

ORC

VOID SHEET

TO: License Fee Management Branch  
FROM: Susan L. Greene  
SUBJECT: VOIDED APPLICATION

Control Number: 021672  
Applicant: Quadra Linc Corporation  
Date Voided: 10/30/96  
Reason for Void: Application considered  
abandoned by applicant after license review.

*Susan L. Greene*  
Susan L. Greene 10/30/96  
Signature Date  
NMSS/IMNS/IMAB

Attachment:  
Official Record Copy of  
Voided Action

FOR LFMB USE ONLY

Final Review of VOID Completed:

- ☐ Refund Authorized and processed  
☒ No Refund Due  
☐ Fee Exempt or Fee Not Required

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Log completed ☒  
Processed by: \_\_\_\_\_

060041

0/1  
MLC  
Cyto Reg III

October 30, 1996

Quadra Linc Corporation  
ATTN: Sharon Myers  
2684 Industrial Row  
Troy, Michigan 48084

Dear Ms. Rennie:

This refers to both your initial application, dated July 14, 1994, and your resubmitted application, dated November 10, 1995, requesting an exempt distribution license to distribute an ornamental smoke detector, Model AWCTO-01. Prior to licensing your smoke detector, our Sealed Source Safety Section (SSSS) must perform a device review pursuant to the issuance of a device registration sheet. By letters dated December 13, 1994, July 25, 1995, September 21, 1995, and April 22, 1996, the SSSS has unsuccessfully attempted to obtain additional information in order to continue the evaluation to register your device. The SSSS notified you by letter dated June 17, 1996, that if the requested information was not received in 30 days your request to register the device will be considered abandoned by you and voided.

It is noted that by letter dated August 21, 1996, you stated that you did not want your application voided, and that you would provide an update in September 1996. However, as of the date of this letter, the additional information still has not been received, therefore, the NRC considers your application as having been abandoned by you and have voided your licensing action.

Note that should you decide to submit the necessary additional information within 1 year of the date of this notice, and provided there are no changes to your request, an additional fee will not be required. If you do decide to resubmit, you should reference your earlier submissions, note the fact that you included an application fee with your earlier submission, and reference Mail Control No. 021672.

If you have any questions concerning this action, please contact me at (301) 415-7843.

DISTRIBUTION:

Docket File  
NMSS r/f  
IMNS c/f  
IMAB r/f  
SBaggett  
LCamper

Sincerely,

Original signed by:

Susan L. Greene  
Medical, Academic, and Commercial  
Use Safety Branch  
Division of Industrial and  
Medical Nuclear Safety  
Office of Nuclear Material Safety  
and Safeguards

Docket No. 030-33663

DOCUMENT NAME: G:\QUADRA.CJB

To receive a copy of this document, indicate in the box: "C" = Copy without enclosures "E" = Copy with enclosures "N" = No copy

|        |              |  |  |  |  |  |  |  |  |  |
|--------|--------------|--|--|--|--|--|--|--|--|--|
| OFFICE | IMAB:NMSS    |  |  |  |  |  |  |  |  |  |
| NAME   | SLGreene:cjb |  |  |  |  |  |  |  |  |  |
| DATE   | 10/30/96     |  |  |  |  |  |  |  |  |  |

OFFICIAL RECORD COPY



2684 INDUSTRIAL ROW • TROY, MICHIGAN 48064  
TEL. (810)435-7827 FAX (810)435-2363

*S. Greene*

August 21, 1996

Christopher Brown, General Engineer  
Scaled Source Safety Section  
Medical, Academic, and Commercial Use Safety Branch  
Division of Industrial and Medical Nuclear Safety  
Office of Nuclear Material Safety and Safeguards  
Nuclear Regulatory Commission  
Mail Stop - T8F5  
Washington, DC 20555-0001

Dear Mr. Brown:

In response to the telephone conversation, this letter is to inform you that I have contacted a professional to help us with our application.

As I explained, the information requested for further review of our application was beyond my expertise. I do not wish to waste your time or mine by constantly resubmitting incorrect information. Hopefully, our next package will have everything you need. I do not want our application voided.

I have marked my calendar to contact you with an update in September. If you require any additional information, please do not hesitate to contact me.

Sincerely,

*Sharon Myers*  
Sharon Myers

SM/kh

June 17, 1996

Sharon Myers  
Quadra Linc Corporation  
2684 Industrial Row  
Troy, MI 48084

Dear Ms. Myers:

This letter is in response to your application dated November 10, 1995 requesting registration of the Model AWCTO-01 smoke detector and my letter dated April 22, 1996 which requested additional information in order to continue our evaluation of your request. To date, the requested information has not been received. If we do not receive the requested information within (30) days of the date of this letter we will have considered your application as having been abandoned by you. This is without prejudice to the resubmission of a complete application.

If you have any questions, please contact me at (301) 415-5787 or Mr. Steven Baggett at (301) 415-7273.

Sincerely,

Christopher Brown, General Engineer  
Sealed Source Safety Section  
Medical, Academic, and Commercial  
Use Safety Branch  
Division of Industrial and  
Medical Nuclear Safety  
Office of Nuclear Material Safety  
And Safeguards

cc w/encl: Skimberley, LFDCB

Distribution:

SSSS r/f

SSD-95-116

NE01

DOCUMENT NAME:

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

|        |         |  |          |  |  |  |  |  |  |
|--------|---------|--|----------|--|--|--|--|--|--|
| OFFICE | IMAB    |  | IMAB     |  |  |  |  |  |  |
| NAME   | CBrown  |  | SBaggett |  |  |  |  |  |  |
| DATE   | 06/ /96 |  | 06/ /96  |  |  |  |  |  |  |

OFFICIAL RECORD COPY



2684 INDUSTRIAL ROW • TROY, MICHIGAN 48084  
TEL. (810)435-7827 FAX (810)435-2363

C. Boyle

Rec'd 11/27/95

030-33663

November 10, 1995

Ms. Michele L. Burgess, Mechanical  
Engineer Sealed Source Safety Section  
Source Containment and Devices Branch  
Division of Industrial and Medical  
Nuclear Safety  
Office of Nuclear Material Safety  
And Safeguards  
11545 Rockville Pike  
Building 2 White Flint North  
Rockville, MD 20852-2738

Dear Ms. Burgess:

Pursuant to your letter of September 21, 1995, regarding registration of our Model AWCTO-01 Smoke Detector, we are resubmitting our application in its entirety.

In your package you will find a materials list showing the documents I have included. All documents are numbered with their document number and page.

I have included drop test results. We have changed our process to hot staking the printed circuit board into the housing since our test results show that gluing it in has some separation problems. (Test results attached.)

We will be requiring our vendor to submit testing results and certificate of compliance with each shipment of ornaments, which we have called out in Document #14 Page 3 of 10. We had previously submitted our manufacturer's QA program for your records. We are resubmitting it with this package, Document #12.

As we discussed, at this time, there are no documents that Quadra Linc wishes to consider proprietary information. The statement to that effect on the drawing submitted September 6, 1995, has been removed.

I hope this completes everything you need to have our license issued. If you require any additional information, or have any questions, please do not hesitate to contact me at 810-435-2300.

Sincerely,

*Sharon Myers*  
Sharon Myers

021672



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

September 21, 1995

MEMORANDUM TO: Susan Greene, License Reviewer  
Commercial Section  
Medical, Academic, and Commercial  
Use Safety Branch

FROM: Michele L. Burgess, Mechanical Engineer *MLB*  
Sealed Source Safety Section  
Source Containment and  
Devices Branch

SUBJECT: SSD TECHNICAL ASSISTANCE REQUEST:  
QUADRA LINC CORPORATION  
CONTROL NO. - 021672

Please find attached your SSD technical assistance request dated September 14, 1994. After reviewing the information submitted to date by Quadra Linc, we do not have sufficient information to register the device. The applicant intends to resubmit the application in its entirety at a later date.

If you have any questions, please contact me at 415-7868 or Mr. Douglas Broadus at 415-5847.

Attachment: As stated

cc: SKimberley, LFDCB





November 23, 1994

To: Steven Baggett  
Source Containment and Devices Branch

From: Linda Rennie  
Quadra Linc Corp.

Thank you for your prompt response regarding our application.

It is encouraging to hear that your department has commenced our review. Per my earlier discussions with your department, this radioactive material is of minimal content and should only take a couple of days to review and process our application.

Considering the information provided by your department and that of Susan Greene (Office of Nuclear Material Safety and Safeguard), the latest possible date we should anticipate receipt of our license would be December 8th or 9th, 1994. In accordance with the above schedule, Quadra Linc is projecting delivery to eagerly awaiting retailers on or about December 12, 1994.

Thank you for your assistance and cooperation on our Christmas product. Please contact me if I can be of any further assistance.

Sincerely,

Linda Rennie  
Program Manager

REQUEST FOR A SEALED SOURCE OR  
DEVICE EVALUATION

INSTRUCTIONS: Send this request AND a copy of all related letters/applications and drawings to: The Sealed Source Safety Section, ATTN: Chief, OWFN Mail Stop 6 H3. Change the License Tracking System milestone to 19 and assign to reviewer code I-5.

**NOTE:** Retain a copy of this request with the application and background files.

|   |                                   |   |  |
|---|-----------------------------------|---|--|
| REQUESTER<br>Susan L. Greene                |                                   | REGION/LOCATION:<br><input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/> V <input checked="" type="checkbox"/> HQ <input type="checkbox"/> LFDCB  |  |
| TELEPHONE NUMBER<br>415-7843                | DATE<br>09/14/94                  | TYPE OF ACTION REQUESTED (Check as appropriate)<br><br><div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> SOURCE REVIEW<br/><br/> <input checked="" type="checkbox"/> DEVICE REVIEW<br/><br/> <input type="checkbox"/> CUSTOM REVIEW         </div> <div> <input type="checkbox"/> AMENDMENT OF<br/>REGISTRATION SHEET<br/>NUMBER(S)<br/><br/>         _____       </div> </div> |  |
| APPLICANT'S NAME<br>QUADRA LINC CORPORATION |                                   |   |  |
| MAIL CONTROL NUMBER(S)<br>021672            |                                   |   |  |
| ENTER APPLICATION DATE<br>07/14/94          | LICENSE NUMBER(S)<br>new licensee |   |  |

COMMENTS:

FOR SSSS USE ONLY

|               |               |                 |
|---------------|---------------|-----------------|
| REVIEWER      | MODEL NUMBERS | NUMBER ASSIGNED |
| DATE RECEIVED | DATE ASSIGNED | DATE TO FEES    |

## TYPE OF ACTION (Indicate the number of each type)

|   |  |  |  |
|---|--|--|--|
| COMMERCIAL DISTRIBUTION (FORMAL)  |  | USE BY A SINGLE APPLICANT (CUSTOM)                                 |  |
| SOURCE (9C)   | DEVICE (9A)  | SOURCE (9D)  | DEVICE (9B)  |
| <input type="checkbox"/> NEW<br><input type="checkbox"/> AMENDMENT                                  | <input type="checkbox"/> NEW<br><input type="checkbox"/> AMENDMENT | <input type="checkbox"/> NEW<br><input type="checkbox"/> AMENDMENT | <input type="checkbox"/> NEW<br><input type="checkbox"/> AMENDMENT |
| <input type="checkbox"/> NO SAFETY EVALUATION REQUIRED<br><input type="checkbox"/> NO FEES REQUIRED |  | <input type="checkbox"/> LICENSING ACTION REQUIRED IF KNOWN        |  |
| OTHER (Specify)   |  | <input type="checkbox"/> YES<br><input type="checkbox"/> NO        |  |

|  |                                 |       |
|--|---------------------------------|-------|
|  | TOTAL NUMBER OF<br>REVIEW HOURS | NOTES |
|  | NUMBER OF<br>DEFICIENCY LETTERS |       |
|  | NUMBER OF<br>DEFICIENCY CALLS   |       |

**FOR BILLING PURPOSES ONLY**

|                                      |   |  |   |
|--------------------------------------|---|--|---|
| <input type="checkbox"/> NAME CHANGE | <input type="checkbox"/> ADDRESS CHANGE | <input type="checkbox"/> NEW REGISTRATION --<br>ADD TO BILLING | <input type="checkbox"/> PRODUCT INACTIVE --<br>REMOVE FROM BILLING |
|--------------------------------------|---|--|---|

FOR FEE USE ONLY

|                 |                             |                               |
|-----------------|-----------------------------|-------------------------------|
| TYPE OF FEE     | FEE CATEGORY                |                               |
|                 | <input type="checkbox"/> 9A | <input type="checkbox"/> 9B   |
| AMOUNT RECEIVED | CHECK NUMBER                | <input type="checkbox"/> 9C   |
|                 |                             | <input type="checkbox"/> 9D   |
| DATE OF CHECK   | LOG                         | MATANN UPDATED<br>AS REQUIRED |
|                 |                             | MATSYS UPDATED<br>AS REQUIRED |
| APPROVED BY     | DATE RETURN                 | DATE                          |

## COMMENTS



030-33663

NRC FORM 313

U. S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0120  
EXPIRES 6-30-96(6-93)  
10 CFR 30, 32, 33  
34, 35, 36, 39 and 40

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 9 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. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0120), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

## APPLICATION FOR MATERIAL LICENSE

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:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY  
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS  
U. S. NUCLEAR REGULATORY COMMISSION  
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND,  
MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA,  
RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

LICENSING ASSISTANT SECTION  
NUCLEAR MATERIALS SAFETY BRANCH  
U. S. NUCLEAR REGULATORY COMMISSION, REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO  
RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA,  
SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION  
U. S. NUCLEAR REGULATORY COMMISSION, REGION II  
101 MARIETTA STREET, NW, SUITE 2900  
ATLANTA, GA 30323-0199

IF YOU ARE LOCATED IN:

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

MATERIALS LICENSING SECTION  
U. S. NUCLEAR REGULATORY COMMISSION, REGION III  
801 WARRENVILLE RD.  
LISLE, IL 60532-4351

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW  
MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING,  
SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION  
U. S. NUCLEAR REGULATORY COMMISSION, REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TX 76011-8064

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S.  
TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

RADIOACTIVE MATERIALS SAFETY BRANCH  
U. S. NUCLEAR REGULATORY COMMISSION, REGION V  
1450 MARIA LANE  
WALNUT CREEK, CA 94596-5368

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)

QUADRA LINC CORPORATION  
2684 INDUSTRIAL ROW  
TROY, MI 48084

3 ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

EXPRESS MFG.  
3519 WEST WARNER AVENUE  
SANTA ANA, CA 92704

4 NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

LINDA L. RENNIE

TELEPHONE NUMBER

(810) 435-7827

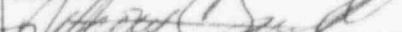
SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE

|   |   |    |  |
|---|---|----|--|
| 5   | RADIOACTIVE MATERIAL<br>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 | LICENSEE FEES (See 10 CFR 170 and Section 170.31)<br>FEE CATEGORY 9A/3H<br>AMOUNT ENCLOSURE 3,700.00<br>2,400.00 |
| 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

ANTHONY C. SAVALLE, PRESIDENT

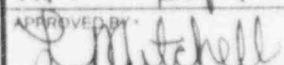
SIGNATURE



DATE

7-14-94

## FOR NRC USE ONLY

|   |                  |                    |                           |                         |          |
|---|------------------|--------------------|---------------------------|-------------------------|----------|
| TYPE OF FEE<br>APP  | FEE LOG<br>Sep 1 | FEE CATEGORY<br>3H | AMOUNT RECEIVED<br>\$2400 | CHECK NUMBER<br>0005483 | COMMENTS |
| APPROVED BY<br> |                  |                    |                           | DATE<br>9-21-94         |          |



2684 INDUSTRIAL ROW • TROY, MICHIGAN 48064  
TEL. (810) 435-7827 FAX (810) 435-2363

July 11, 1994

**ITEM 5:**

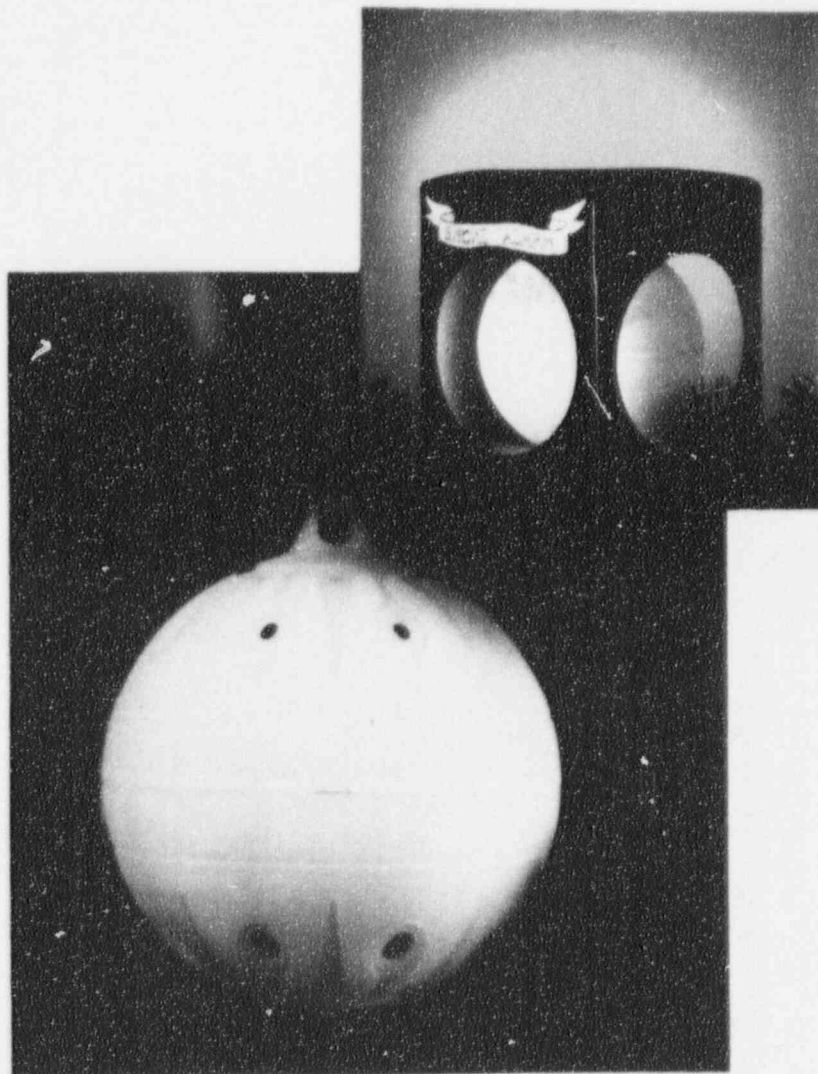
Enclosed you will find all data pertaining to the NRD Foil used by Nemoto & Co., to produce the ionization chamber that we are purchasing. This unit is completely assembled when it comes in to our facility. The maximum amount of units would probably not exceed 50,000 at one time.

**ITEM 6:**

Quadra Linc Corporation will be distributing a Christmas Tree Smoke Alarm Ornament which will be assembled by Express Manufacturing with the Ionization chamber provided by Nemoto & Co.

*BUONNATALE*  
**SMOKE ALARM**  
 CHRISTMAS ORNAMENT

- Technically advanced Battery Powered Christmas Tree Smoke Alarm Ornament.
- Unique glass like ornament.
- Features potential advance warning of smoke detection.
- Hangs near top of tree and monitors air.
- Alarm sounds upon smoke detection.
- Chirp indicates low battery.
- All ornaments are made of Crystal-Like material.
- Individually packaged in attractive HI-GLOSS box ready for display.
- May also be used as decoration around home or office.



**PRICING BASED ON QUANTITY**  
**INQUIRE ON QUANTITY PRICING SCHEDULE**

**STOCK  
 NUMBER**  
 AWCTO-01

**UPC  
 NUMBER**  
 TBD

**DESCRIPTION**  
 X-MAS SMOKE ALARM ORN.

**CASE  
 PACK**  
 24

**QUADRA LINC CORPORATION** 2684 INDUSTRIAL ROW • TROY, MI 48084  
 TEL: (810) 435-7827 FAX: (810) 435-2363



2684 INDUSTRIAL ROW • TROY, MICHIGAN 48064

TEL. (810)435-7827

FAX (810)435-2363

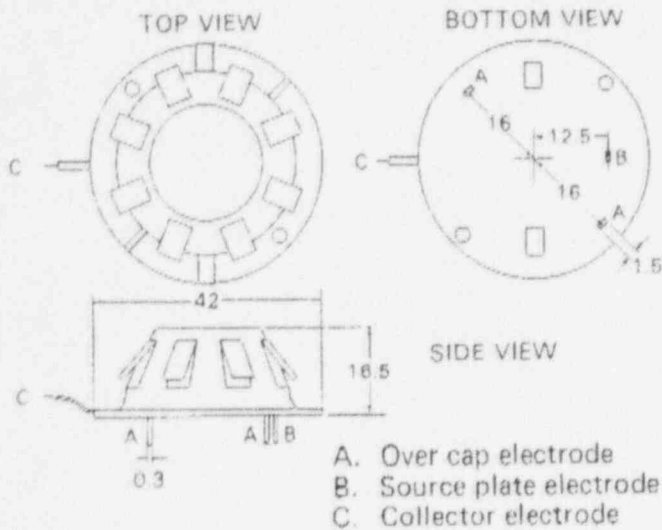
THIS LABEL IS ON THE SIDE OF THE BOX:

"This detector contains 1 microcurie of Americium 241, a radioactive material, and has been manufactured in compliance with U.S. NRC safety criteria in 10CFR32.27. The purchaser is exempt from any regulatory requirements.

THIS LABEL APPEARS ON THE HOUSING OF THE DETECTOR:

CONTAINS RADIOACTIVE MATERIAL, AMERICIUM  
241, 1 MICROCURIE

# SPECIFICATIONS



## FEATURES

- Meets all Underwriters Laboratories Standards (UL217)
- A dual ionization chamber with a single radio-isotope source. Source Am-241, 0.9 $\mu$ Ci.
- Easy mounting.
- Compatible with any I.C. available on the market.
- SD3A
- MC14466
- MC14467A
- High quality.
- Simply designed.

## PROVISIONAL SPECIFICATION

Working Conditions, except where specified are:  
Outer electrode to source electrode potential:  
9V DC

Temperature: 20°  $\pm$  5°C

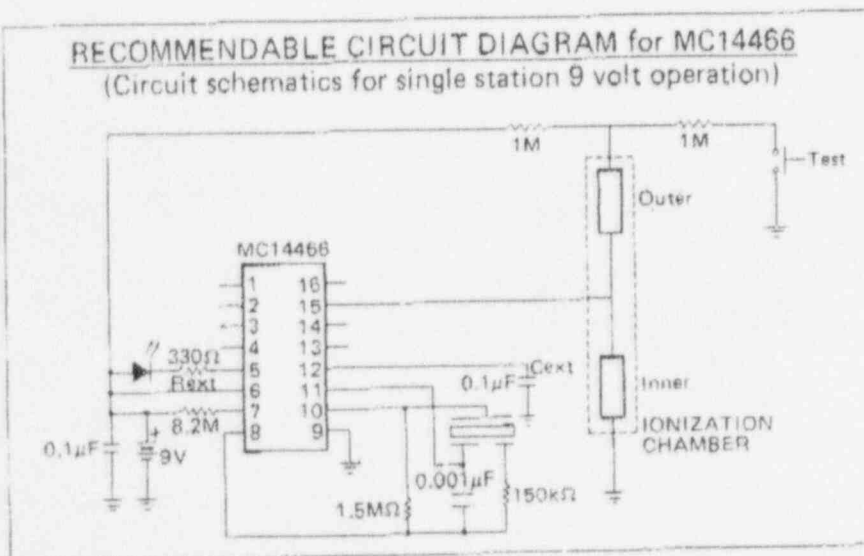
Pressure: Atmospheric, near sea level; clean air

|   | Min.                   | Typical | Max.          |
|---|------------------------|---------|---------------|
| Collector electrode balance potential   | 5.0V                   | 5.3V    | 5.6V          |
| Change in collector balance potential with smoke(4% obscuration/foot) as specified in UL 217.23.1 | 1.1                    | 1.2V    | —             |
| Electrode Capacitance (Collector to outer + source electrodes)                                    | —                      | 4pF     | —             |
| <sup>241</sup> Am source activity   | 0.81                   | 0.9     | 0.99 $\mu$ Ci |
| Weight  | —                      | 12g     | —             |
| Material  | Stainless Steel, Noryl |         |               |

## SENSITIVITY TABLE TO VARIOUS MATERIALS HEATED ON ELECTRIC HEATER (440–480°C)

|                |                             | $\Delta V$ : 1.0V   |
|----------------|-----------------------------|---------------------|
| Material       | quantity: mg/m <sup>3</sup> | obscuration: %/foot |
| silicon rubber | 26                          | 1.0                 |
| vinyl          | 29                          | 1.1                 |
| cigarretts     | 115                         | 3                   |
| filter paper   | 40                          | 1.6                 |
| cotton         | 56                          | 2.5                 |

## RECOMMENDABLE CIRCUIT DIAGRAM for MC14466 (Circuit schematics for single station 9 volt operation)



## REMARKS:

Component values may change depending on type of piezoelectric horn used.  
Final circuit to be adjusted for your purpose of using.

Sealed Tests on Americium-241 Sources  
Used in Model No. NIS-09 Ionization Smoke Chambers

Sealed tests on Americium-241 sources used in Model No. NIS-09 Ionization Chamber were carried out in accordance with ISO-2919 and 1677 and the evaluation was made in accordance with ISO/TR-4826.

Test Sources; Americium-241 sealed sources,  
Model No. ; A001 (NRD)  
Specific activity ;  $0.9 \mu\text{Ci}$  ( $3.33 \times 10^4 \text{ Bq.}$ )  
Dimension ; 5 mm dia x 0.3 mm

1. Surface contamination test (ISO/TR-4826, 1979(E) 2.1.1)

Sources were wiped with a moistened filter paper (2.5 cm diameter), and an activity on a filter paper was measured by liquid scintillation counter.

2. Boiling immersion test (ISO/TR-4826, 1979(E) 2.1.4)

Sources were immersed in hot water and boiled for 10 minutes. The activity in the hot water was measured by liquid scintillation counter.

This operation was repeated totaling 3 times, and the activity from each operation was totaled for evaluation.

3. Temperature test

(a) Sources were placed in an atmosphere of  $-40^\circ\text{C}$  for 20 minutes, and the sources were subjected to Test 1 and 2 after cooling down to room temperature.

(b) Sources were placed in an atmosphere of  $130^\circ\text{C}$  for 1 hour, and the sources were subjected to Test 1 and 2 after cooling down to room temperature.

(c) Sources were placed in an atmosphere of  $800^\circ\text{C}$  for 1 hour, and the sources were subjected to Test 1 and 2 after cooling down to room temperature.

(d) Sources were placed in an atmosphere of  $800^\circ\text{C}$  for 15 minutes, and the sources were subjected to Test 1 and 2 after being transferred in 15 seconds or less to water at a maximum temperature of  $20^\circ\text{C}$ .

\* Remarks : The above (c) and (d) are not specified by ISO.



#### 4. Pressure test

Sources were placed in a pressure chamber for exposing to the pressure of 20 kPa (0.2 atm) for 5 minutes and the pressure was returned to atmospheric. After repeating this operation twice, the sources were subjected to Test 1 and 2.

#### 5. Impact test

Sources<sup>(1)</sup> were placed on an anvil. A 50 gram weight<sup>(2)</sup> was dropped from the height of 1m20cm onto the source.

(1) The sources used in the test were ones sealed in capsule.

(2) The weights used in the test were of 1g, 3g, 5g, 7g, 20g & 30g.

#### 6. Vibration test

Sources were fixed securely to a vibration machine and were swept through the frequencies from minimum (25Hz) to Maximum (500Hz) in 10 minutes (acceleration 5G) and returned to the minimum in 10 minutes. After completing 3 cycles, the sources were subjected to Test 1 and 2.

#### 7. Puncture test

Sources were placed on an anvil. A 1 gram weight with a pin was dropped from the height of 1m20cm onto the source, then the sources were subjected to Test 1 and 2.

The classification of each test was determined according to ISO-2919 Table 2 as below.

| Intended use                      | Test and classification |          |        |           |          |
|-----------------------------------|-------------------------|----------|--------|-----------|----------|
|                                   | Temp.                   | Pressure | Impact | Vibration | Puncture |
| Ion Generator<br>(Smoke detector) | 3                       | 2        | 2      | 2         | 2        |

|   | Temp.                                  | Pressure                      | Impact           | Vibration                        | Puncture        |
|---|--|-------------------------------|------------------|----------------------------------|-----------------|
| Sealed source<br>performance<br>standards | -40°C<br>(20 min)<br>180°C<br>(1 hour) | 20 kPa to<br>atmos-<br>pheric | 50 g<br>from 1 m | 3 times<br>10 min.<br>25 - 500Hz | 1 g<br>from 1 m |

### Measuring method

All the tests and measurement were carried out by the unit of 10 sources. The measured activity was divided by 10 for the estimation of per each/piece activity.

### Measuring instrument

Liquid scintillation counter; Packard TRI CARB 3320  
Detection limit ....  $10^{-13}$  Ci

### Results

| Tests                            | Surface contamination       | Immersion                   |
|----------------------------------|-----------------------------|-----------------------------|
| Untested                         | $1.3 \times 10^{-4}$ Ci/pce | $1.5 \times 10^{-5}$ Ci/pce |
| Temp. ( $-40^{\circ}\text{C}$ )  | $1.3 \times 10^{-4}$        | $1.0 \times 10^{-5}$        |
| Temp. ( $-180^{\circ}\text{C}$ ) | $1.8 \times 10^{-4}$        | $1.3 \times 10^{-6}$        |
| Puncture                         | $3.7 \times 10^{-4}$        | $1.7 \times 10^{-6}$        |
| Pressure                         | $3.2 \times 10^{-4}$        | $6.0 \times 10^{-6}$        |
| Impact                           | $2.6 \times 10^{-4}$        | $3.0 \times 10^{-6}$        |
| Vibration                        | $2.0 \times 10^{-4}$        | $2.4 \times 10^{-7}$        |
| ISO standards                    | $5.0 \times 10^{-3}$        | $5.0 \times 10^{-3}$        |

Estimation of the Safety  
of Ionization Chamber Model NIS-09  
Containing Americium-241 Radioactive Source

Introduction

There are two types of smoke detectors on the market, namely ionization type and photoelectric type smoke detectors. Ionization type detectors are more widely used for an early warning / detection of smoke / fire hazards in commercial and residential properties.

This study estimates the safety features of the ionization chamber Model NIS-09 to be incorporated into smoke detectors in the handling and use as they contain a radioactive material as a radiation source.

1. The Principle of Ionization Type Smoke Detectors

The principle of ionization type smoke detectors is as shown in Fig. 1.

Alpha radiation from Americium-241 increases the ability of air to conduct electricity and thus ionizes the air through chamber A and B allowing for an electrical current flow. In normal operation or when the electrical current flow in chamber A and B is constant, the electrical potential of S point is kept balanced. When smoke particles enter into chambers, Alpha radiation is partly absorbed by the smoke particles and consequently the electrical current flow in the chambers drops unbalancing the electrical potential of point S. This unbalance is detected by the detector's electronic circuitry to activate an alarm horn or buzzer.

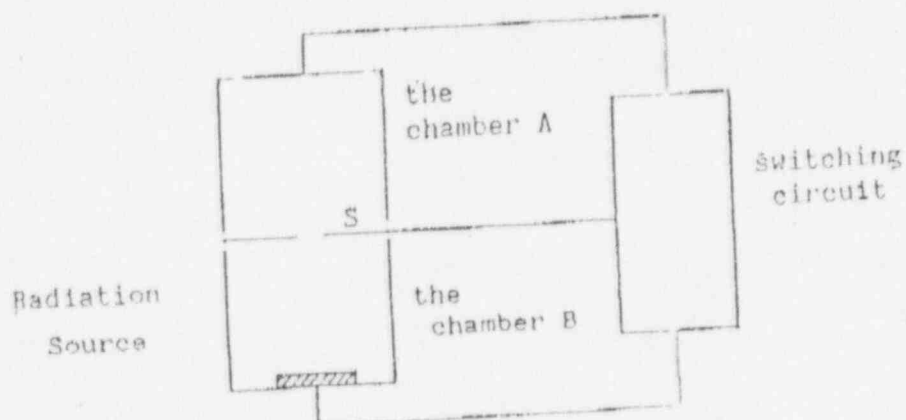


Fig. 1

## 2. Ionization Chamber Model NIS-09

### 2.1 Americium-241

Americium-241 is used in Ionization Chamber Model NIS-09 as a radiation source which emits alpha and gamma rays. The energy of alpha and gamma rays are 5.4 MeV and 60 KeV respectively. The atomic number is 95 and the atomic weight is 241 and the half life is 458 years. The decay scheme is as shown in Fig. 2.

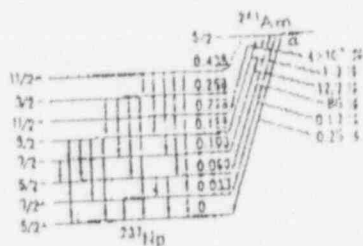


Fig. 2

### 2.2 Composition of Americium-241 source

The radiation source of Ionization chamber is in a disc of Americium oxide foil with a cross section as Fig. 3 on a silver base with a covering of gold. When the source in foil is cut, due to the malleability of gold and silver, the cut sections of the source will become overlaid with gold and silver covering the source, that is, there are not exposed edges to atmosphere. Chemical and physical properties of Americium source are similar to those of gold and silver.

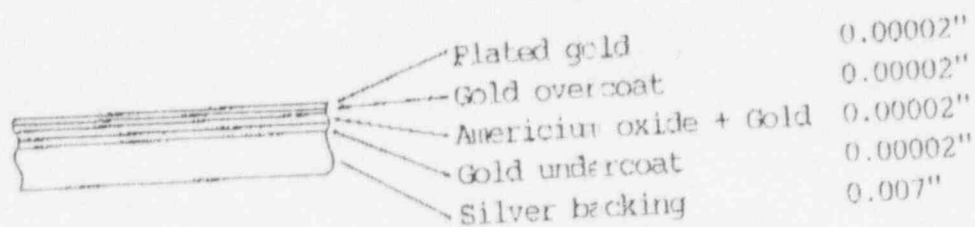


Fig. 3

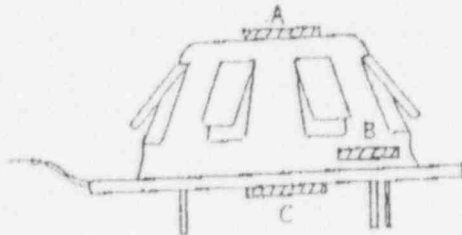
### 2.3 Radioactivity of Americium-241

The radioactivity of  $^{241}\text{Am}$  used in NIS-09 is as listed below.

Model NIS-09 :  $0.9 \pm 0.09 \mu\text{Ci}$

### 3. Safety of Workers Handling Ionization Chambers

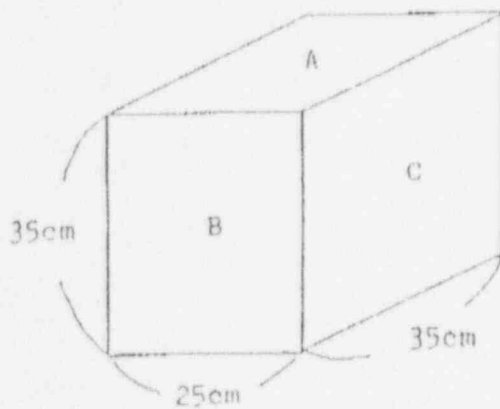
3.1 Radiation doses on the surface of Ionization Chamber have been measured with a use of TLD (NTL-500) as in the Table below.



|                  |             |
|------------------|-------------|
| A (Surface)      | 0.024 mR/hr |
| B (Side)         | 0.002 mR/hr |
| C (Back surface) | 0.020 mR/hr |

### 3.2 Radiation doses on the surface of containers

Radiation doses on the surface of a container containing 5 inner boxes with 100 ionization chambers in each inner box are measured as below.



|                                |                  |
|--------------------------------|------------------|
| A (Surface)                    | 0.022 mR/hr      |
| B (Side)                       | 0.014 mR/hr      |
| C (Back surface)               | 0.014 mR/hr      |
| At 50 cm distance from a point | Background level |

### 3.3 Estimation of radiation doses to workers

An estimation of radiation doses to workers who handle and transfer Ionization Chambers has been made generally, an external radiation dose and an internal radiation dose must be considered, however, in the handling of Ionization Chambers, the internal radiation dose could be ignored as the radiation source is a complete "sealed source" and is further housed in a metal chamber. Only an external radiation is considered hereinafter.

#### (1) Workers assembling Ionization Chambers

##### A. Whole body

Assuming that the average distance between the ionization chambers to be assembled and the worker is 30 cm, and there is a container containing 500 pieces of ionization chambers at a distance of 60 cm from the worker, the total whole body dose (D) is;

$$D = 0.024\text{mR/hr} \times \left(\frac{13}{40}\right)^2 + 0.22\text{mR/hr} \times \left(\frac{18}{50}\right)^2 = 2 \times 10^{-3}\text{mR/hr}$$

Based on a 2,000-hour work / year, the calculated total annual whole body dose is 4 milli rem / year.

##### B. Fingers

It is obvious that the maximally exposed part of the body to radiation is the fingertips of workers. Assuming that the worker's fingers are in contact with the surface of ionization chambers for half the working hour and 10 cm away during the rest half of the working hour, the finger dose (D) is;

$$D = [0.024\text{mR/hr} + 0.024\text{mR/hr} \times \left(\frac{1.3}{10}\right)^2] \times 2 = 0.012\text{mR/hr}$$

Based on a 2,000-hour work / year, the worker is estimated to receive an annual finger dose of 24 milli rem / year.



## (2) Workers transferring ionization chambers

Assuming that in the transfer of containers containing ionization chambers or detectors, the average distance between the worker and the container containing 4,000 ionization chambers is 1 meter as shown in Fig. 4, the total external radiation dose (D) is;

$$D = 0.015 \text{ mR/hr} \times 4 \times \left[ \left( \frac{13}{113} \right)^2 + \left( \frac{13}{138} \right)^2 \right] = 0.73 \times 10^{-3} \text{ mR/hr}$$

The total annual dose based on a 1,000-hour work / year is estimated to be approx. 0.73 milli rem / year.

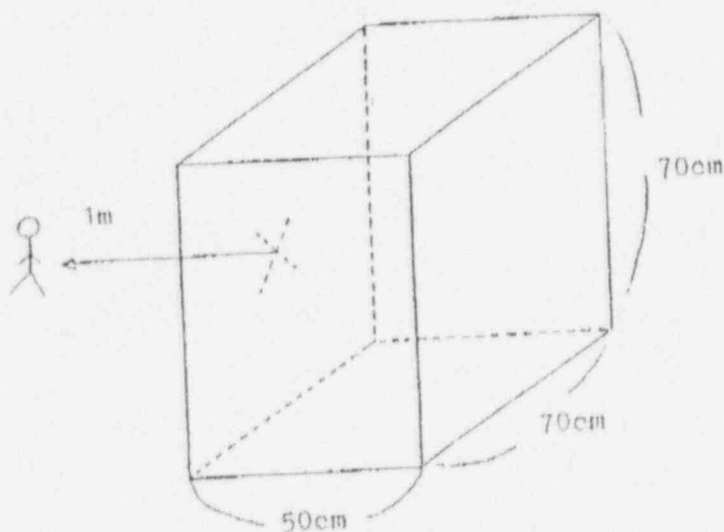


Fig. 4

## 4. Safety of Individual Users

Assuming that an individual user is at 2 meter distance from an ionization smoke detector all day, the total external radiation dose (D) is;

$$D = 0.024 \text{ mR/hr} \times \left( \frac{1.3}{200} \right)^2 = 1.0 \times 10^{-6} \text{ mR/hr}$$

The estimated total annual external dose is approx. 0.0088 milli rem / year.

## 5. Conclusion

The radiation exposure to workers from NIS-09 Ionization Chamber is determined as follows;

- (1) Free from internal radiation exposure.
- (2) External radiation exposure to whole body and fingers are 4 milli rem/year and 24 milli rem/year, which, in comparison with ICRP's recommended annual maximum permissible dosages to whole body of 500 milli rem/year and to fingers of 7,500 milli rem/year, are significantly small, and are within the variation range of local terrestrial back ground radiation dosages.

It is reasonable, therefore, to conclude that NIS-09 Ionization Chambers are safe in handling and radiation exposure dose is considered to be negligible.

Any specific radiation protection control or program would not be required in handling of ionization chambers. However, this is only in the normal processing of handling of ionization chambers, it is a completely different case if ionization chambers were disassembled into pieces and held unsealed for some reason. Also the radiation exposure to consumers is again negligible.

For further information, please contact;

|  |   |
|--|---|
| Nemoto & Co., Ltd., Head office<br>(Overseas Business Dept.) | 1-15-1, Kamiogi, Suginami-ku,<br>Tokyo 167, Japan<br>Tel: 81-3-3392-7181 (Rep)<br>Fax: 81-3-3392-7188 or 7155 |
| Nemoto & Co., Ltd., R & D Center                             | 4-10-9, Tataido Higashi,<br>Suginami-ku, Tokyo 167, Japan<br>Tel: 81-3-3333-7341 (Rep)<br>Fax: 81-3-3333-7344 |

**NRD** INC.

A Subsidiary of Mark IV Industries Inc.

2937 Alt Blvd. North  
Grand Island, NY 14072  
(716) 773-7634

Certificate No. 091275  
Nemato "5mm"

Purchase Order No. N27-070133

**CERTIFICATE**  
**FOR**  
**SEALED RADIOACTIVE SOURCES**

ISO Classification designated by Code No. ISO/C 32222

Model No. A001 ; Radionuclide Americium-241

Activity per unit 33.36 Bq ; Total activity 0.666 GBq

Chemical and physical form: Solid Metal Foil

Leak results, per ISO/RR 4826 < 37 Bq ; Date 1-13-94

Total Units/sources tested 20,000

We certify that this sealed source complies with requirements of  
(ISO 1677 or relevant national standards) and the above information  
is correct.

We declare that we hold "IAE Certificate of Competent Authority"  
No. USA-0036-S, in respect to sealed sources of Special Form Non-  
dispersible Radioactive Material;

Issued on 8-25-82, by U.S. Department of Transportation  
Office of Hazardous Materials Regulations.

1278

Date 1-13-94

Signature James M. Dyer

Title R.C.

ISO 2919 TESTS  
Model A-001  
Page 1  
January 10, 1990

PROTOTYPE TESTS  
NRD IONIZATION SOURCE  
MODEL A001 5 mm DIAMETER  
CONTAINING 0.5 MICROCURIES AM-241

Production source samples were subjected to the following  
Prototype Tests:

TEMPERATURE  
PRESSURE  
IMPACT  
VIBRATION  
PUNCTURE

The tests were performed on three samples in the above  
sequence. See NRD drawing 79A045 Rev 1 for source details.

Tested according to ISO 2919-1980(E)  
Conforming to Classification ISO/C32272

### TEMPERATURE

Test Level: 3

#### PROCEDURE:

Three source samples were placed in a laboratory oven, that was preheated to  $+180^{\circ}\text{C}$ , and held at that temperature for a period of one hour. The samples were removed from the oven, placed into a cold chamber that was stabilized to  $-75^{\circ}\text{C}$ , and held at that temperature for a period of 20 minutes. The samples were removed from the cold chamber and leak tested according to ISO/TR 4826-1979(E) paragraph 2.1.3.

#### EVALUATION:

The source samples were examined visually for damage and none was perceptible.

#### LEAK TEST:

The immersion test, in distilled water, yielded less than 185 Bq.

### EXTERNAL PRESSURE

Test Level: 2

#### PROCEDURE:

Three source samples were placed in a vacuum chamber and exposed to a pressure of less than 0.1 kPa absolute for two periods of 5 minutes each. The pressure was returned to atmospheric between the periods. The samples were removed from the vacuum chamber leak tested according to ISO/TR 4826-1979(E) paragraph 2.1.3.

#### EVALUATION:

The source samples were examined visually for damage and none was perceptible.

#### LEAK TEST:

The immersion test, in distilled water, yielded less than 185 Bq.



### IMPACT

Test Level: 2

#### PROCEDURE:

Three source samples were placed on a steel anvil with a mass of 862 grams. A steel hammer with a mass of 50.3 grams was released from a 1 meter height, impacting the active side of the source. The samples were leak tested according to ISO/TR 4826-1979(E) paragraph 2.1.3.

#### EVALUATION:

The source samples were examined visually for damage and a small dent was visible. No other damage was observed.

#### LEAK TEST

The immersion test, in distilled water yielded less than 185 Bq.

## VIBRATION

Test Level: 2

### PROCEDURE:

Three source samples were fixed securely to a metal plate that was in turn fixed securely to the transducer platform. Each axis of each source was subjected to three complete test cycles. Each cycle was conducted by sweeping through all the frequencies in the range at a uniform rate from 25 Hz to 500 Hz and return to 25 Hz in 11 minutes, with a peak acceleration amplitude of 6g. The samples were leak tested according to ISO/TR 4826-1979(E) paragraph 2.1.3.

### EVALUATION:

The source samples were examined visually for damage and none was perceptible.

### LEAK TEST:

The immersion test, in distilled water, yielded less than 185 Bq.

## PUNCTURE

Test Level: 2

### PROCEDURE:

Three source samples were placed on a steel anvil with a mass of 862 grams. A steel hammer with a mass of 1.12 grams was released from a 1 meter height, impacting the active side of the source. The samples were leak tested according to ISO/TR 4826-1979(E) paragraph 2.1.3.

### EVALUATION:

The source samples were examined visually for damage and a small dent was visible. No other damage was observed.

### LEAK TEST:

The immersion test, in distilled water, yielded less than 185 Bq.

APPENDIX

The leak testing procedure was ISO/TR 4326-1979(E) paragraph 2.1.3, Immersion test.

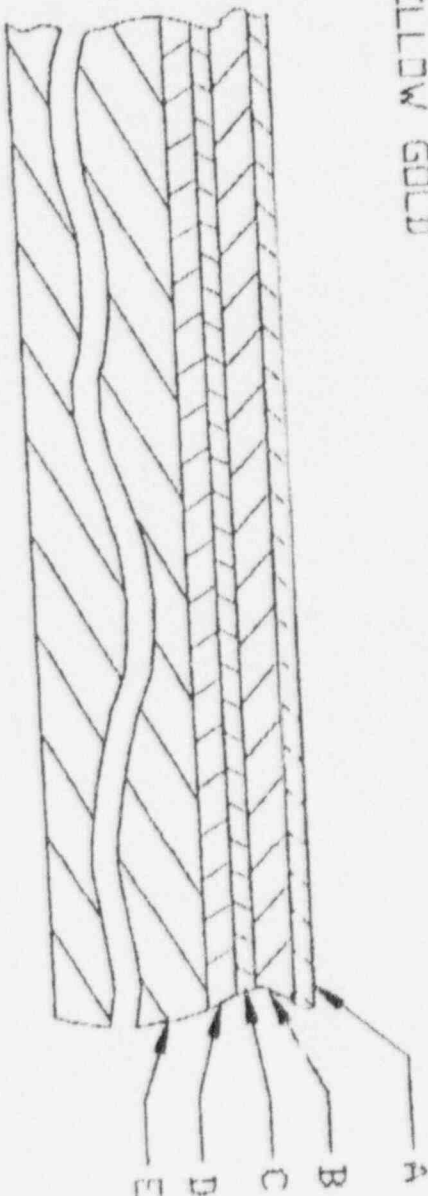
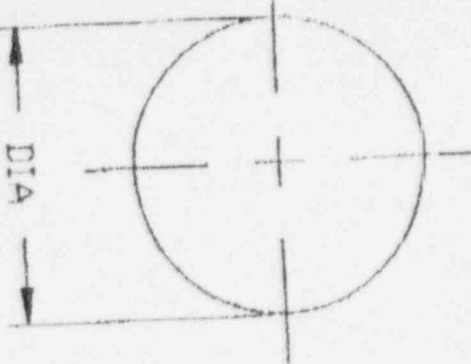
Radioactivity assays were performed in a gas flow windowless proportional counter that was calibrated with a Pu-239 standard.

Counter's minimum detectable activity is 0.007 nCi.

| DATE | BY                 | CHKD |
|------|--------------------|------|
| 1    | REDRAWN ON AUTOCAD |      |
|      |                    |      |
|      |                    |      |
|      |                    |      |
|      |                    |      |
|      |                    |      |

- A. GOLD PLATE 0.00002" \*
- B. GOLD 0.00004"
- C. AMERICIUM & GOLD 0.00002"
- D. GOLD 0.00003"
- E. SILVER 0.004" TO 0.007"

\*NOTE: PLATING WILL BE EITHER  
WHITE OR YELLOW GOLD



FOIL CROSS SECTION

| FOIL<br>DIAMETER | DECIMAL<br>EQUIVALENT |
|------------------|-----------------------|
| 2.3 mm @         | 0.092 in. @           |
| 5.0 mm           | 0.197 in.             |
| 6.0 mm           | 0.236 in.             |
| 16.0 mm          | 0.629 in.             |

@ DIAMETER TOLERANCES  $\pm 0.03$  mm/0.001 in.

|  |  |   |  |
|--|--|---|--|
| <p align="center"><b>NRD INC.</b><br/>A SUBSIDIARY OF MARK IV INDUSTRIES, INC.<br/>2937 ALT BOULEVARD GRAND ISLAND, NEW YORK 14072</p> |  |   |  |
| <p><b>TITLE</b><br/>A-001 SINGLE FACE FOIL</p>   |  | <p><b>SCALE</b><br/>NA</p>              |  |
| <p><b>DATE</b><br/>13AP88</p>  |  | <p><b>ING. NUMBER</b><br/>79A045</p>    |  |
| <p><b>REVISION</b><br/>1</p>   |  | <p><b>APPROVED BY</b><br/>R. BIDELE</p> |  |

(FOR LFMS USE)  
INFORMATION FROM LTS

BETWEEN:

License Fee Management Branch, ARM  
and  
Regional Licensing Sections

Program Code: \_\_\_\_\_  
Status Code: 3  
Fee Category: \_\_\_\_\_  
Exp. Date: 0  
Fee Comments: \_\_\_\_\_  
Decom Fin Assur Req'd: \_\_\_\_\_

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED  
Applicant/Licensee: QUADRA LINC CORP.  
Received Date: 940914  
Docket No: 3033663  
Control No.: 021672  
License No.:  
Action Type: New Licensee

2. FEE ATTACHED  
Amount: \$6100.00  
Check No.: 0005483

3. COMMENTS

Signed M. Moriarty  
Date 9-14-94

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

1. Fee Category and Amount: ~~9H~~ 3H \$6100 ✓  
2. Correct Fee Paid. Application may be processed for:  
Amendment  
Renewal  
License ✓

3. OTHER

Signed Linda Mitchell  
Date 9-21-94

See also SS&D Log (pd for with)  
Sep 94

1004 SEP 15 AM 10:46





## POSSESSION LIMIT INFORMATION

PAGE: 2

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| MATERIAL TYPE  | : | _____ | FORM CODE: _____ | AGGREGATE CODE: _____ |
| MODEL NUMBER   | : | _____ |                  |                       |
| DESCRIPTION    | : | _____ |                  |                       |
| TOTAL QUANTITY | : | _____ | UNIT: _____      |                       |
| OTHER          | : | _____ | # SOURCES: _____ |                       |
|                |   |       |                  |                       |
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| MODEL NUMBER   | : | _____ |                  |                       |
| DESCRIPTION    | : | _____ |                  |                       |
| TOTAL QUANTITY | : | _____ | UNIT: _____      |                       |
| OTHER          | : | _____ | # SOURCES: _____ |                       |

NAME

INDIVIDUAL USERS

AUTHORIZATION

PAGE: 3

ADDRESS WHERE MATERIAL IS USED OR POSSESSED

|           |  |  |  |
|-----------|--|--|--|
| BUILDING: |  |  |  |
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| CITY:     |  |  |  |
| STATE:    |  |  |  |

## DECOMMISSIONING FINANCIAL ASSURANCE INFORMATION

PAGE: 4

DOCKET: 03033663 LIC: NAME: QUADRA LINC CORP.

PARTY ISSUING MECHANISM: ASSUR TYPE: (C=CERT D=DFP)  
NAME: MECH TYPE:  
ADDR1: MECH AMOUNT:  
ADDR2: APPROVED? DATE:  
CITY: EXPIRES ? DATE:  
STATE: ZIP:

PARTY ISSUING MECHANISM: ASSUR TYPE: (C=CERT D=DFP)  
NAME: MECH TYPE:  
ADDR1: MECH AMOUNT:  
ADDR2: APPROVED? DATE:  
CITY: EXPIRES ? DATE:  
STATE: ZIP:

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NAME: MECH TYPE:  
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ADDR2: APPROVED? DATE:  
CITY: EXPIRES ? DATE:  
STATE: ZIP:

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ADDR2: APPROVED? DATE:  
CITY: EXPIRES ? DATE:  
STATE: ZIP:

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ADDR2: APPROVED? DATE:  
CITY: EXPIRES ? DATE:  
STATE: ZIP:

PARTY ISSUING MECHANISM: ASSUR TYPE: (C=CERT D=DFP)  
NAME: MECH TYPE:  
ADDR1: MECH AMOUNT:  
ADDR2: APPROVED? DATE:  
CITY: EXPIRES ? DATE:  
STATE: ZIP:

PARTY ISSUING MECHANISM: ASSUR TYPE: (C=CERT D=DFP)  
NAME: MECH TYPE:  
ADDR1: MECH AMOUNT:  
ADDR2: APPROVED? DATE:  
CITY: EXPIRES ? DATE:  
STATE: ZIP:

LICENSE DATA, CONTINUED

PAGE: 5

=====

DOCKET NO: 03033663      LICENSE NUMBER: \_\_\_\_\_

NAME : QUADRA LINC CORP.

=====

MEDICAL QUALITY MANAGEMENT PROGRAM REQUIRED: N      RECEIVED: \_      APPROVED: \_

DECOMMISSIONING FINANCIAL ASSURANCE REQUIRED: \_      SUBMITTED: \_

CONTINGENCY PLAN REQUIRED: \_      APPROVED: \_

=====

DECAY-IN-STORAGE APPROVED: N      HOLDING FOR < 10 HALF-LIVES APPROVED: \_

T 1/2 > 65 DAYS, ISOTOPE(S): \_\_\_\_\_

INTERIM STORAGE UP TO 1996: N

=====