DEPARTMENT OF VETERANS AFFAIRS
Veterans Health Administration
National Health Physics Program
2200 Fort Roots Drive
North Little Rock, AR 72114

MAR 19 2009

In Reply Refer To: 598/115HP/NLR

Cassandra F. Frazier
Division of Nuclear Material Safety
Nuclear Regulatory Commission (NRC), Region III
2443 Warrenville Road, Suite 210
Lisle, Illinois 60532-4352

Dear Ms. Frazier:

In reference to NRC Master Materials License 03-23853-01VA, we are enclosing closeout survey documentation related to Buildings 3 and 28 at the VA Medical Center, Iowa City, Iowa. This facility holds Permit Number 14-00822-01 under our license. Principal activities have ceased in these buildings. We request the release of Buildings 3 and 28 for unrestricted use.

In support of this request, we have enclosed closeout survey documentation for these buildings. Enclosure 1 is an October 6, 2008, transmittal letter with the August 26, 2008, four-volume closeout survey report from the facility Radiation Safety Officer (RSO). Enclosure 2 is a February 10, 2009, RSO response to a November 10, 2008, NHPP request for information. Enclosure 3 is a March 2, 2009, RSO response to a February 22, 2009, NHPP request for information.

The enclosed documents provide information consistent with 10 CFR 30.36 to evaluate these buildings for decommissioning action. We conclude these enclosed survey results demonstrate Buildings 3 and 28 are acceptable for unrestricted use in accordance with regulatory criteria in 10 CFR 20.1402.

If you have any questions or comments, please contact Thomas E. Huston, Ph.D., National Health Physics Program, at 501-257-1578.

Sincerely,

E. Lynn McGuire
Director, National Health Physics Program

Enclosures

RECEIVED APR 0 1 2009

Enclosure 1

DEPARTMENT OF VETERANS AFFAIRS
Medical Center
601 Highway 6 West
Iowa City, IA 52246

10-16-08P02:49 RCVD

October 6, 2008

Thomas E. Huston, PhD, CHP
National Health Physics Program (115HP/NLR)
Veterans Health Administration
2200 Fort Roots Drive
North Little Rock, Arkansas 72114

Re: VHA Permit Number 14-00822-01, Request for Decommissioning for Unrestricted Release of Buildings 3 & 28 for Demolition

Dear Dr. Huston:

We are requesting authorization for decommissioning of Buildings 3 and 28 at the VA Medical Center, Iowa City, IA, for unrestricted release of these buildings for demolition. The decommissioning survey documentation for Buildings 3 and 28 is enclosed for your review. A Table of Contents for this four volume radiological assessment is attached.

Historically:

Building 3 was originally constructed in 1953 and was used for residential purposes until approximately 1970 when renovations began to convert the structure into research labs. The types of radioactive materials listed in *Table 2.2 – Building 3* (see Volume 1, page 2, enclosed) were used for non-medical research in Building 3 from January 1980 until March 2007.

Building 28 was constructed in 1985 to provide additional research laboratory work areas. The types of radioactive materials listed in *Table 2.1 – Building 28* (see Volume 1, page 1, enclosed) were used for non-medical research in Building 28 from January 1987 until May 2007.

We are unable to determine the date of original licensure for the Iowa City VA. Available records indicate that the Nuclear Regulatory Commission first issued a Type A broadscope radioactive materials license to the Iowa City VAMC on January 14, 1981, however, we were unable to determine the date of original licensure. I contacted the Nuclear Regulatory Commission Region III Office (Cassandra Frasier) and was told this information is available in their archive files, but must be requested by the NHPP.

Please contact me if you have any questions.

Sincerely,

Joe Graves

Joe M. Graves
Radiation Safety Officer
Iowa City VA Medical Center
Ph: 319-335-8517

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VOLUME 1

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CHECKED OCT 2 1 2008

Enclosure 2

From: Graves, Joe M [mailto:joe-graves@uiowa.edu]
Sent: Tuesday, February 10, 2009 3:26 PM
To: Huston, Thomas E.
Cc: Offutt, Lisa M; Roark, Brad; Scholl, Laura M; McGuire, Lynn (VACO)
Subject: RE: Request for Additional Information for VAMC Iowa City Bldgs 3 and 28.doc

Tom,

Attached please find our response to your request for additional information regarding the decommissioning surveys for Bldgs. 3 and 28 at the Iowa City VAMC. If you have any questions or require paper copies, please contact me.

Thanks, Joe

Joe M. Graves
Radiation Safety Officer
University of Iowa & VA Medical Center
Phone: 319-335-8517
Fax: 319-335-7564
joe-graves@uiowa.edu

Request for Additional Information (RAI)

Prepared by: Tom Huston, PhD, CHP (VHA National Health Physics Program)
Date prepared: November 10, 2008
Re: VA Medical Center, Iowa City, Iowa

Note: This RAI involves review of decommissioning document submitted October 6, 2008 (received by NHPP October 16, 2008) in support of a request to release Bldgs. 3 and 28 for unrestricted use: *Radiological Assessment of the Department of Veterans Affairs Medical Center: Deconstruct Buildings 3 and 28, Iowa City, IA (Prepared August 26, 2008, 4 Volumes)*

Please respond to the following comments and questions:

1. Additional details are needed on the overall site and on Bldgs. 3 and 28:

   a. Provide the following general information for the Iowa City VA site: total number of acres at the site, general makeup of surrounding area (i.e., residential, commercial, industrial, mixed).

   HRG Response:

   According to historical information, and Veterans Affairs records and personnel, the historical uses of Buildings 3 and 28 include, but are not limited to, administrative, animal research, photo processing, janitorial closets, radiation equipment, patient care/research, hazardous material storage, chemical and biological research, and laboratory use of hazardous materials.

   Building 3 was originally constructed in 1953 as residential quarters for nurses and directors associated with the Veterans Affairs facility. The building was used for residential purposes until approximately 1970 when renovations began to convert the structure into research labs. Renovations took place between 1970 and 1983, and started in the north wing and ended in the south wing. Fume hoods were installed in the research labs in 1983. The electrical system was updated between 1983 and 1984 to incorporate non-PCB transformers. The southeast corner of the Basement, rooms B12 and B19, was converted into a Biosafety Level 3 (BSL 3) laboratory to study tuberculosis, Ross River Virus, and tularemia. The BSL 3 laboratory was later decommissioned in the spring of 2007. Additional activities included radiation studies in Room 300 in the south wing, and an iodination study in Room 100 of the north wing using Carbon-14. Basement rooms B6, B7, and B8 historically contained centrifugal equipment.

Building 28 was constructed in 1985 to provide additional research laboratory work areas. Based on employee information and visual indications observed during the site investigation, Building 28 apparently stored, processed, or otherwise used less hazardous materials during its operational history than Building 3.

b. Provide following details for each building: number of floors and approximate floor surface area (ft2) of each building.

HRG Response:

The Medical Center overall site is shown on Drawing 1 – Overall Site Plan included in Volume 1, Appendix A. Buildings 3 and 28 are noted on the plan which defines the physical boundaries of Buildings 3 and 28. The physical boundaries represent the extent of the study area addressed in the Report.

As shown in Drawing 1, Building 3 wraps around Building 28 on the north, east, and south sides. As shown in Drawing 2, Building 3 consists of a crawl space and basement (5,045 gross square feet), floors 1 (11,628 gross square feet) and 2(11,628 gross square feet), and the roof. Building 3 construction is concrete structure with masonry (brick) exterior and flat roof with short parapet wall. The first and second floors consist of office space and laboratories. Mechanical equipment, chemical diffusers (dilution tanks) and storage areas are located in the Basement. Laboratory ventilation exhaust fans and exposed ductwork are located on the roof.

As shown in Drawing 1, Building 28 consists of only one ground-level floor (6,099 gross square foot). Building 28 is a single story structure using a pre-engineered metal building with standing seam sloped roof. The main level consists of office space and laboratories.

c. Please confirm dates of decommissioning surveys: August 9-11, 2007.

HRG Response: Confirmed. The decommissioning survey activities occurred August 9-11, 2007.

2. Survey report states that, due to decay, the only suspected radionuclides that would contribute to residual contamination would be H-3 and C-14. Additional justification is needed to support this statement.

a. Provide date of last use for each radionuclide in Table 2.1 and 2.2, if known. If unknown, then 18 months (May 2007 to November 2008) will be used as a decay period.

HRG Response: This information can be found in the attached Excel spreadsheet (Close-Out Data.xls).

b. Provide (for each radionuclide in Table 2.1 and 2.2) a typical maximum amount used in past research protocols (e.g., 200 uCi).

HRG Response: This information can be found in the attached Excel spreadsheet (Close-Out Data.xls). The information presented was shipment limit (mCi), not typical maximum amount used in past research protocols. This is a more conservative value for decay calculations.

As information: We normally list all possible nuclides (as you provide in Tables 2.1 and 2.2) and perform a decay calculation to support limiting the focus to likely remaining nuclides of concern. As a point of reference, we compare to 10 CFR 20, Appendix C values (per NUREG-1757, Volume 1, Section 8.1).

HRG Response: In the table in the attached excel spreadsheet (Close Out Data.xls), H-3, C-14, and Na-22 are predicted to remain as potential contaminants of significance under given assumptions (i.e., values in 10 CFR 20, Appendix C). In addition, S-35 and Cd-109 could still be present and might contribute around 1% to total activity. Except for H-3 (low energy beta emitter), all of these nuclides emit radiations that are likely to be detected by a GM pancake detector during surface scanning. Also, the highlighted nuclides emit radiations that are likely to be detected to some degree with liquid scintillation counting.

As a sample calculation, the table below examines 18 month decay period for residual activity of 200 microcurie per nuclide:

Nuclide	Half life	Assumed Amount Present at Last Use (mCi)	Decay Period (months)	Decay-Corrected Amount (mCi)	% of Total	10 CFR 20 Appendix C (mCi)	< 10CFR20 AppC?
H-3	12.3 y	0.2	18	0.18	27%	1	Yes
C-14	5730 y	0.2	18	0.20	29%	0.1	No
Na-22	2.6 y	0.2	18	0.13	19%	0.01	No
P-32	14.3 d	0.2	18	0.00	0%	0.01	Yes
S-35	87.7 d	0.2	18	0.00	0%	0.1	Yes
Ca-45	163 d	0.2	18	0.02	3%	0.1	Yes
Sc-46	83.8 d	0.2	18	0.00	0%	0.01	Yes
Cr-51	27.7 d	0.2	18	0.00	0%	1	Yes
Fe-59	44.5 d	0.2	18	0.00	0%	0.01	Yes
Ga-67	3.3 d	0.2	18	0.00	0%	1	Yes
Sr-85	64.8 d	0.2	18	0.00	0%	0.1	Yes
Rb-86	18.6 d	0.2	18	0.00	0%	0.1	Yes
Nb-95	35 d	0.2	18	0.00	0%	0.1	Yes
Cd-109	1.27 y	0.2	18	0.09	13%	1	Yes
Sn-113	115 d	0.2	18	0.01	1%	0.1	Yes
I-125	60.1 d	0.2	18	0.00	0%	0.001	Yes
I-131	8 d	0.2	18	0.00	0%	0.001	Yes
Ba-140	12.7 d	0.2	18	0.00	0%	0.1	Yes
Ce-141	32.5 d	0.2	18	0.00	0%	0.1	Yes
Pr-143	13.6 d	0.2	18	0.00	0%	0.1	Yes
Gd-151	124 d	0.2	18	0.01	1%	0.01	Yes
Gd-153	241.6 d	0.2	18	0.04	6%	0.01	No
			Sum-->	0.69	100%		

In the sample table above C-14, Na-22, and Gd-153 are predicted to remain as potential contaminants of significance under given assumptions (i.e., above values in 10 CFR 20, Appendix C). In addition, H-3, Ca-45, Cd-109, and Sn-113 could still be present and might each contribute around 1% or more to total activity. Except for H-3 (low energy beta emitter), all of these nuclides emit radiations that are likely to be detected by a GM pancake detector during surface scanning. Also, except for possibly Gd-151, the highlighted nuclides emit radiations (electrons or low energy X-rays) that are likely to be detected to some degree with liquid scintillation counting.

3. For each building, either provide a list of rooms historically restricted for radioactive materials use or indicate rationale for not surveying every room in building. Note that there are additional questions/comments below regarding rooms that do not appear to have any survey data.

HRG Response: This list of rooms generated from the attached file (Bldg 3 & 28 RAM Use History & Closeout 8-27-08.doc) provided by Joe Graves, RSO at the VA in Iowa City.

Building 28: 132, 132a, 1A1, 1A2, 1A3, 1B2A, 1B2B, 1B5 and 1B6.

Building 3: 100, 116, 118, 120 128, 131, 132, 136, 140, 147, 151, 163, 170, 172, 175, 179, 200, 206, 210, 212, 218, 240, 244, 245, 246, 248, 249, 258, 259, 262, 266, 267, 276, 278, 290, 305, 306, 319, 170S, 206A, 206B, 244A, 259B, 266C, 267S, Apt 5, B12, B18, B18-3, BSL3, C123,

C124, C128, C131, C132, C132A, C133, C137, C138, C139, C140, C146, C240, C244a, C245, C248, S147, S147A, S151 and S152

Investigator	Radionuclide(s)	Shipping limit	On-hand limit	Bld 28 Use areas	Bld 3 Use areas
Ballas	H-3	5 mCi	7.5 mCi	1B2A, 1B2B, 132, 132a	
	Cr-51	10 mCi	40 mCi		
5/2/07	P-32	0.250 mCi	2 mCi		
	S-35	1 mCi	2 mCi		
McGowan	H-3	0.250 mCi	20 mCi		210, 206, 206b, 240, 244, C245 246
	P-32	1 mCi	2 mCi		
5/1/07	S-35	0.50 mCi	20 mCi		
	C-14	0.10 mCi	3 mCi		
	I-125	0.01 mCi	1 mCi		
	Cr-51	2 mCi	2 mCi		
	Tc-99m	1 mCi	1 mCi		
Stapleton	P-32	0.25 mCi	5 mCi	1A1, 1A3	100, 118, 120, C124, 128, 131, C132A, 136, C137, C138, 140, 248, 267
	S-5	2 mCi	2 mCi		
4/17/07	I-25	0.024 mCi	2 mCi		
	H-3	0.25 mCi	3 mCi		
	Cr-51	10 mCi	10 mCi		
	C-14	0.25 mCi	0.05 mCi		
	Ga-67	6 mCi	6 mCi		
	Fe-59	0.5 mCi	0.5 mCi		
Bertolatus	H-3	0.10 mCi	1.5 mCi		200, 206, 206A
	C-14	0.05 mCi	0.05 mCi		
10/91	I-131	2 mCi	4 mCi		
	I-125	2 mCi	4 mCi		
	S-35	2 mCi	4 mCi		
	P-32	1 mCi	2 mCi		
Bishop	S-35	5 mCi	10 mCi		262, 267
	P-32	2.5 mCi	5 mCi		
3/97	H-3	5 mCi	10 mCi		
	I-125	1 mCi	2 mCi		
Bonney	H-3	1 mCi	20 mCi		249
	Cr-51	5 mCi	10 mCi		
12/86	I-131	1 mCi	5 mCi		
	I-125	1 mCi	5 mCi		
Britigan	S-35	5 mCi	10 mCi	1A1, 1A3	116, 120, 131, 132, 136
12/88	H-3	0.10 mCi	0.25 mCi		
Clark	Ca-45	1 mCi	5 mCi		120, 132, 136,140, 151, 240, 278, 290
	H-3	5 mCi	20 mCi		
11/85	C-14	2 mCi	5 mCi		

	Fe-59	0.10 mCi	0.20 mCi		
	I-125	2 mCi	5 mCi		
	Co-57	0.01 mCi	0.02 mCi		
	Cr-51	10 mCi	20 mCi		
Cohen 4/97	P-32	0.5 mCi	1 mCi		262, 266, 267
Cook 5/92	H-3	1 mCi	2 mCi	1B2A	100, 170, 305, 306
	Cr-51	5 mCi	10 mCi		
Dayton 8/85	C-14	0.25 mCi	0.25 mCi		305
Densen 12/85	H-3	5 mCi	20 mCi		120, 132, 136, 140
	C-14	2 mCi	5 mCi		
	I-125	2 mCi	5 mCi		
	Cr-51	10 mCi	20 mCi		
	Fe-59	0.1 mCi	0.2 mCi		
	Co-57	0.01 mCi	0.02 mCi		
DiBona 9/85	C-14	5 mCi	5 mCi		212, 218, 319
	H-3	5 mCi	5 mCi		
	I-125	0.05 mCi	1 mCi		
Ephgrave 4/89	Sc-46	0.50 mCi	0.50 mCi		B12
	Sr-85	0.50 mCi	0.50 mCi		
	Nb-95	0.50 mCi	0.50 mCi		
	Sn-113	0.50 mCi	0.50 mCi		
	Gd-151	0.50 mCi	0.50 mCi		
Feldbush 7/87	Cr-51	2 mCi	4 mCi		259
	H-3	0.05 mCi	4 mCi		
Fitz 1/89	I-125	0.010 mCi	2 mCi		267S
Friedlander 3/86	I-125	0.75 uCi	2 uCi		Apt 5, 151
	H-3	5 uCi	10 uCi		
Ginsberg 9/85	H-3	1 mCi	20 mCi		306
	C-14	0.25 mCi	2.5 mCi		
	I-125	20 mCi	30 mCi		
	S-35	5 mCi	5 mCi		
	P-32	10 mCi	25 mCi		
	I-131	5 mCi	10mCi		
	Cr-51	2 mCi	10 mCi		
	Na-22	1 mCi	2 mCi		
	Ca-45	1 mCi	2 mCi		
	Rb-86	1 mCi	2 mCi		
Goldberg 5/86	H-3	0.01 mCi	2 mCi		100, 151, 206A
	C-14	0.002 mCi	2 mCi		
	I-125	0.05 mCi	2 mCi		

Hart 2/95	Fe-55 (sealed source)	10 uCi	10 uCi		170, 172, 175, 179, 276
	Gd-153	5 uCi	5 uCi		
	Sc-46	5 uCi	5 uCi		
	Sn-113	5 uCi	5 uCi		
	Sr-85	5 uCi	5 uCi		
	H-3	5 uCi	5 uCi		
Heistad 6/96	Sc-46	5 mCi	5 mCi		B18, B12, 278
	Nb-95	5 mCi	5 mCi		
	Ce-141	5 mCi	5 mCi		
	Gd-153	5 mCi	5 mCi		
	Sr-85	5 mCi	5 mCi		
	Sn-113	5 mCi	5 mCi		
	Mn-54	5 mCi	5 mCi		
	Gd-109	5 mCi	5 mCi		
	In-114	5 mCi	5 mCi		
	Cr-51	5 mCi	5 mCi		
	Ru-103	5 mCi	5 mCi		
	Co-57	5 mCi	5 mCi		
	Fe-59	5 mCi	5 mCi		
Hitchon 8/96	Nb-95	0.5 mCi	1 mCi		290
	Sr-85	0.5 mCi	1 mCi		
	Sc-46	0.5 mCi	1 mCi		
	Gd-153	0.5 mCi	1 mCi		
	Ce-141	0.5 mCi	1 mCi		
	Sn-113	0.5 mCi	1 mCi		
Hunsicker 5/88	H-3	10 mCi	25 mCi		200
	I-125	1 mCi	2 mCi		
	I-131	1 mCi	2 mCi		
	Na-22	200 uCi	300 uCi		
	C-14	1 mCi	2 mCi		
Jensen 1/95	Ni-63 (sealed source)	15 mCi	15 mCi		163
Kirchoff 11/99	I-125	1 mCi	2 mCi		306
	Cr-51	1 mCi	2 mCi		
Kirkpatric 12/85	C-14	100 uCi	1 mCi		240, 244A
	S-35	250 uCi	2 mCi		
	H-3	250 uCi	1 mCi		
LaBrecque 8/86	Na-22	1 mCi	2 mCi		240, 244A
	H-3	5 mCi	10 mCi		
	C-14	5 mCi	10 mCi		
	S-35	2 mCi	5 mCi		
	P-32	5 mCi	10 mCi		
	I-125	10 uCi	10 uCi		
LaFrenz 6/86	S-35	1 mCi	2 mCi		151
	H-3	2 mCi	2 mCi		
	P-32	0.5 mCi	1 mCi		
	I-125	5 mCi	10 mCi		
Lawton	I-125	0.01 mCi	2 mCi		Apt 5, 267, B18

10/88					
Loftus	Co-57	500 uCi	1 mCi	1B6	
	Sc-46	500 uCi	1 mCi		
9/98	Nb-95	500 uCi	1 mCi		
	Sn-113	500 uCi	1 mCi		
	Sr-85	500 uCi	1 mCi		
	Ce-141	500 uCi	1 mCi		
Lubaroff	H-3	1 mCi	2 mCi		151, 248, 249, 258, 259, 262, 266, 266c, 267
	Cr-51	10 mCi	20 mCi		
6/02	I-125	0.5 mCi	1.0 mCi		
	P-32	0.25 mCi	0.5 mCi		
Kopp2/00	C-14	5 uCi	5uCi		200
Martin 4/82	H-3	5 mCi	5 mCi		278
Miller 9/99	H-3	10 mCi	40 mCi		170
Nauseef	C-14	0.05 mCi	20 mCi	1A1, 1A2, 1A3, 1B5, 1B6	100, 116, 118, 120, C123, C124, C128, C131, C132, C132A, C133, C137, C138, C139, C140, C146, S147, S147A, S151, S152, C240, C244A, C249, C248
	H-3	0.1 mCi	50 mCi		
10/03	S-35	0.05 mCi	10 mCi		
	P-32	1 mCi	10 mCi		
	I-125	0.024 mCi	4 mCi		
	Co-57	0.05 mCi	0.1 mCi		
	Ga-67	6 mCi	6 mCi		
	Ca-45	5 mCi	10 mCi		
	Cr-51	10 mCi	20 mCi		
	Fe-59	0.5 mCi	1 mCi		
Pettit	Ba-140	1 mCi	2 mCi		278
1/91	Pr-143	1 mCi	2 mCi		
Schlesinger	H-3	1 mCi	12 mCi		BLS3, Room 5, B18-3
	C-14	1 mCi	20 mCi		
2/03	S-35	0.05 mCi	10 mCi		
	P-32	2 mCi	10 mCi		
	I-125	0.024 mCi	4 mCi		
	Fe-59	0.5 mCi	1 mCi		
	Ga-67	6 mCi	12m Ci		
See	P-32	0.250 mCi	4.5 mCi		259, 259b, 266, 267
	I-125	1.5 mCi	4.5 mCi		
8/99	S-35	1 mCi	1 mCi		
	H-3	1 mCi	1.5 mCi		
Spanheimer	C-14	0.25 mCi	0.25 mCi		170S
12/96	H-3	5 mCi	10 mCi		
	S-35	10 mCi	20 mCi		
Talman	S-35	1 mCi	1 mCi	1A1	276, 278, 305
	H-3	0.25 mCi	6 mCi		
4/03	C-14	0.25 mCi	1.5 mCi		
	Sc-46	.5 mCi	.5 mCi		
	Gd-153	.5 mCi	.5 mCi		
	Sn-113	.5 mCi	.5 mCi		

	I-125	0.0015 mCi	0.0015 mCi		
Weinstock 1/89	I-125	10 uCi	10 mCi		116, 240, 244, 245, 306
	P-32	1 mCi	2 mCi		
	S-35	1 mCi	10 mCi		
	H-3	2.6 mCi	10 mCi		
	Cr-51	5 mCi	10 mCi		
Wilson 10/89	I-125	2 mCi	10 mCi		259, 151, 147, 136
	H-3	1 mCi	4 mCi		

4. Provide calibration certificates for all portable radiation detectors used.

   HRG Response: See attached file (Calibration Certificates.pdf)

5. We usually want to receive wipe data in terms of "dpm" rather than "cpm". Additional information is needed for wipe counter to ensure sensitivity is adequate (since all results were reported in cpm):

   a. Provide information on standards used for liquid scintillation counters. What standards were used and what were nominal counting efficiencies for count windows 1, 2, and 3?

   HRG Response:

Radionuclide	W1 % {0.0 – 12.0}	W2 % {12.0 – 156.0}	W3 % {125.0 – 2000.0}
Th-nat	23.95±0.29	134.83±0.83	232.86±1.49
U-nat	22.58±0.21	143.76±0.84	22.82±0.51
C-14	35.70±1.85	56.91±3.51	0.15±0.21
Fe-55	15.51±0.95	0.20±0.22	0.47±0.15
H-3	23.65±1.12	0.02±0.15	0.17±0.19
I-125	56.11±0.99	19.11±1.34	0.19±0.18
I-131	9.56±0.75	80.03±1.63	14.96±0.56
P-32	2.93±0.49	34.29±1.69	64.03±1.84
Cr-51	11.96±0.48	0.75±0.14	0.10±0.10

   b. Confirm that beta/electron energy ranges for windows 1, 2, and 3 are 0-12 keV, 12-156 keV, and 125-2000 keV, respectively.

   HRG Response: These values are correct.

   c. Provide estimate of wipe counter sensitivity (MDC) in terms of "dpm" for windows 1, 2, and 3.

   HRG Response:

   MDC calculation for window 1:

Background: 7.4 cpm (Based on daily background checks)
H-3 Efficiency: ~24%
MDC = (3+4.65vbkgd) /efficiency
MDC = (3+4.65v9.2) / (0.24) = 71.3 dpm

MDC calculation for window 2:

Background: 12.9 cpm (Based on daily background checks)
C-14 Efficiency: ~57%
MDC = (3+4.65vbkgd) /efficiency
MDC = (3+4.65v12.9) / (0.57) = 34.6 dpm

MDC calculation for window 3:

Background: 12.0 cpm (Based on daily background checks)
P-32 Efficiency: ~64%
MDC = (3+4.65vbkgd) /efficiency
MDC = (3+4.65v12.0) / (0.64) = 29.9 dpm

d. Other than background measurements, please describe what other routine QC checks were performed on wipe counters (e.g., control standards counted?).

HRG Response: Background, carbon-14 and tritium standards are run as part of daily QC standard operating procedures for the stationary counting systems.

6. In Section 4.2 of the report, unit prefixes are omitted for exposure rates related to measurements with Inovision 451P; please clarify units.

HRG Response: uR/hr (microR/hour) were the units for the Inovision 451P.

7. In section 4.3.2, the MDC for a static 1-minute count is provided for the Ludlum 44-9; the value was 4321 dpm/100cm^2. However, the scanning investigation level value was not provided in terms of dpm/100cm^2 for direct comparison to release criteria. Please provide estimates of the "2 x background" investigation level (in units of dpm/100cm2) to verify that detection methods provide adequate sensitivity to detect contaminants at levels below your release criteria in Table 3.1.

As information only, a suggested equation for this quantity follows. If you concur with this information, you can indicate that as your response:

Scanning Investigation Level (2 x bkgd) (in terms of dpm/100cm^2):

"2 x Bkgd" Investigation level = $\frac{(2b-b)}{Efficiency_{total}} * \frac{100\ cm^2}{Detector\ \mathrm{Pr}obe\ Area}$

where

b = typical background count rate
Efficiency = total 4-pi counting efficiency for mixture of nuclides
Detector Probe Area = 15 cm^2 (typical active area of 44-9)

As an example calculation, using b = 40 cpm; Efficiency =0.05 c/d (manufacturer typical value for C-14 for Ludlum 44-9 probe); and Detector Probe area =15 cm^2 (Ludlum 44-9 probe):

"2 x Bkgd" Investigation level ($dpm/100cm^2$)= $\frac{(40)}{0.05} * \frac{100}{15} = 5330\ dpm/100cm^2$

Section 4.3.4 of your report states that any scan result above 2 x Background (investigation level) would result in a 1-minute direct measurement at the location. The 2 x Background investigation level above (5330 $dpm/100cm^2$) is approximately equal to the average total contamination release criterion (5000 dpm/100cm2) and well below the maximum total release criterion (15000 dpm/100cm2) cited in Section 3.0 of your report.

Section 4.3.2 reports the MDC of a fixed measurement as 4321 dpm/100 cm2 and is below the maximum and average total surface criteria in Table 3.1. Therefore, the scanning technique of performing a more quantitative survey if the "2 x Background" level were exceeded, would allow activity above the release criteria to be identified for radionuclides with 0.05 or better detection efficiency.

In addition, the "2 x Background" level and MDC noted above are all well below the NRC-approved decommissioning screening level criteria in NUREG-1757, Vol. 1, Rev. 2, Table B.1 for the radionuclides of concern (H-3: 1.2E+8 dpm/100cm2; C-14: 3.7E+6 dpm/100cm2; Na-22: 9.5E+3 dpm/100cm2).

HRG Response: We concur with the above assessment.

8. In Appendix B, for instrument checks on August 9, 2008, the beginning and end of day instrument checks are identical for every instrument checked. Please confirm that August 9, 2008 instrument check data are accurate.

   HRG Response: This is a typographical error. See updated pages in attached file (Daily Checks (End of Day).doc).

9. Sections 5.1 and 5.2 reference summary tables of surveys and wipe results in Appendix C. In Appendix C there are no summary *tables*, only diagrams with hand-written numbers on them. There is no legend or key or discussion of the information contained in these diagrams. Please answer the following questions:

   HRG Response: There were tables in the first version of the report submitted. The field records were requested for inclusion in the report. The tables were likely replaced by the field records. We will provide the tables that 5.1 and 5.2 reference in addition to the field notes.

   The diagrams were initially intended as field records and were not to be included in the report. The diagrams were not completely filled out because the same instruments and survey teams were used throughout the investigation. The survey results and the location of the wipes were the important data to be recorded.

a. On overall floor diagrams for Bldgs. 3 and 28, what do hand-written numbers represent? If actual survey results are being shown, specify the type of readings (dose rates, wipe results, etc.), type of instrument used, and the appropriate units. This could be accomplished by providing an annotated version of one of the diagrams.

HRG Response: In building 28, the hand-written numbers represent count rates measured in cpm using a Ludlum model 3 with a 44-9 probe. The count rates were only recorded in building 3 if they exceeded twice background.

b. On the enlarged diagrams for various "sections" there are circled letters and numbers that seem to indicate grid reference numbers. What do the circled numbers within the grid boxes represent? (For example, Bldg 3, Basement, Sect B has seven such numbers.) If actual survey results are being shown, specify what type of readings (dose rates, wipe results, etc.) are shown and what type instrument was used and units. This could be accomplished by providing an annotated version of one of these diagrams.

HRG Response: The circled numbers represent exposure rates measured in uR/hr using an Inovision 451P pressurized ion chamber. We will provide an annotated diagram for Building 3 and 28 to serve as keys.

c. Note that there are no enlarged diagrams for Bldg. 3, Basement, Sections A and D. Please explain this discrepancy or provide diagrams.

HRG Response: Sections A and D are inaccessible dirt-floor crawl spaces under the building.

d. On enlarged diagrams of various "sections," what do line-outs (free-form hand-drawn lines, cross-hatched or curved wavy lines) represent? (perhaps this is just a way to mark non-existing areas?)

HRG Response: The wavy lines represent non-existent areas.

10. Appendices D through P provide survey and wipe sample data.

a. Please explain the grid numbering system that was used for each building. For example, what does grid "3-B-B20B" represent physically as a location? What about grid "28-5"?

HRG Response: In Build 3, the survey unit was an individual room. For 3-B-B20B; "3" represents the building, "B" represents the floor (in this case the basement), and "B20B" is the second survey unit in room B20. For rooms larger than 10x10 meters, multiple grids were established and designated by a letter at the end of the room number.

Building 28 was broken down into 10x10 meter grids: "28" is the building and "5" is the grid number.

b. What do free form lines indicate on grid survey diagrams? (Perhaps these are areas excluded from specified grid)?

HRG Response: The free form lines indicate areas excluded from that specific grid.

c. Grid diagrams with reference points on 4 corners appear to represent floor areas; grid diagrams with reference points on only 2 corners appear to represent walls. Please confirm that this understanding is correct.

HRG Response: This is correct.

d. Grid drawings have data points labeled with a "W" (e.g., "W45"). Does the "W" label denote a wipe survey location? (There was no legend or key to confirm this).

HRG Response: The "W" label does denote wipe survey locations.

e. Many of the fields on the survey data sheets are blank (surveyor name, instrument serial no., Cal. date, etc.). Please confirm that instruments listed in Appendix B were used for scanning surveys (i.e., Ludlum Model 3 with 44-9 GM pancake probe for surface contamination scans and direct measurements; Inovision Model 451P for exposure rate measurements).

HRG Response: These fields were not completed because the data sheets were intended to be field notes only. The instruments listed in Appendix B are the ones used for the surveys.

f. Wipe count results are numbered 1, 2, 3,... on what appear to be liquid scintillation counter print-outs. The sample IDs on print-outs are labeled as 1, 2, 3,..., and do not correlate with the labels on the survey grid diagrams (e.g., W46, W47, W48, etc.). How are wipe count data linked to a grid area? (Perhaps Sample IDs of 1, 2, 3, refer to the wipes in a sequenced order form smallest to largest such as W41, W42, W43 for a given grid?

HRG Response: This is correct, the Sample IDs of 1, 2, 3... refer to the wipes in a sequenced order form smallest to largest such as W41, W42, W43... for a given grid.

g. It appears that an effort was made to collect a wipe sample from each sink. Were wipes collected from the actual sink drain or just the surfaces of the sink? If wipes were not from sink drains, please collect wipe samples and report results for each sink drain.

HRG Response: Wipe samples were collected from each sink drain.

h. It appears that an effort was made to collect a wipe sample from each hood. Were wipes collected from the exit ducts or just the surfaces of the hood? If wipes were not collected from the exit ducts, please collect wipe samples and report results for each duct.

HRG Response: Wipe samples were collected from the exit duct of each fume hood.

11. In Appendix D (Bldg. 3, Basement, Section A): Please explain whether surveys were performed in Rooms B-11 and B-18 (perhaps B-18 is the autoclave area). If not, please explain why.

    HRG Response: B-11 was a crawlspace area that was not used for radioactive materials. B-18 was an autoclave area.

12. In Appendix E (Bldg. 3, Basement, Section B): Please explain whether surveys were performed in Room B-10 ~~(perhaps B-18 is the autoclave area)~~. If not, please explain why.

    HRG Response: Area B-10 is crawlspace and not accessible and was assumed to be a non-impacted area.

13. In Appendix F (Bldg. 3, Basement, Section C):

    a. For diagram for grid 3-C-B-6, Wall 3-4, the statement reads "Survey results indicate to residual contamination in excess of free release criteria." Should this have read "Survey results indicate no residual contamination in excess of free release criteria."?

       HRG Response: This is a typo. It should read "Survey results indicate no residual contamination in excess of free release criteria."

    b. Please explain why there are two sets of results for grid 3-C-B-7 (presumably Bldg. 3, Section C, Room B-7) and no survey data for Room B-2 and B-4 (presumably grids 3-C-B-2 and 3-C-B-4).

       HRG Response: [Bldg # - Section - Room #]: Grid 3-C-7 (Group 8 tag – top of page) is correct as labeled. Grid 3-C-7 (Group 12 tag – top of page) was mis-labeled; correct room label should read Grid 3-C-B4. Room B2 is a crawl space accessible from Room B3, Room B2 was not tested.

14. In Appendix G (Bldg 3, Basement, Section D, "Field Survey and Wipe Results"), a diagram is provided but no survey results accompany the drawing. Please explain discrepancy. (Note: There are some results for a grid 3-B-B20B in Appendix D that perhaps account for a portion of this area).

    HRG Response: The results for this area are found in a combination of some results from grid 3-B-B20B in Appendix D and grid 3-1-ST05A in Appendix H. The results of the survey are background levels. The blank diagram was left in place to acknowledge the space existed, but we missed noting these facts on the diagram.

15. In Appendix H (Bldg. 3, Floor 1, Section A): Please explain why no survey results are provided for Room 157. Also, please confirm that results in grids 3-1-185-6 through 3-1-185-9 encompass the entire corridor area in Section A.

    HRG Response: The results in grids 3-1-185-6 through 3-1-185-9 do encompass the entire corridor area in Building 3, Floor 1, Section A.

16. In Appendix J (Bldg. 3, Floor 1, Section C), the third page after the diagram for grid 3-1-137A is labeled as 3-1-147A. Is this a typographical error? (Room 147A is addressed in Appendix I).

HRG Response: Yes, this is a typographical error and should be labeled 3-1-137A.

17. In Appendix L (Bldg. 3, Floor 2, Section A): Please explain why no survey results were provided for Room 272 (results could not be found).

HRG Response: Room 272 is a very small closet that was not suspected for use of radioactive materials.

Wipe number W-25 was taken in the doorway which is indicated on survey diagram grid 3-2-308-11. Instrument survey was completed of the area and indicated background levels. Survey results are background.

18. In Appendix M (Bldg. 3, Floor 3, Section B):

a. In the set of results for grid 3-2-261, one diagram for a wall in this area appears to be incorrectly labeled as 3-2-269. Please confirm if typo error occurred.

HRG Response: Yes, the diagram is incorrectly labeled. It should be labeled 3-2-261.

b. What was done with the HEPA filter(s) in room 267? Was the HEPA filter housing surveyed internally to ensure release criteria are met?

HRG Response: Yes, the HEPA filter housing was dismantled and surveyed internally to ensure the release criteria were met. Instrument survey indicated background levels and wipe number W-62 was background.

19. In Appendix O (Bldg. 3, Floor 2, Section D):

a. The wipe count data for grid 3-2-218-1 is incomplete. It appears to be missing header information due to landscape mode page orientation. Please provide comment or submit a corrected page.

HRG Response: Page format will be corrected.

b. The survey diagram for the first wall diagram after the grid 3-2-2ST01 floor diagram is not labeled. Please confirm that this drawing is for grid 3-2-2ST01.

HRG Response: Yes, this drawing is for grid 3-2-2ST01.

20. In Appendix P (Bldg. 28, Floor 1):

a. Throughout this appendix there are circled numbers shown. What does these values represent? (Exposure rates? Units?)

HRG Response: The circled numbers represent exposure rates measured in uR/hr using an Inovision 451P pressurized ion chamber.

b. There does not appear to be wipe data for grid 28-1-3. Please comment.

HRG Response: If we assume that 28-3 (Room A1A) is the space in question, the survey is attached to the survey group 28-2. The room is a small mechanical space that was not used for radioactive materials. The room is defined in the survey floor plan as bounded by A2, B2, A3 and B3. A meter survey was performed and one confirmatory wipe was taken in this space. The survey results were background.

End of Document

Buildings 3 & 28 RAM Use History & Close-Out
08/27/08
Joe Graves, RSO
VA Medical Center
Iowa City, Iowa

Investigator (Close Out Date)	**Radionuclide(s)**	**Shipping limit**	**On-hand limit**	**Bld 28** Use areas	**Bld 3** Use areas
Ballas	H-3	5 mCi	7.5 mCi	1B2A, 1B2B, 132, 132a	
	Cr-51	10 mCi	40 mCi		
5/2/07	P-32	0.250 mCi	2 mCi		
	S-35	1 mCi	2 mCi		
McGowan	H-3	0.250 mCi	20 mCi		210, 206, 206b, 240, 244, C245 246
	P-32	1 mCi	2 mCi		
5/1/07	S-35	0.50 mCi	20 mCi		
	C-14	0.10 mCi	3 mCi		
	I-125	0.01 mCi	1 mCi		
	Cr-51	2 mCi	2 mCi		
	Tc-99m	1 mCi	1 mCi		
Stapleton	P-32	0.25 mCi	5 mCi	1A1, 1A3	100, 118, 120, C124, 128, 131, C132A, 136, C137, C138, 140, 248, 267
	S-5	2 mCi	2 mCi		
4/17/07	I-25	0.024 mCi	2 mCi		
	H-3	0.25 mCi	3 mCi		
	Cr-51	10 mCi	10 mCi		
	C-14	0.25 mCi	0.05 mCi		
	Ga-67	6 mCi	6 mCi		
	Fe-59	0.5 mCi	0.5 mCi		
Bertolatus	H-3	0.10 mCi	1.5 mCi		200, 206, 206A
	C-14	0.05 mCi	0.05 mCi		
10/91	I-131	2 mCi	4 mCi		
	I-125	2 mCi	4 mCi		
	S-35	2 mCi	4 mCi		
	P-32	1 mCi	2 mCi		
Bishop	S-35	5 mCi	10 mCi		262, 267
	P-32	2.5 mCi	5 mCi		
3/97	H-3	5 mCi	10 mCi		
	I-125	1 mCi	2 mCi		
Bonney	H-3	1 mCi	20 mCi		249
	Cr-51	5 mCi	10 mCi		
12/86	I-131	1 mCi	5 mCi		
	I-125	1 mCi	5 mCi		
Britigan	S-35	5 mCi	10 mCi	1A1, 1A3	116, 120, 131, 132, 136
12/88	H-3	0.10 mCi	0.25 mCi		
Clark	Ca-45	1 mCi	5 mCi		120, 132, 136,140, 151, 240, 278, 290
	H-3	5 mCi	20 mCi		
11/85	C-14	2 mCi	5 mCi		
	Fe-59	0.10 mCi	0.20 mCi		

	I-125	2 mCi	5 mCi		
	Co-57	0.01 mCi	0.02 mCi		
	Cr-51	10 mCi	20 mCi		
Investigator	**Radionuclide(s)**	**Shipping limit**	**On-hand limit**	**Bld 28** Use areas	**Bld 3** Use areas
Cohen 4/97	P-32	0.5 mCi	1 mCi		262, 266, 267
Cook 5/92	H-3	1 mCi	2 mCi	1B2A	100, 170, 305, 306
	Cr-51	5 mCi	10 mCi		
Dayton 8/85	C-14	0.25 mCi	0.25 mCi		305
Densen 12/85	H-3	5 mCi	20 mCi		120, 132, 136, 140
	C-14	2 mCi	5 mCi		
	I-125	2 mCi	5 mCi		
	Cr-51	10 mCi	20 mCi		
	Fe-59	0.1 mCi	0.2 mCi		
	Co-57	0.01 mCi	0.02 mCi		
DiBona 9/85	C-14	5 mCi	5 mCi		212, 218, 319
	H-3	5 mCi	5 mCi		
	I-125	0.05 mCi	1 mCi		
Ephgrave 4/89	Sc-46	0.50 mCi	0.50 mCi		B12
	Sr-85	0.50 mCi	0.50 mCi		
	Nb-95	0.50 mCi	0.50 mCi		
	Sn-113	0.50 mCi	0.50 mCi		
	Gd-151	0.50 mCi	0.50 mCi		
Feldbush 7/87	Cr-51	2 mCi	4 mCi		259
	H-3	0.05 mCi	4 mCi		
Fitz 1/89	I-125	0.010 mCi	2 mCi		267S
Friedlander 3/86	I-125	0.75 uCi	2 uCi		Apt 5, 151
	H-3	5 uCi	10 uCi		
Ginsberg 9/85	H-3	1 mCi	20 mCi		306
	C-14	0.25 mCi	2.5 mCi		
	I-125	20 mCi	30 mCi		
	S-35	5 mCi	5 mCi		
	P-32	10 mCi	25 mCi		
	I-131	5 mCi	10mCi		
	Cr-51	2 mCi	10 mCi		
	Na-22	1 mCi	2 mCi		
	Ca-45	1 mCi	2 mCi		
	Rb-86	1 mCi	2 mCi		
Goldberg 5/86	H-3	0.01 mCi	2 mCi		100, 151, 206A
	C-14	0.002 mCi	2 mCi		
	I-125	0.05 mCi	2 mCi		
Hart 2/95	Fe-55 (sealed source)	10 uCi	10 uCi		170, 172, 175,

Hart 2/95	Gd-153	5 uCi	5 uCi		179, 276
	Sc-46	5 uCi	5 uCi		
	Sn-113	5 uCi	5 uCi		
	Sr-85	5 uCi	5 uCi		
	H-3	5 uCi	5 uCi		

Investigator	**Radionuclide(s)**	**Shipping limit**	**On-hand limit**	**Bld 28** Use areas	**Bld 3** Use areas
Heistad 6/96	Sc-46	5 mCi	5 mCi		B18, B12, 278
	Nb-95	5 mCi	5 mCi		
	Ce-141	5 mCi	5 mCi		
	Gd-153	5 mCi	5 mCi		
	Sr-85	5 mCi	5 mCi		
	Sn-113	5 mCi	5 mCi		
	Mn-54	5 mCi	5 mCi		
	Gd-109	5 mCi	5 mCi		
	In-114	5 mCi	5 mCi		
	Cr-51	5 mCi	5 mCi		
	Ru-103	5 mCi	5 mCi		
	Co-57	5 mCi	5 mCi		
	Fe-59	5 mCi	5 mCi		
Hitchon 8/96	Nb-95	0.5 mCi	1 mCi		290
	Sr-85	0.5 mCi	1 mCi		
	Sc-46	0.5 mCi	1 mCi		
	Gd-153	0.5 mCi	1 mCi		
	Ce-141	0.5 mCi	1 mCi		
	Sn-113	0.5 mCi	1 mCi		
Hunsicker 5/88	H-3	10 mCi	25 mCi		200
	I-125	1 mCi	2 mCi		
	I-131	1 mCi	2 mCi		
	Na-22	200 uCi	300 uCi		
	C-14	1 mCi	2 mCi		
Jensen 1/95	Ni-63 (sealed source)	15 mCi	15 mCi		163
Kirchoff 11/99	I-125	1 mCi	2 mCi		306
	Cr-51	1 mCi	2 mCi		
Kirkpatric 12/85	C-14	100 uCi	1 mCi		240, 244A
	S-35	250 uCi	2 mCi		
	H-3	250 uCi	1 mCi		
LaBrecque 8/86	Na-22	1 mCi	2 mCi		240, 244A
	H-3	5 mCi	10 mCi		
	C-14	5 mCi	10 mCi		
	S-35	2 mCi	5 mCi		

	P-32	5 mCi	10 mCi		
	I-125	10 uCi	10 uCi		
LaFrenz	S-35	1 mCi	2 mCi		151
	H-3	2 mCi	2 mCi		
6/86	P-32	0.5 mCi	1 mCi		
	I-125	5 mCi	10 mCi		
Lawton 10/88	I-125	0.01 mCi	2 mCi		Apt 5, 267, B18

Investigator	**Radionuclide(s)**	**Shipping limit**	**On-hand limit**	**Bld 28** Use areas	**Bld 3** Use areas
Loftus	Co-57	500 uCi	1 mCi	1B6	
	Sc-46	500 uCi	1 mCi		
9/98	Nb-95	500 uCi	1 mCi		
	Sn-113	500 uCi	1 mCi		
	Sr-85	500 uCi	1 mCi		
	Ce-141	500 uCi	1 mCi		
Lubaroff	H-3	1 mCi	2 mCi		151, 248, 249, 258, 259, 262, 266, 266c, 267
	Cr-51	10 mCi	20 mCi		
6/02	I-125	0.5 mCi	1.0 mCi		
	P-32	0.25 mCi	0.5 mCi		
Kopp2/00	C-14	5 uCi	5uCi		200
Martin 4/82	H-3	5 mCi	5 mCi		278
Miller 9/99	H-3	10 mCi	40 mCi		170
Nauseef	C-14	0.05 mCi	20 mCi	1A1, 1A2, 1A3, 1B5, 1B6	100, 116, 118, 120, C123, C124, C128, C131, C132, C132A, C133, C137, C138, C139, C140, C146, S147, S147A, S151, S152, C240, C244A, C249, C248
	H-3	0.1 mCi	50 mCi		
10/03	S-35	0.05 mCi	10 mCi		
	P-32	1 mCi	10 mCi		
	I-125	0.024 mCi	4 mCi		
	Co-57	0.05 mCi	0.1 mCi		
	Ga-67	6 mCi	6 mCi		
	Ca-45	5 mCi	10 mCi		
	Cr-51	10 mCi	20 mCi		
	Fe-59	0.5 mCi	1 mCi		
Pettit	Ba-140	1 mCi	2 mCi		278
1/91	Pr-143	1 mCi	2 mCi		
Schlesinger	H-3	1 mCi	12 mCi		BLS3, Room 5, B18-3
	C-14	1 mCi	20 mCi		
2/03	S-35	0.05 mCi	10 mCi		
	P-32	2 mCi	10 mCi		

	I-125	0.024 mCi	4 mCi		
	Fe-59	0.5 mCi	1 mCi		
	Ga-67	6 mCi	12m Ci		
See	P-32	0.250 mCi	4.5 mCi		259, 259b, 266, 267
	I-125	1.5 mCi	4.5 mCi		
8/99	S-35	1 mCi	1 mCi		
	H-3	1 mCi	1.5 mCi		
Spanheimer	C-14	0.25 mCi	0.25 mCi		170S
	H-3	5 mCi	10 mCi		
12/96	S-35	10 mCi	20 mCi		

Investigator	**Radionuclide(s)**	**Shipping limit**	**On-hand limit**	**Bld 28** Use areas	**Bld 3** Use areas
Talman	S-35	1 mCi	1 mCi	1A1	276, 278, 305
	H-3	0.25 mCi	6 mCi		
4/03	C-14	0.25 mCi	1.5 mCi		
	Sc-46	.5 mCi	.5 mCi		
	Gd-153	.5 mCi	.5 mCi		
	Sn-113	.5 mCi	.5 mCi		
	I-125	0.0015 mCi	0.0015 mCi		
Weinstock	I-125	10 uCi	10 mCi		116, 240, 244, 245, 306
	P-32	1 mCi	2 mCi		
1/89	S-35	1 mCi	10 mCi		
	H-3	2.6 mCi	10 mCi		
	Cr-51	5 mCi	10 mCi		
Wilson	I-125	2 mCi	10 mCi		259, 151, 147, 136
	H-3	1 mCi	4 mCi		
10/89	S-35	3 mCi	6 mCi		

Investigator	Close Out Date	Nuclide	Half life (Days)	Decay (Days)	Shipment Limit (mCi)	Shipment Decayed (mCi)	Total Amount By Radionuclide Decayed (mCi)	% of Total	10 CFR 20 Appendix C (mCi)	< 10CFR20 Appendix C?
Pettit	1/1/1991	Ba-140	12.74	6514.00	1.00	0.00	0.00	0%	0.1	Yes
LaBrecque	8/1/1986	C-14	2092882.50	8128.00	5.00	4.99	17.51	36%	0.1	No
DiBona	9/1/1985	C-14	2092882.50	8462.00	5.00	4.99			0.1	
Densen	12/1/1985	C-14	2092882.50	8371.00	2.00	1.99			0.1	
Clark	11/1/1985	C-14	2092882.50	8401.00	2.00	1.99			0.1	
Schlesinger	2/3/2003	C-14	2092882.50	2098.00	1.00	1.00			0.1	
Hunsicker	5/1/1988	C-14	2092882.50	7489.00	1.00	1.00			0.1	
Stapleton	4/17/2007	C-14	2092882.50	564.00	0.25	0.25			0.1	
Talman	4/3/2003	C-14	2092882.50	2039.00	0.25	0.25			0.1	
Spanheimer	12/1/1996	C-14	2092882.50	4353.00	0.25	0.25			0.1	
Ginsberg	9/1/1985	C-14	2092882.50	8462.00	0.25	0.25			0.1	
Dayton	8/1/1985	C-14	2092882.50	8493.00	0.25	0.25			0.1	
McGowan	5/1/2007	C-14	2092882.50	550.00	0.10	0.10			0.1	
Kirkpatric	12/1/1985	C-14	2092882.50	8371.00	0.10	0.10			0.1	
Nauseef	10/3/2003	C-14	2092882.50	1856.00	0.05	0.05			0.1	
Bertolatus	10/1/1991	C-14	2092882.50	6241.00	0.05	0.05			0.1	
Kopp	2/1/2000	C-14	2092882.50	3196.00	0.01	0.00			0.1	
Goldberg	5/1/1986	C-14	2092882.50	8220.00	0.00	0.00			0.1	
Nauseef	10/3/2003	Ca-45	163.00	1856.00	5.00	0.00	0.00	0%	0.1	Yes
Clark	11/1/1985	Ca-45	163.00	8401.00	1.00	0.00			0.1	
Ginsberg	9/1/1985	Ca-45	163.00	8462.00	1.00	0.00			0.1	
Heistad	6/1/1996	Cd-109	463.87	4536.00	5.00	0.01	0.01	0%	0.001	No
Loftus	9/1/1998	Ce-141	32.50	3714.00	0.50	0.00	0.00	0%	0.1	Yes
Heistad	6/1/1996	Ce-141	32.50	4536.00	5.00	0.00			0.1	
Hitchon	8/1/1996	Ce-141	32.50	4475.00	0.50	0.00			0.1	
Nauseef	10/3/2003	Co-57	270.90	1856.00	0.05	0.00	0.00	0%	0.1	Yes
Heistad	6/1/1996	Co-57	270.90	4536.00	5.00	0.00			0.1	
Loftus	9/1/1998	Co-57	270.90	3714.00	0.50	0.00			0.1	
Densen	12/1/1985	Co-57	270.90	8371.00	0.01	0.00			0.1	
Clark	11/1/1985	Co-57	270.90	8401.00	0.01	0.00			0.1	

Ballas	5/2/2007	Cr-51	27.70	549.00	10.00	0.00	0.00	0%	1	Yes
Stapleton	4/17/2007	Cr-51	27.70	564.00	10.00	0.00			1	
McGowan	5/1/2007	Cr-51	27.70	550.00	2.00	0.00			1	
Nauseef	10/3/2003	Cr-51	27.70	1856.00	10.00	0.00			1	
Lubaroff	6/2/2002	Cr-51	27.70	2344.00	10.00	0.00			1	
Kirchoff	11/1/1999	Cr-51	27.70	3288.00	1.00	0.00			1	
Heistad	6/1/1996	Cr-51	27.70	4536.00	5.00	0.00			1	
Cook	5/1/1992	Cr-51	27.70	6028.00	5.00	0.00			1	
Weinstock	1/1/1989	Cr-51	27.70	7244.00	5.00	0.00			1	
Feldbush	7/1/1987	Cr-51	27.70	7794.00	2.00	0.00			1	
Bonney	12/1/1986	Cr-51	27.70	8006.00	5.00	0.00			1	
Densen	12/1/1985	Cr-51	27.70	8371.00	10.00	0.00			1	
Clark	11/1/1985	Cr-51	27.70	8401.00	10.00	0.00			1	
Ginsberg	9/1/1985	Cr-51	27.70	8462.00	2.00	0.00			1	
Stapleton	4/17/2007	Fe-59	44.53	564.00	0.50	0.00	0.00	0%	0.01	Yes
Nauseef	10/3/2003	Fe-59	44.53	1856.00	0.50	0.00			0.01	
Schlesinger	2/3/2003	Fe-59	44.53	2098.00	0.50	0.00			0.01	
Heistad	6/1/1996	Fe-59	44.53	4536.00	5.00	0.00			0.01	
Densen	12/1/1985	Fe-59	44.53	8371.00	0.10	0.00			0.01	
Clark	11/1/1985	Fe-59	44.53	8401.00	0.10	0.00			0.01	
Stapleton	4/17/2007	Ga-67	3.26	564.00	6.00	0.00	0.00	0%	1	Yes
Nauseef	10/3/2003	Ga-67	3.26	1856.00	6.00	0.00			1	
Schlesinger	2/3/2003	Ga-67	3.26	2098.00	6.00	0.00			1	
Ephgrave	4/1/1989	Gd-151	124.00	7154.00	0.50	0.00	0.00	0%	0.01	Yes
Talman	4/3/2003	Gd-153	241.60	2039.00	0.50	0.00			0.01	
Heistad	6/1/1996	Gd-153	241.60	4536.00	5.00	0.00			0.01	
Hitchon	8/1/1996	Gd-153	241.60	4475.00	0.50	0.00			0.01	
Hart	2/1/1995	Gd-153	241.60	5022.00	0.01	0.00			0.01	
Miller	9/1/1999	H-3	4510.84	3349.00	10.00	5.98	31.20	64%	1	No
Ballas	5/2/2007	H-3	4510.84	549.00	5.00	4.60			1	
Hunsicker	5/1/1988	H-3	4510.84	7489.00	10.00	3.16			1	
Bishop	3/1/1997	H-3	4510.84	4263.00	5.00	2.60			1	
Spanheimer	12/1/1996	H-3	4510.84	4353.00	5.00	2.56			1	

LaBrecque	8/1/1986	H-3	4510.84	8128.00	5.00	1.43			1	
Densen	12/1/1985	H-3	4510.84	8371.00	5.00	1.38			1	
Clark	11/1/1985	H-3	4510.84	8401.00	5.00	1.38			1	
DiBona	9/1/1985	H-3	4510.84	8462.00	5.00	1.36			1	
Martin	4/1/1982	H-3	4510.84	9711.00	5.00	1.12			1	
Weinstock	1/1/1989	H-3	4510.84	7244.00	2.60	0.85			1	
Schlesinger	2/3/2003	H-3	4510.84	2098.00	1.00	0.72			1	
Lubaroff	6/2/2002	H-3	4510.84	2344.00	1.00	0.70			1	
See	8/1/1999	H-3	4510.84	3380.00	1.00	0.59			1	
LaFrenz	6/1/1986	H-3	4510.84	8189.00	2.00	0.57			1	
Cook	5/1/1992	H-3	4510.84	6028.00	1.00	0.40			1	
Wilson	10/1/1989	H-3	4510.84	6971.00	1.00	0.34			1	
Bonney	12/1/1986	H-3	4510.84	8006.00	1.00	0.29			1	
Ginsberg	9/1/1985	H-3	4510.84	8462.00	1.00	0.27			1	
McGowan	5/1/2007	H-3	4510.84	550.00	0.25	0.23			1	
Stapleton	4/17/2007	H-3	4510.84	564.00	0.25	0.23			1	
Talman	4/3/2003	H-3	4510.84	2039.00	0.25	0.18			1	
Nauseef	10/3/2003	H-3	4510.84	1856.00	0.10	0.08			1	
Kirkpatric	12/1/1985	H-3	4510.84	8371.00	0.25	0.07			1	
Bertolatus	10/1/1991	H-3	4510.84	6241.00	0.10	0.04			1	
Britigan	12/1/1988	H-3	4510.84	7275.00	0.10	0.03			1	
Feldbush	7/1/1987	H-3	4510.84	7794.00	0.05	0.02			1	
Goldberg	5/1/1986	H-3	4510.84	8220.00	0.01	0.00			1	
Hart	2/1/1995	H-3	4510.84	5022.00	0.01	0.00			1	
Friedlander	3/1/1986	H-3	4510.84	8281.00	0.01	0.00			1	
Stapleton	4/17/2007	I-125	60.14	564.00	0.02	0.00	0.00	0%	1	Yes
McGowan	5/1/2007	I-125	60.14	550.00	0.01	0.00			1	
Nauseef	10/3/2003	I-125	60.14	1856.00	0.02	0.00			1	
Lubaroff	6/2/2002	I-125	60.14	2344.00	0.50	0.00			1	
Schlesinger	2/3/2003	I-125	60.14	2098.00	0.02	0.00			1	
Talman	4/3/2003	I-125	60.14	2039.00	0.00	0.00			1	
Kirchoff	11/1/1999	I-125	60.14	3288.00	1.00	0.00			1	
See	8/1/1999	I-125	60.14	3380.00	1.50	0.00			1	

Bishop	3/1/1997	I-125	60.14	4263.00	1.00	0.00			1	
Bertolatus	10/1/1991	I-125	60.14	6241.00	2.00	0.00			1	
Wilson	10/1/1989	I-125	60.14	6971.00	2.00	0.00			1	
Hunsicker	5/1/1988	I-125	60.14	7489.00	1.00	0.00			1	
Weinstock	1/1/1989	I-125	60.14	7244.00	0.01	0.00			1	
Fitz	1/1/1989	I-125	60.14	7244.00	0.01	0.00			1	
Lawton	10/1/1988	I-125	60.14	7336.00	0.01	0.00			1	
Bonney	12/1/1986	I-125	60.14	8006.00	1.00	0.00			1	
LaFrenz	6/1/1986	I-125	60.14	8189.00	5.00	0.00			1	
Ginsberg	9/1/1985	I-125	60.14	8462.00	20.00	0.00			1	
Densen	12/1/1985	I-125	60.14	8371.00	2.00	0.00			1	
Clark	11/1/1985	I-125	60.14	8401.00	2.00	0.00			1	
Goldberg	5/1/1986	I-125	60.14	8220.00	0.05	0.00			1	
LaBrecque	8/1/1986	I-125	60.14	8128.00	0.01	0.00			1	
DiBona	9/1/1985	I-125	60.14	8462.00	0.05	0.00			1	
Friedlander	3/1/1986	I-125	60.14	8281.00	0.00	0.00			1	
Bertolatus	10/1/1991	I-131	8.04	6241.00	2.00	0.00	0.00	0%	1	Yes
Hunsicker	5/1/1988	I-131	8.04	7489.00	1.00	0.00			1	
Bonney	12/1/1986	I-131	8.04	8006.00	1.00	0.00			1	
Ginsberg	9/1/1985	I-131	8.04	8462.00	5.00	0.00			1	
Heistad	6/1/1996	In-114	49.51	4536.00	5.00	0.00	0.00	0%	0.01	Yes
Heistad	6/1/1996	Mn-54	312.50	4536.00	5.00	0.00	0.00	0%	0.1	Yes
LaBrecque	8/1/1986	Na-22	950.38	8128.00	1.00	0.00	0.01	0%	0.01	No
Ginsberg	9/1/1985	Na-22	950.38	8462.00	1.00	0.00			0.01	
Hunsicker	5/1/1988	Na-22	950.38	7489.00	0.20	0.00			0.01	
Loftus	9/1/1998	Nb-95	35.15	3714.00	0.50	0.00	0.00	0%	0.1	Yes
Heistad	6/1/1996	Nb-95	35.15	4536.00	5.00	0.00			0.1	
Hitchon	8/1/1996	Nb-95	35.15	4475.00	0.50	0.00			0.1	
Ephgrave	4/1/1989	Nb-95	35.15	7154.00	0.50	0.00			0.1	
McGowan	5/1/2007	P-32	14.29	550.00	1.00	0.00	0.00	0%	0.01	Yes
Ballas	5/2/2007	P-32	14.29	549.00	0.25	0.00			0.01	
Stapleton	4/17/2007	P-32	14.29	564.00	0.25	0.00			0.01	
Nauseef	10/3/2003	P-32	14.29	1856.00	1.00	0.00			0.01	

Schlesinger	2/3/2003	P-32	14.29	2098.00	2.00	0.00			0.01	
Lubaroff	6/2/2002	P-32	14.29	2344.00	0.25	0.00			0.01	
See	8/1/1999	P-32	14.29	3380.00	0.25	0.00			0.01	
Bishop	3/1/1997	P-32	14.29	4263.00	2.50	0.00			0.01	
Bertolatus	10/1/1991	P-32	14.29	6241.00	1.00	0.00			0.01	
Weinstock	1/1/1989	P-32	14.29	7244.00	1.00	0.00			0.01	
Cohen	4/1/1987	P-32	14.29	7885.00	0.50	0.00			0.01	
LaBrecque	8/1/1986	P-32	14.29	8128.00	5.00	0.00			0.01	
LaFrenz	6/1/1986	P-32	14.29	8189.00	0.50	0.00			0.01	
Ginsberg	9/1/1985	P-32	14.29	8462.00	10.00	0.00			0.01	
Pettit	1/1/1991	Pr-143	13.56	6514.00	1.00	0.00	0.00	0%	0.1	Yes
Ginsberg	9/1/1985	Rb-86	18.66	8462.00	1.00	0.00	0.00	0%	0.1	Yes
Heistad	6/1/1996	Ru-103	39.28	4536.00	5.00	0.00	0.00	0%	0.1	Yes
Stapleton	4/17/2007	S-35	87.44	564.00	2.00	0.02	0.04	0%	0.1	Yes
Ballas	5/2/2007	S-35	87.44	549.00	1.00	0.01			0.1	
McGowan	5/1/2007	S-35	87.44	550.00	0.50	0.01			0.1	
Talman	4/3/2003	S-35	87.44	2039.00	1.00	0.00			0.1	
Nauseef	10/3/2003	S-35	87.44	1856.00	0.05	0.00			0.1	
Schlesinger	2/3/2003	S-35	87.44	2098.00	0.05	0.00			0.1	
See	8/1/1999	S-35	87.44	3380.00	1.00	0.00			0.1	
Bishop	3/1/1997	S-35	87.44	4263.00	5.00	0.00			0.1	
Spanheimer	12/1/1996	S-35	87.44	4353.00	10.00	0.00			0.1	
Bertolatus	10/1/1991	S-35	87.44	6241.00	2.00	0.00			0.1	
Wilson	10/1/1989	S-35	87.44	6971.00	3.00	0.00			0.1	
Britigan	12/1/1988	S-35	87.44	7275.00	5.00	0.00			0.1	
Weinstock	1/1/1989	S-35	87.44	7244.00	1.00	0.00			0.1	
LaBrecque	8/1/1986	S-35	87.44	8128.00	2.00	0.00			0.1	
LaFrenz	6/1/1986	S-35	87.44	8189.00	1.00	0.00			0.1	
Ginsberg	9/1/1985	S-35	87.44	8462.00	5.00	0.00			0.1	
Kirkpatric	12/1/1985	S-35	87.44	8371.00	0.25	0.00			0.1	
Talman	4/3/2003	Sc-46	83.83	2039.00	0.50	0.00	0.00	0%	0.01	Yes
Loftus	9/1/1998	Sc-46	83.83	3714.00	0.50	0.00			0.01	
Heistad	6/1/1996	Sc-46	83.83	4536.00	5.00	0.00			0.01	

Hitchon	8/1/1996	Sc-46	83.83	4475.00	0.50	0.00			0.01	
Hart	2/1/1995	Sc-46	83.83	5022.00	0.01	0.00			0.01	
Ephgrave	4/1/1989	Sc-46	83.83	7154.00	0.50	0.00			0.01	
Talman	4/3/2003	Sn-113	115.90	2039.00	0.50	0.00	0.00	0%	0.1	Yes
Loftus	9/1/1998	Sn-113	115.90	3714.00	0.50	0.00			0.1	
Heistad	6/1/1996	Sn-113	115.90	4536.00	5.00	0.00			0.1	
Hitchon	8/1/1996	Sn-113	115.90	4475.00	0.50	0.00			0.1	
Hart	2/1/1995	Sn-113	115.90	5022.00	0.01	0.00			0.1	
Ephgrave	4/1/1989	Sn-113	115.90	7154.00	0.50	0.00			0.1	
Loftus	9/1/1998	Sr-85	64.84	3714.00	0.50	0.00	0.00	0%	0.1	Yes
Heistad	6/1/1996	Sr-85	64.84	4536.00	5.00	0.00			0.1	
Hitchon	8/1/1996	Sr-85	64.84	4475.00	0.50	0.00			0.1	
Hart	2/1/1995	Sr-85	64.84	5022.00	0.01	0.00			0.1	
Ephgrave	4/1/1989	Sr-85	64.84	7154.00	0.50	0.00			0.1	
McGowan	5/1/2007	Tc-99m	0.25	550.00	1.00	0.00	0.00	0%	1	Yes
					Sum -->	48.77		100%		

Environmental health and Safety
Iowa State University

Instrument Calibration Certificate

This is to certify that the instrument described herein has been calibrated on the date shown in accordance with the specifications described for this model by the Manufacturer's Technical Manual. Sources used for calibration are traceable by documentation to a source certified within 5 percent accuracy by the U.S. National Institute of Standards and Technology.

Instrument Owner EH&S

Manufacturer Inovision Model No. 451P

Serial No. 549 Type Ion Chamber

Calibration Source Cs-137

Calibrated by Leo Ponce de Leon Date 06/22/2007

Calibration Data

(Auto-scale) Scale	Exposure Rate (mR/hr) *{before}*	Instrument Reading (mR/hr)	Exposure Rate (mR/hr) *{after}*	Instrument Reading (mR/hr)
x100 + 10 70°	0.40	0.284	0.40	0.318
x100 + 10 22°	4.01	3.18	4.01	3.26
x100 20°	39.81	35.9	39.81	38.2
x10 19°	405.98	384.0	405.98	402.0
x0 17°	3981.04	4870.0	3981.04	4050.0

Comments: (Integrate mode)
Standard dose: 2574.65 mR (4480.51 mR/hr, for 34.478 min)
Actual recorded dose: 2600.00 mR

FLUKE Biomedical

Calibration Report
1/4/2007
As Calibrated-547-1-4-2007

Survey Meter Model #:	451P-RYR
Survey Meter S/N:	547
Customer Name:	Iowa State University
Customer P.O.:	174975200
Received:	12/29/2006
Fluke Biomedical SO/WO/RO:	182183
Customer #:	n/a
Survey Meter Description:	Pressurized Ion Chamber Survey Meter
Tolerance Condition:	The % Error must be less than 10%.
Tolerance Statement:	451P-RYR Serial Number 547 is In Tolerance
Calibration Source:	Cs-137
Check Source Reading:	N/A
Notes:	None

Environmental Constraints:
The Model 451P-RYR Survey meter is designed to read accurately from -20 C to 50 C. The meter is capable of reading from 0 to 5 R/hr, and is pressurized, therefore, requires no air density corrections.

Calibration Description:
The Model 451P-RYR is exposed through the side of the detector and calibrated on all ranges according to CAL-450/451, Revision 4.

All readings were corrected for background.

The % Error is calculated using the following formula:

% Error = ((Indicated - Actual) * 100)/(Actual)

The uncertainty of the calibration is 3.6%, with 2.2% associated with the uncertainty of the source.

This calibration is traceable to the National Institute of Standards and Technology.

The calibration is warranted to be within specified accuracy limits, at the time of calibration. In the event of a calibration error, our liability is limited to standard recalibration cost. We cannot be responsible for injury or damages resulting from improper use.

Proper function and reliability of the instrument described in this document are highly dependent upon handling and use. It is recommended the user establish a technique to monitor the constancy of the instrument response before and after its return to the manufacturer.

If there are any problems with the calibration of the instrument, please contact the calibration laboratory manager.

Authorized Calibration and Service
Victoreen®
Nuclear Associates
Keithley RMD
Inovision

Calibrations Programs
ISO 17025
ANSI Z540
Mammography MQSA
NIST & PTB Traceable
CNSC

Quality Programs
ISO 9001:2000
ISO 13485:1996
FDA/QSR
NRC/Part 50, Appendix B/Part 21

Global Calibration Laboratory
6045 Cochran Road Cleveland OH 44139-3303 USA
Telephone 440.498.2564
Facsimile 440.542.3682
Email service@globalcal.com
Internet www.globalcal.com

FLUKE Biomedical

Calibration Data
As Calibrated-547-1-4-2007

Calibration Data: As Calibrated
Temperature (C): 20.4
Pressure (mm Hg): 734.7

Rate Calibration Point	Range	Rate	Net	% Error
		(µR/hr)	(µR/hr)	
20 Ci Cs-137 at 1000 cm w/ 5 Att	0-500 µR/hr	182	181	-0.5 % - Pass
20 Ci Cs-137 at 1000 cm w/ 4 Att	0-500 µR/hr	345	351	1.8 % - Pass
		(mR/hr)	(mR/hr)	
20 Ci Cs-137 at 1000 cm w/ 3 Att	0-5 mR/hr	1.71	1.73	0.9 % - Pass
20 Ci Cs-137 at 1000 cm w/ 2 Att	0-5 mR/hr	3.27	3.31	1.2 % - Pass
		(mR/hr)	(mR/hr)	
20 Ci Cs-137 at 1000 cm w/ 1 Att	0-50 mR/hr	16.7	16.6	-0.7 % - Pass
20 Ci Cs-137 at 1000 cm w/ 0 Att	0-50 mR/hr	34.1	34.1	-0.1 % - Pass
		(mR/hr)	(mR/hr)	
2000 Ci Cs-137 at 900 cm w/ 3 Att	0-500 mR/hr	156	157	0.9 % - Pass
2000 Ci Cs-137 at 900 cm w/ 2 Att	0-500 mR/hr	299	299	-0.1 % - Pass
		(R/hr)	(R/hr)	
2000 Ci Cs-137 at 900 cm w/ 0 Att	0-5 R/hr	3.12	3.16	1.1 % - Pass

Integration Calibration Point	Range	Exposure	Net	
		(mR)	(mR)	
299 mR/hr, 100 seconds	0-50 mR	8.31	8.28	-0.4 % - Pass

Calibration Performed by: Rodger Kay **Date:** 04-Jan-07

Technical Review: Pat Feigbaum **Date:** 1/4/2007

The suggested recalibration date is: 4-Jan-2008

Authorized Calibration and Service
Victoreen®
Nuclear Associates
Keithley RMD
Inovision

Calibrations Programs
ISO 17025
ANSI Z540
Mammography MQSA
NIST & PTB Traceable
CNSC

Quality Programs
ISO 9001:2000
ISO 13486:1996
FDA/QSR
NRC/Part 50,
Appendix B/Part 21

Global Calibration Laboratory
6045 Cochran Road Cleveland OH 44139-3303 USA
Telephone 440.498.2564
Facsimile 440.542.3682
Email service@globalcal.com
Internet www.globalcal.com

Environmental health and Safety
Iowa State University

Instrument Calibration Certificate

This is to certify that the instrument described herein has been calibrated on the date shown in accordance with the specifications described for this model by the Manufacturer's Technical Manual. Sources used for calibration are traceable by documentation to a source certified within 5 percent accuracy by the U.S. National Institute of Standards and Technology.

Instrument Owner EH&S

Manufacturer Ludlum Model No. 3

Serial No. 74870 Type GM (pancake) SN: PR06527

Calibration Source Cs-137

Calibrated by Leo Ponce de Leon Date 01/16/2007

Calibration Data

Scale	Exposure Rate (mR/hr) *{before}*	Instrument Reading (mR/hr)	Exposure Rate (mR/hr) *{after}*	Instrument Reading (mR/hr)
X0.1 (using pulser *)	0.04	0.04	0.04	0.04
X0.1 (using pulser *)	0.16	0.15	0.16	0.15
X1 x100 129=	1.01	1.0	1.01	1.0
X1 x100 150=	1.62	1.6	1.62	1.6
X10 x100 63=	4.1	4.5	4.1	4.5
X10 x100 32=	15.96	14.5	15.96	14.5
X100 x10 62=	40.78	40.0	40.78	43.0
X100 x10 31=	153.04	130.0	153.04	138.0

Comments: Manufacturer's specifications:
3300 cpm / 1 mR/hr, ^{137}Cs - gamma

Environmental Health and Safety
Iowa State University

Background: 30 cpm

COUNTING EFFICIENCIES

reported by: Leo Ponce de Leon date: 01/22/2007

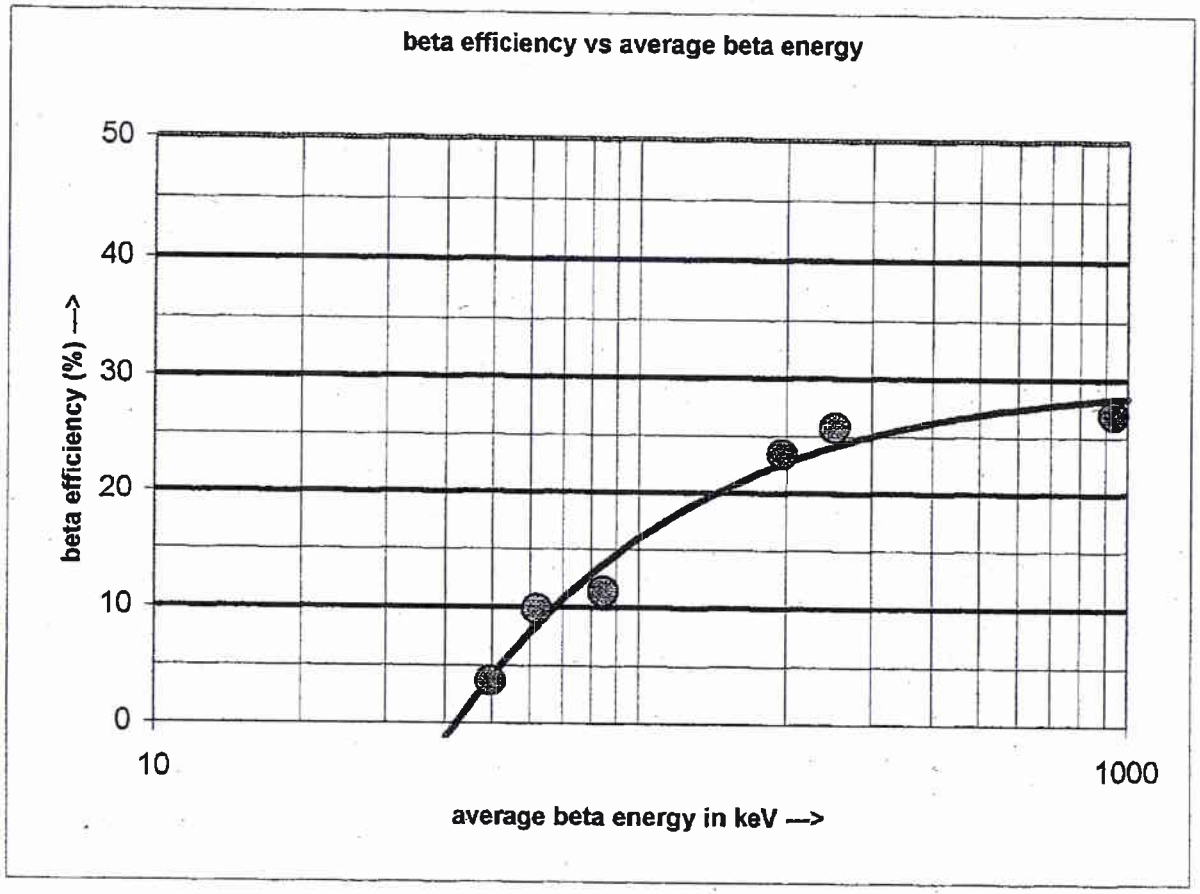
Nuclide	S.N.	activity (dpm)	net cpm	Efficiency %	counting factor
C-14	369-24-1	218237	7970	3.7	29.38
Pm-147	369-24-2	306	~~570~~ 30	9.8	10.20
Tc-99	369-18-1	23398	2670	11.4	8.76
Cl-36	172-31-3	27039	6970	25.8	3.88
Bi(Pb)-210	369-20-1	13644	3170	23.2	4.3
Sr(Y)-90	369-20-2	16817	8420	50.4	1.99.
S-35*				3.6	27.78
P-32*				27.8	3.60
P-33*				12.2	8.20
~~I-125*~~ Ca-45*				12.3	8.13

* efficiencies estimated

DATA ENTRY	
radionuclide	efficiency (%)
C-14	3.7
Pm-147	9.8
Tc-99	11.4
Cl-36	25.8
Sr/Y-90	50.4

calculated values	
radionuclide	efficiency (%)
S-35	3.6
P-33	12.2
Ca-45	12.3
P-32	27.8

$r^2 = 0.9741$



Environmental health and Safety
Iowa State University

Instrument Calibration Certificate

This is to certify that the instrument described herein has been calibrated on the date shown in accordance with the specifications described for this model by the Manufacturer's Technical Manual. Sources used for calibration are traceable by documentation to a source certified within 5 percent accuracy by the U.S. National Institute of Standards and Technology.

Instrument Owner EH&S

Manufacturer Ludlum Model No. 3

Serial No. 77948 Type GM

Calibration Source Cs-137

Calibrated by Leo Ponce deLeon Date 07/05/2007

Calibration Data

Scale	Exposure Rate (mR/hr) *{before}*	Instrument Reading (mR/hr)	Exposure Rate (mR/hr) *{after}*	Instrument Reading (mR/hr)
X 0.1 x100+10 132	0.11	0.08	0.11	0.11
X 0.1 x100+10 110	0.16	0.11	0.16	0.15
X 1 x100+10 70	0.40	0.36	0.40	0.40
X 1 x100+10 35	1.60	1.43	1.60	1.50
X 10 x00+44 33	4.0	4.3	4.0	4.3
X 10 x100+4 17	16.10	15.0	16.10	15.0
* X 100 x10 62	39.69	45.0	39.69	45.0
X 100 x10 31 ~~155.07~~	155.07	100.0	155.07	155.0

Comments: * Do not use x 100 scale; difference from standard field > 20%.

Environmental Health and Safety
Iowa State University

COUNTING EFFICIENCIES

Background (cpm): 40
S/N#: 77948
reported by: Leo Ponce de Leon date: 07/07/2007

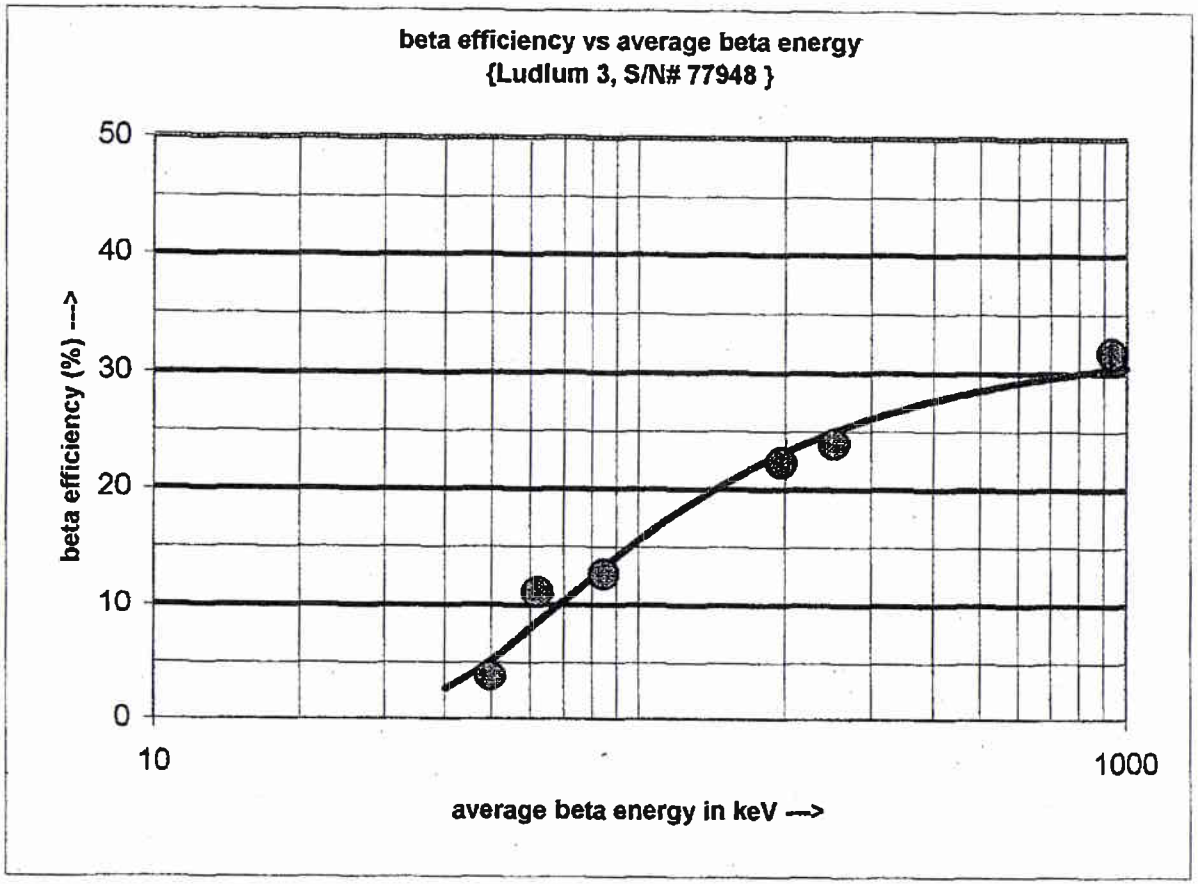
Nuclide	S.N.	activity (dpm)	net cpm	Efficiency %	counting factor
C-14	369-24-1	218225	8260	3.79	26.42
Pm-147	369-24-2	271	30	11.07	9.03
Tc-99	369-18-1	23398	2960	12.65	7.90
Cl-36	172-31-3	29039	6460	23.89	4.19
Bi(Pb)-210	369-20-1	13453	3060	22.75	4.40
Sr(Y)-90	369-20-2	16633	8960	53.87	1.86
Ni-63	362-84-2	187178	160	0.085	1170.0
Ca-45*				11.9	8.40
S-35*				4.9	20.41
P-32*				29.6	3.38
P-33*				11.8	8.47
~~I-125~~	~~42~~				

* efficiencies estimated

DATA ENTRY	
radionuclide	efficiency (%)
C-14	3.8
Pm-147	11.1
Tc-99	12.7
Cl-36	23.9
Sr/Y-90	53.9

calculated values	
radionuclide	efficiency (%)
S-35	4.9
P-33	11.8
Ca-45	11.9
P-32	29.6

$r^2 = 0.9761$



Environmental health and Safety
Iowa State University

Instrument Calibration Certificate

This is to certify that the instrument described herein has been calibrated on the date shown in accordance with the specifications described for this model by the Manufacturer's Technical Manual. Sources used for calibration are traceable by documentation to a source certified within 5 percent accuracy by the U.S. National Institute of Standards and Technology.

Instrument Owner EH&S

Manufacturer Ludlum Model No. 3

Serial No. 148692 Type GM

Calibration Source Cs-137

Calibrated by Leo Ponce de Leon Date 02/13/2007

Calibration Data

Scale	Exposure Rate (mR/hr) *{before}*	Instrument Reading (mR/hr)	Exposure Rate (mR/hr) *{after}*	Instrument Reading (mR/hr)
X0.1 * using pulser	0.04	0.04	0.04	0.04
X0.1 * using pulser	0.16	0.16	0.16	0.16
X1 ×100 127*	1.01	1.0	1.01	1.0
X1 ×100 100*	1.62	1.6	1.62	1.6
X10 ×10 64*	3.98	4.3	3.98	4.0
X10 ×100 32*	15.96	16.3	15.96	15.5
X100 ×10 62*	40.78	45.0	40.78	40.0
X100 ×10 is 31*	153.04	163.0	153.04	150.0

Comments: * Manufacturer's specifications: 3300 cpm/1mR/hr ^{137}Cs gamma

S/N# 148692
Background: 50 cpm

Environmental Health and Safety
Iowa State University

COUNTING EFFICIENCIES

reported by: Leo Ponce de Leon date: 02/13/2007

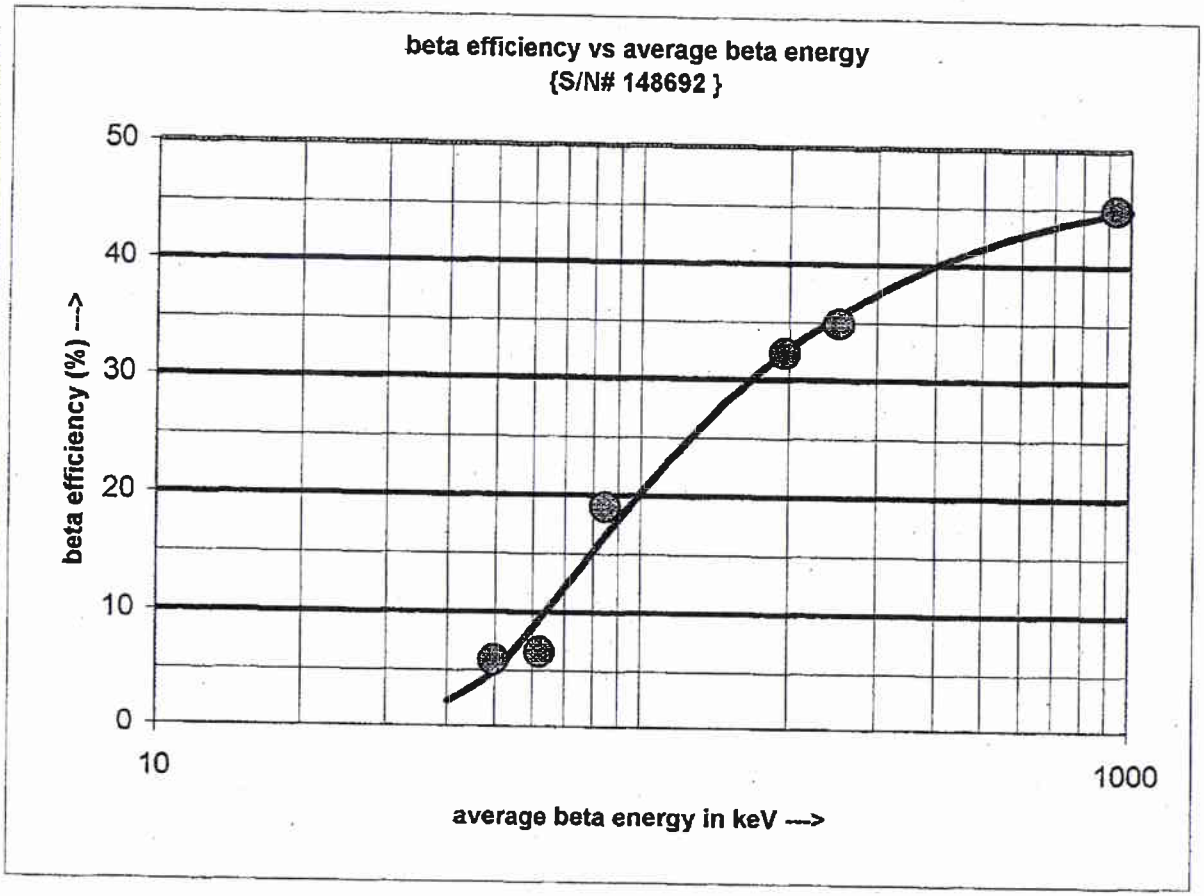
Nuclide	S.N.	activity (dpm)	net cpm	Efficiency %	counting factor
C-14	369-24-1	218235	12950	~~37~~ 5.9	16.85
Pm-147	369-24-2	301	20	~~13~~ 6.6	15.05
Tc-99	369-18-1	23398	4450	19.0	5.26
Cl-36	172-31-3	27039	9450	34.9	2.86
Bi(Pb)-210	369-20-1	13618	4750	34.9	2.87
Sr(Y)-90	369-20-2	16992	12950	77.1	1.3
S-35*				4.7	21.28
P-32*				43.4	2.30
P-33*				14.3	6.99
~~I-125~~*					

* efficiencies estimated

DATA ENTRY	
radionuclide	efficiency (%)
C-14	5.9
Pm-147	6.6
Tc-99	19.0
Cl-36	34.9
Sr/Y-90	77.1

calculated values	
radionuclide	efficiency (%)
S-35	4.7
P-33	14.3
Ca-45	14.5
P-32	43.4

$r^2 = 0.9878$



Environmental health and Safety
Iowa State University
Instrument Calibration Certificate

This is to certify that the instrument described herein has been calibrated on the date shown in accordance with the specifications described for this model by the Manufacturer's Technical Manual. Sources used for calibration are traceable by documentation to a source certified within 5 percent accuracy by the U.S. National Institute of Standards and Technology.

Instrument Owner EH&S

Manufacturer Ludlum Model No. ~~3~~ 14-C

Serial No. 74571 Type GM

Calibration Source Cs-137

Calibrated by Leo Ponce de Leon Date 03/14/2007

Calibration Data

	Scale	Exposure Rate (mR/hr) *{before}*	Instrument Reading (mR/hr)	Exposure Rate (mR/hr) *{after}*	Instrument Reading (mR/hr)
* using pulser	X0.1	0.04	0.04	0.04	0.04
	X0.1	0.16	0.165	0.16	0.165
x100 127	X1	1.01	1.0	1.01	1.0
x100 100	X1	1.62	1.6	1.62	1.6
x100 63	X10	4.10	4.3	4.10	4.3
x100 32	X10	15.96	14.7	15.96	14.7
* x10 62	X100	40.78	37.0	40.78	37.0
* x10 31	X100	153.04	195.0	153.04	195.0
x2 42	X1000	408.59	475.0	408.59	400.0
x2 20	X1000	1660.65	1730	1660.65	1500.0

Comments: * Manufacturer's specification: 3300 cpm / 1 mR/hr ^{137}Cs gamma

* Do not use x 100 scale; margin of deviation from standard > 10%

Environmental Health and Safety
Iowa State University

COUNTING EFFICIENCIES

Background (cpm): 30
S/N#: 74571
reported by: Leo Ponce de Leon date: 03/14/2007

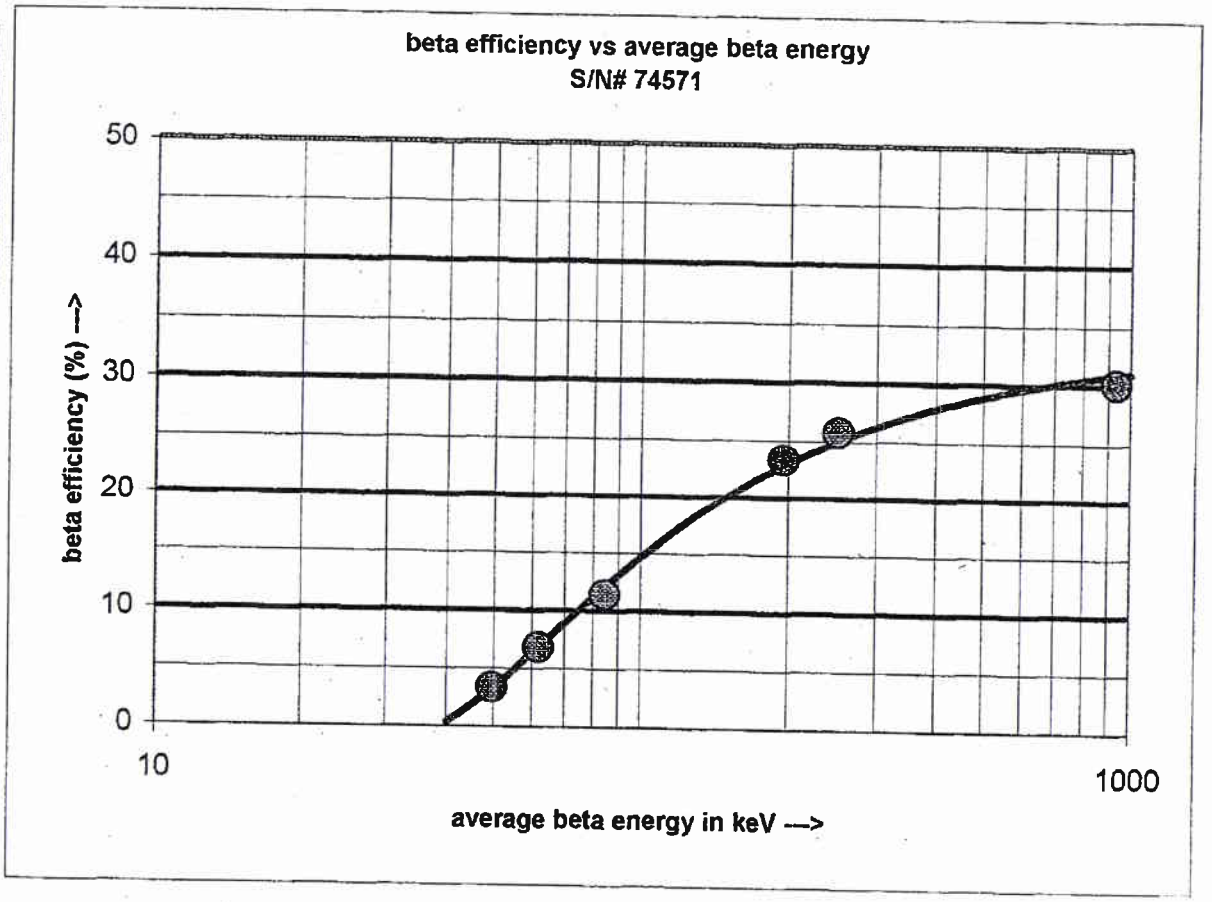
Nuclide	S.N.	activity (dpm)	net cpm	Efficiency %	counting factor
C-14	369-24-1	218233	7470	3.4	29.21
Pm-147	369-24-2	295	20	6.8	14.75
Tc-99	369-18-1	233978	2670	11.4	8.76
Cl-36	172-31-3	27039	6970	25.8	3.88
Bi(Pb)-210	369-20-1	13585	2970	21.9	4.57
Sr(Y)-90	369-20-2	16760	8970	53.5	1.87
Ni-63	362-84-2	187583	120	0.1	1567.19
Ca-45*				10.6	9.43
S-35*				3.0	33.33
P-32*				30.1	3.32
P-33*				10.5	9.52
~~I-125~~	~~42~~				

* efficiencies estimated

DATA ENTRY	
radionuclide	efficiency (%)
C-14	3.4
Pm-147	6.8
Tc-99	11.4
Cl-36	25.8
Sr/Y-90	53.5

calculated values	
radionuclide	efficiency (%)
S-35	3.0
P-33	10.5
Ca-45	10.6
P-32	30.1

$r^2 = 0.9968$



Daily Background and Source Checks
VA Medical Center
Iowa City, Iowa

End of Day

Date: August 9, 2007
Surveyor: Seth Inyang
Instrument: Ludum 3 w/44-9 probe
Serial #: 74870
Cal Date: 1/16/2007
C-14 check: 0.09203uCi 1/3/2003 serial #952-90-2

Count#	Bkg(cpm)	Source(cpm)
1	40	6000
2	20	6000
3	20	6000
4	20	6000
5	40	6000
6	30	6000
7	20	6000
8	20	6000
9	20	6000
10	40	6000
Average	27	6000

Date: August 9, 2007
Surveyor: Seth Inyang
Instrument: Ludum 3 w/44-9 probe
Serial #: 77948
Cal Date: 7/6/2007
C-14 check: 0.09203uCi 1/3/2003 serial #952-90-2

Count#	Bkg(cpm)	Source(cpm)
1	20	6000
2	40	6000
3	40	6000
4	20	6000
5	20	6000
6	20	6000
7	40	6000
8	20	6000
9	20	6000
10	20	6000
Average	26	6000

Date: August 9, 2007
Surveyor: Seth Inyang
Instrument: Ludum 3 w/44-9 probe
Serial #: 74571
Cal Date: 3/14/2007
C-14 check: 0.09203uCi 1/3/2003 serial #952-90-2

Count#	Bkg(cpm)	Source(cpm)
1	20	5000
2	40	6000
3	40	6000
4	40	6000
5	40	6000
6	20	6000
7	20	6000
8	40	6000
9	30	6000
10	40	6000
Average	33	5900

Date: August 9, 2007
Surveyor: Seth Inyang
Instrument: Ludum 3 w/44-9 probe
Serial #: 148692
Cal Date: 2/13/2007
C-14 check: 0.09203uCi 1/3/2003 serial #952-90-2

Count#	Bkg(cpm)	Source(cpm)
1	20	10000
2	40	10000
3	60	10000
4	80	10000
5	20	10000
6	0	10000
7	0	10000
8	20	10000
9	0	10000
10	40	10000
Average	28	10000

Daily Background and Source Checks
VA Medical Center
Iowa City, Iowa

Date: August 9, 2007
Surveyor: Seth Inyang
Instrument: INOVISION 451P
Serial #: 549
Cal Date: 6/22/2007
Cs-137 check: 1.121uCi 10/1/1987
serial#173-7-1

Count#	Bkg(uR/hr)	Source(uR/hr)
1	8	115
2	9	121
3	7	117
4	7	122
5	6	104
6	4	121
7	6	113
8	6	124
9	9	104
10	5	108
Average	6.7	114.9

Date: August 9, 2007
Surveyor: Seth Inyang
Instrument: INOVISION 451P
Serial #: 547
Cal Date: 1/4/2007
Cs-137 check: 1.121uCi 10/1/1987
serial#173-7-1

Count#	Bkg(uR/hr)	Source(uR/hr)
1	7	105
2	8	95
3	9	89
4	6	94
5	8	98
6	11	111
7	7	104
8	9	103
9	10	91
10	9	106
Average	8.4	99.6

Enclosure 3

From: Graves, Joe M [joe-graves@uiowa.edu]
Sent: Monday, March 02, 2009 1:44 PM
To: Huston, Thomas E.
Cc: Roark, Brad; Scholl, Laura M
Subject: FW: Decommissioning of Bldgs 3 and 28: Follow-up to request for information dated November10, 2008
Importance: High
Attachments: Item 1.a Amended Response 030209.doc; Item 9.b Annotated Survey Diagram.doc; Item 19 3-2-218-1.pdf; Item 9 - Building 28.pdf; Item 9 - Building 3.pdf

Tom,

We trust that response below and the attached answer your questions. Please contact me if you require additional clarification.

Thanks, Joe

From: Huston, Thomas E.
Sent: Sunday, February 22, 2009 5:29 PM
To: 'Graves, Joe M'
Cc: Offutt, Lisa M; Williamson, Sandra
Subject: Decommissioning of Bldgs 3 and 28: Followup to request for information dated November10, 2008

Joe,

I reviewed your email reply of Feb 10, 2009 to my request for information (RFI) dated November 10, 2008. There are some items which need follow-up.

1. Item 1.a. of my the RFI requested additional details for the overall VA site (land area) where Bldgs. 3 and 28 are located, specifically the total number of acres at the site 12 acres and general makeup of the areas surrounding the VA site Mixed occupancies: Residential west and north of the medical center, University classroom and university hospitals and clinics to the south and east (i.e., whether the area surrounding the site is residential, commercial, industrial, or mixed). The answer in the Feb 10 response did not provide this information; please provide.

2. The excerpt below is from item 9 and notes that tables would be provided. Please provide tables.

> 9. Sections 5.1 and 5.2 reference summary tables of surveys and wipe results in Appendix C. In Appendix C there are no summary *tables*, only diagrams with hand-written numbers on them. There is no legend or key or discussion of the information contained in these diagrams. Please answer the following questions:
>
> HRG Response: There were tables in the first version of the report submitted. The field records were requested for inclusion in the report. The tables were likely replaced by the field records. We will provide the tables that 5.1 and 5.2 reference in addition to the field notes.

3. The excerpt below is from item 9.b. and notes that an annotated diagram(s) for Bldg. 3 and 28 would be provided. Please provide annotated diagram(s).

> b. On the enlarged diagrams for various "sections" there are circled letters and numbers that seem to indicate grid reference numbers. What do the circled numbers within the grid boxes represent? (For example, Bldg 3, Basement, Sect B has seven such numbers.) If actual survey results are being shown, specify what type of readings (dose rates, wipe results, etc.) are shown and what type instrument was used and units. This could be accomplished by providing an annotated version of one of these diagrams.
>
> HRG Response: The circled numbers represent exposure rates measured in uR/hr using an Inovision 451P pressurized ion chamber. We will provide an annotated diagram for Building 3 and 28 to serve as keys.

4. The excerpt below is from item 19.a. Please provide corrected page.

19.	In Appendix O (Bldg. 3, Floor 2, Section D):
	a. The wipe count data for grid 3-2-218-1 is incomplete. It appears to be missing header information due to landscape mode page orientation. Please provide comment or submit a corrected page.
	HRG Response: Page format will be corrected

Please provide the requested information by March 4, 2009 (Wednesday). Email, fax (501-257-1570), or regular mail is acceptable. Please contact me if you have any questions.

Thomas E. Huston, PhD, CHP
Health Physicist/Program Manager
VHA National Health Physics Program (115HP/NLR)
Phone: (501) 257-1578

(i) Item 1.a

1. Additional details are needed on the overall site and on Bldgs. 3 and 28:

   a. Provide the following general information for the Iowa City VA site: total number of acres at the site, general makeup of surrounding area (i.e., residential, commercial, industrial, mixed).

   HRG Response:

   According to historical information, and Veterans Affairs records and personnel, the historical uses of Buildings 3 and 28 include, but are not limited to, administrative, animal research, photo processing, janitorial closets, radiation equipment, patient care/research, hazardous material storage, chemical and biological research, and laboratory use of hazardous materials.

   The VAMC site comprises 12 acres. Surrounding areas around the VAMC facility is mixed use occupancies with single-family and small multi-family residential areas to the west and north of the Medical Center, University of Iowa academic buildings to the east, and to the south the University of Iowa College of Medicine academic and research buildings and the University of Iowa Hospitals and Clinic medical center.

   Building 3 was originally constructed in 1953 as residential quarters for nurses and directors associated with the Veterans Affairs facility. The building was used for residential purposes until approximately 1970 when renovations began to convert the structure into research labs. Renovations took place between 1970 and 1983, and started in the north wing and ended in the south wing. Fume hoods were installed in the research labs in 1983. The electrical system was updated between 1983 and 1984 to incorporate non-PCB transformers. The southeast corner of the Basement, rooms B12 and B19, was converted into a Biosafety Level 3 (BSL 3) laboratory to study tuberculosis, Ross River Virus, and tularemia. The BSL 3 laboratory was later decommissioned in the spring of 2007. Additional activities included radiation studies in Room 300 in the south wing, and an iodination study in Room 100 of the north wing using Carbon-14. Basement rooms B6, B7, and B8 historically contained centrifugal equipment.

   Building 28 was constructed in 1985 to provide additional research laboratory work areas. Based on employee information and visual indications observed

during the site investigation, Building 28 apparently stored, processed, or otherwise used less hazardous materials during its operational history than Building 3.

(2) Item 9
Bldg. 3

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor 1
Section A

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
154	2	Bkg	<DCGL
155A	2	Bkg	<DCGL
155	2	Bkg	<DCGL
156	2	Bkg	<DCGL
157	2	Bkg	<DCGL
158	2	Bkg	<DCGL
158A	3	Bkg	<DCGL
163	1	Bkg	<DCGL
170	2	Bkg	<DCGL
172	2	Bkg	<DCGL
173	2	Bkg	<DCGL
174	1	Bkg	<DCGL
175	2	Bkg	<DCGL
179	2	Bkg	<DCGL
180	2	Bkg	<DCGL
181	2	Bkg	<DCGL
183	2	Bkg	<DCGL
184	2	Bkg	<DCGL
185	1	Bkg	<DCGL
1ST04	ND	Bkg	<DCGL
1ST05	3	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor 1
Section B

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
147	2	Bkg	<DCGL
147A	2	Bkg	<DCGL
148	5	Bkg	<DCGL
150	1	Bkg	<DCGL
151	2	Bkg	<DCGL
152	2	Bkg	<DCGL
1ST06	0	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor 1
Section C

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
124	2	Bkg	<DCGL
128	3	Bkg	<DCGL
131	4	Bkg	<DCGL
132	2	Bkg	<DCGL
132A	2	Bkg	<DCGL
132B	3	Bkg	<DCGL
133	2	Bkg	<DCGL
136	3	Bkg	<DCGL
137	2	Bkg	<DCGL
137A	2	Bkg	<DCGL
138	ND	Bkg	<DCGL
139	3	Bkg	<DCGL
140	2	Bkg	<DCGL
141	2	Bkg	<DCGL
142	4	Bkg	<DCGL
142A	ND	Bkg	<DCGL
146	4	Bkg	<DCGL
1ST03	1	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor 1
Section D

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
100	2	Bkg	<DCGL
101	ND	Bkg	<DCGL
102	ND	Bkg	<DCGL
106	2	Bkg	<DCGL
107	3	Bkg	<DCGL
110	4	Bkg	<DCGL
115	3	Bkg	<DCGL
116	2	Bkg	<DCGL
116A	2	Bkg	<DCGL
117	2	Bkg	<DCGL
118	1	Bkg	<DCGL
120	2	Bkg	<DCGL
122	2	Bkg	<DCGL
122A	ND	Bkg	<DCGL
1ST02	1	Bkg	<DCGL
1ST01	2	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor 2
Section A

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
272	3	Bkg	<DCGL
274	2	Bkg	<DCGL
276	2	Bkg	<DCGL
278	3	Bkg	<DCGL
290	3	Bkg	<DCGL
2ST05	2	Bkg	<DCGL
292	1	Bkg	<DCGL
292A	1	Bkg	<DCGL
293	2	Bkg	<DCGL
298	2	Bkg	<DCGL
305	3	Bkg	<DCGL
305A	0	Bkg	<DCGL
306	3	Bkg	<DCGL
307	2	Bkg	<DCGL
308	2	Bkg	<DCGL
2ST04	2	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor 2
Section B

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
259	2	Bkg	<DCGL
259A	2	Bkg	<DCGL
261	3	Bkg	<DCGL
262	3	Bkg	<DCGL
266	1	Bkg	<DCGL
267	3	Bkg	<DCGL
2ST07	3	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor 2
Section C

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
240	3	Bkg	<DCGL
244	2	Bkg	<DCGL
244A	2	Bkg	<DCGL
245	3	Bkg	<DCGL
246	2	Bkg	<DCGL
248	2	Bkg	<DCGL
249	3	Bkg	<DCGL
249A	1	Bkg	<DCGL
251	2	Bkg	<DCGL
258	2	Bkg	<DCGL
2ST03	3	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor 2
Section D

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
200	3	Bkg	<DCGL
201	3	Bkg	<DCGL
206A	2	Bkg	<DCGL
206B	2	Bkg	<DCGL
212	2	Bkg	<DCGL
217	2	Bkg	<DCGL
218	2	Bkg	<DCGL
224	3	Bkg	<DCGL
224A	2	Bkg	<DCGL
226	2	Bkg	<DCGL
259	2	Bkg	<DCGL
2ST01	1	Bkg	<DCGL
2ST02	3	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor Basement
Section A

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
B20	2	Bkg	<DCGL
B20B	ND	Bkg	<DCGL
B21	2	Bkg	<DCGL
B21A	3	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor Basement
Section B

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
B12	3	Bkg	<DCGL
B15	4	Bkg	<DCGL
B16	3	Bkg	<DCGL
B17	3	Bkg	<DCGL
B18A	3	Bkg	<DCGL
B19	1	Bkg	<DCGL
B19A	3	Bkg	<DCGL
B19B	1	Bkg	<DCGL
BST06	ND	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor Basement
Section C

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
B3	2	Bkg	<DCGL
B4	4	Bkg	<DCGL
B6	4	Bkg	<DCGL
B7	1	Bkg	<DCGL
B8	3	Bkg	<DCGL
B9	2	Bkg	<DCGL
BST03	3	Bkg	<DCGL

Veterans Affairs Medical Center
Iowa City, Iowa

Building 3
Floor Basement
Section D

Room	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
B20B	2	Bkg	<DCGL

Item 9
(2) Bldg. 28

Veterans Affairs Medical Center
Iowa City, Iowa

Building 28

Grid	Dose rate (µrem/hr)	GM survey (cpm)	Wipes (dpm/100 cm2)
1	6	Bkg	<DCGL
2	7	Bkg	<DCGL
3	5	Bkg	<DCGL
4	9	Bkg	<DCGL
5	6	Bkg	<DCGL
6	7	Bkg	<DCGL
7	6	Bkg	<DCGL
8	6	Bkg	<DCGL
9	4	Bkg	<DCGL
10	6	Bkg	<DCGL
11	7	Bkg	<DCGL
12	8	Bkg	<DCGL
13	8	Bkg	<DCGL
14	7	Bkg	<DCGL
15	7	Bkg	<DCGL
16	9	Bkg	<DCGL
17	7	Bkg	<DCGL
18	9	Bkg	<DCGL
19	8	Bkg	<DCGL
20	9	Bkg	<DCGL
21	7	Bkg	<DCGL
22	8	Bkg	<DCGL*
23	5	Bkg	<DCGL
24	11	Bkg	<DCGL
25	7	Bkg	<DCGL
26	6	Bkg	<DCGL
27	7	Bkg	<DCGL
28	8	Bkg	<DCGL
29	8	Bkg	<DCGL

* In Grid 22, one wipe in Room 1B5 in the sink had a value of 188 dpm/100cm^2 which is well below the DCGL and requires no further investigation.

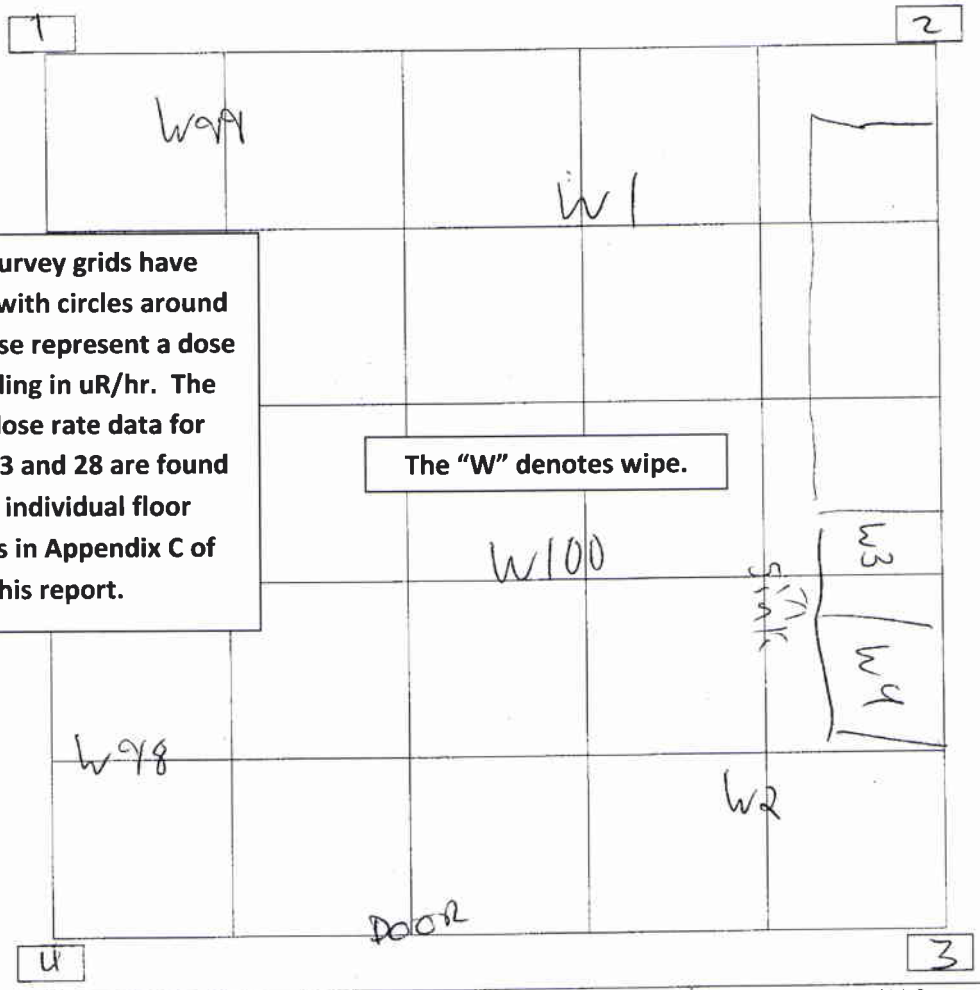
(3) Item 9.b.

The "6" is the order this survey group was

& 6

Project: VA-Iowa City Bldg 3 & 28 Facilities Survey

This is a grid corner.



Some survey grids have numbers with circles around them. These represent a dose rate reading in uR/hr. The actual dose rate data for Buildings 3 and 28 are found on the individual floor diagrams in Appendix C of this report.

The "W" denotes wipe.

Grid: B-2-218-1	Inst.: Ludlum 3 w/44-9	Inst.: Ludlum 3 w/44-9
Date: 8-11-07	Ser. No.:	Ser. No.:
Time:	Cal. Date:	Cal. Date:
Surveyor:	Src. Chk.:	Src. Chk.:
Signature:	Inst.: Inovision 451P	Inst.:
Signature:	Ser. No.:	Ser. No.:
Notes:	Cal. Date:	Cal. Date:
	Src. Chk.:	Src. Chk.:

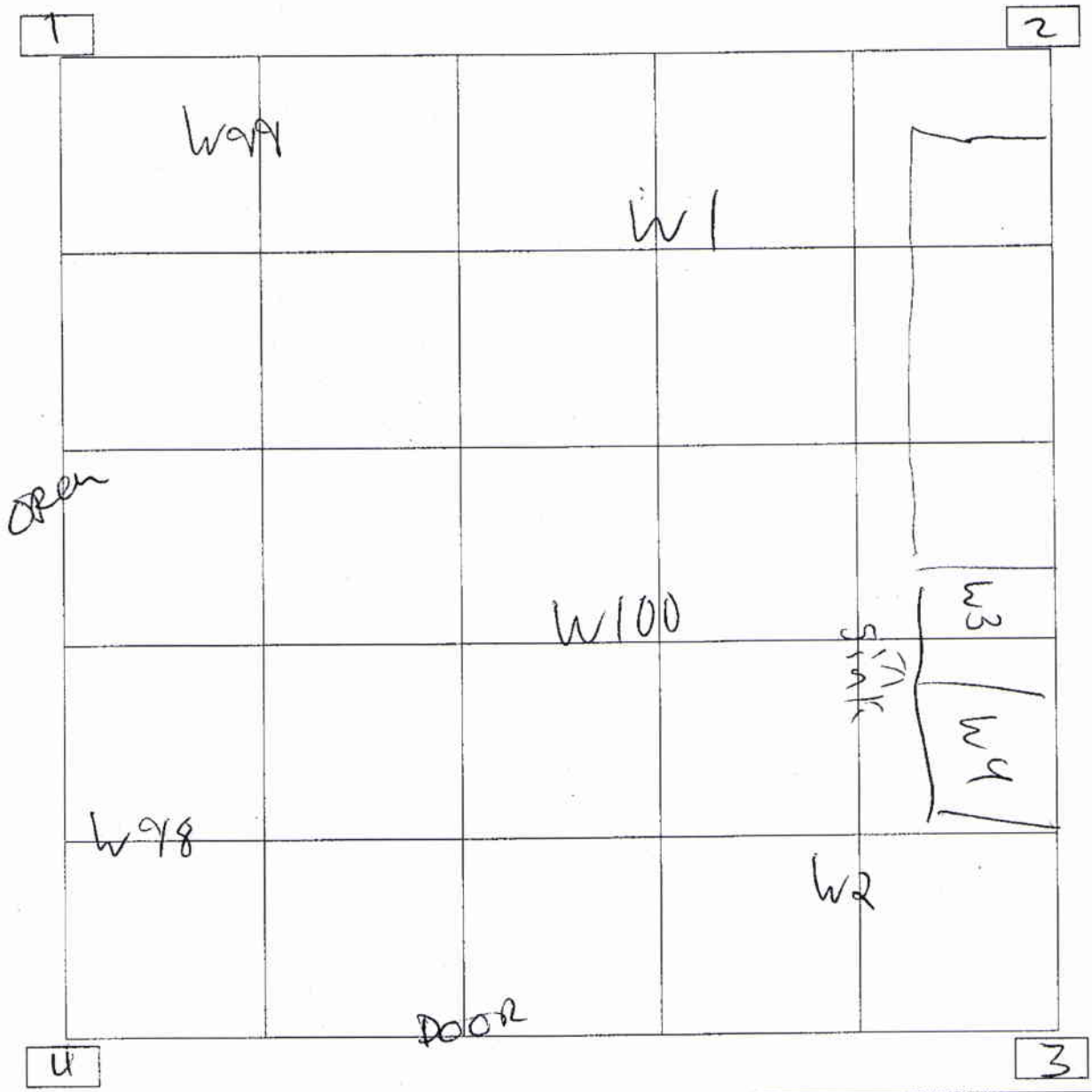
Survey results indicate no residual contamination in excess of free release criteria.

2	1

This hand drawn diagram indicates a survey area requiring more than one survey unit. Generally, drawn for hallways and larger spaces.

④ Item 19 & 6

Project: VA-Iowa City Bldg 3 & 28 Facilities Survey



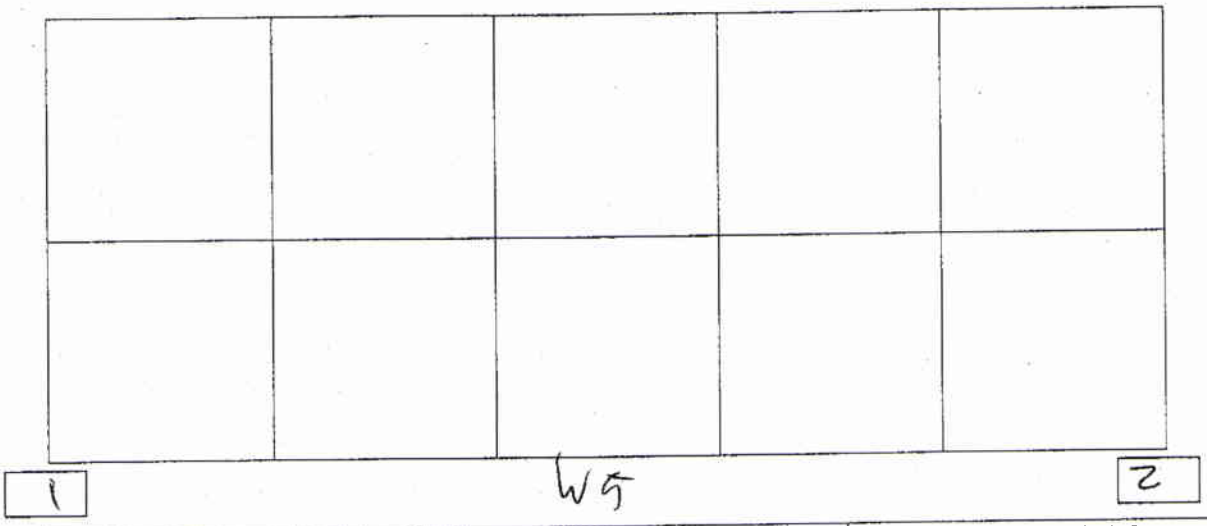
Grid: B-2-218-1	Inst.: Ludlum 3 w/44-9	Inst.: Ludlum 3 w/44-9
Date: 8-16-07	Ser. No.:	Ser. No.:
Time:	Cal. Date:	Cal. Date:
Surveyor:	Src. Chk.:	Src. Chk.:
Signature:	Inst.: Inovision 451P	Inst.:
Signature:	Ser. No.:	Ser. No.:
Notes:	Cal. Date:	Cal. Date:
	Src. Chk.:	Src. Chk.:

Survey results indicate no residual contamination in excess of free release criteria

2	1

12

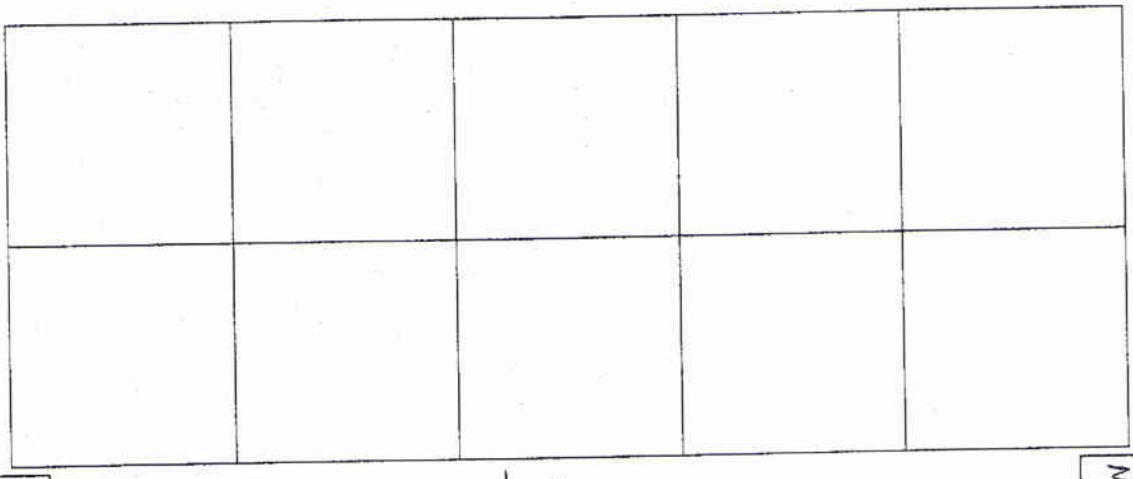
Project: VA-Iowa City Bldg 3 & 28 Facilities Survey



Grid: 3-2-218-1	Inst.: Ludlum 3 w/ 44-9	Inst.: Ludlum 3 w/44-9
Date: 8-11-07	Ser. No.:	Ser. No.:
Time:	Cal. Date:	Cal. Date:
Surveyor:	Src. Chk.:	Src. Chk.:
Signature:	Inst.: Inovision 451P	Inst.: Inovision 451P
Signature:	Ser. No.:	Ser. No.:
Notes:	Cal. Date:	Cal. Date:
	Src. Chk.:	Src. Chk.:

Survey results indicate no residual contamination in excess of free release criteria

Project: VA-Iowa City Blgd 3 & 28 Facilities Survey

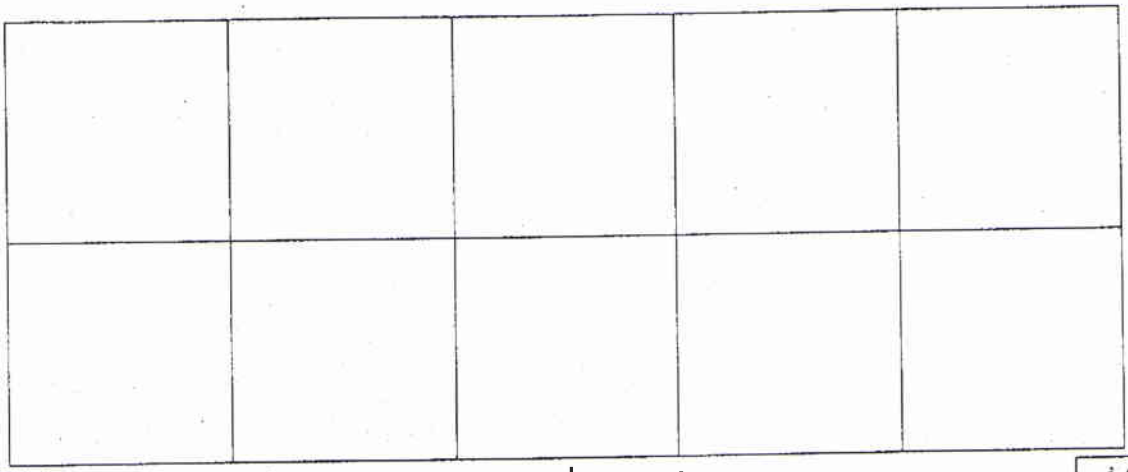


2 WG 3

Grid: 3-2-218-1	Inst.: Ludlum 3 w/ 44-9	Inst.: Ludlum 3 w/44-9
Date: 8-1-07	Ser. No.:	Ser. No.:
Time:	Cal. Date:	Cal. Date:
Surveyor:	Src. Chk.:	Src. Chk.:
Signature:	Inst.: Inovision 451P	Inst.: Inovision 451P
Signature:	Ser. No.:	Ser. No.:
Notes:	Cal. Date:	Cal. Date:
	Src. Chk.:	Src. Chk.:

Survey results indicate no residual contamination in excess of free release criteria

Project: VA-Iowa City Bldg 3 & 28 Facilities Survey



3 W7 W8-Door 4

Grid: 3-2-218-1	Inst.: Ludlum 3 w/ 44-9	Inst.: Ludlum 3 w/44-9
Date: 8-11-07	Ser. No.:	Ser. No.:
Time:	Cal. Date:	Cal. Date:
Surveyor:	Src. Chk.:	Src. Chk.:
Signature:	Inst.: Inovision 451P	Inst.: Inovision 451P
Signature:	Ser. No.:	Ser. No.:
Notes:	Cal. Date:	Cal. Date:
	Src. Chk.:	Src. Chk.:

Survey results indicate no residual contamination in excess of free release criteria

ID:VA-IOWA CITY 22 AUG 2007 22:29

USER: 6 COMMENT:3-2-218-1

PRESET TIME :	1.00						
DATA CALC :	CPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	:EDIT
COUNT BLANK :	NO	IC#	: NO	REPLICATES :	1	RS232	:EDIT
TWO PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1		
SCINTILLATOR:	LIQUID	LUMEX: NO		LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:				none	

KEV : 0.0 - 12.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
KEV : 12.0 - 156.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
KEV : 125.0 - 2000.0 %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

ALPHA-BETA DISCRIMINATION: NO

SAM NO	POS	TIME MIN	H#	WIND1 CPM	WIND1 %ERROR	WIND2 CPM	WIND2 %ERROR	WIND3 CPM	WIND3 %ERROR	LUMEX %	ELAPSED TIME
1	**-1	1.00	124.1	11.00	60.30	18.00	47.14	16.00	50.00	0.92	1.45
2	**-2	1.00	118.2	6.00	81.65	18.00	47.14	12.00	57.74	1.30	3.10
3	**-3	1.00	117.8	7.00	75.59	11.00	60.30	15.00	51.64	0.55	4.61
4	**-4	1.00	114.3	5.00	89.44	10.00	63.25	9.00	66.67	0.40	6.25
5	**-5	1.00	114.6	6.00	81.65	16.00	50.00	14.00	53.45	0.23	7.88
6	**-6	1.00	115.0	5.00	89.44	11.00	60.30	12.00	57.74	0.27	9.53
7	**-7	1.00	114.1	7.00	75.59	14.00	53.45	12.00	57.74	0.19	11.05
8	**-8	1.00	111.5	9.00	66.67	15.00	51.64	13.00	55.47	0.19	12.71
9	**-9	1.00	111.4	12.00	57.74	16.00	50.00	17.00	48.51	0.16	14.23
10	**-10	1.00	117.3	9.00	66.67	12.00	57.74	14.00	53.45	0.77	15.88
11	**-11	1.00	116.0	10.00	63.25	11.00	60.30	12.00	57.74	1.25	17.51

ID:VA-IOWA CITY 23 AUG 2007 01:53

USER:20 COMMENT:BACKGROUND VIALS 10 TOTAL

PRESET TIME :	1.00						
DATA CALC :	CPM	H# :YES	SAMPLE REPEATS:	1	PRINTER	:EDIT	
COUNT BLANK :	NO	IC# : NO	REPLICATES :	1	RS232	:EDIT	
TWO PHASE :	NO	AQC : NO	CYCLE REPEATS :	1			
SCINTILLATOR:	LIQUID	LUMEX: NO	LOW SAMPLE REJ:	0			
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:		none			

KEV : 0.0 - 12.0	%ERROR: 0.00	FACTOR:	1.000000	BKG. SUB:	0
KEV : 12.0 - 156.0	%ERROR: 0.00	FACTOR:	1.000000	BKG. SUB:	0
KEV : 125.0 - 2000.0	%ERROR: 0.00	FACTOR:	1.000000	BKG. SUB:	0

ALPHA-BETA DISCRIMINATION: NO

SAM NO	POS	TIME MIN	H#	WIND1 CPM	WIND1 %ERROR	WIND2 CPM	WIND2 %ERROR	WIND3 CPM	WIND3 %ERROR	LUMEX %	ELAPSED TIME
1	**-1	1.00	113.4	13.00	55.47	14.00	53.45	8.00	70.71	0.23	1.45
2	**-2	1.00	112.5	4.00	100.00	8.00	70.71	14.00	53.45	0.33	3.09
3	**-3	1.00	112.9	14.00	53.45	8.00	70.71	10.00	63.25	0.29	4.72
4	**-4	1.00	112.9	9.00	66.67	12.00	57.74	14.00	53.45	0.25	6.38
5	**-5	1.00	113.8	7.00	75.59	12.00	57.74	6.00	81.65	0.33	8.01
6	**-6	1.00	111.8	9.00	66.67	14.00	53.45	6.00	81.65	0.28	9.64
7	**-7	1.00	110.3	10.00	63.25	11.00	60.30	16.00	50.00	0.19	11.16
8	**-8	1.00	110.0	8.00	70.71	9.00	66.67	12.00	57.74	0.23	12.80
9	**-9	1.00	111.8	6.00	81.65	9.00	66.67	13.00	55.47	0.26	14.34
10	**-10	1.00	112.5	9.00	66.67	15.00	51.64	19.00	45.88	0.18	16.01

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