

Docket: 030-38448
INST. CODE: 24004



April 28th 2011

Licensing Assistance Team
Division of Nuclear Materials Safety
U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415

RECEIVED
REGION I
2011 MAY -6 AM 11:17

ARC Electronics is submitting an application for your review and consideration. This application is for an Exempt Distribution License (NRC Form 313) for lighting products containing Krypton-85. In addition a check for \$10,100 dollars payable to the Nuclear Regulatory Commission is enclosed for the application fee. I would like to request an expedited review process for this application since the ability to honor contractual obligations for distribution is time sensitive. If there are any questions or if you require additional information please contact Ken Sturgess at ARC Electronics - 603-458-2683 or Nasser Rashidifard at Radiation Safety & Control Services - 603-778-2871 ext. 40. In addition the Responsible Individual to act on my behalf in all matters pertaining to the Radioactive Materials License is Tracey Durfee who can be reached at 603-458-2089.

Sincerely,

A handwritten signature in black ink, appearing to be "Ken Sturgess", written in a cursive style.

Ken Sturgess,
President, ARC Electronics

MAIL CONTROL: 575111

NRC FORM 313
(3-2009)
10 CFR 30, 32, 33,
34, 35, 36, 39, and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0120

EXPIRES: 3/31/2012

APPLICATION FOR MATERIALS LICENSE

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 Records and FOIA/Privacy 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, NEOF-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
612 E. LAMAR BOULEVARD, SUITE 400
ARLINGTON, TX 76011-4125

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 _____
 C. RENEWAL OF LICENSE NUMBER _____

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

Ken Sturges
ARC Electronics
16 Peaslee Court
Hampstead, NH 03841

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

American Warehouse
8 Industrial way
Hudson, NH 03051

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Nasser Rashidifard - Radiation Safety & Control Services

TELEPHONE NUMBER

(603) 778-2871

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

5. RADIOACTIVE MATERIAL

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

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 **3I** AMOUNT ENCLOSED **\$ 10,100.00**

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 CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL 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

Ken Sturges, President ARC Electronics

SIGNATURE



DATE

04/28/2011

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			\$		

APPROVED BY

DATE



ARC Electronics Supplemental Information for an NRC Exempt
Distribution License Application

Prepared by

Radiation Safety & Control Services, Inc

91 Portsmouth Avenue
Stratham, NH 03885-2468
1-800-525-8339
(603) 778-2871 (Outside USA)
www.radsafety.com



Date: April 28th, 2011

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1 Introduction

ARC Electronics is applying for an Exempt Distribution License to distribute high efficiency induction light bulbs containing small amounts of Krypton-85 gas to persons exempt from the requirements for an NRC license pursuant of 10CFR30.14 and in accordance with 10CFR32.11, 10CFR32.12, and 10CFR32.13. This document provides the information required for completion of items 5 and 6 of NRC form 313 “Application for Material License”, followed by specific information, pursuant to 10CFR32.14, to support the exempt distribution license application.

ARC electronics does business as Nedap Light controls to distribute and implement Nedap brand lighting products and systems. The intent of this license is to allow distribution of light bulbs containing less than 115nCi of Krypton-85 each to retail and OEM facilities for use and sale. The bulbs are rated for 55, 85, and 165 watts with activities of 27.5, 85, and 115 nCi of Krypton-85 respectively. Each bulb wattage has four different color temperatures of 2700K, 3000K, 4000K, and 5000K each of which has a separate model number. The activity present in the bulbs is a function of the wattage and does not vary with the temperature of the color spectrum.

The material that is being licensed for exempt distribution is currently distributed by Phillips Inc. In June 2011 Phillips has decided to discontinue the sales and distribution of this product line and allow NEDAP Light controls to take over under its own branding. To store and handle the logistics of distribution, ARC Electronics has employed the services of American Warehouse Inc, a third party distributor, located in Hudson NH. American Warehouse distributes a wide variety of products that include some that are categorized as Hazardous Material.

ARC Electronics is located in Hampstead New Hampshire, which is an Agreement state. In parallel with this application for an NRC Exempt Distribution License, an application for a Radioactive Materials License for *Possession Incident to Exempt Distribution*. This license will be issued by the New Hampshire Department of Health and Human Services - Radiological Health Section. It is understood that the Exempt Distribution License cannot be issued until the possession license has been issued by the state of New Hampshire.

As discussed in NREG 1556, Volume 8, Section 6.1, items 7 through 11 on NRC Form 313 are left blank as those items apply to a possession license and are not applicable to the Exempt distribution License application.

2 NRC Form 313 Information

2.1 NRC Form 313, Item5, “Radioactive Material”

Under an Exempt Distribution License, ARC Electronics will receive and distribute induction light bulbs to various OEM and retail facilities without an NRC license. Initially ARC Electronics will receive the remainder of the

inventory from Phillips under its NH possession license. This inventory will be distributed until the stock is depleted and NEDAP branded light bulbs arrive at the facility. The bulbs will be packaged individually for use or resale with 6 individual packages in one case. There will be multiple cases per pallet. Inventory will be received at American Warehouse in Hudson NH in pallet form from the manufacturer. Orders will vary in size based on customer requests. Cases of bulbs may be shipped separately or combined and placed on a pallet for larger consignments.

The Krypton-85 is in a volatile gaseous (elemental) form sealed inside each individual light bulb. The gas is inert and will not react chemically with any other material. The gas is used to enhance the excitation process that occurs inside the bulb. Each bulb is placed on an antenna that carries a 2.65MHz signal from the High Frequency generator which excites and illuminates the gases inside the bulb. Neither the antenna nor the frequency generator contains any radioactive material. The NH possession license requests to have no more than 200mCi of Krypton-85 onsite and no more than 625nCi per individual bulb. 10CFR30.70 schedule B has a value for Krypton-85 as 100 microcuries (μCi), therefore requiring a possession license for storage. The activity limits will encompass any future products that may be developed for distribution. Figure 1 is an example of an induction light bulb system that is representative of the product to be distributed. Tables 1 and 2 provide the activity content per bulb based on brand and wattage.

A summary of the information provided for item 5 A through C on NRC Form 313

- a) Krypton-85, a byproduct material.
- b) The Krypton-85 is in a volatile gas (elemental) contained inside a sealed glass light bulb and will not interact chemically with any other material it will potentially come into contact with.
- c) The Possession License issued by the state of New Hampshire will allow for 200 millicuries (mCi) of Krypton-85 onsite at American Warehouse Inc.

2.2 NRC Form 313 Item 6, "Purpose(s) for which Licensed Material will be used"

The product will be used solely for the purpose of Exempt Distribution to OEM and retail facilities for installation and sale to the end user. Under the possession of ARC Electronics the products containing byproduct material will not be manufactured, altered, or destroyed in any way. All bulbs are manufactured at another facility. The purpose of the byproduct material is to enhance the efficiency of the excitation reaction by induction. This creates a fluorescent bulb that can maintain up to 70% of its original luminosity after 10 years. This is a particularly useful application for low maintenance lighting in difficult to access or hazardous areas

3 Information in support of the Exempt distribution License application, NUREG 1556, Volume 8 Appendix J section A through C

These sections refer to the items present in 10CFR32.14, the Manufacture, distribution and transfer of exempt quantities of byproduct material: Requirements for license.

3.1 Section A

Section A refers to an application meeting all of the conditions set forth in 10CFR30.33 (a) (2) and (3) on requirements to obtain a possession license by the NRC. ARC Electronics will obtain a possession license from The State of New Hampshire, an agreement state, to satisfy these requirements. It is understood the issuance of an Exempt Distribution license shall be on the condition of the approval of the possession license by The State of New Hampshire.

3.2 Section B

As mentioned in sections 1 and 2 of this supplemental packet, the product in question is a high efficiency induction light bulb containing no more than 115 nCi of Krypton-85 in the form of a volatile gas. Only upon the breaking of a bulb will the gas escape and potentially be inhaled by an individual. The Radiation Protection Manual (attachment 2), **Section 8.1, *Dose Calculation Based on Full Release of Inventory*** provides the dose estimates for various levels of release to a warehouse worker in the designated storage area. Assuming the average amount of inventory was destroyed and released its full complement of Krypton-85, a worker would receive 4.7mrem if that individual worked in that location for 2000 hours with no ventilation.

3.2.1 Section B part 1

Each product (individual bulb) will contain 27.5, 85, or 115nCi of Krypton-85 gas. The byproduct material is in its elemental form, an inert volatile gas, unbound to any other compound or element. Tables 1 and 2 provide the Krypton-85 loading of each bulb.

Table 1 Model Numbers for NEDAP Branded Light Bulbs

Model	Activity per bulb (nCi)	Bulbs Per Case	Cases Per Pallet
QL05500027-3063011	27.5	6	27
QL05500030-3063020	27.5	6	27
QL05500040-3063038	27.5	6	27
QL05500050-3063046	27.5	6	27
QL08500027-3063054	85.0	6	18
QL08500030-3063062	85.0	6	18
QL08500040-3063089	85.0	6	18
QL08500050-3063097	85.0	6	18
QL16500027-3063119	115.0	6	15
QL16500030-3063127	115.0	6	15
QL16500040-3063135	115.0	6	15
QL16500050-3063143	115.0	6	15

Table 2 Model Numbers for Phillips Branded Light Bulbs

Model	Activity per bulb (nCi)	Bulbs per case	Cases per pallet
13545-9 QL 55W/830	27.5	6	27
13546-7 QL 55W/840	27.5	6	27
20095-6 QL 55W/850	27.5	6	27
13549-1 QL 85W/830	85.0	6	27
13550-9 QL85W/840	85.0	6	18
20096-4 QL85W/850	85.0	6	18
36917-3 QL 165W/830	115.0	6	18
36918-1 QL 165W/840	115.0	6	18
20097-2 QL 165W/850	115.0	6	15

3.2.2 Section B part 2

Figure 1 shows the components of the induction lighting system. The finished product contains 3 parts, the bulb (A), the power coupler (B), and the high frequency generator (C). The light bulb (A) itself is the only component of the system that contains Krypton-85. The Krypton gas is contained in the volume of the bulb shown in figure 2.

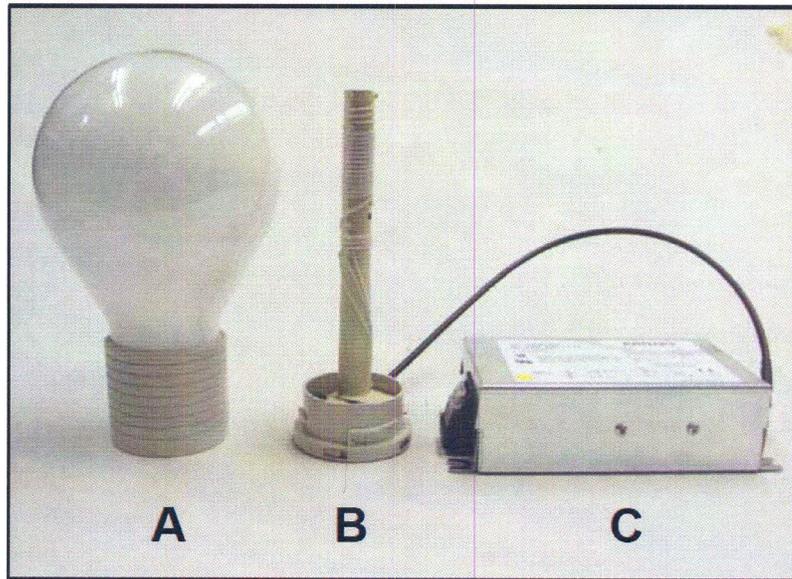


Figure 1 Example of an Induction Light bulb System to be Distributed

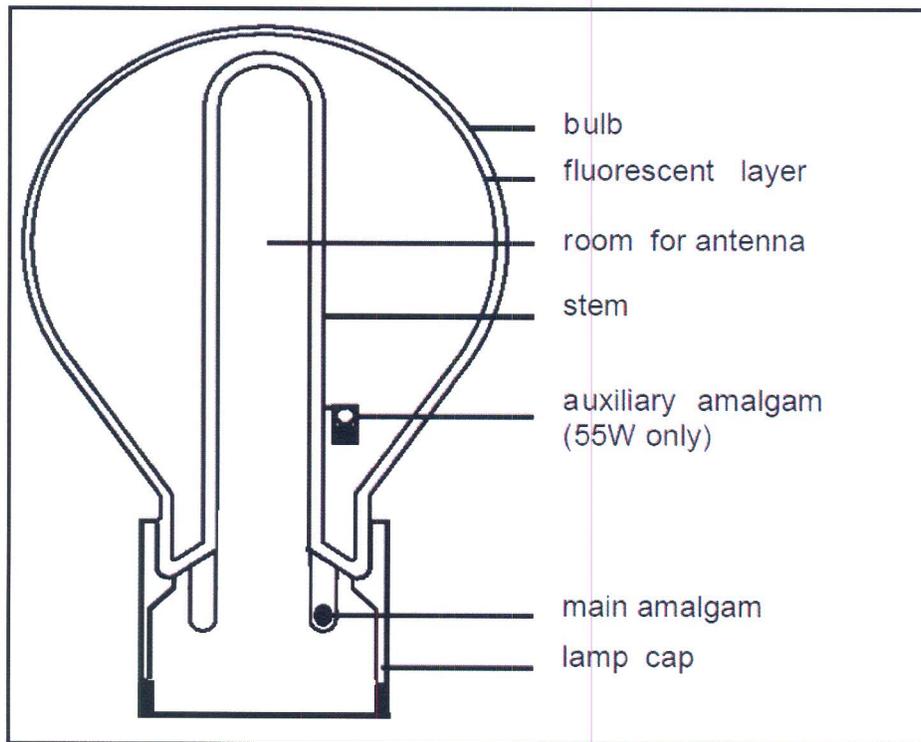


Figure 2 Cross Section of Light Bulb

Figures 3 through 5 show the overall lighting system dimensions.

55W System

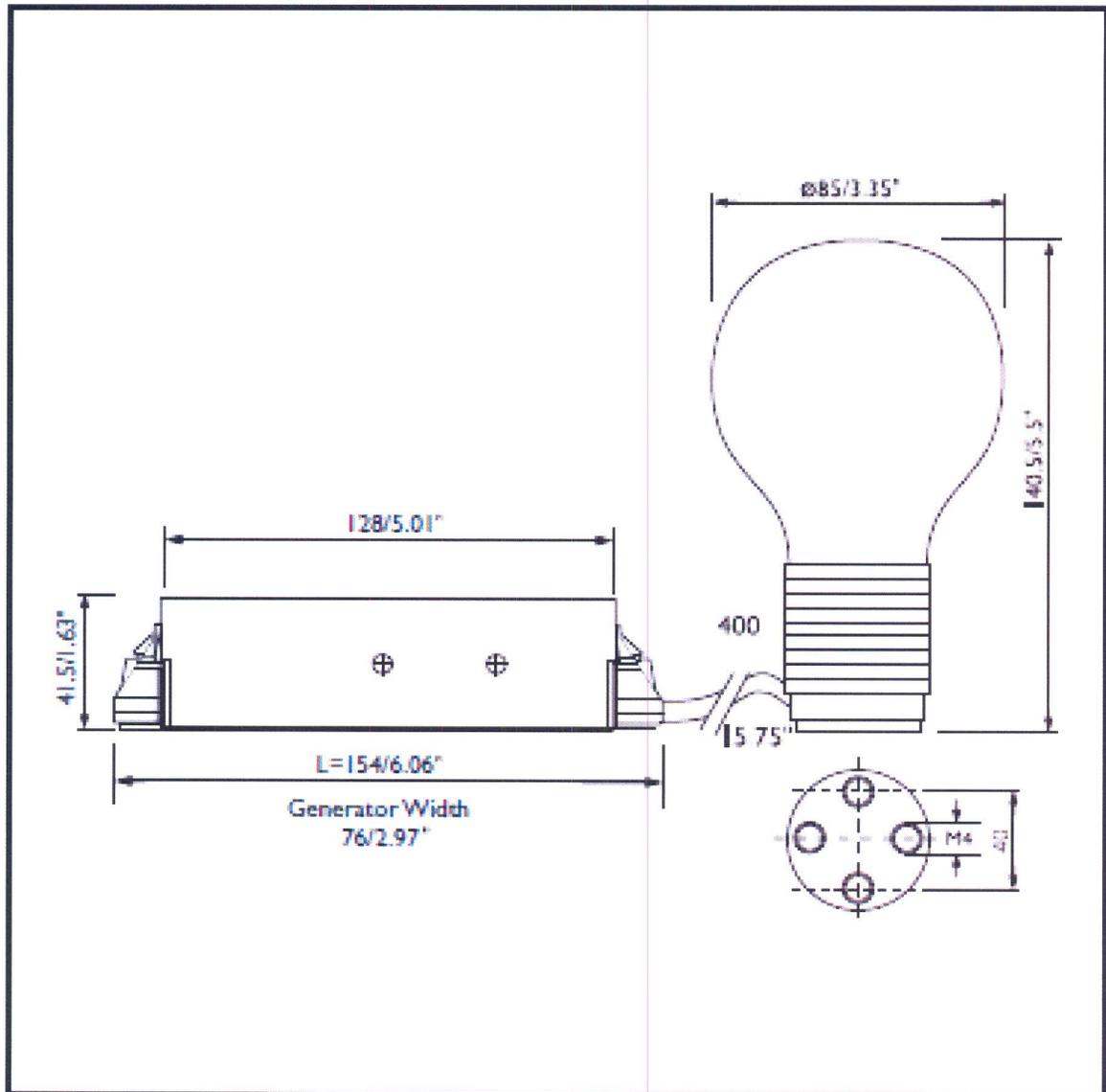


Figure 3 Dimensions of 55W Induction Lighting System

85W System

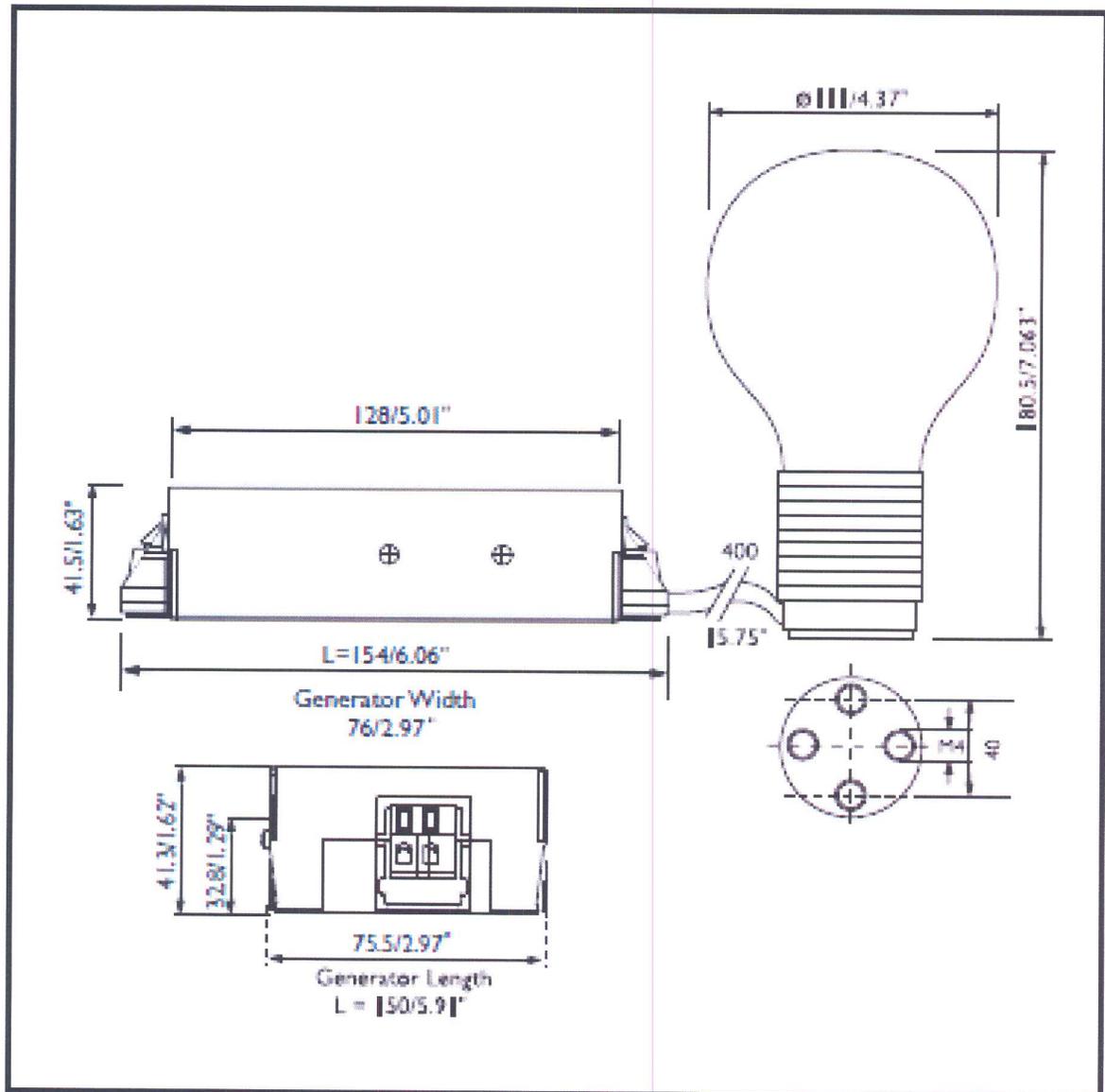


Figure 4 Dimensions of 85W Induction Lighting System

165W System

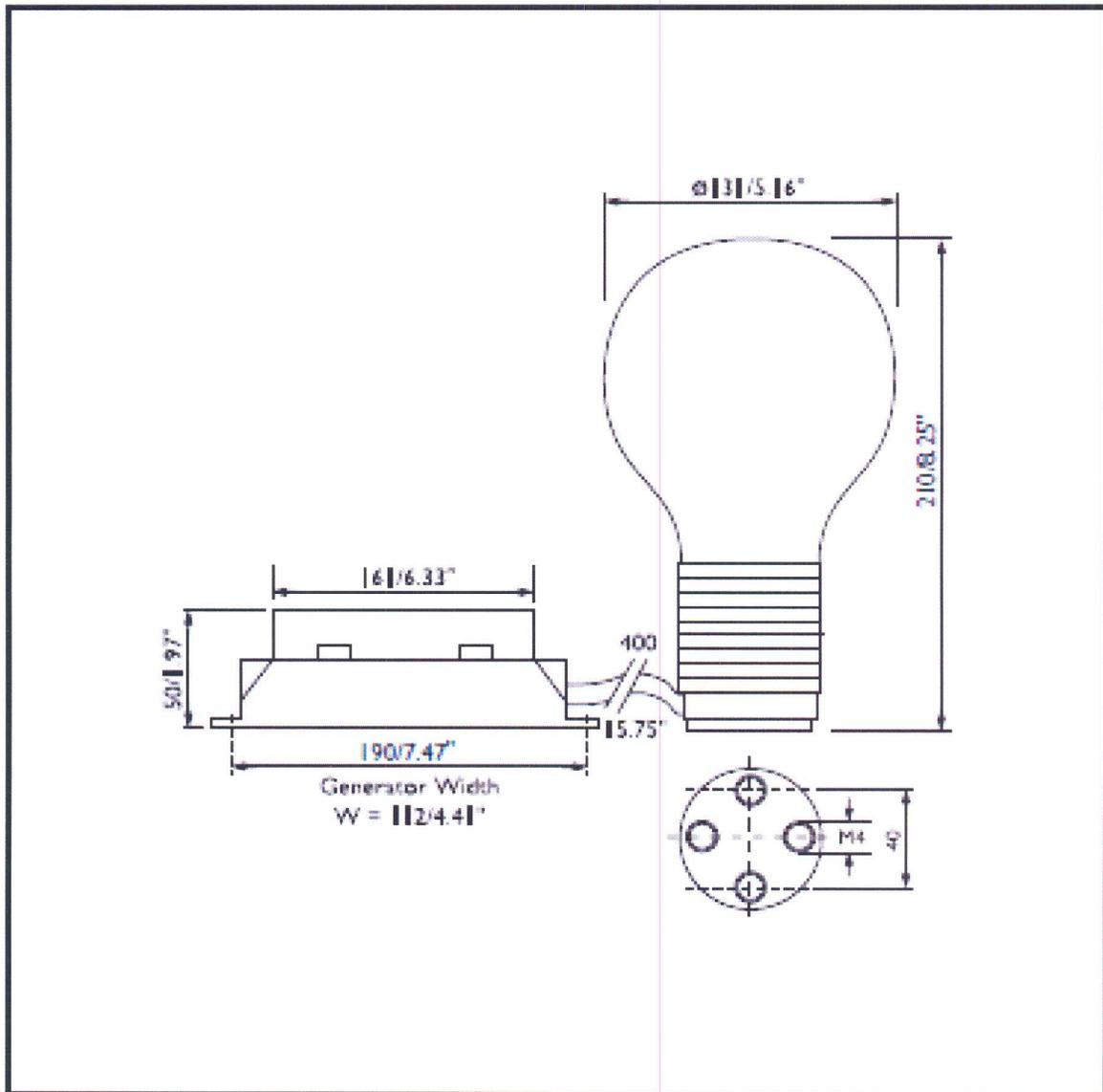


Figure 5 Dimensions of 165W Induction Lighting System

3.2.3 Section B part 3

The byproduct material is contained as long as the integrity of the glass enclosure is intact. Since the Krypton-85 gas is in its elemental form damage to the bulb would cause the gas to disperse and dissipate readily, posing no danger to an individual from a radiological aspect.

3.2.4 Section B part 4

There is no need to have prototyping in place since the product is neither manufactured nor modified onsite. The Licensee will only take possession and initially transfer the product to the end user.

3.2.5 Section B part 5

The product is not to be manufactured or modified in anyway onsite therefore results of prototype testing are not applicable. The Licensee will only take possession and initially transfer the product to the end user.

3.2.6 Section B part 6

The product is not to be manufactured or modified in anyway onsite therefore quality control procedures are not applicable. The Licensee will only take possession and initially transfer the product to the end user.

3.2.7 Section B part 7

Labeling of the products is done by means of the individual bulb packages containing the phrase “QL **XX**W lamp contains less than **XXX** nci of Kr-85” or equivalent. The label on the packaging will contain all 3 of the bulleted phrases, or equivalent, on the package since all 3 wattages will be used with similar print and only varying in dimensions. Markings will be equivalent between the packaging of both Phillips and Nedap brand bulbs.

- QL55W lamp contains less than 27.5 nCi of Kr-85
- QL 85W lamp contains less than 85 nCi of Kr-85
- QL 165W lamp contains less than 115nCi of Kr-85

3.2.8 Section B part 8

MicroShield v8 by Grove Software was used to evaluate the potential dose contribution from an individual product. A 115 nCi point isotropic source of Krypton-85 was assumed for this calculation. A point at 2cm was used to approximate a contact reading at the surface of the bulb. An exposure rate was calculated to be 3.7×10^{-4} mR/hr for this point. This represents an increase of $0.37 \mu\text{R/hr}$ over background. This does not take into account the shielding provided by the glass wall of the bulb. Therefore the product is not expected to exceed any limits set forth in 10CFR30.15.

3.2.9 Section B part 9

Attachment 1 provides the MSDS product information sheet for the induction bulbs and indicates there is no affects expected as a result of the byproduct material contained in the products.

3.3 Section C

Each bulb is to contain less than 0.115 μCi of Krypton-85, this is less than the limit of 30 μCi of Krypton-85 stated in 10CFR30.15.

4 Attachments

ATTACHMENT 1: MSDS Information for Induction Light Bulb Products

PHILIPS

Philips Lighting Company

MATERIAL SAFETY DATA SHEET

Revised: 6/01

PRODUCT: QL INDUCTION LIGHTING LAMPS

SECTION 1: MANUFACTUERER

Manufacturer's Name and Address: Philips Lighting Company
A Division of Philips Electronics
North America Corporation
200 Franklin Square Drive
P.O. Box 6800
Somerset, NJ 08875

Emergency Telephone Number: (800) 424-9300 CHEMTREC
(732) 563-3197 Safety and Compliance

Other Information Calls: (607) 776-3311 Ext. 300

SECTION 2: HAZARDOUS INGREDIENTS

	OSHA PEL	ACGIH	PERCENTAGE
LAMP ASSEMBLY			
Phosphor Powder (nuisance dust)	15mg/m ³	10 mg/m ³	less than .6%
Yttrium Oxide (1314-36-9)	1 mg/m ³	1 mg/m ³	less than .2%
Barium Aluminate (insoluble)	none	none	less than .2%
Magnesium Aluminate (insoluble)	none	none	less than .2%
Rare Earth Aluminate (insoluble)	none	none	less than .2%
Bismuth (7440-69-9)	none	none	less than .3%
Indium (7440-74-6)	.1 mg/m ³	.1 mg/m ³	less than .3%
Mercury(7439-97-6)	1.0 mg/m ³	.025mg/m ³	less than 20 ppm
Krypton-85			27.5nCi
Copper (7440-50-8)	1 mg/m ³	1 mg/m ³	approx. 20%
Zinc (7440-66-6)	none	none	approx. 20%
Inert ingredients (glass, plastic, iron)	none	none	approx. 58%



A division of
Philips Electronics North America Corporation

200 Franklin Square Drive
P.O. Box 6800
Somerset, NJ 08875-6800
Tel: 732.563.3000

SECTION 3: PHYSICAL CHEMICAL CHARACTERISTICS (Cont'd)

ELECTRONICS

Lead (7439-92-1)	50 ug/m ³	150ug/m ³	approx. 1%
Tin (7440-31-5)	none	2 mg/m ³	less than 1%
Steel (iron 7439-89-6)	10 mg/m ³	5 mg/m ³	approx. 98%

Not Applicable. This item is a light bulb. The lamp envelope is made of glass. The electronic package is in a steel box.

SECTION 4: FIRE AND EXPLOSION DATA

Not Applicable. The lamp and electronic materials are not flammable.

SECTION 5: REACTIVITY DATA

Stability: The lamp and components are stable

Incompatibility: The glass envelope will react with Hydrofluoric acid. The Electronic package would react with various acids including Hydrochloric and Nitric Acids.

SECTION 6: HEALTH EFFECTS

Not applicable to the intact lamp. The luminescent materials are contained within the glass vessel. Breakage of the vessel may result in some exposure to the phosphor powder dust, mercury and small amounts of Bismuth, Indium and Mercury. No adverse effects are expected from occasional exposure to broken lamps, but as a matter of good practice, prolonged or frequent exposure should be avoided through use of adequate ventilation during disposal of large number of lamps. Regarding infrared and ultraviolet radiation, it can be stated that the output levels of the QL lamp system are below the threshold limits as recommended by the ACGIH in case of unintentional exposure.

With regard to UV radiation this means that at an illumination level of 1000 lux from bare QL lamps, a daily exposure of up to 24 hr. will have no effect on the skin.

With respect to the electromagnetic radiation of the QL lamp system, it can be stated that the system comes well within the limits specified by the American National Standards Institute and the more severe guidelines of the International Radiation Protection Association. The HF generator output frequency is 2.65 MHz. Investigations have shown that no interference with any of the know pacemakers can possibly occur.



A division of
Philips Electronics North America Corporation

200 Franklin Square Drive
P.O. Box 6800
Somerset, NJ 08875-6800
Tel: 732.563.3000

QL INDUCTION LIGHTING LAMPS Page 3 of 3

SECTION 6: HEALTH EFFECTS (Cont'd)

EMERGENCY AND FIRST AID PROCEDURE: Normal first aid procedure for glass cuts, if such occur through lamp breakage.

SECTION 7: PRECAUTIONS FOR SAFE HANDLING AND USE

For indoor/ outdoor use. Minimum temperature for ignition of the lamp is -20°C .

The QL lamp system operates with a very low pressure inside the discharge vessel. This means that in the case an implosion will occur, followed by a possible spray of glass particles. It is therefore strongly advised to wear protective glasses during handling of discharge vessels.

WASTE DISPOSAL METHOD: Under the Toxicity Characteristic Leaching Procedure (TCLP) promulgated by the United States Environmental Protection Agency, tests of used or spent fluorescent and High Intensity Discharge lamps indicate that some types of these lamps are classified as hazardous wastes. However, the Philips ALTOTM fluorescent lamps pass the TCLP test and are not hazardous. This lamp has the low mercury/ lamp weight ratio as the ALTO lamps but has not been subjected to the TCLP tests because we have not received end of life lamps yet. (Lamp life is eleven years). The electronics package does contain a small amount of lead. In order to make a waste determination TCLP testing will be needed. As that becomes available we will supply data upon request. If a spent lamp is the only waste generated, then depending on local State regulation, you may be exempt from regulation. Contact with your State Agency for guidance.

SECTION 8: CONTROL MEASURES

It is strongly recommended that the HF generator be positioned at the coolest spot possible in the total luminaire construction. The distance of the HF generator from the power coupler is limited by the length of the coaxial cable of about 400 mm.

There are no restrictions on shipping these lamps by any mode of transportation.

Prepared: 3/1/98

S22-98001



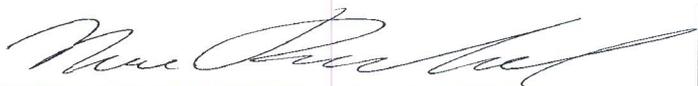
A division of
Philips Electronics North America Corporation

200 Franklin Square Drive
P.O. Box 6800
Somerset, NJ 08875-6800
Tel: 732.563.3000

ATTACHMENT 2: Radiation Protection Manual for ARC Electronics.



Radiation Protection Manual

Originated by: 
Nasser Rashidifard, Health Physicist

Reviewed by: _____
Greg Babineau, Sr. Health Physicist

Approved by: _____
Tracey Durfee, Operations Manager, RSO

Approved by: _____
Ken Sturgess, President ARC Electronics

Prepared by:

Radiation Safety & Control Services, Inc

91 Portsmouth Avenue
Stratham, NH 03885-2468
1-800-525-8339
(603) 778-2871 (Outside USA)
www.radsafety.com



Date

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1 Company Profile

1.1 ARC Electronics

ARC Electronics is a distributor of electrical and lighting products in North America. ARC Electronics does business as Nedap Lighting Controls North America to import and distribute electronic and lighting products manufactured by Nedap to North America. ARC electronics is located in Hampstead NH and operates out of the Nedap Lighting Controls offices in Atkinson NH. Ken Sturgess is the president of Arc Electronics. Tracey Durfee is the business operations manager and will serve as RSO. ARC Electronics will receive, possess and store radioactive material under a NH Radioactive Material License and will distribute products containing radioactive material under an NRC Exempt Distribution License.

1.2 American Warehouse Inc.

American Warehouse Inc. is a third party distributor for a wide variety of products. The storage facility and offices are located in Hudson NH. Currently American Warehouse is under contract with ARC electronics to lease space in the facility to receive, store, and ship lighting systems containing Kr-85 gas imported by Nedap Lighting controls. Robert Gibbs is the president of American Warehouse. Daniel Havey is the Vice President and will serve as the assistant RSO to Tracey Durfee.

2 American Warehouse Inc. Facility Description

2.1 Building

The storage facility for the radioactive material is located at 8 Industrial Way in Hudson NH. The material will be stored in a room that previously was used for vehicle storage and repair. The area is approximately 7500 sqft with 50ft high ceilings. The area has one loading dock door and two sliding doors on either side allowing passage to the adjacent storage areas. Figure 1 is a blueprint of the facility layout. The radioactive material is planned to be stored in the Truck Repair section which is highlighted in yellow. This area has been emptied and is ready for use as storage. All other non radioactive components will either be stored in the same location or in an alternate section of the building.

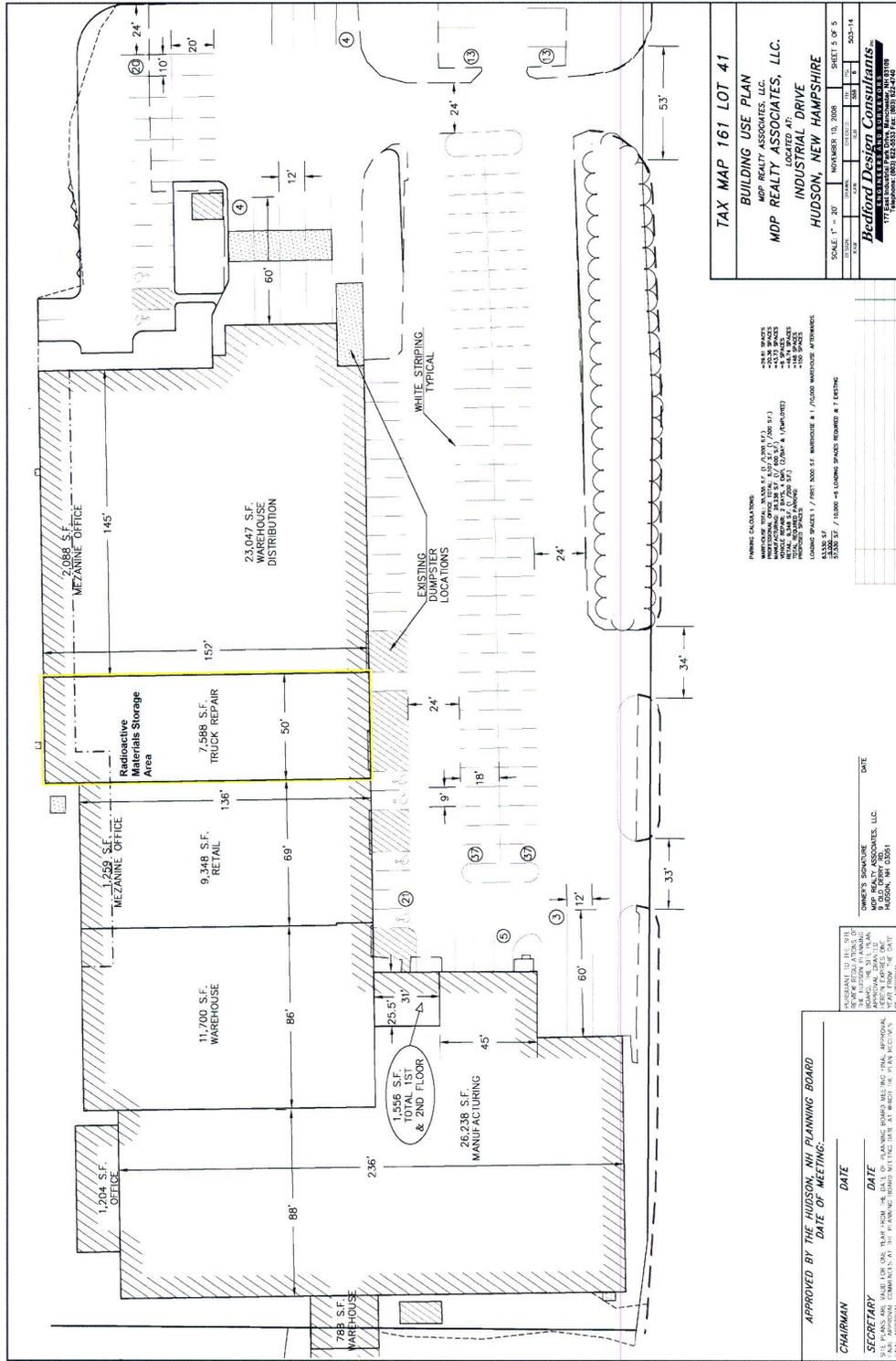


Figure 1 Layout of the American Warehouse Storage Facility

2.2 Security

An alarm system is connected on all entry doors and loading docks. There are no windows in this facility. The system was installed and is monitored remotely by ADT. Police response is activated by ADT in the event of a break in. During business hours the facility has alarms that are connected to each entryway that chimes with different tones. These chimes can be heard in all areas of the building and warehouse personnel are instructed to react to every chime. The two sliding doors will be locked at end of shift to prevent unauthorized access. The loading dock door will have sensors that are connected to the building alarm system. The sliding doors do not need to be connected to the alarm system since in order to gain access to them an individual would need to enter through an alarmed door.

2.3 Fire Prevention

The building has a 100 percent water sprinkler system with heat sensors. The water/sprinkler system is checked four times per year by the landlord of the building and once per year by the fire dept. of Hudson NH. Upon activation, the system initiates an emergency signal to the Hudson Fire Dept. for response. If either the sprinkler or the heat sensors are activated the entire building alarms and an alarm at the Hudson Fire Dept. occurs initiating a response.

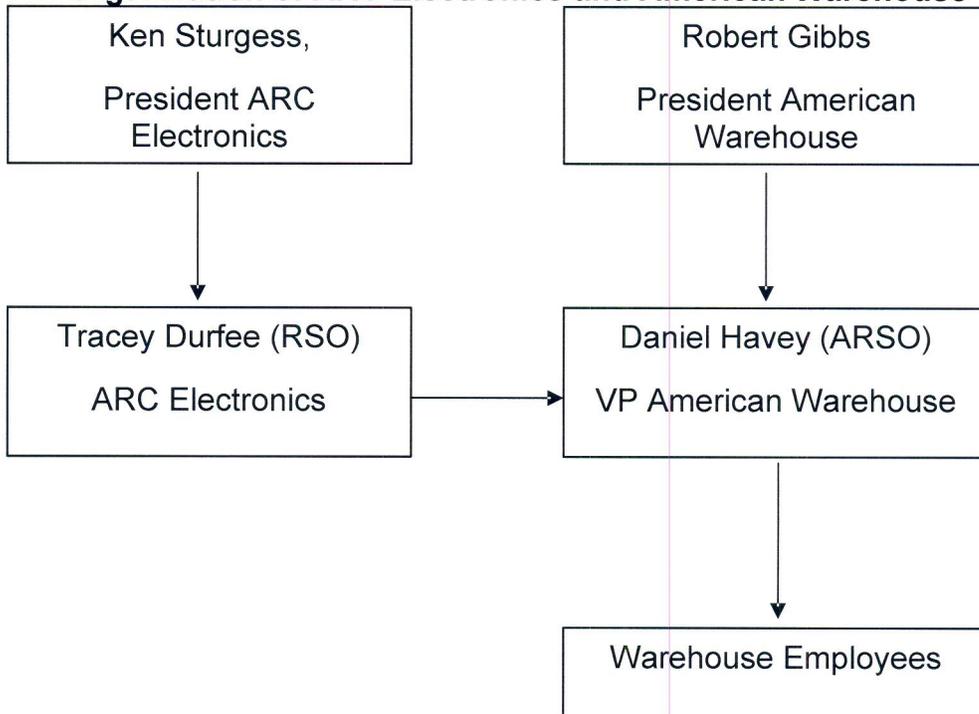
3 Radiation Protection Organization and Program

The Radiation Protection program is implemented to assure compliance to the regulations presented by the USNRC and the State of New Hampshire Department of Health and Human Services, Radiological Health Section. The organizational chart below provides the structure of the business and radiation safety arrangement regarding the licensed activities. Tracey Durfee is the RSO named on the license and will complete formal RSO training prior to assuming RSO duties. Tracey is a Consultant working full time at ARC Electronics and lives locally in Salem New Hampshire. Dan Havey will assist Tracey with daily activities at the warehouse. Dan Havey will also attend the RSO training course and receive comparable training to assist the RSO. Table 1 is a list of contact information in case of emergency.

Table 1 Emergency Contact Numbers

Name	Organization	Office Number	Mobile Number
Ken Sturgess	ARC Electronics	603-458-2683	603-494-1584
Tracey Durfee(RSO)	ARC Electronics	603-458-2089	603-548-0064
Robert Gibbs(ARSO)	American Warehouse	603-881-7272	603-234-3952
Daniel Havey	American Warehouse	603-881-7272	603-234-4371
For Emergencies Dial 911 for Local Emergency Response			
NH-Radiological Health	NH-DHHS-RHS	603-271-4588	

Organization of ARC Electronics and American Warehouse



3.1 Emergency Planning

New Hampshire regulation He-P 4030 table 4030.1 provides a minimum licensed activity for the requirement of an Emergency Plan. The value for Kr-85 in that table is $6E6$ Ci. Since the license limits the onsite activity to 200 millicuries there is no need to have an emergency plan setup in accordance with He-P-4030. The gaseous form of Kr-85 is an inert gas that when released will instantly disperse. There is no risk of contamination or internal exposure from the gaseous form of Kr-85.

3.2 SOPs

The following operating procedures are to establish guidelines for receiving, handling, and shipping of the radioactive materials. These procedures will be executed by individuals under the supervision of the RSO or Assistant RSO.

- ARC-001-Receipt of Incoming Radioactive Material
- ARC-002-Monthly Inventory Monitoring
- ARC-003-Handling of Damaged Inventory
- ARC-004-Disposal of Damaged inventory
- ARC-005-Shipping of Inventory to End User

3.3 Program Maintenance

ARC Electronics shall have an independent audit conducted to help maintain compliance to its program and the regulations. This audit shall be performed on a yearly basis. This audit will be used to help identify potential issues and recommend corrective actions. The licensee shall address concerns brought to its attention by the audit.

4 Personnel Qualifications

Every facility that holds a radioactive materials license is required to have a Radiation Safety Officer (RSO). The RSO is responsible for ensuring that all required practices and activities are executed for the facility to remain compliant with its licenses.

Minimum qualification for an individual to serve as a Radiation Safety Officer is the successful completion of a comprehensive Radiation Safety Officer course. This course will be conducted by Radiation Safety & Control Services Inc., Stratham, NH. The individual that serves as the Radiation Safety Officer is charged with fulfilling the following responsibilities:

- Ensure that the facility is in compliance with its license requirements regarding inventory levels, employee training and notifications, and informational postings (license, Notice to Employees, area labeling and signage – as required)
- Ensure that all radioactive materials are handled and accounted for properly. Provide appropriate training as necessary for new employees and refresher training annually thereafter.
- Review monthly facility inventory reports to ascertain if the facility remains within its license limits.
- Ensure that all personnel associated with the handling of undamaged and damaged products containing radioactive materials are adequately trained and knowledgeable in proper handling procedures.
- Manage the separation, documentation, and coordination of scrap and/or waste lamps containing radioactive materials.
- Participate in the annual license audit.
- Attend an annual 8 hour RSO refresher training program, which may be provided in conjunction with the annual license audit.
- Coordinate physical inventories of licensed product (as required).
- Maintain local document files for, but not limited to, the license, license amendments, audits, inspections, responses to agencies, applicable State and Federal regulations, monthly inventory reports, physical inventory reports, and damaged lamp disposal shipments.
- Participate in any inspections performed by State or Federal agencies related to the facility's Radioactive Material Licenses.

Training for the RSO and authorized users will be provided by the Radiation Safety Officer Course taught by Radiation Safety & Control Services Inc. This comprehensive course is designed to provide radiation safety training to the degree an individual that can act as RSO. This course will cover the following topics:

- Math Review
- Nuclear Physics Review
- Radiation and Radioactive Material
- Interaction of Radiation With Matter
- Radiation Exposure and Dose
- Biological Effects of Radiation
- Radiological Hazards
- Special Topics in Radiation Protection
- Radiological Hazards
- Principals of radiation Detection
- Operational Radiation Safety Program
- Planning For Emergencies
- Special topics in Radiation Protection
- Nuclear Regulatory Commission Regulations
- Transportation of Radioactive Material

Upon Completion of the course a certificate shall be issued indicating that the individual has completed the requirements of the course. This certificate will be forwarded to the State of New Hampshire Radiological Health Section to be kept on file in order to document the individual's training.

4.1 RSO and ARSO Responsibilities

The RSO for ARC Electronics is responsible for the overall implementation of the company's radiation management and safety program. Specifically,

- Obtaining, amending, and renewing all necessary State and Federal Radioactive Material Licenses. These changes include, but are not limited to changes in any personnel designated within a license, facility status, address, etc.
- Maintaining all historic records associated with the license.
- Establishing appropriate policies and procedures necessary to ensure that each licensed facility remains in compliance with its respective licenses.
- Funding and coordinating annual audits of each licensed facility by an external party and subsequent follow-up to ensure that any deficiencies noted in the audit are corrected.
- Funding and coordinating the annual refresher training for the RSO, Assistant RSO, and authorized users at each licensed facility.
- Review and address any circumstances that may be in potential violation of license requirements.

- Addressing and responding to any Notices of Violation that may be generated following a State or NRC inspection of a licensed facility.
- Maintaining data to allow complete and accurate inventory reporting of licensed product, by product, isotope, location, and license.
- Provide annual goods movement reports for licensed products to the NRC and respective State agencies (including both shipped and disposed product).
- Ensure that all products being shipped out are correctly labeled to be in compliance with NH and DOT regulations regarding radioactive material.

5 Material control

5.1 Material to be licensed

The materials to be licensed are QL Induction Light bulbs containing various amounts of Kr-85 based on wattage. The bulbs are used in commercial applications where accessibility is limited such as street lamps, bridge lighting, and hazardous areas. The bulbs use Kr-85 to increase the efficiency of the bulbs. There are 21 different types of bulbs that are based on vendor, wattage, and color temperature. Table 1 provides the model numbers and activity for each wattage bulb Imported by Nedap Lighting Controls. Table 2 provides similar information for the bulbs from Philips. Each vendor packs the bulbs in a similar fashion since it is produced at the same manufacturing plant in Holland for OEM use. There are 6 individual bulbs per case and the number of cases per pallet varies from 15 to 27. The inventory will be stored on pallets in the designated area until needed.

Table 2 Model Numbers and Associated Activity for Nedap brand QL bulbs

Model	Activity per bulb (nCi)	Bulbs Per Case	Cases Per Pallet
QL05500027-3063011	27.5	6	27
QL05500030-3063020	27.5	6	27
QL05500040-3063038	27.5	6	27
QL05500050-3063046	27.5	6	27
QL08500027-3063054	85.0	6	18
QL08500030-3063062	85.0	6	18
QL08500040-3063089	85.0	6	18
QL08500050-3063097	85.0	6	18
QL16500027-3063119	115.0	6	15
QL16500030-3063127	115.0	6	15
QL16500040-3063135	115.0	6	15
QL16500050-3063143	115.0	6	15

Table 3 Model Numbers and Associated Activity for Phillip brand QL light bulbs

Model	Activity per bulb (nCi)	Bulbs per case	Cases per pallet
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13545-9 QL 55W/830	27.5	6	27
13546-7 QL 55W/840	27.5	6	27
20095-6 QL 55W/850	27.5	6	27
13549-1 QL 85W/830	85.0	6	27
13550-9 QL85W/840	85.0	6	18
20096-4 QL85W/850	85.0	6	18
36917-3 QL 165W/830	115.0	6	18
36918-1 QL 165W/840	115.0	6	18
20097-2 QL 165W/850	115.0	6	15

5.2 Inventory storage and tracking

Inventory of radioactive products will be maintained by Traker Systems software used at American warehouse. Traker System is a third party logistics software package for warehouses that handles billing and shipping needs of multiple inventories. It includes complete inbound/receiving capabilities. It can assign lot numbers manually or automatically, print inbound receipts and receiving labels. It also includes complete outbound/shipping capabilities. Shipments may be withdrawn automatically or manually using either the FIFO (First In First Out) or LIFO (Last In First Out) method. It will also print Picking Slips, Shipping Labels and Bills of Lading for each shipment. The software has the capability to allow an individual to log in locally or remotely and pull inventory of any product on site. This software package will be used to maintain an up to date inventory listing of all Kr-85 containing products.

After hours the area designated for storage of radioactive materials will be locked to maintain any unauthorized access. During business hours the side doors can remain open to allow warehouse traffic to pass through to adjacent rooms. All radioactive shall be placed towards the back of the room behind a yellow and magenta tape

5.3 Broken bulbs

The licensed facility is to maintain a designated storage area for damaged licensed product. The storage area for licensed product must be appropriately labeled as to the radioactive nature of the products.

When collecting and storing any damaged product containing radioactive materials, these materials must be separated from other product and be placed into plastic-lined drums equipped with locking lids, segregated by isotope. Drum lids must be locked at all times when product is not being added. Each drum is to be labeled with an appropriate label containing the phrase "Caution Radioactive Materials" and "Kr-85". This label must be manually annotated, legibly in ink, to indicate the date licensed product was first placed in the drum.

Any undamaged lamps containing licensed materials that are to be repacked should also be separated from other products and shipped separately for repack. Lamps subject to repack are not regarded as scrap or waste.

Accurate inventory records must be maintained for disposed lamps. This is a requirement for both financial and regulatory purposes. An inventory of disposed lamps must be kept. The data to include: date drum storage started, product number and quantity, the radioactive isotope, and the activity level for each lamp.

When a drum is full it should be surveyed appropriately according to procedure ARC-004. If the drum is clean it can be disposed of as nonradioactive material. If there is residual activity then arrangements shall be made with a disposal company that is licensed to handle radioactive waste.

All shipments of waste lamps, including licensed products, must be fully and properly manifested.

Any questions related to the elements contamination and dose impact shall be addressed the RSO or Designee.

5.4 Receipt

Upon receipt of the inventory the quantity of each bulb shall be entered into the Traker System database in accordance with procedure ARC-001. Shipments shall be placed in the designated areas after receipt and the RSO shall update the database used for tracking total activity.

5.5 Shipping

Shipping shall be performed in accordance with procedure ARC-005. Due to the varying bulb concentrations and order sizes, material can either be shipped as Exempt or Excepted Quantities. The material does not require a type-A package because it meets the requirement that it has a total activity of 1000 times less than the Normal Form A_2 value. The A_2 value for Kr-85 is $2.7E+2Ci$ therefore if a consignment is less than $2.7E-1Ci$, it can be packaged and shipped as an Excepted Quantity. The proposed licensed activity limit is 200 mCi (0.2 Ci) of Kr-85, therefore no individual shipment will approach the Excepted Quantity limits. Individually a single bulb is less than both the Exempt concentration and consignment values and can therefore be shipped without any labeling requirements. Shipping material is covered in procedure ARC-005 and must be performed by the RSO or designee.

Table 4 DOT Limits for the shipment of Radioactive Material

Isotope	A ₁ (Ci)	A ₂ (Ci)	Excepted Package Limit (Ci)	Exempt Concentration (Ci/g)	Exempt Consignment (Ci)	Reportable Quantity (Ci)
Kr-85	2.7E+2	2.7E+2	2.7E-1	2.7E-6	2.7E-7	1000

For multiple bulb shipments, the limits on labeling requirement are established by the exempt consignment limits. A consignment is established by the Department of transportation as:

- A stock of merchandise advanced to a dealer and located at his place of business, but with title remaining in the source of supply.
- A shipment of goods to a consignee.

If an order to a Customer exceeds the Bulb limit in Table 5 then the package must be marked with the labels UN2911 on the outer package and the wording "Radioactive" on the inner or outer package. If traveling by air the package must contain additional UN2911 labeling to conform to IATA regulations. Each carrier has its own requirements in addition to DOT regulations, therefore consult with the hazardous materials division of that carrier. Details are contained in procedure ARC-005.

Table 5 Limits on the Number of Light Bulbs for Exempt Shipment

Bulb Wattage (W)	Activity per bulb (nCi)	Consignment Limit (nCi)	Bulb Limit	Activity (nCi)
55	27.5	270	9	247.5
85	85	270	3	255
115	115	270	2	230

5.6 Emergency conditions

The RSO or Designee shall be on call in case of emergencies. Emergency contact information will be posted at multiple locations throughout the facility including all entrances to the room containing the radioactive materials. Emergency contact numbers shall be posted in the offices and at all entryways into the storage area for the radioactive material.

6 Posting and labeling

The sliding doors used to enter the room will be posted with a sign containing the yellow and magenta Tri-foil and the wording "Caution: Radioactive Materials Storage" or equivalent. In addition all postings mentioned in section 4 shall be posted in a visible location within the designated area.

The floor will contain yellow and magenta markings to encompass the area in which material may be stored.

7 Surveys

Upon the receipt of inventory the RSO or ARSO shall be informed of the delivery. Personnel shall receive the material in accordance with procedure ARC-001. If the reading is distinguishable from background inform the RSO or ARSO for appropriate action.

Surveys conducted in accordance with procedure ARC-005 shall be performed for material being shipped to the end user.

Surveys shall be documented on the form provided with procedures ARC-001 and ARC-005.

8 Dose control

8.1 Calculation of Dose Based on Full Release of Inventory

The amounts and form of Kr-85 do not pose a hazard from a dose perspective. If the total licensed activity, 200 millicuries, is instantaneously released and mixed in the area that is designated for storage the concentration will be $1.8E-5 \mu\text{Ci/mL}$. This is based on the room dimensions of 50Wx53Hx152L ft. The submersion concentration limit from table He-p 4090.01 has a value of $1.0E-4 \mu\text{Ci/mL}$ for Kr-85. Assuming no ventilation and if an individual were to spend 2,000 hrs in that location, that individual can expect to receive 929mRem. An inventory of 200 millicuries would require a facility with an approximate size to that of the entire American Warehouse facility. Estimates of the average inventory will be approximately 1 mCi, which will reduce the calculated dose by a factor of 200 to a value of 4.7mRem. Therefore no employee is expected to receive greater than 10% of the legal limit and dosimetry will not be required.

8.2 State of New Hampshire Dose Limits

- **Adults**

ARC Electronics shall control the occupational dose to individual adults to an annual limit for a total effective dose equivalent (TEDE) of 5000 millirem.

- **Members of the Public**

ARC Electronics shall conduct operations so that the total effective dose equivalent to individual members of the public does not exceed the annual limit of 100 millirem, and doses in unrestricted areas does not exceed 2 millirem in any one hour.

- **Declared Pregnant Woman**

In addition, ARC Electronics shall ensure that the dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 500 millirem.

9 Administrative posting

In order to ensure that personnel have access to the appropriate administrative documents governing the use of licensed radioactive material and radiation emitting devices in the facility, ARC Electronics will post either the following documents or a notice as to where the following documents may be found:

- The New Hampshire Rules for the Control of Radiation
- ARC Electronics Radioactive Material License
- Emergency contact list for RSO and supervisors.
- ARC Electronics Operating Procedures applicable to work under the license.
- All notices or violations involving radiological working conditions, proposed imposition of civil penalty, or order issued pursuant to the Act.
- Any response by ARC Electronics to an imposed violation, civil penalty, or order pursuant to the Act.
- In addition, Program Form RHS - 5, Notice to Employees, will be posted in sufficient conspicuous locations, (office/lab area, work locations and storage/shipping area) to allow all individuals entering and leaving the Westinghouse facility to view them. All documents posted pursuant to He-P 2019.01(a) shall be posted within 2 working days after the receipt of the documents from the NH RHS. ARC Electronics responses, if any, shall be posted within 2 working days after dispatch. Such documents shall remain posted for a

minimum of 5 working days of until action correcting the violation has been completed, whichever is later.

10 Security of material

During normal business hours, only warehouse personnel shall be present in the designated area for radioactive materials unless escorted by a staff member. Doors leading outside of the facility shall only be opened during loading and unloading and during those times a staff member shall be present until the door can be secured. Sliding doors leading into the designated area can be left open during normal business hours to allow daily activities to be conducted. During off hours the doors shall be closed and locked.

The expected normal business hours are 6am to 6pm Monday through Friday. During off hours the facility will be secured and the alarm system mentioned in section 2.2 will be armed. American Warehouse staff will be alerted upon receipt of an alarm by ADT and can respond accordingly by contacting the RSO. Any theft of radioactive material shall be reported to the NH-RHS immediately.

11 Appendix A – Operating Procedures for ARC Electronics



ARC-001 - Receipt of Radioactive Materials

1 Purpose

The purpose of this procedure is to establish proper receipt of inventory. Receipt of material will occur during normal business hours during the week. This procedure is designed to be implemented under the supervision of the RSO or designee upon receipt of radioactive material.

2 Procedure

1. Upon arrival of material inform the RSO or designee of the shipment that contains the radioactive material.
2. Upon entry into the warehouse survey the sides of the pallet on at least 2 accessible sides using a μ R meter to ensure that the readings on the outside of the package are not reading higher than background.
 - a. If pallet does not show an elevated reading above background then proceed to step 3.
 - b. If levels are elevated above background, stop with receipt and inform the RSO or designee so that they can evaluate and direct further actions.
3. Place the inventory in the designated area and continue to survey the next pallet of material.
4. After completion of the delivery enter the quantity of bulbs in the Traker System Software under the appropriate brand and model of bulb.
5. Repeat steps 2 through 4 for each pallet that is received in the warehouse.
6. Once the entire shipment is received generate a report to provide the RSO with the amount of product that was received in order for the radioactive materials inventory to be updated.



ARC-002 Monthly Inventory Monitoring

1 Purpose

The purpose of this procedure is to establish proper Tracking of licensed quantities of radioactive materials. This procedure is designed to be initiated by the RSO and implemented by the RSO or designee on a monthly basis to ensure that the quantity of material on site does not exceed the maximum licensed limit.

2 Procedure

1. Using the Traker System software, generate a current inventory list.
2. Compare the quantities generated by the inventory with the separate database maintained to track the quantities on hand.
 - a. If the quantities on both databases are in agreement then inform the RSO to document the .
 - b. If the quantities are not in agreement then inform the RSO and proceed to step 3.
3. Obtain a physical inventory of the quantity of bulbs that are stored in the warehouse listing each brand, model number, and their respective inventories.
4. Count the number of bulbs that have been damaged and placed in storage for disposal.
5. Search the Warehouse for misplaced pallets of material, if found place in designated area and inform the RSO of the discovery.
6. Report the information to the RSO to allow determination of the cause of the discrepancy.
 - a. If the material is accounted for, provide information for the RSO to update the database accordingly.
 - b. If the material is determined to be lost or stolen, it must be reported to the State of New Hampshire Radiological Health Section by the RSO as per He-P 4022.12 within the periods indicated in the table below based on activity missing.

Isotope	He-P 4092 Quantity	Immediate Reporting Limit	30 Day Reporting Limit
Kr-85	1,000 μ Ci	1,000,000 μ Ci	10,000 μ Ci

- c. If the material is to be reported immediately then contact the NH-Radiological Health Department at (603) 271-4588 as soon as possible. Otherwise make a telephone report within 30 days.
- d. Have the following information ready prior to calling
 - A description of the licensed or registered source of radiation involved, including:
 - For radioactive material, the kind, quantity, and chemical and physical form; and
 - For radiation machines, the manufacturer, model and serial number, type and maximum energy of radiation emitted;
 - A description of the circumstances under which the loss or theft occurred;
 - A statement of disposition, or probable disposition, of the licensed or registered source of radiation involved;
 - Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas;
 - Actions that have been taken, or will be taken, to recover the source of radiation; and
 - Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the loss or theft of licensed or registered sources of radiation.
- e. The RSO will submit a report to the NH-Radiological Health Department within 30 days of report by phone.



ARC-003 Handling of Damaged Material

1 Purpose

The purpose of this procedure is to establish proper handling protocols for damaged light bulbs containing Kr-85. This procedure is designed to be implemented under the supervision of the RSO or designee upon discovery of damaged inventory in accordance with the Radiation Protection Manual.

2 Procedure

1. Stop all shipping and receiving of radioactive material upon discovery of damaged inventory.
2. Remove the case(s) containing the damaged bulbs from the pallet and place them in the designated area for 24hrs to allow clearing of the volatile Kr-85 gas prior to opening. Use caution as there may be sharp fragments of glass present, latex gloves or equivalent are recommended.
3. After isolation of the damaged inventory normal shipping and receiving activities can be resumed.
4. After 24hrs the packages can be opened and any undamaged bulbs can be carefully removed and repackaged for distribution.
5. Record the number and model of the damaged and salvaged bulbs in order to update the inventory databases to reflect changes.
6. Place the damaged bulbs in the designated waste accumulation area and drum for storage and for disposal.



ARC-004 Disposal of Damaged Inventory

1 Purpose

The purpose of this procedure is to establish proper disposal protocol of damaged inventory. This procedure is designed to be implemented by the RSO in accordance with the Radiation Protection Manual. This procedure provides the steps to dispose of damaged bulbs containing Kr-85. It is under the assumption that the Kr-85 in volatile form from any of the damaged bulbs will disperse into the atmosphere and leave no residual contamination. The mercury vapor contained in the bulbs is also considered volatile and will eventually evaporate.

2 Procedure

1. The broken waste in the accumulation area shall be consolidated into a sturdy disposal container such as a lined cardboard or plastic box, using care due to the danger of broken glass. Latex gloves are recommended due to the chemicals used to process the bulbs.
2. Using a contamination survey instrument, survey the waste by taking several measurements on the outside of the container and logging the survey on a blank survey form.
 - a. If the material reads less than twice the background count rate then the material can be disposed of as non radioactive after RSO approval.
 - b. If the material reads greater than twice background, replace container into the waste accumulation area and contact the RSO. The presence of radioactive material is not expected, the RSO will conduct further evaluations to determine the cause of the elevated readings.
3. Prior to disposal ensure that the damaged bulbs are removed from the database, with their disposition as waste identified in order to track the material for financial and regulatory purposes.
4. To adhere to regulations on disposal of mercury, contact a local waste disposal site in order to obtain a quote for proper disposal.



ARC-005 Shipment of Outgoing Radioactive Material

1 Purpose

The purpose of this procedure is to establish proper shipment of inventory. Shipment of material will occur during normal business hours during the week. This procedure is designed to be implemented under the supervision of the RSO or designee for shipment of radioactive material. This procedure shall be implemented in accordance to 10CFR20, 49CFR, the NH regulations and the Radiation Protection Manual.

2 Procedure

1. Package inventory in accordance with the customer order and process in the Traker software to generate Bill of Lading.
 - a. On the outer packaging place the IATA label that contains "Radioactive Materials, Excepted Package" and "UN2911" to indicate that the package has an excepted amount of radioactivity inside and is to be shipped as instruments and articles.
2. Place any additional labeling required by the carrier prior to shipment.
3. As required, fill out the appropriate information for isotope, activity, and chemical form on the carrier's documentation along with any additional required information.
4. Load the material onto the outgoing vehicle for delivery.
5. After the shipment has departed, provide the quantity of inventory to the RSO or Designee to update the materials database accordingly.

00324
01000

FedEx USA Airbill

Tracking Number

801349397145

0200

FedEx Retrieval Copy

SPH31

1 From

Date 5/11/2011 Sender's FedEx Account Number 1006-1308-5

Sender's Name M. A. Paskus, DMS Phone (610) 277-5778

Company U S NUCLEAR REGULATORY COMM

Address 475 ALLENDALE RD Dept./Floor/Suite/Room

City KING OF PRUSSIA State PA ZIP 19406

2 Your Internal Billing Reference Information

3 To

Recipient's Name MARLENE M KELLY Phone (501) 455-7876

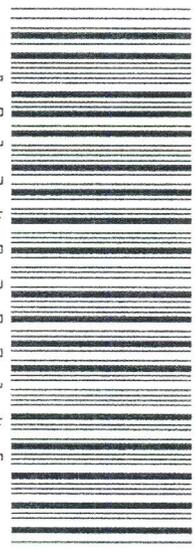
Company USNRC

Address 11545 ROCKVILLE PIKE Dept./Floor/Suite/Room

City ROCKVILLE State MD ZIP 20852

For HOLD at FedEx Location check here
 Hold Weekday Hold Saturday

For Saturday Delivery check here
 Saturday Delivery



A 0 1 3 4 9 3 9 7 1 4 5

4a Express Package Service Packages under 150 lbs

FedEx Priority Overnight FedEx Standard Overnight FedEx 2Day*
 FedEx First Overnight FedEx Express Saver*

4b Express Freight Service Packages over 150 lbs

FedEx Overnight Freight FedEx Day Freight FedEx Express Saver Freight
 FedEx Dry Ice

5 Packaging

FedEx 2X letter FedEx 3X Box FedEx Tube Other

6 Special Handling

Does this shipment contain dangerous goods? Yes No
 Dry Ice Fragile High Value Perishable Live Animals Hazardous Materials

7 Payment

Bill to Sender Recipient Third Party Credit Card Cash
 Account No. Account No. Account No. Account No.

Total Packages Total Weight



Total Charges \$ Credit Card Auth.

8 Release Signature

287

WCS: 080
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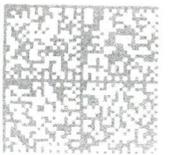
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