N/A
A1	N.Wall	C	473	302	393	324	-69	0.286	1.8	-134.03	11	1	3	2	-1	0.233	1.8	-2.38	-0.25	1.21	N/A	N/A
A2	N.Wall	C	473	302	393	290	-103	0.286	1.8	-200.08	11	1	3	4	1	0.233	1.8	2.38	-0.25	-0.99	N/A	N/A

Table 9
ANFB-NSSF - FSS Surveys - Static Survey Results
STATIC SURVEY RESULTS

Area/Building: Filter Bed
Room: Active North Filter Bed
Date:01/26/05

North Side

			Results in CPM					Instrument		Results in DPM/100cm²	Results in CPM					Instrument		Results in DPM/100cm²	Smear Results in DPM/100cm²		Results in µR/hr Gamma	
	Surface	Material	Alpha + Beta BKG			Static Measurements					Alpha BKG			Static Measurements								
Grid	Medium	Type	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	Alpha	Beta	Contact	1 Meter
A4	N.Wall	C	473	302	393	296	-97	0.286	1.8	-166.42	11	1	3	5	2	0.233	1.8	4.77	1.69	1.21	N/A	N/A
A6	N.Wall	C	473	302	393	304	-89	0.286	1.8	-172.88	11	1	3	5	2	0.233	1.8	4.77	1.69	-0.99	N/A	N/A
A7	N.Wall	C	473	302	393	292	-101	0.286	1.8	-196.19	11	1	3	1	-2	0.233	1.8	-4.77	-0.25	-3.2	N/A	N/A
A9	N.Wall	C	473	302	393	298	-95	0.286	1.8	-184.64	11	1	3	5	2	0.233	1.8	4.77	-0.25	0.11	N/A	N/A
B3	N.Wall	C	473	302	393	313	-80	0.286	1.8	-155.40	11	1	3	5	2	0.233	1.8	4.77	-0.25	2.32	N/A	N/A
A2	E.Wall	C	473	302	393	291	-102	0.286	1.8	-198.14	11	1	3	3	0	0.233	1.8	0.00	-0.25	-0.99	N/A	N/A
A3	E.Wall	C	473	302	393	287	-106	0.286	1.8	-205.91	11	1	3	2	-1	0.233	1.8	-2.38	-0.25	0.11	N/A	N/A
A5	E.Wall	C	473	302	393	268	-125	0.286	1.8	-242.61	11	1	3	2	-1	0.233	1.8	-2.38	-0.25	1.21	N/A	N/A
A7	E.Wall	C	473	302	393	313	-80	0.286	1.8	-155.40	11	1	3	11	8	0.233	1.8	19.07	-0.25	-0.99	N/A	N/A
A9	E.Wall	C	473	302	393	302	-91	0.286	1.8	-176.77	11	1	3	3	0	0.233	1.8	0.00	-0.25	1.21	N/A	N/A
A11	E.Wall	C	473	302	393	304	-89	0.286	1.8	-172.88	11	1	3	5	2	0.233	1.8	4.77	1.69	4.53	N/A	N/A
B2	E.Wall	C	473	302	393	294	-99	0.286	1.8	-192.31	11	1	3	2	-1	0.233	1.8	-2.38	-0.25	0.11	N/A	N/A
B11	E.Wall	C	473	302	393	313	-80	0.286	1.8	-155.40	11	1	3	3	0	0.233	1.8	0.00	1.69	-0.99	N/A	N/A

Table 10
ANFB-NSSF - FSS Surveys - Scan Survey Results
SCAN SURVEY RESULTS

Area/Building: Filter Bed
Room: Active North
Date: 01/25/05 **North Side**

			Results in CPM					Instrument		Results in DPM/100cm²	Results in CPM					Instrument		Results in DPM/100cm²	Smear Results in DPM/100cm²		Results in µR/hr Gamma	
	Surface	Material	Alpha + Beta BKG			Scan Measurements					Alpha BKG			Scan Measurements								
Grid	Medium	Type	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	Alpha	Beta	Contact	1 Meter
A1	Floor	C	545	301	457	406	-51	0.286	1.8	-99.07	35	0	16	N/A	N/A	0.233	1.8	N/A	-0.25	3.43	9	10
A2	Floor	C	545	301	457	344	-113	0.286	1.8	-219.60	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A3	Floor	C	545	301	457	373	-84	0.286	1.8	-163.17	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A4	Floor	C	545	301	457	410	-47	0.286	1.8	-91.30	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A5	Floor	C	545	301	457	378	-81	0.286	1.8	-157.34	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A6	Floor	C	545	301	457	411	-46	0.286	1.8	-89.36	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A7	Floor	C	545	301	457	362	-95	0.286	1.8	-184.54	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A8	Floor	C	545	301	457	430	-27	0.286	1.8	-52.48	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A9	Floor	C	545	301	457	454	-3	0.286	1.8	-5.83	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A10	Floor	C	545	301	457	364	-93	0.286	1.8	-180.65	35	0	16	N/A	N/A	0.233	1.8	N/A	-0.25	3.43	N/A	N/A
A11	Floor	C	545	301	457	463	6	0.286	1.8	11.66	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	9	10
B1	Floor	C	545	301	457	309	-148	0.286	1.8	-287.49	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B2	Floor	C	545	301	457	378	-81	0.286	1.8	-157.34	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B3	Floor	C	545	301	457	340	-117	0.286	1.8	-227.27	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B4	Floor	C	545	301	457	320	-137	0.286	1.8	-266.12	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B5	Floor	C	545	301	457	366	-91	0.286	1.8	-176.77	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B6	Floor	C	545	301	457	326	-131	0.286	1.8	-254.47	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B7	Floor	C	545	301	457	369	-88	0.286	1.8	-170.94	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B8	Floor	C	545	301	457	395	-62	0.286	1.8	-120.44	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B9	Floor	C	545	301	457	382	-75	0.286	1.8	-145.69	35	0	16	N/A	N/A	0.233	1.8	N/A	-0.25	0.11	N/A	N/A
B10	Floor	C	545	301	457	384	-73	0.286	1.8	-141.80	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B11	Floor	C	545	301	457	361	-96	0.286	1.8	-186.48	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C1	Floor	C	545	301	457	324	-133	0.286	1.8	-258.35	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C2	Floor	C	545	301	457	414	-43	0.286	1.8	-83.53	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C3	Floor	C	545	301	457	316	-142	0.286	1.8	-276.84	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C4	Floor	C	545	301	457	288	-169	0.286	1.8	-328.28	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C5	Floor	C	545	301	457	464	7	0.286	1.8	13.60	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C6	Floor	C	545	301	457	355	-102	0.286	1.8	-198.14	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C7	Floor	C	545	301	457	324	-133	0.286	1.8	-258.35	35	0	16	N/A	N/A	0.233	1.8	N/A	-0.25	0.11	N/A	N/A
C8	Floor	C	545	301	457	360	-107	0.286	1.8	-207.85	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C9	Floor	C	545	301	457	435	-22	0.286	1.8	-42.74	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C10	Floor	C	545	301	457	309	-148	0.286	1.8	-287.49	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
C11	Floor	C	545	301	457	358	-99	0.286	1.8	-192.31	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D1	Floor	C	545	301	457	428	-29	0.286	1.8	-56.33	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D2	Floor	C	545	301	457	362	-95	0.286	1.8	-184.54	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D3	Floor	C	545	301	457	319	-138	0.286	1.8	-268.07	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D4	Floor	C	545	301	457	341	-116	0.286	1.8	-225.33	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D5	Floor	C	545	301	457	308	-149	0.286	1.8	-289.43	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D6	Floor	C	545	301	457	312	-145	0.286	1.8	-281.66	35	0	16	N/A	N/A	0.233	1.8	N/A	-0.25	-0.99	N/A	N/A
D7	Floor	C	545	301	457	305	-152	0.286	1.8	-295.26	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D8	Floor	C	545	301	457	378	-82	0.286	1.8	-159.29	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D9	Floor	C	545	301	457	411	-46	0.286	1.8	-89.36	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D10	Floor	C	545	301	457	336	-121	0.286	1.8	-235.04	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
D11	Floor	C	545	301	457	473	16	0.286	1.8	31.08	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
E1	Floor	C	545	408	457	495	38	0.282	1.8	74.66	35	0	16	N/A	N/A	0.228	1.8	N/A	-0.25	2.32	N/A	N/A
E2	Floor	C	545	408	457	518	61	0.282	1.8	120.17	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
E3	Floor	C	545	408	457	502	45	0.282	1.8	88.66	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A

Table 10
ANFB-NSSF - FSS Surveys - Scan Survey Results
SCAN SURVEY RESULTS

Area/Building: Filter Bed
Room: Active North
Date: 01/25/05

North Side

Grid	Surface Medium	Material Type	Results in CPM: Alpha + Beta BKG DLV	Alpha + Beta BKG Ambient	Alpha + Beta BKG Mean	Scan Measurements Gross Counts	Scan Measurements Net Counts	Instrument EFF	Instrument CF	Results in DPM/100cm² Activity	Results in CPM: Alpha BKG DLV	Alpha BKG Ambient	Alpha BKG Mean	Scan Measurements Gross Counts	Scan Measurements Net Counts	Instrument EFF	Instrument CF	Results in DPM/100cm² Activity	Smear Results in DPM/100cm² Alpha	Smear Results in DPM/100cm² Beta	Results in µR/hr Gamma Contact	Gamma 1 Meter
E4	Floor	C	545	408	457	516	59	0.282	1.8	116.23	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
E5	Floor	C	545	408	457	485	28	0.282	1.8	55.16	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
E6	Floor	C	545	408	457	484	27	0.282	1.8	53.19	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	13	14
E7	Floor	C	545	408	457	491	34	0.282	1.8	66.98	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
E8	Floor	C	545	408	457	528	71	0.282	1.8	139.87	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
E9	Floor	C	545	408	457	516	59	0.282	1.8	116.23	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
E10	Floor	C	545	408	457	483	26	0.282	1.8	51.22	35	0	16	N/A	N/A	0.228	1.8	N/A	1.59	-0.99	N/A	N/A
E11	Floor	C	545	408	457	453	-4	0.282	1.8	-7.88	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F1	Floor	C	545	408	457	474	17	0.282	1.8	33.49	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F2	Floor	C	545	408	457	538	81	0.282	1.8	159.57	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F3	Floor	C	545	408	457	480	23	0.282	1.8	45.31	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F4	Floor	C	545	408	457	540	83	0.282	1.8	163.51	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F5	Floor	C	545	408	457	512	55	0.282	1.8	108.36	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F6	Floor	C	545	408	457	543	86	0.282	1.8	169.42	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F7	Floor	C	545	408	457	477	20	0.282	1.8	39.40	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F8	Floor	C	545	408	457	542	85	0.282	1.8	167.45	35	0	16	N/A	N/A	0.228	1.8	N/A	1.59	-0.99	N/A	N/A
F9	Floor	C	545	408	457	472	15	0.282	1.8	29.55	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F10	Floor	C	545	408	457	481	24	0.282	1.8	47.28	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
F11	Floor	C	545	408	457	499	42	0.282	1.8	82.74	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G1	Floor	C	545	408	457	492	35	0.282	1.8	68.95	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G2	Floor	C	545	408	457	529	72	0.282	1.8	141.84	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G3	Floor	C	545	408	457	533	76	0.282	1.8	149.72	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G4	Floor	C	545	408	457	490	33	0.282	1.8	65.01	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G5	Floor	C	545	408	457	502	45	0.282	1.8	88.66	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G6	Floor	C	545	408	457	531	74	0.282	1.8	145.78	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G7	Floor	C	545	408	457	528	69	0.282	1.8	136.93	35	0	16	N/A	N/A	0.228	1.8	N/A	-0.26	3.43	N/A	N/A
G8	Floor	C	545	408	457	476	19	0.282	1.8	37.43	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G9	Floor	C	545	408	457	490	33	0.282	1.8	65.01	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G10	Floor	C	545	408	457	518	61	0.282	1.8	120.17	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
G11	Floor	C	545	408	457	446	-11	0.282	1.8	-21.67	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H1	Floor	C	545	408	457	483	26	0.282	1.8	51.22	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H2	Floor	C	545	408	457	488	31	0.282	1.8	61.07	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H3	Floor	C	545	408	457	465	8	0.282	1.8	15.76	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H4	Floor	C	545	408	457	421	-36	0.282	1.8	-70.92	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H5	Floor	C	545	408	457	461	4	0.282	1.8	7.88	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H6	Floor	C	545	408	457	469	12	0.282	1.8	23.64	35	0	16	N/A	N/A	0.228	1.8	N/A	-0.26	3.43	N/A	N/A
H7	Floor	C	545	408	457	474	17	0.282	1.8	33.49	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H8	Floor	C	545	408	457	510	53	0.282	1.8	104.41	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H9	Floor	C	545	408	457	464	7	0.282	1.8	13.79	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H10	Floor	C	545	408	457	450	-7	0.282	1.8	-13.79	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
H11	Floor	C	545	408	457	473	16	0.282	1.8	31.52	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
I1	Floor	C	545	408	457	528	71	0.282	1.8	139.87	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	11	11
I2	Floor	C	545	408	457	449	-8	0.282	1.8	-15.76	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
I3	Floor	C	545	408	457	531	74	0.282	1.8	145.78	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
I4	Floor	C	545	408	457	496	39	0.282	1.8	76.83	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
I5	Floor	C	545	408	457	454	-3	0.282	1.8	-5.91	35	0	16	N/A	N/A	0.228	1.8	N/A	-0.26	0.11	N/A	N/A
I6	Floor	C	545	408	457	439	-18	0.282	1.8	-35.46	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A

Table 10
ANFB-NSSF - FSS Surveys - Scan Survey Results
SCAN SURVEY RESULTS

Area/Building: Filter Bed
Room: Active North
Date: 01/25/05 **North Side**

			Results in CPM					Instrument		Results in	Results in CPM					Instrument		Results in	Smear Results in		Results in µR/hr	
	Surface	Material	Alpha + Beta BKG			Scan Measurements				DPM/100cm²	Alpha BKG			Scan Measurements				DPM/100cm²	DPM/100cm²		Gamma	
Grid	Medium	Type	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	Alpha	Beta	Contact	1 Meter
I7	Floor	C	545	408	457	543	86	0.282	1.8	169.42	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
I8	Floor	C	545	408	457	498	41	0.282	1.8	80.77	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
I9	Floor	C	545	408	457	490	33	0.282	1.8	65.01	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
I10	Floor	C	545	408	457	480	23	0.282	1.8	45.31	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
I11	Floor	C	545	408	457	419	-38	0.282	1.8	-74.86	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	10	10
A1	N.Wall	C	545	408	457	378	-82	0.282	1.8	-161.54	35	0	16	N/A	N/A	0.228	1.8	N/A	-0.25	2.32	N/A	N/A
A2	N.Wall	C	545	408	457	374	-83	0.282	1.8	-163.51	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A3	N.Wall	C	545	408	457	440	-17	0.282	1.8	-33.49	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A4	N.Wall	C	545	408	457	410	-47	0.282	1.8	-92.59	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A5	N.Wall	C	545	408	457	389	-68	0.282	1.8	-133.96	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A6	N.Wall	C	545	408	457	442	-15	0.282	1.8	-29.55	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A7	N.Wall	C	545	408	457	465	8	0.282	1.8	15.76	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A8	N.Wall	C	545	408	457	463	6	0.282	1.8	11.82	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A9	N.Wall	C	545	408	457	388	-69	0.282	1.8	-135.93	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B1	N.Wall	C	545	408	457	416	-41	0.282	1.8	-80.77	35	0	16	N/A	N/A	0.228	1.8	N/A	-0.25	2.32	N/A	N/A
B2	N.Wall	C	545	408	457	384	-73	0.282	1.8	-143.61	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B3	N.Wall	C	545	408	457	385	-72	0.282	1.8	-141.84	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B4	N.Wall	C	545	408	457	366	-91	0.282	1.8	-179.28	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B5	N.Wall	C	545	408	457	476	19	0.282	1.8	37.43	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B6	N.Wall	C	545	408	457	518	61	0.282	1.8	120.17	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B7	N.Wall	C	545	408	457	487	30	0.282	1.8	59.10	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B8	N.Wall	C	545	408	457	542	85	0.282	1.8	167.45	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B9	N.Wall	C	545	408	457	442	-15	0.282	1.8	-29.55	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A1	E.Wall	C	545	408	457	389	-68	0.282	1.8	-133.96	35	0	16	N/A	N/A	0.228	1.8	N/A	-0.25	0.11	N/A	N/A
A2	E.Wall	C	545	408	457	447	-10	0.282	1.8	-19.70	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A3	E.Wall	C	545	408	457	426	-32	0.282	1.8	-63.04	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A4	E.Wall	C	545	408	457	456	-1	0.282	1.8	-1.97	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A5	E.Wall	C	545	408	457	412	-45	0.282	1.8	-88.65	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A6	E.Wall	C	545	408	457	402	-55	0.282	1.8	-108.35	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A7	E.Wall	C	545	408	457	422	-35	0.282	1.8	-68.98	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A8	E.Wall	C	545	408	457	437	-20	0.282	1.8	-39.40	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A9	E.Wall	C	545	408	457	445	-12	0.282	1.8	-23.64	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A10	E.Wall	C	545	408	457	386	-71	0.282	1.8	-139.87	35	0	16	N/A	N/A	0.228	1.8	N/A	-0.25	-3.2	N/A	N/A
A11	E.Wall	C	545	408	457	401	-56	0.282	1.8	-110.32	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B1	E.Wall	C	545	408	457	376	-81	0.282	1.8	-159.57	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B2	E.Wall	C	545	408	457	402	-55	0.282	1.8	-108.35	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B3	E.Wall	C	545	408	457	408	-49	0.282	1.8	-96.53	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B4	E.Wall	C	545	408	457	349	-108	0.282	1.8	-212.77	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B5	E.Wall	C	545	408	457	426	-31	0.282	1.8	-61.07	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B6	E.Wall	C	545	408	457	367	-90	0.282	1.8	-177.30	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B7	E.Wall	C	545	408	457	401	-56	0.282	1.8	-110.32	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B8	E.Wall	C	545	408	457	402	-55	0.282	1.8	-108.35	35	0	16	N/A	N/A	0.228	1.8	N/A	-0.25	0.11	N/A	N/A
B9	E.Wall	C	545	408	457	379	-78	0.282	1.8	-153.66	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B10	E.Wall	C	545	408	457	399	-58	0.282	1.8	-114.26	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
B11	E.Wall	C	545	408	457	360	-97	0.282	1.8	-191.10	35	0	16	N/A	N/A	0.228	1.8	N/A	N/A	N/A	N/A	N/A
A1	W.Wall	C	545	301	457	370	-87	0.286	1.8	-169.00	35	0	16	N/A	N/A	0.233	1.8	N/A	-0.25	-0.99	N/A	N/A
A2	W.Wall	C	545	301	457	284	-173	0.286	1.8	-336.05	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A

Table 10
ANFB-NSSF - FSS Surveys - Scan Survey Results
SCAN SURVEY RESULTS

Area/Building: Filter Bed
Room: Active North
Date: 01/25/05 **North Side**

			Results in CPM					Instrument		Results in	Results in CPM					Instrument		Results in	Smear Results in		Results in µR/hr	
	Surface	Material	Alpha + Beta BKG			Scan Measurements				DPM/100cm²	Alpha BKG			Scan Measurements				DPM/100cm²	DPM/100cm²		Gamma	
Grid	Medium	Type	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	DLV	Ambient	Mean	Gross Counts	Net Counts	EFF	CF	Activity	Alpha	Beta	Contact	1 Meter
A3	W.Wall	C	645	301	457	385	-92	0.286	1.8	-178.71	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A4	W.Wall	C	645	301	457	336	-121	0.286	1.8	-235.04	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A5	W.Wall	C	645	301	457	436	-21	0.286	1.8	-40.79	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A6	W.Wall	C	645	301	457	421	-36	0.286	1.8	-69.93	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A7	W.Wall	C	645	301	457	348	-109	0.286	1.8	-211.73	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A8	W.Wall	C	645	301	457	336	-122	0.286	1.8	-236.99	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A9	W.Wall	C	645	301	457	439	-18	0.286	1.8	-34.97	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A10	W.Wall	C	645	301	457	407	-50	0.286	1.8	-97.13	35	0	16	N/A	N/A	0.233	1.8	N/A	-0.26	3.43	N/A	N/A
A11	W.Wall	C	645	301	457	325	-132	0.286	1.8	-256.41	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B1	W.Wall	C	645	301	457	311	-146	0.286	1.8	-283.61	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B2	W.Wall	C	645	301	457	301	-156	0.286	1.8	-303.03	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B3	W.Wall	C	645	301	457	278	-181	0.286	1.8	-351.59	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B4	W.Wall	C	645	301	457	329	-128	0.286	1.8	-248.64	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B5	W.Wall	C	645	301	457	314	-143	0.286	1.8	-277.78	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B6	W.Wall	C	645	301	457	297	-160	0.286	1.8	-310.80	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B7	W.Wall	C	645	301	457	319	-138	0.286	1.8	-268.07	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B8	W.Wall	C	645	301	457	317	-140	0.286	1.8	-271.96	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B9	W.Wall	C	645	301	457	308	-149	0.286	1.8	-289.43	35	0	16	N/A	N/A	0.233	1.8	N/A	-0.26	1.21	N/A	N/A
B10	W.Wall	C	645	301	457	403	-54	0.286	1.8	-104.90	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B11	W.Wall	C	645	301	457	346	-111	0.286	1.8	-216.62	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A1	S.Wall	C	645	301	457	314	-143	0.286	1.8	-277.78	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A2	S.Wall	C	645	301	457	316	-141	0.286	1.8	-273.89	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A3	S.Wall	C	645	301	457	358	-99	0.286	1.8	-192.31	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A4	S.Wall	C	645	301	457	432	-25	0.286	1.8	-48.66	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A5	S.Wall	C	645	301	457	451	-6	0.286	1.8	-11.66	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A6	S.Wall	C	645	301	457	447	-10	0.286	1.8	-19.43	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A7	S.Wall	C	645	301	457	317	-140	0.286	1.8	-271.96	35	0	16	N/A	N/A	0.233	1.8	N/A	-0.26	-0.99	N/A	N/A
A8	S.Wall	C	645	301	457	411	-46	0.286	1.8	-89.36	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
A9	S.Wall	C	645	301	457	347	-110	0.286	1.8	-213.68	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B1	S.Wall	C	645	301	457	350	-107	0.286	1.8	-207.86	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B2	S.Wall	C	645	301	457	436	-21	0.286	1.8	-40.79	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B3	S.Wall	C	645	301	457	408	-49	0.286	1.8	-95.18	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B4	S.Wall	C	645	301	457	378	-78	0.286	1.8	-151.62	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B5	S.Wall	C	645	301	457	347	-110	0.286	1.8	-213.68	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B6	S.Wall	C	645	301	457	389	-68	0.286	1.8	-132.09	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B7	S.Wall	C	645	301	457	362	-95	0.286	1.8	-184.64	35	0	16	N/A	N/A	0.233	1.8	N/A	3.44	-0.99	N/A	N/A
B8	S.Wall	C	645	301	457	407	-50	0.286	1.8	-97.13	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A
B9	S.Wall	C	645	301	457	353	-104	0.286	1.8	-202.02	35	0	16	N/A	N/A	0.233	1.8	N/A	N/A	N/A	N/A	N/A

Table 11
ANFB Dosing Chamber Walkover Scan Survey

ANFB Dosing Chamber
Walkover Scan (Results in Kcpm)

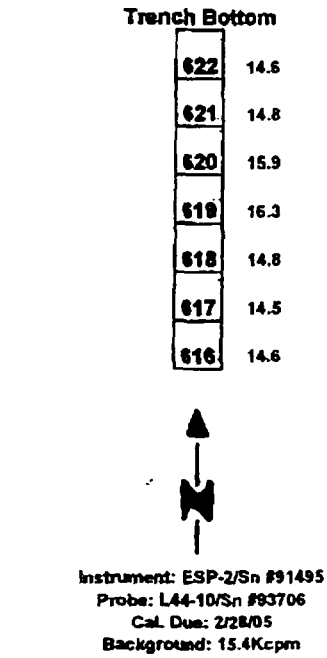
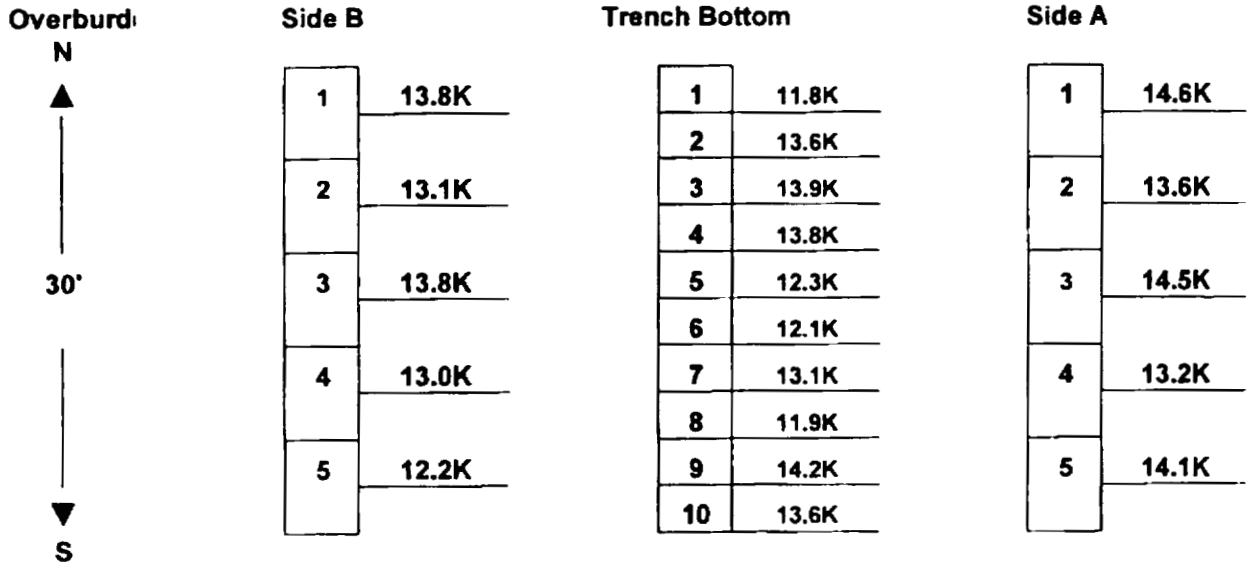


Table 12
ANFB to MH-2 WALKOVER SCAN SURVEY

Area/Location: Active North Filter Bed to Manhole 2



Results in Kcpm

Bkgd = 12.4 Kcpm
ESP-2/Sn #91463 W/ L44-10/SN #94987

Table 13
ANFB Dosing Chamber Excavation Soil Result Summary

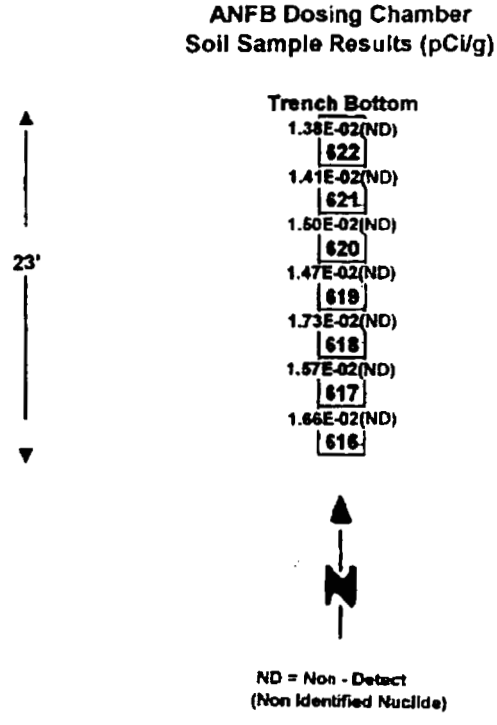


Table 14
ANFB to MH-2 EXCAVATION SOIL RESULTS SUMMARY

Area/Location: Active North Filter Bed to Manhole 2

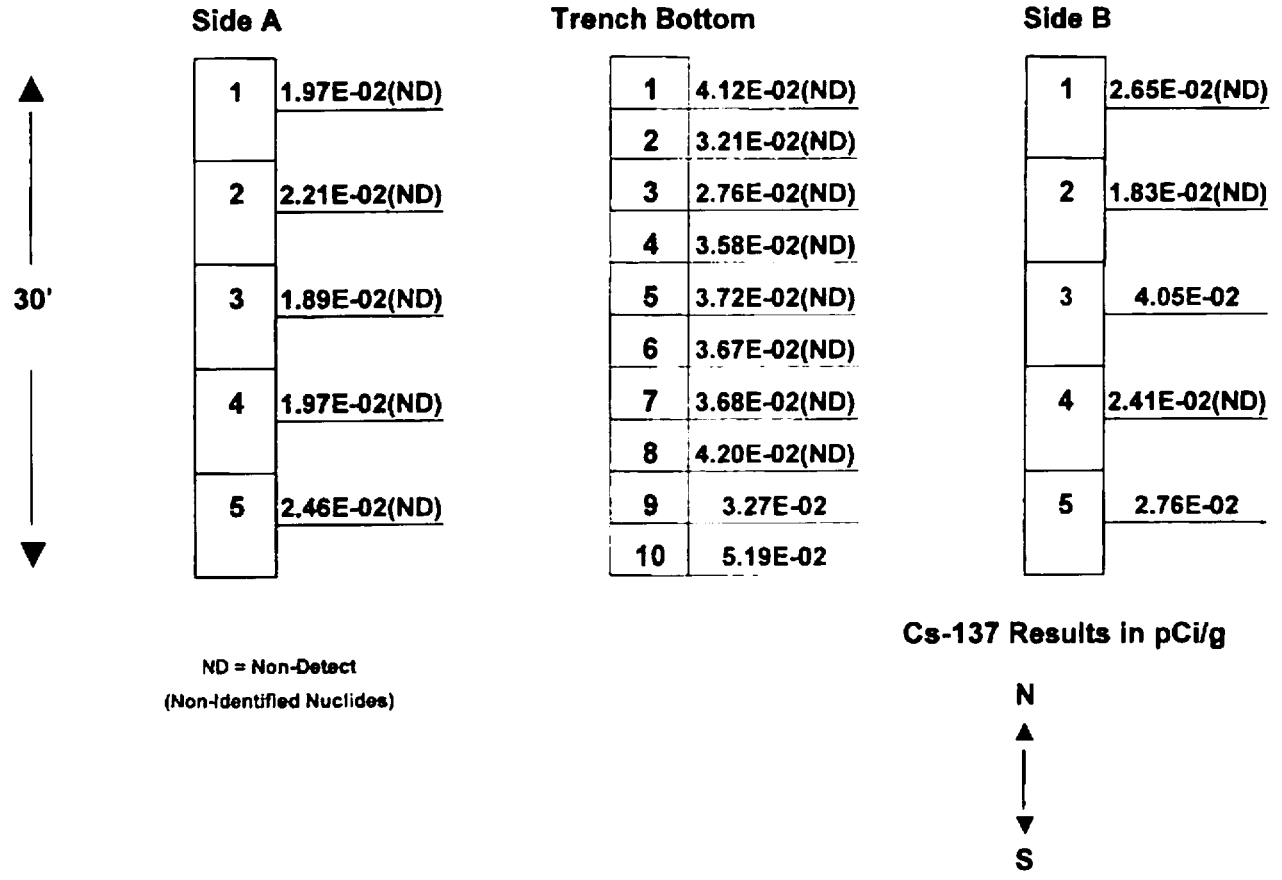


Table 15
ANFB DOSING CHAMBER SOIL ANALYTICAL RESULTS
Analytical Results

Analytical Parameter	RL04-1635-0616 Base Soil			RL04-1636-0617 Base Soil			RL04-1637-0618 Base Soil		
	Result (pCi/g)	2 σ (pCi/g)	MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	MDA (pCi/g)
Be-7	2.03E-02	7.76E-02	1.36E-01	-1.40E-02	7.11E-02	1.21E-01	-6.36E-02	8.27E-02	1.36E-01
K-40	1.24E+01	1.35E+00	1.31E-01	1.26E+01	1.36E+00	1.33E-01	1.33E+01	1.43E+00	1.39E-01
Co-58	-7.30E-03	8.73E-03	1.45E-02	-9.60E-03	7.88E-03	1.26E-02	-8.20E-03	9.01E-03	1.49E-02
Co-60	2.09E-03	9.90E-03	1.76E-02	4.98E-03	9.10E-03	1.65E-02	-1.17E-02	1.11E-02	1.74E-02
Zn-65	-1.86E-02	2.67E-02	3.65E-02	6.83E-03	2.63E-02	3.81E-02	-3.01E-03	2.92E-02	4.29E-02
Sb-125	1.42E-02	2.81E-02	4.60E-02	-8.58E-03	2.38E-02	4.03E-02	2.48E-03	2.72E-02	4.71E-02
I-131	1.67E-03	1.05E-02	1.83E-02	-1.03E-02	9.67E-03	1.59E-02	2.19E-04	1.13E-02	1.97E-02
Cs-134	1.35E-03	9.29E-03	1.39E-02	-1.00E-03	8.93E-03	1.30E-02	-7.48E-03	1.07E-02	1.47E-02
Cs-137	-5.43E-03	1.01E-02	1.66E-02	-8.10E-03	9.75E-03	1.67E-02	-1.24E-02	1.10E-02	1.73E-02
Eu-152	-1.66E-03	3.84E-02	6.16E-02	-1.34E-03	3.62E-02	4.93E-02	1.92E-02	4.01E-02	6.59E-02
Eu-154	3.26E-03	2.68E-02	4.52E-02	7.92E-03	2.56E-02	4.32E-02	-1.01E-02	2.83E-02	4.70E-02
Tl-208	1.75E-01	2.58E-02	1.64E-02	1.65E-01	2.53E-02	1.49E-02	1.63E-01	2.50E-02	1.73E-02
Bi-212	6.52E-01	2.43E-01	2.12E-01	5.40E-01	2.52E-01	2.02E-01	5.78E-01	2.68E-01	2.37E-01
Pb-212	5.58E-01	5.39E-02	3.34E-02	5.37E-01	5.21E-02	3.33E-02	5.59E-01	5.45E-02	3.67E-02
Bi-214	7.71E-01	6.17E-02	3.12E-02	7.89E-01	5.97E-02	3.06E-02	8.39E-01	6.81E-02	3.31E-02
Pb-214	7.59E-01	6.32E-02	3.81E-02	7.56E-01	6.21E-02	3.36E-02	8.60E-01	7.22E-02	4.08E-02
Ac-228	6.11E-01	6.48E-02	5.83E-02	5.59E-01	5.68E-02	5.86E-02	6.11E-01	6.68E-02	6.66E-02
Th-234	9.69E-01	1.62E+00	6.36E-01	6.40E-01	1.49E+00	5.93E-01	1.08E+00	1.75E+00	8.90E-01
U-235	5.39E-02	9.49E-02	3.57E-02	-7.25E-03	9.27E-02	3.33E-02	7.77E-02	1.01E-01	3.88E-02
Am-241	-2.82E-01	2.81E-01	4.66E-01	-7.59E-02	2.61E-01	4.46E-01	-3.61E-01	3.08E-01	5.07E-01

Analytical Parameter	RL04-1638-0619 Base Soil			RL04-1639-0620 Base Soil			RL04-1640-0621 Base Soil		
	Result (pCi/g)	2 σ (pCi/g)	MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	MDA (pCi/g)
Be-7	3.89E-02	6.60E-02	1.17E-01	-3.79E-03	7.06E-02	1.21E-01	-4.49E-02	7.06E-02	1.17E-01
K-40	1.20E+01	1.29E+00	1.24E-01	1.24E+01	1.34E+00	1.23E-01	1.16E+01	1.25E+00	1.31E-01
Co-58	-1.14E-02	8.46E-03	1.34E-02	-1.06E-02	8.30E-03	1.32E-02	-7.75E-03	7.94E-03	1.30E-02
Co-60	2.36E-03	8.94E-03	1.59E-02	2.09E-03	9.00E-03	1.60E-02	-7.67E-04	9.22E-03	1.60E-02
Zn-65	-1.08E-02	2.44E-02	3.46E-02	-7.78E-03	2.58E-02	3.71E-02	-1.06E-02	2.40E-02	3.39E-02
Sb-125	-2.89E-03	2.48E-02	4.23E-02	-6.71E-03	2.40E-02	4.07E-02	-2.78E-03	2.28E-02	3.91E-02
I-131	-2.35E-03	1.01E-02	1.73E-02	2.77E-03	1.06E-02	1.85E-02	-5.91E-03	9.83E-03	1.65E-02
Cs-134	-2.67E-03	8.64E-03	1.27E-02	-2.25E-03	9.00E-03	1.30E-02	-4.83E-03	8.79E-03	1.23E-02
Cs-137	-9.56E-03	9.27E-03	1.47E-02	-1.10E-02	9.60E-03	1.50E-02	-1.37E-02	9.26E-03	1.41E-02
Eu-152	5.63E-03	3.47E-02	4.65E-02	-1.19E-02	3.60E-02	4.68E-02	-2.90E-02	3.46E-02	4.40E-02
Eu-154	-4.40E-03	2.43E-02	4.08E-02	-1.27E-02	2.52E-02	4.17E-02	-6.38E-03	2.39E-02	3.98E-02
Tl-208	1.42E-01	2.26E-02	1.49E-02	1.45E-01	2.33E-02	1.64E-02	1.12E-01	1.95E-02	1.46E-02
Bi-212	6.98E-01	1.99E-01	1.97E-01	7.65E-01	2.47E-01	1.96E-01	4.00E-01	1.92E-01	2.14E-01
Pb-212	5.03E-01	4.89E-02	3.24E-02	4.90E-01	4.90E-02	3.28E-02	3.73E-01	4.60E-02	3.22E-02
Bi-214	7.15E-01	5.98E-02	2.80E-02	6.58E-01	5.58E-02	2.84E-02	6.60E-01	5.41E-02	2.69E-02
Pb-214	7.21E-01	6.03E-02	3.36E-02	7.29E-01	6.19E-02	3.60E-02	6.55E-01	5.75E-02	3.68E-02
Ac-228	5.27E-01	5.83E-02	5.22E-02	5.06E-01	5.83E-02	6.47E-02	4.48E-01	5.35E-02	5.32E-02
Th-234	4.25E-01	1.42E+00	5.67E-01	3.40E-01	1.60E+00	5.79E-01	6.47E-02	1.42E+00	5.56E-01
U-235	7.30E-02	8.89E-02	3.17E-02	3.97E-02	9.01E-02	3.26E-02	-4.88E-03	8.61E-02	3.10E-02
Am-241	-2.76E-01	2.58E-01	4.26E-01	-1.38E-01	2.64E-01	4.47E-01	6.48E-03	2.67E-01	4.43E-01

Table 15
ANFB DOSING CHAMBER SOIL ANALYTICAL RESULTS
Analytical Results

Analytical Parameter	RL04-1641-0622 Base Soil		
	Result (pCi/g)	2 σ (pCi/g)	MDA (pCi/g)
Be-7	-4.06E-02	6.77E-02	1.13E-01
K-40	1.17E+01	1.26E+00	1.16E-01
Co-58	-1.30E-02	8.68E-03	1.35E-02
Co-60	-4.36E-03	8.75E-03	1.46E-02
Zn-65	-1.90E-02	2.60E-02	3.55E-02
Sb-125	1.44E-02	2.23E-02	3.96E-02
I-131	5.39E-03	1.01E-02	1.78E-02
Cs-134	6.05E-05	8.68E-03	1.28E-02
Cs-137	-5.83E-03	8.48E-03	1.38E-02
Eu-152	2.58E-04	3.46E-02	4.46E-02
Eu-154	1.34E-02	2.42E-02	4.11E-02
Tl-208	1.29E-01	2.22E-02	2.97E-02
Bi-212	4.59E-01	1.39E-01	1.82E-01
Pb-212	4.51E-01	4.99E-02	3.11E-02
Bi-214	6.53E-01	5.29E-02	2.80E-02
Pb-214	6.40E-01	5.68E-02	3.47E-02
Ac-228	4.38E-01	5.10E-02	5.65E-02
Th-234	7.30E-01	1.44E+00	5.57E-01
U-235	2.55E-02	8.60E-02	3.04E-02
Am-241	6.25E-02	2.53E-01	4.38E-01

Table 16
ANFB to MH-2 Excavation Base Soil Analytical Results

Analytical Parameter	RL04-1555-547 Result (pCi/g)	RL04-1555-547 2 σ (pCi/g)	RL04-1555-547 2 σ MDA (pCi/g)	RL04-1556-548 Result (pCi/g)	RL04-1556-548 2 σ (pCi/g)	RL04-1556-548 2 σ MDA (pCi/g)	RL04-1557-549 Result (pCi/g)	RL04-1557-549 2 σ (pCi/g)	RL04-1557-549 2 σ MDA (pCi/g)
Be-7	1.40E-02	1.60E-01	2.69E-01	-1.79E-02	1.40E-01	2.49E-01	5.47E-02	1.45E-01	2.76E-01
K-40	1.25E+01	1.60E+00	3.10E-01	1.32E+01	1.68E+00	3.52E-01	1.31E+01	1.57E+00	2.96E-01
Co-58	-7.13E-03	1.84E-02	3.26E-02	9.75E-03	1.51E-02	3.09E-02	8.36E-03	1.73E-02	3.46E-02
Co-60	-1.10E-02	2.04E-02	3.46E-02	-7.13E-03	2.14E-02	3.76E-02	-3.40E-03	2.18E-02	3.98E-02
Zn-65	-2.25E-03	5.64E-02	8.79E-02	-2.45E-02	5.33E-02	7.60E-02	-4.01E-02	5.46E-02	7.17E-02
Sb-125	-2.78E-02	5.53E-02	9.45E-02	1.79E-02	4.92E-02	9.19E-02	1.62E-02	5.28E-02	9.86E-02
I-131	-1.26E-02	2.16E-02	3.69E-02	1.89E-02	1.93E-02	3.77E-02	-2.29E-02	2.11E-02	3.40E-02
Cs-134	1.34E-02	1.65E-02	2.99E-02	2.35E-03	1.68E-02	2.71E-02	1.45E-03	1.67E-02	2.70E-02
Cs-137	1.38E-02	2.16E-02	4.12E-02	-2.67E-02	2.15E-02	3.21E-02	-1.92E-02	1.83E-02	2.76E-02
Eu-152	3.76E-02	8.16E-02	1.08E-01	-4.95E-02	7.62E-02	1.07E-01	4.14E-02	7.32E-02	1.01E-01
Eu-154	5.83E-02	5.72E-02	1.03E-01	-2.37E-02	5.40E-02	9.06E-02	1.86E-03	5.18E-02	9.01E-02
Tl-208	1.37E-01	4.26E-02	7.26E-02	1.93E-01	4.20E-02	3.55E-02	9.62E-02	3.69E-02	3.38E-02
Bi-212	5.19E-01	4.74E-01	5.70E-01	5.47E-01	3.55E-01	5.19E-01	4.89E-01	3.32E-01	4.83E-01
Pb-212	5.56E-01	9.42E-02	1.47E-01	5.46E-01	9.20E-02	1.48E-01	4.31E-01	8.26E-02	1.37E-01
Bi-214	5.59E-01	8.75E-02	8.57E-02	6.35E-01	9.09E-02	5.97E-02	4.91E-01	9.54E-02	1.73E-01
Pb-214	7.57E-01	9.52E-02	7.85E-02	6.58E-01	9.67E-02	7.74E-02	6.17E-01	8.75E-02	7.56E-02
Ac-228	6.89E-01	1.67E-01	2.99E-01	6.43E-01	1.70E-01	2.74E-01	5.03E-01	1.47E-01	2.74E-01
Th-234	-1.38E+00	3.44E+00	1.35E+00	2.67E-01	2.96E+00	1.25E+00	4.73E-01	3.13E+00	1.27E+00
U-235	9.84E-02	1.96E-01	7.45E-02	-3.03E-02	1.78E-01	7.33E-02	9.10E-02	1.73E-01	6.85E-02
Am-241	2.93E-01	6.87E-01	1.07E+00	1.35E-01	6.67E-01	1.00E+00	-4.47E-01	6.01E-01	1.01E+00

Analytical Parameter	RL04-1558-550 Result (pCi/g)	RL04-1558-550 2 σ (pCi/g)	RL04-1558-550 2 σ MDA (pCi/g)	RL04-1559-551 Result (pCi/g)	RL04-1559-551 2 σ (pCi/g)	RL04-1559-551 2 σ MDA (pCi/g)	RL04-1560-552 Result (pCi/g)	RL04-1560-552 2 σ (pCi/g)	RL04-1560-552 2 σ MDA (pCi/g)
Be-7	2.57E-02	1.38E-01	2.57E-01	4.02E-02	1.59E-01	2.98E-01	1.38E-01	1.57E-01	3.06E-01
K-40	9.01E+00	1.26E+00	2.92E-01	1.29E+01	1.69E+00	3.42E-01	1.22E+01	1.59E+00	3.26E-01
Co-58	-5.84E-03	1.67E-02	2.82E-02	-2.58E-03	1.87E-02	3.46E-02	-1.28E-02	1.99E-02	3.40E-02
Co-60	2.07E-03	1.80E-02	3.48E-02	8.99E-03	1.74E-02	3.74E-02	-5.58E-03	2.06E-02	3.69E-02
Zn-65	-3.78E-02	5.26E-02	6.97E-02	-1.49E-02	6.07E-02	9.11E-02	-2.67E-02	5.58E-02	7.96E-02
Sb-125	2.26E-02	5.05E-02	9.52E-02	-4.71E-03	5.31E-02	9.55E-02	1.39E-02	5.22E-02	9.66E-02
I-131	-1.31E-02	1.93E-02	3.26E-02	-1.81E-02	2.21E-02	3.87E-02	2.29E-02	1.97E-02	3.91E-02
Cs-134	6.45E-03	1.48E-02	2.58E-02	-3.52E-03	2.30E-02	3.46E-02	1.29E-02	1.95E-02	3.34E-02
Cs-137	1.16E-02	1.83E-02	3.58E-02	7.73E-02	2.17E-02	3.72E-02	-8.62E-03	2.17E-02	3.67E-02
Eu-152	4.80E-02	6.78E-02	9.44E-02	-3.48E-02	8.51E-02	1.25E-01	-2.07E-02	7.61E-02	1.12E-01
Eu-154	-1.29E-03	4.92E-02	8.50E-02	4.46E-03	5.93E-02	1.03E-01	-2.15E-02	5.38E-02	9.06E-02
Tl-208	1.29E-01	3.21E-02	6.29E-02	1.71E-01	4.70E-02	8.06E-02	1.54E-01	4.21E-02	3.67E-02
Bi-212	9.17E-01	4.12E-01	4.20E-01	1.06E+00	4.66E-01	5.44E-01	1.17E+00	5.57E-01	4.32E-01
Pb-212	4.43E-01	7.54E-02	6.44E-02	5.04E-01	9.33E-02	1.56E-01	4.67E-01	8.71E-02	1.49E-01
Bi-214	6.05E-01	8.95E-02	3.89E-02	7.27E-01	1.02E-01	8.18E-02	6.77E-01	9.35E-02	7.47E-02
Pb-214	5.76E-01	9.04E-02	7.18E-02	7.31E-01	1.08E-01	1.02E-01	7.37E-01	1.00E-01	7.87E-02
Ac-228	4.24E-01	1.28E-01	2.47E-01	5.63E-01	1.70E-01	3.08E-01	4.88E-01	1.44E-01	2.66E-01
Th-234	2.99E+00	3.06E+00	1.12E+00	-1.31E+00	1.44E+00	1.44E+00	1.92E+00	3.36E+00	1.30E+00
U-235	-1.54E-02	1.71E-01	6.91E-02	1.14E-01	7.32E-02	7.32E-02	-1.25E-01	1.97E-01	7.33E-02
Am-241	-9.51E-01	5.12E-01	7.66E-01	-1.56E-01	6.15E-01	1.07E+00	-4.46E-01	5.90E-01	9.90E-01

Table 16
ANFB to MH-2 Excavation Base Soil Analytical Results

Analytical Parameter	RL04-1561-553			RL04-1562-554			RL04-1563-555		
	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)
Be-7	3.17E-02	1.50E-01	2.76E-01	-8.41E-02	1.48E-01	2.49E-01	4.46E-02	1.31E-01	2.49E-01
K-40	1.30E+01	1.65E+00	2.93E-01	1.06E+01	1.39E+00	2.93E-01	6.83E+00	1.04E+00	3.29E-01
Co-58	2.71E-03	2.02E-02	3.79E-02	-1.52E-02	1.81E-02	3.00E-02	-6.46E-03	1.42E-02	2.62E-02
Co-60	-7.56E-03	2.10E-02	3.67E-02	-2.15E-03	2.07E-02	3.79E-02	4.13E-03	1.78E-02	3.56E-02
Zn-65	-6.40E-03	5.40E-02	8.32E-02	-1.14E-03	4.62E-02	7.61E-02	4.03E-02	4.06E-02	7.93E-02
Sb-125	-1.46E-02	5.07E-02	8.90E-02	-1.67E-03	5.32E-02	8.51E-02	3.20E-03	4.34E-02	8.03E-02
I-131	-4.90E-03	2.12E-02	3.74E-02	-1.53E-03	1.79E-02	3.22E-02	-2.74E-04	1.88E-02	3.42E-02
Cs-134	-8.10E-06	1.90E-02	2.96E-02	4.44E-03	1.61E-02	2.53E-02	1.25E-02	1.44E-02	2.72E-02
Cs-137	-8.13E-03	2.17E-02	3.88E-02	6.18E-03	2.33E-02	4.20E-02	3.27E-02	2.15E-02	3.28E-02
Eu-152	1.10E-02	7.55E-02	1.14E-01	-1.93E-02	7.59E-02	1.05E-01	2.71E-02	6.80E-02	9.20E-02
Eu-154	7.83E-03	5.23E-02	9.10E-02	-2.03E-02	5.33E-02	8.97E-02	2.20E-03	4.64E-02	8.09E-02
Tl-208	1.89E-01	4.59E-02	3.50E-02	1.49E-01	4.40E-02	6.73E-02	5.07E-02	3.04E-02	4.87E-02
Bi-212	7.79E-01	4.34E-01	4.21E-01	7.93E-01	4.28E-01	4.17E-01	2.95E-01	2.62E-01	5.32E-01
Pb-212	4.72E-01	8.78E-02	1.51E-01	5.29E-01	8.67E-02	1.41E-01	2.62E-01	6.86E-02	1.16E-01
Bi-214	7.13E-01	9.51E-02	6.24E-02	7.10E-01	9.15E-02	5.63E-02	6.93E-01	8.98E-02	6.20E-02
Pb-214	7.21E-01	9.37E-02	7.33E-02	7.10E-01	9.28E-02	7.88E-02	7.14E-01	9.49E-02	7.28E-02
Ac-228	6.76E-01	1.74E-01	2.98E-01	4.57E-01	1.39E-01	2.46E-01	3.48E-01	1.30E-01	2.30E-01
Th-234	2.72E+00	3.26E+00	1.24E+00	9.40E-01	3.04E+00	1.18E+00	1.61E+00	2.85E+00	1.09E+00
U-235	1.31E-01	1.90E-01	7.46E-02	1.14E-01	1.78E-01	7.27E-02	5.48E-02	1.61E-01	6.74E-02
Am-241	4.63E-02	5.68E-01	1.01E+00	-3.61E-01	5.67E-01	9.61E-01	-2.99E-01	4.82E-01	7.86E-01

Analytical Parameter	RL04-1569-580		
	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)
Be-7	2.47E-02	9.44E-02	1.71E-01
K-40	6.03E+00	7.80E-01	1.56E-01
Co-58	-1.16E-02	1.03E-02	1.83E-02
Co-60	1.58E-02	1.16E-02	2.31E-02
Zn-65	-1.49E-02	2.97E-02	4.19E-02
Sb-125	-2.03E-03	3.18E-02	5.62E-02
I-131	6.94E-03	1.26E-02	2.33E-02
Cs-134	5.49E-03	1.12E-02	1.84E-02
Cs-137	5.19E-02	2.16E-02	2.01E-02
Eu-152	-1.00E-02	4.63E-02	6.45E-02
Eu-154	1.47E-02	3.19E-02	5.57E-02
Tl-208	9.07E-02	2.60E-02	4.06E-02
Bi-212	2.91E-01	1.72E-01	3.44E-01
Pb-212	2.57E-01	4.80E-02	7.82E-02
Bi-214	6.14E-01	6.64E-02	4.03E-02
Pb-214	6.76E-01	7.00E-02	5.12E-02
Ac-228	2.39E-01	7.30E-02	1.41E-01
Th-234	4.23E-01	1.96E+00	7.55E-01
U-235	4.28E-02	1.22E-01	4.43E-02
Am-241	-1.26E-01	3.37E-01	

Table 17

ANFB to MH-2 Excavation Sidewall Soil Analytical Results

Analytical Parameter	RL04-1565-556 Result (pCi/g)	RL04-1565-556 2 σ (pCi/g)	RL04-1565-556 2 σ MDA (pCi/g)	RL04-1566-557 Result (pCi/g)	RL04-1566-557 2 σ (pCi/g)	RL04-1566-557 2 σ MDA (pCi/g)	RL04-1567-558 Result (pCi/g)	RL04-1567-558 2 σ (pCi/g)	RL04-1567-558 2 σ MDA (pCi/g)
Be-7	-1.07E-01	9.13E-02	1.46E-01	-6.36E-02	8.65E-02	1.44E-01	9.23E-02	8.07E-02	1.50E-01
K-40	1.37E+01	1.51E+00	1.43E-01	9.27E+00	1.07E+00	1.74E-01	9.57E+00	1.09E+00	1.84E-01
Co-58	-9.70E-03	1.11E-02	1.84E-02	-1.56E-02	1.16E-02	1.82E-02	-1.81E-02	1.06E-02	1.58E-02
Co-60	1.06E-02	1.16E-02	2.24E-02	-2.32E-03	1.29E-02	2.26E-02	3.32E-03	1.18E-02	2.14E-02
Zn-65	-5.42E-03	3.38E-02	4.97E-02	-1.69E-02	3.07E-02	4.28E-02	1.34E-03	2.78E-02	4.23E-02
Sb-125	1.01E-02	3.10E-02	5.48E-02	1.02E-02	3.32E-02	5.89E-02	-8.01E-03	3.07E-02	5.25E-02
I-131	2.54E-03	1.17E-02	2.06E-02	-5.79E-03	1.15E-02	1.96E-02	7.04E-04	1.06E-02	1.84E-02
Cs-134	5.66E-04	1.16E-02	1.73E-02	5.53E-03	1.31E-02	2.03E-02	-1.01E-02	1.12E-02	1.50E-02
Cs-137	-7.29E-03	1.20E-02	1.97E-02	-9.71E-03	1.36E-02	2.21E-02	-3.71E-03	1.13E-02	1.89E-02
Eu-152	-3.89E-02	4.81E-02	5.97E-02	1.52E-03	4.73E-02	6.24E-02	-3.83E-02	4.20E-02	5.56E-02
Eu-154	-3.40E-02	3.24E-02	5.25E-02	2.48E-02	3.32E-02	5.75E-02	3.44E-03	2.90E-02	4.92E-02
Tl-208	1.77E-01	3.04E-02	1.95E-02	1.03E-01	2.63E-02	2.05E-02	1.39E-01	2.42E-02	1.78E-02
Bi-212	4.22E-01	2.67E-01	2.88E-01	4.24E-01	2.99E-01	2.78E-01	5.67E-01	2.47E-01	2.48E-01
Pb-212	5.60E-01	5.97E-02	4.13E-02	3.55E-01	4.95E-02	4.40E-02	3.84E-01	4.83E-02	3.98E-02
Bi-214	5.70E-01	6.24E-02	3.89E-02	9.79E-01	8.34E-02	4.31E-02	8.04E-01	6.88E-02	3.35E-02
Pb-214	6.10E-01	6.28E-02	4.52E-02	9.99E-01	8.78E-02	5.02E-02	8.38E-01	7.16E-02	4.15E-02
Ac-228	6.74E-01	7.43E-02	7.58E-02	3.49E-01	6.04E-02	7.44E-02	4.20E-01	6.68E-02	6.89E-02
Th-234	6.81E-01	1.89E+00	7.61E-01	1.29E+00	2.05E+00	8.39E-01	7.71E-01	1.74E+00	6.85E-01
U-235	8.26E-02	1.16E-01	4.15E-02	1.01E-01	1.19E-01	4.78E-02	-1.49E-02	1.08E-01	4.34E-02
Am-241	-1.20E-01	3.29E-01	5.62E-01	-6.60E-02	3.63E-01	6.24E-01	-3.13E-01	2.99E-01	4.93E-01

Analytical Parameter	RL04-1568-559 Result (pCi/g)	RL04-1568-559 2 σ (pCi/g)	RL04-1568-559 2 σ MDA (pCi/g)	RL04-1569-560 Result (pCi/g)	RL04-1569-560 2 σ (pCi/g)	RL04-1569-560 2 σ MDA (pCi/g)
Be-7	4.22E-02	8.78E-02	1.57E-01	9.38E-02	8.57E-02	1.60E-01
K-40	1.34E+01	1.48E+00	1.67E-01	1.09E+01	1.24E+00	1.75E-01
Co-58	-6.56E-03	1.01E-02	1.71E-02	-1.06E-02	9.97E-03	1.61E-02
Co-60	1.64E-03	1.23E-02	2.19E-02	9.32E-03	1.27E-02	2.40E-02
Zn-65	6.70E-03	3.13E-02	4.81E-02	-2.92E-03	2.92E-02	4.38E-02
Sb-125	-1.89E-02	2.86E-02	4.77E-02	-8.84E-03	3.14E-02	5.38E-02
I-131	4.25E-03	1.11E-02	1.97E-02	-1.03E-02	1.14E-02	1.90E-02
Cs-134	-2.12E-03	1.19E-02	1.74E-02	-4.13E-03	1.16E-02	1.67E-02
Cs-137	-5.03E-04	1.15E-02	1.97E-02	1.92E-02	1.32E-02	2.46E-02
Eu-152	2.81E-02	4.43E-02	6.60E-02	2.61E-02	4.57E-02	5.96E-02
Eu-154	5.15E-04	3.13E-02	5.29E-02	-3.70E-04	3.18E-02	5.39E-02
Tl-208	1.85E-01	3.00E-02	1.91E-02	1.81E-01	2.85E-02	1.81E-02
Bi-212	7.02E-01	2.22E-01	2.81E-01	5.56E-01	2.23E-01	2.69E-01
Pb-212	5.38E-01	5.73E-02	4.17E-02	4.69E-01	5.38E-02	4.25E-02
Bi-214	6.20E-01	6.35E-02	3.68E-02	6.16E-01	6.40E-02	3.49E-02
Pb-214	6.20E-01	6.31E-02	4.47E-02	6.84E-01	6.25E-02	4.29E-02
Ac-228	6.42E-01	6.67E-02	7.12E-02	5.00E-01	6.54E-02	7.74E-02
Th-234	-7.67E-03	1.83E+00	7.40E-01	1.50E+00	1.96E+00	7.47E-01
U-235	4.13E-02	1.08E-02	4.16E-02	-1.61E-02	1.08E-01	4.17E-02
Am-241	-2.98E-02	3.35E-01	5.78E-01	-3.59E-01	3.39E-01	5.59E-01

Table 17
ANFB to MH-2 Excavation Sidewall Soil Analytical Results

Analytical Parameter	RL04-1570-S61 Result (pCi/g)	RL04-1570-S61 2 σ (pCi/g)	RL04-1570-S61 2 σ MDA (pCi/g)	RL04-1571-S62 Result (pCi/g)	RL04-1571-S62 2 σ (pCi/g)	RL04-1571-S62 2 σ MDA (pCi/g)	RL04-1572-S63 Result (pCi/g)	RL04-1572-S63 2 σ (pCi/g)	RL04-1572-S63 2 σ MDA (pCi/g)
Be-7	4.04E-02	1.01E-01	1.80E-01	-3.95E-03	8.68E-02	1.51E-01	-5.75E-02	9.10E-02	1.52E-01
K-40	1.31E+01	1.48E+00	2.01E-01	1.14E+01	1.30E+00	1.66E-01	1.01E+01	1.15E+00	1.64E-01
Co-58	-1.07E-02	1.17E-02	1.92E-02	-9.78E-04	1.03E-02	1.85E-02	1.91E-03	9.88E-03	1.81E-02
Co-60	-5.13E-03	1.33E-02	2.25E-02	-7.67E-04	1.04E-02	1.86E-02	-6.98E-03	1.17E-02	1.93E-02
Zn-65	3.15E-03	3.18E-02	4.89E-02	-5.55E-04	3.06E-02	4.62E-02	-2.45E-02	3.68E-02	4.87E-02
Sb-125	3.28E-02	3.58E-02	6.61E-02	5.07E-03	3.12E-02	5.51E-02	7.41E-03	3.11E-02	5.50E-02
I-131	-5.57E-04	1.18E-02	2.05E-02	4.00E-04	1.12E-02	1.96E-02	1.65E-02	1.19E-02	2.22E-02
Cs-134	-4.13E-03	1.34E-02	1.94E-02	-3.27E-04	1.11E-02	1.66E-02	5.86E-03	1.15E-02	1.81E-02
Cs-137	1.56E-02	1.48E-02	2.65E-02	-1.51E-02	1.23E-02	1.83E-02	4.05E-02	1.71E-02	2.06E-02
Eu-152	1.26E-02	4.77E-02	8.48E-02	2.00E-02	4.53E-02	8.55E-02	3.03E-02	4.32E-02	5.93E-02
Eu-154	4.89E-03	3.37E-02	5.73E-02	1.37E-02	3.14E-02	5.40E-02	1.86E-02	3.08E-02	5.32E-02
Tl-208	1.57E-01	3.11E-02	4.59E-02	1.34E-01	2.74E-02	2.15E-02	1.18E-01	2.84E-02	2.00E-02
Bi-212	6.94E-01	2.79E-01	2.78E-01	5.10E-01	2.23E-01	2.63E-01	3.59E-01	2.26E-01	2.94E-01
Pb-212	5.40E-01	7.16E-02	9.33E-02	4.08E-01	4.89E-02	4.05E-02	4.33E-01	5.18E-02	4.14E-02
Bi-214	7.00E-01	6.92E-02	4.26E-02	6.36E-01	6.39E-02	3.92E-02	6.51E-01	6.65E-02	3.59E-02
Pb-214	7.30E-01	7.08E-02	5.14E-02	6.35E-01	6.59E-01	4.67E-02	6.82E-01	6.32E-02	4.59E-02
Ac-228	5.81E-01	7.50E-02	7.74E-02	3.81E-01	6.32E-01	7.20E-02	4.87E-01	6.66E-02	6.96E-02
Th-234	1.13E-01	1.94E+00	8.38E-01	6.55E-01	1.85E+00	7.39E-01	3.22E-01	1.67E+00	7.09E-01
U-235	4.66E-02	1.22E-01	4.50E-02	-1.13E-02	1.11E-01	4.30E-02	1.44E-02	1.10E-01	4.26E-02
Am-241	3.18E-02	3.48E-01	6.06E-01	-1.86E-01	3.16E-01	5.36E-01	-3.21E-02	3.32E-01	5.74E-01

Analytical Parameter	RL04-1573-S64 Result (pCi/g)	RL04-1573-S64 2 σ (pCi/g)	RL04-1573-S64 2 σ MDA (pCi/g)	RL04-1574-S65 Result (pCi/g)	RL04-1574-S65 2 σ (pCi/g)	RL04-1574-S65 2 σ MDA (pCi/g)
Be-7	-1.52E-02	9.21E-02	1.58E-01	3.37E-02	9.73E-02	1.72E-01
K-40	1.20E+01	1.36E+00	1.58E-01	1.20E+01	1.34E+00	1.42E-01
Co-58	-4.01E-03	1.12E-02	1.95E-02	-1.26E-02	1.08E-02	1.68E-02
Co-60	6.13E-03	1.17E-02	2.20E-02	-2.27E-03	1.21E-02	2.11E-02
Zn-65	-1.28E-02	3.13E-02	4.48E-02	-8.76E-03	3.08E-02	4.49E-02
Sb-125	-6.78E-03	3.22E-02	5.54E-02	2.36E-02	3.18E-02	5.77E-02
I-131	-2.20E-03	1.14E-02	1.97E-02	2.76E-03	1.16E-02	2.09E-02
Cs-134	4.98E-03	1.11E-02	1.74E-02	-1.12E-02	1.28E-02	1.72E-02
Cs-137	1.98E-02	1.28E-02	2.41E-02	2.76E-02	1.96E-02	2.55E-02
Eu-152	-3.61E-03	4.46E-02	8.29E-02	1.37E-03	4.60E-02	8.88E-02
Eu-154	9.95E-03	3.10E-02	5.31E-02	-2.10E-02	3.16E-02	5.19E-02
Tl-208	1.31E-01	2.48E-02	1.92E-02	1.45E-01	2.66E-02	2.22E-02
Bi-212	7.01E-01	2.77E-01	2.55E-01	3.75E-01	2.42E-01	2.73E-01
Pb-212	4.58E-01	6.11E-02	4.31E-02	4.67E-01	5.49E-02	4.40E-02
Bi-214	6.55E-01	6.56E-02	3.69E-02	6.36E-01	6.68E-02	3.75E-02
Pb-214	6.82E-01	6.76E-02	4.61E-02	6.90E-01	6.89E-02	4.79E-02
Ac-228	5.10E-01	6.37E-02	7.84E-02	5.04E-01	7.10E-02	8.64E-02
Th-234	-4.12E-01	1.88E+00	7.77E-01	-6.08E-02	1.90E+00	7.42E-01
U-235	9.04E-02	1.11E-01	4.26E-02	8.47E-02	1.14E-01	4.38E-02
Am-241	-4.56E-02	3.48E-01	5.99E-01	-3.76E-01	3.47E-01	5.72E-01

Table 18
ANFB to MH-2 Sidewall Comparison Value Calculation

Area/Volume ID		Number of Data Points	t95% (n-1) Value from Table B-1 of NUREG/CR-5849
ANFB to MH-2	Sidewall Soil	10	1.833

	Sample Number	Cs-137 Result (pCi/g)
1	561	0.0265
2	562	0.0183
3	563	0.0405
4	564	0.0241
5	565	0.0276
6	556	0.0197
7	557	0.0221
8	558	0.0189
9	559	0.0197
10	560	0.0246

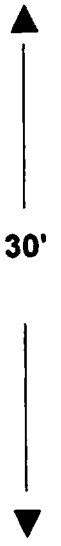
Comparison Value Equation

$$\mu_\alpha = \bar{x} + t_{1-\alpha,df}\frac{s_x}{\sqrt{n}}$$

Average	Comparison Value
0.0242	0.03
Standard Deviation	**Screening Criteria**
0.01	11
	Comparison < Criteria
	Yes

Table 19
ANFB to MH-2 Overburden A and B Soil Results Summary

Area/Location: Active North Filter Bed to Manhole 2



	Overburden B	Overburden A
1	1.97E-01	6.34E-02
2	4.88E-02(ND)	5.27E-02(ND)
3	3.43E-02	4.86E-02(ND)
4	2.26E-02(ND)	2.13E-02(ND)
5	2.71E-02(ND)	2.30E-02(ND)
6	2.82E-02(ND)	2.25E-02(ND)
7	2.94E-02(ND)	2.18E-02(ND)
8	2.87E-02(ND)	2.41E-02
9	2.49E-02	2.35E-02(ND)
10	2.69E-02(ND)	1.97E-02(ND)

Cs-137 Results in pCi/g

ND = Non-Detect
(Non-Identified Nuclides)

Table 20
ANFB to MH-2 Overburden A Soil Analytical Results

Analytical Parameter	RL04-1549-540			RL04-1551-542			RL04-1554-545		
	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)
Be-7	-1.50E-02	9.07E-02	1.66E-01	-1.19E-02	1.43E-01	2.57E-01	1.55E-02	1.68E-01	3.01E-01
K-40	1.14E+01	1.28E+00	1.85E-01	1.09E+01	1.46E+00	2.96E-01	1.01E+01	1.36E+00	2.60E-01
Co-58	-6.54E-03	1.04E-02	1.49E-02	-6.54E-03	1.69E-02	2.85E-02	1.13E-02	1.90E-02	3.76E-02
Co-60	6.87E-04	1.26E-02	2.22E-02	1.39E-02	1.92E-02	4.08E-02	1.01E-03	2.06E-02	3.91E-02
Zn-65	-3.99E-02	3.42E-02	4.27E-02	-7.62E-03	5.31E-02	8.17E-02	7.27E-03	5.09E-02	8.32E-02
Sb-125	2.73E-02	3.19E-02	5.77E-02	-3.71E-02	5.55E-02	9.31E-02	2.25E-03	5.23E-02	9.48E-02
I-131	3.26E-03	1.11E-02	1.96E-02	2.01E-02	2.09E-02	4.05E-02	-1.28E-03	2.04E-02	3.66E-02
Cs-134	1.88E-03	1.13E-02	1.71E-02	2.70E-02	2.14E-02	3.88E-02	2.02E-02	1.77E-02	3.30E-02
Cs-137	6.34E-02	2.44E-02	2.12E-02	5.29E-02	2.56E-02	5.27E-02	2.41E-02	2.54E-02	4.86E-02
Eu-152	2.67E-02	4.55E-02	6.02E-02	-4.53E-02	7.47E-02	1.08E-01	-1.06E-02	7.70E-02	9.99E-02
Eu-154	2.79E-02	3.16E-02	5.44E-02	-2.66E-02	5.21E-02	8.71E-02	7.60E-04	5.34E-02	9.22E-02
Tl-208	1.49E-01	2.70E-02	1.92E-02	1.55E-01	4.46E-02	7.36E-02	1.42E-01	4.18E-02	4.18E-02
Bi-212	6.48E-01	2.77E-01	2.56E-01	7.50E-01	5.43E-01	4.86E-01	3.10E-01	3.07E-01	5.99E-01
Pb-212	4.51E-01	5.90E-02	4.20E-02	5.39E-01	9.13E-02	7.18E-02	4.64E-01	8.25E-02	1.42E-01
Bi-214	7.16E-01	6.64E-02	3.90E-02	4.93E-01	1.14E-01	1.85E-01	6.47E-01	1.07E-01	1.89E-01
Pb-214	7.14E-01	6.84E-02	4.58E-02	7.14E-01	1.04E-01	7.28E-02	6.88E-01	1.02E-01	8.17E-02
Ac-228	4.96E-01	7.10E-02	7.12E-02	4.88E-01	1.55E-01	2.72E-01	4.55E-01	1.63E-01	2.76E-01
Th-234	4.96E-01	1.87E+00	7.54E-01	2.26E+00	3.31E+00	1.30E+00	8.55E-02	2.94E+00	1.32E+00
U-235	4.64E-02	1.11E-01	4.36E-02	6.46E-02	1.83E-01	7.19E-02	3.33E-02	1.86E-01	7.50E-02
Am-241	7.03E-02	3.39E-01	5.91E-01	-4.40E-01	5.88E-01	9.89E-01	-3.08E-01	5.67E-01	9.69E-01

Analytical Parameter	RL04-1576-566			RL04-1576-567			RL04-1577-568		
	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)	Result (pCi/g)	2 σ (pCi/g)	2 σ MDA (pCi/g)
Be-7	-1.30E-02	8.50E-02	1.46E-01	-6.47E-02	8.96E-02	1.48E-01	-2.46E-02	9.49E-02	1.62E-01
K-40	1.21E+01	1.36E+00	1.35E-01	1.20E+01	1.34E+00	1.74E-01	1.22E+01	1.36E+00	1.48E-01
Co-58	-6.88E-03	1.02E-02	1.72E-02	6.71E-04	1.07E-02	1.93E-02	-8.57E-03	9.91E-03	1.64E-02
Co-60	-3.91E-04	1.12E-02	1.98E-02	-3.02E-03	1.11E-02	1.92E-02	1.19E-02	1.21E-02	2.32E-02
Zn-65	-9.82E-03	2.99E-02	4.32E-02	1.18E-02	2.93E-02	4.83E-02	-1.92E-02	3.39E-02	4.73E-02
Sb-125	-8.93E-03	2.92E-02	5.02E-02	-8.94E-03	3.16E-02	5.39E-02	3.64E-02	3.09E-02	5.89E-02
I-131	-8.60E-04	1.14E-02	1.98E-02	-4.78E-04	1.21E-02	2.10E-02	4.86E-03	1.19E-02	2.11E-02
Cs-134	-1.83E-03	1.12E-02	1.64E-02	-2.57E-03	1.23E-02	1.79E-02	6.10E-03	1.05E-02	1.67E-02
Cs-137	-4.16E-03	1.27E-02	2.13E-02	1.45E-02	1.41E-02	2.30E-02	8.70E-03	1.27E-02	2.25E-02
Eu-152	2.17E-02	4.39E-02	6.15E-02	-1.37E-02	4.38E-02	6.38E-02	-1.56E-02	4.48E-02	6.52E-02
Eu-154	-4.63E-03	3.08E-02	5.18E-02	-3.48E-04	3.06E-02	5.15E-02	-9.24E-03	3.12E-02	5.22E-02
Tl-208	1.54E-01	2.67E-02	2.05E-02	1.74E-01	3.07E-02	1.89E-02	1.66E-01	3.14E-02	4.23E-02
Bi-212	5.81E-01	2.08E-01	2.62E-01	6.14E-01	2.69E-01	2.59E-01	7.22E-01	2.78E-01	2.29E-01
Pb-212	5.23E-01	5.63E-02	3.85E-02	5.13E-01	6.32E-02	4.27E-02	4.67E-01	6.10E-02	4.14E-02
Bi-214	6.75E-01	6.32E-02	3.62E-02	6.45E-01	6.41E-02	3.75E-02	6.66E-01	6.20E-02	3.87E-02
Pb-214	7.15E-01	6.68E-02	4.26E-02	7.14E-01	7.13E-02	4.40E-02	6.96E-01	6.27E-02	4.62E-02
Ac-228	5.41E-01	6.92E-02	6.92E-02	5.01E-01	7.43E-02	7.98E-02	5.06E-01	6.45E-02	6.56E-02
Th-234	6.45E-01	1.83E+00	7.15E-01	-3.09E-01	1.83E+00	7.33E-01	1.81E+00	1.95E+00	7.26E-01
U-235	1.63E-02	1.08E-01	4.03E-02	-5.18E-02	1.11E-01	4.38E-02	1.80E-01	1.12E-01	3.98E-02
Am-241	-7.07E-04	3.28E-01	5.68E-01	-1.23E-02	3.37E-01	5.82E-01	-2.62E-01	3.23E-01	5.39E-01

Table 20
ANFB to MH-2 Overburden A Soil Analytical Results

Analytical Parameter	RL04-1578-569 Result (pCi/g)	RL04-1578-569 2 σ (pCi/g)	RL04-1578-569 2 σ MDA (pCi/g)	RL04-1579-570 Result (pCi/g)	RL04-1579-570 2 σ (pCi/g)	RL04-1579-570 2 σ MDA (pCi/g)	RL04-1580-571 Result (pCi/g)	RL04-1580-571 2 σ (pCi/g)	RL04-1580-571 2 σ MDA (pCi/g)
Be-7	2.74E-02	8.52E-02	1.51E-01	4.72E-02	9.20E-02	1.64E-01	4.89E-02	8.78E-02	1.58E-01
K-40	1.20E+01	1.34E+00	1.70E-01	1.15E+01	1.29E+00	1.62E-01	1.23E+01	1.37E+00	1.82E-01
Co-58	-1.19E-03	9.89E-03	1.76E-02	-6.99E-04	9.46E-03	1.69E-02	-9.54E-03	1.06E-02	1.73E-02
Co-60	-6.21E-03	1.20E-02	2.00E-02	-1.39E-02	1.14E-02	1.72E-02	-4.92E-04	1.22E-02	2.14E-02
Zn-65	-7.84E-03	3.15E-02	4.60E-02	-1.73E-02	3.17E-02	4.43E-02	3.30E-02	2.84E-02	4.76E-02
Sb-125	-2.30E-02	3.09E-02	5.13E-02	-9.49E-03	3.07E-02	5.24E-02	7.02E-03	2.95E-02	5.22E-02
I-131	-9.46E-03	1.16E-02	1.93E-02	6.12E-04	1.09E-02	1.91E-02	2.42E-03	1.15E-02	2.03E-02
Cs-134	-5.99E-03	1.11E-02	1.55E-02	-2.75E-03	1.13E-02	1.64E-02	-3.57E-03	1.14E-02	1.64E-02
Cs-137	8.53E-04	1.27E-02	2.16E-02	2.41E-02	1.63E-02	2.02E-02	1.63E-03	1.37E-02	2.35E-02
Eu-152	2.26E-02	4.36E-02	5.55E-02	-9.90E-03	4.32E-02	6.04E-02	4.26E-03	4.40E-02	6.28E-02
Eu-154	5.28E-02	3.28E-02	5.38E-02	1.23E-02	3.05E-02	5.22E-02	1.42E-02	3.09E-02	5.23E-02
Tl-208	1.57E-01	2.71E-02	1.64E-02	1.67E-01	2.93E-02	1.76E-02	1.53E-01	2.71E-02	1.97E-02
Bi-212	6.01E-01	2.70E-01	2.46E-01	5.63E-01	2.14E-01	2.67E-01	5.49E-01	2.50E-01	2.62E-01
Pb-212	6.36E-01	6.49E-02	3.90E-02	6.01E-01	5.38E-02	4.04E-02	4.49E-01	5.81E-02	4.17E-02
Bi-214	5.99E-01	6.14E-02	3.33E-02	7.07E-01	6.51E-02	3.53E-02	6.94E-01	6.34E-02	3.69E-02
Pb-214	6.66E-01	6.73E-02	4.30E-02	7.01E-01	6.55E-02	4.73E-02	6.70E-01	6.48E-02	4.42E-02
Ac-228	5.02E-01	6.56E-02	7.16E-02	6.60E-01	6.58E-02	7.38E-02	5.08E-01	6.40E-01	6.98E-02
Th-234	2.26E+00	1.99E+00	7.28E-01	6.94E-01	1.84E+00	7.24E-01	2.65E-01	1.82E+00	7.14E-01
U-235	3.89E-02	1.07E-01	4.02E-02	-1.49E-02	1.07E-01	4.20E-02	3.40E-02	1.13E-01	4.07E-02
Am-241	-7.33E-01	3.32E-01	6.08E-01	-1.46E-01	3.29E-01	6.60E-01	2.00E-02	3.20E-01	6.55E-01

Analytical Parameter	RL04-1581-572 Result (pCi/g)	RL04-1581-572 2 σ (pCi/g)	RL04-1581-572 2 σ MDA (pCi/g)
Be-7	3.23E-02	8.96E-02	1.58E-01
K-40	1.26E+01	1.39E+00	1.60E-01
Co-58	-7.36E-03	1.01E-02	1.69E-02
Co-60	3.17E-03	1.23E-02	2.21E-02
Zn-65	1.33E-02	2.75E-02	4.38E-02
Sb-125	2.82E-02	3.14E-02	5.69E-02
I-131	-1.32E-03	1.16E-02	2.01E-02
Cs-134	-1.52E-03	1.14E-02	1.87E-02
Cs-137	-9.19E-03	1.22E-02	1.97E-02
Eu-152	-1.66E-02	4.30E-02	6.27E-02
Eu-154	1.73E-02	3.12E-02	5.20E-02
Tl-208	1.49E-01	2.81E-02	4.04E-02
Bi-212	8.95E-01	2.69E-01	2.33E-01
Pb-212	6.01E-01	6.23E-02	3.97E-02
Bi-214	6.36E-01	6.22E-02	3.52E-02
Pb-214	6.37E-01	7.03E-02	4.32E-02
Ac-228	6.69E-01	6.96E-02	7.32E-02
Th-234	-1.09E-02	1.78E+00	7.27E-01
U-235	1.94E-02	1.10E-01	4.06E-02
Am-241	-1.44E-01	3.28E-01	6.57E-01

Table 20
ANFB to MH-2 Overburden B Soil Analytical Results

Analytical Parameter	RL04-1550-541 Result (pCi/g)	RL04-1550-541 2 σ (pCi/g)	RL04-1550-541 2 σ MDA (pCi/g)	RL04-1552-543 Result (pCi/g)	RL04-1552-543 2 σ (pCi/g)	RL04-1552-543 2 σ MDA (pCi/g)	RL04-1553-544 Result (pCi/g)	RL04-1553-544 2 σ (pCi/g)	RL04-1553-544 2 σ MDA (pCi/g)
Be-7	1.48E-03	8.51E-02	1.48E-01	-5.25E-04	1.80E-01	3.23E-01	-9.74E-02	1.64E-01	2.76E-01
K-40	8.88E+00	1.02E+00	1.45E-01	1.17E+01	1.58E+00	3.99E-01	1.06E+01	1.44E+00	2.11E-01
Co-58	-1.59E-02	9.32E-02	1.38E-02	-1.89E-02	1.71E-02	2.66E-02	9.32E-03	1.71E-02	3.43E-02
Co-60	7.99E-03	1.07E-02	2.03E-02	1.30E-02	2.33E-02	4.50E-02	4.60E-03	1.69E-02	3.44E-02
Zn-65	-4.07E-03	2.55E-02	3.79E-02	2.32E-03	5.08E-02	8.26E-02	1.92E-02	4.12E-02	7.39E-02
Sb-125	1.61E-03	2.92E-02	5.09E-02	8.10E-03	5.67E-02	1.02E-01	3.07E-02	4.74E-02	9.19E-02
I-131	1.93E-03	1.07E-02	1.89E-02	-1.27E-02	2.35E-02	4.03E-02	4.11E-03	1.74E-02	3.26E-02
Cs-134	-1.74E-03	1.07E-02	1.56E-02	7.72E-03	1.97E-02	3.32E-02	4.06E-03	1.91E-02	3.07E-02
Cs-137	1.97E-01	2.91E-02	1.70E-02	1.76E-02	2.57E-02	4.88E-02	3.43E-02	3.52E-02	2.76E-02
Eu-152	2.24E-02	4.13E-02	8.04E-02	-9.75E-02	8.49E-02	1.06E-01	2.00E-02	7.37E-02	1.03E-01
Eu-154	1.61E-02	2.91E-02	5.00E-02	1.03E-02	5.58E-02	9.92E-02	1.59E-03	5.14E-02	8.90E-02
Tl-208	1.06E-01	2.32E-02	1.71E-02	1.48E-01	4.45E-02	7.77E-02	1.31E-01	3.71E-02	6.60E-02
Bi-212	3.47E-01	2.20E-01	2.11E-01	6.13E-01	4.78E-01	4.96E-01	6.13E-01	3.92E-01	4.33E-01
Pb-212	3.42E-01	4.32E-02	3.94E-02	3.86E-01	9.93E-02	1.58E-01	4.11E-01	7.61E-02	7.78E-02
Bi-214	7.70E-01	6.60E-02	3.57E-02	7.56E-01	1.09E-01	6.65E-02	6.71E-01	1.03E-01	6.60E-02
Pb-214	7.64E-01	6.81E-02	4.18E-02	7.65E-01	1.06E-01	8.41E-02	7.22E-01	9.18E-02	8.13E-02
Ac-228	3.84E-01	5.63E-02	6.38E-02	5.10E-01	1.65E-01	2.91E-01	2.75E-01	1.87E-01	2.37E-01
Th-234	4.29E-01	1.71E+00	6.73E-01	1.48E+00	3.38E+00	1.41E+00	-2.06E+00	3.02E+00	1.29E+00
U-235	1.70E-02	1.05E-01	4.03E-02	1.51E-02	2.17E-01	8.09E-02	1.32E-01	1.82E-01	7.42E-02
Am-241	-2.07E-01	3.05E-01	6.13E-01	-2.61E-01	5.98E-01	1.03E+00	3.64E-01	5.65E-01	1.04E+00

Analytical Parameter	RL04-1582-573 Result (pCi/g)	RL04-1582-573 2 σ (pCi/g)	RL04-1582-573 2 σ MDA (pCi/g)	RL04-1583-574 Result (pCi/g)	RL04-1583-574 2 σ (pCi/g)	RL04-1583-574 2 σ MDA (pCi/g)	RL04-1584-575 Result (pCi/g)	RL04-1584-575 2 σ (pCi/g)	RL04-1584-575 2 σ MDA (pCi/g)
Be-7	-2.23E-02	9.71E-02	1.68E-01	-6.61E-02	1.16E-01	1.98E-01	-7.49E-02	1.07E-01	1.77E-01
K-40	1.23E+01	1.39E+00	1.67E-01	1.07E+01	1.28E+00	2.21E-01	1.07E+01	1.27E+00	1.98E-01
Co-58	-2.34E-03	1.11E-02	1.95E-02	-2.01E-03	1.26E-02	2.27E-02	-2.56E-03	1.22E-02	2.19E-02
Co-60	-2.78E-03	1.27E-02	2.19E-02	1.06E-03	1.34E-02	2.47E-02	-8.03E-03	1.39E-02	2.32E-02
Zn-65	7.20E-04	3.27E-02	4.94E-02	-1.43E-02	3.78E-02	6.46E-02	-9.03E-04	3.49E-02	5.39E-02
Sb-125	1.64E-02	3.37E-02	5.01E-02	2.31E-02	3.79E-02	6.96E-02	3.13E-02	3.90E-02	7.24E-02
I-131	7.68E-03	1.19E-02	2.15E-02	1.30E-02	1.49E-02	2.77E-02	7.08E-03	1.63E-02	2.77E-02
Cs-134	-2.29E-03	1.34E-02	1.96E-02	5.91E-03	1.43E-02	2.27E-02	5.62E-03	1.39E-02	2.22E-02
Cs-137	-4.66E-03	1.36E-02	2.26E-02	-3.16E-03	1.59E-02	2.71E-02	-7.30E-03	1.69E-02	2.82E-02
Eu-152	-8.62E-03	4.66E-02	8.54E-02	8.29E-03	5.81E-02	7.95E-02	3.80E-02	5.48E-02	7.96E-02
Eu-154	1.44E-02	3.28E-02	5.62E-02	1.72E-02	4.05E-02	6.99E-02	1.24E-02	3.81E-02	6.58E-02
Tl-208	1.72E-01	3.09E-02	4.39E-02	1.55E-01	3.47E-02	2.49E-02	1.55E-01	2.83E-02	2.81E-02
Bi-212	5.78E-01	2.81E-01	2.72E-01	5.16E-01	3.03E-01	3.19E-01	4.07E-01	2.65E-01	3.10E-01
Pb-212	5.39E-01	6.44E-02	4.65E-02	4.14E-01	7.14E-02	7.29E-02	4.44E-01	6.57E-02	5.22E-02
Bi-214	6.98E-01	6.81E-02	4.03E-02	7.57E-01	8.20E-02	4.42E-02	6.94E-01	7.49E-02	4.98E-02
Pb-214	6.69E-01	6.69E-02	4.48E-02	6.94E-01	7.92E-02	5.91E-02	6.81E-01	7.44E-02	5.28E-02
Ac-228	5.48E-01	7.48E-02	8.15E-02	4.77E-01	8.21E-02	9.97E-02	5.33E-01	1.21E-01	2.00E-01
Th-234	7.68E-01	1.96E+00	7.68E-01	-6.37E-01	2.34E+00	9.62E-01	-1.07E+00	2.27E+00	9.24E-01
U-235	8.20E-02	1.13E-01	4.45E-02	2.35E-03	1.41E-01	5.06E-02	2.44E-02	1.36E-01	5.21E-02
Am-241	-1.03E-01	3.51E-01	6.01E-01	1.14E-02	4.28E-01	7.46E-01	1.92E-02	3.92E-01	6.87E-01

Table 20
ANFB to MH-2 Overburden B Soil Analytical Results

Analytical Parameter	RL04-1585-676 Result (pCi/g)	RL04-1585-676 2 σ (pCi/g)	RL04-1585-676 2 σ MDA (pCi/g)	RL04-1586-677 Result (pCi/g)	RL04-1586-677 2 σ (pCi/g)	RL04-1586-677 2 σ MDA (pCi/g)	RL04-1587-678 Result (pCi/g)	RL04-1587-678 2 σ (pCi/g)	RL04-1587-678 2 σ MDA (pCi/g)
Be-7	3.00E-02	1.15E-01	2.05E-01	-3.70E-02	1.22E-01	2.09E-01	5.58E-02	1.14E-01	2.07E-01
K-40	1.11E+01	1.31E+00	1.89E-01	1.26E+01	1.47E+00	2.05E-01	1.19E+01	1.39E+00	2.52E-01
Co-58	-6.07E-03	1.37E-02	2.38E-02	-8.24E-03	1.40E-02	2.38E-02	-2.22E-03	1.25E-02	2.24E-02
Co-60	-8.96E-03	1.42E-02	2.39E-02	-4.05E-03	1.71E-02	2.97E-02	-7.86E-03	1.45E-02	2.42E-02
Zn-65	-2.50E-02	3.73E-02	5.07E-02	2.43E-03	3.81E-02	5.94E-02	8.38E-04	3.80E-02	5.86E-02
Sb-125	8.59E-03	3.71E-02	5.66E-02	-1.18E-02	3.84E-02	5.63E-02	6.79E-03	3.93E-02	7.00E-02
I-131	1.65E-03	1.44E-02	2.56E-02	-1.87E-02	1.64E-02	2.69E-02	-3.62E-03	1.48E-02	2.57E-02
Cs-134	2.55E-03	1.45E-02	2.24E-02	3.92E-04	1.53E-02	2.32E-02	4.69E-03	1.42E-02	2.23E-02
Cs-137	1.10E-02	1.61E-02	2.94E-02	-1.53E-03	1.66E-02	2.87E-02	2.49E-02	1.82E-02	3.02E-02
Eu-152	-1.92E-02	5.52E-02	7.71E-02	-5.44E-03	5.70E-02	7.98E-02	-1.62E-02	5.38E-02	7.96E-02
Eu-154	3.54E-03	3.85E-02	6.59E-02	-1.81E-02	4.00E-02	6.87E-02	-5.21E-03	3.71E-02	6.29E-02
Tl-208	1.77E-01	3.24E-02	5.34E-02	1.72E-01	3.67E-02	2.78E-02	1.53E-01	3.16E-02	5.08E-02
Bi-212	5.32E-01	2.88E-01	3.08E-01	6.67E-01	3.06E-01	3.47E-01	5.50E-01	3.93E-01	3.56E-01
Pb-212	4.96E-01	7.34E-02	1.06E-01	4.92E-01	7.02E-02	5.40E-02	3.78E-01	7.10E-02	1.03E-01
Bi-214	6.73E-01	7.36E-02	4.48E-02	6.94E-01	7.71E-02	5.23E-02	6.33E-01	7.33E-02	4.87E-02
Pb-214	6.87E-01	7.97E-02	6.44E-02	7.46E-01	8.25E-02	5.81E-02	6.19E-01	7.51E-02	5.77E-02
Ac-228	5.33E-01	8.96E-02	1.03E-01	4.76E-01	8.82E-02	1.02E-01	5.14E-01	1.30E-01	2.01E-01
Th-234	-5.96E-01	2.29E+00	8.99E-01	7.64E-01	2.41E+00	1.04E+00	8.57E-01	2.27E+00	9.28E-01
U-235	1.17E-01	1.36E-01	5.11E-02	5.79E-02	1.45E-01	5.24E-02	3.30E-02	1.38E-01	5.22E-02
Am-241	-4.01E-02	4.15E-01	7.22E-01	-5.08E-01	4.40E-01	7.20E-01	-6.12E-02	4.21E-01	7.30E-01

Analytical Parameter	RL04-1588-679 Result (pCi/g)	RL04-1588-679 2 σ (pCi/g)	RL04-1588-679 2 σ MDA (pCi/g)
Be-7	1.31E-02	9.75E-02	1.75E-01
K-40	1.16E+01	1.36E+00	2.17E-01
Co-58	-1.67E-03	1.19E-02	2.15E-02
Co-60	1.09E-03	1.38E-02	2.53E-02
Zn-65	2.53E-03	3.57E-02	5.56E-02
Sb-125	3.90E-06	3.61E-02	6.38E-02
I-131	1.24E-03	1.36E-02	2.40E-02
Cs-134	8.49E-03	1.35E-02	2.20E-02
Cs-137	2.00E-03	1.53E-02	2.69E-02
Eu-152	5.46E-02	5.53E-02	8.02E-02
Eu-154	1.61E-02	3.81E-02	6.59E-02
Tl-208	1.49E-01	3.31E-02	2.66E-02
Bi-212	4.68E-01	3.05E-01	3.13E-01
Pb-212	4.38E-01	6.31E-02	5.14E-02
Bi-214	6.43E-01	7.27E-02	4.66E-02
Pb-214	6.95E-01	7.50E-02	5.86E-02
Ac-228	4.94E-01	8.06E-02	9.28E-02
Th-234	2.13E+00	2.36E+00	8.99E-01
U-235	4.64E-02	1.31E-01	5.19E-02
Am-241	-2.46E-01	4.01E-01	6.79E-01

Table 21
ANFB to MH-2 Overburden A Comparison Value Calculation

Area/Volume ID		Number of Data Points	t95% (n-1) Value from Table B-1 of NUREG/CR-5849
ANFB to MH-2	Overburden A	10	1.833

	Sample Number	Cs-137 Result (pCi/g)
1	540	0.0634
2	542	0.0527
3	545	0.0486
4	566	0.0213
5	567	0.023
6	568	0.0225
7	569	0.0218
8	570	0.0241
9	571	0.0235
10	572	0.0197

Comparison Value Equation $\mu_\alpha = \bar{x} + t_{1-\alpha,df}\frac{s_x}{\sqrt{n}}$

Average	Comparison Value
0.03206	0.04
Standard Deviation	**Screening Criteria**
0.02	11
0.0634	Comparison < Criteria
0.0197	Yes

Table 22
ANFB to MH-2 Overburden B Comparison Value Calculation

Area/Volume ID		Number of Data Points	t95% (n-1) Value from Table B-1 of NUREG/CR-5849
ANFB to MH-2	Overburden B	10	1.833

	Sample Number	Cs-137 Result (pCi/g)
1	541	0.197
2	543	0.0488
3	544	0.0343
4	573	0.0226
5	574	0.0271
6	575	0.0282
7	576	0.0294
8	577	0.0287
9	578	0.0249
10	579	0.0269

Comparison Value Equation

$$\mu_a = \bar{x} + t_{1-\alpha,df}\frac{s_x}{\sqrt{n}}$$

Average	Comparison Value
0.04679	0.08
Standard Deviation	**Screening Criteria**
0.05	11
	Comparison < Criteria
	Yes

Attachment A

Minimum Detectable Activity Calculations for a Ludlum Model 43-20 Detector and Eberline ESP-2 Meter

The minimum detectable activity (MDA) for scanning an alpha/beta point source with instrument progression rate of 5 centimeters per second (cm/sec) is calculated using the following method:

Given:

Width of detector = 10 cm
Area of detector = 180 cm^2

Time probe is above point (T) = $\frac{10cm}{5cm/\sec} * \frac{1\min}{60\sec} = 0.033\min$

Alpha/beta background (worst case brick) = 729 counts per minute (cpm)

C_b = scanning background = 729 cpm x 0.033 min = 24.1 counts (c)
S_b = standard deviation of $C_b = \sqrt{C_b} = 4.91$
Eff = efficiency of detector = 0.28 counts per disintegration (c/d)

$$MDA = \frac{3 + (4.65 * S_b)}{Eff * T * \frac{A}{100}} = \frac{3 + (4.65 * 4.91)}{(0.28 * 0.033 * \frac{180}{100})} = 1600 \text{ dpm/100 cm}^2$$

For a wide area alpha/beta source, the MDA would approach the static 1 minute count MDA:

T = 1 minute
S_b = $\sqrt{background} = \sqrt{729} = 27$ cpm

$$MDA + \frac{3 + (4.65 * 27)}{(0.28 * 1 * \frac{180}{100})} = 260 \text{ dpm/100 cm}^2$$

The MDA for an alpha source is calculated using the same methodology. The following presents the calculation.

Given:

Width of detector = 10 cm

Area of detector = 180 cm^2

Time probe is above point (T) = $\frac{10cm}{5cm/\sec} * \frac{1\min}{60\sec} = 0.033\min$

Alpha background = 1 counts per minute (cpm)

C_b = scanning background = 1 cpm x 0.033 min = 0.033 counts (c)
S_b = standard deviation of C_b = $\sqrt{C_b}$ = 0.18
Eff = efficiency of detector = 0.23 counts per disintegration (c/d)

$$MDA = \frac{3 + (4.65 * S_b)}{Eff * T * \frac{A}{100}} = \frac{3 + (4.65 * 0.18)}{(0.23 * 0.033 * \frac{180}{100})} = 281 \text{ disintegrations per minute}$$

For a wide area alpha source, the MDA would approach the static 1 minute count MDA:

T = 1 minute
S_b = $\sqrt{background}$ = $\sqrt{1}$ = 1 cpm

$$MDA + \frac{3 + (4.65 * 1)}{(0.23 * 1 * \frac{A}{100})} = 18.5 \text{ dpm}/100 \text{ cm}^2$$