

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 030-05626/90001(DRSS)
Docket No. 030-05626
License No. 34-00507-16 Category E1A Priority 2
Docket No. 030-05624
License No. 034-00507-04 Category C Priority 1
Docket No. 040-00531
License No. SMB-689 Category E Priority 3

Licensee: National Aeronautics and Space Administration
Lewis Research Center, MS 21-15
21000 Brookpark Road
Cleveland, OH 44135

Inspection Conducted: October 24 and 25, 1990

Purpose of Inspection: Routine, unannounced safety inspection to determine compliance with Commission rules, regulations and license conditions.

Inspector: *J. F. Patterson*
J. F. Patterson
Radiation Specialist

11/21/90
Date

Approved By: *William H. Schultz*
William H. Schultz, Chief
Nuclear Materials Safety
Section 1

11-21-90
Date

Inspection Summary

Inspection on October 24 and 25, 1990 (Report No. 030-05626/90001(DRSS))

Areas Inspected: This routine, unannounced safety inspection included a review of the licensee's organizational structure; scope of program; audits; training; facilities; instrumentation; leak test-inventory; receipt and transfer of material; area surveys; personnel radiation protection-external; personnel radiation protection-internal; bioassay program; waste disposal; notification and reports; posting-labeling; environmental monitoring; and confirmatory measurements.

Results: Of the areas inspected, no apparent violations of NRC requirements were identified.

DETAILS

1. Persons Contacted

*Peter W. McCallum, Chief, Office of Environmental Programs
*Albert B. Smith, RSO, Chief, Health Physics Office
*Dr. John W. Cooper, Health Physicist
Dale Krismanth, H. P. Technician
Gayle Reid, H. P. Technician

*Indicates presence at exit meeting.

2. Inspection History

This license was last inspected on December 9 and 11, 1987. No violations were identified.

3. Organization

Peter W. McCallum is the Chief, Office of Environmental Programs for the Lewis Research Center; Albert B. Smith is the Chairman of the Radiation Safety Committee and Radiation Safety Officer. The RSC meets on a quarterly basis and approves all users of licensed materials.

No violations of NRC requirements were identified.

4. Licensed Program

The 34-00507-16 license authorizes any byproduct material with Atomic Numbers 1 through 84, including sealed sources, foils; AM-241, H-3, iodine-125; iodine-126; iodine-129, iodine-131; and Polonium-210 for research and development as defined in 10 CFR Part 30 Section 30.4(g) and instrument calibration. At the present time there is only one (1) active user, Dr. James Blue, who uses sealed sources occasionally. He has been working with the cyclotron on a cancer treatment program with representatives from Case-Western University, Cleveland, Ohio this program is to expire around the end of November and the machine will be deactivated and dismantled in about five (5) years time.

Two (2) H. P. Technicians perform routine daily radiation safety tasks, including survey instrument calibrations, air sampling collections and analyses.

The quantities, types and use of radioactive material appears to be as authorized in the license.

No violations of NRC requirements were identified.

The 034-00507-04 license is currently inactive, the Iridium-192 sealed source is in storage and has decayed to about 10 millicuries. The

licensee's exposure records indicates that since March 21, 1988 to August 7, 1989, there was a total of eight (8) radiation exposures made. There are current leak test and inventory records available. The licensee was reminded that the source would have to be leak tested again before final disposal or transfer.

No violations of NRC requirements were identified.

A review of the SMB-689 license showed limited use of thorium and uranium material. Most material is in storage or awaiting disposal. The licensee stated that there has been little active use in the last five years. The September 21, 1990 inventory showed Thorium-228, 3 uCi, Uranium (natural and depleted) 226.593 pounds in solid form were on hand at that time.

No violations of NRC requirements were identified.

5. Audits

John Ross, certified health physicist from Teladyne in Sandusky, Ohio, performs an annual audit of the licensed activities and issues a written summary of his findings. The inspector reviewed the 1988 and 1989 audits reports without comment. Mr. Ross' current 1990 audit review is still in its working mode and was not available for review at the time of this inspection.

No violations of NRC requirements were identified.

6. Training

The RSC reviews, with assistance from the RSO, applicant's user training and experience in accordance with the requirements for a Type A broad scope program and the requirements of the Lewis Research Center operational safety manual. If insignificant training on the applicant's part is discovered, then the application is denied, according to statements made by the licensee.

Annual training for radiation workers and general staff was held on September 26 through 27, 1990. On July 3, 1990, John W. Cooper, CHP, conducted a one day radiation safety training session for the Cesium-137 gauge users at the Plum Brook Reactor facility which was attended by 23 employees according to licensee's records.

No violations of NRC requirements were identified.

7. Facilities

A radioactive source and calibration area is located in the basement of the materials and structures building 49. This location also houses ~~area~~ ^{an} which includes low-level waste, radioactive material storage; calibration range for low-range radiation survey meters; and for processing shipments and receipt of radioactive packages. This area is identified as rooms 21,

22 and 23, which were found to be locked and posted as required. The above mentioned rooms were visually inspected and direct surveys were made with no problems noted. Room ventilation checks appear adequate.

No violations of NRC requirements were identified.

8. Instrumentation

Survey instruments used by NASA staff (GMs, ion chambers, neutron and alpha meters) are calibrated every 3 months by the HP technician using cobalt-60, cesium-137 and radium sealed sources according to the licensee's calibration records.

No violations of NRC requirements were identified.

9. Leak Test Inventory

Leak tests are conducted every six (6) months on about 25 sealed sources. Latest record of the week of October 15, 1990 showed test results were found to be less than 0.005 uCi. A current copy of the licensee's last source inventory dated September 21, 1990 is attached to this report. A review of the licensee's inventory records indicate that the licensee possession amount is under the authorized limits.

No violations of NRC requirements were identified.

10. Receipt and Transfer

Packages containing radioactive material are delivered to shipping and receiving department in building 21 where the package is given a primary radiation survey and visual inspection by a H. P. technician. Authorization for intended recipients to possess the material is also verified. Records or receipt are maintained as required and a sampling review revealed no problems.

No violations of NRC requirements were identified.

12. Personnel Radiation Protection - External

The licensee provides approximately 25 employees with personnel dosimetry supplied by a NVLAP approved vendor. Whole body film badges are exchanged monthly. A review of records from January 31, 1987 to September 30, 1990 revealed exposures to radiation workers well below 10 CFR Part 20 limits.

No violations of NRC requirements were identified.

13. Personnel Radiation Protection - Internal

Research Laboratory personnel using iodine-125 or iodine-131 have their thyroids counted in accordance with Regulatory Guide 8.20. A review of bioassay records from August 7, 1987 to July 3, 1990, did not identify any significant uptakes.

14. Waste Disposal

The licensee decays as much waste as possible, holding it for 10 half-lives and then disposing of shipped for burial by a waste broker. A review of the licensee's waste disposal records showed that five (5) waste shipments occurred in 1990 to date. The licensee has a contract with Applied Health Physics, Inc. of Bethel Park, Pennsylvania to package and ship all waste.

No violations of NRC requirements were identified.

15. Notifications and Reports

No overexposures, incidents or theft of material occurred since the last inspection, December 9 and 11, 1987 to the date of this inspection.

No violations of NRC requirements were identified.

16. Posting

A review of buildings 21 and 49 and several research laboratories revealed appropriate posting of notices and and cautionary signs.

No violations of NRC requirements were identified.

17. Confirmatory Measurements

Radiation level measurements made by the inspector were performed with a Xetex 305 B-GM, Serial No. 008368 calibrated May 5, 1990. Radiation levels were found to be comparable to licensee measurements and within restricted and unrestricted limits in 10 CFR Part 20.

18. Exit Meeting

At the conclusion of the inspection on October 25, 1990, the inspector met with Peter W. McCallum, Albert B. Smith and John W. Cooper. A summary of the areas inspected was made and a NRC Form 591, indicating that no violations were observed, was issued.

SOURCE INVENTORY:

REVISED: 9-21-90

ISOTOPE	Ao	I. D. #	LOC.	FORM	LICENSE	T1/2
Americium-241	0.1 uCi	1-9-68	49/16	solid	General	450y
Americium-241	1.5 mCi	6-8-77	6/120	SS	General	450y
Americium-241	1.5 mCi	6-8-77	49/22	SS	General	450y
Americium-241	300 mCi	7-2-86	49/22	SS	34-00507-16	450y
Americium-241	300 mCi	7-2-86	49/22	SS	34-00507-16	450y
Americium-241	300 mCi	7-2-86	49/22	SS	34-00507-16	450y
AmBe	54 Ci	1-18-66	49/5	SS	34-00507-16	450y
AmBe	1 Ci	7-22-70	49/22	SS	34-00507-16	450y
Bismuth-207	0.2 uCi	9-19-72	49/16	solid	unlicensed	32y
Cadmium-109	50 uCi	9-19-72	49/16	solid	unlicensed	462d
Cadmium-109	5 mCi	5-17-88	14/108A	SS	General	462d
Cadmium-109	8.9 uCi	3-30-89	6/11	SS	Exempt	462d
Calif-252	0.54 mCi	7-27-70	49/22	SS	34-00507-16	2.64y
Calif-252	59 mCi	10-27-72	49/21	SS	34-00507-16	2.64y
Carbon-14	102 nCi	1-24-84	49/17	solid		5730y
Cesium-137	24 Ci	8-14-59	49/9	SS	34-00507-16	30y
Cesium-137	14.5 uCi	6-9-67	49/16	solid	34-00507-16	30y
Cesium-137	4 nCi	12-12-67	49/17	SS	Exempt	30y
Cesium-137	1 uCi	11-30-70	49/22	SS	Exempt	30y
Cesium-137	7.5 uCi	2-2-72	49/16	solid	Exempt	30y
Cesium-137	16.55 nCi	12-12-83	49/17	solid		30y
Cesium-137	150 mCi	2-2-90	PB	SS	34-00507-16	30y
Cobalt-57	1.7 mCi	7-19-76	49/16	solid	Unlicensed	272d
Cobalt-57	2 mCi	7-10-90	49/13	liquid	34-00507-16	272d
Cobalt-60	1 Ci	1-20-54	49/22	SS	34-00507-16	5.27y
Cobalt-60	20 Ci	11-8-56	49/9	SS	34-00507-16	5.27y
Cobalt-60	3.8 uCi	6-9-67	49/16	solid	34-00507-16	5.27y
Cobalt-60	1 uCi	11-30-70	49/22	SS	Exempt	5.27y
Cobalt-60	16.71 uCi	12-12-83	49/17	solid		5.27y
Curium-244	1 uCi	1-28-81	49/16	solid	General	18y
Erbium-169	0.4 mCi	7-11-90	49/13	solid	34-00507-16	9.4d

Hydrogen-3	250 mCi	10-23-74	77/52	ADG	General	12.3y
Hydrogen-3	250 mCi	8-6-79	6/107	ADG	General	12.3y
Hydrogen-3	250 mCi	10-11-79	6/103	ADG	General	12.3y
Hydrogen-3	200 mCi	12-9-83	49/22	ADG	General	12.3y
Iridium-192	50 Ci	10-22-70	49/9	SS	34-00507-04	74d
Iridium-192	58 Ci	11-24-87	14/104	SS	34-00507-04	74d
Iron-55	100 uCi	9-19-72	49/16	solid	exempt	2.6y
Iron-55	5 mCi	5-17-88	14/108A	SS	General	2.6y
Iron-55	0.1 mCi	3-30-89	6/11	SS	Exempt	2.6y
Krypton-85	0.1 uCi	10-4-73	6/25	ADG	Exempt	10.7y
Nickel-63	15 mCi	12-3-76	6/101	SS	34-00507-16	100y
Nickel-63	8 mCi	10-27-81	6/101	SS	General	100y
Nickel-63	8 mCi	5-4-82	6/101	SS	General	100y
Nickel-63	8 mCi	8-17-84	6/101	SS	General	100y
Nickel-63	8 mCi	10-3-86	6/101	SS	General	100y
Plutonium-239	1.1 uCi	8-4-64	49/23	solid	General	2.4E4y
Plutonium-239	3 nCi	12-12-67	49/17	solid	General	2.4E4y
Plutonium-239	0.7 nCi	12-12-67	49/17	solid	General	2.4E4y
Plutonium-239	13 nCi	11-15-71	49/17	solid	General	2.4E4y
Plutonium-239	0.41 uCi	9-7-90	49/23	solid	General	2.4E4y
Promethium-145	1 uCi	9-19-72	49/16	solid	Unlicensed	17.7y
Promethium-147	2.4 mCi	12-11-75	aircraft	solid	Exempt	2.6y
Radium-226	1.06 mCi	4-12-50	49/21	SS	Unlicensed	1620y
Radium-226	9.62 mCi	10-30-56	49/21	SS	Unlicensed	1620y
Radium-226	100 uCi	2-6-79	106/132	SS	Unlicensed	1620y
Radium-228	38 mCi	6-23-58	49/13	liquid	Unlicensed	1620y
Sodium-22	1 uCi	11-30-70	49/22	SS	Unlicensed	2.6y
Sodium-22	3.6 uCi	2-2-72	49/16	liquid	Unlicensed	2.6y
Strontium-90	50 mCi	12-17-82	49/cyc	SS	34-00507-16	29y
Strontium-90	13.8 nCi	12-12-83	49/17	solid	34-00507-16	29y
Technetium-99	10 nCi	11-15-71	49/17	solid	Exempt	2E5y
Thorium (nat)			labwide	solid	SMB-689	
Thorium-228	3 uCi	2-2-72	49/16	solid	SMB-689	1.9y
Tin-119m	2 mCi	7-5-77	49/23	SS	34-00507-16	293d
Tin-119m	2 mCi	5-7-79	49/23	SS	34-00507-16	293d
Uranium (nat. & depleted)	226.593#		labwide	solid	SMB-689	