Can.

GENERAL ELECTRIC COMPANY

NELA PARK, CLEVELAND 12, OHIO . . . . . TELEPHONE 451-6600

LAMP DIVISION

LIGHTING RESEARCH AND DEVELOPMENT OPERATION

SEPTEMBER 20, 1963

MR. WILLIAM SCHULTZ
U. S. ATOMIC ENERGY COMMISSION
ARGONNE NATIONAL LABORATORY
LEMONT, ILLINOIS

DEAR MR. SCHULTZ:

I REGRET I WAS NOT AVAILABLE WHEN YOU CALLED TO MAKE ARRANGEMENTS FOR A ROUTINE REVIEW OF THE RADIATION FACILITIES OF THE LAMP DIVISION OF THE GENERAL ELECTRIC CO. AS CHAIRMAN AND RADIOLOGICAL SAFETY OFFICER FOR THE RADIOISOTOPE COMMITTEE OF THIS DIVISION, I AM CUSTODIAN OF ALL RECORDS PERTAINING TO OUR LICENSING ARRANGEMENTS WITH THE AEC. IT WAS FOR THIS REASON THAT DR. D. H. GREEN SUGGESTED THAT YOU POSTPONE YOUR VISIT UNTIL SUCH TIME AS I WOULD BE AVAILABLE.

INASMUCH AS I AM ALSO RESPONSIBLE FOR THE INDUSTRIAL HYGIENE ACTIVITY OF OUR ENTIRE LAMP DIVISION, I FIND MYSELF AWAY FROM THE OFFICE APPRECIABLE PERIODS OF TIME. I AM WRITING, THEREFORE, TO INQUIRE AS TO WHAT YOUR PLANS MAY BE FOR VISITING US SO THAT I CAN ARRANGE MY SCHEDULE TO BE HERE AT THAT TIME. UNFORTUNATELY, MANY COMMITMENTS HAVE ALREADY BEEN MADE FOR THE NEXT SEVERAL MONTHS THAT WILL REDUCE THE TIME I WILL BE SPENDING HERE AT NELA PARK. I WOULD, THEREFORE, APPRECIATE KNOWING AS SOON AS POSSIBLE THE PROPOSED DATES FOR YOUR VISIT SO THAT I CAN REARRANGE SOME OF THESE COMMITMENTS, IF POSSIBLE.

VERY TRULY YOURS,

I. Matelsky

I. MATELSKY
CHAIRMAN
RADIOISOTOPE COMMITTEE

IM:EJP

Called by Nucleus
& arranged appointment

SEP 24 1963

A-32
10/1/92

NL

LICENSE FILE ROUTING

JMA	Jms
WHS	WHS
GEH	CEH

60523

October 30, 1963

Mr. I. Matelsky, Chairman
Isotope Committee
General Electric Company
Lamp Division
Nela Park
Cleveland 12, Ohio

Dear Mr. Matelsky:

As a result of the inspection on October 21 & 22, 1963, a Form AEC-591, INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT, is issued for Licenses No. 34-54-4, -5 and SMB-191. You will note that this form indicates that no item of noncompliance was noted. It is not necessary that you complete Item 6 of this form nor that you acknowledge receipt of this form.

With regard to the results of the inspection of License No. 34-54-6 which showed items of noncompliance, you may expect to receive additional communication from the Atomic Energy Commission as necessary.

I wish to express my appreciation for the cooperation extended to me during the inspection.

Sincerely yours,

Charles E. Norelius
Radiation Specialist
Region III

Enclosure:
AEC-591

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

F-33

OFFICE ▶	CO III	CO:III				
SURNAME ▶	Norelius/pts	Allen				
DATE ▶	10-30-63					

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

Form AEC-591
(11-62)

UNITED STATES ATOMIC ENERGY COMMISSION

DIVISION OF COMPLIANCE

I C(2), II, 2 #3

-5, I-C(1), I, B #2

SMB-191, II-B, III, 2 #2

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

1. LICENSEE

General Electric Company
Lamp Division
Nela Park
Cleveland 12, Ohio

2. REGIONAL OFFICE

REGION III, DIV. OF COMPLIANCE
OAKBROOK PROFESSIONAL BLDG.
OAK BROOK, ILLINOIS

3. LICENSE NUMBER(S)

34-54-4, -5 and SMB-191

4. DATE OF INSPECTION

October 21 & 22, 1963

5. INSPECTION FINDINGS

[X] A. No Item of noncompliance was found.

[ ] B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 31.302

[ ] C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c)(1) or 31.302

[ ] D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)

[ ] E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)

[ ] F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f)(1) or (f)(2)

[ ] G. Storage containers were not properly labeled to show the quantity, date of measurement, or kind of radioactive material in the containers. 10 CFR 20.203(f)(4)

[ ] H. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)

[ ] I. [illegible] AEC-3 was not properly posted. 10 CFR 20.206(c)

[ ] J. [illegible] the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 31.203(b)

[ ] [illegible] surveys [illegible] disposals were not properly maintained. 10 CFR 20.401(b) or 31.303(d)

[ ] L. [illegible] receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. [illegible].1, 40.61 or 70.51

[ ] M. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 31.105(c).

[ ] N. Records of inventories were not maintained. 10 CFR 31.106

[ ] O. Utilization logs were not maintained. 10 CFR 31.107

Charles E. Norelius Charles E. Norelius
(AEC Compliance Inspector)

6. LICENSEE'S ACKNOWLEDGMENT

The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.

(Date) (Licensee Representative — Title or Position)

COPIES: [ ] LICENSEE; [X] COMPLIANCE REGION; [ ] DIV. OF LIC. & REG.; [ ] DIV. OF COMPLIANCE

Mailed 10-31-63

8205110051

REPORT COMPILED SHEET

Identifying Information

Type report (circle) 591 592

1. Licensee General Electric Company
2. Address Lamp Division
Nela Park
Cleveland, Ohio
3. License No(s) 34-54-4, -5, and SMb-191
4. Date of Inspection October 21 and 22, 1963
5. Inspector C. E. Norelius
6. Status of Compliance Compliance

Items of Noncompliance

7.

Section of Regulation or License Condition	Details Paragraph
A	A
B	B
C	C
D	D
E	E
F	F
G	G

Classified Information

8. This report contains classified or business confidential information. Yes No

Health Physics Analysis included with 592 notes.

GBN 11/29/63

EJW 12-4-63

Expanded Notes
General Electric
Lamp Division
Cleveland, Ohio

GENERAL INFORMATION

9. This announced reinspection was conducted on October 21 and 22, 1963. Mr. I. Matelski was notified by telephone on October 7th of this scheduled inspection. A Form AEC-592 was issued for the activities under License No. 34-54-6, and a separate set of notes has been written concerning the activities under that license.

10. The Ohio State Department of Public Health was not notified of this inspection, and the AEC representative was unaccompanied.

11. During this inspection the following were interviewed and provided information:

Mr. I. Matelski, Chairman of the Isotope Committee, and Head of the Industrial Hygiene Activity.
Dr. D. H. Green, Radio Physicist
Mr. G. Shernit, Finance and Administration Operation
Mr. R. Volland, Gas Mixing Plant

INSPECTION HISTORY

12. An initial inspection of the activities under Licenses No. 34-54-3, -4, and R-119 was conducted on 9-23-59. At that time two items of noncompliance were noted with regard to the -4 license. On 9-29-60 an initial inspection of License No. 34-54-5 and Reinspection No. 1 of 34-54-3, -4, and R-119 was conducted. No item of noncompliance was noted. On August 22, and 23rd of 1961 inspections were conducted of the activities under License No. 34-54-4 (Reinspection No. 2), SMB-191 (Superseded R-119), 34-54-5 (Reinspection No. 1), and 34-54-6 (Initial). No item of noncompliance was noted.

PROGRAM

13. License No. 34-54-4 is a broad license for research and development which authorizes the licensee to possess up to 500 millicuries of any byproduct material between atomic numbers 3 and 83, plus additional amounts of Krypton 85, Promethium 147 and Tritium. Those interviewed stated that all of the basic research and development work is carried out by Dr. D. H. Green in his laboratory at the Lamp Division in Nela Park. If a certain process appears to be feasible in the production area, this operation will be set up in the pilot plant at Nela Park, also under the supervision of Dr. Green. If the pilot plant tests shows the operation to be feasible on the production line, the authorization to do this on a production basis is then requested by the licensee under their -5 license. At the time of this inspection Dr. Green gave examples of some of the experiments which he was doing at the current time in his laboratory. Dr. Green explained that in the past Tritium gas has been mixed with other gases before this combination of material was added to glow lamps and switches. He stated that he has been doing experimental work such that the Tritium could be added to lamps by means of a paladium leak. In this system regular gas is put into the lamps and the Tritium leaks into the sealed lamp by means of traversing through the paladium. He stated that approximately .02 microcuries of Tritium is used per each device. In another experiment Dr. Green stated he is using approximately 2 millicuries of Cesium 137 for the determination of the thickness of Tungsten ingots and subsequent transformation into wire. Other research work has involved the use of Tungsten 187 (24 hour half life) in which the blending of Tungsten powder is being studied by adding trace amounts of the radioactive Tungsten and after mixing in the blender samples are counted at various time intervals. Subitem B of this license authorizes the licensee to possess up to 20 curies of Krypton gas for research and developmental purposes. Dr. Green stated that only microcurie amounts of Krypton 85 are used at the present, for the leak testing of various electrical components. In this test the components are placed in a chamber and the chamber is pressurized by the radioactive Krypton gas. The components are later taken out and counted. If there are defects within the materials or workmenship involved in these components, the Krypton gas will remain in these defective areas and can be picked up on the counting equipment. Dr. Green stated that he has a source of Promethium 147 on hand, but this has been unsatisfactory for experimental purposes. Strontium 90, (approximately 20 millicuries) has been used by Dr. Green to give high dosages to very small areas of materials for test pruposes to determine the radiation effect on these materials. Dr. Green stated that they have also used Argon 39 for any

PROGRAM (continued)

experimental purposes. A physical inventory of Dr. Green's laboratory is shown starting with page 14 of the field notes.

14. Hydrogen 3 and Krypton 85 gases are used continuously by the licensee for the manufacture of spark gaps, glow lamps, and glow switches. Records maintained by the licensee show that approximately 3½ curies of Tritium and 3½ curies of Krypton 85 are used per month under this license. Mr. Matelsky stated that glow lamps containing Hydrogen 3 contain approximately .02 microcuries per unit. He stated that spark gaps have not been manufactured for approximately five years by the Lamp Division. Glow switches containing Krypton 85 are distributed with each switch containing about .9 microcuries of Krypton 85. In addition to this use, the licensee also prepares gases tagged with Hydrogen 3 and Krypton 85 for distribution to other authorized recipients. In all cases, shipment of tagged gases has been to other General Electric Divisions. In each case records show that the Lamp Division would obtain the License No. and specifications or a copy of the recipients AEC byproduct material license. When such information is received by Mr. Metalsky, he will write a letter to the gas mixing operation in the wire plant, telling the authorized person there exactly what shipment can be made and to whom the shipment should be sent.

15. Under License No. SMB-191 the licensee uses Thorium [redacted] for the manufacture of 1 and 2% thoriated tungsten wire and billets, thoriated tungsten welding rods, thoria impregnated electrodes, emission mixes containing thoria, and vials containing thorium slivers. Attached as page 15 to the field notes, is a copy of a letter dated September 19, 1963 to various persons in areas of Thorium usage from I. Matelsky, Chairman of the Radioisotope Comittee, giving a suggested break down of the amounts of Thorium which each department should try to limit themselves to. Each [redacted] of use has an inventory which they must maintain and copies of this inventory are also held by the Isotope Committee to assure that the maximum possession limit is never exceeded.

The basic information on the organization and administrative control is given in the expanded notes for the 592 for the -6 license, except as follows:

16. When byproduct material is to be used for a research purpose the ordering can be handled by Dr. Green personally. For material ordered in the production Department, a copy of the order for byproduct material is sent to Mr. Matelsky. Matelsky checks the inventory, and if the possession of the material to be ordered does not cause the licensee to be in excess of the limits set forth in the license, the order is "okayed" and returned to the specific department for ordering. All orders for Thorium and Uranium are handled by Mr. H. B. Parker, of the Purchasing Department of the Lamp Division. He is also responsible for the ordering of all chemicals, however for Thorium orders, he checks the purchase request to assure that the licensee remains in compliance with the possession limits of License No. SMB -191. Each plant where Thorium is used keeps a continuous inventory of this material which is on hand. Whenever any radioisotopes are received in a department or shipped to another department, a copy of the form beginning with page 12 of the field notes must be filled out and sent to Mr. Matelsky, Chairman of the Radioisotope Committee. Information is taken from this form by his secretary for the maintenance of his inventory. Approximately yearly checks are made with each division to see that the inventory in that particular area is identical to the one which Mr. Metalsky maintains. A copy of this yearly inventory form is shown beginning with page 13 of the field notes.

17. As stated previously, in the research program Dr. Green envelopes various processes which he checks in the pilot plant to assure that these will work within the operation. After this, these procedures involving radioactive materials may be used on a production schedule. Most of the radioactive gases are handled initially in the Gas Mixing Plant, which is part of the Cleveland Wire Plant. Mr. Coates is responsible for radioactive materials which come in and go out of this Gas Mixing Plant. Mr. R. Volland is the individual who does the actual mixing of the radioactive gases.

RADIOLOGICAL SAFETY PROCEDURES

18. At the time of this inspection Mr. Metalsky maintained copies of all of the byproduct material and source material licenses, issued to the Lamp Division

RADIOLOGICAL SAFETY PROCEDURES (continued)

of General Electric Company, 10 CFR 20, 10 CFR 30, and 10 CFR 40.

19. There are no general written instructions which have been written concerning the safe handling of radioactive materials. For each specific instance letters are written from Mr. Matalsky to the responsible user in a specific area. The responsible user in each area is also designated in writing from the Isotope Committee. The responsible users in each area are the only ones who can acknowledge receipt of byproduct material, and they are responsible for maintaining a correct inventory for the material in their area.

FACILITIES

20. The research and developmental work involving isotopes is carried out within the Radioisotope Laboratory of Dr. D. H. Green. This laboratory is located on the third floor of Building 336, at Nela Park. Dr. Green is the only person who works in this laboratory. The laboratory remains locked at all times when he is not working there. The outer door to the laboratory, coming from the hallway, leads into an area where Dr. Green has his desk. There is also a work bench located here but no radioactive materials are used in this area. [redacted] The entire laboratory is divided into three separate sections. The one area has been described above. To the right, as one enters the door, there is a low level counting room which contains the various types of GM, scintillation and gas proportional counters which Dr. Green uses. In the far south east corner there is the Hot Laboratory which again has another locked door leading to it. Page 8 of the field notes dated 10-22-63, show a rough sketch of this laboratory area. This shows that on the east wall of the laboratory there is a storage cabinet in which the majority of radioactive materials are stored. There is a Kewanee scientific equipment hood located in one corner, and a california hood also in this room. Low level materials are sometimes stored in these hood areas. Stainless steel sinks and work benches are located in this Hot Lab also. Dr. Green stated that the walls of this laboratory are constructed of high density concrete with concrete blocks swaged in place. The entire laboratory is covered with a peelable paint covering, such that contamination can be easily removed. There are large green and red [redacted] in this laboratory. Dr. Green explained that the green bulbs are on if the power is on to the room, and the red bulbs are on if the fans are on exhausting air from the room. The room is designed such that the air in the room is changed approximately every two minutes. All byproduct material was properly stored in containers such that no radiation level in excess of 5 mr/hr could be found within this room.

21. All Krypton 85 and Tritium gases are received at the Gas Mixing area of the Cleveland Wire Plant. A single room having dimensions of approximately 10 X 10 X 10 feet is used for the mixing of all gases. A small area off to the side of this room is used for the storage of radioactive gases. A heavy metal door slides up and down over this storage area. The gas mixing room has an exhaust system which operates such that the air in this mixing room is changed each minute. The radioactive materials are mixed with other gases to desired levels for lamp usage, and then they are shipped from the Wire Plant to other plants within the Division with most of the material going to the Cleveland Lamp Plant. Occasionally some of these gases are shipped to other licensee's. In the past these have always been in different divisions of General Electric.

22. The areas of Thorium usage were not observed at the time of this inspection. However those interviewed explained that the greatest problem area with Thorium is at the Wire Plant. The Thorium is received there as thorium nitrate powder. Approximately four times a year, fifty to a hundred pounds of this powder are mixed in a blending operation. After mixing in powder form, this goes into a slurry, and later comes out in pressed chunks or billets. Later on in the operation, it is swaged into wire of various diameters for use in lamps.

EQUIPMENT

23. Health Physics survey instruments possessed by the licensee included a Nuclear Chicago Model 2612 instrument utilizing a thin end window GM tube, and a Jordan rad gun, both of which were used and stored in Dr. Green's laboratory.

EQUIPMENT (continued)

It was also noted that a Tracerlab "cutie pie", having ranges from 0 to 25[illegible] 250 and 2500 mr/hr was located in the Gas Mixing Plant and used by Mr. Volland to conduct surveys in that area. Dr. Green stated that these instruments were not calibrated at any preset time intervals. He stated that he regularly checks the Nuclear Chicago meter, by use of the incorporated Carbon 14 check source. He said that occasionally he will calibrate the instruments using Cobalt 60 or Cesium 137 sources. At these times, he stated, he will calibrate at a number of points on each scale. In addition to these survey instruments, Dr. Green possesses thin end window GM tubes, scintillation counters, and a 2[illegible] gas flow proportional counter of his own design, which is used for counting and analysis. Dr. Green explained that on the commercially available 2[illegible] gas flow counters the counting region is usually hemispherically shaped and he stated that the counting efficiency was not exactly the same for all areas in this type of a chamber. The 2 pi counter which he has made consists of a number of wire probes inside the counting chamber rather than the single loop of wire probe in the commercially available models. He stated that with the many different wire probes in the chamber, the chamber is equally sensitive in all areas, and he felt this was much more efficient for counting wipes which may have contamination over the entire surface, rather than located as a point source would be.

PERSONNEL MONITORING AND EXPOSURE DETERMINATION

24. Permanently assigned film badges are used by Mr. Coates and Mr. Volland in the gas mixing facility and Mr. Metalsky and Dr. Green. Mr. Volland, who does the mixing of gases also wears a pocket dosimeter. Film badges are received by the licensee on a bi-weekly basis from Tracerlab Incorporated. The film badge records are sent to Mr. Metalsky, who reviews and files these. Temporary badges may also be assigned to people who would work for short periods in the Hot Lab, such as someone who might assist Dr. Green on a specific experiment. Each individual who is assigned a film badge, receives a written report quarterly and annually, showing the amount of exposure received.

25. As mentioned above, Mr. Volland wears a pocket dosimeter along with his film badge. He records results of this pocket dosimeter daily and at various intervals his daily results are sent to Mr. Metalsky. Dr. Green has other pocket dosimeters available for use by anyone who would want to use one. Dr. Green stated that he wears his pocket dosimeter only occasionally, such as times when he may be using one of the larger sealed sources of Cobalt 60 or Cesium 137.

RADIATION SURVEYS AND/OR EVALUATIONS

26. In the Research Laboratory periodic surveys are conducted by Dr. Green which include both the radiation levels in mr/hr and wipe tests of the area to determine if there is any contamination present. These survey results are recorded in Dr. Green's personal notebook.

27. The Isotope Committee is responsible for conducting physical radiation surveys in each area where radioactive materials are used. In the Gas Mixing Plant, the evaluation for radiation hazards involving tritium gas have been based on a maximum credible accident. If all the tritium gas in a single storage cylinder were to be released inside the gas mixing room, the concentration would still be less than the maximum permissible concentration as specified by 10 CFR 20. There is also a complete change of air in this room each minute.

28. For an evaluation of the hazard involved in the licensee's use of Krypton gas, Mr. Metalsky and Dr. Green have taken air samples in the Lamp Plant at the point where the Krypton gas is to be injected into one of the lamps. For the purposes of this survey the lamps were removed from the line and the Krypton gas was allowed to be released directly into the atmosphere at the time the samples were being taken. These were then analyzed by Dr. Green in his laboratory at which time he used known volumes of Krypton gas as a calibration for his counting system. Records maintained by the licensee on these results showed that even with such a condition existing, the air concentrations were still less than those permitted by 10 CFR 20.

RADIATION SURVEYS AND/OR EVALUATIONS (continued)

29. Dr. Green and Mr. Metalsky stated that with regard to thorium usage, each area where thorium is openly used or exposed a survey has been taken where the thorium is in a powder form and each step where there can possibly be air borne concentration. Air samples have been taken in breathing zones and in general work areas where the thorium is in a liquid slurry. Gamma counts have also been taken and results recorded in terms of mr hr. All air [redacted] are taken using millipore filter paper and the instrument used draws air at a rate of 1 cubic foot per minute. Samples are usually taken up to approximately fifteen minutes of time. Dr. Green analyzes these millipore filters using his 2 pi proportional gas flow counter. This unit is calibrated with a standard radium D&E source in equilibrium. The analysis is made on the alpha activity and the beta particles are not counted because of the region of proportionality used with the counter. In the analysis of these samples, Dr. Green stated that he divides all counts by a factor of two before converting the results to microcuries. This is poradssible and possibly even conservative, because in the thorium decay chain anywhere from two to six alpha particles will be emitted per each decay of Thorium 232, depending on the time which has elapsed since the chemical separation of thorium. Records maintained by the licensee show that all surveys conducted to analyze for thorium content in the air have shown less than the permissible concentration, by approximately a factor of ten, as [redacted] given in 10 CFR 20. Approximately four days are allowed to elapse between the sampling and analysis of the samples to allow for the decay of naturally occurring [redacted] thoron & radon daughters in the air.

POSTING AND LABELING

30. A radiation area existed in the Hot Lab and in Dr. Green's Laboratory near the area where a Cobalt 60 sealed source was stored. This area was posted in colors of magenta on yellow, bearing the radiation caution symbol and the words, "Caution - Radiation Area." In this laboratory, on the storage cabinet, and on the door leading to the Hot Lab, there were signs in the colors of magenta on yellow bearing the radiation caution symbol and the words, "Caution - Radioactive Material."

31. Each container that was observed in the Hot Lab and in the Gas Mixing Plant which was used for the storage of radioactive materials, was noted to be labeled in the colors of magenta on yellow bearing the radiation caution symbol and the words, "Caution - Radioactive Material." Additional information noted on each label gave the isotope inside, the amount of isotope, and the date of measurement of that amount.

32. It was noted that Form AEC-3 was posted on the wall inside Dr. Green's laboratory.

LEAK TESTS

33. All wipes of sealed sources possessed under the -4 license are conducted by Dr. D. H. Green. He also performs the analysis of these wipes using a Nuclear Chicago Model 2612 survey instrument with a thin end window (1.4 milligrams per square centimeter) GM tube. The wipe test is based on the beta analysis of the sample. A copy of the procedure used by Dr. Green is attached as page 11 to the field notes.

WASTE DISPOSAL OR TRANSFER OF SPENT SOURCES

34. Within the Research Laboratory all radioactive materials of measurable quantity which have been disposed of have been in the form of gas. This is disposed of by bleeding small amounts from tanks up [redacted] the hood and out through the exhaust system. Dr. Green stated that other trace quantities of material have been washed down the sink in the process of washing beakers or other containers in which the material has been stored.

35. By-product material used in the Production Department is released in the licensee's products to the general public. Such release is authorized by this license. Thorium is also released to the general public as part of the licensee's product.

REPORTS OF THEFT OR LOSS

36. Those interviewed stated that no by product material has been lost or stolen.

Continuation Sheet #5
General Electric
Lamp Division
Cleveland, Ohio

INCIDENTS OR UNUSUAL OCCURRENCES

37. Those interviewed stated they have no knowledge of any incidents or unusual occurrences which had happened with regard to the handling or use of by-product or source material.

RECORDS

38. Mr. Metalsky stated that the Purchasing Department in each area keeps records showing all materials which have been received in the specific plant. With regard to byproduct and source materials, the responsible user in each area must keep a running inventory of such materials on hand in the area of his responsibility. Whenever he receives material in his area he must give specific information regarding this receipt in writing to Mr. Matelsky. Whenever material is shipped from his department he must again file a written report with Mr. Metalsky showing this. Mr. Metalsky keeps an inventory in his office of the material which is located in each specific area. This inventory is kept on the basis of the reports submitted by the responsible users. Approximately yearly the inventories are compared in Mr. Metalsky's office, of those which he keeps and those which the responsible user in each area keeps. All inventory records were scanned through the date of the last inspection to the present and it appears that the licensee has remained within the possession limits of each specific license at all times. It should be noted that if the licensee has material under a research license and a process is perfected where it can be used in production, transfer records are maintained showing the transfer of this material from the research (-4) license to the production (-5) license.

39. At the time of this inspection it was observed that the licensee maintained film badge supplier reports from 1955 through to the date of this inspection. These were all briefly scanned and ~~indicated~~ it was noted that in each instance where any exposure was noted, an explanation showing cause for this exposure was written on the record. The licensee does maintain a modified form AEC-5. It contains all the information required by AEC-5, and in addition has a column such that the pocket dosimeter readings can be compared with those shown on the film badges. The highest readings noted were for Mr. Volland, of the Gas Mixing Plant, who received 77 mr during the first quarter of 1963, and 96 mr during the second quarter of 1963. These were the highest readings noted of anyone working with ~~radioactive materials~~ licensable radioactive materials.

INDEPENDENT MEASUREMENTS

40. At the time of this inspection the AEC representative, using and Eberline Model E 500B survey ~~meter~~ instrument, made a physical radiation survey of Dr. Green's laboratory. No areas of contamination could be found on the floors or work benches and the highest radiation level to be noted was 5 mr/hr at the surface of a lead storage container, in which was stored a sealed source of Cobalt 60.

41. Wipe tests were also taken in Dr. Green's laboratory. These were analyzed at Argonne National Laboratory and showed that the floor inside of the Hot Storage Laboratory near the storage cabinet gave a reading of 425 disintegrations per minute. Another wipe was taken directly inside of the door coming from the hallway in this laboratory. The analysis of this wipe showed 682 disintegrations per minute. Both wipes were approximately one square area. C. E. Norelius contacted Dr. D. H. Green by telephone on November 14, 1963 and informed him of the results of these wipe tests. The wipe showing the highest reading was supposedly taken in a clean area. Dr. Green was suprised as to how such a reading could occurr. He then related that he had been making measurements of the fall out collected from filters on air which was coming into the building. He stated that some of these were quite hot and that he had some stored inside of a cabinet near the front doorway. He thought it may have been possible for some of these to have been bumped or moved in some way that radioactive dust could have gotten on to the floor in this area. He stated that he would make other wipe tests of the area to determine the extent and type of contamination that was found.

LICENSE CONDITIONS

42. The following shows the status of compliance with the conditions of this license which were in effect at the time of this inspection:

License No. 34-54-4

Condition 10 - "Authorized place of use."

See Condition 11.

Condition 11 - "Authorized place of use." Amendment No. 4

It has been determined that the principal place of use of byproduct material procured under this license has been at the Lamp Division at Nela Park in Cleveland. However, when experimental work is initially set up in production plants, it is done so under this license, and for this reason Condition 11 Amendment No. 4 was obtained such that byproduct material could also be used at the various other locations. Mr. Matelsky explained as soon as the experimental work is completed at the beginning of use of material under this license the use is then switched to the production (-5) license.

Condition 12 - "Compliance with 10 CFR 20."

Details are given elsewhere in this report.

Condition 13 - "Use of byproduct materials."

It was determined that all byproduct materials are used under the supervision of individuals designated by the Isotope Committee, Mr. I. Metalsky, Chairman, in accordance with this license condition. Written authorization is given by the Isotope Committee, giving certain individuals responsibility for the handling, use and maintenance of inventory concerning radioactive materials in each area.

Condition 14 - "Leak test requirements."

A. Dr. Green stated that he has not procured any sealed sources since the time of the last previous inspection. A review of records maintained by Dr. Green showed that he has leak tested all sealed sources possessed under this license within the six month intervals at all times. Mr. Matelsky's secretary maintains a file such that at approximately six month intervals she reminds Dr. Green that the leak tests are due. Dr. Green also keeps a reminder in his own personal laboratory notebook of the times when the various leak tests are due and has performed these at six month intervals.

B. Those interviewed stated that they have never fabricated any of their own sealed sources, therefore this part of the condition does not apply.

C. The licensee does not possess any sealed sources which are used for the purpose of alpha emissions, therefore this part of this condition does not apply.

D. The tests used by Dr. Green is capable of detecting .005 microcuries of contamination. Details of this test are given in page 11 attached to the field notes.

E. It was noted that the leak tests results in Dr. Green's notebook are maintained in units of microcuries. No test has shown the presence of .005 microcuries or more of removable contamination.

Condition 15 - "Authorized use of byproduct material."

From discussion with those interviewed and observation of some facilities, it appears that the licensee is using byproduct materials as authorized by this license in accordance with the documents referenced in this license condition.

LICENSE CONDITIONS (continued)

Condition 16 - "Transfer of byproduct materials" Amendment No. 5

Mr. Metalsky stated that the transfer of byproduct material from this license would only be to the -5 or manufacturing and production license. Waste by-product material generated in research and development is handled as follows: Short half life material is stored for decay and when there is no detectable activity remaining this is released into the sanitary system. Longer half life material is shipped to an authorized recipient. Records showing that the last such shipment was made on 7-11-63, and the shipment was made to the Nuclear Engineering Corporation. Small amounts of radioactive gas are diluted up the hood.

Condition 17 - "Authorization to transfer possession and control of tungsten wire"

Dr. Green stated that he has only done one experiment during August 10 and 11, 1963 involving irradiated tungsten wire. He stated that this material was still stored as powder in his laboratory, and that by this time all the radioactive tungsten had decayed. He stated that he has not distributed any of this material as yet, so he has not had any reporting requirements of transfers.

Condition 18 - "Release of Krypton 85 and Tritium gases."

Those interviewed stated that they have released no Krypton 85 or Tritium as authorized in this license condition as yet.

✓43. License No. 34-54-5

Condition 10 - "Authorized place of use."

See Condition 11.

Condition 11 - "Authorized place of use."

Initially all byproduct material procured under this license is received at the Lamp, Metals, and Components Department at ~~21800 Tungsten Road~~ Cleveland 17, Ohio as authorized by this license.
After mixing at this plant, it is then sent to other plants with most of it going to the Lamp Plant, and being used there under this license. Some tagged gases are sent to other authorized recipients also.

Condition 12 - "Compliance with 10 CFR 20."

Details are given elsewhere in this report.

Condition 13 - "Authorization for individuals to use byproduct material as designated by the Isotope Committee."

It was determined that written authorization is given from the Isotope Committee, Mr. I. Metalsky, Chairman, which authorizes certain individuals to use byproduct material in various areas. Mr. Coats and Mr. Volland are the authorized users of byproduct material at the Gas Mixing Plant.

Condition 14 - "Authorized use of byproduct material."

From discussion with those interviewed it appears that the byproduct materials procured under this license are being used in accordance with the referenced documents.

Condition 15 - "Labeling of glow lamps and glow switches, and packages containing these units."

None of the actual packages were observed in which glow lamps and glow switches were packed. However, Mr. Metalsky stated that the packages containing glow lamps and glow switches, containing Krypton 85, are labeled as described in his letter and application dated May 25, 1962.

LICENSE CONDITIONS (continued)

44. License No. SMB-191

Condition 8 - "Authorized use."

From discussion with Mr. Metalsky and Dr. Green, it appears that all source material procured under this license is being used in accordance with procedures that were described in the licensee's application dated March 26, 1962 and April 30, 1962.

Condition 9 - "Authorized places of use."

An attachment to the field notes shown as page 15, shows the breakdown by departments and the approximate usage of source material at each of these various departments.

45. MANAGEMENT DISCUSSION

The results of this inspection was discussed with Dr. D. H. Green, Radio Physicist, and Mr. R. Metalsky, Chairman of the Isotope Committee. They were informed that the program appeared to be in very good condition, and that no item of noncompliance was noted with regard to any of the three licenses covered in these notes. Namely, 34-54-4, -5, and SMB-191