Center for Domestic Preparedness
P.O. Box 5100
Anniston, AL 36205

FEMA

Q-5
MS-16

November 11, 2008

Ms. Betsy Ullrich
Division of Nuclear Materials Safety
Region 1
Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, Pennsylvania 19406-1415

01-31331-01
03037827

SUBJECT: Mail Control Number 142784, Additional Information Reply

Dear Ms. Ullrich,

This is in reference to your deficiency letter dated October 1, 2008, and the application submitted August 25, 2008. We have reviewed all of your questions and have provided the additional information you requested within the enclosed attachments.

Please contact us with additional questions you may have and we look forward to working with the NRC and yourself in establishing a new license in the name of the Center for Domestic Preparedness.

My point of contact for this action is Mr. Michael Vice and he can be reached at the following:

Office: (256) 847-2266
Cell: (256) 310-6346
Email: vicem@cdpemail.dhs.gov

RECEIVED
REGION 1
2008 NOV 13 PM 2:27

Sincerely,

Dr. Christopher T. Jones
Superintendent

Attachments:
Response to Questions,
CDP Radiation Safety Program, November 2008

142784

NMSS/RGN1 MATERIALS-002

1. a. Permanent Locations

The Center for Domestic Preparedness (CDP) is a federally funded training facility consisting of the four major facilities listed below in a campus type configuration.

1. *Main Responder Training Complex* – This location is a classroom type setting with additional breakout rooms where students learn the terminology, capabilities and use of multiple detection devices used in response to various emergencies to include but not limited to chemical, biological, radiological, and natural disasters. Detection devices used within this facility include APD 2000 utilizing Ni-63 sealed sources.

2. *Chemical, Ordnance, Biological, Radiological Training Facility (COBRATF)* – This location is a scenario based, hands on training facility where chemical agent training is conducted. Students perform tasks utilizing detection technologies based on ion mobility spectroscopy. These devices are the ICAM and APD 2000 both utilizing Ni-63 sealed sources.

3. *Noble Training Facility (NTF)* – This location is a classroom type setting with additional scenario-based breakout rooms where students learn the terminology, capabilities and use of multiple detection devices used in response to various emergencies in a hospital type setting. Detection devices used within this facility include APD 2000 utilizing Ni-63 sealed sources. CS-137, sealed, double encapsulated sources are used as training aides to condition students to the proper operations of detection devices. See reply (8) for a detailed listing of radiation survey instruments used by the CDP.

4. *500 Area Training Complex* – This location is a scenario based complex where students exercise and apply techniques learned during training delivery. Detection devices used at this complex include APD 2000 utilizing Ni-63 sealed sources. CS-137, sealed, double encapsulated sources are used as training aides to condition students to the proper operations of detection devices. See reply (8) for a detailed listing of radiation survey instruments used by the CDP.

b. The CDP will utilize licensed sources (Ni-63, Cs-137, Am-241) at the permanent locations listed below:

1. Main Responder Training Complex
61 Responder Drive
Anniston, AL 36205

2. Chemical, Ordnance, Biological, Radiological Training Facility (COBRATF)
801 Walt Philips Road
Anniston, AL 36205

3. Noble Training Facility (NTF)
490 Care Drive
Anniston, AL 36205

4. 500 Area Training Complex
363 Wall Street
Anniston, AL 36205

c. At this time, the CDP requests permission to store APD 2000 detection devices at three regional locations that support training delivery. Each regional storage location will have a logistics manager that has completed the 1-2 hours radiation safety training as described in reply 6.a. The logistics manager will be responsible for storage, security, and inventory control of licensed sources located at the regional storage location. While at the regional storage location, the APD 2000 detection devices will be stored inside a closable and lockable container (i.e. Pelican case) and the container will be stored within a secured Conex container. The three regional storage locations are listed below:

1. Eastern Region
Brooklyn Homeland Security
2615 W 13th Street
Brooklyn, NY 11223

2. Central Region
Central Region Inventory Control Facility
5973 West, 400 South
Jamestown, IN 46147

3. Western Region
Western Region Inventory Control Facility
1201 Blucher Ave.
Granada Hills, CA 91344

d. The CDP requests authorization to use the APD 2000 detection devices which utilize Ni-63 sealed sources at temporary training sites during training delivery. CS-137, sealed, double encapsulated sources will not be utilized at temporary training sites away from the above permanent locations listed in reply 1.b. The CDP Radiation Safety Program will outline instructions for maintaining security and control of licensed materials during storage and use at temporary training sites; instructions for radiation safety and DOT compliance during transportation; procedures to maintain accountability for licensed materials at temporary training sites; and emergency

procedures in the event that licensed materials are lost or damaged at temporary training sites.

2. Please note the chart below that identifies the sealed sources utilized by the CDP.

	Radioisotope	Activity (mCi)	Manufacturer	Model/Type Number
APD 2000	Nickel 63	10	Smiths Detection	SSDR# MD-0263-D-102-G
ICAM	Nickel 63	10	Intellitec	SSDR# MD-0263-D-102-G
RAID-M	Nickel 63	15	Bruker	Part # 226533
Multi-IMS	Americium 241	0.16	Drager	Part # 09-23918-01E
M8A1	Americium 241	0.25	Brunswick Defense	SSDR# NR-1129-D-102-S
Sealed, Double Encapsulated Capsules	Cesium 137	16 **At the date of manufacture -1977*	Nuclear Chicago	Defense Civil Preparedness Agency Standard Item Specification and Designation OCD-S-104

3. The CDP is a federally funded training facility tasked with a mission to teach and train first responders/students.

4. Mr. Vice attended the Radiation Safety Officer course at the Radiation Safety Academy in September of 2007. Since that time, Mr. Vice has been working with the RSO(s) which oversee two NRC licenses the CDP is currently operating under.

The Operations and Maintenance contractor at the COBRATF currently holds a NRC license for Nickel 63 sealed sources (10 millicuries) found in the APD 2000, ICAM, and RAID-M and Americium 241 sources (0.25 millicuries) found in the Multi-IMS and M8A1.

The CDP is currently working under an Interagency Agreement with the U.S. Army Primary Standards Laboratory (APSL), a Directorate of the U.S. Army Test, Measurement and Diagnostic Equipment Activity (USATA) for the use of CS-137, sealed, double encapsulated sources (16 millicuries).

Mr. Vice assists each RSO with monthly area surveys of radiation source storage locations, routine wipe tests of sources and detection devices, source inventories, and dosimetry badge tracking. As RSO for the new CDP NRC license, Mr. Vice will work directly with Mr. Nicodemus, the CDP authorized user and source manager, to ensure instructional staff and students receive proper training of general radiation safety, radiation hazards, radiation control measures to include time, distance and shielding and coordinate radiation source inventory, maintenance, calibration, wipe tests and proper source storage.

5. a. Under the new CDP NRC license, Mr. Nicodemus will be designated as an authorized user and the source manager. Mr. Nicodemus works for the Operations and Maintenance contractor referenced in reply (4) and currently serves as the authorized user and source custodian under that NRC license. Mr. Nicodemus served twenty-two years in the U.S.Army and sixteen years of that as a Nuclear, Chemical, and Biological Specialist.

   During this twenty-two year period, Mr. Nicodemus worked on the Nuclear Accident/Incident Control Team at Fort Ord; graduated the Nuclear Emergency Team Operations course at Kirkland Air Force Base; and graduated the Chemical Non-Commissioned Officer Advanced course at Ft. McClellan which included radiation training in instrumentation, total dose calculations, nuclear yield predictions, and shielding factors. Mr. Nicodemus also participated in multiple Nuclear Emergency Team Exercises while at Kirkland Air Force Base.

   Mr. Nicodemus completed the Radiation Safety Officer course at the Radiation Safety Academy in May of 2001 and again completed the course as a refresher in September of 2005.

   b. At this time, no other individuals will be named as Authorized Users on the CDP NRC license.

6. a. CDP personnel supervising the use of licensed sources during training delivery will receive 1 to 2 hours of site and source specific radiation safety training to include but not be limited to: safe use of sources and devices; radiation versus contamination; internal versus external exposure; the use of time, distance and shielding to minimize exposure; operating and emergency procedures; security, control and accountability for sources and devices; temporary site protocols; and employee protection and proper conduct while licensed sources are being utilized.

   b. A closed book, written test will not be given.

   c. Employee radiation safety training will be delivered by the CDP RSO and/or the CDP Authorized User/Source Manager.

   d. Records of all employee radiation safety training will be maintained by the CDP RSO and/or the CDP Authorized User/Source Manager.

7. Please reference Annex A, Item 8 of the revised CDP Radiation Safety Program which outlines on site service and/or repair procedures.

8. Please note the charts below that identify the survey instruments and detection instruments that will be available and utilized by the CDP RSO and/or CDP Authorized User/Source Manager during active use activities such as area surveys of radiation source storage locations, routine wipe tests of sources and detection devices and source inventories.

Location: COBRATF

Type	Quantity	Type of Radiation Detected	Range	Use
Radiac AN/PDR 77 (Geiger-Mueller)	2	Alpha, Beta, Gamma, Low Level Radiation	1 – 999,000 CPM, μCi/m², DPM/100 cm²	Monitoring & Surveying (Active Use)

Location: Noble Training Facility (NTF)

Type	Quantity	Type of Radiation Detected	Range	Use
Ludlum 2241-3 With scintillator detector probe 44-2	1	Low Energy Gamma	Sensitivity: Typically 175 cpm per μR/hr for Cs 137	Monitoring & Surveying (Active Use)

;

9. Please note revision to CDP Radiation Safety Program, Annex A, Item 1.d.

10. No response.

11. Please note revision to CDP Radiation Safety Program, Annex A, Item 4.c.

12. No response.

13. Due to the low energy of Ni-63, detectors containing this source have a very low external exposure rate; therefore, dosimetry will not be required for use of these detectors. The exposure rate of detectors containing Am-241 is low and also does not produce an external dose rate capable of exceeding the 10% dose limits. All CDP employees and students participating in training delivery utilizing Chicago Nuclear Cs-137 sources shall be issued dosimetry.

14. The CDP Radiation Safety Program will adhere to all of the training and transportation requirements within 49 CFR and 10 CFR pertaining to the transportation of radioactive material.

FEMA

U.S. Department of Homeland Security
Federal Emergency Management Agency
Center for Domestic Preparedness

CDP Radiation Safety Program

CDP 5304.0

(November 2008)

TABLE OF CONTENTS

1. **PURPOSE.** This program establishes policies and procedures for the use of, licensing, disposal, transportation, safety design, and inventory control of ionizing radiation sources used by the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), Center for Domestic Preparedness (CDP). It also provides radiation exposure standards, dosimetry monitoring, and accident reporting instructions. Its objective is to assure safe use of radiation sources and compliance with all applicable Federal and State regulations.

2. **APPLICABILITY.** This program applies to all elements of the CDP and all activities supported by the CDP involving procurement, receipt, handling, transporting, storage, use, maintenance, and disposal of radioactive materials and other sources of ionizing radiation. This program also applies to contractors, sub contractors, and all other individuals who work in (or visit) CDP facilities.

3. **REFERENCES.** Required, related and referenced publications are listed in Appendix A.

4. **EXPLANATION OF TERMS.** Abbreviation and special terms used within this program are explained in the glossary, Appendix B.

5. **RESPONSIBILITIES.**

   a. Superintendent, CDP will:

      (1) Designate, in writing a qualified individual to serve as Radiation Safety Officer (RSO);

      (2) Ensure a written Radiation Safety Program is established to provide compliance with applicable Federal and State regulations.

   b. Associate Director, Operations and Support will:

      Ensure that adequate personnel are assigned, and the necessary facilities and equipment are available to manage the CDP Radiation Safety Program.

c. CDP Safety & Occupational Health Manager / RSO will:

(1) Establish written policies and procedures to assure compliance with applicable Federal and State radiation safety regulations and directives;

(2) Ensure that an internal or external audit of the Radiation Safety Program is conducted annually;

(3) Direct the CDP Radiation Safety Program;

(4) Serve as technical advisor to the CDP Superintendent and senior management on matters pertaining to the acquisition, use, storage, and disposal of all radioactive materials;

(5) Perform and/or oversee radiation surveys required to document that operations involving the use of radiation sources are conducted in compliance with all Federal and State regulations and directives;

(6) Review plans and procedures relating to operations conducted or being proposed which involve radioactive materials

d. CDP Contractor Project Managers that conduct operations involving ionizing radiation sources will:

(1) Ensure adequate facilities, personnel and equipment is available to comply with applicable Federal and State regulations regarding the use of radiation sources;

(2) Provide management assistance in the enforcement of policies and procedures established within this program.

6. DEVIATIONS.

a. This program document serves as the Nuclear Regulatory Commission's (NRC) mandated Radiation Safety Program document and as such becomes a condition of the NRC license.

b. Request for deviations will be reviewed and forwarded through the office of the RSO.

c. Deviations will be documented and a copy of the deviation granted will be maintained by the RSO.

CDP Radiation Safety Program
Annex A
Ionizing Radiation

1. GENERAL.

a. Compliance with NRC regulations and NRC licenses

(1) All personnel working with radioactive material under an authority issued by CDP will comply will all applicable NRC regulations and conditions of NRC licenses.

(2) All Associate/Assistant Directors, Contractor Project Managers, and Supervisors will ensure that personnel working with radioactive materials are aware of applicable regulations and conditions that apply.

b. Sources of ionizing radiation used that do not require NRC licensing will be controlled to the same extent as those requiring licensing.

c. Shielding and control designs. The RSO will evaluate all design plans for use with any source of ionizing radiation capable of generating a "Radiation Area" as defined in the glossary.

d. Any area accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 Rem (0.05 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates will be designated a radiation area. There are no high or very high radiation areas at the CDP.

2. NUCLEAR REGULATORY COMMISSION LICENSES.

a. The issuance of an NRC license is required for the possession of by-product, source, and/or special nuclear material.

b. The management of the CDP NRC license is conducted through the CDP Radiation Safety Officer.

c. Requests for radioactive materials not already authorized by the current NRC license will be processed through the Radiation Safety Officer. Requisition of sources requiring NRC licensing will not be initiated until necessary NRC license amendments are received.

3. NON-NRC LICENSED RADIATION SOURCES.

a. Radioactive materials not requiring NRC licensing are authorized for use by the CDP Radiation Safety Officer.

b. Exempt quantities of radioactive material may be possessed and used only by RSO approval and will be inventoried annually.

c. Applicable authorizations will be approved and implemented prior to the acquisition of any radiation sources.

4. INVENTORY MANAGEMENT.

a. Current radiation inventories are required to ensure the CDP does not exceed the established limits of possession assigned by the CDP NRC license.

b. Procurement of all radiation sources will be coordinated through the Radiation Safety Officer.

(1) Requested radioactive isotope and activity will be verified against license authorization and current inventory to ensure that material is authorized and that possession limits are not exceeded.

(2) All radioactive material will be processed through the radiation safety office. If special handling is necessary (chemical surety material, biological material, classified, etc...) appropriate personnel will work in conjunction with the radiation safety office to ensure proper handling and safety precautions.

c. The radiation safety officer will ensure active inventories are documented and maintained. An inventory check will be conducted at the end of each training exercise as well as every six months to ensure the control of radioactive materials.

d. Records of isotope inventories will be maintained and will include, at a minimum, the following information: radionuclide, quantities, manufacturer's name and model numbers and the date of the inventory.

5. LEAK TEST.

a. Sealed sources of radioactive material authorized by the CDP NRC license are required to have periodic leak testing unless specifically exempted by the NRC.

(1) Sealed sources designed to emit alpha radiation will be leak tested at least every 3 months.

(2) Sealed sources designed to emit beta/gamma radiation will be leak tested at least every six months.

(3) Sealed sources that are designated as "in storage" and/or awaiting disposal shall be leak tested every (10) years.

b. Radioactive material authorized under a manufacturer's general license will be leak tested at a frequency not to exceed that required by the manufacturer.

c. Results of leak tests will be in units of microcurie (μCi) and maintained on file.

6. SURVEYS.

a. Surveys will be conducted monthly to ensure the magnitude and extent of radiation levels of radioactive materials do not exceed regulatory limits.

b. Portable radiation instrumentation used to quantify radiation levels or to make determination of the presence and extent of radioactive contamination will be calibrated "Active" through the Test Measurement and Diagnostic Equipment (TMDE) Activity or approved commercial calibration facility. Calibration frequencies will be in accordance with manufacture's specifications, but will not exceed a period of at least once per year.

c. Records of required surveys will be maintained by the RSO.

7. RADIOACTIVE MATERIALS DISPOSAL.

a. Transfer of unwanted radiation sources will be coordinated through the CDP RSO. No radioactive material or sources of radiation will be disposed of through the use of normal trash removal.

b. Unwanted radiation sources will be transferred using the following general guidelines:

(1) Items that have other hazardous materials as well as a radioactive component will be segregated and all hazards identified at the time of request for disposal.

(2) Radioactive material will remain on the inventory until physical transfer of material has occurred.

(3) Sealed sources of radioactive material, not known to be leaking, will be placed in an intermediate container (i.e., zip lock bag or single clear trash bag). Sources known or suspected of leaking will be placed in double bags.

(4) The RSO will maintain the active inventory for items designated for disposal.

c. Equipment containing radiation sources will only be transferred or sent for disposal to licensed and or permitted facilities. Transfers and/or disposals will follow all pertinent NRC and DOT regulations.

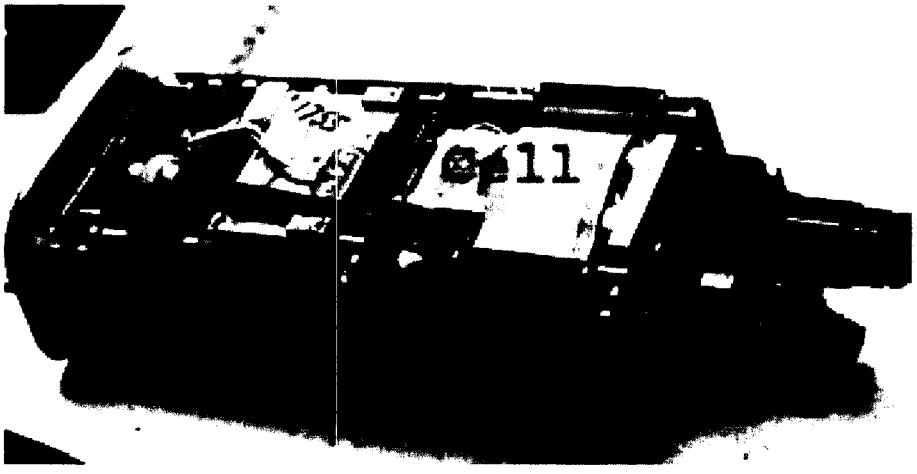
d. Records of transfer and/or disposal of radioactive material will be maintained by the RSO and kept for a minimum of three years.

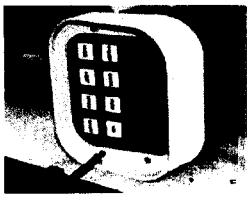
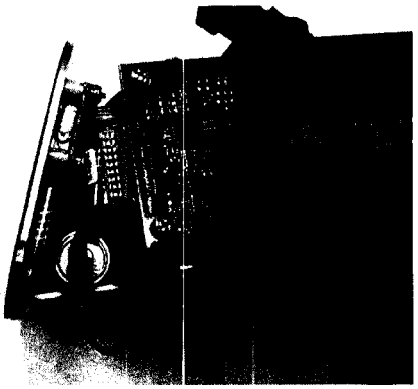
8. SERVICE and/or REPAIR PROCEDURES

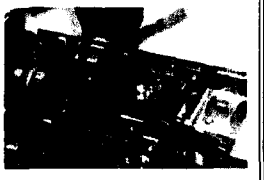
On site service and/or repair of chemical agent monitors shall be accomplished utilizing the below procedures. In addition, service and/or repair technicians coming on site to perform service and/or repair of chemical agent monitors will receive 1 to 2 hours of site and source specific training before beginning work.

CAUTION

Do not disassemble the cell containing the Ni-63 radioactive source



OP.#	OPERATION DESCRIPTION	
10	**Return & Repair** **Step 1.) Leak test** a. Using filter paper or a cotton bud, wipe a random area approximately 100 sq/cm of the unit surface. b. Analyze the smear using a Liquid Scintillation counter (LSC). c. Verify the dpm level reported by the LSC is less then 100. If so proceed to operation 20. d. If over 100 dpm report to the Radiation Safety Officer for instructions of how to proceed. **Step 2.) Disassembly and General Maintenance:** Check Unit for visual damage. Record any findings on APD2000	
20	Repair/Evaluation Sheet. **Step 3.) Remove inner chassis from APD as follows:** a. Remove four screws used to attach Front Bezel. b. Remove Protective Cap and Nut from Aux. Port connector. c. Remove Nozzle Cover and Nut securing Nozzle at front of APD. d. Push on Nozzle to begin to remove chassis from Case.  e. While removing chassis, feed Aux. Port connector through opening in Case.	 

OP.#	OPERATION DESCRIPTION	
20 Cont'd	f. When unit is fully removed from Case, loosen CCA screws to allow for removal of Battery Wire connector. Remove connector and tighten screws back. g. Remove Charcoal Filter by loosening and removing fittings on both ends. h. Disconnect Ammonia Source by removing connector and two screws at Sieve Pack. **Step 4.) Replace Charcoal and Sieve as follows:** a. Replace Charcoal Filter b. Remove Sieve Pack Lid by removing screws. Discard screws and sieve material. c. Refill Sieve Pack with new sieve material and install new screws. d. Reinstall Ammonia Source. e. Remove MGP radiation detector board. f. Check Membrane: clean or replace as required. g. Check Inline Filter and replace as required. h. Refit MGP radiation detector board. i. Perform leak test to ensure that the sieve pack is not leaking.(Pneumatic leak) **Step 5.) Run recirculation pump unit overnight.** **Step 6.) Reassemble unit.** **Step 7.) Check unit with confidence sample.** **Step 8.) Repeat operation 10 for final radiation leak wipe test.**	  

Serial #_____ **APD 2000 Repair/Evaluation Sheet**

RMA #_____

Customer:

		EVALUATED	CLEANED	REPLACED
Sales Order Number				
Date Received:				
Repaired by:				
Serviced by:				
Date:				
Hours to complete:				
Inspected by:				
Warranty:				
Non-Warranty:				
Charge #				
Part ID	**Part No.**			
General Maintenance				
Sieve	n/a			
Charcoal	n/a			
Ammonia source	2429256			
Upgrade				
Battery Cap	2428626			
AUX Port	2428606			
Software	n/a			
RAD Detector	2429260			
Repair Parts List				
Cell, Rear	2428821			
Cell, Front End	2428824			
Cell, Drift Tube	2428826			
Confid. Sample	442-642			
Carrying Strap	2428628			
Inlet Cap	2428623			
Bezel Panel	2428627			
RAD Detector	2429260			
Duracell Batteries	74336983			
Sensor Board	2428613			
Processor Board	2428609			
Head Amp	2428616			
Pump Assy	2427591-30			
Membrane	2428046			
Motor	2428230-467			
Horn Assy	2428047			
Control Panel	2429203			
Cell Assy	2429249			

ATTN:

Phone:

Problem:

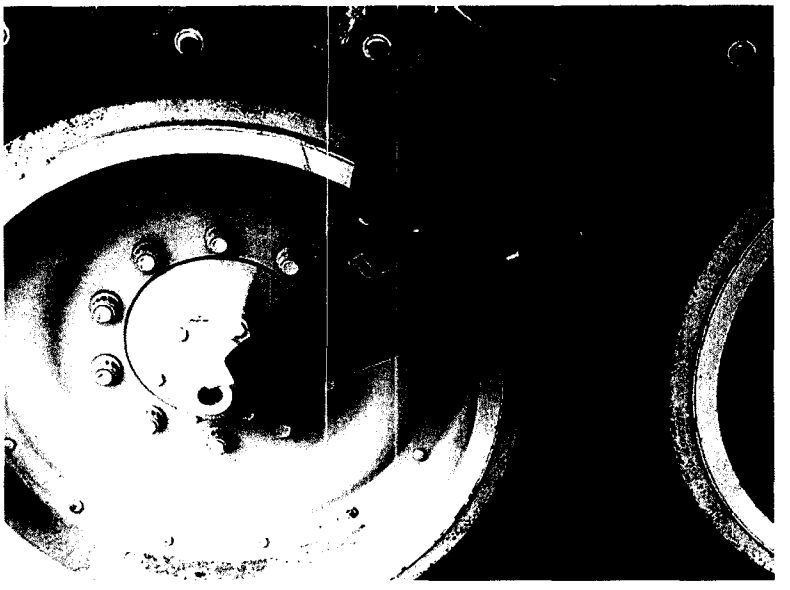
Comments / other

Shipping Information:

Tracking Number_____ ***Date Shipped:***

Carrier

SIEVE REPLACEMENT PROCEDURE FOR ICAM

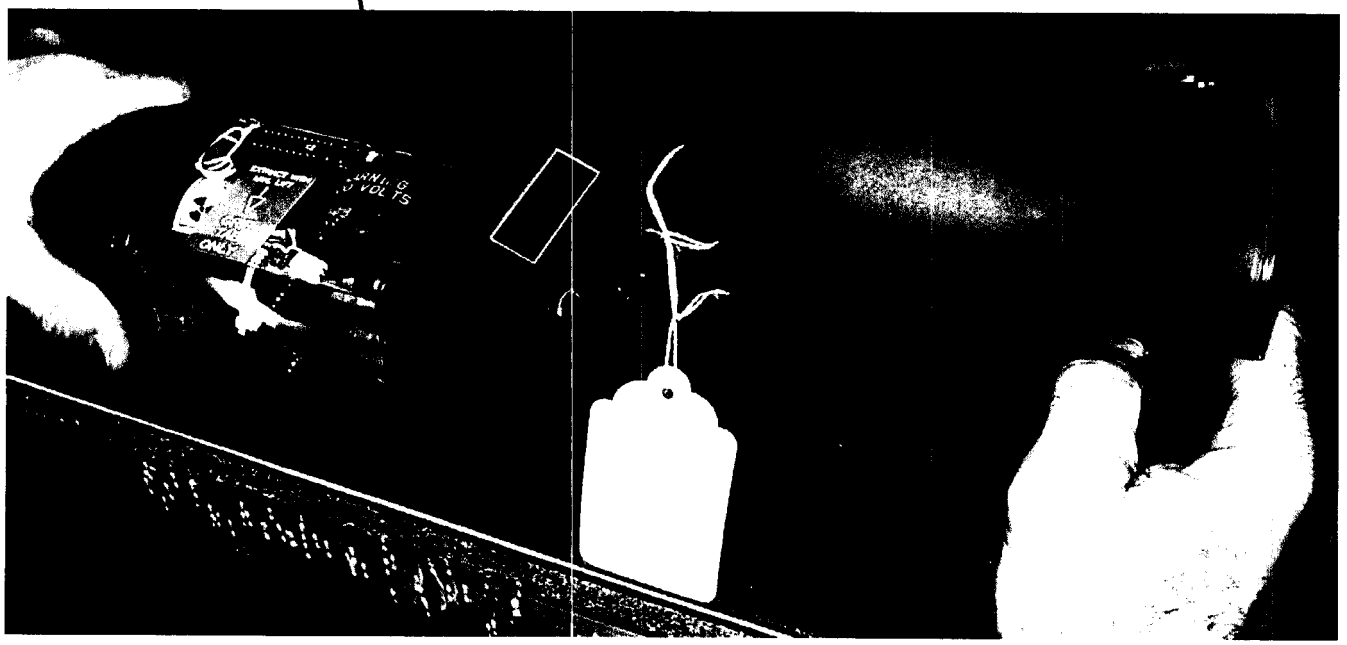


Step 1. Perform a radiation wipe test of the unit as follows:

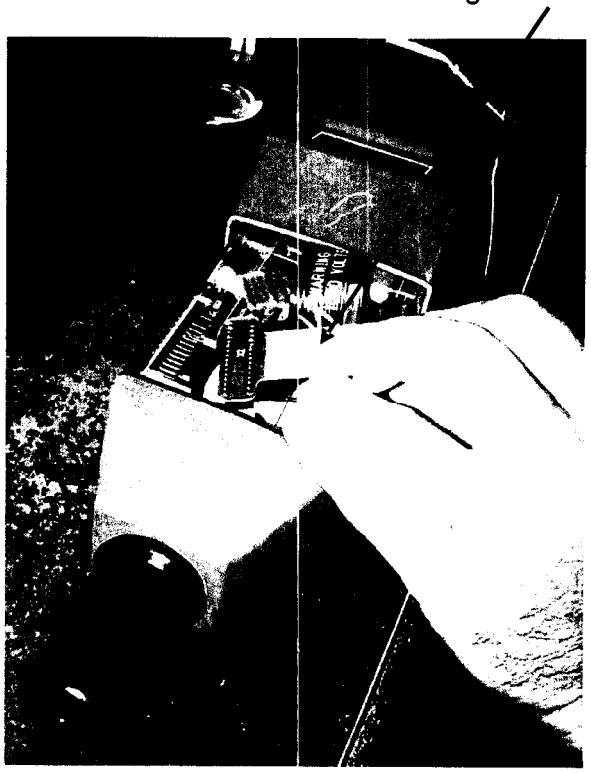
a. Using filter paper or a cotton bud wipe a random area approximately 100 sq/cm of the unit surface.
b. Analyze the smear using a Liquid Scintillation counter (LSC).
c. Verify the dpm level reported by the LSC is less then 100.
d. If over 100 dpm report to the Radiation Safety Officer for instructions of how to proceed.

Step 2. Remove the nut and serial number rings.

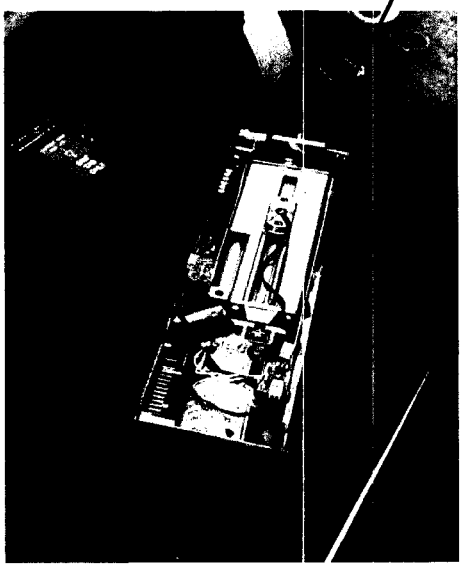
Step 3. Carefully slide module out from case, but not so far as to stress the flex circuit.



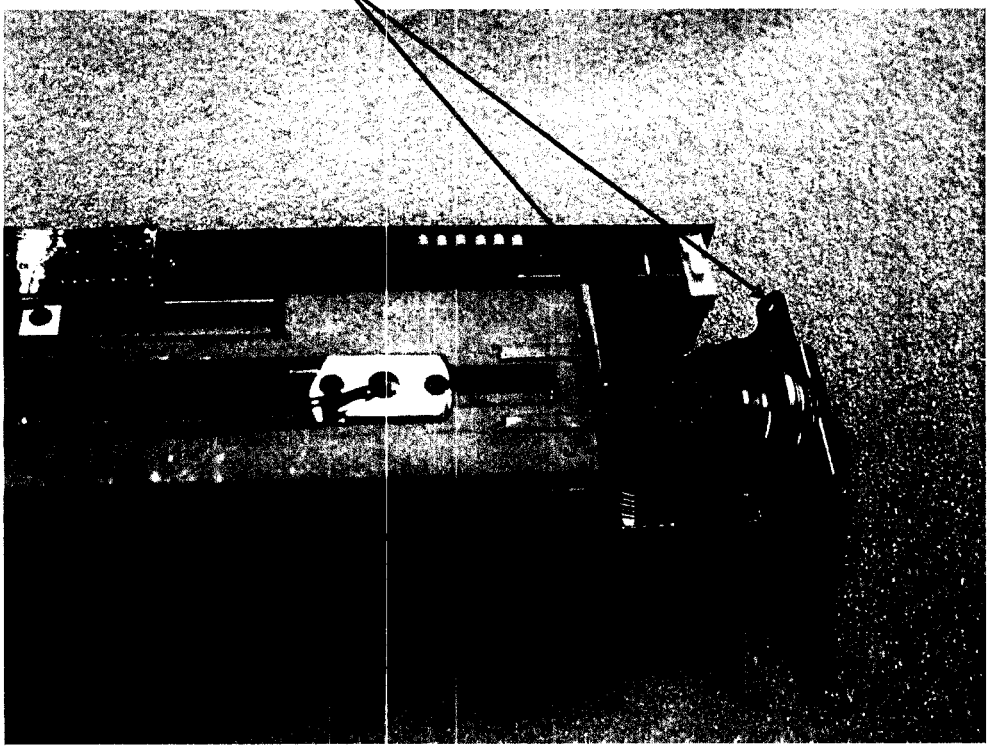
Step 4. Remove flex circuit connector using the tab.



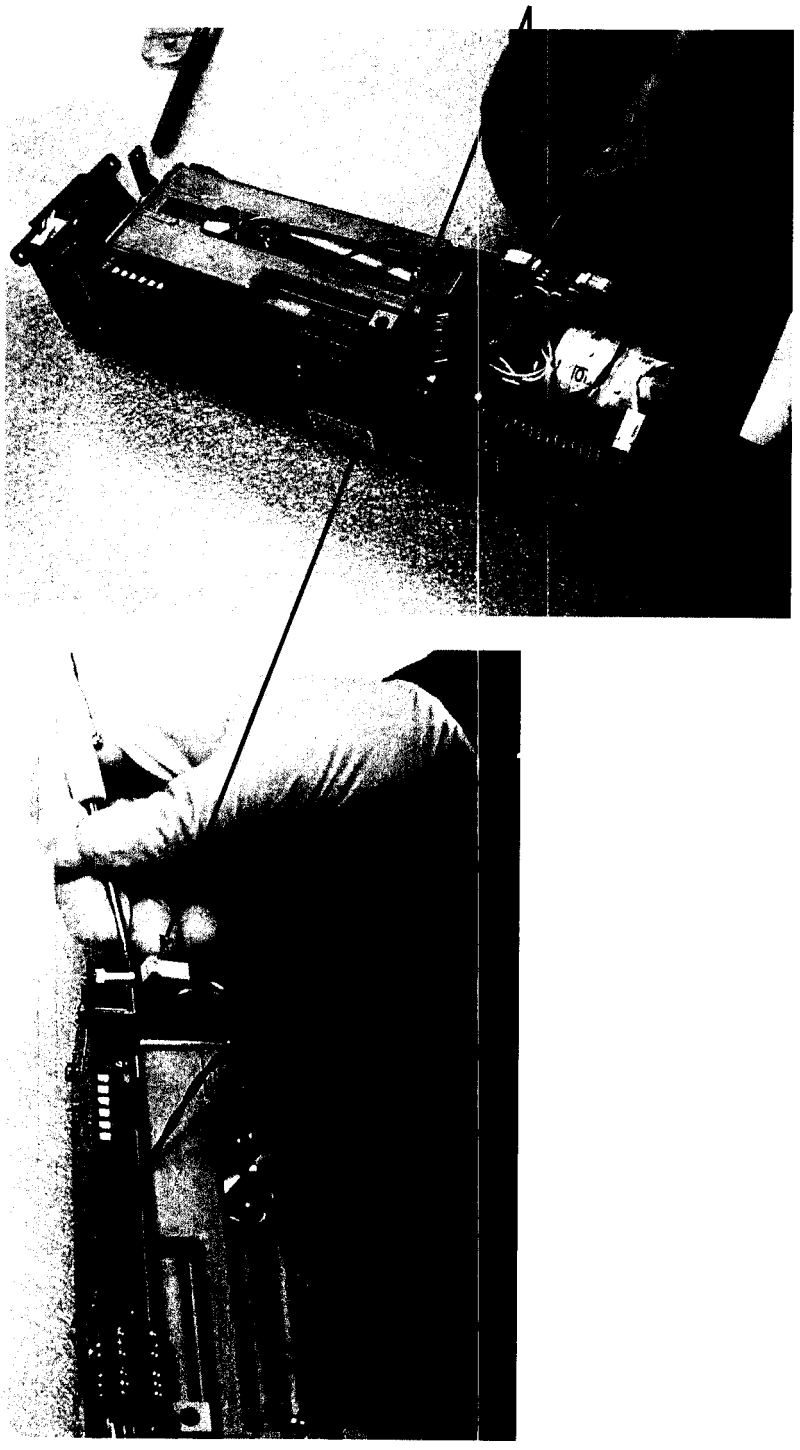
Step 5. Remove the electric insulation sheet.



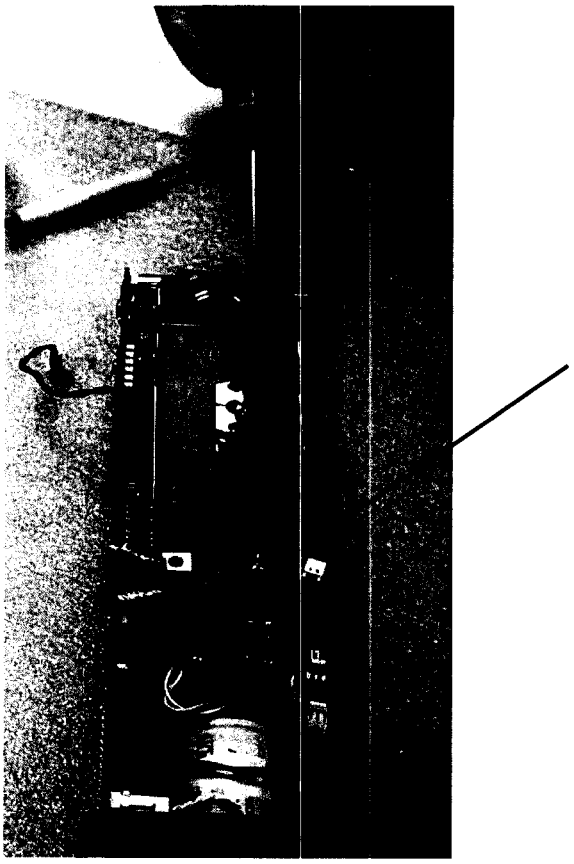
Step 6. Remove two screws holding connector bracket so it will pivot out.



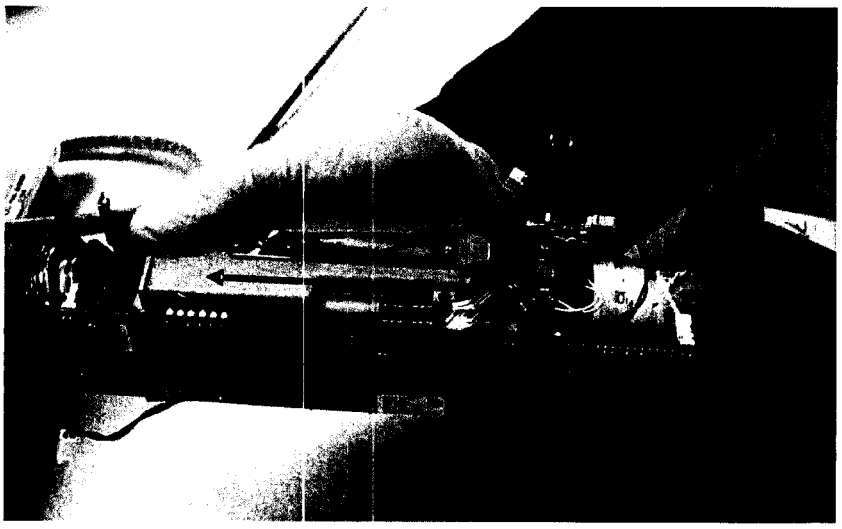
Step 7. Disconnect two electrical connectors as shown below.

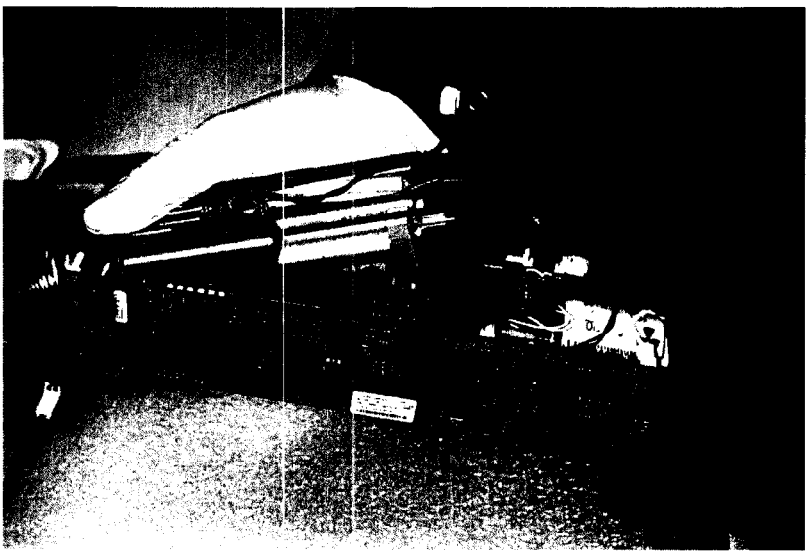


Step 8. Completely unthread captive screw.

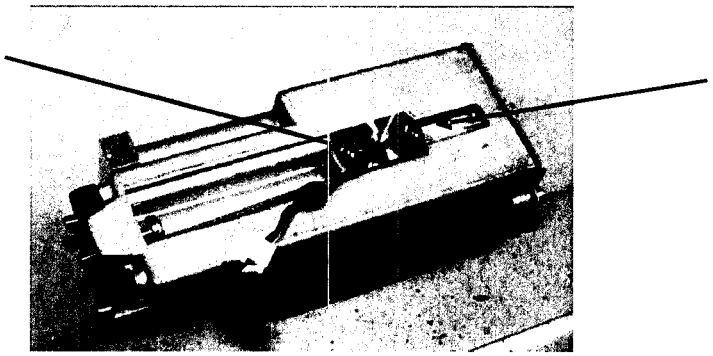


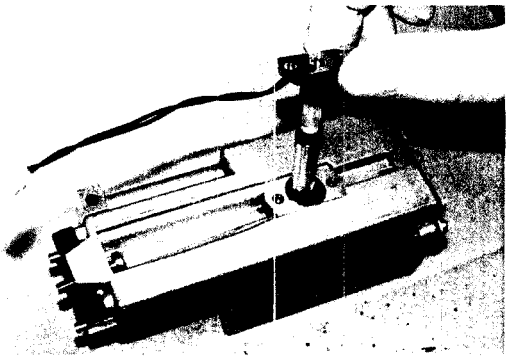
Step 9. Grasp the unit as shown and remove sieve pack per the directional arrows in photos below.



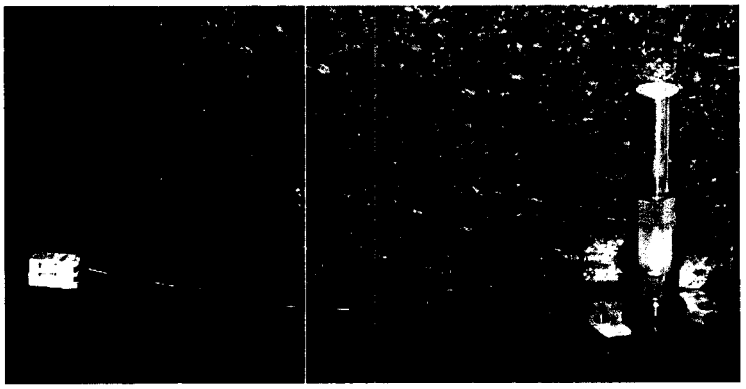


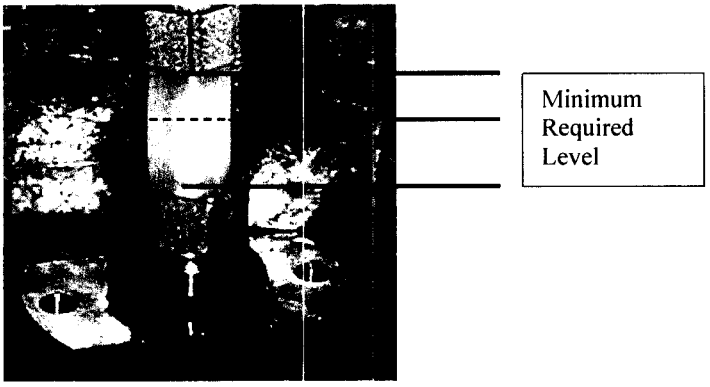
Step 10. Remove the two screws retaining the acetone source, then the source itself.



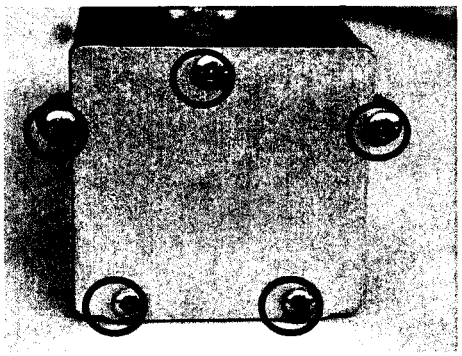


Step 11. Invert the acetone source as shown and note the volume in the translucent portion. It may be necessary to tap lightly to get all the fluid down. If the fluid comprises less than half of the translucent portion it should be replaced.



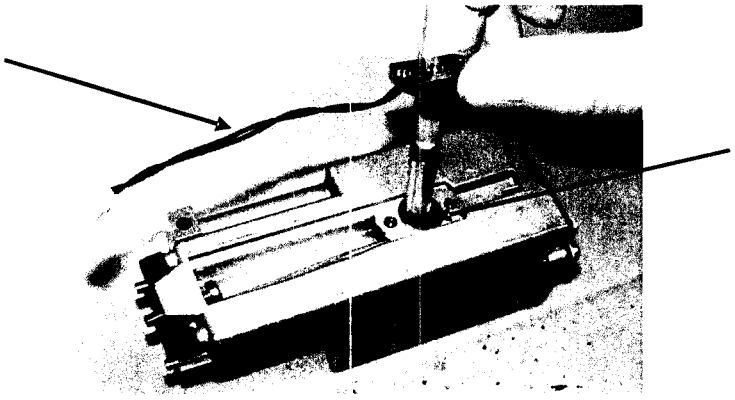


Step 12. Remove the five screws, empty the old sieve and refill with new. Replace screws and torque to 120 ±8 in. oz.

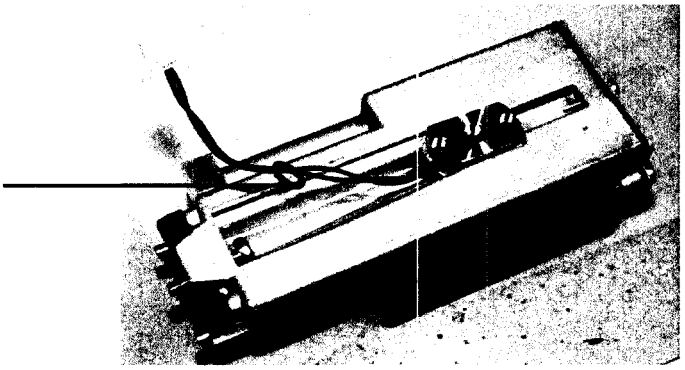


NOTE: NEW SIEVE SHOULD BE EXPOSED TO THE OPEN ATMOSPHERE AS LITTLE AS POSSIBLE. IF THE SIEVE PACK IS NOT GOING INTO A UNIT IT SHOULD BE IN A DESICANT CONTAINER.

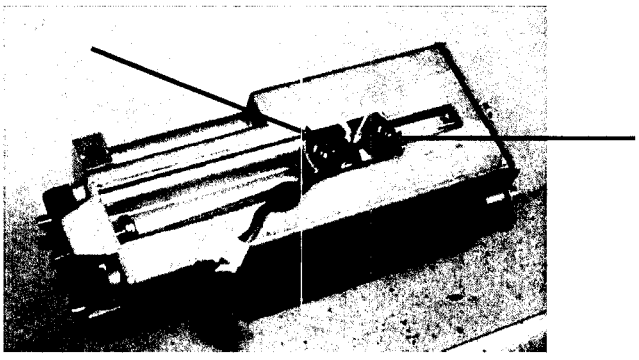
Step 13. Place the acetone source assembly in the appropriate hole with the wire orientated as shown.



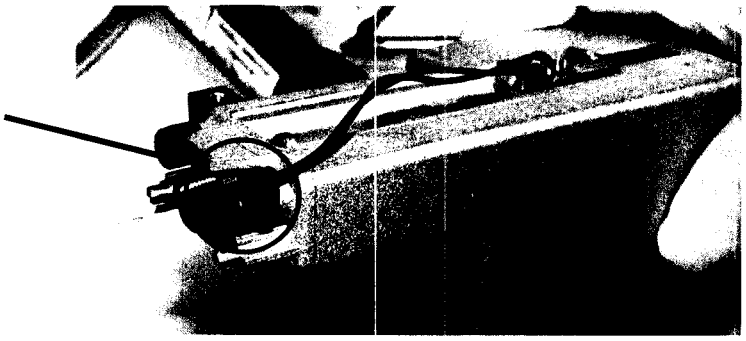
Step 14. Verify that the o-ring is over the acetone source wire as shown below.



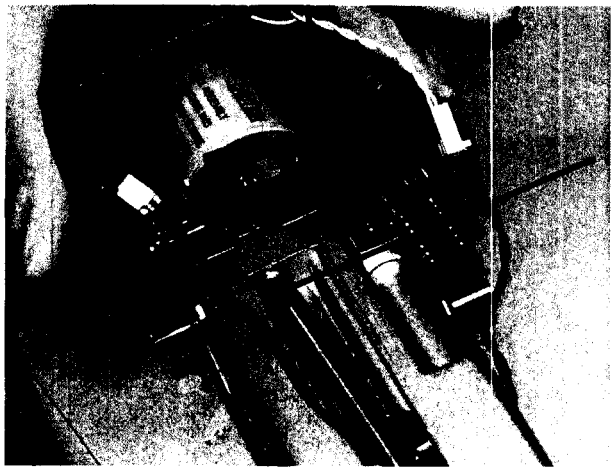
Step 15. Secure the acetone source in the sieve pack assembly with the two screws. Torque to 65 ±3 in. oz.

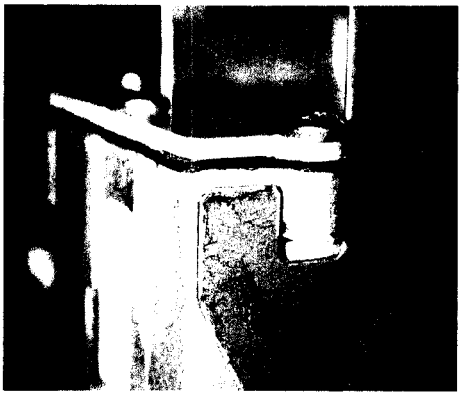


Step 16. Secure the wire to the sieve pack body using the o-ring as shown.



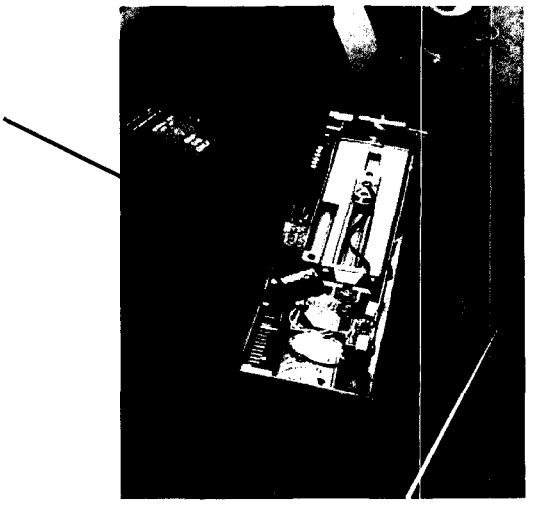
Step 17. Assemble the sieve pack into the monitor assembly and tighten captured screw until it is fully seated against the cell assembly (shown below).



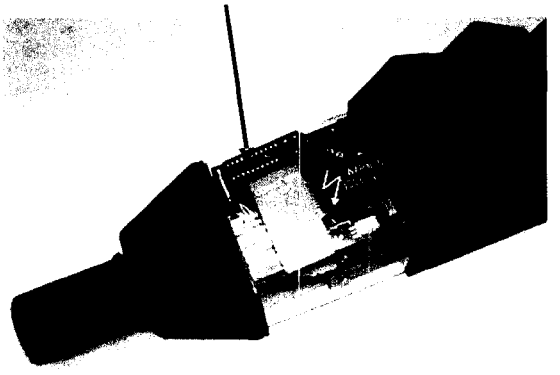


Sieve Pack fully seated in frame

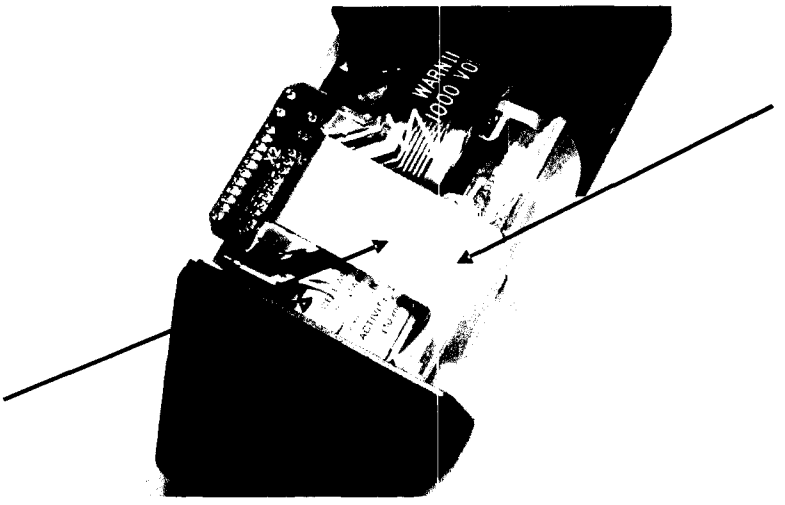
Step 18. Reinstall the clear protective cover.



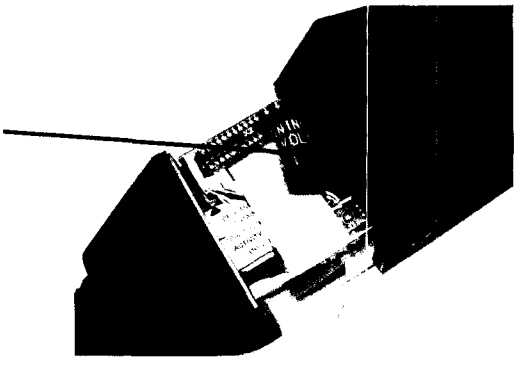
Step 19. Carefully insert the module into the case. Stop the monitor module assembly about ¾ the way into the case so you can connect the display to the PCB.



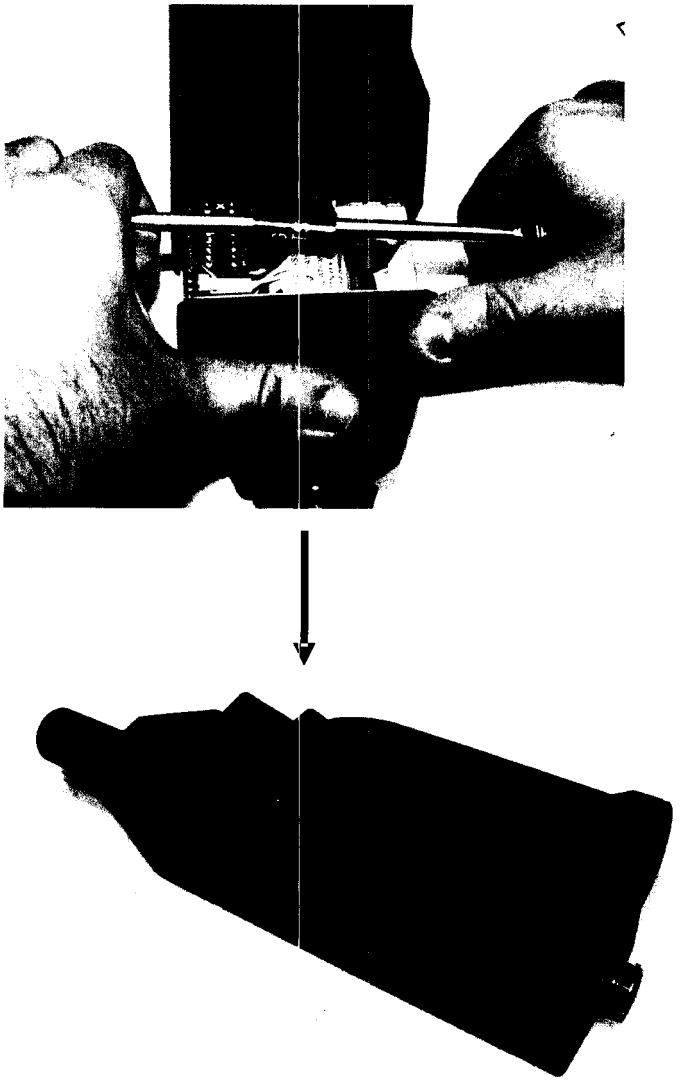
Step 20. Insert the connector tab into the slot on the electric insulation sheet as shown below.



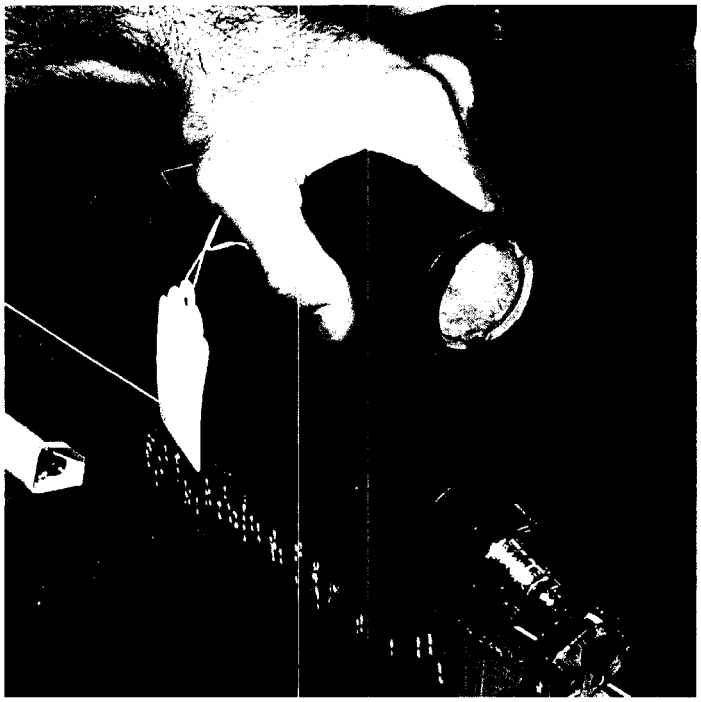
Step 21. Fold the flex circuit towards the front of the ICAM and push the module into the case while pulling the film wire out.



Step 22. When the flex circuit gets hard to pull out put a screwdriver through the loop of the film wire (as shown below) and use it to guide the film wire out until the module goes completely into the case.



Step 23. Reinstall the nut and serial number rings. Torque to 85 ±5 in/lbs.



Step 24. Perform another radiation wipe test of the unit as follows:

a. Using filter paper or a cotton bud wipe a random area approximately 100 sq/cm of the unit surface.
b. Analyze the smear using a Liquid Scintillation counter (LSC).
c. Verify the dpm level reported by the LSC is less then 100.
d. If over 100 dpm report to the Radiation Safety Officer for instructions of how to proceed.

Step 25. Start unit up and allow to run overnight.

Step 26. After overnight run, challenge unit with confidence sample to verify proper operation.

CDP Radiation Safety Program
Annex B
Safety Standards, Dosimetry, and Recordkeeping

1. GENERAL.

It is the responsibility of the licensee and all users of radiation sources to conduct operations to ensure that radiation exposures received by workers and members of the general public are below those limits established by Federal and State regulations. Furthermore, doses shall be maintained at levels that are As Low As Reasonably Achievable (ALARA).

2. IONIZING RADIATION.

a. The Code of Federal Regulations (CFR) Title 10, Part 20, prescribes the maximum annual exposures to workers and members of the general public. While it is understood that 10 CFR applies only to the NRC Licensed materials, the CDP accepts those limits for all sources of ionizing radiation.

b. The following table identifies the standards as specified by 10 CFR Part 20:

Category	Maximum [1,2,3]
Member of the General Public	100 mrem (TEDE) in a calendar year[4]
Fetus/embryo of occupationally exposed **declared pregnant** worker	500 mrem (DDE of mother + ED due to radionuclides in fetus/embryo) for entire pregnancy
Occupationally Exposed Adult	5 rem TEDE in a calendar year
Lens of the Eye	15 rem EDE in a calendar year
Individual Organ	50 rem DDE+CDE in a calendar year
Skin or Extremity	50 rem SDE in a calendar year
Occupationally Exposed Minor	10% of applicable limit for adult

1. Maximum doses will be the limit listed in this table or the current version of 10 CFR Part 20, which ever is the most restrictive.
2. Abbreviations: TEDE = Total Effective Dose Equivalent; DDE = Deep Dose Equivalent; ED = Effective Dose; EDE = Effective Dose Equivalent; CDE = Committed Dose Equivalent; SDE = Shallow Dose Equivalent
3. OSHA standard for occupational exposure of adults and for the lens of the eye is 1¼ rem in a calendar quarter. OSHA standard for skin of whole body is 7½ rem in a calendar quarter. OSHA standard for hands and forearms; feet and ankles is 18¾ rem in a calendar quarter.
4. The dose in any unrestricted area from external sources of ionizing radiation will not exceed 2 mrem in any one hour.

c. All CDP employees conducting operations involving ionizing radiation sources must comply with the above exposure criteria.

d. Dosimetry. Occupationally exposed individuals requiring monitoring will only use dosimeters supplied by the RSO. The CDP Dosimetry Program will be managed by the CDP RSO.

(1) Dosimetry will be issued based on the following criteria:

(a) Personnel likely to receive 10% of any limits established above.

(b) Personnel entering restricted areas where the external radiation requires the posting of a "Radiation Area, High Radiation Area, or Very High Radiation Area" sign.

(c) Personnel not permanently assigned to the CDP meeting the requirements above may be issued a dosimeter as a "Visitor/Student".

(2) Storage of dosimeters while not being worn will only be in locations authorized by the RSO.

(3) Individuals assigned dosimeters will contact the RSO immediately if any of the following situations occur:

(a) Dosimeter is lost or damaged during wear period.

(b) Dosimeter is inadvertently exposed (i.e. dosimeter falls off during set-up and not noticed until after exposure.)

(c) Dosimeter is worn by an individual other than the individual it is assigned.

3. RADIOACTIVE CONTAMINATION.

a. Operations with radioactive materials will be conducted to ensure that radioactive contamination is avoided.

b. Contamination in "restricted areas" will be maintained below the applicable levels in the table below:

Nuclide	Average[2,3]	Maximum[2,4]	Removable[2,5]
Alpha emitters	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Beta-Gamma emitters	5,000 dpm/100 cm^2	15,000 dpm/100 cm^2	1,000 dpm/100 cm^2

1. Where surface contamination by both alpha and beta-gamma nuclide exists, the limits established for alpha and beta-gamma emitting nuclides should apply independently.
2. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
3. Measurements of average contamination should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each object.
4. The maximum contamination level applies to an area of not more than 100 cm^2.
5. The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

c. Areas of contamination above the limits stated above will be decontaminated to levels below those listed.

d. Equipment stored and/or used in restricted areas identified for release to unrestricted areas will be surveyed to ensure that contamination levels are as far below the limits as practicable.

CDP Radiation Safety Program
Annex C
Special Reporting Requirements

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1. **GENERAL.**

   a. Accidents and/or incidents involving radiation sources requiring reporting as described below, will be reported to the CDP Radiation Safety Officer (RSO) at (256) 847-2266.

   b. The CDP RSO will be responsible for conducting an appropriate investigation and making any additional notifications as required.

2. **IONIZING RADIATION.** The following situations will require notification of the CDP RSO:

   a. Any accident or incident where occupational workers or members of the general public are likely to receive an exposure greater than normal anticipated exposures.

   b. The loss of control of any radioactive material.

   c. Contamination levels indicated within a restricted area ten times greater than the limits specified in Annex B, paragraph 3.b.

   d. Contamination levels indicated within an unrestricted area greater than the limits specified in Annex B, paragraph 3.b.

CDP Radiation Safety Program
Appendix A
References

1. **Title 10 Code of Federal Regulations** Nuclear Regulatory Commission

2. **Title 21 Code of Federal Regulations, Subchapter J** Radiological Health

3. **Title 29 Code of Federal Regulations** Occupational Safety and Health Administration

4. **Title 49 Code of Federal Regulations** Department of Transportation

5. **NUREG-1556, Volume 1** Program-Specific Guidance About Portable Gauge Licenses

6. **NUREG-1556, Volume 7** Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope

7. **USNRC Regulatory Guide 8.13** Instruction Concerning Prenatal Radiation Exposure

8. **USNRC Regulatory Guide 8.29** Instruction Concerning Risk for Occupational Radiation Exposure

CDP Radiation Safety Program
Appendix B
Glossary

1. **ALARA.** Acronym for "As Low As Reasonably Achievable" means making every effort to maintain exposures to radiation as far below applicable dose limits as is practical consistent with the purpose for which the source of radiation is required.

2. **Authorized User.** An individual who has been authorized by the Radiation Safety Committee to possess and use CDP radiation sources.

3. **Background Radiation.** Radiation received from cosmic, terrestrial, inhaled radionuclides, and other sources of radiation not resulting from the possession, use, or disposal of a radiation source.

4. **Committed Dose Equivalent.** The dose equivalent to organs or tissues of reference that will be received from an intake (internal exposure) of radioactive material by an individual during the 50-year period following the intake.

5. **Committed Effective Dose Equivalent.** The sum of the products of the weighing factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues.

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

7. **Decommission.** To remove (as a facility) safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of the NRC License, or CDP Permitted operations.

8. **Deep Dose Equivalent.** Applies to external whole-body exposure and is the dose equivalent to a tissue depth of 1 centimeter (1000 mg/cm^2).

9. **Deviation.** A departure from the requirements of this program document.

10. **Effective Dose Equivalent**. The sum of the products of the dose equivalent to the organ or tissue and the weighting factors applicable to each of the body organs or tissues that are irradiated. The units of dose equivalent are the rem and the Sievert (Sv).

11. **Exposure.** In risk management, the frequency and length of time subjected to a hazard.

12. **High Radiation Area.** An area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.1 rem (1 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

13. **Ionizing Radiation.** Charged subatomic particles and ionized atoms with kinetic energies greater than 12.4 eV, electromagnetic radiation with photon energies greater than 12.4 eV, and all free neutrons and other uncharged subatomic particles (except neutrinos and antineutrinos).

14. **Member of the Public.** Any individual that is not involved with the direct possession, use or disposal of a radiation source.

15. **Occupational Dose.** Exposure received in the course of employment in which duties involve the exposure to radiation sources or radioactive materials.

16. **Radiation Area.** An area, accessible to an individual, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 rem (0.05 mSv) in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

17. **Restricted Area.** An area whose access is controlled for the purpose of minimizing exposure of individuals to sources of radiation.

18. **Sealed Source.** A radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent release and dispersal of the radioactive material under the most severe conditions which are likely to be encountered in normal use and handling and which is used in that configuration.

19. **Shallow Dose Equivalent.** Applies to external exposure of the skin or an extremity and is taken as the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm^2) averaged over an area of 1 square centimeter.

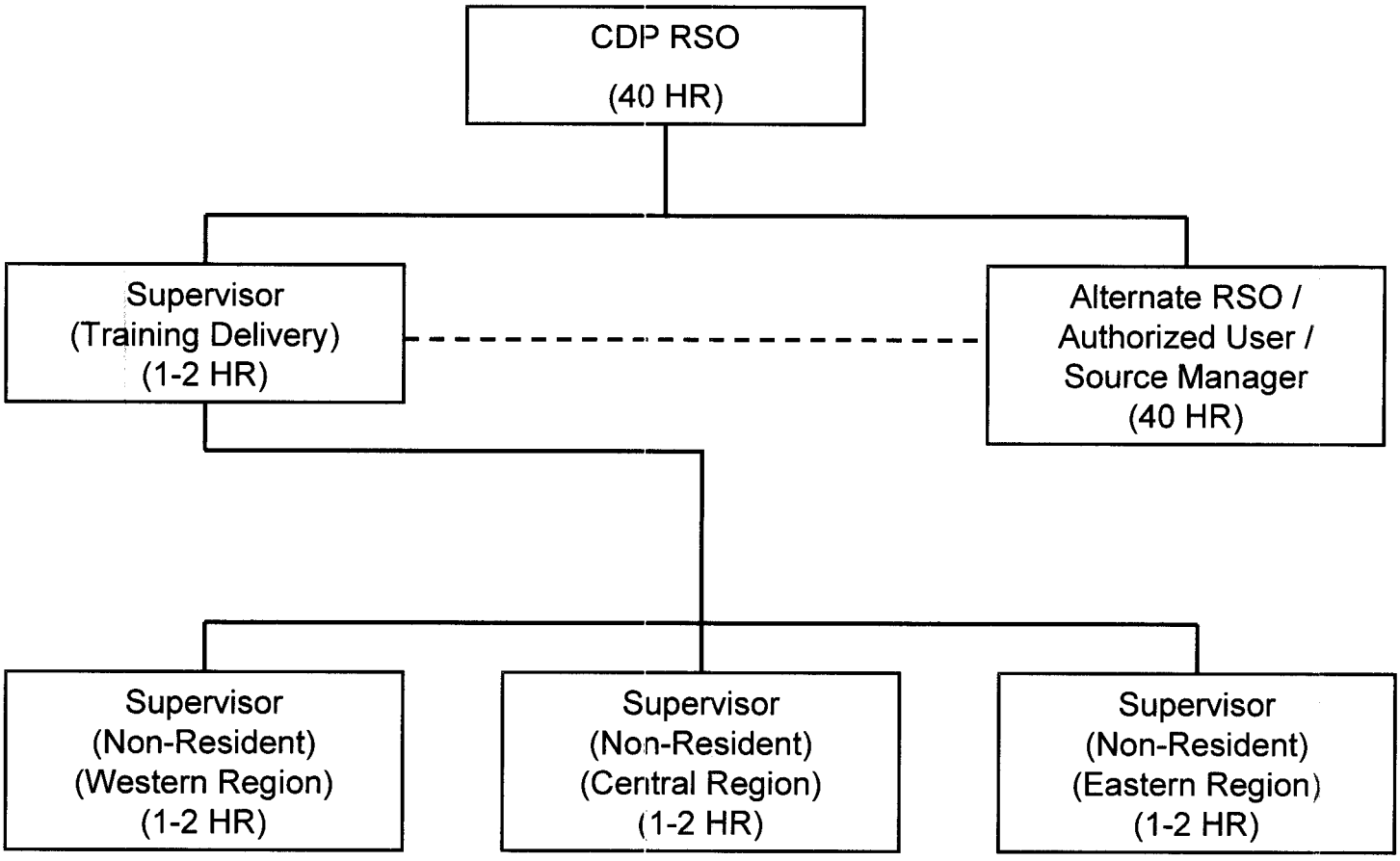
20. **Survey.** The evaluation of a facility or operation to determine the effectiveness of the radiation safety program. Surveys may include, but are not limited to, review of operations, the taking of and analysis of physical measurement.

21. **Unrestricted Area.** An area, access to which is neither limited nor controlled for the purpose of ionizing radiation safety.

22. **Very High Radiation Area.** An area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose is excess of 500 rads (5 gray) in 1 hour at 1 meter from a radiation source or any surface that the radiation penetrates.

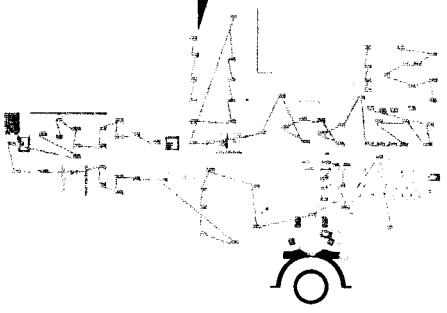
See Attached Flow Chart

CDP Radiation Management



See Attached Facility Drawings

RADIOACTIVE MATERIAL
STORAGE AREA



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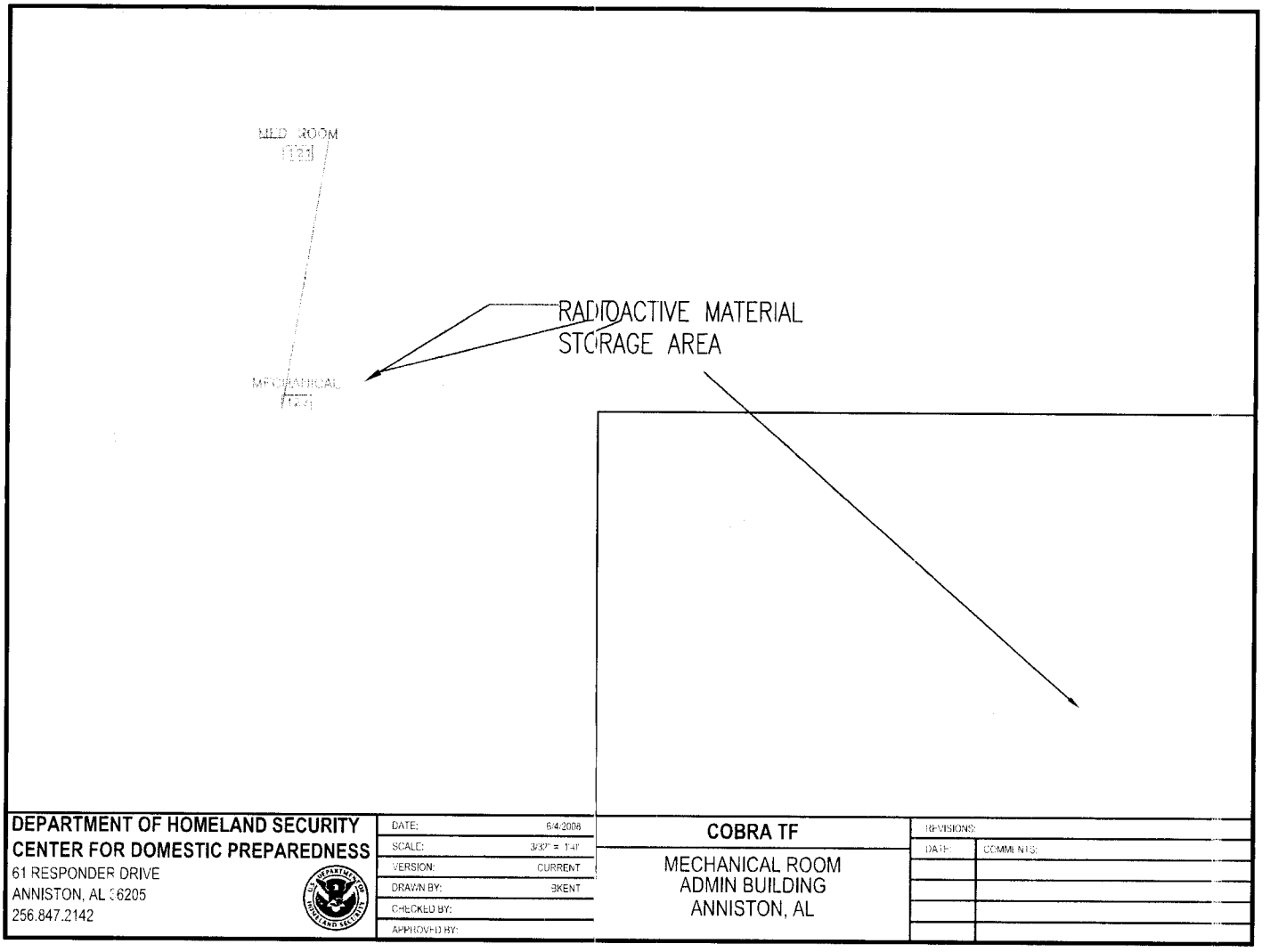

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COBRA TF

MECHANICAL ROOM
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ANNISTON, AL

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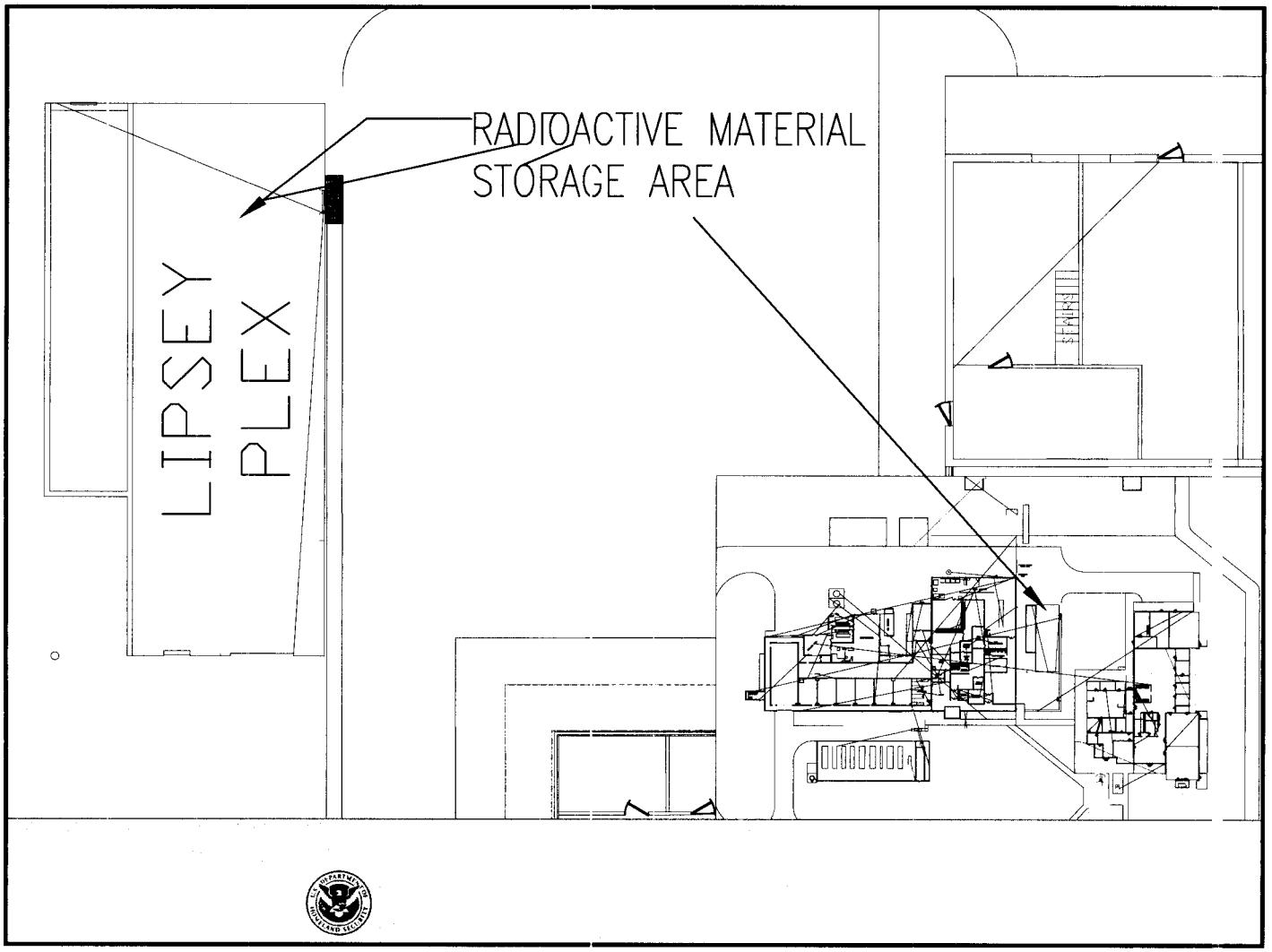
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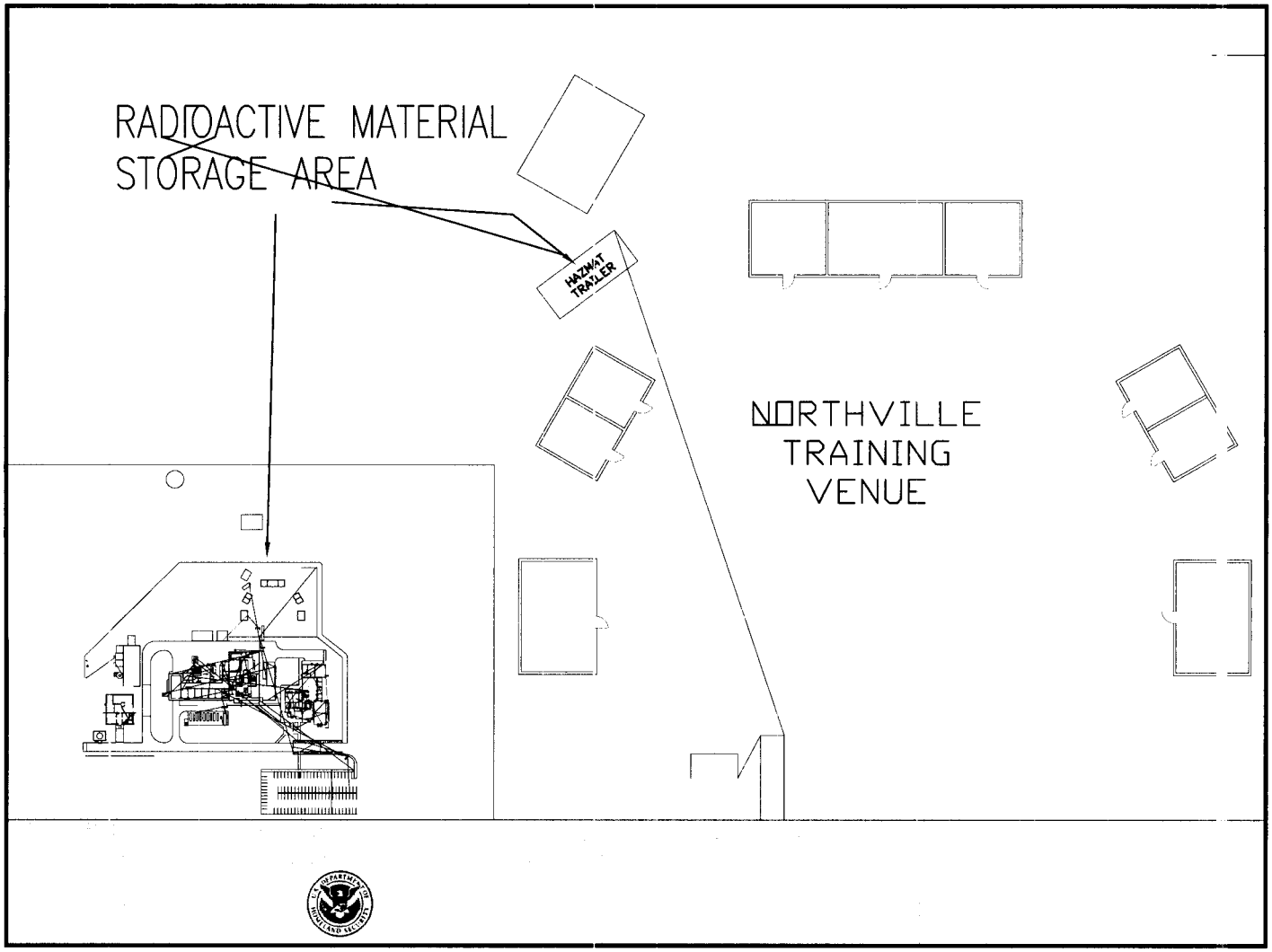
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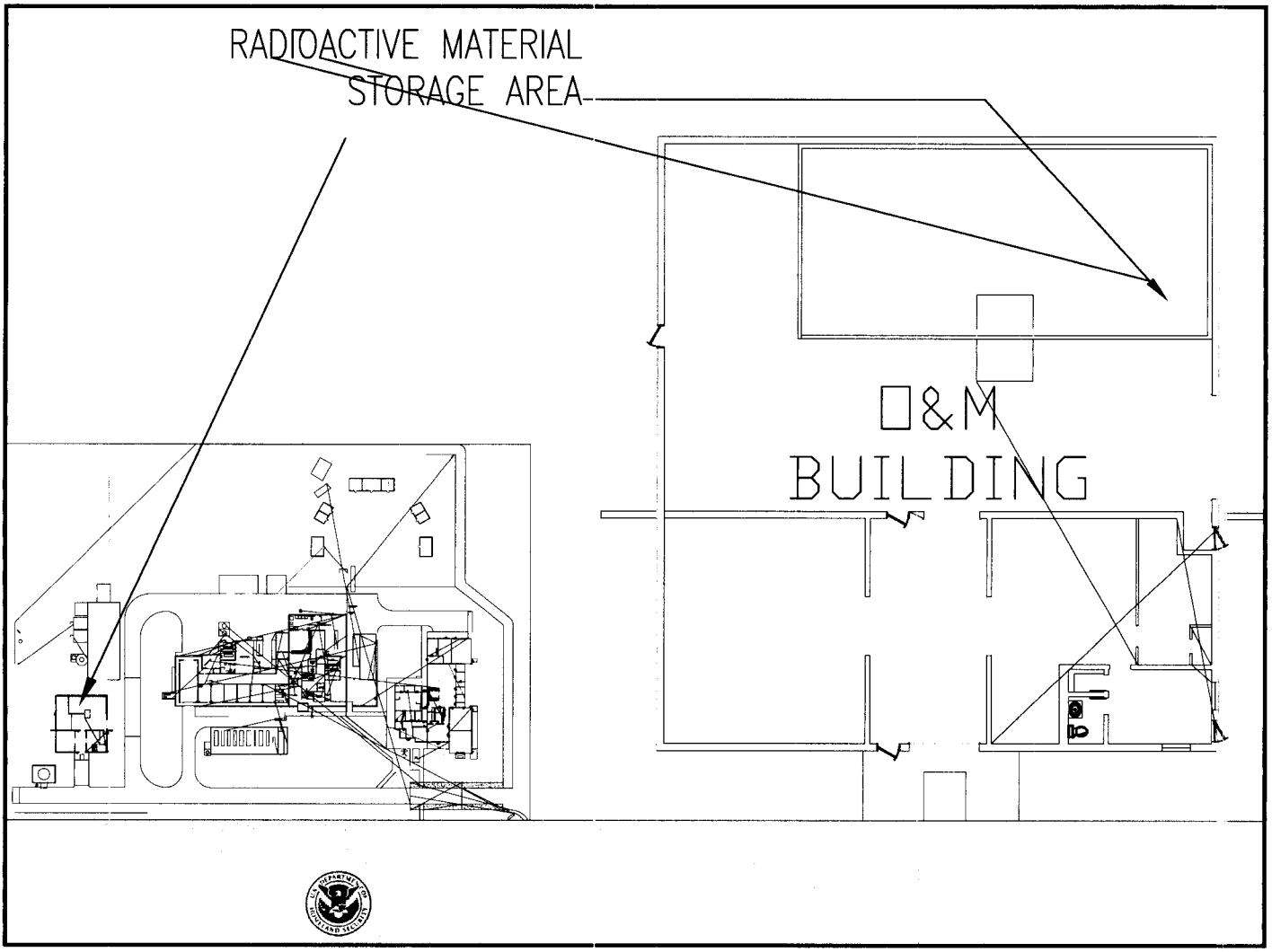
VENUE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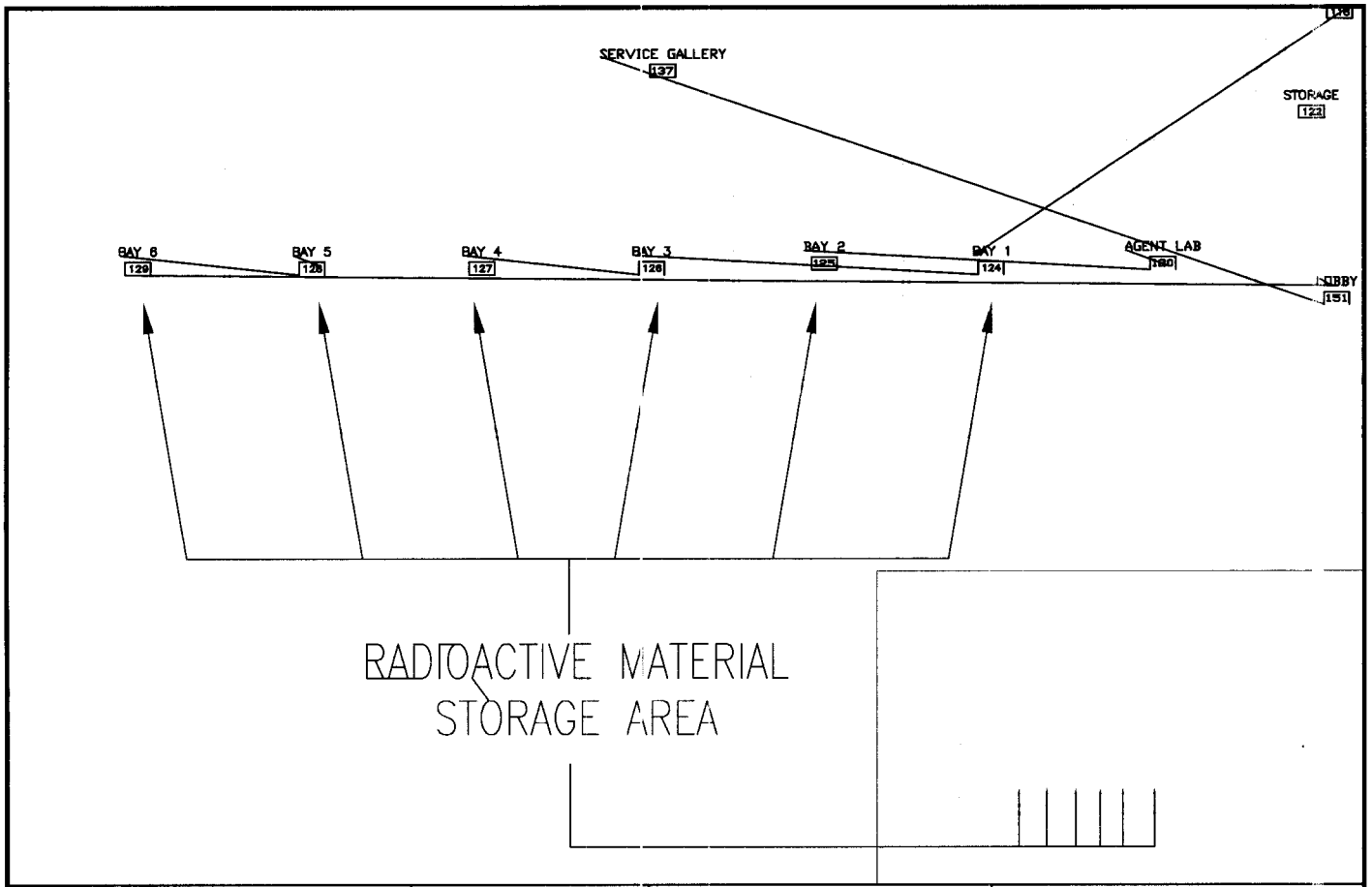

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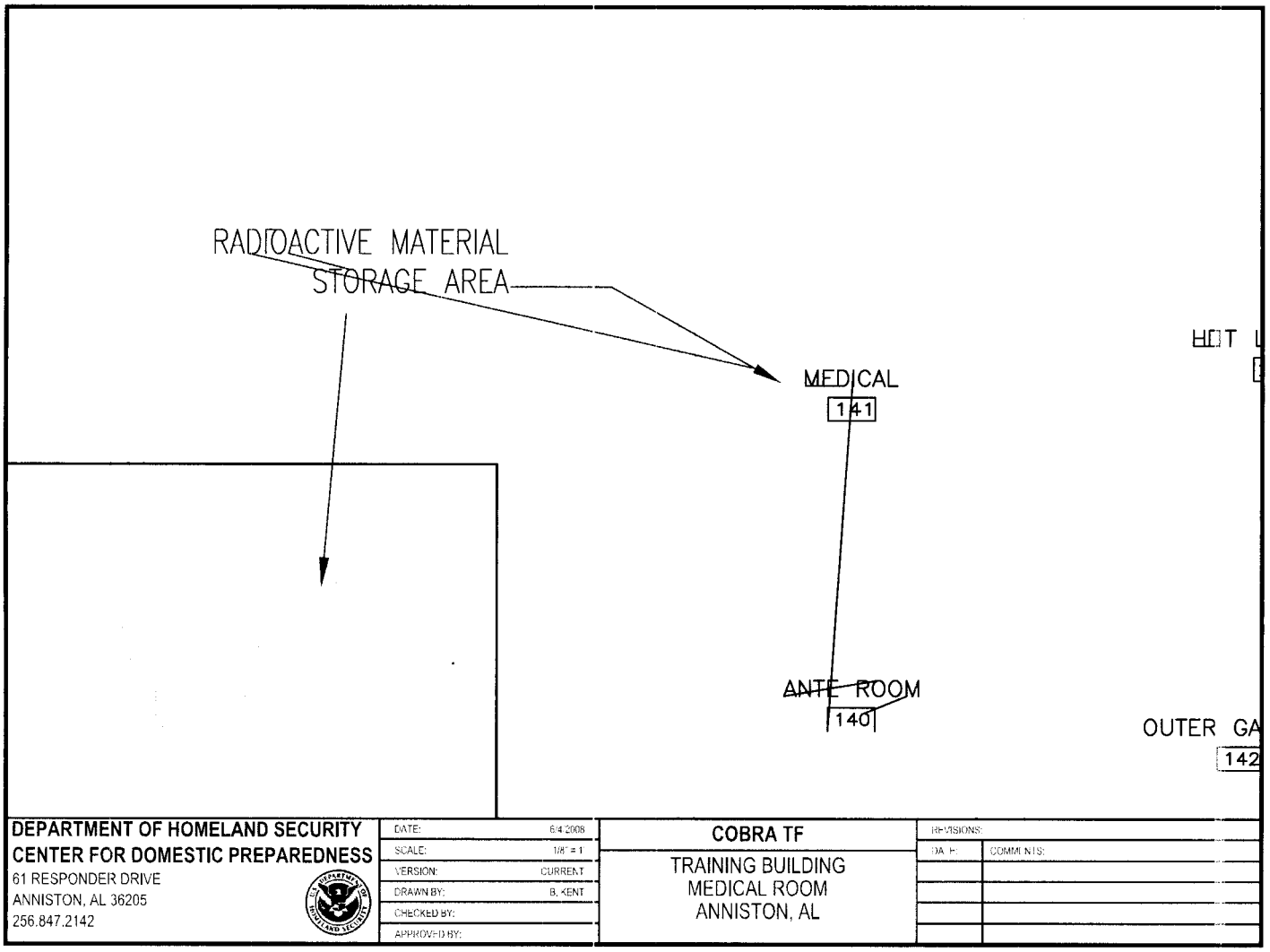

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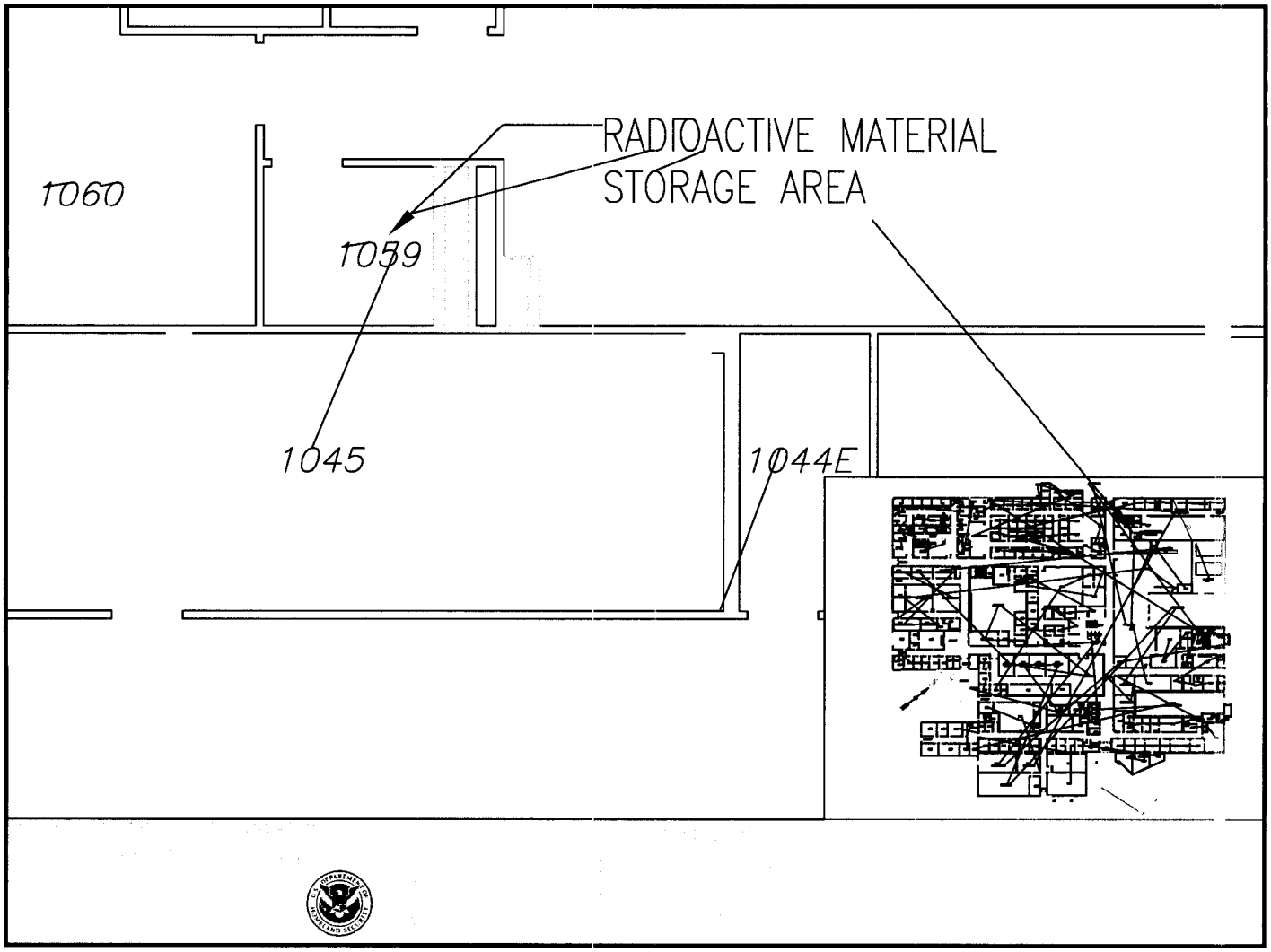
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