DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

20 September 2018

MEMORANDUM FOR NRC REGION IV
ATTN: Dr. Robert Evans

FROM: AFMSA/SG3PB

Subject: Review of the Final Status Survey Report (FSSR) of the Phase 1 of the Building 181 at Robins AFB GA

We have attached the Final Status Survey Report (FSSR) of the Phase 1 of the Building 181 of the Robins AFB GA (Attachment 1). This project was performed under the regulatory authority of ARS Radioactive Materials License No. 17-29441-01 and a project-specific License Agreement between USAF and ARS Aleut Remediation (AAR) which specifies the responsibilities of Robins AFB under Master Materials License 42-23539-01AF and the activities of AAR under the ARS license. We reviewed the draft FSSR and provided comments which have been incorporated into this document. We have also attached the copy of the Verification Survey of the cell 5 and cell 6 of the Building 181 performed by the USAF School of Aerospace Medicine Occupational and Environmental Health Department/OECM Wright-Patterson AFB, OH (Attachment 2). After NRC approves the Attachment 1, USAF selected demolition contractor will demolish the Building 181 under the supervision of AAR/ARS.

We are reviewing at present, the Phase 2 Final Status Survey Plan for Building 181 dated August 2018. We request you to review the Attachment 1 and provide your approval/comments by 1 November 2018.

If you have any questions, please contact me at 703-681-6871 or email at ramachandra.k.bhat.civ@mail.mil

Ramachandra K. Bhat, Ph.D., CHP
Senior Health Physicist
USAF Radioisotope Committee Secretariat
Air Force Medical Support Agency
Office of the Surgeon General

2 Attachments:
1. FSSR of the Phase 1 of the Building 181
2. Verification Survey by USAFSAM

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CC:
1.402 CMXG/MXDEC (Mr. Bethel)
2.78 MDG (Capt Baseley)
3. AFCEC (Ms. Cordell)
4. EPA Region IV (Mr. Richards)
5. The State of GA (Mr. Matos)
6. The State of GA (Mr. Simonton)
7. USAFSAM/OECM (Maj Shirah)

# Attachment 1

## Final Status Survey Report for Building 181

**August 2018**

***Prepared for:***
**Robins Air Force Base**

***Prepared by:***
**ARS Aleut Remediation, LLC**
**2609 N. River Road**
**Port Allen, Louisiana 70767**

ARS Aleut Remediation

# Attachment 1

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Attachment 3 – Waste Disposal Certifications (Not Available As of Date of This Report)

Attachment 4 – Building 181 Final Status Survey Results (Survey Sheets)

Attachment 5 – Instrument Certifications and Daily Source Checks

Attachment 6 – Laboratory Analytical Report for Sediment Samples

# Attachment 1

## Acronyms

| | |
|---|---|
| AAR | ARS Aleut Remediation, LLC |
| AFB | Air Force Base |
| ALARA | as low as reasonably achievable |
| ANL | Argonne National Laboratory |
| ANSI | American National Standards Institute |
| ARS | ARS International, LLC |
| C&D | Construction and Demolition |
| CFR | Code of Federal Regulations |
| CHP | Certified Health Physicist |
| cm | centimeter |
| cpm | count per minute |
| DAC | derived air concentration |
| DCGL | Derived Concentration Guideline Level |
| DoD | Department of Defense |
| DP | Decommissioning Plan |
| dpm | disintegration per minute |
| DQO | Data Quality Objective |
| DU | Depleted Uranium |
| ELAP | Environmental Laboratory Accreditation Program |
| FSS | Final Status Survey |
| FSSR | Final Status Survey Report |
| g | gram |
| HPT | Health Physics Technician |
| HVAC | heating, venting, and air conditioning |
| LAW | Large Area Wipe |
| LBP | Lead-Based Paint |
| LBGR | lower bound of the gray region |
| LLRW | low-level radioactive waste |
| lpm | liter per minute |
| m | meter |
| MARSSIM | Multi-Agency Radiation Site Survey Implementation Manual |
| MDA | Minimum Detectable Activity |
| MDC | Minimum Detectable Concentration |
| NIST | National Institute of Science and Technology |
| pCi | picocurie |
| QC | Quality control |
| RCT | Radiation Control Technician |
| RESRAD | Residual Radioactivity Computer Codes |
| RICS | Radioisotope Committee Secretariat |
| RP | Radiological Protection |
| sf | square foot |
| Th | thorium |

### Acronyms (Continued)

| | |
|---|---|
| U | uranium |
| USAF | United States Air Force |
| US EPA | United States Environmental Protection Agency |
| US NRC | United States Nuclear Regulatory Commission |
| WAC | Waste Acceptance Criteria |

# Attachment 1

## Executive Summary

The objective of the Robins Air Force Base (Robins AFB or the Base) Building 181 Final Status Survey (FSS) was to collect sufficient data to demonstrate that the residual radioactive contamination has been mitigated sufficiently to remove the site from federal and state radiological controls and permits. This document, referred to as an FSS Report (FSSR), describes: (i) the implementation of the Decommissioning Plan (DP); (ii) the results of the FSS activities; and (iii) develops conclusions based on the data.

Building 181, Cells 1 through 8, at Robins AFB is scheduled for demolition. Cells 5 and 6 in Building 181 are listed in Robins AFB Radioactive Material Permit (GA-00462-03/01AFP). The permit states that, “Building 181 remains on the permit until a Final Status Survey is conducted, a Final Status Survey Report is submitted for Building 181 (Cell numbers 5 and 6), and the United States Air Force (USAF) formally removes Building 181 from the permit.”

Building 181 was characterized for radiological contamination resulting from depleted uranium (DU) operations within the facility. Preliminary radiation surveys performed by others, as well as surveys by ARS Aleut Remediation, LLC (AAR), a subsidiary of ARS International, LLC (ARS), detected radiological contamination in Cells 5 and 6 of Building 181.

AAR performed a Baseline Survey in November and December 2015 in the portions of Building 181 that will be demolished. The baseline survey delineated areas of depleted uranium (DU) contamination in Cells 5 and 6. The other cells and rooms of Building 181 were characterized to determine if they were impacted by migration of contamination from Cells 5 or 6. The baseline survey results indicated that only Cell 5, Cell 6, Room 3A (a room located between Cells 5 and 6), and contiguous areas and utilities were radiologically impacted.

This baseline survey provided sufficient information to develop a DP for Building 181. The DP established the scope and sequence for the decontamination and FSS activities. The DP specified the means and methods for collecting sufficient data to determine whether the radiological condition of the building satisfies the criteria for release of radiological regulatory controls. This release would allow demolition debris to be disposed in a construction and demolition (C&D) debris landfill.

The numerical criteria for release, which are called Derived Concentration Guideline Levels (DCGLs), were derived for the building surfaces of Building 181 Cells 5 and 6 and for the soils underlying Building 181. Details of the derivation of the DCGLs are provided in the DP, which was approved by the USAF and the United States Nuclear Regulatory Commission (US NRC). The State of Georgia and the United States Environmental Protection Agency (US EPA Region 4) were provided an opportunity to comment on the DCGLs. The radionuclide of concern may be described as DU. The DCGL for building surfaces contaminated with DU was calculated to be

2,570 disintegrations per minute per 100 square centimeters (dpm/100 $cm^2$) of net gross beta contamination averaged over one square meter ($m^2$). In this context, the measurement of gross beta contamination net of background is used as a surrogate for measurement of DU isotopes on building surfaces. The DCGL for soil under Building 181 was calculated to be 4.6 picocuries per gram (pCi/g) of uranium-238 (U-238), where U-238 is a surrogate for the radionuclides in the decay sequence of DU. The DP requires removal of radiological contamination that exceed the building surfaces and soil DCGLs.

The DP also requires removal of DU contamination that exceeds the As Low As Reasonably Achievable (ALARA) criterion. The ALARA criterion was interpreted to mean that DU contamination that is below the DCGL should be removed if it is practicable. The DP does not provide a specific numerical ALARA limit for DU contamination. To implement the ALARA requirement, numerical guidance was applied during the FSS scanning activities. The numerical guidance was to remove localized contamination that exceeded a significant fraction of 2,570 dpm/100 $cm^2$. Removal of localized contamination below the DCGL is not required by the Multi-Agency Radiation Site Survey Implementation Manual (MARSSIM) (US NRC, 2000) and, therefore, not subject to MARSSIM criteria for elevated measurement comparisons.

The DP established two phases of activity. Phase 1 includes the decontamination and surveys needed to support the demolition of the structure (i.e., the roof, walls, floor slab, and outdoor pavement) and disposal of the demolition debris as non-radiological wastes. Phase 2 includes the surveys needed to demonstrate the release of the site, including the soil and any building material that is below the floor slab. This FSSR covers the Phase 1 activities of the DP. An addendum to this FSSR will be prepared to summarize the Phase 2 survey activities and results.

The Phase 1 radiological decontamination activities were performed using means and methods described in the DP. As of the date of this report, the resulting radioactive wastes are stored at Building 181 pending disposal at a licensed facility. This Phase 1 FSSR will be amended upon waste disposal, and the certifications of waste disposal will be attached.

Following the decontamination activities, the FSS was conducted. The MARSSIM [Nuclear Regulatory Commission Regulation (NUREG)-1575, Rev. 1] provides general guidance for performing appropriate FSS measurements. Specific FSS means and methods approved by the US NRC are stipulated in the DP. The final scanning, systematic, and biased measurements conducted following the decontamination of Building 181 did not detect contamination that exceeded the building surface DCGL of 2,570 dpm/100 $cm^2$. To demonstrate quality control, a minimum of 10 percent of the basic FSS measurements, involving more than 100 smear and static measurement locations, were replicated. The quality control measurements also indicate that no residual contamination exceeds the DCGL. The final condition of the facility is that all measurements of surface contamination are below 2,570 dpm/100 $cm^2$ of net gross beta activity. A US NRC inspection team observed the FSS activities and collected confirmatory measurements in January 2018. A USAF verification survey was performed in March 2018, after the Phase 1 FSS was completed by AAR.

It is noted that during the Cell 6 FSS activities, AAR discovered that a portion of a utility chase under Room 6A1 was constructed as a subsurface vault. Access to this confined space is through an approximately 2-foot by 2-foot square manhole located in the southern half of Room 6A1. In this report, the term "subsurface vault" is used to describe the portion of the utility chase that lies under Room 6A1. The term "pipe chase" is used to describe the portion of the utility chase that is under Room 6B1.

The scope of Phase 1 did not include surveying materials below the floor slab; therefore, the Phase 1 activity to assess the subsurface vault was limited to collecting characterization data. The accessible (i.e., non-confined space) portions of the subsurface vault in Room 6A1 were evaluated for radiological contamination in January 2018 by collecting scans, direct frisk measurements, and smears at the entrance man-hole. A sample of sediment was also collected from the vault. A characterization survey team returned to the site in April 2018 and entered the vault. The subsurface vault apparently connects eastward to the pipe chase under Room 6B1, which then exits the east end of Cell 6. Further efforts are planned to survey the subsurface during demolition of the building. An addendum to Section 5.2 of the DP is being prepared to direct this Phase 2 effort.

During the Phase 1 FSS activities, AAR also discovered that the concrete apron at the west exit of Cell 6 was contaminated above the DCGL. The area was decontaminated and the Phase 1 FSS activity was expanded to include the apron and a buffer zone as FSS survey units.

The results presented in this FSSR demonstrate that the roof, walls, and floor slab in the radiological impacted areas of Building 181 (i.e., Cell 5, Cell 6, Room 3A, and contiguous areas) have been decontaminated to levels that support deregulation of these portions of the structure. Compliance with the DCGL was demonstrated because the highest measured total reading was 2,255 dpm/100cm$^2$ and the highest single smear reading was 130 dpm/100cm$^2$.

The subsurface structures, piping, and the soils under the impacted areas (e.g., Cells 5 and 6) will be surveyed during Phase 2. The Phase 2 activities include final status surveys of: (i) the subsurface vault under Room 6A1; (ii) the piping and the pipe chase located under Room 6B1; (iii) the soil underneath Cells 5 and 6; (iv) the underside of the pavement and the soil under the concrete apron and pavement on the west side of Cell 6; and (v) the sink and shower drain lines from the Room 6B1 restroom and any drain lines encountered under the pavement on the west side of Cell 6. A separate FSS report will be prepared for Phase 2.

# Attachment 1

## 1.0 Introduction

### *1.1 Background*

Building 181, Cells 1 through 8, at Robins Air Force Base (Robins AFB or Base) is scheduled for demolition. The location of Building 181 at Robins AFB is shown on Figure 1. Cells 5 and 6 of Building 181 are listed in the Robins AFB Radioactive Material Permit (GA-00462-03/01AFP). The permit notes that, "Building 181 remains on the permit until a Final Status Survey is conducted, a Final Status Survey Report is submitted for Building 181 (Cell numbers 5 and 6), and the United States Air Force (USAF) formally removes Building 181 from the permit."

Building 181 at Robins AFB was constructed in the 1940s and originally used for testing aircraft engines. A plan view of Building 181 is shown on Figure 2. The facility was constructed to include 12 "cells" (to house the engines during testing) on the first floor, interconnecting rooms between the cells on the first floor, rooms on the second and third floors, and a limited number of subsurface rooms. After the testing of engines was curtailed, the individual cells of Building 181 were re-purposed for other uses. Cells 5 and 6 were converted to support removing depleted uranium (DU) oxidation products from DU shapes used as counterweights in various aircraft. Oxidation was removed from counterweights using manual and mechanical processes, including scraping and scrubbing the oxidation. This process resulted in loose DU contamination in the work area. The cleaned DU counterweights were wiped with isopropyl alcohol prior to being encased in aluminum screening. The process methods employed during these operations resulted in residual contamination of work areas in a portion of the building (e.g., Cells 5 and 6), including the rooms between Cells 5 and 6. The DU process is believed to be the sole source of radiological contamination within Building 181.

### *1.2 Layout of Cells 5 and 6*

Building 181 has a total footprint of approximately 70,000 square feet (sf); Cells 1 through 8 encompass approximately 64,000 sf. As shown on Figure 2, Cell 5 consists of a single open space. Cell 6 has been separated into two rooms (Room 6A1 and 6B1). A breakroom, restroom, and shower are located on the east side of Room 6B1. A two-story structure abuts the north side of Cell 6. This structure contains Rooms 3A, 3D, and 3E, which were included in the survey program.

Historical engineering drawings of Building 181, including Cells 5 and 6, indicate that a utility chase runs under the east end of Cell 6, connecting to the underground utilities that run north-to-south on the exterior of the east side of Building 181. Drain pipes were observed exiting the utility chase under Room 6B1 at the east end of the building. Presumably the utility chase includes the utility pipes from Cell 6.

There is also an electrical vault located adjacent to the overhead doors on the west end of Cell 6. There are historical drawings that indicate a 9-foot deep mechanical pit is located under Cell 6. However, ARS Aleut Remediation, LLC's (AAR) investigation of Cell 6 determined that the as-built location of the mechanical pit is under the east end of the Center Section (Room 4E) of Building 181, as shown on Figure 2.

### 1.3 Radionuclides of Concern

The radioactive contaminant of concern is DU because of the aircraft counterweight cleaning operations. The constituents of DU are U-238, U-235, U-234, and the associated decay products. DU is characterized by having the concentration of U-234 less than 50 percent of the concentration of U-238.

### 1.4 Historical Site Assessments

The portion of Building 181 that will be demolished was characterized for radiological contamination resulting from the DU operations conducted within the facility. A preliminary radiation survey performed by 78 AMDS/SGPB (Bioenvironmental Engineering) included 46 measurements for total radioactive contamination in Cells 5 and 6. Contamination was detected above 5,000 disintegrations per minute per 100 square centimeters (dpm/100 $cm^2$). The date of this preliminary survey is not known. This survey established that portions of the building were impacted.

To corroborate this survey, AAR performed a follow-up scoping survey in August 2015 that also detected radiological contamination in Cells 5 and 6 of Building 181. The survey maps and affiliated results of the surveys performed in August 2015 are summarized in the Decommissioning Plan (DP) (AAR, 2017) (Attachment 1). There were no operations in the other portions of Building 181 that would have contaminated the structure; and therefore, these areas were not surveyed during the scoping survey.

AAR subsequently performed a Baseline Survey in November and December 2015 in the portions of Building 181 that will be demolished. The baseline survey delineated the areas of DU contamination in Cell 5, Cell 6, and Rooms 3A, 3D, and 3E. The other cells and rooms of Building 181 were also characterized to determine if they were impacted by migration of contamination from Cells 5 or 6. The baseline survey results indicated that only Cell 5, Cell 6, Room 3A (a first-floor room located between Cells 5 and 6), and contiguous areas and utilities were radiologically impacted.

The baseline survey data were used to prepare the DP. The DP documented: (i) the extent of radiological contamination requiring decontamination; (ii) an overview of how the decontamination would be performed and managed; and (iii) presented a design for the Multi-

Agency Radiation Survey and Site Investigation Manual (MARSSIM) Final Status Survey (FSS), including the calculation of site-specific Derived Concentration Guideline Levels (DCGLs). The scope of the FSS also included performing several measurements of the baseline survey that were incomplete. The DP was approved by the USAF, the United States Environmental Protection Agency Region 4 (US EPA Region 4), the Georgia Environmental Protection Division (GA EPD), the Radioisotope Committee Secretariat (RICS), and the United States Nuclear Regulatory Commission (US NRC) in September 2017.

### *1.5 Purpose*

The purpose of the FSS is to determine if the radiological condition of the building satisfies the criteria for release from radiological regulatory controls. The approved DP established two phases of activity. Phase 1 included the decontamination and surveys needed to support the demolition of the structure (i.e., the roof, walls, floor slab, and outdoor pavement) and the disposal of any demolition debris as non-radiological wastes. Phase 2 included the surveys needed to demonstrate the release of the site, including the soil and any building material that is below the floor slab. This FSSR describes the Phase 1 activities of the Robins AFB DP.

The Phase 1 FSSR presents: (i) a summary of the decommissioning activities; (ii) the design of the FSS performed following decommissioning activities; (iii) the FSS field activities and procedures followed; (iv) the FSS results; (v) analysis of the FSS results; (vi) conclusions; and (vii) references.

## 2.0 Decontamination of Cells 5 and 6

In accordance with the DP, select areas of Building 181 required decontamination/decommissioning prior to performing the FSS. This section provides an overview of these activities.

The following areas of Building 181 required decontamination/decommissioning of lead-based paint (LBP) and/or radioactive material:

- Cell 5 – Radiologically contaminated LBP on the walls up to two meters within the entire cell.
- Cell 5 – LBP on the walls above two meters and ceiling (which may or may not be radiologically contaminated).
- Cell 6 – Radiologically contaminated floors (includes LBP and tile), equipment, and walls (includes LBP) in Cells 5 and 6.
- Cell 6 – The entrance to the subsurface vault under Room 6A1.
- Cell 6 – The concrete apron and pavement (west side).
- Room 3A – Radiologically contaminated floor (LBP) and threshold to Room 6A1.

The decontamination was implemented between December 2017 and February 2018 in general accordance with the DP. The decontamination was performed under the regulatory authority of ARS Radioactive Materials License No. 17-29441-01 and a project-specific License Agreement between USAF and AAR, which specifies the responsibilities of Robins AFB under Master Materials License 42-23539-01AF and the activities of AAR under the ARS license. In summary, this agreement states that AAR, a wholly-owned subsidiary of ARS, shall perform the decontamination/decommissioning work in accordance with its US NRC License No. 17-29441-01. Robins AFB shall continue to possess the radioactive material in Building 181 while it is on and within Building 181 and after it has been removed from the building surfaces and properly contained until such time the material is properly transported and disposed. Attachment 2 includes a photograph log with photographs of the decommissioning activities.

The numerical criteria for release, which are called DCGLs, were derived for both the building surfaces of Building 181 and for the underlying soil. Details of the derivation of the DCGLs are delineated in the DP. The radionuclide of concern may be described as DU. The DCGL for building surfaces contaminated with DU was calculated to be 2,570 dpm/100 $cm^2$ of net gross beta contamination averaged over one square meter ($m^2$). In this context, the measurement of gross beta contamination net of background is used as a surrogate for measurement of DU on building surfaces. The DCGL for soil under Building 181 is 4.6 picocuries per gram (pCi/g) of U-238, where U-238 is a surrogate radionuclide for all of the uranium isotopes in DU and their short-lived decay products.

### 2.1 Decontamination Summary

The decontamination included abatement of LBP greater than 1.0 milligram per square centimeter ($mg/cm^2$), or 0.5 percent by weight, and with radioactive contamination greater than the DCGL from the interior surfaces of Cell 5 and Cell 6. The DP also required removal of DU contamination that exceeded the As Low As Reasonably Achievable (ALARA) criterion. The DCGL and the ALARA criteria are developed separately in the US NRC regulations (US NRC, 2018). The DCGL is a numerical value, while the US NRC defines ALARA as:

> "making every reasonable effort to maintain exposures to ionizing radiation as far below the dose limits as practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest." (US NRC, 2018)

The DP also requires removal of DU contamination that exceeds the As Low As Reasonably Achievable (ALARA) criterion. The ALARA criterion was interpreted to mean that DU contamination that is below the DCGL should be removed if it is practicable. The DP does not provide a specific numerical ALARA limit for DU contamination. To implement the ALARA requirement, numerical guidance was applied during the FSS scanning activities. The numerical guidance was to remove localized contamination that exceeded a significant fraction of 2,570 dpm/100 $cm^2$. Removal of localized contamination below the DCGL is not required by the Multi-Agency Radiation Site Survey Implementation Manual (MARSSIM) (US NRC, 2000) and, therefore, not subject to MARSSIM criteria for elevated measurement comparisons.

The radiological decontamination included the use of strippable coatings, physical removal, and mechanical impaction/scarifying of building surfaces and equipment. Any localized spots of contamination that were found to exceed the approved DCGL after LBP removal were decontaminated by scarifying, scabbling, or chipping concrete to implement the ALARA criterion. These efforts succeeded in reducing contamination below the DCGL criteria for building surfaces.

During the decommissioning activities, surveys of the adjacent roof surfaces and the heating, venting, and air conditioning (HVAC) equipment and affiliated ductwork were performed. The adjacent roof surfaces and the powered ventilator on the roof were surveyed under MARSSIM

Class 1 criteria. The measurements were indistinguishable from background; therefore, no decontamination was performed on the roof or on the ventilation stack.

The HVAC equipment and affiliated ductwork were also surveyed under MARSSIM Class 1 specifications. The ductwork surveys consisted of both exposed exterior surface areas, as well as accessible interior surfaces. Coupon samples were cut from the ducts at bends and at locations where DU contamination might settle. The coupons, as well as the interior surfaces that were made accessible by the coupons, were surveyed. No DU contamination was found inside the Cell 6 HVAC system. Contaminated HVAC insulation in Room 6A1 was removed and will be disposed as low-level radioactive waste (LLRW). Some HVAC ductwork and other components in Room 6A1 were decontaminated. The space heaters in Cell 6 were found to be contaminated on exterior surfaces and will be disposed of as LLRW. Alternatively, the space heaters in Cell 5 were not contaminated above the DCGL and were left in place (there was not HVAC system in Cell 5).

The subsurface vault under the west end of Cell 6 Room 6A1, the soil below the concrete apron and pavement on the west side of Cell 6, and the soil under the building may be impacted; however, they cannot be accessed prior to demolition. The soil under the Building 181 Cells 5 and 6 will undergo a 100 percent gamma walk-over scan and systematic and biased soil samples will be collected following the demolition of Building 181. The post-demolition efforts (Phase 2 of the FSS) are further described in the DP.

### *2.2 Waste Management*

The radiologically contaminated waste generated during the decontamination efforts is stored in Room 3A (double bagged asbestos materials) and in a shed located outside Cell 5 (LLRW). As of the date of this report, the radioactive wastes are pending disposal at a licensed facility. This Phase 1 FSS report will be amended upon waste disposal, and the certifications of waste disposal will be attached (Attachment 3). The waste was characterized in accordance with the proposed waste disposal facility's Waste Acceptance Criteria (WAC) and will be manifested for disposal as LLRW. Prior to shipment, the wastes will be size-reduced as necessary and packaged for transport and disposal as LLRW and/or mixed waste at a licensed treatment, storage, and disposal facility (TSDF).

Other miscellaneous debris or wastes with no radiological contamination detected by the survey instruments will be disposed as construction debris waste by the demolition contractor.

## 3.0 Final Status Survey Design

This section contains discussions of the: (i) MARSSIM classification; (ii) survey units; (iii) application of release criteria; (iv) data quality objectives (DQO); (v) deviations and field changes; (vi) reference area background; (vii) data verification and validation; and (viii) the number of measurements in each survey unit. The survey design was developed in the DP and implemented during the FSS.

### *3.1 MARSSIM Classification*

Based on the results of the preliminary and baseline surveys, the decommissioning of Building 181 Cells 5 and 6 is classified as a Group 4 decommissioning project under US NRC criteria (NUREG-1757 Volume 1 Rev. 2 Figure 1.1) (US NRC, 2006), and the FSS is, therefore, subject to MARSSIM guidance. MARSSIM identifies two categories of radiological status: (i) impacted, which means having a possibility of containing radioactive contamination and a survey is required; and (ii) non-impacted, which means not considered as possibly containing significant residual regulated radioactivity. Cells 5 and 6 and the adjacent rooms, pavement, and underlying soil, are impacted; therefore, they are subject to a FSS.

MARSSIM further divides impacted areas by three classifications based on contamination potential:

- Class 1 Areas: Areas that have, or had prior to remediation, a potential for radioactive contamination (based on site operating history) or known contamination (based on previous radiation surveys) greater than release criteria.

- Class 2 Areas: Areas that have, or had prior to remediation, a potential for radioactive contamination, or known contamination, but are not expected to exceed release criteria.

- Class 3 Areas: Any impacted areas that are not expected to contain any residual radioactivity or are expected to contain levels of residual radioactivity at a small fraction of the release criteria.

MARSSIM recommends the following survey unit areas for building surfaces:

- Class 1 – Up to 100 $m^2$;

- Class 2 – Up to 2,000 $m^2$; and

- Class 3 – Unlimited.

### *3.2 Survey Units*

The MARSSIM classification system was applied to the designation of survey units (SUs) for this FSS. A SU is defined as a system, structure, or part of a structure that is likely to have similar potential contamination characteristics. Twenty SUs are listed in Table 1. There are 13 Class 1 SUs (65 percent of the total SUs); there is one Class 2 SU (5 percent of the total SUs); and six Class 3 SUs (30 percent of the total SUs).

The lower walls are defined for the survey as wall areas from the floor to a height of two meters. The upper walls are defined as wall areas that extend up to two meters above the lower walls. Ceilings are defined as wall and ceiling surfaces above the upper walls.

In three cases, the narrative of the DP included survey requirements that are not included in the listed FSS survey units. Therefore, these survey requirements were added to the scope of two adjacent survey units as follows:

- FSS-6 is a Class 1 survey of the upper walls of Room 6B1. The narrative of the DP also commits to a large area wipe (LAW) survey of the ceiling. Therefore, LAW measurements of the ceiling were added to the scope of FSS-6. The scope of FSS-6 does not include a Class 1 survey of the ceiling surfaces.

- FSS-9 is a Class 1 survey of the upper walls of Room 6A1. The narrative of the DP also commits to a LAW survey of the ceiling. Therefore, LAW measurements of the ceiling were added to the scope of FSS-9. The scope of FSS-9 does not include a Class 1 survey of the ceiling surfaces.

- The surveys of Room 3D and Room 3E that were completed after removal of asbestos tile are included as survey unit FC-2.

During the Phase 1 FSS, AAR further investigated a subsurface vault on the west end of Room 6A1 (FSS-10). Access to this confined space is through an approximately 2-foot by 2-foot square manhole located in the southern half of Room 6A1. The DP's discussion on survey unit classification (DP Section 2.3.4, *MARSSIM Classification and Survey Units*) states that:

> "water could have carried contamination into this pipe chase/trench. The probability that such contamination could exceed the DCGL is low. This survey unit will be surveyed as part of the FSS following decontamination inside Cell 5 and 6 and conducted when the USAF demolition contractor initiates the removal of this portion of the Cell 5 and 6 floors."

In DP Section 5.1, the text reads

> "the trench in Cells 5 and 6 had water in it and the trench was not surveyed during the Baseline Survey. The water will be removed during the decontamination of Cells 5 and 6. This trench will then be surveyed as a MARSSIM Class 2 area as originally planned."

The approved DP included dewatering of the pipe chase as a Phase 1 activity and placed the survey of the pipe chase in Phase 2. The DP assigned low probability to finding contamination in the pipe chase. The DP does not explicitly direct a characterization survey of the pipe chase, but such measurements are implicit, given that the chase was not characterized during the baseline survey.

An inspection of the subsurface vault during the Phase 1 activities indicated that there was no longer water in the vault and that the subsurface vault extended under the floor of Room 6A1. The vault is classified as a confined space. Because the Phase 1 scope of the DP did not include entering a confined space of this type, the characterization survey of the vault was limited to collecting scans, direct frisk measurements, and smears at the entrance manhole and the area directly below the man hole that could be accessed with remote tools. A sample of sediment was collected from the floor of the vault [sediment samples were also collected at other locations, see Section 4.7 (Sediment Samples)].

A characterization survey team returned to the site in April 2018 and entered the vault. The vault was found to be 20 feet wide, extending the length of Room 6A1 and narrowing at the west end. The vault is approximately four feet high. The subsurface vault apparently connects eastward to the pipe chase under Room 6B1, which then exits the east end of Cell 6, as previously described. The floor is damp and covered with sediment and debris. A sump containing water was discovered at the west end of the vault.

Characterization data were collected and are presently being analyzed. The results will be reported in a supplemental work plan that is being developed to address remediation and decontamination prior to demolition of the pipe chase. The results will be reported in an addendum to this FSSR.

The scope of this FSS survey activity also included completion of the baseline survey of the concrete apron and pavement on the west side of Cell 6. The completed baseline survey results exceeded the building surface DCGL. This result was an unexpected discovery. The pattern of the contamination was consistent with migration of contamination by historical operations involving DU being dispersed during loading or unloading operations on the apron or migrating out of Room 6A1 when the entrance door was opened. This contamination may have then spread as the result of wind, rain, or operational activities. The discovered contamination was removed, and the Phase 1 FSS activity was expanded to ensure that no other contamination was present above the DCGL in this area.

### 3.3 Application of Release Criteria

The release criteria include DCGLs and administrative actions for ALARA (i.e., actions that affect implementation of the release criteria). The DCGLs were applied as strict numerical criteria. The ALARA criterion was applied during the scan surveys by removing spots of significant contamination that were below the 2,570 dpm/100 cm$^2$ DCGL, but were in localized areas of contamination, relative to the average contamination in the survey unit.

The derivation of the surface contamination DCGL assumed that ten percent of the surface contamination was removable. This assumption does not constitute a DCGL per se. Rather, it is a data quality objective that must be evaluated during the validation process.

#### 3.3.1 Derived Concentration Guideline Levels

DCGLs were derived for the building surfaces of Building 181 and for the soil beneath Cells 5 and 6. Details of the derivation of the DCGLs are contained in Appendix B of the DP: "*Building 181 RESRAD Modeling Robins Air Force Base, Georgia*" (Geosyntec 2016).

RESRAD-Build was used to derive the DU surface contamination value that would cause a total effective dose equivalent of 25 millirem per year (mrem/yr) to a worker. The derived value was 2,570 dpm/100 cm$^2$ using the assumption that ten percent of the total amount of radioactivity was removable contamination. This DCGL includes the radioactivity contributions from each of the three uranium isotopes (U-238, U-235, and U-234) present in DU. This combined DCGL was used because the hand-held radiation detectors used for the survey sum the contribution of the radiations emitted from all isotopes. The radiation dose equivalent contributed by each of the uranium isotopes is included in the DCGL calculation. No sum-of-fractions calculation for each of the isotopes is required because the DCGL for DU was computed considering the contribution of each uranium isotope and its decay products.

The assumption that removable contamination does not exceed ten percent of the DCGL will be tested and validated by measuring removable contamination during the FSS activity. The assumption that removable contamination does not exceed ten percent of the DCGL does not impose a distinct DCGL of 257 dpm/100 cm$^2$ for removable gross beta contamination. However, there is an obligation to ensure that the smear measurements are sufficiently sensitive to test and validate this assumption, and that the final results conform to the dose objective.

The soil DCGL was developed based on the US NRC's radiological criteria for unrestricted use of 25 mrem/yr (10 CFR 20.1402). A combined DCGL of 5.42 pCi/g for depleted uranium was calculated from the individual radionuclide DCGLs using the gross activity equation with the site-specific radionuclide fractions determined from the baseline survey. The combined DCGL was multiplied by the site-specific fraction of U-238 (85 percent) to obtain a surrogate DCGL of 4.60

pCi/g (i.e., achieving a U-238 concentration of 4.60 pCi/g will maintain a depleted uranium concentration of 5.42 pCi/g and satisfy the dose criterion). A surrogate DCGL for soil based on U-238 concentration is appropriate because depleted uranium is the sole radioactive contributor to risk, and the sum-of-fractions criterion is not applicable.

#### *3.3.2 Application of Release Criteria*

According to the DP, a survey unit may be released if the survey data satisfy the DCGL criteria and the ALARA criterion. The building surface DCGL and the soil DCGL are applied separately because exposure from soil will not occur until the building is being demolished and the limits are based on annual exposures. The surface activity DCGL (2,570 net dpm/100 cm$^2$) is applied to building surfaces as a limit to the average concentration in a square meter for MARSSIM evaluations or as a limit to the individual results of static measurements for ALARA criteria.

There is no need to perform non-parametric statistical analyses if the individual scanning and statics measurement results do not exceed the surface contamination DCGL.

The expected soil concentration guides the classification of soil survey units after demolition. Phase 1 of the FSS did not include soil samples; however, the sediment samples are relevant to estimating potential soil concentrations. The ratio of U-234 to U-238 in DU is used to distinguish natural U-238 from U-238 associated with DU. Except for the subsurface vault under Room 6A1, volumetric characterization surveys of building sediments or debris that were conducted during this FSS do not present U-238 results that exceed the DCGL for soil. The soil under the impacted areas will be surveyed in Phase 2 after demolition of the building.

Application of the ALARA criterion is distinct from the MARSSIM FSS process. Surface radioactivity that is below the DCGL may be removed under ALARA without triggering elevated measurement criteria actions under MARSSIM and without causing reclassification or resurveying of a survey unit.

#### *3.3.3 Investigation Levels*

Investigation levels were established for scanning surfaces with floor monitor probes. The investigation level implements the MARSSIM requirement to investigate elevated scan results so that small areas of elevated radioactivity may be detected, if present. The FSS used the LM43-37 probe, which has 584 cm$^2$ of active area, for scanning large areas. For calculating the investigation level, the LM43-37 probe was assumed to have 100 cm$^2$ of active area, which is a significant conservatism. The investigation level was set at 50 percent of the DCGL for a 100 cm$^2$ active area probe, which is 1,285 net dpm. When the minimum detectable concentration (MDC) is based on equal false positive and false negative errors, and the MDC is equal to the DCGL, the investigation level is 2.33 sigma values above background, and the investigation level is 50 percent of the

DCGL. When the MDC is less than the DCGL, the investigation level is still 2.33 sigma values above background, but it is less than 50 percent of the DCGL. The DP used the terms MDC and minimum detectable activity (MDA) interchangeable. This report follows that convention.

Background levels were measured daily in Cell 4 using the same measurement methods that were implemented in the impacted areas. The investigation levels were calculated daily in terms of gross counts per minute. The survey spreadsheets were programmed with conditional formatting so that the scan results above the daily investigation level (or static results above the DCGL) were highlighted in red font on a pink fill. The LM43-37 probe has 584 $cm^2$ of open area. Any scan result of a one square meter area with an LM43-37 probe that exceeded the daily investigation level resulted in a follow-up 100 percent scan survey with an LM43-93 or LM43-89 probe. The LM43-93 probe has 100 $cm^2$ of open area. The LM43-89 probe has 125 $cm^2$ of active area. If all other factors are equal, the LM43-89 probe is more sensitive than the LM43-93 probe. The location showing the highest count rate was subjected to a one-minute static measurement and a smear sample.

When a 100 percent scan of a one square meter area was initially performed with an LM43-93 or LM43-89 probe, the location showing the highest count rate was subjected to a one-minute static measurement and a smear sample. In this case, the use of an investigation level was not applicable.

### *3.4 Data Quality Objectives*

The DQO process and a graded approach are integrated within the MARSSIM process. The objective of the FSS is to demonstrate that the radioactive contamination has been sufficiently mitigated to support removal of Building 181 from the Robins AFB Radioactive Material Permit (GA-00462-03/01AFP). Removal of the building from the permit will allow disposal of building materials in a permitted construction and demolition (C&D) landfill. An initial survey, called the baseline survey, was performed to characterize the contamination, and provide a technical basis for the DP. The present survey, which follows the decontamination activity, is the MARSSIM FSS.

Instruments were calibrated according to American National Standards Institute (ANSI) N323A-1997. The survey methods specified in applicable AAR operating and technical procedures have been documented to provide a 95 percent confidence level in detection of surface contamination at values that satisfy the requirements of this FSS. The MDCs did not exceed 50 percent of the DCGL. The MDCs are recorded on each daily survey form.

Instruments were checked daily with traceable sources before use to assure they are operating within approximately 20 percent of their calibrated intrinsic efficiencies. Efficiencies are provided on each survey form.

Measurement accuracy and precision are approximately 20 percent. Completeness is assured by meeting the minimum surface area scan coverage requirements of MARSSIM (i.e., greater than 80 percent useable data).

The surveys were performed by trained Health Physics Technicians (HPTs) who followed standard procedures and who used properly calibrated instruments, as specified in the DP. HPTs were qualified in accordance with ARS' radiological protection (RP) procedure RP-29, *Radiological Control and Survey Technician Training*. Surveys were performed in accordance with ARS procedure RP-10, *Radioactive Contamination Control and Monitoring* and the ARS Operational Guide for Contamination Monitoring. Instrument background and performance was checked each day according to ARS procedures RP-52 and RP-53, *Setup and Operability Tests of Portable Field Instruments* and *Operability Tests – Field Instruments*.

Quality control (QC) verification measurements were performed on ten percent of the FSS static and smear measurements. The field QC verification measurements were generally performed by a dedicated QC HPT who did not perform the original measurements and who used a different instrument. QC instruments were tested daily to ensure that the instrument response was within 20 percent of the expected result. Smears were not counted by the same HPT that collected the smear samples.

During actual operations, a Certified Health Physicist (CHP) observed measurements and reviewed FSS field documentation. In addition, the CHP reviewed and evaluated the data collected during the FSS in support of this FSSR.

### 3.5 Deviations and Field Changes

Deviations between the FSS described in the DP and the FSS that was implemented in the field are presented below.

- The survey units were given sequential numerical designations. This is an administrative change, not a technical change, relative to the DP.

- The SU for the lower walls of Cell 5, which was a single Class 1 SU in the DP, was divided into two Class 1 SUs because the area of the lower walls was found to exceed 100 square meters. This is a technical change required to conform to MARSSIM. The actual surveyed area exceeds the minimum requirements of the approved DP, which is conservative.

- The floor of the foyer on the east side of Cell 6B1, which comprises approximately two square meters of concrete, was added to the scope of the Class 1 floor survey of Cell 6B1. The omission of this area from the scope of the floor survey was an administrative oversight.

- The ceiling of Room 6A1 was surveyed with scans, systematic statics, and smears. This exceeds the requirements of the DP, which specified only LAWs. The additional effort was performed due to the discovery of contamination above the DCGL on the heaters in the upper wall of the SU.

- The SU for the floor of Cell 6A1, which was a single Class 1 SU in the DP, was divided into two Class 1 SUs because the area of the floor was found to exceed 100 square meters. This is a technical change required to conform to MARSSIM.

- The HVAC system was added to the list of survey units because the DP narrative committed to a Class 1 survey of this equipment. The omission of these SUs from the table of SUs in the DP was an administrative oversight.

- Spots of contamination above the DCGL were found on the Cell 6 concrete apron and adjacent pavement. The designation of the concrete apron at the west exterior of Cell 6A1 was changed from Class 3 to Class 1. The survey area was also expanded to include the electrical utility vault that is contiguous with the Cell 6 concrete apron and a portion of the pavement in the yard that was contaminated.

- An additional SU was created as a buffer zone around the new Cell 6A1 apron SU in compliance with MARSSIM guidance. This is a technical change caused by discovery of contamination.

- An additional SU was added for investigation of soil under the Cell 6 apron and adjacent yard area after demolition.

- The utility chase described in the DP was found to be configured as a subsurface vault. Phase 1 survey plans were modified to include confined space entries. The scope of work in Phase 2 will be modified to address the subsurface vault under a separate work plan.

- AAR generally conducted its field QC measurements with different radiological instruments and on different days, which resulted in the QC measurements being similar but not identical to the primary MARSSIM measurements documented during the FSS. AAR's quality objective was to verify that no contamination above DCGLs existed in the survey units.

- All field QC measurements were performed by a qualified HPT who did not perform the initial MARSSIM measurements. Generally, the QC HPT used a different field instrument, but in some cases, excessive out-of-service instruments required use of the same instrument.

- The MDC for individual smears typically exceeded the sensitivity quality objective for removeable gross beta of 129 dpm/100cm$^2$. The highest individual smear MDC was 135 dpm/100cm$^2$. This exceedance is within the 20 percent DQO for conformance. The MDC for the average removeable gross beta contamination in a survey unit did not exceed 32 dpm/100cm$^2$ (Section 6.3)

- QC smears were collected by a dedicated QC HPT and counted on the same smear counter that was used for the primary MARSSIM smears. The back-up counter was reserved for counting air samples.

### 3.6 Reference Area Background

The reference radiation background was measured inside Cell 4 because: (i) the construction materials in Cell 4 are similar to materials in Cells 5 and 6; (ii) Cell 4 does not have a history of operations with DU; and (iii) contamination was not found in Cell 4. Therefore, Cell 4 is not an impacted area.

### 3.7 Data Verification and Validation

Data verification and validation ensured that the DQO process was implemented within the FSS process. Data verification involves comparing the type and quantity of data and documentation that were collected against the acquisition requirements of the DP. Data validation involves a review to ensure the data and documents satisfy the technical qualification requirements of the DP.

During the FSS activities, data verification was implemented by the CHP and the HP Supervisor, who independently reviewed the data packages for each survey unit to verify the type and quantity of data and documentations. Ten percent of the data points were repeated by a QC technician (who did not perform initial measurements).

Data validation was implemented by ensuring that each type of measurement was qualified prior to use. Instruments were calibrated according to ANSI N323A-1997. Survey instruments and methods, including smear sampling methods, were documented to provide a 95 percent confidence level in detection of surface contamination at levels not exceeding 50 percent of the DCGL. Instruments were checked daily before use to assure they are operating within approximately 20 percent of their calibrated intrinsic efficiencies. Qualification criteria are provided on each survey form (Attachment 4). Data were reviewed for completeness and compliance.

### 3.8 Number of Measurements

Scanning is the process of traversing a surface carefully with a probe to detect radioactivity. Scanning was performed with field survey instruments, with the exception of the LM2929, which was used for static counts. Scanning was performed on 100 percent of the Class 1 SU surfaces and 10 percent of Class 3 SU surfaces; the one Class 2 SU is included under the scope for the Phase 2 FSS activities.

Static measurements are performed by holding the detector probe stationary approximately 0.25 inches above the surface of a material and recording the number of counts observed in a minute. A static measurement was collected in each scanned grid element (one square meter). Additional random systematic static measurements were collected in most of the SUs to be conservative. A minimum of 15 direct static measurements were required for each survey unit according to the DP. The locations of the static measurements were systematic in Class 1 survey units and judgmental in Class 3 survey units. The actual number of static measurements ranged from 24 to 125 depending on the SU.

In addition to the static measurements, removable contamination measurements using swipes were performed at each static measurement location. Swipe measurements are performed by rubbing a filter paper with moderate pressure over an area of 100 $cm^2$ to sample removable contamination. The radiations emitted from the filter paper are then counted on an LM2929. Since the swipe measurement results in this FSS did not exceed the DCGL, no further analysis was performed. Background levels for the field portable instruments were measured daily in Cell 4.

## 4.0 FSS Field Activities and Procedures

Following the decontamination of the radiologically contaminated areas of Building 181 as summarized in Section 2.0, a MARSSIM FSS was performed on the decontaminated surfaces. The photograph log in Attachment 2 includes photographs of the FSS activities.

### *4.1 Survey Staff*

The FSS activity was organized and staffed as described in the DP (Attachment 1).

### *4.2 Survey Instruments*

The selection and use of survey instruments conformed to the DP. Instrument calibration and certification data are provided in Attachment 5.

#### *4.2.1 Selection and Types*

The field survey instruments that are specified in the DP were used to perform the FSS. The 584 $cm^2$ (active area) LM 43-37 and LM 43-37-1 gas flow probes were generally used for scanning floor and walls. If the surface was not sufficiently level to provide a suitable geometry for measurement or if the handling of a large probe was inadvisable for ergonomic reasons, an LM43-93 or LM43-89 probe was used for initial scanning. The LM43-37s were paired to Ludlum Model 2221 scalers. The LM43-93s and LM43-89s were paired to LM4360 meters. Scanning results were recorded for each nominal one square meter grid element.

Ludlum gas flow proportional detectors were operated with LM2221 meters that were set to the 30 second integration mode. For each scan, the daily instrument background was added to the number of counts that would constitute 1,285 dpm of net beta activity per probe area. This quantity was programmed into the survey reports as conditional formatting that caused the result to appear in red font if the LM43-37 measurement exceeded the investigation level. In such cases, the affected grid element was resurveyed with the LM43-93 or LM43-89 probe.

When the LM43-93 or LM43-89 probe was used for scanning, the entire grid element was scanned at prescribed speed and distance. A one-minute static measurement and a smear were collected at the location of highest scan count rate.

The LM43-93 or LM43-89 probe was used to make total surface beta contamination measurements that were compared to the DCGL.

A Ludlum Model 2929 counter coupled with a Ludlum 43-10-1 dual phosphor detector was used to analyze swipes for removable alpha and beta/gamma contamination. The swipes were collected over 100 $cm^2$ areas and analyzed for removable alpha and beta/gamma contamination.

### *4.2.2 Calibration*

Instruments were calibrated according to ANSI N323A-1997 as documented by the calibration certificates that are provided in Attachment 5.

### *4.2.3 Daily Checks*

Daily performance tests were conducted with National Institute of Science and Technology (NIST) traceable sources prior to survey activities. No instruments exhibiting questionable performance were used in the FSS. Instruments were checked daily to assure operation within approximately 20 percent of calibrated efficiencies. The CHP reviewed all instrument source and background check results. Pertinent instrument data are provided on each FSS survey report form.

### *4.2.4 Probe Area Correction*

The active area of the LM43-93 probe is 100 $cm^2$; and therefore, no probe area correction is required for comparison to the DCGL. The active area of the LM43-89 probe is 125 $cm^2$. When individual surveys are conducted only with the LM43-89, the net counts were divided by the factor 1.25. If an individual survey involves both the LM43-93 and the LM43-89, the net counts were not corrected, which is conservative. The active area of the LM43-37 probe (584 $cm^2$) was conservatively assumed to be 100 $cm^2$ when calculating investigation levels.

### *4.2.5 Efficiency*

The calibrated 2 pi efficiencies were used for the FSS probes, as recommended in MARSSIM. The calibrated Sr-90/Y-90 source efficiency and a 0.50 surface efficiency factor were used for beta particles, according to NUREG 1507. The calibrated thorium-230 (Th-230) source efficiency and a 0.25 surface efficiency were used for alpha radiation, also per NUREG 1507. Note that the alpha radiation measurements were recorded for information only. The net gross beta measurement results were used to assess if a surface met the DCGL.

The beta source efficiency was measured using a S-90/Y-90 radiation source traceable to the NIST. The beta radiation energies from Sr-90/Y-90 closely match the beta radiation energies from thorium-234 and protactinium-234, which are decay products of U-238 in secular equilibrium with U-238. The alpha source efficiency was measured using a Th-230 source traceable to NIST, which matches the alpha energy of uranium-238. Alpha efficiencies were not used to calculate activity for comparison to the DCGL. Typical beta efficiencies and MDCs are shown in Table 2. The actual efficiencies are provided on Page 1 of the calibration report for each probe. These reports are provided in Attachment 5.

### 4.2.6 Sensitivity

With typical background counts and detector efficiencies, the MDCs of the radiation detection instruments used for this survey were adequate to meet the DCGLs. The MDC is used to express radiation detection instrument sensitivity. The MDC is the level of radioactivity that, if it were present, would be above the investigation level with 95 percent reliability. The MDC is a value that includes the statistical variation in the background count rate and the statistical variation in the sample count rate.

Equation 1 is used to calculate the scanning MDC, which is derived from equations 6-8 and 6-9 of MARSSIM. Equation 2 shows the equation for calculating the static MDC, which is derived from equation 6-7 and equation 6-15 of MARSSIM.

*Equation 1. Scan MDC*

$$\text{MDC} = (1.38 * (\text{bcs} * i)^{0.5} * 60/i) / (0.75^{0.5} * \text{A} * \text{es} * \text{ei})$$

where:

- 1.38 is the index of sensitivity for a true positive proportion of 0.95 and a false positive proportion of 0.60;
- bcs is the background count rate in counts per second;
- *i* is the measurement interval for this survey (1 second for both the Ludlum 43-93 and the Ludlum 43-89 detector);
- 0.75 is the observer efficiency (for experienced surveyors);
- A is the area of the detector in units of 100 $cm^2$, which is 1 for the LM43-93 or LM43-37 series probes and 1.25 for the larger LM43-89 probe;
- es is the surface efficiency; and
- ei is the source efficiency.

For example, using the values in Table 2, the scan MDC of the LM 43-89 probe in Table 2 is calculated as:

$$\text{MDC} = (1.38 * ((500/60) * 1)^{0.5} * 60/1) / (0.75^{0.5} * 1.25 * 0.22) = 1{,}000 \text{ dpm}/100 \text{ cm}^2.$$

Note that the MDC was rounded down. The values in Table 2 are calculated using a one second measurement interval for the LM43-93 and LM43-89 probes. The measurement interval for the LM43-37 probe is two seconds. Using the LM43-37 probe as an example, the scan MDC is:

$$MDC = (1.38 * ((1000/60) * 2)^{0.5} *60/2)/ (0.75^{0.5} *1* 0.22) = 1{,}250 \text{ dpm}/100 \text{ cm}^2.$$

*Equation 2. Static MDC*

$$MDC = (3/ts + 3.29 * sn)/ (A * es * ei);$$

$$sn = (60*bcs/ts + 60*bcs/tb)^{0.5}$$

where:

- 3 is a statistical parameter related to reliability;
- 3.29 is a statistical parameter that represents 95 percent confidence with equal background and static count times;
- sn is the propagated uncertainty of the net count rate (e.g., MARSSIM equation 6-15);
- ts is the gross sample count time (min); and
- tb is the background sample count time (min).

The count time used for the LM43-93 and LM43-89 probes was one minute; the count time for the LM43-37 series probes was 30 seconds. The background time for all probes was one minute for calculating sensitivity; longer background count times were used in the field to be conservative. Using the values in Table 2, the static MDC of the LM 43-89 probe in Table 2 is calculated as:

$$sn = (60*(500/60)/1 + 60*(500/60)/1)^{0.5} = 1000^{0.5} = 31.62$$

$$MDC = (3/1 + 3.29*31.62)/ (1.25*0.22) = 390 \text{ dpm}/100 \text{ cm}^2.$$

Using the LM43-37 probe as an example, the static MDC is:

$$sn = (60*(1000/60)/0.5 + 60*(1000/60)/1)^{0.5} = 3000^{0.5} = 54.77$$

$$MDC = (3/0.5 + 3.29*54.77)/ (1*0.22) = 850 \text{ dpm}/100 \text{ cm}^2.$$

### 4.3 Survey Methods

A one-meter square grid was established on all MARSSIM Class 1 SUs and on the Class 3 floor SUs. Grid boundaries were marked with indelible marker or paint. The numbering convention for the square meter grid was generally "SRC" under the convention that:

- S denotes the type of surface, where F denotes floor, W denotes wall, and C denotes ceiling;
- R denotes rows, which are letters; and
- C denoted columns, which are numbers.

For example, FA1 will denote a floor location at Row A, Column 1.

Because floors are noted on the survey forms and distinguishable by inspection in the field, the "F" designation was not always applied. The rows were typically incremented from west to east. The columns were typically incremented from north to south. Survey data were documented in accordance with DP requirements. The final measurement locations were marked in the field and numbered on survey reports. The survey reports are included in Attachment 4.

Note that the instrument results were not corrected for the open detector area of the 821 $cm^2$ Ludlum 43-37-1 or the 584 $cm^2$ Ludlum 43-37. No correction was made because the contamination under the detector was not known to be uniform. If the contaminated area was less than the detector's active area, using the full area would underestimate the sensitivity. To be conservative, the assigned area of the LM43-37 probe did not exceed 125 $cm^2$, which is the area of the LM43-89 probe, for the purpose of calculating the value of the scan MDC. Therefore, the approach taken in this survey is to apply a conservative investigation level and use LM43-93 or LM43-89 probes for calculating surface contamination area concentrations.

The LM43-93 has an active area of 100 $cm^2$. The LM43-89 has an active area of 125 $cm^2$. If the LM43-89 was used exclusively for a series of measurements, the count rate results were corrected to normalize the reported contamination to a 100 $cm^2$ area.

The HPT performed a one-minute static measure and collected a smear at the location of the highest scanning count rate. The survey spreadsheet was programmed to identify LM43-37 scan results that exceeded 50 percent of the DCGL (1,275 dpm), which corresponds to approximately 2.33 sigma values above background. The HPT investigated any areas presenting above 1,285 dpm on an LM43-37 by scanning affected grid elements with the smaller probes.

### 4.4 Gridding

Class 1 SUs were divided into grid elements for scanning by marking lines at one-meter intervals in vertical and horizontal planes. Class 3 SUs were generally not gridded for scanning; instead, the locations for scanning, statics, and smears in Class 3 SUs were selected according to process knowledge. Process knowledge was applied so that locations that were most likely to be contaminated were selected for scanning in Class 3 SUs. However, floors and pavement were always gridded because it was practicable and because floors were most likely to require upgrading. In this FSS, for example, the SU for the Cell 6 concrete apron was upgraded to Class 1 during the FSS survey, and an additional Class 3 SU was added as a buffer zone.

Systematic sampling locations were typically laid out on a random-start triangular grid, as specified in MARSSIM, for the Class 1 SUs. Typically, a pattern based on a two-meter-sided isosceles triangle was marked on the SU. This resulted in significantly more than 15 systematic sample locations in most SUs, which was conservative. Drawings of the basic grid locations in Cells 5, Room 6B1, Room 6A1, and Room 3A are provided on Figures 3, 4, 5 and 6, respectively.

### 4.5 Static Measurements

At a minimum, static measurements were collected at systematic sampling locations and at the highest location in grid elements that exceeded the LM43-37 investigation level. The LM43-93 or LM43-89 probe was used to measure surface contamination for comparison to the DCGL. Measurements were made with the detector held approximately 0.25 inches above the surface being measured. A one-minute count was performed, which achieved a MDC less than 50 percent of the DCGL. The terms MDA and MDC are generally interchangeable in this FSSR.

Biased direct measurements were made at locations where the HPT noted an LM43-37 scan measurement result greater than the investigation level. The purpose was to search for potential discrete areas of contamination that exceeded the DCGL.

Figures 7 and 8 show the location of the basic static sample locations in Cell 5, Cell 6, and Room 3A, respectively.

The gross detector response in the alpha channel was reduced by the area background (net count) and corrected for detector efficiency (both source and intrinsic) to yield dpm/100 cm$^2$ readings. Note that the decision to decontaminate an area and the success of the decontamination in meeting the DCGL were always based on the direct (static) beta measurements.

### 4.6 Smear Samples

Smear samples were collected wherever static measurements were collected for FSS purposes. Smears were wiped over an area of 100 $cm^2$; the alpha and beta activity on the sample was counted in the Ludlum Model 2929 low-background counter.

### 4.7 Sediment Samples

In addition to the surface contamination surveys that are required by the DP, sediment samples were collected in the electrical vault on the west side of Cell 6 (Attachment 2, Photograph 26), in the pipe chase on the east side of Cell 6 (Attachment 2, Photographs 24 and 25), and from the subsurface vault under Room 6A1 (Attachment 2, Photographs 4 and 18). These samples were collected for characterization purposes to inform planning for Phase 2 of the FSS. Note that the soil under the impacted portions of Building 181 was not sampled. The soil under the impacted portions of Building 181 structure will be surveyed after the building has been demolished.

The sediment samples were collected using hand trowels. The samples were placed in zip-lock bags, double bagged in the field, and then triple-bagged prior to shipping to mitigate potential cross-contamination.

The samples were sent to the ARS' Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) accredited laboratory in Port Allen, Louisiana under chain-of-custody. The sediment samples were analyzed by gamma spectroscopy and by alpha spectroscopy for U-238, U-235, and U-234.

### 4.8 Air Monitoring

Air sampling was performed with stationary pumps that operated for an entire work shift at approximately 40 to 60 liters per minute (lpm) or with portable breathing zone samplers that operated during a work activity at approximately 3 lpm. A total of 34 air samples were collected over a period of 23 working days. The total internal exposure resulting from all samples was 7.41 derived air concentration hours (DAC-hrs), based on beta radioactivity measurements of the air filters and the most restrictive occupational air concentration limit (2E-11 microcuries/ml per 10 CFR 20, Appendix B, Table 1, Class Y) for U-238. Of this total potential exposure, 6.31 DAC-hrs was associated with breathing zone samplers and 1.10 DAC-hrs were associated with general area air samples. The highest general area and breathing zone air samples were recounted to verify that the measurements were reproducible.

The general area air samples were simultaneously collected in the general area of indoor decontamination activities and immediately outside the building's roll-up doors. The conversion factor for assigning dose from internal exposures is 2.5 millirem per DAC-hr. The general area internal dose for the project was, therefore, approximately 3 millirem. This dose is below the US NRC threshold for recording internal or external radiation doses from occupational exposures (500 millirem) and below the US NRC limit for exposure to members of the public (100 millirem) (US NRC, 2018).

Breathing zone samplers were carried by individuals when decontamination work would likely result in potential airborne radioactivity. Such work was always performed by workers who wore respirators. Among the workers who wore respirators and carried breathing zone air samplers, the highest exposure was 3.37 DAC-hrs. The corresponding radiation dose was 7 millirem. This dose is below the US NRC threshold for recording internal or external radiation doses from occupational exposures (500 millirem) (US NRC, 2018) and below the US NRC limit for exposure to members of the public (100 millirem) (US NRC, 2018). The affected workers wore a negative pressure air-purifying respirator, which would have significantly reduced the inhalation dose. For conservatism, the natural airborne radioactivity was not subtracted from the air sample result. Air sampling data are provided in Table 3. Exposure was calculated by converting air sample readings to radioactivity concentrations and applying a conversion factor. For example, Air Sample No 1:

$$EXP_{U\text{-}238} = (A_{beta}/2.22E{+}6)/(AF{*}T_{AF}{+}{*}1E{+}3{*}2E{-}11) = 0.04$$

where:

- EXPU-238 is the internal exposure (DAC-hrs);
- Abeta is the U-238 activity (dpm);
- 2.22E+6 is the conversion factor from activity in dpm to microcuries (μCi);
- AF is the flow rate of air into the filter sample (lpm);
- TAF is the duration of air sampling (minutes);
- 1E+3 is the conversion factor from volume in liters to milliliters (mL); and
- 2E+11 is the conversion factor from concentration in μCi/mL to DAC-hrs.

For Air Sample No. 1, this calculation yields:

- $EXP_{U\text{-}238} = (5.4E{+}0/2.22E{+}6)\ (600/60)/(50{*}600{*}1E{+}3{*}2E{-}11) = 0.04$

An air sample number with an “R” indicates a recount of a previous result.

## 5.0 Survey Results

This section provides details of the radiological FSS measurements that were performed in each SU. The results are summarized in Table 4, which provides the highest readings and the highest MDCs in each survey unit. The highest MDC is provided to show that all measurements were performed with adequate sensitivity. The highest measurements are provided to show that all survey units in Phase 1 comply with the DCGL requirement. The highest MDC may not be applicable to the highest contamination reading. The MDCs for static readings and for scanning with the LM43-37 class instruments were calculated for each survey report. In cases where the LM43-37 class instruments were not used for scanning, the scanning MDC was obtained from Table 2. Note that negative readings are expected in large surveys due to variations in natural background between the location of sampling and the location of the background measurement. These variations may be due to differences in materials, temporal changes, or statistical fluctuations. In an ideal environment in the absence of regulated radioactivity, 50 percent of all measurements would be negative due to statistical fluctuations. Additional analyses and reviews are provided in Section 6.0 (Analysis of Data).

### *5.1 Survey Unit FSS-1*

This survey unit area is divided into two Class 1 SUs: (i) FSS-1A, the south and east lower walls of Cell 5; and (ii) FSS-1B, the north and west lower walls of Cell 5.

#### *5.1.1 FSS-1A*

This SU is comprised of 68 grid elements that were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 26 dpm/100 cm$^2$ of removable beta contamination and 318 dpm/100 cm$^2$ of total contamination.

One grid element on the south wall, SW-P2, presented a 30 second scan count above the investigation level. The grid element was later rescanned with an LM43-93 probe. The rescan recorded 47 dpm/100 cm$^2$ of removable beta contamination and 134 dpm/100 cm$^2$ of total contamination. The MDCs were 132 and 292 dpm/100 cm$^2$, respectively.

There were 30 systematic measurement locations in FSS-1A; the highest smear and static readings recorded were 111 dpm/100 cm$^2$ of removable beta contamination and 155 dpm/100 cm$^2$ of total contamination.

The standard deviation of the systematic static measurements was 319 dpm/100 cm$^2$. The highest scan MDC was 765 dpm/100 cm$^2$. The highest smear and statics MDCs were 133 and 371 dpm/100 cm$^2$, respectively.

#### 5.1.2 FSS-1B

This SU is comprised of 68 grid elements that were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 53 dpm/100 $cm^2$ of removable beta contamination and 357 dpm/100 $cm^2$ of total contamination.

No grid element presented a 30 second scan count above the investigation level.

There were 30 systematic measurement locations; the highest smear and static readings recorded were 62 dpm/100 $cm^2$ of removable beta contamination and 309 dpm/100 $cm^2$ of total contamination.

The standard deviation of the systematic static measurements was 297 dpm/100 $cm^2$. The highest scan MDC was 765 dpm/100 $cm^2$. The highest smear and statics MDCs were 135 and 417 dpm/100 $cm^2$, respectively.

### 5.2 Survey Unit FSS-2

FSS-2 is a Class 3 survey unit comprising of the floor of Cell 5, which includes 96 $m^2$ of scannable floor area. Because the survey unit is entirely flooring, every grid element was surveyed as an ALARA protocol. This exceeds the minimum requirements for a Class 3 survey unit, which is 10 percent of the area.

This SU is comprised of 99 grid elements that were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 58 dpm/100 $cm^2$ of removable beta contamination and 272 dpm/100 $cm^2$ of total contamination.

No grid element presented a 30 second scan count above the investigation level. However, two grid elements were rescanned based on the HPT's judgment. The highest results from the rescans were 17 dpm/100 cm2 of removable beta contamination and 456 dpm/100 cm2 of total contamination.

There were 28 systematic measurement locations; the highest smear and static readings recorded were 83 dpm/100 $cm^2$ of removable beta contamination and 544 dpm/100 $cm^2$ of total contamination.

The standard deviation of the systematic measurements was 248 dpm/100 $cm^2$. The scan MDC was 683 dpm/100 $cm^2$. The highest smear and statics MDCs were 133 and 411 dpm/100 $cm^2$, respectively.

### 5.3 Survey Unit FSS-3

FSS-3 is a Class 3 survey unit comprising the upper walls of Cell 5 (136 $m^2$) and the ceiling of Cell 5 (131 $m^2$). The minimum number of 1 $m^2$ grid elements for a Class 3 survey unit, which is 10 percent of the area, is 27. In the field, 24 square meters were scanned on the upper walls and 15 grid elements were scanned on the ceiling as an ALARA activity. The grid elements were selected by the judgment of the HPT, according to likely locations for contamination. This exceeds the minimum requirements. The light fixtures were surveyed as additional measurements. The highest reading on a light fixture was 85 dpm/100 $cm^2$ of total contamination.

This SU was scanned with the LM43-89 probe. A static and a smear were collected at the location of the highest count rate in each selected grid element. The highest smear and static readings recorded in association with the scan were 59 dpm/100 $cm^2$ of removable beta contamination and 196 dpm/100 $cm^2$ of total contamination.

There were 22 judgmental systematic measurement locations. The highest smear and static readings recorded were 45 dpm/100 $cm^2$ of removable beta contamination and 641 dpm/100 $cm^2$ of total contamination. Seven of the 22 systematic measurements presented residual contamination above the MDC. The average beta reading was 179 dpm/100 $cm^2$ of total contamination.

The standard deviation of the systematic measurements was 138 dpm/100 $cm^2$. The MDC was 1,000 dpm/100 $cm^2$ (Table 2). The highest smear and static MDCs were 133 and 417 dpm/100 $cm^2$, respectively.

### 5.4 Survey Unit FSS-4

FSS-4 is a Class 1 SU comprising 59 $m^2$ of the main floor of Room 6B1, 2 $m^2$ in a foyer, and 9 $m^2$ of the bathroom that is within Room 6B1. The SU was divided into the bathroom floor and the main floor because the floor grid numbering of the main floor could not be carried into the bathroom floor.

The main floor was scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 67 dpm/100 $cm^2$ of removable beta contamination and 551 dpm/100 $cm^2$ of total contamination.

Of the 59 grid elements, 28 presented a 30 second scan count above the investigation level. The grid elements were later rescanned with an LM43-93 probe. The highest levels recorded by the rescan were 45 dpm/100 $cm^2$ of removable beta contamination and 605 dpm/100 $cm^2$ of total contamination. The concrete floor of Room 6B1 is different than the concrete used as the reference area in Cell 4. All 89 of the grid elements presented positive direct frisk readings, indicating that there is a difference in the radiological composition of the floor of Room 6B1, compared to the reference area.

In addition, 9 $m^2$ were scanned on the bathroom floor with an LM43-37. Eight of these results were above the investigation level and were rescanned with an LM43-93. The highest smear and static readings recorded in association with the bathroom floor scan were 36 dpm/100 $cm^2$ of removable beta contamination and 769 dpm/100 $cm^2$ of total contamination. The highest levels recorded by the bathroom floor rescan were 46 dpm/100 $cm^2$ of removable beta contamination and 1,012 dpm/100 $cm^2$ of total contamination.

There is a small floor slab (2 $m^2$) in a foyer that provides access to Room 6B1 from the outside. The floor was scanned with an LM43-93 probe. The highest readings were 73 dpm/100 $cm^2$ of removable beta contamination and 1,127 dpm/100 $cm^2$ of total contamination.

There were 25 systematic measurement locations on the main floor; the highest smear and static readings recorded were 87 dpm/100 $cm^2$ of removable beta contamination and 663 dpm/100 $cm^2$ of total contamination.

The standard deviation of the systematic floor measurements was 208 dpm/100 $cm^2$. The highest scan MDC was 730 dpm/100 $cm^2$, except for the two square meters of the foyer that were scanned with the LM43-93, where the scan MDC was 1,250 dpm/100 $cm^2$. The scan MDC for the LM43-93 probe is taken from Table 2. The highest smear and static MDCs were 127 and 425 dpm/100 $cm^2$, respectively.

### *5.5 Survey Unit FSS-5*

FSS-5 is a Class 1 SU comprising 65 $m^2$ of the lower walls of room 6B1 and 18 $m^2$ of the lower walls of the bathroom that is within Room 6B1. The SU was subdivided into the bathroom walls and the main room walls because the grid numbering of the main room's lower walls could not be carried onto the bathroom's lower walls.

The lower walls were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 94 dpm/100 $cm^2$ of removable beta contamination and -170 dpm/100 $cm^2$ of total contamination.

Of the 83 total grid elements, one grid element presented a 30 second scan count above the investigation level. The grid element was rescanned with an LM43-93 probe. The highest levels recorded by the rescan were 31 dpm/100 $cm^2$ of removable beta contamination and -236 dpm/100 $cm^2$ of total contamination.

There were 36 systematic measurement locations on the main lower walls and four systematic measurements on the lower walls of the bathroom. The highest smear and static readings recorded were 65 dpm/100 $cm^2$ of removable beta contamination and -189 dpm/100 $cm^2$ of total contamination.

The scan MDC was 730 dpm/100 $cm^2$. The highest smear and static MDCs were 133 and 425 dpm/100 $cm^2$, respectively.

The lower and upper walls of Room 6B1 are lined with gypsum board. This gypsum board apparently emits lower amounts of natural radioactivity than the concrete used as the reference area in Cell 4. The average direct frisk associated with scans is -446 dpm/100 $cm^2$, which is -17 percent of the DCGL (-446/2570 = -17 percent). This bias is, therefore, within the 20 percent error specification of the DP. Therefore, the negative bias does not confound the determination that potential DU concentrations do not exceed the DCGL on the lower walls.

### *5.6 Survey Unit FSS-6*

FSS-6 is a Class 1 SU comprising the upper walls of Room 6B1, plus a LAW-only survey of the ceiling surfaces. FSS-6 includes 79 $m^2$ of the upper walls of room 6B1 and 12 $m^2$ of the upper walls of the bathroom that is within Room 6B1. The SU was subdivided into the bathroom and the main room because the grid numbering of the main upper wall could not be carried onto the bathroom upper wall.

Of the 91 total grid elements, 24 were located on the ceiling. Although these 25 grid elements were, technically speaking, categorized as ceiling surfaces, they were scanned along with the upper wall surfaces. The survey of SU FSS-6, therefore, exceeded the minimum requirement of the DP, which specified LAW-only surveying.

The upper walls were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 95 dpm/100 $cm^2$ of removable beta contamination and 453 dpm/100 $cm^2$ of total contamination.

Of the 91 total grid elements, seven grid elements presented a 30 second scan count above the investigation level. Those grid elements were rescanned with an LM43-93 probe. The highest levels recorded by the rescan were 65 dpm/100 $cm^2$ of removable beta contamination and 453 dpm/100 $cm^2$ of total contamination. The MDCs were 81 and 281 dpm/100 $cm^2$, respectively.

There were 34 systematic measurement locations on the main upper walls and two systematic measurements on the upper walls of the bathroom. The highest smear and static readings recorded were 104 dpm/100 cm$^2$ of removable beta contamination and 91 dpm/100 cm$^2$ of total contamination. The MDCs were 125 and 371 dpm/100 cm$^2$, respectively.

The standard deviation of the systematic measurements was 202 dpm/100 cm$^2$. The highest MDCs were 744 dpm/100 cm$^2$ for scans, 133 dpm/100 cm$^2$ for removeable contamination and 373 dpm/100 cm$^2$ for direct frisks.

The lower and upper walls of Room 6B1 are lined with gypsum board. This gypsum board apparently emits lower amounts of natural radioactivity than the concrete used as the reference area in Cell 4. The average direct frisk associated with systematic statics is -343 dpm/100 cm$^2$, which is -13 percent of the DCGL (-343/2570 = -13 percent). This bias is, therefore, within the 20 percent error specification of the DP. Therefore, the negative bias does not confound the determination that potential DU concentrations do not exceed the DCGL on the lower walls.

Eight LAW measurements were collected from accessible areas of the ceiling by wiping a large area of the ceiling with a masslin cloth. The HPT then performed a direct frisk on the masslin cloth with an LM43-89 probe. The highest LAW reading was 29 dpm/100 cm$^2$. Note that 24 m$^2$ of the ceiling area were included in the upper wall surveys. These grid elements are distinguished by the number “5” or “6” in the location number (e.g., C5 or H5).

## *5.7 Survey Unit FSS-7*

This survey unit area is divided into two Class 1 survey units: (i) FSS-7A, the west end of the floor of Room 6A1, comprising rows A through H; and (ii) FSS-7B, the eastern portion of the floor of Room 6A1, comprising rows I through Q.

### *5.7.1 FSS-7A*

This SU is comprised of 48 grid elements that were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 126 dpm/100 cm$^2$ of removable beta contamination and 1,672 dpm/100 cm$^2$ of total contamination.

Twelve grid elements presented 30 second scan counts above the investigation level. The grid elements were later rescanned with an LM43-93 probe. The rescan recorded maximum readings of 88 dpm/100 cm$^2$ of removable beta contamination and 2,126 dpm/100 cm$^2$ of total contamination.

There were 18 systematic measurement locations; the highest smear and static readings recorded were 83 dpm/100 cm$^2$ of removable beta contamination and 1,203 dpm/100 cm$^2$ of total contamination.

The standard deviation was 362 dpm/100 $cm^2$. The scan MDC was 712 dpm/100 $cm^2$. The smear and static MDCs were 127 and 419 dpm/100 $cm^2$, respectively.

#### 5.7.2 FSS-7B

This SU is comprised of 48 grid elements in rows I to Q that were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 74 dpm/100 $cm^2$ of removable beta contamination and 1121 dpm/100 $cm^2$ of total contamination.

Eleven grid elements presented 30 second scan counts above the investigation level. The grid elements were later rescanned with an LM43-93 probe. The rescan recorded maximum readings of 46 dpm/100 $cm^2$ of removable beta contamination and 1,360 dpm/100 $cm^2$ of total contamination.

There were 15 systematic measurement locations; the highest smear and static readings recorded were 97 dpm/100 $cm^2$ of removable beta contamination and 1,318 dpm/100 $cm^2$ of total contamination.

The standard deviation was 402 dpm/100 $cm^2$. The scan MDC was 712 dpm/100 $cm^2$. The smear and static MDCs were 127 and 419 dpm/100 $cm^2$, respectively.

### 5.8 Survey Unit FSS-8

This survey unit area is a Class 1 survey unit comprised of the lower walls of Room 6A1. This SU is comprised of 90 grid elements that were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 89 dpm/100 $cm^2$ of removable beta contamination and 958 dpm/100 $cm^2$ of total contamination.

Twenty-seven grid elements presented 30 second scan counts above the investigation level. The grid elements were later rescanned with an LM43-89 or LM43-93 probe. The highest rescan results were 15 dpm/100 $cm^2$ of removable beta contamination and 1,326 dpm/100 $cm^2$ of total contamination.

There were 15 systematic measurement locations; the highest smear and static readings recorded were 118 dpm/100 $cm^2$ of removable beta contamination and 783 dpm/100 $cm^2$ of total contamination.

The standard deviation was 532 dpm/100 $cm^2$. The scan MDC was 704 dpm/100 $cm^2$. The smear and static MDCs were 109 and 419 dpm/100 $cm^2$, respectively.

### 5.9 Survey Unit FSS-9

According to the DP, the required scope of FSS-9 is a Class 1 survey of the upper walls of Room 6A1, plus a LAW-only survey of the ceiling. Survey Unit 9 is a Class 1 SU comprising 79 m$^2$ of the upper walls of room 6B1, plus the ceiling survey. That is, the survey is constituted as a Class 1 survey of the upper walls, plus a limited additional effort in the ceiling area. The LAW survey is mentioned in the narrative of the DP, but not listed in the summary of the FSS scope (DP, Table 21).

#### 5.9.1 FSS-9 Ceiling

The LAW survey of the ceiling was expanded into an LM43-93 scan survey of 20 m$^2$ of ceiling due to a reference to contamination in an "overhead pipe chase" in the baseline survey. Because the specific location of the "overhead pipe chase" was not recorded in the baseline survey, the LAW survey was expanded to comprise 20 locations of 1 m$^2$ each. The locations were selected to correspond to potential "overhead pipe chase" locations and other areas judged to potentially be contaminated. Each location was scanned, and a direct frisk and a smear was collected at the highest reading spot in each 1 m$^2$ area.

The 20 ceiling locations were scanned with the LM43-93 probe. The scan MDC was 1,250 dpm/100 cm$^2$(Table 2). The highest smear and static readings recorded in association with the scan were 100 dpm/100 cm$^2$ of removable beta contamination and 1,021 dpm/100 cm$^2$ of total contamination. The highest MDCs were 133 dpm/100 cm$^2$ for removeable contamination and 418 dpm/100 cm$^2$, for direct frisks. The average of these biased smear samples is 16 dpm/100 cm$^2$ of removable beta contamination and the average biased static reading was 292 dpm/100 cm$^2$ of total contamination.

Contamination was found in the overhead pipe area associated with the HVAC system in Room 6A1. This equipment was surveyed as part of the HVAC SU, FSS-13. The HVAC contamination is reported in FSS-13. The survey of the ceiling surface is reported here. The ceiling survey did not uncover contamination that exceeded the DCGL.

#### 5.9.2 FSS-9 Upper Walls

There were 92 grid elements laid out on the upper walls, each 1 m$^2$ in area. The upper walls were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 123 dpm/100 cm$^2$ of removable beta contamination and 442 dpm/100 cm$^2$ of total contamination.

Of the 92 total grid elements, 15 grid elements presented a 30 second scan count above the investigation level. Those grid elements were rescanned with an LM43-93 probe. The highest levels recorded by the rescan were 27 dpm/100 $cm^2$ of removable beta contamination and 109 dpm/100 $cm^2$ of total contamination.

There were 15 systematic measurement locations; the highest smear and static readings recorded were 83 dpm/100 $cm^2$ of removable beta contamination and -55 dpm/100 $cm^2$ of total contamination.

The standard deviation of the systematic measurements was 150 dpm/100 $cm^2$. The scan MDC was 704 dpm/100 $cm^2$. The highest MDCs were 133 dpm/100 $cm^2$ for removeable contamination and 418 dpm/100 $cm^2$, for direct frisks.

### *5.10 Survey Unit FSS-10*

This characterization survey includes the utility spaces under Cell 6 and the connecting pipe chase that is outdoors on the east side of Building 181. The subsurface vault entrance in Room 6A1 and the pipe chase exit of Room 6B1 exit were treated as non-permitted confined spaces. The entrance to the vault that is inside Cell 6 consisted of a 2-feet by 2-feet iron grate in Room 6A1. The grate allowed material to migrate from the floor of Room 6A1 into the vault. The grate and a metal bucket that was found in the vault were contaminated and classified as LLRW. The lip of the concrete floor that held the grate was decontaminated. An entry into the vault was performed as a follow-up activity. The radiological status of the vault and proposed actions will be described in a separate work plan.

The surface contamination survey data at the vault entrance indicate that the building surfaces of the utility chase under Cell 6 are radiologically impacted.

#### *5.10.1 Subsurface Vault Entrance in Room 6A1*

The accessible portions of the entrance of the vault were 100 percent probed and smeared. The accessible portion consisted of the lip of the entrance and the underside of the floor slab that could be reached by hand. The lip was found to be contaminated above the DCGL and was decontaminated prior to the FSS measurements. The floor of the vault was observed to be covered with sediment and debris. A bucket found inside the utility vault removed and found to be contaminated and was classified as LLRW. The sediment in the pipe chase prevented survey measurements of the floor of the vault.

The FSS scans and direct frisks showed that surface contamination levels did not exceed the DCGL. The smear and static readings recorded in association with the scan were 2 to 130 dpm/100 cm$^2$ of removable beta contamination and 360 to 2,255 dpm/100 cm$^2$ of total contamination. The MDCs were 132 dpm/100 cm$^2$ for removeable contamination, 1,250 dpm/100 cm$^2$ for scans and 303 dpm/100 cm$^2$ for direct frisks. The scan MDC for the LM43-93 probe was taken from Table 2.

A sample of the sediment was collected for U-238, U-235, and U-234 analyses. The laboratory analysis report of the sediment sample is provided in Attachment 6, and the analytical results are summarized in Table 5. The sediment in the vault presented a U-234/U-238 ratio indicative of DU and a U-238 sediment concentration above the soil DCGL. The analysis of isotope ratios is provided for information only. The sediment was packaged for disposal as LLRW. Release decisions are solely based on the concentration of U-238.

### 5.10.2 Pipe Chase Exit

The accessible impacted portions of the exit of the pipe chase were probed. Scanning did not indicate the presence of DU contamination. The floor of the chase was covered with sediment and obstructed by the piping. Therefore, a direct frisk of the concrete floor could not be obtained. The piping was hung above the floor, such that the absence of contamination on the exit piping could not be judged representative of absence of contamination on the floor of the pipe chase. The piping presumably includes the sink and shower drains from Room 6B1. Therefore, the absence of contamination on the exterior of the piping is not an indication of the absence of contamination on the interior of the drain piping. Available data regarding contamination surveys of the floor in Room 6B1 are provided in the results of Survey Unit FSS-4. Since the drain pipes are inside the utility chase, material, and equipment surveys of the interior of the pipes are in the scope of work for the Phase 2 survey of the utility chase.

A sample of the sediment at the pipe chase exit was collected for isotopic analysis of U-238, U-235 and U-234. The laboratory analysis report of the sediment sample is provided in Attachment 6, and the analytical results are summarized in Table 5. The gamma spectroscopy data indicate that the total U-238 concentration in sediment in the east exit of the pipe chase was below the DCGL for soil. This sediment was left in place.

## 5.11 Survey Unit FSS-11

This Class 1 survey unit is comprised of the floor of Room 3A, which connects Room 6A1 to the personnel entrance on the west side of Building 181. Because the survey unit is Class 1, every grid element was surveyed.

This SU is comprised of 39 grid elements that were scanned with the LM43-37 probe. The highest smear and static readings recorded in association with the scan were 50 dpm/100 $cm^2$ of removable beta contamination and 1286 dpm/100 $cm^2$ of total contamination.

Twenty grid elements presented a 30 second scan count above the investigation level. These grid elements were rescanned. A static frisk and a smear were collected at the location of the highest count rate on each grid element. The highest results from the rescans were 23 dpm/100 $cm^2$ of removable beta contamination and 1,344 dpm/100 $cm^2$ of total contamination. The average direct frisk result was 723 dpm/100 $cm^2$ of total contamination.

There were 37 systematic measurement locations; the highest smear and static readings recorded were 76 dpm/100 $cm^2$ of removable beta contamination and 1,463 dpm/100 $cm^2$ of total contamination.

The standard deviation was 321 dpm/100 $cm^2$. The scan MDC was 650 dpm/100 $cm^2$. The highest smear and static MDCs were 133 and 423 dpm/100 $cm^2$, respectively.

### *5.12 Survey Unit FSS-12*

This survey includes the powered exhaust vent that is above the impacted cells and the surrounding roof area. The exhaust vent is located above a small "doghouse" structure on the main roof of Building 181. The fan, motor, and ductwork were 100 percent scanned and surveyed. There was a 100 percent scan survey of the roof of the doghouse.

The roof survey is comprised of 18 grid elements of 1 $m^2$ area. The roof was 100 percent scanned with the LM43-93 probe. A direct static frisk and a smear were collected at the location of the highest count rate in each grid element. The storm water drain on the roof was separately scanned and smear sampled. In addition, an air conditioning unit on the roof was scanned. Five statics and smears were collected on the air conditioning unit. The powered exhaust ventilator stack was scanned. Five statics and smears were collected on the exhaust unit.

The smears were counted on an LM2929 after a 1-minute background count. Upon review, the resulting MDC was found to be inappropriate due to an inadequate background time. A second set of smears was collected and counted with a 10-minute background. Both sets of data are provided in the survey records. The highest smear result in the second set of samples was 59 dpm/100 $cm^2$ of removable beta contamination. The highest static reading recorded in association with the scan was -328 dpm/100 $cm^2$ of total contamination. The negative results may be due to differences in materials or temporal changes in natural background. The MDCs were 135 dpm/100 $cm^2$ for removeable contamination, 1,250 dpm/100 $cm^2$ for scans, and 584 dpm/100 $cm^2$ for direct frisks. The scan MDC for the LM43-93 probe was taken from Table 2.

### *5.13 Survey Unit FSS-13*

This survey includes the HVAC equipment in Cell 5 and Cell 6. In Cell 5, the HVAC equipment consists of two space heaters located in the overhead area, one on each end of the cell. These heaters operated with piped hot water; there are no supply, return, or exhaust ducts. In Room 6B1, the HVAC equipment consists of supply and exhaust ducts only. The mechanical and heating equipment are in Room 6A1. In Room 6A1, a large overhead pipe chase and platform support the mechanical equipment. The ducts only supply and return air from Room 6B1. Space heaters were installed in the overhead of Room 6A1. DU contamination was measured on the exterior of HVAC ducts in the overhead pipe chase of Room 6A1 and on the overhead space heaters in Room 6A1. These space heaters were removed and disposed as LLRW. The FSS activity included a total of 43 locations where statics and smears were collected. The highest MDCs were 133 dpm/100 $cm^2$ for removeable contamination, 1,250 dpm/100 $cm^2$ for scans, and 471 dpm/100 $cm^2$ for direct frisks. The scan MDC for the LM43-93 probe was taken from Table 2.

#### *5.13.1 Cell 5*

The space heaters in Cell 5 consist of a heat exchanger and a fan in a single overhead enclosure. These units are relatively compact. Each unit was 100 percent scanned. A direct frisk and a smear were taken at the location of the highest count rate. The highest smear result in the second set of samples was 62 dpm/100 $cm^2$ of removable beta contamination. The highest static reading was negative (-14 dpm/100 $cm^2$) of total contamination. The negative results may be due to differences in materials or temporal changes in natural background.

#### *5.13.2 Room 6B1*

In Room 6B1, the HVAC equipment consists of heating supply and exhaust ducts in the overhead. The supply duct is in the center of the ceiling with two discharge plenums in series. The return ducts are on the north and south sides of the ceiling with one large return register on each duct. The ducts connect to a heat exchanger and air handler in the overhead pipe chase in Room 6A1. There is also an air conditioning unit located on the east wall of Room 6B1. The inside of the ducts and the outside of the register of the wall unit were surveyed with LAWs. The results were negative for DU contamination.

The grill covers of the overhead north and south return ducts were removed, and the accessible interior of the ducts was surveyed. The exteriors of the return ducts were scanned, including the west end of the duct, where it penetrated the wall into Room 6A1. A four-inch-diameter coupon was cut from the sheet metal of the return ducts at a low point of the horizontal run of both return ducts. The results were negative for DU contamination. Coupons were also collected at the bends in the return ducts, which are in the overhead of Room 6A1. The highest smear result from the coupons was 112 dpm/100 $cm^2$ of removable beta contamination. The highest static reading on the coupons was 184 dpm/100 $cm^2$ of total contamination.

The supply ducts have large flared discharge vents that are accessible to the LM43-93 probe. Therefore, no disassembly of the supply vents was performed. Each unit was scanned on the exterior and to the extent of discharge vent accessibility. The flow directors in the flared openings of the supply vents were surveyed. A direct frisk and a smear were taken at the location of the highest count rates. Two LAWs were also collected on the vents. A total of 23 locations were recorded for statics and smears.

#### *5.13.3 Room 6A1*

The space heaters in Room 6A1 consisted of a compact heat exchanger and a fan in a single enclosure located in the overhead space. These units were heavily corroded, compared to the units in Cell 5. The results of the scoping survey indicated that the units were contaminated. The survey was terminated; the units were removed for disposal as LLRW.

The mechanical HVAC equipment and the associated overhead pipe chase and platform were also surveyed. Contamination was discovered on exterior horizontal surfaces. To be conservative and meet ALARA requirements, the HVAC equipment and the overhead chase were decontaminated. The highest smear result in the final FSS samples was 60 dpm/100 $cm^2$ of removable beta contamination. The highest static reading was 644 dpm/100 $cm^2$ of total contamination. A total of 18 statics and smears were collected on the HVAC equipment that remained in Room 6A1.

### *5.14 Survey Unit FSS-14*

This survey unit area is divided into one Class 1 survey unit and one Class 3 buffer unit: (i) FSS-14A, the concrete apron at the west end outside of Cell 6, is the Class 1 SU; and (ii) FSS-14B, a Class 3 buffer zone, extends to the north, west, and south of FSS-14A. FSS-14A was upgraded to a Class 1 SU following discovery of contamination, and FSS-14B was added as a buffer zone because FSS-14A is outdoors and because it was prudent to extend the survey to the storm drain in the yard.

#### *5.14.1 FSS-14A*

This SU is comprised of 38 grid elements of concrete pavement that were 100 percent scanned with the LM43-93 probe, and a concrete electrical vault that was scanned with an LM43-93 probe. For this survey unit, the systematic measurement locations were organized on a square grid and the data were collected during the scan survey by measuring a static count in every grid element.

For a survey unit of 38 square meters, where 15 survey locations are required, MARSSIM equation 5-6 gives the grid spacing requirement of a square grid as:

$$L = SQRT\ (38\ m^2/15) = 1.6\ m.$$

For FSS-14A, the grid spacing was one meter and 38 measurement locations were recorded, which exceeds the MARSSIM requirement.

The scan MDC (see Table 2) for the LM43-93 is 1,250 dpm/100 $cm^2$. The highest smear and static readings recorded in association with the pavement scan were 70 dpm/100 $cm^2$ of removable beta contamination and 1,191 dpm/100 $cm^2$ of total contamination. The highest smear and static MDCs were 130 and 206 dpm/100 $cm^2$, respectively.

An electrical vault is located within the boundary of the survey unit. The lid of the vault was surveyed as part of the pavement surface. The lids were opened, and the interior walls of the vault and the deactivated electrical cables were scanned. Direct frisks and smears were collected. No measurements exceeded the DCGL. The floor of the vault was covered with debris and sediment, which prevented surveying the concrete floor of the vault. Two samples of the sediment were collected for U-238, U-235, and U-234 analyses. The laboratory analyses are provided in Attachment 6, and the analytical results are summarized in Table 5. The sediment in the electrical vault presented a U-234/U-238 ratio indicative of DU. The U-238 concentration was below the DCGL for soil. The sediment was left in place.

The highest smear and static readings recorded in association with the electrical vault scan were 98 dpm/100 $cm^2$ of removable beta contamination and 1,058 dpm/100 $cm^2$ of total contamination. The highest MDCs were 130 and 306 dpm/100 $cm^2$, respectively.

#### *5.14.2 FSS-14B*

This SU is comprised of 32 grid elements scanned with the LM43-89 probe. Each grid element was 10 percent scanned, rather than 100 percent scanning of 10 percent of the grid elements, to ensure that the outdoor contamination was bounded by the buffer zone. The scan MDC (see Table 2) was 1,000 dpm/100 $cm^2$. The highest smear and static readings recorded in association with the scan were 81 dpm/100 $cm^2$ of removable beta contamination and 499 dpm/100 $cm^2$ of total contamination. The MDCs were 130 and 309 dpm/100 $cm^2$, respectively.

For this survey unit, the systematic measurement locations were organized on a square grid and the data were collected during the scan survey by measuring a static count in every grid element. For a survey unit of 32 square meters that requires 15 survey locations, MARSSIM Equation 5-6 gives the grid spacing requirement of a square grid as:

$$L = SQRT\ (32\ m^2/15) = 1.5$$

For FSS-14A, the grid spacing was one meter, which exceeds the MARSSIM requirement.

### 5.15 Survey Unit FC-1

This survey completes the baseline survey of Cell 4. The prior Cell 4 baseline survey did not include sufficient area to satisfy the DQOs. Two additional square meters were required for completion. This SU is comprised of two grid elements that were scanned with the LM43-37 probe. The scan MDC was 626 dpm/100 $cm^2$. None of the LM43-37 scan readings exceeded the investigation level, which was 145 counts above background. The smear readings recorded in association with the scan were -23 and -78 dpm/100 $cm^2$ of removable beta contamination. The direct frisk readings recorded in association with the scan were 120 and 203 dpm/100 $cm^2$ of total contamination. The MDCs were 83 and 330 dpm/100 $cm^2$, respectively. None of these values exceeded a small fraction of the DCGL. The categorization of Cell 4 as non-impacted was confirmed.

### 5.16 Survey Unit FC-2

This section discusses data that were collected during the survey of Rooms 3D and 3E following the abatement/removal of ACM floor tiles and mastic. The floors cover 98 $m^2$. The data are included here to provide a complete record of the structural surveys. As reported in the DP, the floors were scanned with a 10 percent MARSSIM Class 3 method (17 $m^2$). No contamination was detected. All measurements were less than the MDC. The floors were then resurveyed with a 10 percent MARSSIM Class 3 method. These resurvey data are provided in the DP (Table 12). The survey forms and map are included in Attachment 4. The survey included scans, direct measurements, and smears. All results were below the MDC. No contamination was observed. No removable contamination was detected.

## 6.0 Analysis of Data

As indicated above, the survey data were compared directly with the DCGLs to evaluate the level and extent of contamination. The data demonstrate that the release survey data satisfy the guideline requirements. This section summarizes the: (i) QC measurements; (ii) retrospective measurement uncertainty; (iii) validation and verification of data; and (iv) sediment concentration results.

The preponderance of the QC measurements was performed by an experienced FSS radiation control technician (RCT) who functioned as a dedicated QC technician. In a few cases, the RCT supervisor performed QC measurements. The QC technician generally used an LM 2360 meter (#253248) with a dedicated LM 43-93 probe (PR312654). For example, the QC surveys of Room 3A, Room 6A1, Cell 5 and the Cell 6 apron were performed with this meter and probe combination. The QC survey of the grids in Room 6A1 were performed with LM 2360 (#310179) and LM 43-89 (PR337815). The QC survey of Room 6B1 was performed with an LM 2360 (#253248) and LM 43-93 (PR244541). All QC smears were counted with LM 2929 (#190602) and LM 43-10-1 probe (PR199159). Although the dedicated QC meter (LM 2360 #253248) was reserved for independent QC measurements, meters 310179 and 253248 were used for QC measurements when damaged mylar windows and other instrument defects confounded the primary instrument assignments. In such cases, AAR ensured that the same meter was not used for initial and QC measurements.

### *6.1 Quality Control Measurements*

The QC measurements are discussed in terms of Cell 5 (FSS-1 through FSS-3), Cell 6 (FSS-4 through FSS-6), Room 6A (FSS-7 through FSS-9), and other adjoining areas to Cells 5 and 6 (FSS-11 through FSS-14). The survey plan includes both smear and static measurements; therefore, the QC measurement locations do not coincide with the initial FSS locations. Although static measurements can be repeated exactly on the original measurement locations, smearing the same spot twice was not considered to be appropriate. Therefore, the QC samples were collected near the original locations. As a result, the QC data cannot be compared to the original data, other than to compare both data sets to the DCGL.

#### *6.1.1 FSS-1 through FSS-3 (Cell 5)*

In Cell 5, there were a total of 153 required FSS measurements on the floor, walls, and ceiling, and a total of 20 QC measurements were completed. The QC measurements were performed as specified in the DP. The maximum, mean, and standard deviation of the FSS measurements and the QC measurements are shown in Table 6. Table 6 provides a conservative estimate of the t-statistic to demonstrate that the QC results agree with the FSS data. The value 1.96 is a conservative estimate of the 95 percent confidence level of the t-statistic:

$$t_{QC} = (Mean_{FSS} - Mean_{QC})/\sigma_{QC} = (-252 + 40)/378 = 0.56$$

where:

- $t_{QC}$ is a conservative estimate of the t-statistic;
- $Mean_{FSS}$ is the mean of the systematic FSS measurements;
- $Mean_{QC}$ is the mean of the corresponding QC measurements; and
- $s_{QC}$ is a conservative estimate of the standard deviation of the difference between the means.

The QC results validated the findings of the FSS survey. No contamination was found that exceeded the DCGL. The absolute difference between the mean FSS measurement and the mean QC measurement was divided by the standard deviation of the QC measurements to obtain the standard deviation of the means, which is also called the z-score. The z-score value is 0.56. The 95 percent confidence level for a two-tailed test has a critical level of 1.96, which means that a z-score below 1.96 is consistent with random variation between the FSS and QC data. The QC test of Cell 5 data indicates that the FSS results are valid and reproducible.

### *6.1.2 FSS-4 through FSS-6 (Room 6B1)*

In Room 6B1, there were a total of 232 required FSS measurements on the floor, walls, and ceiling, and a total of 26 QC measurements were completed. The QC measurements were performed as specified in the DP. The maximum, mean, and standard deviation of the FSS measurements and the QC measurements are shown in Table 7. The QC results validated the findings of the FSS survey. No contamination was found that exceeded the DCGL. The absolute difference between the mean FSS measurement and the mean QC measurement was divided by the standard deviation of the QC measurements to obtain the standard deviation of the means, which is also called the z-score. The z-score value is 1.39. The 95 percent confidence level for a two-tailed test has a critical level of 1.96, which means that a z-score below 1.96 is consistent with random variation between the FSS and QC data. The QC test of Room 6B1 data indicates that the FSS results are valid and reproducible.

### *6.1.3 FSS-7 through FSS-9 (Room 6A1)*

In Room 6A1, there were a total of 265 required FSS measurements on the floor, walls, and ceiling and, a total of 36 QC measurements were completed. The QC measurements were performed as specified in the DP. The maximum, mean, and standard deviation of the FSS measurements and the QC measurements are shown in Table 8. The QC results validated the findings of the FSS survey. No contamination was found that exceeded the DCGL. The absolute difference between the mean FSS measurement and the mean QC measurement was divided by the standard deviation of the QC measurements to obtain the standard deviation of the means, which is also called the z-score. The z-score value is 0.47. The 95 percent confidence level for a two-tailed test has a critical level of 1.96, which means that a z-score below 1.96 is consistent with random variation between the FSS and QC data. The QC test of Room 6A1 data indicates that the FSS results are valid and reproducible.

### *6.1.4 FSS-11 through FSS-14*

An additional total of 20 QC measurements were collected for the four SUs that included the floor of Room 3A, the roof and stack of Cell 6, the HVAC, and the concrete apron and pavement outside Cell 6 (FSS-14A and FSS-14B). The QC measurements were performed as specified in the DP at a minimum 10 percent rate. A statistical analysis was not performed for these other QC measurements because the number of QC measurements was limited to four measurements in each SU. The CHP evaluated the additional QC data. The additional QC results did not uncover contamination that exceeded the DCGL and were evaluated to be in general agreement with the FSS measurements. The QC data were, therefore, found to validate the accuracy and reproducibility of the FSS measurements.

## *6.2 Retrospective Measurement Uncertainty*

The minimum number of required FSS measurements in each survey unit was fifteen measurements, as established in the DP. At least fifteen systematically located measurement points were planned for each SU based on the MARSSIM approach for calculating the number of measurement data points to demonstrate compliance for release purposes. To ensure representativeness, the actual number of systematic measurements ranged from 27 to 97. The MARSSIM approach relies, in part, on the expected standard deviation (σ) of the measurements. After completing the measurements, the standard deviation may be calculated and the adequacy of the number of measurements may be validated retrospectively. The retrospective calculation of the minimum number of systematic samples points is provided in Table 9. For example, the relative shift for FSS-1A was calculated as:

$$\Delta/\sigma = (\text{DCGL} - \text{MDC}/2)/\sigma = (2{,}570 - 289/2)/319 = 7.6$$

where:

- DCGL = 2,570 dpm/100 cm$^2$;
- MDC = 289 dpm/100 cm$^2$; and
- $\sigma$ = 319 dpm/100 cm$^2$.

The relative shift is rounded down to one decimal place. For convenience, Table 5.3 of MARSSIM was used to determine the minimum number of planned samples. The minimum number of samples is nine when the relative shift is at least four. As an additional example, the relative shift for FSS-5 was calculated as:

$$\Delta/\sigma = (\text{DCGL} - \text{MDC}/2)/\sigma = (2{,}570 - 411/2)/153 = 15.4$$

For convenience, Table 5.3 of MARSSIM was used to determine the minimum number of planned samples. The minimum number of samples is nine when the relative shift is at least four.

The number of planned samples in each survey unit was obtained by measuring σ in each data set and applying the following assumptions:

- The alpha and beta errors are both 0.05.
- The background count rate is significant.
- The lower bound of the grey region (LBGR) is 50 percent of the MDC.

In Table 5.3 of MARSSIM, the number of planned samples has been increased by 50 percent above the number of required samples to account for unusable data. The results of this evaluation are provided in Table 9.

FSS-10, FSS-12, and FSS-13 were not evaluated by this method because the data point locations were not laid out on a systematic grid. Therefore, the calculation of σ, which uses a simple Gaussian model, could not be strictly applied. The retrospective adequacy of the number of measurements in these SUs was evaluated by observing that the minimum value of the relative shift in the FSS data were 4.4 (SU FSS-8). In MARSSIM Table 5.3, any SU with a relative shift that is at least 4.0 would require nine planned samples, including a 20 percent margin for loss. Therefore, the minimum number of valid sample results is seven. In this FSS activity, the minimum number of samples collected in the field was 15. Assuming the relative shifts of the 14 SUs in Table 9 that were explicitly calculated are representative of FSS 10, 12 and 13, collecting 15 valid results exceeded the MARSSIM requirements.

### *6.3 Validation and Verification of Data*

The field HP Supervisor oversaw the collection of data and daily instrument checks. The field HP Supervisor also reviewed the raw data sheets and entered raw data into daily report spreadsheets. A CHP observed field measurements and provided technical direction to the field staff. When the data spreadsheets were completed, the CHP compared the data to the type and quantity of required measurements, the instrument specifications, the assumptions that support the survey unit classifications, and the FSSR requirements.

The CHP validated the data as follows:

- Ensured that the measurement process satisfied the survey plan requirements.
- Compared the actual standard deviations to the estimated standard deviations.
- Confirmed the number of measurements in each survey unit to be sufficient.
- Checked that transcription of data values was accurate.
- Confirmed that actual results were reported.
- Performed an independent data review.
- Confirmed that repetitive (i.e., QC) measurements agree with initial measurements.
- Compared the reported values to the DCGL.
- Confirmed that the assumptions of the survey design were valid.

The CHP verified the data as follows:

- Reviewed daily instrument checks and control charts.
- Verified the calculations of MDC and investigation levels.
- Verified that instrument backgrounds were consistent with the desired MDCs.
- Verified that the number of measurements was adequate.
- Reviewed investigation results when scans exceeded investigation levels.
- Reviewed the spreadsheets for completeness, reasonableness, and internal reviews.

The FSS results for Phase 1 activities were verified.

The DQO process and a graded approach were integrated within the survey design to assure valid data. Compliance with the DCGL was demonstrated because no single post-remediation measurement of radioactivity exceeded the DCGL. The hand-held instruments used for the survey had detection limits lower than the DCGL.

An administrative MDC of 129 dpm/100 $cm^2$ was imposed on removable gross beta contamination measurements. The field measurements typically presented MDCs in the range of 127 to 135 dpm/100 $cm^2$. This administrative MDC was subject to the overall FSS DQO for measurement accuracy and precision, which is 20 percent.

The MDC describes the sensitivity of an individual measurement, based on a calculation of 3.29 standard deviations times the propagated uncertainty of a single net measurement in a one-tailed test. The survey units in the DP included at least 18 measurements. The standard error of the mean measurement in a survey unit, which is indicative of the sensitivity of a set of measurements, is equal to the standard deviation of the individual measurement divided by the square root of the number of measurements. For a set of 18 measurements, the sensitivity of the mean smear measurement is smaller than the sensitivity of an individual smear measurement according to the factor 1/SQRT(18) (or 24 percent). The number of smears exceeded 18 in every survey unit (Table 9). The data reported in Table 4 indicate that the highest MDC for a single measurement is 135 dpm/100$cm^2$ (FSS-1B). Therefore, the worst-case calculated sensitivity for the mean removeable contamination in a survey unit is 135/SQRT(18) (or 32 dpm/100$cm^2$).

Compliance with the DCGL was demonstrated because no single post-remediation measurement of total radioactivity exceeded the DCGL, and the measured removable radioactivity did not exceed ten percent of the DCGL. The highest measured total reading was 2,255 dpm/100$cm^2$ and the highest single smear reading was 130 dpm/100$cm^2$ (Table 4).

The non-parametric statistical analyses in MARSSIM are not necessary because all measurement results were less than the DCGL following decontamination. Likewise, there are no areas with measured contamination values averaged over 1 $m^2$ that exceed the DCGL. Survey data were reviewed to assure that the DP was followed.

This review also included evaluation of quality control data. The daily source checks included short background measurements to ensure accurate efficiency checks. The daily source checks were reviewed. All instruments satisfied the daily efficiency check requirements. The daily checks demonstrated that efficiencies were relative stable. Daily source check results are provided in Attachment 5.

The potential effect of background on sensitivity was controlled by automatically calculating the MDC daily on the survey forms and verifying compliance. Generally, high background results were undesirable because high backgrounds require extended counting times to meet sensitivity requirements. Trending backgrounds could also have been regarded as precursors to instrument failure. The high background issues were generally limited to alpha count rates, which were not used to calculate activity. The FSS HPTs were equipped with a sufficient number of spare instruments so that an adequate inventory of usable instruments was available during the FSS activities. The daily beta backgrounds for survey use were recorded in Cell 4. Figures 9 and 10 provide the beta background data and data trends for the 22 days when FSS measurements were performed. Field backgrounds were 10-minute durations and only recorded on days where the instrument was expected to be used. The LM2929 backgrounds were 60-minute backgrounds.

### *6.4 Sediment Concentration Results*

The sediment sampling results are provided in Attachment 6, and the results are summarized in Table 5. The analysis of isotope ratios is provided for information only. Release decisions are solely based on the concentration of U-238. The natural U-234/U-238 ratio in the environment varies from 0.5 to 1.2. The U-234 to U-238 ratios in all sediment samples indicate that the samples contain some DU because the U-234/U-238 ratios are less than 0.5, which is typically the lower limit of the U-234/U-238 ratio in natural soil. Upon inspection of the results, it is apparent that, if all measured U-238 was associated with DU, only the sediment sampled inside the subsurface vault in Room 6A1 exceeded the DCGL for soil.

An algorithm, presented below, was developed to analyze soil sample results at Robins AFB. The isotopic data indicate that the U-234/U-238 ratio from the sample collected inside the subsurface vault in Room 6A1 is 14.4 percent. Assuming this ratio is representative of DU at Robins AFB, the following equation may be derived to conservatively estimate the maximum amount of U-238 attributable to DU in a soil sample.

$$U238_{DU} = U238_{GS} – (U234_{AS} - U238_{AS} * DUR_{234/238})/1.2$$

Where:

$U238_{DU}$ = the maximum U-238 attributed to DU;

$U238_{GS}$ = the activity concentration of U-238 by gamma spectroscopy;

$U234_{AS}$ = the activity concentration of U-234 by alpha spectroscopy;

$U238_{AS}$ = the activity concentration of U-238 by alpha spectroscopy;

1.2 = the maximum natural ratio of U-234/U-238; and

$DUR_{234/238}$ = the activity ratio of U-234 to U-238 in DU at Robins AFB.

The equation overestimates U-238 DU because DUR234/238 is biased high and the factor 1.2 underestimates the natural U-238. The gamma spectroscopy value is used to measure compliance because alpha spectroscopy results typically underestimate true soil concentrations at environmental levels due to the relatively small analytical aliquot mass and the heterogenous nature of soil. This typical relationship between gamma spectroscopy and alpha spectroscopy in soil is consistent with the sediment sample results at Robins AFB, where the gamma spectroscopy results are higher than the alpha spectroscopy results at environmental levels, but not for the elevated results for the sample inside the utility chase.

## 7.0 Conclusion

All Phase 1 FSS measurements are less than the building surface DCGL of 2,570 dpm/100 $cm^2$; and therefore, the applicable Phase 1 survey units satisfy the release criteria. The removeable contamination measurements do not exceed 10 percent of the DCGL. The subsurface vault, the utility chase, the soil under the building, and the soil under the concrete apron and pavement will be surveyed in Phase 2. An addendum to the DP will be submitted to address the subsurface vault under Room 6A1 and the concrete apron and pavement on the west side of Cell 6. The Phase 2 activities include final status surveys of: (i) the subsurface vault under Room 6A1; (ii) the piping and the pipe chase located under Room 6B1; (iii) the soil underneath Cells 5 and 6; (iv) the underside of the pavement and the soil under the concrete apron and pavement on the west side of Cell 6; and (v) the sink and shower drain lines from the Room 6B1 restroom and any drain lines encountered under the pavement on the west side of Cell 6. A separate FSS report will be prepared for Phase 2.

## 8.0 References

| | |
|---|---|
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| US NRC, 2000 | Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) NUREG-1575, Revision 1, August 2000 |
| US NRC, 2006 | Consolidated Decommissioning Guidance, Decommissioning Process for Materials Licenses, NUREG-1757, Vol. 1, Revision 2, September 2006 |
| US NRC, 2018 | Standards for Protection Against Radiation, 10 CFR Part 20, September 2018 |

# TABLES

Attachment 1

**Table 1**
**Building 181 MARSSIM Survey Units**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Survey Unit ID | Description | Survey Class | Survey Phase | Comments |
|---|---|---|---|---|
| FSS-1A | Cell 5, south and east lower walls | 1 | 1 | The walls were decontaminated by removing LBP and then surveyed. |
| FSS-1B | Cell 5, north and west walls | 1 | 1 | The walls were decontaminated by removing LBP and then surveyed. |
| FSS-2 | Cell 5 floor | 3 | 1 | Floor was surveyed after decontamination of walls. |
| FSS-3 | Cell 5 upper walls and ceiling | 3 | 1 | LBP was removed from the ceiling, upper walls, and light fixtures and then surveyed. |
| FSS-4 | Room 6B1 floor | 1 | 1 | The floor was surveyed, including the floor of the bathroom. |
| FSS-5 | Room 6B1 lower walls | 1 | 1 | The lower walls were surveyed, including the lower walls of the bathroom |
| FSS-6 | Room 6B1 upper walls and ceiling | 1 | 1 | The required scope of FSS-6 is a Class 1 survey of the upper walls, plus an LAW-only survey of the ceiling. |
| FSS-7A | Room 6A1 floor | 1 | 1 | The floor was decontaminated. Rows “A” through “H” were surveyed. |

**Table 1**
**Building 181 MARSSIM Survey Units**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Survey Unit ID | Description | Survey Class | Survey Phase | Comments |
|---|---|---|---|---|
| FSS-7B | Room 6A1 floor | 1 | 1 | The floor was decontaminated. Rows “I” through “Z” were surveyed. |
| FSS-8 | Room 6A1 lower walls | 1 | 1 | The walls were decontaminated by removing LBP and then surveyed. |
| FSS-9 | Room 6A1 upper walls and ceiling | 1 | 1 | Space heaters were removed for disposal as LLRW. The upper walls and ceiling were surveyed. |
| FSS-10 | Cell 6 subsurface vault | 2 | 2 | A subsurface vault was discovered under Room 6A1. Characterization surveys indicate direct frisks up to 90 percent of the DCGL and DU in sediments above the soil DCGL. Further effort will be performed under a separate work plan. |
| FSS-11 | Room 3A floor | 1 | 1 | LBP was removed from the floor and the floor was surveyed. |
| FSS-12 | Roof ventilator and surrounding roof | 1 | 1 | The roof was surveyed. |

Attachment 1

**Table 1**
**Building 181 MARSSIM Survey Units**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Survey Unit ID | Description | Survey Class | Survey Phase | Comments |
|---|---|---|---|---|
| FSS-13 | HVAC | 1 | 1 | The HVAC equipment in Cell 5 and Cell 6 was surveyed. This includes the "upper pipe chase" described in the FSSP. |
| FSS-14A | Cell 6 exterior concrete apron and electrical vault | 1 | 1 | Upgraded to Class 1 due to discovery of contamination above DCGL and surveyed. |
| FSS-14B | Cell 6 concrete apron buffer zone | 3 | 1 | Nominal two-meter wide buffer zone around FSS-14A was surveyed. |
| FSS-15 | Soil under Cell 5 and Cell 6 | 3 | 2 | Placeholder for future soil survey under building slab after demolition |
| FSS-16 | Soil adjacent to Cell 5 and Cell 6 | 3 | 2 | Placeholder for future survey of soil adjacent to Cell 6 after demolition |
| FC-1 | Two square meters of Cell 4 floor | 3 | 1 | Data needed to complete baseline survey was collected. |
| FC-2 | Rooms 3D and 3E | 3 | 1 | Prior characterization surveys of floors after asbestos removal. |

**Notes:**
DCGL - Derived Concentration Guideline Level
DU - Depleted Uranium
FSS - Final Status Survey
HVAC - Heating, Venting, and Air Conditioning
LAW - Large Area Wipe
LBP - Lead-Based Paint
LLRW - Low-Level Radioactive Waste
MARSSIM - Multi-Agency Radiation Site Survey Implementation Manual

**Table 2**
**Typical Beta Detection MDCs**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Detector | Application | Efficiency[1] (counts/disintegration) | Background (cpm) | Scan MDC (dpm/100 $cm^2$) | Static MDC (dpm/100 $cm^2$) |
|---|---|---|---|---|---|
| 2929 | Beta | 0.25 | 100 | N/A | 90 |
| 43-93 | Beta | 0.22 | 500 | 1,250 | 490 |
| 43-89 | Beta | 0.22 | 500 | 1,000 | 390 |
| 43-37 | Beta | 0.22 | 1,000 | 1,250 | 850[2] |

**Notes:**
(1) Calculated by multiplying the surface efficiency (50%) by the 2 pi source efficiency.
(2) The LM43-37 detector was used in a static 30-second count mode for scans.
MDC: Minimum Detectable Concentration.
N/A: Not Applicable.

**Table 3**
**Air Sampling Data**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Air Sample No. | Air Sampler No. | Location | Date | Air Sample Flow Rate (lpm) | Run Time (minutes) | Sample Alpha Counts | Sample Beta Counts | U-238 Beta (dpm) | U-238 Beta (DAC-hrs) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4198 | Cell 5 | 14-Dec-17 | 50 | 600 | 2 | 2153 | 5.36E+00 | 0.04 |
| 2 | 4190 | Cell5 | 14-Dec-17 | 50 | 600 | 4 | 2137 | 1.88E+00 | 0.01 |
| 3 | 4190 | Cell 6 | 18-Dec-17 | 50 | 570 | 4 | 2136 | 1.67E+00 | 0.01 |
| 4 | 4198 | Cell 6 | 18-Dec-17 | 50 | 570 | 4 | 2180 | 1.12E+01 | 0.08 |
| 5 | 12408 | Cell 6 | 18-Dec-17 | 3 | 265 | 2 | 2183 | 1.19E+01 | 1.49 |
| 6 | 14279 | Cell 6 | 18-Dec-17 | 3 | 265 | 3 | 2199 | 1.54E+01 | 1.92 |
| 7 | 4190 | Cell 6 | 19-Dec-17 | 50 | 385 | 19 | 2288 | 3.47E+01 | 0.26 |
| 8 | 4198 | Cell 6 | 19-Dec-17 | 50 | 385 | 4 | 2140 | 2.54E+00 | 0.02 |
| 9 | 4190 | Cell 6 | 20-Dec-17 | 50 | 345 | 4 | 2191 | 1.36E+01 | 0.10 |
| 10 | 4198 | Cell 6 | 20-Dec-17 | 50 | 345 | 2 | 2097 | -6.81E+00 | -0.05 |
| 11 | 14279 | Cell 6 | 20-Dec-17 | 3 | 325 | 2 | 2145 | 3.62E+00 | 0.45 |
| 12 | 12408 | Cell 6 | 20-Dec-17 | 3 | 325 | 5 | 2199 | 1.54E+01 | 1.92 |
| 13 | 4198 | Cell 5 | 12-Dec-17 | 50 | 480 | 17 | 2236 | 2.34E+01 | 0.18 |
| 14 | 4190 | Cell 5 | 12-Dec-17 | 50 | 570 | 6 | 2086 | -9.20E+00 | -0.07 |
| 15 | 4198 | Cell 5 | 13-Dec-17 | 50 | 570 | 8 | 2180 | 1.12E+01 | 0.08 |
| 16 | 12408 | Cell 6 | 4-Jan-18 | 3 | 435 | 4 | 2079 | -1.07E+01 | -1.34 |
| 17 | 4190 | Cell 6 | 4-Jan-18 | 3 | 540 | 19 | 2068 | -1.31E+01 | -1.64 |
| 18 | 4190 | Cell 6 | 5-Jan-18 | 60 | 470 | 38 | 2159 | 6.67E+00 | 0.04 |
| 19 | 14279 | Cell 6 | 5-Jan-18 | 3 | 460 | 5 | 2047 | -1.77E+01 | -2.21 |
| 20 | 4190 | Cell 6 | 9-Jan-18 | 50 | 535 | 7 | 1957 | 4.38E+00 | 0.03 |
| 21 | 4198 | Cell 6 | 9-Jan-18 | 50 | 525 | 4 | 2115 | 4.02E+01 | 0.30 |
| 22 | 12409 | Cell 6 | 9-Jan-18 | 3 | 505 | 10 | 1994 | 1.28E+01 | 1.60 |
| 23 | 4198 | Cell 6 | 10-Jan-18 | 50 | 540 | 12 | 1890 | -1.08E+01 | -0.08 |
| 24 | 4198 | Cell 6 | 11-Jan-18 | 50 | 455 | 4 | 1866 | -1.62E+01 | -0.12 |
| 25 | 4198 | Cell 6 | 16-Jan-18 | 50 | 580 | 10 | 1960 | 0.00E+00 | 0.00 |
| 26 | 4198 | Cell 6 | 18-Jan-18 | 50 | 515 | 12 | 1908 | -1.18E+01 | -0.09 |

**Table 3**
**Air Sampling Data**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Air Sample No. | Air Sampler No. | Location | Date | Air Sample Flow Rate (lpm) | Run Time (minutes) | Sample Alpha Counts | Sample Beta Counts | U-238 Beta (dpm) | U-238 Beta (DAC-hrs) |
|---|---|---|---|---|---|---|---|---|---|
| 27 | 4198 | Cell 6 | 17-Jan-18 | 50 | 575 | 5 | 1917 | -9.75E+00 | 0.00 |
| 28 | 4198 | Cell 6 | 15-Jan-18 | 50 | 580 | 1 | 1918 | -9.52E+00 | -0.07 |
| 29 | 12408 | Cell 6 | 18-Jan-18 | 3 | 255 | 12 | 1871 | -2.02E+01 | -2.52 |
| 30 | 4198 | Cell 6 | 22-Jan-18 | 50 | 545 | 23 | 1898 | -1.41E+01 | -0.11 |
| 31 | 4198 | Cell 6 | 23-Jan-18 | 50 | 580 | 8 | 1949 | -2.49E+00 | -0.02 |
| 32 | 4198 | Cell 6 | 24-Jan-18 | 50 | 575 | 33 | 1960 | 0.00E+00 | 0.00 |
| 33 | 4198 | Cell 6 | 25-Jan-18 | 50 | 565 | 14 | 1932 | -6.35E+00 | -0.05 |
| 34 | 4198 | Cell 6 | 26-Jan-18 | 50 | 575 | 25 | 1961 | -3.79E+01 | -0.28 |
| 18R | 4190 | Cell 6 | 5-Jan-18 | 60 | 470 | 11 | 1917 | 1.74E+01 | 0.11 |
| 32R | 4198 | Cell 6 | 24-Jan-18 | 50 | 575 | 13 | 1914 | 1.67E+01 | 0.13 |
| 34R | 4198 | Cell 6 | 26-Jan-18 | 50 | 575 | 15 | 1874 | 7.63E+00 | 0.06 |
| 17R | 4190 | Cell 6 | 4-Jan-18 | 3 | 540 | 19 | 1959 | 2.69E+01 | 3.37 |
| 7R | 4190 | Cell 6 | 19-Dec-17 | 50 | 385 | 9 | 1841 | 1.51E-01 | 0.00 |
| 13R | 4198 | Cell 5 | 12-Dec-17 | 50 | 480 | 14 | 2010 | 3.85E+01 | 0.29 |
| 33R | 4198 | Cell 6 | 25-Jan-18 | 50 | 565 | 6 | 1893 | 1.19E+01 | 0.09 |
| 26R | 4198 | Cell 6 | 18-Jan-18 | 50 | 515 | 10 | 2001 | 3.64E+01 | 0.27 |
| 29R | 12408 | Cell 6 | 18-Jan-18 | 3 | 255 | 8 | 1956 | 2.62E+01 | 3.28 |

**Notes:**
DAC-hrs - derived air concentration hours
dpm - disintegration per minute
lpm - liters per minute

**Table 4**
**Building 181 MARSSIM Survey Summary**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Survey Unit ID | Highest Smear (dpm/100 $cm^2$) | Smear Highest MDC (dpm/100 $cm^2$) | Highest Static (dpm/100 $cm^2$) | LM43-93/LM43-89 Highest MDC (dpm/100 $cm^2$) | Highest Scan MDC (dpm/100 $cm^2$) |
|---|---|---|---|---|---|
| FSS-1A | 111 | 133 | 318 | 371 | 765 |
| FSS-1B | 62 | 135 | 357 | 417 | 765 |
| FSS-2 | 83 | 133 | 544 | 411 | 683 |
| FSS-3 | 59 | 133 | 641 | 417 | 1,000 [1] |
| FSS-4 | 87 | 127 | 1,127 | 425 | 730 |
| FSS-5 | 94 | 133 | -170 | 425 | 730 |
| FSS-6 | 104 | 133 | 453 | 373 | 744 |
| FSS-7A | 126 | 127 | 2,126 | 419 | 712 |
| FSS-7B | 97 | 127 | 1,360 | 419 | 712 |
| FSS-8 | 118 | 109 | 1,326 | 419 | 704 |
| FSS-9 Walls | 123 | 133 | 442 | 418 | 704 |
| FSS-9 Ceiling | 100 | 133 | 1,021 | 418 | 1,250 [1] |
| FSS-10 | 130 | 132 | 2,255 | 303 | 1,250 [1] |
| FSS-11 | 76 | 133 | 1,463 | 423 | 650 |
| FSS-12 | 59 | 135 | -328 | 584 | 1,250 [1] |
| FSS-13 | 112 | 133 | 664 | 471 | 1,250 [1] |
| FSS-14A | 98 | 130 | 1,058 | 306 | 1,250 [2] |
| FSS-14B | 81 | 130 | 499 | 309 | 1,000 [2] |
| FC-1 | -23 | 83 | 203 | 340 | 650 |

**Notes:**

dpm/100 $cm^2$ - disintegrations per minute per 100 square centimeters

MDC - Maximum Detectable Concentration

(1) Roof, ceiling, utility trench, and HVAC equipment surveys were performed with LM43-93 and LM43-89 probes. The MDCs are taken from Table 2.

(2) Contamination was concentrated in cracks in the pavement. The survey was performed with LM43-93 and LM43-89 probes for enhanced sensitivity to small areas of elevated contamination. The MDCs are taken from Table 2.

**Table 5**
**Sediment Sample Analytical Results[1]**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Location | U-234 Alpha Spec. (pCi/g) | U-235 Alpha Spec. (pCi/g) | U-238 Alpha Spec. (pCi/g) | U-234 to U-238 Ratio | U-238 Gamma Spec. (pCi/g) | U-238 DCGL (pCi/g) | Max. U-234 as DU (pCi/g) | Min. U-234 as $U_{nat}$ (pCi/g) | Max. U-238 as DU (pCi/g) |
|---|---|---|---|---|---|---|---|---|---|
| Electrical Vault (NW) | 0.436 | 0.042 | 1.624 | 0.268 | 3.310 | 4.600 | 0.234 | 0.202 | 3.1 |
| Electrical Vault (NE) | 0.489 | 0.055 | 1.084 | 0.451 | 1.110 | 4.600 | 0.156 | 0.333 | 0.8 |
| I/S R6A1 Utility Trench | 4.155 | 0.254 | 28.850 | 0.144 | 27.512 | 4.600 | 4.155 | 0.000 | 27.5 |
| Utility Trench East End | 0.420 | 0.028 | 1.201 | 0.350 | 3.282 | 4.600 | 0.173 | 0.247 | 3.1 |

**Notes:**
[1] For information purposes only.
DU - Depleted Uranium
pCi/g - picocuries per gram
$U_{nat}$ - Natural Uranium

**Table 6**
**Cell 5 Quality Control Data**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Type | Max. Reading (dpm/100 $cm^2$) | Mean Reading (dpm/100 $cm^2$) | Standard Deviation ($\sigma$) (dpm/100 $cm^2$) | $[(Mean_{FSS}-Mean_{QC})/\sigma_{QC}]$ | 95 percent Confidence Level | QC Pass or Fail |
|---|---|---|---|---|---|---|
| FSS | 544 | -252 | 520 | N/A | N/A | N/A |
| QC | 805 | -40 | 378 | 0.56 | 1.96 | Pass |

**Notes:**
$\sigma$ - standard deviation
dpm/100 $cm^2$ - disintegrations per minute per 100 square centimeters
FSS - Final Status Survey
QC - Quality Control

**Table 7**
**Room 6B1 Quality Control Data**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Type | Max. Reading (dpm/100 $cm^2$) | Mean Reading (dpm/100 $cm^2$) | Standard Deviation ($\sigma$) (dpm/100 $cm^2$) | $[(Mean_{FSS}-Mean_{QC})/\sigma_{QC}]$ | 95 percent Confidence Level | QC Pass or Fail |
|---|---|---|---|---|---|---|
| FSS | 663 | -226 | 328 | N/A | N/A | N/A |
| QC | -82 | -668 | 318 | 1.39 | 1.96 | Pass |

**Notes:**
$\sigma$ - standard deviation
dpm/100 $cm^2$ - disintegrations per minute per 100 square centimeters
FSS - Final Status Survey
QC - Quality Control

**Table 8**
**Room 6A1 Quality Control Data**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

| Type | Max. Reading (dpm/100 $cm^2$) | Mean Reading (dpm/100 $cm^2$) | Standard Deviation ($\sigma$) (dpm/100 $cm^2$) | $[(Mean_{FSS}-Mean_{QC})/\sigma_{QC}]$ | 95 percent Confidence Level | QC Pass or Fail |
|---|---|---|---|---|---|---|
| FSS | 1672 | 14 | 773 | N/A | N/A | N/A |
| QC | 1049 | 202 | 404 | 0.47 | 1.96 | Pass |

**Notes:**
$\sigma$ - standard deviation
dpm/100 $cm^2$ - disintegrations per minute per 100 square centimeters
FSS - Final Status Survey
QC - Quality Control

**Table 9**
**Retrospective Review of Uncertainty**

**Final Status Survey Report for Building 181**
**Robins Air Force Base, Georgia**

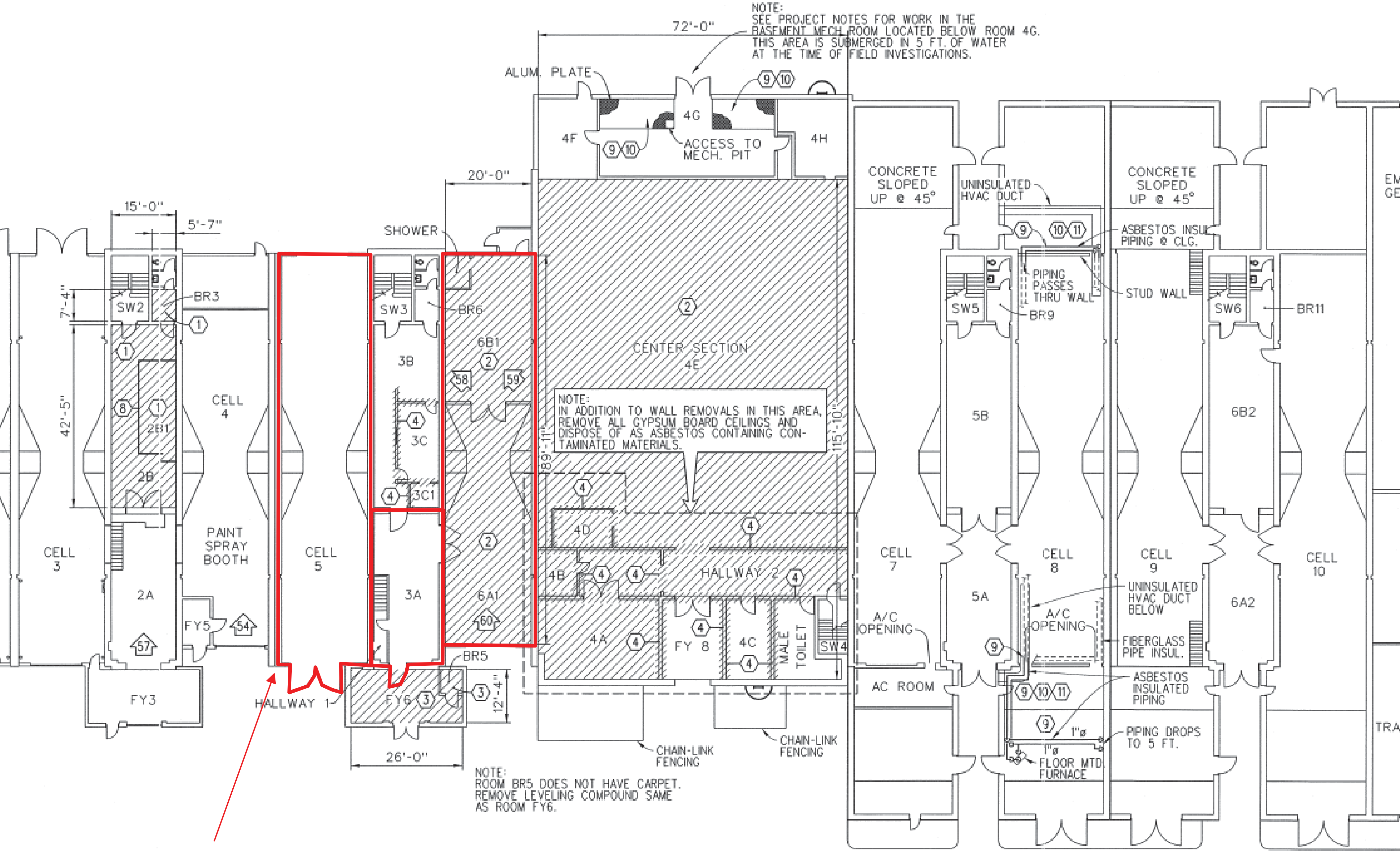
| Survey Unit No. | LBGR = MDC/2 | Δ = DCGL - LBGR | Mean Static (dpm/ccm$^2$) | Static σ* (dpm/ccm$^2$) | Relative Shift (Δ/σ) | Table 5.3 Min. No. Statics | Min. No. Statics |
|---|---|---|---|---|---|---|---|
| FSS-1A | 145 | 2,426 | -263 | 319 | 7.6 | 9 | 68 |
| FSS-1B | 202 | 2,369 | -301 | 297 | 7.9 | 9 | 68 |
| FSS-2 | 200 | 2,371 | -156 | 248 | 9.5 | 9 | 97 |
| FSS-3 | 201 | 2,369 | -511 | 138 | 17.1 | 9 | 27 |
| FSS-4 | 206 | 2,365 | 242 | 208 | 11.3 | 9 | 70 |
| FSS-5 | 206 | 2,365 | -490 | 153 | 15.4 | 9 | 83 |
| FSS-6 | 186 | 2,385 | -345 | 202 | 11.8 | 9 | 79 |
| FSS-7A | 203 | 2,367 | 408 | 362 | 6.5 | 9 | 48 |
| FSS-7B | 203 | 2,367 | 445 | 402 | 5.8 | 9 | 48 |
| FSS-8 | 203 | 2,367 | -168 | 532 | 4.4 | 9 | 90 |
| FSS-9 | 223 | 2,348 | -304 | 150 | 15.6 | 9 | 79 |
| FSS-11 | 205 | 2,366 | 204 | 321 | 7.4 | 9 | 39 |
| FSS-14A | 149 | 2,422 | 158 | 432 | 5.6 | 9 | 38 |
| FSS-14B | 151 | 2,420 | -34 | 274 | 8.8 | 9 | 32 |

**Note:**
Δ - Delta between DCGL and LBGR
σ - standard deviation
ccm$^2$ - 100 square centimeters
DCGL - Derived Concentration Guideline Level
dpm - disintegration per minute
LBGR - Lower Bound of the Gray Region
MDC - Minimum Detectable Concentration

Attachment 1

# FIGURES


| PREPARED BY | ARS Aleut Remediation / Geosyntec consultants | PREPARED FOR | PROJECT NAME FINAL |
|---|---|---|---|
| PROJECT NO. | GW0082/02 | | SITE DESCRIPTION |
| DOCUMENT NO. | GA180190 | | |




Areas included for Decommissioning and Final Status Survey [Cell 5, Cell 6, (Rooms 6A1 and 6B1), and Room 3A]

| PREPARED BY | PREPARED FOR | PROJECT NAME |
|---|---|---|
| ARS Aleut Remediation; Geosyntec consultants | | FINAL STA |

# Attachment 1

**Figure 3**
**Cell 5 "Lay Flat" View**

| | | | | | |
|---|---|---|---|---|---|
| EWA2 | B3 | C2 | D2 | E2 | F2 |
| EWA1 | B1 | C1 | D1 | E1 | F1 |

| | |
|---|---|
| BB2 | NWBB1 |
| AA2 | NWAA1 |
| Z2 | NWZ1 |
| Y2 | NWY1 |
| X2 | NWX1 |
| W2 | NWW1 |
| V2 | NWV1 |
| U2 | NWU1 |
| T2 | NWT1 |
| S2 | NWS1 |
| R2 | NWR1 |
| Q2 | NWQ1 |
| P2 | NWP1 |
| O2 | NWO1 |
| N2 | NWN1 |
| M2 | NWM1 |
| L2 | NWl1 |
| K2 | NWK1 |
| J2 | NWJ1 |
| I2 | NWI1 |
| H2 | NWH1 |
| G2 | NWG1 |
| F2 | NWF1 |
| E2 | NWE1 |
| D2 | NWD1 |
| C2 | NWC1 |
| B2 | NWB1 |
| A2 | NWA1 |

| | | | | | |
|---|---|---|---|---|---|
| BB1 | BB2 | BB3 | BB4 | BB5 | BB6 |
| AA1 | AA2 | AA3 | AA4 | AA5 | AA6 |
| Z1 | Z2 | Z3 | Z4 | Z5 | Z6 |
| Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| X1 | X2 | X3 | X4 | X5 | X6 |
| W1 | W2 | W3 | W4 | W5 | W6 |
| V1 | V2 | V3 | V4 | V5 | V6 |
| U1 | U2 | U3 | U4 | U5 | U6 |
| T1 | T2 | T3 | T4 | T5 | T6 |
| S1 | S2 | S3 | S4 | S5 | S6 |
| R1 | R2 | R3 | R4 | R5 | R6 |
| Q1 | Q2 | Q3 | Q4 | Q5 | Q6 |
| P1 | P2 | P3 | P4 | P5 | P6 |
| O1 | O2 | O3 | O4 | O5 | O6 |
| N1 | N2 | N3 | N4 | N5 | N6 |
| M1 | M2 | M3 | M4 | M5 | M6 |
| L1 | L2 | L3 | L4 | L5 | L6 |
| K1 | K2 | K3 | K4 | K5 | K6 |
| J1 | J2 | J3 | J4 | J5 | J6 |
| I1 | I2 | I3 | I4 | I5 | I6 |
| H1 | H2 | H3 | H4 | H5 | H6 |
| G1 | G2 | G3 | G4 | G5 | G6 |
| F1 | F2 | F3 | F4 | F5 | F6 |
| E1 | E2 | E3 | E4 | E5 | E6 |
| D1 | D2 | D3 | D4 | D5 | D6 |
| C1 | C2 | C3 | C4 | C5 | C6 |
| B1 | B2 | B3 | B4 | B5 | B6 |
| A1 | A2 | A3 | A4 | A5 | A6 |

| | |
|---|---|
| SWBB1 | BB2 |
| SWAA1 | SWAA2 |
| SWZ1 | Z2 |
| SWY1 | Y2 |
| SWX1 | X2 |
| SWW1 | W2 |
| SWV1 | V2 |
| SWU1 | U2 |
| SWT1 | T2 |
| SWS1 | S2 |
| SWR1 | R2 |
| SWQ1 | Q2 |
| SWP1 | P2 |
| SWO1 | O2 |
| SWN1 | N2 |
| SWM1 | M2 |
| SWL1 | L2 |
| SWK1 | K2 |
| SWJ1 | J2 |
| SWI1 | SWI2 |
| SWH1 | H2 |
| SWG1 | G2 |
| SWF1 | F2 |
| SWE1 | E2 |
| SWD1 | D2 |
| SWC1 | C2 |
| SWB1 | B2 |
| SWA1 | A2 |

| | | | | | |
|---|---|---|---|---|---|
| WWA1 | B1 | C1 | D1 | E1 | F1 |
| WWA2 | B2 | C2 | D2 | E2 | F2 |

# Attachment 1

**Figure 4**
**Cell 6 Room 6B1 "Lay Flat" View**

| | | | | | |
|---|---|---|---|---|---|
| EWA4 | B1 | C4 | D4 | E4 | F4 |
| EWA3 | B2 | C3 | D3 | E3 | F3 |
| EWA2 | B3 | C2 | D2 | E2 | F2 |
| EWA1 | B1 | C1 | D1 | E1 | F1 |

| | | | |
|---|---|---|---|
| K4 | K3 | C2 | NWK1 |
| J4 | J3 | J2 | NWJ1 |
| I4 | I3 | I2 | NWI1 |
| H4 | H3 | H2 | NWH1 |
| G4 | G3 | G2 | NWG1 |
| F4 | F3 | F2 | NWF1 |
| E4 | E3 | E2 | NWE1 |
| D4 | D3 | D2 | NWD1 |
| C4 | C3 | C2 | NWC1 |
| B4 | B3 | B2 | NWB1 |
| A4 | A3 | A2 | NWA1 |

| | | | | | |
|---|---|---|---|---|---|
| K1 | C2 | K3 | K4 | K5 | K6 |
| J1 | J2 | J3 | J4 | J5 | J6 |
| I1 | I2 | I3 | I4 | I5 | I6 |
| H1 | H2 | H3 | H4 | H5 | H6 |
| G1 | G2 | G3 | G4 | G5 | G6 |
| F1 | F2 | F3 | F4 | F5 | F6 |
| E1 | E2 | E3 | E4 | E5 | E6 |
| D1 | D2 | D3 | D4 | D5 | D6 |
| C1 | C2 | C3 | C4 | C5 | C6 |
| B1 | B2 | B3 | B4 | B5 | B6 |
| A1 | A2 | A3 | A4 | A5 | A6 |

| | | | |
|---|---|---|---|
| SWK1 | C2 | K3 | K4 |
| SWJ1 | J2 | J3 | J4 |
| SWI1 | I2 | I3 | I4 |
| SWH1 | H2 | H3 | H4 |
| SWG1 | G2 | G3 | G4 |
| SWF1 | F2 | F3 | F4 |
| SWE1 | E2 | E3 | E4 |
| SWD1 | D2 | D3 | D4 |
| SWC1 | C2 | C3 | C4 |
| SWB1 | B2 | B3 | B4 |
| SWA1 | A2 | A3 | A4 |

| | | | | | |
|---|---|---|---|---|---|
| WWA1 | B1 | C1 | D1 | E1 | F1 |
| WWA2 | B2 | C2 | D2 | E2 | F2 |
| WWA3 | B3 | C3 | D3 | E3 | F3 |
| WWA4 | B4 | C4 | D4 | E4 | F4 |

# Attachment 1

**Figure 5**
**Cell 6 Room 6A1 "Lay Flat" View**

| | | | | | |
|---|---|---|---|---|---|
| EWA4 | B1 | C4 | D4 | E4 | F4 |
| EWA3 | B2 | C3 | D3 | E3 | F3 |
| EWA2 | B3 | C2 | D2 | E2 | F2 |
| EWA1 | B1 | C1 | D1 | E1 | F1 |

| | | | |
|---|---|---|---|
| Q4 | Q3 | Q2 | NWQ1 |
| P4 | P3 | P2 | NWP1 |
| O4 | O3 | O2 | NWO1 |
| N4 | N3 | N2 | NWN1 |
| M4 | M3 | M2 | NWM1 |
| L4 | L3 | L2 | NWL1 |
| K4 | K3 | K2 | NWK1 |
| J4 | K3 | J2 | NWJ1 |
| I4 | J3 | I2 | NWI1 |
| H4 | H3 | H2 | NWH1 |
| G4 | G3 | G2 | NWG1 |
| F4 | F3 | F2 | NWF1 |
| E4 | E3 | E2 | NWE1 |
| D4 | D3 | D2 | NWD1 |
| C4 | C3 | C2 | NWC1 |
| B4 | B3 | B2 | NWB1 |
| A4 | A3 | A2 | NWA1 |

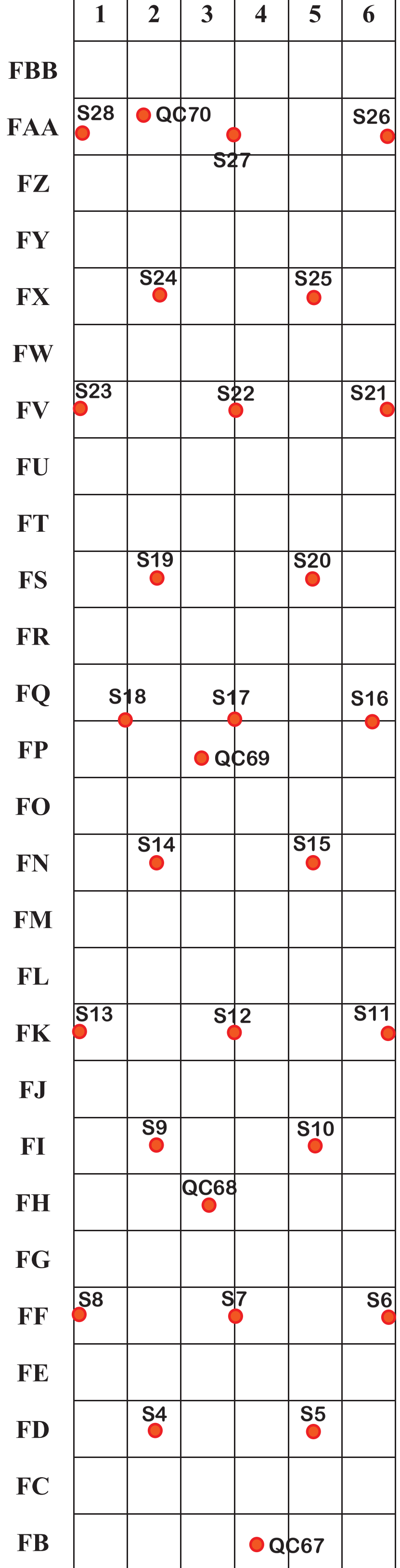
| | | | | | |
|---|---|---|---|---|---|
| Q1 | Q2 | Q3 | Q4 | Q5 | Q6 |
| P1 | P2 | P3 | P4 | P5 | P6 |
| O1 | O2 | O3 | O4 | O5 | O6 |
| N1 | N2 | N3 | N4 | N5 | N6 |
| M1 | M2 | M3 | M4 | M5 | M6 |
| L1 | L2 | L3 | L4 | L5 | L6 |
| K1 | K2 | K3 | K4 | K5 | K6 |
| J1 | J2 | J3 | J4 | J5 | J6 |
| I1 | I2 | I3 | I4 | I5 | I6 |
| H1 | H2 | H3 | H4 | H5 | H6 |
| G1 | G2 | G3 | G4 | G5 | G6 |
| F1 | F2 | F3 | F4 | F5 | F6 |
| E1 | E2 | E3 | E4 | E5 | E6 |
| D1 | D2 | D3 | D4 | D5 | D6 |
| C1 | C2 | C3 | C4 | C5 | C6 |
| B1 | B2 | B3 | B4 | B5 | B6 |
| A1 | A2 | A3 | A4 | A5 | A6 |
| | | DOOR | DOOR | | |

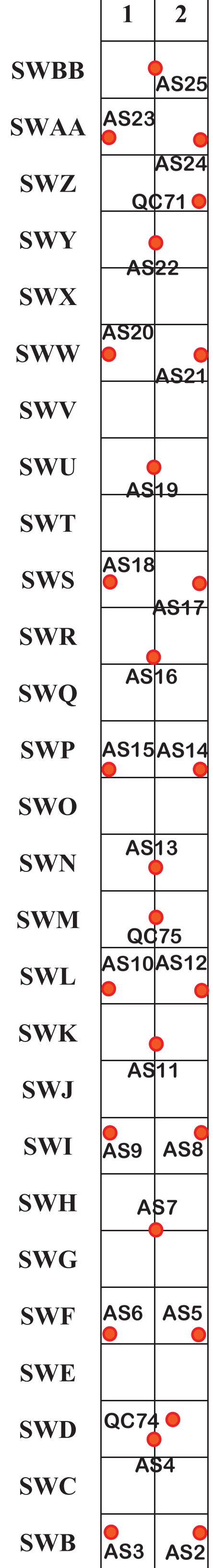
| | | | |
|---|---|---|---|
| SWQ1 | Q2 | Q3 | Q4 |
| SWP1 | P2 | P3 | P4 |
| SWO1 | O2 | O3 | O4 |
| SWN1 | N2 | N3 | N4 |
| SWM1 | M2 | M3 | M4 |
| SWL1 | L2 | L3 | L4 |
| SWK1 | K2 | K3 | K4 |
| SWJ1 | J2 | J3 | J4 |
| SWI1 | SWI2 | SWI3 | SWI4 |
| SWH1 | H2 | H3 | H4 |
| SWG1 | G2 | G3 | G4 |
| SWF1 | F2 | F3 | F4 |
| SWE1 | E2 | E3 | E4 |
| SWD1 | D2 | D3 | D4 |
| SWC1 | C2 | C3 | C4 |
| SWB1 | B2 | B3 | B4 |
| SWA1 | A2 | A3 | A4 |

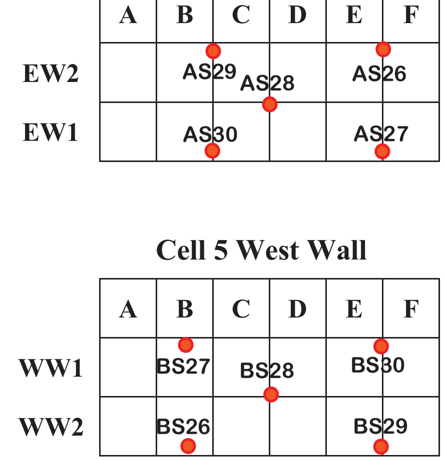
| | | | | | |
|---|---|---|---|---|---|
| WWA1 | B1 | C1 | D1 | E1 | F1 |
| WWA2 | B2 | C2 | D2 | E2 | F2 |
| WWA3 | B3 | C3 | D3 | E3 | F3 |
| WWA4 | B4 | C4 | D4 | E4 | F4 |

**Figure 6**
**Room 3A "Lay Flat" View**

| | | | |
|---|---|---|---|
| J1 | J2 | J3 | J4 |
| I1 | I2 | I3 | I4 |
| H1 | H2 | H3 | H4 |
| G1 | G2 | G3 | G4 |
| F1 | F2 | F3 | F4 |
| E1 | E2 | E3 | E4 |
| D1 | D2 | D3 | D4 |
| C1 | C2 | C3 | C4 |
| B1 | B2 | B3 | B4 |
| WALL | A2 | A3 | A4 |








CELL 5 AND
FINAL STATU
NOTI

1. Final Status Survey 1A
Walls ≤2 meters. (Clas

2. Final Status Survey 1A
walls ≤2 meters. (Class

3. Final Status Survey 2 –

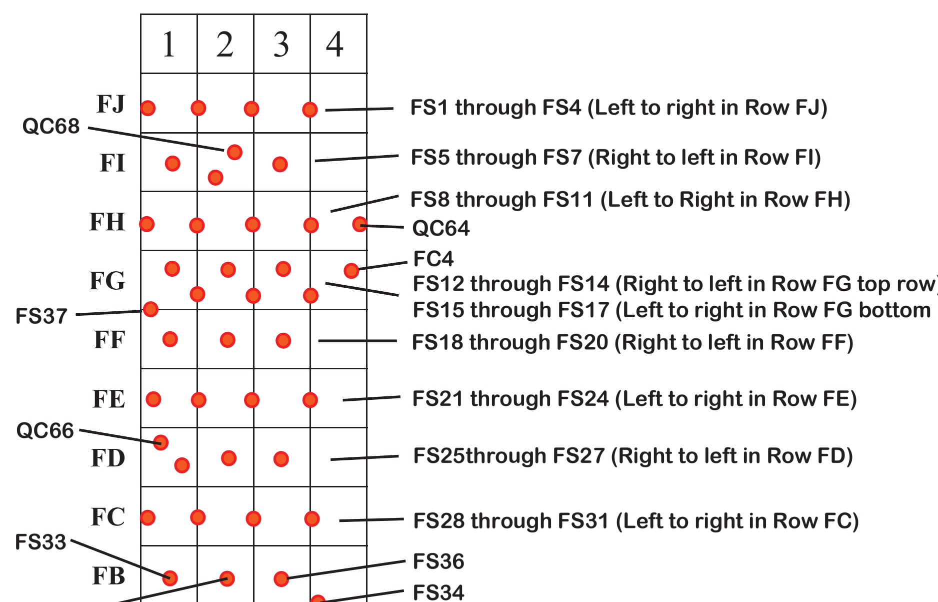
4. Final Status 3A – All W
Area).

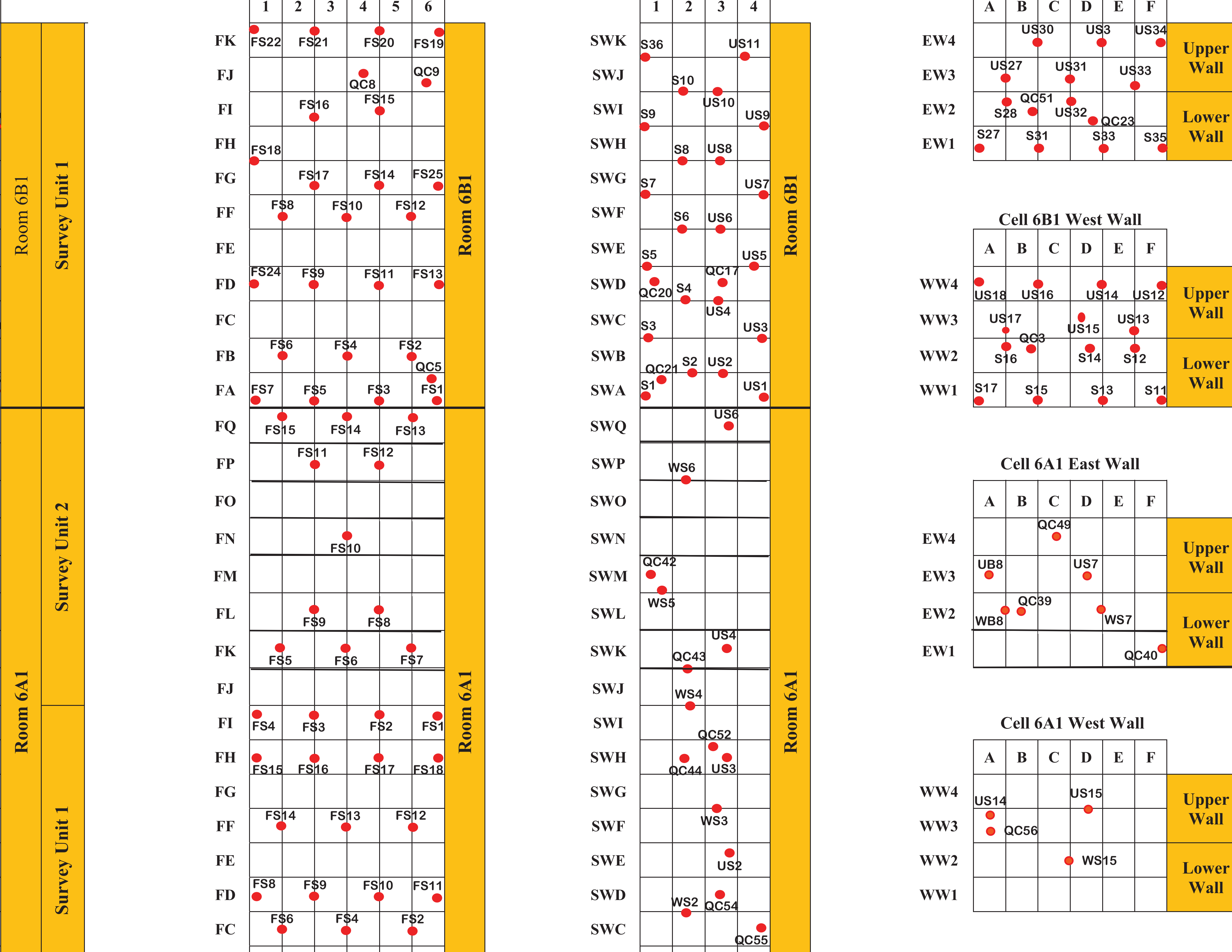
5. Final Status Survey 3B

6. Final Status Survey 11 –
Area).

● Location of static measu

Room 3A Floor



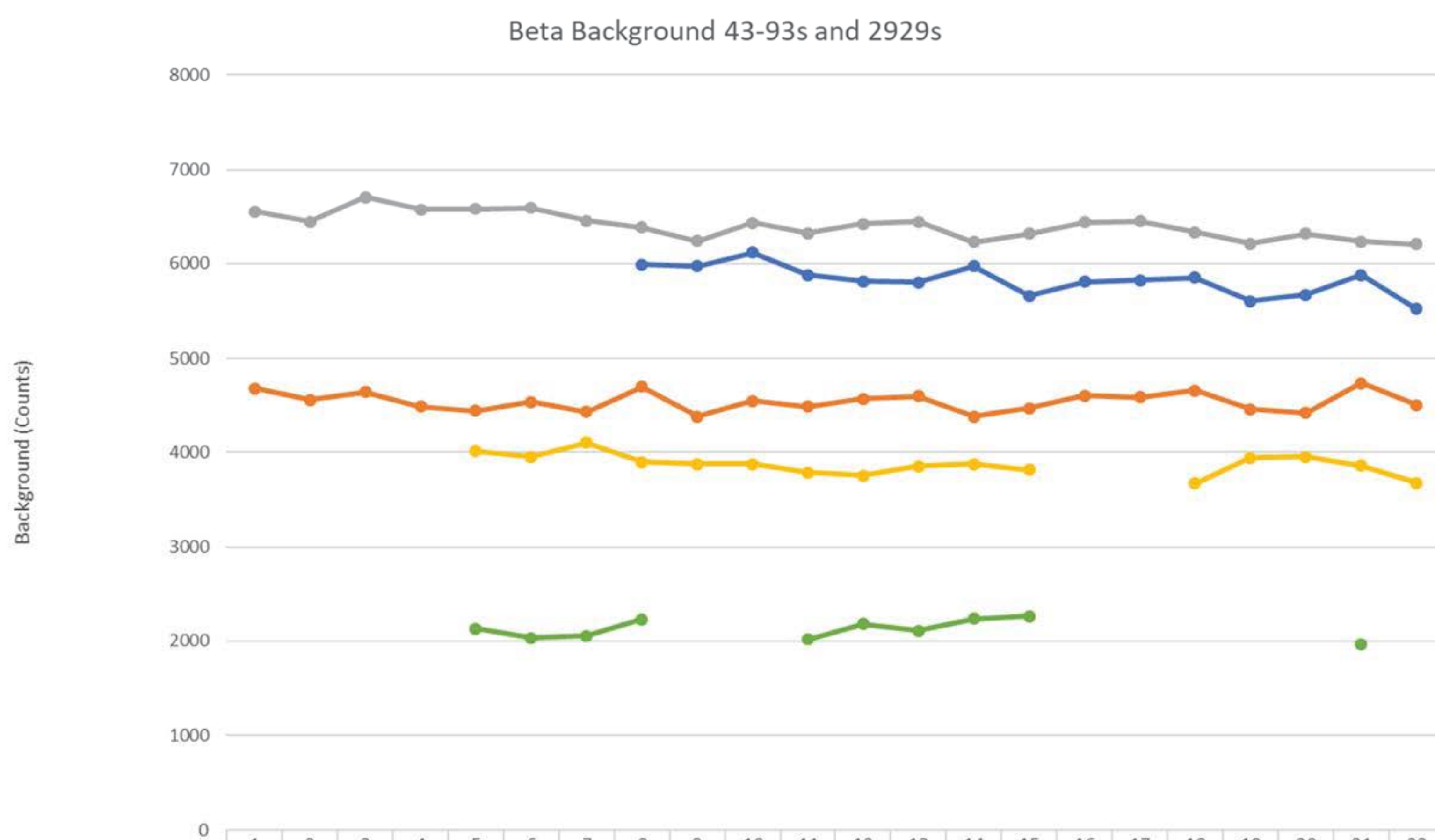


Room 6B1
Survey Unit 1
Room 6A1
Survey Unit 2
Survey Unit 1
1 2 3 4 5 6
FK FJ FI FH FG FF FE FD FC FB FA
FS22 FS21 FS20 FS19
QC8 QC9
FS16 FS15
FS18
FS17 FS14 FS25
FS8 FS10 FS12
FS24 FS9 FS11 FS13
FS6 FS4 FS2 QC5
FS7 FS5 FS3 FS1
FQ FP FO FN FM FL FK FJ FI FH FG FF FE FD FC
FS15 FS14 FS13
FS11 FS12
FS10
FS9 FS8
FS5 FS6 FS7
FS4 FS3 FS2 FS1
FS15 FS16 FS17 FS18
FS14 FS13 FS12
FS8 FS9 FS10 FS11
FS6 FS4 FS2
Room 6B1
Room 6A1
1 2 3 4
SWK SWJ SWI SWH SWG SWF SWE SWD SWC SWB SWA
S36 US11
S10 US10
S9 US9
S8 US8
S7 US7
S6 US6
S5 US5
QC20 S4 QC17 US4
S3 US3
QC21 S2 US2
S1 US1
SWQ SWP SWO SWN SWM SWL SWK SWJ SWI SWH SWG SWF SWE SWD SWC
US6
WS6
QC42 WS5
US4 QC43
WS4
QC52 QC44 US3
WS3
US2
WS2 QC54
QC55
Room 6B1
Room 6A1
A B C D E F
EW4 EW3 EW2 EW1
US30 US3 US34
US27 US31 US33
QC51 S28 US32 QC23
S27 S31 S33 S35
Upper Wall
Lower Wall
Cell 6B1 West Wall
A B C D E F
WW4 WW3 WW2 WW1
US18 US16 US14 US12
US17 US15 US13
QC3 S16 S14 S12
S17 S15 S13 S11
Upper Wall
Lower Wall
Cell 6A1 East Wall
A B C D E F
EW4 EW3 EW2 EW1
QC49
UB8 US7
WB8 QC39 WS7
QC40
Upper Wall
Lower Wall
Cell 6A1 West Wall
A B C D E F
WW4 WW3 WW2 WW1
US14 US15
QC56
WS15
Upper Wall
Lower Wall

# Attachment 1

**Figure 9**

**Beta Background for LM2929 (Alpha Beta Sample Counter) and LM43-93 (Alpha and Beta Probe) Instruments**



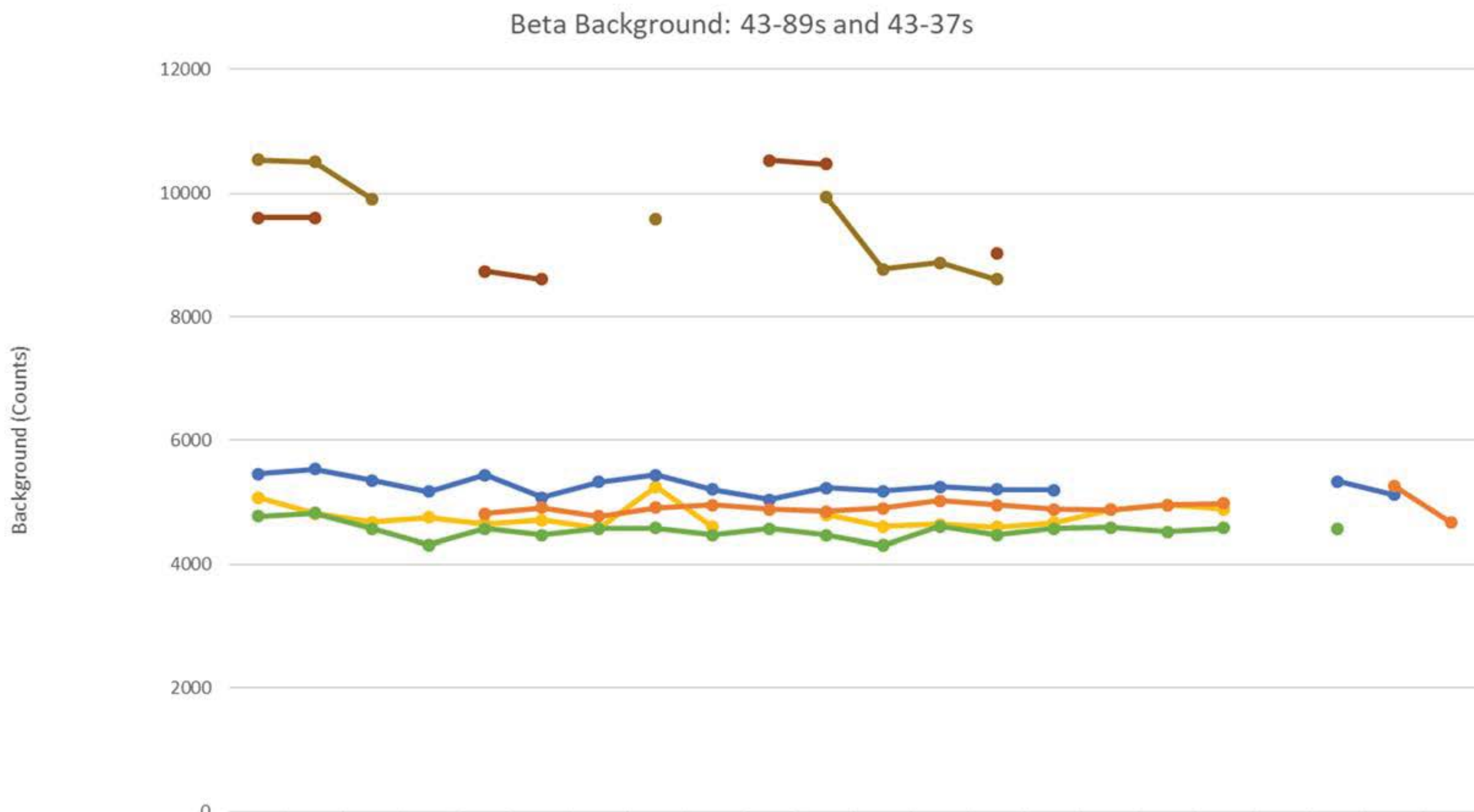

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 43-93 274959 beta | 4684 | 4561 | 4644 | 4488 | 4444 | 4539 | 4436 | 4702 | 4383 | 4549 | 4491 | 4573 | 4600 | 4383 | 4472 | 4606 | 4590 | 4659 | 4462 | 4425 | 4737 | 4504 |
| 43-93 234834 beta | | | | | 4012 | 3954 | 4099 | 3896 | 3876 | 3876 | 3785 | 3750 | 3850 | 3876 | 3812 | | | 3667 | 3938 | 3949 | 3856 | 3676 |
| 43-93 253248 beta | | | | | 2133 | 2038 | 2056 | 2235 | | | 2016 | 2184 | 2112 | 2241 | 2268 | | | | | | 1966 | |
| 2929 185266 | | | | | | | | 5991 | 5971 | 6117 | 5881 | 5813 | 5801 | 5972 | 5659 | 5808 | 5823 | 5851 | 5602 | 5668 | 5880 | 5521 |
| 2929 190602 | 6552 | 6444 | 6708 | 6578 | 6581 | 6593 | 6455 | 6385 | 6241 | 6432 | 6321 | 6424 | 6445 | 6228 | 6319 | 6440 | 6451 | 6333 | 6212 | 6319 | 6232 | 6203 |

Days

# Attachment 1

**Figure 10**

**Beta Background for LM43-37 (Gas Flow Proportional Counter) and LM43-89 (Alpha and Beta Probe) Instruments**




| Days | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 43-89 310164 beta | 5077 | 4817 | 4674 | 4758 | 4651 | 4710 | 4578 | 5251 | 4597 | | 4796 | 4607 | 4643 | 4597 | 4672 | 4875 | 4952 | 4883 | | | | |
| 43-89 310179 beta | 4776 | 4821 | 4573 | 4311 | 4572 | 4469 | 4574 | 4584 | 4465 | 4574 | 4466 | 4306 | 4604 | 4465 | 4574 | 4590 | 4519 | 4581 | | 4562 | | |
| 43-37 287606 beta | 9599 | 9604 | | | 8733 | 8601 | | | | 10540 | 10476 | | | 9031 | | | | | | | | |
| 43-37 253275 beta | 10547 | 10512 | 9911 | | | | | 9572 | | | 9950 | 8764 | 8868 | 8607 | | | | | | | | |
| 43-89 310170 beta | 5455 | 5531 | 5354 | 5168 | 5441 | 5078 | 5330 | 5438 | 5206 | 5038 | 5230 | 5182 | 5253 | 5206 | 5200 | | | | | 5339 | 5119 | |
| 43-37 268477 beta | | | | | 4818 | 4915 | 4776 | 4910 | 4954 | 4885 | 4848 | 4899 | 5020 | 4954 | 4883 | 4878 | 4953 | 4976 | | | 5258 | 4665 |

# ATTACHMENT 1

## Decommissioning Plan for Robins Air Force Base Building 181, June 2017

# Attachment 1

# Decommissioning Plan

# for

## Robins Air Force Base
## Building 181

**June 2017**

*Prepared for:*
**Robins Air Force Base**

*Prepared by:*
**ARS Aleut Remediation, LLC**
**2609 N. River Road**
**Port Allen, LA  70767**

# Attachment 1

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# Attachment 1

## Acronyms

| | |
|---|---|
| AAR | ARS Aleut Remediation, LLC |
| AFB | Air Force Base |
| ANSI | American National Standards Institute |
| ARS | American Radiation Services |
| C&D | Construction and Demolition |
| cm | centimeter |
| cpm | count per minute |
| DCGL | Derived Concentration Guideline |
| DOE | Department of Energy |
| dpm | disintegration per minute |
| dps | disintegration per second |
| DQO | Data Quality Objective |
| DU | Depleted Uranium |
| FIDLER | Field Instrument for Detecting Low Energy Radiation |
| FSS | Final Status Survey |
| FSSP | Final Status Survey Plan |
| g | gram |
| GPS | Global Positioning System |
| GWS | Gamma Walkover Survey |
| HPT | Health Physics Technician |
| IFB | Indistinguishable from Background |
| LAW | Large Area Wipe |
| LBP | Lead-Based Paint |
| m | meter |
| MARSAME | Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual |
| MARSSIM | Multi-Agency Radiation Site Survey Implementation Manual |
| MDA | Minimum Detectable Activity |
| MDC | Minimum Detectable Concentration |
| N/A | Not Applicable |
| NIST | National Institute of Science and Technology |
| NRC | Nuclear Regulatory Commission |
| Pa | protactinium |
| pCi | picocurie |
| RP | Radiation Protection |
| SF | Square Foot |
| TEDE | Total effective dose equivalent |
| Th | thorium |
| TRU | transuranic |
| TSDF | Treatment Storage Disposal Facility |
| U | uranium |
| USAF | United States Air Force |
| USNRC | United States Nuclear Regulatory Commission |

## Executive Summary

Building 181, Cells 1 through 8 at Robins Air Force Base (AFB) is scheduled for demolition. This portion of Building 181 was characterized for radiological contamination resulting from depleted uranium (DU) operations within the facility. Preliminary radiation surveys performed by others and by ARS Aleut Remediation, LLC (AAR) in August 2015 detected radiological contamination in Building 181 Cells 5 and 6. Because of this, these and other cells and rooms of Building 181, excluding Cells 9-12, were surveyed for radioactive contamination. The objective of this survey, referred to as a Baseline Survey, was to delineate where radiological contamination is present in excess of Building-specific Derived Concentration Guidelines (DCGLs). DCGLs were derived for the interior surfaces of Building 181 and for the soil beneath Cells 5 and 6 using the Residual Radioactivity computer codes (RESRAD) (ANL 2001 and ANL 2003). Details of the derivation of the DCGLs are contained in the technical memorandum: "*Building 181 RESRAD Modeling Robins Air Force Base, Georgia" (Geosyntec 2016).* This Decommissioning Plan for Building 181, Cells 1 through 8 presents the radiological contamination status of the building; the plan that was followed to perform the survey; the plans to remove the contamination, some of which is contained in lead-based paint; the status of pallets, furniture, and miscellaneous equipment within the building; and a Final Status Survey Plan (FSSP) for the building. Based on the results of these historical and recent baseline surveys, it was determined that the decommissioning of Building 181 Cells 5 and 6 are classified as a Group 4 decommissioning project under NUREG 1757 Volume 1 Figure 1.1.

The Baseline Survey was performed according to the guidelines and requirements of the Multi-Agency Radiation Site Survey Implementation Manual (MARSSIM) (NUREG-1575, Rev. 1) and its companion manual the Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (MARSAME) (NUREG-1575, Supp.1). The Baseline Survey was completed in November 2015. The survey found radioactive contamination in Cell 5; the carpet in Rooms 3A, 3B, 3C, and FY 6; and Cell 6. Some pallets and other equipment were also found with contamination in excess of background. These items, the contaminated carpet, and some contaminated floor tiles are properly packaged, stored, and await disposal as low level radioactive material.

Radioactive contamination found on the concrete floor of Cell 6 will be removed by scabbling or other appropriate means. Lead-based paint on the walls of Cell 6 and on the lower walls to a height of two meters in Cell 5 will be abated. This abated material will be disposed as low level radioactive waste or mixed waste depending on the results of waste characterization following abatement.

During survey activities, standing water (presumably stormwater from leaky roof) was observed in Cell 7 and Rooms 5a and 5b. A total of approximately 160 gallons of water was removed and containerized in 55-gallon drums. Samples of that water were analyzed for lead and gross alpha/beta and isotopic uranium via alpha spectroscopy and the laboratory analytical results were provided to the Base. Per direction provided by the Base, the water was disposed of at the Base's industrial wastewater treatment plant (IWTP). The solids mixed in with the water were filtered out during discharge to the IWTP and will be disposed of separately as low level radioactive waste during Building 181 decommissioning efforts.

# Attachment 1

Contamination is not anticipated below the concrete floors of Cells 5 and 6. To verify, the soil underneath the two cells will undergo a Final Status Survey as a Class 3 survey unit. The survey will consist of a thorough gamma walk-over scan of the entire soil surface footprint. In addition, systematic and biased soil samples will be collected. The biased soil samples will be collected at elevated areas of activity as compared to the reference background to ensure the soil DGCL is not exceeded.

Decontamination and abatement will begin upon approval of this Decommissioning Plan. The decontamination will be properly and safely performed in accordance with a license with the U.S. Nuclear Regulatory Commission and Robins Air Force Base radioactive materials license. A Final Status Survey (FSS) will be conducted thereafter to prove the success of the decontamination and allow the rest of the building to be disposed in a construction landfill.

## 1.0 Introduction

Building 181 at Robins Air Force Base (AFB) consists of cells on the first floor, interconnecting rooms on the first floor, and rooms on the second and third floors. There are a total of 12 cells and ancillary rooms in Building 181. Building 181, Cells 1 through 8 and interconnecting rooms on the first, second, and third stories is scheduled for decommissioning and demolition. Review of NUREG 1757 Volume 1 Figure 1.1, shows that the decommissioning of Robins AFB Building 181 Cells 5 and 6 to fall under a Group 4 project. Licensed material was used in a manner that resulted in persistent contamination of work areas, but did not contaminate groundwater. Residual radioactive material remains at the site and will be remediated to levels that are As Low As Reasonably Achievable (ALARA) and below levels that meet U. S. Nuclear Regulatory Commission (NRC) criteria for unrestricted use by applying site-specific criteria developed using RESRAD modeling.

The portion of Building 181 that will be demolished was characterized for radiological contamination resulting from depleted uranium (DU) operations within the facility. Preliminary radiation surveys performed by the 78 MDG Bioenvironmental Engineering team completed forty-six (46) measurements for total radioactive contamination. Contamination was detected exceeding the Regulatory Guide 1.86 value of 5,000 dpm/100 $cm^2$. The date of this survey is not known. To corroborate these previous surveys, ARS Aleut Remediation, LLC (AAR) performed a follow-up scoping survey in August 2015 that also detected radiological contamination in Building 181 Cells 5 and 6. The survey maps and affiliated results of all surveys performed in August 2015 are depicted in Attachment 2 and are summarized within Section 3.0 of this decommissioning plan. There were no operations in the other portions of Building 181 where contamination was expected.

A Baseline Survey was performed in November and December of 2015 in the portions of Building 181 that will be demolished. Contamination from DU was found in Cells 5 and 6. The purpose was to delineate contamination so that it could be removed prior to building demolition. This report details the results of the Baseline Survey. Removal of the contamination would assure that the building demolition debris did not pose a risk to human health or the environment.

The other portions of Building 181, excluding Cells 9-12, were also surveyed for radioactive contamination. The objective of this survey was to provide evidence as to whether these areas were impacted by operations with DU in Cells 5 and 6 and to demonstrate that the demolition debris did not pose a risk to human health or the environment.

The survey was designed to allow contamination levels of from ten percent to 50 percent of the DCGL for DU to be detected (2,570 dpm/100 $cm^2$). This detection capability is reasonably achieved through a combination of one minute fixed point (static measurements) and surface scans with large area gas proportional detectors. Lower detection levels would require significantly lower instrument scan speeds, more static measurements, and make the use of large area gas proportional detectors infeasible (except for highly sophisticated and expensive specialty detectors). Lower detection levels were not needed to meet the overall project objectives.

The DCGL was derived using RESRAD-Build. The dose criterion used was 25 mrem/y total effective dose equivalent (TEDE) and a full working year of building occupancy even though the building is not currently occupied and is scheduled to be demolished. The attached Technical Memorandum (Appendix B) provides the details of the DCGL derivation.

Surfaces with DU exceeding the DCGL will be decontaminated. The removed, decontaminated material will be packaged and disposed as low level radioactive waste. Once decontamination is complete and the decontaminated surfaces are resurveyed and proven to meet the DCGL, the building will be demolished and disposed in a construction debris landfill.

Once decontamination is complete, a FSS will be conducted to demonstrate that the radioactive contamination has been successfully removed. This Decommissioning Plan describes the Baseline Survey design, presents the Baseline Survey Results, and describes the proposed building decontamination methods. The proposed FSS Plan is also provided.

Contamination is not anticipated below the concrete floors of Cells 5 and 6. To verify, the soil underneath the two cells will undergo a Final Status Survey as a Class 3 survey unit. The survey will consist of a thorough gamma walk-over scan of the entire soil surface footprint. In addition, systematic and biased soil samples will be collected. The biased soil samples will be collected at elevated areas of activity as compared to the reference background to ensure the soil DGCL is not exceeded.

The location of Building 181 at Robins AFB is shown in ***Figure 1***. Building 181 is three stories high and is arranged as 12 cells with adjoining rooms and a center section. Appendix B provides a photographic log presenting pictures of Building 181. Those cells and adjoining rooms that were characterized for radioactive contamination are discussed further as follows. Cell 1A and room FY1 is between and connects cells 1 and 2. Rooms 2A, 2B, 2B1, and FY3 are between and connect cells 3 and 4. Rooms 3A, 3B, and FY6 are between and connect cells 5 and 6. Rooms 3C and 3D are on the second floor above rooms 3A and 3B. Rooms 5A and 5B are between cells 7 and 8. A plan view of Building 181 is shown in ***Figure 2***. Building 181 has a total footprint of ~70,000 square feet (SF), with ~ 64,000 SF within Cells 1-8. The various cells and rooms are labeled on ***Figure 2***.

Building 181 was originally used for testing aircraft engines. After the testing of engines was curtailed, the Building 181 Cells were re-purposed for other uses. Building 181 Cells 5 and 6 were converted to and used to remove DU oxidation products from depleted uranium counterweights used in various aircraft. The DU oxidation products were removed from the counterweights using manual and mechanical processes that included scraping and scrubbing the oxidation until it was removed. The cleaned DU counterweights were then wiped down with isopropyl alcohol prior to the clean DU counterweights being encased in aluminum screening. This process is believed to be the only source of radiological contamination within Building 181 Cells 5 and 6. Other cells and rooms of Building 181 were characterized to determine if radioactive material was spread into these other building areas. The radioactive contamination survey was performed according to the principles of MARSSIM and its companion manual MARSAME.

The Baseline Survey Plan that was used comprises Section 2.0. Baseline Survey results are presented in Section 3.0. Decontamination plans and methods are in Section 4.0. The Final Status Survey Plan is presented in Section 5.0.

# Attachment 1

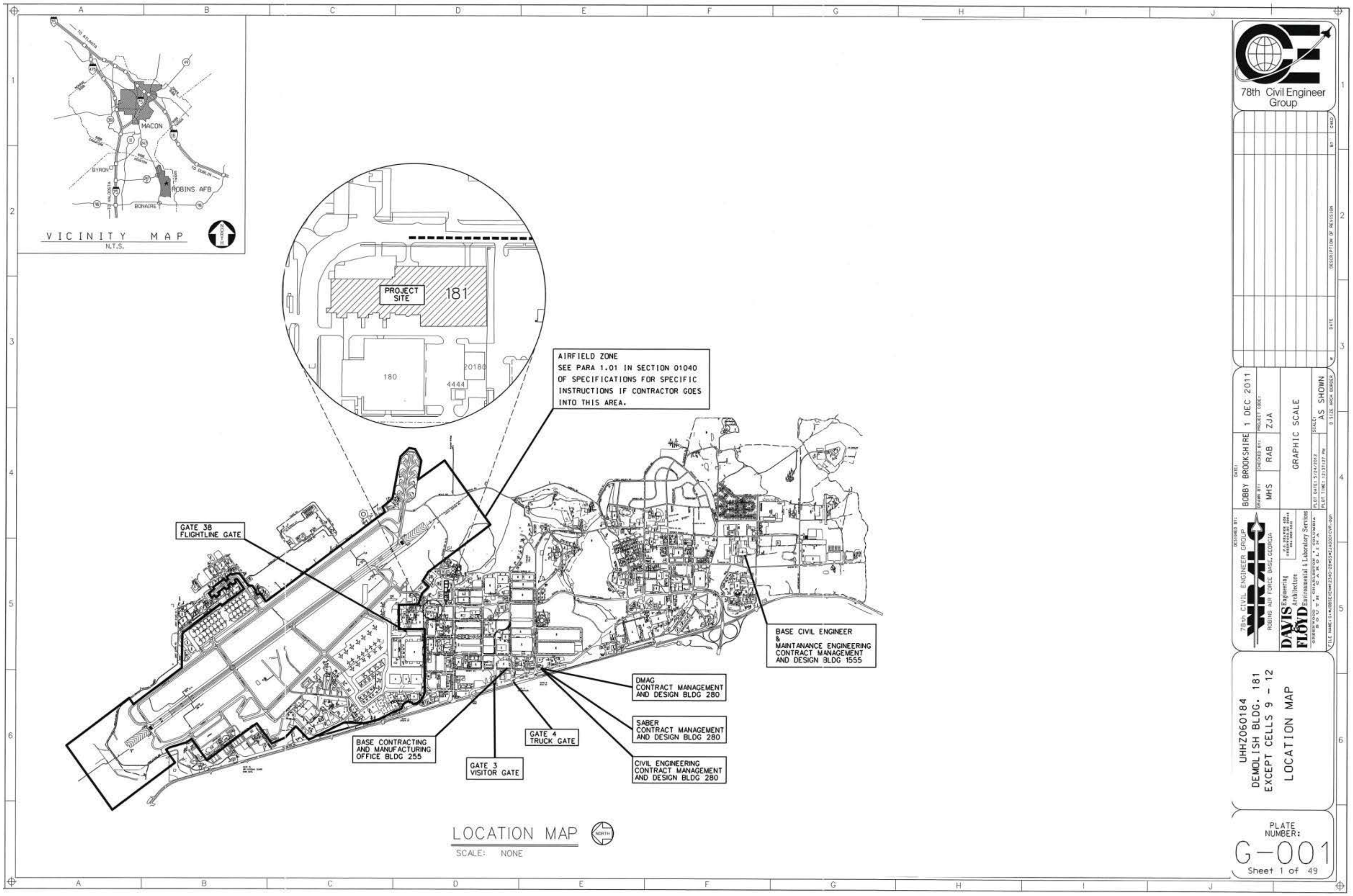


**Figure 1. Locator Map**

# Attachment 1

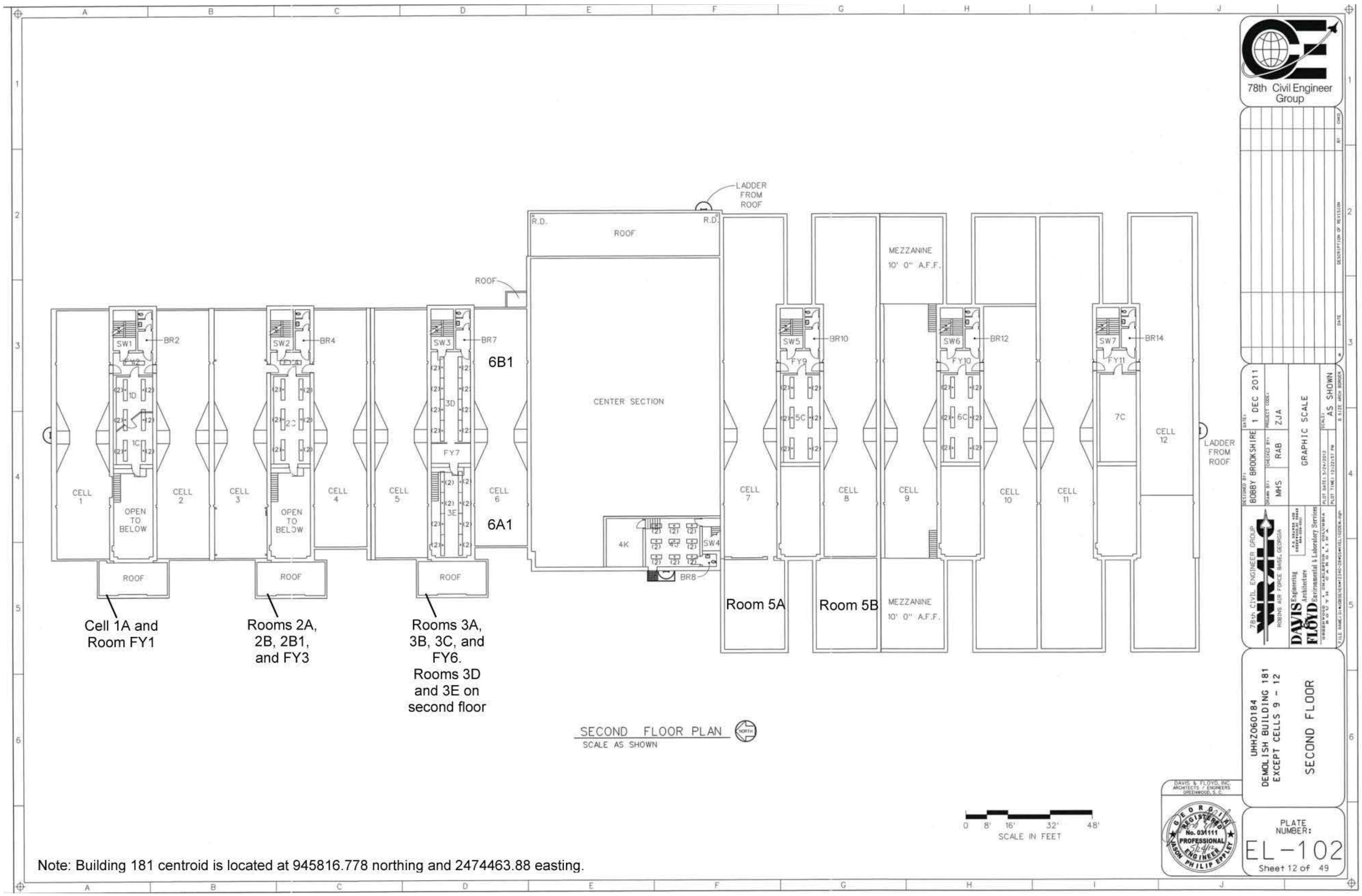


Figure 2. Plan View

## 2.0 Baseline Survey Plan

This section of the Decommissioning Plan documents the approach and results of the Robins Building 181 Cell 1-8 Baseline Survey conducted to obtain data and other information needed to develop the Building 181 Cells 6 and 6 Decommissioning Plan and Final Status Survey Plan. Sections 4.0 and 5.0 of this document provides the specifics related to the Decommissioning Plan and Final Status Survey Plan. The baseline survey for radiological contamination was performed by ARS Aleut Remediation, LLC (AAR) under its subcontract to Geosyntec Consulting, Inc. (Geosyntec). It includes the comprehensive survey in Building 181, Cells 5 and 6 as well as the scoping surveys performed in the other parts of Building 181 Cells 1-4, the Building Center, Cell 7, and Cell 8 to determine whether contamination has been spread to these areas. It also discusses how the miscellaneous equipment and material within the building was evaluated for contamination.

The Baseline Survey was performed according to the principles of MARSSIM (NUREG-1575, Rev. 1) and its companion manual the Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (MARSAME) (NUREG-1575, Supp.1).

### *2.1. Radioactive Contaminant of Concern*

The assumed radioactive contaminant of concern, based on operational knowledge, is DU because of the counterweight cleaning operations. This was confirmed by collection of paint chip samples that were flaking off of the floor/walls of Building 181 Cell 6 and a sample of metal shavings found in a trash can located in the corner of the Cell 6 High-bay area. The samples were analyzed by gamma spectroscopy, alpha spectroscopy, gross alpha, and gross beta. ***Table 1*** summarizes the alpha spectroscopy isotopic uranium analytical results. The laboratory report is shown in Attachment 1, *Building 181 Cells 1-8 Baseline Survey Analytical Reports*. Based on these sample results, the site-specific radionuclide activity fractions for U-238, U-235, and U-234 are 85%, 4%, and 11%, respectively. The sample results show that the uranium-234 concentration is depleted when compared to the uranium-238 concentration. None of the daughters of U-234 were detected in excess of the laboratory MDA.

**Table 1. Summarized Analytical Results[1]**

| Radionuclide | Sample 1 Paint Chips (pCi/g) | Sample 2 Paint Chips (pCi/g) | Sample 3 Metal Shavings (pCi/g) | Average (pCi/g) | Radionuclide Percent | Ratio To U-238 |
|---|---|---|---|---|---|---|
| U-238 | 901.7 | 98.29 | 3,221 | 1,407.00 | 85% | 1 |
| U-235 | 53.71 | 2.124 | 161.9 | 72.58 | 4% | 0.0516 |
| U-234 | 105.5 | 12.03 | 418.1 | 178.54 | 11% | 0.1269 |

Footnote 1 The isotopic uranium results were ascertained via alpha spectroscopy (Eichrom ACW-03).
Footnote 2 - The radionuclide percent was calculated as the average individual radionuclide concentration divided by the average total uranium concentration. The normalized concentrations were calculated as the average individual radionuclide concentration divided by the average U-238 concentration. All three samples were used for calculating the averages because depleted uranium is the sole radioactive contaminant of concern and the isotopic ratios for the two types of samples (paint chips and metal shavings) are consistent with depleted uranium.

### 2.2. Applicable Guidelines

Building 181 will be decontaminated such that the TEDE to an occupant for one working year will be as far below 25 mrem as is reasonably achievable. RESRAD-Build was used to derive the DU surface contamination value that would cause a TEDE of 25 mrem/y. The value so derived was 2,570 dpm/100 $cm^2$. This value was derived using the assumption that ten percent of the total amount of radioactivity was removable contamination. This DCGL includes the radioactivity contributions from all three uranium isotopes, uranium-238, uranium-235, and uranium-234 that are present in DU. This combined DCGL was used because the hand-held radiation detectors used for the survey sum the contribution of the radiations emitted from all isotopes. The radiation dose equivalent contributed by each of the uranium isotopes is included in the DCGL calculation. No sum of fractions calculation for each of the isotopes is required because DCGL was computed taking into account the percentage of each uranium isotope in the single radioactive contaminant, DU. The attached Technical Memorandum provides the details of the DCGL derivation.

### 2.3. Radiological Survey Design

This section contains a discussion of data quality objectives, instruments, MARSSIM Survey Unit classification, data requirements, survey locations, data evaluations, and background determination.

A MARSSIM-based survey was performed in Building 181, Cells 1 – 8. The purpose of the survey in Cells 5 and 6 was to delineate and mark potentially contaminated areas for decontamination. The purpose of the survey in the rest of the building (except Cells 9 – 12 which will not be demolished) was to demonstrate that the likelihood that these other areas were contaminated from former operations in Cells 5 and 6 was low, thus allowing the demolition debris to be disposed in a construction debris landfill with radioactivity concentrations indistinguishable from natural background.

A second survey shall be performed after decontamination/decommissioning of Cells 5, 6 and any other Building 181 areas found to have radiological contamination in excess of the regulatory limits. The surveys performed before and after will be identical, except the area surveyed during the second survey will be limited to those areas requiring decontamination. The second survey will serve as the FSS and will be performed to demonstrate that contamination identified during the first survey has been successfully removed to levels that are below the DCGL and are ALARA.

#### 2.3.1 General

The survey design and implementation is consistent with concepts and terminology within MARSSIM and MARSAME. The data quality objective (DQO) process and a graded approach are integrated within the MARSSIM and MARSAME process, and within this plan, to assure defensible data with cost effectiveness. Compliance with the DCGL established above was determined by demonstrating that no single measurement exceeds the DCGL as an ALARA measure. The hand-held instruments used for the survey easily detect the DCGL such that it was reasonably achievable to find and then eventually to remediate all areas that exceed the DCGL. The non-parametric statistical analyses in MARSSIM are not necessary given this approach because all measurement results will be less than the DCGL following decontamination. Likewise, there will be no areas with contamination values when averaged over one $m^2$ that exceed the DCGL following decontamination; therefore, there will be no need to perform elevated measurement comparisons (EMC).

Surveys were performed by trained HPTs who are following standard, written procedures, and are using properly calibrated instruments sensitive to the alpha and beta radiation from uranium-238 (DU) and daughter products to include Thorium-234, Protactinium-234, and Uranium-234. A small amount of Uranium-235 is also present, and its radiations will also be detected.
The following requirements also applied:

- HPTs performing surveys were qualified in accordance with ARS procedure RP-29, *Radiological Control and Survey Technician Training* (Shown in Appendix A).
- Surveys were performed in accordance with ARS procedure RP-10, *Radioactive Contamination Control and Monitoring* and the ARS Operational Guide for Contamination Monitoring (Shown in Appendix A).
- Instrument calibrated and performance was checked each day an instrument was used according to ARS procedures RP-52 and RP-53, *Setup and Operability Tests of Portable Field Instruments* and *Operability Tests – Field Instruments* (Shown in Appendix A).
- Surveys were performed in accordance with applicable AAR instrument operating guides (On file).

#### *2.3.2 Data Quality Objectives*

The objective of the surveys was to develop data to identify and mark locations within Building 181 where DU contamination exceeds the DCGLs (for total and removable contamination). Identified areas with contamination greater than the DCGLs shall be decontaminated. A second survey shall be performed to document that the radioactive contamination has been successfully removed to support the termination of Building 181 Cells 5 and 6 from the Robins AFB Permit No. GA-00462-03/01AFP, which is authorized under U.S. Nuclear Regulatory Commission (USNRC) Master Material License No. 42-23539-XXAFP. This second survey shall be the MARSSIM FSS.

The DCGLs for radiological contamination established by the USNRC (and other agencies), independent of the DQO process. For the purposes of unconditional release of the building to another demolition contractor, the data developed by the approach described Section 4, shall be used to demonstrate, at the 95% confidence level, that the DCGLs are met.

The following Sections describe the survey design, equipment, and techniques to achieve these objectives. Measurement sensitivities are defined as the Minimum Detectable Activity (MDA), at the 95 percent confidence level. The measurements shall be 10 to 50 percent of the DCGLs.

Measurement accuracy and precision are ±20%. Completeness is assured by meeting the minimum surface area scan coverage requirements of MARSSIM, i.e., >80% useable data.

#### *2.3.3 Radiation Detection Instruments*

The instrument used to measure total surface contamination at a specific location was a 100 $cm^2$ Ludlum Model 43-93 dual phosphor detectors coupled with a Ludlum Model 2360 ratemeter/scaler that simultaneously measure and record beta-gamma and alpha radiation. The Ludlum Model 43-

93 detector was used to obtain and record the results of direct radiation measurements with the detector held over and at contact with a specific area for one minute time period.

The instruments used to scan for contamination were the 500 $cm^2$ Ludlum Model 43-37 gas flow monitor to be used for walls and ceilings and the 609 $cm^2$ Ludlum 43-37-1 gas flow proportional floor monitor detector. These detectors were coupled with Ludlum Model 2221 ratemeter/scalers. The two gas flow detectors were operated with a high voltage setting that allowed a combined reading from alpha, beta, and gamma radiation. Two Ludlum gas flow proportional detectors were used to scan a surface area of one square meter to measure the average contamination level.

A Ludlum model 2929 ratemeter/scaler was coupled with a Ludlum 43-1-10-1 dual phosphor detector was used to analyze swipes for removable alpha and beta/gamma contamination. The swipes were collected over 100 $cm^2$ areas and analyzed for removable alpha and beta/gamma contamination.

With typical background counts and detector efficiencies, the sensitivity, or MDA, of the radiation detection instrument used for this survey were adequate to meet the DCGLs. The MDA is used to express radiation detection instrument sensitivity. The MDC is the level at which one can be 95 percent confident that a statistically elevated measurement exceeds background. The MDC (sometimes referred to as the Lower Limit of Detection) is a combined parameter that includes the statistical variation in the background count rate and the statistical variation in the actual count rate.

The condition of the surface being surveyed can result in decreased detection sensitivity. Surfaces that are rough or have small crevasses can cause attenuation of alpha and beta particles. Correction factors can be applied to account for the decreased detection sensitivity. The overall measurement efficiency is comprised of detector response (4 pi efficiency, $\varepsilon_i$) and a factor for surface condition correction (source efficiency, $\varepsilon_s$). Four (4) pi efficiency is lower than 2 pi efficiency and was employed during the baseline survey activities for conservatism. A 2-pi efficiency will be used for the FSS as recommended in MARSSIM. The surface detection sensitivity for alpha radiation is at least a factor of two less than for beta radiation and the surface detection sensitivity for alpha radiation will be much more variable than for beta radiation. The survey design is therefore keyed to the detection of beta radiation, primarily. The surface efficiency used is 0.50 for beta instruments per NUREG 1507. The comparison of beta/gamma measurement results to the DCGL was used to determine whether a surface met the DCGL or required decontamination. The surface efficiency used for alpha radiation was 0.25 also per NUREG 1507, although the alpha radiation measurement results were recorded and reported simply for information.

The beta source efficiency was determined using a Strontium-90/Ytrium-90 radiation source traceable to the National Institute of Science and Technology (NIST). The beta radiation energies from Strontium-90/Ytrium-90 closely match the beta radiation energies from Thorium-234 and Protactinium-234. The alpha source efficiency was determined using a Thorium-230 source traceable to NIST, which closely matches the alpha energy of uranium-238.

The beta efficiencies for both detectors for static and scanning measurements based on the formulas in MARSSIM are shown in ***Table 2***. A surveyor efficiency factor of 0.75 for an experienced surveyor and a scan time of 1.5 second (one probe area/1.5 seconds) for the Ludlum Model 43-37 and Ludlum Model 43-37-1 and 1 second for the Ludlum Model 43-93) were used in the calculation of scan MDA. Equation 1 is the equation used to calculate the scanning MDA. Equation 2 shows the equation for calculating the static MDA.

**Equation 1 Scan MDC (derived by combining equations 6-8 and 6-9 of MARSSIM and using two beta emissions for every one alpha emission from U-238)**

MDA = $(1.38 * (bcs * i)^{0.5} * 60/i)/ (0.75^{0.5} * es * ei * 2)$ where:

1.38 is the index of sensitivity for a true positive proportion of 0.95 and a false positive proportion of 0.60;
bcs is the background count rate in counts per second;
i is the measurement interval (for this survey 1.5 seconds for the Ludlum 43-37 and 43-37-1 detectors and 1 second for the Ludlum 43-93 detector);
0.75 is the observer efficiency (for experienced surveyors);
es is the surface efficiency;
ei is the source efficiency; and
2 is the factor accounting for two beta emissions for each disintegration of U-238.

**Equation 2 Static MDC (from equation 6-7** of **MARSSIM and using two beta emissions for every one alpha emission from -238)**

MDA = $(3 + 4.65 * b^{0.5})/(2 * es * ei)$ where:

3 is a factor from combined error terms;
4.65 represents 95% confidence and equal background and static count times of one minute;
b is the number of background counts in one minute; and
2 is the factor accounting for two beta emissions for each disintegration of U-238.

Note that the efficiency terms in the MDA equation are equivalent to use of the factor "C" in MARSSIM equation 6-7. An area correction factor, also part of "C" is not required because the detector surface area is 100 $cm^2$.

Daily performance tests were conducted prior to survey activities. No instruments exhibiting questionable performance were used for developing quantitative data.

**Table 2. Detector MDA**

| Detector | Application | *Combined Efficiency (intrinsic and surface) | Typical Background Recorded During the Survey (cpm) | Scanning MDA (dpm/detector area) | Static MDA (dpm/detector area) |
|---|---|---|---|---|---|
| 43-93 | Beta | 0.125 | 250 | 781 | 306 |
| 43-37-1 | Beta | 0.125 | 1000 | 1275 | N/A |

*Determined by multiplying the surface efficiency by the source intrinsic efficiency.

**Example Calculation for Ludlum Model 43-37-1 detector of Scanning MDA Using Parameters in Table 2**

bcs = 1000 cpm/60 (s/min) = 16.7 cps
MDA = $(1.38 * (16.7 * 1.5)^{0.5} * 60/1.5)/(0.75^{0.5} *0.25 * 0.5 *2)$ = 1275 dpm/detector area

**Example Calculation of Static MDA Using Parameters in Table 2**

MDA = $(3 + 4.65* 250^{0.5})/(0.25 * 0.5 * 2)$ = 306 dpm

### *2.3.4 MARSSIM Classification and Survey Units*

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

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

MARSSIM recommends the following Survey Unit areas for building surfaces:

- Class 1 – Up to 100 $m^2$
- Class 2 – Up to 2,000 $m^2$
- Class 3 – Unlimited

A Survey Unit is defined as system, structure, or part of a structure that is likely to have similar potential contamination characteristics. Six Survey Units were identified. The Survey Units, MARRSIM Class, and classification rationale are shown in ***Table 3*** below. Note that the walls and ceilings of all rooms and cells of Building 181, other than Cells 5 and 6, were considered non-impacted. Only the floors of these other portions of the building were surveyed. If the results of the Baseline Survey showed that the floors in these areas meet the DCGL, then classifying the walls and ceilings as non-impacted is valid.

**Table 3. Baseline Survey Plan – Survey Units**

| Survey Unit | MARSSIM Class | Rationale |
|---|---|---|
| 1. Floors in Cells 5 and 6 | 1 | Contamination has been found in excess of the DCGL in Cell 5 and may exceed the DCGL in Cell 6. |

| Table 3. Baseline Survey Plan – Survey Units | | |
|---|---|---|
| **Survey Unit** | **MARSSIM Class** | **Rationale** |
| 2. Walls in Cells 5 and 6 up to 2 m above the floor | 2 | Lower wall surfaces have a higher potential for contamination, but contamination levels found on the floors during surveys performed before this current survey effort began were relatively low therefore the probability that these surfaces have contamination greater than the DCGLs is low. |
| 3. Walls above 2 m and ceilings in Cells 5 and 6 | 3 | Contamination could be present, but this is considered unlikely. |
| 4. Floors in other Building 181 cells and rooms | 3 | Contamination could be present, but this is considered unlikely. |
| 5. Surfaces currently in the pipe chase trench under Cells 5 and 6 | 2 | Water could have carried contamination into this pipe chase/trench. The probability that such contamination could exceed the DCGL is low. This Survey Unit will be surveyed as part of the FSS following decontamination inside Cell 5 and 6 and conducted when the USAF demolition contractor initiates the removal of this portion of the Cell 5 and 6 floors. |
| 6. Areas outside of cells 5 and 6 (e.g., roof, concrete apron(s) at doors, asphalt, etc.) | 3 | The potential for track out of contamination is slight given the removable contamination results found before this current survey effort began. |

The purpose for the Baseline Survey in Survey Units 1, 2, and 3 was to find contaminated areas that required decontamination prior to building demolition. The purpose of the Baseline Survey in Survey Units 4 and 6 was to demonstrate that these building areas were not contaminated using a survey design that would satisfy the requirements for a MARSSIM FSS. Survey Unit 5 will be surveyed during the FSS following decontamination in Cell 5.

### 2.3.5 Data Requirements

Fifteen direct systematically located measurement points were planned for each Survey Unit based on the recommended MARSSIM approach for calculating the number of measurement data points to demonstrate compliance for release purposes. Assumptions for this data point determination were a) the lower bound of the gray region is equal to 2500 dpm/ 100 cm$^2$, or ½ the total contamination DCGL; b) Type 1 and Type II decision errors are each 0.05; c) the uncertainty in data is equal to the detection sensitivity; and d) the background level is significant. These systematic measurements are in addition to any measurements performed as a result of positive scans; i.e. where the HPT believed the instrument MDC has been exceeded (judgmental measurements). Removable contamination measurements using swipes were performed at each systematic measurement location and at each of the judgmental measurement locations.

Scanning coverage was 100% for Class 1 units, 25% for Class 2 units, and 10% for Class 3 units (as allowed by MARSSIM). If scans of any unit reveal contamination exceeding the clearance level any such unit will be upgraded to Class 1 during the follow-on FSS survey.

*2.3.6 Referencing Survey Locations*

Measurement locations are shown on the facility drawing in Attachment 2. A one (1) meter square grid was established on MARSSIM Class 1 and Class 2 Survey Units. This was done using laser distance measurement devices. Grid node intersections were marked. The numbering convention for the square meter grid will be as follows:

F, W, or C-R-C-X where:
F denotes floor, W denotes wall, and C denotes ceiling;
R denotes rows, which will be a letter;
C denoted columns, which will be a number; and
X denotes whether the measurement is an average per square meter (A), an evenly spaced static measurement (S), or a biased measurement (B).

For example, F-A-01 will denote floor, Row A, Column 01.

Average measurement results for each square meter along with direct systematic measurements and direct biased measurements were made and referenced to the square meter grid system. These measurement locations were denoted by appending an “A” for average, “S” for systematic and “B” for biased as a suffix to the grid number. For example, F-A-01-A denotes the average result for floor row 01, column A.

Class 3 Survey Units were not gridded. This is consistent with MARSSIM. Measurement locations were denoted and numbered on a survey map as there was not a square meter grid. The notations “A”, “S”, and “B” were still used.

*2.3.7 Surveying Material and Equipment for Contamination*

Many times, miscellaneous material and equipment that may contain radioactive contamination is cheaper to dispose as radioactive waste than to perform surveys necessary to demonstrate the DCGLs are met. This is often the fastest course of action to disposition these items.

Items in Building 181 consist of numerous wooden pallets and miscellaneous office furnishings. Pallets are difficult to survey because the wood is porous and contamination may be within crevasses and holes. AAR considered pallets to have a low probability of contamination and surveyed then 10 percent as a MARSAME Class 3 Survey Unit. AAR performed a statistically-based scan survey of pallets by selecting 10 percent of them at random. The entire surface area of these selected pallets was surveyed for total beta contamination using the Ludlum 43-93 detector. Removable contamination was checked using Large Area Wipes (LAWs). A LAW is taken using an oil-impregnated cloth, called masslin. The surface area wiped was many times greater than 100 $cm^2$. The LAW is then analyzed by checking its surface with the 43-93 detector. LAWs are a quick way to demonstrate the absence of removable radioactive contamination.

If any of these pallets and/or office furnishing had contamination detected above background, all pallets were designated for disposal as radioactive waste. If none of the pallets were found to contain radioactivity above background, surveying continued at a rate of 10% of the remaining pallets. If all pallets were uncontaminated at background levels, all pallets were labeled as “clean” and shall be left for disposal as Construction and Demolition (C&D) debris by the Building 181 demolition contractor. If any pallet was found to be contaminated, all pallets were considered to be contaminated and shall be disposed as low level radioactive waste and/or mixed wastes. Please refer to Section 3 and the survey results in Attachment 2.

Miscellaneous office furnishings have a lower potential for contamination. They were surveyed and evaluated on a case-by-case basis for each piece of furniture. These furnishings were surveyed ≥25% of their surface area as allowed by MARSAME for a Class 3 Survey Unit. If the furnishings had no detectable contamination above background, they were labeled as "clean" and shall be left for disposal as C&D debris by the Building 181 demolition contractor. Otherwise the individual items will be disposed as radioactive waste.

A photo was taken of items surveyed. Photos are appended to survey forms used to document survey results and are included in Attachment 2.

#### 2.3.8 Data Evaluation

As indicated above, all survey data were compared directly with guideline values to determine the level and extent of contamination exceeding guidelines or to demonstrate that release survey data satisfy the guideline requirements. By definition, all measurements must be less than the DCGLs for total and removable contamination to consider for release, thus statistical testing will not be required.

#### 2.3.9 Background Determination

Facility-specific background levels were determined for comparison and correction of scanning and direct measurement data and to enable calculation of appropriate detection/measurement sensitivity levels. Locations where natural material content or elevated ambient gamma background levels result in high measurement sensitivity values were evaluated on an individual basis by the AAR Survey Team Lead. Background was determined for each day in the Building 181 Center Section and is included on the survey results discussed in Section 3.0 and provided in Attachment 2.

### 2.4. Survey Techniques and Sampling Methods

The Ludlum detectors were used to scan surfaces and to make the direct one minute counts for the Survey Units. The results were compared directly to the DCGLs to determine whether these units may be released to the demolition contractor.

#### 2.4.1 Scan Measurements

Scan measurements were made with the detector held approximately one cm from the surface. The scan speed for the Ludlum Model 49-93 will be one detector probe width per every one second, approximately. The scan speeds for the Ludlum Model 43-37 and 43-37-1 detectors were one probe width every 1.5 seconds, approximately. These scan speeds achieved scan MDCs lower than the DCGL.

Scan measurements with the Ludlum 43-37 and 43-37-1 detectors were made with the detector voltages set such that they summed both alpha and beta radiation measurements emitted from the surfaces. The detector did not distinguish between alpha and beta radiation events detected. Two beta radiations occur from the radioactive decay of U-238. The alpha radiation from U-238, U-

235, and U-234 was also detected, although less effectively than the beta radiation because of the lower source efficiency.

Scan measurements were made with the large area gas flow proportional monitors with a surface area equal to or greater than 500 $cm^2$. There are twenty 500 $cm^2$ areas per $m^2$. Each square meter was scanned at a uniform rate for 30 seconds. The Ludlum Model 2221Scaler has a 30 second integration time. At a minimum, 20 detector surfaces areas traversed an entire square meter in 30 seconds. Thus, a detector probe surface area dwelled over the surface for an average of 1.5 seconds (30/20).

The gas flow proportional detector operating voltages were set to detect all radiation events emitted from the surfaces (alpha, beta, and gamma). There are two beta radiations emitted from the daughters in secular equilibrium with the U-238 isotope. U-238 is more prevalent than the U-235 and U-234 isotopes when DU is the contaminant. Approximately 70% of the uranium radioactivity was assumed to be from U-238, 28% is from U-234, and 2% is from U-235. Therefore 3.3 radiation events are capable of being detected for each molecule of DU deposited as a contaminant on surfaces (1 alpha from U-238 plus one beta from Pa-234 plus 1 beta from Th-234 plus 0.28 alpha from U-234 plus 0.02 alpha from U-235). The net radiation signal from all radiation events will, at a minimum, overestimate the amount of DU on surfaces by a factor of two. Therefore, the radiation signal detected and corrected by surface and source efficiency was halved when reporting the average scan measurement result over each 1 $m^2$ when compared to the DCGL of 2,570 dpm/100 $cm^2$. This is how results of this Baseline Survey are reported herein. This factor of two reduction will not be used during the FSS to ensure that residual contamination is reduced to As Low As Reasonably Achievable (ALARA) levels.

Note that the instrument results were not corrected for the detector area for the 609 $cm^2$ Ludlum 43-37-1 or the 500 $cm^2$ Ludlum 43-37. The surface areas of both these detectors are greater than the 100 $cm^2$ DCGL area factor. No correction was made because the distribution of contamination under the detectors was not necessarily uniform. In many cases the area of contamination under the detector was greater than 100 $cm^2$. However, in cases where the contaminated area was less than or equal to 100 $cm^2$, then dividing the instrument result by the detector area (either 609 $cm^2$ or 500 $cm^2$) would underestimate the actual contamination present when compared to the DCGL which is stated in unit areas of 100 $cm^2$. Because in most cases the contaminated area exceeded 100 $cm^2$, scan results reported typically overestimated the contamination present. Areas identified as exceeding the DCGL using surface scanning measurements will be remediated and this will provide additional assurance that contamination will be removed to levels that are ALARA.

The HPT also evaluated whether any specific locations within each $m^2$ exceed three times background (nominally expected to be 800 – 1,000 cpm). The HPT investigated any areas greater than three times background within the $m^2$ once the 30 second scan is completed. This was done to evaluate whether any single area of 100 $cm^2$ potentially exceeds 2,570 dpm. Any such areas were the focus of biased measurements made using the Ludlum 43-93 detector held stationary over the area for one minute.

### 2.4.2 Direct Measurements

The 43-93 detector, different than the 43-37-1 detector, was used to differentiate between alpha and beta radiation. This detector does not rely on changes in detector voltage to distinguish between alpha only events (lower voltage setting on the 43-37-1) and alpha plus beta events (higher voltage setting on the 43-37-1). The 43-93 detector is made of two detectors layered on top of each other to detect alpha and beta radiation separately when the detector is set to the same operating voltage. There were direct systematic measurements for both alpha and beta radiation made as well as biased measurements for both alpha and beta radiation made at locations with higher readings recorded while scanning measurements are made. All direct systematic locations were uniformly and evenly spaced over the particular Survey Unit. Direct measurements were made with the Ludlum 43-93. Measurements were made with the detector held at contact with the surface being measured. A timed one minute count was performed to achieve a MDC less than the total contamination DCGL.

Biased direct measurements were made at areas where the HPT noted a scan measurement result greater than three times background. The purpose of this was to check for smaller areas of contamination that exceeded the DCGL because the scan measurements represent surface contamination averaged over one $m^2$.

A smear for removable contamination was obtained at each location where a direct radiation measurement is made. Quantitative smears or wipes with cloth filters was conducted over an area of approximately 100 $cm^2$ and alpha and beta activity collected on the sample determined by counting in the Ludlum Model 2929 sensitive, low-background counter.

The gross detector response in the alpha channel was reduced by the area background (net count) and corrected for detector efficiency (both source and intrinsic) to yield the dpm/100 $cm^2$ readings. This quantitated the alpha response for direct comparison to the DCGL because the alpha events detected are directly comparable to the DU on the surface (comprised of the sum of alpha signal from U-238 plus U-234 plus U-235). The gross detector response in the beta channel was reduced by the area background (net count) and corrected for detector efficiency (both source and intrinsic). This result was halved and recorded as the amount of radioactivity due to U-238 per 100 $cm^2$ because two beta radiation events occur as a result of one radiation decay of U-238. U-238 is the predominant component of DU, therefore this represents only a slight underestimate of the DU on the surface. Note that the decisions to decontaminate an area and the success of the decontamination in meeting the DCGL are preferentially based on the scanning measurements, which always exceeded the results of the direct measurements at the same location.

Results of this Baseline Survey are reported herein using the factor of two to account for the two beta radiation events for every one radioactive decay of U-238. This factor of two reduction will not be used during the FSS as a result of comments received during Nuclear Regulatory Commission (NRC) review of this decommissioning plan. Elimination of the factor of two will help assure that residual contamination is reduced to As Low As Reasonably Achievable (ALARA) levels.

### *2.5. Evaluation of Results*

Survey data were reviewed to assure all aspects of this plan were followed and that surveyed items were properly characterized and segregated and/or released. This review also included evaluation of documentation and acceptable quality assurance/quality control data.

### *2.6. Documentation and Proposed Format of Site Characterization Report*

Survey data was documented in accordance with applicable AAR procedures. The results of the survey are documented in Section 3.0

### *2.7. Baseline Survey Quality Assurance*

Instruments were calibrated according to ANSI N323A-1997. Survey instruments and methods specified in applicable AAR operating and technical procedures have been documented as to their ability to provide a 95% confidence level in detection of surface contamination at levels, which meet the requirements of this characterization plan. Instruments were checked daily before use to assure they are operating within ±20% of their calibrated intrinsic efficiencies. Results are on file. Supporting data is provided on each survey form.

ARS ES&H Manager and Radiation Safety Officer, Steven Green (CSP/CHP), reviewed the data and information from the survey; assisted, as requested, in evaluation of the survey data; and prepared this report. His interpretations of the data are provided herein in Section 3.0.

## 3.0 Baseline Survey Results

The results of the surveys performed to quantify the DU contamination on the interior surfaces of Building 181 and on miscellaneous equipment within the building is summarized in this section.

### *3.1. Cell 1*

The Cell 1 floor is approximately 154 $m^2$. A total of 20 $m^2$ were scanned and 19 systematic measurements were made. This exceeds the minimum number of 15 systematic measurements required for this Class 3 area.

Cell 1 was not expected to have any DU contamination. It was considered a MARSSIM Class 3 area. Only the floor was surveyed. Survey coverage was 10% of the floor for scans. Twenty square meters were surveyed. Results of scans, direct measurements, and smears are summarized in ***Table 4***. The summary table shows the measurement type, the MDA for the instruments used in the survey, the number of measurements taken, the number of measurements that were less than the MDA, the average of any of the results that exceeded the MDA, and the average of all results whether above or below the MDA. All results were less than the DCGL.

Equipment/materials in Cell 1 consisted of boxes of lights and a cart. Direct measurements for alpha and beta/gamma contamination were all less than the MDA. The absence of removable contamination was determined by taking a large area wipe with an oil-impregnated cloth. No removable contamination was detected.

**Table 4. Summarized Measurements**

| Measurement Type | MDA (dpm/100 $cm^2$) | Number of Measurements | Number <MDA | Average of DU Results >MDA (dpm/100 $cm^2$) | Average of all DU Results (dpm/100 $cm^2$) | Minimum/ Maximum result (dpm/100 $cm^2$) |
|---|---|---|---|---|---|---|
| Beta/gamma scans | 1618 | 20 | 19 | 2123 | 678 | -146/2123 |
| Alpha Direct | 56 | 19 | 0 | 200 | 200 | 56/412 |
| Beta/gamma Direct | 269 | 19 | 0 | 640 | 640 | 433/875 |
| Alpha Smear | 23 | 19 | 19 | N/A | -2 | -3/0 |
| Beta/gamma smear | 49 | 19 | 19 | N/A | -28 | -51/2 |

### *3.2. Cell 1A/Room FY1*

The Cell 1A and Room FY1 floor area combined is approximately 141 $m^2$. A total of 18 $m^2$ were scanned and 18 systematic measurements were taken. This exceeds the minimum surface area requiring scanning and the minimum number of 15 systematic measurements required for this Class 3 area.

Cell 1A is between Cells 1 and 2. Room FY1 spans across and connects all three cells on the west side of Building 181. They were not expected to contain DU contamination. Cell 1A and Room FY1 were considered MARSSIM Class 3 areas. Survey coverage was 10% of the floor for scans. Eighteen square meters were surveyed. Results of scans, direct measurements, and smears are summarized in ***Table 5***. All results were less than the DCGL.

Equipment/materials in Cell 1A consisted of pallets, a hoist, and electrical equipment. Direct measurements for alpha and beta/gamma contamination were all less than the MDA. The absence of removable contamination was determined by taking a large area wipe with an oil-impregnated cloth. No removable contamination was detected.

| Table 5. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Type** | **MDA (dpm/100 cm$^2$)** | **Number of Measurements** | **Number <MDA** | **Average of DU Results >MDA (dpm/100 cm$^2$)** | **Average of all DU Results (dpm/100 cm$^2$)** | **Minimum/ Maximum result (dpm/100 cm$^2$)** |
| Beta/gamma scans | 1565 | 18 | 18 | N/A | -1030 | -2037/550 |
| Alpha Direct | 144 | 18 | 18 | N/A | 18 | -19/56 |
| Beta/gamma Direct | 287 | 18 | 17 | 291 | 47 | -178/291 |
| Alpha Smear | 23 | 18 | 18 | N/A | -2 | -3/0 |
| Beta/gamma smear | 46 | 18 | 18 | N/A | -2 | -16/7 |

### *3.3. Cell 2*

Cell 2 floor is approximately 162 m$^2$. A total of 19 m$^2$ were scanned and 15 systematic measurements were made in this Class 3 area which meets survey design requirements.

Cell 2 was not expected to contain DU contamination. Cell 2 was considered a MARSSIM Class 3 area. Survey coverage was 10% of the floor for scans. Nineteen square meters were surveyed. Results of the scans, direct measurements, and smears are summarized in ***Table 6***. All results were less than the DCGL.

Equipment/materials in Cell 2 consisted of a metal stand, buckets, drums, hoses, tables, a cart, a port-a-cool, a ladder, and a shelf. Direct measurements for alpha and beta/gamma contamination were all less than the MDA. The absence of removable contamination was determined by taking a large area wipe with an oil-impregnated cloth. No removable contamination was detected.

| Table 6. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Type** | **MDA (dpm/100 cm$^2$)** | **Number of Measurements** | **Number <MDA** | **Average of DU Results >MDA (dpm/100 cm$^2$)** | **Average of all DU Results (dpm/100 cm$^2$)** | **Minimum/ Maximum Result (dpm/100 cm$^2$)** |
| Beta/gamma scans | 1663 | 19 | 19 | N/A | -599 | -2028/455 |
| Alpha Direct | 143 | 15 | 12 | 181 | 83 | 0/243 |
| Beta/gamma Direct | 276 | 15 | 12 | 336 | 132 | -65/387 |
| Alpha Smear | 23 | 15 | 15 | N/A | -2 | -3/0 |
| Beta/gamma smear | 45 | 15 | 15 | N/A | 1 | -16/21 |

### *3.4. Cell 3*

Cell 3 floor is approximately 162 $m^2$. A total of 20 $m^2$ were scanned and 16 systematic measurements were made in this Class 3 area which exceeds survey design requirements.

Cell 3 was not expected to contain DU contamination. Cell 3 was considered a MARSSIM Class 3 area. Survey coverage was 10% of the floor for scans. Twenty square meters were surveyed. Results of scans, direct measurements, and smears are summarized in ***Table 7***. All results were less than the DCGL.

Equipment/materials in Cell 3 consisted of a metal table and a blue drum with aluminum pellets. Direct measurements for alpha and beta/gamma contamination were all less than the MDA. The absence of removable contamination was determined by taking a large area wipe with an oil-impregnated cloth. No removable contamination was detected.

**Table 7. Summarized Measurements**

| Measurement Type | MDA (dpm/100 $cm^2$) | Number of Measurements | Number <MDA | Average of DU Results >MDA (dpm/100 $cm^2$) | Average of all DU Results (dpm/100 $cm^2$) | Minimum/ Maximum Result (dpm/100 $cm^2$) |
|---|---|---|---|---|---|---|
| Beta/gamma scans | 1571 | 20 | 20 | N/A | -358 | -2123/275 |
| Alpha Direct | 144 | 16 | 16 | N/A | 49 | 0/112 |
| Beta/gamma Direct | 280 | 16 | 11 | 422 | 212 | -301/508 |
| Alpha Smear | 23 | 16 | 16 | N/A | -2 | -3/0 |
| Beta/gamma smear | 46 | 16 | 16 | N/A | 0 | -14/31 |

### *3.5. Rooms 2A, 2B, 2B1, FY*

Rooms 2A, 2B, 2B1, and FY combined had a floor area of 156 $m^2$. A total of 22 $m^2$ were scanned and 22 systematic measurements were made. This exceeds the survey design requirements for this Class 3 area.

Rooms 2A, 2B, 2B1, and FY were not expected to contain DU contamination. They were considered MARSSIM Class 3 areas. Survey coverage was 10% of the floor for scans. Twenty-two square meters were surveyed. Results of scans, direct measurements, and smears are summarized in ***Table 8***. All results were less than the DCGL.
There was no equipment in these rooms.

| Table 8. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Type** | **MDA (dpm/100 cm$^2$)** | **Number of Measurements** | **Number <MDA** | **Average of DU Results >MDA (dpm/100 cm$^2$)** | **Average of all DU Results (dpm/100 cm$^2$)** | **Maximum/ Minimum Result (dpm/100 cm$^2$)** |
| Beta/gamma scans | 1692 | 22 | 22 | N/A | -1760 | -2845/-696 |
| Alpha Direct | 207 | 22 | 22 | N/A | 26 | -56/94 |
| Beta/gamma Direct | 264 | 22 | 16 | 568 | 234 | -56/1109 |
| Alpha Smear | 23 | 22 | 22 | N/A | -2 | -3/0 |
| Beta/gamma smear | 46 | 22 | 22 | N/A | -5 | -23/12 |

### *3.6. Cell 4*

Cell 4 had a floor area of approximately 140 m$^2$. A total of 12 m$^2$ were scanned and 12 systematic measurements were made. An additional 2 m$^2$ are needed to meet the minimum requirement of 10%. However, the relative shift in the beta/gamma direct measurements was determined to be 122. This exceeds a value of 4 stipulated in MARSSIM Table 5.3. Therefore, only nine (9) systematic measurements were required for this floor area, which eliminates the need for surveying the additional 2 m$^2$ required to meet the 10% of floor area.

Cell 4 was not expected to contain DU contamination. Cell 4 was considered a MARSSIM Class 3 area. Survey coverage was 10% of the floor for scans. Twelve square meters were surveyed. Results of scans, direct measurements, and smears are summarized in ***Table 9***. All results were less than the DCGL.

Equipment/materials in Cell 4 consisted of pallets. Direct measurements for alpha and beta/gamma contamination were all less than the MDA. The absence of removable contamination was determined by taking a large area wipe with an oil-impregnated cloth. No removable contamination was detected.

| Table 9. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Type** | **MDA (dpm/100 cm$^2$)** | **Number of Measurements** | **Number <MDA** | **Average of DU Results >MDA (dpm/100 cm$^2$)** | **Average of all DU Results (dpm/100 cm$^2$)** | **Minimum/ Maximum Result (dpm/100 cm$^2$)** |
| Beta/gamma scans | 1484 | 12 | 12 | N/A | 342 | -430/971 |
| Alpha Direct | 144 | 12 | 12 | N/A | 9 | -19/37 |
| Beta/gamma Direct | 249 | 12 | 2 | 389 | 351 | 138/580 |
| Alpha Smear | 23 | 12 | 11 | 27 | 0 | -3/27 |
| Beta/gamma smear | 46 | 12 | 12 | N/A | 0 | -22/9 |

### *3.7. Cell 5*

Cell 5 floor area was 166 $m^2$. Cell 5 was anticipated/suspected to contain DU contamination based on prior survey results and historical operational knowledge. The floor was considered a MARSSIM Class 1 area. The walls below two meters in height were considered a MARSSIM Class 2 area. The walls above two meters and the ceiling and overhead structures/equipment were considered a MARSSIM Class 3 area. Survey coverage was 100% of the floor and 25% of the lower walls. The upper walls above two meters, ceiling, and overhead structure were not scanned because the peeling paint would have destroyed the detectors. Direct measurements were made on these areas and the measurements in the overhead structure were made on the top surfaces of the light fixtures. Results of scans, direct measurements, and smears are summarized in ***Table 10***.

A total of 162 $m^2$ of floor were scanned representing 100% of the surface area available for scanning. A total of 46 systematic measurements were performed. This exceeds the MARSSIM survey design for the floor.

All results were less than the DCGL. The scans for contamination on the lower walls detected radioactivity above background on the lead-based paint. Two of 11 direct measurements on the lower walls detected radioactivity above background on the lead-based paint. No measurements, either scans or directs detected radioactivity above background on the upper walls. The paint may be a hazardous waste and would then be considered a mixed low level radioactive waste. AAR recommends that the lower 2 meters of Cell 5's painted walls have the lead based paint (LBP) removed as radiologically contaminated and that the resulting wastes be packaged and disposed of as low level radioactive and/or mixed wastes. The lead-based paint that is peeling off the upper walls and ceiling should be removed and then sampled to determine whether it is a hazardous waste or a radioactive-mixed waste.

The walls and ceiling will be decontaminated for lead-based paint. The walls and ceiling will be surveyed during the FSS as a MARSSIM Class 3 area following this decontamination to demonstrate the DCGL is met. During the baseline survey, the Cell 5 floor was surveyed as a Class 1 area (see Table 3 "*Baseline Survey Units.*"). However, to confirm that the floor was not contaminated above the DCGL during the LBP removal operations, the floor will be resurveyed as a FSS Class 3 area (see Table 21 for FSS classifications).

There were no equipment/materials in Cell 5.

A representative of Robins AFB requested that vents on the roof and areas surrounding the vents be checked for contamination. This, however, was mistakenly not performed. The roof vents for Cells 5 and 6 and surrounding areas will be checked before these cells are demolished and decontamination, if warranted, will be performed.

**Table 10. Summarized Measurements**

| Measurement Type | MDA (dpm/100 $cm^2$) | Number of Measurements | Number <MDA | Average of DU Results >MDA (dpm/100 $cm^2$) | Average of all DU Results (dpm/100 $cm^2$) | Minimum/ Maximum Results (dpm/100 $cm^2$) |
|---|---|---|---|---|---|---|
| Beta/gamma scans, floors | 1451 | 162 | 158 | 2194 | 342 | -894/3816 |

| Table 10. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Type** | **MDA (dpm/100 cm$^2$)** | **Number of Measurements** | **Number <MDA** | **Average of DU Results >MDA (dpm/100 cm$^2$)** | **Average of all DU Results (dpm/100 cm$^2$)** | **Minimum/ Maximum Results (dpm/100 cm$^2$)** |
| Beta/gamma scans, lower walls | 1451 | 14 | 0 | 2125 | 2125 | 498/2664 |
| Alpha Direct, floors | 143 | 46 | 41 | 317 | 38 | -19/505 |
| Beta/gamma Direct, floors | 276 | 46 | 46 | N/A | 103 | -71/423 |
| Alpha Smear, floors | 23 | 46 | 46 | N/A | -1 | -3/6 |
| Beta/gamma smear, floors | 45 | 46 | 46 | N/A | 4 | -14/25 |
| Alpha Direct, lower walls | 143 | 10 | 10 | N/A | -4 | -19/37 |
| Beta/gamma Direct, lower walls | 276 | 10 | 10 | N/A | -1 | -331/245 |
| Alpha Smear, lower walls | 23 | 10 | 10 | N/A | -2 | -3/0 |
| Beta/gamma smear, lower walls | 45 | 10 | 10 | N/A | 3 | -21/15 |
| Alpha Direct, upper walls | 143 | 7 | 7 | N/A | 29 | 0/93 |
| Beta/gamma Direct, upper walls | 276 | 7 | 7 | N/A | 69 | -65/365 |
| Alpha Smear, upper walls | 23 | 7 | 7 | N/A | -2 | -3/3 |
| Beta/gamma smear, upper walls | 45 | 7 | 7 | N/A | 10 | 5/15 |
| Alpha Direct, top of light fixtures | 143 | 16 | 16 | N/A | 44 | -19/112 |
| Beta/gamma Direct, top of light fixtures | 276 | 16 | 11 | 568 | 211 | -238/836 |
| Alpha Smear, top of light fixtures | 23 | 16 | 16 | N/A | -1 | -3/0 |
| Beta/gamma smear, top of light fixtures | 45 | 16 | 16 | N/A | 8 | -5/30 |

### *3.8. Rooms 3A, 3B, 3C, and FY6*

Rooms 3A, 3B, 3C, and FY6 were not suspected to contain DU. The room area was approximately 136 $m^2$. The plan was to survey only the floor throughout all of these rooms 10% as a MARSSIM Class 3 area.

Room 3A had a concrete floor and was surveyed one time. Room 3A has a door on the south side that opens into Cell 6, which has contamination above the DCGL. Contamination was detected in the doorway between Room 3A and Cell 6 because it appears that drums were moved from Cell 6 into Room 3A as evidenced by "drag marks" on the floor. The contamination in the doorway between Cell 6 and Room 3A will be cleaned when Cell 6 is decontaminated and this area, to include all of Room 3A, will be resurveyed during the FSS as a MARSSIM Class 1 area.

Rooms 3B, 3C, and FY6 were surveyed twice. Room 3B and 3C had tile above a concrete floor. The tile contained asbestos and was removed. The surface of the tile was surveyed before it was removed. The concrete floor underneath was then surveyed after tile removal. Neither the tile nor the concrete underneath exceeded the DCGL. The walls in Rooms 3B and 3C were surveyed 25% to demonstrate there was no reason to suspect these surfaces were impacted.

Room FY6 was carpeted. The northern portion of the carpet was dry and was surveyed and found to be contaminated, therefore the entire carpet was removed and is stored as radioactive waste. The concrete floor throughout the entire room was then surveyed after the carpet had been removed.

The approximate surface area of the floors in Rooms 3B, 3C, and FY6 is 85 $m^2$. These concrete floors had either tile or carper flooring removed. This concrete was scanned 100% as a single MARSSIM Class 1 area. A total of 85 $m^2$ were scanned and 19 systematic measurements were performed. This exceeds the survey design requirements for this Class 1 area. None of these measurements exceeded the DCGL.

All survey results both pre- and post-tile and carpet removal are shown in Table ***11***. A total of 18 of 39 systematic and biased measurements taken before tile and carpet removal were lost and are not included in this report. This has no impact on the survey outcome as they were made before the tile and carpet was removed.

There were no equipment/materials in Rooms 3A, 3B, 3C, and FY6.

**Table 11. Summarized Measurements**

| Measurement Type | MDA (dpm/ 100 $cm^2$) | Number of Measurements | Number <MDA | Average of DU Results >MDA (dpm/100 $cm^2$) | Average of all DU Results (dpm/100 $cm^2$) | Minimum/ Maximum Results (dpm/100 $cm^2$) |
|---|---|---|---|---|---|---|
| ***Results before tile and carpet removal*** | | | | | | |
| Beta/gamma scans, floors | 1455 | 91 | 13 | 5247 | 4613 | -524/31001 |
| Beta/gamma scans, walls | 1455 | 15 | 15 | N/A | -219 | -653/1083 |
| Alpha Direct, floors | 14 | 21 | 4 | 65 | 53 | 0/127 |

| Table 11. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| Measurement Type | MDA (dpm/ 100 cm$^2$) | Number of Measurements | Number <MDA | Average of DU Results >MDA (dpm/100 cm$^2$) | Average of all DU Results (dpm/100 cm$^2$) | Minimum/ Maximum Results (dpm/100 cm$^2$) |
| Beta/gamma Direct, floors | 229 | 21 | 5 | 680 | 562 | 132/2111 |
| Alpha Smear, floors | 23 | 39 | 38 | 30 | 1 | -3/30 |
| Beta/gamma smear, floors | 49 | 39 | 38 | 63 | -2 | -14/109 |
| ***Results after tile and carpet removal*** | | | | | | |
| Beta/gamma scans, floors | Ranged from 1332 – 1455 | 85 | 63 | 1536 | 658 | -1238/1882 |
| Alpha Direct, floors | 139 | 19 | 17 | 470 | 68 | -18/217 |
| Beta/gamma Direct, floors | 245 | 19 | 4 | 507 | 421 | 31/676 |
| Alpha Smear, floors | 9 | 19 | 19 | N/A | 0 | 0/3 |
| Beta/gamma smear, floors | 46 | 19 | 19 | N/A | -1 | -17/13 |

### *3.9. Rooms 3D and 3E*

Rooms 3D and 3E had a floor area of 96 m$^2$. Rooms 3D and 3E were not suspected to contain DU. There was asbestos containing material in the tile floor. The floor was scanned over 10% of its surface as a MARSSIM Class 3 area to determine whether the tile needed to be disposed as low level radioactive waste. Seventeen square meters were scanned which exceeds the survey design requirement. Direct measurements and smears were taken but the results were lost. As such, AAR will resurvey Rooms 3D and 3E during the decommissioning phase to replace the lost data and to validate the former data points.

Results of scans before the tiles were removed are listed in ***Table 12***. Results of the scan measurements were all less than the MDA. This data is considered sufficient to allow the abated tile to not require disposal as low level radioactive waste. This is because the scan MDA was less than the DCGL. Additionally, the MDA was less than the surface contamination guidelines in Regulatory Guide 1.86 which is applicable to the release of material and equipment for unrestricted use.

The floor was then resurveyed 10% as a MARSSIM Class 3 area after removal of the tile. Results of scans, direct measurements, and smears are summarized in ***Table 12***. All results were less than the DCGL after the tile was removed. A total of 24 m$^2$ were scanned and 18 direct measurements and smears were taken. This exceeds the MARSSIM survey design requirements.

The equipment/materials consisted of chairs, doors, lamps, and a cabinet. Direct measurements for alpha and beta/gamma contamination were all less than the MDA. The absence of removable contamination was determined by taking a large area wipe with an oil-impregnated cloth. No removable contamination was detected.

| Table 12. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Type** | **MDA (dpm/100 cm$^2$)** | **Number of Measurements** | **Number <MDA** | **Average of DU Results >MDA (dpm/100 cm$^2$)** | **Average of all DU Results (dpm/100 cm$^2$)** | **Maximum/ Minimum Results (dpm/100 cm$^2$)** |
| ***Results before tile removal*** | | | | | | |
| Beta/gamma scans, floors | 977 | 17 | 17 | N/A | 44 | -421/456 |
| ***Results after tile removal*** | | | | | | |
| Beta/gamma scans, floors | 1568 | 24 | 24 | N/A | -889 | -1762/-154 |
| Alpha Direct, floors | 139 | 18 | 18 | N/A | 35 | -18/91 |
| Beta/gamma Direct, floors | 297 | 18 | 18 | N/A | -129 | -329/180 |
| Alpha Smear, floors | 9 | 18 | 18 | N/A | 0 | 0/0 |
| Beta/gamma smear, floors | 35 | 18 | 18 | N/A | -3 | -21/14 |

### *3.10. Cell 6*

Cell 6 consists of a western and eastern room. The western room is approximately 102 m$^2$ and the eastern room is approximately 70 m$^2$. There is a 15 m$^2$ concrete apron outside Cell 6 on the western side.

Cell 6 was suspected to contain DU contamination based on prior survey results. The floor of the western room, 6A1, was considered a MARSSIM Class 1 area. The walls below two meters in height in both rooms of Cell 6 were considered a MARSSIM Class 2 area. The walls above two meters and the ceiling and overhead structure in both rooms of Cell 6 were considered MARSSIM Class 3 areas. Survey coverage was 100% of the floor, 25% of the lower walls and 10% of the walls above two meters. The tops of the light fixtures were evaluated with direct measurements and smears.

The eastern room, Room 6B1, had a tile floor that was abated for asbestos containing material. The tile floor was surveyed 25% before abatement to determine if it required disposal as low level radioactive waste. The floor underneath the tile was re-surveyed 100% following tile removal.

One hundred twenty square meters of floor were scanned in both rooms combined before tile removal in room 6B1. Results of scans, direct measurements, and smears are summarized in Table 13. The survey results for the floors and walls in Rooms 6A1 and 6B1 are combined and reported together in ***Table 13***. Two different detectors with different backgrounds were used for the scan and direct surveys.

The majority of the floor, both bare concrete and tile, exceeded the DCGL before tile removal. The tile will be disposed as low level radioactive waste.

All measurements, including those above two meters, of the 20 square meters scanned on the walls in Room 6A1 exceeded the MDA. Many approached and exceeded the DCGL. No measurements on the ceiling or light fixtures exceeded the DCGL although ten of 16 exceeded the MDA. A single measurement on the top side of a pipe chase near the ceiling exceeded the DCGL. The lead-based paint, once abated, will be disposed as low level radioactive waste and possibly as mixed waste depending on the results of characterization samples collected once abated.

Once the tile was removed in Room 6B1, the 70-square meter concrete floor underneath was re-survey at 100%. Smears and direct measurements were also made. Results are summarized in ***Table 13***. No measurement result exceeded the DCGL.

The concrete apron outside Cell 6 on the western side only had three systematic measurements made on it. This did not meet the MARSSIM survey design. This apron will be resurveyed during the FSS.

Pallets in Cell 6 had detectable contamination. All pallets from Cell 6 are stored in a Radioactive Materials Area awaiting disposal as low level radioactive waste. Other equipment/materials included a couch, office partitions, a refrigerator, a sink and water heater, a break table, a brown chair, a grey chair, shelves, pipes, a trash can, and broken office chairs. Some items had detectable contamination and are stored awaiting disposal as low level radioactive waste.

Cell 6 will be decontaminated and resurveyed during the FSS. The walls both above and below two meters will be surveyed as a Class 1 area. The floor in room 6A1 will be decontaminated and resurveyed as a Class 1 area. The floor under the removed tile in room 6B1 met the DCGL. A total of 70 $m^2$ was scanned and 10 systematic measurements were made. This floor will be resurveyed as a MARSSIM Class 1 area during the FSS following decontamination of the walls to demonstrate that contamination did not occur during the clean-up work on the walls.

**Table 13. Summarized Measurements**

| Measurement Type | MDA (dpm/100 $cm^2$) | Number of Measurements | Number <MDA | Average of DU Results >MDA (dpm/100 $cm^2$) | Average of all DU Results (dpm/100 $cm^2$) | Minimum/ Maximum Results (dpm/100 $cm^2$) |
|---|---|---|---|---|---|---|
| ***Results before floor tile removal*** | | | | | | |
| Beta/gamma scan, floors | 1156 - 1475 | 120 | 29 | 7396 | 6717 | -3799/19896 |
| Alpha Direct, floors | 56-139 | 62 | 6 | 964 | 878 | 19/3712 |
| Beta/gamma Direct, floors | 242-261 | 62 | 1 | 3271 | 3220 | 110/15335 |
| Alpha Smear, floors | 9-70 | 62 | 52 | 26 | 6 | -3/92 |
| Beta/gamma smear, floors | 35 - 44 | 62 | 52 | 114 | 29 | -15/256 |
| Beta/gamma scans, walls | 895 | 20 | 0 | 6864 | 6864 | 2846/16872 |

| Table 13. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Type** | **MDA (dpm/100 cm²)** | **Number of Measurements** | **Number <MDA** | **Average of DU Results >MDA (dpm/100 cm²)** | **Average of all DU Results (dpm/100 cm²)** | **Minimum/ Maximum Results (dpm/100 cm²)** |
| Alpha Direct, walls | 56-139 | 30 | 16 | 640 | 293 | 0/1720 |
| Beta/gamma Direct, walls | 242-261 | 30 | 16 | 1876 | 929 | -25/2531 (11782 pipe chase) |
| Alpha Smear, walls | 9-70 | 30 | 23 | 27 | 7 | -3/51 |
| Beta/gamma smear, walls | 35 - 44 | 30 | 23 | 85 | 18 | -66/164 |
| Alpha Direct, ceiling and lights | 56-139 | 16 | 11 | 376 | 139 | -18/489 |
| Beta/gamma Direct, ceiling and lights | 242-261 | 16 | 6 | 958 | 638 | -14/2128 |
| Alpha Smear, ceiling, and lights | 9-70 | 16 | 12 | 26 | 8 | 0/51 |
| Beta/gamma smear, ceiling, and lights | 35 - 44 | 16 | 13 | 77 | 27 | -7/96 |
| ***Results after floor tile removal*** | | | | | | |
| Beta/gamma scan, floors | 1499 | 70 | 69 | 1530 | 197 | -490/1530 |
| Alpha Direct, floors | 139 | 10 | 8 | 172 | 81 | 0/181 |
| Beta/gamma Direct, floors | 297 | 10 | 9 | 360 | 129 | -76/360 |
| Alpha Smear, floors | 9 | 10 | 10 | N/A | 1 | 0/3 |
| Beta/gamma smear, floor | 46 | 10 | 10 | N/A | 0 | -10/12 |

### *3.11. Center Section*

The Center Section was approximately 500 $m^2$. A total of 98 $m^2$ were scanned and 38 systematic direct measurements were made. This exceeds the MARSSIM survey design.

The Center Section between Cells 6 and 7 was not expected to have DU contamination. It was considered MARSSIM Class 3 areas. Only the floor was surveyed. Survey coverage was 10% of the floor for scans. Ninety-eight square meters were surveyed. Two different detectors were used with different backgrounds. Results of scans, direct measurements, and smears are summarized in ***Table 14***. All results were less than the DCGL.

Equipment/materials in the Center Section consisted of pallets, bubble wrap, a cart with equipment, a fan, a table, a Tugger, pallets of equipment, trash bins, a metal stand, air hoses, and a cabinet. Direct measurements for alpha and beta/gamma contamination were all less than the MDA. The absence of removable contamination was determined by taking a large area wipe with an oil-impregnated cloth. No removable contamination was detected.

**Table 14. Summarized Measurements**

| Measurement Type | MDA (dpm/100 $cm^2$) | Number of Measurements | Number <MDA | Average of DU Results >MDA (dpm/100 $cm^2$) | Average of all DU Results (dpm/100 $cm^2$) | Minimum/ Maximum Results (dpm/100 $cm^2$) |
|---|---|---|---|---|---|---|
| Beta/gamma scans | 1376 - 1814 | 98 | 98 | N/A | -3006 | -4185/ -2062 |
| Alpha Direct | 144 | 38 | 38 | N/A | 24 | -19/75 |
| Beta/gamma Direct | 249 | 38 | 33 | 458 | 47 | -247/567 |
| Alpha Smear | 9 | 38 | 38 | N/A | 1 | 0/6 |
| Beta/gamma smear | 48 | 38 | 38 | N/A | -6 | -28/16 |

### 3.12. Cell 7

Cell 7 had approximately 280 $m^2$ of floor area. A total of 98 $m^2$ were scanned and 38 systematic measurements were made. This exceeds the MARSSIM survey design for this Class 3 area.

Cell 7 was not expected to have DU contamination. It was considered MARSSIM Class 3 areas. Only the floor was surveyed. Survey coverage was 10% of the floor for scans. Results of scans, direct measurements, and smears are summarized in ***Table 15***. All results were less than the DCGL.

Equipment/materials in the Cell 7 consisted of gas cans, metal frames, cabinets, a fan, a table, an eye wash, and miscellaneous metal. Direct measurements for alpha and beta/gamma contamination were all less than the MDA. The absence of removable contamination was determined by taking a large area wipe with an oil-impregnated cloth. No removable contamination was detected.

Prior to conducting the surveys in Cell 7, AAR and its subcontractors had to remove and containerize approximately 160-gallons of water (presumably stormwater from a leaky roof and other building openings) and sludge that were covering a large portion of the Cell's floor. This water was removed using squeegees/pumps/absorbent materials; sampled for offsite analyses for isotopic uranium, gross alpha/beta, and lead; and containerized in DOT 7A Type A drums for storage. Only gross beta radioactivity was detected at 113.314 pCi/L. Lead was detected at 33.59 ug/L. Results are shown in ***Table 16*** and the laboratory reports for these samples are presented in ***Attachment 1***.

| Table 15. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Type** | **MDA (dpm/100 cm$^2$)** | **Number of Measurements** | **Number <MDA** | **Average of DU Results >MDA (dpm/100 cm$^2$)** | **Average of all DU Results (dpm/100 cm$^2$)** | **Minimum/ Maximum Results (dpm/100 cm$^2$)** |
| Beta/gamma scans | 1687 | 39 | 39 | N/A | -1961 | -3094/-1177 |
| Alpha Direct | 139 | 40 | 39 | 145 | 46 | -18/145 |
| Beta/gamma Direct | 242 | 40 | 3 | 449 | 430 | -42/876 |
| Alpha Smear | 9 | 40 | 40 | N/A | 1 | 0/3 |
| Beta/gamma smear | 44 | 40 | 40 | N/A | 9 | -9/41 |

| Table 16. Summarized Measurements Water Analyses | | | | |
|---|---|---|---|---|
| *Water Analyses Cell 7* | | | | |
| **Analyte** | **Result** | **MDC** | **Qualifier** | **Method** |
| U-234 | 0.737 pCi/L | 0.883 pCi/L | Q, U | Eichrom ACW-03 |
| U-235 | 0.106 pCi/L | 0.286 pCi/L | Q, U | Eichrom ACW-03 |
| U-238 | 0.610 pCi/L | 1.090 pCi/L | Q, U | Eichrom ACW-03 |
| U-238 | -57.025 pCi/L | 41.300 pCi/L | U | EPA 901.1 |
| U-235 | -0.473 pCi/L | 12.000 pCi/L | U | EPA 901.1 |
| Gross Alpha | 0.662 pCi/L | 1.080 pCi/L | U | SM 7110C |
| Gross Beta | 113.314 pCi/L | 1.366 pCi/L | | EPA 900.0 |
| Lead | 33.59 ug/L | 10.00 ug/L | J | EPA 200.8/EPA 6020B |

### *3.13. Rooms 5A and 5B*

Rooms 5A and 5B have a combined floor area of 98 m$^2$. A total of 16 m2 and 16 systematic measurements were made. This exceeds the MARSSIM survey design for the Class 3 area.

Cell 7 Rooms 5A and 5B are between Cells 7 and 8. They were not expected to have DU contamination. They were considered MARSSIM Class 3 areas. Only the floor was surveyed. Survey coverage was 10% of the floor for scans. Results of scans, direct measurements, and smears are summarized in ***Table 17***. All results were less than the DCGL.

There were no equipment/materials in Rooms 5A and 5B.

Prior to conducting the surveys in Cell 7 Room 5A and 5B, AAR and its subcontractors had to remove and containerize approximately 160-gallons of water (presumably stormwater from a leaky roof and other building openings) and sludge that were covering a large portion of the Cell's floor. This water was removed using squeegees/pumps/absorbent materials; sampled for offsite analyses for isotopic uranium, gross alpha/beta, and lead; and containerized in DOT 7A Type A drums for storage. The results of the analytical analyses of this water/sludge in presented in ***Table*** 18 and the laboratory reports for these samples are presented in ***Attachment 1***. A total of approximately 160 gallons of water was removed and containerized in 55-gallon drums. Samples of that water were analyzed for lead (due to scraping suspected lead-based paint in the areas) and gross alpha/beta and isotopic uranium via alpha spectroscopy. The lead concentrations in the water were found to range from non-detect to 0.049 mg/L (less than the toxicity limit of 5 mg/L for lead). The analytical results for the gross alpha/beta and isotopic uranium via alpha spectroscopy indicated concentrations below the water effluent screening concentrations listed in 10 CFR Part 20 Appendix B, Table 2. Based on these results Base personnel approved for the water to be disposed of at the Base's industrial wastewater treatment plant (IWTP). The solids mixed in with the water were filtered out during discharge to the IWTP and will be disposed of separately as low-rad waste during Building 181 decommissioning efforts.

**Table 17. Summarized Measurements**

| Measurement Type | MDA (dpm/100 cm$^2$) | Number of Measurements | Number <MDA | Average of DU Results >MDA (dpm/100 cm$^2$) | Average of all DU Results (dpm/100 cm$^2$) | Minimum/ Maximum Results (dpm/100 cm$^2$) |
|---|---|---|---|---|---|---|
| Beta/gamma scans | 1486 | 16 | 16 | N/A | -984 | -1529/-60 |
| Alpha Direct | 139 | 16 | 16 | N/A | 6 | -18/36 |
| Beta/gamma Direct | 242 | 16 | 2 | 449 | 414 | 130/622 |
| Alpha Smear | 9 | 16 | 16 | N/A | 1 | 0/3 |
| Beta/gamma smear | 44 | 16 | 16 | N/A | 5 | -9/16 |

**Table 18. Summarized Measurements Water Analyses**

| ***Water Analyses Room 5A*** | | | | |
|---|---|---|---|---|
| **Analyte** | **Result** | **MDC** | **Qualifier** | **Method** |
| U-234 | 0.367 pCi/L | 0.624 pCi/l | Q,U | Eichrom ACW-03 |
| U-235 | 0.095 pCi/L | 0.526 pCi/L | Q,U | Eichrom ACW-03 |
| U-238 | 0.285 pCi/L | 0.917 pCi/L | Q,U | Eichrom ACW-03 |
| U-238 | 18.342 pCi/L | 44.800 pCi/L | U | EPA 901.1 |
| U-235 | 0.093 pCi/L | 12.400 pCi/L | U | EPA 901.1 |
| Gross Alpha | 1.572 pCi/L | 1.062 pCi/L | | SM 7110C |
| Gross Beta | 45.629 pCi/L | 0.865 pCi/L | | EPA 900.0 |
| Lead | <50 ug/L | 50.0 ug/L | U | EPA 200.8/EPA 6020B |
| Total Uranium | 58.13 ug/L | 11.023 ug/L | J | EPA 200.8/EPA 6020B |
| ***Water Analyses Room 5B*** | | | | |
| **Analyte** | **Result** | **MDC** | **Qualifier** | **Method** |
| U-234 | 0.034 pCi/L | 0.062 pCi/L | U | Eichrom ACW-03 |
| U-235 | -0.010 pCi/L | 0.061 pCi/L | U | Eichrom ACW-03 |
| U-238 | -0.002 pCi/L | 0.092 pCi/L | U | Eichrom ACW-03 |
| U-238 | 0.326 pCi/L | 1.340 pCi/L | U | EPA 901.1 |
| U-235 | 0.133 pCi/L | 0.372 pCi/L | U | EPA 901.1 |
| Gross Alpha | 0.217 pCi/L | 1.737 pCi/L | U | SM 7110C |

| Table 18. Summarized Measurements Water Analyses | | | | |
|---|---|---|---|---|
| *Water Analyses Room 5A* | | | | |
| Gross Beta | 1,387 pCi/L | 1.650 pCi/L | U | EPA 900.0 |
| Lead | 49.36 ug/L | 12.5 ug/L | J | EPA 200.8/EPA 6020B |
| Total Uranium | 41.04 ug/L | 11.221 ug/L | J | EPA 200.8/EPA 6020B |

### *3.14. Cell 8*

The Cell 8 floor area was approximately 190 $m^2$. A total of 30 $m^2$ were scanned and 30 systematic measurements were made. This exceeds the MARSSIM survey design for this Class 3 area.

Cell 8 was not expected to have DU contamination. It was considered a MARSSIM Class 3 area. Only the floor was surveyed. Survey coverage was 10% of the floor for scans. Results of scans, direct measurements, and smears are summarized in ***Table 19***. All results were less than the DCGL.

Equipment/materials in Cell 8 consisted of miscellaneous metal, a white tank, and metal racks. Direct measurements for alpha and beta/gamma contamination were all less than the MDA. The absence of removable contamination was determined by taking a large area wipe with an oil-impregnated cloth. No removable contamination was detected.

| Table 19. Summarized Measurements | | | | | | |
|---|---|---|---|---|---|---|
| **Measurement Type** | **MDA (dpm/100 $cm^2$)** | **Number of Measurements** | **Number <MDA** | **Average of DU Results >MDA (dpm/100 $cm^2$)** | **Average of all DU Results (dpm/100 $cm^2$)** | **Minimum/ Maximum Results (dpm/100 $cm^2$)** |
| Beta/gamma scans | 1435 | 30 | 30 | N/A | 248 | -1006/945 |
| Alpha Direct | 231 | 30 | 30 | N/A | -26 | -75/56 |
| Beta/gamma Direct | 255 | 30 | 4 | 394 | 356 | -59/397 |
| Alpha Smear | 23 | 30 | 30 | N/A | -2 | -3/0 |
| Beta/gamma smear | 47 | 30 | 30 | N/A | -4 | -21/12 |

## 4.0 Building 181 Decontamination and Demolition

This section provides an overview of the decontamination that will be performed in Building 181, Cells 5 and 6, specifies the building areas requiring decontamination, provides the decommissioning management and organization, states the approach to decommissioning task management, and specifies environmental controls.

### *4.1. Overview*

Lead-based paint (LBP) greater than 1.0 mg/cm$^2$ or 0.5% by weight and radioactive contamination greater than the DCGL must be removed from all interior surfaces of Building 181 before the building is demolished. Such contamination will be removed to levels that are nearly background of the direct-reading radiation detectors so that radiation exposures are ALARA. This will allow the demolition debris to be disposed in a construction landfill. The removed paint and radioactivity will be properly packaged and disposed at a licensed Treatment, Storage and Disposal Facility (TSDF) capable of receiving low level radioactive wastes and mixed low level radioactive wastes.

Decontamination of the contaminated portions of Building 181 discussed in the previous sections of this document will be performed according to ARS International Radioactive Materials License No. 17-29441-01 and a project-specific License Agreement between USAF and AAR which specifies the responsibilities of Robins AFB under Master Materials License 42-23539-XXAFP and AAR/ARS. In summary, this agreement states that AAR, a wholly-owned subsidiary of ARS International, LLC, shall perform the decontamination/decommissioning work in accordance with its USNRC License No. 17-29441-01. Robins AFB shall continue to possess the radioactive material in Building 181 while it is on and within Building 181 and after it has been removed from the building surfaces and properly contained until such time the material is properly transported and disposed.

Radiologically contaminated equipment/materials within Building 181 has been properly stored in a labeled Radioactive Materials Area in Cell 5. These equipment/materials will be size-reduced as necessary and packaged into DOT 7A Type A drums, B-25containers or IP-1 roll-off containers for transport and disposal as low level radioactive waste.

Decontamination of the radiologically contaminated areas Cells 5 and 6 delineated in previous sections of this document will be performed by scabbling the concrete floors and walls. Other methods of surface cleaning such as scraping, chemical decontamination, and/or use of needle guns will be used as necessary to remove the paint and radioactivity. Removed material will be packaged into 55-gallon 7A Type A drums or other suitable strong tight containers. The waste shall be characterized in accordance with the proposed waste disposal facility's Waste Acceptance Criteria (WAC) and manifested for disposal as low level radioactive waste and mixed low level radioactive waste depending on the results of the waste characterization.

The building, Cells 1 through 8, will be demolished by the USAF selected demolition contractor using conventional means. It should be noted that the demolition of Cells 1 through 4 and Cells 7 and 8 can be initiated prior to the completion of the decontamination/decommissioning efforts in Cells 5 and 6, as long as these demolition activities do not impact the ability to safely and efficiently decontaminate/decommission Cells 5 and 6 by AAR and its subcontractors. Because the potential exists for radiological contamination to be present under the concrete foundation beneath Cells 5 and 6 (the cells where DU was handled), including the sub-slab utility trench and soils, AAR shall conduct radiological surveys of these areas during the demolition process by the USAF's demolition contractor.

### *4.2. Building Areas Requiring Decontamination*

The following areas of Building 181 require decontamination/decommissioning of lead-based paint and radioactive material:

- Cell 5 – Radiologically contaminated LBP on the walls up to two meters within the entire cell.
- Cell 5 – LBP on the walls and ceiling above 2 m (which may or may not be radiologically contaminated).
- Cell 6 – Radiologically contaminated floors, walls (includes LBP), and utility trench in Cells 5 and 6.
- Cell 6 - The entire floor that was not previously covered with tile requires decontamination. The floor in the doorway leading from Cell 6 into Room 3A requires decontamination as well.
- Cell 6 - The pipe chase that runs under the floor of Cell 6 requires decontamination or disposal as low level radioactive waste.

The walls throughout the entire Cell 6 require LBP abatement and the waste should be treated as low level radioactive waste or mixed low level radioactive waste depending on the results of waste characterization following abatement.

Equipment, pallets, tile, and carpet that was determined to be contaminated has already been packaged and properly stored in a labeled Radioactive Materials Area in Cell 6. These items shall be disposed as low level radioactive waste and/or mixed waste, depending on the results of disposal site WAC characterization efforts.

### *4.3 Decommissioning Management Organization*

The decommissioning organization is shown in ***Figure 3***. The Robins AFB Project Manager has overall authority for the project. The radioactive material within Building 181 and generated during decontamination is possessed under the Robins AFB Nuclear Materials License. The responsibility for this radioactive material while at Robins AFB rests with the Robins Radiation Safety Officer (RSO). The contractor organization is responsible for the safety and health (to include the radiation safety) of the decontamination workforce. The physical decommissioning work will be performed under the AAR Nuclear Materials License and the radiation safety and ALARA practices during the decommissioning work are the responsibility of the AAR RSO. This organization hierarchy, responsibilities, authorities, and accountability are discussed in the subsections below.

#### *4.3.1 Robins AFB RSO*

The radioactive material in Building 181 is possessed under the USAF Master Materials License 42-23539-XXAFP. The Robins RSO is responsible for the safe possession of this radioactive material at Robins AFB whether it is on the building surfaces or has been removed by decontamination and safely packaged. The Robins RSO responsibility for this radioactive material ends when the material is safely shipped for disposal as a radioactive or mixed waste.

The Robins RSO is also responsible for oversight of the radiation safety practices conducted by Geosyntec and their subcontractor, AAR. The Robins RSO may stop work at any time if the conditions of the Robins license are not followed or potentially unsafe practices are observed during work.

#### *4.3.2 Project Management*

Geosyntec is contracted to Robins AFB to manage and execute the decontamination of Building 181 Cells 5 and 6. The Geosyntec Project Manager (PM) is accountable to the USAF Robins Project Manager for the safe and efficient conduct of work. The PM has overall responsibility for the planning, execution, compliance, and performance of the project. The PM prepares and approves project deliverables, plans, policies, procedures, and associated guidance. Responsibilities include providing strategic planning for all levels of the project organization; identifying resources needed, performing cost and schedule review, tracking, and control; managing and reporting the project budget; understanding and analyzing project cost and schedule metrics; facilitating inter- and intra-team communication; managing subcontractors; providing leadership and overall direction for project staff; and directing overall contract execution.

The PM ensures coordination of management, safety and health, radiation safety, and quality assurance functions; allocates resources to the project to ensure successful execution and completion of milestones; demonstrates commitment and implementation of Safety and Health, Radiation Safety, Waste Management, and Quality Assurance; and maintains signature authority to commit Geosyntec and its subcontractor AAR. The PM is the primary point of contact with the USAF. The PM is responsible to ensure all work and project activities are executed in accordance with established regulatory requirements and project programs, plans, and procedures.

#### *4.3.3 Decontamination Manager*

The Decontamination Manager reports to the Project Manager and is empowered fully responsibly for performing the scope of the building decontamination according to the project schedule and budget. The Decommissioning Manager will prioritize daily work activities and assign resources to determine processes and techniques for work execution; ensure compliance with the Safety Health Program, Radiation Safety Plan, and have overall management responsibility for work operations, including training, and waste management.

#### *4.3.4 AAR RSO*

The radiological decontamination work will be performed under the AAR Nuclear Materials License No. 17-29441-01. The AAR RSO reports to the Project Manager and is responsible for meeting the requirements of the AAR License and implementing the Radiation Safety Plan. The RSO is responsible establishing ALARA goals for individuals and the project, providing guidance for the safe and efficient approach to completing radiological work. The AAR RSO will also be responsible for implementing the Final Status Survey Plan in Section 5.0. The RSO or the Site Safety and Health Officer and Quality Manager (SSHO) will be at the site anytime work is performed at the site. The AAR RSO will have stop work authority if the requirements of these documents are not properly followed.

The RSO is responsible to ensure that the resources required to meet the requirements of the Radiation Safety Plan are assigned. The RSO will establish programs for assessing radiation safety performance and reporting deficiencies to program and procedural requirements. He is responsible to ensure all work and project activities are executed in accordance with established regulatory requirements and project programs, plans, and procedures. The RSO may stop work if the Nuclear Material License is not followed.

### *4.3.5 Site Safety and Health Officer and Quality Assurance Manager*

The Geosyntec SSHO recognizes, evaluates, recommends, and implements policies and procedures to assure awareness of and compliance with ES&H requirements of the organization. The SSHO is responsible for monitoring and preventing adverse exposure to chemical, biological, and physical hazards throughout the work sites. The SSHO helps develop and provide basic environmental, safety, and health training to employees and promotes communication programs to enhance and encourage employee awareness of accident prevention, industrial hygiene, and environmental compliance. The SSHO is responsible to ensure all work and project activities are executed in accordance with established regulatory requirements and Geosyntec programs, plans, and procedures. The SSHO may stop work if unsafe conditions are observed.

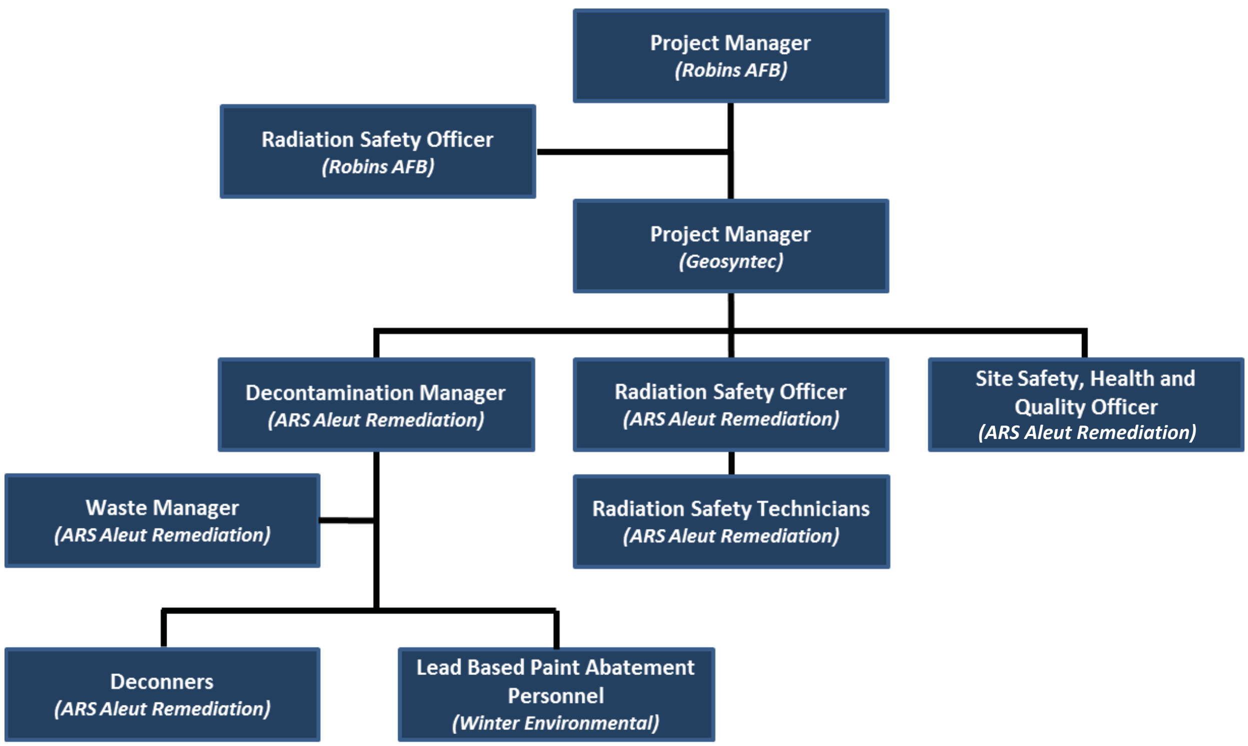


**Figure 3. Decommissioning Organization**

***Figure 4*** presents the schedule for the decommissioning and final status survey activities for Building 181 Cells 5 and 6.

# Attachment 1

Classic Schedule Layout

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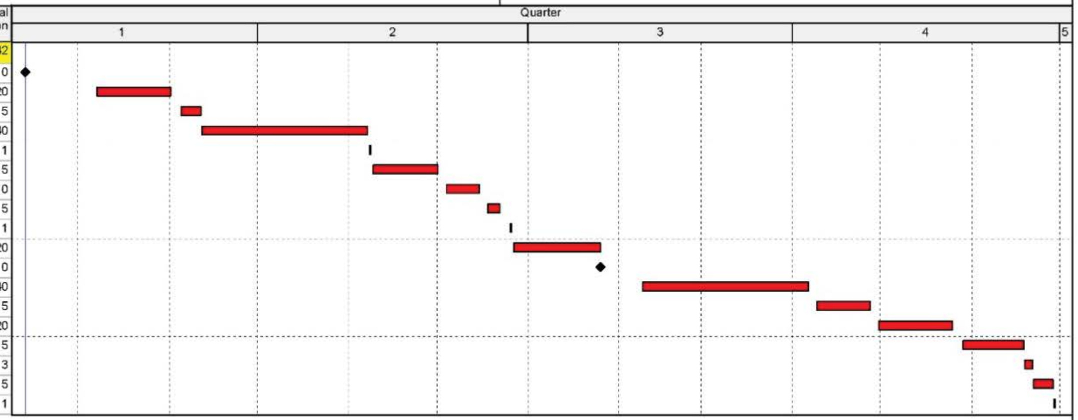
| Activity Name | Original Duration |
|---|---|
| **Building 181 Low Level Radionuclide Investigation and Mitigation** | 242 |
| NRC Region 4 and State of GA Approval of Final Work Plan/DP | 0 |
| Decontamination and LBP Abatement of Cells 5 and 6 | 20 |
| MARSSIM Final Status Survey of Cells 5 and 6 | 5 |
| Preparation of Final Status Survey Report | 40 |
| Submittal of Draft Final Status Survey Report to Robins AFB and RICS | 1 |
| Robins AFB and RICS Review of Draft Final Status Suirvey Report | 15 |
| Geosyntec Response on Draft Final Status Survey Report | 10 |
| Robins AFB and RICS Approval of Draft Final Status Survey Report | 5 |
| RICS Submit Final Status Survey Report to NRC/GA | 1 |
| NRC Region 4 and State of GA Review of Final Status Survey Report | 20 |
| NRC Region 4 and State of GA Approval of Final Status Survey Report | 0 |
| On-Site RADCON Support of Building 181 Demolition Contractor | 40 |
| MARSSIM Final Status Survey of Subsurface Soils (2 week Laboratory Analysis) | 15 |
| Preparation of Final Status Survey Report for Subsurface Soils | 20 |
| Robins AFB and RICS Review of Draft Final Status Survey Report for Subsurface Soils | 15 |
| Geosyntec Response to Comments on Draft Final Status Survey Report for Subsurface Soils | 3 |
| Robins AFB and RICS Approval of Final Staus Survey Report for Subsurface Soils | 5 |
| Submit Final Status Survey Report for Subsurface Soils to NRC and State of GA | 1 |




Actual Work | Critical Remaining Work | Remaining Work ◆ | ◆ Milestone

Project Schedule

TASK filter: All Activities

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Figure 4. Building 181 Decommissioning and Final Status Survey Project Schedule

### 4.4 Decommissioning Task Management

Under the direction and oversight of the AAR Project Manager, the Building 181 Cells 5 and 6 decontamination and decommissioning (D&D) operations will directly involve the Decontamination Manager, Waste Manager, decontamination technicians, and lead abatement personnel. These personnel will be supported by the Radiation Safety Officer, SSHO/QA, and Radiation Safety Technicians. This group of personnel, as a team, will identify and plan the necessary D&D work tasks. The planning includes the identification and mitigation of all actual and potential work hazards. Once the work plan is acceptable to all involved skill crafts, the specific work task plan will be reviewed and approved by AAR and Geosyntec Project Managers. Once approval is achieved, the specific work task can commence within the prescribed radiological, industrial hygiene, and industrial safety requirements. The task specific work steps, and "Hold Points" if necessary, will be depicted in the associated work plan.

The required radiological, industrial hygiene, and industrial safety requirements will be presented in the affiliated Hazardous Work Permit (HWP). Note that the HWP includes all the safety requirements, including all of the radiological controls, and thus will be used in lieu of the Radiation Work Permit (RWP).

The work plan and HWP will be reviewed during morning toolbox meetings. As D&D operations continue the need for work plan and/or HWP revisions may become necessary. In addition, "lessons learned" will also be included in work planning and toolbox meetings as the D&D operations progress. As always, the Robins AFB Project Manager and Radiation Safety Officer have a standing invitation to all work planning activities. Furthermore, the team will entertain any recommendations and/or comments relative to the work plans and HWPs.

The paramount item associated with the planned D&D operations is that all associated personnel have "Stop Work" authority in the event of the identification of safety concern. Said work will commence only after safety concern is addressed, minimized, and/or mitigated as necessary.

#### 4.4.1 Decontamination/Decommissioning Work Tasks Description

It is anticipated that the contaminated concrete Building 181 Cells 5 and 6 will mainly be decontaminated with the Pentek Squirrel and Moose scabbling units. These scabbling units are an industry standard and will be operated by decontamination technicians and/or lead abatement personnel that are trained in their use. These scabbling units are equipped with HEPA filtration thus nearly eliminating the generation of airborne particulates. However, personal, work area, and environmental air sampling will be deployed for all aggressive D&D operations. In addition, the work areas will be controlled so to prevent the inadvertent entry of non-project personnel. The scabbling units will remove roughly 1/16 to 1/8 inches of concrete per pass. The scabbling passes will continue until radiological survey results are $\leq$ to the DCGL (2,570 dpm/100 $cm^2$). In addition, other less aggressive and feasible decontamination methods may be used if appropriate (e.g., scraping, brushing, sanding, wiping, etc.).

The floors of Cells 5 and 6 will be decontaminated to remove any radiological contamination in excess of the DCGL. The floors will be decontaminated using scabbling and/or other less aggressive and feasible techniques. The floors will subsequently be surveyed under FSS Class 1 requirements.

The Cells 5 and 6 walls will be decontaminated to remove both Lead Based Paint (LBP) and/or radiological contamination. This work scope is being subcontracted to winter Environmental of Norcross, GA. Winter Environmental is licensed by the State of Georgia for lead and asbestos abatement operations. Any radiological contamination in excess of the DCGL on the walls will be decontaminated using scabbling and/or other less aggressive and feasible techniques. The walls are separated into two survey unit types being walls up to two meters from floor (FSS Class 2) and the remaining walls above two meters to the ceiling (FSS Class 3).

The LBP on the Cells 5 and 6 ceilings must be remediated. Surveys will determine if there is any radiological contamination in excess of the DCGL. Any such contaminated areas will be decontaminated using an appropriate method such needle guns, scraping, brushing, sanding, wiping, etc. No or very small amounts of contamination is anticipated on the ceilings and as such they are considered as FSS Class 3 survey unit types.

The majority of the roof surface associated with Cells 5 and 6 will be surveyed under FSS Class 3 specifications. The roof ducts and adjacent roof surface will be surveyed under FSS Class 1 criteria. No or very small amounts of contamination is anticipated on the majority of the roof (i.e., not adjacent to roof vents). The survey process will determine if there is any contamination in excess of the DCGL. Any such contaminated areas will be decontaminated and/or removed using an appropriate method(s).

All HVAC equipment and affiliated ductwork will, initially, undergo scoping/work control surveys will to ascertain and prescribe the appropriate radiological and industrial hygiene controls. Ultimately the HVAC equipment and ductwork will be surveyed under FSS Class 1 specifications. Ductwork surveys will consist of both exposed exterior surface areas as well as all accessible interior surfaces. If necessary, coupon samples may be obtained to accurately ascertain the ductwork radiological conditions. Any contaminated ductwork will be remediated by removing specific offending sections or even removing entire ductwork systems. If the initial/scoping survey results indicate the presence of contamination, the Waste Manager and the appropriate Robins AFB personnel may opt to totally remove all HVAC equipment/ductwork as an economically feasible alternative.

#### *4.4.2 Hazardous Work Permit*

When decommissioning tasks are evaluated using IWCP a determination is made whether a Hazardous Work Permit (HWP) is required to supplement the Activity Hazard Analysis. A HWP fulfills the requirement for a Radiation Work Permit (RWP). The HWP includes protective requirements for hazards in addition to radiation. A copy of the HWP procedure is included in *Appendix A, Additional Procedures*.

HWPs are developed jointly by the SSHO, RSO, HPT, and other project personnel as part of the IWCP. The hazards are analyzed and controls to mitigate the hazards are determined. The HPT then is responsible to prepare the HWP.

The HWP is reviewed and approved by the SSHO and the RSO. The HWP then becomes part of the work controlling documents and supports the Integrated Work Document which is approved by the Decontamination Manager.

Personnel shall not deviate from the requirements, precautions, or other instructions on the HWP. If changes are necessary, the HWP shall be revised to reflect the changed condition before work on that HWP may proceed. A copy of the HWP shall be posted at the work site. The original shall remain at a central location (Safety and Health Office). Associated support documents containing environmental conditions (soil activities, contamination surveys, etc.) shall be maintained by the RSO and be available upon request.
Prior to entry into the area governed by the HWP, all personnel working under an HWP must:

- Satisfy medical and training requirements as established in the Integrated Work Document.
- Be adequately briefed by the RSO regarding the work to be performed and the associated HWP requirements and the safety procedures to be followed for its completion.

### *4.5 Worker and Environmental Monitoring*

Worker safety, health, and radiation protection monitoring is discussed in detail in the Radiation Safety Plan, which is part of Attachment 4. Steps to protect the environment and environmental monitoring for radioactivity are discussed in this section. Controls will be enacted to prevent airborne releases and waterborne contamination. Air monitoring will be performed outside the building. External radiation exposure rates inside the building are already low, such that no radiation monitoring external to the building is necessary.

The objective of the decontamination is to remove radioactivity from interior building surfaces before demolition to prevent insult to the environment. The decontamination of surfaces will be performed indoors which will minimize the potential for airborne releases to the environment. Air monitoring for gross alpha and gross beta radiation on airborne particulates will be performed inside the building for worker protection purposes. This monitoring will consist of general air monitoring with stationary pumps operating at approximately 40 to 60 liters per minute (LPM). This monitoring will characterize the general area conditions inside the building. Selected workers will also wear breathing zone air monitors (BZ) with filters affixed at approximately shoulder height. These BZ monitors will operate at approximately five to ten LPM with the air filters analyzed for gross alpha and beta radiation. Results of this interior air monitoring will be compared to the Derived Air Concentration for Lung Absorption Class Y U-238. DU is primarily U-238. The indoor air monitoring will be used to determine whether respiratory protection is required and will be used for DAC-hour tracking in lieu of bioassay if workers may receive an internal committed effective dose equivalent of 500 mrem.

Environmental air will be monitored at strategic locations that would best represent worst case outdoor airborne conditions. Monitoring will be performed with stationary pumps set inside weather enclosures. These monitors will operate for an entire work shift at approximately 40 to 60 LPM. This will draw sufficient air to allow a minimum detection level of 10% of the 10CFR20, Appendix B, Table 2 airborne effluent limit of 6E-14 uCi/mL of air. The likely monitoring locations will be immediately outside the building bay doors. These doors will be left open because high airborne environmental releases are not likely and to minimize the build-up of airborne radioactivity inside the work area to help maintain worker exposures ALARA. If outdoor air monitoring finds concentrations exceed 6E-15 uCi/mL, the bay doors will be closed.

Contamination of water will be prevented by plugging drains inside the building during decontamination. If water runoff inside the building can get outside the building, then containment pigs will be placed at the doorways to prevent this.

## 5.0 Final Status Survey Plan

Following the decontamination of the radiologically contaminated areas of Building 181 as delineated in this document, AAR shall perform a MARSSIM FSS on the floor and walls of Cell 5, Cell 6, and the doorway leading from Cell 6 into Room 3A.

The floor and wall areas that are decontaminated will be scanned using the large area gas flow proportional detectors described in Section 2.3.3. Timed direct one minute measurements will be made using the 100 $cm^2$ alpha/beta detectors also described in Section 2.3.3. The gamma radiation background will be measured inside Cells 1 through 4 because they have similar construction materials and have been found to not be contaminated. No statistical testing will be performed as all measurement results will be required to be less than the DCGL.

A FSS will also be performed on the soil underneath cells 5 and 6 once the building is demolished by the USAF demolition contractor. There is little reason to suspect to contamination migration through a five to six-foot-thick concrete slab. Therefore, in-situ scanning results with a Field Instrument for Detecting Low Energy Radiation (FIDLER), will be compared to the reference background survey results. Systematic soil samples will be collected using the random coordinate starting point along with triangular based spacing. In addition, biased soil samples will be collected for areas that indicate gamma levels in excess of twice the reference background gamma levels. The reference background gamma and soil samples will be collected from a non-impacted and similar soil area at Robins AFB. The results at the background area will be compared to the results from the area under Cells 5 and 6 using the Wilcoxon Rank Sum Test. The Final Status Survey Design checklist from NUREG – 1757, Vol. 1, Rev 2 is shown in ***Table 20*** along with reference to the section of this plan that fulfills the checklist requirement.

**Table 20. Final Status Survey Design**

| Checklist Item | Plan Reference Section |
|---|---|
| A brief overview describing the final status survey design. | 5.0 and 5.1 |
| A description and map or drawing of impacted areas of the site, area, or building classified by residual radioactivity levels (Class 1, 2, or 3) and divided into Survey Units with an explanation of the basis for division of Survey Units. | Figures 4 and 5, Section 5.1 |
| A description of the background reference areas and materials, if they will be used, and a justification for their selection. | Section 5.0 for building material<br>Section 5.2.2 for soil |
| A summary of the statistical tests that will be used to evaluate the survey results. | Section 5.0 for building surfaces,<br>Section 5.2.2 for soil |
| A description of scanning instruments, methods, calculations, operational checks, coverage, and sensitivity for each media and radionuclide. | Sections 2.3 and 2.4 for building surfaces,<br>Section 5.2.1 for soil |
| For in-situ sample measurements made by field instruments, a description of the instruments, calibration, operational checks, sensitivity, and sampling methods, with a demonstration that the instrumentation and methods have adequate sensitivity. | Sections 2.3 and 2.4 for building surfaces,<br>Section 5.2.1 for soil |

| Table 20. Final Status Survey Design | |
|---|---|
| **Checklist Item** | **Plan Reference Section** |
| A description of the analytical instruments for measuring samples in the laboratory, as well as calibration, sensitivity, and methods with a demonstration that the instruments and methods have adequate sensitivity. | Section 5.2 |
| A description of how samples to be analyzed in the laboratory will be collected, controlled, and handled. | Section 5.2 |
| A description of the final status survey investigation levels and how they will be determined. | Section 5.0 for building surfaces,<br>Section 5.2.1 for soil |
| A summary of any significant additional residual radioactivity that was not accounted for during site characterization. | Not applicable |
| A summary of direct measurement results and/or soil concentration levels in units that are comparable to the DCGL, and if data is used to estimate or update the Survey Unit. | Section 5.1 for building surfaces,<br>Section 5.2.1 for soil |
| A summary of the direct measurements or sample data used to both evaluate the success of remediation and to estimate the Survey Unit variance. | Section 5.0 for building surfaces,<br>Section 5.2.2 for soil |

### *5.1. Final Status Survey Plan for Building 181*

The lower walls of Cell 5 and the Floors and Walls, both above and below two meters of Cell 6 will both be considered as MARSSIM Class 1 Survey Units. These areas had radioactive contamination that exceeded the DCGL. Drawings of Cells 5 and of Cell 6 are shown ***of Figures 5 and 6***, respectively. These drawings show the results of the baseline survey and are also shown in a larger format in Attachment 2.

The entire lower wall of Cell 5 (all four walls) is considered one Survey Unit. It has a surface area less than 100 $m^2$, the MARSSIM upper limit for the size of a Class 1 Survey Unit. The upper walls and ceiling of Cell 5, which were not surveyed during the Baseline Survey, will be surveyed as a single Class 3 survey Unit. The floor of Cell 5, which requires no decontamination, will be considered a MARSSIM Class 3 area following decontamination of the walls in Cell 5. This will be done to assure that no contamination was spread from the walls to the floor during decontamination. The probability of this is considered remote, because the walls in Cell 5 did not have contamination in excess of the DCGL. The entire floor will be a single Survey Unit. If contamination is found on the floor, the floor will be upgraded to a Class 1 Survey Unit and scanned 100%.

The trench in Cells 5 and 6 had water in it and the trench was not surveyed during the Baseline Survey. The water will be removed during the decontamination of Cells 5 and 6. This trench will then be surveyed as a MARSSIM Class 2 area as originally planned.

The eastern room floor of Cell 6, labeled 6B1 in Figure 6, will be a single Class 1 Survey Unit. The western room, Room 6A1 is approximately 130 $m^2$ and will be two Class 1 Survey Units. The other Survey Units will be as follows:

- Walls below 2 m, Room 6A1,

- Walls below 2 m, Room 6B1,
- Walls above 2 m, Room 6A1, and
- Walls above 2 m, Room 6B1

The ceilings and overhead structure of Cell 6, except the pipe chase have already been shown, in Section 3, to meet the DCGL. No further survey shall be required of these areas, other than large area wipes taken with masslin cloths to demonstrate no removable contamination has occurred during the decontamination process. The walls of both Cell 5 and 6 are being cleaned of lead-based paint and because the walls had detectable contamination above the MDA, the removed paint will be disposed as low level radioactive waste, or possibly as a mixed low level radioactive waste pending the outcome of waste characterization.

The roof vents and surrounding roof area, Room 3A, Cell 4, and concrete apron outside of Cell 6, were either not surveyed or were not surveyed sufficiently during the Baseline Survey. The roof vents and roof area surrounding the vents were mistakenly omitted during the Baseline Survey. These will be considered a MARSSIM class 1 area because of potential for contamination. Room 3A will be resurveyed as a MARSSIM Class 1 area once the doorway between Cell 6 and Room 3A have been decontaminated. Cell 4 requires two additional $m^2$ to be resurveyed to meet the minimum MARSSIM coverage requirement for a Class 3 area. The concrete apron outside Cell 6 requires 11 more systematic measurements to complete this Class 3 area. The areas to be surveyed inside Building 181 during the FSS and their MARSSIM classification are summarized in ***Table 21***.

**Table 21. Building 181 MARSSIM Final Status Survey Plan Summary**

| Building Area | MARSSIM Survey Class | Rationale |
|---|---|---|
| Cell 5, all four lower walls below 2 m | Class 1 | LBP has detectable radioactivity and are being decontaminated for the lead. |
| Cell 5, floor | Class 3 | Surveyed to demonstrate it is not re-contaminated during LBP removal on walls and ceilings. |
| Cell 5 and 6, trench | Class 2 | Had water in it and could not be surveyed during Baseline Survey. |
| Cell 5 and 6, Soil beneath floors | Class 3 | Exposed soil footprint will be surveyed after USAF D&D contractors remove floors of Cells 5 & 6. |
| Cell 5, walls above 2 m and ceiling | Class 3 | Could not be surveyed during the Baseline Survey because of peeling paint. |
| Cell 6, Room 6B1, floor | Class 1 | This floor was covered with tile and the concrete underneath was not contaminated. However, the walls are contaminated and require decontamination. The floor will be resurveyed to prove that they have not |

| Table 21. Building 181 MARSSIM Final Status Survey Plan Summary | | |
|---|---|---|
| | | become contaminated as a result of the wall decontamination. |
| Cell 6, Room 6A1, floor | Two Class 1 Survey Units | Floor is contaminated above DCGL. |
| Cell 6, Room 6A1, walls below 2 m | Class 1 | Wall is contaminated above DCGL. |
| Cell 6, Room 6A1, walls above 2 m | Class 1 | Wall is contaminated above DCGL. |
| Cell 6, Room 6B1, walls below 2 m | Class 1 | Wall is contaminated above DCGL. |
| Cell 6, Room 6B1, walls above 2 m | Class 1 | Wall is contaminated above DCGL. |
| Roof vents and surround roof area above Cells 5 and 6 | Class 1 | Exhaust air from the cells could have contaminated these locations. |
| Room 3A, floor | Class 1 | Doorway between Room 3A and Cell 6 is contaminated above DCGL. Entire room will be resurveyed to be thorough. |
| Cell 4, floor | Class 3 | Two additional $m^2$ require survey to meet survey design minimum coverage. |
| Concrete apron on west side of Cell 6 | Class 3 | Insufficient systematic measurements were performed during Baseline Survey. |

Survey design, methods, and approach will be similar to those used during the Baseline Survey and as already described in Section 2.0 of this Decommissioning Plan. The changes to the approach are:

- Survey results will not be divided by two as an ALARA measure. Most building surfaces already are well less than the DCGL over the majority of the surface area that is planned for decontamination. It is the LBP that causes widespread removal of material from the walls and ceilings of Cells 5 and 6. Building decontamination methods will effectively remove most all contamination to levels that approach or equal background.
- During the FSS, 2 pi source efficiency as recommended by MARSSIM will be used.

Decontamination of radioactivity, in areas where this is required, shall be considered complete when contamination measurement results show that radioactivity levels are less than the DCGL.

# Attachment 1

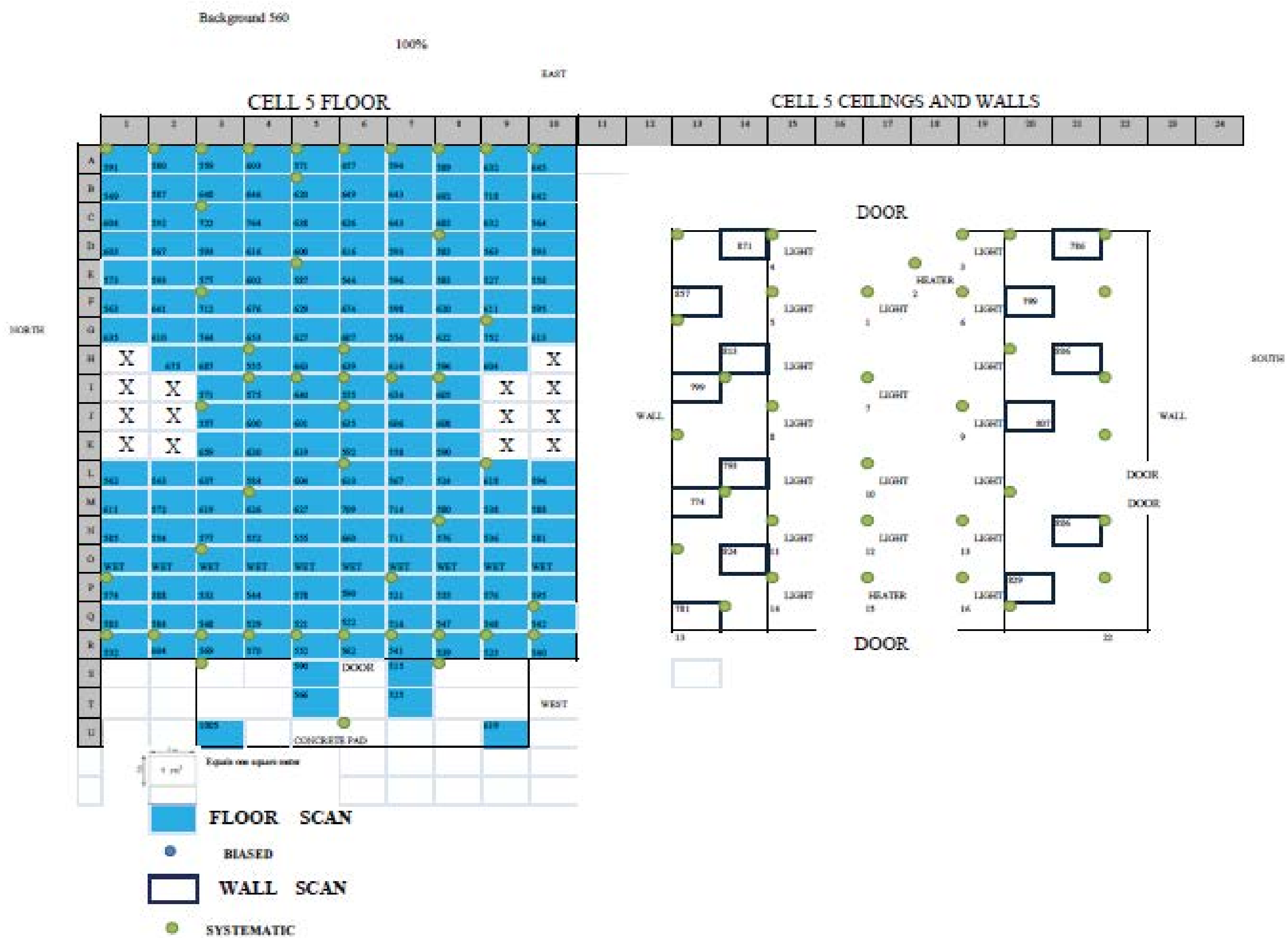



**Figure 5. Drawing of Cell 5**

# Attachment 1

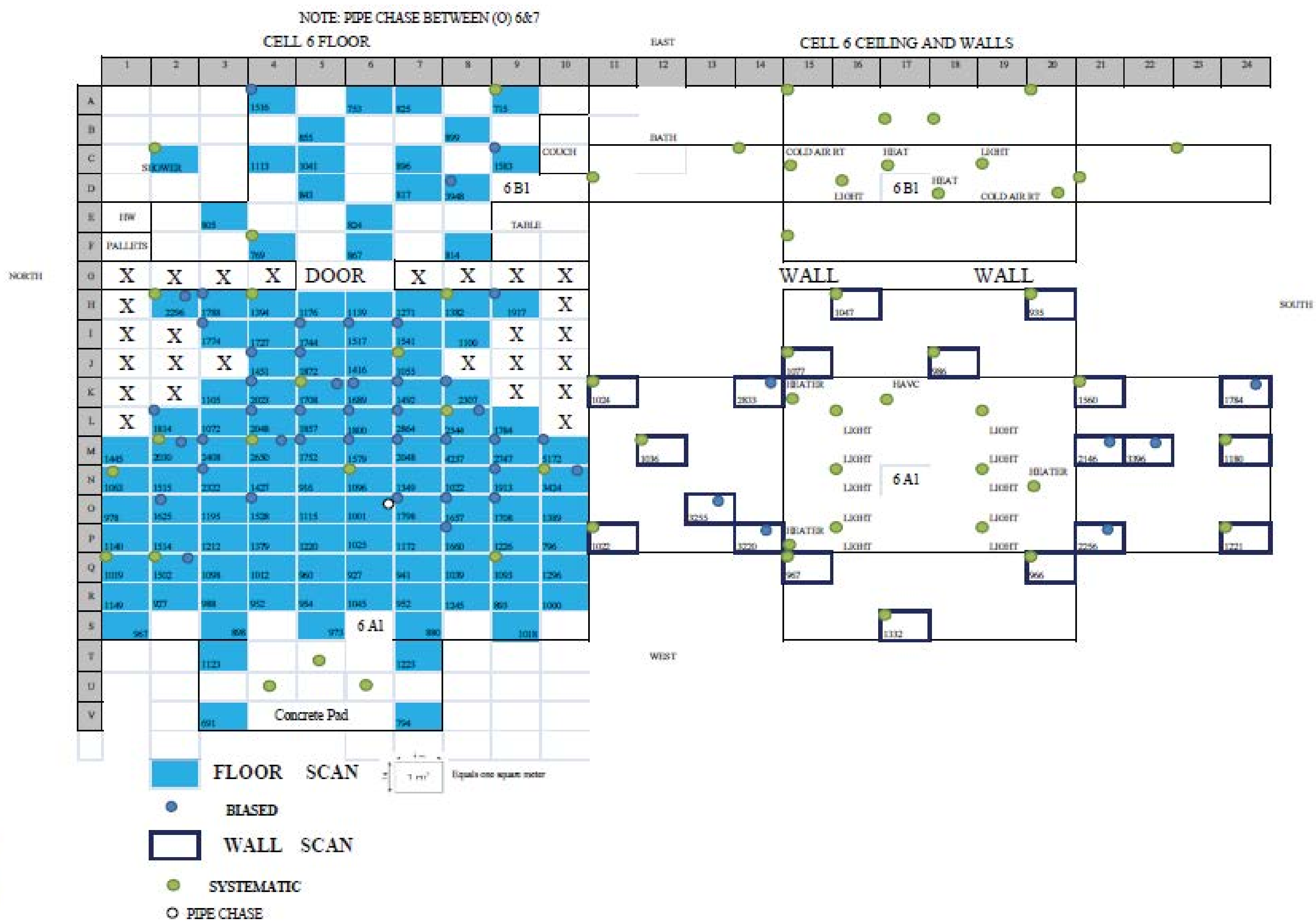



Figure 6. Drawing of Cell 6

### *5.2. Final Status Survey Plan for Soil under Cells 5 and 6*

This section describes the survey methods and the survey deign. The contamination within the Building 181 is relatively light. It is not anticipated that the soil under Cells 5 and 6 will be contaminated. Thus, the entire area will be considered a MARSSIM Class 3 area. The area will be treated as a single Survey Unit.

A DCGL has been derived and the method is detailed in Attachment 2. A surrogate DCGL of 4.6 pCi/g for U-238 will be used. When the concentration of U-238 is less than the DCGL this assures that the TEDE will be less than 25 mrem/y when the amounts of U-234 and U-235 are considered.

#### *5.2.1 Survey Methods*

A number of field activities will be conducted as part of this effort. The principle activities include:

- Gamma Walk-Over Surveys (GWSs),
- Biased Sampling, and
- Systematic Sampling

#### **Gamma Walkover Survey (GWS)**

GWS data will be collected using a Field Instrument for Detecting Low Energy Radiation (FIDLER) because of the low energy gamma emissions from U-238 and daughters. The GWS will be conducted to provide complete, 100 percent coverage of exposed soil surfaces in the footprint of the excavated cells, with a data density of, on average, at least one measurement per square meter. All GWS data will be electronically logged. Coordinate quality on the x, y plane will include sub-meter accuracy. Areas that are inaccessible due to terrain or standing water will be clearly demarcated on a map.

The GWS will be performed with a global position system (GPS) capable of recording a survey measurement and a paired position approximately every second. The GPS will be capable of sub-meter accuracy (x, y data). The GWS will be used to determine if there are areas of gamma count rate different than background. If such locations are found, a decision will be made during the conduct of the survey to collect a biased sample. There will be no need to upgrade the Survey Unit if potential contamination is suspected because 100 percent of the Survey Unit is already planned to be scanned.

The GWS will be performed by a technician traversing areas on foot at a rate approximately 0.5 meters per second carrying a backpack mounted GPS and the detectors. Data will be presented graphically and in electronic table form. The data at a minimum will contain counts per minute (cpm), northing and easting (x, y), and dilution of precision (PDOP), date, and time.

The MDA for uranium at a scan speed of 0.5 m/s is 60 pCi/g (Reference: Phase 1 Decommissioning Plan for the West Valley Demonstration Project, Revision 1; May 2011; prepared by Argonne National Laboratory for the U.S. Department of Energy; approved by the US NRC). This MDA is considerably higher than the DCGL. Therefore, the gamma scan will serve as a qualitative evaluation of whether there are any significantly above-background gamma levels in the area when compared to the reference background GWS results. In this manner, gamma levels in excess of twice the reference area background levels will require a biased soil sample. The soil sample results will be compared to the 4.6 pCi/g DCGL. The soil sample collection and analysis will be relied upon to evaluate the condition of the soil under the slab.

### Sample Collection and Analysis

Samples will be collected using hand trowels or a hand auger. Samples will be collected in 15 cm depth increments from ground surface to 15 cm below ground surface. Samples will be mixed in a stainless-steel bowl and packaged in 500 or 1000 g plastic jars.

Systematic samples will be collected using a random start triangular grid. The purpose of systematic samples is to determine an unbiased average concentration to be compared to natural background determined by collecting samples in a background reference area. The spacing of systematic samples will be dependent on the number of samples required and the size of the Survey Unit. Previous experience when collecting samples shows that the variability in the data will be low as the soil concentration approaches background. Therefore, 18 samples will be collected; nine from the Survey Unit and nine from a background reference area (see below).

Biased samples may also be collected depending on the results of the GWS. The number of such biased samples, if any, will be determined by the AAR Site Radiation Safety Officer.

Samples will be sent to ARS DOD ELAP accredited laboratory in Port Allen, Louisiana. Chain of Custody will be documented on forms supplied by the laboratory. Samples will be in the custody of the sampler or stored in a locked location if left unattended.

Samples will be analyzed by alpha spectroscopy for U-238 and U-234. A comparison of the U-238 to U-234 ratio will prove useful to help determine whether any uranium detected in naturally occurring or depleted. If the uranium appears naturally occurring, this will help with an evaluation of whether low level concentrations are natural background.

#### *5.2.2 Survey Design*

The goal of the soil FSS is to demonstrate that the soil underneath Cells 5 and 6 is not different than natural background. This will be done by collecting an equal number of samples from the Survey Unit and from a background reference location. The sample analytical results will be compared using the Wilcoxon Rank Sum Test as discussed in MARSSIM.

Type 1 and Type 2 error rates are established at 0.05 for both. Given that the soil underneath the cells is not expected to be contaminated, then the variability in the data (standard deviation) is expected to be relatively low; approximately 0.1 pCi/g. Natural background for uranium typically ranges from 0.5 to 2 pCi/g with a typical average of 1.0 pCi/g. The difference between typical background of 1.0 pCi/g and the typical lower bound of background of 0.5 pCi/g results in a value of the relative shift (delta) of 0.5 pCi/g. The value of delta over sigma would then be 5. Given Type 1 and Type 2 error rates of 0.05, the number of samples required per MARSSIM Table 5.3 is 18. Nine samples are required in the Survey Unit and nine samples are required in the background reference area.

*5.2.3 Background Reference Area*

A location at Robins AFB will be selected in consultation with USAF Robins' personnel. The reference area will be at a location that has not been impacted by work with radioactive material. The soil type and geology of the reference area will be the same as that found underneath Building 181.

*5.2.4 Decontamination Support and FSS Quality Assurance*

Instruments will be calibrated according to ANSI N323A-1997. Survey instruments and methods specified in applicable AAR operating and technical procedures have been documented as to their ability to provide a 95% confidence level in detection of surface contamination at levels, which meet the requirements of FSS plan.

Instruments shall undergo daily quality control background and source checks prior use to assure they are operating within ±20% of their calibrated intrinsic efficiencies. All check sources will be traceable to the NIST. All instrument source and background check results will be reviewed by the project AAR Radiation Safety Office. All instrument calibration reports, source certificates, source/background checks will be retained as well as attached to the FSS final report. RCTs will verify that instruments have passed their daily source and background checks prior to their use. In addition, supporting instrument data is provided on each survey form.

QA duplicate static measurements, smears, and soil samples will be performed on ten percent of all FSS measurements. The QA duplicate measurements and smears will be performed by a different RCT using different an instrument. The instruments will be identical in model but have different serial numbers. QA soil samples will be collected and packaged by a different RCT. QA duplicate results shall show reasonable agreement with original results (i.e., within 20%).

All soil samples will be affiliated with a Chain of Custody for appropriate shipment to the ARS laboratory in Port Allen, LA for subsequent preparation and analysis. All soil sample analyses will be performed by ARS laboratory personnel in accordance with their applicable AAR operating and technical procedures.

During actual operations, the AAR Corporate RSO will also review FSS documentation during an unannounced site project assessment or as requested. In addition, the corporate RSO will also review and evaluate all FSS information in support of FSS Final Report generation.

## 6.0 References

ANL, 2001 User's Manual for RESRAD Version 6, Environmental Assessment Division, Argonne National Laboratory, ANL/EAD-4, July 2001.

ANL, 2003 User's Manual for RESRAD-Build Version 3, Environmental Assessment Division, Argonne National Laboratory, ANL/EAD/03-1, June 2003.

NRC, 2006 Consolidated Decommissioning Guidance, Decommissioning Process for Materials Licenses, NUREG-1757, Vol. 1, Rev 2, September 2006.

# ATTACHMENT 2

## Photograph Log

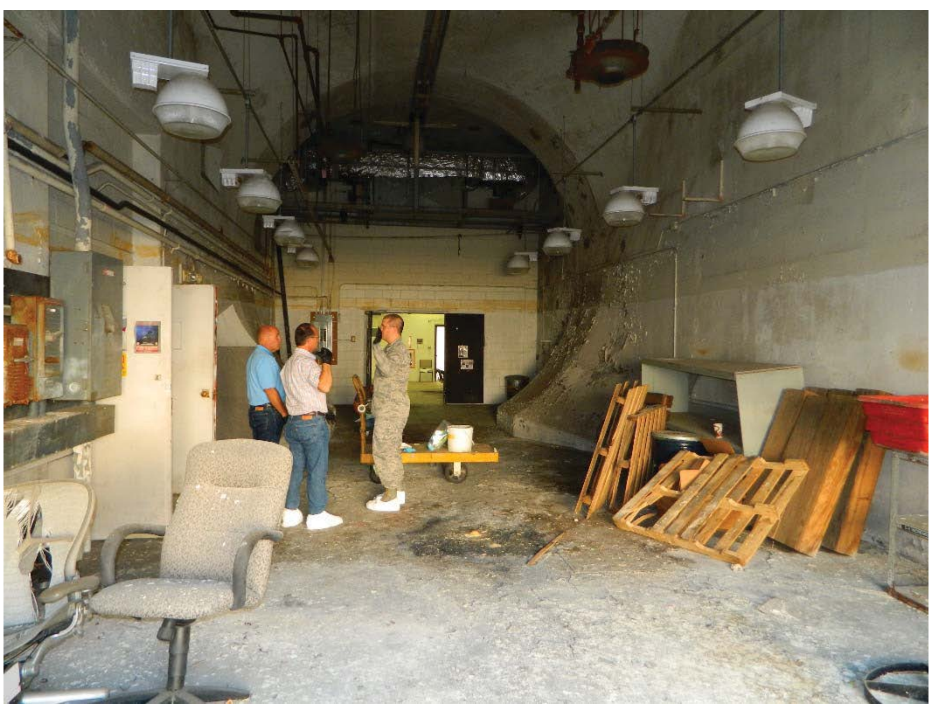
# Attachment 1

Geosyntec consultants

**PHOTOGRAPH LOG**

| | | | |
|---|---|---|---|
| PROJECT NAME: | Final Status Survey Report for Building 181 | PROJECT NO.: | GW0082 |
| CLIENT: | Robins Air Force Base, Georgia | FILE NAME: | Building 181_Photolog.pptx |

Photograph 1: View of Building 181 looking north/northwest.



Photograph 2: Room 6A1 of Cell 6 looking east toward doorway into Room 6B1. Doorway to Room 3A on left side.

# Attachment 1

Geosyntec consultants

**PHOTOGRAPH LOG**

| | | |
|---|---|---|
| PROJECT NAME: | Final Status Survey Report for Building 181 | PROJECT NO.: GW0082 |
| CLIENT: | Robins Air Force Base, Georgia | FILE NAME: Building 181_Photolog.pptx |

Photograph 3: Paint peeling on wall inside Cell 6 (typical of conditions observed in other cells of Building 181).

Photograph 4: Room 6A1 following removal of lead-based paint.

# Attachment 1

Geosyntec consultants

**PHOTOGRAPH LOG**

| PROJECT NAME: Final Status Survey Report for Building 181 | PROJECT NO.: GW0082 |
|---|---|
| CLIENT: Robins Air Force Base, Georgia | FILE NAME: Building 181_Photolog.pptx |

Photograph 5; Low-level radioactive waste (LLRW) storage shed outside Cell 5.


Photograph 6: Application of paint stripper in Cell 5.

# Attachment 1

Geosyntec consultants

**PHOTOGRAPH LOG**

| | | | |
|---|---|---|---|
| PROJECT NAME: | Final Status Survey Report for Building 181 | PROJECT NO.: | GW0082 |
| CLIENT: | Robins Air Force Base, Georgia | FILE NAME: | Building 181_Photolog.pptx |


Photograph 7: Arrangement of HVAC supply and return in Room 6B1.


Photograph 8: HVAC at east end of Room 6A1.

# Attachment 1

| Geosyntec consultants | PHOTOGRAPH LOG |
|---|---|

| | |
|---|---|
| PROJECT NAME: Final Status Survey Report for Building 181 | PROJECT NO.: GW0082 |
| CLIENT: Robins Air Force Base, Georgia | FILE NAME: Building 181_Photolog.pptx |


Photograph 9: Floor scanner in Room 6A1.


Photograph 10: Expanded survey grid in the concrete apron area at the west entrance to Cell 6 (prior to decontamination).

# Attachment 1

| Geosyntec consultants | PHOTOGRAPH LOG |
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| | | |
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| PROJECT NAME: Final Status Survey Report for Building 181 | | PROJECT NO.: GW0082 |
| CLIENT: Robins Air Force Base, Georgia | | FILE NAME: Building 181_Photolog.pptx |


Photograph 11: Static measurement with LM43-93 probe.


Photograph 12: Static measurement from a lift.

**Attachment 1**

| Geosyntec consultants | PHOTOGRAPH LOG |
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| PROJECT NAME: | Final Status Survey Report for Building 181 | PROJECT NO.: GW0082 |
| CLIENT: | Robins Air Force Base, Georgia | FILE NAME: Building 181_Photolog.pptx |


Photograph 13: Static measurements in Cell 5.


Photograph 14: Floor scanning in Cell 5.

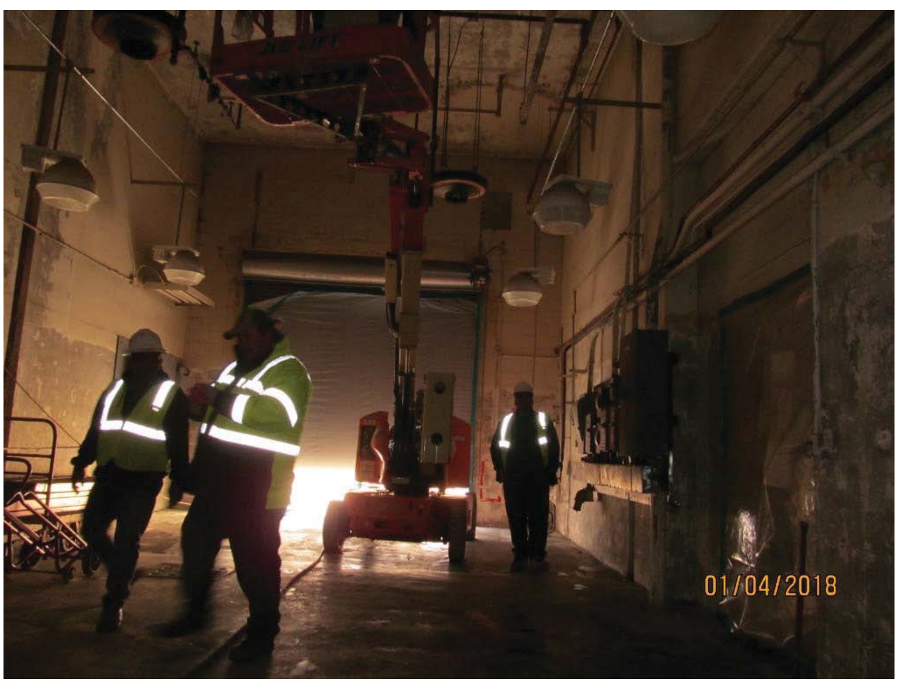
Attachment 1

Geosyntec consultants

## PHOTOGRAPH LOG

| | |
|---|---|
| PROJECT NAME: Final Status Survey Report for Building 181 | PROJECT NO.: GW0082 |
| CLIENT: Robins Air Force Base, Georgia | FILE NAME: Building 181_Photolog.pptx |


Photograph 15: East entrance to Cell 5.




Photograph 16: Decontamination using a lift.

# Attachment 1

Geosyntec consultants

**PHOTOGRAPH LOG**

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| PROJECT NAME: Final Status Survey Report for Building 181 | PROJECT NO.: GW0082 |
| CLIENT: Robins Air Force Base, Georgia | FILE NAME: Building 181_Photolog.pptx |


Photograph 17: Room 6A1 after decontamination. The doorway to Room 3A is on the left side.

Photograph 18: Cell 5 after decontamination.

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**PHOTOGRAPH LOG**

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| PROJECT NAME: | Final Status Survey Report for Building 181 | PROJECT NO.: | GW0082 |
| CLIENT: | Robins Air Force Base, Georgia | FILE NAME: | Building 181_Photolog.pptx |

Photograph 19: Powered ventilation stack lying on roof of Cell 6.


Photograph 20: Measurement of large area wipe (LAW) in Room 6A1.

# Attachment 1

Geosyntec consultants

**PHOTOGRAPH LOG**

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| PROJECT NAME: | Final Status Survey Report for Building 181 | PROJECT NO.: | GW0082 |
| CLIENT: | Robins Air Force Base, Georgia | FILE NAME: | Building 181_Photolog.pptx |


Photograph 21: Floor of Cell 5 covered with plastic during decontamination of walls.


Photograph 22: Shower in the bathroom of Room 6B1.

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**PHOTOGRAPH LOG**

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| PROJECT NAME: | Final Status Survey Report for Building 181 | PROJECT NO.: | GW0082 |
| CLIENT: | Robins Air Force Base, Georgia | FILE NAME: | Building 181_Photolog.pptx |

Photograph 23: Coupons were cut from HVAC ducts in Cell 6 to assess potential internal contamination.

Photograph 24: Surveying the pipe chase at the east end of Cell 6.

# Attachment 1

Geosyntec consultants

## PHOTOGRAPH LOG

| | | | |
|---|---|---|---|
| PROJECT NAME: | Final Status Survey Report for Building 181 | PROJECT NO.: | GW0082 |
| CLIENT: | Robins Air Force Base, Georgia | FILE NAME: | Building 181_Photolog.pptx |


Photograph 25: East entrance to Room 6B1. Note, east exit of the pipe chase below the AC Unit.

Photograph 26: Electrical Vault outside the west entrance of Cell 6.

# ATTACHMENT 3

## Waste Disposal Certifications
## (Not Available As of Date of This Report)

# ATTACHMENT 4

## Building 181 Final Status Survey Results (Survey Sheets)

Attachment 1

# Survey Unit FC-1

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 4 | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | | Baseline survey of additional two grids | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-3-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 1115 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-3-18 | 2360/43-89 | 310164 | 4/17/2018 | 43-89 | 125 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 13 | 4696 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | 287606 | 11/17/2018 | 43-37 | 100 | PR278379 | 11/17/2018 | 0.3845 | 0.4517 | 1 | 8733 | 10 | 0.5 |
| | Review: CBP 1-4-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 315 | -3 | -23 | 1 | 6 | 497 | 45 | 120 | 510 | P5 |
| 2 | 0 | 267 | -3 | -78 | 2 | 5 | 516 | 36 | 203 | 516 | P6 |
| 3 | | | | | 3 | | | | | | |
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| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 15 | 83 |
| 43-89 | 67 | 340 |
| 43-37 | 78 | 650 |


Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FC-2

# Attachment 1

ARS INTERNATIONAL

**Radiological Survey Form** — Robins AFB Project: Federal-DOD-20150-0200

Location: Robins AFB Project 181 | RWP# N/A | Room: CELL 3D,3E POST ABATEMENT | Survey Type: SMEARS AND DIRECTS | Page 1 of 1

| Comments | Surveyed By: | Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | α Eff. | β Eff. | α Bkg. (cpm) | β Bkg. (cpm) | Sample Count Time (min) | BKG Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2929 | 290488 | 12/19/2015 | 43-10-1 | 100 | PR337598 | 12/19/2015 | 0.3356 | 0.434 | 0 | 62 | 1 | 1 |
| | DAVE HOWE | 11/13/15 | 2360/43-93 | 268512 | 10/22/2016 | 43-93 | 100 | PR289416 | 10/22/2016 | 0.3981 | 0.5062 | 1 | 482 | 1 | 1 |
| | Reviewed By: | AED 9/7/18 | | | | | | | | | | | | | |

| | Smears | | | | | Direct Frisk | | | | Dose Rate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross CPM | | DPM/100cm² | | | Gross CPM | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | urem/hr | Location Number |
| 1 | 0 | 63 | 0 | 2 | 1 | 4 | 485 | 30 | 12 | | F-A-1-S |
| 2 | 0 | 74 | 0 | 28 | 2 | 3 | 472 | 20 | -40 | | F-A-4-S |
| 3 | 0 | 66 | 0 | 9 | 3 | 4 | 469 | 30 | -51 | | F-A-7-S |
| 4 | 0 | 70 | 0 | 18 | 4 | 1 | 473 | 0 | -36 | | F-D-2-S |
| 5 | 0 | 50 | 0 | -28 | 5 | 0 | 546 | -10 | 253 | | F-D-5-S |
| 6 | 0 | 53 | 0 | -21 | 6 | 2 | 440 | 10 | -166 | | F-D-7-S |
| 7 | 0 | 61 | 0 | -2 | 7 | 4 | 431 | 30 | -202 | | F-F-3-S |
| 8 | 0 | 44 | 0 | -41 | 8 | 2 | 420 | 10 | -245 | | F-F-5-S |
| 9 | 0 | 58 | 0 | -9 | 9 | 4 | 442 | 30 | -158 | | F-F-7-S |
| 10 | 0 | 56 | 0 | -14 | 10 | 4 | 439 | 30 | -170 | | F-H-2-S |
| 11 | 0 | 57 | 0 | -12 | 11 | 1 | 412 | 0 | -277 | | F-H-6-S |
| 12 | 0 | 61 | 0 | -2 | 12 | 1 | 409 | 0 | -288 | | F-H-7-S |
| 13 | 0 | 55 | 0 | -16 | 13 | 1 | 410 | 0 | -284 | | F-J-3-S |
| 14 | 0 | 53 | 0 | -21 | 14 | 6 | 402 | 50 | -316 | | F-J-7-S |
| 15 | 0 | 70 | 0 | 18 | 15 | 3 | 365 | 20 | -462 | | F-L-1-S |
| 16 | 0 | 65 | 0 | 7 | 16 | 6 | 447 | 50 | -138 | | F-L-3-S |
| 17 | 0 | 57 | 0 | -12 | 17 | 4 | 427 | 30 | -217 | | F-L-6-S |
| 18 | 0 | 60 | 0 | -5 | 18 | 3 | 365 | 20 | -462 | | F-N-3-S |
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| 31 | | | | | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |

| Instrument | α MDA | β MDA |
|---|---|---|
| 2929 | 91 | 183 |
| 2360/43-93 | 77 | 415 |

Signature: Arthur E Desrsosiers CHP

# Attachment 1

ARS INTERNATIONAL

## Radiological Survey Form

**Robins AFB Project: Federal-DOD-20150-0200**

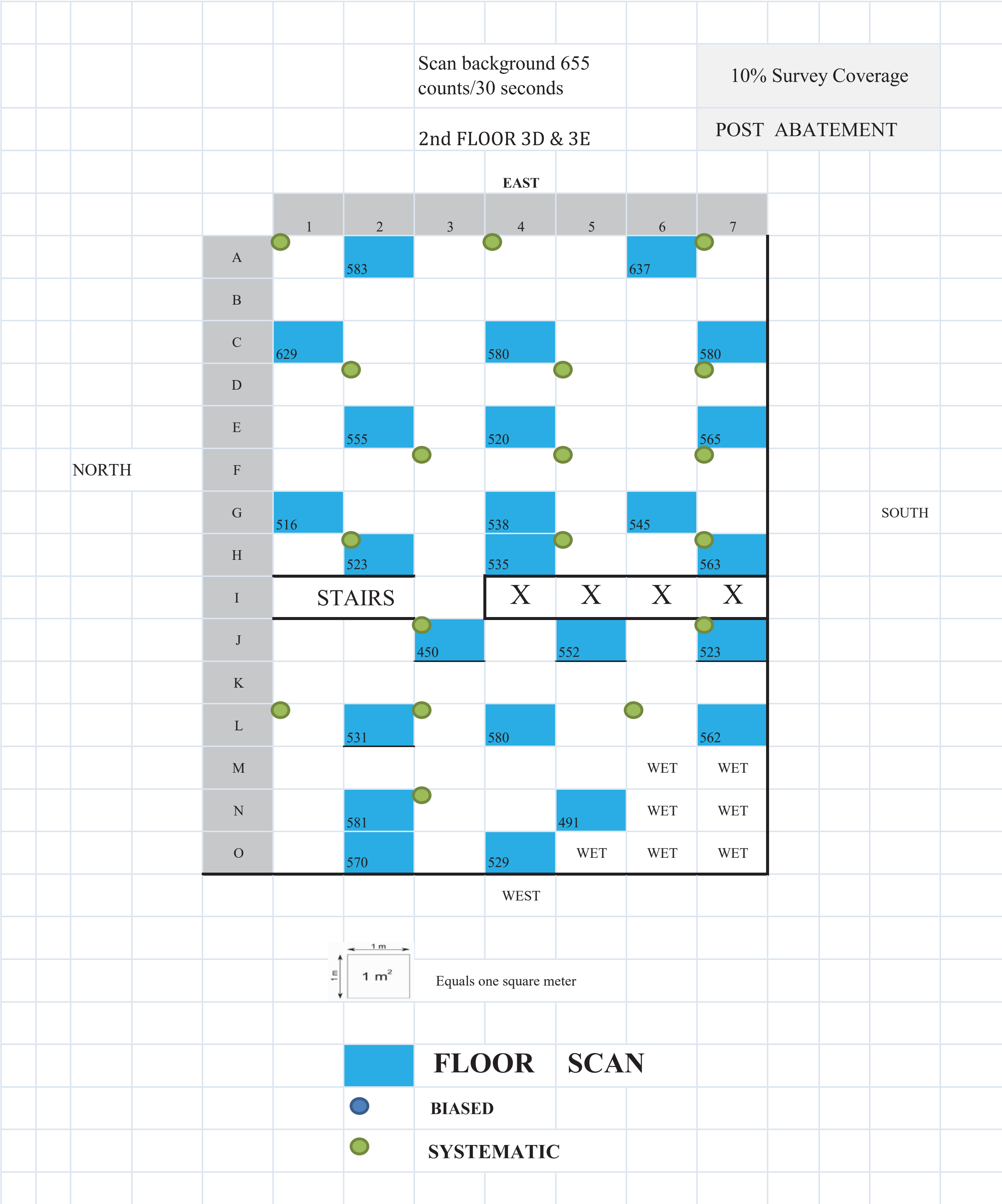
| Location: Robins AFB Building 181 | RWP# N/A | Room: CELL 3D,3E POST ABATEMENT | Survey Type: Scan for average contamination levels | Page 1 of 1 |
|---|---|---|---|---|

| Comments | Surveyed By: | Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | β Surface Eff. | β Source Eff. | β Bkg. (counts per 30 s) | β MDA dpm/ 100cm² | | BKG Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TIMOTHY DOUTT | 11/13/15 | 2221/43-37-1 | 308088 | 10/21/2016 | 43-47-1 | 100 | PR149172 | 10/21/2016 | 0.5 | 0.3316 | 655 | 1473 | | 0.5 |
| | Reviewed By: AED 8/7/18 | | | | | | | | | | | | | | |

| Smears | | | | | Direct Frisk | | | | Dose Rate | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gross CPM | | DPM/100cm² | | | Gross (counts/30 s) | | DPM/100cm² | | | |
| α | β | α | β | No. | α | β | α | β | urem/hr | Location Number |
| | | | | 1 | N/A | 583 | N/A | <BKG | | F-A-2-A |
| | | | | 2 | N/A | 637 | N/A | <BKG | | F-A-6-A |
| | | | | 3 | N/A | 629 | N/A | <BKG | | F-C-1-A |
| | | | | 4 | N/A | 580 | N/A | <BKG | | F-C-4-A |
| | | | | 5 | N/A | 580 | N/A | <BKG | | F-C-7-A |
| | | | | 6 | N/A | 555 | N/A | <BKG | | F-E-2-A |
| | | | | 7 | N/A | 520 | N/A | <BKG | | F-E-4-A |
| | | | | 8 | N/A | 565 | N/A | <BKG | | F-E-7-A |
| | | | | 9 | N/A | 516 | N/A | <BKG | | F-G-1-A |
| | | | | 10 | N/A | 538 | N/A | <BKG | | F-G-4-A |
| | | | | 11 | N/A | 545 | N/A | <BKG | | F-G-6-A |
| | | | | 12 | N/A | 523 | N/A | <BKG | | F-H-2-A |
| | | | | 13 | N/A | 535 | N/A | <BKG | | F-H-4-A |
| | | | | 14 | N/A | 563 | N/A | <BKG | | F-H-7-A |
| | | | | 15 | N/A | 450 | N/A | <BKG | | F-J-3-A |
| | | | | 16 | N/A | 552 | N/A | <BKG | | F-J-5-A |
| | | | | 17 | N/A | 523 | N/A | <BKG | | F-J-7-A |
| | | | | 18 | N/A | 531 | N/A | <BKG | | F-L-2-A |
| | | | | 19 | N/A | 580 | N/A | <BKG | | F-L-4-A |
| | | | | 20 | N/A | 562 | N/A | <BKG | | F-L-7-A |
| | | | | 21 | N/A | 581 | N/A | <BKG | | F-N-2-A |
| | | | | 22 | N/A | 491 | N/A | <BKG | | F-N-5-A |
| | | | | 23 | N/A | 570 | N/A | <BKG | | F-O-2-A |
| | | | | 24 | N/A | 529 | N/A | <BKG | | F-O-4-A |

Signature: Arthur E Desrosiers CHP

# Attachment 1



# Attachment 1

## Survey Unit FSS-1A

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

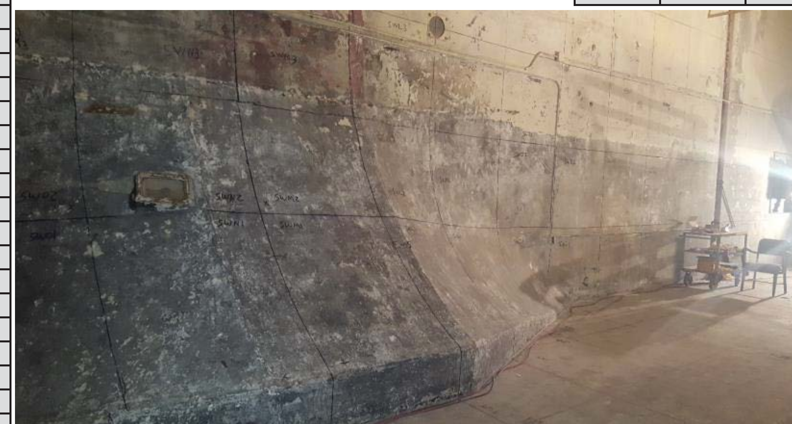
| Robins AFB Building 181 | HWP# 02-181 | CELL 5 South and East Wall Survey | Survey Unit & Type: Systematic grid | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS - 1A | LOWER WALLS "A" | FSS-1A systematic points | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-26-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 1051 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 17 | 4405 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/26/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

## Systematic survey statics and smears

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 101 | 5 | -14 | 1 | 5 | 396 | 34 | -219 | | A1 |
| 2 | 0 | 112 | -1 | 24 | 2 | 3 | 345 | 13 | -470 | | A2 |
| 3 | 3 | 137 | 16 | 111 | 3 | 1 | 447 | -7 | 32 | | A3 |
| 4 | 0 | 80 | -1 | -87 | 4 | 2 | 402 | 3 | -190 | | A4 |
| 5 | 0 | 109 | -1 | 14 | 5 | 9 | 382 | 75 | -288 | | A5 |
| 6 | 0 | 105 | -1 | 0 | 6 | 2 | 452 | 3 | 57 | | A6 |
| 7 | 1 | 108 | 5 | 10 | 7 | 1 | 268 | -7 | -849 | | A7 |
| 8 | 0 | 115 | -1 | 34 | 8 | 4 | 281 | 24 | -785 | | A8 |
| 9 | 0 | 109 | -1 | 14 | 9 | 3 | 279 | 13 | -795 | | A9 |
| 10 | 0 | 131 | -1 | 90 | 10 | 3 | 457 | 13 | 81 | | A10 |
| 11 | 0 | 111 | -1 | 21 | 11 | 6 | 423 | 44 | -86 | | A11 |
| 12 | 1 | 85 | 5 | -70 | 12 | 0 | 450 | -17 | 47 | | A12 |
| 13 | 0 | 105 | -1 | 0 | 13 | 4 | 472 | 24 | 155 | | A13 |
| 14 | 0 | 114 | -1 | 31 | 14 | 1 | 457 | -7 | 81 | | A14 |
| 15 | 0 | 121 | -1 | 55 | 15 | 1 | 386 | -7 | -268 | | A15 |
| 16 | 1 | 101 | 5 | -14 | 16 | 4 | 453 | 24 | 62 | | A16 |
| 17 | 0 | 112 | -1 | 24 | 17 | 3 | 435 | 13 | -27 | | A17 |
| 18 | 0 | 114 | -1 | 31 | 18 | 2 | 442 | 3 | 7 | | A18 |
| 19 | 0 | 113 | -1 | 27 | 19 | 3 | 415 | 13 | -126 | | A19 |
| 20 | 0 | 118 | -1 | 45 | 20 | 0 | 447 | -17 | 32 | | A20 |
| 21 | 0 | 107 | -1 | 7 | 21 | 2 | 412 | 3 | -140 | | A21 |
| 22 | 0 | 102 | -1 | -11 | 22 | 3 | 371 | 13 | -342 | | A22 |
| 23 | 0 | 93 | -1 | -42 | 23 | 0 | 424 | -17 | -81 | | A23 |
| 24 | 0 | 117 | -1 | 41 | 24 | 3 | 417 | 13 | -116 | | A24 |
| 25 | 0 | 115 | -1 | 34 | 25 | 6 | 350 | 44 | -446 | | A25 |
| 26 | 1 | 98 | 5 | -25 | 26 | 3 | 351 | 13 | -441 | | A26 |
| 27 | 1 | 111 | 5 | 21 | 27 | 2 | 330 | 3 | -544 | | A27 |
| 28 | 0 | 87 | -1 | -63 | 28 | 2 | 287 | 3 | -756 | | A28 |
| 29 | 2 | 98 | 10 | -25 | 29 | 3 | 282 | 13 | -781 | | A29 |
| 30 | 0 | 99 | -1 | -21 | 30 | 4 | 298 | 24 | -702 | | A30 |
| 31 | | | | | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 26 | 133 |
| 43-89 | 77 | 371 |




Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 5 | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-1A South Wall | FSS | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Tom Hunter 1/30/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 1035 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 11 | 4453 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-31-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Rescanned 100% with 43-93; static & smear highest spot**

| | Smears | | | | | Direct Frisk | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | |
| No. | α | β | α | β | | α | β | α | β | Location # |
| 1 | 0 | 117 | -1 | 47 | 1 | 4 | 480 | 27 | 134 | SWP2 |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 6 | | | | | | | | | | |
| 7 | | | | | | | | | | |
| 8 | | | | | | | | | | |
| 9 | | | | | | | | | | |
| 10 | | | | | | | | | | |
| 11 | | | | | | | | | | |
| 12 | | | | | | | | | | |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |
| 15 | | | | | | | | | | |
| 16 | | | | | | | | | | |
| 17 | | | | | | | | | | |
| 18 | | | | | | | | | | |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |
| 21 | | | | | | | | | | |
| 22 | | | | | | | | | | |
| 23 | | | | | | | | | | |
| 24 | | | | | | | | | | |
| 25 | | | | | | | | | | |
| 26 | | | | | | | | | | |
| 27 | | | | | | | | | | |
| 28 | | | | | | | | | | |
| 29 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 31 | | | | | | | | | | |
| 32 | | | | | | | | | | |
| 33 | | | | | | | | | | |
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| 35 | | | | | | | | | | |
| 36 | | | | | | | | | | |
| 37 | | | | | | | | | | |
| 38 | | | | | | | | | | |
| 39 | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 24 | 132 |
| 43-93 | 61 | 292 |
| | | |

Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Location: Robins AFB Building 181 | HWP# 02-181 | Cell 5 Lower Wall - West | Survey Unit & Type: 1 m2 grids | Page of 1 of 3 |
|---|---|---|---|---|
| | | | FSS-1A | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 12/21/17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 3 | 1118 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 12/21/17 | 2360/43-89 | 310164 | 4/17/2018 | 43-89 | 125 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 9 | 4674 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9911 | 10 | 0.5 |
| | Reviewed By: CBP 12/21/17 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 3 | 305 | 4 | -35 | 1 | 4 | 290 | 30 | -775 | 500 | A1 |
| 2 | 0 | 315 | -2 | -24 | 2 | 0 | 341 | -9 | -552 | 481 | A2 |
| 3 | 0 | 320 | -2 | -18 | 3 | 3 | 281 | 20 | -814 | 339 | B1 |
| 4 | 2 | 288 | 2 | -55 | 4 | 3 | 290 | 20 | -775 | 378 | B2 |
| 5 | 2 | 318 | 2 | -20 | 5 | 1 | 304 | 1 | -714 | 371 | C1 |
| 6 | 3 | 304 | 4 | -36 | 6 | 2 | 313 | 11 | -675 | 386 | C2 |
| 7 | 0 | 302 | -2 | -39 | 7 | 3 | 272 | 20 | -854 | 384 | D1 |
| 8 | 1 | 296 | 0 | -46 | 8 | 3 | 313 | 20 | -675 | 372 | D2 |
| 9 | 0 | 323 | -2 | -14 | 9 | 1 | 355 | 1 | -491 | 440 | E1 |
| 10 | 1 | 307 | 0 | -33 | 10 | 3 | 365 | 20 | -447 | 454 | E2 |
| 11 | 1 | 274 | 0 | -71 | 11 | 5 | 366 | 40 | -443 | 416 | F1 |
| 12 | 1 | 319 | 0 | -19 | 12 | 3 | 331 | 20 | -596 | 456 | F2 |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 13 | 83 |
| 43-89 | 61 | 339 |
| 43-37 | 80 | 742 |


Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

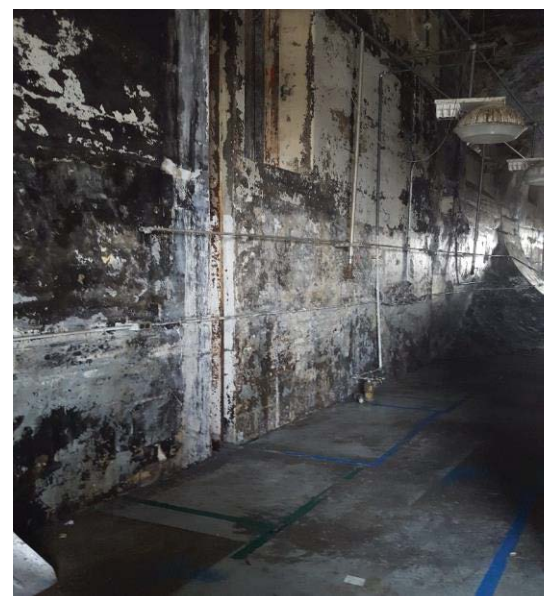
**Radiological Survey Form** — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | CELL 5 LOWER SOUTH WALL | Survey Unit & Type: 1 m2 grids | Page of 2 of 3 |
|---|---|---|---|---|
| | | | FSS-1A | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | THOMAS HUNTER 12/21/17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 3 | 1118 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | PAUL FLETCHER 12/21/17 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 10 | 4644 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 10547 | 10 | 0.5 |
| | Reviewed By: CBP 12/21/17 | | | | | | | | #N/A | 0.4631 | | | | |
| | | | | | | | | | #N/A | 0.4631 | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 301 | 0 | -40 | 1 | 1 | 460 | 0 | -17 | 589 | SW K1 |
| 2 | 0 | 302 | -2 | -39 | 2 | 0 | 422 | -9 | -163 | 612 | SW K2 |
| 3 | 1 | 296 | 0 | -46 | 3 | 1 | 459 | 0 | -21 | 601 | SW L1 |
| 4 | 1 | 305 | 0 | -35 | 4 | 0 | 494 | -9 | 114 | 602 | SW L2 |
| 5 | 0 | 345 | -2 | 11 | 5 | 1 | 480 | 0 | 60 | 567 | SW M1 |
| 6 | 2 | 354 | 2 | 22 | 6 | 1 | 477 | 0 | 49 | 599 | SW M2 |
| 7 | 2 | 276 | 2 | -69 | 7 | 0 | 448 | -9 | -63 | 607 | SW N1 |
| 8 | 0 | 358 | -2 | 26 | 8 | 0 | 545 | -9 | 310 | 634 | SW N2 |
| 9 | 0 | 309 | -2 | -31 | 9 | 0 | 428 | -9 | -140 | 659 | SW O1 |
| 10 | 1 | 289 | 0 | -54 | 10 | 1 | 542 | 0 | 299 | 637 | SW O2 |
| 11 | 1 | 356 | 0 | 24 | 11 | 1 | 510 | 0 | 176 | 602 | SW P1 |
| 12 | 0 | 337 | -2 | 2 | 12 | 2 | 547 | 9 | 318 | 670 | SW P2 |
| 13 | 0 | 234 | -2 | -118 | 13 | 2 | 516 | 9 | 199 | 653 | SW Q1 |
| 14 | 1 | 313 | 0 | -26 | 14 | 0 | 471 | -9 | 25 | 606 | SW Q2 |
| 15 | 0 | 322 | -2 | -16 | 15 | 1 | 438 | 0 | -102 | 603 | SW R1 |
| 16 | 0 | 295 | -2 | -47 | 16 | 0 | 472 | -9 | 29 | 617 | SW R2 |
| 17 | 0 | 344 | -2 | 10 | 17 | 1 | 369 | 0 | -367 | 543 | SW S1 |
| 18 | 1 | 324 | 0 | -13 | 18 | 0 | 391 | -9 | -283 | 540 | SW S2 |
| 19 | 0 | 325 | -2 | -12 | 19 | 0 | 396 | -9 | -263 | 559 | SW T1 |
| 20 | 3 | 294 | 4 | -48 | 20 | 0 | 401 | -9 | -244 | 495 | SW T2 |
| 21 | 0 | 298 | -2 | -43 | 21 | 0 | 387 | -9 | -298 | 508 | SW U1 |
| 22 | 0 | 328 | -2 | -9 | 22 | 0 | 411 | -9 | -206 | 525 | SW U2 |
| 23 | 1 | 331 | 0 | -5 | 23 | 2 | 396 | 9 | -263 | 588 | SW V1 |
| 24 | 0 | 323 | -2 | -14 | 24 | 1 | 415 | 0 | -190 | 590 | SW V2 |
| 25 | 0 | 311 | -2 | -28 | 25 | 2 | 380 | 9 | -325 | 525 | SW W1 |
| 26 | 1 | 341 | 0 | 6 | 26 | 0 | 434 | -9 | -117 | 560 | SW W2 |
| 27 | 1 | 319 | 0 | -19 | 27 | 0 | 424 | -9 | -156 | 555 | SW X1 |
| 28 | 1 | 317 | 0 | -21 | 28 | 0 | 436 | -9 | -109 | 538 | SW X2 |
| 29 | 1 | 332 | 0 | -4 | 29 | 0 | 389 | -9 | -290 | 576 | SW Y1 |
| 30 | 2 | 322 | 2 | -16 | 30 | 2 | 411 | 9 | -206 | 562 | SW Y2 |
| 31 | 0 | 327 | -2 | -10 | 31 | 1 | 395 | 0 | -267 | 509 | SW Z1 |
| 32 | 0 | 336 | -2 | 1 | 32 | 1 | 396 | 0 | -263 | 546 | SW Z2 |
| 33 | 1 | 302 | 0 | -39 | 33 | 0 | 405 | -9 | -229 | 500 | SW AA1 |
| 34 | 2 | 305 | 2 | -35 | 34 | 0 | 398 | -9 | -256 | 525 | SW AA2 |
| 35 | 1 | 333 | 0 | -3 | 35 | 0 | 349 | -9 | -444 | 481 | SW BB1 |
| 36 | 1 | 337 | 0 | 2 | 36 | 1 | 368 | 0 | -371 | 507 | SW BB2 |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 13 | 83 |
| 43-93 | 59 | 298 |
| 43-37 | 80 | 765 |



Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

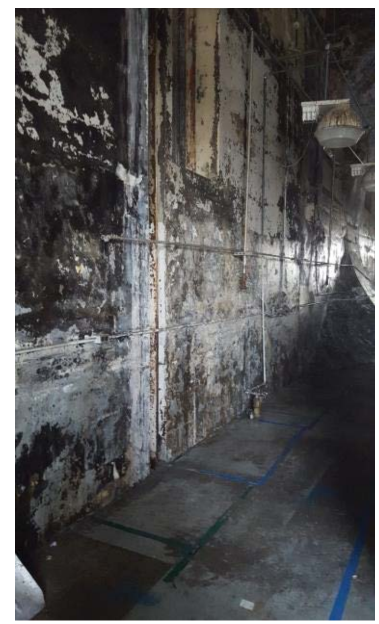
| Robins AFB Building 181 | HWP# 02-181 | CELL 5 N WALL AND S WALL Lower | Survey Unit & Type: 1 m2 grids | Page of 3 OF 3 |
|---|---|---|---|---|
| | | | FSS-1A | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | THOMAS HUNTER 12/19/17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 6 | 1092 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | PAUL FLETCHER 12/19/17 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 11 | 4684 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9911 | 10 | 0.5 |
| | Reviewed By: CBP 12/19/17 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

## Initial Scan

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | | | | | 1 | | | | | | (North Wall) |
| 2 | | | | | 2 | | | | | | (North Wall) |
| 3 | | | | | 3 | | | | | | (North Wall) |
| 4 | | | | | 4 | | | | | | (North Wall) |
| 5 | | | | | 5 | | | | | | (North Wall) |
| 6 | | | | | 6 | | | | | | (North Wall) |
| 7 | | | | | 7 | | | | | | (North Wall) |
| 8 | | | | | 8 | | | | | | (North Wall) |
| 9 | | | | | 9 | | | | | | (North Wall) |
| 10 | | | | | 10 | | | | | | (North Wall) |
| 11 | | | | | 11 | | | | | | (North Wall) |
| 12 | | | | | 12 | | | | | | (North Wall) |
| 13 | | | | | 13 | | | | | | (North Wall) |
| 14 | | | | | 14 | | | | | | (North Wall) |
| 15 | | | | | 15 | | | | | | (North Wall) |
| 16 | | | | | 16 | | | | | | (North Wall) |
| 17 | | | | | 17 | | | | | | (North Wall) |
| 18 | | | | | 18 | | | | | | (North Wall) |
| 19 | 2 | 304 | 0 | -27 | 19 | 2 | 375 | 8 | -360 | 551 | SW A1 |
| 20 | 0 | 312 | -3 | -18 | 20 | 4 | 361 | 27 | -414 | 545 | SW A2 |
| 21 | 0 | 311 | -3 | -19 | 21 | 0 | 382 | -10 | -333 | 513 | SW B1 |
| 22 | 0 | 283 | -3 | -52 | 22 | 2 | 398 | 8 | -271 | 500 | SW B2 |
| 23 | 0 | 332 | -3 | 5 | 23 | 4 | 366 | 27 | -394 | 567 | SW C1 |
| 24 | 0 | 288 | -3 | -46 | 24 | 1 | 392 | -1 | -294 | 487 | SW C2 |
| 25 | 2 | 311 | 0 | -19 | 25 | 3 | 380 | 17 | -340 | 563 | SW D1 |
| 26 | 1 | 293 | -2 | -40 | 26 | 1 | 353 | -1 | -444 | 517 | SW D2 |
| 27 | 0 | 300 | -3 | -32 | 27 | 7 | 357 | 54 | -429 | 513 | SW E1 |
| 28 | 0 | 299 | -3 | -33 | 28 | 3 | 388 | 17 | -310 | 544 | SW E2 |
| 29 | 1 | 324 | -2 | -4 | 29 | 8 | 423 | 63 | -175 | 561 | SW F1 |
| 30 | 1 | 307 | -2 | -24 | 30 | 1 | 349 | -1 | -460 | 524 | SWF2 |
| 31 | 1 | 319 | -2 | -10 | 31 | 1 | 389 | -1 | -306 | 570 | SW G1 |
| 32 | 1 | 324 | -2 | -4 | 32 | 0 | 420 | -10 | -186 | 519 | SW G2 |
| 33 | 0 | 335 | -3 | 9 | 33 | 0 | 250 | -10 | -841 | 384 | SW H1 |
| 34 | 0 | 325 | -3 | -3 | 34 | 2 | 260 | 8 | -802 | 388 | SW H2 |
| 35 | 0 | 315 | -3 | -15 | 35 | 1 | 263 | -1 | -791 | 403 | SW I1 |
| 36 | 3 | 326 | 2 | -2 | 36 | 0 | 280 | -10 | -725 | 446 | SW I2 |
| 37 | 0 | 293 | -3 | -40 | 37 | 3 | 396 | 17 | -279 | 422 | SW J1 |
| 38 | 0 | 285 | -3 | -49 | 38 | 2 | 410 | 8 | -225 | 543 | SW J2 |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 15 | 82 |
| 43-93 | 61 | 299 |
| 43-37 | 80 | 742 |



Signature: *Arthur Desrosiers CHP*

# Attachment 1

# Survey Unit FSS-1B

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | CELL 5 | Survey Unit & Type: Systematic grid | Page of 1 of 1 |
|---|---|---|---|---|
| | LOWER N & W WALLS | SURVEY "B" | FSS | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-24-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 0 | 1071 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 19 | 4515 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/26/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 111 | 0 | 14 | 1 | 4 | 363 | 25 | -483 | | B1 |
| 2 | 1 | 109 | 6 | 7 | 2 | 4 | 423 | 25 | -156 | | B2 |
| 3 | 0 | 114 | 0 | 24 | 3 | 4 | 424 | 25 | -150 | | B3 |
| 4 | 0 | 87 | 0 | -70 | 4 | 3 | 390 | 13 | -336 | | B4 |
| 5 | 0 | 117 | 0 | 34 | 5 | 2 | 416 | 1 | -194 | | B5 |
| 6 | 1 | 98 | 6 | -32 | 6 | 4 | 447 | 25 | -25 | | B6 |
| 7 | 0 | 100 | 0 | -25 | 7 | 0 | 397 | -23 | -298 | | B7 |
| 8 | 0 | 98 | 0 | -32 | 8 | 3 | 450 | 13 | -8 | | B8 |
| 9 | 1 | 110 | 6 | 10 | 9 | 2 | 428 | 1 | -128 | | B9 |
| 10 | 0 | 87 | 0 | -70 | 10 | 4 | 415 | 25 | -199 | | B10 |
| 11 | 0 | 93 | 0 | -49 | 11 | 2 | 466 | 1 | 79 | | B11 |
| 12 | 1 | 101 | 6 | -21 | 12 | 1 | 508 | -11 | 309 | | B12 |
| 13 | 0 | 99 | 0 | -28 | 13 | 6 | 452 | 49 | 3 | | B13 |
| 14 | 1 | 98 | 6 | -32 | 14 | 2 | 444 | 1 | -41 | | B14 |
| 15 | 0 | 125 | 0 | 62 | 15 | 3 | 360 | 13 | -500 | | B15 |
| 16 | 0 | 101 | 0 | -21 | 16 | 6 | 425 | 49 | -145 | | B16 |
| 17 | 0 | 114 | 0 | 24 | 17 | 6 | 417 | 49 | -188 | | B17 |
| 18 | 0 | 84 | 0 | -80 | 18 | 5 | 404 | 37 | -259 | | B18 |
| 19 | 0 | 119 | 0 | 41 | 19 | 3 | 425 | 13 | -145 | | B19 |
| 20 | 1 | 116 | 6 | 31 | 20 | 5 | 394 | 37 | -314 | | B20 |
| 21 | 2 | 103 | 12 | -14 | 21 | 5 | 385 | 37 | -363 | | B21 |
| 22 | 0 | 120 | 0 | 45 | 22 | 1 | 354 | -11 | -532 | | B22 |
| 23 | 2 | 98 | 12 | -32 | 23 | 1 | 376 | -11 | -412 | | B23 |
| 24 | 0 | 109 | 0 | 7 | 24 | 7 | 386 | 62 | -358 | | B24 |
| 25 | 0 | 104 | 0 | -11 | 25 | 7 | 364 | 62 | -478 | | B25 |
| 26 | 0 | 115 | 0 | 27 | 26 | 3 | 265 | 13 | -1019 | | B26 |
| 27 | 0 | 104 | 0 | -11 | 27 | 1 | 258 | -11 | -1057 | | B27 |
| 28 | 0 | 89 | 0 | -63 | 28 | 4 | 303 | 25 | -811 | | B28 |
| 29 | 2 | 110 | 12 | 10 | 29 | 3 | 392 | 13 | -325 | | B29 |
| 30 | 1 | 110 | 6 | 10 | 30 | 4 | 362 | 25 | -489 | | B30 |
| 31 | | | | | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 17 | 135 |
| 43-93 | 94 | 417 |


Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

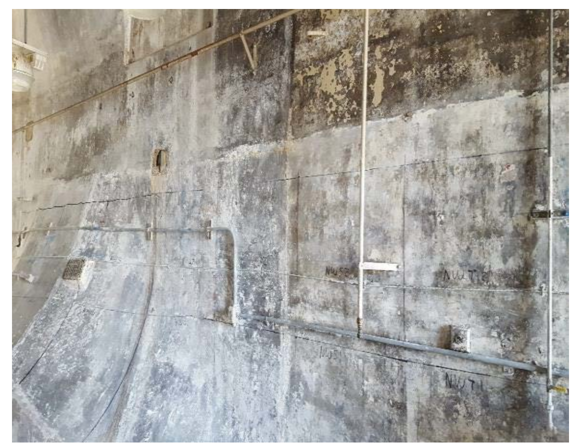
| Robins AFB Building 181 | HWP# 02-181 | CELL 5 NORTH LOWER WALL | Survey Unit & Type: 1 m2 grids | Page of 1 of 3 |
|---|---|---|---|---|
| | | FSS-1B | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | THOMAS HUNTER 12/19/17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 6 | 1092 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | PAUL FLETCHER 12/19/17 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 11 | 4684 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9911 | 10 | 0.5 |
| | Reviewed: CBP 12/19/17 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan with LM43-37; take a static and smear at center of each grid element

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 316 | -3 | -13 | 1 | 4 | 398 | 27 | -271 | 458 | NW A1 |
| 2 | 0 | 322 | -3 | -6 | 2 | 0 | 422 | -10 | -179 | 521 | NW A2 |
| 3 | 0 | 321 | -3 | -8 | 3 | 2 | 381 | 8 | -337 | 509 | NW B1 |
| 4 | 0 | 286 | -3 | -48 | 4 | 1 | 390 | -1 | -302 | 513 | NW B2 |
| 5 | 0 | 304 | -3 | -27 | 5 | 2 | 436 | 8 | -125 | 506 | NWC1 |
| 6 | 0 | 303 | -3 | -29 | 6 | 2 | 430 | 8 | -148 | 490 | NWC2 |
| 7 | 0 | 329 | -3 | 2 | 7 | 4 | 360 | 27 | -417 | 539 | NW D1 |
| 8 | 1 | 302 | -2 | -30 | 8 | 4 | 401 | 27 | -260 | 478 | NW D2 |
| 9 | 0 | 300 | -3 | -32 | 9 | 1 | 353 | -1 | -444 | 514 | NW E1 |
| 10 | 1 | 341 | -2 | 16 | 10 | 1 | 406 | -1 | -240 | 499 | NW E2 |
| 11 | 0 | 350 | -3 | 26 | 11 | 0 | 376 | -10 | -356 | 525 | NW F1 |
| 12 | 0 | 339 | -3 | 13 | 12 | 1 | 450 | -1 | -71 | 512 | NW F2 |
| 13 | 0 | 317 | -3 | -12 | 13 | 2 | 386 | 8 | -317 | 600 | NW G1 |
| 14 | 0 | 345 | -3 | 20 | 14 | 0 | 445 | -10 | -90 | 545 | NW G2 |
| 15 | 0 | 326 | -3 | -2 | 15 | 1 | 446 | -1 | -86 | 586 | NW H1 |
| 16 | 0 | 286 | -3 | -48 | 16 | 2 | 405 | 8 | -244 | 578 | NW H2 |
| 17 | 1 | 326 | -2 | -2 | 17 | 4 | 436 | 27 | -125 | 554 | NW I1 |
| 18 | 3 | 345 | 2 | 20 | 18 | 5 | 423 | 36 | -175 | 562 | NW I2 |
| 19 | 1 | 295 | -2 | -38 | 19 | 2 | 406 | 8 | -240 | 575 | NW J1 |
| 20 | 2 | 305 | 0 | -26 | 20 | 3 | 449 | 17 | -75 | 579 | NW J2 |
| 21 | 0 | 298 | -3 | -34 | 21 | 0 | 453 | -10 | -59 | 555 | NW K1 |
| 22 | 0 | 322 | -3 | -6 | 22 | 0 | 455 | -10 | -52 | 586 | NW K2 |
| 23 | 0 | 373 | -3 | 53 | 23 | 2 | 470 | 8 | 6 | 600 | NW L1 |
| 24 | 1 | 321 | -2 | -8 | 24 | 1 | 469 | -1 | 2 | 594 | NW L2 |
| 25 | 2 | 347 | 0 | 22 | 25 | 1 | 545 | -1 | 295 | 539 | NW M1 |
| 26 | 0 | 296 | -3 | -37 | 26 | 2 | 508 | 8 | 152 | 564 | NW M2 |
| 27 | 0 | 322 | -3 | -6 | 27 | 1 | 561 | -1 | 357 | 571 | NW N1 |
| 28 | 0 | 319 | -3 | -10 | 28 | 1 | 489 | -1 | 79 | 549 | NW N2 |
| 29 | 1 | 302 | -2 | -30 | 29 | 2 | 517 | 8 | 187 | 560 | NW O2 |
| 30 | 1 | 303 | -2 | -29 | 30 | 0 | 453 | -10 | -59 | 588 | NW O2 |
| 31 | 0 | 345 | -3 | 20 | 31 | 1 | 543 | -1 | 287 | 611 | NW P1 |
| 32 | 0 | 330 | -3 | 3 | 32 | 3 | 470 | 17 | 6 | 552 | NW P2 |
| 33 | 1 | 334 | -2 | 7 | 33 | 2 | 462 | 8 | -25 | 542 | NW Q1 |
| 34 | 0 | 310 | -3 | -20 | 34 | 0 | 452 | -10 | -63 | 598 | NW Q2 |
| 35 | 2 | 323 | 0 | -5 | 35 | 1 | 461 | -1 | -28 | 577 | NW R1 |
| 36 | 1 | 339 | -2 | 13 | 36 | 2 | 441 | 8 | -106 | 580 | NW R2 |
| 37 | 1 | 334 | -2 | 7 | 37 | 2 | 469 | 8 | 2 | 555 | NW S1 |
| 38 | 2 | 311 | 0 | -19 | 38 | 0 | 484 | -10 | 60 | 539 | NW S2 |

| Probe | αMDA | βMDA |
|---|---|---|
| 2929 | 15 | 82 |
| 43-93 | 61 | 299 |
| 43-37 | 80 | 742 |



Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 5 LOWER EAST WALL | Survey Unit & Type: 1 m2 grids | Page of 2 of 3 |
|---|---|---|---|---|
| | | FSS-1B | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | THOMAS HUNTER 12/21/17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 3 | 1118 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | PAUL FLETCHER 12/21/17 | 2360/43-89 | 310164 | 4/17/2018 | 43-89 | 125 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 9 | 4674 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 10547 | 10 | 0.5 |
| | Reviewed By: CBP 12/21/17 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan with LM43-37; take a static and a smear at center of each grid element

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 2 | 315 | 2 | -24 | 1 | 5 | 369 | 40 | -430 | 464 | A1 |
| 2 | 1 | 286 | 0 | -57 | 2 | 2 | 330 | 11 | -600 | 429 | A2 |
| 3 | 0 | 332 | -2 | -4 | 3 | 2 | 315 | 11 | -666 | 368 | B1 |
| 4 | 0 | 290 | -2 | -53 | 4 | 1 | 283 | 1 | -806 | 374 | B2 |
| 5 | 0 | 295 | -2 | -47 | 5 | 3 | 265 | 20 | -884 | 344 | C1 |
| 6 | 3 | 338 | 4 | 3 | 6 | 0 | 331 | -9 | -596 | 391 | C2 |
| 7 | 0 | 305 | -2 | -35 | 7 | 2 | 308 | 11 | -696 | 331 | D1 |
| 8 | 0 | 336 | -2 | 1 | 8 | 7 | 290 | 59 | -775 | 376 | D2 |
| 9 | 0 | 327 | -2 | -10 | 9 | 4 | 372 | 30 | -417 | 414 | E1 |
| 10 | 1 | 259 | 0 | -89 | 10 | 2 | 376 | 11 | -399 | 431 | E2 |
| 11 | 0 | 316 | -2 | -22 | 11 | 2 | 354 | 11 | -495 | 419 | F1 |
| 12 | 1 | 286 | 0 | -57 | 12 | 10 | 391 | 88 | -334 | 440 | F2 |
| 13 | | | | | 13 | | | | | | |
| 14 | | | | | 14 | | | | | | |
| 15 | | | | | 15 | | | | | | |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
| 18 | | | | | 18 | | | | | | |
| 19 | | | | | 19 | | | | | | |
| 20 | | | | | 20 | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
| 25 | | | | | 25 | | | | | | |
| 26 | | | | | 26 | | | | | | |
| 27 | | | | | 27 | | | | | | |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 13 | 83 |
| 43-89 | 61 | 339 |
| 43-37 | 80 | 765 |


Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

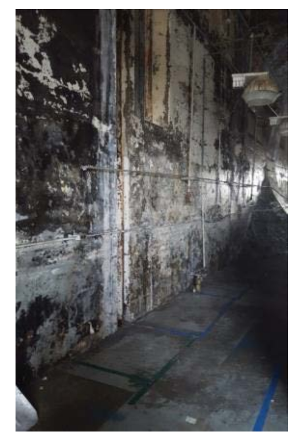
| Robins AFB Building 181 | HWP# 02-181 | CELL 5 N WALL AND S WALL Lower | Survey Unit & Type: 1 m2 grids | Page of 3 OF 3 |
|---|---|---|---|---|
| | | FSS-1B | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | THOMAS HUNTER 12/19/17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 6 | 1092 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | PAUL FLETCHER 12/19/17 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 11 | 4684 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9911 | 10 | 0.5 |
| | Reviewed By: CBP 12/19/17 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan with LM43-37; take a static and smear at center of each grid element

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 2 | 314 | 0 | -16 | 1 | 2 | 415 | 8 | -206 | 504 | NW T1 |
| 2 | 0 | 322 | -3 | -6 | 2 | 1 | 438 | -1 | -117 | 571 | N W T2 |
| 3 | 0 | 338 | -3 | 12 | 3 | 0 | 405 | -10 | -244 | 539 | NW U1 |
| 4 | 1 | 295 | -2 | -38 | 4 | 2 | 440 | 8 | -109 | 530 | N W U2 |
| 5 | 0 | 308 | -3 | -23 | 5 | 2 | 396 | 8 | -279 | 536 | NW V1 |
| 6 | 0 | 303 | -3 | -29 | 6 | 0 | 413 | -10 | -213 | 531 | NW V2 |
| 7 | 1 | 305 | -2 | -26 | 7 | 0 | 434 | -10 | -132 | 588 | N W W1 |
| 8 | 1 | 317 | -2 | -12 | 8 | 0 | 415 | -10 | -206 | 540 | N W W2 |
| 9 | 0 | 336 | -3 | 10 | 9 | 2 | 432 | 8 | -140 | 511 | N W X1 |
| 10 | 1 | 319 | -2 | -10 | 10 | 0 | 393 | -10 | -290 | 547 | N W X2 |
| 11 | 0 | 326 | -3 | -2 | 11 | 0 | 395 | -10 | -283 | 514 | N W Y1 |
| 12 | 3 | 316 | 2 | -13 | 12 | 3 | 430 | 17 | -148 | 532 | N W Y2 |
| 13 | 1 | 314 | -2 | -16 | 13 | 3 | 372 | 17 | -371 | 504 | N W Z1 |
| 14 | 0 | 362 | -3 | 40 | 14 | 2 | 388 | 8 | -310 | 516 | NW Z2 |
| 15 | 0 | 309 | -3 | -22 | 15 | 4 | 401 | 27 | -260 | 524 | NW AA1 |
| 16 | 1 | 351 | -2 | 27 | 16 | 6 | 442 | 45 | -102 | 492 | NW AA2 |
| 17 | 0 | 285 | -3 | -49 | 17 | 2 | 414 | 8 | -209 | 562 | NW BB1 |
| 18 | 1 | 299 | -2 | -33 | 18 | 1 | 399 | -1 | -267 | 524 | NW BB2 |
| 19 | | | | | 19 | | | | | | |
| 20 | | | | | 20 | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
| 25 | | | | | 25 | | | | | | |
| 26 | | | | | 26 | | | | | | |
| 27 | | | | | 27 | | | | | | |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 15 | 82 |
| 43-93 | 61 | 299 |
| 43-37 | 80 | 742 |



Signature: *Arthur Desrosiers CHP*

# Attachment 1

## Survey Unit FSS-2

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 5 Floor | Survey Unit & Type: 1 m2 grids | Page of 1 of 3 |
|---|---|---|---|---|
| | | FSS-2 | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 12/19/17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 6 | 1092 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 12/19/17 | 2360/43-89 | 310164 | 4/17/2018 | 43-89 | 125 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 9 | 5077 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 287606 | 11/17/2018 | 43-37 | 100 | PR278379 | 11/17/2018 | 0.3845 | 0.4517 | 1 | 9693 | 10 | 0.5 |
| | Reviewed: CBP 12-20-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan with LM43-37; take a static and a smear at center of each grid

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 265 | -2 | -73 | 1 | 1 | 449 | 1 | -256 | 455 | FA1 |
| 2 | 2 | 296 | 0 | -37 | 2 | 3 | 405 | 20 | -449 | 447 | FA2 |
| 3 | 1 | 289 | -2 | -45 | 3 | 6 | 416 | 49 | -401 | 424 | FA3 |
| 4 | 0 | 305 | -3 | -26 | 4 | 2 | 444 | 11 | -278 | 456 | FA4 |
| 5 | 0 | 338 | -3 | 12 | 5 | 1 | 505 | 1 | -12 | 471 | FA5 |
| 6 | 1 | 330 | -2 | 3 | 6 | 2 | 423 | 11 | -370 | 443 | FA6 |
| 7 | 2 | 305 | 0 | -26 | 7 | 0 | 471 | -9 | -160 | 485 | FB1 |
| 8 | 1 | 326 | -2 | -2 | 8 | 7 | 469 | 59 | -169 | 451 | FB2 |
| 9 | 0 | 353 | -3 | 29 | 9 | 4 | 439 | 30 | -300 | 499 | FB3 |
| 10 | 0 | 320 | -3 | -9 | 10 | 5 | 469 | 40 | -169 | 476 | FB4 |
| 11 | 1 | 315 | -2 | -15 | 11 | 1 | 464 | 1 | -191 | 461 | FB5 |
| 12 | 0 | 318 | -3 | -11 | 12 | 3 | 458 | 20 | -217 | 425 | FB6 |
| 13 | 0 | 301 | -3 | -31 | 13 | 4 | 428 | 30 | -348 | 496 | FC1 |
| 14 | 2 | 312 | 0 | -18 | 14 | 1 | 454 | 1 | -235 | 484 | FC2 |
| 15 | 0 | 318 | -3 | -11 | 15 | 2 | 453 | 11 | -239 | 509 | FC3 |
| 16 | 0 | 323 | -3 | -5 | 16 | 0 | 440 | -9 | -296 | 475 | FC4 |
| 17 | 0 | 324 | -3 | -4 | 17 | 1 | 468 | 1 | -173 | 427 | FC5 |
| 18 | 1 | 304 | -2 | -27 | 18 | 2 | 455 | 11 | -230 | 517 | FC6 |
| 19 | 0 | 296 | -3 | -37 | 19 | 0 | 450 | -9 | -252 | 471 | FD1 |
| 20 | 0 | 314 | -3 | -16 | 20 | 3 | 464 | 20 | -191 | 517 | FD2 |
| 21 | 0 | 329 | -3 | 2 | 21 | 3 | 425 | 20 | -361 | 469 | FD3 |
| 22 | 1 | 310 | -2 | -20 | 22 | 5 | 451 | 40 | -248 | 493 | FD4 |
| 23 | 0 | 337 | -3 | 11 | 23 | 0 | 403 | -9 | -457 | 482 | FD5 |
| 24 | 1 | 327 | -2 | -1 | 24 | 1 | 431 | 1 | -335 | 479 | FD6 |
| 25 | 0 | 328 | -3 | 0 | 25 | 2 | 438 | 11 | -305 | 490 | FE1 |
| 26 | 0 | 300 | -3 | -32 | 26 | 2 | 454 | 11 | -235 | 493 | FE2 |
| 27 | 0 | 293 | -3 | -40 | 27 | 1 | 485 | 1 | -99 | 474 | FE3 |
| 28 | 0 | 338 | -3 | 12 | 28 | 5 | 405 | 40 | -449 | 497 | FE4 |
| 29 | 0 | 298 | -3 | -34 | 29 | 2 | 465 | 11 | -187 | 460 | FE5 |
| 30 | 0 | 310 | -3 | -20 | 30 | 2 | 451 | 11 | -248 | 509 | FE6 |
| 31 | 0 | 303 | -3 | -29 | 31 | 0 | 458 | -9 | -217 | 452 | FF1 |
| 32 | 1 | 324 | -2 | -4 | 32 | 5 | 540 | 40 | 141 | 501 | FF2 |
| 33 | 0 | 327 | -3 | -1 | 33 | 1 | 465 | 1 | -187 | 532 | FF3 |
| 34 | 0 | 331 | -3 | 4 | 34 | 7 | 504 | 59 | -16 | 607 | FF4 |
| 35 | 0 | 306 | -3 | -25 | 35 | 3 | 570 | 20 | 272 | 531 | FF5 |
| 36 | 0 | 283 | -3 | -52 | 36 | 3 | 508 | 20 | 1 | 524 | FF6 |
| 37 | 1 | 331 | -2 | 4 | 37 | 3 | 444 | 20 | -278 | 467 | FG1 |
| 38 | 0 | 333 | -3 | 6 | 38 | 8 | 488 | 69 | -86 | 535 | FG2 |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 15 | 82 |
| 43-89 | 61 | 353 |
| 43-37 | 78 | 683 |



Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 5 FLOOR | Survey Unit & Type: 1 m2 grids | Page of 2 of 3 |
|---|---|---|---|---|
| | | FSS-2 | Fss scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 12/19/17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 6 | 1092 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 12/19/17 | 2360/43-89 | 310164 | 4/17/2018 | 43-89 | 125 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 9 | 5077 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 287606 | 11/17/2018 | 43-37 | 100 | PR278379 | 11/17/2018 | 0.3845 | 0.4517 | 1 | 9693 | 10 | 0.5 |
| | Reviewed: CBP 12-20-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Scan with LM43-37; take statics & smears at center of grids; note additional two rescans**

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 341 | -2 | 16 | 1 | 5 | 450 | 40 | -252 | 480 | FG3 |
| 2 | 1 | 351 | -2 | 27 | 2 | 8 | 483 | 69 | -108 | 526 | FG4 |
| 3 | 0 | 311 | -3 | -19 | 3 | 8 | 470 | 69 | -165 | 534 | FG5 |
| 4 | 2 | 330 | 0 | 3 | 4 | 3 | 451 | 20 | -248 | 493 | FG6 |
| 5 | 0 | 293 | -3 | -40 | 5 | 3 | 418 | 20 | -392 | 477 | FH1 |
| 6 | 0 | 296 | -3 | -37 | 6 | 4 | 502 | 30 | -25 | 494 | FH2 |
| 7 | 0 | 288 | -3 | -46 | 7 | 2 | 441 | 11 | -291 | 535 | FH3 |
| 8 | 2 | 343 | 0 | 18 | 8 | 3 | 500 | 20 | -34 | 520 | FH4 |
| 9 | 0 | 317 | -3 | -12 | 9 | 3 | 551 | 20 | 189 | 477 | FH5 |
| 10 | 0 | 287 | -3 | -47 | 10 | 2 | 416 | 11 | -401 | 475 | FH6 |
| 11 | 0 | 319 | -3 | -10 | 11 | 1 | 450 | 1 | -252 | 478 | FI1 |
| 12 | 1 | 297 | -2 | -35 | 12 | 2 | 425 | 11 | -361 | 492 | FI2 |
| 13 | 0 | 323 | -3 | -5 | 13 | 6 | 441 | 49 | -291 | 523 | FI3 |
| 14 | 0 | 330 | -3 | 3 | 14 | 6 | 431 | 49 | -335 | 534 | FI4 |
| 15 | 0 | 296 | -3 | -37 | 15 | 3 | 445 | 20 | -274 | 579 | FI5 |
| 16 | 0 | 318 | -3 | -11 | 16 | 4 | 397 | 30 | -484 | 464 | FI6 |
| 17 | 0 | 339 | -3 | 13 | 17 | 1 | 375 | 1 | -580 | 507 | FJ1 |
| 18 | 0 | 300 | -3 | -32 | 18 | 4 | 445 | 30 | -274 | 531 | FJ2 |
| 19 | 0 | 348 | -3 | 24 | 19 | 2 | 420 | 11 | -383 | 493 | FJ3 |
| 20 | 0 | 321 | -3 | -8 | 20 | 2 | 470 | 11 | -165 | 510 | FJ4 |
| 21 | 1 | 321 | -2 | -8 | 21 | 2 | 476 | 11 | -139 | 531 | FJ5 |
| 22 | 0 | 300 | -3 | -32 | 22 | 0 | 443 | -9 | -283 | 461 | FJ6 |
| 23 | 1 | 348 | -2 | 24 | 23 | 3 | 435 | 20 | -318 | 482 | FK1 |
| 24 | 1 | 348 | -2 | 24 | 24 | 4 | 437 | 30 | -309 | 532 | FK2 |
| 25 | 0 | 303 | -3 | -29 | 25 | 0 | 463 | -9 | -195 | 497 | FK3 |
| 26 | 0 | 264 | -3 | -74 | 26 | 5 | 428 | 40 | -348 | 447 | FK4 |
| 27 | 0 | 324 | -3 | -4 | 27 | 3 | 420 | 20 | -383 | 472 | FK5 |
| 28 | 0 | 279 | -3 | -56 | 28 | 5 | 446 | 40 | -270 | 529 | FK6 |
| 29 | 0 | 378 | -3 | 58 | 29 | 1 | 466 | 1 | -182 | 508 | FL1 |
| 30 | 0 | 348 | -3 | 24 | 30 | 2 | 427 | 11 | -353 | 510 | FL2 |
| 31 | 0 | 339 | -3 | 13 | 31 | 3 | 480 | 20 | -121 | 490 | FL3 |
| 32 | 0 | 285 | -3 | -49 | 32 | 1 | 425 | 1 | -361 | 479 | FL4 |
| 33 | 0 | 378 | -3 | 58 | 33 | 2 | 427 | 11 | -353 | 465 | FL5 |
| 34 | 2 | 297 | 0 | -35 | 34 | 9 | 437 | 78 | -309 | 522 | FL6 |
| 35 | 0 | 315 | -3 | -15 | 35 | 0 | 612 | -9 | 456 | Biased | FF4B |
| 36 | 0 | 342 | -3 | 17 | 36 | 5 | 580 | 40 | 316 | Biased | FI5B |
| 37 | 0 | 315 | -3 | -15 | 37 | 6 | 427 | 49 | -353 | 507 | FM2 |
| 38 | 0 | 315 | -3 | -15 | 38 | 3 | 440 | 20 | -296 | 472 | GM3 |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 15 | 82 |
| 43-89 | 61 | 353 |
| 43-37 | 78 | 683 |

Note: rescans were based on HPT's judgment.

FF4B surveyed by 43-89 - static and smear at highest point.
FI5B surveyed by 43-89 - static and smear at highest point.

Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

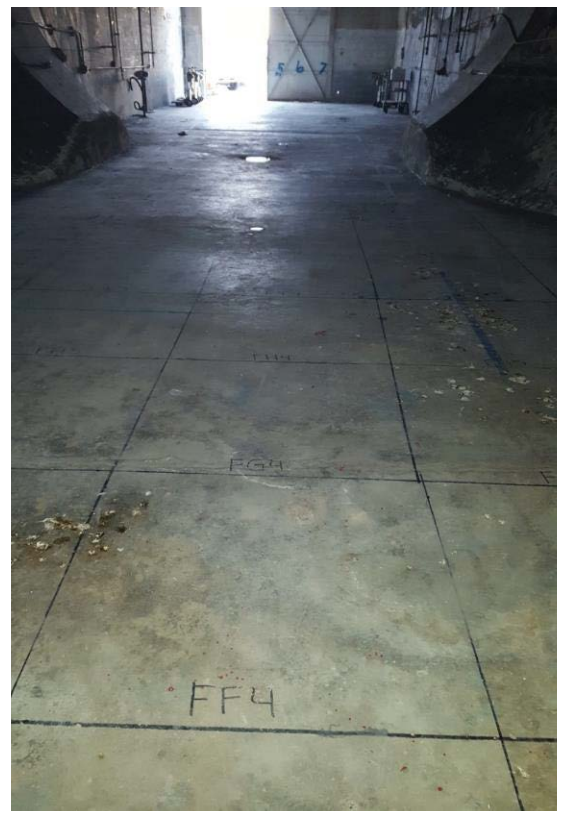
| Location: Robins AFB Building 181 | HWP# 02-181 | Cell 5 Floor | Survey Unit & Type: 1 m2 grids | Page of 3 of 3 |
|---|---|---|---|---|
| | | FSS-2 | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 12-19-17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 6 | 1092 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 12-19-17 | 2360/43-89 | 310164 | 4/17/2018 | 43-89 | 125 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 9 | 5077 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 287379 | 11/17/2018 | 43-37 | 100 | PR278379 | 11/17/2018 | 0.3845 | 0.4517 | 1 | 9693 | 10 | 0.5 |
| | Reviewed By: CBP 12-20-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Scan with LM43-37; take a static and a smear at center of each grid**

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 300 | -3 | -32 | 1 | 3 | 425 | 20 | -361 | 489 | FM4 |
| 2 | 0 | 312 | -3 | -18 | 2 | 6 | 457 | 49 | -222 | 526 | FM5 |
| 3 | 0 | 339 | -3 | 13 | 3 | 2 | 446 | 11 | -270 | 473 | FN2 |
| 4 | 0 | 338 | -3 | 12 | 4 | 0 | 468 | -9 | -173 | 511 | FN3 |
| 5 | 0 | 345 | -3 | 20 | 5 | 2 | 462 | 11 | -200 | 460 | FN4 |
| 6 | 0 | 297 | -3 | -35 | 6 | 3 | 422 | 20 | -374 | 456 | GN5 |
| 7 | 0 | 321 | -3 | -8 | 7 | 4 | 416 | 30 | -401 | 461 | F02 |
| 8 | 0 | 333 | -3 | 6 | 8 | 3 | 470 | 20 | -165 | 507 | FO3 |
| 9 | 1 | 345 | -2 | 20 | 9 | 2 | 501 | 11 | -29 | 526 | FO4 |
| 10 | 1 | 315 | -2 | -15 | 10 | 2 | 435 | 11 | -318 | 515 | FO5 |
| 11 | 1 | 330 | -2 | 3 | 11 | 2 | 449 | 11 | -256 | 529 | FP2 |
| 12 | 1 | 249 | -2 | -91 | 12 | 2 | 447 | 11 | -265 | 471 | FP3 |
| 13 | 2 | 318 | 0 | -11 | 13 | 2 | 441 | 11 | -291 | 510 | FP4 |
| 14 | 0 | 315 | -3 | -15 | 14 | 3 | 418 | 20 | -392 | 512 | FP5 |
| 15 | 1 | 333 | -2 | 6 | 15 | 4 | 472 | 30 | -156 | 564 | FT3 |
| 16 | 1 | 330 | -2 | 3 | 16 | 3 | 400 | 20 | -471 | 578 | FT5 |
| 17 | 0 | 363 | -3 | 41 | 17 | 4 | 440 | 30 | -296 | 509 | FV2 |
| 18 | 0 | 297 | -3 | -35 | 18 | 1 | 430 | 1 | -339 | 491 | FV4 |
| 19 | 0 | 243 | -3 | -98 | 19 | 5 | 523 | 40 | 67 | 580 | FY5 |
| 20 | 0 | 327 | -3 | -1 | 20 | 3 | 457 | 20 | -222 | 557 | FAA3 |
| 21 | 0 | 285 | -3 | -49 | 21 | 4 | 467 | 30 | -178 | 602 | FAA5 |
| 22 | 1 | 285 | -2 | -49 | 22 | 2 | 397 | 11 | -484 | 501 | FBB2 |
| 23 | 0 | 330 | -3 | 3 | 23 | 8 | 410 | 69 | -427 | 522 | FBB4 |
| 24 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 26 | | | | | | | | | | | |
| 27 | | | | | | | | | | | |
| 28 | | | | | | | | | | | |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 15 | 82 |
| 43-89 | 61 | 353 |
| 43-37 | 78 | 683 |




Signature: *Arthur Desrosiers CHP*

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 5 | Survey Unit & Type: Systematic grid | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-2 | FSS systematics | |

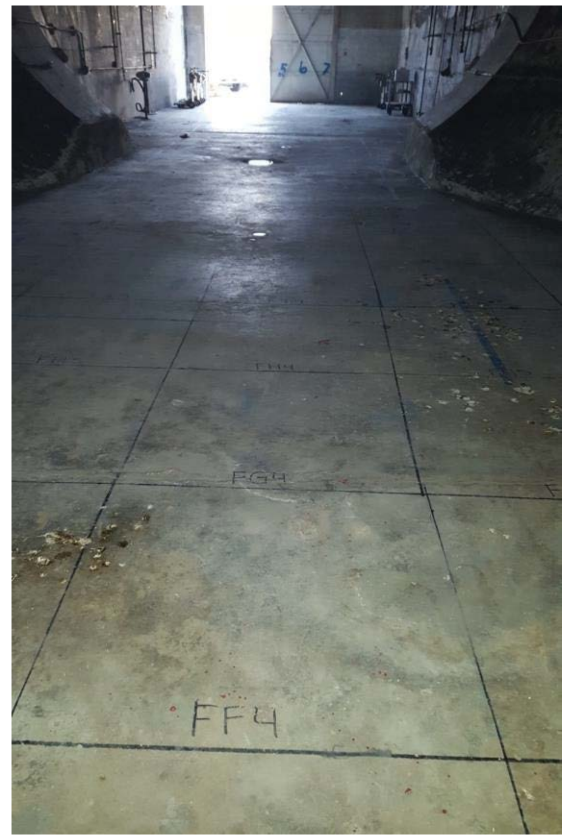
| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-24-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1041 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 28 | 5446 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-25-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

### FSS systematic statics and smears

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 98 | -2 | -21 | 1 | 4 | 485 | 12 | -294 | N/A | S1 |
| 2 | 0 | 110 | -2 | 21 | 2 | 7 | 475 | 43 | -343 | N/A | S2 |
| 3 | 0 | 106 | -2 | 7 | 3 | 2 | 545 | -8 | 2 | N/A | S3 |
| 4 | 0 | 110 | -2 | 21 | 4 | 2 | 448 | -8 | -476 | N/A | S4 |
| 5 | 0 | 90 | -2 | -49 | 5 | 1 | 447 | -18 | -481 | N/A | S5 |
| 6 | 0 | 113 | -2 | 31 | 6 | 5 | 520 | 23 | -121 | N/A | S6 |
| 7 | 0 | 82 | -2 | -77 | 7 | 3 | 491 | 2 | -264 | N/A | S7 |
| 8 | 0 | 106 | -2 | 7 | 8 | 5 | 502 | 23 | -210 | N/A | S8 |
| 9 | 0 | 113 | -2 | 31 | 9 | 2 | 479 | -8 | -323 | N/A | S9 |
| 10 | 1 | 99 | 3 | -18 | 10 | 6 | 531 | 33 | -67 | N/A | S10 |
| 11 | 0 | 107 | -2 | 10 | 11 | 1 | 508 | -18 | -180 | N/A | S11 |
| 12 | 2 | 109 | 9 | 17 | 12 | 4 | 510 | 12 | -170 | N/A | S12 |
| 13 | 0 | 99 | -2 | -18 | 13 | 1 | 544 | -18 | -3 | N/A | S13 |
| 14 | 0 | 98 | -2 | -21 | 14 | 5 | 505 | 23 | -195 | N/A | S14 |
| 15 | 0 | 87 | -2 | -59 | 15 | 4 | 463 | 12 | -402 | N/A | S15 |
| 16 | 1 | 108 | 3 | 14 | 16 | 3 | 545 | 2 | 2 | N/A | S16 |
| 17 | 0 | 123 | -2 | 66 | 17 | 3 | 407 | 2 | -678 | N/A | S17 |
| 18 | 0 | 107 | -2 | 10 | 18 | 2 | 528 | -8 | -82 | N/A | S18 |
| 19 | 1 | 93 | 3 | -39 | 19 | 6 | 655 | 33 | 544 | N/A | S19 |
| 20 | 0 | 96 | -2 | -28 | 20 | 5 | 524 | 23 | -101 | N/A | S20 |
| 21 | 0 | 128 | -2 | 83 | 21 | 4 | 536 | 12 | -42 | N/A | S21 |
| 22 | 0 | 105 | -2 | 3 | 22 | 3 | 509 | 2 | -175 | N/A | S22 |
| 23 | 0 | 107 | -2 | 10 | 23 | 2 | 486 | -8 | -289 | N/A | S23 |
| 24 | 0 | 101 | -2 | -11 | 24 | 3 | 536 | 2 | -42 | N/A | S24 |
| 25 | 1 | 113 | 3 | 31 | 25 | 7 | 637 | 43 | 455 | N/A | S25 |
| 26 | 1 | 109 | 3 | 17 | 26 | 2 | 533 | -8 | -57 | N/A | S26 |
| 27 | 0 | 102 | -2 | -7 | 27 | 1 | 493 | -18 | -254 | N/A | S27 |
| 28 | 1 | 116 | 3 | 41 | 28 | 4 | 520 | 12 | -121 | N/A | S28 |
| 29 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

Note: Debris was removed from the floor prior to performing static measurements or collecting smear samples.

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 30 | 133 |
| 43-89 | 90 | 411 |




Signature: *Arthur Desrosiers CHP*

# Attachment 1

# Survey Unit FSS-3A

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | CELL 5 LIGHTS | Survey Unit & Type: Systematic grid | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-3A | OVERHEAD HANGING LIGHTS | FSS systematics | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-26-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 1051 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 19 | 4515 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/26/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

### Scan 7 light fixtures; take a static & smear at highest scan locations

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | | Location # |
| 1 | 1 | 94 | 5 | -39 | 1 | 0 | 432 | -23 | -106 | LIGHTS | OVERHEAD |
| 2 | 0 | 95 | -1 | -35 | 2 | 2 | 421 | 1 | -167 | LIGHTS | OVERHEAD |
| 3 | 0 | 108 | -1 | 10 | 3 | 1 | 467 | -11 | 85 | LIGHTS | OVERHEAD |
| 4 | 0 | 109 | -1 | 14 | 4 | 2 | 382 | 1 | -380 | LIGHTS | OVERHEAD |
| 5 | 0 | 108 | -1 | 10 | 5 | 2 | 455 | 1 | 19 | LIGHTS | OVERHEAD |
| 6 | 2 | 122 | 10 | 59 | 6 | 2 | 384 | 1 | -369 | LIGHTS | OVERHEAD |
| 7 | 1 | 102 | 5 | -11 | 7 | 1 | 406 | -11 | -248 | LIGHTS | OVERHEAD |
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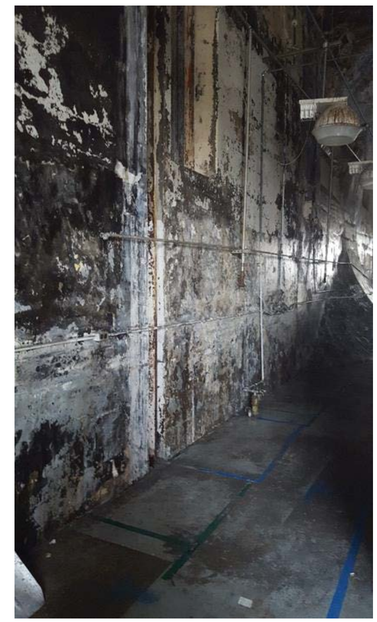
Note: the beta scan MDA of the LM43-93 is 1200 dpm/100 cm².

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 26 | 133 |
| 43-93 | 94 | 417 |



Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 5 Upper Walls | Survey Unit & Type: Class 3 | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-3A | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 12-20-17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 1074 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 12-20-17 | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 13 | 5531 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Reviewed By: CBP 12/21/17 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Scan 1 m2 with LM43-89 probe; take a static and a smear at highest reading in each m2**

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 2 | 330 | 1 | 9 | 1 | 1 | 476 | -3 | -380 | N/A | NUW Y1 |
| 2 | 0 | 327 | -3 | 6 | 2 | 0 | 427 | -13 | -621 | N/A | NUW Y2 |
| 3 | 2 | 302 | 1 | -23 | 3 | 2 | 464 | 7 | -439 | N/A | NUW V3 |
| 4 | 1 | 333 | -1 | 13 | 4 | 0 | 447 | -13 | -522 | N/A | NUW V4 |
| 5 | 1 | 325 | -1 | 3 | 5 | 1 | 453 | -3 | -493 | N/A | NUW S5 |
| 6 | 1 | 313 | -1 | -11 | 6 | 0 | 446 | -13 | -527 | N/A | NUW S6 |
| 7 | 0 | 322 | -3 | 0 | 7 | 4 | 496 | 28 | -281 | N/A | NUW J7 |
| 8 | 2 | 335 | 1 | 15 | 8 | 2 | 398 | 7 | -764 | N/A | NUW J8 |
| 9 | 1 | 328 | -1 | 7 | 9 | 1 | 465 | -3 | -434 | N/A | NUWF9 |
| 10 | 0 | 346 | -3 | 28 | 10 | 0 | 434 | -13 | -587 | N/A | NUW G10 |
| 11 | 2 | 320 | 1 | -3 | 11 | 2 | 465 | 7 | -434 | N/A | NUW C11 |
| 12 | 0 | 316 | -3 | -7 | 12 | 0 | 453 | -13 | -493 | N/A | NUW E12 |
| 13 | 1 | 302 | -1 | -23 | 13 | 1 | 446 | -3 | -527 | N/A | SUW D1 |
| 14 | 0 | 298 | -3 | -28 | 14 | 0 | 491 | -13 | -306 | N/A | SUW E2 |
| 15 | 0 | 310 | -3 | -14 | 15 | 2 | 401 | 7 | -749 | N/A | SUW G3 |
| 16 | 2 | 329 | 1 | 8 | 16 | 1 | 470 | -3 | -409 | N/A | SUW G4 |
| 17 | 1 | 336 | -1 | 16 | 17 | 1 | 467 | -3 | -424 | N/A | SUW J5 |
| 18 | 0 | 330 | -3 | 9 | 18 | 2 | 459 | 7 | -463 | N/A | SUW K6 |
| 19 | 0 | 291 | -3 | -36 | 19 | 0 | 462 | -13 | -449 | N/A | SUW R7 |
| 20 | 0 | 330 | -3 | 9 | 20 | 0 | 410 | -13 | -705 | N/A | SUW S8 |
| 21 | 0 | 286 | -3 | -42 | 21 | 1 | 410 | -3 | -705 | N/A | SUW U9 |
| 22 | 2 | 306 | 1 | -19 | 22 | 0 | 412 | -13 | -695 | N/A | SUW V10 |
| 23 | 0 | 325 | -3 | 3 | 23 | 1 | 416 | -3 | -675 | N/A | SUW X11 |
| 24 | 0 | 344 | -3 | 25 | 24 | 1 | 420 | -3 | -655 | N/A | SUW Y12 |
| 25 | | | | | | | | | | | |
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Note: the beta scan MDA of the LM43-89 is 1000 dpm/100 cm².

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 15 | 82 |
| 43-89 | 71 | 414 |

Upper walls were scanned with 43-89 probe


Signature: Arthur Desrosiers CHP

# Survey Unit FSS-3B

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 5 Ceiling | Survey Unit & Type: Class 3 | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-3B | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 12-20-17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 1074 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 12-20-17 | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 13 | 5531 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Reviewed By: CBP 12/21/17 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan judgmental 1m2 areas by 43-93 - statics and smears at highest point in each 1 m2

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 306 | -3 | -19 | 1 | 2 | 593 | 7 | 196 | N/A | CC3 |
| 2 | 3 | 310 | 3 | -14 | 2 | 3 | 591 | 17 | 187 | N/A | CD2 |
| 3 | 1 | 325 | -1 | 3 | 3 | 6 | 460 | 48 | -458 | N/A | CJ3 |
| 4 | 0 | 323 | -3 | 1 | 4 | 6 | 435 | 48 | -582 | N/A | CK3 |
| 5 | 1 | 288 | -1 | -40 | 5 | 0 | 446 | -13 | -527 | N/A | CN3 |
| 6 | 0 | 296 | -3 | -30 | 6 | 1 | 402 | -3 | -744 | N/A | CO3 |
| 7 | 0 | 316 | -3 | -7 | 7 | 0 | 519 | -13 | -168 | N/A | CR3 |
| 8 | 0 | 287 | -3 | -41 | 8 | 1 | 577 | -3 | 118 | N/A | CS3 |
| 9 | 2 | 373 | 1 | 59 | 9 | 2 | 482 | 7 | -350 | N/A | CU3 |
| 10 | 0 | 317 | -3 | -6 | 10 | 3 | 445 | 17 | -532 | N/A | CX3 |
| 11 | 1 | 318 | -1 | -5 | 11 | 5 | 454 | 38 | -488 | N/A | CY3 |
| 12 | 0 | 343 | -3 | 24 | 12 | 6 | 433 | 48 | -591 | N/A | CAA3 |
| 13 | 0 | 317 | -3 | -6 | 13 | 5 | 420 | 38 | -655 | N/A | CBB3 |
| 14 | 3 | 298 | 3 | -28 | 14 | 3 | 454 | 17 | -488 | N/A | CY1 |
| 15 | 1 | 315 | -1 | -8 | 15 | 1 | 443 | -3 | -542 | N/A | CZ1 |
| 16 | | | | | | | | | | | |
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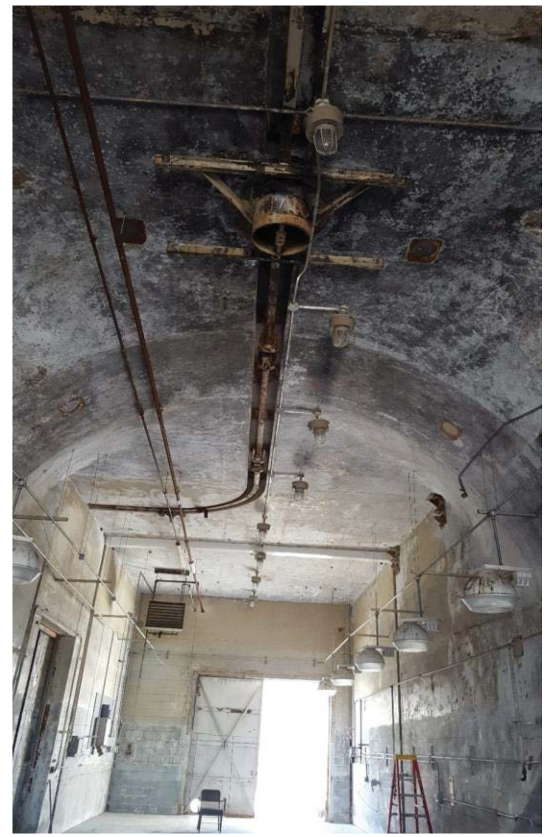
| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 15 | 82 |
| 43-89 | 71 | 414 |

Note: the beta scan MDA of the LM43-89 is 1000 dpm/100 cm².



Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 5 | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-3B | FSS systematic | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1/26/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 1051 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/1/7/18 | 0.4367 | 0.5194 | 19 | 4515 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/27/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

## CEILING SYSTEMATIC SURVEY - take a static and a smear at judmental locations

| | Smears | | | | | Direct Frisk | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | |
| No. | α | β | α | β | | α | β | α | β | Location # |
| 1 | 0 | 103 | -1 | -7 | 1 | 3 | 603 | 10 | 583 | C1 |
| 2 | 0 | 106 | -1 | 3 | 2 | 3 | 547 | 10 | 368 | C2 |
| 3 | 0 | 104 | -1 | -4 | 3 | 3 | 618 | 10 | 641 | C3 |
| 4 | 0 | 88 | -1 | -59 | 4 | 4 | 598 | 19 | 564 | C4 |
| 5 | 1 | 118 | 5 | 45 | 5 | 2 | 568 | 1 | 449 | C5 |
| 6 | 1 | 109 | 5 | 14 | 6 | 6 | 603 | 38 | 583 | C6 |
| 7 | 0 | 91 | -1 | -49 | 7 | 0 | 501 | -17 | 191 | C7 |
| 8 | 0 | 106 | -1 | 3 | 8 | 6 | 543 | 38 | 352 | C8 |
| 9 | 0 | 103 | -1 | -7 | 9 | 0 | 490 | -17 | 148 | C9 |
| 10 | 0 | 102 | -1 | -11 | 10 | 2 | 469 | 1 | 67 | C10 |
| 11 | 0 | 109 | -1 | 14 | 11 | 3 | 480 | 10 | 110 | C11 |
| 12 | 0 | 105 | -1 | 0 | 12 | 1 | 506 | -8 | 210 | C12 |
| 13 | 0 | 104 | -1 | -4 | 13 | 4 | 522 | 19 | 271 | C13 |
| 14 | 0 | 111 | -1 | 21 | 14 | 4 | 485 | 19 | 129 | C14 |
| 15 | 0 | 87 | -1 | -63 | 15 | 1 | 400 | -8 | -198 | C15 |
| 16 | 0 | 95 | -1 | -35 | 16 | 6 | 410 | 38 | -160 | UC1 |
| 17 | 0 | 108 | -1 | 10 | 17 | 5 | 369 | 28 | -318 | UC2 |
| 18 | 0 | 112 | -1 | 24 | 18 | 5 | 482 | 28 | 117 | UC3 |
| 19 | 0 | 104 | -1 | -4 | 19 | 3 | 442 | 10 | -37 | UC4 |
| 20 | 0 | 83 | -1 | -77 | 20 | 3 | 461 | 10 | 37 | UC5 |
| 21 | 0 | 114 | -1 | 31 | 21 | 4 | 402 | 19 | -191 | UC6 |
| 22 | 0 | 108 | -1 | 10 | 22 | 2 | 459 | 1 | 29 | UC7 |
| 23 | | | | | | | | | | |
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| 39 | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 26 | 133 |
| 43-93 | 71 | 294 |

Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FSS-4

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 INSIDE BATHROOM AREA | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS 4 | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1/8/18 | 2929 | 185266 | 12/6/2018 | 43-10-1 | 100 | PR194717 | 12/6/2018 | 0.6992 | 0.5514 | 9 | 972 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Thomas Hunter 1/8/18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 8 | 4702 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9572 | 10 | 0.5 |
| | Reviewed CBP 1-9-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Scan with LM43-37 - take a static and a smear at center of each grid element**

| No. | Smears Gross Counts α | Smears Gross Counts β | Smears DPM/100cm² α | Smears DPM/100cm² β | | Direct Frisk Gross Counts α | Direct Frisk Gross Counts β | Direct Frisk DPM/100cm² α | Direct Frisk DPM/100cm² β | 43-37 Scan 1 m² 30 Sec. Count | Location # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 276 | -5 | -19 | 1 | 4 | 457 | 29 | -51 | 490 | FA 1 |
| 2 | 3 | 234 | 1 | -70 | 2 | 13 | 642 | 112 | 662 | 726 | FA 2 |
| 3 | 0 | 297 | -5 | 7 | 3 | 22 | 642 | 194 | 662 | 784 | FA 3 |
| 4 | 1 | 300 | -3 | 10 | 4 | 2 | 584 | 11 | 438 | 706 | FB 1 |
| 5 | 0 | 297 | -5 | 7 | 5 | 22 | 615 | 194 | 558 | 720 | FB 2 |
| 6 | 1 | 309 | -3 | 21 | 6 | 17 | 670 | 148 | 769 | 773 | FB 3 |
| 7 | 2 | 321 | -1 | 36 | 7 | 5 | 597 | 38 | 488 | 690 | FC1 |
| 8 | 0 | 255 | -5 | -44 | 8 | 14 | 576 | 121 | 407 | 711 | FC2 |
| 9 | 1 | 291 | -3 | -1 | 9 | 14 | 667 | 121 | 758 | 724 | FC3 |
| 10 | 0 | 288 | -5 | -4 | 10 | 2 | 427 | 11 | -166 | N/A | SHOWER DRAIN |
| 11 | | | | | 11 | | | | | | |
| 12 | | | | | 12 | | | | | | |
| 13 | | | | | 13 | | | | | | |
| 14 | | | | | 14 | | | | | | |
| 15 | | | | | 15 | | | | | | |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
| 18 | | | | | 18 | | | | | | |
| 19 | Rescan with LM43-93 - take one static and one smear at highest spot | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | 21 | 330 | 35 | 46 | 21 | 20 | 607 | 176 | 527 | N/A | FA 2 |
| 22 | 0 | 285 | -5 | -8 | 22 | 19 | 655 | 167 | 712 | N/A | FA 3 |
| 23 | 0 | 321 | -5 | 36 | 23 | 16 | 606 | 139 | 523 | N/A | FB 1 |
| 24 | 0 | 300 | -5 | 10 | 24 | 10 | 616 | 84 | 561 | N/A | FB 2 |
| 25 | 0 | 321 | -5 | 36 | 25 | 15 | 679 | 130 | 804 | N/A | FB 3 |
| 26 | 0 | 309 | -5 | 21 | 26 | 1 | 577 | 2 | 411 | N/A | FC1 |
| 27 | 0 | 312 | -5 | 25 | 27 | 16 | 733 | 139 | 1012 | N/A | FC2 |
| 28 | 0 | 300 | -5 | 10 | 28 | 20 | 663 | 176 | 742 | N/A | FC3 |
| 29 | | | | | | | | | | | |
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| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 17 | 81 |
| 43-93 | 56 | 299 |
| 43-37 | 80 | 730 |

Signed: Arthur Desrosiers CHP

# Attachment 1

Radiological Survey Form | Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6B1 EAST SLAB | Survey Unit & Type: 1 M2 GRIDS | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-4 | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-22-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 940 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-22-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 7 | 4577 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-23-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

SLAB SCANNED OVER ENTIRE SURFACE AREA WITH 43-93

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 3 | 258 | 3 | -28 | 1 | 7 | 660 | 76 | 1105 | N/A | A1 |
| 2 | 3 | 345 | 3 | 73 | 2 | 3 | 664 | 28 | 1127 | N/A | A2 |
| 3 | | | | | 3 | | | | | | |
| 4 | | | | | 4 | | | | | | |
| 5 | | | | | 5 | | | | | | |
| 6 | | | | | 6 | | | | | | |
| 7 | | | | | 7 | | | | | | |
| 8 | | | | | 8 | | | | | | |
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| 13 | | | | | 13 | | | | | | |
| 14 | | | | | 14 | | | | | | |
| 15 | | | | | 15 | | | | | | |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
| 18 | | | | | 18 | | | | | | |
| 19 | | | | | 19 | | | | | | |
| 20 | | | | | 20 | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
| 25 | | | | | 25 | | | | | | |
| 26 | | | | | 26 | | | | | | |
| 27 | | | | | 27 | | | | | | |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

Survey of concrete slab in foyer of exit

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 14 | 76 |
| 43-93 | 71 | 419 |


Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6B1 Floor | Survey Unit & Type: 1 m2 grids | Page of 1A of 2 |
|---|---|---|---|---|
| | | FSS-4 | Cell 6B1 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1/17/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 3 | 1057 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-17-18 | 2360/43-93 | 274959 | ######## | 43-93 | 100 | PR293983 | ######## | 0.4367 | 0.5194 | 17 | 4320 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 287606 | ######## | 43-37 | 100 | PR278379 | ######## | 0.3845 | 0.4517 | 43 | 9031 | 10 | 0.5 |
| | Review: CBP 1/24/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Rescan with an LM43-93 - take a direct frisk and a smear at highest spots**

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 356 | -2 | 45 | 1 | 3 | 528 | 12 | 370 | 606 | A1 |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | 1 | 281 | 0 | -42 | 4 | 3 | 232 | 12 | -770 | 637 | A4 |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | 0 | 264 | -2 | -62 | 11 | 3 | 474 | 12 | 162 | 615 | B5 |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | 0 | 243 | -2 | -86 | 14 | 1 | 544 | -6 | 431 | 634 | C2 |
| 15 | 0 | 300 | -2 | -20 | 15 | 1 | 589 | -6 | 605 | 680 | C3 |
| 16 | 0 | 327 | -2 | 11 | 16 | 3 | 484 | 12 | 200 | 687 | C4 |
| 17 | 1 | 288 | 0 | -34 | 17 | 4 | 552 | 21 | 462 | 618 | C5 |
| 18 | | | | | | | | | | | |
| 19 | 0 | 297 | -2 | -23 | 19 | 6 | 538 | 39 | 408 | 672 | D1 |
| 20 | 0 | 294 | -2 | -27 | 20 | 3 | 477 | 12 | 173 | 631 | D2 |
| 21 | 0 | 297 | -2 | -23 | 21 | 1 | 497 | -6 | 250 | 622 | D3 |
| 22 | 0 | 273 | -2 | -51 | 22 | 6 | 508 | 39 | 293 | 627 | D4 |
| 23 | 0 | 264 | -2 | -62 | 23 | 2 | 489 | 3 | 219 | 624 | D5 |
| 24 | | | | | | | | | | | |
| 25 | 0 | 225 | -2 | -107 | 25 | 4 | 548 | 21 | 447 | 598 | E1 |
| 26 | 1 | 258 | 0 | -69 | 26 | 3 | 563 | 12 | 504 | 651 | E2 |
| 27 | 0 | 294 | -2 | -27 | 27 | 2 | 534 | 3 | 393 | 644 | E3 |
| 28 | 0 | 294 | -2 | -27 | 28 | 1 | 530 | -6 | 377 | 623 | E4 |
| 29 | 2 | 231 | 2 | -100 | 29 | 6 | 527 | 39 | 366 | 621 | E5 |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| 32 | 0 | 324 | -2 | 8 | 32 | 1 | 544 | -6 | 431 | 632 | F2 |
| 33 | 1 | 315 | 0 | -2 | 33 | 3 | 532 | 12 | 385 | 635 | F3 |
| 34 | | | | | | | | | | | |
| 35 | 0 | 339 | -2 | 25 | 35 | 5 | 525 | 30 | 358 | 616 | F5 |
| 36 | 0 | 285 | -2 | -37 | 36 | 4 | 502 | 21 | 270 | 597 | F6 |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | 0 | 327 | -2 | 11 | 39 | 3 | 520 | 12 | 339 | 621 | G3 |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 13 | 81 |
| 43-93 | 69 | 288 |
| 43-37 | 165 | 661 |


Signed Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6B1 Floor | Survey Unit & Type: 1 m2 grids | Page of 1A of 2 |
|---|---|---|---|---|
| | | FSS-4 | Cell 6B1 | |

| Comments | Surveyed By: / Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1/17/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 3 | 1057 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-17-18 | 2360/43-93 | 274959 | ######## | 43-93 | 100 | PR293983 | ######## | 0.4367 | 0.5194 | 17 | 4320 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 287606 | ######## | 43-37 | 100 | PR278379 | ######## | 0.3845 | 0.4517 | 43 | 9031 | 10 | 0.5 |
| | Review: CBP 1/24/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Rescan with an LM43-93 - take a direct frisk and a smear at highest spots

| No. | Smears Gross Counts α | Smears Gross Counts β | Smears DPM/100cm² α | Smears DPM/100cm² β | | Direct Frisk Gross Counts α | Direct Frisk Gross Counts β | Direct Frisk DPM/100cm² α | Direct Frisk DPM/100cm² β | 43-37 Scan 1 m² 30 Sec. Count | Location # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 356 | -2 | 45 | 1 | 3 | 528 | 12 | 370 | 606 | A1 |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | 1 | 281 | 0 | -42 | 4 | 3 | 232 | 12 | -770 | 637 | A4 |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | 0 | 264 | -2 | -62 | 11 | 3 | 474 | 12 | 162 | 615 | B5 |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | 0 | 243 | -2 | -86 | 14 | 1 | 544 | -6 | 431 | 634 | C2 |
| 15 | 0 | 300 | -2 | -20 | 15 | 1 | 589 | -6 | 605 | 680 | C3 |
| 16 | 0 | 327 | -2 | 11 | 16 | 3 | 484 | 12 | 200 | 687 | C4 |
| 17 | 1 | 288 | 0 | -34 | 17 | 4 | 552 | 21 | 462 | 618 | C5 |
| 18 | | | | | | | | | | | |
| 19 | 0 | 297 | -2 | -23 | 19 | 6 | 538 | 39 | 408 | 672 | D1 |
| 20 | 0 | 294 | -2 | -27 | 20 | 3 | 477 | 12 | 173 | 631 | D2 |
| 21 | 0 | 297 | -2 | -23 | 21 | 1 | 497 | -6 | 250 | 622 | D3 |
| 22 | 0 | 273 | -2 | -51 | 22 | 6 | 508 | 39 | 293 | 627 | D4 |
| 23 | 0 | 264 | -2 | -62 | 23 | 2 | 489 | 3 | 219 | 624 | D5 |
| 24 | | | | | | | | | | | |
| 25 | 0 | 225 | -2 | -107 | 25 | 4 | 548 | 21 | 447 | 598 | E1 |
| 26 | 1 | 258 | 0 | -69 | 26 | 3 | 563 | 12 | 504 | 651 | E2 |
| 27 | 0 | 294 | -2 | -27 | 27 | 2 | 534 | 3 | 393 | 644 | E3 |
| 28 | 0 | 294 | -2 | -27 | 28 | 1 | 530 | -6 | 377 | 623 | E4 |
| 29 | 2 | 231 | 2 | -100 | 29 | 6 | 527 | 39 | 366 | 621 | E5 |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| 32 | 0 | 324 | -2 | 8 | 32 | 1 | 544 | -6 | 431 | 632 | F2 |
| 33 | 1 | 315 | 0 | -2 | 33 | 3 | 532 | 12 | 385 | 635 | F3 |
| 34 | | | | | | | | | | | |
| 35 | 0 | 339 | -2 | 25 | 35 | 5 | 525 | 30 | 358 | 616 | F5 |
| 36 | 0 | 285 | -2 | -37 | 36 | 4 | 502 | 21 | 270 | 597 | F6 |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | 0 | 327 | -2 | 11 | 39 | 3 | 520 | 12 | 339 | 621 | G3 |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 13 | 81 |
| 43-93 | 69 | 288 |
| 43-37 | 165 | 661 |


Signed Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6B1 Floor | Survey Unit & Type: 1 m2 grids | Page of 2A of 2 |
|---|---|---|---|---|
| | | FSS-4 | Cell 6B1 | |

| Comments | Surveyed By: | Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter | 1/17/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 3 | 1057 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher | 1-17-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 17 | 4320 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | 2360/43-37 | 287606 | 11/17/2018 | 43-37 | 100 | PR278379 | 11/17/2018 | 0.3845 | 0.4517 | 43 | 9031 | 10 | 0.5 |
| | Review: CBP | 1/17/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | | #N/A | #N/A | | | | |

Rescan with LM43-93 - take a direct frisk and a smear at highest spots

| | Smears at Highest Spot | | | | | Direct Frisk Highest Spot | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | 0 | 300 | -2 | -20 | 4 | 2 | 475 | 3 | 166 | 600 | H1 |
| 5 | 0 | 297 | -2 | -23 | 5 | 5 | 526 | 30 | 362 | 634 | H2 |
| 6 | 0 | 324 | -2 | 8 | 6 | 1 | 547 | -6 | 443 | 673 | H3 |
| 7 | 0 | 282 | -2 | -41 | 7 | 3 | 559 | 12 | 489 | 632 | H4 |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | 0 | 246 | -2 | -82 | 10 | 5 | 532 | 30 | 385 | 621 | I3 |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | 0 | 301 | -2 | -19 | 19 | 1 | 499 | -6 | 258 | 677 | K5 |
| 20 | | | | | | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
| 25 | | | | | 25 | | | | | | |
| 26 | | | | | 26 | | | | | | |
| 27 | | | | | 27 | | | | | | |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 13 | 81 |
| 43-93 | 69 | 288 |
| 43-37 | 165 | 661 |

Signed: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6B1 Floor | Survey Unit & Type: 1 m2 grids | Page of 2 of 2 |
|---|---|---|---|---|
| | | FSS-4 | Cell 6B1 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1/17/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 3 | 1057 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-17-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 17 | 4320 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 287606 | 11/17/2018 | 43-37 | 100 | PR278379 | 11/17/2018 | 0.3845 | 0.4517 | 43 | 9031 | 10 | 0.5 |
| | Review: CBP 1/17/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Scan 100% - take a direct frisk and a smeaar at center of each grid - rescan as required**

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 261 | -2 | -65 | 1 | 7 | 615 | 49 | 705 | 592 | G4 |
| 2 | 0 | 270 | -2 | -55 | 2 | 2 | 486 | 3 | 208 | 591 | G5 |
| 3 | 0 | 240 | -2 | -89 | 3 | 6 | 477 | 39 | 173 | 537 | G6 |
| 4 | 0 | 258 | -2 | -69 | 4 | 2 | 521 | 3 | 343 | 600 | H1 |
| 5 | 0 | 273 | -2 | -51 | 5 | 1 | 539 | -6 | 412 | 634 | H2 |
| 6 | 1 | 300 | 0 | -20 | 6 | 3 | 536 | 12 | 400 | 673 | H3 |
| 7 | 1 | 294 | 0 | -27 | 7 | 3 | 556 | 12 | 477 | 632 | H4 |
| 8 | 1 | 285 | 0 | -37 | 8 | 4 | 503 | 21 | 273 | 554 | H5 |
| 9 | 1 | 264 | 0 | -62 | 9 | 2 | 472 | 3 | 154 | 584 | H6 |
| 10 | 0 | 360 | -2 | 50 | 10 | 3 | 553 | 12 | 466 | 621 | I3 |
| 11 | 1 | 315 | 0 | -2 | 11 | 3 | 529 | 12 | 374 | 575 | I4 |
| 12 | 1 | 300 | 0 | -20 | 12 | 2 | 572 | 3 | 539 | 577 | I5 |
| 13 | 1 | 276 | 0 | -48 | 13 | 1 | 489 | -6 | 219 | 558 | I6 |
| 14 | 1 | 301 | 0 | -19 | 14 | 2 | 494 | 3 | 239 | 574 | J3 |
| 15 | 0 | 321 | -2 | 5 | 15 | 4 | 490 | 21 | 223 | 596 | J4 |
| 16 | 0 | 267 | -2 | -58 | 16 | 2 | 517 | 3 | 327 | 542 | J5 |
| 17 | 1 | 309 | 0 | -9 | 17 | 2 | 499 | 3 | 258 | 565 | J6 |
| 18 | 0 | 297 | -2 | -23 | 18 | 7 | 516 | 49 | 323 | 568 | K4 |
| 19 | 0 | 273 | -2 | -51 | 19 | 3 | 559 | 12 | 489 | 677 | K5 |
| 20 | 0 | 315 | -2 | -2 | 20 | 3 | 506 | 12 | 285 | 549 | K6 |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
| 25 | | | | | 25 | | | | | | |
| 26 | | | | | 26 | | | | | | |
| 27 | | | | | 27 | | | | | | |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 13 | 81 |
| 43-93 | 69 | 288 |
| 43-37 | 165 | 661 |

Signed Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6B1 Floor | Survey Unit & Type: Systematic survey | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS- 4 | | FSS systematics | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-23-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 940 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-23-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 13 | 4696 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-24-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 117 | 3 | 80 | 1 | 3 | 464 | 21 | -31 | | S1 |
| 2 | 0 | 102 | -2 | 28 | 2 | 4 | 518 | 33 | 264 | | S2 |
| 3 | 0 | 101 | -2 | 24 | 3 | 2 | 475 | 8 | 29 | | S3 |
| 4 | 0 | 114 | -2 | 70 | 4 | 3 | 531 | 21 | 335 | | S4 |
| 5 | 1 | 113 | 3 | 66 | 5 | 3 | 478 | 21 | 46 | | S5 |
| 6 | 0 | 116 | -2 | 77 | 6 | 1 | 547 | -4 | 423 | | S6 |
| 7 | 0 | 113 | -2 | 66 | 7 | 4 | 481 | 33 | 62 | | S7 |
| 8 | 0 | 112 | -2 | 63 | 8 | 0 | 552 | -16 | 450 | | S8 |
| 9 | 2 | 112 | 9 | 63 | 9 | 1 | 492 | -4 | 122 | | S9 |
| 10 | 0 | 94 | -2 | 0 | 10 | 6 | 556 | 57 | 472 | | S10 |
| 11 | 1 | 106 | 3 | 42 | 11 | 0 | 526 | -16 | 308 | | S11 |
| 12 | 0 | 91 | -2 | -10 | 12 | 1 | 507 | -4 | 204 | | S12 |
| 13 | 1 | 108 | 3 | 49 | 13 | 15 | 478 | 165 | 46 | | S13 |
| 14 | 0 | 99 | -2 | 17 | 14 | 1 | 566 | -4 | 526 | | S14 |
| 15 | 0 | 118 | -2 | 83 | 15 | 1 | 468 | -4 | -9 | | S15 |
| 16 | 0 | 99 | -2 | 17 | 16 | 1 | 536 | -4 | 363 | | S16 |
| 17 | 0 | 112 | -2 | 63 | 17 | 2 | 525 | 8 | 303 | | S17 |
| 18 | 2 | 99 | 9 | 17 | 18 | 0 | 474 | -16 | 24 | | S18 |
| 19 | 1 | 100 | 3 | 21 | 19 | 6 | 475 | 57 | 29 | | S19 |
| 20 | 1 | 108 | 3 | 49 | 20 | 3 | 525 | 21 | 303 | | S20 |
| 21 | 0 | 105 | -2 | 38 | 21 | 13 | 583 | 141 | 619 | | S21 |
| 22 | 0 | 86 | -2 | -28 | 22 | 1 | 591 | -4 | 663 | | S22 |
| 23 | 0 | 98 | -2 | 14 | 23 | 3 | 504 | 21 | 188 | | S23 |
| 24 | 0 | 91 | -2 | -10 | 24 | 1 | 467 | -4 | -14 | | S24 |
| 25 | 0 | 119 | -2 | 87 | 25 | 4 | 529 | 33 | 324 | | S25 |
| 26 | | | | | 26 | | | | | | |
| 27 | | | | | 27 | | | | | | |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 127 |
| 43-93 | 84 | 425 |


Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FSS-5

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 EAST WALL LOWER | Survey Unit & Type: 1 m2 grids | Page of 1 of |
|---|---|---|---|---|
| | FSS-5 | | FSS scan | |

| Comments | Surveyed By: / Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% α; 50% β | Paul Fletcher 1-8-18 | 2929 | 185266 | 12/6/2018 | 43-10-1 | 100 | PR194717 | 12/6/2018 | 0.6992 | 0.5514 | 9 | 972 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Thomas Hunter 1-8-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 8 | 4702 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9572 | 10 | 0.5 |
| | Reviewed By: CBP 1-9-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 288 | -3 | -4 | 1 | 7 | 401 | 57 | -266 | 492 | A1 |
| 2 | 2 | 288 | -1 | -4 | 2 | 5 | 348 | 38 | -471 | 424 | A2 |
| 3 | 1 | 312 | -3 | 25 | 3 | 3 | 363 | 20 | -413 | 514 | B1 |
| 4 | 2 | 300 | -1 | 10 | 4 | 9 | 350 | 75 | -463 | 420 | B2 |
| 5 | 1 | 258 | -3 | -41 | 5 | 3 | 347 | 20 | -474 | 498 | C1 |
| 6 | 0 | 312 | -5 | 25 | 6 | 5 | 398 | 38 | -278 | 429 | C2 |
| 7 | 1 | 258 | -3 | -41 | 7 | 6 | 341 | 48 | -497 | 509 | D1 |
| 8 | 0 | 312 | -5 | 25 | 8 | 5 | 347 | 38 | -474 | 478 | D2 |
| 9 | 1 | 267 | -3 | -30 | 9 | 2 | 357 | 11 | -436 | 409 | E1 |
| 10 | 1 | 318 | -3 | 32 | 10 | 2 | 385 | 11 | -328 | 474 | E2 |
| 11 | 1 | 249 | -3 | -52 | 11 | 3 | 349 | 20 | -467 | 488 | F1 |
| 12 | 1 | 297 | -3 | 7 | 12 | 6 | 351 | 48 | -459 | 445 | F2 |
| 13 | | | | | 13 | | | | | | |
| 14 | | | | | 14 | | | | | | |
| 15 | | | | | 15 | | | | | | |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
| 18 | | | | | 18 | | | | | | |
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| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
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| 34 | | | | | 34 | | | | | | |
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| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 17 | 81 |
| 43-93 | 56 | 299 |
| 43-37 | 80 | 730 |


Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: 6B1 LOWER NORTH WALLS | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS - 5 | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1-8-18 | 2929 | 185266 | 12/6/2018 | 43-10-1 | 100 | PR194717 | 12/6/2018 | 0.6992 | 0.5514 | 9 | 972 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Thomas Huntr 1-8-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 8 | 4702 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9572 | 10 | 0.5 |
| | Reviewed By: CBP 1-31-18 | 2929 | 185266 | 12/6/2018 | 43-10-1 | 100 | PR194717 | 12/6/2018 | 0.6992 | 0.5514 | 4 | 1135 | 10 | 3 |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 282 | -5 | -12 | 1 | 5 | 369 | 38 | -390 | 441 | A1 |
| 2 | 2 | 324 | -1 | 39 | 2 | 3 | 351 | 20 | -459 | 437 | A2 |
| 3 | 0 | 270 | -5 | -26 | 3 | 6 | 377 | 48 | -359 | 534 | B1 |
| 4 | 0 | 348 | -5 | 68 | 4 | 4 | 405 | 29 | -251 | 779 | B2 |
| 5 | 0 | 369 | -5 | 94 | 5 | 4 | 375 | 29 | -367 | 506 | C1 |
| 6 | 0 | 330 | -5 | 46 | 6 | 6 | 395 | 48 | -290 | 519 | C2 |
| 7 | 0 | 303 | -5 | 14 | 7 | 4 | 393 | 29 | -297 | 475 | D1 |
| 8 | 0 | 276 | -5 | -19 | 8 | 4 | 404 | 29 | -255 | 492 | D2 |
| 9 | 0 | 249 | -5 | -52 | 9 | 9 | 371 | 75 | -382 | 479 | E1 |
| 10 | 1 | 309 | -3 | 21 | 10 | 6 | 387 | 48 | -320 | 505 | E2 |
| 11 | 0 | 267 | -5 | -30 | 11 | 7 | 370 | 57 | -386 | 498 | F1 |
| 12 | 0 | 333 | -5 | 50 | 12 | 3 | 386 | 20 | -324 | 509 | F2 |
| 13 | 0 | 282 | -5 | -12 | 13 | 2 | 348 | 11 | -471 | 471 | G1 |
| 14 | 0 | 330 | -5 | 46 | 14 | 1 | 414 | 2 | -216 | 528 | G2 |
| 15 | 0 | 282 | -5 | -12 | 15 | 5 | 389 | 38 | -313 | 501 | H1 |
| 16 | 1 | 282 | -3 | -12 | 16 | 2 | 426 | 11 | -170 | 480 | H2 |
| 17 | 0 | 261 | -5 | -37 | 17 | 2 | 383 | 11 | -336 | 524 | I1 |
| 18 | 1 | 321 | -3 | 36 | 18 | 7 | 387 | 57 | -320 | 462 | I2 |
| 19 | 1 | 291 | -3 | -1 | 19 | 6 | 385 | 48 | -328 | 441 | J1 |
| 20 | 1 | 285 | -3 | -8 | 20 | 5 | 383 | 38 | -336 | 456 | J2 |
| 21 | 2 | 317 | -1 | 31 | 21 | 4 | 409 | 29 | -236 | N/A | B2 biased |
| 22 | | | | | | | | | | | |
| 23 | | | | | | | | | | | |
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| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

**Rescans** **Smears** **Directs**

| | | | Smears α | Smears β | Directs α | Directs β | | |
|---|---|---|---|---|---|---|---|---|

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 17 | 81 |
| 43-93 | 56 | 299 |
| 43-37 | 80 | 730 |
| 2929 | 14 | 87 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6B1 South Lower Walls | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-5 | | FSS scan | |

| Comments | Surveyed By: | Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter | 1-22-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1041 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher | 1-22-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 13 | 4696 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9572 | 10 | 0.5 |
| | Review: Initials mm-dd-yy | | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 243 | 0 | -80 | 1 | 3 | 380 | 21 | -489 | 436 | A1 |
| 2 | 1 | 300 | 0 | -14 | 2 | 5 | 357 | 45 | -615 | 446 | A2 |
| 3 | 1 | 267 | 0 | -53 | 3 | 3 | 340 | 21 | -708 | 397 | B1 |
| 4 | 1 | 309 | 0 | -4 | 4 | 3 | 401 | 21 | -375 | 425 | B2 |
| 5 | 3 | 285 | 3 | -32 | 5 | 7 | 334 | 69 | -741 | 437 | C1 |
| 6 | 2 | 309 | 2 | -4 | 6 | 3 | 341 | 21 | -702 | 412 | C2 |
| 7 | 1 | 282 | 0 | -35 | 7 | 4 | 365 | 33 | -571 | 480 | D1 |
| 8 | 1 | 276 | 0 | -42 | 8 | 1 | 357 | -4 | -615 | 419 | D2 |
| 9 | 2 | 276 | 2 | -42 | 9 | 4 | 369 | 33 | -549 | 424 | E1 |
| 10 | 2 | 348 | 2 | 41 | 10 | 2 | 359 | 8 | -604 | 434 | E2 |
| 11 | 1 | 267 | 0 | -53 | 11 | 3 | 384 | 21 | -468 | 425 | F1 |
| 12 | 0 | 303 | -2 | -11 | 12 | 3 | 388 | 21 | -446 | 445 | F2 |
| 13 | 1 | 303 | 0 | -11 | 13 | 6 | 360 | 57 | -599 | 492 | G1 |
| 14 | 2 | 267 | 2 | -53 | 14 | 3 | 385 | 21 | -462 | 456 | G2 |
| 15 | 1 | 267 | 0 | -53 | 15 | 3 | 354 | 21 | -631 | 410 | H1 |
| 16 | 0 | 258 | -2 | -63 | 16 | 2 | 399 | 8 | -386 | 448 | H2 |
| 17 | 0 | 327 | -2 | 17 | 17 | 3 | 350 | 21 | -653 | 452 | I1 |
| 18 | 1 | 312 | 0 | 0 | 18 | 5 | 360 | 45 | -599 | 434 | I2 |
| 19 | 1 | 240 | 0 | -84 | 19 | 4 | 342 | 33 | -697 | 442 | J1 |
| 20 | 0 | 276 | -2 | -42 | 20 | 5 | 397 | 45 | -397 | 420 | J2 |
| 21 | 1 | 285 | 0 | -32 | 21 | 4 | 371 | 33 | -539 | 419 | K1 |
| 22 | 1 | 270 | 0 | -49 | 22 | 5 | 401 | 45 | -375 | 471 | K2 |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
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| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 14 | 80 |
| 43-93 | 84 | 425 |
| 43-37 | 80 | 730 |


Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: 6B1 Lower Walls | 1 m2 grids - Static counts and smears | Page of 1 of |
|---|---|---|---|---|
| | FSS - 5 | | FSS systematics | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-22-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1041 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-22-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 13 | 4696 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/23/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 102 | 3 | -7 | 1 | 10 | 411 | 105 | -320 | N/A | S1 |
| 2 | 1 | 101 | 3 | -11 | 2 | 2 | 359 | 8 | -604 | N/A | S2 |
| 3 | 1 | 106 | 3 | 7 | 3 | 2 | 341 | 8 | -702 | N/A | S3 |
| 4 | 1 | 102 | 3 | -7 | 4 | 3 | 403 | 21 | -364 | N/A | S4 |
| 5 | 1 | 110 | 3 | 21 | 5 | 0 | 347 | -16 | -670 | N/A | S5 |
| 6 | 1 | 112 | 3 | 27 | 6 | 2 | 341 | 8 | -702 | N/A | S6 |
| 7 | 1 | 99 | 3 | -18 | 7 | 0 | 346 | -16 | -675 | N/A | S7 |
| 8 | 0 | 108 | -2 | 14 | 8 | 2 | 399 | 8 | -386 | N/A | S8 |
| 9 | 1 | 100 | 3 | -14 | 9 | 2 | 362 | 8 | -588 | N/A | S9 |
| 10 | 1 | 101 | 3 | -11 | 10 | 4 | 385 | 33 | -462 | N/A | S10 |
| 11 | 0 | 112 | -2 | 27 | 11 | 1 | 391 | -4 | -429 | N/A | S11 |
| 12 | 1 | 96 | 3 | -28 | 12 | 3 | 366 | 21 | -566 | N/A | S12 |
| 13 | 1 | 113 | 3 | 31 | 13 | 4 | 356 | 33 | -620 | N/A | S13 |
| 14 | 1 | 112 | 3 | 27 | 14 | 0 | 357 | -16 | -615 | N/A | S14 |
| 15 | 0 | 107 | -2 | 10 | 15 | 3 | 385 | 21 | -462 | N/A | S15 |
| 16 | 0 | 106 | -2 | 7 | 16 | 4 | 343 | 33 | -691 | N/A | S16 |
| 17 | 0 | 105 | -2 | 3 | 17 | 2 | 417 | 8 | -287 | N/A | S17 |
| 18 | 0 | 107 | -2 | 10 | 18 | 5 | 393 | 45 | -418 | N/A | S18 |
| 19 | 1 | 106 | 3 | 7 | 19 | 4 | 367 | 33 | -560 | N/A | S19 |
| 20 | 1 | 96 | 3 | -28 | 20 | 3 | 382 | 21 | -478 | N/A | S20 |
| 21 | 1 | 110 | 3 | 21 | 21 | 3 | 421 | 21 | -265 | N/A | S21 |
| 22 | 1 | 97 | 3 | -25 | 22 | 4 | 435 | 33 | -189 | N/A | S22 |
| 23 | 0 | 107 | -2 | 10 | 23 | 4 | 420 | 33 | -271 | N/A | S23 |
| 24 | 0 | 104 | -2 | 0 | 24 | 6 | 368 | 57 | -555 | N/A | S24 |
| 25 | 0 | 111 | -2 | 24 | 25 | 4 | 362 | 33 | -588 | N/A | S25 |
| 26 | 1 | 107 | 3 | 10 | 26 | 4 | 359 | 33 | -604 | N/A | S26 |
| 27 | 1 | 105 | 3 | 3 | 27 | 3 | 367 | 21 | -560 | N/A | S27 |
| 28 | 1 | 101 | 3 | -11 | 28 | 2 | 382 | 8 | -478 | N/A | S28 |
| 29 | 0 | 109 | -2 | 17 | 29 | 5 | 435 | 45 | -189 | N/A | S29 |
| 30 | 1 | 97 | 3 | -25 | 30 | 3 | 374 | 21 | -522 | N/A | S30 |
| 31 | 0 | 102 | -2 | -7 | 31 | 2 | 380 | 8 | -489 | N/A | S31 |
| 32 | 2 | 109 | 9 | 17 | 32 | 4 | 376 | 33 | -511 | N/A | S32 |
| 33 | 1 | 102 | 3 | -7 | 33 | 3 | 388 | 21 | -446 | N/A | S33 |
| 34 | 0 | 100 | -2 | -14 | 34 | 4 | 307 | 33 | -888 | N/A | S34 |
| 35 | 1 | 119 | 3 | 52 | 35 | 4 | 396 | 33 | -402 | N/A | S35 |
| 36 | 0 | 115 | -2 | 38 | 36 | 2 | 371 | 8 | -539 | N/A | S36 |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 30 | 133 |
| 43-93 | 84 | 425 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 INSIDE BATHROOM AREA | Survey Unit & Type: SYSTEMATIC SURVEYS | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-5 | FSS systematics | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1/23/18 | 2929 | 185266 | 12/6/2018 | 43-10-1 | 100 | PR194717 | 12/6/2018 | 0.6992 | 0.5514 | 4 | 940 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Thomas Hunter 1/23/18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 7 | 4577 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Reviewed By: CBP 1-24-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Systematic points UW & LW inside the bathroom

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 132 |
| 43-93 | 54 | 296 |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | No. | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 107 | -2 | 47 | 1 | 3 | 336 | 21 | -469 | | BS1-LW |
| 2 | | | | | | | | | | | |
| 3 | 2 | 112 | 9 | 65 | 3 | 3 | 377 | 21 | -311 | | BS3-LW |
| 4 | | | | | | | | | | | |
| 5 | 0 | 105 | -2 | 40 | 5 | 2 | 358 | 12 | -384 | | BS5-LW |
| 6 | 0 | 82 | -2 | -44 | 6 | 1 | 371 | 3 | -334 | | BS6-LW |
| 7 | | | | | 7 | | | | | | |
| 8 | | | | | 8 | | | | | | |
| 9 | | | | | 9 | | | | | | |
| 10 | | | | | 10 | | | | | | |
| 11 | | | | | 11 | | | | | | |
| 12 | | | | | 12 | | | | | | |
| 13 | | | | | 13 | | | | | | |
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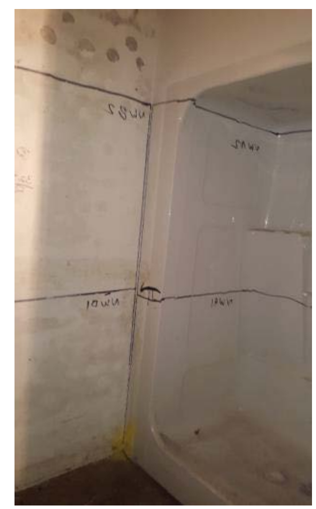

Signed: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 WEST WALL LOWER | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS - 5 | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1-8-18 | 2929 | 185266 | 12/6/2018 | 43-10-1 | 100 | PR194717 | 12/6/2018 | 0.6992 | 0.5514 | 9 | 972 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Thomas Hunter 1-8-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 8 | 4702 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9572 | 10 | 0.5 |
| | Reviewed By: CBP 1-9-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 279 | -5 | -15 | 1 | 6 | 351 | 48 | -459 | 430 | A1 |
| 2 | 2 | 282 | -1 | -12 | 2 | 2 | 346 | 11 | -478 | 443 | A2 |
| 3 | 0 | 303 | -5 | 14 | 3 | 2 | 357 | 11 | -436 | 474 | B1 |
| 4 | 1 | 246 | -3 | -55 | 4 | 4 | 336 | 29 | -517 | 450 | B2 |
| 5 | 1 | 252 | -3 | -48 | 5 | 1 | 331 | 2 | -536 | 420 | D1 |
| 6 | 2 | 306 | -1 | 17 | 6 | 6 | 295 | 48 | -675 | 441 | D2 |
| 7 | 0 | 288 | -5 | -4 | 7 | 6 | 330 | 48 | -540 | 443 | E1 |
| 8 | 0 | 240 | -5 | -62 | 8 | 3 | 357 | 20 | -436 | 428 | E2 |
| 9 | 0 | 291 | -5 | -1 | 9 | 3 | 371 | 20 | -382 | 416 | F1 |
| 10 | 1 | 246 | -3 | -55 | 10 | 3 | 365 | 20 | -405 | 437 | F2 |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
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| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 17 | 81 |
| 43-93 | 56 | 299 |
| 43-37 | 80 | 730 |

Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FSS-6

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | | Room: Cell 6B1 FSS Ceiling | | | Survey Unit & Type: CEILING AND VENTS | | | | | Page of 1 of 1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FSS-6 | | | | | Ceiling survey FSS | | | | | | | | |
| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-22-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 10 | 1041 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-22-18 | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 23 | 4441 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-23-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| LAWS | | | | | | Direct Frisk | | | | 43-37 Scan | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # | LAWα | LAWβ |
| 1 | | | | | 1 | 3 | 410 | 7 | -168 | | North | 4 | 349 |
| 2 | | | | | 2 | 2 | 450 | -3 | 29 | | North | 2 | 359 |
| 3 | | | | | 3 | 1 | 397 | -13 | -232 | | North | 1 | 315 |
| 4 | | | | | 4 | 1 | 401 | -13 | -212 | | North | 3 | 310 |
| 5 | | | | | 5 | 4 | 415 | 17 | -143 | | South | 1 | 347 |
| 6 | | | | | 6 | 3 | 378 | 7 | -326 | | South | 4 | 307 |
| 7 | | | | | 7 | 3 | 392 | 7 | -257 | | South | 1 | 318 |
| 8 | | | | | 8 | 1 | 427 | -13 | -84 | | South | 3 | 354 |
| 9 | | | | | 9 | | | | | | | | |
| 10 | | | | | 10 | | | | | | | | |
| 11 | | | | | 11 | | | | | | | | |
| 12 | | | | | 12 | | | | | | | | |
| 13 | | | | | 13 | | | | | | | | |
| 14 | | | | | 14 | | | | | | | | |
| 15 | | | | | 15 | | | | | | | | |
| 16 | | | | | 16 | | | | | | | | |
| 17 | | | | | 17 | | | | | | | | |
| 18 | | | | | 18 | | | | | | | | |
| 19 | | | | | 19 | | | | | | | | |
| 20 | | | | | 20 | | | | | | | | |
| 21 | | | | | 21 | | | | | | | | |
| 22 | | | | | 22 | | | | | | | | |
| 23 | | | | | 23 | | | | | | | | |
| 24 | | | | | 24 | | | | | | | | |
| 25 | | | | | 25 | | | | | | | | |
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| 30 | | | | | 30 | | | | | | | | |
| 31 | | | | | 31 | | | | | | | | |
| 32 | | | | | 32 | | | | | | | | |
| 33 | | | | | 33 | | | | | | | | |
| 34 | | | | | 34 | | | | | | | | |
| 35 | | | | | 35 | | | | | | | | |
| 36 | | | | | 36 | | | | | | | | |
| 37 | | | | | 37 | | | | | | | | |
| 38 | | | | | 38 | | | | | | | | |
| 39 | | | | | 39 | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 18 | 80 |
| 43-89 | 84 | 373 |

Note: LAW result units are counts/minute

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** | **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 61B EAST/NORTH UPPER WALLS | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-6 | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1-3-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 1048 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | | 2360/43-89 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 4/17/2018 | 0.4367 | 0.5194 | 9 | 4573 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 8733 | 10 | 0.5 |
| | Reviewed By: CBP 1-4-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| Smears | | | | | Direct Frisk | | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | No. | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 2 | 310 | 3 | -5 | 1 | 4 | 388 | 28 | -267 | 457 | EW D3 |
| 2 | 1 | 81 | 1 | -271 | 2 | 7 | 325 | 56 | -509 | 477 | EW D4 |
| 3 | 0 | 311 | -1 | -4 | 3 | 2 | 362 | 10 | -367 | 454 | EW D5 |
| 4 | 2 | 313 | 3 | -2 | 4 | 0 | 385 | -8 | -278 | 436 | EW C3 |
| 5 | 1 | 334 | 1 | 23 | 5 | 3 | 342 | 19 | -444 | 473 | EW C4 |
| 6 | 1 | 269 | 1 | -53 | 6 | 0 | 360 | -8 | -375 | 492 | EW C5 |
| 7 | 2 | 289 | 3 | -29 | 7 | 2 | 400 | 10 | -221 | 486 | EW B4 |
| 8 | 0 | 314 | -1 | 0 | 8 | 3 | 378 | 19 | -305 | 481 | EW B5 |
| 9 | 1 | 309 | 1 | -6 | 9 | 4 | 390 | 28 | -259 | 550 | NW I4 |
| 10 | 1 | 302 | 1 | -14 | 10 | 0 | 483 | -8 | 99 | 503 | NW I5 |
| 11 | 0 | 311 | -1 | -4 | 11 | 2 | 332 | 10 | -482 | 516 | EW A5 |
| 12 | | | | | 12 | | | | | | |
| 13 | | | | | 13 | | | | | | |
| 14 | | | | | 14 | | | | | | |
| 15 | | | | | 15 | | | | | | |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
| 18 | | | | | 18 | | | | | | |
| 19 | | | | | 19 | | | | | | |
| 20 | | | | | 20 | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
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| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
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| 33 | | | | | 33 | | | | | | |
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| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 11 | 81 |
| 43-93 | 57 | 296 |
| 43-37 | 80 | 699 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6B1 NORTH WALL UPPER | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-6 | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1-11-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 998 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Thomas Hunter 1-11-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 8 | 4702 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9572 | 10 | 0.5 |
| | Reviewed By: Date: | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 345 | -1 | 53 | 1 | 4 | 400 | 29 | -270 | 512 | A3 |
| 2 | 0 | 297 | -3 | -3 | 2 | 2 | 447 | 11 | -89 | 563 | A4 |
| 3 | 0 | 339 | -3 | 46 | 3 | 0 | 367 | -7 | -397 | 545 | A5 |
| 4 | 2 | 249 | 1 | -58 | 4 | 2 | 430 | 11 | -155 | 537 | B3 |
| 5 | 1 | 309 | -1 | 11 | 5 | 2 | 454 | 11 | -62 | 567 | B4 |
| 6 | 1 | 303 | -1 | 4 | 6 | 0 | 416 | -7 | -209 | 600 | B5 |
| 7 | 2 | 300 | 1 | 1 | 7 | 4 | 415 | 29 | -213 | 569 | C3 |
| 8 | 1 | 312 | -1 | 15 | 8 | 2 | 427 | 11 | -166 | 536 | C4 |
| 9 | 0 | 381 | -3 | 95 | 9 | 4 | 406 | 29 | -247 | 575 | C5 |
| 10 | 1 | 267 | -1 | -38 | 10 | 3 | 367 | 20 | -397 | 471 | D3 |
| 11 | 0 | 276 | -3 | -27 | 11 | 2 | 331 | 11 | -536 | 577 | D4 |
| 12 | 0 | 321 | -3 | 25 | 12 | 5 | 313 | 38 | -605 | 567 | D5 |
| 13 | 2 | 330 | 1 | 35 | 13 | 6 | 435 | 48 | -136 | 500 | E3 |
| 14 | 0 | 297 | -3 | -3 | 14 | 3 | 434 | 20 | -139 | 551 | E4 |
| 15 | 1 | 285 | -1 | -17 | 15 | 7 | 481 | 57 | 42 | 634 | E5 |
| 16 | 2 | 261 | 1 | -45 | 16 | 1 | 431 | 2 | -151 | 493 | F3 |
| 17 | 0 | 357 | -3 | 67 | 17 | 6 | 489 | 48 | 72 | 565 | F4 |
| 18 | 2 | 270 | 1 | -34 | 18 | 1 | 467 | 2 | -12 | 532 | F5 |
| 19 | 0 | 303 | -3 | 4 | 19 | 2 | 511 | 11 | 157 | 534 | G3 |
| 20 | 0 | 249 | -3 | -58 | 20 | 4 | 424 | 29 | -178 | 592 | G4 |
| 21 | 0 | 309 | -3 | 11 | 21 | 5 | 508 | 38 | 146 | 580 | G5 |
| 22 | 0 | 324 | -3 | 29 | 22 | 4 | 484 | 29 | 53 | 579 | H3 |
| 23 | 0 | 303 | -3 | 4 | 23 | 4 | 431 | 29 | -151 | 584 | H4 |
| 24 | 0 | 315 | -3 | 18 | 24 | 1 | 504 | 2 | 130 | 573 | H5 |
| 25 | 2 | 315 | 1 | 18 | 25 | 2 | 349 | 11 | -467 | Note 1 | I3 |
| 26 | 0 | 321 | -3 | 25 | 26 | 4 | 356 | 29 | -440 | Note 1 | J3 |
| 27 | 0 | 110 | -3 | -220 | 27 | 5 | 520 | 38 | 192 | N/A | E5 biased |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
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| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

RESCAN: Smears Directs

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 15 | 79 |
| 43-93 | 56 | 299 |
| 43-37 | 80 | 730 |

Note 1
The scan survey of I3 and J3 was performed by hand using the 43-93 probe on 1-25-18 because the location was not accessible to the 43-37 probe on 1-11-18.
The direct frisk was taken on 1-25-18 at the location of the highest scan result.
All of the smears were collected on 1-11-18 at the center of the grid element, except for the "E5 biased" smear, which was collected at the highest scan location.

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 SOUTH WALL UPPER | Survey Unit & Type: 1 m2 grids | Page of 1A of 2 |
|---|---|---|---|---|
| | FSS-6 | | FSS rescan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | PAUL FLETCHER 1/9/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 1078 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | THOMAS HUNTER 1/9/18 | 2360/43-93 | 274959 | ######## | 43-93 | 100 | PR293983 | ######## | 0.4367 | 0.5194 | 14 | 4383 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | ######## | 43-37 | 100 | PR278380 | ######## | 0.3774 | 0.4203 | 1 | 8733 | 10 | 0.5 |
| | Reviewed By: CBP 1-19-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

RESCAN w/43-93

| Smears No. | Smears Gross Counts α | Smears Gross Counts β | Smears DPM/100cm² α | Smears DPM/100cm² β | Direct Frisk No. | Direct Frisk Gross Counts α | Direct Frisk Gross Counts β | Direct Frisk DPM/100cm² α | Direct Frisk DPM/100cm² β | 43-37 Scan 1 m² 30 Sec. Count | Location # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 0 | 294 | -3 | -34 | 7 | 3 | 492 | 15 | 207 | 594 | B5 |
| 11 | 0 | 330 | -3 | 8 | 11 | 1 | 499 | -4 | 234 | 587 | C5 |
| 19 | 0 | 285 | -3 | -45 | 19 | 2 | 489 | 5 | 195 | 585 | E5 |
| 27 | 0 | 321 | -3 | -3 | 27 | 1 | 521 | -4 | 318 | 643 | G5 |
| 31 | 0 | 300 | -3 | -27 | 31 | 6 | 502 | 42 | 245 | 596 | H5 |
| 35 | 0 | 306 | -3 | -20 | 35 | 2 | 490 | 5 | 199 | 636 | I5 |

Smears α β — Directs α β

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 15 | 82 |
| 43-93 | 65 | 290 |
| 43-37 | 80 | 699 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 SOUTH WALL UPPER | Survey Unit & Type: 1 m2 grids | Page of 1 of 2 |
|---|---|---|---|---|
| | FSS-6 | | Scans | |

| Comments | Surveyed By: / Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | PAUL FLETCHER 1/9/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 1078 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | THOMAS HUNTER 1/9/18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 14 | 4383 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 8733 | 10 | 0.5 |
| | Reviewed By: CBP 1-10-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1135 | 10 | 3 |
| | | | | | | | | | #N/A | #N/A | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 15 | 82 |
| 43-93 | 65 | 290 |
| 43-37 | 80 | 699 |
| 43-10-1 | 14 | 84 |

| No. | Smears Gross Counts α | Smears Gross Counts β | Smears DPM/100cm² α | Smears DPM/100cm² β | No. | Direct Frisk Gross Counts α | Direct Frisk Gross Counts β | Direct Frisk DPM/100cm² α | Direct Frisk DPM/100cm² β | 43-37 Scan 1 m² 30 Sec. Count | Location # | | RESCAN w/43-93 Smears α | Smears β | Directs α | Directs β |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 291 | -3 | -38 | 1 | 4 | 387 | 24 | -198 | 424 | A3 | | | | | |
| 2 | 0 | 246 | -3 | -90 | 2 | 6 | 347 | 42 | -352 | 505 | A4 | | | | | |
| 3 | 0 | 360 | -3 | 42 | 3 | 1 | 533 | -4 | 365 | 539 | A5 | | | | | |
| 4 | 0 | 309 | -3 | -17 | 4 | 3 | 484 | 15 | 176 | | A6 | NOT ACCESSIBLE TO 43-37; SCANNED BY 43-93 | | | | |
| 5 | 0 | 327 | -3 | 4 | 5 | 4 | 362 | 24 | -294 | 425 | B3 | | | | | |
| 6 | 0 | 321 | -3 | -3 | 6 | 3 | 457 | 15 | 72 | 508 | B4 | | | | | |
| 7 | 0 | 360 | -3 | 42 | 7 | 4 | 489 | 24 | 195 | 594 | B5 | | | | | |
| 8 | 0 | 336 | -3 | 15 | 8 | 2 | 511 | 5 | 280 | | B6 | NOT ACCESSIBLE TO 43-37; SCANNED BY 43-93 | | | | |
| 9 | 0 | 327 | -3 | 4 | 9 | 1 | 397 | -4 | -159 | 446 | C3 | | | | | |
| 10 | 0 | 303 | -3 | -24 | 10 | 0 | 409 | -13 | -113 | 516 | C4 | | | | | |
| 11 | 0 | 342 | -3 | 22 | 11 | 1 | 508 | -4 | 268 | 587 | C5 | | | | | |
| 12 | 0 | 285 | -3 | -45 | 12 | 8 | 541 | 60 | 395 | | C6 | NOT ACCESSIBLE TO 43-37; SCANNED BY 43-93 | | | | |
| 13 | 0 | 294 | -3 | -34 | 13 | 2 | 359 | 5 | -305 | 453 | D3 | | | | | |
| 14 | 1 | 315 | -1 | -10 | 14 | 4 | 493 | 24 | 211 | 477 | D4 | | | | | |
| 15 | 0 | 324 | -3 | 1 | 15 | 5 | 470 | 33 | 122 | 566 | D5 | | | | | |
| 16 | 1 | 267 | -1 | -65 | 16 | 4 | 555 | 24 | 449 | | D6 | NOT ACCESSIBLE TO 43-37; SCANNED BY 43-93 | | | | |
| 17 | 0 | 315 | -3 | -10 | 17 | 2 | 420 | 5 | -70 | 425 | E3 | | | | | |
| 18 | 2 | 316 | 1 | -9 | 18 | 1 | 451 | -4 | 49 | 481 | E4 | | | | | |
| 19 | 1 | 324 | -1 | 1 | 19 | 4 | 500 | 24 | 238 | 585 | E5 | | | | | |
| 20 | | | | | 20 | | | | | | E6 | MOSTLY NOT ACCESSIBLE; MEASURED AS PART OF ADJACENT GRIDS | | | | |
| 21 | 0 | 270 | -3 | -62 | 21 | 2 | 367 | 5 | -275 | 472 | F3 | | | | | |
| 22 | 1 | 237 | -1 | -100 | 22 | 4 | 536 | 24 | 376 | 445 | F4 | | | | | |
| 23 | 0 | 315 | -3 | -10 | 23 | 4 | 556 | 24 | 453 | 560 | F5 | | | | | |
| 24 | 1 | 321 | -1 | -3 | 24 | 3 | 533 | 15 | 365 | | F6 | NOT ACCESSIBLE TO 43-37; SCANNED BY 43-93 | | | | |
| 25 | 0 | 312 | -3 | -13 | 25 | 6 | 371 | 42 | -259 | 455 | G3 | | | | | |
| 26 | 0 | 254 | -3 | -80 | 26 | 3 | 473 | 15 | 134 | 491 | G4 | | | | | |
| 27 | 0 | 246 | -3 | -90 | 27 | 4 | 483 | 24 | 172 | 643 | G5 | | | | | |
| 28 | 0 | 282 | -3 | -48 | 28 | 2 | 513 | 5 | 288 | | G6 | NOT ACCESSIBLE TO 43-37; SCANNED BY 43-93 | | | | |
| 29 | 0 | 363 | -3 | 46 | 29 | 3 | 366 | 15 | -278 | 477 | H3 | | | | | |
| 30 | 2 | 294 | 1 | -34 | 30 | 0 | 437 | -13 | -5 | 530 | H4 | | | | | |
| 31 | 1 | 288 | -1 | -41 | 31 | 3 | 546 | 15 | 415 | 596 | H5 | | 0 | 100 | 6 | 502 |
| 32 | 1 | 336 | -1 | 15 | 32 | 3 | 506 | 15 | 261 | | H6 | NOT ACCESSIBLE TO 43-37; SCANNED BY 43-93 | | | | |
| 33 | 1 | 267 | -1 | -65 | 33 | 1 | 366 | -4 | -278 | 462 | I3 | | | | | |
| 34 | 1 | 339 | -1 | 18 | 34 | 2 | 420 | 5 | -70 | 510 | I4 | | | | | |
| 35 | 1 | 315 | -1 | -10 | 35 | 1 | 471 | -4 | 126 | 636 | I5 | | 0 | 102 | 2 | 490 |
| 36 | 1 | 366 | -1 | 49 | 36 | 3 | 529 | 15 | 349 | | I6 | NOT ACCESSIBLE TO 43-37; SCANNED BY 43-93 | | | | |
| 37 | 0 | 285 | -3 | -45 | 37 | 3 | 361 | 15 | -298 | 463 | J3 | | | | | |
| 38 | 1 | 306 | -1 | -20 | 38 | 5 | 454 | 33 | 60 | 558 | J4 | | | | | |
| 39 | | | | | 39 | | | | | | | | | | | |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 SOUTH WALLS | Survey Unit & Type: 1 m2 grids | Page of 2 of 2 |
|---|---|---|---|---|
| | FSS-6 | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 *pi* α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | PAUL FLETCHER 1/9/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 6 | 1020 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | THOMAS HUNTER 1/9/18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 14 | 4383 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 8733 | 10 | 0.5 |
| | Reviewed By: CBP 1-10-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

LM43-37 scan - take a direct static and a smear at center of each grid element

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # | |
| 1 | 0 | 288 | -3 | -21 | 1 | 6 | 472 | 42 | 130 | 562 | J5 | |
| 2 | 0 | 348 | -3 | 49 | 2 | 0 | 447 | -13 | 34 | | J6 | Scanned by 43-93 |
| 3 | 0 | 327 | -3 | 24 | 3 | 5 | 333 | 33 | -405 | 419 | K3 | |
| 4 | 0 | 297 | -3 | -10 | 4 | 2 | 379 | 5 | -228 | 514 | K4 | |
| 5 | 0 | 327 | -3 | 24 | 5 | 3 | 486 | 15 | 184 | 501 | K5 | |
| 6 | 0 | 246 | -3 | -70 | 6 | 4 | 500 | 24 | 238 | | K6 | Scanned by 43-93 |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |
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| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 15 | 80 |
| 43-93 | 65 | 290 |
| 43-37 | 80 | 699 |


Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 UW in bathroom | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS 6 | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1/8/18 | 2929 | 185266 | 12/6/2018 | 43-10-1 | 100 | PR194717 | 12/6/2018 | 0.6992 | 0.5514 | 9 | 972 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Thomas Hunter 1/8/18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 8 | 4702 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 1 | 9572 | 10 | 0.5 |
| | Reviewed By: CBP 1-8-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 2 | 310 | -1 | 22 | | 1 | 402 | 2 | -263 | 579 | NW B4 |
| 2 | 1 | 281 | -3 | -13 | | 4 | 495 | 29 | 95 | 665 | NW B5 |
| 3 | 0 | 311 | -5 | 23 | | 3 | 464 | 20 | -24 | 599 | NW C4 |
| 4 | 2 | 313 | -1 | 26 | | 3 | 533 | 20 | 242 | 582 | NW C5 |
| 5 | 1 | 334 | -3 | 51 | | 4 | 419 | 29 | -197 | 604 | NW B3 |
| 6 | 1 | 269 | -3 | -27 | | 6 | 418 | 48 | -201 | 591 | NW C3 |
| 7 | 0 | 345 | -5 | 65 | | 4 | 399 | 29 | -274 | 421 | EW A3 |
| 8 | 0 | 249 | -5 | -52 | | 5 | 365 | 38 | -405 | 454 | EW B3 |
| 9 | 0 | 297 | -5 | 7 | | 3 | 382 | 20 | -340 | 439 | SW B3 |
| 10 | 0 | 243 | -5 | -59 | | 8 | 383 | 66 | -336 | 406 | SW C3 |
| 11 | 1 | 321 | -3 | 36 | | 1 | 394 | 2 | -293 | 484 | WW A3 |
| 12 | 0 | 261 | -5 | -37 | | 3 | 377 | 20 | -359 | 453 | WW B3 |
| 13 | 0 | 294 | -5 | 3 | | 4 | 586 | 29 | 446 | N/A | NW B5 biased |
| 14 | | | | | | | | | | | |
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**RESCAN** **SMEARS** **DIRECTS**

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 17 | 81 |
| 43-93 | 56 | 299 |
| 43-37 | 80 | 730 |

Reviewed: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6B1 Upper Walls | 1 m2 grids - Static counts and smears | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-6 | | FSS systematics | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-22-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1040 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-22-18 | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 13 | 4696 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-23-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 87 | -2 | -59 | 1 | 3 | 460 | 17 | -47 | N/A | S1 |
| 2 | 1 | 114 | 3 | 35 | 2 | 0 | 331 | -13 | -683 | N/A | S2 |
| 3 | 0 | 106 | -2 | 7 | 3 | 3 | 452 | 17 | -87 | N/A | S3 |
| 4 | 0 | 117 | -2 | 45 | 4 | 1 | 349 | -3 | -594 | N/A | S4 |
| 5 | 1 | 107 | 3 | 10 | 5 | 2 | 445 | 7 | -121 | N/A | S5 |
| 6 | 0 | 111 | -2 | 24 | 6 | 3 | 361 | 17 | -535 | N/A | S6 |
| 7 | 0 | 108 | -2 | 14 | 7 | 4 | 425 | 28 | -220 | N/A | S7 |
| 8 | 0 | 127 | -2 | 80 | 8 | 3 | 393 | 17 | -377 | N/A | S8 |
| 9 | 1 | 107 | 3 | 10 | 9 | 2 | 382 | 7 | -431 | N/A | S9 |
| 10 | 1 | 100 | 3 | -14 | 10 | 3 | 349 | 17 | -594 | N/A | S10 |
| 11 | 1 | 90 | 3 | -49 | 11 | 3 | 429 | 17 | -200 | N/A | S11 |
| 12 | 0 | 112 | -2 | 28 | 12 | 4 | 407 | 28 | -308 | N/A | S12 |
| 13 | 0 | 106 | -2 | 7 | 13 | 3 | 328 | 17 | -697 | N/A | S13 |
| 14 | 0 | 103 | -2 | -3 | 14 | 5 | 435 | 38 | -170 | N/A | S14 |
| 15 | 3 | 109 | 15 | 17 | 15 | 3 | 358 | 17 | -550 | N/A | S15 |
| 16 | 1 | 99 | 3 | -17 | 16 | 5 | 488 | 38 | 91 | N/A | S16 |
| 17 | 0 | 105 | -2 | 3 | 17 | 0 | 353 | -13 | -574 | N/A | S17 |
| 18 | 0 | 103 | -2 | -3 | 18 | 4 | 446 | 28 | -116 | N/A | S18 |
| 19 | 1 | 105 | 3 | 3 | 19 | 1 | 381 | -3 | -436 | N/A | S19 |
| 20 | 0 | 127 | -2 | 80 | 20 | 3 | 466 | 17 | -18 | N/A | S20 |
| 21 | 0 | 109 | -2 | 17 | 21 | 2 | 381 | 7 | -436 | N/A | S21 |
| 22 | 0 | 117 | -2 | 45 | 22 | 3 | 356 | 17 | -559 | N/A | S22 |
| 23 | 0 | 103 | -2 | -3 | 23 | 6 | 434 | 48 | -175 | N/A | S23 |
| 24 | 0 | 113 | -2 | 31 | 24 | 4 | 472 | 28 | 12 | N/A | S24 |
| 25 | 0 | 93 | -2 | -38 | 25 | 3 | 414 | 17 | -274 | N/A | S25 |
| 26 | 0 | 134 | -2 | 104 | 26 | 4 | 396 | 28 | -362 | N/A | S26 |
| 27 | 0 | 98 | -2 | -21 | 27 | 1 | 374 | -3 | -471 | N/A | S27 |
| 28 | 1 | 102 | 3 | -7 | 28 | 3 | 399 | 17 | -348 | N/A | S28 |
| 29 | 0 | 101 | -2 | -10 | 29 | 1 | 380 | -3 | -441 | N/A | S29 |
| 30 | 0 | 98 | -2 | -21 | 30 | 1 | 420 | -3 | -244 | N/A | S30 |
| 31 | 0 | 93 | -2 | -38 | 31 | 4 | 387 | 28 | -407 | N/A | S31 |
| 32 | 1 | 102 | 3 | -7 | 32 | 5 | 403 | 38 | -328 | N/A | S32 |
| 33 | 0 | 108 | -2 | 14 | 33 | 2 | 383 | 7 | -426 | N/A | S33 |
| 34 | 0 | 101 | -2 | -10 | 34 | 3 | 364 | 17 | -520 | N/A | S34 |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 133 |
| 43-89 | 71 | 383 |
| | | |


Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 INSIDE BATHROOM AREA | Survey Unit & Type: SYSTEMATIC SURVEYS | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-6 | FSS systematiccs | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1/23/18 | 2929 | 185266 | 12/6/2018 | 43-10-1 | 100 | PR194717 | 12/6/2018 | 0.6992 | 0.5514 | 4 | 940 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Thomas Hunter 1/23/18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 7 | 4577 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Reviewed By: CBP 1-23-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

## Upepr wall systematic points in bathroom

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | | | | | 1 | | | | | | |
| 2 | 0 | 88 | -2 | -22 | 2 | 3 | 347 | 21 | -426 | N/A | BS2-UW |
| 3 | | | | | 3 | | | | | | |
| 4 | 0 | 112 | -2 | 65 | 4 | 0 | 372 | -6 | -330 | N/A | BS4-UW |
| 5 | | | | | | | | | | | |
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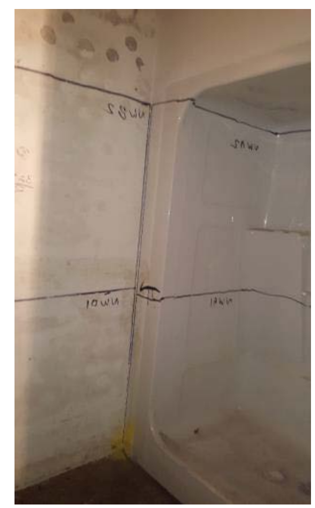
| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 132 |
| 43-93 | 54 | 296 |
| 43-37 | | |

Signed: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** | **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6B1 WEST WALL UPPER | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-6 | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1-11-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 998 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 4/17/2018 | 0.4367 | 0.5194 | 14 | 4432 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 37 | 9950 | 10 | 0.5 |
| | Reviewed By: CBP 1-11-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 303 | -3 | 4 | 1 | 5 | 315 | 33 | -494 | 444 | A3 |
| 2 | 0 | 309 | -3 | 11 | 2 | 5 | 380 | 33 | -243 | 571 | A4 |
| 3 | 0 | 342 | -3 | 49 | 3 | 8 | 452 | 60 | 34 | 527 | A5 |
| 4 | 0 | 312 | -3 | 15 | 4 | 4 | 380 | 24 | -243 | 423 | B3 |
| 5 | 0 | 315 | -3 | 18 | 5 | 5 | 370 | 33 | -282 | 508 | B4 |
| 6 | 2 | 258 | 1 | -48 | 6 | 11 | 448 | 88 | 18 | 530 | B5 |
| 7 | 0 | 339 | -3 | 46 | 7 | 2 | 358 | 5 | -328 | 482 | C3 |
| 8 | 0 | 306 | -3 | 8 | 8 | 5 | 440 | 33 | -12 | 502 | C4 |
| 9 | 1 | 336 | -1 | 42 | 9 | 3 | 386 | 15 | -220 | 548 | C5 |
| 10 | 0 | 261 | -3 | -45 | 10 | 2 | 327 | 5 | -447 | 493 | D3 |
| 11 | 0 | 306 | -3 | 8 | 11 | 3 | 378 | 15 | -251 | 535 | D4 |
| 12 | 0 | 306 | -3 | 8 | 12 | 4 | 452 | 24 | 34 | 507 | D5 |
| 13 | 0 | 294 | -3 | -6 | 13 | 4 | 367 | 24 | -293 | 423 | E3 |
| 14 | 0 | 243 | -3 | -65 | 14 | 5 | 378 | 33 | -251 | 590 | E4 |
| 15 | 0 | 345 | -3 | 53 | 15 | 10 | 432 | 79 | -43 | 529 | E5 |
| 16 | 0 | 321 | -3 | 25 | 16 | 3 | 323 | 15 | -463 | 470 | F3 |
| 17 | 0 | 324 | -3 | 29 | 17 | 9 | 404 | 70 | -151 | 523 | F4 |
| 18 | 1 | 273 | -1 | -31 | 18 | 6 | 444 | 42 | 3 | 581 | F5 |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
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| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 15 | 79 |
| 43-93 | 65 | 291 |
| 43-37 | 161 | 744 |

Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FSS-7A

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 Floor | Survey Unit & Type: | Page of 2 of 2 |
|---|---|---|---|---|
| | FSS - 7A | A Section | FSS systematics | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-22-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 940 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-22-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 7 | 4577 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-23-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 101 | -2 | 24 | 1 | 1 | 505 | 4 | 258 | | FS1 |
| 2 | 0 | 112 | -2 | 63 | 2 | 4 | 498 | 40 | 220 | | FS2 |
| 3 | 0 | 108 | -2 | 49 | 3 | 4 | 493 | 40 | 193 | | FS3 |
| 4 | 0 | 98 | -2 | 14 | 4 | 7 | 487 | 76 | 160 | | FS4 |
| 5 | 1 | 100 | 3 | 21 | 5 | 5 | 525 | 52 | 368 | | FS5 |
| 6 | 0 | 113 | -2 | 66 | 6 | 4 | 532 | 40 | 406 | | FS6 |
| 7 | 1 | 104 | 3 | 35 | 7 | 4 | 502 | 40 | 242 | | FS7 |
| 8 | 0 | 97 | -2 | 10 | 8 | 5 | 543 | 52 | 466 | | FS8 |
| 9 | 1 | 100 | 3 | 21 | 9 | 22 | 671 | 257 | 1165 | | FS9 |
| 10 | 1 | 92 | 3 | -7 | 10 | 3 | 491 | 28 | 182 | | FS10 |
| 11 | 0 | 118 | -2 | 83 | 11 | 9 | 538 | 100 | 439 | | FS11 |
| 12 | 0 | 90 | -2 | -14 | 12 | 7 | 532 | 76 | 406 | | FS12 |
| 13 | 0 | 110 | -2 | 56 | 13 | 3 | 678 | 28 | 1203 | | FS13 |
| 14 | 0 | 93 | -2 | -3 | 14 | 1 | 407 | 4 | -277 | | FS14 |
| 15 | 0 | 107 | -2 | 45 | 15 | 6 | 566 | 64 | 591 | | FS15 |
| 16 | 0 | 114 | -2 | 70 | 16 | 8 | 615 | 88 | 859 | | FS16 |
| 17 | 0 | 107 | -2 | 45 | 17 | 6 | 505 | 64 | 258 | | FS17 |
| 18 | 0 | 102 | -2 | 28 | 18 | 3 | 496 | 28 | 209 | | FS18 |
| 19 | | | | | 19 | | | | | | |
| 20 | | | | | 20 | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
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| 31 | | | | | 31 | | | | | | |
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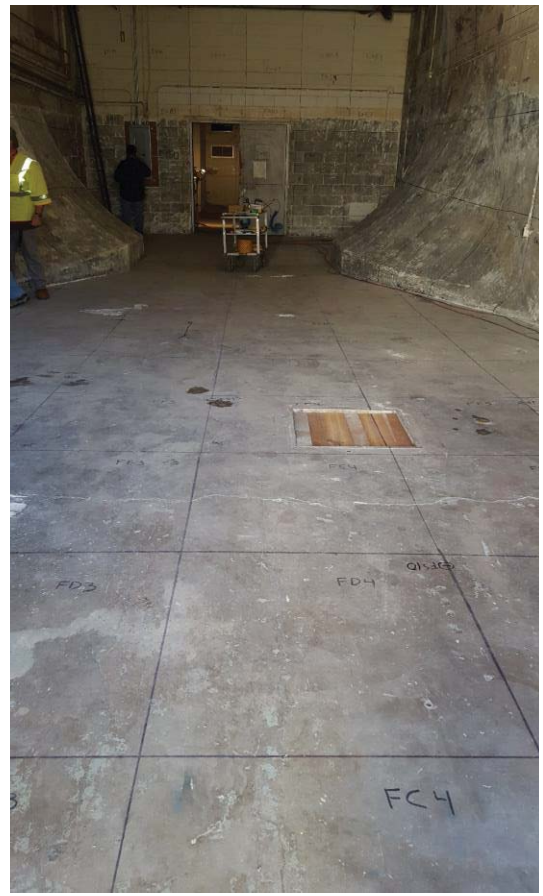
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 127 |
| 43-93 | 71 | 419 |




Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| | | | | |
|---|---|---|---|---|
| Robins AFB Building 181 | HWP# 02-181 | CELL 6 FLOOR | Survey Unit & Type: 1 m2 grids | Page of 1A of 3 |
| | FSS-7A | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-10-18 | 2929 | 190602 | ######## | 43-10-1 | 100 | PR199159 | ######## | 0.6933 | 0.5749 | 5 | 998 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | David Davis 1-10-18 | 2360/43-93 | 274959 | ######## | 43-93 | 100 | PR293983 | ######## | 0.4367 | 0.5194 | 8 | 4398 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | Paul Fletcher 1-10-18 | 2360/43-37 | 287606 | ######## | 43-37 | 100 | PR278379 | ######## | 0.3845 | 0.4517 | 27 | 10540 | 10 | 0.5 |
| | Reviewed: CBP 1/15/18 | 2929 | 190602 | ######## | 43-10-1 | 100 | PR199159 | ######## | 0.6933 | 0.5749 | 4 | 1135 | 10 | 3 |
| | Reviewed: AED 1/31/18 | 2360/43-89 | 310179 | ######## | 43-89 | 125 | PR337815 | ######## | 0.3126 | 0.3249 | 12 | 4328 | 10 | 1 |

**Recans of grids with elevated 43-37 response**

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | | | | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # | α | β | | α | β |
| 8 | 1 | 297 | -1 | -3 | 8 | 10 | 597 | 84 | 605 | 688 | B2 | | | | | |
| 9 | 11 | 372 | 19 | 37 | 9 | 1 | 552 | -2 | 587 | 645 | B3 | | | | | |
| 14 | 2 | 270 | 1 | -34 | 14 | 14 | 667 | 121 | 875 | 764 | C2 | | | | | |
| 17 | 0 | 375 | -3 | 88 | 17 | 16 | 648 | 139 | 802 | 742 | C5 | | | | | |
| 20 | 1 | 297 | -1 | -3 | 20 | 22 | 641 | 194 | 775 | 920 | D2 | | | | | |
| 21 | 1 | 297 | -1 | -3 | 21 | 24 | 712 | 213 | 1048 | 882 | D3 | | | | | |
| 26 | 1 | 342 | -1 | 49 | 26 | 11 | 566 | 93 | 486 | 825 | E2 | | | | | |
| 27 | 0 | 330 | -3 | 35 | 27 | 28 | 719 | 249 | 1075 | 880 | E3 | | | | | |
| 29 | 1 | 279 | -1 | -24 | 29 | 86 | 992 | 780 | 2126 | 695 | E5 | | | | | |
| 32 | 0 | 306 | -3 | 8 | 32 | 24 | 671 | 213 | 890 | 721 | F2 | | | | | |
| 33 | 0 | 279 | -3 | -24 | 33 | 81 | 785 | 735 | 1329 | 894 | F3 | | | | | |
| 34 | 0 | 276 | -3 | -27 | 34 | 7 | 693 | 57 | 975 | 692 | F4 | | | | | |
| 35 | 0 | 282 | -3 | -20 | 35 | 8 | 585 | 66 | 559 | 812 | F5 | | | | | |

| α | β | |
|---|---|---|
| Probe | α MDA | β MDA |
| 2929 | 15 | 79 |
| 43-93 | 56 | 290 |
| 43-37 | 144 | 711 |
| 2929 | 14 | 84 |
| 43-89 | 69 | 368 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| | | | | |
|---|---|---|---|---|
| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6 A 1 FLOOR | Survey Unit & Type: 1 m2 grids | Page of 2A of 3 |
| | | FSS-7B | Post LBP abatement and decon survey | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-10-18 | 2929 | 190602 | ######## | 43-10-1 | 100 | PR199159 | ######## | 0.6933 | 0.5749 | 5 | 998 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-10-18 | 2360/43-93 | 274959 | ######## | 43-93 | 100 | PR293983 | ######## | 0.4367 | 0.5194 | 8 | 4398 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 287606 | ######## | 43-37 | 100 | PR278379 | ######## | 0.3845 | 0.4517 | 21 | 10567 | 10 | 0.5 |
| | Reviewed: CBP 1/15/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Rescan grids with LM43-93 probe and take a static and smear at hot spots

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 12 | 3 | 304 | 3 | 5 | 12 | 4 | 638 | 29 | 763 | 877 | I2 |
| 14 | 1 | 286 | -1 | -16 | 14 | 4 | 604 | 29 | 632 | 843 | I4 |
| 15 | 1 | 295 | -1 | -5 | 15 | 8 | 706 | 66 | 1025 | 675 | I5 |
| 18 | 3 | 279 | 3 | -24 | 18 | 7 | 638 | 57 | 763 | 754 | J2 |
| 19 | 1 | 293 | -1 | -7 | 19 | 4 | 580 | 29 | 540 | 732 | J3 |
| 20 | 1 | 301 | -1 | 2 | 20 | 7 | 657 | 57 | 836 | 676 | J4 |
| 21 | 3 | 339 | 3 | 46 | 21 | 5 | 581 | 38 | 544 | 686 | J5 |
| 25 | 0 | 288 | -3 | -13 | 25 | 6 | 716 | 48 | 1064 | 719 | K3 |
| 26 | 1 | 261 | -1 | -45 | 26 | 5 | 686 | 38 | 948 | 732 | K4 |
| 30 | 0 | 318 | -3 | 22 | 30 | 2 | 793 | 11 | 1360 | 720 | L3 |
| 31 | 0 | 285 | -3 | -17 | 31 | 3 | 620 | 20 | 694 | 799 | L4 |

| Probe | α MDA (dpm/100 cm²) | β MDA (dpm/100 cm²) |
|---|---|---|
| 43-10-1 | 15 | 79 |
| 43-93 | 56 | 290 |
| 43-37 | 134 | 712 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6 FLOOR | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | ADDITIONAL STATICS | FSS-7A &7B | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Camille Patrick 3/1/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 37 | 1 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 145474 | 7/10/2018 | 43-93 | 100 | PR299606 | 7/10/2018 | 0.4173 | 0.4921 | 3 | 339 | 1 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: Initials mm-dd-yy | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | |
| No. | α | β | α | β | | α | β | α | β | Location # |
| 1 | 2 | 53 | 6 | 56 | 1 | 4 | 481 | 10 | 577 | FB2 |
| 2 | 3 | 50 | 12 | 45 | 2 | 14 | 444 | 105 | 427 | FC2 |
| 3 | 6 | 57 | 29 | 70 | 3 | 3 | 535 | 0 | 797 | FE3 |
| 4 | 6 | 63 | 29 | 90 | 4 | 6 | 461 | 29 | 496 | FE4 |
| 5 | 2 | 52 | 6 | 52 | 5 | 13 | 491 | 96 | 618 | FG2 |
| 6 | 2 | 60 | 6 | 80 | 6 | 14 | 572 | 105 | 947 | FI2 |
| 7 | 1 | 51 | 0 | 49 | 7 | 4 | 375 | 10 | 146 | FI5 |
| 8 | 3 | 46 | 12 | 31 | 8 | 4 | 431 | 10 | 374 | FJ6 |
| 9 | 2 | 52 | 6 | 52 | 9 | 5 | 404 | 19 | 264 | FJ1 |
| 10 | 6 | 62 | 29 | 87 | 10 | 5 | 392 | 19 | 215 | FL5 |
| 11 | 2 | 55 | 6 | 63 | 11 | 4 | 358 | 10 | 77 | FM2 |
| 12 | 1 | 61 | 0 | 83 | 12 | 4 | 602 | 10 | 1,069 | FN2 |
| 13 | 3 | 48 | 12 | 38 | 13 | 4 | 420 | 10 | 329 | FQ1 |
| 14 | 1 | 53 | 0 | 56 | 14 | 5 | 296 | 19 | -175 | FQ2 |
| 15 | 2 | 52 | 6 | 52 | 15 | 2 | 417 | -10 | 317 | FP5 |
| 16 | 4 | 58 | 17 | 73 | 16 | 9 | 438 | 58 | 402 | FP6 |
| 17 | 3 | 59 | 12 | 77 | 17 | 7 | 385 | 38 | 187 | FQ3 |
| 18 | 2 | 49 | 6 | 42 | 18 | 6 | 438 | 29 | 402 | FQ4 |
| 19 | 5 | 72 | 23 | 122 | 19 | 4 | 458 | 10 | 484 | FJ4 |
| 20 | 6 | 48 | 29 | 38 | 20 | 5 | 474 | 19 | 549 | FG6 |
| 21 | | | -6 | -129 | 21 | | | -29 | -1378 | |
| 22 | | | -6 | -129 | 22 | | | -29 | -1378 | |
| 23 | | | -6 | -129 | 23 | | | -29 | -1378 | |
| 24 | | | -6 | -129 | 24 | | | -29 | -1378 | |
| 25 | | | -6 | -129 | 25 | | | -29 | -1378 | |
| 26 | | | -6 | -129 | 26 | | | -29 | -1378 | |
| 27 | | | -6 | -129 | 27 | | | -29 | -1378 | |
| 28 | | | -6 | -129 | 28 | | | -29 | -1378 | |
| 29 | | | -6 | -129 | 29 | | | -29 | -1378 | |
| 30 | | | -6 | -129 | 30 | | | -29 | -1378 | |
| 31 | | | -6 | -129 | 31 | | | -29 | -1378 | |
| 32 | | | -6 | -129 | 32 | | | -29 | -1378 | |
| 33 | | | -6 | -129 | 33 | | | -29 | -1378 | |
| 34 | | | -6 | -129 | 34 | | | -29 | -1378 | |
| 35 | | | -6 | -129 | 35 | | | -29 | -1378 | |
| 36 | | | -6 | -129 | 36 | | | -29 | -1378 | |
| 37 | | | -6 | -129 | 37 | | | -29 | -1378 | |
| 38 | | | -6 | -129 | 38 | | | -29 | -1378 | |
| 39 | | | -6 | -129 | 39 | | | -29 | -1378 | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 44 | 109 |
| 43-93 | 106 | 360 |

Signature:

# Attachment 1

## Survey Unit FSS-7B

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 Floor | Survey Unit & Type: | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS - 7B | Rows I to Q | FSS | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-22-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 940 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-22-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 7 | 4577 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: Initials CBP 1-23-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 107 | -2 | 45 | 1 | 6 | 689 | 64 | 1263 | | FS1 |
| 2 | 0 | 94 | -2 | 0 | 2 | 6 | 519 | 64 | 335 | | FS2 |
| 3 | 0 | 84 | -2 | -35 | 3 | 12 | 699 | 136 | 1,318 | | FS3 |
| 4 | 1 | 111 | 3 | 59 | 4 | 2 | 517 | 16 | 324 | | FS4 |
| 5 | 1 | 108 | 3 | 49 | 5 | 5 | 507 | 52 | 269 | | FS5 |
| 6 | 0 | 97 | -2 | 10 | 6 | 5 | 548 | 52 | 493 | | FS6 |
| 7 | 0 | 119 | -2 | 87 | 7 | 3 | 509 | 28 | 280 | | FS7 |
| 8 | 2 | 103 | 9 | 31 | 8 | 1 | 545 | 4 | 477 | | FS8 |
| 9 | 0 | 81 | -2 | -45 | 9 | 4 | 575 | 40 | 641 | | FS9 |
| 10 | 0 | 97 | -2 | 10 | 10 | 5 | 496 | 52 | 209 | | FS10 |
| 11 | 0 | 90 | -2 | -14 | 11 | 3 | 458 | 28 | 2 | | FS11 |
| 12 | 0 | 122 | -2 | 97 | 12 | 2 | 445 | 16 | -69 | | FS12 |
| 13 | 1 | 106 | 3 | 42 | 13 | 2 | 586 | 16 | 701 | | FS13 |
| 14 | 0 | 98 | -2 | 14 | 14 | 5 | 483 | 52 | 138 | | FS14 |
| 15 | 1 | 91 | 3 | -10 | 15 | 3 | 511 | 28 | 291 | | FS15 |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
| 18 | | | | | 18 | | | | | | |
| 19 | | | | | 19 | | | | | | |
| 20 | | | | | 20 | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
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| 26 | | | | | 26 | | | | | | |
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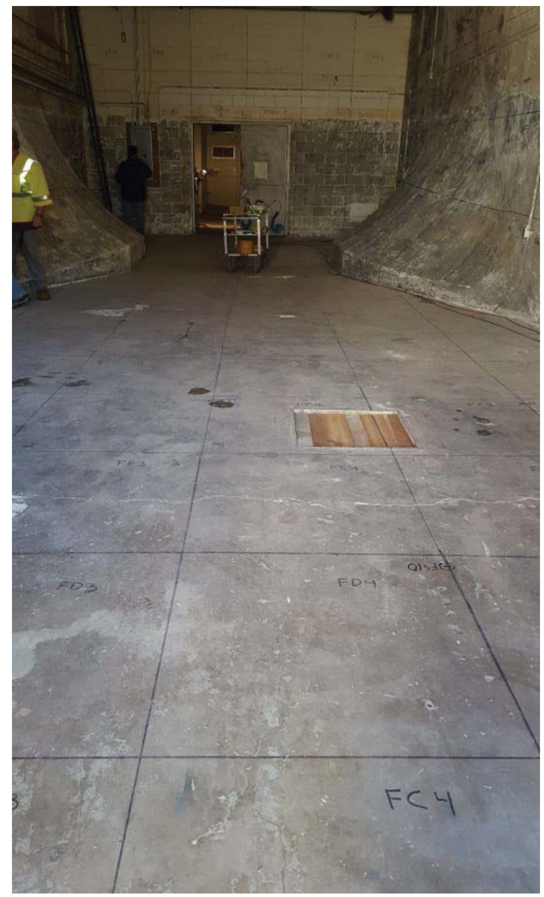
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 127 |
| 43-93 | 71 | 419 |




Signature: Arthur Desrosiers CHP

# Survey Unit FSS-8

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 EAST AND WEST LOWER WALLS | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-8 | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1-11-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 1064 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 8 | 4539 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 53 | 8868 | 10 | 0.5 |
| | Reviewed CBP 1-12-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan with LM43-37; take one direct static and one smear at center of each grid

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 2 | 285 | 3 | -40 | 1 | 2 | 369 | 11 | -327 | 528 | East A1 |
| 2 | 0 | 243 | -1 | -88 | 2 | 4 | 375 | 29 | -304 | 526 | A2 |
| 3 | 0 | 309 | -1 | -12 | 3 | 5 | 347 | 38 | -412 | 490 | B1 |
| 4 | 0 | 300 | -1 | -22 | 4 | 4 | 366 | 29 | -338 | 475 | B2 |
| 5 | 0 | 360 | -1 | 47 | 5 | 3 | 344 | 20 | -423 | 484 | D1 |
| 6 | 0 | 288 | -1 | -36 | 6 | 2 | 330 | 11 | -477 | 431 | D2 |
| 7 | 0 | 294 | -1 | -29 | 7 | 0 | 356 | -7 | -377 | 472 | E1 |
| 8 | 0 | 330 | -1 | 13 | 8 | 2 | 397 | 11 | -219 | 471 | E2 |
| 9 | 1 | 285 | 1 | -40 | 9 | 8 | 381 | 66 | -281 | 575 | F1 |
| 10 | 0 | 291 | -1 | -33 | 10 | 3 | 430 | 20 | -92 | 460 | F2 |
| 11 | 0 | 282 | -1 | -43 | 11 | 1 | 369 | 2 | -327 | 437 | West A1 |
| 12 | 0 | 333 | -1 | 16 | 12 | 1 | 375 | 2 | -304 | 464 | A2 |
| 13 | 1 | 294 | 1 | -29 | 13 | 10 | 347 | 84 | -412 | 470 | B1 |
| 14 | 1 | 312 | 1 | -8 | 14 | 7 | 366 | 57 | -338 | 466 | B2 |
| 15 | 1 | 333 | 1 | 16 | 15 | 4 | 444 | 29 | -38 | 514 | C1 |
| 16 | 4 | 369 | 7 | 58 | 16 | 2 | 425 | 11 | -111 | 510 | C2 |
| 17 | 3 | 366 | 5 | 54 | 17 | 7 | 450 | 57 | -15 | 542 | D1 |
| 18 | 5 | 396 | 9 | 89 | 18 | 6 | 401 | 48 | -204 | 460 | D2 |
| 19 | 1 | 336 | 1 | 19 | 19 | 1 | 467 | 2 | 50 | 548 | E1 |
| 20 | 4 | 300 | 7 | -22 | 20 | 4 | 430 | 29 | -92 | 516 | E2 |
| 21 | 0 | 288 | -1 | -36 | 21 | 3 | 355 | 20 | -381 | 498 | F1 |
| 22 | 0 | 324 | -1 | 6 | 22 | 7 | 336 | 57 | -454 | 492 | F2 |
| 23 | | | | | | | | | | | |
| 24 | | | | | | | | | | | |
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| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 10 | 81 |
| 43-93 | 56 | 294 |
| 43-37 | 180 | 704 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 | Survey Unit & Type: Systematic grid | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS- 8 | Lower Walls | FSS systematics | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-23-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 940 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-23-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 7 | 4577 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/24/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Collect one static and one smear at each systematic location.

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 91 | -2 | -10 | 1 | 2 | 295 | 16 | -889 | N/A | WS1 |
| 2 | 0 | 102 | -2 | 28 | 2 | 3 | 412 | 28 | -250 | N/A | WS2 |
| 3 | 1 | 120 | 3 | 90 | 3 | 1 | 442 | 4 | -86 | N/A | WS3 |
| 4 | 1 | 110 | 3 | 56 | 4 | 3 | 475 | 28 | 94 | N/A | WS4 |
| 5 | 0 | 97 | -2 | 10 | 5 | 5 | 601 | 52 | 783 | N/A | WS5 |
| 6 | 0 | 111 | -2 | 59 | 6 | 2 | 504 | 16 | 253 | N/A | WS6 |
| 7 | 0 | 99 | -2 | 17 | 7 | 3 | 359 | 28 | -539 | N/A | WS7 |
| 8 | 0 | 106 | -2 | 42 | 8 | 1 | 281 | 4 | -965 | N/A | WS8 |
| 9 | 0 | 124 | -2 | 104 | 9 | 0 | 532 | -8 | 406 | N/A | WS9 |
| 10 | 1 | 116 | 3 | 77 | 10 | 3 | 552 | 28 | 515 | N/A | WS10 |
| 11 | 0 | 99 | -2 | 17 | 11 | 1 | 476 | 4 | 100 | N/A | WS11 |
| 12 | 0 | 91 | -2 | -10 | 12 | 4 | 306 | 40 | -829 | N/A | WS12 |
| 13 | 0 | 128 | -2 | 118 | 13 | 4 | 360 | 40 | -534 | N/A | WS13 |
| 14 | 0 | 111 | -2 | 59 | 14 | 4 | 380 | 40 | -424 | N/A | WS14 |
| 15 | 0 | 98 | -2 | 14 | 15 | 9 | 430 | 100 | -151 | N/A | WS15 |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
| 18 | | | | | 18 | | | | | | |
| 19 | | | | | 19 | | | | | | |
| 20 | | | | | 20 | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
| 25 | | | | | 25 | | | | | | |
| 26 | | | | | 26 | | | | | | |
| 27 | | | | | 27 | | | | | | |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 127 |
| 43-93 | 71 | 419 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 North Lower Walls | Survey Unit & Type: 1 m2 grids | Page of 1A of 1 |
|---|---|---|---|---|
| | | FSS-8 | Rescan of FSS grids | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Camille Patrick 1/31/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1135 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 12 | 4328 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: AED 1-31-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**100% Scan in grids, highest area 1 min. static count**

| Smears | | | | | Direct Frisk | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | No. | α | β | α | β | Grid | Location |
| 1 | 4 | 292 | 5 | -56 | 1 | 1 | 490 | -2 | 282 | I1 | NORTH L-WALL |
| 2 | 4 | 297 | 5 | -50 | 2 | 2 | 526 | 8 | 459 | J1 | NORTH L-WALL |
| 3 | 1 | 332 | 0 | -10 | 3 | 1 | 521 | -2 | 434 | J2 | NORTH L-WALL |
| 4 | 0 | 323 | -2 | -20 | 4 | 3 | 596 | 18 | 804 | K1 | NORTH L-WALL |
| 5 | 3 | 298 | 3 | -49 | 5 | 2 | 513 | 8 | 395 | L1 | NORTH L-WALL |
| 6 | 1 | 302 | 0 | -45 | 6 | 4 | 601 | 29 | 828 | L2 | NORTH L-WALL |
| 7 | 0 | 317 | -2 | -27 | 7 | 1 | 512 | -2 | 390 | M2 | NORTH L-WALL |
| 8 | 0 | 331 | -2 | -11 | 8 | 2 | 540 | 8 | 528 | N1 | NORTH L-WALL |
| 9 | 0 | 305 | -2 | -41 | 9 | 2 | 550 | 8 | 577 | N2 | NORTH L-WALL |
| 10 | 0 | 321 | -2 | -23 | 10 | 2 | 562 | 8 | 636 | O1 | NORTH L-WALL |
| 11 | 0 | 331 | -2 | -11 | 11 | 0 | 532 | -12 | 489 | O2 | NORTH L-WALL |
| 12 | 3 | 314 | 3 | -31 | 12 | 3 | 690 | 18 | 1267 | P1 | NORTH L-WALL |
| 13 | 0 | 331 | -2 | -11 | 13 | 0 | 467 | -12 | 168 | P2 | NORTH L-WALL |
| 14 | 1 | 323 | 0 | -20 | 14 | 0 | 702 | -12 | 1326 | Q1 | NORTH L-WALL |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 14 | 84 |
| 43-89 | 69 | 368 |

Signed: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6 A1 SOUTH LOWER WALL | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-8 | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1-11-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 1064 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | 1/16/2018 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 8 | 4539 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 53 | 8868 | 10 | 0.5 |
| | Reviewed By: CBP 1/18/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan with LM43-37 - take a direct static and a smear at center of grid elemetns

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 324 | -1 | 6 | 1 | 5 | 423 | 38 | -119 | 480 | A1 |
| 2 | 1 | 330 | 1 | 13 | 2 | 5 | 394 | 38 | -231 | 386 | A2 |
| 3 | 0 | 324 | -1 | 6 | 3 | 2 | 383 | 11 | -273 | 489 | B1 |
| 4 | 1 | 288 | 1 | -36 | 4 | 4 | 413 | 29 | -157 | 398 | B2 |
| 5 | 1 | 291 | 1 | -33 | 5 | 7 | 395 | 57 | -227 | 514 | C1 |
| 6 | 1 | 317 | 1 | -3 | 6 | 3 | 394 | 20 | -231 | 462 | C2 |
| 7 | 0 | 302 | -1 | -20 | 7 | 4 | 414 | 29 | -154 | 544 | D1 |
| 8 | 4 | 296 | 7 | -27 | 8 | 5 | 384 | 38 | -269 | 487 | D2 |
| 9 | 0 | 318 | -1 | -1 | 9 | 4 | 446 | 29 | -30 | 497 | E1 |
| 10 | 1 | 290 | 1 | -34 | 10 | 8 | 375 | 66 | -304 | 513 | E2 |
| 11 | 0 | 307 | -1 | -14 | 11 | 5 | 474 | 38 | 77 | 501 | F1 |
| 12 | 1 | 312 | 1 | -8 | 12 | 2 | 420 | 11 | -131 | 512 | F2 |
| 13 | 0 | 330 | -1 | 13 | 13 | 4 | 422 | 29 | -123 | 501 | G1 |
| 14 | 1 | 287 | 1 | -37 | 14 | 2 | 415 | 11 | -150 | 525 | G2 |
| 15 | 2 | 351 | 3 | 37 | 15 | 4 | 463 | 29 | 35 | 546 | H1 |
| 16 | 0 | 312 | -1 | -8 | 16 | 1 | 450 | 2 | -15 | 517 | H2 |
| 17 | 0 | 276 | -1 | -50 | 17 | 3 | 436 | 20 | -69 | 570 | I1 |
| 18 | 0 | 327 | -1 | 9 | 18 | 3 | 452 | 20 | -7 | 554 | I2 |
| 19 | 1 | 303 | 1 | -19 | 19 | 7 | 479 | 57 | 97 | 636 | J1 |
| 20 | 0 | 318 | -1 | -1 | 20 | 1 | 590 | 2 | 524 | 493 | J2 |
| 21 | 0 | 301 | -1 | -21 | 21 | 6 | 476 | 48 | 85 | 615 | K1 |
| 22 | 0 | 332 | -1 | 15 | 22 | 2 | 585 | 11 | 505 | 540 | K2 |
| 23 | 2 | 309 | 3 | -12 | 23 | 2 | 515 | 11 | 235 | 670 | L1 |
| 24 | 1 | 322 | 1 | 3 | 24 | 3 | 572 | 20 | 455 | 559 | L2 |
| 25 | 0 | 316 | -1 | -4 | 25 | 0 | 476 | -7 | 85 | 653 | M1 |
| 26 | 0 | 312 | -1 | -8 | 26 | 1 | 475 | 2 | 81 | 640 | M2 |
| 27 | 0 | 285 | -1 | -40 | 27 | 3 | 577 | 20 | 474 | 677 | N1 |
| 28 | 0 | 303 | -1 | -19 | 28 | 5 | 596 | 38 | 547 | 640 | N2 |
| 29 | 1 | 307 | 1 | -14 | 29 | 3 | 511 | 20 | 220 | 699 | O1 |
| 30 | 0 | 310 | -1 | -11 | 30 | 1 | 489 | 2 | 135 | 631 | O2 |
| 31 | 2 | 292 | 3 | -32 | 31 | 1 | 587 | 2 | 513 | 533 | P1 |
| 32 | 0 | 297 | -1 | -26 | 32 | 0 | 433 | -7 | -80 | 533 | P2 |
| 33 | 0 | 321 | -1 | 2 | 33 | 1 | 501 | 2 | 181 | 696 | Q1 |
| 34 | 0 | 306 | -1 | -15 | 34 | 3 | 420 | 20 | -131 | 576 | Q2 |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 10 | 81 |
| 43-93 | 56 | 294 |
| 43-37 | 180 | 704 |

Signature: Arthur Desroseirs CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6 A WALLS | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | ADDITIONAL STATICS | FSS-8 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Camille Patrick 3/1/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 37 | 1 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 145474 | 7/10/2018 | 43-93 | 100 | PR299606 | 7/10/2018 | 0.4173 | 0.4921 | 3 | 339 | 1 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: AED 04-03-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | |
| No. | α | β | α | β | | α | β | α | β | Location # |
| 1 | 2 | 46 | 6 | 31 | 1 | 3 | 281 | 0 | -236 | NWA2 |
| 2 | 2 | 51 | 6 | 49 | 2 | 5 | 314 | 19 | -102 | NWB2 |
| 3 | 5 | 50 | 23 | 45 | 3 | 11 | 478 | 77 | 565 | NWF2 |
| 4 | 6 | 61 | 29 | 83 | 4 | 3 | 450 | 0 | 451 | NWJ1 |
| 5 | 2 | 57 | 6 | 70 | 5 | 3 | 447 | 0 | 439 | NWK1 |
| 6 | 2 | 44 | 6 | 24 | 6 | 7 | 414 | 38 | 305 | MWL1 |
| 7 | 3 | 44 | 12 | 24 | 7 | 2 | 458 | -10 | 484 | NWM1 |
| 8 | 3 | 47 | 12 | 35 | 8 | 3 | 548 | 0 | 849 | NWQ1 |
| 9 | 2 | 64 | 6 | 94 | 9 | 7 | 282 | 38 | -232 | EWA1 |
| 10 | 4 | 44 | 17 | 24 | 10 | 5 | 298 | 19 | -167 | EWF1 |
| 11 | 4 | 67 | 17 | 104 | 11 | 1 | 446 | -19 | 435 | SWN1 |
| 12 | 4 | 49 | 17 | 42 | 12 | 5 | 496 | 19 | 638 | SWM1 |
| 13 | 4 | 67 | 17 | 104 | 13 | 4 | 423 | 10 | 341 | SWK2 |
| 14 | 5 | 51 | 23 | 49 | 14 | 7 | 379 | 38 | 163 | SWJ1 |
| 15 | 5 | 52 | 23 | 52 | 15 | 1 | 387 | -19 | 195 | SWG2 |
| 16 | 2 | 71 | 6 | 118 | 16 | 1 | 310 | -19 | -118 | SWE2 |
| 17 | 1 | 40 | 0 | 10 | 17 | 1 | 352 | -19 | 53 | SWD1 |
| 18 | 2 | 63 | 6 | 90 | 18 | 1 | 292 | -19 | -191 | WWF2 |
| 19 | 2 | 41 | 6 | 14 | 19 | 0 | 253 | -29 | -350 | WWB2 |
| 20 | | | -6 | -129 | 20 | | | -29 | -1378 | |
| 21 | | | -6 | -129 | 21 | | | -29 | -1378 | |
| 22 | | | -6 | -129 | 22 | | | -29 | -1378 | |
| 23 | | | -6 | -129 | 23 | | | -29 | -1378 | |
| 24 | | | -6 | -129 | 24 | | | -29 | -1378 | |
| 25 | | | -6 | -129 | 25 | | | -29 | -1378 | |
| 26 | | | -6 | -129 | 26 | | | -29 | -1378 | |
| 27 | | | -6 | -129 | 27 | | | -29 | -1378 | |
| 28 | | | -6 | -129 | 28 | | | -29 | -1378 | |
| 29 | | | -6 | -129 | 29 | | | -29 | -1378 | |
| 30 | | | -6 | -129 | 30 | | | -29 | -1378 | |
| 31 | | | -6 | -129 | 31 | | | -29 | -1378 | |
| 32 | | | -6 | -129 | 32 | | | -29 | -1378 | |
| 33 | | | -6 | -129 | 33 | | | -29 | -1378 | |
| 34 | | | -6 | -129 | 34 | | | -29 | -1378 | |
| 35 | | | -6 | -129 | 35 | | | -29 | -1378 | |
| 36 | | | -6 | -129 | 36 | | | -29 | -1378 | |
| 37 | | | -6 | -129 | 37 | | | -29 | -1378 | |
| 38 | | | -6 | -129 | 38 | | | -29 | -1378 | |
| 39 | | | -6 | -129 | 39 | | | -29 | -1378 | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 44 | 109 |
| 43-93 | 106 | 360 |

Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FSS-9

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 UPPER EAST WALL | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-9 | | FSS scans | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-16-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 966 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-16-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 4/17/2018 | 0.4367 | 0.5194 | 16 | 4441 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 53 | 8868 | 10 | 0.5 |
| | Reviewed By: CBP 1-17-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 2 | 321 | 3 | 36 | 1 | 5 | 383 | 31 | -235 | 508 | A3 |
| 2 | 0 | 294 | -1 | 5 | 2 | 4 | 394 | 22 | -193 | 468 | B3 |
| 3 | 0 | 357 | -1 | 78 | 3 | 10 | 399 | 77 | -174 | 511 | C3 |
| 4 | 0 | 327 | -1 | 43 | 4 | 9 | 396 | 68 | -185 | 508 | E3 |
| 5 | 0 | 318 | -1 | 33 | 5 | 7 | 416 | 49 | -108 | 446 | F3 |
| 6 | 0 | 294 | -1 | 5 | 6 | 8 | 374 | 59 | -270 | 462 | A4 |
| 7 | 1 | 279 | 1 | -13 | 7 | N/R | N/R | N/R | N/R | 597 | B4 |
| 8 | 1 | 261 | 1 | -33 | 8 | 4 | 390 | 22 | -208 | 617 | C4 |
| 9 | 0 | 345 | -1 | 64 | 9 | 3 | 520 | 13 | 292 | 643 | E4 |
| 10 | 1 | 273 | 1 | -19 | 10 | 8 | 391 | 59 | -204 | 579 | F4 |
| 11 | 1 | 327 | 1 | 43 | 11 | N/R | N/R | N/R | N/R | 503 | D3 |
| 12 | 1 | 273 | 1 | -19 | 12 | N/R | N/R | N/R | N/R | 568 | D4 |
| 13 | | | | | 13 | | | | | | |
| 14 | | | | | 14 | | | | | | |
| 15 | | | | | 15 | | | | | | |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
| 18 | | | | | 18 | | | | | | |
| 19 | | | | | 19 | | | | | | |
| 20 | | | | | 20 | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
| 25 | | | | | 25 | | | | | | |
| 26 | | | | | 26 | | | | | | |
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| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 11 | 77 |
| 43-93 | 67 | 291 |
| 43-37 | 180 | 704 |

Note: "N/R" means that data were not recorded. The four highest grid elements were rescanned on 1/31/18

Note: Portions of this wall are covered by the HVAC system, which is reported under FSS-13.

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 | Survey Unit & Type: Systematic grid | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-9 Ceiling | | FSS ceiling scans | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-24-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1042 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-24-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 16 | 4550 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/24/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Scan 1m2 judgmental locations - take a direct frisk and a smear at highest spot per grid**

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 110 | -2 | 20 | 1 | 7 | 479 | 65 | 131 | N/A | C1 |
| 2 | 1 | 90 | 3 | -49 | 2 | 5 | 538 | 41 | 453 | N/A | C2 |
| 3 | 0 | 103 | -2 | -4 | 3 | 4 | 602 | 29 | 803 | N/A | C3 |
| 4 | 0 | 111 | -2 | 24 | 4 | 6 | 443 | 53 | -66 | N/A | C4 |
| 5 | 1 | 119 | 3 | 51 | 5 | 7 | 522 | 65 | 366 | N/A | C5 |
| 6 | 2 | 101 | 9 | -11 | 6 | 14 | 503 | 150 | 262 | N/A | C6 |
| 7 | 1 | 133 | 3 | 100 | 7 | 5 | 634 | 41 | 978 | N/A | C7 |
| 8 | 0 | 91 | -2 | -46 | 8 | 1 | 605 | -7 | 819 | N/A | C8 |
| 9 | 1 | 113 | 3 | 31 | 9 | 3 | 513 | 17 | 317 | N/A | C9 |
| 10 | 0 | 102 | -2 | -8 | 10 | 7 | 419 | 65 | -197 | N/A | C10 |
| 11 | 0 | 107 | -2 | 10 | 11 | 4 | 590 | 29 | 737 | N/A | C11 |
| 12 | 1 | 106 | 3 | 6 | 12 | 7 | 642 | 65 | 1021 | N/A | C12 |
| 13 | 4 | 108 | 21 | 13 | 13 | 4 | 512 | 29 | 311 | N/A | C13 |
| 14 | 1 | 125 | 3 | 72 | 14 | 2 | 395 | 5 | -328 | N/A | C14 |
| 15 | 1 | 112 | 3 | 27 | 15 | 1 | 457 | -7 | 11 | N/A | C15 |
| 16 | 0 | 88 | -2 | -56 | 16 | 6 | 463 | 53 | 44 | N/A | C16 |
| 17 | 0 | 119 | -2 | 51 | 17 | 3 | 427 | 17 | -153 | N/A | C17 |
| 18 | 1 | 96 | 3 | -29 | 18 | 0 | 438 | -19 | -93 | N/A | C18 |
| 19 | 0 | 124 | -2 | 69 | 19 | 2 | 444 | 5 | -60 | N/A | C19 |
| 20 | 0 | 116 | -2 | 41 | 20 | 15 | 545 | 162 | 492 | N/A | C20 |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
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| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 133 |
| 43-93 | 89 | 418 |
| | | |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 | Survey Unit & Type: Systematic grid | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-9B | Upper Walls | FSS | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-24-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 1042 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-24-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 16 | 4550 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/24/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 105 | -1 | 3 | 1 | 8 | 375 | 77 | -437 | N/A | US1 |
| 2 | 0 | 98 | -1 | -22 | 2 | 5 | 377 | 41 | -426 | N/A | US2 |
| 3 | 0 | 104 | -1 | -1 | 3 | 5 | 415 | 41 | -218 | N/A | US3 |
| 4 | 2 | 117 | 11 | 45 | 4 | 5 | 429 | 41 | -142 | N/A | US4 |
| 5 | 0 | 112 | -1 | 27 | 5 | 3 | 445 | 17 | -55 | N/A | US5 |
| 6 | 0 | 120 | -1 | 55 | 6 | 1 | 424 | -7 | -169 | N/A | US6 |
| 7 | 1 | 111 | 5 | 24 | 7 | 12 | 409 | 126 | -251 | N/A | US7 |
| 8 | 0 | 122 | -1 | 62 | 8 | 9 | 368 | 89 | -475 | N/A | US8 |
| 9 | 1 | 81 | 5 | -81 | 9 | 3 | 371 | 17 | -459 | N/A | US9 |
| 10 | 0 | 93 | -1 | -39 | 10 | 6 | 427 | 53 | -153 | N/A | US10 |
| 11 | 1 | 107 | 5 | 10 | 11 | 2 | 407 | 5 | -262 | N/A | US11 |
| 12 | 0 | 84 | -1 | -70 | 12 | 2 | 362 | 5 | -508 | N/A | US12 |
| 13 | 0 | 128 | -1 | 83 | 13 | 5 | 425 | 41 | -164 | N/A | US13 |
| 14 | 0 | 128 | -1 | 83 | 14 | 2 | 376 | 5 | -431 | N/A | US14 |
| 15 | 0 | 114 | -1 | 34 | 15 | 4 | 381 | 29 | -404 | N/A | US15 |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
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| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 24 | 133 |
| 43-93 | 89 | 418 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6A1 UPPER NORTH WALL | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-9 | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-16-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 966 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-16-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 4/17/2018 | 0.4367 | 0.5194 | 16 | 4441 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 53 | 8868 | 10 | 0.5 |
| | Reviewed By: CBP 1-17-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 330 | 1 | 47 | 1 | 2 | 342 | 4 | -393 | 576 | A3 |
| 2 | 1 | 270 | 1 | -23 | 2 | 9 | 512 | 68 | 261 | 581 | A4 |
| 3 | 1 | 303 | 1 | 15 | 3 | 1 | 364 | -5 | -308 | 490 | B3 |
| 4 | 1 | 282 | 1 | -9 | 4 | 8 | 559 | 59 | 442 | 588 | B4 |
| 5 | 2 | 357 | 3 | 78 | 5 | 5 | 376 | 31 | -262 | 554 | C3 |
| 6 | 0 | 336 | -1 | 54 | 6 | 4 | 527 | 22 | 319 | 574 | C4 |
| 7 | 1 | 273 | 1 | -19 | 7 | 10 | 396 | 77 | -185 | 509 | D3 |
| 8 | 2 | 276 | 3 | -16 | 8 | 5 | 424 | 31 | -77 | 617 | D4 |
| 9 | 0 | 324 | -1 | 40 | 9 | 3 | 364 | 13 | -308 | 506 | E3 |
| 10 | 1 | 237 | 1 | -61 | 10 | 4 | 471 | 22 | 104 | 563 | E4 |
| 11 | 0 | 276 | -1 | -16 | 11 | 6 | 333 | 40 | -428 | 409 | F3 |
| 12 | 1 | 318 | 1 | 33 | 12 | 3 | 409 | 13 | -135 | 545 | F4 |
| 13 | 3 | 276 | 5 | -16 | 13 | 7 | 355 | 49 | -343 | 507 | G3 |
| 14 | 1 | 360 | 1 | 81 | 14 | 3 | 401 | 13 | -166 | 539 | G4 |
| 15 | 3 | 378 | 5 | 102 | 15 | 10 | 386 | 77 | -224 | 476 | H3 |
| 16 | 0 | 303 | -1 | 15 | 16 | 5 | 348 | 31 | -370 | 527 | H4 |
| 17 | 1 | 279 | 1 | -13 | 17 | 4 | 419 | 22 | -97 | 504 | I3 |
| 18 | 4 | 333 | 7 | 50 | 18 | 9 | 409 | 68 | -135 | 560 | I4 |
| 19 | 0 | 282 | -1 | -9 | 19 | 4 | 502 | 22 | 223 | 574 | J3 |
| 20 | 0 | 294 | -1 | 5 | 20 | 4 | 456 | 22 | 46 | 482 | J4 |
| 21 | 0 | 249 | -1 | -47 | 21 | 0 | 442 | -15 | -8 | 497 | K3 |
| 22 | 0 | 336 | -1 | 54 | 22 | 11 | 494 | 86 | 192 | 520 | K4 |
| 23 | 2 | 372 | 3 | 95 | 23 | 22 | 500 | 187 | 215 | 580 | L3 |
| 24 | 0 | 342 | -1 | 61 | 24 | 5 | 457 | 31 | 50 | 503 | L4 |
| 25 | 0 | 303 | -1 | 15 | 25 | 19 | 503 | 159 | 227 | 546 | M3 |
| 26 | 2 | 327 | 3 | 43 | 26 | 2 | 463 | 4 | 73 | 480 | M4 |
| 27 | 0 | 327 | -1 | 43 | 27 | 8 | 415 | 59 | -112 | 611 | N3 |
| 28 | 1 | 279 | 1 | -13 | 28 | 2 | 503 | 4 | 227 | 567 | N4 |
| 29 | 0 | 336 | -1 | 54 | 29 | 5 | 438 | 31 | -23 | 496 | O3 |
| 30 | 2 | 297 | 3 | 8 | 30 | 6 | 324 | 40 | -462 | 568 | O4 |
| 31 | 0 | 315 | -1 | 29 | 31 | 11 | 438 | 86 | -23 | 491 | P3 |
| 32 | 2 | 285 | 3 | -6 | 32 | 2 | 437 | 4 | -27 | 507 | P4 |
| 33 | 0 | 240 | -1 | -58 | 33 | 2 | 403 | 4 | -158 | 485 | Q3 |
| 34 | 0 | 351 | -1 | 71 | 34 | 2 | 381 | 4 | -243 | 530 | Q4 |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 11 | 77 |
| 43-93 | 67 | 291 |
| 43-37 | 180 | 704 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 East Upper Wall | Survey Unit & Type: 1 m2 grids | Page of 1A of 1 |
|---|---|---|---|---|
| | FSS-9 | | Rescan of grids | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Camille Patrick 1/31/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1135 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 12 | 4328 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: AED 1-31-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**100% Scan in grids, highest area 1 min. static count**

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | Grid | Location |
| 1 | | | | | | | | | | | |
| 2 | 1 | 316 | 0 | -28 | | 1 | 423 | -2 | -48 | B4 | EAST UPPER WALL |
| 3 | 2 | 364 | 2 | 27 | | 2 | 435 | 8 | 11 | C4 | EAST UPPER WALL |
| 4 | 0 | 304 | -2 | -42 | | 0 | 455 | -12 | 109 | E4 | EAST UPPER WALL |
| 5 | 3 | 331 | 3 | -11 | | 3 | 452 | 18 | 95 | F4 | EAST UPPER WALL |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
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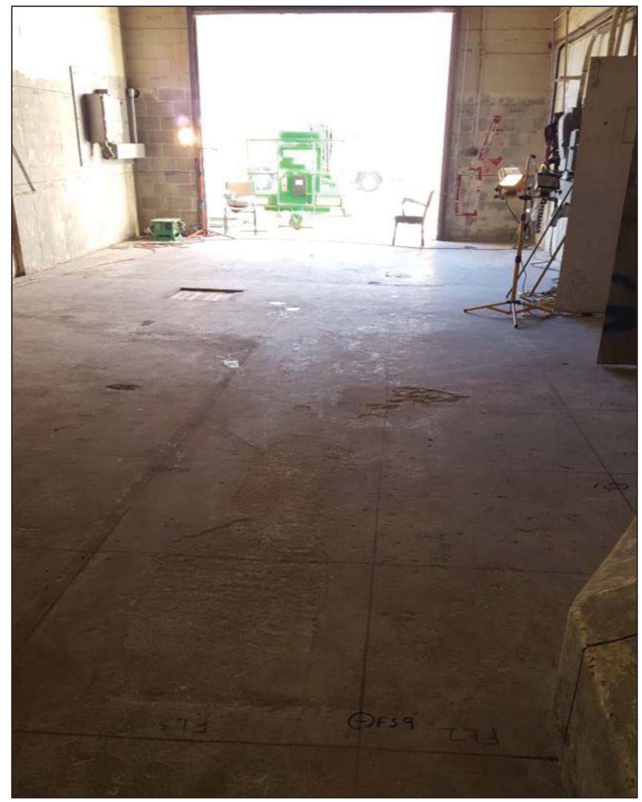
| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 14 | 84 |
| 43-89 | 69 | 368 |



Reviewed: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 North UW rescan | Survey Unit & Type: 1 m2 grids | Page of 1A of 1 |
|---|---|---|---|---|
| | FSS-9 | | Rescan of grids | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Camille Patrick 1/31/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1135 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 12 | 4328 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: AED 1-31-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

100% Scan in grids, highest area 1 min. static count

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | Grid | Location |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
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| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | 4 | 294 | 5 | -54 | 15 | 4 | 453 | 29 | 99 | A4 | NORTH UW |
| 16 | 0 | 321 | -2 | -23 | 16 | 0 | 441 | -12 | 40 | B4 | NORTH UW |
| 17 | 6 | 344 | 9 | 4 | 17 | 6 | 400 | 49 | -162 | D4 | NORTH UW |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
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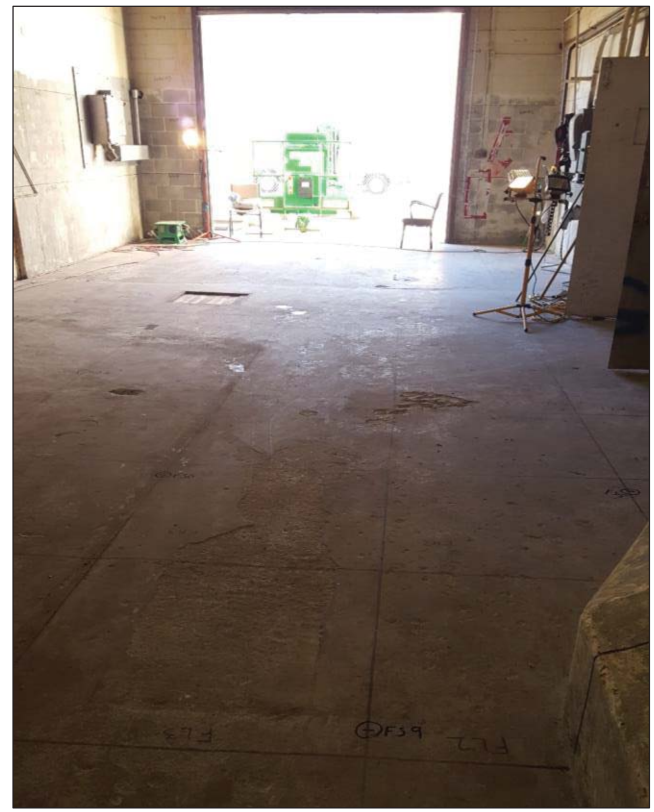
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 14 | 84 |
| 43-89 | 69 | 368 |



Reviewed: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6A1 UPPER SOUTH WALL | | | | Survey Unit & Type: 1 m2 grids | | | | | Page of 1 of 1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Post LBP abatement survey | | | | | | | | |
| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-16-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 966 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-16-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 4/17/2018 | 0.4367 | 0.5194 | 16 | 4441 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 53 | 8868 | 10 | 0.5 |
| | Reviewed By: CBP 1-17-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 2 | 327 | 3 | 43 | 1 | 5 | 361 | 31 | -320 | 517 | A3 |
| 2 | 3 | 342 | 5 | 61 | 2 | 3 | 352 | 13 | -355 | 514 | A4 |
| 3 | 1 | 288 | 1 | -2 | 3 | 5 | 362 | 31 | -316 | 585 | B3 |
| 4 | 0 | 339 | -1 | 57 | 4 | 6 | 412 | 40 | -124 | 525 | B4 |
| 5 | 4 | 351 | 7 | 71 | 5 | 10 | 394 | 77 | -193 | 539 | C3 |
| 6 | 0 | 396 | -1 | 123 | 6 | 6 | 428 | 40 | -62 | 579 | C4 |
| 7 | 2 | 306 | 3 | 19 | 7 | 2 | 463 | 4 | 73 | 517 | D3 |
| 8 | 1 | 351 | 1 | 71 | 8 | 1 | 391 | -5 | -204 | 523 | D4 |
| 9 | 0 | 309 | -1 | 22 | 9 | 5 | 431 | 31 | -50 | 499 | E3 |
| 10 | 1 | 294 | 1 | 5 | 10 | 1 | 438 | -5 | -23 | 574 | E4 |
| 11 | 2 | 309 | 3 | 22 | 11 | 11 | 366 | 86 | -301 | 493 | F3 |
| 12 | 1 | 273 | 1 | -19 | 12 | 6 | 397 | 40 | -181 | 504 | F4 |
| 13 | 3 | 321 | 5 | 36 | 13 | 6 | 391 | 40 | -204 | 498 | G3 |
| 14 | 0 | 273 | -1 | -19 | 14 | 1 | 401 | -5 | -166 | 524 | G4 |
| 15 | 1 | 294 | 1 | 5 | 15 | 6 | 407 | 40 | -143 | 556 | H3 |
| 16 | 1 | 345 | 1 | 64 | 16 | 1 | 398 | -5 | -178 | 572 | H4 |
| 17 | 0 | 321 | -1 | 36 | 17 | 7 | 392 | 49 | -201 | 585 | I3 |
| 18 | 1 | 300 | 1 | 12 | 18 | 4 | 452 | 22 | 30 | 561 | I4 |
| 19 | 0 | 345 | -1 | 64 | 19 | 4 | 456 | 22 | 46 | 550 | J3 |
| 20 | 1 | 294 | 1 | 5 | 20 | 1 | 434 | -5 | -39 | 627 | J4 |
| 21 | 0 | 282 | -1 | -9 | 21 | N/R | N/R | N/A | N/A | 559 | K3 |
| 22 | 1 | 309 | 1 | 22 | 22 | N/R | N/R | N/A | N/A | 581 | K4 |
| 23 | 1 | 300 | 1 | 12 | 23 | N/R | N/R | N/A | N/A | 570 | L3 |
| 24 | 0 | 261 | -1 | -33 | 24 | N/R | N/R | N/A | N/A | 516 | L4 |
| 25 | 1 | 252 | 1 | -44 | 25 | N/R | N/R | N/A | N/A | 530 | M3 |
| 26 | 0 | 285 | -1 | -6 | 26 | N/R | N/R | N/A | N/A | 640 | M4 |
| 27 | 0 | 249 | -1 | -47 | 27 | N/R | N/R | N/A | N/A | 582 | N3 |
| 28 | 2 | 327 | 3 | 43 | 28 | N/R | N/R | N/A | N/A | 522 | N4 |
| 29 | 0 | 336 | -1 | 54 | 29 | N/R | N/R | N/A | N/A | 503 | O3 |
| 30 | 2 | 252 | 3 | -44 | 30 | N/R | N/R | N/A | N/A | 594 | O4 |
| 31 | 1 | 309 | 1 | 22 | 31 | N/R | N/R | N/A | N/A | 502 | P3 |
| 32 | 1 | 276 | 1 | -16 | 32 | N/R | N/R | N/A | N/A | 563 | P4 |
| 33 | 0 | 333 | -1 | 50 | 33 | N/R | N/R | N/A | N/A | 464 | Q3 |
| 34 | 1 | 318 | 1 | 33 | 34 | N/R | N/R | N/A | N/A | 527 | Q4 |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 11 | 77 |
| 43-93 | 67 | 291 |
| 43-37 | 180 | 704 |

Direct frisks were not performed in grid elements K3 through Q4 during the scan survey. Damaged mylar windows resutled in a shortage of instruments. The FSS Plan requires direct frisk measuremetns at systematic locations and biased locations (where the scan result exceeds the action level). The routine direct frosks are optional and were discontinued on this survey due to a shortage of meters. Biased frisks were performed at K4, M4. N3 and Q4 during the rescan survey.

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

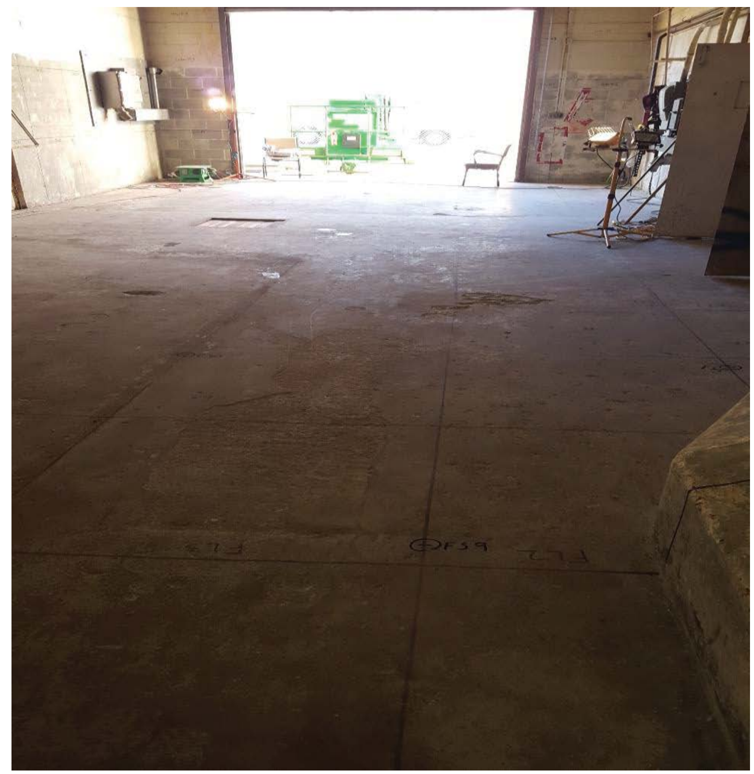
| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 South Upper Wall | Survey Unit & Type: 1 m2 grids | Page of 1A of 1 |
|---|---|---|---|---|
| | FSS-9 | | Rescan of grid elements | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Camille Patrick 1/31/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1135 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 12 | 4328 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: AED 1-31-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**100% Scan in grids, highest area 1 min. static count**

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | Grid | Location |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | | | | | | | | | | | |
| 19 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | 1 | 362 | 0 | 25 | 22 | 1 | 382 | -3 | -313 | B3 | SOUTH UPPER WALL |
| 23 | 4 | 344 | 5 | 4 | 23 | 1 | 441 | -3 | 50 | C4 | SOUTH UPPER WALL |
| 24 | 4 | 338 | 5 | -3 | 24 | 4 | 448 | 36 | 94 | I3 | SOUTH UPPER WALL |
| 25 | 1 | 294 | 0 | -54 | 25 | 3 | 432 | 23 | -5 | J4 | SOUTH UPPER WALL |
| 26 | 3 | 335 | 3 | -6 | 26 | 1 | 436 | -3 | 20 | K4 | SOUTH UPPER WALL |
| 27 | 1 | 350 | 0 | 11 | 27 | 2 | 440 | 10 | 44 | M4 | SOUTH UPPER WALL |
| 28 | 2 | 307 | 2 | -39 | 28 | 3 | 417 | 23 | -97 | N3 | SOUTH UPPER WALL |
| 29 | 3 | 339 | 3 | -2 | 29 | 0 | 413 | -15 | -122 | Q4 | SOUTH UPPER WALL |
| 30 | | | | | | | | | | | |
| 31 | | | | | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
| 34 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 36 | | | | | | | | | | | |
| 37 | | | | | | | | | | | |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 14 | 84 |
| 43-89 | 69 | 368 |



Reviewed: Artuhr Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6A1 UPPER WEST WALL | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-9 | | FSS scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-16-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 966 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-16-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 4/17/2018 | 0.4367 | 0.5194 | 16 | 4441 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 253275 | 11/17/2018 | 43-37 | 100 | PR278380 | 11/17/2018 | 0.3774 | 0.4203 | 53 | 8868 | 10 | 0.5 |
| | Reviewed By: CBP 1-17-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan with LM43-37 - take a direct static and a smear at the center of each grid element

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 348 | -1 | 67 | 1 | 1 | 380 | -5 | -247 | 478 | A3 |
| 2 | 1 | 321 | 1 | 36 | 2 | 6 | 426 | 40 | -70 | 503 | A4 |
| 3 | 4 | 283 | 7 | -8 | 3 | 4 | 422 | 22 | -85 | 483 | B3 |
| 4 | 1 | 345 | 1 | 64 | 4 | 4 | 354 | 22 | -347 | 462 | B4 |
| 5 | 3 | 315 | 5 | 29 | 5 | 3 | 426 | 13 | -70 | 520 | C3 |
| 6 | 1 | 294 | 1 | 5 | 6 | 2 | 377 | 4 | -258 | 492 | C4 |
| 7 | 2 | 369 | 3 | 92 | 7 | 8 | 417 | 59 | -104 | 509 | D3 |
| 8 | 1 | 294 | 1 | 5 | 8 | 3 | 347 | 13 | -374 | 495 | D4 |
| 9 | 2 | 345 | 3 | 64 | 9 | 4 | 299 | 22 | -559 | 484 | E3 |
| 10 | 5 | 344 | 8 | 63 | 10 | 1 | 373 | -5 | -274 | 505 | E4 |
| 11 | 1 | 309 | 1 | 22 | 11 | 5 | 354 | 31 | -347 | 461 | F3 |
| 12 | 2 | 333 | 3 | 50 | 12 | 5 | 330 | 31 | -439 | 516 | F4 |
| 13 | | | | | 13 | | | | | | |
| 14 | | | | | 14 | | | | | | |
| 15 | | | | | 15 | | | | | | |
| 16 | | | | | 16 | | | | | | |
| 17 | | | | | 17 | | | | | | |
| 18 | | | | | 18 | | | | | | |
| 19 | | | | | 19 | | | | | | |
| 20 | | | | | 20 | | | | | | |
| 21 | | | | | 21 | | | | | | |
| 22 | | | | | 22 | | | | | | |
| 23 | | | | | 23 | | | | | | |
| 24 | | | | | 24 | | | | | | |
| 25 | | | | | 25 | | | | | | |
| 26 | | | | | 26 | | | | | | |
| 27 | | | | | 27 | | | | | | |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 11 | 77 |
| 43-93 | 67 | 291 |
| 43-37 | 180 | 704 |

Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FSS-10

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form

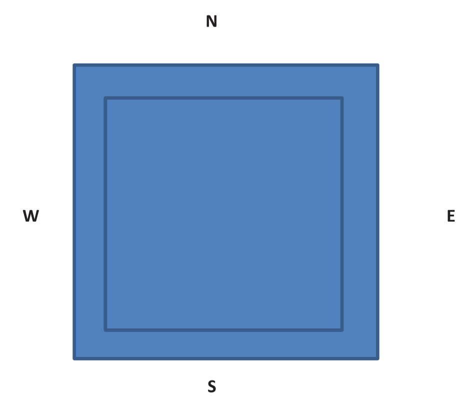
Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: CELL 6A1 TRENCH IN GROUND | Survey Unit & Type: | Page of 1 of 1 |
|---|---|---|---|---|
| | INSIDE UTILITY TRENCH | Drain opening and underside floor slab | FSS-10 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1/30/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 1035 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Tom Hunter 1/30/18 | 2360/43-93 | 268477 | 12/19/2018 | 43-93 | 100 | PR289427 | 4/17/2018 | 0.4606 | 0.5266 | 14 | 4963 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/30/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | Areas scanned with 43-93 |
| No. | α | β | α | β | | α | β | α | β | Location # |
| 1 | 0 | 97 | -1 | -23 | 1 | | | | | SL |
| 2 | 0 | 111 | -1 | 26 | 2 | 4 | 869 | 23 | 1415 | WL |
| 3 | 0 | 126 | -1 | 78 | 3 | 2 | 654 | 5 | 599 | NL |
| 4 | 0 | 100 | -1 | -12 | 4 | | | | | EL |
| 5 | 0 | 89 | -1 | -50 | 5 | 13 | 1012 | 101 | 1959 | SW |
| 6 | 0 | 130 | -1 | 92 | 6 | 9 | 694 | 66 | 751 | WW |
| 7 | 0 | 100 | -1 | -12 | 7 | 9 | 591 | 66 | 360 | NW |
| 8 | 1 | 113 | 5 | 33 | 8 | 6 | 803 | 40 | 1165 | EW |
| 9 | 0 | 104 | -1 | 2 | 9 | 5 | 623 | 31 | 481 | UW |
| 10 | 1 | 99 | 5 | -16 | 10 | 3 | 632 | 14 | 515 | US |
| 11 | 0 | 95 | -1 | -30 | 11 | 5 | 623 | 31 | 481 | UW |
| 12 | 2 | 100 | 11 | -12 | 12 | 8 | 600 | 57 | 394 | UN |
| 13 | | | | | 13 | 1 | 728 | -3 | 880 | BUCKET |
| 14 | | | | | 14 | 5 | 1090 | 31 | 2255 | BUCKET |
| 15 | | | | | 15 | 1 | 824 | -3 | 1245 | SEDIMENT |
| 16 | | | | | 16 | 2 | 848 | 5 | 1336 | SEDIMENT |
| 17 | | | | | 17 | 2 | 1056 | 5 | 2126 | SEDIMENT |
| 18 | | | | | 18 | | | | | |
| 19 | | | | | 19 | | | | | |
| 20 | | | | | 20 | | | | | |
| 21 | | | | | 21 | | | | | |
| 22 | | | | | 22 | | | | | |
| 23 | | | | | 23 | | | | | |
| 24 | | | | | 24 | | | | | |
| 25 | | | | | 25 | | | | | |
| 26 | | | | | 26 | | | | | |
| 27 | | | | | 27 | | | | | |
| 28 | | | | | 28 | | | | | |
| 29 | | | | | 29 | | | | | |
| 30 | | | | | 30 | | | | | |
| 31 | | | | | 31 | | | | | |
| 32 | | | | | 32 | | | | | |
| 33 | | | | | 33 | | | | | |
| 34 | | | | | 34 | | | | | |
| 35 | | | | | 35 | | | | | |
| 36 | | | | | 36 | | | | | |
| 37 | | | | | 37 | | | | | |
| 38 | | | | | 38 | | | | | |
| 39 | | | | | 39 | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 24 | 132 |
| 43-93 | 61 | 303 |




l = lip
W = wall (edge of slab) below lip
U = underneath slab

Note: Bucket disposed as LLRW; sediment data FYI only

Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FSS-11

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 3A FLOOR | Survey Unit & Type: 1 m2 grids | Page of 1A of 1 |
|---|---|---|---|---|
| | | FSS-11 | Floor Scans | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | David Davis 1-3-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 1115 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-3-18 | 2360/43-89 | 310164 | 4/17/2018 | 43-89 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 7 | 4651 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 287606 | 11/17/2018 | 43-37 | 100 | PR278379 | 11/17/2018 | 0.3845 | 0.4517 | 1 | 8733 | 10 | 0.5 |
| | Reviewed: CBP 1/8/18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 17 | 4320 | 10 | 1 |
| | | | | | | | | | #N/A | #N/A | | | | |

Rescan and take a 1 minute count and a smear at highest spot

| No. | Biased Smears Gross Counts α | Biased Smears Gross Counts β | Biased Smears DPM/100cm² α | Biased Smears DPM/100cm² β | No. | Biased Direct Frisk Gross Counts α | Biased Direct Frisk Gross Counts β | Biased Direct Frisk DPM/100cm² α | Biased Direct Frisk DPM/100cm² β | 43-37 Scan 1 m² 30 Sec. Count | Location # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |
| 13 | | | | | | | | | | | |
| 14 | 0 | 270 | -3 | -75 | 14 | 9 | 590 | 67 | 608 | 627 | FD3 biased |
| 15 | | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| 17 | | | | | | | | | | | |
| 18 | 1 | 210 | -1 | -144 | 18 | 7 | 535 | 49 | 397 | 617 | FE3 biased |
| 19 | 0 | 282 | -3 | -61 | 19 | 6 | 523 | 39 | 350 | 667 | FE4 biased |
| 20 | | | | | | | | | | | |
| 21 | | | | | | | | | | | |
| 22 | 0 | 249 | -3 | -99 | 22 | 2 | 685 | 3 | 974 | 616 | FF3 biased |
| 23 | 0 | 309 | -3 | -30 | 23 | 2 | 762 | 3 | 1,271 | 593 | FF4 biased |
| 24 | | | | | | | | | | | |
| 25 | 1 | 342 | -1 | 9 | 25 | 3 | 724 | 12 | 1,124 | 610 | FG2 biased |
| 26 | 0 | 336 | -3 | 2 | 26 | 2 | 643 | 3 | 812 | 594 | FG3 biased |
| 27 | 1 | 330 | -1 | -5 | 27 | 7 | 781 | 49 | 1,344 | 607 | FG4 biased |
| 28 | 0 | 342 | -3 | 9 | 28 | 3 | 538 | 12 | 408 | 669 | FH1 biased |
| 29 | 0 | 288 | -3 | -54 | 29 | 4 | 562 | 21 | 501 | 1,145 | FH2 biased |
| 30 | 1 | 345 | -1 | 12 | 30 | 5 | 454 | 30 | 85 | 591 | FH3 biased |
| 31 | 0 | 216 | -3 | -137 | 31 | 2 | 555 | 3 | 474 | 755 | FH4 biased |
| 32 | 1 | 303 | -1 | -37 | 32 | 12 | 743 | 94 | 1,198 | 660 | FI1 biased |
| 33 | 0 | 258 | -3 | -89 | 33 | 6 | 638 | 39 | 793 | 743 | FI2 biased |
| 34 | 0 | 279 | -3 | -64 | 34 | 9 | 557 | 67 | 481 | 758 | FI3 biased |
| 35 | 0 | 264 | -3 | -82 | 35 | 4 | 639 | 21 | 797 | 1,286 | FI4 biased |
| 36 | 1 | 354 | -1 | 23 | 36 | 13 | 614 | 104 | 701 | 671 | FJ1 biased |
| 37 | 1 | 339 | -1 | 5 | 37 | 14 | 656 | 113 | 863 | 726 | FJ2 biased |
| 38 | 3 | 315 | 3 | -23 | 38 | 14 | 692 | 113 | 1,001 | 792 | FJ3 biased |
| 39 | 0 | 273 | -3 | -71 | 39 | 1 | 503 | -6 | 273 | 968 | FJ4 biased |

| Probe | α MDA | β |
|---|---|---|
| 2929 | 15 | 83 |
| 43-89 | 71 | 423 |
| 43-37 | 78 | 650 |
| 43-93 | 69 | 288 |

Note: 43-37 data are repeated from Page 1 for convenience


Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 3A FLOOR | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-11 | FSS-11 | FSS floor scan | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | David Davis 1-3-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 1115 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-3-18 | 2360/43-89 | 310164 | 4/17/2018 | 43-89 | 125 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 7 | 4651 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | 2360/43-37 | 287606 | 11/17/2018 | 43-37 | 100 | PR278379 | 11/17/2018 | 0.3845 | 0.4517 | 1 | 8733 | 10 | 0.5 |
| | Reviewed: CBP 1/8/18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 17 | 4320 | 10 | 1 |
| | | | | | | | | | #N/A | #N/A | | | | |

Complete scan and a 1 minute re-count of each grid over MDA

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 288 | -1 | -54 | 1 | 2 | 400 | 3 | -123 | 438 | FA2 |
| 2 | 0 | 306 | -3 | -33 | 2 | 2 | 422 | 3 | -39 | 497 | FA3 |
| 3 | 0 | 264 | -3 | -82 | 3 | 6 | 481 | 39 | 189 | 482 | FA4 |
| 4 | 0 | 303 | -3 | -37 | 4 | 2 | 417 | 3 | -58 | 409 | FB1 |
| 5 | 1 | 300 | -1 | -40 | 5 | 3 | 454 | 12 | 85 | 431 | FB2 |
| 6 | 1 | 279 | -1 | -64 | 6 | 2 | 455 | 3 | 89 | 510 | FB3 |
| 7 | 1 | 336 | -1 | 2 | 7 | 2 | 460 | 3 | 108 | 508 | FB4 |
| 8 | 0 | 267 | -3 | -78 | 8 | 6 | 431 | 39 | -4 | 440 | FC1 |
| 9 | 2 | 372 | 1 | 43 | 9 | 8 | 485 | 58 | 204 | 430 | FC2 |
| 10 | 0 | 309 | -3 | -30 | 10 | 11 | 528 | 85 | 370 | 567 | FC3 |
| 11 | 0 | 318 | -3 | -19 | 11 | 6 | 509 | 39 | 296 | 559 | FC4 |
| 12 | 0 | 297 | -3 | -43 | 12 | 8 | 442 | 58 | 39 | 498 | FD1 |
| 13 | 2 | 300 | 1 | -40 | 13 | 11 | 480 | 85 | 185 | 498 | FD2 |
| 14 | 0 | 336 | -3 | 2 | 14 | 9 | 545 | 67 | 435 | 627 | FD3 |
| 15 | 1 | 354 | -1 | 23 | 15 | 7 | 491 | 49 | 227 | 564 | FD4 |
| 16 | 0 | 285 | -3 | -57 | 16 | 2 | 481 | 3 | 189 | 473 | FE1 |
| 17 | 3 | 327 | 3 | -9 | 17 | 7 | 541 | 49 | 420 | 573 | FE2 |
| 18 | 1 | 309 | -1 | -30 | 18 | 14 | 630 | 113 | 762 | 617 | FE3 |
| 19 | 0 | 315 | -3 | -23 | 19 | 2 | 540 | 3 | 416 | 667 | FE4 |
| 20 | 1 | 297 | -1 | -43 | 20 | 5 | 475 | 30 | 166 | 447 | FF1 |
| 21 | 3 | 296 | 3 | -45 | 21 | 6 | 492 | 39 | 231 | 519 | FF2 |
| 22 | 0 | 303 | -3 | -37 | 22 | 13 | 629 | 104 | 759 | 616 | FF3 |
| 23 | 1 | 300 | -1 | -40 | 23 | 4 | 490 | 21 | 223 | 593 | FF4 |
| 24 | 0 | 342 | -3 | 9 | 24 | 6 | 452 | 39 | 77 | 522 | FG1 |
| 25 | 1 | 369 | -1 | 40 | 25 | 6 | 469 | 39 | 142 | 610 | FG2 |
| 26 | 1 | 282 | -1 | -61 | 26 | 4 | 636 | 21 | 786 | 594 | FG3 |
| 27 | 2 | 303 | 1 | -37 | 27 | 4 | 515 | 21 | 320 | 607 | FG4 |
| 28 | 1 | 342 | -1 | 9 | 28 | 7 | 585 | 49 | 589 | 669 | FH1 |
| 29 | 1 | 279 | -1 | -64 | 29 | 4 | 570 | 21 | 531 | 1,145 | FH2 |
| 30 | 2 | 318 | 1 | -19 | 30 | 10 | 501 | 76 | 266 | 591 | FH3 |
| 31 | 4 | 321 | 5 | -16 | 31 | 1 | 510 | -6 | 300 | 755 | FH4 |
| 32 | 0 | 315 | -3 | -23 | 32 | 7 | 615 | 49 | 705 | 660 | FI1 |
| 33 | 0 | 324 | -3 | -12 | 33 | 8 | 776 | 58 | 1,325 | 743 | FI2 |
| 34 | 1 | 288 | -1 | -54 | 34 | 8 | 685 | 58 | 974 | 758 | FI3 |
| 35 | 1 | 303 | -1 | -37 | 35 | 0 | 663 | -16 | 889 | 1,286 | FI4 |
| 36 | 0 | 267 | -3 | -78 | 36 | 9 | 625 | 67 | 743 | 671 | FJ1 |
| 37 | 0 | 294 | -3 | -47 | 37 | 11 | 728 | 85 | 1,140 | 726 | FJ2 |
| 38 | 0 | 312 | -3 | -26 | 38 | 12 | 735 | 94 | 1,167 | 792 | FJ3 |
| 39 | 3 | 378 | 3 | 50 | 39 | 1 | 444 | -6 | 46 | 968 | FJ4 |

Note: direct frisk was performed with the LM43-93 probe

| Probe | α MDA | β |
|---|---|---|
| 2929 | 15 | 83 |
| 43-89 | 57 | 338 |
| 43-37 | 78 | 650 |
| 43-93 | 69 | 288 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: 3A Floor | Survey Unit & Type: Systematic grid | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-11 | floor statics | FSS-11 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-24-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 1042 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-24-18 | 2360/43-89 | 310179 | 11/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 16 | 4550 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/24/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 108 | 5 | 13 | 1 | 2 | 447 | 4 | -39 | | FS1 |
| 2 | 1 | 103 | 5 | -4 | 2 | 4 | 499 | 25 | 217 | | FS2 |
| 3 | 2 | 121 | 11 | 58 | 3 | 16 | 630 | 147 | 862 | | FS3 |
| 4 | 0 | 113 | -1 | 31 | 4 | 4 | 520 | 25 | 320 | | FS4 |
| 5 | 0 | 101 | -1 | -11 | 5 | 14 | 530 | 127 | 369 | | FS5 |
| 6 | 0 | 106 | -1 | 6 | 6 | 17 | 752 | 158 | 1,463 | | FS6 |
| 7 | 1 | 126 | 5 | 76 | 7 | 5 | 548 | 35 | 458 | | FS7 |
| 8 | 0 | 103 | -1 | -4 | 8 | 10 | 469 | 86 | 69 | | FS8 |
| 9 | 0 | 108 | -1 | 13 | 9 | 2 | 484 | 4 | 143 | | FS9 |
| 10 | 1 | 91 | 5 | -46 | 10 | 3 | 509 | 14 | 266 | | FS10 |
| 11 | 1 | 95 | 5 | -32 | 11 | 6 | 456 | 45 | 5 | | FS11 |
| 12 | 0 | 107 | -1 | 10 | 12 | 5 | 430 | 35 | -123 | | FS12 |
| 13 | 1 | 98 | 5 | -22 | 13 | 7 | 547 | 55 | 453 | | FS13 |
| 14 | 0 | 120 | -1 | 55 | 14 | 6 | 449 | 45 | -30 | | FS14 |
| 15 | 0 | 116 | -1 | 41 | 15 | 9 | 517 | 76 | 305 | | FS15 |
| 16 | 1 | 111 | 5 | 24 | 16 | 2 | 468 | 4 | 64 | | FS16 |
| 17 | 0 | 99 | -1 | -18 | 17 | 3 | 497 | 14 | 207 | | FS17 |
| 18 | 0 | 104 | -1 | -1 | 18 | 5 | 582 | 35 | 625 | | FS18 |
| 19 | 0 | 110 | -1 | 20 | 19 | 5 | 521 | 35 | 325 | | FS19 |
| 20 | 0 | 89 | -1 | -53 | 20 | 5 | 431 | 35 | -118 | | FS20 |
| 21 | 0 | 99 | -1 | -18 | 21 | 9 | 470 | 76 | 74 | | FS21 |
| 22 | 1 | 102 | 5 | -8 | 22 | 2 | 455 | 4 | 0 | | FS22 |
| 23 | 1 | 104 | 5 | -1 | 23 | 5 | 487 | 35 | 158 | | FS23 |
| 24 | 0 | 87 | -1 | -60 | 24 | 8 | 512 | 66 | 281 | | FS24 |
| 25 | 1 | 97 | 5 | -25 | 25 | 14 | 564 | 127 | 537 | | FS25 |
| 26 | 0 | 105 | -1 | 3 | 26 | 8 | 459 | 66 | 20 | | FS26 |
| 27 | 0 | 99 | -1 | -18 | 27 | 4 | 457 | 25 | 10 | | FS27 |
| 28 | 0 | 115 | -1 | 38 | 28 | 0 | 466 | -16 | 54 | | FS28 |
| 29 | 1 | 98 | 5 | -22 | 29 | 3 | 436 | 14 | -94 | | FS29 |
| 30 | 1 | 118 | 5 | 48 | 30 | 7 | 526 | 55 | 350 | | FS30 |
| 31 | 2 | 110 | 11 | 20 | 31 | 10 | 466 | 86 | 54 | | FS31 |
| 32 | 0 | 106 | -1 | 6 | 32 | 2 | 408 | 4 | -231 | | FS32 |
| 33 | 1 | 109 | 5 | 17 | 33 | 4 | 386 | 25 | -340 | | FS33 |
| 34 | 0 | 87 | -1 | -60 | 34 | 6 | 487 | 45 | 158 | | FS34 |
| 35 | 0 | 113 | -1 | 31 | 35 | 4 | 488 | 25 | 163 | | FS35 |
| 36 | 1 | 108 | 5 | 13 | 36 | 6 | 492 | 45 | 182 | | FS36 |
| 37 | 0 | 106 | -1 | 6 | 37 | 7 | 522 | 55 | 330 | | FS37 |
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 24 | 133 |
| 43-89 | 75 | 377 |

Signature: Arthur Desrosiuers CHP

Attachment 1

# Survey Unit FSS-12

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: Roof over Cells 5 and 6 | Survey Unit & Type: Systematic grid | Page of 2 of 2 |
|---|---|---|---|---|
| | FSS- | Smears Only | FSS-12 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1-25-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 1071 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-25-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

## Smears

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | 1 m² | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 1 | 111 | 5 | 14 | 1 | | | | | | K2 |
| 2 | 0 | 104 | -1 | -11 | 2 | | | | | | L2 |
| 3 | 0 | 121 | -1 | 48 | 3 | | | | | | M2 |
| 4 | 0 | 106 | -1 | -4 | 4 | | | | | | K3 |
| 5 | 0 | 104 | -1 | -11 | 5 | | | | | | M3 |
| 6 | 1 | 107 | 5 | 0 | 6 | | | | | | K4 |
| 7 | 1 | 123 | 5 | 55 | 7 | | | | | | L4 |
| 8 | 0 | 95 | -1 | -42 | 8 | | | | | | M4 |
| 9 | 0 | 107 | -1 | 0 | 9 | | | | | | C2 |
| 10 | 0 | 114 | -1 | 24 | 10 | | | | | | C4 |
| 11 | 1 | 112 | 5 | 17 | 11 | | | | | | E3 |
| 12 | 0 | 113 | -1 | 21 | 12 | | | | | | G2 |
| 13 | 0 | 118 | -1 | 38 | 13 | | | | | | G4 |
| 14 | 0 | 121 | -1 | 48 | 14 | | | | | | I3 |
| 15 | 0 | 101 | -1 | -21 | 15 | | | | | | J1 |
| 16 | 2 | 122 | 11 | 52 | 16 | | | | | | J5 |
| 17 | 0 | 94 | -1 | -46 | 17 | | | | | | P2 |
| 18 | 0 | 114 | -1 | 24 | 18 | | | | | | R5 |
| 19 | 0 | 91 | -1 | -56 | 19 | | | | | | R5 drain |
| 20 | 1 | 124 | 5 | 59 | 20 | | | | | | O2 AC unit |
| 21 | 0 | 118 | -1 | 38 | 21 | | | | | | P3 AC unit |
| 22 | 0 | 120 | -1 | 45 | 22 | | | | | | P3 AC unit |
| 23 | 2 | 95 | 11 | -42 | 23 | | | | | | Q2 AC unit |
| 24 | 1 | 106 | 5 | -4 | 24 | | | | | | Q3 AC unit |
| 25 | 0 | 96 | -1 | -39 | 25 | | | | | | L3 vent stack |
| 26 | 0 | 100 | -1 | -25 | 26 | | | | | | L3 vent stack |
| 27 | 0 | 102 | -1 | -18 | 27 | | | | | | L3 vent stack |
| 28 | 1 | 109 | 5 | 7 | 28 | | | | | | L3 vent stack |
| 29 | 0 | 106 | -1 | -4 | 29 | | | | | | L3 vent stack |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 24 | 135 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

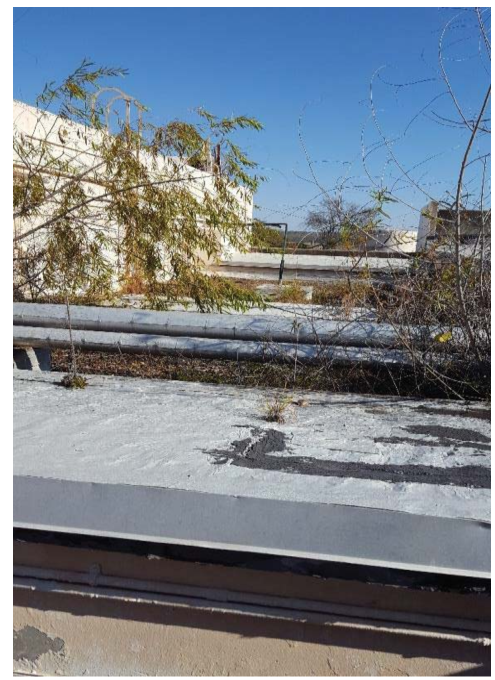
| Robins AFB Building 181 | HWP# 02-181 | Room: Roof over cells 5 and 6 | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | | FSS LM 43-93 scan and statics | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 12/14/17 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 122 | 1 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 5 | 499 | 1 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 12/19/17 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**93-93 used to scan all acessible areas.**

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 100 | -6 | -77 | 1 | 6 | 309 | 12 | -1038 | N/A | K2 |
| 2 | 0 | 117 | -6 | -17 | 2 | 2 | 307 | -36 | -1049 | N/A | L2 |
| 3 | 0 | 93 | -6 | -101 | 3 | 10 | 305 | 60 | -1060 | N/A | M2 |
| 4 | 1 | 112 | 0 | -35 | 4 | 5 | 294 | 0 | -1120 | N/A | K3 |
| 5 | 0 | 103 | -6 | -66 | 5 | 9 | 297 | 48 | -1103 | N/A | M3 |
| 6 | 0 | 116 | -6 | -21 | 6 | 5 | 304 | 0 | -1065 | N/A | K4 |
| 7 | 0 | 86 | -6 | -125 | 7 | 2 | 297 | -36 | -1103 | N/A | L4 |
| 8 | 1 | 113 | 0 | -31 | 8 | 1 | 292 | -48 | -1131 | N/A | M4 |
| 9 | 2 | 87 | 6 | -122 | 9 | 7 | 357 | 24 | -776 | N/A | C2 |
| 10 | 0 | 102 | -6 | -70 | 10 | 8 | 304 | 36 | -1065 | N/A | C4 |
| 11 | 0 | 95 | -6 | -94 | 11 | 14 | 439 | 109 | -328 | N/A | E3 |
| 12 | 0 | 103 | -6 | -66 | 12 | 9 | 293 | 48 | -1125 | N/A | G2 |
| 13 | 0 | 96 | -6 | -90 | 13 | 8 | 307 | 36 | -1049 | N/A | G4 |
| 14 | 1 | 91 | 0 | -108 | 14 | 7 | 318 | 24 | -989 | N/A | I3 |
| 15 | 5 | 102 | 23 | -70 | 15 | 11 | 344 | 72 | -847 | N/A | J1 |
| 16 | 0 | 111 | -6 | -38 | 16 | 7 | 317 | 24 | -994 | N/A | J5 |
| 17 | 0 | 91 | -6 | -108 | 17 | 5 | 307 | 0 | -1049 | N/A | P2 |
| 18 | 1 | 96 | 0 | -90 | 18 | 3 | 345 | -24 | -841 | N/A | R5 |
| 19 | 0 | 114 | -6 | -28 | 19 | 18 | 383 | 157 | -634 | N/A | R5 drain |
| 20 | 0 | 111 | -6 | -38 | 20 | 11 | 277 | 72 | -1212 | N/A | O2 AC unit |
| 21 | 3 | 195 | 12 | 254 | 21 | 6 | 231 | 12 | -1464 | N/A | P3 AC unit |
| 22 | 0 | 92 | -6 | -104 | 22 | 8 | 256 | 36 | -1327 | N/A | P3 AC unit |
| 23 | 2 | 98 | 6 | -83 | 23 | 5 | 238 | 0 | -1425 | N/A | Q2 AC unit |
| 24 | 2 | 102 | 6 | -70 | 24 | 9 | 286 | 48 | -1163 | N/A | Q3 AC unit |
| 25 | 0 | 117 | -6 | -17 | 25 | 18 | 279 | 157 | -1202 | N/A | L3 vent stack |
| 26 | 1 | 115 | 0 | -24 | 26 | 12 | 291 | 84 | -1136 | N/A | L3 vent stack |
| 27 | 0 | 113 | -6 | -31 | 27 | 32 | 328 | 326 | -934 | N/A | L3 vent stack |
| 28 | 1 | 17 | 0 | -365 | 28 | 23 | 301 | 217 | -1081 | N/A | L3 vent stack |
| 29 | 0 | 106 | -6 | -56 | 29 | 17 | 277 | 145 | -1212 | N/A | L3 vent stack |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 44 | 189 |
| 43-93 | 162 | 584 |



Note: the smear MDA is too high. The smear survey was repeated and recorded separately. The initial smear data are presented here in order to present a complete record. The 43-93 was used for scans due to the location of the survey. The statics and smears were taken at the location of the highest scan reading.

Signature: Arthur Desrosiers CHP

# Attachment 1

## Survey Unit FSS-13

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6A1 | Survey Unit & Type: Systematic grid | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-13 | PRE DECON HVAC | FSS | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-24-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 1042 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-24-18 | 2360/43-93 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 16 | 3999 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/29/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan HVAC equipment with LM43-89; take statics, smears or LAWs as appropriate

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 24 | 133 |
| 43-89 | 75 | 354 |

| No. | Smears Gross Counts α | Smears Gross Counts β | Smears DPM/100cm² α | Smears DPM/100cm² β | | Direct Frisk Gross Counts α | Direct Frisk Gross Counts β | Direct Frisk DPM/100cm² α | Direct Frisk DPM/100cm² β | 43-37 Scan 1 m² 30 Sec. Count | Location # | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | 1 | 1 | 516 | -6 | 572 | N/A | HEATER 1 | |
| 2 | | | | | 2 | 3 | 535 | 14 | 665 | N/A | HEATER 1 | |
| 3 | | | | | 3 | 1 | 516 | -6 | 572 | N/A | HEATER 2 | |
| 4 | | | | | 4 | 3 | 535 | 14 | 665 | N/A | HEATER 2 | |
| 5 | | | | | 5 | 6 | 548 | 45 | 729 | N/A | SCREEN | |
| 6 | | | | | 6 | 2 | 1172 | 4 | 3802 | N/A | FAN ON HEATER | SPACE HEATERS REMOVED AND DISPOSED AS LLRW |
| 7 | | | | | 7 | 0 | 392 | -16 | -39 | N/A | SCREEN | |
| 8 | | | | | 8 | 0 | 441 | -16 | 202 | N/A | 4" CONDUIT | |
| 9 | 0 | 110 | -1 | 20 | 9 | 18 | 666 | 168 | 1310 | N/A | HVAC in O/H chase | HVAC decontaminated |
| 10 | 0 | 104 | -1 | -1 | 10 | 10 | 652 | 86 | 1241 | N/A | HVAC in O/H chase | |
| 11 | 2 | 95 | 11 | -32 | 11 | 5 | 450 | 35 | 247 | N/A | HVAC in O/H chase | |
| 12 | 0 | 100 | -1 | -15 | 12 | 2 | 261 | 4 | -684 | N/A | HVAC in O/H chase | |
| 13 | 0 | 113 | -1 | 31 | 13 | 2 | 280 | 4 | -590 | N/A | HVAC in O/H chase | |
| 14 | 0 | 108 | -1 | 13 | 14 | 1 | 320 | -6 | -393 | N/A | HVAC in O/H chase | |
| 15 | 0 | 104 | -1 | -1 | 15 | 11 | 440 | 96 | 197 | N/A | HVAC in O/H chase | |
| 16 | 0 | 111 | -1 | 24 | 16 | 6 | 648 | 45 | 1222 | N/A | HVAC in O/H chase | |
| 17 | 2 | 109 | 11 | 17 | 17 | 6 | 288 | 45 | -551 | N/A | HVAC in O/H chase | |
| 18 | 0 | 111 | -1 | 24 | 18 | 2 | 303 | 4 | -477 | N/A | HVAC in O/H chase | |
| 19 | 1 | 123 | 5 | 65 | 19 | 0 | 343 | -16 | -280 | N/A | HVAC in O/H chase | |
| 20 | 0 | 94 | -1 | -35 | 20 | 0 | 320 | -16 | -393 | N/A | HVAC in O/H chase | |
| 21 | 0 | 105 | -1 | 3 | 21 | 1 | 273 | -6 | -625 | N/A | HVAC in O/H chase | |
| 22 | 0 | 116 | -1 | 41 | 22 | 1 | 285 | -6 | -566 | N/A | HVAC in O/H chase | |
| 23 | 0 | 112 | -1 | 27 | 23 | 1 | 352 | -6 | -236 | N/A | HVAC in O/H chase | |
| 24 | | | | | | 14 | 623 | 127 | 1099 | N/A | HEATER 1 LAW | |
| 25 | | | | | | 4 | 883 | 25 | 2379 | N/A | HEATER 1 LAW | |
| 26 | | | | | | 41 | 852 | 403 | 2226 | N/A | HEATER 2 LAW | |
| 27 | | | | | | 1 | 402 | -6 | 10 | N/A | HEATER 2 LAW | HEATERS REMOVED AND DISPOSED AS LLRW |
| 28 | | | | | | 6 | 548 | 45 | 729 | N/A | SCREEN LAW | |
| 29 | | | | | | 0 | 447 | -16 | 232 | N/A | LAW on ceiling above FF1 | |
| 30 | | | | | | | | | | | | |
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Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6B1 | Survey Unit & Type: CEILING AND VENTS | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-13 | FSS-13 | HVAC | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Tom Huntr 1-3-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 1041 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-3-18 | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 100 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 24 | 4540 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-4-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| No. | LAWS Gross Counts α | LAWS Gross Counts β | LAWS DPM/100cm² α | LAWS DPM/100cm² β | | Direct Frisk Gross Counts α | Direct Frisk Gross Counts β | Direct Frisk DPM/100cm² α | Direct Frisk DPM/100cm² β | 43-37 Scan 1 m² 30 Sec. Count | Location # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | 1 | 4 | 345 | 16 | -537 | N/A | RETURN VENT GRILLS |
| 2 | | | | | 2 | 1 | 312 | -14 | -699 | N/A | INSIDE N. RETURN VENT |
| 3 | | | | | 3 | 1 | 326 | -14 | -630 | N/A | INSIDE S. RETURN VENT |
| 4 | | | | | 4 | 1 | 275 | -14 | -882 | N/A | OUTSIDE N. DUCT#1 |
| 5 | | | | | 5 | 3 | 289 | 6 | -813 | N/A | OUTSIDE N. DUCT #2 |
| 6 | | | | | 6 | 2 | 314 | -4 | -689 | N/A | OUTSIDE S. DUCT #1 |
| 7 | | | | | 7 | 1 | 284 | -14 | -837 | N/A | OUTSIDE S. DUCT #2 |
| 8 | | | | | 8 | 0 | 339 | -25 | -566 | N/A | W. end of S. duct vertical |
| 9 | | | | | 9 | 0 | 222 | -25 | -1143 | N/A | W. end of S. duct horizontal |
| 10 | | | | | 10 | 0 | 345 | -25 | -537 | N/A | W. end of N. duct vertical |
| 11 | | | | | 11 | 1 | 282 | -14 | -847 | N/A | W. end of N. duct horizontal |
| 12 | | | | | 12 | 1 | 264 | -14 | -936 | N/A | upper wall duct I/S |
| 13 | | | | | 13 | 1 | 204 | -14 | -1231 | N/A | lower wall duct I/S |
| 14 | | | | | 14 | 1 | 345 | -14 | -537 | N/A | upper wall duct O/S |
| 15 | | | | | 15 | 0 | 285 | -25 | -832 | N/A | lower wall duct I/S |
| 16 | | | | | 16 | 1 | 360 | -14 | -463 | N/A | W. end supply duct |
| 17 | | | | | 17 | 0 | 288 | -25 | -817 | N/A | E. end supply duct |
| 18 | | | | | 18 | | | | | | |
| 19 | | | | | 19 | | | | | | |
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| 39 | | | | | 39 | | | | | | |

## Probe highest locations in the HVAC systems

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 15 | 80 |
| 43-89 | 107 | 471 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 6B1 | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-6B | | FSS-13 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 *pi* α *e* ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-22-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 940 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-22-18 | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 7 | 4696 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-22-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Probe and collect statics, smeans & LAWs at highest locations in the HVAC supply vents**

| | Smears | | | | | Direct Frisk | | | | 43-37 Scan 1 m² | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | 30 Sec. Count | Location # |
| 1 | 0 | 103 | -2 | 31 | 1 | 5 | 328 | 52 | -773 | N/A | outlet vent W. |
| 2 | 0 | 100 | -2 | 21 | 2 | 3 | 340 | 28 | -708 | N/A | outlet vent W. |
| 3 | 1 | 108 | 3 | 49 | 3 | 3 | 362 | 28 | -588 | N/A | outlet vent W. |
| 4 | 1 | 122 | 3 | 97 | 4 | 5 | 426 | 52 | -238 | N/A | outlet vent E. |
| 5 | 0 | 120 | -2 | 90 | 5 | 4 | 382 | 40 | -478 | N/A | outlet vent E. |
| 6 | 1 | 109 | 3 | 52 | 6 | 4 | 398 | 40 | -391 | N/A | outlet vent E. |
| 7 | | | -2 | | | 1 | 339 | 4 | -713 | N/A | LAW outlet vent W. |
| 8 | | | -2 | | | 5 | 426 | 52 | -238 | N/A | LAW outlet vent W. |
| 9 | | | -2 | | | | | | | | |
| 10 | | | -2 | | | | | | | | |
| 11 | | | -2 | | | | | | | | |
| 12 | | | -2 | | | | | | | | |
| 13 | | | -2 | | | | | | | | |
| 14 | | | -2 | | | | | | | | |
| 15 | | | -2 | | | | | | | | |
| 16 | | | -2 | | | | | | | | |
| 17 | | | -2 | | | | | | | | |
| 18 | | | -2 | | | | | | | | |
| 19 | | | -2 | | | | | | | | |
| 20 | | | -2 | | | | | | | | |
| 21 | | | -2 | | | | | | | | |
| 22 | | | -2 | | | | | | | | |
| 23 | | | -2 | | | | | | | | |
| 24 | | | -2 | | | | | | | | |
| 25 | | | -2 | | | | | | | | |
| 26 | | | -2 | | | | | | | | |
| 27 | | | -2 | | | | | | | | |
| 28 | | | -2 | | | | | | | | |
| 29 | | | -2 | | | | | | | | |
| 30 | | | -2 | | | | | | | | |
| 31 | | | -2 | | | | | | | | |
| 32 | | | -2 | | | | | | | | |
| 33 | | | -2 | | | | | | | | |
| 34 | | | -2 | | | | | | | | |
| 35 | | | -2 | | | | | | | | |
| 36 | | | -2 | | | | | | | | |
| 37 | | | -2 | | | | | | | | |
| 38 | | | -2 | | | | | | | | |
| 39 | | | -2 | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 127 |
| 43-93 | 71 | 425 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | CELL 5 HVAC HEATERS | Survey Unit & Type: EQUIPMENT | Page of 1 of 1 |
|---|---|---|---|---|
| | | | FSS-13 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-24-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 1051 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR337817 | 4/17/2018 | 0.3314 | 0.3662 | 19 | 4515 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/26/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | | Location # |
| 1 | 0 | 106 | -1 | 3 | 1 | 4 | 342 | 25 | -598 | | O/H HEATER |
| 2 | 1 | 123 | 5 | 62 | 2 | 1 | 449 | -11 | -14 | | O/H HEATER |
| 3 | | | | | | | | | | | |
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| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 26 | 133 |
| 43-93 | 94 | 417 |
| | | |

Note: There is a heater at each end of Cell 5. Both heaters were scanned with a 43-93. A direct frisk and a smear were collected at the location of the highest scan reading.

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | HVAC CELL 6A1 | Survey Unit & Type: HVAC | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-13 | POST DECON | FSS-13 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Thomas Hunter 1-29-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 998 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 253248 | 11/17/2018 | 43-93 | 100 | PR244541 | 11/17/2018 | 0.4099 | 0.38 | 2 | 2006 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/29/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Scan with 43-93; take a static and a smear at highest spot**

| No. | Smears Gross Counts α | Smears Gross Counts β | Smears DPM/100cm² α | Smears DPM/100cm² β | | Direct Frisk Gross Counts α | Direct Frisk Gross Counts β | Direct Frisk DPM/100cm² α | Direct Frisk DPM/100cm² β | | Location # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 100 | -2 | 1 | 1 | 2 | 219 | 18 | 97 | | top north |
| 2 | 1 | 117 | 3 | 60 | 2 | 0 | 192 | -2 | -45 | | top center |
| 3 | 0 | 111 | -2 | 39 | 3 | 0 | 150 | -2 | -266 | | top south |
| 4 | 4 | 100 | 21 | 1 | 4 | 8 | 323 | 76 | 644 | | under |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
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| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 130 |
| 43-93 | 44 | 273 |
| | | |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6B1 | Survey Unit & Type: CEILING AND VENTS | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-13 | FSS-13 | LAWS HVAC | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Tom Huntr 1-3-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 5 | 1041 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | Paul Fletcher 1-3-18 | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 100 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 24 | 4540 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-4-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

**Probe and collect LAWs at highest locations in the HVAC systems**

| No. | LAWS Gross Counts α | LAWS Gross Counts β | LAWS DPM/100cm² α | LAWS DPM/100cm² β | | Direct Frisk Gross Counts α | Direct Frisk Gross Counts β | Direct Frisk DPM/100cm² α | Direct Frisk DPM/100cm² β | 43-37 Scan 1 m² 30 Sec. Count | Location # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | 1 | 4 | 345 | 16 | -537 | N/A | RETURN VENT GRILLS |
| 2 | | | | | 2 | 1 | 312 | -14 | -699 | N/A | INSIDE N. RETURN VENT |
| 3 | | | | | 3 | 1 | 326 | -14 | -630 | N/A | INSIDE S. RETURN VENT |
| 4 | | | | | 4 | 1 | 275 | -14 | -882 | N/A | OUTSIDE N. DUCT#1 |
| 5 | | | | | 5 | 3 | 289 | 6 | -813 | N/A | OUTSIDE N. DUCT #2 |
| 6 | | | | | 6 | 2 | 314 | -4 | -689 | N/A | OUTSIDE S. DUCT #1 |
| 7 | | | | | 7 | 1 | 284 | -14 | -837 | N/A | OUTSIDE S. DUCT #2 |
| 8 | | | | | 8 | 0 | 339 | -25 | -566 | N/A | W. end of S. duct vertical |
| 9 | | | | | 9 | 0 | 222 | -25 | -1143 | N/A | W. end of S. duct horizontal |
| 10 | | | | | 10 | 0 | 345 | -25 | -537 | N/A | W. end of N. duct vertical |
| 11 | | | | | 11 | 1 | 282 | -14 | -847 | N/A | W. end of N. duct horizontal |
| 12 | | | | | 12 | 1 | 264 | -14 | -936 | N/A | upper wall duct I/S |
| 13 | | | | | 13 | 1 | 204 | -14 | -1231 | N/A | lower wall duct I/S |
| 14 | | | | | 14 | 1 | 345 | -14 | -537 | N/A | upper wall duct O/S |
| 15 | | | | | 15 | 0 | 285 | -25 | -832 | N/A | lower wall duct I/S |
| 16 | | | | | 16 | 1 | 360 | -14 | -463 | N/A | W. end supply duct |
| 17 | | | | | 17 | 0 | 288 | -25 | -817 | N/A | E. end supply duct |
| 18 | | | | | 18 | | | | | | |
| 19 | | | | | 19 | | | | | | |
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| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 15 | 80 |
| 43-89 | 107 | 471 |

Signature: Arthur Desrosiers CHP

# Attachment 1

Radiological Survey Form — Robins AFB Project: WR0082

ARS Aleut Remediation

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6A1 | Survey Unit & Type: Coupon Samples from HVAC | Page of 1 of 1 |
|---|---|---|---|---|
| | | HVAC | FSS-13 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Tom Hunter | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 998 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | 1/29/2018 | 2360/43-89 | 310170 | 4/17/2018 | 43-89 | 100 | PR337820 | 4/17/2018 | 0.3283 | 0.4149 | 10 | 3834 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/29/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Scan coupons and take direct frisk and a smear at highest spot

| | Smears | | | | | Direct Frisk | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | |
| No. | α | β | α | β | | α | β | α | β | Location # |
| 1 | 1 | 132 | 3 | 112 | 1 | 4 | 431 | 29 | 184 | HVAC N. |
| 2 | 0 | 110 | -2 | 35 | 2 | 2 | 424 | 10 | 157 | HVAC N. |
| 3 | 2 | 114 | 9 | 49 | 3 | 1 | 403 | 0 | 76 | HVAC N. |
| 4 | 0 | 122 | -2 | 77 | 4 | 4 | 391 | 29 | 29 | HVAC N. |
| 5 | 0 | 109 | -2 | 32 | 5 | 2 | 377 | 10 | -25 | HVAC S. |
| 6 | 2 | 101 | 9 | 4 | 6 | 1 | 372 | 0 | -44 | HVAC S. |
| 7 | 0 | 124 | -2 | 84 | 7 | 0 | 367 | -10 | -63 | HVAC S. |
| 8 | 0 | 118 | -2 | 63 | 8 | 0 | 417 | -10 | 130 | HVAC S. |
| 9 | | | | | | | | | | |
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| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 130 |
| 43-89 | 79 | 340 |

Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FSS-14A

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Outside West of Cell 6 | Survey Unit & Type: Characterization | Page of 1 of 1 |
|---|---|---|---|---|
| | FSS-14A | inside elecctrical vault below grade | Sample locations listed | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1/29/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 998 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 12/20/2018 | 43-93 | 100 | PR312654 | 12/20/2018 | 0.4398 | 0.4675 | 6 | 3868 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/29/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | |
| No. | α | β | α | β | No. | α | β | α | β | Location # |
| 1 | 0 | 93 | -2 | -24 | 1 | 8 | 553 | 67 | 711 | W WALL |
| 2 | 1 | 103 | 3 | 11 | 2 | 6 | 505 | 49 | 506 | W WALL |
| 3 | 0 | 109 | -2 | 32 | 3 | 2 | 600 | 13 | 912 | S WALL |
| 4 | 0 | 118 | -2 | 63 | 4 | 4 | 577 | 31 | 814 | S WALL |
| 5 | 0 | 114 | -2 | 49 | 5 | 3 | 557 | 22 | 728 | E WALL |
| 6 | 0 | 107 | -2 | 25 | 6 | 2 | 524 | 13 | 587 | E WALL |
| 7 | 0 | 120 | -2 | 70 | 7 | 5 | 420 | 40 | 142 | N WALL |
| 8 | 0 | 106 | -2 | 22 | 8 | 3 | 516 | 22 | 553 | N WALL |
| 9 | 1 | 95 | 3 | -17 | 9 | 1 | 578 | 4 | 818 | FLOOR E |
| 10 | 0 | 89 | -2 | -38 | 10 | 3 | 634 | 22 | 1,058 | FLOOR N |
| 11 | 0 | 96 | -2 | -13 | 11 | 0 | 569 | -5 | 779 | FLOOR W |
| 12 | 0 | 128 | -2 | 98 | 12 | 0 | 447 | -5 | 258 | FLOOR S |
| 13 | 1 | 97 | 3 | -10 | 13 | 1 | 479 | 4 | 394 | FLOOR CENTER |
| 14 | 0 | 88 | -2 | -41 | 14 | 2 | 499 | 13 | 480 | CABLE W |
| 15 | 0 | 107 | -2 | 25 | 15 | 1 | 456 | 4 | 296 | CABLE E |
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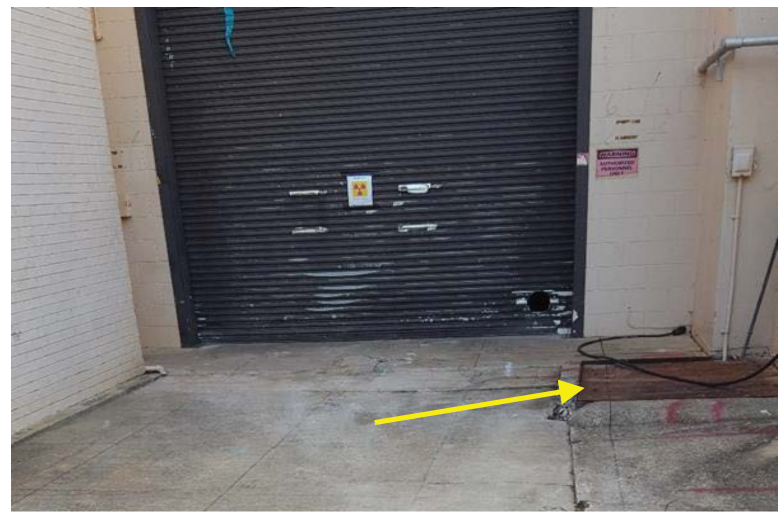
| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 30 | 130 |
| 43-93 | 52 | 303 |

Soil sample taken in NW corner and NE corner



Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

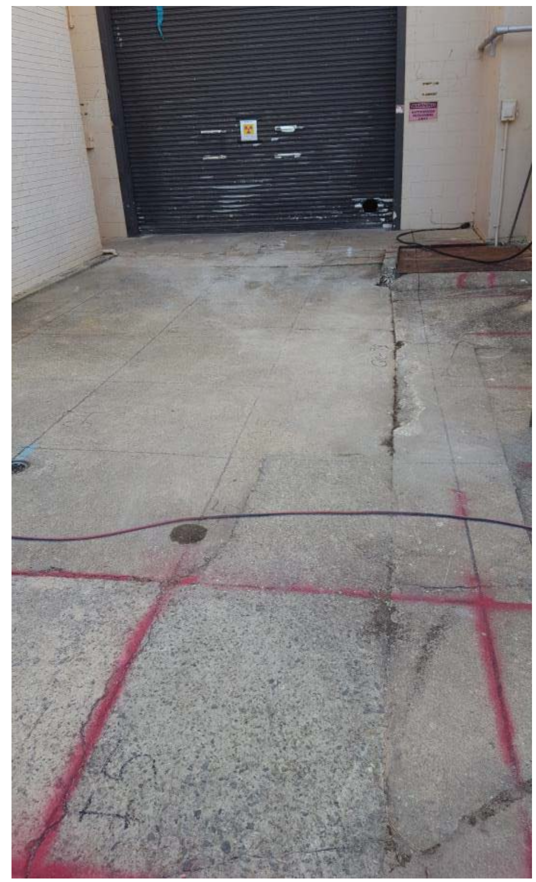
| Robins AFB Building 181 | HWP# 02-181 | Room: Outside cell 6 pad | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-14A | Class 1 - FSS | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Paul Fletcher 1/29/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 998 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 274959 | 11/17/2018 | 43-93 | 100 | PR293983 | 11/17/2018 | 0.4367 | 0.5194 | 11 | 4918 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/29/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

GRIDS SCANNED 100% WITH 43-93; a direct frisk and a smear at the hot spot of each grid

| | Smears | | | | | Direct Frisk | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | |
| No. | α | β | α | β | No. | α | β | α | β | Location # |
| 1 | 0 | 112 | -2 | 42 | 1 | 5 | 547 | 36 | 213 | D1 |
| 2 | 0 | 110 | -2 | 35 | 2 | 8 | 656 | 63 | 632 | D2 |
| 3 | 0 | 88 | -2 | -41 | 3 | 21 | 674 | 182 | 702 | D3 |
| 4 | 1 | 114 | 3 | 49 | 4 | 6 | 801 | 45 | 1191 | D4 |
| 5 | 0 | 101 | -2 | 4 | 5 | 18 | 658 | 155 | 640 | D5 |
| 6 | 0 | 103 | -2 | 11 | 6 | 10 | 486 | 82 | -22 | D6 |
| 7 | 0 | 120 | -2 | 70 | 7 | 5 | 762 | 36 | 1040 | C1 |
| 8 | 0 | 95 | -2 | -17 | 8 | 9 | 698 | 72 | 794 | C2 |
| 9 | 0 | 109 | -2 | 32 | 9 | 17 | 675 | 146 | 705 | C3 |
| 10 | 0 | 84 | -2 | -55 | 10 | 8 | 756 | 63 | 1017 | C4 |
| 11 | 0 | 102 | -2 | 8 | 11 | 15 | 523 | 127 | 120 | C5 |
| 12 | 0 | 94 | -2 | -20 | 12 | 9 | 526 | 72 | 132 | C6 |
| 13 | 0 | 110 | -2 | 35 | 13 | 7 | 631 | 54 | 536 | B2 |
| 14 | 0 | 107 | -2 | 25 | 14 | 13 | 506 | 109 | 55 | B3 |
| 15 | 1 | 94 | 3 | -20 | 15 | 6 | 486 | 45 | -22 | B4 |
| 16 | 1 | 118 | 3 | 63 | 16 | 5 | 532 | 36 | 155 | B5 |
| 17 | 1 | 96 | 3 | -13 | 17 | 39 | 488 | 347 | -15 | B6 |
| 18 | 0 | 108 | -2 | 29 | 18 | 13 | 452 | 109 | -153 | A2 |
| 19 | 0 | 101 | -2 | 4 | 19 | 12 | 460 | 100 | -122 | A3 |
| 20 | 0 | 108 | -2 | 29 | 20 | 8 | 438 | 63 | -207 | A4 |
| 21 | 0 | 101 | -2 | 4 | 21 | 11 | 515 | 91 | 89 | A5 |
| 22 | 1 | 108 | 3 | 29 | 22 | 12 | 468 | 100 | -92 | E2 |
| 23 | 0 | 115 | -2 | 53 | 23 | 5 | 478 | 36 | -53 | E3 |
| 24 | 0 | 101 | -2 | 4 | 24 | 5 | 417 | 36 | -288 | E4 |
| 25 | 0 | 115 | -2 | 53 | 25 | 4 | 486 | 27 | -22 | E5 |
| 26 | 0 | 103 | -2 | 11 | 26 | 2 | 468 | 8 | -92 | F2 |
| 27 | 0 | 115 | -2 | 53 | 27 | 13 | 497 | 109 | 20 | F3 |
| 28 | 0 | 117 | -2 | 60 | 28 | 7 | 388 | 54 | -400 | F4 |
| 29 | 1 | 109 | 3 | 32 | 29 | 1 | 603 | -1 | 428 | F5 |
| 30 | 0 | 103 | -2 | 11 | 30 | 11 | 404 | 91 | -338 | G3 |
| 31 | 0 | 96 | -2 | -13 | 31 | 7 | 434 | 54 | -223 | G4 |
| 32 | 0 | 111 | -2 | 39 | 32 | 2 | 631 | 8 | 536 | G5 |
| 33 | 1 | 108 | 3 | 29 | 33 | 19 | 392 | 164 | -384 | H3 |
| 34 | 0 | 102 | -2 | 8 | 34 | 13 | 414 | 109 | -300 | H4 |
| 35 | 0 | 97 | -2 | -10 | 35 | 8 | 529 | 63 | 143 | H5 |
| 36 | 0 | 99 | -2 | -3 | 36 | 15 | 536 | 127 | 170 | I3 |
| 37 | 0 | 101 | -2 | 4 | 37 | 9 | 379 | 72 | -434 | I4 |
| 38 | 0 | 103 | -2 | 11 | 38 | 16 | 449 | 136 | -165 | I5 |
| 39 | | | | | 39 | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 130 |
| 43-93 | 61 | 306 |



Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: Outside Pad West of Cell 6 | Survey Unit & Type: SYSTEMATICS | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-14A AND 14B | Additional data | |

| Comments | Surveyed By: | Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Camille Patrick | 3/1/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 44 | 1 | 1 |
| βMDA (total) <= 1285 dpm total | | | 2360/43-93 | 145474 | 7/10/2018 | 43-93 | 100 | PR299606 | 7/10/2018 | 0.4173 | 0.4921 | 3 | 339 | 1 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | | #N/A | #N/A | | | | |
| | Review: AED 3-16-18 | | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | | #N/A | #N/A | | | | |

| No. | Smears Gross Counts α | Smears Gross Counts β | Smears DPM/100cm² α | Smears DPM/100cm² β | | Direct Frisk Gross Counts α | Direct Frisk Gross Counts β | Direct Frisk DPM/100cm² α | Direct Frisk DPM/100cm² β | 14A AND 14B | Location # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 43 | 0 | -3 | 1 | 3 | 255 | 0 | -341 | | 1 |
| 2 | 1 | 49 | 0 | 17 | 2 | 5 | 522 | 19 | 744 | | 2 |
| 3 | 0 | 35 | -6 | -31 | 3 | 6 | 460 | 29 | 492 | | 3 |
| 4 | 0 | 66 | -6 | 77 | 4 | 6 | 398 | 29 | 240 | | 4 |
| 5 | 1 | 59 | 0 | 52 | 5 | 6 | 444 | 29 | 427 | | 5 |
| 6 | 1 | 57 | 0 | 45 | 6 | 7 | 416 | 38 | 313 | | 6 |
| 7 | 2 | 62 | 6 | 63 | 7 | 13 | 345 | 96 | 24 | | 7 |
| 8 | 0 | 44 | -6 | 0 | 8 | 2 | 346 | -10 | 28 | | 8 |
| 9 | 2 | 46 | 6 | 7 | 9 | 6 | 322 | 29 | -69 | | 9 |
| 10 | 1 | 55 | 0 | 38 | 10 | 8 | 346 | 48 | 28 | | 10 |
| 11 | 3 | 54 | 12 | 35 | 11 | 5 | 328 | 19 | -45 | | 11 |
| 12 | 3 | 52 | 12 | 28 | 12 | 1 | 384 | -19 | 183 | | 12 |
| 13 | 3 | 49 | 12 | 17 | 13 | 2 | 322 | -10 | -69 | | 13 |
| 14 | 1 | 58 | 0 | 49 | 14 | 8 | 366 | 48 | 110 | | 14 |
| 15 | 1 | 59 | 0 | 52 | 15 | 8 | 355 | 48 | 65 | | 15 |
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| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 44 | 118 |
| 43-93 | 106 | 360 |

Signature: Arthur Desrosiers CHP

# Attachment 1

# Survey Unit FSS-14B

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Outside Cell 6 West side Pad | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | 14 - B Survey unit | CLASS 3 | Post Decon FSS Survey | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Tom Hunter 1/29/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 998 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-89 | 310170 | 4/17/2018 | 43-89 | 125 | PR337820 | 4/17/2018 | 0.3283 | 0.4149 | 4 | 5015 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/29/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Grids scanned 10% with 43-89 probe; direct frisk and a smear at hot spot of each grid

| Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | |
| No. | α | β | α | β | No. | α | β | α | β | Location # |
| 1 | 1 | 98 | 3 | -6 | 1 | 12 | 432 | 113 | -268 | A6 |
| 2 | 0 | 115 | -2 | 53 | 2 | 32 | 601 | 308 | 384 | A7 |
| 3 | 0 | 95 | -2 | -17 | 3 | 14 | 500 | 133 | -6 | E6 |
| 4 | 0 | 107 | -2 | 25 | 4 | 12 | 477 | 113 | -94 | E7 |
| 5 | 1 | 116 | 3 | 56 | 5 | 1 | 491 | 6 | -40 | F6 |
| 6 | 0 | 107 | -2 | 25 | 6 | 14 | 570 | 133 | 264 | F7 |
| 7 | 0 | 119 | -2 | 67 | 7 | 10 | 533 | 94 | 121 | G1 |
| 8 | 0 | 101 | -2 | 4 | 8 | 14 | 579 | 133 | 299 | G2 |
| 9 | 0 | 94 | -2 | -20 | 9 | 4 | 507 | 35 | 21 | G6 |
| 10 | 0 | 97 | -2 | -10 | 10 | 18 | 460 | 172 | -160 | G7 |
| 11 | 0 | 113 | -2 | 46 | 11 | 15 | 602 | 142 | 388 | H1 |
| 12 | 0 | 121 | -2 | 74 | 12 | 5 | 482 | 45 | -75 | H2 |
| 13 | 0 | 89 | -2 | -38 | 13 | 20 | 502 | 191 | 2 | H6 |
| 14 | 1 | 100 | 3 | 1 | 14 | 22 | 577 | 211 | 291 | H7 |
| 15 | 0 | 99 | -2 | -3 | 15 | 12 | 450 | 113 | -199 | I1 |
| 16 | 0 | 123 | -2 | 81 | 16 | 15 | 523 | 142 | 83 | I2 |
| 17 | 0 | 96 | -2 | -13 | 17 | 14 | 514 | 133 | 48 | I6 |
| 18 | 0 | 102 | -2 | 8 | 18 | 7 | 457 | 64 | -172 | I7 |
| 19 | 3 | 103 | 15 | 11 | 19 | 21 | 631 | 201 | 499 | J1 |
| 20 | 0 | 93 | -2 | -24 | 20 | 7 | 441 | 64 | -233 | J2 |
| 21 | 0 | 102 | -2 | 8 | 21 | 15 | 603 | 142 | 391 | J3 |
| 22 | 0 | 95 | -2 | -17 | 22 | 11 | 539 | 103 | 145 | J4 |
| 23 | 0 | 100 | -2 | 1 | 23 | 18 | 488 | 172 | -52 | J5 |
| 24 | 0 | 101 | -2 | 4 | 24 | 11 | 497 | 103 | -17 | J6 |
| 25 | 0 | 88 | -2 | -41 | 25 | 8 | 498 | 74 | -13 | J7 |
| 26 | 1 | 114 | 3 | 49 | 26 | 14 | 375 | 133 | -488 | K1 |
| 27 | 0 | 92 | -2 | -27 | 27 | 11 | 411 | 103 | -349 | K2 |
| 28 | 0 | 110 | -2 | 35 | 28 | 4 | 393 | 35 | -418 | K3 |
| 29 | 0 | 91 | -2 | -31 | 29 | 17 | 436 | 162 | -253 | K4 |
| 30 | 1 | 107 | 3 | 25 | 30 | 7 | 388 | 64 | -438 | K5 |
| 31 | 0 | 94 | -2 | -20 | 31 | 12 | 363 | 113 | -534 | K6 |
| 32 | 0 | 96 | -2 | -13 | 32 | 4 | 442 | 35 | -229 | K7 |
| 33 | | | | | 33 | | | | | |
| 34 | | | | | 34 | | | | | |
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| 39 | | | | | 39 | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 30 | 130 |
| 43-89 | 51 | 309 |

Signature: *Arthur Desrosiers CHP*

# Attachment 1

# Survey Unit FSS-QC

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: 3A | Survey Unit & Type: 10% VERIFICATION SURVEY | Page of 1 of 1 |
|---|---|---|---|---|
| | | FLOOR | FSS-QC | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% α; 50% β | Christine Hunter 1/25/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 0 | 1071 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 234834 | 12/20/2018 | 43-93 | 100 | PR312654 | 4/17/2018 | 0.4398 | 0.4675 | 19 | 3877 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-25-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

GRIDS LISTED SCANNED 100%

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | GRID # | QC# |
| 1 | 3 | 129 | 17 | 76 | 1 | 9 | 650 | 65 | 1,122 | FJ2 | QC63 |
| 2 | 0 | 105 | 0 | -7 | 2 | 1 | 444 | -8 | 241 | FH4 | QC64 |
| 3 | 0 | 96 | 0 | -39 | 3 | 4 | 489 | 19 | 433 | FG3 | QC65 |
| 4 | 0 | 90 | 0 | -59 | 4 | 5 | 401 | 28 | 57 | FDJ | QC66 |
| 5 | | | | | | | | | | | |
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| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 17 | 135 |
| 43-93 | 71 | 303 |
| | | |


Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

**Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-121 | Room: CELL 6A1 | Survey Unit & Type: QC 10% VERIFICATION SURVEY | Page of 1 of 1 |
|---|---|---|---|---|
| | | HVAC in 6A1 | FSS-QC | |

| Comments | Surveyed By: | Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Christine Hunter | 1/29/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 998 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | | 2360/43-93 | 234834 | 12/20/2018 | 43-93 | 100 | PR312654 | 4/17/2018 | 0.4398 | 0.4675 | 6 | 3868 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/29/18 | | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | QC# | Location # |
| 1 | 0 | 96 | -2 | -13 | 1 | 1 | 300 | 4 | -371 | 91 | HVAC - TOP |
| 2 | 1 | 118 | 3 | 63 | 2 | 0 | 270 | -5 | -500 | 92 | HVAC-MIDDLE |
| 3 | 0 | 92 | -2 | -27 | 3 | 1 | 310 | 4 | -329 | 93 | HVAC-TOP |
| 4 | 0 | 94 | -2 | -20 | 4 | 1 | 303 | 4 | -359 | 94 | HVAC - BOTTOM |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
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| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 123 |
| 43-93 | 52 | 293 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

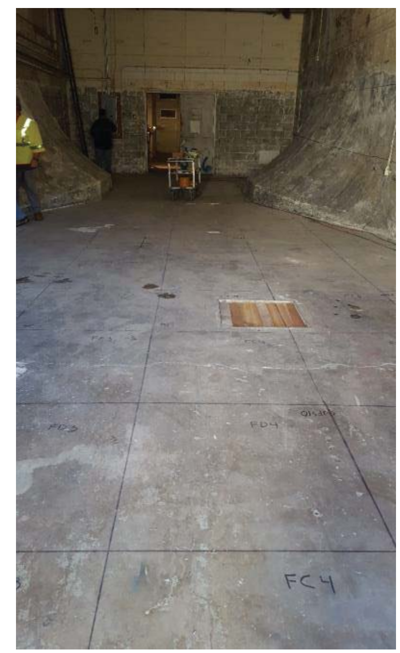
Radiological Survey Form — Robins AFB Project: WR0082

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Robins AFB Building 181 | HWP# 02-181 | | Room: Cell 61A | | | Survey Unit & Type: QC 10% VERIFICATION | | | | | Page of 1 of 1 | | | |
| | | | Floor, walls & ceiling | | | FSS-QC | | | | | | | | |
| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α eff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
| surf. eff. = 25% alpha; 50% beta | Christine Hunter 1-25-18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 0 | 1071 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 234834 | 12/20/2018 | 43-93 | 100 | PR312654 | 12/20/2018 | 0.4398 | 0.4675 | 19 | 3877 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1-25-18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

GRIDS LISTED SCANNED 100%

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | GRID # | Location # |
| 1 | 0 | 107 | 0 | 0 | 1 | 25 | 600 | 210 | 908 | FD2 | QC27 |
| 2 | 0 | 90 | 0 | -59 | 2 | 2 | 393 | 1 | 23 | FA3 | QC28 |
| 3 | 1 | 118 | 6 | 38 | 3 | 13 | 550 | 101 | 694 | FC5 | QC29 |
| 4 | 2 | 118 | 12 | 38 | 4 | 22 | 516 | 183 | 549 | FD3 | QC30 |
| 5 | 0 | 119 | 0 | 41 | 5 | 5 | 447 | 28 | 254 | FF4 | QC31 |
| 6 | 1 | 112 | 6 | 17 | 6 | 5 | 536 | 28 | 634 | FF2 | QC32 |
| 7 | 0 | 109 | 0 | 7 | 7 | 4 | 476 | 19 | 378 | FJ5 | QC33 |
| 8 | 0 | 105 | 0 | -7 | 8 | 13 | 633 | 101 | 1049 | FJ2 | QC34 |
| 9 | 0 | 107 | 0 | 0 | 9 | 2 | 577 | 1 | 810 | FL4 | QC35 |
| 10 | 2 | 97 | 12 | -35 | 10 | 4 | 481 | 19 | 399 | FP1 | QC36 |
| 11 | 0 | 124 | 0 | 59 | 11 | 2 | 420 | 1 | 138 | FQ4 | QC37 |
| 12 | 0 | 108 | 0 | 3 | 12 | 1 | 601 | -8 | 913 | NWQ1 | QC38 |
| 13 | 0 | 102 | 0 | -18 | 13 | 2 | 341 | 1 | -200 | EWB2 | QC39 |
| 14 | 0 | 95 | 0 | -42 | 14 | 3 | 361 | 10 | -114 | EW41 | QC40 |
| 15 | 1 | 93 | 6 | -49 | 15 | 1 | 406 | -8 | 78 | SWP2 | QC41 |
| 16 | 0 | 133 | 0 | 90 | 16 | 1 | 521 | -8 | 570 | SWM1 | QC42 |
| 17 | 0 | 94 | 0 | -46 | 17 | 1 | 370 | -8 | -76 | SWJ2 | QC43 |
| 18 | 0 | 101 | 0 | -21 | 18 | 6 | 332 | 37 | -238 | SWH2 | QC44 |
| 19 | 1 | 115 | 6 | 27 | 19 | 9 | 314 | 65 | -315 | SWB2 | QC45 |
| 20 | 1 | 90 | 6 | -59 | 20 | 1 | 269 | -8 | -508 | NWE2 | QC46 |
| 21 | 3 | 113 | 17 | 21 | 21 | 1 | 403 | -8 | 65 | NWJ2 | QC47 |
| 22 | 0 | 111 | 0 | 14 | 22 | 5 | 564 | 28 | 754 | NWM1 | QC48 |
| 23 | 0 | 125 | 0 | 62 | 23 | 10 | 507 | 74 | 510 | EWC4 | QC49 |
| 24 | 0 | 112 | 0 | 17 | 24 | 3 | 369 | 10 | -80 | FN5 | QC50 |
| 25 | 0 | 114 | 0 | 24 | 25 | 2 | 547 | 1 | 681 | I17 | QC51 |
| 26 | 0 | 108 | 0 | 3 | 26 | 2 | 345 | 1 | -183 | US13 | QC52 |
| 27 | 0 | 92 | 0 | -53 | 27 | 2 | 409 | 1 | 91 | H15 | QC53 |
| 28 | 0 | 114 | 0 | 24 | 28 | 4 | 381 | 19 | -29 | SWD3 | QC54 |
| 29 | 1 | 97 | 6 | -35 | 29 | 2 | 426 | 1 | 164 | SWC4 | QC55 |
| 30 | 1 | 102 | 6 | -18 | 30 | 2 | 360 | 1 | -119 | WWA3 | QC56 |
| 31 | 1 | 130 | 6 | 80 | 31 | 2 | 385 | 1 | -12 | NWB3 | QC57 |
| 32 | 2 | 92 | 12 | -53 | 32 | 2 | 335 | 1 | -225 | NWD3 | QC58 |
| 33 | 0 | 96 | 0 | -39 | 33 | 3 | 417 | 10 | 125 | E27 | QC59 |
| 34 | 1 | 98 | 6 | -32 | 34 | 12 | 407 | 92 | 83 | NWF4 | QC60 |
| 35 | 0 | 101 | 0 | -21 | 35 | 5 | 264 | 28 | -529 | NWH3 | QC61 |
| 36 | 0 | 107 | 0 | 0 | 36 | 2 | 398 | 1 | 44 | NWJ4 | QC62 |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 17 | 135 |
| 43-93 | 71 | 303 |




Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Cell 6A1 Various Locations | Survey Unit & Type: 1 m2 grids | Page of 1 of 1 |
|---|---|---|---|---|
| | | FSS-QC | Rescan of 6A1 grids | |

| Comments | Surveyed By: | Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Camille Patrick | 1/31/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 1135 | 10 | 3 |
| βMDA (total) <= 1285 dpm total | | | 2360/43-89 | 310179 | 4/17/2018 | 43-89 | 125 | PR337815 | 4/17/2018 | 0.3126 | 0.3249 | 12 | 4328 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | | #N/A | #N/A | | | | |
| | Review: AED 3-1-18 | | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | | #N/A | #N/A | | | | |

**100% Scan in grids, highest area 1 min. static count**

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | Grid | Location |
| 1 | 4 | 292 | 5 | -56 | 1 | 1 | 490 | -3 | 352 | I1 | NORTH LOWER WALL |
| 2 | 4 | 297 | 5 | -50 | 2 | 2 | 526 | 10 | 574 | J1 | NORTH LOWER WALL |
| 3 | 1 | 332 | 0 | -10 | 3 | 1 | 521 | -3 | 543 | J2 | NORTH LOWER WALL |
| 4 | 0 | 323 | -2 | -20 | 4 | 3 | 596 | 23 | 1,005 | K1 | NORTH LOWER WALL |
| 5 | 3 | 298 | 3 | -49 | 5 | 2 | 513 | 10 | 494 | L1 | NORTH LOWER WALL |
| 6 | 1 | 302 | 0 | -45 | 6 | 4 | 601 | 36 | 1,035 | L2 | NORTH LOWER WALL |
| 7 | 0 | 317 | -2 | -27 | 7 | 1 | 512 | -3 | 488 | M2 | NORTH LOWER WALL |
| 8 | 0 | 331 | -2 | -11 | 8 | 2 | 540 | 10 | 660 | N1 | NORTH LOWER WALL |
| 9 | 0 | 305 | -2 | -41 | 9 | 2 | 550 | 10 | 721 | N2 | NORTH LOWER WALL |
| 10 | 0 | 321 | -2 | -23 | 10 | 2 | 562 | 10 | 795 | O1 | NORTH LOWER WALL |
| 11 | 0 | 331 | -2 | -11 | 11 | 0 | 532 | -15 | 611 | O2 | NORTH LOWER WALL |
| 12 | 3 | 314 | 3 | -31 | 12 | 3 | 690 | 23 | 1,583 | P1 | NORTH LOWER WALL |
| 13 | 0 | 331 | -2 | -11 | 13 | 0 | 467 | -15 | 211 | P2 | NORTH LOWER WALL |
| 14 | 1 | 323 | 0 | -20 | 14 | 0 | 702 | -15 | 1,657 | Q1 | NORTH LOWER WALL |
| 15 | 4 | 294 | 5 | -54 | 15 | 4 | 453 | 36 | 124 | A4 | NORTH UPPER WALL |
| 16 | 0 | 321 | -2 | -23 | 16 | 0 | 441 | -15 | 50 | B4 | NORTH UPPER WALL |
| 17 | 6 | 344 | 9 | 4 | 17 | 6 | 400 | 61 | -202 | D4 | NORTH UPPER WALL |
| 18 | 1 | 316 | 0 | -28 | 18 | 1 | 423 | -3 | -60 | B4 | EAST UPPER WALL |
| 19 | 2 | 364 | 2 | 27 | 19 | 2 | 435 | 10 | 14 | C4 | EAST UPPER WALL |
| 20 | 0 | 304 | -2 | -42 | 20 | 0 | 455 | -15 | 137 | E4 | EAST UPPER WALL |
| 21 | 3 | 331 | 3 | -11 | 21 | 3 | 452 | 23 | 118 | F4 | EAST UPPER WALL |
| 22 | 1 | 362 | 0 | 25 | 22 | 1 | 382 | -3 | -313 | B3 | SOUTH UPPER WALL |
| 23 | 4 | 344 | 5 | 4 | 23 | 1 | 441 | -3 | 50 | C4 | SOUTH UPPER WALL |
| 24 | 4 | 338 | 5 | -3 | 24 | 4 | 448 | 36 | 94 | I3 | SOUTH UPPER WALL |
| 25 | 1 | 294 | 0 | -54 | 25 | 3 | 432 | 23 | -5 | J4 | SOUTH UPPER WALL |
| 26 | 3 | 335 | 3 | -6 | 26 | 1 | 436 | -3 | 20 | K4 | SOUTH UPPER WALL |
| 27 | 1 | 350 | 0 | 11 | 27 | 2 | 440 | 10 | 44 | M4 | SOUTH UPPER WALL |
| 28 | 2 | 307 | 2 | -39 | 28 | 3 | 417 | 23 | -97 | N3 | SOUTH UPPER WALL |
| 29 | 3 | 339 | 3 | -2 | 29 | 0 | 413 | -15 | -122 | Q4 | SOUTH UPPER WALL |
| 30 | 11 | 372 | 19 | 37 | 30 | 1 | 552 | -3 | 734 | B3 | FLOOR |
| 31 | | | | | | | | | | | |
| 32 | | | | | | | | | | | |
| 33 | | | | | | | | | | | |
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| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 14 | 84 |
| 43-89 | 69 | 368 |

Reviewed: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

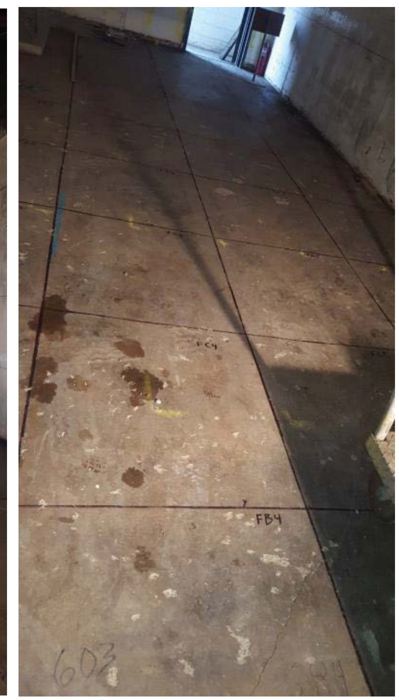
| Robins AFB Building 181 | HWP# 02-181 | Room: 6B1 | Survey Unit & Type: 10% Verification | Page of 1 of 1 |
|---|---|---|---|---|
| | 10% Verificaction Survey | Floors, walls & ceiling | FSS-QC | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Christine Hunter 1/25/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 1 | 1071 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 253275 | 11/17/2018 | 43-93 | 100 | PR244541 | 11/17/2018 | 0.4099 | 0.38 | 14 | 3826 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/25/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

Grids listed were 100% scanned

| | page1 | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | GRID LOCATION | QC # |
| 1 | 1 | 128 | 5 | 73 | 1 | 5 | 225 | 35 | -829 | FB3 | QC1 |
| 2 | 0 | 99 | -1 | -28 | 2 | 5 | 229 | 35 | -808 | FH2 | QC2 |
| 3 | 0 | 114 | -1 | 24 | 3 | 3 | 220 | 16 | -856 | NWB2 | QC3 |
| 4 | 1 | 104 | 5 | -11 | 4 | 2 | 256 | 6 | -666 | FA1 | QC4 |
| 5 | 0 | 105 | -1 | -7 | 5 | 6 | 241 | 45 | -745 | FA6 | QC5 |
| 6 | 0 | 118 | -1 | 38 | 6 | 2 | 208 | 6 | -919 | FE5 | QC6 |
| 7 | 1 | 105 | 5 | -7 | 7 | 8 | 214 | 64 | -887 | FB2 | QC7 |
| 8 | 0 | 97 | -1 | -35 | 8 | 1 | 248 | -4 | -708 | FJ4 | QC8 |
| 9 | 0 | 100 | -1 | -25 | 9 | 2 | 223 | 6 | -840 | FJ6 | QC9 |
| 10 | 0 | 104 | -1 | -11 | 10 | 6 | 211 | 45 | -903 | SWA1 | QC10 |
| 11 | 1 | 92 | 5 | -53 | 11 | 1 | 222 | -4 | -845 | CEILING | QC11 |
| 12 | 2 | 103 | 11 | -14 | 12 | 2 | 188 | 6 | -1024 | NWA11 | QC12 |
| 13 | 1 | 124 | 5 | 59 | 13 | 2 | 172 | 6 | -1108 | NWB5 | QC13 |
| 14 | 1 | 104 | 5 | -11 | 14 | 2 | 173 | 6 | -1103 | NWD3 | QC14 |
| 15 | 0 | 100 | -1 | -25 | 15 | 7 | 166 | 55 | -1140 | NWD4 | QC15 |
| 16 | 0 | 105 | -1 | -7 | 16 | 6 | 221 | 45 | -851 | NWE4 | QC16 |
| 17 | 0 | 132 | -1 | 87 | 17 | 1 | 309 | -4 | -387 | SWE3 | QC17 |
| 18 | 0 | 106 | -1 | -4 | 18 | 1 | 351 | -4 | -166 | HVAC | QC18 |
| 19 | 0 | 99 | -1 | -28 | 19 | 4 | 332 | 25 | -266 | SWH3 | QC19 |
| 20 | 0 | 104 | -1 | -11 | 20 | 4 | 367 | 25 | -82 | SWD1 | QC20 |
| 21 | 0 | 98 | -1 | -32 | 21 | 1 | 330 | -4 | -277 | SWA1 | QC21 |
| 22 | 1 | 98 | 5 | -32 | 22 | 2 | 267 | 6 | -608 | SWH1 | QC22 |
| 23 | 0 | 111 | -1 | 14 | 23 | 8 | 310 | 64 | -382 | EWD2 | QC23 |
| 24 | 1 | 125 | 5 | 62 | 24 | 4 | 321 | 25 | -324 | NWC2 | QC24 |
| 25 | 0 | 116 | -1 | 31 | 25 | 2 | 333 | 6 | -261 | NWE2 | QC25 |
| 26 | 0 | 98 | -1 | -32 | 26 | 7 | 311 | 55 | -377 | NWH2 | QC26 |
| 27 | | | | | 27 | | | | | | |
| 28 | | | | | 28 | | | | | | |
| 29 | | | | | 29 | | | | | | |
| 30 | | | | | 30 | | | | | | |
| 31 | | | | | 31 | | | | | | |
| 32 | | | | | 32 | | | | | | |
| 33 | | | | | 33 | | | | | | |
| 34 | | | | | 34 | | | | | | |
| 35 | | | | | 35 | | | | | | |
| 36 | | | | | 36 | | | | | | |
| 37 | | | | | 37 | | | | | | |
| 38 | | | | | 38 | | | | | | |
| 39 | | | | | 39 | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 24 | 135 |
| 43-93 | 69 | 371 |




Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | CELL 5 | Survey Unit & Type: 10% VERIFICATION SURVEY | Page of 1 of 1 |
|---|---|---|---|---|
| | QC | Floor, walls & ceiling | FSS | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Christine Hunter 1/26/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 1051 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 234834 | 12/20/2018 | 43-93 | 100 | PR312654 | 12/20/2018 | 0.4398 | 0.4675 | 12 | 3939 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/27/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

GRIDS LISTED SCANNED 100% with 43-93 then static and smear highest point

| | Smears | | | | | Direct Frisk | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | | |
| No. | α | β | α | β | | α | β | α | β | QC# | Location # | |
| 1 | 0 | 100 | -1 | -18 | 1 | 1 | 324 | -2 | -299 | 71 | SWY1 | |
| 2 | 0 | 93 | -1 | -42 | 2 | 4 | 346 | 25 | -205 | 72 | SW01 | |
| 3 | 0 | 95 | -1 | -35 | 3 | 2 | 279 | 7 | -492 | 73 | SWD2 | |
| 4 | 0 | 101 | -1 | -14 | 4 | 2 | 313 | 7 | -346 | 74 | NWD2 | |
| 5 | 0 | 89 | -1 | -56 | 5 | 3 | 324 | 16 | -299 | 75 | NWN1 | |
| 6 | 0 | 95 | -1 | -35 | 6 | 3 | 333 | 16 | -261 | 76 | NWX2 | |
| 7 | 0 | 114 | -1 | 31 | 7 | 2 | 352 | 7 | -179 | 77 | FE2 | LIGHT |
| 8 | 0 | 113 | -1 | 27 | 8 | 4 | 389 | 25 | -21 | 78 | NEW | UPPER |
| 9 | 0 | 103 | -1 | -7 | 9 | 2 | 582 | 7 | 805 | 79 | FE2 | CEILING |
| 10 | 1 | 116 | 5 | 38 | 10 | 0 | 373 | -11 | -89 | 80 | FT1 | LIGHT |
| 11 | 0 | 110 | -1 | 17 | 11 | 0 | 389 | -11 | -21 | 81 | NWS2 | UPPER |
| 12 | 0 | 134 | -1 | 101 | 12 | 2 | 438 | 7 | 189 | 82 | FR2 | CEILING |
| 13 | 1 | 100 | 5 | -18 | 13 | 1 | 527 | -2 | 569 | 83 | FA2 | CEILING |
| 14 | 0 | 96 | -1 | -32 | 14 | 6 | 566 | 44 | 736 | 84 | FA3 | CEILING |
| 15 | 1 | 96 | 5 | -32 | 15 | 1 | 359 | -2 | -149 | 85 | FA3 - FA4 | UPPER |
| 16 | 0 | 107 | -1 | 7 | 16 | 0 | 241 | -11 | -654 | 86 | SWH2 | UPPER |
| 17 | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | |
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| 39 | | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 2929 | 26 | 133 |
| 43-93 | 62 | 306 |
| | | |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

**Radiological Survey Form** — **Robins AFB Project: WR0082**

| Robins AFB Building 181 | HWP# 02-181 | Room: Outside Cell 6 Pad | Survey Unit & Type: 10% Verification Survey | Page of 1 of 1 |
|---|---|---|---|---|
| | QC of FSS - 14A | | FSS-QC | |

| Comments | Surveyed By: | Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 *pi* α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Christine Hunter | 1/29/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 998 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | | 2360/43-93 | 234834 | 12/20/2018 | 43-93 | 100 | PR312654 | 4/17/2018 | 0.4398 | 0.4675 | 6 | 3868 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/29/18 | | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | QA# | Location # |
| 1 | 0 | 83 | -2 | -58 | 1 | 8 | 657 | 67 | 1156 | 95 | D4 |
| 2 | 1 | 76 | 3 | -83 | 2 | 8 | 525 | 67 | 591 | 96 | C1 |
| 3 | 0 | 81 | -2 | -65 | 3 | 18 | 785 | 158 | 1704 | 97 | B2 |
| 4 | 0 | 108 | -2 | 29 | 4 | 4 | 370 | 31 | -72 | 98 | F5 |
| 5 | | | | | | | | | | | |
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| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 130 |
| 43-93 | 52 | 303 |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

Radiological Survey Form — Robins AFB Project: WR0082

| Robins AFB Building 181 | HWP# 02-181 | Room: Outside Cell 6 Pad | Survey Unit & Type: 10% Verification Survey | Page of 1 of 1 |
|---|---|---|---|---|
| | QC of FSS - 14B | | FSS-QC | |

| Comments | Surveyed By: | Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 *pi* α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Christine Hunter | 1/29/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 4 | 998 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | | 2360/43-93 | 234834 | 12/20/2018 | 43-93 | 100 | PR312654 | 4/17/2018 | 0.4398 | 0.4675 | 6 | 3868 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/29/18 | | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | QA# | Location # |
| 1 | 0 | 98 | -2 | -6 | 1 | 2 | 490 | 13 | 441 | 99 | A7 |
| 2 | 0 | 106 | -2 | 22 | 2 | 9 | 396 | 76 | 39 | 100 | H1 |
| 3 | 0 | 115 | -2 | 53 | 3 | 14 | 370 | 122 | -72 | 101 | J1 |
| 4 | 0 | 107 | -2 | 25 | 4 | 16 | 520 | 140 | 570 | 102 | J3 |
| 5 | | | | | | | | | | | |
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| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 30 | 130 |
| 43-93 | 52 | 303 |
| | | |

Signature: Arthur Desrosiers CHP

# Attachment 1

ARS Aleut Remediation

## Radiological Survey Form

**Robins AFB Project: WR0082**

| | | | | |
|---|---|---|---|---|
| Robins AFB Building 181 | HWP# 02-181 | Room: ROOF OVER CELLS 5 AND 6 | Survey Unit & Type: QC 10% VERIFICTION SURVEY | Page of 1 of 1 |
| | | | FSS-12 | |

| Comments | Surveyed By: Date: | Instrument | Serial # | Cal. Due | Probe | Area | Serial # | Cal. Due | 2 pi α e ff. | 2 pi β eff. | α Bkg. counts | β Bkg. counts | BKG Count Time (min) | Sample Count Time (min) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| surf. eff. = 25% alpha; 50% beta | Christine Hunter 1/26/18 | 2929 | 190602 | 12/6/2018 | 43-10-1 | 100 | PR199159 | 12/6/2018 | 0.6933 | 0.5749 | 2 | 1051 | 10 | 1 |
| βMDA (total) <= 1285 dpm total | | 2360/43-93 | 234834 | 12/20/2018 | 43-93 | 100 | PR312654 | 12/20/2018 | 0.4398 | 0.4675 | 12 | 3939 | 10 | 1 |
| βMDA (loose) <= 129 dpm total | | | | | | | | | #N/A | #N/A | | | | |
| | Review: CBP 1/27/18 | | | | | | | | #N/A | #N/A | | | | |
| | | | | | | | | | #N/A | #N/A | | | | |

| | Smears | | | | | Direct Frisk | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Counts | | DPM/100cm² | | | Gross Counts | | DPM/100cm² | | | |
| No. | α | β | α | β | | α | β | α | β | QC# | Location # |
| 1 | 0 | 79 | -1 | -91 | 1 | 5 | 291 | 35 | -440 | 87 | C5 - ROOF LEDGE |
| 2 | 1 | 93 | 5 | -42 | 2 | 17 | 394 | 144 | 0 | 88 | E1 - ALUMINUM |
| 3 | 0 | 88 | -1 | -59 | 3 | 22 | 349 | 189 | -192 | 89 | R5 - DRAIN |
| 4 | 3 | 96 | 16 | -32 | 4 | 7 | 213 | 53 | -774 | 90 | P3/5 - A/C |
| 5 | | | | | | | | | | | |
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| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |

| Probe | α MDA | β MDA |
|---|---|---|
| 43-10-1 | 26 | 133 |
| 43-93 | 62 | 306 |

Signature: Arthur Desrosiers CHP

# ATTACHMENT 5

## Instrument Certifications and Daily Source Checks

# Attachment 1

# Instrument Certifications

AF V

Setting: 670 V AT (120

FT % ERROR

| % ERROR |
| --- |
| 0.00% |
| 0.00% |
| 0.00% |
| 0.00% |
| 0.00% |
| 0.00% |
| 0.00% |
| 0.00% |
| 0.00% |
| 0.00% |
| 0.00% |
| 0.00% |

AF 250: 250.1 % E

AF 2500: 2501 % E

AF 25K: 25.02 K % E

AF 250K: 250.1 K % E

☑ Is the As Fo

R

x.1 or x1 Sca

x1 or x10 Sca

x10 or x100 Sca

x100 or x1000 Sca

etpoints

V

lpha: 120 mV

fficiences

| | A-B XTLK |
|---|---|
| 2.97% | 4.46% |
| 7.03% | |
| 2.31% | |
| 2.74% | |

ncy from

| Back ground: | Alpha |
|---|---|
| | 0 |
| Pu-239: | 3905 |
| Tc-99: | 22 |
| Th-230: | 6113 |
| SrY-90: | N/A |

"AF" in the AL E
Efficiencies in th

5163 **Average:** 5164.0 ☑ **Are th**

bration and the B-A Xtalk is <1% and the A-B Xtalk is <1
ortional probes = 1/8" from surface unless otherwise sp

99 **Source 2:** Th-230

AF V

V Setting: 825 V AT (120

EFT % ERROR

| | |
|---|---|
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |

**AF 250:** 251 %

**AF 2500:** 2501 %

**AF 25K:** 25.01 K %

**AF 250K:** 250.1 K %

☑ **Is the As Fo**

**F**

**x.1 or x1 Sca**

**x1 or x10 Sca**

**x10 or x100 Sca**

**x100 or x1000 Sca**

points

V

ha: 120 mV

iciences

A-B XTLK

| | |
|---|---|
| .07% | 9.07% |
| .30% | |
| .79% | |
| .62% | |

cy from

AS

| | Alpha |
|---|---|
| Back ground: | 0 |
| Pu-239: | 4092 |
| Tc-99: | 26 |
| Th-230: | 5697 |
| SrY-90: | N/A |

"AF" in the AL Ef

Efficiencies in th

4154 Average: 4126.0 ☑ Are the

ration and the B-A Xtalk is <1% and the A-B Xtalk is <1

rtional probes = 1/8" from surface unless otherwise spe

9 Source 2: Pu-239

AF V

Setting: 790 V

AT (120

| EFT | % ERROR |
|---|---|
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |

**AF 250:** 250.1 %

**AF 2500:** 2501 %

**AF 25K:** 25.01 K %

**AF 250K:** 250.1 K %

☑ **Is the As Fo**

**x.1 or x1 Sc**

**x1 or x10 Sc**

**x10 or x100 Sc**

**x100 or x1000 Sc**

etpoints

V

pha: 120 mV

fficiences

| | A-B XTLK |
|---|---|
| 5.57% | 7.75% |
| 1.62% | |
| 3.37% | |
| 6.88% | |

ncy from

| | Alpha |
|---|---|
| Back ground: | 1 |
| Pu-239: | 4348 |
| Tc-99: | 14 |
| Th-230: | 6403 |
| SrY-90: | N/A |

"AF" in the AL E

Efficiencies in th

5736 **Average:** 5824.3 ☑ **Are th**

bration and the B-A Xtalk is <1% and the A-B Xtalk is <1

ortional probes = 1/8" from surface unless otherwise sp

99 **Source 2:** Th-230

V Setting: 650 V AT (12

| EFT | % ERROR |
|---|---|
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |

**AF 250:** 251 %

**AF 2500:** 2501 %

**AF 25K:** 25.01 K %

**AF 250K:** 250.1 K %

☑ **Is the As Fo**

**x.1 or x1 Sc**

**x1 or x10 Sc**

**x10 or x100 Sc**

**x100 or x1000 Sc**

tpoints

V

pha: 120 mV

fficiences

| | A-B XTLK |
|---|---|
| 4.50% | 4.97% |
| 1.71% | |
| 2.15% | |
| 6.38% | |

ncy from

| Back ground: | Alpha |
|---|---|
| | 0 |
| Pu-239: | 4165 |
| Tc-99: | 17 |
| Th-230: | 6070 |
| SrY-90: | N/A |

"AF" in the AL E
Efficiencies in th

5786 Average: 5727.7 ☑ Are the

bration and the B-A Xtalk is <1% and the A-B Xtalk is <1
ortional probes = 1/8" from surface unless otherwise spe

99 Source 2: Th-230

HV Setting: 800 V

AT (12

| LEFT | % ERROR |
| --- | --- |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |

| | | |
| --- | --- | --- |
| AF 250: | 250 | % |
| AF 2500: | 2500 | % |
| AF 25K: | 25 K | % |
| AF 250K: | 250 K | % |

☑ Is the As F

x.1 or x1 Sc

x1 or x10 Sc

x10 or x100 Sc

x100 or x1000 Sc

0 V

Alpha: 120 mV

Efficiences

| | A-B XTLK |
|---|---|
| 0.00% | #Div/0! |
| 0.00% | |
| 0.00% | |
| 0.00% | |

ency from

| Back ground: | Alpha |
|---|---|
| | 0 |
| Pu-239: | 4968 |
| Tc-99: | 11 |
| Th-230: | 5810 |
| SrY-90: | N/A |

"AF" in the AL

Efficiencies in t

3 4989 Average: 4984.0 ☑ Are th

alibration and the B-A Xtalk is <1% and the A-B Xtalk is <

oportional probes = 1/8" from surface unless otherwise sp

c-99 Source 2: Th-230

HV Setting: 775 V AT (12

| LEFT | % ERROR |
|---|---|
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |
| AF | 0.00% |

| | | |
|---|---|---|
| AF 250: | 250 | % |
| AF 2500: | 2500 | % |
| AF 25K: | 25 K | % |
| AF 250K: | 250 K | % |

☑ Is the As F

x.1 or x1 Sc

x1 or x10 Sc

x10 or x100 Sc

x100 or x1000 Sc

etpoints

V

Alpha: 120 mV

Efficiencies

| | A-B XTLK |
|---|---|
| 17.59% | 10.47% |
| 7.07% | |
| 15.19% | |
| 19.35% | |

ency from

| Back ground: | Alpha |
|---|---|
| Back ground: | 0 |
| Pu-239: | 4974 |
| Tc-99: | 3 |
| Th-230: | 5533 |
| SrY-90: | N/A |

"AF" in the AL E
Efficiencies in t

3 3894 Average: 3911.0 ☑ Are th

alibration and the B-A Xtalk is <1% and the A-B Xtalk is <
portional probes = 1/8" from surface unless otherwise sp

s-99 Source 2: Pu-239

# Attachment 1

**Safety and Ecology Corporation**
SEC PROCEDURE # SEC-IS-418 Rev 2
2800 Solway Road
Knoxville, TN 37931
Page 1 of 1
**Calibration Certificate**
4/17/2017

**Calibration Certificate for 2360,Serial # 310164, Bar Code # 01508,Property # ARS13**

Date: 04/17/17 | Date Last Cal. Expires: 05/05/16 | Technician: Carl Hall
Location: 999999, | Reason For Calibration: Due for Calibration

**EQUIPMENT USED DURING CALIBRATION**

| MODEL: | SERIAL #: | CAL DUE: |
|---|---|---|
| 500-2 | 132896 | 06/20/17 |
| | | |

**AS FOUND DATA** Geotropism: SAT | AS FOUND Instrument Condition: SAT | AS LEFT Instrument Condition: SAT

☒ New Batteries? Battery Check: SAT | AS FOUND Mechanical Zero: 0 | AS LEFT Mechanical Zero: 0

| HIGH VOLTAGE (+/- 10% tolerance) | | AS FOUND HV | AS LEFT HV |
|---|---|---|---|
| | 500 V: | 503 V | AF V |
| | 1000 V: | 999 V | AF V |
| | 1500 V: | 1496 V | AF V |
| | AF HV Setting: | 800 V | AL HV Setting: 800 V |

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

## RATE METER

| SCALE | RATE CPM | AS FOUND | % ERROR | AS LEFT | % ERROR |
|---|---|---|---|---|---|
| x.1 or x1 | 100 | 100 | 0.00% | AF | 0.00% |
| | 250 | 250 | 0.00% | AF | 0.00% |
| | 400 | 400 | 0.00% | AF | 0.00% |
| x1 or x10 | 1000 | 1000 | 0.00% | AF | 0.00% |
| | 2500 | 2500 | 0.00% | AF | 0.00% |
| | 4000 | 4000 | 0.00% | AF | 0.00% |
| x10 or x100 | 10K | 10 | 0.00% | AF | 0.00% |
| | 25K | 25 | 0.00% | AF | 0.00% |
| | 40K | 40 | 0.00% | AF | 0.00% |
| x100 or x1000 | 100K | 100 | 0.00% | AF | 0.00% |
| | 250K | 250 | 0.00% | AF | 0.00% |
| | 400K | 400 | 0.00% | AF | 0.00% |

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

## DIGITAL SCALER

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AF 250: | 250 | % ERR: | 0.00% | AL 250: | AF | % ERR: | 0.00% |
| AF 2500: | 2500 | % ERR: | 0.00% | AL 2500: | AF | % ERR: | 0.00% |
| AF 25K: | 25 K | % ERR: | 0.00% | AL 25K: | AF K | % ERR: | 0.00% |
| AF 250K: | 250 K | % ERR: | 0.00% | AL 250K: | AF K | % ERR: | 0.00% |

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

## REPRODUCIBILITY

| | | | |
|---|---|---|---|
| x.1 or x1 Scale: | 250 | 250 | 250 |
| x1 or x10 Scale: | 2500 | 2500 | 2500 |
| x10 or x100 Scale: | 25 K | 25 K | 25 K |
| x100 or x1000 Scale: | 250 K | 250 K | 250 K |

☑ Are the Individual Counts Within 10% of the Average?

Audio Response: SAT
Overload Light: SAT
Low Battery (2.2V): SAT

**Comments:** Married as a set with: Model: 43-89 Serial #: PR337817 Bar Code #: 01505

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

Date Instrument is Due For Next Calibration: 04/17/18

Performed by: [signature] Reviewed by: [signature] Date: 4-19-17

Printed Name: Carl Hall

# Attachment 1

**Safety and Ecology Corporation** SEC PROCEDURE # SEC-IS-420 Rev 3
2800 Solway Road, Knoxville, TN 37931

4/17/2017

## Calibration Certificate

**Calibration Certificate for 43-89, Serial # PR337817, Bar Code # 01505, Property # ARS14**

Date: 04/17/17 Date Last Cal. Expires: 05/05/16 Technician: Carl Hall
Location: 999999, Reason For Calibration: Due and Repair

**EQUIPMENT USED DURING CALIBRATION** MODEL: 2360 SERIAL #: 310164 CAL DUE 04/17/18

| NIST TRACEABLE SOURCES USED | SOURCE | ISOTOPE | ACTIVITY | 2π | ASSAY DATE |
|---|---|---|---|---|---|
| Efficiencies from last calibration | 5744-06 | Sr-90 | 16430 dpm | 11,528 cpm | 1/3/2017 |
| Pu: 20.04 % | 5746-06 | Tc-99 | 31900 dpm | 20,000 cpm | 1/3/2017 |
| Tc: 12.81 % | 5747-06 | Pu-239 | 25797 dpm | 13,098 cpm | 1/3/2017 |
| Th: 17.24 % | 5748-06 | Th-230 | 34899 dpm | 17,699 cpm | 1/3/2017 |
| SrY: 26.14 % | | | | | |

### AS FOUND DATA

AS FOUND Instrument Condition: SAT
Calibration Setpoints
HV: 800 V

Threshold Beta: 4 - 40 mV Alpha: 120 mV

| | Alpha | | Beta | | AF 4 π Efficiencies | A-B XTLK |
|---|---|---|---|---|---|---|
| Back ground: | 0 | CPM | 0 | CPM | | |
| Pu-239: | 0 | CPM | 0 | CPM | 0.00% | #Div/0! |
| Tc-99: | 0 | CPM | 0 | CPM | 0.00% | |
| Th-230: | 0 | CPM | N/A | | 0.00% | |
| SrY-90: | N/A | | 0 | CPM | 0.00% | |

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

AS LEFT Instrument Condition: SAT
AS LEFT DATA after repair, HV adjust or Plateau

HV: 800 V

| | Alpha | | Beta | | AL 4 π Efficiencies | A-B XTLK |
|---|---|---|---|---|---|---|
| Back ground: | 1 | CPM | 179 | CPM | | |
| Pu-239: | 4945 | CPM | 668 | CPM | 19.17% | 9.89% |
| Tc-99: | 8 | CPM | 4199 | CPM | 12.60% | |
| Th-230: | 5867 | CPM | N/A | | 16.81% | |
| SrY-90: | N/A | | 4400 | CPM | 25.69% | |

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

Reproducibility: Isotope: Sr-90 4437 4382 4416 Average: 4411.7 ☑ Are the individual counts within 10% of the average?

If the As Found data (even after repair) is within 10% of the last calibration and the B-A Xtalk is <1% and the A-B Xtalk is <10%, then the technician may N/A the Plateau Data and go directly to Comments. Geometry of source = flush to surface, except gas proportional probes > 1/8" from surface unless otherwise specified.

### PLATEAU DATA

Source 1: Tc-99 Source 2: Th-230

| High Voltage | Response (CPM) A ch. | B ch. | Net Eff. | Response (CPM) A ch. | B ch. | Net Eff. | Background (CPM) A ch. | B ch. | Net A to B Xtalk: <10% |
|---|---|---|---|---|---|---|---|---|---|
| N/A | | | | | | | | | N/A |
| | | | | | | | | | N/A |
| | | | | | | | | | N/A |
| | | | | | | | | | N/A |
| | | | | | | | | | N/A |
| | | | | | | | | | N/A |

**2 Pi Efficiencies:**

| Pu-239 | Tc-99 | Th-230 | SrY-90 |
|---|---|---|---|
| 37.75% | 20.10% | 33.14% | 36.62% |

**Comments:** Married as a set with: Model: 2360 Serial #: 310164 Bar Code #: 01508
Replaced damaged mylar.

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

Date Instrument is Due For Next Calibration: 04/17/18

Performed by: [signature] Reviewed by: [signature] Date: 4-17-17
Printed Name: Carl Hall

@ 10,000 CPM: 10,021 **CPM**

0%, the technician may place AF in AS LEFT sec

| **PPLY CALIBRATION** | **AS FOUND** |
|---|---|
| **Vernier Setting:** | 2.86 |
| **HV Setpoints:** | 700 **V** |
| **500 V Reading:** | 504 **V** |
| **1000 V Reading:** | 1010 **V** |
| **1500 V Reading:** | 1501 **V** |
| **Max HV (1500 V +):** | |

**ERR:** 0.03% **AL 250:** AF **%**

**ERR:** 0.04% **AL 2500:** AF **%**

Threshold

ta: 4 - 50 mV

Alpha: 175 mV

fficiencies

| | A-B XTLK |
|---|---|
| 5.25% | 3.1% |
| 4.79% | B-A XTLK |
| 5.17% | 0.2% |
| 0.26% | |

ency from the last cal.?

AS LE

Alph

| | |
|---|---|
| Back ground: | 0 |
| Pu-239: | 599 |
| Tc-99: | 12 |
| Th-230: | 963 |
| SrY-90: | N/A |

"AF" in th
Efficienci

6133 Average: 6153.7 ☑ Are the

ration and the B-A Xtalk is <1% and the A-B Xtalk is <1
r probes are in contact with surface unless otherwise sp

Source 2: Th-230

Response (CPM) Backg

AF V

Setting: 1825 V

AT (120

ET % ERROR

0.00%

0.00%

0.00%

0.00%

0.00%

0.00%

0.00%

0.00%

0.00%

0.00%

0.00%

0.00%

AF 250: 250.1 % E

AF 2500: 2501 % E

AF 25K: 25.02 K % E

AF 250K: 250.1 K % E

☑ Is the As Fou

R

x.1 or x1 Sca

x1 or x10 Sca

x10 or x100 Sca

x100 or x1000 Sca

etpoints

V

lpha: 120 mV

fficiences

| | A-B XTLK |
|---|---|
| 7.40% | 6.39% |
| 0.61% | |
| 5.69% | |
| 0.71% | |

ncy from

| Back ground: | Alpha |
|---|---|
| | 8 |
| Pu-239: | 2966 |
| Tc-99: | 32 |
| Th-230: | 4307 |
| SrY-90: | N/A |

"AF" in the AL E

Efficiencies in t

3725 Average: 3656.7 ☑ Are th

bration and the B-A Xtalk is <1% and the A-B Xtalk is <

ortional probes = 1/8" from surface unless otherwise sp

/ Setting: 1700 **V**

**AT (120**

| EFT | % ERROR |
| --- | --- |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |

| | | |
| --- | --- | --- |
| **AF 250:** | 251 | **%** |
| **AF 2500:** | 2501 | **%** |
| **AF 25K:** | 25.01 K | **%** |
| **AF 250K:** | 250.1 K | **%** |

☑ **Is the As Fo**

**I**

**x.1 or x1 Sca**

**x1 or x10 Sca**

**x10 or x100 Sca**

**x100 or x1000 Sca**

V

lpha: 120 mV

Efficiencies

A-B XTLK

| | |
|---|---|
| 20.52% | 7.51% |
| 25.11% | |
| 9.14% | |
| 9.44% | |

ncy from

| Back ground: | Alpha |
|---|---|
| | 5 |
| Pu-239: | 3493 |
| Tc-99: | 17 |
| Th-230: | 5250 |
| SrY-90: | N/A |

"AF" in the AL E
Efficiencies in t

4876 Average: 4967.7 ☑ Are th

bration and the B-A Xtalk is <1% and the A-B Xtalk is <
ortional probes = 1/8" from surface unless otherwise sp

99 Source 2: Th-230

V Setting: 1700 V

AT (12

| LEFT | % ERROR |
|---|---|
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |
| F | 0.00% |

AF 250: 251 %

AF 2500: 2501 %

AF 25K: 25.01 K %

AF 250K: 250.1 K %

☑ Is the As F

x.1 or x1 Sc

x1 or x10 Sc

x10 or x100 Sc

x100 or x1000 Sc

V

lpha: 120 mV

Efficiencies

| | A-B XTLK |
|---|---|
| 20.13% | 7.07% |
| 23.71% | |
| 18.16% | |
| 29.92% | |

ency from

| Back ground: | Alpha |
|---|---|
| | 6 |
| Pu-239: | 3428 |
| Tc-99: | 22 |
| Th-230: | 4982 |
| SrY-90: | N/A |

"AF" in the AL

Efficiencies in t

5039 Average: 5089.3 ☑ Are th

ibration and the B-A Xtalk is <1% and the A-B Xtalk is <

portional probes = 1/8" from surface unless otherwise sp

-99 Source 2: Th-230

AF V

/ Setting: 1725 V

AT (120

| EFT | % ERROR |
|---|---|
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |
| | 0.00% |

**AF 250:** 251 %

**AF 2500:** 2501 %

**AF 25K:** 25.01 K %

**AF 250K:** 250.1 K %

☑ **Is the As Fo**

**F**

**x.1 or x1 Sca**

**x1 or x10 Sca**

**x10 or x100 Sca**

**x100 or x1000 Sca**

etpoints

V

lpha: 120 mV

fficiences

| | A-B XTLK |
|---|---|
| 1.29% | 6.99% |
| 4.32% | |
| 9.50% | |
| 1.64% | |

ncy from

| Back ground: | Alpha |
|---|---|
| | 6 |
| Pu-239: | 3625 |
| Tc-99: | 19 |
| Th-230: | 5350 |
| SrY-90: | N/A |

"AF" in the AL E
Efficiencies in t

5408 Average: 5457.0 ☑ Are th

bration and the B-A Xtalk is <1% and the A-B Xtalk is <
ortional probes = 1/8" from surface unless otherwise sp

99 Source 2: Th-230

# Attachment 1

# Daily Source Checks

# Attachment 1

**ATTACHMENT W (SEC-RP-F-059)**
**DESKTOP ALPHA/BETA COUNTING INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET**
**(Use for Model 2929, 3030 or MPC 2000)**

Meter # 185266 Probe # PR194717

**PART 1:** INITIAL REFERENCE RESPONSE TEST

| | | | |
|---|---|---|---|
| SET UP DATE: 1-5-18 | LOCATION: Building 181 | HV / Vernier: 700 / 2.9 | BY: K Grider |
| SERIAL #: 185266 | MODEL: 29-29 | CAL. DUE: 01-04-19 | EFF: α: 69.92% β: 55.14% |
| DETECTOR SERIAL #: 194717 | DETECTOR MODEL: 43-10-1 | CAL. DUE: 01-04-19 | CF: α: 1.43 β: 1.81 |

ALPHA INSTRUMENT. $L_C$: ______ (cpm) ALPHA MDC: ______ (dpm)

GEOMETRY: Center of planchet SOURCE (S) TYPE: Sr-Y-90 / Th-230 ID #: 82341A-526 / 82344-526

α BKG COUNT (1 10-minute count): 1. 5 (total counts) β BKG COUNT (1 1-minute count): 1. 90 (cpm)

α 5 SOURCE CNTS (cpm): 1. 4561 2. 4529 3. 4618 4. 4610 5. 4739

β 5 SOURCE CNTS (cpm): 1. 8466 2. 8354 3. 8449 4. 8396 5. 8440

| | | | | |
|---|---|---|---|---|
| α BACKGROUND: 0.5 (cpm) | α BKG RANGE: | 0 - 5 cpm | | |
| β BACKGROUND: 90 (cpm) | β BKG RANGE: | 72 | TO | 108 (cpm) |
| α SOURCE AVERAGE: 4611.4 (cpm) | α SOURCE RANGE (± 20% AVG.): | 3689.12 | TO | 5533.68 (cpm) |
| β SOURCE AVERAGE: 8421 (cpm) | β SOURCE RANGE (± 20% AVG.): | 6736.8 | TO | 10,105.2 (cpm) |

**PART 2:** RESPONSE TEST

| 1 DATE | 2 TIME | 3 CAL DUE (Enter Date) | 4 HV (Volts)/ Vernier | 5 BACKGROUND (CPM) α | β | 6 α SOURCE RESPONSE (Gross CPM) | 7 β SOURCE RESPONSE (Gross CPM) | 8 S/U/ Number | 9 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|
| 1-8-18 | 0700 | 01-04-19 | 700 | 0.1 | 102 | 4648 | 8325 | S | Kimberly Sinder |
| 1-9-18 | 0830 | ↓ | 700 | 0.1 | 101 | 4699 | 8449 | S | Kimberly Sinder |
| 1-10-18 | 0700 | | 700 | 0.1 | 95 | 4703 | 8358 | S | Kimberly Sinder |
| 1-11-18 | 0710 | | 700 | 1 | 85 | 4597 | 8611 | S | Kimberly Sinder |
| 1-15-18 | 0730 | | 700 | 1 | 107 | 4712 | 8436 | S | Kimberly Sinder |
| 1-16-18 | 0700 | | 700 | 0.1 | 96 | 4619 | 8619 | S | Kimberly Sinder |
| 1-17-18 | 0730 | | 700 | 0.1 | 84 | 4553 | 8545 | S | Kimberly Sinder |
| 1-18-18 | 0700 | | 700 | 0.1 | 105 | 4626 | 8416 | S | Kimberly Sinder |
| 1-22-18 | 0800 | | 700 | 1 | 98 | 4444 | 8630 | S | Darl A Dan |
| 1-23-18 | 0700 | | 700 | 0.1 | 85 | 4507 | 8632 | S | Darl A Dan |
| 1-24-18 | 0700 | | 700 | 0.1 | 95 | 4696 | 8536 | S | Darl A Dan |
| 1-25-18 | 0700 | | 700 | 1 | 94 | 4648 | 8540 | S | Darl A Dan |
| 1-26-18 | 0700 | | 700 | 0.1 | 89 | 4573 | 8693 | S | Darl A Dan |
| 1-29-18 | 0700 | | 700 | 1 | 102 | 4646 | 8521 | S | Darl A Dan |
| 1-30-18 | 0800 | ↓ | 700 | 1 | 96 | 4526 | 8626 | S | Darl A Dan |

RCT Supervisor or Designee Signature: Daniel Date: 3-16-18

# Attachment 1

**ATTACHMENT W (SEC-RP-F-059)**
**DESKTOP ALPHA/BETA COUNTING INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET**
**(Use for Model 2929, 3030 or MPC 2000)**

Meter # 190602 Probe # 199159

**PART 1: INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 12-12-17 | LOCATION: Building 181 | HV / Vernier: 700 / 2.86 | BY: K Grider |
| SERIAL #: 190602 | MODEL: 2929 | CAL. DUE: 12-6-18 | EFF: α: ~~69.92%~~ 69.33% β: ~~55.14%~~ 57.49% |
| DETECTOR SERIAL #: 199159 | DETECTOR MODEL: 43-10-1 | CAL. DUE: 12-6-18 | CF: α: 1.44 β: 1.74 |
| ALPHA INSTRUMENT. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm) | |
| GEOMETRY: Center of planchet | | SOURCE (S) TYPE: Sr-Y-90 / Th-230 | ID #: 82341A-526 / 82344-526 |
| α BKG COUNT (1 10-minute count): 1. 5 (total counts) | | β BKG COUNT (1 1-minute count): 1. 109.5 (cpm) | |

| | 1. | 2. | 3. | 4. | 5. |
|---|---|---|---|---|---|
| α 5 SOURCE CNTS (cpm): | 4403 | 4417 | 4611 | 4438 | 4401 |
| β 5 SOURCE CNTS (cpm): | 8314 | 8304 | 8263 | 8462 | 8393 |

| | | | |
|---|---|---|---|
| α BACKGROUND: 0.5 (cpm) | α BKG RANGE: 0 - 5 cpm | | |
| β BACKGROUND: 109.5 (cpm) | β BKG RANGE: 87.6 | TO 131.4 | (cpm) |
| α SOURCE AVERAGE: 4454 (cpm) | α SOURCE RANGE (± 20% AVG.): 3563.2 | TO 5344.8 | (cpm) |
| β SOURCE AVERAGE: 8347.2 (cpm) | β SOURCE RANGE (± 20% AVG.): 6647.76 | TO 10,016.64 | (cpm) |

**PART 2: RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL DUE (Enter Date) | 4 HV (Volts)/ Vernier | 5 BACKGROUND (CPM) α | 5 BACKGROUND (CPM) β | 6 α SOURCE RESPONSE (Gross CPM) | 7 β SOURCE RESPONSE (Gross CPM) | 8 S/U/ Number | 9 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|
| 12-12-17 | 0930 | 12-6-18 | 700 | 0.1 | 108 | 4357 | 8343 | S | Kimberly Sinder |
| 12-13-17 | 0718 | ↓ | 700 | 0.1 | 88 | 4392 | 8518 | S | Kimberly Sinder |
| 12-14-17 | 0730 | | 700 | 0.1 | 122 | 4517 | 8268 | S | Kimberly Sinder |
| 12-18-17 | 0715 | | 700 | 1 | 107 | 4477 | 8461 | S | Kimberly Sinder |
| 12-19-17 | 0715 | | 700 | 0.1 | 105 | 4517 | 8351 | S | Kimberly Sinder |
| 12-20-17 | 0710 | | 700 | 0.1 | 110 | 4453 | 8338 | S | Kimberly Sinder |
| 12-21-17 | 0715 | | 700 | 0.1 | 99 | 4397 | 8391 | S | Kimberly Sinder |
| 1-2-18 | 0940 | | 700 | 1 | 116 | 4402 | 8406 | S | Kimberly Sinder |
| 1-3-18 | 0730 | | 700 | 0.1 | 107 | 4360 | 8357 | S | Kimberly Sinder |
| 1-4-18 | 0730 | | 700 | 0.1 | 114 | 4415 | 8306 | S | Kimberly Sinder |
| 1-5-18 | 0730 | | 700 | 0.1 | 109 | 4338 | 8381 | S | Kimberly Sinder |
| 1-8-18 | 0700 | | 700 | 0.1 | 114 | 4506 | 8122 | S | Kimberly Sinder |
| 1-9-18 | 0730 | | 700 | 0.1 | 99 | 4438 | 8288 | S | Kimberly Sinder |
| 1-10-18 | 0700 | | 700 | 0.1 | 119 | 4470 | 8230 | S | Kimberly Sinder |
| 1-11-18 | 0700 | ↓ | 700 | 0.1 | 117 | 4349 | 8313 | S | Kimberly Sinder |

RCT Supervisor or Designee Signature: CPaarik Date: 3-14-18

# Attachment 1

ATTACHMENT W (SEC-RP-F-059)
DESKTOP ALPHA/BETA COUNTING INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
(Use for Model 2929, 3030 or MPC 2000)

Meter # 190602 Probe # 199159

**PART 1:** INITIAL REFERENCE RESPONSE TEST

| | | | |
|---|---|---|---|
| SET UP DATE: 12-12-17 | LOCATION: Building 181 | HV / Vernier: 700 / 2.86 | BY: K Guider |
| SERIAL #: 190602 | MODEL: 2929 | CAL. DUE: 12-6-18 | EFF: α: 69.33% β: 57.49% |
| DETECTOR SERIAL #: 199159 | DETECTOR MODEL: 43-10-1 | CAL. DUE: 12-6-18 | CF: α: 1.44 β: 1.74 |

ALPHA INSTRUMENT. $L_C$: ______ (cpm) ALPHA MDC: ______ (dpm)

GEOMETRY: Center of planchet SOURCE (S) TYPE: Sr-Y90/Th-230 ID #: 82344-526/82341A-526

α BKG COUNT (1 10-minute count): 1. 5 (total counts) β BKG COUNT (1 1-minute count): 1. 109.5 (cpm)

α 5 SOURCE CNTS (cpm): 1. 4403 2. 4417 3. 4611 4. 4438 5. 4401

β 5 SOURCE CNTS (cpm): 1. 8314 2. 8304 3. 8263 4. 8462 5. 8393

| | | | |
|---|---|---|---|
| α BACKGROUND: 0.8 (cpm) | α BKG RANGE: | 0 - 5 cpm | |
| β BACKGROUND: 109.5 (cpm) | β BKG RANGE: 87.6 | TO 131.4 | (cpm) |
| α SOURCE AVERAGE: 4454 (cpm) | α SOURCE RANGE (± 20% AVG.): 3563.2 | TO 5344.8 | (cpm) |
| β SOURCE AVERAGE: 8347.2 (cpm) | β SOURCE RANGE (± 20% AVG.): 6647.76 | TO 10016.64 | (cpm) |

**PART 2:** RESPONSE TEST

| 1 DATE | 2 TIME | 3 CAL DUE (Enter Date) | 4 HV (Volts)/ Vernier | 5 BACKGROUND (CPM) α | β | 6 α SOURCE RESPONSE (Gross CPM) | 7 β SOURCE RESPONSE (Gross CPM) | 8 S/U/ Number | 9 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|
| 1-15-18 | 0700 | 12-6-18 | 700 | 0.1 | 105 | 4323 | 8384 | S | Kimberly Guider |
| 1-16-18 | 0700 | ↓ | 700 | 0.1 | 94 | 4377 | 8327 | S | Kimberly Guider |
| 1-17-18 | 0730 | | 700 | 0.1 | 88 | 4405 | 8386 | S | Kimberly Guider |
| 1-18-18 | 0700 | | 700 | 1 | 102 | 4389 | 8164 | S | Kimberly Guider |
| 1-22-18 | 0800 | | 700 | 1 | 103 | 4361 | 8287 | S | [illegible] |
| 1-23-18 | 0700 | | 700 | 0.1 | 113 | 4293 | 8331 | S | [illegible] |
| 1-24-18 | 0700 | | 700 | 0.1 | 98 | 4410 | 8213 | S | [illegible] |
| 1-25-18 | 0700 | | 700 | 0.1 | 101 | 4532 | 8273 | S | [illegible] |
| 1-26-18 | 0700 | | 700 | 0.1 | 94 | 4356 | 8409 | S | [illegible] |
| 1-29-18 | 0700 | | 700 | 1 | 109 | 4441 | 8242 | S | [illegible] |
| 1-30-18 | 0800 | | 700 | 1 | 92 | 4488 | 8385 | S | [illegible] |
| 1-31-18 | 0900 | | 700 | 0 | 113 | 4402 | 8081 | S | C Patrick |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

RCT Supervisor or Designee Signature: [illegible] Date: 3-16-18

**Attachment 1**

## ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 234834 Probe # 312654

**PART 1: INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 12-11-17 | LOCATION: Building 181 | HV / C.S. THR: / α: β: | BY: K Guider |
| SERIAL #: 234834 | MODEL: 2360 | CAL. DUE: 10-20-2018 | EFF: α: 20.96% β: 32.43% |
| PROBE SERIAL #: 312654 | PROBE MODEL: 4393 | CAL. DUE: 10-20-2018 | CF: α: 4.77 β: 3.08 |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ ($dpm/100cm^2$) | |
| GEOMETRY: ~~flat~~ flat surface | | SOURCE (S) TYPE: Sr 90 / Th 230 | ID #: 82344-526 / 82341A-526 |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 11/3955

1 (1-MINUTE) BKG COUNT (cpm): β: 1. ______

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2265 2. 2416 3. 2370 4. 2345 5. 2261

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 6988 2. 7065 3. 7111 4. 6960 5. 7028

| | |
|---|---|
| α BKG COUNT RATE: 1.1 (cpm) | α BKG RANGE: 0 TO 5 (cpm) |
| β BKG COUNT RATE: 395.5 (cpm) | β BKG RANGE: 316.4 TO 474.6 (cpm) |
| α SOURCE AVERAGE: 2331.4 (cpm) | α SOURCE RANGE (± 20% AVG.): 1865.12 TO 2797.68 (cpm) |
| β SOURCE AVERAGE: 7030.4 (cpm) | β SOURCE RANGE (± 20% AVG.): 5624.32 TO 8436.48 (cpm) |

**PART 2: RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-12-17 | 0734 | 10-20-18 | S | S | | 1 | 396 | 2380 | 7188 | | Kimberly Guider |
| 12-13-17 | 0715 | | S | S | | 0.1 | 385 | 2410 | 6734 | | Kimberly Guider |

Returned For Maint.

BCT Supervisor or Designee Signature: Claewil Date: 3-16-18

**Attachment 1**

# ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 234834 Probe # PR312654

PART 1: INITIAL REFERENCE RESPONSE TEST

| | | | |
|---|---|---|---|
| SET UP DATE: 1-2-18 | LOCATION: Building 181 | HV / C.S. THR: 670 / α 120 β: 4-40 | BY: K Guider |
| SERIAL #: 234834 | MODEL: 2360 | CAL. DUE: 12-20-18 | EFF: α: 43.98% β: 46.75% |
| PROBE SERIAL #: 312654 | PROBE MODEL: 43-93 | CAL. DUE: 12-20-18 | CF: α: 2.27 β: 2.14 |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm²) | |
| GEOMETRY: flat surface | | SOURCE (S) TYPE: Th-230 / Sr-Y-90 | ID #: 82341A-526 / 82344-526 |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 8 / 3827

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 385

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2418 2. 2448 3. 2420 4. 2470 5. 2420

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 6997 2. 7118 3. 7004 4. 7060 5. 7081

| | | | | |
|---|---|---|---|---|
| α BKG COUNT RATE: 0.8 (cpm) | α BKG RANGE: | 0 TO 5 (cpm) | | |
| β BKG COUNT RATE: 401 (cpm) | β BKG RANGE: | 320.8 | TO 481.2 | (cpm) |
| α SOURCE AVERAGE: 2435.2 (cpm) | α SOURCE RANGE (±20% AVG.): | 1948.16 | TO 2922.24 | (cpm) |
| β SOURCE AVERAGE: 7052 (cpm) | β SOURCE RANGE (±20% AVG.): | 5641.6 | TO 8462.4 | (cpm) |

PART 2: RESPONSE TEST

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-3-18 | 0800 | 12-20-18 | S | S | S | 2 | 429 | 2379 | 6857 | S | Kimberly Snider |
| 1-4-18 | 0930 | | S | S | S | 1 | 421 | 2443 | 6949 | S | Kimberly Snider |
| 1-5-18 | 0730 | | S | S | S | 2 | 355 | 2340 | 7009 | S | Kimberly Snider |
| 1-8-18 | 0630 | | S | S | S | 1 | 410 | 2474 | 6909 | S | Kimberly Snider |
| 1-9-18 | 0630 | | S | S | S | 2 | 397 | 2484 | 6836 | S | Kimberly Snider |
| 1-10-18 | 0630 | | S | S | S | 1 | 424 | 2472 | 6917 | S | Kimberly Snider |
| 1-11-18 | 0630 | | S | S | S | 0.1 | 409 | 2477 | 7013 | S | Kimberly Snider |
| 1-15-18 ~~1-14-18~~ | 0620 | | S | S | S | 1 | 409 | 2317 | 6870 | S | Kimberly Snider |
| 1-16-18 | 0640 | | S | S | S | 0.1 | 422 | 2428 | 6771 | S | Kimberly Snider |
| 1-17-18 | 0700 | | S | S | S | 0.1 | 412 | 2407 | 7153 | S | Kimberly Snider |
| 1-18-18 | 0645 | | S | S | S | 0.1 | 375 | 2384 | 7005 | S | Kimberly Snider |
| 1-23-18 | 1520 | | S | S | S | 0.8 | 383 | 2405 | 7006 | S | Dal A Dan |
| 1-24-18 | 0700 | | S | S | S | 0.5 | 367 | 2423 | 6839 | S | Dal A Dan |
| 1-25-18 | 0700 | | S | S | S | 0.4 | 405 | 2329 | 7056 | S | Dal A Dan |

RCT Supervisor or Designee Signature: Rorrile Date: 3-16-18 cont page

# ATTACHMENT L (SEC-RP-F-048) **Attachment 1**

## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET

### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)

(NOTE: Used with 1-minute beta background count time)

Meter # 234834 Probe # PR312654

**PART 1: INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 1-2-18 | LOCATION: BLDG 181 | HV / C.S. THR: / α: β: | BY: |
| SERIAL #: 234834 | MODEL: 2360 | CAL. DUE: | EFF: α: β: |
| PROBE SERIAL #: | PROBE MODEL: | CAL. DUE: | CF: α: β: |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm$^2$) | |
| GEOMETRY: | | SOURCE (S) TYPE: | ID #: |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts) : ______

1 (1-MINUTE) BKG COUNT (cpm): β: 1. ______

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. ______ 2. ______ 3. ______ 4. ______ 5. ______

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. ______ 2. ______ 3. ______ 4. ______ 5. ______

| | |
|---|---|
| α BKG COUNT RATE: (cpm) | α BKG RANGE: 0 TO 5 (cpm) |
| β BKG COUNT RATE: (cpm) | β BKG RANGE: TO (cpm) |
| α SOURCE AVERAGE: (cpm) | α SOURCE RANGE (± 20% AVG.) : TO (cpm) |
| β SOURCE AVERAGE: (cpm) | β SOURCE RANGE (± 20% AVG.) : TO (cpm) |

**PART 2: RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-26-18 | 0700 | 12-20-18 | S | S | S | 1 | 396 | 2178 | 7104 | S | [signature] |
| 1-29-18 | 0700 | | S | S | S | 1 | 384 | 2273 | 7097 | S | [signature] |
| 1-30-18 | 0800 | | S | S | S | .5 | 367 | 2410 | 6966 | S | [signature] |
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RCT Supervisor or Designee Signature: [signature] Date: 3-14-18

**Attachment 1**

# ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 253248

Probe # 244541

**PART 1: INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 12-11-2017 | LOCATION: Building 181 | HV / C.S. THR: 825 / α: 120 β: 4-40 | BY: KGuder |
| SERIAL #: 253248 | MODEL: 2360 | CAL. DUE: 11-17-2018 | EFF: α: 20.79% β: 26.62% |
| PROBE SERIAL #: 244541 | PROBE MODEL: 4393 | CAL. DUE: 11-17-2018 | CF: α: 4.81 β: 3.76 |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm²) | |
| GEOMETRY: flat Surface | | SOURCE (S) TYPE: Sr 90 / Th 230 | ID #: 82344-526 / 82341A-526 |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 9/2466

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 235

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2217 2. 2241 3. 2196 4. 2277 5. 2199

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 5530 2. 5527 3. 5554 4. 5531 5. 5600

| | | | |
|---|---|---|---|
| α BKG COUNT RATE: 0.9 (cpm) | α BKG RANGE: | 0 TO 5 (cpm) | |
| β BKG COUNT RATE: 246.6 (cpm) | β BKG RANGE: | 197.28 TO | 295.92 (cpm) |
| α SOURCE AVERAGE: 2226 (cpm) | α SOURCE RANGE (± 20% AVG.): | 1780.8 TO | 2671.2 (cpm) |
| β SOURCE AVERAGE: 5548.4 (cpm) | β SOURCE RANGE (± 20% AVG.): | 4438.72 TO | 6658.08 (cpm) |

**PART 2: RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-12-17 | 0734 | 11-17-18 | S | S | S | 0.1 | 236 | 2654 | 5678 | | Kimberly Sinder |
| 12-13-17 | 0715 | | S | S | S | 0.1 | 235 | 2213 | 5598 | | Kimberly Sinder |
| 12-14-17 | 0700 | | S | S | S | 3 | 239 | 1936 | 5674 | | Kimberly Sinder |
| 12-18-17 | 0700 | | S | S | S | 0 | 243 | 2223 | 5626 | | Kimberly Sinder |
| | | | | | | | | | | | |

~~Meter~~ Was Returned For Maint.

RCT Supervisor or Designee Signature: [signature] Date: 3-16-18

**Attachment 1**

# ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)

(NOTE: Used with 1-minute beta background count time)

Meter # 253248 Probe # PR244541

**PART 1: INITIAL REFERENCE RESPONSE TEST**

SET UP DATE: 1-2-18 | LOCATION: Building 181 | HV / C.S. THR: 825 / α: 120 β: 4-40 | BY: [signature]

SERIAL #: 253248 | MODEL: 2360 | CAL. DUE: 11-17-18 | EFF: α: 40.99% β: 38.00%

PROBE SERIAL #: PR244541 | PROBE MODEL: 4393 | CAL. DUE: 11-17-18 | CF: α: 2.44 β: 2.63

ALPHA INSTR. $L_C$: ______ (cpm) | ALPHA MDC: ______ (dpm/100cm²)

GEOMETRY: flat surface | SOURCE (S) TYPE: Th-230 / Sr-90 | ID #: 82341A-526 / 82344-526

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 1/2004

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 208

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2650 2. 2606 3. 2614 4. 2695 5. 2582

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 4982 2. 4756 3. 5088 4. 5000 5. 4946

α BKG COUNT RATE: 0.1 (cpm) | α BKG RANGE: 0 TO 5 (cpm)

β BKG COUNT RATE: 191 (cpm) | β BKG RANGE: 152.8 TO 229.2 (cpm)

α SOURCE AVERAGE: 2629.4 (cpm) | α SOURCE RANGE (± 20% AVG.): 2103.52 TO 3155.28 (cpm)

β SOURCE AVERAGE: 4954.4 (cpm) | β SOURCE RANGE (± 20% AVG.): 3963.52 TO 5945.28 (cpm)

**PART 2: RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-3-18 | 0830 | 11-17-18 | S | S | S | 0.1 | 194 | 2711 | 4893 | S | [signature] |
| 1-4-18 | 0930 | | S | S | S | 0.1 | 228 | 2685 | 4944 | S | [signature] |
| 1-5-18 | 0815 | | S | S | S | 0.1 | 205 | 2633 | 4800 | S | [signature] |
| 1-8-18 | 0640 | | S | S | S | 0.1 | 200 | 2741 | 4788 | S | [signature] |
| 1-9-18 | 0630 | | S | S | S | 0.1 | 219 | 2678 | 5074 | S | [signature] |
| 1-10-18 | 0645 | | S | S | S | 0.1 | 211 | 2788 | 5156 | S | [signature] |
| 1-11-18 | 0630 | | S | S | S | 1 | 277 | 2642 | 5029 | S | [signature] |
| 1-15-18 ~~1-14-18~~ | 0630 | | S | S | S | 0.1 | 198 | 2668 | 5045 | S | [signature] |
| 1-16-18 | 0640 | | S | S | S | 2 | 205 | 2678 | 4936 | S | [signature] |
| 1-17-18 | 0700 | | S | S | S | 0.1 | 229 | 2680 | 5074 | S | [signature] |
| 1-18-18 | 0648 | | S | S | S | 0.1 | 242 | 2615 | 5048 | S | [signature] |
| 1-24-18 | 1315 | | S | S | S | 0 | 190 | 2685 | 3066 | S | [signature] |
| 1-29-18 | 0800 | | S | S | S | 1 | 195 | 2421 | 4696 | S | [signature] |
| | | | | | | | | | | | |

RCT Supervisor or Designee Signature: [signature] Date: 3-16-18

# ATTACHMENT R (SEC-RP-F-054)
## FLOOR MONITOR INSTRUMENT RESPONSE/DAILY TEST SHEET
### (Use for Model 12, 2221, 2224, 2224-1 or Model 2360 with 43-37 probe)

Meter # 253275 Probe # PR278380

**PART 1:** INITIAL REFERENCE RESPONSE TEST

| | | | |
|---|---|---|---|
| SET UP DATE: 12-19-17 | LOCATION: Building 181 | HV / C.S. THR: / α: β: | BY: |
| SERIAL #: 253275 | MODEL: 2360 | CAL. DUE: 11-17-18 | EFF: α: N/A 37.74 β: N/A 42.03 |
| PROBE SERIAL #: 278380 | PROBE MODEL: 43-37 | CAL. DUE: 11-17-18 | CF: α: N/A 2.65 β: N/A 2.38 |
| GEOMETRY: flat surface | | SOURCE (S) TYPE: Th-230 / Sr-90 | ID #: 82341A-526 / 82344-526 |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 5 (1-MINUTE) BACKGROUND COUNTS (cpm): α | 0.1 | 5 | 5 | 4 | 3 |
| 5 (1-MINUTE) BACKGROUND COUNTS (cpm): β | 975 | 930 | 948 | 959 | 954 |
| 5 (1-MINUTE) SOURCE CNTS (cpm): α | 1330 | 1295 | 1282 | 1333 | 1327 |
| 5 (1-minute) SOURCE CNTS (cpm): β | 5007 | 4811 | 4844 | 4937 | 4889 |

| | | | |
|---|---|---|---|
| α BACKGROUND AVG: 3.42 (cpm) | α BKG RANGE: | 0 TO 10 (cpm) | |
| β BACKGROUND AVG: 953.2 (cpm) | β BKG RANGE (± 20% AVG.): | 762.56 TO 1143.84 | (cpm) |
| α SOURCE AVERAGE: 1315.4 (cpm) | α SOURCE RANGE (± 20% AVG.): | 1052.32 TO 1578.48 | (cpm) |
| β SOURCE AVERAGE: 4897.6 (cpm) | β SOURCE RANGE (± 20% AVG.): | 3918.08 TO 5877.12 | (cpm) |

**PART 2:** RESPONSE TEST

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. S/U | 5 H.V. (Volts) | 6 THRESHLD (S/U or ±2% for 2221) | 7 BACKGROUND (CPM) α | β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-19-17 | 0730 | 11-17-18 | S | S | S | 3.9 | 1054.7 | 1311 | 5427 | S | [signature] |
| 12-20-17 | 0730 | | S | S | S | 3.3 | 1051.2 | 1348 | 5419 | S | [signature] |
| 12-21-17 | 0730 | | S | S | S | 2.2 | 991.1 | 1324 | 5352 | S | [signature] |
| 1-8-18 | 0800 | | S | S | S | 2.1 | 957.2 | 1297 | 5381 | S | [signature] |
| 1-11-18 | 0800 | | S | S | S | 2.6 | 995 | 1285 | 5269 | S | [signature] |
| 1-15-18 | 0800 | | S | S | S | 6.1 | 876.4 | 1168 | 4606 | S | [signature] |
| 1-16-18 | 0800 | | S | S | S | 5.3 | 886.8 | 1148 | 4367 | S | [signature] |
| 1-17-18 | 0800 | | S | S | S | 8.3 | 860.7 | 1161 | 4748 | S | [signature] |
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RCT Supervisor or Designee Signature: [signature] Date: 3-16-18

# Attachment 1

ATTACHMENT L (SEC-RP-F-048)
DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
(Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 268477 Probe # PR289427

PART 1: INITIAL REFERENCE RESPONSE TEST

SET UP DATE: 1-2-18 | LOCATION: Building 181 | HV / C.S. THR: 790 / α: 120 β: 4.40 | BY: K Gunder

SERIAL #: 268477 | MODEL: 2360 | CAL. DUE: 12-19-18 | EFF: α: 46.06% β: 52.66%

PROBE SERIAL #: 289427 | PROBE MODEL: 43-93 | CAL. DUE: 12-19-18 | CF: α: 2.17 β: 1.9

ALPHA INSTR. $L_C$: ______ (cpm) | ALPHA MDC: ______ (dpm/100cm²)

GEOMETRY: flat surface | SOURCE (S) TYPE: Th-230 / Sr-Y90 ID #: 82341A-526 / 82344-526

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 9/4819

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 495

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2570 2. 2584 3. 2581 4. 2664 5. 2594

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 7847 2. 7873 3. 7905 4. 7934 5. 7929

α BKG COUNT RATE: 0.9 (cpm) | α BKG RANGE: 0 TO 5 (cpm)

β BKG COUNT RATE: 480 (cpm) | β BKG RANGE: 384 TO 576 (cpm)

α SOURCE AVERAGE: 2586.6 (cpm) | α SOURCE RANGE (± 20% AVG.): 2069.28 TO 3103.92 (cpm)

β SOURCE AVERAGE: 7897.6 (cpm) | β SOURCE RANGE (± 20% AVG.): 6318.08 TO 9477.12 (cpm)

PART 2: RESPONSE TEST

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-3-18 | 0800 | 12-19-18 | S | S | S | 0.1 | 516 | 2700 | 7772 ~~4772~~ | S | Kimberly Swinder |
| 1-4-18 | 0715 | ↓ | S | S | S | 0.1 | 461 | 2705 | 7737 KS ~~4737~~ 1/5/18 | S | Kimberly Swinder |
| 1-5-18 | 0800 | | S | S | S | 0.1 | 499 | 2663 | 7924 | S | Kimberly Swinder |
| 1-8-18 | 0630 | | S | S | S | 0.1 | 496 | 2581 | 7696 | S | Kimberly Swinder |
| 1-9-18 | 0630 | | S | S | S | 0.1 | 516 | 2680 | 7944 | S | Kimberly Swinder |
| 1-10-18 | 0630 | | S | S | S | 1 | 493 | 2581 | 7884 | S | Kimberly Swinder |
| 1-11-18 | 0630 | | S | S | S | 1 | 472 | 2609 | 7984 | S | Kimberly Swinder |
| 1-15-18 ~~1-14-18~~ | 0620 | | S | S | S | 2 | 477 | 2589 | 8102 | S | Kimberly Swinder |
| 1-16-18 | 0630 | | S | S | S | 0.1 | 487 | 2642 | 7697 | S | Kimberly Swinder |
| 1-17-18 | 0630 | | S | S | S | 0.1 | 521 | 2601 | 7946 | S | Kimberly Swinder |
| 1-18-18 | 0630 | | S | S | S | 1 | 484 | 2424 | 8035 | S | Kimberly Swinder |
| 1-22-18 | 0800 | | S | S | S | 1.4 | 486 | 2570 | 8123 | S | Dahl A Dan |
| 1-23-18 | 0700 | | S | S | S | 1.7 | 495 | 2398 | 7789 | S | Dahl A Dan |
| 1-24-18 | 0700 | ↓ | S | S | S | .7 | 497 | 2428 | 7908 | S | Dahl A Dan |

RCT Supervisor or Designee Signature: C Vaurell  Date: 3-16-18

Con't Page 2

**Attachment 1**

## ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

**Meter #** 268477 **Probe #** PR 289427

**PART 1: INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: | LOCATION: | HV / C.S. THR: / α: β: | BY: |
| SERIAL #: | MODEL: | CAL. DUE: | EFF: α: β: |
| PROBE SERIAL #: | PROBE MODEL: | CAL. DUE: | CF: α: β: |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm²) | |
| GEOMETRY: | | SOURCE (S) TYPE: | ID #: |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts) : ______

1 (1-MINUTE) BKG COUNT (cpm): β: 1. ______

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. ______ 2. ______ 3. ______ 4. ______ 5. ______

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. ______ 2. ______ 3. ______ 4. ______ 5. ______

| | |
|---|---|
| α BKG COUNT RATE: (cpm) | α BKG RANGE: 0 TO 5 (cpm) |
| β BKG COUNT RATE: (cpm) | β BKG RANGE: TO (cpm) |
| α SOURCE AVERAGE: (cpm) | α SOURCE RANGE (± 20% AVG.) : TO (cpm) |
| β SOURCE AVERAGE: (cpm) | β SOURCE RANGE (± 20% AVG.) : TO (cpm) |

**PART 2: RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-29-18 | 0800 | 12-19-18 | S | S | S | 1 | 497 | 2633 | 7708 | S | [illegible] |
| 1-30-18 | 0800 | | S | S | S | .4 | 466 | 2649 | 7991 | S | [illegible] |
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PCT Supervisor or Designee Signature: [illegible] Date: 3-16-18

# Attachment 1

## ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 274959

Probe # PR293983

**PART 1: INITIAL REFERENCE RESPONSE TEST**

SET UP DATE: 12-11-17 | LOCATION: Building 181 | HV / C.S. THR: 650 / α: 120 β: 4-40 | BY: K. Guider

SERIAL #: 274959 | MODEL: 2360 | CAL. DUE: 11-17-18 | EFF: α: 43.67% β: 51.94%

PROBE SERIAL #: 293983 | PROBE MODEL: 43-93 | CAL. DUE: 11-17-18 | CF: α: 2.29 β: 1.93

ALPHA INSTR. $L_c$: ________ (cpm) | ALPHA MDC: ________ (dpm/100cm²)

GEOMETRY: flat surface | SOURCE (S) TYPE: Sr-Y-90 / Th-230 | ID #: 82344-526 / 82341A-526

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 6/4625

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 473

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2278 2. 2497 3. 2460 4. 2424 5. 2397

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 7850 2. 7720 3. 7748 4. 7802 5. 7679

α BKG COUNT RATE: 0.6 (cpm) | α BKG RANGE: 0 TO 5 (cpm)

β BKG COUNT RATE: 462.5 (cpm) | β BKG RANGE: 370 TO 555 (cpm)

α SOURCE AVERAGE: 2411.2 (cpm) | α SOURCE RANGE (±20% AVG.): 1928.96 TO 2893.44 (cpm)

β SOURCE AVERAGE: 7759.8 (cpm) | β SOURCE RANGE (±20% AVG.): 6207.84 TO 9311.76 (cpm)

**PART 2: RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-12-17 | 0733 | 11-17-18 | S | S | S | 1 | 441 | 2569 | 7706 | S | Kimberly Sinder |
| 12-13-17 | 0715 | ↓ | S | S | S | 2 | 467 | 2459 | 7746 | S | Kimberly Sinder |
| 12-14-17 | 0700 | | S | S | S | 5 | 499 | 2490 | 7733 | S | Kimberly Sinder |
| 12-18-17 | 0700 | | S | S | S | 1 | 455 | 2477 | 7748 | S | Kimberly Sinder |
| 12-19-17 | 0715 | | S | S | S | 1 | 476 | 2409 | 7900 | S | Kimberly Sinder |
| 12-20-17 | 0700 | | S | S | S | 3 | 467 | 2530 | 7723 | S | Kimberly Sinder |
| 12-21-17 | 0700 | | S | S | S | 0.1 | 426 | 2518 | 7883 | S | Kimberly Sinder |
| 1-2-18 | 0900 | | S | S | S | 0.1 | 430 | 2423 | 7598 | S | Kimberly Sinder |
| 1-3-18 | 0800 | | S | S | S | 1 | 450 | 2339 | 7675 | S | Kimberly Sinder |
| 1-4-18 | 0715 | | S | S | S | 1 | 464 | 2445 | 7792 | S | Kimberly Sinder |
| 1-5-18 | 0800 | | S | S | S | 0.1 | 470 | 2443 | 7671 | S | Kimberly Sinder |
| 1-8-18 | 0640 | | S | S | S | 2 | 442 | 2390 | 7518 | S | Kimberly Sinder |
| 1-9-18 | 0630 | | S | S | S | 0.1 | 418 | 2468 | 7692 | S | Kimberly Sinder |
| 1-10-18 | 0630 | ↓ | S | S | S | 2 | 470 | 2388 | 7787 | S | Kimberly Sinder |

RCT Supervisor or Designee Signature: [signature] Date: 3-16-18

# Attachment 1

**ATTACHMENT L (SEC-RP-F-048)**
**DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET**
**(Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)**
(NOTE: Used with 1-minute beta background count time)

Meter # 274959 Probe # PR293983

**PART 1: INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 12-11-17 | LOCATION: Building 181 | HV / C.S. THR: 650 / α: 120 β: 4-40 | BY: [signature] |
| SERIAL #: 274959 | MODEL: 2360 | CAL. DUE: 11-17-18 | EFF: α: 43.67% β: 51.94% |
| PROBE SERIAL #: 293983 | PROBE MODEL: 43-93 | CAL. DUE: 11-17-18 | CF: α: 2.29 β: 1.93 |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm²) | |
| GEOMETRY: flat surface | | SOURCE (S) TYPE: Th-230 / Sr-90 | ID #: 82341A-526 / 82344-526 |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 6 / 4628

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 473

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2278 2. 2497 3. 2460 4. 2424 5. 2397

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 7850 2. 7720 3. 7748 4. 7802 5. 7679

| | | | | |
|---|---|---|---|---|
| α BKG COUNT RATE: 0.6 (cpm) | α BKG RANGE: | 0 TO 5 (cpm) | | |
| β BKG COUNT RATE: 462.5 (cpm) | β BKG RANGE: | 370 | TO | 555 (cpm) |
| α SOURCE AVERAGE: 2411.2 (cpm) | α SOURCE RANGE (±20% AVG.): | 1928.96 | TO | 2893.44 (cpm) |
| β SOURCE AVERAGE: 7759.8 (cpm) | β SOURCE RANGE (±20% AVG.): | 6207.84 | TO | 9311.76 (cpm) |

**PART 2: RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-11-18 | 0630 | 11-17-18 | S | S | S | 0.1 | 480 | 2423 | 7745 | S | [signature] |
| 1-15-18 ~~1-14-18~~ | 0620 | ↓ | S | S | S | 1 | 429 | 2494 | 7701 | S | [signature] |
| 1-16-18 | 0638 | | S | S | S | 0.1 | 460 | 2494 | 7456 | S | [signature] |
| 1-17-18 | 0630 | | S | S | S | 1 | 438 | 2389 | 7708 | S | [signature] |
| 1-18-18 | 0630 | | S | S | S | 1 | 444 | 2480 | 7799 | S | [signature] |
| 1-22-18 | 0800 | | S | S | S | 1 | 451 | 2406 | 7764 | S | [signature] |
| 1-23-18 | 0700 | | S | S | S | 1 | 460 | 2451 | 7842 | S | [signature] |
| 1-24-18 | 0700 | | S | S | S | 1 | 477 | 2426 | 7746 | S | [signature] |
| 1-25-18 | 0700 | | S | S | S | 1 | 440 | 2384 | 7819 | S | [signature] |
| 1-26-18 | 0700 | | S | S | S | 1 | 433 | 2366 | 7697 | S | [signature] |
| 1-29-18 | 0800 | | S | S | S | 1 | 455 | 2484 | 7734 | S | [signature] |
| 1-30-18 | 0800 | | S | S | S | 1 | 456 | 2657 | 7599 | S | [signature] |
| | | | | | | | | | | | |
| | | ↓ | | | | | | | | | |

RCT Supervisor or Designee Signature: [signature] Date: 3-14-18

## ATTACHMENT R (SEC-RP-F-054)
## FLOOR MONITOR INSTRUMENT RESPONSE/DAILY TEST SHEET
### (Use for Model 12, 2221, 2224, 2224-1 or Model 2360 with 43-37 probe)

**Meter #** 287606 **Probe #** PR278379

**PART 1:** **INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 12-19-17 | LOCATION: Building 181 | HV / C.S. THR: / α: β: | BY: |
| SERIAL #: 287606 | MODEL: 2360 | CAL. DUE: 11-17-18 | EFF: α: N/A 38.45 β: N/A 45.17 |
| PROBE SERIAL #: 278379 | PROBE MODEL: 43-93 | CAL. DUE: 11-17-18 | CF: α: N/A 2.6 β: N/A 2.21 |
| GEOMETRY: flat surface | | SOURCE (S) TYPE: Th-230 / Sr-90 | ID #: 82344-526 / 82341A-526 |

5 (1-MINUTE) BACKGROUND COUNTS (cpm): α 1. 2 2. 2 3. 5 4. 4 5. 2

5 (1-MINUTE) BACKGROUND COUNTS (cpm): β 1. 1009 2. 1007 3. 1014 4. 1073 5. 1040

5 (1-MINUTE) SOURCE CNTS (cpm): α 1. 1495 2. 1554 3. 1596 4. 1579 5. 1574

5 (1-minute) SOURCE CNTS (cpm): β 1. 5242 2. 5234 3. 5191 4. 5089 5. 5267

| | | | |
|---|---|---|---|
| α BACKGROUND AVG: 3 (cpm) | α BKG RANGE: | 0 TO 10 (cpm) | |
| β BACKGROUND AVG: 1028.6 (cpm) | β BKG RANGE (± 20% AVG.): | 822.88 TO 1234.32 | (cpm) |
| α SOURCE AVERAGE: 1559.6 (cpm) | α SOURCE RANGE (± 20% AVG.): | 1247.68 TO 1871.52 | (cpm) |
| β SOURCE AVERAGE: 5204.6 (cpm) | β SOURCE RANGE (± 20% AVG.): | 4163.68 TO 6245.52 | (cpm) |

**PART 2:** **RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. S/U | 5 H.V. (Volts) | 6 THRESHLD (S/U or ±2% for 2221) | 7 BACKGROUND (CPM) α | 7 BACKGROUND (CPM) β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-19-17 | 0730 | 11-17-18 | S | S | S | 2.5 | 959.9 | 1390 | 5480 | S | [signature] |
| 12-20-17 | 0730 | ↓ | S | S | S | 4.1 | 960.4 | 1368 | 5516 | S | [signature] |
| ~~12-21-17~~ 1-3-18 | 0800 | | S | S | S | 3.1 | 873.3 | 1349 | 5499 | S | [signature] |
| 1-4-18 | 0800 | | S | S | S | 2.4 | 860.1 | 1361 | 5473 | S | [signature] |
| 1-10-18 | 0800 | | S | S | S | 2.7 | 1054 | 1357 | 5474 | S | [signature] |
| 1-11-18 | 0800 | | S | S | S | 1.7 | 1047.6 | 1344 | 5483 | S | [signature] |
| 1-~~15~~ 17-18 | 0800 | | S | S | S | 4.3 | 903.1 | 1340 | 4967 | S | [signature] |
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RCT Supervisor or Designee Signature: [signature] Date: 3-16-18

**Attachment 1**

# ATTACHMENT L (SEC-RP-F-048)

## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET

**(Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)**

(NOTE: Used with 1-minute beta background count time)

**Meter #** 310164 **Probe #** PR337817

**PART 1:** **INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 12-11-17 | LOCATION: Building 181 | HV / C.S. THR: 800 / α 120 β: 4-40 | BY: K Guider |
| SERIAL #: 310164 | MODEL: 2360 | CAL. DUE: 4-17-18 | EFF: α: 33.14% β: 36.62% |
| PROBE SERIAL #: 337817 | PROBE MODEL: 43-89 | CAL. DUE: 4-17-18 | CF: α: 3.02 β: 2.73 |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm²) | |
| GEOMETRY: flat surface | | SOURCE (S) TYPE: Th-230 / Sr-Y-90 | ID #: 82344-526 / 82341A-526 |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 6/4890

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 448

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2051 2. 2092 3. 2099 4. 2004 5. 2112

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 6071 2. 6188 3. 6433 4. 6289 5. 6195

| | | | |
|---|---|---|---|
| α BKG COUNT RATE: 0.6 (cpm) | α BKG RANGE: 0 TO 5 (cpm) | | |
| β BKG COUNT RATE: 489.0 (cpm) | β BKG RANGE: 391.2 | TO 586.8 | (cpm) |
| α SOURCE AVERAGE: 2071.6 (cpm) | α SOURCE RANGE (± 20% AVG.): 1657.28 | TO 2485.92 | (cpm) |
| β SOURCE AVERAGE: 6235.2 (cpm) | β SOURCE RANGE (± 20% AVG.): 4988.16 | TO 7482.24 | (cpm) |

**PART 2:** **RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-12-17 | 0733 | 4-17-18 | S | S | S | 1 | 473 | 2015 | 6422 | S | [signature] |
| 12-13-17 | 0715 | | S | S | S | 2 | 455 | 2034 | 6296 | S | [signature] |
| 12-14-17 | 0700 | | S | S | S | 5 | 461 | 1994 | 6213 | S | [signature] |
| 12-18-17 | 0700 | | S | S | S | 0.1 | 424 | 2477 | 6235 | S | [signature] |
| 12-19-17 | 0715 | | S | S | S | 2 | 496 | 2013 | 6348 | S | [signature] |
| 12-20-17 | 0700 | | S | S | S | 1 | 456 | 2079 | 6187 | S | [signature] |
| 12-21-17 | 0700 | | S | S | S | 1 | 444 | 2084 | 6216 | S | [signature] |
| 1-2-18 | 0900 | | S | S | S | 0.1 | 486 | 1880 | 6374 | S | [signature] |
| 1-3-18 | 0715 | | S | S | S | 1 | 470 | 1988 | 6474 | S | [signature] |
| 1-4-18 | 0730 | | S | S | S | 0.1 | 485 | 1848 | 6243 | S | [signature] |
| 1-5-18 | 0730 | | S | S | S | 2 | 470 | 1946 | 6427 | S | [signature] |
| 1-8-18 | 0650 | | S | S | S | 0.1 | 471 | 1960 | 5981 | S | [signature] |
| 1-9-18 | 0650 | | S | S | S | 0.1 | 491 | 1990 | 6261 | S | [signature] |
| 1-10-18 | 0645 | | S | S | S | 3 | 466 | 1889 | 6072 | S | [signature] |

RCT Supervisor or Designee Signature: [signature] Date: 3-16-18

**Attachment 1**

# ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 310164 Probe # PR337817

PART 1: **INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 12-11-17 | LOCATION: Building 181 | HV / C.S. THR: 800 / α:120 β:4.40 | BY: K Guider |
| SERIAL #: 310164 | MODEL: 2360 | CAL. DUE: 4-17-18 | EFF: α: 33.14% β: 36.62% |
| PROBE SERIAL #: 337817 | PROBE MODEL: 43-89 | CAL. DUE: 4-17-18 | CF: α: 3.02 β: 2.73 |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm²) | |
| GEOMETRY: flat surface | | SOURCE (S) TYPE: Th-230 / Sr-Y-90 | ID #: 82344-826 / 82341A-826 |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 6/4890

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 448

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2081 2. 2092 3. 2099 4. 2004 5. 2112

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 6021 2. 6188 3. 6433 4. 6289 5. 6195

| | | | | |
|---|---|---|---|---|
| α BKG COUNT RATE: 0.6 (cpm) | α BKG RANGE: | 0 TO 5 (cpm) | | |
| β BKG COUNT RATE: 489.0 (cpm) | β BKG RANGE: | 391.2 | TO | 586.8 (cpm) |
| α SOURCE AVERAGE: 2071.6 (cpm) | α SOURCE RANGE (± 20% AVG.): | 1657.28 | TO | 2485.92 (cpm) |
| β SOURCE AVERAGE: 6235.2 (cpm) | β SOURCE RANGE (± 20% AVG.): | 4988.16 | TO | 7482.24 (cpm) |

PART 2: **RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-12-17 | 0733 | 4-17-18 | S | S | S | 1 | 473 | 2015 | 6422 | S | Kimberly Dinder |
| 12-13-17 | 0715 | ↓ | S | S | S | 2 | 488 | 2034 | 6296 | S | Kimberly Dinder |
| 12-14-17 | 0700 | | S | S | S | 5 | 461 | 1994 | 6213 | S | Kimberly Dinder |
| 12-18-17 | 0700 | | S | S | S | 0.1 | 424 | 2477 | 6238 | S | Kimberly Dinder |
| 12-19-17 | 0715 | | S | S | S | 2 | 496 | 2013 | 6348 | S | Kimberly Dinder |
| 12-20-17 | 0700 | | S | S | S | 1 | 456 | 2079 | 6187 | S | Kimberly Dinder |
| 12-21-17 | 0700 | | S | S | S | 1 | 444 | 2084 | 6216 | S | Kimberly Dinder |
| 1-2-18 | 0900 | | S | S | S | 0.1 | 486 | 1880 | 6374 | S | Kimberly Dinder |
| 1-3-18 | 0715 | | S | S | S | 1 | 470 | 1988 | 6474 | S | Kimberly Dinder |
| 1-4-18 | 0730 | | S | S | S | 0.1 | 485 | 1848 | 6243 | S | Kimberly Dinder |
| 1-5-18 | 0730 | | S | S | S | 2 | 470 | 1946 | 6427 | S | Kimberly Dinder |
| 1-8-18 | 0650 | | S | S | S | 0.1 | 471 | 1960 | 5981 | S | Kimberly Dinder |
| 1-9-18 | 0650 | | S | S | S | 0.1 | 491 | 1990 | 6261 | S | Kimberly Dinder |
| 1-10-18 | 0645 | ↓ | S | S | S | 3 | 466 | 1889 | 6072 | S | Kimberly Dinder |

RCT Supervisor or Designee Signature: CRaasch Date: 3-16-18

**Attachment 1**

# ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 310170 Probe # PR337820

**PART 1:** INITIAL REFERENCE RESPONSE TEST

| | | | |
|---|---|---|---|
| SET UP DATE: 12-11-18 | LOCATION: Building 181 | HV / C.S. THR: 800 / α: 120 β: 4.40 | BY: K Snider |
| SERIAL #: 310170 | MODEL: 2360 | CAL. DUE: 4-17-18 | EFF: α: 32.83% β: 41.49% |
| PROBE SERIAL #: 337820 | PROBE MODEL: 43-89 | CAL. DUE: 4-17-18 | CF: α: 3.05 β: 2.41 |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm²) | |
| GEOMETRY: flat surface | | SOURCE (S) TYPE: Th-230 / Sr-90 | ID #: 82344-526 / 82341A-526 |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 8 / 5410

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 506

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2067 2. 2047 3. 2086 4. 2060 5. 2050

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 6702 2. 6695 3. 6871 4. 6830 5. 6786

| | | | | |
|---|---|---|---|---|
| α BKG COUNT RATE: 0.8 (cpm) | α BKG RANGE: | 0 TO 5 (cpm) | | |
| β BKG COUNT RATE: 543.0 (cpm) | β BKG RANGE: | 434.4 | TO 651.6 | (cpm) |
| α SOURCE AVERAGE: 2062 (cpm) | α SOURCE RANGE (±20% AVG.): | 1649.6 | TO 2474.4 | (cpm) |
| β SOURCE AVERAGE: 6766.8 (cpm) | β SOURCE RANGE (±20% AVG.): | 5413.44 | TO 8120.16 | (cpm) |

**PART 2:** RESPONSE TEST

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-12-17 | 0734 | 4-17-18 | S | S | S | 2 | 509 | 2012 | 7141 | S | Kimberly Snider |
| 12-13-17 | 0715 | | S | S | S | 0.1 | 541 | 2001 | 7120 | S | Kimberly Snider |
| 12-14-17 | 0700 | | S | S | S | 3 | 499 | 2004 | 6911 | S | Kimberly Snider |
| 12-18-17 | 0700 | | S | S | S | 0.1 | 527 | 2097 | 6727 | S | Kimberly Snider |
| 12-19-17 | 0715 | | S | S | S | 2 | 581 | 2027 | 6878 | S | Kimberly Snider |
| 12-20-17 | 0700 | | S | S | S | 2 | 467 | 2002 | 6781 | S | Kimberly Snider |
| 12-21-17 | 0700 | | S | S | S | 2 | 490 | 2004 | 6952 | S | Kimberly Snider |
| 1-2-18 | 0900 | | S | S | S | 1 | 510 | 1917 | 7018 | S | Kimberly Snider |
| 1-3-18 | 0715 | | S | S | S | 1 | 511 | 1869 | 6862 | S | Kimberly Snider |
| 1-4-18 | 0800 | | S | S | S | 0.1 | 498 | 1856 | 6885 | S | Kimberly Snider |
| 1-5-18 | 0750 | | S | S | S | 0.1 | 514 | 1929 | 6761 | S | Kimberly Snider |
| 1-8-18 | 0630 | | S | S | S | 4 | 531 | 1881 | 6695 | S | Kimberly Snider |
| 1-9-18 | 0630 | | S | S | S | 0.1 | 505 | 1890 | 6840 | S | Kimberly Snider |
| 1-10-18 | 0645 | | S | S | S | 0.1 | 516 | 2025 | 6938 | S | Kimberly Snider |

RCT Supervisor or Designee Signature: [illegible] Date: 3-16-18

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**Attachment 1**

# ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 310170 Probe # PR337820

**PART 1: INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 12-11-18 | LOCATION: Building 181 | HV / C.S. THR: 860 / α: 120 β: 4-40 | BY: K Guider |
| SERIAL #: 310170 | MODEL: 2360 | CAL. DUE: 4-17-18 | EFF: α: 32.83% β: 41.49% |
| PROBE SERIAL #: 337820 | PROBE MODEL: 43-89 | CAL. DUE: 4-17-18 | CF: α: 3.05 β: 2.41 |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm$^2$) | |
| GEOMETRY: flat surface | | SOURCE (S) TYPE: Th-230 / Sr-90 | ID #: 82344-526 / 82341A-526 |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 8 / 5410

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 566

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2067 2. 2047 3. 2086 4. 2060 5. 2050

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 6702 2. 6695 3. 6871 4. 6830 5. 6736

| | | | | |
|---|---|---|---|---|
| α BKG COUNT RATE: 0.8 (cpm) | α BKG RANGE: | 0 TO 5 (cpm) | | |
| β BKG COUNT RATE: 543.0 (cpm) | β BKG RANGE: | 434.4 | TO | 651.6 (cpm) |
| α SOURCE AVERAGE: 2062 (cpm) | α SOURCE RANGE (±20% AVG.): | 1649.6 | TO | 2474.4 (cpm) |
| β SOURCE AVERAGE: 6766.8 (cpm) | β SOURCE RANGE (±20% AVG.): | 5413.44 | TO | 8120.16 (cpm) |

**PART 2: RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-11-18 | 0630 | 4-17-18 | S | S | S | 2 | 570 | 1967 | 6946 | S | Kimberly Sides |
| 1-15-18 | 0640 | | S | S | S | 0.1 | 520 | 1851 | 6786 | S | Kimberly Sides |
| 1-16-18 | 0700 | | S | S | S | 1 | 491 | 1959 | 6678 | S | Kimberly Sides |
| 1-17-18 | 0700 | | S | S | S | 0.1 | 510 | 1916 | 7024 | S | Kimberly Sides |
| 1-18-18 | 0645 | | S | S | S | 1 | 517 | 1850 | 6949 | S | Kimberly Sides |
| 1-26-18 | 0700 | | S | S | S | 1 | 521 | 1957 | 6792 | S | [illegible] |
| 1-29-18 | 0700 | | S | S | S | 1 | 514 | 2012 | 6869 | S | [illegible] |
| | | | | | | | | | | | |
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RCT Supervisor or Designee Signature: [illegible] Date: 3-16-18

**Attachment 1**

# ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 310179 Probe # PR337815

PART 1: INITIAL REFERENCE RESPONSE TEST

SET UP DATE: 12-11-17 | LOCATION: Building 181 | HV / C.S. THR: 775 / α: 120 β: 4-40 | BY: K Guider

SERIAL #: 310179 | MODEL: 2360 | CAL. DUE: 4-17-18 | EFF: α: 31.26% β: 32.49%

PROBE SERIAL #: 337815 | PROBE MODEL: 43-89 | CAL. DUE: 4-17-18 | CF: α: 3.2 β: 3.08

ALPHA INSTR. $L_C$: ______ (cpm) | ALPHA MDC: ______ (dpm/100cm²)

GEOMETRY: flat surface | SOURCE (S) TYPE: SrY-90 / Th-230 | ID #: 52344-526 / 82341B-526

2 5-MINUTE BKG CNT (counts): α 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): ______

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 455

5 (1-MINUTE) SOURCE CNTS (cpm): α 1. 2052 2. 1965 3. 1983 4. 1948 5. 1979

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 6011 2. 6180 3. 6119 4. 6255 5. 5954

α BKG COUNT RATE: 0.9 (cpm) | α BKG RANGE: 0 TO 5 (cpm)

β BKG COUNT RATE: 465.9 (cpm) | β BKG RANGE: 372.72 TO 559.08 (cpm)

α SOURCE AVERAGE: 1985.4 (cpm) | α SOURCE RANGE (±20% AVG.): 1588.32 TO 2382.48 (cpm)

β SOURCE AVERAGE: 6103.8 (cpm) | β SOURCE RANGE (±20% AVG.): 4883.04 TO 7324.56 (cpm)

PART 2: RESPONSE TEST

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12-12-17 | 0733 | 4-17-18 | S | S | S | 0.1 | 469 | 2050 | 6246 | S | Kimberly Dicks |
| 12-13-17 | 0715 | ↓ | S | S | S | 1 | 448 | 1907 | 6086 | S | Kimberly Dicks |
| 12-14-17 | 0700 | | S | S | S | 0.1 | 464 | 1959 | 6004 | S | Kimberly Dicks |
| 12-18-17 | 0700 | | S | S | S | 2 | 450 | 2017 | 6070 | S | Kimberly Dicks |
| 12-19-17 | 0715 | | S | S | S | 0.1 | 473 | 2046 | 6165 | S | Kimberly Dicks |
| 12-20-17 | 0700 | | S | S | S | 1 | 492 | 2099 | 5889 | S | Kimberly Dicks |
| 12-21-17 | 0700 | | S | S | S | 1 | 448 | 1983 | 6064 | S | Kimberly Dicks |
| 1-2-18 | 0900 | | S | S | S | 2 | 453 | 1894 | 6231 | S | Kimberly Dicks |
| 1-3-18 | 0730 | | S | S | S | 0.1 | 446 | 1859 | 6190 | S | Kimberly Dicks |
| 1-4-18 | 0730 | | S | S | S | 0.1 | 462 | 1879 | 6027 | S | Kimberly Dicks |
| 1-5-18 | 0750 | | S | S | S | 0.1 | 397 | 1923 | 5922 | S | Kimberly Dicks |
| 1-8-18 | 0640 | | S | S | S | 1 | 434 | 1838 | 5708 | S | Kimberly Dicks |
| 1-9-18 | 0650 | | S | S | S | 0.1 | 452 | 1982 | 5947 | S | Kimberly Dicks |
| 1-10-18 | 0645 | ↓ | S | S | S | 0.1 | 504 | 2000 | 5957 | S | Kimberly Dicks |

RCT Supervisor or Designee Signature: [signature] Date: 3-14-18

**Attachment 1**

# ATTACHMENT L (SEC-RP-F-048)
## DUAL-USE ALPHA/BETA CONTAMINATION INSTRUMENT (95% CL) RESPONSE/DAILY TEST SHEET
### (Use for Model 2224-1 or 2360 with 43-68, 43-89 or 43-93 probe)
(NOTE: Used with 1-minute beta background count time)

Meter # 310179 Probe # PR337815

PART 1:

**INITIAL REFERENCE RESPONSE TEST**

| | | | |
|---|---|---|---|
| SET UP DATE: 12-11-17 | LOCATION: Building 181 | HV / C.S. THR: 775 / α: 120 β: 4.40 | BY: K Snider |
| SERIAL #: 310179 | MODEL: 2360 | CAL. DUE: 4-17-18 | EFF: α: 31.26% β: 32.49% |
| PROBE SERIAL #: 337815 | PROBE MODEL: 43-89 | CAL. DUE: 4-17-18 | CF: α: 3.2 β: 3.08 |
| ALPHA INSTR. $L_C$: ______ (cpm) | | ALPHA MDC: ______ (dpm/100cm$^2$) | |
| GEOMETRY: flat surface | | SOURCE (S) TYPE: Sr-Y-90 / Th-230 | ID #: 82344-526 / 82341A-526 |

2 5-MINUTE BKG CNT (counts): α: 1. ______ 2. ______ TOTAL COUNTS (counts): ______ OR 1 10-MINUTE BKG CNT (counts): 9 / 4809

1 (1-MINUTE) BKG COUNT (cpm): β: 1. 455

5 (1-MINUTE) SOURCE CNTS (cpm): α: 1. 2052 2. 1965 3. 1983 4. 1948 5. 1979

5 (1-MINUTE) SOURCE CNTS (cpm): β: 1. 6011 2. 6180 3. 6119 4. 6255 5. 5954

| | | | | |
|---|---|---|---|---|
| α BKG COUNT RATE: 0.9 (cpm) | α BKG RANGE: | 0 TO 5 (cpm) | | |
| β BKG COUNT RATE: 465.9 (cpm) | β BKG RANGE: | 372.72 | TO | 559.08 (cpm) |
| α SOURCE AVERAGE: 1985.4 (cpm) | α SOURCE RANGE (±20% AVG.): | 1588.32 | TO | 2382.48 (cpm) |
| β SOURCE AVERAGE: 6103.8 (cpm) | β SOURCE RANGE (±20% AVG.): | 4883.04 | TO | 7324.56 (cpm) |

PART 2:

**RESPONSE TEST**

| 1 DATE | 2 TIME | 3 CAL. DUE (Enter Date) | 4 BATT. (S/U) | 5 H.V. (Volts) | 6 THRESHLD α/β (S/U) | 7 BACKGROUND α | 7 BACKGROUND β | 8 α SOURCE RESPONSE (Gross CPM) | 9 β SOURCE RESPONSE (Gross CPM) | 10 S/U/ Number | 11 SIGNATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-11-18 | 0630 | 4-17-18 | S | S | S | 0.1 | 484 | 1919 | 5884 | S | Kimberly Snider |
| 1-15-18 | 0640 | ↓ | S | S | S | 1 | 454 | 1859 | 5991 | S | Kimberly Snider |
| 1-16-18 | 0638 | | S | S | S | 2 | 473 | 1798 | 5945 | S | Kimberly Snider |
| 1-17-18 | 0630 | | S | S | S | 4 | 452 | 1868 | 5901 | S | Kimberly Snider |
| 1-18-18 | 0630 | | S | S | S | 1 | 484 | 1833 | 5893 | S | Kimberly Snider |
| 1-22-18 | 0800 | | S | S | S | 1 | 474 | 1874 | 5941 | S | [signature] |
| 1-23-18 | 0700 | | S | S | S | 1 | 472 | 1958 | 5795 | S | [signature] |
| 1-24-18 | 0700 | | S | S | S | .5 | 468 | 1936 | 5814 | S | [signature] |
| 1-25-18 | 0700 | | S | S | S | 1 | 470 | 1945 | 5800 | S | [signature] |
| ~~1-26-18~~ | ~~0700~~ | | ~~S~~ | ~~S~~ | ~~S~~ | ~~1~~ | ~~433~~ | | | | DAO |
| 1-26-18 | 0700 | | S | S | S | 1 | 472 | 1936 | 5927 | S | [signature] |
| 1-31-18 | 0730 | | S | S | S | 4 | 453 | 1849 | 5553 | S | [signature] |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

RCT Supervisor or Designee Signature: [signature] Date: 3-16-18

# ATTACHMENT 6

## Laboratory Analytical Report for Sediment Samples

2609 North River Road, Port Allen, Louisiana 70767
(800) 401-4277 -- FAX (225) 381-2996

ARS Aleut Analytical

# ARS International, LLC

## Laboratory Analysis Report

## ARS1-18-00307

*Prepared for:*

## ARS Aleut Remediation, LLC

**Steve Shirley**
**802 E. Martintown Road, Suite 214**
**North Augusta, SC 29841**

**sshirley@aar-llc.com; jhampel@aar-llc.com**

**Phone: 803-442-7661**

**Project Manager Review**



**Contact Person: Questions regarding this analytical report should be addressed to:**

**Project Manager**
**ProjectManagers@amrad.com**

**Phone: 225.381.2991**
**Fax: 225.381.2996**

**LELAP Cert# 01949**

# Notes (Case Narrative):

## General Comments:

1.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.
2.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of "m" to the procedure number (i.e. 900.0M).

## Radiochemistry Comments:

1.0) All MDA/MDC values are calculated on a sample specific basis.
2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.
3.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.
4.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).
5.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).
6.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).
7.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).
8.0) Gamma spectroscopy results are calculated values based on the **ORTEC**® GammaVision ENV32 Analysis Engine.
9.0) ACLASS DOD and ISO 17025 certification applies only to the following analytes and methods: Gross Alpha and Gross Beta (EPA 900, SM7110B&C, SW846 9310); Radium 226 (EPA 903, EPA 903.1, SM 7500 Ra-B, SW846 9315); Radium 228 (EPA 904, SM 7500 Ra-B SW846 9320); Iodine-131(EPA 901.1); Uranium by ICPMS (EPA 200.8); Strontium 89/90 (EPA 905, Eichrom SRW01, HASL 300 Sr-03-RC); Tritium (EPA 906, EPA 906M); Gamma Emitters (EPA 901.1, SM7120B, HASL 300 Ga-01-R); Americium-241, Curium 242/244, Plutonium 239/240 and 241, Thorium 228/230/232, Uranium 234/233 and 238 (Eichrom ACW03 VBS); Lead 210 (HASL 300 Pb-01-RC, Eichrom OTW01); Polonium 210 (HASL 300 Po-01-RC, HASL 300 Po-02-RC); Technetium-99 (Eichrom TCW02, Eichrom TCS01M).

## Definitions:

**CRDL** Contract Required Detection Limit
**CSU** Combined Standard Uncertainty
**DLC** Decision Level Concentration (ANSI N42.23) or critical level
**DO** Duplicate Original
**DUP** Method Duplicate
**LCS/LCSD** Laboratory Control Sample/Laboratory Control Sample Duplicate
**MDA** Minimum Detectable Activity
**MDC** (Minimum Detectable Concentration) minimum concentration of the analyte that ARS can detect utilizing the specific analysis
**MBL** Method Blank
**MS/MSD** Matrix Spike/Matrix Spike Duplicate
**N/A** Not Applicable
**NP** Not Provided
**NR** Not Referenced
**LOD** Limit of Detection
**LOQ** Limit of Quantitation
**MCL** Maximum Contaminant Level

## Data Qualifiers:

**B** The analyte is found in both the associated method blank and the sample. This flag indicates probable blank contamination.
**D** Sample analysis accomplished through dilution.
**J** The reported result is an estimated value above the limit of detection but outside of quantitation range (e.g., matrix interference was observed).
**Q** One or more quality control criteria failed (e.g., LCS recovery, surrogate spike recovery, or CCV recovery).
**U** Activity is below the MDC, MDA, MDL, or LOD
**N** The analyte is a tentatively identified compound using mass spectrometry or any non-customer requested compounds that are tentatively identified.
***** LCS/LCSD or MS/MSD fails RPD criteria.
**S** Spike
**SC** Subcontracted out to another qualified laboratory
**H** Holding time exceeded
**E** Exceeds MCL
****** Reporting Limit is higher than MCL; Target cannot be detected

# Attachment 1

2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-18-00307
**Client Sample ID:** CELL 6A1 I/S TRENCH
**Sample Collection Date:** 01/30/18
**Sample Matrix:** Soil/Solid/Sludge
**Percent Solids:** N/A

**Request or PO Number:** NA
**ARS Sample ID:** ARS1-18-00307-001
**Date Received:** 02/01/18
**Report Date:** 02/08/18

## Radiochemistry

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | CRDL | Qual | Analysis Units | Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U-234 | 4.155 | 0.671 | 0.102 | 0.034 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 82% |
| U-235 | 0.254 | 0.123 | 0.065 | 0.013 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 82% |
| U-238 | 28.850 | 3.678 | 0.169 | 0.068 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 82% |
| Be-7 | 0.324 | 0.547 | 0.924 | 0.462 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Bi-212 | 0.207 | 0.528 | 0.927 | 0.464 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Bi-214 | 0.526 | 0.199 | 0.267 | 0.134 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| K-40 | 3.147 | 1.118 | 0.982 | 0.491 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Pb-210 | 1.293 | 1.538 | 2.160 | 1.080 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Pb-214 | 0.582 | 0.200 | 0.274 | 0.137 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Ra-226 | 11.934 | 2.574 | 2.410 | 1.205 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Ra-228 | 0.689 | 0.320 | 0.421 | 0.211 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Sc-46 | -0.015 | 0.070 | 0.121 | 0.061 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Th-228 | 1.128 | 0.227 | 0.211 | 0.106 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Tl-208 | 0.361 | 0.112 | 0.137 | 0.069 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| U-235 | 0.683 | 0.476 | 0.749 | 0.375 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| U-238 | 27.512 | 3.414 | 2.920 | 1.460 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Total NORM Gamma | 48.949 | N/A | N/A | N/A | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |
| Total NORM Activity | 160.550 | N/A | N/A | N/A | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:21 | ECAMP | N/A |



LELAP Certificate# 01949

# Attachment 1

ARS Aleut Analytical

2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-18-00307
**Client Sample ID:** CELL 6B1 E. end UTILITY
**Sample Collection Date:** 01/29/18
**Sample Matrix:** Soil/Solid/Sludge
**Percent Solids:** N/A

**Request or PO Number:** NA
**ARS Sample ID:** ARS1-18-00307-002
**Date Received:** 02/01/18
**Report Date:** 02/08/18

## Radiochemistry

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | CRDL | Qual | Analysis Units | Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U-234 | 0.420 | 0.193 | 0.202 | 0.080 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 68% |
| U-235 | 0.028 | 0.066 | 0.132 | 0.041 | NP | U | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 68% |
| U-238 | 1.201 | 0.320 | 0.197 | 0.077 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 68% |
| Be-7 | 0.228 | 0.466 | 0.797 | 0.399 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Bi-212 | 2.513 | 0.680 | 0.485 | 0.243 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Bi-214 | 1.497 | 0.259 | 0.163 | 0.082 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| K-40 | 0.483 | 0.777 | 1.320 | 0.660 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Pb-210 | 2.395 | 1.440 | 1.790 | 0.895 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Pb-214 | 1.611 | 0.309 | 0.216 | 0.108 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Ra-226 | 4.391 | 2.242 | 2.380 | 1.190 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Ra-228 | 3.005 | 0.376 | 0.176 | 0.088 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Sc-46 | 0.000 | 0.055 | 0.101 | 0.051 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Th-228 | 3.047 | 0.306 | 0.162 | 0.081 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Tl-208 | 1.062 | 0.172 | 0.111 | 0.056 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| U-235 | 0.300 | 0.435 | 0.721 | 0.361 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| U-238 | 3.282 | 1.099 | 2.090 | 1.045 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Total NORM Gamma | 28.619 | N/A | N/A | N/A | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |
| Total NORM Activity | 60.196 | N/A | N/A | N/A | NP | | pCi/g | ARS-007/EPA 901.1M | 02/05/18 13:22 | ECAMP | N/A |



LELAP Certificate# 01949

# Attachment 1

2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • FAX (225) 381-2996

**ARS Sample Delivery Group:** ARS1-18-00307
**Client Sample ID:** NE ELECT. VAULT
**Sample Collection Date:** 01/29/18
**Sample Matrix:** Soil/Solid/Sludge
**Percent Solids:** N/A

**Request or PO Number:** NA
**ARS Sample ID:** ARS1-18-00307-003
**Date Received:** 02/01/18
**Report Date:** 02/08/18

## Radiochemistry

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | CRDL | Qual | Analysis Units | Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U-234 | 0.489 | 0.187 | 0.109 | 0.033 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 68% |
| U-235 | 0.055 | 0.063 | 0.050 | 0.000 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 68% |
| U-238 | 1.084 | 0.290 | 0.094 | 0.025 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 68% |
| Be-7 | 0.003 | 0.334 | 0.621 | 0.311 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Bi-212 | 0.263 | 0.381 | 0.636 | 0.318 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Bi-214 | 0.548 | 0.157 | 0.174 | 0.087 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| K-40 | 3.377 | 1.001 | 0.829 | 0.415 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Pb-210 | 0.576 | 0.874 | 1.570 | 0.785 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Pb-214 | 0.597 | 0.146 | 0.180 | 0.090 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Ra-226 | 3.420 | 1.564 | 1.730 | 0.865 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Ra-228 | 0.666 | 0.250 | 0.333 | 0.167 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Sc-46 | -3.367E-4 | 0.013 | 0.098 | 0.049 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Th-228 | 0.723 | 0.157 | 0.163 | 0.082 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Tl-208 | 0.290 | 0.087 | 0.083 | 0.042 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| U-235 | 0.143 | 0.230 | 0.392 | 0.196 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| U-238 | 1.110 | 0.993 | 1.660 | 0.830 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Total NORM Gamma | 11.870 | N/A | N/A | N/A | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |
| Total NORM Activity | 25.493 | N/A | N/A | N/A | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:49 | ECAMP | N/A |



LELAP Certificate# 01949

# Attachment 1

2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • FAX (225) 381-2996

| | | | |
|---|---|---|---|
| **ARS Sample Delivery Group:** | ARS1-18-00307 | **Request or PO Number:** | NA |
| **Client Sample ID:** | NW ELECT. VAULT | **ARS Sample ID:** | ARS1-18-00307-004 |
| **Sample Collection Date:** | 01/29/18 | **Date Received:** | 02/01/18 |
| **Sample Matrix:** | Soil/Solid/Sludge | **Report Date:** | 02/08/18 |
| **Percent Solids:** | N/A | | |

## Radiochemistry

| Analysis Description | Analysis Results | CSU +/- 2 s | MDC | DLC | CRDL | Qual | Analysis Units | Method | Analysis Date/Time | Analysis Technician | Tracer/Chem Recovery |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U-234 | 0.436 | 0.166 | 0.085 | 0.023 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 73% |
| U-235 | 0.042 | 0.058 | 0.089 | 0.022 | NP | U | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 73% |
| U-238 | 1.624 | 0.361 | 0.114 | 0.037 | NP | | pCi/g | ARS-026/Eichrom ACW-03 | 02/07/18 16:26 | SCAUSEY | 73% |
| Be-7 | -0.018 | 2.449 | 0.591 | 0.296 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Bi-212 | 0.172 | 0.348 | 0.610 | 0.305 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Bi-214 | 0.434 | 0.161 | 0.170 | 0.085 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| K-40 | 1.487 | 0.720 | 0.828 | 0.414 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Pb-210 | 2.854 | 1.105 | 1.170 | 0.585 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Pb-214 | 0.358 | 0.113 | 0.168 | 0.084 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Ra-226 | 1.960 | 1.036 | 1.190 | 0.595 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Ra-228 | 0.809 | 0.205 | 0.110 | 0.055 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Sc-46 | -0.013 | 0.042 | 0.077 | 0.038 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Th-228 | 0.683 | 0.136 | 0.112 | 0.056 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Tl-208 | 0.091 | 0.054 | 0.076 | 0.038 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| U-235 | 0.114 | 0.259 | 0.441 | 0.221 | NP | U | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| U-238 | 3.310 | 0.889 | 1.130 | 0.565 | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Total NORM Gamma | 12.462 | N/A | N/A | N/A | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |
| Total NORM Activity | 33.913 | N/A | N/A | N/A | NP | | pCi/g | ARS-007/EPA 901.1M | 02/06/18 6:50 | ECAMP | N/A |



LELAP Certificate# 01949

ARS Aleut Analytical

## QC Results per Analytical Batch

| | |
|---|---|
| Analytical Batch | ARS1-B18-00272 |
| SDG | ARS1-18-00307 |
| Analysis | Gamma Spec (Solid) |
| Analysis Test Method | ARS-007/EPA 901.1M |
| Analysis Code | GAM-A-SO |
| Report Units | pCi/g |

## Acceptable QC Performance Ranges

| QC Sample Type | Performance Items and Ranges | | |
|---|---|---|---|
| Laboratory Control Sample | Recovery (%): | > 75 | < 125 |
| Matrix Spike | Recovery (%): | > 60 | < 140 |
| Duplicate | Replicate Error Ratio (RER): | | < 1 |
| | Duplicate Error Ratio (DER): | | < 3 |
| | Relative Percent Difference (RPD %): | | ≤ 25 |

### Laboratory Control Sample

Analysis Date: 02/05/18 10:46 | Analysis Technician: ECAMP

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | Expected Value | LCS Rec (%) | MDC |
|---|---|---|---|---|---|---|---|
| ARS1-B18-00272-01 | **LCS** | AM-241 | 3.914E+4 | 2.861E+3 | 4.000E+4 | 97.8 | 738.900 |
| ARS1-B18-00272-01 | **LCS** | CO-60 | 7.106E+4 | 3.164E+3 | 6.719E+4 | 105.8 | 821.700 |
| ARS1-B18-00272-01 | **LCS** | CS-137 | 5.981E+4 | 2.617E+3 | 5.727E+4 | 104.4 | 331.100 |

### Duplicate RER/DER/RPD

Analysis Date: 02/05/18 11:45 | Analysis Technician: ECAMP

| Analyte | Results LCS | CSU LCS (2s) | Results LCSD | CSU LCSD (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| AM-241 | 3.914E+4 | 2.861E+3 | 3.917E+4 | 2.838E+3 | 0.010 | 0.014 | 0.1 |
| CO-60 | 7.106E+4 | 3.164E+3 | 6.743E+4 | 2.987E+3 | 1.157 | 1.636 | 5.2 |
| CS-137 | 5.981E+4 | 2.617E+3 | 5.666E+4 | 2.519E+3 | 1.202 | 1.700 | 5.4 |

### Method Blank

Analysis Date: 02/05/18 12:16 | Analysis Technician: ECAMP

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | MDC | Qual |
|---|---|---|---|---|---|---|
| ARS1-B18-00272-03 | **MBL** | AM-241 | 2.040 | 18.793 | 34.100 | U |
| ARS1-B18-00272-03 | **MBL** | BI-212 | 48.284 | 102.970 | 185.000 | U |
| ARS1-B18-00272-03 | **MBL** | BI-214 | -11.562 | 78.539 | 67.400 | U |
| ARS1-B18-00272-03 | **MBL** | IR-192 | 1.689 | 11.816 | 21.500 | U |
| ARS1-B18-00272-03 | **MBL** | K-40 | -138.430 | 5.537E+3 | 565.000 | U |
| ARS1-B18-00272-03 | **MBL** | PB-212 | -11.427 | 60.076 | 55.600 | U |
| ARS1-B18-00272-03 | **MBL** | PB-214 | -27.703 | 207.520 | 69.300 | U |
| ARS1-B18-00272-03 | **MBL** | RA-224 | 96.786 | 289.570 | 505.000 | U |
| ARS1-B18-00272-03 | **MBL** | RA-226 | 530.760 | 299.280 | 333.000 | |
| ARS1-B18-00272-03 | **MBL** | RA-228 | -31.142 | 169.720 | 119.000 | U |
| ARS1-B18-00272-03 | **MBL** | SC-46 | -3.313 | 2.736E+3 | 32.200 | U |
| ARS1-B18-00272-03 | **MBL** | TL-208 | -4.615 | 33.348 | 33.400 | U |
| ARS1-B18-00272-03 | **MBL** | U-235 | 8.884 | 16.043 | 30.500 | U |
| ARS1-B18-00272-03 | **MBL** | U-238 | -30.690 | 239.280 | 391.000 | U |



LELAP Certificate# 01949

ARS Aleut Analytical

# QC Results per Analytical Batch

| | |
|---|---|
| **Analytical Batch** | **ARS1-B18-00273** |
| **SDG** | **ARS1-18-00307** |
| **Analysis** | **Uranium Solid, Waste, Biota, Sediment, Veg** |
| **Analysis Test Method** | **ARS-026/Eichrom ACW-03-15** |
| **Analysis Code** | **ASP-U-SO** |
| **Report Units** | **pCi/g** |

## Acceptable QC Performance Ranges

| QC Sample Type | Performance Items and Ranges | | |
|---|---|---|---|
| **Laboratory Control Sample** | **Recovery (%):** | **> 75** | **< 125** |
| **Matrix Spike** | **Recovery (%):** | **> 60** | **< 140** |
| **Duplicate** | | **Replicate Error Ratio (RER):** | **< 1** |
| | | **Duplicate Error Ratio (DER):** | **< 3** |
| | | **Relative Percent Difference (RPD %):** | **≤ 25** |

## Laboratory Control Sample

| Analysis Date | 02/07/18 16:26 | Analysis Technician | SCAUSEY |
|---|---|---|---|

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | Expected Value | LCS Rec (%) | MDC |
|---|---|---|---|---|---|---|---|
| ARS1-B18-00273-01 | **LCS** | U-238 | 12.628 | 1.650 | 12.886 | 98.0 | 0.067 |

## Duplicate RER/DER/RPD

| Analysis Date | 02/07/18 16:26 | Analysis Technician | SCAUSEY |
|---|---|---|---|

| Analyte | Results LCS | CSU LCS (2s) | Results LCSD | CSU LCSD (2s) | RER | DER | RPD |
|---|---|---|---|---|---|---|---|
| U-238 | 12.628 | 1.650 | 12.315 | 1.586 | 0.190 | 0.268 | 2.5 |

## Method Blank

| Analysis Date | 02/07/18 16:26 | Analysis Technician | SCAUSEY |
|---|---|---|---|

| Analysis Batch Sample ID | QC Type | Analyte | Results | CSU (2s) | MDC | Qual |
|---|---|---|---|---|---|---|
| ARS1-B18-00273-03 | **MBL** | U-234 | 0.033 | 0.043 | 0.068 | U |
| ARS1-B18-00273-03 | **MBL** | U-235 | -0.005 | 0.008 | 0.058 | U |
| ARS1-B18-00273-03 | **MBL** | U-238 | 0.005 | 0.029 | 0.068 | U |



LELAP Certificate# 01949

# DEPARTMENT OF THE AIR FORCE
## WASHINGTON DC

31 May 2019

MEMORANDUM FOR NRC REGION IV
ATTN: Dr. Robert Evans

FROM: AFMSA/SG3PB

Subject: Attachment 2 of "Review of the Final Status Survey Report (FSSR) of the Phase 1 of the Building 181 at Robins AFB GA" dated 20 Sep 18

We attached copy of the Verification Survey of the cell 5 and cell 6 of the Building 181 performed by the USAF School of Aerospace Medicine Occupational and Environmental Health Department/OECM Wright-Patterson AFB, OH to our cover memorandum "Review of the Final Status Survey Report (FSSR) of the Phase 1 of the Building 181 at Robins AFB GA" dated 20 Sep 18. This survey report currently has a limited distribution statement, and is not cleared for public release or posting on the NRC's public ADAMS database.

The verification survey is currently re-routing for security and public affairs release as publically available. We will supply the revised verification survey for public release when it becomes available for posting in ADAMS.

If you have any questions, please contact me at 703-681-6988 or email at alan.c.hale.mil@mail.mil

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ALAN C. HALE, Lt Col, USAF, BSC
Chief, Radioisotope Committee Secretariat
Air Force Medical Support Agency
Office of the Surgeon General

[Type here]