REGION I FORM 111
(Revised August 78)

U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

REGION I

IRRADIATOR INSPECTION

(Field Notes)

Licensee	Facility
Department of the Army Harry Diamond Laboratories	Adelphi, Md.
License No.	**Inspection Date**
19-17250-05	11/28 & 29/78
Principal Inspector	**Other Accompanying Persons**
R.C. Jerman	—

Individuals Interviewed **Titles**

a. *Claude Rowe R.P.O.
b. Klaus G. Kerris, Physicist
c. Howard Carstens, Trainee
d. *Richard Williams, Mgr. Safety
e. *Mr. S.M. Marcus, Director, Technical Support operations
f.
g.
h.

Date of Interview 11/29/78

Place of Interview office site

Name of RSO	Telephone No. of RSO
Claude Rowe	8-394-2218

Enforcement Action(s)

None.

R.C. Jerman

A. Scope of Program

1. Number of individuals occupationally exposed 20.
2. Type of Irradiator (eg. Pool, Pit, etc.) Poolshield, Capable as in air [illegible]
3. Number of Curies 25,442 of Co as of 12/9/77
4. Frequency of use: ____ times per ____.
   25% utilization only as pool irradiator
   No use as yet as in air irradiator.

B. Exposure Evaluation

1. Personnel
   a. Film Badge ✓
   b. Dosimeter Available but not normally used.
   c. Other —
2. Facility
   a. Independent area radiation monitor Yes (3)
   b. Survey meter when enter HRA Yes

C. Surveys

1. Radiation levels in unrestricted areas < 0.2 mrem/hr.
2. Contamination smears in restricted area BG
3. Leak Tests
   a. Frequency 6 months
   b. Method adequate Yes
4. Interlocks into HRA
   a. Frequency of Testing Each day of use
   b. Functional at time of inspection Yes

c. Are they intentionally bypassed or deleted. Yes (No)

(1) Procedure if yes

d. In accordance with license?

e. Adequate?

5. Routine maintenance of Hot cell equipment adequate. (Yes) No

D. Instrumentation

1. Adequate type and number: (Yes) No

2. Calibration as required: (Yes) No

E. Evaluation of Effluent

1. Liquid Pool samples

2. Airborne No.

F. Training

1. Std. Procedures OK

2. Emergency Procedures OK

3. NRC Regulations OK.

G. Signs/Posting

1. CRM Yes

2. CHRA Yes

3. 19.11 Yes

H. Evaluation of Incoming Packages (20.205)

N/A

I. Disposal

None made.

J. Evaluation of Outgoing Shipments - (DOT)

None made

K. Unusual Occurrences or Events

None

L. Independent Measurements (Van, Inspector)

See below.

For irradiatiors not completely self-shielded containing:

379 Ci colbalt-60

1042 Ci iridium-192

1515 Ci cesium-137 or more, the following must be determined:

M. Control Devices

1. What control device will prevent entry of individuals into the irradiator when the source is exposed?

Special Door Lock (Adam Lock Corp.)

2. What control device will retract the source if an individual attempts entry?

Can't enter - door is locked.

3. What control device prevents operation of the source if an individual is present in the irradiator?

Two scram buttons inside the irradiator one is a microswitch interlock. The other is tied in with compressed air system which operates elevator.

4. Do any of the above control devices prevent egress from the irradiator?

No.

N. If the Entry Control Devices Fails:

1. What control device will retract the source?

Interlock on door retracts source.

2. Are visible and audible alarm signals generated to warn individuals entering of the hazard, and to alert another knowledgeable individual? Klaxon horn sounds for 15 seconds after console is operated to raise source before source rises. [illegible] light [illegible] inside the irradiator and lights on RAM readout outside are on.

O. If there is credible probability, the physical radiation barriers can fail: No.

1. What control device will cause the source to retract?

2. Are visible and audible alarms signals generated to warn individuals entering of the hazard, and to alert another knowledgeable individual?

P. <u>If the Source Is Stored In A Liquid Shield:</u>

1. Is loss of liquid level adequately signaled for immediate action? Yes. If during the off hours or if no one is in the control room, there is no alarm given to a remote location. When room is entered, annunciator panel and RAM readouts indicate low pool water level.

Q. <u>Exposing the Source</u>

1. What device will automatically generate visible and audible alarm signals to alert individuals before exposing the source?

See N.2 above

2. What clearly identified device can be activated from inside the irradiator which will prevent the source from becoming exposed?

See M.3 above

3. Is there a procedure to assure that the area is clear of individuals prior to exposing the source? Yes

R. Physical Radiation Measurements

1. Is a physical radiation measurement made upon entry to the irradiator after source operation? Yes.

S. Tests of Entry Control Devices

1. Are tests of the entry control devices conducted each day prior to initial operation of the source? (Note: These tests are not required if operations are uninterruptedly continued from the previous day.) Yes - Attempt to raise elevator with door open
Check Reset function.
Test of warning system.
Test of maze door lock.

2. Are records of these tests maintained?

Yes.

T. Control of Portals Into Irradiator

1. What safety devices and administrative procedures are used to prevent entry by individuals through portals that convey materials in and out?

There are 4 offset holes primarily for electrical and/or electronic cables, one of which contained a cable. There appeared to be no hazards associated with these holes

2. Are exit portals equipped to detect and signal presence of loose radiation sources and to automatically prevent them from being carried out?

N/A

U. Independent Measurements

1. Take water sample and split with licensee.

   a. Licensee results

   B.E

   b. IE:I Results

2. Planchet or bottle source standard. N/A

   a. Value

   b. Licensee's results

3. Results of interlock checks

   OK.

4. Is water continuously circulating through demineralizer? Yes.

5. Results of surveys around demineralizer.

   < 0.2 mrem/hr.

6. Demineralized conductivity measurement
   inlet measurement / Megohm Cm

7. Results of PH check with litmus paper

8. Restricted area survey results with meter

   < 0.2 mrem/hr.

9. Restricted area survey results with wipes

   B. G.

10. Unrestricted area survey results

11. Results of check of liquid level indicator

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IRRADIATOR INSPECTION

(Field Notes)

Licensee Dept. of the Army	Facility Harry Diamond Lab. Adelphi, MD 20783
License No. 19-17250-05	Inspection Date June 16, 1981
Principal Inspector Laurence F. Friedman	Other Accompanying Persons

Individuals Interviewed	Titles	Date of Interview
a.	e.	
b.	f.	Place of Interview
c. Charles Casser	operator g.	
d.	h.	

Name of RSO Richard Williams, Safety Mgr. Acting RSO	Telephone No. of RSO FTS 394-2218

Enforcement Action(s)

591 clear

J. D. Kinneman 6-23-81

A. Scope of Program

1. Number of individuals occupationally exposed 2 + supervisor
2. Type of Irradiator (eg. Pool, Pit, etc.) pool .
3. Number of Curies ~~20-25 KC.~~ 17.5 KC. of ^{60}Co .
4. Frequency of use: 15-20 hrs ~~times~~ per week .

B. Exposure Evaluation in pool + in air

1. Personnel
   a. Film Badge ✓
   b. Dosimeter _____
   c. Other _____
2. Facility
   a. Independent area radiation monitor yes
   b. Survey meter when enter HRA yes

C. Surveys

1. Radiation levels in unrestricted areas bkgnd
2. Contamination smears in restricted area none, bkgnd in room.
3. Leak Tests
   a. Frequency @ 6 mos.
   b. Method adequate each pencil placed in fresh water for 24 hr ~~water counted~~
4. Interlocks into HRA
   a. Frequency of Testing each day in air irradiation is done
   b. Functional at time of inspection yes

c. Are they intentionally bypassed or deleted. ~~Yes~~ No no

(1) Procedure if yes

can only be done with source elevator empty. Procedure for doing plus radiation monitors will prevent if source left on elevator

d. In accordance with license?

e. Adequate?

5. Routine maintenance of Hot cell equipment adequate. Yes No

D. Instrumentation

1. Adequate type and number: Yes No

2. Calibration as required: Yes No

E. Evaluation of Effluent

1. Liquid

2. Airborne

F. Training

1. Std. Procedures ✓

2. Emergency Procedures ✓

3. NRC Regulations ✓

G. Signs/Posting

1. CRM ✓

2. CHRA ✓

3. 19.11 ✓

H. Evaluation of Incoming Packages (20.205)

n/a

I. Disposal

n/a

J. Evaluation of Outgoing Shipments - (DOT)

n/a

K. Unusual Occurrences or Events

Elevator cable snagged winter '80. Elevator went to bottom of pool.

L. Independent Measurements (Van, Inspector)

pool liquid sample taken

For irradiatiors not completely self-shielded containing:

379 Ci colbalt-60

1042 Ci iridium-192

1515 Ci cesium-137 or more, the following must be determined:

M. Control Devices

1. What control device will prevent entry of individuals into the irradiator when the source is exposed?

solenoid locks on door

2. What control device will retract the source if an individual attempts entry?

door interlock

3. What control device prevents operation of the source if an individual is present in the irradiator?

search switch, 20 sec to get out + ~~do~~ start

4. Do any of the above control devices prevent egress from the irradiator?

no, panic bar on door

N. If the Entry Control Devices Fails:

1. What control device will retract the source?

any break in circuit will retract source

double independent circuits

2. Are visible and audible alarm signals generated to warn individuals entering of the hazard, and to alert another knowledgeable individual?

yes

O. If there is credible probability, the physical radiation barriers can fail:

n/a

1. What control device will cause the source to retract?

2. Are visible and audible alarms signals generated to warn individuals entering of the hazard, and to alert another knowledgeable individual?

P. If the Source Is Stored In A Liquid Shield:

1. Is loss of liquid level adequately signaled for immediate action?

yes

Q. Exposing the Source

1. What device will automatically generate visible and audible alarm signals to alert individuals before exposing the source?

purple beacon + klaxon

2. What clearly identified device can be activated from inside the irradiator which will prevent the source from becoming exposed?

large red button

3. Is there a procedure to assure that the area is clear of individuals prior to exposing the source?

search switch

R. Physical Radiation Measurements

1. Is a physical radiation measurement made upon entry to the irradiator after source operation? yes

S. Tests of Entry Control Devices

1. Are tests of the entry control devices conducted each day prior to initial operation of the source? (Note: These tests are not required if operations are uninterruptedly continued from the previous day.) yes

2. Are records of these tests maintained? yes

T. Control of Portals Into Irradiator

1. What safety devices and administrative procedures are used to prevent entry by individuals through portals that convey materials in and out? n/a

2. Are exit portals equipped to detect and signal presence of loose radiation sources and to automatically prevent them from being carried out? n/a

U. Independent Measurements

1. Take water sample and split with licensee.

   a. Licensee results

   b. IE:I Results

2. Planchet or bottle source standard.

   a. Value Background on mobile lab

   b. Licensee's results

3. Results of interlock checks
   all interlocks functioning.

4. Is water continuously circulating through demineralizer?
   yes

5. Results of surveys around demineralizer.
   bgnd.

6. Demineralized conductivity measurement
   3.5 MΩ cm

7. Results of PH check with litmus paper

8. Restricted area survey results with meter
   elevator not loaded, measurements not possible.

9. Restricted area survey results with wipes

10. Unrestricted area survey results

bgnd -

11. Results of check of liquid level indicator

OK