030-32498

Kidde Fenwal

A UTC Fire & Security Company

March 1, 2012

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

To Whom It May Concern,

Please find the 2012 renewal application for our Exempt Materials License (20-15285-03E) for the Kidde-Fenwal facility located at 400 Main Street, Ashland, MA.

The Associated fee was not included; I have been unable to contact anyone regarding the cost associated with this renewal. Please advise on the associated fees.

If you have any questions regarding this report, or if any further information is required, please contact me at (508) 881-2000 ext. 2510.

Sincerely

Shawn Menard
Environmental Health & Safety Supervisor

577145

NRC FORM 313 (1-2012)
10 CFR 30, 32, 33, 34, 35, 36, 39, and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIALS LICENSE

APPROVED BY OMB: NO. 3150-0120 EXPIRES: (03/31/2012)

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 Information Services 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.

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
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

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 20-15285-03E

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

Kidde-Fenwal, Inc.
400 Main Street
Ashland, Massachusetts

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

400 Main Street
Ashland, Massahcusetts 01721

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Shawn Menard

TELEPHONE NUMBER

(508) 881-2000

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMAT ION 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. maiximum amount which will be possessed at any one time.

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

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

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

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSE FEES *(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, 39, AND 40, AND THAT ALL INFORMATION CONTANED 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
Bradley Dean Lewis		3/1/12

FOR NRC USE ONLY

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

U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 06

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 application dated September 17, 2004,
1. Kidde-Fenwal, Inc.	3. License number 20-15285-03E is amended in its entirety to read as follows:
2. 400 Main Street Ashland, Massachusetts 01721	4. Expiration date March 31, 2012
	5. Docket No. 030-32498 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. Americium-241	A. Foil sources (Nuclear Radiation Development Model A-001, AEA Technology plc. Model AMM-1001H)	A. Not Applicable (See Condition 11)

9. Authorized use:

Pursuant to Section 32.26, 10 CFR Part 32, the licensee is authorized to distribute smoke detector devices specified in Condition 10 to persons exempt from the requirements for a license pursuant to Section 30.20, 10 CFR Part 30, or equivalent provisions of the regulations of any Agreement State.

CONDITIONS

10. The following smoke detector devices may be distributed pursuant to this license provided the amount of Americium-241 contained in the device does not exceed the amounts specified in the following table:

Device Model	Maximum Quantity per Device
CPD-7051	0.8 microcuries (AEA Model AMM-1001H)
CPD-7052	0.8 microcuries (AEA Model AMM-1001H) or 0.7 microcuries (NRD Model A-001)
CPD-7054	0.8 microcuries (AEA Model AMM-1001H)
CPD-7054D	0.8 microcuries (AEA Model AMM-1001H)

11. This license does not authorize possession or use of licensed material.

12. The licensee may distribute only from its facility located at 400 Main Street, Ashland, Massachusetts.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
20-15285-03E

Docket or Reference Number
030-32498

Amendment No. 06

CONDITIONS

(Continued)

13. The licensee shall file periodic reports as specified in Section 32.29(c), 10 CFR Part 32.

14. Except as specifically provided otherwise by 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 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 27, 1991;
B. Letter dated December 9, 1991;
C. Letter dated May 27, 1992;
D. Letter and application dated August 14, 1992;
E. Letter dated August 24, 1992;
F. Letter dated October 6, 1996;
G. Letter dated February 28, 1997, with enclosure;
H Facsimile dated April 8, 1997;
I Facsimile dated July 29,1997;
J. Registry No. NR-0668-D-101-E
K. Application dated August 22, 2001;
L. Letter dated November 7, 2001;
M. Electronic mail dated March 15, 2002,
N. Letter dated March 23, 2002;
O. Letter dated July 24, 2003; and
P. Letter dated September 17, 2004.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

DATE: ~~April 27, 2005~~

BY: Anthony S. Kirkwood

Anthony S. Kirkwood
Materials Safety and Inspection Branch
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards
Washington, D.C. 20555

Deke Mousseau

Has successfully completed the 40 hour technical short course entitled

Radiation Safety Officer

May 16 – May 20, 2011

This certificate originally presented in Roswell, Georgia, May 20, 2011

By Nevada Technical Associates, Inc.

Approval codes for C.E. units are: ASRT 30.5 units: NVZ0146001, AAHP 32 units: 2008-00-005, ABIH 4.5 units: 08-1362

Hermon Rao
Instructor

Certificate Number: 1305529212

Certificate of Training

Awarded To

Shawn Menard

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

January 19, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman Ph.D. CHP
Division Manager

Certificate of Training

Awarded To

George Thompson

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

January 24, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D, CHP
Division Manager

Certificate of Training

Awarded To

Frank Myers

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

January 6, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman Ph.D. CHP
Division Manager

Mousseau, Deke E UTCFS

From: Fakturovich, Ilya A UTCFS
Sent: Thursday, January 05, 2012 9:50 AM
To: Mousseau, Deke E UTCFS; Gabrielsen, Eric UTCFS
Subject: FW: X-Ray Safety Online Training

Importance: High

Certificate of Training

Awarded To

Fakturovich, Ilya

has completed all the requirements for the course

X-Ray Safety Awareness
Recognizing completion of 1 hour of specialized instruction

sponsored by

Dade Moeller Radiation Safety Academy
438 N. Frederick Avenue
Suite 220
Gaithersburg, MD 20877

Course Modules

X-ray Radiation Safety
X-ray Safety Features

Signed:

Academy Training Manager

Date: 1/5/2012

DADE MOELLER RADIATION SAFETY ACADEMY

Certificate of Training

Awarded To

Roger Sylvester

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

January 28, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D, CHP
Division Manager

Certificate of Training

Awarded To

Aida Rivera

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

February 8, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D. CHP
Division Manager

Certificate of Training

Awarded To

Carol Lariviere

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

February 8, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D. CHP
Division Manager

Certificate of Training

Awarded To

Priscilla Ames

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

February 8, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D, CHP
Division Manager

Certificate of Training

Awarded To

Linda Blanchette

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

February 8, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D. CHP
Division Manager

Certificate of Training

Awarded To

Nancy Barsamian

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

February 8, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D, CHP
Division Manager

Certificate of Training

Awarded To

Jayne Alicea

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

February 8, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D. CHP
Division Manager

Certificate of Training

Awarded To

Jeff Krill

Recognizing completion of 1 hour of specialized instruction in

Radiation Safety Refresher Training - Safety Programs

February 8, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D, CHP
Division Manager

Certificate of Training

Awarded To

Pat Malone

Recognizing completion of 1 hour of specialized instruction in

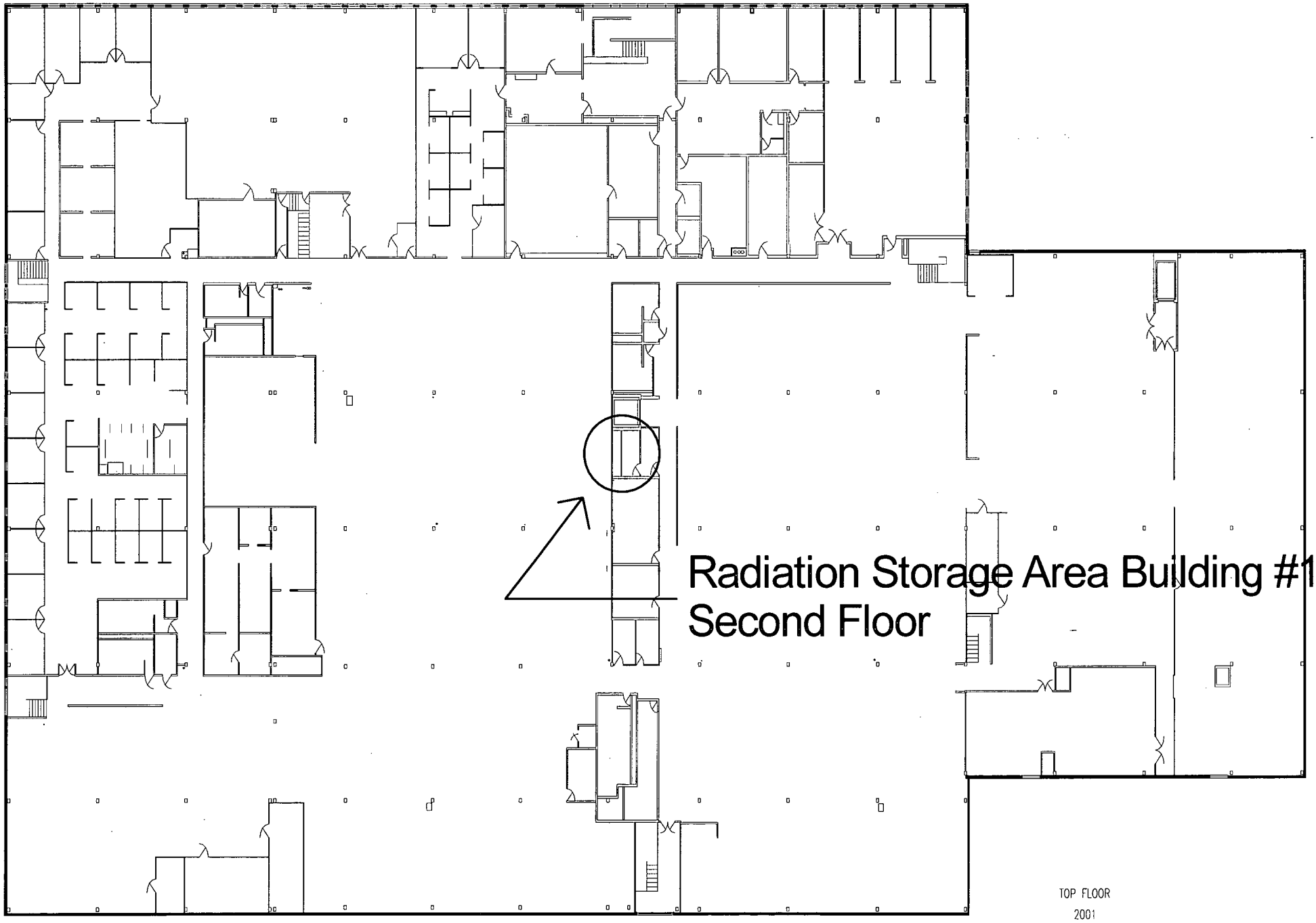
Radiation Safety Refresher Training - Safety Programs

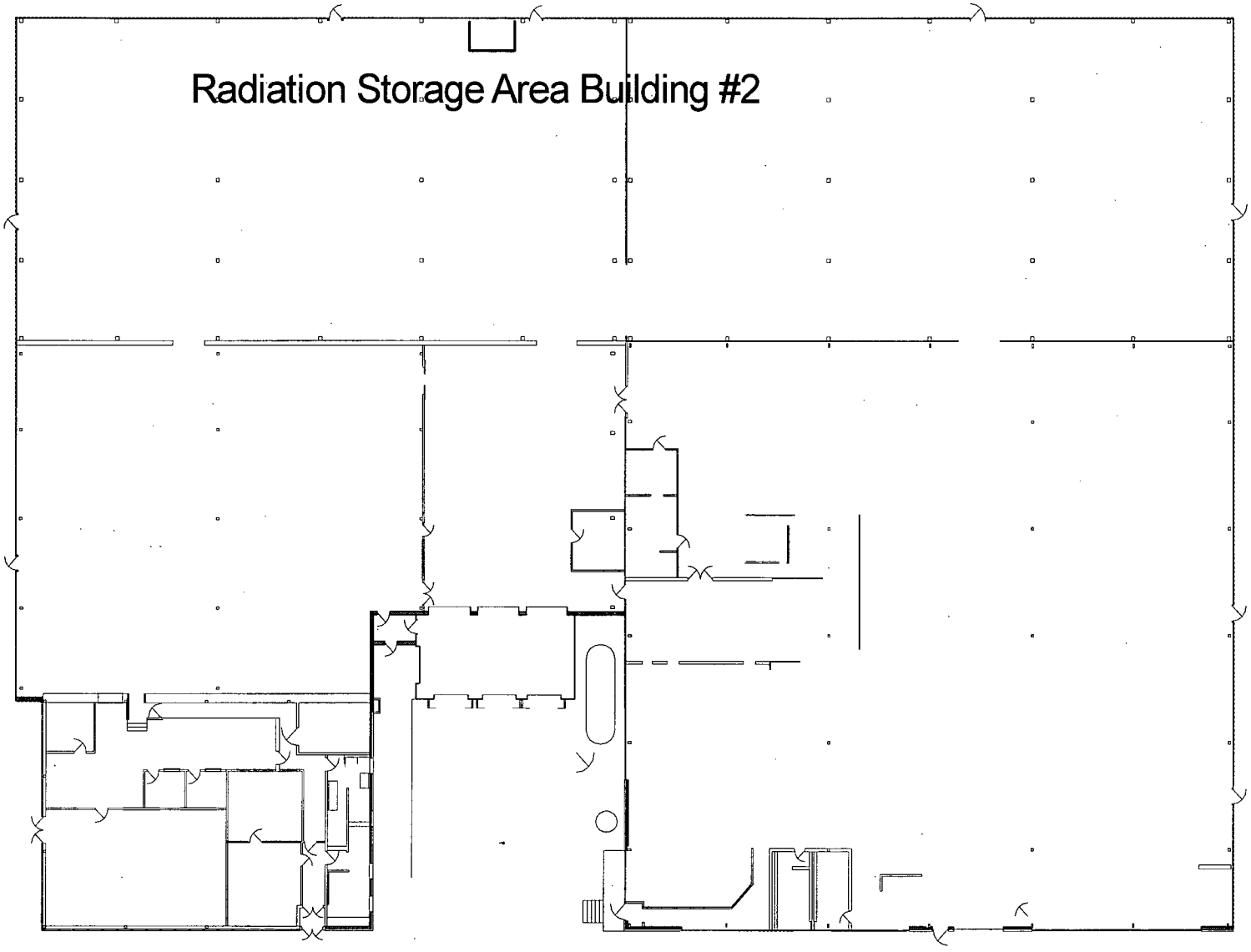
February 8, 2012

Presented By:
Dade Moeller Training Academy
438 N. Frederick Ave. Suite 220
Gaithersburg, MD 20877

Alan Fellman

Alan Fellman Ph.D. CHP
Division Manager


Radiation Storage Area Building #1
Second Floor
TOP FLOOR
2001


Radiation Storage Area Building #2

Certificate of Calibration

Atlantic Nuclear Corp. / 100 Weymouth St Unit E Rockland MA 02370
Tel (800) 878-9118 Fax (781) 878-3378

Customer Kidde Fenwal Order No. AN61524

Mfg. NDS Products Model ND-2RPC Serial No. 30416

Mfg. NDS Products Model PC101-02 Serial No. P10694

Cal. Date 10/31/11 Cal Due Date 10/31/12 Cal interval 1 Year Meter face Analog

Check mark applies to applicable instrument and/or detector IAW mfg spec Temp 70 RH 54 Alt. in. Hg 30.44

☐ New Instrument Inst. received ☒ within toler +/- 10 % ☐ 10-20% ☐ Out of tol. ☐ Requiring Repair ☐ Other

Mechanical ck. X Meter zeroed X

F/S Resp ck. X Reset ck

Audio ck. X Alarm settings ck. Batt ck. X

Instrument Volt Set 600 V. input sens mV Det Oper =

Comments: new tube $134 repaired short 1 hour $95 X100 scale shot perpendicular

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING
X0.1	70 uR/hr	70 uR/hr	70 uR/hr
X0.1	150 uR/hr	150 uR/hr	150 uR/hr
X1	600 uR/hr	600 uR/hr	600 uR/hr
X1	1.2 mR/hr	1.1 mR/hr	1.1 mR/hr
X10	4.7 mR/hr	5 mR/hr	5 mR/hr
X10	14.4 mR/hr	13.5 mR/hr	13.5 mR/hr
X100	50 mR/hr	55 mR/hr	55 mR/hr
X100	150 mR/hr	135 mR/hr	135 mR/hr
X1000	530 mR/hr	200 mR/hr	580 mR/hr
X1000	1500 mR/hr	400 mR/hr	1450 mR/hr

Reference Instruments and/or Sources: Cs-137 Gamma S/N

☐ Alpha S/N ☐ Beta S/N ☒ Mdl. 28-5 SN 10184 Cs-137

☐ m 500 S/N ☐ Gamma S/N MO-547 ☐ Multimeter S/N

Calibrated by: [signature] **Date:** 10/31/11

All Calibrations are NIST traceable and compliant with ANSI N323-1978 and Atlantic Nuclear procedures unless otherwise stated.

State of Massachusetts License number # 56-0477

Certificate of Calibration

Atlantic Nuclear Corp. / 100 Weymouth St Unit E Rockland MA 02370
Tel (800) 878-9118 Fax (781) 878-3378

Customer Kidde Fenwal Order No.AN60508

Mfg. NDS Products Model RA-500 Serial No. 26481

Mfg. _____ Model _____ Serial No. _____

Cal. Date 5/11/11 Cal Due Date 5/11/12 Cal interval 1 Year Meter face _____

Check mark applies to applicable instrument and/or detector IAW mfg spec Temp 72 RH 59 Alt. in. Hg 30.09

☐ New Instrument Inst. received ☒ within toler +/- 10 % ☐ 10-20% ☐ Out of tol. ☐ Requiring Repair ☐ Other

Mechanical ck. X Meter zeroed

F/S Resp ck. Reset ck

Audio ck. Alarm settings ck. X Batt ck. X _____

Instrument Volt Set _____ V. input sens _____ mV Det Oper _____ _____ _____ = _____

Comments:

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING
	Alarms at 390 mR/hr		

Reference Instruments and/or Sources: Cs-137 Gamma S/N

☐ Alpha S/N _____ ☐ Beta S/N _____ ☒ Mdl. 28-5 SN 10184 Cs-137

☐ m 500 S/N _____ ☐ Gamma S/N MO-547 ☐ Multimeter S/N _____

Calibrated by: _____ **Date:** 5/11/11

All Calibrations are NIST traceable and compliant with ANSI N323-1978 and Atlantic Nuclear procedures unless otherwise stated.

State of Massachusetts License number # 56-0477

Certificate of Calibration

Atlantic Nuclear Corp. / 100 Weymouth St Unit E Rockland MA 02370
Tel (800) 878-9118 Fax (781) 878-3378

Customer Kidde Fenwal Order No. AN60615

Mfg. NDS Products Model ND-2RPC Serial No. 30416

Mfg. NDS Products Model PC101-02 Serial No. P10694

Cal. Date 5/31/11 Cal Due Date 5/31/12 Cal interval 1 Year Meter face Analog

Check mark applies to applicable instrument and/or detector IAW mfg spec Temp 70 RH 62 Alt. in. Hg 30.26

[ ] New Instrument Inst. received [x] within toler +/- 10 % [ ] 10-20% [ ] Out of tol. [ ] Requiring Repair [ ] Other

Mechanical ck. X Meter zeroed X

F/S Resp ck. X Reset ck

Audio ck. X Alarm settings ck. Batt ck. X

Instrument Volt Set _____ V. input sens _____ mV Det Oper _____ _____ _____ = _____

Comments:

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING
X0.1	70 uR/hr	70 uR/hr	70 uR/hr
X0.1	150 uR/hr	150 uR/hr	150 uR/hr
X1	600 uR/hr	600 uR/hr	600 uR/hr
X1	1.3 mR/hr	1.3 mR/hr	1.3 mR/hr
X10	4.9 mR/hr	5 mR/hr	5 mR/hr
X10	15 mR/hr	13.5 mR/hr	13.5 mR/hr
X100	53 mR/hr	40 mR/hr	58 mR/hr
X100	145 mR/hr	80 mR/hr	135 mR/hr
X1000	445 mR/hr	800 mR/hr	480 mR/hr
X1000	1487 mR/hr	1700 mR/hr	1350 mR/hr

Reference Instruments and/or Sources: Cs-137 Gamma S/N

[ ] Alpha S/N _____ [ ] Beta S/N _____ [x] Mdl. 28-5 SN 10184 Cs-137

[ ] m 500 S/N _____ [ ] Gamma S/N MO-547 [ ] Multimeter S/N _____

Calibrated by: William Murphy **Date:** 5/31/11

All Calibrations are NIST traceable and compliant with ANSI N323-1978 and Atlantic Nuclear procedures unless otherwise stated.

State of Massachusetts License number # 56-0477

Certificate of Calibration

Atlantic Nuclear Corp. / 100 Weymouth St Unit E Rockland MA 02370
Tel (800) 878-9118 Fax (781) 878-3378

Customer Kidde Fenwal Order No. AN60615

Mfg. Ludlum Model 12 Serial No.

Mfg. Ludlum Model 44-6 Serial No.

Cal. Date 5/31/11 Cal Due Date 5/31/12 Cal interval 1 Year Meter face Analog

Check mark applies to applicable instrument and/or detector IAW mfg spec Temp 70 RH 62 Alt. in. Hg 30.26

[ ] New Instrument Inst. received [x] within toler +/- 10 % [ ] 10-20% [ ] Out of tol. [ ] Requiring Repair [ ] Other

Mechanical ck. X Meter zeroed X

F/S Resp ck. Reset ck X

Audio ck. Alarm settings ck. Batt ck. X

Instrument Volt Set 900 V. input sens mV Det Oper =

Comments:

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING
X1	100 cpm	100 cpm	100 cpm
X1	400 cpm	415 cpm	415 cpm
X10	1kcpm	1 kcpm	1 kcpm
X10	4 kcpm	4.2 kcpm	4.2 kcpm
X100	10 kcpm	10 kcpm	10 kcpm
X100	40 kcpm	41.5 kcpm	41.5 kcpm
X1000	100 kcpm	100 kcpm	100 kcpm
X1000	400 kcpm	400 kcpm	400 kcpm
X1	70 uR/hr	120 cpm	120 cpm
X1	300 uR/hr	400 cpm	400 cpm
X10	0.9 mR/hr	1.2 kcpm	1.2 kcpm
X10	3 mR/hr	4 kcpm	4 kcpm
X100	9 mR/hr	12 kcpm	12 kcpm
X100	35 mR/hr	46 kcpm	46 kcpm
X1000	53 mR/hr	70 kcpm	70 kcpm
X1000	445 mR/hr	320 kcpm	320 kcpm

Reference Instruments and/or Sources: Cs-137 Gamma S/N

[ ] Alpha S/N [ ] Beta S/N [x] Mdl. 28-5 SN 10184 Cs-137

[x] m 500 S/N 214064 [ ] Gamma S/N MO-547 [ ] Multimeter S/N

Calibrated by: _____ **Date:** 5/31/11

All Calibrations are NIST traceable and compliant with ANSI N323-1978 and Atlantic Nuclear procedures unless otherwise stated.

State of Massachusetts License number # 56-0477

NRC FORM 540

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1. EMERGENCY TELEPHONE NUMBE (INCLUDE AREA CODE) 800-424-9300			
ORGANIZATION Chemtrec	WSDS #: CHEN01RAD		
2. IS THIS AN "EXCLUSIVE USE" SHIPMENT? [ ] YES [x] NO	3. TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST	6	
4. DOES EPA REGULATED WASTE REQUIRING A MANIFEST ACCOMPANY THIS SHIPMENT? [ ] YES [x] NO	EPA MANIFEST NUMBER NA		

5. SHIPPER- NAME AND FACILITY Chase Environmental Group, Inc. 11450 Watterson Court Louisville, KY 40299	SHIPPER ID # N/A X COLLECTOR PROCESSOR	7. NRC FORM 540 AND 540A PAGE 1 __1_PAGE(S) NRC FORM 541 AND 541A OF __1__PAGE(S) NRC FORM 542 AND 542A __1__PAGE(S) ADDITIONAL INFORMATION None PAGE(S)	8. Manifest Number (Use this number on all continuation pages) TO-2011-011
USER PERMIT NUMBER T-KY003-L11	SHIPMENT # N/A	GENERATOR TYPE (SPECIFY)	9. CONSIGNEE-NAME AND FACILITY ADDRESS TOXCO, Inc. 109 Flint Road Oak Ridge, TN 37830
CONTACT Janet Baker		TELEPHONE # 865-250-4593	Contact Rick Low Telephone Number (Include area code) (865) 482-5532
6. CARRIER NAME AND ADDRESS SJ Transportation Co., Inc. PO Box 169 Woodstown, NJ 08098		EPA ID # NJD071629976 SHIPPING DATE 1/21/2011	SIGNATURE-Authorized consignee acknowledging waste receipt Date
CONTACT Kevin Elder		TELEPHONE # 856-769-2741	10. Certification
SIGNATURE D. J. C		DATE 1-21-11	This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10CFR parts 20 and 61, or equivalent state regulations.
AUTHORIZED SIGNATURE D. J. C	TITLE Technician	DATE 1-21-11	

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12 DOT LABEL "RADIOACTIVE"	13 TRANSPORT INDEX	14 PHYSICAL AND CHEMICAL FORM	15 INDIVIDUAL RADIONUCLIDES	16 TOTAL PACKAGE ACTIVITY IN MBq	17 LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME m^3	19. ID NUMBER OF PACKAGE
UN2911, Radioactive material, excepted package-instruments, 7 One drum with Am-241 smoke detectors for transship	NA	NA	Solid/oxide	Am-241	4.51E+00	NA	0.212	TO-TS-T-11-009
UN2910, Radioactive material, excepted package-limited quantity of material, 7 One drum with Ra-226 smoke detectors for disposal	NA	NA	Solid/oxide	Ra-226	6.66E-01	NA	0.114	TO-TS-T-11-010
UN2915, Radioactive material, Type A package, 7 One drum with Ra-226 foils for disposal	Yellow-II	0.2	Solid/oxide	Ra-226	2.63E+01	NA	0.038	TO-SP-E-11-011
UN2911, Radioactive material, excepted package-instruments, 7 One drum with Am-241 foils for disposal	NA	NA	Solid/oxide	Am-241	1.42E+02	NA	0.038	TO-SP-E-11-012
Non DOT Regulated Material One drum of DAW for disposal	NA	NA	Solid/oxide	Ra-226	3.70E-04	NA	0.212	TO-CT-E-11-013
Non DOT Regulated Material One drum of DAW for disposal	NA	NA	Solid/oxide	Ra-226	3.70E-05	NA	0.019	TO-CT-E-11-014

Generator Certification Statement:
The constituents of the waste manifested herein are known to the generator. There are no EPA RCRA, pathogenic or other hazards present other than those specifically listed on the Form 541.

Print name	Signature	Date
ANTHONY M. NOCE	Anthony M. Noce AS AGENT OF ILIDDE FENWAL	21JAN11

CONSIGNEE ORIGINAL (MUST ACCOMPANY WASTE IN TRANSIT)

SECTION 1
DEFINITIONS

A_1 means the maximum activity of special form radioactive material permitted in a Type A package. A_2 means the maximum activity of radioactive material, other than special form radioactive material, permitted in a Type A package. These values are either listed in 105 CMR 120.795: *Table I*, or may be derived in accordance with the procedure prescribed in 105 CMR 120.795: *Appendix A*.

Absorbed dose shall mean the amount of energy imparted to matter by ionizing radiation. It is determined by dividing the energy in a specific region by the mass of the material in that region. It shall be expressed in rads, grays or submultiples, thereof. (See "Rads" and "Grays").

Act means M.G.L. c. 111 §§,3,5M,5N,5O,5P.

Activity means the rate of disintegration or transformation or decay of radioactive material. The units of activity are the becquerel (Bq) and the curie (Ci).

Adult means an individual 18 or more years of age.

Agency Shall Mean: Commonwealth of Massachusetts, Department of Public Health, Radiation Control Program.

Agreement State Shall mean any state with which the U.S. Nuclear Regulatory Commission has entered into an effective agreement under subsection 274b of the atomic energy act of 1954, as ammended (St. 1973, c 689). The Commonwealth of Massachusetts is an agreement state.

Airborne Radioactive Material shall mean airborne radioactive material in any form, such as dusts, fumes, vapors, mists, gases, or smokes.

ALARA- As low as reasonably achievable.

ALI - Annual limit intake.

Americium (241) a synthetically produced radioisotope of Americium, a transuranic, metallic element, Atomic Number 95. It emits alpha particles and gamma radiation.

Analytical X-Ray Equipment: Any device which utilizes X-rays for the purpose of examining the microstructure of materials. This includes all types of X-ray diffraction and spectrographic equipment.

Annual Refresher Training means a review conducted or provided by the licensee or registrant for its employees on radiation saftey aspects of industrial radiography. The review include, as appropriate, the results of internal audits, new procedures or equipment, new or revised regulations, accidents or errors that have been observed, and should also provide oportunities for employess to ask safety questions.

ANSI means American National Standards Institiute.

Associated Equipment means equipment that is used in conjunction with a radiographic exposure device to make radiographic exposures that drives, guides, or comes in contact with the source (such as guide tube, control tube, control cable) (drive cable), removable source stop…

Becquerel (Bq) means the SI unit of activity (see 'SI' in this section). One becquerel is equal to one disintegration or transformation per second (dps or tps).

Body Burden shall mean the amount of radioactive material fixed in the body at any time.

Cabinet Radiography means industrial radiography conducted in an enclosure or cabinet so shielded that doses to individual members of the public at every location in the exterior meets th limits specified in 105 CMR 120.221 (A).

Cabinet X-Ray System means an x-ray system with the x-ray tube installed in an enclosure which, independent of existing architectural structures except the floor on which it may be placed, is intended to:

(1) Contain at least that portion of the material being irradiated;
(2) Provide radiation attenuation;
(3) Exclude personnel from its interior during generation of x-radiation.

Included are all x-ray systems designed primarily for the inspection of carry-on baggage at airline, bus terminal, railroad, and in similar facilities. An x-ray tube used within a shielded part of a building, or x-ray equipment which may temporarily or occasionally incorporate portable shielding, is not considered a cabinet x-ray system.

Calendar Quarter shall mean:

A. A period of not less than 12 nor more than 14 complete consecutive calendar weeks.
B. A period of three (3) consecutive calendar months. Once he has established the method to be used to determine calendar quarters, no employer shall change his method without prior permission from the Commissioner.

Certification: The process by which an individual acquires authorization to perform radiation functions.

A. R.S.O. 10 CFR 34.41 (a) or 10 CFR 34.42 (a).
B. Radiographer 10 CFR 34.43 (a) (1).
C. 105 CMR 120.320.
D. ANSI / SNT-TC-1A, Mil-Std-410, and or Mil-Std-1580.

Certified Cabinet X-Ray System means an x-ray system which has been certified in accordance with 21 CFR 1010.2 as being manufactured an assembled pursuant to the previsions of 21 CFR 1020.40.

Certified Industrial Radiographer means an indivdual who has meet prescribed training and experience requirements and has passed an approved examination to perform industrial radiography.

Certified Industrial Radiographer Trainee means an individual who is authorized to be instructed in industrial radiography and who may perform industrial radiography while under the supervision of a certified industrial radiographer or an approved Provisionally Certified Radiographer.

CFR: Code of Federal regulations.

CMR: Code of Massachusetts regulations.

Controlled Area shall mean a defined area, access to which is controlled for the purpose of radiation protection.

Critical Organ shall mean that part of the body that is most susceptible to radiation damage under the specific conditions considered.

Curie (Ci) shall mean the standard unit used in measuring the activity of a radioactive substance, and shall be numerically equal to 3.7×10^{10} disintegration's per second. Commonly used sub-multiples of the curie are: The microcurie (one millionth of a curie), um = 3.7×10^{4} disintegrations per second, and the millicurie (one thousandth of a curie), mc = 3.7×10^{7} disintegrations per second. The International Systems (SI) equivalent of the Curie is the Becquerel (Bq) is equal to one disintegration per second.

Diagnostic Type Protective Tube Housing means an X-ray tube housing so constructed that the leakage radiation at a distance of 1 meter from the target cannot exceed 100 milliroentgens in 1 hour when the tube is being operated at any of its specific ratings.

Dose is a generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, total organ dose equivalent, or total effective dose equivalent. For purposes of 105 CMR 120.000, "radiation dose" is an equivalent term.

Dose equivalent (H_T) means the product of the absorbed dose in tissue, quality factor and all other necessary modifying factors at the location of interest. The units of dose equivalent are the sievert (Sv) and rem.

Dose limits means the permissible upper bounds of radiation doses established in accordance with 105 CMR 120.000. For purposes of 105 CMR 120.000, "limits" is an equivalent term.

Enclosed Radiography means industrial radiography conducted in an enclosed cabinet or room and includes cabinet radiography and shielded room radiography.

Environment means all portions of man's earthly surroundings (including the atmosphere) frequented and/or utilized directly or indirectly by man.

Exposure means the quotient of dQ by dm where "dQ" is the absolute value of the total charge of the ions of one sign produced in air when all the electrons (negatrons and positrons) liberated by photons in a volume element of air having mass "dm" are completely stopped in air. The SI units of exposure is the coulomb per kilogram (C/kg). See 105 CMR 120.014 Units of Exposure and Dose for the special unit.

Exposure Rate means the exposure per unit of time, such as roentgen per minute and milliroentgen per hour.

Film Badge means a packet of appropriately sensitized material and filters used to determine amounts of ionizing radiation. Also called radiation detection badge because some, a TLD (Thermoluminescent Detector or Dosimeter) for example, use electronics rather than film for detection. See 'Personnel Monitoring Equipment'.

Filter means a device which when placed in a beam of ionizing radiation will absorb the less penetrating ionizing radiations.

Gray - See RAD.

Half-Value Layer (hvl) means the thickness of an absorber required to reduce a beam of ionizing radiation to one-half its incident intensity.

High Radiation Area shall mean any area accessible to personnel in which there exists radiation at such levels that a major portion of the body could receive, in any one hour at a distance of 30 cm from any source, a dose in excess of 1 mSv (0.1 rem).

I.D. Card means the document(s) issued conferring certification.

Industrial Establishments at Kidde-Fenwal Inc. shall include manufacturing establishments, factories, work shops, mechanical establishments, laboratories, mercantile establishments, and all other buildings or parts thereof where manufacturing, assembly, storage, research, testing, transfer and removal are carried on.

Industrial Radiography means the examination of the microstructure of materials by non-destructive methods using sources of radiation derived from radioactive materials or radiation machines.

Industrial Radiography – Raditaion Machines means the process of performing industrial radiography using radiation producing machines.

Interlock A safety device which will not allow the energizing of an x-ray system if it is not properly engaged. Also it will shut down a system if it's electrical continuity is broken.

Ionizing Radiation shall mean and include alpha and beta particles, protons, neutrons, gamma and X-ray, and all other particles, photons or materials that produce ionizing radiation directly or indirectly, including various wave lengths of electromagnetic radiation. Not included is non-ionizing radiation such as radiowaves, microwaves, visible, infrared or ultraviolet light.

Installation shall mean the area of radiation hazard under the administrative control of the person or organization possessing the source of radiation. A part of or an entire industrial establishment may be designated as an installation.

Maximum Permissible Exposure shall mean that amount of exposure to radiation set for regulatory purposes, which in the light of present knowledge is not expected to cause appreciable bodily injury to a person during his lifetime.

Mercantile Establishments shall mean any premises used for the purposes of trade, in the purchase or sale of any goods or merchandise.

Minor means an individual less than 18 years of age.

National Regulatory Commission (NRC) is U.S. Federal program whose objective is to protect the interests and health of the public with regards to ionizing radiation by setting standards and issuing licenses.

Occupancy Factor means the factor which, for purposes of evaluating the hazards from ionizing radiation, may be used when making allowances for the percentage of time an individual occupies a specified area.

Occupational Dose means the absorbed dose received by an individual whose duties of employment directly or indirectly may result in exposure to ionizing radiation in the course of said employment.

Person means an individual, partnership, association, syndicate, company, firm, trust, corporation, department, bureau, agency, organization, institution, political subdivision, or any other entity recognized by law as the subject of rights and duties.

Personal Supervision means supervision provided by a Certified Industrial Radiographer or an approved provisionally Certified Industrial Radiographer who is physically present at the site where sources of radiation and associated equipment are being used, visually evaluating the performance of the Certified Industrial Radiographer Trainee and in such proximity that immediate assistance can be given if required.

Personnel Monitoring Equipment means devices designed to be worn or used for the purpose of evaluating the exposure dose of individuals (e.g., Badges, either film or thermoluminescent (TLD) dosimeters badges, pocket chambers, pocket dosimeters, and film rings, wristlets, earrings or necklaces).

Place of Employment shall mean every place, whether indoors or out, or underground, and the premises appurtenant thereto, into, in or upon which any employee goes, or remains, either temporarily or regularly in the course of his employment. Public refers to those individuals who may or may not be working directly with ionizing radiation but who may be exposed to it. This includes employees as well as non-employees.

Pregnant Woman, Declared, is a woman who has voluntarily informed her employer, in writing, of her pregnancy and the estimated date of conception.

Public Dose means the dose received by a member of the public from sources of radiation licensed or registered operations. Public dose does not include occupational dose, or dose received from background radiation, or dose received as a patient from medical practice, or dose from voluntary participation in medical research programs.

Qualified Expert: An individual or company who possesses the required certifications to perform inspections, repairs surveys and/or audits as they pertain to ionizing radiation.

Rad shall mean the standard unit used in measuring the absorbed dose, and shall be numerically equal to 100 ergs per gram, or 0.01 joules per kilogram (0.01 grays). A common sub-multiple is the millirad (mrad), which is one thousandth part of a rad, or 62.4 MeV (million electron volts/gram).

Radiation: See ionizing radiation.

Radiation Machine shall mean any device, instrument, equipment, or machine capable of producing ionizing radiation except those which produce radiation only from radioactive material.

Radiation Safety Officer (RSO) means an individual named by the licensee or registrant who has the knowledge of, responsibility for, and authority to enforce appropriate radiation protection rules, standards, and practices on the behalf of the licensee and/or registrant and who meets the requirements of 105 CMR 120.380. A more detailed job description apperas in Section 18 of this manual.

Radiation Survey: Survey should be under the supervision of the RSO or his designee.

Radioactive Material shall mean any material, either solid, liquid, or gas, which emits ionizing radiation spontaneously (radioisotopes or radionuclides).

Radiographer means any individual who performs or personally supervises industrial radiographic operations and who is responsible to the licensee or registrant for assuring compliance with the intent of the requirements of 105 CMR 120.000 and all license and/or certificate of registration conditions. (See Certified Indusrial Radiographer).

Radium (226) -metallic element, atomic number 88, that emits alpha particles and gamma rays naturally.

Rem shall mean a measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of one roentgen of X-ray. It is equal to rads multiplied by a quality factor. The SI unit is the Sievert, 1 rem = 0.01 Sv.

Roentgen: Is a special measure of exposure to ionizing radiation. It is one of the most common methods of measuring the changes produced by X and gamma radiation as they ionize air. For x and gamma, values of exposure in roentgens can be considered as numerically equal to absorbed doses in rads, or to dose equivalents in rems.

Sealed Source shall mean any radioactive material that is encased in and is to be used only in a permanent container in a manner intended to prevent leakage of the radioactive material and yet permitting the radioactive material to be used as a source of radiation.

SI is the abbreviation for the international system of units.

Sievert is the SI unit of dose equivalent. It is equal to Grays multiplied by a quality factor (1Sv = 100 rem).

Survey shall mean the evaluation of the radiation hazard incident to the use, handling, processing, application, transfer, storage, and removal of all sources, materials, instruments, machines, and equipment which produce, generate, or emit ionizing radiation.

Shall: Where "shall" is used for a provision specified herein, that provision is intended to be mandatory.

Should or Is Recommended: Is used to indicate provisions that are not mandatory but are recommended as good practice.

Thermoluminescent Dosimeters (TLD): Are monitoring devices that use a material sensitive to X and Gamma Radiation other than photographic film.

SECTION 2
EMPLOYEE QUALIFICATIONS AND HEALTH PROVISIONS

1.0 Selection of Workers

Persons who are neat and careful are preferred as radioisotope workers, since they are less likely to be involved in accidents or spread contamination. Persons failing to develop radiation protection skills and who have a poor record of involvement in contamination incidents or overexposure should not be used in any area or function which produces ionizing radiation nor should persons who have a history of sudden physical seizures, such as fainting.

2.0 Instruction of Workers

All radiation workers shall be informed about the radioactive materials which they are to handle and of the hazards connected with the work. They shall be instructed in radiation safety protection rules and shall be expected to observe these rules. They shall be trained to report any injury or unusual incident as it relates to the possibility of over-exposure or internal absorption so that it can be investigated.

It is important that workers handling radioisotopes be considered as potentially exposed for the remainder of their lifetimes. It should not be assumed that they will work with radioisotopes or radiation for only a few years. Kidde-Fenwal Inc. will post any required documents in an appropriate area for the perusal or education of employees involved with ionizing radiation.

3.0 Health Provisions

3.1 For minors and declared pregnant women, the amount of work that can be done in areas in which ionizing radiation may be present shall be limited as required by 105 CMR 120.00.

3.2 **Physical Examinations:** Industrial Radiographers shall have a physical examination and testing before assignment to this kind of work.

Examination may include:

A. Medical history
B. Exposure history
C. Chest X-ray
D. Blood Analysis
E. Urinalysis

Any individual permanently leaving a work assignment from an ionizing radiation risk position shall be considered as being exposed from that time on. Any employee terminating employment or retiring will undergo the same examination.

3.3 **Medical Records:** All medical records shall be kept on file in the Clinic under the supervision of the Human Resources Department Director.

3.4 **Annual Reporting:** An annual summary shall be made available to every employee issued a film badge (NRC Form 5).

3.5 **Form 132-086 and annual summaries:** (NRL forms) shall be filed in the clinic as part of an employees medical history.

3.6 **Test Records** Employees may request access to all test records, and an annual summary shall be available for every employee who is issued a film or TLD badge and requests such a summary.

SECTION 3
SAFETY - ADMINISTRATION OF

1. Supervision

The supervisor of the ionizing radiation work area has a responsibility to protect both the workers and the general public from Ionizing Radiation Hazards. The person should be familiar with the basic principles of radiation protection. The responsible supervisor and the RSO should enforce rules regarding the handling of food in the area, use of personal items in the area, use of protective equipment, wearing of badges, personnel monitoring, storage of radioactive material, etc. The supervisor with the RSO, must provide training for the new workers to know and follow all applicable procedures.

2. Restrictions - Monitoring

2.1 The Radioactive work area should be restricted to Authorized Personnel Only.

2.2 The Manufacturing Supervisor has full responsibility for the safety of all personnel assigned to the radioisotope assembly areas and for all visitors allowed to enter that area.

2.3 The Radiation Safety Officer shall monitor the enforcement of the policy as stated under paragraphs 2.1 and 2.2.

2.4 Radiation film badges dosimeters or TLD'S must be worn by all personnel who are assigned to work with ionizing radiation materials. The personnel monitoring devices are supplied, maintained, collected, and inventoried by the Radiation Safety Officer. (See Section 6 of this policy.)

2.5 Entrance to the restricted assembly/storage area is for authorized employees only, and those who enter this area shall wear a personnel monitoring device to detect radiation exposure.

2.6 Keys to the restricted area are limited to: The Radiation Safety Officer, Radioactive work area supervisor and the Production Manager.

2.7 The Restricted storage area must be locked at all times.

1. **Personal Hygiene**

Extreme personal cleanliness is a requirement for work involving radioisotopes. Hands should be washed frequently and they shall be washed before eating, smoking and at the end of each work period. No edibles of any kind - food, gum, candy or beverages - shall be brought into the work area.. Personnel should refrain from using personal items, e.g., pocket knives, handkerchiefs, lipsticks, etc., in the work area. Employees with open wounds in hands should not handle radioactive material. Hand protection (gloves) must be available in the assembly area and available should an employee want them.

Monitor hands, shoes, clothing and work surfaces with a low-level G-M survey instrument for contamination before leaving the restricted area. Record the highest reading in the Personal Scan Log, IHFO-008. This Log shall be monitored monthly by the RSO as part of the Ionizing Radiation Survey & Inspection Form, IHFO-007. The dose equivalent shall not exceed the 5 REM threshold per 105 CMR 120.211.

Personnel should be cautioned to not rub their eyes, ears, mouth or other body orifices while handling materials capable of emitting ionizing radiation.

Employees should keep their work areas free from equipment and materials not needed for immediate work. Orderliness and cleanliness of work areas are the requirements for avoiding the spread of contamination. After use, equipment should be decontaminated then stored in a controlled location. Radioisotopes must be returned to restricted storage when no longer needed.

2. **Handling Procedures and Controls**

2.1 Approved warning signs must be properly displayed in all areas where there is a radiation hazard. (See Paragraph 4 - this section.)

2.2 All containers holding radioactive materials, including sealed sources or any radioactive sources should be labeled with radiation warning labels. The isotope, amount and date should be indicated on the containers.

2.3 Radioactive material must be stored in the restricted storage area, and there should be enough shielding to reduce the radiation level below 0.1 rems (1.0 mSv) per hour at the surface of the shield.

2.4 Aseptic techniques shall be used in handling radioactive materials. Gloves or other protective means must be used if there is a strong probability of hand contamination. Smoke Detectors containing Americium-241should be handled wearing gloves during disassembly.

2.5 A person with breaks in the skin of the hands must protect affected areas and gloves must be worn.

3. Safety of Personnel

3.1 The employer shall assign a competent employee as the Radiation Safety Officer to manage radiation safety regulations as they apply to employees who handle radioactive materials and exposure to ionizing radiation. (See Section 18.)

3.2 The employer shall assign a competent employee as the supervisor for operations that require handling radioactive materials. The supervisor shall, under the aegis of the Radiation Safety Officer, enforce the radiation safety regulations covering his working areas. The duties of the Supervisor shall include:

3.2.1 Control of annual exposure to workers so as to limit the annual dose of each to 5 rem or less. The basis of this control shall be the

information given in the report covering the appropriate radiation survey, along with the results of the Monthly Badge Monitoring Program.

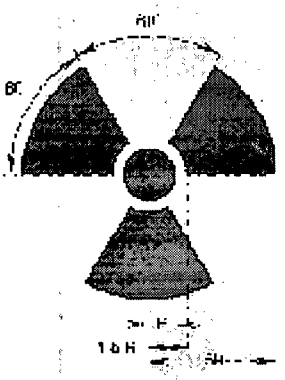
3.3 The employer shall assign the R.S.O. or his designee the duty of instructing and training all employees working in radioactive areas about the dangers of exposure to ionizing radiation. The general methods of radiation protection and the means of avoiding exposure should be explained to personnel; they should be warned against taking unnecessary chances. Safe working practices should be emphasized.

3.4 Safety regulations and instructions shall be posted in all radiation areas.

3.5 Areas shall indicate the presence of radiation by conspicuous warning signs. Each sign shall bear the standard warning symbol as described in paragraph 4 of this section. And the words **"CAUTION or DANGER"** and appropriate explanatory wording such as: **RADIATION AREA** or **X-RAY AREA**. (See 105 CMR 120.242, 120.243, 120.244.)

4. **Approved Sign Design**

Colors employed: The cross-hatched area of the symbol and required lettering shall be colored magenta, black or purple and the background of the label or sign upon which it appears shall be colored yellow. (See 105 CMR 120.241.)



SECTION 5
SURVEY INSTRUMENTS, CONTROLS AND CALIBRATION

INSTRUMENTS RETAINED BY KIDDE-FENWAL, INC.

Digi/Rate

Manufactured by Reactor Experiments, Inc.
Serial No. D R 472
Range 0.1 MR/H to 99.9 R/H
Asset No. E1901

Survey Meter - NDS

Manufactured by NDS Products
Model No. ND-2RCP
Serial No. 30416
Range 0-.2 MR/H, 0-2 MR/H, 0-20 MR/H, 0-200 MR/H, 0-2000 MR/H

Count Rate Meter

Manufactured by Ludlum Measurements, Inc.
Model 12
Range - 500 Counts/min., X1, X10, X100, X1000
With Geiger-Muller Probe

Scaler

Manufactured by Ludlum Measurements Inc.
Model 2000
Serial #83836
Ludlum Alpha Probe
Model 43-2
Serial # PR 097208

Personal Monitor

Manufactured By NDS Product
Model RA-500
Serial # 26481

POLICY AND CALIBRATION FREQUENCY

1. Instruments used to monitor radiation leakage shall be of approved design and manufacturer.

2 Instruments shall be certified at established frequency as to their accuracy with calibration frequencies not to exceed 6 months for NDS meter used for x-ray machine monitoring, 12 months for all others.

3. The calibration shall be performed by an approved laboratory whose primary instruments have been certified against, and whose accuracy is traceable to NIST.

4. If an instrument malfunctions, or there is a question as to its performance, it shall be promptly repaired and calibrated, or replaced.

5. The certifying laboratory will supply notarized copy of test procedure and test results on completion of calibration program. Certification Forms will be kept in the RSO'S files.

6. Calibration of survey instruments shall be scheduled in a manner which ensures that a survey meter (s) is always available for immediate use.

7. One recommended calibration vendor is:
   Atlantic Nuclear Corp.
   1020 Turn Pike St. Unit #9
   Canton, MA 02021
   Telephone # (800) 878-9118

SECTION 6
FILM BADGE - RADIATION MONITORING

1. Radiation detection badges issued by Radiation Safety Officer shall be worn at **all** times by all personnel when assigned to work with radioactive materials or in areas producing Ionizing Radiation.

2. Each employee shall be assigned a badge number. This number shall be used exclusively by that person for the duration of employment in radioactive areas.

3. Badges shall be worn for a one month period. At the end of this period, badges shall be mailed to an independent laboratory for analysis.

4. Reports issued by independent laboratory shall be reviewed and maintained by the RSO .

5. Any indication of over exposure shall be immediately investigated to determine cause, reported to the individual (120 CMR 754(A)) and the agency.

6. At the discretion of the Radiation Safety Officer, the Production Manager, the EH&S Coordinator or the Area Supervisor, film monitoring badges may be placed at various work stations to determine the radiation activity levels at these specific points.

7. Spare film badges shall be maintained for use by temporary workers or visitors.

   7.1 Temporary badges shall be issued by the Radiation Safety Officer, who shall enter in log book: badge number, date of issue, period and person to whom badge is issued.

   7.2 The issue of such a badge shall freeze that badge number for the control period during which it was issued.

8. Badges are currently supplied and evaluated by:
   Landauer Co.
   Glenwood Science Park
   2 Science Rd.
   Glenwood, IL 60425

(708) 755-7000
or any other approved source.

9. The company supplying and evaluating the badges shall include an annual occupational exposure record for each employee participating in the annual Radiation Monitoring Program.

10. The annual report will be distributed each year to the named individual, if requested, and a copy kept in K-F's. R.S.O. files (Ref: 105 CMR 120.754 (B)).

SECTION 7
MAXIMUM PERMISSIBLE EXPOSURE

1. The exposure of persons to internal and external ionizing radiation shall always be kept at the lowest practicable level. (ALARA) See 105 CMR 120.200. (See Definitions, Section 1.)

2. Except as provided below, no employer shall suffer or permit an employee to receive in the course of his work a dose from radiation sources outside the body greater than those specified in Section 4, paragraph 3.2.1. See 105 CMR 120.211.

3. Rates of radiation dose to the tissues of the body from radioactive materials within the body shall be controlled by limiting the average rates at which radioactive materials are taken into the body by inhalation, ingestion or otherwise. No employer shall suffer or permit an employee to work in an atmosphere where the concentration of airborne radioactive materials averaged over 7 consecutive days exceeds a level which, if inhaled continuously during a calendar quarter work period, will result in an effective radiation exposure to the body or any organ thereof greater than the amount specified in Section 4, in paragraph 3.2.2., unless the employee is supplied with, and required to use, appropriate protective equipment. See 105 CMR 120.213 and 120.214.

4. When employees are exposed to radiation from both external and internal sources, either simultaneously or successively, the aggregate dose to any organ shall not exceed 100 percent of the pro-rated amounts in paragraphs 2 and 3. See 105 CMR 120.212

5. Not withstanding the provisions of 2, 3, and 4, an employer may, during any calendar quarter, suffer and permit an employee over 18 years of age to receive an annual dose greater than a permissible annual dose subject to the following requirements: See 105 CMR 120.215 and 120.216.

5.1 During any calendar year a dose to the whole body from sources of radiation in the employer's possession, shall not exceed 5 rems.

5.2 The employer has determined the individual's accumulated occupational dose and records of such determination are available for inspection by representatives of the Department.

6. **Radiation Outside Control Area:** The employer shall shield, isolate, protect or otherwise arrange and control every source so that the absorbed dose received by an individual outside the installation cannot exceed 10% of the limits specified above. See 120 CMR 120.221 and 120.222.

7. **Dose Limits to Minors and Declared Pregnant Women:** 10% of annual permitted dose to adults. See 105 CMR 120.217

8. **Dose Limits To Embryo/Fetus:** Max. 0.5 rems (5 mSv) over the entire term of pregnancy. See 105 CMR 120.218.

SECTION 8
RADIATION SURVEY PROCEDURES

1. Restricted Area

The restricted area (see Section 12) will be isolated from other Kidde-Fenwal, Inc. manufacturing areas. Access to this area will be limited to authorized employees who have been specifically trained in the precautions and safety requirements for the handling of radioactive sources.

All authorized employees entering the restricted area will be required to wear film badges for such period of time that they remain in the area. Badges for authorized employees will be stored outside of the restricted area. A bulletin board adjacent to the restricted area will be used to post all applicable documents for employee perusal which relate to Federal and State requirements, procedures and precautions. A regulation sign will be posted on the door to identify this as a radiation control area.

The manufacturing supervisor responsible for the use of this area will insure that all activities within the area are carried out in accordance with this Radiation Safety Plan.

Radioactive sources as received and accepted from outside licensed suppliers will be stored in the Restricted Area. Shielded canisters containing waste sources will be stored in a locked cabinet within the restricted area. Access to the locked cabinet will be controlled by the area supervisor and Radiation Safety Officer. A sign will be posted on the door identifying the presence of radioactive materials.

As production lots (max. 500 sealed sources) are removed from the cabinet for assembly into products, they will be counted and the computer inventory updated to reflect date, quantity of issue, and factory order number. Issues will be made on a first-in, first-out basis and requirements integrated with Kidde-Fenwal, Inc. inventory management programs for control of further procurement.

Sources which have not been assembled into products will be returned to the locked cabinet at the end of each work day. If the sources are returned into storage the inventory will reflect their being added back in.

Entry into the restricted and locked storage area is controlled through keys held by:

1. Radiation Safety Officer
2. Manufacturing Supervisor (Smoke Detectors)
3. Plant Maintenance Manager
   Entry into the restricted storage area is prohibited to anyone without a film safety badge.

2. Sub-Assembly

A printed wiring board sub-assembly containing all the associated electronics, less the radioactive sources will be manufactured, inspected, and tested in a non-restricted area. These sub-assemblies will be delivered to the restricted area in factory order lots where the sources will be added.

Radioactive sources will be assembled into chambers then the chambers will be assembled to the printed wiring board sub-assemblies, and inspected for workmanship. A metallic enclosure will then be added which will limit the accessibility to the radioactive sealed sources completing the assembly activities in the restricted area.

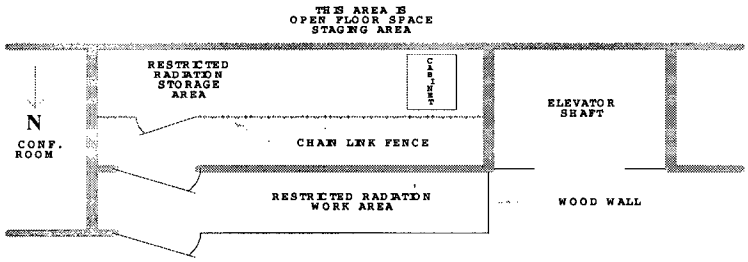
3. Final Assembly

Completed printed wiring board assemblies will be issued from the restricted area in factory order lots to the non-restricted final assembly area. Here they will be installed in housings, labeled and final testing will be done per Engineering Specifications. They are also tested to Quality Control standards. Any rework which requires the removal of the chamber enclosure will be accomplished back in the restricted area.

Finished units will be individually packaged in cardboard cartons. Cartons will be labeled in the prescribed manner and finally stored in a secured section of the finished goods inventory warehouse. Here they will be logged in against their respective factory order numbers and logged out against specific sales order numbers which are traceable to a customer.

Prior to packaging; finished units are subject to a wipe test (see section 8, § 8). Each wipe will be placed in a glassine envelope with I.D. markings for tractability and given to the RSO to finish scaler tests on the wipes.

RESTRICTED AREA LAYOUT



Each entrance into the restricted area is locked
and the cabinet in the storage area is padlocked.

4. New Or Revisions To Assembly And Storage Areas

4.1 Plans for any new radioactive installation or for changes in any existing installation should be checked and approved by the Radiation Safety Officer to determine whether the proposed radioactive safety features are adequate. The approved plans shall be maintained/filed. Structural changes to the assembly and storage areas must first be approved by the MA DPH.

4.2 **Approval of Plans:** Before any new isotope assembly area is placed in operation, a survey shall be made by the Radiation Safety Officer to:

4.2.1 Classify the installation/area as to radiation hazard level authorization to enter/admit, and appropriate signature or postings required.

4.2.2 Determine whether the radiation exposure limits are within the limits set by 105 CMR 120.00.

4.3 **Survey of Installation:** When changes are made in any existing installation, or when any existing installation is moved to a new location, or when there are changes in the occupancy of adjacent space, a radiation survey shall be carried out to ascertain that no new hazards have been introduced.

4.4 **Report on Survey:** No existing radioactive installation shall be assumed to conform with the provisions of this Standard unless a radiation survey has been made and a report to this effect has been placed in the RSO'S files (log).

4.5 **Elimination of Hazards:** The radiation hazards which may be found in the course of a survey shall be promptly eliminated. Equipment or area affected shall not be used until corrections have been made.

4.6 **Filing of Survey Reports:** Reports on all radiation surveys shall be filed together with a record of any corrective actions taken/done. The surveys will be filed in the RSO'S files as part of the permanent records.

5.0 Radiation Survey Procedures - Manufacturing Areas

The survey of Manufacturing areas shall include the following:

5.1 **Installation Inspection:** The installation/area shall be inspected to see that it conforms with the plans and specifications relating to radiation protection as specified in 105 CMR 120.225.

5.2 **Installation Area Inspection:** The installation/ area and its adjoining areas should be examined in order to determine whether radiation hazards are eliminated.

5.3 **Operating Technique:** Assembly methods for sealed sources shall be observed to ensure that radiation hazards are eliminated.

5.4 **Dosage Rate in Occupied Regions:** Dosage rate of radioactive sources shall be measured in each region permitted to be occupied.

5.4.1 Installation measurements of dosage rate shall be made with the maximum number/controlled radioactive sources in the area.

5.4.2 Maximum number of sealed sources (Assy-Radiator 06-128211-002) allowed in restricted work bench area at any one time is 500.

5.4.3 Maximum number of sealed sources (Assy-Source 06-117926-001) allowed at Department 42 assembly work station at any one time is 500.

5.5 Monthly Radiation Survey shall be made of all radioactive areas using the approved radiation survey instrument.

5.5.1 Radiation surveys shall be conducted following all maintenance repairs made or changes in manufacturing process involving sealed source areas.

5.5.2 The results of all Radiation Surveys shall be noted in the Radiation Safety Officer's log book.

5.5.3 All surveys which indicate radiation leakage in excess of the allowable limits shall be brought immediately to the attention of the Production Manager.

5.3.1.1 Excess readings which trigger operation shut-down and immediate correction are:

A. 0.5 milli-rems and above (survey meter)
B. 50DPM/CM (scaler/wipes)

6. Kidde-Fenwal Inprocess Wipe Test: Contamination Control

Introduction

Quantitative measurements of surface contamination are difficult because of unknown factors such as self absorption, geometry, and depths of penetration. However, estimates made by counting Wipes furnish useful information and should be made in order to prevent personnel contamination and to check the spread of contamination. Systematic investigations show that the amount wiped off during Wipe Study is in proportion to the initial activity on the work surface. Normally the fraction removed by the Wipe ranges from 1 to 10% of initial activity.

Procedure

1. The work areas of the benches and other work surfaces in the Restricted Area and at random in other Manufacturing and Test areas shall be wiped once each month with an

absorbent material, such as, Whatman No. 40 filters of 4.25 cm diameter shall be used to collect sample.

2. Wipe the designated area using light pressure with finger tips; wipe an area of about 100 cm squared.

3 Place the Wipe in a clean envelope and identify it as to location and date.

4. Count the Wipe in a fixed geometry using the Ludlum Scintillation 2000 Scaler.

5. Calculate the total disintegration per minute.

6. Contamination shall not be allowed to exceed the safe operating limits which are specified under Section 4 of this manual.

7. If contamination exceeds established limits, all personnel will vacate the area until decontamination of the area has been completed and a resurvey has indicated that the area has been thoroughly cleaned and is again safe to work in.

8. Any wipe greater than 50 DPM/CM^2 shall be brought to the attention of the Production Manager and the wipe shall then be sent to a qualified outside consultant for analysis, evaluation and recommendation.

7. Wipe Test Procedure For Work Area

7.1 Using a Whatman #40 filter paper 4.25 CM diameter, wipe a designated area of about 100 CM square.

7.2 Place the wipe in a clean envelope and identify as to location and date.

7.3 Measure the background radiation in counts per minute using the Ludlum Model 2000 Scaler.

7.4 Measure the wipe using the same meter.

7.5 Subtract the background count from the wipe. This is the wipe's actual count.

7.6 Calculate the total disintegrations/100 CM squared using the following formula:

$$DPM/100\ CM^2 = \frac{\text{Net Counts/Minute}}{\text{Efficiency}}$$

7.6.1 For Americium 241: efficiency = 0.14

7.6.2 For Radium 22: efficiency = .22

7.7 Determine DPM/CM^2 by dividing the result from Step 7.6 by 100.

7.8 Any wipe greater than 50 DPM/CM^2 shall be brought to the attention of the Production Manager and referred to an outside qualified consultant for analysis.

8. Wipe Test Procedure For Kidde-Fenwal, Inc. Final Product (Kidde-Fenwal Manufactured Units Model # Cpd-705x)

Completed order of above units must be wipe tested as follows before delivery to Shipping:

8.1 Determine sample size based on number of units in order, using Table #6 of NRC 10 CFR sub part C, Quality Control Sampling Procedure #32.110 (LTPD of 5.0%).

8.2 Wipe the total surface area of the number of detectors determined from step 1 above, using a Whatman #40 or equivalent filter paper (4.25CM diameter).

8.3 Determine the background count using the Ludlum Model #2000 Scaler or equivalent.

8.4 Similarly count the wipe in questions per step 8.3 above.

8.5 Subtract the background count (step 8.3) from the wipe's count (step 8.4), this is the wipe's actual count.

8.6 Calculate the total disintegrations/min. DPM by dividing the actual count by 0.14, the efficiency factor for Americium 241.

8.7 Calculate DPM/sq. cm by dividing the DPM from Step 8.6 by the total surface area wiped (this is the surface area of one detector, determined by std. mathematical techniques multiplied by the sample size from step 8.1 above).

8.8 Any wipe greater than 50DPM/CM^2 shall be brought to the attention of the Production Manager for corrective action.

8.9 Wipe test results are to be recorded on Form D-185 per work order route sheet.

9. Wipe Test Procedures for Kidde-Fenwal, Inc. (Incoming shipments from Nohmi Bosai, Ltd.)

Kidde-Fenwal will perform the following incoming tests at Receiving Inspection: (in the event of a wet or damaged carton:)

9.1 a. Determine sample size required from NRC 10 CFR Sub Part C - Quality Control Sampling Procedure #32.110. "Table 6 lot tolerance percent defective 5.0 percent. (Except in lot size 2001 to 100,000, the acceptance number is 0. See enclosed copy).

Example: A lot size of 50,000 detectors are received for incoming inspection from Nohmi. Nohmi's test results must be included. The procedure is as follows:

b. Select sample size from table 6 lot tolerance percent defective 5.0 percent.

Sample size - 75 pieces with an acceptance number of 0.

c. Check all 75 pieces from proper labels and markings. If there is one failure, missing label or incorrect markings, the lot must be screened 100%.

d. Proceed to Step 9.2.

9.2 Wipe the entire surface area of 75 detectors using the same filter paper (Whatman #40 or equivalent filter paper) (4.25CM diameter) or wipe three separate lots of 25 detectors each using a separate filter paper for each lot.

9.3 Determine the background count using the Ludlum Model 2000 scaler or equivalent.

9.4 Using the Ludlum Model 2000 scaler or equivalent, determine the count of the filter paper (75 detectors) from step 9.1, or using the same equipment, determine the count of each individual filter paper per 25 units for a total of 3 filter papers (75 units total) if second option from step 9.2 is employed.

9.5 Subtract the background count from the sample wipe count. This is the wipe's actual count.

9.6 Calculate the total disintegrations/minute (DPM) by dividing the actual count by 0.14, the efficiency factor for Americium 241.

9.7 Calculate disintegrations/sq. CM by dividing total disintegrations/minute by the total surface area of the detector (for Model 7051, surface area is 200 sq. CM). For 75 units, the reading is 15,000 sq. CM. For 25 units, the reading is 5,000 sq. CM.

9.8 Any wipe greater than 50 DPM/CM^2 shall be brought to the attention of the Production Manager for Corrective Action.

NOTE: The Nohmi 7051 can be considered to be a cylindrical object. Diameter 3.75", Height 0.75".

$$A = (2)\pi (R)^2 + \pi (D)(H) = 30.9 \text{ sq." } = 200 \text{ sq. CM}$$

1. Your immediate action in the event of failures.
   Example:

   a. Reject shipment and notify Nohmi. Place lot in hold area.

2. Corrective Action Plan from Nohmi is required, including the following:

a. Identification of cause for non-conformance.
b. Plan to eliminate cause for non-conformance.
c. Time table for completion of Corrective Action Plan.

NOTE: The actual Wipe Test results from Nohmi must be included with each shipment. **Failure to supply data will result in the rejection of the lot.**

Test results from Nohmi and Kidde-Fenwal must be retained by Kidde Fenwal for inspection by the Agency on their audits of our Quality System.

10. Final Product Wipe Test Procedure for Nohmi Bosai, Ltd.

Manufacturer of the CPD-705X Smoke Detector.

The following sample shall be taken at Final Inspection by Nohmi prior to shipping the product to Kidde-Fenwal, Inc.

10.1 a. Determine sample size required from NRC 10 CFR Sub Part C - Quality Control Sampling Procedure #32.110. "Table 6 lot tolerance percent defective 5.0 percent. (Except in lot size 2001 to 100,000, the acceptance number is 0. See enclosed copy).

Example: A lot size of 50,000 detectors are ready for shipment to Kidde-Fenwal, the procedure is as follows:

b. Select sample size from table 6 lot tolerance percent defective 5.0 percent.

Sample size - 75 pieces with an acceptance number of 0.

c. Check all 75 pieces from proper labels and markings. If there is one failure, missing label or incorrect markings, the lot must be screened 100%.

d. Proceed to step 10.2.

10.2 Wipe the entire surface area of 75 detectors using the same filter paper (Whatman #40 or equivalent filter paper) (4.25CM diameter) or wipe three separate lots of 25 detectors each using a separate filter paper for each lot.

10.3 Determine the background count using the Ludlum Model 2000 scaler or equivalent.

10.4 Using the Ludlum Model 2000 scaler or equivalent, determine the count of the filter paper (75 detectors) from step 10.1, or using the same equipment, determine the count of each individual filter paper per 25 units for a total of 3 filter papers (75 units total) if second option from step 10.2 is employed.

10.5 Subtract the background count from the sample wipe count. This is the wipe's actual count.

10.6 Calculate the total disintegrations/minute (DPM) by dividing the actual count by 0.14, the efficiency factor for Americium 241.

10.7 Calculate disintegrations/sq. CM by dividing total disintegrations/minute by the total surface area of the detector (for Model 7051, surface area is 200 sq. CM). For 75 units, the reading is 15,000 sq. CM. For 25 units, the reading is 5,000 sq. CM.

10.8 Any wipe greater than 50 DPM/CM^2 shall be brought to the attention of the Production Manager for Corrective Action.

NOTE: The Nohmi 7051 can be considered to be a cylindrical object. Diameter 3.75", Height 0.75".

$$A = (2)\pi (R)^2 + \pi (D)(H) = 30.9 \text{ sq." } = 200 \text{ sq. CM}$$

1. Your immediate action in the event of failures.
   Example:

   a. Stop shipment and screen the lot 100%.
   b. Check stock (determine in Correction Action Step if stock requires screening).

2. Corrective Action Plan, including the following:

   a. Identification of cause for non-conformance.
   b. Plan to eliminate cause for non-conformance.
   c. Time table for completion of Corrective Action Plan.

   NOTE: The actual results must be included with each shipment. **Failure to supply data will result in the rejection of the lot.**

   Kidde-Fenwal must also perform the same test upon receiving.

   Test results from Nohmi and Kidde-Fenwal must be retained by Kidde Fenwal for inspection by the NRC or the agency on their audits of our Quality System.

SECTION 9
TRAINING PROGRAM

1. Procedural Safeguards

All employees and visitors who enter a controlled radiation area or assemble radioisotopes shall be informed of the requirements and procedures for their protection against internal and external exposure.

2. Radiation

2.1 General rules and instructions shall be given in sufficient detail to employees handling the radioisotopes. There should be a current list designating the area supervisor or other persons assigned responsibility for radiation protection and persons to be contacted in various emergencies.

2.1.1 Radiation Safety Training will be given prior to any work assignment involving radioisotopes.

2.2 For repetitive work with radioisotopes, the standard operating procedures should be prepared in writing. They may be incorporated into work procedure documentation.

2.3 X-ray machine operators must receive training/testing which complies with the intent of 105 CMR 120.320 and 120.321, as available, and/or appropriate at the time.

2.4 The RSO will have had appropriate training which complies with the intent of 105 CMR 120. 320 (A) (B).

2.5 New employees assigned to working in the manufacturing area using radioisotopes will be given radiation safety training prior to the work assignment.

2.6 Employees transferred into work assignments in the manufacturing area using radioisotopes will be given radiation safety training prior to the work assignment.

2.7 All employees working with radioisotopes or x-ray support service will receive a refresher training session once a year.

2.7.1 An attendance record will be created for each training session for the RSO'S files.

3. Outline of General Training Program

3.1 Biological effects of radiation

3.2 Basic principals of radiation safety

3.3 Film badges and their reasons

3.4 Handling Americium-241 sources

3.4.1 Contamination vs. Clean, orderly work area

3.4.2 Protective gear-gloves

4. Hygiene

4.1 Threat of ingestion or absorption through the skin

4.1.1 Hand to mouth, eyes and nose

4.1.2 Cuts, abrasions and skin breaks

5. Certification-Training

5.1 Radiographic technicians will possess certification licenses (cards) acquired through the testing process and issued by approved sources (See CMR 120.320, 120.360 and 120.321) Cards must be in an individuals possession and producable upon request.

The RSO will also fulfill the requirements of 5.1 (See CMR 120.320 AND 120.380 (A) (B)).

SECTION 10
PROCUREMENT

The sealed radioactive sources, mounted in Holders, will be procured from licensed manufacturers and/or distributors in accordance with Kidde-Fenwal Engineering Specifications (06-128211-002, 06-117926-001). They will be procured for quantity deliveries in accordance with planned production schedules in order to minimize the inventory on hand at any one time. This quantity will be controlled at a level not to exceed a maximum in-house inventory of **801.8 millicuries** of Americium-241. The purchase order shall specify quantity, method of packaging, method of shipment, method of outer carton identification and other precautionary information as required by law. Labels shall be as described and illustrated in Handbook of Federal Regulations, Transportation of Radioactive Materials, Part 73. Vendor wipe test certification applies to incoming shipments. (See -105 CMR 120.770, 49 CFR 100-189) (D.O.T.).

Note: Kidde-Fenwal's N.R.C. license 20-15285-01 (7-24-03) March 31, 2012* specifies maximum amounts in possession at any one time.

A. Americium 241 Not to exceed 1.8 millicuries total or 6 microcuries per source.
B. Americium 241 Not to exceed 800 millicuries total or 2.5 microcuries per source.

*Now under control of Commonwealth of Massachusetts

SECTION 11
SEALED SOURCES

1. Sealed Sources shall be tested for leakage before being put into use.

2. Sealed Sources held in storage shall be retested at six month intervals there after unless exempted by the Agency.

3. Sealed Sources found to be leaking will be P.M.R.'d with a corrective action and held in storage for disposition.

4. Any disposition resulting in a Return To Vendor needs the Radiation Officer approval that this action can be done within the limits of N.R.C./DOT Policies as they relate to shipping of sealed sources.

5. Any sealed sources which cannot be return shipped due to violation of N.R.C./DOT regulation guidelines will be scrapped and placed in radioactive waste containers for proper disposal according to hazardous waste guidelines.

6. All scrapped sealed sources will be stored in the locked cabinet located in the restricted storage area.

SECTION 12
STORAGE OF RADIOACTIVE MATERIAL

1. Radioactive material not in use shall be stored in properly labeled and shielded containers secured against unauthorized access or removal.
2. Vaults used for storing radioactive materials shall be suitably ventilated and locked.
3. Storage containers for radioactive materials shall be structurally sound with regards to corrosion, radiation and temperature effects that may develop.
4. On receipt in stores or shipping, any packaging that appears to be unsuitable for proper protection of contents during normal handling/storage should be reported to the supervisor who will contact manufacturing engineering.

   It is the responsibility of quality and manufacturing engineering to ensure that stores and shipping have the proper equipment to handle and store material with special requirements.
5. The environmental conditions of each storage facility are to be established and familiar to all materials control personnel and any deviation from requirements is to be reported.

   All facilities are to be kept clean and orderly, consistent with requirements of the material and general safety guidelines.
6. Storage vault will be kept locked at all times.
7. All entry doors to restricted area will also be locked at all times.
8. Keys to the restricted area and vault will be held by:

   8.1 Area Supervisor

   8.2 Master Key File-Facilities Mgr.

   8.3 Radiation Safety Officer

9. The Ashland Fire Department will be informed about the restricted storage area, it's contents and location.

SECTION 13
WASTE DISPOSAL

1. WASTE - RADIATION SOURCES

1.1 All scrap, rejected sources, etc. will be retained in a properly labeled scrap container that is located in the restricted storage area locked cabinet.

1.2 Container(s) will be identified on the outside with radiation warning labels.

NOTE: The scrap container will be held in locked radiation storage cabinet located in the restricted storage area.

1.3 Scrapped seal sources will be controlled by an inventory card which shall be attached to, or retained outside of the radiation storage cabinet. No additions to or withdrawal of scrapped sealed sources from the storage cabinet are to be made unless reflected on the inventory control. Area should be surveyed when significant changes are made.

1.4 Disposal will be made by turning material over to a qualified/approved hazardous waste disposal company at intervals to insure an accumulation of waste material does not exceed licensing limits.

1.5 Radioactive Sources to be disposed of will be held in locked storage area cabinet until proper shipping instructions are arranged by K-F Inc.'s Hazardous Waste Material Technician. The waste sources will be packaged by the hazardous waste contractors.

1.6 Kidde-Fenwal's hazardous waste material specialist will contract for disposal of scrapped radioactive sources and maintain files on all documentation created by the radioactive waste disposal process.

2. WASTE - CLEANING MATERIAL

2.1 Wiping cloths, rags, towelettes, gloves, wipes, etc. shall be placed in a waste receptacle located in restricted area and kept separate from regular manufacturing waste.

2.2 The container used to collect waste shall be labeled with radiation label warnings

2.3 The container of waste-cleaning or handling materials shall be monitored for contamination by the R.S.O.

2.3.1 If no contamination, waste may be disposed of as regular waste.

2.3.2 If contamination is found above background level, it shall be retained for disposition. The RSO will bag it, label it and hold it for disposal as radioactive hazardous waste. The labeled bag/container will be secured in the restricted storage area and added to the inventory control card. The RSO will also document the event in his/her log/files.

WASTE MATERIAL DISPOSAL

Disposal of scrapped sources shall be completed by original supplier. Certification of disposal shall be submitted by the disposal vendor to Kidde-Fenwal, Inc. for record and files maintained by the Hazardous Waste Technician. All shipments of disposed material shall conform to recommended Department of Transportation regulations.

1. Americium 241 sealed sources are to be returned to original suppliers, Nuclear Radiation Development (NRD) or Nohmi Bosai.

2. Radium sealed sources are to be sent to a approved LLRW disposal site through a NRC licensed broker; such as Chem-Nuclear. (See 1.6 of this section.)

3. Waste Materials: Wipes, rags, gloves, etc.

SECTION 14
REPAIRS TO EQUIPMENT AND WORK AREAS

1. Defective shields, barriers, storage vaults, tools, jigs, and fixtures used in the manufacturing process for sources shall be promptly repaired.

2. Following each repair, the RSO shall check out the repair to insure that repairs are adequate and that the proper degree of protection has been restored.

3. If it is found that the repairs are inadequate, and that no internal answer for the correction can be made by Kidde-Fenwal Inc. resources, outside qualified expert(s) shall be consulted for a solution.

4. The RSO shall maintain a log book on repairs which will fully define the problem, the solution, corrective action taken, the date of that action and its results.

5. All lock-out rules will be adhered to when the X-ray unit is being repaired.

6. Perform a thorough survey after repairs or changes have been made. Record results in R.S.O. Log Book.

SECTION 15
X-RAY SAFETY STANDARDS

The purpose of this standard is to establish safety standards for X-ray personnel and visitors.

1. The X-ray Equipment is to be used by trained personnel.
   - 1.1 The area will be posted with required signage.
   - 1.2 The area will have warning light(s) to indicate when the unit is producing ionizing radiation.
   - 1.3 A three foot restristed area will be marked off surrounding the X-Ray machine.
2. The X-ray Technician is completely responsible for the safety of the X-ray personnel and/or any visitors in the vicinity of the X-ray equipment.
3. The radiation energizing switch must be turned off when visitors enter the X-ray area.
   - 3.1 The X-ray machine may be turned on for demonstration purposes only on the approval of the X-ray Technician and if all visitors are provided a personnel monitoring device and given verbal safety precautions.
4. In the event of operating failure the R.S.O. shall be notified immediately to have repairs.
   - 4.1 In the event of failure of the X-ray tube a qualified X-ray repair service shall be notified and necessary repairs are to be made.
5. Energizing of the X-ray tube shall be done by means of the Master Control only. Bypassing sliding door safety interlocks to energize the X-ray system is forbidden.

6. All repairs must follow the lock-out procedure and shall be carried out by a qualified X-ray repair service and under the supervision of the R.S.O.

7. Before any work is put into or taken out of the X-ray cabinet the console display start LED button should not be on.

   7.1 Prior to use the operator must test the operation of the interlock. The results must be logged on the interlock log sheet.

8. At the conclusion of the operation, the main control switch **must** be turned off and key removed. **Keys are not to be left in the X-ray machine unattented**.

9. Radiation film badges shall be assigned and worn at all times by employees qualified to operate the X-ray equipment. Personal dosimeters shall also be worn by x-ray technicians when operating the x-ray machine. Unlike the film badges, dosimeters can be read immediately whereas film badges must be processed to obtain a reading. Dosimeters should be clipped to a pocket or lapel. The x-ray technician is able to determine exposure received during a specific x-ray procedure.

   Dosimeters must be recharged at the beginning of each shift. If dosimeter can not be recharged properly, do not operate X-ray machine and notify the R.S.O. immediately.

   Dosimeters shall meet the criteria in ANSI.N322, and shall have a range of 0-200 milliroentgens. If a pocket dosimeter is discharged beyond its range, radiographic operations by that individual shall cease, and the individuals film badge shall be processed immediately. The individual shall not return to work with sources of ionizing radiation until a determination of his/her exposure has been made.

   A log will be maintained by each industrial radiographer with dosimeter readings and serial numbers.

   Visitors to the x-ray area shall wear a pocket dosimeter and recorded in the log.

   9.1 All employees shall be given the identical badge each month as assigned by the RSO or his designee.

9.2 Badges shall be worn for a one month period. At the end of each period all badges shall be returned to the vendor by the RSO.

10. A monthly radiation survey shall be made of the X-ray area and equipment using the calibrated survey meter.

10.1 Additional radiation surveys shall be conducted by the RSO following all electrical maintenance checks or repairs to the X-ray equipment.

10.2 Copies of the monthly x-ray area radiation survey report shall be kept on file by the RSO.

10.3 Monthly records relating to x-ray area film badges shall be checked and filed by the RSO.

SECTION 16
NOTIFICATION OF INCIDENTS

1. INVESTIGATIONS

1.1 Overexposures, serious accidents, or spills involving radioactive materials, should be investigated to correct, control, or eliminate hazardous conditions. Such investigations may indicate corrective actions are necessary in previously accepted procedures or equipment. Corrective action shall be made immediately.

1.2 The data obtained from such an investigation should be written in detail and made a part of the exposure record of each individual involved. Such information is frequently useful in reviewing the capabilities of individuals for handling radioactive materials, for assessing their total exposure history, and for interpreting results from later measurements of excreta.

2. NOTIFICATION

2.1 In compliance with 105CMR120.00 the RSO shall notify the Agency within twenty-four hours by telephone or fax, and shall make an immediate report in writing of any incident involving overexposure due to sources of radiation.

2.1.1 An exposure to the whole body of any individual to 5 rems (0.5 Sv) or more of radiation; exposure to the skin of the whole body of any individual of 30 rems or more of radiation; or exposure to the feet, ankles, hands, or forearms to 75 rems or more of radiation. (See 105 CMR 120.211.)

2.1.2 The release of radioactive material in concentrations which if averaged over twenty-four hours would exceed 500 times limits established.

2.2 The RSO shall notify the Agency within twenty-four hours, by telephone or fax, and shall report the following immediately in writing.

2.2.1 The loss or theft of any source of ionizing radiation.

2.2.2 Fires, explosions or other accidents where it is known or believed that radioactive material has been involved.

2.3 The RSO shall make a report in writing to the Agency within 7 days about the following:

2.3.1 A record of additions/ removals of sources of ionizing radiation which would change the inventory of sources shall be recorded.

2.4. Any changes or modification of installations, safety devices, work rules or operating conditions dose of employees must be noted in the RSO files/log.

2.5 The RSO shall make a report in writing to the Agency within thirty days of each over exposure of an individual to radiation or concentrations of radioactive materials in excess of applicable limits.

2.5.1 Each report required shall describe the extent of exposure of persons to radiation or to radioactive materials; levels of radiation and concentrations of radioactive material involved; the cause of the exposure, levels or concentrations and corrective steps taken or planned to assure against a recurrence.

2.5.2 Any employee subject to the question of radiation overexposure shall not be permitted in the radioactive areas until definite results are established. Findings and any corrective steps that are required shall be written up and

attached to original laboratory report which indicates over exposure. (See 105 CMR 120.281, 120.282.)

SECTION 17
RECORDS-RETENTION-RADIATION

1. All records required in this policy shall be kept on file for the duration of employment of the individual concerned and for five years following termination.

2. A record shall be kept of all data pertaining to radiation monitoring. The records shall include both monitor films or dosage meter readings and shall be adequate to indicate whether the permissible daily dose has been exceeded for the employee in question, in which case there shall be noted in the record the special conditions under which the overexposure occurred, the cause to which it is attributed, and the corrective action taken.

3. Record keeping shall conform 105 CMR 120.261 (A) & (B).

4. Kidde-Fenwal Inc. will maintain the exposure history (badge) reports in its clinic files. Film monitor (badge) reports should be kept in the clinic's files and made available for inspection by either an authorized representative of the Nuclear Regulatory Commission or a representative of Radiation Control Program, Commonwealth of Massachusetts.

5. Radiation Safety Training Records will be maintained by the RSO In addition, the training will be noted on the employees personnel records as required by I.S.O. standards/policy.

SECTION 18
Radiation Safety Officer (R.S.O.)

1. **General:** The Radiation Safety Officer must have, by training and experience, sufficient knowledge of radiation problems and the control of health hazards to be able to dependably perform his duties and to keep adequate records. He should be a neat, careful, and organized person. He must have the ability to write a clear and concise report, express himself clearly, and act as advisor to Management & related personnel involved in the Ionizing Radiation Program at Kidde-Fenwal, Inc. A Radiation Safety Officer (RSO) shall be designated for every license and certificate of registration issued by the Agency.

2.0 **Qualifications**

2.1 Possession of a high school diploma or a certificate of high school equivalency based on the G.E.D. test.

2.2 Completion of the training and testing requirements to the intent of 105 CMR 120.380 (A), (B), (C) and 120.320 (A), (B), (C).

2.3 Two years of documented experience related to radiation protection, including knowledge of industrial radiographic operations.

3.0. **Activities:** The Radiation Safety Officer performs various ionizing radiation surveys, sends tests to approved agencies, and monitors the test results. He updates Kidde-Fenwal, Inc. regulations to new radiation regulatory agency requirements. He monitors and enforces compliance with Kidde-Fenwal, Inc. Ionizing Radiation Policy. He oversees periodic calibration and any necessary maintenance of ionizing radiation monitoring equipment. He files necessary reports with radiation regulatory agencies. He performs receiving inspection tests on incoming ionizing radiation and insures that radioactive waste is properly packaged and returned to the supplier for disposal. He keeps complete

records of all ionizing radiation program activities, including all test results, and reviews them as necessary with agency auditors.

4.0. **Duties**: Specific but not limited to.

4.1 To establish and oversee operating emergency, and ALARA procedures, and to review them regularly to ensure that the procedures are current and conform with rules.

4.2 To oversee and approve all phases of the training program for radiographic personnel so that appropriate and effective radiation protection practices are taught.

4.3 To ensure that required radiation surveys and leak tests are performed and documented in accordance with 105 CMR 120.000, including any corrective measures when levels of radiation exceed established limits.

4.4 To ensure that personnel monitoring devices are calibrated and used properly by occupationally-exposed personnel, that records are kept of the monitoring results, and that timely notifications are made as required by 105 CMR 120.200.

4.5 To ensure that any required interlock switches and warning signals are functional and that radiation signs, ropes, and barriers are properly posted and positioned.

4.6 To investigate and report to the Agency each known or suspected case of radiation exposure to an individual or radiation level detected in excess of limits established by these rules and each theft or loss of source(s) of radiation to determine the cause and to take steps to prevent its recurrence.

4.7 To have a thorough knowledge of management policies and administrative procedures of the licensee or registrant.

4.8 To assume control and have the authority to institute corrective actions including shutdown of operations when necessary in emergency situations or unsafe conditions.

4.9 To maintain records as required by 105 CMR 120.000 (See 105 CMR 120.397 *Appendix* C).

4.10 To ensure the proper storing, labeling transport and use of exposure devices and sources of radiation.

4.11 To ensure that quarterly inventory and inspection and maintenance programs are performed in accordance with 105 CMR 120.318 and

4.12 To ensure that personnel are complying with 105 CMR 120.000, the conditions of the license or the operating and emergency procedures of the licensee or registrant.

SECTION 19
Procedure For Receiving And Opening Packages Containing Radioactive Material

Reference:

10 CFR Part 20, Section 20.1906, as amended 8/31/92.
DOT Regulations 49 CFR 173.403 (m) and (w) and 173.421-423.
10 CFR 71.4 and Appendix A to 10 CFR Part 71.
DOT Regulation 49 CFR 172.403 and 172.436.

BACKGROUND

Section 20.1906, as amended 8/31/92, of 10 CFR Part 20, "Standards for Protection Against Radiation", requires Kidde-Fenwal (KF) to have procedures for receiving and opening packages. The provisions of section 20.1906 requires that:

A. A person receiving a package of radioactive material in excess of Type A_1 quantities (8.0Ci for Am-241) take possession promptly of the package when offered by the carrier. (This reduces the chances of packages being misplaced or lost.)

B. The external surfaces of a "labeled Package" be monitored for possible contamination, unless the package contains only radioactive material in the form of a gas or in special form. (This allows for early detection of possible escape of radioactive material from the package and action to control its dispersal in the transportation system.)

C. The external surface of a "labeled Package" shall be monitored for radiation levels if the package contains more than a Type A_1 Quantity. (This allows for early detection of problems such as shutter coming open on an industrial gauge during shipment. Early detection enables investigation and evaluation of possible exposure to carrier personnel and others.)

D. Any package known to contain radioactive material, regardless of the Quantity be surveyed for radioactive material contamination and excessive radiation levels if there is evidence of degradation of package integrity, such as packages that are crushed, wet or damaged. (This allows for detection and evaluation of possible contamination and excessive radiation levels.)

E. The monitoring stated above in (b), (c) and (d) be performed within three hours of receipt of the package if received during normal working hours or within three hours of start of the next work day if the package is received after working hours. If a wipe sample of 300 cm2 reveals removable surface contamination in excess of 600 dpm for an alpha emitter (e.g., Am241), or (2) if radiation level is in excess of 200 mrem/h on the surface of the package or 10 mrem/h at 1 meter is found, notification shall be made to the carrier and to the NRC as prescribed in subsection 20.1906(d) of 10 CFR Part 20.

F. KF has written procedures for safely opening packages in which radioactive material is received, and shall follow those procedures.

G. Radioactive material received at KF fits into 3 categories:

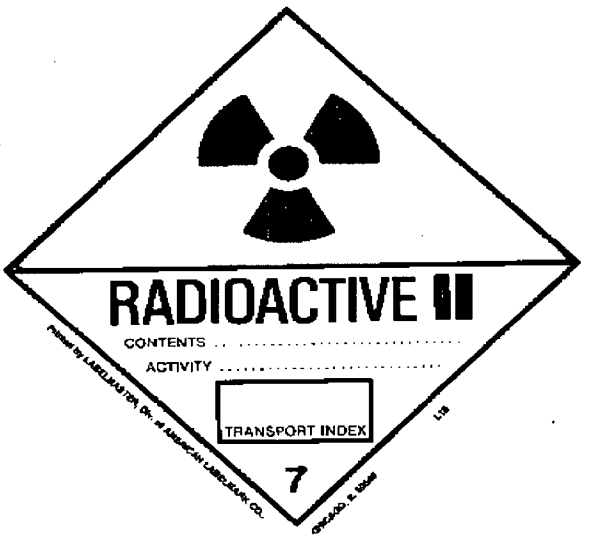
1) Am- 241 foil sources mounted in source holders ("radiators")
2) Am-241 foil sources contained in smoke detectors manufactured in Japan by Nohmi.
3) Radium-226 foil sources contained in outdated smoke detectors which are returned by users to K-F Inc. for disposal. This is a result of a label which advised the customer to return the detector to the manufacturer for disposal.

The above 3 categories of incoming shipments may reasonably be considered by the shippers to K-F Inc. to be exempt from certain Department of Transportation (DOT) labeling requirements as instruments or manufactured articles. Also, since a source and its holder (radiator) or smoke detector from NRD, Amersham and Nohmi contains, on the average, about 1 microcurie, It is unlikely that K-F would receive a single package containing more than an A_2 Quantity (0.008 Ci Am-241). However, since it may be convenient for our suppliers not to consider radiators or detectors to be manufactured articles or instruments and since "over-labeling" can occur, our Receiving Department will be instructed by the RSO about the label and the required action. The label used should be Radioactive White-I.

RECEIVING DEPARTMENT INSTRUCTIONS for RADIOACTIVE MATERIAL

1.0 Take possession promptly when packages containing radioactive material are offered by the carrier. Handle with care so that packages are not damaged.

2.0 Packages containing radioactive material shall be identified by shipping papers and/or label. The label will be the RADIOACTIVE WHITE-I as shown below:



The background on the RADIOACTIVE WHITE-I label will be white. The printing and symbol will be black, shaped, four inches on each side. Two or more of these labels would be affixed to opposite sides of the package.

3.0 The shippers of radioactive material to KF are Nuclear Radiation Development Corp., Amersham Corp. and Nohmi.

4.0 If the total number of sources or detectors in a package is 8,000 or more or if the package has the RADIOACTIVE WHITE-I label, notify the RSO immediately (within 2 hours of receipt) and move the package to the secured area (Do Not Open).

4.1 If any package of radioactive material, regardless of quantity, is damaged or wet, notify the Radiation Safety Officer immediately (within 2 hours of receipt) and move the package to the secured area **(Do Not Open).**

4.2 If the package contains less then 8,000 sources or detectors, is not labeled, or is not damaged move to the secured area and notify the Radiation Safety Officer (Do Not Open).

4.3 The Radiation Safety Officer can be contacted at any time for additional information about handling radioactive material shipment

INSPECTION OF UNOPENED PACKAGE BY THE RSO

1.0 Check the external surface of a labeled or damaged package for contamination and radiation levels by performing wipe test and /or meter radiation surveys. This inspection must be performed within 3 hours after the package is received at the KF Inc. facility. Monitoring shall be performed in; accordance with 10 CFR 71.47 for external radiation levels and with 10 CFR 71.87(I) for removable surface contamination. If the external radiation levels are greater than the limits of 71.47 (200 mrem/h at any point on the external surface or 10 mrem/hr. at 1 meter from the package) or a wipe test of 300 cm2 shows greater than 660 dpm, the RSO shall immediately notify the final delivery carrier by telephone or telegram, mailgram or facsimile, Department of Public Health, Radiation Safety Program ,Commonwealth of Massachusetts.

2.0 Packages that are not labeled, do not contain more than 8 millicures (8.0 mCi) of Am-241, and/or are not damaged, do not require wipe tests on the external surfaces of the package or monitoring of external radiation levels.

OPENING AND INSPECTION OF PACKAGES

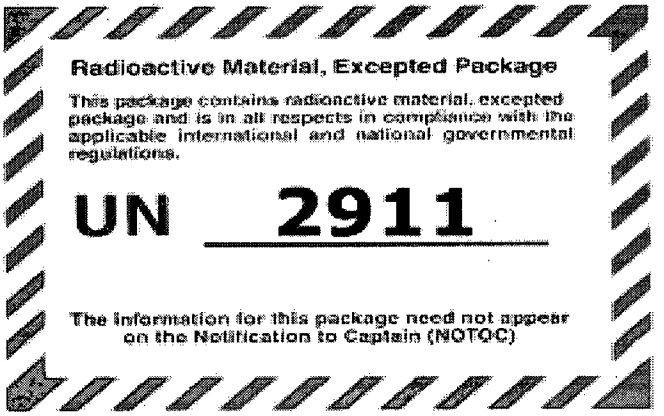
1.0 Shipping packages shall be opened by or under supervision of the RSO.

2.0 Wipe tests will be conducted on foil/holders (radiators) and/or detectors. Any wipe greater than 0.005 microcuries shall be cause for rejection and notification of rejection given to the supplier.

3.0 An inventory of the package contents shall agree with the contents and the shipping documents. Any differences will be investigated reported and reconciled by the RSO.

SECTION 20
SHIPPING IONIZING SMOKE DETECTORS

1.0 International Air Transportation Association (IATA) regulations require any excepted packages sent by air which would be labeled UN2911 must usethe IATA red bordered label which contains the complete text description of the UN code.



SECTION 21
PROCEDURE FOR RETURN AND INVENTORY CONTROL OF K-F INC.'S IONIZING SMOKE DETECTORS

1.0 Customers looking to return K-F smoke detectors shall send return requests to the customer service department. Once the request is received customer service shall confirm that the smoke detectors being returned are listed in Table 1 (pg 61). Only detectors found in Table 1 will be accepted. Customer service department prior to return authorization will contact the EH&S Department to confirm that we have the storage space to accept the detectors. Once EH&S confirms space is available then customer service will authorizes the return of smoke detectors and initiates an R.M.A. (Returned Material Authorization) which is numbered to a particular return.

2.0 Customer service department must communicate to the customer prior to detector return that Saturday, holiday, or off hour deliveries cannot be accepted. Also, it must be explained to the customer that no opened, dismantled, or exposed radioactive material will be accepted.

3.0 The R.M.A. directs incoming units through the receiving department to the Q.A. customer returns section where the units are processed immediately and a count of pieces being returned is matched against the authorized R.M.A. count. Once processed contact EH&S to contact authorized personnel to have the units transferred to the restricted storage area. If the return units are not picked up within 30 minutes contact the EH&S Department.

4.0 The R.M.A. creates the received inventory control for ionizing smoke detectors.

TABLE 1

Model Number	Source	Strength
Fire - Alert CPD – 1201 (obsolete)	Ra-226	1.0 – 1.6 μC
Fire - Alert CPD – 1212 (obsolete)	Ra-226	1.0 – 1.6 μC
Kidde – Fenwal CPD – 7021 (obsolete)	Am-241	1.0 μC
Kidde – Fenwal CPD – 7023 (obsolete)	Am-241	1.0 μC
Kidde – Fenwal CPD – 7042 (obsolete)	Am-241	< 1.0 μC
Kidde – Fenwal CPD – 7051 (obsolete)	Am-241	0.7 μC
Kidde – Fenwal CPD – 7051C (obsolete)	Am-241	0.7 μC
Kidde – Fenwal CPD – 7051D (obsolete)	Am-241	0.7 μC
Kidde – Fenwal CPD – 7052 (obsolete)	Am-241	0.7 μC
Kidde – Fenwal CPD – 7054 (obsolete)	Am-241	0.8 μC
Kidde – Fenwal CPD – 7054D (obsolete)	Am-241	0.8 μC
Chemetron Addressable 70101349	Am-241	0.7 μC
Chemetron Conventional 70101550	Am-241	0.8 μC

SECTION 22
PROCEDURE FOR DISASSEMBLY OF RADIUM SEALED SOURCE FROM SMOKE DETECTORS

1.0 Visually inspect unit(s) for physical damage or corrosion. Do a meter survey to ensure activity levels are less than 0.5 milli.rem/hour

1.1 If level is acceptable proceed to disassemble.

1.2 If corroded or damaged perform wipe test.

1.2.1 If readings from wipe test are below 50 DPM/CM2 proceed to disassemble.

1.2.2 If readings are 50 DPM/CM2 or above, secure the unit in vault and notify RSO.

2.0 Open smoke detector by removing outer steel cover and plastic radiator to expose the standoffs that hold the circuit board in place. Remove the standoffs to free-up both sides of circuit board. Take off rectangular steel cover to expose the two plastic holders. Snip wires as close to top of plastic holders as possible. Take the two plastic holders out of the circuit board. Pop the radium sealed source from the two plastic holders and place in the radiation scrap can.

3.0 Black-out the radiation caution sticker on the back of the steel cover. Place all refuse material in a receptacle. Before disposing of this refuse survey for any radioactivity. Secure the refuse and notify RSO if reading is .05 milli-rem/hour or greater.

4.0 Transfer radium sealed sources from radiation scrap can to vault and record the amount added to vault inventory.

Personnel Qualifications

1. The person performing the disassembly must be trained and experienced in principles of radiation safety.

2. The person must have experience in use of survey meters and wipe procedures.

Personnel Protection

1. Must wear a film badge when performing disassembly operation.

2. Must wear protective gloves.

Tools

1. All hand tools are dedicated and must only be used in the disassembly process.

2. The hand tools will be in the RSO's possession when not being used.

3. All tools and work surfaces used for disassembly must be wiped clean after use.

4. The wipes must be deposited in the radiation waste basket.

Note: A meter survey and wipes will be done again upon completion of radium disassembly tasks by the RSO to eliminate the possibility of radiation contamination hazards.

NRC FORM 541 — US NUCLEAR REGULATORY COMMISSION

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

1. MANIFEST TOTALS							2. MANIFEST NUMBER
NUMBER OF PACKAGES	NET WASTE VOL. m3	NET WASTE WGHT kg	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	TOTAL	TO-2011-011
6	0.633	117	NP	NP	NP	NP	3
							PAGE 1 OF 1 PAGE(S)
ACTIVITY (MBq/mCi) ALL NUCLIDES		TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	4. SHIPPER NAME
1.74E+02	MBq	NP	NP	NP	NP	NP	Chase Env. Group
4.69E+00	mCi						SHIPPER ID NUMBER N/A

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER								16. WASTE CLASS A-STABLE A-UNSTABLE B-CLASS B C-CLASS C
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR NUMBER	6 CONTAINER DESCRIPTION (See Note 1)	7 VOLUME (m3)	8 WASTE AND CONTAINER WEIGHT (kg)	9. SURFACE RADIATION LEVEL X uSv/hr ___ mSv/hr	10. SURFACE CONTAMINATION MBq/100 cm2 ALPHA	BETA-GAMMA	PHYSICAL DESCRIPTION 11. WASTE DESCRIPTOR (See Note 2)	12. Approximate WASTE VOLUME(S) IN CONTAINER (m3)	13. SORBENT SOLIDIFICATION STABILIZATION MEDIA (See Note 3)	14. CHEMICAL DESCRIPTION CHEMICAL FORM / CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1 %	15. RADIOLOGICAL DESCRIPTION INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT Nuclide	MBq	mCi	
TO-TS-T-11-009 0712	4	0.212	43.5	<5.00	<3.67E-6	<3.67E-5	59 smoke detectors	0.212	100	Oxide/NP	NP	Am-241	4.51E+00	1.22E-01	N/A
												Package total	**4.51E+00**	**1.22E-01**	
TO-TS-T-11-010 0712	4	0.114	29.5	<5.00	<3.67E-6	<3.67E-5	59 smoke detectors	0.114	100	Oxide/NP	NP	Ra-226	6.66E-01	1.80E-02	N/A
												Package total	**6.66E-01**	**1.80E-02**	
TO-SP-T-11-011 0712	4	0.038	24.5	60	<3.67E-6	<3.67E-5	59 Radium foils	0.038	100	Oxide/NP	NP	Ra-226	2.63E+01	7.10E-01	N/A
												Package total	**2.63E+01**	**7.10E-01**	
TO-SP-T-11-012 0712	4	0.038	30.5	<5.00	<3.67E-6	<3.67E-5	59 Am-241 foils	0.038	100	Oxide/NP	NP	Am-241	1.42E+02	3.84E+00	N/A
												Package total	**1.42E+02**	**3.84E+00**	
TO-CT-E-11-013 0712	4	0.212	46.0	<5.00	<3.67E-6	<3.67E-5	39	0.212	100	Oxide/NP	NP	Ra-226	3.70E-04	1.00E-05	N/A
												Package total	**3.70E-04**	**1.00E-05**	
TO-CT-E-11-014 0712	4	0.019	3.0	<5.00	<3.67E-6	<3.67E-5	39	0.019	100	Oxide/NP	NP	Ra-226	3.70E-05	1.00E-06	N/A
												Package total	**3.70E-05**	**1.00E-06**	

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

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

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

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

Note 3: For solidification media that meet disposal site structural stability requirements, the numerical code must be followed by "-S."

For all solidification media, the vendor (mfr/supplier) and brand name must also be identified in Item 13. Code 100 = NONE REQUIRED.

Sorption
60. Speedi Dri
61. Celetom
62. Floor Dry/ Superfine
63. Hi Dri
64. Safe-T-Sorb
65. Safe-N-Dri
66. Fiorce
67. Fiorce X
68. Solid-A-Sorb
69. Chemsil 30
70. Chemsil 50
71. Chemsil 3030
72. Dicapen HP200
73. Dicapen HP500
74. Petroset
75. Petroset II
76. Aquaset
77. Aquaset II
65. Other. Describe in Item 13, or additional page

Solidification
90. Cement
91. Concrete (Encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in Item 13, or Additional Page
100. None Required

NRC FORM 542 U.S. NUCLEAR REGULATORY COMMISSION

(5-1998)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

MANIFEST INDEX AND REGIONAL COMPACT TABULATION

List all original "PROCESSED WASTE" before "COLLECTED WASTE".

1. WASTE COLLECTOR/PROCESSOR

NAME: Chase Environmental Group, Inc.

IDENTIFICATION NUMBER: T-KY003-L11

SHIPPING DATE: 1/21/2011

SHIPPER USE ONLY

2. MANIFEST NUMBER: TO-2011-011

3. PAGE_1_OF _1_PAGE(S)

4. GENERATOR IDENTIFICATION NUMBER	5. GENERATOR NAME PERMIT NUMBER AND TELEPHONE NUMBER	6. GENERATOR FACILITY ADDRESS	7. PREPROCESSED WASTE (OR MATERIAL) VOLUME (m3)	8. MANIFEST NUMBER UNDER WHICH WASTE (OR MATERIAL) RECEIVED AND DATE OF RECEIPT	9. WASTE CODE PREPROCESSED COLLECTED	10. ORIGINATING COMPACT OR STATE	11. AS PROCESSED/COLLECTED TOTAL A. SOURCE MATERIAL (kg)	B. SNM (g)	C. ACTIVITY (MBq)	D. VOLUME (m3)
0712	Kidde-Fenwal 508-231-2650	400 Main Street Ashland, MA 01721	0.633	NA	C	MA	NP	NP	1.74E+02	0.633
TOTALS OF ALL PAGES (NRC FORMS 542 AND 542A)							0.00E+00	0.000	1.74E+02	0.633

NRC FORM 542 (5-1998)

NRC FORM 540

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER

1 EMERGENCY TELEPHONE NUMBE (INCLUDE AREA CODE): 800-424-9300			
ORGANIZATION: Chemtrec	WSDS #: CHEN01RAD		
2 IS THIS AN EXCLUSIVE USE SHIPMENT? [ ] YES [x] NO	3 TOTAL NUMBER OF PACKAGES IDENTIFIED ON THIS MANIFEST: 3		
4 DOES EPA REGULATED WASTE REQUIRED A MANIFEST ACCOMPANY THIS SHIPMENT? [ ] YES [x] NO	EPA MANIFEST NUMBER: NA		

5. SHIPPER- NAME AND FACILITY: Chase Environmental Group, Inc. 11450 Watterson Court Louisville, KY 40299	SHIPPER ID #: N/A X COLLECTOR PROCESSOR	7 NRC FORM 540 AND 540A PAGE 1 __1_PAGE(S) NRC FORM 541 AND 541A OF __1__PAGE(S) NRC FORM 542 AND 542A __1__PAGE(S) ADDITIONAL INFORMATION None PAGE(S)	8. Manifest Number (Use this number on all continuation pages) TO-2011-289
USER PERMIT NUMBER: T-KY003-L11 / SHIPMENT #: N/A	GENERATOR TYPE (SPECIFY)	9. CONSIGNEE-NAME AND FACILITY ADDRESS: TOXCO, Inc. 109 Flint Road Oak Ridge, TN 37830	Contact: Rick Low Telephone Number (Include area code): (865) 482-5532
CONTACT: Janet Baker	TELEPHONE #: 865-250-4593		
6. CARRIER NAME AND ADDRESS: SJ Transportation Co., Inc. PO Box 169 Woodstown, NJ 08098	EPA ID #: NJD071629976 SHIPPING DATE: 11/11/2011	SIGNATURE-Authorized consignee acknowledging waste reciept	Date
CONTACT: Kevin Elder	TELEPHONE #: 856-769-2741	10. Certification	
SIGNATURE: D. Joseph Grenier	DATE: 11-11-11	AUTHORIZED SIGNATURE: D. Joseph Grenier / TITLE: Technician	DATE: 11-11-11

11. U.S DEPARTMENT OF TRANSPORTATION DESCRIPTION (Including proper shipping name, hazard class, UN ID number, and any additional information)	12 DOT LABEL "RADIOACTIVE"	13 TRANSPORT INDEX	14 PHYSICAL AND CHEMICAL FORM	15 INDIVIDUAL RADIONUCLIDES	16 TOTAL PACKAGE ACTIVITY IN MBq	17 LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME m^3	19. ID NUMBER OF PACKAGE
UN2915, Radioactive material, Type A package, 7 One drum with smoke detectors for disposal	Yellow-II	0.1	Solid/oxide	Am-241; Ra-226	3.44E+00	NA	0.212	TO-SP-E-11-688
UN2911, Radioactive material, excepted package-instruments, 7 One drum with smoke detectors for disposal	NA	NA	Solid/oxide	Am-241	1.71E+01	NA	0.212	TO-SP-E-11-689
UN2911, Radioactive material, excepted package-instruments, 7 One drum with smoke detectors for disposal	NA	NA	Solid/oxide	Am-241	1.70E+01	NA	0.212	TO-SP-E-11-690

Generator Certification Statement:
The constituents of the waste manifested herein are known to the generator. There are no EPA RCRA, pathogenic or other hazards present other than those specifically listed on the Form 541.

Deke Mousseau (Print name) — Signature — 11/11/11 (Date)

CONSIGNEE ORIGINAL (MUST ACCOMPANY WASTE IN TRANSIT)

NRC FORM 541 US NUCLEAR REGULATORY COMMISSION

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

1. MANIFEST TOTALS							2. MANIFEST NUMBER
NUMBER OF PACKAGES	NET WASTE VOL. m3	NET WASTE WGHT kg	SPECIAL NUCLEAR MATERIAL (grams) U-233	U-235	Pu	TOTAL	TO-2011-289
3	0.636	214.5	NP	NP	NP	NP	3
							PAGE 1 OF 1 PAGE(S)
ACTIVITY (MBq/mCi) ALL NUCLIDES		TRITIUM	C-14	Tc-99	I-129	SOURCE (kg)	4. SHIPPER NAME
3.75E+01	MBq	NP	NP	NP	NP	NP	Chase Env. Group
1.01E+00	mCi						SHIPPER ID NUMBER N/A

DISPOSAL CONTAINER DESCRIPTION							WASTE DESCRIPTION FOR EACH WASTE TYPE IN CONTAINER								16 WASTE CLASS A-S-A STABLE A-U-A UNSTABLE B-CLASS B C-CLASS C
							PHYSICAL DESCRIPTION			14. CHEMICAL DESCRIPTION		15. RADIOLOGICAL DESCRIPTION			
5. CONTAINER IDENTIFICATION NUMBER/ GENERATOR NUMBER	6 CONTAINER DESCRIPTION (See Note 1)	7 VOLUME (m3)	8 WASTE AND CONTAINER WEIGHT (kg)	9. SURFACE RADIATION LEVEL _X_ uSv/hr ___ mSv/hr	10 SURFACE CONTAMINATION MBq/100 cm2 ALPHA	BETA-GAMMA	11. WASTE DESCRIPTOR (See Note 2)	12. Approximate WASTE VOLUME IN CONTAINER (m3)	13. SORBENT SOLIDIFICATION STABILIZATION MEDIA (See Note 3)	CHEMICAL FORM / CHELATING AGENT	WEIGHT % CHELATING AGENT IF > 0.1%	INDIVIDUAL RADIONUCLIDES AND ACTIVITY (MBq) AND CONTAINER TOTAL OR CONTAINER TOTAL ACTIVITY AND RADIONUCLIDE PERCENT Nuclide	MBq	mCi	
TO-SP-E-11-688 0712	4	0.212	70.5	5.5	<3.67E-6	<3.67E-5	59 smoke detectors	0.212	100	Oxide/NP	NP	Am-241	8.14E-01	2.20E-02	N/A
												Ra-226	2.63E+00	7.10E-02	
												Package total	**3.44E+00**	**9.30E-02**	
TO-SP-E-11-689 0712	4	0.212	75.5	<5.00	<3.67E-6	<3.67E-5	59 smoke detectors	0.212	100	Oxide/NP	NP	Am-241	1.71E+01	4.61E-01	N/A
												Package total	**1.71E+01**	**4.61E-01**	
TO-SP-E-11-690 0712	4	0.212	68.5	<5.00	<3.67E-6	<3.67E-5	59 smoke detectors	0.212	100	Oxide/NP	NP	Am-241	1.70E+01	4.60E-01	N/A
												Package total	**1.70E+01**	**4.60E-01**	

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

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

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

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

Note 3: For solidification media that meet disposal site structural stability requirements, the numerical code must be followed by "-S."

For all solidification media, the vendor (manufacturer) and brand name must also be identified in Item 13. Code 100 = NONE REQUIRED.

Sorption

60 Speedi Dri
61 Celetom
62 Floor Dry/ Superfine
63 Hi Dri
64 Safe-T-Sorb
65 Safe-N-Dri
66 Florco
67 Florco X
68 Solid-A-Sorb
69 Chemsil 30
70 Chemsil 50
71 Chemsil 3030
72 Dicaperl HP200
73 Dicaperl HP500
74 Petrusel
75 Petrusel II
76 Aquasel
77 Aquasel II
89 Other Describe in Item 13, or additional page

Solidification

90 Cement
91 Concrete (Encapsulation)
92 Bitumen
93 Vinyl Chloride
94 Vinyl Ester Styrene
99 Other Describe in Item 13, or Additional Page
100 None Required

NRC FORM 542 (5-1998) — U.S. NUCLEAR REGULATORY COMMISSION

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

MANIFEST INDEX AND REGIONAL COMPACT TABULATION

List all original "PROCESSED WASTE" before "COLLECTED WASTE".

1. WASTE COLLECTOR/PROCESSOR
NAME: Chase Environmental Group, Inc.
IDENTIFICATION NUMBER: T-KY003-L11
SHIPPING DATE: 11/11/2011

SHIPPER USE ONLY

2. MANIFEST NUMBER: TO-2011-289

3. PAGE_1_OF _1_PAGE(S)

4. GENERATOR IDENTIFICATION NUMBER	5. GENERATOR NAME PERMIT NUMBER AND TELEPHONE NUMBER	6. GENERATOR FACILITY ADDRESS	7. PREPROCESSED WASTE (OR MATERIAL) VOLUME (m3)	8. MANIFEST NUMBER UNDER WHICH WASTE (OR MATERIAL) RECEIVED AND DATE OF RECEIPT	9. WASTE CODE (PREPROCESSED) (COLLECTED)	10. ORIGINATING COMPACT OR STATE	11. AS PROCESSED/COLLECTED TOTAL A. SOURCE MATERIAL (kg)	B. SNM (g)	C. ACTIVITY (MBq)	D. VOLUME (m3)
0712	Kidde-Fenwal 508-231-2650	400 Main Street Ashland, MA 01721	0.636	NA	C	MA	NP	NP	3.75E+01	0.636
TOTALS OF ALL PAGES (NRC FORMS 542 AND 542A)							0.00E+00	0.000	3.75E+01	0.636

NRC FORM 542 (5-1998)

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A UTC Fire & Security Company

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ComBasPrice

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02 1W
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