

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee <b>WESTINGHOUSE ELECTRIC CORPORATION</b> Westinghouse Lamp Division 1-71 MacArthur Avenue Bloomfield, New Jersey	2. Date of inspection <b>August 24, 1961</b>
3. License number(s), issue and expiration dates, scope and conditions (including amendments)	4. Type of inspection <b>Reinspection</b>
5. License No. <b>SMB-353 (Reinspection)</b>	6. 10 CFR Part(s) applicable <b>20 - 40</b>
Docket No. <b>40-2286</b>	Date <b>7/13/61</b>
Exp. Date <b>7/31/64</b>	

Scope: Six hundred and fifty (650) pounds of uranium and thorium for use in accordance with the procedures described in the licensee's applications dated May 19 and July 10, 1961.

6. Inspection findings (and items of noncompliance)  
Westinghouse Electric Corporation, Bloomfield plant manufactures metal products for ultimate use in lamps, tubes, etc. There are nine plants in the Lamp Division of Westinghouse Electric; Bloomfield is headquarters. Mr. A. A. Rapp is the Safety Supervisor at the plant and plant R50. The Bloomfield plant manufactures thoriated tungsten wire, thoriated metal rods and sheets for specialized use. When processing, approximately 14 to 26 persons are involved in the use of material on a three shift basis. At the time of the inspection, the facilities, instrumentation, safety precautions and procedures, procurement, waste disposal, personnel monitoring results and survey results were reviewed. The only items of noncompliance noted or observed during the course of the inspection are as set out below:

20.105 "Permissible levels of radiation in unrestricted areas"  
(b)(1) & (2) - in that the licensee caused radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 2 mrem in any one hour and in excess of 100 mrem in seven consecutive days. (See item 15 of report details.)

(CONT'D)

7. Date of last previous inspection <b>January 26, 1959</b>	8. Is Company Confidential information contained in this report? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Specify page(s) and paragraph(s))
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DISTRIBUTION 1 cc DL&R, HQ 1 cc CO-HQ 2 cc CO-1	Walter R. Lorent Inspector Approved by <b>Robert M. Kirkman, Director</b> Division 1, Division of Compliance (Operations office) <b>November 8, 1961</b>
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If additional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head format, leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under appropriate item.

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

# UNITED STATES ATOMIC ENERGY COMMISSION COMPLIANCE INSPECTION REPORT

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Westinghouse Lamp Division  
1-71 MacArthur Avenue  
Bloomfield, New Jersey

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August 24, 1961

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Reinspection

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20.105 - 20.106

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8. Is "Company Confidential" information contained in this report? Yes ☐ No ☒  
(Specify page(s) and paragraph(s))

## DISTRIBUTION

1 cc DLR, HQ  
1 cc CO-HQ  
2 cc CO-1

Walter R. Lorenz

Approved by

Robert W. Kirkman, Director  
Division of Compliance

November 8, 1961

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PDR FOIA  
VINICOM92-443 PDR

ITEM 6 CONT'D

20.201 "Surveys" *no evaluation of air conducted*  
(b) - in that the licensee has made no evaluation of the air concentration of radioactive materials in unrestricted areas. (See item 13B of report details.)  
*OK*

20.203 "Caution signs, labels, and signals" *Bldg 8 storage cabinet*  
(f)(2) - in that a jar containing approximately 15 lbs of  $\text{THO}_2$  was not labeled with any "Caution - Radioactive Material" sign. (See item 17 of report details.)  
*OK*

20.401 "Records of surveys, radiation monitoring, and disposal"  
(b) - in that the licensee could not find records of direct radiation surveys, made by a person formerly employed with Westinghouse, at the time of the inspection. (See item 23B of report details.)  
*check with Dick*

PART 40 INSPECTION

WESTINGHOUSE ELECTRIC CORPORATION  
Westinghouse Lamp Division  
1-71 MacArthur Avenue  
Bloomfield, New Jersey

Date of Inspection: August 24, 1961 (Announced Reinspection)

Persons Accompanying Inspector:

None. (State Health Department notified).

Persons Contacted and Titles:

Mr. A. A. Rapp, Safety Supervisor in the Lamp Division  
Mr. J. Carroll, Works Manager

DETAILS

9. Background Information

On 11/7/56 an initial inspection was made of license R-126 which is presently license SMB-353. This inspection report, made by Mr. Paul B. Klevin of this office, was transmitted to Headquarters on 3/28/57. The memo of transmittal included what was termed noncompliance with Section 20.21, 20.42, 20.24, 20.27, 20.22 and 20.26.

The report was forwarded from Headquarters to the Division of Civilian Application, pointing out the noncompliance with 10 CFR 20. On 6/13/57 the Division of Civilian Application, in a memo to Headquarters, indicated that they would not bring the items of noncompliance to the attention of the licensee.

On 1/27/58 a reinspection was made of license R-126 by Mr. Adams of this office. This inspection report was transmitted to Headquarters on 3/20/58 and included the following items of noncompliance:

- 20.201 "Surveys"
- 20.203 "Caution signs, labels, and signals"  
(e)(2) and (f)(2)
- 40.10 "Restrictions on transfers"

This report was transmitted from Headquarters to DL&R on 4/7/58. On 5/7/58 DL&R notified the licensee of the above items of noncompliance and requested corrective action. In a letter dated 6/9/58, DL&R indicated to the licensee that they had satisfactorily corrected their items of noncompliance as indicated in the licensee's letter dated 5/13/58.

On 1/26/59 a follow-up inspection was made of license R-126 by Jack R. Roeder of this office. The letter of transmittal was sent to DL&R on 3/20/59 and included one item of noncompliance. This item of noncompliance was 20.203(f)(2) "Caution signs, labels and signals". The report details indicates that the licensee had taken steps to correct this deficiency by ordering proper labels.

No further correspondence between DL&R and the licensee is contained in this file.

10. Organization and Administration

The licensee at this location, manufactures metal products for ultimate use in lamps, tubes, etc. There are nine plants in the Lamp Division. Bloomfield is the headquarters for the Lamp Division and is essentially an accommodation plant for suppliers. This facility manufactures thoriated tungsten and thoriated tungsten wire which is used in shock resistant lamps, emission tubes and vacuum tubes, in general, and in welding rods. Mr. A. Rapp is the Safety Supervisor for the Lamp Division and the person responsible for the safe use of thorium at this plant.

Rapp stated that there is an isotope committee which consists of one person at present, a Mr. Carth, Committee Chairman who recently assumed this duty. Rapp stated that during normal operations between 14 and 26 men work with the thorium on a three shift basis. During this inspection no thorium operations were in process.

11. Facilities and Use

The thoriated tungsten is processed in Buildings 6 and 9. Thorium rods and sheets are processed in Building 8. The processes conducted in Building 6 and 9 are as follows:

- (1) Thorium is purchased as thorium nitrate crystals and a mixture tungsten oxide and thorium nitrate are formed into a slurry.
- (2) The slurry is fired at approximately 1100° C and reduced to thoria.
- (3) The mixture of tungsten oxide and thoria is subsequently heated in a hydrogen atmosphere at approximately 1000° C.
- (4) The tungsten oxide is reduced to tungsten metal and the finished product contains either 1 or 2% thoria in balance with pure tungsten.

These slurry sieving and drying are all done in enclosed or under exhausted conditions. Personnel operating the equipment reportedly wear protective equipment such as cloths and respirators.

Thorium rods and sheets are processed as follows:

- (1) Thorium oxide and ground calcium metal mixture is heated in a vacuum for degasification.
- (2) At 1150° C thoria is reduced to thorium.
- (3) Calcium is then leached out with acetic acid and water washed and then vacuum filtered and oven dried.
- (4) The bottled thorium metal powder is then stored.
- (5) After storage the metal powder is pressed into rods or slabs and heated at 1200° in a vacuum and rolled to the various shapes desired.

These processes are done in enclosed conditions and personnel wear respirators and gloves to reduce contamination and prevent any air concentrations in the process areas. Finished thorium products from the above processes are then sold in products as indicated in item 10 of the report details.

Additional detailed descriptions of their processes are contained in their application dated July 10, 1961.

## 12. Instrumentation and Calibration

The licensee has a Nuclear Chicago Cuttle Pie, Atomic Accessories portable survey meters, range 0 to 50 mr. Electrostatic persipertators for air sampling. Additional instrumentation at this facility is as indicated in their byproduct material License 29-3022-1.

## 13. Radiological Safety Precautions and Procedures

### A. Instructions

The licensee posts several AEC-3 forms about the facility in conspicuous locations. In addition, instructions are provided production personnel, and supervisors have been issued written safety practice instruction sheets for thorium dated 6/25/58. Additional instructions are included in a safe practices bulletin T-4 which is supplementary to all other instructions. These instructions contain references to Part 20, the controlled use of licensing, storage, surveying and personnel protection, ventilation and medical controls. A copy of the latter instruction is contained in the licensee's files.

### B. Surveys

Monthly wipe tests are made when material is used. Results run between 0 and 200 alpha d/m/100 cm<sup>2</sup>. Rapp stated that areas indicating over 50 alpha d/m/100 cm<sup>2</sup> are cleaned and rechecked each and every time. Average wipes on their records indicate readings ranging between 5 and 10 alpha d/m/100 cm<sup>2</sup>. Wipe results are sent to their East Pittsburgh office for analysis. Operations in which area wipe surveys indicate greater than 50 d/m/100 cm<sup>2</sup> are rechecked to evaluate the reason for the contamination and where possible the operations are revised such that contamination will be reduced to 0 or lower than 50 alpha d/m/100 cm<sup>2</sup>. An upper limit of 50 alpha d/m/100 cm<sup>2</sup> was recommended by their East Pittsburgh plant, industrial hygiene office.

Air samples were taken on May 11, 1961, June 5, 1961 and April 18, 1960. The maximum reading on the latest air samples indicated  $3.8 \times 10^{-11}$  uc/ml. The low reading on their survey records indicated  $.02 \times 10^{-11}$  uc/ml of thorium. Areas which indicated greater than  $5 \times 10^{-11}$  uc/ml are checked and the operation causing this concentration is revised such that the limit will be less than  $5 \times 10^{-11}$  uc/ml. The above wipe and air surveys made by the licensee have all been conducted within their restricted areas.

Rapp stated that no air samples or wipe samples have been taken in their unrestricted areas, such as from stack hood exhaust units, roof areas, etc. Rapp also noted that he has not made a survey or evaluation to determine compliance with concentrations of thorium in unrestricted areas.

Direct radiation surveys are made in Building 6 and Building 9 and the results were reportedly recorded, however, the person recording the results is no longer at the plant site and the records could not be found by Rapp after a thorough search of the production office.

Direct radiation surveys of their thorium processes made by the inspector using an open end window GM survey meter indicated less than .1 mr/hr at the surface of areas likely to be contaminated.

Radiation levels around their locked storage cabinets are indicated in item 15 of this report.

14. Procurement Procedures and Control

Isotopes are purchased by the purchasing agent, Mr. P. E. Murphy. A monthly inventory of material is maintained by Murphy and he is the person responsible for seeing that the license limit is not exceeded. Material is purchased for the most part from Lindsey and Davidson Chemical Company. The quantities of material on hand at the time of the inspection are as follows:

uranium compounds, pure grade uranium 592.4 grams, uranium scrap powder 182.5 grams,  $UO_2$  10,611 grams,  $U_3O_8$  65 grams,  $UO_2$  6,286.8 grams,  $UO_2$  as urinal acetate 222.5 grams,  $KU_2F_6$  23,674 grams,  $UO_2$  as urinal nitrate 45,361 grams, urinal chloride ( $UCl_3$ ) 1 lb., urinal chloride ( $UCl_4$ ) 5.5 lbs. and urinal fluoride 15.75 lbs.

thorium compounds, thorium metal 5.56 lbs, thorium powder 6.04 lbs, thorium chloride 6 lbs,  $K_2ThF_6$  35 lbs, thorium nitrate 209 lbs, thorium oxide 54.5 lbs, thorium trimmings 2.43 lbs.

Of the total thorium on hand, 75.73 lbs. contained in various compounds will be disposed to the National Lead Company of Ohio. In addition, Murphy stated that he expects to dispose of all but analytical quantities of uranium. The above monthly inventory is maintained by P. E. Murphy, Purchasing Agent at Bloomfield.

15. Storage and Security

In Building 9 thorium crystals are stored in a locked cabinet located in the center of a room in which the production of thoriated tungsten is conducted. This storage cabinet (6' x 3' x 1 1/2') contained approximately 155 lbs of thoriated crystals through the cabinet. The radiation measurements found by the inspector using a calibrated G3-2 Nuclear Measurement Corporation survey meter (calibrated 8/11/61) in contact with the locked storage cabinet revealed 0.75 mr/hr front cabinet, 1.6 mr/hr sides, and 5 mr/hr cm contact with the back side of the storage cabinet. The area around this storage cabinet is not restricted according to Rapp as he does not control access with respect to radiation in Building 9.

The storage cabinet located in Building 8 which contained many small quantities of thorium in a powder and/or metallic state was locked. The radiation level at the surface of this locked cabinet within the restricted area was 4.5 mr/hr. Rapp stated that he considered Building 8 a restricted area as access to the area is controlled.

Both storage cabinets were noted to be locked and a supervisor of each respective area was the only person who had the key to the storage cabinet.

16. Waste Disposal

Rapp stated that all material is converted to the metal or the thoriated tungsten. After wipe smears are taken and the smears are found to be low ( $<50$  dpm/100  $cm^2$ ), the areas are wet swept and flushed to the sanitary sewer system. No disposals to date have been made to Crossroads or any other commercial disposal company. The water flow to the sanitary sewer system was reported by Rapp to be  $123 \times 10^6$  gallons per year.

17. Posting and Labeling

The licensee for the most part has posted all areas where radioactive materials are used with a standard "Caution - Radioactive Materials" sign and indicated the standard radiation symbol. All storage cabinets are additionally posted with a "Caution - Radiation Area" sign and the words, "Do Not Loiter Within 2' of Cabinet". All jars containing radioactive materials were labeled with the standard "Caution - Radioactive Materials" sign and standard symbol, except one jar in the Building 8 storage cabinet which contained 15 lbs of thorium oxide. This jar was labeled with the kind, quantity, and date of assay of materials but was inadvertently labeled with a "Caution - Radioactivity" sign instead of the standard "Caution - Radioactive Materials" sign. Rapp stated this would be corrected.

18. Personnel Monitoring

The licensee is supplied two-month film badges from the East Pittsburgh Industrial Hygiene Lab of the Westinghouse Corporation. These badges are issued when material is used. Two film badges are also used for area monitoring. Results are reportedly returned to the Bloomfield plant only when there is an exposure indicated on the film badges. Rapp stated that no film badges to date had been returned.

The licensee also performs blood counts and chest X-rays on persons working with radioactive materials on a routine basis as part of their policy.

PUNCH CARD DATA SHEET

NAME  
Westinghouse Electric Corp.  
Lamp Division

LICENSE/DOCKET NO.  
40-2286

STATE  
New Jersey

DATE      August      1961  
                 month                   year

TYPE  
Inspection

CATEGORY

VIOLATIONS

ENFORCEMENT ACTION

TYPE OF INCIDENT

MATERIAL INVOLVED

QUANTITY INVOLVED

CAUSE OF INCIDENT

PERSONNEL EXPOSURE

External      Internal      Dose

EQUIPMENT FAILURE