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

OCT 2 2 2007

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 License 03-23853-01VA, we are enclosing closeout survey documentation related to Building 72 at the VA Medical Center, Hampton, Virginia, for your review. Principal activities under the license have ceased in this building; therefore, we are requesting that Building 72 be released for unrestricted use.

As supporting information for review and approval of this request, we enclose the following documents:

Enclosure 1	Historical Site Assessment and Final Status Survey Report for the Veterans Administration Facility, Building 72, in Hampton Virginia
Enclosure 2	Additional Information Provided by the Permittee to the National Health Physics Program (NHPP)
Enclosure 3	Annotated Versions of Attachments 5.0 and 7.0 of Enclosure 1 to This Letter
Enclosure 4	Additional Comments on Enclosure 1 by NHPP Reviewer with Permittee Responses
Enclosure 5	Additional Facility Details

We believe these documents provide information consistent with 10 CFR 30.36 criteria to evaluate this separate building for a decommissioning action, and we conclude that the survey results and assessment comply with the radiological dose criteria in 10 CFR 20.1402 for an unrestricted release.

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

Sincerely,

E. Lynn McGuire
Director, National Health Physics Program

Enclosures

Area Classification: 3
Building/Area: Room 108
Floor/Elevation: Floor
Survey Unit/Grid: Bathroom/shower
Surface: ceramic tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
ceramic tile β floor	1.24k cpm	2.48k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 1.41k cpm
Smears taken - see map for location
12C on sink and 13C on floor of shower - No positive activity detected

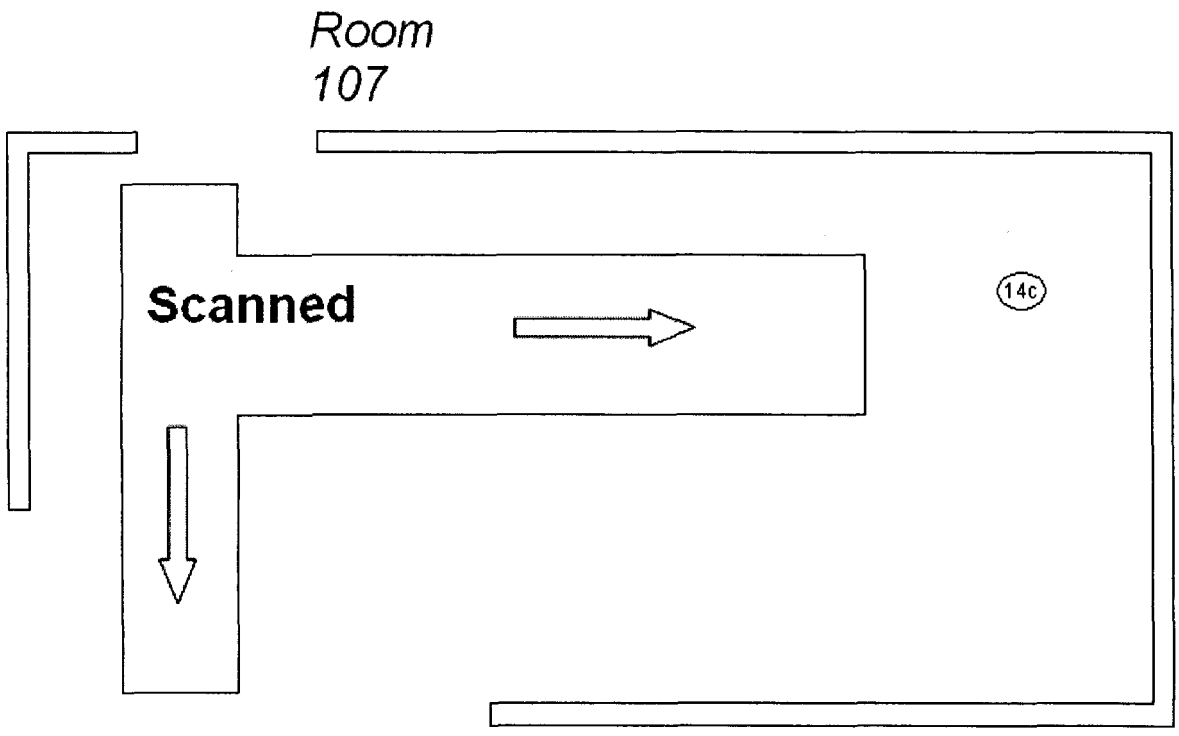
Comments:

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007


Room
107
Scanned
14c

Area Classification:	3
Building/Area:	Room 107
Floor/Elevation:	Floor
Survey Unit/Grid:	
Surface:	ceramic tile
Survey Type:	β scan 771 cm^2 probe
Date/TIme:	2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	35%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
ceramic tile β floor	1.24k cpm	2.48k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

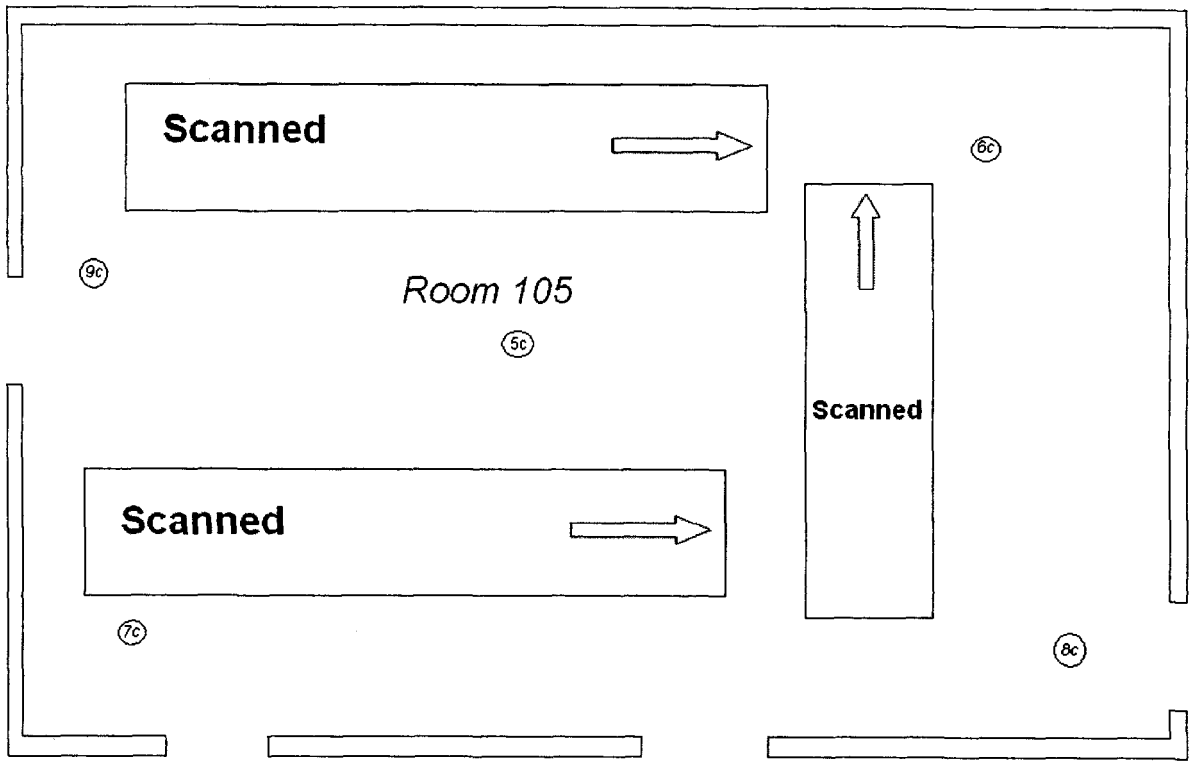
Highest scan level seen in this room was 1.41k cpm
Smears taken - see map for location
14C on floor - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) Byron Bland (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) Joseph W Moon (Signature) Date: 4/11/2007


Scanned
6c
9c
Room 105
5c
Scanned
Scanned
7c
8c

Area Classification: 3
Building/Area: Room 105
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 729 cpm
Smears taken - see map for location
6C through 9C on floor and 5C on floor drain - No positive activity detected

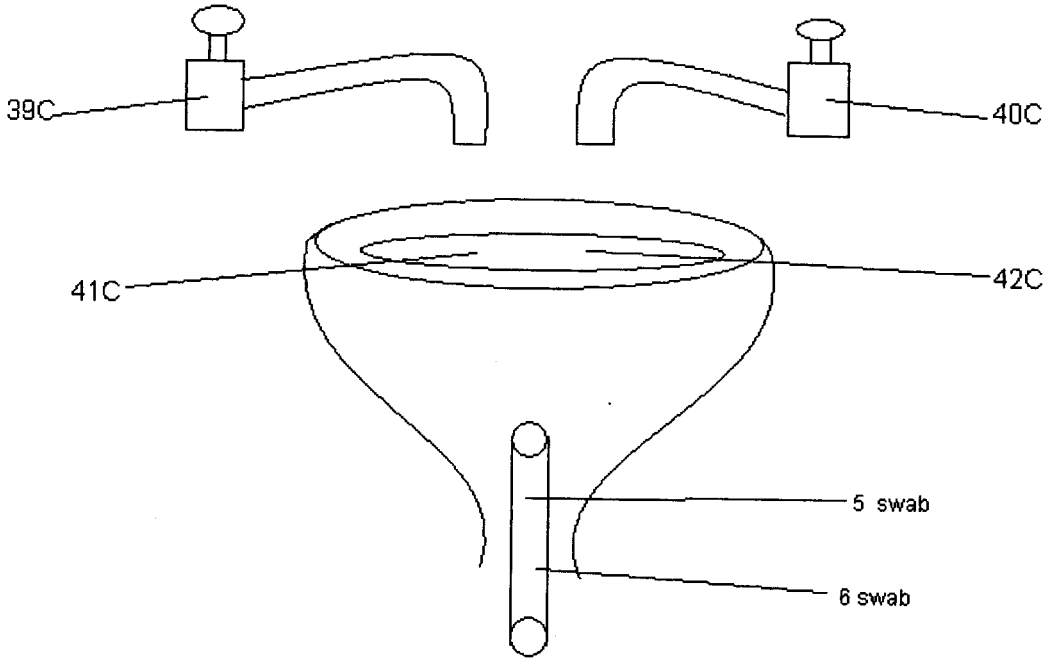
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Sink in room 104



Area Classification: 3
Building/Area: Room 104
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: ceramic tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	25%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
ceramic tile β floor	1.24k cpm	2.48k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 1.58k cpm
Smears taken - see map for location
99B on floor - No positive activity detected
Initial survey 30C in sink drain - positive activity detected at 226 dpm/100 cm^2 H-3 and 195 dpm/100 cm^2 C-14
Follow-up Investigational survey of sink (39C through 42C) - No positive activity detected 3-24-07

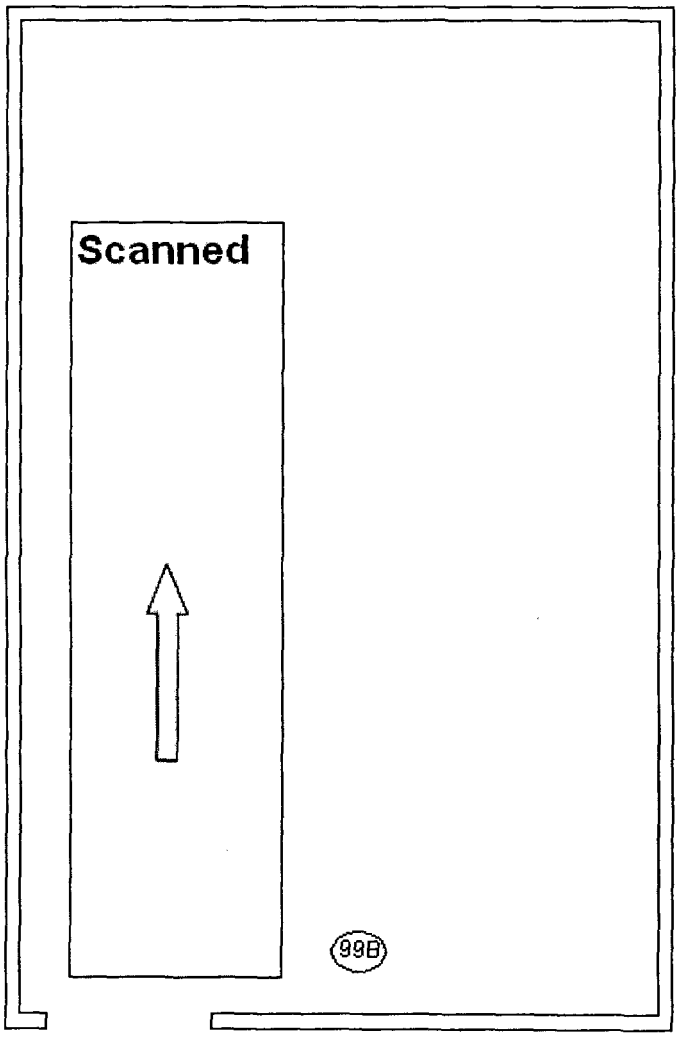
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

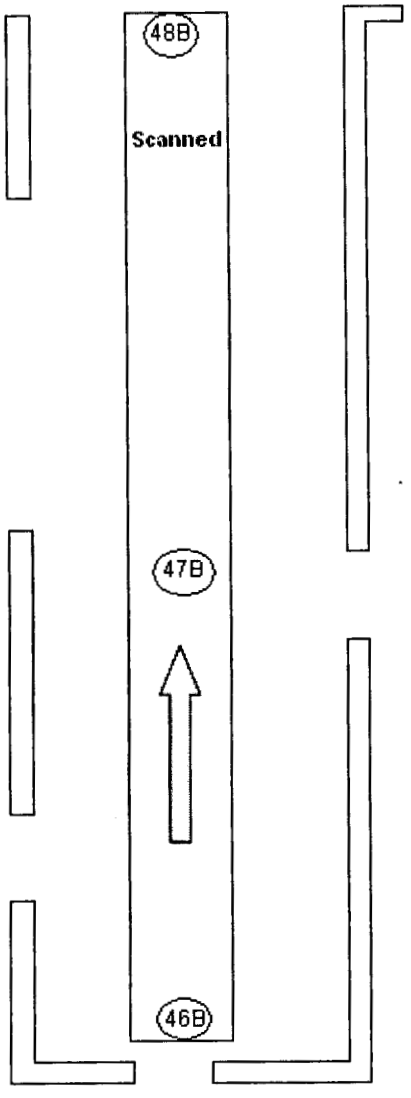
Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007



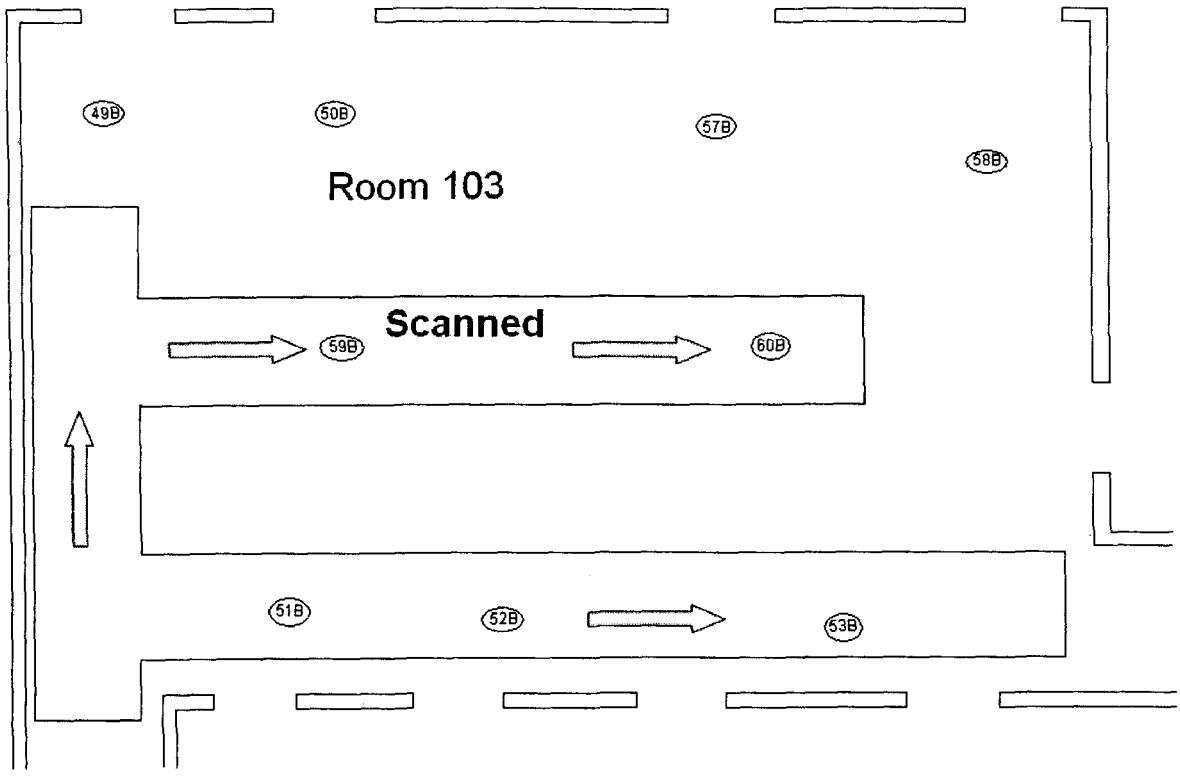
Room 104

Final 8/13/2007



Room 128

Final 8/13/2007



Area Classification:	3
Building/Area:	Room 128 & 103
Floor/Elevation:	Floor
Survey Unit/Grid:	
Surface:	ceramic tile
Survey Type:	β scan 771 cm^2 probe
Date/Time:	2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
ceramic tile β floor	1.24k cpm	2.48k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 1.69k cpm
Smears taken - see map for location
46B through 53B, 57B & 58B - No positive activity detected
Floor Drains 59B & 60B - No positive activity detected

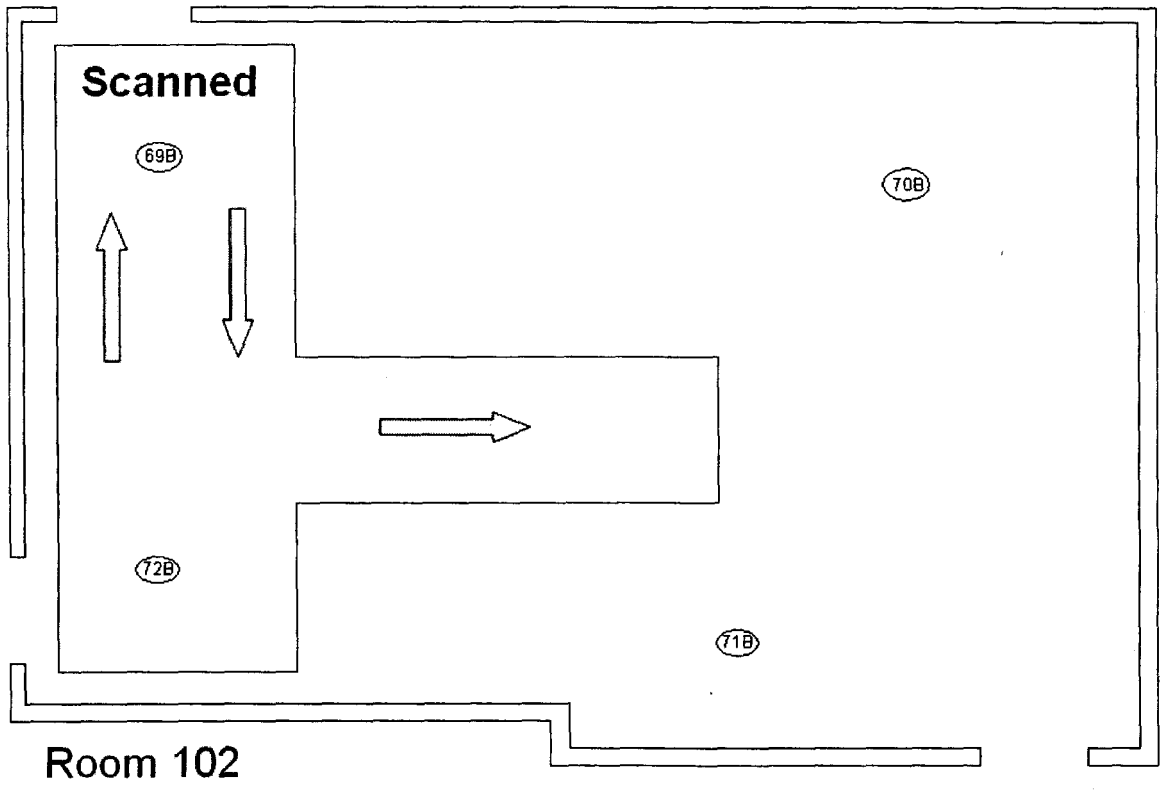
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007



Area Classification:	3
Building/Area:	Room 102
Floor/Elevation:	Floor
Survey Unit/Grid:	Utility Room
Surface:	sealed concrete
Survey Type:	β scan 771 cm^2 probe
Date/Time:	2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	35%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

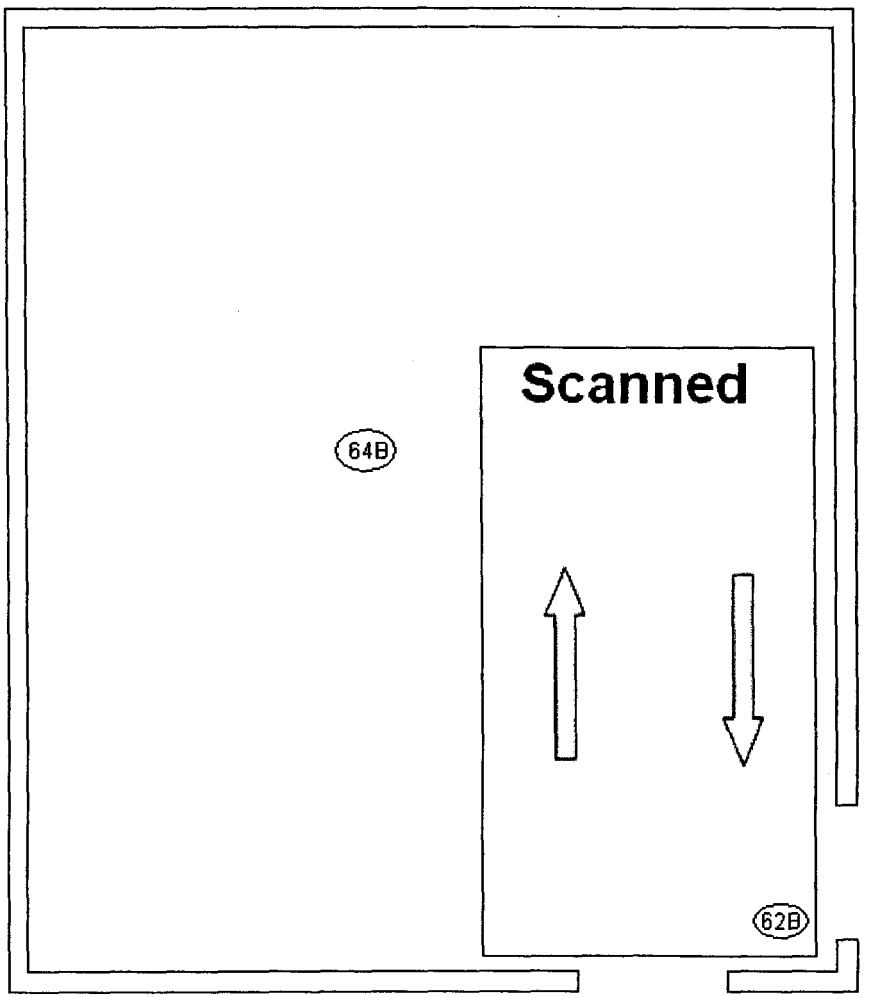
Highest scan level seen in this room was 872 cpm
Smears taken - see map for location
69B & 72B on floor - No positive activity detected
66B in sink drain - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007


Room 101
Scanned
64B
62B

Area Classification: 3
Building/Area: Room 101
Floor/Elevation: Floor
Survey Unit/Grid: Feed Room
Surface: sealed concrete
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 1.0k cpm
Smears taken - see map for location
64B on floor and 62B on floor drain - No positive activity detected

Comments:

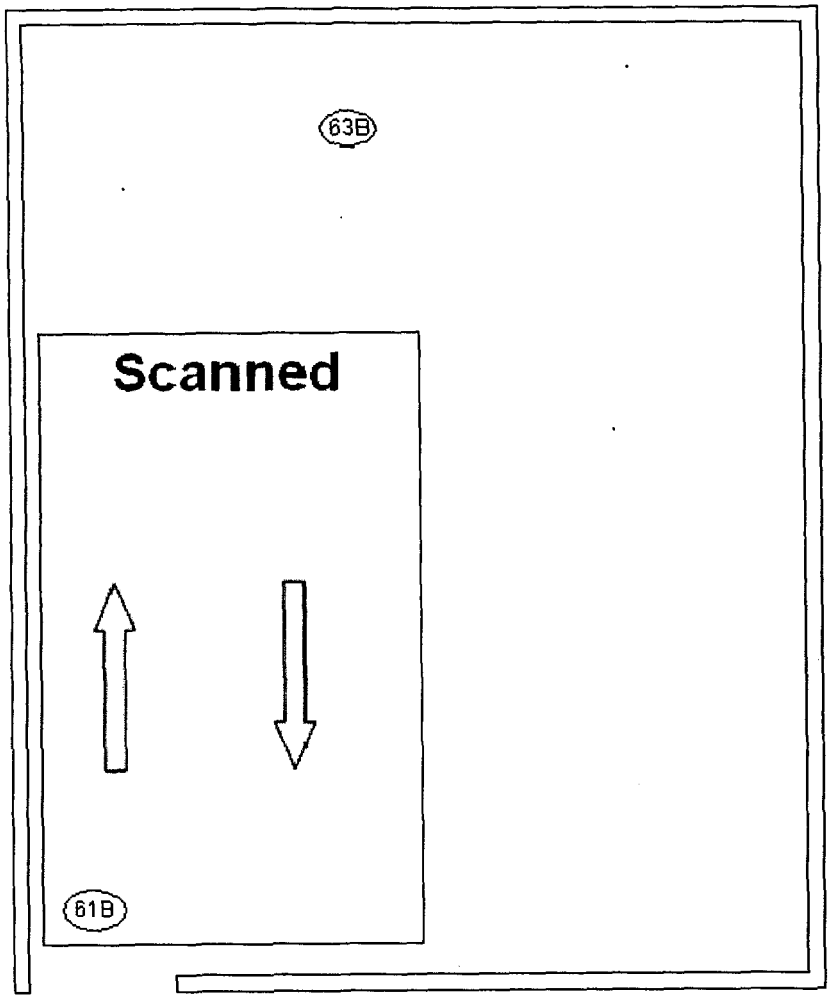
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007



Room 100

Area Classification:	3
Building/Area:	Room 100
Floor/Elevation:	Floor
Survey Unit/Grid:	Autoclave Room
Surface:	sealed concrete
Survey Type:	β scan 771 cm^2 probe
Date/Time:	2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 1.1k cpm
Smears taken - see map for location
63B on floor and 61B on floor drain - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) _____ (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) _____ (Signature) Date: 4/11/2007

Attachment 1
Individual Survey Area Results and Maps

Historical Site Assessment and Final Status Survey Report for the Veterans Administration Facility Building 72 in Hampton, Virginia

1.0 Historical Site Assessment

The Hampton, Virginia Veterans Administration is the fourth oldest facility in the VA health care system, established just after the Civil War (in 1870) as a National Home for Volunteer Soldiers and Sailors. Building 72 was added to the facility in 1908 and was originally used as Dining Room for soldiers.

The first recorded use of radioactive materials at the Hampton, Virginia facility in 1961 was conducted under the authority of the Atomic Energy Commission (AEC). Under the Atomic Energy Act of 1954, the AEC had responsibility for the development and production of nuclear weapons and for both the development and the safety regulation of the civilian uses of nuclear materials. The Energy Reorganization Act of 1974 split these functions, assigning to one agency, now the Department of Energy, the responsibility for the development and production of nuclear weapons, promotion of nuclear power, and other energy-related work, and established the Nuclear Regulatory Commission for regulation of the civilian uses of nuclear materials. Over the next few years, the NRC developed its system of licensing and assumed regulatory authority over the research activities conducted by the Veterans Administration (VA). Materials Permits at the various VA facilities were organized under a single Broad Scope NRC License which is now administered from the North Little Rock, Arkansas VA facility.

The use of radioactive materials at the Hampton, Virginia facility has since been conducted under the authority of Materials Permit # 45-07569-01 now in its 82nd amended form.

1.1 Building Description

Building 72 was converted into a research building in 1974. The East end of the building is a single floor brick enclosure with an extensive wooden frame attic space capped with a slate roof and underlain by a dirt floor crawl space about three feet in height. This section of the building (presumably the former main dining hall) consists of laboratory facilities, administrative office spaces and a library. Fume hoods in the laboratory spaces are operated under a negative pressure gradient and generally are found to be filtered prior to entering the attic space. The fume hoods are exhausted through independent ventilation ducts/fan housings to the exterior of the roofing material. Sinks in the laboratories in this section of the building are drained to the crawl space area with piping typical of laboratory settings where corrosive materials are utilized and are often composed of lead. A system of floor drains was also installed in the laboratory spaces which drain to the crawl space area. There does not appear to be any type of hold-up tank system for the general neutralization of laboratory liquid wastes or the monitoring of hazardous liquid discharge. The liquid effluents of the building discharge to the sanitary sewerage system. The flooring is generally composed of a wood overlain by linoleum tiling in the halls and laboratory spaces and medium duty wall to wall carpeting in office and library spaces.

The West end of Building 72 (presumably the former kitchen and clean-up areas) is also a single floor brick enclosure but with a less expansive attic space. Several areas of the west end of the building appear to be additions of considerable age. This end of the building is underlain

by a cellar space of approximately five feet in height that houses the major utility equipment. This cellar space has recently been remediated for asbestos insulation on the piping and a low density concrete floor was poured over the original cellar floor surface. Access to the crawl space under the east end of the building (an opening of approximately 2.5 x 3 feet) is located here on the east wall of the cellar under the west end of the building. The flooring of the west end of the building is a mixture of ceramic tile, linoleum tiles, and a plastiform and/or linoleum sheeting applied over concrete or wooden substrate. The rooms in the west end of the building appear to have been designed to house animal studies, and consist of a series of wards and laboratories and support rooms containing incubators and sterilization chambers as well as bathroom facilities. The central area of the west end of the building appears to be composed of a series of isolation chambers/rooms connected to a common hallway with an adjacent decontamination room containing a large walk-in washdown chamber and laboratory complex.

An elevated enclosed wooden platform along the south side of the east end of Building 72 accessed by the main central hallway appears to have been the radioactive waste storage and processing area for the building. The far western end of this platform was isolated from the remainder of the platform and was apparently the location of a fire in the building. From the exterior, burned areas of the wooden siding surrounding a ventilation fan housing were observed and the view through a small window though obscured indicated that the space contained rubble scattered upon the floor. This space had no apparent access and was not able to be entered. A similar elevated enclosed wooden platform on the northern side of the east end of Building 72 connects to an adjacent larger building of unknown usage to the north.

A current floor plan of Building 72 was obtained from the Engineering Department of the Hampton, Virginia VA facility and a request was made for any existing maintenance or filter media change out frequencies or historical information concerning the fume hoods in Building 72.

1.2 Findings: Historical Usage of Radioactive Materials in Building 72

It is presumed that radioactive materials were not introduced to Building 72 until after the conversion of the building to a research facility in 1974. [Specific information on the applications for amendment to Materials Permit # 45-07569-01 which may help refine this information has been requested from the broad License administrator and is forthcoming.]

An interview with the current Radiation Safety Officer, Dr. Tapan K. Chaudhuri, was conducted on February 22, 2007. Dr. Chaudhuri provided a copy of the current Material Permit (Amendment 82) as well as copies of a series of *Health Physicist Assessments* spanning the time frame between 1998 and 2001 for review as documentation of the activities in Building 72 involving the use of radioactive material. These reports appear to be quarterly summaries of the activities of researchers in Building 72 by the Health and Safety staff of the Hampton VA facility. The reports were submitted to the facility Radiation Safety Officer for review. Each report would detail the active authorized users, the status of the building radioactive source inventory (including any additions or disposals) and whether any iodinations had been performed during the quarter by the researchers. Dr. Chaudhuri also provided a comprehensive list of authorized users of radioactive materials in Building 72 and the radionuclides which they were authorized to utilize in their studies and which radionuclides were actually used by these individuals. This list is reproduced below:

Researchers:

Richard Atkinson, M.D. – 12/1/86-11/27/93 – used H-3
Paul Aravich, Ph.D. – 7/1/87 -4/8/90- used I-125
Thomas Lauterio, Ph.D. – 4/8/90 – 1/8/94. used I-131, H-3.
Jerome Seyer Ph.D., 7/21/96 – 10/30/04, used H-3, S-35, P-32.
Steven Gentry, M.D. – 1991-1995, used H-3.

This list was compared to the current Materials Permit, the information contained in the quarterly assessment reports reviewed and a physical inspection of Building 72 with the following items being noted:

- The current Materials Permit lists these specific radionuclides under section 6 E through J as "storage only pending disposal and decommissioning", but also lists item 6 F as carbon-14 which is not cited on the list above as a radionuclide used in Building 72. Dr. Chaudhuri was asked about the usage of C-14 in Building 72 when a note in the Health Physics Assessment for the first quarter of 2001 mentioned a pick-up by a disposal company of 5 barrels of radioactive trash labeled as tritium (H-3) and Carbon-14. Dr. Chaudhuri reaffirmed that he had no knowledge of any historical usage of Carbon-14 by any of the researchers in Building 72.

- Laboratory and/or office spaces in the east end of Building 72 are labeled with some of these researchers names and radioactive material labels on fume hoods, drawers; and storage spaces within these laboratories are generally consistent with this usage. Some lead pig type casks in room 113D and the 2" lead bricks located in both rooms 113c and 113D are more commonly used to store/transport/shield high energy gamma emitting radionuclides but most likely were used to shield the often significant bremsstrahlung radiations coincident to common usage of phosphorus-32. One small container in room 113C was labeled as having contained manganese-54 but may have been transferred to Building 72 solely as a lead container after the Mn-54 was removed

- No overt evidence of historical usage of radioactive materials was found in the west end of Building 72 (beyond the double door access which separate the two sections of the building) in the form of radioactive material labels, shielding materials, equipment or laboratory notes within the rooms. This is consistent with anecdotal information concerning the building

- Although it is clear that monthly radioactive material inventory logs were kept for Building 72, these logs were not available for review nor were they located during visual inspections of any of the rooms. From the information contained in the summary quarterly *Health Physics Assessment* reports, the tracking of reduction of radioactive material inventory by decay in storage was not implemented over the period of usage.

- The types and quantities of loose radioactive material used in the building with the exception of tritium (H-3) were of relatively short half-life and mostly disposed of during a clean-up evolution in the first quarter of 2001, which was the last recorded documentation of usage and disposal in the building. The sealed sources that were present in the building (I-129, Cs-137 and Ni-63 rod or calibration/check sources) were either disposed of at that time or subsequently transferred to the inventory of the main hospital building and nuclear medicine laboratory (Eu-152 source).

- The last quarterly *Health Physics Assessment* report available for review (dated September 18, 2001) was still listing 180 µCi of H-3 and an undetermined, but minor, quantity of Sulfur-35, as well as noting the presence of a Cs-137 sealed check source in the building but exempt from inclusion on the formal inventory. The previous quarterly *Health Physics Assessment* report (dated July 12, 2001) noted that this material was scheduled to be disposed of in October of 2001.

- No waste disposal manifests were available for review but their existence is inferred from statements on the last quarterly *Health Physics Assessment* report (dated September 18, 2001). The last manifest noted was dated 2/12/01 (Manifest 01311) and listed three entries of H-3 waste in the amount of 37mBq each.

- The waste processing area on the elevated enclosed wooden platform on the south side of the East end of Building 72 was populated with various containers for the storage of red bag waste as well as an open 30 gallon drum half full of liquid (presumably mop water from rad labs) and some empty and unassembled cardboard boxes (with mold infestation) labeled for use as radioactive material. A container of absorbent material was also found.

- The sink in room 113D was taped over and noted to be "out of service-do not use" due to a broken drain line. The cabinet below the sink was open and contained approximately ½ inch of liquid covering the floor space of the cabinet. There was also evidence that the floor may have been coated with a water resistant barrier at some point (although it appeared well degraded). A bottle of "Isoclean" was also on the floor of this cabinet and presumably the liquid resident in the space.

1.3 Conclusions

Based on the identified past usage and documented inventory, the presence of remaining and residual radioactive material was expected to be minimal in Building 72. The activity, if present, should have been confined to the east end of the Building 72 and located primarily as tritium residue on laboratory surfaces. These surfaces include, but are not limited to, refrigerator and fume hood floors, fume hood filtration media, radioactive material storage drawer in room 113C, and the sink bowls and drains utilized for disposal of radioactive materials by discharge to the sanitary sewerage system (as noted in quarterly *Health Physics Assessment* reports). The possibility of contamination in the decontamination liquid residue found under the broken sink in room 113D and in the radioactive material labeled drum in the waste processing area was considered because of general nature and location.

On the basis of the radioactive materials authorized for use at the facility, carbon-14 and tritium were the only two radionuclides that were considered as potential contaminants. All other listed authorized radionuclides have short half-lives and will have decayed away to undetectable levels as of March of 2007.

In consideration of the nature of the materials observed in the laboratories of room 113 (lead container marked Mn-54) and two inch lead blocks spread about the lab, a cursory survey for the presence of gamma emitting radionuclides was also considered prudent.

2.0 Final Status Survey Design

2.1 Radiological Hazard Assessment and Survey Strategy

Based on the conclusions of the Historical Site Assessment, the Final Status Survey (FSS) of Building 72 focused on the detection of tritium (H-3) and carbon-14 (C-14) contamination on surfaces and floors of the specific laboratories, where radioactive materials were known to have been used. These areas, for the purpose of this survey were subjected to a rigorous evaluation with 100% of the accessible floor areas and horizontal surfaces being assessed for residual contamination. Other areas were evaluated under a graded approach, consistent with MARSSIM guidance. Accessible floor areas were surveyed with a 20% or greater coverage of total floor area and biased sampling was conducted targeting floor drains and sink drains.

Smear surveys for loose surface contamination were conducted in each room of the facility for the initial survey. The initial surveys represented wide area smears to determine the general presence of non-fixed surface contamination. Should any transferable surface contamination be detected, a second series of smear surveys were conducted as an investigatory process to determine the actual levels of transferable contamination in units appropriate to comparison with the clean-up standard.

2.2 Site Clean-up Criteria

For the release of this facility, the approach was no detectable levels of residual contamination using past acceptance criteria for unrestricted release as found in U.S. NRC Regulatory Guide 1.86 (See Attachment 2). The applicable criterion is set forth in Table 1 "Acceptable Surface Contamination Levels" of this Guide. Specifically, for the radionuclides of concern (C-14 and H-3), these criteria are those listed for beta-gamma emitters. The criterion is 5000 dpm/100cm^2 averaged over no more than 1 square meter with no area in excess of 15,000 dpm/100cm^2. In addition, no area may contain removable contamination in excess of 1000 dpm/100cm^2 as determined by dry smear count evaluated over no more than 100 cm^2.

2.3 Survey Instrumentation

Thin windowed portable gas flow proportional counters were selected for the floor and horizontal surface assessment. The proportional detectors are of two different sizes, a large area probe (771 cm^2) used in conjunction with a scanning floor monitor unit which scans at a fixed rate of approximately 2.5 inches/second and a hand held probe of an area more appropriate to direct comparisons with the clean-up standard (126 cm^2). If contamination is detected with the floor monitoring unit, the smaller probe will be used to evaluate the contamination levels for comparison with the clean-up criterion.

Specifically, the two proportional counters used are:

Ludlum Model 43-37-1 gas flow proportional detector (SN PR145081) 771 cm^2 thin window (8 mg/ cm^2 mylar) coupled with a Ludlum Model 2350-1 (SN 129408) data logger, and

Ludlum Model 43-68 gas flow proportional detector (SN PR148454) 126 cm^2 thin window (8 mg/ cm^2 mylar) coupled with a Ludlum Model 2350-1 (SN 129408) data logger

This type of detector is particularly sensitive to pure beta emitting radionuclides such as C-14. These detectors were calibrated and efficiencies established for C-14 at around 18% (See Attachment 3). This type of detector is not particularly sensitive to H-3 due to the very low energy beta emission. Essentially, beta particles from H-3 cannot penetrate even the thin window of these detectors. Therefore, the monitoring for H-3 contamination was performed by smear survey evaluation. While it is possible for H-3 to be present as fixed contamination on surfaces, the mobile nature of this radionuclide makes it also most likely that a fraction will also be present as non-fixed and available for smear survey identification. A liquid scintillation counter was utilized for the evaluation of the smear sample media by a qualified independent vendor service.

The smears utilized for the survey were the special type which dissolves completely into the liquid scintillation cocktail so that light transmission is not impaired in the counting vials by the smear media. The smears were evaluated at three energy bands corresponding to the energies of the radionuclides of concern -- a low energy band for H-3, mid-energy for C-14/S-35, and an upper energy band for P-32 and other radionuclides, which would include common beta/gamma emitting radionuclides. In addition to liquid scintillation counting of smears, a general area survey for gamma emitting radionuclides was conducted using a 1" x 1" NaI(Tl) detector.

2.4 Evaluations

Background levels and check source response were verified prior to the commencement of surface monitoring or surveying and periodically during the evaluation period as well as at the completion of daily activities to assure that the instruments were performing with the efficiency determined during calibration. Background measurements for the various types of media present were established so that appropriate background levels could be subtracted from the direct measurements.

If no C-14 contamination was detected by direct measurement survey or smear evaluations, no H-3 detected by smear evaluations, and no elevated gamma levels were detected; then these initial screening surveys were considered sufficient for final assessment. If investigations of areas were necessary due to detection of the presence of radioactive materials during the initial survey phase, then specific levels of contamination were evaluated by performance of additional surveys and smears.

3.0 Initial Radiological Survey

3.1 Conduct of the Initial Radiological Survey

The initial survey of Building 72 was conducted on February 22nd and February 23rd of 2007. Each room of the facility was evaluated with the floor monitor at the percentages established by the survey design. In addition, two hundred and thirty smear samples were obtained over the entire building with some being biased samples of every floor drain and sink drain in the facility. The locations of the smear samples were documented of a plat drawing of Building 72 obtained from the onsite Engineering group (See Attachment 4).

The smear samples were individually packaged to prevent cross-contamination if any were found to be present and were sent to Radiation Service Organization (RSO, Inc.) of Laurel

Maryland for evaluation on February 26, 2007. RSO, Inc evaluated the samples with a Packard Model 5300 Liquid Scintillation Counter (See Attachment 5).

3.2 Findings

Evidence of facility contamination was detected with the floor monitor in rooms 113 (two locations) and 113B (one location). These locations were further evaluated using the hand held proportional counter and these areas were found to have maximum contamination levels of 3500 cpm/126 cm^2 and 4500 cpm/126 cm^2 in Room 113 and a level of 6200 cpm/126 cm^2 in room 113B. Assuming that the contamination is primarily C-14, the levels in room 113 are above the NRC Regulatory Guide 1.86 criterion for beta-gamma emitting radionuclides at 12,500 dpm/100 cm^2 (3500 cpm/126 cm^2) and 16,750 dpm/100 cm^2 (4500 cpm/126 cm^2). The floor location in room 113B is also above the NRC Regulatory Guide 1.86 criterion at 24,250 dpm/100 cm^2.

Smears of these three contaminated floor areas were obtained and evaluated with the initial smear sets (smear samples 26C through 28C). None of these smears were in excess of the NRC Regulatory Guide 1.86 criterion for removable beta-gamma emitting radionuclides with the highest in the identified floor contamination areas being 17 dpm/100cm^2.

An additional area of surface contamination was found on the sink surface in room 113B directly between the two faucets at 8500 cpm/126 cm^2 (36,500 dpm/100cm^2. A smear of this area (smear sample 29C) returned a removable contamination level of 23 dpm/100cm^2.

The other smear samples taken in room 113B before the floor contamination was discovered (smear samples 10B sink drain and 12B floor drain) also showed indication of removable surface contamination at 230 dpm/100 cm^2 and 52 dpm/100 cm^2. Smear sample 21B taken near the exit door from the Room 113 complex indicated a removable contamination level of 15 dpm/100 cm^2.

Four other smear samples gave a positive indication of removable contamination. Smear sample 31B was taken beneath the sink in room 113D and indicated 11 dpm/100 cm^2. Smear sample 40B was taken as a large area smear on the inner surfaces of the refrigerator/freezer in Room 113C and indicated 124 dpm/100 cm^2 in the H-3 channel and 47 dpm/100 cm^2 in the C-14 channel. Smear sample 41B was taken on the floor in room 125 and indicated 64 dpm/100 cm^2 in the H-3 channel and 22 dpm/100 cm^2 in the C-14 channel. The final smear indicating removable contamination (30C) was taken in the sink drain in the women's bathroom (room 104) and indicated 226 dpm/100 cm^2 in the H-3 channel and 195 dpm/100 cm^2 in the C-14 channel.

3.3 Evaluation of Initial Survey Results

Based on the findings of the initial survey, seven distinct areas were targeted for follow-up investigational surveys. These areas are identified below:

- The sink bowl and drain in Room 104 (Women's Bathroom). This area was not anticipated to have been contaminated.
- Room 125 NW corner to verify presence of removable contamination. This area was not anticipated to have been contaminated.

- Room 113B removable contamination indications on floor drain and sink drain smears.
- Room 113 fixed floor contamination locations (obtain wax build-up scrapings to determine if contamination is removable).
- Room 113C a more comprehensive evaluation of refrigerator surfaces to possibly isolate the contamination location.
- Room 114 Fume Hood (very low indication but rad sticker on side of hood warrants further investigation.
- Room 113D under "out of order" sink

These areas were identified for detailed follow-up investigational surveys to better define the areas indicating positive contamination results to assist in defining any needed remediation activities. The direct measurement surveys of the remainder of the laboratory bench tops and other horizontal surfaces above floor level in Rooms 112 and 124 and the Room 113 laboratory complex were deferred until the follow-up survey tasking.

4.0 Follow-up Investigational Survey

4.1 Conduct of the Follow-up Survey

The radiological survey team returned on March 21st and March 22nd of 2007 to conduct follow-up investigational surveys on areas identified to be impacted by the findings of the initial surveys performed on February 22nd and 23rd of 2007. Additional surveys included smears for removable contamination with smears submitted to RSO, Inc for counting on March 26th 2007 and the results reported on March 27th, 2007 (See Attachment 6).

4.2 Investigational Survey Details

An additional 36 smear samples (31C through 67C) for surface areas and 3 swabs for drains were obtained in the targeted investigation areas. A general gamma activity survey was conducted with a Ludlum Model 19 µR meter. All remaining above floor horizontal laboratory surfaces in the designated comprehensive survey areas were evaluated with the 126 cm^2 thin-window, gas flow proportional detector (Rooms 112 and 124 as well as the remaining above floor level horizontal surfaces in the Room 113 laboratory complex).

4.3 Findings

The following summarize the survey results:

- The sink in the women's bathroom was evaluated with four smears and 2 swabs (on surfaces inside the drain). No evidence of removable contamination was found on any of the survey media.

- The Northwest corner Room 125 was evaluated with five smear samples. No evidence of removable contamination was found on any of the survey media.

- The Fume hood in room 114 was investigated by taking two smear samples on each vertical surface (one high and one low) as well as direct measurements with the hand held proportional counter detector. Smears 31C through 38C returned no evidence of

removable contamination and the direct measurements were indistinguishable from the background count rate.

- No evidence of contaminated surfaces was found in rooms 124 or 112 during the addition direct measurements of the above floor horizontal surfaces.

- Three additional contaminated areas were identified on the above floor horizontal surfaces within the room 113 complex. In room 113A, a direct measurement of the speed concentrator lid was 7500 cpm/100cm^2 (33,000 dpm/100cm^2). A smear sample of the concentrator lid (49C) returned a removable contamination level of 1147 dpm/100 cm^2 of H-3 and 1318 dpm/100 cm^2 of C-14. In room 113D, an additional hot spot was identified on the left front top of the bench top of the sink surface of 2900 cpm/100cm^2 (11,500 dpm/100cm^2). A smear sample (67C) of this location returned no evidence of removable surface contamination.

- An additional hot spot was identified on top of the decontamination sink in room 113B with a direct measurement of 321,000 cpm/100 cm^2 (1,340,000 dpm/100cm^2) a smear sample of this location returned removable contamination of 3998 dpm/100cm2 in the H-3 channel and 5389 dpm/100cm2 in the C-14 channel. Smears of the known two hot spots on the sink top surface and vertical surface of the sink confirm removable contamination in excess of the clean-up guidelines. The smear survey of the floor drain and swabs within the floor drain do not confirm the presence of removable contamination.

- The refrigerator/freezer in room 113C returned positive but low-level indications of removable surface contamination in two of the twelve smear samples obtained. The left bottom drawer returned H-3 activity of 30 dpm/100 cm^2 and C-14 activity of 14 dpm/100 cm^2. The floor of the freezer returned H-3 activity of 107 dpm/100 cm^2 and C-14 activity of 20 dpm/100 cm^2. The top shelf of the freezer door returned H-3 activity of 51 dpm/100 cm^2 and C-14 activity of 8 dpm/100 cm^2. The next to bottom shelf of the refrigerator door returned H-3 activity of 63 dpm/100 cm^2 and no apparent C-14 activity. None of the areas of the refrigerator freezer were contaminated above the Regulatory Guide 1.86 guideline of 1000 dpm/100 cm^2.

4.4 Delineation of Areas Confirmed to be Contaminated (Results)

All areas of Building 72 with the exception of the Room 113 complex were free of detectable contamination both fixed and removable. No beta emitters or gamma emitting radionuclides above background levels were identified.

Within the Room 113 complex, areas of the Room 113 floor marked as having fixed contamination were above the Regulatory Guide 1.86 guideline but the radioactive material appears to be fixed. In room 113D, the top of the sink contained an area of fixed contamination in excess of the guideline. In Room 113C, the refrigerator/freezer contained removable contamination below the guideline. In room 113A, the speed concentrator unit was contaminated above the guidelines for both removable and direct measurements of C-14.and H-3. In room 113B, a small area of floor was contaminated above the guideline and the top of the sink benchtop was contaminated above the guidelines.

4.5 Recommendations for Remediation

The following remediation actions were recommended and taken:

- Discard the Speed concentrator in Room 113A as radioactive waste.
- Remove portions of the sinktop in rooms 113B and 113D identified as contaminated and discard as radioactive waste.
- Decontaminate/remove as radioactive waste contaminated sections of the refrigerator/freezer in room 113C.
- Remove portions of the flooring identified to be contaminated and discard as radioactive material.

5.0 Remediation

Chesapeake Nuclear Services returned to the facility on June 28th, 2007, to remediate the areas recommended in Section 4.5 and to perform surveys to demonstrate that all surfaces identified as contaminated during the Follow-up survey of March 21st and 22nd, 2007, were either removed from the facility or otherwise met the facility clean-up criteria as described in Section 2.2. Arrangements were made with licensed radioactive waste broker RSO, Inc of Laurel, MD to package and remove the debris that resulted from the remediation effort. Post remediation surveys were conducted with a Ludlum Model 2360 attached to the 125 cm^2 thin window gas-flow proportional detector used for the follow-up surveys on March 21st and 22nd, 2007 to demonstrate that all facility surfaces remaining met the facility clean-up criteria. Swipe surveys were also conducted of surfaces that had undergone remediation or were suspected to possibly have been impacted by the remediation process.

- Speed Concentrator in Room 113A. Based on the results of the Follow-up survey, the benchtop surface in room 113A was not impacted by the presence of internal contamination within the speed concentrator. The speed concentrator was removed and discarded as radioactive waste.

- Sinktop and Floor surfaces in Room 113B: Major impacted portions of the sinktop were partitioned and carefully removed to prevent transfer of loose surface contamination to otherwise non-impacted surfaces. Following removal of the known contaminated sections of the sinktop, additional surveys were conducted to locate any additional areas that might require remediation. During these measurements, the faucet plumbing fixture on the right side of the sink was found to be contaminated but due to geometric considerations, it was difficult to determine at what levels. Decontamination of the fixture was attempted but was unsuccessful. A decision was made to remove the fixture and discard it as radioactive waste. A portion of the wooden framework beneath the sinktop was observed to be water stained and due to its location beneath the contaminated portion of the sinktop was surveyed for residual contamination. Although no contamination was measurable with the proportional detector, this section of wooden truss was removed and discarded as radioactive waste due to the high probability of contamination set into the wooden fibers. The areas of linoleum tile identified as contaminated in Room 113B were removed and discarded as radioactive waste.

- Refrigerator Internal Surfaces in Room 113C: Two decontamination passes were performed with Windex and Bounty paper towels on the internal surfaces of the refrigerator/freezer in Room 113C. The decontamination media was discarded as

radioactive waste. The contamination levels of this refrigerator were not detectable with the proportional counter during the Follow-up surveys but were only measurable by smear survey.

- Sinktop in Room 113D: The impacted section of the sinktop in Room 113D was removed and discarded as radioactive waste.

- Floor surfaces in Room 113: The two areas of linoleum tile identified as impacted during the Follow-up surveys of March 21st and 22nd, 2007 were removed and discarded as radioactive waste.

6.0 Final Status Survey

6.1 Conduct of the Final Status Survey

Following the completion of all remediation tasks and in-process surveys, the container of radioactive waste sealed and removed from the facility. A radioactive waste manifest was prepared and forwarded to the facility RSO for approval and certification statement signature. Final measurements and smear surveys were then conducted of the remediated floor surfaces, the internal surfaces of the refrigerator/freezer and the sink/benchtop or floor surfaces nearest those surfaces removed during the remediation.

6.2 Results of the Final Status Survey

No detectable contamination was measured above background with the 125 cm^2 proportional detector on any of the remediated floor surfaces in Rooms 113 or 113B. No detectable contamination was measured above background on the remaining sinktop surfaces in Room 113D. A small residual sinktop surface of approximately 400 cm^2 located in Room 113B at the top of the remaining wooden framework of the sink (right rear) was found to have residual contamination below the clean-up criteria at 3,600 dpm/100 cm2 and a total activity around 5 nCi (C-14). A smear of this area was obtained to assess the loose surface contamination status. No other surfaces were found to contain residual contamination by direct measurement. The results of the smears taken of the interior of the refrigerator in Room 113C and of the remaining residually contaminated surface in Room 113B as well as remediated floor surfaces and areas near the removed sinktop surface were all found to be free of loose surface contamination (Attachment 7.0).

6.3 Analysis of the Final Status Survey Results

The remediation of the identified contaminated areas/equipment was completed; all identified areas with elevated levels were remediated to below Regulatory Guide 1.86 clean-up criteria. RSO, Inc. of Laurel, MD, took possession the waste for disposal – 211 lbs, 4.1 cubic feet containing 0.9 mCi C-14 and 0.001 mCi H-3.

The facility clean-up criteria as established in Section 2.2 requires that all surfaces be less than 5000 dpm/100cm^2 averaged over no more than 1 square meter with no area in excess of

15,000 dpm/100cm^2. The remaining residually contaminated surface is significantly less than 1 square meter (0.04 square meters) and yet still meets the clean-up criteria for average fixed contamination. The remaining residually contaminated surface at 3600 dpm/100cm^2 is a small fraction (< 0.25) of the maximum residual contamination clean-up criteria for a 100 cm^2 sized area. NRC's default surface contamination level corresponding to 25 mrem/yr is 3.7E+06 dpm/100 cm2 (NUREG-1757). So, leaving in-place does not pose an issue for the unconditional release of the site. Additionally, the piece is below the 10 CFR 30 exempt concentration value for C-14 of 8x10^{-3} uCi/ml and the exempt total activity level of 100 uCi.

The hypothetical dose to a member of the public from the unconditional release of the facility is much less than 1 mrem per year and well below the 25 mrem per year decommissioning criteria of 10 CFR 20.

Table of Contents

Attachments

Historical Site Assessment and Final Status Survey Report for the Veterans Administration Facility Building 72 in Hampton, Virginia

Final Report

8/13/2007

Surveys Performed by:

Joseph W. Moon, CHP
and
Byron W. Bland

Chesapeake Nuclear Services

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Enclosure 1

Historical Site Assessment and Final Status Survey Report for the Veterans administration Facility Building 72 in Hampton Virginia

(Prepared: August 13, 2007)

Area Classification:	3
Building/Area:	Room 119
Floor/Elevation:	Floor
Survey Unit/Grid:	Copy Room
Surface:	8 inch tile
Survey Type:	β scan 771 cm^2 probe
Date/Time:	2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

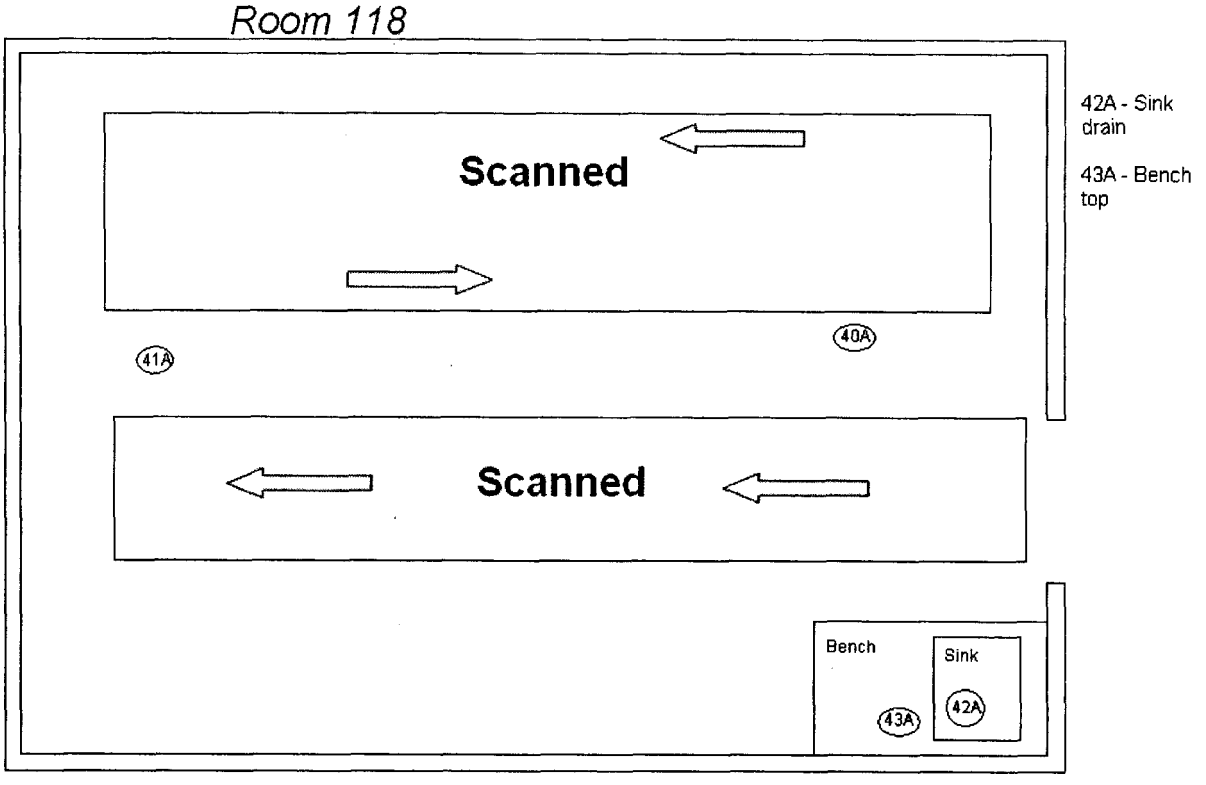
Highest scan level seen in this room was 750 cpm
Smears taken - see map for location
44A - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007


Room 118
Scanned
Scanned
41A
40A
42A - Sink drain
43A - Bench top
Bench
Sink
42A
43A

Area Classification: 3
Building/Area: Room 118
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	35%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 760 cpm
Smears taken - see map for location
40A through 43A - No positive activity detected

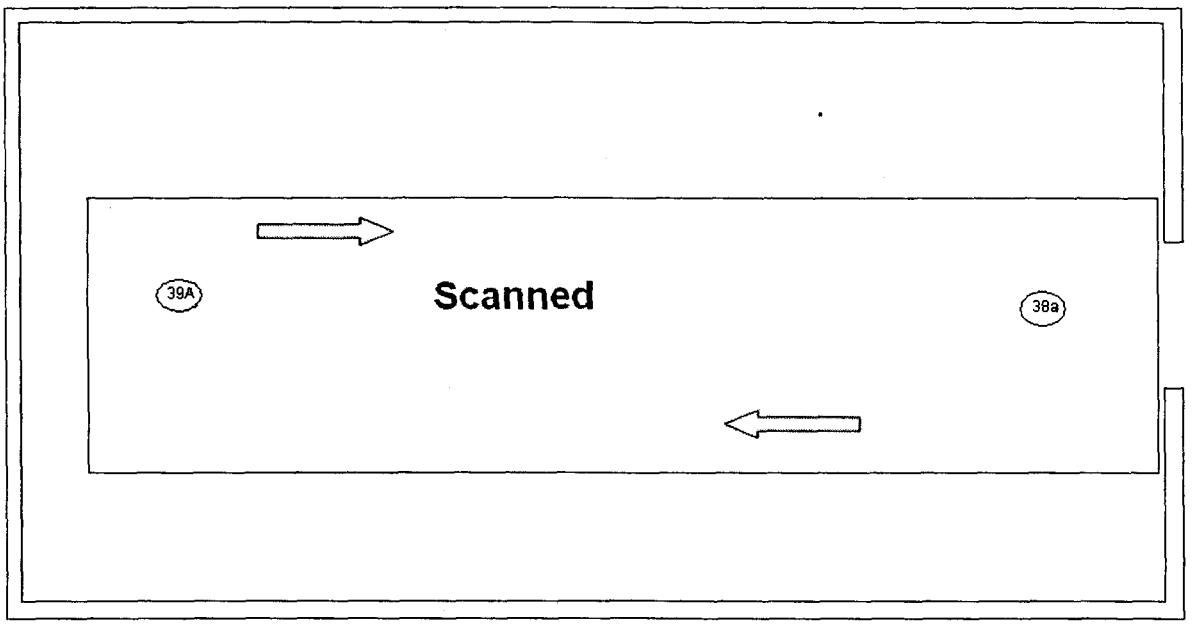
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Room 117



Area Classification: 3
Building/Area: Room 117
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	40%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 849 cpm
Smears taken - *see map for location*
38A and 39A - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

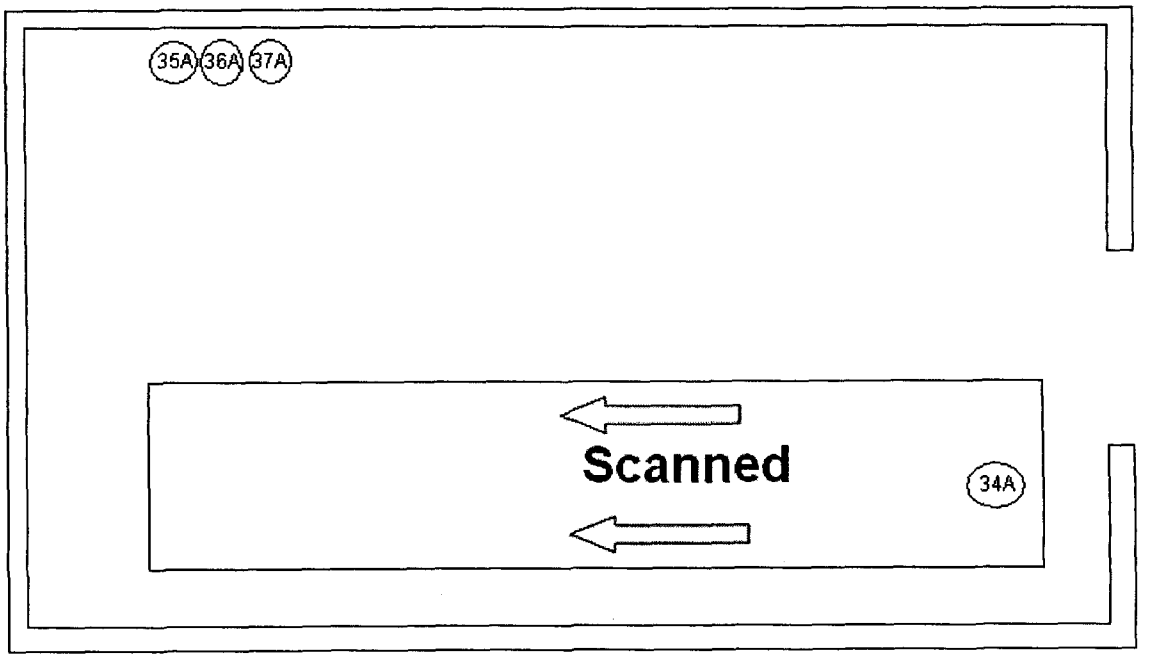
Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007

Room 116A

Fume Hood
35A - Floor
36A - Walls
37A - Exhoust



Area Classification: 3
Building/Area: Rooms 116 and 116A
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	25%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this survey area was 772 cpm
Smears taken - see map for location
Room 116 - 33A - No positive activity detected
Room 116A - 34A through 37A - No positive activity detected

Room 116A Fume Hood is detached (not connected to any ventilation system) odor of VOC's in room
Note: Radiation Symbol on Fume Hood - should be removed

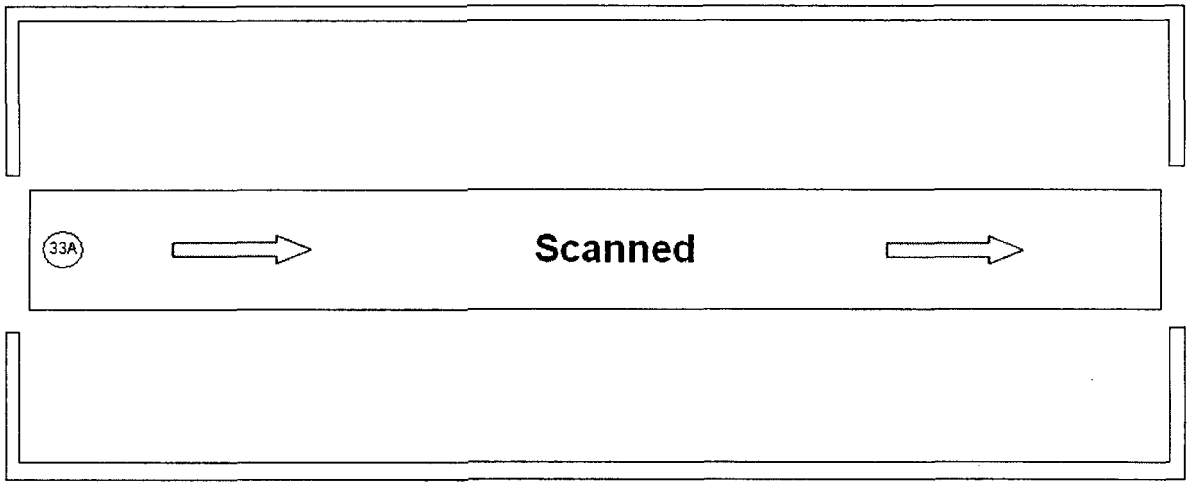
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

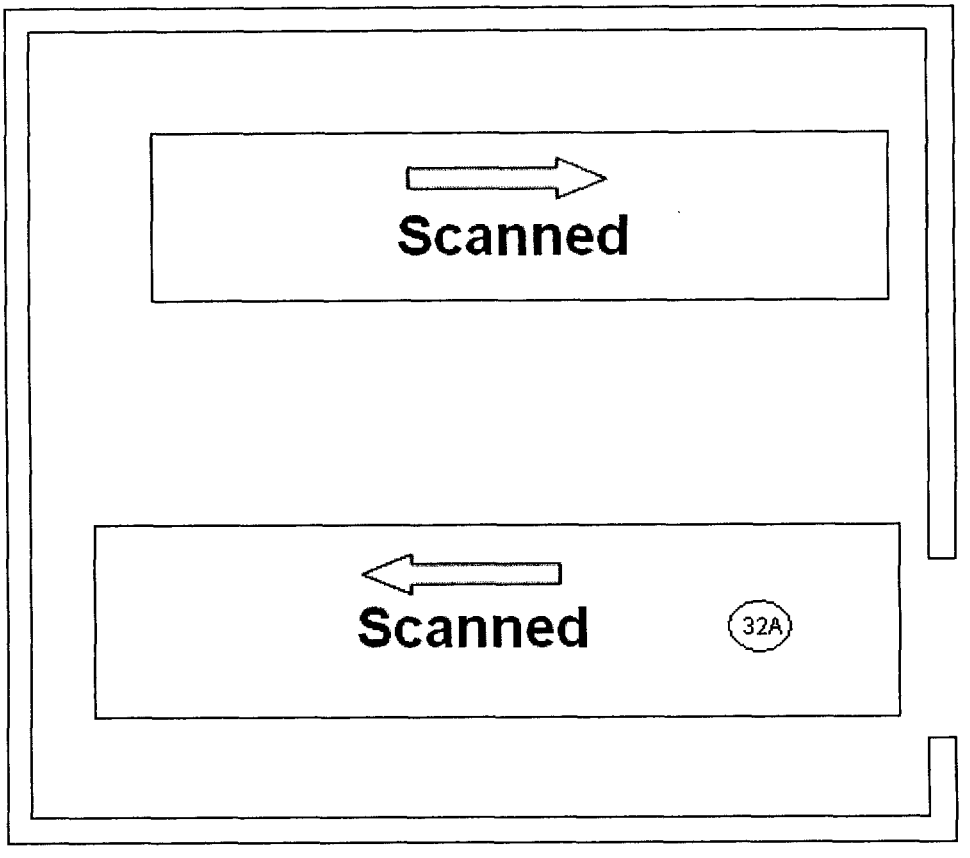
Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

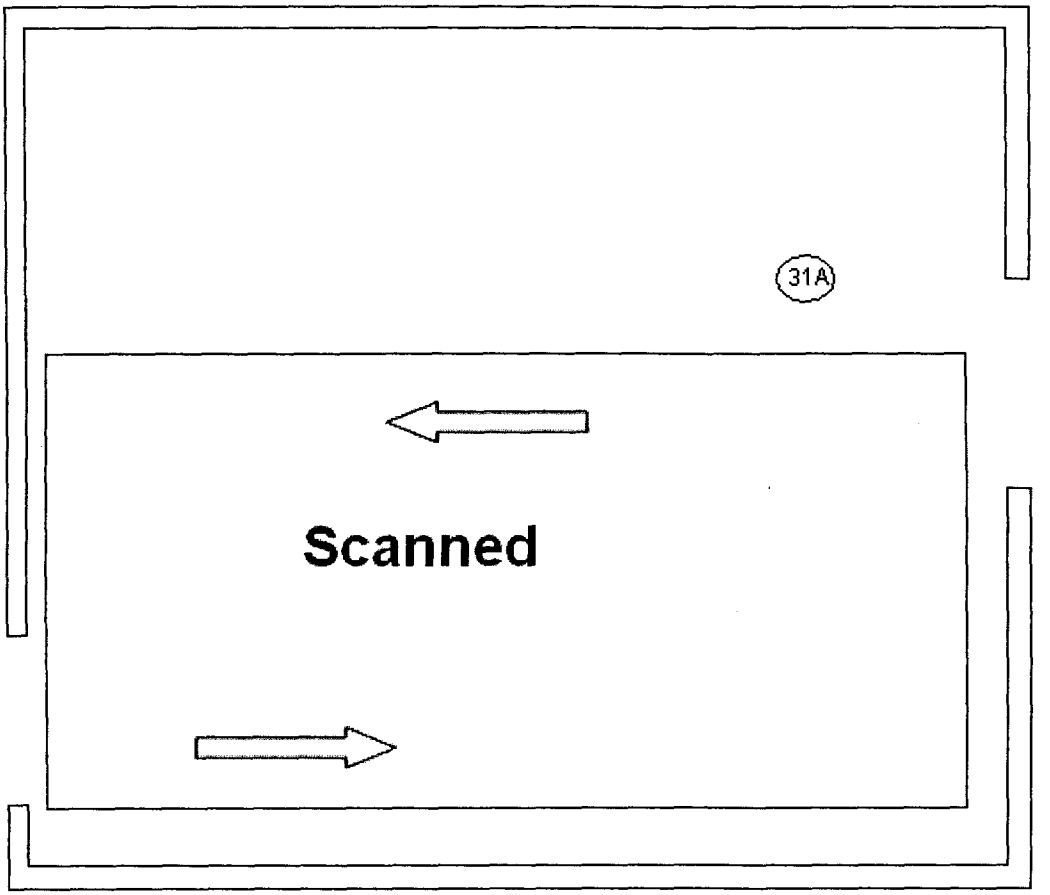
Room 116



Room 115A



Room 115



Area Classification: 3
Building/Area: Rooms 115 and 115A
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	45%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 792 cpm
Smears taken - see map for location
Room 115 31A - No positive activity detected
Room 115A 32A - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

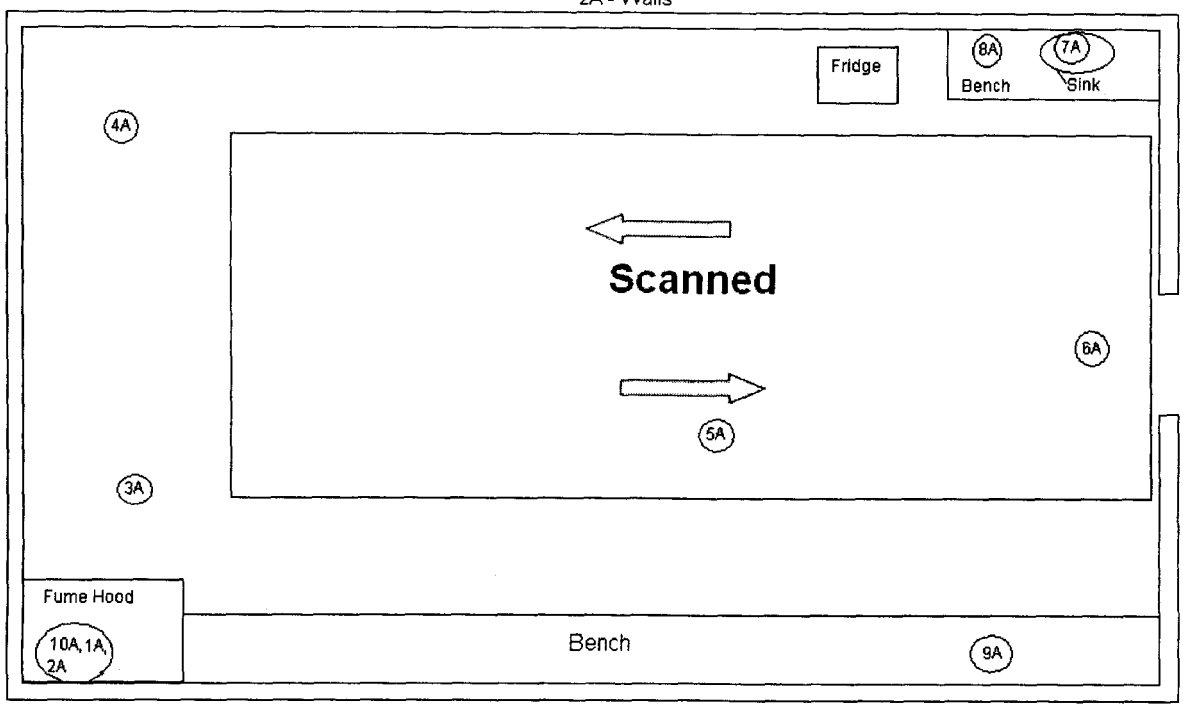
Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007

Room 114

Fume Hood
10A - exhoust
1A - Floor
2A - Walls

8A - Top of bench
7A - In sink
9A - Top of bench



Area Classification: 3
Building/Area: Room 114
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	40%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 867 cpm
Smears taken - see map for location
1A through 10A
Highest positive smear 2A @ 14 dpm/100 cm2 in C-14 channel on Fume Hood walls
No positive activity detected on any other smear
Investigation of positive result on 3/22/07
Static Measurements of Fume Hood walls and glass with 126 cm2 probe - no detectable activity above background
Additional smears taken 3/22/07 2 on each vertical surface one of upper surface and one of lower surface
31C through 38C all less than 10 dpm/100 cm2 in C-14 channel

Note: Radiation Symbol on side of Fume Hood - should be removed
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

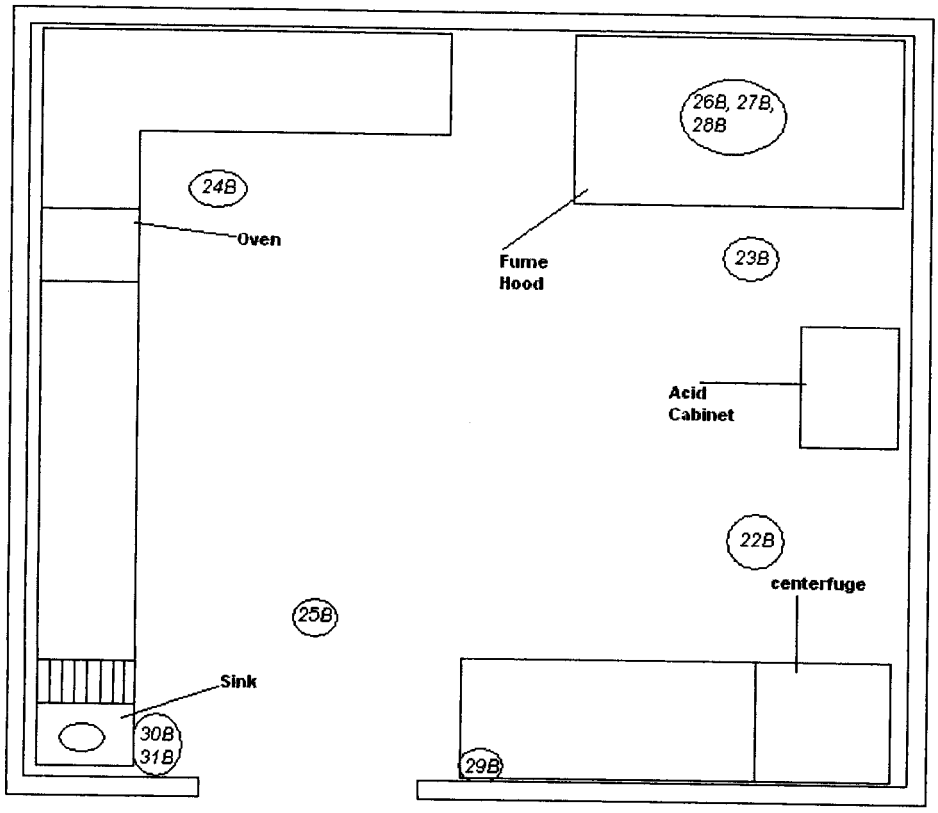
Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007

Room 113D



Fume hood

26B - floor
27B - Walls
28B - exhoust
23B - in fume hood drain

30B - Sink drain
31B - Under sink
29B - Bench top

Area Classification:	1
Building/Area:	Room 113D
Floor/Elevation:	Floor
Survey Unit/Grid:	
Surface:	8 inch tile
Survey Type:	β scan 771 cm^2 probe
	β scan 126 cm^2 probe
	γ scan µR meter
Date/Time:	2/23/2007and 3/22/2007

Survey Requirements

	Beta	Gamma
Floor	100%	as required
Wall		
Working Surfaces	100%	100%
Actual surveyed	100%	100%

Beta Scan Speed:	2.5 inches/sec
Beta Scan Height:	1/2 inch
γ Scan Speed:	
γ Scan Height:	1/2 inch

Instrument Information

	β Floor	β hand held	γ µR meter
Floor Monitor ID Number:	1	2	Ludlum
Logger Model:	2350-1	2350-1	
Logger Serial Number:	149408	149408	
Cal Due Date:	10/22/2007	10/22/2007	9/19/2007
Detector Model:	43-37-1	43-68	Model 19
Detector Serial Number:	PR145081	PR148454	182679

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	
Lab bench β Hand	239 cpm	478 cpm	
µR/hr γ exposure rate	8-15 µR/hr	30 µR/hr	

Source Checks

		Date	Time	Initials
β Floor	**Prior:**	2/23/2007	921	bwb
	End:	2/23/2007	1630	bwb
β hand	**Prior:**	3/22/2007	905	bwb
	End:	3/22/2007	1315	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room with the floor monitor was 680 cpm
Highest hand held measurement was on the front left sink top at 2900 cpm/100cm2 (11,500 dpm/100cm2).
Smears taken - see map for location
Smears 22B through 33B - No positive activity detected on floor, the fume hood interior or bench top surfaces
A smear sample (67C) of the contaminated sink top location returned no evidence of removable surface contamination.
A smear taken of the liquid below the sink (31B) showed minimal positive activity.

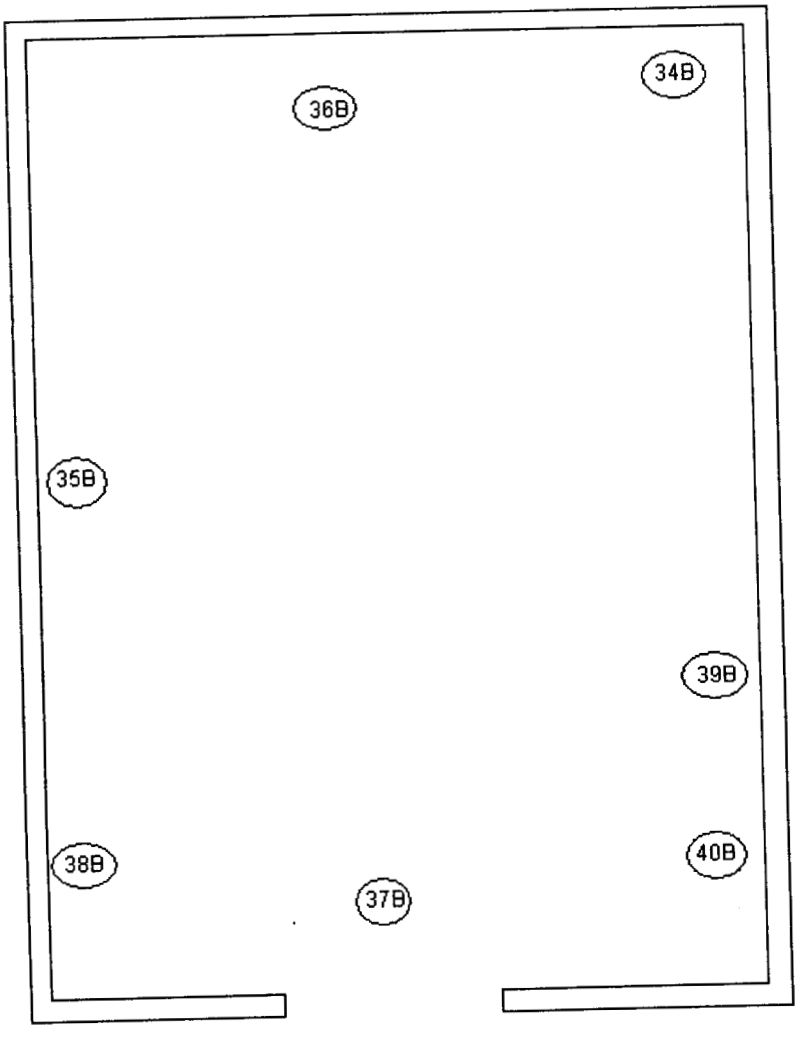
Activity found in excess of the RG 1.86 (1974) clean-up guidelines only on the sink top location
This activity is fixed and not removable

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007



113C

38B - In sink drain

40B - Taken in fridge / freezer

Area Classification: 1
Building/Area: Room 113C
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
β scan 126 cm^2 probe
γ scan μR meter
Date/Time: 2/23/2007and 3/22/2007

Beta Scan Speed: 2.5 inches/sec
Beta Scan Height: 1/2 inch
γ Scan Speed:
γ Scan Height: 1/2 inch

Survey Requirements

	Beta	Gamma
Floor	100%	as required
Wall		
Working Surfaces	100%	100%
Actual surveyed	100%	100%

Instrument Information

	β Floor	β hand held	γ μR meter
Floor Monitor ID Number:	1	2	Ludlum
Logger Model:	2350-1	2350-1	
Logger Serial Number:	149408	149408	
Cal Due Date:	10/22/2007	10/22/2007	9/19/2007
Detector Model:	43-37-1	43-68	Model 19
Detector Serial Number:	PR145081	PR148454	182679

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	
Lab bench β Hand	239 cpm	478 cpm	
μR/hr γ exposure rate	8-15 μR/hr	30 μR/hr	

Source Checks

		Date	Time	Initials
β Floor	Prior:	2/23/2007	921	bwb
	End:	2/23/2007	1630	bwb
β hand	Prior:	3/22/2007	905	bwb
	End:	3/22/2007	1315	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room with the floor monitor was 775 cpm
Highest hand held measurement was background
Smears taken - see map for location
Smears 34B through 39B - No positive activity detected on floor or bench top surfaces
Smear 40B taken in the refrigerator/freezer showed positive indication of activity
Follow-up investigation of the refrigerator/freezer showed positive activity at a maximum
H-3 activity of 107 dpm/100 cm2 and C-14 activity of 20 dpm/100 cm2.
The refrigerator/freezer activity is not fixed and does not exceed the clean-up guideline for removable contamination

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

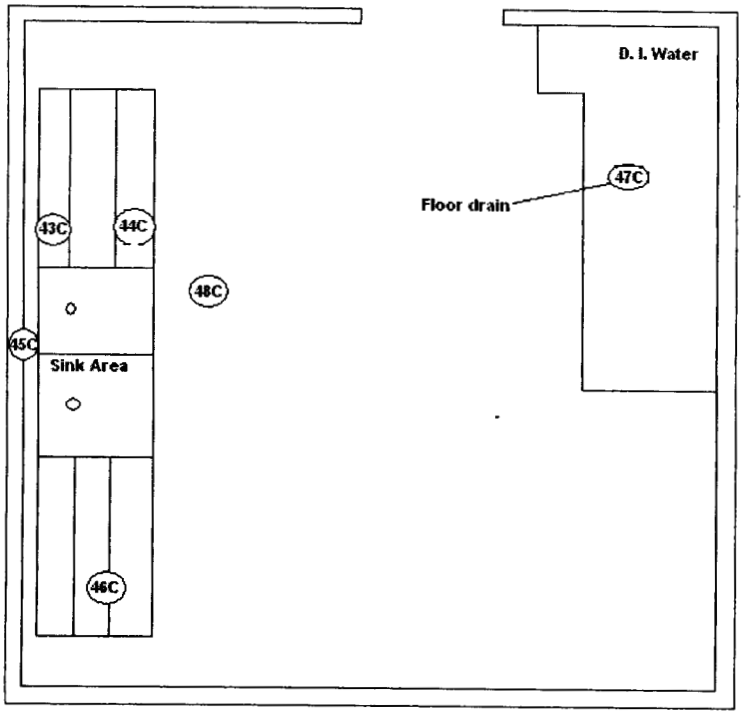
Attach survey map to this document

Technician/Surveyor: Byron Bland _____ Date: 4/11/2007
Name Signature

Supervisor/Reviewer: Joseph W. Moon, CHP _____ Date: 4/11/2007
Name Signature

Final 8/13/2007

Room 113B



Direct measurements of contaminated surfaces with a model 43-68 proportional hand held detector directly on the areas shown on the map where smears were obtained

Location	Measurement
43C	1,340,000 dpm/100cpm^2
44C	8500 dpm/100cpm^2
45C	21,750 dpm/100cpm^2
46C	BKG
48C	14,600 dpm/100cpm^2

Area Classification: 1
Building/Area: Room 113B
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
β scan 126 cm^2 probe
γ scan μR meter
Date/Time: 2/23/2007and 3/22/2007

Beta Scan Speed: 2.5 inches/sec
Beta Scan Height: 1/2 inch
γ Scan Speed:
γ Scan Height: 1/2 inch

Survey Requirements

	Beta	Gamma
Floor	100%	as required
Wall		
Working Surfaces	100%	100%
Actual surveyed	100%	100%

Instrument Information

	β Floor	β hand held	γ μR meter
Floor Monitor ID Number:	1	2	Ludlum
Logger Model:	2350-1	2350-1	
Logger Serial Number:	149408	149408	
Cal Due Date:	10/22/2007	10/22/2007	9/19/2007
Detector Model:	43-37-1	43-68	Model 19
Detector Serial Number:	PR145081	PR148454	182679

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	
Lab bench β Hand	239 cpm	478 cpm	
μR/hr γ exposure rate	8-15 μR/hr	30 μR/hr	

Source Checks

		Date	Time	Initials
β Floor	Prior:	2/23/2007	921	bwb
	End:	2/23/2007	1630	bwb
β hand	Prior:	3/22/2007	905	bwb
	End:	3/22/2007	1315	bwb

Comments:

Initial Survey 2/23/07 Note: Source checks required at beginning and end of shift

One floor region was detected as contaminated above the Investigation level by the floor monitor
Highest hand held measurement of this floor area was 6.2k cpm/126 cm^2 (24,250 dpm/100 cm^2)
Two areas were found to be contaminated on the decon sink top during the initial survey.
The highest reading of these two was 8500 cpm/126 cm^2 between the faucets
Smears taken - see map for location
Floor smears in Room 113B 5B through 8B & 28C (floor hot spot) - No positive activity detected
Smear samples 12B (floor drain) and 10B (right sink drain) indicated positive activity

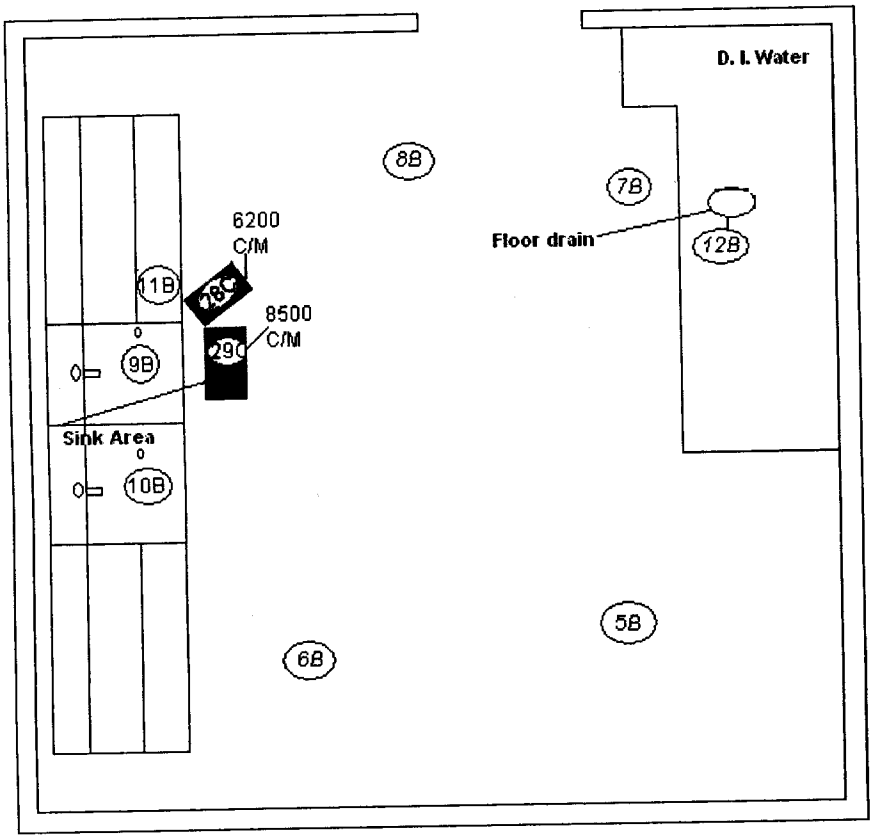
Follow-up Survey 3/22/07
Highest μR meter measurement seen in this room was background
Highest hand held measurement found on the above floor level horizontal surfaces
was 321,000 cpm/100 cm^2 (1,340,000 dpm/100cm^2) on the right rear side of the decon sink top.
Decon sink smear of highest contaminated areas (43C) was 3998 dpm/100cm2 in the H-3 channel
and 5389 dpm/100cm2 in the C-14 channel. Other sink top smears (44C, 45C & 48C) confirm activity in excess of clean-up guideline. Floor drain smear (47C) - No positive activity detected

Attach survey map to this document

Technician/Surveyor: Byron Bland _____ Date: 4/11/2007
Name Signature

Supervisor/Reviewer: Joseph W. Moon, CHF _____ Date: 4/11/2007
Name Signature

Room 113B



11B - Bench top
12B - Floor drain
10B - In sink drain
9B - In sink drain
29C - Between faucets

Area Classification: 1
Building/Area: Room 113A
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
β scan 126 cm^2 probe
γ scan μR meter
Date/Time: 2/23/2007and 3/22/2007

Beta Scan Speed: 2.5 inches/sec
Beta Scan Height: 1/2 inch
γ Scan Speed:
γ Scan Height: 1/2 inch

Survey Requirements

	Beta	Gamma
Floor	100%	as required
Wall		
Working Surfaces	100%	100%
Actual surveyed	100%	100%

Instrument Information

	β Floor	β hand held	γ μR meter
Floor Monitor ID Number:	1	2	Ludlum
Logger Model:	2350-1	2350-1	
Logger Serial Number:	149408	149408	
Cal Due Date:	10/22/2007	10/22/2007	9/19/2007
Detector Model:	43-37-1	43-68	Model 19
Detector Serial Number:	PR145081	PR148454	182679

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	
Lab bench β Hand	239 cpm	478 cpm	
μR/hr γ exposure rate	8-15 μR/hr	30 μR/hr	

Source Checks

		Date	Time	Initials
β Floor	Prior:	2/23/2007	921	bwb
	End:	2/23/2007	1630	bwb
β hand	Prior:	3/22/2007	905	bwb
	End:	3/22/2007	1315	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room with the floor monitor was 700 cpm
Highest hand held measurement was 7500 cpm/100cm2 (33,000 dpm/100cm2) on the lid of the speed concentrator.
Smears taken - see map for location
Smears 1B through 4B no positive activity detected on floor or bench top surfaces
Smear on lid of speed concentrator (49C) returned a removable contamination level of
1147 dpm/100 cm2 of H-3 and 1318 dpm/100 cm^2 of C-14.

Activity was detected in excess of the RG 1.86 (1974) clean-up guidelines on a piece of equipment
(Speed concentrator) on a bench top in the room. This activity exceeds the removable
as well as the total activity limitation.

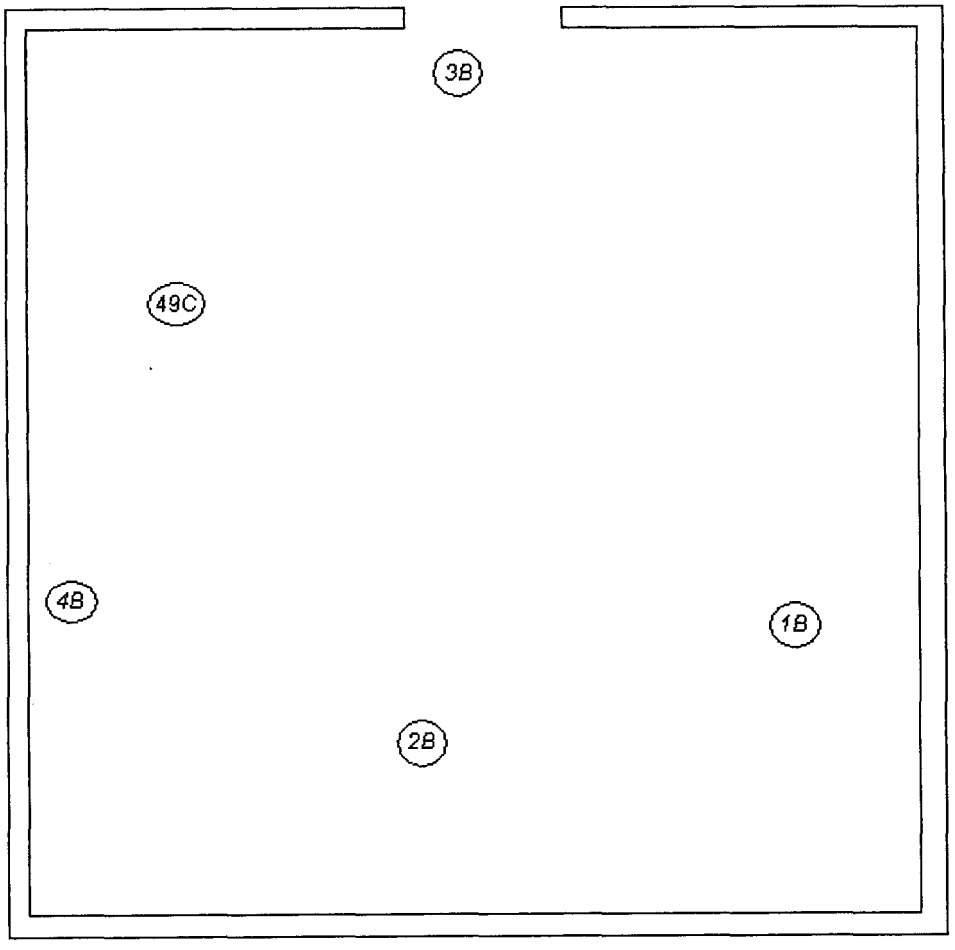
Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) _____ (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) _____ (Signature) Date: 4/11/2007

Final 8/13/2007

Room 113A



4B - On bench

Area Classification: 1
Building/Area: Room 113
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
β scan 126 cm^2 probe
γ scan μR meter
Date/Time: 2/23/2007and 3/22/2007

Beta Scan Speed: 2.5 inches/sec
Beta Scan Height: 1/2 inch
γ Scan Speed:
γ Scan Height: 1/2 inch

Survey Requirements

	Beta	Gamma
Floor	100%	as required
Wall		
Working Surfaces	100%	100%
Actual surveyed	100%	100%

Instrument Information

	β Floor	β hand held	γ μR meter
Floor Monitor ID Number:	1	2	Ludlum
Logger Model:	2350-1	2350-1	
Logger Serial Number:	149408	149408	
Cal Due Date:	10/22/2007	10/22/2007	9/19/2007
Detector Model:	43-37-1	43-68	Model 19
Detector Serial Number:	PR145081	PR148454	182679

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	
Lab bench β Hand	239 cpm	478 cpm	
μR/hr γ exposure rate	8-15 μR/hr	30 μR/hr	

Source Checks

		Date	Time	Initials
β Floor	Prior:	2/23/2007	921	bwb
	End:	2/23/2007	1630	bwb
β hand	Prior:	3/22/2007	905	bwb
	End:	3/22/2007	1315	bwb

Note: Source checks required at beginning and end of shift

Comments:

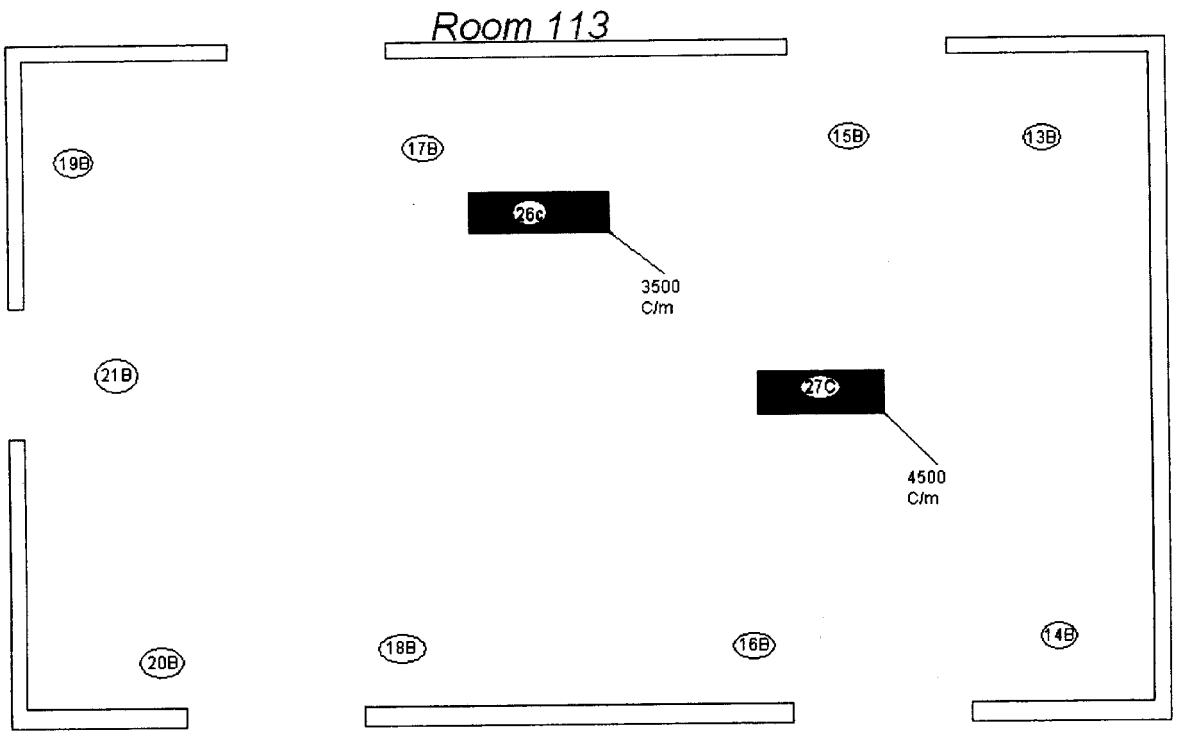
Two floor regions were detected as contaminated above the Investigation level by the floor monitor
Highest hand held measurement of these two floor areas was 4500 cpm/126 cm^2 (16,750 dpm/100cm^2)
Highest μR meter measurement seen in this room was background
Smears taken - see map for location
Floor smears in Room 113 13B through 21B - No positive activity detected except 21B (15 dpm/100cm^2)

Floor activity was detected in excess of the RG 1.86 (1974) clean-up guidelines
This activity appears to be fixed into the floor surface

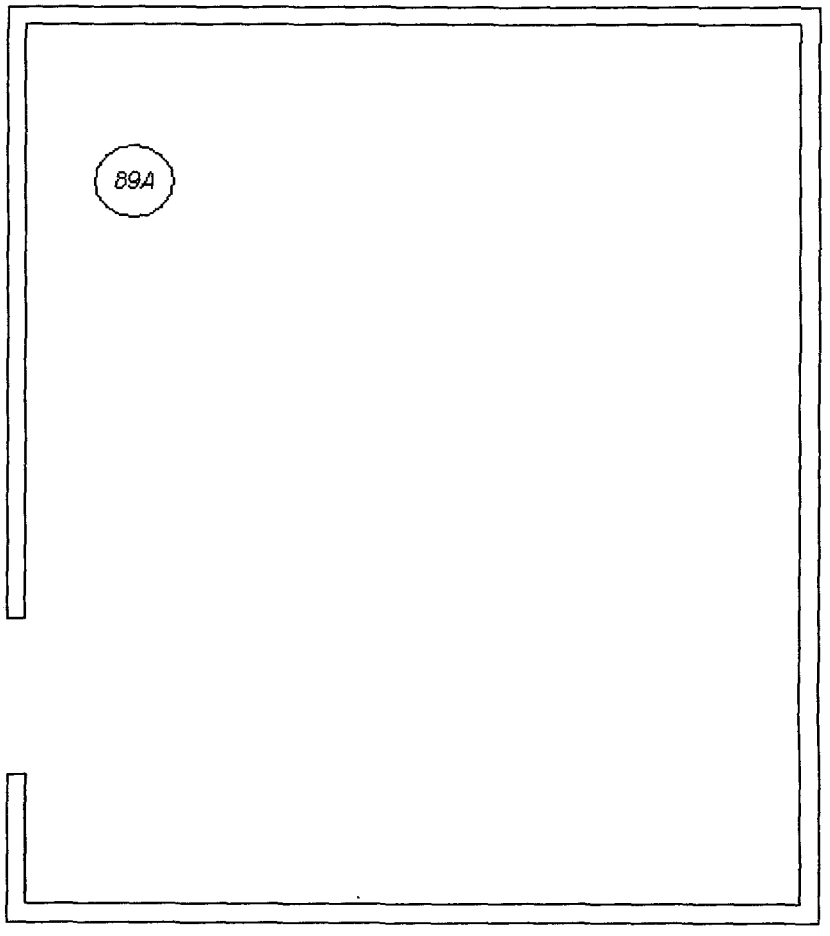
Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) Byron Bland (Signature) Date: 4/11/2007

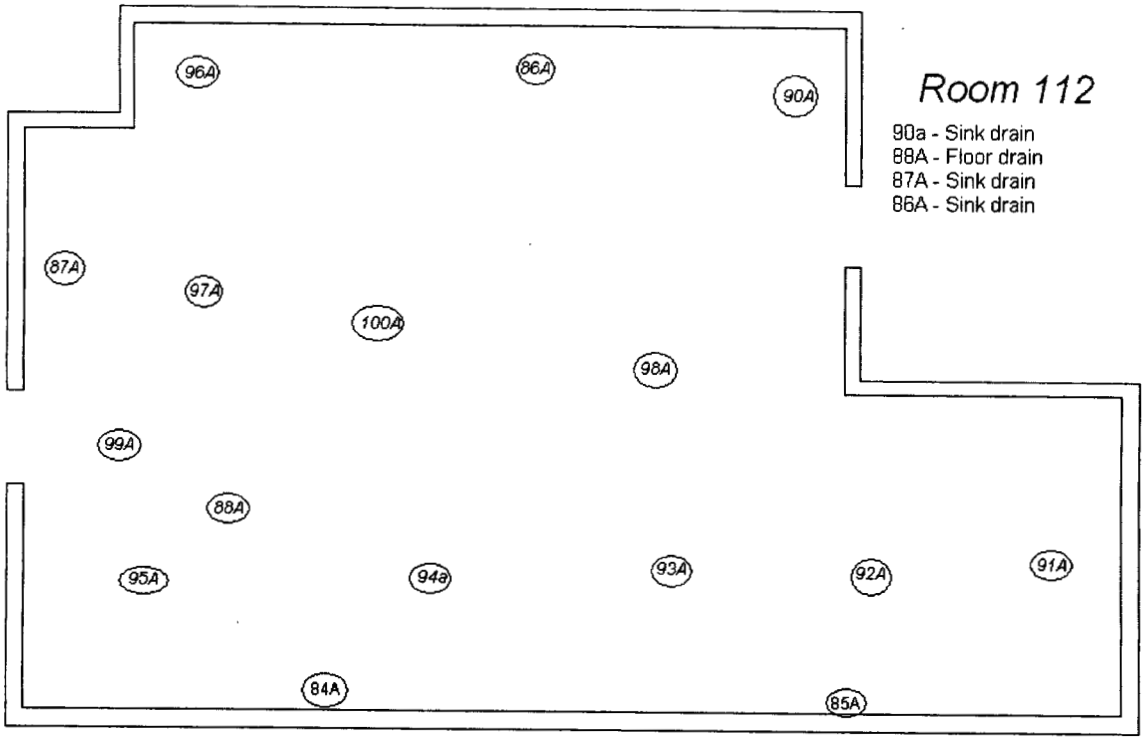
Supervisor/Reviewer: Joseph W. Moon, CHP (Name) Joseph W Moon (Signature) Date: 4/11/2007


Room 113
19B
17B
15B
13B
26C
3500
C/m
21B
27C
4500
C/m
20B
18B
16B
14B

Room 112A



Final 8/13/2007



Room 112

90a - Sink drain
88A - Floor drain
87A - Sink drain
86A - Sink drain

Area Classification: 1
Building/Area: Rooms 112 and 112A
Floor/Elevation: Floor
Survey Unit/Grid: Rad Lab and Office
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
β scan 126 cm^2 probe
γ scan μR meter
Date/Time: 2/23/2007and 3/22/2007

Beta Scan Speed: 2.5 inches/sec
Beta Scan Height: 1/2 inch
γ Scan Speed:
γ Scan Height: 1/2 inch

Survey Requirements

	Beta	Gamma
Floor	100%	as required
Wall		
Working Surfaces	100%	100%
Actual surveyed	100%	100%

Instrument Information

	β Floor	β hand held	γ μR meter
Floor Monitor ID Number:	1	2	Ludlum
Logger Model:	2350-1	2350-1	
Logger Serial Number:	149408	149408	
Cal Due Date:	10/22/2007	10/22/2007	9/19/2007
Detector Model:	43-37-1	43-68	Model 19
Detector Serial Number:	PR145081	PR148454	182679

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	
Lab bench β Hand	239 cpm	478 cpm	
μR/hr γ exposure rate	8-15 μR/hr	30 μR/hr	

Source Checks

		Date	Time	Initials
β Floor	Prior:	2/23/2007	921	bwb
	End:	2/23/2007	1630	bwb
β hand	Prior:	3/22/2007	905	bwb
	End:	3/22/2007	1315	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest Floor Monitor scan level seen in this room was 787β cpm
Highest hand held scan level seen in this room was background
Highest μR meter measurement seen in this room was background
Smears taken - see map for location

Sink drains in Room 112 - 84A through 87A and 90A - No positive activity detected
Floor drain in Room 112 - 88A - No positive activity detected
Floor smear in Room 112 - 91A through 100A - No positive activity detected
Floor smear in Room 112A - 89A - - No positive activity detected
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

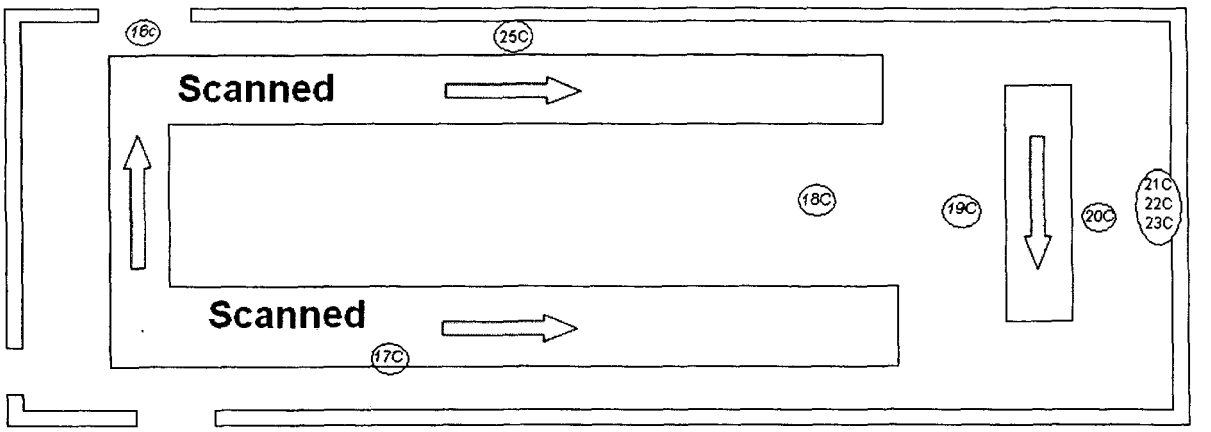
Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) _____ (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) _____ (Signature) Date: 4/11/2007

Final 8/13/2007

Room 111



Fume Hood
21C - floor
22C - walls
23C - exhaust

25C - in sink

Area Classification: 3
Building/Area: Room 111
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	35%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

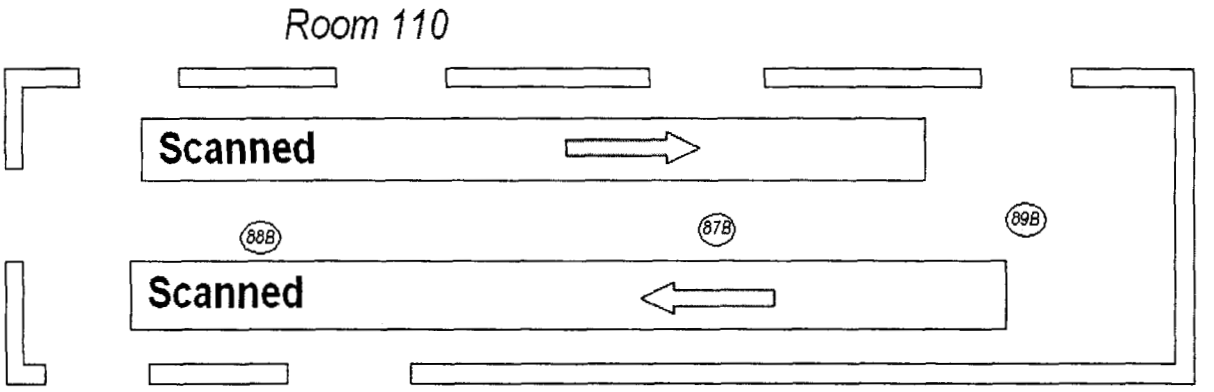
Highest scan level seen in this room was 701 cpm
Smears taken - see map for location
16C through 20C on floor and 25C on sink drains - No positive activity detected
21C through 23C on Fume Hood internals - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) Byron Bland (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) Joseph W Moon (Signature) Date: 4/11/2007


Room 110
Scanned
88B
87B
89B
Scanned

Area Classification:	3
Building/Area:	Room 110
Floor/Elevation:	Floor
Survey Unit/Grid:	
Surface:	sealed concrete
Survey Type:	β scan 771 cm^2 probe
Date/Time:	2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	40%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

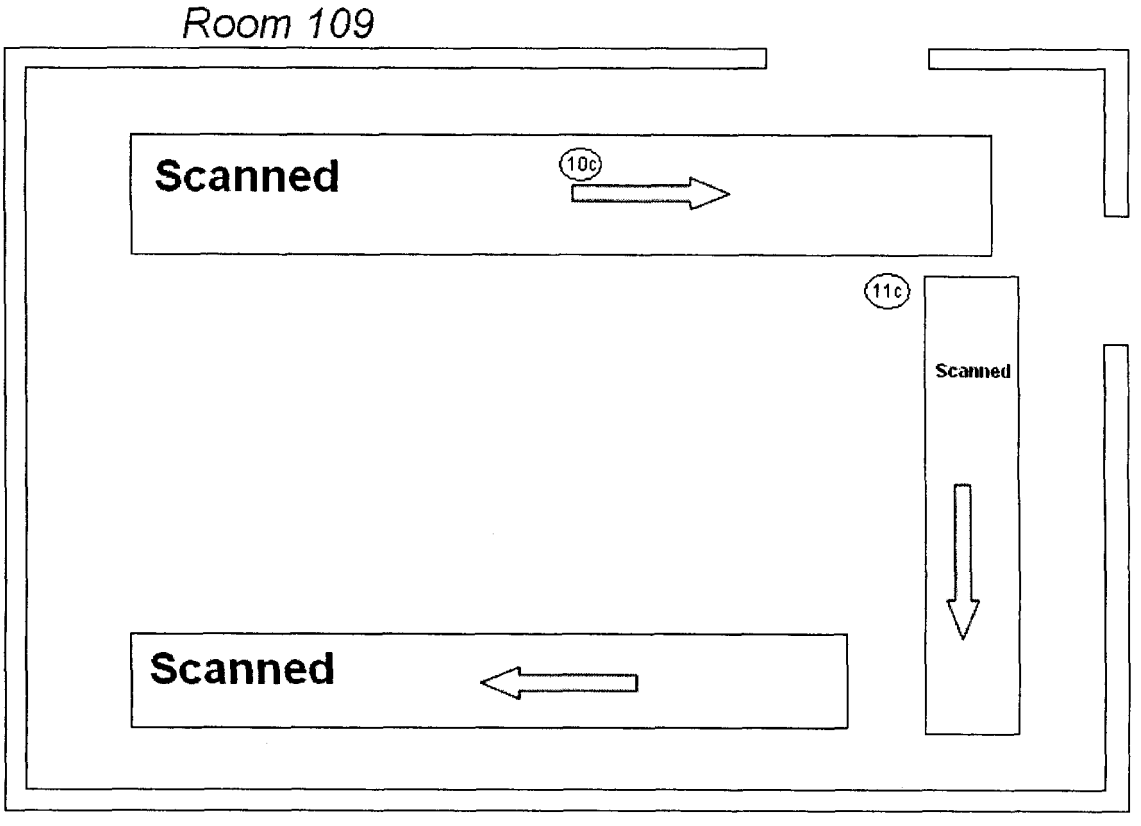
Highest scan level seen in this room was 923 cpm
Smears taken - see map for location
88B & 89B on floor and 87B on floor drain - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) Byron Bland (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) Joseph W Moon (Signature) Date: 4/11/2007


Room 109
Scanned
10c
11c
Scanned
Scanned

Area Classification: 3
Building/Area: Room 109
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 810 cpm
Smears taken - see map for location
10C on floor and 11C on floor drain - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

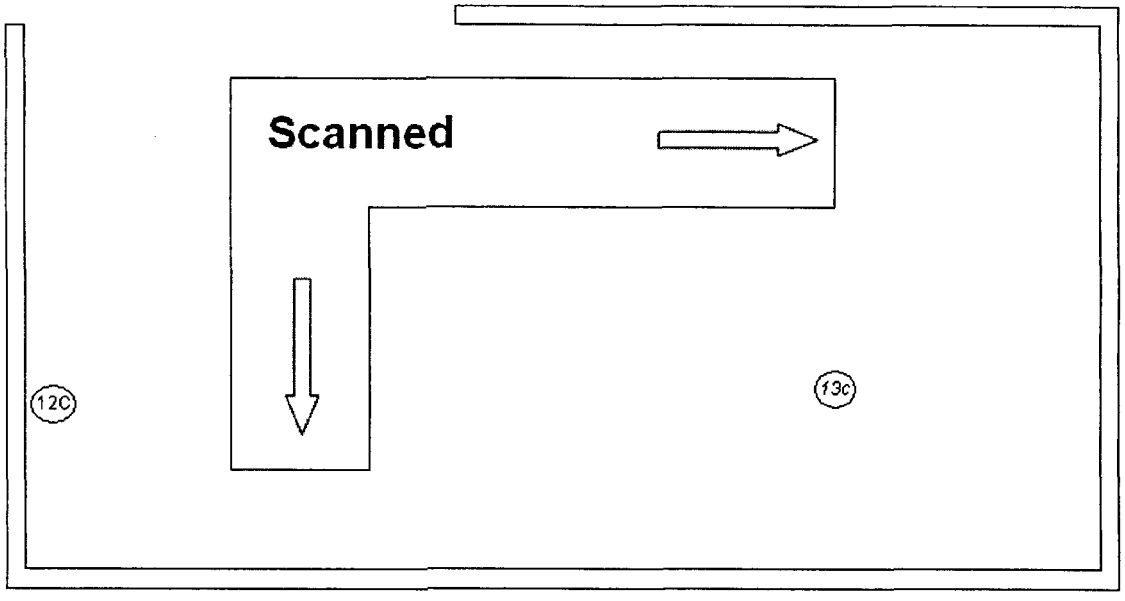
Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Room 108

12c - In sink



Area Classification: 3
Building/Area: Rooms 120, 120A & 120B
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	35%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 720 cpm
Smears taken - see map for location
45A through 48A - No positive activity detected
Carpeted floor surfaces
Note: partitions delineating closet space Room 120C no longer present

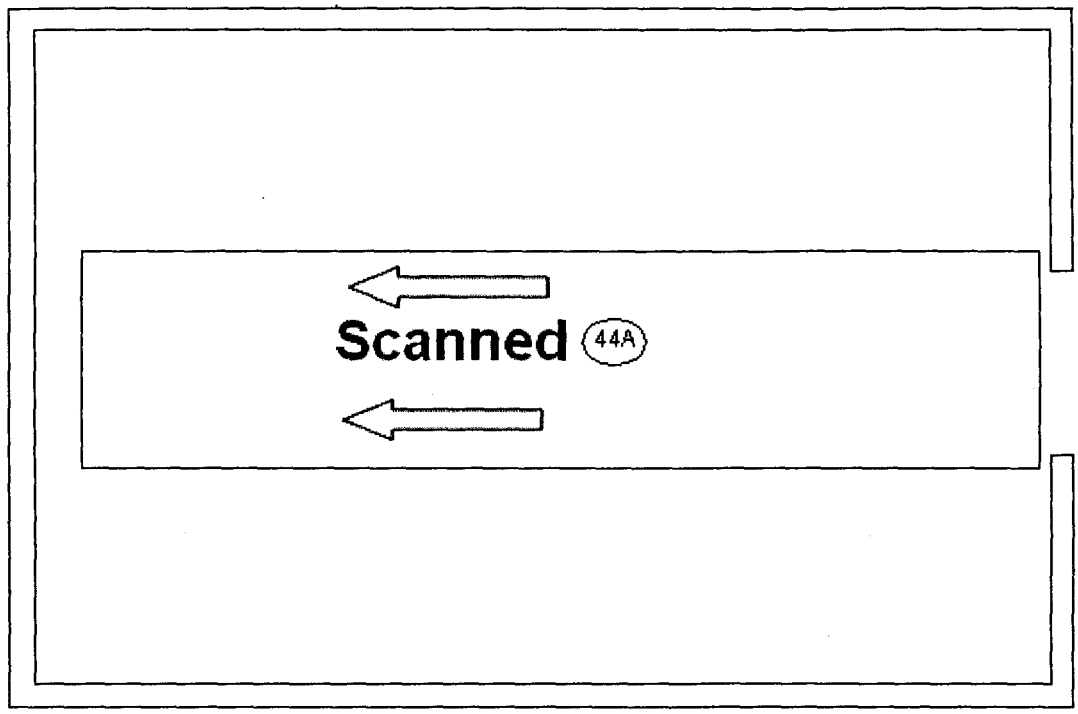
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

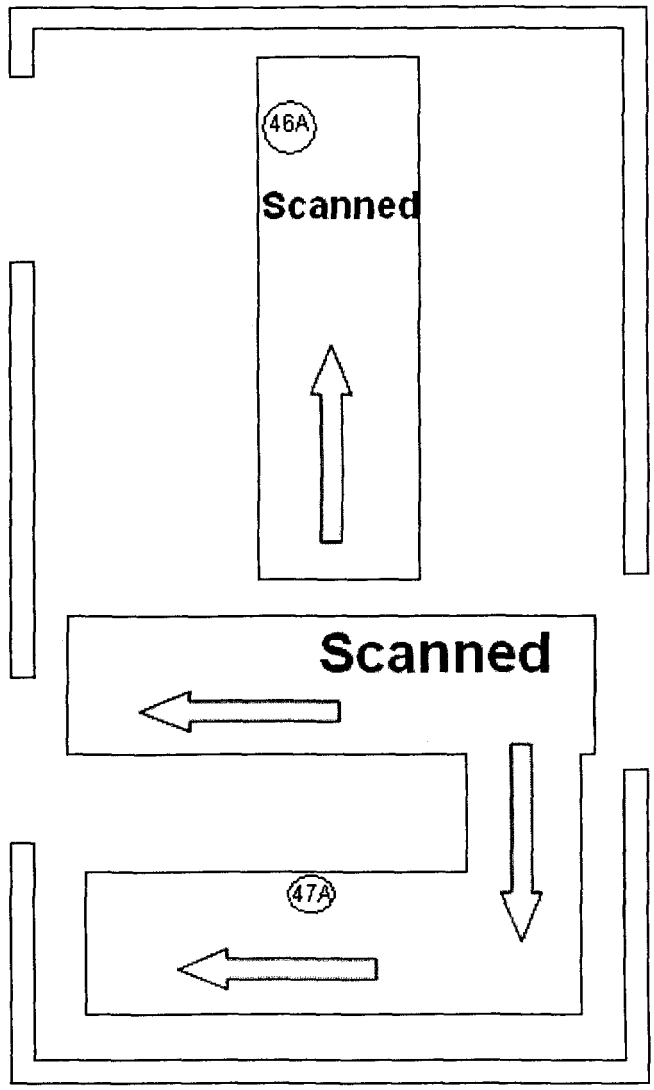
Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

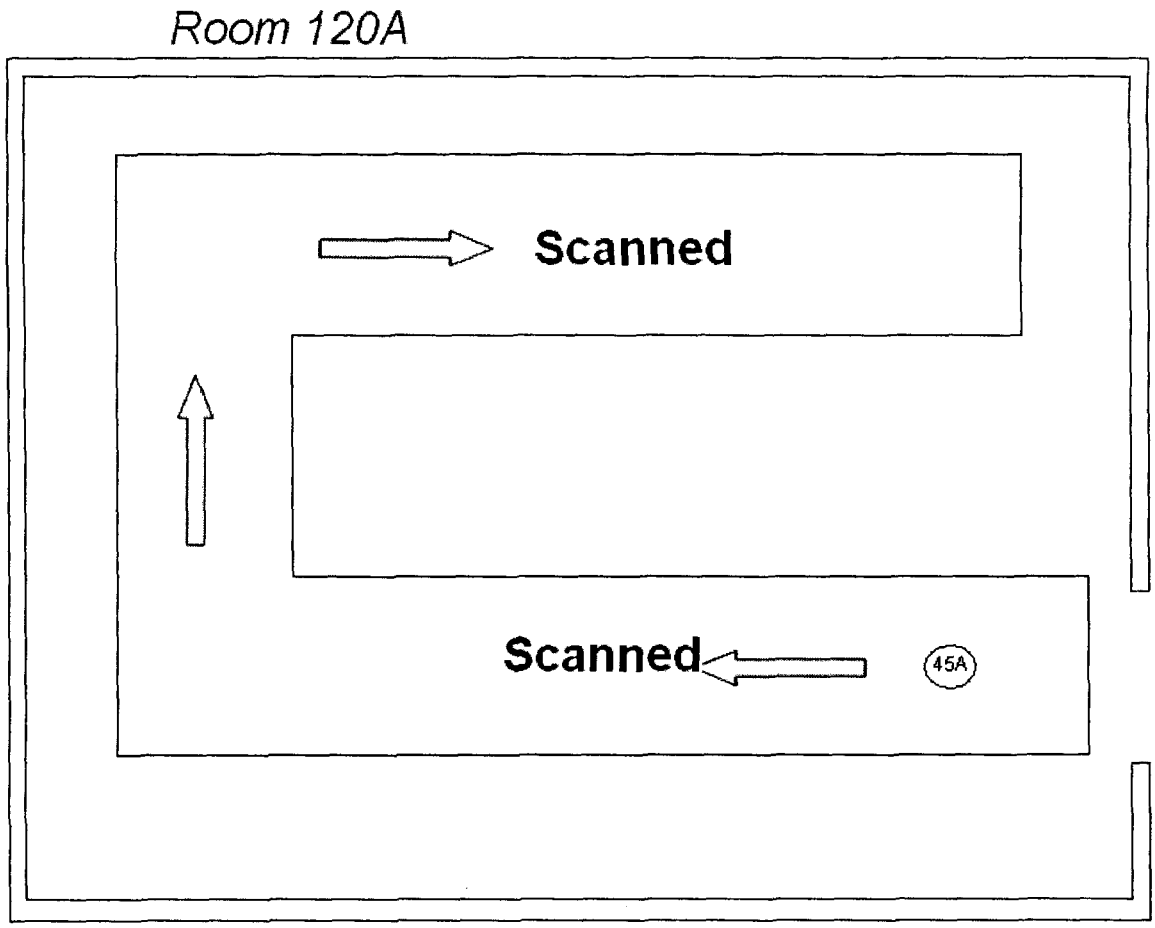
Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Room 119



Room 120




Room 120A
Scanned
Scanned
45A

Area Classification: 3
Building/Area: Room 121
Floor/Elevation: Floor
Survey Unit/Grid: Non-Rad Lab
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	921	bwb
End:	2/23/2007	1630	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 760 cpm
Smears taken - see map for location
49A through 60A - No positive activity detected

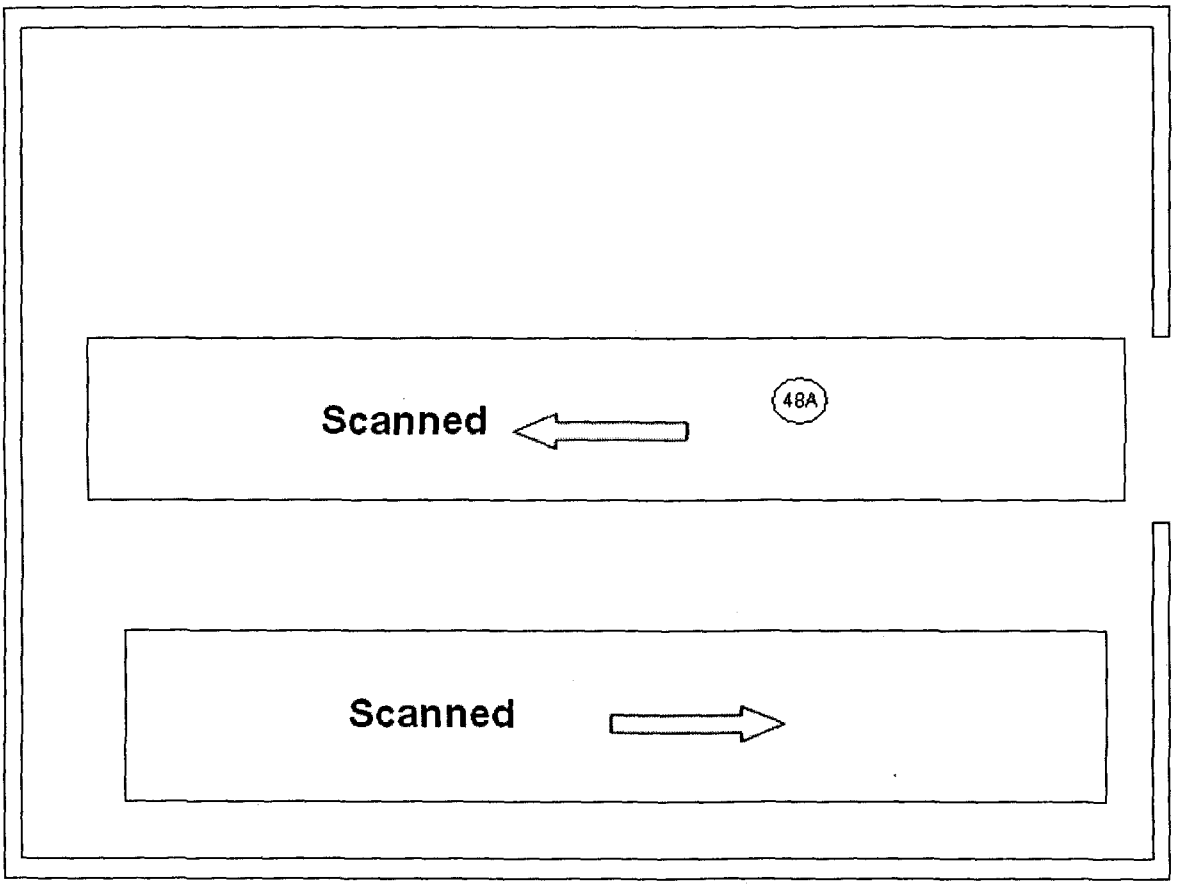
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland _____ Date: 4/11/2007
Name Signature

Supervisor/Reviewer: Joseph W. Moon, CHP _____ Date: 4/11/2007
Name Signature

Room 120B



Area Classification: 3
Building/Area: Rooms 123, 123A and 123B
Floor/Elevation: Floor
Survey Unit/Grid: Non-Rad Lab/Darkroom/Office
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 665 cpm
Smears taken - see map for location
Floor Smears room 123 were 61A through 65A - No positive activity detected
Floor Smear from room 123A (Darkroom) was 66A - No positive activity detected
Floor Smear from room 123B (Office) was 71A - No positive activity detected
Floor Drain smears in room 123 were 67A and 68A - No positive activity detected
Sink Drain smears from rooms 123 and 123A were 69A and 70A - No positive activity detected

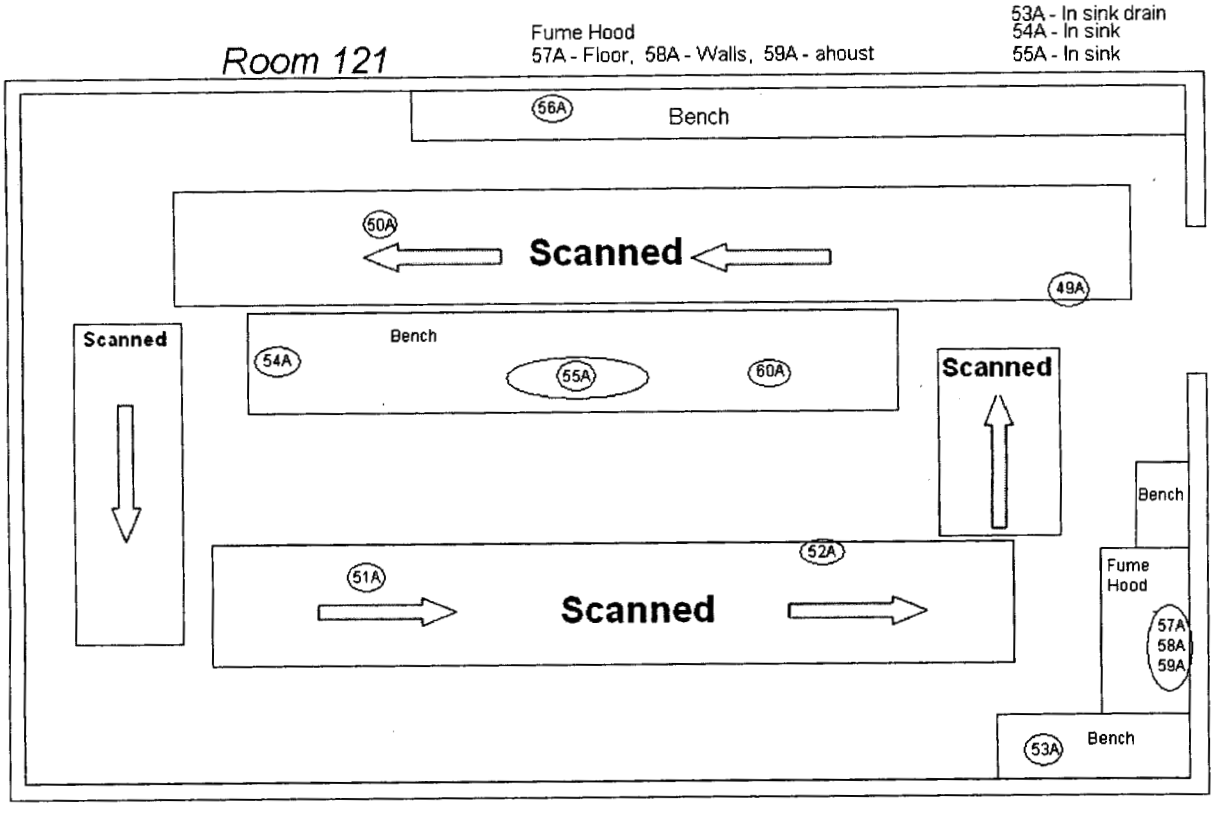
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

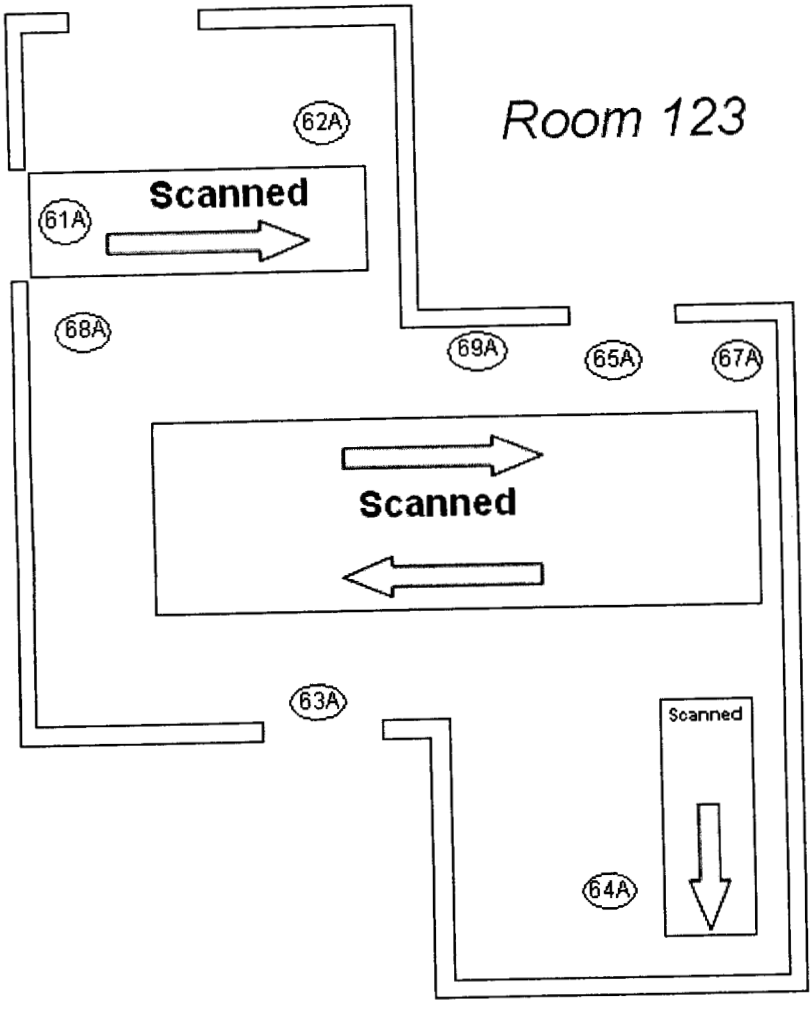
Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007



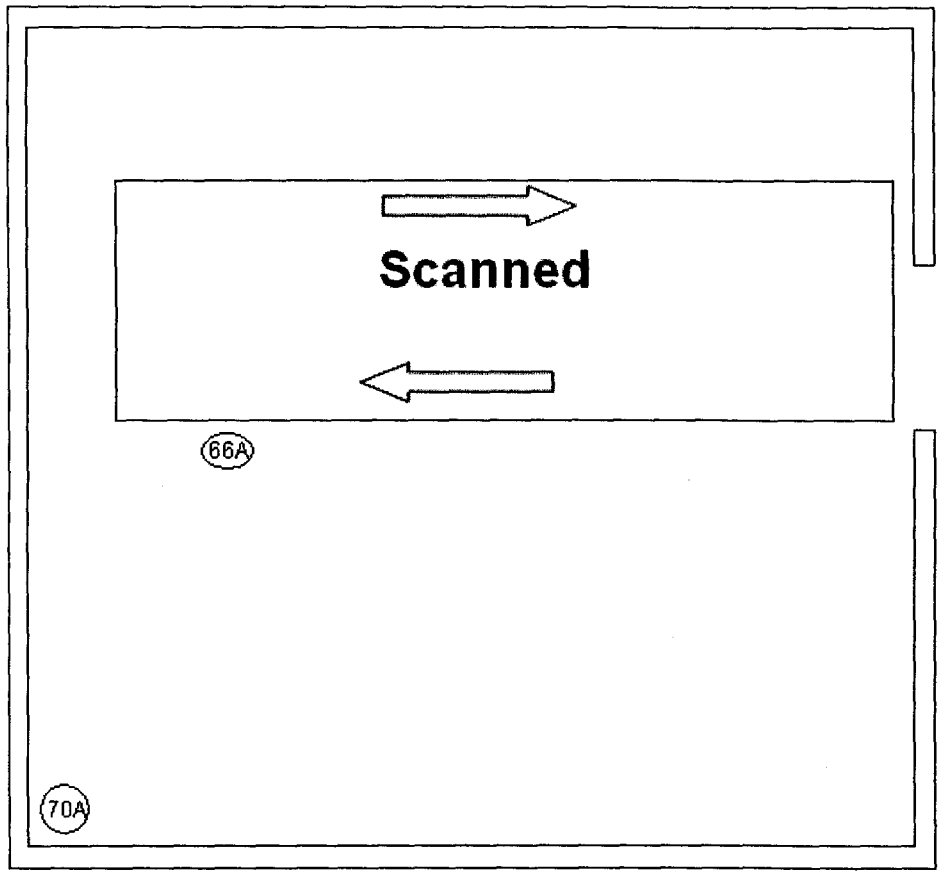
Final 8/13/2007



67A - Floor drain
68A - Floor drain
69A - Sink drain

Final 8/13/2007

Room 123A



70A - Sink drain

Area Classification: 1
Building/Area: Rooms 124 & 124A
Floor/Elevation: Rad Lab and Office
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
β scan 126 cm^2 probe
γ scan μR meter
Date/Time: 2/23/2007and 3/22/2007

Beta Scan Speed: 2.5 inches/sec
Beta Scan Height: 1/2 inch
γ Scan Speed:
γ Scan Height: 1/2 inch

Survey Requirements

	Beta	Gamma
Floor	100%	as required
Wall		
Working Surfaces	100%	100%
Actual surveyed	100%	100%

Instrument Information

	β Floor	β hand held	γ μR meter
Floor Monitor ID Number:	1	2	Ludlum
Logger Model:	2350-1	2350-1	
Logger Serial Number:	149408	149408	
Cal Due Date:	10/22/2007	10/22/2007	9/19/2007
Detector Model:	43-37-1	43-68	Model 19
Detector Serial Number:	PR145081	PR148454	182679

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	
Lab bench β Hand	239 cpm	478 cpm	
μR/hr γ exposure rate	8-15 μR/hr	30 μR/hr	

Source Checks

		Date	Time	Initials
β Floor	Prior:	2/23/2007	921	bwb
	End:	2/23/2007	1630	bwb
β hand	Prior:	3/22/2007	905	bwb
	End:	3/22/2007	1315	bwb

Note: Source checks required at beginning and end of shift

Comments:

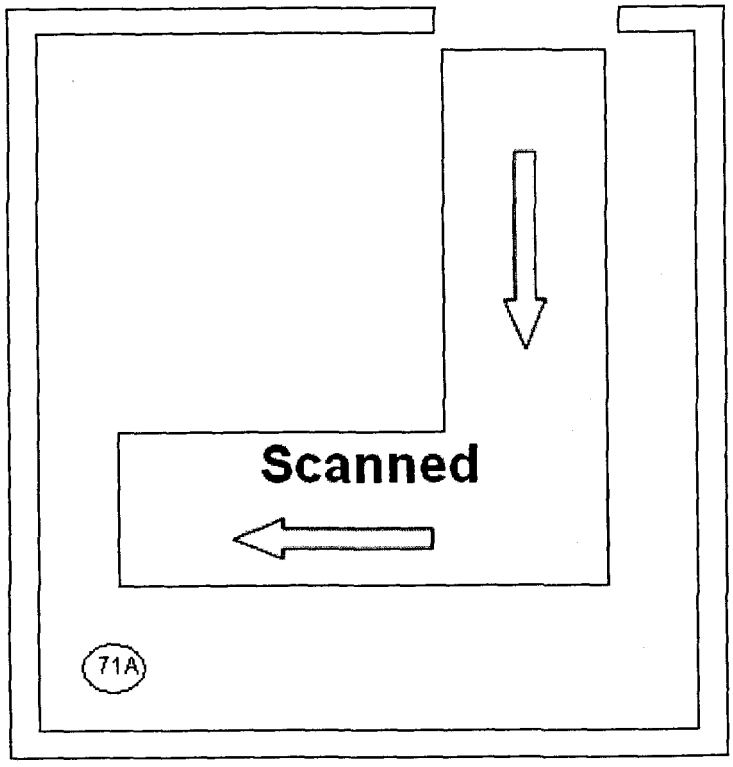
Highest floor monitor scan level seen in this room was 754 cpm
Highest hand held scan level seen in this room was background
Highest μR meter measurement seen in this room was background
Smears taken - see map for location
Floor smears in Room 124 72A through 77A - No positive activity detected
Sink drains in Room 124 79A and 80A - No positive activity detected
Floor smear in Room 124A - 78A - No positive activity detected
Fume hood smears in Room 124 - 80A - 83A - No positive activity detected
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

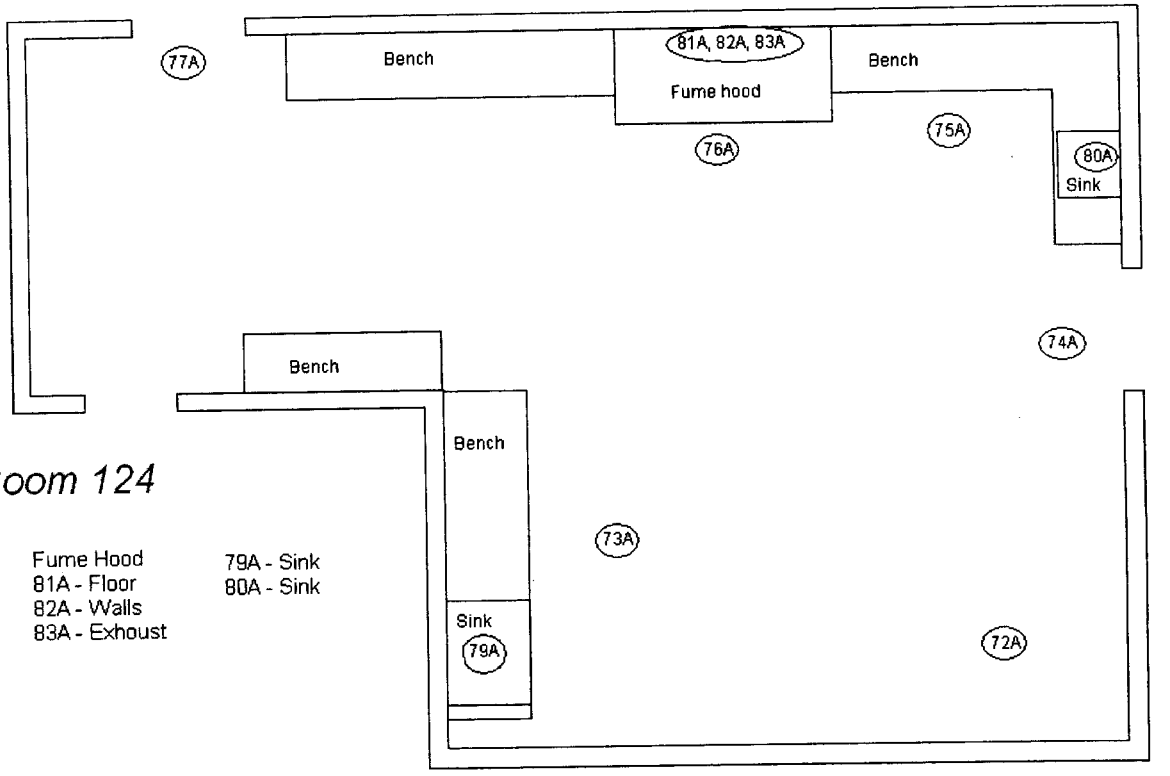
Technician/Surveyor: Byron Bland — Name — Signature — Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP — Name — Signature — Date: 4/11/2007

Room 123B



Final 8/13/2007

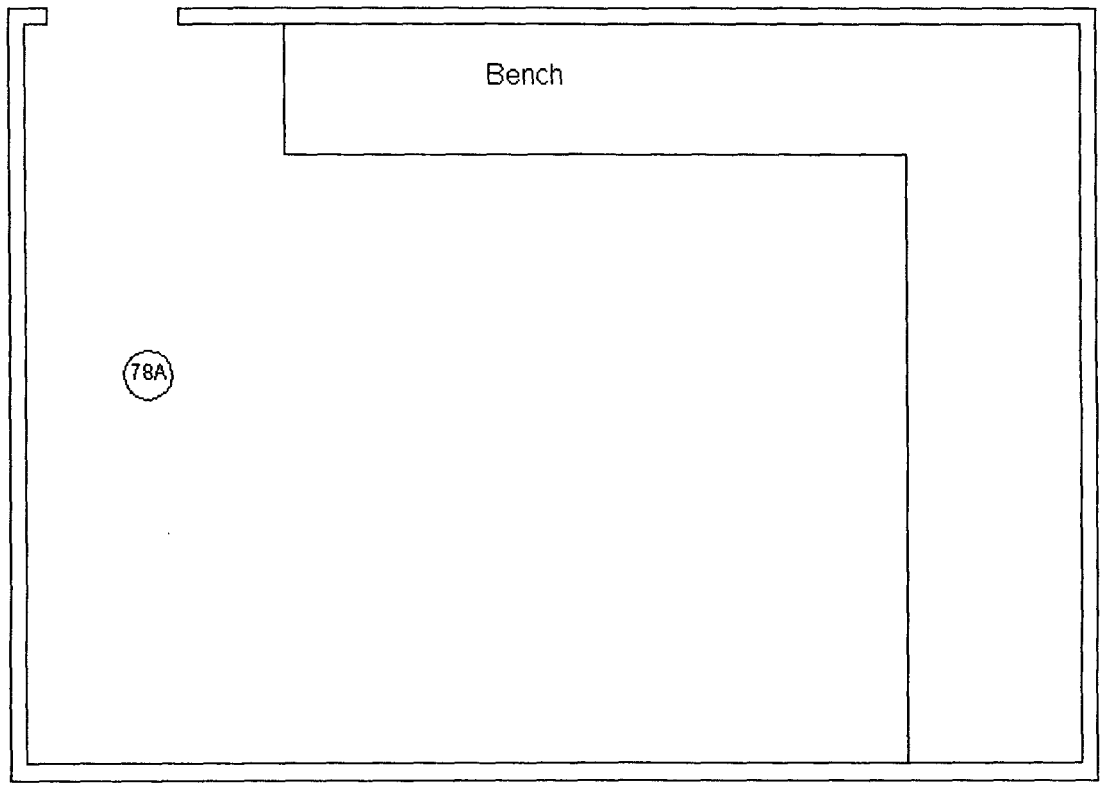


Room 124

Fume Hood
81A - Floor
82A - Walls
83A - Exhoust

79A - Sink
80A - Sink

Room 124A



100% scan of accessible floor area

Area Classification: 3
Building/Area: Room 125
Floor/Elevation: Floor
Survey Unit/Grid: Office
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 817 cpm
Smears taken - see map for location
Initial survey 41B through 44B on floor and 45B on floor drain - No positive activity detected except 41B (124 dpm/100cm2 for H-3 and 47 dpm/100cm2 for C-14)
Investigational survey 50C through 54C - No positive activity detected

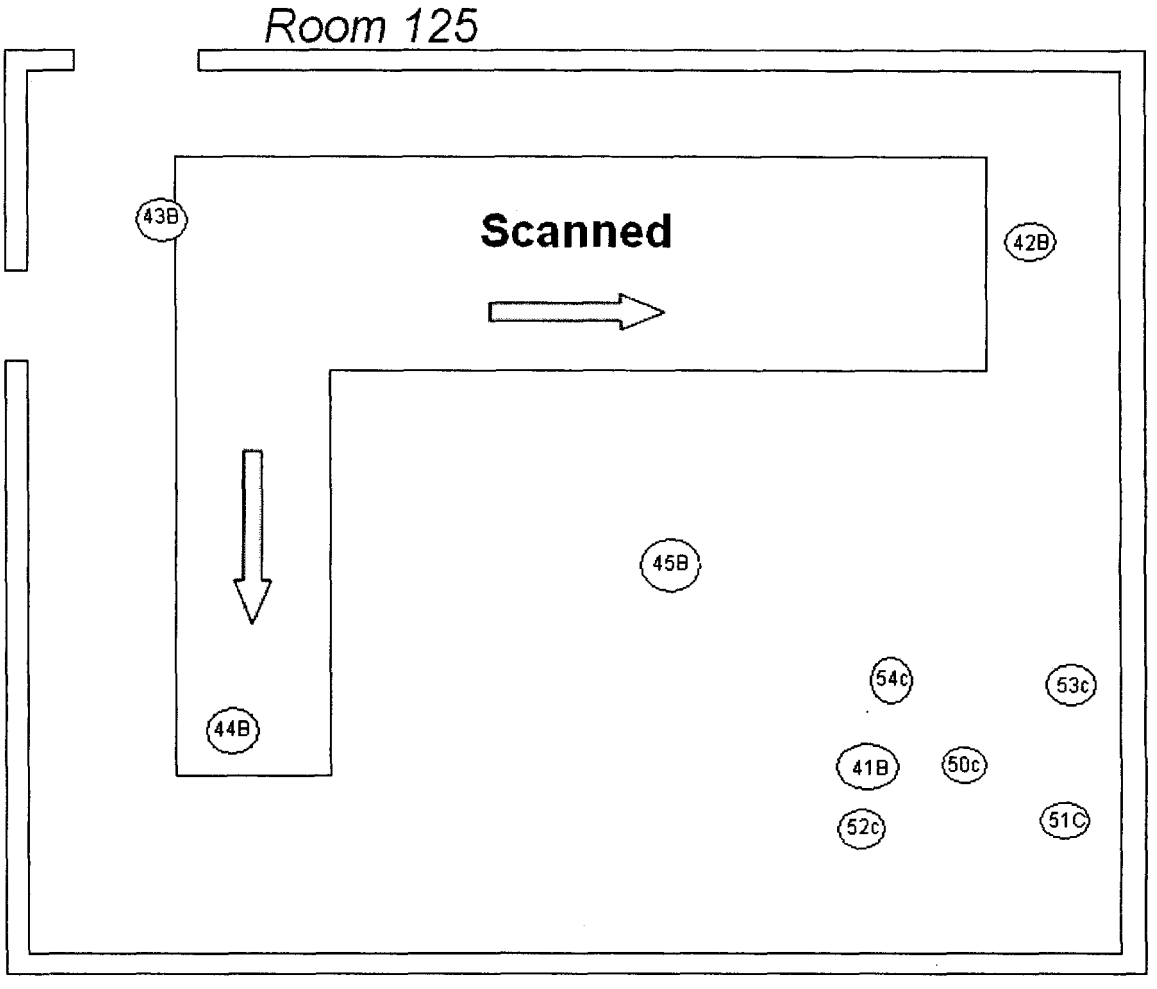
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) Byron Bland (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) Joseph W. Moon (Signature) Date: 4/11/2007

Final 8/13/2007



Area Classification: 3
Building/Area: Room 127
Floor/Elevation: Floor
Survey Unit/Grid: Ward
Surface: sealed concrete
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	35%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

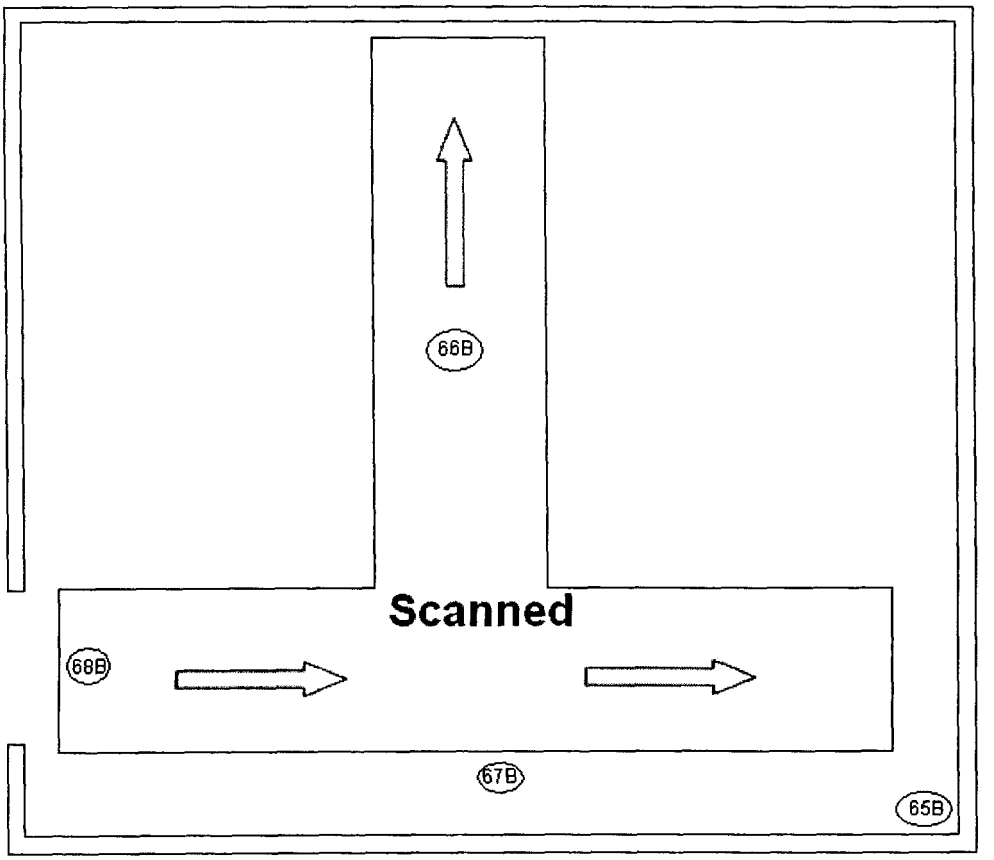
Highest scan level seen in this room was 950 cpm
Smears taken - see map for location
67B & 68B on floor and 66B on floor drain - No positive activity detected
65B in sink drain - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007



Room 127

65B - In sink

Area Classification:	3
Building/Area:	Room 129
Floor/Elevation:	Floor
Survey Unit/Grid:	
Surface:	sealed concrete
Survey Type:	β scan 771 cm^2 probe
Date/Time:	2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 840 cpm
Smears taken - see map for location
73B & 78B on floor and 83B on floor drain- No positive activity detected

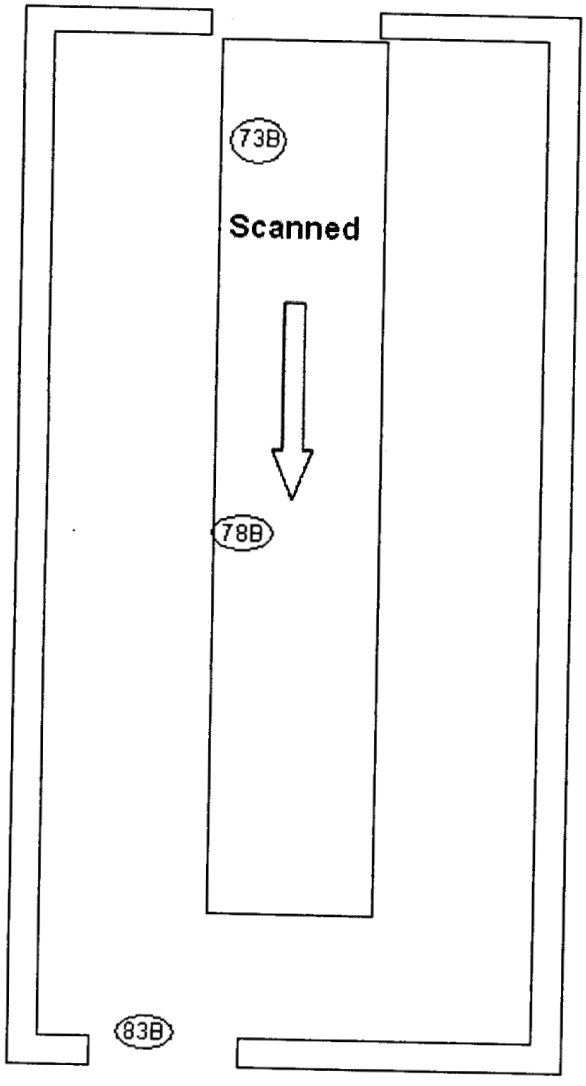
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) Byron Bland (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) Joseph W Moon (Signature) Date: 4/11/2007

Final 8/13/2007



Room 129

Area Classification: 3
Building/Area: Room 130
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: sealed concrete
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	25%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 921 cpm
Smears taken - see map for location
74B & 79B on floor and 84B on floor drain- No positive activity detected

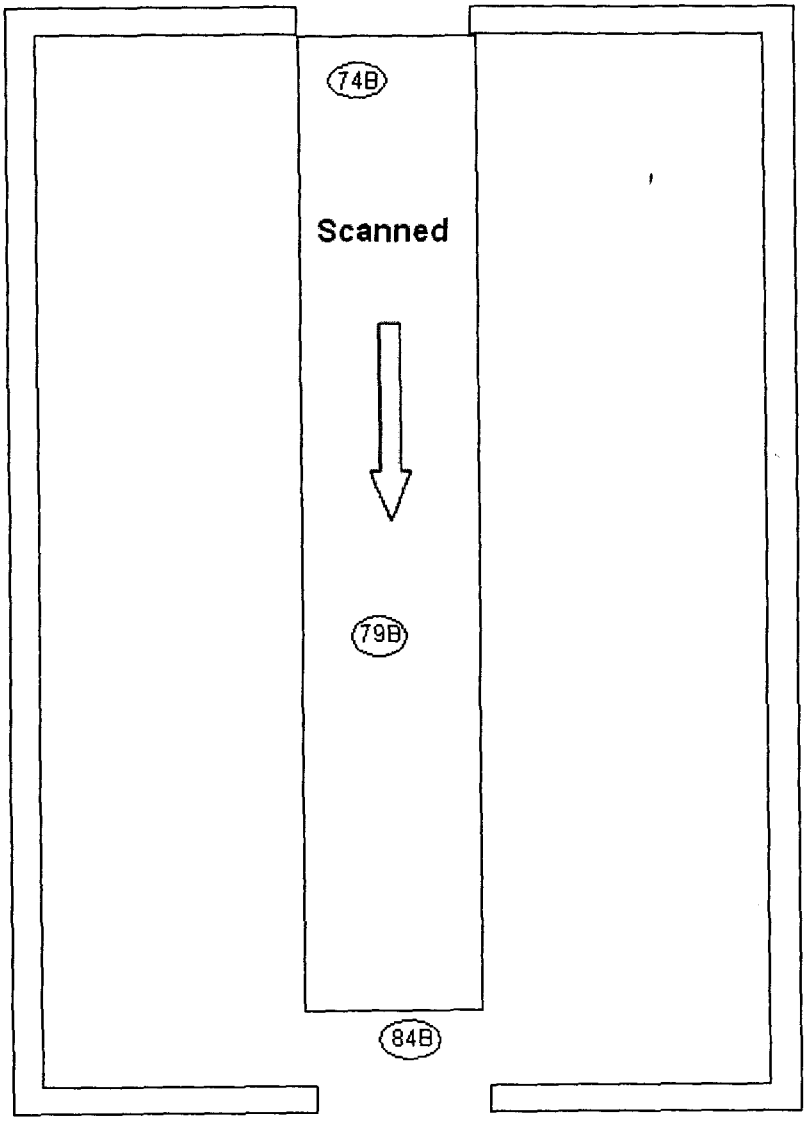
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007



Room 130

Area Classification:	3
Building/Area:	Room 131
Floor/Elevation:	Floor
Survey Unit/Grid:	
Surface:	sealed concrete
Survey Type:	β scan 771 cm^2 probe
Date/Time:	2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 945 cpm
Smears taken - *see map for location*
75B & 80B on floor and 85B on floor drain- No positive activity detected

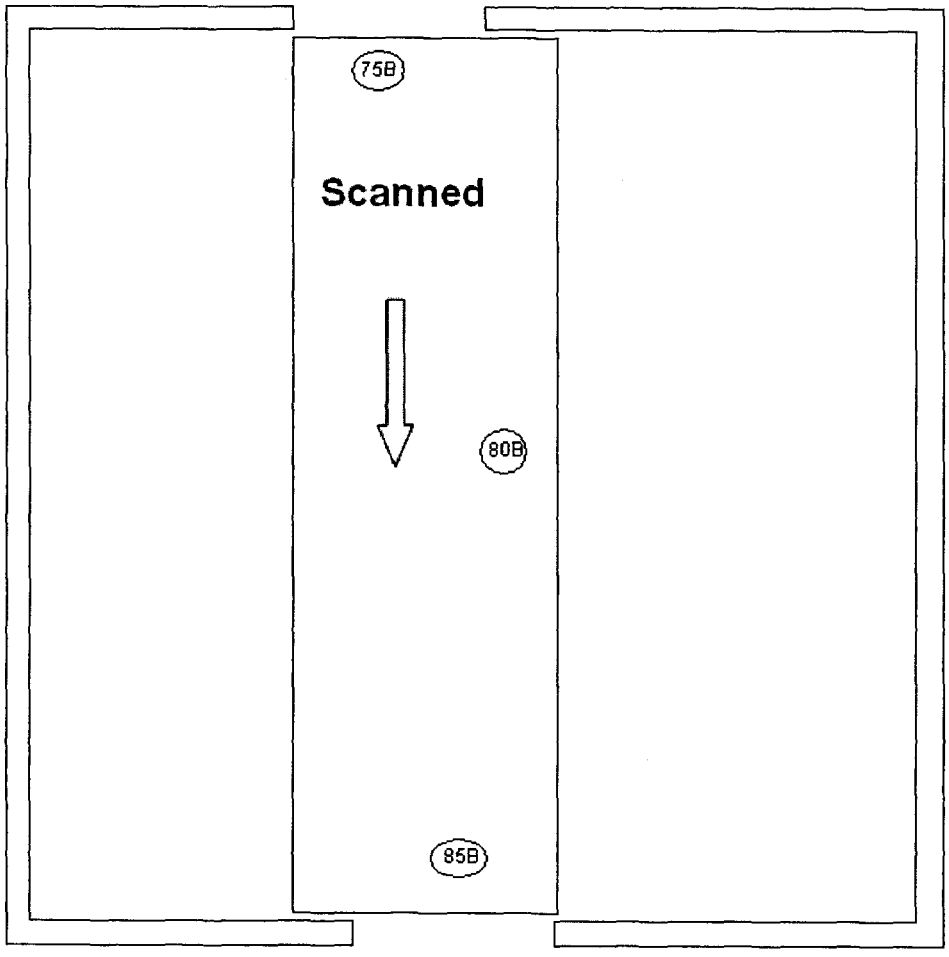
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Final 8/13/2007



Room 131

Area Classification: 3
Building/Area: Room 132
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: sealed concrete
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

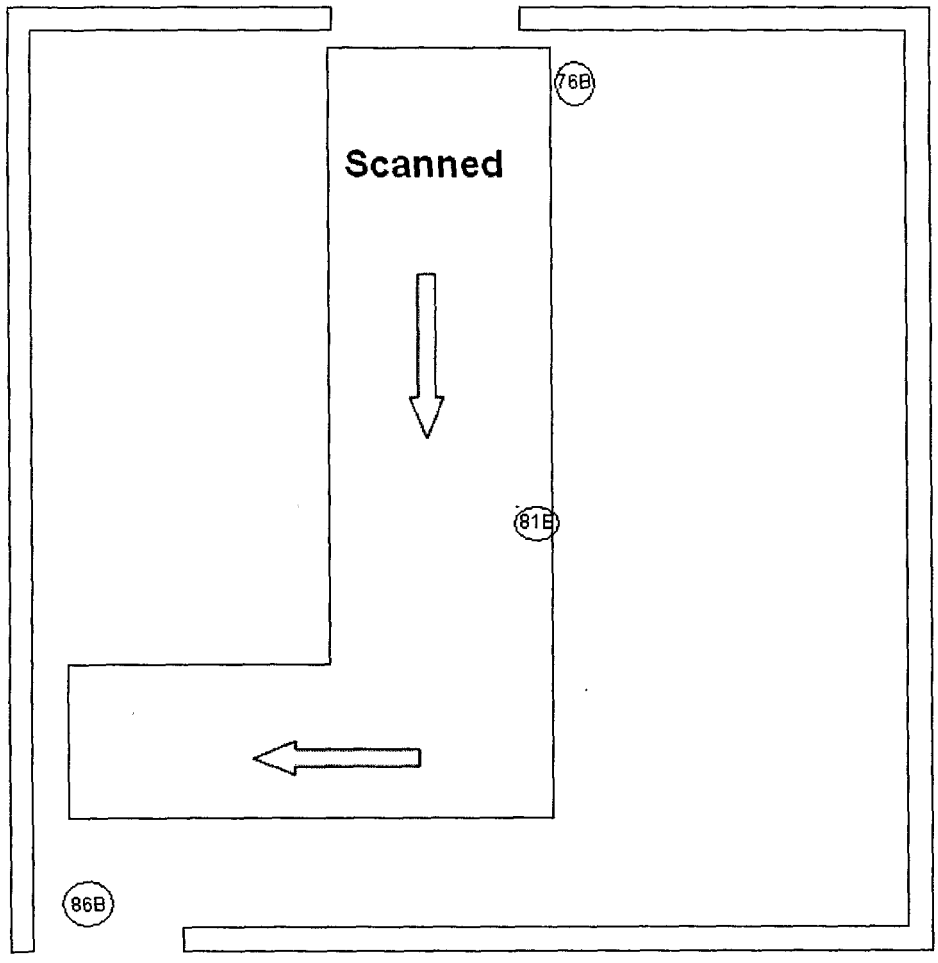
Highest scan level seen in this room was 981 cpm
Smears taken - see map for location
76B & 81B on floor and 86B on floor drain- No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007



Room 132

Area Classification: 3
Building/Area: Room 133
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: sealed concrete
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	40%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 940 cpm
Smears taken - see map for location
77B, 82B, & 96B on floor - No positive activity detected
97B on the sink drain - No positive activity detected

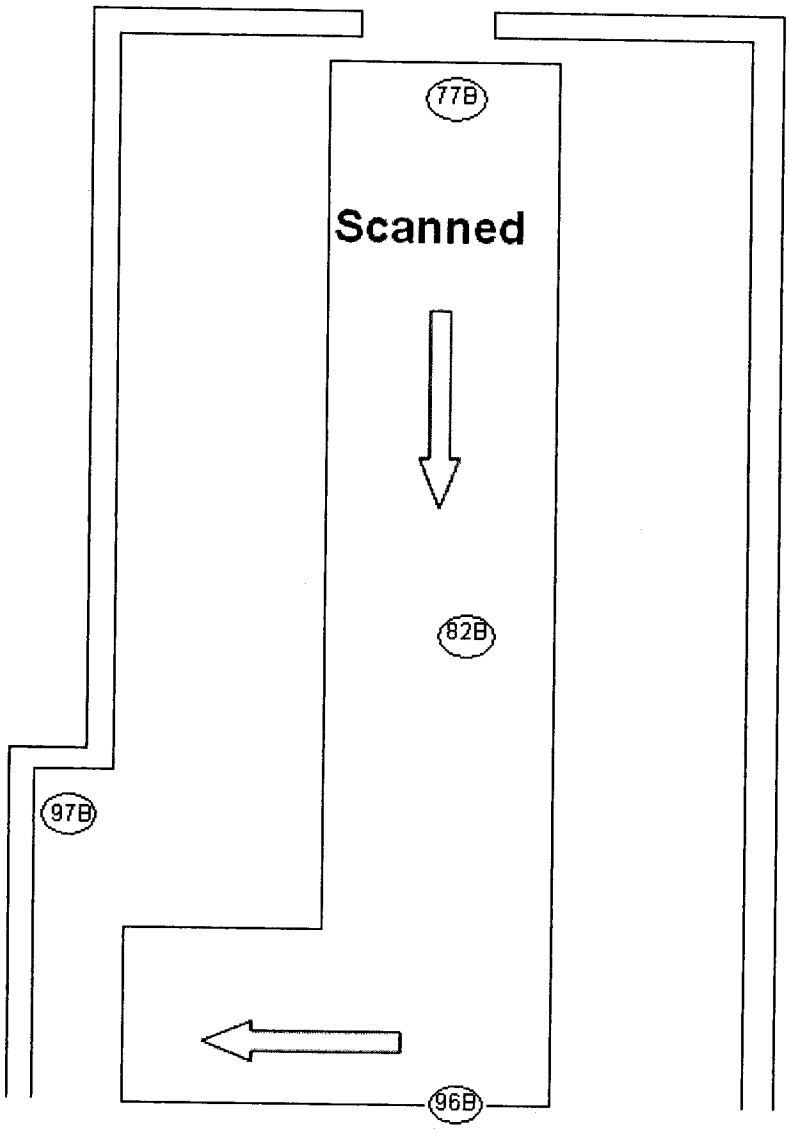
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) Byron Bland (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) Joseph W Moon (Signature) Date: 4/11/2007

Final 8/13/2007



Room 133

97B - In sink

Area Classification: 3
Building/Area: Room 134
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: sealed concrete
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	35%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 857 cpm
Smears taken - see map for location
91B, 92B 95B on floor - No positive activity detected
93B on sink top and 94B on sink drain - No positive activity detected
98B on the walk-in decon booth - No positive activity detected

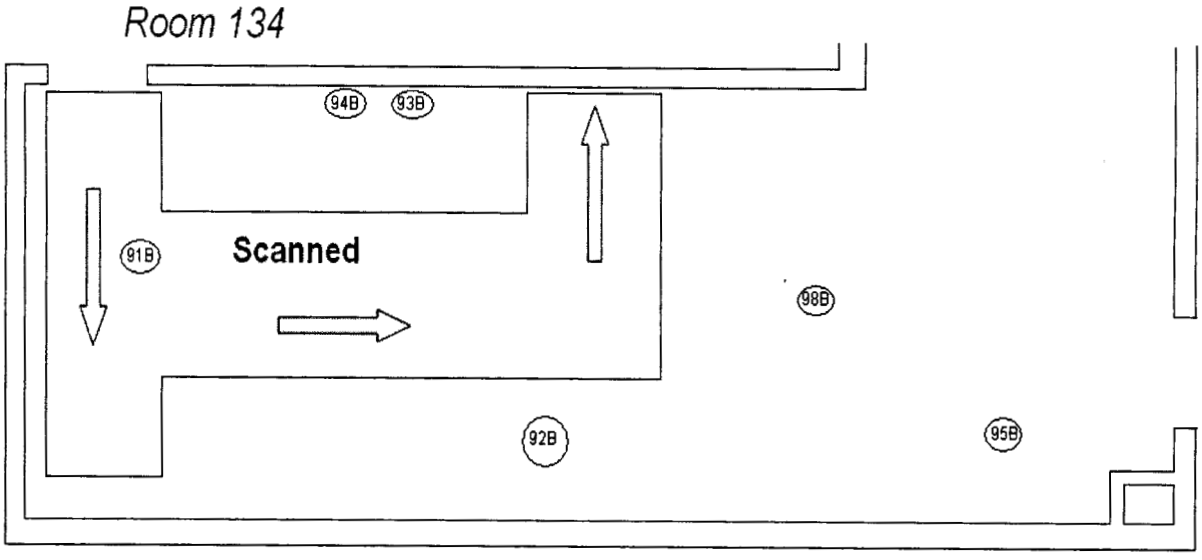
Comments:

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007



94B - In sink

Area Classification:	3
Building/Area:	135
Floor/Elevation:	Floor
Survey Unit/Grid:	
Surface:	sealed concrete
Survey Type:	β scan 771 cm^2 probe
Date/Time:	2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	35%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
sealed concrete	929 cpm	1.86k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 1.01k cpm
Smears taken - see map for location
90B on floor - No positive activity detected

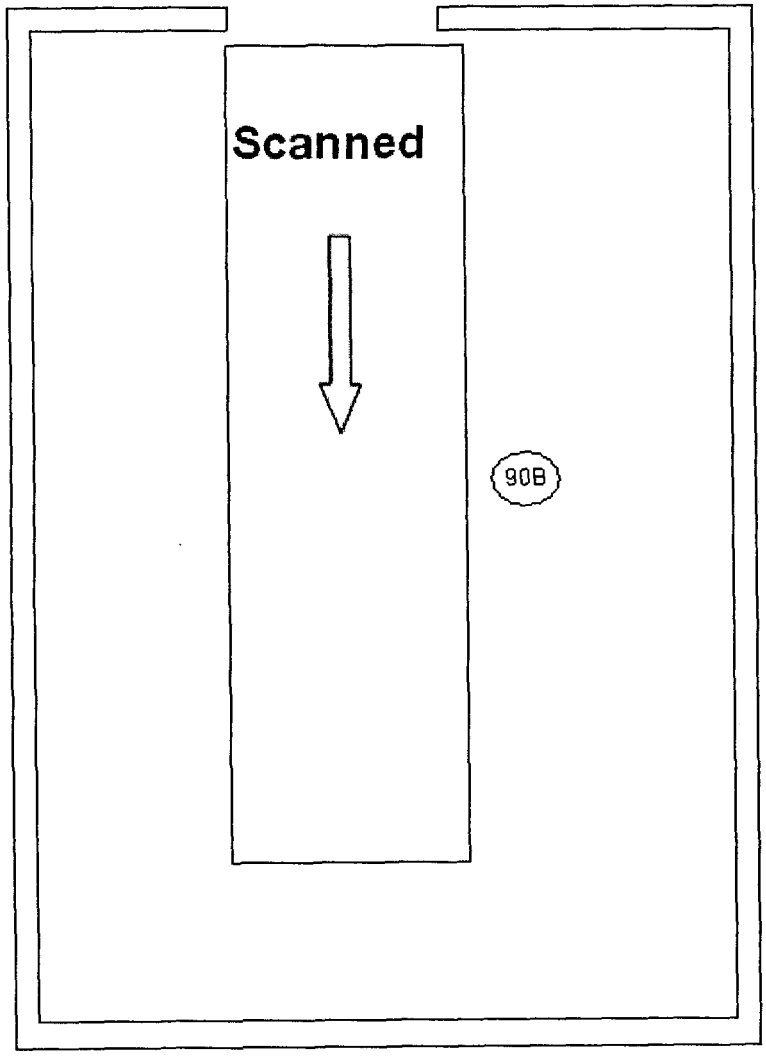
Comments:

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) Byron Bland (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) Joseph W Moon (Signature) Date: 4/11/2007



Room135

Area Classification: 3
Building/Area: Room 136
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1630	bwb

Note: Source checks required at beginning and end of shift

Comments:

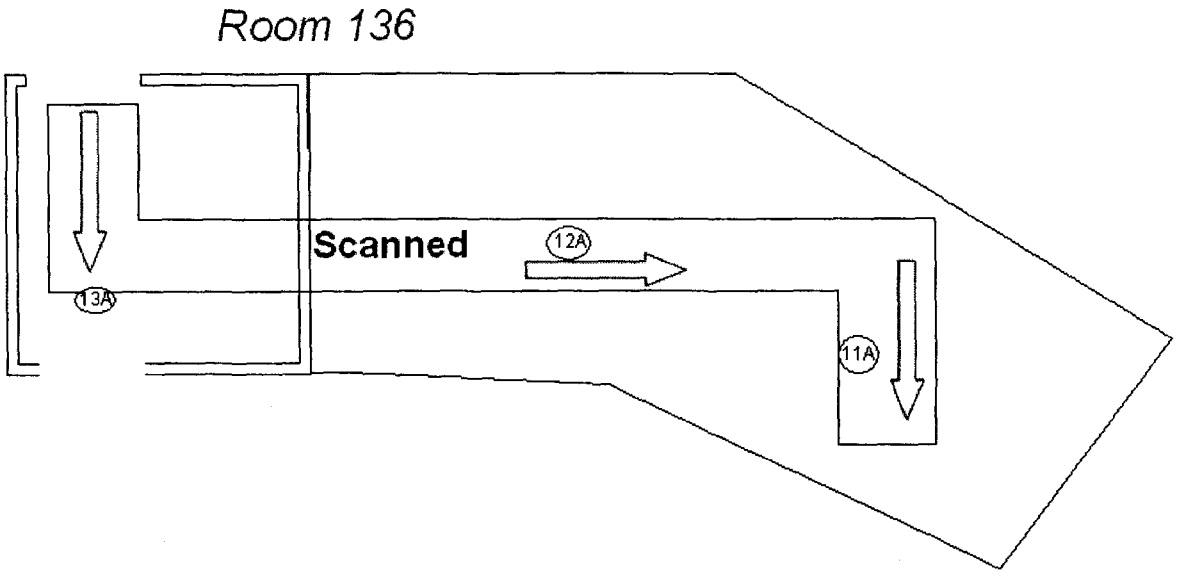
Highest scan level seen in this room was 970 cpm
Smears taken - see map for location
11A through 13A - No positive activity detected

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007


Room 136
Scanned
12A
13A
11A

Area Classification: 3
Building/Area: Room 137
Floor/Elevation: Floor
Survey Unit/Grid: Rad Waste processing
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	20%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 1.09k cpm
Smears taken - see map for location
Floor smears 20A through 23A - No positive activity detected
smear 24A dipped in liquid standing in uncovered 30 gallon Radwaste drum
smear 25A taken on 5 -6 crushed moldy cardboard boxes marked for Rad waste usage (presumed unused)
No positive activity detected on smears 24A or 25A

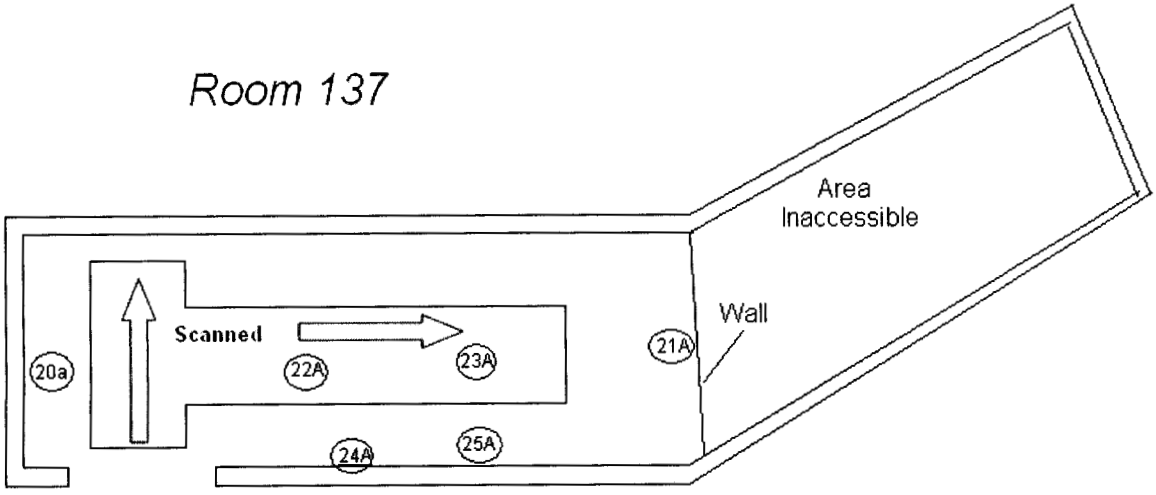
Note: materials marked with radioactive material labels should be removed from this room and disposed prior to demolition of building

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) _____ (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) _____ (Signature) Date: 4/11/2007


Room 137
Area
Inaccessible
Wall
Scanned
20a
22A
23A
21A
24A
25A

Area Classification:	3
Building/Area:	Hall C-1
Floor/Elevation:	Floor
Survey Unit/Grid:	
Surface:	8 inch tile
Survey Type:	β scan 771 cm^2 probe
Date/Time:	2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:	
Alpha/Beta Scan Speed:	2.5 inches/sec
Alpha/Beta Scan Height:	1/2 inch
Gamma Scan Speed:	
Gamma Scan Height:	
MARSS Inst ID:	
Logger Model:	2350-1
Logger Serial Number:	149408
Cal Due Date:	10/22/2007
Detector Model:	43-37-1
Detector Serial Number:	PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 776 cpm
Smears taken - see map for location
14A and 15A - No positive activity detected

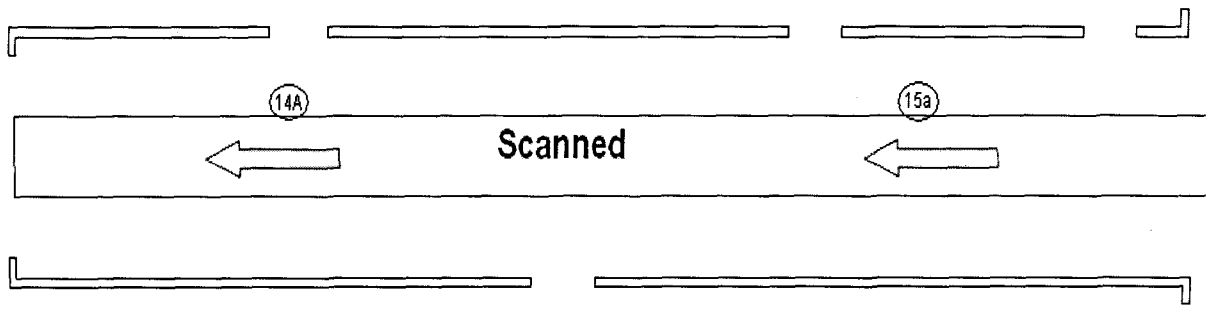
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) (Signature) Date: 4/11/2007

Hall C-1



Area Classification: 3
Building/Area: C-2
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 776 cpm
Smears taken - see map for location
16A through 19A - No positive activity detected

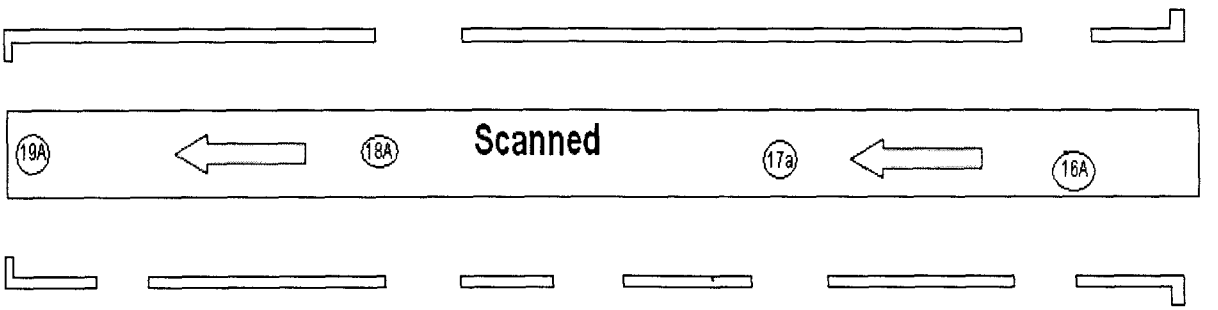
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland — Name — Signature — Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP — Name — Signature — Date: 4/11/2007

Hall C-2



Area Classification: 3
Building/Area: C-3
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/22/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	30%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	1400	bwb
End:	2/22/2007	1655	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 803 cpm
Smears taken - see map for location
26A through 30A - No positive activity detected

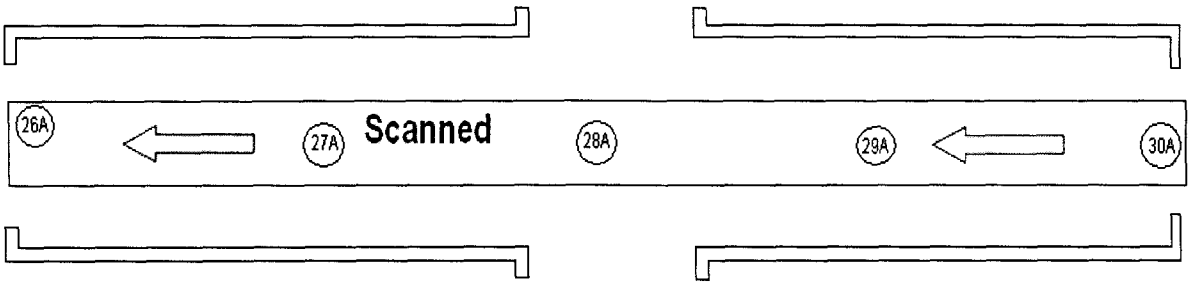
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland (Name) _____ (Signature) Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP (Name) _____ (Signature) Date: 4/11/2007

Hall C-3



Area Classification: 3
Building/Area: Hall C-4/C-5
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: covered floor
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	35%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
covered wood	828 cpm	1.65k cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 1.04k cpm
Smears taken - see map for location
54B through 56B & 100B on floor - No positive activity detected

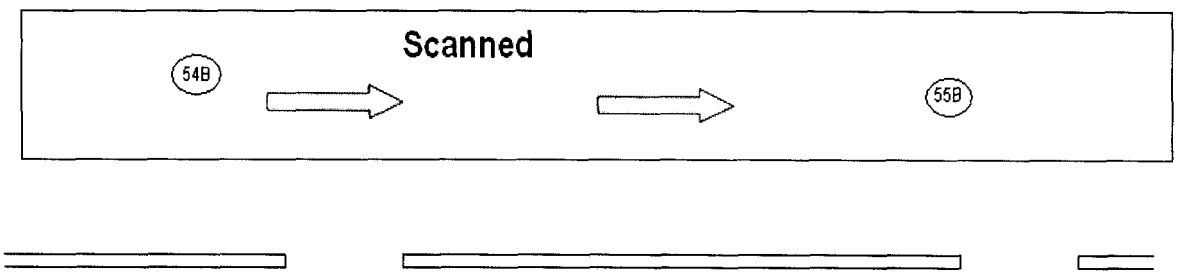
No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland — Name — Signature — Date: 4/11/2007

Supervisor/Reviewer: Joseph W. Moon, CHP — Name — Signature — Date: 4/11/2007

Hall C-4



Area Classification: 3
Building/Area: Hall C-6
Floor/Elevation: Floor
Survey Unit/Grid:
Surface: 8 inch tile
Survey Type: β scan 771 cm^2 probe
Date/Time: 2/23/2007

Survey Requirements

	Beta	Gamma
Floor	20%	
Wall		
Ceiling		
Actual surveyed	40%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-37-1
Detector Serial Number: PR145081

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
8 inch tile β Floor	618 cpm	1236 cpm	

Source Checks

	Date	Time	Initials
Prior:	2/23/2007	925	bwb
End:	2/23/2007	1635	bwb

Note: Source checks required at beginning and end of shift

Comments:

Highest scan level seen in this room was 720 cpm
Smears taken - see map for location
15C on floor and 24C in sink drain - No positive activity detected

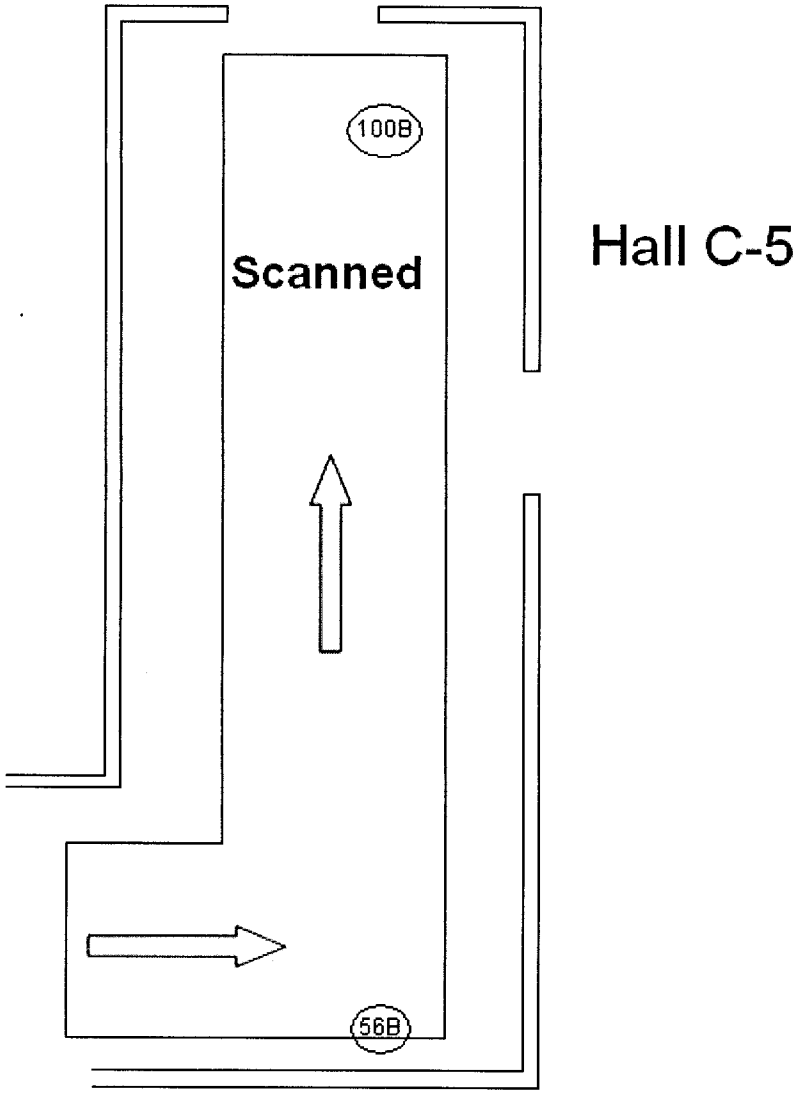
Comments:

No activity found in excess of the RG 1.86 (1974) clean-up guidelines

Attach survey map to this document

Technician/Surveyor: Byron Bland _____ Date: 4/11/2007
Name Signature

Supervisor/Reviewer: Joseph W. Moon, CHP _____ Date: 4/11/2007
Name Signature



Hall C-5

Area Classification:	1
Building/Area:	All class 1 areas
Floor/Elevation:	
Survey Unit/Grid:	
Surface:	all surfaces
Survey Type:	γ general area
Date/Time:	3/22/2007

Survey Requirements

	Beta	Gamma
Floor		
Wall		
Ceiling		
Class 1 areas		100%

Instrument Information

MARSS Inst ID:		
Logger Model:		
Logger Serial Number:		
Cal Due Date:	9/20/2007	9/19/2007
Detector Model:	Model 19	model 19
Detector Serial Number:	180302	182679

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
All material	8-15 µR/hr	30 µR/hr	

Source Checks

	Date	Time	Initials
Prior:	2/22/2007	820	bwb
End:	2/22/2007	1200	bwb

Note: Source checks required at beginning and end of shift

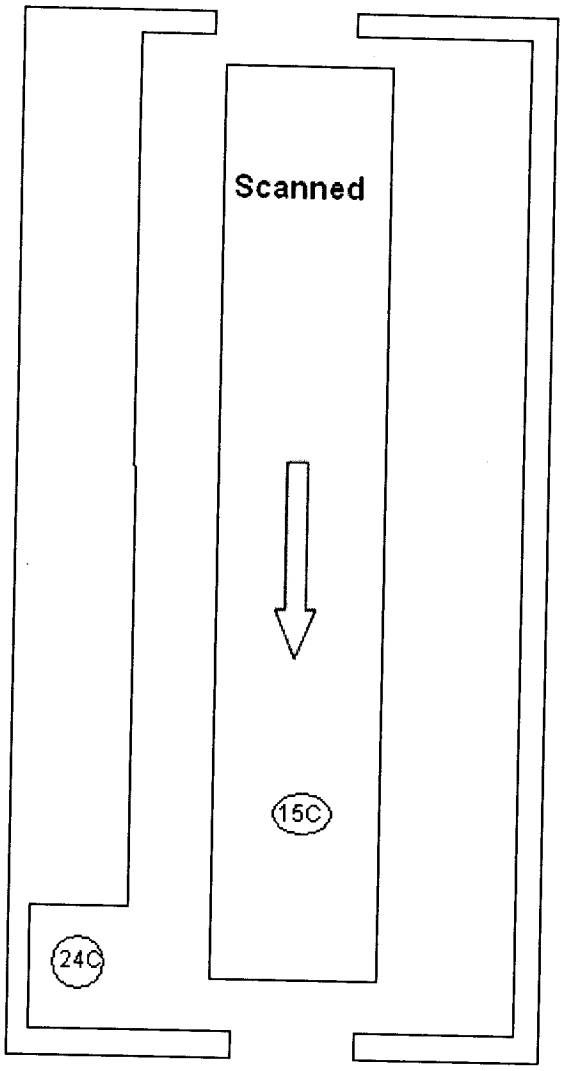
Comments:

No elevated levels were detected except for
in rooms 137 and 136 but when verified with
off site background materials it was determined that the leaves
seen in these two rooms were in fact background

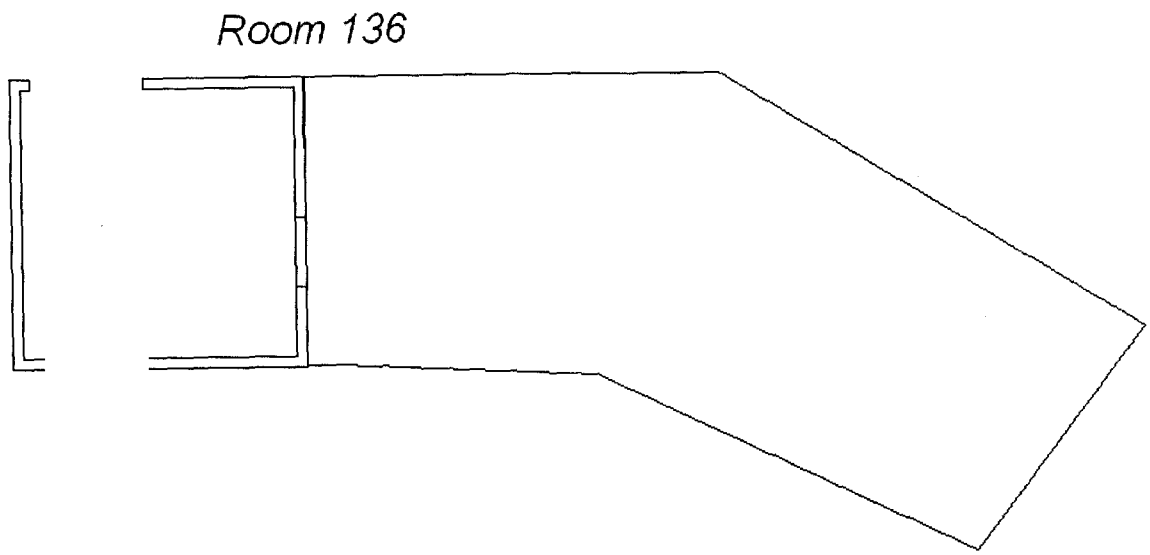
Attach survey map to this document

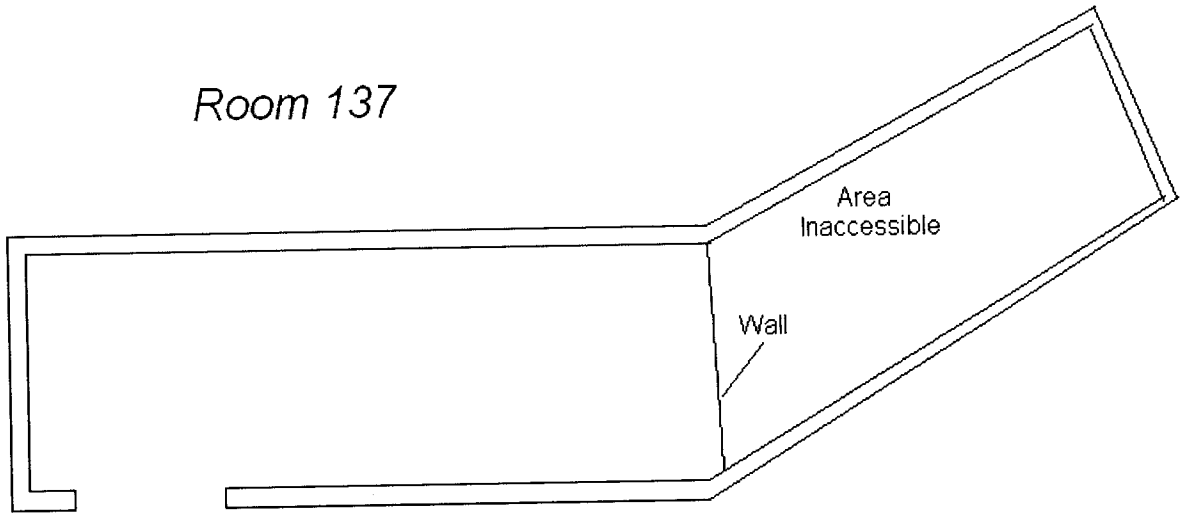
Technician/Surveyor: Byron Bland _____ Date: 4/11/2007
Name Signature

Supervisor/Reviewer: Joseph W. Moon, CHP _____ Date: 4/11/2007
Name Signature



Hall C-6


Room 136


Room 137
Area
Inaccessible
Wall

Area Classification: 1
Building/Area: Room 113,a,b,c,d
Floor/Elevation: All objects in rooms
Survey Unit/Grid:
Surface: misc above floor
Survey Type: β scan 126 cm^2 probe
Date/Time: 2/23/2007and 3/22/2007

Survey Requirements

	Beta	Gamma
Floor		
Wall		
Ceiling		
Material in rooms	100%	

Instrument Information

Floor Monitor ID Number:
Alpha/Beta Scan Speed: 2.5 inches/sec
Alpha/Beta Scan Height: 1/2 inch
Gamma Scan Speed:
Gamma Scan Height:

MARSS Inst ID:
Logger Model: 2350-1
Logger Serial Number: 149408
Cal Due Date: 10/22/2007
Detector Model: 43-68
Detector Serial Number: Pr148454

Background Information

Material	Bkgd Level	Invest. Level	Alarm Level
Misc	225β cpm	450β cpm	

Source Checks

	Date	Time	Initials
Prior:	3/22/2007	905	bwb
End:	3/22/2007	1200	bwb

Note: Source checks required at beginning and end of shift

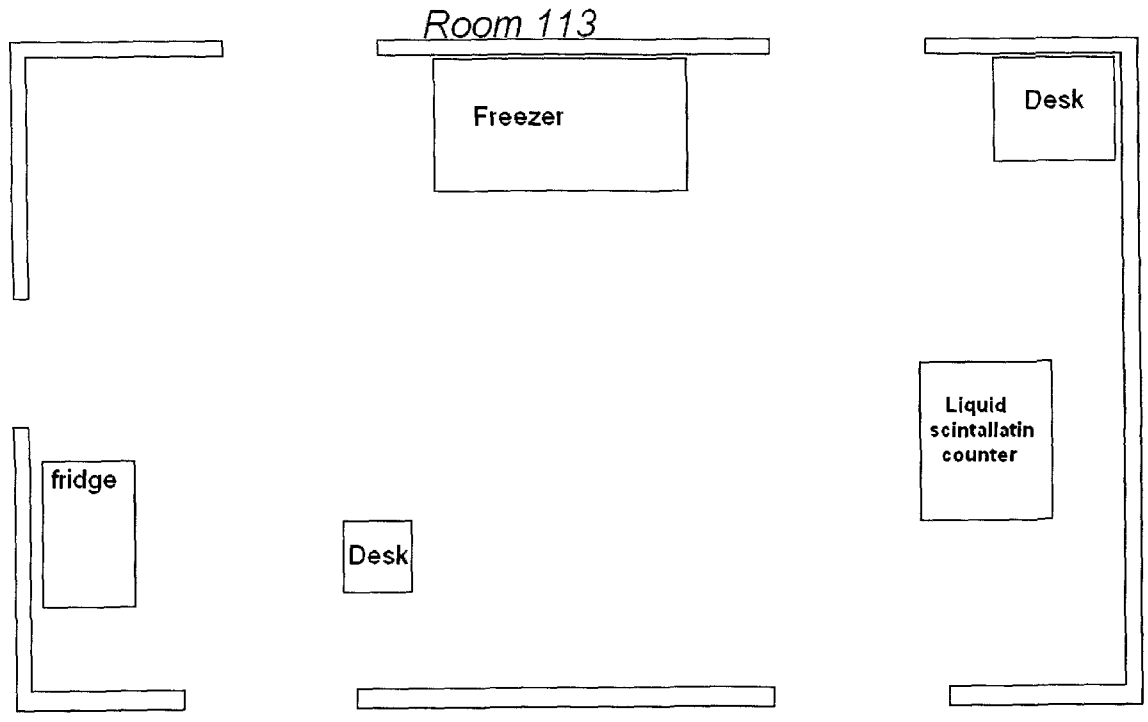
Comments:

Mesureable levels of contamination were found in rooms 113B on the lab sink and in room 113D on the edge of the sink.

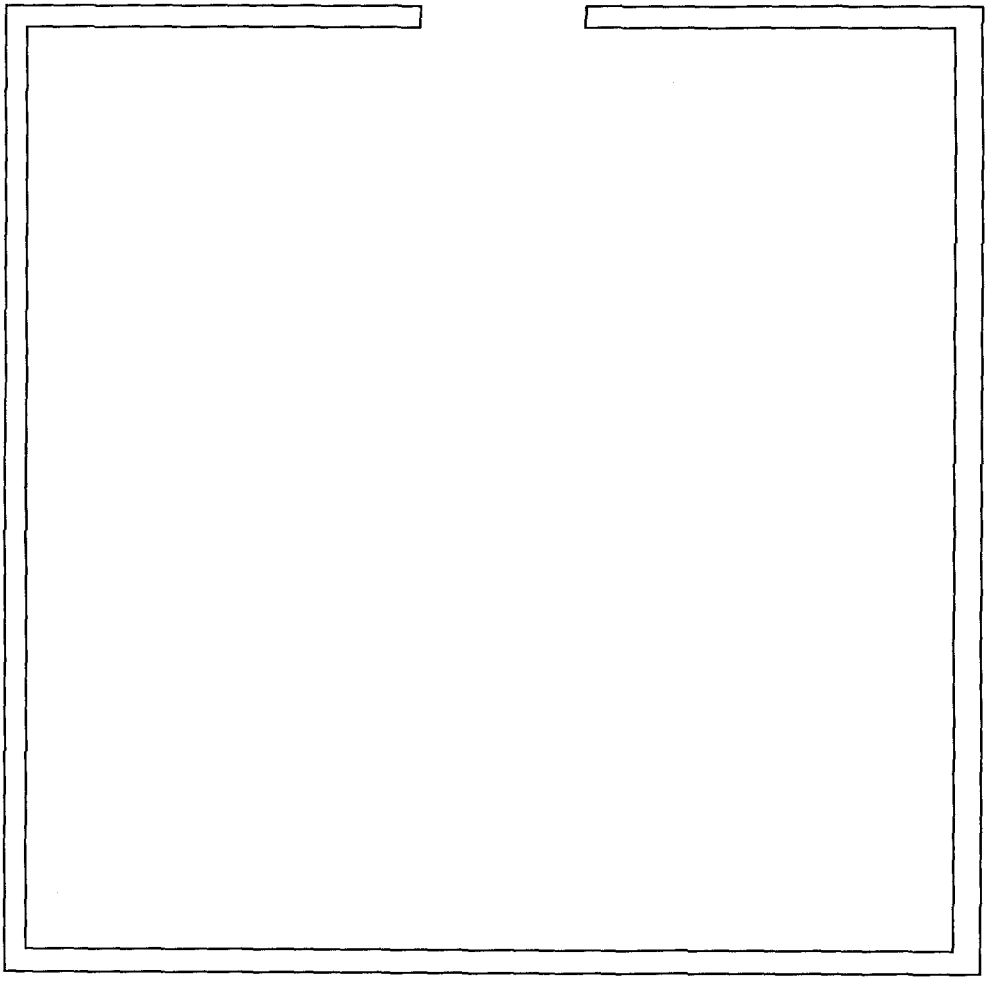
Attach survey map to this document

Technician/Surveyor: Byron Bland _____ Date: 4/11/2007
Name Signature

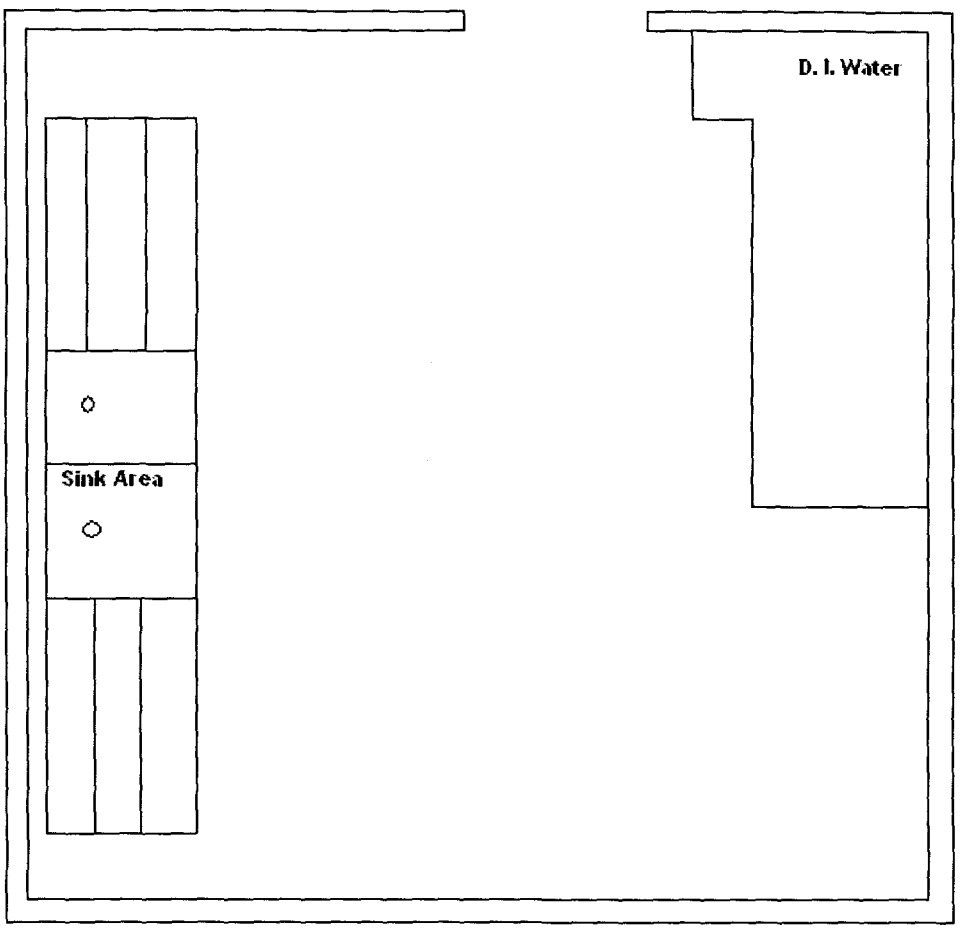
Supervisor/Reviewer: Joseph W. Moon, CHP _____ Date: 4/11/2007
Name Signature

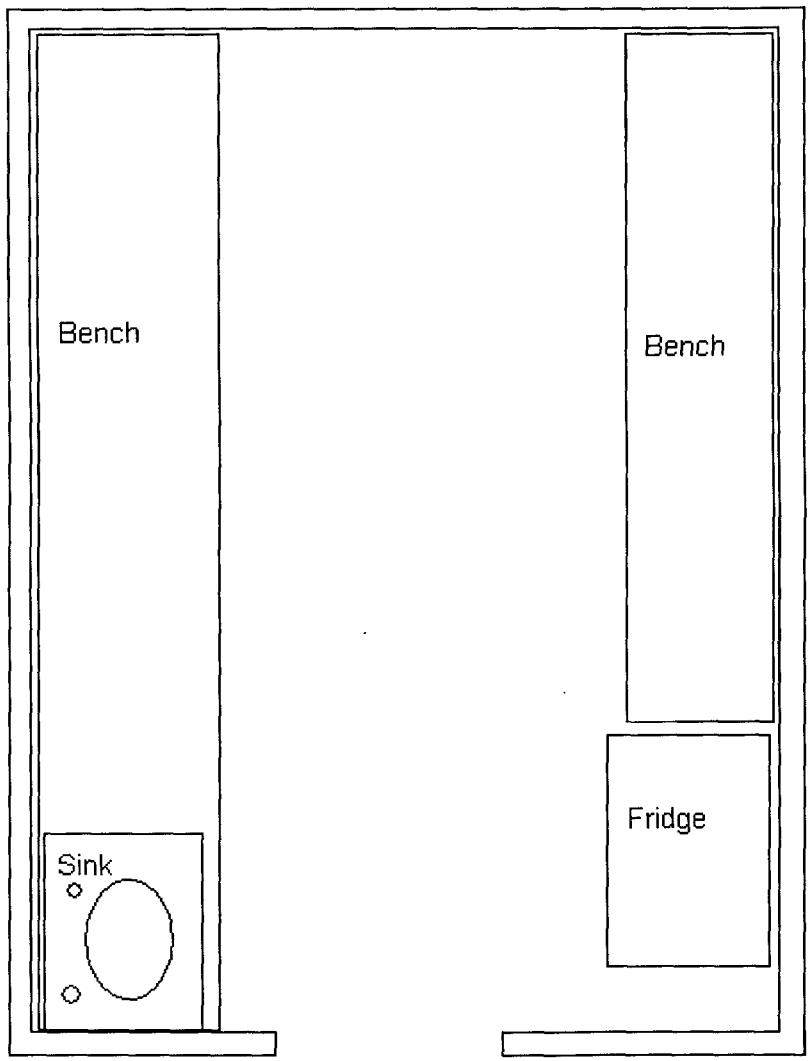

Room 113
Freezer
Desk
Liquid scintallatin counter
fridge
Desk

Room 113A



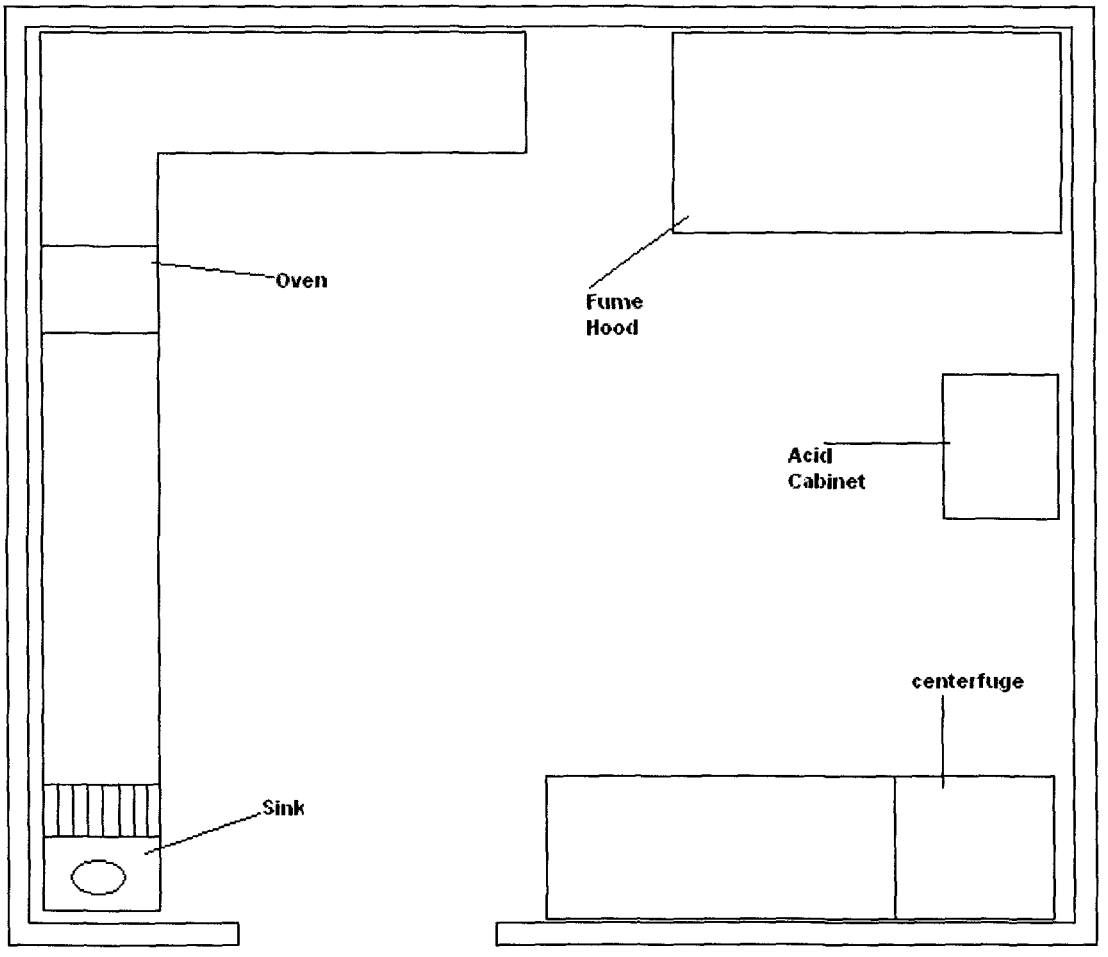
Room 113B





113C

Room 113D



Attachment 2.0
U. S. NRC Regulatory Guide 1.86 (1974)

U.S. ATOMIC ENERGY COMMISSION

June 1974

REGULATORY GUIDE

DIRECTORATE OF REGULATORY STANDARDS

REGULATORY GUIDE 1.86

TERMINATION OF OPERATING LICENSES FOR NUCLEAR REACTORS

A. INTRODUCTION

Section 50.51, "Duration of license, renewal," of 10 CFR Part 50, "Licensing of Production and Utilization Facilities," requires that each license to operate a production and utilization facility be issued for a specified duration. Upon expiration of the specified period, the license may be either renewed or terminated by the Commission. Section 50.82, "Applications for termination of licenses," specifies the requirements that must be satisfied to terminate an operating license, including the requirement that the dismantlement of the facility and disposal of the component parts not be inimical to the common defense and security or to the health and safety of the public. This guide describes methods and procedures considered acceptable by the Regulatory staff for the termination of operating licenses for nuclear reactors. The Advisory Committee on Reactor Safeguards has been consulted concerning this guide and has concurred in the regulatory position.

B. DISCUSSION

When a licensee decides to terminate his nuclear reactor operating license, he may, as a first step in the process, request that his operating license be amended to restrict him to possess but not operate the facility. The advantage to the licensee of converting to such a possession-only license is reduced surveillance requirements in that periodic surveillance of equipment important to the safety of reactor operation is no longer required. Once this possession-only license is issued, reactor operation is not permitted. Other activities related to cessation of operations such as unloading fuel from the reactor and placing it in storage (either onsite of offsite) may be continued.

A licensee having a possession-only license must retain, with the Part 50 license, authorization for special nuclear material (10 CFR Part 70, "Special Nuclear Material"), byproduct material (10 CFR Part 30, "Rules of General Applicability to Licensing of Byproduct Material"), and source material (10 CFR Part 40, "Licensing of Source Material"), until the fuel, radioactive components, and sources are removed from the facility. Appropriate administrative controls and facility requirements are imposed by the Part 50 license and the technical specifications to assure that proper surveillance is performed and that the reactor facility is maintained in a safe condition and not operated.

A possession-only license permits various options and procedures for decommissioning, such as mothballing, entombment, or dismantling. The requirements imposed depend on the option selected.

Section 50.82 provides that the licensee may dismantle and dispose of the component parts of a nuclear reactor in accordance with existing regulations. For research reactors and critical facilities, this has usually meant the disassembly of a reactor and its shipment offsite, sometimes to another appropriately licensed organization for further use. The site from which a reactor has been removed must be decontaminated, as necessary, and inspected by the Commission to determine whether unrestricted access can be approved. In the case of nuclear power reactors, dismantling has usually been accomplished by shipping fuel offsite, making the reactor inoperable, and disposing of some of the radioactive components.

Radioactive components may be either shipped offsite for burial at an authorized burial ground or secured

on the site. Those radioactive materials remaining on the site must be isolated from the public by physical barriers or other means to prevent public access to hazardous levels of radiation. Surveillance is necessary to assure the long term integrity of the barriers. The amount of surveillance required depends upon (1) the potential hazard to the health and safety of the public from radioactive material remaining on the site and (2) the integrity of the physical barriers. Before areas may be released for unrestricted use, they must have been decontaminated or the radioactivity must have decayed to less than prescribed limits (Table I).

The hazard associated with the retired facility is evaluated by considering the amount and type of remaining contamination, the degree of confinement of the remaining radioactive materials, the physical security provided by the confinement, the susceptibility to release of radiation as a result of natural phenomena, and the duration of required surveillance.

C. REGULATORY POSITION

1. APPLICATION FOR A LICENSE TO POSSESS BUT NOT OPERATE (POSSESSION-ONLY LICENSE)

A request to amend an operating license to a possession-only license should be made to the Director of Licensing, U.S. Atomic Energy Commission, Washington, D.C. 20545. The request should include the following information:

a. A description of the current status of the facility.

b. A description of measures that will be taken to prevent criticality or reactivity changes and to minimize releases of radioactivity from the facility.

c. Any proposed changes to the technical specifications that reflect the possession-only facility status and the necessary disassembly/retirement activities to be performed.

d. A safety analysis of both the activities to be accomplished and the proposed changes to the technical specifications.

e. An inventory of activated materials and their location in the facility.

2. ALTERNATIVES FOR REACTOR RETIREMENT

Four alternatives for retirement of nuclear reactor facilities are considered acceptable by the Regulatory staff. These are:

a. **Mothballing.** Mothballing of a nuclear reactor facility consists of putting the facility in a state of protective storage. In general, the facility may be left intact except that all fuel assemblies and the radioactive fluids and waste should be removed from the site. Adequate radiation monitoring, environmental surveillance, and appropriate security procedures should be established under a possession-only license to ensure that the health and safety of the public is not endangered.

b. **In-Place Entombment.** In-place entombment consists of sealing all the remaining highly radioactive or contaminated components (e.g., the pressure vessel and reactor internals) within a structure integral with the biological shield after having all fuel assemblies, radioactive fluids and wastes, and certain selected components shipped offsite. The structure should provide integrity over the period of time in which significant quantities (greater than Table I levels) of radioactivity remain with the material in the entombment. An appropriate and continuing surveillance program should be established under a possession-only license.

c. **Removal of Radioactive Components and Dismantling.** All fuel assemblies, radioactive fluids and waste, and other materials having activities above accepted unrestricted activity levels (Table I) should be removed from the site. The facility owner may then have unrestricted use of the site with no requirement for a license. If the facility owner so desires, the remainder of the reactor facility may be dismantled and all vestiges removed and disposed of.

d. **Conversion to a New Nuclear System or a Fossil Fuel System.** This alternative, which applies only to nuclear power plants, utilizes the existing turbine system with a new steam supply system. The original nuclear steam supply system should be separated from the electric generating system and disposed of in accordance with one of the previous three retirement alternatives.

3. SURVEILLANCE AND SECURITY FOR THE RETIREMENT ALTERNATIVES WHOSE FINAL STATUS REQUIRES A POSSESSION-ONLY LICENSE

A facility which has been licensed under a possession-only license may contain a significant amount of radioactivity in the form of activated and contaminated hardware and structural materials. Surveillance and commensurate security should be provided to assure that the public health and safety are not endangered.

a. Physical security to prevent inadvertent exposure of personnel should be provided by multiple locked barriers. The presence of these barriers should make it extremely difficult for an unauthorized person to gain access to areas where radiation or contamination levels exceed those specified in Regulatory Position C.4. To prevent inadvertent exposure, radiation areas above 5 mR/hr, such as near the activated primary system of a power plant, should be appropriately marked and should not be accessible except by cutting of welded closures or the disassembly and removal of substantial structures

and/or shielding material. Means such as a remote-readout intrusion alarm system should be provided to indicate to designated personnel when a physical barrier is penetrated. Security personnel that provide access control to the facility may be used instead of the physical barriers and the intrusion alarm systems.

b. The physical barriers to unauthorized entrance into the facility, e.g., fences, buildings, welded doors, and access openings, should be inspected at least quarterly to assure that these barriers have not deteriorated and that locks and locking apparatus are intact.

c. A facility radiation survey should be performed at least quarterly to verify that no radioactive material is escaping or being transported through the containment barriers in the facility. Sampling should be done along the most probable path by which radioactive material such as that stored in the inner containment regions could be transported to the outer regions of the facility and ultimately to the environs.

d. An environmental radiation survey should be performed at least semiannually to verify that no signficant amounts of radiation have been released to the environment from the facility. Samples such as soil, vegetation, and water should be taken at locations for which statistical data has been established during reactor operations.

e. A site representative should be designated to be responsible for controlling authorized access into and movement within the facility.

f. Administrative procedures should be established for the notification and reporting of abnormal occurrences such as (1) the entrance of an unauthorized person or persons into the facility and (2) a significant change in the radiation or contamination levels in the facility or the offsite environment.

g. The following reports should be made:

(1) An annual report to the Director of Licensing, U.S. Atomic Energy Commission, Washington, D.C. 20545, describing the results of the environmental and facility radiation surveys, the status of the facility, and an evaluation of the performance of security and surveillance measures.

(2) An abnormal occurrence report to the Regulatory Operations Regional Office by telephone within 24 hours of discovery of an abnormal occurrence. The abnormal occurrence will also be reported in the annual report described in the preceding item.

h. Records or logs relative to the following items should be kept and retained until the license is terminated, after which they may be stored with other plant records:

(1) Environmental surveys;

(2) Facility radiation surveys,

(3) Inspections of the physical barriers, and

(4) Abnormal occurrences.

4. DECONTAMINATION FOR RELEASE FOR UNRESTRICTED USE

If it is desired to terminate a license and to eliminate any further surveillance requirements, the facility should be sufficiently decontaminated to prevent risk to the public health and safety. After the decontamination is satisfactorily accomplished and the site inspected by the Commission, the Commission may authorize the license to be terminated and the facility abandoned or released for unrestricted use. The licensee should perform the decontamination using the following guidelines:

a. The licensee should make a reasonable effort to eliminate residual contamination.

b. No covering should be applied to radioactive surfaces of equipment or structures by paint, plating, or other covering material until it is known that contamination levels (determined by a survey and documented) are below the limits specified in Table I. In addition, a reasonable effort should be made (and documented) to further minimize contamination prior to any such covering.

c. The radioactivity of the interior surfaces of pipes, drain lines, or ductwork should be determined by making measurements at all traps and other appropriate access points, provided contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement should be assumed to be contaminated in excess of the permissable radiation limits.

d. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated in excess of the limits specified. This may include, but is not limited to, special circumstances such as the transfer of premises to another licensed organization that will continue to work with radioactive materials. Requests for such authorization should provide:

(1) Detailed, specific information describing the premises, equipment, scrap, and radioactive contaminants and the nature, extent, and degree of residual surface contamination.

(2) A detailed health and safety analysis indicating that the residual amounts of materials on surface areas, together with other considerations such as the prospective use of the premises, equipment, or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

e. Prior to release of the premises for unrestricted use, the licensee should make a comprehensive radiation survey establishing that contamination is within the limits specified in Table I. A survey report should be filed with the Director of Licensing, U.S. Atomic Energy Commission, Washington, D.C. 20545, with a copy to the Director of the Regulatory Operations Regional Office having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report should:

(1) Identify the premises;

(2) Show that reasonable effort has been made to reduce residual contamination to as low as practicable levels;

(3) Describe the scope of the survey and the general procedures followed; and

(4) State the finding of the survey in units specified in Table 1.

After review of the report, the Commission may inspect the facilities to confirm the survey prior to granting approval for abandonment.

5. REACTOR RETIREMENT PROCEDURES

As indicated in Regulatory Position C.2, several alternatives are acceptable for reactor facility retirement. If minor disassembly or "mothballing" is planned, this could be done by the existing operating and maintenance procedures under the license in effect. Any planned actions involving an unreviewed safety question or a change in the technical specifications should be reviewed and approved in accordance with the requirements of 10 CFR §50.59.

If major structural changes to radioactive components of the facility are planned, such as removal of the pressure vessel or major components of the primary system, a dismantlement plan including the information required by §50.82 should be submitted to the Commission. A dismantlement plan should be submitted for all the alternatives of Regulatory Position C.2 except mothballing. However, minor disassembly activities may still be performed in the absence of such a plan, provided they are permitted by existing operating and maintenance procedures. A dismantlement plan should include the following:

a. A description of the ultimate status of the facility

b. A description of the dismantling activities and the precautions to be taken.

c. A safety analysis of the dismantling activities including any effluents which may be released.

d. A safety analysis of the facility in its ultimate status.

Upon satisfactory review and approval of the dismantling plan, a dismantling order is issued by the Commission in accordance with §50.82. When dismantling is completed and the Commission has been notified by letter, the appropriate Regulatory Operations Regional Office inspects the facility and verifies completion in accordance with the dismantlement plan. If residual radiation levels do not exceed the values in Table I, the Commission may terminate the license. If these levels are exceeded, the licensee retains the possession-only license under which the dismantling activities have been conducted or, as an alternative, may make application to the State (if an Agreement State) for a byproduct materials license.

TABLE I

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDE[a]	AVERAGE[b c]	MAXIMUM[b d]	REMOVABLE[b e]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm^2	3000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm β-γ/100 cm^2	15,000 dpm β-γ/100 cm^2	1000 dpm β-γ/100 cm^2

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

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

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

Attachment 3.0
Instrument Calibration Records

RSO, Inc.
P.O. Box 1450
Laurel, MD 20725
(301) 953-2482

Certificate of Calibration

RSO Job No. 7040

ISSUED TO: Chesapeake Nuclear Services
788 Sonne Dr.
Annapolis, MD 21401

CONTACT: Stewart Bland
PHONE: (410) 266-9174

PO NO: Credit Card

INSTRUMENT: LUDLUM
MODEL: 2360
TYPE: DATA LOGGER
SN: 141321

RSO, Inc. certifies that on 02/15/2007 the above described instrument was calibrated using a radioactive source to determine the efficiency for a specific radionuclide(s) and using electronically generated pulse for the linearity. Pulsed using Ludlum 500-2, S/N 159110.

The results are tabulated below. Calibration is traceable to NIST.

Calibration Data

	RANGE	EXPECTED	OBSERVED		C.F.
X	1	100	100	cpm	1.00
		400	400	cpm	1.00
X	10	1000	1000	cpm	1.00
		4000	4000	cpm	1.00
X	100	10000	10000	cpm	1.00
		40000	40000	cpm	1.00
X	1000	100000	100000	cpm	1.00
		400000	400000	cpm	1.00
			C.F. AVERAGE		1.00

Probe type(s) Probe1: PROPORTIONAL Probe2: Probe3:

MODEL	SER#	WINDOW	GEOMETRY	VOLT	ISOTOPE 1	EFF.(%)	ISOTOPE 2	EFF.(%)	ISOTOPE 3	EFF.(%)	ISOTOPE 4	EFF.(%)
43-68	PR148454	FIXED	CONTACT	1658	Tc99	17	C14	20				

INSTRUMENT CHECKS

1 mR/hr CHECK: N/A
BATTERY CHECK: NORMAL
CHECK SOURCE 1: N/A READING:
CHECK SOURCE 2: N/A READING:

ENVIRONMENTAL

TEMP: 24°C
PRESS: 759 mmHg
HUMID: 23 %

THE SUGGESTED RECALIBRATION DATE FOR THIS INSTRUMENT IS 02/15/2008

Calibrated By: Dorsey Austin Reviewed By: RAE Cal Date: 02/15/2007

Maryland License MD-33-021-01

4380

RSO, Inc.
P.O. Box 1450
Laurel, MD 20725
(301) 953-2482

RSO Job No. 7040

Certificate of Calibration

ISSUED TO: Chesapeake Nuclear Services
788 Sonne Dr.
Annapolis, MD 21401

INSTRUMENT: LUDLUM
MODEL: 2360
TYPE: DATA LOGGER
SN: 141311

CONTACT: Stewart Bland
PHONE: (410) 266-9174

PO NO: Credit Card

RSO, Inc. certifies that on 02/15/2007 the above described instrument was calibrated using a radioactive source to determine the efficiency for a specific radionuclide(s) and using electronically generated pulse for the linearity. Pulsed using Ludlum 500-2, S/N 159110.

The results are tabulated below. Calibration is traceable to NIST.

Calibration Data

	RANGE	EXPECTED	OBSERVED		C.F.
X	1	100	103	cpm	0.97
		400	400	cpm	1.00
X	10	1000	1000	cpm	1.00
		4000	4000	cpm	1.00
X	100	10000	10000	cpm	1.00
		40000	40000	cpm	1.00
X	1000	100000	100280	cpm	1.00
		400000	400000	cpm	1.00
			C.F. AVERAGE		1.00

Probe type(s) Probe1: PROPORTIONAL Probe2: Probe3:

MODEL	SER#	WINDOW	GEOMETRY	VOLT	ISOTOPE 1	EFF.(%)	ISOTOPE 2	EFF.(%)	ISOTOPE 3	EFF.(%)	ISOTOPE 4	EFF.(%)
43-68	PR148454	FIXED	CONTACT	1658	Tc99	18	C14	20				

INSTRUMENT CHECKS

1 mR/hr CHECK: N/A
BATTERY CHECK: NORMAL
CHECK SOURCE 1: N/A READING:
CHECK SOURCE 2: N/A READING:

ENVIRONMENTAL

TEMP: 23°C
PRESS: 759 mmHg
HUMID: 24 %

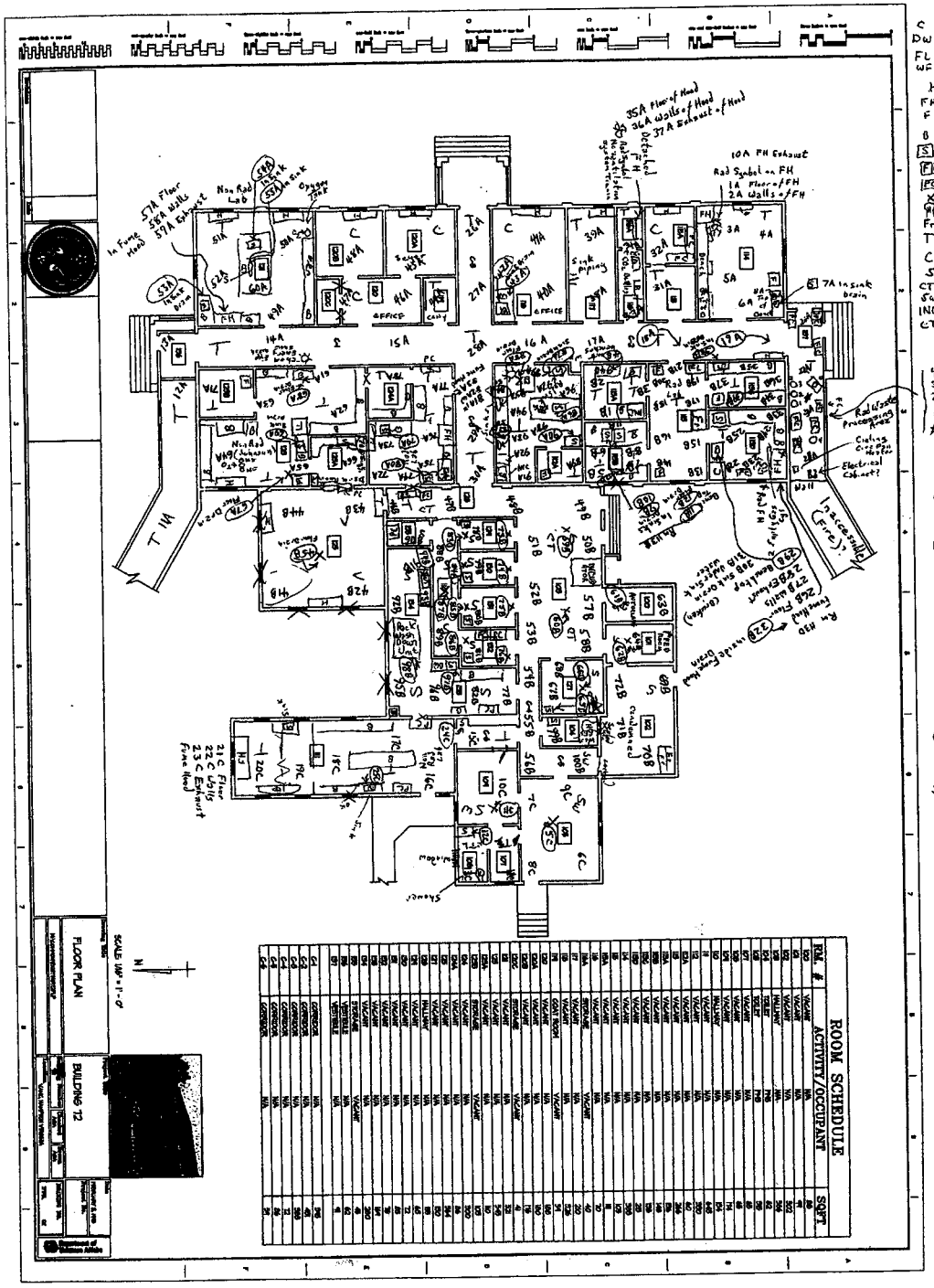
THE SUGGESTED RECALIBRATION DATE FOR THIS INSTRUMENT IS 02/15/2008

Calibrated By: Dorsey Austin Reviewed By: RAG Cal Date: 02/15/2007

Maryland License MD-33-021-01

4381

Attachment 4.0
Large Area Survey Map Initial Survey



C Centrifuge
DW Dishwasher
FL Flammables Locker
WF Water Fountain
H HEATING UNIT
FH FUME HOOD
F Refrigerator
B LAB BENCH WORK SURFACE
S SINK
FC File Cabinets
PC Portable Closet
X Floor Drain
T Toilet
Fr Freezer
T Tile Floor 8"x8" V Vinyl Roll 6' wide on Concrete
C Carpet Floor
S Sealed Concrete
CT Ceramic Tile Red 6"x6" grouted
SW Baked Wood
INC Incubator/oven
CTL Little ceramic tiles 3/4" x 3/4" Rm 104 only 108

4 Ash Can @ Absorbant KL kitty Litter
3 Red Ash can
2 Red Waste Can Autoclave
1 Red Waste 35 gal @ water 24A dipped in wet liquid
★ 5 or 6 old moldy crushed Red Boxes (Cardboard) presumed unused Red waste 25A eg cardboard surfaces

ONF Non Flammable Gas Tank
O_2 Oxygen Tank

Note 39B taken inside Rm 113C Bench Drawer Top Right (Tiled)
40B Fridge/Freezer inside 113C Radioactive Waste Store for Decay (with hasp lock)

Sink Drains in
Rm 129 1C
Rm 130 2C
Rm 131 3C
Rm 132 4C

(X) Indicates smear taken from floor or Sink drain

Swipes on Hot Spots in Rm 113 3500 rpm 26C
4500 rpm 27C
Rm 113B 6200 rpm 28C
Sink in Rm 113B 5500 rpm 29C

30C Womens Restroom 104 Sink Drain

Attachment 5.0
Initial Smear Survey Results

RSO, Inc.

Radiation Service Organization

March 7, 2007

Chesapeake Nuclear
Attn: Stewart Bland
788 Sonne Dr.
Annapolis, MD 21401

Dear Mr. Bland,

Enclosed please find the results for the wipe tests received on February 26, 2007. The wipe tests were analyzed using Liquid Scintillation and Gamma Counters. An individual data print out for each analysis process is attached for your review. The only elevated activity indicated on the analysis reports were as follows:

Wipe test group B1-B100 found 3 wipe tests exceeding 100 but less than 300 dpm.
Wipe test group C1-C30 found 1 wipe test exceeding 100 but less than 300 dpm.

All other results indicated activity levels below 50 dpm which included the gamma test results.

If you have any questions please do not hesitate to call me at (301) 953-2482 ext. 305 or by e-mail james.dean@rsoinc.com.

Sincerely,

James W. Dean

James W. Dean
Manager, Radiation Safety Services – Radiation Safety Officer

JWD:11P

Enclosure

P.O. Box 1450, Laurel, Maryland 20725-1450
Washington (301) 953-2482 Fax (301) 498-3017 Baltimore (410) 792-7444

NIH

REVIEWED BY: JD 2/28/07

Assay Definition- A1-A100

Assay Description:
CHESAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM\20070227_0946.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H-TOL-7-17-06
Mid Energy: 14C-TOL-07-17-06
High Energy: 32P-UG-02-28-05
Count Time (min): 5.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM
1	10.00	5	8	6	0	0	0	53.33	565.99	2
2	5.00	6	12	1	10	14	1	50.09	507.24	1
3	5.00	2	5	-1	3	6	-1	78.46	512.01	1
4	5.00	1	1	1	2	1	1	66.19	476.71	1
5	5.00	3	3	2	5	3	3	49.74	467.57	1
6	5.00	5	4	2	8	4	2	60.15	573.07	0
7	5.00	1	5	0	1	5	-0	75.54	427.61	1
8	5.00	0	0	2	1	-0	3	164.69	462.19	1
9	5.00	1	3	1	2	4	1	1.62	306.19	4

L-D

10	5.00	0	1	1	0	1	2	84.37	411.28	1
11	5.00	3	2	-1	5	2	-2	43.92	479.24	1
12	5.00	-0	3	2	-1	3	3	103.07	466.05	1
13	5.00	-1	1	0	-3	1	-0	0.00	426.18	2
14	5.00	-3	2	1	-6	2	1	0.00	425.05	2
15	5.00	1	2	0	2	3	0	76.50	463.16	1
16	5.00	-1	3	-0	-3	4	-0	162.91	474.31	1
17	5.00	3	2	2	6	2	3	37.19	470.20	1
18	5.00	-1	3	3	-3	3	3	121.02	435.72	1
19	5.00	-1	2	2	-2	2	2	70.56	412.71	1
20	5.00	-1	3	1	-2	3	1	131.99	463.25	1
21	5.00	-1	3	1	-4	4	2	75.56	443.58	1
22	5.00	-2	0	-1	-5	1	-1	0.00	385.77	2
23	5.00	-2	4	-1	-9	6	-1	50.56	300.45	4
24	5.00	-1	2	0	-4	3	0	0.00	336.11	1
25	5.00	1	4	-0	0	5	-0	48.35	476.27	1
26	5.00	-2	5	2	-6	6	2	77.54	401.47	1
27	5.00	-1	1	1	-2	1	2	191.16	464.66	3
28	5.00	-1	4	-0	-3	4	-0	121.77	450.80	1
29	5.00	1	1	0	1	1	-0	85.65	444.69	1
30	5.00	-2	1	1	-4	2	1	0.00	434.83	2
31	5.00	-1	1	3	-2	1	4	0.00	457.58	3
32	5.00	-2	3	1	-5	4	1	165.62	440.46	1
33	5.00	1	2	2	2	1	2	42.15	473.72	1
34	5.00	-1	3	1	-3	3	1	94.86	445.94	1
35	5.00	0	1	1	0	1	1	26.39	467.69	1
36	5.00	1	2	4	2	1	4	49.53	478.99	1
37	5.00	0	2	2	-0	2	2	58.39	495.99	1
38	5.00	3	4	-1	4	4	-1	73.24	582.81	1
39	5.00	1	-0	-1	1	-0	-1	202.71	530.46	1
40	5.00	-1	2	-1	-2	3	-1	154.80	477.57	1
41	5.00	-0	3	1	-2	4	2	145.75	474.29	1
42	5.00	-0	0	1	-0	-0	1	0.00	450.80	1
43	5.00	-1	3	1	-3	4	1	164.44	482.72	1
44	5.00	-1	3	1	-2	3	2	106.80	482.94	1
45	5.00	1	1	2	2	0	2	92.63	469.04	3
46	5.00	2	1	1	4	1	2	41.37	468.06	2
47	5.00	-0	3	0	-2	4	-0	68.89	444.83	1
48	5.00	1	3	1	1	4	1	30.16	468.23	2
49	5.00	1	2	1	2	2	1	49.21	449.88	1
50	5.00	-0	1	-0	-1	2	-0	0.00	437.52	3
51	5.00	-2	2	1	-5	2	2	221.76	361.44	3
52	5.00	0	1	3	0	1	4	69.25	467.47	1
53	5.00	-0	1	1	-1	1	1	0.00	464.38	3
54	5.00	-1	0	3	-1	-0	4	0.00	410.80	2
55	5.00	0	3	1	-0	4	1	33.72	456.61	9
56	5.00	1	5	-0	2	5	-0	52.90	463.19	1
57	5.00	3	3	1	5	3	2	58.61	503.89	1
58	5.00	-0	5	3	-2	5	3	78.08	428.75	2
59	5.00	-0	2	3	-1	1	4	345.52	470.79	1
60	5.00	1	2	2	1	2	2	148.95	531.00	1
61	5.00	1	4	3	1	4	3	35.79	422.45	2
62	5.00	-1	2	0	-3	2	-0	235.67	424.77	1
63	5.00	-0	2	1	-0	2	1	189.44	448.19	3
64	5.00	-0	1	1	-1	2	1	9.18	444.92	3
65	5.00	1	3	1	0	3	1	43.93	444.11	2
66	5.00	1	-0	1	2	-1	2	0.00	470.64	1
67	5.00	-0	2	2	-1	2	2	45.66	445.41	1
68	5.00	0	4	-0	-1	5	-0	52.53	485.27	2
69	5.00	1	3	1	1	3	1	44.72	493.74	1
70	5.00	-1	1	2	-2	1	2	0.00	359.14	1
71	5.00	-2	1	2	-4	1	2	0.00	493.28	3

72	5.00	-1	1	1	-2	1	1	0.00	443.49	3
73	5.00	-1	3	1	-3	3	1	92.85	489.84	3
74	5.00	2	2	1	4	2	1	67.75	500.40	1
75	5.00	-0	4	-0	-1	5	-0	45.08	447.97	1
76	5.00	-0	-1	-0	-1	-1	-0	0.00	474.57	2
77	5.00	2	5	0	3	5	0	46.56	451.32	2
78	5.00	1	2	2	2	2	2	95.41	506.63	1
79	5.00	2	7	-0	3	8	-1	59.05	528.17	1
80	5.00	1	4	-2	-0	6	-2	95.06	501.81	1
81	5.00	1	2	0	2	2	0	96.76	493.99	2
82	5.00	0	5	2	-1	6	2	65.41	440.00	1
83	5.00	-0	2	2	-1	2	2	72.39	462.11	1
84	5.00	1	0	1	3	0	1	80.30	481.03	1
85	5.00	2	1	1	4	1	2	54.60	475.36	1
86	5.00	-0	2	1	-1	3	1	61.02	455.60	3
87	5.00	1	5	1	-0	6	1	70.80	470.08	2
88	5.00	1	-0	-1	2	-0	-1	335.18	476.39	1
89	5.00	-2	1	2	-4	0	3	0.00	495.81	2
90	5.00	1	2	3	1	2	4	73.47	387.85	1
91	5.00	-0	0	1	-1	0	1	0.00	444.24	2
92	5.00	1	1	4	2	1	5	0.00	419.76	1
93	5.00	-1	3	1	-2	3	1	125.54	448.79	1
94	5.00	-0	2	3	-2	2	4	97.02	449.34	1
95	5.00	2	1	0	4	1	0	7.35	502.13	1
96	5.00	0	3	2	-0	4	2	99.12	435.06	1
97	5.00	2	2	0	5	2	0	32.94	440.45	1
98	5.00	-0	5	2	-3	6	3	62.61	462.34	2
99	5.00	1	2	1	2	2	1	11.40	488.29	1
100	5.00	-1	2	0	-3	2	0	120.26	439.24	1
101	5.00	0	1	3	0	0	4	117.61	522.56	1

Protocol #: 7 SWIPES 1A – 100A User : Lab Technician

CHESAPEAKE NUCLEAR
Count Time(minutes): 1.00
Assay Type: CPM
Background Subtract : IPA Bkg
Outlier: 5.0 FLAG
%Spillup: 0.00
%Spilldown: 0.00
Screening: OFF

REVIEWED BY: LD 2/28/07

	Window A		Window B		Window C	
Nuclide:	I-125	15 - 75 keV	Co-57	75 - 165 keV	MAN	15 - 2000 keV
Bkg:	24.7		29.2		229	
Sigma:	0.00		0.00		2.00	
LCR:	0		0		0	
Half Life(hours):	0.00		0.00			
Multiplier:	1.0000					
%CV Flag Limit:	0.00		0.00			

S#	A:CPM	A:%SIG	B:CPM	B:%SIG	C:CPM	C:%SIG
1	0.0		0.0		0.0	
2	0.0		0.0		0.0	
3	0.0		0.0		0.0	
4	4.3	48.5	5.8	41.5	20.7	22.0
5	0.0		0.0		0.0	
6	2.3	66.5	10.8	30.4	25.7	19.7
7	2.3	66.5	0.8	112	0.0	
8	3.3	55.4	6.8	38.3	19.7	22.5
9	0.0		0.0		11.7	29.2
10	11.3	29.8	0.0		8.7	33.9
(24A) 11	0.0		3.8	51.3	1.7	76.7

EDITDATA.D07 Archived to C:\ARCH\ARCH07D.183
C:\DATA\P7DATA Copied to C:\DATA\ARCH07A.183

26 Feb 07 14:19:18 Packard Model 5003 COBRA SN: 424559

PROTOCOL # 7
SWIPES
CHESAPEAKE NUCLEAR
COUNT TIME 1.00 Minutes

Window A		Window B		Window C	
LLD:	15 keV	LLD:	75 keV	LLD:	15 keV
ULD:	75 keV	ULD:	165 keV	ULD:	2000 keV
EFF:	79 %	EFF:	85 %	EFF:	70 %

Sample #	A:CPM	A:DPM	B:CPM	B:DPM	C:CPM	C:DPM
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	4	5	6	7	21	30
5	0	0	0	0	0	0

	7	2	3	1	1	9	0
	8	3	4	7	8	20	28
	9	0	0	0	0	12	17
	10	11	14	0	0	9	12
(24A)	11	0	0	4	4	2	2

LD

REVIEWED BY:
2/28/07

Assay Definition- B1-B100

Assay Description:
CHESAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\Default\Triple Lable DPM\20070227_2036.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H-TOL-7-17-06
Mid Energy: 14C-TOL-07-17-06
High Energy: 32P-UG-02-28-05
Count Time (min): 5.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM
1	10.00	5	9	7	0	0	0	58.17	508.25	1
2	5.00	-1	3	1	-3	4	1	55.31	412.81	1
3	5.00	-0	2	-2	-2	3	-2	24.80	341.97	1
4	5.00	0	1	-1	-0	2	-1	122.67	421.97	1
5	5.00	0	2	1	1	2	1	36.35	413.85	1
6	5.00	-0	1	-1	-1	2	-1	72.87	399.09	0
7	5.00	-0	-1	0	-0	-1	0	0.00	446.69	2
8	5.00	1	5	1	0	5	1	47.45	425.83	2

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9	5.00	3	2	-0	7	2	-0	19.43	434.03	0
10	5.00	142	206	-2	281	230	-3	30.40	409.51	0
11	5.00	8	3	-1	16	2	-1	18.35	473.41	1
12	5.00	51	50	0	110	52	0	28.44	407.61	0
13	5.00	1	3	-1	3	4	-2	13.19	377.05	1
14	5.00	-1	2	0	-2	3	0	105.23	434.40	1
15	5.00	-0	4	0	-1	5	0	83.34	460.97	1
16	5.00	6	3	1	11	3	1	33.28	523.38	1
17	5.00	1	1	-2	1	1	-2	64.50	486.01	1
18	5.00	-1	5	-1	-3	6	-1	5.34	349.32	1
19	5.00	1	1	0	2	1	0	24.07	432.31	1
20	5.00	2	1	-0	4	1	-0	0.00	438.26	0
21	5.00	3	13	-1	4	15	-1	52.15	474.39	1
22	5.00	1	1	1	2	1	1	78.77	483.19	1
23	5.00	3	1	-0	6	1	-0	42.17	503.43	1
24	5.00	0	2	-1	-0	3	-1	33.62	494.81	1
25	5.00	2	2	-2	4	2	-2	49.92	467.97	1
26	5.00	-1	3	-1	-4	4	-1	113.45	442.71	1
27	5.00	3	1	-2	8	1	-3	19.30	463.06	1
28	5.00	1	-1	-1	2	-1	-1	0.00	468.02	1
29	5.00	1	0	0	2	-0	0	0.00	470.18	1
30	5.00	0	4	-1	-1	5	-1	146.34	511.65	1
31	5.00	7	10	-1	12	11	-1	28.84	484.54	1
32	5.00	0	-0	1	1	-1	1	0.00	417.74	6
33	5.00	2	4	-0	2	4	-0	51.23	450.98	1
34	5.00	1	2	-2	1	3	-2	94.08	519.56	1
35	5.00	1	2	-0	1	2	-0	57.04	472.85	1
36	5.00	1	3	-1	1	4	-1	87.59	502.18	1
37	5.00	1	3	-0	2	3	-0	54.79	446.92	1
38	5.00	0	2	-0	-0	2	-0	0.00	438.78	1
39	5.00	-0	1	-0	-0	1	-0	84.06	389.94	1
40	5.00	62	46	0	124	47	0	23.22	476.51	0
41	5.00	29	21	-1	64	22	-1	21.87	407.33	0
42	5.00	2	3	0	2	3	0	51.82	521.94	1
43	5.00	1	1	2	2	0	3	0.00	435.47	0
44	5.00	0	-0	-1	1	0	-1	0.00	443.59	1
45	5.00	0	-2	0	2	-2	0	0.00	478.42	0
46	5.00	-0	6	1	-3	7	1	57.52	464.18	1
47	5.00	1	-1	-1	2	-1	-1	0.00	447.53	1
48	5.00	-1	2	0	-3	2	0	474.48	517.93	1
49	5.00	0	1	-0	-0	1	-0	0.00	450.99	1
50	5.00	1	1	-2	2	1	-2	122.44	428.73	1
51	5.00	-1	1	-4	-2	3	-5	63.13	464.40	1
52	5.00	-1	3	-1	-4	4	-1	0.00	415.69	1
53	5.00	0	1	0	1	1	0	140.84	441.55	1
54	5.00	-1	2	-1	-3	3	-1	0.00	427.46	1
55	5.00	2	-0	0	4	-1	0	0.00	447.01	1
56	5.00	-2	1	1	-5	2	1	0.00	491.88	2
57	5.00	-1	2	-1	-2	3	-1	203.66	440.31	1
58	5.00	0	0	1	1	-0	1	0.00	450.53	1
59	5.00	1	5	-3	1	7	-4	54.76	434.20	1
60	5.00	1	1	-1	2	1	-1	45.40	458.36	1
61	5.00	0	5	-1	-1	6	-1	68.51	493.39	1
62	5.00	-0	2	-1	-1	3	-1	0.00	459.26	1
63	5.00	1	1	-1	2	2	-2	67.41	517.56	1
64	5.00	0	2	-1	-0	2	-1	13.34	441.37	1
65	5.00	0	2	-1	-0	3	-1	83.79	505.13	1
66	5.00	1	1	-0	1	1	-0	93.19	450.49	1
67	5.00	-0	2	-1	-1	3	-1	134.52	466.33	1
68	5.00	-0	1	-1	-1	1	-1	0.00	440.87	1
69	5.00	1	-1	-0	2	-2	-0	0.00	472.70	2
70	5.00	-1	1	-1	-2	1	-1	0.00	425.86	1

71	5.00	0	2	-1	-1	3	-1	87.94	428.66	1
72	5.00	1	3	-1	0	4	-1	71.82	499.38	0
73	5.00	0	-1	-2	1	-1	-2	0.00	411.42	2
74	5.00	0	-2	-2	2	-3	-2	0.00	533.90	2
75	5.00	1	1	1	1	1	1	0.00	450.96	1
76	5.00	2	0	-1	4	0	-1	0.00	504.50	0
77	5.00	-0	-2	3	-0	-3	4	0.00	447.94	2
78	5.00	1	0	-0	2	0	-0	0.00	426.97	0
79	5.00	1	-0	-1	3	-0	-1	57.46	456.95	1
80	5.00	1	0	-0	3	-0	-0	95.80	472.18	1
81	5.00	3	1	-1	5	2	-1	46.91	486.01	1
82	5.00	1	0	-1	3	0	-1	115.79	516.21	1
83	5.00	-0	-1	2	-0	-1	3	0.00	459.62	2
84	5.00	1	1	-2	3	1	-2	0.00	448.96	3
85	5.00	-1	2	-3	-3	4	-4	73.83	449.59	1
86	5.00	-0	3	-1	-1	3	-1	152.77	472.92	3
87	5.00	-1	1	-1	-2	2	-1	19.66	464.82	1
88	5.00	0	4	-1	-0	5	-1	99.37	457.58	1
89	5.00	0	1	1	0	1	2	167.56	472.50	1
90	5.00	-0	4	2	-2	5	2	124.60	464.35	2
91	5.00	1	-0	1	2	-0	1	0.00	546.07	1
92	5.00	-1	1	3	-3	1	3	0.00	478.54	3
93	5.00	2	1	1	5	0	1	9.28	472.60	2
94	5.00	1	2	2	1	2	2	74.00	453.37	1
95	5.00	0	1	-1	0	1	-1	16.18	451.53	3
96	5.00	3	0	2	6	-1	3	57.03	498.04	1
97	5.00	1	2	2	3	1	3	13.89	479.78	1
98	5.00	2	-1	-2	4	-1	-2	0.00	503.45	1
99	5.00	1	-0	3	2	-2	4	0.00	448.46	3
100	5.00	0	1	-1	-0	1	-1	137.03	452.35	3
101	5.00	0	3	-1	-1	4	-1	54.32	441.07	0

Protocol #: 7 SWIPES 1B-100B User : Lab Technician

CHESAPEAKE NUCLEAR
Count Time(minutes): 1.00
Assay Type: CPM
Background Subtract: IPA Bkg
Outlier: 5.0 FLAG
%Spillup: 0.00
%Spilldown: 0.00
Screening: OFF

REVIEWED BY:
JD 2/28/07

	Window A		Window B		Window C	
Nuclide:	I-125	15 - 75 keV	Co-57	75 - 165 keV	MAN	15 - 2000 keV
Bkg:	24.7		29.2		229	
Sigma:	0.00		0.00		2.00	
LCR:	0		0		0	
Half Life(hours):	0.00		0.00			
Multiplier:	1.0000					
%CV Flag Limit:	0.00		0.00			

S#	A:CPM	A:%SIG	B:CPM	B:%SIG	C:CPM	C:%SIG
1	1.3	89.1	0.0		0.0	
2	0.3	196	5.8	41.5	1.7	76.7
3	0.0		0.0		10.7	30.6
4	0.0		1.3	74.5	0.0	
5	2.3	66.5	22.8	20.9	33.7	17.2
6	0.0		2.8	59.8	39.7	15.9
7	0.0		0.8	112	4.7	46.1
8	5.3	43.6	6.8	38.3	15.7	25.2
9	5.3	43.6	7.8	35.8	24.7	20.1
10	10.3	31.2	5.8	41.5	38.7	16.1
(31B) 11	0.0		0.0		0.0	

EDITDATA.D07 Archived to C:\ARCH\ARCH07D.185
C:\DATA\P7DATA Copied to C:\DATA\ARCH07A.185

26 Feb 07 14:41:17 Packard Model 5003 COBRA SN: 424559

PROTOCOL # 7
SWIPES
CHESAPEAKE NUCLEAR
COUNT TIME 1.00 Minutes

Window A		Window B		Window C	
LLD:	15 keV	LLD:	75 keV	LLD:	15 keV
ULD:	75 keV	ULD:	165 keV	ULD:	2000 keV
EFF:	79 %	EFF:	85 %	EFF:	70 %

Sample #	A:CPM	A:DPM	B:CPM	B:DPM	C:CPM	C:DPM
1	1	2	0	0	0	0
2	0	0	6	7	2	2
3	0	0	0	0	13	15
4	0	0	2	2	0	0
5	2	3	23	27	34	48

	7	0	0	1	1	5	7
	8	5	7	7	8	16	22
	9	5	7	8	9	25	35
	10	10	13	6	7	39	55
(31B)	11	0	0	0	0	0	0

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NIH

REVIEWED BY: 2/28/07

Assay Definition- C1-C30

Assay Description:
CHESAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM\20070228_0727.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H-TOL-7-17-06
Mid Energy: 14C-TOL-07-17-06
High Energy: 32P-UG-02-28-05
Count Time (min): 5.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM
1	10.00	5	8	6	0	0	0	57.03	557.01	1
2	5.00	0	1	0	-0	1	0	94.29	462.46	1
3	5.00	0	3	1	-0	4	2	23.18	445.34	1
4	5.00	-1	5	2	-3	6	3	68.50	498.42	2
5	5.00	0	0	-1	0	1	-1	67.14	536.01	1
6	5.00	-1	2	1	-3	2	2	165.05	401.30	3
7	5.00	-1	1	2	-4	1	2	0.00	453.80	2
8	5.00	0	2	-0	0	3	-0	4.01	466.14	1
9	5.00	0	2	1	0	3	1	49.20	447.97	0

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10	5.00	-1	3	-0	-2	3	-0	14.28	435.11	0
11	5.00	-1	0	-0	-3	1	-0	0.00	467.48	2
12	5.00	2	1	1	4	1	1	68.81	496.99	1
13	5.00	2	3	2	4	3	2	24.20	494.78	1
14	5.00	-2	2	0	-4	3	0	291.31	485.55	1
15	5.00	-0	3	-1	-1	4	-1	98.21	526.58	1
16	5.00	0	1	2	0	1	3	100.05	473.52	1
17	5.00	-1	3	1	-3	4	1	15.83	409.92	1
18	5.00	0	3	0	-0	4	0	43.64	419.27	1
19	5.00	0	2	1	-0	3	2	88.34	508.49	1
20	5.00	-2	4	1	-6	5	1	109.70	469.81	1
21	5.00	1	1	1	1	1	1	26.30	493.88	0
22	5.00	-0	5	2	-2	5	2	81.71	457.87	1
23	5.00	-0	3	1	-2	3	1	82.78	485.97	1
24	5.00	0	2	0	0	2	0	131.77	525.48	1
25	5.00	-0	0	1	-0	-0	2	0.00	365.34	1
26	5.00	-0	4	0	-2	4	0	60.47	400.52	1
27	5.00	0	8	2	-2	10	2	49.10	436.35	1
28	5.00	4	15	1	5	17	1	51.71	443.39	1
29	5.00	12	20	0	21	23	-0	37.18	451.32	0
30	5.00	124	176	0	226	195	-1	37.13	474.19	0
31	5.00	-0	4	0	-1	4	0	56.09	451.11	1

Protocol #: 7 SWIPES IC-30C User : Lab Technician

CHESAPEAKE NUCLEAR
Count Time(minutes): 1.00
Assay Type: CPM
Background Subtract : IPA Bkg
Outlier: 5.0 FLAG
%Spillup: 0.00
%Spilldown: 0.00
Screening: OFF

REVIEWED BY: 2/28/07

	Window A		Window B		Window C	
Nuclide:	I-125	15 - 75 keV	Co-57	75 - 165 keV	MAN	15 - 2000 keV
Bkg:	24.7		29.2		229	
Sigma:	0.00		0.00		2.00	
LCR:	0		0		0	
Half Life(hours):	0.00		0.00			
Multiplier:	1.0000					
%CV Flag Limit:	0.00		0.00			

S#	A:CPM	A:%SIG	B:CPM	B:%SIG	C:CPM	C:%SIG
1	0.0		2.8	59.8	0.0	
2	0.0		0.0		0.0	
3	0.0		0.8	112	0.0	

EDITDATA.D07 Archived to C:\ARCH\ARCH07D.184
C:\DATA\P7DATA Copied to C:\DATA\ARCH07A.184

26 Feb 07 14:35:40 Packard Model 5003 COBRA SN: 424559

PROTOCOL # 7
SWIPES
CHESAPEAKE NUCLEAR
COUNT TIME 1.00 Minutes

	Window A	Window B	Window C
LLD:	15 keV	75 keV	15 keV
ULD:	75 keV	165 keV	2000 keV
EFF:	79 %	85 %	70 %

Sample #	A:CPM	A:DPM	B:CPM	B:DPM	C:CPM	C:DPM
1	0	0	3	3	0	0
2	0	0	0	0	0	0
3	0	0	1	1	0	0

Attachment 6.0
Follow-up Smear Survey Results

RSO, Inc.

Radiation Service Organization

March 27, 2007

Chesapeake Nuclear
Attn: Stewart Bland
788 Sonne Dr.
Annapolis, MD 21401

Dear Mr. Bland,

Enclosed please find the results for the wipe tests received on March 26, 2007. The wipe tests were analyzed using Liquid Scintillation, Gamma Counters and Gamma Spectroscopy. An individual data print out for each analysis process is attached for your review. The only elevated activity indicated on the analysis reports were as follows:

Wipe test group 3C to 67C (37 wipe tests) found 3 wipe tests exceeding 100 and 2 wipe tests exceeding 1,000 dpm. Please review attached beta-gamma LSC data results for activity concentrations.

Analysis of swabs 5, 6 & 8 found no activity exceeding 10 dpm.
Please review attached beta-gamma LSC data results for activity concentrations.

Wipe tests were Gamma counted and analysis results indicated all activity levels below 50 dpm. Please review attached gamma data results for activity concentrations.

Gamma spec analysis of scrapings received within 7 small bags found no spectrum outside of normal background.

If you have any questions please do not hesitate to call me at (301) 953-2482 ext. 305 or by e-mail james.dean@rsoinc.com.

Sincerely,

James W. Dean

James W. Dean
Manager, Radiation Safety Services – Radiation Safety Officer

Enclosure

P.O. Box 1450, Laurel, Maryland 20725-1450
Washington (301) 953-2482 Fax (301) 498-3017 Baltimore (410) 792-7444

CHAIN-OF-CUSTODY RECORD

INSTALLATION _____ PROJECT NO. _____

PROJECT OFFICER _____

PACKED BY Byron Bland

DATE SAMPLED	FIELD IDENTIFICATION NUMBER	C of C NUMBER	SAMPLE TYPE	COMP	GRAB	TOTAL #	SAMPLE PARAMETER: Liquid Scin	SAMPLE PARAMETER: Qualitative gamma spec
* 3-22-07	3C - 67C		Smear			36	✓	
3-22-07	113 & 113B		Scrapings			7		✓ ← collectively ; 1 & spec analysis
~~3-22-07~~	~~5, 6, 8 BLD~~		~~0+ 1 smear~~					
3-22-07	5, 6, 8		Swab			3	✓	

REMARKS

* 37 NOT 36 RE

CHESAPEAKE NUCLEAR
Count Time(minutes): 1.00
Assay Type: CPM
Background Subtract: IPA Bkg
Outlier: 5.0 FLAG
%Spillup: 0.00
%Spilldown: 0.00
Screening: OFF

REVIEWED BY:
3/27/07

	Window A		Window B		Window C	
Nuclide:	I-125	15 - 75 keV	Co-57	75 - 165 keV	MAN	15 - 2000 keV
Bkg:	23.1		26.7		210	
Sigma:	0.00		0.00		2.00	
LCR:	0		0		0	
Half Life(hours):	0.00		0.00			
Multiplier:	1.0000					
%CV Flag Limit:	0.00		0.00			

S#	A:CPM	A:%SIG	B:CPM	B:%SIG	C:CPM	C:%SIG
1	1.9	72.2	0.0		0.0	
2	9.9	31.8	2.3	65.4	6.2	40.2
3	3.9	50.5	3.3	54.7	15.2	25.6
4	0.0		3.3	54.7	20.2	22.2
5	0.0		3.3	54.7	21.2	21.7
6	11.9	29.0	6.3	39.7	41.2	15.6
7	0.0		0.3	171	6.2	40.2

EDITDATA.007 Archived to C:\ARCH\ARCHO7D.191
C:\DATA\P7DATA Copied to C:\DATA\ARCHO7A.191

26 Mar 07 14:10:59 Packard Model 5003 CUBRA SN: 424559

PROTOCOL # 7
SWIPES
CHESAPEAKE NUCLEAR
COUNT TIME 1.00 Minutes

Window A		Window B		Window C	
LLD:	15 keV	LLD:	75 keV	LLD:	15 keV
ULD:	75 keV	ULD:	165 keV	ULD:	2000 keV
EFF:	79 %	EFF:	85 %	EFF:	70 %

Sample #	A:CPM	A:DPM	B:CPM	B:DPM	C:CPM	C:DPM
1	2	3	0	0	0	0
2	10	14	2	3	6	9
3	4	6	3	4	15	21
4	0	0	3	4	20	29
5	0	0	3	4	21	30
6	12	17	6	8	41	59
7	0	0	0	0	6	9

NIH

REVIEWED BY:
3/27/07

Assay Definition-

Assay Description:
CHEASAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM\20070326_1554.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H-TOL-7-17-06
Mid Energy: 14C-TOL-07-17-06
High Energy: 32P-UG-02-28-05
Count Time (min): 5.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM
BKG-1	10.00	6	11	6	0	0	0	68.71	527.52	2
*1 2	5.00	1	-2	3	2	-3	3	0.00	490.83	4
3	5.00	1	-2	-1	4	-2	-1	0.00	497.42	4
4	5.00	0	1	1	0	1	2	0.00	481.85	2
5	5.00	1	0	2	2	-0	3	0.00	505.94	2
6	5.00	0	0	1	1	-0	1	0.00	497.94	2
7	5.00	1	7	3	0	7	4	47.92	456.63	2
8	5.00	1	2	1	1	3	2	0.00	502.96	2
9	5.00	0	4	3	-0	4	3	17.25	464.03	2

	10	5.00	0	1	2	0	1	2	0.00	470.50	2
	11	5.00	-1	1	1	-2	2	1	0.00	473.34	3
	12	5.00	0	2	2	-0	2	2	0.00	422.26	2
	13	5.00	-1	-1	5	-2	-2	6	0.00	498.13	3
	14	5.00	2426	4726	5	3998	5389	-16	41.30	482.06	0
	15	5.00	100	162	3	168	182	3	41.74	518.21	0
	16	5.00	129	168	3	237	184	3	35.88	481.58	0
	17	5.00	5	5	2	11	5	3	4.24	408.48	1
	18	5.00	0	4	2	-1	5	2	40.89	407.03	2
	19	5.00	9	12	4	16	12	4	23.53	457.51	1
	20	5.00	649	1164	1	1147	1318	-3	37.46	447.54	0
	21	5.00	-0	3	2	-2	3	2	0.00	420.95	1
	22	5.00	3	1	1	7	1	2	0.00	446.18	2
	23	5.00	1	5	-0	-0	6	-0	45.66	432.58	2
	24	5.00	-1	1	1	-2	1	1	0.00	397.77	1
	25	5.00	1	1	3	3	0	3	0.00	464.81	2
	26	5.00	9	3	-1	18	3	-1	8.11	490.25	1
	27	5.00	14	13	-2	30	14	-2	12.92	395.32	1
	28	5.00	1	0	2	3	-0	2	0.00	496.22	2
	29	5.00	26	2	1	63	-2	1	0.00	408.92	1
	30	5.00	3	3	0	5	4	0	0.00	487.01	2
	31	5.00	6	2	1	12	1	1	0.00	488.62	2
	32	5.00	5	0	2	10	-1	2	0.00	500.78	2
	33	5.00	24	9	-1	51	8	-1	14.71	485.19	1
	34	5.00	44	22	1	107	20	1	13.43	369.64	0
	35	5.00	10	5	-2	20	6	-2	22.25	521.84	1
	36	5.00	4	3	1	7	3	2	31.37	487.86	3
	37	5.00	17	10	3	32	9	3	18.44	541.92	1
#37	38	5.00	2	2	2	4	2	2	1.42	507.76	2
#5	39	5.00	1	-3	0	4	-4	0	0.00	535.89	3
#6	40	5.00	3	3	3	6	3	4	29.67	515.97	2
#8	41	5.00	3	-2	3	6	-4	3	0.00	524.08	2

****
***** GAMMA SPECTRUM ANALYSIS *****
****

Report Generated On : 3/26/07 12:30:12 PM

Sample Title : Soil
Spectrum Description :
Sample Identification : CHESAPEAKE NUC
Sample Type : Sol
Sample Geometry : Marinelli Beaker

REVIEWED BY:
3/27/07

Peak Locate Threshold : 3.00
Peak Locate Range (in channels) : 50 - 8192
Peak Area Range (in channels) : 50 - 8192
Identification Energy Tolerance : 1.000 keV

Sample Size : 1.000E+000 Grams

Sample Taken On : 3/26/07 12:15:06 PM
Acquisition Started : 3/26/07 12:15:06 PM

Live Time : 900.0 seconds
Real Time : 900.1 seconds

Energy Calibration Used Done On : 1/25/07
Efficiency Calibration Used Done On : 1/23/07

Jim

I put these 7 small bags of scrappings into a beaker + counted. Let me know if you need additional info.

Rich
3/26/07

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: Soil
Nuclide Library Used: C:\GENIE2K\CAMFILES\NORMPLUS.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/Gram)	Activity Uncertainty

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
* INTERFERENCE CORRECTED REPORT *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/Gram)	Wt mean Activity Uncertainty

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 3/26/07 12:30:11 PM
Peak Locate From Channel: 50
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
1	26.35	1.5569E-001	25.45

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

Attachment 7.0
Final Status Survey Smear Results

RSO, Inc.

Radiation Service Organization

July 10, 2007

Chesapeake Nuclear
Attn: Stewart Bland
788 Sonne Dr.
Annapolis, MD 21401

Dear Mr. Bland,

Enclosed please find the results of the 10 wipe tests received on July 2, 2007. The wipe tests were analyzed using Liquid Scintillation (LSC) counting technology. An LSC individual data results print out denoting each analysis result is attached for your review. The results of the first sample are for background determination. The wipe test analysis begins with sample location #2. Wipe test results were background deducted presenting net results. Reported analytical data indicates all activity levels below 50 dpm.

If you have any questions please do not hesitate to call me at (301) 953-2482 ext. 305 or by e-mail james.dean@rsoinc.com.

Sincerely,

James W. Dean
Manager, Radiation Safety Services – Radiation Safety Officer

Enclosure

July 2, 2007

Stewart Bland
Chesapeake Nuclear Services, Inc.
788 Sonne Dr.
Annapolis, MD 21401
USA

Dear Stewart:
The ten swipes delivered to RSO Inc. were found to be < 50dpm. The final results will be sent to you with the invoice.

Sincerely,

Mr. Richard Emmons
Laboratory Technician

REVIEWED BY:
7/06/07

Assay Definition-

Assay Description:
CHESAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\Default\Triple Lable DPM\20070702_1238.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
  Quench Indicator: tSIE/AEC
  External Std Terminator (sec): 0.5 2s%
  Pre-Count Delay (min): 0.00
Quench Sets:
  Low Energy: 3H-TOL-7-17-06
  Mid Energy: 14C-TOL-07-17-06
  High Energy: 32P-UG-02-28-05
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM
1	10.00	7	8	8	0	0	0	53.73	524.81	2
2	1.00	8	21	-2	10	25	-3	57.54	556.93	0
3	1.00	1	6	-1	-1	7	-2	101.77	552.25	0
4	1.00	3	3	-2	5	3	-3	71.39	556.11	0
5	1.00	5	5	-2	8	6	-3	31.53	544.69	0
6	1.00	-2	2	-3	-5	4	-4	587.91	480.71	0
7	1.00	-3	1	5	-8	1	6	0.00	424.99	0
8	1.00	6	10	-0	9	12	-0	33.38	563.77	0

9	1.00	14	6	-4	27	6	-5	22.48	529.99	0
10	1.00	4	2	-2	7	2	-3	64.25	531.70	0
11	1.00	-2	5	-1	-6	6	-2	120.79	547.00	0

JD 7/06/07

Attachment 8.0
Radioactive Waste Shipment Manifest

FORM 540 — Radiation Service Organization, Inc.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBER (Include Area Code): 1-800-424-9300

ORGANIZATION: Chemtrec

2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? ☑ YES ☐ NO

3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST ======> 1

4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? ☐ YES ☑ NO
If "Yes," provide Manifest Number ======>

EPA MANIFEST NUMBER

5. SHIPPER – NAME AND FACILITY
VA Medical Center
100 Emancipation Drive
Hampton, VA 23667

SHIPPER I.D. NUMBER: NA

☐ COLLECTOR
☐ PROCESSOR
☑ GENERATOR TYPE (Specify) M

NA

SHIPMENT NUMBER: 15882

CONTACT: Joe Moon

TELEPHONE NUMBER (Include Area Code): (610)873-4514

6. CARRIER – Name and Address
RSO, Inc.
5204 Minnick Road
Laurel,, MD 20707

Truck #: 96233
Trailer #: N/A

EPA I.D. NUMBER: MDD-08-927-8669

SHIPPING DATE: 06/28/2007

CONTACT: David Wellner

TELEPHONE (Include Area Code): (301)953-2482

SIGNATURE – Authorized carrier acknowledging waste receipt

DATE: 6-28-07

7. FORM 540 AND 540A — PAGE 1 OF 1 PAGE(S)
FORM 541 AND 541A — 1 PAGE(S)
FORM 542 AND 542A — None PAGE(S)
ADDITIONAL INFORMATION — None PAGE(S)

8. MANIFEST NUMBER (Use this number on all continuation pages): 15882

9. CONSIGNEE - Name and Facility
RSO, Inc.
5204 Minnick Road
Laurel, MD 20707

CONTACT: David Wellner

TELEPHONE (Include Area Code): (301)953-2482

SIGNATURE – Authorized consignee acknowledging waste receipt

DATE: 6-28-07

10. CERTIFICATION
This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

AUTHORIZED SIGNATURE

TITLE: M.D. R.SO

DATE: 6/28/07

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES	16. TOTAL PACKAGE ACTIVITY MBq	mCi	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (Use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Radioactive material, excepted package-limited quantity of material, 7, UN 2910	NA	NA	Solid Labware, Tiles	C-14 H-3	3.3337E+01	9.0100E-01	NA	~~85~~ 211 LBS; 4.1 FT3	56161

FOR CONSIGNEE USE ONLY

TENNESSEE "LICENSE FOR DELIVERY" NO _____

SOUTH CAROLINA TRANSPORT PERMIT NO _____

US ECOLOGY GENERATOR NO _____

US ECOLOGY PERMIT NO _____

20.
Dr. Chadhuri VA contact
757: 722-9961 Ext. 3528

FORM 540 (10-96)

FORM 541 | Radiation Service Organization, Inc.

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. MANIFEST TOTALS

NUMBER OF PACKAGES/ DISPOSAL CONTAINERS	NET WASTE VOLUME		NET WASTE WEIGHT		SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	Total
1	m3	0.1161	kg	38.5554	NP	NP	NP	NP
	ft3	4.1000	lb	85.0000				

ACTIVITY	ALL NUCLIDES	TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	
MBq	3.3337E+01	3.7000E-02	3.3300E+01	NP	NP	(kg)	NA
mCi	9.0100E-01	1.0000E-03	9.0000E-01	NP	NP	(lbs)	NA

2. MANIFEST NUMBER: 15882

3. PAGE 1 OF 1 PAGE(S)

4. SHIPPER NAME: VA Medical Center

SHIPMENT ID NUMBER: NA

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER							18. WASTE CLASSIFICATION AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR ID NUMBER	6. CONTAINER DESCRIPTION (See Note 1) PROCESS REQUESTED (See Note 1A) BURIAL/DISPOSITION (See Note 2A)	7. VOLUME (m3) / (ft3)	8. WASTE AND CONTAINER WEIGHT (kg) / (lb)	9. SURFACE RADIATION LEVEL (mSv/hr) / (mrem/hr)	10. SURFACE CONTAMINATION (MBq/100 cm2) / (dpm/100cm2) ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2)	12. APPROXIMATE WASTE VOLUME(S) IN CONTAINER (m3) / (FT3)	13. SOLIDIFICATION OR STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM/ CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL; OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT RADIONUCLIDES	MBq	mCi	
56161/VAMC	4 C E	0.1161	38.5554	2.0000E-04	<1.6700E-06	<1.6700E-06	33	0.1161	NA	Labware, Tiles/NP	NP	C-14	3.3300E+01	9.0000E-01	AU
		4.1000	85.0000	2.0000E-02	<1.0000E+02	<1.0000E+02		4.1000				H-3	3.7000E-02	1.0000E-03	
												Subtotal	3.3337E+01	9.0100E-01	
												Total	3.3337E+01	9.0100E-01	
Shipment Totals		0.1161	38.5554										3.3337E+01	9.0100E-01	
		4.1000	85.0000												

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural overpacks the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Process Requested

C	Compaction
SR	Steam Reforming
DI	Direct Incineration
SI	Sort & Incinerate
D	Decon
G	Green is Clean
M	Metal Melt
T	Trans-Ship
LI	Liquid for Incineration
OI	Oil for Incineration
O	Other (describe)

NOTE 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 11, or additional page

NOTE 2A: Burial/Disposition Site

B	Barnwell Waste Management
E	Envirocare
R	Richland, WA
PR	Process and Return
O	Other

Note3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume. For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 13. Code 100=NONE REQUIRED

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or additional page
100. None Required.

FORM 541 (10-96)

Enclosure 2

Additional Information Provided by Permittee to the National Health Physics Program

The National Health Physics Program (NHPP) issued a request for information (RFI) to the permittee based on an NHPP review of the report included as **Enclosure 1**. This enclosure (**Enclosure 2**) documents that request and the permittee's response. Information referenced as ***attached*** in permittee responses are provided at the end of this enclosure.

NHPP Request Item 1
Attachment 3 of the report only includes instrument calibration records for two Ludlum 43-68 probes. Please provide calibration records (showing efficiencies traceable to NIST) for the other instruments used: Ludlum Model 43-37-1, Ludlum Model 19, Liquid Scintillation Counters (wipes), and Gamma Counters (wipes).

Permittee Response to Item 1
The requested calibration records are **attached**. Please note the documentation of efficiency for the Ludlum 43-68 detector with a different cable was reported by email from RSO, Inc.; a complete re-calibration was not deemed necessary, but we did re-establish the efficiency for C-14.

NHPP Request Item 2
Wipe data (Attachments 5.0 and 6.0) need better identification. Please provide Attachments 5.0 and 6.0 with sample results that are more clearly labeled with the sample field IDs.

Permittee Response to Item 2
The number designation used by RSO, Inc., for the smear analysis reflects an incremental increase by one (1) from the number designation denoted on the survey forms. The reason for this is that the first sample designation (i.e., analysis #1) is used for establishing the system background. A cross comparison between the RSO, Inc., smear analysis numbers and those as designated on the survey forms are **attached [as Enclosure 3]**.

NHPP Request Item 3
Provide additional discussion on how/where background was established for the various surface scanning detection instruments and surveyed media. The report provides different background levels for different detector probes and different media: "sealed concrete," "ceramic tile," and "8-inch tile."

Permittee Response to Item 3
The backgrounds for the various survey media that composed the facility flooring were taken in non-impacted areas of the building. This approach is allowed by MARSSIM, where it may be difficult to find locations/facilities away from the facility under evaluation for obtaining suitable backgrounds. Additionally, when evaluating the identified elevated areas, additional consideration was given to observed increase in relative instrument response. For example, for the decontamination sink in Room 113B the left side of the surface was found to be not impacted; i.e., levels consistent with those for other non-impacted areas throughout the facility. Also once the right side of the lab table surface was broken up, we verified the background on the bottom surface of a slab that was also non-impacted. For the Lab table surface in Room 113C, the right side of the sink table was not impacted, so that was used as an indication of background for the impacted left-side surface.

NHPP Request Item 4
Provide the height above floor at which the exposure rate measurements (using Ludlum Model 19 meter) were made (1 meter is normally used). Also, the report does not include any discussion of exposure rate results in Rooms 113A, 113C, and 113D; please provide this information.

Permittee Response to Item 4
There were not chest-height gamma dose rates taken in the facility. Review of the detailed radionuclide inventory maintained for Building 72 by the VAHA RSO and his staff show no use or storage of loose gamma-emitting substances that would still be present in the facility (short-lived I-131 was used in Building 72). The gamma measurements made were all near surfaces that would most likely have exhibited long-lived gamma activity had any actually been used (e.g., hood Sink drains in the Rooms 113 Lab Complex and any other area where small or large lead pigs were found in source storage drawer). No indications of elevated gamma-emitting radionuclides were found in any part of Building 72. These surveys were precautionary in nature since one of the abandoned pigs in Room 113D was marked "Mn-54" but not as part of an official label.

NHPP Request Item 5
Comments in Attachment 1 for Room 137 mention standing liquid material in a 30-gallon drum marked as "radioactive material." Describe what was done with this material. (Has it been removed from the building/properly disposed?)

Permittee Response to Item 5
The 30-gallon drum with the standing liquid was sampled (wetted smear) during the initial survey evolution and found to be non-contaminated. Upon return for the follow-up survey, the liquid had evaporated and no sediment was observed in the bottom of the drum. The "Radioactive" Symbol on the drum was removed, as were other radioactive symbols throughout the facility.

NHPP Request Item 6
The report mentions an inaccessible area adjacent to Room 137. The inaccessible area is closed off by a wall and may have suffered fire damage in the past. No surveys were able to be performed in the area, and the radiological status of this area is unknown. Provide justification for not surveying this area for unrestricted release (i.e., certify no radioactive materials were ever used in the area) or provide survey data for the area.

Permittee Response to Item 6
The Head of Research Service [at permittee facility] has confirmed that radioactive materials were never used in the inaccessible area adjacent to Room 137.

RSO, Inc.
P.O. Box 1450
Laurel, MD 20725
(301) 953-2482

RSO Job No: 6994

Certificate of Calibration

ISSUED TO: Chesapeake Nuclear Services
788 Sonne Dr.
Annapolis, MD 21401

INSTRUMENT: LUDLUM
MODEL: 2350-1
TYPE: DATA LOGGER
SN: 129408

CONTACT: Stewart Bland
PHONE: (410) 266-9174

PO NO: Credit Card

RSO, Inc. certifies that on 01/26/2007 the above described instrument was calibrated using a radioactive source to determine the efficiency for a specific radionuclide(s) and using electronically generated pulse for the linearity. Pulsed using Ludlum S00-2, S/N 159110.

The results are tabulated below. Calibration is traceable to NIST.

Calibration Data

	RANGE	EXPECTED	OBSERVED		C.E.
AUTO		100	102	cpm	0.98
		400	400	cpm	1.00
RANGING		1000	1000	cpm	1.00
		4000	4000	cpm	1.00
SCALE		10000	10000	cpm	1.00
		40000	39900	cpm	1.00
		100000	100000	cpm	1.00
		400000	399000	cpm	1.00
			C.E. AVERAGE		1.00

Probe type(s) Probe1: PROPORTIONAL Probe2: PROPORTIONAL Probe3: *PROPORTIONAL*

MODEL	SER#	WINDOW	GEOMETRY	VOLT	ISOTOPE 1	EFF.(%)	ISOTOPE 2	EFF.(%)	ISOTOPE 3	EFF.(%)	ISOTOPE 4	EFF.(%)
43-37-1	PR145081	FIXED	CONTACT	1780	Tc99	21	C14	18				
43-68	PR148456	FIXED	CONTACT	1780	Tc99	20	C14	19				
43-68	PR148454	FIXED	CONTACT	1780	Tc99	20	C14	19				

Note: Window = OFF, Threshold = 30 (3mV).

INSTRUMENT CHECKS

1 mR/hr CHECK: N/A
BATTERY CHECK: NORMAL
CHECK SOURCE 1: N/A READING:
CHECK SOURCE 2: N/A READING:

ENVIRONMENTAL

TEMP: 21°C
PRESS: 760 mmHg
HUMID: 27 %

THE SUGGESTED RECALIBRATION DATE FOR THIS INSTRUMENT IS 01/26/2008

Calibrated By: Dewey Austin Reviewed By: Roe Cal Date: 01/26/2007

Maryland License MD 33-021-01

4235

RSO, Inc.
P.O. Box 1450
Laurel, MD 20725
(301) 953-2482

Certificate of Calibration

RSO Job No. 6793

ISSUED TO: Chesapeake Nuclear Services
788 Sonne Dr.
Annapolis, MD 21401

INSTRUMENT: LUDLUM
MODEL: 19
TYPE: MICRO R
SN: 182679

CONTACT: Stewart Bland
PHONE: (410) 266-9174

PO NO: Credit Card

RSO, Inc. certifies that on 09/19/2006 the above described instrument was calibrated in a known radiation field using 137 Cs (662 keV) beam calibrator (J.L. Shepherd Model 28-6A, S/N 10056). Electronically pulsed using Ludlum 500-2, S/N 159110.

The results are tabulated below. Calibration is traceable to NIST.

Calibration Data

	RANGE	EXPECTED	OBSERVED	C.F.
	25	5	5 • uR/hr	1.00
		20	20 • uR/hr	1.00
•	50	10	10 • uR/hr	1.00
		40	40 • uR/hr	1.00
	250	50	50 • uR/hr	1.00
		200	200 • uR/hr	1.00
	500	100	100 • uR/hr	1.00
		400	400 • uR/hr	1.00
	5000	1000	1000 uR/hr	1.00
		4000	4000 uR/hr	1.00
			C.F. AVERAGE	1.00

• Electronically pulsed.

Probe type(s) Probe1: SCINTILLATOR Probe2: Probe3:

MODEL	SER#	WINDOW	GEOMETRY	VOLT	ISOTOPE 1	EFF.(%)	ISOTOPE 2	EFF.(%)	ISOTOPE 3	EFF.(%)	ISOTOPE 4	EFF.(%)
NTERNAL		NONE	FRONT	752								

INSTRUMENT CHECKS

1 mR/hr CHECK: N/A
BATTERY CHECK: NORMAL
CHECK SOURCE 1: N/A READING:
CHECK SOURCE 2: N/A READING:

ENVIRONMENTAL

TEMP: 24°C
PRESS: 754 mmHg
HUMID: 47 %

THE SUGGESTED RECALIBRATION DATE FOR THIS INSTRUMENT IS 09/19/2007

Calibrated By: Richard Ramos Reviewed By: Cal Date: 09/19/2006

Maryland License MD-33-021-01

14819

From: Dorsey Austin [DorseyA@RSOInc.com]
Sent: Wednesday, July 18, 2007 10:22 AM
To: 'J Stewart Bland'
Subject: RE: Ludlum 2360 w/43-68 probe Efficiency

Stewart,
I checked the efficiency of your Ludlum 43-68 probe SN PR148454 using the three foot cable and found the efficiency for C-14 to be 11%.
Both meter and detector were in calibration at the time the test was performed.
Dorsey Austin
1-888-723-5463
dorseya@rsoinc.com

From: J Stewart Bland [mailto:jsbland@chesnuc.com]
Sent: Tuesday, July 17, 2007 4:16 PM
To: dorseya@rsoinc.com
Cc: jwmoon@verizon.net; bwbland@aol.com
Subject: Ludlum 2360 w/43-68 probe Efficiency

Dorsey,
During an instrument check of our Ludlum 2360 with a 43-68 probe (# PR148454) performed for Byron Bland, you provided a C-14 detection efficiency of 11% for the use of the 3 foot detector cable. Will you please formally document this efficiency. An email transmittal should be sufficient for our records.
Thanks,

J Stewart Bland, CHP

Chesapeake Nuclear Services

788 Sonne Drive
Annapolis, MD 21401
voice: 410-266-9174
fax: 410-266-5811

Enclosure 3

Annotated Version of Attachments 5.0 and 7.0 in Enclosure 1 to This Letter

(Facility response to NHPP comments in Enclosure 2, Item 2)

RSO, Inc.

Radiation Service Organization

Annotated in response for additional information

JWMoon 9-5-07

JBland 10-5-07

March 7, 2007

Chesapeake Nuclear
Attn: Stewart Bland
788 Sonne Dr.
Annapolis, MD 21401

Dear Mr. Bland,

Enclosed please find the results for the wipe tests received on February 26, 2007. The wipe tests were analyzed using Liquid Scintillation and Gamma Counters. An individual data print out for each analysis process is attached for your review. The only elevated activity indicated on the analysis reports were as follows:

Wipe test group B1-B100 found 3 wipe tests exceeding 100 but less than 300 dpm.
Wipe test group C1-C30 found 1 wipe test exceeding 100 but less than 300 dpm.

All other results indicated activity levels below 50 dpm which included the gamma test results.

If you have any questions please do not hesitate to call me at (301) 953-2482 ext. 305 or by e-mail james.dean@rsoinc.com.

Sincerely,

James W. Dean

James W. Dean
Manager, Radiation Safety Services – Radiation Safety Officer

JWD:11P

Enclosure

NIH

REVIEWED BY: JD 2/28/07

Assay Definition- A1-A100

Assay Description:
CHESAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM\20070227_0946.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H-TOL-7-17-06
Mid Energy: 14C-TOL-07-17-06
High Energy: 32P-UG-02-28-05
Count Time (min): 5.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

	S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM
Bkg	1	10.00	5	8	6	0	0	0	53.33	565.99	2
A-1	2	5.00	6	12	1	10	14	1	50.09	507.24	1
	3	5.00	2	5	-1	3	6	-1	78.46	512.01	1
	4	5.00	1	1	1	2	1	1	66.19	476.71	1
	5	5.00	3	3	2	5	3	3	49.74	467.57	1
	6	5.00	5	4	2	8	4	2	60.15	573.07	0
	7	5.00	1	5	0	1	5	-0	75.54	427.61	1
	8	5.00	0	0	2	1	-0	3	164.69	462.19	1
A-8	9	5.00	1	3	1	2	4	1	1.62	306.19	4

Protocol# 1 - Triple Lable DPM.lsa

User: NIH

NIH

L-D

A-9 ↓

10	5.00	0	1	1	0	1	2	84.37	411.28	1
11	5.00	3	2	-1	5	2	-2	43.92	479.24	1
12	5.00	-0	3	2	-1	3	3	103.07	466.05	1
13	5.00	-1	1	0	-3	1	-0	0.00	426.18	2
14	5.00	-3	2	1	-6	2	1	0.00	425.05	2
15	5.00	1	2	0	2	3	0	76.50	463.16	1
16	5.00	-1	3	-0	-3	4	-0	162.91	474.31	1
17	5.00	3	2	2	6	2	3	37.19	470.20	1
18	5.00	-1	3	3	-3	3	3	121.02	435.72	1
19	5.00	-1	2	2	-2	2	2	70.56	412.71	1
20	5.00	-1	3	1	-2	3	1	131.99	463.25	1
21	5.00	-1	3	1	-4	4	2	75.56	443.58	1
22	5.00	-2	0	-1	-5	1	-1	0.00	385.77	2
23	5.00	-2	4	-1	-9	6	-1	50.56	300.45	4
24	5.00	-1	2	0	-4	3	0	0.00	336.11	1
25	5.00	1	4	-0	0	5	-0	48.35	476.27	1
26	5.00	-2	5	2	-6	6	2	77.54	401.47	1
27	5.00	-1	1	1	-2	1	2	191.16	464.66	3
28	5.00	-1	4	-0	-3	4	-0	121.77	450.80	1
29	5.00	1	1	0	1	1	-0	85.65	444.69	1
30	5.00	-2	1	1	-4	2	1	0.00	434.83	2
31	5.00	-1	1	3	-2	1	4	0.00	457.58	3
32	5.00	-2	3	1	-5	4	1	165.62	440.46	1
33	5.00	1	2	2	2	1	2	42.15	473.72	1
34	5.00	-1	3	1	-3	3	1	94.86	445.94	1
35	5.00	0	1	1	0	1	1	26.39	467.69	1
36	5.00	1	2	4	2	1	4	49.53	478.99	1
37	5.00	0	2	2	-0	2	2	58.39	495.99	1
38	5.00	3	4	-1	4	4	-1	73.24	582.81	1
39	5.00	1	-0	-1	1	-0	-1	202.71	530.46	1
40	5.00	-1	2	-1	-2	3	-1	154.80	477.57	1
41	5.00	-0	3	1	-2	4	2	145.75	474.29	1
42	5.00	-0	0	1	-0	-0	1	0.00	450.80	1
43	5.00	-1	3	1	-3	4	1	164.44	482.72	1
44	5.00	-1	3	1	-2	3	2	106.80	482.94	1
45	5.00	1	1	2	2	0	2	92.63	469.04	3
46	5.00	2	1	1	4	1	2	41.37	468.06	2
47	5.00	-0	3	0	-2	4	-0	68.89	444.83	1
48	5.00	1	3	1	1	4	1	30.16	468.23	2
49	5.00	1	2	1	2	2	1	49.21	449.88	1
50	5.00	-0	1	-0	-1	2	-0	0.00	437.52	3
51	5.00	-2	2	1	-5	2	2	221.76	361.44	3
52	5.00	0	1	3	0	1	4	69.25	467.47	1
53	5.00	-0	1	1	-1	1	1	0.00	464.38	3
54	5.00	-1	0	3	-1	-0	4	0.00	410.80	2
55	5.00	0	3	1	-0	4	1	33.72	456.61	9
56	5.00	1	5	-0	2	5	-0	52.90	463.19	1
57	5.00	3	3	1	5	3	2	58.61	503.89	1
58	5.00	-0	5	3	-2	5	3	78.08	428.75	2
59	5.00	-0	2	3	-1	1	4	345.52	470.79	1
60	5.00	1	2	2	1	2	2	148.95	531.00	1
61	5.00	1	4	3	1	4	3	35.79	422.45	2
62	5.00	-1	2	0	-3	2	-0	235.67	424.77	1
63	5.00	-0	2	1	-0	2	1	189.44	448.19	3
64	5.00	-0	1	1	-1	2	1	9.18	444.92	3
65	5.00	1	3	1	0	3	1	43.93	444.11	2
66	5.00	1	-0	1	2	-1	2	0.00	470.64	1
67	5.00	-0	2	2	-1	2	2	45.66	445.41	1
68	5.00	0	4	-0	-1	5	-0	52.53	485.27	2
69	5.00	1	3	1	1	3	1	44.72	493.74	1
70	5.00	-1	1	2	-2	1	2	0.00	359.14	1
71	5.00	-2	1	2	-4	1	2	0.00	493.28	3

↓ A70

Protocol# 1 - Triple Lable DPM.lsa

User: NIH

NIH

A-71	72	5.00	-1	1	1	-2	1	1	0.00	443.49	3
↓	73	5.00	-1	3	1	-3	3	1	92.85	489.84	3
	74	5.00	2	2	1	4	2	1	67.75	500.40	1
	75	5.00	-0	4	-0	-1	5	-0	45.08	447.97	1
	76	5.00	-0	-1	-0	-1	-1	-0	0.00	474.57	2
	77	5.00	2	5	0	3	5	0	46.56	451.32	2
	78	5.00	1	2	2	2	2	2	95.41	506.63	1
	79	5.00	2	7	-0	3	8	-1	59.05	528.17	1
	80	5.00	1	4	-2	-0	6	-2	95.06	501.81	1
	81	5.00	1	2	0	2	2	0	96.76	493.99	2
	82	5.00	0	5	2	-1	6	2	65.41	440.00	1
	83	5.00	-0	2	2	-1	2	2	72.39	462.11	1
	84	5.00	1	0	1	3	0	1	80.30	481.03	1
	85	5.00	2	1	1	4	1	2	54.60	475.36	1
	86	5.00	-0	2	1	-1	3	1	61.02	455.60	3
	87	5.00	1	5	1	-0	6	1	70.80	470.08	2
	88	5.00	1	-0	-1	2	-0	-1	335.18	476.39	1
	89	5.00	-2	1	2	-4	0	3	0.00	495.81	2
	90	5.00	1	2	3	1	2	4	73.47	387.85	1
	91	5.00	-0	0	1	-1	0	1	0.00	444.24	2
	92	5.00	1	1	4	2	1	5	0.00	419.76	1
	93	5.00	-1	3	1	-2	3	1	125.54	448.79	1
	94	5.00	-0	2	3	-2	2	4	97.02	449.34	1
	95	5.00	2	1	0	4	1	0	7.35	502.13	1
	96	5.00	0	3	2	-0	4	2	99.12	435.06	1
	97	5.00	2	2	0	5	2	0	32.94	440.45	1
	98	5.00	-0	5	2	-3	6	3	62.61	462.34	2
↓	99	5.00	1	2	1	2	2	1	11.40	488.29	1
	100	5.00	-1	2	0	-3	2	0	120.26	439.24	1
A-100	101	5.00	0	1	3	0	0	4	117.61	522.56	1

CHESAPEAKE NUCLEAR
Count Time(minutes): 1.00
Assay Type: CPM
Background Subtract : IPA Bkg
Outlier: 5.0 FLAG
%Spillup: 0.00
%Spilldown: 0.00
Screening: OFF

REVIEWED BY: LD 2/28/07

	Window A		Window B		Window C	
Nuclide:	I-125	15 - 75 keV	Co-57	75 - 165 keV	MAN	15 - 2000 keV
Bkg:	24.7		29.2		229	
Sigma:	0.00		0.00		2.00	
LCR:	0		0		0	
Half Life(hours):	0.00		0.00			
Multiplier:	1.0000					
%CV Flag Limit:	0.00		0.00			

S#	A:CPM	A:%SIG	B:CPM	B:%SIG	C:CPM	C:%SIG
1	0.0		0.0		0.0	
2	0.0		0.0		0.0	
3	0.0		0.0		0.0	
4	4.3	48.5	5.8	41.5	20.7	22.0
5	0.0		0.0		0.0	
6	2.3	66.5	10.8	30.4	25.7	19.7
7	2.3	66.5	0.8	112	0.0	
8	3.3	55.4	6.8	38.3	19.7	22.5
9	0.0		0.0		11.7	29.2
10	11.3	29.8	0.0		8.7	33.9
11	0.0		3.8	51.3	1.7	76.7

(24A) ← Compare 90 sec

EDITDATA.D07 Archived to C:\ARCH\ARCH07D.183
C:\DATA\P7DATA Copied to C:\DATA\ARCH07A.183

26 Feb 07 14:19:18 Packard Model 5003 COBRA SN: 424559

PROTOCOL # 7
SWIPES
CHESAPEAKE NUCLEAR
COUNT TIME 1.00 Minutes

Window A		Window B		Window C	
LLD:	15 keV	LLD:	75 keV	LLD:	15 keV
ULD:	75 keV	ULD:	165 keV	ULD:	2000 keV
EFF:	79 %	EFF:	85 %	EFF:	70 %

Sample #	A:CPM	A:DPM	B:CPM	B:DPM	C:CPM	C:DPM
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	4	5	6	7	21	30
5	0	0	0	0	0	0

	6	2	3	11	13	26	37
	7	2	3	1	1	0	0
	8	3	4	7	8	20	28
	9	0	0	0	0	12	17
	10	11	14	0	0	9	12
(24A)	11	0	0	4	4	2	2

2D

REVIEWED BY:
2D 2/28/07

Assay Definition- B1-B100

Assay Description:
CHESAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\Default\Triple Lable DPM\20070227_2036.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H-TOL-7-17-06
Mid Energy: 14C-TOL-07-17-06
High Energy: 32P-UG-02-28-05
Count Time (min): 5.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

	S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM
BKg	1	10.00	5	9	7	0	0	0	58.17	508.25	1
B-1	2	5.00	-1	3	1	-3	4	1	55.31	412.81	1
↓	3	5.00	-0	2	-2	-2	3	-2	24.80	341.97	1
	4	5.00	0	1	-1	-0	2	-1	122.67	421.97	1
	5	5.00	0	2	1	1	2	1	36.35	413.85	1
	6	5.00	-0	1	-1	-1	2	-1	72.87	399.09	0
	7	5.00	-0	-1	0	-0	-1	0	0.00	446.69	2
B-7	8	5.00	1	5	1	0	5	1	47.45	425.83	2

Protocol# 2 - Triple Lable DPM.lsa User: Default

JD

B8	9	5.00	3	2	-0	7	2	-0	19.43	434.03	0
↓	10	5.00	142	206	-2	281	230	-3	30.40	409.51	0
	11	5.00	8	3	-1	16	2	-1	18.35	473.41	1
	12	5.00	51	50	0	110	52	0	28.44	407.61	0
	13	5.00	1	3	-1	3	4	-2	13.19	377.05	1
	14	5.00	-1	2	0	-2	3	0	105.23	434.40	1
	15	5.00	-0	4	0	-1	5	0	83.34	460.97	1
	16	5.00	6	3	1	11	3	1	33.28	523.38	1
	17	5.00	1	1	-2	1	1	-2	64.50	486.01	1
	18	5.00	-1	5	-1	-3	6	-1	5.34	349.32	1
	19	5.00	1	1	0	2	1	0	24.07	432.31	1
	20	5.00	2	1	-0	4	1	-0	0.00	438.26	0
	21	5.00	3	13	-1	4	15	-1	52.15	474.39	1
	22	5.00	1	1	1	2	1	1	78.77	483.19	1
	23	5.00	3	1	-0	6	1	-0	42.17	503.43	1
	24	5.00	0	2	-1	-0	3	-1	33.62	494.81	1
	25	5.00	2	2	-2	4	2	-2	49.92	467.97	1
	26	5.00	-1	3	-1	-4	4	-1	113.45	442.71	1
	27	5.00	3	1	-2	8	1	-3	19.30	463.06	1
	28	5.00	1	-1	-1	2	-1	-1	0.00	468.02	1
	29	5.00	1	0	0	2	-0	0	0.00	470.18	1
	30	5.00	0	4	-1	-1	5	-1	146.34	511.65	1
	31	5.00	7	10	-1	12	11	-1	28.84	484.54	1
	32	5.00	0	-0	1	1	-1	1	0.00	417.74	6
	33	5.00	2	4	-0	2	4	-0	51.23	450.98	1
	34	5.00	1	2	-2	1	3	-2	94.08	519.56	1
	35	5.00	1	2	-0	1	2	-0	57.04	472.85	1
	36	5.00	1	3	-1	1	4	-1	87.59	502.18	1
	37	5.00	1	3	-0	2	3	-0	54.79	446.92	1
	38	5.00	0	2	-0	-0	2	-0	0.00	438.78	1
	39	5.00	-0	1	-0	-0	1	-0	84.06	389.94	1
	40	5.00	62	46	0	124	47	0	23.22	476.51	0
	41	5.00	29	21	-1	64	22	-1	21.87	407.33	0
	42	5.00	2	3	0	2	3	0	51.82	521.94	1
	43	5.00	1	1	2	2	0	3	0.00	435.47	0
	44	5.00	0	-0	-1	1	0	-1	0.00	443.59	1
	45	5.00	0	-2	0	2	-2	0	0.00	478.42	0
	46	5.00	-0	6	1	-3	7	1	57.52	464.18	1
	47	5.00	1	-1	-1	2	-1	-1	0.00	447.53	1
	48	5.00	-1	2	0	-3	2	0	474.48	517.93	1
	49	5.00	0	1	-0	-0	1	-0	0.00	450.99	1
	50	5.00	1	1	-2	2	1	-2	122.44	428.73	1
	51	5.00	-1	1	-4	-2	3	-5	63.13	464.40	1
	52	5.00	-1	3	-1	-4	4	-1	0.00	415.69	1
	53	5.00	0	1	0	1	1	0	140.84	441.55	1
	54	5.00	-1	2	-1	-3	3	-1	0.00	427.46	1
	55	5.00	2	-0	0	4	-1	0	0.00	447.01	1
	56	5.00	-2	1	1	-5	2	1	0.00	491.88	2
	57	5.00	-1	2	-1	-2	3	-1	203.66	440.31	1
	58	5.00	0	0	1	1	-0	1	0.00	450.53	1
	59	5.00	1	5	-3	1	7	-4	54.76	434.20	1
	60	5.00	1	1	-1	2	1	-1	45.40	458.36	1
	61	5.00	0	5	-1	-1	6	-1	68.51	493.39	1
	62	5.00	-0	2	-1	-1	3	-1	0.00	459.26	1
	63	5.00	1	1	-1	2	2	-2	67.41	517.56	1
	64	5.00	0	2	-1	-0	2	-1	13.34	441.37	1
	65	5.00	0	2	-1	-0	3	-1	83.79	505.13	1
	66	5.00	1	1	-0	1	1	-0	93.19	450.49	1
	67	5.00	-0	2	-1	-1	3	-1	134.52	466.33	1
	68	5.00	-0	1	-1	-1	1	-1	0.00	440.87	1
	69	5.00	1	-1	-0	2	-2	-0	0.00	472.70	2
B69	70	5.00	-1	1	-1	-2	1	-1	0.00	425.86	1

Protocol# 2 - Triple Lable DPM.lsa User: Default

B70	71	5.00	0	2	-1	-1	3	-1	87.94	428.66	1
↓	72	5.00	1	3	-1	0	4	-1	71.82	499.38	0
	73	5.00	0	-1	-2	1	-1	-2	0.00	411.42	2
	74	5.00	0	-2	-2	2	-3	-2	0.00	533.90	2
	75	5.00	1	1	1	1	1	1	0.00	450.96	1
	76	5.00	2	0	-1	4	0	-1	0.00	504.50	0
	77	5.00	-0	-2	3	-0	-3	4	0.00	447.94	2
	78	5.00	1	0	-0	2	0	-0	0.00	426.97	0
	79	5.00	1	-0	-1	3	-0	-1	57.46	456.95	1
	80	5.00	1	0	-0	3	-0	-0	95.80	472.18	1
	81	5.00	3	1	-1	5	2	-1	46.91	486.01	1
	82	5.00	1	0	-1	3	0	-1	115.79	516.21	1
	83	5.00	-0	-1	2	-0	-1	3	0.00	459.62	2
	84	5.00	1	1	-2	3	1	-2	0.00	448.96	3
	85	5.00	-1	2	-3	-3	4	-4	73.83	449.59	1
	86	5.00	-0	3	-1	-1	3	-1	152.77	472.92	3
	87	5.00	-1	1	-1	-2	2	-1	19.66	464.82	1
	88	5.00	0	4	-1	-0	5	-1	99.37	457.58	1
	89	5.00	0	1	1	0	1	2	167.56	472.50	1
	90	5.00	-0	4	2	-2	5	2	124.60	464.35	2
	91	5.00	1	-0	1	2	-0	1	0.00	546.07	1
	92	5.00	-1	1	3	-3	1	3	0.00	478.54	3
	93	5.00	2	1	1	5	0	1	9.28	472.60	2
	94	5.00	1	2	2	1	2	2	74.00	453.37	1
	95	5.00	0	1	-1	0	1	-1	16.18	451.53	3
	96	5.00	3	0	2	6	-1	3	57.03	498.04	1
	97	5.00	1	2	2	3	1	3	13.89	479.78	1
	98	5.00	2	-1	-2	4	-1	-2	0.00	503.45	1
	99	5.00	1	-0	3	2	-2	4	0.00	448.46	3
	100	5.00	0	1	-1	-0	1	-1	137.03	452.35	3
B100	101	5.00	0	3	-1	-1	4	-1	54.32	441.07	0

Protocol #: 7 SWIPES 1B – 100B User : Lab Technicia

CHESAPEAKE NUCLEAR
Count Time(minutes): 1.00
Assay Type: CPM
Background Subtract : IPA Bkg
Outlier: 5.0 FLAG
%Spillup: 0.00
%Spilldown: 0.00
Screening: OFF

REVIEWED BY: JD 2/28/07

	Window A		Window B		Window C	
Nuclide:	I-125	15 - 75 keV	Co-57	75 - 165 keV	MAN	15 - 2000 keV
Bkg:	24.7		29.2		229	
Sigma:	0.00		0.00		2.00	
LCR:	0		0		0	
Half Life(hours):	0.00		0.00			
Multiplier:	1.0000					
%CV Flag Limit:	0.00		0.00			

composite gamma

S#	A:CPM	A:%SIG	B:CPM	B:%SIG	C:CPM	C:%SIG
1	1.3	89.1	0.0		0.0	
2	0.3	196	5.8	41.5	1.7	76.7
3	0.0		0.0		10.7	30.6
4	0.0		1.8	74.5	0.0	
5	2.3	66.5	22.8	20.9	33.7	17.2
6	0.0		2.8	59.8	39.7	15.9
7	0.0		0.8	112	4.7	46.1
8	5.3	43.6	6.8	38.3	15.7	25.2
9	5.3	43.6	7.8	35.8	24.7	20.1
10	10.3	31.2	5.8	41.5	38.7	16.1
(31B) 11	0.0		0.0		0.0	

EDITDATA.D07 Archived to C:\ARCH\ARCH07D.185
C:\DATA\P7DATA Copied to C:\DATA\ARCH07A.185

28 Feb 07 14:41:17 Packard Model 5003 COBRA SN: 424559

PROTOCOL # 7
SWIPES
CHESAPEAKE NUCLEAR
COUNT TIME 1.00 Minutes

Window A		Window B		Window C	
LLD:	15 keV	LLD:	75 keV	LLD:	15 keV
ULD:	75 keV	ULD:	165 keV	ULD:	2000 keV
EFF:	29 %	EFF:	65 %	EFF:	70 %

Sampl:

#	A:CPM	A:DPM	B:CPM	B:DPM	C:CPM	C:DPM
1	1	2	0	0	0	0
2	0	0	6	7	2	2
3	0	0	0	0	11	15
4	0	0	2	2	0	0
5	2	3	23	27	34	48

	6	0	0	3	3	40	56
	7	0	0	1	1	5	7
	8	5	7	7	8	16	22
	9	5	7	8	9	25	35
	10	10	13	6	7	39	55
(31B)	11	0	0	0	0	0	0

28

NIH

REVIEWED BY: 2/28/07

Assay Definition- C1-C30

Assay Description:
CHESAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM\20070228_0727.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H-TOL-7-17-06
Mid Energy: 14C-TOL-07-17-06
High Energy: 32P-UG-02-28-05
Count Time (min): 5.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

	S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM
BKG	1	10.00	5	8	6	0	0	0	57.03	557.01	1
IC	2	5.00	0	1	0	-0	1	0	94.29	462.46	1
↓	3	5.00	0	3	1	-0	4	2	23.18	445.34	1
	4	5.00	-1	5	2	-3	6	3	68.50	498.42	2
	5	5.00	0	0	-1	0	1	-1	67.14	536.01	1
	6	5.00	-1	2	1	-3	2	2	165.05	401.30	3
	7	5.00	-1	1	2	-4	1	2	0.00	453.80	2
	8	5.00	0	2	-0	0	3	-0	4.01	466.14	1
QC	9	5.00	0	2	1	0	3	1	49.20	447.97	0

Protocol# 1 - Triple Lable DPM.lsa

User: NIH

NIH

28

9C ↓	10	5.00	-1	3	-0	-2	3	-0	14.28	435.11	0
	11	5.00	-1	0	-0	-3	1	-0	0.00	467.48	2
	12	5.00	2	1	1	4	1	1	68.81	496.99	1
	13	5.00	2	3	2	4	3	2	24.20	494.78	1
	14	5.00	-2	2	0	-4	3	0	291.31	485.55	1
	15	5.00	-0	3	-1	-1	4	-1	98.21	526.58	1
	16	5.00	0	1	2	0	1	3	100.05	473.52	1
	17	5.00	-1	3	1	-3	4	1	15.83	409.92	1
	18	5.00	0	3	0	-0	4	0	43.64	419.27	1
	19	5.00	0	2	1	-0	3	2	88.34	508.49	1
	20	5.00	-2	4	1	-6	5	1	109.70	469.81	1
	21	5.00	1	1	1	1	1	1	26.30	493.88	0
	22	5.00	-0	5	2	-2	5	2	81.71	457.87	1
	23	5.00	-0	3	1	-2	3	1	82.78	485.97	1
	24	5.00	0	2	0	0	2	0	131.77	525.48	1
	25	5.00	-0	0	1	-0	-0	2	0.00	365.34	1
	26	5.00	-0	4	0	-2	4	0	60.47	400.52	1
	27	5.00	0	8	2	-2	10	2	49.10	436.35	1
	28	5.00	4	15	1	5	17	1	51.71	443.39	1
	29	5.00	12	20	0	21	23	-0	37.18	451.32	0
	30	5.00	124	176	0	226	195	-1	37.13	474.19	0
30C	31	5.00	-0	4	0	-1	4	0	56.09	451.11	1

Protocol #: 7 SWIPES IC-30C User : Lab Technician

CHESAPEAKE NUCLEAR
Count Time(minutes): 1.00
Assay Type: CPM
Background Subtract : IPA Bkg
Outlier: 5.0 FLAG
%Spillup: 0.00
%Spilldown: 0.00
Screening: OFF

REVIEWED BY: 2/28/07

	Window A		Window B		Window C	
Nuclide:	I-125	15 - 75 keV	Co-57	75 - 165 keV	MAN	15 - 2000 keV
Bkg:	24.7		29.2		229	
Sigma:	0.00		0.00		2.00	
LCR:	0		0		0	
Half Life(hours):	0.00		0.00			
Multiplier:	1.0000					
%CV Flag Limit:	0.00		0.00			

S#	A:CPM	A:%SIG	B:CPM	B:%SIG	C:CPM	C:%SIG
1	0.0		2.8	59.8	0.0	
2	0.0		0.0		0.0	
3	0.0		0.8	112	0.0	

EDITDATA.D07 Archived to C:\ARCH\ARCH07D.184
C:\DATA\P7DATA Copied to C:\DATA\ARCH07A.184

26 Feb 07 14:35:40 Packard Model 5003 COBRA SN: 424559

PROTOCOL # 7
SWIPES
CHESAPEAKE NUCLEAR
COUNT TIME 1.00 Minutes

Window A		Window B		Window C	
LLD:	15 keV	LLD:	75 keV	LLD:	15 keV
ULD:	75 keV	ULD:	165 keV	ULD:	2000 keV
EFF:	79 %	EFF:	85 %	EFF:	70 %

Sample #	A:CPM	A:DPM	B:CPM	B:DPM	C:CPM	C:DPM
1	0	0	3	3	0	0
2	0	0	0	0	0	0
3	0	0	1	1	0	0

RSO, Inc.

Radiation Service Organization

Annotated in response to request for additional information
JW Mean 9-5-07
JS Bland 10-5-07

March 27, 2007

Chesapeake Nuclear
Attn: Stewart Bland
788 Sonne Dr.
Annapolis, MD 21401

Dear Mr. Bland,

Enclosed please find the results for the wipe tests received on March 26, 2007. The wipe tests were analyzed using Liquid Scintillation, Gamma Counters and Gamma Spectroscopy. An individual data print out for each analysis process is attached for your review. The only elevated activity indicated on the analysis reports were as follows:

⇒ Note: Range of wipe test group is 3C through 67C.

Wipe test group 3C to 67C (37 wipe tests) found 3 wipe tests exceeding 100 and 2 wipe tests exceeding 1,000 dpm. Please review attached beta-gamma LSC data results for activity concentrations.

Analysis of swabs 5, 6 & 8 found no activity exceeding 10 dpm.
Please review attached beta-gamma LSC data results for activity concentrations.

Wipe tests were Gamma counted and analysis results indicated all activity levels below 50 dpm. Please review attached gamma data results for activity concentrations.

Gamma spec analysis of scrapings received within 7 small bags found no spectrum outside of normal background.

If you have any questions please do not hesitate to call me at (301) 953-2482 ext. 305 or by e-mail james.dean@rsoinc.com.

Sincerely,

James W. Dean

James W. Dean
Manager, Radiation Safety Services – Radiation Safety Officer

Enclosure

CHAIN-OF-CUSTODY RECORD

INSTALLATION _____ PROJECT NO. _____

PROJECT OFFICER _____

PACKED BY Byron Bloand

DATE SAMPLED	FIELD IDENTIFICATION NUMBER	C of C NUMBER	SAMPLE TYPE	COMP	GRAB	TOTAL #	SAMPLE PARAMETER: Liquid Scin	SAMPLE PARAMETER: Qualitative gamma spec
* 3-22-07	31c - 67c		Smear			36	✓	
3-22-07	113 & 113B		Scrappings			7		✓ ← collectively ; 1 γ-spec analysis
~~3-22-07~~	~~5, 6, 8 B+D~~		6 + 1 smear					
3-22-07	5, 6, 8		Swab			3	✓	

REMARKS

* 37 NOT 36 RE

CHESAPEAKE NUCLEAR
Count Time(minutes): 1.00
Assay Type: CPM
Background Subtract : IPA Bkg
Outlier: 5.0 FLAG
%Spillup: 0.00
%Spilldown: 0.00
Screening: OFF

REVIEWED BY: 3/27/07

	Window A		Window B		Window C	
Nuclide:	I-125	15 - 75 keV	Co-57	75 - 165 keV	MAN	15 - 2000 keV
Bkg:	23.1		26.7		210	
Sigma:	0.00		0.00		2.00	
LCR:	0		0		0	
Half Life(hours):	0.00		0.00			
Multiplier:	1.0000					
%CV Flag Limit:	0.00		0.00			

Gamma of wax scrapings

S#	A:CPM	A:%SIG	B:CPM	B:%SIG	C:CPM	C:%SIG
1	1.9	72.2	0.0		0.0	
2	9.9	31.8	2.3	65.4	6.2	40.2
3	3.9	50.5	3.3	54.7	15.2	26.6
4	0.0		3.3	54.7	20.2	22.2
5	0.0		3.3	54.7	21.2	21.7
6	11.9	29.0	6.3	39.7	41.2	15.6
7	0.0		0.3	171	6.2	40.2

EDITDATA.D07 Archived to C:\ARCH\ARCH07D.191
C:\DATA\P7DATA Copied to C:\DATA\ARCH07A.191

26 Mar 07 14:10:59 Packard Model 5003 COBRA SN: 424559

PROTOCOL # 7
SWIPES
CHESAPEAKE NUCLEAR
COUNT TIME 1.00 Minutes

Window A		Window B		Window C	
LLD:	15 keV	LLD:	75 keV	LLD:	15 keV
ULD:	75 keV	ULD:	165 keV	ULD:	2000 keV
EFF:	79 %	EFF:	85 %	EFF:	70 %

Sample #	A:CPM	A:DPM	B:CPM	B:DPM	C:CPM	C:DPM
1	2	2	0	0	0	0
2	10	13	2	3	6	9
3	4	5	3	4	15	22
4	0	0	3	4	20	29
5	0	0	3	4	21	30
6	12	15	6	7	41	59
7	0	0	0	0	6	9

REVIEWED BY:
JD 3/27/07

Assay Definition-

Assay Description:
CHEASAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\NIH\Triple Lable DPM\20070326_1554.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H-TOL-7-17-06
Mid Energy: 14C-TOL-07-17-06
High Energy: 32P-UG-02-28-05
Count Time (min): 5.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM
BKG-1	10.00	6	11	6	0	0	0	68.71	527.52	2
#1 2	5.00	1	-2	3	2	-3	3	0.00	490.83	4
3	5.00	1	-2	-1	4	-2	-1	0.00	497.42	4
3IC 4	5.00	0	1	1	0	1	2	0.00	481.85	2
5	5.00	1	0	2	2	-0	3	0.00	505.94	2
6	5.00	0	0	1	1	-0	1	0.00	497.94	2
7	5.00	1	7	3	0	7	4	47.92	456.63	2
8	5.00	1	2	1	1	3	2	0.00	502.96	2
38C 9	5.00	0	4	3	-0	4	3	17.25	464.03	2

NIH

39C	10	5.00	0	1	2	0	1	2	0.00	470.50	2
	11	5.00	-1	1	1	-2	2	1	0.00	473.34	3
↓	12	5.00	0	2	2	-0	2	2	0.00	422.26	2
	13	5.00	-1	-1	5	-2	-2	6	0.00	498.13	3
43C	14	5.00	2426	4726	5	3998	5389	-16	41.30	482.06	0 } Sink Top
44C	15	5.00	100	162	3	168	182	3	41.74	518.21	0 } 113 B
45C	16	5.00	129	168	3	237	184	3	35.88	481.58	0 }
	17	5.00	5	5	2	11	5	3	4.24	408.48	1
↓	18	5.00	0	4	2	-1	5	2	40.89	407.03	2
	19	5.00	9	12	4	16	12	4	23.53	457.51	1
49C	20	5.00	649	1164	1	1147	1318	-3	37.46	447.54	0 Speed Concentrator
	21	5.00	-0	3	2	-2	3	2	0.00	420.95	1 (internals) 113A
↓	22	5.00	3	1	1	7	1	2	0.00	446.18	2
	23	5.00	1	5	-0	-0	6	-0	45.66	432.58	2
	24	5.00	-1	1	1	-2	1	1	0.00	397.77	1
	25	5.00	1	1	3	3	0	3	0.00	464.81	2
	26	5.00	9	3	-1	18	3	-1	8.11	490.25	1
	27	5.00	14	13	-2	30	14	-2	12.92	395.32	1
	28	5.00	1	0	2	3	-0	2	0.00	496.22	2
	29	5.00	26	2	1	63	-2	1	0.00	408.92	1
	30	5.00	3	3	0	5	4	0	0.00	487.01	2
	31	5.00	6	2	1	12	1	1	0.00	488.62	2
	32	5.00	5	0	2	10	-1	2	0.00	500.78	2
	33	5.00	24	9	-1	51	8	-1	14.71	485.19	1 Rm 113C
	34	5.00	44	22	1	107	20	1	13.43	369.64	0 } Pre-decon
	35	5.00	10	5	-2	20	6	-2	22.25	521.84	1 } Refrigerator
	36	5.00	4	3	1	7	3	2	31.37	487.86	3 } (internals)
66C	37	5.00	17	10	3	32	9	3	18.44	541.92	1 }
#57	38	5.00	2	2	2	4	2	2	1.42	507.76	2 Rm 113D sink top
#5	39	5.00	1	-3	0	4	-4	0	0.00	535.89	3 } left side
#6	40	5.00	3	3	3	6	3	4	29.67	515.97	2 } Drain
#8	41	5.00	3	-2	3	6	-4	3	0.00	524.08	2 } Swabs

67C

****
***** GAMMA SPECTRUM ANALYSIS *****
****

Report Generated On : 3/26/07 12:30:12 PM

Sample Title : Soil
Spectrum Description :
Sample Identification : CHESAPEAKE NUC
Sample Type : Sol
Sample Geometry : Marinelli Beaker

REVIEWED BY:
LD 3/27/07

Peak Locate Threshold : 3.00
Peak Locate Range (in channels) : 50 - 8192
Peak Area Range (in channels) : 50 - 8192
Identification Energy Tolerance : 1.000 keV

Sample Size : 1.000E+000 Grams

Sample Taken On : 3/26/07 12:15:06 PM
Acquisition Started : 3/26/07 12:15:06 PM

Live Time : 900.0 seconds
Real Time : 900.1 seconds

Energy Calibration Used Done On : 1/25/07
Efficiency Calibration Used Done On : 1/23/07

Note: Scrapings were wax surface over contaminated linoleum floor tiles Rm 113 and 113B

Jim

I put these 7 small bags of scrappings into a beaker & counted. Let me know if you need additional info.

unknown & 113B

Rich
3/26/07

****
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
****

Sample Title: Soil
Nuclide Library Used: C:\GENIE2K\CAMFILES\NORMPLUS.NLB

..... IDENTIFIED NUCLIDES .....

Nuclide Name	Id Confidence	Energy (keV)	Yield (%)	Activity (pCi/Gram)	Activity Uncertainty

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.30
Errors quoted at 2.000 sigma

****
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
****

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/Gram)	Wt mean Activity Uncertainty

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 3/26/07 12:30:11 PM
Peak Locate From Channel: 50
Peak Locate To Channel: 8192

Peak No.	Energy (keV)	Peak Size in Counts per Second	Peak CPS % Uncertainty
1	26.35	1.5569E-001	25.45

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 2.000 sigma

RSO, Inc.

Radiation Service Organization

Annotated in response to request for additional information
JW Moon 9-5-07
JS Bland 10-5-07

July 10, 2007

Chesapeake Nuclear
Attn: Stewart Bland
788 Sonne Dr.
Annapolis, MD 21401

Dear Mr. Bland,

Enclosed please find the results of the 10 wipe tests received on July 2, 2007. The wipe tests were analyzed using Liquid Scintillation (LSC) counting technology. An LSC individual data results print out denoting each analysis result is attached for your review. The results of the first sample are for background determination. The wipe test analysis begins with sample location #2. Wipe test results were background deducted presenting net results. Reported analytical data indicates all activity levels below 50 dpm.

If you have any questions please do not hesitate to call me at (301) 953-2482 ext. 305 or by e-mail james.dean@rsoinc.com.

Sincerely,

James W. Dean

James W. Dean
Manager, Radiation Safety Services – Radiation Safety Officer

Enclosure

July 2, 2007

Stewart Bland
Chesapeake Nuclear Services, Inc.
788 Sonne Dr.
Annapolis, MD 21401
USA

Dear Stewart:
The ten swipes delivered to RSO Inc. were found to be < 50dpm. The final results will be sent to you with the invoice.

Sincerely,

Mr. Richard Emmons
Laboratory Technician

REVIEWED BY:
7/06/07

Assay Definition-

Assay Description:
CHESAPEAKE NUCLEAR

Assay Type: DPM (Triple)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\Triple Lable DPM
Raw Results Path: C:\Packard\Tricarb\Results\Default\Triple Lable DPM\20070702_1238.results
Assay File Name: C:\Packard\TriCarb\Assays\Triple Lable DPM.lsa

Count Conditions-

Nuclide: Triple Label
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 0.5 2s%
Pre-Count Delay (min): 0.00
Quench Sets:
Low Energy: 3H-TOL-7-17-06
Mid Energy: 14C-TOL-07-17-06
High Energy: 32P-UG-02-28-05
Count Time (min): 1.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Background Subtract: On - 1st Vial
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL	Bkg Subtract
A	0.0	12.0	1st Vial
B	12.0	156.0	1st Vial
C	156.0	2000.0	1st Vial

Count Corrections-

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: n/a
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions	Half Life	Units	Reference Date	Reference Time
A				
B				
C				

Cycle 1 Results

S#	Time	CPMA	CPMB	CPMC	DPM1	DPM2	DPM3	SIS	tSIE	LUM	
1	10.00	7	8	8	0	0	0	53.73	524.81	2	
2	1.00	8	21	-2	10	25	-3	57.54	556.93	0	Rm 113B Sink top Remnant
3	1.00	1	6	-1	-1	7	-2	101.77	552.25	0	Rm 113B Floor & adjacent surfaces post remediation
4	1.00	3	3	-2	5	3	-3	71.39	556.11	0	
5	1.00	5	5	-2	8	6	-3	31.53	544.69	0	
6	1.00	-2	2	-3	-5	4	-4	587.91	480.71	0	Rm 113A below SC
7	1.00	-3	1	5	-8	1	6	0.00	424.99	0	Rm 113 Floor Post Remediation
8	1.00	6	10	-0	9	12	-0	33.38	563.77	0	

9	1.00	14	6	-4	27	6	-5	22.48	529.99	0	Rm 113C Refrige Post Decon
10	1.00	4	2	-2	7	2	-3	64.25	531.70	0	
11	1.00	-2	5	-1	-6	6	-2	120.79	547.00	0	Rm 113D Adjacent Surface & floor post remediation

JD 7/06/07

The following additional information was provided to NHPP by the facility contractor, in reference to the previous 18 pages (Annotated Version of Attachments 5.0 and 7.0 in Enclosure 1)

Page 5: NHPP Reviewer Comments
Gamma count results—Can sample #s 1-10 be annotated to an actual field location? Is #1 background? I only see "(24A)" shown for sample #11. It is just unclear what sample # goes with what field location.

Facility Contractor Response: The contracted laboratory performed the gamma analysis before the LSC analysis. Ten wipe tests were separated and rolled together in their packaging and counted as a composite sample. If elevated activity is found, then each of the 10 wipes would be counted separately. Therefore, there were 10 composite vials analyzed for each of the A and B sets, and only 3 for the C set. There is no first vial for background for gamma wipe test analysis. No elevated gamma was detected, so we do not have separate results by individual location for the gamma analysis. The exception for this is for location #24A, which was counted separately and represented a sample of the liquid from the drum in the radwaste processing area (Room 137).

Page 6: NHPP Reviewer Comments
Looks like sample #6 was lost on page break. Can you write in the results for it?

Facility Contractor Response: The results for sample #6 have been deduced from the count data which is also included (in a table of count data above the table with the missing sample 6 entry).

Page 10: NHPP Reviewer Comments
Same as Page 5...I only see "(31B)" identified for sample #11.

Facility Contractor Response: Same response as provided above [for Page 5]. The separate gamma analysis for smear #31B was for liquid (water) that had accumulated under a sink in Room 113B.

Page 11: NHPP Reviewer Comments
Sample #6 results were lost between page break.

Facility Contractor Response: This is the same issue as discussed above [for Page 6]. Results have been deduced from the count data that is included.

Page 14: NHPP Reviewer Comments
Note in header says these are for samples 1C-30C. I am not sure what this means since there are only three sample count results. Were samples composited? Maybe these could be annotated.

Facility Contractor Response: As discussed above, for the gamma counts the smears were composited into groups of 10. Therefore, there were only three composite analyses. Since there was no detectable gamma, separate smear analyses were not performed.

Page 17: NHPP Reviewer Comments
Same comment as Pages 5, 10, and 14 regarding what field samples these correspond to. From cover letter this appears to be seven scrapings from rooms 113/113B.

Facility Contractor Response: The analysis was a qualitative evaluation of wax scrapings from the floor in Rooms 113 and 113B from areas identified as contaminated. The purpose of these samples was for qualifying the contamination, whether embedded in the wax or the floor tile. The separate gamma analysis and the composite gamma spectral analysis showed no detectable gamma radionuclides. The contaminated tiles were removed during the remediation.

Enclosure 4

Additional Comments on Enclosure 1 by NHPP Reviewer
(Thomas E. Huston, PhD, CHP) with Permittee Responses

Note: Facility's response to each comment is shown in italics after the NHPP comment.

1. A review of permit records indicates there has been no history of sealed sources over 100 microcuries used at the facility. There have been some smaller sealed sources listed on the license/permit that were possibly used in Building 72. The sources include the following:

   C-14: Not more than 25 microcurie/source
   Eu-152: Not more than 25 microcurie/source

   Facility's response to Point 1
   The VAHA RSO [Radiation Safety Officer] *maintained a surveillance program over the activities in Building 72 that included detailed radionuclide inventories including sealed sources and their ultimate disposition. The C-14 sealed source was not listed as having been used in Building 72 and the Eu-152 source (installed in a liquid scintillation counter) had been removed from the instrument and transferred to the inventory of the radiopharmaceutical lab in the main hospital.*

2. The report did not contain any discussion of the maximum quantities of radioactive materials that could have been present in the buildings and last dates of use. Also a comparison of the decay-corrected maximum possession values to 10 CFR 20, Appendix C is warranted (as per NUREG-1757, Vol. 1, Rev. 2, Figure 7.1).

   A review of the facility use permit indicates the possession limits shown in the table below for research purposes, potentially used in Building 72 (e.g., see Items 6F-6S on Amendment No. 69 of license/permit for unsealed sources). Based on information in permit files maintained by NHPP, the last research use of radionuclides in Building 72 was most likely during 2001. So a five-year decay period was applied to determine which nuclides could still be present at significant levels. Based on conservative assumptions only H-3, C-14, Cl-36, and Fe-55 could remain as potential contaminants of significance (i.e., above values in 10 CFR 20, Appendix C). H-3 is a very low-energy beta emitter (max energy = 19 keV). C-14 is a low-energy beta emitter (max energy = 156 keV). Cl-36 is a medium-energy beta emitter (max energy = 710 keV). Fe-55 decays by electron capture, emitting low-energy x-rays.

Nuclide	Half life	Possession Limit (mCi)	Maximum Amount (mCi) (after 5yr-decay)	10 CFR 20 Appendix C (mCi)	Activity Fraction
H-3	12.3 y	100	75.449	1	0.43
C-14	5730 y	90	89.946	0.100	0.51
P-32	14.3 d	150	0.000	0.010	0.00
S-35	87.4 d	2	0.000	0.100	0.00
Cl-36	301000 y	9	9.000	0.010	0.05
K-42	0.5 d	25	0.000	1.000	0.00
Ca-45	163 d	9	0.004	0.100	0.00
Cr-51	28 d	30	0.000	1.000	0.00
Fe-55	997 d	10	2.810	0.100	0.02
Fe-59	45 d	10	0.000	0.010	0.00
Ru-103	39 d	5	0.000	0.100	0.00
I-125	60.1 d	105	0.000	0.001	0.00
I-131	8 d	3	0.000	0.001	0.00
		Total-->	177.209		1.00

Possession Limits set as maximum values observed in past permits.
5-year decay used per references in permit file that research use ended upon shipment of wastes offsite in 2001.

Facility's response to Point 2
We felt that since the RSO and his staff had maintained such tight controls of the radionuclide inventories present in Building 72 including new incoming inventory additions disposals and current inventories verified quarterly, that such an analysis as performed in Item 2 was not necessary. Of note, while listed on the facility permit, [there were] no indications that the radionuclides Cl-36 or Fe-55 were ever ordered or used in Building 72. The inventories left only the key long-lived radionuclides C-14 and H-3 of primary concern.

3. Survey results with portable meters use the detector efficiency for C-14 (around 0.20) to convert cpm to dpm. There was no provision to account for the possibility that some surface contamination may be from H-3 (or possibly other contaminants such as Cl-36 and Fe-55 which were listed on past versions of the license and may have been introduced into the area). The total effective efficiency should be:

   Total Efficiency = (Fraction of Activity that is C-14)*(Efficiency for C-14)
   + (Fraction of Activity that is H-3)*(Efficiency for H-3)
   + (Other Radionuclides)(Efficiency of other nuclides)

   Since the Efficiency for H-3 is zero and assuming the same for all other nuclides except C-14 (for detectors used in this effort), the total efficiency simply becomes:

   Total Efficiency = (Fraction of Activity that is C-14) (Efficiency for C-14)

   Assuming that ~50% of the total surface activity is from C-14 (as discussed in Item 2 above), the total detection efficiency for surface activity would be reduced from 0.2 (for C-14 alone) to 0.1. This would have the net effect of increasing all of the vendor's interpreted survey results (dpm) by a factor of 2. However, even with this efficiency adjustment, no areas were

reported to remain at any levels exceeding NRC pre-approved screening DCGLs in Table B.1 of NUREG-1757, Vol. 1, Rev. 2. (additional discussion in Item 11 of **Enclosure 5**).

Facility's response to Point 3
The [portable scanning] *survey instrumentation used was not sensitive to the very low-energy beta emitted by H-3. Therefore, smear analysis was used for evaluating and identifying residual H-3 contamination. Both Cl-36 and Fe-55 were not identified during the HSA as being radionuclides of concern. Regardless, we concur with Dr. Huston's evaluations demonstrating sufficient detection capability even if these radionuclides were present.*

4. The report did not include a comparison of "Background" and "Investigation Levels" to release limits for the different detection techniques employed. It appears that a level of "2 x background" was used to label surfaces as "contaminated" above background. To provide additional information, the reviewer performed calculations using data supplied in the report to determine these levels in "dpm/100 cm^2" so they could be compared to the release limits.

   In the first table the total efficiency was assigned as 0.1, consistent with the discussion in Item 3 above. This assumes that about half of the activity present is from C-14 (see Item 1). This is also supported by some of the swipe samples which had positive activity. The second table assigns an efficiency of 0.2 (equal to the efficiency for C-14). The Investigation Level, traditional "static count" Minimum Detectable Concentration (MDC_{static}) , and scan MDC were calculated using the following equations (where b is the background count rate, cpm):

$$\text{Investigation level (net } dpm/100\text{cm}^2) = \frac{(2b-b)}{Efficiency_{total}} * \frac{Detector\ Probe\ Area}{100\ cm^2}$$

$$MDC_{static}(dpm/100cm^2) = \frac{3+4.65\sqrt{b}}{Efficiency_{total}} * \frac{Detector\ Probe\ Area}{100\ cm^2} \text{ (for 1 minute count)}$$

$$MDC_{scan}(dpm/100cm^2) = \frac{d'\frac{\sqrt{b_i}}{i\sqrt{p}}}{Efficiency_{total}} * \frac{Detector\ Probe\ Area}{100\ cm^2}$$

   Where:
   b_i is the number of background counts in observation interval i (2 seconds used)
   d' is the "detectability index" (2.32 from Table 6.5 in MARSSIM, based on tolerance rates of 95% for true positives 75% for false positives).
   p is the surveyor efficiency relative to the ideal observer (0.5 from MARSSIM, Section 6.7.2.1)

Media	Bkgd (cpm)	MDC_{static} (dpm/100cm^2)	MDC_{scan} (dpm/100cm^2)	2xBkg (dpm/100cm^2)
Ludlum 43-37-1 (771 cm2) (Using Total Efficiency = 0.1)				
Sealed concrete	618	154	579	802
Ceramic Tile	929	188	710	1205
8-inch Tile	1240	216	821	1608
Ludlum 43-68 (126 cm2) (Using Total Efficiency = 0.1)				
Lab Bench	239	594	2205	1897

Media	Bkgd (cpm)	MDC_{static} (dpm/100cm^2)	MDC_{scan} (dpm/100cm^2)	2xBkg (dpm/100cm^2)
Ludlum 43-37-1 (771 cm2) (Using C-14 Efficiency = 0.2)				
Sealed concrete	618	77	290	401
Ceramic Tile	929	94	355	602
8-inch Tile	1240	108	410	804
Ludlum 43-68 (126 cm2) (Using C-14 Efficiency = 0.2)				
Lab Bench	239	297	1102	948

The above data indicate that surface measurement techniques (using a 2x background decision point) are generally comparable to the scan MDC values that would have been obtained if a strict MARSSIM approach had been used. Also a"2 times background" action level has sensitivity necessary to identify contamination at both the NRC License Termination Screening Levels (i.e., 1.20E+8 dpm/100cm^2 for H-3, 3.70E+6 dpm/100cm^2 for C-14, 5.00E+5 dpm/100cm^2 for Cl-36, and 4.50E+6 dpm/100 cm^2 for Fe-55, in Table B.1 of NUREG-1757, Vol. 1, Rev. 2) and at the facility's adopted lower release criteria based on NUREG-1556, Volume 7, Appendix Q (i.e., direct levels < 5000 dpm/100 cm^2 averaged over 1 m^2 and < 15,000 dpm/100 cm^2 maximum surface contamination).

The wipe sample techniques (with background generally below about 10 cpm, efficiencies above about 0.5, nominal 1 minute sample count time, and assumed wipe area of 100 cm^2) were associated with MDCs < ~40 dpm/100 cm^2. This is well below the facility's adopted release criteria of 1000 dpm/100 cm^2 for removable beta-gamma activity (from NRC Reg Guide 1.86). This is also much less than 0.1 times the NUREG-1757 screening levels (0.1 is what the authors assumed for the removable fraction of activity in deriving NRC screening levels in NUREG-1757).

In conclusion, the measurement techniques have the necessary sensitivity to identify contamination above the release criteria.

*Facility's response to Point 4**

We concur with the additional analysis as performed by Dr. Huston; our instrumentation and survey techniques were selected precisely to obtain these results; however, a rigorous analysis was not performed rather was based on our long experience with the clean-up levels and the techniques and instrumentation required to attain sufficient measurement sensitivity to demonstrate compliance with the clean-up criteria.

*Note: Additional discussion and calculation of "Scan MDCs" were added after the facility reviewed and commented; however, final conclusions were unchanged; thus no follow-up comments were sought from the facility. (T. Huston, NHPP Reviewer)

5. Reviewer Comments on Attachment 1, Room Survey Sheets. Several of the survey sheets in the report give the reviewer the impression that contamination above release limits could still remain in the area. It is clear that some of these sheets were not updated to reflect the final status of the areas (i.e., remediation activities on June 28, 2007, and associated follow-up surveys). The following are specific references and comments on these sheets to help resolve these discrepancies:

   a. Room 113: Text in the body of the report (Sections 5.0 and 6.0) states the contaminated floor sections were removed (disposed of as radioactive waste) and the area was re-surveyed and no detectable contamination above background was found.

   b. Room 113A: Text in the body of the report (Sections 5.0 and 6.0) indicates the "Speed Concentrator" was removed from the room and disposed of as radioactive waste. It states that other surfaces were not impacted by the Speed Concentrator.

   c. Room 113B: Text in the body of the report (Sections 5.0 and 6.0) indicates remediation activities were performed in the area and that only one small area (~400 cm^2) of detectable activity remained (sink top ~ 3600 dpm/100 cm^2), but that it was below release criteria. Applying a factor of 2 to this result (to address potential presence of other nuclides) yields 7200 dpm/100 cm^2 (fixed) over ~400 cm^2. Averaging this over 1 m^2 (10,000 cm^2), would reduce the level below 5000 dpm/100 cm^2 and would be well below all applicable release criteria.

   d. Room 113C: Text in body of report (Sections 5.0 and 6.0) indicates the refrigerator/ freezer was decontaminated and final surveys showed no detectable activity above background.

   e. Room 113D: Text in body of report (Sections 5.0 and 6.0) indicates the area was remediated and final surveys showed no contamination above background.

   f. Room 113/A/B/C/D Objects: This is the last survey sheet in Attachment 1 of the document. The text in Sections 5.0 and 6.0 indicates remediation occurred for all contaminated objects and that only in the case of Room 113B (see Item c above) was contamination still present above background levels.

   Facility's response to Point 5
   We concur with Dr. Huston's evaluation. There are no open issues concerning residual radioactive materials above the clean-up criteria in Building 72. The existing survey sets for the Room 113 complex can be annotated as detailed here if the review staff feels it is necessary.

Enclosure 5

Additional Facility Details for Release of Building 72 (Hampton, Virginia)

Note: This enclosure contains information that may be useful for preparing an Environmental Assessment and Federal Register Notice for the requested action.

1. **Description of facility to be released.**
   The facility to be released is a separate building, Building 72, located at the Hampton VA Medical Center (HVAMC). HVAMC is a United States Department of Veterans Affairs facility with a street address of 100 Emancipation Drive, Hampton, Virginia. The HVAMC site encompasses approximately 85 acres and contains over 25 buildings and multiple parking areas. Building 72 was constructed in 1908 and was originally used as a dining room for soldiers. It was converted into a research facility in 1974. Building 72 is a single floor, brick construction with a wooden frame attic. Additional details of Building 72 are provided in Section 1.1 of the assessment included as **Enclosure 1**.

2. **Date license initially issued.**
   The first license for use of radioactive materials at HVAMC was issued August 1, 1961, by the US Atomic Energy Commission (AEC). The License No. was 45-7569-1. Following promulgation of the Energy Reorganization Act of 1974, the US Nuclear Regulatory Commission (NRC) was established and assumed regulatory authority for use of radioactive materials at the site. On March 17, 2003, NRC issued a broad-scope Master Materials License (MML) to the Department of Veterans Affairs (VA). Concurrent with issuance of the MML, VA facility licenses were converted into "Materials Permits," which are issued under various conditions of the MML. The Material Permits are administered by the Veterans Health Administration's National Health Physics Program (NHPP), located in North Little Rock, Arkansas. The use of radioactive materials at HVAMC is now authorized under VHA Materials Permit # 45-07569-01.

3. **Type of licensed material used.**
   HVAMC has used licensed material for both medical diagnostic and treatment purposes and research purposes, including animal studies. Building 72 was formerly a dining hall; it began to be used as used as a research facility in 1974. Based on the Historical Site Assessment (**Enclosure 1**), it is presumed that no radioactive materials were introduced into the building until 1974. **Enclosure 4** (Item 2) provides a listing of radionuclides that were authorized to be used for research purposes. Based on that information and **Enclosure 1**, the materials of primary concern with respect to releasing Building 72 are H-3 and C-14.

4. **Type of licensed activities engaged in.**
   With respect to all licensed activities at HVAMC, the facility has been engaged in both research and medical use. With respect to Building 72, the authorized activities included *in vitro*, research, and animal studies.

5. **Site description: size (square feet, square miles, acres), structures (labs, office space), surrounding area (residential, commercial, industrial, mixed).**
   Building 72 is approximately 10,600 square feet and consists of vacant labs, offices, bathrooms, corridors, and storage areas. The building is on VA-controlled land and surrounded by other VA-controlled buildings. Additional details are provided in Section 1.1 of **Enclosure 1**.

6. **Size and description of affected area(s): building, rooms, areas, size.**
   The following rooms were considered to be the primary affected areas and subject to 100% surface scanning: 112, 112A, 113, 113A, 113B, 113C, 113D, 124, and 124A. Other rooms in the building were subjected to 25% to 40% surface scanning. In addition, smear samples were collected from all rooms. Attachment 4.0 of **Enclosure 1** provides the surface area (SQFT) for the rooms in Building 72.

7. **Date licensed activities ceased.**
   Except for some final cleaning and disposal efforts associated with final status surveys (during June 2007), the last recorded usage and disposal of radioactive materials in Building 72 was during calendar year 2001 (Section 1.2 in **Enclosure 1**). Licensed materials will continue to be used in other buildings at the facility in accordance with the facility's VHA Materials Permit.

8. **Date decontamination activities started.**
   Decontamination efforts began before or during the first quarter of 2001, based on disposal records (discussed in Section 1.2 in **Enclosure 1**). Additional decontamination efforts were performed on June 28, 2007, in response to initial closeout surveys in the building.

9. **Date(s) final status surveys performed and areas surveyed.**
   Final status surveys were performed by a contract firm in a phased approach. Dates of these surveys (provided in **Enclosure 1**) were February 22 and 23, 2007; March 21 and 22, 2007; and June 28, 2007, with completion being on this latter date.

10. **List of radionuclides used with half-life greater than 120 days.**
    According to the Historical Site Assessment (Section 1.0 of **Enclosure 1**), radionuclides recorded to have been used in Building 72 with half-life greater than 120 days include H-3 and C-14.

11. **What DCGLs were used?**
    Permit commitments require the facility to meet criteria in NUREG-1556, Volume 7, Appendix Q for unrestricted release of research facilities. These criteria are restated below as information.

For equipment released for unrestricted use (from Table Q.2, for beta emitters):

Nuclide[a]	Average[b, c]	Maximum[b, d]	Removable[b, e]
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	83.3 Bq*/100 cm^2 (5,000 dpm/100 cm^2)	250 Bq/100 cm^2 (15,000 dpm /100 cm^2)	16.7 Bq/100 cm^2 (1,000 dpm/100 cm^2)

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

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

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

* 1 Bq = 1 Disintegration per second

For building surfaces (from Table Q.3, values for H-3 and C-14):

Radionuclide	Symbol	Screening levels for unrestricted release (dpm/100 cm^2)
Hydrogen-3 (Tritium)	H-3	1.2×10^8
Carbon-14	C-14	3.7×10^6

According to NUREG-1556, the screening values above represent total surface concentrations of individual radionuclides that would be deemed in compliance with the 0.25 mSv/yr (25 mrem/yr) unrestricted release dose limit in 10 CFR 20.1402. For radionuclide mixtures, either a sum of fractions rule could be applied or the more restrictive limit (for C-14) simply adopted and applied to the sum of both contaminants.

The facility arbitrarily chose to apply release criteria from Regulatory Guide 1.86 (provided in Attachment 2.0 of Enclosure 1). For H-3 and C-14, the criteria in that document are much more restrictive than the values provided above for NUREG-1556, Vol. 7, Appendix Q.

In addition to release criteria above, reasonable efforts must be taken to reduce any residual contamination to levels that are ALARA. Based on the discussion in Enclosure 1 and on a site visit by NHPP following all clean-up and survey activities, it is believed that reasonable efforts were taken to reduce contamination levels to ALARA levels.

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