MEMO ROUTE SLIP
Form AEC-93 (Rev. May 14, 1947)

☐ See me about this. ☐ Note and return. ☐ For concurrence. ☐ For signature. ☐ For action. ☐ For information.

TO (Name and unit)	INITIALS / DATE	REMARKS
E. R. Price Assistant Director DL&R, HQ		Re: General Electric Company, Missile and Space Div. Philadelphia and King of Prussia, Pennsylvania - License Nos. 37-2006-2, -3, -4, -5 and SUC-626
L. Dubinski, Ass't Director for Materials, CO:HQ		Back-up notes for 591 and 592 transmitted 2/14/64 As per request by E. R. Harris, Safety Engineer, ~~enclosed~~ parts B report ~~is~~ to be considered as ~~classified information~~.
		REMARKS are Company confidential. changed 2/20/64.
FROM (Name and unit) R. G. Gilbert, Radiation Specialist CO:I		REMARKS ERP & LD copies changed accordingly
PHONE NO. X-386 / DATE 2/17/64		

USE OTHER SIDE FOR ADDITIONAL REMARKS

GPO 863 16 - 77649 - 1

D-4

FEB 14 1964

Ext. 386

CO:I:EV

General Electric Company
Missile and Space Division
Space Technology Center
Goddard Boulevard
King of Prussia, Pennsylvania

Attention: Mr. M. Paige, Manager

Gentlemen:

This letter relates to the discussion Mr. Vinciguerra of this office held with you following the inspection conducted on January 23 and 24, 1964, of the activities authorized under AEC Byproduct Material License Nos. 37-2006-2, -3, -4, -5, and SUC-626.

Forms AEC-591 relating to all activities, except those conducted under 37-2006-4, were issued at the time of the inspection or forwarded to you under separate cover.

With respect to License 37-2006-4, as noted during the discussion, it appears that certain of your activities were not conducted in full compliance with conditions of the license. The items and references to the pertinent requirements are listed in Item 5 of the attached Form AEC-592.

The purpose of this letter is to give you an opportunity to advise us, in writing, of your position concerning these items and of any corrective steps you have taken or plan to take with respect to the items listed on the attached form, and the date all corrective action was or will be completed. Your reply should be sent to us within twenty (20) days of the date of this letter to assure that it will receive proper attention in our further evaluation of this matter.

OFFICE ▶	COMPLIANCE					
SURNAME ▶	VINCIGUERRA:ehr	GILBERT	KIRKMAN			
DATE ▶	2/14/64					

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

Should you have any questions concerning this matter you may communicate directly with this office.

Sincerely yours,

Robert W. Kirkman, Director
Region I, Division of Compliance

Enclosure:
ASC-592

cc: Mr. S. Harris, Re-entry Systems Dept. w/o enclosure
Mr. J. Stricker, Space Technology Center w/o enclosure

bcc: CO:HQ
DL&R w/back-up notes
CO:I

Form AEC-592
(5-63)

7-C

UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE

1. LICENSEE	2. REGIONAL OFFICE
GENERAL ELECTRIC COMPANY Missile and Space Division Space Technology Center Goddard Boulevard King of Prussia, Pennsylvania	U. S. Atomic Energy Commission Region I, Division of Compliance 376 Hudson Street New York, New York 10014
3. LICENSE NUMBER	**4. DATE(S) OF INSPECTION**
37-2006-4	January 24, 1964 (Initial)

5. The following activities under your license (identified in Item No. 3 above) appear to be in noncompliance with AEC regulations or license requirements, as indicated.

(a) Contrary to the provisions of License Condition No. 8(A), which authorizes the possession of 400 mc of H-3, as 12 sources, no single source to exceed 200 mc, at the time of the inspection you possessed 3730 mc of H-3 as 12 sources with the following activities: four sources of 400 mc each, four sources of 300 mc each, and one source each of 360, 270, 200 and 100 mc.

(b) The 12 sealed H-3 light sources were used under the supervision of Mr. T. Vogt and the 100 mc Pm-147 source under the supervision of Dr. L. Cohen, contrary to License Condition No. 12 which authorizes the use of the H-3 sources by, or under the supervision of, E. H. Stockoff, D. Wykstra and D. McMorrow and the remaining licensed material by, or under the supervision of, E. H. Stockoff and D. Wykstra only.

Supplementary page None attached. Eugene Vinciguerra — AEC Compliance Inspector — 2/14/64 — Date

ORIGINAL: LICENSEE. COPIES: ☐ CO REGION ☐ CO HEADQUARTERS ☐ L&R HEADQUARTERS.

U.S. GOVERNMENT PRINTING OFFICE: 1963—O-665311

BACKUP NOTES FOR 591 AND 592

PART 30 - 31 - 40 INSPECTION

GENERAL ELECTRIC COMPANY
3198 Chestnut Street
Philadelphia, Pennsylvania

Inspector's Name: Eugene Vinciguerra
License Nos.: 37-2006-2, -3, -4, -5
SUC-626

and

GENERAL ELECTRIC COMPANY
Missile and Space Division
Space Technology Center
Goddard Boulevard
King of Prussia, Pennsylvania

Date of Inspection: 1/23 & 1/24/64 (Announced Initial and Reinspection)

Persons Accompanying Inspector:

Karl Ericson, Philadelphia Department of Health

Persons Contacted:

Mr. E. Harris, RSO, Re-entry Systems Department (Lic -2, -3, SUC-626)
Mr. J. Stricker, RSO, Space Technology Center (Lic -4, -5)
C. Dates, Manager Employee and Community Relations, Re-entry Systems Department
Mr. H. Paige, Manager Missile and Space Division

DETAILS

Inspection History

9. This is the fourth reinspection under License 37-2006-2 and the initial inspection of License -3, -4, -5 and SUC-626. As a result of the most recent past inspection under License -2, the licensee was cited for not leak testing a 0.5 c Co-60 sealed source at six month intervals. Following the current inspection, 591's were issued for License -2, -3, -5 and SUC-626. A 592 is to be issued for License -4.

Organization and Administration

10. The missile and Space Division of the General Electric Company is involved in research, development and manufacture in connection with the National Space Program. The use and storage of licensed material involves the Re-entry Systems Department in Philadelphia, Pennsylvania, and the Space Technology Center and Advanced Space Projects Department, both located in King of Prussia, Pennsylvania, ~~several miles apart.~~ The Division General Manager is H. Paige.

11. The RSO for the Re-entry Systems Department is Mr. E. R. Harris, Safety Engineer. Harris is responsible for all safety and fire protection for the Department. In addition, he has conducted the physical radiation surveys, evaluated all proposed uses of radioisotopes, designated the areas of isotope use and storage and supervised the personnel monitoring program since joining the Missile and Space Division in 1961. Harris reports to T. Handley, Manager of Security, Safety and Plant Protection who in turn is responsible to C. Dates, Manager of Employee and Community Relations. According to Harris, the Re-entry Systems Department conducts the research, development and manufacture of nose cones and associated electronic equipment.

12. The RSO for the Space Technology Center is Mr. [illegible]. Stricker, Safety Engineer (experience as per 9/23/63 application for License -5). Stricker is responsible to H. Messick, Manager of Security, Safety and Plant Protection who in turn reports to R. Haughton, Manager of Employee and Community Relations. Stricker stated that the activities of the Space Technology Center include the design, fabrication and testing of unmanned spacecraft, the testing of Re-entry Systems under environmental conditions and a wide variety of space science research including radiation physics research. Stricker reported that he is also responsible for the use of licensed material by the Advanced Space Projects Department.

License 37-2006-2, -3 and SUC-626
Facilities and Uses of Byproduct and Source Material

13. According to Harris, all radioactive material possessed under License 37-2006-2, -3 and SUC-626 is presently being held in storage by the Re-entry Systems Department. The inspector noted that the Department occupies a large industrial building at 3198 Chestnut Street, Philadelphia, Pennsylvania. Harris stated that the only licensable material currently possessed by the Department is a 460 mc Co-60 sealed source in a Mitchell projector Model

X-105 under License -2, five sealed sources (Patterson-Moos Model 300 nuclear batteries) each containing 450 mc of Kr-85 under License -3, and 605 lbs. of depleted uranium under SUC-626. According to Harris, the Co-60 source has not been used in the past 2½ years and has been in storage awaiting disposal. He added that the Kr-85 batteries and depleted uranium have never been used since procured. Harris explained that the limited use of sources is the result of cancelled U. S. government contracts and that since the sources are owned by the government he has encountered certain delays in disposing of them. He reported that no other radiation sources have ever been procured or used under the above licenses.

not used since 6/61

14. Harris stated that all of the above sources are stored in a locked concrete shielded enclosure (Rm T-596) previously used for radiography. The enclosure is located on the track level (1st floor below street level) of the building and has been described in detail in the previous inspection reports (3/8/63 report P. 2, 5/17/61 report P.3 and Exhibit A). The track level floor was reported by Harris to be a regular work area.

Radiological Safety Precautions and Procedures

Surveys

15. Harris reported that physical radiation surveys of the concrete enclosure and surrounding areas have been made and recorded. He added that no survey has been conducted in about one year since radiography is no longer performed and the shielding of the facility was found to be adequate for storage. The inspector noted that records of the above surveys were reviewed during the previous inspection.

16. An independent survey of the storage facility was performed by the inspector with an NMC Model GS-2 GM survey meter with the following results:

At 12" from Mitchell projector with 460 mc Co-60 sealed source - 16 mr/hr

At 12" from sealed source (nuclear battery) with 450 mc of Kr-85 - 6 mr/hr

Outside enclosure at 18" from entrance (unrestricted area) - 0.05 mr/hr

Leak Tests

17. Harris stated that he leak tests the 460 mc Co-60 source at least once every six months by taking a smear of the crevice around the lid on the Mitchell projector with a Budd Company Model LT-100 leak test kit. The smear is then sent to Budd for evaluation. Of the two leak tests performed since the last inspection, the most recent test on 1/14/64 had not as yet been reported by Budd. The result of the earlier test on 6/17/63 was noted from the licensee's records to be 0.000 uc. According to Harris, no leak tests have been performed on the Kr-85 batteries.

Instructions

18. The inspector noted that copies of the licenses and Parts 20 and 31 were available in Harris' files. Form AEC-3 was observed to be posted on a wall inside the storage facility.

Instrumentation

19. Harris reported that a Nuclear Chicago Model 2588 "Cutie Pie" was available for physical radiation surveys. The inspector noted that the instrument has three ranges, 0-25, 0-250, and 0-2500 mr/hr. According to Harris, the instrument section of the Department performs the calibration once every three months using a radium source. The latest date of calibration was marked on the instrument and was observed to be within three months.

Procurement Procedures and Control

20. According to Harris, the sources presently possessed under the above licenses constitute the only byproduct or source material ever procured by the licensee (paragraph 13). A record of the receipt of depleted uranium under SUC-626 was available and was reviewed by the inspector. Receipt records for the other sources were reported by Harris to be available in the archives of the Department. Harris stated that the Purchasing Office has been instructed not to place any orders for radioactive material unless it first checks with him.

Storage and Security of Material

21. The inspector noted that the door to the storage facility is provided with a special security combination lock. Harris stated that only he and the security personnel have the combination and that the lock is checked regularly on security rounds. On those occasions when the facility is entered, e.g. to leak test the source, such entry is recorded in a security log. The inspector also noted that an audible alarm over the entrance is energized when the door to the facility is opened and that the Mitchell projector containing the Co60 source is locked and bolted to the floor.

Waste Disposal

22. As indicated in paragraph 13, no material has been disposed of under License-2,-3, and SUC/626.

Posting and Labeling

23. The door to the storage facility was noted to be posted with CRA and CHRA signs bearing the standard radiation symbol but lacked a sign with the words "Caution Radioactive Materials". The Kr 85 batteries were labeled with CRM signs bearing the standard symbol and the kind, quantity and date of measurement of material. The depleted uranium in its original shipping crates was labeled as per ICC regulations. The Mitchell projector housing the 460 mc Co60 sealed source bore a CRM sign with standard symbol, the kind and quantity of material but no date of measurement. The date was added in the inspector's presence.

Personnel Monitoring

24. According to Harris, the only persons provided with personnel monitoring in the Reentry Systems Department are X-ray personnel since no radioisotopes are presently in use under License-2,-3 and SUC 626.

Quarterly Inventory

25. Harris reported that the presence of the Co 60 sealed source (License-2) in its storage facility location is ascertained at least once every three months but that no record of the inventory check is maintained.

License 4 and 5

Facilities and Uses of Byproduct Material

26. According to Stricker, all use of radioactive material under License-4 and-5 is presently carried out at the licensee's facilities at King of Prussia, Pennsylvania. Stricker listed the following licensable material as being on hand at the time of the inspection:

At the Space Technology Center

License-4

12/H^3 sealed light sources (NENC Model NEP 2) as four sources of 400 mc each, four sources of 300 mc each and one source each of 360, 270, 200 and 100 mc.

1 Pm^{147} sealed source (Nuclear/Chicago Model RG/31P) of 100 mc

License 5

3 Co 60 sealed sources (U. S. Radium Model LAB 470) of 10 mc each

1 Am^{241} plated source (O. R. Tech Enterprises Model AM/1C) of 0.1 uc

1 Ru^{106} sealed source (U. S. Radium Model LAB 370/1) of 10 mc

At the Advanced Space Projects Department

License 5

1 Sr^{90} sealed source (Jordan Model BE/1010A) of 3 uc

The inspector noted that License 4 authorizes only a total of 400 mc of H^3 as 12 sources with no single source to exceed 200 mc. The authorized form is NENC Model NEP/1. Stricker reported that he was informed by New England Nuclear Corp that Model NEP 2 is an improved version of NEP 1.

27. Stricker reported that the H^3 light sources (License 4) are used as constant output light sources for the development of a star tracking device under the supervision of T. Vogt, supervising engineer. The inspector noted that the place of use is the Inertial and Optical Sensor Engineering Laboratory on

the ground floor of the Space Technology Center, a modern research facility located on Goddard Boulevard in King of Prussia, Pennsylvania. Stricker further reported that the Ru^{106} (License 5) and Pm^{147} (License 4) sources are used as electron sources, and the Am^{241} (License 5) as an alpha source, for the development and testing of an electron telescope and semi-conductor radiation detectors under the supervision of Dr. L. Cohen, Physicist. The place of use was observed to be the Radiation Laboratory (M 9105) on the ground floor of the Space Technology Center.

28. The inspector noted that Condition 12 of License 4 requires b product material to be used under the supervision of E. Stockoff or D. Wykstra. In addition, H^3 light sources may be used under the supervision of D. McMorrow. According to Stricker, neither Stockoff nor Wykstra have any responsibility for the use of sources under License 4 at the present time and McMorrow is no longer affiliated with the licensee. ~~The inspector also noted that in a letter to DL&R dated 12/27/63 Stricker requested that amongest others he and Dr. L. Cohen be listed as authorized users under License 4. No action appears to have been taken by DL&R on this request.~~

29. According to Stricker, the three 10 mc Co 60 sealed sources (License 5) have never been used and are in storage awaiting disposal. The inspector noted that the storage facility is a locked concrete shielded room (diagram submitted with licensee's application dated 9/25/63) in the basement storage area of the Space Technology Center. The sources were observed to be stored in pb pigs in the original shipping crates. Several maintenance people were noted to be seated at desks approximately 30' from the entrance to the storage room. Stricker reported that aside from occasional occupancy by maintenance personnel, the area is normally unoccupied. He added that the storage room is considered to be a restricted area and that he has been designated as custodian of the Co60 sources.

30. Stricker stated that the 3 uc Sr^{90} sealed source (License 5) is used as an internal calibration source in a Jordan AGB-10KG-SR "Rad" gun. He added that he is responsible for the source which is used by the Advanced Space

Projects Department located in the Cabot, Cabot and Forbes Building on Allendale Road, King of Prussia, Pennsylvania, a short distance from the Space Technology Center. According to Stricker, the above described uses have been the only uses of byproduct material under license -4 and -5.

Radiological Safety Precautions and Procedures

Surveys

31. Stricker reported that he has used a portable ion chamber survey meter to measure radiation levels from the Co 60 sealed sources located in the basement storage area but that records have not been maintained of the results. An independent survey by the inspector using an NMC Model GS2 GM survey meter noted a maximum of 5 mr/hr on contact with the wooden crates housing the pb storage pigs.

32. Stricker stated that because of the relatively minor hazard associated with the use of the remaining sources possessed under License 4 and 5 no other physical surveys have been conducted. In this connection, recorded information indicating the kinds and quantities of radioactive material possessed by the licensee and the rate and manner of use were noted to be available.

Leak Tests

33. According to Stricker, the three Co 60 sealed sources are leak tested once every six months by G. Sullivan, Physicist with the Spacecraft Department using a Budd Company Model LT100 kit. The smears are sent to Budd for evaluation. Review of leak test records indicated that all results were below 0.001 uc.

34. The only other sources reported by Stricker to be leak tested under License 4 and 5 are the Ru 106 and Pm 147 sealed sources. Stricker said that smears are taken of these sources twice per month by Dr. L. Cohen who then places them against the end window of a Victoreen "Thyac" survey meter. Records of leak tests noted no results above normal instrument background (0.03 to 0.03 mr/hr).

Instructions

35. Stricker reported that a course in radiation safety which includes the applicable provisions of Part 20 is given periodically by Dr. Cohen to personnel at the Space Technology Center involved in the use of radiation sources. The inspector observed that copies of Part 20 and the licenses were available in Stricker's file. According to Stricker, Form AEC-3 was not posted anywhere within the facilities of the Space Technology Center.

Instrumentation

36. The inspector noted that the following instrumentation was available fof use at the Space Technology Center:

1 Victoreen Model 489 "Thyac"

1 Victoreen "Radector"

1 Victoreen Model 440 portable ion chamber

Procurement Procedures and Control

37. Stricker reportedtthat no radioactive material can be procured by personnal at the Space Technology Center unless the purchasing office first checks with him. He added that records of the material received under License -4 and -5 have been maintained in the archives of the facility. Because time did not permit, a trip to the archives was not made by the inspector.

Storage and Security of Material

38. All sources with the exception of the Co-60 sealed sources are stored inllocked metal cabinets at the location of use. Storage of the Co-60 sources was discussed earlier in the report. Stricker stated that he has the only key to the Co-60 storage room. The entire facility was noted by the inspector to be under strict security surveillance.

Waste Disposal

39. Stricker repotted that the only radioactive material disposed of under License -4 or -5 was a ~~100~~ 10 mc Co-60 sealed source (License -5) which was transferred to Pan American Airlines at Cape Kennedy, Florida in 11/62. A record of the transfer was available and was reviewed by the inspector.

Posting and Labeling

40. The Co-60 storage room was noted to be posted with "Caution - Radioactive Material" and "Caution - Radiation Area" signs bearing the standard radiation symbol. All other areas of isotope use or storage reviewed bore a "Caution - Radioactive Material" sign with standard symbol. In addition, all byproduct material storage containers bore a "Caution - Radioactive Material" sign, the standard symbol and the kind, quantity and date of measurement of material.

Personnel Monitoring

41. Stricker reported that R. S. Landauer and Co. monthly film badge service is provided for those persons working with radiation sources under License -4 and -5. Film badge results were noted to be maintained on the Landauer report form only and in all cases were reported as less than the minimum detectable exposure.

Management Discussion

42. The items of noncompliance were discussed with Mr. H. Paige, Manager of the Missile and Space Division. In addition, noncompliance under License -2, -3 and SUC-626 was discussed with Mr. C. Dates, Manager

of Employee and Community Relations for the Re-entry Systems Department. Both gentlemen indicated that steps would be taken to eliminate existing deficiencies. In connection with the 592 issued under License -4, Stricker reported that he intends to request a license amendment authorizing the additional quantities of H-3 posessed as light sources and permitting all radiation sources to be used under his supervision. He added that he could not explain the overpossession since he was not responsible for procurement when the H³ was obtained and the man now, the authorized user at the time, has left G.E.

Noncompliance Paragraphs

43. License -2 (591)

20.203(e) Room improperly posted - paragraphs 13, 14, 16, and 23

20.203(f)(4) No date of measurement - paragraph 23

31.106 - No quarterly inventory record - paragraph 25

License -3 (591)

20.203(e) - Room improperly posted - paragraphs 13, 14, 16, and 23

SUG626 (591)

20.203(e) - Room improperly posted - Paragraphs 13, 14 and 23

License -4 (592)

Condition 8A - Exceeding possession limits - paragraphs 26

Condition 12 - Unauthorized supervision - paragraphs 27 and 28

License -5 (591)

20.401(b) - No survey record - paragraph 29 and 31

20.206(c) - Form AEC-3 not posted - paragraph 29 and 35

License conditions

44. Except as noted ~~under~~ in connection with noncompliance under license -4, license conditions for all licenses were reviewed and found to be adhered to.