ADDENDUM A
NRC LICENSE TERMINATION REPORT
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

DATA EVALUATION USING THE SCENARIO A NULL HYPOTHESIS

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Attachment 1	NRC Correspondence, September and October 2005
Attachment 2	Corrected Instrument Function Check Data from Depleted Uranium Igloo and Building Surveys

1.0 INTRODUCTION

1.1 PURPOSE OF ADDENDUM

The purpose of this addendum is to report the results of the use of the MARSSIM Scenario A null hypothesis (NRC, 2000) to evaluate radiological survey data in support of the termination of Nuclear Regulatory Commission (NRC) license SUC-1275, held by the US Army at Seneca Army Depot Activity (SEDA). Where noted, the information in this addendum supersedes information presented in the *NRC License Termination Report for Seneca Army Depot Activity* (the Report; Parsons, June 2004). Survey data in the Report were evaluated using the MARSSIM Scenario B approach that was ultimately rejected by NRC staff in correspondence dated September 7, 2005 (**Attachment 1**). Per a subsequent teleconference with the NRC staff on October 18, 2005, it was determined that an addendum presenting the results evaluated using MARSSIM Scenario A would be acceptable to continue the NRC license termination process at SEDA (**Attachment 1**).

1.2 ORGANIZATION OF ADDENDUM

The structure of Addendum A closely follows the organization of the Report. **Section 1** is the introduction. **Section 2** presents supplemental information, including the revised compliance approach and some additional details on changes from the original data evaluation. **Section 3** presents the results of the evaluation of survey data from the depleted uranium storage igloos, while **Section 4** presents the results of the survey data evaluation for the depleted uranium storage buildings. **Section 5** discusses the results of the evaluation of survey data from Building 612. **Section 6** of this addendum presents the conclusions from the use of MARSSIM Scenario A, and **Section 7** lists the references cited. In addition, a compact disc included with this addendum contains additional electronic files with spreadsheets of statistical tests and attachments of updated information.

2.0 SUPPLEMENTAL INFORMATION

2.1 COMPLIANCE APPROACH (supersedes Section 2.6 of the Report)

Survey data from SEDA were evaluated using the MARSSIM Scenario A null hypothesis that assumes that the median survey unit measurement exceeds that of the reference area by more than the wide area derived concentration guideline level ($DCGL_W$). In other words, the survey unit is assumed not to meet the release criterion unless it is statistically proven to be clean. The DCGLs developed in the License Termination Plan (LTP, **Appendix 1.A**) are presented in **Table A2-1**, and the gross activity DCGL calculation for depleted uranium is detailed in **Table A2-2**. Since all of the survey units potentially impacted by licensed commodities consisted of interior surfaces of buildings or structures, only the surface activity DCGLs were used in the evaluation of survey data in this addendum. The survey data were evaluated per the method described in MARSSIM Section 8 for measurements with the radionuclides of concern present in background. This method is summarized in **Table A2-3** and **Figure A2-1**. Summary statistics of the background datasets used in the statistical evaluation of the survey data presented in this addendum are presented in **Table A2-4.**

2.2 ADDITIONAL CHANGES FROM REPORT

In the course of preparing this addendum, rounding errors, typos, and other conversion errors were discovered in the Report, and have been corrected and/or updated in the tables included in this addendum. Updated or corrected information, where appropriate, has been shaded in the addendum tables to indicate a change from the Report. Global changes are discussed in further detail below, and are summarized in **Table A2-5**. Additional table-specific changes also appear in **Table A2-5**.

Information about the activities of the check sources used for the instrument function checks for the 2002 depleted uranium storage igloo and building surveys was corrected. In particular, the activity of the americium-241 (Am-241) source used for the FIDLER function checks was incorrect. The correct activity was added to the function check control sheets, and an updated average instrument efficiency was calculated and used in the determination of the instrument-specific DCGLs. The updated control sheets from the 2002 surveys (superseding Appendices 3.A and 4.A of the Report) are included with this addendum as **Attachment 2**.

Another global change was a correction in the weight fractions for the constituents of depleted uranium. The 0.0006% by weight for U-234 listed in WHO, 2001, was incorrectly included in the calculations as 0.0008%. Also, the probe areas for phoswich, floor monitor, and handheld gas proportional detectors were changed from the "open" area to the "physical" or "active" area, per MARSSIM Section 6.6.1.

3.0 EVALUATION OF DEPLETED URANIUM STORAGE IGLOO DATA

The depleted uranium storage igloos that were evaluated using MARSSIM Scenario A are listed in **Table A3-1**. The instrument-specific DCGLs, the minimum detectable activities (MDAs), and the number of required measurements per MARSSIM are presented in **Table A3-2**, **Table A3-3**, and **Table A3-4**, respectively.

3.1 SUMMARY STATISTICS AND WIDE AREA EVALUATION (Supersedes Section 3.3.2 of the Report)

Tables A3-5 through **A3-9** present the summary statistics (mean, median, standard deviation, minimum, and maximum) of the three datasets collected per igloo, organized by igloo block (e.g., A, B, C).

Table A3-10 presents the initial Scenario A data reduction as described in MARSSIM Section 8, and outlined in **Table A2-3** and **Figure A2-1**. All of the alpha and beta datasets from all 125 igloos demonstrated a difference between the survey unit mean and the reference area mean that was less than the $DCGL_W$, and a difference between the survey unit maximum measurement and the reference area minimum measurement that was less than the $DCGL_W$. In addition, gamma datasets from 33 igloos demonstrated the same as the alpha and beta datasets. As such, those 33 igloos met the release criterion without any further statistical testing required, and are so noted in **Table A3-10**.

Gamma datasets from the remaining 92 igloos were evaluated using the Wilcoxon Rank Sum (WRS) test, per MARSSIM. The results of the WRS tests are presented in **Table A3-11**. Ninety of the 92 WRS tests with the gamma survey data rejected the Scenario A null hypothesis that the median survey unit measurement exceeds that in the reference area by more than the $DCGL_W$, and as such, those 90 igloos passed (i.e., met the release criterion). The null hypothesis was accepted (i.e., the survey unit failed) for the gamma measurements from two igloos, Igloos A0317 and A0508. However, because the radionuclide of concern at these igloos was plutonium-239 (Pu-239), which is primarily an alpha emitter, and because the gamma $DCGL_W$ for Pu-239 was small relative to background (408 counts per minute [cpm], compared with an average background of 6445 cpm, or less than 10%), it was concluded that these igloos met the release criterion based on the alpha and beta measurements.

3.2 ELEVATED MEASUREMENT COMPARISON (Supersedes Section 3.3.3 of the Report)

As shown in **Table A3-12**, alpha/beta and gamma scanning measurements collected in the depleted uranium storage igloos were compared to conservative flag values based on the instrument $DCGL_W$ and average background measurement (**Table A3-2**). All alpha/beta scanning measurements were below the flag value. A number of gamma scanning measurements exceeded the flag value, but all gamma measurements were below the $DCGL_{EMC}$ (**Table A3-2**). It was concluded that there were no localized areas of elevated contamination within the depleted uranium storage igloos.

3.3 CONCLUSIONS (Supersedes Section 3.4 of the Report)

Based on the statistical analyses described above, it was concluded that all 125 survey units that were part of the depleted uranium storage igloo survey met the release criterion of 10 millirem per year (mrem/yr) and are suitable for unrestricted release.

4.0 EVALUATION OF DEPLETED URANIUM STORAGE BUILDING DATA

The 34 survey units in the depleted uranium storage buildings evaluated using Scenario A are listed in **Table A4-1**. The instrument-specific DCGLs, the MDAs, and the number of required measurements per MARSSIM are presented in **Table A4-2**, **Table A4-3**, and **Table A4-4**, respectively.

4.1 SUMMARY STATISTICS AND WIDE AREA EVALUATION (Supersedes Section 4.3.2 of the Report)

Tables A4-5 through **A4-8** present the summary statistics (mean, median, standard deviation, minimum, and maximum) of the measurement datasets collected per survey unit, organized by instrument and building.

Table A4-9 presents the initial Scenario A data reduction as described in MARSSIM Section 8, and outlined in **Table A2-3** and **Figure A2-1**. All of the alpha and beta datasets from the four depleted uranium storage buildings demonstrated a difference between the survey unit mean and the reference area mean less than the $DCGL_W$, and a difference between the survey unit maximum measurement and the reference area minimum measurement less than the $DCGL_W$. In addition, gamma datasets from 13 survey units from the depleted uranium storage buildings demonstrated the same as the alpha and beta datasets. As such, those 13 survey units met the release criterion without any further statistical testing required, and are so noted in **Table A4-9**.

Gamma datasets from the remaining 21 building survey units were evaluated using the WRS test, per MARSSIM. The results of the WRS tests are presented in **Table A4-10**. All 21 WRS tests with the gamma survey data from the depleted uranium storage buildings rejected the Scenario A null hypothesis that the median survey unit measurement exceeds that in the reference area by more than the $DCGL_W$, and as such, those 21 survey units passed (i.e., met the release criterion).

4.2 ELEVATED MEASUREMENT COMPARISON (Supersedes Section 4.3.3 of the Report)

As shown in **Table A4-11**, alpha/beta and gamma scanning measurements collected in the depleted uranium storage buildings were compared to conservative flag values based on the instrument $DCGL_W$ and average background measurement (**Table A4-2**). All alpha/beta scanning measurements collected with the phoswich and gas proportional floor monitor detectors were below the flag value. Gamma scanning measurements from three survey units exceeded the flag value, but all gamma scanning measurements were below the $DCGL_{EMC}$ (**Table A4-2**). It was concluded that there were no localized areas of elevated contamination within the depleted uranium storage buildings.

4.3 CONCLUSIONS (Supersedes Section 4.4 of the Report)

Based on the statistical analyses described above, it was concluded that all 34 survey units that were part of the depleted uranium storage building survey met the release criterion of 10 mrem/yr and are suitable for unrestricted release.

5.0 EVALUATION OF BUILDING 612 DATA

The 28 survey unit from Building 612 evaluated using Scenario A are listed in **Table A5-1**. The instrument-specific DCGLs, the MDAs, and the number of required measurements per MARSSIM are presented in **Table A5-2**, **Table A5-3**, and **Table A5-4**, respectively.

5.1 SUMMARY STATISTICS AND WIDE AREA EVALUATION (Supersedes Section 5.3.2 of the Report)

Table A5-5 presents the summary statistics (mean, median, standard deviation, minimum, and maximum) of the measurement datasets collected per survey unit, organized by instrument.

Table A5-6 presents the initial Scenario A data reduction as described in MARSSIM Section 8, and outlined in **Table A2-3** and **Figure A2-1**. All of the alpha or beta datasets from the 28 survey units in Building 612 demonstrated a difference between the survey unit mean and the reference area mean less than the $DCGL_W$, and a difference between the survey unit maximum measurement and the reference area minimum measurement less than the $DCGL_W$. However, the gamma datasets from all 28 survey units required further statistical analysis with the WRS test.

Gamma datasets from the 28 Building 612 survey units were evaluated using the WRS test, per MARSSIM. The results of the WRS tests are presented in **Table A5-7**. Eighteen of the 28 WRS tests with the gamma survey data from the Building 612 rejected the Scenario A null hypothesis that the median survey unit measurement exceeds that in the reference area by more than the $DCGL_W$, and as such, those 18 survey units passed (i.e., met the release criterion). The null hypothesis was accepted (i.e., the survey unit failed) for the gamma measurements from the remaining 10 survey units. However, due to the gamma $DCGL_W$ being small relative to background (301 cpm, compared with an average background of 3211 cpm, or less than 10%), it was concluded that these 10 survey units within Building 612 also met the release criterion based on the alpha and beta measurements. This methodology was discussed with NRC staff during the October 2005 teleconference, and was agreed upon to be a reasonable approach.

5.2 ELEVATED MEASUREMENT COMPARISON (Supersedes Section 5.3.3 of the Report)

All alpha and beta direct measurements from Building 612 were below the $DCGL_{EMC}$'s listed in **Table A5-2**. Six survey units from Building 612 had at least one gamma direct measurement that exceeded $DCGL_{EMC}$ (**Table A5-8**). However, based on the evaluation of the alpha and beta measurements, it was concluded that there were no localized areas of elevated contamination within the Building 612.

5.3 CONCLUSIONS (Supersedes Section 5.4 of the Report)

Based on the statistical analyses described above, it was concluded that all 28 survey units that were part of the Building 612 survey met the release criterion of 10 mrem/yr and are suitable for unrestricted release.

6.0 SUMMARY OF FINDINGS

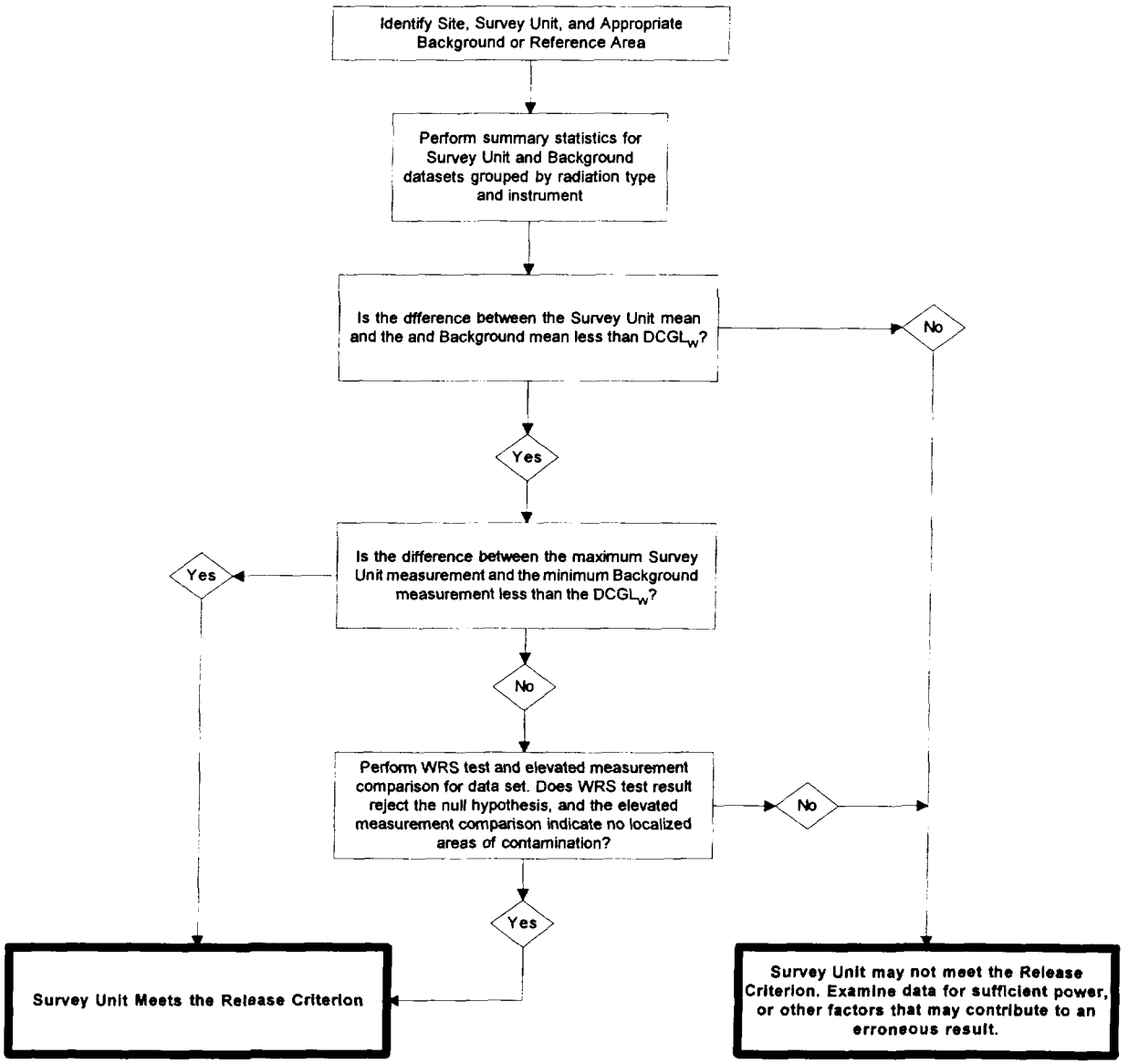
Survey data from the depleted uranium storage igloos, depleted uranium storage buildings, and Building 612 at SEDA were re-evaluated using the MARSSIM Scenario A null hypothesis and accompanying statistical tests. The analysis of the SEDA survey data using Scenario A was requested by NRC staff after their review of the *NRC License Termination Report for Seneca Army Depot Activity* (Parsons, June 2004). Based on this re-evaluation, there is sufficient evidence to conclude that all survey units evaluated at SEDA for determining license termination met the release criterion of 10 mrem/yr, as established in the LTP. Therefore, it is requested that SEDA be removed from all related licenses and be released for unrestricted use.

7.0 REFERENCES

NRC, 2000. Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Revision 1, August.

Parsons, 2004. NRC License Termination Report for Seneca Army Depot Activity, June.

Figure A2-1
Scenario A Data Evaluation Process
License Termination Report Addendum
Seneca Army Depot Activity



Adapted from Section 8 of
MARSSIM (NRC, 2000)

Table A2-1
Derived Concentration Guideline Levels
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Ac-227	6.9		670	
H-3	5800		2.07E+08	
Pa-231	2.5		1360	
Pb-210	5.6		1790	
Pm-147	46000		1.69E+07	
Pu-239	59		4240	
Ra-226	1.7		2870	
Ra-228	2.2		3790	
Sm-147	240		57500	
Th-228	3.8		3950	
Th-230	54		16200	
Th-232	1.5		3090	
U-234	180		35100	
U-235	33		18200	
U-238	98		31600	
	Gross Soil DCGLw	Gross Soil $DCGL_{EMC}$	Gross Surface DCGLw	Gross Surface $DCGL_{EMC}$
Depleted Uranium [4]	100	450 [5]	31647	376599 [5]
Pitchblende Ore [4]	3.3	4.3 [6]	4062	34119 [7]

Notes:

(1) Soil and surface DCGLs for the listed radionuclides were developed in the Seneca Army Depot Activity License Termination and License Release Plan (ANL, 2003; **Appendix 1.A**)

(2) pCi/g = picocuries per gram.

(3) dpm/100cm^2 = decays per minute per 100 square centimeters.

(4) Gross activity DCGLs were calculated per MARSSIM for depleted uranium and pitchblende ore using expected mass/activity fractions from WHO, 2001 (depleted uranium, **Table A2-2**) and NCRP, 1987 (uranium ore).

(5) The $DCGL_{EMC}$'s for DU were calculated using the extrapolated area factors for a 4m^2 survey grid for U-235 (AF = 4.5 soil, 11.9 surface) from ANL, 2003.

(6) The soil $DCGL_{EMC}$ for pitchblende was calculated using the area factor for a 100m^2 survey grid for Ra-226 and Th-228 (AF = 1.6) from ANL, 2003.

(7) The surface $DCGL_{EMC}$ for pitchblende was calculated using the extrapolated area factor for a 4m^2 survey grid for Ra-226 (AF = 8.4) from ANL, 2003.

Table A2-2
Calculation of Gross Activity $DCGL_W$ for Depleted Uranium
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Radionuclide	Half-life (yr) (1)	Half-life (sec)	Decay Constant (sec^{-1})	Weight Fraction (2)	Activity (decays/sec)	Activity Fraction	$DCGL_W$ (dpm/100cm^2) (3)	Gross Activity DCGL for Depleted Uranium (dpm/100cm^2) (4)
U-234	244500	7.71E+12	8.99E-14	6.00E-06	1387.62	0.099	35100	**31647**
U-235	7.04E+08	2.22E+16	3.12E-17	0.002	160.00	0.011	18200	
U-238	4.47E+09	1.41E+17	4.92E-18	0.998	12418.12	0.889	31600	
				Sum	13965.74			
							(pCi/g) (5)	
U-234	244500	7.71E+12	8.99E-14	6.00E-06	1387.62	0.099	180	**100**
U-235	7.04E+08	2.22E+16	3.12E-17	0.002	160.00	0.011	33	
U-238	4.47E+09	1.41E+17	4.92E-18	0.998	12418.12	0.889	98	
				Sum	13965.74			

Notes

(1) Half-life in years from *Handbook of Health Physics and Radiological Health* , 1998.

(2) Weight fractions for depleted uranium from WHO, 2001.

(3) dpm/100cm^2 = decays per minute per 100 square centimeters. From ANL, 2003.

(4) Calculated per Equation 4-4 of MARSSIM (NRC, 2001).

(5) pCi/g = picocuries per gram. From ANL, 2003.

Table A2-3
Summary of Statistical Tests
Radionuclide in Background or Radionuclide Non-Specific (Gross) Measurements Made
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[illegible]	[illegible]
Difference between largest survey unit measurement and smallest reference area measurement is less than the $DCGL_W$	Survey unit meets the release criterion
Difference of survey unit average and reference area average is greater than the $DCGL_W$	Survey unit does not meet the release criterion
Difference between any survey unit measurement and any reference area measurement is greater than the $DCGL_W$ and the difference of survey unit average and reference area average is less than the $DCGL_W$	Conduct WRS test and elevated measurement comparison

From MARSSIM, Table 8.2

Table A2-4
Summary Statistics of Background Measurements
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Bldg 722	Alpha FM	15	3.8	2.4	0	8	4
Bldg 722	Beta FM	15	775	284.1	498	1435	715
Bldg 722	Alpha HH	105	3	1.9	0	8	2
Bldg 722	Beta HH	105	176	55.3	86	436	159
Bldg 722	Alpha PH	100	4	2.3	0	14	3
Bldg 722	Beta PH	100	365	186	160	1187	303.5
Bldg 722	Gamma - FIDLER out	120	11265	3307	5267	19762	11235
Bldg 2078	Alpha FM	31	7	3.4	1	13	7
Bldg 2078	Beta FM	31	951	182.2	628	1209	1065
Bldg 2078	Alpha HH	32	1	1.3	0	5	1
Bldg 2078	Beta HH	32	186	70.5	99	336	166.5
Building 612/DFC [3]	Gamma FIDLER	40	3211	1156	1650	5286	3724.5
Igloos - 2002	Alpha PH	150	5	12	0	111	3
Igloos - 2002	Beta PH	150	222	56	111	596	216
Igloos - 2002	Gamma - FIDLER out	150	6445	1251	2417	7915	6973.5

Notes:

(1) Instruments are as follows:

Alpha/Beta FM = gas proportional floor monitor.

Alpha/Beta HH = gas proportional hand-held detector.

Alpha/Beta PH = phoswich scintillation detector.

Gamma FIDLER out = low-energy gamma scintillation detector with energy window open

Gamma FIDLER in = low-energy gamma scintillation detector with energy window set for range of 50 to 250 keV.

(2) cpm = counts per minute.

(3) DFC = daily function checks. Gamma background for the Building 612 surveys was determined by the daily function check background measurements.

Table A2-5
Updated/Corrected Information
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Addendum Table	Report Table	Change	Basis
Global			
All	All	Gross activity depleted uranium DCGLs	Previous calculation used 0.0008% U-234 rather than 0.0006% U-234 (WHO, 2001)
All	All	Probe area corrected from "open" area to "physical" or "active" area	MARSSIM Section 6.6.1
All	All	FIDLER efficiency corrected for DU igloo and building surveys	Original FIDLER check source activity was listed as 0.138 uCi; corrected to 0.273 uCi (Attachment 2)
Specific			
A2-1	2-1	Added Pu-239 DCGLs to table	In LTP but not listed in Table 2-1
A2-1	2-1	Volumetric $DCGL_{EMC}$ for DU - correct area factor	Previous volumetric $DCGL_{EMC}$ used area factor for surface DCGLs
A2-2	--	New table	Demonstration of gross activity DCGL calculation
A2-3	--	New table	Summary of Scenario A data evaluation
A2-4	2-3	Addition of background data from FIDLER daily function checks for Building 612	Data appeared elsewhere in Report, but not with other background data
A3-1	3-1	Change C0808 to C0908	Incorrect igloo listed
A3-4	3-4	Added minimum number of measurements calculation based on Pu-239 DCGL	Not previously included
A3-5 to A3-9	3-5 to 3-9	Summary statistics only	Data reduction and WRS test results moved to Tables A3-10 and A3-11, respectively
A3-10	--	New table	Scenario A data evaluation
A3-11	--	New table	Scenario A data evaluation
A4-5 to A4-8	4-5 to 4-8	Summary statistics only	Data reduction and WRS test results moved to Tables A4-9 and A4-10, respectively
A4-9	--	New table	Scenario A data evaluation

Table A2-5
Updated/Corrected Information
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Addendum Table	Report Table	Change	Basis
A4-10	--	New table	Scenario A data evaluation
A5-2 and A5-3	5-2 and 5-3	Efficiencies for handheld gas proportional and floor monitor	Incorrect efficiencies used in calculations
A5-5	5-5	Summary statistics only	Data reduction and WRS test results moved to Tables A4-9 and A4-10, respectively
A5-6	--	New table	Scenario A data evaluation
A5-7	--	New table	Scenario A data evaluation

Table A3-1
List of Depleted Uranium Storage Igloos
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A0201 [3]	B0709	C0510	D0107	E0112
A0316 [3]	B0711	C0511	D0108	E0211
A0317 [3]	B0801	C0513	D0110	E0301
A0508 [3]	B0802	C0603	D0113	E0302
A0701 [4]	B0804	C0604	D0206	E0303
A0706	B0809	C0605	D0207	E0312
A0707	B0810	C0606	D0305	E0402
A0710	B0811	C0608	D0306	E0410
A0711	B0909	C0701	D0312	E0411
A0901	C0203	C0706	D0401	E0413
A0905	C0303	C0707	D0406	E0504
A1108	C0307	C0708	D0407	E0506
A1109	C0308	C0801	D0413	E0508
B0109	C0401	C0803	D0601	E0510
B0411	C0403	C0807	D0604	E0512
B0501	C0405	C0809	D0607	E0602
B0602	C0406	C0901	D0704	E0604
B0603	C0407	C0902	D0705	E0609
B0609	C0408	C0906	D0711	E0610
B0610	C0501	C0907	D0712	E0702
B0701	C0503	C0908	D0801	E0706
B0705	C0504	C0909	D0805	E0711
B0707	C0505	D0104	E0103	E0801
B0708	C0508	D0105	E0105	E0802

Notes:
(1) Unless otherwise noted, igloos were used for storage of packaged DU ammunition (SUC-1275).
(2) Compiled from *Seneca Army Depot Activity License Termination and License Release Plan* (ANL, 2003).
(3) Also potentially used for storage of special weapons (ROCs - H-3 and Pu-239)
(4) Also used for the storage of light anti-tank rockets containing Pm-147 (BML 12-00722-07).

Table A3-2
Derived Concentration Guideline Levels
Depleted Uranium Storage Igloos
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Instrument	Applicable $DCGL_W$	$DCGL_W$ (dpm/100cm^2) (1)	$DCGL_{EMC}$ (dpm/100cm^2) (2)	Probe Area (cm^2)	Efficiency (3)	$DCGL_W$ (cpm) (4)	$DCGL_{EMC}$ (cpm) (4)	Background Average (cpm)	Background Dataset	Background Corrected $DCGL_W$ (cpm) (5)	Background Corrected $DCGL_{EMC}$ (cpm) (5)
Alpha Phoswich	Depleted Uranium	31647	376599	83	15%	3940	46887	5	Igloo - 2002	3945	**46892**
Beta Phoswich	Depleted Uranium	31647	376599	83	11%	2889	34384	222	Igloo - 2002	3111	**34606**
Gamma FIDLER	Depleted Uranium	31647	376599	126.7	7.6%	3047	36263	6445	Igloo - 2002	9492	**42708**
Alpha Phoswich	Pu-239 (6)	4240	50456	83	15%	528	6282	5	Igloo - 2002	533	**6287**
Beta Phoswich	Pu-239	4240	50456	83	11%	387	4607	222	Igloo - 2002	609	**4829**
Gamma FIDLER	Pu-239	4240	50456	126.7	7.6%	408	4859	6445	Igloo - 2002	6853	**11304**

Notes:

(1) dpm/100cm^2 = decays per minute per 100 square centimeters. Depleted uranium DCGL calculated using equation 4-4 of MARSSIM. Expected activity fractions for depleted uranium based on uranium depleted to 99.8 weight percent U-238, 0.2 weight percent U-235, and 0.0006 weight percent U-234 (WHO, 2001).

(2) $DCGL_{EMC}$ based on area factor of 11.9 for 4 m^2 grid (from ANL, 2003, for worst-case radionuclide of concern [U-235]).

(3) Average efficiency for instrument as determined by daily function checks during survey (**Appendix 3.A**).

(4) The instrument-specific $DCGL_W$ and $DCGL_{EMC}$ in counts per minute (cpm) are calculated using the instrument efficiency and active probe area.

(5) The Background Corrected $DCGL_W$ and $DCGL_{EMC}$ for each instrument is the sum of the DCGL and the Background Average for that instrument.

(6) Pu-239 is an ROC at Igloos A0201, A0316, A0317, and A0508. H-3 is also an ROC at those igloos, but the DCGL for Pu-239 is significantly more conservative than the DCGL for H-3 (**Table A2-1**).

Table A3-3
Survey Instrumentation
Depleted Uranium Storage Igloos
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Instrument	Measurement Type	Probe	Meter	Probe Area (cm^2) [1]	Average Instrument Efficiency [2]	1-Minute Direct Measurement MDA ($dpm/100cm^2$) [3]	Standard MDA ($dpm/100cm^2$) [3]	DCGL$_w$ for DU ($dpm/100cm^2$) [4]
Phoswich	Alpha/Beta	Ludlum Model 43-1-1	Ludlum Model 2224	83	Alpha: 15% Beta: 11%	Alpha: 46 Beta: 417	4925	31647
FIDLER	Low-Energy Gamma	Bicron G5 FIDLER	Bicron Analyst	126.7	7.6%	2140	23439	31647
Exposure Rate	Ambient Gamma Exposure Rate	Bicron MicroRem or Ludlum Model 19		-- [5]	--	--	--	NA [6]
GM Pancake	Alpha/Beta/Gamma	Ludlum Model 44-9	Ludlum Model 3	15	20% [7]	--	2200-5000	NA
Gamma Spectrometer	In-Situ Gamma	Alpha Spectra FIDLER	RSA URSA-I MCA	126.7	7.6%	2140 for gross 1-minute count; otherwise measurement-specific	--	31647
E-Perm	Radon	RadElec SST E-Perm		--	--	0.2 to 0.5 pCi/L [8]	--	NA

Notes:

(1) cm^2 = square centimeters. Areas listed and used in the calculations are the active or physical probe area listed by the manufacturer, per MARSSIM Section 6.6.1 (NRC, 2000).

(2) Except where noted, the average instrument efficiency was determined from the daily function check data (refer to **Appendix 3.A**).

(3) dpm/100cm2 = decays per minute per 100 square centimeters. Except where noted, the minimum detectable amounts (MDAs) were calculated using the procedures outlined in MARSSIM Section 6.7 (NRC, 2000).

(4) Gross activity DCGL$_w$ was calculated using radionuclide-specific DCGLs derived by ANL, 2003 (**Appendix 1.A**).

(5) "--" = Indicates that parameter was not used or calculated for instrument.

(6) NA= not applicable. DCGLs were not applied to exposure rate, personnel/equipment frisking, or radon measurements.

(7) GM Pancake efficiency for uranium from MARSSIM Table 6.4 (NRC, 2000).

(8) pCi/L = picocuries per liter; MDA values from MARSSIM Table 6.10 (NRC, 2000).

Table A3-4
Total Number of Required Measurements
Depleted Uranium Storage Igloos
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Dataset [1]	Gross Activity $DCGL_W$ (dpm/100cm^2) [2]	Background Corrected $DCGL_W$ (cpm) [3]	LBGR [4]	Δ [5]	Observed Survey σ_s (cpm) [6]	Observed Bkgd σ (cpm)	Δ/σ [7]	P_r [8]	$Z(1-\alpha)$	$Z(1-\beta)$	Total N [9]
A Block											
Gamma FIDLER & Igloo Background	31647	9492	4746	4746	1440	1251	3.3	0.98	1.645	1.645	15
Alpha PH & Igloo Background	31647	3945	1973	1973	7.5	12	164.4	1.00	1.645	1.645	14
Beta PH & Igloo Background	31647	3111	1556	1556	56	56	27.8	1.00	1.645	1.645	14
Gamma FIDLER & Igloo Background	4240	6853	3427	3427	1440	1251	2.4	0.94	1.645	1.645	18
Alpha PH & Igloo Background	4240	533	267	267	7.5	12	22.2	1.00	1.645	1.645	14
Beta PH & Igloo Background	4240	644	322	322	56	56	5.8	1.00	1.645	1.645	14
B Block											
Gamma FIDLER & Igloo Background	31647	9492	4746	4746	1217	1251	3.8	0.99	1.645	1.645	15
Alpha PH & Igloo Background	31647	3945	1973	1973	5.7	12	164.4	1.00	1.645	1.645	14
Beta PH & Igloo Background	31647	3111	1556	1556	43	56	27.8	1.00	1.645	1.645	14
C Block											
Gamma FIDLER & Igloo Background	31647	9492	4746	4746	899	1251	3.8	0.99	1.645	1.645	15
Alpha PH & Igloo Background	31647	3945	1973	1973	9.9	12	164.4	1.00	1.645	1.645	14
Beta PH & Igloo Background	31647	3111	1556	1556	48	56	27.8	1.00	1.645	1.645	14

Table A3-4
Total Number of Required Measurements
Depleted Uranium Storage Igloos
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Seneca Army Depot Activity

Dataset [1]	Gross Activity $DCGL_W$ (dpm/100cm^2) [2]	Background Corrected $DCGL_W$ (cpm) [3]	LBGR [4]	Δ [5]	Observed Survey σ (cpm) [6]	Observed Bkgd σ (cpm)	Δ/σ [7]	Pr [8]	$Z_{(1-\alpha)}$ [9]	$Z_{(1-\beta)}$ [9]	Total [10]
D Block											
Gamma FIDLER & Igloo Background	31647	9492	4746	4746	1408	1251	3.4	0.98	1.645	1.645	15
Alpha PH & Igloo Background	31647	3945	1973	1973	5.7	12	164.4	1.00	1.645	1.645	14
Beta PH & Igloo Background	31647	3111	1556	1556	45	56	27.8	1.00	1.645	1.645	14
E Block											
Gamma FIDLER & Igloo Background	31647	9492	4746	4746	1377	1251	3.4	0.98	1.645	1.645	15
Alpha PH & Igloo Background	31647	3945	1973	1973	12	12	164.4	1.00	1.645	1.645	14
Beta PH & Igloo Background	31647	3111	1556	1556	54	56	27.8	1.00	1.645	1.645	14

Notes:

(1) Calculation is combined for each "block" of igloos. Instruments: PH = alpha/beta phoswich detector; FIDLER = low-energy gamma scintillator.

(2) dpm/100cm^2 = decays per minute per 100 square centimeters. Gross activity $DCGL_W$ for DU calculated per MARSSIM.

(3) cpm = counts per minute. Instrument-specific $DCGL_W$ calculated per MARSSIM. Includes average background count rate.

(4) LBGR = lower bound of gray region. Per MARSSIM, LBGR was set to 1/2 of the $DCGL_W$.

(5) $\Delta = DCGL_W$ - LBGR.

(6) The standard deviation (σ) for the survey data includes all measurements collected with that instrument.

(7) Δ/σ calculated using the larger value between the survey standard deviation and the background standard deviation.

(8) Values of Pr are from Table 5.1 of MARSSIM using Δ/σ. Pr is defined by MARSSIM as the probability that a random measurement from the survey unit exceeds a random measurement from the background reference area by less than the $DCGL_W$ when the survey unit median is equal to the LBGR above background.

Table A3-4
Total Number of Required Measurements
Depleted Uranium Storage Igloos
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Dataset [1]	Gross Activity $DCGL_w$ (dpm/100cm^2) [2]	Background Corrected $DCGL_w$ (cpm) [3]	LBGR [4]	Δ [5]	Observed Survey σ (cpm) [6]	Observed Bkgd σ (cpm)	Δ/σ [7]	Pr [8]	Z(1-α) [9]	Z(1-β) [9]	Total N [10]

(9) Values of Z(1-α) and Z(1-β) (decision error percentiles) are from Table 5.2 of MARSSIM for α=β=0.05.

(10) N = total required number of measurements or samples (includes both survey and background areas).

Table A3-5
Summary Statistics
A-Block Igloos - Direct Measurements
License Termination Report Addendum A
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Igloo	Dataset	Number of Measurements	Mean (cpm)	Median (cpm)	Standard Deviation (cpm)	Minimum (cpm)	Maximum (cpm)
A0201	Alpha PH	30	3	2	2	0	7
A0201	Beta PH	30	214	218	38	108	277
A0201	Gamma FIDLER	30	4554	4765	714	1894	5094
A0316	Alpha PH	30	2	2	2	0	6
A0316	Beta PH	30	224	227	35	138	276
A0316	Gamma FIDLER	30	4568	4806	807	1630	4985
A0317	Alpha PH	30	3	2	2	0	6
A0317	Beta PH	30	208	212	39	117	276
A0317	Gamma FIDLER	30	6943	7278	1216	2696	7650
A0508	Alpha PH	30	4	4	2	0	8
A0508	Beta PH	30	232	230	51	116	361
A0508	Gamma FIDLER	30	7157	7475	1150	3111	8056
A0701	Alpha PH	30	2	2	1	0	4
A0701	Beta PH	30	206	202	54	124	381
A0701	Gamma FIDLER	30	4289	4429	478	2196	4785
A0706	Alpha PH	30	5	4	3	1	18
A0706	Beta PH	30	239	225	79	148	608
A0706	Gamma FIDLER	30	7039	7233	828	3540	8007
A0707	Alpha PH	30	3	2	3	0	17
A0707	Beta PH	30	225	204	61	143	415
A0707	Gamma FIDLER	30	7119	7261	535	5045	7559
A0710	Alpha PH	30	3	2	5	0	29
A0710	Beta PH	30	239	241	54	121	413
A0710	Gamma FIDLER	30	4456	4546	424	2583	4920
A0711	Alpha PH	30	7	4	11	1	64
A0711	Beta PH	30	233	222	46	161	389
A0711	Gamma FIDLER	30	6911	7040	689	3762	7861
A0901	Alpha PH	30	2	1	5	0	30
A0901	Beta PH	30	238	235	47	145	407
A0901	Gamma FIDLER	30	4466	4582	582	2115	4908
A0905	Alpha PH	30	3	1	9	0	49
A0905	Beta PH	30	243	246	58	136	350
A0905	Gamma FIDLER	30	4573	4684	505	2289	5060

Table A3-5
Summary Statistics
A-Block Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A1108	Alpha PH	30	2	1	5	0	29
A1108	Beta PH	30	198	194	40	140	334
A1108	Gamma FIDLER	30	6587	6783	787	3234	7364
A1109	Alpha PH	30	2	2	3	0	13
A1109	Beta PH	30	233	228	65	144	513
A1109	Gamma FIDLER	30	4472	4531	490	2287	4957

Notes:
(1) Measurements from each survey unit were grouped by radiation type and instrument.
Instruments: PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.
(2) cpm = counts per minute.

Table A3-6
Summary Statistics
B-Block Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

Igloo	Dataset	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B0109	Alpha PH	30	2	1	2	0	6
B0109	Beta PH	30	202	199	32	117	273
B0109	Gamma FIDLER	30	6812	6937	779	3084	7399
B0411	Alpha PH	30	1	1	1	0	4
B0411	Beta PH	30	215	210	40	130	277
B0411	Gamma FIDLER	30	4332	4370	489	2381	4955
B0501	Alpha PH	30	1	0	2	0	8
B0501	Beta PH	30	181	177	31	97	252
B0501	Gamma FIDLER	30	6477	6752	1109	2046	7274
B0602	Alpha PH	30	2	2	2	0	11
B0602	Beta PH	30	191	189	32	131	256
B0602	Gamma FIDLER	30	6803	6992	718	3624	7521
B0603	Alpha PH	30	2	1	2	0	10
B0603	Beta PH	30	197	191	35	124	270
B0603	Gamma FIDLER	30	6904	7079	738	3638	7532
B0609	Alpha PH	30	3	2	3	0	19
B0609	Beta PH	30	219	218	47	100	294
B0609	Gamma FIDLER	30	6730	6834	738	3446	7636
B0610	Alpha PH	30	2	1	3	0	19
B0610	Beta PH	30	203	195	44	132	278
B0610	Gamma FIDLER	30	6851	6962	778	3477	7841
B0701	Alpha PH	30	4	3	7	0	42
B0701	Beta PH	30	205	212	41	113	267
B0701	Gamma FIDLER	30	6923	7126	780	3628	7609
B0705	Alpha PH	30	3	2	7	0	39
B0705	Beta PH	30	204	203	45	108	291
B0705	Gamma FIDLER	30	6755	6924	744	3373	7372
B0707	Alpha PH	30	4	3	3	1	18
B0707	Beta PH	30	207	207	39	126	287
B0707	Gamma FIDLER	30	6595	6926	911	3476	7772
B0708	Alpha PH	30	2	1	3	0	16
B0708	Beta PH	30	192	191	37	127	293
B0708	Gamma FIDLER	30	6814	6976	747	3552	7347
B0709	Alpha PH	30	1	1	2	0	9
B0709	Beta PH	30	197	190	47	99	300
B0709	Gamma FIDLER	30	6707	6975	958	3386	7513
B0711	Alpha PH	30	1	0	3	0	13
B0711	Beta PH	30	208	202	42	143	346
B0711	Gamma FIDLER	30	6647	6824	773	3269	7346

Table A3-6
Summary Statistics
B-Block Igloos - Direct Measurements
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[illegible]	Dataset ID	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B0801	Alpha PH	30	2	1	4	0	21
B0801	Beta PH	30	196	198	31	120	247
B0801	Gamma FIDLER	30	4555	4659	487	2512	5008
B0802	Alpha PH	30	2	1	4	0	20
B0802	Beta PH	30	196	202	33	116	240
B0802	Gamma FIDLER	30	4349	4454	486	2366	4910
B0804	Alpha PH	30	1	1	2	0	13
B0804	Beta PH	30	192	183	43	115	276
B0804	Gamma FIDLER	30	4332	4431	438	2304	4675
B0809	Alpha PH	30	6	5	10	0	57
B0809	Beta PH	30	228	208	71	132	486
B0809	Gamma FIDLER	30	6673	6855	665	3957	7168
B0810	Alpha PH	30	5	4	5	0	31
B0810	Beta PH	30	217	214	43	143	354
B0810	Gamma FIDLER	30	6621	6800	758	3157	7241
B0811	Alpha PH	30	2	1	6	0	36
B0811	Beta PH	30	208	201	43	131	295
B0811	Gamma FIDLER	30	6973	7136	802	3730	7736
B0909	Alpha PH	30	3	1	8	0	42
B0909	Beta PH	30	204	208	43	109	331
B0909	Gamma FIDLER	30	7302	7416	835	3834	8358

Notes:
(1) Measurements from each survey unit were grouped by radiation type and instrument.
Instruments: PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.
(2) cpm = counts per minute.

Table A3-7
Summary Statistics
C-Block Igloos - Direct Measurements
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C0203	Alpha PH	30	5	4	4	1	21
C0203	Beta PH	30	199	195	34	108	288
C0203	Gamma FIDLER	30	6736	6731	730	3531	7599
C0303	Alpha PH	30	5	1	18	0	101
C0303	Beta PH	30	208	210	64	110	500
C0303	Gamma FIDLER	30	6424	6525	714	3271	7233
C0307	Alpha PH	30	5	2	16	0	91
C0307	Beta PH	30	214	204	59	127	478
C0307	Gamma FIDLER	30	6651	6755	780	3328	7461
C0308	Alpha PH	30	6	3	18	0	101
C0308	Beta PH	30	198	182	60	159	489
C0308	Gamma FIDLER	30	6703	6771	628	3980	7317
C0401	Alpha PH	30	5	2	13	0	71
C0401	Beta PH	30	208	205	53	111	430
C0401	Gamma FIDLER	30	6634	6722	711	3358	7290
C0403	Alpha PH	30	4	2	10	0	57
C0403	Beta PH	30	194	189	39	114	340
C0403	Gamma FIDLER	30	6795	6911	646	3943	7380
C0405	Alpha PH	30	3	2	5	0	30
C0405	Beta PH	30	189	189	31	107	258
C0405	Gamma FIDLER	30	6559	6708	741	3399	7262
C0406	Alpha PH	30	4	2	12	0	68
C0406	Beta PH	30	202	202	48	119	397
C0406	Gamma FIDLER	30	6537	6714	704	3369	7012
C0407	Alpha PH	30	3	1	11	0	63
C0407	Beta PH	30	200	196	51	125	426
C0407	Gamma FIDLER	30	6496	6595	658	3477	7174
C0408	Alpha PH	30	1	1	2	0	11
C0408	Beta PH	30	183	175	35	142	332
C0408	Gamma FIDLER	30	6604	6754	673	3696	7324
C0501	Alpha PH	30	2	2	2	0	6
C0501	Beta PH	30	186	191	34	115	264
C0501	Gamma FIDLER	30	6611	6748	712	3352	7199
C0503	Alpha PH	30	4	2	9	0	51
C0503	Beta PH	30	191	190	32	149	318
C0503	Gamma FIDLER	30	6815	6940	626	4031	7475
C0504	Alpha PH	30	3	1	6	0	33
C0504	Beta PH	30	193	194	35	122	321
C0504	Gamma FIDLER	30	6716	6884	716	3552	7675

Table A3-7
Summary Statistics
C-Block Igloos - Direct Measurements
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Igloo	Parameter	Number of Measurements	Mean (cpm)	Median (cpm)	Standard Deviation (cpm)	Minimum (cpm)	Maximum (cpm)
C0505	Alpha PH	30	5	3	12	0	70
C0505	Beta PH	30	205	206	54	137	451
C0505	Gamma FIDLER	30	6852	6943	691	3631	7622
C0508	Alpha PH	30	4	2	8	0	44
C0508	Beta PH	30	196	194	43	135	372
C0508	Gamma FIDLER	30	6782	6938	669	3845	7785
C0510	Alpha PH	30	2	1	4	0	21
C0510	Beta PH	30	190	176	77	127	569
C0510	Gamma FIDLER	30	6684	6931	769	3552	7165
C0511	Alpha PH	30	2	2	2	0	11
C0511	Beta PH	30	188	188	30	135	248
C0511	Gamma FIDLER	30	6217	6387	759	3367	7151
C0513	Alpha PH	30	1	1	1	0	6
C0513	Beta PH	30	187	188	37	132	274
C0513	Gamma FIDLER	30	6787	6942	726	3565	7660
C0603	Alpha PH	30	7	2	25	0	139
C0603	Beta PH	30	208	193	102	121	699
C0603	Gamma FIDLER	30	6499	6663	620	3705	7065
C0604	Alpha PH	30	3	1	8	0	46
C0604	Beta PH	30	188	178	43	126	363
C0604	Gamma FIDLER	30	6369	6524	712	3089	7638
C0605	Alpha PH	30	2	1	4	0	24
C0605	Beta PH	30	204	196	39	138	308
C0605	Gamma FIDLER	30	6333	6467	671	3207	6868
C0606	Alpha PH	30	1	0	2	0	10
C0606	Beta PH	30	194	192	32	118	304
C0606	Gamma FIDLER	30	6416	6505	458	4517	6986
C0608	Alpha PH	30	2	2	4	0	20
C0608	Beta PH	30	182	182	29	113	268
C0608	Gamma FIDLER	30	5246	5518	966	2884	6489
C0701	Alpha PH	30	4	2	11	0	59
C0701	Beta PH	30	203	191	62	124	474
C0701	Gamma FIDLER	30	6774	6924	638	3971	7462
C0706	Alpha PH	30	6	3	18	0	99
C0706	Beta PH	30	202	195	65	140	512
C0706	Gamma FIDLER	30	6611	6779	701	3562	7122
C0707	Alpha PH	30	3	3	5	0	29
C0707	Beta PH	30	204	205	33	129	287
C0707	Gamma FIDLER	30	6780	6933	748	3446	7484

Table A3-7
Summary Statistics
C-Block Igloos - Direct Measurements
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Igloo	Dataset	Number of Measurements	Mean (cpm)	Median (cpm)	Standard Deviation (cpm)	Minimum (cpm)	Maximum (cpm)
C0708	Alpha PH	30	3	2	6	0	31
C0708	Beta PH	30	192	187	34	125	300
C0708	Gamma FIDLER	30	6759	6929	766	3410	7411
C0801	Alpha PH	30	1	1	1	0	3
C0801	Beta PH	30	188	188	33	127	297
C0801	Gamma FIDLER	30	7039	7231	775	3551	7594
C0803	Alpha PH	30	1	1	1	0	3
C0803	Beta PH	30	197	198	37	131	282
C0803	Gamma FIDLER	30	7127	7265	746	3860	7737
C0807	Alpha PH	30	1	1	2	0	13
C0807	Beta PH	30	189	183	35	116	287
C0807	Gamma FIDLER	30	6863	7033	731	3668	7582
C0809	Alpha PH	30	3	1	7	0	37
C0809	Beta PH	30	200	194	55	118	358
C0809	Gamma FIDLER	30	6826	7002	750	3520	7364
C0901	Alpha PH	30	2	1	8	0	43
C0901	Beta PH	30	194	189	54	110	381
C0901	Gamma FIDLER	30	7273	7400	787	3818	7904
C0902	Alpha PH	30	4	3	7	0	42
C0902	Beta PH	30	212	210	47	140	376
C0902	Gamma FIDLER	30	7080	7387	1053	3437	7864
C0906	Alpha PH	30	5	2	20	0	113
C0906	Beta PH	30	222	207	70	100	470
C0906	Gamma FIDLER	30	7212	7434	840	3637	7757
C0907	Alpha PH	30	2	2	1	0	5
C0907	Beta PH	30	191	190	31	114	254
C0907	Gamma FIDLER	30	6908	7089	789	3481	7523
C0908	Alpha PH	30	3	2	7	0	40
C0908	Beta PH	30	201	207	37	129	316
C0908	Gamma FIDLER	30	7117	7276	782	3428	7732
C0909	Alpha PH	30	3	2	7	0	42
C0909	Beta PH	30	206	199	48	132	369
C0909	Gamma FIDLER	30	4894	4994	554	2535	5402

Notes:

(1) Measurements from each survey unit were grouped by radiation type and instrument.
Instruments: PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.

(2) cpm = counts per minute.

Table A3-8
Summary Statistics
D-Block Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

Igloo	Dataset	Number of Measurements	Mean (cpm)	Median (cpm)	Standard Deviation (cpm)	Minimum (cpm)	Maximum (cpm)
D0104	Alpha PH	30	5	2	13	0	72
D0104	Beta PH	30	233	227	60	154	448
D0104	Gamma FIDLER	30	4624	4698	506	2319	5432
D0105	Alpha PH	30	3	2	5	0	25
D0105	Beta PH	30	220	213	42	137	315
D0105	Gamma FIDLER	30	4519	4617	463	2339	4885
D0107	Alpha PH	30	3	1	8	0	47
D0107	Beta PH	30	251	249	47	186	415
D0107	Gamma FIDLER	30	4736	4769	701	2474	7483
D0108	Alpha PH	30	4	1	15	0	81
D0108	Beta PH	30	200	198	47	127	381
D0108	Gamma FIDLER	30	7038	7233	803	3537	7624
D0110	Alpha PH	30	2	1	3	0	16
D0110	Beta PH	30	206	206	44	134	355
D0110	Gamma FIDLER	30	4393	4504	491	2225	4856
D0113	Alpha PH	30	5	4	5	0	31
D0113	Beta PH	30	208	205	41	138	302
D0113	Gamma FIDLER	30	6586	6766	694	3152	7031
D0206	Alpha PH	30	3	2	6	0	35
D0206	Beta PH	30	207	195	47	135	318
D0206	Gamma FIDLER	30	4708	4804	437	2559	5043
D0207	Alpha PH	30	2	2	4	0	20
D0207	Beta PH	30	224	217	46	120	361
D0207	Gamma FIDLER	30	4496	4612	523	2176	5038
D0305	Alpha PH	30	3	2	2	0	12
D0305	Beta PH	30	223	225	35	131	309
D0305	Gamma FIDLER	30	6945	7150	768	3544	7537
D0306	Alpha PH	30	3	1	6	0	33
D0306	Beta PH	30	198	195	39	122	315
D0306	Gamma FIDLER	30	7052	7279	767	3633	7655
D0312	Alpha PH	30	2	2	3	0	13
D0312	Beta PH	30	198	203	30	120	266
D0312	Gamma FIDLER	30	7123	7388	819	3550	7757
D0401	Alpha PH	30	2	1	3	0	14
D0401	Beta PH	30	217	217	42	147	338

Table A3-8
Summary Statistics
D-Block Igloos - Direct Measurements
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Igloo	Survey Unit	Number of Measurements	Mean (cpm)	Median (cpm)	Standard Deviation (cpm)	Minimum (cpm)	Maximum (cpm)
D0401	Gamma FIDLER	30	4579	4687	492	2341	4949
D0406	Alpha PH	30	2	1	4	0	24
D0406	Beta PH	30	199	193	47	131	332
D0406	Gamma FIDLER	30	7269	7534	880	3542	7968
D0407	Alpha PH	30	2	1	5	0	28
D0407	Beta PH	30	196	192	37	114	286
D0407	Gamma FIDLER	30	7197	7479	835	3611	7810
D0413	Alpha PH	30	2	2	2	0	13
D0413	Beta PH	30	211	221	35	136	274
D0413	Gamma FIDLER	30	7156	7351	838	3448	7883
D0601	Alpha PH	30	2	1	2	0	7
D0601	Beta PH	30	222	223	47	129	301
D0601	Gamma FIDLER	30	7054	7192	791	3606	7729
D0604	Alpha PH	30	1	1	1	0	5
D0604	Beta PH	30	238	239	51	128	360
D0604	Gamma FIDLER	30	7148	7360	782	3762	7981
D0607	Alpha PH	30	2	1	2	0	13
D0607	Beta PH	30	206	197	43	103	328
D0607	Gamma FIDLER	30	4590	4688	510	2349	5026
D0704	Alpha PH	30	1	1	1	0	5
D0704	Beta PH	30	199	197	34	143	312
D0704	Gamma FIDLER	30	7049	7245	746	3687	7523
D0705	Alpha PH	30	2	2	1	0	4
D0705	Beta PH	30	230	227	36	134	306
D0705	Gamma FIDLER	30	7121	7372	837	3461	7676
D0711	Alpha PH	30	2	1	6	0	33
D0711	Beta PH	30	205	200	36	134	306
D0711	Gamma FIDLER	30	4591	4702	498	2286	4934
D0712	Alpha PH	30	2	2	1	0	5
D0712	Beta PH	30	195	197	29	121	248
D0712	Gamma FIDLER	30	4745	4860	500	2464	5106
D0801	Alpha PH	30	2	1	4	0	20
D0801	Beta PH	30	198	196	31	127	264
D0801	Gamma FIDLER	30	4523	4618	496	2298	5040

Table A3-8
Summary Statistics
D-Block Igloos - Direct Measurements
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D0805	Alpha PH	30	3	1	9	0	50
D0805	Beta PH	30	228	219	54	143	370
D0805	Gamma FIDLER	30	6953	7080	706	3837	7703

Notes:
(1) Measurements from each survey unit were grouped by radiation type and instrument.
Instruments: PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.
(2) cpm = counts per minute.

Table A3-9
Summary Statistics
E-Block Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

E0103	Alpha PH	30	3	1	10	0	57
E0103	Beta PH	30	215	214	44	125	377
E0103	Gamma FIDLER	30	7340	7559	897	3344	7969
E0105	Alpha PH	30	4	2	13	0	74
E0105	Beta PH	30	235	218	76	157	514
E0105	Gamma FIDLER	30	7131	7409	1040	3273	7829
E0112	Alpha PH	30	3	3	3	1	17
E0112	Beta PH	30	208	211	35	126	275
E0112	Gamma FIDLER	30	7050	7313	877	3245	7603
E0211	Alpha PH	30	4	2	10	0	56
E0211	Beta PH	30	200	195	42	131	362
E0211	Gamma FIDLER	30	6965	7143	777	3334	7535
E0301	Alpha PH	30	3	2	6	0	31
E0301	Beta PH	30	196	193	35	113	295
E0301	Gamma FIDLER	30	4406	4512	503	2204	4840
E0302	Alpha PH	30	3	2	4	0	23
E0302	Beta PH	30	213	217	37	125	324
E0302	Gamma FIDLER	30	6651	6834	846	3175	7619
E0303	Alpha PH	30	6	4	13	0	75
E0303	Beta PH	30	217	212	51	135	423
E0303	Gamma FIDLER	30	7027	7175	843	3251	7830
E0312	Alpha PH	30	2	2	4	0	23
E0312	Beta PH	30	193	190	30	133	299
E0312	Gamma FIDLER	30	6634	6828	791	3147	7237
E0402	Alpha PH	30	2	2	2	0	12
E0402	Beta PH	30	199	199	34	95	283
E0402	Gamma FIDLER	30	6696	6833	774	3125	7498
E0410	Alpha PH	30	2	1	2	0	13
E0410	Beta PH	30	204	201	39	114	275
E0410	Gamma FIDLER	30	6832	7197	1101	2850	7641
E0411	Alpha PH	30	2	1	3	0	18
E0411	Beta PH	30	201	197	42	122	293
E0411	Gamma FIDLER	30	4520	4659	513	2185	4910
E0413	Alpha PH	30	2	2	1	0	5
E0413	Beta PH	30	223	211	43	165	300
E0413	Gamma FIDLER	30	6862	7139	887	3194	7467
E0504	Alpha PH	30	2	1	5	0	26
E0504	Beta PH	30	229	219	34	185	306
E0504	Gamma FIDLER	30	7001	7221	859	3416	7860
E0506	Alpha PH	30	2	1	2	0	6

Table A3-9
Summary Statistics
E-Block Igloos - Direct Measurements
License Termination Report Addendum A
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E0506	Beta PH	30	224	224	52	132	361
E0506	Gamma FIDLER	30	6948	7073	732	3667	7806
E0508	Alpha PH	30	1	1	1	0	5
E0508	Beta PH	30	226	226	36	131	292
E0508	Gamma FIDLER	30	7233	7487	867	3557	7888
E0510	Alpha PH	30	2	1	3	0	16
E0510	Beta PH	30	225	213	60	148	467
E0510	Gamma FIDLER	30	7036	7257	806	3566	7551
E0512	Alpha PH	30	2	1	4	0	21
E0512	Beta PH	30	190	197	40	94	277
E0512	Gamma FIDLER	30	4482	4684	696	1818	4969
E0602	Alpha PH	30	13	7	37	1	206
E0602	Beta PH	30	245	231	127	172	902
E0602	Gamma FIDLER	30	4523	4633	515	2399	5673
E0604	Alpha PH	30	7	5	13	0	73
E0604	Beta PH	30	220	216	52	126	438
E0604	Gamma FIDLER	30	4624	4669	619	2486	6729
E0609	Alpha PH	30	9	3	34	0	188
E0609	Beta PH	30	232	207	117	134	820
E0609	Gamma FIDLER	30	4642	4718	481	2447	5153
E0610	Alpha PH	30	3	3	2	0	11
E0610	Beta PH	30	212	205	43	121	312
E0610	Gamma FIDLER	30	4713	4887	558	2436	5132
E0702	Alpha PH	30	3	1	10	0	53
E0702	Beta PH	30	219	220	45	114	340
E0702	Gamma FIDLER	30	4419	4569	494	2213	4857
E0706	Alpha PH	30	2	1	2	0	13
E0706	Beta PH	30	203	201	39	118	341
E0706	Gamma FIDLER	30	6512	6623	770	3152	7361
E0711	Alpha PH	30	2	1	3	0	16
E0711	Beta PH	30	201	197	32	126	264
E0711	Gamma FIDLER	30	6711	6909	845	3166	7245
E0801	Alpha PH	30	2	2	2	0	12
E0801	Beta PH	30	222	227	34	162	307
E0801	Gamma FIDLER	30	4586	4712	502	2309	5035
E0802	Alpha PH	30	3	3	3	1	19
E0802	Beta PH	30	225	217	41	168	330
E0802	Gamma FIDLER	30	4575	4691	506	2281	5105

Table A3-9
Summary Statistics
E-Block Igloos - Direct Measurements
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Notes:
(1) Measurements from each survey unit were grouped by radiation type and instrument.
Instruments: PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.
(2) cpm = counts per minute.

Table A3-10
Initial Scenario A Data Reduction
Depleted Uranium Storage Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

		Survey Unit		Reference Area					
Igloo	Dataset[1]	Mean (cpm)[2]	Maximum (cpm)[2]	Mean (cpm)[3]	Minimum (cpm)[3]	$DCGL_W$ (cpm)[4]	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion[5]
A0201	Alpha PH	3	7	5	0	528	Yes	Yes	Perform WRS test for FIDLER data set
A0201	Beta PH	214	277	222	111	387	Yes	Yes	
A0201	Gamma FIDLER	4554	5094	6445	2417	408	Yes	**No**	
A0316	Alpha PH	2	6	5	0	528	Yes	Yes	Perform WRS test for FIDLER data set
A0316	Beta PH	224	276	222	111	387	Yes	Yes	
A0316	Gamma FIDLER	4568	4985	6445	2417	408	Yes	**No**	
A0317	Alpha PH	3	6	5	0	528	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
A0317	Beta PH	208	276	222	111	387	Yes	Yes	
A0317	Gamma FIDLER	6943	7650	6445	2417	408	**No**	**No**	
A0508	Alpha PH	4	8	5	0	528	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
A0508	Beta PH	232	361	222	111	387	Yes	Yes	
A0508	Gamma FIDLER	7157	8056	6445	2417	408	**No**	**No**	
A0701	Alpha PH	2	4	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
A0701	Beta PH	206	381	222	111	2889	Yes	Yes	
A0701	Gamma FIDLER	4289	4785	6445	2417	3047	Yes	Yes	
A0706	Alpha PH	5	18	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
A0706	Beta PH	239	608	222	111	2889	Yes	Yes	
A0706	Gamma FIDLER	7039	8007	6445	2417	3047	Yes	**No**	
A0707	Alpha PH	3	17	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
A0707	Beta PH	225	415	222	111	2889	Yes	Yes	
A0707	Gamma FIDLER	7119	7559	6445	2417	3047	Yes	**No**	
A0710	Alpha PH	3	29	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
A0710	Beta PH	239	413	222	111	2889	Yes	Yes	
A0710	Gamma FIDLER	4456	4920	6445	2417	3047	Yes	Yes	
A0711	Alpha PH	7	64	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
A0711	Beta PH	233	389	222	111	2889	Yes	Yes	
A0711	Gamma FIDLER	6911	7861	6445	2417	3047	Yes	**No**	
A0901	Alpha PH	2	30	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
A0901	Beta PH	238	407	222	111	2889	Yes	Yes	
A0901	Gamma FIDLER	4466	4908	6445	2417	3047	Yes	Yes	

Table A3-10
Initial Scenario A Data Reduction
Depleted Uranium Storage Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

		Survey Unit		Reference Area					
Igloo	Dataset [1]	Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]	$DCGL_W$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion [5]
A0905	Alpha PH	3	49	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
A0905	Beta PH	243	350	222	111	2889	Yes	Yes	
A0905	Gamma FIDLER	4573	5060	6445	2417	3047	Yes	Yes	
A1108	Alpha PH	2	29	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
A1108	Beta PH	198	334	222	111	2889	Yes	Yes	
A1108	Gamma FIDLER	6587	7364	6445	2417	3047	Yes	**No**	
A1109	Alpha PH	2	13	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
A1109	Beta PH	233	513	222	111	2889	Yes	Yes	
A1109	Gamma FIDLER	4472	4957	6445	2417	3047	Yes	Yes	
B0109	Alpha PH	2	6	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0109	Beta PH	202	273	222	111	2889	Yes	Yes	
B0109	Gamma FIDLER	6812	7399	6445	2417	3047	Yes	**No**	
B0411	Alpha PH	1	4	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
B0411	Beta PH	215	277	222	111	2889	Yes	Yes	
B0411	Gamma FIDLER	4332	4955	6445	2417	3047	Yes	Yes	
B0501	Alpha PH	1	8	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0501	Beta PH	181	252	222	111	2889	Yes	Yes	
B0501	Gamma FIDLER	6477	7274	6445	2417	3047	Yes	**No**	
B0602	Alpha PH	2	11	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0602	Beta PH	191	256	222	111	2889	Yes	Yes	
B0602	Gamma FIDLER	6803	7521	6445	2417	3047	Yes	**No**	
B0603	Alpha PH	2	10	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0603	Beta PH	197	270	222	111	2889	Yes	Yes	
B0603	Gamma FIDLER	6904	7532	6445	2417	3047	Yes	**No**	
B0609	Alpha PH	3	19	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0609	Beta PH	219	294	222	111	2889	Yes	Yes	
B0609	Gamma FIDLER	6730	7636	6445	2417	3047	Yes	**No**	
B0610	Alpha PH	2	19	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0610	Beta PH	203	278	222	111	2889	Yes	Yes	
B0610	Gamma FIDLER	6851	7841	6445	2417	3047	Yes	**No**	

Table A3-10
Initial Scenario A Data Reduction
Depleted Uranium Storage Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

		Survey Unit		Reference Area					
Igloo	Dataset [1]	Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]	$DCGL_W$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion [5]
B0701	Alpha PH	4	42	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0701	Beta PH	205	267	222	111	2889	Yes	Yes	
B0701	Gamma FIDLER	6923	7609	6445	2417	3047	Yes	**No**	
B0705	Alpha PH	3	39	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0705	Beta PH	204	291	222	111	2889	Yes	Yes	
B0705	Gamma FIDLER	6755	7372	6445	2417	3047	Yes	**No**	
B0707	Alpha PH	4	18	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0707	Beta PH	207	287	222	111	2889	Yes	Yes	
B0707	Gamma FIDLER	6595	7772	6445	2417	3047	Yes	**No**	
B0708	Alpha PH	2	16	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0708	Beta PH	192	293	222	111	2889	Yes	Yes	
B0708	Gamma FIDLER	6814	7347	6445	2417	3047	Yes	**No**	
B0709	Alpha PH	1	9	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0709	Beta PH	197	300	222	111	2889	Yes	Yes	
B0709	Gamma FIDLER	6707	7513	6445	2417	3047	Yes	**No**	
B0711	Alpha PH	1	13	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0711	Beta PH	208	346	222	111	2889	Yes	Yes	
B0711	Gamma FIDLER	6647	7346	6445	2417	3047	Yes	**No**	
B0801	Alpha PH	2	21	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
B0801	Beta PH	196	247	222	111	2889	Yes	Yes	
B0801	Gamma FIDLER	4555	5008	6445	2417	3047	Yes	Yes	
B0802	Alpha PH	2	20	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
B0802	Beta PH	196	240	222	111	2889	Yes	Yes	
B0802	Gamma FIDLER	4349	4910	6445	2417	3047	Yes	Yes	
B0804	Alpha PH	1	13	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
B0804	Beta PH	192	276	222	111	2889	Yes	Yes	
B0804	Gamma FIDLER	4332	4675	6445	2417	3047	Yes	Yes	
B0809	Alpha PH	6	57	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0809	Beta PH	228	486	222	111	2889	Yes	Yes	
B0809	Gamma FIDLER	6673	7168	6445	2417	3047	Yes	**No**	

Table A3-10
Initial Scenario A Data Reduction
Depleted Uranium Storage Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

		Survey Unit		Reference Area					
Igloo	Dataset [1]	Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]	$DCGL_W$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion [5]
B0810	Alpha PH	5	31	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0810	Beta PH	217	354	222	111	2889	Yes	Yes	
B0810	Gamma FIDLER	6621	7241	6445	2417	3047	Yes	**No**	
B0811	Alpha PH	2	36	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0811	Beta PH	208	295	222	111	2889	Yes	Yes	
B0811	Gamma FIDLER	6973	7736	6445	2417	3047	Yes	**No**	
B0909	Alpha PH	3	42	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
B0909	Beta PH	204	331	222	111	2889	Yes	Yes	
B0909	Gamma FIDLER	7302	8358	6445	2417	3047	Yes	**No**	
C0203	Alpha PH	5	21	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0203	Beta PH	199	288	222	111	2889	Yes	Yes	
C0203	Gamma FIDLER	6736	7599	6445	2417	3047	Yes	**No**	
C0303	Alpha PH	5	101	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0303	Beta PH	208	500	222	111	2889	Yes	Yes	
C0303	Gamma FIDLER	6424	7233	6445	2417	3047	Yes	**No**	
C0307	Alpha PH	5	91	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0307	Beta PH	214	478	222	111	2889	Yes	Yes	
C0307	Gamma FIDLER	6651	7461	6445	2417	3047	Yes	**No**	
C0308	Alpha PH	6	101	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0308	Beta PH	198	489	222	111	2889	Yes	Yes	
C0308	Gamma FIDLER	6703	7317	6445	2417	3047	Yes	**No**	
C0401	Alpha PH	5	71	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0401	Beta PH	208	430	222	111	2889	Yes	Yes	
C0401	Gamma FIDLER	6634	7290	6445	2417	3047	Yes	**No**	
C0403	Alpha PH	4	57	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0403	Beta PH	194	340	222	111	2889	Yes	Yes	
C0403	Gamma FIDLER	6795	7380	6445	2417	3047	Yes	**No**	
C0405	Alpha PH	3	30	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0405	Beta PH	189	258	222	111	2889	Yes	Yes	
C0405	Gamma FIDLER	6559	7262	6445	2417	3047	Yes	**No**	

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Igloo	Dataset [1]	Survey Unit		Reference Area		$DCGL_W$ [4] (cpm)	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion [5]
		Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]				
C0406	Alpha PH	4	68	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0406	Beta PH	202	397	222	111	2889	Yes	Yes	
C0406	Gamma FIDLER	6537	7012	6445	2417	3047	Yes	**No**	
C0407	Alpha PH	3	63	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0407	Beta PH	200	426	222	111	2889	Yes	Yes	
C0407	Gamma FIDLER	6496	7174	6445	2417	3047	Yes	**No**	
C0408	Alpha PH	1	11	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0408	Beta PH	183	332	222	111	2889	Yes	Yes	
C0408	Gamma FIDLER	6604	7324	6445	2417	3047	Yes	**No**	
C0501	Alpha PH	2	6	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0501	Beta PH	186	264	222	111	2889	Yes	Yes	
C0501	Gamma FIDLER	6611	7199	6445	2417	3047	Yes	**No**	
C0503	Alpha PH	4	51	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0503	Beta PH	191	318	222	111	2889	Yes	Yes	
C0503	Gamma FIDLER	6815	7475	6445	2417	3047	Yes	**No**	
C0504	Alpha PH	3	33	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0504	Beta PH	193	321	222	111	2889	Yes	Yes	
C0504	Gamma FIDLER	6716	7675	6445	2417	3047	Yes	**No**	
C0505	Alpha PH	5	70	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0505	Beta PH	205	451	222	111	2889	Yes	Yes	
C0505	Gamma FIDLER	6852	7622	6445	2417	3047	Yes	**No**	
C0508	Alpha PH	4	44	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0508	Beta PH	196	372	222	111	2889	Yes	Yes	
C0508	Gamma FIDLER	6782	7785	6445	2417	3047	Yes	**No**	
C0510	Alpha PH	2	21	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0510	Beta PH	190	569	222	111	2889	Yes	Yes	
C0510	Gamma FIDLER	6684	7165	6445	2417	3047	Yes	**No**	
C0511	Alpha PH	2	11	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0511	Beta PH	188	248	222	111	2889	Yes	Yes	
C0511	Gamma FIDLER	6217	7151	6445	2417	3047	Yes	**No**	

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		Survey Unit		Reference Area					
Igloo	Dataset [1]	Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]	$DCGL_w$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_w$?	Difference between SU max and bkgd min less than $DCGL_w$?	Conclusion
C0513	Alpha PH	1	6	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0513	Beta PH	187	274	222	111	2889	Yes	Yes	
C0513	Gamma FIDLER	6787	7660	6445	2417	3047	Yes	**No**	
C0603	Alpha PH	7	139	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0603	Beta PH	208	699	222	111	2889	Yes	Yes	
C0603	Gamma FIDLER	6499	7065	6445	2417	3047	Yes	**No**	
C0604	Alpha PH	3	46	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0604	Beta PH	188	363	222	111	2889	Yes	Yes	
C0604	Gamma FIDLER	6369	7638	6445	2417	3047	Yes	**No**	
C0605	Alpha PH	2	24	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0605	Beta PH	204	308	222	111	2889	Yes	Yes	
C0605	Gamma FIDLER	6333	6868	6445	2417	3047	Yes	**No**	
C0606	Alpha PH	1	10	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0606	Beta PH	194	304	222	111	2889	Yes	Yes	
C0606	Gamma FIDLER	6416	6986	6445	2417	3047	Yes	**No**	
C0608	Alpha PH	2	20	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0608	Beta PH	182	268	222	111	2889	Yes	Yes	
C0608	Gamma FIDLER	5246	6489	6445	2417	3047	Yes	**No**	
C0701	Alpha PH	4	59	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0701	Beta PH	203	474	222	111	2889	Yes	Yes	
C0701	Gamma FIDLER	6774	7462	6445	2417	3047	Yes	**No**	
C0706	Alpha PH	6	99	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0706	Beta PH	202	512	222	111	2889	Yes	Yes	
C0706	Gamma FIDLER	6611	7122	6445	2417	3047	Yes	**No**	
C0707	Alpha PH	3	29	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0707	Beta PH	204	287	222	111	2889	Yes	Yes	
C0707	Gamma FIDLER	6780	7484	6445	2417	3047	Yes	**No**	
C0708	Alpha PH	3	31	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0708	Beta PH	192	300	222	111	2889	Yes	Yes	
C0708	Gamma FIDLER	6759	7411	6445	2417	3047	Yes	**No**	

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		Survey Unit		Reference Area					
Igloo	Dataset [1]	Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]	$DCGL_W$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion [5]
C0801	Alpha PH	1	3	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0801	Beta PH	188	297	222	111	2889	Yes	Yes	
C0801	Gamma FIDLER	7039	7594	6445	2417	3047	Yes	**No**	
C0803	Alpha PH	1	3	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0803	Beta PH	197	282	222	111	2889	Yes	Yes	
C0803	Gamma FIDLER	7127	7737	6445	2417	3047	Yes	**No**	
C0807	Alpha PH	1	13	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0807	Beta PH	189	287	222	111	2889	Yes	Yes	
C0807	Gamma FIDLER	6863	7582	6445	2417	3047	Yes	**No**	
C0809	Alpha PH	3	37	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0809	Beta PH	200	358	222	111	2889	Yes	Yes	
C0809	Gamma FIDLER	6826	7364	6445	2417	3047	Yes	**No**	
C0901	Alpha PH	2	43	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0901	Beta PH	194	381	222	111	2889	Yes	Yes	
C0901	Gamma FIDLER	7273	7904	6445	2417	3047	Yes	**No**	
C0902	Alpha PH	4	42	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0902	Beta PH	212	376	222	111	2889	Yes	Yes	
C0902	Gamma FIDLER	7080	7864	6445	2417	3047	Yes	**No**	
C0906	Alpha PH	5	113	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0906	Beta PH	222	470	222	111	2889	Yes	Yes	
C0906	Gamma FIDLER	7212	7757	6445	2417	3047	Yes	**No**	
C0907	Alpha PH	2	5	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0907	Beta PH	191	254	222	111	2889	Yes	Yes	
C0907	Gamma FIDLER	6908	7523	6445	2417	3047	Yes	**No**	
C0908	Alpha PH	3	40	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
C0908	Beta PH	201	316	222	111	2889	Yes	Yes	
C0908	Gamma FIDLER	7117	7732	6445	2417	3047	Yes	**No**	
C0909	Alpha PH	3	42	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
C0909	Beta PH	206	369	222	111	2889	Yes	Yes	
C0909	Gamma FIDLER	4894	5402	6445	2417	3047	Yes	Yes	

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Igloo	Dataset [1]	Survey Unit		Reference Area		$DCGL_W$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion [5]
		Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]				
D0104	Alpha PH	5	72	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0104	Beta PH	233	448	222	111	2889	Yes	Yes	
D0104	Gamma FIDLER	4624	5432	6445	2417	3047	Yes	Yes	
D0105	Alpha PH	3	25	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0105	Beta PH	220	315	222	111	2889	Yes	Yes	
D0105	Gamma FIDLER	4519	4885	6445	2417	3047	Yes	Yes	
D0107	Alpha PH	3	47	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0107	Beta PH	251	415	222	111	2889	Yes	Yes	
D0107	Gamma FIDLER	4736	7483	6445	2417	3047	Yes	**No**	
D0108	Alpha PH	4	81	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0108	Beta PH	200	381	222	111	2889	Yes	Yes	
D0108	Gamma FIDLER	7038	7624	6445	2417	3047	Yes	**No**	
D0110	Alpha PH	2	16	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0110	Beta PH	206	355	222	111	2889	Yes	Yes	
D0110	Gamma FIDLER	4393	4856	6445	2417	3047	Yes	Yes	
D0113	Alpha PH	5	31	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0113	Beta PH	208	302	222	111	2889	Yes	Yes	
D0113	Gamma FIDLER	6586	7031	6445	2417	3047	Yes	**No**	
D0206	Alpha PH	3	35	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0206	Beta PH	207	318	222	111	2889	Yes	Yes	
D0206	Gamma FIDLER	4708	5043	6445	2417	3047	Yes	Yes	
D0207	Alpha PH	2	20	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0207	Beta PH	224	361	222	111	2889	Yes	Yes	
D0207	Gamma FIDLER	4496	5038	6445	2417	3047	Yes	Yes	
D0305	Alpha PH	3	12	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0305	Beta PH	223	309	222	111	2889	Yes	Yes	
D0305	Gamma FIDLER	6945	7537	6445	2417	3047	Yes	**No**	
D0306	Alpha PH	3	33	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0306	Beta PH	198	315	222	111	2889	Yes	Yes	
D0306	Gamma FIDLER	7052	7655	6445	2417	3047	Yes	**No**	

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		Survey Unit		Reference Area					
Igloo	Dataset [1]	Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]	$DCGL_w$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_w$?	Difference between SU max and bkgd min less than $DCGL_w$?	Conclusion [5]
D0312	Alpha PH	2	13	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0312	Beta PH	198	266	222	111	2889	Yes	Yes	
D0312	Gamma FIDLER	7123	7757	6445	2417	3047	Yes	**No**	
D0401	Alpha PH	2	14	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0401	Beta PH	217	338	222	111	2889	Yes	Yes	
D0401	Gamma FIDLER	4579	4949	6445	2417	3047	Yes	Yes	
D0406	Alpha PH	2	24	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0406	Beta PH	199	332	222	111	2889	Yes	Yes	
D0406	Gamma FIDLER	7269	7968	6445	2417	3047	Yes	**No**	
D0407	Alpha PH	2	28	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0407	Beta PH	196	286	222	111	2889	Yes	Yes	
D0407	Gamma FIDLER	7197	7810	6445	2417	3047	Yes	**No**	
D0413	Alpha PH	2	13	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0413	Beta PH	211	274	222	111	2889	Yes	Yes	
D0413	Gamma FIDLER	7156	7883	6445	2417	3047	Yes	**No**	
D0601	Alpha PH	2	7	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0601	Beta PH	222	301	222	111	2889	Yes	Yes	
D0601	Gamma FIDLER	7054	7729	6445	2417	3047	Yes	**No**	
D0604	Alpha PH	1	5	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0604	Beta PH	238	360	222	111	2889	Yes	Yes	
D0604	Gamma FIDLER	7148	7981	6445	2417	3047	Yes	**No**	
D0607	Alpha PH	2	13	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0607	Beta PH	206	328	222	111	2889	Yes	Yes	
D0607	Gamma FIDLER	4590	5026	6445	2417	3047	Yes	Yes	
D0704	Alpha PH	1	5	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0704	Beta PH	199	312	222	111	2889	Yes	Yes	
D0704	Gamma FIDLER	7049	7523	6445	2417	3047	Yes	**No**	
D0705	Alpha PH	2	4	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0705	Beta PH	230	306	222	111	2889	Yes	Yes	
D0705	Gamma FIDLER	7121	7676	6445	2417	3047	Yes	**No**	

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Igloo	Dataset [1]	Survey Unit Mean (cpm) [2]	Survey Unit Maximum (cpm) [2]	Reference Area Mean (cpm) [3]	Reference Area Minimum (cpm) [3]	$DCGL_W$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion [5]
D0711	Alpha PH	2	33	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0711	Beta PH	205	306	222	111	2889	Yes	Yes	
D0711	Gamma FIDLER	4591	4934	6445	2417	3047	Yes	Yes	
D0712	Alpha PH	2	5	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0712	Beta PH	195	248	222	111	2889	Yes	Yes	
D0712	Gamma FIDLER	4745	5106	6445	2417	3047	Yes	Yes	
D0801	Alpha PH	2	20	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
D0801	Beta PH	198	264	222	111	2889	Yes	Yes	
D0801	Gamma FIDLER	4523	5040	6445	2417	3047	Yes	Yes	
D0805	Alpha PH	3	50	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
D0805	Beta PH	228	370	222	111	2889	Yes	Yes	
D0805	Gamma FIDLER	6953	7703	6445	2417	3047	Yes	**No**	
E0103	Alpha PH	3	57	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0103	Beta PH	215	377	222	111	2889	Yes	Yes	
E0103	Gamma FIDLER	7340	7969	6445	2417	3047	Yes	**No**	
E0105	Alpha PH	4	74	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0105	Beta PH	235	514	222	111	2889	Yes	Yes	
E0105	Gamma FIDLER	7131	7829	6445	2417	3047	Yes	**No**	
E0112	Alpha PH	3	17	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0112	Beta PH	208	275	222	111	2889	Yes	Yes	
E0112	Gamma FIDLER	7050	7603	6445	2417	3047	Yes	**No**	
E0211	Alpha PH	4	56	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0211	Beta PH	200	362	222	111	2889	Yes	Yes	
E0211	Gamma FIDLER	6965	7535	6445	2417	3047	Yes	**No**	
E0301	Alpha PH	3	31	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
E0301	Beta PH	196	295	222	111	2889	Yes	Yes	
E0301	Gamma FIDLER	4406	4840	6445	2417	3047	Yes	Yes	
E0302	Alpha PH	3	23	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0302	Beta PH	213	324	222	111	2889	Yes	Yes	
E0302	Gamma FIDLER	6651	7619	6445	2417	3047	Yes	**No**	

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Igloo	Dataset[1]	Survey Unit		Reference Area		$DCGL_W$ (cpm)[4]	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion
		Mean (cpm)[2]	Maximum (cpm)[2]	Mean (cpm)[3]	Minimum (cpm)[3]				
E0303	Alpha PH	6	75	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0303	Beta PH	217	423	222	111	2889	Yes	Yes	
E0303	Gamma FIDLER	7027	7830	6445	2417	3047	Yes	**No**	
E0312	Alpha PH	2	23	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0312	Beta PH	193	299	222	111	2889	Yes	Yes	
E0312	Gamma FIDLER	6634	7237	6445	2417	3047	Yes	**No**	
E0402	Alpha PH	2	12	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0402	Beta PH	199	283	222	111	2889	Yes	Yes	
E0402	Gamma FIDLER	6696	7498	6445	2417	3047	Yes	**No**	
E0410	Alpha PH	2	13	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0410	Beta PH	204	275	222	111	2889	Yes	Yes	
E0410	Gamma FIDLER	6832	7641	6445	2417	3047	Yes	**No**	
E0411	Alpha PH	2	18	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
E0411	Beta PH	201	293	222	111	2889	Yes	Yes	
E0411	Gamma FIDLER	4520	4910	6445	2417	3047	Yes	Yes	
E0413	Alpha PH	2	5	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0413	Beta PH	223	300	222	111	2889	Yes	Yes	
E0413	Gamma FIDLER	6862	7467	6445	2417	3047	Yes	**No**	
E0504	Alpha PH	2	26	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0504	Beta PH	229	306	222	111	2889	Yes	Yes	
E0504	Gamma FIDLER	7001	7860	6445	2417	3047	Yes	**No**	
E0506	Alpha PH	2	6	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0506	Beta PH	224	361	222	111	2889	Yes	Yes	
E0506	Gamma FIDLER	6948	7806	6445	2417	3047	Yes	**No**	
E0508	Alpha PH	1	5	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0508	Beta PH	226	292	222	111	2889	Yes	Yes	
E0508	Gamma FIDLER	7233	7888	6445	2417	3047	Yes	**No**	
E0510	Alpha PH	2	16	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0510	Beta PH	225	467	222	111	2889	Yes	Yes	
E0510	Gamma FIDLER	7036	7551	6445	2417	3047	Yes	**No**	

Table A3-10
Initial Scenario A Data Reduction
Depleted Uranium Storage Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

Igloo	Dataset [1]	Survey Unit		Reference Area		$DCGL_w$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_w$?	Difference between SU max and bkgd min less than $DCGL_w$?	Conclusion [5]
		Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]				
E0512	Alpha PH	2	21	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
E0512	Beta PH	190	277	222	111	2889	Yes	Yes	
E0512	Gamma FIDLER	4482	4969	6445	2417	3047	Yes	Yes	
E0602	Alpha PH	13	206	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0602	Beta PH	245	902	222	111	2889	Yes	Yes	
E0602	Gamma FIDLER	4523	5673	6445	2417	3047	Yes	**No**	
E0604	Alpha PH	7	73	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0604	Beta PH	220	438	222	111	2889	Yes	Yes	
E0604	Gamma FIDLER	4624	6729	6445	2417	3047	Yes	**No**	
E0609	Alpha PH	9	188	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
E0609	Beta PH	232	820	222	111	2889	Yes	Yes	
E0609	Gamma FIDLER	4642	5153	6445	2417	3047	Yes	Yes	
E0610	Alpha PH	3	11	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
E0610	Beta PH	212	312	222	111	2889	Yes	Yes	
E0610	Gamma FIDLER	4713	5132	6445	2417	3047	Yes	Yes	
E0702	Alpha PH	3	53	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
E0702	Beta PH	219	340	222	111	2889	Yes	Yes	
E0702	Gamma FIDLER	4419	4857	6445	2417	3047	Yes	Yes	
E0706	Alpha PH	2	13	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0706	Beta PH	203	341	222	111	2889	Yes	Yes	
E0706	Gamma FIDLER	6512	7361	6445	2417	3047	Yes	**No**	
E0711	Alpha PH	2	16	5	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
E0711	Beta PH	201	264	222	111	2889	Yes	Yes	
E0711	Gamma FIDLER	6711	7245	6445	2417	3047	Yes	**No**	
E0801	Alpha PH	2	12	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
E0801	Beta PH	222	307	222	111	2889	Yes	Yes	
E0801	Gamma FIDLER	4586	5035	6445	2417	3047	Yes	Yes	
E0802	Alpha PH	3	19	5	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
E0802	Beta PH	225	330	222	111	2889	Yes	Yes	
E0802	Gamma FIDLER	4575	5105	6445	2417	3047	Yes	Yes	

Table A3-10
Initial Scenario A Data Reduction
Depleted Uranium Storage Igloos - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

		Survey Unit		Reference Area					
Igloo	Dataset [1]	Mean (cpm) [2]	Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [3]	$DCGL_W$ (cpm) [4]	Difference between SU mean and bkgd mean less than $DCGL_W$?	Difference between SU max and bkgd min less than $DCGL_W$?	Conclusion [5]

Notes:

(1) Measurements from each survey unit were grouped by radiation type and instrument. Instruments:PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.

(2) cpm = counts per minute. Refer to **Tables A3-5** through **A3-9** for complete summary statistics for each survey unit.

(3) Measurements from five unimpacted igloos were used as the reference area for the Depleted Uranium storage igloos . Refer to **Table A2-3** for complete summary statistics for the reference areas.

(4) The instrument-specific $DCGL_W$ was calculated using the physical or active probe area in cm^2 and the instrument efficiency (**Table A3-2**), and does not include background.

(5) Per MARSSIM Section 8 and Figure 2-1 of this addendum.

Table A3-11
Wilcoxon Rank Sum Test Results
Depleted Uranium Storage Igloos
License Termination Report Addendum A
Seneca Army Depot Activity

Igloo	Dataset ID	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A0201	Gamma FIDLER - Pu-239 $DCGL_W$	30	150	14003.6	15568.5	Reject	**Survey Unit Meets Release Criterion**
A0316	Gamma FIDLER - Pu-239 $DCGL_W$	30	150	14003.6	15569	Reject	**Survey Unit Meets Release Criterion**
A0317	Gamma FIDLER - Pu-239 $DCGL_W$	30	150	14003.6	13804	Accept	Survey unit meets release criterion based on alpha and beta measurements
A0508	Gamma FIDLER - Pu-239 $DCGL_W$	30	150	14003.6	13369	Accept	Survey unit meets release criterion based on alpha and beta measurements
A0706	Gamma FIDLER	30	150	14003.6	15576.5	Reject	**Survey Unit Meets Release Criterion**
A0707	Gamma FIDLER	30	150	14003.6	15599	Reject	**Survey Unit Meets Release Criterion**
A0711	Gamma FIDLER	30	150	14003.6	15608	Reject	**Survey Unit Meets Release Criterion**
A1108	Gamma FIDLER	30	150	14003.6	15658	Reject	**Survey Unit Meets Release Criterion**
B0109	Gamma FIDLER	30	150	14003.6	15628	Reject	**Survey Unit Meets Release Criterion**
B0501	Gamma FIDLER	30	150	14003.6	15662	Reject	**Survey Unit Meets Release Criterion**
B0602	Gamma FIDLER	30	150	14003.6	15635	Reject	**Survey Unit Meets Release Criterion**
B0603	Gamma FIDLER	30	150	14003.6	15618	Reject	**Survey Unit Meets Release Criterion**
B0609	Gamma FIDLER	30	150	14003.6	15639	Reject	**Survey Unit Meets Release Criterion**
B0610	Gamma FIDLER	30	150	14003.6	15612	Reject	**Survey Unit Meets Release Criterion**
B0701	Gamma FIDLER	30	150	14003.6	15615	Reject	**Survey Unit Meets Release Criterion**
B0705	Gamma FIDLER	30	150	14003.6	15639	Reject	**Survey Unit Meets Release Criterion**
B0707	Gamma FIDLER	30	150	14003.6	15655.5	Reject	**Survey Unit Meets Release Criterion**
B0708	Gamma FIDLER	30	150	14003.6	15630	Reject	**Survey Unit Meets Release Criterion**
B0709	Gamma FIDLER	30	150	14003.6	15636	Reject	**Survey Unit Meets Release Criterion**
B0711	Gamma FIDLER	30	150	14003.6	15652	Reject	**Survey Unit Meets Release Criterion**
B0809	Gamma FIDLER	30	150	14003.6	15653	Reject	**Survey Unit Meets Release Criterion**
B0810	Gamma FIDLER	30	150	14003.6	15652	Reject	**Survey Unit Meets Release Criterion**
B0811	Gamma FIDLER	30	150	14003.6	15594	Reject	**Survey Unit Meets Release Criterion**
B0909	Gamma FIDLER	30	150	14003.6	15433.5	Reject	**Survey Unit Meets Release Criterion**
C0203	Gamma FIDLER	30	150	14003.6	15642	Reject	**Survey Unit Meets Release Criterion**
C0303	Gamma FIDLER	30	150	14003.6	15691	Reject	**Survey Unit Meets Release Criterion**

Table A3-11
Wilcoxon Rank Sum Test Results
Depleted Uranium Storage Igloos
License Termination Report Addendum A
Seneca Army Depot Activity

C0307	Gamma FIDLER	30	150	14003.6	15653.5	Reject	Survey Unit Meets Release Criterion
C0308	Gamma FIDLER	30	150	14003.6	15647	Reject	Survey Unit Meets Release Criterion
C0401	Gamma FIDLER	30	150	14003.6	15657	Reject	Survey Unit Meets Release Criterion
C0403	Gamma FIDLER	30	150	14003.6	15634	Reject	Survey Unit Meets Release Criterion
C0405	Gamma FIDLER	30	150	14003.6	15663.5	Reject	Survey Unit Meets Release Criterion
C0406	Gamma FIDLER	30	150	14003.6	15664.5	Reject	Survey Unit Meets Release Criterion
C0407	Gamma FIDLER	30	150	14003.6	15682	Reject	Survey Unit Meets Release Criterion
C0408	Gamma FIDLER	30	150	14003.6	15661	Reject	Survey Unit Meets Release Criterion
C0501	Gamma FIDLER	30	150	14003.6	15660	Reject	Survey Unit Meets Release Criterion
C0503	Gamma FIDLER	30	150	14003.6	15632	Reject	Survey Unit Meets Release Criterion
C0504	Gamma FIDLER	30	150	14003.6	15643	Reject	Survey Unit Meets Release Criterion
C0505	Gamma FIDLER	30	150	14003.6	15625	Reject	Survey Unit Meets Release Criterion
C0508	Gamma FIDLER	30	150	14003.6	15630	Reject	Survey Unit Meets Release Criterion
C0510	Gamma FIDLER	30	150	14003.6	15647.5	Reject	Survey Unit Meets Release Criterion
C0511	Gamma FIDLER	30	150	14003.6	15715.5	Reject	Survey Unit Meets Release Criterion
C0513	Gamma FIDLER	30	150	14003.6	15632	Reject	Survey Unit Meets Release Criterion
C0603	Gamma FIDLER	30	150	14003.6	15678	Reject	Survey Unit Meets Release Criterion
C0604	Gamma FIDLER	30	150	14003.6	15696	Reject	Survey Unit Meets Release Criterion
C0605	Gamma FIDLER	30	150	14003.6	15707	Reject	Survey Unit Meets Release Criterion
C0606	Gamma FIDLER	30	150	14003.6	15700	Reject	Survey Unit Meets Release Criterion
C0608	Gamma FIDLER	30	150	14003.6	15787	Reject	Survey Unit Meets Release Criterion
C0701	Gamma FIDLER	30	150	14003.6	15638	Reject	Survey Unit Meets Release Criterion
C0706	Gamma FIDLER	30	150	14003.6	15659	Reject	Survey Unit Meets Release Criterion
C0707	Gamma FIDLER	30	150	14003.6	15632	Reject	Survey Unit Meets Release Criterion
C0708	Gamma FIDLER	30	150	14003.6	15632	Reject	Survey Unit Meets Release Criterion
C0801	Gamma FIDLER	30	150	14003.6	15601	Reject	Survey Unit Meets Release Criterion
C0803	Gamma FIDLER	30	150	14003.6	15581	Reject	Survey Unit Meets Release Criterion

Table A3-11
Wilcoxon Rank Sum Test Results
Depleted Uranium Storage Igloos
License Termination Report Addendum A
Seneca Army Depot Activity

C0807	Gamma FIDLER	30	150	14003.6	15626	Reject	Survey Unit Meets Release Criterion
C0809	Gamma FIDLER	30	150	14003.6	15626	Reject	Survey Unit Meets Release Criterion
C0901	Gamma FIDLER	30	150	14003.6	15519	Reject	Survey Unit Meets Release Criterion
C0902	Gamma FIDLER	30	150	14003.6	15555	Reject	Survey Unit Meets Release Criterion
C0906	Gamma FIDLER	30	150	14003.6	15555	Reject	Survey Unit Meets Release Criterion
C0907	Gamma FIDLER	30	150	14003.6	15619	Reject	Survey Unit Meets Release Criterion
C0908	Gamma FIDLER	30	150	14003.6	15581.5	Reject	Survey Unit Meets Release Criterion
D0107	Gamma FIDLER	30	150	14003.6	15816	Reject	Survey Unit Meets Release Criterion
D0108	Gamma FIDLER	30	150	14003.6	15598.5	Reject	Survey Unit Meets Release Criterion
D0113	Gamma FIDLER	30	150	14003.6	15657	Reject	Survey Unit Meets Release Criterion
D0305	Gamma FIDLER	30	150	14003.6	15615.5	Reject	Survey Unit Meets Release Criterion
D0306	Gamma FIDLER	30	150	14003.6	15593	Reject	Survey Unit Meets Release Criterion
D0312	Gamma FIDLER	30	150	14003.6	15576	Reject	Survey Unit Meets Release Criterion
D0406	Gamma FIDLER	30	150	14003.6	15498.5	Reject	Survey Unit Meets Release Criterion
D0407	Gamma FIDLER	30	150	14003.6	15541.5	Reject	Survey Unit Meets Release Criterion
D0413	Gamma FIDLER	30	150	14003.6	15555.5	Reject	Survey Unit Meets Release Criterion
D0601	Gamma FIDLER	30	150	14003.6	15588	Reject	Survey Unit Meets Release Criterion
D0604	Gamma FIDLER	30	150	14003.6	15550.5	Reject	Survey Unit Meets Release Criterion
D0704	Gamma FIDLER	30	150	14003.6	15600	Reject	Survey Unit Meets Release Criterion
D0705	Gamma FIDLER	30	150	14003.6	15583	Reject	Survey Unit Meets Release Criterion
D0805	Gamma FIDLER	30	150	14003.6	15610	Reject	Survey Unit Meets Release Criterion
E0103	Gamma FIDLER	30	150	14003.6	15461.5	Reject	Survey Unit Meets Release Criterion
E0105	Gamma FIDLER	30	150	14003.6	15549.5	Reject	Survey Unit Meets Release Criterion
E0112	Gamma FIDLER	30	150	14003.6	15594	Reject	Survey Unit Meets Release Criterion
E0211	Gamma FIDLER	30	150	14003.6	15609	Reject	Survey Unit Meets Release Criterion
E0302	Gamma FIDLER	30	150	14003.6	15652	Reject	Survey Unit Meets Release Criterion
E0303	Gamma FIDLER	30	150	14003.6	15580	Reject	Survey Unit Meets Release Criterion

Table A3-11
Wilcoxon Rank Sum Test Results
Depleted Uranium Storage Igloos
License Termination Report Addendum A
Seneca Army Depot Activity

E0312	Gamma FIDLER	30	150	14003.6	15653	Reject	**Survey Unit Meets Release Criterion**
E0402	Gamma FIDLER	30	150	14003.6	15646	Reject	**Survey Unit Meets Release Criterion**
E0410	Gamma FIDLER	30	150	14003.6	15615	Reject	**Survey Unit Meets Release Criterion**
E0413	Gamma FIDLER	30	150	14003.6	15621	Reject	**Survey Unit Meets Release Criterion**
E0504	Gamma FIDLER	30	150	14003.6	15581	Reject	**Survey Unit Meets Release Criterion**
E0506	Gamma FIDLER	30	150	14003.6	15600	Reject	**Survey Unit Meets Release Criterion**
E0508	Gamma FIDLER	30	150	14003.6	15521.5	Reject	**Survey Unit Meets Release Criterion**
E0510	Gamma FIDLER	30	150	14003.6	15602	Reject	**Survey Unit Meets Release Criterion**
E0602	Gamma FIDLER	30	150	14003.6	15824	Reject	**Survey Unit Meets Release Criterion**
E0604	Gamma FIDLER	30	150	14003.6	15819	Reject	**Survey Unit Meets Release Criterion**
E0706	Gamma FIDLER	30	150	14003.6	15673	Reject	**Survey Unit Meets Release Criterion**
E0711	Gamma FIDLER	30	150	14003.6	15638	Reject	**Survey Unit Meets Release Criterion**

Notes:
(1) Measurements from each survey unit were grouped by radiation type and instrument. Four igloos had low-energy gamma datasets compared with $DCGL_W$ for Pu-239.
(2) The Valid N for a dataset refers to the number of measurements from that dataset used in the WRS test.
(3) The Critical Value for the WRS test was calculated for the number of measurements in the survey unit and background areas per MARSSIM Appendix I.
(4) Per MARSSIM for Scenario A, if the Sum of Reference Area Ranks is greater than the Critical Value, the Scenario A null hypothesis that the median survey unit measurement exceeds that in the reference area by more than the $DCGL_W$ is rejected, and the survey unit passes (i.e., the survey unit meets the release criterion). Electronic versions of the WRS test spreadsheets (per MARSSIM Appendix I) are available in the **Supporting Files**.
(5) Conclusions for these survey units are based on the WRS test results, and the initial data reduction shown in **Table A3-10**.

Table A3-12
Summary of Igloo Scanning Results
Depleted Uranium Storage Igloos
License Termination Report Addendum A
Seneca Army Depot Activity

	Alpha/Beta Scanning with Phoswich					Gamma Scanning with NaI(Tl)				
Igloo	Minimum (cpm) [2]	Maximum (cpm)	Scanning Mean (cpm) [3]	Standard Deviation of Scanning Mean (cpm) [3]	Is Maximum Reading Greater than Flag? [4]	Minimum (cpm)	Maximum (cpm)	Scanning Mean (cpm) [3]	Standard Deviation of Scanning Mean (cpm) [3]	Is Maximum Reading Greater than Flag? [4]
A0201	100	340	236	48	No	1500	7000	4423	1077	No
A0316	80	340	208	38	No	1000	7000	4308	1251	No
A0317	80	340	210	41	No	2000	10000	6962	1677	Yes [5]
A0508	60	400	201	46	No	2000	11000	7115	1816	Yes
A0701	60	380	201	42	No	1000	7000	4154	774	No
A0706	100	700	240	84	No	3000	10000	6962	1198	Yes
A0707	60	460	226	59	No	3000	11000	7346	987	Yes
A0710	100	460	242	49	No	2000	6000	4462	803	No
A0711	100	500	233	57	No	3000	10000	7038	1127	Yes
A0901	100	500	243	55	No	1800	6000	4223	850	No
A0905	100	480	249	63	No	1000	7000	4231	665	No
A1107	100	900	261	93	No	2000	8000	6423	1205	No
A1108	60	400	193	47	No	3000	8000	6500	1080	No
A1109	100	400	222	45	No	1000	7000	4231	927	No
B0109	80	360	192	42	No	3000	8000	6615	893	No
B0411	100	360	218	33	No	2000	7000	4077	732	No
B0501	60	300	178	34	No	1000	10000	6538	1738	Yes
B0602	80	360	190	35	No	3000	10000	6885	1044	Yes
B0603	80	360	195	41	No	3000	10000	7077	976	Yes
B0609	100	400	219	32	No	3000	10000	7231	1285	Yes
B0610	80	340	195	36	No	3000	10000	7038	1163	Yes
B0701	80	460	213	47	No	3000	11000	7154	1281	Yes
B0705	80	380	210	51	No	3000	10000	7000	1118	Yes
B0707	80	380	208	46	No	3000	10000	6654	774	Yes
B0708	80	300	178	29	No	2000	10000	6808	1164	Yes
B0709	40	360	202	47	No	2000	10000	6500	1258	Yes
B0711	80	340	202	29	No	3000	10000	7000	1080	Yes
B0801	100	280	188	18	No	1000	7000	4269	696	No
B0802	60	360	198	38	No	2000	7000	4154	516	No
B0804	100	380	202	33	No	1000	6000	4038	721	No
B0806	80	600	218	61	No	3000	10000	7115	870	Yes
B0809	80	600	230	89	No	3000	10000	6731	881	Yes
B0810	100	440	231	57	No	3000	10000	6923	1115	Yes

Table A3-12
Summary of Igloo Scanning Results
Depleted Uranium Storage Igloos
License Termination Report Addendum A
Seneca Army Depot Activity

	Alpha/Beta Scanning with Phoswich					Gamma Scanning with [illegible]				
Igloo	Minimum (cpm)	Maximum (cpm)	Scanning Mean (cpm) [3]	Standard Deviation of Scanning Mean (cpm) [3]	Is Maximum Reading Greater than Flag? [4]	Minimum (cpm)	Maximum (cpm)	Scanning Mean (cpm)	Standard Deviation of Scanning [illegible] (cpm)	[illegible] Flag?
B0811	60	380	195	39	No	3000	10000	7269	1092	Yes
B0909	80	500	212	69	No	3000	11000	7308	1200	Yes
C0203	80	380	200	42	No	3000	10000	6769	1013	Yes
C0303	60	600	210	94	No	3000	9000	6385	1024	No
C0307	80	600	219	74	No	3000	9000	6462	1050	No
C0308	120	600	232	84	No	3000	10000	6769	971	Yes
C0401	80	600	204	95	No	3000	10000	7115	982	Yes
C0403	60	500	193	53	No	3000	11000	6962	1050	Yes
C0405	40	500	201	58	No	3000	9000	6615	939	No
C0406	100	500	218	63	No	3000	10000	6962	1163	Yes
C0407	80	440	195	47	No	3000	10000	6923	1058	Yes
C0408	40	300	182	26	No	3000	9000	6577	1115	No
C0501	80	300	174	21	No	3000	10000	6769	927	Yes
C0503	100	500	200	47	No	3000	10000	6962	877	Yes
C0504	100	300	186	29	No	3000	10000	6846	1028	Yes
C0505	100	500	198	52	No	3000	10000	6923	1058	Yes
C0508	80	500	191	55	No	3000	11000	6962	946	Yes
C0510	80	600	202	65	No	3000	10000	6808	947	Yes
C0511	100	300	183	26	No	3000	9000	6038	967	No
C0513	40	300	172	33	No	3000	10000	6615	820	Yes
C0603	60	600	183	73	No	3000	10000	6577	838	Yes
C0604	80	600	186	68	No	2000	9000	6346	966	No
C0605	80	400	209	51	No	2000	9000	6500	1021	No
C0606	60	300	184	32	No	3000	9000	6346	899	No
C0608	60	420	193	44	No	2000	7000	5000	1137	No
C0701	80	600	193	71	No	3000	9000	6577	1058	No
C0706	80	600	194	65	No	3000	9000	6500	1000	No
C0707	80	320	204	36	No	3000	10000	6692	902	Yes
C0708	80	360	192	34	No	3000	10000	6846	1008	Yes
C0801	80	320	171	29	No	3000	10000	7154	1049	Yes
C0803	80	280	172	21	No	3000	9000	6538	989	No
C0807	80	320	188	29	No	3000	9000	6500	979	No
C0809	60	420	192	47	No	3000	9000	6654	1068	No

Table A3-12
Summary of Igloo Scanning Results
Depleted Uranium Storage Igloos
License Termination Report Addendum A
Seneca Army Depot Activity

	Alpha/Beta Scanning with Phoswich					Gamma Scanning with [illegible]				
Igloo	Minimum (cpm)	Maximum (cpm)	Scanning Mean (cpm) [3]	Standard Deviation of Scanning Mean (cpm) [3]	Is Maximum Reading Greater than Flag? [4]	Minimum (cpm)	Maximum (cpm)	Scanning Mean (cpm) [3]	Standard Deviation of Scanning Mean (cpm) [3]	Is Maximum Reading Greater than Flag? [4]
C0901	60	450	177	55	No	3000	9000	6962	1181	No
C0902	100	420	209	58	No	3000	10000	7038	1089	Yes
C0906	80	400	197	56	No	3000	11000	7192	1217	Yes
C0907	80	340	184	28	No	3000	9000	6654	1049	No
C0908	100	460	205	46	No	3000	10000	7077	1134	Yes
C0909	100	480	194	38	No	2000	7000	4423	813	No
C0912	40	420	201	41	No	2000	6000	4327	800	No
D0104	80	500	236	58	No	2000	7000	4038	721	No
D0105	100	420	216	39	No	2000	6000	3962	477	No
D0107	120	450	258	43	No	1000	10000	4577	1239	Yes
D0108	80	600	192	87	No	3000	9000	6577	1017	No
D0110	80	360	188	36	No	2000	6000	3808	522	No
D0113	40	400	199	41	No	3000	9000	6615	893	No
D0206	80	360	198	45	No	2000	6000	3962	431	No
D0207	80	440	218	59	No	2000	6000	4000	577	No
D0305	100	340	217	48	No	3000	10000	6923	932	Yes
D0306	80	400	188	46	No	3000	11000	7192	1128	Yes
D0312	80	340	198	35	No	2000	10000	6692	1234	Yes
D0401	80	400	197	43	No	2000	6000	3923	572	No
D0405	100	400	215	59	No	2000	11000	7115	1244	Yes
D0406	100	400	208	46	No	2000	11000	7385	1402	Yes
D0407	60	440	202	45	No	3000	10000	6731	949	Yes
D0413	100	400	208	61	No	3000	11000	7231	1268	Yes
D0601	100	400	207	46	No	3000	10000	7038	1145	Yes
D0604	100	400	235	35	No	3000	10000	6808	723	Yes
D0607	80	360	193	39	No	2000	6000	3885	506	No
D0704	100	440	191	43	No	3000	10000	7115	961	Yes
D0705	100	300	204	25	No	3000	10000	7115	1044	Yes
D0711	60	420	214	51	No	2000	6000	3808	522	No
D0712	60	420	206	49	No	1000	7000	4346	658	No
D0801	100	280	183	17	No	1000	6000	4115	768	No
D0805	100	420	229	35	No	2000	10000	6769	1317	Yes
E0103	80	600	212	51	No	2000	10000	7115	1227	Yes

Table A3-12
Summary of Igloo Scanning Results
Depleted Uranium Storage Igloos
License Termination Report Addendum A
Seneca Army Depot Activity

Igloo No.	Alpha/Beta Scanning with Phoswich					Gamma Scanning with [illegible]				
	Minimum (cpm) [2]	Maximum (cpm)	Scanning Mean (cpm) [3]	Standard Deviation of Scanning Mean (cpm) [3]	Is Maximum Reading Greater than Flag? [4]	Minimum (cpm)	Maximum (cpm)	Scanning Mean (cpm) [3]	Standard Deviation of Scanning Mean (cpm)	[illegible] [4]
E0105	100	600	234	89	No	2000	11000	7269	1467	Yes
E0112	80	400	210	53	No	3000	10000	7000	1275	Yes
E0211	80	500	194	51	No	3000	11000	7077	1239	Yes
E0301	80	340	203	29	No	1000	7000	4231	665	No
E0302	60	400	212	46	No	3000	8000	6538	1145	No
E0303	100	420	191	57	No	2000	11000	7077	1397	Yes
E0312	60	380	179	43	No	2000	10000	6692	1109	Yes
E0402	80	340	185	27	No	3000	8000	6538	1145	No
E0403	80	440	212	44	No	2000	11000	7077	1718	Yes
E0410	80	400	196	43	No	2000	11000	7038	1520	Yes
E0411	80	300	185	30	No	1000	7000	4192	805	No
E0413	100	320	213	34	No	3000	9000	6731	1129	No
E0504	100	360	233	26	No	3000	10000	7000	1275	Yes
E0506	100	400	218	41	No	2000	11000	7038	1361	Yes
E0508	80	380	215	37	No	3000	10000	7154	1197	Yes
E0510	100	400	222	36	No	2000	12000	7423	1441	Yes
E0512	60	300	173	36	No	1000	7000	4231	971	No
E0602	100	1000	255	195	No	1000	6000	4192	663	No
E0604	100	600	232	84	No	1000	7000	4269	665	No
E0609	100	1200	278	222	No	1000	7000	4308	723	No
E0610	100	400	212	44	No	1000	7000	4423	838	No
E0702	80	460	214	50	No	1000	8000	4346	922	No
E0706	80	500	212	46	No	3000	8000	6462	1145	No
E0711	60	300	182	34	No	2000	8000	6269	1301	No
E0801	80	400	220	29	No	1000	7000	4346	689	No
E0802	100	380	227	44	No	1000	6000	4038	776	No

Notes:

(1) All Alpha/Beta measurements collected in the igloos were collected with a phoswich detector. Thirteen scanning measurements were collected in each igloo.

(2) cpm = counts per minute

(3) The scanning mean for the survey unit was calculated by averaging the average scanning measurement from the thirteen scanning locations for each igloo, and the standard deviation of the scanning mean is the standard deviation of the thirteen averages.

Table A3-12
Summary of Igloo Scanning Results
Depleted Uranium Storage Igloos
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	Alpha/Beta Scanning with Phoswich					Gamma Scanning with FIDLER				
Igloo	Minimum (cpm) (1,2)	Maximum (cpm)	Scanning Mean (cpm) (3)	Standard Deviation of Scanning Mean (cpm) (3)	Is Maximum Reading Greater than Flag? (4)	Minimum (cpm)	Maximum (cpm)	Scanning Mean (cpm) (3)	Standard Deviation of Scanning Mean (cpm)	Is Maximum Reading Greater than Flag?

(4) The flag values used for the scanning measurements within the igloos were the background corrected DU $DCGL_W$'s (**Table A3-2**). The flag value for the alpha/beta phoswich scanning was 7056 cpm, which is the sum of the individual alpha and beta DU $DCGL_W$'s. The flag value for the FIDLER scanning was 9492 cpm.

(5) All FIDLER measurements from Igloos A0317 and A0508 were below the $DCGL_{EMC}$ for Pu-239 (11304 cpm; **Table A3-2**). All other FIDLER measurements were below the $DCGL_{EMC}$ for DU (42708 cpm).

Table A4-1
List of Depleted Uranium Storage Buildings and Survey Units
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5	1	5-1	2	SUC-1275; SUC-1380
	2	5-2	2	SUC-1275; SUC-1380
	3	5-3	2	SUC-1275; SUC-1380
	4	5-4	2	SUC-1275; SUC-1380
	5	5-5	2	SUC-1275; SUC-1380
	6	5-6	2	SUC-1275; SUC-1380
	7	5-7	2	SUC-1275; SUC-1380
	8	5-8	2	SUC-1275; SUC-1380
	9	5-9	2	SUC-1275; SUC-1380
	10	5-10	2	SUC-1275; SUC-1380
	11	5-11	3	SUC-1275; SUC-1380
	12	5-12	3	SUC-1275; SUC-1380
	13	5-13	3	SUC-1275; SUC-1380
	14	5-14	3	SUC-1275; SUC-1380
	15	5-15	3	SUC-1275; SUC-1380
	16	5-16	2	SUC-1275; SUC-1380
306	1	306-1	3	SUC-1275; SUC-1380
	2	306-2	3	SUC-1275; SUC-1380
	3	306-3	3	SUC-1275; SUC-1380
	4	306-4	3	SUC-1275; SUC-1380
	5	306-5	3	SUC-1275; SUC-1380
	6	306-6	3	SUC-1275; SUC-1380
	7	306-7	3	SUC-1275; SUC-1380
	8	306-8	3	SUC-1275; SUC-1380
	10	306-10	2	SUC-1275; SUC-1380
	11	306-11	2	SUC-1275; SUC-1380
	12	306-12	2	SUC-1275; SUC-1380
	13	306-13	2	SUC-1275; SUC-1380
2073	1	2073-1	2	SUC-1275; SUC-1380
	2	2073-2	2	SUC-1275; SUC-1380
	3	2073-3	2	SUC-1275; SUC-1380
S-2084	2	2084-2	2	SUC-1275; SUC-1380
	3	2084-3	2	SUC-1275; SUC-1380
	6	2084-6	2	SUC-1275; SUC-1380

Notes:
(1) Buildings were used for receipt and storage of packaged DU ammunition (SUC-1275).
(2) Compiled from *Seneca Army Depot Activity License Termination and License Release Plan* (ANL, 2003).

Table A4-2
Derived Concentration Guideline Levels
Depleted Uranium Storage Buildings
License Termination Report Addendum A
Seneca Army Depot Activity

Instrument	Applicable DCGL	$DCGL_W$ (dpm/100cm^2)(1)	$DCGL_{EMC}$ (dpm/100cm^2)(2)	Area (cm^2)	Efficiency(3)	$DCGL_W$ (cpm)(4)	$DCGL_{EMC}$ (cpm)(4)	Background Average (cpm)	Background Dataset	Background Corrected $DCGL_W$ (cpm)(5)	Background Corrected $DCGL_{EMC}$ (cpm)(5)
Alpha Floor Monitor	Depleted Uranium	31647	376599	582	5%	9209	109590	4	Bldg 722	9213	**109594**
Beta Floor Monitor	Depleted Uranium	31647	376599	582	18.5%	34074	405484	775	Bldg 722	34849	**406259**
Alpha Phoswich	Depleted Uranium	31647	376599	83	15%	3940	46887	4	Bldg 722	3944	**46891**
Beta Phoswich	Depleted Uranium	31647	376599	83	11%	2889	34384	365	Bldg 722	3254	**34749**
Gamma FIDLER	Depleted Uranium	31647	376599	126.7	7.6%	3047	36263	11265	Bldg 722	14312	**47528**

Notes:

(1) dpm/100cm^2 = decays per minute per 100 square centimeters. Depleted uranium DCGL calculated using equation 4-4 of MARSSIM. Expected activity fractions for depleted uranium based on uranium depleted to 99.8 weight percent U-238, 0.2 weight percent U-235, and 0.0006 weight percent U-234 (WHO, 2001).

(2) $DCGL_{EMC}$ based on area factor of 11.9 for 4 m^2 grid (from ANL, 2003, for worst-case radionuclide [U-235]).

(3) Average efficiency for instrument as determined by daily function checks during survey (**Appendix 4.A**).

(4) The instrument-specific $DCGL_W$ and $DCGL_{EMC}$ in counts per minute (cpm) are calculated using the instrument efficiency and active probe area.

(5) The Background Corrected $DCGL_W$ and $DCGL_{EMC}$ for each instrument is the sum of the DCGL and the Background Average for that instrument.

Table A4-3
Survey Instrumentation
Depleted Uranium Storage Buildings
License Termination Report Addendum A
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Instrument	Measurement Type	Probe	Meter	Probe Area (cm^2) (1)	Average Instrument Efficiency (2)	1-Minute Direct Measurement MDA (dpm/100cm²) (3)	Scanning MDA (dpm/100cm²) (3)	[illegible]
Phoswich	Alpha/Beta	Ludlum Model 43-1-1	Ludlum Model 2224	83	Alpha: 15% Beta: 11%	Alpha: 41 Beta: 535	6176	31647
Floor Monitor	Alpha/Beta	Ludlum Model 43-37	Ludlum Model 2360	582	Alpha: 5% Beta: 18.5%	Alpha: 18 Beta: 66	916	31647
FIDLER	Low-Energy Gamma	Bicron G5 FIDLER	Bicron Analyst	126.7	15%	2817	30857	31647
Exposure Rate	Ambient Gamma Exposure Rate	Bicron MicroRem or Ludlum Model 19		-- (5)	--	--	--	NA (6)
GM Pancake	Alpha/Beta/Gamma	Ludlum Model 44-9	Ludlum Model 3	15	20% (7)	--	2200-5000	NA
Gamma Spectrometer	In-Situ Gamma	Alpha Spectra FIDLER	RSA URSA-I MCA	126.7	15%	2817 for gross 1-minute count; otherwise measurement-specific	--	31647

Notes:

1) cm^2 = square centimeters. Areas listed and used in the calculations are the active or physical probe area listed by the manufacturer, per MARSSIM Section 6.6.1 (NRC, 2000).

2) Except where noted, the average instrument efficiency was determined from the daily function check data (refer to **Appendix 4.A**).

3) dpm/100cm^2 = decays per minute per 100 square centimeters. Except where noted, the minimum detectable activities (MDAs) were calculated using the procedures outlined in MARSSIM Section 6.7 (NRC, 2000).

4) Gross activity $DCGL_w$ was calculated using radionuclide-specific DCGLs derived by ANL, 2003 (**Appendix 1.A**).

5) "--" = Indicates that parameter was not used or calculated for instrument.

6) NA= not applicable. DCGLs were not applied to exposure rate or personnel/equipment frisking measurements.

7) GM efficiency of 20% for uranium based on Table 6.4 of MARSSIM.

Table A4-4
Total Number of Required Measurements
Depleted Uranium Storage Buildings
License Termination Report Addendum A
Seneca Army Depot Activity

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Gamma FIDLER & Blgd 722 Background	31647	14312	7156	7156	2415	3307	2.2	0.92	1.645	1.645	20
Alpha PH & Bldg 722 Background	31647	3944	1972	1972	1.25	2.3	857	1.00	1.645	1.645	14
Beta PH & Bldg 722 Background	31647	3254	1627	1627	63	186	9	1.00	1.645	1.645	14
Alpha FM & Bldg 722 Background	31647	9213	4607	4607	2.6	2.4	1785	1.00	1.645	1.645	14
Beta FM & Bldg 722 Background	31647	34849	17425	17425	137	284	61	1.00	1.645	1.645	14

Notes:

(1) All measurements for all survey units are combined for this evaluation. Instruments: FM = alpha/beta gas proportional floor monitor; FIDLER = low-energy gamma scintillator; PH = alpha/beta phoswich detector.

(2) dpm/100cm^2 = decays per minute per 100 square centimeters. Gross activity $DCGL_W$ for DU calculated per MARSSIM.

(3) cpm = counts per minute. Instrument-specific DCGLw calculated per MARSSIM. Includes average background count rate.

(4) LBGR = lower bound of gray region. Per MARSSIM, LBGR was set to 1/2 of the $DCGL_W$.

(5) $\Delta = DCGL_W$ - LBGR.

(6) The standard deviation (σ) for the survey data includes all measurements collected with that instrument.

(7) Δ/σ calculated using the larger value between the survey standard deviation and the background standard deviation.

(8) Values of Pr are from Table 5.1 of MARSSIM using Δ/σ. Pr is defined by MARSSIM as the probability that a random measurement from the survey unit exceeds a random measurement from the background reference area by less than the $DCGL_W$ when the survey unit median is equal to the LBGR above background.

(9) Values of $Z(1-\alpha)$ and $Z(1-\beta)$ (decision error percentiles) are from Table 5.2 of MARSSIM for $\alpha=\beta=0.05$.

(10) N = total required number of measurements or samples (includes both survey and background areas).

Table A4-5
Summary Statistics
Building 5 Direct Measurements
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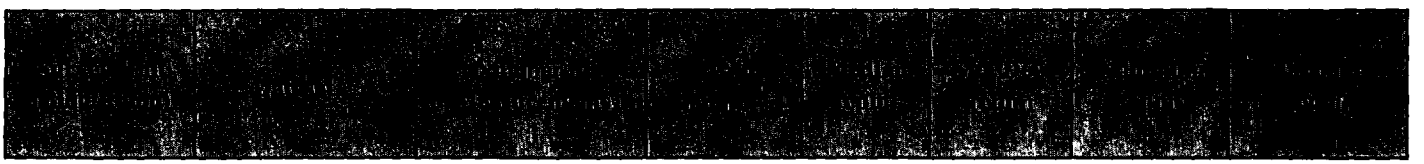
Seneca Army Depot Activity

Survey Unit (Bldg/Room)								
5	1	Alpha FM	53	5	5	2	1	11
5	1	Beta FM	53	661	671	112	401	1043
5	1	Alpha PH	32	1	1	2	0	8
5	1	Beta PH	32	170	154.5	46	118	336
5	1	Gamma FIDLER	85	5172	4466	1546	3572	10791
5	2	Alpha FM	14	5	4.5	3	2	11
5	2	Beta FM	14	693	676.5	143	444	1087
5	2	Alpha PH	6	1	1	1	0	3
5	2	Beta PH	6	175	183	35	129	212
5	2	Gamma FIDLER	20	6317	6436.5	2104	3457	12071
5	3	Alpha FM	11	6	5	3	2	10
5	3	Beta FM	11	663	676	105	390	809
5	3	Alpha PH	6	1	1	1	0	2
5	3	Beta PH	6	177	169.5	23	146	211
5	3	Gamma FIDLER	17	4258	4338	700	2488	5494
5	4	Alpha FM	11	5	5	2	2	9
5	4	Beta FM	11	672	666	73	540	816
5	4	Alpha PH	6	1	0	1	0	2
5	4	Beta PH	6	220	200.5	57	184	335
5	4	Gamma FIDLER	17	4874	4665	888	3877	7619
5	5	Alpha FM	30	5	5	3	0	11
5	5	Beta FM	30	678	684	50	564	754
5	5	Alpha PH	59	1	0	1	0	4
5	5	Beta PH	59	143	140	23	107	223
5	5	Gamma FIDLER	89	4419	4277	796	3181	7493
5	6	Alpha FM	30	5	5	3	1	12
5	6	Beta FM	30	649	664.5	72	449	754
5	6	Alpha PH	18	1	1	1	0	3
5	6	Beta PH	18	162	163.5	20	133	207
5	6	Gamma FIDLER	48	4981	4392	1213	3536	7462
5	7	Alpha FM	7	3	3	1	1	5
5	7	Beta FM	7	813	808	55	726	887
5	7	Alpha PH	17	1	1	1	0	3
5	7	Beta PH	17	252	208	77	163	385
5	7	Gamma FIDLER	24	8261	8009.5	2717	3378	13108
5	8	Alpha FM	13	4	4	1	1	6
5	8	Beta FM	13	787	830	180	575	1059
5	8	Alpha PH	8	2	2	1	0	4
5	8	Beta PH	8	274	274	82	178	377
5	8	Gamma FIDLER	21	8829	8441	2172	5344	13109

Table A4-5
Summary Statistics
Building 5 Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

5	9	Alpha FM	27	4	4	2	0	12
5	9	Beta FM	27	703	726	92	415	802
5	9	Alpha PH	36	1	1	1	0	5
5	9	Beta PH	36	169	169	19	129	201
5	9	Gamma FIDLER	63	4825	4069	1303	3152	7284
5	10	Alpha FM	16	5	4	2	2	8
5	10	Beta FM	16	761	783	137	559	1031
5	10	Alpha PH	9	2	2	1	0	3
5	10	Beta PH	9	209	175	61	163	331
5	10	Gamma FIDLER	25	6625	7314	2072	3478	11742
5	11	Alpha FM	3	5	5	1	4	6
5	11	Beta FM	3	764	752	22	751	790
5	11	Alpha PH	27	1	1	1	0	2
5	11	Beta PH	27	182	173	60	131	409
5	11	Gamma FIDLER	30	9021	9085.5	1350	6061	11913
5	12	Alpha PH	30	1	1	1	0	3
5	12	Beta PH	30	263	249	56	182	369
5	12	Gamma FIDLER	30	10822	11026.5	1596	8096	13713
5	13	Alpha FM	3	6	5	2	4	8
5	13	Beta FM	3	781	775	16	769	799
5	13	Alpha PH	27	1	0	2	0	10
5	13	Beta PH	27	210	200	41	143	291
5	13	Gamma FIDLER	30	6757	6631.5	1091	4543	9098
5	14	Alpha FM	4	4	5	2	2	5
5	14	Beta FM	4	505	497	45	460	564
5	14	Alpha PH	26	1	0	1	0	4
5	14	Beta PH	26	155	141	51	111	365
5	14	Gamma FIDLER	30	5196	5004	926	3884	7693
5	15	Alpha FM	2	5	5	0	5	5
5	15	Beta FM	2	684	684	48	650	718
5	15	Alpha PH	28	1	1	1	0	3
5	15	Beta PH	28	230	213	66	153	444
5	15	Gamma FIDLER	30	9220	9193	1339	5878	11574
5	16	Alpha FM	8	5	4	3.0	1	10
5	16	Beta FM	8	699	644	110	599	873
5	16	Alpha PH	5	0.6	0	0.89	0	2
5	16	Beta PH	5	217	178	73	169	343
5	16	Gamma FIDLER	13	7420	7662	1539	4519	9388

Table A4-5
Summary Statistics
Building 5 Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity



Notes:

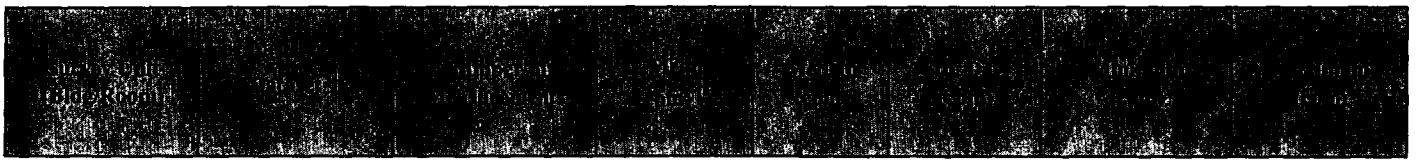
(1) Measurements from each survey unit were grouped by radiation type and instrument. Instruments: FM = alpha/beta gas proportional floor monitor; PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.

(2) cpm = counts per minute.

Table A4-6
Summary Statistics
Building 306 Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

306	1	Alpha PH	30	1	1	1	0	3
306	1	Beta PH	30	162	166	19	115	208
306	1	Gamma FIDLER	30	9450	9189	2071	5283	13635
306	2	Alpha PH	30	2	1	2	0	7
306	2	Beta PH	30	184	190	31	114	231
306	2	Gamma FIDLER	30	8142	8064	1342	4281	11294
306	3	Alpha PH	30	2	2	2	0	5
306	3	Beta PH	30	252	237	60	174	410
306	3	Gamma FIDLER	30	10457	9938	2538	6750	17053
306	4	Alpha PH	30	2	2	2	0	6
306	4	Beta PH	30	287	264	77	152	475
306	4	Gamma FIDLER	30	10752	10396	2629	5468	15915
306	5	Alpha PH	30	1	1	1	0	5
306	5	Beta PH	30	218	199	65	119	339
306	5	Gamma FIDLER	30	7737	7292	1778	4083	11176
306	6	Alpha PH	30	1	1	1	0	5
306	6	Beta PH	30	239	236	47	165	346
306	6	Gamma FIDLER	30	8787	8682	1846	6194	12980
306	7	Alpha PH	30	1	1	1	0	3
306	7	Beta PH	30	209	200	46	142	348
306	7	Gamma FIDLER	30	7837	7709	1921	4346	10787
306	8	Alpha PH	30	2	1	1	0	4
306	8	Beta PH	30	197	183	50	137	347
306	8	Gamma FIDLER	30	6290	6079	1512	4605	12064
306	10	Alpha FM	23	7	7	3	1	13
306	10	Beta FM	23	723	645	272	421	1311
306	10	Alpha PH	18	1	1	1	0	4
306	10	Beta PH	18	181	163	50	149	363
306	10	Gamma FIDLER	41	6394	5787	1858	4216	12382
306	11	Alpha FM	18	6	5	3	3	12
306	11	Beta FM	18	607	571	141	436	1034
306	11	Alpha PH	28	1	1	1	0	4
306	11	Beta PH	28	151	155	20	112	181
306	11	Gamma FIDLER	46	5835	5743	902	3627	8451
306	12	Alpha FM	42	5	5	3	0	12
306	12	Beta FM	42	593	581	129	415	971
306	12	Alpha PH	47	1	1	1	0	4
306	12	Beta PH	47	147	145	21	93	189
306	12	Gamma FIDLER	89	5163	5190	1490	2616	10669
306	13	Alpha FM	21	7	7	4	1	18
306	13	Beta FM	21	667	636	130	557	1106
306	13	Alpha PH	21	1	1	1	0	3
306	13	Beta PH	21	200	180	119	140	711
306	13	Gamma FIDLER	42	4866	4556	976	3723	7393

Table A4-6
Summary Statistics
Building 306 Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity



Notes:

(1) Measurements from each survey unit were grouped by radiation type and instrument. Instruments: FM = alpha/beta gas proportional floor monitor; PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.

(2) cpm = counts per minute.

Table A4-7
Summary Statistics
Building 2073 Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

2073	1	Alpha FM	56	5	5	3	0	12
2073	1	Beta FM	56	578	609	82	397	686
2073	1	Alpha PH	67	1	1	1	0	5
2073	1	Beta PH	67	161	160	23	105	213
2073	1	Gamma FIDLER	123	3854	3693	850	2139	6819
2073	2	Alpha PH	25	2	2	1	0	4
2073	2	Beta PH	25	188	196	40	91	234
2073	2	Gamma FIDLER	25	5184	5496	930	2891	6077
2073	3	Alpha FM	32	7	7	2	3	11
2073	3	Beta FM	32	522	555	100	368	684
2073	3	Alpha PH	31	1	1	1	0	3
2073	3	Beta PH	31	146	142	20	110	179
2073	3	Gamma FIDLER	63	5516	5499	524	3949	6765

Notes:

(1) Measurements from each survey unit were grouped by radiation type and instrument. Instruments: FM = alpha/beta gas proportional floor monitor; PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.

(2) cpm = counts per minute.

Table A4-8
Summary Statistics
Building S-2084 Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

2084	2	Alpha FM	20	4	3.5	2	0	9
2084	2	Beta FM	20	594	642	104	400	716
2084	2	Alpha Phoswich	14	1	1	1	0	4
2084	2	Beta Phoswich	14	132	126	29	91	193
2084	2	Gamma FIDLER	34	5569	5574	534	3336	6558
2084	3	Alpha FM	74	6	5	3	1	15
2084	3	Beta FM	74	631	660	126	371	823
2084	3	Alpha Phoswich	99	1	1	1	0	7
2084	3	Beta Phoswich	99	126	122	24	90	221
2084	3	Gamma FIDLER	173	3994	3757	832	2287	6176
2084	6	Alpha FM	15	4	5	2	1	9
2084	6	Beta FM	15	512	447	121	378	760
2084	6	Gamma FIDLER	15	5335	5291	486	4553	6187

Notes:
(1) Measurements from each survey unit were grouped by radiation type and instrument. Instruments: FM = alpha/beta gas proportional floor monitor; PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.
(2) cpm = counts per minute.

Table A4-9
Initial Scenario A Data Reduction
Depleted Uranium Storage Buildings - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

5	1	Alpha FM	5	11	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
5	1	Beta FM	661	1043	775	498	34074	Yes	Yes	
5	1	Alpha PH	1	8	4	0	3940	Yes	Yes	
5	1	Beta PH	170	336	365	160	2889	Yes	Yes	
5	1	Gamma FIDLER	5172	10791	11265	5267	3047	Yes	**No**	
5	2	Alpha FM	5	11	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
5	2	Beta FM	693	1087	775	498	34074	Yes	Yes	
5	2	Alpha PH	1	3	4	0	3940	Yes	Yes	
5	2	Beta PH	175	212	365	160	2889	Yes	Yes	
5	2	Gamma FIDLER	6317	12071	11265	5267	3047	Yes	**No**	
5	3	Alpha FM	6	10	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
5	3	Beta FM	663	809	775	498	34074	Yes	Yes	
5	3	Alpha PH	1	2	4	0	3940	Yes	Yes	
5	3	Beta PH	177	211	365	160	2889	Yes	Yes	
5	3	Gamma FIDLER	4258	5494	11265	5267	3047	Yes	Yes	
5	4	Alpha FM	5	9	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
5	4	Beta FM	672	816	775	498	34074	Yes	Yes	
5	4	Alpha PH	1	2	4	0	3940	Yes	Yes	
5	4	Beta PH	220	335	365	160	2889	Yes	Yes	
5	4	Gamma FIDLER	4874	7619	11265	5267	3047	Yes	Yes	
5	5	Alpha FM	5	11	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
5	5	Beta FM	678	754	775	498	34074	Yes	Yes	
5	5	Alpha PH	1	4	4	0	3940	Yes	Yes	
5	5	Beta PH	143	223	365	160	2889	Yes	Yes	
5	5	Gamma FIDLER	4419	7493	11265	5267	3047	Yes	Yes	
5	6	Alpha FM	5	12	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
5	6	Beta FM	649	754	775	498	34074	Yes	Yes	
5	6	Alpha PH	1	3	4	0	3940	Yes	Yes	
5	6	Beta PH	162	207	365	160	2889	Yes	Yes	
5	6	Gamma FIDLER	4981	7462	11265	5267	3047	Yes	Yes	

Table A4-9
Initial Scenario A Data Reduction
Depleted Uranium Storage Buildings - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

5	7	Alpha FM	3	5	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
5	7	Beta FM	813	887	775	498	34074	Yes	Yes	
5	7	Alpha PH	1	3	4	0	3940	Yes	Yes	
5	7	Beta PH	252	385	365	160	2889	Yes	Yes	
5	7	Gamma FIDLER	8261	13108	11265	5267	3047	Yes	**No**	
5	8	Alpha FM	4	6	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
5	8	Beta FM	787	1059	775	498	34074	Yes	Yes	
5	8	Alpha PH	2	4	4	0	3940	Yes	Yes	
5	8	Beta PH	274	377	365	160	2889	Yes	Yes	
5	8	Gamma FIDLER	8829	13109	11265	5267	3047	Yes	**No**	
5	9	Alpha FM	4	12	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
5	9	Beta FM	703	802	775	498	34074	Yes	Yes	
5	9	Alpha PH	1	5	4	0	3940	Yes	Yes	
5	9	Beta PH	169	201	365	160	2889	Yes	Yes	
5	9	Gamma FIDLER	4825	7284	11265	5267	3047	Yes	Yes	
5	10	Alpha FM	5	8	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
5	10	Beta FM	761	1031	775	498	34074	Yes	Yes	
5	10	Alpha PH	2	3	4	0	3940	Yes	Yes	
5	10	Beta PH	209	331	365	160	2889	Yes	Yes	
5	10	Gamma FIDLER	6625	11742	11265	5267	3047	Yes	**No**	
5	11	Alpha FM	5	6	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
5	11	Beta FM	764	790	775	498	34074	Yes	Yes	
5	11	Alpha PH	1	2	4	0	3940	Yes	Yes	
5	11	Beta PH	182	409	365	160	2889	Yes	Yes	
5	11	Gamma FIDLER	9021	11913	11265	5267	3047	Yes	**No**	
5	12	Alpha PH	1	3	4	0	3959	Yes	Yes	Perform WRS test for FIDLER data set
5	12	Beta PH	263	369	365	160	2903	Yes	Yes	
5	12	Gamma FIDLER	10822	13713	11265	5267	3047	Yes	**No**	

Table A4-9
Initial Scenario A Data Reduction
Depleted Uranium Storage Buildings - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

5	13	Alpha FM	6	8	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
5	13	Beta FM	781	799	775	498	34074	Yes	Yes	
5	13	Alpha PH	1	10	4	0	3940	Yes	Yes	
5	13	Beta PH	210	291	365	160	2889	Yes	Yes	
5	13	Gamma FIDLER	6757	9098	11265	5267	3047	Yes	**No**	
5	14	Alpha FM	4	5	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
5	14	Beta FM	505	564	775	498	34074	Yes	Yes	
5	14	Alpha PH	1	4	4	0	3940	Yes	Yes	
5	14	Beta PH	155	365	365	160	2889	Yes	Yes	
5	14	Gamma FIDLER	5196	7693	11265	5267	3047	Yes	Yes	
5	15	Alpha FM	5	5	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
5	15	Beta FM	684	718	775	498	34074	Yes	Yes	
5	15	Alpha PH	1	3	4	0	3940	Yes	Yes	
5	15	Beta PH	230	444	365	160	2889	Yes	Yes	
5	15	Gamma FIDLER	9220	11574	11265	5267	6015	Yes	**No**	
5	16	Alpha FM	5	10	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
5	16	Beta FM	699	873	775	498	34074	Yes	Yes	
5	16	Alpha PH	0.6	2	4	0	3940	Yes	Yes	
5	16	Beta PH	217	343	365	160	2889	Yes	Yes	
5	16	Gamma FIDLER	7420	9388	11265	5267	3047	Yes	**No**	
306	1	Alpha PH	1	3	4	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
306	1	Beta PH	162	208	365	160	2889	Yes	Yes	
306	1	Gamma FIDLER	9450	13635	11265	5267	3047	Yes	**No**	
306	2	Alpha PH	2	7	4	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
306	2	Beta PH	184	231	365	160	2889	Yes	Yes	
306	2	Gamma FIDLER	8142	11294	11265	5267	3047	Yes	**No**	
306	3	Alpha PH	2	5	4	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
306	3	Beta PH	252	410	365	160	2889	Yes	Yes	
306	3	Gamma FIDLER	10457	17053	11265	5267	3047	Yes	**No**	

Table A4-9
Initial Scenario A Data Reduction
Depleted Uranium Storage Buildings - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

306	4	Alpha PH	2	6	4	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
306	4	Beta PH	287	475	365	160	2889	Yes	Yes	
306	4	Gamma FIDLER	10752	15915	11265	5267	3047	Yes	**No**	
306	5	Alpha PH	1	5	4	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
306	5	Beta PH	218	339	365	160	2889	Yes	Yes	
306	5	Gamma FIDLER	7737	11176	11265	5267	3047	Yes	**No**	
306	6	Alpha PH	1	5	4	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
306	6	Beta PH	239	346	365	160	2889	Yes	Yes	
306	6	Gamma FIDLER	8787	12980	11265	5267	3047	Yes	**No**	
306	7	Alpha PH	1	3	4	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
306	7	Beta PH	209	348	365	160	2889	Yes	Yes	
306	7	Gamma FIDLER	7837	10787	11265	5267	3047	Yes	**No**	
306	8	Alpha PH	2	4	4	0	3940	Yes	Yes	Perform WRS test for FIDLER data set
306	8	Beta PH	197	347	365	160	2889	Yes	Yes	
306	8	Gamma FIDLER	6290	12064	11265	5267	3047	Yes	**No**	
306	10	Alpha FM	7	13	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
306	10	Beta FM	723	1311	775	498	34074	Yes	Yes	
306	10	Alpha PH	1	4	4	0	3940	Yes	Yes	
306	10	Beta PH	181	363	365	160	2889	Yes	Yes	
306	10	Gamma FIDLER	6394	12382	11265	5267	3047	Yes	**No**	
306	11	Alpha FM	6	12	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
306	11	Beta FM	607	1034	775	498	34074	Yes	Yes	
306	11	Alpha PH	1	4	4	0	3940	Yes	Yes	
306	11	Beta PH	151	181	365	160	2889	Yes	Yes	
306	11	Gamma FIDLER	5835	8451	11265	5267	3047	Yes	**No**	
306	12	Alpha FM	5	12	3.8	0	9209	Yes	Yes	Perform WRS test for FIDLER data set
306	12	Beta FM	593	971	775	498	34074	Yes	Yes	
306	12	Alpha PH	1	4	4	0	3940	Yes	Yes	
306	12	Beta PH	147	189	365	160	2889	Yes	Yes	
306	12	Gamma FIDLER	5163	10669	11265	5267	3047	Yes	**No**	

Table A4-9
Initial Scenario A Data Reduction
Depleted Uranium Storage Buildings - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

306	13	Alpha FM	7	18	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
306	13	Beta FM	667	1106	775	498	34074	Yes	Yes	
306	13	Alpha PH	1	3	4	0	3940	Yes	Yes	
306	13	Beta PH	200	711	365	160	2889	Yes	Yes	
306	13	Gamma FIDLER	4866	7393	11265	5267	3047	Yes	Yes	
2073	1	Alpha FM	5	12	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
2073	1	Beta FM	578	686	775	498	34074	Yes	Yes	
2073	1	Alpha PH	1	5	4	0	3940	Yes	Yes	
2073	1	Beta PH	161	213	365	160	2889	Yes	Yes	
2073	1	Gamma FIDLER	3854	6819	11265	5267	3047	Yes	Yes	
2073	2	Alpha PH	2	4	4	0	3940	Yes	Yes	**Survey Unit Meets Release Criterion**
2073	2	Beta PH	188	234	365	160	2889	Yes	Yes	
2073	2	Gamma FIDLER	5184	6077	11265	5267	3047	Yes	Yes	
2073	3	Alpha FM	7	11	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
2073	3	Beta FM	522	684	775	498	34074	Yes	Yes	
2073	3	Alpha PH	1	3	4	0	3940	Yes	Yes	
2073	3	Beta PH	146	179	365	160	2889	Yes	Yes	
2073	3	Gamma FIDLER	5516	6765	11265	5267	3047	Yes	Yes	
2084	2	Alpha FM	4	9	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
2084	2	Beta FM	594	716	775	498	34074	Yes	Yes	
2084	2	Alpha PH	1	4	4	0	3940	Yes	Yes	
2084	2	Beta PH	132	193	365	160	2889	Yes	Yes	
2084	2	Gamma FIDLER	5569	6558	11265	5267	3047	Yes	Yes	
2084	3	Alpha FM	6	15	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
2084	3	Beta FM	631	823	775	498	34074	Yes	Yes	
2084	3	Alpha PH	1	7	4	0	3940	Yes	Yes	
2084	3	Beta PH	126	221	365	160	2889	Yes	Yes	
2084	3	Gamma FIDLER	3994	6176	11265	5267	3047	Yes	Yes	

Table A4-9
Initial Scenario A Data Reduction
Depleted Uranium Storage Buildings - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

2084	6	Alpha FM	4	9	3.8	0	9209	Yes	Yes	**Survey Unit Meets Release Criterion**
2084	6	Beta FM	512	760	775	498	34074	Yes	Yes	
2084	6	Gamma FIDLER	5335	6187	11265	5267	3047	Yes	Yes	

Notes:
(1) Measurements from each survey unit were grouped by radiation type and instrument. Instruments: FM = alpha/beta gas proportional floor monitor; PH = alpha/beta phoswich scintillator; FIDLER = low-energy gamma scintillator.
(2) cpm = counts per minute. Refer to **Tables A4-5** through **A4-8** for complete summary statistics for each survey unit.
(3) The reference area for the DU Storage Buildings was Building 722. Refer to **Table A2-3** for complete summary statistics for the reference areas.
(4) The instrument-specific $DCGL_W$ was calculated using the physical or active probe area in cm^2 and the instrument efficiency (**Table A4-2**), and does not include background.
(5) Per MARSSIM Section 8 and **Figure A2-1** of this addendum.

Table A4-10
Wilcoxon Rank Sum Test Results
Depleted Uranium Storage Buildings
License Termination Report Addendum A
Seneca Army Depot Activity

5-1	Gamma FIDLER	85	120	13048.3	17405	Reject	**Survey Unit Meets Release Criterion**
5-2	Gamma FIDLER	20	120	8736.2	9623	Reject	**Survey Unit Meets Release Criterion**
5-7	Gamma FIDLER	24	120	9006.9	9910	Reject	**Survey Unit Meets Release Criterion**
5-8	Gamma FIDLER	21	120	8804.1	9568	Reject	**Survey Unit Meets Release Criterion**
5-10	Gamma FIDLER	25	120	9074.3	10210.5	Reject	**Survey Unit Meets Release Criterion**
5-11	Gamma FIDLER	30	120	9410.1	10609.5	Reject	**Survey Unit Meets Release Criterion**
5-12	Gamma FIDLER	30	120	9410.1	10174.5	Reject	**Survey Unit Meets Release Criterion**
5-13	Gamma FIDLER	30	120	9410.1	10845	Reject	**Survey Unit Meets Release Criterion**
5-15	Gamma FIDLER	30	120	9410.1	10568	Reject	**Survey Unit Meets Release Criterion**
5-16	Gamma FIDLER	13	120	8257.1	8798	Reject	**Survey Unit Meets Release Criterion**
306-1	Gamma FIDLER	30	120	9410.1	10447	Reject	**Survey Unit Meets Release Criterion**
306-2	Gamma FIDLER	30	120	9410.1	10742	Reject	**Survey Unit Meets Release Criterion**
306-3	Gamma FIDLER	30	120	9410.1	10225	Reject	**Survey Unit Meets Release Criterion**
306-4	Gamma FIDLER	30	120	9410.1	10110	Reject	**Survey Unit Meets Release Criterion**
306-5	Gamma FIDLER	30	120	9410.1	10721	Reject	**Survey Unit Meets Release Criterion**
306-6	Gamma FIDLER	30	120	9410.1	10591	Reject	**Survey Unit Meets Release Criterion**
306-7	Gamma FIDLER	30	120	9410.1	10723	Reject	**Survey Unit Meets Release Criterion**
306-8	Gamma FIDLER	30	120	9410.1	10810	Reject	**Survey Unit Meets Release Criterion**
306-10	Gamma FIDLER	41	120	10144	12069	Reject	**Survey Unit Meets Release Criterion**
306-11	Gamma FIDLER	46	120	10475.9	12776	Reject	**Survey Unit Meets Release Criterion**
306-12	Gamma FIDLER	89	120	13311.2	17893	Reject	**Survey Unit Meets Release Criterion**

Notes:

(1) Measurements from each survey unit were grouped by radiation type and instrument.

(2) The Valid N for a dataset refers to the number of measurements from that dataset used in the WRS test.

(3) The Critical Value for the WRS test was calculated per MARSSIM Appendix I.

(4) Per MARSSIM for Scenario A, if the Sum of Reference Area Ranks is greater than the Critical Value, the Scenario A null hypothesis that the median survey unit measurement exceeds that in the reference area by more than the $DCGL_W$ is rejected, and the survey unit passes (i.e., the survey unit meets the release criterion). Electronic versions of the WRS test spreadsheets (per MARSSIM Appendix I) are available in the **Supporting Files**.

(5) Conclusions for these survey units are based on the WRS test results, and the initial data reduction shown in **Table A4-9**.

Table A4-11
Summary of Building Scanning Results
Depleted Uranium Storage Buildings
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ALPHA/BETA FLOOR MONITOR

5	1	53	300	1200	609	113	44062	No
5	2	14	200	1300	654	117	44062	No
5	3	11	300	900	627	61	44062	No
5	4	11	400	900	659	58	44062	No
5	5	30	400	900	657	64	44062	No
5	6	30	300	1000	645	79	44062	No
5	7	7	600	1100	814	48	44062	No
5	8	13	400	1300	785	149	44062	No
5	9	27	300	1000	685	88	44062	No
5	10	16	400	1200	744	83	44062	No
5	16	8	400	1200	744	105	44062	No
306	10	23	300	1400	643	125	44062	No
306	11	18	300	1200	603	117	44062	No
306	12	42	300	1200	589	89	44062	No
306	13	21	400	1200	660	103	44062	No
2073	1	56	200	900	563	83	44062	No
2073	3	32	200	800	500	97	44062	No
2084	2	20	200	800	615	110	44062	No
2084	3	74	200	1000	572	116	44062	No
2084	6	15	200	800	473	112	44062	No

ALPHA/BETA PHOSWICH

5	1	32	80	400	176	33	7198	No
5	2	6	80	300	182	32	7198	No
5	3	6	100	380	193	32	7198	No
5	4	6	100	400	222	43	7198	No
5	5	59	40	300	151	23	7198	No
5	6	18	80	280	165	19	7198	No
5	7	17	80	460	247	64	7198	No
5	8	8	100	420	258	50	7198	No
5	9	32	80	320	173	20	7198	No
5	10	9	100	480	220	61	7198	No
5	11	2	100	240	170	28	7198	No
5	12	2	120	380	240	42	7198	No
5	13	4	100	300	193	19	7198	No
5	14	2	80	380	195	78	7198	No
5	15	2	140	380	245	35	7198	No
5	16	5	120	460	238	55	7198	No
306	1	5	60	240	148	16	7198	No
306	2	4	60	300	160	37	7198	No
306	3	1	100	320	210	156	7198	No
306	4	1	180	320	250	99	7198	No
306	5	2	140	400	240	42	7198	No

Table A4-11
Summary of Building Scanning Results
Depleted Uranium Storage Buildings
License Termination Report Addendum A
Seneca Army Depot Activity

306	6	3	120	380	247	6	7198	No
306	7	6	100	300	202	19	7198	No
306	8	3	100	360	200	30	7198	No
306	10	18	60	480	184	53	7198	No
306	11	28	60	300	161	19	7198	No
306	12	47	60	300	154	17	7198	No
306	13	21	60	800	195	119	7198	No
2073	1	67	80	300	166	22	7198	No
2073	2	25	60	340	195	29	7198	No
2073	3	31	40	260	157	17	7198	No
2084	2	14	60	220	137	18	7198	No
2084	3	99	40	280	134	20	7198	No
GAMMA FIDLER								
5	1	85	2000	14000	5253	1654	14312	No
5	2	20	2000	15000	6738	2203	14312	Yes [4]
5	3	17	2000	7000	4368	531	14312	No
5	4	17	2000	10000	4824	814	14312	No
5	5	89	2000	10000	4480	715	14312	No
5	6	48	2000	10000	5182	1345	14312	No
5	7	24	2000	16000	8344	2511	14312	Yes
5	8	21	4000	15000	9024	2159	14312	Yes
5	9	59	2000	10000	5140	1507	14312	No
5	10	25	3200	13000	6554	1809	14312	No
5	11	2	5000	11000	8500	2121	14312	No
5	12	2	8000	13000	10500	0 [5]	14312	No
5	13	4	4000	9000	6000	408	14312	No
5	14	2	3000	7000	5000	0 [5]	14312	No
5	15	2	5000	12000	8750	1768	14312	No
5	16	13	3000	13000	7769	1666	14312	No
306	1	5	6000	12000	9200	758	14312	No
306	2	4	5000	11000	8000	913	14312	No
306	3	1	7000	12000	9500	3536	14312	No
306	4	1	8000	12000	10000	2828	14312	No
306	5	2	5000	10000	7500	0 [5]	14312	No
306	6	3	6000	10000	8333	289	14312	No
306	7	6	4000	11000	6667	1033	14312	No
306	8	3	4000	9000	6333	289	14312	No
306	10	41	3000	13000	6510	1613	14312	No
306	11	46	3000	10000	6239	861	14312	No
306	12	89	2000	12000	5242	1429	14312	No
306	13	42	2000	9000	4764	1113	14312	No
2073	1	123	1000	8000	3809	816	14312	No

Table A4-11
Summary of Building Scanning Results
Depleted Uranium Storage Buildings
License Termination Report Addendum A
Seneca Army Depot Activity

2073	2	25	2000	8000	5040	776	14312	No
2073	3	63	3000	8000	5083	447	14312	No
2084	2	34	2000	8000	5250	448	14312	No
2084	3	173	1000	8000	3893	788	14312	No
2084	6	15	3000	7000	4933	458	14312	No

Notes:

(1) cpm = counts per minute.

(2) The scanning mean for the survey unit was calculated by averaging the average scanning measurement from the total number of scanning locations from each survey unit, and the standard deviation of the scanning mean is the standard deviation of the those averages.

(3) The scanning flag values for measurements in the Class 2 and 3 survey units are based on the gross activity $DCGL_W$ for DU. Average background is included in the flag value. The alpha/beta flag values are the sum of the alpha and beta DU $DCGL_W$'s for that instrument (**Table A4-2**).

(4) All FIDLER scanning measurements were below the background corrected $DCGL_{EMC}$ of 47528 cpm (**Table A4-2**).

(5) Three survey grids were scanned with this instrument and each had the same range and average measurement; therefore, the standard deviation for the average scanning measurment for this survey unit is zero.

Table A5-1
List of Building 612 Survey Units [1,2]
License Termination Report Addendum A
Seneca Army Depot Activity

612	A	612-A	1	SUC-1275; SUC-1380
	B	612-B	1	SUC-1275; SUC-1380
	C	612-C	1	SUC-1275; SUC-1380
	D	612-D	1	SUC-1275; SUC-1380
	E	612-E	1	SUC-1275; SUC-1380
	F	612-F	1	SUC-1275; SUC-1380
	G	612-G	1	SUC-1275; SUC-1380
	H	612-H	1	SUC-1275; SUC-1380
	I	612-I	1	SUC-1275; SUC-1380
	J	612-J	1	SUC-1275; SUC-1380
	K	612-K	1	SUC-1275; SUC-1380
	L	612-L	1	SUC-1275; SUC-1380
	M	612-M	1	SUC-1275; SUC-1380
	N	612-N	1	SUC-1275; SUC-1380
	O	612-O	1	SUC-1275; SUC-1380
	P	612-P	1	SUC-1275; SUC-1380
	Q	612-Q	1	SUC-1275; SUC-1380
	R	612-R	1	SUC-1275; SUC-1380
	S	612-S	1	SUC-1275; SUC-1380
	T	612-T	1	SUC-1275; SUC-1380
	U	612-U	1	SUC-1275; SUC-1380
	V	612-V	1	SUC-1275; SUC-1380
	W	612-W	1	SUC-1275; SUC-1380
	X	612-X	1	SUC-1275; SUC-1380
	Y	612-Y	1	SUC-1275; SUC-1380
	Z	612-Z	1	SUC-1275; SUC-1380
	AA	612-AA	1	SUC-1275; SUC-1380
	BB	612-BB	1	SUC-1275; SUC-1380

Notes:
(1) Buildings were used for receipt and storage of packaged DU ammunition (SUC-1275).
(2) Compiled from *Seneca Army Depot Activity License Termination and License Release Plan* (ANL, 2003).

Table A5-2
Derived Concentration Guideline Levels
Building 612
License Termination Report Addendum A
Seneca Army Depot Activity

Instrument	Radionuclide	$DCGL_W$ (pCi/g)	$DCGL_{EMC}$ (dpm/100cm^2) (1)	Area (cm^2) (2)	Efficiency (3)	$DCGL_W$ (cpm) (4)	$DCGL_{EMC}$ (cpm) (4)	Background Average (cpm)	Background Determined	Background Corrected $DCGL_W$ (cpm) (5)	Background Corrected $DCGL_{EMC}$ (cpm) (5)
Alpha Floor Monitor	Depleted Uranium	31647	376599	582	18.2%	33522	398909	7	Blgd 2078	**33529**	**398916**
Beta Floor Monitor	Depleted Uranium	31647	376599	582	33.4%	61518	732064	951	Blgd 2078	**62469**	**733015**
Alpha Handheld Gas Proportional	Depleted Uranium	31647	376599	126	17.7%	7058	83989	1	Blgd 2078	**7059**	**83990**
Beta Handheld Gas Proportional	Depleted Uranium	31647	376599	126	24%	9570	113884	186	Blgd 2078	**9756**	**114070**
Gamma FIDLER	Depleted Uranium	31647	376599	126.7	0.75%	301	3579	3211	DFC (6)	**3512**	**6790**

Notes:

(1) dpm/100cm^2 = decays per minute per 100 square centimeters. Depleted uranium DCGL calculated using equation 4-4 of MARSSIM. Expected activity fractions for depleted uranium based on uranium depleted to 99.8 weight percent U-238, 0.2 weight percent U-235, and 0.0006 weight percent U-234 (WHO, 2001).

(2) $DCGL_{EMC}$ based on area factor of 11.9 for 4 m^2 grid (from ANL, 2003, for worst-case radionuclide [U-235]).

(3) Average efficiency for instrument as determined by daily function checks during survey (**Appendix 5.A**).

(4) The instrument-specific $DCGL_W$ and $DCGL_{EMC}$ in counts per minute (cpm) are calculated using the instrument efficiency and active probe area.

(5) The Background Corrected $DCGL_W$ and $DCGL_{EMC}$ for each instrument is the sum of the DCGL and the Background Average for that instrument.

(6) DFC = daily function checks. The background average used in this calculation for the FIDLER was from the background measurements conducted as part of the daily function check.

Table A5-3
Survey Instrumentation
Building 612
License Termination Report Addendum A
Seneca Army Depot Activity

[illegible]	[illegible] Type	Probe	Meter	Probe Area (cm²) (1)	Average Instrument Efficiency (2)	[illegible] (dpm/100cm²) (3)	[illegible]	[illegible]
Hand-Held Gas Proportional	Alpha/Beta	Ludlum Model 43-68	Ludlum Model 2360	126	Alpha: 17.7% Beta: 24%	Alpha: 11 Beta: 115	1352	31647
Floor Monitor	Alpha/Beta	Ludlum Model 43-37	Ludlum Model 2360	582	Alpha: 18.2% Beta: 33.4%	Alpha: 8 Beta: 56	514	31647
FIDLER	Low-Energy Gamma	Bicron G5 FIDLER	Bicron Analyst	126.7	0.75%	15239 (5)	166939 (5)	31647
Exposure Rate	Ambient Gamma Exposure Rate	No data available		-- (6)	--	--	--	NA (7)
GM Pancake	Alpha/Beta/Gamma	No data available		--	--	--	--	NA

Notes:

(1) cm^2 = square centimeters. Areas listed and used in the calculations are the active or physical probe area listed by the manufacturer, per MARSSIM Section 6.6.1 (NRC, 2000).

(2) Except where noted, the average instrument efficiency was determined from the daily function check data (refer to **Appendix 5.A**).

(3) $dpm/100cm^2$ = decays per minute per 100 square centimeters. Except where noted, the minimum detectable activities (MDAs) were calculated using the procedures outlined in MARSSIM Section 6.7 (NRC, 2000).

(4) Gross activity $DCGL_w$ was calculated using radionuclide-specific DCGLs derived by ANL, 2003 (**Appendix 1.A**).

(5) Average background from daily function checks used in MDA calculations for FIDLER (**Appendix 5.A**).

(6) "--" = Indicates that parameter was not used or calculated for instrument.

(7) NA= not applicable. DCGLs were not applied to exposure rate or personnel/equipment frisking measurements.

Table A5-4
Total Number of Required Measurements
Building 612
License Termination Report Addendum A
Seneca Army Depot Activity

Survey Unit	Gross Activity DCGLw (dpm/100cm²) (2)	Background Corrected DCGLw (cpm) (3)	LBGR (4)	Δ (5)	Observed Survey Σ (cpm) (6)	Observed Background Σ (cpm)	Δ/σ (7)	Pr (8)	Z(1-α) (9)	Z(1-β) (9)	N (10)
FIDLER - DFC bkgd (11)	31647	3512	1756	1756	1270	1156	1.4	0.84	1.645	1.645	31
Alpha HH - 2078	31647	7059	3530	3530	1	1	2675	1.00	1.645	1.645	14
Beta HH - 2078	31647	9570	4785	4785	45	71	68	1.00	1.645	1.645	14
Alpha FM - 2078	31647	33522	16761	16761	2	3	4883	1.00	1.645	1.645	14
Beta FM - 2078	31647	61518	30759	30759	70	182	169	1.00	1.645	1.645	14

Notes:

(1) All measurements for all survey units are combined for this evaluation. Instruments: FM = alpha/beta gas proportional floor monitor; FIDLER = low-energy gamma scintillator; HH = alpha/beta gas proportional hand-held detector.

(2) dpm/100cm2 = decays per minute per 100 square centimeters. Gross activity DCGLw for DU calculated per MARSSIM.

(3) cpm = counts per minute. Instrument-specific DCGLw calculated per MARSSIM. Includes average background count rate.

(4) LBGR = lower bound of gray region. Per MARSSIM, LBGR was set to 1/2 of the DCGLw.

(5) Δ = DCGLw - LBGR.

(6) The standard deviation (σ) for the survey data includes all measurements collected with that instrument.

(7) Δ/σ calculated using the larger value between the survey standard deviation and the background standard deviation.

(8) Values of Pr are from Table 5.1 of MARSSIM using Δ/σ. Pr is defined by MARSSIM as the probability that a random measurement from the survey unit exceeds a random measurement from the background reference area by less than the DCGLW when the survey unit median is equal to the LBGR above background.

(9) Values of $Z(1-\alpha)$ and $Z(1-\beta)$ (decision error percentiles) are from Table 5.2 of MARSSIM for $\alpha=\beta=0.05$.

(10) N = total required number of measurements or samples (includes both survey and background areas).

(11) Background measurements used for the 612 FIDLER data were the background measurements from the daily instrument function check data (DFC).

Table A5-5
Summary Statistics
Building 612 Direct Measurements
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Seneca Army Depot Activity

612-A	Alpha HH	47	1	1	1	0	4
612-A	Beta HH	47	161	158	31	115	262
612-A	Alpha FM	12	3	3	2	0	5
612-A	Beta FM	12	670	666.5	51	559	733
612-A	Gamma FIDLER	59	3939	4638	1424	1733	5749
612-AA	Alpha HH	97	1	1	1	0	4
612-AA	Beta HH	97	126	123	35	66	221
612-AA	Alpha FM	45	4	4	2	0	10
612-AA	Beta FM	45	853	852	43	748	958
612-AA	Gamma FIDLER	142	2619	2448	775	372	4569
612-B	Alpha HH	22	2	1	1	0	4
612-B	Beta HH	22	195	192	31	144	245
612-B	Gamma FIDLER	22	5818	5983.5	751	4552	7271
612-BB	Alpha HH	27	1	1	1	0	3
612-BB	Beta HH	27	131	138	32	70	181
612-BB	Alpha FM	10	4	4.5	2	0	6
612-BB	Beta FM	10	907	899.5	44	850	1003
612-BB	Gamma FIDLER	37	2583	2169	776	1640	3995
612-C	Alpha HH	11	2	2	1	0	3
612-C	Beta HH	11	175	185	26	137	205
612-C	Alpha FM	2	4	4	0	4	4
612-C	Beta FM	2	709	709	49	674	744
612-C	Gamma FIDLER	13	5964	5918	566	4978	6824
612-D	Alpha HH	14	2	2	1	0	5
612-D	Beta HH	14	158	160.5	26	118	209
612-D	Alpha FM	4	6	6.5	3	2	10
612-D	Beta FM	4	728	727.5	43	676	782
612-D	Gamma FIDLER	18	5969	6173.5	909	4432	7019
612-E	Alpha HH	16	1	1	1	0	4
612-E	Beta HH	16	174	181	30	124	242
612-E	Alpha FM	6	5	4.5	1	4	5
612-E	Beta FM	6	696	704	52	619	763
612-E	Gamma FIDLER	22	5747	5719.5	577	4898	6882
612-F	Alpha HH	33	1	1	1	0	3
612-F	Beta HH	33	154	152	33	98	210
612-F	Alpha FM	12	3	3.5	2	0	6
612-F	Beta FM	12	713	714	33	653	762
612-F	Gamma FIDLER	44	4918	4840	944	2873	7078
612-G	Alpha HH	9	1	1	1	0	2
612-G	Beta HH	9	130	131	21	94	157
612-G	Gamma FIDLER	9	4097	4002	176	3922	4420
612-H	Alpha HH	9	1	1	1	0	3
612-H	Beta HH	9	153	147	24	115	187

Table A5-5
Summary Statistics
Building 612 Direct Measurements
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Survey Unit (Bldg/Room)							
612-H	Gamma FIDLER	9	4183	4000	592	3253	5269
612-I	Alpha HH	16	2	1.5	2	0	6
612-I	Beta HH	16	165	167	27	121	207
612-I	Gamma FIDLER	16	3992	4326	1280	1947	5812
612-J	Alpha HH	17	1	1	1	0	3
612-J	Beta HH	17	178	189	34	121	237
612-J	Gamma FIDLER	17	6049	5761	601	5402	7016
612-K	Alpha HH	27	1	1	1	0	3
612-K	Beta HH	27	117	96	44	70	230
612-K	Alpha FM	5	8	8	3	4	13
612-K	Beta FM	5	908	890	36	876	955
612-K	Gamma FIDLER	32	2430	2415	508	1418	3589
612-L	Alpha HH	23	1	0	1	0	2
612-L	Beta HH	23	129	133	45	61	217
612-L	Alpha FM	6	4	4	2	3	6
612-L	Beta FM	6	880	879	31	843	922
612-L	Gamma FIDLER	29	2479	2501	513	1535	3469
612-M	Alpha HH	170	1	1	1	0	5
612-M	Beta HH	170	114	101	53	60	627
612-M	Alpha FM	62	4	3.5	3	0	12
612-M	Beta FM	62	855	859	37	781	933
612-M	Gamma FIDLER	232	2440	2429.5	656	1114	4229
612-N	Alpha HH	27	1	1	2	0	6
612-N	Beta HH	27	124	102	44	72	231
612-N	Alpha FM	10	4	4	2	1	6
612-N	Beta FM	10	883	890	35	815	926
612-N	Gamma FIDLER	37	2338	2018	745	1082	3650
612-O	Alpha HH	26	1	1	1	0	5
612-O	Beta HH	26	119	118	31	70	194
612-O	Alpha FM	10	2	2.5	1	1	4
612-O	Beta FM	10	850	847	41	779	910
612-O	Gamma FIDLER	36	2373	1988	730	1521	3704
612-P	Alpha HH	31	1	1	1	0	4
612-P	Beta HH	31	149	140	54	84	383
612-P	Alpha FM	10	3	3	1	1	6
612-P	Beta FM	10	863	891	120	525	939
612-P	Gamma FIDLER	41	2410	1979	870	1323	4035
612-Q	Alpha HH	31	1	1	1	0	3
612-Q	Beta HH	31	147	154	35	77	213
612-Q	Alpha FM	9	5	5	3	0	10
612-Q	Beta FM	9	977	999	42	904	1023
612-Q	Gamma FIDLER	41	2408	2095	589	1714	3822
612-R	Alpha HH	18	1	1	1	0	4

Table A5-5
Summary Statistics
Building 612 Direct Measurements
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612-R	Beta HH	18	132	137.5	30	61	172
612-R	Alpha FM	10	3	2	2	0	7
612-R	Beta FM	10	868	880.5	44	759	910
612-R	Gamma FIDLER	37	2951	2017	1528	1455	5766
612-S	Alpha HH	25	1	1	1	0	5
612-S	Beta HH	25	128	131	39	74	241
612-S	Alpha FM	10	4	4	2	1	7
612-S	Beta FM	10	839	875.5	95	641	920
612-S	Gamma FIDLER	35	2226	1839	742	1406	3704
612-T	Alpha HH	26	1	1	1	0	3
612-T	Beta HH	26	127	128.5	35	79	229
612-T	Alpha FM	10	4	3.5	1	2	6
612-T	Beta FM	10	863	868	25	811	897
612-T	Gamma FIDLER	36	2289	1966	698	1421	3551
612-U	Alpha HH	64	1	1	1	0	4
612-U	Beta HH	64	115	106	33	67	228
612-U	Alpha FM	30	4	4	2	1	11
612-U	Beta FM	30	864	871.5	41	785	955
612-U	Gamma FIDLER	95	2021	1747	807	523	3934
612-V	Alpha HH	73	1	1	1	0	4
612-V	Beta HH	73	116	117	39	45	233
612-V	Alpha FM	45	5	4	2	0	11
612-V	Beta FM	45	888	900	46	785	971
612-V	Gamma FIDLER	117	1967	1775	645	602	4569
612-W	Alpha HH	68	1	1	1	0	4
612-W	Beta HH	68	113	91.5	59	66	419
612-W	Alpha FM	35	5	4	3	1	10
612-W	Beta FM	35	852	863	43	723	906
612-W	Gamma FIDLER	103	2138	2065	654	529	3453
612-X	Alpha HH	72	1	1	1	0	5
612-X	Beta HH	72	105	99.5	29	53	173
612-X	Alpha FM	35	5	5	2	0	10
612-X	Beta FM	35	877	886	47	774	963
612-X	Gamma FIDLER	107	2245	2271	675	610	3802
612-Y	Alpha HH	100	1	1	1	0	5
612-Y	Beta HH	100	112	101	41	61	328
612-Y	Alpha FM	44	5	4	3	0	18
612-Y	Beta FM	44	873	871.5	42	785	976
612-Y	Gamma FIDLER	146	2002	1992	777	425	4433
612-Z	Alpha HH	63	1	1	1	0	4
612-Z	Beta HH	63	124	121	40	66	308
612-Z	Alpha FM	30	5	4	2	1	12
612-Z	Beta FM	30	901	900	44	813	975

Table A5-5
Summary Statistics
Building 612 Direct Measurements
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612-Z	Gamma FIDLER	93	2090	1996	755	502	4291

Notes:
(1) Measurements from each survey unit were grouped by radiation type and instrument. Instruments: FM = alpha/beta gas proportional floor monitor; HH = alpha/beta handheld gas proportional;
(2) cpm = counts per minute.

Table A5-6
Initial Data Reduction
Building 612 - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

		Survey Unit		Reference Area					
			Maximum (cpm) [2]	Mean (cpm) [3]	Minimum (cpm) [4]	DGGL$_w$ (cpm) [5]	Difference between SU mean and RA mean greater than DGGL$_w$	Difference between SU maximum and RA mean greater than DGGL$_w$	
612-A	Alpha HH	1	4	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-A	Beta HH	161	262	186	99	9570	Yes	Yes	
612-A	Alpha FM	3	5	7	1	33522	Yes	Yes	
612-A	Beta FM	670	733	951	628	61518	Yes	Yes	
612-A	Gamma FIDLER	3939	5749	3211	1650	301	**No**	**No**	
612-AA	Alpha HH	1	4	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-AA	Beta HH	126	221	186	99	9570	Yes	Yes	
612-AA	Alpha FM	4	10	7	1	33522	Yes	Yes	
612-AA	Beta FM	853	958	951	628	61518	Yes	Yes	
612-AA	Gamma FIDLER	2619	4569	3211	1650	301	Yes	**No**	
612-B	Alpha HH	2	4	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-B	Beta HH	195	245	186	99	9570	Yes	Yes	
612-B	Gamma FIDLER	5818	7271	3211	1650	301	**No**	**No**	
612-BB	Alpha HH	1	3	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-BB	Beta HH	131	181	186	99	9570	Yes	Yes	
612-BB	Alpha FM	4	6	7	1	33522	Yes	Yes	
612-BB	Beta FM	907	1003	951	628	61518	Yes	Yes	
612-BB	Gamma FIDLER	2583	3995	3211	1650	301	Yes	**No**	
612-C	Alpha HH	2	3	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-C	Beta HH	175	205	186	99	9570	Yes	Yes	
612-C	Alpha FM	4	4	7	1	33522	Yes	Yes	
612-C	Beta FM	709	744	951	628	61518	Yes	Yes	
612-C	Gamma FIDLER	5964	6824	3211	1650	301	**No**	**No**	

Table A5-6
Initial Data Reduction
Building 612 - Direct Measurements
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		Survey Unit		Reference Area					
			Maximum (cpm) [2]	Mean (cpm) [2]	Minimum (cpm) [2]	DCGL (cpm) [3]	Difference between Survey Unit measurements and DCGL?	Survey Unit measurements less than DCGL?	
612-D	Alpha HH	2	5	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-D	Beta HH	158	209	186	99	9570	Yes	Yes	
612-D	Alpha FM	6	10	7	1	33522	Yes	Yes	
612-D	Beta FM	728	782	951	628	61518	Yes	Yes	
612-D	Gamma FIDLER	5969	7019	3211	1650	301	**No**	**No**	
612-E	Alpha HH	1	4	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-E	Beta HH	174	242	186	99	9570	Yes	Yes	
612-E	Alpha FM	5	5	7	1	33522	Yes	Yes	
612-E	Beta FM	696	763	951	628	61518	Yes	Yes	
612-E	Gamma FIDLER	5747	6882	3211	1650	301	**No**	**No**	
612-F	Alpha HH	1	3	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-F	Beta HH	154	210	186	99	9570	Yes	Yes	
612-F	Alpha FM	3	6	7	1	33522	Yes	Yes	
612-F	Beta FM	713	762	951	628	61518	Yes	Yes	
612-F	Gamma FIDLER	4918	7078	3211	1650	301	**No**	**No**	
612-G	Alpha HH	1	2	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-G	Beta HH	130	157	186	99	9570	Yes	Yes	
612-G	Gamma FIDLER	4097	4420	3211	1650	301	**No**	**No**	
612-H	Alpha HH	1	3	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-H	Beta HH	153	187	186	99	9570	Yes	Yes	
612-H	Gamma FIDLER	4183	5269	3211	1650	301	**No**	**No**	
612-I	Alpha HH	2	6	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-I	Beta HH	165	207	186	99	9570	Yes	Yes	
612-I	Gamma FIDLER	3992	5812	3211	1650	301	**No**	**No**	
612-J	Alpha HH	1	3	1	0	7058	Yes	Yes	Survey unit meets release criterion based on alpha and beta measurements
612-J	Beta HH	178	237	186	99	9570	Yes	Yes	
612-J	Gamma FIDLER	6049	7016	3211	1650	301	**No**	**No**	
612-K	Alpha HH	1	3	1	0	7058	Yes	Yes	

Table A5-6
Initial Data Reduction
Building 612 - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

612-K	Beta HH	117	230	186	99	9570	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-K	Alpha FM	8	13	7	1	33522	Yes	Yes	
612-K	Beta FM	908	955	951	628	61518	Yes	Yes	
612-K	Gamma FIDLER	2430	3589	3211	1650	301	Yes	**No**	
612-L	Alpha HH	1	2	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-L	Beta HH	129	217	186	99	9570	Yes	Yes	
612-L	Alpha FM	4	6	7	1	33522	Yes	Yes	
612-L	Beta FM	880	922	951	628	61518	Yes	Yes	
612-L	Gamma FIDLER	2479	3469	3211	1650	301	Yes	**No**	
612-M	Alpha HH	1	5	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-M	Beta HH	114	627	186	99	9570	Yes	Yes	
612-M	Alpha FM	4	12	7	1	33522	Yes	Yes	
612-M	Beta FM	855	933	951	628	61518	Yes	Yes	
612-M	Gamma FIDLER	2440	4229	3211	1650	301	Yes	**No**	
612-N	Alpha HH	1	6	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-N	Beta HH	124	231	186	99	9570	Yes	Yes	
612-N	Alpha FM	4	6	7	1	33522	Yes	Yes	
612-N	Beta FM	883	926	951	628	61518	Yes	Yes	
612-N	Gamma FIDLER	2338	3650	3211	1650	301	Yes	**No**	
612-O	Alpha HH	1	5	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-O	Beta HH	119	194	186	99	9570	Yes	Yes	
612-O	Alpha FM	2	4	7	1	33522	Yes	Yes	
612-O	Beta FM	850	910	951	628	61518	Yes	Yes	
612-O	Gamma FIDLER	2373	3704	3211	1650	301	Yes	**No**	

Table A5-6
Initial Data Reduction
Building 612 - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

612-P	Alpha HH	1	4	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-P	Beta HH	149	383	186	99	9570	Yes	Yes	
612-P	Alpha FM	3	6	7	1	33522	Yes	Yes	
612-P	Beta FM	863	939	951	628	61518	Yes	Yes	
612-P	Gamma FIDLER	2410	4035	3211	1650	301	Yes	**No**	
612-Q	Alpha HH	1	3	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-Q	Beta HH	147	213	186	99	9570	Yes	Yes	
612-Q	Alpha FM	5	10	7	1	33522	Yes	Yes	
612-Q	Beta FM	977	1023	951	628	61518	Yes	Yes	
612-Q	Gamma FIDLER	2408	3822	3211	1650	301	Yes	**No**	
612-R	Alpha HH	1	4	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-R	Beta HH	132	172	186	99	9570	Yes	Yes	
612-R	Alpha FM	3	7	7	1	33522	Yes	Yes	
612-R	Beta FM	868	910	951	628	61518	Yes	Yes	
612-R	Gamma FIDLER	2951	5766	3211	1650	301	Yes	**No**	
612-S	Alpha HH	1	5	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-S	Beta HH	128	241	186	99	9570	Yes	Yes	
612-S	Alpha FM	4	7	7	1	33522	Yes	Yes	
612-S	Beta FM	839	920	951	628	61518	Yes	Yes	
612-S	Gamma FIDLER	2226	3704	3211	1650	301	Yes	**No**	
612-T	Alpha HH	1	3	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-T	Beta HH	127	229	186	99	9570	Yes	Yes	
612-T	Alpha FM	4	6	7	1	33522	Yes	Yes	
612-T	Beta FM	863	897	951	628	61518	Yes	Yes	
612-T	Gamma FIDLER	2289	3551	3211	1650	301	Yes	**No**	

Table A5-6
Initial Data Reduction
Building 612 - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

612-U	Alpha HH	1	4	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-U	Beta HH	115	228	186	99	9570	Yes	Yes	
612-U	Alpha FM	4	11	7	1	33522	Yes	Yes	
612-U	Beta FM	864	955	951	628	61518	Yes	Yes	
612-U	Gamma FIDLER	2021	3934	3211	1650	301	Yes	**No**	
612-V	Alpha HH	1	4	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-V	Beta HH	116	233	186	99	9570	Yes	Yes	
612-V	Alpha FM	5	11	7	1	33522	Yes	Yes	
612-V	Beta FM	888	971	951	628	61518	Yes	Yes	
612-V	Gamma FIDLER	1967	4569	3211	1650	301	Yes	**No**	
612-W	Alpha HH	1	4	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-W	Beta HH	113	419	186	99	9570	Yes	Yes	
612-W	Alpha FM	5	10	7	1	33522	Yes	Yes	
612-W	Beta FM	852	906	951	628	61518	Yes	Yes	
612-W	Gamma FIDLER	2138	3453	3211	1650	301	Yes	**No**	
612-X	Alpha HH	1	5	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-X	Beta HH	105	173	186	99	9570	Yes	Yes	
612-X	Alpha FM	5	10	7	1	33522	Yes	Yes	
612-X	Beta FM	877	963	951	628	61518	Yes	Yes	
612-X	Gamma FIDLER	2245	3802	3211	1650	301	Yes	**No**	
612-Y	Alpha HH	1	5	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-Y	Beta HH	112	328	186	99	9570	Yes	Yes	
612-Y	Alpha FM	5	18	7	1	33522	Yes	Yes	
612-Y	Beta FM	873	976	951	628	61518	Yes	Yes	
612-Y	Gamma FIDLER	2002	4433	3211	1650	301	Yes	**No**	

Table A5-6
Initial Data Reduction
Building 612 - Direct Measurements
License Termination Report Addendum A
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612-Z	Alpha HH	1	4	1	0	7058	Yes	Yes	Perform WRS Test for FIDLER Data Set
612-Z	Beta HH	124	308	186	99	9570	Yes	Yes	
612-Z	Alpha FM	5	12	7	1	33522	Yes	Yes	
612-Z	Beta FM	901	975	951	628	61518	Yes	Yes	
612-Z	Gamma FIDLER	2090	4291	3211	1650	301	Yes	**No**	

Notes:

(1) Measurements from each survey unit were grouped by radiation type and instrument. Instruments: FM = alpha/beta gas proportional floor monitor; HH = alpha/beta gas proportional hand-held; FIDLER = low-energy gamma scintillator.

(2) cpm = counts per minute. Refer to **Table A5-5** for complete summary statistics for each survey unit.

(3) The reference area for the Building 612 was Building 2078. Refer to **Table A2-3** for complete summary statistics for the reference areas.

(4) The instrument-specific $DCGL_W$ was calculated using the physical or active probe area in cm^2 and the instrument efficiency (**Table A5-2**), and does not include background.

(5) Per MARSSIM Section 8 and **Figure A2-1** of this addendum.

Table A5-7
Wilcoxon Rank Sum Test Results
Building 612 - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

612-A	Gamma FIDLER	59	40	2230.7	1727.5	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-AA	Gamma FIDLER	142	40	4144.1	5123	Reject	**Survey unit meets release criterion**
612-B	Gamma FIDLER	22	40	1371.8	839	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-BB	Gamma FIDLER	37	40	1721.3	1968.5	Reject	**Survey unit meets release criterion**
612-C	Gamma FIDLER	13	40	1159.6	825.5	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-D	Gamma FIDLER	18	40	1277.9	843	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-E	Gamma FIDLER	22	40	1371.8	839	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-F	Gamma FIDLER	44	40	1883.7	1147.5	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-G	Gamma FIDLER	9	40	1063.7	983	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-H	Gamma FIDLER	9	40	1063.7	957	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-I	Gamma FIDLER	16	40	1230.7	1071.5	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-J	Gamma FIDLER	17	40	1254.3	830	Accept	Survey unit meets release criterion based on alpha and beta measurements
612-K	Gamma FIDLER	32	40	1605.2	1765	Reject	**Survey unit meets release criterion**
612-L	Gamma FIDLER	29	40	1535.3	1668.5	Reject	**Survey unit meets release criterion**
612-M	Gamma FIDLER	232	40	6215.8	7909	Reject	**Survey unit meets release criterion**
612-N	Gamma FIDLER	37	40	1721.3	2019	Reject	**Survey unit meets release criterion**
612-O	Gamma FIDLER	36	40	1698.1	1994	Reject	**Survey unit meets release criterion**
612-P	Gamma FIDLER	41	40	1814.1	2156	Reject	**Survey unit meets release criterion**

Table A5-7
Wilcoxon Rank Sum Test Results
Building 612 - Direct Measurements
License Termination Report Addendum A
Seneca Army Depot Activity

612-Q	Gamma FIDLER	41	40	1814.1	2100.5	Reject	**Survey unit meets release criterion**
612-R	Gamma FIDLER	37	40	1721.3	1797	Reject	**Survey unit meets release criterion**
612-S	Gamma FIDLER	35	40	1674.9	1977	Reject	**Survey unit meets release criterion**
612-T	Gamma FIDLER	36	40	1698.1	2008.5	Reject	**Survey unit meets release criterion**
612-U	Gamma FIDLER	95	40	3061.4	4024	Reject	**Survey unit meets release criterion**
612-V	Gamma FIDLER	117	40	3568.3	4819.5	Reject	**Survey unit meets release criterion**
612-W	Gamma FIDLER	103	40	3245.8	4205.5	Reject	**Survey unit meets release criterion**
612-X	Gamma FIDLER	107	40	3337.9	4238.5	Reject	**Survey unit meets release criterion**
612-Y	Gamma FIDLER	146	40	4236.3	5755.5	Reject	**Survey unit meets release criterion**
612-Z	Gamma FIDLER	93	40	3015.3	3922	Reject	**Survey unit meets release criterion**

Notes:
(1) Measurements from each survey unit were grouped by radiation type and instrument.
(2) The Valid N for a dataset refers to the number of measurements from that dataset used in the WRS test.
(3) The Critical Value for the WRS test was calculated per MARSSIM Appendix I.
(4) Per MARSSIM for Scenario A, if the Sum of Reference Area Ranks is greater than the Critical Value, the Scenario A null hypothesis that the median survey unit measurement exceeds that in the reference area by more than the $DCGL_W$ is rejected, and the survey unit passes (i.e., the survey unit meets the release criterion).
(5) Conclusions for these survey units are based on the WRS test results, and the initial data reduction shown in **Table A5-6**.

Table A5-8
Survey Units with Measurements Exceeding $DCGL_{EMC}$
Building 612
License Termination Report Addendum A
Seneca Army Depot Activity

612-B	Gamma FIDLER	22	3	7271	6790
612-C	Gamma FIDLER	13	1	6824	6790
612-D	Gamma FIDLER	18	4	7019	6790
612-E	Gamma FIDLER	22	2	6882	6790
612-F	Gamma FIDLER	45	2	7078	6790
612-J	Gamma FIDLER	17	3	7016	6790

Notes:
(1) cpm = counts per minute. Complete survey data is presented in **Appendix 5.C**.
(2) Background corrected $DCGL_{EMC}$ from **Table A5-2**.

Seneca Army Depot Activity
License Termination Report Addendum
Attachment 1

Correspondence from NRC Staff
September and October 2005

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

September 7, 2005

Docket No. 04008526 License No. SUC-1275
Control No. 135163

Stephen M. Absolom
Installation Manager
Caretaker Office
Seneca Army Depot Activity
5786 State Route 96
P.O. Box 9
Romulus, NY 14541-0009

SUBJECT: SENECA ARMY DEPOT ACTIVITY, REQUEST FOR ADDITIONAL INFORMATION CONCERNING APPLICATION FOR AMENDMENT TO LICENSE, CONTROL NO. 135163

Dear Mr. Absolom:

This is in reference to your letter dated February 28, 2005 providing additional information concerning your license termination request for Seneca Army Depot Activity (SEDA). We have completed our review of the additional information you have provided. This review was conducted by both NRC Region I staff and NRC Office of Nuclear Materials Safety and Safeguards staff. As a result of our review we have determined that the use of Scenario B to demonstrate compliance with the NRC criteria for the unrestricted release of SEDA is inappropriate.

NUREG-1757, Consolidated NMSS Decommissioning Guidance, Volume 2, *Characterization, Survey, and Determination of Radiological Criteria*, Section 2.4 states that:

> "... NRC staff's default assumption is that the use of Scenario A is appropriate. The use of Scenario B is expected only for a small number of facilities, and the considerations for any given facility are expected to be site specific. Therefore, NRC staff recommends that licensees contact NRC early in the licensee's FSS design process to discuss considerations for their situation."

In your *License Termination and License Release Plan*, which was transmitted by your letter dated February 11, 2003, you provided information indicating that Scenario A would be used to demonstrate compliance with the NRC criteria for unrestricted release. Our letter to you dated June 11, 2003 transmitted Amendment 13 of your license which incorporated by reference your *License Termination and License Release Plan* in condition 15 of the license. Therefore, based on Condition 15 of your license, you had committed to use Scenario A for the SEDA decommissioning.

When applying Scenario B to a site decommissioning, the key assumption is that the $DCGL_w$ is small when compared to measurement and/or background variability. For the SEDA decommissioning, however, it appears that your $DCGL_w$ values are large compared to

background/measurement variability which would allow the use of Scenario A. Additionally, we noted that you used Scenario B even though some reference areas failed the K-W test, reference areas were established based on different materials (although background from different materials is not expected to be similar), and reference areas were established based on an artificial separation of high and low measurements.

Since we have determined that the use of Scenario B is inappropriate for your facility, please provide us with your plans for license termination relative to the conditions of your license and the considerations of NUREG-1757, Volume 2.

We will continue our review of your license amendment application for license termination upon receipt of this information. Please reply to my attention at the Region I Office and refer to Mail Control No. 135163. If you have any technical questions regarding this letter, please call me at (610) 337-5214.

If we do not receive a reply from you within 30 calendar days from the date of this letter, we will assume that you do not wish to pursue your license amendment application.

Sincerely,

James Kottan
Senior Health Physicist
Decommissioning Branch
Division of Nuclear Materials Safety

cc:
John Cleary, Radiation Safety Officer

Hackett, John

From: Hackett, John
Sent: Wednesday, October 19, 2005 8:28 AM
To: 'Stephen Absolom'; 'john.f.cleary@us.army.mil'; 'Tom Enroth (E-mail)'
Cc: 'Picel, Kurt C.'; Travers, Jacqueline; 'James Kottan'; Kadlubak, Kathleen
Subject: Summary of Conference Call with NRC 10-18-05

To all,

Attached is a summary of our conference call this morning regarding License Termination at the Seneca Army Depot.

Attendees:

Jackie Travers/John Hackett - Parsons

Tom Enroth/John Cleary - Seneca

Kurt Picel - ANL

Jim Kottan/Dave Everhart - NRC

The following was discussed (Conclusions from the discussion are shown in red).

1. Use of Scenario A:

Regarding the re-submittal, the Army asked what the NRC would like to see. Spreadsheets will be generated to show the data comparison per MARSSIM Appendix I. Parsons could submit electronic copies, hard copies, examples or a summary. *NRC requested electronic copies and additional explanatory text as addendum to original report. It will not be necessary to resubmit the whole report.*

The Army wanted to confirm that the use of measurement units of cpm for the data comparison was acceptable. *Use of counts per minute is acceptable.*

The Army discussed how to handle the data in survey areas where a small number of measurements come from one instrument compared to the background data set. For example, if there were 10 alpha locations and 3 of these locations were from the floor monitor and 7 from the phoswich. Could the data be compared directly to the DCGL rather than using the WRS test? *Comparison directly with DCGL in these circumstances is ok. If using the WRS test is necessary (i.e. some data points exceed the DCGL), all alpha data would need to be put in comparable units for a comparison with background data.*

2. The Army asked if there were any Issues with previous requests for information? *NRC indicated it was a safe assumption that there were no issues with previous comment/response.*

3. The Army asked if the use of a gross surface activity DCGL for depleted uranium was acceptable. *NRC indicated that use of DU DCGL listed on Table 2.1 of the report was acceptable.*

4. The results of Building 612 were discussed. Using FIDLER efficiencies available from source checks done during that survey, 10 survey units did not pass using the gamma measurements under a Scenario A comparison. However, they do for alpha and beta. Can we rely upon alpha/beta to demonstrate those survey units pass?

NRC indicated that additional alpha/beta measurements could be used to justify passing these survey units despite the issues with the FIDLER measurements.

5. A due date was discussed. *No specific timeframe was indicated by NRC. A sixty-day window was established. However, the Army believes they can have the addendum out to NRC sooner.*

Please feel free to contact me should you have any questions.

John R. Hackett, P.E.
PARSONS
1700 Broadway, Suite 900
Denver, CO 80290
(303) 764-8774 office
(720) 284-9495 cell
(303) 831-8208 fax

Seneca Army Depot Activity
License Termination Report Addendum
Attachment 2

Instrument Function Check Data from DU Igloo and DU Building Surveys

(Supersedes Appendices 3.A and 4.A)

FIDLER A983P

Parameter Being Tracked Am-241 Source Data

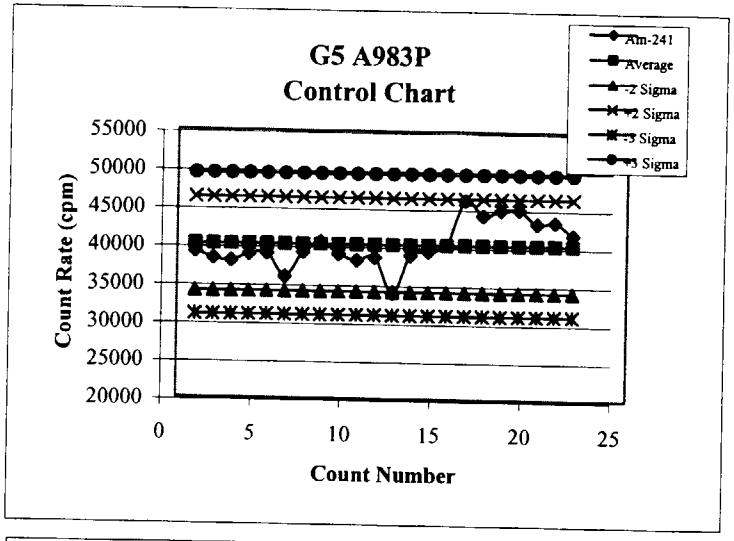
Electronics

Instrument Type	Ratemeter
Model Number	Analyst
Manufacturer	Bicron
Serial Number	A983P

Detector

Instrument Type	FIDLER
Model Number	G5
Manufacturer	Bicron
Serial Number	A394Q
Geometry	Jig
ROI	

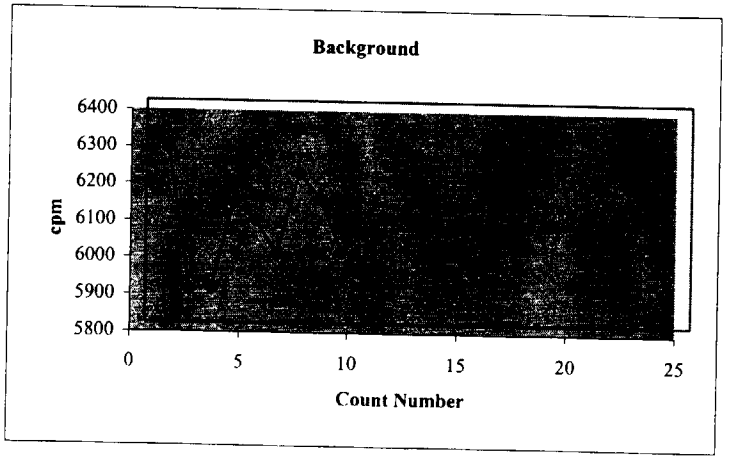
Count Data			2 Sigma	3 Sigma
Mean=	40172.95	High	46308.01	49375.54
STDEV=	3067.529	Low	34037.9	30970.37



Avg. Efficiency
6.6%

Am-241

Date/Time	Data Number	Bkgd Data (cpm)	Am-241 Data (cpm)	Pull Block	Status	4 Pi Eff (%)	
8/25/2002 8:35	1st	6269	39106		OK	6%	
8/25/2002 14:20	2nd	5889	38259		OK	6%	
8/25/2002 16:00	3rd	5892	37937		OK	6%	
8/26/2002 7:00	4th	6123	38788		OK	6%	
8/26/2002 12:35	5th	6078	38892		OK	6%	
8/26/2002 17:30	6th	5984	35885		OK	6%	
8/27/2002 7:00	7th	6203	39086		OK	6%	
8/27/2002 12:20	8th	6134	40495		OK	6%	
8/27/2002 17:25	9th	5992	38851		OK	7%	
9/9/2002 7:00	10th	6041	38112		OK	6%	
9/9/2002 12:15	11th	6081	38466		OK	6%	
9/9/2002 16:00	12th	6083	33849		OK	6%	
9/10/2002 7:00	13th	6217	38801		Investigate	6%	
9/10/2002 11:45	14th	5988	39320		OK	6%	
9/11/2002 7:00	15th	5940	40225		OK	7%	
9/11/2002 12:40	16th	6321	46037		OK	8%	recheck in evening
9/11/2002 18:00	17th	6249	44067		OK	7%	
9/12/2002 7:00	18th	6322	44801		OK	7%	
9/12/2002 12:10	19th	6213	44868		OK	7%	
9/12/2002 17:30	20th	5974	43069		OK	7%	
9/13/2002 7:00	21st	6076	43261		OK	7%	
9/13/2002 12:00	22nd	5949	41630		OK	7%	End of program



FIDLER A978P

Parameter Being Tracked Am-241 Source Data

Electronics

Instrument Type	Ratemeter
Model Number	Analyst
Manufacturer	Bicron
Serial Number	A951P

Detector

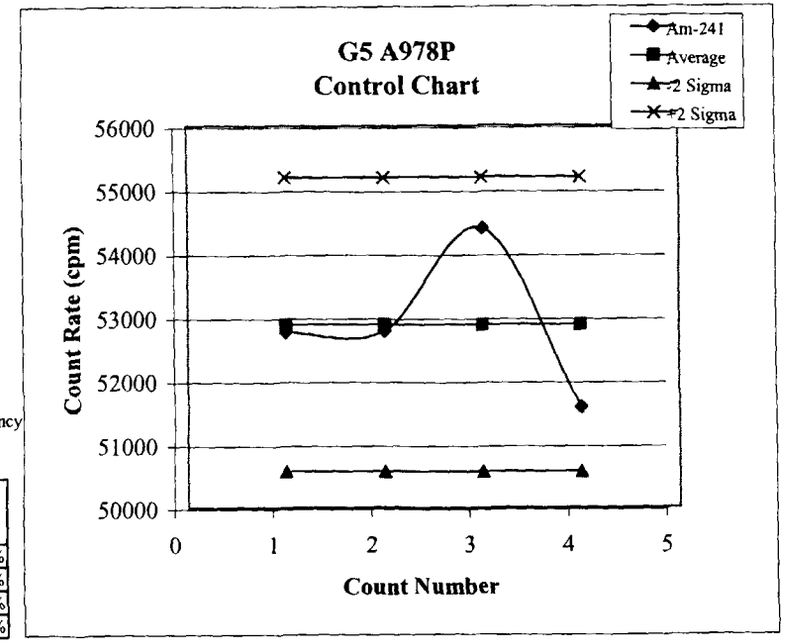
Instrument Type	FIDLER
Model Number	G5
Manufacturer	Bicron
Serial Number	A365Q
Geometry	Jig
ROI	

Count Data		2 Sigma	3 Sigma
Mean=	52879.25	High 55192.09	56348.5
STDEV=	1156.418	Low 50566.41	49410

Avg. Efficiency
8.7%

Am-241

Date/Time	Data Number	Bkgd Data (cpm)	Am-241 Data (cpm)	Pull Block	Status	4 Pi Eff (%)
9/12/2002 13:30	1st	5594	52756		OK	9%
9/12/2002 17:00	2nd	5655	52780		OK	9%
9/13/2002 7:00	3rd	5933	54398		OK	9%
9/13/2002 12:00	4th	5692	51583		OK	9%



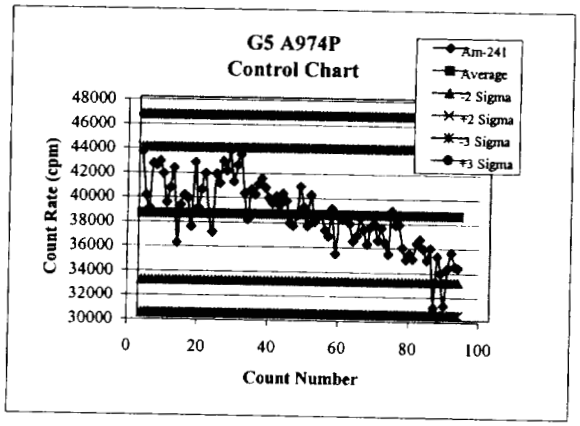
FIDLER A974P

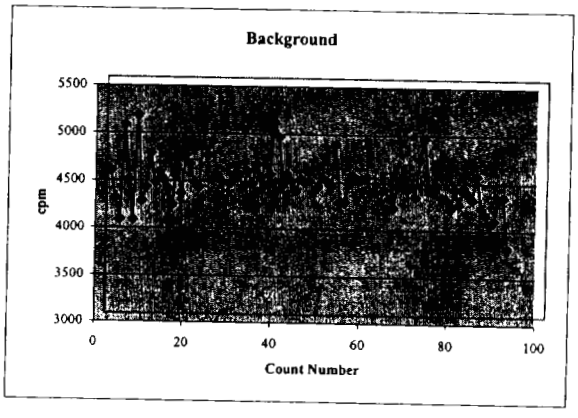
Parameter Being Tracked Am-241 Source Data

Electronics	
Instrument Type	Ratemeter
Model Number	Analyst
Manufacturer	Bicron
Serial Number	A974P

Detector	
Instrument Type	FIDLER
Model Number	G5
Manufacturer	Bicron
Serial Number	A381Q
Geometry	Jig
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	38464.43	High	43869.14	46571.5
STDEV=	2702.357	Low	33059.71	30357.36





Avg. Efficiency
6.3%

Date/Time	Data Number	Bkgd Data (cpm)	Am-241 Data (cpm)	Pull Block	Status	4 Pi Eff (%)	
7/10/2002 15:25	1st	4516	43532		OK	7%	
7/11/2002 11:20	2nd	4230	39961		OK	7%	
7/11/2002 17:00	3rd	4000	38909		OK	6%	
7/12/2002 7:00	4th	5000	42555		OK	7%	
7/12/2002 11:30	5th	4427	42422		OK	7%	
7/12/2002 16:25	6th	4000	42767		OK	7%	
7/13/2002 7:00	7th	5103	41726		OK	7%	
7/13/2002 11:20	8th	4200	39371		OK	6%	
7/13/2002 15:30	9th	4348	40577		OK	7%	
7/14/2002 8:00	10th	4703	42,229		OK	7%	
7/14/2002 12:05	11th	4397	36106		OK	6%	
7/14/2002 15:45	12th	4505	39170		OK	6%	
7/15/2002 7:00	13th	4422	39987		OK	7%	
7/15/2002 11:30	14th	4330	39766		OK	7%	
7/15/2002 16:55	15th	4161	37418		OK	6%	
7/16/2002 7:00	16th	4574	42674		OK	7%	
7/16/2002 11:40	17th	4282	38986		OK	6%	
7/16/2002 17:00	18th	4685	40463		OK	7%	
7/17/2002 7:15	19th	4590	41757		OK	7%	
7/17/2002 11:40	20th	4398	38551		OK	6%	
7/17/2002 15:30	21st	4355	36987		OK	6%	
7/22/2002 7:00	22nd	4945	41737		OK	7%	
7/23/2002 7:00	23rd	4686	40964		OK	7%	
7/23/2002 11:30	24th	4842	42776		OK	7%	
7/23/2002 17:00	25th	4485	41992		OK	7%	
7/24/2002 7:00	26th	4420	43665		OK	7%	
7/24/2002 11:45	27th	4081	41123		OK	7%	
7/24/2002 17:00	28th	4391	42467		OK	7%	
7/25/2002 7:00	29th	4459	43334		OK	7%	
7/25/2002 11:45	30th	4483	40167		OK	7%	
7/25/2002 17:00	31st	4355	38054		OK	6%	
7/26/2002 7:00	32nd	4515	40472		OK	7%	
7/26/2002 12:00	33rd	4389	40046		OK	7%	
7/26/2002 17:00	34th	4591	40937		OK	7%	
7/27/2002 7:00	35th	4458	41378		OK	7%	
7/27/2002 12:00	36th	4594	40624		OK	7%	
7/27/2002 17:00	37th	4489	39779		OK	7%	
7/28/2002 8:00	38th	5029	39372		OK	6%	
7/28/2002 12:40	39th	4884	39940		OK	7%	
7/28/2002 16:20	40th	4384	39231		OK	6%	
7/29/2002 7:00	41st	4492	40164		OK	7%	
7/29/2002 12:00	42nd	4419	39573		OK	7%	
7/30/2002 7:00	43rd	4318	37760		OK	6%	
7/30/2002 12:20	44th	4444	37541		OK	6%	
7/30/2002 17:15	45th	4406	38398		OK	6%	
7/31/2002 7:00	46th	4424	40755		OK	7%	
8/8/2002 7:20	47th	4312	39072		OK	6%	
8/8/2002 12:45	48th	4371	37532		OK	6%	
8/8/2002 17:55	49th	4461	40057		OK	7%	
8/9/2002 7:00	50th	4424	37899		OK	6%	
8/11/2002 9:00	51st	4373	38381		OK	6%	
8/11/2002 14:20	52nd	4816	38468		OK	6%	
8/11/2002 17:50	53rd	4204	37216		OK	6%	
8/12/2002 7:00	54th	4204	36725		OK	6%	
8/12/2002 12:30	55th	4402	39000		OK	6%	
8/12/2002 17:50	56th	4478	35328		OK	6%	reads low will recheck in morning
8/13/2002 7:00	57th	4428	38326		OK	6%	
8/13/2002 12:30	58th	4449	38089		OK	6%	
8/13/2002 17:30	59th	4469	38369		OK	6%	
8/20/2002 13:15	60th	4307	37804		OK	6%	
8/20/2002 17:35	61st	4307	36362		OK	6%	
8/21/2002 7:00	62nd	4218	36781		OK	6%	
8/21/2002 12:50	63rd	4342	38282		OK	6%	
8/21/2002 17:20	64th	4251	37287		OK	6%	Batteries changed after check
8/22/2002 7:00	65th	4149	36125		OK	6%	
8/22/2002 13:15	66th	4372	37538		OK	6%	

FIDLER A974P

Parameter Being Tracked Am-241 Source Data

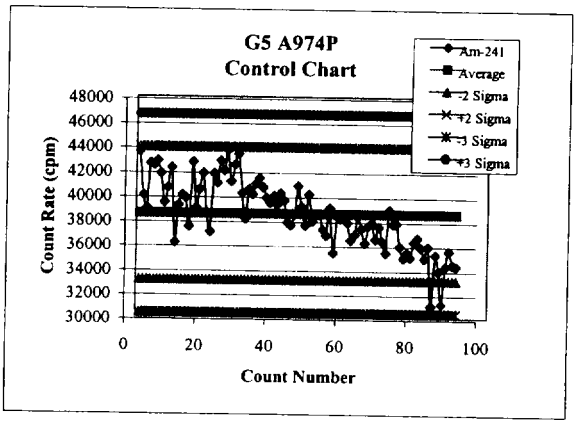
Electronics

Instrument Type	Ratemeter
Model Number	Analyst
Manufacturer	Bicron
Serial Number	A974P

Detector

Instrument Type	FIDLER
Model Number	G5
Manufacturer	Bicron
Serial Number	A381Q
Geometry	Jig
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	38464.43	High	43869.14	46571.5
STDEV=	2702.357	Low	33059.71	30357.36



Avg. Efficiency 6.3%

Am-241

Date/Time	Data Number	Bkgd Data (cpm)	Am-241 Data (cpm)	Pull Block	Status	4 Pi Eff (%)	
8/22/2002 18:05	67th	4390	37789		OK	6%	
8/23/2002 7:05	68th	4340	36445		OK	6%	
8/23/2002 13:00	69th	4372	37435		OK	6%	
8/23/2002 17:00	70th	4266	36268		OK	6%	
8/24/2002 7:00	71st	4662	35336		OK	6%	
8/24/2002 13:30	72nd	4886	38851		OK	6%	
8/24/2002 18:00	73rd	4364	37688		OK	6%	
8/25/2002 8:00	74th	4312	37713		OK	6%	
8/25/2002 12:20	75th	4378	35866		OK	6%	
8/26/2002 7:00	76th	4264	34901		OK	6%	
8/26/2002 12:35	77th	4251	35388		OK	6%	
8/26/2002 17:30	78th	4146	34976		OK	6%	
8/27/2002 7:00	79th	4350	36244		OK	6%	
8/27/2002 12:20	80th	4193	36566		OK	6%	
8/27/2002 17:25	81st	4363	35772		OK	6%	
9/9/2002 7:00	82nd	4303	34877		OK	6%	
9/9/2002 12:15	83rd	4243	35824		OK	6%	
9/9/2002 17:00	84th	4493	31012		Investigate	5%	
9/10/2002 7:00	85th	4148	35189		OK	6%	
9/10/2002 13:00	86th	4081	33827		OK	6%	battery changed
9/10/2002 17:50	87th	3982	31152		Investigate	5%	
9/11/2002 7:00	88th	4023	34226		OK	6%	
9/11/2002 11:10	89th	4246	35492		OK	6%	
9/11/2002 17:30	90th	4270	34368		OK	6%	
9/12/2002 12:10	91st	3731	34254		OK	6%	End of program

FIDLER A978P

Parameter Being Tracked Am-241 Source Data

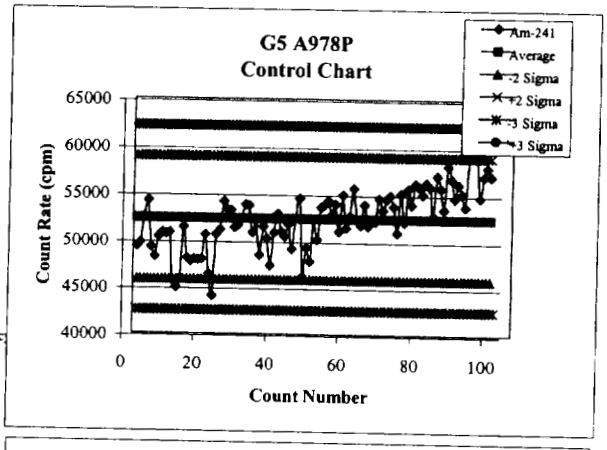
Electronics

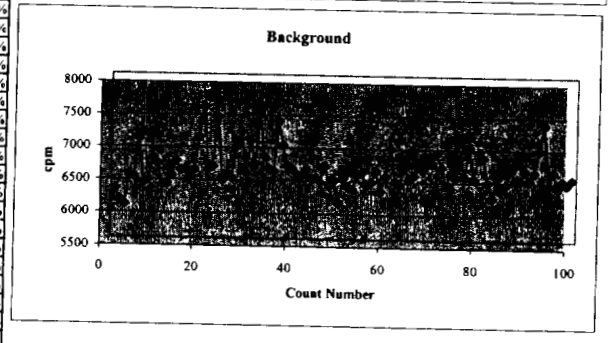
Instrument Type	Ratemeter
Model Number	Analyst
Manufacturer	Bicron
Serial Number	A978P

Detector

Instrument Type	FIDLER
Model Number	G5
Manufacturer	Bicron
Serial Number	A379Q
Geometry	Jig
ROI	

Count Data		2 Sigma	3 Sigma
Mean=	52330.34	High 58892.96	62174.27
STDEV=	3281.307	Low 45767.73	42486.42





Avg. Efficiency
8.6%

Am-241

Date/Time	Data Number	Bkgd Data (cpm)	Am-241 Data (cpm)	Pull Block	Status	4 Pi Eff (%)	
7/10/2002 15:25	1st	6231	49296		OK	8%	
7/11/2002 11:20	2nd	6067	49718		OK	8%	
7/11/2002 17:00	3rd	6000	52519		OK	9%	
7/12/2002 7:00	4th	6461	54204		OK	9%	
7/12/2002 11:30	5th	6425	49235		OK	8%	
7/12/2002 16:25	6th	7000	48183		OK	8%	
7/13/2002 7:00	7th	6333	50348		OK	8%	
7/13/2002 12:05	8th	6374	50803		OK	8%	
7/13/2002 15:30	9th	6719	50639		OK	8%	
7/14/2002 13:30	10th	6619	50799		OK	8%	
7/14/2002 15:45	11th	6300	45605		Investigate	8%	
7/14/2002 16:00	12th	6314	44865		Investigate	7%	
7/14/2002 16:05	13th	6440	45829		OK	8%	
7/15/2002 7:00	14th	6664	51371		OK	8%	
7/15/2002 11:30	15th	6526	48074		OK	8%	
7/15/2002 17:00	16th	6543	47747		OK	8%	
7/16/2002 7:00	17th	6420	47965		OK	8%	
7/16/2002 11:40	18th	6534	47893		OK	8%	
7/16/2002 17:00	19th	7028	47967		OK	8%	
7/17/2002 7:15	20th	7495	50577		OK	8%	
7/17/2002 11:40	21st	6543	46365		OK	8%	
7/17/2002 15:30	22nd	6586	44012		Investigate	7%	
7/22/2002 7:15	23rd	7341	50596		OK	8%	
7/24/2002 7:00	24th	6383	51108		OK	8%	
7/24/2002 11:45	25th	6485	54121		OK	9%	
7/24/2002 17:00	26th	6416	53284		OK	9%	
7/25/2002 7:00	27th	6897	53182		OK	9%	
7/25/2002 11:45	28th	7122	51362		OK	8%	
7/25/2002 17:00	29th	6493	51595		OK	9%	
7/26/2002 7:00	30th	6981	52327		OK	9%	
7/26/2002 12:00	31st	6623	53810		OK	9%	
7/26/2002 17:00	32nd	7414	53712		OK	9%	
7/27/2002 7:00	33rd	6744	50845		OK	8%	
7/27/2002 12:00	34th	6553	52183		OK	9%	
7/27/2002 17:00	35th	6523	48426		OK	8%	
7/28/2002 8:00	36th	7285	51440		OK	8%	
7/28/2002 12:40	37th	6924	50193		OK	8%	
7/28/2002 18:00	38th	6609	47305		OK	8%	
7/29/2002 7:00	39th	6562	50830		OK	8%	
7/29/2002 12:00	40th	6484	52846		OK	9%	
7/29/2002 17:00	41st	6454	50945		OK	8%	
7/30/2002 7:00	42nd	6565	50402		OK	8%	
7/30/2002 12:35	43rd	6420	51711		OK	9%	
7/30/2002 17:15	44th	6427	49086		OK	8%	
7/31/2002 7:00	45th	6361	52425		OK	9%	
7/31/2002 12:00	46th	6616	54502		OK	9%	
7/31/2002 15:15	47th	6318	46172		OK	8%	
8/5/2002 7:00	48th	6396	49229		OK	8%	
8/5/2002 12:00	49th	6052	47769		OK	8%	batteries changed
8/5/2002 16:45	50th	6432	52199		OK	9%	
8/6/2002 7:35	51st	6302	50127		OK	8%	
8/6/2002 12:20	52nd	6260	53584		OK	9%	
8/6/2002 18:00	53rd	6473	53851		OK	9%	
8/7/2002 7:20	54th	6515	54254		OK	9%	
8/7/2002 12:20	55th	6327	52780		OK	9%	
8/7/2002 17:30	56th	6370	53900		OK	9%	
8/8/2002 7:20	57th	6534	50997		OK	8%	
8/8/2002 12:45	58th	6232	54871		OK	9%	
8/8/2002 17:55	59th	6459	51389		OK	8%	
8/9/2002 7:30	60th	6892	52656		OK	9%	
8/9/2002 12:30	61st	6380	55608		OK	9%	
8/9/2002 17:45	62nd	6328	52255		OK	9%	
8/10/2002 7:00	63rd	6595	51681		OK	9%	
8/10/2002 12:05	64th	6420	53882		OK	9%	
8/10/2002 17:15	65th	6486	51589		OK	9%	
8/11/2002 9:15	66th	6618	51997		OK	9%	

FIDLER A978P

Parameter Being Tracked Am-241 Source Data

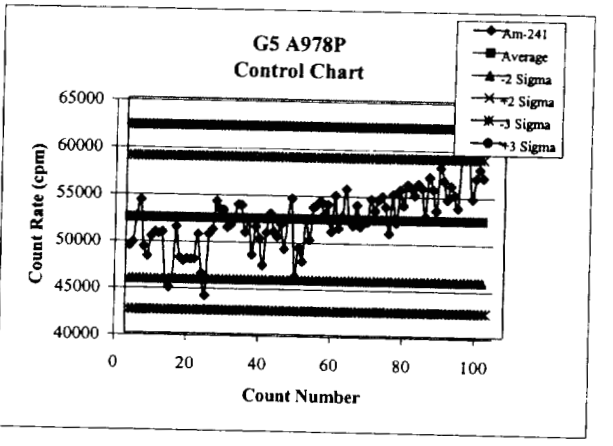
Electronics

Instrument Type	Ratemeter
Model Number	Analyst
Manufacturer	Bicron
Serial Number	A978P

Detector

Instrument Type	FIDLER
Model Number	G5
Manufacturer	Bicron
Serial Number	A379Q
Geometry	Jig
ROI	

Count Data		2 Sigma	3 Sigma
Mean=	52330.34	High 58892.96	62174.27
STDEV=	3281.307	Low 45767.73	42486.42



Avg. Efficiency
8.6%

Am-241

Date/Time	Data Number	Bkgd Data (cpm)	Am-241 Data (cpm)	Pull Block	Status	4 Pi Eff (%)	
8/11/2002 14:20	67th	6563	52118		OK	9%	
8/11/2002 17:50	68th	6662	54555		OK	9%	
8/12/2002 7:00	69th	6663	53275		OK	9%	
8/12/2002 12:30	70th	6826	54470		OK	9%	
8/12/2002 17:50	71st	6612	54861		OK	9%	
8/13/2002 7:00	72nd	6340	53741		OK	9%	
8/13/2002 12:30	73rd	6293	50891		OK	8%	
8/13/2002 17:30	74th	6449	55079		OK	9%	
8/14/2002 7:00	75th	6758	52035		OK	9%	
8/14/2002 12:15	76th	6464	55602		OK	9%	
8/19/2002 7:00	77th	6926	53916		OK	9%	
8/19/2002 12:30	78th	6439	56135		OK	9%	
8/19/2002 17:30	79th	6854	55785		OK	9%	batteries changed
8/20/2002 7:00	80th	6762	55011		OK	9%	
8/20/2002 12:20	81st	6381	56258		OK	9%	
8/20/2002 17:35	82nd	6152	55811		OK	9%	
8/21/2002 7:00	83rd	6451	52725		OK	9%	
8/21/2002 12:50	84th	6327	56966		OK	9%	
8/21/2002 17:45	85th	6367	55659		OK	9%	
8/22/2002 7:00	86th	6575	53406		OK	9%	
8/22/2002 11:35	87th	6418	58024		OK	10%	
8/22/2002 17:40	88th	6419	56655		OK	9%	
8/23/2002 7:05	89th	6563	54582		OK	9%	
8/23/2002 13:10	90th	6422	56057		OK	9%	
8/23/2002 17:00	91st	6546	55093		OK	9%	
8/24/2002 7:00	92nd	6888	53706		OK	9%	
8/24/2002 13:30	93rd	7278	59461		Investigate	10%	likely due to rain
8/24/2002 18:45	94th	6348	60209		Investigate	10%	likely due to rain
8/25/2002 8:00	95th	6554	59206		Investigate	10%	
8/25/2002 12:35	96th	6310	54689		OK	9%	
8/26/2002 7:00	97th	6417	56902		OK	9%	
8/26/2002 0:35	98th	6362	57844		OK	10%	
8/27/2002 13:25	99th	6436	56937		OK	9%	End of use

MicroRem C251A

Parameter Being Tracke(Cs-137 Source Data

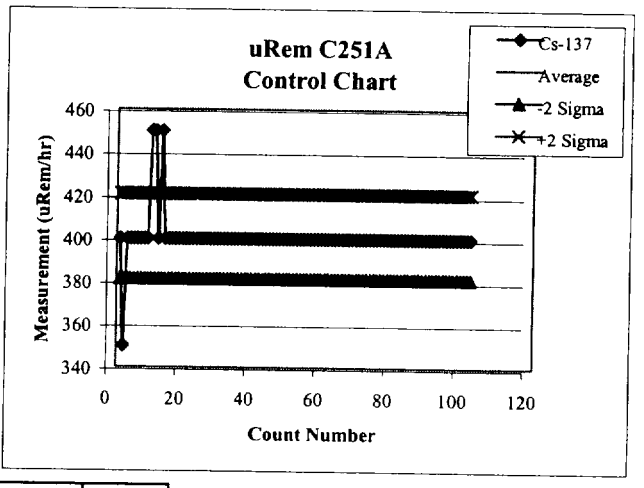
Electronics

Instrument Type	NA
Model Number	NA
Manufacturer	NA
Serial Number	NA

Detector

Instrument Type	Exposure Ratemeter (1x1 inch NaI)
Model Number	MicroRem
Manufacturer	Bicron
Serial Number	C251A
Geometry	Contact
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	400.9804	High	420.7833	430.6848
STDEV=	9.901475	Low	381.1774	371.276



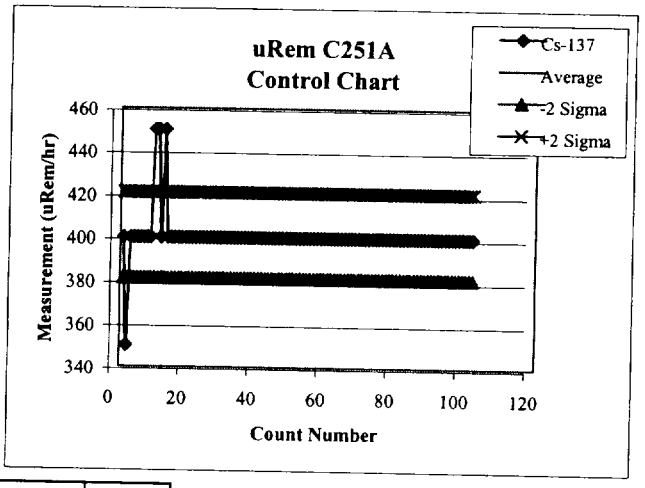
Date/Time	Data Number	Bkgd Data (urem/h)	Cs-137 Data (urem/h)	Pull Block	Status	
7/10/2002 15:25	1st	6	400		OK	
7/11/2002 11:20	2nd	6	350		Investigate	
7/11/2002 17:00	3rd	8	400		OK	
7/12/2002 7:00	4th	8	400		OK	
7/12/2002 11:30	5th	10	400		OK	
7/12/2002 16:25	6th	7	400		OK	
7/13/2002 7:00	7th	9	400		OK	
7/13/2002 11:30	8th	14	400		OK	
7/13/2002 15:30	9th	14	400		OK	
7/22/2002 7:15	10th	14	450		Investigate	
7/23/2002 13:12	11th	15	450		Investigate	
7/23/2002 17:00	12th	15	400		OK	
7/24/2002 7:00	13th	12	450		Investigate	
7/24/2002 11:45	14th	8	400		OK	
7/24/2002 17:00	15th	10	400		OK	
7/25/2002 7:00	16th	10	400		OK	
7/25/2002 11:45	17th	7	400		OK	
7/26/2002 7:00	18th	7	400		OK	
7/26/2002 12:00	19th	10	400		OK	
7/26/2002 17:00	20th	8	400		OK	
7/27/2002 7:00	21st	9	400		OK	
7/27/2002 12:00	22nd	10	400		OK	
7/27/2002 17:00	23rd	9.5	400		OK	
7/28/2002 8:00	24th	7	400		OK	
7/28/2002 12:40	25th	8	400		OK	
7/28/2002 16:30	26th	10	400		OK	
7/29/2002 7:00	27th	8	400		OK	
7/29/2002 12:00	28th	7	400		OK	
7/29/2002 17:15	29th	8	400		OK	
7/30/2002 7:00	30th	10	400		OK	
7/30/2002 12:35	31st	8	400		OK	
7/30/2002 17:15	32nd	7	400		OK	
7/31/2002 7:00	33rd	7	400		OK	
7/31/2002 12:00	34th	11	400		OK	
7/31/2001 15:15	35th	9	400		OK	
8/5/2002 7:00	36th	9	400		OK	
8/5/2002 12:00	37th	6	400		OK	
8/5/2002 16:45	38th	9	400		OK	
8/6/2002 7:35	39th	10	400		OK	
8/6/2002 12:20	40th	9	400		OK	batteries changed
8/6/2002 18:00	41st	9	400		OK	
8/7/2002 7:20	42nd	7	400		OK	
8/7/2002 12:20	43rd	8	400		OK	
8/7/2002 17:30	44th	7	400		OK	
8/8/2002 7:20	45th	7	400		OK	

MicroRem C251A

Parameter Being Tracke Cs-137 Source Data

	Electronics
Instrument Type	NA
Model Number	NA
Manufacturer	NA
Serial Number	NA
	Detector
Instrument Type	Exposure Ratemeter (1x1 inch NaI)
Model Number	MicroRem
Manufacturer	Bicron
Serial Number	C251A
Geometry	Contact
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	400.9804	High	420.7833	430.6848
STDEV=	9.901475	Low	381.1774	371.276



Date/Time	Data Number	Bkgd Data (urem/h)	Cs-137 Data (urem/h)	Pull Block	Status
8/8/2002 12:45	46th	7	400		OK
8/8/2002 17:55	47th	8	400		OK
8/9/2002 7:00	48th	7	400		OK
8/9/2002 12:30	49th	8	400		OK
8/9/2002 17:45	50th	8	400		OK
8/10/2002 7:00	51st	7	400		OK
8/10/2002 12:05	52nd	7	400		OK
8/10/2002 17:15	53rd	7	400		OK
8/11/2002 9:00	54th	8	400		OK
8/11/2002 14:20	55th	9	400		OK
8/11/2002 17:50	56th	8	400		OK
8/12/2002 7:00	57th	7	400		OK
8/12/2002 12:30	58th	7	400		OK
8/12/2002 17:50	59th	8	400		OK
8/13/2002 7:00	60th	8	400		OK
8/13/2002 12:30	61st	8	400		OK
8/13/2002 17:30	62nd	9	400		OK
8/14/2002 7:00	63rd	5	400		OK
8/14/2002 12:15	64th	7	400		OK
8/19/2002 7:00	65th	9	400		OK
8/19/2002 12:30	66th	6	400		OK
8/19/2002 17:30	67th	7	400		OK
8/20/2002 7:00	68th	7	400		OK
8/20/2002 12:20	69th	8	400		OK
8/20/2002 17:35	70th	6	400		OK
8/21/2002 7:00	71st	7	400		OK
8/21/2002 12:50	72nd	8	400		OK
8/21/2002 17:20	73rd	7	400		OK
8/22/2002 7:00	74th	7	400		OK
8/22/2002 13:15	75th	8	400		OK
8/22/2002 18:05	76th	8	400		OK
8/23/2002 7:05	77th	9	400		OK
8/23/2002 13:00	78th	8	400		OK
8/23/2002 17:00	79th	9	400		OK
8/24/2002 7:00	80th	7	400		OK
8/24/2002 13:30	81st	7	400		OK
8/24/2002 19:00	82nd	6	400		OK
8/25/2002 8:00	83rd	7	400		OK
8/25/2002 12:35	84th	7	400		OK
8/26/2002 7:00	85th	7	400		OK
8/26/2002 12:35	86th	5	400		OK
8/27/2002 7:00	87th	7	400		OK
8/27/2002 12:20	88th	7	400		OK
8/27/2002 17:30	89th	7	400		OK
9/9/2002 7:00	90th	7	400		OK

MicroRem C251A

Parameter Being Tracke Cs-137 Source Data

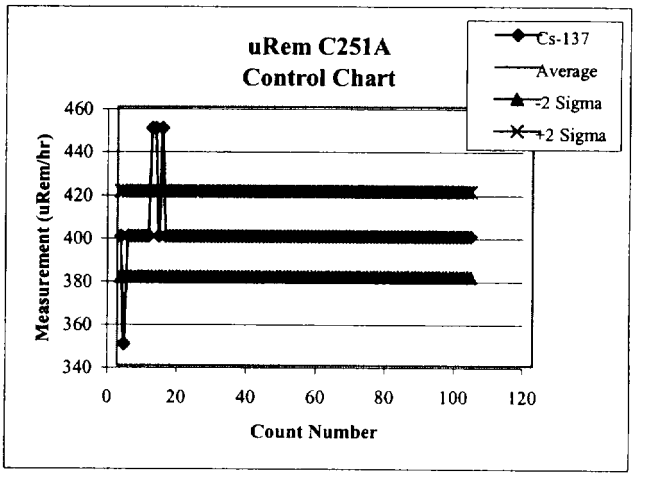
Electronics

Instrument Type	NA
Model Number	NA
Manufacturer	NA
Serial Number	NA

Detector

Instrument Type	Exposure Ratemeter (1x1 inch NaI)
Model Number	MicroRem
Manufacturer	Bicron
Serial Number	C251A
Geometry	Contact
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	400.9804	High	420.7833	430.6848
STDEV=	9.901475	Low	381.1774	371.276



Date/Time	Data Number	Bkgd Data (urem/h)	Cs-137 Data (urem/h)	Pull Block	Status
9/9/2002 11:45	91st	8	400		OK
9/9/2002 17:00	92nd	8	400		OK
9/10/2002 7:00	93rd	8	400		OK
9/11/2002 7:00	94th	10	400		OK
9/11/2002 12:40	95th	9	400		OK
9/11/2002 18:00	96th	10	400		OK
9/12/2002 7:00	97th	7	400		OK
9/12/2002 12:10	98th	6	400		OK
9/12/2002 17:25	99th	6	400		OK
9/13/2002 7:00	100th	6	400		OK
9/13/2002 12:00	101st	6	400		OK
9/13/2002 16:20	102nd	7	400		OK

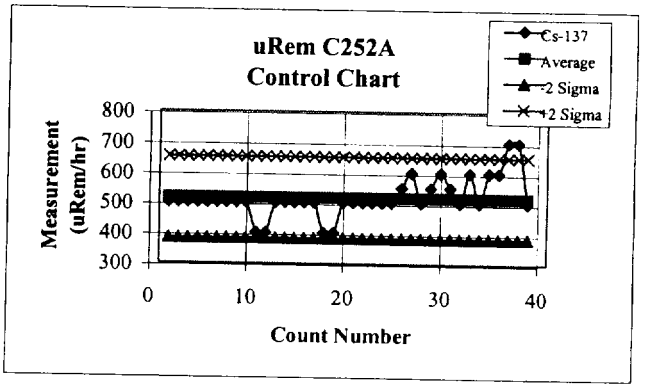
End of Program

MicroRem C252A

Parameter Being Tracked: Cs-137 Source Data

	Electronics
Instrument Type	NA
Model Number	NA
Manufacturer	NA
Serial Number	NA
	Detector
Instrument Type	Exposure Ratemeter (1x1 NaI detector)
Model Number	micro rem
Manufacturer	Bicron
Serial Number	C252A
Geometry	Contact
ROI	
Count Data	

			2 Sigma	3 Sigma
Mean=	517.1053	High	651.2216	718.2798
STDEV=	67.05818	Low	382.9889	315.9307



Date/Time	Data Number	Bkgd Data (urem/h)	Cs-137 Data (urem/h)	Pull Block	Status	
7/10/2002 15:25	1st	9	500		OK	
7/11/2002 11:20	2nd	7.5	500		OK	
7/11/2002 17:00	3rd	8	500		OK	
7/12/2002 7:00	4th	7.5	500		OK	
7/12/2002 11:30	5th	8	500		OK	
7/12/2002 16:30	6th	8	500		OK	
7/13/2002 7:00	7th	7	500		OK	
7/13/2002 11:30	8th	7	500		OK	
7/13/2002 15:30	9th	7	500		OK	
7/14/2002 8:00	10th	7	400		OK	
7/14/2002 12:05	11th	8	400		OK	
7/15/2002 7:00	12th	8	500		OK	
7/15/2002 11:30	13th	10	500		OK	
7/15/2002 17:00	14th	10	500		OK	
7/16/2002 7:00	15th	9	500		OK	
7/16/2002 11:40	16th	8	500		OK	
7/16/2002 17:00	17th	8	400		OK	
7/17/2002 7:15	18th	9	400		OK	
7/17/2002 11:40	19th	9	500		OK	
7/17/2002 15:30	20th	8	500		OK	
7/22/2002 7:15	21st	9	500		OK	
7/22/2002 11:45	22nd	11	500		OK	
7/23/2002 13:05	23rd	16	500		OK	HV high
7/24/2002 7:00	24th	13	500		OK	HV high
7/24/2002 11:45	25th	12	550		OK	HV high
7/24/2002 17:00	26th	15	600		OK	HV high, will recheck in morning
7/25/2002 7:00	27th	13	500		OK	HV high
7/25/2002 11:45	28th	15	550		OK	HV high
7/25/2002 17:00	29th	17	600		OK	HV high, will recheck in morning
7/26/2002 7:00	30th	17	550		OK	HV high
7/26/2002 12:00	31st	14	500		OK	HV high
7/26/2002 17:00	32nd	19	600		OK	HV high
7/27/2002 7:00	33rd	16	500		OK	HV high
7/27/2002 12:00	34th	18	600		OK	HV high
7/27/2002 17:00	35th	20	600		OK	HV high
7/28/2002 8:00	36th	20	700		Investigate	HV high
7/28/2002 12:40	37th	30	700		Investigate	HV high
7/28/2002 18:00	38th	10	500		OK	HV high Taken out of service.

Model 19 33054

Parameter Being Tracked Cs-137 Source Data

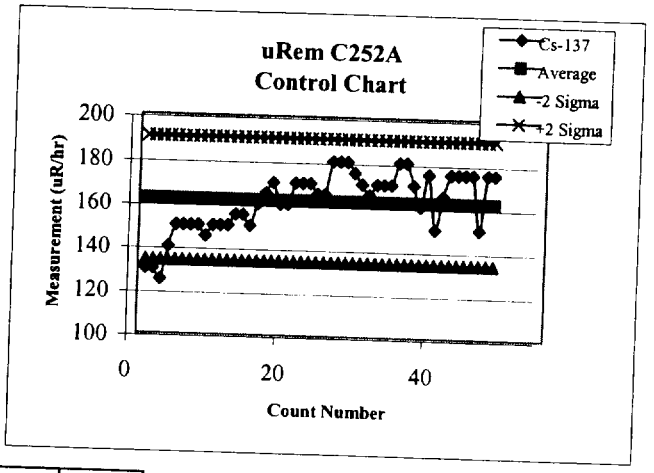
Electronics

Instrument Type	NA
Model Number	NA
Manufacturer	NA
Serial Number	NA

Detector

Instrument Type	Exposure Ratemeter (1x1 inch NaI)
Model Number	Model 19
Manufacturer	Ludlum
Serial Number	33054
Geometry	Contact
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	161.9792	High	190.1685	204.2631
STDEV=	14.09465	Low	133.7899	119.6952



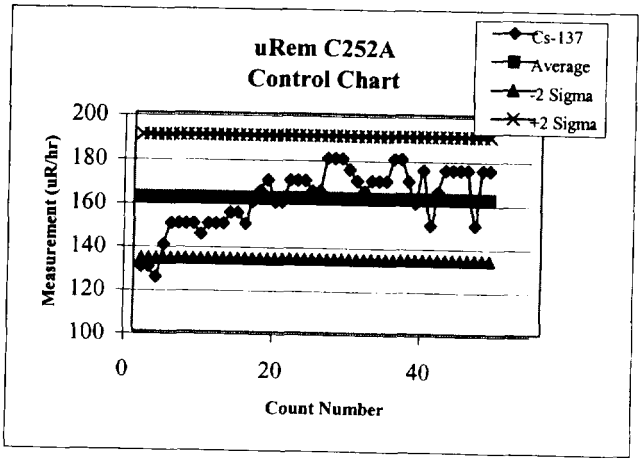
Date/Time	Data Number	Bkgd Data (urem/h)	Cs-137 Data (urem/h)	Pull Block	Status
7/29/2002 7:00	1st	2.5	130		Investigate
7/29/2002 12:00	2nd	3	130		Investigate
7/29/2002 17:00	3rd	3	125		Investigate
7/30/2002 7:00	4th	3	140		OK
7/30/2002 12:20	5th	3	150		OK
7/30/2002 17:15	6th	3	150		OK
7/31/2002 7:00	7th	3	150		OK
8/8/2002 7:20	8th	3	150		OK
8/8/2002 12:45	9th	3	145		OK
8/8/2001 17:55	10th	3	150		OK
8/11/2002 9:00	11th	3	150		OK
8/11/2002 14:20	12th	3	150		OK
8/11/2002 17:50	13th	3	155		OK
8/12/2002 7:00	14th	3.5	155		OK
8/12/2002 12:30	15th	4	150		OK
8/12/2002 17:50	16th	3.5	160		OK
8/13/2002 7:00	17th	3.5	165		OK
8/13/2002 12:30	18th	3.5	170		OK
8/13/2002 17:30	19th	3	160		OK
8/20/2002 13:15	20th	3	160		OK
8/20/2002 17:35	21st	4	170		OK
8/21/2002 7:00	22nd	3	170		OK
8/21/2002 12:50	23rd	4	170		OK
8/21/2002 17:45	24th	4	165		OK
8/22/2002 7:00	25th	4	165		OK
8/22/2002 11:35	26th	4	180		OK
8/22/2002 17:40	27th	4	180		OK
8/23/2002 7:05	28th	4	180		OK
8/23/2002 13:10	29th	3	175		OK
8/23/2002 17:00	30th	4	170		OK
8/24/2002 7:00	31st	4	165		OK
8/24/2002 13:30	32nd	4	170		OK
8/24/2002 17:00	33rd	4	170		OK
8/25/2002 8:00	34th	4	170		OK
8/25/2002 12:20	35th	4.5	180		OK
8/26/2002 7:00	36th	4	180		OK
8/26/0212:35	37th	4	170		OK
8/26/2002 17:30	38th	3	160		OK
8/27/2002 7:00	39th	4	175		OK
8/27/2002 12:20	40th	4	150		OK
9/9/2002 7:00	41st	3.5	165		OK
9/9/2002 12:15	42nd	5	175		OK
9/9/2002 16:00	43rd	4	175		OK
9/10/2002 7:00	44th	4	175		OK
9/11/2002 7:00	45th	4	175		OK
9/11/2002 11:10	46th	4	150		OK
9/11/2002 17:30	47th	4	175		OK

Model 19 33054

Parameter Being Tracked Cs-137 Source Data

	Electronics
Instrument Type	NA
Model Number	NA
Manufacturer	NA
Serial Number	NA
	Detector
Instrument Type	Exposure Ratemeter (1x1 inch NaI)
Model Number	Model 19
Manufacturer	Ludlum
Serial Number	33054
Geometry	Contact
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	161.9792	High	190.1685	204.2631
STDEV=	14.09465	Low	133.7899	119.6952



Date/Time	Data Number	Bkgd Data (urem/h)	Cs-137 Data (urem/h)	Pull Block	Status
9/12/2002 7:00	48th	4	175	[illegible]	OK

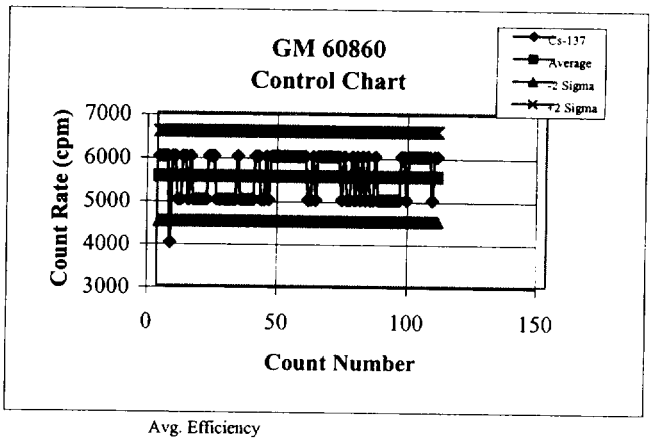
End of program

GM 60860

Parameter Being Tracked Cs-137 Source Data

	Electronics
Instrument Type	Ratemeter
Model Number	3
Manufacturer	Ludlum
Serial Number	60860
	Detector
Instrument Type	GM Pancake Probe
Model Number	44-9
Manufacturer	Ludlum
Serial Number	Not recorded
Geometry	Contact, active side out
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	5537.037	High	6575.581	7094.853
STDEV=	519.2721	Low	4498.493	3979.221



Avg. Efficiency
0.3%

Cs-137

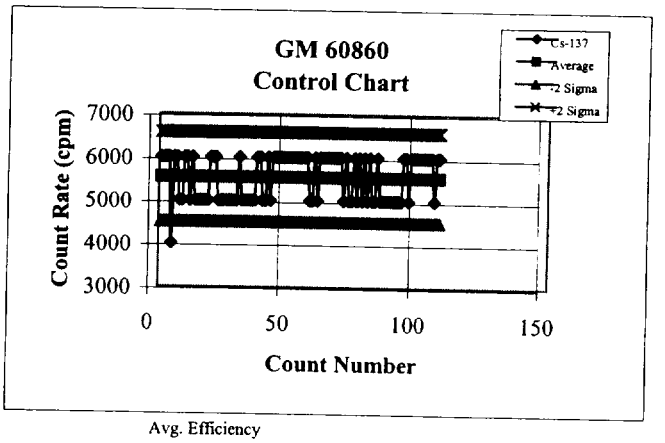
Date/Time	Data Number	Bkgd Data (cpm)	Cs-137 Data (cpm)	Pull Block	Status	4 Pi Eff (%)
7/10/2002 15:25	1st	30	6000		OK	0.4%
7/11/2002 11:20	2nd	20	6000		OK	0.4%
7/11/2002 17:00	3rd	20	6000		OK	0.4%
7/12/2002 7:00	4th	30	6000		OK	0.4%
7/12/2002 11:30	5th	30	4000		Investigate	0.2%
7/12/2002 16:30	6th	20	6000		OK	0.4%
7/13/2002 7:00	7th	30	6000		OK	0.4%
7/13/2002 12:10	8th	30	5000		OK	0.3%
7/13/2002 15:30	9th	20	5000		OK	0.3%
7/15/2002 7:00	10th	40	6000		OK	0.4%
7/15/2002 11:40	11th	20	6000		OK	0.4%
7/17/2002 7:15	12th	20	5000		OK	0.3%
7/17/2002 11:40	13th	30	6000		OK	0.4%
7/22/2002 7:00	14th	30	5000		OK	0.3%
7/22/2002 11:45	15th	20	5000		OK	0.3%
7/22/2002 16:30	16th	30	5000		OK	0.3%
7/23/2002 7:00	17th	40	5000		OK	0.3%
7/23/2002 11:30	18th	30	5000		OK	0.3%
7/23/2002 17:00	19th	20	5000		OK	0.3%
7/24/2002 7:00	20th	20	6000		OK	0.4%
7/24/2002 11:45	21st	20	6000		OK	0.4%
7/24/2002 17:00	22nd	30	6000		OK	0.4%
7/25/2002 7:00	23rd	20	5000		OK	0.3%
7/25/2002 11:45	24th	20	5000		OK	0.3%
7/25/2002 17:00	25th	40	5000		OK	0.3%
7/26/2002 7:00	26th	30	5000		OK	0.3%
7/26/2002 12:00	27th	20	5000		OK	0.3%
7/26/2002 17:00	28th	25	5000		OK	0.3%
7/27/2002 7:00	29th	25	5000		OK	0.3%
7/27/2002 12:00	30th	20	5000		OK	0.3%
7/27/2002 17:00	31st	25	6000		OK	0.4%
7/28/2002 8:00	32nd	30	5000		OK	0.3%
7/28/2002 12:40	33rd	20	5000		OK	0.3%
7/28/2002 17:45	34th	20	5000		OK	0.3%
7/29/2002 7:00	35th	20	5000		OK	0.3%
7/29/2002 12:00	36th	20	5000		OK	0.3%
7/29/2002 17:15	37th	30	5000		OK	0.3%
7/30/2002 7:00	38th	30	6000		OK	0.4%
7/30/2002 12:35	39th	40	6000		OK	0.4%
7/30/2002 17:15	40th	20	5000		OK	0.3%
7/31/2002 7:00	41st	30	5000		OK	0.3%
7/31/2002 12:00	42nd	30	6000		OK	0.4%
7/31/2001 15:15	43rd	30	5000		OK	0.3%
8/5/2002 7:00	44th	40	6000		OK	0.4%
8/5/2002 12:00	45th	40	6000		OK	0.4%
8/5/2002 17:00	46th	50	6000		OK	0.4%
8/6/2002 7:35	47th	30	6000		OK	0.4%

GM 60860

Parameter Being Tracked Cs-137 Source Data

	Electronics
Instrument Type	Ratemeter
Model Number	3
Manufacturer	Ludlum
Serial Number	60860
	Detector
Instrument Type	GM Pancake Probe
Model Number	44-9
Manufacturer	Ludlum
Serial Number	Not recorded
Geometry	Contact, active side out
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	5537.037	High	6575.581	7094.853
STDEV=	519.2721	Low	4498.493	3979.221



Avg. Efficiency
0.3%

Cs-137

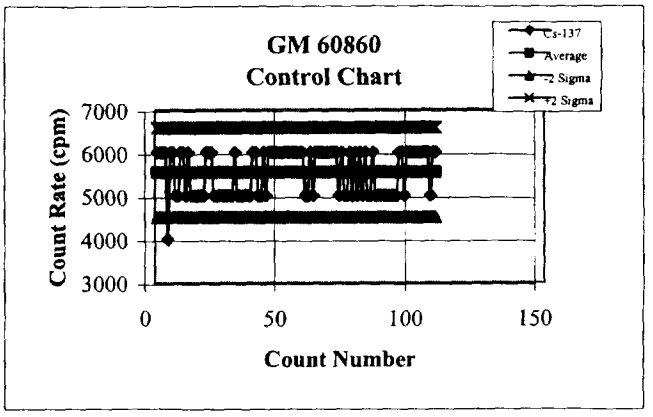
Date/Time	Data Number	Bkgd Data (cpm)	Cs-137 Data (cpm)	Pull Block	Status	4 Pi Eff (%)
8/6/2002 12:20	48th	30	6000		OK	0.4%
8/6/2002 18:00	49th	30	6000		OK	0.4%
8/7/2002 7:20	50th	40	6000		OK	0.4%
8/8/2002 7:20	51st	40	6000		OK	0.4%
8/8/2002 12:45	52nd	20	6000		OK	0.4%
8/8/2002 17:55	53rd	30	6000		OK	0.4%
8/11/2002 9:00	54th	20	6000		OK	0.4%
8/11/2002 14:20	55th	30	6000		OK	0.4%
8/11/2002 17:50	56th	40	6000		OK	0.4%
8/12/2002 7:00	57th	20	6000		OK	0.4%
8/12/2002 12:30	58th	40	5000		OK	0.3%
8/12/2002 17:50	59th	20	5000		OK	0.3%
8/13/2002 7:00	60th	40	6000		OK	0.4%
8/13/2002 12:30	61st	20	5000		OK	0.3%
8/13/2002 17:30	62nd	20	6000		OK	0.4%
8/20/2002 13:20	63rd	20	6000		OK	0.4%
8/20/2002 17:35	64th	20	6000		OK	0.4%
8/21/2002 7:00	65th	30	6000		OK	0.4%
8/21/2002 12:50	66th	30	6000		OK	0.4%
8/21/2002 17:30	67th	40	6000		OK	0.4%
8/22/2002 7:00	68th	40	6000		OK	0.4%
8/22/2002 11:35	69th	20	6000		OK	0.4%
8/22/2002 18:05	70th	20	6000		OK	0.4%
8/23/2002 7:05	71st	20	5000		OK	0.3%
8/23/2002 13:00	72nd	30	6000		OK	0.4%
8/23/2002 17:00	73rd	30	5000		OK	0.3%
8/24/2002 7:00	74th	20	5000		OK	0.3%
8/24/2002 13:30	75th	30	6000		OK	0.4%
8/24/2002 19:00	76th	30	5000		OK	0.3%
8/25/2002 8:00	77th	30	6000		OK	0.4%
8/25/2002 12:35	78th	20	5000		OK	0.3%
8/26/2002 7:00	79th	30	6000		OK	0.4%
8/26/2002 12:35	80th	30	5000		OK	0.3%
8/27/2002 7:00	81st	30	6000		OK	0.4%
8/27/2002 12:20	82nd	30	5000		OK	0.3%
8/27/2002 17:30	83rd	30	5000		OK	0.3%
8/28/2002 7:15	84th	20	6000		OK	0.4%
8/28/2002 11:30	85th	20	5000		OK	0.3%
9/9/2002 7:00	86th	30	5000		OK	0.3%
9/9/2002 12:15	87th	30	5000		OK	0.3%
9/9/2002 17:00	88th	30	5000		OK	0.3%
9/10/2002 7:00	89th	20	5000		OK	0.3%
9/10/2002 12:15	90th	20	5000		OK	0.3%
9/10/2002 18:00	91st	20	5000		OK	0.3%
9/11/2002 7:00	92nd	30	5000		OK	0.3%
9/11/2002 12:40	93rd	20	5000		OK	0.3%
9/11/2002 18:00	94th	30	6000		OK	0.4%

GM 60860

Parameter Being Tracked Cs-137 Source Data

	Electronics
Instrument Type	Ratemeter
Model Number	3
Manufacturer	Ludlum
Serial Number	60860
	Detector
Instrument Type	GM Pancake Probe
Model Number	44-9
Manufacturer	Ludlum
Serial Number	Not recorded
Geometry	Contact, active side out
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	5537.037	High	6575.581	7094.853
STDEV=	519.2721	Low	4498.493	3979.221



Avg. Efficiency
0.3%

Cs-137

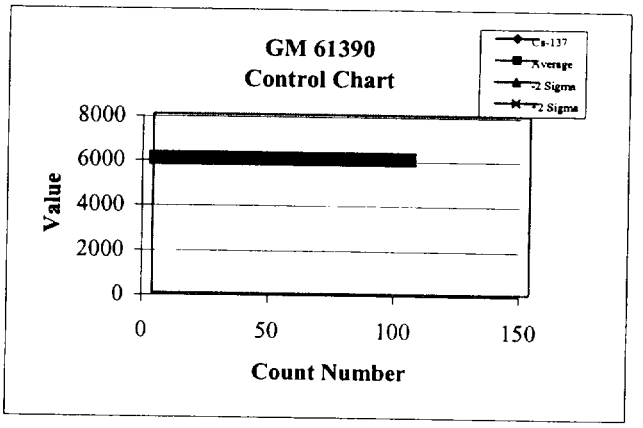
Date/Time	Data Number	Bkgd Data (cpm)	Cs-137 Data (cpm)	Pull Block	Status	4 Pi Eff (%)
9/12/2002 7:00	95th	40	6000		OK	0.4%
9/12/2002 12:10	96th	30	5000		OK	0.3%
9/12/2002 17:30	97th	30	6000		OK	0.4%
9/13/2002 7:00	98th	20	6000		OK	0.4%
9/13/2002 12:00	99th	30	6000		OK	0.4%
9/14/2002 7:00	100th	20	6000		OK	0.4%
9/14/2002 11:30	101st	30	6000		OK	0.4%
9/14/2002 15:40	102nd	40	6000		OK	0.4%
9/16/2002 7:00	103rd	40	6000		OK	0.4%
9/16/2002 12:00	104th	40	6000		OK	0.4%
9/16/2002 18:00	105th	20	6000		OK	0.4%
9/17/2002 7:00	106th	20	5000		OK	0.3%
9/17/2002 11:30	107th	30	6000		OK	0.4%
9/17/2002 16:05	108th	30	6000		OK	0.4%

GM 61390

Parameter Being Tracked Cs-137 Source Data

	Electronics
Instrument Type	Ratemeter
Model Number	3
Manufacturer	Ludlum
Serial Number	61390
	Detector
Instrument Type	GM Pancake Probe
Model Number	44-9
Manufacturer	Ludlum
Serial Number	PR019247
Geometry	Contact, active side out
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	6000	High	6000	6000
STDEV=	0	Low	6000	6000



Avg. Efficiency
0.4%

Cs-137

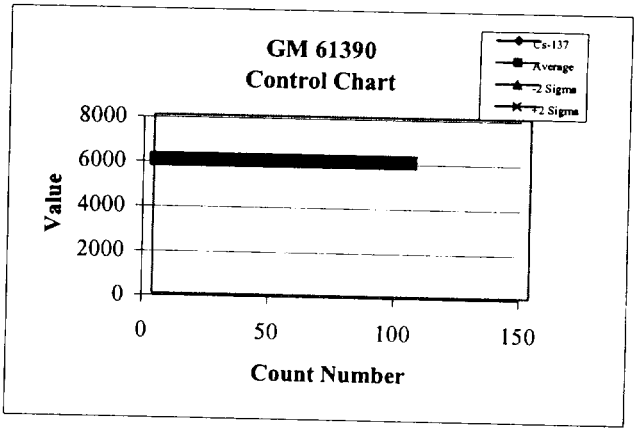
Date/Time	Data Number	Bkgd Data (cpm)	Cs-137 Data (cpm)	Pull Block	Status	4 Pi Eff (%)
7/10/2002 15:25	1st	40	6000		OK	0.4%
7/11/2002 11:20	2nd	40	6000		OK	0.4%
7/11/2002 17:00	3rd	40	6000		OK	0.4%
7/12/2002 7:00	4th	20	6000		OK	0.4%
7/12/2002 11:30	5th	40	6000		OK	0.4%
7/12/2002 16:25	6th	40	6000		OK	0.4%
7/13/2002 7:10	7th	30	6000		OK	0.4%
7/13/2002 12:05	8th	20	6000		OK	0.4%
7/13/2002 15:30	9th	20	6000		OK	0.4%
7/14/2002 8:00	10th	30	6000		OK	0.4%
7/14/2002 12:05	11th	30	6000		OK	0.4%
7/14/2002 15:45	12th	40	6000		OK	0.4%
7/15/2002 17:00	13th	30	6000		OK	0.4%
7/16/2002 7:00	14th	40	6000		OK	0.4%
7/16/2002 11:40	15th	40	6000		OK	0.4%
7/16/2002 17:00	16th	40	6000		OK	0.4%
7/17/2002 7:15	17th	40	6000		OK	0.4%
7/17/2002 11:40	18th	40	6000		OK	0.4%
7/17/2002 15:30	19th	30	6000		OK	0.4%
7/22/2002 7:00	20th	30	6000		OK	0.4%
7/23/2002 8:15	21st	30	6000		OK	0.4%
7/23/2002 11:30	22nd	30	6000		OK	0.4%
7/23/2002 17:00	23rd	20	6000		OK	0.4%
7/24/2002 7:00	24th	40	6000		OK	0.4%
7/24/2002 11:45	25th	30	6000		OK	0.4%
7/24/2002 17:00	26th	40	6000		OK	0.4%
7/25/2002 7:00	27th	40	6000		OK	0.4%
7/25/2002 11:45	28th	60	6000		OK	0.4%
7/25/2002 17:00	29th	50	6000		OK	0.4%
7/26/2002 7:00	30th	50	6000		OK	0.4%
7/26/2002 12:00	31st	60	6000		OK	0.4%
7/26/2002 17:00	32nd	40	6000		OK	0.4%
7/27/2002 7:00	33rd	40	6000		OK	0.4%
7/27/2002 12:00	34th	40	6000		OK	0.4%
7/28/2002 8:00	35th	60	6000		OK	0.4%
7/28/2002 12:40	36th	40	6000		OK	0.4%
7/28/2002 17:45	37th	40	6000		OK	0.4%
7/29/2002 7:00	38th	40	6000		OK	0.4%
7/29/2002 12:00	39th	30	6000		OK	0.4%
7/29/2002 17:00	40th	30	6000		OK	0.4%
7/30/2002 7:00	41st	30	6000		OK	0.4%
7/30/2002 12:20	42nd	30	6000		OK	0.4%
7/30/2002 17:15	43rd	30	6000		OK	0.4%
7/31/2002 7:00	44th	30	6000		OK	0.4%
8/7/2002 12:20	45th	40	6000		OK	0.4%

GM 61390

Parameter Being Tracked Cs-137 Source Data

	Electronics
Instrument Type	Ratemeter
Model Number	3
Manufacturer	Ludlum
Serial Number	61390
	Detector
Instrument Type	GM Pancake Probe
Model Number	44-9
Manufacturer	Ludlum
Serial Number	PR019247
Geometry	Contact, active side out
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	6000	High	6000	6000
STDEV=	0	Low	6000	6000



Avg. Efficiency
0.4%

Cs-137

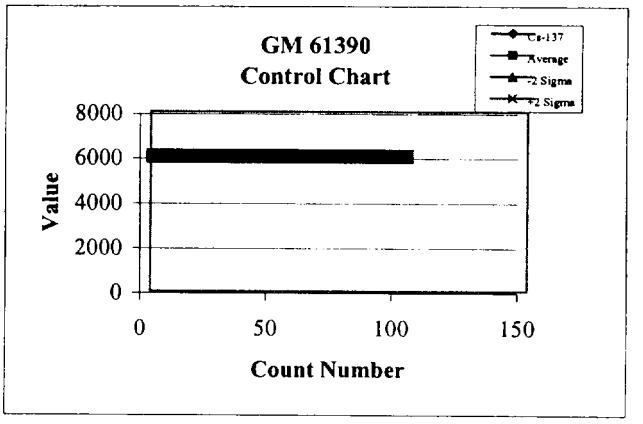
Date/Time	Data Number	Bkgd Data (cpm)	Cs-137 Data (cpm)	Pull Block	Status	4 Pi Eff (%)
8/7/2002 17:30	46th	40	6000		OK	0.4%
8/8/2002 7:20	47th	30	6000		OK	0.4%
8/8/2002 12:45	48th	30	6000		OK	0.4%
8/8/2002 17:55	49th	30	6000		OK	0.4%
8/9/2002 7:00	50th	30	6000		OK	0.4%
8/9/2002 12:30	51st	40	6000		OK	0.4%
8/9/2002 17:45	52nd	40	6000		OK	0.4%
8/10/2002 7:00	53rd	40	6000		OK	0.4%
8/10/2002 12:05	54th	40	6000		OK	0.4%
8/10/2002 17:15	55th	40	6000		OK	0.4%
8/11/2002 9:00	56th	20	6000		OK	0.4%
8/11/2002 14:20	57th	20	6000		OK	0.4%
8/11/2001 17:50	58th	40	6000		OK	0.4%
8/12/2002 7:00	59th	40	6000		OK	0.4%
8/12/2002 12:30	60th	20	6000		OK	0.4%
8/12/2002 17:50	61st	30	6000		OK	0.4%
8/13/2002 7:00	62nd	30	6000		OK	0.4%
8/13/2002 12:30	63rd	40	6000		OK	0.4%
8/13/2002 17:30	64th	40	6000		OK	0.4%
8/14/2002 7:00	65th	30	6000		OK	0.4%
8/14/2002 12:15	66th	30	6000		OK	0.4%
8/19/2002 7:00	67th	20	6000		OK	0.4%
8/19/2002 12:30	68th	30	6000		OK	0.4%
8/19/2002 17:30	69th	40	6000		OK	0.4%
8/20/2002 7:00	70th	40	6000		OK	0.4%
8/20/2002 12:20	71st	30	6000		OK	0.4%
8/20/2002 17:35	72nd	40	6000		OK	0.4%
8/21/2002 7:00	73rd	30	6000		OK	0.4%
8/21/2002 12:50	74th	30	6000		OK	0.4%
8/21/2002 17:45	75th	40	6000		OK	0.4%
8/22/2002 7:00	76th	40	6000		OK	0.4%
8/22/2002 13:15	77th	40	6000		OK	0.4%
8/22/2002 17:40	78th	40	6000		OK	0.4%
8/23/2002 7:05	79th	30	6000		OK	0.4%
8/23/2002 13:10	80th	30	6000		OK	0.4%
8/23/2002 17:00	81st	30	6000		OK	0.4%
8/24/2002 7:00	82nd	30	6000		OK	0.4%
8/24/2002 13:30	83rd	40	6000		OK	0.4%
8/24/2002 18:30	84th	40	6000		OK	0.4%
8/25/2002 8:00	85th	20	6000		OK	0.4%
8/25/2002 12:20	86th	30	6000		OK	0.4%
8/26/2002 7:00	87th	40	6000		OK	0.4%
8/26/2002 12:35	88th	40	6000		OK	0.4%
8/26/2002 17:30	89th	40	6000		OK	0.4%
8/27/2002 7:00	90th	40	6000		OK	0.4%

GM 61390

Parameter Being Tracked Cs-137 Source Data

	Electronics
Instrument Type	Ratemeter
Model Number	3
Manufacturer	Ludlum
Serial Number	61390
	Detector
Instrument Type	GM Pancake Probe
Model Number	44-9
Manufacturer	Ludlum
Serial Number	PR019247
Geometry	Contact, active side out
ROI	

Count Data			2 Sigma	3 Sigma
Mean=	6000	High	6000	6000
STDEV=	0	Low	6000	6000



Avg. Efficiency
0.4%

Cs-137

Date/Time	Data Number	Bkgd Data (cpm)	Cs-137 Data (cpm)	Pull Block	Status	4 Pi Eff (%)
8/27/2002 12:20	91st	40	6000	[redacted]	OK	0.4%
8/27/2002 17:30	92nd	40	6000	[redacted]	OK	0.4%
9/9/2002 7:00	93rd	40	6000	[redacted]	OK	0.4%
9/9/2002 12:15	94th	40	6000	[redacted]	OK	0.4%
9/9/2002 17:00	95th	20	6000	[redacted]	OK	0.4%
9/10/2002 7:00	96th	30	6000	[redacted]	OK	0.4%
9/10/2002 11:45	97th	40	6000	[redacted]	OK	0.4%
9/10/2002 17:35	98th	40	6000	[redacted]	OK	0.4%
9/11/2002 7:00	99th	40	6000	[redacted]	OK	0.4%
9/11/2002 11:10	100th	50	6000	[redacted]	OK	0.4%
9/11/2002 17:30	101st	30	6000	[redacted]	OK	0.4%
9/12/2002 7:00	102nd	30	6000	[redacted]	OK	0.4%

End of program

Floor Monitor 138256

Parameter Being Tracked: Tc-99 Beta and Th-230 Alpha Source Data

Electronics

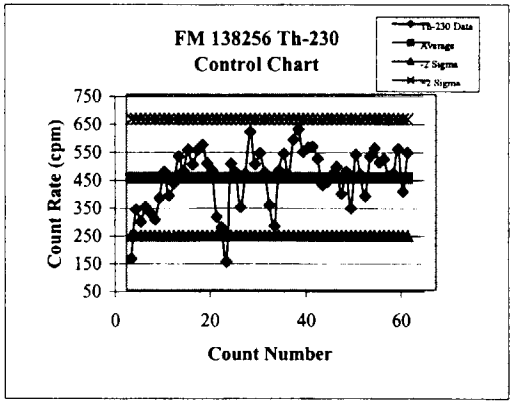
Instrument Type	Ratemeter
Model Number	2360
Manufacturer	Ludlum
Serial Number	138256

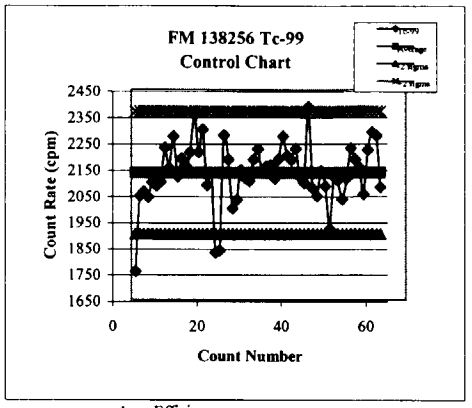
Detector

Instrument Type	Gas Proportional Floor Monitor
Model Number	43-37
Manufacturer	Ludlum
Serial Number	Not recorded
Geometry	Center of probe, 1 cm
ROI	

Count Data

	Th-230 Alpha	Tc-99 Beta	Alpha	Beta	
Mean=	452.2881	2133.424	661.0672	2365.871	high cutoff (+2 Sigma)
STDEV=	104.3895	116.2237	243.5091	1900.976	low cutoff (-2 Sigma)





Avg. Efficiency

Beta	Alpha
18.5%	4.8%

		Bkgd Data		Tc-99 Data				Th-230 Data						
Date/Time	Data Number	Alpha Counts (cpm)	Beta Counts (cpm)	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Tc-99 Eff (%)	Th-230 Eff (%)	
7/10/2002 0:00	1st	1	319	2	1756	[redacted]	Investigate	160	740	[redacted]	Investigate	15.2%	1.7%	
7/11/2002 13:00	2nd	3	507	4	2046	[redacted]	OK	338	901	[redacted]	OK	17.7%	3.6%	
7/11/2002 17:00	3rd	5	529	1	2062	[redacted]	OK	294	822	[redacted]	OK	17.9%	3.1%	
7/12/2002 7:00	4th	8	487	4	2041	[redacted]	OK	347	815	[redacted]	OK	17.7%	3.7%	
7/12/2002 11:30	5th	2	528	0	2098	[redacted]	OK	326	827	[redacted]	OK	18.2%	3.4%	
7/12/2002 16:25	6th	5	491	3	2085	[redacted]	OK	302	889	[redacted]	OK	18.1%	3.2%	
7/13/2002 7:25	7th	6	520	7	2099	[redacted]	OK	379	899	[redacted]	OK	18.2%	4.0%	
7/13/2002 11:55	8th	10	569	5	2229	[redacted]	OK	473	898	[redacted]	OK	19.3%	5.0%	
7/13/2002 15:30	9th	5	543	3	2152	[redacted]	OK	388	846	[redacted]	OK	18.6%	4.1%	
7/14/2002 8:30	10th	11	519	12	2272	[redacted]	OK	432	833	[redacted]	OK	19.7%	4.6%	
7/14/2002 15:45	11th	5	523	8	2119	[redacted]	OK	529	883	[redacted]	OK	18.4%	5.6%	mylar replaced
7/15/2002 7:00	12th	18	563	10	2188	[redacted]	OK	476	939	[redacted]	OK	19.0%	5.0%	
7/15/2002 11:30	13th	9	601	6	2159	[redacted]	OK	552	922	[redacted]	OK	18.7%	5.8%	
7/15/2002 17:00	14th	7	584	6	2213	[redacted]	OK	499	887	[redacted]	OK	19.2%	5.3%	
7/16/2002 7:00	15th	6	537	7	2352	[redacted]	OK	551	914	[redacted]	OK	20.4%	5.8%	
7/16/2002 11:45	16th	5	566	3	2212	[redacted]	OK	570	852	[redacted]	OK	19.2%	6.0%	
7/16/2002 17:00	17th	1	534	1	2298	[redacted]	OK	503	897	[redacted]	OK	19.9%	5.3%	
7/17/2002 7:15	18th	4	536	2	2087	[redacted]	OK	478	906	[redacted]	OK	18.1%	5.1%	
7/17/2002 11:40	19th	9	480	2	2134	[redacted]	OK	311	868	[redacted]	OK	18.5%	3.3%	
7/17/2002 15:30	20th	5	422	5	1828	[redacted]	Investigate	273	810	[redacted]	OK	15.8%	2.9%	low gas
7/22/2002 7:15	21st	6	381	5	1837	[redacted]	Investigate	149	811	[redacted]	Investigate	15.9%	1.6%	low gas/purge
7/22/2002 13:00	22nd	2	494	6	2276	[redacted]	OK	502	862	[redacted]	OK	19.7%	5.3%	
7/22/2002 16:30	23rd	2	587	5	2184	[redacted]	OK	469	951	[redacted]	OK	18.9%	5.0%	
7/23/2002 7:00	24th	5	443	2	1997	[redacted]	OK	346	846	[redacted]	OK	17.3%	3.7%	
7/23/2002 11:30	25th	3	513	4	2031	[redacted]	OK	466	903	[redacted]	OK	17.6%	4.9%	
7/23/2002 17:00	26th	1	487	3	2145	[redacted]	OK	616	991	[redacted]	OK	18.6%	6.5%	
7/24/2002 7:00	27th	3	517	3	2114	[redacted]	OK	500	866	[redacted]	OK	18.3%	5.3%	
7/25/2002 7:00	28th	10	521	4	2102	[redacted]	OK	540	908	[redacted]	OK	18.2%	5.7%	
7/25/2002 11:45	29th	6	512	3	2184	[redacted]	OK	470	854	[redacted]	OK	18.9%	5.0%	
7/25/2002 17:00	30th	7	494	3	2224	[redacted]	OK	353	841	[redacted]	OK	19.3%	3.7%	
7/26/2002 7:00	31st	4	448	4	2144	[redacted]	OK	279	891	[redacted]	OK	18.6%	3.0%	

Floor Monitor 138256

Parameter Being Trackec Tc-99 Beta and Th-230 Alpha Source Data

Electronics

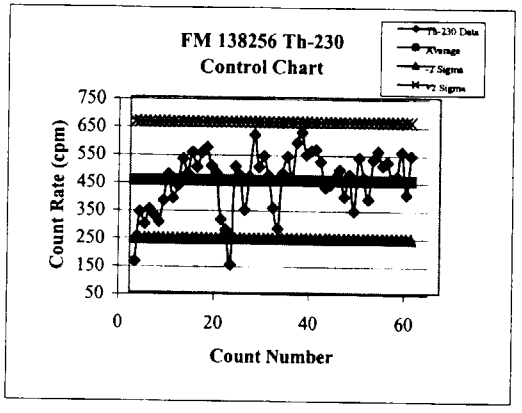
Instrument Type	Ratemeter
Model Number	2360
Manufacturer	Ludlum
Serial Number	138256

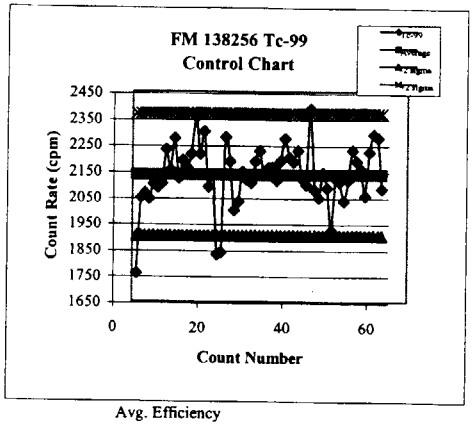
Detector

Instrument Type	Gas Proportional Floor Monitor
Model Number	43-37
Manufacturer	Ludlum
Serial Number	Not recorded
Geometry	Center of probe, 1 cm
ROI	

Count Data

	Th-230 Alpha	Tc-99 Beta	Alpha	Beta	
Mean=	452.2881	2133.424	661.0672	2365.871	high cutoff (+2 Sigma)
STDEV=	104.3895	116.2237	243.5091	1900.976	low cutoff (-2 Sigma)





Avg. Efficiency

Beta	Alpha
18.5%	4.8%

		Bkgd Data		Tc-99				Th-230					
				Tc-99 Data				Th-230 Data					
Date/Time	Data Number	Alpha Counts (cpm)	Beta Counts (cpm)	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Tc-99 Eff (%)	Th-230 Eff (%)
7/26/2002 12:00	32nd	7	484	11	2158	[redacted]	OK	478	883	[redacted]	OK	18.7%	5.1%
7/26/2002 17:00	33rd	2	494	2	2163	[redacted]	OK	538	876	[redacted]	OK	18.7%	5.7%
7/27/2002 7:00	34th	4	484	6	2112	[redacted]	OK	461	832	[redacted]	OK	18.3%	4.9%
7/27/2002 12:00	35th	9	550	7	2186	[redacted]	OK	588	954	[redacted]	OK	18.9%	6.2%
7/27/2002 17:00	36th	2	536	2	2271	[redacted]	OK	624	938	[redacted]	OK	19.7%	6.6%
7/28/2002 8:00	37th	3	531	7	2200	[redacted]	OK	545	934	[redacted]	OK	19.1%	5.8%
7/28/2002 12:40	38th	7	530	5	2183	[redacted]	OK	559	858	[redacted]	OK	18.9%	5.9%
7/30/2002 13:25	39th	7	527	5	2226	[redacted]	OK	563	866	[redacted]	OK	19.3%	6.0%
7/3/2002 17:15	40th	3	552	8	2119	[redacted]	OK	520	935	[redacted]	OK	18.4%	5.5%
8/8/2002 7:20	41st	4	532	5	2096	[redacted]	OK	427	869	[redacted]	OK	18.2%	4.5%
8/8/2002 12:45	42nd	3	486	5	2385	[redacted]	Investigate	437	837	[redacted]	OK	20.7%	4.6%
8/8/2002 17:55	43rd	3	518	8	2074	[redacted]	OK	462	836	[redacted]	OK	18.0%	4.9%
8/26/2002 12:50	44th	5	473	3	2045	[redacted]	OK	491	885	[redacted]	OK	17.7%	5.2%
8/27/2002 7:00	45th	1	495	2	2140	[redacted]	OK	394	860	[redacted]	OK	18.5%	4.2%
8/27/2002 12:20	46th	4	507	7	2082	[redacted]	OK	473	872	[redacted]	OK	18.0%	5.0%
9/9/2002 12:45	47th	1	390	2	1920	[redacted]	OK	342	765	[redacted]	OK	16.6%	3.6%
9/9/2002 17:00	48th	3	570	2	2118	[redacted]	OK	534	941	[redacted]	OK	18.3%	5.6%
9/10/2002 7:15	49th	6	532	3	2105	[redacted]	OK	462	843	[redacted]	OK	18.2%	4.9%
9/10/2002 12:30	50th	1	464	3	2033	[redacted]	OK	386	826	[redacted]	OK	17.6%	4.1%
9/10/2002 17:45	51st	4	560	4	2111	[redacted]	OK	528	1894	[redacted]	OK	18.3%	5.6%
9/11/2002 7:00	52nd	5	585	3	2227	[redacted]	OK	558	923	[redacted]	OK	19.3%	5.9%
9/11/2002 12:40	53rd	6	538	2	2184	[redacted]	OK	507	878	[redacted]	OK	18.9%	5.4%
9/11/2002 18:00	54th	4	498	1	2154	[redacted]	OK	518	853	[redacted]	OK	18.7%	5.5%
9/12/2002 7:00	55th	6	537	4	2052	[redacted]	OK	454	905	[redacted]	OK	17.8%	4.8%
9/12/2002 12:10	56th	3	529	5	2220	[redacted]	OK	467	883	[redacted]	OK	19.2%	4.9%
9/12/2002 17:00	57th	5	491	3	2287	[redacted]	OK	555	855	[redacted]	OK	19.8%	5.9%
9/13/2002 7:00	58th	0	526	3	2274	[redacted]	OK	402	868	[redacted]	OK	19.7%	4.3%
9/13/2002 12:00	59th	5	492	9	2079	[redacted]	OK	541	881	[redacted]	OK	18.0%	5.7%

End of program

Phoswich 119803

Parameter Being Trackec Tc-99 Beta and Th-230 Alpha Source Data

Electronics

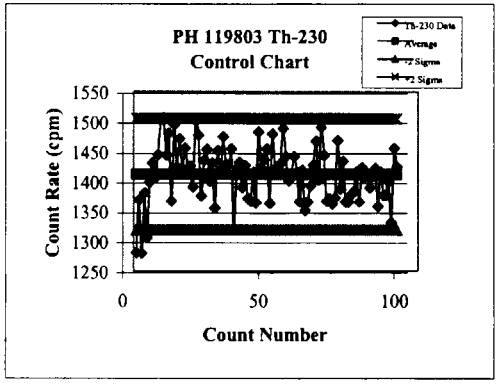
Instrument Type	Ratemeter
Model Number	2224
Manufacturer	Ludlum
Serial Number	119803

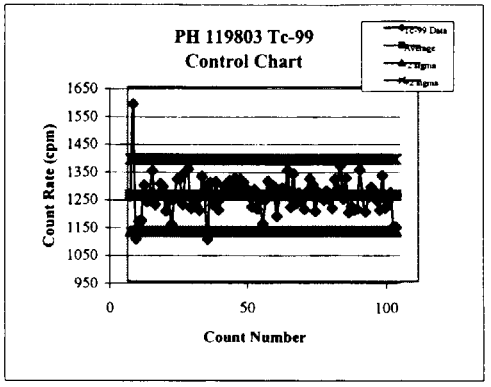
Detector

Instrument Type	Phoswich
Model Number	43-1-1
Manufacturer	Ludlum
Serial Number	PR166008
Geometry	Jig, 1 cm
ROI	

Count Data

	Th-230 Alpha	Tc-99 Beta	Alpha	Beta	
Mean=	1411.392	1259.536	1504.53	1388.62	high cutoff (+2 Sigma)
STDEV=	46.56907	64.54215	1318.254	1130.452	low cutoff (-2 Sigma)





Avg. Efficiency

Beta	Alpha
10.9%	14.92%

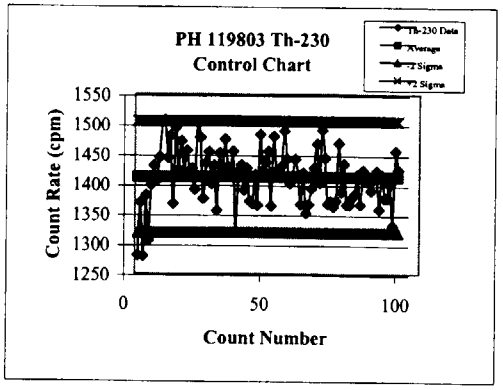
		Bkgd Data		Tc-99				Th-230					
				Tc-99 Data				Th-230 Data					
Date/Time	Data Number	Alpha Counts (cpm)	Beta Counts (cpm)	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Tc-99 Eff (%)	Th-230 Eff (%)	
7/22/2002 7:40	1st	1	162	0	1256		OK	1280	316		Investigate	10.9%	13.5%	
7/22/2002 11:45	2nd	0	154	1	1587		Investigate	1369	305		OK	13.7%	14.5%	
7/22/2002 16:30	3rd	0	146	1	1102		Investigate	1279	294		Investigate	9.5%	13.5%	
7/23/2002 7:00	4th	0	158	2	1165		OK	1381	287		OK	10.1%	14.6%	
7/23/2002 11:30	5th	0	126	1	1169		OK	1305	276		Investigate	10.1%	13.8%	Mylar replaced
7/24/2002 7:00	6th	0	143	1	1296		OK	1398	274		OK	11.2%	14.8%	
7/24/2002 11:45	7th	0	152	3	1236		OK	1430	293		OK	10.7%	15.1%	
7/24/2002 17:00	8th	0	139	0	1252		OK	1405	294		OK	10.8%	14.9%	
7/25/2002 7:00	9th	1	153	2	1347		OK	1444	297		OK	11.7%	15.3%	
7/25/2005 11:45	10th	0	148	0	1226		OK	1504	268		OK	10.6%	15.9%	
7/25/2002 17:00	11th	0	138	0	1264		OK	1506	305		Investigate	10.9%	15.9%	
7/26/2002 7:00	12th	0	152	0	1302		OK	1443	338		OK	11.3%	15.3%	
7/26/2002 12:00	13th	0	169	0	1292		OK	1480	293		OK	11.2%	15.6%	
7/26/2002 17:00	14th	0	153	0	1202		OK	1367	271		OK	10.4%	14.5%	
7/27/2002 7:00	15th	0	137	1	1239		OK	1494	312		OK	10.7%	15.8%	
7/27/2002 12:00	16th	0	114	1	1155		OK	1423	276		OK	10.0%	15.0%	
7/27/2002 17:00	17th	2	143	1	1247		OK	1471	280		OK	10.8%	15.6%	
7/28/2002 8:00	18th	3	141	0	1318		OK	1413	342		OK	11.4%	14.9%	
7/28/2002 12:40	19th	3	148	2	1321		OK	1455	323		OK	11.4%	15.4%	
7/28/2002 16:20	20th	1	157	0	1227		OK	1421	278		OK	10.6%	15.0%	
7/29/2002 7:00	21st	0	147	1	1344		OK	1425	277		OK	11.6%	15.1%	
7/29/2002 12:00	22nd	0	151	1	1354		OK	1390	279		OK	11.7%	14.7%	
7/29/2002 17:15	23rd	1	178	0	1214		OK	1502	292		OK	10.5%	15.9%	
7/30/2002 7:00	24th	1	154	2	1240		OK	1477	283		OK	10.7%	15.6%	
7/30/2002 12:35	25th	2	165	0	1218		OK	1375	297		OK	10.6%	14.5%	
7/30/2002 17:15	26th	0	140	1	1206		OK	1434	291		OK	10.4%	15.2%	
7/31/2002 7:00	27th	0	143	1	1327		OK	1453	315		OK	11.5%	15.4%	
7/31/2002 12:00	28th	1	167	2	1276		OK	1400	302		OK	11.1%	14.8%	
7/31/2002 15:15	29th	0	162	1	1101		Investigate	1430	303		OK	9.5%	15.1%	recheck in morning
8/5/2002 7:00	30th	1	139	0	1305		OK	1355	298		OK	11.3%	14.3%	
8/5/2002 12:00	31st	1	146	0	1227		OK	1451	318		OK	10.6%	15.3%	
8/5/2002 17:00	32nd	0	149	2	1308		OK	1412	326		OK	11.3%	14.9%	

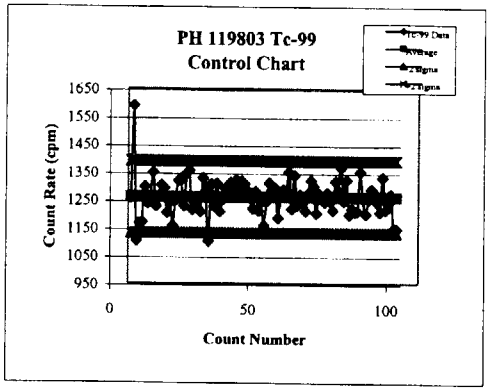
Phoswich 119803

Parameter Being Tracked: Tc-99 Beta and Th-230 Alpha Source Data

Electronics	
Instrument Type	Ratemeter
Model Number	2224
Manufacturer	Ludlum
Serial Number	119803
Detector	
Instrument Type	Phoswich
Model Number	43-1-1
Manufacturer	Ludlum
Serial Number	PR166008
Geometry	Jig, 1 cm
ROI	

Count Data	Th-230 Alpha	Tc-99 Beta	Alpha	Beta	
Mean=	1411.392	1259.536	1504.53	1388.62	high cutoff (+2 Sigma)
STDEV=	46.56907	64.54215	1318.254	1130.452	low cutoff (-2 Sigma)





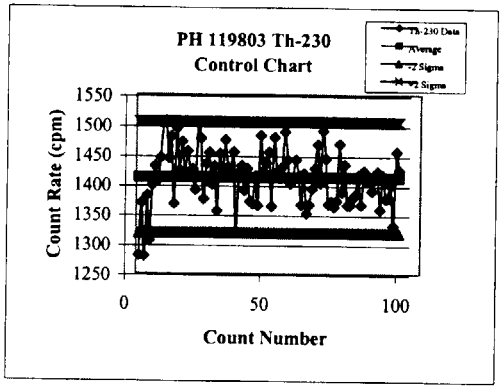
		Bkgd Data		Tc-99		Tc-99 Data		Th-230		Th-230 Data		Avg Efficiency			
												Beta	Alpha		
												10.9%	14.92%		
Date/Time	Data Number	Alpha Counts (cpm)	Beta Counts (cpm)	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Tc-99 Eff (%)	Th-230 Eff (%)		
8/6/2002 7:35	33rd	2	149	0	1207		OK	1474	315		OK	10.5%	15.6%		
8/6/2002 12:20	34th	0	160	2	1249		OK	1428	345		OK	10.8%	15.1%		
8/6/2002 18:00	35th	1	177	3	1292		OK	1421	313		OK	11.2%	15.0%		
8/7/2002 7:20	36th	2	141	1	1268		OK	1454	384		OK	11.0%	15.4%		
8/7/2002 12:20	37th	3	177	3	1312		OK	1319	277		OK	11.4%	13.9%		
8/7/2002 17:30	38th	0	158	0	1286		OK	1420	270		OK	11.1%	15.0%		
8/8/2002 7:20	39th	0	158	1	1321		OK	1431	301		OK	11.4%	15.1%		
8/8/2002 12:45	40th	0	150	2	1277		OK	1389	304		OK	11.1%	14.7%		
8/8/2002 17:55	41st	0	159	0	1317		OK	1426	333		OK	11.4%	15.1%		
8/9/2002 7:00	42nd	0	163	1	1308		OK	1371	284		OK	11.3%	14.5%		
8/9/2002 12:30	43rd	0	155	0	1285		OK	1367	314		OK	11.1%	14.5%		
8/9/2002 17:45	44th	0	154	2	1257		OK	1414	301		OK	10.9%	15.0%		
8/10/2002 7:00	45th	0	156	1	1218		OK	1364	279		OK	10.6%	14.4%		
8/10/2002 12:05	46th	0	147	0	1280		OK	1482	330		OK	11.1%	15.7%		
8/10/2002 17:15	47th	2	214	1	1210		OK	1422	286		OK	10.5%	15.0%		
8/11/2002 9:00	48th	1	132	0	1242		OK	1436	287		OK	10.8%	15.2%		
8/11/2002 14:20	49th	2	131	0	1158		OK	1454	280		OK	10.0%	15.4%	mylar repaired	
8/11/2002 17:50	50th	0	141	1	1245		OK	1363	280		OK	10.8%	14.4%		
8/12/2002 7:00	51st	1	169	0	1311		OK	1479	296		OK	11.4%	15.6%		
8/12/2002 12:30	52nd	0	146	2	1275		OK	1420	286		OK	11.0%	15.0%		
8/12/2002 17:50	53rd	2	169	1	1293		OK	1421	278		OK	11.2%	15.0%		
8/13/2002 7:00	54th	1	160	0	1184		OK	1429	278		OK	10.3%	15.1%		
8/13/2002 12:30	55th	1	135	1	1263		OK	1488	304		OK	10.9%	15.7%		
8/13/2002 17:30	56th	0	132	0	1286		OK	1441	253		OK	11.1%	15.2%		
8/14/2002 7:00	57th	0	116	1	1269		OK	1401	308		OK	11.0%	14.8%		
8/14/2002 12:15	58th	1	131	5	1350		OK	1413	282		OK	11.7%	14.9%		
8/19/2002 7:00	59th	2	143	1	1217		OK	1441	295		OK	10.5%	15.2%		
8/19/2002 12:30	60th	0	151	1	1337		OK	1414	339		OK	11.6%	15.0%		
8/19/2002 17:30	61st	0	141	1	1230		OK	1366	295		OK	10.7%	14.4%		
8/20/2002 7:00	62nd	2	135	2	1268		OK	1418	324		OK	11.0%	15.0%		
8/20/2002 12:20	63rd	0	143	2	1260		OK	1351	303		OK	10.9%	14.3%		
8/20/2002 17:35	64th	0	120	2	1209		OK	1366	305		OK	10.5%	14.4%		

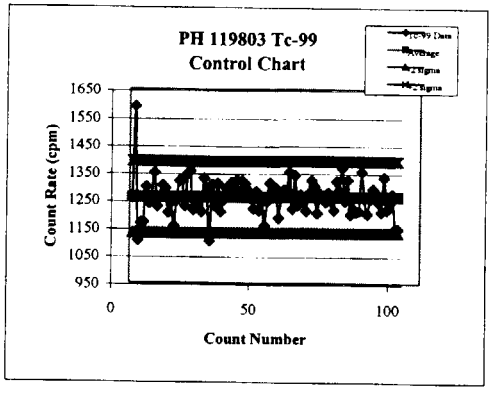
Phoswich 119803

Parameter Being Trackec Tc-99 Beta and Th-230 Alpha Source Data

	Electronics
Instrument Type	Ratemeter
Model Number	2224
Manufacturer	Ludlum
Serial Number	119803
	Detector
Instrument Type	Phoswich
Model Number	43-1-1
Manufacturer	Ludlum
Serial Number	PR166008
Geometry	Jig, 1 cm
ROI	

	Count Data				
	Th-230 Alpha	Tc-99 Beta	Alpha	Beta	
Mean=	1411.392	1259.536	1504.53	1388.62	high cutoff (+2 Sigma)
STDEV=	46.56907	64.54215	1318.254	1130.452	low cutoff (-2 Sigma)





		Bkgd Data		Tc-99				Th-230				Avg. Efficiency	
				Tc-99 Data				Th-230 Data				Beta	Alpha
												10.9%	14.92%
Date/Time	Data Number	Alpha Counts (cpm)	Beta Counts (cpm)	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Tc-99 Eff (%)	Th-230 Eff (%)
8/21/2002 7:00	65th	0	150	0	1273		OK	1392	300		OK	11.0%	14.7%
8/21/2002 12:50	66th	2	154	0	1320		OK	1427	305		OK	11.4%	15.1%
8/21/2002 17:20	67th	1	139	1	1300		OK	1467	297		OK	11.3%	15.5%
8/22/2002 7:00	68th	1	154	2	1201		OK	1402	263		OK	10.4%	14.8%
8/22/2002 13:15	69th	0	167	1	1271		OK	1490	275		OK	11.0%	15.8%
8/22/2002 18:05	70th	0	152	1	1258		OK	1443	330		OK	10.9%	15.3%
8/23/2002 7:05	71st	2	134	0	1243		OK	1367	251		OK	10.8%	14.5%
8/23/2002 13:10	72nd	1	162	1	1275		OK	1371	329		OK	11.0%	14.5%
8/23/2002 16:50	73rd	1	187	1	1245		OK	1362	310		OK	10.8%	14.4%
8/24/2002 7:00	74th	2	151	2	1212		OK	1372	292		OK	10.5%	14.5%
8/24/2002 13:30	75th	0	164	0	1316		OK	1468	317		OK	11.4%	15.5%
8/24/2002 19:00	76th	0	160	1	1283		OK	1387	300		OK	11.1%	14.7%
8/25/2002 8:00	77th	0	151	0	1365		OK	1433	320		OK	11.8%	15.2%
8/25/2002 12:35	78th	4	167	1	1246		OK	1365	283		OK	10.8%	14.4%
8/26/2002 7:00	79th	1	147	2	1321		OK	1365	323		OK	11.4%	14.4%
8/26/2002 12:35	80th	0	145	0	1197		OK	1377	317		OK	10.4%	14.6%
8/26/2002 17:30	81st	0	163	2	1218		OK	1383	296		OK	10.6%	14.6%
8/27/2002 7:00	82nd	1	145	2	1206		OK	1415	318		OK	10.4%	15.0%
8/27/2002 12:20	83rd	1	152	1	1209		OK	1366	364		OK	10.5%	14.4%
9/9/2002 7:00	84th	2	158	2	1351		OK	1423	278		OK	11.7%	15.0%
9/9/2002 12:15	85th	0	147	0	1256		OK	1406	263		OK	10.9%	14.9%
9/9/2002 16:00	86th	0	138	0	1199		OK	1413	328		OK	10.4%	14.9%
9/10/2002 7:00	87th	0	152	0	1253		OK	1389	318		OK	10.9%	14.7%
9/11/2002 7:00	88th	1	158	1	1288		OK	1409	296		OK	11.2%	14.9%
9/11/2002 12:00	89th	0	131	0	1276		OK	1422	308		OK	11.1%	15.0%
9/11/2002 18:00	90th	0	143	2	1241		OK	1358	286		OK	10.8%	14.4%
9/12/2002 7:00	91st	0	161	4	1206		OK	1415	304		OK	10.4%	15.0%
9/12/2002 12:10	92nd	1	141	2	1330		OK	1376	307		OK	11.5%	14.5%
9/12/2002 17:30	93rd	0	146	1	1213		OK	1377	283		OK	10.5%	14.6%
9/13/2002 7:00	94th	1	123	2	1237		OK	1400	328		OK	10.7%	14.8%
9/13/2002 12:00	95th	0	151	0	1269		OK	1331	281		OK	11.0%	14.1%
9/14/2002 7:00	96th	0	140	1	1146		OK	1455	287		OK	9.9%	15.4%

Phoswich 119803

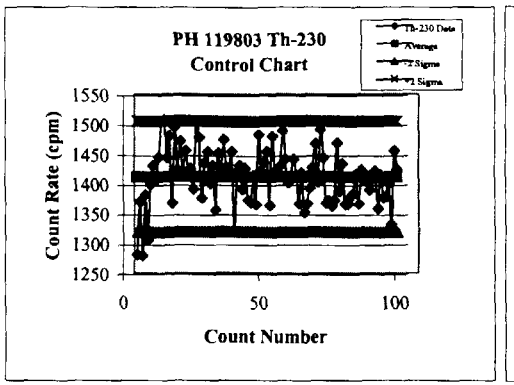
Parameter Being Trackec Tc-99 Beta and Th-230 Alpha Source Data

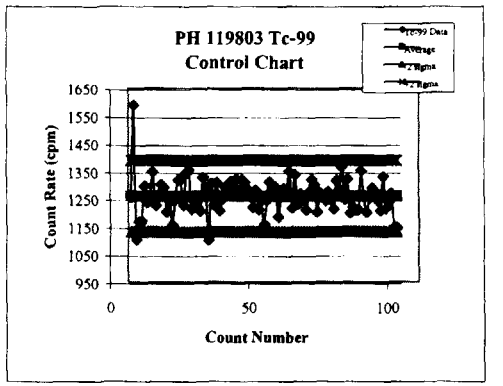
Electronics

Instrument Type	Ratemeter
Model Number	2224
Manufacturer	Ludlum
Serial Number	119803

Detector

Instrument Type	Phoswich
Model Number	43-1-1
Manufacturer	Ludlum
Serial Number	PR166008
Geometry	Jig, 1 cm
ROI	





	Count Data Th-230 Alpha	Tc-99 Beta	Alpha	Beta	
Mean=	1411.392	1259.536	1504.53	1388.62	high cutoff (+2 Sigma)
STDEV=	46.56907	64.54215	1318.254	1130.452	low cutoff (-2 Sigma)

Avg. Efficiency

Beta	Alpha
10.9%	14.92%

		Bkgd Data		Tc-99 Tc-99 Data				Th-230 Th-230 Data					
Date/Time	Data Number	Alpha Counts (cpm)	Beta Counts (cpm)	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Tc-99 Eff (%)	Th-230 Eff (%)
9/14/2002 11:30	97th	3	131	1	1144	[illegible]	OK	1424	272	[illegible]	OK	9.9%	15.1%

End of program

Phoswich 119815

Parameter Being Tracked Tc-99 Beta and Th-230 Alpha Source Data

Electronics

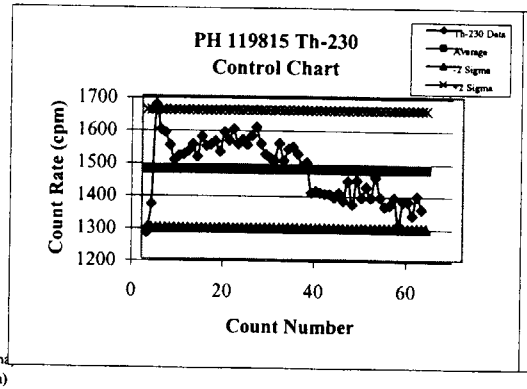
Instrument Type	Ratemeter
Model Number	2224
Manufacturer	Ludlum
Serial Number	119815

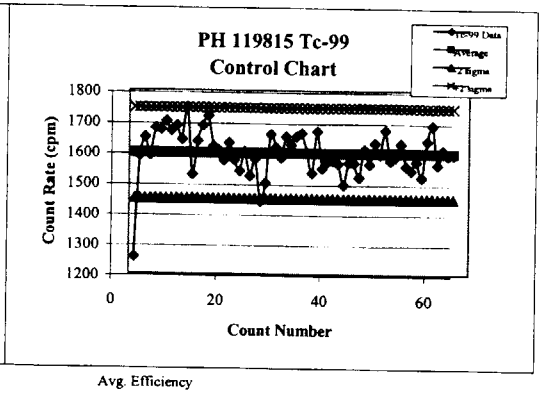
Detector

Instrument Type	Phoswich
Model Number	43-1-1
Manufacturer	Ludlum
Serial Number	PR155183
Geometry	Jig, 1 cm
ROI	

Count Data

	Th-230 Alpha	Tc-99 Beta	Alpha	Beta	
Mean=	1476.951	1596.242	1656.9	1744.672	high cutoff (+2 Sigma)
STDEV=	89.97471	74.21495	1297.001	1447.812	low cutoff (-2 Sigma)





		Bkgd Data		Tc-99		Tc-99 Data		Th-230		Th-230 Data		Avg. Efficiency		
												Beta	Alpha	
												13.8%	15.6%	
Date/Time	Data Number	Alpha Counts (cpm)	Beta Counts (cpm)	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Alpha Counts (cpm)	Beta Counts (cpm)	Pull Block	Status	Tc-99 Eff (%)	Th-230 Eff (%)	
7/22/2002 7:40	1st	1	162	0	1256	[redacted]	Investigate	1280	316	[redacted]	Investigate	10.9%	13.5%	
7/22/2002 11:45	2nd	0	154	1	1587	[redacted]	OK	1369	305	[redacted]	OK	13.7%	14.5%	
7/22/2002 16:30	3rd	1	175	1	1647	[redacted]	OK	1674	359	[redacted]	Investigate	14.3%	17.7%	
7/23/2002 7:00	4th	0	177	0	1589	[redacted]	OK	1598	286	[redacted]	OK	13.8%	16.9%	
7/23/2002 11:30	5th	0	184	0	1678	[redacted]	OK	1588	296	[redacted]	OK	14.5%	16.8%	
7/23/2002 17:00	6th	2	149	1	1673	[redacted]	OK	1550	302	[redacted]	OK	14.5%	16.4%	
7/24/2002 7:00	7th	1	175	1	1700	[redacted]	OK	1505	313	[redacted]	OK	14.7%	15.9%	
7/24/2002 11:45	8th	1	175	1	1668	[redacted]	OK	1518	301	[redacted]	OK	14.4%	16.1%	
7/24/2002 17:00	9th	3	193	2	1686	[redacted]	OK	1522	328	[redacted]	OK	14.6%	16.1%	
7/25/2002 7:00	10th	0	210	0	1640	[redacted]	OK	1531	328	[redacted]	OK	14.2%	16.2%	
7/25/2002 11:45	11th	1	187	3	1746	[redacted]	Investigate	1553	341	[redacted]	OK	15.1%	16.4%	mylar replaced
7/25/2002 17:00	12th	2	177	1	1526	[redacted]	OK	1514	299	[redacted]	OK	13.2%	16.0%	
7/26/2002 7:00	13th	1	173	1	1635	[redacted]	OK	1577	328	[redacted]	OK	14.2%	16.7%	
7/26/2002 12:00	14th	0	189	3	1686	[redacted]	OK	1547	291	[redacted]	OK	14.6%	16.4%	
7/26/2002 17:00	15th	4	164	2	1717	[redacted]	OK	1552	283	[redacted]	OK	14.9%	16.4%	
7/27/2002 7:00	16th	0	166	0	1619	[redacted]	OK	1562	320	[redacted]	OK	14.0%	16.5%	
7/27/2002 12:00	17th	0	161	0	1606	[redacted]	OK	1529	301	[redacted]	OK	13.9%	16.2%	
7/27/2002 17:00	18th	0	168	1	1572	[redacted]	OK	1590	284	[redacted]	OK	13.6%	16.8%	
7/28/2002 8:00	19th	2	192	0	1630	[redacted]	OK	1564	328	[redacted]	OK	14.1%	16.5%	
7/28/2002 12:40	20th	2	183	2	1574	[redacted]	OK	1599	353	[redacted]	OK	13.6%	16.9%	
7/28/2002 17:45	21st	0	167	0	1538	[redacted]	OK	1553	282	[redacted]	OK	13.3%	16.4%	
7/29/2002 7:00	22nd	0	178	0	1602	[redacted]	OK	1567	301	[redacted]	OK	13.9%	16.6%	
7/29/2002 12:00	23rd	0	156	2	1522	[redacted]	OK	1551	276	[redacted]	OK	13.2%	16.4%	
7/30/2002 7:00	24th	0	160	1	1577	[redacted]	OK	1579	316	[redacted]	OK	13.7%	16.7%	
7/30/2002 12:20	25th	1	138	2	1439	[redacted]	Investigate	1605	265	[redacted]	OK	12.5%	17.0%	
7/30/2002 17:15	26th	0	188	0	1500	[redacted]	OK	1555	320	[redacted]	OK	13.0%	16.4%	
7/31/2002 7:00	27th	3	155	0	1658	[redacted]	OK	1522	364	[redacted]	OK	14.4%	16.1%	
8/8/2002 7:20	28th	1	155	1	1616	[redacted]	OK	1511	280	[redacted]	OK	14.0%	16.0%	
8/8/2002 12:45	29th	0	170	1	1581	[redacted]	OK	1504	282	[redacted]	OK	13.7%	15.9%	
8/8/2002 17:55	30th	2	161	0	1651	[redacted]	OK	1556	303	[redacted]	OK	14.3%	16.5%	
8/10/2002 14:45	31st	0	157	2	1625	[redacted]	OK	1504	313	[redacted]	OK	14.1%	15.9%	
8/11/2002 9:00	32nd	1	173	0	1651	[redacted]	OK	1539	290	[redacted]	OK	14.3%	16.3%	
8/11/2002 14:20	33rd	0	242	0	1662	[redacted]	OK	1545	302	[redacted]	OK	14.4%	16.3%	mylar repaired
8/11/2002 17:50	34th	0	256	0	1601	[redacted]	OK	1524	315	[redacted]	OK	13.9%	16.1%	
8/12/2002 7:00	35th	1	155	1	1532	[redacted]	OK	1484	263	[redacted]	OK	13.3%	15.7%	

Phoswich 119815

Parameter Being Tracked Tc-99 Beta and Th-230 Alpha Source Data

Electronics

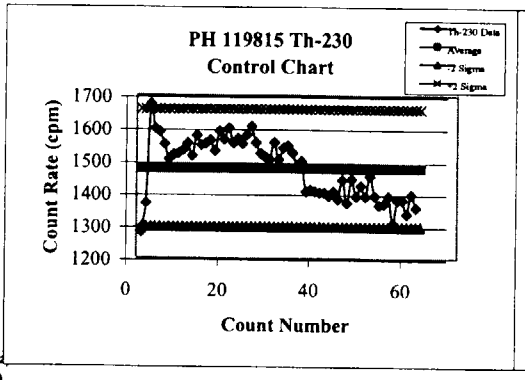
Instrument Type	Ratemeter
Model Number	2224
Manufacturer	Ludlum
Serial Number	119815

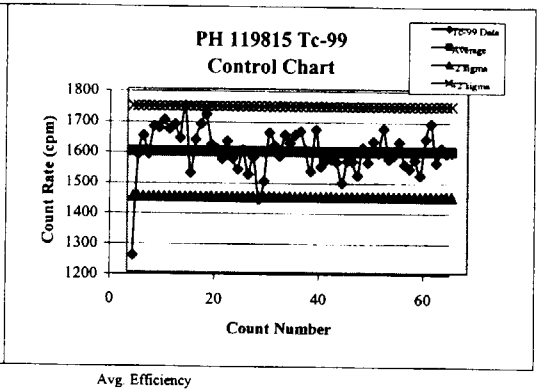
Detector

Instrument Type	Phoswich
Model Number	43-1-1
Manufacturer	Ludlum
Serial Number	PR155183
Geometry	Jig, 1 cm
ROI	

Count Data

	Th-230 Alpha	Tc-99 Beta	Alpha	Beta	
Mean=	1476.951	1596.242	1656.9	1744.672	high cutoff (+2 Sigma)
STDEV=	89.97471	74.21495	1297.001	1447.812	low cutoff (-2 Sigma)





Avg. Efficiency

Beta	Alpha
13.8%	15.6%

Date/Time	Data Number	Bkgd Data: Alpha Counts (cpm)	Bkgd Data: Beta Counts (cpm)	Tc-99 Data: Alpha Counts (cpm)	Tc-99 Data: Beta Counts (cpm)	Tc-99 Data: Pull Block	Tc-99 Data: Status	Th-230 Data: Alpha Counts (cpm)	Th-230 Data: Beta Counts (cpm)	Th-230 Data: Pull Block	Th-230 Data: Status	Tc-99 Eff (%)	Th-230 Eff (%)	
8/12/2002 12:30	36th	1	167	1	1668	[redacted]	OK	1498	325	[redacted]	OK	14.4%	15.8%	
8/12/2002 17:50	37th	1	190	0	1547	[redacted]	OK	1405	274	[redacted]	OK	13.4%	14.9%	
8/13/2002 7:00	38th	4	184	0	1569	[redacted]	OK	1410	304	[redacted]	OK	13.6%	14.9%	
8/13/2002 12:30	39th	0	173	1	1572	[redacted]	OK	1405	246	[redacted]	OK	13.6%	14.9%	
8/13/2002 17:30	40th	0	157	0	1563	[redacted]	OK	1401	288	[redacted]	OK	13.5%	14.8%	
8/20/2002 13:15	41st	1	148	3	1494	[redacted]	OK	1401	198	[redacted]	OK	12.9%	14.8%	
8/20/2002 17:35	42nd	1	168	1	1566	[redacted]	OK	1391	307	[redacted]	OK	13.6%	14.7%	
8/21/2002 7:00	43rd	1	199	0	1565	[redacted]	OK	1405	288	[redacted]	OK	13.6%	14.9%	
8/21/2002 12:50	44th	0	174	1	1519	[redacted]	OK	1381	301	[redacted]	OK	13.2%	14.6%	
8/21/2002 17:45	45th	1	231	1	1610	[redacted]	OK	1441	358	[redacted]	OK	13.9%	15.2%	
8/22/2002 7:00	46th	1	171	1	1561	[redacted]	OK	1370	291	[redacted]	OK	13.5%	14.5%	
8/22/2002 13:15	47th	0	183	0	1630	[redacted]	OK	1444	295	[redacted]	OK	14.1%	15.3%	
8/22/2002 17:40	48th	1	164	0	1593	[redacted]	OK	1390	341	[redacted]	OK	13.8%	14.7%	
8/23/2002 7:05	49th	0	165	1	1671	[redacted]	OK	1423	283	[redacted]	OK	14.5%	15.0%	
8/23/2002 13:00	50th	3	189	2	1572	[redacted]	OK	1390	299	[redacted]	OK	13.6%	14.7%	
8/23/2002 17:00	51st	0	184	2	1585	[redacted]	OK	1453	296	[redacted]	OK	13.7%	15.4%	
8/24/2002 7:00	52nd	0	172	0	1628	[redacted]	OK	1392	391	[redacted]	OK	14.1%	14.7%	
8/24/2002 13:30	53rd	1	158	1	1554	[redacted]	OK	1363	291	[redacted]	OK	13.5%	14.4%	
8/24/2002 18:45	54th	1	170	1	1540	[redacted]	OK	1367	342	[redacted]	OK	13.3%	14.5%	
8/25/2002 8:00	55th	2	153	1	1570	[redacted]	OK	1391	309	[redacted]	OK	13.6%	14.7%	
8/25/2002 12:20	56th	1	159	2	1519	[redacted]	OK	1307	302	[redacted]	OK	13.2%	13.8%	
8/26/2002 7:00	57th	1	174	2	1638	[redacted]	OK	1378	270	[redacted]	OK	14.2%	14.6%	
8/26/2002 12:35	58th	2	181	1	1689	[redacted]	OK	1379	282	[redacted]	OK	14.6%	14.6%	
8/27/2002 7:00	59th	1	159	2	1560	[redacted]	OK	1337	296	[redacted]	OK	13.5%	14.1%	
8/27/2002 12:20	60th	0	200	0	1609	[redacted]	OK	1395	318	[redacted]	OK	13.9%	14.8%	
8/27/2002 17:30	61st	0	175	1	1591	[redacted]	OK	1356	295	[redacted]	OK	13.8%	14.3%	
9/9/2002 7:00	62nd	0	157	1	1594	[redacted]	OK			[redacted]	Investigate	13.8%	0.0%	End of use

SOURCES USED

Serial #	Radionuclide	Half-life	Unit	Activity (uCi)	Activity (dpm)
8921	Am-241	433	yr	0.273	606060
1842-94	Th-230	7.54E+04	yr	0.00426	9457.2
1843-94	Tc-99	2.13E+05	yr	0.0052	11544
1844-94	Cs-137	30	yr	0.733	1627260

AMSAM-TMD-SRN

CALIBRATION RESULTS

Isotope	S/N	Emission Rate (2 pi geometry)	Activity
	(Sources Included in DNS-9, S/N L8681)		
^{230}Th	1842-94	4,728 alphas / minute	0.004 uCi
^{99}Tc	1843-94	5,772 betas / minute	0.005 uCi
^{137}Cs	1844-94	---------	0.733 uCi
^{241}Am	8921	303,391 alphas / minute	0.273 uCi