

UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

I-C(4)

1. LICENSEE Aluminum Company of America Alcoa Research Laboratories P. O. Box 772 New Kensington, Pennsylvania	2. REGIONAL OFFICE U. S. A. E. C. Division of Compliance 376 Hudson Street New York 14, N. Y.
3. LICENSE NUMBER(S) 37-7653-2	4. DATE OF INSPECTION January 14, 1965 (Reinspection)
5. INSPECTION FINDINGS <div style="margin-top: 10px;"> <input checked="" type="checkbox"/> A. No item of noncompliance was found. </div> <div style="margin-top: 10px;"> <input type="checkbox"/> B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 31.302 </div> <div style="margin-top: 10px;"> <input type="checkbox"/> 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 </div> <div style="margin-top: 10px;"> <input type="checkbox"/> D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d) </div> <div style="margin-top: 10px;"> <input type="checkbox"/> E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e) </div> <div style="margin-top: 10px;"> <input type="checkbox"/> F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f) (1) or (f) (2) </div> <div style="margin-top: 10px;"> <input type="checkbox"/> 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) </div> <div style="margin-top: 10px;"> <input type="checkbox"/> 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) </div> <div style="margin-top: 10px;"> <input type="checkbox"/> I. Form AEC-3 was not properly posted. 10 CFR 20.206(c) </div> <div style="margin-top: 10px;"> <input type="checkbox"/> J. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 31.203(b) </div> <div style="margin-top: 10px;"> <input type="checkbox"/> K. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 31.303(d) </div> <div style="margin-top: 10px;"> <input type="checkbox"/> L. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.41, 40.61 or 70.51 </div> <div style="margin-top: 10px;"> <input type="checkbox"/> M. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 31.105(c). </div> <div style="margin-top: 10px;"> <input type="checkbox"/> N. Records of inventories were not maintained. 10 CFR 31.106 </div> <div style="margin-top: 10px;"> <input type="checkbox"/> O. Utilization logs were not maintained. 10 CFR 31.107 </div>	
<div style="text-align: right; margin-right: 100px;"> (AEC Compliance Inspector) </div>	
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.	
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 30%;"> (Date) </div> <div style="width: 60%; text-align: right;"> (Licensee Representative - Title or Position) </div> </div>	

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Act, exemptions b6
FOIA- 2005-345

b-3

BACK-UP FOR AEC-591

PART 30 INSPECTION

Inspector: James F. Bresson

ALUMINUM COMPANY OF AMERICA
Alcoa Research Laboratory
Freeport Road
New Kensington, Pennsylvania

License No.: 37-7653-2

Date of Inspection: January 14, 1965 (Announced Reinspection)

Persons Accompanying Inspector:

Don Hamner, Pennsylvania Department of Health

Persons Contacted:

R. C. Geiger, RSO
Dr. P. T. Stroup, Assistant Director, Research Laboratories
Norman Cochrane, Division Leader, Chemical Research

DETAILS

Background Information

1. This facility was last inspected May 10, 1962 and a clear 591 was issued.

Organization And Administration

2. Geiger stated that he reports to Cochrane who in turn reports to Dr. Stroup. Geiger said at least 75% of his time is devoted to radiation safety. Geiger stated that approximately 5 people in the laboratory come in contact with radioactive material.

Use and Possession of Material

3. Geiger stated that the majority of work utilizing radioactive material at the Research Laboratory consists of evaluation of residual activities ~~and~~ ⁱⁿ aluminum alloys after irradiation. The materials are irradiated to determine the kinds and types of impurities in such compounds as Bauxite and various aluminas. The samples are sent to the BNL reactor for irradiation. Post irradiation effect studies are conducted at New Kensington. The second project consists of studying stress and corrosion principals on various compounds utilizing

tritiated water. This will be discussed separately. Geiger stated that the size of the samples irradiated are usually in the order of a few grams. For the most part, he said that amounts returned from Brookhaven are in the microcurie range. It was noted that approximately one irradiation per month is performed for Alcoa by Brookhaven. It was noted that on a few occasions amount receipt of shipments of ^HK₂PO₄ were received whose activity is in the millicurie range. On 10/7/64, a total of 928 mc was received. On 8/31/64, 215 and 213 mc shipments were received. On 12/21/64, a total of 1.36 c P-32 was received, and on 12/30/64, 1.09 c was received. The inspector noted that the license limit for P-32 in this case is two curies and that by the time the second shipment of greater than 1 c was received the first had decayed to less than 1 c. All other receipts were noted to be in a microcurie range, records of receipt were maintained.

Tritium Operations

4. Geiger stated that tritium is used in conjunction with a study of stress and corrosion on various aluminum products. In general, a sample was placed in tritiated water, subjected to stress such that cracks or flaws appear. The tritiated water deposits in these cracks. It then evaporates with the tritium remaining in position and autoradiographs are made.
5. Tritium comes in gaseous form from Oak Ridge. Since the previous inspection, tritium receipts are as follows: 9/9/64, 20 c; 1/7/65 - 30 c. The license limit for tritium is 50 c. The gas tritium gas arrives in glass containers in amounts of 5 c/container. As many as 3 containers are placed in a tin can and are wrapped with soft packing material. ~~and~~ The ampoule is then moved ~~to~~ into a closed glass system, and by means of an electro-magnet as appears in Exhibit "A," the seal to the ampoule is broken and the tritium is released. It is then converted to tritiated water. The enclosed glass system in which this ~~process~~ operation is performed is located inside a hood with a separate exhaust fan. The door to this hood is kept closed during the operation so that in the unlikely event that tritium should escape from the enclosed glass system, it would be drawn up and out of the stack rather than out into the room. Geiger stated that no accidents ^{have} ever happened with the glass ampoules.

6. The H-3 gas is then passed over hot copper oxide into a tube and ^{immersed} ~~emerged~~ in dry ice. It is then collected as tritiated water. The entire operation is carried on in the same glass enclosed system. The tritiated water is frozen with dry ice. After it is frozen, the ^{tritiated ice} ~~ice~~ is placed into a pressure container along with the aluminum sample to be stress analyzed. The water is melted and the glass container, ~~is~~ now sealed, is put into an oven and gently heated. Stress is applied to the aluminum sample until a crack forms. The glass is then put into an alcohol dry ice bath so that the H-3 is again frozen; however, some of the tritium has been absorbed into the flaw or crack and, after it ~~evaluates~~ evaporates, the H-3 remains deposited in this area. An autoradiograph of the sample, which is quite small, is then taken. The oven in which the H-3 is melted as described above is also located in an enclosed hood. Geiger stated that as the ~~a~~ sample is removed from the glass container rubber gloves are worn and ^{the} ~~a~~ sample is removed with tweezers. The sample is then washed with water prior to autoradiograph. A rough calculation was performed at the time of inspection, and it was calculated that approximately 10 uc tritium is deposited in each sample.
7. Also at the facility at the time of inspection were three gauges, ^{None} ~~None~~ of which were installed at that time. One was a nominal 100 mc Co-60 liquid level gauge, the second was a 13.5 mc Sr-90 gauge and the third was a 25 mc Cs-137 gauge. Also on hand and in storage at the time of inspection, were the following: 10 mc C-14, 7 mc Zn-65, 1 mc Ir-192, 1 mc Ce-141, 13.7 mc Co-60, 100 mc Cs-137, 23.25 mc C-14, 580 uc Al-26, 21 mc Sc-46, 20 mc Cr-51, 120 mc Co-60, 3.5 mc Ni-63, 3 mc Zn-65, 276 uc Se-75, 8 mc Sr-90, 90 uc Zr-95, 56 uc Sb-122-124, 190 mc Cs-137, ~~1x~~ .6 mc Ir-192, .3 uc Ce-141, 2.2 mc Ta-182, .1 uc Hf-182, ~~11-uc~~ .9 mc W-85. All this material was noted to be stored behind lead and concrete shielding in a vault.

Surveys

8. Surveys are performed on all incoming shipments according to Geiger. Records are maintained of these surveys. It was noted that ~~the~~ dose rates of incoming shipments have ranged from .5 to 15 mr/hr at a distance of 12" from the package. Some irradiated samples have ranged ~~from~~ to 40 mr/hr at a foot from the package. Surveys are also performed to see if the containers themselves are contaminated. ~~Surveys~~ Radiation surveys are also performed to determine dose rates from unshielded containers. It was noted that some of the samples have ranged from 200 to 400 mr/hr at a foot unshielded. Periodic contamination surveys are performed by Geiger. ^{swaps} ~~Swaps~~ are taken in various areas. They are analyzed for beta-gamma content and also for H-3. Records are maintained and it was noted that no evidence of any contamination problem was recorded.
9. Direct radiation surveys of various areas are also conducted monthly. In fact, in general all the surveys described above are conducted on a monthly basis, Geiger has drawn maps of all areas and records of either contamination levels or dose rates are maintained on these forms.

Leak Tests

10. Leak tests on the various gauges kept in storage are performed by Geiger himself. The licensee's procedures incorporated as part of condition 17 describe leak tests. ^{very part of a} A/small/sponge is dampened and wiped over an accessible surface. The sponge is then counted on an end window GM tube. The scaler is calibrated periodically. Records were examined and it was noted that wipe tests are conducted in December and June. All results are recorded in units of micro-curies and all results were noted to be less than .005 uc contamination.

Personnel Monitoring

11. Both film badges and pocket dosimeters are used. Film badges are supplied by St. John's X-Ray Company. They are changed on a biweekly basis. Geiger said he ~~h~~ adds the dosimeter readings to the beta component of the St. John's readings and uses this total as the whole body dose. He stated he did this because it had been company policy for years. It was noted that film badge records are recorded on Form AEC-5. It was noted that there are five people

on the film badge program. The highest exposures are incurred by [REDACTED] Ex 6
[REDACTED] who ~~ix~~ has received up to 1 rem beta plus gamma in a quarter. His average quarterly doses are approximately 400 mrem. Others on the film badge program have averaged less than 200 mr/quarter.

Urinalysis

12. Geiger stated that when tritium is handled monthly urine samples are collected and submitted to New England Nuclear for analysis. Since the past inspection only two tritium shipments were received, ^{one} in September, which was kept in storage, the latter was received on January 7, 1965. The project, according to Geiger, actually started up again for the first time in three years in December, 1964. He stated the first samples would be sent to New England Nuclear about the middle of January 1965.

Waste Disposal

13. Geiger stated that samples ^{on} which autoradiography has been finished are discarded as radioactive waste. Also discarded are the irradiated material which have been tested after their return from Brookhaven. He stated that since the previous inspection two waste shipments have been sent to Nuclear Engineering Company in Kentucky. They were both sent in 1964, one in April the other in September. A total of 10 mc of miscellaneous material was shipped each time. Records of these transfers are maintained, and were examined as part of the inspection. Contamination surveys and dose rate readings are taken by Geiger and recorded prior to shipping. No evidence of contamination was noted and the dose rate at contact with the containers was always less than 10 mr/hr.

Instrumentation

14. The licensee has at his disposal Nuclear-Chicago count rate meters, and Atomic Accessories H-3 gas monitor, Tracerlab scalers equipped with end window GM tubes, Technical Associates Juno, Nuclear-Chicago Model 1615 Sentinel which is a count rate meter, a Nuclear-Chicago Model 2112 survey meter equipped with an alpha probe, Nuclear-Chicago Model 2612 geiger survey meter with a range of from 0 - 20 mr/hr and a Nuclear-Chicago Model cutie pie, Model 2586, with a range of from 0 - 2500 mr/hr. These are kept functioning according to Geiger by an electronics technician and they are calibrated at approximately six month intervals.

Inspector's Survey

15. The inspector conducted a survey of the laboratory facilities. It was noted that all labs are labeled with the standard "Caution - Radioactive Material" signs and symbols. Form AEC-3 was posted in laboratory areas. A survey was conducted of the storage area which is a combination lead and concrete shielded vault. The room to this vault is kept locked and Geiger retained the key. It was noted that the general dose rate in the room was 5 mr/hr with dose rates of up to 20 mr/hr at contact with the vault. The dose rate ~~at the vault~~ outside of the door to the vault was approximately .5 mr/hr. It was noted all containers were labeled with the standard "Caution - Radioactive Material" signs and symbols and contained information as to kind and quantity of material and date of assay.

Training and Instruction

16. Geiger stated that he trained the people who handled radioactive material. His training and experience ^{are} were on file with various applications for license. He retained copies of the license, all amendments and pertinent parts of the Code of Federal Regulations in his possession.

OPENING GLASS AMPOULES

The following method of opening glass ampoules has been found to be effective at ORNL.

A circular electromagnet which will slip over the tubing enclosing the break seal provides the force necessary to move the iron rod against the break seal.

In practice the ampoule is mounted horizontally and the electromagnet is positioned to pull the iron rod approximately $1/16$ inch past the tip of the break seal when the magnet is energized. The center of the iron rod will not go past the center of the electromagnet.

