

UNITED STATES GOVERNMENT

## Memorandum

TO : Robert Lowenstein, Acting Director  
Division of Licensing and Regulation  
Headquarters

DATE: April 11, 1961

FROM : Roy C. Hageman, Director  
Compliance Division  
Chicago Operations Office

SUBJECT: INSPECTION REPORT - CLEVITE CORPORATION, CLEVELAND, OHIO  
LICENSES NO. 34-653-2, 34-653-3, C-3692, C-3790 AND SNM-183

CD:ETM

The noncompliance items noted in paragraph 6 of the attached report were discussed with Danforth R. Hale, Head, Crystal Growth Section, Electronics Research Division, J. E. Dawson, Security Officer and Safety Director, and D. J. Berger, Executive Assistant to the Manager, Mechanical Research Division.

It is recommended that a letter be addressed to A. D. Schwope, Manager, Mechanical Research Division, with copies to Dr. Hale and Mr. Dawson.

The letter should request confirmation of the corrective actions which Hale and Dawson said would be taken with regard to the non-compliance items noted under License 34-653-2, and renewal of License C-3790. In regard to the incorrect wording on signs and lack of labels noted under Licenses SNM-183 and C-3790, the letter should request that corrective action be taken, since none was offered by Berger. He said he saw no need to follow the requirements of Section 20.203 for posting the licensed material on hand, in view of the contract material they also handle for which such posting and labeling is not used.

Aside from Berger's refusal to comply with posting and labeling requirements of Section 20.203, the licensee's representatives were cooperative during the inspection. Dr. Hale did not seem to be at all familiar with the terms of his license. Mr. Dawson was not able to give satisfactory answers in regard to compliance with the conditions of Licenses 34-653-2 and 34-653-3. He seemed to be quite unaware of the decay of radioisotopes. Dawson was not correctly informed about the survey instruments in the Crystal Growth Section: he said that they had the specified range, whereas in fact they had a very inadequate range.

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The letter from DI&R to the licensee could very well be quite strong, in view of the fact that Berger stated that he would be interested to see just what kind of a letter the AEC would send.

We do not plan to make a follow-up visit before the next scheduled date for reinspection.

Enclosure:  
Inspection Report (1 cy)

cc: Division of Compliance, HQ - w/encl (orig.)

Continuation Sheet #9  
Clevite Corporation  
Cleveland, Ohio

February 8, 1961

24. Personnel Monitoring

Film badges are supplied by R. S. Landauer, Jr. on a two-week basis for those handling byproduct, source, or special nuclear materials. Records of film badge readings were reviewed for 1957 through 1960 during the inspection.

All readings for 1960 were reported as M (minimum measurable limit: beginning January 1, 1961 this will mean less than 9.6 millirem X and gamma radiation).

The highest reading for the period 1957-1960 was 190 millirem gamma for the two weeks beginning July 13, 1959 for W. Roberts of the Mechanical Research Division.

Mr. Berger stated that Form AEC-4 will be filled out for those individuals currently involved with radiation. He said that current radiation exposures will be entered on Form AEC-5 on a calendar-month basis.

25. Discussion of Noncompliance Items

The items of noncompliance noted in this report were discussed with Dr. Hale, Mr. Dawson, and Mr. Berger.

## COMPLIANCE INSPECTION REPORT

1. Name and address of licensee  Clevite Corporation Cleveland, Ohio	2. Date of inspection  February 8, 1961
	3. Type of inspection Reinspection
	4. 10 CFR Part(s) applicable  20, 30, 40 and 70

5. License number(s), issue and expiration dates, scope and conditions (including amendments)

<u>34-653-2</u>			
Amendment No. 1	8-20-59	8-31-61	Reinspection #1
(amended in entirety)			
<u>34-653-3</u>			
Amendment No. 1	5-16-60	5-31-65	Reinspection #1
(amended in entirety)			
<u>C-3692</u>	5-19-58	5-31-59	Reinspection #1
<u>C-3790</u>	7-1-59	7-31-60	Reinspection #1
<u>SNM-183, as amended</u>	3-10-60	3-31-62	Reinspection #1

6. Inspection findings (and items of noncompliance)

The only items of noncompliance observed or noted during the course of the inspection are as set out below:

License 34-653-2

License 34-653-2, Amendment No. 1, Condition 13 - licensee to follow procedures contained in letter dated July 22, 1957 from E. A. Gentry, which states that radiographic exposures are limited to two hours.

1. Exposures run  $5\frac{1}{2}$  hours. See Section 13 of report details, Condition 13.

License 34-653-2, Amendment No. 1, Condition 16 - survey instrumentation shall have a range of a few milliroentgens per hour to at least one roentgen per hour.

2. Survey meter on hand had range of 0 to 20 milliroentgens per hour. See Section 13 of report details, Condition 16.

10 CFR 20.203 Caution signs, labels, and signals.

3. (f)(1) Incorrect wording on labels on storage containers. See Section 15 of report details.

(continued)

7. Date of last previous inspection  May 14, 1958	8. Is "Company Confidential" information contained in this report? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Specify page(s) and paragraph(s))
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DISTRIBUTION:

Division of Compliance  
Headquarters (Orig.)

Eugene T. Mapp

E. T. Mapp  
Inspector

February 8, 1961

6. Inspection Findings (continued)

License C-3790

10 CFR 40.10 Restriction on transfers.

4. Licensee received refined source material prior to issuance of License C-3790 and shipped refined source material after expiration of License C-3790. See end of Section 18 of report details.

Licenses SNM-183 and C-3790

10 CFR 20.203 Caution signs, labels and signals.

5. (e)(1) and (2) Incorrect wording on signs at entrances to AEC Process Area and vault where source and special nuclear materials are stored. See Section 21 of report details.
6. (f)(1), (f)(2) and (f)(4) No labels prescribed by this section were on containers in which source and special nuclear materials are stored. See Section 21 of report details.



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DETAILS

9. Inspection History

The initial inspection of this licensee was made on May 14, 1958. The licensee was in noncompliance.

The letter dated September 9, 1958 from DL&R to the licensee stated in part:

"It appears that certain of your activities were not conducted in full compliance with a condition of your license in that: You had in your possession 9,028 grams of enriched uranium which is 18 grams more than the quantity covered by license No. SNM-183.

"The inspection report indicated that the irradiated quartz crystal (License No. 34-653-1) would be disposed of by diluting with water and draining it down the sewer. We would like to call your attention to Section 20.303(a) which limits the material to be disposed of by this method to a readily soluble or dispersible form.

"In connection with the use of the Cobalt 60 sources (License No. 34-653-2), please submit information on the basis for the determination that personnel monitoring is not required under Section 20.202(a) of Part 20."

The letter dated October 10, 1958 from the licensee to DL&R stated in part:

"In connection with license No. 34-653-1 we have had no crystalline compounds irradiated which are not in a readily soluble or dispersible form so that all of these compounds meet the requirements of Section 20.303(a), Disposal by Release into Sanitary Sewage Systems.

"In connection with license No. 34-653-2 we are submitting a summary of the film badge reports of the employee who handles the Cobalt 60 sources. All of this employee's weekly or biweekly film badge reports covering the period from September 23, 1957 to September 22, 1958 have been zero with the exception of the biweekly period beginning October 7, 1957 when it was 40 mr and the weekly period beginning December 2, 1957 when it was 10 mr. Based on these film badge reports we feel that we meet the requirements of Section 20.202(a)(1), Personnel Monitoring, since at no time during the past year has the employee received a dose in excess of 25% of the limits specified in Appendix A."

The letter dated November 4, 1958 from DL&R to the licensee thanked him for his letter of October 10, 1958.

10. Announced Visit

The licensee was notified by letter dated January 30, 1961 of the scheduled inspection.

11. Persons Accompanying Inspector

The inspector was not accompanied. The Ohio Department of Health had been notified of the scheduled inspection.

12. Persons Interviewed

The following employees of Clevite Corporation were interviewed: D. J. Berger, J. E. Dawson, D. R. Hale and Helmut Krueger. They furnished the information given in this report.

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13. Compliance with Provisions and Conditions of License 34-653-2, Amendment No. 1

In connection with this license, Dr. Danforth R. Hale, Head of the Crystal Growth Section of the Electronics Research Division, and Mr. J. E. Dawson, Security Officer and Safety Director, were interviewed. They furnished the pertinent information.

Items 6A, 7A, 8A provide for a total of 4 curies of Cobalt 60 as ORNL sealed sources: one each of 500, 300, and 200 millicuries and one of 3 curies.

The Cobalt 60 sealed sources on hand had original strengths of 500, 300, and 200 millicuries as of November 15, 1950 and 3 curies as of March 21, 1952, respectively.

As provided in Item 9A, these industrial radiography sources are used in Clevite exposure devices, Drawing No. 4-13X6241-001. They are used for radiography through heavy-walled steel tubing to determine the condition of growing quartz crystals.

Condition 10 specifies the authorized place of use as the licensee's address, 540 East 105th Street, Cleveland 8, Ohio. The sources are used in the Crystal Growth Section of the Electronics Research Division at that address.

Condition 11 specifies that byproduct material shall be used by, or under the direct supervision of, Danforth R. Hale. The sources are used under the direct supervision of Dr. Hale, Head of the Crystal Growth Section.

Condition 12 specifies that sealed sources shall not be opened or combined. The sealed sources are not opened or combined.

Condition 13 specifies that the licensee shall possess and use byproduct material in accordance with statements, representations, and procedures contained in his application dated July 27, 1959, administrative instructions entitled "Administrative Control and Radiological Protection Procedures" dated July 3, 1957, and letter dated July 22, 1957 from E. A. Gentry.

The documents referred to were reviewed with Dr. Hale and Mr. Dawson during the inspection. They stated that the specified procedures are followed. However, Gentry's letter of July 22, 1957 states that radiographic exposures are limited to a maximum of 2 hours in length. In noncompliance with this statement, the exposures run 5½ hours, according to Dr. Hale. They are planning to make override exposures and will request an amendment to cover this.

Condition 14 requires compliance with 10 CFR 20. Compliance and noncompliance details are given elsewhere in this report.

Condition 15 specifies that written administrative instructions shall be followed and a copy shall be supplied to each user. Any changes shall have the prior approval of DI&R.

Hale and Dawson stated that the instructions are followed and are furnished to each user and that any changes would be submitted to DI&R for prior approval.

Condition 16 specifies that calibrated and operable survey instrumentation is to be maintained at each site where radiographic exposures are being made. A physical radiation survey is to be made (1) to determine compliance with Sections 20.102 and 20.203, and (2) immediately after each radiographic exposure is completed to determine that the source has been returned to its storage condition. The survey instrumentation shall have a range of a few milliroentgens per hour (mr/hr) to at least one roentgen per hour.

Hale and Dawson stated that the instrument on hand in the Crystal Growth Section is used to make surveys as required under (1) and (2) above.

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13. Compliance with Provisions and Conditions of License 34-653-2,  
Amendment No. 1 (continued)

The Victoreen Beta-Gamma Survey Meter on hand (Model 263B, Serial No. 384) has a range of 0 to 20 mr/hr. This constitutes noncompliance with Condition 16.

A Victoreen Thyac Survey Meter (Model 646, Serial No. 163) had been sent to Victoreen for repair on November 26, 1960. Its range is 0 to 25 mr/hr. (These are not the survey instruments described in Gentry's letter of July 28, 1957.)

Hale and Dawson said that they would obtain a survey meter having the specified range.

Condition 17 specifies that the radiographic areas are to be kept under continuous surveillance during each exposure operation. Hale and Dawson stated that the radiographic areas are kept under continuous surveillance during each exposure.

They are planning to make overnight exposures and will request an exemption from this condition.

Condition 18 specifies that the licensee shall exercise appropriate administrative control to assure that no person will use or personally supervise the use of by-product material until such person has received instructions in, and demonstrated a thorough understanding of, 10 CFR 20, the licensee's operating and emergency procedures, and the license provisions; and demonstrated competency in the use of byproduct material, equipment, and survey instruments which will be used.

Dr. Hale stated that the licensee, Clevite Corporation, exercises appropriate administrative control through J. E. Dawson, Security Officer and Safety Director.

14. Facilities and Equipment - License 34-653-2

Each Cobalt 60 sealed source is used and stored in a Clevite combination exposure device portable container.

The containers are stored in a concrete storage vault, 21 by 21 by 21 inches outside dimensions. The vault is sunk below ground level and measures 14 by 14 by 16 inches inside. The cover is 3 inches thick.

15. Posting and Labeling - License 34-653-2

The concrete storage vault is posted with a sign bearing the conventional radiation symbol in magenta on yellow background and the words CAUTION RADIOACTIVE MATERIAL.

Each combination exposure device portable container bears a label showing the isotope, amount, and date of measurement. The label also bears a conventional radiation symbol in magenta on yellow background and the words DANGER RADIOACTIVITY. This wording is in noncompliance with Section 20.203(f)(1). Hale and Dawson said that labels with the correct wording would be obtained.

16. Compliance with Provisions and Conditions of License 34-653-3, Amendment No. 1

In connection with this license, Helmut H. A. Krueger of the Electrical Properties Section of the Electronics Research Division and J. E. Dawson, Security Officer and Safety Director, were interviewed. They furnished the pertinent information.

Items 6A, 7A, 8A provide for a total of 525 millicuries of any byproduct material between Atomic Nos. 3 and 83, inclusive, as irradiated crystalline compounds.

The byproduct material on hand consisted of irradiated crystalline compounds (sodium chlorate, lead stirconate-titanate, barium titanate, ammonium dihydrogen phosphate) whose original activity was 525 millicuries as of 1956 and 1957. It is now almost completely decayed.



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16. Compliance with Provisions and Conditions of License 34-653-3,  
Amendment No. 1 (continued)

The material is stored in the original ORNL containers, which are labeled. It is planned to dispose of the insoluble compounds by sea burial and the soluble compounds by release into sanitary sewage.

As provided in Item 9A, the byproduct material was used to measure frequencies and piezoelectric constants.

Condition 10 specifies the authorized place of use as the licensee's address, 540 East 105th Street, Cleveland 8, Ohio. The byproduct material was used in the Electrical Properties Section of the Electronics Research Division at that address.

Condition 11 requires compliance with 10 CFR 20.

Condition 12 specifies that byproduct material shall be used by, or under the direct supervision of, Helmut H. A. Krueger. The material was used under the supervision of Mr. Krueger.

17. Compliance with Provisions of License C-3692

In connection with this license, J. E. Dawson, Security Officer and Safety Director, was interviewed. He furnished the pertinent information.

License C-3692 was issued March 25, 1957 and expired April 1, 1958. It was renewed May 19, 1958 and expired May 31, 1959.

License C-3692 specifies that Clevite Corporation is licensed to receive possession of and title to 5 grams of thorium sulfide during the term of the license for use in research at 540 East 105th Street, Cleveland 8, Ohio.

On May 6, 1957, 5 grams of thorium sulfide were shipped to Clevite from Leo Brewer at the University of California at Berkeley through the San Francisco Operations Office of the AEC.

According to Dawson, 5 grams of thorium sulfide were on hand on February 8, 1961 in the original container in a vault in the Chemistry laboratory.

18. Compliance with Provisions of License C-3790

In connection with this license, D. J. Berger, Executive Assistant to the Manager, Mechanical Research Division, was interviewed. He furnished the pertinent information.

License C-3790 was issued August 8, 1957 and expired August 1, 1958. It was renewed July 14, 1958 effective August 1, 1958 and expired July 31, 1959. It was renewed July 1, 1959 effective August 1, 1959 and expired July 31, 1960. Mr. Berger stated that a renewal would be applied for.

License C-3790 specifies that Clevite Corporation, Mechanical Research Division is licensed to receive possession of and title to 200 pounds of source material during the term of the license for research and processing studies, at 540 East 105th Street, Cleveland 8, Ohio.

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18. Compliance with Provisions of License C-3790 (continued)

Records of inventories, receipts, and transfers of refined source material show the following transactions by Clevite Corporation:

Normal Uranium Metal

> *Received 7-25-57 from General Atomics	3.62 kilograms
Received 9-3-57 from Mallinckrodt	10.71 kilograms
Received 12-2-57 from Mallinckrodt	<u>10.82 kilograms</u>
Removal 1-20-58 to General Atomics	25.15 kilograms
	2.98 kilograms
	<u>22.17 kilograms</u>
On hand	21.68 kilograms
Loss in processing	.49 kilograms

21.68  
 2.2  
 43.36  
 43.36  
 47.00 lbs.

\*Prior to issuance of License C-3790 on 8-8-57.

Depleted UO<sub>2</sub>

Received 5-16-58 from Spencer Chemical	150 grams net	132 grams Uranium
Received 5-16-58 from Spencer Chemical	150 grams net	132 grams Uranium
Received 6-12-58 from Spencer Chemical	50 grams net	<u>44 grams Uranium</u>
	350 grams net	308 grams Uranium
Removal 6-18-58 to Owens-Corning	150 grams net	132 grams Uranium
Inventory	200 grams net	176 grams Uranium

Depleted Uranium Metal

Received 12-9-58 from Davison Chemical 4.625 kilograms

On hand 1-31-61 4.625 kilograms

Depleted UO<sub>2</sub> Pellets

Received 3-2-59 from Mallinckrodt 368 grams

On hand 1-31-61 368 grams

Depleted U<sub>3</sub>O<sub>8</sub>

Received 9-1-59 from Mallinckrodt 9.281 kilograms

Received 6-20-60 from Mallinckrodt 4.570 kilograms

Total received 13.851 kilograms

On hand 2 kilograms

In process at Owens-Corning 4.851 kilograms

4.6  
 2.2  
 9.2  
 9.2  
 10.32 lbs.

9.8  
 2.2  
 12.0  
 12.0  
 17.8 lbs.

Shipments of the depleted U<sub>3</sub>O<sub>8</sub> have been made to Owens-Corning since July 31, 1960, when License C-3790 expired. The material is processed and returned to Clevite.

The shipment of depleted U<sub>3</sub>O<sub>8</sub> to Owens-Corning since License C-3790 expired July 31, 1960 and the receipt of normal uranium metal from General Atomics on July 25, 1957 prior to issuance of License C-3790 on August 8, 1957 constituted noncompliance with Section 40.10 of 10 CFR 40.

Mr. Berger stated that Clevite would apply for a renewal of License C-3790.

Total U on hand 77.62 lbs

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19. Compliance with Provisions and Conditions of License SNM-183

In connection with this license, D. J. Berger, Executive Assistant to the Manager, Mechanical Research Division, was interviewed. He furnished the pertinent information.

Item 7 provides for possession of 55.8 kilograms U-235 contained in uranium enriched to 90% in the U-235 isotope by Clevite Corporation, Mechanical Research Division.

At the time of the inspection there had been no change since the inventory of December 31, 1961, at which time there were on hand 8982.00 grams of U-235 contained in 9710.00 grams of uranium of 89.61%, 93.15%, and 93.44% enrichment, as scrap.

Of the special nuclear material on hand, Westinghouse Atomic Power Division under License TR-2 is responsible for 5370.00 grams of U-235 contained in 5749.00 grams of uranium of 93.44% enrichment.

Clevite plans to ship their portion of this scrap to Engelhard Industries, Inc., Newark, New Jersey, Baker Refining Division, which is licensed to receive scrap and reprocess it for return to AEC.

Clevite is also doing work under AEC contract as well as under AEC license. Inventory control separates the special nuclear materials by job and by enrichment. This also keeps the licensed material and the contract material separated.

Item 8 authorizes use in accordance with the procedures described in the licensee's applications dated March 14, 1958, December 19, 1958, February 16, 1959, June 8, 1959, and February 29, 1960. These documents were reviewed with Mr. Berger during the inspection. He stated that the licensed material was used in accordance with the procedures described therein.

Since the special nuclear material on hand is in the form of scrap, the procedures which are now pertinent are the following parts of Standard Procedure No. CR-17-D, Process and Criticality Control Procedures for Westinghouse Test Reactor Fuel Element Fabrication, submitted with the application of December 19, 1958:

J. Scrap Control, page 6

K. Shipping, page 7

Waste disposal is covered by the procedures referred to in the preceding paragraph. Mr. Berger stated that the procedures given are being followed.

Condition 10 specifies that the authorized place of use is the licensee's address at 540 East 105th Street, Cleveland 8, Ohio. The licensed material is used at this location.

20. Facilities and Equipment - Licenses C-3790 and SNM-183

Source and special nuclear materials (SS materials) have been used in work involving the melting, alloying, rolling, forging, shearing, stamping, and machining of SS materials into fuel plates and assemblies.

Equipment includes vacuum furnaces, heat-treat furnaces, rolling mills, forging presses, power shears, punch presses, and machine tools such as power saws and milling machines.

At the time of inspection, no processing was going on. The SS materials were being stored in the vault.

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20. Facilities and Equipment - Licenses C-3790 and SNM-183 (continued)

The area in which the SS materials are used and stored is known as the AEC Process Area. This area is completely self-contained with only one entrance, at which there is a guard on duty 24 hours a day. In addition, there are two emergency exits with panic hardware. The total area is isolated and secured, and the entire building is completely fenced. All doors are wired to the central light and buzzer system at the guard station.

The floor throughout the area is of concrete treated with a resin filler which penetrated into the concrete and formed a seal. This seal permits easy cleaning and lessens the possibility of the pores in the concrete filling up with SS materials. There are no floor openings to the sewer system. Ventilation is of the natural flow type with four exhaust fans on the outside walls.

The Nuclear Measurements Corporation gamma alarm in the AEC Process Area has a preset alarm point of 5 millirem per hour.

There are stations in the vault and at several other locations in and around the AEC Process Area for the American District Telegraph 24-hour alarm system.

21. Posting and Labeling - Licenses C-3790 and SNM-183

The AEC Process Area, in which SS materials are used and stored, is posted at the entrance with a sign bearing the conventional radiation symbol in magenta on yellow background and the words RADIATION HAZARD. This wording is in non-compliance with Section 20.203(e)(1) and (2). Other signs bear the words DANGER NO SMOKING and RESTRICTED CONTAMINATED AREA.

The entrance to the vault in the AEC Process Area in which the SS materials are stored is posted with a sign bearing the conventional radiation symbol in magenta on yellow background and the words RADIATION HAZARD. This wording is in noncompliance with Section 20.203(e)(1) and (2).

In the vault, the source material is stored in tote pans, and the special nuclear material is stored in drums. The only labeling on the tote pans and drums consists of number and letter codes. This is in noncompliance with Section 20.203(f)(1) and (2) and (f)(b).

Form AEC-3 is posted in the AEC Process Area.

In lieu of posting, the current AEC regulations, AEC licenses, and operating procedures are kept available for employees' examination, in accordance with Section 20.206(b).

22. Radiation Surveys

When SS materials are in process, air samples and smear samples are taken in the AEC Process Area at locations marked on a drawing of the area. Results are recorded in disintegrations per minute per cubic meter and are converted to microcuries per cubic meter, and the locations are described.

When work involving enriched material is in progress, an alpha survey meter is used for making area surveys in the AEC Process Area and for hand monitoring before leaving the area.

23. Bioassays

Records of urinalyses on the persons handling source or special nuclear materials are kept on the reverse of their personnel monitoring records. Uranium disintegrations per minute (dpm) per 24 hours and uranium dpm per 1500 milliliters both have run from 1 to 5. The hematocrit and blood count are also shown. They have been normal.