LOCKHEED MARTIN
Electronics & Missiles, *World Wide Lantirn Depot*
Phone: (912) 328-0025, P.O. Box 2348, Warner Robins, GA 31099-2438

10-25439-01
130-34766

David Collins
Nuclear Materials Safety Section
U.S. Nuclear Regulatory Commission, Region II
Atlanta Federal Center
61 Forsyth Street SW
Suite 23T85
Atlanta, GA 30303-3415

May 28, 1998

RE: Application for Radioactive Materials License

Dear Mr. Collins:

Enclosed please find our application for our Radioactive Materials License to operate at Robins AFB. As part of our application there are several attachments. These include the following:

A. A description of the source, its use and the maximum number.

B. A copy of my resume.

C. A floorplan of our facility showing the locations of storage cabinets and spill kits. Also included are the operating procedures sections of the manuals for our radiation detection equipment.

D. Copies of our Site Specific Procedures dealing with radioactive materials. These include:

1. "HANDLING OF AMERICIUM 241 LASER WITH SUSPECTED DAMAGE".

2. "LEAK TESTING OF LASERS WITH AMERICIUM 241".

3. "DECONTAMINATION PROCEDURE AMERICIUM 241".

4. "LTR TRACKING, HANDLING AND SHIPPING".

5. "AMERICIUM 241 RADIATION PROTECTION PLAN".

E. Our hazardous waste disposal Point of Contact.

257967

NMSS/RGNI MATERIALS-002

If any further information is required or if I can be of assistance in this matter please contact me at:

Phone: (912) 328-0082
Fax: (912) 328-1001

Sincerely,

James D. Kincaid
Radiation Safety Officer, Lockheed Martin WWLD

cc: Jacob P. Schoch
Manager, Lockheed Martin WWLD

Nancy Davis
Legal department
MP 186
Lockheed Martin
5600 Sand Lake Road
Orlando, FL 32819-8907

257967

NRC FORM 313 (10-94)
10 CFR 30, 32, 33, 34, 35, 36, 39 and 40

U. S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIAL LICENSE

APPROVED BY OMB: NO. 3150-0120
EXPIRES 6-30-96

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 (T-6 F33), 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.

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:

US NRC RII–ATLANTA FEDERAL CENTER
SUITE 23T85, ATTN: DNMS
61 FORSYTH STREET
ATLANTA, GA 30303

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

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, 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 SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-8064

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)*

- [X] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER _____
- [ ] C. RENEWAL OF LICENSE NUMBER _____

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

Lockheed Martin
P.O. Box 2348
Warner Robins, GA 31099-2348

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

Lockheed Martin, LANTIRN
Building 640, Door X19
Page Road
Robins AFB, GA 31098

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

James D. Kincaid

TELEPHONE NUMBER

(912)328-0082

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.
Attachment A

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

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

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

9. FACILITIES AND EQUIPMENT.
Attachment C

10. RADIATION SAFETY PROGRAM.
Attachment D

11. WASTE MANAGEMENT.
Attachment E

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY 3P
AMOUNT ENCLOSED $ 750.00

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	SIGNATURE	DATE
James D. Kincaid, Radiation Safety Officer	James D. Kincaid	May 5, 1998

FOR NRC USE ONLY

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

PRINTED ON RECYCLED PAPER

ATTACHMENT A

RADIOACTIVE MATERIAL

The radioactive material that we will be dealing with is Americium 124. It is an Alpha emitter. The physical form of the source is a plated foil disc (Amersham Corp. Model AMM). No single source to exceed 4.5 Microcuries.

The sources will be sealed in a LASER Transmitter-Receiver (LTR) also called a LASER Designator Ranger Module (Page A2 Figure 2). The LTR is used in a Low Altitude Navigation and Targeting InfraRed for Night (LANTIRN) Targeting Pod. (Page A2 Figure 1).There will be two sources installed in each LTR. The total for each LTR not to exceed 9.0 Microcuries.

With respect to LTRs this facility will be used for storage and distribution only. There will be no work performed on LTRs other than to remove them from or install them into LANTIRN Pod. There will be no intentional violation of LTR seals.

The maximum number of LTRs in our facility at any one time would be 20. The usual amount of LTRs is five to six. Most LTRs received from customers for repair are usually shipped to the repair vendor within a week. Most LTRs returned from the repair vendor are shipped to the customer within a week.

ATTACHMENT B

WORK EXPERIENCE

May 1992 - Present

LOCKHEED MARTIN ELECTRONICS & MISSILES DIVISION
LANTIRN SPECIAL REPAIR ACTIVITY

As a Staff Engineer at the Goldsboro SRA, primary duties include the troubleshooting and repair of LANTIRN Targeting and Navigation Pods and all associated Field Support Equipment in support of Interim Contractor Support, Warrenty and Retrofit commitments. Collateral duties include Shift Supervisor, Radiation Safety Officer responsible for tracking and monitoring LASERs containing Am241 and Property Custodian of government and company owned test equipment, classified software and secure labs.

Sept. 1986 - May 1992

LOCKHEED MARTIN ELECTRONICS & MISSILES DIVISION
LANTIRN PRODUCTION TEST EQUIPMENT

As a Production Test Equipment Engineer for LANTIRN Production primary duties included design and supervising the building of production test equipment for LANTIRN Targeting and Navigation Pods and Field Support Equipment. Collateral duties included writing test equipment software and conducting certification of test equipment.

July 1979 - Sept. 1987

CFE INDUSTRIES

As Senior Electronics Technician primary duties included design and building of production test equipment for several product lines, building product prototypes and performing qualification testing of product prototypes. Collateral duties included design of product packaging and layout of printed circuit boards.

March 1977 - March 1978

HAMILTON ALARM COMPANY

As a Staff Electronics Technician primary duties included the installation and repair of various types of burglar and fire alarm systems including detectors, controllers and communication devices.

Sept. 1976 - March 1977

B & B DISTRIBUTORS

As a Route Salesman primary duties included wholesale sales and delivery of furniture to retail outlets.

Nov. 1995 - Sept. 1996

JACKSON WELDING SUPPLY

As a Route Salesman primary duties included sales and delivery of various welding supplies and bottled gases ,both flammable and inflammable.

April 1969 - June 1975

UNITED STATES NAVY

As a Nuclear Qualified Internal Communications Electrician primary duties included the maintenance of electrical machinery , Electrical Load Dispatcher and Reactor Operator in the propulsion plant of the USS ENTERPRISE (CV(N)65). Collateral duties included Radiation monitor and member of the Contamination Spill Team during reactor maintenance and weapons handling operations.

ATTACHMENT C

FACILITIES AND EQUIPMENT

Decontamination Kit
Storage Locker

GENERAL NOTES

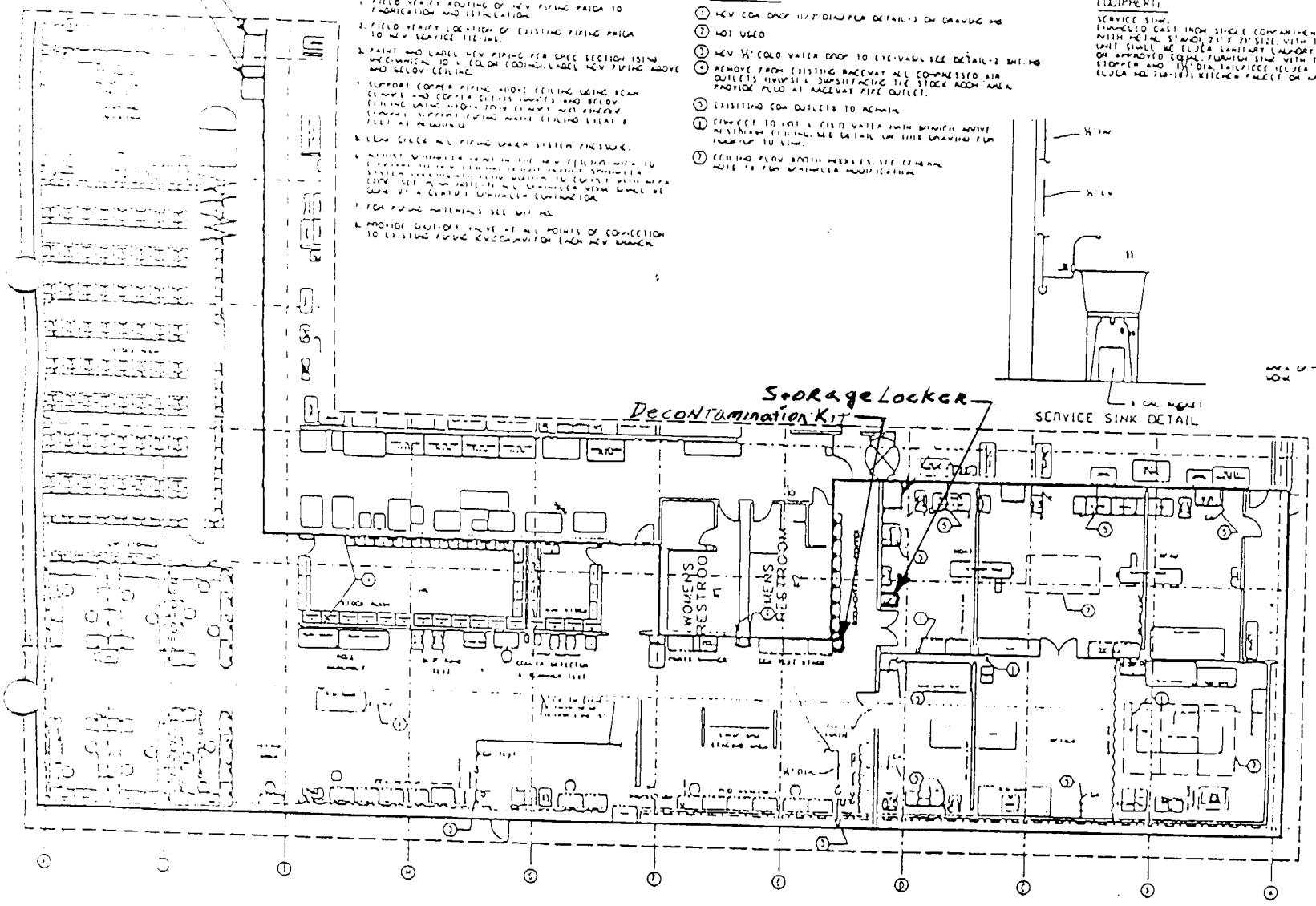
1. FIELD VERIFY ROUTING OF NEW PIPING PRIOR TO FABRICATION AND INSTALLATION.
2. FIELD VERIFY LOCATION OF EXISTING PIPING PRIOR TO NEW SERVICE TIE-INS.
3. PAINT AND LABEL NEW PIPING PER SPEC SECTION 15190 MECHANICAL ID & COLOR CODING. LABEL NEW PIPING ABOVE AND BELOW CEILING.
4. SUPPORT COPPER PIPING ABOVE CEILING USING BEAM CLAMPS AND COPPER CLEVIS HANGERS AND BELOW CEILING USING MODIFIED TYPE 21 HOOK AND FINISHED SUPPORT. SUPPORT PIPING WITH CEILING LATHS & FELT AT ROUNDS.
5. FLOW CHECK ALL PIPING UNDER SYSTEM PRESSURE.
6. REMOVE DOWNSTREAM PORTION OF NEW CEILING WITH 10 SYSTEM [illegible] SYSTEM. [illegible] CODE [illegible] WORK SHALL BE DONE BY A CERTIFIED SPRINKLER CONTRACTOR.
7. FOR PIPING MATERIALS SEE DWG NO.
8. PROVIDE DRAIN VALVE AT ALL POINTS OF CONNECTION TO EXISTING PIPING & RUN DRAIN VALVE EACH NEW BRANCH.

PLAN NOTES

1. NEW CDA DROP 1 1/2" DIA. PER DETAIL-3 ON DRAWING M6
2. NOT USED
3. NEW 3/4" COLD WATER DROP TO EYEWASH SEE DETAIL-2 DWG. M6
4. REMOVE FROM EXISTING RACEWAY ALL COMPRESSED AIR OUTLETS (WHIPS) & SUPPLY PROVIDE PLUG AT RACEWAY PIPE OUTLET.
5. EXISTING CDA OUTLETS TO REMAIN
6. CONNECT TO HOT & COLD WATER FROM BRANCH ABOVE RESTROOM CEILING. SEE DETAIL ON THIS DRAWING FOR HOOK-UP TO SINK.
7. CEILING FLOW BOOTH HEADER. SEE DETAIL NOTE 7 FOR DRAWING MODIFICATION

EQUIPMENT:

SERVICE SINK:
ENAMELED CAST IRON SINGLE COMPARTMENT, SELF SUPPORT WITH METAL STAND, 24" X 20" SIZE, WITH THREE FAUCET HOLES. UNIT SHALL BE ELJER SANITARY LAUNDRY TRAY MODEL 222-2218 OR APPROVED EQUAL. FURNISH SINK WITH TRAP PLUG WITH RUBBER STOPPER AND 1 1/2" DIA. TAILPIECE (ELJER [illegible]) AND ELJER NO. 710-1071 KITCHEN FAUCET OR APPROVED EQUAL.



PIPING PLAN

APPROVALS

PROJECT: R/L LANTIRN AIR TO WAGNER ROBINS AIR LOGISTICS CENTER

SHEET TITLE: PIPING PLAN

FACILITIES ENGINEERING

M3

DATE PLOTTED [illegible]

LUDLUM MODEL 2200

SCALER RATEMETER

Revised August 1997
Serial No. 138666 and Succeeding
Serial Numbers

257967

LUDLUM MEASUREMENTS, INC.
501 OAK ST., P.O. BOX 810
SWEETWATER, TX 79556
915/235-5494 FAX: 915/235-4672

• HV: A 10 turn precision meter control for adjusting HV from 100 volts to 2500 volts. It provides a linear adjustment of the detector voltage supply. Changing the detector voltage will cause the detector gain to change. A linear change in voltage will cause an exponential change in detector gain. The instrument will support 100 megohm scintillation loads to 1500 volts.

• Ratemeter: A 4-decade linear meter with ranges of 0-500, 0-5000, 0-50,000, 0-500,000 CPM. Readout is on a 2.5 inch scale panel meter. Separate scales are for battery check and high-voltage readout in conjunction with the Rate, HV, and Bat Switch.

• Count Readout: A 6-decade, light-emitting diode readout indicating the count.

3.2 Back Panel

• DATA connector: A 15 pin connector, allowing a recorder output. Data output is available to operate optional printer. (See Section 7-1.)

• Fuse: A screw-in type at the rear of the instrument. Replace with type 3AG, 1 amp fuse.

• 115 VAC: A receptacle for 115 volts 50-60 Hz line cord.

• Battery compartment: Contains 4 "D" cell batteries. Rechargeable nickel-cadmium batteries may be used.

3.3 Internal Controls

• Ratemeter Calibration Controls: Four potentiometers used to calibrate the ratemeter. Each range control is labeled respectively to the ratemeter range switch on the front panel.

4. OPERATING PROCEDURES

4.1 Power

Select either line or battery operation with the power switch.

• LINE Operation: Connect the instrument to line power of 115 volts 50-60 Hz. Turn the power switch to LINE and proceed to use the instrument.

• Battery Operation: The battery compartment lid is located at the rear of the instrument. Remove 4 screws to open the lid. Place 4 "D" cells or rechargeable batteries in the instrument. Note the polarity. Turn the power switch to BAT to operate. Check the battery condition by placing the RATE-HV-BAT selector on BAT. (A down scale reading indicates battery reversal.)

• Rechargeable Battery Operation: Place the batteries in the instrument as described above. Turn the power switch to BAT. Connect the instrument to line power. Turn the selector switch to CHG. Allow batteries to charge 24 hours (or longer if desired). At full charge, batteries should have a typical life of 20 hours. Turn the power switch to BAT and proceed with the operation of the instrument.

CAUTION

THE CHG POSITION SHOULD NOT BE USED ON AN INSTRUMENT THAT HAS NON-RECHARGEABLE BATTERIES. THE BATTERIES COULD RUPTURE OR EXPLODE, CAUSING CORROSION TO THE BATTERY HOLDER AND DAMAGE TO THE INSTRUMENT.

- Operational Check: Determine that the instrument is operational by first pressing COUNT and then HOLD. The count lamp should go on and then off. (These actions start and stop the count.)

4.2 DISCR and THRESHOLD Settings

The instrument DISCR control is calibrated at the factory so that 1.00 on the threshold dial is equal to a 10-millivolt (mV) input sensitivity. The DISCR control should not be changed unless a pulser is available to determine the threshold-versus-millivolt relationship.

The threshold control should not be set below approximately 1.00. Excessive counting may occur at lower threshold settings.

Set DISCR and THRESHOLD for appropriate detector.

- For scintillation detectors:

  - o Set THRESHOLD on 1.00.

  - o Connect scaler to Pulser.

  - o Set Pulser pulse height at 10 mV.

  - o Adjust DISCR until scaler meter reaches 75% of generated incoming count rate. The input sensitivity is now set for 10 mV with THRESHOLD set for 1.00.

  - o Proceed to use instrument with THRESHOLD setting at 1.00 or more.

- For G-M detectors:

  - o Set the THRESHOLD and the Pulser as in the first 3 steps for scintillation detectors.

  - o Disconnect Pulser and Set the THRESHOLD on 3.00 and proceed to use the instrument. The input sensitivity is approximately 30 millivolts. At settings less than this, double-pulsing may occur. Some G-M tubes may require even higher settings of 7.00 or 8.00.

- For proportional detectors:

  - o Set the THRESHOLD on 1.00.

  - o Connect the scaler to the Pulser.

  - o Set the Pulser pulse height at 2 mV.

  - o Adjust the DISCR until the scaler meter reaches 75% of the generated incoming count rate. The input sensitivity is now set for 2 millivolts with the THRESHOLD set on 1.00.

  - o Proceed to use instrument with THRESHOLD setting at 1.00 or more.

4.3 Operating Point

The instrument and detector operating point is established by setting the probe voltage (HV) and instrument sensitivity (DISCR and THRESHOLD). Efficiency, background and noise for a given detector system are fixed by the physical makeup of the detector and rarely vary from unit to unit. However, the selection of the operating point makes a marked difference in the apparent contribution of these 3 sources of count.

In the singular case of the G-M detector, a minimum operating voltage is required to establish the G-M operating region. (At lower voltages, the detector operates as a very insensitive proportional counter.) This detector is not capable of energy discrimination (pulse-height discrimination).

For gain sensitive detectors (proportional or scintillation), the most straightforward method of selecting the operating point is to develop a graph, relating count rate to system gain. This relationship is commonly referred to as a plateau or instrument plateau curve. System gain may be changed by adjusting detector high voltage (HV), THRESHOLD control or DISCR (amplifier gain).

4.4 Determining Instrument Plateau

- Set window ON-OFF at OFF.

- Set X0.1 - EXT at X0.1 and MINUTES thumbwheel switch to 01. This gives a 0.1 minute count.

- Set THRESHOLD control at 1.0

- With the detector shielded from the source, adjust the high voltage control by 100-volt increments and take a plot of HV-versus-background count rate until the detector voltage rating is reached. Return the HV control to zero.

✓ NOTE: If the detector voltage rating is reached before any background counts are detected, turn the DISCR clockwise to increase the sensitivity.

- Expose the detector to a source and again make a plot of count-versus-voltage.

- Plot both sets of data and select the operating point to correspond with the maximum source count and minimum background count. Avoid areas of very fast count rate changes with small changes in detector voltage. The optimum operating point for low background detectors is just above the inflection point (or break-over point) of the plateau curve. If the background count is irrelevant, shift the operating point to the plateau center for greater stability.

4.5 Operating the Instrument.

Insure that all settings and adjustments have been properly made. Proceed to use the instrument.

5. WINDOW OPERATION AND ENERGY CALIBRATION PROCEDURES

5.1 General

The M2200 is calibrated at the factory so that 1 turn on the THRESHOLD control is equal to1 turn on the window dial.

5.2 Equipment Required.

- Detector capable of energy discrimination. Examples used are the Ludlum Models 44-3 and 44-2.

- Known gamma radiation sources. Typical sources are ^{137}Cs (662 keV) and ^{241}Am (60 keV).

5.3 Procedure to Calibrate Threshold to 10 keV/Turn.

- Initial M2200 control settings

  - o Window ON-OFF switch at OFF

  - o Ratemeter RANGE selector switch - X1

  - o THRESHOLD dial - 5.50

  - o WINDOW dial - 1.00

  - o HV dial - 0.00

- Turn-on

  - o Connect the Model 44-3 detector to the instrument.

  - o Turn the power switch to the appropriate power supply.

- Operation and Calibration

  - o Expose the to detector

  - o Increase the HV setting until the count from the source just starts to count

  - o Switch the window ON-OFF to ON.

  - o Increase the HV until the source peaks on the ratemeter. Increase the range switch as needed to prevent the meter from exceeding full scale.

  - o The THRESHOLD dial is now calibrated to 10 keV/turn. The WINDOW control may be widened or narrowed without affecting the THRESHOLD setting. (As now calibrated, the instrument will respond only to radiation energies between 55 keV and 65 keV. Adjust the THRESHOLD dial for other energies of interest.

5.4 Procedure to Calibrate Threshold to 100 keV/Turn.

- Initial M2200 control settings:

  - o Switch the window ON-OFF to OFF.

  - o Ratemeter RANGE selector switch - X10

  - o THRESHOLD dial - 6.42

  - o WINDOW dial - 0.40

  - o HV dial - 1.00

- Turn-on

o Connect the Model 44-2 detector to the instrument.

o Turn the power switch to the appropriate power supply.

- Operation and Calibration

o Expose ^{137}Cs to detector.

o Increase HV setting until count from source just starts to count.

o Switch window ON-OFF switch to ON.

o Increase HV until source peaks on ratemeter. Increase RANGE switch as needed to prevent meter from exceeding full scale.

o THRESHOLD dial is now calibrated to 100 keV/Turn. The WINDOW control may be widened or narrowed without affecting the threshold setting. (As now calibrated, the instrument will respond only to radiation energies between 642 keV and 682 keV. Adjust THRESHOLD dial for other energies of interest.)

6. SPECIAL PRECAUTIONS ON RECHARGEABLE BATTERIES

With rechargeable batteries, avoid total discharge. Optimum performance is obtained if the battery pack is not discharged below 4 volts.

If the battery pack is totally discharged (or very deeply discharged) it is possible to reverse-charge 1 or 2 of the cells. If this occurs, the battery pack will indicate low voltage after a normal charge time.

If reverse charge is indicated, remove the batteries and check the potential of each cell. The reverse-charged cells will show zero voltage (or slight negative voltage).

Connect an independent battery charger to the reverse-charged cell. Place the cell behind a protective barrier.

CAUTION
The following procedure may cause the cell to rupture.

While monitoring the cell voltage, apply a 5-ampere charging rate for 15 seconds. Terminate the charge. If some potential is developed and maintained, the cell may be recharged at the normal rate. If some potential is not developed, allow the cell to cool. Then try again at a 10-ampere rate.

257967

LUDLUM MODEL 43-10

ALPHA SAMPLE COUNTER

OCTOBER 1992

LUDLUM MEASUREMENTS, INC.
501 OAK ST., P.O. BOX 810
SWEETWATER, TX 79556
915/235-5494 FAX: 915/235-4672

( ) M43-10 Alpha Sample Count( )

1. GENERAL

The Model 43-10 is a Windowless Alpha Sample Changer for counting filters or planchets. The Sample Changer can be used with any of the Ludlum scaler instruments or other equivalent counting instruments.

The scintillator material ZnS(Ag) is attached to the light pipe.

2. OPERATION

o Connect the M43-10 to the scaler. The coax cable with "C" connectors carries both the signal and HV.

o HV is applied to the Photomultiplier tube (PMT) when the sample slide is pushed completely in, tripping the microswitch. Rotate the sample slide lever to the locked position, securing sample slide in the "ON" position.

o Select appropriate count time and record background counts. Approximately three counts per minute can be expected as normal backgroud activity.

o For counting source material, place the source material on the appropriate side of the sample holder for the one or two inch filters. Do not allow the source material to extend above the top of the sample slide. Place Sample Slide in locked position for a short time before taking count to allow room light to decay out of the scintillation material.

o A background count should be taken after each source count to check for contamination on the sample holder or area within the o'ring.

3. SPECIFICATIONS

- Scaler Input Sensitivity: 2mV to 500mV
- Photomultiplier Tube: 2" diameter, 14 pin tube base, 10 pin dynode structure
- Scintillator Material: ZnS disc; plastic 0.01" thick
- Sample Holder: 1" diameter x 1/8" deep and 2" diameter x 1/8" deep
- HV Switch: Opening sample slide disables PMT high voltage
- Sample Holder Opening: 2-1/4" diameter x 3/8" deep
- Efficiency: 70% (2pi) for Pu-239

4. CALIBRATION PROCEDURE

✓Caution: Do not tip sample counter over with sample holder in sample slide. The sample holder will tear the thin metalized mylar window allowing light to scintillate the ZnS and cause excessive count in the beta channel.

4.1 Counting Instrument

- Calibrated Scaler Instrument
- HV Range- Nominally 800 ±200 volts.
- Nominal Input Sensitivity- 2mV to 500mV, nominally 10mV

✓Model 43-10- Instrument should be dark adapted slide closed and locked, a minimum of two hours after assembly before taking data.

4.2 Procedure

- Background Check

☐ Connect M43-10 to counting instrument with proper cable.

☐ Close and lock sample drawer.

☐ Record background count starting at 500 volts with 50 volt increments. Increase voltage until

background count exceeds 10 counts per minute or greater. Do not exceed 1500 volts.

- Source Plateau

☐ Place check source in Sample Drawer. Close and lock. Raise source from bottom of Sample Drawer if thickness of source permits.

☐ Record sample count starting at 500 volts. Increase voltage in 50 volt increments until 10 counts per minute background voltage determined in third step of Background Check.

☐ Set HV just above knee of plateau. Background count should be less than three counts per minute at that operating point.

- Determining Efficiency

☐ NBS traceable check source required

☐ Source may be in CPM, DPM, or microcuries.

- CPM Source: Position source for best geometry in Sample Drawer.

1. ☐ Set HV determined in third step of Source Plateau.
2. ☐ Record source count. Divide source count. Divide source count by calibrated CPM source times 100 for percent efficiency (2 Pi).

- DPM- Repeat first two steps as in CPM Source.

1. ☐ Record source count divided by calibrated DPM source times 100 for 4 Pi efficiency. Normally there is approximately 1.5% backscatter for a check source plated on a metal disc. The source manufacturer should provide information as to the amount of backscatter expected.

- Microcurie Source: To calculate DPM from microcurie source, change microcuries to DPM equivalent, and calculate efficiency as in Source Plateau. (1 microcurie is equal to 2.22 x 10^6 DPM).

5. TROUBLE SHOOTING

5.1 Zero or Very Low Counts

- Large light leak
- PMT malfunction
- Broken wire in tube socket
- Inoperative HV switch on M43-10-1 or broken wire
- Counting instrument malfunction
- Source too far from scintillation material
- Cable malfunction

5.2 No Source Plateau

- Light leak- slide not sealed properly against true base
- Noisy PMT
- Noisy HV switch
- Poor PMT to scintillation- light pipe interface

5.3 Excessive Background Count

- Light leak
- PMT malfunction
- Cable malfunction
- Noisy HV switch
- Instrument contaminated

LUDLUM MODEL 3

SURVEY METER

Revised April 1992
Serial No. 93535 and Succeeding
Serial Numbers

LUDLUM MEASUREMENTS, INC.
601 OAK ST., P.O. BOX 810
SWEETWATER, TX 79556
915/235-5494 FAX: 915/235-4672

• H.V. Adjustment: Provides a means to vary the high voltage from 400 to 1500 volts. The high voltage setting may be checked at the probe connector with an appropriate voltmeter.

• Range Calibration Adjustments: Recessed potentiometers located under the calibration cover, on the right side of the front panel. These adjustment controls allow individual calibration for each range multiplier.

4. OPERATING PROCEDURES

✓ Note: To open the Battery Lid, twist the lid button counterclockwise 1/4 turn. To close, twist clockwise 1/4 turn.

o Open the Battery Lid and install two "D" size batteries. Note (+) (-) marks on the inside of the lid. Match the battery polarity to these marks.

✓ NOTE: Center post of flashlight battery is positive. Close the battery box lid.

o Switch the range switch to BAT. The meter should deflect to the battery check portion of the meter scale.If the meter does not respond, recheck that the batteries have proper polarity.

o Connect a detector to the M3.

o Turn the instrument range switch to X100. Expose the detector to a check source. The speaker should click with the AUDIO ON-OFF switched to ON.

o Move the range switch to the lower scales until a meter reading is indicated. The toggle switch labeled F-S should have fast response in "F" and slow response in "S".

o Depress the RES switch. The meter should zero.

o Proceed to use the instrument.

✓NOTE: To assure proper operation of the instrument between calibrations, an instrument operational check should be performed prior to use. A reference reading with a check source should be obtained at the time of initial calibration or as soon as possible afterwards, for confirming correct operation. Confirm the proper reading on each scale.

If instrument fails to fall within ±20% of proper reading, it should be sent in to a calibration facility for recalibration.

5. CALIBRATION

5.1 Detector Operating Point.

Adjust the HV control for 900 volts at the instrument connector for G-M detectors.

✓ NOTE: Measure High Voltage with a Model 500 pulser or a High Impedance voltmeter with a high meg probe. If one of these is not available, use a voltmeter with a minimum of 1000 megohm input resistance.

Switch the Range multiplier to the X100 position. Expose the instrument to a calibrated gamma field which corresponds to approximately 80% of full meter scale. Adjust the X100 range calibration control for proper reading. Position instrument in field which corresponds to approximately 20% of meter scale and confirm meter indicates within ±10% of field. Repeat calibration for the X10-X0.1 ranges.

✓ NOTE: In the event that a calibration field is not available for the X0.1 range, the position will have to be electronically (pulser) calibrated. Connect a Ludlum Model 500 Pulser to the Model 3 and switch to the calibrated X1 range position. Adjust the pulser count rate until the meter reads approximately 80% of full meter scale. Note the count rate. Switch the Model 3 to the X0.1 position and decade the pulser to the next lowest range. Calibrate the X0.1 position to correspond to the 80% meter scale reading. Check the 20% scale indication by dividing the pulser count rate by 4.

5.2 Special Use Calibration.

For special G-M detector applications, the power supply may be adjusted for 450-volt and 1200-volt G-M tubes. Follow the above procedure, only set the supply at the new operating voltage.

For scintillation counters, connect the scintillator. Expose the unit to a source and develop an operating

257967

[illegible] voltage [illegible] operating voltage [illegible] flatted point [illegible] the meter, the procedure [illegible] adjust each [illegible] control for the desired [illegible] reading.

5.3 Calibrating CPM Meter Dial

To calibrate the CPM scale, a precision pulse generator is required. The pulse generator should be [illegible] pulse [illegible] time [illegible] pulse [illegible]

[illegible] the pulse [illegible] and adjust the pulse frequency [illegible] scale [illegible] on the X100 range. [illegible] adjust the X100 range calibration potentiometer as required. Decrease the pulse frequency by decades and adjust each range calibration potentiometer as required.

6. MAINTENANCE

Instrument maintenance consists of keeping the instrument clean and periodically checking the batteries and the calibration.

An instrument operational check should be performed prior to each use by exposing the detector to a known source and confirming the proper reading on each scale.

Recalibration should be accomplished after any maintenance or adjustment of any kind has been performed on the instrument. Battery replacements are not considered to be maintenance and do not normally require the instrument to be recalibrated.

Ludlum Measurements recommends recalibration at intervals no greater than one year. Check the appropriate regulatory agencies regulations to determine required recalibration intervals.

The batteries should be removed and the battery contacts cleaned of any corrosion at least every three months. If the instrument has been exposed to a very dusty or corrosive atmosphere, more frequent battery servicing should be used.

Use a spanner wrench to unscrew the battery contact insulators, exposing the internal contacts and battery springs. Removing the handle will facilitate access to these contacts.

NOTE

NEVER STORE THE INSTRUMENT OVER 30 DAYS WITHOUT REMOVING BATTERIES. ALTHOUGH THIS INSTRUMENT WILL OPERATE AT VERY HIGH AMBIENT TEMPERATURES, BATTERY SEAL FAILURE CAN OCCUR AT TEMPERATURES AS LOW AS 100° FAHRENHEIT.

7. THEORY OF OPERATION

7.1 INPUT

Detector pulses are coupled from the detector through C57 to emitter follower Q96. R83, R89 provide bias. R137 protects Q96 from input shorts. R27 couples the detector to the high voltage supply.

7.2 AMPLIFIER

A self-biased amplifier provides gain in proportion to R63 divided by R70. Transistor (pin 6 of U1) provides amplification. Pin 12,15 of U1 are coupled as current mirror to provide a load for pin 6 of U1. The output self-biases to 2 Vbe (approximately 1.4 volts) at pin 7 of U1. This provides just enough bias current through pin 6 of U1 to conduct all of the current from the current mirror.

Positive pulses from pin 7 of U1 are coupled to the discriminator.

Instruction Manual

LUDLUM MODEL 43-[illegible] A

LUDLUM MEASUREMENTS, INC.

[illegible] 735-5391 P. O. BOX [illegible]

[illegible] TEXAS, U.S.A. [illegible]

DESIGNER AND MANUFACTURER
OF
Scientific and Industrial
INSTRUMENTS

LUDLUM MODEL 43-2 ALPHA DETECTOR

1. GENERAL:

The Model 43-2 is an Alpha detector used for surveying and wipe tests.

2. SPECIFICATIONS:

WINDOW: 0.8 mg/cm^2

WINDOW AREA: 1.5" diameter- active area of 11.4 cm^2

EFFICIENCY: 60% of 2 pi for Pu-239

SCINTILLATION MATERIAL: ZnS(Ag)

HIGH VOLTAGE: 500-1000 volts typical

CONNECTOR: Series "C"; other connectors available upon request

3. MAINTENANCE:

Malfunctions are normally due to either light leaks, defective photomultiplier tube (PMT), contamination or high voltage not set properly. The malfunction caused by light holes gives an increase in background counts up to complete saturation where the instrument may indicate zero counts.

It is important to make sure the voltage to the detector is set properly by running a plateau and setting the operating point in the first third plateau, above the knee of the curve.

To check for a light leak, cover the window with an opaque material. If the instrument indicates a change in counts after a few minutes, the source of the light can sometimes be determined by visual inspection of the window or by uncovering small areas of the window and looking for a change in counts.

The photomultiplier tube rarely fails, but a tube malfunction can be isolated by insuring the instrument is not saturated due to light leaks and does not indicate any counts in a known radiation field.

257967

LUDLUM MEASUREMENTS, INC
800 622-0828 915 235-4672 (FAX) 915 235-5494

DATE: 08/29/97

TO: Mr Jim Kincaid
COMPANY: Lockheed Martin

Fx:919.735.0110
Ph.0015

FROM: Bill Huckabee

Total Pages including cover sheet: 01

COMMENTS: Thank you for your interest in Ludlum products. Per your request, I am pleased to provide the following:

Am-241 NIST Traceable source, 47mm size, 44mm active area
activity between 15,000 to 20,000 dpm, electroplated (for allowing alpha emissions)

If I may assist in any manner, please call at your convenience.

Regards,

Bill Huckabee
Nuclear Instrument Sales

ATTACHMENT D

SITE SPECIFIC PROCEDURES PERTAINING TO RADIOACTIVE MATERIALS

SITE SPECIFIC PROCEDURE

LOCKHEED MARTIN

LANTIRN SRA

HANDLING OF AMERICIUM 241 LASER

WITH SUSPECTED DAMAGE

FILE COPY

Quality Assurance _____ Date: 11/13/97

Technical Lead _____ Date: 11/13/97

Program Approval (Offsite) _____ Date: 11/13/97

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CHANGE LEVEL	DISCRIPTION	DATE
NEW	Initial release	10-20-9[illegible]
A	Reformat document and add dose limits.	07-15-97
B	Add ocupational dose limits	07-15-97

SITE SPECIFIC PROCEDURE

HANDLING OF SUSPECTED DAMAGED AMERICIUM 241 LASER

1.0 PURPOSE

To address the actions to be taken should there be suspected damage to the Americium 241 (AM241) Laser Transmitter Receiver (LTR).

2.0 BACKGROUND

2.1 The AM241 is an alpha particle emitter that can only travel a few centimeters and can not penetrate the skin. Contamination can only occur through inhalation or ingestion of AM241 dust. In the LANTIRN application, the AM241 is contained/secured within a sealed LTR.

2.2 The activity level is 8 microcuries, an extremely small quantity, equivalent to 8 household smoke detectors. This quantity is exempt from the requirement for monitoring or wipe testing when received. It is only if the LTR is severely damaged or dismantled that a potential exposure could occur.

2.3 Only authorized personnel are to handle LTRs.No member of the general public or declared pregnant women are to handle LTRs to prevent dose limits from being exeeded. he dose limit for an individual of the public is 0.1rem and for declared pregnant women is 0.5rem.

2.4 The ocupational dose limits for adults are as follows:

(1)an annual limit, which is the more limiting of:

(a) the total effective dose equivalent being equal to five rems (0.05Sv); or

(b) the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (0.5 Sv); and

(2) the annual limits to the lens of the eye, to the skin, and to the extremities which are:

(a) an eye dose equivalent of 15 rems (0.15 Sv), and

(b) a shallow-dose equivalent of 50 rems

[illegible]

3.0 HANDLING LTR WITH SUSPECTED DAMAGED

3.1 The laser will be considered suspect if it has been dropped or for some other reason the device is breached. Even if the LTR is intact, it will always be assumed that the holder containing the AM241 has been compromised until proven otherwise by the Radiation Safety Officer (RSO).

3.2 In the event a LTR is breached or is suspected of being damaged the following actions shall be taken:

3.2.1 A minimum of 10 feet shall be cordoned off around the LTR. Insure that no member of the public or declared pregnant women enter the cordoned area so that dose limits will not be exeeded.

3.2.2 The LTR shall be completely covered with an impermeable barrier, i.e. visquine, cardboard box.

3.2.3 The RSO shall be notified immediately.

3.2.4 The RSO will determine if the LTR is leaking, using the procedures of SOP-040-002.

3.2.5 If it is determined that the LTR is leaking:

3.2.5.1 An authorized individual shall don protective equipment and clothing per SOP-040-003 and place the LTR in an impermeable container, i.e. the shipping container the laser was received in.

3.2.5.2 Perform decontamination of the area per SOP-040-003.

3.2.5.3 The LTR/container shall be placed in the designated AM241 LTR storage container.

3.2.4.4 The RSO will notify the RSO in Orlando by calling plant protection (407-356-8884). No other action is to be taken thereafter, including returning the LTR to the manufacturer, until direction is received from Orlando's RSO.

REFERENCE

SSP-040-002	Leak testing of lasers with Americium 241
SSP-040-003	Decontamination procedure Americium 241
SSP-040-004	Laser transmitter reciever tracking, shipping and handling
SSP-040-005	Americium 241 radiation protection plan

LOCKHEED MARTIN

August 23, 1997

SITE SPECIFIC PROCEDURE

LOCKHEED MARTIN
LANTIRN SRA

LEAK TESTING OF LASERS WITH

AMERICIUM 241

FILE COPY

Quality Assurance _____ Date: 11/13/97

Technical Lead _____ Date: 11/13/97

Program Approval (Offsite) _____ Date: 11/13/97

CHANGE LEVEL	DISCRIPTION	DATE
NEW	Initial release	10-20-95
A	Reformat document and add dose limits.	07-11-97
B	Add occupational dose limits and correct procedure.	

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SITE SPECIFIC PROCEDURE
LEAK TESTING OF LASERS WITH AMERICIUM 241

1.0 PURPOSE

To address the actions to be taken when a Laser Transmitter Receiver (LTR) equipped with Americium 241 (AM241) is suspected of being damaged and a leak test certificate is required.

2.0 BACKGROUND

2.1 The AM241 is an alpha particle emitter that can only travel a few centimeters and can not penetrate the skin. Contamination can only occur through inhalation or ingestion of AM241 dust. In the LANTIRN application, the AM241 is contained/secured within a sealed LTR.

2.2 The activity level is 8 microcuries, an extremely small quantity, equivalent to 8 household smoke detectors. This quantity is exempt from the requirement for monitoring or wipe testing when received. It is only if the LTR is severely damaged or dismantled that a potential exposure could occur.

2.3 Only authorized personnel are to handle LTRs. No member of the general public or declared pregnant women are to handle LTRs to prevent dose limits from being exeeded. The dose limit for an individual of the public is 0.1rem and for declared pregnant women is 0.5rem.

2.4 The ocupational dose limits for adults are as follows:

(1) an annual limit, which is the more limiting of:
- (a) the total effective dose equivalent being equal to five rems (0.05Sv); or
- (b) the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (0.5 Sv); and

(2) the annual limits to the lens of the eye, to the skin, and to the extremities which are:
- (a) an eye dose equivalent of 15 rems (0.15 Sv), and
- (b) a shallow-dose equivalent of 50 rems (0.5 Sv) to the skin or to each of the extremities.

3.0 LEAK TESTING

3.1 AM241 LTR's will be leak tested in the following manner.

3.1.1 Leak test Americium 241 (AM241) laser containing sealed sources using the Ludlum 2200 Scaler Ratemeter connected to the Ludlum 43-10 Sample Counter.

3.1.2 Ensure that the instrument is turned on (it is good practice to never turn the counter off, since the sodium lodite crystals are voltage dependent).

3.1.3 Check that the timer is set to 60 seconds.

3.1.4 Set the threshold at 50 and set the window at 20. The window toggle must be engaged.

3.1.5 Place the AM241 source in the sample counter and count for one minute. Record the count. This count is referred to as the calibration count and should be within 5 percent of the last calibration count.

3.1.6 Remove the AM241 source and count for one minute with the counter empty. Record this count, this is the background count.

3.1.7 With a moistened wiper, wipe the external surface of the laser over a 300 square centimeter area.

3.1.8 Place the wipe in a small zip-lock bag, seal, and place in the well counter and count for one minute. This is referred to as the wipe count.

3.1.9 Perform the following calculation and record on the laser leak test certificate (SRA Form GBSRA-1005):

$$DPM = \frac{[\text{ wipe counts }] - [\text{ background counts }]}{\text{detector efficiency}}$$

If the wipe reveals greater than 2200 dpm 0.001 µcl of activity evacuate the area immediately and notify the RSO.

3.1.10 The RSO shall take immediate action. A survey shall be performed to determine the extent of the contamination and the area will be secured. The source will be contained and the area will be decontaminated per SSP040-003.

REFERENCE

SSP-040-001	Handling [illegible] Americium 241 laser with suspected damage
SSP-040-003	Decontamination procedure Americium 241
SSP-040-004	Laser transmitter reciever tracking, shipping and handling
SSP-040-005	Americium 241 radiation protection plan

LASER LEAK TEST CERTIFICATE

SOURCE TYPE: AMERICIUM-241 VENDOR: AMERGHAM

SAMPLE DATE : _____

LASER PART NUMBER: 60510990-49

LASER SERIAL NUMBER : _____

CALIBRATION COUNT : _____

LAST CALIBRATION COUNT : _____

BACKGROUND COUNT : _____

WIPE COUNT : _____

DETECTOR EFFICIENCY : _____

CALCULATED DPM : _____

MICROCURIES OF ACTIVITY : _____

Analysis of the wipe used to conduct a leak test on the laser/source was performed by scintillation detection reveals removable contamination was less than 0.005 microcuries when compared to NIST traceable standards. The results are indicative of a non-leaking source.

AUTHENTICATING

SIGNATURE : _____

DATE : _____

SRA FORM GBSRA-1005

LOCKHEED MARTIN

August 28, 1997

SITE SPECIFIC PROCEDURE

LOCKHEED MARTIN

LANTIRN SRA

DECONTAMINATION PROCEDURE

AMERICIUM 241

FILE COPY

Quality Assurance _____ Date: 11/13/97

Technical Lead _____ Date: 11/13/97

Program Approval (Offsite) _____ Date: 11/13/97

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CHANGE LEVEL	DISCRIPTION	DATE
NEW	Initial release	10-20-95
A	Reformat document and add dose limits.	07-11-97
B	Add ocupational dose limits.	

STANDARD OPERATION PROCEDURE

DECONTAMINATION PROCEDURE AMERICIUM 241

1.0 PURPOSE

To address the actions to be taken should there be suspected damage to the Americium 241 (AM241) Laser Transmitter Receiver (LTR).

2.0 BACKGROUND

2.1 The AM241 is an alpha particle emitter that can only travel a few centimeters and can not penetrate the skin. Contamination can only occur through inhalation or ingestion of AM241 dust. In the LANTIRN application, the AM241 is contained/secured within a sealed LTR.

2.2 The activity level is 8 microcuries, an extremely small quantity, equivalent to 8 household smoke detectors. This quantity is exempt from the requirement for monitoring or wipe testing when received. It is only if the LTR is severely damaged or dismantled that a potential exposure could occur.

2.3 Only authorized personnel are to handle LTRs or perform decontamination. No member of the general public or declared pregnant women are to handle LTRs or perform decontamination to prevent dose limits from being exeeded. The dose limit for an individual of the public is 0.1rem and for declared pregnant women is 0.5rem.

3.4 The occupational dose limits for adults are as follows:

(1) an annual limit, which is the more limiting of:

(a) the total effective dose equivalent being equal to five rems (0.05 Sv); or

(b) the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (0.5 Sv); and

(2) the annual limits to the lens of the eye, to the skin, and to the extremities which are:

(a) an eye dose equivalent of 15 rems (0.15 Sv), and

(b) a shallow-dose equivalent of 50 rems (0.5 Sv) to the skin or to each of the extremities.

3.0 DECONTAMINATION PROCEDURE

3.1 Maintain a safe distance from the laser (10 feet approximately) while keeping it in sight. Do not track contamination all over the area, at the edge of the safe zone remove shoes. Do not let other personnel near the area.

3.2 From the radioactive spill kit remove the half mask respirator and don over the nose and mouth. Ensure that the respirator is equipped with hepa cartage's (magenta) this filter offers protection from radionuclides.

3.3 Don coveralls and plastic gloves from radioactive spill kit.

3.4 Seal off the contaminated area and do not let anyone in or out. Close all doors, shut off or close ventilation system if possible, and turn off all fans and blowers.

3.5 Do not attempt immediate decontamination [illegible] immediate action is required to [illegible] shoes or equipment. If possible the decontamination should take place under the direction of the RSO.

3.6 The individuals involved in the contamination shall generally be required to perform the cleanup using materials from the spill kit. The RSO shall determine the procedures and equipment to be used and shall render assistance as necessary.

3.7 Determine the extent of the contaminated area by surveying with the Ludlum Geiger Counter. Check all objects and clothing for contamination before leaving the contaminated area,

3.8 Materials kimwipes, mops, coveralls, gloves, and masks will be placed in plastic bags provided in the spill kit and labeled with the radiation hazard warning labels. The RSO shall ensure that this material is properly disposed of.

*** do not throw away any material used in the cleanup

3.9 All personnel and areas involved shall be surveyed to ensure decontamination has been effective before work is resumed.

3.10 All personnel involved in the cleanup will ensure that their hands are washed prior to returning to work.

REFERENCE

SSP-040-001	Handling of Americium 241 laser with suspected damage
SSP-040-002	Leak testing of laser with Americium 241
SSP-040-004	Laser transmitter reciever tracking, shipping and handling
SSP-040-005	Americium 241 radiation protection plan

LOCKHEED MARTIN

August 23, 1997

SITE SPECIFIC PROCEDURE

LOCK HEED MARTIN
LANTIRN SRA

LASER TRANSMITTER RECEIVER TRACKING, SHIPPING AND HANDLING

FILE COPY

Quality Assurance _____ Date: 2-11-98

Technical Lead _____ Date: 2-11-98

Program Approval (Offsite) _____ Date: 2-11-98

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LASER TRANSMITTER RECEIVER TRACKING, RECEIVING AND HANDLING

1.0 PURPOSE

This document provides the guidelines to be followed for the tracking and handling of Laser Transmitter Receivers (LTR) through the SRA. LTRs contain two pellets of Americium which is a radioactive material and requires monitoring.

2.0 BACKGROUND

2.1 The AM241 is an alpha particle emitter that can only travel a few centimeters and can not penetrate the skin. Contamination can only occur through inhalation or ingestion of AM241 dust. In the LANTIRN application, the AM241 is contained/secured within a sealed LTR.

2.2 The activity level is 8 microcuries, an extremely small quantity, equivalent to 8 household smoke detectors. This quantity is exempt from the requirement for monitoring or wipe testing when received. It is only if the LTR is severely damaged or dismantled that a potential exposure could occur.

2.3 Only authorized personnel are to handle LTRs. No member of the general public or declared pregnant women are to handle LTRs to prevent dose limits from being exeeded. The dose limit for an individual of the public is 0.1rem and for declared pregnant women is 0.5rem.

2.4 The occupational dose limits for adults are as follows:

(1)an annual limit, which is the more limiting of:

(a) the total effective dose equivalent being equal to five rems (.5Sv); or

(b) the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (0.5 Sv); and

(2) the annual limits to the lens of the eye, to the skin, and to the extremities which are:

(a) an eye dose equivalent of 15 rems (0.15 Sv), and

(b) a shallow-dose equivalent of 50 rems (0.5 Sv) to the skin or to each of the extremities.

3.0 PROCEDURE

3.1 TRACKING

3.1.1 The SRA Radiation Officer will be responsible for the tracking of LTRs through the facility.

3.1.2 All LTRs, some of which may be received inside of a targeting pod or NSESA, shipped to the SRA shall be documented in the Laser Transmitter Receivers (LTR) Log. The log shall consist of date received, received from, pod/NSESA/LTR serial number as applicable, date of last leak test, ship date, and shipped to.

3.1.3 LTRs received in from Litton Laser Systems will have a Radioactive Materials Transfer Form (LLS Form 6049). These forms shall be retained in the Laser Transmitter Receivers (LTR) Log.

3.1.4 SRA Support Group shall retain the tracking log for each shipment transaction on file for future reference for a period of two years.

3.1.5 The transfer of LTRs to other locations and/or departments will be documented on a Material Transfer Request (MTR).

3.1.6 Every six months an inventory shall be taken. It shall be compared to the tracking log to insure correct count and date of last leak test. If the date exceeds six months the LTR shall be leak tested per SOP-040-002.

3.2 SHIPPING

3.2.1 The shipper documents for a Pod containing a LTR shall contain the following statement:

> "This package conforms to the conditions and limitations specified in 49CFR 173.421 for radioactive material, excepted package-limited quantity of materal, UN2910".

3.2.2 The shipper documents for a LTR shall contain the following statement:

> "Secure item in locked storage area or keep under constant surveillance until carrier pick-up. This package conforms to the conditions and limitations specified in 49CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910".

3.3 HANDLING AND STORAGE

3.3.1 All LTRs upon receipt will be inspected for damage In the event that a LTR is suspected to be damaged, the subject LTR shall be handled in accordance with SOP-040-001.

3.3.2 All LTRs are required to undergo a periodic leak test every three months. Upon receipt of a LTR the tracking log and supplied paper work will be checked for date of last leak test. If date exceeds three months or if there is no record then a leak test per SOP-040-002 shall be performed.

3.3.3 All LTRs will be stored in their original supplier packaging, a laser transport tote, or bubble wrap within a secure cabinet if not mounted in a Pod or NSESA. The secure cabinet shall be marked in accordance with federal and state regulations for the handling/storage of radioactive materials. A log shall be maintained showing when assets are placed in/removed from the cabinet. The log book shall track as a minimum the following information:

Nomenclature:
LTR Part Number:
LTR Serial Number:
Source #1 Serial Number:
Source #2 Serial Number:
In date:
Out date:
Location:

3.3.4 The log shall be used by the Safety Officer for audit purposes.

REFERENCE

SSP-040-001	Handling of Americium 241 laser with suspected damage
SSP-040-002	Leak testing of lasers with Americium 241
SSP-040-003	Decontamination procedure Americium 241
SSP-040-005	Americium 241 radiation protection plan
L0-POD-97-0012-0	Americium Accountability

SITE SPECIFIC PROCEDURE

LOCK HEED MARTIN
LANTIRN SRA

AMERICIUM 241
RADIATION PROTECTION PLAN

FILE COPY

Quality Assurance _____ Date: 11/13/97

Technical Lead _____ Date: 11/13/97

Program Approval (Offsite) _____ Date: 11/13/97

CHANGE LEVEL	DESCRIPTION	DATE
NEW	Initial release	

AMERICIUM 241
RADIATION PROTECTION PLAN

1.0 PURPOSE

This document provides the guidelines to be followed for the protection of personnel due to the presence of Laser Transmitter Receivers (LTR) at the SRA which contain two pellets of Americium 241 which is a radioactive material.

2.0 BACKGROUND

2.1 The AM241 is an alpha particle emitter that can only travel a few centimeters and can not penetrate the skin. Contamination can only occur through inhalation or ingestion of AM241 dust. In the LANTIRN application, the AM241 is contained/secured within a sealed LTR.

2.2 The activity level is 8 microcuries, an extremely small quantity, equivalent to 8 household smoke detectors. This quantity is exempt from the requirement for monitoring or wipe testing when received. It is only if the LTR is severely damaged or dismantled that a potential exposure could occur.

2.3 Only authorized personnel are to handle LTRs. No member of the general public or declared pregnant women are to handle LTRs to prevent dose limits from being exeeded. The dose limit for an individual of the public is 0.1rem and for declared pregnant women is 0.5rem.

2.4 The occupational dose limits for adults are as follows:

(1)an annual limit, which is the more limiting of:

(a) the total effective dose equivalent being equal to five rems (.5Sv); or

(b) the sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (0.5 Sv); and

(2) the annual limits to the lens of the eye, to the skin, and to the extremities which are:

(a) an eye dose equivalent of 15 rems (0.15 Sv), and

(b) a shallow-dose equivalent of 50 rems (0.5 Sv) to the skin or to each of the extremities.

3.0 PROCEDURES

3.1 Procedures shall be written to discribe the proper handling of LTRs containing Americium 241 while at the SRA

3.2 There shall be a procedure for the tracking, shipping, and handling of LTRs. This procedure shall discribe the various logs and other documentation required

3.3 There shall be a procedure for the proper handling of LTRs that are suspected of having a leak. It shall also describe who is to be notified and where and how the LTR is to be stored until appropriate removal from the SRA can be accomplished

3.4 There shall be a procedure for leak testing LTRs. It shall describe the equipment and the proper technique for performing the test. It shall also provide a data sheet for recording the results.

3.5 There shall be a proceure for decontamination in case of a leak. It shall describe the equipment and the proper technique to be used.

4.0 TRAINING AND NOTICES

4.1 Employees shall be given periodic training every six months. New employees will be given ther first traing during orientation then again at the next periodic training session.

4.2 Training shall consist of the following:

(1) Description of the hazards posed by the presence of LTRs containing Americium 241 at the SRA.
(2) Contents of Americium 241 Proceures.
(3) Locations of safety bulletin boards where notices and emergency checklists can be found.
(4) Locations of radiation spill kits.
(5) Locations of copies of Americium 241 procedures.
(6) Who to notify in case of an incident.

4.3 Notices pertaining to the presence of Americium 241 at the SRA shall be posted of the safety bulletin boards.

4.4 An emergency check list shall be posted on the bulletin boards. This check list shall describe what actions to take and who to notify in case of an incident

5.0 AUDIT AND REVIEW OF PLAN

5.1 A periodic audit will be conducted annualy the audit shall cover the following

(1) LTR tracking log and LTR storage cabinet logs
(2) LTR inventory
(3) LTR leak test records
(4) LTR shipping and receiving records
(5) Proper handling of LTRs
(6) Safety bulletin boards for current emergency check lists and notices

5.2 After each audit a critique and review of the the radiation protection plan shall be held. All aspects of the plan shall be checked so that it is in compliance with all applicable requirements.

SSP-040-001	Handling of Americium 241 laser with suspected damage
SSP-040-002	Leak testing of lasers with Americium 241
SSP-040-003	Decontamination procedure Americium 241
SSP-040-004	Laser transmitter reciever tracking, shipping and handling
L0-POD-97-0012-0	Americium Accountability

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ATTACHMENT E

Our radioactive waste disposal, if ever needed, would be handled by Robins AFB Bioenvironmental Engineering. Point of Contact is:

Craig A. Refosco, Capt., 43E3A
Bioenvironmental Engineering
78th Medical Group/SGPB
655 7th Street
Robins AFB, GA 31098-2427

Phone (912) 926-8860
Fax (912) 926-3111