DEPARTMENT OF THE ARMY
US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY, NEW JERSEY 07806-5000

Q-5

26 March 2007

Docket No. 040-06377 License No. SUB-348
Control No. 131469 and 132247

Ms. Betsy Ullrich
Nuclear Materials Safety Branch 2
Division of Nuclear Materials Safety
U.S. Nuclear Regulatory Commission – Region 1
475 Allendale Road
King of Prussia, Pa. 19406-1415

Dear Ms. Ullrich,

This is a follow-up to your December 18, 2002 correspondence (encl 1) notifying ARDEC that the criteria of 5,000 disintegrations per 100 square-centimeters (dpm/100cm2) used for the decommissioning of Building 318 was not approved as meeting the NRC license termination criteria. A copy of the report entitled Derivation of a Site Specific DCGL for the Remediation of TACOM-ARDEC Picatinny Arsenal Building 318 and Evaluation of Final Survey Results" dated October 2004 (encl 2) is being submitted to document the derivation of a Site Specific DCGL for the remediation of Building 318 that should be acceptable to the NRC in illustrating that the previously performed Final Survey of Building 318 provides sufficient evidence that the Derived Site Specific Removable Activity Concentration of 240 dpm/100cm^2 has not been exceeded.

It is believed that this document (encl 2) along with the Final Survey Plan (encl 3) and Final Survey Report (encl 4) should form the basis for approving the license amendment request to remove Building 318 as an authorized location for the use of radioactive materials.

Note that several prior attempts had been made by this office to converse further with the contractor, Duratek, on the contents of the report (encl. 2) prior to submittal to your agency, but without success. Therefore, in order not to further delay this action, the report and supplements is being submitted to you at this time.

Point of contact regarding this correspondence is either Mr. Joseph Fabiano, 1.973.724.3742, jfabiano@pica.army.mil or the undersigned at 1.973.724.3126, rfliszar@pica.army.mil.

Sincerely,

Richard W. Fliszar

Richard W. Fliszar
RDECOM-ARDEC Radiation Protection Officer

140310

26 March 2007

Docket No. 040-06377 License No. SUB-348
Control No. 131469 and 132247

Copies Furnished (w/o encl):

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AMSTA-AR-QES (Ms. Allison Schwier)
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

December 18, 2002

Docket No. 04006377 License No. SUB-348
Control No. 132247

Richard W. Fliszar
TACOM-ARDEC Radiation Protection Officer
Department of the Army
U. S. Army Tank-Automotive and Armaments Command
Amrmament Research, Development and Engineering Center
Picatinny Arsenal, NJ 07806-5000

SUBJECT: DEPARTMENT OF THE ARMY, NOTIFICATION OF ACTIVITIES, CONTROL NO. 132247

Dear Mr. Fliszar:

This is in reference to your letter dated October 8, 2002, notifying the NRC that you disposed of machinery previously used for depleted uranium (DU) machining operations at the Frankford Arsenal, which was stored in Building 318 at the Picatinny Arsenal since the 1970's. You also informed us that you surveyed Building 318 for release of the building for unrestricted use in accordance with your license commitments and intend to begin renovations of this building on December 9, 2002.

We understand that you are authorized to approve the use of new facilities at your licensed location and to release facilities in accordance with your licensed procedures, and the letter notifying us of this change is not required by license condition. We further understand that you are not requesting that the NRC release the building for unrestricted use or remove the building as an authorized location of use of source material on your license.

The criteria of 5,000 disintegrations per 100 square-centimeters (dpm/100 cm^2) used for the decommissioning of Building 318 is not approved at this time by the NRC as meeting the license termination criteria. The NRC screening value for depleted uranium (DU) on building surfaces of 101 dpm/100 cm^2 is acceptable to meet the license termination criteria and may be used without prior approval from the NRC. However, alternate criteria to demonstrate that facilities meet the license termination criteria must be approved by the NRC prior to use. Although the criteria used for Building 318 is more restrictive than that approved by the NRC for release of Building 611B (5,500 dpm/100 cm^2 as specified by License Condition No. 15 of Amendment No. 26 dated October 21, 2002), the Building 611B criteria may not be applicable to other areas on your site and may not be used to demonstrate that other facilities meet the license termination criteria without specific approval from the NRC, because it was based on a model specific to Building 611B.

Please note that, when you terminate your license, you may be required to survey Building 318 again to demonstrate that this building meets the NRC license termination criteria. At that time, you may choose to use the NRC screening values or you may request approval of alternate criteria, submitting the information as required for your past approvals of alternate criteria. If you have any questions, you may contact me by telephone at (610) 337-5040 or by electronic mail at exu@nrc.gov.

Your cooperation is appreciated.

Sincerely,

Betsy Ullrich
Senior Health Physicist
Nuclear Materials Safety Branch 2
Division of Nuclear Materials Safety

cc:
Richard W. Fliszar, Radiation Safety Officer

Duratek, Inc.

DERIVATION OF A SITE SPECIFIC DCGL FOR THE REMEDIATION OF TACOM – ARDEC PICATINNY ARSENAL BUILDING 318 AND EVALUATION OF FINAL SURVEY RESULTS

October 2004

Commercial Projects
1009 Commerce Park Drive, Suite 100
Oak Ridge, TN 37830

DERIVATION OF A SITE SPECIFIC DCGL FOR THE REMEDIATION OF TACOM – ARDEC PICATINNY ARSENAL BUILDING 318 AND EVALUATION OF FINAL SURVEY RESULTS

October 2004

Prepared By: _____ Date: 10/4/04
Douglas Schult, CHP

Reviewed By: _____ Date: 10/4/04
Elizabeth Langille, CHP

Reviewed By: _____ Date: 10/4/04
Robin Shult

Approved By: _____ Date: 10/28/2004
Mike Styvaert

Duratek, Inc.
Commercial Projects
1009 Commerce Park Drive
Oak Ridge, TN 37830

Joseph A. Fabrano

DERIVATION OF A SITE SPECIFIC DCGL FOR THE REMEDIATION OF TACOM – ARDEC PICATINNY ARSENAL BUILDING 318 AND EVALUATION OF FINAL SURVEY RESULTS

October 2004

Prepared By: _____ Date: 10/4/04
Douglas Schult, CHP

Reviewed By: E. Langille Date: 10/4/04
Elizabeth Langille, CHP

Reviewed By: _____ Date: 10/4/04
Robin Shult

Approved By: _____ Date: _____
Mike Styvaert

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Commercial Projects
1009 Commerce Park Drive
Oak Ridge, TN 37830

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LIST OF TABLES

1.0 INTRODUCTION

In August of 2002, Duratek performed a final survey of Building 318 to demonstrate that the building met the criteria for release for unrestricted use. The final survey was performed in accordance with the requirements contained within the approved final survey plan, (reference 8.1). The final survey plan, (Section 3.0), specified that depleted uranium was the radionuclide of concern and provided the criteria for release for unrestricted use.

The Army specified that for the final survey of Building 318 that the criteria for release for unrestricted use was to be based on the criteria specified in Table 5-2, "Surface Radioactivity Values" of Army Regulation 11-9, "The Army Radiation Safety Program". Table 1-1 summarizes the criteria specified in Table 5-2.

Table 1-1
Criteria For Release For Unrestricted Use

Nuclide	Removable	Total (fixed & removable)
^{nat}U, ^{235}U, ^{238}U, and associated decay products	1000 dpm/100 cm^2	5000 dpm/100 cm^2

The Army chose to use Table 5-2 as the basis for the criteria for release for unrestricted use based on their experience remediating depleted uranium contaminated facilities including the planned remediation of Building 611B, also located at Picatinny Arsenal.

In planning for the remediation of Building 611B, site specific derived concentration guideline values, DCGLs, for depleted uranium were calculated and documented in an NRC approved final survey plan, (reference 8.2). The approved depleted uranium DCGL for total activity on the surfaces of Building 611B was 5,500 dpm/100 cm^2 with the stipulation that the removable activity concentration would not exceed 10 percent of the total, or 550 dpm/100 cm^2.

Based on the stipulation that the removable activity concentration could not exceed 10 percent of the total, the criteria for release for unrestricted use for the final survey of Building 318 were 5000 dpm/100 cm^2 and 500 dpm/100 cm^2 for total and removable surface activity respectively.

Following the completion of the final survey of Building 318 a final survey report was prepared documenting that the criteria for release for unrestricted use specified above were met, (reference 8.3). The Army then notified the NRC of the results of the final survey and informed them that they planned to begin remodeling Building 318. The NRC responded in a letter dated December 18, 2002, (reference 8.4) stating that they understood that the Army could release Building 318 in accordance with their licensed procedures and stating that they further understood that the Army was not requesting that the NRC release the building for unrestricted use or remove the building as an authorized location for use of source material on their license.

The NRC stated that the criteria for release for unrestricted use used for the final survey of Building 318 was not approved by the NRC and that the criteria previously approved for Building 611B was not applicable to other areas. The NRC went on to say that when the Army terminated their license that they may be required to survey Building 318 again to demonstrate that the building meets the NRC license termination criteria.

The intent of this document is to document the derivation of a site specific DCGL for the remediation of Building 318 which will be acceptable to the NRC and also to illustrate that the previously performed final survey of Building 318 provides sufficient evidence that the site specific DCGL has not been exceeded. Thus, allowing the Army to request that the NRC amend their license removing Building 318 as an authorized location for the use of radioactive material and eliminating the need to survey the building again at the time of license termination.

2.0 SITE DESCRIPTION

Building 318 is part of the U.S. Army Armament Research, Development and Engineering Center (ARDEC) located at the Picatinny Arsenal in Dover, New Jersey. According to information provided by the Army, Building 318 was used to store equipment from other facilities and some of that equipment was determined to be contaminated with depleted uranium.

Building 318 is a single story, brick, high-bay structure that is approximately 30 ft wide by 130 ft long. The building had been partitioned at one end to provide an office space of about 30 ft by 30 ft. The remaining 3,000 square feet was used as storage space. Building 318 was used to store manufacturing equipment transferred from Frankfurt Arsenal several years ago. Much of this equipment was found to be contaminated with depleted uranium (DU). Of particular interest were three large pieces of contaminated equipment; a furnace, a roll mill machine, and a dynapak. Each of these pieces of equipment were contaminated, and due to their size, each of these pieces of equipment required dismantlement/sizing in order to move them. In addition to being contaminated with DU, the furnace was determined to contain asbestos, which required the use of a State of New Jersey licensed asbestos abatement contractor to aid in its dismantlement.

Prior to performing the final survey all of the equipment stored within Building 318 was removed. Some of the equipment was free released and the rest disposed of as radioactive waste. Of the equipment that was free released, the majority was disposed of as waste while several items were moved to other buildings on site for potential re-use. At the time of the final survey, Building 318 was completely empty.

3.0 RADIONUCLIDES OF CONCERN

The radionuclides of concern within Building 318 are those associated with depleted uranium. Depleted uranium consists of three naturally occurring, long-lived uranium isotopes, uranium-234, uranium-235, and uranium-238. As compared to naturally occurring uranium, depleted uranium contains less uranium-234 and uranium-235. The relative fractions, in terms of activity concentrations, of the three long lived uranium isotopes in the depleted uranium used at the Picatinny Arsenal are:

- U-234 0.305
- U-235 0.013
- U-238 0.682

NOTE: The relative fractions of the uranium isotopes in depleted uranium assumed above are conservative. If deemed necessary this Final Survey Plan, specifically Sections 1.3 and 3.0, may be revised to take advantage of less conservative relative fractions. If this Final Survey Plan is so revised, it will be forwarded to the NRC for review along with the basis for the new relative fractions.

The half lives of uranium-234, uranium-235, and uranium-238 are 2.44E5 years, 7.04E8 years, and 4.47E9 years respectively. Uranium-238 and uranium-234 are both members of the uranium decay chain and will eventually reach equilibrium. However the time required to reach equilibrium is measured in millenniums. Due to the half lives involved, the relative ratios of the three uranium isotopes in depleted uranium will remain essentially constant.

While uranium-234 and uranium-238 are both members of the uranium decay chain, uranium-235 is a member of the actinium decay chain. Table 3-1 shows the first several radionuclides of the uranium decay chain and Table 3-2 shows the first several members of the actinium decay chain.

Table 3-1
Uranium Decay Chain
(partial)

Nuclide	Half Life	Major Radiations Energies (MeV) and intensities (%)		
		Alpha	Beta	Gamma
U-238	4.51E9 years	5.15 MeV 25% 4.20 MeV 75%		
Th-234	2.41E1 days		0.103 MeV 21% 0.193 MeV 79%	0.063MeV 3.5% 0.93 MeV 4.0%
Pa-234m*	1.17E0 min		2.29 MeV 99.8%	0.765 MeV 0.3% 1.001 MeV 0.6%
U-234	2.27E5 years	4.72 MeV 28% 4.77 MeV 72%		0.053 MeV 0.2%
Th-230	8.0E4 years	4.62 MeV 24% 4.68 Mev 76%		0.068 MeV 0.6% 0.142 MeV 0.1%

* In the above table the fact that Pa-235m undergoes an isomeric transition to its ground state approximately 0.16 % of the time is ignored.

Table 3-2
Actinium Decay Chain
(partial)

Nuclide	Half Life	Major Radiations Energies (MeV) and intensities (%)		
		Alpha	Beta	Gamma
U-235	7.1E8 years	4.37 MeV 18% 4.40 MeV 57% 4.58 MeV 8%		0.143 Mev 11% 0.185 MeV 54% 0.204 MeV 5%
Th-231	2.55E1 hours		0.140 MeV 45% 0.220 MeV 15% 0.305 MeV 40%	0.026 MeV 2% 0.084 MeV 10%
Pa-231	3.25E4 years	4.95 MeV 22% 5.01 MeV 24% 5.02 MeV 23%		0.027 MeV 6% 0.29 MeV 6%

Based on the relative fractions of the radionuclides associated with depleted uranium and their decay chains, compliance with the DCGL for building surfaces will be evaluated based on direct beta measurements collected using a detector calibrated using Tc-99. The use of a detector calibrated using Tc-99 will be conservative considering the energy and yields of the beta particles emitted during the decay of depleted uranium

4.0 CRITERIA FOR RELEASE FOR UNRESTRICTED USE

Subpart E to 10 CFR 20 provides the criteria for release for unrestricted use. It states that the total effective dose equivalent (TEDE) to a member of a critical group, due to residual contamination that is distinguishable from background, shall not exceed 25 mrem/yr and requires that the residual contamination levels be reduced to levels that are as low as reasonably achievable (ALARA). In order to demonstrate compliance with the criteria for release for unrestricted use, screening values may be used or site specific DCGLs may be calculated and forwarded to the NRC for review and approval. The screening value for depleted uranium on building surfaces is 101 dpm/100 cm^2. Since residual contamination in excess of the screening value for depleted uranium is expected within Building 318 a site specific DCGL for building surfaces is required. The site specific DCGL will relate a depleted uranium activity concentration on building surfaces (dpm/100 cm^2) to an annual TEDE of 25 mrem.

5.0 SITE SPECIFIC DERIVED CONCENTRATION GUIDELINE VALUE

Based on the physical attributes of Building 318 it was determined that a conservative exposure scenario on which to base the DCGL for depleted uranium on building surfaces would be a residential scenario. Although Building 318 has previously been used for industrial purposes and is located on an active military base there is a potential that the building could be converted to a residential facility. Possibly for military personnel. Although the conversion to a residential facility would require actions that would likely reduce the TEDE associated with residual contamination these actions were not accounted for in deriving the DCGL.

The computer code RESRAD-BUILD, Version 3.22 was used to calculate the DCGL. Appendix A contains a copy of the RESRAD-BUILD run. In calculating the DCGL the RESRAD-BUILD default values were used with the following exceptions:

- The evaluation times of 0, 1, 2, 5, 10, 100, 1000 years were selected.
- The removable activity fraction was set at 0.1.
- The area source type was selected.

As the RESRAD-Build run in Appendix A shows, an assumed depleted uranium activity concentration of 1,000 pCi/m^2 results in a maximum dose in the first year of exposure of 0.23 mrem. Given that the criteria for release for unrestricted use is 25 mrem/yr, the DCGL for building surfaces is:

$$DCGL = \frac{25mrem}{yr} * \frac{1{,}000pCi/m^2}{0.23mrem/yr} * \frac{2.22dpm}{pCi} * \frac{m^2}{10{,}000cm^2} * \frac{100cm^2}{100cm^2} = 2{,}413dpm/100cm^2$$

As stated above, the DCGL for depleted uranium on building surfaces was calculated in part based on the assumption that the removable activity fraction was 0.1. Since the DCGL for depleted uranium of 2,413 dpm/100 cm^2 applies to total activity (fixed plus removable) the removable activity concentration should not exceed 240 dpm/100 cm^2.

6.0 FINAL SURVEY RESULTS

The DCGL calculated for Building 318 is 2,413 dpm/100 cm^2 assuming that the removable activity concentration does not exceed 240 dpm/100 cm^2. Although the final survey of Building 318 was not designed with this DCGL in mind the results of the final survey clearly demonstrate that the DCGL was met and that Building 318 should be acceptable for release for unrestricted use. This document along with the final survey plan (reference 8.1) and the final survey report (reference 8.3) should form the basis of a license amendment allowing the NRC to remove Building 318 as an authorized location for the use of radioactive materials.

Tables 6-1 and 6-2 provide a summary of the results of the final survey of Building 318. Tables 6-1 and 6-2 were obtained from the final survey report (reference 8-3).

Table 6-1
Removable Beta Activity

Survey Unit Number	Description	Number Of Meas	Mean dpm/100 cm^2	Stan Dev dpm/100 cm^2	Maximum dpm/100 cm^2	MDA dpm/100 cm^2
OF-1	Office Floor	30	15	34	84	129
OF-2	Office Walls	30	3	28	76	129
OF-3	Office Wall and Ceiling	30	15	32	76	129
HB-1	High Bay Floor	36	21	35	93	129
HB-2	High Bay Floor	36	14	37	93	129
HB-3	High Bay Floor	36	14	36	102	129
HB-4	High Bay Floor	36	15	37	111	129
HB-5	High Bay Attic Floor	30	7	33	84	129
HB-6	High Bay Wall	30	2	34	102	129
HB-7	High Bay Wall	30	9	33	76	129
HB-8	High Bay Wall	30	18	29	93	129
HB-9	High Bay Wall	30	9	25	49	129
HB-10	High Bay Overhead	30	23	38	111	129
HB-11	High Bay Vents	20	16	35	93	129
HB-12	High Bay Pit	30	13	35	102	129

As shown in Table 6-1, approximately 450 measurements for removable activity were performed as part of the final survey. None of the results exceeded the minimum detectable activity, which was approximately130 dpm/100 cm^2.

Table 6-2
Total Beta Activity

Survey Unit Number	Description	Number Of Meas	Mean dpm/100 cm^2	Stan Dev dpm/100 cm^2	Maximum dpm/100 cm^2	MDA dpm/100 cm^2
OF-1	Office Floor	30	109	189	601	596
OF-2	Office Walls	30	339	458	1326	581
OF-3	Office Wall and Ceiling	30	178	244	780	562
HB-1	High Bay Floor	36	626	192	1115	617
HB-2	High Bay Floor	36	737	200	1081	620
HB-3	High Bay Floor	36	961	346	2281	615
HB-4	High Bay Floor	35	714	228	1347	533
HB-5	High Bay Attic Floor	30	89	223	716	602
HB-6	High Bay Wall	30	482	605	**2915**	644
HB-7	High Bay Wall	30	440	350	988	622
HB-8	High Bay Wall	30	329	334	1000	624
HB-9	High Bay Wall	29	135	222	658	571
HB-10	High Bay Overhead	31	81	214	488	558
HB-11	High Bay Vents	21	41	241	531	594
HB-12	High Bay Pit	30	518	170	767	600

As shown in Table 6-2, approximately 450 measurements for total beta activity were performed as part of the final survey. The results have not been corrected to account for the natural radioactivity found in most materials of construction. Previous experience has shown that the natural radioactivity contained in cement and bricks can contribute several hundred dpm/100 cm^2 to measurements of total beta activity.

The average total beta activity for each of the survey units was well below the DCGL for depleted uranium of 2,413 dpm/100 cm^2. In all but one survey unit the maximum total beta activity measurement was below the DCGL. For the one survey unit in which the DCGL was exceeded (Survey Unit HB-6) only one measurement result exceeded the DCGL. As stated previously the results of the total beta activity measurements were not corrected to account for the natural radioactivity in different building materials. It is possible that if the natural radioactivity contained in cement and bricks had been accounted for, that the residual activity associated with this one elevated measurement would not have exceed the DCGL. Although the area associated with this one elevated measurement was not determined it is extremely unlikely that the dose criteria associated with the DCGL was exceeded since the average total beta activity concentration for the survey unit in question was 482 dpm/100 cm^2 which is approximately 20% of the DCGL.

Information concerning the protocols used during the final survey of Building 318 can be found in references 8.1 and 8.3.

Appendix B contains several pictures of Building 318 taken at the time of the Final Survey. These pictures show that at the time of the Final Survey, Building 318 was essentially an empty shell.

7.0 CONCLUSION

If the NRC will approve the site specific DCGL derived for depleted uranium on building surfaces within Building 318 the final survey results for Building 318, summarized in Section 6.0, demonstrate that Building 318 is acceptable for release for unrestricted use.

8.0 REFERENCES

1.1 Final Survey Plan for the TACOM – ARDEC Picatinny Arsenal Building 318, Revision 0, April 2002.

1.2 Final Survey Plan for the TACOM – ARDEC Picatinny Arsenal Building 611B, Revision 1, January 2002.

1.3 Final Survey Report for the TACOM – ARDEC Picatinny Arsenal Building 318, Revision 0, October 2002.

1.4 Letter from Betsy Ullrich of the NRC to Richard W. Fliszar the TACOM – ARDEC Radiation Safety Officer, dated December 18, 2002.

Appendix A

Title : Picatinny Arsenal, Building 318
Input File : site1.bld

RESRAD-BUILD Table of Contents

RESRAD-BUILD Table of Contents

RESRAD-BUILD Input Parameters

Number of Sources : 1
Number of Receptors: 1
Total Time : 3.650000E+02 days
Fraction Inside : 5.000000E-01

Receptor Information

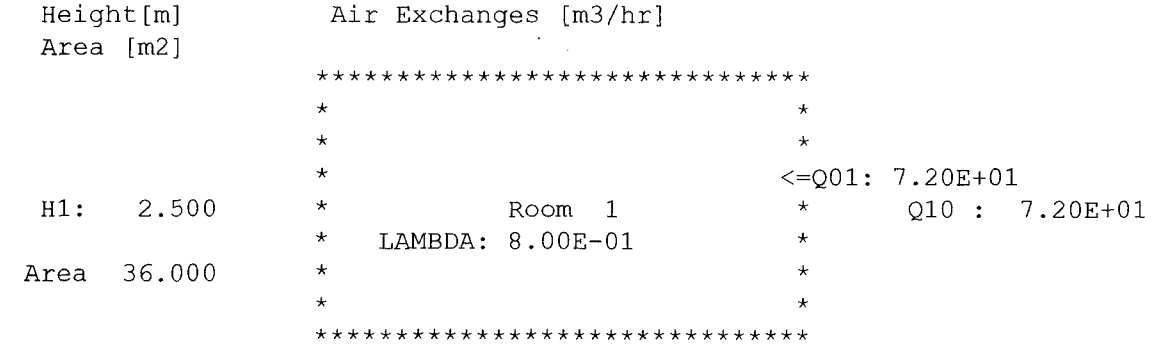
Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	1.000	1.000	1.000	1.000	1.80E+01	1.00E-04

Receptor-Source Shielding Relationship

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete

Building Information

Building Air Exchange Rate: 8.00E-01 1/hr



Deposition velocity: 1.00E-02 [m/s] Resuspension Rate: 5.00E-07 [1/s]

Source Information

Source: 1

Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00[m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 1.000E-01
Time to Remove: 3.650E+02 [day]

Radon Release Fraction: 1.000E-01

Contamination::

Nuclide	Concentration [pCi/m2]	Dose Conversion Factor (Library: BUILD Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/(pCi/m3)]
U-238	6.820E+02	2.690E-04	1.180E-01	1.600E-04
U-235	1.300E+01	2.670E-04	1.230E-01	9.030E-04
U-234	3.050E+02	2.830E-04	1.320E-01	8.930E-07
PA-231	0.000E+00	1.060E-02	1.280E+00	2.010E-04
TH-230	0.000E+00	5.480E-04	3.260E-01	2.040E-06
AC-227	0.000E+00	1.480E-02	6.720E+00	2.160E-03
RA-226	0.000E+00	1.330E-03	8.600E-03	1.040E-02
PB-210	0.000E+00	7.270E-03	2.320E-02	1.050E-05

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 0.00000000E+00 years

Assessment for Time: 1
Time =0.00E+00 yr

Source Information

Source: 1
Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00 [m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 1.000E-01
Time to Remove: 3.650E+02 [day]

Contamination::

Nuclide	Concentration [pCi/m2]
U-238	6.820E+02
U-235	1.300E+01
U-234	3.050E+02
PA-231	0.000E+00
TH-230	0.000E+00
AC-227	0.000E+00
RA-226	0.000E+00
PB-210	0.000E+00

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 0.00000000E+00 years

RESRAD-BUILDDose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Total
Receptor 1	2.31E-01	2.31E-01
Total	2.31E-01	2.31E-01

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 0.00000000E+00 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.25E-04	4.14E-06	3.46E-08	2.29E-01	5.77E-13	1.36E-03
Total	3.25E-04	4.14E-06	3.46E-08	2.29E-01	5.77E-13	1.36E-03

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	1.52E-01	1.52E-01
U-234	2.36E-07	2.36E-07
TH-230	1.76E-12	1.76E-12
RA-226	1.43E-17	1.43E-17
PB-210	1.48E-19	1.48E-19
U-235		
U-235	3.04E-03	3.04E-03
PA-231	3.36E-07	3.36E-07
AC-227	1.76E-08	1.76E-08
U-234		
U-234	7.58E-02	7.58E-02
TH-230	8.40E-07	8.40E-07
RA-226	9.11E-12	9.11E-12
PB-210	1.17E-13	1.17E-13

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 1.00000000 years

Assessment for Time: 2
Time =1.00E+00 yr

Source Information

Source: 1
Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00 [m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 3.650E+02 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	U-238	6.138E+02
	U-235	1.170E+01
	U-234	2.745E+02
	PA-231	2.475E-04
	TH-230	2.471E-03
	AC-227	3.899E-06
	RA-226	5.352E-07
	PB-210	5.502E-09

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 1.00000000 years

RESRAD-BUILDDose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Total
Receptor 1	3.07E-04	3.07E-04
Total	3.07E-04	3.07E-04

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 1.00000000 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.07E-04	0.00E+00	0.00E+00	0.00E+00	3.93E-12	0.00E+00
Total	3.07E-04	0.00E+00	0.00E+00	0.00E+00	3.93E-12	0.00E+00

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 1.00000000 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	2.73E-04	2.73E-04
U-234	6.72E-11	6.72E-11
TH-230	3.54E-16	3.54E-16
RA-226	1.06E-16	1.06E-16
PB-210	4.54E-21	4.54E-21
U-235		
U-235	2.70E-05	2.70E-05
PA-231	2.38E-10	2.38E-10
AC-227	4.66E-11	4.66E-11
U-234		
U-234	7.07E-06	7.07E-06
TH-230	7.19E-11	7.19E-11
RA-226	3.11E-11	3.11E-11
PB-210	1.73E-15	1.73E-15

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 2.00000000 years

Assessment for Time: 3
Time =2.00E+00 yr

Source Information

Source: 1
Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00 [m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 3.650E+02 [day]

Contamination::

Nuclide	Concentration [pCi/m2]
U-238	6.138E+02
U-235	1.170E+01
U-234	2.745E+02
PA-231	4.951E-04
TH-230	4.942E-03
AC-227	1.543E-05
RA-226	2.140E-06
PB-210	4.367E-08

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 2.00000000 years

RESRAD-BUILDDose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Total
Receptor 1	3.07E-04	3.07E-04
Total	3.07E-04	3.07E-04

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 2.00000000 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.07E-04	0.00E+00	0.00E+00	0.00E+00	1.07E-11	0.00E+00
Total	3.07E-04	0.00E+00	0.00E+00	0.00E+00	1.07E-11	0.00E+00

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 2.00000000 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	2.73E-04	2.73E-04
U-234	1.12E-10	1.12E-10
TH-230	9.62E-16	9.62E-16
RA-226	4.58E-16	4.58E-16
PB-210	3.07E-20	3.07E-20
U-235		
U-235	2.70E-05	2.70E-05
PA-231	3.97E-10	3.97E-10
AC-227	1.25E-10	1.25E-10
U-234		
U-234	7.07E-06	7.07E-06
TH-230	1.20E-10	1.20E-10
RA-226	8.45E-11	8.45E-11
PB-210	7.44E-15	7.44E-15

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 5.00000000 years

Assessment for Time: 4
Time =5.00E+00 yr

Source Information

Source: 1
Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00 [m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 3.650E+02 [day]

Contamination::

Nuclide	Concentration [pCi/m2]
U-238	6.138E+02
U-235	1.170E+01
U-234	2.745E+02
PA-231	1.238E-03
TH-230	1.235E-02
AC-227	9.348E-05
RA-226	1.337E-05
PB-210	6.667E-07

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 5.00000000 years

RESRAD-BUILDDose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Total
Receptor 1	3.07E-04	3.07E-04
Total	3.07E-04	3.07E-04

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 5.00000000 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.07E-04	0.00E+00	0.00E+00	0.00E+00	5.11E-11	0.00E+00
Total	3.07E-04	0.00E+00	0.00E+00	0.00E+00	5.11E-11	0.00E+00

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 5.00000000 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	2.73E-04	2.73E-04
U-234	2.46E-10	2.46E-10
TH-230	4.61E-15	4.61E-15
RA-226	4.73E-15	4.73E-15
PB-210	6.66E-19	6.66E-19
U-235		
U-235	2.70E-05	2.70E-05
PA-231	8.73E-10	8.73E-10
AC-227	5.82E-10	5.82E-10
U-234		
U-234	7.07E-06	7.07E-06
TH-230	2.64E-10	2.64E-10
RA-226	4.04E-10	4.04E-10
PB-210	7.51E-14	7.51E-14

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 10.0000000 years

Assessment for Time: 5
Time =1.00E+01 yr

Source Information

Source: 1
Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00 [m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 3.650E+02 [day]

Contamination::

Nuclide	Concentration [pCi/m2]
U-238	6.138E+02
U-235	1.170E+01
U-234	2.745E+02
PA-231	2.475E-03
TH-230	2.471E-02
AC-227	3.553E-04
RA-226	5.345E-05
PB-210	5.134E-06

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 10.0000000 years

RESRAD-BUILDDose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Total
Receptor 1	3.07E-04	3.07E-04
Total	3.07E-04	3.07E-04

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 10.0000000 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.07E-04	0.00E+00	0.00E+00	0.00E+00	1.86E-10	0.00E+00
Total	3.07E-04	0.00E+00	0.00E+00	0.00E+00	1.86E-10	0.00E+00

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 10.0000000 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	2.73E-04	2.73E-04
U-234	4.70E-10	4.70E-10
TH-230	1.68E-14	1.68E-14
RA-226	3.27E-14	3.27E-14
PB-210	8.48E-18	8.48E-18
U-235		
U-235	2.70E-05	2.70E-05
PA-231	1.67E-09	1.67E-09
AC-227	2.01E-09	2.01E-09
U-234		
U-234	7.07E-06	7.07E-06
TH-230	5.03E-10	5.03E-10
RA-226	1.47E-09	1.47E-09
PB-210	5.00E-13	5.00E-13

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 50.0000038 years

Assessment for Time: 6
Time =5.00E+01 yr

Source Information

Source: 1
Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00 [m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 3.650E+02 [day]

Contamination::

Nuclide	Concentration [pCi/m2]
U-238	6.138E+02
U-235	1.170E+01
U-234	2.745E+02
PA-231	1.237E-02
TH-230	1.235E-01
AC-227	6.182E-03
RA-226	1.328E-03
PB-210	4.871E-04

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 50.0000038 years

RESRAD-BUILDDose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Total
Receptor 1	3.08E-04	3.08E-04
Total	3.08E-04	3.08E-04

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 50.0000038 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.08E-04	0.00E+00	0.00E+00	0.00E+00	4.27E-09	0.00E+00
Total	3.08E-04	0.00E+00	0.00E+00	0.00E+00	4.27E-09	0.00E+00

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 50.0000038 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	2.73E-04	2.73E-04
U-234	2.26E-09	2.26E-09
TH-230	3.87E-13	3.87E-13
RA-226	3.61E-12	3.61E-12
PB-210	3.61E-15	3.61E-15
U-235		
U-235	2.70E-05	2.70E-05
PA-231	8.02E-09	8.02E-09
AC-227	3.24E-08	3.24E-08
U-234		
U-234	7.07E-06	7.07E-06
TH-230	2.42E-09	2.42E-09
RA-226	3.38E-08	3.38E-08
PB-210	4.22E-11	4.22E-11

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 100.000008 years

Assessment for Time: 7
Time =1.00E+02 yr

Source Information

Source: 1
Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00 [m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 3.650E+02 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	U-238	6.138E+02
	U-235	1.170E+01
	U-234	2.746E+02
	PA-231	2.473E-02
	TH-230	2.470E-01
	AC-227	1.729E-02
	RA-226	5.275E-03
	PB-210	2.931E-03

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 100.000008 years

RESRAD-BUILDDose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Total
Receptor 1	3.08E-04	3.08E-04
Total	3.08E-04	3.08E-04

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 100.000008 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.08E-04	0.00E+00	0.00E+00	0.00E+00	1.68E-08	0.00E+00
Total	3.08E-04	0.00E+00	0.00E+00	0.00E+00	1.68E-08	0.00E+00

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 100.000008 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	2.73E-04	2.73E-04
U-234	4.50E-09	4.50E-09
TH-230	1.53E-12	1.53E-12
RA-226	2.83E-11	2.83E-11
PB-210	4.47E-14	4.47E-14
U-235		
U-235	2.70E-05	2.70E-05
PA-231	1.59E-08	1.59E-08
AC-227	8.97E-08	8.97E-08
U-234		
U-234	7.07E-06	7.07E-06
TH-230	4.81E-09	4.81E-09
RA-226	1.33E-07	1.33E-07
PB-210	2.50E-10	2.50E-10

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 500.000000 years

Assessment for Time: 8
Time =5.00E+02 yr

Source Information

Source: 1
Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00 [m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 3.650E+02 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	U-238	6.138E+02
	U-235	1.170E+01
	U-234	2.750E+02
	PA-231	1.231E-01
	TH-230	1.234E+00
	AC-227	1.154E-01
	RA-226	1.245E-01
	PB-210	1.100E-01

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 500.000000 years

RESRAD-BUILDDose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Total
Receptor 1	3.11E-04	3.11E-04
Total	3.11E-04	3.11E-04

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 500.000000 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.11E-04	0.00E+00	0.00E+00	0.00E+00	3.93E-07	0.00E+00
Total	3.11E-04	0.00E+00	0.00E+00	0.00E+00	3.93E-07	0.00E+00

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 500.000000 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	2.73E-04	2.73E-04
U-234	2.24E-08	2.24E-08
TH-230	3.80E-11	3.80E-11
RA-226	3.35E-09	3.35E-09
PB-210	9.43E-12	9.43E-12
U-235		
U-235	2.70E-05	2.70E-05
PA-231	7.91E-08	7.91E-08
AC-227	5.96E-07	5.96E-07
U-234		
U-234	7.06E-06	7.06E-06
TH-230	2.39E-08	2.39E-08
RA-226	3.11E-06	3.11E-06
PB-210	9.28E-09	9.28E-09

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 1000.00000 years

Assessment for Time: 9
Time =1.00E+03 yr

Source Information

Source: 1
Location:: Room : 1 x: 0.00 y: 0.00 z: 0.00 [m]
Geometry:: Type: Area Area:3.60E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E-01
Removable fraction: 0.000E+00
Time to Remove: 3.650E+02 [day]

Contamination::

Nuclide	Concentration [pCi/m2]
U-238	6.138E+02
U-235	1.170E+01
U-234	2.755E+02
PA-231	2.450E-01
TH-230	2.464E+00
AC-227	2.373E-01
RA-226	4.648E-01
PB-210	4.376E-01

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 1000.00000 years

RESRAD-BUILDDose Tables

Source Contributions to Receptor Doses

[mrem]

	Source 1	Total
Receptor 1	3.21E-04	3.21E-04
Total	3.21E-04	3.21E-04

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 1000.00000 years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	3.19E-04	0.00E+00	0.00E+00	0.00E+00	1.47E-06	0.00E+00
Total	3.19E-04	0.00E+00	0.00E+00	0.00E+00	1.47E-06	0.00E+00

Title : Picatinny Arsenal, Building 318
Input File : site1.bld
Evaluation Time: 1000.00000 years

Nuclide Detail of Doses

[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	2.73E-04	2.73E-04
U-234	4.48E-08	4.48E-08
TH-230	1.51E-10	1.51E-10
RA-226	2.53E-08	2.53E-08
PB-210	7.82E-11	7.82E-11
U-235		
U-235	2.70E-05	2.70E-05
PA-231	1.57E-07	1.57E-07
AC-227	1.22E-06	1.22E-06
U-234		
U-234	7.05E-06	7.05E-06
TH-230	4.77E-08	4.77E-08
RA-226	1.16E-05	1.16E-05
PB-210	3.69E-08	3.69E-08

RESRAD-BUILD Dose (Time) Tables

Receptor Dose Received for the Exposure Duration

(mrem)

	Evaluation Time [yr]								
	0.00E+00	1.00E+00	2.00E+00	5.00E+00	1.00E+01	5.00E+01	1.00E+02	5.00E+02	1.00E+03
1	2.31E-01	3.07E-04	3.07E-04	3.07E-04	3.07E-04	3.08E-04	3.08E-04	3.11E-04	3.21E-04

Receptor Dose/Yr Averaged Over Exposure Duration

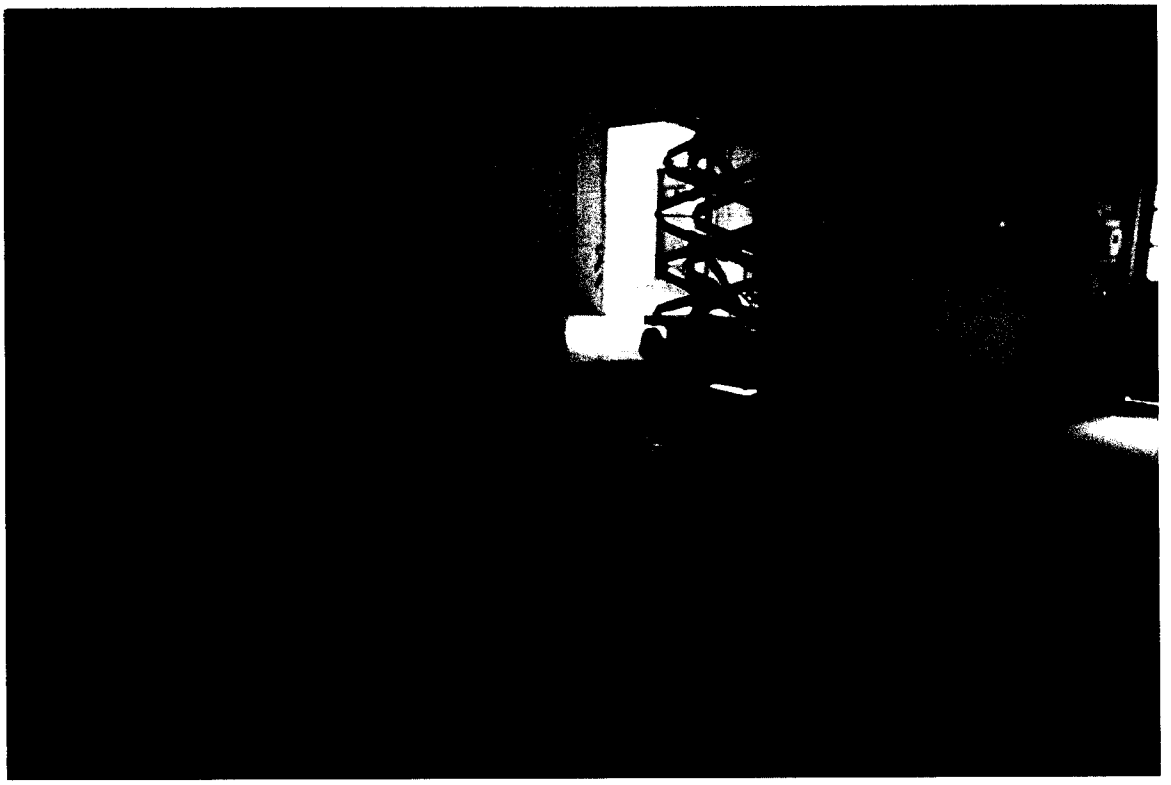
(mrem/yr)

	Evaluation Time [yr]								
	0.00E+00	1.00E+00	2.00E+00	5.00E+00	1.00E+01	5.00E+01	1.00E+02	5.00E+02	1.00E+03
1	2.31E-01	3.08E-04	3.08E-04	3.08E-04	3.08E-04	3.08E-04	3.08E-04	3.12E-04	3.21E-04

Appendix B

Office Area

Office Area

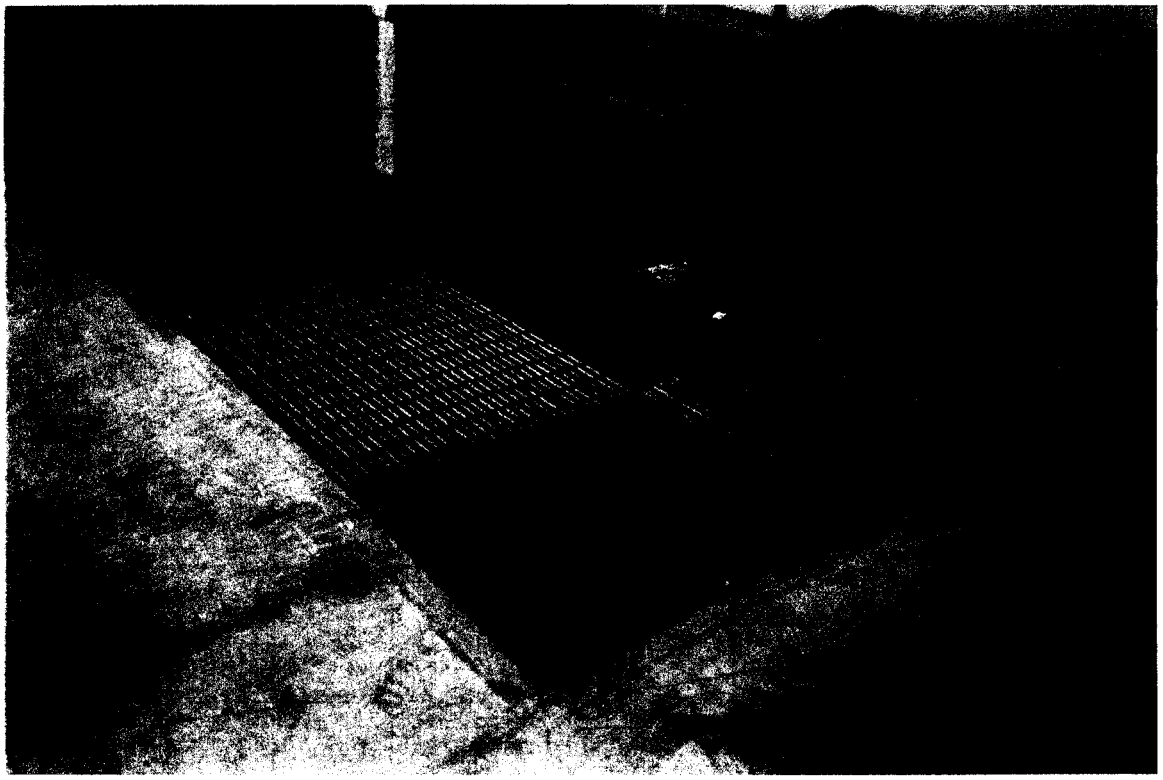


High Bay

High Bay

High Bay Looking Into Office

Sump In High Bay



Approvals Page

FINAL SURVEY PLAN
for the
TACOM - ARDEC
PICATINNY ARSENAL
BUILDING 318

Revision 0
April 2002

Prepared by:	E. Langille Elizabeth Langille, CHP	4/25/02 Date
Reviewed by:	 Douglas Schult, CHP	4/25/02 Date
Reviewed by:	 Robin Shult, Commercial Operations General Manager	4/26/02 Date
Approved by:	 Mike Styvert, Army Project Manager	4/23/02 Date

Radiological Field Services
Commercial Operations
628 Gallaher Road
Kingston, TN 37763

TABLE OF CONTENTS

1.0 SITE INFORMATION

Building 318 is part of the U.S. Army Armament Research, Development and Engineering Center (ARDEC) located at the Picatinny Arsenal in Dover, New Jersey. According to information provided by the Army, Building 318 was used to store equipment from other facilities and some of that equipment was determined to be contaminated with depleted uranium. The purpose of this Final Survey Plan is to specify the survey protocols and subsequent data analyses necessary to show that Building 318 meets the criteria established for release for unrestricted use. Implementation of this Final Survey Plan will result in documentation showing that Building 318 meets the criteria for release for unrestricted use.

1.1 Background Information

Building 318 is a single story, brick, high-bay structure that is approximately 30 ft wide by 130 ft long. The building has been partitioned at one end to provide an office space of about 30 ft by 30 ft. The remaining 3,000 square feet have been used as storage space. Building 318 was used to store manufacturing equipment transferred from Frankfurt Arsenal several years ago. These articles were later found to be contaminated with depleted uranium (DU).

The major equipment in Building 318 includes: a contaminated furnace, a contaminated roll milling machine, a contaminated Dynapak machine, and four 5-gallon pails of oil-like liquids that require sampling, profiling and testing for radiological contamination.

1.2 Radionuclides of Concern

The radionuclides of concern within Building 318 are those associated with depleted uranium. Depleted uranium consists of three naturally occurring, long lived uranium isotopes, uranium-234, uranium-235, and uranium-238. As compared to naturally occurring uranium, depleted uranium contains less uranium-234 and uranium-235. The relative fractions, in terms of activity of the three long-lived uranium isotopes in the depleted uranium used at the Picatinny Arsenal are:

- U-234 0.305
- U-235 0.013
- U-238 0.682

NOTE: The relative fractions of the uranium isotopes in depleted uranium assumed above are conservative. If deemed necessary this Final Survey Plan, specifically Sections 1.2 and 3.0, may be revised to take

advantage of less conservative relative fractions. If this Final Survey Plan is so revised, it will be forwarded to the Army for review along with the basis for the new relative fractions.

The half-lives of uranium-234, uranium-235, and uranium-238 are 2.44E5 years, 7.04E8 years, and 4.47E9 years respectively. Uranium-238 and uranium-234 are both members of the uranium decay chain and will eventually reach equilibrium. However the time required to reach equilibrium is measured in millenniums. Due to the half-lives involved, the relative ratios of the three uranium isotopes in depleted uranium will remain essentially constant.

While uranium-234 and uranium-238 are both members of the uranium decay chain, uranium-235 is a member of the actinium decay chain. Table 1-1 shows the first several radionuclides of the uranium decay chain and Table 1-2 shows the first several members of the actinium decay chain.

Table 1-1
Uranium Decay Chain
(partial)

Nuclide	Half Life	Major Radiations Energies (MeV) and intensities (%)		
		Alpha	Beta	Gamma
U-238	4.51E9 years	5.15 MeV 25% 4.20 MeV 75%		
Th-234	2.41E1 days		0.103 MeV 21% 0.193 MeV 79%	0.063MeV 3.5% 0.93 MeV 4.0%
Pa-234m*	1.17E0 min		2.29 MeV 98%	0.765 MeV 0.3% 1.001 MeV 0.6%
U-234	2.27E5 years	4.72 MeV 28% 4.77 MeV 72%		0.053 MeV 0.2%
Th-230	8.0E4 years	4.62 MeV 24% 4.68 Mev 76%		0.068 MeV 0.6% 0.142 MeV 0.1%

* In the above table the fact that Pa-235m undergoes an isomeric transition to its ground state approximately 0.13 % of the time is ignored.

Table 1-2
Actinium Decay Chain
(partial)

Nuclide	Half Life	Major Radiations Energies (MeV) and intensities (%)		
		Alpha	Beta	Gamma
U-235	7.1E8 years	4.37 MeV 18% 4.40 MeV 57% 4.58 MeV 8%		0.143 Mev 11% 0.185 MeV 54% 0.204 MeV 5%
Th-231	2.55E1 hours		0.140 MeV 45% 0.220 MeV 15% 0.305 MeV 40%	0.026 MeV 2% 0.084 MeV 10%
Pa-231	3.25E4 years	4.95 MeV 22% 5.01 MeV 24% 5.02 MeV 23%		0.027 MeV 6% 0.29 MeV 6%

Based on the relative fractions of the radionuclides associated with depleted uranium and their decay chains compliance with the criteria for release for unrestricted use for building surfaces will be evaluated based on direct beta measurements collected using a detector calibrated using Tc-99. The use of a detector calibrated using Tc-99 will be conservative considering the energy and yields of the beta particles emitted during the decay of depleted uranium.

2.0 ORGANIZATION AND RESPONSIBILITIES

Duratek will implement an integrated management approach that includes project management oversight and technical support. The full resources of Duratek's Bear Creek and Gallaher Road offices, including professional engineering and quality assurance staff, are available to support the Project Manager to ensure successful project execution and completion.

The on-site survey team will consist of a Project Manager and Senior HP Technicians. These personnel will, as a minimum, be trained, qualified, and experienced in field radiological survey procedures and have current HAZWOPER training.

2.1 Project Manager (On-site)

The Project Manager is the primary point of contact and interface. The minimum requirements for the Project Manager are 5-10 years of health physics experience including prior management experience.

He/she will be responsible for the supervision and coordinate the daily activities including the overview of the final status surveys. In order to ensure regulatory compliance, he/she will be qualified in the use of the survey instruments used and be familiar with the aspects of surveying as described in NUREG-1575 and this Survey Plan.

2.2 Health Physics (HP) Technician(s)

The HP Technician(s) are responsible for performing the final surveys and collecting samples as necessary. They will be qualified in the use of the survey instruments and the performance of surveys in accordance with NUREG-1575 as well as this Final Survey Plan.

3.0 CRITERIA FOR RELEASE FOR UNRESTRICTED USE

Given that depleted uranium is the radionuclide of concern, the criteria for release for unrestricted use of Building 318 is 5000 dpm/100 cm^2 as specified in Table 5-2, "Surface Radioactivity Values" of Army Regulation 11-9, *The Army Radiation Safety Program.* This table is reproduced, in part, as Table 3-1 in this survey plan. This criteria will be applied to all building surfaces and any remaining permanent structures.

The criteria for release for unrestricted use of Building 318 is approximates the site specific criteria of 5,500 dpm/100 cm^2 derived for use during the remediation of Building 611B. The criteria derived for Building 611, which equates to an annual total

effective dose equivalent of 25 mrem to a hypothetical member of the public, was based on a set of conservative assumptions. It was decided that there would be little benefit in deriving a site specific criteria for Building 318. The criteria specified in Table 5-2 of AR 11-9 (May 1999) was deemed to be reasonably conservative.

The criteria for release for unrestricted use is ment to apply to measurements of total activity (fixed plus removable). Typically the criteria for release for unrestricted use is derived, in part, by limiting the removable component of the total activity. In deriving the site specific criteria for Building 611B the removable component was limited to 10 percent of the total. For consistency, the removable component of the criteria for release for unrestricted use for Building 318 will be limited to 10 percent of the 5,000 dpm/100 cm^2 limit for total activity or 500 dpm/100 cm^2. This is also deemed to be conservative as Table 5-2 of AR 11-9 allows removable activity of up to 1,000 dpm/100 cm^2.

Table 3-1
Criteria for Unrestricted Use
Surface Radioactivity Values in dpm/100cm^2

Nuclide[a]	Removable[b,c]	Total (fixed + removable)[b,d]
^{nat}U, ^{235}U, ^{238}U, and associated decay products	1,000	5,000

a. This table is extracted from AR 11-9, and 10 CFR 835, appendix D. The values in this table apply to radioactive contamination deposited on, but not incorporated into the interior of, the contaminated item. Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, apply the limits established for alpha- and beta-gamma-emitting nuclides independently.

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

c. The amount of removable radioactive material per 100 cm^2 of surface activity should be determined by swiping the area with dry filter or soft absorbent paper, applying moderate pressure, and then assessing the amount of radioactive material on the swipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface are less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use swiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination. The levels may be averaged over one square meter provided the maximum surface activity in any area of 100 cm^2 is less than three times the value specified.

4.0 SURVEY OVERVIEW

Following remediation to levels less than the criteria for release for unrestricted use, a final survey of Building 318 will be conducted. The criteria for release for unrestricted use is typically specified in terms of total activity. However, since Table 3-1 provides criteria for both total and removable activity, compliance with both criteria will be demonstrated as part of this Final Survey Plan. The survey will include survey unit classification, systematic and/or random measurements, and surface scans. This Final Survey Plan is based in part on the guidance contained in the MARSSIM. In order to design the survey, several parameters must be set to ensure that the survey will stand up to and meet the statistical evaluations to justify the release of the facility. These include the establishment of the Data Quality Objectives, establishing the acceptable decision errors, and the calculation of the Relative Shift in order to determine the number of required measurements per survey unit.

4.1 Data Quality Objectives

To ensure the proper release of the facility, the objectives of this survey plan are:

- The selection of appropriate instrumentation to adequately detect the radionuclides of concern,
- Establish proper count times and measurement MDAs (Minimum Detectable Activities) to verify that the release criteria are met,
- Perform surveys to verify the radiological status of the facility,
- Ensure that criteria for release for unrestricted use are not exceeded, and
- Statistically evaluate the data to ensure that sufficient data has been collected to justify releasing Building 318 for unrestricted use.

Surveys and data evaluation will be based on the guidance in NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, and include measurements for direct surface activity, and removable activity.

4.2 Non Parametric Statistics

Compliance with the criteria for release for unrestricted use for building surfaces will be demonstrated by collected direct measurements and smears. Since these measurements are not radionuclide specific the Wilcoxon Rank Sum Test will be used to evaluate the resulting data. Each survey unit evaluated using the Wilcoxon Rank Sum Test will be compared to an appropriately chosen Reference Area.

4.3 Decision Error

There are two types of decision error applied to analytical results: Type I (α) and Type II (β) errors. A Type I error, or false positive, is the probability that a

survey result/measurement is above the release criteria when in fact it is not, while a Type II error, or false negative, is the probability of determining that a result/measurement is below the release criteria when it is not. The probability of making decision errors can be controlled by adopting an approach called hypothesis testing.

The null hypothesis (H_0) is treated like a baseline condition and is defined by MARSSIM as:

H_0 = residual radioactivity in the survey exceeds the release criterion.

This means that the site or survey area is assumed contaminated until proven otherwise. For the purpose of this Final Survey, both Type I (α) and Type II (β) will be set at 0.05 or 5 percent.

4.4 Relative Shift

The relative shift is defined as " Δ / σ " where "Δ" is the criteria for release for unrestricted use - LBGR (Lower Bound of the Gray Region) and " σ " is the standard deviation of the contaminant distribution. In order to calculate the relative shift, the criteria for release for unrestricted use must be determined and two assumptions made to estimate the LBGR and the standard deviation of the measurement distribution. MARSSIM suggests that the LBGR be set at approximately 50% of the criteria for release for unrestricted use but can be adjusted later to provide a value for the relative shift between the range of 1 to 3. The standard deviation may be calculated from preliminary survey data, prior surveys of similar areas and materials or the standard deviation of a reference background area. It should be noted that " σ " represents the standard deviation prior to release after all area decontamination is thought to be complete. If no reference data is available to make a reasonable estimate, MARSSIM suggests using 30% of the mean survey unit background.

4.5 Number of Samples/Measurements

The number of samples and/or measurements to be collected in each survey unit is dependent on the non parametric statistics to be used to test the null hypothesis, acceptable decision errors, and the relative shift. In cases where scanning sensitivities are not adequate to see the criteria for release for unrestricted use, the samples and measurements will need to be increased. Since non radionuclide specific direct beta measurements will be used to evaluate direct beta measurements on building surfaces they will be evaluated using the Wilcoxon Rank Sum Test. The Wilcoxon Rank Sum Test requires the evaluation off appropriately chosen reference areas.

Once the relative shift, Δ / σ, has been determined and the decision errors defined the Table in Attachment A can be used to determine the number of measurements required to evaluate a given survey unit. The interpolated value of N/2 gives the number of measurements required within a given survey unit. An equal number, N/2, of measurements are required from within the reference area.

4.6 Sample/Measurement Number Reasonableness

Once the number of measurements has been calculated, it must be determined whether or not the number is reasonable for the survey. It is possible, even if the MARSSIM guidance is strictly followed, that there are not enough samples to produce the desired level of ***"comfort"*** or the number appears to be excessive. This is performed on a case-by-case basis and if the number of Samples/measurements is not reasonable, then the data quality objectives or initial assumptions will be re-evaluated.

It must also be determined if the scanning MDA (beta) calculated in accordance with Section 6.2 of this plan exceeds the criteria for release for unrestricted use. If the scanning MDA exceeds the criteria for release for unrestricted use, the number of measurements to be collected in each survey unit may need to be increased to account for the lack of scanning sensitivity. However, it is not expected that the number of measurement in a given survey unit will need to be increased. Previous evaluations have shown that the instrumentation to be used for scanning during this final survey have MDAs less than the criteria for release for unrestricted use.

Because characterization survey data may be limited and insufficient to calculate the number of measurements, a minimum of 30 measurements in each survey unit will be required.

Because the background reference area should have the same number of survey points, 30 reference area measurements will also be obtained.

4.7 Elevated Measurements above the Criteria for Release

Measurements that exceed the criteria for release for unrestricted use will require that the area from which the result was obtained be evaluated using the criteria specified in Table 3-1. Specifically, the levels may be averaged over one square meter provided the maximum surface activity in any area of 100 cm^2 is less than three times the criteria for release for unrestricted use.

5.0 SURVEY DESIGN AND IMPLEMENTATION

The purpose of the survey is to collect sufficient survey data to demonstrate that Building 318 meets the criteria for release for unrestricted use. The project team will perform surveys according to project specific procedures and this Survey Plan. Implementation of this Survey Plan will include the following:

- Survey instrumentation will be set up and source checked to ensure proper operation.
- The Project Manager will perform preliminary inspections of the areas to identify additional specific survey requirements.
- The Project Manager will develop survey packages for the survey areas.
- The project team will grid the survey areas (Class I survey units only) as specified by the following survey protocols and/or mark the survey locations as applicable.
- The project team will take survey measurements and analyze samples using appropriate calibrated instruments and perform daily source and background checks before and after each day's work.
- Direct survey data collected during the project will be downloaded from the survey instrument into a database for storage and processing.
- The Project Manager will review the completed survey packages to ensure that all required surveys have been performed.
- The Project Manager will review the survey results to identify any areas exceeding the specified release criteria.

In order to support the final surveys of the building, the facility will be cleared of all loose equipment and materials to the maximum extent possible. Surveys will then be performed as follows:

5.1 Instrumentation and Selection

Selection and use of survey instrumentation will ensure sensitivities are sufficient to detect the identified radionuclides at the minimum detection requirements. Table 5-1 provides a list of the instruments, types of radiations detected and calibration sources, which will be utilized.

Duratek will use the Ludlum Model 2350 Data Logger with a variety of detectors for direct beta measurements and beta scans. The Data Logger is a portable microprocessor computer based counting instrument capable of operation with NaI(Tl) gamma scintillation, gas-flow proportional, GM and ZnS scintillation detectors.

Detector selection will depend upon the type of survey, surface contour and survey area size. The project team will typically use the 126 cm^2 gas-flow proportional detector for direct beta measurements for most areas and the 15.5 cm^2 GM detector for smaller areas in which the gas-flow proportional detector will not fit.

Analysis for removable beta activity will be performed using an Eberline BC-4 scaler counter.

Table 5-1
Survey Instrumentation

Ludlum Model 2350 wt. 43-68, 43-98 or 43-94 detector	Gas-flow proportional ($126cm^2$)	Beta	^{99}Tc (β) ^{230}Th (α)	Direct beta measurement and Beta scans.
Ludlum Model 2350 wt. 44-40 detector	Shielded GM (15.5cm5)	Beta	^{99}Tc (β)	Direct beta measurement and Beta scans.
Eberline BC-4 Scaler Counter	Shielded GM	Beta	^{99}Tc (β)	Smear counting

5.1.1 Instrument Calibration

The data loggers, associated detectors and all other portable instrumentation are calibrated on a semi-annual basis using National Institute of Standards and Technology (NIST) traceable sources and calibration equipment. Calibration typically includes:

- High Voltage calibration,
- Discriminator/threshold calibration,
- Window calibration,
- Alarm operation verification, and
- Scaler calibration verification

The detector calibration includes:

- Operating voltage determination,
- Calibration constant determination, and
- Dead time correction determination

Calibration labels showing the instrument identification number, calibration date and calibration due date are attached to all portable field instruments.

5.1.2 Sources

All sources used for calibration or efficiency determinations for the survey will be representative of the instrument's response to the identified radionuclides and are traceable to NIST.

Health Physics Technicians will control radioactive sources used for instrument response checks and efficiency determination. Sources will be stored securely and signed out when needed in the field. A source sign-out log will track the location of all sources when they are removed from the Duratek field office.

5.2 Survey Unit Classification

Survey units are discrete areas, consisting of building surfaces, of a specific size and shape for which separate decisions relative to the criteria for release for unrestricted use will be made. Survey units are defined based on the site's history, potential for residual contamination, and physical characteristics. All impacted areas are divided into survey units. Impacted areas are those areas with a potential of being contaminated. Non impacted areas are areas that do not have a potential for being contaminated and are not surveyed as part of the final survey.

Survey units are classified as Class1, 2, or 3. A Class 1 survey unit is a survey unit that has or had prior to remediation contamination levels approaching or exceeding the criteria for release for unrestricted use. A Class 2 survey unit is a survey unit that does not have contamination approaching or exceeding the criteria for release for unrestricted use. Typically Class 2 survey units are not remediated. If remediation is required the survey unit is reclassified as Class 1. A Class 3 survey unit is a survey unit is a survey unit that is not expected to contain contamination or is expected to contain contamination at a fraction (< 10 %) of the criteria for release for unrestricted use.

Survey units are limited in size to ensure adequate survey coverage. The type of measurements and scanning coverage is also defined for each survey unit classification. The size limits, measurements, and scanning frequency are specified in Table 5-2.

Table 5-2
Survey Units

Impacted Survey Unit Classification	Size Limit, m^2	Scan Frequency	Bldg 318 Initial Classification
Class 1 Building Surfaces	< 100	100 % coverage	Floors
Class 2 Building Surfaces/ sturctures	<1,000	10 – 100% coverage	*No areas will be initially calssified as 2*
Class 3 Building Surfaces/ structures	No limit	Judgement	Walls, ceilings and overhead structures

Based on the probability for contamination, the floors will initially be classified as Class 1, and the walls, ceilings, and overhead structures will be classified as Class 3 impacted.

It is possible that as remediation activities progress, in prepararion for the final survey, that some of the survey units initially classified as 3 may be reclassified to 2 or 1. It is also possible that additional survey units may be established.

Survey units may be reclassified when residual activity is encountered during the survey process. The following guidelines for reclassification will be applied:

- A Class 3 survey unit will be reclassified to a Class 2 survey unit when the average activity for the survey unit exceeds 25% of the criteria for unrestricted use in Table 3-2.

- A Class 2 survey unit will be reclassified to a Class 1 survey unit when the average activity for the survey unit exceeds 75% of the criteria for unrestricted use in Table 3-2.

5.3 Survey Package Development

For each survey area/unit, the project team will develop a package, or portfolio, by performing a walk-down and preparing a worksheet/tracking sheet outlining the general survey instructions, location codes, and any specific survey instructions for any abnormal conditions within the survey area. Completion and review signature blocks will be used to track the progress of the surveys.

During the survey, the project team will update the survey package(s) with the survey data and results of any special surveys or sample analyses performed.

5.4 Survey Protocols/Requirements

The final status survey of the building will consist of beta scans, fixed beta measurements, and smears for gross beta analysis. Surveys will be performed as follows:

5.4.1 Surface Beta Scans

For class 1 survey units, beta scans will be performed over 100% of the accessible building surfaces (interior) using a gas-flow proportional detector while listening to the audible output of the instrument. For class 2 survey units, beta scans will be performed over approximately 50% of the accessible building surfaces. For class 3 survey units, beta scans will be performed over approximately 10% of the accessible building surfaces. All areas of elevated activity will be identified for further investigation and potential decontamination. Any area exceeding the criteria for release for unrestricted use will be identified and decontaminated. Scan speeds will be established such that contamination at levels of approximately 50% of the criteria for release for unrestricted use will be detected.

5.4.2 Direct Beta Measurements

Direct beta measurement will be taken on the structural surfaces of Building 318 within each survey area/unit. The number of measurements and spacing will be determined in accordance with MARSSIM and this Plan.

Number of Measurements

Initially a minimum of 30 measurements will be used for each survey unit. If characterization data or survey data is available such that good confidence in the distribution of the activity can be assumed, the number

of measurement for each survey unit will be determined in accordance with section 4.5 of this plan. A relative shift of between 1 and 3 should be used, resulting in approximately 10-30 measurement per survey unit.

The number of measurements determined in accordance with section 4.5.1, N/2, represents the number of measurements to be collected from each survey unit. An equal number of measurements, N/2, needs to be collected from an appropriate reference area in order to evaluate the final survey data using the Wilcoxon Rank Sum Test.

5.4.3 Removable Activity Measurements

Smears will be taken at each direct measurement location for gross beta analysis.

5.4.4 Grid Spacing

The grid spacing for will be determined assuming a square grid pattern as follows:

$$L = \sqrt{\frac{A}{N}}$$

Where A = Survey unit Area
N = Number of measurements

Once the number of measurements and the grid spacing are determined, a starting point for the survey must be established for each survey unit. This will be performed by selecting a reference point for the survey unit such as the corner of the room and a random number generator providing a random number between 0 and 1 for an initial offset from the reference point in both the x and y coordinates. The random number pair will be multiplied by the calculated grid spacing providing the offset from the reference point for the first grid location.

Upon establishing the fist grid location, the calculated grid spacing will be used to establish a grid system throughout the survey unit.

Once gridded, it will verified that the number of grid locations satisfies the calculated number of measurements. If not, then smaller grid spacing will be used to ensure the appropriate number of measurements and samples are obtained.

5.5 Survey Records

The project team will maintain records of surveys in the survey packages for each area according to project procedures. The survey package may include the following records depending upon the survey design and protocols:

- Survey Package Worksheet giving the package identification, survey location information, general survey instructions and any specific survey instructions.
- Survey Unit Diagram of the area to be surveyed as available.
- Photographs of the survey area, as necessary, to show special or unique conditions.
- Printout of laboratory analysis results (if performed).
- Ludlum Model 2350 data files and associated spreadsheets for all radiation survey measurements.

Duratek will use a proprietary computer program to download the contents and survey data from the Data Loggers memory to a database and generate a survey report that presents all raw data, converted data, and information by survey location. The survey technician and supervisor will review these reports for completeness, accuracy, suspect entries and compare the data to the guideline values in Table 3-2.

Any changes to the database tables such as detector efficiency and background, that could affect survey results will require management approval. In addition, changes to data in the primary table will require a written explanation on a change request. The change request will be attached to the survey report and maintained as a permanent record.

Data and document control will include the maintenance of the raw data files, translated data files (spreadsheets) and documentation of all corrections made to the data. The databases will be backed up on a daily basis.

6.0 MINIMUM DETECTABLE ACTIVITY, MDA

Minimum Detectable Activity (MDA) is defined as the smallest amount or concentration of radioactive material that will yield a net positive count with a 5% probability of falsely interpreting background responses as true activity. The MDA is dependent upon count times, geometry, sample size, detector efficiency background, and for scanning the scanning rate and the efficiency of the surveyor.

The MDAs for direct beta measurements, and analyses for removable activity, will be set at 25 % or less of the criteria for release for unrestricted use. The MDA for beta scans will be set equal to or less then the appropriate criteria for release for unrestricted use. Since the MDA for scanning will be equal to or less than the criteria for release for unrestricted use, the scanning MDAs will not effect the number of measurements or samples required to evaluate a specific survey unit.

6.1 Direct Measurements

The equation used for calculating the MDA for direct measurements is:

$$MDA = \frac{\frac{2.71}{t_s} + 3.29\sqrt{\frac{R_b}{t_s} + \frac{R_b}{t_b}}}{E\left(\frac{A}{100}\right)}$$

Where:
- MDA = Minimum Detectable Activity (dpm/100 cm^2)
- R_b = Background Count Rate (cpm)
- t_b = Background Count Time (min)
- t_s = Sample Count Time (min)
- A = Detector Area (cm^2)
- E = Detector Efficiency (c/d)

6.2 Beta Scans

The equation used for calculating the MDA for beta scans is:

$$MDA = \frac{d' * \sqrt{b_i} * \frac{60}{i}}{E_i * E_s * \sqrt{p} * \frac{A}{100}}$$

Where:
- MDA = Minimum Detectable Activity (dpm/100 cm^2)
- d' = Decision error taken from Table 6-5 of MARSSIM
- i = Observation counting interval (scan speed divided by the detector width)
- b_i = Background count per observation interval
- E_I = Detector Efficiency (c/d)
- E_s = Surface Efficiency (typically around 50% for beta contamination on concrete)
- p = Surveyor Efficiency (typically 50%)
- A = Detector Area (cm^2)

7.0 DATA QUALITY ASSESSMENT AND EVALUATION

Once all the surveys are complete, the data will be assessed and evaluated to ensure that the criteria for release for unrestricted use was met. All areas exceeding the criteria for release for unrestricted use will be remediated, scanned and the survey unit re-surveyed. Once complete, the data will be evaluated following the methodology specified in MARSSIM and this Plan to re-calculate the number of measurements based on the survey standard deviation to ensure that the proper number of measurements was taken. If it is determined that enough data was not collected, the grid size may be reduced and the survey area re-gridded and re-surveyed as appropriate.

Provided an adequate number of measurements were taken and that NO measurements exceed the criteria for release for unrestricted use, the survey area/unit meets the requirements for release for unrestricted use and no further statistical tests are required. If there is data in excess of the criteria for release for unrestricted use, the area will be decontaminated unless an evaluation is made by the Project Manager showing that it is not necessary. In this case, the data must be statistically evaluated using non-parametric statistics and the elevated measurement evaluated against the criteria for elevated measurements.

If elevated measurements above the criteria for release for unrestricted use exist, an elevated measurement comparison must be performed in accordance with section 4.7 of this Plan; otherwise, the area will be decontaminated.

8.0 QUALITY ASSURANCE AND QUALITY CONTROL

Duratek's Quality Assurance/Quality Control Programs ensure that all quality and regulatory requirements are satisfied. All activities affecting quality are controlled by procedures and this plan. These documents include the following Quality Control measures as an integral part of the survey process.

8.1 Selection of Personnel

Project management and supervisory personnel are required to have extensive experience with Duratek procedures and be familiar with the requirements of MARSSIM and this Survey and Sampling Plan. Management must have prior experience with the radionuclide(s) of concern and a working knowledge of the instruments used to detect the radionuclides on site. Project management and supervision are required to maintain OSHA safety qualifications as safety is a primary concern of Duratek.

Duratek will select supervisory personnel to direct the survey based upon their experience and familiarity with the survey procedures and processes. Likewise, Health Physics technicians who will perform the surveys will be selected based upon their qualifications and experience.

8.2 Training

All project personnel will receive site-specific training to identify the specific hazards present in the work and survey areas. Training will also include a briefing and review of this Plan, Duratek procedures and the Site Safety and Health Plan.

During site orientation and training, survey personnel will become familiar with site emergency procedures. In the event of an emergency, personnel will act in accordance with all applicable site emergency procedures and the Site Safety and Health Plan.

8.3 Written Procedures

All survey tasks, which are essential to survey data quality, will be controlled by procedures and this plan.

8.4 Instrumentation Selection, Calibration and Operation

Duratek has selected instruments proven to reliably detect the radionuclides present at the facility. Duratek will calibrate instruments or qualified vendors under approved procedures using calibration sources traceable to the National Institute of Standards and Technology (NIST).

All instruments and detectors will be inspected and source checked daily when in use to verify proper operation. Control charts and/or source check criteria will be established at the beginning of the project for reference.

Procedures for calibration, maintenance, accountability, operation and quality control of radiation detection instruments implement the guidelines established in American National Standard Institute (ANSI) standard ANSI N323-1978 and ANSI N42.17A-1989.

8.5 Survey Documentation

Survey packages will be the primary method of controlling and tracking the hard copy records of survey results. Records of surveys will be documented and maintained in the survey package for each area according to Duratek procedures. Each survey measurement will be identified by the date, technician, instrument

type and serial number, detector type and serial number, location code, type of measurement, mode of instrument operation, and Quality Control (QC) sample number, as applicable.

8.6 Chain of Custody

Procedures establish responsibility for the custody of samples from the time of collection until results are obtained. If samples are shipped off site for analysis, they will be accompanied by a chain-of-custody record to track each sample.

8.7 Records Management

Generation, handling and storage of survey data packages are controlled by an approved procedure.

8.8 Duplicate Review of Survey Results

The survey package and survey data from each area will be reviewed by two separate people to verify all documentation is complete and accurate. This will include the surveyor and either the Project Manager or his designee.

9.0 SURVEY REPORT

Following the completion of the final survey, a Final Status Survey Report, documenting that Building 318 meets the criteria for release for unrestricted use, will be prepared and forwarded to the Army for their review and approval.

10.0 REFERENCES

10.1 NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, December 1997

10.2 NUREG-1727, *MNSS Decommissioning Standard Review Plan, September 2000*

10.3 Draft NUREG-1549, *Using Decision Methods for Dose Assessment to Comply with Radiological Criteria for License Termination*

10.4 Federal Register, Volume 63, No. 222, Wednesday, November 18, 1998, pages 64132-64134

10.5 Army Regulation 11-9, The Army Radiation Safety Program, Department of the Army, Washington, DC, May 1999

10.6 10 CFR20, Standards for Protection Against Radiation

ATTACHMENT A

Values for N/2 for a Given Relative Shift (Δ/σ) and decision errors α and β when a Contaminant is Present in the Background.

	α=0.01					α=0.025					α=0.05					α=0.1					α=0.25				
	β					β					β					β					B				
	0.01	0.025	0.05	0.1	0.25	0.01	0.025	0.05	0.1	0.25	0.01	0.025	0.05	0.1	0.25	0.01	0.025	0.05	0.1	0.25	0.01	0.025	0.05	0.1	0.25
0.1	5452	4627	3972	3278	2268	4627	3870	3273	2646	1748	3972	3273	2726	2157	1355	3278	2646	2157	1655	964	2268	1748	1355	964	459
0.2	1370	1163	998	824	370	1163	973	823	665	440	998	823	685	542	341	824	665	542	416	243	570	440	341	243	116
0.3	614	521	448	670	256	521	436	369	298	197	448	359	307	243	153	370	298	243	187	109	256	197	153	109	52
0.4	350	297	255	211	146	297	248	210	170	112	255	210	175	139	87	211	170	139	106	62	146	112	87	62	30
0.5	227	193	166	137	95	193	162	137	111	73	166	137	114	90	57	137	111	90	69	41	95	73	57	41	20
0.6	161	137	117	97	67	137	114	97	78	52	117	97	81	64	40	97	78	64	49	29	67	52	40	29	14
0.7	121	103	88	73	51	103	86	73	59	39	88	73	61	48	30	73	59	46	37	22	51	39	30	22	11
0.8	95	81	69	57	40	81	68	57	46	31	69	57	48	38	24	57	46	38	29	17	40	31	24	17	8
0.9	77	66	56	47	32	66	55	46	38	25	56	46	39	31	20	47	38	31	24	14	32	25	20	14	7
1.0	64	55	47	39	27	55	46	39	32	21	47	39	32	26	16	39	32	28	20	12	27	21	16	12	6
1.1	55	47	40	33	23	47	39	33	27	18	40	33	28	22	14	33	27	22	17	10	23	18	14	10	5
1.2	48	41	35	29	20	41	34	29	24	16	35	29	24	19	12	29	24	19	15	9	20	16	12	9	4
1.3	43	36	31	26	18	36	30	26	21	14	31	26	22	17	11	28	21	17	13	8	18	14	11	8	4
1.4	38	32	28	23	16	32	27	23	19	13	28	23	19	15	10	23	19	15	12	7	16	13	10	7	4
1.5	35	30	25	21	15	30	25	21	17	11	25	21	18	14	9	21	17	14	11	7	15	11	9	7	3
1.6	32	27	23	19	14	27	23	19	16	11	23	19	16	13	8	19	16	13	10	6	14	11	8	6	3
1.7	30	25	22	18	13	25	21	18	15	10	22	18	15	12	8	18	15	12	9	6	13	10	8	6	3
1.8	28	24	20	17	12	24	20	17	14	9	20	17	14	11	7	17	14	11	9	5	12	9	7	5	3
1.9	26	22	19	16	11	22	19	16	13	9	19	16	13	11	7	16	13	11	8	5	11	9	7	5	3
2.0	25	21	18	15	11	21	18	15	12	8	18	15	13	10	7	15	12	10	8	5	11	8	7	5	3
2.25	22	19	16	14	10	19	18	14	11	8	16	14	11	9	6	14	11	9	7	4	10	8	6	4	2
2.5	21	18	15	13	9	18	15	13	10	7	15	13	11	9	6	13	10	9	7	4	9	7	6	4	2
2.75	20	17	15	12	9	17	14	12	10	7	15	12	10	8	5	12	10	8	6	4	9	7	5	4	2
3.0	19	16	14	12	8	16	14	12	10	6	14	12	10	8	5	12	10	8	6	4	8	6	5	4	2
3.5	18	16	13	11	8	16	13	11	9	6	13	11	9	8	5	11	9	8	6	4	8	6	5	4	2
4.0	18	15	13	11	8	15	13	11	9	6	13	11	9	7	5	11	9	7	6	4	8	6	5	4	2

ATTACHMENT 3

PROCEDURE LIST

PA-DTK-CHM-205	SAMPLE PREPARATION FOR GAMMA SPECTRAL ANALYSIS
PA-DTK-DEC-201	OPERATION OF WALL AND FLOOR SCABBLERS
PA-DTK-DEC-203	HEPA VACUUM OPERATION
PA-DTK-DEC-204	OPERATION AND MAINTENANCE OF THE PENTEK-CORNER-CUTTER
PA-DTK-DEC-205	OPERATION AND MAINTENANCE OF THE SQUIRREL-III SCABBLER
PA-DTK-DEC-206	OPERATION, MAINTENANCE, AND DECONTAMINATION OF THE PENTEK VAC-PAC MODELS 6A & 9A
PA-DTK-DEC-207	OPERATION OF NORCLEAN VACUUM SYSTEMS
PA-DTK-DEC-301	DECONTAMINATION OF TOOLS, AREAS, AND EQUIPMENT
PA-DTK-DEC-303	DECONTAMINATION TECHNIQUES – SELECTION AND PRECAUTIONS
PA-DTK-DEC-305	RETURN AND RECEIPT OF DECONTAMINATION EQUIPMENT
PA-DTK-INST-201	OPERATION OF LUDLUM MODEL 2350 DATA LOGGERS
PA-DTK-INST-209	OPERATION OF THE LUDLUM MODEL 177 PORTABLE FRISKER
PA-DTK-INST-211	OPERATION OF EBERLINE BC-4 PORTABLE BETA COUNTER
PA-DTK-INST-216	OPERATION OF F&J LV-1 AND HV-1 AIR SAMPLES
PA-DTK-OPS-202	SELECTION AND USE OF PROTECTIVE CLOTHING
PA-DTK-OPS-208	RADIATION/HAZARDOUS WORK PERMITS
PA-DTK-OPS-303	POSTING AND RADIOLOGICALLY CONTROLLED AREAS
PA-DTK-OPS-304	ANALYSIS AND EVALUATION OF AIR SAMPLES
PA-DTK-RAM-103	UNCONDITIONAL RELEASE OF TOOLS, EQUIPMENT, AND WASTE MATERIALS
PA-DTK-RAM-106	SHIPMENT OF RADIOACTIVE MATERIAL
PA-DTK-RAM-107	PACKAGING OF RADIOACTIVE MATERIAL
PA-DTK-RP-001	FREE RELEASE OF ITEMS FROM RADIOLOGICALLY CONTROLLED AREAS.
PA-DTK-RSP-103	HEPA VENTILATION OPERATION
PA-DTK-RW-302	PACKAGING RADIOACTIVE WASTE FOR OFF-SITE PROCESSING
PA-DTK-RW-405	SHIPPING RADIOACTIVE – LSA & RADIOACTIVE – SCO TO DURATEK

NOTE: THE "PA" DESIGNATION DENOTES PROCEDURES PREPARED SPECIFICALLY FOR USE AT PICTINNY ARSENAL.

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Approvals Page

FINAL SURVEY REPORT
For the
TACOM - ARDEC
PICATINNY ARSENAL
BUILDING 318

Revision 0
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1.0 SITE INFORMATION

This report documents the results of a final survey performed in Building 318. Building 318 is part of the U.S. Army Armament Research, Development and Engineering Center (ARDEC) located at the Picatinny Arsenal in Dover, New Jersey. According to information provided by the Army, Building 318 was used to store equipment from other facilities and some of that equipment was determined to be contaminated with depleted uranium. The final survey was performed in August of 2002 following the removal of all contaminated equipment from the building. The final survey demonstrated that Building 318 met the criteria for release for unrestricted use.

1.1 Background Information

Building 318 is a single story, brick, high-bay structure that is approximately 30 ft wide by 130 ft long. The building had been partitioned at one end to provide an office space of about 30 ft by 30 ft. The remaining 3,000 square feet was used as storage space. Building 318 was used to store manufacturing equipment transferred from Frankfurt Arsenal several years ago. Much of this equipment was found to be contaminated with depleted uranium (DU). Of particular interest were three large pieces of contaminated equipment; a furnace, a roll mill machine, and a dynapak. Each of these pieces of equipment were contaminated, and due to their size, each of these pieces of equipment required dismantlement/sizing in order to move them. In addition to being contaminated with DU, the furnace was determined to contain asbestos, which required the use of a State of New Jersey licensed asbestos abatement contractor to aid in its dismantlement.

1.2 Radionuclides of Concern

The radionuclides of concern within Building 318 were those associated with depleted uranium. Depleted uranium consists of three naturally occurring, long lived uranium isotopes, uranium-234, uranium-235, and uranium-238. As compared to naturally occurring uranium, depleted uranium contains less uranium-234 and uranium-235. The relative fractions, in terms of activity of the three long-lived uranium isotopes in the depleted uranium at the Picatinny Arsenal were conservatively assumed to be:

- U-234 0.305
- U-235 0.013
- U-238 0.682

The half-lives of uranium-234, uranium-235, and uranium-238 are 2.44E5 years, 7.04E8 years, and 4.47E9 years respectively. Uranium-238 and uranium-234 are both members of the uranium decay chain and will eventually reach equilibrium. However the time required to reach equilibrium is measured in millenniums. Due to the half-lives involved, the relative ratios of the three uranium isotopes in depleted uranium will remain essentially constant.

While uranium-234 and uranium-238 are both members of the uranium decay chain, uranium-235 is a member of the actinium decay chain. Table 1-1 shows the first several radionuclides of the uranium decay chain and Table 1-2 shows the first several members of the actinium decay chain.

Table 1-1
Uranium Decay Chain
(partial)

Nuclide	Half Life	Major Radiations Energies (MeV) and intensities (%)		
		Alpha	Beta	Gamma
U-238	4.51E9 years	5.15 MeV 25% 4.20 MeV 75%		
Th-234	2.41E1 days		0.103 MeV 21% 0.193 MeV 79%	0.063MeV 3.5% 0.93 MeV 4.0%
Pa-234m*	1.17E0 min		2.29 MeV 98%	0.765 MeV 0.3% 1.001 MeV 0.6%
U-234	2.27E5 years	4.72 MeV 28% 4.77 MeV 72%		0.053 MeV 0.2%
Th-230	8.0E4 years	4.62 MeV 24% 4.68 Mev 76%		0.068 MeV 0.6% 0.142 MeV 0.1%

* In the above table the fact that Pa-235m undergoes an isomeric transition to its ground state approximately 0.13 % of the time is ignored.

Table 1-2
Actinium Decay Chain
(partial)

Nuclide	Half Life	Major Radiations Energies (MeV) and intensities (%)		
		Alpha	Beta	Gamma
U-235	7.1E8 years	4.37 MeV 18% 4.40 MeV 57% 4.58 MeV 8%		0.143 Mev 11% 0.185 MeV 54% 0.204 MeV 5%
Th-231	2.55E1 hours		0.140 MeV 45% 0.220 MeV 15% 0.305 MeV 40%	0.026 MeV 2% 0.084 MeV 10%
Pa-231	3.25E4 years	4.95 MeV 22% 5.01 MeV 24% 5.02 MeV 23%		0.027 MeV 6% 0.29 MeV 6%

Based on the relative fractions of the radionuclides associated with depleted uranium and their decay chains compliance with the criteria for release for unrestricted use for building surfaces was evaluated based on direct beta measurements collected using a detector calibrated using Tc-99. The use of a detector calibrated using Tc-99 was conservative considering the energy and yields of the beta particles emitted during the decay of depleted uranium.

2.0 ORGANIZATION AND RESPONSIBILITIES

Duratek implemented an integrated management approach during the remediation of Building 318 and subsequent final survey which included project management oversight and technical support. The full resources of Duratek's Bear Creek and Gallaher Road offices, including the professional engineering and quality assurance staffs, were available to support the Project Manager to ensure successful project execution and completion.

During the final survey the on-site survey team consisted of a Project Manager, a Radiological Engineer, and Senior HP Technician. These personnel were trained, qualified, and experienced in radiological survey procedures and had current HAZWOPER training.

2.1 Project Manager (On-site)

The Project Manager was the primary point of contact and interface between the Army and Duratek. The Project Manager had over 20 years of health physics experience including prior management experience. In addition the Project Manager was a Certified Health Physicist.

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He was responsible for the supervision and coordinate the daily activities including the overview of the final survey. In order to ensure regulatory compliance, he was qualified in the use of the survey instruments used and was familiar with the aspects of surveying as described in NUREG-1575 and this Survey Plan.

2.2 Radiological Engineer

The Radiological Engineer assisted the Project Manager in implementing the final survey and reviewing the resulting data. He also assisted the Health Physics Technician in performing Final Surveys and collecting necessary samples.

2.3 Health Physics (HP) Technician

The HP Technician was responsible for performing the final surveys and collecting samples as necessary. He was qualified in the use of the survey instruments and the performance of surveys in accordance with NUREG-1575 as well as this Final Survey Plan.

3.0 CRITERIA FOR RELEASE FOR UNRESTRICTED USE

Given that depleted uranium is the radionuclide of concern, the criteria for release for unrestricted use of Building 318 was 5000 dpm/100 cm^2 as specified in Table 5-2, "Surface Radioactivity Values" of Army Regulation 11-9, *The Army Radiation Safety Program*. This table is reproduced, in part, as Table 3-1. This criteria was applied to all building surfaces and all remaining permanent structures.

The criteria for release for unrestricted use of Building 318 approximates the site specific criteria of 5,500 dpm/100 cm^2 derived for use during the remediation of Building 611B. The criteria derived for Building 611B, which equates to an annual total effective dose equivalent of 25 mrem to a hypothetical member of the public, was based on a set of conservative assumptions. It was decided that there would be little benefit in deriving a site specific criteria for Building 318. The criteria specified in Table 5-2 of AR 11-9 (May 1999) was deemed to be reasonably conservative.

The criteria for release for unrestricted use is meant to apply to measurements of total activity (fixed plus removable). Typically the criteria for release for unrestricted use is derived, in part, by limiting the removable component of the total activity. In deriving the site specific criteria for Building 611B the removable component was limited to 10 percent of the total. For consistency, the removable component of the criteria for release for unrestricted use for Building 318 was limited to 10 percent of the 5,000 dpm/100 cm^2 limit for total activity or 500 dpm/100 cm^2. This was also deemed to be conservative as Table 5-2 of AR 11-9 allows removable activity of up to 1,000 dpm/100 cm^2.

Table 3-1
Criteria for Unrestricted Use
Surface Radioactivity Values in dpm/100cm²

Nuclide[a]	Removable[b,c]	Total (fixed + removable)[b,d]
^{nat}U, ^{235}U, ^{238}U, and associated decay products	1,000	5,000

a. This table is extracted from AR 11-9, and 10 CFR 835, appendix D. The values in this table apply to radioactive contamination deposited on, but not incorporated into the interior of, the contaminated item. Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, apply the limits established for alpha- and beta-gamma-emitting nuclides independently.
b. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
c. The amount of removable radioactive material per 100 cm^2 of surface activity should be determined by swiping the area with dry filter or soft absorbent paper, applying moderate pressure, and then assessing the amount of radioactive material on the swipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface are less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use swiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination. The levels may be averaged over one square meter provided the maximum surface activity in any area of 100 cm^2 is less than three times the value specified.

4.0 SURVEY OVERVIEW

Following remediation to levels less than the criteria for release for unrestricted use, a final survey of Building 318 was conducted. The criteria for release for unrestricted use is typically specified in terms of total activity. However, since Table 3-1 provides criteria for both total and removable activity, compliance with both criteria was demonstrated as part of the final survey. The final survey was performed in accordance with the Final Survey Plan for the TACOM – ARDEC Picatinny Arsenal Building 318. The Final Survey Plan was based in part on the guidance contained in the MARSSIM.

4.1 Data Quality Objectives

To ensure that the data collected during the final survey could be used to justify the release of Building 318 for unrestricted use the following objectives were established;

- Ensure that the instrumentation used during the survey can adequately detect the radionuclides of concern.
- Ensure that proper count times are established to meet the required minimum detectable activities.
- Ensure that the minimum detectable activities are set below the criteria for release for unrestricted use.
- Ensure that systematic surveys are performed and documented detailing the radiological status of Building 318.
- Ensure that the appropriate statistical analyses is performed on the results of the final survey.
- Ensure that criteria for release for unrestricted use was not exceeded.

The final surveys and the statistical analyses of the resulting data was based in part on the guidance in NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*. The final survey included measurements for total beta activity and measurements of removable beta activity.

4.2 Non Parametric Statistics

The final survey included measurements for total beta activity and measurements of removable beta activity. Since these measurements are not radionuclide specific the Wilcoxon Rank Sum Test was to be used, if required, to evaluate the resulting data. Each survey unit to be evaluated using the Wilcoxon Rank Sum Test was to be compared to an appropriately chosen Reference Area. However, since none of the final survey data exceeded the criteria for release for unrestricted use the use of non parametric statistics to evaluate the resulting data was not required.

4.3 Decision Error

There are two types of decision error applied to analytical results: Type I (α) and Type II (β) errors. A Type I error, or false positive, is the probability that a survey result/measurement is above the release criteria when in fact it is not, while a Type II error, or false negative, is the probability of determining that a result/measurement is below the release criteria when it is not. The probability of making decision errors can be controlled by adopting an approach called hypothesis testing.

The null hypothesis (H_0) is treated like a baseline condition and is defined by MARSSIM as:

H_0 = residual radioactivity in the survey exceeds the release criterion.

This means that the site or survey area is assumed contaminated until proven otherwise. For the purpose of this Final Survey, both Type I (α) and Type II (β) were set at 0.05 or 5 percent.

4.4 Relative Shift

The relative shift is defined as " Δ / σ " where "Δ" is the criteria for release for unrestricted use - LBGR (Lower Bound of the Gray Region) and " σ " is the standard deviation of the contaminant distribution. In order to calculate the relative shift, the criteria for release for unrestricted use must be determined and two assumptions made to estimate the LBGR and the standard deviation of the measurement distribution. MARSSIM suggests that the LBGR be set at approximately 50% of the criteria for release for unrestricted use but can be adjusted later to provide a value for the relative shift between the range of 1 to 3. The standard deviation may be calculated from preliminary survey data, prior surveys of similar areas and materials or the standard deviation of a reference background area. It should be noted that " σ " represents the standard deviation prior to release after all area decontamination is thought to be complete. Due to the lack surface contamination following the remediation of Building 318, insufficient data was available to properly evaluate the standard deviation of the contaminates distribution.

4.5 Number of Samples/Measurements

The number of samples and/or measurements to be collected in each survey unit was originally to be dependent on the non parametric statistics to be used to test the null hypothesis, acceptable decision errors, and the relative shift. However, estimating the relative shift proved difficult and it became apparent as the final survey progressed that the use of non parametric statistics, such as the Wilcoxon Rank Sum Test would not be required. The use of non parametric statistics is only required when individual measurements from a given survey unit exceed the criteria for release for unrestricted use and the mean of the measurements for the survey unit meet the criteria. For these reasons the minimum number of measurements in each survey unit was conservatively set at 30

5.0 SURVEY DESIGN AND IMPLEMENTATION

The purpose of the final survey was to collect sufficient survey data to demonstrate that Building 318 meets the criteria for release for unrestricted use. The project team performed the final survey in according to project specific procedures and the Final Survey Plan. Implementation of the Final Survey Plan included the following:

- Ensuring that all instrumentation was source checked daily prior to use to ensure proper operation.
- Having the Project Manager perform preliminary inspections of the areas to be surveyed to identify specific survey requirements.
- Develop survey packages detailing the survey requirements.
- Gridding or marking of survey measurement locations.
- Downloading of survey data stored in the data loggers to appropriate databases for storage and processing. Hard copies of each download were maintained with the survey packages.
- Having the Project Manager review the completed survey packages to ensure that all required surveys have been performed.
- Having the Project Manager review all survey results to identify any areas that may exceed the criteria for release for unrestricted use.

In order to support the final surveys of the building, the facility was cleared of all loose equipment and materials to the maximum extent possible prior to initiating the survey.

5.1 Instrumentation and Selection

The selection and use of survey instrumentation ensured that their sensitivities were sufficient to detect the identified radionuclides at the minimum detection requirements. Table 5-1 provides a list of the instruments used during the final survey.

The Ludlum Model 2350 Data Logger was used in combination with a large area gas flow proportional counter for obtaining measurements of total beta activity and performing beta scans. The Data Logger is a portable microprocessor computer based counting instrument.

Analysis for removable beta activity was performed using an Eberline BC-4.

Table 5-1
Survey Instrumentation

Ludlum Model 2350 with. 43-68 detector	Gas-flow proportional ($126cm^2$)	Beta	^{99}Tc (β)	Total Beta Measurement and Beta Scans.
Eberline BC-4	Shielded GM	Beta	^{99}Tc (β)	Smear Counting

5.1.1 Instrument Calibration

All instrumentation used during the final survey had been calibrated within the previous 6 months using National Institute of Standards and Technology (NIST) traceable sources and calibration equipment. As appropriate the calibration included:

- High Voltage calibration,
- Discriminator/threshold calibration,
- Window calibration,
- Alarm operation verification, and
- Scaler calibration verification
- Operating voltage determination,
- Calibration constant determination, and
- Dead time correction determination

Calibration labels showing the instrument identification number, calibration date and calibration due date were attached to all portable field instruments.

5.1.2 Sources

All sources used for calibration and efficiency determinations were chosen to be representative of the radionuclides of concern or chosen such that the resulting calibration and/or efficiency determination was conservative as compared to the radionuclides of concern. All sources used for calibrations and efficiency determinations were traceable to NIST.

5.2 Survey Unit Classification

All surfaces surveyed during the final survey were assigned to a specific survey area. Each survey area was then divided into survey units. Survey units are discrete areas, consisting of building surfaces, of a specific size and shape for which separate decisions relative to the criteria for release for unrestricted use will be made. Survey units were defined based on the site's history, potential for residual contamination, and physical characteristics.

Each survey unit was classified as either a Class1 or a Class 3 survey unit. A Class 1 survey unit is a survey unit that has or had prior to remediation contamination levels approaching or exceeding the criteria for release for unrestricted use. A Class 3 survey unit is a survey unit ~~is a survey unit~~ that is not expected to contain contamination or is expected to contain contamination at a fraction (< 10 %) of the criteria for release for unrestricted use.

None of the survey units were classified as a Class 2 survey unit. A Class 2 survey Unit is a survey unit not known or expected to have contamination approaching the criteria for release for unrestricted use.

Survey units are limited in size to ensure adequate survey coverage. The number of measurements and scanning coverage required during a final survey is defined for each survey unit classification. The size limits, measurements, and scanning frequency are specified in Table 5-2.

Table 5-2
Survey Units

Impacted Survey Unit Classification	**Size Limit, m^2**	**Scan Frequency**	**Bldg 318 Initial Classification**
Class 1 Building Surfaces	< 100	100 % coverage	Floors
Class 2 Building Surfaces/ structures	<1,000	10 – 100% coverage	*No areas were classified as Class 2*
Class 3 Building Surfaces/ structures	No limit	Judgement	Walls, ceilings and overhead structures

Based on the potential for contamination, all floors to be surveyed during the final survey were classified as Class 1. The walls, ceilings, and overhead structures were classified as Class 3.

The design of the final survey resulted in the creation of 2 survey areas subdivided into multiple survey units. Table 5-3 provides a general description of each of the survey units.

Table 5-3
Final Survey, Survey Units

Survey Area	Survey Unit	General Description	Area Classification
1	1	Office Area, Floor	Impacted, Class 1
1	2	Office Area, North, South, and West Walls	Impacted , Class 3
1	3	Office Area, East Wall and Overhead	Impacted, Class 3
2	1	High Bay, Floor #1	Impacted, Class 1
2	2	High Bay, Floor #2	Impacted, Class 1
2	3	High Bay, Floor #3	Impacted, Class 1
2	4	High Bay, Floor #4	Impacted, Class 1
2	5	Floor of Crawl Space Above Office Area	Impacted, Class 1
2	6	High Bay, North Wall	Impacted, Class 3
2	7	High Bay, East Wall and Upper West Wall	Impacted, Class 3
2	8	High Bay, South Wall	Impacted, Class 3
2	9	High Bay, West Wall	Impacted, Class 3
2	10	High Bay Overhead	Impacted, Class 3
2	11	Ventilation Ducts and Fans	Impacted, Class 3
2	12	High Bay, Pit	Impacted, Class 1

5.3 Survey Package Development

For each survey area/unit, the project team developed a survey package, or portfolio, by performing a walk-down and preparing a worksheet/tracking sheet outlining the general survey instructions, location codes, and any specific survey instructions for any abnormal conditions within the survey area.

5.4 Survey Protocols/Requirements

The final status survey of the Building 318 consisted of beta scans, measurements for total beta activity, and smears for gross beta analysis.

5.4.1 Surface Beta Scans

For class 1 survey units, beta scans were performed over 100% of the accessible building surfaces (interior) using a gas-flow proportional detector while listening to the audible output of the instrument. For class 3 survey units, beta scans were performed over approximately 10% of the accessible building surfaces. All areas of elevated activity were identified for further investigation. Scan speeds were established to ensure that contamination exceeding the criteria for release for unrestricted use would be detected.

5.4.2 Measurements for Total Beta Activity

Measurement for Total Beta Activity was taken on the structural surfaces of Building 318 within each survey area/unit. A minimum of 30 measurements were taken in each survey unit.

5.4.3 Removable Beta Activity Measurements

Smears were taken at each direct measurement location and analyzed for removable beta activity.

5.4.4 Grid Spacing

The grid spacing for those surfaces that were gridded was determined assuming a square grid pattern as follows:

$$L = \sqrt{\frac{A}{N}}$$

Where A = Survey unit Area
N = Number of measurements

Only the floors of Building 318 were gridded. In all other survey units the measurement locations were marked. In non gridded survey units the measurement locations were chosen to provide uniform coverage of the area being surveyed.

5.5 Survey Records

The project team maintained records of the final surveys in survey packages for each survey unit according to project procedures. The survey packages included the following:

- Survey Package Worksheet giving the package identification, survey location information, general survey instructions and any specific survey instructions.
- Survey Unit Diagram of the area to be surveyed as available.
- Photographs of the survey area to show special or unique conditions.
- Printout of laboratory analysis results (if performed).
- Ludlum Model 2350 Data Logger data files and associated spreadsheets.

Duratek used a proprietary computer program to download the contents of the data logger's memory to a database used to generate survey reports. The survey reports present raw data, converted data, and associated information. The survey technician and Project Manager reviewed these reports for completeness, accuracy, and suspect entries. The also compared the data to the criteria for release for unrestricted use.

6.0 MINIMUM DETECTABLE ACTIVITY, MDA

The Minimum Detectable Activity (MDA) is defined as the smallest amount or concentration of radioactive material that will yield a net positive count with a 5% probability of falsely interpreting background responses as true activity. The MDA is dependent upon count times, geometry, sample size, detector efficiency background, and for scanning the scanning rate and the efficiency of the surveyor.

The MDAs for direct beta measurements, and analyses for removable activity, was set at 25 % or less of the criteria for release for unrestricted use. The MDA for beta scans was equal to or less then the appropriate criteria for release for unrestricted use.

6.1 Direct Measurements

The equation used for calculating the MDA for direct measurements is:

$$MDA = \frac{\frac{2.71}{t_s} + 3.29\sqrt{\frac{R_b}{t_s} + \frac{R_b}{t_b}}}{E\left(\frac{A}{100}\right)}$$

Where: MDA = Minimum Detectable Activity (dpm/100 cm^2)
R_b = Background Count Rate (cpm)
t_b = Background Count Time (min)
t_s = Sample Count Time (min)
A = Detector Area (cm^2)
E = Detector Efficiency (c/d)

6.2 Beta Scans

The equation used for calculating the MDA for beta scans is:

$$MDA = \frac{d' * \sqrt{b_i} * \frac{60}{i}}{E_i * E_s * \sqrt{p} * \frac{A}{100}}$$

Where: MDA = Minimum Detectable Activity (dpm/100 cm^2)
d' = Decision error taken from Table 6-5 of MARSSIM
i = Observation counting interval (scan speed divided by the detector width)
b_i = Background count per observation interval
E_i = Detector Efficiency (c/d)
E_s = Surface Efficiency (typically around 50% for beta contamination on concrete)
p = Surveyor Efficiency (typically 50%)
A = Detector Area (cm^2)

7.0 SURVEY RESULTS

The results of the Final Survey are presented in the following sections. The results will be used to demonstrate that Building 318 meets the criteria for release for unrestricted use.

7.1 Measurements For Removable Beta Activity

A summary of the measurements for removable beta activity is provided in Table 7-1. Appendix A contains the individual measurement results.

Table 7-1
Removable Beta Activity

Survey Unit Number	Description	Number Of Meas	Mean dpm/100 cm^2	Stan Dev dpm/100 cm^2	Maximum dpm/100 cm^2	MDA dpm/100 cm^2
OF-1	Office Floor	30	15	34	84	129
OF-2	Office Walls	30	3	28	76	129
OF-3	Office Wall and Ceiling	30	15	32	76	129
HB-1	High Bay Floor	36	21	35	93	129
HB-2	High Bay Floor	36	14	37	93	129
HB-3	High Bay Floor	36	14	36	102	129
HB-4	High Bay Floor	36	15	37	111	129
HB-5	High Bay Attic Floor	30	7	33	84	129
HB-6	High Bay Wall	30	2	34	102	129
HB-7	High Bay Wall	30	9	33	76	129
HB-8	High Bay Wall	30	18	29	93	129
HB-9	High Bay Wall	30	9	25	49	129
HB-10	High Bay Overhead	30	23	38	111	129
HB-11	High Bay Vents	20	16	35	93	129
HB-12	High Bay Pit	30	13	35	102	129

As shown in Table 7-1, approximately 450 measurements for removable activity were performed as part of the final survey. None of the results exceeded the criteria for release for unrestricted use provided in Section 3.0. In fact none of the results exceeded the minimum detectable activity which as shown in Appendix A was approximately130 dpm/100 cm^2.

7.2 Measurements for Total Beta Activity

A summary of the measurements for total beta activity is provided in Table 7-2. Appendix B contains the individual measurement results.

Table 7-2
Total Beta Activity

Survey Unit Number	Description	Number Of Meas	Mean dpm/100 cm^2	Stan Dev dpm/100 cm^2	Maximum dpm/100 cm^2	MDA dpm/100 cm^2
OF-1	Office Floor	30	109	189	601	596
OF-2	Office Walls	30	339	458	1326	581
OF-3	Office Wall and Ceiling	30	178	244	780	562
HB-1	High Bay Floor	36	626	192	1115	617
HB-2	High Bay Floor	36	737	200	1081	620
HB-3	High Bay Floor	36	961	346	2281	615
HB-4	High Bay Floor	35	714	228	1347	533
HB-5	High Bay Attic Floor	30	89	223	716	602
HB-6	High Bay Wall	30	482	605	2915	644
HB-7	High Bay Wall	30	440	350	988	622
HB-8	High Bay Wall	30	329	334	1000	624
HB-9	High Bay Wall	29	135	222	658	571
HB-10	High Bay Overhead	31	81	214	488	558
HB-11	High Bay Vents	21	41	241	531	594
HB-12	High Bay Pit	30	518	170	767	600

As shown in Table 7-1, approximately 450 measurements for total beta activity were performed as part of the final survey. The results have not been corrected to account for the natural radioactivity found in most materials of construction. Previous experience has shown that the natural radioactivity contained in cement and bricks can contribute several hundred dpm/100 cm^2 to measurements of total beta activity.

None of the results exceeded the criteria for release for unrestricted use provided in Section 3.0. Since none of the results exceeded the criteria for release for unrestricted use, use of the Wilcoxon Rank Sum Test to demonstrate that the criteria for release for unrestricted use was not required. Therefore, no reference area measurements were collected for use in evaluating the Wilcoxon Rank Sum Test. The results of the total beta measurements are shown in Appendix B.

8.0 CONCLUSION

The results of the final survey documented in this Final Survey Report demonstrates that Building 318 meets the criteria for release for unrestricted use.

9.0 REFERENCES

9.1 NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), December 1997

9.2 NUREG-1727, MNSS Decommissioning Standard Review Plan, September 2000

9.3 Draft NUREG-1549, Using Decision Methods for Dose Assessment to Comply with Radiological Criteria for License Termination

9.4 Federal Register, Volume 63, No. 222, Wednesday, November 18, 1998, pages 64132-64134

9.5 Army Regulation 11-9, The Army Radiation Safety Program, Department of the Army, Washington, DC, May 1999

9.6 10 CFR20, Standards for Protection Against Radiation

9.7 Final Survey Plan for the TACOM – ARDEC Picatinny Arsenal Building 318, Revision 0, April 2002

ATTACHMENT A

Smear Results

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
Office Floor (SU #1)	8/11/02	1	20	25	22.5	0.5	16	31	129
Office Floor (SU #1)	8/11/02	2	20	25	22.5	0.5	7	-49	129
Office Floor (SU #1)	8/11/02	3	20	25	22.5	0.5	8	-40	129
Office Floor (SU #1)	8/11/02	4	20	25	22.5	0.5	17	40	129
Office Floor (SU #1)	8/11/02	5	20	25	22.5	0.5	13	4	129
Office Floor (SU #1)	8/11/02	6	20	25	22.5	0.5	12	-4	129
Office Floor (SU #1)	8/11/02	7	20	25	22.5	0.5	17	40	129
Office Floor (SU #1)	8/11/02	8	20	25	22.5	0.5	20	67	129
Office Floor (SU #1)	8/11/02	9	20	25	22.5	0.5	17	40	129
Office Floor (SU #1)	8/11/02	10	20	25	22.5	0.5	14	13	129
Office Floor (SU #1)	8/11/02	11	20	25	22.5	0.5	13	4	129
Office Floor (SU #1)	8/11/02	12	20	25	22.5	0.5	21	76	129
Office Floor (SU #1)	8/11/02	13	20	25	22.5	0.5	14	13	129
Office Floor (SU #1)	8/11/02	14	20	25	22.5	0.5	14	13	129
Office Floor (SU #1)	8/11/02	15	20	25	22.5	0.5	19	58	129
Office Floor (SU #1)	8/11/02	16	20	25	22.5	0.5	13	4	129
Office Floor (SU #1)	8/11/02	17	20	25	22.5	0.5	9	-31	129
Office Floor (SU #1)	8/11/02	18	20	25	22.5	0.5	15	22	129
Office Floor (SU #1)	8/11/02	19	20	25	22.5	0.5	9	-31	129
Office Floor (SU #1)	8/11/02	20	20	25	22.5	0.5	12	-4	129
Office Floor (SU #1)	8/11/02	21	20	25	22.5	0.5	10	-22	129
Office Floor (SU #1)	8/11/02	22	20	25	22.5	0.5	19	58	129
Office Floor (SU #1)	8/11/02	23	20	25	22.5	0.5	17	40	129
Office Floor (SU #1)	8/11/02	24	20	25	22.5	0.5	12	-4	129
Office Floor (SU #1)	8/11/02	25	20	25	22.5	0.5	11	-13	129
Office Floor (SU #1)	8/11/02	26	20	25	22.5	0.5	16	31	129
Office Floor (SU #1)	8/11/02	27	20	25	22.5	0.5	10	-22	129
Office Floor (SU #1)	8/11/02	28	20	25	22.5	0.5	13	4	129
Office Floor (SU #1)	8/11/02	29	20	25	22.5	0.5	22	84	129
Office Floor (SU #1)	8/11/02	30	20	25	22.5	0.5	14	13	129
							NUM	30	
							MEAN	15	
							STAN DEV	34	
							MAX	84	

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
Office Walls (SU #2)	8/11/02	1	20	25	22.5	0.5	16	31	129
Office Walls (SU #2)	8/11/02	2	20	25	22.5	0.5	16	31	129
Office Walls (SU #2)	8/11/02	3	20	25	22.5	0.5	13	4	129
Office Walls (SU #2)	8/11/02	4	20	25	22.5	0.5	13	4	129
Office Walls (SU #2)	8/11/02	5	20	25	22.5	0.5	14	13	129
Office Walls (SU #2)	8/11/02	6	20	25	22.5	0.5	10	-22	129
Office Walls (SU #2)	8/11/02	7	20	25	22.5	0.5	15	22	129
Office Walls (SU #2)	8/11/02	8	20	25	22.5	0.5	8	-40	129
Office Walls (SU #2)	8/11/02	9	20	25	22.5	0.5	21	76	129
Office Walls (SU #2)	8/11/02	10	20	25	22.5	0.5	13	4	129
Office Walls (SU #2)	8/11/02	11	20	25	22.5	0.5	11	-13	129
Office Walls (SU #2)	8/11/02	12	20	25	22.5	0.5	13	4	129
Office Walls (SU #2)	8/11/02	13	20	25	22.5	0.5	17	40	129
Office Walls (SU #2)	8/11/02	14	20	25	22.5	0.5	15	22	129
Office Walls (SU #2)	8/11/02	15	20	25	22.5	0.5	11	-13	129
Office Walls (SU #2)	8/11/02	16	20	25	22.5	0.5	11	-13	129
Office Walls (SU #2)	8/11/02	17	20	25	22.5	0.5	9	-31	129
Office Walls (SU #2)	8/11/02	18	20	25	22.5	0.5	17	40	129
Office Walls (SU #2)	8/11/02	19	20	25	22.5	0.5	12	-4	129
Office Walls (SU #2)	8/11/02	20	20	25	22.5	0.5	14	13	129
Office Walls (SU #2)	8/11/02	21	20	25	22.5	0.5	6	-58	129
Office Walls (SU #2)	8/11/02	22	20	25	22.5	0.5	10	-22	129
Office Walls (SU #2)	8/11/02	23	20	25	22.5	0.5	12	-4	129
Office Walls (SU #2)	8/11/02	24	20	25	22.5	0.5	14	13	129
Office Walls (SU #2)	8/11/02	25	20	25	22.5	0.5	13	4	129
Office Walls (SU #2)	8/11/02	26	20	25	22.5	0.5	11	-13	129
Office Walls (SU #2)	8/11/02	27	20	25	22.5	0.5	11	-13	129
Office Walls (SU #2)	8/11/02	28	20	25	22.5	0.5	15	22	129
Office Walls (SU #2)	8/11/02	29	20	25	22.5	0.5	15	22	129
Office Walls (SU #2)	8/11/02	30	20	25	22.5	0.5	9	-31	129
							NUM	30	
							MEAN	3	
							STAN DEV	28	
							MAX	76	

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
Office Wall & Ceiling (SU #3)	8/11/02	1	20	25	22.5	0.5	18	49	129
Office Wall & Ceiling (SU #3)	8/11/02	2	20	25	22.5	0.5	16	31	129
Office Wall & Ceiling (SU #3)	8/11/02	3	20	25	22.5	0.5	12	-4	129
Office Wall & Ceiling (SU #3)	8/11/02	4	20	25	22.5	0.5	16	31	129
Office Wall & Ceiling (SU #3)	8/11/02	5	20	25	22.5	0.5	17	40	129
Office Wall & Ceiling (SU #3)	8/11/02	6	20	25	22.5	0.5	13	4	129
Office Wall & Ceiling (SU #3)	8/11/02	7	20	25	22.5	0.5	7	-49	129
Office Wall & Ceiling (SU #3)	8/11/02	8	20	25	22.5	0.5	12	-4	129
Office Wall & Ceiling (SU #3)	8/11/02	9	20	25	22.5	0.5	15	22	129
Office Wall & Ceiling (SU #3)	8/11/02	10	20	25	22.5	0.5	12	-4	129
Office Wall & Ceiling (SU #3)	8/11/02	11	20	25	22.5	0.5	15	22	129
Office Wall & Ceiling (SU #3)	8/11/02	12	20	25	22.5	0.5	11	-13	129
Office Wall & Ceiling (SU #3)	8/11/02	13	20	25	22.5	0.5	14	13	129
Office Wall & Ceiling (SU #3)	8/11/02	14	20	25	22.5	0.5	21	76	129
Office Wall & Ceiling (SU #3)	8/11/02	15	20	25	22.5	0.5	19	58	129
Office Wall & Ceiling (SU #3)	8/11/02	16	20	25	22.5	0.5	15	22	129
Office Wall & Ceiling (SU #3)	8/11/02	17	20	25	22.5	0.5	18	49	129
Office Wall & Ceiling (SU #3)	8/11/02	18	20	25	22.5	0.5	5	-67	129
Office Wall & Ceiling (SU #3)	8/11/02	19	20	25	22.5	0.5	13	4	129
Office Wall & Ceiling (SU #3)	8/11/02	20	20	25	22.5	0.5	14	13	129
Office Wall & Ceiling (SU #3)	8/11/02	21	20	25	22.5	0.5	15	22	129
Office Wall & Ceiling (SU #3)	8/11/02	22	20	25	22.5	0.5	17	40	129
Office Wall & Ceiling (SU #3)	8/11/02	23	20	25	22.5	0.5	11	-13	129
Office Wall & Ceiling (SU #3)	8/11/02	24	20	25	22.5	0.5	8	-40	129
Office Wall & Ceiling (SU #3)	8/11/02	25	20	25	22.5	0.5	12	-4	129
Office Wall & Ceiling (SU #3)	8/11/02	26	20	25	22.5	0.5	13	4	129
Office Wall & Ceiling (SU #3)	8/11/02	27	20	25	22.5	0.5	14	13	129
Office Wall & Ceiling (SU #3)	8/11/02	28	20	25	22.5	0.5	18	49	129
Office Wall & Ceiling (SU #3)	8/11/02	29	20	25	22.5	0.5	18	49	129
Office Wall & Ceiling (SU #3)	8/11/02	30	20	25	22.5	0.5	17	40	129

NUM	30
MEAN	15
STAN DEV	32
MAX	76

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Floor (SU #1)	8/10/02	1	20	25	22.5	0.5	22	84	129
HB Floor (SU #1)	8/10/02	2	20	25	22.5	0.5	15	22	129
HB Floor (SU #1)	8/10/02	3	20	25	22.5	0.5	15	22	129
HB Floor (SU #1)	8/10/02	4	20	25	22.5	0.5	12	-4	129
HB Floor (SU #1)	8/10/02	5	20	25	22.5	0.5	16	31	129
HB Floor (SU #1)	8/10/02	6	20	25	22.5	0.5	10	-22	129
HB Floor (SU #1)	8/10/02	7	20	25	22.5	0.5	22	84	129
HB Floor (SU #1)	8/10/02	8	20	25	22.5	0.5	12	-4	129
HB Floor (SU #1)	8/10/02	9	20	25	22.5	0.5	12	-4	129
HB Floor (SU #1)	8/10/02	10	20	25	22.5	0.5	17	40	129
HB Floor (SU #1)	8/10/02	11	20	25	22.5	0.5	13	4	129
HB Floor (SU #1)	8/10/02	12	20	25	22.5	0.5	14	13	129
HB Floor (SU #1)	8/10/02	13	20	25	22.5	0.5	12	-4	129
HB Floor (SU #1)	8/10/02	14	20	25	22.5	0.5	14	13	129
HB Floor (SU #1)	8/10/02	15	20	25	22.5	0.5	16	31	129
HB Floor (SU #1)	8/10/02	16	20	25	22.5	0.5	14	13	129
HB Floor (SU #1)	8/10/02	17	20	25	22.5	0.5	14	13	129
HB Floor (SU #1)	8/10/02	18	20	25	22.5	0.5	9	-31	129
HB Floor (SU #1)	8/10/02	19	20	25	22.5	0.5	23	93	129
HB Floor (SU #1)	8/10/02	20	20	25	22.5	0.5	14	13	129
HB Floor (SU #1)	8/10/02	21	20	25	22.5	0.5	15	22	129
HB Floor (SU #1)	8/10/02	22	20	25	22.5	0.5	10	-22	129
HB Floor (SU #1)	8/10/02	23	20	25	22.5	0.5	18	49	129
HB Floor (SU #1)	8/10/02	24	20	25	22.5	0.5	17	40	129
HB Floor (SU #1)	8/10/02	25	20	25	22.5	0.5	23	93	129
HB Floor (SU #1)	8/10/02	26	20	25	22.5	0.5	19	58	129
HB Floor (SU #1)	8/10/02	27	20	25	22.5	0.5	17	40	129
HB Floor (SU #1)	8/10/02	28	20	25	22.5	0.5	8	-40	129
HB Floor (SU #1)	8/10/02	29	20	25	22.5	0.5	16	31	129
HB Floor (SU #1)	8/10/02	30	20	25	22.5	0.5	12	-4	129
HB Floor (SU #1)	8/10/02	31	20	25	22.5	0.5	13	4	129
HB Floor (SU #1)	8/10/02	32	20	25	22.5	0.5	9	-31	129
HB Floor (SU #1)	8/10/02	33	20	25	22.5	0.5	18	49	129
HB Floor (SU #1)	8/10/02	34	20	25	22.5	0.5	18	49	129
HB Floor (SU #1)	8/10/02	35	20	25	22.5	0.5	11	-13	129
HB Floor (SU #1)	8/10/02	36	20	25	22.5	0.5	15	22	129

NUM	36
MEAN	21
STAN DEV	35
MAX	93

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Floor (SU #2)	8/10/02	1	20	25	22.5	0.5	10	-22	129
HB Floor (SU #2)	8/10/02	2	20	25	22.5	0.5	19	58	129
HB Floor (SU #2)	8/10/02	3	20	25	22.5	0.5	8	-40	129
HB Floor (SU #2)	8/10/02	4	20	25	22.5	0.5	16	31	129
HB Floor (SU #2)	8/10/02	5	20	25	22.5	0.5	15	22	129
HB Floor (SU #2)	8/10/02	6	20	25	22.5	0.5	22	84	129
HB Floor (SU #2)	8/10/02	7	20	25	22.5	0.5	18	49	129
HB Floor (SU #2)	8/10/02	8	20	25	22.5	0.5	11	-13	129
HB Floor (SU #2)	8/10/02	9	20	25	22.5	0.5	16	31	129
HB Floor (SU #2)	8/10/02	10	20	25	22.5	0.5	14	13	129
HB Floor (SU #2)	8/10/02	11	20	25	22.5	0.5	7	-49	129
HB Floor (SU #2)	8/10/02	12	20	25	22.5	0.5	20	67	129
HB Floor (SU #2)	8/10/02	13	20	25	22.5	0.5	16	31	129
HB Floor (SU #2)	8/10/02	14	20	25	22.5	0.5	12	-4	129
HB Floor (SU #2)	8/10/02	15	20	25	22.5	0.5	16	31	129
HB Floor (SU #2)	8/10/02	16	20	25	22.5	0.5	10	-22	129
HB Floor (SU #2)	8/10/02	17	20	25	22.5	0.5	13	4	129
HB Floor (SU #2)	8/10/02	18	20	25	22.5	0.5	17	40	129
HB Floor (SU #2)	8/10/02	19	20	25	22.5	0.5	17	40	129
HB Floor (SU #2)	8/10/02	20	20	25	22.5	0.5	10	-22	129
HB Floor (SU #2)	8/10/02	21	20	25	22.5	0.5	23	93	129
HB Floor (SU #2)	8/10/02	22	20	25	22.5	0.5	20	67	129
HB Floor (SU #2)	8/10/02	23	20	25	22.5	0.5	14	13	129
HB Floor (SU #2)	8/10/02	24	20	25	22.5	0.5	20	67	129
HB Floor (SU #2)	8/10/02	25	20	25	22.5	0.5	10	-22	129
HB Floor (SU #2)	8/10/02	26	20	25	22.5	0.5	15	22	129
HB Floor (SU #2)	8/10/02	27	20	25	22.5	0.5	11	-13	129
HB Floor (SU #2)	8/10/02	28	20	25	22.5	0.5	12	-4	129
HB Floor (SU #2)	8/10/02	29	20	25	22.5	0.5	12	-4	129
HB Floor (SU #2)	8/10/02	30	20	25	22.5	0.5	6	-58	129
HB Floor (SU #2)	8/10/02	31	20	25	22.5	0.5	10	-22	129
HB Floor (SU #2)	8/10/02	32	20	25	22.5	0.5	14	13	129
HB Floor (SU #2)	8/10/02	33	20	25	22.5	0.5	12	-4	129
HB Floor (SU #2)	8/10/02	34	20	25	22.5	0.5	11	-13	129
HB Floor (SU #2)	8/10/02	35	20	25	22.5	0.5	14	13	129
HB Floor (SU #2)	8/10/02	38	20	25	22.5	0.5	17	40	129
							NUM	36	
							MEAN	14	
							STAN DEV	37	
							MAX	93	

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Floor (SU #3)	8/10/02	1	20	25	22.5	0.5	14	13	129
HB Floor (SU #3)	8/10/02	2	20	25	22.5	0.5	15	22	129
HB Floor (SU #3)	8/10/02	3	20	25	22.5	0.5	13	4	129
HB Floor (SU #3)	8/10/02	4	20	25	22.5	0.5	13	4	129
HB Floor (SU #3)	8/10/02	5	20	25	22.5	0.5	17	40	129
HB Floor (SU #3)	8/10/02	6	20	25	22.5	0.5	24	102	129
HB Floor (SU #3)	8/10/02	7	20	25	22.5	0.5	18	49	129
HB Floor (SU #3)	8/10/02	8	20	25	22.5	0.5	10	-22	129
HB Floor (SU #3)	8/10/02	9	20	25	22.5	0.5	9	-31	129
HB Floor (SU #3)	8/10/02	10	20	25	22.5	0.5	11	-13	129
HB Floor (SU #3)	8/10/02	11	20	25	22.5	0.5	12	-4	129
HB Floor (SU #3)	8/10/02	12	20	25	22.5	0.5	16	31	129
HB Floor (SU #3)	8/10/02	13	20	25	22.5	0.5	17	40	129
HB Floor (SU #3)	8/10/02	14	20	25	22.5	0.5	14	13	129
HB Floor (SU #3)	8/10/02	15	20	25	22.5	0.5	22	84	129
HB Floor (SU #3)	8/10/02	16	20	25	22.5	0.5	19	58	129
HB Floor (SU #3)	8/10/02	17	20	25	22.5	0.5	11	-13	129
HB Floor (SU #3)	8/10/02	18	20	25	22.5	0.5	11	-13	129
HB Floor (SU #3)	8/10/02	19	20	25	22.5	0.5	7	-49	129
HB Floor (SU #3)	8/10/02	20	20	25	22.5	0.5	12	-4	129
HB Floor (SU #3)	8/10/02	21	20	25	22.5	0.5	20	67	129
HB Floor (SU #3)	8/10/02	22	20	25	22.5	0.5	8	-40	129
HB Floor (SU #3)	8/10/02	23	20	25	22.5	0.5	11	-13	129
HB Floor (SU #3)	8/10/02	24	20	25	22.5	0.5	16	31	129
HB Floor (SU #3)	8/10/02	25	20	25	22.5	0.5	8	-40	129
HB Floor (SU #3)	8/10/02	26	20	25	22.5	0.5	17	40	129
HB Floor (SU #3)	8/10/02	27	20	25	22.5	0.5	16	31	129
HB Floor (SU #3)	8/10/02	28	20	25	22.5	0.5	11	-13	129
HB Floor (SU #3)	8/10/02	29	20	25	22.5	0.5	16	31	129
HB Floor (SU #3)	8/10/02	30	20	25	22.5	0.5	14	13	129
HB Floor (SU #3)	8/10/02	31	20	25	22.5	0.5	10	-22	129
HB Floor (SU #3)	8/10/02	32	20	25	22.5	0.5	19	58	129
HB Floor (SU #3)	8/10/02	33	20	25	22.5	0.5	13	4	129
HB Floor (SU #3)	8/10/02	34	20	25	22.5	0.5	17	40	129
HB Floor (SU #3)	8/10/02	35	20	25	22.5	0.5	11	-13	129
HB Floor (SU #3)	8/10/02	36	20	25	22.5	0.5	13	4	129

NUM	36
MEAN	14
STAN DEV	36
MAX	102

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Floor (SU #4)	8/10/02	1	20	25	22.5	0.5	10	-22	129
HB Floor (SU #4)	8/10/02	2	20	25	22.5	0.5	14	13	129
HB Floor (SU #4)	8/10/02	3	20	25	22.5	0.5	14	13	129
HB Floor (SU #4)	8/10/02	4	20	25	22.5	0.5	14	13	129
HB Floor (SU #4)	8/10/02	5	20	25	22.5	0.5	17	40	129
HB Floor (SU #4)	8/10/02	6	20	25	22.5	0.5	19	58	129
HB Floor (SU #4)	8/10/02	7	20	25	22.5	0.5	12	-4	129
HB Floor (SU #4)	8/10/02	8	20	25	22.5	0.5	11	-13	129
HB Floor (SU #4)	8/10/02	9	20	25	22.5	0.5	11	-13	129
HB Floor (SU #4)	8/10/02	10	20	25	22.5	0.5	7	-49	129
HB Floor (SU #4)	8/10/02	11	20	25	22.5	0.5	11	-13	129
HB Floor (SU #4)	8/10/02	12	20	25	22.5	0.5	14	13	129
HB Floor (SU #4)	8/10/02	13	20	25	22.5	0.5	16	31	129
HB Floor (SU #4)	8/10/02	14	20	25	22.5	0.5	20	67	129
HB Floor (SU #4)	8/10/02	15	20	25	22.5	0.5	12	-4	129
HB Floor (SU #4)	8/10/02	16	20	25	22.5	0.5	7	-49	129
HB Floor (SU #4)	8/10/02	17	20	25	22.5	0.5	13	4	129
HB Floor (SU #4)	8/10/02	18	20	25	22.5	0.5	9	-31	129
HB Floor (SU #4)	8/10/02	19	20	25	22.5	0.5	18	49	129
HB Floor (SU #4)	8/10/02	20	20	25	22.5	0.5	11	-13	129
HB Floor (SU #4)	8/10/02	21	20	25	22.5	0.5	24	102	129
HB Floor (SU #4)	8/10/02	22	20	25	22.5	0.5	15	22	129
HB Floor (SU #4)	8/10/02	23	20	25	22.5	0.5	8	-40	129
HB Floor (SU #4)	8/10/02	24	20	25	22.5	0.5	19	58	129
HB Floor (SU #4)	8/10/02	25	20	25	22.5	0.5	15	22	129
HB Floor (SU #4)	8/10/02	26	20	25	22.5	0.5	17	40	129
HB Floor (SU #4)	8/10/02	27	20	25	22.5	0.5	14	13	129
HB Floor (SU #4)	8/10/02	28	20	25	22.5	0.5	17	40	129
HB Floor (SU #4)	8/10/02	29	20	25	22.5	0.5	14	13	129
HB Floor (SU #4)	8/10/02	30	20	25	22.5	0.5	12	-4	129
HB Floor (SU #4)	8/10/02	31	20	25	22.5	0.5	16	31	129
HB Floor (SU #4)	8/10/02	32	20	25	22.5	0.5	14	13	129
HB Floor (SU #4)	8/10/02	33	20	25	22.5	0.5	25	111	129
HB Floor (SU #4)	8/10/02	34	20	25	22.5	0.5	17	40	129
HB Floor (SU #4)	8/10/02	35	20	25	22.5	0.5	10	-22	129
HB Floor (SU #4)	8/10/02	36	20	25	22.5	0.5	15	22	129

NUM	36
MEAN	15
STAN DEV	37
MAX	111

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Attic Floor (SU #5)	8/11/02	1	20	25	22.5	0.5	9	-31	129
HB Attic Floor (SU #5)	8/11/02	2	20	25	22.5	0.5	12	-4	129
HB Attic Floor (SU #5)	8/11/02	3	20	25	22.5	0.5	12	-4	129
HB Attic Floor (SU #5)	8/11/02	4	20	25	22.5	0.5	13	4	129
HB Attic Floor (SU #5)	8/11/02	5	20	25	22.5	0.5	8	-40	129
HB Attic Floor (SU #5)	8/11/02	6	20	25	22.5	0.5	18	49	129
HB Attic Floor (SU #5)	8/11/02	7	20	25	22.5	0.5	22	84	129
HB Attic Floor (SU #5)	8/11/02	8	20	25	22.5	0.5	13	4	129
HB Attic Floor (SU #5)	8/11/02	9	20	25	22.5	0.5	10	-22	129
HB Attic Floor (SU #5)	8/11/02	10	20	25	22.5	0.5	16	31	129
HB Attic Floor (SU #5)	8/11/02	11	20	25	22.5	0.5	12	-4	129
HB Attic Floor (SU #5)	8/11/02	12	20	25	22.5	0.5	14	13	129
HB Attic Floor (SU #5)	8/11/02	13	20	25	22.5	0.5	11	-13	129
HB Attic Floor (SU #5)	8/11/02	14	20	25	22.5	0.5	12	-4	129
HB Attic Floor (SU #5)	8/11/02	15	20	25	22.5	0.5	18	49	129
HB Attic Floor (SU #5)	8/11/02	16	20	25	22.5	0.5	14	13	129
HB Attic Floor (SU #5)	8/11/02	17	20	25	22.5	0.5	15	22	129
HB Attic Floor (SU #5)	8/11/02	18	20	25	22.5	0.5	19	58	129
HB Attic Floor (SU #5)	8/11/02	19	20	25	22.5	0.5	20	67	129
HB Attic Floor (SU #5)	8/11/02	20	20	25	22.5	0.5	19	58	129
HB Attic Floor (SU #5)	8/11/02	21	20	25	22.5	0.5	12	-4	129
HB Attic Floor (SU #5)	8/11/02	22	20	25	22.5	0.5	15	22	129
HB Attic Floor (SU #5)	8/11/02	23	20	25	22.5	0.5	11	-13	129
HB Attic Floor (SU #5)	8/11/02	24	20	25	22.5	0.5	12	-4	129
HB Attic Floor (SU #5)	8/11/02	25	20	25	22.5	0.5	10	-22	129
HB Attic Floor (SU #5)	8/11/02	26	20	25	22.5	0.5	13	4	129
HB Attic Floor (SU #5)	8/11/02	27	20	25	22.5	0.5	9	-31	129
HB Attic Floor (SU #5)	8/11/02	28	20	25	22.5	0.5	7	-49	129
HB Attic Floor (SU #5)	8/11/02	29	20	25	22.5	0.5	11	-13	129
HB Attic Floor (SU #5)	8/11/02	30	20	25	22.5	0.5	12	-4	129

NUM	30
MEAN	7
STAN DEV	33
MAX	84

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Wall (SU #6)	8/10/02	1	20	25	22.5	0.5	17	40	129
HB Wall (SU #6)	8/10/02	2	20	25	22.5	0.5	12	-4	129
HB Wall (SU #6)	8/10/02	3	20	25	22.5	0.5	21	76	129
HB Wall (SU #6)	8/10/02	4	20	25	22.5	0.5	12	-4	129
HB Wall (SU #6)	8/10/02	5	20	25	22.5	0.5	13	4	129
HB Wall (SU #6)	8/10/02	6	20	25	22.5	0.5	16	31	129
HB Wall (SU #6)	8/10/02	7	20	25	22.5	0.5	11	-13	129
HB Wall (SU #6)	8/10/02	8	20	25	22.5	0.5	8	-40	129
HB Wall (SU #6)	8/10/02	9	20	25	22.5	0.5	14	13	129
HB Wall (SU #6)	8/10/02	10	20	25	22.5	0.5	12	-4	129
HB Wall (SU #6)	8/10/02	11	20	25	22.5	0.5	9	-31	129
HB Wall (SU #6)	8/10/02	12	20	25	22.5	0.5	18	49	129
HB Wall (SU #6)	8/10/02	13	20	25	22.5	0.5	9	-31	129
HB Wall (SU #6)	8/10/02	14	20	25	22.5	0.5	15	22	129
HB Wall (SU #6)	8/10/02	15	20	25	22.5	0.5	13	4	129
HB Wall (SU #6)	8/10/02	16	20	25	22.5	0.5	11	-13	129
HB Wall (SU #6)	8/10/02	17	20	25	22.5	0.5	10	-22	129
HB Wall (SU #6)	8/10/02	18	20	25	22.5	0.5	14	13	129
HB Wall (SU #6)	8/10/02	19	20	25	22.5	0.5	14	13	129
HB Wall (SU #6)	8/10/02	20	20	25	22.5	0.5	13	4	129
HB Wall (SU #6)	8/10/02	21	20	25	22.5	0.5	11	-13	129
HB Wall (SU #6)	8/10/02	22	20	25	22.5	0.5	10	-22	129
HB Wall (SU #6)	8/10/02	23	20	25	22.5	0.5	11	-13	129
HB Wall (SU #6)	8/10/02	24	20	25	22.5	0.5	16	31	129
HB Wall (SU #6)	8/10/02	25	20	25	22.5	0.5	10	-22	129
HB Wall (SU #6)	8/10/02	26	20	25	22.5	0.5	8	-40	129
HB Wall (SU #6)	8/10/02	27	20	25	22.5	0.5	7	-49	129
HB Wall (SU #6)	8/10/02	28	20	25	22.5	0.5	13	4	129
HB Wall (SU #6)	8/10/02	29	20	25	22.5	0.5	24	102	129
HB Wall (SU #6)	8/10/02	30	20	25	22.5	0.5	10	-22	129

NUM	30
MEAN	2
STAN DEV	34
MAX	102

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Wall (SU #7)	8/10/02	1	20	25	22.5	0.5	8	-40	129
HB Wall (SU #7)	8/10/02	2	20	25	22.5	0.5	21	76	129
HB Wall (SU #7)	8/10/02	3	20	25	22.5	0.5	16	31	129
HB Wall (SU #7)	8/10/02	4	20	25	22.5	0.5	10	-22	129
HB Wall (SU #7)	8/10/02	5	20	25	22.5	0.5	11	-13	129
HB Wall (SU #7)	8/10/02	6	20	25	22.5	0.5	12	-4	129
HB Wall (SU #7)	8/10/02	7	20	25	22.5	0.5	21	76	129
HB Wall (SU #7)	8/10/02	8	20	25	22.5	0.5	15	22	129
HB Wall (SU #7)	8/10/02	9	20	25	22.5	0.5	10	-22	129
HB Wall (SU #7)	8/10/02	10	20	25	22.5	0.5	18	49	129
HB Wall (SU #7)	8/10/02	11	20	25	22.5	0.5	13	4	129
HB Wall (SU #7)	8/10/02	12	20	25	22.5	0.5	14	13	129
HB Wall (SU #7)	8/10/02	13	20	25	22.5	0.5	17	40	129
HB Wall (SU #7)	8/10/02	14	20	25	22.5	0.5	16	31	129
HB Wall (SU #7)	8/10/02	15	20	25	22.5	0.5	12	-4	129
HB Wall (SU #7)	8/10/02	16	20	25	22.5	0.5	16	31	129
HB Wall (SU #7)	8/10/02	17	20	25	22.5	0.5	17	40	129
HB Wall (SU #7)	8/10/02	18	20	25	22.5	0.5	10	-22	129
HB Wall (SU #7)	8/10/02	19	20	25	22.5	0.5	8	-40	129
HB Wall (SU #7)	8/10/02	20	20	25	22.5	0.5	14	13	129
HB Wall (SU #7)	8/10/02	21	20	25	22.5	0.5	13	4	129
HB Wall (SU #7)	8/10/02	22	20	25	22.5	0.5	18	49	129
HB Wall (SU #7)	8/10/02	23	20	25	22.5	0.5	11	-13	129
HB Wall (SU #7)	8/10/02	24	20	25	22.5	0.5	10	-22	129
HB Wall (SU #7)	8/10/02	25	20	25	22.5	0.5	18	49	129
HB Wall (SU #7)	8/10/02	26	20	25	22.5	0.5	15	22	129
HB Wall (SU #7)	8/10/02	27	20	25	22.5	0.5	13	4	129
HB Wall (SU #7)	8/10/02	28	20	25	22.5	0.5	9	-31	129
HB Wall (SU #7)	8/10/02	29	20	25	22.5	0.5	14	13	129
HB Wall (SU #7)	8/10/02	30	20	25	22.5	0.5	7	-49	129

NUM	30
MEAN	9
STAN DEV	33
MAX	76

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Wall (SU #8)	8/10/02	1	20	25	22.5	0.5	13	4	129
HB Wall (SU #8)	8/10/02	2	20	25	22.5	0.5	10	-22	129
HB Wall (SU #8)	8/10/02	3	20	25	22.5	0.5	15	22	129
HB Wall (SU #8)	8/10/02	4	20	25	22.5	0.5	16	31	129
HB Wall (SU #8)	8/10/02	5	20	25	22.5	0.5	13	4	129
HB Wall (SU #8)	8/10/02	6	20	25	22.5	0.5	16	31	129
HB Wall (SU #8)	8/10/02	7	20	25	22.5	0.5	12	-4	129
HB Wall (SU #8)	8/10/02	8	20	25	22.5	0.5	23	93	129
HB Wall (SU #8)	8/10/02	9	20	25	22.5	0.5	18	49	129
HB Wall (SU #8)	8/10/02	10	20	25	22.5	0.5	16	31	129
HB Wall (SU #8)	8/10/02	11	20	25	22.5	0.5	20	67	129
HB Wall (SU #8)	8/10/02	12	20	25	22.5	0.5	13	4	129
HB Wall (SU #8)	8/10/02	13	20	25	22.5	0.5	13	4	129
HB Wall (SU #8)	8/10/02	14	20	25	22.5	0.5	8	-40	129
HB Wall (SU #8)	8/10/02	15	20	25	22.5	0.5	17	40	129
HB Wall (SU #8)	8/10/02	16	20	25	22.5	0.5	17	40	129
HB Wall (SU #8)	8/10/02	17	20	25	22.5	0.5	11	-13	129
HB Wall (SU #8)	8/10/02	18	20	25	22.5	0.5	12	-4	129
HB Wall (SU #8)	8/10/02	19	20	25	22.5	0.5	15	22	129
HB Wall (SU #8)	8/10/02	20	20	25	22.5	0.5	15	22	129
HB Wall (SU #8)	8/10/02	21	20	25	22.5	0.5	16	31	129
HB Wall (SU #8)	8/10/02	22	20	25	22.5	0.5	14	13	129
HB Wall (SU #8)	8/10/02	23	20	25	22.5	0.5	18	49	129
HB Wall (SU #8)	8/10/02	24	20	25	22.5	0.5	12	-4	129
HB Wall (SU #8)	8/10/02	25	20	25	22.5	0.5	12	-4	129
HB Wall (SU #8)	8/10/02	26	20	25	22.5	0.5	19	58	129
HB Wall (SU #8)	8/10/02	27	20	25	22.5	0.5	9	-31	129
HB Wall (SU #8)	8/10/02	28	20	25	22.5	0.5	16	31	129
HB Wall (SU #8)	8/10/02	29	20	25	22.5	0.5	14	13	129
HB Wall (SU #8)	8/10/02	30	20	25	22.5	0.5	12	-4	129
							NUM	30	
							MEAN	18	
							STAN DEV	29	
							MAX	93	

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Wall (SU #9)	8/10/02	1	20	25	22.5	0.5	12	-4	129
HB Wall (SU #9)	8/10/02	2	20	25	22.5	0.5	13	4	129
HB Wall (SU #9)	8/10/02	3	20	25	22.5	0.5	12	-4	129
HB Wall (SU #9)	8/10/02	4	20	25	22.5	0.5	17	40	129
HB Wall (SU #9)	8/10/02	5	20	25	22.5	0.5	13	4	129
HB Wall (SU #9)	8/10/02	6	20	25	22.5	0.5	12	-4	129
HB Wall (SU #9)	8/10/02	7	20	25	22.5	0.5	15	22	129
HB Wall (SU #9)	8/10/02	8	20	25	22.5	0.5	13	4	129
HB Wall (SU #9)	8/10/02	9	20	25	22.5	0.5	18	49	129
HB Wall (SU #9)	8/10/02	10	20	25	22.5	0.5	17	40	129
HB Wall (SU #9)	8/10/02	11	20	25	22.5	0.5	18	49	129
HB Wall (SU #9)	8/10/02	12	20	25	22.5	0.5	15	22	129
HB Wall (SU #9)	8/10/02	13	20	25	22.5	0.5	8	-40	129
HB Wall (SU #9)	8/10/02	14	20	25	22.5	0.5	15	22	129
HB Wall (SU #9)	8/10/02	15	20	25	22.5	0.5	13	4	129
HB Wall (SU #9)	8/10/02	16	20	25	22.5	0.5	12	-4	129
HB Wall (SU #9)	8/10/02	17	20	25	22.5	0.5	13	4	129
HB Wall (SU #9)	8/10/02	18	20	25	22.5	0.5	13	4	129
HB Wall (SU #9)	8/10/02	19	20	25	22.5	0.5	9	-31	129
HB Wall (SU #9)	8/10/02	20	20	25	22.5	0.5	10	-22	129
HB Wall (SU #9)	8/10/02	21	20	25	22.5	0.5	14	13	129
HB Wall (SU #9)	8/10/02	22	20	25	22.5	0.5	12	-4	129
HB Wall (SU #9)	8/10/02	23	20	25	22.5	0.5	13	4	129
HB Wall (SU #9)	8/10/02	24	20	25	22.5	0.5	10	-22	129
HB Wall (SU #9)	8/10/02	25	20	25	22.5	0.5	9	-31	129
HB Wall (SU #9)	8/10/02	26	20	25	22.5	0.5	17	40	129
HB Wall (SU #9)	8/10/02	27	20	25	22.5	0.5	14	13	129
HB Wall (SU #9)	8/10/02	28	20	25	22.5	0.5	18	49	129
HB Wall (SU #9)	8/10/02	29	20	25	22.5	0.5	18	49	129
HB Wall (SU #9)	8/10/02	30	20	25	22.5	0.5	12	-4	129

NUM	30
MEAN	9
STAN DEV	25
MAX	49

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Overhead (SU #10)	8/11/02	1	20	25	22.5	0.5	17	40	129
HB Overhead (SU #10)	8/11/02	2	20	25	22.5	0.5	18	49	129
HB Overhead (SU #10)	8/11/02	3	20	25	22.5	0.5	15	22	129
HB Overhead (SU #10)	8/11/02	4	20	25	22.5	0.5	11	-13	129
HB Overhead (SU #10)	8/11/02	5	20	25	22.5	0.5	11	-13	129
HB Overhead (SU #10)	8/11/02	6	20	25	22.5	0.5	17	40	129
HB Overhead (SU #10)	8/11/02	7	20	25	22.5	0.5	11	-13	129
HB Overhead (SU #10)	8/11/02	8	20	25	22.5	0.5	11	-13	129
HB Overhead (SU #10)	8/11/02	9	20	25	22.5	0.5	19	58	129
HB Overhead (SU #10)	8/11/02	10	20	25	22.5	0.5	13	4	129
HB Overhead (SU #10)	8/11/02	11	20	25	22.5	0.5	12	-4	129
HB Overhead (SU #10)	8/11/02	12	20	25	22.5	0.5	15	22	129
HB Overhead (SU #10)	8/11/02	13	20	25	22.5	0.5	12	-4	129
HB Overhead (SU #10)	8/11/02	14	20	25	22.5	0.5	12	-4	129
HB Overhead (SU #10)	8/11/02	15	20	25	22.5	0.5	9	-31	129
HB Overhead (SU #10)	8/11/02	16	20	25	22.5	0.5	9	-31	129
HB Overhead (SU #10)	8/11/02	17	20	25	22.5	0.5	15	22	129
HB Overhead (SU #10)	8/11/02	18	20	25	22.5	0.5	15	22	129
HB Overhead (SU #10)	8/11/02	19	20	25	22.5	0.5	15	22	129
HB Overhead (SU #10)	8/11/02	20	20	25	22.5	0.5	17	40	129
HB Overhead (SU #10)	8/11/02	21	20	25	22.5	0.5	17	40	129
HB Overhead (SU #10)	8/11/02	22	20	25	22.5	0.5	21	76	129
HB Overhead (SU #10)	8/11/02	23	20	25	22.5	0.5	25	111	129
HB Overhead (SU #10)	8/11/02	24	20	25	22.5	0.5	22	84	129
HB Overhead (SU #10)	8/11/02	25	20	25	22.5	0.5	15	22	129
HB Overhead (SU #10)	8/11/02	26	20	25	22.5	0.5	22	84	129
HB Overhead (SU #10)	8/11/02	27	20	25	22.5	0.5	21	76	129
HB Overhead (SU #10)	8/11/02	28	20	25	22.5	0.5	10	-22	129
HB Overhead (SU #10)	8/11/02	29	20	25	22.5	0.5	15	22	129
HB Overhead (SU #10)	8/11/02	30	20	25	22.5	0.5	11	-13	129

NUM	30
MEAN	23
STAN DEV	38
MAX	111

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Vents (SU #11)	8/11/02	1	20	25	22.5	0.5	14	13	129
HB Vents (SU #11)	8/11/02	2	20	25	22.5	0.5	9	-31	129
HB Vents (SU #11)	8/11/02	3	20	25	22.5	0.5	23	93	129
HB Vents (SU #11)	8/11/02	4	20	25	22.5	0.5	12	-4	129
HB Vents (SU #11)	8/11/02	5	20	25	22.5	0.5	9	-31	129
HB Vents (SU #11)	8/11/02	6	20	25	22.5	0.5	15	22	129
HB Vents (SU #11)	8/11/02	7	20	25	22.5	0.5	21	76	129
HB Vents (SU #11)	8/11/02	8	20	25	22.5	0.5	19	58	129
HB Vents (SU #11)	8/11/02	9	20	25	22.5	0.5	16	31	129
HB Vents (SU #11)	8/11/02	10	20	25	22.5	0.5	10	-22	129
HB Vents (SU #11)	8/11/02	11	20	25	22.5	0.5	12	-4	129
HB Vents (SU #11)	8/11/02	12	20	25	22.5	0.5	16	31	129
HB Vents (SU #11)	8/11/02	13	20	25	22.5	0.5	17	40	129
HB Vents (SU #11)	8/11/02	14	20	25	22.5	0.5	11	-13	129
HB Vents (SU #11)	8/11/02	15	20	25	22.5	0.5	10	-22	129
HB Vents (SU #11)	8/11/02	16	20	25	22.5	0.5	16	31	129
HB Vents (SU #11)	8/11/02	17	20	25	22.5	0.5	11	-13	129
HB Vents (SU #11)	8/11/02	18	20	25	22.5	0.5	14	13	129
HB Vents (SU #11)	8/11/02	19	20	25	22.5	0.5	17	40	129
HB Vents (SU #11)	8/11/02	20	20	25	22.5	0.5	14	13	129

NUM	20
MEAN	16
STAN DEV	35
MAX	93

Description	Sample Date	Smear #	BKG Count Time min	Beta BKG cpm	Beta Eff cpd	Beta Count Time min	Beta Counts	Beta Activity dpm/100 cm^2	Beta MDA dpm/100 cm^2
HB Pit (SU #12)	8/11/02	1	20	25	22.5	0.5	14	13	129
HB Pit (SU #12)	8/11/02	2	20	25	22.5	0.5	15	22	129
HB Pit (SU #12)	8/11/02	3	20	25	22.5	0.5	8	-40	129
HB Pit (SU #12)	8/11/02	4	20	25	22.5	0.5	16	31	129
HB Pit (SU #12)	8/11/02	5	20	25	22.5	0.5	14	13	129
HB Pit (SU #12)	8/11/02	6	20	25	22.5	0.5	14	13	129
HB Pit (SU #12)	8/11/02	7	20	25	22.5	0.5	18	49	129
HB Pit (SU #12)	8/11/02	8	20	25	22.5	0.5	8	-40	129
HB Pit (SU #12)	8/11/02	9	20	25	22.5	0.5	13	4	129
HB Pit (SU #12)	8/11/02	10	20	25	22.5	0.5	24	102	129
HB Pit (SU #12)	8/11/02	11	20	25	22.5	0.5	13	4	129
HB Pit (SU #12)	8/11/02	12	20	25	22.5	0.5	17	40	129
HB Pit (SU #12)	8/11/02	13	20	25	22.5	0.5	19	58	129
HB Pit (SU #12)	8/11/02	14	20	25	22.5	0.5	17	40	129
HB Pit (SU #12)	8/11/02	15	20	25	22.5	0.5	12	-4	129
HB Pit (SU #12)	8/11/02	16	20	25	22.5	0.5	13	4	129
HB Pit (SU #12)	8/11/02	17	20	25	22.5	0.5	22	84	129
HB Pit (SU #12)	8/11/02	18	20	25	22.5	0.5	9	-31	129
HB Pit (SU #12)	8/11/02	19	20	25	22.5	0.5	13	4	129
HB Pit (SU #12)	8/11/02	20	20	25	22.5	0.5	15	22	129
HB Pit (SU #12)	8/11/02	21	20	25	22.5	0.5	12	-4	129
HB Pit (SU #12)	8/11/02	22	20	25	22.5	0.5	16	31	129
HB Pit (SU #12)	8/11/02	23	20	25	22.5	0.5	10	-22	129
HB Pit (SU #12)	8/11/02	24	20	25	22.5	0.5	10	-22	129
HB Pit (SU #12)	8/11/02	25	20	25	22.5	0.5	13	4	129
HB Pit (SU #12)	8/11/02	26	20	25	22.5	0.5	8	-40	129
HB Pit (SU #12)	8/11/02	27	20	25	22.5	0.5	12	-4	129
HB Pit (SU #12)	8/11/02	28	20	25	22.5	0.5	10	-22	129
HB Pit (SU #12)	8/11/02	29	20	25	22.5	0.5	19	58	129
HB Pit (SU #12)	8/11/02	30	20	25	22.5	0.5	16	31	129
							NUM	30	
							MEAN	13	
							STAN DEV	35	
							MAX	102	

ATTACHMENT B
Measurements for Total Beta Activity

Description	Location	Sample #	Date	Counts	Count Time (S)	Raw File	Package ID	Count Type	BKG (cpm)	EFF (%)	Activity dpm/100cm²	MDA dpm/100cm²
Office Floor (SU #1)	I000100001	0	11-Aug-02	1905	300	16	I0001	FLDBK				
Office Floor (SU #1)	I000100001	1	11-Aug-02	69	10	16	I0001	FLDCT	376	23.3	130	596
Office Floor (SU #1)	I000100001	2	11-Aug-02	55	10	16	I0001	FLDCT	376	23.3	-156	596
Office Floor (SU #1)	I000100001	3	11-Aug-02	68	10	16	I0001	FLDCT	376	23.3	110	596
Office Floor (SU #1)	I000100001	4	11-Aug-02	64	10	16	I0001	FLDCT	376	23.3	28	596
Office Floor (SU #1)	I000100001	5	11-Aug-02	62	10	16	I0001	FLDCT	376	23.3	-13	596
Office Floor (SU #1)	I000100001	6	11-Aug-02	57	10	16	I0001	FLDCT	376	23.3	-115	596
Office Floor (SU #1)	I000100001	7	11-Aug-02	68	10	16	I0001	FLDCT	376	23.3	110	596
Office Floor (SU #1)	I000100001	8	11-Aug-02	54	10	16	I0001	FLDCT	376	23.3	-176	596
Office Floor (SU #1)	I000100001	9	11-Aug-02	75	10	16	I0001	FLDCT	376	23.3	253	596
Office Floor (SU #1)	I000100001	10	11-Aug-02	67	10	16	I0001	FLDCT	376	23.3	90	596
Office Floor (SU #1)	I000100001	11	11-Aug-02	61	10	16	I0001	FLDCT	376	23.3	-33	596
Office Floor (SU #1)	I000100001	12	11-Aug-02	68	10	16	I0001	FLDCT	376	23.3	110	596
Office Floor (SU #1)	I000100001	13	11-Aug-02	60	10	16	I0001	FLDCT	376	23.3	-53	596
Office Floor (SU #1)	I000100001	14	11-Aug-02	75	10	16	I0001	FLDCT	376	23.3	253	596
Office Floor (SU #1)	I000100001	15	11-Aug-02	58	10	16	I0001	FLDCT	376	23.3	-94	596
Office Floor (SU #1)	I000100001	16	11-Aug-02	81	10	16	I0001	FLDCT	376	23.3	376	596
Office Floor (SU #1)	I000100001	17	11-Aug-02	92	10	16	I0001	FLDCT	376	23.3	601	596
Office Floor (SU #1)	I000100001	18	11-Aug-02	61	10	16	I0001	FLDCT	376	23.3	-33	596
Office Floor (SU #1)	I000100001	19	11-Aug-02	65	10	16	I0001	FLDCT	376	23.3	49	596
Office Floor (SU #1)	I000100001	20	11-Aug-02	71	10	16	I0001	FLDCT	376	23.3	171	596
Office Floor (SU #1)	I000100001	21	11-Aug-02	79	10	16	I0001	FLDCT	376	23.3	335	596
Office Floor (SU #1)	I000100001	22	11-Aug-02	64	10	16	I0001	FLDCT	376	23.3	28	596
Office Floor (SU #1)	I000100001	23	11-Aug-02	76	10	16	I0001	FLDCT	376	23.3	274	596
Office Floor (SU #1)	I000100001	24	11-Aug-02	75	10	16	I0001	FLDCT	376	23.3	253	596
Office Floor (SU #1)	I000100001	25	11-Aug-02	82	10	16	I0001	FLDCT	376	23.3	396	596
Office Floor (SU #1)	I000100001	26	11-Aug-02	53	10	16	I0001	FLDCT	376	23.3	-197	596
Office Floor (SU #1)	I000100001	27	11-Aug-02	79	10	16	I0001	FLDCT	376	23.3	335	596
Office Floor (SU #1)	I000100001	28	11-Aug-02	68	10	16	I0001	FLDCT	376	23.3	110	596
Office Floor (SU #1)	I000100001	29	11-Aug-02	67	10	16	I0001	FLDCT	376	23.3	90	596
Office Floor (SU #1)	I000100001	30	11-Aug-02	64	10	16	I0001	FLDCT	376	23.3	28	596
Office Floor (SU #1)	I000100001	31	11-Aug-02	1852	300	16	I0001	FLDBK				

NUM	30	# of measurements
MEAN	109	– dpm/100cm²
STAN DE	189	– dpm/100cm²
MAX	601	– dpm/100cm²

Descrip	Location	Sample Number	Date	Counts	Count Ti	Raw File	Package ID	Count Type	BKG	EFF	Acti	MDA
Office Walls (SU #2)	I000100002	0	11-Aug-02	1635	300	17	I0001	FLDBK				
Office Walls (SU #2)	I000100002	1	11-Aug-02	54	10	17	I0001	FLDCT	354.6	23.3	-104	581
Office Walls (SU #2)	I000100002	2	11-Aug-02	61	10	17	I0001	FLDCT	354.6	23.3	39	581
Office Walls (SU #2)	I000100002	3	11-Aug-02	69	10	17	I0001	FLDCT	354.6	23.3	202	581
Office Walls (SU #2)	I000100002	4	11-Aug-02	64	10	17	I0001	FLDCT	354.6	23.3	100	581
Office Walls (SU #2)	I000100002	5	11-Aug-02	58	10	17	I0001	FLDCT	354.6	23.3	-22	581
Office Walls (SU #2)	I000100002	6	11-Aug-02	45	10	17	I0001	FLDCT	354.6	23.3	-288	581
Office Walls (SU #2)	I000100002	7	11-Aug-02	89	10	17	I0001	FLDCT	354.6	23.3	611	581
Office Walls (SU #2)	I000100002	8	11-Aug-02	62	10	17	I0001	FLDCT	354.6	23.3	59	581
Office Walls (SU #2)	I000100002	9	11-Aug-02	101	10	17	I0001	FLDCT	354.6	23.3	856	581
Office Walls (SU #2)	I000100002	10	11-Aug-02	82	10	17	I0001	FLDCT	354.6	23.3	468	581
Office Walls (SU #2)	I000100002	11	11-Aug-02	58	10	17	I0001	FLDCT	354.6	23.3	-22	581
Office Walls (SU #2)	I000100002	12	11-Aug-02	55	10	17	I0001	FLDCT	354.6	23.3	-84	581
Office Walls (SU #2)	I000100002	13	11-Aug-02	67	10	17	I0001	FLDCT	354.6	23.3	161	581
Office Walls (SU #2)	I000100002	14	11-Aug-02	61	10	17	I0001	FLDCT	354.6	23.3	39	581
Office Walls (SU #2)	I000100002	15	11-Aug-02	97	10	17	I0001	FLDCT	354.6	23.3	775	581
Office Walls (SU #2)	I000100002	16	11-Aug-02	116	10	17	I0001	FLDCT	354.6	23.3	1163	581
Office Walls (SU #2)	I000100002	17	11-Aug-02	124	10	17	I0001	FLDCT	354.6	23.3	1326	581
Office Walls (SU #2)	I000100002	18	11-Aug-02	106	10	17	I0001	FLDCT	354.6	23.3	959	581
Office Walls (SU #2)	I000100002	19	11-Aug-02	96	10	17	I0001	FLDCT	354.6	23.3	754	581
Office Walls (SU #2)	I000100002	20	11-Aug-02	104	10	17	I0001	FLDCT	354.6	23.3	918	581
Office Walls (SU #2)	I000100002	21	11-Aug-02	56	10	17	I0001	FLDCT	354.6	23.3	-63	581
Office Walls (SU #2)	I000100002	22	11-Aug-02	43	10	17	I0001	FLDCT	354.6	23.3	-329	581
Office Walls (SU #2)	I000100002	23	11-Aug-02	61	10	17	I0001	FLDCT	354.6	23.3	39	581
Office Walls (SU #2)	I000100002	24	11-Aug-02	58	10	17	I0001	FLDCT	354.6	23.3	-22	581
Office Walls (SU #2)	I000100002	25	11-Aug-02	59	10	17	I0001	FLDCT	354.6	23.3	-2	581
Office Walls (SU #2)	I000100002	26	11-Aug-02	99	10	17	I0001	FLDCT	354.6	23.3	815	581
Office Walls (SU #2)	I000100002	27	11-Aug-02	103	10	17	I0001	FLDCT	354.6	23.3	897	581
Office Walls (SU #2)	I000100002	28	11-Aug-02	80	10	17	I0001	FLDCT	354.6	23.3	427	581
Office Walls (SU #2)	I000100002	29	11-Aug-02	61	10	17	I0001	FLDCT	354.6	23.3	39	581
Office Walls (SU #2)	I000100002	30	11-Aug-02	81	10	17	I0001	FLDCT	354.6	23.3	448	581
Office Walls (SU #2)	I000100002	31	11-Aug-02	1911	300	17	I0001	FLDBK				
										NUM	30	
										MEAN	339	
										STAN DE	458	
										MAX	1326	

Description	Location	Sample #	Date	Count	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
Office Wall & Ceiling (SU #3)	I000100003	0	11-Aug-02	1601	300	18	I0001	FLDBK				
Office Wall & Ceiling (SU #3)	I000100003	1	11-Aug-02	48	10	18	I0001	FLDCT	329	23.3	-140	562
Office Wall & Ceiling (SU #3)	I000100003	2	11-Aug-02	62	10	18	I0001	FLDCT	329	23.3	146	562
Office Wall & Ceiling (SU #3)	I000100003	3	11-Aug-02	53	10	18	I0001	FLDCT	329	23.3	-37	562
Office Wall & Ceiling (SU #3)	I000100003	4	11-Aug-02	48	10	18	I0001	FLDCT	329	23.3	-140	562
Office Wall & Ceiling (SU #3)	I000100003	5	11-Aug-02	67	10	18	I0001	FLDCT	329	23.3	249	562
Office Wall & Ceiling (SU #3)	I000100003	6	11-Aug-02	65	10	18	I0001	FLDCT	329	23.3	208	562
Office Wall & Ceiling (SU #3)	I000100003	7	11-Aug-02	55	10	18	I0001	FLDCT	329	23.3	3	562
Office Wall & Ceiling (SU #3)	I000100003	8	11-Aug-02	59	10	18	I0001	FLDCT	329	23.3	85	562
Office Wall & Ceiling (SU #3)	I000100003	9	11-Aug-02	50	10	18	I0001	FLDCT	329	23.3	-99	562
Office Wall & Ceiling (SU #3)	I000100003	10	11-Aug-02	61	10	18	I0001	FLDCT	329	23.3	126	562
Office Wall & Ceiling (SU #3)	I000100003	11	11-Aug-02	44	10	18	I0001	FLDCT	329	23.3	-221	562
Office Wall & Ceiling (SU #3)	I000100003	12	11-Aug-02	74	10	18	I0001	FLDCT	329	23.3	392	562
Office Wall & Ceiling (SU #3)	I000100003	13	11-Aug-02	50	10	18	I0001	FLDCT	329	23.3	-99	562
Office Wall & Ceiling (SU #3)	I000100003	14	11-Aug-02	63	10	18	I0001	FLDCT	329	23.3	167	562
Office Wall & Ceiling (SU #3)	I000100003	15	11-Aug-02	78	10	18	I0001	FLDCT	329	23.3	473	562
Office Wall & Ceiling (SU #3)	I000100003	16	11-Aug-02	59	10	18	I0001	FLDCT	329	23.3	85	562
Office Wall & Ceiling (SU #3)	I000100003	17	11-Aug-02	65	10	18	I0001	FLDCT	329	23.3	208	562
Office Wall & Ceiling (SU #3)	I000100003	18	11-Aug-02	67	10	18	I0001	FLDCT	329	23.3	249	562
Office Wall & Ceiling (SU #3)	I000100003	19	11-Aug-02	65	10	18	I0001	FLDCT	329	23.3	208	562
Office Wall & Ceiling (SU #3)	I000100003	20	11-Aug-02	71	10	18	I0001	FLDCT	329	23.3	330	562
Office Wall & Ceiling (SU #3)	I000100003	21	11-Aug-02	71	10	18	I0001	FLDCT	329	23.3	330	562
Office Wall & Ceiling (SU #3)	I000100003	22	11-Aug-02	56	10	18	I0001	FLDCT	329	23.3	24	562
Office Wall & Ceiling (SU #3)	I000100003	23	11-Aug-02	77	10	18	I0001	FLDCT	329	23.3	453	562
Office Wall & Ceiling (SU #3)	I000100003	24	11-Aug-02	93	10	18	I0001	FLDCT	329	23.3	780	562
Office Wall & Ceiling (SU #3)	I000100003	25	11-Aug-02	49	10	18	I0001	FLDCT	329	23.3	-119	562
Office Wall & Ceiling (SU #3)	I000100003	26	11-Aug-02	85	10	18	I0001	FLDCT	329	23.3	617	562
Office Wall & Ceiling (SU #3)	I000100003	27	11-Aug-02	64	10	18	I0001	FLDCT	329	23.3	187	562
Office Wall & Ceiling (SU #3)	I000100003	28	11-Aug-02	75	10	18	I0001	FLDCT	329	23.3	412	562
Office Wall & Ceiling (SU #3)	I000100003	29	11-Aug-02	78	10	18	I0001	FLDCT	329	23.3	473	562
Office Wall & Ceiling (SU #3)	I000100003	30	11-Aug-02	54	10	18	I0001	FLDCT	329	23.3	-17	562
Office Wall & Ceiling (SU #3)	I000100003	31	11-Aug-02	1689	300	18	I0001	FLDBK				
										NUM	30	
										MEAN	178	
										STAN DEV	244	
										MAX	780	

Description	Location	Sample Number	Date	Counts	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Floor (SU #1)	I000200001	0	10-Aug-02	1922	300	8	I0002	FLDBK				
HB Floor (SU #1)	I000200001	1	10-Aug-02	91	10	8	I0002	FLDCT	383	22.7	570	617
HB Floor (SU #1)	I000200001	2	10-Aug-02	79	10	8	I0002	FLDCT	383	22.7	318	617
HB Floor (SU #1)	I000200001	3	10-Aug-02	104	10	8	I0002	FLDCT	383	22.7	843	617
HB Floor (SU #1)	I000200001	4	10-Aug-02	95	10	8	I0002	FLDCT	383	22.7	654	617
HB Floor (SU #1)	I000200001	5	10-Aug-02	91	10	8	I0002	FLDCT	383	22.7	570	617
HB Floor (SU #1)	I000200001	6	10-Aug-02	85	10	8	I0002	FLDCT	383	22.7	444	617
HB Floor (SU #1)	I000200001	7	10-Aug-02	90	10	8	I0002	FLDCT	383	22.7	549	617
HB Floor (SU #1)	I000200001	8	10-Aug-02	99	10	8	I0002	FLDCT	383	22.7	738	617
HB Floor (SU #1)	I000200001	9	10-Aug-02	92	10	8	I0002	FLDCT	383	22.7	591	617
HB Floor (SU #1)	I000200001	10	10-Aug-02	87	10	8	I0002	FLDCT	383	22.7	486	617
HB Floor (SU #1)	I000200001	11	10-Aug-02	101	10	8	I0002	FLDCT	383	22.7	780	617
HB Floor (SU #1)	I000200001	12	10-Aug-02	105	10	8	I0002	FLDCT	383	22.7	864	617
HB Floor (SU #1)	I000200001	13	10-Aug-02	77	10	8	I0002	FLDCT	383	22.7	276	617
HB Floor (SU #1)	I000200001	14	10-Aug-02	79	10	8	I0002	FLDCT	383	22.7	318	617
HB Floor (SU #1)	I000200001	15	10-Aug-02	107	10	8	I0002	FLDCT	383	22.7	906	617
HB Floor (SU #1)	I000200001	16	10-Aug-02	100	10	8	I0002	FLDCT	383	22.7	759	617
HB Floor (SU #1)	I000200001	17	10-Aug-02	93	10	8	I0002	FLDCT	383	22.7	612	617
HB Floor (SU #1)	I000200001	18	10-Aug-02	91	10	8	I0002	FLDCT	383	22.7	570	617
HB Floor (SU #1)	I000200001	19	10-Aug-02	94	10	8	I0002	FLDCT	383	22.7	633	617
HB Floor (SU #1)	I000200001	20	10-Aug-02	99	10	8	I0002	FLDCT	383	22.7	738	617
HB Floor (SU #1)	I000200001	21	10-Aug-02	83	10	8	I0002	FLDCT	383	22.7	402	617
HB Floor (SU #1)	I000200001	22	10-Aug-02	102	10	8	I0002	FLDCT	383	22.7	801	617
HB Floor (SU #1)	I000200001	23	10-Aug-02	93	10	8	I0002	FLDCT	383	22.7	612	617
HB Floor (SU #1)	I000200001	24	10-Aug-02	74	10	8	I0002	FLDCT	383	22.7	213	617
HB Floor (SU #1)	I000200001	25	10-Aug-02	117	10	8	I0002	FLDCT	383	22.7	1115	617
HB Floor (SU #1)	I000200001	26	10-Aug-02	93	10	8	I0002	FLDCT	383	22.7	612	617
HB Floor (SU #1)	I000200001	27	10-Aug-02	89	10	8	I0002	FLDCT	383	22.7	528	617
HB Floor (SU #1)	I000200001	28	10-Aug-02	97	10	8	I0002	FLDCT	383	22.7	696	617
HB Floor (SU #1)	I000200001	29	10-Aug-02	101	10	8	I0002	FLDCT	383	22.7	780	617
HB Floor (SU #1)	I000200001	30	10-Aug-02	88	10	8	I0002	FLDCT	383	22.7	507	617
HB Floor (SU #1)	I000200001	31	10-Aug-02	104	10	8	I0002	FLDCT	383	22.7	843	617
HB Floor (SU #1)	I000200001	32	10-Aug-02	94	10	8	I0002	FLDCT	383	22.7	633	617
HB Floor (SU #1)	I000200001	33	10-Aug-02	93	10	8	I0002	FLDCT	383	22.7	612	617
HB Floor (SU #1)	I000200001	34	10-Aug-02	100	10	8	I0002	FLDCT	383	22.7	759	617
HB Floor (SU #1)	I000200001	35	10-Aug-02	85	10	8	I0002	FLDCT	383	22.7	444	617
HB Floor (SU #1)	I000200001	36	10-Aug-02	100	10	8	I0002	FLDCT	383	22.7	759	617
HB Floor (SU #1)	I000200001	37	10-Aug-02	1908	300	8	I0002	FLDBK				
										NUM	36	
										MEAN	626	
										STAN DE	192	
										MAX	1115	

Description	Location	Sample #	Date	Counts	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Floor (SU #2)	I000200002	0	10-Aug-02	1878	300	7	I0002	FLDBK				
HB Floor (SU #2)	I000200002	1	10-Aug-02	84	10	7	I0002	FLDCT	387	22.7	409	620
HB Floor (SU #2)	I000200002	2	10-Aug-02	98	10	7	I0002	FLDCT	387	22.7	703	620
HB Floor (SU #2)	I000200002	3	10-Aug-02	109	10	7	I0002	FLDCT	387	22.7	934	620
HB Floor (SU #2)	I000200002	4	10-Aug-02	101	10	7	I0002	FLDCT	387	22.7	766	620
HB Floor (SU #2)	I000200002	5	10-Aug-02	86	10	7	I0002	FLDCT	387	22.7	451	620
HB Floor (SU #2)	I000200002	6	10-Aug-02	93	10	7	I0002	FLDCT	387	22.7	598	620
HB Floor (SU #2)	I000200002	7	10-Aug-02	107	10	7	I0002	FLDCT	387	22.7	892	620
HB Floor (SU #2)	I000200002	8	10-Aug-02	93	10	7	I0002	FLDCT	387	22.7	598	620
HB Floor (SU #2)	I000200002	9	10-Aug-02	91	10	7	I0002	FLDCT	387	22.7	556	620
HB Floor (SU #2)	I000200002	1	10-Aug-02	106	10	7	I0002	FLDCT	387	22.7	871	620
HB Floor (SU #2)	I000200002	11	10-Aug-02	114	10	7	I0002	FLDCT	387	22.7	1039	620
HB Floor (SU #2)	I000200002	12	10-Aug-02	86	10	7	I0002	FLDCT	387	22.7	451	620
HB Floor (SU #2)	I000200002	13	10-Aug-02	112	10	7	I0002	FLDCT	387	22.7	997	620
HB Floor (SU #2)	I000200002	14	10-Aug-02	105	10	7	I0002	FLDCT	387	22.7	850	620
HB Floor (SU #2)	I000200002	15	10-Aug-02	106	10	7	I0002	FLDCT	387	22.7	871	620
HB Floor (SU #2)	I000200002	16	10-Aug-02	106	10	7	I0002	FLDCT	387	22.7	871	620
HB Floor (SU #2)	I000200002	17	10-Aug-02	88	10	7	I0002	FLDCT	387	22.7	493	620
HB Floor (SU #2)	I000200002	18	10-Aug-02	107	10	7	I0002	FLDCT	387	22.7	892	620
HB Floor (SU #2)	I000200002	19	10-Aug-02	89	10	7	I0002	FLDCT	387	22.7	514	620
HB Floor (SU #2)	I000200002	20	10-Aug-02	106	10	7	I0002	FLDCT	387	22.7	871	620
HB Floor (SU #2)	I000200002	21	10-Aug-02	81	10	7	I0002	FLDCT	387	22.7	346	620
HB Floor (SU #2)	I000200002	22	10-Aug-02	90	10	7	I0002	FLDCT	387	22.7	535	620
HB Floor (SU #2)	I000200002	23	10-Aug-02	116	10	7	I0002	FLDCT	387	22.7	1081	620
HB Floor (SU #2)	I000200002	24	10-Aug-02	107	10	7	I0002	FLDCT	387	22.7	892	620
HB Floor (SU #2)	I000200002	25	10-Aug-02	101	10	7	I0002	FLDCT	387	22.7	766	620
HB Floor (SU #2)	I000200002	26	10-Aug-02	96	10	7	I0002	FLDCT	387	22.7	661	620
HB Floor (SU #2)	I000200002	27	10-Aug-02	105	10	7	I0002	FLDCT	387	22.7	850	620
HB Floor (SU #2)	I000200002	28	10-Aug-02	111	10	7	I0002	FLDCT	387	22.7	976	620
HB Floor (SU #2)	I000200002	29	10-Aug-02	94	10	7	I0002	FLDCT	387	22.7	619	620
HB Floor (SU #2)	I000200002	30	10-Aug-02	108	10	7	I0002	FLDCT	387	22.7	913	620
HB Floor (SU #2)	I000200002	31	10-Aug-02	84	10	7	I0002	FLDCT	387	22.7	409	620
HB Floor (SU #2)	I000200002	32	10-Aug-02	109	10	7	I0002	FLDCT	387	22.7	934	620
HB Floor (SU #2)	I000200002	33	10-Aug-02	104	10	7	I0002	FLDCT	387	22.7	829	620
HB Floor (SU #2)	I000200002	34	10-Aug-02	96	10	7	I0002	FLDCT	387	22.7	661	620
HB Floor (SU #2)	I000200002	35	10-Aug-02	101	10	7	I0002	FLDCT	387	22.7	766	620
HB Floor (SU #2)	I000200002	36	10-Aug-02	96	10	7	I0002	FLDCT	387	22.7	661	620
HB Floor (SU #2)	I000200002	37	10-Aug-02	1991	300	7	I0002	FLDBK				
										NUM	36	
										MEAN	737	
										STAN DEV	200	
										MAX	1081	

Description	Location	Sample #	Date	Counts	Count Time	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Floor (SU #3)	I000200003	4	10-Aug-02	1833	300	I0002	FLDBK				
HB Floor (SU #3)	I000200003	5	10-Aug-02	97	10	I0002	FLDCT	380	22.7	708	615
HB Floor (SU #3)	I000200003	6	10-Aug-02	95	10	I0002	FLDCT	380	22.7	666	615
HB Floor (SU #3)	I000200003	7	10-Aug-02	91	10	I0002	FLDCT	380	22.7	582	615
HB Floor (SU #3)	I000200003	8	10-Aug-02	115	10	I0002	FLDCT	380	22.7	1086	615
HB Floor (SU #3)	I000200003	9	10-Aug-02	95	10	I0002	FLDCT	380	22.7	666	615
HB Floor (SU #3)	I000200003	10	10-Aug-02	103	10	I0002	FLDCT	380	22.7	834	615
HB Floor (SU #3)	I000200003	11	10-Aug-02	92	10	I0002	FLDCT	380	22.7	603	615
HB Floor (SU #3)	I000200003	12	10-Aug-02	91	10	I0002	FLDCT	380	22.7	582	615
HB Floor (SU #3)	I000200003	13	10-Aug-02	117	10	I0002	FLDCT	380	22.7	1128	615
HB Floor (SU #3)	I000200003	14	10-Aug-02	121	10	I0002	FLDCT	380	22.7	1211	615
HB Floor (SU #3)	I000200003	15	10-Aug-02	109	10	I0002	FLDCT	380	22.7	960	615
HB Floor (SU #3)	I000200003	16	10-Aug-02	108	10	I0002	FLDCT	380	22.7	939	615
HB Floor (SU #3)	I000200003	17	10-Aug-02	105	10	I0002	FLDCT	380	22.7	876	615
HB Floor (SU #3)	I000200003	18	10-Aug-02	109	10	I0002	FLDCT	380	22.7	960	615
HB Floor (SU #3)	I000200003	19	10-Aug-02	118	10	I0002	FLDCT	380	22.7	1149	615
HB Floor (SU #3)	I000200003	20	10-Aug-02	101	10	I0002	FLDCT	380	22.7	792	615
HB Floor (SU #3)	I000200003	21	10-Aug-02	105	10	I0002	FLDCT	380	22.7	876	615
HB Floor (SU #3)	I000200003	22	10-Aug-02	122	10	I0002	FLDCT	380	22.7	1232	615
HB Floor (SU #3)	I000200003	23	10-Aug-02	100	10	I0002	FLDCT	380	22.7	771	615
HB Floor (SU #3)	I000200003	24	10-Aug-02	172	10	I0002	FLDCT	380	22.7	2281	615
HB Floor (SU #3)	I000200003	25	10-Aug-02	111	10	I0002	FLDCT	380	22.7	1002	615
HB Floor (SU #3)	I000200003	26	10-Aug-02	107	10	I0002	FLDCT	380	22.7	918	615
HB Floor (SU #3)	I000200003	27	10-Aug-02	104	10	I0002	FLDCT	380	22.7	855	615
HB Floor (SU #3)	I000200003	28	10-Aug-02	129	10	I0002	FLDCT	380	22.7	1379	615
HB Floor (SU #3)	I000200003	29	10-Aug-02	98	10	I0002	FLDCT	380	22.7	729	615
HB Floor (SU #3)	I000200003	30	10-Aug-02	124	10	I0002	FLDCT	380	22.7	1274	615
HB Floor (SU #3)	I000200003	31	10-Aug-02	127	10	I0002	FLDCT	380	22.7	1337	615
HB Floor (SU #3)	I000200003	32	10-Aug-02	87	10	I0002	FLDCT	380	22.7	498	615
HB Floor (SU #3)	I000200003	33	10-Aug-02	120	10	I0002	FLDCT	380	22.7	1190	615
HB Floor (SU #3)	I000200003	34	10-Aug-02	142	10	I0002	FLDCT	380	22.7	1652	615
HB Floor (SU #3)	I000200003	35	10-Aug-02	99	10	I0002	FLDCT	380	22.7	750	615
HB Floor (SU #3)	I000200003	36	10-Aug-02	111	10	I0002	FLDCT	380	22.7	1002	615
HB Floor (SU #3)	I000200003	37	10-Aug-02	103	10	I0002	FLDCT	380	22.7	834	615
HB Floor (SU #3)	I000200003	38	10-Aug-02	103	10	I0002	FLDCT	380	22.7	834	615
HB Floor (SU #3)	I000200003	39	10-Aug-02	89	10	I0002	FLDCT	380	22.7	540	615
HB Floor (SU #3)	I000200003	40	10-Aug-02	106	10	I0002	FLDCT	380	22.7	897	615
HB Floor (SU #3)	I000200003	41	10-Aug-02	1962	300	I0002	FLDBK				
									NUM	36	
									MEAN	961	
									STAN DEV	346	
									MAX	2281	

Description	Location	Sample #	Date	Counts	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Floor (SU #4)	I000200004	4	09-Aug-02	2010	300	5	I0002	FLDBK				
HB Floor (SU #4)	I000200004	5	09-Aug-02	91	10	5	I0002	FLDCT	410	27.1	398	533
HB Floor (SU #4)	I000200004	6	09-Aug-02	96	10	5	I0002	FLDCT	410	27.1	486	533
HB Floor (SU #4)	I000200004	7	09-Aug-02	128	10	5	I0002	FLDCT	410	27.1	1048	533
HB Floor (SU #4)	I000200004	8	09-Aug-02	121	10	5	I0002	FLDCT	410	27.1	925	533
HB Floor (SU #4)	I000200004	9	09-Aug-02	109	10	5	I0002	FLDCT	410	27.1	715	533
HB Floor (SU #4)	I000200004	10	09-Aug-02	107	10	5	I0002	FLDCT	410	27.1	679	533
HB Floor (SU #4)	I000200004	11	09-Aug-02	124	10	5	I0002	FLDCT	410	27.1	978	533
HB Floor (SU #4)	I000200004	12	09-Aug-02	96	10	5	I0002	FLDCT	410	27.1	486	533
HB Floor (SU #4)	I000200004	13	09-Aug-02	118	10	5	I0002	FLDCT	410	27.1	873	533
HB Floor (SU #4)	I000200004	14	09-Aug-02	104	10	5	I0002	FLDCT	410	27.1	627	533
HB Floor (SU #4)	I000200004	15	09-Aug-02	121	10	5	I0002	FLDCT	410	27.1	925	533
HB Floor (SU #4)	I000200004	16	09-Aug-02	122	10	5	I0002	FLDCT	410	27.1	943	533
HB Floor (SU #4)	I000200004	17	09-Aug-02	121	10	5	I0002	FLDCT	410	27.1	925	533
HB Floor (SU #4)	I000200004	18	09-Aug-02	113	10	5	I0002	FLDCT	410	27.1	785	533
HB Floor (SU #4)	I000200004	19	09-Aug-02	100	10	5	I0002	FLDCT	410	27.1	556	533
HB Floor (SU #4)	I000200004	20	09-Aug-02	118	10	5	I0002	FLDCT	410	27.1	873	533
HB Floor (SU #4)	I000200004	21	09-Aug-02	116	10	5	I0002	FLDCT	410	27.1	838	533
HB Floor (SU #4)	I000200004	22	09-Aug-02	120	10	5	I0002	FLDCT	410	27.1	908	533
HB Floor (SU #4)	I000200004	23	09-Aug-02	117	10	5	I0002	FLDCT	410	27.1	855	533
HB Floor (SU #4)	I000200004	24	09-Aug-02	107	10	5	I0002	FLDCT	410	27.1	679	533
HB Floor (SU #4)	I000200004	25	09-Aug-02	105	10	5	I0002	FLDCT	410	27.1	644	533
HB Floor (SU #4)	I000200004	26	09-Aug-02	104	10	5	I0002	FLDCT	410	27.1	627	533
HB Floor (SU #4)	I000200004	27	09-Aug-02	94	10	5	I0002	FLDCT	410	27.1	451	533
HB Floor (SU #4)	I000200004	28	09-Aug-02	145	10	5	I0002	FLDCT	410	27.1	1347	533
HB Floor (SU #4)	I000200004	29	09-Aug-02	93	10	5	I0002	FLDCT	410	27.1	433	533
HB Floor (SU #4)	I000200004	30	09-Aug-02	103	10	5	I0002	FLDCT	410	27.1	609	533
HB Floor (SU #4)	I000200004	31	09-Aug-02	86	10	5	I0002	FLDCT	410	27.1	310	533
HB Floor (SU #4)	I000200004	32	09-Aug-02	111	10	5	I0002	FLDCT	410	27.1	750	533
HB Floor (SU #4)	I000200004	33	09-Aug-02	93	10	5	I0002	FLDCT	410	27.1	433	533
HB Floor (SU #4)	I000200004	34	09-Aug-02	117	10	5	I0002	FLDCT	410	27.1	855	533
HB Floor (SU #4)	I000200004	35	09-Aug-02	96	10	5	I0002	FLDCT	410	27.1	486	533
HB Floor (SU #4)	I000200004	36	09-Aug-02	121	10	5	I0002	FLDCT	410	27.1	925	533
HB Floor (SU #4)	I000200004	37	09-Aug-02	104	10	5	I0002	FLDCT	410	27.1	627	533
HB Floor (SU #4)	I000200004	38	09-Aug-02	97	10	5	I0002	FLDCT	410	27.1	504	533
HB Floor (SU #4)	I000200004	39	09-Aug-02	96	10	5	I0002	FLDCT	410	27.1	486	533
HB Floor (SU #4)	I000200004	40	09-Aug-02	2090	300	5	I0002	FLDBK				
										NUM	35	
										MEAN	714	
										STAN DE	228	
										MAX	1347	

Description	Location	Sample #	Date	Count	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Attic Floor (SU #5)	I000200005	41	11-Aug-02	80	10	12	I0002	FLDCT	384	23.3	328	602
HB Attic Floor (SU #5)	I000200005	42	11-Aug-02	60	10	12	I0002	FLDCT	384	23.3	-81	602
HB Attic Floor (SU #5)	I000200005	43	11-Aug-02	62	10	12	I0002	FLDCT	384	23.3	-40	602
HB Attic Floor (SU #5)	I000200005	44	11-Aug-02	76	10	12	I0002	FLDCT	384	23.3	246	602
HB Attic Floor (SU #5)	I000200005	45	11-Aug-02	78	10	12	I0002	FLDCT	384	23.3	287	602
HB Attic Floor (SU #5)	I000200005	46	11-Aug-02	68	10	12	I0002	FLDCT	384	23.3	82	602
HB Attic Floor (SU #5)	I000200005	47	11-Aug-02	63	10	12	I0002	FLDCT	384	23.3	-20	602
HB Attic Floor (SU #5)	I000200005	48	11-Aug-02	56	10	12	I0002	FLDCT	384	23.3	-163	602
HB Attic Floor (SU #5)	I000200005	49	11-Aug-02	53	10	12	I0002	FLDCT	384	23.3	-224	602
HB Attic Floor (SU #5)	I000200005	50	11-Aug-02	55	10	12	I0002	FLDCT	384	23.3	-183	602
HB Attic Floor (SU #5)	I000200005	51	11-Aug-02	76	10	12	I0002	FLDCT	384	23.3	246	602
HB Attic Floor (SU #5)	I000200005	52	11-Aug-02	57	10	12	I0002	FLDCT	384	23.3	-142	602
HB Attic Floor (SU #5)	I000200005	53	11-Aug-02	68	10	12	I0002	FLDCT	384	23.3	82	602
HB Attic Floor (SU #5)	I000200005	54	11-Aug-02	71	10	12	I0002	FLDCT	384	23.3	144	602
HB Attic Floor (SU #5)	I000200005	55	11-Aug-02	65	10	12	I0002	FLDCT	384	23.3	21	602
HB Attic Floor (SU #5)	I000200005	56	11-Aug-02	79	10	12	I0002	FLDCT	384	23.3	307	602
HB Attic Floor (SU #5)	I000200005	57	11-Aug-02	70	10	12	I0002	FLDCT	384	23.3	123	602
HB Attic Floor (SU #5)	I000200005	58	11-Aug-02	52	10	12	I0002	FLDCT	384	23.3	-245	602
HB Attic Floor (SU #5)	I000200005	59	11-Aug-02	84	10	12	I0002	FLDCT	384	23.3	409	602
HB Attic Floor (SU #5)	I000200005	60	11-Aug-02	63	10	12	I0002	FLDCT	384	23.3	-20	602
HB Attic Floor (SU #5)	I000200005	61	11-Aug-02	58	10	12	I0002	FLDCT	384	23.3	-122	602
HB Attic Floor (SU #5)	I000200005	62	11-Aug-02	68	10	12	I0002	FLDCT	384	23.3	82	602
HB Attic Floor (SU #5)	I000200005	63	11-Aug-02	65	10	12	I0002	FLDCT	384	23.3	21	602
HB Attic Floor (SU #5)	I000200005	64	11-Aug-02	67	10	12	I0002	FLDCT	384	23.3	62	602
HB Attic Floor (SU #5)	I000200005	65	11-Aug-02	61	10	12	I0002	FLDCT	384	23.3	-61	602
HB Attic Floor (SU #5)	I000200005	66	11-Aug-02	99	10	12	I0002	FLDCT	384	23.3	716	602
HB Attic Floor (SU #5)	I000200005	67	11-Aug-02	84	10	12	I0002	FLDCT	384	23.3	409	602
HB Attic Floor (SU #5)	I000200005	68	11-Aug-02	66	10	12	I0002	FLDCT	384	23.3	42	602
HB Attic Floor (SU #5)	I000200005	69	11-Aug-02	83	10	12	I0002	FLDCT	384	23.3	389	602
HB Attic Floor (SU #5)	I000200005	70	11-Aug-02	63	10	12	I0002	FLDCT	384	23.3	-20	602
HB Attic Floor (SU #5)	I000200005	71	11-Aug-02	1919	300	12	I0002	FLDBK				
										NUM	30	
										MEAN	89	
										STAN DEV	223	
										MAX	716	

Description	Location	Sample #	Date	Counts	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Wall (SU #6)	I000200006	0	10-Aug-02	1966	300	10	I0002	FLDBK				
HB Wall (SU #6)	I000200006	1	10-Aug-02	84	10	10	I0002	FLDCT	420	22.7	293	644
HB Wall (SU #6)	I000200006	2	10-Aug-02	109	10	10	I0002	FLDCT	420	22.7	817	644
HB Wall (SU #6)	I000200006	3	10-Aug-02	89	10	10	I0002	FLDCT	420	22.7	398	644
HB Wall (SU #6)	I000200006	4	10-Aug-02	76	10	10	I0002	FLDCT	420	22.7	167	644
HB Wall (SU #6)	I000200006	5	10-Aug-02	120	10	10	I0002	FLDCT	420	22.7	1048	644
HB Wall (SU #6)	I000200006	6	10-Aug-02	89	10	10	I0002	FLDCT	420	22.7	398	644
HB Wall (SU #6)	I000200006	7	10-Aug-02	114	10	10	I0002	FLDCT	420	22.7	922	644
HB Wall (SU #6)	I000200006	8	10-Aug-02	65	10	10	I0002	FLDCT	420	22.7	-106	644
HB Wall (SU #6)	I000200006	9	10-Aug-02	72	10	10	I0002	FLDCT	420	22.7	41	644
HB Wall (SU #6)	I000200006	10	10-Aug-02	140	10	10	I0002	FLDCT	420	22.7	1468	644
HB Wall (SU #6)	I000200006	11	10-Aug-02	209	10	10	I0002	FLDCT	420	22.7	2915	644
HB Wall (SU #6)	I000200006	12	10-Aug-02	68	10	10	I0002	FLDCT	420	22.7	-43	644
HB Wall (SU #6)	I000200006	13	10-Aug-02	81	10	10	I0002	FLDCT	420	22.7	230	644
HB Wall (SU #6)	I000200006	14	10-Aug-02	90	10	10	I0002	FLDCT	420	22.7	419	644
HB Wall (SU #6)	I000200006	15	10-Aug-02	87	10	10	I0002	FLDCT	420	22.7	356	644
HB Wall (SU #6)	I000200006	16	10-Aug-02	94	10	10	I0002	FLDCT	420	22.7	503	644
HB Wall (SU #6)	I000200006	17	10-Aug-02	113	10	10	I0002	FLDCT	420	22.7	901	644
HB Wall (SU #6)	I000200006	18	10-Aug-02	79	10	10	I0002	FLDCT	420	22.7	188	644
HB Wall (SU #6)	I000200006	19	10-Aug-02	107	10	10	I0002	FLDCT	420	22.7	775	644
HB Wall (SU #6)	I000200006	20	10-Aug-02	97	10	10	I0002	FLDCT	420	22.7	566	644
HB Wall (SU #6)	I000200006	21	10-Aug-02	87	10	10	I0002	FLDCT	420	22.7	356	644
HB Wall (SU #6)	I000200006	22	10-Aug-02	68	10	10	I0002	FLDCT	420	22.7	-43	644
HB Wall (SU #6)	I000200006	23	10-Aug-02	100	10	10	I0002	FLDCT	420	22.7	629	644
HB Wall (SU #6)	I000200006	24	10-Aug-02	51	10	10	I0002	FLDCT	420	22.7	-399	644
HB Wall (SU #6)	I000200006	25	10-Aug-02	86	10	10	I0002	FLDCT	420	22.7	335	644
HB Wall (SU #6)	I000200006	26	10-Aug-02	88	10	10	I0002	FLDCT	420	22.7	377	644
HB Wall (SU #6)	I000200006	27	10-Aug-02	82	10	10	I0002	FLDCT	420	22.7	251	644
HB Wall (SU #6)	I000200006	28	10-Aug-02	81	10	10	I0002	FLDCT	420	22.7	230	644
HB Wall (SU #6)	I000200006	29	10-Aug-02	100	10	10	I0002	FLDCT	420	22.7	629	644
HB Wall (SU #6)	I000200006	30	10-Aug-02	62	10	10	I0002	FLDCT	420	22.7	-169	644
HB Wall (SU #6)	I000200006	31	10-Aug-02	2236	300	10	I0002	FLDBK				
										NUM	30	
										MEAN	482	
										STAN DEV	605	
										MAX	2915	

Description	Location	Sample #	Date	Count	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Wall (SU #7)	I000200007	0	10-Aug-02	2242	300	12	I0002	FLDBK				
HB Wall (SU #7)	I000200007	1	10-Aug-02	81	10	12	I0002	FLDCT	412	23.3	252	622
HB Wall (SU #7)	I000200007	10	10-Aug-02	105	10	12	I0002	FLDCT	412	23.3	743	622
HB Wall (SU #7)	I000200007	11	10-Aug-02	104	10	12	I0002	FLDCT	412	23.3	722	622
HB Wall (SU #7)	I000200007	12	10-Aug-02	87	10	12	I0002	FLDCT	412	23.3	375	622
HB Wall (SU #7)	I000200007	13	10-Aug-02	77	10	12	I0002	FLDCT	412	23.3	171	622
HB Wall (SU #7)	I000200007	14	10-Aug-02	94	10	12	I0002	FLDCT	412	23.3	518	622
HB Wall (SU #7)	I000200007	15	10-Aug-02	86	10	12	I0002	FLDCT	412	23.3	354	622
HB Wall (SU #7)	I000200007	16	10-Aug-02	65	10	12	I0002	FLDCT	412	23.3	-75	622
HB Wall (SU #7)	I000200007	17	10-Aug-02	77	10	12	I0002	FLDCT	412	23.3	171	622
HB Wall (SU #7)	I000200007	18	10-Aug-02	94	10	12	I0002	FLDCT	412	23.3	518	622
HB Wall (SU #7)	I000200007	19	10-Aug-02	75	10	12	I0002	FLDCT	412	23.3	130	622
HB Wall (SU #7)	I000200007	2	10-Aug-02	86	10	12	I0002	FLDCT	412	23.3	354	622
HB Wall (SU #7)	I000200007	20	10-Aug-02	60	10	12	I0002	FLDCT	412	23.3	-177	622
HB Wall (SU #7)	I000200007	3	10-Aug-02	116	10	12	I0002	FLDCT	412	23.3	968	622
HB Wall (SU #7)	I000200007	4	10-Aug-02	103	10	12	I0002	FLDCT	412	23.3	702	622
HB Wall (SU #7)	I000200007	5	10-Aug-02	108	10	12	I0002	FLDCT	412	23.3	804	622
HB Wall (SU #7)	I000200007	6	10-Aug-02	117	10	12	I0002	FLDCT	412	23.3	988	622
HB Wall (SU #7)	I000200007	7	10-Aug-02	104	10	12	I0002	FLDCT	412	23.3	722	622
HB Wall (SU #7)	I000200007	8	10-Aug-02	98	10	12	I0002	FLDCT	412	23.3	600	622
HB Wall (SU #7)	I000200007	9	10-Aug-02	69	10	12	I0002	FLDCT	412	23.3	7	622
HB Wall (SU #7)	I000200007	31	11-Aug-02	90	10	12	I0002	FLDCT	412	23.3	436	622
HB Wall (SU #7)	I000200007	32	11-Aug-02	93	10	12	I0002	FLDCT	412	23.3	498	622
HB Wall (SU #7)	I000200007	33	11-Aug-02	96	10	12	I0002	FLDCT	412	23.3	559	622
HB Wall (SU #7)	I000200007	34	11-Aug-02	104	10	12	I0002	FLDCT	412	23.3	722	622
HB Wall (SU #7)	I000200007	35	11-Aug-02	44	10	12	I0002	FLDCT	412	23.3	-504	622
HB Wall (SU #7)	I000200007	36	11-Aug-02	106	10	12	I0002	FLDCT	412	23.3	763	622
HB Wall (SU #7)	I000200007	37	11-Aug-02	80	10	12	I0002	FLDCT	412	23.3	232	622
HB Wall (SU #7)	I000200007	38	11-Aug-02	98	10	12	I0002	FLDCT	412	23.3	600	622
HB Wall (SU #7)	I000200007	39	11-Aug-02	109	10	12	I0002	FLDCT	412	23.3	825	622
HB Wall (SU #7)	I000200007	40	11-Aug-02	80	10	12	I0002	FLDCT	412	23.3	232	622
HB Wall (SU #7)	I000200007	30	11-Aug-02	1921	300	12	I0002	FLDBK				
HB Wall (SU #7)	I000200007	21	10-Aug-02	2016	300	12	I0002	FLDBK				

NUM	30
MEAN	440
STAN DE	350
MAX	988

Description	Location	Sample #	Date	Counts	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Wall (SU #8)	I000200008	0	10-Aug-02	1833	300	11	I0002	FLDBK				
HB Wall (SU #8)	I000200008	1	10-Aug-02	64	10	11	I0002	FLDCT	392	22.7	-28	624
HB Wall (SU #8)	I000200008	2	10-Aug-02	113	10	11	I0002	FLDCT	392	22.7	1000	624
HB Wall (SU #8)	I000200008	3	10-Aug-02	81	10	11	I0002	FLDCT	392	22.7	329	624
HB Wall (SU #8)	I000200008	4	10-Aug-02	78	10	11	I0002	FLDCT	392	22.7	266	624
HB Wall (SU #8)	I000200008	5	10-Aug-02	87	10	11	I0002	FLDCT	392	22.7	455	624
HB Wall (SU #8)	I000200008	6	10-Aug-02	94	10	11	I0002	FLDCT	392	22.7	602	624
HB Wall (SU #8)	I000200008	7	10-Aug-02	73	10	11	I0002	FLDCT	392	22.7	161	624
HB Wall (SU #8)	I000200008	8	10-Aug-02	91	10	11	I0002	FLDCT	392	22.7	539	624
HB Wall (SU #8)	I000200008	9	10-Aug-02	76	10	11	I0002	FLDCT	392	22.7	224	624
HB Wall (SU #8)	I000200008	10	10-Aug-02	90	10	11	I0002	FLDCT	392	22.7	518	624
HB Wall (SU #8)	I000200008	11	10-Aug-02	84	10	11	I0002	FLDCT	392	22.7	392	624
HB Wall (SU #8)	I000200008	12	10-Aug-02	111	10	11	I0002	FLDCT	392	22.7	958	624
HB Wall (SU #8)	I000200008	13	10-Aug-02	75	10	11	I0002	FLDCT	392	22.7	203	624
HB Wall (SU #8)	I000200008	14	10-Aug-02	80	10	11	I0002	FLDCT	392	22.7	308	624
HB Wall (SU #8)	I000200008	15	10-Aug-02	91	10	11	I0002	FLDCT	392	22.7	539	624
HB Wall (SU #8)	I000200008	16	10-Aug-02	101	10	11	I0002	FLDCT	392	22.7	749	624
HB Wall (SU #8)	I000200008	17	10-Aug-02	90	10	11	I0002	FLDCT	392	22.7	518	624
HB Wall (SU #8)	I000200008	18	10-Aug-02	56	10	11	I0002	FLDCT	392	22.7	-195	624
HB Wall (SU #8)	I000200008	19	10-Aug-02	61	10	11	I0002	FLDCT	392	22.7	-91	624
HB Wall (SU #8)	I000200008	20	10-Aug-02	81	10	11	I0002	FLDCT	392	22.7	329	624
HB Wall (SU #8)	I000200008	21	10-Aug-02	82	10	11	I0002	FLDCT	392	22.7	350	624
HB Wall (SU #8)	I000200008	22	10-Aug-02	82	10	11	I0002	FLDCT	392	22.7	350	624
HB Wall (SU #8)	I000200008	23	10-Aug-02	88	10	11	I0002	FLDCT	392	22.7	476	624
HB Wall (SU #8)	I000200008	24	10-Aug-02	72	10	11	I0002	FLDCT	392	22.7	140	624
HB Wall (SU #8)	I000200008	25	10-Aug-02	65	10	11	I0002	FLDCT	392	22.7	-7	624
HB Wall (SU #8)	I000200008	26	10-Aug-02	38	10	11	I0002	FLDCT	392	22.7	-573	624
HB Wall (SU #8)	I000200008	27	10-Aug-02	103	10	11	I0002	FLDCT	392	22.7	791	624
HB Wall (SU #8)	I000200008	28	10-Aug-02	83	10	11	I0002	FLDCT	392	22.7	371	624
HB Wall (SU #8)	I000200008	29	10-Aug-02	74	10	11	I0002	FLDCT	392	22.7	182	624
HB Wall (SU #8)	I000200008	30	10-Aug-02	66	10	11	I0002	FLDCT	392	22.7	14	624
HB Wall (SU #8)	I000200008	31	10-Aug-02	2086	300	11	I0002	FLDBK				
										NUM	30	
										MEAN	329	
										STAN DEV	334	
										MAX	1000	

Description	Location	Sample Number	Date	Counts	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Wall (SU #9)	I000200009	0	10-Aug-02	1525	300	9	I0002	FLDBK				
HB Wall (SU #9)	I000200009	1	10-Aug-02	48	10	9	I0002	FLDCT	321.8	23	-118	571
HB Wall (SU #9)	I000200009	2	10-Aug-02	71	10	9	I0002	FLDCT	321.8	23	364	571
HB Wall (SU #9)	I000200009	3	10-Aug-02	81	10	9	I0002	FLDCT	321.8	23	574	571
HB Wall (SU #9)	I000200009	4	10-Aug-02	64	10	9	I0002	FLDCT	321.8	23	217	571
HB Wall (SU #9)	I000200009	5	10-Aug-02	72	10	9	I0002	FLDCT	321.8	23	385	571
HB Wall (SU #9)	I000200009	6	10-Aug-02	48	10	9	I0002	FLDCT	321.8	23	-118	571
HB Wall (SU #9)	I000200009	7	10-Aug-02	51	10	9	I0002	FLDCT	321.8	23	-55	571
HB Wall (SU #9)	I000200009	8	10-Aug-02	56	10	9	I0002	FLDCT	321.8	23	50	571
HB Wall (SU #9)	I000200009	9	10-Aug-02	65	10	9	I0002	FLDCT	321.8	23	238	571
HB Wall (SU #9)	I000200009	10	10-Aug-02	51	10	9	I0002	FLDCT	321.8	23	-55	571
HB Wall (SU #9)	I000200009	11	10-Aug-02	75	10	9	I0002	FLDCT	321.8	23	448	571
HB Wall (SU #9)	I000200009	12	10-Aug-02	57	10	9	I0002	FLDCT	321.8	23	71	571
HB Wall (SU #9)	I000200009	13	10-Aug-02	44	10	9	I0002	FLDCT	321.8	23	-202	571
HB Wall (SU #9)	I000200009	14	10-Aug-02	54	10	9	I0002	FLDCT	321.8	23	8	571
HB Wall (SU #9)	I000200009	15	10-Aug-02	78	10	9	I0002	FLDCT	321.8	23	511	571
HB Wall (SU #9)	I000200009	16	10-Aug-02	85	10	9	I0002	FLDCT	321.8	23	658	571
HB Wall (SU #9)	I000200009	17	10-Aug-02	60	10	9	I0002	FLDCT	321.8	23	134	571
HB Wall (SU #9)	I000200009	18	10-Aug-02	60	10	9	I0002	FLDCT	321.8	23	134	571
HB Wall (SU #9)	I000200009	19	10-Aug-02	52	10	9	I0002	FLDCT	321.8	23	-34	571
HB Wall (SU #9)	I000200009	20	10-Aug-02	65	10	9	I0002	FLDCT	321.8	23	238	571
HB Wall (SU #9)	I000200009	21	10-Aug-02	63	10	9	I0002	FLDCT	321.8	23	196	571
HB Wall (SU #9)	I000200009	22	10-Aug-02	49	10	9	I0002	FLDCT	321.8	23	-97	571
HB Wall (SU #9)	I000200009	23	10-Aug-02	51	10	9	I0002	FLDCT	321.8	23	-55	571
HB Wall (SU #9)	I000200009	24	10-Aug-02	55	10	9	I0002	FLDCT	321.8	23	29	571
HB Wall (SU #9)	I000200009	25	10-Aug-02	50	10	9	I0002	FLDCT	321.8	23	-76	571
HB Wall (SU #9)	I000200009	26	10-Aug-02	60	10	9	I0002	FLDCT	321.8	23	134	571
HB Wall (SU #9)	I000200009	27	10-Aug-02	57	10	9	I0002	FLDCT	321.8	23	71	571
HB Wall (SU #9)	I000200009	28	10-Aug-02	58	10	9	I0002	FLDCT	321.8	23	92	571
HB Wall (SU #9)	I000200009	29	10-Aug-02	62	10	9	I0002	FLDCT	321.8	23	176	571
HB Wall (SU #9)	I000200009	30	10-Aug-02	1693	300	9	I0002	FLDBK				
										NUM	29	
										MEAN	135	
										STAN DE	222	
										MAX	658	

Description	Location	Sample #	Date	Counts	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Overhead (SU #10)	I000200010	0	11-Aug-02	1624	300	14	I0002	FLDBK				
HB Overhead (SU #10)	I000200010	1	11-Aug-02	58	10	14	I0002	FLDCT	325	23.3	79	558
HB Overhead (SU #10)	I000200010	10	11-Aug-02	54	10	14	I0002	FLDCT	325	23.3	-3	558
HB Overhead (SU #10)	I000200010	11	11-Aug-02	78	10	14	I0002	FLDCT	325	23.3	488	558
HB Overhead (SU #10)	I000200010	12	11-Aug-02	64	10	14	I0002	FLDCT	325	23.3	202	558
HB Overhead (SU #10)	I000200010	13	11-Aug-02	52	10	14	I0002	FLDCT	325	23.3	-44	558
HB Overhead (SU #10)	I000200010	14	11-Aug-02	39	10	14	I0002	FLDCT	325	23.3	-309	558
HB Overhead (SU #10)	I000200010	15	11-Aug-02	52	10	14	I0002	FLDCT	325	23.3	-44	558
HB Overhead (SU #10)	I000200010	16	11-Aug-02	49	10	14	I0002	FLDCT	325	23.3	-105	558
HB Overhead (SU #10)	I000200010	17	11-Aug-02	57	10	14	I0002	FLDCT	325	23.3	59	558
HB Overhead (SU #10)	I000200010	18	11-Aug-02	45	10	14	I0002	FLDCT	325	23.3	-187	558
HB Overhead (SU #10)	I000200010	19	11-Aug-02	37	10	14	I0002	FLDCT	325	23.3	-350	558
HB Overhead (SU #10)	I000200010	2	11-Aug-02	63	10	14	I0002	FLDCT	325	23.3	181	558
HB Overhead (SU #10)	I000200010	20	11-Aug-02	45	10	14	I0002	FLDCT	325	23.3	-187	558
HB Overhead (SU #10)	I000200010	21	11-Aug-02	65	10	14	I0002	FLDCT	325	23.3	222	558
HB Overhead (SU #10)	I000200010	22	11-Aug-02	74	10	14	I0002	FLDCT	325	23.3	406	558
HB Overhead (SU #10)	I000200010	23	11-Aug-02	73	10	14	I0002	FLDCT	325	23.3	386	558
HB Overhead (SU #10)	I000200010	24	11-Aug-02	75	10	14	I0002	FLDCT	325	23.3	426	558
HB Overhead (SU #10)	I000200010	25	11-Aug-02	68	10	14	I0002	FLDCT	325	23.3	283	558
HB Overhead (SU #10)	I000200010	26	11-Aug-02	62	10	14	I0002	FLDCT	325	23.3	161	558
HB Overhead (SU #10)	I000200010	27	11-Aug-02	67	10	14	I0002	FLDCT	325	23.3	263	558
HB Overhead (SU #10)	I000200010	28	11-Aug-02	50	10	14	I0002	FLDCT	325	23.3	-84	558
HB Overhead (SU #10)	I000200010	29	11-Aug-02	60	10	14	I0002	FLDCT	325	23.3	120	558
HB Overhead (SU #10)	I000200010	3	11-Aug-02	61	10	14	I0002	FLDCT	325	23.3	140	558
HB Overhead (SU #10)	I000200010	30	11-Aug-02	57	10	14	I0002	FLDCT	325	23.3	59	558
HB Overhead (SU #10)	I000200010	31	11-Aug-02	1756	300	14	I0002	FLDBK	325	23.3	90	130
HB Overhead (SU #10)	I000200010	4	11-Aug-02	57	10	14	I0002	FLDCT	325	23.3	59	558
HB Overhead (SU #10)	I000200010	5	11-Aug-02	63	10	14	I0002	FLDCT	325	23.3	181	558
HB Overhead (SU #10)	I000200010	6	11-Aug-02	40	10	14	I0002	FLDCT	325	23.3	-289	558
HB Overhead (SU #10)	I000200010	7	11-Aug-02	62	10	14	I0002	FLDCT	325	23.3	161	558
HB Overhead (SU #10)	I000200010	8	11-Aug-02	63	10	14	I0002	FLDCT	325	23.3	181	558
HB Overhead (SU #10)	I000200010	9	11-Aug-02	53	10	14	I0002	FLDCT	325	23.3	-23	558

NUM	31
MEAN	81
STAN DEV	214
MAX	488

Descriotion	Location	Sample Number	Date	Counts	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Vents (SU #11)	I000200011	0	11-Aug-02	1860	300	13	I0002	FLDBK				
HB Vents (SU #11)	I000200011	1	11-Aug-02	62	10	13	I0002	FLDCT	372	23.3	0	594
HB Vents (SU #11)	I000200011	10	11-Aug-02	50	10	13	I0002	FLDCT	372	23.3	-245	594
HB Vents (SU #11)	I000200011	11	11-Aug-02	48	10	13	I0002	FLDCT	372	23.3	-286	594
HB Vents (SU #11)	I000200011	12	11-Aug-02	74.00001	10	13	I0002	FLDCT	372	23.3	245	594
HB Vents (SU #11)	I000200011	13	11-Aug-02	66	10	13	I0002	FLDCT	372	23.3	82	594
HB Vents (SU #11)	I000200011	14	11-Aug-02	64.00001	10	13	I0002	FLDCT	372	23.3	41	594
HB Vents (SU #11)	I000200011	15	11-Aug-02	56	10	13	I0002	FLDCT	372	23.3	-123	594
HB Vents (SU #11)	I000200011	16	11-Aug-02	73	10	13	I0002	FLDCT	372	23.3	225	594
HB Vents (SU #11)	I000200011	17	11-Aug-02	85	10	13	I0002	FLDCT	372	23.3	470	594
HB Vents (SU #11)	I000200011	18	11-Aug-02	75	10	13	I0002	FLDCT	372	23.3	266	594
HB Vents (SU #11)	I000200011	19	11-Aug-02	88	10	13	I0002	FLDCT	372	23.3	531	594
HB Vents (SU #11)	I000200011	2	11-Aug-02	70	10	13	I0002	FLDCT	372	23.3	163	594
HB Vents (SU #11)	I000200011	20	11-Aug-02	72	10	13	I0002	FLDCT	372	23.3	204	594
HB Vents (SU #11)	I000200011	21	11-Aug-02	1584	300	13	I0002	FLDBK	372	23.3	-188	139
HB Vents (SU #11)	I000200011	3	11-Aug-02	55	10	13	I0002	FLDCT	372	23.3	-143	594
HB Vents (SU #11)	I000200011	4	11-Aug-02	65	10	13	I0002	FLDCT	372	23.3	61	594
HB Vents (SU #11)	I000200011	5	11-Aug-02	65	10	13	I0002	FLDCT	372	23.3	61	594
HB Vents (SU #11)	I000200011	6	11-Aug-02	59	10	13	I0002	FLDCT	372	23.3	-61	594
HB Vents (SU #11)	I000200011	7	11-Aug-02	52	10	13	I0002	FLDCT	372	23.3	-204	594
HB Vents (SU #11)	I000200011	8	11-Aug-02	69.00001	10	13	I0002	FLDCT	372	23.3	143	594
HB Vents (SU #11)	I000200011	9	11-Aug-02	43	10	13	I0002	FLDCT	372	23.3	-388	594

NUM	21
MEAN	41
STAN DEV	241
MAX	531

Description	Location	Sample #	Date	Counts	Count Time	Raw File	Package ID	Count Type	BKG	EFF	Activity	MDA
HB Pit (SU #12)	I000200012	0	11-Aug-02	3709	600	15	I0002	FLDBK				
HB Pit (SU #12)	I000200012	1	11-Aug-02	100	10	15	I0002	FLDCT	381	23.3	746	600
HB Pit (SU #12)	I000200012	2	11-Aug-02	81	10	15	I0002	FLDCT	381	23.3	358	600
HB Pit (SU #12)	I000200012	3	11-Aug-02	82	10	15	I0002	FLDCT	381	23.3	378	600
HB Pit (SU #12)	I000200012	4	11-Aug-02	92	10	15	I0002	FLDCT	381	23.3	583	600
HB Pit (SU #12)	I000200012	5	11-Aug-02	93	10	15	I0002	FLDCT	381	23.3	603	600
HB Pit (SU #12)	I000200012	6	11-Aug-02	98	10	15	I0002	FLDCT	381	23.3	705	600
HB Pit (SU #12)	I000200012	7	11-Aug-02	97	10	15	I0002	FLDCT	381	23.3	685	600
HB Pit (SU #12)	I000200012	8	11-Aug-02	90	10	15	I0002	FLDCT	381	23.3	542	600
HB Pit (SU #12)	I000200012	9	11-Aug-02	75	10	15	I0002	FLDCT	381	23.3	235	600
HB Pit (SU #12)	I000200012	10	11-Aug-02	79	10	15	I0002	FLDCT	381	23.3	317	600
HB Pit (SU #12)	I000200012	11	11-Aug-02	96	10	15	I0002	FLDCT	381	23.3	664	600
HB Pit (SU #12)	I000200012	12	11-Aug-02	100	10	15	I0002	FLDCT	381	23.3	746	600
HB Pit (SU #12)	I000200012	13	11-Aug-02	83	10	15	I0002	FLDCT	381	23.3	399	600
HB Pit (SU #12)	I000200012	14	11-Aug-02	101	10	15	I0002	FLDCT	381	23.3	767	600
HB Pit (SU #12)	I000200012	15	11-Aug-02	94	10	15	I0002	FLDCT	381	23.3	624	600
HB Pit (SU #12)	I000200012	16	11-Aug-02	87	10	15	I0002	FLDCT	381	23.3	480	600
HB Pit (SU #12)	I000200012	17	11-Aug-02	99	10	15	I0002	FLDCT	381	23.3	726	600
HB Pit (SU #12)	I000200012	18	11-Aug-02	80	10	15	I0002	FLDCT	381	23.3	337	600
HB Pit (SU #12)	I000200012	19	11-Aug-02	90	10	15	I0002	FLDCT	381	23.3	542	600
HB Pit (SU #12)	I000200012	20	11-Aug-02	77	10	15	I0002	FLDCT	381	23.3	276	600
HB Pit (SU #12)	I000200012	21	11-Aug-02	74	10	15	I0002	FLDCT	381	23.3	215	600
HB Pit (SU #12)	I000200012	22	11-Aug-02	94	10	15	I0002	FLDCT	381	23.3	624	600
HB Pit (SU #12)	I000200012	23	11-Aug-02	87	10	15	I0002	FLDCT	381	23.3	480	600
HB Pit (SU #12)	I000200012	24	11-Aug-02	76	10	15	I0002	FLDCT	381	23.3	256	600
HB Pit (SU #12)	I000200012	25	11-Aug-02	95	10	15	I0002	FLDCT	381	23.3	644	600
HB Pit (SU #12)	I000200012	26	11-Aug-02	85	10	15	I0002	FLDCT	381	23.3	440	600
HB Pit (SU #12)	I000200012	27	11-Aug-02	84	10	15	I0002	FLDCT	381	23.3	419	600
HB Pit (SU #12)	I000200012	28	11-Aug-02	88	10	15	I0002	FLDCT	381	23.3	501	600
HB Pit (SU #12)	I000200012	29	11-Aug-02	89	10	15	I0002	FLDCT	381	23.3	521	600
HB Pit (SU #12)	I000200012	30	11-Aug-02	99	10	15	I0002	FLDCT	381	23.3	726	600
HB Pit (SU #12)	I000200012	31	11-Aug-02	1955	300	15	I0002	FLDBK				

NUM	30
MEAN	518
STAN DEV	170
MAX	767

This is to acknowledge the receipt of your letter/application dated

3/26/2007, and to inform you that the initial processing which includes an administrative review has been performed.

☑ ENVIRON. ASSESSMENT SUB-348
There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

☐ Please provide to this office within 30 days of your receipt of this card

_____.

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 140310.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

NRC FORM 532 (RI)
(6-96)

Sincerely,
Licensing Assistance Team Leader