

COMPLIANCE INSPECTION REPORT

1. Name of Licensee	2. Date of Inspection
3. Title of Inspection	4. Type of Inspection
5. Name of Inspector	6. Name of Licensee Representative

Findings:

1. The licensee shall ensure that all radioactive materials are properly labeled and stored in accordance with the requirements of 10 CFR 20.170. The inspection revealed that the licensee's labeling system was inadequate and that some materials were not properly stored.

2. The licensee shall ensure that all radioactive materials are properly handled and disposed of in accordance with the requirements of 10 CFR 20.170. The inspection revealed that the licensee's handling and disposal procedures were inadequate.

7. Date of Follow-up Inspection	8. Date of Licensee Response
9. Name of Follow-up Inspector	10. Name of Licensee Representative

Recommendations:

1. The licensee should improve its labeling system to ensure that all radioactive materials are properly labeled and stored in accordance with the requirements of 10 CFR 20.170.

2. The licensee should improve its handling and disposal procedures to ensure that all radioactive materials are properly handled and disposed of in accordance with the requirements of 10 CFR 20.170.

Comments:

The inspection was conducted in accordance with the requirements of 10 CFR 20.170. The licensee's response to the findings was satisfactory. The licensee has agreed to implement the recommendations within the specified time frame.

11. Date of Licensee Response	12. Date of Follow-up Inspection
13. Name of Licensee Representative	14. Name of Follow-up Inspector

Conclusion:

The licensee has demonstrated a commitment to compliance with the requirements of 10 CFR 20.170. The inspection was successful and the licensee's response was satisfactory.

COMPLIANCE INSPECTION REPORT

1. Name of Licensee	2. Date of Inspection
3. Name of Inspectors	4. Type of Inspection
5. Title of Inspection	6. Date of Report

7. Name of the person or persons who conducted the inspection

8. Name of the person or persons who conducted the inspection

9. Name of the person or persons who conducted the inspection

10. Name of the person or persons who conducted the inspection

11. Name of the person or persons who conducted the inspection

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19. Name of the person or persons who conducted the inspection

20. Name of the person or persons who conducted the inspection

Item 5 (CONT'D)

Licence No. Date Rev. Date

37-909-4
amend. 2 2/24/99 2/29/64 (amended in its entirety)

- SCOPE: A. 10 ms of I-131 in any form for laboratory studies as a scavenger for free radical detection.
B. 1 source of 4 ms. 1 source of 15 ms. Total 19 ms of Sr-90 as sealed light sources (U.S. Radium Corp.) to be used as standard light sources.
C. 10 ms of Co-60 in any form for storage only.

CONDITIONS: #11-Hypodermic material may also be used at Radiation Research Laboratories, Belmont, Pennsylvania. #12-Compliance with Part 20. #13-Hypodermic material(s) shall be used by, or under the direct supervision of, Robert E. Schuler. #14-Sealed sources containing hypodermic material except solid metal Iridium-192; Tantalum-182, Cobalt-60 plated with gold or nickel; and gases, shall be tested for leakage and contamination at intervals of not more than six months and records of test results shall be maintained by the licensee.

37-909-4
amend. 3 5/12/99 2/29/64 (amended to add the following):

- SCOPE: D. 1 source of 20 ms of Sr-90 as sealed source (U.S. Radium Corp. Model No. L4B-349) to be used in a Barber-Colman Gas Chromatographic Detection Cell Model A-4071 or A-4072.

CONDITIONS: #15-Hypodermic material as sealed sources shall not be opened.

37-909-5 12/27/97 12/31/62

- SCOPE: 500 c of Co-60 as NBL standard tubular source to be used in a Brookhaven irradiator (tag number NBL-83 2-33-31-5 Rev C.) for radiation chemical studies.

CONDITIONS: #11-Hypodermic material to be used by, or under the supervision of, Robert E. Schuler, M.D. #12-Sealed source licensed above shall not be opened. #13-Written administrative instructions covering appropriate radiological protection phases of operational procedures and establishing responsibility for radiological protection, control, and security of the hypodermic material shall be supplied individuals using or having responsibility for use of such material. #14-Notwithstanding Section 20.203 (c)(2) of the Atomic Energy Commission's Standards for Protection Against Radiation (10-CFR-20), a control device for reducing the radiation level or energizing an alarm signal upon entry is not required for high radiation areas produced incident to the use of the source licensed above. In lieu of the automatic devices, access to any high radiation area shall be under the direct control of irradiator operator at all times when the irradiator is not locked in the closed position.

37-909-5
amend. 1 10/27/98 12/31/62

SCOPE: No change.

CONDITIONS: None added.

Item 21 Licensee's address is amended to read:

Radiation Research Laboratories
Belmont, Pennsylvania

ITEM 5 (CONT'D)

License No. Date Exp. Date

37-909-6 10/15/58 10/31/60

SCOPE: A. 12.5 mg of I-131
B. 2 mg of C-14
C. 1.5 mg of Co-60
A. thru C.: in any form for laboratory research studies.

CONDITIONS: #11-Compliance with Part 20. #12-Hyproduct material shall be used by, or under the direct supervision of, D. L. McConaughy. #13-Hyproduct material shall not be used in or on human beings. #14-Hyproduct material shall not be used in products distributed to the public. #15-Hyproduct material shall not be used in field applications where activity is released.

37-909-6
amend. 1 5/22/59 10/31/60 (amended to add the following:

SCOPE: D. 300 mg of H-3 in any form to label organic polymers and similar laboratory studies.

CONDITIONS: None added.

37-909-7 10/15/58 10/31/60

SCOPE: A. 10 mg of C-14 in any form for laboratory studies in lower animals.

CONDITIONS: #11-Compliance with Part 20. #12-Hyproduct material shall be used by, or under the direct supervision of, Robert H. Schuler.

37-909-7
amend. 1 2/9/59 10/31/60

SCOPE: Item 94. Authorized Use is amended to read: To be used as a tracer in chemical reactions and in laboratory studies in lower animals.

CONDITIONS: None added.

37-909-7
amend. 2 4/27/59 10/31/60 (amended to add the following:

SCOPE: B. 10 g of H-3 as tritium absorbed on titanium to be used as a target for a Van de Graaf accelerator.

CONDITIONS: #13-Hydrogen 3 may only be used at Bushy Run Laboratories, Delmont-Harrison City Road, Delmont, Pennsylvania. #14-Total amount of Hydrogen 3 (tritium) acquired under this license shall not exceed 10 curies.

END A2

C-240 4/23/59 4/30/60

SCOPE: Thirty (30) pounds of source material for use as an analytical reagent.

CONDITIONS: Maintain records of inventories, receipts and transfers of refined source material. Compliance with Part 20.

ITEM 6 (CONT'D)

License 37-909-4

Condition 14

- in that two (4 ms and 15 ms) Sr-90 sealed light sources have not been leak tested at intervals of six months or less and the results recorded.
(See paragraph 10, License -4 of Part 30 report details.)

License 37-909-5

20.203 "Caution signs, labels and signals"

(f)(1), (f)(4) "Containers" - in that the irradiator container in which a 195 mc Co-60 sealed source was stored, although labeled with the sign "Danger - Radioactive Material" and showing the kind and quantity of radioactive material it contained, was not labeled with the prescribed radiation symbol and failed to show the date of assay. (See paragraph 10, License -5, Item D of Part 30 report details.)

20.401 "Records of surveys, radiation monitoring and disposal"

(e) - in that radiation surveys of areas adjacent to the Co-60 irradiator have not been recorded. (See paragraph 10, License -5, Item C of Part 30 report details.)

License 37-909-6

20.203 "Caution signs, labels and signals"

(e)(1) "Additional Requirements" - in that Room 752 where millicurie amounts of tritium were stored, although posted with the sign "Caution - Radioactivity" and prescribed symbol, was not posted with the sign "Caution - Radioactive Material". (See paragraph 10, License -6, Item E of Part 30 report details.)

(f)(1), (f)(4) "Containers" - in that the containers in which millicurie amounts of tritium and 100 mc of C-14 were stored, although labeled with the sign "Radioactivity" or "Radioactive" and prescribed symbol and showing the kind, quantity and date of measurement of the quantity of radioactive material each contained, were not labeled with the sign "Caution - Radioactive Material". The container in which was stored 600 mc of Co-60 was not labeled. (See paragraph 10, License -6, Item E of Part 30 report details.)

License 37-909-7

20.203 "Caution signs, labels and signals"

(f)(1) "Containers" - in that the container in which 1.3 mc of C-14 was stored, although showing the kind, quantity and date of measurement of the quantity of radioactive material it contained, was not labeled with the sign "Caution - Radioactive Material" and symbol. (See paragraph 10, License -7 of Part 30 report details.)

20.301 "Treatment or Disposal by Incineration"

- in that two mc of C-14 was disposed of by incineration. (See paragraph 10, License -7 of Part 30 report details.)

Part 40

6-240

20.203 "Caution signs, labels and signals"

(e)(2) "Additional Requirements" - in that neither the room nor the area where uranium ore containing approximately 27 pounds of uranium was stored was posted with the sign "Caution - Radioactive Material" and symbol.
(See Part 40 report details.)

(f)(2), (f)(4) "Containers" - in that steel drums in which was stored uranium ore containing greater than 1.5 pounds of uranium were not labeled with the sign "Caution - Radioactive Material" and symbol and failed to show the kind, quantity and date of measurement of the quantity of radioactive material each contained. (See Part 40 report details.)

PART 32 INSPECTION

MELLON INSTITUTE
Radiation Research Laboratories
4400 Fifth Avenue
Pittsburgh 13, Pennsylvania

Date of Inspection: July 22, 1959 (Announced)

Persons Accompanying Inspector:

Mr. Andrew Mammarella, Pennsylvania Department of Health,
Division of Industrial Hygiene

Persons Contacted:

R. H. Schuler, Ph.D., Head, Radiation Research Laboratories
G. A. Webb, Ph.D., Director of Administration
E. M. Perfetti, Ph.D., Senior Fellow
W. E. Hall, Ph.D., Senior Fellow
Mr. J. Hood, Research Assistant

DETAILS

9. Organization and Administration

The Mellon Institute is conducting basic and applied research using byproduct material both at their Radiation Research Laboratories located in Belmont, Pennsylvania and at the Institute itself located in Pittsburgh, Pennsylvania. The Institute has issued "Radiation Protection Regulations" (See Exhibit "A"), which provides only the administrative procedures by which work involving radiation is to be conducted. No other written administrative instructions with regard to radiological safety exist other than specific instructions covering procedures for operating their 195 e Co-60 irradiator. It was noted that some confusion exists as to the assignment of specific duties and responsibilities inasmuch as Dr. Schuler, the Radiation Safety Officer, stated that the licensed users were performing the radiation surveys at their facilities while actually, no licensed user, other than Schuler, is making any radiation surveys. Dr. Hall, one of the licensed users, stated that radiation surveys were not his responsibility but that of the isotope committee.

Schuler is designated as the "Institute's expert in radiation safety" and "in charge of radiation protection". Schuler stated that his duties as Radiation Safety Officer included occasional non-routine radiation surveys to ensure that "things are in order". He added that he had the authority to enforce as necessary procedures essential to maintaining radiological safety.

A radioisotope committee composed of the following members as designated by the Institute functions only in an advisory capacity:

Dr. Kling, Chairman and Assistant Director of Research
Dr. Schuler, RSO
Dr. T. H. Davies, Director of Research

Schuler reported that the meetings were held approximately once per year.

10. Details Concerning Specific Licenses

License 37-209-1 w/amend. 1

A. Hours, Use and Facilities

W. K. Hall, the licensed user, is using C-14 in Room 822 of the Mellon Institute located in Pittsburgh, Pennsylvania for the study of chemisorption of paraffins in cracking catalysts. Hall has had no formal training in radiological safety. His experience consists of on-the-job training at the Institute for approximately seven years working with milliecurie amounts of C-14.

All experiments are performed by Hall and consist of transferring several millieuries of gaseous C-14 as CO₂ in a sealed container to a glass vacuum system where the experiments are conducted. Hall explained that the C-14 container seal is not broken until the container has been connected to the glass system and the system placed under vacuum. Throughout the experiment the vacuum is maintained by means of a vacuum pump whose vacuum discharge is exhausted in a chemical fume hood. Small amounts of gaseous C-14 are exhausted to atmosphere as a result of maintaining a vacuum on the glass system. Hall stated that not more than one milliliter of gaseous C-14 having a concentration of 180,000 d/m per ml was exhausted daily. (Hood exhausts 500 cu.ft./min.-On continually.)

The laboratory, a small room of approximately 12' x 15' with the glass vacuum system located in the center, is considered a restricted area and locked when unattended.

B. Instrumentation

No radiation survey instruments were available other than a GM counter, which was an integral part of the vacuum pump discharge system.

C. Radiological Safety Precautions and Procedures

Hall reported that inasmuch as he was the only user, no written or oral radiological safety precautions had been provided. He added that no radiation surveys of the laboratory had been made by himself. Schuler reported that he occasionally surveyed the laboratory using an end window GM. Hall stated that no special precautions were taken when using the C-14 in that it was confined within the glass vacuum system, and the laboratory was self-monitored by the GM counter connected to the glass system's pump discharge. A smear survey of the laboratory by the inspector revealed no detectable contamination (less than 100 cpm).

D. Posting and Labeling

The laboratory, Room 822, where 15 mc of C-14 was located, was not posted with a radiation caution sign and symbol. The container in which the C-14 was stored was labeled with the sign "Caution - Radioactive Material" and prescribed symbol, and showed the kind, quantity and date of measurement of the quantity of radioactive material it contained.

License 37-209-4 w/amend. 2 & 3

R. H. Schuler, the licensed user, reported that none of the by-product material under this license was being used. The only byproduct material on hand at the time of the inspection was two Sr-90 sealed light sources of 4 mc and 15 mc each, stored in Rooms 113 and 302 of the Institute (Pittsburgh) and approximately 5 mc of Co-60 also stored there. Schuler stated that the two Sr-90 light sources had not been leak tested since April of 1957 when

they had been placed in storage. Although no records were available of the leak tests, Schuler reported that no detectable count (less than 100 cpm) was observed. The storage areas, in which the Sr-90 sealed light sources and the Co-60 byproduct material are stored, are considered restricted areas and locked when unattended. Schuler stated that the 20 mc Sr-90 sealed source for use in the Barber-Colman gas chromatographic detection cell had never been procured, but that they intended to do so in the near future.

License Y7-202-5 W/SHULER, J

A. Source, Use and Facilities

A Brookhaven irradiator containing a 195 c Co-60 sealed source (assay January, 1958) is being used at the Radiation Research Laboratories in Belmont, Pennsylvania for irradiation studies. All work is being performed by Schuler and under his supervision by Dr. A. Henglein, Dr. T. Gausman, Dr. M. H. J. Wijnen and Mr. G. A. Maccini. None of the above users has had any formal training in radiological safety. Schuler's experience consists of on-the-job training at the University of Notre Dame and at the Brookhaven National Laboratory using a 1000 c Co-60 irradiator and other radioisotopes in tracer applications. Henglein's experience consists of eight years on-the-job training working with radioisotopes in Germany. Gausman's experience consists of six months on-the-job training at the University of California Radiation Laboratories. Wijnen's and Maccini's experience has consisted of on-the-job training at the Mellon Institute under Schuler's supervision.

Irradiations are performed by loading and unloading the irradiator remotely using a cable and pulley arrangement. In performing this operation, however, the operator must stand within approximately three feet of the irradiator container. A radiation survey by the inspector at the operator's position during this operation revealed radiation dose rates of 15 mr/hr at chest level and 20 mr/hr at head level. It was noted that the irradiator was not barricaded as described in Schuler's letter of October 20, 1958 and shown in the floor plans enclosed with his letter (See Exhibit "B"), to prevent the possibility of an operator inadvertently getting a portion of his body in the irradiator beam. Schuler reported that this operation is performed approximately once per day and requires a total of approximately three minutes.

The irradiations are performed in Room 124, which is located on the basement floor of the radiation laboratory. The walls and ceiling of this room are of concrete two feet thick with a semi labyrinth type entry way. The room is not locked; however, all building personnel wear film badges and have been instructed to stay out. It was noted and confirmed by Schuler that the Co-60 irradiator container is always locked when unattended. The door from Room 124 to the outside of the building is an emergency exit with no means of opening the door from the outside. A survey of the Co-60 irradiator container by the inspector revealed radiation dose rates of 20 mr/hr at two feet above the irradiator container, 1.5 mr/hr at the side of the container and less than 0.59 mr/hr in all adjacent rooms.

B. Instrumentation and Calibration

The following instrumentation was available and reportedly operable:

- one Tracerlab, SU-1A, CP survey meter
- one Tracerlab, SU-1A, end window GM_s survey meter
- one Baird-Atomic, 1091 wall-type counter,
scintillation probe and scaler

Schuler reported that the constant radiation field at the irradiator container was used to check periodically their radiation dose rate instruments.

C. Radiological Safety Precautions and Procedures

Written administrative instructions covering operating and emergency procedures have been furnished the users of the Co-60 irradiator. (See Exhibit "C"). Schuler reported that radiation surveys had been made but not recorded both within the Co-60 irradiator room (room 124) and outside of the room to ensure that acceptable radiation levels existed. He added that the results of their radiation surveys, conducted when the irradiator was located at the Mellon Institute in Pittsburgh, were recorded and available for review. He explained that the radiation surveys made at their present facility had not been recorded inasmuch as far more adequate shielding existed in the present facility to ensure that radiation dose rates in unrestricted areas would be acceptable.

D. Posting and Labeling

The Co-60 Room (Room 124) was posted with a huge sign "Caution - High Radiation Area - Personnel Monitoring Required" and prescribed symbol. The irradiator (container) in which 195 g of Co-60 was stored although labeled with the sign "Danger - Radioactive Material" and showing the kind and quantity of radioactive material it contained, was not labeled with the prescribed radiation symbol and failed to show the date of assay.

License 37-909-6 w/amend. 1

A. Users, Use and Facilities

D. L. McGowanthy, the licensed user, and Mr. James Hoed, Research Assistant directly under his supervision, are using tritium as H_2O for labeling organic resins. Hoed has had no formal training in radiological safety. His experience has consisted of on-the-job training at the Mellon Institute working with milliecurie amounts of tritium.

The work to date, consisting of labeling 20 grams of resin with 90 mc of tritium, was reportedly performed within a chemical fume hood with rubber gloves being worn and tongs being used to prevent any direct contact with the solution. Approximately 10 percent of the labeled resin was quantitatively burned (5 mc total) and the tritium liberated as gas counted and exhausted within a hood. To date, 100 mc of tritium as H_2O has been prepared.

Facilities consist of Room 758 at the Institute (Pittsburgh) where the tritium labeling operation was performed and Room 752 where all byproduct material under this license is stored and where the labeled resin was analyzed by burning and counting. At the time of the inspection, the licensee possessed, in addition to the tritium, only 100 mc of C-14 and 600 mc of Co-60, which were in storage and no longer being used. Room 752 is considered a restricted area and locked when unattended.

B. Instrumentation

Instrumentation consisted of a homemade proportional counter for gas counting.

G. Radiochemical Safety Precautions and Procedures

No written instructions have been provided the users. Mr. Hood has been orally instructed to wear rubber gloves, to never allow the tritium solution to contact his skin and to always work with the radioisotopes within the hood. No radiation surveys are being made by the individual users, and no bioassay of urine samples is being conducted. Schuler reported that he occasionally surveyed the laboratory using the proportional counter.

H. Waste Disposal

No disposals or transfers have been made of byproduct material. Approximately five mc of tritium have been exhausted to the atmosphere via the chemical fume hood during the process of analyzing the tritiated resins. The hood exhausts approximately 500 cu. ft. of air per minute.

I. Posting and Labeling

Room 752, in which 195.0 millicuries of tritium were stored, although posted with the sign "Caution - Radioactivity" and prescribed symbol, was not posted with the sign "Caution - Radioactive Material". The containers in which millicurie amounts of tritium were stored, although labeled with a sign "Radioactivity" and prescribed symbol, and showing the kind, quantity and date of measurement of the quantity of radioactive material each contained, were not labeled with the sign "Caution - Radioactive Material". The container in which was stored 100 mc of C-14, although labeled with a sign "Radioactive" and prescribed symbol, and showing the kind, quantity and date of measurement of the quantity of radioactive material it contained, was not labeled with the sign "Caution - Radioactive Material". The container in which was stored 600 mc of Co-60 was not labeled.

License 37-209-7 w/encs. 1 & 2

Schuler reported that no tritium has been procured to date under this license. He added that 1.3 mc of C-14 procured under License -3 have been transferred by John T. Since to himself, the licensee user under License -7. He explained that the C-14 was not being used and was being stored in the Co-60 room (Room 124). It was noted by the inspector that the container in which the C-14 was stored, although showing the kind, quantity and date of measurement of the quantity of radioactive material it contained, was not labeled with the sign "Caution - Radioactive Material" and symbol. Schuler reported that two mc of C-14 had been disposed of, by incineration, during June of 1979 at the Radiation Laboratories.

11. Procurement Procedures and Control

Procurement of license material is initiated by the individual users, but all copies of such purchase orders must be sent to Schuler who checks to ensure that the license limits are not being exceeded. Their suppliers to date have been Brookhaven National Laboratory, ORNL and New England Nuclear.

12. Personal Monitoring

St. John film badges are worn by all personnel of the radiation research laboratory and processed bi-weekly. A review of the film badge records revealed all dosages to be below detectable limits (less than 50 mrem). In addition, Cambridge self-reading pocket dosimeters are worn and read before and after entering a field of radiation. No detectable dosages have reportedly been noted to date. Schuler reported that dosimeter results of greater than 10 mrem would be recorded.

13. Records

Records of procurement, radiation surveys, disposal and personnel monitoring are maintained by Schuler.

14. Additional Information

It was noted that none of the hoods at the new Radiation Laboratories located at Dalmont, Pennsylvania, were equipped with filters.

Instrumentation used by the inspector was a Nuclear Measurements, GS-2, #5571, GM survey meter, calibrated 4/28/99.

PART 40 INSPECTION

WELLMAN INSTITUTE
4400 Fifth Avenue
Pittsburgh 13, Pennsylvania

Date of Inspection: July 22, 1959

Persons Accompanying Inspector:

Mr. Andrew Mammarella, Pennsylvania Department of Health,
Division of Industrial Hygiene

Persons Contacted:

G. A. Webb, Ph.D., Director of Administration
J. R. West, Ph.D., Senior Fellow

DETAILS

Dr. Webb is responsible for all purchases of source material and maintains records of procurement and inventory. A review of the records revealed that the following amounts have been procured:

2/5/57 - uranium foil - 10 grams
3/57 - carnotite - 1,934 pounds
3/57 - uraninite - 2,966 pounds
4/9/57 - uranyl nitrate - 1 pound
4/17/57 - thorium nitrate - 1 pound
4/29/57 - ammonium diuranate - 9 pounds
5/9/57 - uranium sulfate - 1/4 pound
1/23/58 - uranium nitrate - 1 ounce
3/26/58 - thorium oxide - 1 pound
3/2/59 - thorium nitrate - 1 ounce
3/4/59 - uranium foil - 20 grams
3/23/59 - uranium acetate - 1 ounce
3/23/59 - uranium nitrate - 1 ounce

With the exception of the carnotite and uraninite ore procured in 3/57 and the ammonium diuranate procured in 4/57, all of the above material is no longer in their possession having been used in numerous laboratories in the Institute for analytical purposes and disposed of via the sanitary sewer. Webb reported that the daily discharge to the sanitary sewer totaled 434,000 gallons. Their current inventory consists of 31 ounces of uranyl acetate procured in 1947 and 1948, 1920 lbs. of carnotite ore, 1,936 lbs. of uraninite ore, and nine lbs. of diuranate. The ore was used for several months in laboratories 734, 736, 738 and 624 by Dr. West and a few people under his direct supervision for performing extractive research. The work is now completed and the material is stored in a locked garage located near the Institute. Dr. West reported that neither the room nor the area where ore was stored (approximately 27 pounds of uranium) was posted with a sign "Caution - Radioactive Material" and symbol. In addition, he added that some of the steel drums contained greater than 1.5 pounds of uranium and were not labeled with the sign "Caution - Radioactive Materials" and symbol, and failed to show the kind, quantity and date of measurement of the quantity of radioactive material they contained.