APPENDIX F

COMMERCIAL IRRADIATOR INSPECTION FIELD NOTES
REGION I

Inspection Report No. 91-001 License No. 29-01022-10

Licensee (name and address) Docket No. 030-09718

Department of the Army
US Army Communications Electronics Command
Fort Monmouth, New Jersey 07703-5000

Acting for Joe Santarone

Licensee Contact Brett Armstrong Steve Hoard Telephone No. (908) 544-3112

Last Amendment No. 19 Date of Amendment March 26, 1991

Priority : 1 Program Code: 35210

Date of Last Inspection September 19, 1990

Date of This Inspection September 30, 1991

Type of Inspection :
( ) Announced (✓) Unannounced
(✓) Routine ( ) Special
( ) Initial ( ) Reinspection

Next Inspection Date 4/93 ( ) Normal (✓) Extended ( ) Reduced

Summary of Findings and Action:

(✓) No violations, Clear 591 or regional letter issued
( ) Violations, 591 or Regional letter issued
( ) Previous Violations ( ) Action ( ) No Action

Inspector : (Signature) Date 10/2/91

Approved : (Signature) Date 10/24/91

DD/23

1. ORGANIZATION

a. Management Structure

Army is moving towards developing a "Navy" like program - large broad scope with preventive.

(1) Plant Manager involved in safety program? [L/C] (✓) Y ( ) N

(2) Plant Manager sets safety goals/objectives? [L/C] (✓) Y ( ) N

(3) Adequate budget and resources are provided to the safety program? (✓) Y ( ) N

(4) Corporate management supports safety through site visits, program reviews, and site support? [L/C] (✓) Y ( ) N

Remarks: Army Material Command (Alexandria, VA)

↓

CECOM (Ft Monmouth)

Steve Horne, Chief of Safety Office

↓

(2) engineers, (1) environmental, + (1) Radiation Safety branch → Joe Santasiero is Rad Safety Branch Chief (currently on temporary detail to Rad Control to set up emergency response to Nuclear accidents)

Dr. Kronenberg + J. Tomaini only users of irradiator.

Overseer Rad Safety at pool irrad. ← Rich Lovell, Hugo Bianci, Gary Riola ← Cpt. Batt Armstrong (Security) ←

b. Radiation Protection

(1) Radiation protection function is separate from plant operations? [L/C] (✓) Y ( ) N

(2) A corporate policy exists which addresses radiation safety? [L/C] (✓) Y ( ) N

(3) A trained qualified RSO assigned? [L/C] (✓) Y ( ) N

(4) Radiation Protection procedures have been written and approved [L/C] (✓) Y ( ) N

Remarks:

Licensee also has a Radiation Control Committee of which Joe Santasiero is Chairman + Steve Horne is the General representative — very active, meet quarterly

c. Authorized Users

Authorized users are qualified through training ? [L/C] (✓) Y ( ) N

Remarks:

2. LICENSEE INTERNAL AUDITS

a. Does the Radiation Safety Officer (RSO) conduct radiation safety audits? [L/C] (✓) Y ( ) N

Frequency Varies — N quarterly

b. Does corporate management conduct audits/reviews? [L/C] (✓) Y ( ) N

Frequency Varies — N Annual

c. Does the licensee conduct annual ALARA reviews? [L/C] (✓) Y ( ) N

d. Are audit and review findings discussed in safety meetings? [L/C] (✓) Y ( ) N

Remarks: All safety functions performed by Safety office, one member of office in Irradiator facility every day (estimate 60% of work effort). Army Materiel Command audits entire program annually (includes HP)

3. INSPECTION HISTORY

a. Were violations, unresolved items or deviations identified in previous inspections? (✓) Y ( ) N

b. Were licensee corrective actions adequate on previous inspection findings? (✓) Y ( ) N

Remarks: January, '95 inspected Indicated violations were and no deficiency — clean inspection 12/95, 10/92, 9/90.

4. TRAINING AND INSTRUCTIONS TO EMPLOYEES

a. Initial Radiation Worker/Operator Training

(1) A formal qualification/training program has been established and implemented. [L/C] (✓) Y ( ) N

requires approval, interview, by Radiation Control Committee

(2) Required tests administered, test scores satisfactory, and records retained. [L/C] NA ( ) Y ( ) N

(3) Training program is adequate for intended purpose and contains sufficient technical depth. [L/C] (✓) Y ( ) N

(4) Management periodically reviews training program implementaion. [L/C] (✓) Y ( ) N

RPO has authority for interim approval

b. Retraining Program

After approval, given Rad Safety Course in house

(1) A formal program has been established to retrain radiation workers/ operators. [L/C] ( ) Y (✗) N

(2) Retraining records are retained and reflect adequate program implementation. [L/C] (✓) Y ( ) N

Not found, conduct as needed. A Degree for needs

c. General Training

(1) Instruction to workers provided [19.12] (✓) Y ( ) N

(2) Instruction provided to ancillary personnel (security, custodial, maintenance, etc.) [L/C] (✓) Y ( ) N

Remarks: Training provided to security & fire brigade on contract — instructed not to enter building

No other ancillary people with access to network area.

5. RADIATION PROTECTION PROCEDURES

a. Have operating and emergency evacuating procedures been developed and implemented? [L/C] (✓) Y ( ) N

b. Are manufacturer's instructions for devices used and available? [L/C] NA ( ) Y (✓) N

c. Does the licensee maintain a logbook for recording operational data? [L/C] (✓) Y ( ) N

d. Is access controlled to high radiation areas? [20.203(c)]

Sources are never removed from pool, irradiation taken place at bottom of 20 ft pool – HRA > 10 ft deep.

(1) postings (✓) Y ( ) N
(2) locks/barriers (✓) Y ( ) N
(3) interlocks (✓) Y ( ) N

e. Are interlocks checked periodically for operability? [L/C] (✓) Y ( ) N

f. Are interlocks designed such that it is difficult to tamper or intentionally defeat them? [L/C] ( ) Y (✓) N

g. Are restricted areas established, posted, and properly controlled? [20.203] (✓) Y ( ) N

h. Are security measures in place to control or protect materials in storage? [20.207] (✓) Y ( ) N

i. Is entrance key attached to hand held survey meter? [L/C] ( ) Y (✓) N

Remarks: IN-pool irradiation — sources never exposed — located at the bottom of a 20 ft pool. "Interlocks" are (3) RMS II sensors located at vault door, over pool, and next to DI filters, set at 2 MR/hr, checked monthly. Also have (2) float switches which alarm if water level drops ~1 ft, and ~2 ft. All alarms sound in irradiation building, security / fire instructed on who to call. Have a pipe tied up to fill tank in the event of a catastrophic leak – fill can take place outside of building – static water table so high that if catastrophic leak – water would flow into pool.

6. MATERIALS, FACILITIES, AND INSTRUMENTS

a. Is the licensee in possession of the authorized type, quantity, and form of material? [L/C] ~8,000 curies Co 60 (✓) Y ( ) N

b. Are the materials being used as authorized? [L/C] (✓) Y ( ) N

c. Are appropriate survey meters on hand and operable? [L/C] (✓) Y ( ) N

d. Are survey meters calibrated at the required frequency? [L/C] by TMDE (Army) (✓) Y ( ) N
(Test, Measurement and Diagnostic Equipment) → NIST Traceable

e. Are fixed process or area monitors operable and calibrated at the required frequency? [L/C] (✓) Y ( ) N

f. Is source shroud in place and in good repair? [L/C] ( ) Y ( ) N
Sources in pool, barrier around pool

g. Type of irradiator: ( ) carrier ( ) tote ( ) pallet NA

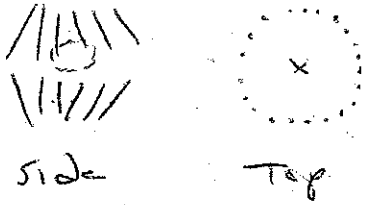
h. Manufacturer and model: Current Weight: Sources, pool designed Inhouse

i. Mode of operation: ( ) continuous (✓) batch

Remarks: pool ~10 ft in diameter, 127 pencils located in device at bottom of pool. Designed so that objects placed at center would receive uniform dose throughout. Currently delivers 7.8 R/sec. Materials introduced manually suspended by "fish gale" located inside of a plastic peanut butter jar for water tight

Irradiation time from 10 min to one month

demonstrate how does irradiation



7. SOURCE LOADING AND UNLOADING Loaded into 60's, never removed or otherwise manipulated

a. Are procedures developed and implemented [L/C] (X) Y ( ) N

b. Are transfers of byproduct material proper? [30.41] NA ( ) Y ( ) N

c. Are labels and packaging material appropriate? [71.5] NA ( ) Y ( ) N

d. Are records of receipt, transfer, storage survey, and monitoring maintained? [30.51] NA ( ) Y ( ) N

e. Does licensee know the position (by serial number and activity) of all sources? [L/C] (✓) Y ( ) N

Remarks:

One inch diameter x ~12" pencils, outer encapsulation aluminum, inner stainless steel, internal cobalt rod - other pencil irradiators N, γ — Co 60.

8. PERSONNEL PROTECTION - EXTERNAL

a. Personnel monitoring control; minimize exposures, control of accumulated dose [20.101,102,104,202] (✓) Y ( ) N

b. Dosimetry supplier: Army — Lexington Bluegrass (NVLAP)

c. Frequency of exchange: monthly

d. Type of dosimeters: film

e. Maximum exposures (W.B. and ~~extremity~~) :

minimum

f. Number of persons monitored: for steady irradiation, 3 persons

g. Surveys conducted [20.201] monthly using cuvettes (✓) Y ( ) N range .01 mR/hr ZR

h. Frequency, results, records [20.401] monthly
<2x background at pool surface
yes

i. Levels in Unrestricted Areas [20.105] ~20 μR/hr

Remarks: This license authorized a go-to quarterly frequency, has not done so because other Army Cecom licenses not yet approval for quarterly - waiting for complete authorization

9. LEAK TESTS/SOURCE INTEGRITY EVALUATIONS

a. Are leak tests and/or source integrity evaluations conducted? [L/C] — (✓) Y ( ) N

(1) Are the tests conducted at regular intervals? [L/C] — (✓) Y ( ) N

(2) Is the testing method sufficient to detect leakage or source integrity problem? [L/C] — (✓) Y ( ) N

continuous monitoring of DI system, RMS II set at 2 mR/hr, also take 100 ml sample 2x/year + analyze intrinsic germanium, Canberra 35+. Nothing over LLD over detected (5×10^{-6} μCi) last done 2/12/91 + 8/19/91 evaluate (2) samples each test

b. Is a water chemistry program established and procedures developed? [L/C] — (✓) Y ( ) N

(1) Have chemical parameters and sampling frequency been identified? [L/C] — (✓) Y ( ) N

(2) Have appropriate limits and action levels been established? [L/C] — (✓) Y ( ) N

(3) Does the chemical sampling program include the following? [L/C]

- total and suspended solids (conductivity) — (✓) Y ( ) N
- pH — ( ) Y (✓) N
- pool clarity — (✓) Y ( ) N
- chlorides/fluorides — ( ) Y (✓) N

change at 10 μ Siemens → recorded ~2x/month, tested more frequently, at inspection pool conductivity 0.9 μ Siemens

c. Is the pool cleanup and cooling system operated as designed? — (✓) Y ( ) N

d. Are demineralizers used for pool cleanup? [L/C] — (✓) Y ( ) N

(1) Are demineralizers always in operation or are they used intermittently? [L/C] *Always* — (✓) Y ( ) N *DI + charcoal, changed ~2x/yr*

(2) Are radiation monitors placed on or adjacent to the demineralizer? [L/C] — (✓) Y ( ) N

(3) Are alarm set points established for those monitors? [L/C] *2 mR/hr* — (✓) Y ( ) N

(4) Does the monitor alarm in the control room? [L/C] — (✓) Y ( ) N

e. Are records maintained of leak tests and source integrity? [L/C] — (✓) Y ( ) N

Remarks:

10. RELEASE OF EFFLUENTS [20.106]

Does licensee evaluate:

a. water leakage from pool? (✓) Y ( ) N
b. effluent from regeneration of demineralizer? (✓) Y ( ) N Not regenerated
c. pool sediment? ( ) Y (✓) N
d. release of demineralizer to nonlicensed service company? NA ( ) Y ( ) N

Remarks: Low source strength (minimal heating of water) combined with no movement of sources results in very low water loss. Licensee adds an inch of water ~2x/year to make up for evaporation. Demineralizer resin replaced, was resin evaluated (100 grams) of intensive gamma emitters, no detectable activity, disposal of in regular waste. Intake for demineralizer at bottom of tank, free of a good sample

11. TRANSPORTATION (10 CFR 71.5(a) and 49 CFR 171-189)

a. Licensee makes shipments of RAM ( ) Y (✓) N

b. Shipments are:

( ) delivered to common carriers
( ) transported in licensee's own private vehicle
( ) both
( ) no shipments since last inspection

Remarks.

Inspector took water sample, no detectable Co 60.

Complete only if shipments made since last inspection:

c. Shipments

(1) Authorized packages used [173.415,416] ( ) Y ( ) N ( ) N/A

(2) Package type used _____

(3) For DOT-7A packages, performance test record on file [173.415(a)] ( ) Y ( ) N ( ) N/A

(4) For DOT-55 packages, use is approved by NRC [173.416(a)] ( ) Y ( ) N ( ) N/A

(5) Other Type B packages used are approved [173.416(a)]	( ) Y ( ) N ( ) N/A
(6) Licensee has COCs on file with NRC [71.12(c)(1)]	( ) Y ( ) N ( ) N/A
(7) Licensee has a QA program approved by NRC [71.12(b)]	( ) Y ( ) N ( ) N/A
(8) For special form sources, performance test record on file [173.476(a)]	( ) Y ( ) N ( ) N/A
(9) Packages properly labeled [172.403, 173.441]	( ) Y ( ) N ( ) N/A
(10) Packages properly marked [173.200]	( ) Y ( ) N ( ) N/A
(11) Proper shipping papers prepared and used [172.200-204]	( ) Y ( ) N ( ) N/A
(12) Shipping papers readily accessible during transport [177.817(e)]	( ) Y ( ) N ( ) N/A
(13) Vehicles placarded as necessary [172.500, 504]	( ) Y ( ) N ( ) N/A
(14) Cargo blocked and braced [177.842(d)]	( ) Y ( ) N ( ) N/A
(15) Any incidents reported to DOT [171.15-16]	( ) Y ( ) N ( ) None

Remarks.

12. NOTIFICATIONS AND REPORTS

a. To individuals [19.13]	(✓) Y ( ) N
b. Overexposures, excessive levels and concentrations, incidents [20.403,405]	( ) Y ( ) N (✓) None
c. Personnel exposures and monitoring termination reports [20.407,408]	( ) Y ( ) N (✓) None
d. Theft or loss of licensed material [20.402]	( ) Y ( ) N (✓) None

Remarks:

Individuals associated with past incidents have been with group many years

13. POSTING OF NOTICES

a. Parts 19 and 20, license and documents, procedures, and Notices of Violations [19.11] (✓) Y ( ) N

b. Form NRC-3 [19.11] (✓) Y ( ) N

Remarks:

14. EMERGENCY PREPAREDNESS

a. Has an emergency plan and general implementing procedures been developed? [L/C] (✓) Y ( ) N

b. Has the plan been coordinated with appropriate offsite support authorities? (e.g. local government, emergency medical, state health authorities) [L/C] coordinates with fire department (✓) Y ( ) N

c. Are notification procedures adequate and up to date? (✓) Y ( ) N

d. Are management, RSO, and ~~offsite~~ authorities listed on the notification procedure? [L/C] NO offsite (✓) Y ( ) N

e. Are licensee employees trained in emergency response activities? [L/C] (✓) Y ( ) N

f. Are drills conducted? [L/C] 1987 (✓) Y ( ) N

If "Yes," are the drills critiqued? (✓) Y ( ) N

g. Are offsite officials involved in drills and training? [L/C] 1987 (✓) Y ( ) N

Remarks:

Licensee believes emergency would involve leaky source (detected by one of three RO2 alarms), fire, or loss of pool water (detected by one of two water level alarms). Security has call number (on keepsake). Security + fire department instructed not to enter building. Fire department could fill pool remotely. Fire not RO2 issue, sources remain at bottom of pool, stored building. n/a.

15. PRODUCT MONITORING

a. Has the licensee established a program for periodically monitoring irradiated products for potential contamination? [L/C] ( ) Y ( ) N

If "Yes," does the program include:

(1) direct radiation surveys? [L/C] ( ) Y ( ) N

(2) removable contamination surveys? [L/C] ( ) Y ( ) N

b. Have action limits been established for product contamination levels? [L/C] ( ) Y ( ) N

c. Are the licensee's survey techniques and methods sensitive enough to detect the established contamination level? [L/C] ( ) Y ( ) N

Remarks:

batch process — when material removed from pool there is an RMSII detector at surface of the water next to where the material exits (set at 2mR/hr). Source pencil much bigger than most materials irradiated.

16. RECORDKEEPING FOR DECOMMISSIONING

a. Records of information important to the safe and effective decommissioning of the facility maintained in an independent and identifiable location until license termination [30.35(g)] (✓) Y ( ) N

b. Records include all information outlined in [30.35(g)] (✓) Y ( ) N

Remarks.

17. NRC CONFIRMATORY MEASUREMENTS [10 CFR 20.105,201] ( ) N/A

a. Meter used: Bicron

b. Calib. Date: Not indicated — New instrument

c. Serial No: 33472

d. Describe measurements taken and results:

Surveyed pool, demineralizer → ~20 μR/hr

collected 500 ml sample for analysis in our lab

No detectable activity.

18. INDEPENDENT INSPECTION EFFORT

Scope of program: (Results)

19. CONTINUATION OF REPORT ITEMS - USE BACK OF PAGE IF NECESSARY

Licensee has not instituted quarterly dosimetry as approved on this license at last amendment. Waiting on approval for -06 license so they can institute in whole program. Checked back at office, -06 license amendment No. 37 was signed out 1/29/91 — license (at Ft. Monmouth) had never received.

Licensee also initiated in two amendments to the -07 license, one to authorized increase in possession of no particular source already approved and one to add a new source. Processed the first amendment in house — second amendment not yet in house — licensee believes it is still in their headquarters, will try to shake down. Received request and processed amend.

20. LIST OF VIOLATIONS

NA

21. PERFORMANCE EVALU. ION FACTORS

Licensee (name & location): Department of the Army, CECOM, Ft Monmouth, NJ 07703

Inspector: J. Dwyer

Inspection Date: September 30, 1991

a. Lack of senior management involvement with the radiation safety program and/or Radiation Safety Officer (RSO) oversight — ( ) Y (✓) N

b. RSO too busy with other assignments — ( ) Y (✓) N

c. Insufficient staffing — ( ) Y (✓) N

d. Radiation Safety Committee fails to meet or functions inadequately — ( ) Y (✓) N ( ) N/A

e. Inadequate consulting services or inadequate audits — ( ) Y (✓) N ( ) N/A

Remarks (consider above assessment and/or other pertinent PEFs):

Very good program — recommend reduced frequency of inspection

Regional follow-up on above PEFs citations: