DEPARTMENT OF THE ARMY
US ARMY PUBLIC HEALTH COMMAND
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND MARYLAND 21010-5403

Br. 2.

04007008

SMB-707

MCHB-CG

13 June 2014

MEMORANDUM FOR Licensing Assistance Team, Division of Nuclear Materials Safety, U.S. Nuclear Regulatory Commission, Region I, 2100 Renaissance Blvd., Suite 100, King of Prussia, PA 19406-2713

SUBJECT: Application for Renewal of NRC License No. SMB-707

1. Transmitted herewith is the application for renewal of Nuclear Regulatory Commission (NRC) License No. SMB-707 for the US Army Public Health Command (USAPHC), Aberdeen Proving Ground, Maryland 21010-5403.

2. Request that the NRC license be renewed in its entirety. We would request that this application for renewal of NRC License No. SMB-707 supersedes all communications on this license dated before 31 May 2014.

3. There are no significant changes to NRC License No. SMB-707 (Tab A) requested at this time. The items to remain as listed and identified are: requested materials (Tab B), authorized material use (Tab B), decommissioning funding plan (Tab B), address where licensed material will be used or possessed, Radiation Safety Officer and Radiation Management Committee Chairman (Tab C).

4. Enclosures for requested minor changes to our license are provided for your review. These changes include the USAPHC radiation safety training program (Tab D); USAPHC facilities, radiation detection equipment, personnel dosimetry and calibration and maintenance (Tab E); The USAPHC radiation safety program document, USAPHC Regulation 385-24 (Tab F); and waste management (Tab G).

5. The subject application was reviewed and approved by the USAPHC Radiation Management Committee.

6. The current Nuclear Regulatory Commission license expires on 31 July 2014.

RECD 06/17/14 AM11:52

584142

NMSS/RGN1 MATERIALS-002

7. The point of contact for this memorandum is Scott Goodison, Command Radiation Safety Officer, commercial 410-436-8076 or email scott.g.goodison.civ@mail.mil.

Encl

DEAN G. SIENKO
Major General, USA
Commanding

NRC FORM 313 (03-2014)
10 CFR 30, 32, 33, 34, 35, 36, 37, 39, and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIALS LICENSE

APPROVED BY OMB: NO. 3150-0120 EXPIRES: 05/31/2015

Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the FOIA, Privacy, and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW. *AMENDMENTS/RENEWALS THAT INCREASE THE SCOPE OF THE EXISTING LICENSE TO A NEW OR HIGHER FEE CATEGORY WILL REQUIRE A FEE.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

OFFICE OF FEDERAL & STATE MATERIALS AND
ENVIRONMENTAL MANAGEMENT PROGRAMS
DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA,

SEND APPLICATIONS TO:

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MISSISSIPPI, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING,

SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
1600 E. LAMAR BOULEVARD
ARLINGTON, TX 76011-4511

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S.NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*

- [ ] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER
- [x] C. RENEWAL OF LICENSE NUMBER SMB 707

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include ZIP code)*

Commander
US Army Public Health Command
5158 Blackhawk Rd.
Aberdeen Proving Ground-South, MD 21010

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

Licensed material will be used and stored at Building E-2100, Bush River Road, Aberdeen Proving Ground-South, Aberdeen Proving Ground, MD; Building 5111 Pistol Rd., 5111 Pistol Rd., Aberdeen Proving Ground-North, Aberdeen Proving Ground, MD; and at US Army Public Health Command temporary job sites anywhere in the United States.

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Scott G. Goodison

BUSINESS TELEPHONE NUMBER	BUSINESS CELLULAR TELEPHONE NUMBER
(410) 436-8076	(410) 459-5978

BUSINESS EMAIL ADDRESS

scott.g.goodison.civ@mail.mil

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL

a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time. Tab B

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED. Tab B

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE. Tab C

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS. Tab D

9. FACILITIES AND EQUIPMENT. Tab E

10. RADIATION SAFETY PROGRAM. Tab F

11. WASTE MANAGEMENT. Tab G

12. LICENSE FEES (Fees required only for new applications, with few exceptions*) *(See 10 CFR 170 and Section 170.31)* FEE CATEGORY [ ] AMOUNT ENCLOSED $ [ ]

13. CERTIFICATION. *(Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.*

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35 , 36, 37, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.
WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A C RIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE
Dean G. Sienko, Major General, USA, Commanding	Dean G Sienko	16 JUN 14

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED $	CHECK NUMBER	COMMENTS
APPROVED BY				DATE	

NRC FORM 313 (03-2014)

Tab A

Current NRC License

SMB-707

NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 28

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with the letter dated December 16, 2013,
1. Department of the Army US Army Public Health Command MCHB-CG-RSO	3. License number SMB-707 is amended in its entirety to read as follows:
2. 5158 Black Hawk Road Aberdeen Proving Ground, Maryland 21010-5403	4. Expiration date July 31, 2014
	5. Docket No. 040-07008 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Natural Uranium	A. Any	A. 50 kilograms
B. Depleted Uranium	B. Any	B. 230 kilograms
C. Thorium	C. Any	C. 25 kilograms
D. Uranium 232	D. Any	D. 2 grams
E. Uranium 234	E. Any	E. 2 grams
F. Uranium 236	F. Any	F. 2 grams
G. Uranium 238	G. Any	G. 2 grams

9. Authorized use:

A. through G. Laboratory sample analyses.
D. through G. Calibration standards.

CONDITIONS

10. Licensed material may be used or stored at the licensee's facilities located at Building E-2100, Bush River Road, Aberdeen Proving Ground-South, Aberdeen Proving Ground, Maryland; Building B5111, 5111 Pistol Road, Aberdeen Proving Ground-North, Aberdeen Proving Ground, Maryland; and at temporary job sites of the licensee anywhere in the United States.

MATERIALS LICENSE SUPPLEMENTARY SHEET

License Number
SMB-707

Docket or Reference Number
040-07008

Amendment No. 28

11. A. Licensed material shall only be used by, or under the supervision of, individuals designated, in writing, by the Ionizing Radiation Control Committee. The licensee shall maintain records of individuals designated as users for 3 years following the last use of licensed material by the individual.

    B. The Radiation Safety Officer for this license is Scott G. Goodison.

12. The licensee shall not use licensed material in or on human beings.

13. The licensee shall not use licensed material in field applications where it is released except as provided otherwise by specific condition of this license.

14. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

    A. Letter dated November 8, 1996
    B. Letter dated March 3, 1998
    C. Application dated May 5, 2004 (ML041470433)
    D. Letter dated December 16, 2013 (ML13361A057)
    E. Letter dated January 17, 2014 (ML14036A146)

For the U.S. Nuclear Regulatory Commission

Date February 6, 2014

By ***Original signed by Dennis R. Lawyer***

Dennis R. Lawyer
Commercial, Industrial, R&D and Academic Branch
Division of Nuclear Materials Safety
Region I
King of Prussia, Pennsylvania 19406

Thursday, February 6, 2014 06:58:12

Tab B

Radioactive Material

Purpose for which Licensed Material will be Used

Decommissioning Funding Plan

Item 5: Radioactive Material

Item Letter	Source Material	Chemical and/or physical form	Maximum amount that licensee may possess at any one time under this license
A	Natural Uranium	Any	50 kilograms
B	Depleted Uranium	Any	230 kilograms
C	Thorium	Any	25 kilograms
D	Uranium 232	Any	2 grams
E	Uranium 234	Any	2 grams
F	Uranium 236	Any	2 grams
G	Uranium 238	Any	2 grams

Item 6: Purpose for Which Licensed Material Will be Used

Item Letter Above	Authorized Use
A through G	Laboratory Sample Analysis
D through G	Calibration Standards

Decommissioning Funding Plan

DEPARTMENT OF THE ARMY
US Army Public Health Command
Aberdeen Proving Ground, Maryland 21010-5403

Reference: Nuclear Regulatory Commission Source Material License Number SMB-707, Byproduct Material License 19-09880-10 and Special Nuclear Material License SNM-860

Decommissioning Funding Plan
June 2014

Prepared by: Scott Goodison
Health Physicist
Command Radiation Safety Officer
US Army Public Health Command

Reference: NRC License SMB-707 Renewal Request, US Army Public Health Command

1. Description of the facility buildings, rooms, and grounds, including the number and dimensions of areas (e.g. laboratories) that could require decontamination:

a. Radioactive Material Use.

(1) The U.S. Public Health Command (USAPHC) mission requires that we maintain the capacity to possess Army commodities containing radioactive material in quantities in excess of 100 mCi. Such commodities are returned to the manufacturer or disposed of as radioactive waste upon completion of analysis. On a day to day basis, USAPHC possesses only small quantities (less than 1.0 mCi) of low level unsealed radioactive material.

(2) USAPHC also possesses sealed sources in various amounts up to our possession limits that are leak tested as required by our NRC license conditions. No sealed source leak test that we have performed has exceeded our action level of 0.0005 microcuries, 10 percent of the value that requires reporting to the NRC in accordance with our NRC license conditions.

(3) As a result of the control and mitigation efforts performed by the Radiation Safety Staff at USAPHC, a large scale decontamination effort will not be required to comply with future decommissioning of USAPHC facilities presently authorized under our USNRC Licenses.

(4) Radiation surveys and mitigation required for the return of any previously controlled radiation areas to unrestricted use shall be performed under the supervision of the USAPHC Radiation Safety Staff. The cost of surveying and mitigation will be resident in the operating budget of the USAPHC or other sponsoring organizations.

(5) The cost estimate provided below will allow USAPHC to meet the release criteria of 10 CFR 20.1402.

b. Facilities.

(1) Building E-2100 radiation analysis laboratories are used for sample analysis and contain sealed and unsealed radiation sources and low level radioactive waste that is awaiting pick-up for disposal. There are approximately 17 laboratory spaces (including large rooms that are subdivided into smaller spaces). Total area of laboratory and storage areas is approximately 354 square meters.

(2) Building E-2100 and 2101 radioactive material storage areas are used to store sealed sources, low level radioactive waste that is awaiting pick-up for disposal, and unsealed calibration standards. There are 3 areas designated as storage areas. All laboratory and storage areas are considered to have similar levels of contamination (less than 200 dpm gross alpha-beta/100cm^2), so all of these areas are consolidated in the tables below.

(3) A license amendment has been submitted to allow for the temporary storage of low-level radioactive waste governed by the USAPHC NRC Licenses in building B5111, Aberdeen Proving Ground North. However; the responsibility for radiation safety and decommissioning of building B5111, Aberdeen Proving Ground North falls under the purview of the US Army Aberdeen Test Center. Therefore building B5111, Aberdeen Proving Ground (APG) North is not included in this decommissioning funding plan.

(4) All other areas in USAPHC buildings are considered non-impacted areas.

c. Waste Disposal

(1) A total of about one cubic meter of waste materials are generated every three years under USAPHC NRC licenses. Check sources are shipped and disposed of as radioactive waste as radionuclide's decay, or are replaced.

(2) Radioactive waste generated at USAPHC under our USNRC licenses is disposed of through the U.S Army Joint Munitions Command (JMC), Rock Island, Illinois. The Joint Munitions Command is responsible for all costs associated with disposal of low-level radioactive waste in Army facilities.

Number and Dimensions of Facility Components (A.3.5)
Name of room, laboratory, or area: Storage and use areas in USAPHC
Level of contamination: less than 200 dpm (gross alpha-beta/100 cm^2)

Component	***Number of Components***	***Dimensions of Component (specify units)***	***Total Dimensions (specify units)***
Glove Boxes	0	0	0
Fume Hoods	7*	2.2 m^2	15.4m^2
Lab Benches	17*	Varied	94 m^2
Sinks	10*	0.8m^2	8 m^2
Drains	2*	5 cm diameter	10 cm diameter
Floors	0*	0	0
Walls	0*	0	0
Ceilings	0*	0	0
Ventilation/Ductwork (2'x 4'x 2')	10	0.9 m^3	9 m^3
Hot Cells	0	0	0
Equipment/Materials	10*	N/A	N/A
Soil Plots	0	0	0
Storage Tanks	0	0	0
Storage Areas	2*	10 m^2 average	20 m^2
Radwaste Areas	4*	5.6 m^2 average	22.4 m^2
Scrap Recovery Areas	0	0	0
Maintenance Shop	0	0	0
Equipment Decontamination Areas	0	0	0
Other (specify)	N/A	N/A	N/A

*Assumption: residual radioactivity concentration is expected to be minimal or non-existent as lab practice rules prohibit work to be performed without the use of plastic-backed paper or in some cases, spill trays. Contamination limits are set at 200 dpm (gross alpha-beta/100 cm^2) for all daily and monthly use and storage area wipe surveys, so contamination is monitored and documented on a continuous basis.

Planning and Preparation (A.3.6)

Activity	Labor Category RSO $832/day	Labor Category HP $704/day	Labor Category Clerical $300/day	Labor Category HP Tech $494/day
Preparation of Documentation for Regulatory Agencies	5	0	2	0
Submittal of Decommissioning Plan to NRC when required by 10CFR 40.42(g)(1)	5	5	3	0
Development of Work Plans	5	5	3	0
Procurement of Special Equipment	0	0	0	0
Staff Training	0	0	0	0
Characterization of Radiological Condition of the Facility (including soil and tailings analysis or groundwater analysis of applicable)	10	10	5	2
Other (specify)	0	0	0	0
TOTALS	25	20	13	2

1. Cost figure includes $5,000 for travel and incidental expenses.
2. These items are for preparation and documentation for all USAPHC use and storage areas.
3. All labor rates are fully burdened.

Decontamination or Dismantling of Radioactive Facility Components (Work Days) (A.3.7)
Name of room, laboratory or area: Storage and use areas in USAPHC
Level of contamination: less than 200dpm (gross alpha-beta/100 cm^2)

Component	Decon Method	Labor Category RSO	Labor Category HP	Labor Category Clerical	Labor Category HP Tech
Glove Boxes	N/A	0	0	0	0
Fume Hoods*	Rad Wash	2	2	0	5
Lab Benches*	Rad Wash	1	1	0	5
Sinks*	Dismantle/ Rad Wash	1	1	0	2
Drains	Dismantle/ Rad Wash	0	0	0	1
Floors*	Rad Wash	1	1	0	2
Walls*	Rad Wash	1	1	0	2
Ceilings*	Rad Wash	1	1	0	2
Ventilation/Ductwork	Rad Wash	1	1	0	1
Hot Cells	N/A	0	0	0	0
Equipment/Materials*	Rad Wash	1	1	0	1
Soil Plots	N/A	0	0	0	0
Storage Tanks	N/A	0	0	0	0
Storage Areas*	Rad Wash	1	1	0	1
Radwaste Areas*	Rad Wash	1	1	0	1
Scrap Recovery Areas	N/A	0	0	0	0
Maintenance Shop	N/A	0	0	0	0
Equipment Decontamination Areas	N/A	0	0	0	0
Other (specify)	N/A	0	0	0	0
TOTALS		11	11	0	23

*Assumption: contamination is expected to be minimal or non-existent as lab practice rules prohibit work to be performed without the use of plastic-backed paper or in some cases, spill trays. Contamination limits are also set at 200 dpm (gross alpha-beta/100 cm^2) for all daily and monthly use and storage area wipe surveys, so contamination is monitored and documented on a continuous basis.

Restoration of Contaminated Areas on Facility Grounds (Work Days) (A.3.8)

Activity	Labor Category RSO	Labor Category HP	Labor Category Clerical	Labor Category HP Tech
Backfill and Restore Site	0*	0	0	0
TOTALS	0	0	0	0

* Not applicable to USAPHC facilities or grounds

Final Radiation Survey (Work Days) (A.3.9)

Activity	Labor Category RSO	Labor Category HP	Labor Category Clerical	Labor Category HP Tech
Final Wipe/Survey	1	1	0	2
2nd Decon	1	1	0	4
Report Review	5	3	2	1
TOTALS	7	5	2	7

Site Stabilization and Long-Term Surveillance (Work Days) (A.3.10)

Activity	Labor Category RSO	Labor Category HP	Labor Category Clerical	Labor Category HP Tech
Site Stabilization	0*	0	0	0
Long-Term Surveillance	0	0	0	0
TOTALS	0	0	0	0

* Not applicable to USAPHC facilities or grounds

Total Work Days by Labor Category (A.3.11)

Task	Labor Category RSO	Labor Category HP	Labor Category Clerical	Labor Category HP Tech
Planning and Preparation (TOTALS from Table A.3.6)	25	20	13	2
Decontamination and/or Dismantling of Radioactive Facility Components (Sum of TOTALS from all copies of Table A.3.7)	11	11	0	23
Restoration of Contaminated Areas on Facility Grounds (TOTALS from Table A.3.8)	0	0	0	0
Final Radiation Survey (TOTALS from Table 3.9)	7	5	2	7
Site Stabilization and Long-Term Surveillance (TOTALS from Table 3.10)	0	0	0	0

Reference: NRC License SMB-707 Renewal Request, US Army Public Health Command

Cost Estimate Tables Unit Cost for Workers (A.3.12)

Position	Basic Salaries ($/yr)	Overhead Rate (%)	Worker Cost/Year	Worker Cost/Day
Radiation Safety Officer (GS-14 equivalent))	129,313	67.3	$216,340	$832
Health Physicist (GS-13 equivalent)	109,428	67.3	$183,073	$704
Clerical (GS-6 equivalent)	46,696	67.3	$78,122	$300
Health Physics Technician (GS-11 equivalent)	76,773	67.3	$128,441	$494

*Based on 260 work days per year

Total Labor Costs by Major Decommissioning Task (A.3.13)

Task	Labor Category RSO ($832/day)	Labor Category HP ($704/day)	Labor Category Clerical ($300/day)	Labor Category HP Tech ($494/day)	Total
Planning and Preparation	$20,800	$14,080	$3900	$5,988**	$44,768.00
Decontamination and/or Dismantling of Radioactive Facility Components	$9,152	$7,744	$0	$11,362	$28,258.00
Restoration of Contaminated Areas on Facility Grounds	$0	$0	$0	$0	$0
Final Radiation Survey	$5,824	$3,520	$600	$3,458	$13,402.00
Site Stabilization and Long-Term Surveillance	$0	$0	$0	$0	$0

**Cost figure includes $5,000 for travel and incidental expenses

Packaging, Shipping, and Disposal of Radioactive Wastes (Excluding Labor Costs) (A.3.14)

(a) Packing Material Costs*

Waste Type	Volume (m^3)	Number of Containers	Type of Container	Unit Cost of Container	Total Packaging Costs
LL Solid	1.5	4	Lined Drum	$125	$500
TOTAL	1.5	4	Lined Drums	$125/drum	$500

* services are brokered through the Army's executive agency for radioactive waste such that packaging, transport and disposal are charged together so costs are provided here for informational purposes only.

(b) Shipping costs*

Waste Type	Number of Truckloads	Unit Cost ($/mile/ truckload)	Surcharges	Overweight Charges	Distance Shipped (miles)	Total Shipment Costs
LL Solid	1	$25 per mile for each mile over 200 traveled	$1,800 per drum	N/A	1,200	$32,200
TOTAL	1	1,000 miles traveled	4 drums = $7,200	N/A		$32,200

*services are brokered through the Army's executive agency for radioactive waste such that packaging, transport and disposal are charged together so costs are provided here for informational purposes only.

(c) Waste Disposal Costs*

Waste Type	Disposal Volume (m^3)	Unit Cost ($/$m^3$)	Surcharges	Total Disposal Costs
LL Solid	6.0	$9,000	*	$54,000
Total	6.0	$9,000	*	$54,000

* services are brokered through the Army's executive agency for radioactive waste such that packaging, transport and disposal are charged together so costs are provided here for informational purposes only.

Equipment Costs (Excluding Containers) (A.3.15)

Reference: NRC License SMB-707 Renewal Request, US Army Public Health Command

Equipment/Supplies	Quantity	Unit Cost	Total Equipment/Supply Cost
Wipes	2 Boxes	$70/box of 500 wipes	$140
Radwash	30 gallons	$20/gallon	$600
TOTAL			$740.00

Laboratory Costs (A.3.16)

Activity	Total Cost
Sampling	$2,000
Transport of samples	$300
Testing and analysis	$10,000
Other(specify) - Supplies	$5,000
TOTAL	$17,300.00

Miscellaneous Costs (A3.17)

Cost Item	Total Cost
License Fees	$0
Insurance	$0
Other (specify)	$0
TOTAL	$0

Total Decommissioning Costs (A.3.18)

Task/Component	Cost	Percentage
Planning & Prep (from Table A.3.13)	$44,768	23.4%
Decontamination and/or Dismantling (from Table A.3.13)	$28,258	14.8%
Restoration of Cont Areas (from Table A.3.13)	$0	0%
Final Radiation Survey (from Table A.3.13)	$13,402	7.0%
Site Stab & Long Term Surveillance (from Table A.3.13)	$0	0%
Packing Material Costs (from Table A.3.14a)	$500	0.3%
Shipping Costs (from Table A.3.14b)	$32,200	16.8%
Waste Disposal Costs (from Table A.3.14c)	$54,000	28.2%
Equipment/Supply Costs (from Table A.3.15)	$740	0.4%
Laboratory Costs (from Table A.3.16)	$17,300	9.0%
Miscellaneous Costs (from Table A.3.17)	$0	0%
SUBTOTAL	$191,168.00	100%
25% Contingency	$47,792	
TOTAL DECOMMISSIONING COST ESTIMATE	$238,960	

Tab C

Personnel Responsible for the Radiation Safety Program and their Training and Experience

DEPARTMENT OF THE ARMY
US ARMY PUBLIC HEALTH COMMAND
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND MARYLAND 21010-5403

MCHB-CG

14 August 2013

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Appointment Orders for Membership of the USAPHC/AIPH Radiation Management Committee

1. Effective immediately, personnel in the positions indicated below are appointed as members of the U.S. Army Public Health Command (USAPHC)/Army Institute of Public Health (AIPH) Radiation Management Committee (RMC).

a. Chief of Staff, USAPHC or Director, AIPH or their designated representative as Chairperson.

b. Command Radiation Safety Officer, USAPHC.

c. Chief, Safety and Environmental Management Office or designated representative.

d. Portfolio Director, Occupational and Environmental Medicine Portfolio or designated representative.

e. Program Manger, Health Physics or designated representative.

f. Chief, Laboratory Analytical Division-Inorganic or designated representative.

g. All AIPH Radiation Permit Holders/Principal Users.

h. G-4, Director of Logistics or designated representative (non-voting member).

i. Other members as designated by the Chairperson.

2. Authority.

a. Army Regulation 40-5, Preventive Medicine, 25 May 07.

b. Army Regulation 385-10, The Army Safety Program, (*RAR 004 10/04/2011), 23 August 2007.

c. DA PAM 385-24, The Army Radiation Safety Program (*RAR 002 09-22-2011), 24 August 2007.

3. Purpose: Provide oversight and technical guidance on radiation safety within the U.S. Army Public Health Command and the Army Institute of Public Health.

4. Period: Until officially relieved or released from appointment.

5. Special Instructions: None.

JOHN J. RESTA
Deputy to the Commander
for Public Health

DISTRIBUTION:
Each Committee Member

Chairman, Radiation Management Committee

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WORK EXPERIENCE

August 2010 to Present – US Army Public Health Command, Aberdeen Proving Ground, MD - Director, Army Institute of Public Health/Deputy to the Commander, US Army Public Health Command (APHC). Supervisor: MG Jimmie O. Keenan. Serve as the Director of the Army Institute of Public Health (AIPH), a subordinate activity of the US Army Public Health Command and as the Deputy to the Commander, US Army Public Health Command.

- Directly supervise the activities of over 800 military, civilian and contractor public health professionals assigned to the AIPH and oversee the activities of over 2200 additional personnel assigned to one of the five APHC Regional Commands. These personnel comprise over sixty discrete professional disciplines and occupations such as environmental engineers, industrial hygienists, public health nurses, chemists, epidemiologists, occupational medicine physicians, biologists, psychologists and veterinarians. Organized along nine portfolios, these specialists provide over 3000 discrete services annually to include projects such as industrial hygiene surveys at Army Depots, public health emergency response to natural disasters such as the Japanese earthquake and Fukushima reactor emergency, toxicological support to the Army acquisition of experimental military munitions, health hazard assessment of new military material, veterinary food inspection of fresh fruits and vegetables for Naval Forces afloat, community health promotion support at Army installations, epidemiological outbreak investigations of outbreaks in garrison and operational settings, Environmental Health Site Assessments at Forward Operating Basecamps in Iraq and Afghanistan, injury prevention assessments of Army basic trainees and suicide risk factor analyses among redeploying Soldiers.

- Oversee the planning, programming, budgeting and execution of an annual budget greater than $160M comprised of DHP, Army-OMA, Army-RDT&E and OCO appropriations. Serve as the institutional official for Human Subjects Research Protection, Institutional Animal Use and Care, Radiation Safety and Laboratory Quality Assurance.

- Oversee the design and implementation of the Army Military Public Health Enterprise (MPHE) to establish a synchronized approach to public health throughout the Army. Using novel organizational relationships developed as part of the Army's Core Enterprise initiative, we have crafted a concept of operations that creates a unified public health team at the installation (tactical) level, provides specialized public health capabilities at the area, regional and national (operational) level and establishes a single point of responsibility for public health at the Army (strategic) level while maintaining the existing command and control relationships of the Army Medical Command (MEDCOM). This concept of operations is being implemented through a series of organizational experiments, policy modifications, portfolio management practices, collaborative relationships and management controls throughout the MEDCOM. These efforts, such as mandating quarterly review meetings at the regional and portfolio levels, have resulted

in measured improvements in situational awareness throughout the MPHE, built resilient lines of communication/collaboration throughout the Army Medical Command and identified the need for further refinement of technical metrics at all levels of the enterprise. These practices were exercised in 2011, when the APHC led the DOD response to the first rabies fatality within the DOD in over 40 years. This response identified and contacted over 8000 Soldiers, Sailors, Airmen and Marines, DOD Civilian Employees and DOD Contractors ensuring those personnel at risk for rabies received the appropriate post-exposure treatment.

June 2005 to August 2010 - US Army Public Health Command (Provisional) (PHC(P)) (Formerly US Army Center for Health Promotion and Preventive Medicine (USACHPPM), Aberdeen Proving Ground, MD- Scientific Advisor. Supervisor: BG Timothy Adams. Served as the Scientific Advisor for the PHC(P)/USACHPPM.

- Responsible for the accomplishment of the command scientific mission and with the effective and economical internal functioning of the organization. Oversaw the operations of the Strategic Initiatives Office and Command Project Management Office.

- Provided active executive oversight of the successful USACHPPM migration to the National Security Personnel System. I served as the Manager for the Supervisory Pay Pool; successfully completing the first three rounds of NSPS assessments for 88 supervisory personnel. I used this role to change the command culture as directed by the USACHPPM commander so that the organization could evolve to meet emerging missions. As the Scientific Advisor, I did not have the direct supervisory authority necessary to mandate changes. The NSPS provided me the opportunity to affect change, without direct authority. Recognizing that organizational change can be driven through supervisors, I successfully advocated that all command supervisory personnel be evaluated through a single Supervisory Pay Pool and volunteered to serve as the NSPS Pay Pool Manager reconciling all supervisory performance assessments and determining whether an individual supervisor would receive an annual performance salary increase and/or bonus. I then used this authority to influence programmatic changes via indirect means such as creating command-wide standardized supervisory performance plan objectives while ensuring that the formal chain of command was respected.

- Led the development and implementation of a command project management system to manage the over 3000 projects executed by the command annually. Titled Open Project Management (OPM), the initiative was designed to provide visibility into the command's complete worldwide project portfolio in real time in order to:

    - Track time and funds expended against projects at the task level and use this data to monitor and improve services.
    - Standardize project management practices throughout the command to allow the command's leaders towards measuring performance of individuals, programs, services, and the command using data instead of emotion.
    - Store project deliverables so that they are accessible by the command's personnel worldwide allowing them to learn from their peers.

  Ensured that the system development and deployment were conducted in an open, transparent manner in an attempt to ease the overall organizational opposition which was extensive throughout the command, to include among several of the command's senior leaders. Using a collaborative approach to identify system functional requirements and COTS software solutions, the system was completed in June 2007, six

months after the commander's deadline, but over the objections of the system designers as major system software changes were still required. At the end of FY07, less than one-third of the command's total execution was being tracked in the system. This increased to 70% by the end of FY08, but confidence in the system's data by managers at all levels within the organization was weak and most personnel remained opposed to the system. Using surveys and town halls, I identified key gaps in the system usage and design and directed a strategy to address these gaps. This included a proposed restriction of system access to supervisors. This last item met with considerable objections by most of the command's managers who felt that project management was an administrative task instead of a critical management task. At the end of FY 11, overall OPM usage throughout the command exceeded 70% of the command's financial execution; however, this has degraded with the implementation of the DA mandated General Funds Enterprise Business System (GFEBS) in April 12 while its project management capabilities are developed. The project management capabilities developed under this effort are directly supporting the overall portfolio management approach being used to manage the Army's Military Public Health Enterprise.

- Co-chaired the Armed Forces Health Surveillance Center (AFHSC) workgroup, leading a yearlong reorganization effort aligning health surveillance personnel from the Army, Air Force, Navy and DOD into a single Joint organization as a DOD Executive Agency overseen by the Army. The workgroup developed the final concept of operations which was approved by the ASD-Health Affairs and continues to guide the operations of the AFHSC.

- Co-Chaired the MEDCOM Public Health Command Transition Team, leading a two year analysis and reorganization effort that transformed the MEDCOM public health program by merging select missions of the USACHPPM and the US Army Veterinary Command (VETCOM). The VETCOM is responsible for all DOD Veterinary Services. I assembled a team that represented each of these organizations and developed a workflow that completed the necessary analyses to support a decision. This was a somewhat difficult task because each of the organizations represented were concerned about losing resources, authorities and ultimately status because of the reorganization. This was particularly true of the VETCOM as they had operated as a unified organization from the installation level up thru the headquarters level since 1995; viewed themselves as unique because of their specialized public health capabilities in food protection and quality assurance; and were concerned about the impact of the reorganization on the career progression of their military officers. I adopted a posture that the workgroup would operate in a transparent, collaborative manner where all organizational equities would be identified. Organizational representatives initially resisted these efforts by failing to obtain the needed information to complete an analysis or withholding the information until the last moment. I was able to overcome this resistance by insisting that decisions be supported with objective data versus emotion and spending considerable time and effort persuading workgroup members to evaluate proposals from a mission focused perspective instead of an organizational impact perspective. I kept the MEDCOM senior leadership informed of the workgroup progress and used the senior leadership's interest as a tool to keep the workgroup involved in the effort. This too was difficult as each organization was led by senior officers who often disagreed with the workgroup's recommendations. I provided a final decision briefing to the Army Surgeon General (LTG Schoomaker) in May 2009 which was modified in August 2010 to mitigate the risk of mission failure of the installation veterinary services mission. The organizational alignment developed by this effort was implemented in October 2009.

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- Attended Harvard University, Kennedy School of Government Senior Executive Fellow Program.

[redacted] National Defense University, Industrial College of the Armed Forces - Senior Service College Student, Ft Mc Nair, Washington, D.C. Supervisor: BG Michael Cates (ret), - Senior Service College attendance at the National Defense University-Industrial College of the Armed Forces.

- One of two non-Acquisition Corps attendees within AY 04/05 Department of Army Civilian nominees (One of eight DA Civilians.)

- Completed program requirements for Master of Science degree in National Resource Strategy.

- Distinguished Graduate. Recognized as a finalist for the best student paper in Economics.

July 1996- August 2004 – USACHPPM, APG, MD, Supervisory Environmental Engineer, APG, MD, Supervisor: Stephen Kistner (ret) Served as the Director, Health Risk Management and the Program Manager, Deployment Environmental Surveillance. Directed the worldwide missions of the Environmental Health Risk Assessment, Deployment Environmental Surveillance, Risk Communication Programs and the DOD Liaison to the US Agency for Toxic Substances and Disease Registry. Supervised 62 DA Civilians, military, and contractors thru subordinate supervisors up thru the grade of GS-15.

- Focused on developing capabilities to identify, assess, control and document occupational and environmental health (OEH) exposures to deployed US Forces in response to the experience of returning veterans who, along with their families, and Congress became concerned about service-related illnesses and fears following among Operation Desert Storm. A primary cause of Veterans' concerns were the various OEH exposures they experienced during the war, ranging from oil well fire smoke, to pesticides, to perceived low levels of chemical agents from the demolition of the depot at Khamisiyah. Epidemiological and environmental health investigations into the linkage between exposures and illnesses were hindered by the absence of quantitative exposure information, coupled with accurate unit location/roster data. I was named the initial Program Manager in July 1996 because of my ability to build programs and charged with developing the needed strategic, operational, tactical, and financial plans needed to develop an OEH surveillance capability within the Army and ultimately DOD. I developed a programmatic business plan which laid out the personnel strength and composition, contract, travel, equipment and supplies costs and led the effort to develop and defend a successful $20M program objective memorandum for the Fiscal Year 98-03 budget years. Once this internal effort was completed, I identified the need to develop operational policies and procedures for OEH surveillance during Joint operations. I contacted the Chair of the Joint Preventive Medicine Policy Group and arranged for them to charter a subordinate working group called the Joint Environmental Surveillance Workgroup in October 1997. Comprised of representatives from the Air Force, Navy, Combatant Commands, Defense and Service Secretariats, and various Service Major Commands, this workgroup this workgroup was charged with developing Joint policy and guidance for Deployment OEH surveillance and risk assessment for the DOD and Military Services. It has met on a regular basis since FY 98. I served as the Chairman from its inception thru July 2004. To date, the workgroup has developed the OEH surveillance requirements for inclusion into the Defense Occupational and Environmental Health Readiness System and Theater Medical Information Program (FY 98), drafted a Joint

Staff directive on Deployment Health Surveillance (MCM-0006-02, Feb 02), and prepared a White Paper that has served as the DOD's Vision for deployment OEH Surveillance (FY 02), coordinated Service input into the revision of DODI 6490.3 Deployment Health Surveillance and Medical Readiness, continued assessing the gaps for Deployment OEHS policies within the Services and Joint Community, developed a Deployment Environmental Health Site Assessments Standard by the American Society for Testing and Materials, chartered three sub-working groups to identify and research field drinking water issues, laboratory issues and equipment issues for OEH Surveillance, and developed and completed a Joint assessment of OEH Lessons Learned from Operation Iraqi Freedom. This effort continues today and is responsible, in coordination with deployed Army, Navy and Air Force Preventive Medicine units, an extensive data set on Deployment OEH exposures from Iraq and Afghanistan which is being used by DOD and Veterans Administration physicians to address returning Service members' health concerns, provide medical treatment where required and ease anxieties when necessary.

EDUCATION:

- Pennsylvania State University [redacted], University Park, PA Degree: B.S. - Environmental Engineering
- University of Delaware [redacted] Newark, DE: M.C.E - Civil Engineering. [redacted]
- National Defense University-ICAF [redacted] Ft Mc Nair, Washington DC, MS - National Resource Strategy

LICENSES/CERTIFICATES:

- Professional Engineer, State of Maryland, 1984-Present

OTHER INFORMATION:

- Adjunct Assistant Professor of Preventive Medicine and Biometrics at the Uniformed Services University of the Health Sciences.

- Member of the National Society of Professional Engineers, the Society for Risk Analysis.

- Active member of the local community, supporting numerous community service efforts. I served as the Susquehanna Chapter- Maryland Society of Professional Engineers MATHCOUNTS Coordinator for over 10 years. Active in the Bel Air Recreation Committee (BARC) youth athletics program serving as a volunteer boys baseball, girls and boys soccer, and girls basketball coach. Currently, serving as the President, BARC Board of Directors. Previously, I was active in the Boy Scouts of America, and had served as an Assistant Scoutmaster for Troop 808, and a Den Leader for Pack 808 in Bel Air, Maryland. I've led high adventure trips to the Florida Keys (1999), Southwest Virginia (2000), and Philmont, New Mexico (2001).

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Radiation Safety Officer

Scott Goodison
[redacted]
[redacted] Work: (410) 436-8076
Email: scott.g.goodison.civ@mail.mil

Academic Degrees

Bachelor of Science, [redacted]
Specialization in Health Physics
Wayland Baptist University, Plainview, TX

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Professional Experience

July 2013-Present, Command Radiation Safety Officer
Army Public Health Command, Army Institute of Public Health
Aberdeen Proving Ground – South, MD

- Provide internal customers and subordinate commands with responsive and comprehensive services in radiation safety worldwide.
- Directly responsible to the Commander, USAPHC on all matters of radiation safety within the command, to include subordinate commands.
- Provide command-wide consultations and radiation safety evaluations.
- Develop radiation safety policies, exercising oversight of all radiation safety activities within the command. Use in-depth operational radiation safety knowledge to direct and mentor the RSOs at the subordinate commands to ensure proper radiation safety.
- Represent the Command at all radiation safety related meetings and working groups.
- Perform radiation safety surveys of all laboratories and operations involving radiation or radioactive material.
- Ensure the Command is in compliance with all regulations that pertain to the use and disposal of radioactive material authorized under three Nuclear Regulatory Commission licenses.

February 2002 – July 2013, ***Health Physicist***
Army Public Health Command, Army Institute of Public Health – Health Physics Program (HPP), Aberdeen Proving Ground – South, MD

- Team Leader for Health Physics Operations Team providing all project support and supervision for six Army Officers, Non-commissioned Officers and Soldiers
- Subject matter expert in radiological environmental monitoring and risk assessment for deployed forces world wide.
- Provides consultation and assistance to USAPHC, DA, and other DOD activities in radiological health risk assessments resulting from the deliberate use or incidental presence of Weapons of Mass Destruction (WMD), to include nuclear/radiological agents, during wartime operations, stability and support operations and homeland security actions.
- Provides deployment risk assessment training, sampling protocols and environmental sampling equipment for DOD environmental surveillance assets worldwide.
- Deploys to field settings to conduct environmental radiation protection studies, risk assessments, consultations and surveys; and makes recommendations to mitigate health risks to acceptable levels.
- Acts as primary liaison for health physics consultation and support with the Deployment Environmental Surveillance Program (DESP) and the Radiologic Classic and Clinical

Chemistry Division (RCCCD) providing all environmental radiological data analysis for military deployments worldwide.
- Acts as the Alternate augmentee to the Specialized Medical Command Response Capability Team
- Provides pre-publication review of Army and DOD radiation safety regulations and provides guidance in the form of fact sheets information papers, and technical guides where standards are unclear or do not exist.
- Principal user for two Army Public Health Command Radiation Permits.

May 2001 – January 2002, ***Human Systems Integration Engineer***
Science Applications International Corporation, Abingdon, MD

- Perform human systems integration and human factors engineering analyses and hazard assessments in support of various DOD joint service programs.
- Develop system hazard analyses, health hazard assessments, failure modes and effect analyses and health and safety plans for a variety of engineered systems.

January 1985 – May 2001, ***Health Physics Technician/Supervisor***
Unites States Army

- Acted as Alternate Radiation Protection Officer for 3 Nuclear Regulatory Commission (NRC) Licenses and an Army Radiation Authorization (Army Environmental Hygiene Agency).
- Performed radiation protection studies and surveys and monitored radiological compliance with Federal, Army and DOD regulations pertaining to radioactive material in Department of Defense (DOD) Facilities worldwide.
- Performed radiation protection surveys in a variety of medical facilities including Nuclear Medicine, Radiology, Department of Clinical Investigations and Research labs.
- Evaluated potential personnel exposure to radiation and radioactive material including human factors which may cause personnel overexposure.
- Provided oversight of all aspects of radioactive waste management to include transportation, storage for radioactive decay and disposal, and interface with local authorities to ensure local regulatory disposal compliance
- Compiled data and provided written reports and data analysis to service requesting commands and customers.

Special Projects
- Technical Lead and Project Officer, Radiological Environmental Evaluation of the Tuwaitha Nuclear Research Facility, Baghdad Iraq, 2003
- Technical Lead and Project Officer, Environmental Site Characterization Survey, Udairi Firing Range, Kuwait, 2003
- Technical Lead, Environmental Evaluation of the Samawah Rail Depot, Samawah, Iraq, 2004
- Technical Lead, Environmental Closeout Survey of the Army Contaminated Equipment Retrograde Facility, Camp Arifjan, Kuwait, 2005
- Project Manager, Study of the Effectiveness of Army Radiological Basecamp Assessments, 2006

Publications & Posters

- Author, U.S. Army Guidance For Deployed Preventive Medicine Personnel On Radiological Health Risk Management, Health Physics Society (HPS) Midyear Meeting, Augusta, GA 2003
- Co-author, The United States Army Medical Department (USAMEDD) Response To Nuclear And Radiological Incidents: The Special Medical Augmentation Response Team – Preventive Medicine (SMART-PM) Program, HPS Midyear Meeting 2003
- Co-author, Deployment Radiation Risks to US Troops at the Tuwaitha Nuclear Research Center During the Early Phases of Operation Iraqi Freedom, HPS Midyear Meeting 2005
- Technical Co-Author, USACHPPM Technical Guide 251 (TG251): A Soldier's Guide to Environmental and Occupational Health Field Sampling During Military Deployment, (Draft), November 2001
- Technical Co-Author, USACHPPM Technical Guide 275, Personal Protection Equipment Guide for Military Medical Treatment Facility Personnel Handling Casualties from Weapons of Mass Destruction and Terrorism Events
- Technical Co-Author, TB Med 577, Sanitary Control and Surveillance of Field Water Supplies
- Technical Co-Author, CHACPPM Technical Guide 195, Safety and Health Guidance for Mortuary Affairs Operations
- Technical Co-Author, Standards for Safe Transport of Radiologically Contaminated Decedents from Overseas Theaters of Operation to the Continental United States.

Presentations

- Lecturer, Occupational and Environmental Health Surveillance Operational Risk Management Course, USACHPPM; various locations (2002 - Present)
- Lecturer and Coordinator, Health Physics and Nuclear Medical/Radiological Sciences Track, Force Health Protection Conference, USACHPPM; Aberdeen Proving Ground, MD (2002 – 2011)
- Lecturer and Coordinator, Field/Deployment Radiation Safety Officer's Course, APHC; Aberdeen Proving Ground, MD (2006 – 2012)
- Lecturer and Coordinator, Radiological Hazards Operations Course, Idaho National Labs (2003-2012)

Affiliations/Activities

- Health Physics Society
- National Registry of Radiation Protection Technologists

Honors & Awards

- Military Awards and Honors, 1981-2001
- Order of Military Medical Merit, 1997
- Commander's Award for Civilian Service, 2003 and 2011

Specialized Training

- US Army Health Physics Specialist Course Phase 1 and 2 (46 weeks)
- Medical Effects Of Nuclear Weapons Course (1 week)
- Radiation Protection Officer's Course (1 week)
- Medical Radiation Protection Officer's Course (1 week)
- Occupational Environmental Radiation Protection Course (1 week)
- Medical Management of Radiation Casualties Course (2 days)
- Radioactive Waste Management Course (1 week)
- Nuclear Emergency Team Operations Course (1 week)
- Medical X-ray Survey Techniques Course (2 weeks)
- Laser/Radio frequency Hazards Course (1 week)

Radiation Management Committee

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CURRICULUM VITAE

John P. Cuellar
Colonel, Medical Service Corps, United States Army

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Home of Record	[redacted]
Current Address	[redacted]
Current Telephone Numbers	[redacted] W – (410) 436-8396
Date and Place of Birth	[redacted]
Education	Instructional Psychology Masters University of Oklahoma, OK [redacted] Physics Bachelors Pitzer College, CA [redacted]
Other Education and Training	
1996-1998	Graduate Courses Medical Health Physics Program- 30+ Hrs University of Texas Health Science Center San Antonio, TX
1994	HAZMAT Emergency Response Team Course University of Kansas Fort Clayton, Panama
1992	Occupational & Environmental Radiation Protection Course Harvard University Boston, MA

General Publications

"Consequence Management Advisory Teams" *NBC Report*, USANCA, Fall/Winter 2005

"Microwaves and Electromagnetic Fields," with D. H. Sliney, Chapter 13 of Environmental Toxicants: Human Exposures and Their Health Effects, by Morton Lippmann (Editor), New York: John Wiley & Sons, 1991.

Department of Homeland Security Publication

Co-author, National Safety Handbook for Medical First Responder and Receivers in Response to an IND 2013.

White paper co-author for national recommendations for medical training objectives and curriculum to prepare for responding to an IND event 2013.

Co-author for the National Radiological and Nuclear Terrorism Risk Assessment and Terrorist "Dirty Bombs": Threats and Responses 2013.

Department of the Army Publications

"LucAl Phantom Evaluation," *Preventive Medicine Newsletter,* US Army Medical Department, San Antonio, 1992.

Department of Defense Publications

"Biota Sampling Report for Plutonium at Johnston Atoll" with Phillip Lobel and David Rynders, Defense Threat Reduction Agency, 2001.

"Sediment Sampling of the Johnston Atoll Lagoon" with Douglas Winquist, Defense Threat Reduction Agency, 2001.

"Corrective Measures Study/Feasibility Study for the Disposition of Metal/Concrete Debris & Radioactive Coral Located in the Radiological Control Area on JI, Johnston Atoll" with J Esterl, J Fraher, D Rynders, H Stumpf, and D Winquist, Defense Threat Reduction Agency, 2002.

Academic Experience

June 2009 – July 2013	Assistant Professor Uniformed Service University Preventive Medicine and Biometrics Bethesda, MD
January 2002 – September 2004	Instructor/Advisor Defense Nuclear Weapons School Defense Threat Reduction Agency Kirtland AFB, NM and Fort Belvoir, VA
July 1998 – June 2001	Assistant Professor Department of Physics United States Military Academy West Point, NY
December 1995 - August 1996	Instructor NBC Sciences, Army Medical Department Center and School Fort Sam Houston, TX

Courses Taught:

Graduate 2009-2013	Health Physics Medical Effects of Ionizing Radiation
Professional 2002-2004	Effects of Nuclear Weapons Medical Aspects of Nuclear War Radiation Effects Response to Radiological Incidents Consequence Management Topics
Undergraduate 1998-2000:	Introductory Physics I and II Medical Radiation Physics Experimental Physics Modern Physics
Professional 1995-1996:	Army Medical Department OBC Army Medical Department OAC X-ray Survey Techniques Course X-ray Technologist Basic Course Preventive Medicine Course Medical Management of BC Casualties Course

USMA Committee Assignments Faculty Development Committee (1999-2001)

Military Education and Training

2006	Joint Nuclear Operations Course Defense Nuclear Weapons School Kirtland AFB, NM
2005	WMD Planners Course Defense Nuclear Weapons School Washington, DC
2004	WMD response course Defense Threat Reduction Agency
1998	Combined Arms and Services Staff School US Army Command and General Staff College Fort Leavenworth, KS
1996	Medical Management of Chem/Bio Casualties Fort Detrick & Aberdeen Proving Ground, MD
1996	Faculty Development Course USAMEDD Center and School Fort Sam Houston, TX
1995	US Army Medical Department Officer Advance Course USAMEDD Center and School Fort Sam Houston, TX
1991	Nuclear Emergency Team Operations Course Interservice Nuclear Weapons School Kirtland AFB, NM
	Nuclear Hazards Training Course Interservice Nuclear Weapons School Kirtland AFB, NM
	REAC/TS Radiation Accidents WRAMC, MD
	Medical Effects of Nuclear Weapons Armed Forces Radiobiology Research Institute Xerox Training Center, VA
1989	AMEDD Officers Basic Course AMEDD C & S Fort Sam Houston, TX

Professional Experience

July 2013 – Current	Program Manager Health Physics Program Public Health Command Aberdeen Proving Ground MD
November 2009 – Current	Advisor to the Assistant Secretary of Homeland Security, Office of Health Affairs and Chief Medical Officer DHS Washington, DC
March 2008 – July 2013	Deputy Director Environmental Health & Safety Radiation Safety Officer Assistant Professor Preventive Medicine/Biometrics USUHS Bethesda, MD
July 2005 – March 2008	Nuclear Operations Staff Officer USANCA Fort Belvoir, VA
July 2001– July 2005	CM Advisory Team Leader Division Health Physicist and Pu Project Officer Defense Threat Reduction Agency Kirtland AFB, NM and Fort Belvoir, VA
April 1996 - July 1996	Assistant Radiation Safety Officer Brooke Army Medical Center Fort Sam Houston, TX
July 1993 - June 1995	Hospital and Radiation Safety Officer Gorgas Army Community Hospital, Panama
December 1989 - July 1993 October 1992 - July 1993	Army Radiation Protection Consultant/ Alternate Radiation Safety Officer USAEHA Aberdeen Proving Ground, MD
Selected Military Awards	DMSM (2), MSM (3), JSCOM, ARCOM, AAM
Professional Affiliations	Society of Physics Students

TRAINING AND RADIOISOTOPE EXPERIENCE

John P. Cuellar

Training.

Training and experience at USMA under the supervision of MAJ Mike Johns included calibration procedures and radiation safety procedures and requirements.

Training and experience at USAEHA under the supervision of COL William Johnson Ph.D., LTC Mike Mueller Ph. D. and CPT Gary Matcek included radioactivity measurement standardization, calibration procedures and radiation safety procedures and requirements.

Category A: Principles and Practice of Radiation Protection
Category B: Radioactivity Measurement Standardization and Monitoring
Category C: Mathematics and Calculations Basic to the Use and Measurement of Radioactivity
Category D: Biological Effects of Radiation
Category E: Radioactive Waste Disposal

CATEGORY	*LOCATION OF TRAINING*	*DATE/DURATION*	*TYPE OF TRAINING*
C,D	Pitzer College, CA	1985-1989	Classes
A,B,C,D,E	University of Texas, San Antonio	1996-1998	Classes/Laboratory
A,B,C,D,E	Various (see curriculum vitae)	1989-1997	Classes
A,B,C,D,E	USAEHA, APG, MD	1989-1994	On the job
A,B,C,D,E	Department of Physics, United States Military Academy, West Point, NY	1998–2001	On the job
A,B,C,D,E	Environmental Health and Safety Uniformed Service University (USUHS), Bethesda MD	2008-2013	On the job

Experience with Isotopes

ISOTOPE	***MAXIMUM ACTIVITY/ QUANTITY***	***DURATION OF EXPERIENCE***	***TYPE OF EXPERIENCE***
Uranium	2500 kg	1998-2001	Light Water Moderated Subcritical Assembly
Pu-239	80 g	1998-2001	Sealed neutron source
Cs-137	50 mCi 300 mCi 8,400	1998-2001 2008-2013 2008-2013	Compton Source & Check Sources Check Sources Sealed sources
Co-57	15 mCi 8,800Ci	1998-2001 2008-2013	Mossbauer Source & Check Sources Sealed sources
Atomic Nos 1-83	10 mCi	1995-1996 1998-2001 2008-2013	Sealed sources
Am-241	5 Ci	1994-1995	Calibration
C-14	5 Ci	2008-2013	University Research
Co-57	5 Ci	1994-1995	Calibration
Cs-137	5 Ci	1994-1995	Calibration
H-3	15 Ci	2008-2013	University Research
P-32/33 S-35	2 Ci	2008-2013	University Research
Tc-99m	5 mCi	1995-1996	Diagnostic doses

April 2008 – March 2013	RSO, USUHS NRC Licenses 19-23344-01 and 19-23344-0
July 1998 — July 2001	RSO, USMA Dept Physics NRC Licenses 31-02102-02 and SUD-311
April 1996 - July 1996	Brook Army Medical Center Broad scope license (NRC LIC # 19-09880-01)
December 1995 - August 1996	NBC Sciences, AMEDD C & S NRC license # 42-01368-04
July 1993 - June 1995	Radiation Safety Officer DA Radionuclides Authorization No. 91-01-90
December 1989 - July 1993 October 1992 - July 1993	Army Radiation Protection Consultant/ Alternate RSO NRC LIC # 19-09880-01

Anthony Trubiano
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Home: (570) 269-2577; Work: (410) 436-5149
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Academic Degrees

Master's Degree in Health Physics, [redacted]
Concentration in Nuclear Non-Proliferation
Georgetown University, Washington, DC

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Bachelor's Degree in Mathematics, [redacted]
Bloomsburg University, Bloomsburg PA

Bachelor's Degree in Business Administration, [redacted]
Concentration in Accounting
Bloomsburg University, Bloomsburg PA

Bachelor's Degree in Business Economics, [redacted]
Bloomsburg University, Bloomsburg PA

Professional Experience

December 2012 – Present, ***Health Physicist***
Army Public Health Command, Army Institute of Public Health – Health Physics Program (HPP), Aberdeen Proving Ground – South, MD

- Trained for field deployments involving Radiological Dispersion Devices/Improvised Nuclear Detonations
- Train active duty military on radiation safety practices
- Perform medical and dental surveys on x-ray producing devices
- Conduct audits of radiation safety programs for adequacy and regulatory compliance
- Perform leak tests of radiation sources
- Issue classification for use of industrial x-ray equipment
- Perform radiation shielding calculations for buildings using radioactive material/producing devices
- Package and transport radioactive sources per regulatory guidance
- Familiar with non-ionizing radiation and laser safety
- Familiar with risk communication / public relations pertain to radiation hazards
- Survey radioactive waste for disposal
- Acts as the Alternate augmentee to the Specialized Medical Command Response Capability Team
- Hand receipt holder for SMRC deployment equipment
- Provides pre-publication review of Army and DOD radiation safety regulations and provides guidance in the form of fact sheets information papers, and technical guides where standards are unclear or do not exist.
- Principal user for two Army Public Health Command Radiation Permits.

July 2012 – December 2012, ***Health Technician (Radiation Health)***
Naval Health Clinic New England
Saratoga Springs , NY

- Assist Radiation Health Officer in management of Radiation Health and Safety services
- Manage the administration of the facility's radiation health program for 1300-1500 servicemen
- Conducts radiation safety training as required by Navy directives

January 2012 – May 2012, ***Health physicist Intern***
Office of Environmental Health and Safety, Georgetown University
Washington, DC

- Conducted lab surveys of research laboratories for contamination and compliance verification
- Performed disposal of solid and aqueous radioactive waste containing long and short lived isotopes
- Decontamination of contaminated equipment and areas
- Calibrated survey meters and instruments
- Analyzed results from and operated a liquid scintillation counter and Nal (Ti) gamma counter
- Performed urinalysis and thyroid bioassays to determine ingested or inhaled activity levels
- Issued and collected personnel dosimetry for analysis
- Collaborated with health physicists on special projects
- Collected and analyzed data to characterize a gamma source
- Performed shipping and receiving of radioactive materials compliant with all state and federal laws
- Investigated RAM incidents, identified root causes and recommended corrective action

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Specialized Training

- Radioactive Commodity Identification and Transportation Course(1 week)
- Medical X-ray Survey Techniques Course (2 weeks)
- Laser/Radio frequency Hazards Course (1 week)
- Civilian Education System-Basic Course (2 weeks)

THOMAS E BEEGLE
[redacted]
410 436 8244 W

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SKILLS

Chemistry, radiochemistry, operation and calibration of gas-flow proportional counters, liquid scintillation counters, multichannel gamma ray and alpha particle spectrometry analyzers, radiation protection and safety, writing technical reports, customer relations, interagency coordination, development of laboratory protocols and procedures, analytical laboratory contract writing, contract data review, mentoring and training of staff, VAX/VMS system management operation, Fortran programming and computer skills.

EXPERIENCE

May 07 – Present, 40HPW, Supervisory Chemist, GS-1320-13,
May 98 – Present, 40HPW, Chemist, GS-1320-12,
Jul 91 – May 98, 40HPW, Chemist, GS-1320-11,
Jul 90 - Jul 91, 40HPW, Chemist, GS-1320-09
Jun 89 - Jul 90, 40HPW, Chemist, GS-1320-07
US Army Institute of Public Health, Aberdeen Proving Ground, MD 21010, Craig S. Miser, (410) 436-8278.
Perform chemical and radiochemical analyses and tests on a broad range of biological, environmental, and radioactive commodity samples. Independently responsible for selecting and modifying established procedures and developing new procedures for a wide variety of complex samples including urine, soil, water and biological tissues. Review analytical data for technical accuracy. Review work of peers and lower grade professionals and technicians. Prepare laboratory reports for internal Center customers and external Center customers. Confer with Center customers and local, state and federal officials to develop sample analysis protocol and data quality objectives to meet regulatory requirements and customer requirements. Train analysts in analytical methods to perform sample analysis.

Mar 07 – Present, 40HPW, Supervisory Chemist , GS-1320-13,
US Army Institute of Public Health, Aberdeen Proving Ground, MD 21010, Craig S. Miser, (410) 436-8278.
Supervises section personnel and rate their performance. Manage section workload to include use of in-house or contract resources, Assign work assignments. Track team productivity and report to management with recommendations for improvement. Ensure safe work area and provide all potential problems with solutions to management. Ensure adequate resources for Section to achieve mission objectives. Develop cross training initiatives. Ensure compliance with all required regulatory requirements.

Mar 04 – May 07, 40HPW, Chemist (Team Leader), GS-1320-12,
US Army Center for Health Promotion and Preventative Medicine, Aberdeen Proving

Ground, MD 21010, [redacted]
Manage team workload to include use of in-house or contract resources, Assign work assignments to team analysts. Track team productivity and report to management with recommendations for improvement. Ensure safe work area and provide all potential problems with solutions to management. Ensure adequate resources for Team to achieve mission objectives. Develop cross training initiatives. Provide input for analyst performance ratings.

Mar 00 – May 07, 40HPW, Chemist (Quality Control Coordinator), GS-1320-12,
US Army Center for Health Promotion and Preventative Medicine, Aberdeen Proving Ground, MD 21010, Ronald J Swatski, (410) 671-3983.
Interact with Local, State, and Federal regulatory officials and certification inspectors to maintain laboratory certification. Establish quality control protocols for new instrumentation and new analytical methods. Perform external audit of private contractors in order to determine compliancy with Army mission and DOD Quality System Management. Review contract data from other laboratories for technical accuracy. Develop terms for analytical laboratory contracts with other laboratories. Provide audit samples for contractor compliancy with DOD contracts.

EDUCATION
BS Chemistry, [redacted] University of Delaware, Newark, DE [redacted]

TRAINING
Intern Leadership and Development Course, 1991
Intermediate Gamma Spectroscopy, 1992
Genie Spectroscopy System Management, 1995
Inductively Coupled Plasma-Mass Spectroscopy Course, 2000

AWARDS
Performance Awards for exemplary performance (1994, 1995, 1996, 1997, 1998, 1999), Special Act Award (1996).
USACHPPM TEAM Award, 2005

PROFESSIONAL MEMBERSHIPS
Health Physics Society - Plenary Member, 1992 - Present.

Security Clearance: Secret , 20 Jan 2001.

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29 January 2014

CURRICULUM VITAE
of
SARA SPENCE

Personal Information:

Home Address: [redacted]

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Education:

Bachelor of Science in Chemistry, Messiah College, Grantham, Pennsylvania

Military Service:

N/A

WORK EXPERIENCE:

Juniata College, Huntingdon, PA, [redacted]ab Assistant, Chemistry.
US Pasture Laboratory, Penn State University, University Park, PA, 5/89 to 8/89, Lab Assistant, Chemistry and Microbiology.
USAPHC, APG-EA, MD, 6/90 to present, Chemist, Chemistry.

JOB DESCRIPTION:

Is responsible for the analysis of environmental and industrial hygiene samples such as water, soil, and air for inorganic parameters. Is also responsible for the analysis of environmental (water, soil, etc.) and biological samples for radioactivity. Assignments include analyzing samples with difficult or complex matrices which may require method modifications. Provides technical training and guidance in areas of expertise. Reviews and approves analytical data generated by junior personnel. Prepares and releases analytical reports with the assistance of the team leader. Permit holder for IRS Section and manages radioactive materials according to the CHPPM USNRC license.

TRAINING:

Training	Duration	Location	Year
CPR	08/90-08/90		1990
TRAACS 800	09/90-09/90	Elmford, NY	1990
DoD Federal Hazardous Communication	01/91-01/91	USAEHA-Bldg E2100	1991
Hazardous Waste Management Workshop	05/91-05/91	USAEHA-Bldg E2100	1991
Fundamentals of Word Perfect 5.0	05/91-05/91	Harford Community College	1991
Powerful Communication Skills for Women	06/91-06/91	Shawnee Mission, KS	1991
Fundamentals of Dbase III	08/91-08/91	USAEHA-Bldg E2100	1991
Intern Leadership & Development Course	08/91-08/91	U.S. Army	1991
RCRA Regulations Compliance Course	10/91-10/91	Government Institutes, Inc.	1991
Team Member Respon. & Skills (TQM)	10/91-10/91	Daniel Management Center	1991

Training	Duration	Location	Year
Electronic Mail	11/91-11/91	Harford Community College	1991
The Promotable Woman	12/91-12/91	Management Training Systems, Inc.	1991
Harvard Graphics	04/92-04/92	Harford Community College	1992
Fundamentals of Maint. & Troubleshooting	06/92-06/92	Dionex Corp.	1992
AI-450 Training	06/92-06/92	Dionex Corp.	1992
Theory of IC	02/93-02/93	Dionex Corp.	1993
Operational Techniques of Ion Chromatography	02/93-02/93	Dionex Corp.	1993
DOS 5.0	03/93-03/93	Harford Community College	1993
Word Perfect 5.1	05/93-06/93	Harford Community College	1993
Quality Systems Training	09/93-09/93	USACHPPM	1993
Exceptional Customer Service	10/93-10/93	Dun & Bradstreet Business Education Services	1993
8 Hour Hazwoper Refresher Course	11/93-11/93	USAEHA-WDED, IHD	1993
Ethics Training Course	11/93-11/93	CPO	1993
CPR	11/93-11/93		1993
Hazardous Waste Generator Handler/ SAS Manager	07/94-07/94	DSHE	1994
Hazcom	08/94-08/94	USAEHA	1994
Intro. to Sign Language	09/94-10/94	Harford Community College	1994
Quality System Training	12/94-12/94	USACHPPM	1994
Disinfectant By-Products	02/95-02/95	Yuefeng Water Research	1995
Quality System Training	03/95-03/95	USACHPPM	1995
Hazardous Waste Generator Handlers Refresher Course	05/95-05/95	DSHE	1995
CC:Mail 2.2 for Windows Basic	11/95-11/95	Executrain	1995
The Pittsburgh Conference	03/96-03/96	Pittcon	1996
Statistically Valid Detection Limits & Practical Quantitation Limits	03/96-03/96	Pittcon	1996
Hazardous Waste Generator Handlers Refresher Course	05/96-05/96	DSHE	1996
Lims Training "Strategy & Tactics"	06/96-06/96	McDowall Consulting	1996
Annual Security Awareness	06/96-06/96		1996
LIMS Spreadsheet Entry Module Training	06/95-06/96	USACHPPM	1996
Quality System Assessment and Auditing	06/96-06/96	The Victoria Group	1996
Prevention of Sexual Harassment	09/96-09/06	CPO	1996
Quality System Training	10/96-10/96	USACHPPM	1996
Quality System Training	10/96-10/96	USACHPPM	1996
Quality System Training	12/96-12/96	USACHPPM	1996
TRAACS 2000/TAOS Software Operation	01/97-01/97	Bran Luebbe, Inc.	1997
EPA 1664 Oil & Grease Training	03/97-03/97	PAAEL	1997
Hazardous Waste Generator Handlers Refresher Course	06/97-06/97	DSHE	1997
Annual Radiation Safety Training	2/98	CHPPM	1998
Annual Hazcom/Chemical Hygiene Refresher	4/98	CHPPM	1998
Increasing Human Effectiveness II	5/98	Edge Learning Institute	1998

Training	Duration	Location	Year
Hazardous Waste Generator Handlers Refresher Course	6/98	DSHE	1998
Environmental Radiochemistry	6/98	Nevada Technical Associates, Inc.	1998
Annual Security Awareness Training	7/98	CHPPM	1998
Annual Radiation Safety Training	12/98	CHPPM	1998
Annual Hazcom/Chemical Hygiene Training	1/99	CHPPM	1999
Annual Security Awareness	7/99	CHPPM	1999
Hazardous Waste Generator-Handlers Refresher Course	6/99	DSHE	1999
Annual Radiation Safety Training	12/99	CHPPM	1999
USACHPPM Customer Relations Training	5/00	CHPPM	2000
Annual Security Awareness	8/00	CHPPM	2000
Prevention of Sexual Harassment Refresher	9/00	CHPPM	2000
Hazardous Waste Generators Handler Refresher Course	9/00	DSHE	2000
Annual Radiation Safety Training	10/00	MRICD	2000
Annual Hazcom/Chemical Hygiene Refresher	10/00	CHPPM	2000
Principles of Radiochemistry Training Course	Feb-Mar 01	Radiation Safety & Control Services, Inc.	2001
Annual Security Awareness Training	7/01	CHPPM	2001
Hazardous Waste Generator Training	6/01	DSHE	2001
Prevention of Sexual Harassment	8/01	CHPPM	2001
Annual Radiation Safety Training	10/01	MRICD	2001
Hazardous Waste Generator Handler Refresher Course	6/02	DSHE	2002
Annual Hazcom/Chemical Hygiene Refresher	4/02	CHPPM	2002
Prevention of Sexual Harassment Training	10/02	CHPPM	2002
Annual Radiation Safety Training	10/02	MRICD	2002
Annual Hazcom/Chemical Hygiene Refresher	3/03	CHPPM	2003
On-Line Health Privacy Training	4/03	CHPPM	2003
Refresher for Preventing Sexual Harassment	5/03	CHPPM	2003
Hazardous Waste Generator Handler Refresher Training	6/03	DSHE	2003
AT Level I Awareness Training (On-Line)	7/03	CHPPM	2003
Annual Security Awareness Training	7/03	CHPPM	2003
Annual Radiation Safety Training	12/03	CHPPM	2003
Annual Hazcom/Chemical Hygiene Refresher	3/04	CHPPM	2004
Hazardous Waste Generator Handler Refresher Training	6/04	DSHE	2004

Training	Duration	Location	Year
Annual Radiation Safety Training	12/04	CHPPM	2004
Perkin Elmer Workshop/User Group Meeting	5/05	Greenbelt, MD	2005
Hazardous Waste Generator Handler Refresher Training	6/05	DSHE	2005
Introduction to Gamma Spectroscopy	8/05	Aiken, South Carolina	2005
Basic Environmental Quality Assurance	12/05	CHHPM	2005
Annual Radiation Safety Training	12/05	CHPPM	2005
Hazardous Waste Generator Handler Refresher Training	6/06	DSHE	2006
ICP-MS with Elan Software Training	7/06	Connecticut	2006
Annual Radiation Safety Training	12/06	CHPPM	2006
Hazardous Waste Generator Handler Refresher Training	6/07	DSHE	2007
Annual Radiation Safety Training	12/07	CHPPM	2007
Hazardous Waste Generator Handler Refresher Training	7/08	DSHE	2008
A Basic Course in the Fundamentals of Analytical Radiochemistry	9/08	Montgomery, Alabama	2008
Annual Radiation Safety Training	11/08	CHPPM	2008
Hazardous Waste Generator Handler Refresher Training	7/09	DSHE	2009
Annual Radiation Safety Training	12/09	CHPPM	2009
Hazardous Waste Generator Handler Refresher Training	7/10	DSHE	2010
CEM analytical workshop/seminar on microwave digestion	4/10	Baltimore, MD	2010
Quality Systems Training	7/10	CHPPM	2010
Root Cause Analysis Training	7/10	CHPPM	2010
Annual Radiation Safety Training	1/11	PHC	2011
Hazardous Waste Generator Handler Refresher Training	7/11	DSHE	2011
Annual Radiation Safety Training	1/12	PHC	2012
Root Cause Analysis Workshop	1/12	PHC	2012
Hazardous Waste Generator Handler Refresher Training	8/12	DSHE	2012
Perkin Elmer ICP-MS Training	9/12	PHC	2012
Perkin Elmer 2012 Inspiring Innovation Tour/Users Meeting	10/12	Chevy Chase, MD	2012
Perkin Elmer Liquid Scintillation Counter Training	12/12	Online	2012
Annual Radiation Safety Training	1/13	PHC	2013
Hazardous Waste Generator Handler Refresher Training	8/13	DSHE	2013
Annual Radiation Safety Training	1/14	PHC	2014

Warren Scott Monks, Jr., MPAS, PA-C

USAPHC-AIPH-OEM • [redacted] • warren.s.monks.civ@mail.mil

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SUMMARY

Over 10 years of clinical and leadership experience. Solid background in emergency/urgent care, family practice, and occupational medicine. Practiced pre-hospital and clinic-based urgent and emergent medical services, wartime military medicine, family medicine, and currently providing occupational medicine services at the strategic level for the US Army. Experienced in handling acute and chronic medical conditions of both pediatric and adult patients. Skilled in minor surgical procedures, orthopedics, EKG interpretation, x-ray and laboratory interpretation. CPR certified.

EXPERIENCE

US Army Public Health Command – Aberdeen Proving Ground, *Edgewood, MD* February 2013-Present

Physician Assistant (GS-0603-12)

- Advises on Occupational Health (OH) program development, management, administration and evaluation. Formulates OH service policies and objectives as required. Advises on program requirements and procedures. Establishes criteria for OH Program evaluations and assessments. Advises on the development, interpretation and application of occupational health standards. Provides technical assistance on health conservation requirements, OH practices and delivery of OH services which impact worker health as needed. Participates in epidemiological investigation of disease, illness or accidents of particular importance to the OH program as required.
- Plans, coordinates and conducts OH Program Consultation reviews, visits, and special studies. Evaluate the effectiveness of OH Programs. Analyzes and interprets data on OH programs. Resolve complex OH problems to improve OH nursing services, health education, and wellness. Researches trends and patterns. Checks for unusual conditions and critical problems unique to Army installations. Reports on findings and conclusions, with recommendations as needed.
- Reviews DOD and DA regulations on occupational health for mission impact, recommending changes as needed. Develops new OH program evaluation methods and criteria. Develops standard procedures, model administrative documents, and informational material relating to the development and management of installation OH programs. Develops innovative and unique methods of problem solving and evaluation. 20%
- Plans, coordinates and conducts OH workshops and training courses. Conducts training in the fundamentals of Occupational Medicine and other OH program related courses specifically to physicians, physician assistants, and nurses.
- Represents OMP at conferences, meetings, seminars, and work groups involving policy matters relating to Occupational Health. Serves on committees established to review proposed regulations, guidelines and procedures. Presents lectures or briefings on OH topics as requested. Coordinates OH Video Telecommunication Conferences (OHVTC).

Johns Hopkins Community Physicians – Water's Edge, *Belcamp, MD* August 2008-February 2013

Full Time Physician Assistant

- Clinical role includes maintaining an urgent care schedule to increase access for the patients of the practice for acute care needs. Skills acquired from previous urgent care and emergency care employment are noted below
- In 2009, assumed a new role as the Patient-Centered Medical Home (PCMH) provider pilot subject for the Water's Edge practice. While maintaining my clinical schedule, I was allowed to develop and implement new programs, protocols, and practice methods that would eventually be used as a model for future PCMH practices throughout Johns Hopkins Medicine.
- Developed, established, and implemented the Physician Assistant role in the PCMH concept of healthcare; Water's Edge was the first site in the JHCP organization to develop this practice model
- Developed, resourced, and implemented the Diabetes Education Group Visit Program at Water's Edge, including the development of the clinical metric tracking system currently in place using Microsoft Excel and Centricity Logician. Over 150 patients have completed the course to-date with an average A1c reduction of 1.25%
- Developed, resourced, and implemented the Depression Follow-up Program and the Smoking Cessation Program at Water's Edge
- Member: Johns Hopkins Medicine Diabetes Care Redesign Team and Diabetes Self Management sub-committee. Responsible for the evaluation and interpretation of the program's high-risk prediction tool which combines multiple clinical metrics to determine a patient's risk of hospitalization, then developing a plan with the patient's care team to reduce this risk and improve the patient's health status
- Chairman; Water's Edge Employee Engagement Group. Responsibilities include working with the workplace safety team to develop programs and policies to reduce job site safety incidents/accidents and to increase employee job satisfaction
- Trained in the use of population management software including MD Datacor and Meridios. Also proficient with Microsoft Word, Powerpoint, and Excel
- Represented Johns Hopkins Community Physicians as a subject-matter expert on the following topics:

  -Implementing Diabetes Group Visits into Your Primary Care Practice – Presentation and Panel Discussion. Maryland Learning Collaborative Conference, November 12, 2011

  -Implementation of Point-of-Care Diabetes Services for RNs at JHCP Practices - Presentation. JHCP RN Conference, March 10, 2012

  -Evidence-Based Recommendations for Educating Diabetic Patients About Maintaining a Healthy Diet - Webinar. Maryland Learning Collaborative Care Manager Conference Call, Sept. 20, 2012

  -PA Role in Development and Implementation of the Patient Centered Medical Home in Adult Primary Care - Presentation and Panel Discussion. AAPA CORE Leadership Conference, Sept. 28, 2012

Patient First, Greenspring Station, *Lutherville, MD* October 2003-November 2008

Full Time Physician Assistant

- Obtained patient histories and performed physical examinations
- Ordered and interpreted plain film x-rays, laboratory tests including blood, urine, and microscopic evaluations
- Development and implementation of medical treatment plans including pharmacologic, preventative medicine, and patient education modalities
- Development and implementation of trauma treatment plans including care of musculoskeletal, integumentary, and soft-tissue injuries.
- Performed repair of minor lacerations, I&D of abscesses, skin biopsies and wart destruction, orthopedic procedures, gynecologic exams for acute conditions, and ACLS and CPR related procedures
- Assisted in on-the-job training of new physician staff in facility and medical procedures
- Experience completing DOT and CDL physicals, sports and fit-for-duty physicals, pre-operative evaluations, and workers compensation evaluations

US Army, Maryland Army National Guard April 2003-November 2011

Captain, Army Medical Specialist Corps

HHC, 1-175th Infantry: April 2003-February 2008 – Battalion Physician Assistant and Medical Platoon Leader
104th Area Support Medical Company: February 2008 – November 2011 – Senior Physician Assistant

- Veteran: Operation Iraqi Freedom April 2007-April 2008

Awards: Bronze Star Medal, Meritorious Service Medal, Army Commendation Medal for Valor with 1 OLC, Army Achievement Medal, Army Reserve Component Achievement Medal, National Defense Service Medal, Iraq Campaign Medal, Global, War on Terrorism Medal, the Combat Medical Badge

Achievements:

- Exceeded Course Standards: AMEDD Officer Basic Course, Ft Sam Houston, TX: December 2003
- Graduate: Combat Casualty Care Course, Tactical Combat Medical Care Course, and Field Care of the Chemical/Biological Casualty Care Course: 2007
- Advisor to the Battalion Commander, 1-175th IN, regarding the health of a 700+ soldier infantry battalion during a combat tour
- Responsible for treating over 1600 US soldiers, Coalition forces, and Iraqi civilians during Operation Iraqi Freedom (OIF) 07-09
- Established, supervised, and maintained operations in 4 separate Company-Level Aid Stations during OIF 07-09
- Responsible for over 9000 man-hours of continuing medical education training for the combat medics of the 175th IN during OIF allowing seven soldiers the ability to challenge the NREMT-I certification examination.
- As the Senior PA for the 104th ASMC, developed, resourced, and supervised six company-sized training events over the course of a three year period including three mandatory annual enlisted combat medic skills training events, two Area Support Medical Company 24-hour operations training events, and one cadaver lab teaching combat medical skills at the University of Maryland Medical School

EDUCATION

Masters of Physician Assistant Studies: Towson University/CCBC Essex, MD [redacted]

Physician Assistant Certified: 10+ Years Experience

NCCPA # 1058890; MD License # C0002793; DEA # MM1036892, MD CDS # PA55949, NPI # 1063638922

Bachelor of Science – Biology: Salisbury State University, MD [redacted]

EMT-B (CCBC Essex, MD) December 1999 – December 2002

Member: Aberdeen Volunteer Fire Department, MD December 1999 – June 2001

ADDITIONAL CERTIFICATIONS & MEMBERSHIPS

CPR – Healthcare Provider March 2014 – March 2016

Fellow, American Academy of Physician Assistants January 2003 - Present

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CURRICULUM VITAE
Mr. Roy A. Valiant
USAPHC Safety Manager

roy.a.valiant.civ@mail.mil
Work 410-436-3841

Civilian Assignments

Safety Manager — Aug 2002 to Present
United States Army Public Health Command
Aberdeen Proving Ground, MD 21010

Safety Specialist — Jun 1997 to Aug 2002
HQ, United States Army Europe
Heidelberg, GE

Safety Specialist — Nov 1995 to Jun 1997
HQ, V Corps
Heidelberg, GE

Military Assignments

Personnel Management Officer — Apr 1994 to Mar 1995
HQ, V Corps
Heidelberg, GE

Regiment Safety Officer — Sep 1991 to Apr 1994
HQ, 2nd ACR
Nurnberg, GE

Aviation Safety Officer — Jan 1980 to Sep 1991
Numerous Attack Helicopter Units
Fort Hood, TX, Korea, and Germany

Professional Education

American Technological University — BS [redacted]
Killeen, TX — Career Aviation

Military Education and Schools

Warrant Officer Staff Course [redacted]
Fort Rucker, AL

Warrant Officer Senior Course [redacted]
Fort Rucker, AL – correspondence

Army Aviation Safety Course [redacted]
Fort Rucker, AL

Air Cavalry Attack Helicopter Commanders' Course [redacted]
Fort Knox, KY

AH-1G (Cobra) Aviator Qualification Course [redacted]
Fort Rucker, AL

Rotary Wing Aviator Qualification Course [redacted]
Fort Rucker, AL

CP-12 Skills Assessment – Safety & Occupational Health (018)

See attached CP-12 Form 2.0 for additional education and experience.

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James Robert Seeger
[redacted]
Work: 410-436-8356
Cell: 410-937-9628
Email Address: james.r.seeger.civ@mail.mil

Academic Background: Excelsior College, Chemistry/Environmental Management, 114 credits.
Ashland High School: Ashland WI [redacted]

Professional Experience:

Mar 2010 - Present. ***Supervisory Chemist***
Employer: US Army Public Health Command, Institute for Public Health.
5158 Blackhawk Road, APG (EA), MD 21010

Serves as Chief, Sample Management Laboratory supervisory chemist in the Laboratory Operations Division responsible for managing a centralized system for the collection, receipt, and processing of environmental and occupational health samples submitted for chemical analysis. Plan, direct, coordinate and review all technical functions of the laboratory; determine what methods or procedures need to be developed and carry out projects to satisfy the needs of clients. Solve problems encountered. Supervise the activities of 5 – 8 employees performing assignments ranging from preparation of kits for sample collection, to the disposal of chemical wastes. Provide subject matter expertise to the Institutes engineers and scientist concerning sample management requirements.

May 2007 to Mar 2010. ***Supervisory Chemist***
Employer: US Army Center for Health Promotion and Preventative Medicine
5158 Blackhawk Road, APG (EA), MD 21010

Served as supervisory chemist in the Specialty Chemistry Section of the Laboratory Analytical Division providing analytical support for a wide variety of environmental and/or occupational health samples. Samples are generated in conjunction with military deployment efforts; industrial hygiene, water quality, waste disposal, health physics, and toxicology projects; and other military activities for analytical support. Assignments involve the use of a combination of diverse and complex instrumentation, and standard and novel chemistry procedures. I plan and conduct complex chemical analyses of a wide variety of unknown samples from military installations and deployments worldwide for the purpose of determining chemical composition including the presence and identification of toxic constituents. Samples, submitted for both quantitative and qualitative chemical analyses, have little or no historical documentation and may not be fully characterized by straightforward analytical methods. Samples may be pure compounds or highly complex mixtures and often require multiple methods of analysis. I determine approaches I provide consulting support to Command personnel and personnel of other federal agencies to solve unique technical problems involving identification of the chemical composition of various solid, solid/liquid, liquid and gas type samples to the parts per billion range. Accumulated experience in and an in depth knowledge of fields such as spectrometry, spectroscopy, chromatography, radiochemistry, wet chemistry, and general analytical chemistry are required in determining which methods are best suited to the specific sample and, as required, adapting, extending or developing methodology to obtain data required.

Jan 1990 to May 2007. ***Chemist***
Employer: US Army Center for Health Promotion and Preventative Medicine
5158 Blackhawk Road, APG (EA), MD 21010

Served as an analytical chemist in the Pesticide Team of the Chromatographic Analysis Division and is responsible for analysis of environmental samples such as biological specimens, vegetation, soil, sludge, water and wipe samples to determine trace level pesticide, herbicide and

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PCB residues. Assignments include analyzing very difficult, unusual or complex matrices that may require method modifications. Perform method validation, method improvement projects, process monitoring and improvement, and laboratory improvement functions. Responsible for review of analytical reports generated by other Pesticide team analysts including contractors for completeness of analysis, correct reporting limits, proper methodology and appropriate quality control. Provides analytical assistance and training as needed to junior chemist and technicians. Serves as hazardous waste/sample disposal coordinator for the Pesticide Team. Involved in two projects in support of the USACHPPM-Toxicology Division. The first project was for the determination of PCBs in Deer tissue. Duties included extraction and analysis of extremely complex matrices using Gel Permeation Clean-up and Gas Chromatography. The second project was the determination of Chemical Warfare agent degradation products in Russian Bitumen Salt Mass (BSM). These samples required multiple analysis using different chemistry techniques. Conducted method validation and implementation of EPA Method 505. Conducted method development and implementation of a pesticide method using Solid Phase Micro Extraction (SPME). This method allows for analysis of drinking water samples for a number of regulated pesticides, and reduces sample processing time from approximately two days to less than an hour. Both procedures were in support of a request from the USACHPPM-Deployment Surveillance Program for miniaturized drinking water methods.

Nov 1988 to Jan 1990. ***Physical Science Technician***
Employer: - US Army Chemical Command, Product Assurance Directorate.
Bldg E5100, APG, MD 21010

Served as Physical Science Technician performing tests requiring a large number of complex steps following published methods to determine protective material compliance with military specifications. Responsible for testing protective materials, including items such as masks, filters, boots and gloves against toxic agents both liquid and vapor. Procedures required a high level of manipulation, skill and precision, along with the ability to recognized unanticipated or unusual chemical reactions. Acquired knowledge of fundamental concepts and terminology in the field of chemistry. Required to set up, program, maintain, operate and trouble shoot permeation analyzers. Able to detect and identified subtle indications that these highly complex automated devices were malfunctioning. Conducted final treatment and packaging of toxic waste in accordance with military and federal regulations, upon completion permeation testing.

May 1983 to Oct 1988. ***Medical Laboratory Technician***
Employer: US Army Environmental Hygiene Agency. APG, MD 21010,
5158 Blackhawk Road, APG (EA), MD 21010

Served as a military laboratory technician responsible for the extraction and analysis of environmental, industrial hygiene and occupational health samples for various inorganic, organic and toxic constituents. Experience in numerous wet chemistry techniques to include biological and chemical oxygen demand, solids, phenols, cyanide, pH and conductivity. Extensive experience on Ion Chromatograph (IC), Gas Chromatograph (GC) and High Performance Liquid Chromatograph (HPLC). Conducted instrument set up, method development and implementation of a new EPA IC procedure that combined five manual wet chemistry procedures into a single automated system. Served as senior military technician for Drinking Water and Hazardous Waste surveillance programs through the USAEHA Water Quality and Waste Disposal Engineering Divisions. Both programs required monitoring and interpretation of data to assure safe drinking and ground water levels were achieved. Assignments required extensive method knowledge to determine appropriate testing methods. Duties required interaction and consultation with numerous profession personnel to determine sample history and potential unknown hazards. Served as senior military technician for industrial hygiene samples, which consisted of data interpretation to establish exposure levels. Additional responsibilities included collection, classification and disposal of hazardous waste generated by analytical laboratory procedures. Served as Directorate of Laboratory Sciences Non Commissioned Officer In-Charge (DLS-NCOIC) supervising junior level military laboratory technicians.

Training:
05/01/1982 Chemistry Laboratory Specialist Course, 16 weeks, US Army; 01/07/1987 Basic Medical Laboratory Specialist Course, 14 weeks, US Army; 02/17/1989, RCRA Regulation Course, 4 days, 04/18/1991, Hazardous Materials Management And Spill Response, 4 days, USAEHA; 08/05/1991, Intern Leadership Development Course, 5 days, US Army; 09/12/1991, Techniques of Gas Chromatography-Mass Spectrometry, 5 days, Hewlett Packard; 06/10/1992, Techniques of Gas Chromatography, 3 days, Hewlett Packard; 09/07/1994, Gas Chromatography Troubleshooting and Maintenance, 2 days, Restek Corp.; 10/01/1995, Increasing Human Effectiveness, 2 days, US Army;

Awards:
Honor Graduate, Chemical Laboratory Specialist Course, Ft McClellan, AL; Commanders Award, Basic Medical Laboratory Specialist Course, Ft Sam Houston, TX; U.S. Army Commendation Medal; U.S. Army Achievement Medal; U.S. Army Physical Fitness Excellence Patch

Licenses/Certificates:
Maryland Department of Environment Analyst Certification

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TERRY G. MEADE

[redacted]

EDUCATION

M.S. University of Kentucky, Lexington, KY
Area of Specialization: Soil and Water Biogeochemistry
Thesis title: *Enhanced Mineralization of Chlorinated Pesticides at Aerobic-Anaerobic, Plant-Soil-Water Interfaces*

B.S. University of Kentucky, Lexington, KY
Area of Specialization: Soil and Water Conservation

PROFESSIONAL HISTORY

2009 - Present **Environmental Scientist**
U.S. Army Public Health Command
Deployment Environmental Surveillance Program

- Principal User for continuous air monitoring instruments containing ^{14}C and ^{3}H radioactive sources
- Serving as PHC Deployment Occupational Environmental Health Surveillance (OEHS) POC for Kuwait
- Drafting occupational and environmental health risk reports based on laboratory results
- Coordinating group efforts and equipment for ambient air monitoring project with the goal of increasing continuous air monitoring efforts in multiple command regions
- Reviewing and interpreting laboratory results of mixed media samples (soil, water, air)
- Serving as air monitoring expert on special projects research and surveillance groups
- Project lead for missions in theater to service and upgrade equipment and software in ambient air monitoring station

2008 - 2009 **Research Fellowship**
University of Delaware

- Performing laboratory and course work towards doctorate degree in soil and water chemistry group
- Operating Fourier Transform Infrared (FTIR) spectrometer.
- Preliminary work involved investigating environmental fate of organic growth hormones in soil and water systems
- Other projects involved arsenic oxidation using mineral oxides (see publications)

2005 - 2008 **Environmental Scientist III**
Delaware Dept. of Natural Resources and Environmental Control
Air Surveillance Branch

- Preparing research proposals
- Operating ambient particulate matter monitors containing ^{14}C radiation sources.

- Collecting and analyzing atmospheric samples using Gas Chromatography Mass Spectrometry (GC-MS)
- Developing enhanced volatile organic compound measurement project
- Presenting Delaware air toxics information to public at public forums
- Writing Standard Operating Procedures (SOP's) for field and laboratory methods
- Operating, maintaining, and calibrating air toxics analytical equipment

2002 - 2005 **Biological Science Technician**
USDA-ARS National Soil Tilth Lab.

- Designing and implementing field and laboratory research projects involving water retention and native plant species
- Collecting large-bore soil cores using hydraulic coring/drilling equipment
- Determining physical and hydraulic properties for multiple soils throughout Iowa
- Modeling nutrient, water, and pesticide fate in tile-drained fields using Root Zone Water Quality Model
- Performing QA/QC methods on field, laboratory, and simulated data
- Presenting data in form of spreadsheets, graphs, and professional posters
- Designing database for long-term observed and simulated field data
- Maintaining laboratory and field equipment/facilities

1995 - 2002 **Principal Field and Laboratory Technician/Graduate Research Assistant**
University of Kentucky Agronomy Dept.

- Designing and conducting graduate research project investigating radio-labeled chlorinated pesticide mineralization using bio- and phytoremediation strategies
- Conducting sample extractions, derivatizations, and analyses using current standard laboratory procedures
- Using wide range of analytical laboratory equipment for sample analysis (*see Summary of Skills and Experience*) containing ^{14}C and ^{63}Ni radiation sources
- Analyzing data using Statistical Analytical System (PC-SAS)
- Collecting and analyzing water, soil, and plant samples

PUBLICATIONS

Refereed Publications:

Parikh, S.J., Lafferty, B.J., Meade, T.G., Sparks, D.L. 2010 Evaluating Environmental Influences on As(III) Oxidation Kinetics by a Poorly Crystalline Mn-Oxide. Environ. Sci. Technol. 44: 3772-3778.

Malone, R.W., Huth, N., Carberry, P., Ma, L., Kasper, T., Karlen, D.L., Meade, T., Kanwar, R.S., Heilman, P. 2007 Evaluating and Predicting Agricultural Management Effects Under Tile-drainage Using Modified APSIM. Geoderma. 140(3): 310-322.

Malone, R.W., Ma, L., Karlen, D.L., Meade, T., Meek, D.W., Heilman, P., Kanwar, R.S., Hatfield, J.L. 2007 Empirical Analysis and Prediction of Nitrate Loading and Crop Yield for Corn-Soybean Rotation. Geoderma. 140(3): 223-234.

Ma, L., Malone, R.W., Heilman, P., Ahuja, L., Meade, T., Anapalli, S.A., Ascough, J., Kanwar, R.S. 2006. Sensitivity of Tile Drainage Flow and Crop Yield on Measured and Calibrated Soil Hydraulic Properties. Geoderma. 140(3): 284-296.

Singer, J.W., Malone, R.W., Tomer, M.D., Meade, T.G., Welch, J. 2006. Compost Effect on Water Retention and Native Plant Establishment on a Construction Embankment. Journal of Soil and Water Conservation, 61(5):268-273.

Meade, T.G., D'Angelo, E.M. 2005. [14C]Pentachlorophenol Mineralization in the Rice Rhizosphere with Established Oxidized and Reduced Soil Layers. Chemosphere. 61(1):48-55.

Published Abstracts:

Malone, R.W., Ma, L., Karlen, D.L., Meade, T.G., Meek, D.W., Heilman, P., Kanwar, R.S., Hatfield, J.L., Empirical Modeling of Nitrate Loading and Crop Yield for Corn-Soybean Rotations in Iowa. National Water Quality Monitoring Council. (Accepted for publication: May 11, 2006)

Anapalli, S.S., Ma, L., Malone, R.W., Heilman, P., Ahuja, L.R., Kanwar, R.S., Meade, T.G. 2005. Modeling impacts of crop rotations, tillage and N management on crop productivity and water quality using the RZWQM-DSSAT hybrid model. ASA-CSSA-SSSA Annual Meeting, Salt Lake City, UT. Nov. 6-10, 2005.

Malone, R.W., Ma, L., Heilman, P., Meade, T.G., Armendariz, G.A., Ahuja, L.R., Kanwar, R.S. A Quality Assured Database to Easily and Objectively Quantify Nitrate Loading to Tile Drains Under Different Conditions. 2005 ASAE Annual International Meeting.

Malone, R.W., Meade, T.G., Ma, L., Anapalli, S.A., Kanwar, R.S., Karlen, D.L., Hatfield, J.L., Ahuja, L.R. Simulating Late Spring Nitrogen Test Effects on N Leaching and Crop Production. *In* Annual Meeting Abstracts [CD-ROM computer file], ASA, CSSA, and SSSA, Madison, WI. 2003.

Ma, L., Malone, R.W., Anapalli, S.A., Meade, T.G., Kanwar, R.S., Karlen, D.L., Hatfield, J.L., Ahuja, L.R. Simulating Swine Manure Effects on N Leaching and Crop Production. *In* Annual Meeting Abstracts [CD-ROM computer file], ASA, CSSA, and SSSA, Madison, WI. 2003.

Meade, T.G., D'Angelo, E.M., Karathanasis, A.D. Chlorinated Compound Mineralization at Aerobic-Anaerobic, Soil-Water-Plant Interfaces. *In* Annual Meeting Abstracts [CD-ROM computer file], ASA, CSSA, and SSSA, Madison, WI. 2001.

SUMMARY OF SKILLS AND EXPERIENCE

- Experience preparing/submitting successful research proposals
- Experience presenting material at public and professional events
- Designed and completed field and laboratory research projects
- Experience modeling environmental systems using Root Zone Water Quality Model
- Understanding and working knowledge of soil and water biogeochemical processes
- Applied understanding of large data set statistical analysis
- Extensive experience in current laboratory and field methods of soil analysis, including biological, physical, and chemical properties

- Proficient with wide range of analytical laboratory equipment (FTIR, GC-MS, GC-ECD, GC-TCD, GC-FID, TOC furnace, UV/VIS, HPLC, AA Spectrophotometer, Scintillation counter, microplate auto-reader) and MS software including Word, Excel, PowerPoint and Access
- Designed long-term simulated and historic data base (MS ACCESS) capable of reporting user-specified data

TRAINING AND AWARDS

- Radiation Safety Office 40 Hour Course, 2012
- Department of the Army Achievement Medal for Civilian Service, 2012
- Certificate of Appreciation: USARCENT Force Health Protection, 2012
- Science, Technology, Engineering and Mathematics Award of Excellence: APG Team CBRNE Expo, 2012
- Certificate of Appreciation: Fort Huachuca Monument Fire Response, 2011
- 2011 USAPHC TEAM Award for public health conference exhibit
- 2010 USAPHC TEAM Award for public health conference exhibit
- 2010 USAPHC TEAM Award
- 2008 University of Delaware CCZR Research Fellowship
- 2007 US-EPA Air Toxics Data Analysis Workshop
- 2007 US-EPA Atmospheric Sampling (APTI 435)
- 2006 Mid-Atlantic Regional Air Management Assoc. Risk Assessment for Air Toxics Workshop
- 2006 Delaware Governor's Team Excellence Award
- U.S.D.A.-NSTL Extra Effort Award 2005
- National Soil Tilth Laboratory Safety Committee member 2004
- National Soil Tilth Laboratory Safety Committee member 2005
- Mastering Database Fundamentals using Microsoft Access 2000, July 2003
- Mastering Microsoft Access 2000 Programming, July 2003

Doug Dziwulski
[redacted]
Home: [redacted] Work (410) 436-8340

Academic Degree:

Bachelor of Science, Biology, [redacted]
Mount St. Mary's College, Emmitsburg, MD

PERSONAL INFORMATION WAS REMOVED BY NRC. NO COPY OF THIS INFORMATION WAS RETAINED BY THE NRC.

Professional Experience:

Dec. 2000 – Feb. 2004, Contractor, USACHPPM;
Feb. 2004 – present: Physical Scientist, USACHPPM/USAPHC Laboratory Sciences, Aberdeen Proving Ground.

- Worked with the Pesticides section performing sample extractions and analyses for various sample matrices, screening for industrial/manufacturing byproducts, herbicides, pesticides, PCBs, haloacetic acids in water, soil, air and other non-routine matrices (velour strips, bednetting, cotton swabs and gauze strips).
- Serving as Quality Control Coordinator for the Pesticides Section: take QC solution inventory, create control charts, participate in corrective action procedures and implementation, add QC critical values into the LIMS, create control limits.
- Serving as Primary Permit Holder for PHC Permits 7 and 13, for instruments equipped with Ni-63 sources: take inventory of the Ni-63 sources in building E-2100, take yearly Radiation Safety Training, attend RMC meetings.
- Presented work on the miniaturization of EPA 8151A, an extraction method for herbicides in soil, at the Force Health Protection conferences in Albuquerque, NM (2006) and Louisville, KY (2007).

Woodley D. Benoit

USA-IPHC Bldg E2100 Aberdeen Proving Ground, MD

CHEMIST

• Analysis of drinking and waste water, soil, air filter, lead wipe, lead chip, and lead soil via ICP-MS & ICP

• Create, Edit and review of Standard Operating Procedures (SOP)

• Performed as Team Leader

• Appointed Employee of the quarter; signed by Congress?

• Ability to troubleshoot & calibrate Perkin Elmer Equipment

• 24 HR Authorized User Training

• Serve as hazardous waste management officer

• Review Instrumental Data Reports

EMSL ANALYTICAL 2004-2012

Beltsville, MD

CHEMIST

• Use Flame Atomic Absorption (FLAA) for the analysis of waste water, soil, air filter, wipe, and chip for lead

• Use Transmission Electron Microscopy (TEM) for the analysis of asbestos fibers in air samples

• Use Phase Contrast Microscopy (PCM) for the analysis of fibers in air samples

Education:

Bachelor of Science in Biochemistry

Oakwood College * Huntsville, AL. * [redacted]

Bachelor of Arts in Chemistry

Oakwood College * Huntsville, AL. [redacted]

Masters in Biology (Microbiology)

Alabama A&M University * Normal, AL. * [redacted]

PERSONAL INFORMATION WAS REMOVED BY NRC. NO COPY OF THIS INFORMATION WAS RETAINED BY THE NRC.

Shawn Sparks
[redacted]
Shawn.D.Sparks4.civ@mail.mil

Academic Degrees

Bachelor of Science in Physics [redacted]
Towson State University, Towson MD

Masters of Science in Applied Physics [redacted]
Johns Hopkins University, Baltimore MD

Professional Experience

September 1990-Present, Physicist, Nonionizing Radiation Program
Army Public Health Command, Army Institute of Public Health
Aberdeen Proving Ground, MD

- Perform laser and high intensity optical source system safety evaluations.
- Perform training in laser physics and safety.
- Preform range and installation laser program surveys.
- Perform duties of Command Laser Safety Officer
- Primary user of equipment employing C-14 calibration sources.
- Laser and Radio Frequency Radiation Hazards Course, Director (1994-2013)

Presentations

- Lecturer, Laser and Radio Frequency Radiation Hazards Course, USACHPPM; various locations (1994 - Present)
- Lecturer, International Laser Safety Conference; Baltimore, MD (2005)

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Tab D

Training of Personnel Working in or Frequenting Restricted Areas

Radiation Safety Program Orientation and Training.

a. The CRSO will provide radiation workers at USAPHC HQ initial radiation safety program orientation. Training will be given IAW NRC Regulatory Guide 8.29 and 8.13. At a minimum this training will include:

(1) The hazards associated with the handling and use of radioactive material/source(s) and equipment capable of producing ionizing radiation.

(2) The precautions and procedures that is necessary to minimize their exposure to ionizing radiation and to prevent/contain radioactive contamination.

(3) The fundamentals of Radiation Safety and the biological effects of ionizing radiation.

(4) The Commander's philosophy in reference to maintaining ionizing radiation exposures ALARA and reducing the amount of radioactive material released to the environment.

(5) The applicable federal rules and regulations and provisions of NRC licenses and ARAs.

(6) The right of the radiation worker to request reports of exposure to ionizing radiation or radioactive material.

(7) The provisions of the USAPHC RSP and applicable emergency procedures.

(8) The right of USAPHC personnel to contact the NRC if they are concerned about radiation safety or other aspects of NRC licensed activities.

(9) The requirements of developing a site safety plan for temporary job sites where direct measurements or samples are collected for radioactive analysis.

b. All radiation workers will receive annual radiation safety training that will reinforce the initial training and wil,l at a minimum, consist of the topics stated above.

c. The Principal Users will conduct on-the-job training of sufficient content and duration to ensure that all personnel are able to safely perform their assigned tasks. As a minimum, the Principal User will:

(1) Explain the hazards associated with the job the employee is to perform and the corresponding safe practices and procedures to be followed for potentially hazardous operations.

(2) Review applicable SOPs with the employee.

(3) Demonstrate how the operations are performed.

(4) Permit employees to review and practice steps in a procedure.

(5) Periodically review employee's safety practices during job performance.

(6) Document all training. Documentation will be maintained by the Principal User with a copy provided to the RSO.

e. The RSO will train ancillary personnel such as housekeeping, administration and part-time or temporary employees as needed.

f. Orientation and training will be documented on the Training/Experience of Principal/Authorized User Form.

Typical USAPHC Training Slides

Annual Radiation Safety Training 2014

USAPHC

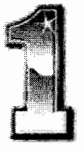
UNITED STATES ARMY PUBLIC HEALTH COMMAND

Training Requirements

Knowledge is your best defense! To work with radioactive material you must be properly trained in safe use to minimize the risk associated with each source you're working with. Additionally, orientation training is required before any "hands on" use of radioactive material. To keep your radiation worker status, you must have radiation safety refresher training once a year.

"Everybody is exposed to radiation. A little bit more or a little bit less is of no consequence."

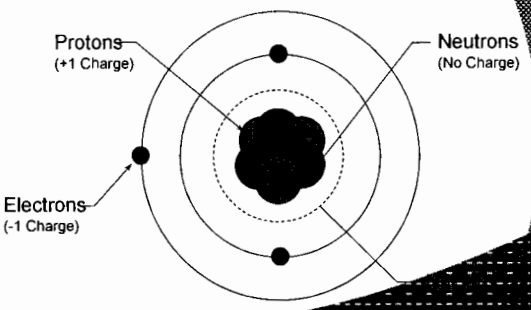
~ excerpt from the obituary of Dixy Lee Ray, Ex-Governor of Washington state, Chair of the Atomic Energy Commission, as shown in the New York Times, 3 January 1994



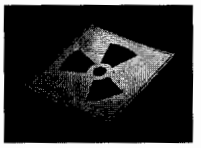
UNIT ONE

Basics of Radiation

Atomic Structure



What is Radiation?



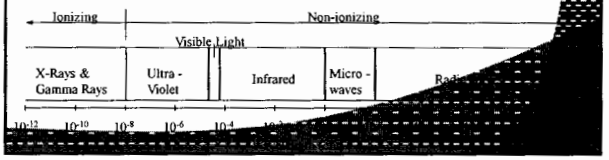
Radiation is simply the transfer of energy through a distance

- The atomic number, represented by the letter Z, is the same as the number of protons in the nucleus and determines the element.
- The mass number, represented by the letter A, is the total number of protons and neutrons in the nucleus.

There are two classes of radiati

- Particulate:

- Electromagnetic: Oscillating electric and magnetic fields that transfer energy to matter via photon or wave interactions



...and Two Types of Radiation within those classes:

Charged vs. Uncharged

Alpha Particle

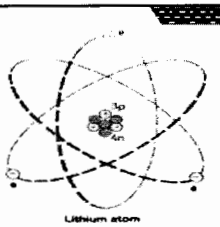
Photon

Beta Particle

Neutron

All substances are made of atoms.

In some types of atoms, the nucleus is unstable, and will decay into a more stable atom. This radioactive decay is completely spontaneous. You can heat the substance up, or subject it to high pressure or strong magnetic fields - in fact, do whatever you like to it - and you won't affect the rate of decay.



This form of Lithium is not radioactive - it's just an example of a simple atom. Most radioactive substances have many more particles in their nucleus.

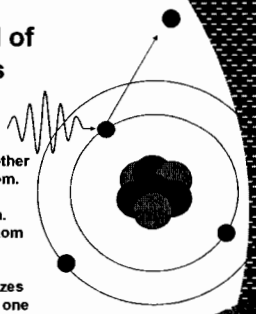
When an unstable nucleus decays, there are three ways that it can do so. It may give out:
- an **alpha particle** (we use the symbol α)
- a **beta particle** (symbol β)
- a **gamma ray** (symbol γ)

Many radioactive substances emit α particles and β particles as well as γ rays. In fact, you won't find a pure γ source; anything that gives off γ rays will also give off α and/or β too.

Ionization: The removal of one or more electrons from the atom.

When an Alpha or Beta particle passes another atom, they tend to pull electrons off the atom. Incident photons can also impart enough energy to remove an electron from an atom. When this happens, we then say that the atom is ionized.

When an alpha particle or beta particle ionizes an atom, it slows the particle down. This is one reason that alpha particles have such a low penetrating power - they ionize other atoms strongly and thus get slowed down in the process.



ALPHA PARTICLES

-Alpha particles are made of **2 protons and 2 neutr**

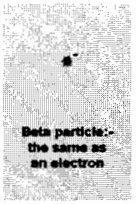
-This means that they have a **charge** of **+2**, and a **ma** of **4**. Because they have a large charge, alpha particles **ionize** other atoms.

-Alpha particles are relatively **slow** and **heavy**.

-They have a VERY **low penetrating power** - you can stop them with just a sheet of **paper**.

Beta Particles

β



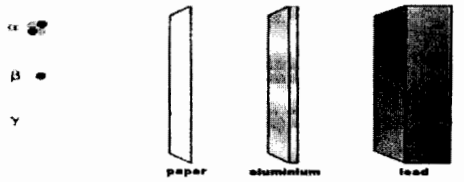
-They are **fast**, and **light**.

-Beta particles have a **medium penetrating power**. They are stopped by a sheet of **aluminum** or **plastic**.

Beta particles **ionize** atoms that they pass, bu not as strongly as Alpha particles do.

Summary

•**Alpha** particles are **easy** to stop, **gamma** rays are **hard** to



•Particles that **ionize** other atoms **strongly** have a **low penetrating power**, because they lose energy each time th ionize an atom; i.e., the alpha particle.

Gamma Rays

γ

-Gamma rays are **waves, not particles**. This mean they have **no mass** and **no charge**.

-Gamma rays have a **high penetrating power** - it tak thick sheet of metal such as **lead**, or **concrete** to redu them significantly.

-Gamma rays do not directly **ionize** other atoms, althou they may cause atoms to emit other particles which wil then cause ionization.

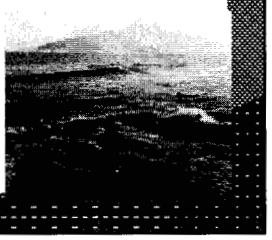
We talk about "radioactive isotopes" -but what's an isotope?

Isotopes of an atom have the same number of protons, but a different number of neutrons.

Atoms having the same atomic number but a different mass number a called isotopes. In *radioisotopes*, the proton/neutron ratio is unstabl a stable configuration is achieved by emitting particles, gamma rays both.

Activity

- The rate of radioactive transformation or the number of atoms transforming per unit of time.
- The SI unit of activity is the Becquerel (Bq) where 1 Bq = 1 transformation per second
- The traditional unit of activity is the curie (Ci) where 1 Ci = 37,000,000,000 Bq



2 Sources of Radiation

UNIT 2

It's Helpful to Know the SI Prefixes when working with radioactive materials.

Prefix	Multiplier
pico (p)	1×10^{-12}
nano (n)	1×10^{-9}
micro (μ)	1×10^{-6}
milli (m)	1×10^{-3}
kilo (k)	1×10^{3}
Mega (M)	1×10^{6}
Giga (G)	1×10^{9}
Tera (T)	1×10^{12}

Radiation is all around us. It is naturally present in our environment and has been since the birth of this planet. Consequently, life has evolved in an environment which has significant levels of ionizing radiation. It comes from outer space (cosmic), the ground (terrestrial), and even from within our own bodies. It is present in the air we breathe, the food we eat, the water we drink, and in the construction materials used to build our homes. Certain foods such as bananas and brazil nuts naturally contain higher levels of radiation than other foods. Brick and stone homes have higher natural radiation levels than homes made of other building materials such as wood. Our nation's Capitol, which is largely constructed of granite, contains higher levels of natural radiation than most homes.

Terrestrial Radiation

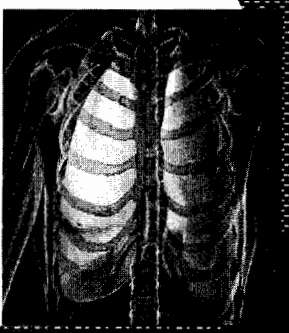
- Radiation from radioactive materials occurring naturally in the earth's crust
  - Lowest on the Atlantic coast
  - Highest on eastern slopes of the Rockies

Cosmic Radiation

- Outer space is full of various types of radiation, such as heavily charged particles and gamma rays. Fortunately, Earth has an atmosphere that helps absorb and filter them out, which protects us from high doses of cosmic radiation. However, some radiation is able to make it through. The dose of cosmic radiation that you receive varies depending on the altitude of the area in which you live. Since air is thinner at higher elevations, less cosmic radiation is filtered out than it is at lower altitudes with thicker air.

Inhaled Radiation

- You cannot see it, smell it, or taste it, but radon is the leading source of natural radiation exposure and the second leading cause of lung cancer. Where does it come from? Well, usually from soil, but it is found everywhere. The ground that we all walk and build our homes upon contains varying levels of naturally occurring radioactive elements that decay into radon.
- Levels vary widely from area to area



Internal Radiation

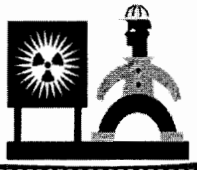
- Radiation from radioactive material incorporated in the human body
  - Primarily Carbon-14 (C-14) and Potassium-40 (K-40)

Medical Sources

- Diagnostic X-ray
  - General Radiography
  - Dental Radiography
  - Fluoroscopy
  - Computed Tomography
- Nuclear Medicine
  - Imaging using I-131, Tl-201
  - Therapy using I-131
- Radiation Therapy
  - Use of external beams
  - & sealed sources to tre cancers

Man-Made Sources

- Medical Uses
- Consumer Products
- Industrial Uses
- Nuclear Power



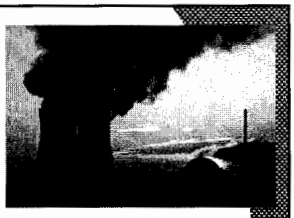
Industrial Sources

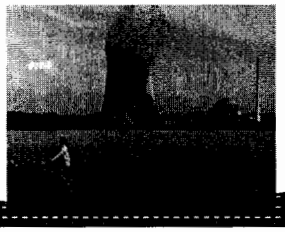
- Industrial Radiography
  - Use of X-rays or sealed gamma-ray sources for imaging structures and components
- Level Gauges
  - Use of sealed sources to check the level of materials in a tank or vat

- Well Logging
  - Use of sealed sourc measure soil moistu soil density, or underground structur composition
- Static Elimination
  - Use of radiation to remove static electri

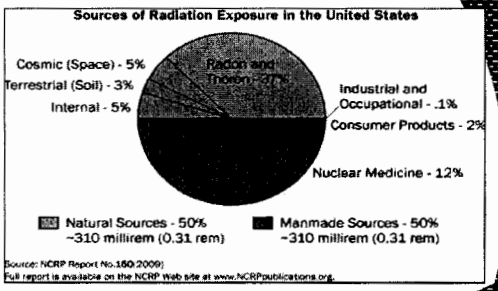
Nuclear Power

- Doses are *minimal* and are calculated for maximally exposed member of the general public.





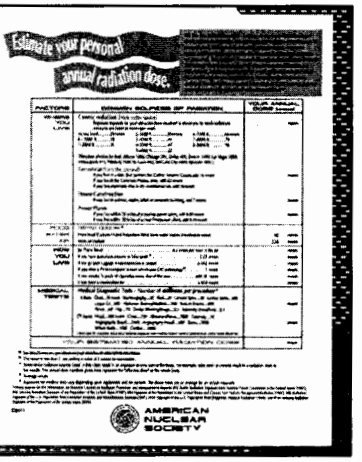
Background Radiation



Background radiation is mainly from natural radioactivity, all around us. As yo
pie chart, the majority of our annual dose comes from radon gas. Unles
radiotherapy, your dose from medical sources is quite low. The
industry adds very little to the level of backgroun

About half of the total annual average U.S. individual's radiation exposure comes from natural sources. The other half is mostly from diagnostic medical procedures. The average annual radiation exposure from natural sources is about 310 millirem. Radon and thoron gases account for two-thirds of this exposure, while cosmic, terrestrial, and internal radiation account for the remainder. No adverse health effects have been discerned from doses arising from these levels of natural radiation exposure.

Just for fun.....-→-→-→

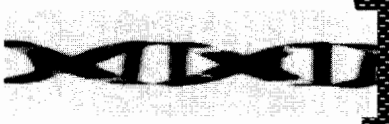


Biological Effects of Ionizing Radiation, Occupational Dose Limits and Dosimetry

UNIT 3

Alpha Particles - In review, alpha particles are slow, have a short range in air, and can be stopped by a sheet of paper. You might therefore assume that alpha particles are the least dangerous of the three types of radiation.

α



Wrong! While they cannot penetrate your skin, if you ate or drank something contaminated with an alpha source, this would put a source of a particles inside your body. Thus alpha particles, while they have a low penetrating power, can be the most dangerous (if taken **INTERNALLY**) because they ionize so strongly.

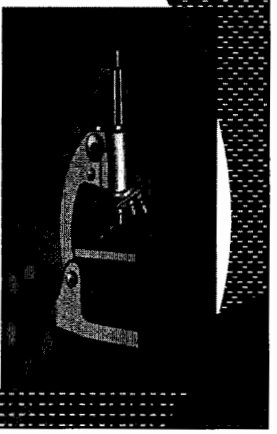
- We tend to think of biological effects of radiation in terms of their effect on living cells. For low levels of radiation exposure, the biological effects are so small they may not be detected. The body has repair mechanisms against damage induced by radiation as well as by chemical carcinogens. Consequently, biological effects of radiation on living cells may result in three outcomes: (1) injured or damaged cells repair themselves, resulting in no residual damage; (2) cells die, much like millions of body cells do every day, being replaced through normal biological processes; or (3) cells incorrectly repair themselves resulting in a biophysical change.

Beta Particles

β

Beta particles have a longer range in air than alpha particles, but ionize less strongly. They do around 1/20th of the damage done by the same dose of alpha particles.

However, they do have more penetrating power than alpha particles, which means that they can get through your skin and affect cells inside you.



Gamma Rays

γ

Gamma rays hardly ionize atoms at all, so they do not cause damage directly in this way.

However, gamma rays are very difficult to stop and requires lead or concrete shielding.

Linear No Threshold Radiation Dose Model

The radiation protection community conservatively assumes that any amount of radiation may pose some risk for causing cancer and hereditary effect, and that the risk is higher for higher radiation exposures. A linear, no-threshold (LNT) dose response relationship is used to describe the relationship between radiation dose and the occurrence of cancer. This dose-response hypothesis suggests that any increase in dose, no matter how small, results in an incremental increase in risk. The LNT hypothesis is accepted by the Nuclear Regulatory Commission as a conservative model for determining radiation dose standards, recognizing that the model may over estimate radiation risk.

- *Assumes* that any amount of radiation has a detrimental effect
- Is used to establish very conservative regulatory dose limits

Stochastic (Random) Effects of Exposure to Radiation are Effects that:

- Occur by chance
- Occur in both exposed and unexposed individuals
- Are not unequivocally related to the radiation exposure
- Become more likely as dose increases
- Severity is independent of the dose

Some Examples of Stochastic (Random) Effects:

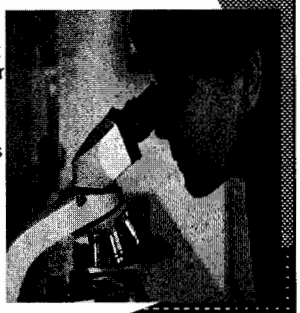
Cancer

Mental Retardation

Genetic Effects

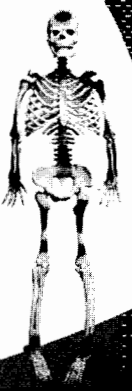
Biological Effects Summary

- Biological effects of concern in the occupational setting do not appear until several years after radiation exposure if they appear at all!!
- The probability of these effects increases with dose.
- In any individual case it can never be determine with 100% confidence that radiation was the cause.



BIOASSAY

- The determination of the kind, quantity, and location of radioactive material in the human body.



What is a Personnel Monitoring Program?

A systematic process for monitoring, recording, evaluating, and reporting the radiation doses received by occupationally exposed individuals.

BIOASSAY METHODS

In-Vivo - direct measurement

In-Vitro - analysis
materials excret
removed

BIOASSAY TYPES

- **Baseline/Pre Operational – Done upon arrival at USAPHC (for LS Rad employees) or prior to specific missions that would require monitoring.**
- **Periodic Monitoring – Not generally done at USAPHC. This type of monitoring is more likely done where larger quantities of materials are used or when a specific incident involving radioactive materials occurs.**
- **Post Operational/Termination – Done upon termination from USAPHC (for LS Rad employ... or following specific missions that requi... monitoring.**

Purpose of Personnel Monitoring

To ensure compliance with established dose limits and to keep radiation doses as low as reasonably achievable (ALARA).

BIOASSAY TYPES

- Emergency/Priority: Sample collected to verify possible exposure to radioactive materials.
- Diagnostic: Follow-up sample to confirm possible exposure.

Dose Limits

	Body Part		Limit
Occupational	Adult-Whole Body		5.0 rem
	Minor-Whole Body		0.5 rem
	Embryo/Fetus		0.5 rem
	Eye		15 rem
	Extremities		50 rem
	Individual Organs		50 rem
Public	General Public		0.1 ...

Declared Pregnancy

- All female radiation workers have a right to declare a pregnancy in writing and receive a lower dose limit
- The 0.5 rem limit on the dose to the embryo/fetus is in force only if the pregnancy is declared, *in writing*, to the RSO.
- Declaration of a pregnancy is *completely* voluntary
- NRC Regulatory Guide 8.13 contains additional information and can be found on the USAPHC Radiation Safety Website.

Monitoring Criteria for Occupational "Radiation" Workers

- Any occupationally exposed individual who is likely to receive a dose in excess of 10% of any applicable limit.
- Any occupationally exposed individual who is likely to receive an intake of radioactive material in excess of 10% of the annual limit on intake (ALI).
- Any person entering a high radiation area or very high radiation area.

Monitoring During a Declared Pregnancy

- A declared pregnant woman will receive instruction concerning the risks to the embryo/fetus from radiation exposure.

Investigational Radiation Dose Level

- Administrative levels below which the Army would like to keep radiation doses

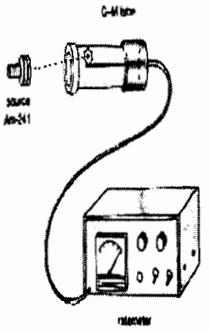
Body part	Level I*	Level II*
Whole Body	125 mrem	375 mrem
Eye	375 mrem	1125 mrem
Other	1250 mrem	3750 mrem

* Values are per calendar quarter

Wearing TLDs

- In general, TLDs should be worn:
  - between the hips and shoulders
  - outside of any clothing
  - on the portion of the body nearest the radiation source
  - with the window facing outward
- Do not attach tape or other substances to the dosimeter (except in the designated spot).
- ***ALWAYS*** store the dosimeters in RSO approved locations!!

Radioactivity is invisible, has no smell, makes no sound - in fact it cannot be detected by any of our senses. However, because radioactivity affects the atoms that it passes, we can easily monitor it using a variety of methods. We will discuss a couple here.



4 Detecting Radioactivity

UNIT 4

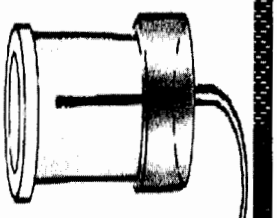
Geiger-Müeller tube (GM tube)

Most people have heard of a "Geiger Counter" for measuring radioactivity. This is actually a Geiger-M with some form of counter attached, which usually tells us the number of particles detected per minute per minute").

GM tubes work using the ionizing effect of radioactivity. Different models of GM tubes are available for de β and γ radiation.

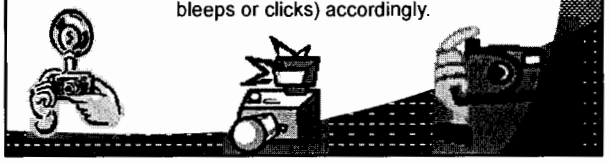
How it Works

You can see how the tube works in the animation on the right. The tube is filled with Argon gas, and around +400 Volts are applied to the thin wire in the middle. When a particle enters the tube, it pulls an electron from an Argon atom. The electron is attracted to the central wire, and as it rushes towards the wire, the electron will knock other electrons from Argon atoms, causing an "avalanche". Thus one single incoming particle will cause many electrons to arrive at the wire, creating a pulse which can be amplified and counted. This gives us a very sensitive detector.



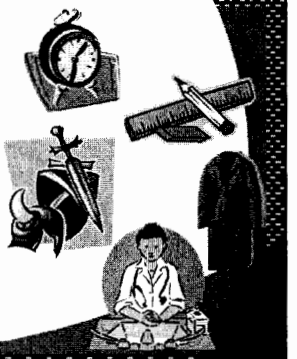
Scintillation Detectors

Scintillation Detectors work by the radiation striking a suitable material (such as Sodium Iodide), and producing a tiny flash of light. This is amplified by a "photomultiplier tube" which results in a burst of electrons large enough to be detected. Scintillation detectors form the basis of the hand-held instruments used to monitor contamination. They can recognize the difference between alpha, beta and gamma radiation, and make different noises (such as bleeps or clicks) accordingly.



Safe Usage

- **Time** – the less time you spend around a radiation source the less exposure you will receive.
- **Distance** – Radiation exposure decreases rapidly with increasing distance from the source.
- **Shielding** – Proper shielding can reduce and/or eliminate potential exposure to the source of radiation being used.
- **Contamination control** – With any isotope being used, contamination control is the most important safety measure you can take. Constant attention must be paid to prevent contamination.



5 UNIT 5

Safe Use of Radioactive Mate

Radioactive Waste

- Almost all research or laboratory analyses involving radioactive material generates some type of waste. Waste stored in the laboratory areas must be:
  - Labeled
  - Secure
  - Shielded if appropriate
  - Contained (i.e., not overflowing)

6

USAPHC Radiation Safety Program

UNIT 6

3 Nuclear Regulatory Commission Licenses

By-Product Material	Source Material	Special Nuclear Material
H-3, C-14, Ni-63, Sr-90, Cs-137, Am-241, etc.	Unat, DU, Th, U-232, U-234, U-236, U-238	Plutonium and Enriched Uranium (U-233/ U-235)

USAPHC Radiation Safety Staff

Scott Goodison: Command Radiation Safety Officer

Lorus Miller: Deputy Command Radiation Safety Officer

What is our radiation management "system"?

INTERNAL System

- Commander
- CRSO/ACRSO
- Radiation Management Committee
- Permit System

EXTERNAL System

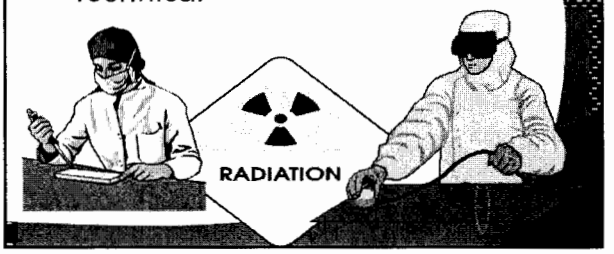
- APG Radiation Control Committee
- MEDCOM Radiation Safety Council

When is a Radiation Permit required by programs within USAPHC?

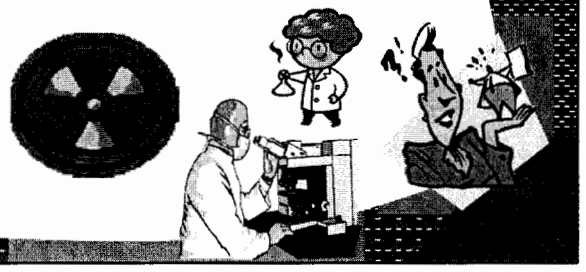
ANY USAPHC Program using radioactive materials or an ionizing radiation producing device must have a current Radiation Permit.

There are 3 types of Radioactive Materials Users:

Principal, Authorized and Technical

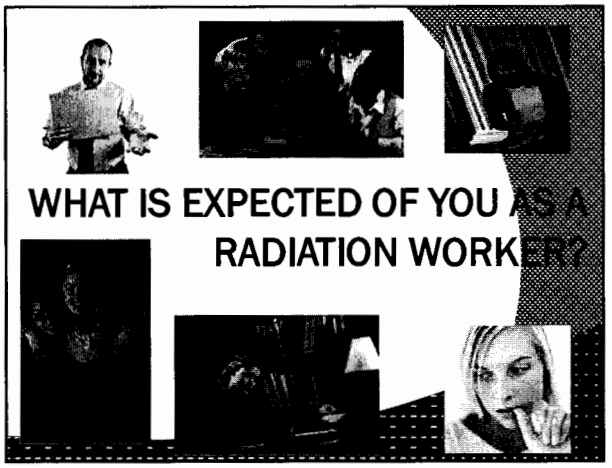


WITHIN OUR PERMIT "S
HOW DO WE CL
RADIOACTIVE MATERIAL USE
THE USAP



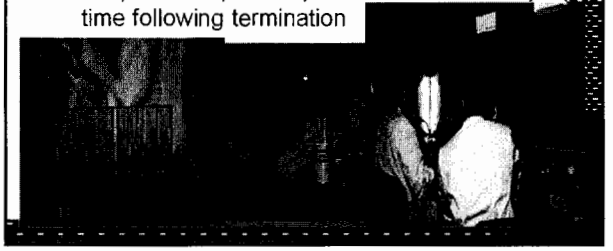
What type of user are you?

- Permit Holder is the Principle User (PU) and has been approved by the RMC to use materials autonomously.
- Authorized Users (AU) are also approved for autonomous use of materials by the RMC.
- In most cases, Technical Users do not have to be approved by the RMC
  - On-the-Job-Training
  - Supervised by PU or AU
  - Use of only check-source quantities



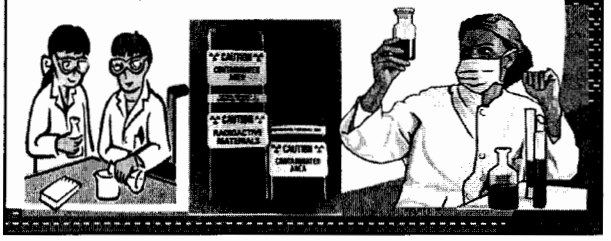
Employees MAY

- Contact the NRC directly
- Request exposure history for current year at time of employment termination
- Request complete exposure histories at any time following termination



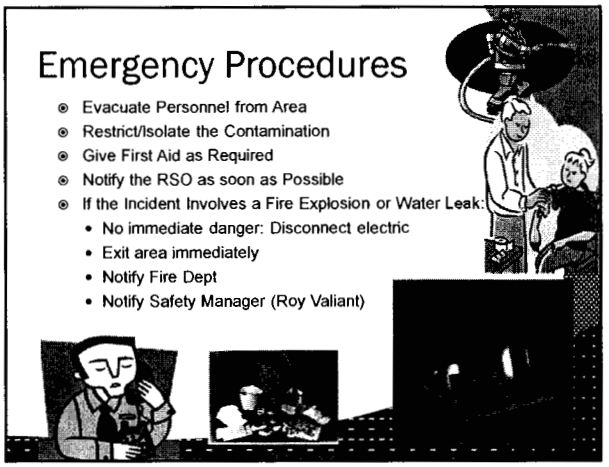
Employees MUST

- Comply with all regulatory requirements
- Follow appropriate safety precautions
- Report all unsafe conditions/potential violations involving radioactive materials to supervisor AND RSO



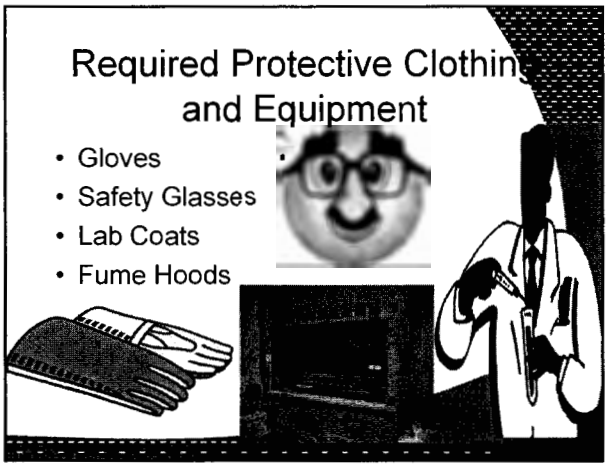
Emergency Procedures

- Evacuate Personnel from Area
- Restrict/Isolate the Contamination
- Give First Aid as Required
- Notify the RSO as soon as Possible
- If the Incident Involves a Fire Explosion or Water Leak:
  - No immediate danger: Disconnect electric
  - Exit area immediately
  - Notify Fire Dept
  - Notify Safety Manager (Roy Valiant)



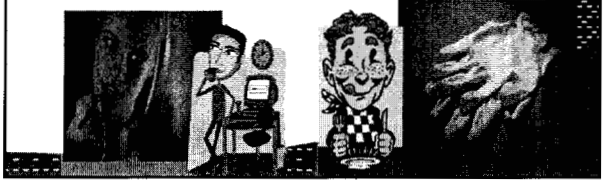
Required Protective Clothing and Equipment

- Gloves
- Safety Glasses
- Lab Coats
- Fume Hoods

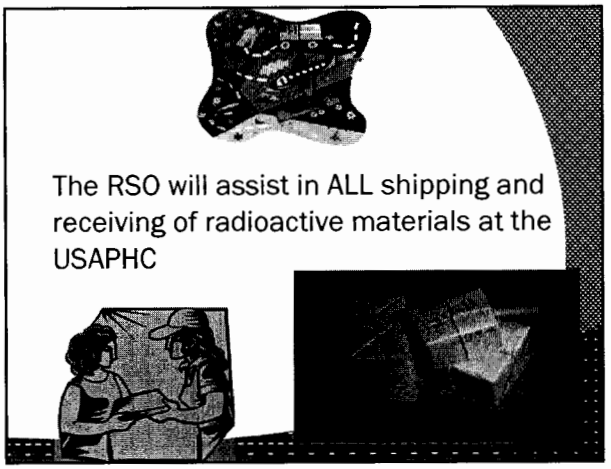


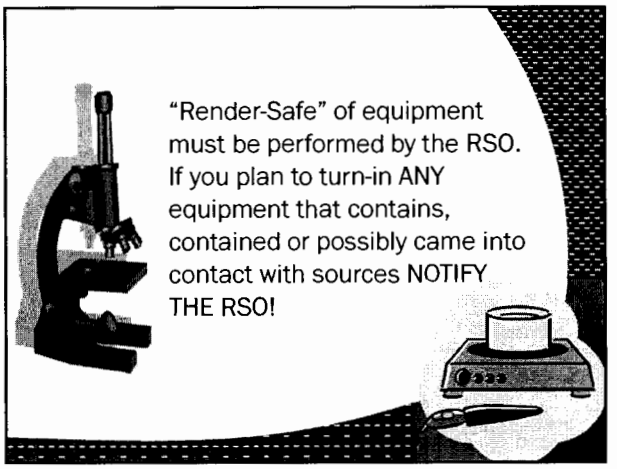
Lab Safety Highlights

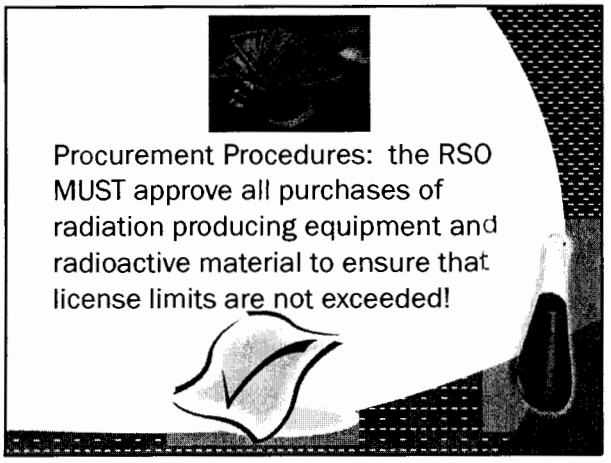
- No eating, drinking, or applying cosmetics in areas where unsealed sources are used
- Wear gloves when handling radioactive material if contamination is possible
- Use absorbent materials on work areas where unsealed sources are used.

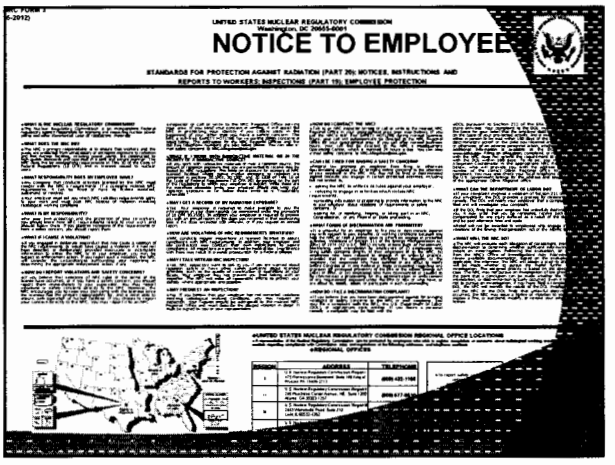


Transfer/Disposal of Radioactive Materials: All transfers or material disposals MUST be approved by the RSO

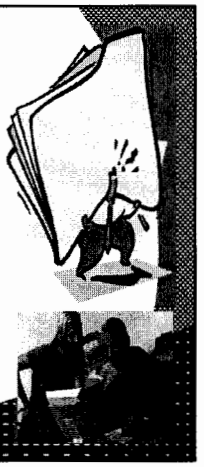

The RSO will assist in ALL shipping and receiving of radioactive materials at the USAPHC


"Render-Safe" of equipment must be performed by the RSO. If you plan to turn-in ANY equipment that contains, contained or possibly came into contact with sources NOTIFY THE RSO!


Procurement Procedures: the RSO MUST approve all purchases of radiation producing equipment and radioactive material to ensure that license limits are not exceeded!


NOTICE TO EMPLOYEE

You may request to see a copy of the USAPHC Licenses and written Radiation Safety Program documents, which are located in the CRSO's Office in Building E5158 or check out the USAPHC Website under Radiation Safety Officer.



Typical USAPHC Annual Training Final Exam

USAPHC
U.S. ARMY PUBLIC HEALTH COMMAND

2014 Annual Radiation Safety Training Final Exam

___1. Radiation Safety Training must be completed:
   a. At least twice per year.
   b. Only once when first starting work.
   c. Initially and then refresher training thereafter.
   d. Not really needed ever.

___2. Which of the following statements is false regarding alpha particles
   a. They are relatively slow and heavy
   b. They have low penetrating power
   c. They are an external hazard
   d. They can be shielded with a piece of paper

___3. Protons can be found in the nucleus of an atom.
   a. True.
   b. False.

___4. Which of the following statements is true?
   a. Activity is defined as the rate of radioactive transformations per unit time
   b. Activity is defined as the number of atoms transforming per unit time
   c. Units of activity can be expressed in becquerels or curies
   d. All of the above

___5. When purchasing radioactive material or ionizing radiation producing devices, purchase requests need only to be routed through the principal user (permit holder) and logistics.
   a. True.
   b. False.

___6. Because alpha particles low penetrating power they are neither an internal or external hazard
   a. True.
   b. False.

___7. The purpose of personnel monitoring is to provide personnel using radioactive material or radiation producing devices assurance that they are not being overexposed.
   a. True.
   b. False.

___8. Radiation dose limits are the same for the whole body, extremities and individual organs of the body

a. True.
b. False.

___ 9. What is appropriate shielding material for gamma sources?

a. plastic
b. lead
c. paper
d. aluminum

___10. Female radiation workers who become pregnant must declare their pregnancy as soon as they become aware that they're pregnant.

a. True.
b. False.

___11. Which statements are true regarding monitoring criteria for radiation workers?

a. Any occupationally exposed individual who is likely to receive a dose in excess of 10 percent of an annual limit will be issued a radiation dosimeter?

b. Any person entering a high or very high radiation area will be issued a radiation dosimeter?

c. All personnel who are issued a radiation dosimeter will also receive a bioassay.

d. a and c above.
e. a and b above.

___12. The atmosphere provides shielding from cosmic radiation.

a. True.
b. False.

___13. Terrestrial Radiation is:

a. radiation from inside your body.
b. radiation from radioactive materials occurring naturally in the earth's crust.
c. radiation from manmade sources.
e. None of the above.

____14. Inhaled radiation levels are generally the same from area to area.

a. True.
b. False.

____15. Three key factors for the safe use of radiation include time, distance and shielding:

a. True
b. False

____16. Radioactive waste stored in laboratory areas must be:

a. Labelled
b. Contained
c. Secure
d. All of the above

___17. Which of the following is not an internal component of the radiation management system for the PHC?

a. Commander
b. MEDCOM Radiation Safety Council
c. The Command Radiation Safety Office
d. The Radiation Management Committee

___18. No radiation permit is needed if you are only using exempt quantities of radioactive material as defined by the NRC and Code of Federal Regulations

a. True
b. False

___19. Employees must go through the command radiation safety office in order to contact the NRC. They are not allowed to contact the NRC directly.

a. True.
b. False.

___20. The two bioassay methods are:

a. Extraction and Carbon Dating
b. In-Vivo and In-Vitro
c. In-Vivo and Extraction.
d. none of the above.

___21. The first thing that should be done in an emergency involving radiation or radioactive material is:

a. Notify your principal user (permit holder)
b. Isolate the contamination if present
c. Give first aid
d. None of the above

___22. Radioactive material can be disposed of by principal users (permit holders) without RSO approval as long it is done in accordance with NRC License conditions.

a. True.
b. False.

___23. TLDs should be worn:

a. on the outside of any clothing.

b. between the hips and shoulders.

c. on the portion of the body closest to the radiation source.

d. All of the above.

___24. Which of the following is not a lab safety highlight:

a. Do not eat drink or apply cosmetics in areas where unsealed radioactive materials are used or stored.

b. Wear proper PPE

c. Ensure that lab work bench surfaces are made of porous material to ensure that any spilled contamination is absorbed into the work bench surface.

d. a, b and c are all lab safety highlights

___25. Equipment containing radiation sources may be turned into logistics without contacting the RSO as long as the paperwork accompanying the equipment clearly states that the item being turned in contains a radiation source.

a. True.

b. False

Tab E

Facilities and Equipment

Facilities and Equipment

a. General

(1) On a day to day basis, USAPHC possesses only small quantities (less than 1.0 mCi) of low level unsealed radioactive material.

(2) USAPHC also possesses sealed sources in various amounts up to our possession limits that are leak tested as required by our NRC license conditions.

(3) Radiation surveys and mitigation required for the return of any previously controlled areas to unrestricted use shall are performed under the supervision of the USAPHC Radiation Safety Staff.

b. Facilities

(1) Building E-2100 radiation analysis laboratories are used for sample analysis and contain sealed and unsealed radiation sources and low level radioactive waste that is awaiting pick-up for disposal. There are approximately 17 laboratory spaces (including large rooms that are subdivided into smaller spaces). Total area of laboratory and storage areas is approximately 354 square meters.

(2) Building E-2100 radioactive material storage areas are used to store sealed sources, low level radioactive waste that is awaiting pick-up for disposal, and unsealed calibration standards. There are 2 areas designated as storage areas. All laboratory and storage areas are considered to have similar levels of contamination (less than 200 dpm gross alpha-beta/100cm^2).

(3) All areas of radioactive material use are controlled access areas accessible only to personnel trained in the safe handling and use of radioactive material. All areas of use within building E-2100 are approved by the USAPHC Radiation Management Committee.

(4) A radiation survey is conducted prior to release of a room for unrestricted use. This survey will demonstrate that residual contamination , if present, is eliminated to the greatest extent possible and that the room is suitable for unrestricted release in accordance with NRC requirements.

(5) A license amendment for NRC License SMB 707 has been granted to allow for the temporary storage of low-level radioactive waste governed by the USAPHC NRC Licenses in building B5111, Aberdeen Proving Ground North. However; the responsibility for radiation safety and decommissioning of building B5111, Aberdeen Proving Ground North falls under the purview of the US Army Aberdeen Test Center.

c. Equipment

(1) Personal protective equipment is worn to prevent personnel contamination in laboratory areas where unsealed radioactive material is used and stored. Gloves, aprons, lab coats, and safety glasses are worn commensurate with the potential hazards such as the nuclide, activity, and the type of work being performed.

(2) Fume hoods are used when working with potentially volatile radioactive material.

Fume hood air flow disturbances are minimized by keeping work spaces uncluttered, by reducing the front opening as much as possible while performing work, and by careful and deliberate hand movements within the hood.

(3) Remote handling devices are used where appropriate.

(4) Shielding is used whenever possible and if appropriate

(5) Secondary spill containment is used whenever possible. That is, laboratory work involving licensed material is performed in a tray or on absorbent paper.

d. Radiation Detection Equipment (If any instrument listed below is replaced, it will be replaced with an instrument that is equivalent in function and capability.):

Type	Make	Model	Radiation Detected	Amount On-hand	Probes
Liquid Scintillation	Beckman	LS 6500	Beta (β)	2	N/A
Liquid Scintillation	Perkin Elmer	Tricarb3100TR	β	1	N/A
Liquid Scintillation	Perkin Elmer	Tricarb3180TR/SL	β	2	N/A
Gas Proportional	Tennelec	S5-SLB	Alpha (α), β	3	N/A
Gas Proportional	Tennelec	LB 5500	α, β	1	N/A
Multi-Channel Analyzer	Canberra	Open VMS	Gamma (Y) Spectrometry	4	High-purity germanium (HPGe)
RADIAC	Ludlum	2350	α, β, Y	10	44-2, 44-3, 44-9, 44-1, 44-40
RADIAC	Ludlum	19	Y	6	Built-in NaI
RADIAC	Ludlum	375	Y	2	133-2
RADIAC	Ludlum	3A	α, β	2	44-9
RADIAC	Eberline	E-120	α, β	1	HP-210
Ionization Chamber	Victoreen	451P	Y	4	Internal
Ionization Chamber	Victoreen	451B	Y	2	Internal
Hand-held Multichannel Analyzers	Inova	IdentiFinder	Y, n	3	Internal

e. Personnel Dosimetry Services. U.S. Army Dosimetry Center, Redstone Arsenal, Alabama, provides the following:

(1) Beta/gamma thermo-luminescent or optically stimulated luminescence dosimeters for external dosimetry.

(2) Neutron thermo-luminescent or optically stimulated luminescence dosimeters for external dosimetry.

f. Bioassay. U.S. Army Public Health Command, Institute of Public Health, Aberdeen Proving Ground, Maryland, will provide bioassay analysis and internal dosimetry assessment when necessary in accordance with USAPHC Regulation 385-24.

g. Calibration and Repair Procedures

(1) Alpha, beta and gamma radiation detection and measurement instruments are calibrated by the Test, Measurement and Diagnostic Equipment Activity, Edgewood Section, Aberdeen Proving Ground, Maryland 21005-5000 under NRC License No. 19-00126-16.

(2) Limited calibration verification and quality assurance measurements are made at USAPHC using various check-sources/standards possessed under NRC License Nos. BML 19-09880-01, SMB-707 and SNM-860.

Tab F

Radiation Safety Program

USAPHC Regulation 385-24

DEPARTMENT OF THE ARMY
U.S. ARMY PUBLIC HEALTH COMMAND
5158 Blackhawk Road
Aberdeen Proving Ground, Maryland 21010-5403

USAPHC Regulation
No. 385-24

30 May 2014

Safety
RADIATION SAFETY PROGRAM

1. HISTORY. This is the first printing of this U.S. Army Public Health Command (USAPHC) regulation.

*This publication rescinds U.S. Army Center for Health Promotion and Preventive Medicine Regulation 11-9, dated 24 October 2006.

Use of trademarked name(s) does not imply endorsement by the U.S. Army but is intended only to assist in identification of a specific product.

2. PURPOSE. This regulation establishes policies and procedures for the procurement, production, transfer, storage, use, and disposal of radioactive material (RAM) and ionizing/nonionizing radiation-producing devices within the USAPHC. It delineates responsibilities and provides for the effective control of radiation sources to minimize the associated hazards. Its objective is to ensure the safe use of radiation sources and compliance with all applicable Federal, host nation, and local rules and regulations at all USAPHC Activities. Additionally, it establishes policies and procedures to ensure that human exposure to ionizing radiation and releases of radioactive effluent to the environment are kept as low as reasonably achievable (ALARA).

3. APPLICABILITY. The policies and procedures established by this regulation are applicable to all USAPHC and its Public Health Command Regions (PHCRs) personnel as well as USAPHC Radiation Permit Holders.

4. REFERENCES. For a list of references and useful publications, see Appendix A.

5. POLICY. This Command is committed to the philosophy of maintaining occupational exposures to ionizing radiation ALARA and to maintaining exposures to ionizing radiation according to the currently accepted personnel protection standards and regulations.

6. RESPONSIBILITIES.

a. The USAPHC Commander will—

(1) Ensure that all USAPHC PHCRs comply with all applicable Federal, Army, host nation, and local rules and regulations.

(2) Provide adequate financial and personnel resources to support the Radiation Safety Program (RSP).

(3) Designate, in writing, and provide support for a Command Radiation Safety Officer (CRSO) and at least one Deputy/Alternate CRSO at the USAPHC-Headquarters.

(4) Sign or approve, through delegation to the CRSO, all USAPHC U.S. Nuclear Regulatory Commission (NRC) License and Army Radiation Authorizations (ARAs) applications.

(5) Designate, in writing, and provide support for an Alternate Radiation Safety Officer–Laser and Optical Radiation (ARSO-LOR) and an Alternate Radiation Safety Officer–Radio Frequency Radiation (ARSO-RFR) at the USAPHC-Headquarters.

(6) Designate, in writing, and provide support for a Dose Records Custodian.

(7) Establish procedures to control potential health and safety hazards from RAM and radiation-producing devices.

(8) Maintain occupational ionizing radiation exposures, general public exposures, and releases of RAM to the environment within the current limits specified in Federal and Army regulations as well as ALARA.

(9) Designate the chairperson and other members of the Radiation Management Committee (RMC).

b. The USAPHC PHCRs will—

(1) Control all aspects of the RSP within their command.

(2) Establish local procedures to control potential health and safety hazards from RAM and radiation-producing devices.

(3) Ensure that their organization possesses a valid NRC License, ARA or USAPHC Radiation Permit for the uses of RAM and radiation-producing devices.

(4) Comply with the all Federal, Army, host nation, Status-of-Forces Agreements (SOFAs), and local rules and regulations. Host nation rules and regulations take precedence if more restrictive; otherwise Army and Federal regulations will apply.

(5) Designate, in writing, and provide support and manpower for a Local Radiation Safety Officer (LRSO) and at least one Alternate Radiation Safety Officer (ARSO) if required by the conditions of an NRC license or ARA. The amount of support and manpower will be commensurate with the complexity of the RSP.

(6) Designate, in writing, a Dose Records Custodian if required by Federal, Army, host nation, or local regulations.

(7) Review and sign all application forms for NRC licenses or ARA renewals or significant amendments.

(8) Designate a Radiation Control Committee (RCC) if required by conditions of an NRC license or ARA. License or authorization conditions will specify the functions and membership of the RCC. A commander also may establish an RCC at his/her discretion.

(9) Ensure that all users of RAM within the Command and each type of RAM use is reviewed and approved by the RCC.

c. The Radiation Management Committee.

(1) The USAPHC HQ RMC will consist of the following members:

(a) Deputy to the Commander for Public Health, Chairperson (Voting Member).

(b) CRSO (Voting Member).

(c) Chief of Safety and Environmental Management Office (SEMO) or Representative (Non-voting Member).

(d) Portfolio Director, Occupational and Environmental Medicine Portfolio or representative (Voting Member).

(e) Manager, Health Physics Program (HPP) or representative (Voting Member).

(f) Portfolio Director, Laboratory Sciences (LS) or representative (Voting Member).

(g) Director, G-4, Logistics, or representative (Non-voting Member).

(h) Permit Holders/Principal Users or representative (Voting Member).

(i) Other persons recommended by the RMC and approved by the Commander.

(2) The recorder may not vote as an RMC member.

(3) The USAPHC PHCRs will establish the RMC/RCC as required by the governing NRC License or ARA. A representative from the Command staff should serve as the Chairman of the RCC.

(4) The RMC/RCC will—

(a) Meet at least quarterly or as required by the governing NRC License or ARA.

(b) Provide recommendations to the Commander on policies for the procurement production, use, handling, storage, transfer, shipment, and disposal of RAM and radiation-producing devices.

(c) The RMC/RCC will review and approve proposals for new uses or modification to current uses of RAM or radiation-producing devices.

(d) Review and approve the qualifications of the RSO, ARSOs, Assistant RSOs, Principal Users, and Authorized Users of RAM and ionizing radiation-producing devices. Submit recommendations to the Commander for signature/approval as appropriate.

(e) Review reports from the RSOs.

(f) Review investigative reports of radiation incidents, accidents and personnel exposures in excess of the ALARA investigational levels to determine the cause and recommend appropriate action to the Commander.

(g) Ensure that RSP audits are conducted at intervals not to exceed 12 months.

(h) Review the findings of the annual audits and recommend corrective actions.

(i) Act on other radiation matters as directed by the Commander.

(j) Maintain records of action taken. All RMC/RCC reports/minutes are subject to the approval of the Chairman. In addition to the Chairman, provide copies of RMC reports/minutes to each RMC/RCC member and Principal User.

(5) RMC business will be conducted as follows:

(a) A majority of the members of the RMC/RCC will constitute a quorum.

(b) A majority of voting members must approve an RMC action.

(c) In emergency situations, the Chairperson or RSO may give interim approval.

d. Chairperson, RMC/RCC.

(1) The Chairperson will—

(a) Serve as the presiding officer for the RMC/RCC.

(b) Advise the Commander on radiation safety issues.

(2) The chairperson may—

(a) Vote as any other member of the RMC/RCC when the vote is by ballot, (e.g., memorandums distributed for RMC concurrence).

(b) In all other cases the Chairperson, as a member of the RMC/RCC, may vote whenever that vote will affect the result.

e. The CRSO will—

(1) Act as the Local RSO for the Army Institute of Public Health/USAPHC-Headquarters.

(2) Exercise staff supervision over the USAPHC RSP.

(3) Advise the USAPHC Commander on all USAPHC NRC license and ARA applications.

(4) Provide Radiation Safety Consultations to all USAPHC Commands every 2 years when they have RAM or radiation-producing devices.

(5) Annually, provide the USAPHC Commander with an RSP review.

f. The LRSOs will—

(1) For NRC licenses and ARAs on which he/she is named, perform or be responsible for the performance of all radiation safety functions required by Federal, Army, host nation, and by license and authorization conditions.

(2) Have direct access to the Local Commander for radiation safety purposes as necessary.

(3) Exercise staff supervision over the local RSP.

(4) Formulate and implement a local RSP.

(5) Formulate, implement, and supervise an active, documented program to keep ionizing radiation exposures ALARA.

(6) Advise and assist the Commander, the RMC/RCC, and personnel within the local Command in all matters regarding radiation safety.

(7) Advise the Chairperson when there is a need for the RMC/RCC to act.

(8) Review current and proposed uses of radiation sources for compliance with regulation and NRC license and ARA conditions and to evaluate potential health hazards and the adequacy of protective measures.

(9) Review standing operating procedures (SOPs) for operations involving radiation sources before submission to the RMC.

(10) Review and approve the procurement of ionizing radiation sources to ensure compliance with NRC license and ARA conditions.

(11) Ensure that Radiation Safety surveys are performed in areas where RAM or radiation-producing devices are used or stored at least monthly or as otherwise required.

(12) Ensure that leak tests of sealed sources are performed at the frequencies required by NRC license or ARA.

(13) Ensure that all RAM and radiation-producing devices are properly received, used, stored, handled, shipped, and disposed of according to current Federal and Army regulations and NRC license and ARA conditions.

(14) Ensure that a physical inventory of RAM is performed annually.

(15) Ensure that dosimeters for radiation workers at the USAPHC are provided, used, collected, and processed.

(16) Maintain an inventory of RAM and a registry of radiation-producing devices.

(17) Maintain Radiation Safety records according to Federal and Army regulations.

(18) Provide training for radiation workers and other personnel regarding radiation safety to include the training required by Title 10, Code of Federal Regulations (CFR) Part 19 and Title 29 CFR Part 1910.

(19) Report all items of noncompliance as required by Federal and Army regulations.

(20) Report packaging and shipping discrepancies.

(21) Investigate all reported or suspected items of noncompliance.

(22) Investigate and document reports of radioactive contamination and radiation incidents/accidents as required by Federal and Army regulations.

(23) Immediately terminate any unsafe activity involving radiation or RAM.

(24) Establish, in writing, an action plan to deploy RAM anywhere in the world.

(25) Provide all RSP documentation to the USAPHC CRSO as required by this regulation and U.S. Army Medical Command (MEDCOM) Regulation 40-42.

g. The Alternate/Deputy CRSO/RSOs will—

(1) Assist the CRSO in managing the RSP.

(2) Perform any of the duties of the CRSO/RSO in his/her absence.

h. The USAPHC PHCR personnel will be subject to the requirements and responsibilities delineated in their respective local radiation safety SOPs as well as this regulation.

i. The Dose Records Custodian will—

(1) Maintain dosimetry records according to current Federal and Army regulations as well as the practices established by the RSO.

(2) Exchange dosimeter badges, and return dosimeter badges for processing.

(3) Assist the RSO in managing the personnel dosimetry program and investigating potential overexposures and lost dosimeters.

j. The Permit Holders/Principal Users will—

(1) Ensure that RSO approval is obtained before procuring any radiation source.

(2) Ensure that each use of ionizing radiation sources is approved by the RMC before beginning the procedure or procuring additional radiation sources.

(3) Develop SOPs to control the use, storage, and disposal of radiation sources, establish emergency procedures, and ensure that the radiation doses received by individuals under their supervision and the release of radioactive effluent to the environment will be maintained ALARA.

(4) Submit SOPs for review and approval by the RMC.

(5) Review SOPs annually, and ensure that SOPs are current and adequate.

(6) Provide protective clothing or devices to radiation workers under their supervision according to the permit SOP (e.g., safety glasses, gloves, aprons, and so forth).

(7) Ensure that RAM and radiation-producing devices are used and stored in approved areas and secured from unauthorized removal from the place of use or storage.

(8) Ensure that all Authorized Users are approved by the RMC.

(9) Ensure that Technical Users receive sufficient training (formal and/or on-the-job) to enable them to safely perform their assigned duties. Document any training, and provide a copy to the RSO.

(10) Coordinate with the RSO before transferring, shipping, or disposing of RAM or analytical devices containing RAM.

(11) Coordinate the disposal of RAM or radioactive waste with the RSO.

(12) Notify the RSO before relocating RAM or sources of ionizing radiation.

(13) Seek RSO assistance in rendering safe any items used in a RAM laboratory prior to turning in to the Defense Logistics Agency (DLA) Disposition Services or any other non-restricted areas.

(14) Notify the RSO immediately if any RAM is delivered to them instead of the RSO.

(15) Notify the RSO whenever there are alleged items of noncompliance or radiation hazards according to Paragraph 10.

(16) Ensure that a physical inventory of RAM is conducted semi-annually, and submit changes, additions, or deletions to the RSO in writing.

(17) Keep Radiation Permit documents current and accurate.

k. The Authorized Users will—

(1) Follow all applicable SOPs and regulations.

(2) Immediately report any unsafe situation, accident, violation of regulation, or violation of NRC License/ARA conditions to their supervisor, Principal User, and the RSO according to Paragraph 10.

(3) Provide supervision and training to Technical Users as directed by the Principal User.

l. The Technical Users will—

(1) Follow all applicable SOPs and regulations.

(2) Only use ionizing radiation sources as follows:

(a) Use sealed sources as an integral part of an instrument or device.

(b) Use exempt quantities of RAM in check sources for instrument quality assurance.

(c) As determined by the RSO in coordination with the Permit Principal User.

(3) Immediately report unsafe situations, potential violations, and radiation incidents to their supervisor, Principal and Authorized Users, and the RSO.

(4) Seek guidance from Principal or Authorized Users when problems arise.

(5) Not perform any maintenance on the radioactive source or open the compartment in which the RAM is contained for any reason.

(6) In a field setting, collect samples only after reading the project SOPs and Site Safety Plan according to paras 6m and 7p.

(7) In a USAPHC laboratory setting—

(a) Only handle, process, or prepare samples for analysis within the scope of the on-the-job- training.

(b) Notify an Authorized User if non-routine, elevated, or degraded samples are encountered.

m. Project Officers. When making direct radiation measurements or collecting samples suspected of being radiologically contaminated at temporary job sites, Project Officers will—

(1) Develop and implement a radiological site safety plan, if necessary, according to this regulation.

(2) Staff the site safety plan through the USAPHC SEMO, the USAPHC CRSO, and the visiting installation Safety Office.

(3) Ensure that all site workers have read and understand the site safety plan.

7. CONTROL PROCEDURES FOR SOURCES OF IONIZING RADIATION.

a. The RSP Reporting Requirements.

(1) RMC/RCC Minutes. A copy of the minutes of each Command's RMC/RCC meeting will be forwarded to the USAPHC CRSO within 30 days after the meeting is held. In the absence of a RMC/RCC, the local RSO should provide an annual report through command channels to RSO of radiation safety activities since the last report.

(2) Incidents and Accidents. Federal reporting requirements for incidents, accidents, and over-exposures are in Title 10 CFR Part 20, subpart M and Title 29 CFR Part 1910.1096(m).

(a) Copies of all reports required by 10 CFR 20.2201 through 20.2205 or by 29 CFR 1910.1096(m) and any other incidents or accidents report to the NRC or as required by license conditions will be submitted through command channels to MEDCOM.

(b) Reports through command channels will meet the same time requirements as do required reports to the NRC and Occupational Safety and Health Administration (OSHA®). For example, if immediate telephonic notification to the NRC is required, it will be followed by immediate telephonic notification through the chain of command to the MEDCOM. (OSHA® is a registered trademark of the Occupational Safety and Health Administration.)

b. Radiation Protection Consultations. Every 2 years, when necessary or in the absence of a written survey tool, the USAPHC CRSO or ACRSO will provide on-site radiation safety consultation to each PHCR. This consultation may serve as the annual program audit for that year. The consultation will be documented in a report furnished to the local Commander.

c. Annual Radiation Report. At the end of each fiscal year, the USAPHC CRSO will provide the Commander with an annual Radiation Program Review to facilitate command oversight.

d. NRC-Licensed Radioactive Material. The NRC licenses special nuclear, source, and byproduct material in the United States and its possessions.

(1) Commanders will forward applications for new licenses, license renewals, and license amendments through USAPHC CRSO to MEDCOM.

(a) Applications will meet appropriate regulatory and advisory guidelines before they are forwarded to the NRC.

(b) Applications for NRC license renewal will be sent to arrive at MEDCOM at least 60 days prior to expiration to allow time for adequate review. Completed applications will be forwarded by MEDCOM to the appropriate NRC regional office.

(c) The USAPHC Commander or Deputy to the Commander will sign applications (NRC Form 313, *Application for Material License*) for NRC licenses, NRC license renewals, and significant amendments to NRC licenses. (Transmittal cover sheets may be signed by a person authorized to sign for the Commander.)

(2) Except as specified in para 7a(2), all USAPHC personnel may communicate directly with the NRC with no restrictions. However, a person considering such communication should also consider whether information to be requested is obtainable from Army sources and whether information provided or obtained is of interest to the chain of command or other Army organizations.

e. ARAs. The ARAs are used by the Army to control Army ionizing radiation sources (including machines that emit ionizing radiation) that the NRC does not license. For USAPHC ARA applications—

(1) The ARA applications must go through USAPHC CRSO to MEDCOM for evaluation and review for adequacy.

(a) Applicants for new ARAs will use Department of the Army (DA) Form 3337 (*Application for Department of the Army Radiation Authorization)*. Applicants for ARA renewals and amendments will use either DA Form 3337 or a memorandum that refers to the original DA Form 3337.

(b) The USAPHC CRSO will assure that applications meet appropriate regulatory and advisory guidelines before forwarding them to MEDCOM for approval and issuance through command channels to the applicant.

(c) Applications for renewal will be sent so that they arrive at the USAPHC CRSO at least 90 days prior to expiration to allow time for adequate review. The completed application will be forwarded by USAPHC-Headquarters to MEDCOM at least 45 days prior to expiration.

(2) The Army's ARA program will correspond to the NRC's licensing program to the maximum extent possible. The Army will apply NRC regulations and guidance, modified as necessary, in its control of ARA ionizing radiation sources. Conditions of ARAs will be similar to NRC license conditions. The NRC's regulations regarding license-exempt concentrations (Title 10 CFR Part 30.14) and quantities (Title 10 Part CFR 30.18) will be applied similarly to naturally occurring radioactive material (NORM) or accelerator-produced RAM with respect to ARA exemption upon MEDCOM approval. Applicants for such exemptions will send supporting documents through command channels to MEDCOM. However, overseas commanders will comply with applicable host nation regulations and SOFAs. In such cases, all deviations from NRC regulations and guidance will be outlined and explained in the ARA application.

f. Radiation Permits. All USAPHC-Headquarters programs working with RAM or ionizing radiation-producing devices must possess a Radiation Permit. In some cases, non-USAPHC Programs may possess a Radiation Permit under the USAPHC NRC Licenses. This type of Radiation Permit is only permitted when a Memorandum of Agreement is made between the two elements. A Radiation Permit is written authorization from the RMC permitting an individual to procure, possess, use, store, or dispose of sources of ionizing radiation according to the terms and conditions of the Permit. Radiation Permits will be issued for a period of 3 years.

(1) Initial Radiation Permits. To obtain a Radiation Permit—

(a) Submit the request on a Radiation Permit Application to the RMC. New Radiation Permit Applications must be signed by the respective Director/Division Chief and routed through the RSO to the Chairperson of the RMC.

(b) Submit to RMC, through the RSO, a copy of the SOP(s) governing the use or uses to be authorized under the permit. These SOPs must address safety procedures, equipment, protective clothing, procedures for using the requested sources of ionizing radiation, emergency procedures, disposal procedures, and so forth as applicable.

(c) Submit the training and experience of the Principal User and Authorized Users on the Training/Experience of Principal/Authorized User, Radiation Permit Application Supplement Form. The applicant must have training and experience with the requested or a similar radiation source. See Appendix B for the minimum qualifications for Principal Users and Authorized Users.

(2) Renewal of Radiation Permits. To renew a Radiation Permit, the Principal User must ensure the following:

(a) If there are no requested changes to the permit, the permit will be automatically renewed by the RSO every 3 years.

(b) If there are requested changes to the permit—

i. Submit the request to the RSO.

ii. Submit the most current version of the applicable SOPs.

iii. Submit the training and experience for new Principal User and/or Authorized Users on the Training/Experience of Principal/Authorized User Form.

iv. Submit the application for renewal at least 30 days before the expiration date of the current permit.

(3) Amendments to Radiation Permits. An amendment is required for a new use, a significant modification to an existing use, a change in the amount of RAM authorized, a change in the location of use, a change in the number or type of ionizing radiation-producing devices, or a change of Principal User or Authorized Users. To amend an existing Radiation Permit, the Principal User must—

(a) Submit the request on a Radiation Permit Application to the RMC. Radiation Permit Applications must be signed by the respective Director/Division Chief/Pricipal User and routed through the RSO to the Chairperson of the RMC.

(b) Submit the SOP(s) applicable to any new uses or modifications of existing uses requested in the amendment.

(c) Submit training and experience for the new Principal User or Authorized User(s) Training/Experience of Principal/Authorized User Form.

(d) Submit justification for changes in amounts of RAM or changes in devices in memorandum form.

(4) Approval.

(a) The RSO and/or the RMC will review all new applications and applications for renewal and amendment of Radiation Permits using the criteria specified in

Appendix B. The RMC may invoke more stringent requirements on a case-by-case basis.

(b) If the RMC disapproves an application, the applicant may make the necessary changes and resubmit the application. Comments on areas that are inadequate will be provided by the RSO.

(c) Upon approval of the application by the RMC, the RSO will issue a Radiation Permit according to the conditions and/or special instructions of the RMC. One copy will be retained by the RSO and one copy provided to the Principal User. An NRC Form 3 (*Notice to Employees*); Section 206 of the Energy Reorganization Act of 1974 (http://www.uwyo.edu/ehs/_files/docs/factsheets/nrcsection206noncompliance.pdf); and a notice indicating the location of the NRC licenses, the ARA, and Title 10 CFR Parts 19, 20 and 21 will be provided to the Principal User. These documents must be posted conspicuously near the entrance to the work area along with applicable emergency procedures. The RSO will post the rooms with radiation warnings, and so forth, as appropriate.

g. Procurement and Receipt of Ionizing Radiation Sources.

(1) Only RAM authorized by the USAPHC NRC licenses or ARA and ionizing radiation-producing devices approved by the RMC/RCC may be procured.

(2) No radiation sources will be ordered, requisitioned, or otherwise acquired by any USAPHC activity or Permit Holder without written RSO approval.

(3) If a DA Form 3953 (Purchase Request and Commitment) is required, it will be submitted through the RSO to logistics. All other requests will be submitted to the RSO by memorandum. A request for RAM will identify the specific radionuclide(s) by element, mass number, and total activity of each radionuclide in curies or a sub-multiple thereof (e.g., Nickel-63, 10 millicurie (mCi)). A request for radiation-producing devices will give the technical specifications regarding radiation (i.e., the energy of radiation, maximum output, and so forth).

(4) The RSO will verify that NRC license and ARA limits are not exceeded and that the requesting individual is authorized to possess the requested radiation source in the requested physical and/or chemical form and quantity by a valid Radiation Permit.

(5) The RSO will review and approve/disapprove the request for purchase of ionizing radiation sources.

(6) If the request is approved, the RSO will—

(a) Ensure that the number and expiration date of the NRC license or ARA which authorizes the procurement of the requested RAM appears on the DA Form 3953.

(b) Ensure that the statement "Reviewed by the RSO" appears on the DA Form 3953, and initial and date this statement.

(c) Maintain a copy of the DA Form 3953 in the RSO files.

(d) Forward the request to logistics.

(7) If the request is disapproved, the RSO will return the request to the requester with a written explanation.

(8) The RSO should be notified immediately when a package addressed to the RSO is received. If package is received at logistics, contact the addressee immediately to inform them of this situation and the identity of the sender. If the package contains RAM, the addressee will immediately notify the RSO.

(9) The RSO or a member of the radiation safety staff will process all incoming shipments of RAM before they are released. This processing will include the following as appropriate:

(a) Performing any surveys or monitoring required by Title 10 CFR Part 20.1906. These must be performed within 3 hours of receipt if during normal duty hours and within 3 hours of the start of the next working day if received outside normal duty hours. See Appendix D for action levels.

(b) Adding the RAM to the inventory.

(c) Documenting the receipt of the package.

h. Use of RAM and Ionizing Radiation-Producing Devices at USAPHC-Headquarters.

(1) The RAM will be used by or under the direct supervision of the Principal User or an Authorized User. Appendix B details the qualifications required for Principal and Authorized Users.

(2) Technical Users may use exempt quantities of RAM as follows:

(a) Sealed sources as an integral part of an instrument or device.

(b) Exempt quantities of RAM as check sources for instrument quality assurance.

i. Transfer and Shipment of Sources of Ionizing Radiation at USAPHC-Headquarters.

(1) The RSO will control the transfer and shipment of sources of ionizing radiation. No sources of ionizing radiation will be transferred to another Radiation Permit, moved to another location, shipped to field sites, or transferred to any person or organization outside the USAPHC without the approval of the CRSO or LRSO. In no case will RAM be shipped to a person or organization that is not authorized to possess the RAM in question.

(2) The RSO or a member of the radiation safety staff will ship all packages containing RAM and ensure that the package is shipped according to current Federal and Army regulations. The only exception to this is found in Paragraph 7n, Use of Radioactive Material at Temporary Job Sites.

j. Radioactive Waste Collection and Disposal at USAPHC-Headquarters.

(1) Solid radioactive waste will be collected in containers approved by the RSO. These containers will be conspicuously labeled with the radiation caution symbol and the words, "Caution: Radioactive Waste" and will be used exclusively for radioactive waste. Each radioactive waste container will be conspicuously labeled in a visible location on the outside of the waste package with the following information: isotope, isotope amount, date item was put into radioactive waste, and permit number.

(2) Liquid radioactive waste will be collected in plastic bottles and placed in containers approved by the RSO and labeled and tagged as specified above for solid waste containers.

(3) A chronological log will be maintained with each container (i.e., a label, log book, or materials accounting worksheet) to show the element, mass number, and the activity of each radionuclide placed into the container for disposal. The log should also indicate the radiation permit number and location for the waste generator.

(4) Separate containers will be used for transuranic and nontransuranic waste.

(5) The radiation permit holder will store any waste they generate in an RSO approved location until pick-up.

(6) Radioactive waste storage areas must be clearly posted to identify the radioactive waste so that workers and the public will not inadvertently enter the storage area.

(7) Attention should be given to compatibility of chemicals placed in radioactive waste containers to avoid chemical reactions.

(8) The inventory of unwanted RAM/waste in the possession of Principal Users will be kept to a practical minimum.

(9) Radioactive waste disposal will be monitored by the RSO to ensure compliance with Federal, state and Army regulations and guidance.

(10) Radioactive waste will be packaged, labeled, and transferred under the supervision of the RSO.

(11) Radioactive waste will be disposed of by shipment through the Aberdeen Proving Ground (APG) Health Physics Office to the U.S. Army's executive agency for radioactive waste disposal (currently the Joint Munitions Command located at Rock Island Arsenal, Illinois) or another approved radioactive waste contractor according to Department of the Army Pamphlet (DA Pam) 385-24 unless specifically stated otherwise in this section.

(12) Liquid radioactive waste will not be disposed of via the sanitary sewer without the approval of the RSO. Refer to the USAPHC Radioactive Waste Management Plan or consult the USAPHC CRSO for the most recent information on disposal via the sanitary sewer system.

(13) Liquid scintillation vials and cocktails containing only tritium or carbon-14 in concentrations less than 0.05 microcuries per gram (µCi/g) of cocktail will be disposed according to their chemical hazard only as authorized by Title 10 CFR Part 20.2005. This disposal will be coordinated with the USAPHC Hazardous Waste Manager.

(14) Animal tissue containing only tritium or carbon-14 in concentrations less than 0.05 µCi/g averaged over the weight of the entire carcass will be disposed of as non-radioactive waste in a manner that precludes its use as food for humans or as animal feed as required by Title 10 CFR 20.2005.

(15) All reasonable measures will be taken to prevent the production of mixed wastes. Storage and disposal of mixed wastes must be coordinated with the RSO and the USAPHC Hazardous Waste Manager.

k. Turn-in of Equipment at USAPHC-Headquarters. Equipment that contains or contained a radioactive source or has been used to handle RAM must be "rendered safe" before turn-in to Logistics, Property Disposal, or disposal in the regular trash. The following "render-safe" procedures will be followed:

(1) The Principal User will notify the RSO of the desire to turn-in the equipment.

(2) If practical, the Principal User will remove any radioactive sources from the equipment under the supervision of the RSO. The RSO will take possession of the source(s).

(3) The RSO will then survey the equipment with an appropriate survey instrument and take smear samples to assess the amount of fixed and/or removable contamination.

(4) The equipment will be decontaminated by the Principal User, if necessary, until it meets the criteria for unrestricted release as specified in Appendix C.

(5) A completed Employee Assistance Program (EAP) Label 1004 (*USAPHC Health Physics Clearance*) will be attached to equipment meeting these criteria, and the equipment may be turned in or disposed of. An EAP Form 1105 (*Statement of Render Safe Procedure*) will also be completed and will accompany the equipment during turn-in.

(6) Equipment for which decontamination is impractical will be disposed of as radioactive waste.

(7) Equipment from which the radioactive source(s) cannot be removed will be returned to the manufacturer, transferred to an authorized recipient, or disposed of as radioactive waste as appropriate.

(8) In addition to the signature, name, and title of the RSO, one of the following statements will be written on turn-in documents:

(a) "I certify that this item is free of radioactive contamination."

(b) "I certify that this item meets the NRC requirements for unrestricted use."

l. Use of Radioactive Sources in Gas Chromatography at USAPHC-Headquarters.

(1) Principal Users are responsible for safe/proper operation of gas chromatographs.

(2) Removal and replacement of the radioactive source module in gas chromatographs will be by/under the supervision of the RSO or Principal User. Under no circumstances will a radiation source be removed from a source module.

(3) Radioactive sources that are not physically installed in gas chromatographs will be stored in containers which are appropriately labeled and secured in Room 0400 of building E-2100.

(4) All gas chromatographs that contain electron capture detectors will have a label attached indicating that RAM is present.

(5) The gas chromatographs will be checked for proper operation of all safety and control devices semi-annually or more frequently at the discretion of the RSO and after replacing a source.

(6) Gas-chromatograph detectors containing RAM will not be operated at temperatures greater than manufacturer's specifications.

(7) The cleaning of the detector and sources will be accomplished by returning the detector and source to the manufacturer.

(8) The exhaust gases from the gas chromatograph will be vented as approved by the RSO and according to the manufacturer's recommendations.

(9) No gas chromatographs containing radium 226 (Ra-226) will be procured.

m. Radiation Source Accounting.

(1) When a shipment of RAM is received, the RSO will ensure that the appropriate information is entered into the inventory.

(2) The Principal Users will maintain records of RAM receipts, use, and disposal. The Principal User will notify the RSO when RAM has been used up, needs to be transferred to another organization or person, or disposed of as waste.

(3) The Principal Users will conduct an inventory of all RAM held under their permit semi-annually or as requested by the RSO. A record of this inventory will be maintained by the Principal Users and the RSO. The RAM may be removed from the inventory only when transferred, used up, or disposed of.

(4) The RSO will forward an annual inventory report to the Garrison RSO, APG, Maryland, according to APG Regulation 385-3.

n. Use of RAM at Temporary Job Sites. The RAM governed by USAPHC-Headquarters NRC Licenses may be used at temporary job sites within the United States if in compliance with the following conditions:

(1) The Principal User must—

(a) Possess a Radiation Permit which specifically authorizes the use of radiation sources at temporary job sites.

(b) Submit to the USAPHC RSO a written protocol stating the intent to transport and use ionizing radiation sources outside of the USAPHC-controlled areas. The protocol will include at least the following information:

i. Specific identification of the radiation sources to include the serial number, the element and mass number (e.g., strontium-90, carbon-14), the total activity of each radionuclide, and the type of instrument or source as appropriate.

ii. The location of the temporary job site.

iii. The name, address, and phone number of a point of contact at the job site (e.g., the installation RSO).

iv. The expected date the radiation source(s) will be shipped to the job site.

v. The method and mode of shipment (e.g., USAPHC mobile laboratory van, commercial transporter/carrier, and so forth). The RAM will not be transported in checked or carry-on baggage on commercial flights.

vi. The expected date the radiation source(s) will be returned to its storage location at the USAPHC.

vii. Procedures for ensuring the physical security of the radiation source to include the method and location of storage when the source is not in use.

viii. The name of all individuals who will be using the radiation source(s) at the temporary job site. Radiation source(s) may only be used by or under the direct supervision of Authorized Users except as provided in Appendix B, paragraph B-3.

ix. Include a copy of (or reference) any applicable SOPs.

(c) If the ionizing radiation sources are to be used at another installation, provide the RSO at that installation a copy of the approved protocol along with a copy of the NRC license.

(d) Coordinate with the RSO for shipment of the radiation source(s).

(2) The Authorized User(s) must—

(a) Ensure safe use of the radiation source(s) at the job site.

(b) Ensure physical security of the radiation source(s) at the job site.

(c) Ensure that only those personnel named in the protocol enter or remain in a restricted area and that only authorized personnel use the radiation source(s).

(d) Ensure that individual monitoring devices are worn (if applicable) and that radiation doses to personnel are maintained ALARA.

(e) Ensure that SOPs, regulations, and the conditions of the Radiation Permit are followed.

(f) Perform any radiation surveys, and so forth, as required by the conditions of the Radiation Permit, SOPs, or RSO instructions.

(g) Ensure that restricted areas are properly posted.

(h) Ensure that RAM is transported according to applicable Federal, state, and Army regulations as well as the RSOs instructions.

(i) Conduct a documented physical inventory of RAM at least once each week, and report any discrepancies to the USAPHC RSO within 8 hours.

(j) Ensure that emergency procedures are followed as specified in applicable SOPs and this regulation.

o. Leak-Testing of Sealed Sources.

(1) Sealed source and detector cells will be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by a certificate of registration as referred to in Title 10 CFR Part 32.210.

(2) Each sealed source designed to emit alpha particles will be tested for leakage at intervals not to exceed 3 months notwithstanding the requirements in para 7o(1).

(3) Sealed sources need not be leak-tested if—

(a) They contain only Hydrogen-3; or

(b) They contain only a gas; or

(c) The half-life of the isotope is 30 days or less; or

(d) They contain no more than 100 µCi of beta and/or gamma-emitting material or not more than 10 µCi of alpha-emitting material; or

(e) They are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person and have not been leak-tested within the required interval, they must be tested before use or transfer. No source or detector cell will be stored for more than 10 years without being tested for leakage and/or contamination.

(4) In the absence of a certificate from the transferor indicating that a leak-test has been made within 6 months, a sealed source or detector cell will not be put into use until tested.

(5) Radioactive sources will be leak-tested by or under the supervision of the RSO or a member of the radiation safety staff.

p. Radiological Site Safety Plans.

(1) Radiological Site Safety Plans are required for all projects which involve: (1) taking direct measurements on radiation sources or for radiological contamination or (2) collecting environmental samples for radioisotope analysis.

(2) The Project Officer is responsible for implementing the site-specific safety plan. The Project Officer will ensure the plan is reviewed by the USAPHC SEMO, the USAPHC Radiation Safety Office, and the local RSO/Safety Office prior to the start of work on-site.

(3) The site safety plan must address the following radiation safety concerns:

(a) Proposed level of personnel monitoring.

(b) Description of site Radiation Safety practices (i.e., personnel protective equipment, surveys, controls).

(c) A list of personnel (to include contractors) who will be on-site.

(d) Emergency procedures.

(e) Address and phone number of installation or site RSO.

(f) Proposed method of the final deposition of all samples sent to the USAPHC. This includes bulk soil and water samples.

8. TRANSFER AND TEMPORARY USE OF RADIOACTIVE MATERIALS AT USAPHC PUBLIC HEALTH COMMAND REGIONS.

a. Transfer of Radioactive Materials.

(1) The RAM will be transferred to and received only by persons authorized to receive and possess it.

(a) Transfer of USAPHC RAM will be according to regulations, instructions, and conditions established by the holder of the NRC license or ARA.

(b) The shipper will obtain and retain appropriate evidence (e.g., a copy of the recipient's ARA or NRC or agreement license) prior to shipping the RAM.

(2) Shipment of RAM will be according to applicable NRC (Title 10 CFR Part 71), Department of Transportation (Title 49 CFR), U.S. Postal Service (Title 39 CFR) regulations, DA, and host nation regulations.

b. USAPHC Temporary RAM Permits. The USAPHC Temporary RAM Use Permits are required for use, storage, and possession of radiation sources by USAPHC PHCRs. Permits are only required for RAM and specific RAM use not specified on the receiving Command's license or authorization.

(1) The Temporary RAM Permit application must demonstrate the following:

(a) A timeline detailing the dates and mode of shipment. Permits may not be valid for more than 120 days. Shipments will be in compliance with all applicable Army, NRC, Department of Transportation (DOT), host nation, and local rules and regulations.

(b) A description of the RAM use including specific locations, SOPs, authorized users, training, and personnel monitoring.

(c) The sending Command has approved the RAM use specified in the application.

(d) The receiving Command has approved the temporary RAM use specified in the application.

(2) If the criteria in paragraphs 8b(1)(a-d) is met, the USAPHC CRSO will issue a Temporary Radioactive Material Use Permit. A copy of the application, sending and receiving Commands' approval, and the permit will be copy furnished to MEDCOM.

9. AS LOW AS REASONABLY ACHIEVABLE PROGRAM.

a. External Personnel Monitoring.

(1) Each radiation worker will complete a DD Form 1952 (*Dosimeter Application and Record of Occupational Radiation Exposure*).

(2) Individual monitoring devices will be issued to individuals occupationally exposed to ionizing radiation who are likely to receive a dose in excess of 10 percent of the applicable yearly limit specified in Title 10 CFR Part 20 Subpart C and DA Pam 385-24 paragraph 5-1d(1).

(3) The primary individual monitoring device will be the thermoluminescent dosimeter.

(4) Each individual issued a dosimeter will receive instruction from the RSO on the proper wearing, care, and handling of the dosimeter.

(5) Each person issued a dosimeter will wear it when working with or around radiation sources.

(6) The Dosimetry Custodian will exchange individual dosimeters on a quarterly basis and send them to the U.S. Army Ionizing Radiation Dosimetry Center (ADC) for processing.

(7) Upon receipt of the Automated Dosimetry Record (ADR) from ADC, the RSO will review the report and provide a copy of the ADR to the Dosimetry Custodian for recording. Individual exposures will be recorded according to DA Pam 385-25.

(8) Radiation workers will be furnished a copy of their dosimetry results annually or upon request.

(9) Radiation workers will ensure that a copy of their dosimetry results is retained in their permanent medical record.

b. Internal Personnel Monitoring.

(1) Because of the types and quantities of RAM routinely used by USAPHC personnel, the USAPHC does not participate in a routine internal monitoring (bioassay) program. Internal monitoring will be instituted at the discretion of the RSO on a strict case-by-case basis.

(2) Individuals likely to receive an intake of RAM in excess of 10 percent of the applicable annual limit on intake (ALI) will be placed on an internal monitoring program.

(3) The RSO will review all bioassay results and forward the doses (including zero results) to the ADC for recording.

(4) Individuals will be furnished a copy of bioassay results annually or upon request.

c. Work Area Radiation Safety Practices.

(1) All work areas where unsealed sources are used (e.g., bench tops, laboratory tables, fume hoods, and so forth) will be covered with disposable absorbent material.

(2) Fume hoods used for RAM will be surveyed for adequate airflow at least semi-annually.

(3) Persons handling unsealed radioactive sources will wear appropriate protective clothing or devices.

(4) Each controlled area will have, immediately available, a radiation survey instrument suitable for the detection and monitoring of the radiation exposure in the area. A spill kit must be available in areas with a high potential for contamination, as determined by the RSO. This requirement may be waived by the RSO when, in his/her opinion, its use is inappropriate.

(5) Radioactive solutions will never be pipetted by mouth.

(6) Special precautions will be taken to avoid the entry of RAM into open wounds.

(7) The use of containers or glassware with sharp edges must be avoided.

(8) Eating, drinking, smoking, and applying cosmetics, lotions, lip balms, and so forth are prohibited in areas where unsealed RAM is handled.

(9) Food and drink will not be stored in the same location (e.g., the refrigerator) as RAM.

d. Storage.

(1) All areas in which RAM material is stored will be conspicuously posted with radiation caution signs as required by Title 10 CFR Part 20.1902.

(2) Radioactive gases/material with radioactive gaseous decay products will be stored in gas-tight containers and in areas having adequate ventilation (e.g., a fume hood designated for gaseous or volatile RAM).

e. Surveys.

(1) Individuals handling unsealed RAM must survey the work area for contamination when they complete any procedure which could result in contamination. If a radiological procedure extends beyond a day, monitoring must be done at the end of each day and upon completion of the procedure. The Principal User must maintain records of monitoring results for periodic review by the RSO.

(2) Routine Radiation Safety surveys will identify and assess changes in radiation levels in the work area, evaluate the effectiveness of controls and procedures, ventilation, protective equipment, fixed and transferable surface contamination, and general exposure levels in the work area. The frequency of any radiation survey will depend on such factors as the type of operation, the type and level of the radiation, the rate at which changes could unknowingly develop, the potential hazard, and the degree of personnel involvement.

(3) Surveys of unsealed RAM use areas will be conducted monthly with an appropriate survey meter and smear samples to assess radiation levels and the amount of radioactive contamination. The action levels for surveys are specified in Appendix D.

(4) Surveys will be conducted of areas where only sealed sources are used at the discretion of the RSO.

(5) Air and water monitoring will be established when considered necessary by the RSO.

f. Calibration of Radiation Survey Instruments. Radiation survey instruments used in the RSP will be calibrated according to current Federal and Army regulations and after each instrument servicing. The RSO instrumentation will be supplied and calibrated appropriately by the HPP. The Principal User for the applicable Radiation Permit will arrange for the calibration of instruments not maintained by the HPP.

g. Radiation Safety Program Orientation and Training.

(1) The CRSO will provide radiation workers at USAPHC-Headquarters initial RSP orientation and annual training. Training will be given according to NRC Regulatory Guide 8.13 and 8.29. This training will include at least the following:

(a) The hazards associated with the handling and use of RAM/source(s) and equipment capable of producing ionizing radiation.

(b) The precautions and procedures necessary to minimize their exposure to ionizing radiation and to prevent/contain radioactive contamination.

(c) The fundamentals of radiation safety and the biological effects of ionizing radiation and nonionizing radiation.

(d) The Commander's philosophy in reference to maintaining ionizing radiation exposures ALARA and reducing the amount of RAM released to the environment.

(e) The applicable Federal rules and regulations and provisions of NRC licenses and ARAs.

(f) The right of the radiation worker to request reports of exposure to ionizing radiation or RAM.

(g) The provisions of the USAPHC RSP and applicable emergency procedures.

(h) The right of USAPHC personnel to contact the NRC if they are concerned about radiation safety or other aspects of NRC-licensed activities.

(i) The requirements of developing a site safety plan for temporary job sites where direct measurements or samples are collected for radioactive analysis.

(2) All radiation workers will receive annual radiation safety training.

(3) Principal Users will conduct on-the-job training of sufficient content and duration to ensure that all personnel are able to safely perform their assigned tasks. At a minimum, the Principal User will—

(a) Explain the hazards associated with the job the employee is to perform and the corresponding safe practices and procedures to be followed for potentially hazardous operations.

(b) Review applicable SOPs with the employee.

(c) Demonstrate how the operations are performed.

(d) Permit employees to review and practice steps in a procedure.

(e) Periodically review employee's safety practices during job performance.

(4) The Principal User will maintain documentation with a copy provided to the RSO.

(5) The RSO will train ancillary personnel (such as housekeeping, administration, and part-time/temporary employees) as needed.

(6) The Principal User will document orientation and training on a USAPHC Form 312-R (*Radiation Permit Application Supplement*).

(7) The APG Health Physics Office will train firefighters, security personnel, and military police.

10. RADIATION INCIDENTS AND NONCOMPLIANCE.

a. Management of Radiation Incidents.

(1) Users of RAM must report any incident/accident involving sources of ionizing radiation to the RSO.

(2) If an ionizing radiation incident/accident results in contamination and/or injury to personnel, perform the following actions in addition to notifying the RSO:

(a) Evacuate all personnel from the involved area.

(b) If appropriate, isolate/restrict the contamination.

(c) Give necessary first-aid.

(d) In the event of fire, explosion, or water leak—

i. If immediate danger to life or limb is not present, disconnect electrical plugs or deactivate electrical circuits at the circuit breaker box as appropriate.

ii. Exit from the laboratory immediately and call for medical assistance; notify the fire department (dial 911) or building engineers as appropriate. Contact the USAPHC Safety Manager (410-436-3841) and the USAPHC RSO (410-436-8076).

(e) The Health Clinic must be notified prior to the arrival of contaminated individuals.

(f) The USAPHC RSO can be reached by the following telephone numbers: during duty hours, DSN: 584-8076 or Commercial: 410- 436-8076. After-duty hours, DSN 584-4375/4376 or Commercial: 410-436-4375/4376.

b. Reporting of Radiation Incidents/Accidents.

(1) The CRSO will report the loss/theft of RAM to the NRC as follows:

(a) Immediately after the loss/theft of NRC-licensed material in an aggregate quantity greater than or equal to 1000 times the quantity specified in Appendix C to Title 10 CFR Part 20 becomes known.

(b) Within 30 days after the loss or theft of NRC-licensed material in a quantity greater than 10 times the quantity specified in Appendix C to 10 CFR Part 20 becomes known.

(c) The notifications in paras 10b(1)(a) and (b) will be made by telephone to the NRC Operations Center at: 301-816-5100 or 301-951-0550 and the MEDCOM Radiation Safety Staff Office (RSSO) at: 210-221-6612.

(d) Within 30 days of any telephonic notification, a written report will be made to Administrator, NRC Region I, 2100 Renaissance Blvd., Suite 100, King of Prussia, PA 19406 and the MEDCOM RSSO. The report will contain the following information:

i. A description of the material involved to include the element, mass number, quantity, and chemical and physical form.

ii. The circumstances under which the loss or theft occurred.

iii. A statement of the disposition (or probable disposition) of the material involved.

iv. Exposures of individuals to radiation, the circumstances of the exposures and the possible Total Effective Dose Equivalent (TEDE) to persons in unrestricted areas.

v. Actions that have been or will be taken to recover the material.

vi. Procedures that have been or will be adopted to prevent a recurrence.

(e) Subsequent to filing a written report, any additional substantive information will be reported within 30 days of learning of the information.

(2) Notification of incidents/exposures, radiation levels, or concentrations that exceed applicable limits will be reported by the RSO as follows:

(a) Immediately after any incident involving NRC-licensed material that may have caused or threatens to cause—

i. An individual to receive a TEDE of 25 roentgen equivalent man (rem) or more; or

ii. An individual to receive an eye dose of 75 rem or more; or

iii. An individual to receive a shallow dose to the skin or extremities of 250 radiation-absorbed dose (rad) or more.

(b) Immediately after a release of RAM, so that if an individual had been present for 24 hours, the individual could have received an intake of 5 times the applicable ALI.

(c) Within 24 hours of any incident involving NRC-licensed material that may have caused or threatens to cause—

i. An individual to receive a TEDE of 5 rem or more; or

ii. An individual to receive an eye dose of 15 rem or more; or

iii. An individual to receive a shallow dose to the skin or extremities of 50 rem or more.

(d) Immediately after a release of RAM, so that if an individual had been present for 24 hours, the individual could have received an intake of one ALI.

(e) The notifications in paras 10b(2)(a)–(d) will be made by telephone to the NRC Operations Center at: 301-816-5100 or 301-951-0550 and by telegram, mailgram, or facsimile transmission to Administrator, NRC Region I, 2100 Renaissance Blvd., Suite 100, King of Prussia, PA 19406 and to the MEDCOM RSSO at: 210-221-6612.

(f) Within 30 days of any of the following—

i. Any of the incidents in paras 10b(2)(a)-(d).

ii. Any dose in excess of the applicable limits as specified in Title 10 CFR Parts 20.1201, 2107, 1208, or 1301.

iii. Radiation levels or concentrations of RAM in a restricted/unrestricted area in excess of any applicable limit.

(g) The written reports in para 10b(2)(f) will be made to: U.S. Nuclear Regulatory Commission, Document Control Desk, Washington, DC 20555 with a copy furnished to Administrator, NRC Region I, 2100 Renaissance Blvd., Suite 100, King of Prussia, PA 19406. The report will contain the following information as appropriate:

i. Estimates of the doses to each individual.

ii. The levels of radiation and/or concentrations of RAM.

iii. The cause of the elevated doses, dose rates, or concentrations.

iv. Procedures that have been or will be adopted to prevent a recurrence, including a schedule for achieving conformance with applicable limits, environmental standards, and license conditions.

(h) Subsequent to filing a written report, any additional substantive information will be reported within 30 days of learning of the information.

(3) Written reports will be prepared so that the names and other personnel information (e.g., social security numbers, and so forth) will appear in a separate and detachable part of the report.

(4) Additional Reports for Ionizing Radiation Incidents.

(a) All potential overexposures will be reported directly to the Office of the Surgeon General by the ADC. The incidents will be investigated and actions will be taken as specified in DA Pam 385-24, DA Pam 385-25, and MEDCOM Regulation 40-42.

(b) For any of the incidents requiring reporting to the NRC, a Radiological Accident Report (RCS DD-R&E (AR) 1168) will be provided to the U.S. Army Safety Center (USASC). This report is a memorandum containing the following information:

i. Date and time of incident.

ii. Radiation-producing device or source involved radiation characteristics and parameters of the incident. Include the national stock number (NSN) if an Army commodity or the model or part number.

iii. A description of the incident, including cause names and social security number of personnel affected, estimated doses, contamination levels, facilities effected, and so forth.

iv. Actions taken to prevent recurrence.

v. Recommendations to prevent similar occurrences at other installations using similar sources or devices.

vi. Name and telephone number of the RSO.

vii. Point of contact (name, address, and telephone number).

viii. A statement of when the NRC and other applicable agencies were notified.

ix. NRC License or ARA number.

c. Reporting of Defects and Noncompliance.

(1) Anyone knowing of, discovering, or suspecting items of potential noncompliance or possible defects will report the problem to the RSO.

(2) The RSO will take immediate action to protect personnel or property if warranted.

(3) The RSO will notify the Chairperson, RMC and the commander of the existence of items of potential noncompliance or possible defects before the end of the day on which the item was reported.

(4) The RSO will begin an evaluation of the item of possible noncompliance or the potential defect within 1 working day after it has been reported.

(5) The RSO will provide initial notification to the NRC Operations Center within 2 days by facsimile transmission at: 301-816-5151 (preferred) or by telephone at: 301-816-5100. Verification of facsimile reception will be verified by telephone. A copy of this notification will be forwarded to the MEDCOM RSSO. This notification will contain the following as appropriate:

(a) Name and address of the individual informing the NRC.

(b) Identification of the facility, activity, or basic component which is in noncompliance or contains a defect.

(c) Identification of the firm constructing the facility or supplying the basic component which is in noncompliance or contains a defect.

(d) The nature of the defect or failure to comply and the safety hazard which is or could be created.

(e) The date on which the information regarding the defect or failure to comply was obtained.

(f) The corrective actions that have been, are being, or will be taken; the name of the individual or organization responsible for the actions; the length of time that has been or will be taken to complete the actions.

(6) The RSO will prepare a written evaluation of the item of potential noncompliance or possible defect and submit it to the NRC through the Commander within 60 days. If the evaluation cannot be completed within 60 days, an interim report describing the noncompliance/defect and the reason the evaluation cannot be completed will be submitted to the NRC through the commander. The evaluation will be submitted upon completion.

(7) The RSO will maintain the evaluation and associated documents for a minimum of 5 years as required by Title10 CFR Part 21.51 and according to AR 25-400-2.

(8) Personnel are encouraged to contact the RSO in the event of any concern about radiation safety. If personnel believe that adequate corrective action is not being taken, they have the right to contact an NRC inspector or the Region I Office. A list of the regional offices can be found on the NRC Form 3 posted in all areas where RAM are used or stored.

(9) No USAPHC personnel will be fired or discriminated against in any way for contacting the NRC.

APPENDIX A

REFERENCES

Section I
Required References

AR 25-400-2
The Army Records Information Management System (ARIMS) 2 October 2007

DA Pam 385-2
The Army Radiation Safety Program, 24 August 2007 (RAR, 09/22/11)

DA Pam 385-25
Occupational Dosimetry and Dose Recording for Exposure to ionizing Radiation, 2 October 2012

MEDCOM Regulation 40-42
MEDCOM Radiation Safety Program, 4 May 2012

APG Regulation 385-3
Radiation Protection, Change 1, 10 October 1990

USAEHA Technical Guide No. 153
Guidelines for Controlling Potential Health Hazards from Radio Frequency Radiation, 13 May 1987

American National Standard N13.12
Surface and Volume Radioactivity Standards for Clearance, 1999

NRC Regulatory Guide 8.10
Operating Philosophy for Maintaining Occupational Radiation Exposures as Low As is Reasonably Achievable, September 1975

NRC Regulatory Guide 8.13
Instruction Concerning Prenatal Radiation Exposure

NRC Regulatory Guide 8.23
Radiation Safety Surveys at Medical Institutions

NRC Regulatory Guide 8.29
Instruction Concerning Risk from Occupational Radiation Exposure

National Council on Radiation Safety and Measurements (NCRP) Report No. 127
Operational Radiation Safety Program, 1998

NCRP Report No. 102
Medical X-Ray, Electron Beam and Gamma-Ray Protection for Energies Up to 50 MeV (Equipment Design, Performance and Use), 30 June 1989

NCRP Report No. 116
Limitation of Exposure to Ionizing Radiation, 31 March 1993

NCRP Report No. 123
Screening Models for Releases of Radionuclides to the Atmosphere, Surface Water, and Ground, 1996

Public Law 93-438, 88 Stat. 12333
Energy Reorganization Act of 1974
http://alternativeenergy.procon.org/sourcefiles/Energy_Reoganization_Act_1974.pdf

Title 10 CFR Part 19
Notices, Instructions and Reports to Workers: Inspections and Investigations

Title 10 CFR Part 20
Standards for Protection Against Radiation

Title 10 CFR Part 20, Subpart C
Occupational Dose Limits

Title 10 CFR Part 20.1201
Occupational dose limits for adults

Title 10 CFR Part 20.1208
Dose equivalent to an embryo/fetus

Title 10 CFR Part 20.1301
Dose limits for individual members of the public

Title 10 CFR Part 20.1902
Posting requirements

Title 10 CFR Part 20.1906
Procedures for receiving and opening packages

Title 10 CFR Part 20.2005
Disposal of specific wastes

Title 10 CFR Part 20.2201
Reports of theft or loss of licensed material

Title 10 CFR Part 20.2202
Notification of incidents

Title 10 CFR Part 20.2203
Reports of exposures, radiation levels, and concentrations of radioactive material exceeding the constraints or limits

Title 10 CFR Part 20.2204
Reports of planned special exposures

Title 10 CFR Part 20.2205
Reports to individuals of exceeding dose limits

Title 10 CFR Part 2107
Records of dose to individual members of the public

Title 10 CFR Part 21
Reporting of Defects and Noncompliance

Title 10 CFR Part 21.51
Maintenance and inspection of records

Title 10 CFR Part 30.14
Exempt concentration

Title 10 CFR Part 30.18
Exempt quantities

Title 10 CFR part 32.210
Registration of product information

Title 10 CFR Part 71
Packaging and Transportation of Radioactive Material

Title 29 CFR Part 1910
Occupational Safety and Health Standards

Title 29 CFR Part 1910.1096(m)
The Ionizing Radiation Standard

Title 39 CFR
Postal Service

Title 49 CFR
Transportation

Section II
Related References

AR 40-5
Preventive Medicine, 25 May 2007

AR 40-66
Medical Record Administration and Health Care Documentation, 17June 2008 (RAR 002, 01/04/ 2010)

AR 40-400
Patient Administration, 27 Nov 2013 (RAR 001, 09/15/2011)

AR 385-10
The Army Safety Program, 27 November 2013

AR 735-11-2
Reporting Supply Discrepancies, 6 August 2001

Technical Bulletin (TB) 43-180
Calibration and Repair Requirements for the Maintenance of Army Materiel, 15 January 2005

Technical Bulletin, Medical (TB MED) 522
Control of Health Hazards from Radioactive Material Used in Self-Luminous Devices, 1 August 1980

TB MED 525
Control of Hazards to Health from Ionizing Radiation Used by the Army Medical Department, 10 March 1988

Technical Manual (TM) 3-261
Handling and Disposal of Unwanted Radioactive Material, 12 May 1988

TM 55-315
Transportability Guidance for Safe Transport of Radioactive Materials, 23 June 1989

American National Standards Institute (ANSI) N43.2-2001
Radiation Safety for X-Ray Diffraction and Fluorescence Analysis Equipment

ANSI/Health Physics Society (HPS) N43.3-2008
Radiation Safety for Installations Using Non-Medical X-Ray and Sealed Gamma-Ray Sources, Energies up to 10 MeV

ANSI Z136.1-2007
American National Standard for Safe Use of Lasers, 16 March 2007

NRC
Byproduct Material License No. 19-09880-01
NRC License, Special Nuclear Material License No. SNM-860

NRC
License, Source Material License No. SMB-707

Title 40 CFR
Protection of Environment (Parts 190-399)

Title 49 CFR Chapter I, Subchapter C
Hazardous Materials Regulations (Parts 171-180)

Section III
Forms and Labels

DA Form 3337
Application for Department of the Army Radiation Authorization

DA Form 3952
Purchase Request and Commitment

DD Form 1952
Dosimeter Application and Record of Occupational Radiation Exposure

EAP Label 1004
USAPHC Health Physics Clearance

EAP Form 1105
Statement of Render Safe Procedure

NRC Form 3
Notice to Employees

NRC Form 313
Application for Material License

USAPHC Form 312-R
Radiation Permit Application Supplement

APPENDIX B

CRITERIA FOR APPROVING USES AND USERS OF RADIATION SOURCES

B-1. CRITERIA FOR EVALUATION OF PRINCIPAL USERS. Principal Users must meet at least the following requirements:

a. The requirements specified for Authorized Users.

b. Have additional experience with the same or a similar use of radiation commensurate with the degree of hazard.

c. Be approved by the RMC.

B-2. CRITERIA FOR EVALUATION OF AUTHORIZED USERS. Authorized Users must meet at least the following requirements:

a. Have either—

(1) A 4-year college degree in a physical or biological science/engineering, or

(2) Equivalent training and experience as determined by the RMC.

b. Have at least 40 hours of training and experience in the safe handling of radiation sources to include the characteristics of ionizing radiation, units associated with radiation, radiation detection instruments, and biological effects of radiation. These 40 hours of training and experience are to be commensurate with the scope of proposed activities. Additionally, the training and experience should be appropriate to the type and forms of byproduct, source, or special nuclear material to be used.

c. Be approved by the RMC.

B-3. EXCEPTIONS TO CRITERIA FOR PRINCIPAL/ AUTHORIZED USERS.

a. For those Radiation Permits which are authorized to use only sealed sources as an integral part of an instrument/device or very small amounts of RAM such as those found in laboratory standards, Principal and Authorized Users need not meet all the requirements above.

b. The RMC will review the applicants training and experience. Each individual must have training and experience that ensures he/she can use the instruments safely and handle any potential emergency situations.

c. Users operating under such permits may not perform any maintenance on the radioactive sources or open source compartments in which the RAM is contained for any reason.

B-4. CRITERIA FOR EVALUATION OF TECHNICAL USERS.

a. Have 8 hours of on-the-job training. The on-the-job training must be documented using a USAPHC Form 312-R.

b. Be approved by the RSO.

c. In some cases, technical users will be required to have the same experience as authorized users. This determination will be made on a case-by-case basis by the Principal User, the RSO, and the RMC.

B-5. CRITERIA FOR EVALUATING USES OF RADIATION SOURCES.

a. The RMC will evaluate all new uses of RAM and will consider all available information in making decisions including evaluating the training and experience of applicants who request authorization to use RAM at the facility, the proposed facilities, and the protocol for using RAM.

b. Each responsible investigator is required to develop an SOP for each use of RAM. These SOPs should address investigational procedures; safety practices; and equipment, waste disposal, spill control/prevention, and so forth as appropriate to the intended use.

c. The SOPs will be reviewed by the RSO and the RMC to ensure that all procedures are according to good radiation safety practices and waste disposal.

d. Additionally, the RSO and RMC will consider the following when evaluating uses of radiation sources:

(1) The adequacy of facilities to include—

(a) Available space.

(b) Laboratory layout.

(c) Safety devices available.

(d) Storage facilities.

(2) The adequacy of SOPs to include—

(a) Emergency procedures.

(b) Safety precautions.

(c) Procurement procedures.

(d) Storage procedures.

(e) Waste disposal procedures.

(3) The training and experience of personnel involved.

APPENDIX C

CRITERIA FOR THE UNRESTRICTED RELEASE OF EQUIPMENT AND FACILITIES

C-1. MATERIALS AND EQUIPMENT. Materials and equipment may be released for unrestricted use if they meet the criteria in Table C-1.

Table C-1. Screening Levels for Materials and Equipment (DA Pam 385-24)

Group Number	Bq/cm^2 or Bq/g[(c)]	$dpm/100\ cm^2$
Group 1 Radium, Thorium, and Transuranics: ^{210}Po, ^{210}Pb, ^{226}Ra, ^{228}Ra, ^{228}Th, ^{230}Th, ^{232}Th, ^{237}Np, ^{239}Pu, ^{240}Pu, ^{241}Am, ^{244}Cm, and associated decay chains[(d)], and others[(a)]	0.1	600
Group 2 Uranium and Selected High Dose Beta-Gamma Emitters: ^{22}Na, ^{54}Mn, ^{58}Co, ^{60}Co, ^{65}Zn, ^{90}Sr, ^{94}Nb, ^{106m}Ru, ^{110}Ag, ^{124}Sb, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{192}Ir, ^{234}U, ^{235}U, ^{238}U, Natural Uranium[(e)], and others[(a)]	10	6000
Group 3 General Beta-Gamma Emitters: ^{24}Na, ^{36}Cl, ^{59}Fe, ^{109}Cd, ^{131}I, ^{129}I, ^{144}Ce, ^{198}Au, ^{241}Pu, and others[(a)]	10	60,000
Group 4[(f)] Other Beta-Gamma Emitters: ^{3}H, ^{14}C, ^{32}P, ^{35}S, ^{45}Ca, ^{51}Cr, ^{55}Fe, ^{63}Ni, ^{89}Sr, ^{99}Tc, ^{111}In, ^{125}I, ^{147}Pm, and others[(a)]	100	600,000

Notes for Table C-1:

(a) To determine the specific group for radionuclides not shown, a comparison of the effective dose factors, by exposure pathway, listed in Table A.1 of NCRP Report No. 123 for the radionuclides in question and the radionuclides in the general groups above shall be performed and a determination of the proper group made, based on similarity of the factors.

(b) Rounded to one significant figure.

(c) The screening levels shown are used for either surface activity concentration (in units of becquerel per square centimeter (Bq/cm^2)), or volume activity concentration (in units of becquerel per gram (Bq/g)). These groupings were determined based on similarity of the scenario modeling results, as described in Annex B of ANSI N13.12–1999.

(d) For decay chains, the screening levels represent the total activity (that is, the activity of the parent plus the activity of all progeny) present.

(e) Where the Natural Uranium activity equals 48.9% from ^{238}U, plus 48.9% from ^{234}U, plus 2.25% from ^{235}U.

Notes for Table C-1 (continued):
(f) Radionuclides were assigned to groups that were protective of 10 microsievert per year (μSv/y) (1.0 millirem per year (mrem/y)) and were limited to 4 groups for ease of application, as discussed in Annex B of ANSI N13.12–1999.

Legend for Table C-1:
dpm: disintegrations per minute

C-2. FACILITIES. Facilities will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are ALARA.

APPENDIX D

ACTION AND INVESTIGATIONAL LEVELS

Appropriate action will be taken if the administrative levels specified in Table D-1 or Table D-2 are exceeded.

Table D-1. Administrative Action Levels for Removable Contamination and Dose Rate

	Unrestricted Area	**Restricted Area**
Removable Alpha Contamination	22 dpm/100cm^2	220 dpm/100cm^2
Removable Beta-Gamma Contamination	220 dpm/100cm^2	2200 dpm/100cm^2
	Unrestricted Area	Restricted Area
Radiation Levels	0.05 mrem/hr	0.25 mrem/hr
Source Storage Areas (Not posted as Radiation Areas)	NA	1.00 mrem/hr

Legend for Table D-1:
dpm – disintegrations per minute

Table D-2. Administrative Action Levels for Leak Tests and Removable Contamination on Packages

Leak Tests of Sealed Sources	0.0005 µCi/smear
Shipping/Receiving Packages (alpha)	110 dpm/cm^2
Shipping/Receiving Packages (beta-gamma)	11 dpm/cm^2
Surface of Packages	0.4 mrem/hr

GLOSSARY

Section I
Acronyms

ADC
Army Dosimetry Center

ADR
Automated Dosimetry Record

ALARA
As Low As Reasonably Achievable

ALI
Annual Limit on Intake

ANSI
American National Standards Institute

APG
Aberdeen Proving Ground

AR
Army Regulation

ARA
Army Radiation Authorization

ARSO
Alternate Radiation Safety Officer

ARSO-LOR
Assistant Radiation Safety Officer for Laser and Optical Radiation

ARSO-RFR
Assistant Radiation Safety Officer for Radiofrequency Radiation

Bq/cm^2
becquerel per square centimeter

Bq/g
bequerel per gram

CARSO
Command Alternate Radiation Safety Officer

CRSO
Command Radiation Safety Officer

CFR
Code of Federal Regulations

DA
Department of the Army

DA Pam
Department of the Army Pamphlet

DLA
Defense Logistics Agency

DOT
Department of Transportation

dpm
disintegrations per minute

EAP
Employee Assistance Program

HPP
Health Physics Program

LRSO
Local Radiation Safety Officer

LS
Laboratory Sciences

MEDCOM
U.S. Army Medical Command

mrem/y
millirem per year

µCi/g
microcurie per gram

µSv/y
microsievert per year

mCi
millicurie

NCRP
National Council on Radiation Protection and Measurements

NORM
naturally occurring radioactive material

NRC
U.S. Nuclear Regulatory Commission

NSN
national stock number

OSHA
Occupational Safety and Health Administration

PHCR
Public Health Command Region

Ra
radium

rad
radiation-absorbed dose

RAM
radioactive material/s

rem
roentgen equivalent man

RCC
Radiation Control Committee

RMC
Radiation Management Committee

RSP
Radiation Safety Program

RSSO
Radiation Safety Staff Office

SEMO
Safety and Environmental Management Office

SOFA
Status-of-Forces Agreement

SOP
standing operating procedure

TB
Technical Bulletin

TB MED
Technical Bulletin, Medical

TEDE
Total Effective Dose Equivalent

TM
Technical Manual

USAPHC
U.S. Army Public Health Command

USASC
U.S. Army Safety Center

Section II
Prefixes

Prefix	Abbrev.	Multiplier
kilo	k	10^{3}
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}

Section III
Terms

Activity
The rate of nuclear transformation.

Alternate Radiation Safety Officer (ARSO)
Individual assessed as qualified and approved by the RMC to act for the RSO when the RSO is not available.

Assistant Radiation Safety Officer
Individual assessed as qualified and approved by the RMC to be responsible for a specific area of nonionizing radiation safety.

Authorized User
An individual approved by the RMC to use ionizing radiation sources without direct supervision.

Bioassay
The determination of kinds, amounts or concentrations and locations of RAM in the human body.

Controlled Area
A defined area under the jurisdiction of the USAPHC Commander to which access is restricted for any reason.

Command Radiation Safety Officer (CRSO)
The primary individual responsible for managing the USAPHC RSP, NRC licenses and ARAs.

curie (Ci)
A unit of activity equal to 3.7×10^{10} nuclear transformations per second.

Direct Supervision
The supervising individual will be, at a minimum, immediately available by telephone and within 15 minutes of the facility.

Electromagnetic Radiation
The propagation of energy in the form of alternating electric and magnetic fields.

Exempt Lasers
Military lasers exempt from 21 CFR 1040 where compliance would hinder mission requirements during actual combat, or when the laser product is classified in the interest of national security.

Exposure
A measure of the ionization produced in air by photon irradiation (technical) or the condition of being exposed to radiation or RAM (colloquial).

High Radiation Area
An area accessible to individuals in which radiation levels could result in a person receiving a dose equivalent in excess of 0.1 rem in 1 hour at 30 cm from the source or any surface the radiation penetrates.

Ionizing Radiation
Radiation capable of producing ionization.

Ionizing Radiation Incident
Any unplanned occurrence involving the possession, use, transfer, or storage of ionizing radiation-producing material or equipment that results in a spill, loss of control of RAM, exposure of personnel, fire, explosion, or flooding.

Ionizing Radiation Sources
Materials, equipment, or devices which generate or are capable of generating ionizing radiation.

Local Radiation Safety Officer (LRSO)
An individual at USAPHC Direct Support Activities that is responsible for supervising the use of radiation sources at their facility under the direction of the USAPHC Radiation Safety Officer.

Microwave Radiation
Electromagnetic radiation with a frequency from about 100 megahertz (MHz) to 30 gigahertz (GHz) (wavelength from about 3 meters (m) down to 1 millimeter (mm)).

Monitoring (area)
Periodic or continuous measurement of the radiation levels or contamination in a certain area, building, room, or on equipment.

Monitoring (personnel)
Assessment of doses received by personnel.

Occupational Dose
A dose from ionizing radiation or intakes of RAM that is incurred as a result of an individual's employment (military or Civilian).

Occupationally Exposed Individual (Radiation Worker)
An individual whose assigned job duties involve exposure to ionizing radiation and/or RAM.

Overexposure
Any human exposure to ionizing/nonionizing radiation, which results in a dose that exceeds permissible standards.

Permissible Exposure Level
The maximum level expressed in absorption rate or derived equivalent power density, electric field strength, or magnetic field strength to which an individual may be exposed which, under the conditions of exposure, will not cause detectable bodily injury according to present medical knowledge.

Principal User
The individual responsible for a Radiation Permit. This person may not be the person using the sources most often but is the person who directs the use, ensures personnel receive training, and handles issues involving radiation sources authorized under their Radiation Permit.

rad
A unit of absorbed dose equal to 0.01 joules per kilogram of tissue.

Radiation Area
Any area accessible to individuals in which radiation levels could result in a person receiving a dose equivalent in excess of 5 mrem in 1 hour at a distance of 30 cm from source or any surface the radiation penetrates.

Radiation Survey
The evaluation of the levels of ionizing and nonionizing radiation, radioactive contamination, and the associated hazards in and around a facility.

Radioactive Contamination
The presence of RAM in areas where it is not desired and particularly in areas where its presence can be a hazard to man or his environment.

rem
A unit of dose equivalent equal to 0.01 joules per kilogram of tissue (absorbed dose in rad times the quality factor of the radiation involved).

Restricted Area
A defined area under the jurisdiction of the USAPHC Commander to which access is restricted for purposes of reducing radiation exposure.

roentgen (R)
A unit of exposure equal to 2.58×10^{-4} coulombs per kilogram.

Sealed Source
Any RAM encased in a capsule designed to prevent leakage of the RAM.

Specular Reflection
A mirror-like reflection at the wavelength of the incident radiation.

Substantial Safety Hazard
The loss of control or a safety function that causes a major reduction in the degree of protection provided to public health and safety.

Technical User
A person who is not qualified and/or approved by the Radiation Management Committee as an Authorized User, but who uses ionizing radiation sources in the performance of their job duties. These personnel may use RAM only as provided in paragraph 6l.

The proponent of this regulation is the Radiation Safety Officer. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications) to Commander, U.S. Public Health Command, ATTN: MCHB-CG-RSO, Aberdeen Proving Ground, MD 21010-5403.

FOR THE COMMANDER:

DENNIS C. BROWN
COL, MS
Chief of Staff

OFFICIAL:

MICHAEL F. JACKSON
Adjutant

DISTRIBUTION:
A plus
RSO (100 cys)

Tab G

Waste Management

Waste Management

1. The Radiation Safety Officer will coordinate the disposal of radioactive waste generated at USAPHC through the Aberdeen Proving Ground Radiation Safety Office. Radioactive waste generated at USAPHC under our USNRC licenses is disposed of through transfer to an authorized recipient by the U.S Army Joint Munitions Command (JMC), Rock Island Arsenal, Rock Island, Illinois. The US Army Joint Munitions Command is Army executive agent responsible for disposal of low-level radioactive waste in Army facilities. All care will be taken to ensure that the radioactive waste is safely transferred.

2. All radioactive waste will be collected in containers which have been approved by the RSO and are labeled with radiation caution symbol and the words "CAUTION: RADIOACTIVE WASTE". These containers will be used for radioactive waste exclusively. A chronological log will be maintained with each container to show the element, mass number, and activity of each radionuclide placed in the container for disposal.

3. Radioactive waste disposal will be monitored by the RSO to ensure compliance with federal requirements.

4. USAPHC will decontaminate all areas where source material was used or stored to levels required under guidelines for unrestricted use before the license is terminated.

5. All areas where radioactive material was used will be surveyed for radioactive contamination by USAPHC personnel. The RSO will decontaminate if necessary, and certify that the area is free of radioactive contamination before the facilities are released for unrestricted use.

6. Any decontamination of facilities requiring alteration of the facilities will be coordinated with the Aberdeen Proving Ground installation RSO to ensure compliance with Federal and Army regulations.

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

6-13-14, and to inform you that the initial processing which includes an administrative review has been performed.

Renew: SMB-707

[V] 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** 584142. 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