DEPARTMENT OF THE ARMY
WATERVLIET ARSENAL
1 Buffington Street
WATERVLIET, NY 12189-4000

22 November 2004

REPLY TO
ATTENTION OF:

Office of the Commander

RECEIVED
REGION 1
'04 DEC -6 P2:16

US Nuclear Regulatory Commission, Region 1
Attn: Kathy Modes, Health Physicist,
Nuclear Materials Branch 2
Division of Nuclear Safety
475 Allendale Road
King of Prussia, PA 19406-1415

04009011

136080

Subject: Removal of Thorium-232 from License STB1554, Control No. ~~1333312~~ new

Dear Ms. Modes,

1. References:
   A. Letter dated 16 September 2003, from the NRC, SUBJECT: Department of the Army Request for additional Information Concerning Application fro Renewal of License Control Number 1333312.

   B. Letter dated 9 October 2003, from WVA, SUBJECT: Nuclear Regulatory Commission (NRC), Request for additional Information Concerning Application fro Renewal of License Control Number 1333312.

   C. The Army Radiation Safety Program, Army Regulation 11-9

2. The NRC letter, reference A, stated the criteria for removing thorium from License No. STB1554. It required a survey of the work facility where thorium may have been used to assure that the area meets the criteria of Subpart E of 10 CFR 20 with respect to thorium. Reference B identifies the area where thorium may have been used at the Arsenal. Watervliet Arsenal has contracted with a qualified contractor to perform the required survey of Room 255, Building 120, the only work area identified where thorium may have been used.

Providing Weapons to Warfighters

136080

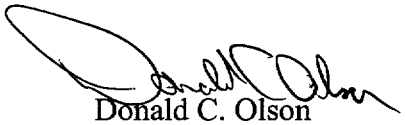
NMSS/RGNI MATERIALS-002

3. A preliminary survey of the room failed to find any evidence of thorium or any other radionuclide. A final survey plan has been prepared for Room 255 and is forwarded with this letter for your approval. The survey plan is based on the alternate simplified method specified in Appendix B, NUREG 1757, Vol. 2.

4. Assuming your agency approves the survey plan, the survey will be conducted by the contractor as soon as it can reasonably be arranged. Once the survey is complete, a report of the survey, including a report of all activities and an evaluation of the findings to demonstrate that the room meets the criteria of Subpart E, 10 CFR 20, will be forwarded for your approval. A request to remove thorium from the license will also be forwarded at that time.

5. The POC for this action is Ms. Sally D'Agostino, Radiation Protection Officer. She can be reached at (518) 266-5633. The contractor technical manager is Mr. Leslie Cole, CHP. If there are questions about the survey plan, Mr. Cole will be the appropriate person to contact. He can be reached at (423) 928-5693.

Sincerely,



Donald C. Olson
Colonel, US Army
Commanding

Enclosure
As stated

Final Survey Plan for Room 255

Building 120, Watervliet Arsenal

November 2004

Prepared by

SOLUTIENT TECHNOLOGIES, LLC
7857 Freedom Avenue NW
North Canton, Ohio 44720

1. Background

Room 255 is a single 25 feet by 40 feet laboratory room in Building 120 at the Watervliet Arsenal, Watervliet, NY. The room contains a fume hood, a laboratory sink, several cabinets and work benches and has a significant portion of the room partitioned off for an office space. The office space can be accessed only through the larger portion of Room 255. The room has been in use as a laboratory space for many years. A variety of different laboratory procedures have been performed in the room – most recently it has been used as an electronics testing facility.

The hood is vented to the outside through a HEPA filtration system. Currently no HEPA filter is installed and the hood is not in use (according to the warning label on the front of the hood). Presumably, the hood has not been recently checked for air flow.

Room 255 may have had small quantities of thorium in the form of ThO_2 used in a process to harden metals by electroplating the thorium onto the surface of the metal. No actual record of use of thorium in any form exists. There is an existing procedure showing how the thorium was to be used. The procedure specified that the use was confined to the fume hood. If the material was actually used, thoria was added to a liquid to form a slurry or a solution. In all other steps in the process, the thorium was in solution. Good contamination controls were specified, so there was little chance of spread of contamination either inside or outside the hood. Discussion with the current Radiation Safety Office indicates that she had talked with the previous RSO who would have been aware if the procedure was actually implemented. He had no recollection of the use of thorium and there are no existing records of such use. There are records of surveys in other laboratory rooms where radioactive materials were used in the time frame of the metal hardening process.

The objective of this survey is to allow thorium to be removed from the facility license. Thorium that was apparently brought to the facility for the metal hardening experiments has been disposed of and the disposal is properly recorded. The survey procedure to be followed for this survey is the alternate simplified method specified in Appendix B, NUREG 1757, Vol 2.

The NRC Screening Values for Th-232 will be used as the derived concentration guideline value (DCGL[1]) for the survey. This conservative value is adequate to limit the risk of any future user of the space, even for full time residential use, to less than 25 mrem of radiation dose as stipulated in 10CFR20.1402. If the space is shown to have no contamination above the DCGL it is suitable for release for unrestricted use.

[1] The proper term is $DCGL_w$ where the w indicates that the DCGL is based on the Wilcoxon Rank Sum statistical test. For simplicity, the term will be show as DCGL without the w except when the reference is to the $DCGL_{emc}$ (the guideline value for elevated measurements) in which case the emc will be added to the term.

2. Previous Surveys of Room 255

Some older routine smear surveys of the room exist but there are no recent surveys conducted by the facility radiation safety office. The older survey exists from the time the previous RSO used the space for his office/laboratory. These surveys showed that the office space was not contaminated.

A preliminary scoping survey was conducted October 25-26, 2004 (see Attachment 1). The scoping survey focused on the hood and the area surrounding the hood. No contamination was found. This room had surface contamination insignificantly lower than other, empty laboratory rooms in Building 120.

3. Radionuclides of Concern

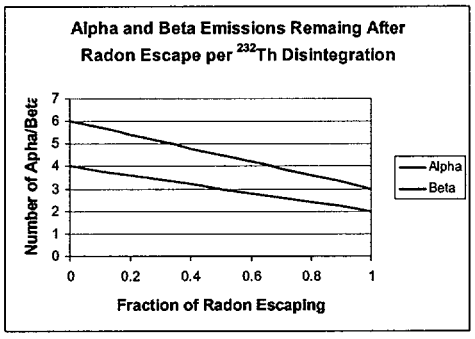
The ^{232}Th that may have been used in the hood is the radionuclide of concern. Since ^{232}Th is the top of a naturally occurring radionuclide series, the decay progeny will also be present. For the purposed of the survey, it is assumed that the ^{232}Th is in equilibrium with its immediate progeny. It follows from this assumption that there is an equal amount of ^{228}Ra, ^{228}Ac, ^{228}Th and ^{224}Ra present. Since ^{224}Ra decays to ^{220}Rn, it is unlikely that the equilibrium would continue beyond that point; however, it is also unlikely that the series radionuclides beyond ^{220}Rn will be totally absent from the room if thorium is present. The section below regarding the derived concentration guideline value discusses this issue.

4. Derived Concentration Guideline Value

The thorium contained in ThO_2 is natural thorium (^{232}Th) and is one of the long-lived naturally occurring radionuclides. The NRC published a set of screening values for surface contamination for a number of radionuclides in 1998 (63 FR 64132) that did not contain a screening value for the alpha radiation emitting radionuclides. A following Federal Register notice (64 FR 68395) approved the use of the screening values in NUREG/GR-5512 vol 3, Table 5.19 for the alpha emitting radionuclides. The screening value listed in Table 5.19 for ^{232}Th is 6.03 dpm/100 cm^2 (for ^{232}Th with the decay progeny present, as in this case). This value is also indicated in the Memorandum from Mr. Michael Borisky to Ms. Sally D'Agostino, RSO for the Watervliet Arsenal.

Since the $DCGL_w$ value applies to the ^{232}Th alone and it is accompanied by the decay progeny that also decay at the same rate as the ^{232}Th, a higher value for the detected contamination will evident. The actual value of the detected contamination is dependent on the amount of one of the decay progeny, which is in gaseous form (^{220}Rn) that may escape from the solid matrix of the deposited ThO_2 on the contaminated surface during the decay process. Some reasonable assumption can be made about the fraction of the radon that may escape during decay. The escape fraction will be low since the half life of ^{220}Rn is only 56 seconds. There is a total of 6 alpha and 4 beta radiation emissions with each ^{232}Th atom that decays occurring simultaneously. If the assumption is that 50% of the radon escapes, there would remain 4.5 alpha and 3 beta emissions with each disintegration of a ^{232}Th atom. It follows then that if the survey is for alpha radiation only, the DCGL needs to be adjusted to 27 dpm/100 cm^2. (If the radon all escapes,

there would be 3 additional alphas for each ^{232}Th atom disintegration and the alpha DCGL would be 18 dpm/100 cm^2.) The following chart shows the number of alphas and betas that remain with the fraction of radon escaping.



If there were enough contamination present to collect a relatively large sample, it would be possible to determine the actual fraction of radon that escaped. Since the amount of contamination is extremely small, perhaps none at all, it is not possible to make the actual determination. The survey must proceed with some reasonable assumption regarding the fraction of radon that escapes. Fifty percent is a very high fraction. Thirty percent is more reasonable and that leads to an alpha DCGL of 30 dpm/100 cm^2. This value is chosen for the final survey DCGL. In accordance with the guidance provided in Appendix B, NUREG 1757, Vol 2, no more than 10% of the DCGL value may be removable. In this case, the removable alpha contamination may not exceed 3 dpm/100 cm^2. Following the guidance of Appendix B, NUREG 1757, Vol 2, the $DCGL_{emc}$[2] is 90 dpm/100 cm^2.

5. Area Classification

Room 255 is approximately 75 m^2 and it meets all the criteria outlined in Appendix B, NUREG 1757, Vol 2 for the alternate simplified survey method. This application is similar to the Class 3 MARSSIM classification except that it requires 100% scan. The room will contain only one survey unit.

6. Choice of Instruments

Since the DCGL is based on the alpha emission, the instrument chose must be capable of measuring alpha radiation. The Ludlum 43-90 detector with the Ludlum 2221 Scaler/Ratemeter will be used for the survey. The direct measurement capability for the instrument is sufficient to measure ~40% of the DCGL in a five minute timed count. These values are based on the manufacturer's specification for the background of the detector of <3 cpm. Past experience has shown the detector to have a lower background. If the actual instruments in use prove to have lower background, the detection limits will be better than indicated.

The calculations for the MDC's are:

[2] $DCGL_{emc}$ is a term from the MARSSIM protocol that identifies the elevated measurement criterion. In this survey, it is 3 times the $DCGL_w$, as specified in the alternative simplified survey method of Appendix B, NUREG 1757, Vol 2.

Calculation of Instrument MDC's

Static Measurements

Background = 3 cpm
Count time = 5 min
Instrument Eff = 0.2
Source Eff = 0.5
Area Probe = 126 cm^2

$$MDC = (4.65+3*\sqrt{BG})/(e_{inst} * e_{source} * t_{count} * A_{probe}/100)$$

MDC = 16 dpm/100 cm^2

Scan MDC

$$\text{Scan MDC} = (-\ln(1-P(n \geq 1))*60)/e_{inst} * e_{source} * t$$

Where:

ln = natural log
P = Probability of detection

Setting the probability to 0.67, time to 4 sec (scanning at 1 in/sec) and using the efficiencies above:

Scan MDC = 170 dpm/100 cm^2

The scan MDC is inadequate to provide information related to areas of elevated measurements. In lieu of a 100 percent scan, it is proposed that one direct, timed measurement in each square meter be performed. These measurements will be for two minutes which is adequate to measure at approximately 45% of the $DCGL_{emc}$. Using the same equation above for static measurements and two minute rather than five minutes, the MDC is 40 dpm/100 cm^2.

7. Area Classification

Since Room 255 has no indication of contamination and may have had no thorium used in it, it is classed as a Class 3 survey unit. There is no size limit on a Class 3 survey unit so the room will contain one survey unit. The room is approximately 20 feet by 40 feet or about 75 m^2. In addition, the small quantity of material that may have been used allows the use of the procedure specified in Appendix D of MARSSIM. This procedure stipulates a requirement of 30 randomly chosen survey points to be surveyed for both fixed (total) contamination and for removable contamination.

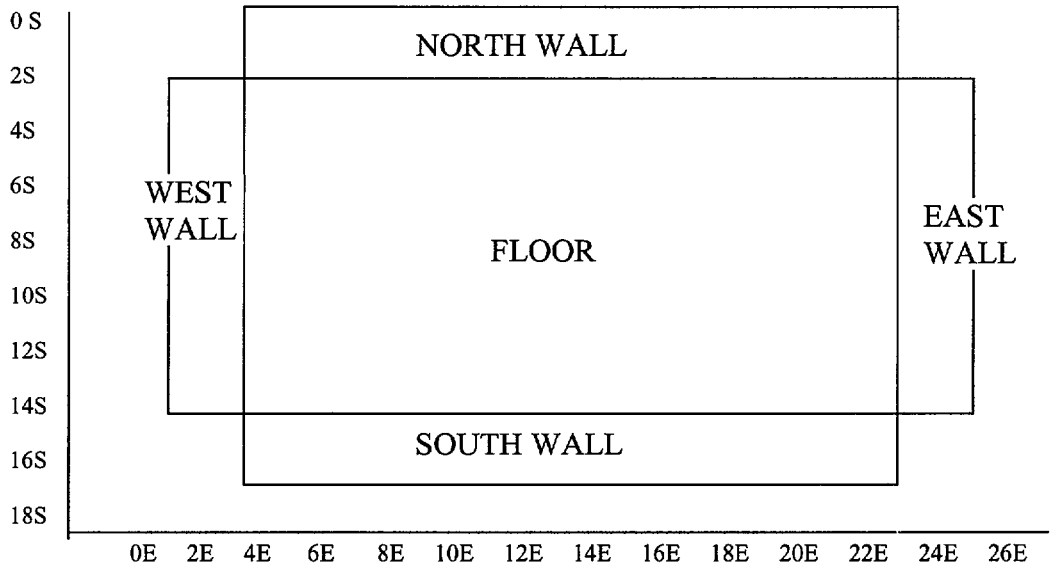
8. Reference Background Area

Another laboratory room will be selected that has similar fixtures and surfaces that is known to be uncontaminated for a background reference area. An attempt was made to find such a room during the preliminary scoping survey and it was not successful. The measurements in five other rooms were somewhat, probably insignificantly, higher than Room 255. When the background reference area is identified, a similar number of measurements will be taken in the reference area s in Room 255 and the measurements in the two rooms compared using one of the statistical test identified in Appendix B NUREG 1757, Vol 2 assuming that some measurements are greater than the DCGL.

9. Survey Procedure

The preliminary scoping survey did not identify any elevated measurement locations in and around the hood in Room 255. The measurement locations included inside the hood, on the floor in front of the hood and inside the HEPA ventilation filter housing as well as some randomly selected locations. This leads to a level of confidence in following the procedure specified in Appendix B, NUREG 1757, Vol 2. Since the scanning capability is inadequate to identify areas of elevated measurements, a two minute direct measurement will be taken in each square meter of the floor, laboratory bench and cabinet tops and the first two meters of the accessible wall surface. After this survey for elevated measurements, a total of 30 randomly selected locations will have direct measurements taken for five minutes and smears samples collected at each location. These 30 measurements will be the basis for the decision that the room meets the release criteria.

The floor area and the lower 2 meters of the walls will be sketched as shown in the sketch below. The line with the numbers to the left and below the sketch represents a grid system for the room.



Survey points will be selected by using pairs of random numbers to select south and east values. Any number pairs that fall in the corner locations will be discarded. A total of 30 locations will be chosen. The location in the room will be measured from the south west corner and marked on the floor or the wall. At each location, a 5 minute direct measurement will be taken followed by a 100 cm^2 smear that is under the area where the detector measured. The direct measurements will be recorded on a survey sheet prepared for this purpose along with the date and time and the surveyors initials. The instrument used will be identified on the survey sheet.

The smears will be evaluated using a low-background counter. This low-background counter will be set to measure below 1 dpm per smear.

10. Background Survey

A room of similar size and composition i.e. floors and walls as much like Room 255 as possible, will be chosen and a survey taken in the same manner as in Room 255. The background survey is required since thorium and it decay progeny and other alpha emitting radionuclides are present in the background. The DCGL is based on the contamination that is "above background." Some of the background radioactive residual is related to housekeeping and general cleanliness so it will be necessary to evaluate the area selected for the background survey with this in mind. The background survey area should have similar housekeeping as Room 255 has.

11. Data Quality Objectives

Data Quality Objectives (DQOs) are established to assure that the data collected are accurate, representative and reliable. Acceptable decision errors have been selected for this project to enable statistical testing of data. The decision error levels define the level of confidence for Type 1 errors, α, and Type 2 errors, β. Type 1 errors are defined as false positives and Type 2 errors are false negatives. A 95 percent confidence level for both Type I ($\alpha = 0.05$) and Type 2 ($\beta = 0.05$) has been selected. The selection of these decision error levels provides a:

- 95% confidence level that the statistical tests will not incorrectly determine that a surveyed area does not satisfy criteria when, in fact, it does satisfy the criteria ($\alpha = 0.05$).

- 95% confidence level that the statistical tests will not incorrectly determine that a surveyed area satisfies criteria when, in fact, it does not satisfy the criteria ($\beta = 0.05$).

Data quality indicators for precision, accuracy, representativeness, completeness, and comparability have also been established.

- *Precision* measures the reproducibility of measurements and will be determined by comparison of replicate values from direct measurements and smear sample analysis; the objective will be a relative percent difference of 35% or less for smear samples. Direct measurement replicates will be analyzed at a minimum frequency of five percent.

- *Accuracy* is the degree of agreement between the true and measured values. Accuracy will be measured through calibration with known standards. The objective for this parameter will be +/- 30% at 50% of the criterion value.

- *Representativeness* and comparability do not have numeric values. Performance for these indicators is assured through the selection and proper implementation of systematic sampling and measurement techniques as promulgated in approved site protocols and those protocols promulgated in the MARSSIM guidance document.

- *Completeness* is defined at the percentage of measurements judged to be valid. The results will be considered valid if they are not rejected during data validation. The objective is 90% for this project.

If the data are determined to satisfy the established guidelines and meet the release criteria following statistical testing, a final report will be prepared, documenting the survey procedures and results.

12. QA/QC Procedures

a. Survey Instrumentation

Instruments will be current in calibration as specified by the manufacture. A daily source check and background check of each instrument will be performed before each day of survey and at the end of the day.

b. Survey

At least 10% of the measurement points will be resurveyed including a smear survey for verification.

c. Smear Counts

In addition to the extra smears indicated above, 10% of the smears will be recounted. The low-background counter will be calibrated following the manufacture's procedures and daily check sources counted before and after counting smears.

13. Data Verification

All data will be examined for completeness and accuracy. Any data not complete will be discarded. The added measurements/samples collected for verification maybe substituted for any discarded measurements/samples.

14. Final Survey Report

A final survey report will be prepared to compile the data and evaluate the survey results to determine if the survey objective is met. The report will be submitted to NRC after approval by the Watervliet Arsenal Command.

Attachment 1

SCOPING SURVEY

Room 255, Building 120, Watervliet Arsenal, NY

1. Background

Room 255 is a single 25 feet by 40 feet laboratory room in Building 120 at the Watervliet Arsenal, Watervliet, NY. The room contains a fume hood, a laboratory sink, several cabinets and work benches and has a significant portion of the room partitioned off for an office space. The office space can be accessed only through the larger portion of Room 255. (See the room sketch in Enclosure 1.)

Room 255 is to be released for unrestricted use. The release procedure to be followed is the procedure specified in the MARSSIM manual. The initial planning for the process leading to the use is to follow the guidance of Appendix B in the MARSSIM manual.

Room 255 may have had small quantities of thorium in the form of ThO_2 used is a process to harden metals by electroplating the thorium onto the surface of the metal. No actual record of use of thorium in any form exists. There is an existing procedure showing how the thorium was to be used. The procedure specified that the use was confined to the fume hood. If the material was actually used, thoria was added to a liquid to form a slurry or a solution. In all other steps in the process, the thorium was in solution. Good contamination controls were specified, so there was little chance of spread of contamination either inside or outside the hood. The purpose of this survey is to determine if there is residual contamination in the room.

2. Survey Parameters

Since this is a preliminary survey with no prior survey information, the only pertinent MARSSIM related parameter is the derived concentration guideline limit (DCGL). The NRC screening value of 6 dpm/100 cm^2 for ^{232}Th will be used for the DCGL. Since this screening value is for the ^{232}Th alone, the actual value used will be increased to account for the decay progeny that accompany the decay of the thorium. The alpha component will be the type radiation evaluated in the survey. The thorium plus the decay progeny include a total of 6 alpha and 4 beta emissions. Some of the decay progeny may be lost due to the emulation of the ^{220}Ra and a conservative assumption of the emulation fraction is selected as 30%. This will leave 5 alpha emissions with each thorium atom that undergoes decay. With that assumption, the DCGL is recalculated as 30 dpm/100 cm^2 (alpha).

3. Instruments Used

The best available instrument for this survey is the Ludlum 2241-2/43-90 Scaler/Ratemeter-detector combination. The Model 43-92 detector is approximately 20% efficient for the thorium alpha emission and the Model 2241-2 scale/ratemeter provides sufficient flexibility for adequate

measurement for thorium contamination. (A source efficiency of 0.7 is also used in the calculations.) Some scanning was done with a Ludlum model 3 with a Ludlum model 44-9 detector. This instrument is sensitive to alpha and beta radiation but it is not the appropriate instrument for this survey but it is small enough to get into places not accessible with the model 43-90 detector. The likely scanning MDA for the model 44-9 is greater than 100 dpm. It is only useful to locate gross contamination relative to the thorium DCGL. In direct measurement mode and a five minute count time the MDA for the area under the probe is approximately 50 dpm.

Enclosure 2 contains the calibration information for the instruments used.

4. Conduct of the Survey

A preliminary scoping survey was conducted by Mr. Leslie Cole, CHP and Mr. Dell Ruess, Solutient Technology, October 25-26, 2004. The survey included scanning the area in and around the fume hood, the floor near the hood, the sink, direct measurements at selected locations and smear samples in a variety of locations including locations near the direct measurement locations. There were no elevated measurement locations identified by the scan survey. At every point where there was indication of any activity, a one minute direct measurement was made and none of these measurements were greater than the background measurement.

The sketch in Enclosure 1 represents the room layout. Direct measurement locations are at the locations indicated by the numbered squares. The measurements were collected using a Ludlum Model 2241-2 Scaler/Ratemeter with a Ludlum Model 43-90 detector. All direct measurements were measured for a 5 minute period. Table 1 below shows the measurement results.

TABLE 1

Direct Measurements in Room 255

Location	α dpm/100 cm^{2*}	$\pm 2\,\delta$
1	13.6	7.4
2	10.1	<MDA
3	19.4	8.8
4	20.5	9.1
5	9.0	<MDA
6	15.9	8.0
7	13.6	7.4
8	5.5	<MDA

BG = 4.25 cpm
Efficiency = 19.6%
MDA = 12.5 ± 3.5 dpm (5 min Count)
*Corrected for BG, Inst Eff, Source Eff and Probe Area

Several smear samples were collected in Room 255. Smear samples were collected at all the locations where the direct measurements were made. These smears were analyzed on a low-background counter for gross alpha. The results are shown in Table 2 below.

TABLE 2
Room 255 Smear Survey Results

Smear #	Gross Alpha dpm	Gross Beta dpm	Smear Location/Description
1	1.1	839	Inside Hood Right Side
2	0.6	762	Inside Hood Left Side
3	0.6	743	Floor in Front of Hood
4	1.7	820	Inside Sink
5	1.1	746	Counters Around Hood Right
6	0.0	740	Counters in Front of Hood
7	2.3	788	Inside Filter Housing
8	2.3	749	Floor Behind Hood
9	0.6	730	Hood Drain Trap
10	1.1	771	Sink Trap

Smear Counter Model:	2929	Probe Model:	43-10-1
Serial Number:	167855	Serial Number:	PR171934
Alpha Background:	0.1	Beta Background:	66.0
Alpha Source	2,176	Beta Source:	286,569
Alpha Efficiency:	35%	Beta Efficiency:	12%
Alpha MDA (dpm)	0.57	Beta MDA (dpm)	786
Calibration Due Date:	9/16/2005		
Count Date:	10/28/2004		

An attempt was made to find a similar room to Room 255 to serve as a background area for the final survey. Several empty laboratory rooms were checked and none were found to have as low direct measurements as low as found in Room 255. Room 232 had a lower α/δ background than Room 255 as measured with the Model 44-9 detector; however, the 5 minute direct alpha measurements were somewhat higher than the similar measurements in Room 255. Six direct measurements were collected in Room 232, Building 120. This higher measurement may be explained by the degree of housekeeping in Room 255 versus the other rooms considered. All the rooms checked for use as a background area were empty and had had little housekeeping activity in the recent past. Room 255 is still occupied and receives some housekeeping. The long term build-up of ^{222}Rn daughters may be higher in the unused rooms than in Room 255. The relatively long lived ^{210}Pb can become measurable and its progeny ^{210}Po is an alpha emitter at the final decay to stable lead. While the build-up is minor, it could be sufficient to explain the higher alpha radiation levels found. Table 3 below shows the measurement results in Room 232.

TABLE 3

Direct Measurements in Room 232		
Location	α dpm/100 cm^{2*}	$\pm 2\,\delta$
1	30.9	11.1
2	21.7	9.3
3	18.2	8.5
4	20.5	9.1
5	28.6	10.7
6	18.2	8.5

BG = 4.25 cpm
Efficiency = 19.6%
MDA = 12.5 ± 3.5 dpm (5 min Count)
*Corrected for BG, Inst Eff, Source Eff and Probe Area

Smears were also collected in Room 232. These smears were collected at the same locations as the first five of the direct measurements. These smears were analyzed on a low-background counter for gross alpha. The results are shown in Table 4 below.

TABLE 4
Room 255 Smear Survey Results

Smear #	Gross Alpha dpm	Gross Beta dpm	Smear Location/Description
1	2.9	729	Floor in front of Lab Bench
2	2.3	783	Lab Bench Top
3	1.1	792	Hood Inside
4	1.1	787	Floor in front of Hood
5	1.1	755	Counter next to Hood

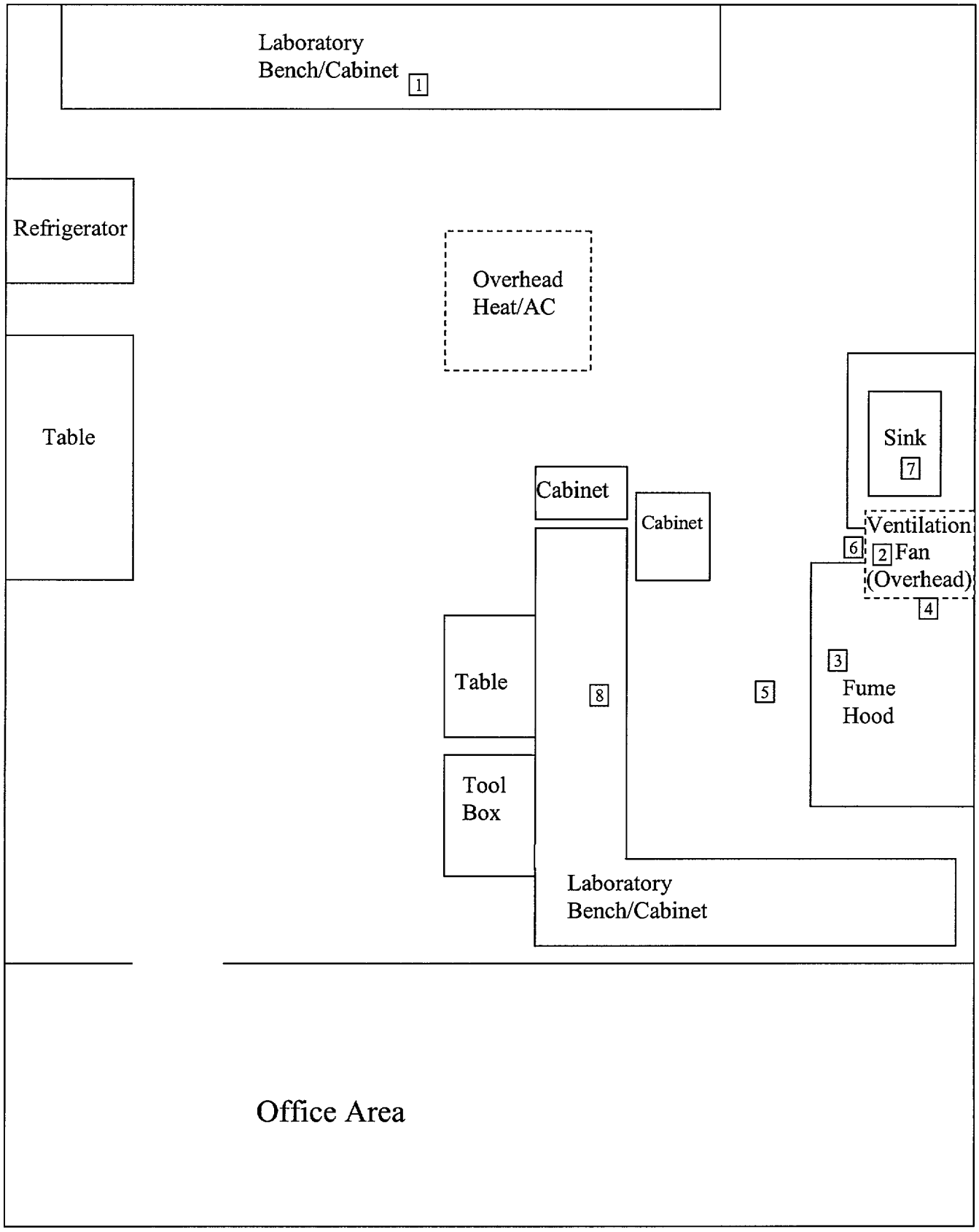
Smear Counter Model:	2929	Probe Model:	43-10-1
Serial Number:	167855	Serial Number:	PR171934
Alpha Background:	0.1	Beta Background:	66.0
Alpha Source	2,176	Beta Source:	286,569
Alpha Efficiency:	35%	Beta Efficiency:	12%
Alpha MDA (dpm)	0.57	Beta MDA (dpm)	786
Calibration Due Date:	9/16/2005		
Count Date:	10/28/2004		

5. Evaluation of Data

Examination of the data indicates that it has been collected in correct manner, that it is accurate and that the instrumentation used is appropriate for the survey. The smear sample data indicates that removable contamination is less than 10% of the total contamination. There were no

samples indicating that the room contained other than background contamination. The data collected in this preliminary survey confirms that there is little, if any, contamination present in the room.

Enclosure 1


Laboratory
Bench/Cabinet
1
Refrigerator
Overhead
Heat/AC
Table
Sink
7
Cabinet
Cabinet
Ventilation
6
2
Fan
(Overhead)
4
3
Fume
Hood
Table
8
5
Tool
Box
Laboratory
Bench/Cabinet
Office Area

Enclosure 2

INSTRUMENT DATA

Ludlum Model 2241-2 with Model 43-90 Detector

Meter Serial No. 174211
Detector Serial No. PR180327
Last Calibrated 3/24/2004

The instrument was checked using a Th-230 plated source before measurements and afterwards on each day. The background was also checked before and after survey.

Ludlum Model 3 with Model 44-9 Detector

Meter Serial No. 165881
Detector Serial No. PR190327
Last Calibrated 3/24/2004

The instrument was checked using a Tc-99 plated source before measurements and afterwards on each day. The background was also checked before and after survey.

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

11/22/2002, and to inform you that the initial processing which includes an administrative review has been performed.

☑ ADAMS. 578-1554
There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

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

---

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

Your action has been assigned **Mail Control Number** 136080.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

NRC FORM 532 (RI)
(6-96)

Sincerely,
Licensing Assistance Team Leader

	:	(FOR LFMS USE)
	:	INFORMATION FROM LTS
BETWEEN:	:	----------
	:	
License Fee Management Branch, ARM	:	Program Code: 11300
and	:	Status Code: 0
Regional Licensing Sections	:	Fee Category: EX 2C
	:	Exp. Date: 20131031
	:	Fee Comments: _____
	:	Decom Fin Assur Reqd: N
	::	

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED
   Applicant/Licensee: ARMY, DEPARTMENT OF THE
   Received Date: 20041206
   Docket No: 4009011
   Control No.: 136080
   License No.: STB-1554
   Action Type: Amendment

2. FEE ATTACHED
   Amount: ____/____
   Check No.: ____/____

3. COMMENTS

Signed M. A. Barkim
Date 12/6/2004

B. LICENSE FEE MANAGEMENT BRANCH (Check when milestone 03 is entered /__/)

1. Fee Category and Amount: _____

2. Correct Fee Paid. Application may be processed for:
   Amendment _____
   Renewal _____
   License _____

3. OTHER _____
   _____

Signed _____
Date _____